



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



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INTERNATIONAL GAMMA RAY ASTROPHYSICS LABORATORY

SPECTROMETER USER MANUAL

INSTRUMENT OPERATIONS

VOLUME 2

| | | | |
|-----------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------|
| Prepared by: | Name: Project Team DSO/ED/DI/SI | Date and Signature: | Secretariat of: DSO/ED/DI/SI |
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| Management configuration | OUI | X |
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| Applicable document | OUI | |
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| Models | SSTM | STM | SEM | EM | FM | ALL | OTHERS |
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FOREWORD

The Spectrometer User's Manual is made up of four volumes:

Volume 1 "Spectrometer Definition"

Provides the instrument description, the different functioning modes at instrument and sub-assembly levels, instrument system budgets. It describes all the interfaces such as mechanical, thermal, electrical data flows and on-board software functioning. A list of each telecommand and telemetry packet and the definition of each parameter are also included.

Volume 2 "Instrument Operations"

Gives all the information needed to operate the spectrometer, particularly a functioning description of some special modes such as eclipse management, cooling management, ..., tables showing equipment temperatures ranges, power consumption, allowed TC's, downlinked TM's according to the running instrument mode. The flight procedures are also given.

Volume 3 "Annexes"

Gathers main documents giving additional information which allows a better understanding of the instrument functioning for example, TM/TC and electrical diagrams, science data format, observer manual inputs, complementary documents of on-board software.

Volume 4 "Data Base Description"

Contains a precise description of each telecommand and telemetry packet, and all parameters characteristics.



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| 4 | 2 | 24/04/01 | Page 80 Page 95 Pages 102, 103 Page 74 Pages 119, 120 Pages 28, 84, 170a, 170b Page 82 Pages 148, 177 Pages 107, 119, 120, 148, 162 Pages 119, 120, 146 | SPI-DM-0-414-CNES - Regularisation SPI-DM-0-434-CNES - Regularisation SPI-DM-0-444-CNES SPI-DM-0B1-457-CNES SPI-DM-0-468-CNES SPI-DM-0-470-CNES SPI-DM-0B-472-CNES - R1 SPI-DM-0-475-CNES SPI-DM-0-477-CNES SPI-DM-0-479-CNES |



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0. INTRODUCTION

0.1. PURPOSE

This document gives all the information needed to operate the spectrometer, particularly a functioning description of some special modes such as eclipse management, cooling management, ..., tables showing equipment temperatures ranges, power consumption, allowed TC's, downlinked TM's according to the running instrument mode. The flight procedures are also given.

0.2. APPLICABLE AND REFERENCE DOCUMENTS

0.2.1. Applicable documents

| | | |
|-----|------------------|-----------------|
| AD1 | ESA-EID-Part A | Issue 1, rev. 5 |
| AD2 | ESA-DV-0-30-CNES | |
| AD3 | INT-RP-AI-0030 | |

0.2.2. Reference documents

| | | |
|------|--------------------------------------------|--------------------|
| RD2 | SPI-Functional Analysis | SPI-NT-0-1100-CNES |
| RD3 | Product Assurance Plan | SPI-PA-0-50-CNES |
| RD4 | Instrument Mission Specification | SPI-SM-0-90-CSCI |
| RD5 | Instrument and System Specification | SPI-ST-0-91-CNES |
| RD6 | General Electrical Specification | SPI-SG-0-80-CNES |
| RD7 | General Mechanical Design Specification | SPI-SG-0-82-CNES |
| RD8 | General Thermal Design Specification | SPI-SG-0-83-CNES |
| RD9 | Electromagnetics Requirements | SPI-SG-0-84-CNES |
| RD10 | General Modelling Specification | SPI-SG-0-85-CNES |
| RD11 | Lower Structure Sub-assembly Specification | SPI-ST-2-1042-CNES |
| RD12 | Mask Sub-assembly Specification | SPI-ST-3-1043-CNES |
| RD13 | Anticoincidence Sub-assembly Specification | SPI-ST-1-1041-CNES |
| RD14 | Specification Technique de Besoin du DFEE | SPI-ST-5-1045-CNES |



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| | | |
|------|----------------------------------------------------------------------------|------------------------|
| RD15 | User Requirement Document for DPE Software | SPI-ST-7-1047-CNES |
| RD16 | Camera Sub-assembly Specification | SPI-ST-4-1044-CNES |
| RD17 | DPE Hardware Specification | INT-SP-AL-0001 |
| RD18 | Instrument Design Report | SPI-DD-1088-CNES |
| RD19 | Specifications of the Integral Spectrometer Finite Element Model Reduction | SPI-SP-0-3023-CNES |
| RD20 | EID-B | SPI-SG-0/SAT-1111-CNES |
| RD21 | SPI Interfaces Specification | SPI-SI-0-1324-CNES |
| RD22 | SPI System Telemetry Budget | SPI-NT-0-13037-CNES |
| RD23 | SPI Science Data Format Specification | SPI-NT-0-2911-CNES |
| RD24 | SPI Instrument and System Geometrical Quality Budget | SPI-NT-0-13067-CNES |

0.3. ACRONYMS

| | |
|------|-----------------------------------|
| AC | Alternative Current |
| ACS | Anti-Coincidence Sub-assembly |
| AFEE | Analogue Front End Electronics |
| AOCS | Attitude and Orbit Control System |
| BCP | Broadcast Pulse |
| CDE | Compressor Drive Electronics |
| CSSW | Common Services Software |
| DC | Direct Current |
| DFEE | Digital Front End Electronics |
| DPE | Data Processing Electronics |
| EOP | End Of Packet |
| EOT | End Of Transmission |
| ESAM | Emergency Sun Acquisition Mode |



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| | |
|------|----------------------------------------------------|
| IREM | Integral Radiation Emission Monitoring |
| HK | HouseKeeping |
| HW | Hardware |
| IASW | Instrument Application Software |
| I/F | Interface |
| IPM | Inertial Pointing Mode |
| ISOC | Integral Science Operations Centre |
| LCR | Lower Collimator Ring |
| LSA | Lower Structure Assembly |
| LSB | Last Significant Bit |
| LSL | Low Speed Line |
| LVPS | Lower Voltage Power Supply |
| LVS | Low Veto Shield |
| MOC | Mission Operation Center |
| MSB | Most Significant Bit |
| OTF | On-Target Flag |
| PDU | Power Distribution Unit |
| PID | Packet Identifier |
| PLM | Pay Load Module |
| PROM | Programmable Read Only Memory |
| PSAC | Plastic Scintillator Anti-Coincidence Sub-assembly |
| PSD | Pulse Shape Discriminator |
| PWM | Pulse Width Modulation |
| RAM | Random Access Memory |
| RTU | Remote Terminal Unit |



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| | |
|-------|--------------------------|
| S/A | Sub-Assembly |
| S/C | SpaceCraft |
| SOP | Start Of Packet |
| SSA | Side Shield Assembly |
| SVM | SerVice Module |
| TBD | To Be Defined |
| TBW | To Be Written |
| TM/TC | TeleMetry/TeleCommand |
| UCR | Upper Collimator Ring |
| VCU | Veto-Shield Control Unit |



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1. INSTRUMENT OPERATIONS

1.1. SPECIAL OPERATIONAL PROCESSES

This chapter gives an overview of the main information which is needed to understand the functioning and to operate the Spectrometer by means of several tables.

The first group concerns the operational modes, the second, the telecommands and telemetry, the third one, the power consumption, the fourth, temperatures and voltages ranges. On-board software maintenance and telecommand verification philosophy are described.

Table 1.1: shows the relation between the spacecraft modes, the payload modes and the spectrometer modes. It also shows the kind of commands (ground, coming from the DPE or spacecraft commanded) to pass from one mode to the other. The thermal control status is indicated.

Table 1.2: shows the relation between the spectrometer modes and the sub-assemblies modes including Cryocoolers ones. For each spectrometer mode, one or several S/A modes can be possible or allowed.

Table 1.3: for each spectrometer mode, the S/A and heaters electrical status are indicated.

Table 1.4: this table sums up the telecommands which are allowed to be sent according to the spectrometer modes.

Table 1.5: this table shows the different telemetry packets downlinked according to the spectrometer modes.

Table 1.6: this table shows the power consumption of the heaters.

Table 1.7: this table shows the minimum or maximum power consumption for each power line in the nominal case according to the spectrometer modes.

Table 1.8: this table gives the temperature variation range of each equipment or part of equipment which is checked by thermal sensors according to the spectrometer modes. This information is transmitted either through PLM RTU, SVM RTU, DPE miniRTU or monitored by sub-assemblies themselves.

Table 1.9: this table indicates the possible current and voltage variation range of some equipment also according to the spectrometer modes.

Figure 1.1: these drawings give an idea of the different sensors location.

Note: Tables 1.6, 1.7, 1.8 and 1.9: the values indicated represent the maximum variation range for each parameter according to the running mode. It is the first assessment of the extreme limit values that must not be exceeded. All these parameters shall be monitored and checked at MOC. The different operational alert limits will be defined later.



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1.1.1. Instrument/sub-assemblies modes/electrical status overview

| SPACECRAFT MODES/ MISSION PHASES | PAYLOAD MODES | SPECTROMETER MODES | CMD TYPE | Thermal control |
|-------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------|
| Launch | OFF | Launch (compressor clamping) | G | OFF |
| Commissioning Servicing | Commissioning (partially ON) | Inactive Outgassing Heat pipe thaw Cooling Stand-by Configuration Operational | G G G G C/G C/G C/G | ON |
| | Servicing or Diagnostic | Inactive (1) Heat pipe thaw Cooling Stand-by Configuration Annealing Calibration Diagnostic | G G G C/G C/G G C/G C/G | ON |
| | Radiation belts | Stand-by Configuration Inactive (1) | C/G C/G G | ON |
| Eclipse | (pre-eclipse) | Stand-by | C/G | ON |
| | Eclipse | Eclipse Inactive (2) | S/G G | antifreezes ON ON |
| Operating | Nom-Observation Nom-Observation On Target Slew | Stand-by Configuration Operational Inactive (1) | C/G C/G C/G G | ON |
| | Radiation belts | Configuration Stand-by Inactive (1) | C/G C/G G | ON |
| Contingency | ESAM (3) | Configuration Inactive (1) | C G | ON |
| | DNEL | Inactive | S | OFF |

See notes at the following page

Table 1.1 - SPI Modes Summary



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Legend: C Commanded by DPE (Broadcast Packet Dependent)
G Ground controlled
S Spacecraft System commanded (including Time Tagged Cmds)

- (1) Only in case of SPI major failure
- (2) Only in case of SPI major failure or eclipse during commissioning phase
- (3) SPI stays in the current mode except for Diagnostic, Operational and Calibration for which it will be put in Configuration mode



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| SPI Mode | Mode | | | | | | | | | | | | | |
|-------------------------|---------------------------|------------------------------|----------------------|------------------------------|-----------------------|---------------------------|-------------------------|-----------------------|-------------------------------------------|----------------------|------------------------------|-----------------------|-----------------------|----|
| | Launch | Mode 0 Launch ECL(E⇒S) | Mode 1 Inactive | Mode 2 Heat Pipes Thaw | Mode 3 Cooling | Mode 4 Stand-by | Mode 5 Configuration | Mode 6 Operational | Mode 7 Eclipse LP/NP ⁽¹⁾ | Mode 8 Annealing | Mode 9 PSD calibration | Mode 10 Diagnostic | Mode 11 Outgassing | |
| DFEE | | | | Stdby ⁽²⁾ | Conf | Stdby ⁽²⁾ | Conf ⁽²⁾ | Oper | | Conf | Oper | Diag ⁽²⁾ | Conf | |
| AFEE Analog chains | | | | ON ⁽²⁾ | ON | ON ⁽²⁾ | ON ⁽²⁾ | ON | | ON | ON | ON ⁽²⁾ | ON | |
| Detectors High voltages | | | | | | | ON ⁽³⁾ | ON | | | ON | ON | | |
| AFEE TM/TC | | | | Stdby | Conf | Stdby ⁽²⁾ | Conf ⁽²⁾ | Oper | | Conf | Oper | Diag ⁽²⁾ | Conf | |
| ACS / PSAC | | | | Stdby ⁽²⁾ | Conf | Stdby ⁽²⁾ | Conf ⁽²⁾ | Oper | | Conf | Oper | Diag ⁽²⁾ | Conf | |
| PMT High voltages | | | | | OFF/ON | | ON ⁽³⁾ | ON | | OFF/ON | ON | ON ⁽²⁾ | OFF/ON | |
| PSD | | | | Stdby ⁽²⁾ | Conf | Stdby ⁽²⁾ | Conf ⁽²⁾ | Oper | | Conf | Cal | Diag ⁽²⁾ | Conf | |
| Cryocooler + CDE 1 | LLM | LLM | Stdby ⁽⁴⁾ | Oper/Stdby ⁽²⁾ | Oper | Oper/Stdby ⁽²⁾ | Oper ⁽²⁾ | Oper | Oper | Stdby ⁽⁴⁾ | Oper | Oper ⁽²⁾ | Stdby ⁽⁴⁾ | |
| Cryocooler + CDE 2 | LLM | LLM | Stdby ⁽⁴⁾ | Oper/Stdby ⁽²⁾ | Oper | Oper/Stdby ⁽²⁾ | Oper ⁽²⁾ | Oper | Oper | Stdby ⁽⁴⁾ | Oper | Oper ⁽²⁾ | Stdby ⁽⁴⁾ | |
| CDE heater A | | Enable | ON | ON | ON | ON | ON | ON | OFF ON | ON | ON | ON | ON | |
| CDE heater B | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | |
| Compressors heater A | Enable | ON | ON | Enable ⁽²⁾ | Enable | Enable ⁽²⁾ | Enable ⁽²⁾ | Enable | Enable | ON | Enable | Enable ⁽²⁾ | ON | |
| Compressors heater B | | | | | | | | | | | | | | |
| Thermal | Heat pipes thaw M | | | ON | | | | | | ON | | | ON | |
| | Annealing 1 | | | | | | | | | ON | | | ON | |
| | Anti-freeze 1 M | | | ON | | ON | ON | ON | ON | | ON | ON ⁽²⁾ | OFF | |
| | Anti-freeze 2 M | | | ON | | ON | ON | ON | ON | | | | OFF | |
| | Compensation heater M | | ON | ON | ON | ON | ON | ON | OFF ON | | ON | ON | | |
| | Mask ACS heaters M | | ON | ON | Enable ⁽²⁾ | Enable | Enable ⁽²⁾ | Enable | Enable | OFF ON | Enable | Enable | Enable ⁽²⁾ | |
| | AFEE, DFEE, PSD heaters M | | ON | ON | Enable ⁽²⁾ | Enable | Enable ⁽²⁾ | Enable | Enable | OFF ON | Enable | Enable | Enable ⁽²⁾ | |
| | Heat pipes thaw R | | | | | | | | | ON | | | ON | |
| | Annealing 2 | | | | | | | | | ON | | | ON | |
| | Anti-freeze 1 R | | | | | | | | | | | | | |
| Control | Anti-freeze 2 R | | | | | | | | | | | | | |
| | Compensation heater R | | | | | | | | | | | | | |
| | Mask ACS heaters R | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | |
| | AFEE, DFEE, PSD heaters R | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | Enable | |
| | DPE | | | OFF/ON | ON | ON | ON | ON | ON | ON | ON | ON | ON | ON |
| IASW | | | OFF/Stdby | Stdby ⁽²⁾ | Conf | Stdby ^{1/2} | Conf | Oper | Stdby1/Stdby2 | Conf | Cal | Diag | Conf | |
| PLM RTU | ON | ON | ON | ON | ON | ON | ON | ON | ON | ON | ON | ON | ON | |
| PLM status | ON | ON | OFF/ON | ON | ON | ON | ON | ON | ON | ON | ON | ON | ON | |

(1) Means Low power sub-mode and Normal power.

(2) The electrical status ON/OFF state is in accordance with the required configuration and the heaters can consume only if the electrical state of the corresponding S/A is OFF.

(3) The PMT and GE high voltages will be switched ON in this mode. But they can be ON or OFF depending on the required configuration.

(4) The cryocoolers Stand-by mode here corresponds to the Stand-by with the Compressors and Displacers disable (The compressor and displacer motors are free to move).

= LCL ON and transistor ON if exist. Enable = LCL ON but the thermostat shall be open.

Table 1.2 - Sub-Assembly Modes

| → | Mode 0 Launch | Mode 1 Inactive | Mode 2 Thaw | Mode 4 Stand-by | Mode 3 Cooling | Mode 5 Configuration | Mode 6 Operational | | Mode 7 Eclipse | Mode 8 Annealing | Mode 9 Calibration | Mode 10 Diagnostic | Mode 11 Outgassing |
|---------------|------------------|--------------------|----------------|--------------------|-------------------|-------------------------|-----------------------|--------------|-------------------|---------------------|-----------------------|-----------------------|-----------------------|
| | | | | | | | Photon/ Photon | TM Emergency | | | | | |
| OFF | 1 | 2 (G) | | | | | | | | | | | |
| Inactive | | | 3 (G) | 4 (G) | | | | | | | | | |
| Thaw | | 5 (G) | | 5 (G) | | | | | | | | | |
| Stand-by | | 6 (G) | 3 (G) | | 7 (G) | 8 (C/G)/ 17 (G) | | | 9 (S/C/G) | 10 (G) | | | 19 (G) |
| Cooling | | | | | 11 (G) | | | | | | | | |
| Configuration | | | | | 12 (C/G) | | | 13-P (C/G) | 13-E (C/G) | | | 14 (C/G) | 15 (C/G) |
| Operational | | | | | 12 (C/G) | | 16 (C/G) | | | | | | |
| Eclipse | | | | | 9 (S/C/G) | | | | | | | | |
| Annealing | | | | | 18 (G) | | | | | | | | |
| Calibration | | | | | 12 (C/G) | | 16 (C/G) | | | | | | |
| Diagnostic | | | | | 12 (C/G) | | 16 (C/G) | | | | | | |
| Outgassing | | | | | 20 (G) | | | | | | | | |

Legend: C Command by DPE (Broadcast Packet Dependent)
 G Ground controlled
 S Spacecraft System commanded (including Time tagged Cmds)
 Number are related to the procedures.

Table 1.3 - Instrument Mode Transition Diagram



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1.1.2. Telecommands and telemetry w.r.t. instrument modes

Warning: The following tables indicate the allowed telecommands with regard to the instrument modes. Actually, in operational context, these telecommands could be accepted or rejected according to the IASW status (protected, commanded or reconfigured).

| SPI modes | APID | Type | Sub-type | DB packet Ident | Category | Purpose |
|----------------------|------|------|----------|-----------------|-----------------------------------------------|-----------------------------------------------|
| Launch | 129 | 2 | 2 | E9960-E9967 | Load task parameters | Cryocoolers + CDE setting (Engine 1) (1) |
| | 129 | 2 | 2 | E9980-E9987 | | Cryocoolers + CDE setting (Engine 2) (1) |
| | TBD | TBD | TBD | P3030 P3031 | | CDE 1 power OFF/ON (1) |
| | | | | P3270-P3271 | | CDE 2 power OFF/ON (1) |
| | | | | T5000-T5001 | | Compressor heater Engine 1 OFF/ON (1) |
| | | | | T5100-T5101 | | Compressor heater Engine 2 OFF/ON (1) |
| | | | | T5575-T5576 | | CDE 1 heater OFF/ON (1) |
| | | | | T5675-T5676 | | CDE 2 heater OFF/ON (1) |
| Inactive | | | | | | All cryocoolers and thermal management TC (1) |
| Thaw | | | | | | All cryocoolers and thermal management TC (1) |
| Cooling | | | | | | All cryocoolers and thermal management TC (1) |
| Stand-by | 1024 | 5 | 5 | E9024 | IASW and S/A set up | SPI DPE1 mode transition to nominal (CSSW) |
| | 1025 | 5 | 5 | E0500 | | IASW ON-OFF configuration |
| | 1025 | 5 | 5 | E0502 | IASW test | Change to Configuration Mode |
| | 1025 | 5 | 4 | E0525 | | Request for IASW ON-OFF status |
| | 1025 | 13 | 1 | E0517 | | Right TC acceptance |
| | 1025 | 5 | 3 | E0518 E0519 | | IASW configuration |
| | 1025 | 5 | 4 | E0523 E0524 | | IASW configuration request |
| | 1025 | 5 | 3 | E0581 E0586 | | Diagnostic parameters setting |
| | 1025 | 5 | 4 | E0591 E0596 | | Diagnostic parameter request |
| | 1025 | 5 | 4 | E0011-E0014 | | AFEE configuration request |
| | 1025 | 5 | 4 | E0020-E0031 | | AFEE HK data request |
| | 1025 | 5 | 4 | E0251-E0272 | | ACS configuration request |
| | 1025 | 5 | 4 | E0280-E0290 | | ACS HK data request |
| | 1025 | 5 | 4 | E0320-E0329 | | PSD configuration request |
| | 1025 | 5 | 4 | E0342-E0343 | | PSD HK data request |
| | 1025 | 5 | 4 | E0111-E0113 | | DFEE configuration request |
| | | | | | All cryocoolers and thermal management TC (1) | |
| Configuration | 1025 | 5 | 3 | E0001-E0004 | Load task parameters | AFEE configuration |
| | 1025 | 5 | 3 | E0101-E0103 | | DFEE configuration |
| | 1025 | 5 | 3 | E0201-E0224 | | ACS configuration |
| | 1025 | 5 | 3 | E0300-E0309 | | PSD configuration |
| | 1025 | 5 | 3 | E0518 E0519 | | IASW configuration |
| | 1025 | 5 | 3 | E0556 | | All configurations sending |
| | 1025 | 5 | 3 | E0581-E0586 | | Diagnostic parameters setting |
| | 1025 | 5 | 4 | E0011-E0014 | Report task parameters | AFEE configuration request |

Table 1.4 - Telecommands Allowed w.r.t. Instrument Modes

| SPI modes | APID | Type | Sub-type | DB packet Ident | Category | Purpose |
|----------------------------------|------|------|----------|-------------------|------------------------|-----------------------------------------------|
| | 1025 | 5 | 4 | E0020-E0031 | | AFEE HK data request |
| | 1025 | 5 | 4 | E0111-E0113 | | DFEE configuration request |
| | 1025 | 5 | 4 | E0251-E0272 | | ACS configuration request |
| | 1025 | 5 | 4 | E0280-E0290 | | ACS HK data request |
| | 1025 | 5 | 4 | E0320-E0329 | | PSD configuration request |
| | 1025 | 5 | 4 | E0342-E0343 | | PSD HK data request |
| | 1025 | 5 | 4 | E0523-E0525 | | IASW configuration request |
| | 1025 | 5 | 4 | E0591-E0596 | | Diagnostic configuration request |
| | 1025 | 5 | 5 | E0501 | Change mode | Change to Operational Photon/Photon |
| | 1025 | 5 | 5 | E0503 | | Change to PSD Calibration Mode |
| | 1025 | 5 | 5 | E0504 | | Change to Diagnostic Mode |
| | 1025 | 5 | 5 | E0505 | | Back to Stand-by Mode |
| | 1025 | 5 | 5 | E0506 | | Change to TM Emergency Mode |
| | 1025 | 6 | 1 | E0507-E0512 | Load memory | For sub-assemblies |
| | 1025 | 6 | 1 | E0557 | | All patches sending |
| | 1025 | 6 | 2 | E0513-E0515 E0521 | Dump memory | For sub-assemblies |
| | 1025 | 6 | 1 | E0516 | Reset memory | For IASW |
| | 1025 | 5 | 1 | E0566 | Start task | Start ACS calibration |
| | 1025 | 5 | 4 | E0567 | Report task parameters | Request ACS calibration data |
| | 1025 | 5 | 1 | E0563 E0564 E0565 | Start task | Start task S/W maintenance |
| | 1025 | 5 | 2 | E0573 E0574 E0575 | Stop task | Stop task S/W maintenance |
| | | | | | | All cryocoolers and thermal management TC (1) |
| Operational Photon/Photon | 1025 | 5 | | E0502 | Change mode | Back to Configuration Mode |
| | 1025 | 5 | 5 | E0505 | | Back to Stand-by Mode |
| | 1025 | 5 | 3 | E0518 E0519 | | IASW configuration |
| | 1025 | 5 | 4 | E0523-E0525 | | IASW configuration request |
| | 1025 | 5 | 4 | E0011-E0014 | | AFEE analogue chains configuration request |
| | 1025 | 5 | 4 | E0020-E0031 | | AFEE HK data request |
| | 1025 | 5 | 4 | E0251-E0272 | | ACS configuration request |
| | 1025 | 5 | 4 | E0280-E0290 | | ACS HK data request |
| | 1025 | 5 | 4 | E0320-E0329 | | PSD configuration request |
| | 1025 | 5 | 4 | E0342-E0343 | | PSD HK data request |
| | 1025 | 5 | 4 | E0111-E0113 | | DFEE configuration request |
| | | | | | | All cryocoolers and thermal management TC (1) |

Table 1.4 - Telecommands Allowed w.r.t. Instrument Modes (cont'd)

| SPI modes | APID | Type | Sub-type | DB packet Ident | Category | Purpose | |
|---------------------------------|------|------|----------|-----------------|----------------------------|-----------------------------------------------|-------------------------------|
| Operational TM Emergency | 1025 | 5 | 5 | E0502 | Change mode | Back to Configuration Mode | |
| | 1025 | 5 | 5 | E0505 | | Back to Stand-by Mode | |
| | 1025 | 5 | 3 | E0518 E0519 | | IASW configuration | |
| | 1025 | 5 | 4 | E0523-E0525 | | IASW configuration request | |
| | 1025 | 5 | 4 | E0011-E0014 | | AFEE analogue chains configuration request | |
| | 1025 | 5 | 4 | E0020-E0031 | | AFEE HK data request | |
| | 1025 | 5 | 4 | E0251-E0272 | | ACS configuration request | |
| | 1025 | 5 | 4 | E0280-E0290 | | ACS HK data request | |
| | 1025 | 5 | 4 | E0320-E0329 | | PSD configuration request | |
| | 1025 | 5 | 4 | E0342-E0343 | | PSD HK data request | |
| | | | | E0111-E0113 | DFEE configuration request | | |
| | | | | | | All cryocoolers and thermal management TC (1) | |
| Eclipse | 1025 | 5 | 4 | E0555 | | Eclipse exit (TBC) CR to be accepted | |
| Annealing | | | | | | All cryocoolers management TC (1) | |
| PSD calibration | 1025 | 5 | 3 | E0310-E0316 | Load task parameters | PSD calibration curves loading | |
| | 1025 | 5 | 5 | E0502 | Change mode | Back to Configuration Mode | |
| | 1025 | 5 | 5 | E0505 | | Back to Stand-by Mode | |
| | 1025 | 5 | 3 | E0518 E0519 | | IASW configuration | |
| | 1025 | 5 | 4 | E0523-E0525 | | IASW configuration request | |
| | 1025 | 5 | 4 | E0011-E0014 | | AFEE analogue chains configuration request | |
| | 1025 | 5 | 4 | E0020-E0031 | | AFEE HK data request | |
| | 1025 | 5 | 4 | E0251-E0272 | | ACS configuration request | |
| | 1025 | 5 | 4 | E0280-E0290 | | ACS HK data request | |
| | 1025 | 5 | 4 | E0320-E0329 | | PSD configuration request | |
| | 1025 | 5 | 4 | E0342-E0343 | | PSD HK data request | |
| | 1025 | 5 | 4 | E0111-E0113 | | DFEE configuration request | |
| | 1025 | 5 | 4 | E0566 | | Start task | Start ACS calibration process |
| | 1025 | 5 | 4 | E0567 | | Report task parameters | Request ACS calibration data |
| | | | | | | All cryocoolers and thermal management TC (1) | |

Table 1.4 - Telecommands Allowed w.r.t. Instrument Modes (cont'd)

| SPI modes | APID | Type | Sub-type | DB packet Ident | Category | Purpose |
|-------------------|------|------|----------|-------------------|------------------------|-----------------------------------------------|
| Diagnostic | 1025 | 6 | 2 | E0513-E0515 E0521 | Dump memory | For sub-assemblies |
| | 1025 | 5 | 5 | E0502 | Change mode | Back to Configuration Mode |
| | 1025 | 5 | 5 | E0505 | | Back to Stand-by Mode |
| | 1025 | 5 | 3 | E0518 E0519 | | IASW configuration |
| | 1025 | 5 | 4 | E0523-E0525 | | IASW configuration request |
| | 1025 | 5 | 4 | E0011-E0014 | | AFEE analogue chains configuration request |
| | 1025 | 5 | 4 | E0020-E0031 | | AFEE HK data request |
| | 1025 | 5 | 4 | E0251-E0272 | | ACS configuration request |
| | 1025 | 5 | 4 | E0280-E0290 | | ACS HK data request |
| | 1025 | 5 | 4 | E0320-E0329 | | PSD configuration request |
| | 1025 | 5 | 4 | E0342-E0343 | | PSD HK data request |
| | 1025 | 5 | 4 | E0111-E0113 | | DFEE configuration request |
| | 1025 | 5 | 1 | E0566 | Start task | Start ACS calibration process |
| | 1025 | 5 | 4 | E0567 | Report task parameters | Request ACS calibration data |
| Outgassing | | | | | | All cryocoolers and thermal management TC (1) |

Table 1.4 - Telecommands Allowed w.r.t. Instrument Modes (cont'd)

| SPI modes | APID | Type | Sub-type | DB packet Ident | Category | Purpose | |
|----------------------------------|------|------|----------|---------------------|------------------------|-----------------------------------------------------------|----------------------------|
| Launch | | | | | | | |
| Inactive | | | | | | | |
| Thaw | | | | | | | |
| Cooling | (1) | | | | Cyclical TM | HK parameters | |
| Stand-by | 1024 | 1 | 8 | | Cyclical TM (1) | CSSW Housekeeping parameters (1) | |
| | 1025 | 1 | 5 | 60011 | | HK parameters downlinked every 8 s (1) | |
| | 1025 | 1 | 6 | 60060 | | HK parameters downlinked every 64 s (1) | |
| | 1025 | 1 | 7-8 | 60601, 60602 | | HK parameters downlinked every 640 s (1) | |
| | 1025 | 1 | 9-10-11 | 63841, 63842, 63843 | | HK parameters downlinked every 3840 s (1) | |
| | 1029 | 5 | 4 | 64041 | | Report task parameters | S/A ON/OFF configuration |
| | 1029 | 5 | 4 | 64000-64040 64046 | | | S/A and IASW configuration |
| | 1029 | 5 | 4 | 64640-64664 | | S/A HK data | |
| Configuration | (1) | | | | Cyclical TM | HK parameters | |
| | 1029 | 5 | 4 | 64000-64040 64046 | Report task parameters | S/A and IASW configuration | |
| | 1029 | 5 | 4 | 64640-64664 | | S/A HK data | |
| | 1030 | 6 | 2 | 64042-64045 | | S/A dump memory | |
| | 1105 | 5 | 4 | 64700 | Report task parameters | ACS calibration data (184 packets) | |
| | 1029 | 5 | 4 | 64041 | | S/A ON/OFF configuration | |
| | 1029 | 5 | 4 | 64901-64906 | | Diagnostic parameters configuration | |
| Operational Photon/Photon | (1) | | | | Cyclical TM | HK parameters | |
| | 1120 | 2 | 0 | 60000 | HK Science TM | DFEE counters 1 st and 2 nd seconds | |
| | 1121 | 2 | 1 | 60001 | | DFEE counters 3 rd and 4 th seconds | |
| | 1122 | 2 | 2 | 60002 | | DFEE counters 5 th and 6 th seconds | |
| | 1123 | 2 | 3 | 60003 | | DFEE counters 7 th and 8 th seconds | |
| | 1124 | 2 | 4 | 60004 | | DFEE counters 1 st to 8 th seconds | |
| | 1088 | 0 | 0 | 61000 | Science TM | Photon/Photon in nominal mode | |
| | 1104 | 1 | 0 | 61100 | | Spectra | |
| | 1029 | 5 | 4 | 64700 | Report task parameters | ACS calibration data (184 packets) | |
| | 1029 | 5 | 4 | 64041 | | S/A ON/OFF configuration | |
| | 1029 | 5 | 4 | 64000-64040 64046 | | S/A and IASW configuration | |
| | 1029 | 5 | 4 | 64640-64664 | | S/A HK data | |

Table 1.5 - Telemetry Downlinked Allowed w.r.t. Instrument Modes

| SPI modes | APID | Type | Sub-type | DB packet Ident | Category | Purpose |
|---------------------------------|------|------|----------|-------------------|------------------------|-----------------------------------------------------------|
| Operational TM Emergency | (1) | | | | Cyclical TM | HK parameters |
| | 1120 | 2 | 0 | 60000 | HK Science TM | DFEE counters 1 st and 2 nd seconds |
| | 1121 | 2 | 1 | 60001 | | DFEE counters 3 rd and 4 th seconds |
| | 1122 | 2 | 2 | 60002 | | DFEE counters 5 th and 6 th seconds |
| | 1123 | 2 | 3 | 60003 | | DFEE counters 7 th and 8 th seconds |
| | 1124 | 2 | 4 | 60004 | | DFEE counters 1 st to 8 th seconds |
| | 1089 | 0 | 1 | 61001 | Science TM | Photon/Photon in Emergency TM mode |
| | 1105 | 1 | 1 | 61101 | | Spectra |
| | 1029 | 5 | 4 | 64041 | Report task parameters | S/A ON/OFF configuration |
| | 1029 | 5 | 4 | 64000-64040 64046 | | S/A and IASW configuration |
| | 1029 | 5 | 4 | 64640-64664 | | S/A HK data |
| | 1029 | 5 | 4 | 64700 | | ACS calibration data (184 packets) |
| Eclipse | | | | | | TBD |
| Annealing | (1) | | | | Cyclical TM | HK parameters |
| PSD calibration | (1) | | | | Cyclical TM | HK parameters |
| | 1090 | 0 | 2 | 61002 | Science TM | Photon/Photon in calibration mode |
| | 1029 | 5 | 4 | 61101 | | Spectra |
| | 1120 | 2 | 0 | 60000 | HK Science TM | DFEE counters 1 st and 2 nd seconds |
| | 1121 | 2 | 1 | 60001 | | DFEE counters 3 rd and 4 th seconds |
| | 1122 | 2 | 2 | 60002 | | DFEE counters 5 th and 6 th seconds |
| | 1123 | 2 | 3 | 60003 | | DFEE counters 7 th and 8 th seconds |
| | 1124 | 2 | 4 | 60004 | | DFEE counters 1 st to 8 th seconds |
| | 1029 | 5 | 4 | 64700 | Report task parameters | ACS calibration data (184 packets) |
| | 1029 | 5 | 4 | 64041 | | S/A ON/OFF configuration |
| | 1029 | 5 | 4 | 64000-64040 64046 | | S/A and IASW configuration |
| | 1029 | 5 | 4 | 64640-64664 | | S/A HK data |

Table 1.5 - Telemetry Downlinked Allowed w.r.t. Instrument Modes (cont'd)

| SPI modes | APID | Type | Sub-type | DB packet Ident | Category | Purpose |
|-------------------------|------|------|-------------|-------------------|----------------------------|-----------------------------------------------------------|
| Diagnostic (TBD) | (1) | | | | | |
| | 1025 | 1 | 12 | 64844 | Cyclical TM | HK parameters |
| | 1030 | 6 | 2 | 64042-64045 | Cyclical TM | Diagnostic parameters configuration |
| | 1091 | 0 | 3 | 61003 | Report task parameters | S/A dump memory |
| | 1120 | 2 | 0 | 60000 | Science TM | Photon/Photon in diagnostic mode |
| | 1121 | 2 | 1 | 60001 | | DFEE counters 1 st and 2 nd seconds |
| | 1122 | 2 | 2 | 60002 | | DFEE counters 3 rd and 4 th seconds |
| | 1123 | 2 | 3 | 60003 | | DFEE counters 5 th and 6 th seconds |
| | 1124 | 2 | 4 | 60004 | | DFEE counters 7 th and 8 th seconds |
| | 1104 | 1 | 0 | 61100 | Science TM | DFEE counters 1 st to 8 th seconds |
| | 1029 | 5 | 4 | 64700 | Report task parameters | Spectra |
| | 1029 | 5 | 4 | 64041 | | ACS calibration data (184 packets) |
| | 1029 | 5 | 4 | 64000-64040 64046 | | S/A ON/OFF configuration |
| 1029 | 5 | 4 | 64640-64664 | | S/A and IASW configuration | |
| 1136-1147 | 3 | 0-11 | 61136-61147 | | S/A HK data | |
| | | | | | | Diagnostic telemetry |
| Outgassing | (1) | | | | Cyclical TM | HK parameters |

(1) means all cyclical Telemetry

Table 1.5 - Telemetry Downlinked Allowed w.r.t. Instrument Modes (cont'd)



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1.1.3. Power consumption

| Equipment | Power Min (26.5 V) | Power Max (28.5 V) |
|------------------------------------|--------------------|--------------------|
| PSD Thermal Control | 0 / 10.13 W | 0 / 11.73 W |
| AFEE1 Thermal Control | 0 / 26.47 W | 0 / 30.67 W |
| AFEE2 Thermal Control | 0 / 26.6 W | 0 / 30.79 W |
| DFEE Thermal Control | 0 / 10.12 W | 0 / 11.75 W |
| ACS Thermal Control | 0 / 45.68 W | 0 / 53.42 W |
| Mask Thermal Control | 0 / 10.56 W | 0 / 12.25 W |
| Compressors heaters powered by PLM | 0 / 86.97 W | 0 / 104.69 W |
| Heat pipes thaw heaters | 0 / 37.22 W | 0 / 44.80 W |
| Annealing heaters | 0 / 14.24 W | 0 / 17.15 W |
| Anti-freeze 1 heater | 0 / 12.52 W | 0 / 15.07 W |
| Anti-freeze 2 heater | 0 / 6.25 W | 0 / 7.53 W |
| Compensation heaters | 0 / 36.2 W | 0 / 43.6 W |

Table 1.6 - Heaters Consumption Range (Peak)

| Spectrometer Power lines Consumption (Min / Max in Watts) | | Mode 0 | Mode 1 | Mode 2 | Mode 3 | Mode 4 | Modes 5 6 9 10 | Mode 7 | Mode 8 | Mode 11 |
|-----------------------------------------------------------------|-----------------|--------|--------------|----------------|---------------|---------------|-------------------|---------------|---------------|---------------|
| | | Launch | Inactive | Thawing | Cooling | Stand-by | Operational | Eclipse | Annealing | Outgassing |
| | | | | PLM PDU | | | | | | |
| 3A2-4: DFEE | | | | 6,16 / 8,65 | 6,16 / 8,65 | 6,16 / 8,65 | 6,16 / 8,65 | | 6,16 / 8,65 | 6,16 / 8,65 |
| 3A2-6: AFEE Analogue chains | | | | 55,46 / 61,62 | 57,98 / 64,39 | 55,46 / 61,62 | 59,38 / 65,94 | | 57,98 / 64,39 | 57,98 / 64,39 |
| 3A1-1: AFEE TM/TC | | | | 3,92 / 4,93 | 4,2 / 5,24 | 3,92 / 4,93 | 4,2 / 5,24 | | 4,2 / 5,24 | 4,2 / 5,24 |
| 3A1-3: ACS | | | | 35,56 / 39 | 49,96 / 61,01 | 35,56 / 39 | 49,96 / 61,01 | | 49,96 / 61,01 | 49,96 / 61,01 |
| 3A2-5: PSD | | | | 10,36 / 12,01 | 10,36 / 12,01 | 10,36 / 12,01 | 10,36 / 12,01 | 10,36 / 12,01 | 10,36 / 12,01 | 10,36 / 12,01 |
| 2A2-6: DFEE, PSD, AFEE heaters | | | 43,7 / 73,4 | | | | | | | |
| 4A2 Nominal | Heat Pipes Thaw | | | 38 / 38 | | | | | | 38 / 38 |
| | Annealing | | | | | | | | 4,8 / 14,29 | |
| | Anti-freeze 1 | | 8,76 / 13,3 | | 8,76 / 13,3 | 8,76 / 13,3 | 7,7 / 13,3 | 8 / 13,3 | 5,2 / 13,3 | |
| | Anti-freeze 2 | | 0 / 5,8 | | 0 / 5,8 | 0 / 5,8 | | 0 / 5,8 | 2 / 5,8 | |
| ACS + Mask heaters | | | 45,4 / 65,7 | | | | | | | |
| Total line 4A2 | | | 54,16 / 75,8 | 38 / 38 | 8,76 / 19,1 | 8,76 / 19,1 | 7,7 / 13,3 | 8 / 19,1 | 12 / 33,4 | 38 / 38 |
| 4B2: Heat Pipes Thaw | | | | | | | | | | 38,7 / 38 |
| 4B2: Annealing | | | | | | | | | 4,8 / 14,29 | 14,3 / 14,29 |
| 2A1-3: Compressors heaters | | | 79,5 / 86,91 | | | | | | 70,5 / 86,91 | 78 / 86,91 |
| 4A2: Compression heaters | | | | 37 / 37 | 37 / 37 | 37 / 37 | 37 / 37 | | | |
| | | | | SVM PDU | | | | | | |
| Nominal: Cryocooler + CDE (nominal case) | | TBD | 12 | 54,2 / 114,8 | 54,2 / 114,8 | 54,2 / 114,8 | 54,2 / 114,8 | 54,2 / 114,8 | 12 / 12 | 0 |
| Redundant: Cryocooler + CDE (nominal case) | | TBD | 12 | 54,2 / 121 | 54,2 / 121 | 54,2 / 121 | 54,2 / 121 | 54,2 / 121 | 12 / 12 | 0 |
| Total SVM lines | | 239 | 24 | 108,4 / 152,6 | 108,4 / 152,6 | 108,4 / 152,6 | 108,4 / 152,6 | 108,4 / 152,6 | 24 / 24 | 0 |
| Nominal: Cryocooler + CDE (failure case) | | NA | 12 | 0 | 0 | 0 | 0 | 0 | 12 | 0 |
| Redundant: Cryocooler + CDE (failure case) | | NA | 0 | 333 | 333 | 333 | 333 | 128 | 0 | 0 |
| Total SVM lines | | NA | 12 | 333 | 333 | 333 | 333 | 128 | 12 | 0 |

Table 1.7 - Power Consumption Range (Peak) for Each Instrument Mode



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Table 1.9 – deleted



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Table 1.10 deletedTable 1.10 deleted

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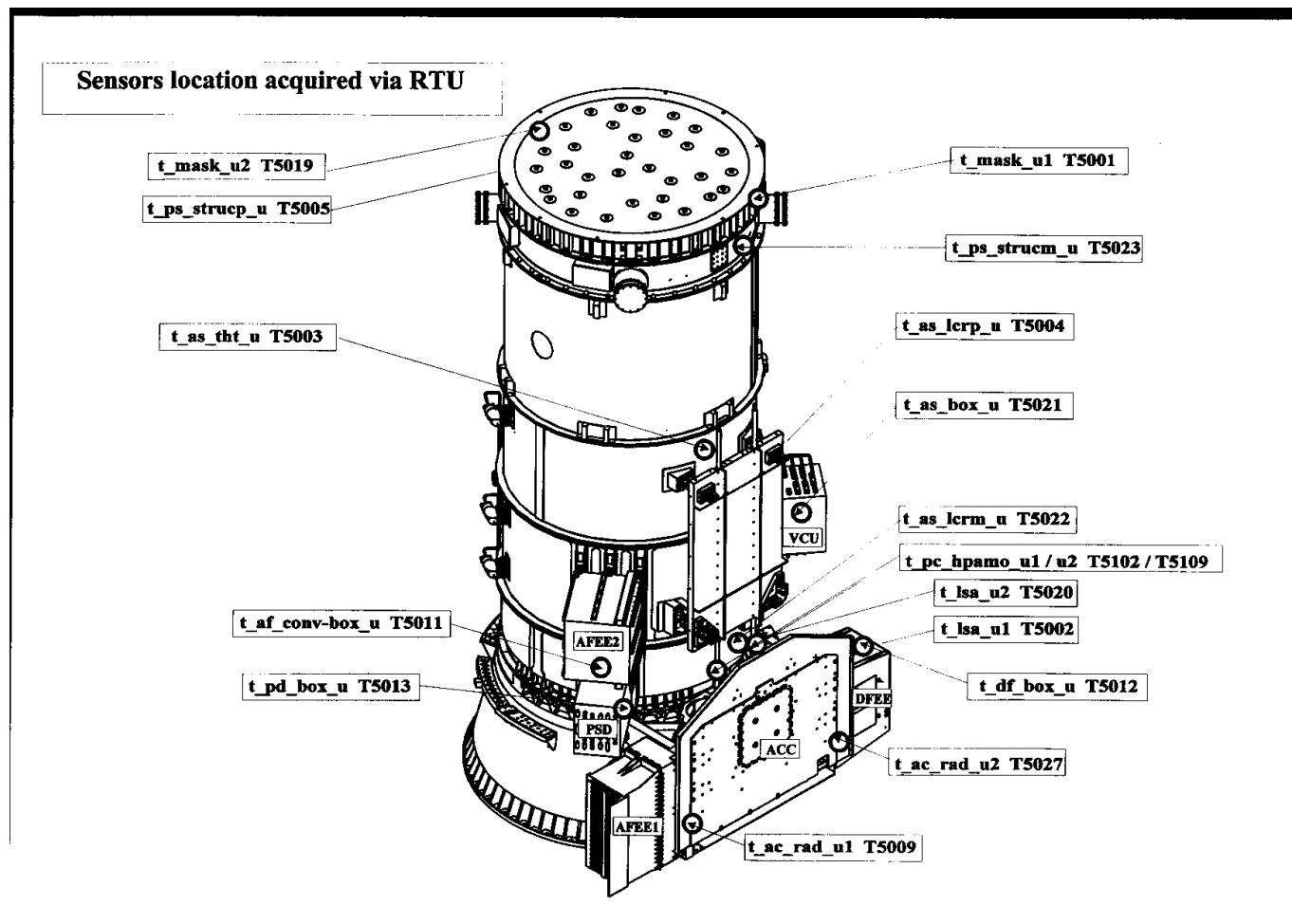


Figure 1

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Sensors location acquired via miniRTU

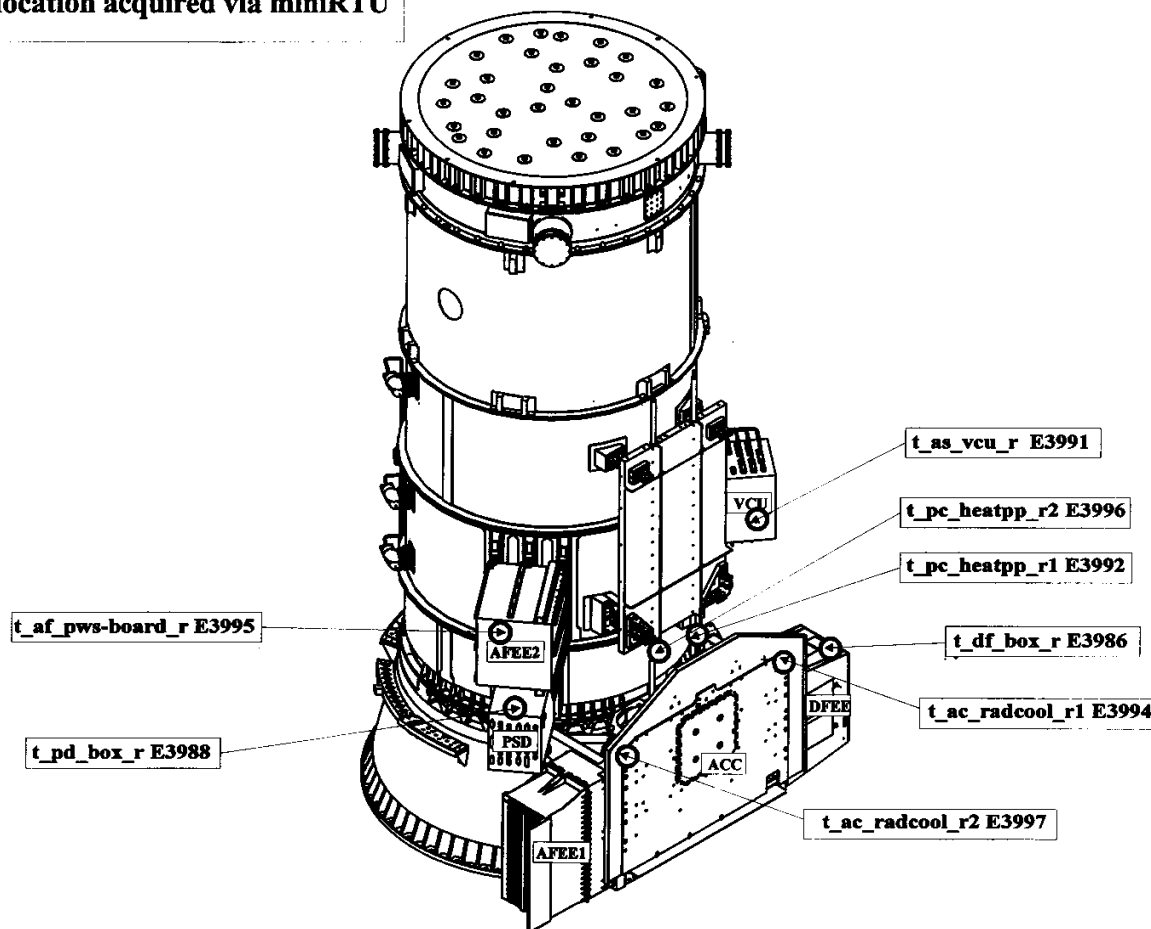
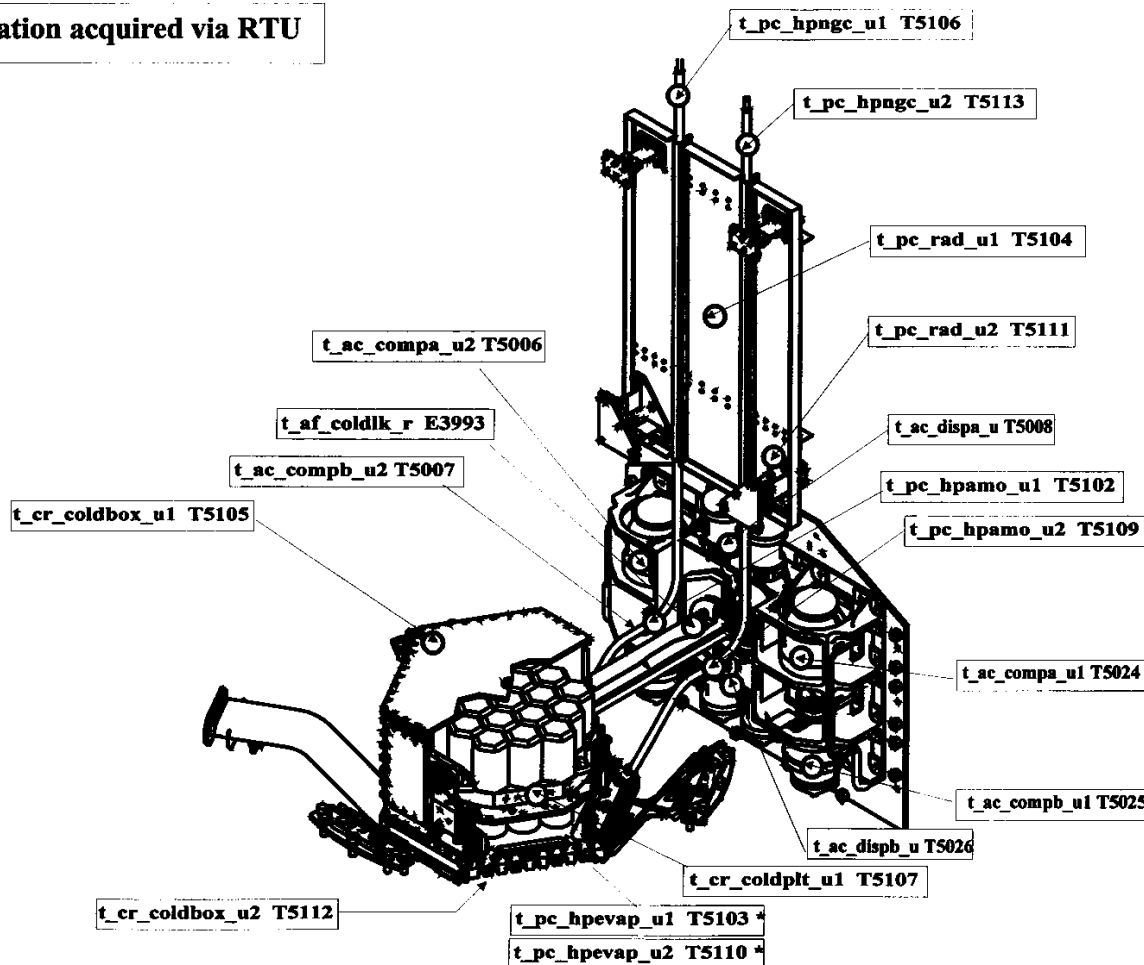


Figure 2

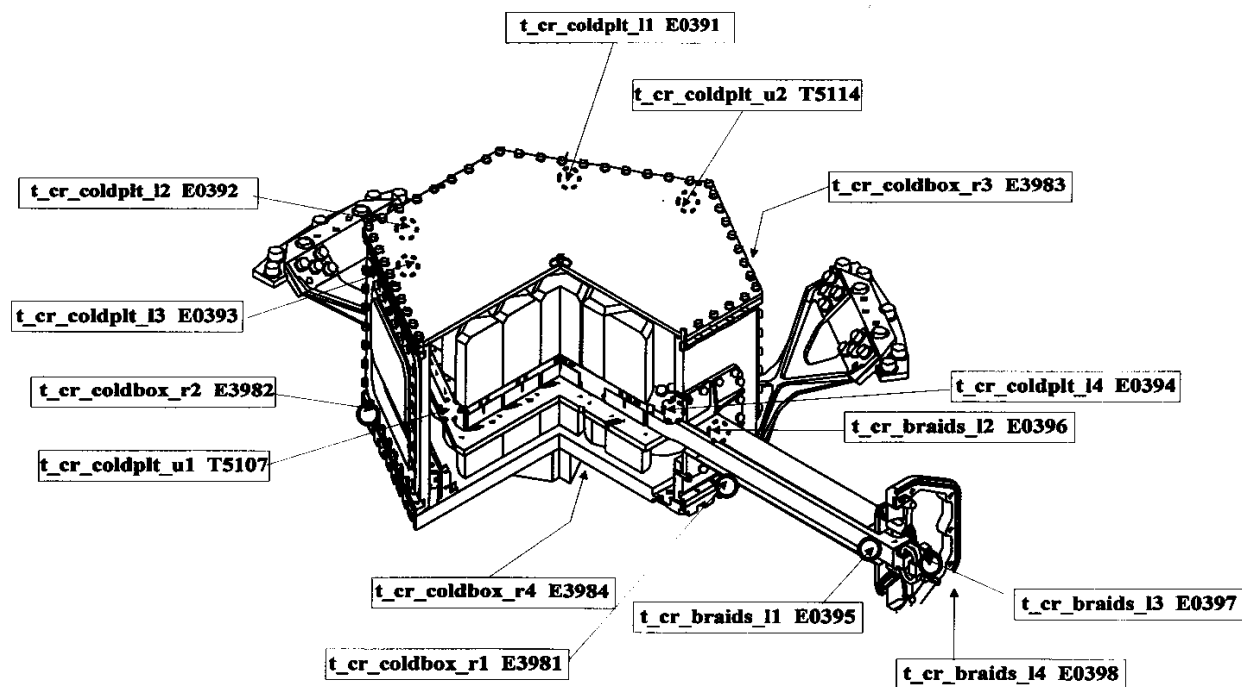
Sensors location acquired via RTU



* at the end of heat pipes

Figure 3

Cold box sensors location



Note: the sensors identified by the parameters E0391 E0392 E0393 and T5114 are located inside the cold box on the cold plate as shown by T5107

Figure 4



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1.1.4. On-board software maintenance

1.1.4.1. S/A SW maintenance description

To guarantee the capability to Load/Dump the whole RAM of the S/As, the S/A SWs run in PROM while they are in a SW maintenance session; they receive a dedicated command to jump to this "Loader" routine in PROM. This "Loader" only responds to Load, Dump commands and to a command to exit the maintenance session; it answers "not allowed command" to any other command.

The S/A SW maintenance is carried out only in CONFIGURATION mode; when exiting the SW maintenance, the S/A is in CONFIGURATION mode.

1.1.4.2. IASW functioning principle

- When receiving the TC to start a S/A SW maintenance, the IASW stops the cyclic HK acquisition from this S/A and forwards the <MAINT SW> command to the concerned S/A, even if this command can't be accepted by the S/A. So, to restart the cyclic HK acquisitions from this S/A, a <RESTART SW> command should be emitted by ground segment. Note that the mRTU acquisitions are not stopped. This TC <MAINT SW> has the following format:

TC (5, 1) Start Task; TID = Number of the S/A, spare field (1 byte) = 0

The IASW reflects in the CSSW periodic HKTm packet that a S/A SW maintenance is in process (Parameter E4339 = 1 means "maintenance in progress") and identifies the S/A (Parameter E4359 = "S/A under maintenance").

Upon reception of the TC to exit a S/A SW maintenance, the IASW forwards the <RESTART SW> command to the concerned S/A and restarts the cyclic HK acquisition from this S/A 1 8Hz cycle after sending the command. This <RESTART SW> TC has the following format:

TC (5, 2) Stop Task; TID = Number of the S/A, spare field (1 byte) = 0.

The IASW reflects in the CSSW periodic HKTm packet that no S/A SW maintenance is in process (Parameter E4339 = 0 means "no maintenance") but the parameter E4359 keeps its value (continues to indicate which S/A was under maintenance").

- The entry into belts or IREM or ESAM condition stops any S/A SW maintenance on course. The IASW first exits the S/A SW maintenance by sending the command <RESTART SW> to the concerned S/A, rises an OE_report for the on-board event, and then proceeds with the already defined actions.
- Any event leading to a mode change to STDBY exits maintenance as shown above.
- The IASW does not check the consistency of incoming LOAD and DUMP TCs destination with regard to the actual S/A under maintenance.
- When executing an automatic reconfiguration (after eclipse or radiation condition), the IASW first, loads the S/A SW updates and then sends the Configuration commands to the S/A.



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The S/A SW update is done by IASW following these steps:

- Stop the cyclic HK of all S/A
- For each S/A ON (first ACS, then PSD and at last DFEE):
 - Send the <MAINT SW> command to the S/A
 - Send the init command to the S/A
 - Wait a configurable time (which is a configuration parameter specific to each S/A: E8949, E8952 and E8956)
 - Send the <LOAD> commands for updates to the S/A (if S/A patches recorded in DPE memory)
 - Exit the S/A SW maintenance by sending the <RESTART SW> to the S/A
- Restart the cyclic HK.

1.1.4.3. Operational constraints

The S/A SW maintenance shall be done one S/A at a time.

The S/A SW maintenance is prohibited in STDBY mode.

It is highlighted that during the S/A SW maintenance, the S/A HKs are no longer acquired.

The Ground segment will start the S/A SW maintenance by sending the relevant TC and exit it by another dedicated TC. These 2 TCs are defined here above according to PSD.

It is to point out that after a start maintenance TC, the concerned S/A respond "NACK". This is normal since the S/A status mode is STANDBY (0) and IASW doesn't acquire to HK, the TM data are set to 0.

See also OPER constraint 17 (DFEE SW maintenance) and OPER constraint 3 (ACS SW maintenance).

1.1.4.4. Memory load and dump functions

The loading TCs enable to patch 1 to 24 bytes each by specifying the start address and the number of bytes to be loaded. They are used to patch parts of the S/A SW, it is not foreseen to patch a complete S/A SW. They are allowed when SPI is in CONF mode and S/A is under SW maintenance.

The dumping TCs enable to dump 1 to 24 bytes each by specifying the start address and the number of bytes to be dumped. They are allowed when SPI is in CONF or DIAG mode.

1.1.4.5. Handling of patches of the S/A

The patches of the periphery are stored in the DPE memory as long as room is available in the dedicated buffer (512 - TC of maximum 24 bytes of data per each one). When the buffer is full the IASW rejects any incoming tc-record_pch TC only allowing tc_load_pch-(s/a) TCs.

The DPE patch dedicated buffer can be emptied to flush any useless patch. This operation requires that useful patches are reloaded after the buffer reset (see procedure 32 FPATCH).

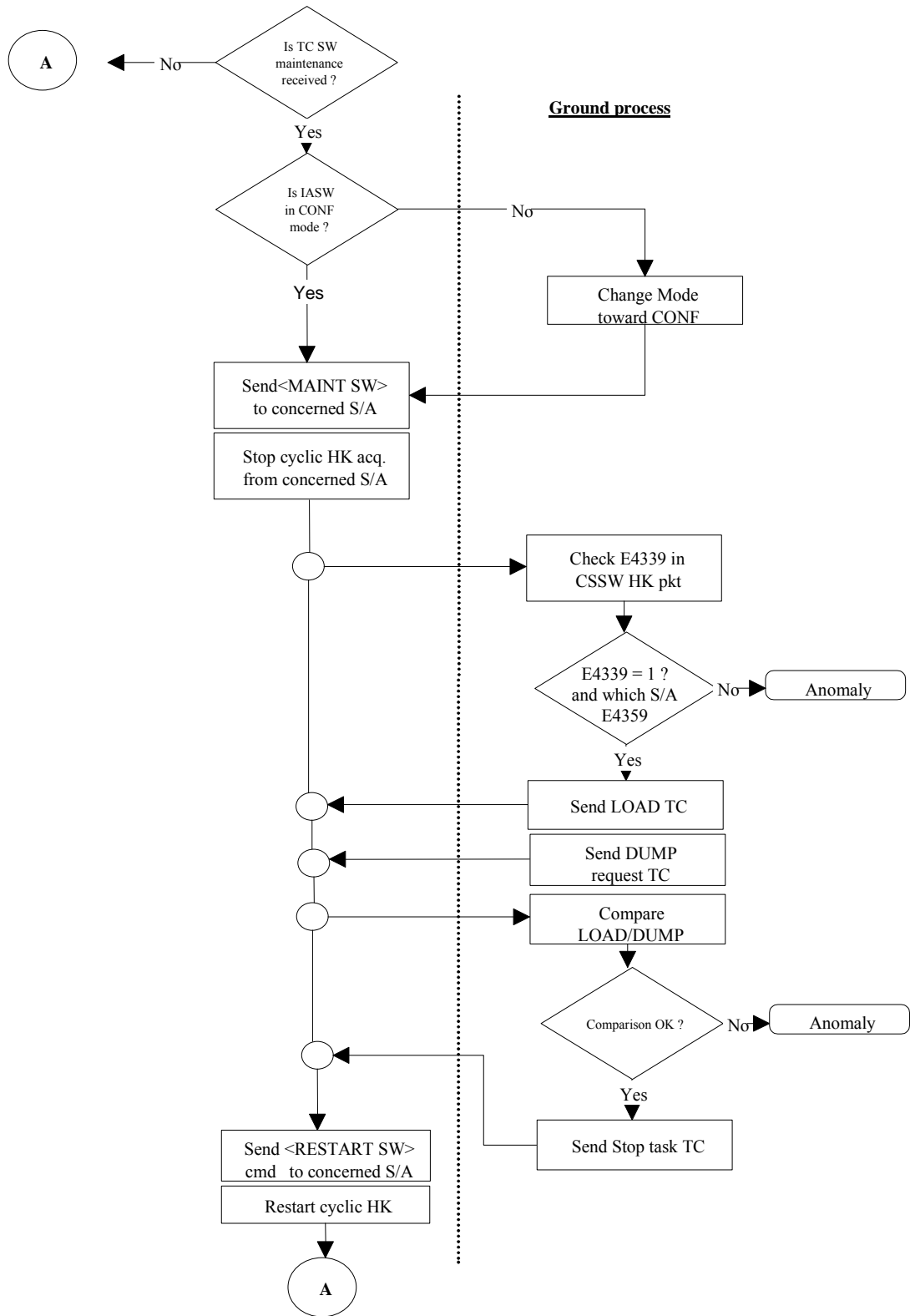


Figure 1.2 - On-Board Software Maintenance Principle



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1.1.5. Telecommands verification

All TCs must be checked by TM feed back.

1.1.5.1. Change mode TCs

These TCs are MF N° 0501 TO E0506.

When such a TC is sent, it is necessary to check its correct execution by IASW prior to skip to next TC to be sent. The verification is to be done with the value of the parameter S/X/C/D/Y/E in the packet of TM of the CSSW. The verification is exited after 16 Sec or by any related on-event report from IASW.

1.1.5.2. Configuration TCs

All configuration TCs including the TC for ON/OFF configuration update (MF N° E0500) are to be verified. The TM feed back for settable parameters is slow (3840 Sec), so for each Configuration TC sent the related on-request acquisition TC is to be sent for verification purposes. These telecommands are:

- MF n° E0011 to E0014 for AFEE,
- MF n° E0111 to E0113 for DFEE,
- MF n° E0251 to E0273 for ACS,
- MF n° E0320 to E0329 for PSD.

So, for example, the content of the TCs MF n° E0001-E0002-E0003-E0004 must be compared with the content of the following TMs TPN n° 64000-64001-64002-64003.

See figure 1.3.

Then the verification must be done with a mask starting from the byte number 6 of Conf TC and On-Request TM down to Checksum byte excluded in TC and TM packet.

Concerning the ON/OFF conf TC (MF N° E0500), it shall be verified by checking in the CSSW HK packet that the IASW has correctly received this command: the comparison is to be done between E8900 to E8903 of the TC packet and E0069 (Operational status) in the CSSW HK packet.

1.1.5.3. Load/Dump TCs

For SW maintenance TC verification, refer to paragraph 1.1.4.

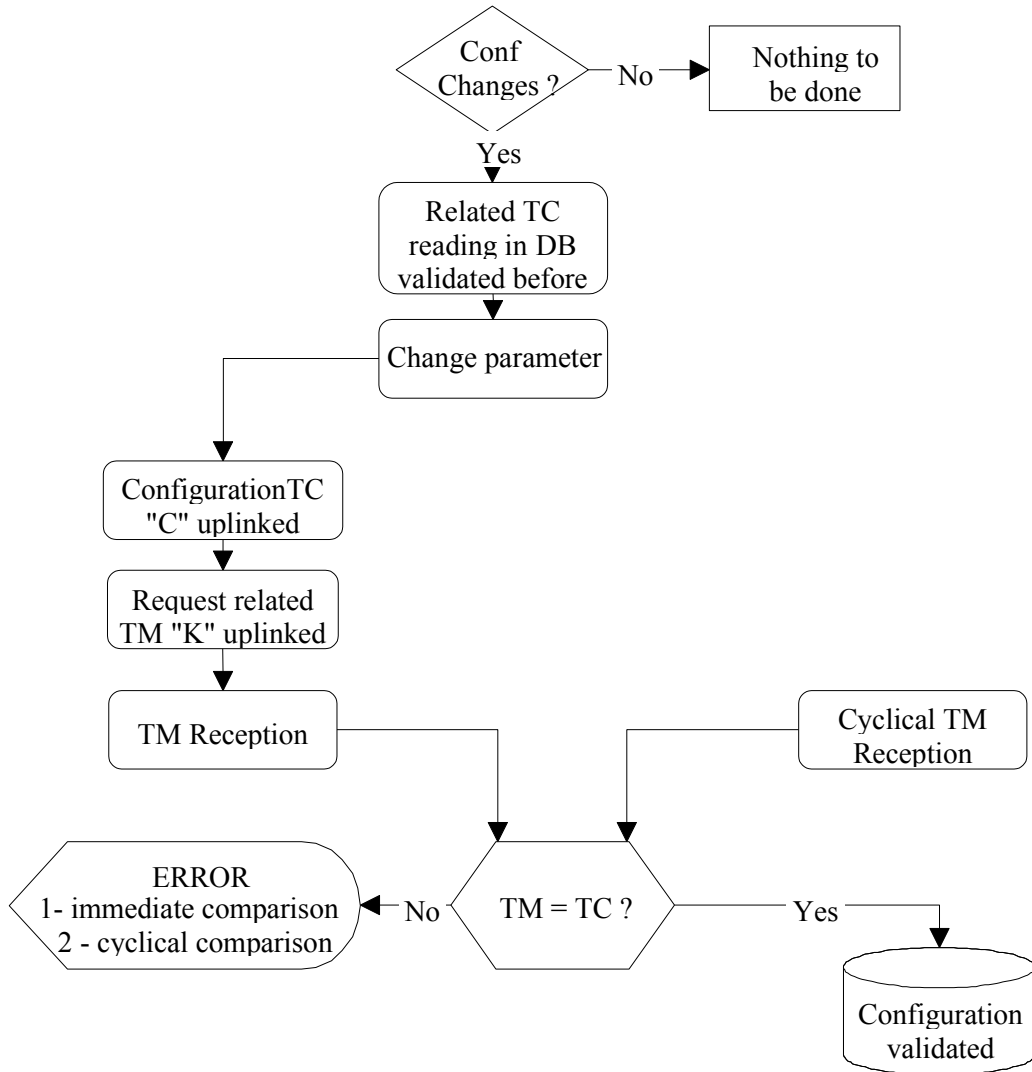


Figure 1.3 - TC Command Verification Diagram



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This table gives the name of the TC packet and the associated TM packet w.r.t. TC verification purpose. The On-request TC name is given for information.

| TC packet MF n° | TM packet TPN n° | Cyclic TM FTPN/Block n° | On-request TC MF n° | TC packet MF n° | TM packet TPN n° | Cyclic TM FTPN/Block n° | On-request TC MF n° |
|-----------------|------------------|-------------------------|---------------------|-----------------|------------------|-------------------------|---------------------|
| E0001 | 64000 | 63841/1 | E0011 | E0309 | 64038 | 63843/10 | E0329 |
| E0002 | 64001 | 63841/2 | E0012 | | 64663 | 60602/5 | E0342 |
| E0003 | 64002 | 63841/3 | E0013 | | 64664 | 60602/6 | E0343 |
| E0004 | 64003 | 63841/4 | E0014 | E0500 | 64041 | N/A | E0525 |
| | | | | E0501 | N/A | N/A | N/A |
| E0102 | 64004 | 63841/5 | E0112 | E0502 | N/A | N/A | N/A |
| E0103 | 64005 | 63841/6 | E0113 | E0503 | N/A | N/A | N/A |
| E0101 | 64006 | 63841/7 | E0111 | E0504 | N/A | N/A | N/A |
| | | | | E0506 | N/A | N/A | N/A |
| E0201 | 64007 | 63841/8 | E0251 | E0507 | 64042 | N/A | E0513 |
| E0202 | 64008 | 63841/9 | E0252 | E0508 | 64042 | N/A | E0513 |
| E0203 | 64009 | 63841/10 | E0253 | E0509 | 64043 | N/A | E0514 |
| E0204 | 64010 | 63841/11 | E0254 | E0510 | 64043 | N/A | E0514 |
| E0205 | 64011 | 63841/12 | E0255 | E0511 | 64044 | N/A | E0515 |
| E0206 | 64012 | 63841/13 | E0256 | E0512 | 64044 | N/A | E0515 |
| E0207 | 64013 | 63841/14 | E0257 | E0516 | N/A | N/A | N/A |
| E0208 | 64014 | 63841/15 | E0258 | E0517 | N/A | N/A | N/A |
| E0209 | 64015 | 63841/16 | E0259 | E0518 | 64039 | 63843/11 | E0523 |
| E0210 | 64016 | 63842/2 | E0260 | E0519 | 64040 | 63843/11 | E0524 |
| E0211 | 64017 | 63842/3 | E0261 | E0555 | N/A | N/A | N/A |
| E0212 | 64018 | 63842/4 | E0262 | E0556 | N/A | N/A | N/A |
| E0213 | 64019 | 63842/5 | E0263 | E0557 | N/A | N/A | N/A |
| E0214 | 64020 | 63842/6 | E0264 | E0563 | N/A | N/A | N/A |
| E0215 | 64021 | 63842/7 | E0265 | E0564 | N/A | N/A | N/A |
| E0216 | 64022 | 63842/8 | E0266 | E0565 | N/A | N/A | N/A |
| E0217 | 64023 | 63842/9 | E0267 | E0566 | N/A | N/A | E0567 |
| E0218 | 64024 | 63842/10 | E0268 | E0573 | N/A | N/A | N/A |
| E0219 | 64025 | 63842/11 | E0269 | E0574 | N/A | N/A | N/A |
| E0220 | 64026 | 63842/12 | E0270 | E0575 | N/A | N/A | N/A |
| E0221 | 64027 | 63842/13 | E0271 | E0581 | 64901 | 63844/1 | E0591 |
| E0222 | 64028 | 63842/14 | E0272 | E0582 | 64902 | 63844/2 | E0592 |
| E0224 | 64046 | 63843/14 | E0273 | E0583 | 64903 | 63844/3 | E0593 |
| | | | | E0584 | 64904 | 63844/4 | E0594 |
| E0300 | 64029 | 63843/1 | E0320 | E0585 | 64905 | 63844/5 | E0595 |
| E0301 | 64030 | 63843/2 | E0321 | E0586 | 64906 | 63844/6 | E0596 |
| E0302 | 64031 | 63843/3 | E0322 | | | | |
| E0303 | 64032 | 63843/4 | E0323 | | | | |
| E0304 | 64033 | 63843/5 | E0324 | | | | |
| E0305 | 64034 | 63843/6 | E0325 | | | | |
| E0306 | 64035 | 63843/7 | E0326 | | | | |
| E0307 | 64036 | 63843/8 | E0327 | | | | |
| E0308 | 64037 | 63843/9 | E0328 | | | | |



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1.1.6. Cooling mode and cryocooler operational management

See also Volume 3 Annexe 15 and Annexe 16.

1.1.6.1. General description

One SPICO consists of 2 off MMS 50/80K Stirling Cycle Coolers. Two SPICO's are mounted on a common structure. Each SPICO comprises 2 compressors and 2 displacers both driven by a Cooler Drive Electronics (CDE) which thus provides a power drive to 2 off compressor and 2 off displacer motors. Thus 2 off CDE units are required to power both SPICO's. The purpose of the two CDE's is also to control (telecommands) and monitor (telemetry) the 4 coolers.

- The CDE comprises two separate compressor power amplifiers. They have a maximum rated output power of 50W each. Pulse Width Modulation (PWM) techniques are utilised to maximise the efficiency of the power amplifiers and thereby minimise overall power consumption.
- It has also two separate displacer power amplifiers with a maximum output rated power of 2 W each and linear drive techniques incorporated.
- Each CDE provides 10 analogue telemetry channels:
 - 4 temperature (PRT 100) monitors,
 - 2 compressor demands,
 - 2 compressor drive amplifier monitors,
 - 2 displacer drive amplifier monitors.
- Each CDE also provides 3 digital telemetry channels:
 - Relay status,
 - Stand-by/Operational status,
 - Launch lock status,
- The CDE is controlled by a single 16 bit serial telecommand named the compressor telecommand. The Most Significant Bit (MSB) B0 is transmitted to the CDE first. The Last Significant Bit (LSB) transmitted is B15. Upon power-up all telecommand bits are initialised to 0.
- Several telecommands allow to configure:
 1. CDE Master or Slave,
 2. Launch lock mode or operating,
 3. Compressors pistons stroke management.



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A telecommand, also, defines the relay status of LCL supplying the coolers:

Command # 1 (E9968 and E9988) = 2 coolers supplied by a CDE through a single LCL (nominal operation when 2 SPICO's i.e. 4 coolers available)

Command # 2 (E9969 and E9989) = 2 coolers supplied by a CDE through a two LCL (degraded mode with only one SPICO operating)

The compressor telecommand structure (TBC) is described below:

| Bit | Compressor function |
|------------|---------------------------------------------------------------|
| B0 | MSB Select Master / Slave Mode (0 = Master) |
| B1 | Compressor / Displacer set 1 drive enable (1 = enable) |
| B2 | MSB |
| B3 | |
| B4 | Compressor 1 amplitude |
| B5 | |
| B6 | |
| B7 | LSB |
| B8 | Displacer 1 and 2 Launch Lock mode (0 = L.L.mode) |
| B9 | Compressor / Displacer set 2 drive enable (1 = enable) |
| B10 | MSB |
| B11 | |
| B12 | Compressor 2 amplitude |
| B13 | |
| B14 | |
| B15 | LSB LSB |

See chapter 1.2.13 Volume 4 for detailed telecommand and telemetry packet structure.

1.1.6.2. CDE Internal functioning

- CDE Internal Synchronisation

The CDE provides a sinusoidal drive for the two compressors and two displacers. All four drive signals oscillate at the cooler operating frequency. This is defined by the personality connector and is nominal 43.4 Hz for Integral.

- Master/Slave Synchronisation

A CDE unit may be defined, **by telecommand**, to be either a Master or a Slave.

When defined as a Master, a CDE operates entirely from the internal crystal clock and generates two outputs: a CLK_OUT and a SYNC_OUT signal. The CLK_OUT signal is the *InternalClock* signal and the SYNC_OUT signal is a pulse which is one *InternalClock* period wide, occurring when the Master Compressor 1 drive is at 90°.



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When defined as a Slave, a CDE does not operate from internal clock, but from these Master CDE generated signals. Upon receipt of a SYNK_OUT signal from the Master, the Slave CDE's Compressor 1 drive is reset to 0°.

1.1.6.3 Operation modes

- **Relay operation**

The compressors can be powered by two ways:

In one configuration the contacts are configured such that power via LCL1 feeds both Compressor 1 and Compressor 2. This configuration is intended for use when the cooler is operating in the Nominal mode. The other configuration allows power to be fed from each LCL. In this latter case LCL 1 feeds power to Compressor 1 and LCL 2 feeds power to Compressor 2. This configuration is intended to be used in the Launch Lock Mode and the Backup Mode. The relay configuration chosen is determined by the status signal. A 5 Volt signal is fed from the data handling subsystem to one of the status contacts. When the relay is set to the Nominal Mode, the contacts are closed and the 5 Volts is short circuited via a resistor located in the data handling system and the status of the relay is noted. When Back Mode is entered, the status contacts become open and the 5 volts is no longer short circuited.

It should be noted that switching between LCL modes is forbidden whilst the coolers are active or the CDE is powered. Hence the CDE must be powered down when switching between Launch Lock mode (4 LCL) and nominal operating mode (2 LCL) or from nominal operating mode (2 LCL) to backup mode (4LCL).

- **Standby Mode**

Upon power up, all the telecommand bits are reset to zero by internal power-on-reset circuitry and the CDE enters its Standby (low power) Mode and consumes approximately 5 watts. The bus input current will be in the range 0.14 to 0.18 Amps.

In this mode both compressors PWM drive stages and displacers linear drive stages are disabled and the compressor and displacer motors are free to move. Also the control loop are not enabled. Hence the DC telemetry reading is non-specific, and the AC telemetry reads zero since effectively zero command has been sent.

- **Launch Lock Mode**

To enter Launch Lock Mode, a telecommand must be sent to enable both compressor and displacer control drive stages. Both the compressor and displacer amplitudes are set to zero in this mode. Hence the Launch Lock Mode is identical to the nominal mode of operation but with the amplitudes of the mechanisms set to zero. Since all amplitudes are set to zero, the drive telemetry (DC) will read 0 volts.

Since the mechanisms are held at zero amplitude, any movement of the motors due to external vibration will be minimized. The power required to prevent the piston from hitting the end stops, will depend on the external vibration levels applied. However, when the external vibration is zero, the power consumption will be in the range 10 to 12 watts and the input current will be in the range 0.35 to 0.4 Amps.

Note: In Launch Lock mode both CDE's should be « Master »

- **Operational Mode**

In Operational Mode, the CDE will drive the compressor and displacer motors to achieve the required cooling.

Telecommands are sent to take the CDE out of Launch Lock Mode and into Operational mode.

Once in the operational mode, the displacers will be set to a fixed amplitude (press by on-board links) but appropriate bits must be set to successively increase the amplitude of the compressor stroke.

The operational mode is split into two further modes. These are the Nominal mode and the Backup mode. In the Nominal mode four compressors operate at 23 wts (5-6 mm) each and two CDE's operate in a Master/Slave configuration, whilst in the Backup mode one CDE drives two compressors at 44 watts each (8-9 mm).

In all the above modes it is assumed that the LCL's and relay have previously been configured for the appropriate mode.

1.1.6.4. Operational functioning principle and constraints

- Starting sequence

Starting the cryocoolers can occur either after a Launch phase or after they have been switched OFF (instrument mode inactive, thaw, eclipse, annealing and outgassing).

The temperature of each component (compressors, displacers and thermal braids) must be comprised between - 20°C and + 35°C. If it is not the case the situation has to be managed as an anomaly.

- Back to Stand-by mode

Before switching off power supply, telecommands must be sent to set all the amplitude bits to zero, the Launch Lock mode bit (B7) remaining to 1.

Cryocoolers stopping duration shall not last more than 5 hours. After this time an annealing process will be necessary. This is due to detectors degradation reasons.

Cryocoolers and their heaters will not be stopped more than 36 hours without irreversible damage.

The cooling duration process from the normal space environment could last 4 to 5 days in nominal mode and 10 days in back-up mode.

Figure 2.5 shows the cooling process in order to reach the adequate temperature functioning.



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1.1.7. Eclipse management

The Eclipse mode is dedicated to the Eclipse phase of the Satellite and the ground non-visibility following the penumbra if any. The Eclipse mode is shared in 2 sub-modes: the Low Power Eclipse Mode and the Nominal Power Eclipse Mode corresponding to 2 different electrical status (see table 1.2) with therefore 2 different sets of design constraints.

1.1.7.1. Mode 7.1: Low power eclipse mode

This sub-mode is defined to cross the penumbra. In order to minimise the power consumption during this mode, the compensation heater shall be powered off, the other sub-assemblies and their nominal heaters are off. To avoid freezing the heat pipe, the antifreeze 1 and 2 are on. The nominal cryocoolers heaters and the redundant sub-assemblies heaters are enable.

Because of the decrease of this phase of the cryocooler temperature, the duration of the phase without compensation heater shall be minimised and shall be less than 1.8 hour.

1.1.7.2. Mode 7.2: Nominal power eclipse mode

This sub-mode is used after the penumbra before the ground station acquisition. In order to avoid the risk of over-consumption in the penumbra induced by the use of Time Tag Commands to power autonomously the SPI units, the sub-assemblies will be powered on only by ground commands. Therefore they are still off in this sub-mode. The compensation heater shall be powered on as soon as possible. The nominal heaters of the sub-assemblies shall be powered again to optimise the thermal balance of the spectrometer.

1.1.7.3. Eclipse mode management

At (**OBT1-T_{IASW_entry}**⁽¹⁾), the IASW starts the context saving and the automatic transition to stand-by. It sends command to the S/A to switch them to stand-by mode to be ready for deactivation via PDU. Moreover the acquisition of digital housekeeping by the DPE is stopped. At this step, the Eclipse status E0089 is set to "YES" in the SPI telemetry.

At (**T entry - 1 minute**), **Beginning of the Low Power Eclipse Mode:** Time Tagged Commands (TT Cmds) will deactivate the AFEE detector chains, the AFEE TM/TC I/F and compensation heater (OFF), via PDU LCLs switch off, and will reconfigure the compressor amplitudes to low power mode. TT Cmds will be issued and all nominal antifreeze heaters will be enabled. One exception is the SPICO heaters, which will not change status during eclipse.

The S/C spurious eclipse software, which is also used for SPICO heater failure, is disabled.

¹ the delay time (T_{IASW_entry}) is configurable in the IASW by Ground TC. By default (T_{IASW_entry}) is presently set to zero.



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At **T entry = (OBT1 + 3 minutes)**, all sub-assemblies (ACS, PSD DFEE) will be deactivated by PDU PROM commands. In addition the S/A nominal heaters loops and the ACS and Mask nominal heaters will be disabled. The S/C Thermal Control Heaters dedicated to SPI will go off.

At **(T exit) = OBT4**, PDU PROM commands will activate all sub-assemblies nominal heaters (AFEE, PSD DFEE, ACS and Mask). In the same way the S/A nominal heaters loops will be enabled. The S/C Thermal Control Heaters dedicated to SPI will also be enabled.

At **(T exit + 1 minute) = (OBT4 + 1 minute)** Time Tagged Commands (TT Cmds) will be issued, will switch on compensation heater again. This is the **end of the Low Power Eclipse Mode and beginning of the Nominal Power Eclipse Mode**. The S/C spurious eclipse software, which is also used for SPICO heater failure, is enabled.

At **T3 = (T exit + T_{AOS}⁽²⁾)**, **after the acquisition of station**, Ground TCs will activate all S/A, including the AFEE detector chains and the AFEE TM/TC I/F. When activating the S/A all nominal heater loops have to be disabled, in order to avoid duplication of power consumption (unit + heater). **This is the end of the Nominal Power Eclipse Mode**.

At **T4 = (T exit + T_{AOS} + about 15 minutes)**, a Ground TC (TC_ecl-exit_IASW E0555) will be sent to the DPE to inform the IASW that all the S/A have been activated again and the S/A auto-tests have been performed. The IASW restarts the automatic reconfiguration (to set the spectrometer as before the eclipse), checks the result of the sub-assemblies auto-tests and restarts the acquisition of the digital housekeeping. But if the spectrometer is under over radiation condition at the eclipse exit, it shall not go in operational mode (STBY2 with HK acquisition) until the over radiation conditions are exited; then the complete reconfiguration will be achieved. At this step, the Eclipse status E0089 is set to "NO" in the SPI telemetry.

Recovery to full instrument performance shall be possible within 30 minutes from reconfiguration.

² T_{AOS} is a possible extra delay after the eclipse exit needed to obtain the acquisition of the ground station.

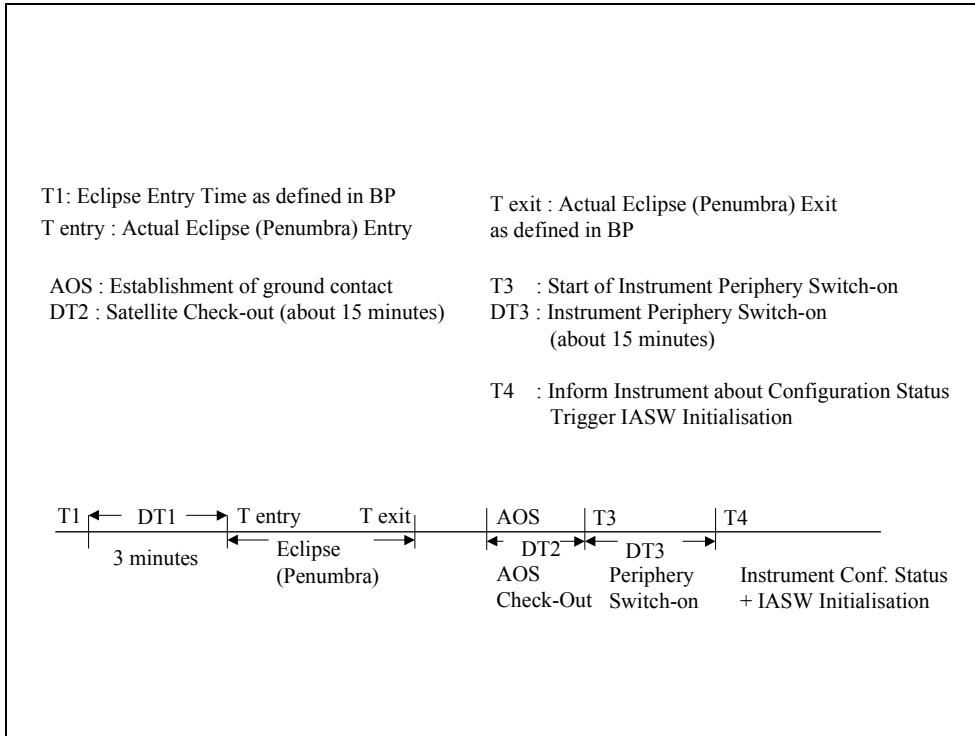


Figure 1.4 - Eclipse Schedule



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| Step | Time | Mechanism | Activity | Remarks |
|------|-----------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 | $T1 - T_{IASW_entry}$ ($T1 = OBT1 = T_{entry} - 3 \text{ min}$) | BP | Instrument Transition to Eclipse / Stand-by mode including context saving | <ul style="list-style-type: none"> This step corresponds to the $T1 - T_{IASW_entry}$ (IASW delay). At this time, all the sub-assemblies have 2 min to reconfigure and to be ready for switch off. At this time, the HK acquisition is stopped: SPI and the IASW are in Stand-by mode without HK acquisition. |
| 9 | $T_{entry} - 1 \text{ min}$ Beginning of the Low Power Eclipse Mode | TT Commands | <ul style="list-style-type: none"> SPI Configuration Setting Antifreeze Heater n° 2 ON (N loop only) Switch off: AFEE detector chains AFEE I/F TM/TC Switch OFF compensation heater SECL S/W (used also for SPI compressor heater failure) is disabled. | <ul style="list-style-type: none"> Antifreeze Heater n° 1 already ON (N only) The switch off must be done when SPI is already reconfigured for the eclipse entry. |
| 10 | Actual eclipse entry (including penumbra) $T_{entry} = OBT2$ | ECL signal Automatic PDU PROM sequence | Switch off : <ul style="list-style-type: none"> ACS PSD DFEE AFEE PSD DFEE nominal heaters ACS and Mask nominal heaters TCS SPI heaters N loops off | <ul style="list-style-type: none"> This step corresponds to the T entry It is the beginning of the switch off sequence SPI is in Eclipse mode IASW is in Stand-by mode without HK acquisition TCS SPI heaters are heaters on the PLM platform dedicated to SPI |
| 11 | During eclipse | TT Commands | During the eclipse passage a set of TT commands will repeat the same S/E (Sun to Eclipse) command: PLM units and N loop heaters switched off. | |
| 12 | Actual eclipse exit $T_{exit} = OBT4$ | ECL signal Automatic PDU PROM sequence | Switch ON: <ul style="list-style-type: none"> AFEE PSD DFEE, nominal heaters ACS and Mask nominal heaters TCS SPI heaters N loops on | <ul style="list-style-type: none"> The IASW is in Stand-by mode without HK acquisition |

Table 1.11 - SPI Eclipse Management



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| Step | Time | Mechanism | Activity | Remarks |
|------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | Textit + 1 min Transition the Nominal Power Eclipse Mode | TT Commands | <ul style="list-style-type: none"> - Compensation heater switch ON - SECL S/W (used also for SPI compressor heater failure) is enabled | <ul style="list-style-type: none"> • The elapse time between step 9 and 12 must be lower than or equal to 1.8 hr. <p>Textit = OBT4</p> |
| 14 | Textit + margin | TT Commands | No action | |
| 15 | Textit + margin | TT Commands | No action | |
| 16 | T3 = Textit + T _{AOS} After the acquisition of the Station End of the Nominal Power Eclipse Mode | Ground Commands | <p>SPI Re-configuration</p> <ul style="list-style-type: none"> - Antifreeze Heater n° 2 OFF <p>Switch off:</p> <ul style="list-style-type: none"> - AFEE PSD DFEE nominal heaters - ACS and Mask nominal heaters <p>Switch ON in the previous eclipse status:</p> <ul style="list-style-type: none"> - AFEE Detect. chains - AFEE I/F TM/TC - ACS - PSD - DFEE | <ul style="list-style-type: none"> • S/A self-tests performing • SPI is in a Stand-by mode without HK acquisition. • IASW is in the Stand-by mode without HK acquisition. |
| 17 | Textit + margin | Ground Commands | No action | |
| 18 | T4 = Textit + T _{AOS} + about 15 min = T _{ecl_exit} | Ground commands IASW automatism | Ground TC sending: TC_ecl_exit_IASW | <p>This TC allows to continue the automatic process for re-configuring the instrument in the same status as before eclipse entry</p> <ul style="list-style-type: none"> • The IASW checks the S/A auto-tests results and restarts HK acquisition. • Switch to the mode interrupted by the eclipse |
| 19 | Textit + margin | Ground Commands | No action | |
| 20 | T3 + TBD | Ground commands | Switch on: nominal heaters AFEE, PSD, DFEE, ACS, Mask | <ul style="list-style-type: none"> • Based upon thermal analysis prediction |

Table 1.11 - SPI Eclipse Management (cont'd)

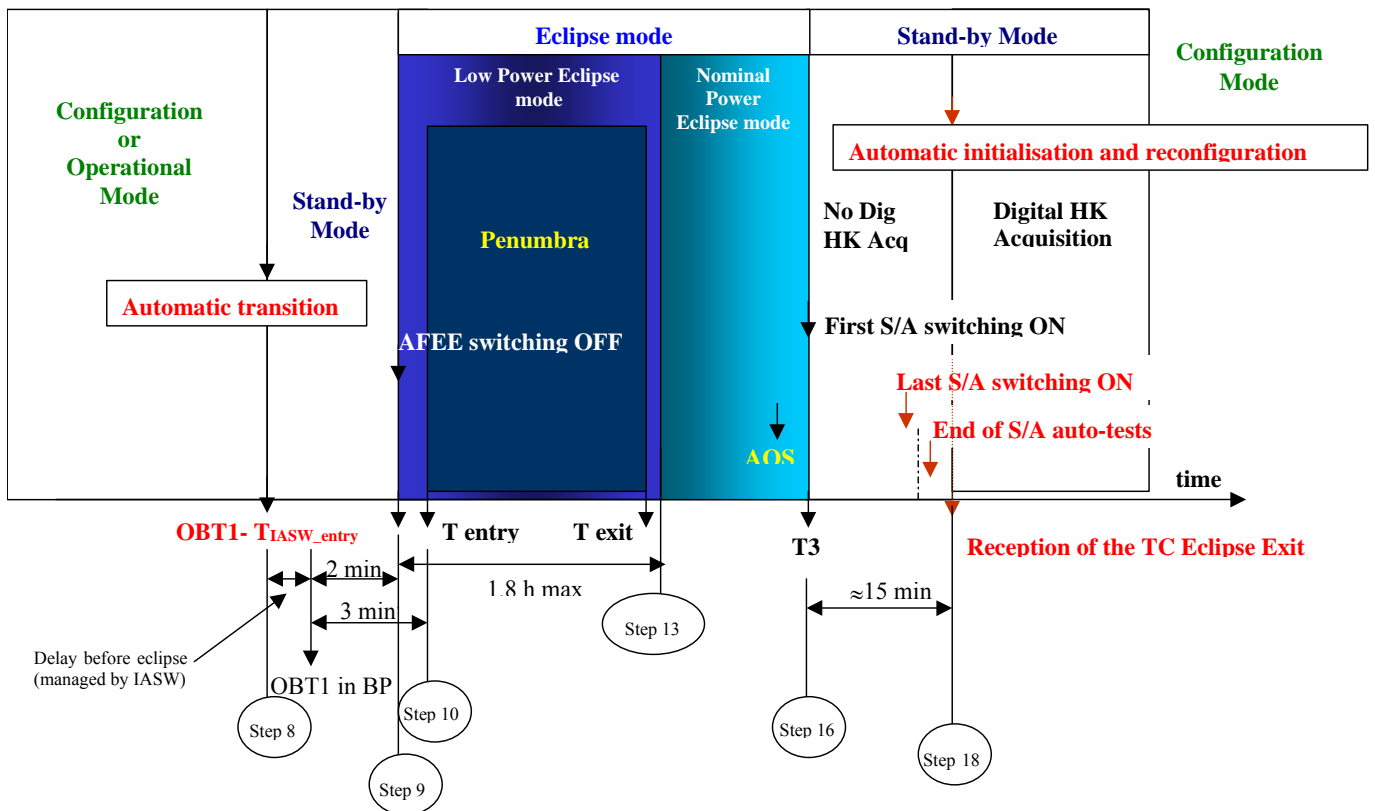


Figure 1.5 - SPI Modes

1.1.8. Reaction to broadcast packet - Automatic transitions (flares, high pack ground, radiations belts)

| Parameter | Reaction to BCPKT | Additional operations performed by the system | Operational constraints |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------|
| A1: On Target Flag (OTF) | Photon by Photon TL not affected. OTF is used to control the spectra accumulation, compression, download, in combination with PID. If the instrument is in an operational mode and the following conditions are met [A3=IPM AND C9#0 (nominally 30 minutes) AND C8-2 nd word#0] the transition from 0 to 1 means that the spectra accumulation starts. | | |
| A2: Emergency Sun Acquisition Flag (ESAM) | SPI stays in the current mode except for Diagnostic, Operational, TM Emergency and Calibration modes for which it will be put in Configuration. HV are maintained on. | Ground commands to return in Operational Mode. | |
| A3: AOCS Modes | If this parameter is equal to IPM(Inertial Pointing Mode) means that the spectra accumulation can be performed. | | |
| A4: AOCS Sub-mode | Not used | | |
| A5: Radiation Monitor Count Rate #1: Proton | Count Rate > threshold: Transition to Configuration or Standby mode (according to configuration parameter E8936). If Configuration selected: ACS and PSAC HV are switched Off. Ge Detector HV remains On. If Stand-by selected: All HV are switched Off Count Rate < threshold: Automatic return to initial configuration. There is a parameter associated to this threshold in order to filter the transition. It defines how many times the radiation counter is higher than the threshold before switching to the transition. A "flare begin" or "flare end" event message is downlinked in CSSW HK packet (1). | | |

| Parameter | Reaction to BCPKT | Additional operations performed by the system | Operational constraints |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A6: Radiation Monitor Count Rate #2: Dose | Ignored | | |
| A7: Radiation Monitor Count Rate #3: Electrons | Ignored | | |
| B1: Radiation Belts Crossing Start Time | Transition to Configuration or Standby (according to configuration parameter E8936). If Configuration selected: ACS and PSAC HV are switched Off. Ge Detector HV remains On. If Stand-by selected: All HV are switched Off. Default value setting = Configuration mode A "flare begin" event message is downlinked in CSSW HK packet (1). | No action | |
| B2: Radiation Belts Crossing Exit Time | Automatic return to initial configuration Nominal transition duration < 1' to reach science mode. A "flare end" event message is downlinked in CSSW HK packet (1). | No action | |
| B3: Eclipse Entry Time | Transition to Eclipse Mode DPE sends TCs to the subassemblies to switch them in standby. The configuration is not saved during the eclipse because it is saved when it is loaded from the ground. | Before eclipse entrance the following actions are performed by means of TT commands: Disable SPICO htr control SW and set SPICO in reduced power mode Switch ON SPI Antifreeze 2A Switch OFF AFEE2 and AFEE TM/TC. At eclipse entrance the S/C performs the automatic sequence stored in the PDU PROMs: DPE and cryocoolers are maintained on, subassemblies are switched OFF | Eclipse entry time in the BCPKT shall be anticipated of 3 minutes wrt. the effective eclipse entry to allow the periphery units reconfiguration before their automatic switch off. AFEE2 and AFEE TM/TC must be switched off only after the other subassemblies have been configured for eclipse entry. |

| Parameter | Reaction to BCPKT | Additional operations performed by the system | Operational constraints |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B4: Eclipse Exit Time | No reaction. | Subassemblies are switched ON by ground command. After the last subassembly is switched on a ground TC E0555 (<i>tc_ecl_exit_iasw</i>) is sent to IASW to trigger the instrument reconfiguration. | |
| B5: Disregard Radiation Monitor Flag (DRMF) | The instrument will not take into account the Radiation Monitor Count Rate. | | |
| C1-C5: TM Share | <p>Re-posting management to adapt the telemetry flow.</p> <p>The re-posting was created in order to have a better homogeneity of TM downloaded (CPU optimisation for DIAG mode).</p> <p>Correlated with TM_SHARE in BCP, IASW check the number of packet per 125 ms cycle to be posted in ICB.</p> <p>Depending on this number, IASW post or not a packet in the current 125 ms cycle. If this number is too high, IASW post the packet in the next 125 ms cycle.</p> <p>TM_SHARE < 64 => 1 packet/125 ms cycle TM_SHARE < 127 => 2 packets/125 ms cycle TM_SHARE >=127 => 3 packets/125 ms cycle</p> | | <p>Should reflect the PST loaded</p> <p>Each time a new PST is loaded, each time the TM_SHARE should be modified in the BCP to the same value as PST allocated to SPI and should keep this value until next PST change.</p> |
| C6: Instrument Imminent Switch Off | Transition to Stand-by Mode | | In order to leave this status, it is necessary to switch off the DPE |
| C7: Ground Station Hand-Over Flag | No reaction | | |
| C8: Pointing ID (PID) | <p>Used in conjunction with OTF for starting accumulation, PID only for ending accumulation.</p> <p>The spectra accumulation process can begin if the following condition is met: A3 = IPM AND C9#0 (nominally 30 minutes) AND C8-2ndword#0.</p> | | |



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| Parameter | Reaction to BCPKT | Additional operations performed by the system | Operational constraints |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------|
| C9: Pointing Duration | The spectra accumulation process is enabled if the following condition is met: A3 = IPM AND C9#0 (nominally 30 minutes) AND C8-2 nd word#0. | | |

(1) NOTE: An event message "flare begin" or "flare end" is sent to the ground either:

- at the beginning/end of radiation belts
- or when the background reaches high level
- or when both occur simultaneously



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1.1.9. PSD calibration

1.1.9.1. General

PSD calibration is one of the four instrument operational modes. Table 1.4 gives the list of telecommands which can be sent while calibration mode is performed. All the telemetry packets are also available (see table 1.5).

One of the goal of the PSD is to compare a pulse shape generated by an event with a set of library shapes for a given detector in order to determine if the measured shape is best represented by a single or multiple shapes. During the detector life, their characteristics could change and consequently the shapes evolve . It is the reason why the shapes must be analysed continuously. The shapes evolution could lead to build a new reference shapes library. From time to time, it is necessary to have a large selection of samples. One curve is downloaded each 4 seconds in nominal modes (Operational, Diagnostic and TM Emergency) in science telemetry packets whereas PSD sends a curve for each event in PSD Calibration mode (5 curves per 8 Hz cycle). Several thousands of simple pulses per detector are necessary for checking or rebuilding a new library. Then the new library will be uploaded in Configuration mode (See RD 23).

1.1.9.2. PSD library calibration activities

The PSD library calibration activities consists of 5 distinct parts:

1. Pulse shape recording
2. Library building
3. Library uplinking
4. Library validation
5. PSD re-configuration



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1.1.9.2.1. Pulse shape recording

The first phase consists of downlinking detector pulse shapes in scientific telemetry. For this purpose, a special scientific operational mode has been foreseen for SPI: the **calibration mode**. In this mode, a maximum of 40 pulse shapes per second is provided by the PSD sub-assembly to the SPI-DEP which will put these pulse shapes in the photon / photon telemetry packets. To build an accurate PSD template library, about 50,000 pulse shapes in the adequate energy range are required for each detector. Assuming a pulse shape rate of 40 Hz, a 100% telemetry efficiency (40 pulse shapes per second are received on-ground), and a fraction of 30% of exploitable pulse shapes¹, **a PSD calibration duration of 22 hours is expected (i.e. SPI has to operated in calibration mode for ~22 hours)**. Note that this value is only an order of magnitude estimate since the shape and the composition of the instrumental background, from which the library templates will be derived, will not be known accurately before the launch of INTEGRAL. **During pulse shape recording, SPI should be pointed to an empty field, i.e. strong point sources and the galactic plane should be outside the fully and partially coded field-of-view.**

1.1.9.2.2. Library building

The data recorded during the first phase shall be processed as quickly as possible by ISDC and made available to the responsible scientist of the SPI team. The real-time data stream should be sufficient for this purpose since small data losses (of the order of 5%) should be acceptable for library building. **The time between data reception at ISDC and reception of the pre-processed data at a SPI PI / Co-I site is expected to be of the order of one day.** From these data, template libraries will be built using dedicated ground software. Although crude pulse shape libraries may eventually be built by a semi-automatic process, the **creation and validation** of accurate library templates needs the expertise of the responsible SPI scientist. **The process of library building at a SPI PI / Co-I site, after reception of the data from ISDC, is anticipated to amount to 1 week.** The libraries will be available in FITS format compliant with the ISDC SPI ICD (RD3). Dedicated software will be available at ISDC to transform the PSD template libraries into MOC command files.

1.1.9.2.3. Library uplinking

PSD template libraries for uplink by MOC will be available in the MOC command file format (RD4). Following the above estimations, these command files will be available about 8 days after the end of the pulse shape recording phase. The possibility of providing a crude approximated template library by using an automatic library creation procedure is under investigation. If such a solution would be installed at ISDC, a crude template library could be available a few hours after the end of the pulse shape recording phase. The required time for library uplink has been estimated by MOC to be less than 8 hours (see RD4).

¹ Pulse shapes that correspond to low-energy events or to multiple-site interactions are not exploitable for PSD calibration. Low-energy events will be rejected by (1) raising the lower trigger threshold (LLD) of the PSD sub-assembly and by (2) applying an energy selection during the data analysis. Multiple-site events will be rejected by event selection and an iterative technique. Based on current experience, a fraction of 30% of exploitable pulse shapes is anticipated.



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Note that together with library uplinking, some configuration parameters related to PSD library handling may also change. Therefore, **it is expected that PSD configuration parameters will change after the uplink of a new library.** The new PSD configuration setting will be delivered together with the PSD template library.

1.1.9.2.4. Library validation

During library uplink, a verification sequence has been implemented by MOC (RD4). **In case of uplink problems (or if later PSD data analyses suggest uplink anomalies) PSD EEPROM memory dumps may be requested by the responsible scientist of the SPI team.** The PSD EEPROM memory dumps can be compared to predicted EEPROM memory images in order to validate the uplink and to detect EEPROM failures.

The final PSD library validation should come from a deep analysis of the PSD background reduction efficiency. Although such an analysis could already be anticipated using the recorded pulse shape calibration data themselves, the statistics may not be sufficient for a conclusive determination of the PSD sensitivity improvement. In addition, proper response matrix calculation at ISDC requires an accurate understanding of the PSD performances –which will strongly depend on the quality of the template library. Hence, **following the uplink of a new library, photon / photon data will be requested by the SPI PI in order to evaluate the PSD performances.** The precise procedures for this evaluation are TBD.

1.1.9.2.5. PSD re-configuration

After library validation and the determination of the PSD performances, the PSD sub-assembly may eventually require a re-configuration. In particular, the on-board single-site discrimination parameters are set in the so-called PSD algorithm parameter blocks, which are uplinked like library templates. Hence, **after PSD performance assessment and optimisation of the discrimination parameters, an update of the PSD algorithm parameter blocks may be required.** This will imply a further uplink of 19 library templates.

1.1.9.3. Operational constraints

As for the other operational modes, the PSD calibration mode must be performed when the S/C is in ground visibility.

This mode can be executed after each annealing process and, if needed, in order to take into account detectors ageing.

The TM rate shall be increased up to 42 kbits/s.

The PSD calibration mode could last 22 hours.

The other S/A shall be in Operational mode.



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1.1.10. Diagnostic mode

1.1.10.1. Generalities

The Diagnostic mode is functionally equivalent to OPER mode except that:

- Dump telecommand are allowed,
- ACS calibration is allowed. However, the science data are not reliable because of the continuous detection threshold changing.
- Additional cyclic acquisitions can be done by IASW:
 - For that, IASW manages an 96 entries on-board table, which is uploaded by the way of a set of 6 IASW configuration telecommands. Each entry is made up of a S/A identifier and an HK identifier. These two parameters allow to identify and to point at any elementary HK blocks. See the following Table 1.12. Possible HK blocks to be downlinked.
 - The pooling sequence of this table is 250 ms (two 8 Hz cycles). In other terms, 24 seconds are necessary to acquire the all of the table.
 - IASW verify if the S/A configuration (ON/OFF status) is in accordance with acquisitions to be performed.
 - The ground has to verify the conformity of S/A identifier and HK identifier when uploading DIAG HK table.
- Diagnostic telemetry is downlinked in VC7 and is processed at ISDC only.

1.1.10.2. Specific diagnostic HK blocks

- ACS acquisition blocks: VCU software specification reference 1.

| N° Byte | S/A identifier: 3 Block identifier: 81 Hex |
|------------|-------------------------------------------------|
| 1 | ACS acknowledgement |
| 2 | 81 Hex |
| 3 | VCU AC current MS byte |
| 4 | VCU AC current LS byte |
| 5 | VCU AC voltage MS byte |
| 6 | VCU AC voltage LS byte |
| 7 | VCU 2.5 V reference MS byte |
| 8 | VCU 2.5 V reference LS byte |
| 9 | VCU + 15 V supply MS byte |
| 10 | VCU + 15 V supply LS byte |
| 11 | VCU - 15 V supply MS byte |
| 12 | VCU - 15 V supply LS byte |
| 13 | VCU + 5 V supply MS byte |
| 14 | VCU + 5 V supply LS byte |
| 15 | VCU ground reference MS byte |
| 16 | VCU ground reference MS byte |
| 17 | VCU mode register |
| 18 | VCU error register |
| 19 | 8 Hz interrupt counter |
| 20 | 8 Hz interrupt counter DIAG |
| 21 | Relative time in hours |
| 22 | Relative time in minutes |
| 23 | Relative time in seconds |
| 24 | Calibration status |
| 25 | Calibration: actual energy threshold value |
| 26 | USART status register |
| 27 | 00 |
| 28 | 00 |
| 29 | 00 |
| 30 | 00 |
| 31 | 00 |
| 32 | 00 |
| 33 | 00 |
| 34 | 00 |
| 35 | 00 |
| 36 | CS |

The all current and voltages parameters are encoded on 12 bits right justified.



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- ACS acquisition blocks: VCU software specification reference 2

| N° Byte | S/A identifier: 3 Block identifier: 83 Hex |
|------------|-----------------------------------------------------|
| 1 | ACS acknowledgement |
| 2 | 83 Hex |
| 3 | Mode transitions |
| 4 | FEE failure of FEE 7 – FEE 0 |
| 5 | FEE failure of FEE 15 – FEE 8 |
| 6 | FEE failure of FEE 23 – FEE 16 |
| 7 | FEE failure of FEE 31 – FEE 24 |
| 8 | FEE failure of FEE 39 – FEE 32 |
| 9 | FEE failure of FEE 47 – FEE 40 |
| 10 | FEE failure of FEE 55 – FEE 48 |
| 11 | FEE failure of FEE 63 – FEE 56 |
| 12 | FEE failure of FEE 71 – FEE 64 |
| 13 | FEE failure of FEE 79 – FEE 72 |
| 14 | FEE failure of FEE 87 – FEE 80 |
| 15 | FEE failure of FEE 91 – FEE 88 |
| 16 | Ratometer failure of FEE 7 – FEE 0 |
| 17 | Ratometer failure of FEE 15 – FEE 8 |
| 18 | Ratometer failure of FEE 23 – FEE 16 |
| 19 | Ratometer failure of FEE 31 – FEE 24 |
| 20 | Ratometer failure of FEE 39 – FEE 32 |
| 21 | Ratometer failure of FEE 47 – FEE 40 |
| 22 | Ratometer failure of FEE 55 – FEE 48 |
| 23 | Ratometer failure of FEE 63 – FEE 56 |
| 24 | Ratometer failure of FEE 71 – FEE 64 |
| 25 | Ratometer failure of FEE 79 – FEE 72 |
| 26 | Ratometer failure of FEE 87 – FEE 80 |
| 27 | Ratometer failure of FEE 91 – FEE 88 |
| 28 | RAM address of first RAM/ROM comparison failure MSB |
| 29 | RAM address of first RAM/ROM comparison failure LSB |
| 30 | 00 |
| 31 | 00 |
| 32 | 00 |
| 33 | 00 |
| 34 | 00 |
| 35 | 00 |
| 36 | CS |



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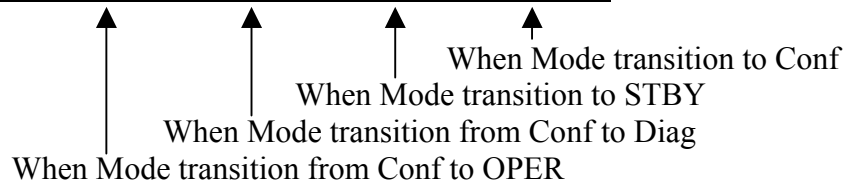
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Mode transitions

| MS Bit n° 0 | Bit n° 1 | Bit n° 2 | Bit n° 3 | Bit n° 4 | Bit n° 5 | Bit n° 6 | LS Bit n° 7 |
|-------------|----------|----------|----------|----------|----------|----------|-------------|
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |



FEE failure or Ratemeter failure of FEE7 – FEE0

| MS Bit n° 0 | Bit n° 1 | Bit n° 2 | Bit n° 3 | Bit n° 4 | Bit n° 5 | Bit n° 6 | LS Bit n° 7 |
|-------------|----------|----------|----------|----------|----------|----------|-------------|
| | | | | | | | |



FEE failure or Ratemeter failure of FEE91 – FEE88

| MS Bit n° 0 | Bit n° 1 | Bit n° 2 | Bit n° 3 | Bit n° 4 | Bit n° 5 | Bit n° 6 | LS Bit n° 7 |
|-------------|----------|----------|----------|----------|----------|----------|-------------|
| 0 | 0 | 0 | 0 | FEE 91 | FEE 90 | FEE 89 | FEE 88 |

- ACS acquisition blocks: VCU software specification reference 3

| N° Byte | S/A identifier: 3 | Block identifier: 90 Hex |
|---------|-------------------------------------------|--------------------------|
| 1 | ACS acknowledgement | |
| 2 | 90 Hex | |
| 3 | FEE 0 FPGA design number | |
| 4 | FEE 0 system service conf | |
| 5 | FEE 0 veto signal conf | |
| 6 | FEE 0 start rate meter conf | |
| 7 | FEE 0 veto propagation delay conf | |
| 8 | FEE 0 event threshold conf | |
| 9 | FEE 0 energy discriminator threshold conf | |
| 10 | FEE 0 HV conf | |
| 11 | FEE 0 Label | |
| 12 | FEE 0 digital status | |
| 13 | 00 | |
| 35 | 00 | |
| 36 | CS | |



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Idem for each FEE up to FEE 90 (block ident = EA Hex)

| N° Byte | S/A identifier: 3 | Block identifier: EB Hex |
|------------|------------------------------------------|--------------------------|
| 1 | ACS acknowledgement | |
| 2 | EB Hex | |
| 3 | PSAC FPGA design number | |
| 4 | PSAC system service conf | |
| 5 | PSAC veto signal conf | |
| 6 | PSAC start rate meter conf | |
| 7 | PSAC veto propagation delay conf | |
| 8 | PSAC event threshold conf | |
| 9 | PSAC energy discriminator threshold conf | |
| 10 | PSAC HV1 conf | |
| 11 | PSAC HV2 conf | |
| 12 | PSAC digital status | |
| 13 | 00 | |
| 35 | 00 | |
| 36 | CS | |



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- DFEE acquisition blocks: detailed ASIC status of previous second (Time Frame 1-2)

| N° Byte | S/A identifier: 5 | Block identifier: OC Hex |
|------------|----------------------------------------------------------------|--------------------------|
| 1 | DFEE acknowledgement | |
| 2 | OC Hex | |
| 3 | NsecFrontStart MSB | |
| 4 | NsecFrontStart LSB | |
| 5 | AsicL30TF1_1 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 6 | AsicL30TF1_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 7 | AsicL30TF1_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 8 | AsicL30TF1_1 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 9 | AsicL30TF1_2 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 10 | AsicL30TF1_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 11 | AsicL30TF1_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 12 | AsicL30TF1_2 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 13 | AsicL30TF1_3 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 14 | AsicL30TF1_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 15 | AsicL30TF1_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 16 | AsicL30TF1_3 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 17 | AsicL30TF1_4 (Line 30 contains 102 bits in 13 bytes) | |
| 18 | AsicL31TF1 MSB (Line 31 contains 10 bits in 2 bytes) | |
| 19 | AsicL31TF1 LSB (Line 31 contains 10 bits in 2 bytes) | |
| 20 | AsicL30TF2_1 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 21 | AsicL30TF2_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 22 | AsicL30TF2_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 23 | AsicL30TF2_1 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 24 | AsicL30TF2_2 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 25 | AsicL30TF2_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 26 | AsicL30TF2_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 27 | AsicL30TF2_2 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 28 | AsicL30TF2_3 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 29 | AsicL30TF2_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 30 | AsicL30TF2_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 31 | AsicL30TF2_3 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 32 | AsicL30TF2_4 (Line 30 contains 102 bits in 13 bytes) | |
| 33 | AsicL31TF2 MSB (Line 31 contains 10 bits in 2 bytes) | |
| 34 | AsicL31TF2 LSB (Line 31 contains 10 bits in 2 bytes) | |
| 35 | 00 | |
| 36 | CS | |



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- DFEE acquisition blocks: detailed ASIC status of previous second (Time Frame 3-4)

| N° Byte | S/A identifier: 5 Block identifier: OD Hex |
|------------|----------------------------------------------------------------|
| 1 | DFEE acknowledgement |
| 2 | OD Hex |
| 3 | NsecFrontStart MSB |
| 4 | NsecFrontStart LSB |
| 5 | AsicL30TF3_1 MSB (Line 30 contains 102 bits in 13 bytes) |
| 6 | AsicL30TF3_1 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 7 | AsicL30TF3_1 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 8 | AsicL30TF3_1 LSB (Line 30 contains 102 bits in 13 bytes) |
| 9 | AsicL30TF3_2 MSB (Line 30 contains 102 bits in 13 bytes) |
| 10 | AsicL30TF3_2 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 11 | AsicL30TF3_2 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 12 | AsicL30TF3_2 LSB (Line 30 contains 102 bits in 13 bytes) |
| 13 | AsicL30TF3_3 MSB (Line 30 contains 102 bits in 13 bytes) |
| 14 | AsicL30TF3_3 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 15 | AsicL30TF3_3 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 16 | AsicL30TF3_3 LSB (Line 30 contains 102 bits in 13 bytes) |
| 17 | AsicL30TF3_4 (Line 30 contains 102 bits in 13 bytes) |
| 18 | AsicL31TF3 MSB (Line 31 contains 10 bits in 2 bytes) |
| 19 | AsicL31TF3 LSB (Line 31 contains 10 bits in 2 bytes) |
| 20 | AsicL30TF4_1 MSB (Line 30 contains 102 bits in 13 bytes) |
| 21 | AsicL30TF4_1 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 22 | AsicL30TF4_1 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 23 | AsicL30TF4_1 LSB (Line 30 contains 102 bits in 13 bytes) |
| 24 | AsicL30TF4_2 MSB (Line 30 contains 102 bits in 13 bytes) |
| 25 | AsicL30TF4_2 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 26 | AsicL30TF4_2 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 27 | AsicL30TF4_2 LSB (Line 30 contains 102 bits in 13 bytes) |
| 28 | AsicL30TF4_3 MSB (Line 30 contains 102 bits in 13 bytes) |
| 29 | AsicL30TF4_3 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 30 | AsicL30TF4_3 Medium SB (Line 30 contains 102 bits in 13 bytes) |
| 31 | AsicL30TF4_3 LSB (Line 30 contains 102 bits in 13 bytes) |
| 32 | AsicL30TF4_4 (Line 30 contains 102 bits in 13 bytes) |
| 33 | AsicL31TF4 MSB (Line 31 contains 10 bits in 2 bytes) |
| 34 | AsicL31TF4 LSB (Line 31 contains 10 bits in 2 bytes) |
| 35 | 00 |
| 36 | CS |



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- DFEE acquisition blocks: detailed ASIC status of previous second (Time Frame 5-6)

| N° Byte | S/A identifier: 5 | Block identifier: OE Hex |
|------------|----------------------------------------------------------------|--------------------------|
| 1 | DFEE acknowledgement | |
| 2 | OE Hex | |
| 3 | NsecFrontStart MSB | |
| 4 | NsecFrontStart LSB | |
| 5 | AsicL30TF5_1 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 6 | AsicL30TF5_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 7 | AsicL30TF5_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 8 | AsicL30TF5_1 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 9 | AsicL30TF5_2 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 10 | AsicL30TF5_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 11 | AsicL30TF5_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 12 | AsicL30TF5_2 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 13 | AsicL30TF5_3 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 14 | AsicL30TF5_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 15 | AsicL30TF5_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 16 | AsicL30TF5_3 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 17 | AsicL30TF5_4 (Line 30 contains 102 bits in 13 bytes) | |
| 18 | AsicL31TF5 MSB (Line 31 contains 10 bits in 2 bytes) | |
| 19 | AsicL31TF5 LSB (Line 31 contains 10 bits in 2 bytes) | |
| 20 | AsicL30TF6_1 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 21 | AsicL30TF6_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 22 | AsicL30TF6_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 23 | AsicL30TF6_1 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 24 | AsicL30TF6_2 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 25 | AsicL30TF6_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 26 | AsicL30TF6_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 27 | AsicL30TF6_2 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 28 | AsicL30TF6_3 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 29 | AsicL30TF6_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 30 | AsicL30TF6_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 31 | AsicL30TF6_3 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 32 | AsicL30TF6_4 (Line 30 contains 102 bits in 13 bytes) | |
| 33 | AsicL31TF6 MSB (Line 31 contains 10 bits in 2 bytes) | |
| 34 | AsicL31TF6 LSB (Line 31 contains 10 bits in 2 bytes) | |
| 35 | 00 | |
| 36 | CS | |



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- DFEE acquisition block: detailed ASIS status of previous second (Time Frame 7-8)

| N° Byte | S/A identifier: 5 | Block identifier: OF Hex |
|------------|----------------------------------------------------------------|--------------------------|
| 1 | DFEE acknowledgement | |
| 2 | OF Hex | |
| 3 | NsecFrontStart MSB | |
| 4 | NsecFrontStart LSB | |
| 5 | AsicL30TF7_1 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 6 | AsicL30TF7_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 7 | AsicL30TF7_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 8 | AsicL30TF7_1 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 9 | AsicL30TF7_2 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 10 | AsicL30TF7_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 11 | AsicL30TF7_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 12 | AsicL30TF7_2 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 13 | AsicL30TF7_3 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 14 | AsicL30TF7_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 15 | AsicL30TF7_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 16 | AsicL30TF7_3 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 17 | AsicL30TF7_4 (Line 30 contains 102 bits in 13 bytes) | |
| 18 | AsicL31TF7 MSB (Line 31 contains 10 bits in 2 bytes) | |
| 19 | AsicL31TF7 LSB (Line 31 contains 10 bits in 2 bytes) | |
| 20 | AsicL30TF8_1 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 21 | AsicL30TF8_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 22 | AsicL30TF8_1 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 23 | AsicL30TF8_1 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 24 | AsicL30TF8_2 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 25 | AsicL30TF8_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 26 | AsicL30TF8_2 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 27 | AsicL30TF8_2 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 28 | AsicL30TF8_3 MSB (Line 30 contains 102 bits in 13 bytes) | |
| 29 | AsicL30TF8_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 30 | AsicL30TF8_3 Medium SB (Line 30 contains 102 bits in 13 bytes) | |
| 31 | AsicL30TF8_3 LSB (Line 30 contains 102 bits in 13 bytes) | |
| 32 | AsicL30TF8_4 (Line 30 contains 102 bits in 13 bytes) | |
| 33 | AsicL31TF8 MSB (Line 31 contains 10 bits in 2 bytes) | |
| 34 | AsicL31TF8 LSB (Line 31 contains 10 bits in 2 bytes) | |
| 35 | 00 | |
| 36 | CS | |



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- DFEE acquisition blocks: ASIC detailed internal configuration (L3-6-8-2)

| N° Byte | S/A identifier: 5 | Block identifier: 10 Hex |
|------------|------------------------------------------------------------|--------------------------|
| 1 | DFEE acknowledgement | |
| 2 | 10 Hex | |
| 3 | NsecFrontStart MSB | |
| 4 | NsecFrontStart LSB | |
| 5 | AsicL03_1 MSB (Line 03 contains 96 bits in 12 bytes) | |
| 6 | AsicL03_1 Medium SB (Line 03 contains 96 bits in 12 bytes) | |
| 7 | AsicL03_1 Medium SB (Line 03 contains 96 bits in 12 bytes) | |
| 8 | AsicL03_1 LSB (Line 03 contains 96 bits in 12 bytes) | |
| 9 | AsicL03_2 MSB (Line 03 contains 96 bits in 12 bytes) | |
| 10 | AsicL03_2 Medium SB (Line 03 contains 96 bits in 12 bytes) | |
| 11 | AsicL03_2 Medium SB (Line 03 contains 96 bits in 12 bytes) | |
| 12 | AsicL03_2 LSB (Line 03 contains 96 bits in 12 bytes) | |
| 13 | AsicL03_3 MSB (Line 03 contains 96 bits in 12 bytes) | |
| 14 | AsicL03_3 Medium SB (Line 03 contains 96 bits in 12 bytes) | |
| 15 | AsicL03_3 Medium SB (Line 03 contains 96 bits in 12 bytes) | |
| 16 | AsicL03_3 LSB (Line 03 contains 96 bits in 12 bytes) | |
| 17 | AsicL06 MSB (Line 06 contains 23 bits in 3 bytes) | |
| 18 | AsicL06 Medium SB (Line 06 contains 23 bits in 3 bytes) | |
| 19 | AsicL06 MSB (Line 06 contains 23 bits in 3 bytes) | |
| 20 | AsicL08 MSB (Line 08 contains 29 bits in 4 bytes) | |
| 21 | AsicL08 Medium SB (Line 08 contains 29 bits in 4 bytes) | |
| 22 | AsicL08 Medium SB (Line 08 contains 29 bits in 4 bytes) | |
| 23 | AsicL08 LSB (Line 08 contains 29 bits in 4 bytes) | |
| 24 | Asic L02 (Line 02 contains 1 bit in 1 byte) | |
| 25 | 00 | |
| 26 | 00 | |
| 27 | 00 | |
| 28 | 00 | |
| 29 | 00 | |
| 30 | 00 | |
| 31 | 00 | |
| 32 | 00 | |
| 33 | 00 | |
| 34 | 00 | |
| 35 | 00 | |
| 36 | CS | |



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- DFEE acquisition blocks: ASIC detailed internal configuration (L4-7-9)

| N° Byte | S/A identifier: 5 | Block identifier: 11 Hex |
|------------|-------------------------------------------------------------|--------------------------|
| 1 | DFEE acknowledgement | |
| 2 | 11 Hex | |
| 3 | NsecFrontStart MSB | |
| 4 | NsecFrontStart LSB | |
| 5 | AsicL04_1 MSB (Line 04 contains 100 bits in 13 bytes) | |
| 6 | AsicL04_1 Medium SB (Line 04 contains 100 bits in 13 bytes) | |
| 7 | AsicL04_1 Medium SB (Line 04 contains 100 bits in 13 bytes) | |
| 8 | AsicL04_1 LSB (Line 04 contains 100 bits in 13 bytes) | |
| 9 | AsicL04_2 MSB (Line 04 contains 100 bits in 13 bytes) | |
| 10 | AsicL04_2 Medium SB (Line 04 contains 100 bits in 13 bytes) | |
| 11 | AsicL04_2 Medium SB (Line 04 contains 100 bits in 13 bytes) | |
| 12 | AsicL04_2 LSB (Line 04 contains 100 bits in 13 bytes) | |
| 13 | AsicL04_3 MSB (Line 04 contains 100 bits in 13 bytes) | |
| 14 | AsicL04_3 Medium SB (Line 04 contains 100 bits in 13 bytes) | |
| 15 | AsicL04_3 Medium SB (Line 04 contains 100 bits in 13 bytes) | |
| 16 | AsicL04_3 LSB (Line 04 contains 100 bits in 13 bytes) | |
| 17 | AsicL04_4 (Line 04 contains 100 bits in 13 bytes) | |
| 18 | AsicL07 MSB (Line 07 contains 22 bits in 3 bytes) | |
| 19 | AsicL07 Medium SB (Line 07 contains 22 bits in 3 bytes) | |
| 20 | AsicL07 LSB (Line 07 contains 22 bits in 3 bytes) | |
| 21 | AsicL09 MSB (Line 09 contains 28 bits in 4 bytes) | |
| 22 | AsicL09 Medium SB (Line 09 contains 28 bits in 4 bytes) | |
| 23 | AsicL09 Medium SB (Line 09 contains 28 bits in 4 bytes) | |
| 24 | AsicL09 LSB (Line 09 contains 28 bits in 4 bytes) | |
| 25 | 00 | |
| 26 | 00 | |
| 27 | 00 | |
| 28 | 00 | |
| 29 | 00 | |
| 30 | 00 | |
| 31 | 00 | |
| 32 | 00 | |
| 33 | 00 | |
| 34 | 00 | |
| 35 | 00 | |
| 36 | CS | |



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- DFEE acquisition blocks: ASIC detailed internal configuration (L5-1-0)

| N° Byte | S/A identifier: 5 | Block identifier: 12 Hex |
|------------|------------------------------------------------------------|--------------------------|
| 1 | DFEE acknowledgement | |
| 2 | 12 Hex | |
| 3 | NsecFrontStart MSB | |
| 4 | NsecFrontStart LSB | |
| 5 | AsicL05_1 MSB (Line 05 contains 73 bits in 10 bytes) | |
| 6 | AsicL05_1 Medium SB (Line 05 contains 73 bits in 10 bytes) | |
| 7 | AsicL05_1 Medium SB (Line 05 contains 73 bits in 10 bytes) | |
| 8 | AsicL05_1 LSB (Line 05 contains 73 bits in 10 bytes) | |
| 9 | AsicL05_2 MSB (Line 05 contains 73 bits in 10 bytes) | |
| 10 | AsicL05_2 Medium SB (Line 05 contains 73 bits in 10 bytes) | |
| 11 | AsicL05_2 Medium SB (Line 05 contains 73 bits in 10 bytes) | |
| 12 | AsicL05_2 LSB (Line 05 contains 73 bits in 10 bytes) | |
| 13 | AsicL05_3 MSB (Line 05 contains 73 bits in 10 bytes) | |
| 14 | AsicL05_3 LSB (Line 05 contains 73 bits in 10 bytes) | |
| 15 | AsicL01_1 MSB (Line 01 contains 48 bits in 6 bytes) | |
| 16 | AsicL01_1 Medium SB (Line 01 contains 48 bits in 6 bytes) | |
| 17 | AsicL01_1 LSB (Line 01 contains 48 bits in 6 bytes) | |
| 18 | AsicL01_2 MSB (Line 01 contains 48 bits in 6 bytes) | |
| 19 | AsicL01_2 Medium SB (Line 01 contains 48 bits in 6 bytes) | |
| 20 | AsicL01_2 LSB (Line 01 contains 48 bits in 6 bytes) | |
| 21 | AsicL00 MSB (Line 00 contains 32 bits in 4 bytes) | |
| 22 | AsicL00 Medium SB (Line 00 contains 32 bits in 4 bytes) | |
| 23 | AsicL00 Medium SB (Line 00 contains 32 bits in 4 bytes) | |
| 24 | AsicL00 LSB (Line 00 contains 32 bits in 4 bytes) | |
| 25 | 00 | |
| 26 | 00 | |
| 27 | 00 | |
| 28 | 00 | |
| 29 | 00 | |
| 30 | 00 | |
| 31 | 00 | |
| 32 | 00 | |
| 33 | 00 | |
| 34 | 00 | |
| 35 | 00 | |
| 36 | CS | |



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1.1.10.3. On-board table description

The following tables show some examples of the possible settings.

| 1 | Table DIAG ACS | | | | |
|----|----------------|-----------|------------------------|-----------------------|------------------------|
| 2 | | | | | |
| 3 | @table | Raw value | 2 first digits meaning | 2 last digits meaning | Set up by |
| 4 | 0 | 0318 | ACS | Block 18 | TC E0581 tc_diag-n1 |
| 5 | 1 | 0381 | ACS | Diag reference 1 | |
| 6 | 2 | 0383 | ACS | Diag reference 2 | |
| 7 | 3 | 0390 | ACS | Diag FEE 0 | |
| 8 | 4 | 0391 | ACS | Diag FEE 1 | |
| 9 | 5 | 0392 | ACS | Diag FEE 2 | |
| 10 | 6 | 0393 | ACS | Diag FEE 3 | |
| 11 | 7 | 0394 | ACS | Diag FEE 4 | |
| 12 | 8 | 0395 | ACS | Diag FEE 5 | |
| 13 | 9 | 0396 | ACS | Diag FEE 6 | |
| 14 | 10 | 0397 | ACS | Diag FEE 7 | |
| 15 | 11 | 0398 | ACS | Diag FEE 8 | |
| 16 | 12 | 0399 | ACS | Diag FEE 9 | |
| 17 | 13 | 039A | ACS | Diag FEE 10 | |
| 18 | 14 | 039B | ACS | Diag FEE 11 | |
| 19 | 15 | 039C | ACS | Diag FEE 12 | |
| 20 | 16 | 039D | ACS | Diag FEE 13 | |
| 21 | 17 | 039E | ACS | Diag FEE 14 | |
| | | | | | |
| 95 | 91 | 03E7 | ACS | Diag FEE 87 | TC E0586 tc_diag-n6 |
| 96 | 92 | 03E8 | ACS | Diag FEE88 | |
| 97 | 93 | 03E9 | ACS | Diag FEE89 | |
| 98 | 94 | 03EA | ACS | Diag FEE90 | |
| 99 | 95 | 03EB | ACS | Diag PSAC | |



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| 1 | Table Diag DFEE + AFEE | | | | | |
|----|------------------------|-----------|------------------------|-----------------------|------------------------|--|
| 2 | | | | | | |
| 3 | @table | Raw value | 2 first digits meaning | 2 last digits meaning | Set up by | |
| 4 | 0 | 050C | DFEE | 0C | TC E0581 tc_diag-n1 | |
| 5 | 1 | 050D | DFEE | 0D | | |
| 6 | 2 | 050E | DFEE | 0E | | |
| 7 | 3 | 050F | DFEE | 0F | | |
| 8 | 4 | 0510 | DFEE | 10 | | |
| 9 | 5 | 0511 | DFEE | 11 | | |
| 10 | 6 | 0512 | DFEE | 12 | | |
| 11 | 7 | 0216 | AFEE | 16 | | |
| 12 | 8 | 050C | DFEE | 0C | | |
| 13 | 9 | 050D | DFEE | 0D | | |
| 14 | 10 | 050E | DFEE | 0E | | |
| 15 | 11 | 050F | DFEE | 0F | | |
| 16 | 12 | 0510 | DFEE | 10 | | |
| 17 | 13 | 0511 | DFEE | 11 | | |
| 18 | 14 | 0512 | DFEE | 12 | | |
| 19 | 15 | 02FF | Default value | | | |
| 20 | 16 | 050C | DFEE | 0C | | |
| 21 | 17 | 050D | DFEE | 0D | | |
| | | | | | | |
| 95 | 91 | 050F | DFEE | 0F | TC E0586 tc_diag-n6 | |
| 96 | 92 | 0510 | DFEE | 10 | | |
| 97 | 93 | 0511 | DFEE | 11 | | |
| 98 | 94 | 0512 | DFEE | 12 | | |
| 99 | 95 | 0216 | AFEE | 16 | | |

1.1.10.4. Diagnostic mode functioning

- Configuration TC

Six configuration telecommands and their corresponding on-request telecommands are used to set up the on-board Diag HK table. See Volume 4 § 1.2.10. They must to be sent in Configuration Mode.

- IASW cyclic TM

The six IASW DIAG configuration blocks are gathered in a cyclic TM packet downloaded once per 3840 s whatever the mode is. See Volume 4 § 1.4.1.5. packet n° 63844.



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- Diagnostic telemetry

In order to downlink the DIAG HK blocks, 12 DIAG telemetry packets are used. These packets are downlinked only in DIAG mode. At least 7 entries in the PST are necessary to downlink the all DIAG packets. See volume 4 § 1.4.7.

The DIAG telemetry packets are built as follow:

- Each DIAG TM packet includes 8 DIAG HK blocks of 36 bytes maximum size.
- Each DIAG HK block identified in the DIAG HK table is located at a fixed address in the DIAG TM packet, that is to say that whatever the size of the blocks present in the DIAG table they always start at the following byte address within one DIAG TM packet: 1, 37, 73, 109, 145, 181, 217, 253.
- When a block size is less than 36 bytes, the IASW fills the remaining bytes with 0 to reach the next start address.
- As soon as the DIAG HK are started, the IASW status to fill in the DIAG TM packets with the DIAG HK blocks in sequence.
- Each DIAG TM packet includes the DIAG HK blocks acquisition performed within 2 seconds.
- The following combinations of APID, types and subtypes and contents are given in the following table:

| APID | Type | Subtype | Content |
|------|------|---------|--------------------------|
| 1136 | 3 | 0 | HK DIAG 1 to HK DIAG 8 |
| 1137 | 3 | 1 | HK DIAG 9 to HK DIAG 16 |
| 1138 | 3 | 2 | HK DIAG 17 to HK DIAG 24 |
| 1139 | 3 | 3 | HK DIAG 25 to HK DIAG 32 |
| 1140 | 3 | 4 | HK DIAG 33 to HK DIAG 40 |
| 1141 | 3 | 5 | HK DIAG 41 to HK DIAG 48 |
| 1142 | 3 | 6 | HK DIAG 49 to HK DIAG 56 |
| 1143 | 3 | 7 | HK DIAG 57 to HK DIAG 64 |
| 1144 | 3 | 8 | HK DIAG 65 to HK DIAG 72 |
| 1145 | 3 | 9 | HK DIAG 73 to HK DIAG 80 |
| 1146 | 3 | 10 | HK DIAG 81 to HK DIAG 88 |
| 1147 | 3 | 11 | HK DIAG 89 to HK DIAG 96 |

- It is necessary to have the DIAG HK tables to decode the DIAG TM packets.



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| S/A | Pkt n° | S/A identifier | Block identifier (hexadecimal) | Data designation |
|------|-------------|----------------|--------------------------------|--------------------------------------------------------------------|
| IASW | 63843/64039 | 01 | 00 | Non exposure parameters acquisition |
| | 64040 | | 01 | Exposure parameters acquisition |
| | 64041 | | 02 | S/A ON/OFF status acquisition |
| AFEE | 240108 | 02 | 00 | HK0 |
| | 60601/64640 | | 10 | Preampli temperatures acquisition for detectors n° 0 to 8 |
| | 64641 | | 11 | HVPS voltage for detectors n° 0 to 18 |
| | 64642 | | 12 | Low thresholds acquisition for detectors n° 0 to 18 |
| | 64643 | | 13 | LVPS voltage acquisition for detectors n° 0 to 18 |
| | 64644 | | 14 | DC-DC converters temperatures acquisition for detectors n° 0 to 18 |
| | 64645 | | 15 | Analog digital converter acquisition for detectors n° 0 to 8 |
| | 64646 | | 16 | DC output voltage acquisition for detectors n° 0 to 18 |
| | 64647 | | 17 | Analysis configuration acquisition for detectors n° 0 to 18 |
| | 64650 | | 20 | AFEE general parameters acquisition |
| AFEE | 60602/64648 | 02 | 18 | Preampli temperatures acquisition for detectors n° 9 to 18 |
| | 64649 | | 19 | Analog digital converter acquisition for detectors n° 9 to 18 |
| | 64651 | | 21 | Cryogenic temperatures acquisition |
| AFEE | 63841/64000 | 02 | 01 | High voltage settings for detectors n° 0 to 18 |
| | 64001 | | 02 | Low threshold settings for detectors n° 0 to 18 |
| | 64002 | | 03 | Chain parameters settings for detectors n° 0 to 18 |
| | 64003 | | 04 | Chain ON/OFF configuration and regeneration settings |
| ACS | 240108 | 03 | 00 | HK0 |
| | 60011 | | 1F | Rate meter and status acquisition |
| | " | | 23 | Gamma Burst start time acquisition |
| | " | | 24 | Overall counters records 1 to 16 acquisition |
| | " | | 25 | Overall counters records 17 to 32 acquisition |
| | " | | 26 | Overall counters records 33 to 48 acquisition |
| | " | | 27 | Overall counters records 49 to 64 acquisition |
| | " | | 28 | Overall counters records 65 to 80 acquisition |
| | " | | 29 | Overall counters records 81 to 96 acquisition |
| | " | | 2A | Overall counters records 97 to 112 acquisition |
| | " | | 2B | Overall counters records 113 to 128 acquisition |
| | " | | 2C | Overall counters records 129 to 144 acquisition |
| | " | | 2D | Overall counters records 145 to 160 acquisition |
| ACS | 60601/64652 | 03 | 17 | Power supply voltage and current acquisition |

Table 1.12. Possible HK blocks to be downlinked



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| S/A | Pkt n° | S/A identifier | Block identifier (hexadecimal) | Data designation |
|-----|-------------|----------------|--------------------------------|-------------------------------------------------------------------------------------------|
| | 64653 | | 18 | Veto shield temperatures acquisition |
| | 64654 | | 19 | Analog status of FEE0 to FEE14 acquisition |
| | 64655 | | 1A | Analog status of FEE15 to FEE29 acquisition |
| | 64656 | | 1B | Analog status of FEE30 to FEE44 acquisition |
| | 64657 | | 1C | Analog status of FEE45 to FEE59 acquisition |
| | 64658 | | 1D | Analog status of FEE60 to FEE75 acquisition |
| | 64659 | | 1E | Analog status of FEE76 to FEE91 acquisition |
| ACS | 60602/64660 | 03 | 20 | Alert status for FEE0 to FEE 30 acquisition |
| | 64661 | | 21 | Alert status for FEE31 to FEE 61 acquisition |
| | 64662 | | 22 | Alert status for FEE62 to FEE 90 acquisition |
| ACS | 63841/64007 | 03 | 01 | System service 1 (watchdog, test config response, HV conf) acquisition for FEE0 to FEE30 |
| | 64008 | | 02 | System service 2 (watchdog, test config response, HV conf) acquisition for FEE31 to FEE61 |
| | 64009 | | 03 | System service 3 (watchdog, test config response, HV conf) acquisition for FEE62 to FEE91 |
| | 64010 | | 04 | Veto generation condition acquisition for FEE0 to FEE30 |
| | 64011 | | 05 | Veto generation condition acquisition for FEE31 to FEE61 |
| | 64012 | | 06 | Veto generation condition acquisition for FEE62 to FEE91 |
| | 64013 | | 07 | Rate meter settings acquisition for FEE0 to FEE30 |
| | 64014 | | 08 | Rate meter settings acquisition for FEE31 to FEE61 |
| ACS | 63842/64015 | 03 | 09 | Rate meter settings acquisition for FEE62 to FEE91 |
| | 64016 | | 0A | Veto delay setting acquisition for FEE0 to FEE30 |
| | 64017 | | 0B | Veto delay setting acquisition for FEE31 to FEE61 |
| | 64018 | | 0C | Veto delay setting acquisition for FEE62 to FEE91 |
| | 64019 | | 0D | Event trigger thresholds acquisition for FEE0 to FEE30 |
| | 64020 | | 0E | Event trigger thresholds acquisition for FEE31 to FEE61 |
| | 64021 | | 0F | Event trigger thresholds acquisition for FEE62 to FEE91 |
| | 64022 | | 10 | Energy discriminator acquisition for FEE0 to FEE30 |
| | 64023 | | 11 | Energy discriminator acquisition for FEE31 to FEE61 |
| | 64024 | | 12 | Energy discriminator acquisition for FEE62 to FEE91 |
| | 64025 | | 13 | High voltage configuration acquisition for FEE0 to FEE30 |
| | 64026 | | 14 | High voltage configuration acquisition for FEE31 to FEE61 |
| | 64027 | | 15 | High voltage configuration acquisition for FEE62 to FEE91 |
| | 64028 | | 16 | Veto pulse width and veto mask configuration acquisition FEE0 to FEE91- Overall veto mask |
| ACS | 63843/64046 | 03 | 40 | ISB communication status acquisition for each FEE |
| ACS | Diag | 03 | 81 | VCU parameters status acquisition |

Table 1.12. Possible HK blocks to be downlinked (cont'd)



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| S/A | Pkt n° | S/A identifier | Block identifier (hexadecimal) | Data designation |
|------|-------------|----------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| | " | | 83 | FEE Failures acquisition |
| | " | | 90 91 92 93 94 95 96 97 98 99 | FEE0 to FEE9 parameters status acquisition |
| | " | | 9A 9B 9C 9D 9E 9F A0 A1 A2 A3 | FEE10 to FEE19 parameters status acquisition |
| | " | | A4 A5 A6 A7 A8 A9 AA AB AC AD | FEE20 to FEE29 parameters status acquisition |
| | " | | AE AF B0 B1 B2 B3 B4 B5 B6 B7 | FEE30 to FEE39 parameters status acquisition |
| | " | | B8 B9 BA BB BC BD BE BF C0 C1 | FEE40 to FEE49 parameters status acquisition |
| | " | | C2 C3 C4 C5 C6 C7 C8 C9 CA CB | FEE50 to FEE59 parameters status acquisition |
| | " | | CC CD CE CF D0 D1 D2 D3 D4 D5 | FEE60 to FEE69 parameters status acquisition |
| | " | | D6 D7 D8 D9 DA DB DC DD DE DF | FEE70 to FEE79 parameters status acquisition |
| | " | | E0 E1 E2 E3 E4 E5 E6 E7 E8 E9 EA | FEE80 to FEE90 parameters status acquisition |
| | " | | EB | PSAC parameters status acquisition |
| PSD | 240108 | 04 | 00 | HK0 |
| | 60060 | | 12 | A/D HK, command Type and count, DFEE identifiers acquisition |
| | " | | 13 | Buffer contents, error status and channel rate acquisition for detector n° 0 to n° 17 |
| | " | | 14 | Channel rate acquisition n° 18 6 Selection statistics channel n° 0 to 10 |
| | " | | 15 | Selection statistics channel n° 11 to n° 18 and rate history for 1 st and 2 nd interval acquisition |
| | " | | 16 | Rate history for 3 rd to 8 th interval acquisition |
| | " | | 17 | Rate history for 9 th to 14 th interval acquisition |
| | " | | 18 | Rate history for 15 th to 20 th interval acquisition |
| | " | | 19 | Rate history for 21 st to 26 th interval acquisition |
| | " | | 1A | Rate history for 27 th to 32 nd interval acquisition |
| PSD | 60602/64663 | 04 | 1B | Running average of baseline and noise acquisition for detectors n° 0 to n°11 |
| | 64664 | | 1C | Running average of baseline and noise acquisition for detectors n° 12 to n°18 soft and analog control |
| PSD | 63843/64029 | 04 | 01 | Detectors enable settings acquisition |
| | 64030 | | 02 | Low threshold energy acquisition for channels n°0 to n°8 |
| | 64031 | | 03 | Low threshold energy acquisition for channels n°9 to n°18 |
| | 64032 | | 04 | High threshold energy acquisition for channels n°0 to n°8 |
| | 64033 | | 05 | High threshold energy acquisition for channels n°9 to n°18 |
| | 64034 | | 06 | A/D offsets acquisition |
| | 64035 | | 07 | Definition of library selection and control n°1 acquisition for detector n° 0 to n°6 |
| | 64036 | | 08 | Definition of library selection and control n°2 acquisition for detector n° 7 to n°12 |
| | 64037 | | 09 | Definition of library selection and control n°3 acquisition for detector n° 13 to n°18 |
| | 64038 | | 0A | Definition of curves transmission rates acquisition |
| DFEE | 240108 | 05 | 00 | HK0 |

Table 1.12. Possible HK blocks to be downlinked (cont'd)



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| S/A | Pkt n° | S/A identifier | Block identifier (hexadecimal) | Data designation |
|------|-------------|----------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| | 63841/64006 | | 01 | Software parameters acquisition |
| | 64004 | | 02 | Front end lines reset and parameters settings acquisition for dead time calculation association, acquisition algorithm, HSL configuration |
| | 64005 | | 03 | Definition of ASIC parameters for Front end signal alignment and veto gate adjustment acquisition |
| DFEE | Diag | 05 | 0C | Detailed ASIC status of previous second (Time Frame 1 – 2) |
| | " | | 0D | Detailed ASIC status of previous second (Time Frame 3 – 4) |
| | " | | 0E | Detailed ASIC status of previous second (Time Frame 5 – 6) |
| | " | | 0F | Detailed ASIC status of previous second (Time Frame 7 – 8) |
| | " | | 10 | ASIC detailed internal configuration (L3-6-8-2) |
| | " | | 11 | ASIC detailed internal configuration (L4-7-9) |
| | " | | 12 | ASIC detailed internal configuration (L5-1-0) |

Table 1.12. Possible HK blocks to be downlinked (cont'd)



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1.1.11. Spectra management

1.1.11.1. Dithering and spectra accumulation

- The spectra accumulation must be started and stopped according to the current pointing and stability of the satellite. The spectra accumulation is possible only in scientific modes, and must be conditioned by the real current pointing state. The pointing information is retrieved from the BCP. At the end of the spectrum accumulation, it is compressed and downloaded while another accumulation can be started.
- The available information about the current pointing is included in the BCP each 8 sec. The ground sets two parameters:
 - C8 (cf. § 1.1.8): The Pointing ID (32 bits), given by the ISOC; the upper word defines the Pointing_ID_revolution (number of orbit), and the lower word the Pointing_ID_Number (number of the exposure in the current orbit).
 - C9: The Pointing Duration (32 bits in second), given by the ISOC; defines the period of time the pointing will last.

Two other parameters are set in real time according to AOCS status:

- A3: ACC Current Mode (on 4 bits): when this parameter is equal to "Inertial Pointing Mode" (IPM), the AOCS is in nominal operational mode.
- A1: On Target Flag (OTF on 1 bit): this flag is set to "1" when a stable pointing is achieved on a predefined target.

Finally the IASW has a configuration parameter defining the accumulation duration (spectra accumulation duration E8976). This parameter has been defined as a default value. There is no need to set up this parameter before every pointing. See Volume 3 IASW User's Manual. The function of this parameter is similar to the Pointing Duration of the BCP, they are both useful.

- Mono or multi-observation orbits: the accumulation of spectra will be ruled by a unique algorithm for both nominal dithering (Galactic Plane Survey) and extended observations of one pointed target. The beginning of the accumulation is first conditioned by the prerequisite conditions:
 - SPI is in a scientific mode AND
 - ACC Current Mode equals "IPM" AND
 - Pointing_Duration has been set to a non zero value (nominally 30 minutes) AND
 - Pointing_ID_lower_word has been set to a non zero value.



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Once these enabling conditions are met, the accumulation will start when the OTF becomes active ("1"); this flag can then be unstable, but the accumulation goes on. In a nominal dithering case, the accumulation will stop when both `Pointing_Duration` and `Pointing_ID_lower_word` are set to zero. Then the spectra are compressed (no accumulation is feasible during compression) and downloaded while the next accumulation can start again when the above conditions are met again. The "start-pointing memory" process allows IASW to restart a building after the compression if the conditions were raised during the compression (and not erased by a stop-pointing condition)

In an extended pointing observation, the accumulation will be stopped when the spectra accumulation duration is elapsed (nominally 27 minutes, which is the proposed ground default value). Then the spectra are compressed and downloaded while the next accumulation starts again if both `Pointing_Duration` and `Pointing_ID_lower_word` are identical to the values before the last compression. If not, a new pointed target preparation is to be executed (enabling conditions and start on OTF).

- TM rate adjustment: the synchronisation of the accumulation with the successive pointings depends on the allocation to SPI of a sufficient rate to guarantee that the spectra download is done in a quite similar or less time than the accumulation duration. In case of a too low TM rate, the IASW will no longer be able to follow the successive pointings due to an impossibility to compress the data because the previous transmission is not yet completed. In this case the IASW will wait until the spectra compression is possible, then compress the pending accumulated spectra, start its transmission and prepare for the next target accumulation. If such a case occurs while in a long exposure, meaning that `IASW_Duration` was elapsed, then the accumulation will go on until the compression is possible as far as the `Pointing` parameters in BCP remain identical.
- Requested configuration from the ground: To optimise the use of the TM rate, the ground will set the `IASW_Duration` to a value just longer than the `Pointing_Duration`, to ensure that, in case of a "short" dithering (Galactic Plane survey), the `IASW_Duration` is never elapsed when the accumulation is stopped. In any case, both durations must remain consistent with the duration to download a spectrum which, according to the present calculation, is 30 minutes. It is now proposed to nominally set the `Pointing_Duration` to 2200s and `IASW_Duration` to 1 hour, when Galactic Plane survey is scheduled. For extended pointing observation, the `IASW_Duration` can stay at its default ground value (1 hour = 3600 s).

1.1.11.2. Spectra constituents in TM emergency mode

The IASW builds the spectra from:

- the data included in DFEE SP *i* (Spectra for chain *i*) (in this case the DFEE is configured to put in the SP *i* blocks only the single events)
- and (according to a configuration parameter):
 - either the energy of the PE (PSD events) events flagged as multiple by the PSD ($S/M = 1$)
 - or the energy of all correlable PE events.

1.1.11.3. Spectra organisation and location

The 19 spectra are organised in memory exactly on the same scheme.

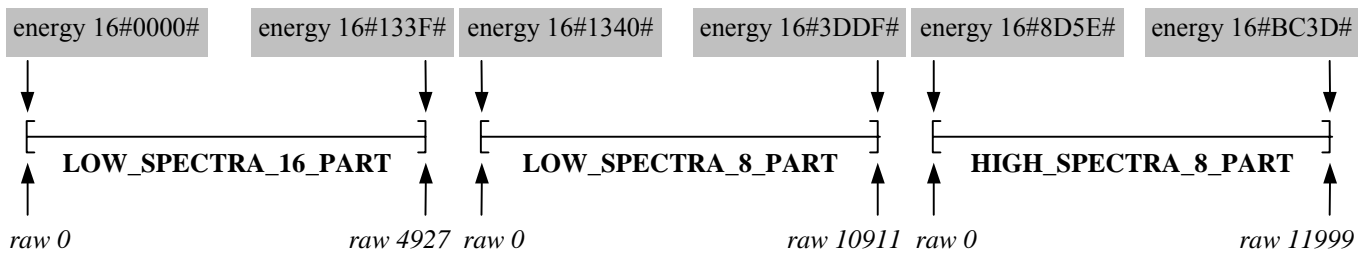
So, each spectra is composed of three continuous arrays in memory.

The first one, called LOW_SPECTRA_16_PART, stores channels of low energy coded on 16 bits each.

The second one, called LOW_SPECTRA_8_PART, stores channels of low energy, coded on 8 bits each.

The third one, called HIGH_SPECTRA_8_PART, stores channels of high energy, coded on 8 bits each.

SPECTRA i



Spectra physical addresses:

| | |
|------------|-----------|
| spectra 0 | 16#60000# |
| spectra 1 | 16#64000# |
| spectra 2 | 16#68000# |
| spectra 3 | 16#6C000# |
| spectra 4 | 16#70000# |
| spectra 5 | 16#74000# |
| spectra 6 | 16#78000# |
| spectra 7 | 16#7C000# |
| spectra 8 | 16#80000# |
| spectra 9 | 16#84000# |
| spectra 10 | 16#88000# |
| spectra 11 | 16#8C000# |
| spectra 12 | 16#90000# |
| spectra 13 | 16#94000# |
| spectra 14 | 16#98000# |
| spectra 15 | 16#9C000# |
| spectra 16 | 16#A0000# |
| spectra 17 | 16#A4000# |
| spectra 18 | 16#A8000# |



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1.1.12. ACS calibration procedure

1.1.12.1. Principle

The calibration will be initiated by the ground when the SPI is in CONFIGURATION mode, then the calibration measurements are carried out by the ACS in an autonomous way. Then the calibration data are fetched by the ground by the way of On_Request acquisitions TCs.

1.1.12.2. ACS SW requirements

The energy calibration will be allowed in Configuration, Diagnostic modes and will be started from the DPE via the **acsStartEnergyCalibration** command.

After receiving the **acsStartEnergyCalibration** command, the VCU SW will perform the energy calibration measurement, which includes the following operations:

- set calibration state to "calibration measurement active"
 - initialise complete ACS calibration buffer to 0
- reset calibration data acquisition counter to 0

LOOP over 32 energy threshold steps (first threshold value will be 1, last threshold value will be 63)

- configure all 92 (FEE's + PEB) with the energy discriminator threshold value
- configure all 92 (FEE's + PEB) with the rate-meter measurement parameter from the configuration table
- start the rate-meter measurement for all 92 (FEE's + PEB)
- wait 2 seconds
- read the 15-bit rate-meter value from all 92 (FEE's + PEB)
- store the rate-meter value in the ACS calibration buffer
- select next energy discriminator threshold value (increment by two)

In total 32 steps * 92 (FEE's + PEB) = 2944 * 15-bit rate-meter values will be acquired.

The VCU RAM usage for the calibration buffer will be 5888 bytes.

The complete ACS calibration measurement time will not exceed 168 seconds (about 2.7 minutes).

The VCU SW will maintain the calibration status in the ACS status at any time.

The acquisition of the ACS calibration buffer will be done via the HK acquisition block **acsGetCalibrationData**. The ground will send 184 times the **acsGetCalibrationData** command.

Each response block will contain 16 * 15-bit rate-meter values.



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In total $2944/16 = 184$ blocks have to be acquired from the DPE to get the complete calibration buffer.

The VCU SW will maintain the calibration data block counter, which counts from 0 to 183.

Assuming that one `acsGetCalibrationData` block will be sent per second, the transmission of the calibration buffer takes 184 seconds or 3.1 minutes.

An active ACS calibration can be aborted due to the following events:

- **New mode command (Valid mode transition)**

If Standby will be commanded as new mode, the calibration status will be set to "*calibration not allowed*", for all other mode transitions, the calibration status will be set to "*calibration allowed*". In this case, the calibration process is stopped and the new mode command is executed.

- **Reset-HV command**

This command is only allowed in Configuration mode, the Calibration status will be set to "*ready for dump calibration buffer*".

The calibration abortion will be indicated in the ACS status by setting the bit "ACS calibration aborted" and can be read from the DPE. This bit will be reset after reading from the DPE.

In all ACS modes and calibration states, the VCU SW allows the dumping of the ACS calibration buffer, (e.g. after an ACS calibration abortion). The ACS calibration buffer will be set to 0 (initialised) after receiving the `acsStartEnergyCalibration` command.

In case of an ACS calibration abortion, the last used energy threshold value can be read out in the diagnostic data.

During an active ACS calibration, an incoming configuration command will be accepted from the VCU SW and will be stored in the configuration table, but the configuration command will not be forwarded to the HW at once. The status of the configuration table will be set to "not initiated to HW". After the ACS calibration will be completed, the configuration table will be forwarded to the HW and the bit not yet initiated to HW^c will be reset to ,0^c.

During an active ACS calibration the VCU SW will perform all functions (e.g. gamma ray measurements, HK data acquisition, etc.). Only the cyclic forwarding of the configuration table to the HW will be stopped for the calibration measurement phase.

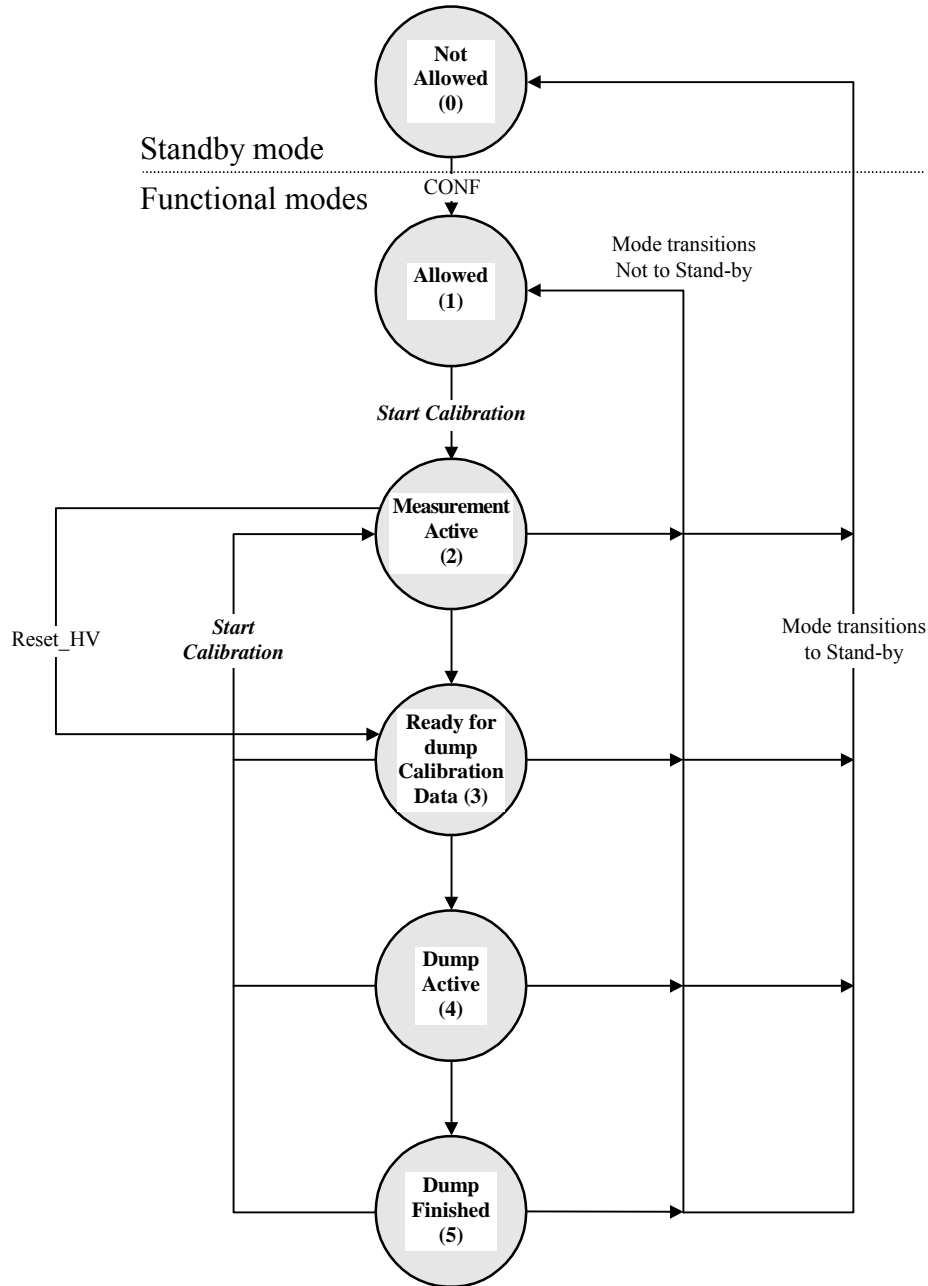


Figure 1.6 - ACS Energy Calibration Diagram

The different steps of the Calibration phase will be available in the CSSW HK packet (FTPN 240108: E1399). Once the Calibration is started, the ACS S/W still fulfills the requirements of the LSL protocol; the HK acquisitions commands are answered nominally and the Configuration HKs reflects the last loaded configuration before the beginning of the Calibration. While the Calibration is active, the ACS SW can receive some configuration command, but the actual execution is delayed as long as the Calibration is active.



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1.1.12.3. IASW functioning principle

The IASW does not monitor the Calibration phase of the ACS. The IASW responsibility consists in the execution of 2 TCs routed to ACS: one to start the Calibration process and one to downlink the calibration data. This last TC must be sent 184 times.

1.1.12.4. Operational constraints

Prior to starting the Calibration, the ground will guarantee that the requested configuration has been loaded to the ACS and that the HK0 medium byte of the ACS equals 0 (no error).

The Calibration will be programmed outside the belts since the HVs need to be on.

If any event (IREM, ESAM) occurs while the calibration is active, the calibration data is meaningless, and another calibration session needs to be carried out.

The ACS calibration process lasts for 5 hours (50 elementary runs) and will be performed twice a year (TBC). It will be done during the cooling and annealing phases and during the detectors outgassing phase.

1.1.13. Automatic transitions (flares, high back-ground, radiations belts)

See § 1.1.8.

1.1.14. Perigee passage

There is no more constraints than for radiations belts passages.

1.1.15. Annealing mode

The annealing operation is critical and the number of annealing shall be minimised. Therefore it shall be performed only after an agreement of the SPI scientific team. However, once a year seems to be realistic.

At the beginning of the annealing mode both annealing electronics are powered on. The dwell temperature (103°C) should be reached around 2 h later. The nominal dwell time of the annealing is 24 h. Then, the ground control centre will telecommand the transition to Stand-By mode. The cold plate temperature will decrease slowly. The cryocoolers will be switched on only when the compressor temperatures are all under + 40°C (T5006, T5007, T5024, T5025 < + 35°C) and when displacers cold tips (E0397, E0398) < +35°C around 3 days after the end of the annealing heating.



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1.1.16. Heat pipe thawing operation

Except during the initial orbit life (before the end of the outgassing), a heat pipe thaw operation shall be performed if the following condition is true: $E3392 < -73^{\circ}\text{C}$ or $E3996 < -73^{\circ}\text{C}$.

The heat pipe thaw can be stopped when the parameters T5102, T5103, T5109, T5110, T5104 and T5111 are all over -47°C .

1.1.17. Cold plate temperature monitoring

The IASW shall switch OFF the Ge detector high voltage when the detector plate temperature exceeds a given threshold.

This monitoring capability shall be disabled by a configuration parameter and shall use a common filter on the 4 sensors cold plate temperatures with 4 thresholds (one for each sensor) adjustable by 6 configuration parameters (4 thresholds, a monitoring status, a filter counter).

This monitoring shall be disabled at the IASW initialisation, in order to avoid an automatic action before the end of cooling. The Ground Control Centre will **enable** this monitoring **just after** the Ge detector high voltage switching ON. This switching ON shall be telecommanded only if all the 4 cold plate temperatures are strictly below the 4 respective thresholds used by the IASW monitoring. The Ground Control Centre shall **disable it** when the cryocooler are switched OFF, especially when an annealing phase is started. When the detector temperature monitoring is disabled the counting filter is reset.

The monitoring will be made on the 4 cold plate temperatures E0391 to E0394 provided in the AFEE bloc 21 hex of the packet TPN 60602.

This monitoring will be made with the following process:

- comparison of the 4 cold plate temperatures (E0391 to E0394) to their 4 respective thresholds (E3964 to E3967) at each AFEE bloc 21 hex acquisition (i.e. 640 sec),
- if at least 2 values are over their thresholds n consecutive times (where n is the counter filter parameter E3942) the IASW will take the corrective actions.

The recovery action taken by the IASW are depending of the current SPI mode and are presented in the following table:

| IASW current mode | Automatic Recovery Actions of IASW |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Stand-by | - Disable the automatic configuration, - Generation of an on-event message. |
| Photon/Photon, TM Emergency, Diagnostic, Configuration, Calibration | - Set SPI in Stand-by mode (automatic switch OFF of the HV), - Disable the automatic configuration, - Generation of an on-event message. |

Table: Actions of the IASW when the detector temperature monitoring has triggered.



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The on-event message corresponding to the monitoring trigger action will inform the Ground Control Centre of this action and will provide it with the identification of the thermal sensor which has activated the last time the monitoring filter. The structure of this on-event message is presented here after:

| Event | Message | Class | Par 1 | Par 2 | Par 3 |
|--------------------------------------------------------------------|---------|-------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Too high detector temperature Disabling automatic configuration | Dec 209 | 2 | Hex 0 | MSB sensor 1 (E0391) LSB sensor 2 (E0392) 1 = trigger 0 = no trigger | MSB sensor 3 (E0393) LSB sensor 4 (E0394) 1 = trigger 0 = no trigger |

When the detector temperature monitoring has triggered, the Ground Control Centre will receive an on-event message, and can stop the SPI nominal operation process and send a telecommand to disable the temperature monitoring if no command to put ON the detector high voltage has been sent to the S/C. If the Ground Control Centre didn't receive the on-event message or didn't take it into account the monitoring will trigger again and send again an on-event message. If for example the counting filter parameter E3942 = 3 the new triggering will be done at least 32 minutes later. There is no risk for the spectrometer as long as the monitoring is enable.

This monitoring is able to manage the failure of one or more thermal sensors:

- in case of one failure, the corresponding threshold shall be set to FFFF Hex,
- in case of two failures, the corresponding thresholds shall be set to FFFF Hex,
- in case of three failures, the corresponding thresholds shall be set to: FFFF Hex for two of them and 0000 Hex for one of them,
- in case of the all sensors fail, the monitoring can be disabled and to avoid a cut off by enabling the monitoring all the threshold shall be set to FFFF Hex.

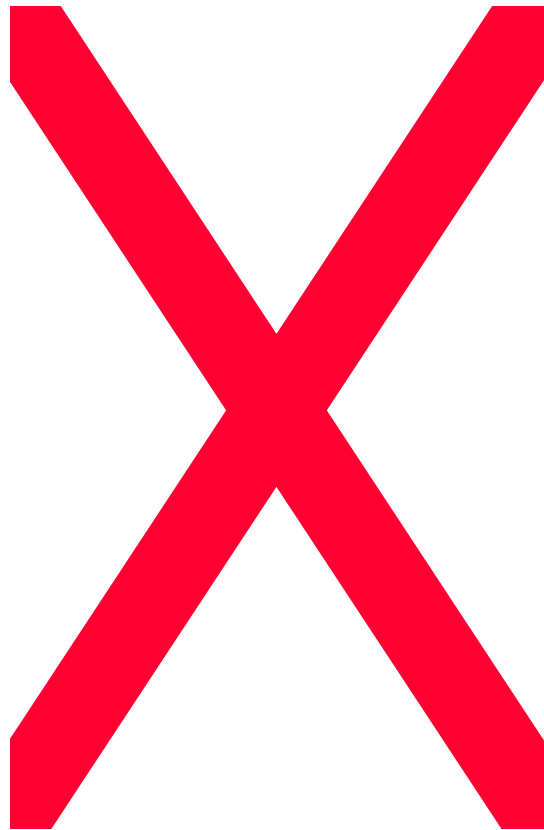


Figure 1.7. Cold plate temperature monitoring process



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1.1.18. Automatic reconfiguration capability

When the IASW is in protected status most telecommands are forbidden. When this protected status is due to radiation belts conditions, it appears that it may be useful to be able to send some configuration commands or maintenance commands for example.

The automatic configuration capability allows to give back control to the ground in this case. A nonexposure configuration parameter (E8944) may disable the automatic reconfiguration.

When then parameter is disabled and when the condition necessary to get out of the protected status are fulfilled, this status is left without any automatic reconfiguration (no automatic change mode, no automatic configuration sending).

In order to be able to send configuration and/or maintenance commands though they are radiation belts or high back ground conditions, the ground shall perform the following sequence:

- Send an IASW configuration telecommand disabling the automatic configuration capability
- Send an IASW configuration telecommand disabling the belts (resp. high background) detection capability (then the IASW gives back the control to the ground).
- Send the change mode and configuration /maintenance telecommands as necessary.
- Send an IASW configuration telecommand enabling the automatic configuration and the belts (resp. high background) detection capabilities if needed. In this case, the IASW goes back in protected status but at the end of radiation belts (resp. high background) conditions. The automatic reconfiguration stops in the mode where the IASW was when receiving the last configuration command.

The automatic reconfiguration disabling mechanism is also needed for the detection plate temperature monitoring function. In this case, it is automatically disabled on board. It has to be noted that, in this case, the configuration parameter is changed on-board.

In addition to this function, the following telecommands can be used if needed:

- SendCONF TC (E0556): to make the IASW send all the configuration commands already loaded in its configuration tables.
- SendPATCH TC (E0557): to make the IASW put the S/A in maintenance submode, send all the patches already loaded in its configuration tables and the S/A exit the maintenance submode. This telecommand allows to reset the S/A by copying from ROM to RAM and to set the variables areas with default values.



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In case of control given to the ground during radiation belts passage the scheduling would be the following. See also procedures n° 30-B and 31.

| Step | BCP events | IASW Mode | IASW Status | Configuration Set | On Event Message | Ground Actions |
|------|-------------|---------------|-------------|-------------------|------------------|---------------------------------------------------------------------------------------------------------|
| 1 | | Photon | Commanded | Conf 1 | | |
| 2 | Belts entry | | | | Flare begin | |
| 3 | | Configuration | Protected | Conf 1 | | |
| 4 | | | | | Flare End | Send TC E0518 to inhibit Automatic reconfiguration capability And radiation belts detection capability |
| 5 | | Configuration | Commanded | Conf 1 | | |
| 6 | | | | | | Send TC's with configuration set 2. Be careful of ACS HV; they should be off under radiations belts. |
| 7 | | Configuration | Commanded | Conf 2 | | |
| 8 | Belts exit | Configuration | Commanded | Conf 2 | | |
| 9 | | | | | | Send TC E0518 to activate Automatic reconfiguration capability And radiation belts detection capability |
| 10 | | Configuration | Commanded | Conf 2 | | Send TC E0557: all patches |
| 11 | | | | | | Send TC E0556: all conf |
| 12 | | | | | | Send TC: ACS HV configuration |
| 13 | | Configuration | Commanded | Conf 2 | | |
| 14 | | | | | | Send TC E0501: change mode OPER |
| 15 | | Photon | Commanded | Conf 2 | | |

In case of control given to the ground during radiation belts passage and eclipse the scheduling would be the following. See also procedures n° 30-E and 31.

| Step | BCP events | IASW Mode | IASW Status | Configuration Set | On Event Message | Ground Actions |
|------|---------------|---------------|-------------|-------------------|------------------|---------------------------------------------------------------------------------------------------------|
| 1 | | Photon | Commanded | Conf 1 | | |
| 2 | Belts entry | | | | Flare begin | |
| 3 | | Configuration | Protected | Conf 1 | | |
| 4 | Eclipse entry | | | | Eclipse begin | |
| 5 | | Standby 1 | Protected | | | |
| 6 | Eclipse exit | | | | Eclipse end | |
| 7 | | Standby 2 | Protected | | | |
| 8 | | | | | | Send TC E0518 to inhibit Automatic reconfiguration capability And radiation belts detection capability |
| 9 | | Standby 2 | Commanded | | Flare End | |
| 10 | | | | | | Send TC E0502 change mode to Conf |
| 11 | | Configuration | Commanded | | | |
| 12 | | | | | | Send TC's with configuration set 2. Be careful of ACS HV; they should be off under radiations belts. |
| 13 | | Configuration | Commanded | Conf 2 | | |
| 14 | Belts exit | Configuration | Commanded | Conf 2 | | |
| | | | | | | Send TC E0518 to activate Automatic reconfiguration capability And radiation belts detection capability |
| | | Configuration | Commanded | Conf 2 | | Send TC E0557: all patches |
| 15 | | | | | | Send TC E0556: all conf |
| 16 | | | | | | Send TC: ACS HV configuration |
| 17 | | Configuration | Commanded | Conf 2 | | |
| 18 | | | | | | Send TC E0501: change mode OPER |
| 19 | | | | | | |
| 20 | | Photon | Commanded | Conf 2 | | |



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1.2. ON-EVENT MESSAGES AND SUB-ASSEMBLIES ALERTS

1.2.1. On-event messages

| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|-------------|-------------------|-------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 6100 | Mode change | HEX 80 DEC 128 | 0 | E9750 | Par. 1 000100:commanded Alias 6850 001000: automatic 001100: protected 010000: off | Appears at each mode transition commanded by ground or triggered by BCP or by internal automatic process | If new mode is expected one: nothing to do. If not: - Without LSL error: send TC for transition to Configuration mode. - With LSL error: See LSL error event (OEM 145) Expected: commanded change mode Or on-board event Or transition Init ⇒ Standby 1 | P16 ECP1/ECP3/ ECP5/ECP7 |
| | | | | E9751 | Par. 2: Old mode HEX0049: INIT HEX0059: STANDBY1 HEX0060: STANDBY2 Alias 6851 HEX0058: CONF HEX0053: PHOTON HEX0043: CALIBRATION HEX0045:EMERGENCY_TM HEX0044: DIAGNOSTIC | | | |
| | | | | E9752 | Par. 3: New mode HEX0049: INIT HEX0059: STANDBY1 HEX0060: STANDBY2 Alias 6851 HEX0058: CONF HEX0053: PHOTON HEX0043: CALIBRATION HEX0045: EMERGENCY_TM HEX0044: DIAGNOSTIC | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|-----------------|-------------------|-------|---------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------|
| 6101 | On board events | HEX 81 DEC 129 | 0 | | Par. 1: HEX0000 | Triggered by BCP | 1: Switch OFF DPE - 2: Nothing to do 3: Nothing to do 4: Nothing to do | P102 |
| | | | | E9753 | Par. 2: HEX0000: Begin HEXFFFF: End | | | |
| | | | | E9754 | Par. 3: 1: switch off 2: eclipse 3: flare 4: esam | | | |
| 6102 | State change | HEX 82 DEC 130 | 0 | | Par. 1 HEX0000 | Appears at each IASW state transition commanded by an internal process | 0: Nothing to do 1: Nothing to do 2: Nothing to do 3: Switch OFF DPE - | P102 |
| | | | | E9755 | Par. 2: Old state 0: commanded 1: automatic 2: protected 3: off imminent | | | |
| | | | | E9756 | Par. 3: New state 0: commanded 1: automatic 2: protected 3: off imminent | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|------------|-------------------|-------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 6103 | mRTU error | HEX 90 DEC 144 | 1 | E9757 | Par. 1: Error type | Can appear during housekeeping parameters acquisition by IASW via miniRTU | Single occurrence: - real time: ignore alarm on this parameter - differed time: parameter value analysis in HK data Multiple occurrences: (more than one per hour) - switch OFF DPE - switch ON DPE If the failure remains: put SPI in Stand-by mode and call the SPI team contact. | ECP9 P12 |
| | | | | Alias 6855 | 000100: time-out 001000: ex analog acquisition error | | | |
| | | | | E9758 | Par. 2 MSB: channel / LSB: 0 | | | |
| | | | | Alias 6856 | 6: E3985 27: E3996 12: E3989 28: E3993 14: E3990 32: E3995 16: E3987 33: E3994 22: E3981 34: E3997 23: E3982 35: E3988 24: E3983 36: E3991 25: E3984 37: E3986 26: E3992 59: REF ANALOG 60: REF PT 500 65: REF YSI | | | |
| | | | | | Par. 3: HEX0000 | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|----------------|-------------------|-------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 6104 | LSL Error | HEX 91 DEC 145 | 1 | E9759 | Par. 1: Error type: 000100: time-out ⇒ No answer from s/a 001000: overrun-error ⇒ USART failure 001100: checksum error ⇒ Detected by DPE on s/a answer | Can appear during housekeeping parameters exchanges by IASW Via LSL links | Single occurrence: - real time: ignore alarm on corresponding parameter - differed time: parameter value analysis in HK data ⇒ Nothing to do Change mode or Multiple occurrences: - automatic transition to Stand-by - - switch OFF and switch ON the s/a See also UM volume 3 annexe 6: IASW user manual | ECP1/ECP3/ ECP5/ECP7 |
| | | | | Alias 6857 | 010000: nack received ⇒ Detected by s/a on DPE answer | | | |
| | | | | E9760 | Par. 2: MSB: channel 0: DFEE 1: PSD 2: AFEE 3: ACS | | | |
| | | | | Alias 6858 | Par. 2: LSB: if nack received, value of the nack, otherwise 0. | | | |
| | | | | E9761 | Par. 2: LSB: if nack received, value of the nack, otherwise 0. | | | |
| | | | | E9762 | Par. 3: MSB: type of telecommand (K, C, M...) | | | |
| | | | | Alias 6859 | | | | |
| | | | | E9763 | Par. 3: LSB: HK or command number or 0. | | | |
| 6105 | HSL error | HEX 92 DEC 146 | 1 | E9764 | Par. 1: 001000: HSL busy | | Simple occurrence: Nothing to do Multiple occurrences: Reset the DPE following the dedicated procedure. If the alarm has disappeared, continue the previous activities. If not, keep SPI in stand-by mode and call the SPI team contact. | ECP9 |
| | | | | | Par. 2: HEX0000 | | | |
| | | | | | Par. 3: HEX0000 | | | |
| 6106 | Autotest error | HEX A0 DEC 160 | 2 | E9765 | Par. 1: Sub assembly: 000100: AFEE 001000: ACS 001100: PSD 010000: DFEE | HK are not acquired from the s/a on error. SPI is in Standby1 mode. | Switch OFF then switch ON the concerned s/a. If the problem remains change the parameter value (Increase by 2 seconds the delay before autotest acquisition ⇒ E8972), switch OFF then switch ON the concerned s/a again and call the SPI team contact. | ECP13/ECP14/ ECP15/ECP16 |
| | | | | Alias 6860 | | | | |
| | | | | E9766 | Par. 2: MSB: HK0 high byte | | | |
| | | | | E9767 | Par. 2: LSB: HK0 medium byte | | | |
| | | | | E9768 | Par. 3: MSB: HK0 low byte | | | |
| | | | | | Par. 3: 0. | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|---------------------------------|-------------------|-------|---------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| 6106 | Configuration status error | HEX B0 DEC 176 | 2 | E9765 | Par. 1: Sub assembly: 000100: AFEE 001000: ACS 001100: PSD 010000: DFEE | Occurs in case of an automatic reconfiguration. The automatic process is stopped | Identify in s/a HK0 which parameter named all command initiated (E3883/E3886/E3889/E3892) is # 0. | |
| | | | | E9766 E9767 | Par. 2: MSB: HK0 high byte Par. 2: LSB: HK0 medium byte | | Switch OFF and switch ON the concerned s/a. Send manually all the required TCs in order to set the spectrometer in the expected mode. | ECP1/ECP3/ ECP5/ECP7 ECP xx |
| | | | | E9768 | Par. 3: MSB: HK0 low byte Par. 3: 0. | | If the problem remains, change the parameter value (Increase by 8 seconds the delay before configuration acquisition ⇒ E8973) then switch OFF and switch ON the concerned s/a again and call the SPI team contact. | ECP24/ECP25/ ECP26/ECP27 |
| 6107 | Automatic reconfiguration error | HEX B1 DEC177 | 2 | E9769 | Par. 1: Automatic step: 000100: autotest step | Automatic transition to Stand-by mode | Identical to autotest error 160 _{dec} then send manually all the required TCs in order to set the spectrometer in the required mode. | ECP13/ECP14/ ECP15/ECP16 |
| | | | | | 001000: conf mode step | | Send TC to configuration mode transition | P16 |
| | | | | | | | If NOK OFF/ON s/a then send manually all the required TCs in order to set the spectrometer in the expected mode. If the problem remains, change the parameter value (Increase by 8 seconds the delay before configuration acquisition ⇒ E8973) and call the SPI team contact. | ECP1/ECP3/ ECP5/ECP7 ECP24/ECP25/ ECP26/ECP27 |
| | | | | | 001100: conf load step | | Correlate with LSL error 145 _{dec} . Send all conf. If NOK send TC to configure the s/a in error. | P17-5 P17-1/P17-3 P17-4/P17-7 |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|-------|---------|-------|---------------------------|--------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| | | | | | 010000: patch load step | | Correlated with LSL error 145 _{dec} . Send all patches. If OK, send all conf | P17-6 P17-5 |
| | | | | | | | then send manually all the required change mode TCs in order to set the spectrometer in the expected mode. | Change mode TC |
| | | | | | | | If NOK, increase E8949 by 1s, E8952 by 0.125s, E8956 by 4s s/a ROM/RAM delay values. | ECP28/ECP29/ ECP30 |
| | | | | | | | Send all patches | P17-6 |
| | | | | | | | Then if OK, send manually all the required change mode TCs in order to set the spectrometer in the expected mode. | Change mode TC |
| | | | | | 010100: conf status step | | Identify in s/a HK0 which parameter named all command initiated (E3883/E3886/E3889/E3892) is # 0. | |
| | | | | | | | Switch OFF and switch ON the concerned s/a. | ECP1/ECP3/ ECP5/ECP7 |
| | | | | | | | Send manually all the required TCs in order to set the spectrometer in the expected mode. | Change mode TC |
| | | | | | | | If the problem remains, change the parameter value (Increase by 8 seconds the delay before configuration acquisition => E8973) then switch OFF and switch ON the concerned s/a again and call the SPI team contact. | ECP24/ECP25/ ECP26/ECP27 |
| | | | | | 011000: start mode step | | Send TC to configuration mode transition | P16 |
| | | | | | | | If NOK OFF/ON s/a | ECP1/ECP3/ ECP5/ECP7 |
| | | | | | | | then send manually all the required TCs in order to set the spectrometer in the expected mode. | Change mode TC |
| | | | | | | | If the problem remains, change the parameter value (Increase by 8 seconds the delay before configuration acquisition => E8973) and call the SPI team contact. | ECP24/ECP25/ ECP26/ECP27 |
| | | | | | Par. 2: HEX0000 | | | |
| | | | | | Par. 3: HEX0000 | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|-------------------------|-------------------|-------|---------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 6108 | TC not executed | HEX C0 DEC 192 | 3 | | Par. 1: HEX0000 | | | |
| | | | | E9770 | Par. 2: Source sequence count of the TC | | | |
| | | | | E9771 | Par. 3: Reason of the reject: 1: Incorrect type or subtype | | | Check the TC, correct it and send it again. |
| | | | | Alias 6862 | 2: TC not allowed 3: TC executed badly | Rejected by IASW (can be rejected by a s/a) | Check validity in IASW UM. If Conf ON/OFF TC (E0500) rejection: switch OFF/ON the s/a then send E0500 again. If change mode TC rejection: switch OFF/ON the s/a Then of the interrupted procedure If one of other TCs: send it again. If NOK call the SPI team contact. | ECP1/ECP3/ ECP5/ECP7 ECP1/ECP3/ ECP5/ECP7 |
| | | | | | 4: TC timeout 5: State OFF | DPE failure In case of imminent switch OFF | Send it again. If NOK, switch OFF DPE. Nothing to do. | P102 |
| 6109 | LVPS AFEE switch off | HEX D0 DEC 208 | 2 | | Par. 1: HEX0000 | Occurs when the low voltage power supply of one or more detection chains are higher than a defined threshold | Check the LV monitoring parameter (E8977 and E8978). If # than specified, back to configuration mode set the right value and send TC for correct AFEE configuration, then send TC for transition to the required operational mode. If the right value had been uploaded call the SPI team contact. | ECP12 P13-P/P14/P15 |
| | | | | E9772 | Par. 2: Channel (0...18) | | | |
| | | | | | Par. 3: HEX0000 | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|---------------------------------------|-------------------|-------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 6110 | Cold plate temperature overflow | HEX D1 DEC 209 | 2 | | Par. 1: HEX0000 | 0: No trigger 1: Trigger | Check sensors temperatures thresholds and the related filter (E8964 to E8967 and E8942) If # than specified, back to configuration mode set the right value and send TC for correct AFEE configuration, then send TC for transition to the required operational mode. If the right value had been uploaded call the SPI team contact. Plot the temperatures parameters (E0391 to E0394) evolution since 24 hours. | ECP17 P13-P/P14/ P15 |
| | | | | E9773 E9774 Alias 6864 | Par. 2: MSB sensor 1 Par. 2: LSB sensor 2 | | | |
| | | | | E9775 E9776 Alias 6864 | Par. 3: MSB sensor 3 Par. 3: LSB sensor 4 | | | |
| 6111 | Software error | HEX E0 DEC 224 | 1 | | Par. 1: HEX0000 | | Single occurrence: nothing to do. Multiple occurrences: call the SPI team contact. | N/A |
| | | | | E9777 | Par. 2: Faulty task id | | | |
| | | | | | Par. 3: HEX0000 | | | |
| 6113 | Patches area overflow | HEX E2 DEC 226 | 1 | | Par. 1: HEX0000 | May occurs during an automatic reconfiguration | Try to optimize patch table. If NOK, disable automatic reconfiguration and use load patch TC. | P30-B P17-6 |
| | | | | E9779 | Par. 2: patch TC source sequence count | | | |
| | | | | | Par. 3: HEX0000 | | | |
| 6116 | Partial flag | HEX E5 DEC 229 | 1 | | Par. 1: HEX0000 | | Single occurrence: call SPI team contact and inform ISDC. Multiple occurrences (more than one per second): Check HSL buffer length, IASW and DFEE are correct Check ACS counting rates. If DFEE parameters Count veto gate (Exxxx) ≥ 200000 Back to Configuration mode and set ACS HV OFF IF DFEE parameters Count veto gate ≤ 200000 call the SPI team contact. | ECP23 |
| | | | | E9783 Alias 6865 | Par. 2: Subblock identifier 0 SE 1 ME 2 PE 3 SP0 4 SP1 5 SP2 6 SP3 7 SP4 8 SP5 9 SP6 10 SP7 11 SP8 12 SP9 13 SP10 14 SP11 15 SP12 16 SP13 17 SP14 18 SP15 19 SP16 20 SP17 21 SP18 | | | |
| | | | | | Par. 3: HEX0000 | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|------------------------------------------------------|-------------------|-------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 6116 | Subblock of words >= 8192 | HEX E6 DEC 230 | 1 | | Par. 1: HEX0000 | | Single occurrence: call SPI team contact and inform ISDC. Multiple occurrences (more than one per second): Check ACS counting rates. If DFEE parameters Count veto gate (Exxxx) ≥ 200000 Back to Configuration mode and set ACS HV OFF If DFEE parameters Count veto gate ≤ 200000 call the SPI team contact and inform ISDC. | ECP23 |
| | | | | E9783 | Par. 2: Subblock identifier 0 SE 1 ME 2 PE 3 SP0 4 SP1 5 SP2 6 SP3 7 SP4 8 SP5 9 SP6 10 SP7 11 SP8 12 SP9 13 SP10 14 SP11 15 SP12 16 SP13 17 SP14 18 SP15 19 SP16 20 SP17 21 SP18 | | | |
| | | | | Alias 6865 | Par. 3: HEX0000 | | | |
| 6117 | Spectra building / compression transmission messages | HEX F0 DEC 240 | 0 | E9784 | Par. 1: Spectra phases 000000: start building 000001: stop building 000100: start compression 000101: stop compression 001000: start transmission 001001: stop transmission | | Informative nominal messages: nothing to do See also UM volume 3 annex 6: IASW user manual | N/A |
| | | | | Alias 6866 | Par. 2: Upper 16 bits pointing ID (PID) for start building Upper 16 bits pointing ID (PID) for stop building 0 for start compression 0 for stop compression 0 for start transmission 0 for stop transmission | | | |
| | | | | E9785 | Par. 3: Lower 16 bits pointing ID (PID) for start building Lower 16 bits pointing ID (PID) for stop building 0 for start compression 0 for stop compression 0 for start transmission 0 for stop transmission | | | |



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| Identifier | Event | Message | Class | Param. /Alias Ident | Parameter | Comments | Errors processing | Procedure to be used |
|------------|---------------------------------------|-------------------|-------|---------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 6118 | Failure in analysing HSL data | HEX F2 DEC 242 | 1 | E9786 | Par. 1: HSL lines DFEE: HEX0000 PSD: HEX0001 | | Single occurrence: Call SPI team contact and inform ISDC. Multiple occurrences (more than one per second): Check HSL buffer length. Check ACS counting rates. If DFEE parameters Count veto gate (Exxxx) ≥ 200000 Back to Configuration mode and set ACS HV OFF If DFEE parameters Count veto gate ≤ 200000 call the SPI team contact and inform ISDC. | ECP23 |
| | | | | E9787 | Par. 2: Synchro word error 1: EOT 2: EOP 3: SOP 4: invalid number of events and curves | | | |
| | | | | E9788 | Par. 3: Level of error 1: single 2: double 3: invalid | | | |
| 6119 | Spectra building not completed | HEX F3 DEC 243 | 1 | | Par. 1: HEX0000 | When the task is pre-empted | Single occurrence: correlation to science data Multiples occurrences: failures on counting rates and call the SPI team contact and inform ISDC. | N/A |
| | | | | E9780 | Par. 2: Detector identifier | | | |
| | | | | | Par. 3: HEX0000 | | | |
| 6119 | Spectra compression not completed | HEX F4 DEC 244 | 1 | | Par. 1: HEX0000 | When the time-out has occurred | Call SPI team contact and inform ISDC | |
| | | | | E9780 | Par. 2: Detector identifier | | | |
| | | | | | Par. 3: HEX0000 | | | |
| 6119 | Spectra compression overflow | HEX F5 DEC 245 | 1 | | Par. 1: HEX0000 | When the space has overflowed | Call SPI team contact and inform ISDC | |
| | | | | E9780 | Par. 2: Detector identifier | | | |
| | | | | | Par. 3: HEX0000 | | | |
| 6121 | Max number of packets per 8s exceeded | HEX FB DEC 251 | 1 | E9790 | Par. 1: 000000: techno HK 000100: On Request 001000: science HK 001100: photon data 010000: spectra data | Is produced every time that more than 16 OR or 5 HK science packets need to be transmitted by 8 s. | Call SPI team contact and inform ISDC | |
| | | | | Alias 6871 | Par. 2: HEX0000 | | | |
| | | | | | Par. 3: HEX0000 | | | |



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| | | | | | | | | |
|-------|------------------------------------------|-------------------|---|-------|---------------------------|--|---------------------------------------|--|
| 6122 | Photon/Photon buffer reading error | HEX FC DEC 252 | 1 | E9792 | Par. 1: | | Call SPI team contact and inform ISDC | |
| | | | | Alias | 000000: no packet number | | | |
| | | | | 6872 | 000100: consistency error | | | |
| | | | | E9793 | Par. 2: New physical page | | | |
| E9794 | Par. 3: New index | | | | | | | |



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1.2.2. Sub-assemblies alerts and warning

The sub-assemblies state is downlinked every 8 seconds in the CSSW packet by Acknowledgement status and housekeeping parameters so called HK0. See Volume 4 chapter 1.4.8.

The parameters identifiers are given in the following table:

| | HK0 | | | |
|-------------|-------|-------|-------|-------|
| | ACK | MSB | mSB | LSB |
| AFEE | E2797 | E2594 | E2595 | E2596 |
| DFEE | E2790 | E2791 | E2792 | E2793 |
| ACS | E2798 | E2597 | E2598 | E2599 |
| PSD | E2796 | E2591 | E2592 | E2593 |

These parameters are encoded on 8 bits but are also divided in various groups of bits.

1.2.2.1. AFEE status bytes acquisition

| Byte number | MSBit n° 0 | Bit n° 1 | Bit n° 2 | Bit n° 3 | Bit n° 4 | Bit n° 5 | Bit n° 6 | LSBit n° 7 |
|-------------|-------------------------|-------------------------------------------|----------|----------|----------|---------------------------------------|--------------------------------------|-----------------------------------------|
| 1 - E2797 | Ack/nack check E0495 | Ack/nack 1rst cmd after reset E0496 | 0 | 0 | 0 | Ack/nack auto-test status E0497 | Ack/nack not allowed cmd E0498 | Ack/nack checksum error E0499 |
| 2 | 00 Hex | | | | | | | |
| 3 - E2794 | Current mode E3881 | | | 0 | 0 | Auto-test status E3882 | 0 | All cmd initiated status E3883 |
| 4 - E2795 | 0 | 0 | 0 | 0 | E0896 | 0 | E0898 | E0899 |
| 5 - E2796 | E0992 | | | | E0993 | | | |
| 6 | Checksum | | | | | | | |

Parameters values w.r.t. modes for normal work:

$E2797 \geq 80$ Hex

| | Most significant byte (E2594) | Medium significant byte (E2595) | Least significant byte (E2596) |
|---------------|----------------------------------|------------------------------------|-----------------------------------|
| Standby | 00000000=00Hex | 0000x000=00Hex or 08Hex | 00100010=22Hex |
| Configuration | 00100000=20Hex | 0000x000=00Hex or 08Hex | 00100010=22Hex |
| Operational | 01000000=40Hex | 00001000=08Hex | 00100010=22Hex |
| Diagnostic | 01100000=60Hex | 00001000=08Hex | 00100010=22Hex |
| Calibration | 01000000=40Hex | 00001000=08Hex | 00100010=22Hex |

x: means "meaningless"



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1.2.2.2. DFEE status bytes acquisition

A status bit, if equal to 1, indicates an abnormal condition, classified as Note, Warning and Alert:

- Note: an abnormal condition was encountered, but the DFEE is able of recovering. The DFEE continues working, and the status will disappear as soon as the condition disappears.
- Warning: an abnormal condition was encountered, but the cause is probably external to the DFEE and it is probably still working if no Alert bit is set. If the condition disappears, the DFEE should recover and continue.
- Alert: the DFEE does not operate correctly and requires partial or complete reset. It is not guaranteed that reset solve the problem.

The HK00 status bits included in the CSSW HK packet (FTPN n° 240108) are reset after each HK block acquisition by the IASW. In other words, they will capture any exceptional condition that will occur in between two following HK00 acquisitions. The interval between acquisitions may be 8 seconds in the SPI IASW application, but the DFEE is not aware of this and could integrate the exceptional conditions over any interval larger than 1 second. The autotests bits are remanant (they are not cleared after HK00 read). The ASIC autotest is performed at Power on and each Restart command.

| Byte number | MSBit n° 0 | Bit n° 1 | Bit n° 2 | Bit n° 3 | Bit n° 4 | Bit n° 5 | Bit n° 6 | LSBit n° 7 |
|-------------|------------------------------|----------------------------------------------|----------------------------|-----------------------------|-----------------------------|------------------------------------------|--------------------------------------|-----------------------------------------|
| 1 - E2790 | Ack/nack check E0595 | Ack/nack 1rst cmd after reset E0596 | 0 | 0 | 0 | Ack/nack auto-test status E0597 | Ack/nack not allowed cmd E0598 | Ack/nack checksum error E0599 |
| 2 | 00 Hex | | | | | | | |
| 3 - E2791 | Current mode E3884 | | | 0 | 0 | Auto-test status E3885 | AutoTstNok E4001 | All cmd initiated status E3886 |
| 4 - E2792 | Warning RunProgr E4002 | Warning HslClkOP E4003 | Alert CoherTst E4004 | Alert Coher cfg E4005 | Alert PobjPrctl E4006 | Alert SmNRUn E4007 | Alert Time Base E4008 | Alert HslErr E4009 |
| 5 - E2793 | Note TimeOut E4010 | Note Drop E4011 | Note ItemOvf E4012 | Note PobjOvf E4013 | Note Dialprtl E4014 | Note 8HzProg E4015 | Warning 8HzAbsnt E4016 | Warning DialPrty E4017 |
| 6 | Checksum | | | | | | | |

E2790 ≥ 80 Hex



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The following table indicates the active condition and severity level of the above bits, as a function of the operational mode.

| Identifier | Status field | Description | Severity |
|------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| E3885 | AutoTstNok | The PROM-resident coded showed a wrong chechsum (if in Cfg # 1 Inhib Autotst Code = 0) OR: the periodic or startup RAM verification failed (if in Cfg # 1 Inhib Autotst ASIC = 0) OR: the startup ASIC autotest failed (if in Cfg # 1 Inhib Autotst RAM = 0) | In Stand-by, Conf, Oper, Diag: Alert |
| E4001 | AutoTstASICNok | The ASIC autotest failed (if in Cfg # 1 Inhib Autotst RAM = 0) | In Stand-by, Conf, Oper, Diag: Alert |
| E4009 | AlertHslErr | During the previous second the number of erroneous HSL tranfers was >/= Cfg # 1 NhsErrThreshold | In Sand-by, Conf: don't care In Oper, Diag: Alert |
| E4008 | AlrtTimeBase | The ASIC in TimeBase is not the correct configuration: HslTst Enabled OR SysTst Enabled OR Not OscClk Enabled OR ExtClk Enabled OR Scan Active | In Sand-by, Conf: don't care In Oper, Diag: Alert |
| E4007 | AlrtSmNRUn | At least One of the ASIC state Machines is NOT Running | In Sand-by, Conf: don't care In Oper, Diag: Alert |
| E4006 | AlrtPobjPrctl | The Pobj FIFO encountered a Protocol Error condition On the Write or the Read port | In Sand-by, Conf: don't care In Oper, Diag: Alert |
| E4005 | AlrtCoherCfg | The ASIC configuration was found incompatible with the microcontroller Cfg # 2 / Cfg # 3 image ASIC lines 1, 3, 4, 5 | In Sand-by, Conf: don't care In Oper, Diag: Alert |
| E4004 | AlrtCoherTst | The ASIC test registers were found incompatible with their excepted operational state ASIC lines 6, 7, 8 | In Stand-by, Conf, Oper, Diag: Alert |
| E4003 | WarnHslClkOp | The HSL Clock is not running (Not HSLEnabled) | In Sand-by, Conf: don't care In Oper, Diag: Warning |
| E4002 | WarnRunProg | The ASIC did not enter correctly into OPER (or DIAG) mode: TframeFirst, OR RunStarting, OR NOT globalEnabledEnv, OR Not TframeEnabled. | In Sand-by, Conf: don't care In Oper, Diag: Warning |
| E4017 | WarnDialPrty | At least one of the SE, ME, PE data blocks was altered during temporary FIFO storage | In Sand-by, Conf: don't care In Oper, Diag: Warning |
| E4016 | Warn8HzAbsnt | The 8 Hz microcontroller was not entered since the last transition to CONF or OPER/DIAG | In Conf, Oper, Diag: Alert If present , other status bits are invalid |
| E4015 | Note8HzProgr | The ASIC and the microcontroller did not react in phase to the 8 HzClock | In Sand-by, Conf: don't care In Oper, Diag: Note |
| E4014 | NoteDialPrtl | At least one of the SE, ME, PE or SP data packets was partial on HSL in the previous second | In Sand-by, Conf: don't care In Oper, Diag: Note |



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| Identifier | Status field | Description | Severity |
|------------|--------------|--------------------------------------------------------------------------|-----------------------------------------------------|
| E4013 | NotePobjOvf | The Pobj logic had to discard event(s) due to overflow | In Sand-by, Conf: don't care In Oper, Diag: Note |
| E4012 | NoteItemOvf | A too long ME cascade was detected and truncated, either at Asso or Acq | In Sand-by, Conf: don't care In Oper, Diag: Note |
| E4011 | NoteDrop | At least one unconsumed Energy/Id was dropped | In Sand-by, Conf: don't care In Oper, Diag: Note |
| E4010 | NoteTimeOut | At least one Time Tagdid not receive the corresponding Energy/Id in time | In Sand-by, Conf: don't care In Oper, Diag: Note |

Note: Due to pipelining, the status encountered during Configuration mode may still be seen during the first two seconds of Operational/Diag mode. status bits declared with the Alert severity should not be checked before the third second of Operational/Diag mode.

Error operational management:

| Byte number | Bits status | Stand-by | Configuration | Operational |
|-------------|------------------------------------|------------|----------------------|--------------------------|
| 3 - E2792 | Bit 0 and bit 1 if one of them # 0 | Don't care | Don't care | Don't care |
| | Bit 2 # 0 | Reset DFEE | Reset DFEE | Reset DFEE |
| | Bit 3 to bit 7 if one of them # 0 | Don't care | Don't care | Reset DFEE |
| 4 - E2793 | Bit 0 to bit 5 if one of them # 0 | Don't care | Don't care | Depends of which bit # 0 |
| | Bit 6 # 0 | Don't care | Redundant activation | |
| | Bit 7 # 0 | Don't care | Don't care | |

1.2.2.2. ACS status bytes acquisition

| Byte number | MSBit n° 0 | Bit n° 1 | Bit n° 2 | Bit n° 3 | Bit n° 4 | Bit n° 5 | Bit n° 6 | LSBit n° 7 |
|-------------|-------------------------|----------------------------------------|----------|----------|----------|------------------------------------|-----------------------------------|-----------------------------------|
| 1 - E2798 | Ack/nack check E0695 | Ack/nack 1rst cmd after reset E0696 | 0 | E0693 | E0694 | Ack/nack auto-test status E0697 | Ack/nack not allowed cmd E0698 | Ack/nack checksum error E0699 |
| 2 | 00 Hex | | | | | | | |
| 3 - E2597 | Current mode E3887 | | | 0 | 0 | Auto-test status E3888 | 0 | All cmd initiated status E3889 |
| 4 - E2598 | E1292 | E1293 | E2131 | E2132 | E1296 | E1297 | E1298 | E1299 |
| 5 - E2599 | E1295 | 0 | 0 | E1393 | E1396 | E1399 | | |
| 6 | Checksum | | | | | | | |

E2798 ≥ 80 Hex



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| SPI mode | Most significant byte (E2597) | Medium significant byte (E2598) | Least significant byte (E2599) |
|----------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STBY | 00000000=00Hex | 0x0xxxxx=0XHex or 1XHex or 4XHex or 5XHex (nominal values) Alert if=xx1xxxx (cyclic autotest status) Warning if=1x0xxxx (watchdog power on) | 000x0000=00Hex or 10Hex (nominal value) Warning if=00001000=08Hex or 18Hex (calibration stopped) Alert if/=00Hex or 10Hex or 08Hex or 18Hex |
| CONF | 00100000=20Hex | 00x00000=00Hex or 20Hex (nominal values) Warning if=10x00000=80Hex or A0Hex (Watchdog power ON) or=x0x00010=02Hex or 22Hex or 82Hex or A2Hex (Gamma measurement data) or=x1x000x0=40Hex or 60Hex or C0Hex or E0Hex or 42Hex or 62Hex or C2Hex or E2Hex (OBT synchro loss) Alert if/=nominal values or warning values (Conf Cmd Parameter error or FEE conf error or ISB response parity or rate meter error) <u>Remark:</u> ISB response and FEE conf error must be present in CONF mode until reception of E224 by ACS | 000x00 <u>01</u> =01Hex or 11Hex or 05Hex or 15Hex (nominal values) Warning if=000x1xxx (calibration stopped) Alert if=81Hex or 85Hex or 91Hex or 95Hex (Load/Dump parameter error) or 00Hex or 10Hex or 07Hex or 17Hex (calibration flags) |
| OPER | 01000000=40Hex | 00x00000=00Hex or 20Hex (nominal values) Warning if=10x00000=80Hex or A0Hex (Watchdog power ON) or=x0x00010=02Hex or 22Hex or 82Hex or A2Hex (Gamma measurement data) or=x1x000x0=40Hex or 60Hex or C0Hex or E0Hex or 42Hex or 62Hex or C2Hex or E2Hex (OBT synchro loss) Alert if/=nominal values or warning values (Conf Cmd Parameter error or FEE conf error or ISB response parity or rate meter error) | 000x00 <u>01</u> =01Hex or or11Hex or 05Hex or 15Hex (nominal values) Warning if=000x1xxx (calibration stopped) Alert if=81Hex or 85Hex or 91Hex or 95Hex (Load/Dump parameter error) or 00Hex or 10Hex or 07Hex or 17Hex (calibration flags) |
| DIAG | 01100000=60Hex | 00x00000=00Hex or 20Hex (nominal values) Warning if=10x00000=80Hex or A0Hex (Watchdog power ON) or=x0x00010=02Hex or 22Hex or 82Hex or A2Hex (Gamma measurement data) or=x1x000x0=40Hex or 60Hex or C0Hex or E0Hex or 42Hex or 62Hex or C2Hex or E2Hex (OBT synchro loss) Alert if/=nominal values or warning values (Conf Cmd Parameter error or FEE conf error or ISB response parity or rate meter error) | 000x00 <u>01</u> =01Hex or 11Hex or 05Hex or 15Hex (nominal values) Warning if=000x1xxx (calibration stopped) Alert if=81Hex or 85Hex or 91Hex or 95Hex (Load/Dump parameter error) or 00Hex or 10Hex or 07Hex or 17Hex (calibration flags) |
| CAL | 01000000=40Hex | 00x00000=00Hex or 20Hex (nominal values) Warning if=10x00000=80Hex or A0Hex (Watchdog power ON) or=x0x00010=02Hex or 22Hex or 82Hex or A2Hex (Gamma measurement data) or=x1x000x0=40Hex or 60Hex or C0Hex or | 000x00 <u>01</u> =01Hex or 11Hex or 05Hex or 15Hex (nominal values) Warning if=000x1xxx (calibration stopped) |



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| SPI mode | Most significant byte (E2597) | Medium significant byte (E2598) | Least significant byte (E2599) |
|----------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| | | E0Hex or 42Hex or 62Hex or C2Hex or E2Hex (OBT synchro loss) Alert if/=nominal values or warning values (Conf Cmd Parameter error or FEE conf error or ISB response parity or rate meter error) | Alert if=81Hex or 85Hex or 91Hex or 95Hex (Load/Dump parameter error) or 00Hex or 10Hex or 07Hex or 17Hex (calibration flags) |

001: should be 101 if a previous ACS CAL DUMP was completed since last power on.

1.2.2.4. PSD status bytes acquisition

| Byte number | MSBit n° 0 | Bit n° 1 | Bit n° 2 | Bit n° 3 | Bit n° 4 | Bit n° 5 | Bit n° 6 | LSBit n° 7 |
|-------------|-------------------------|----------------------------------------|----------|----------|----------|------------------------------------|-----------------------------------|-----------------------------------|
| 1 - E2596 | Ack/nack check E0795 | Ack/nack 1rst cmd after reset E0796 | 0 | 0 | 0 | Ack/nack auto-test status E0797 | Ack/nack not allowed cmd E0798 | Ack/nack checksum error E0799 |
| 2 | 00 Hex | | | | | | | |
| 3 - E2591 | Current mode E3890 | | | 0 | 0 | Auto-test status E3891 | 0 | All cmd initiated status E3892 |
| 4 - E2592 | E1495 | 0 | 0 | 0 | 0 | E1494 | 0 | 0 |
| 5 - E2593 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Checksum | | | | | | | |



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Parameters values w.r.t. modes for normal work:

E2796 ≥ 80 Hex

| | Most significant byte (E2591) | Medium significant byte (E2592) | Least significant byte (E2593) |
|---------------|----------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------|
| Standby | 00000000=00Hex | 0X0000X=00Hex or 01Hex or 40Hex or 41Hex | 00000000=00Hex |
| Configuration | 00100000=20Hex | 0X000 <u>0</u> 0X=00Hex or 01Hex or 04Hex or 05Hex or 40Hex or 41Hex or 44Hex or 45Hex | 00000000=00Hex |
| Operational | 01000000=40Hex | 0X00000X=00Hex or 01Hex or 40Hex or 41Hex | 00000000=00Hex |
| Diagnostic | 01100000=60Hex | 0X00000X=00Hex or 01Hex or 40Hex or 41Hex | 00000000=00Hex |
| Calibration | 10000000=80Hex | 0X00000X=00Hex or 01Hex or 40Hex or 41Hex | 00000000=00Hex |

0: set to 1 during library upload

x: means “meaningless”



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1.3. OPERATIONAL CONSTRAINTS

- Oper-Const – 1 Camera High Voltage switch ON.

For each HV switch ON from ground, the ground segment shall monitor in real time the E0350 to E0368 parameters (DC output voltage) by the mean of 19 plots (Y axis from 2.5 volts to 0 for DC output voltage, X axis is time). These plots shall be refreshed by sending around each second the corresponding on request telecommand E0026 during 5 minutes. It is recommended to wait the downloading of the cyclical packet TPN 60601 in order to not disturb the on request acquisition before sending the TC E0004 (switch ON HV)

- Oper-Const – 2 Cold plate temperature monitoring in annealing mode.

An abnormal high temperature due to an annealing temperature electronic control failure could damage the detection chains (in particular the detectors) and the cryocoolers. In order to cover a failure of the annealing electronic during a non coverage ground control period, the temperature of the cold plate is controlled by the S/C and the annealing is stopped in case of too high temperature.

- Action: If T5107 or T5114 > threshold (111°C), the S/C switches off the annealing heater.

- Oper-Const – 3 ACS SW Maintenance

Due to the non HK acquisition, it is mandatory to switch off ACS HV before ACS SW maintenance and to set the HV to the previous values after ACS SW maintenance.

- Oper-Const – 4 OEM when IASW is in OFF imminent switch OFF state.

One OEM (TC rejected, state OFF) is downlinked each 8 seconds due to the fact that the BCP is rejected. To leave this state, SPI shall be put in inactive mode (procedure P6 - STBINA). In this case, IASW will react by “TC rejected” OEM for each TC sent to the DPE. Don't care.

- Oper-Const – 5 AFEE energy mode update

The IASW configuration parameter can be updated in Operational mode. The new parameter value will be taken into account at the time of the next transition toward the Operational mode.

- Oper-Const – 6 ACS-Calibration procedure.

This procedure shall be performed only when ACS is in configuration (i.e. Annealing, Outgassing, Configuration modes) in order to not disturb science data. On specific request it can be performed also in Diagnostic mode.

- Oper-Const – 7 VCU watchdog configuration.

This parameter (E7025) is set to 0 (disable) after switch ON (default on-board value), but shall be enabled by configuration file loading for normal operation. This is what is done in procedures given hereafter (see TPF files: ES1730_AS-VTPLS_...).

- Oper-Const – 8 Null spectrum accumulation duration value.

It is equivalent to remove spectra building.



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- Oper-Const – 9 Diagnostic process.

When Diagnostic process is required for ACS sub-assembly no more acquisition can be performed at the same time.

- Oper-Const – 10 Operation under radiation belts.

When technological operations under radiation belts are needed, the automatic reconfiguration capability shall be inhibited. In this case, the ground shall take care with the ACS high voltage which shall be OFF when configuration process is performed.

- Oper-Const – 11 Eclipse exit TC sending.

The ground control has to make sure that the real eclipse exit is done before sending eclipse exit TC (E0555). There is no control at IASW level.

- Oper-Const – 12 Eclipse exit.

In case of automatic reconfiguration inhibition, ground control shall send ON/OFF configuration TC (E0500)

- Oper-Const – 13 ACS PMT switch ON after Outgassing.

The ground control has to wait one day before PMT switching ON.

- Oper-Const – 14 In case of flares.

In case of flares appearance in Operational modes, the return to the Configuration mode takes a certain time. It is possible that some sub-assemblies (PSD) will be in Configuration mode before IASW. Then the IASW will generate an OEM "Failure in analysing HSL data". The ground control shall not take this message into account.

- Oper-Const – 15 Patch and dump processes.

The ground control shall verify that the memory addresses are in the concerned sub-assemblies memory limits. For memory limits, refer to S/A Ums in SPI UM Vol. 3.

- Oper-Const – 16 Double CSSW packets.

Sometime, the CSSW can post 2 identical packets. Don't take care.

- Oper-Const – 17 DFEE maintenance.

After DFEE maintenance operation, the configuration telecommand shall be resent. DFEE loses its configuration when having maintenance process.

- Oper-Const – 18 VCU power down

If the high voltage intentionally will be switched off it is recommended to command "HV off" at least 5 sec before the VCU and thus the FEE are powered down.

- Oper-Const – 19 On-request TC's management.

When an OR follows its corresponding configuration TC, a time should be entered by ground segment. This time is needed by S/A to configure physically the equipment. The timing is given in procedures



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(see for example CONF-ACS).

- Oper-Const – 20 BCP's rejected during the automatic reconfiguration.

BCP's are rejected and not recorded during the automatic reconfiguration therefore certain fugitive events that are in these BCPs are not taken into account by IASW.

- Oper-Const – 21 Maintenance processes in Operational modes and Stand-by mode.

Maintenance processes in Operational modes and Stand-by mode are forbidden. If inadvertently a TC is sent, it is rejected by sub-assemblies and IASW, but the cyclical acquisitions to the S/A are stopped by IASW. It is necessary to send to the concerned sub-assembly a Stop maintenance TC to restart the cyclical acquisition.

- Oper-Const – 22 Passage from Configuration to Operational mode and dithering triggering synchronisation.

Need to have at least a BCP after Configuration to Science mode containing:

- ◆ PID = 0 (the lowest word of the Pointing ID in the BCP (the Exposure Number in the current Orbit))
- ◆ Pointing Duration = 0
- ◆ ACC Current Mode equal to "Inertial Pointing Mode"

Need to have a transition in the BCP of On Target Flag from 0 to 1.

- Oper-Const – 23 Telecommands sending rate.

A temporizing is needed between two certain TCs uplinking. When necessary it is indicated in the flight procedures.

- Oper-Const – 24 Chronological order for ACS configuration telecommand sending.

For the ACS the TC E0222 shall be sent first, followed by TC E0224. This constraint is also connected to Oper – Const n° 19. This constraint is reflected in procedures (see CONF-ACS).

- Oper-Const – 25 Deleted

- Oper-Const – 26 Cryocoolers management

See Volume 3 annex 16.

- Oper-Const. – 27 ACS test pulse generator use

When operating with the test pulse generator, event threshold must be greater or equal to 10 dec (raw-value) = 44 mV (eng-value) and the adjustment "forced" for the veto signal generation should be used, in order to get veto events.

- Oper-Const. – 28 GeD temperature wrt High Voltage switch ON.

GeD HV shall never be applied if the GeD temperature is not in the range $35\text{ K} < T < 100\text{ K}$.

- Oper-Const. – 29 TM emergency transition



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In case of a higher than expected level of background radiation, the TM emergency mode should not be used without the agreement of the SPI scientists team. Before using this mode several intermediate solutions could be adopted such as thresholds level modifications. This mode shall be used in case of contingencies.

- Oper-Const. – 30 Thermal control
 - Compressors heaters A
 - CDE heaters B
 - Camera units thermal control R
 - Mask – ACS heaters R

Shall always be ON

- Oper-Const. – 31 Annealing mode transition

The annealing mode shall not be used without the agreement of the SPI scientists team.

- Oper-Const. – 32 Compliance between TM share and PST

The TM share shall be set at the same value of the PST.

- Oper-Const. – 33 Delay between sending TC E0004 and E0014

The delay between the sending of these two telecommands shall be 25 seconds.

- Oper-Const. – 34 Constraints in Cryocooler Launch Lock Mode

- Both CDEs must be set in Launch Lock Mode Both CDEs must be set in Launch Lock Mode
- Both CDEs must be set as Master Both CDEs must be set as Master
- Both CDEs must be supplied by LCL 1 + 2
- SPI shall be under thermal control that means :
 - Cryocooler A (Main) enable,
 - Units thermal control (ACS, Mask, AFEE, DFEE, PSD)

- Oper-Const. – 35 BCP accumulation leads to CSSW OEM

In case of automatic reconfiguration or a lot of patches sent by board (sendallpatch), some BCP are not treated by IASW.

In this case two CSSW OEM are produced :

- ID 3 Class 3 (Rejected/Failed TC report – TC sub-buffer full) with APID 1 (BCP)
- ID 4 Class 2 (DPE CSSW Internal error – Buffer overflow) with parameter set to IASW TC

Ground should ignore these messages if related to on-board TC (BCP).



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1.4 TELEMETRY VALIDITY AND LIMITS

1.4.1 General rules

In general, for a given TM parameter, there will be defined:

- The Validity Criterion of the TM, which defines when the TM reading is valid, for display and limit checking purposes. This is a single expression. See paragraph 1.4.2 for description and paragraph 1.4.3 for applications.
- The Limit Check Conditions, which define the criteria to enable different limit checks. It can be more than one expression.

1.4.2 TELEMETRY VALIDITY CRITERIA

The validity criteria are based on the division of the HK telemetry depending on the way in which the information is acquired. As the three main routes are RTU, m-RTU and LSL, the following partition is proposed:

RTU: as soon as a parameter is acquired (all of them concern temperatures), the correspondent TM is valid: this is way no condition on the general validity of temperature TM

However different limits may be applied, one when the unit is operating (switched on) and one when it is not operating (switched off)

m-RTU: TM parameters relevant to **temperatures, voltages and current** are valid as soon as the DPE is collecting telemetry.

- DPE LCL Close
- IASW Started (IASW mode at least Standby 1 in CSSW packet)

However different limits may be applied, one when the unit is operating (switched on) and one when it is not operating (switched off)

LSL: as soon as DPE is acquiring telemetry from a S/A the correspondent TM is valid.

- DPE LCL Close
- IASW Started (at least Standby 2 Mode)
- S/A LCL Close
- S/A On for IASW
- S/A not in maintenance mode (for PSD, DFEE and VCU)

However, different limits could be applied basing on different operating modes of the S/A

To reproduce this scheme in the database are created three different kind of conditional parameters to establish the TM validity of

- all the temperatures, voltage and current acquired via m-RTU by the SDPE1 or SDPE2
- all the telemetry acquired on LSL by the SDPE1 or the SDPE2 from the different S/A.



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A list of the necessary conditional parameter to be created is presented in Table 1 and Table 2. The conditional parameter for DFEE LSL telemetry is not useful as there is not telemetry acquired via LSL from the DFEE: this is the reason why the two correspondent conditional parameter will not be created and are deleted from the tables.

| CONDITIONAL PARAMETERS | CALCULATION EXPRESSION | NOTES |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| SDPE1_ACQ | SDPE1 LCL Close \Leftrightarrow P2116.RAW = 1 AND IASW Mode NOT Init \Leftrightarrow E0049.raw > 0 | Used for TM Validity of all the temperatures, currents and voltages acquired via m-RTU by the SDPE1 |
| SDPE1_LSL_AFEE | SDPE1 LCL Close \Leftrightarrow P2116.RAW = 1 AND AFEE TM/TC Main LCL Close \Leftrightarrow P2115.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow E0049.RAW > 1 (*) AND AFEE Defined ON \Leftrightarrow E3900.RAW = 1 | Used for TM Validity of all the temperatures, voltages and current of the AFEE acquired via LSL by the SDPE1 |
| SDPE1_LSL_DFEE | SDPE1 LCL Close \Leftrightarrow P2116.RAW = 1 AND DFEE Main LCL Close \Leftrightarrow P2119.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow E0049.RAW > 1 (*) AND DFEE Defined ON \Leftrightarrow E3901.RAW = 1 AND DFEE not under maintenance \Leftrightarrow NOT ((E4359. RAW = 5) and (E4339.RAW = 1)) | Used for TM Validity of all the temperatures, voltages and current of the DFEE acquired via LSL by the SDPE1 |
| SDPE1_LSL_ACS | SDPE1 LCL Close \Leftrightarrow P2116.RAW = 1 AND ACS Main LCL Close \Leftrightarrow P2117.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow E0049.RAW > 1 (*) AND ACS Defined ON \Leftrightarrow E3902.RAW = 1 AND VCU not under maintenance \Leftrightarrow NOT ((E4359. RAW = 3) and (E4339.RAW = 1)) | Used for TM Validity of all the temperatures, voltages and current of the ACS acquired via LSL by the SDPE1 |
| SDPE1_LSL_PSD | SDPE1 LCL Close \Leftrightarrow P2116.RAW = 1 AND PSD Main LCL Close \Leftrightarrow P2120.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow E0049.RAW > 1 (*) AND PSD Defined ON \Leftrightarrow E3903.RAW = 1 AND PSD not under maintenance \Leftrightarrow NOT ((E4359. RAW = 4) and (E4339.RAW = 1)) | Used for TM Validity of all the temperatures, voltages and current of the PSD acquired via LSL by the SDPE1 |

Table 1: General TM Validity conditional parameters for SPI Main parameters.



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| CONDITIONAL PARAMETERS | CALCULATION EXPRESSION | NOTES |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| SDPE2_ACQ | SDPE2 LCL Close \Leftrightarrow P2166.RAW = 1 AND IASW Mode NOT Init \Leftrightarrow F0049.raw > 0 | Used for all the temperatures acquired via m-RTU by the SDPE2 |
| SDPE2_LSL_AFEE | SDPE2 LCL Close \Leftrightarrow P2166.RAW = 1 AND AFEE TM/TC Red LCL Close \Leftrightarrow P2165.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow F0049.RAW > 1 AND AFEE Defined ON \Leftrightarrow F3900.RAW = 1 | Used for all the temperatures, voltages and current of the AFEE acquired via LSL by the SDPE2 |
| SDPE2_LSL_DFEE | SDPE2 LCL Close \Leftrightarrow P2166.RAW = 1 AND DFEE Red LCL Close \Leftrightarrow P2169.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow E0049.RAW > 1 AND DFEE Defined ON \Leftrightarrow F3901.RAW = 1 AND DFEE not under maintenance \Leftrightarrow NOT ((F4359. RAW = 5) and (E4339.RAW = 1)) | Used for all the temperatures, voltages and current of the DFEE acquired via LSL by the SDPE2 |
| SDPE2_LSL_ACS | SDPE2 LCL Close \Leftrightarrow P2166.RAW = 1 AND ACS Red LCL Close \Leftrightarrow P2167.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow F0049.RAW > 1 AND ACS Defined ON \Leftrightarrow F3902.RAW = 1 AND VCU not under maintenance \Leftrightarrow NOT ((F4359. RAW = 3) and (E4339.RAW = 1)) | Used for all the temperatures, voltages and current of the ACS acquired via LSL by the SDPE2 |
| SDPE2_LSL_PSD | SDPE2 LCL Close \Leftrightarrow P2166.RAW = 1 AND PSD Red LCL Close \Leftrightarrow P2170.RAW = 1 AND IASW at least in Standby 2 \Leftrightarrow F0049.RAW > 1 AND PSD Defined ON \Leftrightarrow F3903.RAW = 1 AND PSD not under maintenance \Leftrightarrow NOT ((F4359. RAW = 4) and (E4339.RAW = 1)) | Used for all the temperatures, voltages and current of the PSD acquired via LSL by the SDPE2 |

Table 2: General conditional parameters for SPI Redundant parameters.

1.4.3 APPLICATION TO TECHNICAL HOUSE-KEEPING TELEMETRY

In the following tables it is reported the application of what described in the previous paragraph to the telemetry coming from the different sub-system. The following are considered:

- Cold box telemetry
- AFEE2 Power supply telemetry



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- Passive Cooling telemetry
- Analogue Chains (AFEE1) telemetry
- DFEE telemetry
- PSD telemetry
- ACS telemetry

In each table it is reported the parameter description, the interfaces on which is acquired, the acquisition rate, the range, the identifier in the database, the curve/alias number and the telemetry validity condition if requested.

| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|----------------------------------------------------------------------|------------|-----------|----------------------|-------------|--------------------|----------------------------------------------------|
| Cold Plate Temperature > Operational mode > Annealing mode | LSL | 640s | 62/128 K 62/410 K | E0391-E0394 | C: 6330 C: 6331 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| Thermal Braids Temperature > Operational mode > Annealing mode | LSL | 640s | 62/128 K 62/410 K | E0395-E0398 | C: 6330 C: 6331 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| Cold Plate Temperature C1,C2 | RTU | 8s | -193/ +63 °C | T5107,T5114 | C: 6007 | |
| 200K Cold Box Temperature | Mini - RTU | 640s | -110 / +50 °C | E3981-E3984 | C: 6002 | SDPE1_ACQ OR SDPE2_ACQ |
| 200K Cold Box Temperature I1,I2 | RTU | 8s | -130 / +35 °C | T5105,T5112 | C: 6006 | |
| PA2 Temperature | LSL | 640s | 0/511 K | E210-E228 | C: 6004 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |

Table 3: Cold Box telemetry

| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|-----------------------------------------------------|----------|-----------|-----------------|------------|--------------|----------------------------------------------------|
| AFEE DC/DC converter Temperature (LVPS Temperature) | LSL | 8s | 0 / 511 K | E0310-E328 | C: 6326 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| AFEE ADC converter Temperature | LSL | 640s | 0 / 511 K | E0330-E348 | C: 6009 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| AFEE Power Supply Temperature | Mini-RTU | 640s | -40 / +70 °C | E3995 | C: 6001 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |
| AFEE I/F TM/TC Temperature | Mini-RTU | 8s | 0 / 5 V | E3985 | C: 6005 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |
| AFEE Converter Box Temperature | RTU | 8s | -55 / +90 °C | T5011 | C: 6008 | |

Table 4: AFEE2 (Power Supply) telemetry



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| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|------------------------------------|------------|-----------|---------------|--------------|--------------|------------------------------------------|
| Heat Pipe Temperature | Mini - RTU | 640s | -110 / +50 °C | E3992, E3996 | C: 6002 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |
| Heat Pipe NGC J1-J2 | RTU | 8s | -130 / +35 °C | T5106, T5113 | C: 6006 | |
| Evaporators K3-K4 | RTU | 8s | -130 / +35 °C | T5103, T5110 | C: 6006 | |
| Adiabatic Area K1-K2 | RTU | 8s | -130 / +35 °C | T5102, T5109 | C: 6006 | |
| Passive Radiator Temperature L1-L2 | RTU | 8s | -130 / +35 °C | T5104, T5111 | C: 6006 | |

Table 5: Passive Cooling telemetry

| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|---------------------------------------------|------|-----------|--------------|-------------|---------------------------------------------------------------------|----------------------------------------------------|
| Low Detection Threshold Level | LSL | 640s | 0/255 keV | E0270-E0288 | C: 6020-6638 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| High Voltage Level | LSL | 640s | 0/5 kV | E0250-E0268 | C: 6400 C: 6421-6438 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| Direct Current Output Voltage | LSL | 640s | 0/-2.5 V | E0350-E0368 | C: 6406 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| Selection of Detector Working Range | LSL | 640s | N/A | E0230-E0248 | A: 6302 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| Man/Auto selection for Working Range | LSL | 640s | N/A | E0370-E0388 | A: 6303 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| Detector Low Voltage Acquisition | LSL | 640s | 0 / 12.2 V | E0290-E0308 | C: 6407 C: 6378 C: 6379 C: 6386-6399 C: 6408 C: 6409 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| AFEE I/F TM/TC Source Current 1mA | LSL | 640s | | E0001 | C: 6327 | SDPE1_ACQ_AFEE for EXXX SDPE2_ACQ_AFEE for FXXX |
| AFEE I/F TM/TC electronic Board Temperature | LSL | 640s | -40 / +70 °C | E0002 | C: 6328 | SDPE1_LSL_AFEE for EXXX SDPE2_LSL_AFEE for FXXX |
| AFEE I/F TM/TC Box | RTU | | -55 / | T5010 | C: 6008 | |



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| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|-----------------------|------|-----------|--------|------|--------------|---------------------|
| Temperature | | | +90 °C | | | |

Table 6: Analogue Chains (AFEE1) telemetry

| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|-----------------------|------------|-----------|--------------|-------|--------------|------------------------------------------|
| DFEE Box Temperature | Mini - RTU | 640s | -40/ +70 °C | E3986 | C: 6001 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |
| DFEE Box Temperature | RTU | 8s | -55 / +90 °C | T5012 | C: 6008 | |
| DFEE LVPS | Mini - RTU | 8s | 0 / 5 V | E3987 | C: 6005 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |

Table 7: DFEE telemetry

| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|----------------------------------|------------|-----------|--------------|-------|--------------|------------------------------------------|
| PSD Box Temperature | Mini - RTU | 640s | -40/ +70 °C | E3988 | C: 6001 | SDPE1_ACQ OR SDPE2_ACQ |
| PSD Box Temperature | RTU | 8s | -55 / +90 °C | T5013 | C: 6008 | |
| PSD LVPS | Mini - RTU | 8s | 0 / 5 V | E3989 | C: 6005 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |
| + 5 V Digital | LSL | 64s | N/A | E3824 | C: 6352 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |
| + 5 V Analogue | LSL | 64s | N/A | E3825 | C: 6352 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |
| - 5 V Analogue | LSL | 64s | N/A | E3826 | C: 6353 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |
| A/D Global Offset | LSL | 64s | N/A | E3827 | C: 6354 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |
| DSP non memory board temperature | LSL | 64s | N/A | E3828 | C: 6411 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |
| A/D Board Temperature | LSL | 64s | N/A | E3829 | C: 6411 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |
| Analogue Mux 2 Board Temperature | LSL | 64s | N/A | E3830 | C: 6412 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |
| Analogue Mux 1 Board Temperature | LSL | 64s | N/A | E3831 | C: 6412 | SDPE1_LSL_PSD OR SDPE2_LSL_PSD |

Table 8: PSD telemetry



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| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|--------------------------------|----------|-----------|---------------|-------|--------------|--------------------------------------------------|
| VCU AC Voltage Monitoring 28 V | Mini-RTU | 8s | 0 / +38.46 V | E3990 | C: 6415 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |
| VCU AC Voltage Monitoring 28 V | LSL | 640s | 0 / +38.86 V | E2122 | C: 6403 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| VCU AC Current Monitoring 28 V | LSL | 640s | 0 / 2.25 A | E2121 | C: 6404 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| VCU + 5 V Power Supply | LSL | 64s | -5 / +5 V | E2123 | C: 6413 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| VCU Temperature Monitoring | Mini-RTU | 8s | -40 / +70 °C | E3991 | C: 6001 | SDPE1_ACQ for EXXX SDPE2_ACQ for FXXX |
| UCR Tube | RTU | 8s | -55 / +90 °C | T5003 | C: 6008 | |
| ACS SSA (-Z) | RTU | 8s | -55 / +90 °C | T5021 | C: 6008 | |
| ACS LCR (+Z) | RTU | 8s | -55 / +90 °C | T5004 | C: 6008 | |
| VCU side wall | RTU | 8s | -55 / +90 °C | T5022 | C: 6008 | |
| PSAC Structural Ring +Z | RTU | 8s | -55 / +90 °C | T5005 | C: 6008 | |
| PSAC Structural Ring -Z | RTU | 8s | -55 / +90 °C | T5023 | C: 6008 | |
| UCR0 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2101 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| UCR1 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2102 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| UCR2 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2103 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| LCR0 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2104 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| LCR1 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2105 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| LCR2 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2106 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| SSA0 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2107 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| SSA1 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2108 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| SSA2 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2109 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |



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| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|-----------------------|------|-----------|-------|------|--------------|---------------------|
| | | | | | | FXXX |

Table 9: ACS telemetry

| PARAMETER DESCRIPTION | INT. | ACQ. RATE | RANGE | PREF | CURVE/ ALIAS | VALIDITY CONDITIONS |
|-------------------------------------------|------|-----------|---------------|-------------------------------------------|--------------|--------------------------------------------------|
| LVS0 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2110 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| LVS1 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2111 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| LVS2 Temperature Acquisition | LSL | 640s | -40 / +110 °C | E2112 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| VCU Temperature | LSL | 640s | -40 / +110 °C | E2113 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| Plastic Scintillator Temperature 0-2 | LSL | 640s | -40 / +110 °C | E2114-E2116 | C: 6410 | SDPE1_LSL_ACS for EXXX SDPE2_LSL_ACS for FXXX |
| FEE Digital Status +5V | LSL | 640s | N/A | E2150-E2240 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE Analogue Status +5V | LSL | 640s | N/A | E2250-E2340 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE Analogue Status -5V | LSL | 640s | N/A | E2350-E2399 E3121-E3161 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE Temperature Status | LSL | 640s | N/A | E3164-E3254 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE HV Status | LSL | 640s | N/A | E2002-E2024 E2064-E2100 E3256-E3286 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE PSAC 28V Status | LSL | 640s | N/A | E2241 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE PSAC +5V Status | LSL | 640s | N/A | E2341 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE PSAC +/-9V Status | LSL | 640s | N/A | E3162 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE PSAC HV PS1 Status | LSL | 640s | N/A | E3287 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE PSAC HV PS2 Status | LSL | 640s | N/A | E3288 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |
| FEE PSAC Auxiliary Analogue Supply Status | LSL | 640s | N/A | E3289 | A: 6400 | SDPE1_LSL_ACS OR SDPE2_LSL_ACS |

Table 9: ACS telemetry (cont'd)



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1.4.4 Limits and conditions of the telemetry parameters

In the following paragraphs will be described the limits and the condition to be apply to the limits that have to be defined in the database to monitor in coherent way the instrument telemetry. In particular the limits of telemetry parameters that are meaningless in some particular S/A configuration should be conditioned consequently as well as the limits to be applied in different conditions.



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E0001 | 1 | S | 0.997 | 1.003 | | |
| E0001 | 2 | H | 0.995 | 1.005 | | |
| E0002 | 1 | S | -30 | 50 | | |
| E0002 | 2 | H | -33 | 53 | | |
| E0210 | 1 | S | 209 | 313 | X6548 | 1 |
| E0210 | 2 | H | 208 | 323 | X6548 | 1 |
| E0210 | 3 | S | 209 | 215 | X6549 | 1 |
| E0210 | 4 | H | 208 | 216 | X6549 | 1 |
| E0211 | 1 | S | 209 | 313 | X6550 | 1 |
| E0211 | 2 | H | 208 | 323 | X6550 | 1 |
| E0211 | 3 | S | 209 | 215 | X6551 | 1 |
| E0211 | 4 | H | 208 | 216 | X6551 | 1 |
| E0212 | 1 | S | 209 | 313 | X6552 | 1 |
| E0212 | 2 | H | 208 | 323 | X6552 | 1 |
| E0212 | 3 | S | 209 | 215 | X6553 | 1 |
| E0212 | 4 | H | 208 | 216 | X6553 | 1 |
| E0213 | 1 | S | 209 | 313 | X6554 | 1 |
| E0213 | 2 | H | 208 | 323 | X6554 | 1 |
| E0213 | 3 | S | 209 | 215 | X6555 | 1 |
| E0213 | 4 | H | 208 | 216 | X6555 | 1 |
| E0214 | 1 | S | 209 | 313 | X6556 | 1 |
| E0214 | 2 | H | 208 | 323 | X6556 | 1 |
| E0214 | 3 | S | 209 | 215 | X6557 | 1 |
| E0214 | 4 | H | 208 | 216 | X6557 | 1 |
| E0215 | 1 | S | 209 | 313 | X6558 | 1 |
| E0215 | 2 | H | 208 | 323 | X6558 | 1 |
| E0215 | 3 | S | 209 | 215 | X6559 | 1 |
| E0215 | 4 | H | 208 | 216 | X6559 | 1 |
| E0216 | 1 | S | 209 | 313 | X6560 | 1 |
| E0216 | 2 | H | 208 | 323 | X6560 | 1 |
| E0216 | 3 | S | 209 | 215 | X6561 | 1 |
| E0216 | 4 | H | 208 | 216 | X6561 | 1 |

*Table 10 E and F Parameter limits – Warnings and Alerts
(S = warning; H = Alarm)*



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E0217 | 1 | S | 209 | 313 | X6562 | 1 |
| E0217 | 2 | H | 208 | 323 | X6562 | 1 |
| E0217 | 3 | S | 209 | 215 | X6563 | 1 |
| E0217 | 4 | H | 208 | 216 | X6563 | 1 |
| E0218 | 1 | S | 209 | 313 | X6564 | 1 |
| E0218 | 2 | H | 208 | 323 | X6564 | 1 |
| E0218 | 3 | S | 209 | 215 | X6565 | 1 |
| E0218 | 4 | H | 208 | 216 | X6565 | 1 |
| E0219 | 1 | S | 209 | 313 | X6566 | 1 |
| E0219 | 2 | H | 208 | 323 | X6566 | 1 |
| E0219 | 3 | S | 209 | 215 | X6567 | 1 |
| E0219 | 4 | H | 208 | 216 | X6567 | 1 |
| E0220 | 1 | S | 209 | 313 | X6568 | 1 |
| E0220 | 2 | H | 208 | 323 | X6568 | 1 |
| E0220 | 3 | S | 209 | 215 | X6569 | 1 |
| E0220 | 4 | H | 208 | 216 | X6569 | 1 |
| E0221 | 1 | S | 209 | 313 | X6570 | 1 |
| E0221 | 2 | H | 208 | 323 | X6570 | 1 |
| E0221 | 3 | S | 209 | 215 | X6571 | 1 |
| E0221 | 4 | H | 208 | 216 | X6571 | 1 |
| E0222 | 1 | S | 209 | 313 | X6572 | 1 |
| E0222 | 2 | H | 208 | 323 | X6572 | 1 |
| E0222 | 3 | S | 209 | 215 | X6573 | 1 |
| E0222 | 4 | H | 208 | 216 | X6573 | 1 |
| E0223 | 1 | S | 209 | 313 | X6574 | 1 |
| E0223 | 2 | H | 208 | 323 | X6574 | 1 |
| E0223 | 3 | S | 209 | 215 | X6575 | 1 |
| E0223 | 4 | H | 208 | 216 | X6575 | 1 |
| E0224 | 1 | S | 209 | 313 | X6576 | 1 |
| E0224 | 2 | H | 208 | 323 | X6576 | 1 |
| E0224 | 3 | S | 209 | 215 | X6577 | 1 |
| E0224 | 4 | H | 208 | 216 | X6577 | 1 |
| E0225 | 1 | S | 209 | 313 | X6578 | 1 |
| E0225 | 2 | H | 208 | 323 | X6578 | 1 |
| E0225 | 3 | S | 209 | 215 | X6579 | 1 |
| E0225 | 4 | H | 208 | 216 | X6579 | 1 |



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|-------|-----|------|-----------|------------|-----------|-----------------|
| E0226 | 1 | S | 209 | 313 | X6580 | 1 |
| E0226 | 2 | H | 208 | 323 | X6580 | 1 |
| E0226 | 3 | S | 209 | 215 | X6581 | 1 |
| E0226 | 4 | H | 208 | 216 | X6581 | 1 |
| E0227 | 1 | S | 209 | 313 | X6582 | 1 |
| E0227 | 2 | H | 208 | 323 | X6582 | 1 |
| E0227 | 3 | S | 209 | 215 | X6583 | 1 |
| E0227 | 4 | H | 208 | 216 | X6583 | 1 |
| E0228 | 1 | S | 209 | 313 | X6584 | 1 |
| E0228 | 2 | H | 208 | 323 | X6584 | 1 |
| E0228 | 3 | S | 209 | 215 | X6585 | 1 |
| E0228 | 4 | H | 208 | 216 | X6585 | 1 |
| E0250 | 1 | H | 3.96 | 4.04 | X6430 | 1 |
| E0251 | 1 | H | 3.96 | 4.04 | X6431 | 1 |
| E0252 | 1 | H | 3.96 | 4.04 | X6432 | 1 |
| E0253 | 1 | H | 3.96 | 4.04 | X6433 | 1 |
| E0254 | 1 | H | 3.96 | 4.04 | X6434 | 1 |
| E0255 | 1 | H | 3.96 | 4.04 | X6435 | 1 |
| E0256 | 1 | H | 3.96 | 4.04 | X6436 | 1 |
| E0257 | 1 | H | 3.96 | 4.04 | X6437 | 1 |
| E0258 | 1 | H | 3.96 | 4.04 | X6438 | 1 |
| E0259 | 1 | H | 3.96 | 4.04 | X6439 | 1 |
| E0260 | 1 | H | 3.96 | 4.04 | X6440 | 1 |
| E0261 | 1 | H | 3.96 | 4.04 | X6441 | 1 |
| E0262 | 1 | H | 3.96 | 4.04 | X6442 | 1 |
| E0263 | 1 | H | 3.96 | 4.04 | X6443 | 1 |
| E0264 | 1 | H | 3.96 | 4.04 | X6444 | 1 |
| E0265 | 1 | H | 3.96 | 4.04 | X6445 | 1 |
| E0266 | 1 | H | 3.96 | 4.04 | X6446 | 1 |
| E0267 | 1 | H | 3.96 | 4.04 | X6447 | 1 |
| E0268 | 1 | H | 3.96 | 4.04 | X6448 | 1 |
| E0290 | 1 | S | 9.9 | 10.1 | E0170 | 1 |
| E0290 | 2 | H | 9.8 | 10.2 | E0170 | 1 |
| E0291 | 1 | S | 9.9 | 10.1 | E0171 | 1 |
| E0291 | 2 | H | 9.8 | 10.2 | E0171 | 1 |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E0292 | 1 | S | 9.9 | 10.1 | E0172 | 1 |
| E0292 | 2 | H | 9.8 | 10.2 | E0172 | 1 |
| E0293 | 1 | S | 9.9 | 10.1 | E0173 | 1 |
| E0293 | 2 | H | 9.8 | 10.2 | E0173 | 1 |
| E0294 | 1 | S | 9.9 | 10.1 | E0174 | 1 |
| E0294 | 2 | H | 9.8 | 10.2 | E0174 | 1 |
| E0295 | 1 | S | 9.9 | 10.1 | E0175 | 1 |
| E0295 | 2 | H | 9.8 | 10.2 | E0175 | 1 |
| E0296 | 1 | S | 9.9 | 10.1 | E0176 | 1 |
| E0296 | 2 | H | 9.8 | 10.2 | E0176 | 1 |
| E0297 | 1 | S | 9.9 | 10.1 | E0177 | 1 |
| E0297 | 2 | H | 9.8 | 10.2 | E0177 | 1 |
| E0298 | 1 | S | 9.9 | 10.1 | E0178 | 1 |
| E0298 | 2 | H | 9.8 | 10.2 | E0178 | 1 |
| E0299 | 1 | S | 9.9 | 10.1 | E0179 | 1 |
| E0299 | 2 | H | 9.8 | 10.2 | E0179 | 1 |
| E0300 | 1 | S | 9.9 | 10.1 | E0180 | 1 |
| E0300 | 2 | H | 9.8 | 10.2 | E0180 | 1 |
| E0301 | 1 | S | 9.9 | 10.1 | E0181 | 1 |
| E0301 | 2 | H | 9.8 | 10.2 | E0181 | 1 |
| E0302 | 1 | S | 9.9 | 10.1 | E0182 | 1 |
| E0302 | 2 | H | 9.8 | 10.2 | E0182 | 1 |
| E0303 | 1 | S | 9.9 | 10.1 | E0183 | 1 |
| E0303 | 2 | H | 9.8 | 10.2 | E0183 | 1 |
| E0304 | 1 | S | 9.9 | 10.1 | E0184 | 1 |
| E0304 | 2 | H | 9.8 | 10.2 | E0184 | 1 |
| E0305 | 1 | S | 9.9 | 10.1 | E0185 | 1 |
| E0305 | 2 | H | 9.8 | 10.2 | E0185 | 1 |
| E0306 | 1 | S | 9.9 | 10.1 | E0186 | 1 |
| E0306 | 2 | H | 9.8 | 10.2 | E0186 | 1 |
| E0307 | 1 | S | 9.9 | 10.1 | E0187 | 1 |
| E0307 | 2 | H | 9.8 | 10.2 | E0187 | 1 |
| E0308 | 1 | S | 9.9 | 10.1 | E0188 | 1 |
| E0308 | 2 | H | 9.8 | 10.2 | E0188 | 1 |
| E0310 | 1 | S | 273 | 323 | E0170 | 1 |
| E0310 | 2 | H | 240 | 326 | E0170 | 1 |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E0311 | 1 | S | 273 | 323 | E0171 | 1 |
| E0311 | 2 | H | 240 | 326 | E0171 | 1 |
| E0312 | 1 | S | 273 | 323 | E0172 | 1 |
| E0312 | 2 | H | 240 | 326 | E0172 | 1 |
| E0313 | 1 | S | 273 | 323 | E0173 | 1 |
| E0313 | 2 | H | 240 | 326 | E0173 | 1 |
| E0314 | 1 | S | 273 | 323 | E0174 | 1 |
| E0314 | 2 | H | 240 | 326 | E0174 | 1 |
| E0315 | 1 | S | 273 | 323 | E0175 | 1 |
| E0315 | 2 | H | 240 | 326 | E0175 | 1 |
| E0316 | 1 | S | 273 | 323 | E0176 | 1 |
| E0316 | 2 | H | 240 | 326 | E0176 | 1 |
| E0317 | 1 | S | 273 | 323 | E0177 | 1 |
| E0317 | 2 | H | 240 | 326 | E0177 | 1 |
| E0318 | 1 | S | 273 | 323 | E0178 | 1 |
| E0318 | 2 | H | 240 | 326 | E0178 | 1 |
| E0319 | 1 | S | 273 | 323 | E0179 | 1 |
| E0319 | 2 | H | 240 | 326 | E0179 | 1 |
| E0320 | 1 | S | 273 | 323 | E0180 | 1 |
| E0320 | 2 | H | 240 | 326 | E0180 | 1 |
| E0321 | 1 | S | 273 | 323 | E0181 | 1 |
| E0321 | 2 | H | 240 | 326 | E0181 | 1 |
| E0322 | 1 | S | 273 | 323 | E0182 | 1 |
| E0322 | 2 | H | 240 | 326 | E0182 | 1 |
| E0323 | 1 | S | 273 | 323 | E0183 | 1 |
| E0323 | 2 | H | 240 | 326 | E0183 | 1 |
| E0324 | 1 | S | 273 | 323 | E0184 | 1 |
| E0324 | 2 | H | 240 | 326 | E0184 | 1 |
| E0325 | 1 | S | 273 | 323 | E0185 | 1 |
| E0325 | 2 | H | 240 | 326 | E0185 | 1 |
| E0326 | 1 | S | 273 | 323 | E0186 | 1 |
| E0326 | 2 | H | 240 | 326 | E0186 | 1 |
| E0327 | 1 | S | 273 | 323 | E0187 | 1 |
| E0327 | 2 | H | 240 | 326 | E0187 | 1 |
| E0328 | 1 | S | 273 | 323 | E0188 | 1 |
| E0328 | 2 | H | 240 | 326 | E0188 | 1 |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E0330 | 1 | S | 288 | 323 | E0170 | 1 |
| E0330 | 2 | H | 240 | 326 | E0170 | 1 |
| E0331 | 1 | S | 288 | 323 | E0171 | 1 |
| E0331 | 2 | H | 240 | 326 | E0171 | 1 |
| E0332 | 1 | S | 288 | 323 | E0172 | 1 |
| E0332 | 2 | H | 240 | 326 | E0172 | 1 |
| E0333 | 1 | S | 288 | 323 | E0173 | 1 |
| E0333 | 2 | H | 240 | 326 | E0173 | 1 |
| E0334 | 1 | S | 288 | 323 | E0174 | 1 |
| E0334 | 2 | H | 240 | 326 | E0174 | 1 |
| E0335 | 1 | S | 288 | 323 | E0175 | 1 |
| E0335 | 2 | H | 240 | 326 | E0175 | 1 |
| E0336 | 1 | S | 288 | 323 | E0176 | 1 |
| E0336 | 2 | H | 240 | 326 | E0176 | 1 |
| E0337 | 1 | S | 288 | 323 | E0177 | 1 |
| E0337 | 2 | H | 240 | 326 | E0177 | 1 |
| E0338 | 1 | S | 288 | 323 | E0178 | 1 |
| E0338 | 2 | H | 240 | 326 | E0178 | 1 |
| E0339 | 1 | S | 288 | 323 | E0179 | 1 |
| E0339 | 2 | H | 240 | 326 | E0179 | 1 |
| E0340 | 1 | S | 288 | 323 | E0180 | 1 |
| E0340 | 2 | H | 240 | 326 | E0180 | 1 |
| E0341 | 1 | S | 288 | 323 | E0181 | 1 |
| E0341 | 2 | H | 240 | 326 | E0181 | 1 |
| E0342 | 1 | S | 288 | 323 | E0182 | 1 |
| E0342 | 2 | H | 240 | 326 | E0182 | 1 |
| E0343 | 1 | S | 288 | 323 | E0183 | 1 |
| E0343 | 2 | H | 240 | 326 | E0183 | 1 |
| E0344 | 1 | S | 288 | 323 | E0184 | 1 |
| E0344 | 2 | H | 240 | 326 | E0184 | 1 |
| E0345 | 1 | S | 288 | 323 | E0185 | 1 |
| E0345 | 2 | H | 240 | 326 | E0185 | 1 |
| E0346 | 1 | S | 288 | 323 | E0186 | 1 |
| E0346 | 2 | H | 240 | 326 | E0186 | 1 |
| E0347 | 1 | S | 288 | 323 | E0187 | 1 |
| E0347 | 2 | H | 240 | 326 | E0187 | 1 |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E0348 | 1 | S | 288 | 323 | E0188 | 1 |
| E0348 | 2 | H | 240 | 326 | E0188 | 1 |
| E0350 | 1 | H | -2.4 | -0.1 | E0170 | 1 |
| E0351 | 1 | H | -2.4 | -0.1 | E0171 | 1 |
| E0352 | 1 | H | -2.4 | -0.1 | E0172 | 1 |
| E0353 | 1 | H | -2.4 | -0.1 | E0173 | 1 |
| E0354 | 1 | H | -2.4 | -0.1 | E0174 | 1 |
| E0355 | 1 | H | -2.4 | -0.1 | E0175 | 1 |
| E0356 | 1 | H | -2.4 | -0.1 | E0176 | 1 |
| E0357 | 1 | H | -2.4 | -0.1 | E0177 | 1 |
| E0358 | 1 | H | -2.4 | -0.1 | E0178 | 1 |
| E0359 | 1 | H | -2.4 | -0.1 | E0179 | 1 |
| E0360 | 1 | H | -2.4 | -0.1 | E0180 | 1 |
| E0361 | 1 | H | -2.4 | -0.1 | E0181 | 1 |
| E0362 | 1 | H | -2.4 | -0.1 | E0182 | 1 |
| E0363 | 1 | H | -2.4 | -0.1 | E0183 | 1 |
| E0364 | 1 | H | -2.4 | -0.1 | E0184 | 1 |
| E0365 | 1 | H | -2.4 | -0.1 | E0185 | 1 |
| E0366 | 1 | H | -2.4 | -0.1 | E0186 | 1 |
| E0367 | 1 | H | -2.4 | -0.1 | E0187 | 1 |
| E0368 | 1 | H | -2.4 | -0.1 | E0188 | 1 |
| E0391 | 1 | S | 84.1 | 85.9 | EC0399 | 1 |
| E0391 | 2 | H | 84 | 86 | EC0399 | 1 |
| E0392 | 1 | S | 84.1 | 85.9 | EC0399 | 1 |
| E0392 | 2 | H | 84 | 86 | EC0399 | 1 |
| E0393 | 1 | S | 84.1 | 85.9 | EC0399 | 1 |
| E0393 | 2 | H | 84 | 86 | EC0399 | 1 |
| E0397 | 1 | S | 73 | 95 | EC0399 | 1 |
| E0397 | 2 | H | 62 | 96 | EC0399 | 1 |
| E0398 | 1 | S | 73 | 95 | EC0399 | 1 |
| E0398 | 2 | H | 62 | 96 | EC0399 | 1 |
| E0495 | 1 | H | 1 | | | |
| E0496 | 1 | H | 0 | | | |
| E0497 | 1 | H | 0 | | | |
| E0498 | 1 | H | 0 | | | |
| E0499 | 1 | H | 0 | | | |
| E0595 | 1 | H | 1 | | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E0596 | 1 | H | 0 | | | |
| E0597 | 1 | H | 0 | | | |
| E0598 | 1 | H | 0 | | | |
| E0599 | 1 | H | 0 | | | |
| E0695 | 1 | H | 1 | | | |
| E0696 | 1 | H | 0 | | | |
| E0697 | 1 | H | 0 | | | |
| E0698 | 1 | H | 0 | | | |
| E0699 | 1 | H | 0 | | | |
| E0795 | 1 | H | 1 | | | |
| E0796 | 1 | H | 0 | | | |
| E0797 | 1 | H | 0 | | | |
| E0798 | 1 | H | 0 | | | |
| E0799 | 1 | H | 0 | | | |
| E0896 | 1 | H | 1 | | X6104 | 1 |
| E0898 | 1 | H | 0 | | | |
| E0899 | 1 | H | 0 | | | |
| E0992 | 1 | H | 2 | | | |
| E0993 | 1 | H | 2 | | | |
| E1292 | 1 | H | 0 | | | |
| E1293 | 1 | S | 0 | | | |
| E1295 | 1 | H | 0 | | | |
| E1296 | 1 | H | 0 | | X6111 | 1 |
| E1297 | 1 | H | 0 | | X6111 | 1 |
| E1298 | 1 | H | 0 | | X6111 | 1 |
| E1299 | 1 | H | 0 | | X6111 | 1 |
| E1396 | 1 | H | 0 | | | |
| E2002 | 1 | H | 2 | | X6300 | 1 |
| E2003 | 1 | H | 2 | | X6301 | 1 |
| E2004 | 1 | H | 2 | | X6302 | 1 |
| E2005 | 1 | H | 2 | | X6303 | 1 |
| E2006 | 1 | H | 2 | | X6304 | 1 |
| E2007 | 1 | H | 2 | | X6305 | 1 |
| E2008 | 1 | H | 2 | | X6306 | 1 |
| E2009 | 1 | H | 2 | | X6307 | 1 |
| E2010 | 1 | H | 2 | | X6308 | 1 |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2011 | 1 | H | 2 | | X6309 | 1 |
| E2012 | 1 | H | 2 | | X6310 | 1 |
| E2013 | 1 | H | 2 | | X6311 | 1 |
| E2014 | 1 | H | 2 | | X6312 | 1 |
| E2015 | 1 | H | 2 | | X6313 | 1 |
| E2016 | 1 | H | 2 | | X6314 | 1 |
| E2017 | 1 | H | 2 | | X6315 | 1 |
| E2018 | 1 | H | 2 | | X6316 | 1 |
| E2019 | 1 | H | 2 | | X6317 | 1 |
| E2020 | 1 | H | 2 | | X6318 | 1 |
| E2021 | 1 | H | 2 | | X6319 | 1 |
| E2022 | 1 | H | 2 | | X6320 | 1 |
| E2023 | 1 | H | 2 | | X6321 | 1 |
| E2024 | 1 | H | 2 | | X6322 | 1 |
| E2064 | 1 | H | 2 | | X6323 | 1 |
| E2065 | 1 | H | 2 | | X6324 | 1 |
| E2066 | 1 | H | 2 | | X6325 | 1 |
| E2067 | 1 | H | 2 | | X6326 | 1 |
| E2068 | 1 | H | 2 | | X6327 | 1 |
| E2069 | 1 | H | 2 | | X6328 | 1 |
| E2070 | 1 | H | 2 | | X6329 | 1 |
| E2071 | 1 | H | 2 | | X6330 | 1 |
| E2072 | 1 | H | 2 | | X6331 | 1 |
| E2073 | 1 | H | 2 | | X6332 | 1 |
| E2074 | 1 | H | 2 | | X6333 | 1 |
| E2075 | 1 | H | 2 | | X6334 | 1 |
| E2076 | 1 | H | 2 | | X6335 | 1 |
| E2077 | 1 | H | 2 | | X6336 | 1 |
| E2078 | 1 | H | 2 | | X6337 | 1 |
| E2079 | 1 | H | 2 | | X6338 | 1 |
| E2080 | 1 | H | 2 | | X6339 | 1 |
| E2081 | 1 | H | 2 | | X6340 | 1 |
| E2082 | 1 | H | 2 | | X6341 | 1 |
| E2083 | 1 | H | 2 | | X6342 | 1 |
| E2084 | 1 | H | 2 | | X6343 | 1 |
| E2085 | 1 | H | 2 | | X6344 | 1 |



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| NAME | POS | TYPE | LOW VALUE | HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|------------|-----------|-----------------|
| E2086 | 1 | H | 2 | | X6345 | 1 |
| E2087 | 1 | H | 2 | | X6346 | 1 |
| E2088 | 1 | H | 2 | | X6347 | 1 |
| E2089 | 1 | H | 2 | | X6348 | 1 |
| E2090 | 1 | H | 2 | | X6349 | 1 |
| E2091 | 1 | H | 2 | | X6350 | 1 |
| E2092 | 1 | H | 2 | | X6351 | 1 |
| E2093 | 1 | H | 2 | | X6352 | 1 |
| E2094 | 1 | H | 2 | | X6353 | 1 |
| E2095 | 1 | H | 2 | | X6354 | 1 |
| E2096 | 1 | H | 2 | | X6355 | 1 |
| E2097 | 1 | H | 2 | | X6356 | 1 |
| E2098 | 1 | H | 2 | | X6357 | 1 |
| E2099 | 1 | H | 2 | | X6358 | 1 |
| E2100 | 1 | H | 2 | | X6359 | 1 |
| E2101 | 1 | S | -3 | 39 | | |
| E2101 | 2 | H | -28 | 42 | | |
| E2102 | 1 | S | -3 | 39 | | |
| E2102 | 2 | H | -28 | 42 | | |
| E2103 | 1 | S | -3 | 39 | | |
| E2103 | 2 | H | -28 | 42 | | |
| E2104 | 1 | S | -3 | 39 | | |
| E2104 | 2 | H | -28 | 42 | | |
| E2105 | 1 | S | -3 | 39 | | |
| E2105 | 2 | H | -28 | 42 | | |
| E2106 | 1 | S | -3 | 39 | | |
| E2106 | 2 | H | -28 | 42 | | |
| E2107 | 1 | S | -3 | 39 | | |
| E2107 | 2 | H | -28 | 42 | | |
| E2108 | 1 | S | -3 | 39 | | |
| E2108 | 2 | H | -28 | 42 | | |
| E2109 | 1 | S | -3 | 39 | | |
| E2109 | 2 | H | -28 | 42 | | |
| E2110 | 1 | S | -7 | 39 | | |



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| NAME | POS | TYPE | LOW VALUE | HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|------------|-----------|-----------------|
| E2110 | 2 | H | -28 | 42 | | |
| E2111 | 1 | S | -7 | 39 | | |
| E2111 | 2 | H | -28 | 42 | | |
| E2112 | 1 | S | -7 | 39 | | |
| E2112 | 2 | H | -28 | 42 | | |
| E2113 | 2 | H | -33 | 55 | | |
| E2114 | 1 | S | -10 | 35 | | |
| E2114 | 2 | H | -20 | 38 | | |
| E2115 | 1 | S | -10 | 35 | | |
| E2115 | 2 | H | -20 | 38 | | |
| E2116 | 1 | S | -10 | 35 | | |
| E2116 | 2 | H | -20 | 38 | | |
| E2121 | 1 | S | 1.34 | 2.23 | X6546 | 1 |
| E2121 | 2 | H | 1.24 | 2.43 | X6546 | 1 |
| E2121 | 3 | S | 0.85 | 1.02 | X6547 | 1 |
| E2121 | 4 | H | 0.75 | 1.12 | X6547 | 1 |
| E2122 | 1 | S | 25 | 30 | | |
| E2122 | 2 | H | 24.5 | 31 | | |
| E2123 | 1 | S | 4.8 | 5.4 | | |
| E2123 | 2 | H | 4.5 | 5.6 | | |
| E2131 | 1 | H | 0 | | E3887 | 0 |
| E2132 | 1 | H | 0 | | X6111 | 1 |
| E2150 | 1 | H | 2 | | | |
| E2151 | 1 | H | 2 | | | |
| E2152 | 1 | H | 2 | | | |
| E2153 | 1 | H | 2 | | | |
| E2154 | 1 | H | 2 | | | |
| E2155 | 1 | H | 2 | | | |
| E2156 | 1 | H | 2 | | | |
| E2157 | 1 | H | 2 | | | |
| E2158 | 1 | H | 2 | | | |
| E2159 | 1 | H | 2 | | | |
| E2160 | 1 | H | 2 | | | |
| E2161 | 1 | H | 2 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2162 | 1 | H | 2 | | | |
| E2163 | 1 | H | 2 | | | |
| E2164 | 1 | H | 2 | | | |
| E2165 | 1 | H | 2 | | | |
| E2166 | 1 | H | 2 | | | |
| E2167 | 1 | H | 2 | | | |
| E2168 | 1 | H | 2 | | | |
| E2169 | 1 | H | 2 | | | |
| E2170 | 1 | H | 2 | | | |
| E2171 | 1 | H | 2 | | | |
| E2172 | 1 | H | 2 | | | |
| E2173 | 1 | H | 2 | | | |
| E2174 | 1 | H | 2 | | | |
| E2175 | 1 | H | 2 | | | |
| E2176 | 1 | H | 2 | | | |
| E2177 | 1 | H | 2 | | | |
| E2178 | 1 | H | 2 | | | |
| E2179 | 1 | H | 2 | | | |
| E2180 | 1 | H | 2 | | | |
| E2181 | 1 | H | 2 | | | |
| E2182 | 1 | H | 2 | | | |
| E2183 | 1 | H | 2 | | | |
| E2184 | 1 | H | 2 | | | |
| E2185 | 1 | H | 2 | | | |
| E2186 | 1 | H | 2 | | | |
| E2187 | 1 | H | 2 | | | |
| E2188 | 1 | H | 2 | | | |
| E2189 | 1 | H | 2 | | | |
| E2190 | 1 | H | 2 | | | |
| E2191 | 1 | H | 2 | | | |
| E2192 | 1 | H | 2 | | | |
| E2193 | 1 | H | 2 | | | |
| E2194 | 1 | H | 2 | | | |
| E2195 | 1 | H | 2 | | | |
| E2196 | 1 | H | 2 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2197 | 1 | H | 2 | | | |
| E2198 | 1 | H | 2 | | | |
| E2199 | 1 | H | 2 | | | |
| E2200 | 1 | H | 2 | | | |
| E2201 | 1 | H | 2 | | | |
| E2202 | 1 | H | 2 | | | |
| E2203 | 1 | H | 2 | | | |
| E2204 | 1 | H | 2 | | | |
| E2205 | 1 | H | 2 | | | |
| E2206 | 1 | H | 2 | | | |
| E2207 | 1 | H | 2 | | | |
| E2208 | 1 | H | 2 | | | |
| E2209 | 1 | H | 2 | | | |
| E2210 | 1 | H | 2 | | | |
| E2211 | 1 | H | 2 | | | |
| E2212 | 1 | H | 2 | | | |
| E2213 | 1 | H | 2 | | | |
| E2214 | 1 | H | 2 | | | |
| E2215 | 1 | H | 2 | | | |
| E2216 | 1 | H | 2 | | | |
| E2217 | 1 | H | 2 | | | |
| E2218 | 1 | H | 2 | | | |
| E2219 | 1 | H | 2 | | | |
| E2220 | 1 | H | 2 | | | |
| E2221 | 1 | H | 2 | | | |
| E2222 | 1 | H | 2 | | | |
| E2223 | 1 | H | 2 | | | |
| E2224 | 1 | H | 2 | | | |
| E2225 | 1 | H | 2 | | | |
| E2226 | 1 | H | 2 | | | |
| E2227 | 1 | H | 2 | | | |
| E2228 | 1 | H | 2 | | | |
| E2229 | 1 | H | 2 | | | |
| E2230 | 1 | H | 2 | | | |
| E2231 | 1 | H | 2 | | | |
| E2232 | 1 | H | 2 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2233 | 1 | H | 2 | | | |
| E2234 | 1 | H | 2 | | | |
| E2235 | 1 | H | 2 | | | |
| E2236 | 1 | H | 2 | | | |
| E2237 | 1 | H | 2 | | | |
| E2238 | 1 | H | 2 | | | |
| E2239 | 1 | H | 2 | | | |
| E2240 | 1 | H | 2 | | | |
| E2241 | 1 | H | 2 | | | |
| E2250 | 1 | H | 2 | | | |
| E2251 | 1 | H | 2 | | | |
| E2252 | 1 | H | 2 | | | |
| E2253 | 1 | H | 2 | | | |
| E2254 | 1 | H | 2 | | | |
| E2255 | 1 | H | 2 | | | |
| E2256 | 1 | H | 2 | | | |
| E2257 | 1 | H | 2 | | | |
| E2258 | 1 | H | 2 | | | |
| E2259 | 1 | H | 2 | | | |
| E2260 | 1 | H | 2 | | | |
| E2261 | 1 | H | 2 | | | |
| E2262 | 1 | H | 2 | | | |
| E2263 | 1 | H | 2 | | | |
| E2264 | 1 | H | 2 | | | |
| E2265 | 1 | H | 2 | | | |
| E2266 | 1 | H | 2 | | | |
| E2267 | 1 | H | 2 | | | |
| E2268 | 1 | H | 2 | | | |
| E2269 | 1 | H | 2 | | | |
| E2270 | 1 | H | 2 | | | |
| E2271 | 1 | H | 2 | | | |
| E2272 | 1 | H | 2 | | | |
| E2273 | 1 | H | 2 | | | |
| E2274 | 1 | H | 2 | | | |
| E2275 | 1 | H | 2 | | | |
| E2276 | 1 | H | 2 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2277 | 1 | H | 2 | | | |
| E2278 | 1 | H | 2 | | | |
| E2279 | 1 | H | 2 | | | |
| E2280 | 1 | H | 2 | | | |
| E2281 | 1 | H | 2 | | | |
| E2282 | 1 | H | 2 | | | |
| E2283 | 1 | H | 2 | | | |
| E2284 | 1 | H | 2 | | | |
| E2285 | 1 | H | 2 | | | |
| E2286 | 1 | H | 2 | | | |
| E2287 | 1 | H | 2 | | | |
| E2288 | 1 | H | 2 | | | |
| E2289 | 1 | H | 2 | | | |
| E2290 | 1 | H | 2 | | | |
| E2291 | 1 | H | 2 | | | |
| E2292 | 1 | H | 2 | | | |
| E2293 | 1 | H | 2 | | | |
| E2294 | 1 | H | 2 | | | |
| E2295 | 1 | H | 2 | | | |
| E2296 | 1 | H | 2 | | | |
| E2297 | 1 | H | 2 | | | |
| E2298 | 1 | H | 2 | | | |
| E2299 | 1 | H | 2 | | | |
| E2300 | 1 | H | 2 | | | |
| E2301 | 1 | H | 2 | | | |
| E2302 | 1 | H | 2 | | | |
| E2303 | 1 | H | 2 | | | |
| E2304 | 1 | H | 2 | | | |
| E2305 | 1 | H | 2 | | | |
| E2306 | 1 | H | 2 | | | |
| E2307 | 1 | H | 2 | | | |
| E2308 | 1 | H | 2 | | | |
| E2309 | 1 | H | 2 | | | |
| E2310 | 1 | H | 2 | | | |
| E2311 | 1 | H | 2 | | | |
| E2312 | 1 | H | 2 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2313 | 1 | H | 2 | | | |
| E2314 | 1 | H | 2 | | | |
| E2315 | 1 | H | 2 | | | |
| E2316 | 1 | H | 2 | | | |
| E2317 | 1 | H | 2 | | | |
| E2318 | 1 | H | 2 | | | |
| E2319 | 1 | H | 2 | | | |
| E2320 | 1 | H | 2 | | | |
| E2321 | 1 | H | 2 | | | |
| E2322 | 1 | H | 2 | | | |
| E2323 | 1 | H | 2 | | | |
| E2324 | 1 | H | 2 | | | |
| E2325 | 1 | H | 2 | | | |
| E2326 | 1 | H | 2 | | | |
| E2327 | 1 | H | 2 | | | |
| E2328 | 1 | H | 2 | | | |
| E2329 | 1 | H | 2 | | | |
| E2330 | 1 | H | 2 | | | |
| E2331 | 1 | H | 2 | | | |
| E2332 | 1 | H | 2 | | | |
| E2333 | 1 | H | 2 | | | |
| E2334 | 1 | H | 2 | | | |
| E2335 | 1 | H | 2 | | | |
| E2336 | 1 | H | 2 | | | |
| E2337 | 1 | H | 2 | | | |
| E2338 | 1 | H | 2 | | | |
| E2339 | 1 | H | 2 | | | |
| E2340 | 1 | H | 2 | | | |
| E2341 | 1 | H | 2 | | | |
| E2350 | 1 | H | 2 | | | |
| E2351 | 1 | H | 2 | | | |
| E2352 | 1 | H | 2 | | | |
| E2353 | 1 | H | 2 | | | |
| E2354 | 1 | H | 2 | | | |
| E2355 | 1 | H | 2 | | | |
| E2356 | 1 | H | 2 | | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2357 | 1 | H | 2 | | | |
| E2358 | 1 | H | 2 | | | |
| E2359 | 1 | H | 2 | | | |
| E2360 | 1 | H | 2 | | | |
| E2361 | 1 | H | 2 | | | |
| E2362 | 1 | H | 2 | | | |
| E2363 | 1 | H | 2 | | | |
| E2364 | 1 | H | 2 | | | |
| E2365 | 1 | H | 2 | | | |
| E2366 | 1 | H | 2 | | | |
| E2367 | 1 | H | 2 | | | |
| E2368 | 1 | H | 2 | | | |
| E2369 | 1 | H | 2 | | | |
| E2370 | 1 | H | 2 | | | |
| E2371 | 1 | H | 2 | | | |
| E2372 | 1 | H | 2 | | | |
| E2373 | 1 | H | 2 | | | |
| E2374 | 1 | H | 2 | | | |
| E2375 | 1 | H | 2 | | | |
| E2376 | 1 | H | 2 | | | |
| E2377 | 1 | H | 2 | | | |
| E2378 | 1 | H | 2 | | | |
| E2379 | 1 | H | 2 | | | |
| E2380 | 1 | H | 2 | | | |
| E2381 | 1 | H | 2 | | | |
| E2382 | 1 | H | 2 | | | |
| E2383 | 1 | H | 2 | | | |
| E2384 | 1 | H | 2 | | | |
| E2385 | 1 | H | 2 | | | |
| E2386 | 1 | H | 2 | | | |
| E2387 | 1 | H | 2 | | | |
| E2388 | 1 | H | 2 | | | |
| E2389 | 1 | H | 2 | | | |
| E2390 | 1 | H | 2 | | | |
| E2391 | 1 | H | 2 | | | |
| E2392 | 1 | H | 2 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E2393 | 1 | H | 2 | | | |
| E2394 | 1 | H | 2 | | | |
| E2395 | 1 | H | 2 | | | |
| E2396 | 1 | H | 2 | | | |
| E2397 | 1 | H | 2 | | | |
| E2398 | 1 | H | 2 | | | |
| E2399 | 1 | H | 2 | | | |
| E3121 | 1 | H | 2 | | | |
| E3122 | 1 | H | 2 | | | |
| E3123 | 1 | H | 2 | | | |
| E3124 | 1 | H | 2 | | | |
| E3125 | 1 | H | 2 | | | |
| E3126 | 1 | H | 2 | | | |
| E3127 | 1 | H | 2 | | | |
| E3128 | 1 | H | 2 | | | |
| E3129 | 1 | H | 2 | | | |
| E3130 | 1 | H | 2 | | | |
| E3131 | 1 | H | 2 | | | |
| E3132 | 1 | H | 2 | | | |
| E3133 | 1 | H | 2 | | | |
| E3134 | 1 | H | 2 | | | |
| E3135 | 1 | H | 2 | | | |
| E3136 | 1 | H | 2 | | | |
| E3137 | 1 | H | 2 | | | |
| E3138 | 1 | H | 2 | | | |
| E3139 | 1 | H | 2 | | | |
| E3140 | 1 | H | 2 | | | |
| E3141 | 1 | H | 2 | | | |
| E3142 | 1 | H | 2 | | | |
| E3143 | 1 | H | 2 | | | |
| E3144 | 1 | H | 2 | | | |
| E3145 | 1 | H | 2 | | | |
| E3146 | 1 | H | 2 | | | |
| E3147 | 1 | H | 2 | | | |
| E3148 | 1 | H | 2 | | | |
| E3149 | 1 | H | 2 | | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E3150 | 1 | H | 2 | | | |
| E3151 | 1 | H | 2 | | | |
| E3152 | 1 | H | 2 | | | |
| E3153 | 1 | H | 2 | | | |
| E3154 | 1 | H | 2 | | | |
| E3155 | 1 | H | 2 | | | |
| E3156 | 1 | H | 2 | | | |
| E3157 | 1 | H | 2 | | | |
| E3158 | 1 | H | 2 | | | |
| E3159 | 1 | H | 2 | | | |
| E3160 | 1 | H | 2 | | | |
| E3161 | 1 | H | 2 | | | |
| E3162 | 1 | H | 2 | | | |
| E3164 | 1 | H | 2 | | | |
| E3165 | 1 | H | 2 | | | |
| E3166 | 1 | H | 2 | | | |
| E3167 | 1 | H | 2 | | | |
| E3168 | 1 | H | 2 | | | |
| E3169 | 1 | H | 2 | | | |
| E3170 | 1 | H | 2 | | | |
| E3171 | 1 | H | 2 | | | |
| E3172 | 1 | H | 2 | | | |
| E3173 | 1 | H | 2 | | | |
| E3174 | 1 | H | 2 | | | |
| E3175 | 1 | H | 2 | | | |
| E3176 | 1 | H | 2 | | | |
| E3177 | 1 | H | 2 | | | |
| E3178 | 1 | H | 2 | | | |
| E3179 | 1 | H | 2 | | | |
| E3180 | 1 | H | 2 | | | |
| E3181 | 1 | H | 2 | | | |
| E3182 | 1 | H | 2 | | | |
| E3183 | 1 | H | 2 | | | |
| E3184 | 1 | H | 2 | | | |
| E3185 | 1 | H | 2 | | | |
| E3186 | 1 | H | 2 | | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E3187 | 1 | H | 2 | | | |
| E3188 | 1 | H | 2 | | | |
| E3189 | 1 | H | 2 | | | |
| E3190 | 1 | H | 2 | | | |
| E3191 | 1 | H | 2 | | | |
| E3192 | 1 | H | 2 | | | |
| E3193 | 1 | H | 2 | | | |
| E3194 | 1 | H | 2 | | | |
| E3195 | 1 | H | 2 | | | |
| E3196 | 1 | H | 2 | | | |
| E3197 | 1 | H | 2 | | | |
| E3198 | 1 | H | 2 | | | |
| E3199 | 1 | H | 2 | | | |
| E3200 | 1 | H | 2 | | | |
| E3201 | 1 | H | 2 | | | |
| E3202 | 1 | H | 2 | | | |
| E3203 | 1 | H | 2 | | | |
| E3204 | 1 | H | 2 | | | |
| E3205 | 1 | H | 2 | | | |
| E3206 | 1 | H | 2 | | | |
| E3207 | 1 | H | 2 | | | |
| E3208 | 1 | H | 2 | | | |
| E3209 | 1 | H | 2 | | | |
| E3210 | 1 | H | 2 | | | |
| E3211 | 1 | H | 2 | | | |
| E3212 | 1 | H | 2 | | | |
| E3213 | 1 | H | 2 | | | |
| E3214 | 1 | H | 2 | | | |
| E3215 | 1 | H | 2 | | | |
| E3216 | 1 | H | 2 | | | |
| E3217 | 1 | H | 2 | | | |
| E3218 | 1 | H | 2 | | | |
| E3219 | 1 | H | 2 | | | |
| E3220 | 1 | H | 2 | | | |
| E3221 | 1 | H | 2 | | | |
| E3222 | 1 | H | 2 | | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E3223 | 1 | H | 2 | | | |
| E3224 | 1 | H | 2 | | | |
| E3225 | 1 | H | 2 | | | |
| E3226 | 1 | H | 2 | | | |
| E3227 | 1 | H | 2 | | | |
| E3228 | 1 | H | 2 | | | |
| E3229 | 1 | H | 2 | | | |
| E3230 | 1 | H | 2 | | | |
| E3231 | 1 | H | 2 | | | |
| E3232 | 1 | H | 2 | | | |
| E3233 | 1 | H | 2 | | | |
| E3234 | 1 | H | 2 | | | |
| E3235 | 1 | H | 2 | | | |
| E3236 | 1 | H | 2 | | | |
| E3237 | 1 | H | 2 | | | |
| E3238 | 1 | H | 2 | | | |
| E3239 | 1 | H | 2 | | | |
| E3240 | 1 | H | 2 | | | |
| E3241 | 1 | H | 2 | | | |
| E3242 | 1 | H | 2 | | | |
| E3243 | 1 | H | 2 | | | |
| E3244 | 1 | H | 2 | | | |
| E3245 | 1 | H | 2 | | | |
| E3246 | 1 | H | 2 | | | |
| E3247 | 1 | H | 2 | | | |
| E3248 | 1 | H | 2 | | | |
| E3249 | 1 | H | 2 | | | |
| E3250 | 1 | H | 2 | | | |
| E3251 | 1 | H | 2 | | | |
| E3252 | 1 | H | 2 | | | |
| E3253 | 1 | H | 2 | | | |
| E3254 | 1 | H | 2 | | | |
| E3256 | 1 | H | 2 | | X6360 | 1 |
| E3257 | 1 | H | 2 | | X6361 | 1 |
| E3258 | 1 | H | 2 | | X6362 | 1 |
| E3259 | 1 | H | 2 | | X6363 | 1 |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E3260 | 1 | H | 2 | | X6364 | 1 |
| E3261 | 1 | H | 2 | | X6365 | 1 |
| E3262 | 1 | H | 2 | | X6366 | 1 |
| E3263 | 1 | H | 2 | | X6367 | 1 |
| E3264 | 1 | H | 2 | | X6368 | 1 |
| E3265 | 1 | H | 2 | | X6369 | 1 |
| E3266 | 1 | H | 2 | | X6370 | 1 |
| E3267 | 1 | H | 2 | | X6371 | 1 |
| E3268 | 1 | H | 2 | | X6372 | 1 |
| E3269 | 1 | H | 2 | | X6373 | 1 |
| E3270 | 1 | H | 2 | | X6374 | 1 |
| E3271 | 1 | H | 2 | | X6375 | 1 |
| E3272 | 1 | H | 2 | | X6376 | 1 |
| E3273 | 1 | H | 2 | | X6377 | 1 |
| E3274 | 1 | H | 2 | | X6378 | 1 |
| E3275 | 1 | H | 2 | | X6379 | 1 |
| E3276 | 1 | H | 2 | | X6380 | 1 |
| E3277 | 1 | H | 2 | | X6381 | 1 |
| E3278 | 1 | H | 2 | | X6382 | 1 |
| E3279 | 1 | H | 2 | | X6383 | 1 |
| E3280 | 1 | H | 2 | | X6384 | 1 |
| E3281 | 1 | H | 2 | | X6385 | 1 |
| E3282 | 1 | H | 2 | | X6386 | 1 |
| E3283 | 1 | H | 2 | | X6387 | 1 |
| E3284 | 1 | H | 2 | | X6388 | 1 |
| E3285 | 1 | H | 2 | | X6389 | 1 |
| E3286 | 1 | H | 2 | | X6390 | 1 |
| E3287 | 1 | H | 2 | | X6391 | 1 |
| E3288 | 1 | H | 2 | | X6392 | 1 |
| E3289 | 1 | H | 2 | | | |
| E3824 | 1 | S | 4.9 | 5.1 | | |
| E3824 | 2 | H | 4.85 | 5.15 | | |
| E3825 | 1 | S | 4.83 | 5.17 | | |
| E3825 | 2 | H | 4.78 | 5.22 | | |
| E3826 | 1 | S | -5.25 | -4.75 | | |
| E3826 | 2 | H | -5.30 | -4.70 | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E3827 | 1 | S | 0.8 | 0.86 | | |
| E3827 | 2 | H | 0.79 | 0.87 | | |
| E3828 | 1 | S | 8 | 51 | | |
| E3828 | 2 | H | -33 | 54 | | |
| E3829 | 1 | S | 8 | 51 | | |
| E3829 | 2 | H | -33 | 54 | | |
| E3830 | 1 | S | 8 | 51 | | |
| E3830 | 2 | H | -33 | 54 | | |
| E3831 | 1 | S | 8 | 51 | | |
| E3831 | 2 | H | -33 | 54 | | |
| E3882 | 1 | H | 0 | | | |
| E3885 | 1 | H | 0 | | | |
| E3888 | 1 | H | 0 | | | |
| E3891 | 1 | H | 0 | | | |
| E3981 | 1 | S | -69 | -40 | X6521 | 1 |
| E3981 | 2 | H | -80 | -30 | X6521 | 1 |
| E3981 | 3 | S | -69 | -58 | X6524 | 1 |
| E3981 | 4 | H | -80 | -53 | X6524 | 1 |
| E3981 | 5 | S | -69 | 40 | X6542 | 1 |
| E3981 | 6 | H | -80 | 49 | X6542 | 1 |
| E3982 | 1 | S | -69 | -40 | X6521 | 1 |
| E3982 | 2 | H | -80 | -30 | X6521 | 1 |
| E3982 | 3 | S | -69 | -58 | X6524 | 1 |
| E3982 | 4 | H | -80 | -53 | X6524 | 1 |
| E3982 | 5 | S | -69 | 40 | X6542 | 1 |
| E3982 | 6 | H | -80 | 49 | X6542 | 1 |
| E3983 | 1 | S | -69 | -40 | X6521 | 1 |
| E3983 | 2 | H | -80 | -30 | X6521 | 1 |
| E3983 | 3 | S | -69 | -58 | X6524 | 1 |
| E3983 | 4 | H | -80 | -53 | X6524 | 1 |
| E3983 | 5 | S | -69 | 40 | X6542 | 1 |
| E3983 | 6 | H | -80 | 49 | X6542 | 1 |
| E3984 | 1 | S | -69 | -40 | X6521 | 1 |
| E3984 | 2 | H | -80 | -30 | X6521 | 1 |
| E3984 | 3 | S | -69 | -58 | X6524 | 1 |
| E3984 | 4 | H | -80 | -53 | X6524 | 1 |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| E3984 | 5 | S | -69 | 40 | X6542 | 1 |
| E3984 | 6 | H | -80 | 49 | X6542 | 1 |
| E3985 | 1 | S | 3.92 | 4 | P2115 | 1 |
| E3985 | 2 | H | 3.8 | 4.1 | P2115 | 1 |
| E3986 | 1 | S | -10 | 35 | | |
| E3986 | 2 | H | -33 | 38 | | |
| E3987 | 1 | S | 4.07 | 4.25 | P2119 | 1 |
| E3987 | 2 | H | 4.06 | 4.26 | P2119 | 1 |
| E3988 | 1 | S | 8 | 36 | | |
| E3988 | 2 | H | -33 | 39 | | |
| E3989 | 1 | S | 4.07 | 4.25 | P2120 | 1 |
| E3989 | 2 | H | 4.06 | 4.26 | P2120 | 1 |
| E3990 | 1 | S | 25.9 | 30.9 | P2117 | 1 |
| E3990 | 2 | H | 25.4 | 31.9 | P2117 | 1 |
| E3991 | 1 | S | 0 | 37 | | |
| E3991 | 2 | H | -33 | 40 | | |
| E3992 | 1 | S | -70 | -40 | X6521 | 1 |
| E3992 | 2 | H | -80 | -30 | X6521 | 1 |
| E3992 | 3 | S | -69 | -58 | X6524 | 1 |
| E3992 | 4 | H | -80 | -53 | X6524 | 1 |
| E3992 | 5 | S | -70 | 40 | X6542 | 1 |
| E3992 | 6 | H | -80 | 49 | X6542 | 1 |
| E3995 | 1 | S | -15 | 50 | | |
| E3995 | 2 | H | -33 | 53 | | |
| E3996 | 1 | S | -70 | -40 | X6521 | 1 |
| E3996 | 2 | H | -80 | -30 | X6521 | 1 |
| E3996 | 3 | S | -69 | -58 | X6524 | 1 |
| E3996 | 4 | H | -80 | -53 | X6524 | 1 |
| E3996 | 5 | S | -70 | 40 | X6542 | 1 |
| E3996 | 6 | H | -80 | 49 | X6542 | 1 |
| E3998 | 1 | S | 3.58 | 3.62 | | |
| E3998 | 2 | H | 3.56 | 3.64 | | |
| E3999 | 1 | S | 0 | 0.02 | | |
| E3999 | 2 | H | 0 | 0.04 | | |
| E4000 | 1 | S | 0 | 0.02 | | |
| E4000 | 2 | H | 0 | 0.04 | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| E4001 | 1 | H | 0 | | | |
| E4002 | 1 | H | 0 | | X6398 | 1 |
| E4003 | 1 | H | 0 | | X6398 | 1 |
| E4004 | 1 | H | 0 | | | |
| E4005 | 1 | H | 0 | | X6398 | 1 |
| E4006 | 1 | H | 0 | | X6398 | 1 |
| E4007 | 1 | H | 0 | | X6398 | 1 |
| E4008 | 1 | H | 0 | | X6398 | 1 |
| E4009 | 1 | H | 0 | | X6398 | 1 |
| E4016 | 1 | H | 0 | | X6112 | 1 |
| E4017 | 1 | H | 0 | | X6398 | 1 |
| E9027 | 1 | S | 4.96 | 5.04 | X6900 | 1 |
| E9027 | 2 | H | 4.9 | 5.1 | X6900 | 1 |
| E9028 | 1 | S | 5.004 | 5.108 | X6900 | 1 |
| E9028 | 2 | H | 4.95 | 5.15 | X6900 | 1 |
| E9029 | 1 | S | 16.14 | 16.385 | X6900 | 1 |
| E9029 | 2 | H | 16 | 16.5 | X6900 | 1 |
| E9030 | 1 | S | 14.78 | 15.3 | X6900 | 1 |
| E9030 | 2 | H | 14.7 | 15.4 | X6900 | 1 |
| E9031 | 1 | S | -15.36 | -14.76 | X6900 | 1 |
| E9031 | 2 | H | -15.45 | -14.7 | X6900 | 1 |
| E9032 | 1 | S | -7 | 48 | X6900 | 1 |
| E9032 | 2 | H | -12 | 53 | X6900 | 1 |
| E9033 | 1 | H | 1 | | X6900 | 1 |
| E9034 | 1 | H | 1 | | X6900 | 1 |
| E9035 | 1 | H | 1 | | X6900 | 1 |
| E9036 | 1 | H | 41440 | | X6900 | 1 |
| E9037 | 1 | H | 61781 | | | |
| E9200 | 1 | H | 1 | | | |
| E9201 | 1 | H | 0 | | | |
| E9202 | 1 | H | 1 | | | |
| E9203 | 1 | H | 0 | | | |
| E9204 | 1 | H | 0 | | | |
| E9205 | 1 | H | 0 | | | |
| E9206 | 1 | H | 0 | | | |
| E9207 | 1 | H | 1 | | | |



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|---------|-----|------|-----------|-------------|-----------|-----------------|
| E9208 | 1 | H | 1 | | | |
| E9209 | 1 | H | 1 | | | |
| E9210 | 1 | H | 1 | | | |
| E9211 | 1 | H | 0 | | | |
| E9212 | 1 | H | 0 | | | |
| E9213 | 1 | H | 0 | | | |
| E9243 | 1 | H | 1 | | | |
| E9253 | 1 | H | 0 | | | |
| E9255 | 1 | H | 0 | | | |
| E9800 | 1 | S | 5.004 | 5.108 | X3613 | 1 |
| E9800 | 2 | H | 4.95 | 5.15 | X3613 | 1 |
| E9801 | 1 | C | | | | |
| E9802 | 1 | C | | | | |
| EU0391A | 1 | S | 84.1 | 85.9 | EC0399 | 1 |
| EU0391A | 2 | H | 84 | 86 | EC0399 | 1 |
| EU0391A | 3 | H | 84 | 381.7 | EC0399 | 0 |
| EU0391A | 4 | S | 84.1 | 380.7 | EC0399 | 0 |
| EU0392A | 1 | S | 84.1 | 85.9 | EC0399 | 1 |
| EU0392A | 2 | H | 84 | 86 | EC0399 | 1 |
| EU0392A | 3 | H | 84 | 381.7 | EC0399 | 0 |
| EU0392A | 4 | S | 84.1 | 380.7 | EC0399 | 0 |
| EU0393A | 1 | S | 84.1 | 85.9 | EC0399 | 1 |
| EU0393A | 2 | H | 84 | 86 | EC0399 | 1 |
| EU0393A | 3 | H | 84 | 381.7 | EC0399 | 0 |
| EU0393A | 4 | S | 84.1 | 380.7 | EC0399 | 0 |
| EU0397A | 1 | S | 73 | 380.7 | X6537 | 1 |
| EU0397A | 2 | H | 62 | 381.7 | X6537 | 1 |
| EU0397A | 3 | S | 73 | 310.7 | X6543 | 1 |
| EU0397A | 4 | H | 62 | 312.7 | X6543 | 1 |
| EU0397A | 5 | S | 73 | 95 | EC0399 | 1 |
| EU0397A | 6 | H | 62 | 96 | EC0399 | 1 |
| EU0398A | 1 | S | 73 | 380.7 | X6537 | 1 |
| EU0398A | 2 | H | 62 | 381.7 | X6537 | 1 |
| EU0398A | 3 | S | 73 | 310.7 | X6543 | 1 |
| EU0398A | 4 | H | 62 | 312.7 | X6543 | 1 |
| EU0398A | 5 | S | 73 | 95 | EC0399 | 1 |



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|---------|-----|------|-----------|-------------|-----------|-----------------|
| EU0398A | 6 | H | 62 | 96 | EC0399 | 1 |
| F0001 | 1 | S | 0.997 | 1.003 | | |
| F0001 | 2 | H | 0.995 | 1.005 | | |
| F0002 | 1 | S | 15 | 50 | | |
| F0002 | 2 | H | -33 | 53 | | |
| F0210 | 1 | S | 210 | 215 | E0170 | 1 |
| F0210 | 2 | H | 208 | 303 | E0170 | 1 |
| F0211 | 1 | S | 210 | 215 | E0171 | 1 |
| F0211 | 2 | H | 208 | 303 | E0171 | 1 |
| F0212 | 1 | S | 210 | 215 | E0172 | 1 |
| F0212 | 2 | H | 208 | 303 | E0172 | 1 |
| F0213 | 1 | S | 210 | 215 | E0173 | 1 |
| F0213 | 2 | H | 208 | 303 | E0173 | 1 |
| F0214 | 1 | S | 210 | 215 | E0174 | 1 |
| F0214 | 2 | H | 208 | 303 | E0174 | 1 |
| F0215 | 1 | S | 210 | 215 | E0175 | 1 |
| F0215 | 2 | H | 208 | 303 | E0175 | 1 |
| F0216 | 1 | S | 210 | 215 | E0176 | 1 |
| F0216 | 2 | H | 208 | 303 | E0176 | 1 |
| F0217 | 1 | S | 210 | 215 | E0177 | 1 |
| F0217 | 2 | H | 208 | 303 | E0177 | 1 |
| F0218 | 1 | S | 210 | 215 | E0178 | 1 |
| F0218 | 2 | H | 208 | 303 | E0178 | 1 |
| F0219 | 1 | S | 210 | 215 | E0179 | 1 |
| F0219 | 2 | H | 208 | 303 | E0179 | 1 |
| F0220 | 1 | S | 210 | 215 | E0180 | 1 |
| F0220 | 2 | H | 208 | 303 | E0180 | 1 |
| F0221 | 1 | S | 210 | 215 | E0181 | 1 |
| F0221 | 2 | H | 208 | 303 | E0181 | 1 |
| F0222 | 1 | S | 210 | 215 | E0182 | 1 |
| F0222 | 2 | H | 208 | 303 | E0182 | 1 |
| F0223 | 1 | S | 210 | 215 | E0183 | 1 |
| F0223 | 2 | H | 208 | 303 | E0183 | 1 |
| F0224 | 1 | S | 210 | 215 | E0184 | 1 |
| F0224 | 2 | H | 208 | 303 | E0184 | 1 |
| F0225 | 1 | S | 210 | 215 | E0185 | 1 |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| F0225 | 2 | H | 208 | 303 | E0185 | 1 |
| F0226 | 1 | S | 210 | 215 | E0186 | 1 |
| F0226 | 2 | H | 208 | 303 | E0186 | 1 |
| F0227 | 1 | S | 210 | 215 | E0187 | 1 |
| F0227 | 2 | H | 208 | 303 | E0187 | 1 |
| F0228 | 1 | S | 210 | 215 | E0188 | 1 |
| F0228 | 2 | H | 208 | 303 | E0188 | 1 |
| F0250 | 1 | H | 3.96 | 4.04 | X6830 | 1 |
| F0251 | 1 | H | 3.96 | 4.04 | X6831 | 1 |
| F0252 | 1 | H | 3.96 | 4.04 | X6832 | 1 |
| F0253 | 1 | H | 3.96 | 4.04 | X6833 | 1 |
| F0254 | 1 | H | 3.96 | 4.04 | X6834 | 1 |
| F0255 | 1 | H | 3.96 | 4.04 | X6835 | 1 |
| F0256 | 1 | H | 3.96 | 4.04 | X6836 | 1 |
| F0257 | 1 | H | 3.96 | 4.04 | X6837 | 1 |
| F0258 | 1 | H | 3.96 | 4.04 | X6838 | 1 |
| F0259 | 1 | H | 3.96 | 4.04 | X6839 | 1 |
| F0260 | 1 | H | 3.96 | 4.04 | X6840 | 1 |
| F0261 | 1 | H | 3.96 | 4.04 | X6841 | 1 |
| F0262 | 1 | H | 3.96 | 4.04 | X6842 | 1 |
| F0263 | 1 | H | 3.96 | 4.04 | X6843 | 1 |
| F0264 | 1 | H | 3.96 | 4.04 | X6844 | 1 |
| F0265 | 1 | H | 3.96 | 4.04 | X6845 | 1 |
| F0266 | 1 | H | 3.96 | 4.04 | X6846 | 1 |
| F0267 | 1 | H | 3.96 | 4.04 | X6847 | 1 |
| F0268 | 1 | H | 3.96 | 4.04 | X6848 | 1 |
| F0290 | 1 | S | 9.9 | 10.1 | E0170 | 1 |
| F0290 | 2 | H | 9.8 | 10.2 | E0170 | 1 |
| F0291 | 1 | S | 9.9 | 10.1 | E0171 | 1 |
| F0291 | 2 | H | 9.8 | 10.2 | E0171 | 1 |
| F0292 | 1 | S | 9.9 | 10.1 | E0172 | 1 |
| F0292 | 2 | H | 9.8 | 10.2 | E0172 | 1 |
| F0293 | 1 | S | 9.9 | 10.1 | E0173 | 1 |
| F0293 | 2 | H | 9.8 | 10.2 | E0173 | 1 |
| F0294 | 1 | S | 9.9 | 10.1 | E0174 | 1 |
| F0294 | 2 | H | 9.8 | 10.2 | E0174 | 1 |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| F0295 | 1 | S | 9.9 | 10.1 | E0175 | 1 |
| F0295 | 2 | H | 9.8 | 10.2 | E0175 | 1 |
| F0296 | 1 | S | 9.9 | 10.1 | E0176 | 1 |
| F0296 | 2 | H | 9.8 | 10.2 | E0176 | 1 |
| F0297 | 1 | S | 9.9 | 10.1 | E0177 | 1 |
| F0297 | 2 | H | 9.8 | 10.2 | E0177 | 1 |
| F0298 | 1 | S | 9.9 | 10.1 | E0178 | 1 |
| F0298 | 2 | H | 9.8 | 10.2 | E0178 | 1 |
| F0299 | 1 | S | 9.9 | 10.1 | E0179 | 1 |
| F0299 | 2 | H | 9.8 | 10.2 | E0179 | 1 |
| F0300 | 1 | S | 9.9 | 10.1 | E0180 | 1 |
| F0300 | 2 | H | 9.8 | 10.2 | E0180 | 1 |
| F0301 | 1 | S | 9.9 | 10.1 | E0181 | 1 |
| F0301 | 2 | H | 9.8 | 10.2 | E0181 | 1 |
| F0302 | 1 | S | 9.9 | 10.1 | E0182 | 1 |
| F0302 | 2 | H | 9.8 | 10.2 | E0182 | 1 |
| F0303 | 1 | S | 9.9 | 10.1 | E0183 | 1 |
| F0303 | 2 | H | 9.8 | 10.2 | E0183 | 1 |
| F0304 | 1 | S | 9.9 | 10.1 | E0184 | 1 |
| F0304 | 2 | H | 9.8 | 10.2 | E0184 | 1 |
| F0305 | 1 | S | 9.9 | 10.1 | E0185 | 1 |
| F0305 | 2 | H | 9.8 | 10.2 | E0185 | 1 |
| F0306 | 1 | S | 9.9 | 10.1 | E0186 | 1 |
| F0306 | 2 | H | 9.8 | 10.2 | E0186 | 1 |
| F0307 | 1 | S | 9.9 | 10.1 | E0187 | 1 |
| F0307 | 2 | H | 9.8 | 10.2 | E0187 | 1 |
| F0308 | 1 | S | 9.9 | 10.1 | E0188 | 1 |
| F0308 | 2 | H | 9.8 | 10.2 | E0188 | 1 |
| F0310 | 1 | S | 273 | 323 | | |
| F0310 | 2 | H | 240 | 326 | | |
| F0311 | 1 | S | 273 | 323 | | |
| F0311 | 2 | H | 240 | 326 | | |
| F0312 | 1 | S | 273 | 323 | | |
| F0312 | 2 | H | 240 | 326 | | |
| F0313 | 1 | S | 273 | 323 | | |
| F0313 | 2 | H | 240 | 326 | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| F0314 | 1 | S | 273 | 323 | | |
| F0314 | 2 | H | 240 | 326 | | |
| F0315 | 1 | S | 273 | 323 | | |
| F0315 | 2 | H | 240 | 326 | | |
| F0316 | 1 | S | 273 | 323 | | |
| F0316 | 2 | H | 240 | 326 | | |
| F0317 | 1 | S | 273 | 323 | | |
| F0317 | 2 | H | 240 | 326 | | |
| F0318 | 1 | S | 273 | 323 | | |
| F0318 | 2 | H | 240 | 326 | | |
| F0319 | 1 | S | 273 | 323 | | |
| F0319 | 2 | H | 240 | 326 | | |
| F0320 | 1 | S | 273 | 323 | | |
| F0320 | 2 | H | 240 | 326 | | |
| F0321 | 1 | S | 273 | 323 | | |
| F0321 | 2 | H | 240 | 326 | | |
| F0322 | 1 | S | 273 | 323 | | |
| F0322 | 2 | H | 240 | 326 | | |
| F0323 | 1 | S | 273 | 323 | | |
| F0323 | 2 | H | 240 | 326 | | |
| F0324 | 1 | S | 273 | 323 | | |
| F0324 | 2 | H | 240 | 326 | | |
| F0325 | 1 | S | 273 | 323 | | |
| F0325 | 2 | H | 240 | 326 | | |
| F0326 | 1 | S | 273 | 323 | | |
| F0326 | 2 | H | 240 | 326 | | |
| F0327 | 1 | S | 273 | 323 | | |
| F0327 | 2 | H | 240 | 326 | | |
| F0328 | 1 | S | 273 | 323 | | |
| F0328 | 2 | H | 240 | 326 | | |
| F0330 | 1 | S | 288 | 323 | | |
| F0330 | 2 | H | 240 | 326 | | |
| F0331 | 1 | S | 288 | 323 | | |
| F0331 | 2 | H | 240 | 326 | | |
| F0332 | 1 | S | 288 | 323 | | |
| F0332 | 2 | H | 240 | 326 | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| F0333 | 1 | S | 288 | 323 | | |
| F0333 | 2 | H | 240 | 326 | | |
| F0334 | 1 | S | 288 | 323 | | |
| F0334 | 2 | H | 240 | 326 | | |
| F0335 | 1 | S | 288 | 323 | | |
| F0335 | 2 | H | 240 | 326 | | |
| F0336 | 1 | S | 288 | 323 | | |
| F0336 | 2 | H | 240 | 326 | | |
| F0337 | 1 | S | 288 | 323 | | |
| F0337 | 2 | H | 240 | 326 | | |
| F0338 | 1 | S | 288 | 323 | | |
| F0338 | 2 | H | 240 | 326 | | |
| F0339 | 1 | S | 288 | 323 | | |
| F0339 | 2 | H | 240 | 326 | | |
| F0340 | 1 | S | 288 | 323 | | |
| F0340 | 2 | H | 240 | 326 | | |
| F0341 | 1 | S | 288 | 323 | | |
| F0341 | 2 | H | 240 | 326 | | |
| F0342 | 1 | S | 288 | 323 | | |
| F0342 | 2 | H | 240 | 326 | | |
| F0343 | 1 | S | 288 | 323 | | |
| F0343 | 2 | H | 240 | 326 | | |
| F0344 | 1 | S | 288 | 323 | | |
| F0344 | 2 | H | 240 | 326 | | |
| F0345 | 1 | S | 288 | 323 | | |
| F0345 | 2 | H | 240 | 326 | | |
| F0346 | 1 | S | 288 | 323 | | |
| F0346 | 2 | H | 240 | 326 | | |
| F0347 | 1 | S | 288 | 323 | | |
| F0347 | 2 | H | 240 | 326 | | |
| F0348 | 1 | S | 288 | 323 | | |
| F0348 | 2 | H | 240 | 326 | | |
| F0391 | 1 | S | 89 | 92.5 | | |
| F0391 | 2 | H | 88.5 | 93.5 | | |
| F0392 | 1 | S | 89 | 92.5 | | |
| F0392 | 2 | H | 88.5 | 93.5 | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| F0393 | 1 | S | 89 | 92.5 | | |
| F0393 | 2 | H | 88.5 | 93.5 | | |
| F0394 | 1 | S | 89 | 92.5 | | |
| F0394 | 2 | H | 88.5 | 93.5 | | |
| F0395 | 1 | H | 72.4 | 101 | | |
| F0396 | 1 | H | 72.4 | 101 | | |
| F0397 | 1 | H | 72.4 | 101 | | |
| F0398 | 1 | H | 72.4 | 101 | | |
| F0495 | 1 | H | 1 | | | |
| F0496 | 1 | H | 0 | | | |
| F0497 | 1 | H | 0 | | | |
| F0498 | 1 | H | 0 | | | |
| F0499 | 1 | H | 0 | | | |
| F0595 | 1 | H | 1 | | | |
| F0596 | 1 | H | 0 | | | |
| F0597 | 1 | H | 0 | | | |
| F0598 | 1 | H | 0 | | | |
| F0599 | 1 | H | 0 | | | |
| F0695 | 1 | H | 1 | | | |
| F0696 | 1 | H | 0 | | | |
| F0697 | 1 | H | 0 | | | |
| F0698 | 1 | H | 0 | | | |
| F0699 | 1 | H | 0 | | | |
| F0795 | 1 | H | 1 | | | |
| F0796 | 1 | H | 0 | | | |
| F0797 | 1 | H | 0 | | | |
| F0798 | 1 | H | 0 | | | |
| F0799 | 1 | H | 0 | | | |
| F0896 | 1 | H | 1 | | X6604 | 1 |
| F0898 | 1 | H | 0 | | | |
| F0899 | 1 | H | 0 | | | |
| F0992 | 1 | H | 2 | | | |
| F0993 | 1 | H | 2 | | | |
| F1292 | 1 | H | 0 | | | |
| F1293 | 1 | H | 0 | | | |
| F1295 | 1 | H | 0 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| F1296 | 1 | H | 0 | | X6611 | 1 |
| F1297 | 1 | H | 0 | | X6611 | 1 |
| F1298 | 1 | H | 0 | | | |
| F1299 | 1 | H | 0 | | X6611 | 1 |
| F1396 | 1 | H | 0 | | | |
| F2101 | 1 | S | -3 | 39 | | |
| F2101 | 2 | H | -28 | 42 | | |
| F2102 | 1 | S | -3 | 39 | | |
| F2102 | 2 | H | -28 | 42 | | |
| F2103 | 1 | S | -3 | 39 | | |
| F2103 | 2 | H | -28 | 42 | | |
| F2104 | 1 | S | -3 | 39 | | |
| F2104 | 2 | H | -28 | 42 | | |
| F2105 | 1 | S | -3 | 39 | | |
| F2105 | 2 | H | -28 | 42 | | |
| F2106 | 1 | S | -3 | 39 | | |
| F2106 | 2 | H | -28 | 42 | | |
| F2107 | 1 | S | -3 | 39 | | |
| F2107 | 2 | H | -28 | 42 | | |
| F2108 | 1 | S | -3 | 39 | | |
| F2108 | 2 | H | -28 | 42 | | |
| F2109 | 1 | S | -3 | 39 | | |
| F2109 | 2 | H | -28 | 42 | | |
| F2110 | 1 | S | -7 | 39 | | |
| F2110 | 2 | H | -28 | 42 | | |
| F2111 | 1 | S | -7 | 39 | | |
| F2111 | 2 | H | -28 | 42 | | |
| F2112 | 1 | S | -7 | 39 | | |
| F2112 | 2 | H | -28 | 42 | | |
| F2113 | 1 | S | 10 | 52 | | |
| F2113 | 2 | H | -33 | 55 | | |
| F2114 | 1 | S | -10 | 35 | | |
| F2114 | 2 | H | -35 | 40 | | |
| F2115 | 1 | S | -10 | 35 | | |
| F2115 | 2 | H | -35 | 40 | | |
| F2116 | 1 | S | -10 | 35 | | |



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| F2116 | 2 | H | -35 | 40 | | |
| F2121 | 1 | S | 0.85 | 1.02 | E0501 | 0 |
| F2121 | 2 | H | 0.75 | 1.12 | E0501 | 0 |
| F2121 | 3 | S | 1.34 | 2.23 | X6108 | 1 |
| F2121 | 4 | H | 1.24 | 2.43 | X6108 | 1 |
| F2122 | 1 | S | 25 | 30 | | |
| F2122 | 2 | H | 24.5 | 31 | | |
| F2123 | 1 | S | 4.8 | 5.4 | | |
| F2123 | 2 | H | 4.5 | 5.6 | | |
| F2131 | 1 | H | 0 | | | |
| F2132 | 1 | H | 0 | | X6611 | 1 |
| F3882 | 1 | H | 0 | | | |
| F3885 | 1 | H | 0 | | | |
| F3888 | 1 | H | 0 | | | |
| F3891 | 1 | H | 0 | | | |
| F3985 | 1 | S | 3.92 | 4 | P2165 | 1 |
| F3985 | 2 | H | 3.8 | 4.1 | P2165 | 1 |
| F3986 | 1 | S | -10 | 35 | | |
| F3986 | 2 | H | -33 | 38 | | |
| F3987 | 1 | S | 4.07 | 4.25 | P2169 | 1 |
| F3987 | 2 | H | 4.06 | 4.26 | P2169 | 1 |
| F3989 | 1 | S | 4.07 | 4.25 | P2170 | 1 |
| F3989 | 2 | H | 4.06 | 4.26 | P2170 | 1 |
| F3990 | 1 | S | 25.9 | 30.9 | P2167 | 1 |
| F3990 | 2 | H | 25.4 | 31.9 | P2167 | 1 |
| F3991 | 1 | S | 0 | 37 | | |
| F3991 | 2 | H | -33 | 40 | | |
| F3995 | 1 | S | 0 | 50 | | |
| F3995 | 2 | H | -33 | 53 | | |
| F3998 | 1 | S | 3.58 | 3.62 | | |
| F3998 | 2 | H | 3.56 | 3.64 | | |
| F3999 | 1 | S | 0 | 0.02 | | |
| F3999 | 2 | H | 0 | 0.04 | | |
| F4000 | 1 | S | 0 | 0.02 | | |
| F4000 | 2 | H | 0 | 0.04 | | |
| F4001 | 1 | H | 0 | | | |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| F4002 | 1 | H | 0 | | X6898 | 1 |
| F4003 | 1 | H | 0 | | X6898 | 1 |
| F4004 | 1 | H | 0 | | | |
| F4005 | 1 | H | 0 | | X6898 | 1 |
| F4006 | 1 | H | 0 | | X6898 | 1 |
| F4007 | 1 | H | 0 | | X6898 | 1 |
| F4008 | 1 | H | 0 | | X6898 | 1 |
| F4009 | 1 | H | 0 | | X6898 | 1 |
| F4016 | 1 | H | 0 | | X6612 | 1 |
| F4017 | 1 | H | 0 | | X6898 | 1 |
| F9027 | 1 | S | 4.96 | 5.04 | X6950 | 1 |
| F9027 | 2 | H | 4.9 | 5.1 | X6950 | 1 |
| F9028 | 1 | S | 5.004 | 5.108 | X6950 | 1 |
| F9028 | 2 | H | 4.95 | 5.15 | X6950 | 1 |
| F9029 | 1 | S | 16.14 | 16.385 | X6950 | 1 |
| F9029 | 2 | H | 16 | 16.5 | X6950 | 1 |
| F9030 | 1 | S | 14.78 | 15.3 | X6950 | 1 |
| F9030 | 2 | H | 14.7 | 15.4 | X6950 | 1 |
| F9031 | 1 | S | -15.36 | -14.76 | X6950 | 1 |
| F9031 | 2 | H | -15.45 | -14.7 | X6950 | 1 |
| F9032 | 1 | S | -7 | 48 | X6950 | 1 |
| F9032 | 2 | H | -12 | 53 | X6950 | 1 |
| F9033 | 1 | H | 1 | | X6950 | 1 |
| F9034 | 1 | H | 1 | | X6950 | 1 |
| F9035 | 1 | H | 1 | | X6950 | 1 |
| F9036 | 1 | H | 41440 | | X6950 | 1 |
| F9037 | 1 | H | 61781 | | | |
| F9200 | 1 | H | 1 | | | |
| F9201 | 1 | H | 0 | | | |
| F9202 | 1 | H | 1 | | | |
| F9203 | 1 | H | 0 | | | |
| F9204 | 1 | H | 0 | | | |
| F9205 | 1 | H | 0 | | | |
| F9206 | 1 | H | 0 | | | |
| F9207 | 1 | H | 1 | | | |
| F9208 | 1 | H | 1 | | | |



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|---------|-----|------|-----------|-------------|-----------|-----------------|
| F9209 | 1 | H | 1 | | | |
| F9210 | 1 | H | 1 | | | |
| F9211 | 1 | H | 0 | | | |
| F9212 | 1 | H | 0 | | | |
| F9213 | 1 | H | 0 | | | |
| F9243 | 1 | H | 1 | | | |
| F9253 | 1 | H | 0 | | | |
| F9255 | 1 | H | 0 | | | |
| F9800 | 1 | S | 5.004 | 5.108 | X3663 | 1 |
| F9800 | 2 | H | 4.95 | 5.15 | X3663 | 1 |
| F9801 | 1 | C | | | | |
| F9802 | 1 | C | | | | |
| FU0391A | 1 | S | 61.262 | 380.7 | | |
| FU0391A | 2 | H | 61.262 | 381.7 | | |
| FU0392A | 1 | S | 61.262 | 380.7 | | |
| FU0392A | 2 | H | 61.262 | 381.7 | | |
| FU0393A | 1 | S | 61.262 | 380.7 | | |
| FU0393A | 2 | H | 61.262 | 381.7 | | |
| FU0394A | 1 | S | 61.262 | 380.7 | | |
| FU0394A | 2 | H | 61.262 | 381.7 | | |

Table 10 E and F Parameter limits – Warnings and Alerts

Note: EC0399 is set to 1 when the fine tuning is done; EC9960 is the CDE1 amplitude and EC9980 is the CDE2 amplitude



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| P1060 | 1 | S | 0.15 | 0.35 | X6527 | 1 |
| P1060 | 2 | H | 0.01 | 5.8 | X6527 | 1 |
| P1060 | 3 | S | 0.05 | 0.28 | X6531 | 1 |
| P1060 | 4 | H | 0.01 | 0.4 | X6531 | 1 |
| P1060 | 5 | S | 0.05 | 5.7 | X6535 | 1 |
| P1060 | 6 | H | 0.01 | 5.8 | X6535 | 1 |
| P1061 | 1 | S | 0.15 | 0.35 | X6526 | 1 |
| P1061 | 2 | H | 0.01 | 6.8 | X6526 | 1 |
| P1061 | 3 | S | 0.05 | 0.28 | X6530 | 1 |
| P1061 | 4 | H | 0.01 | 0.4 | X6530 | 1 |
| P1061 | 5 | S | 0.05 | 6.5 | X6534 | 1 |
| P1061 | 6 | H | 0.01 | 6.8 | X6534 | 1 |
| P1061 | 7 | S | 0.05 | 5.5 | X6539 | 1 |
| P1061 | 8 | H | 0.01 | 6 | X6539 | 1 |
| P1061 | 9 | S | 0.05 | 5.7 | X6544 | 1 |
| P1061 | 10 | H | 0.01 | 6.8 | X6544 | 1 |
| P1062 | 1 | S | 0.15 | 0.35 | X6525 | 1 |
| P1062 | 2 | H | 0.01 | 5.9 | X6525 | 1 |
| P1062 | 3 | S | 0.05 | 0.28 | X6529 | 1 |
| P1062 | 4 | H | 0.01 | 0.4 | X6529 | 1 |
| P1062 | 5 | S | 0.05 | 5.7 | X6533 | 1 |
| P1062 | 6 | H | 0.01 | 5.8 | X6533 | 1 |
| P1063 | 1 | S | 0.15 | 0.35 | X6528 | 1 |
| P1063 | 2 | H | 0.01 | 6.9 | X6528 | 1 |
| P1063 | 3 | S | 0.05 | 0.28 | X6532 | 1 |
| P1063 | 4 | H | 0.01 | 0.4 | X6532 | 1 |
| P1063 | 5 | S | 0.05 | 6.5 | X6536 | 1 |
| P1063 | 6 | H | 0.01 | 6.8 | X6536 | 1 |
| P1063 | 7 | S | 0.05 | 5.5 | X6540 | 1 |
| P1063 | 8 | H | 0.01 | 6 | X6540 | 1 |
| P1063 | 9 | S | 0.05 | 5.7 | X6545 | 1 |
| P1063 | 10 | H | 0.01 | 6.8 | X6545 | 1 |
| P2008 | 1 | S | 0.0 | 3.53 | X3608 | 1 |
| P2008 | 2 | H | 0.0 | 4.5 | X3608 | 1 |

Table 11 P Parameter limits – Warnings and Alerts



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|-------|-----|------|-----------|-------------|-----------|-----------------|
| P2011 | 1 | S | 0.0 | 3 | X3611 | 1 |
| P2011 | 2 | H | 0.0 | 4.5 | X3611 | 1 |
| P2012 | 1 | S | 0.12 | 0.17 | X3612 | 1 |
| P2012 | 2 | H | 0.114 | 0.18 | X3612 | 1 |
| P2013 | 1 | S | 0 | 0.504 | X6900 | 1 |
| P2013 | 2 | H | 0 | 0.615 | X6900 | 1 |
| P2013 | 3 | S | 0 | 0.111 | X6902 | 1 |
| P2013 | 4 | H | 0 | 0.125 | X6902 | 1 |
| P2014 | 1 | S | 1.60 | 1.96 | X6546 | 1 |
| P2014 | 2 | H | 1.57 | 2.06 | X6546 | 1 |
| P2014 | 3 | S | 1.13 | 1.4 | X6547 | 1 |
| P2014 | 4 | H | 1.1 | 1.5 | X6547 | 1 |
| P2015 | 1 | S | 0.18 | 0.24 | X3615 | 1 |
| P2015 | 2 | H | 0.17 | 0.26 | X3615 | 1 |
| P2016 | 1 | S | 0.32 | 0.44 | X3616 | 1 |
| P2016 | 2 | H | 0.31 | 0.50 | X3616 | 1 |
| P2017 | 1 | S | 1.85 | 2.1 | X6538 | 1 |
| P2017 | 2 | H | 1.77 | 2.2 | X6538 | 1 |
| P2017 | 3 | H | 0.0 | 0.4 | X6538 | 0 |
| P2018 | 1 | S | 0.0 | 3 | P2122 | 1 |
| P2018 | 2 | H | 0.0 | 3.1 | P2122 | 1 |
| P2058 | 1 | S | 0.0 | 3.53 | X3658 | 1 |
| P2058 | 2 | H | 0.0 | 4.5 | X3658 | 1 |
| P2061 | 1 | S | 0.0 | 3 | X3661 | 1 |
| P2061 | 2 | H | 0.0 | 4.5 | X3661 | 1 |
| P2062 | 1 | S | 0.126 | 0.176 | X3662 | 1 |
| P2062 | 2 | H | 0.112 | 0.192 | X3662 | 1 |
| P2063 | 1 | S | 0 | 0.504 | X6950 | 1 |
| P2063 | 2 | H | 0 | 0.615 | X6950 | 1 |
| P2063 | 3 | S | 0 | 0.111 | X6952 | 1 |
| P2063 | 4 | H | 0 | 0.125 | X6952 | 1 |
| P2064 | 1 | S | 1.134 | 2.156 | X3664 | 1 |
| P2064 | 2 | H | 1.008 | 2.352 | X3664 | 1 |
| P2065 | 1 | S | 0.18 | 0.264 | X3665 | 1 |
| P2065 | 2 | H | 0.16 | 0.288 | X3665 | 1 |



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| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| P2066 | 1 | S | 0.315 | 0.495 | X3666 | 1 |
| P2066 | 2 | H | 0.28 | 0.54 | X3666 | 1 |
| P2067 | 1 | S | 1.62 | 2.42 | X3667 | 1 |
| P2067 | 2 | H | 1.44 | 2.64 | X3667 | 1 |
| P2068 | 1 | S | 0.0 | 3 | P2172 | 1 |
| P2068 | 2 | H | 0.0 | 3.1 | P2172 | 1 |

Table 11 P Parameter limits – Warnings and Alerts

| NAME | POS | TYPE | LOW VALUE | _HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|-------------|-----------|-----------------|
| T5001 | 1 | S | -30 | 25 | | |
| T5001 | 2 | H | -33 | 28 | | |
| T5002 | 1 | S | -30 | 35 | | |
| T5002 | 2 | H | -33 | 38 | | |
| T5003 | 1 | S | -30 | 35 | | |
| T5003 | 2 | H | -28 | 38 | | |
| T5004 | 1 | S | -30 | 35 | | |
| T5004 | 2 | H | -33 | 38 | | |
| T5005 | 1 | S | -30 | 30 | | |
| T5005 | 2 | H | -33 | 33 | | |
| T5006 | 1 | S | -20 | 37 | X6520 | 0 |
| T5006 | 2 | H | -23 | 40 | X6520 | 0 |
| T5006 | 3 | S | -14 | 37 | X6522 | 1 |
| T5006 | 4 | H | -15 | 40 | X6522 | 1 |
| T5006 | 5 | S | -16.5 | 37 | X6523 | 1 |
| T5006 | 6 | H | -17.5 | 40 | X6523 | 1 |
| T5007 | 1 | S | -20 | 37 | X6520 | 0 |
| T5007 | 2 | H | -23 | 40 | X6520 | 0 |
| T5007 | 3 | S | -14 | 37 | X6522 | 1 |
| T5007 | 4 | H | -15 | 40 | X6522 | 1 |
| T5007 | 5 | S | -16.5 | 37 | X6523 | 1 |
| T5007 | 6 | H | -17.5 | 40 | X6523 | 1 |
| T5009 | 1 | S | -20.5 | 37 | X6520 | 0 |
| T5009 | 2 | H | -23 | 40 | X6520 | 0 |
| T5009 | 3 | S | -14 | 37 | X6522 | 1 |
| T5009 | 4 | H | -15 | 40 | X6522 | 1 |
| T5009 | 5 | S | -16.5 | 37 | X6523 | 1 |
| T5009 | 6 | H | -17.5 | 40 | X6523 | 1 |
| T5010 | 1 | S | -30 | 35 | | |
| T5010 | 2 | H | -33 | 38 | | |
| T5011 | 1 | S | -30 | 35 | | |
| T5011 | 2 | H | -33 | 38 | | |
| T5012 | 1 | S | -30 | 35 | | |



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| NAME | POS | TYPE | LOW VALUE | HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|------------|-----------|-----------------|
| T5012 | 2 | H | -33 | 38 | | |
| T5013 | 1 | S | -30 | 36 | | |
| T5013 | 2 | H | -33 | 39 | | |

Table 12 T Parameter limits – Warnings and Alerts

| NAME | POS | TYPE | LOW VALUE | HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|------------|-----------|-----------------|
| T5019 | 1 | S | -30 | 25 | | |
| T5019 | 2 | H | -33 | 28 | | |
| T5020 | 1 | S | -30 | 35 | | |
| T5020 | 2 | H | -33 | 38 | | |
| T5021 | 1 | S | -30 | 35 | | |
| T5021 | 2 | H | -33 | 38 | | |
| T5022 | 1 | S | -30 | 37 | | |
| T5022 | 2 | H | -33 | 40 | | |
| T5023 | 1 | S | -30 | 30 | | |
| T5023 | 2 | H | -33 | 33 | | |
| T5024 | 1 | S | -20 | 37 | X6520 | 0 |
| T5024 | 2 | H | -23 | 40 | X6520 | 0 |
| T5024 | 3 | S | -14 | 37 | X6522 | 1 |
| T5024 | 4 | H | -15 | 40 | X6522 | 1 |
| T5024 | 5 | S | -16.5 | 37 | X6523 | 1 |
| T5024 | 6 | H | -17.5 | 40 | X6523 | 1 |
| T5025 | 1 | S | -20 | 37 | X6520 | 0 |
| T5025 | 2 | H | -23 | 40 | X6520 | 0 |
| T5025 | 3 | S | -14 | 37 | X6522 | 1 |
| T5025 | 4 | H | -15 | 40 | X6522 | 1 |
| T5025 | 5 | S | -16.5 | 37 | X6523 | 1 |
| T5025 | 6 | H | -17.5 | 40 | X6523 | 1 |
| T5027 | 1 | S | -20.5 | 37 | X6520 | 0 |
| T5027 | 2 | H | -23 | 40 | X6520 | 0 |
| T5027 | 3 | S | -14 | 37 | X6522 | 1 |
| T5027 | 4 | H | -15 | 40 | X6522 | 1 |
| T5027 | 5 | S | -16.5 | 37 | X6523 | 1 |
| T5027 | 6 | H | -17.5 | 40 | X6523 | 1 |
| T5031 | 1 | S | -20 | 40 | X6900 | 1 |
| T5031 | 2 | H | -25 | 45 | X6900 | 1 |
| T5031 | 3 | S | -25 | 55 | P2116 | 0 |
| T5031 | 4 | H | -30 | 60 | P2116 | 0 |
| T5041 | 1 | S | -20 | 40 | X6950 | 1 |
| T5041 | 2 | H | -25 | 45 | X6950 | 1 |
| T5041 | 3 | S | -25 | 55 | P2166 | 0 |
| T5041 | 4 | H | -30 | 60 | P2166 | 0 |
| T5049 | 1 | S | -7 | 25 | X4044 | 1 |
| T5049 | 2 | H | -10 | 30 | X4044 | 1 |



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| NAME | POS | TYPE | LOW VALUE | HIGH VALUE | CONDITION | CONDITION VALUE |
|-------|-----|------|-----------|------------|-----------|-----------------|
| T5049 | 3 | S | -20 | 25 | X4045 | 1 |
| T5049 | 4 | H | -25 | 30 | X4045 | 1 |
| T5061 | 1 | S | -15 | 35 | X6900 | 1 |
| T5061 | 2 | H | -20 | 40 | X6900 | 1 |
| T5061 | 3 | S | -20 | 50 | P2116 | 0 |
| T5061 | 4 | H | -25 | 55 | P2116 | 0 |
| T5064 | 1 | S | -15 | 35 | X6950 | 1 |
| T5064 | 2 | H | -20 | 40 | X6950 | 1 |
| T5064 | 3 | S | -20 | 50 | P2166 | 0 |
| T5064 | 4 | H | -25 | 55 | P2166 | 0 |
| T5104 | 1 | S | -73 | -40 | X6521 | 1 |
| T5104 | 2 | H | -80 | -30 | X6521 | 1 |
| T5104 | 3 | S | -73 | -58 | X6524 | 1 |
| T5104 | 4 | H | -80 | -53 | X6524 | 1 |
| T5104 | 5 | S | -73 | 40 | X6542 | 1 |
| T5104 | 6 | H | -80 | 50 | X6542 | 1 |
| T5107 | 1 | S | -188 | 45 | X6541 | 0 |
| T5107 | 2 | H | -188.5 | 85 | X6541 | 0 |
| T5107 | 3 | S | -200 | 108.3 | X6541 | 1 |
| T5107 | 4 | H | -200 | 110 | X6541 | 1 |
| T5111 | 1 | S | -73 | -40 | X6521 | 1 |
| T5111 | 2 | H | -80 | -30 | X6521 | 1 |
| T5111 | 3 | S | -73 | -58 | X6524 | 1 |
| T5111 | 4 | H | -80 | -53 | X6524 | 1 |
| T5111 | 5 | S | -73 | 40 | X6542 | 1 |
| T5111 | 6 | H | -80 | 50 | X6542 | 1 |
| T5114 | 1 | S | -188 | 45 | X6541 | 0 |
| T5114 | 2 | H | -188.5 | 85 | X6541 | 0 |
| T5114 | 3 | S | -200 | 108.3 | X6541 | 1 |
| T5114 | 4 | H | -200 | 110 | X6541 | 1 |

Table 12 T Parameter limits – Warnings and Alerts

| SPE_NAME | Condition | SPE_Description | Condition expression |
|----------|-----------------------------|-------------------------------------------------|-----------------------------------------|
| X3608 | SPI compressor heaters A ON | Board 2A GSW1 and LCL 3 Status must be CLOSE | (P2108.raw == 1) land (T8500.raw == 1); |
| X3611 | SPI Camera heaters A ON | Board 2A GSW2 and LCL 3 Status must be CLOSE | (P2111.raw == 1) land (T8501.raw == 1); |
| X3612 | AFEE TM/TC main ON | Board 3A GSW1 and LCL 1 Status must be CLOSE | (P2114.raw == 1) land (P2115.raw == 1); |
| X3613 | SPI DPE1 ON | Board 3A GSW1 and LCL 2 Status must be CLOSE | P2114.raw == 1) land (P2116.raw == 1); |
| X3614 | SPI ACS main ON | Board 3A GSW1 and LCL 3 Status must be CLOSE | (P2114.raw == 1) land (P2117.raw == 1); |



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| SPE_NAME | Condition | SPE_Description | Condition expression |
|----------|-----------------------------|-------------------------------------------------|-----------------------------------------|
| X3615 | SPI DFEE main ON | Board 3A GSW2 and LCL 1 Status must be CLOSE | (P2118.raw == 1) land (P2119.raw == 1); |
| X3616 | SPI PSD main line ON | Board 3A GSW2 and LCL 2 Status must be CLOSE | (P2118.raw == 1) land (P2120.raw == 1); |
| X3658 | SPI compressor heaters B ON | Board 2B GSW1 and LCL 3 Status must be CLOSE | (P2158.raw == 1) land (T8600.raw == 1); |
| X3661 | SPI Camera heaters B ON | Board 2B GSW2 and LCL 3 Status must be CLOSE | (P2161.raw == 1) land (T8601.raw == 1); |

Table 13 Limit conditions

| SPE_NAME | Condition | SPE_Description | Condition expression |
|----------|-------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X3662 | AFEE TM/TC redundant ON | Board 3B GSW1 and LCL 1 Status must be CLOSE | (P2164.raw == 1) land (P2165.raw == 1); |
| X3663 | SPI DPE2 ON | Board 3A GSW1 and LCL 2 Status must be CLOSE | (P2164.raw == 1) land (P2166.raw == 1); |
| X3664 | SPI ACS redundant ON | Board 3B GSW1 and LCL 3 Status must be CLOSE | (P2164.raw == 1) land (P2167.raw == 1); |
| X3665 | | Board 3B GSW2 and LCL 1 Status must be CLOSE | (P2168.raw == 1) land (P2169.raw == 1); |
| X3666 | | Board 3B GSW2 and LCL 2 Status must be CLOSE | (P2168.raw == 1) land (P2170.raw == 1); |
| X3667 | | Board 3B GSW2 and LCL 3 Status must be CLOSE | (P2168.raw == 1) land (P2171.raw == 1); |
| X4044 | | Algorithm checking if the SPI unit is switched on | ((P2118.raw == 1) lor (P2168.raw == 1)) land ((P2119.raw == 1) lor (P2169.raw == 1)) land ((P2120.raw == 1) lor (P2170.raw == 1)) land ((P2121.raw == 1) lor (P2171.raw == 1)) land ((P2114.raw == 1) lor (P2164.raw == 1)) land ((P2115.raw == 1) lor (P2165.raw == 1)) land ((P2117.raw == 1) lor (P2167.raw == 1)); |
| X4045 | | Algorithm checking if the SPI unit is switched off | ((P2118.raw == 0) land (P2168.raw == 0)) land ((P2119.raw == 0) land (P2169.raw == 0)) land ((P2120.raw == 0) land (P2170.raw == 0)) land ((P2121.raw == 0) land (P2171.raw == 0)) land ((P2114.raw == 0) land (P2164.raw == 0)) land ((P2115.raw == 0) land (P2165.raw == 0)) land ((P2117.raw == 0) land (P2167.raw == 0)); |
| X6104 | AF HK0 LEAST | AFEE HK0 least | (E0992.raw <> 2) lor (E0993.raw <> 2); |
| X6108 | E501=ON | | (E0501.raw == 1); |
| X6111 | AS HK0 CONF OP | SPI1 ACS HK0 in Configuration or Operational mode | (E3887.raw > 0); |
| X6112 | DF HK0 CONF OP | SPI1 ACS HK0 in Configuration or Operational mode | (E3884.raw > 0); |
| X6300 | SPI CHK ACS HV00 | SPI ACS HV status #00 ON | ((X6397.raw) lor (X6897.raw)) land (E0500.raw == 1); |



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| SPE_NAME | Condition | SPE_Description | Condition expression |
|----------|------------------|--------------------------|------------------------------------------------------|
| X6301 | SPI CHK ACS HV01 | SPI ACS HV status #01 ON | ((X6397.raw) lor (X6897.raw)) land (E0501.raw == 1); |
| X6302 | SPI CHK ACS HV02 | SPI ACS HV status #02 ON | ((X6397.raw) lor (X6897.raw)) land (E0502.raw == 1); |
| X6303 | SPI CHK ACS HV03 | SPI ACS HV status #03 ON | ((X6397.raw) lor (X6897.raw)) land (E0503.raw == 1); |
| X6304 | SPI CHK ACS HV04 | SPI ACS HV status #04 ON | ((X6397.raw) lor (X6897.raw)) land (E0504.raw == 1); |
| X6305 | SPI CHK ACS HV05 | SPI ACS HV status #05 ON | ((X6397.raw) lor (X6897.raw)) land (E0505.raw == 1); |
| X6306 | SPI CHK ACS HV06 | SPI ACS HV status #06 ON | ((X6397.raw) lor (X6897.raw)) land (E0506.raw == 1); |

| SPE_NAME | SPE_OLEXP | SPE_Description | PCVF_DESCR |
|----------|------------------|--------------------------|------------------------------------------------------|
| X6307 | SPI CHK ACS HV07 | SPI ACS HV status #07 ON | ((X6397.raw) lor (X6897.raw)) land (E0507.raw == 1); |
| X6308 | SPI CHK ACS HV08 | SPI ACS HV status #08 ON | ((X6397.raw) lor (X6897.raw)) land (E0508.raw == 1); |
| X6309 | SPI CHK ACS HV09 | SPI ACS HV status #09 ON | ((X6397.raw) lor (X6897.raw)) land (E0509.raw == 1); |
| X6310 | SPI CHK ACS HV10 | SPI ACS HV status #10 ON | ((X6397.raw) lor (X6897.raw)) land (E0510.raw == 1); |
| X6311 | SPI CHK ACS HV11 | SPI ACS HV status #11 ON | ((X6397.raw) lor (X6897.raw)) land (E0511.raw == 1); |
| X6312 | SPI CHK ACS HV12 | SPI ACS HV status #12 ON | ((X6397.raw) lor (X6897.raw)) land (E0512.raw == 1); |
| X6313 | SPI CHK ACS HV13 | SPI ACS HV status #13 ON | ((X6397.raw) lor (X6897.raw)) land (E0513.raw == 1); |
| X6314 | SPI CHK ACS HV14 | SPI ACS HV status #14 ON | ((X6397.raw) lor (X6897.raw)) land (E0514.raw == 1); |
| X6315 | SPI CHK ACS HV15 | SPI ACS HV status #15 ON | ((X6397.raw) lor (X6897.raw)) land (E0515.raw == 1); |
| X6316 | SPI CHK ACS HV16 | SPI ACS HV status #16 ON | ((X6397.raw) lor (X6897.raw)) land (E0516.raw == 1); |
| X6317 | SPI CHK ACS HV17 | SPI ACS HV status #17 ON | ((X6397.raw) lor (X6897.raw)) land (E0517.raw == 1); |
| X6318 | SPI CHK ACS HV18 | SPI ACS HV status #18 ON | ((X6397.raw) lor (X6897.raw)) land (E0518.raw == 1); |
| X6319 | SPI CHK ACS HV19 | SPI ACS HV status #19 ON | ((X6397.raw) lor (X6897.raw)) land (E0519.raw == 1); |
| X6320 | SPI CHK ACS HV20 | SPI ACS HV status #20 ON | ((X6397.raw) lor (X6897.raw)) land (E0520.raw == 1); |
| X6321 | SPI CHK ACS HV21 | SPI ACS HV status #21 ON | ((X6397.raw) lor (X6897.raw)) land (E0521.raw == 1); |



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| SPE_NAME | SPE_OLEXP | SPE_Description | PCVF_DESCR |
|----------|------------------|--------------------------|------------------------------------------------------|
| X6322 | SPI CHK ACS HV22 | SPI ACS HV status #22 ON | ((X6397.raw) lor (X6897.raw)) land (E0522.raw == 1); |
| X6323 | SPI CHK ACS HV23 | SPI ACS HV status #23 ON | ((X6397.raw) lor (X6897.raw)) land (E0523.raw == 1); |
| X6324 | SPI CHK ACS HV24 | SPI ACS HV status #24 ON | ((X6397.raw) lor (X6897.raw)) land (E0524.raw == 1); |
| X6325 | SPI CHK ACS HV25 | SPI ACS HV status #25 ON | ((X6397.raw) lor (X6897.raw)) land (E0525.raw == 1); |
| X6326 | SPI CHK ACS HV26 | SPI ACS HV status #26 ON | ((X6397.raw) lor (X6897.raw)) land (E0526.raw == 1); |
| X6327 | SPI CHK ACS HV27 | SPI ACS HV status #27 ON | ((X6397.raw) lor (X6897.raw)) land (E0527.raw == 1); |
| X6328 | SPI CHK ACS HV28 | SPI ACS HV status #28 ON | ((X6397.raw) lor (X6897.raw)) land (E0528.raw == 1); |
| X6329 | SPI CHK ACS HV29 | SPI ACS HV status #29 ON | ((X6397.raw) lor (X6897.raw)) land (E0529.raw == 1); |
| X6330 | SPI CHK ACS HV30 | SPI ACS HV status #30 ON | ((X6397.raw) lor (X6897.raw)) land (E0530.raw == 1); |
| X6331 | SPI CHK ACS HV31 | SPI ACS HV status #31 ON | ((X6397.raw) lor (X6897.raw)) land (E0531.raw == 1); |
| X6332 | SPI CHK ACS HV32 | SPI ACS HV status #32 ON | ((X6397.raw) lor (X6897.raw)) land (E0532.raw == 1); |
| X6333 | SPI CHK ACS HV33 | SPI ACS HV status #33 ON | ((X6397.raw) lor (X6897.raw)) land (E0533.raw == 1); |
| X6334 | SPI CHK ACS HV34 | SPI ACS HV status #34 ON | ((X6397.raw) lor (X6897.raw)) land (E0534.raw == 1); |
| X6335 | SPI CHK ACS HV35 | SPI ACS HV status #35 ON | ((X6397.raw) lor (X6897.raw)) land (E0535.raw == 1); |
| X6336 | SPI CHK ACS HV36 | SPI ACS HV status #36 ON | ((X6397.raw) lor (X6897.raw)) land (E0536.raw == 1); |
| X6337 | SPI CHK ACS HV37 | SPI ACS HV status #37 ON | ((X6397.raw) lor (X6897.raw)) land (E0537.raw == 1); |
| X6338 | SPI CHK ACS HV38 | SPI ACS HV status #38 ON | ((X6397.raw) lor (X6897.raw)) land (E0538.raw == 1); |
| X6339 | SPI CHK ACS HV39 | SPI ACS HV status #39 ON | ((X6397.raw) lor (X6897.raw)) land (E0539.raw == 1); |
| X6340 | SPI CHK ACS HV40 | SPI ACS HV status #40 ON | ((X6397.raw) lor (X6897.raw)) land (E0540.raw == 1); |
| X6341 | SPI CHK ACS HV41 | SPI ACS HV status #41 ON | ((X6397.raw) lor (X6897.raw)) land (E0541.raw == 1); |
| X6342 | SPI CHK ACS HV42 | SPI ACS HV status #42 ON | ((X6397.raw) lor (X6897.raw)) land (E0542.raw == 1); |
| X6343 | SPI CHK ACS HV43 | SPI ACS HV status #43 ON | ((X6397.raw) lor (X6897.raw)) land (E0543.raw == 1); |



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| SPE_NAME | SPE_OLEXP | SPE_Description | PCVF_DESCR |
|----------|------------------|--------------------------|------------------------------------------------------|
| X6344 | SPI CHK ACS HV44 | SPI ACS HV status #44 ON | ((X6397.raw) lor (X6897.raw)) land (E0544.raw == 1); |
| X6345 | SPI CHK ACS HV45 | SPI ACS HV status #45 ON | ((X6397.raw) lor (X6897.raw)) land (E0545.raw == 1); |
| X6346 | SPI CHK ACS HV46 | SPI ACS HV status #46 ON | ((X6397.raw) lor (X6897.raw)) land (E0546.raw == 1); |
| X6347 | SPI CHK ACS HV47 | SPI ACS HV status #47 ON | ((X6397.raw) lor (X6897.raw)) land (E0547.raw == 1); |
| X6348 | SPI CHK ACS HV48 | SPI ACS HV status #48 ON | ((X6397.raw) lor (X6897.raw)) land (E0548.raw == 1); |
| X6349 | SPI CHK ACS HV49 | SPI ACS HV status #49 ON | ((X6397.raw) lor (X6897.raw)) land (E0549.raw == 1); |
| X6350 | SPI CHK ACS HV50 | SPI ACS HV status #50 ON | ((X6397.raw) lor (X6897.raw)) land (E0550.raw == 1); |
| X6351 | SPI CHK ACS HV51 | SPI ACS HV status #51 ON | ((X6397.raw) lor (X6897.raw)) land (E0551.raw == 1); |
| X6352 | SPI CHK ACS HV52 | SPI ACS HV status #52 ON | ((X6397.raw) lor (X6897.raw)) land (E0552.raw == 1); |
| X6353 | SPI CHK ACS HV53 | SPI ACS HV status #53 ON | ((X6397.raw) lor (X6897.raw)) land (E0553.raw == 1); |
| X6354 | SPI CHK ACS HV54 | SPI ACS HV status #54 ON | ((X6397.raw) lor (X6897.raw)) land (E0554.raw == 1); |
| X6355 | SPI CHK ACS HV55 | SPI ACS HV status #55 ON | ((X6397.raw) lor (X6897.raw)) land (E0555.raw == 1); |
| X6356 | SPI CHK ACS HV56 | SPI ACS HV status #56 ON | ((X6397.raw) lor (X6897.raw)) land (E0556.raw == 1); |
| X6357 | SPI CHK ACS HV57 | SPI ACS HV status #57 ON | ((X6397.raw) lor (X6897.raw)) land (E0557.raw == 1); |
| X6358 | SPI CHK ACS HV58 | SPI ACS HV status #58 ON | ((X6397.raw) lor (X6897.raw)) land (E0558.raw == 1); |
| X6359 | SPI CHK ACS HV59 | SPI ACS HV status #59 ON | ((X6397.raw) lor (X6897.raw)) land (E0559.raw == 1); |
| X6360 | SPI CHK ACS HV60 | SPI ACS HV status #60 ON | ((X6397.raw) lor (X6897.raw)) land (E0560.raw == 1); |
| X6361 | SPI CHK ACS HV61 | SPI ACS HV status #61 ON | ((X6397.raw) lor (X6897.raw)) land (E0561.raw == 1); |
| X6362 | SPI CHK ACS HV62 | SPI ACS HV status #62 ON | ((X6397.raw) lor (X6897.raw)) land (E0562.raw == 1); |
| X6363 | SPI CHK ACS HV63 | SPI ACS HV status #63 ON | ((X6397.raw) lor (X6897.raw)) land (E0563.raw == 1); |
| X6364 | SPI CHK ACS HV64 | SPI ACS HV status #64 ON | ((X6397.raw) lor (X6897.raw)) land (E0564.raw == 1); |
| X6365 | SPI CHK ACS HV65 | SPI ACS HV status #65 ON | ((X6397.raw) lor (X6897.raw)) land (E0565.raw == 1); |



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| SPE_NAME | SPE_OLEXP | SPE_Description | PCVF_DESCR |
|----------|------------------|--------------------------|------------------------------------------------------|
| X6366 | SPI CHK ACS HV66 | SPI ACS HV status #66 ON | ((X6397.raw) lor (X6897.raw)) land (E0566.raw == 1); |
| X6367 | SPI CHK ACS HV67 | SPI ACS HV status #67 ON | ((X6397.raw) lor (X6897.raw)) land (E0567.raw == 1); |
| X6368 | SPI CHK ACS HV68 | SPI ACS HV status #68 ON | ((X6397.raw) lor (X6897.raw)) land (E0568.raw == 1); |
| X6369 | SPI CHK ACS HV69 | SPI ACS HV status #69 ON | ((X6397.raw) lor (X6897.raw)) land (E0569.raw == 1); |
| X6370 | SPI CHK ACS HV70 | SPI ACS HV status #70 ON | ((X6397.raw) lor (X6897.raw)) land (E0570.raw == 1); |
| X6371 | SPI CHK ACS HV71 | SPI ACS HV status #71 ON | ((X6397.raw) lor (X6897.raw)) land (E0571.raw == 1); |
| X6372 | SPI CHK ACS HV72 | SPI ACS HV status #72 ON | ((X6397.raw) lor (X6897.raw)) land (E0572.raw == 1); |
| X6373 | SPI CHK ACS HV73 | SPI ACS HV status #73 ON | ((X6397.raw) lor (X6897.raw)) land (E0573.raw == 1); |
| X6374 | SPI CHK ACS HV74 | SPI ACS HV status #74 ON | ((X6397.raw) lor (X6897.raw)) land (E0574.raw == 1); |
| X6375 | SPI CHK ACS HV75 | SPI ACS HV status #75 ON | ((X6397.raw) lor (X6897.raw)) land (E0575.raw == 1); |
| X6376 | SPI CHK ACS HV76 | SPI ACS HV status #76 ON | ((X6397.raw) lor (X6897.raw)) land (E0576.raw == 1); |
| X6377 | SPI CHK ACS HV77 | SPI ACS HV status #77 ON | ((X6397.raw) lor (X6897.raw)) land (E0577.raw == 1); |
| X6378 | SPI CHK ACS HV78 | SPI ACS HV status #78 ON | ((X6397.raw) lor (X6897.raw)) land (E0578.raw == 1); |
| X6379 | SPI CHK ACS HV79 | SPI ACS HV status #79 ON | ((X6397.raw) lor (X6897.raw)) land (E0579.raw == 1); |
| X6380 | SPI CHK ACS HV80 | SPI ACS HV status #80 ON | ((X6397.raw) lor (X6897.raw)) land (E0580.raw == 1); |
| X6381 | SPI CHK ACS HV81 | SPI ACS HV status #81 ON | ((X6397.raw) lor (X6897.raw)) land (E0581.raw == 1); |
| X6382 | SPI CHK ACS HV82 | SPI ACS HV status #82 ON | ((X6397.raw) lor (X6897.raw)) land (E0582.raw == 1); |
| X6383 | SPI CHK ACS HV83 | SPI ACS HV status #83 ON | ((X6397.raw) lor (X6897.raw)) land (E0583.raw == 1); |
| X6384 | SPI CHK ACS HV84 | SPI ACS HV status #84 ON | ((X6397.raw) lor (X6897.raw)) land (E0584.raw == 1); |
| X6385 | SPI CHK ACS HV85 | SPI ACS HV status #85 ON | ((X6397.raw) lor (X6897.raw)) land (E0585.raw == 1); |
| X6386 | SPI CHK ACS HV86 | SPI ACS HV status #86 ON | ((X6397.raw) lor (X6897.raw)) land (E0586.raw == 1); |
| X6387 | SPI CHK ACS HV87 | SPI ACS HV status #87 ON | ((X6397.raw) lor (X6897.raw)) land (E0587.raw == 1); |



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|----------|------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| X6388 | SPI CHK ACS HV88 | SPI ACS HV status #88 ON | ((X6397.raw) lor (X6897.raw)) land (E0588.raw == 1); |
| X6389 | SPI CHK ACS HV89 | SPI ACS HV status #89 ON | ((X6397.raw) lor (X6897.raw)) land (E0589.raw == 1); |
| X6390 | SPI CHK ACS HV90 | SPI ACS HV status #90 ON | ((X6397.raw) lor (X6897.raw)) land (E0590.raw == 1); |
| X6391 | SPI CHK ACS HVP1 | SPI PSAC HV status #1 ON | ((X6397.raw) lor (X6897.raw)) land (E0591.raw == 1); |
| X6392 | SPI CHK ACS HVP2 | SPI PSAC HV status #2 ON | ((X6397.raw) lor (X6897.raw)) land (E0592.raw == 1); |
| X6398 | SPI1 DF OPERDIAG | SPI1 DFEE status current mode OPER (2) or DIAG (3) | (E3884.raw > 1); |
| X6430 | DET 00 HVPS4KV M | SPI1 Detector #00 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0170.raw == 1) land (E0190.raw == 1) land (E0010.eng == 4.0) land (E0049.raw > 2); |
| X6431 | DET 01 HVPS4KV M | SPI1 Detector #01 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0171.raw == 1) land (E0191.raw == 1) land (E0011.eng == 4.0) land (E0049.raw > 2); |
| X6432 | DET 02 HVPS4KV M | SPI1 Detector #02 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0172.raw == 1) land (E0192.raw == 1) land (E0012.eng == 4.0) land (E0049.raw > 2); |
| X6433 | DET 03 HVPS4KV M | SPI1 Detector #03 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0173.raw == 1) land (E0193.raw == 1) land (E0013.eng == 4.0) land (E0049.raw > 2); |
| X6434 | DET 04 HVPS4KV M | SPI1 Detector #04 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0174.raw == 1) land (E0194.raw == 1) land (E0014.eng == 4.0) land (E0049.raw > 2); |
| X6435 | DET 05 HVPS4KV M | SPI1 Detector #05 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0175.raw == 1) land (E0195.raw == 1) land (E0015.eng == 4.0) land (E0049.raw > 2); |
| X6436 | DET 06 HVPS4KV M | SPI1 Detector #06 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0176.raw == 1) land (E0196.raw == 1) land (E0016.eng == 4.0) land (E0049.raw > 2); |
| X6437 | DET 07 HVPS4KV M | SPI1 Detector #07 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0177.raw == 1) land (E0197.raw == 1) land (E0017.eng == 4.0) land (E0049.raw > 2); |
| X6438 | DET 08 HVPS4KV M | SPI1 Detector #08 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0178.raw == 1) land (E0198.raw == 1) land (E0018.eng == 4.0) land (E0049.raw > 2); |
| X6439 | DET 09 HVPS4KV M | SPI1 Detector #09 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0179.raw == 1) land (E0199.raw == 1) land (E0019.eng == 4.0) land (E0049.raw > 2); |
| X6440 | DET 10 HVPS4KV M | SPI1 Detector #10 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0180.raw == 1) land (E0200.raw == 1) land (E0020.eng == 4.0) land (E0049.raw > 2); |
| X6441 | DET 11 HVPS4KV M | SPI1 Detector #11 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0181.raw == 1) land (E0201.raw == 1) land (E0021.eng == 4.0) land (E0049.raw > 2); |
| X6442 | DET 12 HVPS4KV M | SPI1 Detector #12 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0182.raw == 1) land (E0202.raw == 1) land (E0022.eng == 4.0) land (E0049.raw > 2); |
| X6443 | DET 13 HVPS4KV M | SPI1 Detector #13 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0183.raw == 1) land (E0203.raw == 1) land (E0023.eng == 4.0) land (E0049.raw > 2); |
| X6444 | DET 14 HVPS4KV M | SPI1 Detector #14 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0184.raw == 1) land (E0204.raw == 1) land (E0024.eng == 4.0) land (E0049.raw > 2); |
| X6445 | DET 15 HVPS4KV M | SPI1 Detector #15 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0185.raw == 1) land (E0205.raw == 1) land (E0025.eng == 4.0) land (E0049.raw > 2); |



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|----------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| X6446 | DET 16 HVPS4KV M | SPI1 Detector #16 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0186.raw == 1) land (E0206.raw == 1) land (E0026.eng == 4.0) land (E0049.raw > 2); |
| X6447 | DET 17 HVPS4KV M | SPI1 Detector #17 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0187.raw == 1) land (E0207.raw == 1) land (E0027.eng == 4.0) land (E0049.raw > 2); |
| X6448 | DET 18 HVPS4KV M | SPI1 Detector #18 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0188.raw == 1) land (E0208.raw == 1) land (E0028.eng == 4.0) land (E0049.raw > 2); |
| X6520 | (F9971.raw == 1) land (F9972.raw == 0) lor (F9991.raw == 1) land (F9992.raw == 0); | Any cryocooler in OPER and UNLOCK | cryo_oper_unlock |
| X6521 | ((T8502.raw == 1) lor (T8602.raw == 1)) land ((T8503.raw == 0) land (T8603 == 0)); | Any heatpipe htr ON | heatpipe_htr_on |
| X6522 | (X6520.raw == 1) land (P2222.raw == 1 lor P2272.raw == 1); | Any cryocooler in OPER and UNLOCK and any compensation htr ON | X6520&cmp_HTRon |
| X6523 | (X6520.raw == 1) land (P2222.raw == 0) land P2272.raw == 0); | Any cryocooler in OPER and UNLOCK and no compensation htr ON | X6520&nocmpHTRon |
| X6524 | (X6520.raw == 1) land (X6521.raw == 0); | Any cryocooler in OPER and UNLOCK and heatpipe htr OFF | X6520&hpp_HTRoff |
| X6525 | (P1162.raw == 1) land (F9991.raw == 1) land (F9992.raw == 1); | CDE2B LCL2 ON AND CDE2 IN OPER AND CDE2 IN LAUNCH LOCK | lcl2_cd2_oper_lk |
| X6526 | (P1161.raw == 1) land (F9971.raw == 1) land (F9972.raw == 1); | CDE1A LCL1 ON AND CDE1 IN OPER AND CDE1 IN LAUNCH LOCK | lcl1_cd1_oper_lk |
| X6527 | (P1160.raw == 1) land (F9971.raw == 1) land (F9972.raw == 1); | CDE1A LCL2 ON AND CDE1 IN OPER AND CDE1 IN LAUNCH LOCK | lcl2_cd1_oper_lk |
| X6528 | (P1163.raw == 1) land (F9991.raw == 1) land (F9992.raw == 1); | CDE2B LCL1 ON AND CDE2 IN OPER AND CDE2 IN LAUNCH LOCK | lcl1_cd2_oper_lk |
| X6529 | (P1162.raw == 1) land (F9991.raw == 0); | CDE2B LCL2 ON AND CDE2 IN STBY | lcl2_cde2_stby |
| X6530 | (P1161.raw == 1) land (F9971.raw == 0); | CDE1A LCL1 ON AND CDE1 IN STBY | lcl1_cde1_stby |
| X6531 | (P1160.raw == 1) land (F9971.raw == 0); | CDE1A LCL2 ON AND CDE1 IN STBY | lcl2_cde1_stby |
| X6532 | (P1163.raw == 1) land (F9991.raw == 0); | CDE2B LCL1 ON AND CDE2 IN STBY | lcl1_cde2_stby |
| X6533 | (P1162.raw == 1) land (F9991.raw == 1) land (F9992.raw == 0); | CDE2B LCL2 ON AND CDE2 IN OPER AND CDE2 NO LAUNCH LOCK | lcl2_cd2_opr_ulk |



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|----------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|
| X6534 | (P1161.raw == 1) land (F9971.raw == 1) land (F9972.raw == 0) land (EC9960.raw >= 38); | CDE1A LCL1 ON AND CDE1 IN OPER AND CDE1 NO LAUNCH LOCK and cde amplitude >=38 | lcl1_cd1_opr_ulk |
| X6535 | (P1160.raw == 1) land (F9971.raw == 1) land (F9972.raw == 0); | CDE1A LCL2 ON AND CDE1 IN OPER AND CDE1 NO LAUNCH LOCK | lcl2_cd1_opr_ulk |
| X6536 | (P1163.raw == 1) land (F9991.raw == 1) land (F9992.raw == 0) land (EC9980.raw >= 38); | CDE2B LCL1 ON AND CDE2 IN OPER AND CDE2 NO LAUNCH LOCK and cde amplitude >=38 | lcl1_cd2_opr_ulk |
| X6537 | (X6520.raw == 0) land (EC0399.raw == 0); | NO cryocooler in OPER and UNLOCK and FINE tuning FALSE | noCDE_op_ulk_nFT |
| X6538 | (E0170.raw == 1) land (E0180.raw == 1) land (E0188.raw == 1); | Few LVPS ON | lvps0,10,18_on |
| X6539 | (P1161.raw == 1) land (P1160.raw == 0) land (F9971.raw == 1) land (F9972.raw == 0) land (EC9960.raw < 38); | CDE1A LCL1+LCL2 ON AND CDE1 IN OPER AND CDE1 NO LAUNCH LOCK AND AMPLITUDE<38 | cde1_operMODE |
| X6540 | (P1163.raw == 1) land (P1162.raw == 0) land (F9991.raw == 1) land (F9992.raw == 0) land (EC9980.raw < 38); | CDE2B LCL1+LCL2 ON AND CDE2 IN OPER AND CDE2 NO LAUNCH LOCK AND AMPLITUDE<38 | cde2_operMODE |
| X6541 | (T8503.raw == 1) lor (T8603 == 1); | ANNEALING THERMAL SYSTEM A/B TSW ON | anneal_TSW_ON |

| SPE_NAME | SPE_OLEXP | SPE_Description | PCVF_DESCR |
|----------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------|
| X6542 | (X6520.raw == 0) land (X6521.raw == 0); | X6520=FALSE AND X6521=FALSE | noX6520&noX6521 |
| X6543 | (EC0399.raw == 0) land (X6520.raw == 1); | NO FINE TUNNING AND X6520=TRUE | noFT&X6520 |
| X6544 | (P1161.raw == 1) land (P1160.raw == 1) land (F9971.raw == 1) land (F9972.raw == 0) land (EC9960.raw > 38); | CDE1A LCL1+LCL2 ON AND CDE1 IN OPER AND CDE1 NO LAUNCH LOCK AND AMPLITUDE>38 | cde1_backup |
| X6545 | (P1163.raw == 1) land (P1162.raw == 1) land (F9991.raw == 1) land (F9992.raw == 0) land (EC9980.raw > 38); | CDE2B LCL1+LCL2 ON AND CDE2 IN OPER AND CDE2 NO LAUNCH LOCK AND AMPLITUDE>38 | cde2_backup |



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|----------|------------------------------------------------------------------------------------------|-----------------------------------|-----------------|
| X6546 | (E500.raw == 1) land (E518.raw == 1) land (E536.raw == 1) land (E554.raw == 1); | 1 FEE per ring ON | 1FEEper_ring_on |
| X6547 | (X6546.raw == 0) land ((P2117.raw == 1) lor (P2167.raw == 1)); | LCL VCU ON and 1 FEE per ring OFF | VCUon&noX6546 |
| X6548 | (E0170.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps0_on_noFT |
| X6549 | (E0170.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps0_on_FT |
| X6550 | (E0171.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps1_on_noFT |
| X6551 | (E0171.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps1_on_FT |
| X6552 | (E0172.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps2_on_noFT |
| X6553 | (E0172.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps2_on_FT |
| X6554 | (E0173.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps3_on_noFT |
| X6555 | (E0173.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps3_on_FT |
| X6556 | (E0174.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps4_on_noFT |
| X6557 | (E0174.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps4_on_FT |
| X6558 | (E0175.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps5_on_noFT |
| X6559 | (E0175.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps5_on_FT |
| X6560 | (E0176.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps6_on_noFT |
| X6561 | (E0176.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps6_on_FT |
| X6562 | (E0177.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps7_on_noFT |
| X6563 | (E0177.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps7_on_FT |
| X6564 | (E0178.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps8_on_noFT |
| X6565 | (E0178.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps8_on_FT |
| X6566 | (E0179.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps9_on_noFT |
| X6567 | (E0179.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps9_on_FT |
| X6568 | (E0180.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps10_on_noFT |
| X6569 | (E0180.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps10_on_FT |



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|----------|--------------------------------------------|-----------------------------|----------------|
| X6570 | (E0181.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps11_on_noFT |
| X6571 | (E0181.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps11_on_FT |
| X6572 | (E0182.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps12_on_noFT |
| X6573 | (E0182.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps12_on_FT |
| X6574 | (E0183.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps13_on_noFT |
| X6575 | (E0183.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps13_on_FT |
| X6576 | (E0184.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps14_on_noFT |
| X6577 | (E0184.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps14_on_FT |
| X6578 | (E0185.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps15_on_noFT |
| X6579 | (E0185.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps15_on_FT |
| X6580 | (E0186.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps16_on_noFT |
| X6581 | (E0186.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps16_on_FT |
| X6582 | (E0187.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps17_on_noFT |

| SPE_NAME | SPE_OLEXPR | SPE_Description | PCVF_DESCR |
|----------|--------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| X6583 | (E0187.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps17_on_FT |
| X6584 | (E0188.raw ==1) land (EC0399.raw == 0); | LVPS ON and not fine tuning | lvps18_on_noFT |
| X6585 | (E0188.raw ==1) land (EC0399.raw == 1); | LVPS ON and fine tuning | lvps18_on_FT |
| X6604 | AF HK0 OPER | | (F3881.raw > 1); |
| X6611 | AS HK0 CONF OP | | (F3887.raw > 0); |
| X6612 | DF HK0 CONF OP | | (F3884.raw > 0); |
| X6830 | DET 00 HVPS4KV R | SPI2 Detector #00 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0170.raw == 1) land (E0190.raw == 1) land (F0010.raw == 4.0) land (F0049.raw > 2); |
| X6831 | DET 01 HVPS4KV R | SPI2 Detector #01 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0171.raw == 1) land (E0191.raw == 1) land (F0011.raw == 4.0) land (F0049.raw > 2); |



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|----------|------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| X6832 | DET 02 HVPS4KV R | SPI2 Detector #02 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0172.raw == 1) land (E0192.raw == 1) land (F0012.raw == 4.0) land (F0049.raw > 2); |
| X6833 | DET 03 HVPS4KV R | SPI2 Detector #03 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0173.raw == 1) land (E0193.raw == 1) land (F0013.raw == 4.0) land (F0049.raw > 2); |
| X6834 | DET 04 HVPS4KV R | SPI2 Detector #04 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0174.raw == 1) land (E0194.raw == 1) land (F0014.raw == 4.0) land (F0049.raw > 2); |
| X6835 | DET 05 HVPS4KV R | SPI2 Detector #05 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0175.raw == 1) land (E0195.raw == 1) land (F0015.raw == 4.0) land (F0049.raw > 2); |
| X6836 | DET 06 HVPS4KV R | SPI2 Detector #06 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0176.raw == 1) land (E0196.raw == 1) land (F0016.raw == 4.0) land (F0049.raw > 2); |
| X6837 | DET 07 HVPS4KV R | SPI2 Detector #07 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0177.raw == 1) land (E0197.raw == 1) land (F0017.raw == 4.0) land (F0049.raw > 2); |
| X6838 | DET 08 HVPS4KV R | SPI2 Detector #08 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0178.raw == 1) land (E0198.raw == 1) land (F0018.raw == 4.0) land (F0049.raw > 2); |
| X6839 | DET 09 HVPS4KV R | SPI2 Detector #09 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0179.raw == 1) land (E0199.raw == 1) land (F0019.raw == 4.0) land (F0049.raw > 2); |
| X6840 | DET 10 HVPS4KV R | SPI2 Detector #10 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0180.raw == 1) land (E0200.raw == 1) land (F0020.raw == 4.0) land (F0049.raw > 2); |
| X6841 | DET 11 HVPS4KV R | SPI2 Detector #11 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0181.raw == 1) land (E0201.raw == 1) land (F0021.raw == 4.0) land (F0049.raw > 2); |
| X6842 | DET 12 HVPS4KV R | SPI2 Detector #12 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0182.raw == 1) land (E0202.raw == 1) land (F0022.raw == 4.0) land (F0049.raw > 2); |
| X6843 | DET 13 HVPS4KV R | SPI2 Detector #13 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0183.raw == 1) land (E0203.raw == 1) land (F0023.raw == 4.0) land (F0049.raw > 2); |
| X6844 | DET 14 HVPS4KV R | SPI2 Detector #14 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0184.raw == 1) land (E0204.raw == 1) land (F0024.raw == 4.0) land (F0049.raw > 2); |
| X6845 | DET 15 HVPS4KV R | SPI2 Detector #15 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0185.raw == 1) land (E0205.raw == 1) land (F0025.raw == 4.0) land (F0049.raw > 2); |
| X6846 | DET 16 HVPS4KV R | SPI2 Detector #16 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0186.raw == 1) land (E0206.raw == 1) land (F0026.raw == 4.0) land (F0049.raw > 2); |
| X6847 | DET 17 HVPS4KV R | SPI2 Detector #17 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0187.raw == 1) land (E0207.raw == 1) land (F0027.raw == 4.0) land (F0049.raw > 2); |
| X6848 | DET 18 HVPS4KV R | SPI2 Detector #18 LVPS ON and HVPS ON and HV = 4KV and CONF mode | (E0188.raw == 1) land (E0208.raw == 1) land (F0028.raw == 4.0) land (F0049.raw > 2); |
| X6898 | SPI2 DF OPERDIAG | | (F3884.raw > 1); |
| X6900 | SDPE1 ON | Algorithm checking if the SDPE1 and the relay(s) are switched on | (P2114.raw == 1) land (P2116.raw == 1) land ((E9801.raw == 0) lor (E9802.raw == 0)); |
| X6950 | SDPE2 ON | Algorithm checking if the SDPE2 and the relay(s) are switched on | (P2164.raw == 1) land (P2166.raw == 1) land ((F9801.raw == 0) lor (F9802.raw == 0)); |

Table 13 Limit condition



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1.5. AUTONOMOUS FUNCTIONS

1.5.1. IASW

- Meaningless OBT eclipse and radiation belts in BCP:

When both OBT of eclipse entry and eclipse exit become equal to 0 in the BCP, it means that the information relative to the eclipse in the BCP is meaningless. In this case, the IASW keeps the current value, i.e. to stay in eclipse if it was in eclipse before and out of eclipse if it was not before.

It is the same behaviour in case of radiation belts.

- LSL error processing:
See § 3.7.4.9. in Volume 1 4.0
- Automatic reconfiguration after eclipse
- Cold plate temperature monitoring
See § 1.1.17
- Reaction to BCP
See § 1.1.8
- High voltages monitoring
- ACS High voltages management

In case of flare (reflected by OEM "begin Flare") and if Radiation mode is equal to CONF then:

- Either IASW is already in CONF mode and then an LSL command of **switch off High Voltage** is sent to the ACS, IASW mode stays unchanged and IASW state is changed to PROTECTED.
- Or IASW is in oper modes and then IASW mode is changed to CONF, an LSL command of **switch off High Voltage** is sent to the ACS and IASW state is changed to PROTECTED.

In any case, at the end of flare, the automatic reconfiguration process will put the ACS high voltages to the configuration before the flare.

- Low voltage power supply monitoring

The parameters E0170-E0188 are set to 0 in case of automatic switch-off due to high temperature of the low voltages converters



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1.5.2. ACS

- FEE watchdog function

In order to observe anomalies or non-working PMTs, HV and others, it is strongly recommended to arm the FEEs' watchdogs during measurements. FEE Watchdog alerts indicate (if enabled) that:

- Within a period of 32.7 msec, no veto event was observed (thus the watchdog retriggered) from the analogue acquisition circuit (mainly CSA) or
- The asynchronous logic of the FPGA was blocked and thus no further veto was acquired. After 32.7 msec, the watchdog awakes.

In addition to the watchdog alert, FPGA's asynchronous logic is reset and thus allows further proper veto acquisition.

This functionality allows a quasi-online observation of the HV-PMT-CSA chain and indicates malfunctions or wrong setting of parameters (if watchdog alert is generated continuously).

Remark: The alert information is read every 32 seconds by the VCU from each FEE. The FEEs accumulate the alert information within this period and reset these bits with the readout.

The alert information is also accumulated by the VCU until the next readout of the DPE.

1.5.3. DFEE

N/A

1.5.4. PSD

N/A

1.5.5. AFEE

N/A

1.6. PST NEEDS WRT MODES

| PST needed | Photon in solar min | Photon in solar max | Photon for PSD check | Calibration | Diagnostic | Diag for PSD | Emergency | Conf/ Stand-by |
|-------------------------------------------------------------------------------|---------------------|---------------------|----------------------|-------------|------------|--------------|-----------|----------------|
| HK techno | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| HK science | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| Photon 20 events/det/s 8 events/det/s | 40 | 16 | 40 | | 40 | 40 | 9 | |
| Spectra (30 min) | 5 | 5 | 5 | | 5 | 5 | 5 | |
| PSD curves 1c/4s (nominal oper) 1 curve/125 ms (8c/s) maximum 40 c/s | 1 | 1 | 15 | 72 | 1 | 72 | | |
| Diagnostic packets | | | | | 4 | 4 | | |
| Total of packets per polling cycle | 54 | 30 | 68 | 80 | 58 | 129 | 22 | 3 |

Nota: a – for specific purpose the on-board spectra could be deactivated in particular for the PSD check in photon or in diagnostic.

b – the diagnostic mode with the maximum of PSD curves has not been specified and tested. The test has been done with the nominal curve occurrence.



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2. INSTRUMENT PROCEDURES

2.1. LEOP AND COMMISSIONING PHASE PROCEDURES

2.1.1 Leap and commissioning phase procedures

See User's Manual SPI-MU-0-1062V3-CNES volume 3 annex 17

2.1.2. Typical sequences for LEOP and commissioning phase

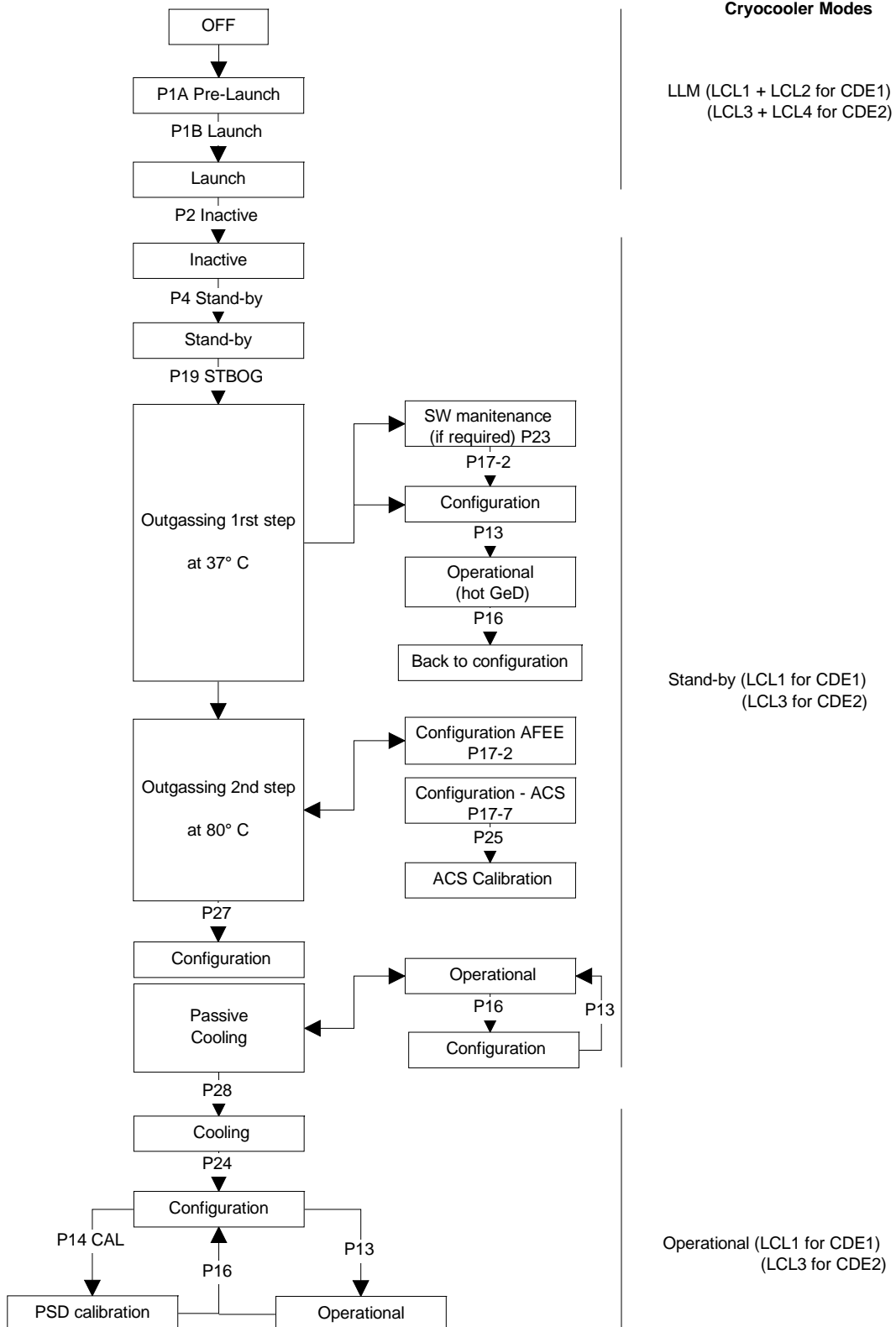


Figure 2.15 - Operation sequence for LEOP



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2.2 NOMINAL OPERATIONAL PROCEDURES

2.2.1. Nominal procedures list

| Procedure n° | Procedure Name | Description |
|--------------|--------------------|-----------------------------------------------------------------------------------------------------------|
| PRELAUNCH | | Instrument setting up for Pre-Launch configuration |
| P1B | LAUNCH | Automatic Instrument setting up for Launch configuration |
| P2 | INACTI | Launch mode to Inactive mode |
| P3 | THAWIN | Inactive mode to heat pipes Thaw mode. It is used in case of anomaly which has led to ice the heat pipes. |
| P4 | INASTB | Inactive mode to Stand-by mode |
| P5 | THAOUT | Back to Inactive or Stand-by mode from Thaw mode |
| P6 | STBINA | Back to Inactive mode from Stand-by mode |
| P7 | STBCOO | Stand-by mode to Cooling mode |
| P8 | STBCON | Stand-by mode to Configuration mode |
| P9 | ECLIPS | Eclipse management |
| P9A | ECLIPS-A | Eclipse occurring during Outgassing phase |
| P10 | STBANI | Stand-by mode to Annealing mode |
| P11 | COOSTB | Back to Stand-by mode from Cooling mode |
| P12 | BKSTBY | Back to Stand-by mode from Configuration, Operational, Calibration and Diagnostic modes |
| P13-P | PHOTON | Configuration mode to Operational Photon/Photon mode |
| P13-E | EMCY | Configuration mode to Operational TM Emergency mode (EMCY) |
| P14 | CAL | Configuration mode to Calibration mode |
| P15 | DIAG | Configuration mode to Diagnostic mode |
| P16 | BKCONF | Back to Configuration mode from Operational, Calibration and Diagnostic modes |
| P17-1 | LDCONF-PSD | PSD configuration loading |
| P17-2 | LDCONF-AFEE-HV-OFF | AFEE configuration loading with HV OFF |
| P17-3 | LDCONF-AFEE-HV-ON | AFEE configuration loading with HV ON |
| P17-4 | LDCONF-DFEE | DFEE configuration loading |
| P17-5 | LDCONF-ALL-CONF | All configurations loading |
| P17-6 | LDCONF-ALL-PATCH | All patches loading |
| P17-7 | LDCONF-ACS | ACS configuration loading |
| P17-8 | LDCONF-IASW | IASW configuration loading |
| P18 | ANISTB | Back to Stand-by mode from Annealing mode |
| P19 | STBOG | Stand-by mode to Outgassing mode |
| P20 | OGSTBY | Outgassing mode to Stand-by mode |
| P21 | EXPOSU | Exposure parameters update |
| P22-D | DUMP-IASW | On-board Software Maintenance for IASW - Dump |
| P22-L | LOAD-IASW | On-board Software Maintenance for IASW - New version loading |
| P23_AS | OBSMAS | On-board Software Maintenance for ACS |
| P23_PD | OBSMPD | On-board Software Maintenance for PSD |
| P23_DF | OBSMDF | On-board Software Maintenance for DFEE |
| P24 | COOCON | Cooling mode to Configuration mode |
| P25 | ACSCAL | ACS calibration |
| P26 | COOTUN | Compressors and displacers amplitude adjustment |
| P27 | OGCONF | Transition to Configuration mode from Outgassing mode |
| P28 | CONCOO | Transition to Cooling mode from Configuration mode and cooling process |
| P30-B | RECINB | Automatic reconfiguration inhibition (belts) |
| P30-E | RECINB | Automatic reconfiguration inhibition (eclipse) |
| P31 | REACT | Automatic reconfiguration reactivation |
| P32 | FPATCH | Flush recorded S/A patches in DPE memory |



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| Procedure n° | Procedure Name | Description |
|---------------------|-----------------------|-----------------------------------------------------------|
| P100 | OFFINA | From OFF mode to Inactive mode (ground test procedure) |
| P101 | INAOFF | Back to OFF mode from Inactive (ground test procedure) |
| P102 | ISOINA | Instrument switch off after imminent switch off detection |



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2.2.2. Nominal procedures description

- **Procedure n° 1 PRELAUNCH**
 - Purpose: Instrument set up for Launch configuration
 - Constraints: This procedure will be performed before Launch
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-----------------------------------------------------------|----------------|----------------------------------|----------------------------------------------------------------------------|-----------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC to select relay configuration CDE 1 | E9968 | CDE1_LCL1/2RELON | | | | Compressors are fed by 2 LCL's |
| 20 | | Send TC to select relay configuration CDE 2 | E9988 | CDE2_LCL1/2RELON | | | | |
| 25 | | Check CDE relay status | | | | | F9970 = 1 F9990 = 1 | CDE1 supplied by LCL1+2 CDE2 supplied by LCL1+2 |
| 30 | | Send TC to switch ON CDE 1 | P3031 P3061 | CDE1_A_LCL1_ON CDE1_A_LCL2_ON | | | P1161 = 1 P1160 = 1 | |
| 40 | | Send TC to switch ON CDE 2 | P3271 P3301 | CDE2_B_LCL1_ON CDE2_B_LCL2_ON | | | P1163 = 1 P1162 = 1 | |
| 50 | | Send TC to switch ON CDE heater Red | T5676 | TWS_CDE_HTRB_ON | | | T8115 = 1 | |
| 70 | | Send TC to switch ON Compressor heater M | T5001 | LCL_COMP_H-A_ON | | | T8500 = 1 | |
| 80 | | | | | | | | |
| 90 | | Send TC to switch ON Thermal Control Line Red | P4339 | BD4 B LCL 2 | | | P2172 = 1 P2068 | |
| 100 | | | | | | | | |
| 110 | | | | | | | | |
| 120 | | Send TC to switch ON AFEE, DFEE, PSD heaters Red | T5106 | LCL_CAMER_H-B_ON | | | T8601 = 1 P2061 | No consumption |
| 130 | | Send TC to switch ON Mask, ACS heaters Red | T5136 | TWS_ACS_MSK-B_ON | | | T8607 = 1 | |
| 140 | | Check the CDE input current | | | | | P1061 P1060 P1063 P1062 | 005 A < I < 0.10 A 0.05 A < I < 0.10 A 0.05 A < I < 0.10 A 0.05 A < I < 0.10 A |
| 150 | | Send TC to set up CDE 1 in the Launch Lock mode as Master | E9960 | CDE1_M_LAUNCH_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | F9960/F9964 < 30 F9961/F9965 < 30 | CDE Main is Master Comp/Disp1 drive enable Comp 1 amplitude Launch Lock mode selected Comp/Disp2 drive enable Comp 2 amplitude |
| 160 | | Send TC to set up CDE 2 in the Launch Lock mode as Master | E9980 | CDE2_M_LAUNCH_LOCK | Bit0 = 0 Bit1 = 1 E9980 = 0 Bit8 = 0 Bit9 = 1 E9981 = 0 | | F9980/F9984 < 30 F9981/F9985 < 30 | CDE Redundant is Master Comp/Disp1 drive enable Comp 1 amplitude Launch Lock mode selected Comp/Disp2 drive enable Comp 2 amplitude |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------|----------------|---------|-----------------|-----------------|----------------------------------------|--------------------------------------------------------------------------------------|
| 170 | | Check the CDE input current | | | | | P1061 P1060 P1063 P1062 | 0.15 A < I < 0.3 A 0.15 A < I < 0.3 A 0.15 A < I < 0.3 A 0.15 A < I < 0.3 A |
| | | Check the launch lock status | | | | | F9972 = F9971 = 1 F9992 = F9991 = 1 | If # => execute GR1 If # => execute GR1 |

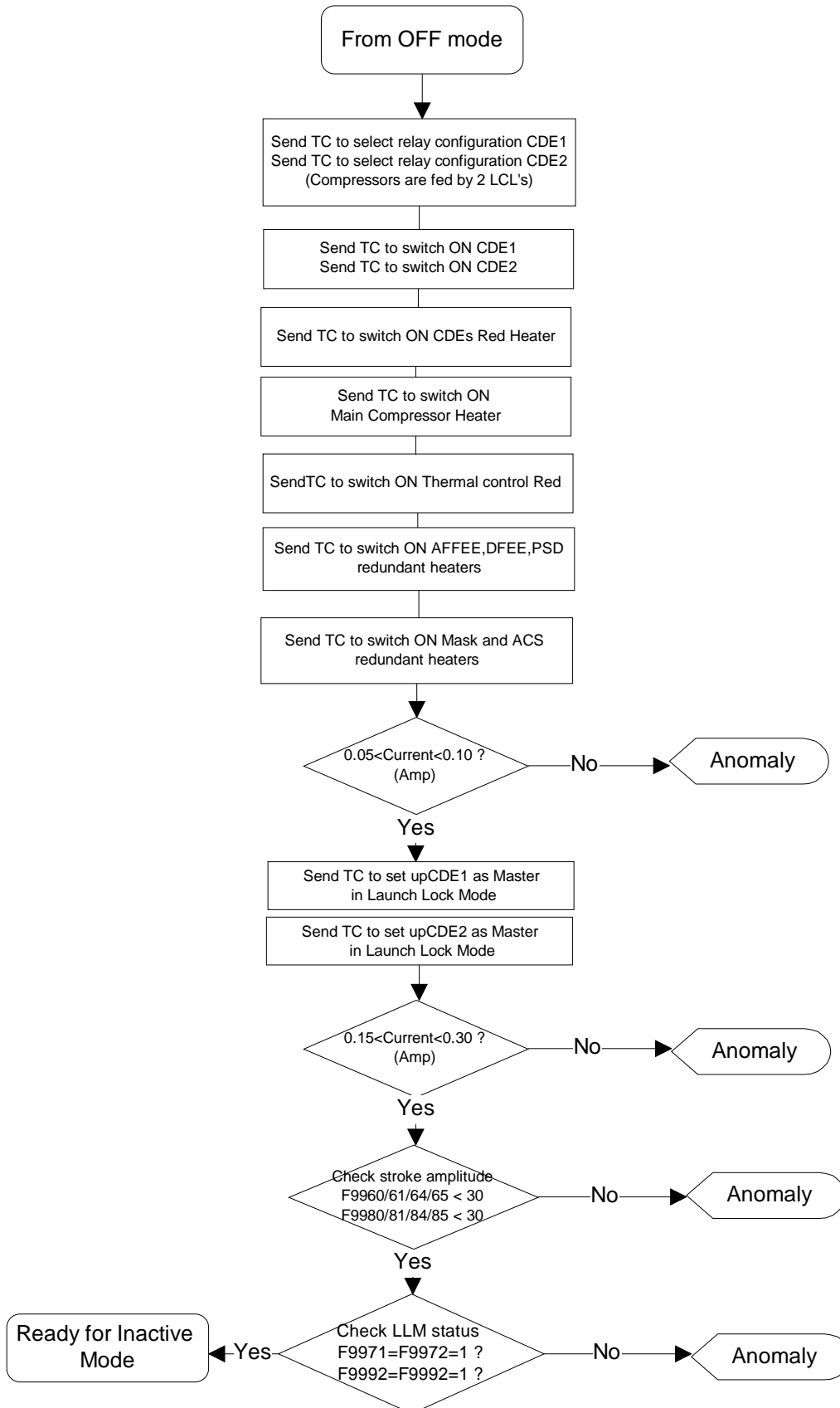


Figure 2.1 -procedure 1A - PRELAUNCH



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- **Procedure 1B LAUNCH**

- Purpose: Instrument set up for Launch configuration. All the commands will be automatically triggered on board. The following sequence is given for information in order to show the operations coherence.
- Constraints: This procedure will be performed after solar arrays opening
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------|----------------|------------------|-----------------|-----------------|-----------------|---------|
| 70 | | Automatic switch ON Compensation heater M | P4459 | TSW_ACC_HTR_A_ON | | | | |
| 80 | | Automatic switch ON Thermal Control Line Main | P4089 | BD4 A LCL 2 | | | | |
| 90 | | Automatic switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | | |
| 100 | | Automatic ON Mask, ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | | |
| 110 | | Automatic switch ON CDE heater Main A | T5576 | TWS_CDE_HTRA_ON | | | | |



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- **Procedure n° 2 INACTI**
 - Purpose: Transition from Launch mode to Inactive mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------|----------------|------------------------------------|----------------------------------------------------------------------------|-----------------|------------------------|------------------------------------------------------------------|
| 10 | | Send TC to set CDE 1 in Stand-by mode as Master | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to CDE1 in Stand-by mode Mandatory before switch off |
| 20 | | Send TC to set CDE 2 in Stand-by mode as Master | E9982 | CDE2_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to CDE2 in Stand-by mode Mandatory before switch off |
| 30 | | Check CDE 1 configuration | | | | | F9971 = 0 F9972 = 0 | If # execute GR1 |
| 40 | | Check CDE 2 configuration | | | | | F9991 = 0 F9992 = 0 | If # execute GR1 |
| 50 | | Send TC to switch OFF CDE 1 | P3030 P3060 | CDE1_A_LCL1_OFF CDE1_A_LCL2_OFF | | | P1161 = 0 P1160 = 0 | |
| 60 | | Send TC to switch OFF CDE 2 | P3270 P3300 | CDE2_B_LCL1_OFF CDE2_B_LCL2_OFF | | | P1163 = 0 P1162 = 0 | |
| 70 | | Send TC to select relay configuration CDE 1 | E9969 | CDE1_LCL1RELON | | | | CDEs must be fed by 1 LCL |
| 80 | | Send TC to select relay configuration CDE 2 | E9989 | CDE2_LCL1RELON | | | | |
| 90 | | Send TC to switch ON CDE 1 | P3031 | CDE1_A_LCL1_ON | | | P1161 = 1 P1160 = 0 | |
| 100 | | Send TC to switch ON CDE 2 | P3271 | CDE2_B_LCL1_ON | | | P1163 = 1 P1162 = 0 | |
| 105 | | Check CDE relay status | | | | | F9970 = 0 F9990 = 0 | CDE1 supplied by LCL1 only CDE2 supplied by LCL1 only |

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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|-------------|------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|--------------------------------|------------------------------------------------|
| 110 | | Send TC to set CDE 1 in Stand-by mode as Master and compressors/displacers disable | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | |
| 115 | | Send TC to set CDE 2 in Stand-by mode as Slave and compressors/displacers disable | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | |
| 120 | | | | | | | | |
| 125 | | Check CDE1 and CDE2 input current | | | | | P1061 P1063 | 0.1 < I < 0.2 A 0.1 < I < 0.2 A |
| 130 | | Check CDE1 and CDE2 configuration | | | | | F9971=F9972=0 F9991=F9992=0 | CDE1 in Stand-by mode CDE2 in Stand-by mode |
| 140 | SAD + 10 hr | Send TC to switch ON Anti-freeze 1 M | T5021 | TSW_ANTFRZ1-A_ON | | | T8504 = 1 | TSW status |
| 150 | SAD + 10 hr | Send TC to switch ON Anti-freeze 2 M | T5026 | TSW_ANTFRZ2-A_ON | | | T8505 = 1 | TSW status |

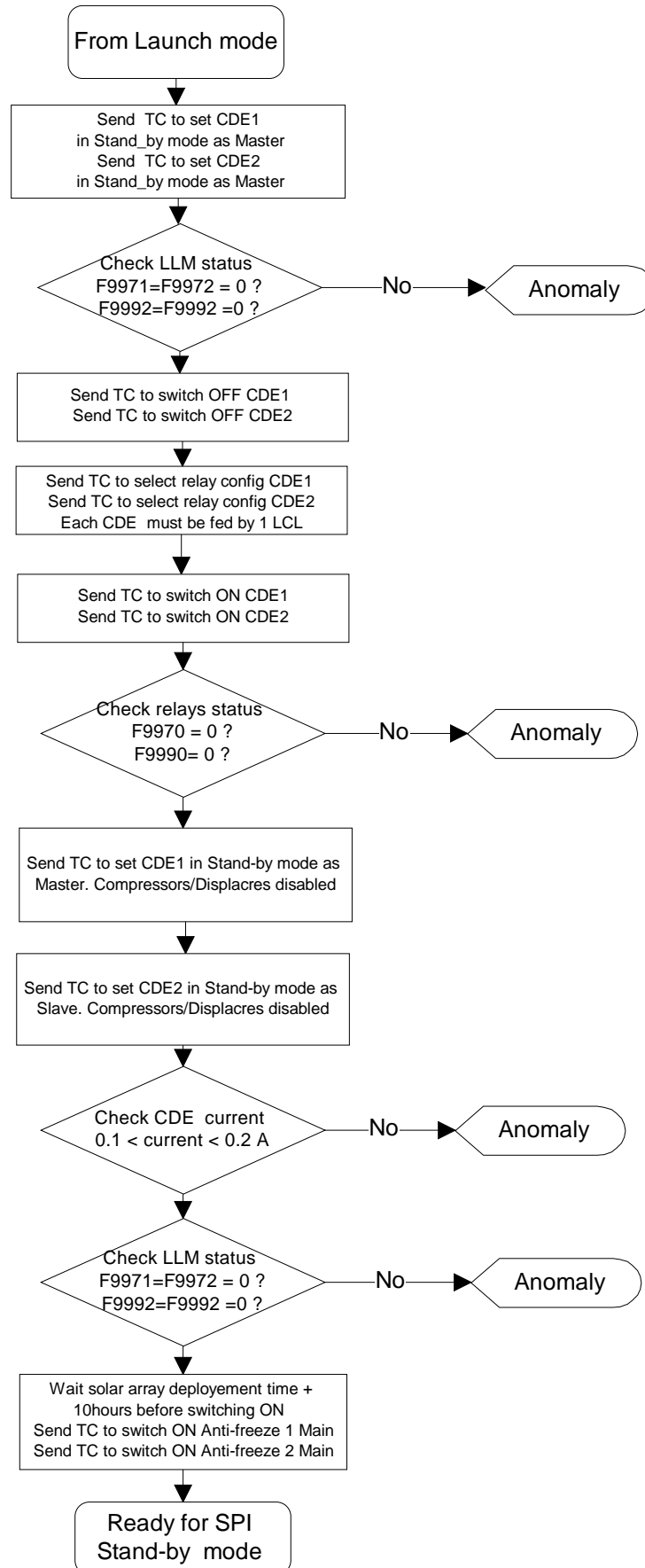


Figure 2.2 - Procedure n° 2 - INACTI



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• Procedure n° 3 THAWIN

- Purpose: Transition from Inactive or Stand-by mode to Heat pipes Thaw mode. It is used in case of anomaly which has led into an Inactive mode for a long time or or in case of failure of Anti-freeze system. In this case the heat pipes could be iced.
- Constraints: Must be activated after checking heat pipes (adiabatic area) temperature, if they are not in the correct range
- Time Criticality:
- System Level Prerequisites: RTU ON, DPE ON, IASW and AFEE IF TM/TC in Stand-by mode
- Sub-system Level Prerequisites: Passive cooling: t_pc_heatpp_r (E3992 or E3996) temperature < - 82°C or the PAC temperature T5104 or T5111 < -80°C.
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------------|----------------|-------------------|-----------------|--------------------------------------------------------------------------|------------------|
| 10 | | Check temperatures of the heat pipes and of the PAC radiator | | | | E3992 < - 82°C Or E3996 < - 82°C T5104 or T5111 < - 80°C | t_pc_heatpp_r |
| 20 | | Send TC to switch OFF Anti-freeze 1 M | T5020 | TSW_ANTFRZ1-A_OFF | | T8504 = 0 | If # execute GR2 |
| 30 | | Send TC to switch OFF Anti-freeze 2 M | T5025 | TSW_ANTFRZ2-A_OFF | | T8505 = 0 | |
| 40 | | Send TC to switch ON Heat Pipes heater M | T5011 | TSW_HEATPIP-A_ON | | T8502 = 1 | |
| 50 | | Perform procedure n° 5 (THAOUT) | | | | | |



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- **Procedure n° 4 INASTB**
 - Purpose: Transition from Inactive mode to Stand-by mode.
 - Constraints: The IASW configuration is ES1700_IASW-PAR_fmconfig_0002.TPF with E8963=0 (cold plate monitoring disable) and ES1750_DIAG-PAR_fmconfig_0001.TPF. A TPF file is created for convenience: ES1700_IASW-PAR_coldpdis_0001.TPF
 - Time Criticality:
 - System Level Prerequisites: The DPE could be ON or OFF before the procedure entrance.
 - Sub-system Level Prerequisites:
 - Special Processing: By default, all S/A should be powered ON. If it is not the case (anomaly or specific test) apply the following before sending TC Conf ON/OFF (E500):
 - AFEE OFF: set parameter E8900=0 and do not execute steps 140 and 150
 - DFEE OFF: set parameter E8901=0 and do not execute step 160
 - ACS OFF: set parameter E8902=0 and do not execute step 180
 - - PSD OFF: set parameter E8903=0 and do not execute step 200



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------|
| 10 | | DPE1 LCL status checking: if P2116 = 0 and P2013 = 0 go to step 30 | | | | | P2116 ? P2013 ? | |
| 20 | | If E49 = 1 go to step 52 | | | | | E49 ? | |
| 30 | | Send TC DPE1 power On | P4045 | LCL_SDPE1_ON | | | P2116 = 1 P2013 | I = 0.28 A ± 0.2 A |
| 40 | | Send TC DPE1 +5V Aux Supply Relay 0 ON | E9800 | SDPE1_RELAYO_ON | | | E9801 = 1 | |
| 50 | | DPE1 status checking | | | | | D6503 = 1 | Running state |
| 52 | | Time synchronisation checking | | | | | APID = 129 | CDMU time |
| 55 | | If (CDMU time ≠ DPE time) Send TC for DPE time synchronisation | D3702 | | APID=1025 | | APID = 1025 | DPE time |
| 56 | | Time synchronisation checking | | | | | APID = 129 APID = 1025 D3712 | CDMU time DPE time |
| 60 | | Checking IASW status | | | | 240108 | E0049 = 0 | Check at least two time cycle If IASW nok ⇒ execute ECP9 |
| 69 | | If (E0049 = 1) go to step 110 | | | | | | |
| 70 | | Starting IASW | E9024 | TRAN_TO_NOMINAL | | | | IASW start-up |
| 80 | | Checking IASW mode and version | | | | 240108 240108 | E0049 = 1 E0029 | If # ⇒ execute ECP9 Version number |
| 110 | | Send TC for IASW general and Diag configuration with the corresponding on-request to check the TC conformance | E0518 E0519 E0523 E0524 E0581 E0582 E0583 E0584 E0585 E0586 E0591 E0592 E0593 E0594 E0595 E0596 | tc_def_conf-iasw tc_def_exp_iasw tc-r_conf_iasw tc-r_exp_iasw tc_diag_n1 tc_diag_n2 tc_diag_n3 tc_diag_n4 tc_diag_n5 tc_diag_n6 tc-r_diag_n1 tc-r_diag_n2 tc-r_diag_n3 tc-r_diag_n4 tc-r_diag_n5 tc-r_diag_n6 | ES1700_IASW- PAR_coldpdis_0 001.TPF ES1750_DIAG- PAR_fmconfig_ 0001.TPF | 63843/11 63843/11 64039 64040 64901 64902 64903 64904 64905 64906 | E3963 = 0 | Nominal parameters except cold plate monitoring disable |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------------------------|---------------------------------------------------------------------------------|----------------|-------------------|------------------------------------------|-----------------|-------------------------------------|----------------------------------------|
| 130 | T ₀ | Send TC to switch OFF AFEE, DFEE, PSD heaters Main | T5005 | LCL_CAMER_H-A_OFF | | | T8501 = 0 P2011 | |
| 135 | T ₀ | Send TC to switch OFF Mask, ACS heaters Main | T5035 | TWS_ACS_MSK-A_OFF | | | T8507 = 0 | |
| 140 | | Send TC AFEE I/F TM/TC power ON AFEE I/F TM/TC self-test status checking | P4041 | LCL_AF2TMTC-A_ON | | 240108 | P2115 = 1 P2012 E3882 = 0 | 0.14A ± 0.01 If # execute ECP13 |
| 150 | | Send TC AFEE detection chain power ON | P4061 | LL_AF2DET-A_ON | | | P2121 = 1 P2017 | 0 ± 0.01 |
| 160 | | Send TC DFEE power ON | P4053 | LCL_DFEE-A_ON | | | P2119 = 1 P2015 | 0.19A ± 0.02 |
| 170 | | DFEE self-test status checking | | | | 240108 | E3885 = 0 | If # execute ECP16 |
| 180 | | Send TC ACS power ON | P4049 | LCL_SPI_ACS_A_ON | | 240108 | P2117 = 1 P2014 | 1.33A ± 0.13A |
| 190 | | ACS self-test status checking | | | | | E3888 = 0 | If # execute ECP14 |
| 200 | | Send TC PSD power ON | P4057 | LCL_PSD_A_ON | | 240108 | P2120 = 1 P2016 | 0.45 ± 0.04A |
| 210 | | PSD self-test status checking | | | | | E3891 = 0 | If # execute ECP15 |
| 220 | | Send TC | E0500 | tc_on_off_conf | E8900=? E8901=? E8902=? E8903=? | | | By default all S/A are ON |
| 230 | | Send TC S/A status request | E0525 | tc-r_on_off_conf | | 64041 | E3900 E3901 E3902 E3903 | If TM # TC execute GR2 |
| 240 | | Check compensation heater is ON | | | | | P2222 = 1 | |
| 250 | T ₀ + 20hrs | Send TC to switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | T8501 = 1 P2011 | |
| 260 | T ₀ + 20hrs | Send TC to switch ON Mask, ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | T8507 | |

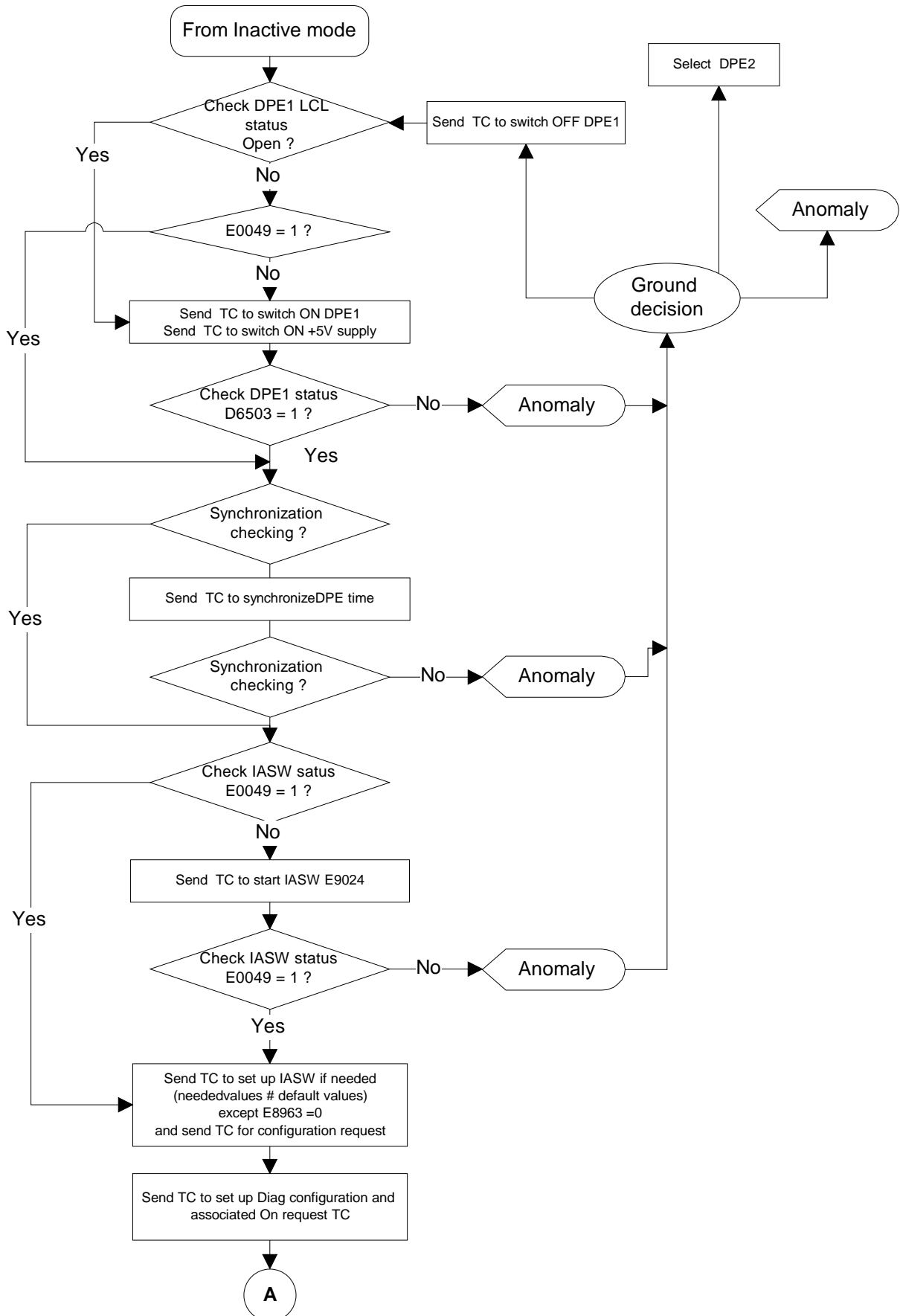


Figure 2.3 - Procedure n° 4 - INASTB

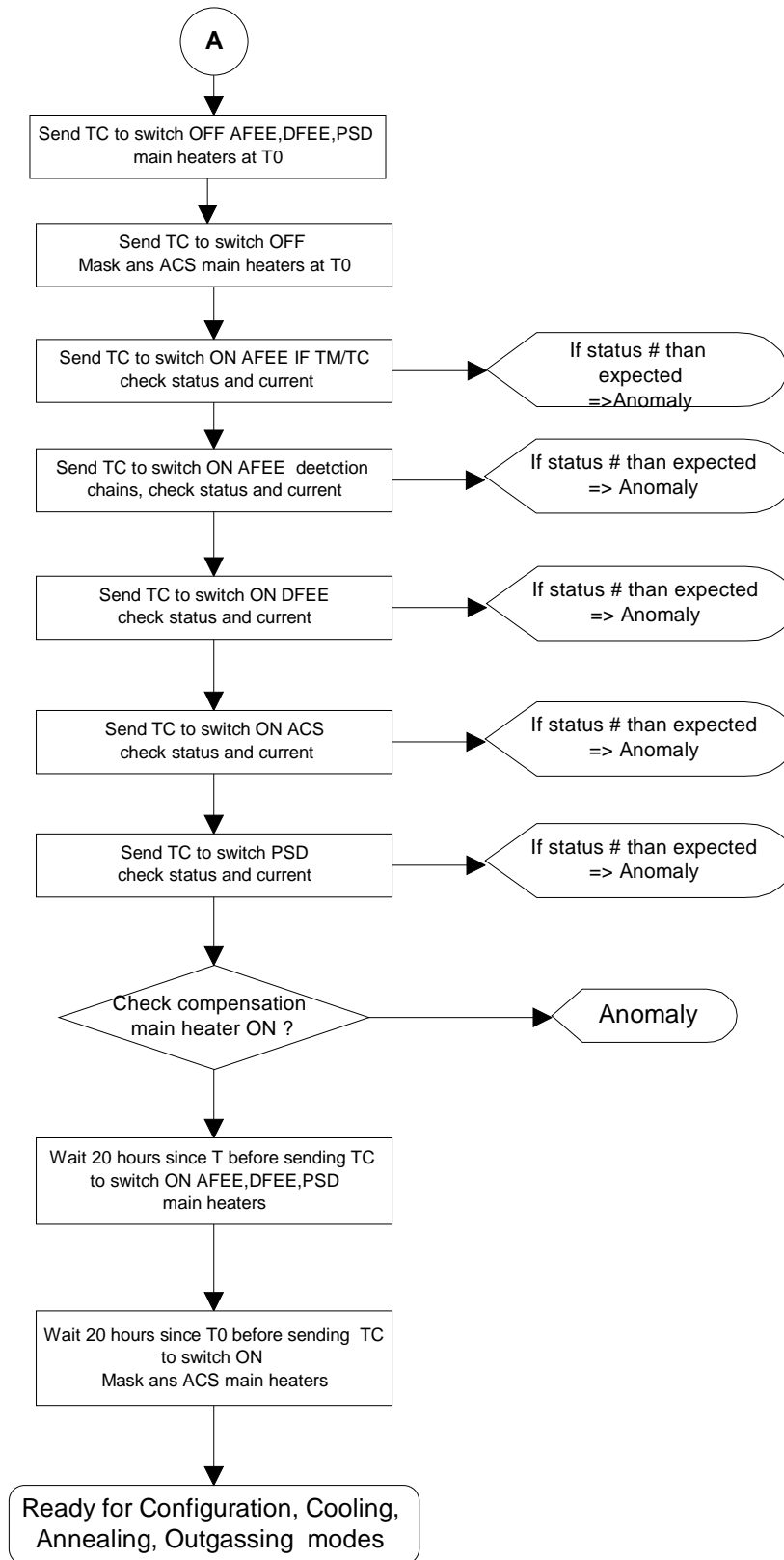


Figure 2.3 - Procedure n° 4 - INASTB (cont'd)



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- **Procedure n° 5 THAOUT**
- Purpose: Back to Inactive or Stand-by mode from Thaw mode
- Constraints: When the heat pipes are thawed
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites: All the parameters T5102, T5103, T5109, T5110, T5104 and T5111 > -47°C
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | Parameter Value | Remarks |
|---------|------|--------------------------------------------|----------------|-------------------|-----------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 10 | | Check temperatures of passive cooling | | | | T5102 > -47°C T5103 > -47°C T5109 > -47°C T5110 > -47°C T5104 > -47°C T5111 > -47°C | Continue when all parameters condition are true |
| 20 | | Send TC to switch OFF heat pipes heaters M | T5010 | TSW_HEATPIP-A_OFF | | T8502 = 0 | If # execute GR2 |
| 30 | | Send TC to switch ON Anti-freeze 1 M | T5021 | TSW_ANTFRZ1-A_ON | | T8504 = 1 | If # execute GR2 |
| 40 | | Send TC to switch ON Anti-freeze 2 M | T5026 | TSW_ANTFRZ2-A_ON | | T8505 = 1 | If # execute GR2 |



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• Procedure n° 6 STBINA

- Purpose: Back to Inactive mode from Stand-by mode. For several reasons, the instrument must return properly to Inactive mode.
- Constraints: The DPE should be maintained ON as much as possible. Only if it is necessary to switch it OFF, the step 135 shall be executed. This procedure can be used when the four machines are running.
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing: The cryocoolers strokes shall be reduced by steps of 0,429 mm ie 3 in raw value, until the commanded strokes are less than: 0,429 mm ie 3 in raw value, then set them to 0.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------------|-------------------------------------------------------------------------------------------------------------|----------------|-------------------|--------------------------------------------------------------------|-----------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 10 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | T ₀ | Send TC ON/OFF configuration | E0500 | tc_on_off_conf | E8900 = 0 E8901 = 0 E8902 = 0 E8903 = 0 | | | |
| 30 | | Send TC ON/OFF configuration request | E0525 | tc-r_on_off_conf | | 64041 | E3900 = 0 E3901 = 0 E3902 = 0 E3903 = 0 | If TM # TC execute GR2 |
| 40 | | AFEE detection chain LCL status checking | | | | | P2121 | |
| 50 | | If (P2121 = 1) send TC AFEE detection chain power OFF | P4060 | LCL_AF2DET-A_OFF | | | P2121 = 0 | |
| 55 | | AFEE2 I/F TM/TC LCL status checking | | | | | P2115 | |
| 58 | | If (P2115 = 1) send TC AFEE I/F TM/TC power OFF | P4040 | LCL_AF2TMTC-A_OFF | | | P2115 = 0 | |
| 60 | | ACS LCL status checking | | | | | P2117 | |
| 70 | T ₀ + 5 s | If (P2117 = 1) send TC ACS power OFF | P4048 | LCL_SPI_ACS_A_OFF | | | P2117 = 0 | |
| 80 | | PSD LCL status checking | | | | | P2120 | |
| 90 | | If (P2120 = 1) send TC PSD power OFF | P4056 | LCL_PSD_A_OFF | | | P2120 = 0 | |
| 100 | | | | | | | | |
| 110 | | | | | | | | |
| 120 | | DFEE LCL status checking | | | | | P2119 | |
| 130 | | If (P2119 = 1) send TC DFEE power OFF | P4052 | LCL_DFEE-A_OFF | | | P2119 = 0 | |
| 135 | | If really required Send TC to switch off DPE 1 | P4044 | LCL_SDPE1_OFF | | | P2116 = 0 P2013 = 0 | Amp |
| 140 | | Check CDE 1 and CDE 2 configuration | | | | | F9972 ? | |
| 150 | | If (F9971 = F9991 = F9972 = F9992 = 0) Perform step 230 | | | | | | CDE's are in Stand-by mode |
| 155 | | If (F9971 = F9991 = 1 and F9972 = F9992 = 0) | | | | | | CDE's are in Normal mode |
| 160 | | Send TC to decrease E9960 and E9961 compressors amplitude CDE 1 step by step until E9960 = 0 and E9961 = 0. | E9966 | CDE1_M_CHG_AMPL | Bit0 = 0 Bit1 = 1 E9960 Bit8 = 1 Bit9 = 1 E9961 | | F9960 decreases F9961 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 170 | | Send TC to decrease E9980 and E9981 compressors amplitude CDE 2 step by step until E9980 = 0 and E9981 = 0. | E9987 | CDE2_S_CHG_AMPL | Bit0 = 1 Bit1 = 1 E9980 Bit8 = 1 Bit9 = E9981 | | F9980 decreases F9981 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 175 | | Check compressor and displacers drive amplitude | | | | | F9960 ; F9961 < 50 F9980 ; F9981 < 50 | |
| 180 | | Check CDE 1 input current Check CDE 2 input current | | | | | P1061 P1063 | 0.5 A < I < 0.6 A (TBC) 0.5 A < I < 0.6 A (TBC) |
| 181 | | | | | | | | |
| 182 | | Send TC to set CDE 1 displacers to "0" amplitude In launch lock mode | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 183 | | Send TC to set CDE 2 displacers to "0" amplitude In launch lock mode | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 184 | | Check the CDE configuration Check CDE input current | | | | | F9971 = F9991 = 1 F9972 = F9992 = 1 P1061 P1063 | If # execute GR1 0.30 A < I < 0.5 A |
| 190 | | Send TC to set CDE 1 in Stand-by mode | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Cryocooler Stand-by mode CDE1 Master |
| 200 | | Send TC to set CDE 2 in Stand-by mode | E9963 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to Cryocooler Stand-by mode CDE2 Slave |
| 205 | | Check CDE 1 input current Check CDE 2 input current | | | | | P1061 P1063 | 0.10 A < I < 0.20 A 0.10 A < I < 0.20 A |

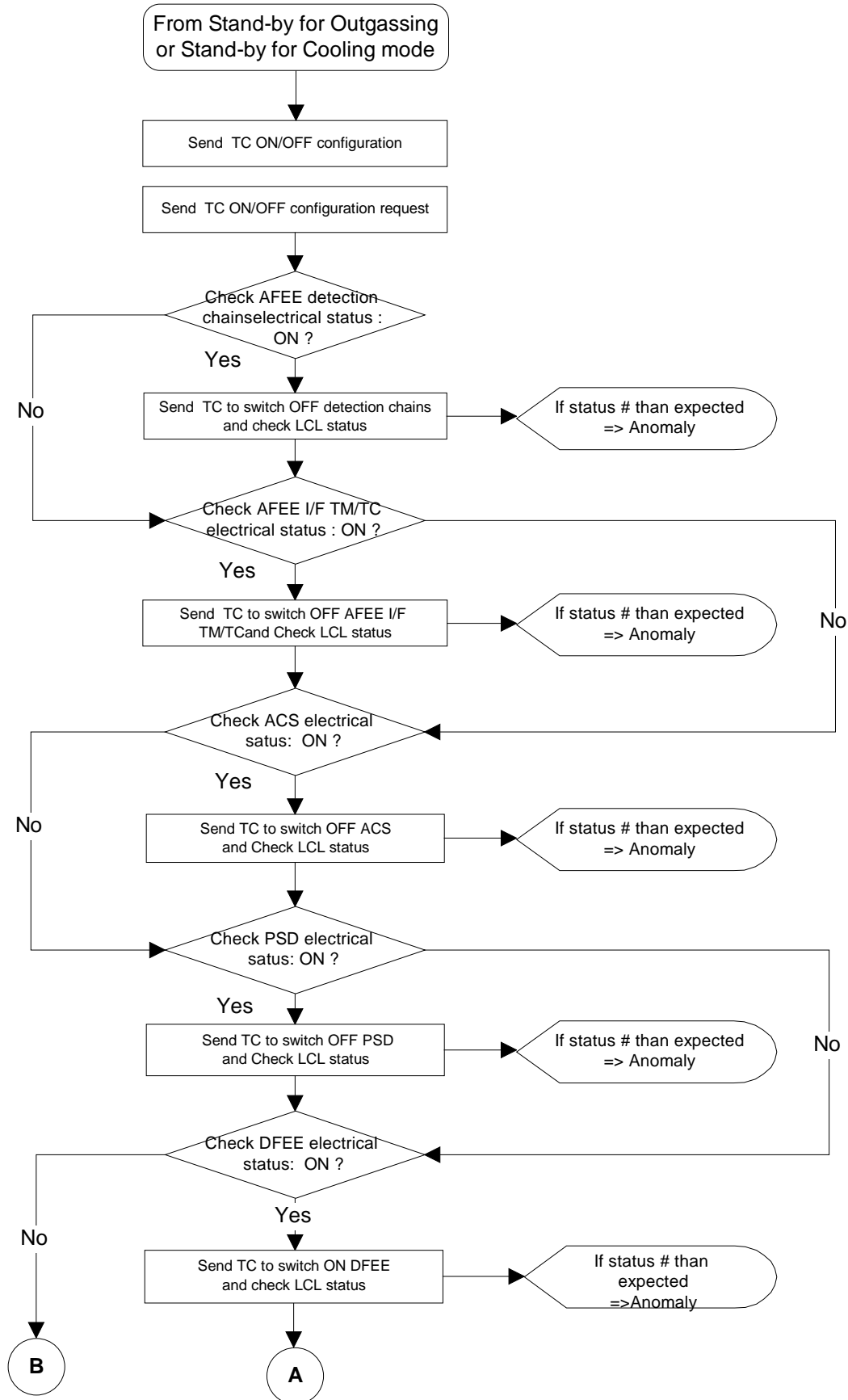


Figure 2.4 - Procedure n° 6 - STBINA

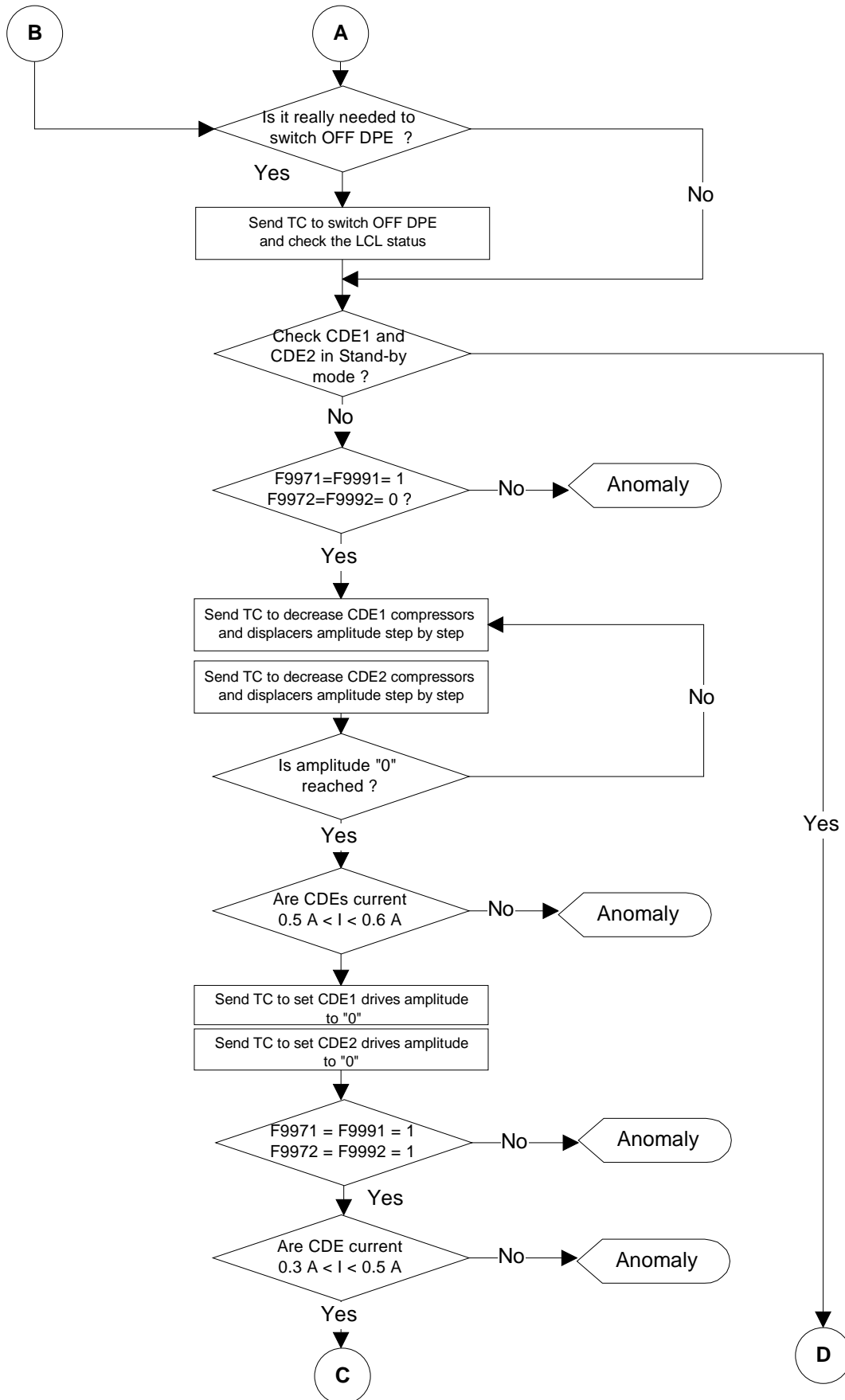


Figure 2.4 - Procedure n° 6 - STBINA (cont'd)

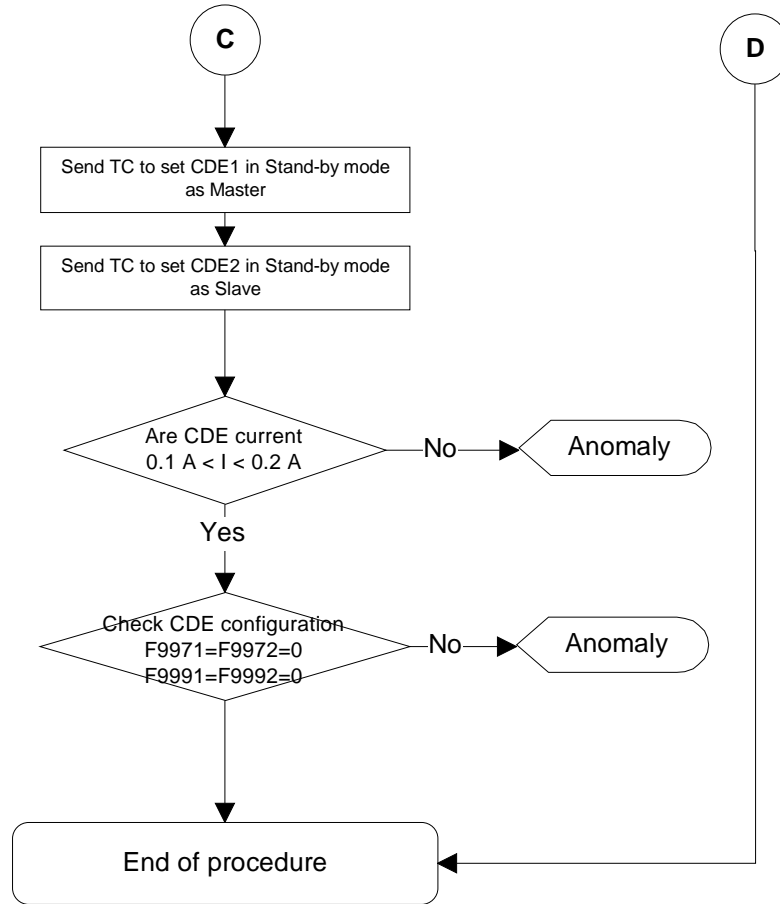


Figure 2.4 - Procedure n° 6 - STBINA (cont'd)



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• Procedure n° 7 STBCOO

- Purpose: Stand-by mode to Cooling mode and cooling process. The cooling occurs at the first time just after the outgassing mode but via configuration mode (not with this procedure cf. P28). This procedure will be used after an annealing mode or a restart of the spectrometer following a contingency case.
- Constraints: Compressors and thermal braids temperatures must be less than 40°C and the thermal control of the cryocooler shall be enable to allow switching on the compressors (T5006, T5007, T5024, T5025 between - 22°C and 38°C; E0397 and E0398 < 35°C).

Use ES1710_AF-CH-OO_def-grnd_0001.TPF TPF file with E5209=0 (range 62-410K) at the beginning of the procedure (while GED cold plate temperatures > 125K). A specific TPF file ES1710_AF-CH-OO_outgass_0001.TPF can be used for convenience.

- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites: Stand-by mode
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|-----------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|
| 10 | | Check that cold plate monitoring is disable | E0523 | | | | E3963 = 0 | |
| 20 | | Change mode TC Stand-by to Configuration | E0502 | tc_mode_chg_x | | | | |
| 30 | | Mode status checking | | | | | E0049 = 3 | If # 3 execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 40 | | Check detectors chains HV are OFF before sending E0004 TC | | | E5190-E5208=? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 50 | Tn | Send TC Cold plate and Thermal braids temperature range setting | E0004 | tc-c_af_ch-oo | ES1710_AF-CH-OO_outgass_0001.TPF | 63841/4 | E5209 = 0 | ES1710_AF-CH-OO_def-grnd_0001.TPF TPF file with E5209=0 (range 62-410K) |
| 60 | Tn+25" | Send TC Temperature range request | E0014 | tc-r_af_ch-oo | | 64003 | E0209 = 0 | |
| 70 | | Check compressors temperatures CDE 1 | | | | | a<T5006<b a<T5024<b | a = -22 °C ; b =+ 38 °C |
| 60 | | Check compressors temperatures CDE 2 | | | | | a<T5007<b a<T5025<b | a = -22 °C ; b =+ 38 °C if temp T5006, T5007 T5024, T5025 ok => continue |
| 80 | | Check Thermal braids temperatures | | | | | E0397<35°C E0398<35°C | If nok => anomaly Don't active CDEs |
| 90 | | Check cold plate temperature | | | | | E0391 ≥ 89 K E0392 ≥ 89 K E0393 ≥ 89 K E0394 ≥ 89 K | |
| 100 | | | | | | | | |
| 110 | | | | | | | | |
| 120 | | Check CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp |
| 130 | | Send TC to set up CDE 1 as master | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | F9971=F9972 = 0 | If # execute GR1 |
| 140 | | Send TC to set up CDE 2 as slave | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | F9991=F9992 = 0 | If # execute GR1 |
| 150 | | Send TC to set up CDE 1 Master in nominal mode | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 1 | | F9960 < 50 190 < F9964 < 210 F9961 < 50 | CDE 1 is assumed to be Master Comp/Disp1 drive enable |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| | | | | | Bit9 = 1 E9961 = 0 | | 200 < F9965 < 220 | |
| 160 | | Send TC to set up CDE 2 Slave in nominal mode | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = 0 Bit8 = 1 Bit9 = 1 E9981 = 0 | | F9980 < 50 180 < F9984 < 200 F9981 < 50 215 < F9985 < 235 | CDE Redundant is assumed to be Slave Comp/Disp1 drive enable |
| 170 | | Check CDE 1 configuration | | | | | F9971 = 1 F9972 = 0 | CDE1 Nominal mode |
| 180 | | Check CDE 2 configuration | | | | | F9991 = 1 F9992 = 0 | CDE2 Nominal mode |
| 190 | | Send TC to set up compressors and displacers amplitude CDE 1 step by step until expected amplitude reached (7 mm TBC ie 50 bits TC raw value). Apply 12 steps of 0.429 m/m (3 bits) then 2 steps of 0.123 m/m (1 bit) (as many time as necessary) | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = TBD Bit8 = 1 Bit9 = 1 E9961 = TBD | | 130 < F9960, F9961 < 180 160 < F9964 < 215 145 < F9965 < 195 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 200 | | Send TC to set up compressors and displacers amplitude CDE 2 engine step by step until expected amplitude reached (7 mm TBC ie 50 bits TC raw value). Apply 12 steps of 0.429 m/m (3 bits) then 2 steps of 0.123 m/m (1 bit) (as many time as necessary) | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = TBD Bit8 = 1 Bit9 = 1 E9981 = TBD | | 130 < F9980 < 180 105 < F9981 < 155 140 < F9984 < 180 150 < F9985 < 200 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 210 | | Check cold plate temperatures If (E0391 or E0392 or E0393 or E0394 ≤ 125K) | | | | 60602/9 | E0391 or E0392 or E0393 or E0394 ≤ 125 K | If true change the temperature range 62 K to 128 K |
| 220 | Tn | Send TC to change temperature range | E0004 | tc-c_af_ch-oo | ES1710_AF-CH-OO_def-grnd_0001.TPF | 63841/4 | E5209 = 1 | E5190-E5208=0 E5209=1 |
| 230 | Tn+25" | Send TC Temperature range request And stay at this step while the temperatures are more than the corresponding thresholds | E0014 | tc-r_af_ch-oo | | 64003 60602/9 | E0209 = 1 E0391 < E3964 E0392 < E3965 E0393 < E3966 E0394 < E3967 | If T5006 or T5024 > 38 °C reduce the stroke step 190, If T5007 or T5025 > 38 °C reduce the stroke step 200, |

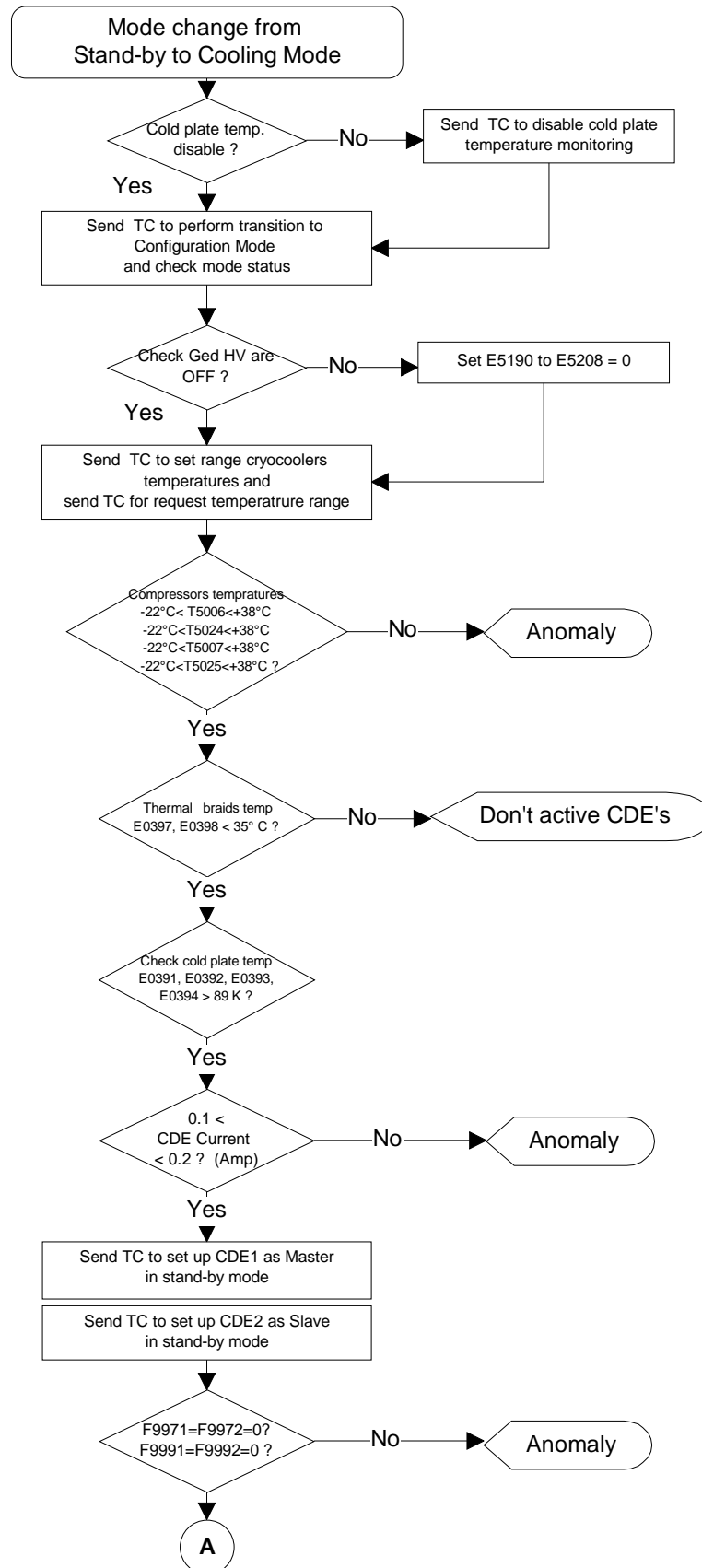


Figure 2.5 - Procedure n° 7 - STBCOO

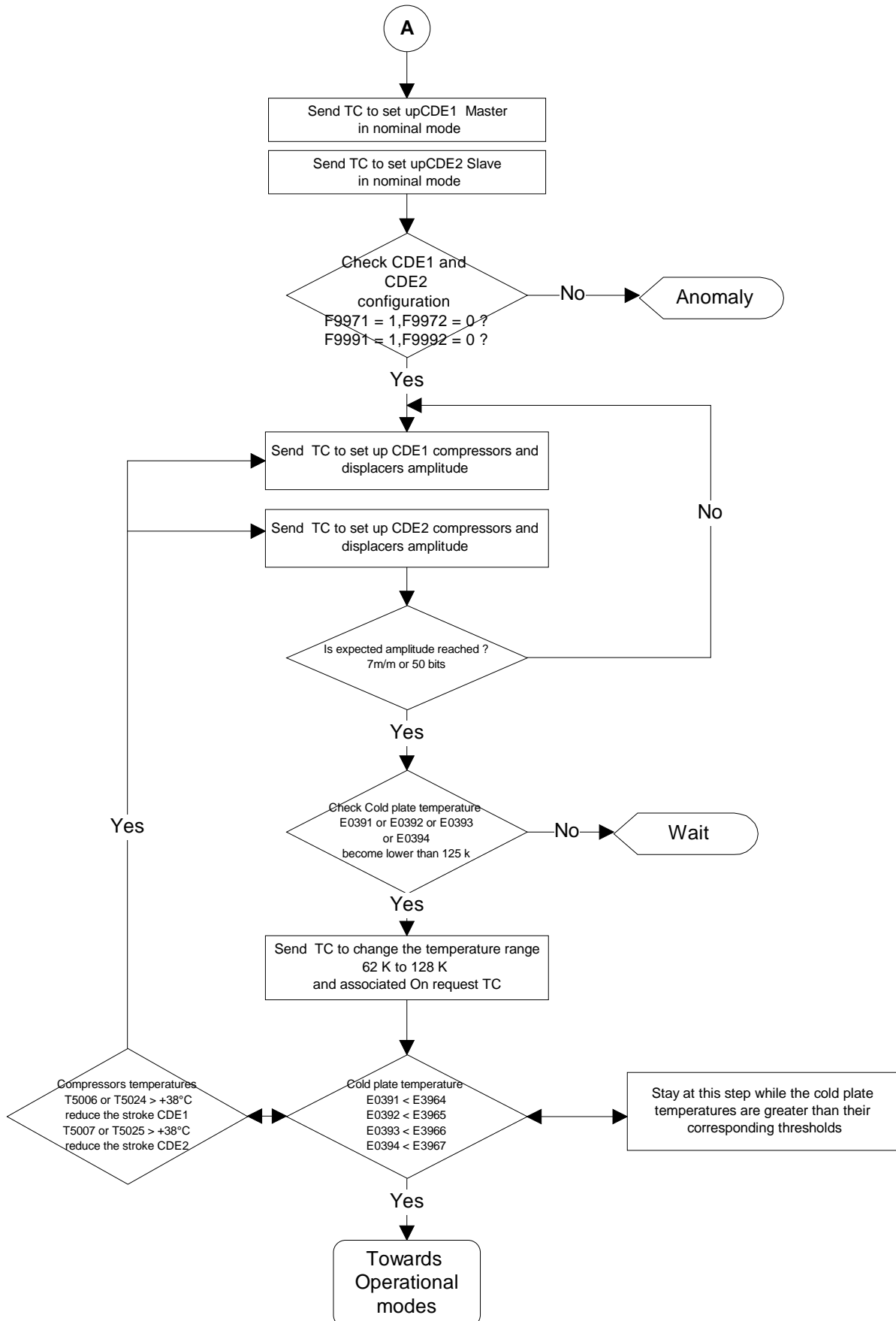


Figure 2.5 - Procedure n° 7 - STBCOO (cont'd)



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- **Procedure n° 8 STBCON**
 - Purpose: Stand-by mode to Configuration Mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------|----------------|------------------|-----------------|-----------------|--------------------------------------------------|------------------------------------------------------|
| 10 | | Mode change from Stand-by mode to Configuration | E0502 | tc_mode_chg_x | | | | |
| 15 | | Send TC to reload all S/A configuration | E0556 | tc_send_conf | | | | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 3 | If # => execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | | | | | | E3881 = 1 E3887 = 1 E3890 = 1 E3884 = 1 | Only if units configuration have been already loaded |
| 30 | | Send TC to switch OFF Anti-freeze 2 heater M | E5025 | TWS_ANTRFZ-A_OFF | 0 | | T8505 = 0 | If # => execute GR2 For power consumption saving |



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• Procedure n° 9 ECLIPS

- Purpose: Eclipse management
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 10 | T – 3 min | Automatic instrument transition to Stand-by mode including context saving | | | | 240108 | E0049 = 1 | HK acquisitions are stopped |
| 20 | T – 1 min | Trigger TT command to switch ON Anti-freeze heater n° 2 Trigger TT command to switch OFF AFEE chain detection Trigger TT command to switch OFF AFEE I/F TM/TC Trigger TT command to disable SECL S/W | T5026 P4060 P4040 | TSW_ANTFRZ2-A_ON LCL_AFE2DET-A_OFF LCL_AFE2TMTC-A_OFF | | | T8505 = 1 P2121 = 0 P2115 = 0 | |
| 30 | T | Trigger automatic switch OFF for ACS, PSD, DFEE, nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), Compensation heaters Main OFF TCS nominal heaters loops OFF, CDE M heaters, | P4458 T5575 | LCL_SPI_ACS-A_OFF LCL_PSD-A_OFF LCL_DFEE-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF TWS_CDE_HTRA_OFF | | | P2117 = 0 P2120 = 0 P2119 = 0 T8501 = 0 T8507 = 0 P2222 = 0 T8015 = 0 | |
| 40 | T exit | Trigger automatic switch ON for nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), TCS nominal heaters loops ON. | T5006 T5036 | TSW_CAMER_H-A_ON TSW_ACS_MSK-A_ON | | | T8501 = 1 T8507 = 1 | |
| 50 | Texit + 1 min | Compensation heaters Main ON | P4459 | | | | P2222 = 1 | |
| 60 | Texit + Taos | Send TC to switch OFF Anti-freeze 2 heater Send TC to switch OFF AFEE, DFEE, PSD, nominal heaters Send TC to switch OFF ACS and MASK nominal heaters Send TC to switch ON AFEE I/F TM/TC Send TC to switch ON AFEE chain detection Send TC to switch ON ACS Send TC to switch ON PSD Send TC to switch ON DFEE | T5025 T5005 T5035 P4041 P4061 P4049 P4057 P4053 | TSW_ANTFRZ2-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF LCL_AF2TMTC-A_ON LCL_AF2DET-A_ON LCL_SPI_ACS-A_ON LCL_PSD-A_ON LCL_DFEE-A_ON | | | T8505 = 0 T8501 = 0 T8507 = 0 P2115 = 1 P2121 = 1 P2117 = 1 P2120 = 1 P2119 = 1 | SPI is in Stand-by mode without HK acquisition IASW is in Stand-by mode without HK acquisition S/A self-tests performing |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------|-----------------|---------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------|
| 70 | | Send TC to start IASW automatic reconfiguration process | E0555 | tc_ecl_exit_iasw | | 63843/11 64039 | E0049=2 | IASW checks the S/A self-tests results and restart HK acquisition set to the mode interrupted by the eclipse |
| 80 | | IASW eclipse status checking | | | | | E0089 = "NO" | If # come back to 70 |
| 90 | | ACS configuration acquisition request to update the High Voltage Configuration Send TC to request System service 1 (watchdog, test conf, HV conf) Send TC to request System service 2 (watchdog, test conf, HV conf) Send TC to request System service 3 (watchdog, test conf, HV conf) | E0251 E0252 E0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 64007 64008 64009 | | |
| 100 | Taos | Send TC to switch ON CDE heater M | T5576 | TSW_CDE_HTRA_ON | 1 | | T8015 = 1 | |
| 110 | Taos + 20 hrs | Send TC to switch ON AFEE, DFEE, PSD, nominal heaters. | T5006 | TSW_CAMER_H-A_ON | | | T8501 = 1 | |
| 120 | Taos + 20 hrs | Send TC to switch ON ACS and MASK nominal heaters. | T5036 | TSW_ACS_MSK-A_ON | | | T8507 = 1 | |

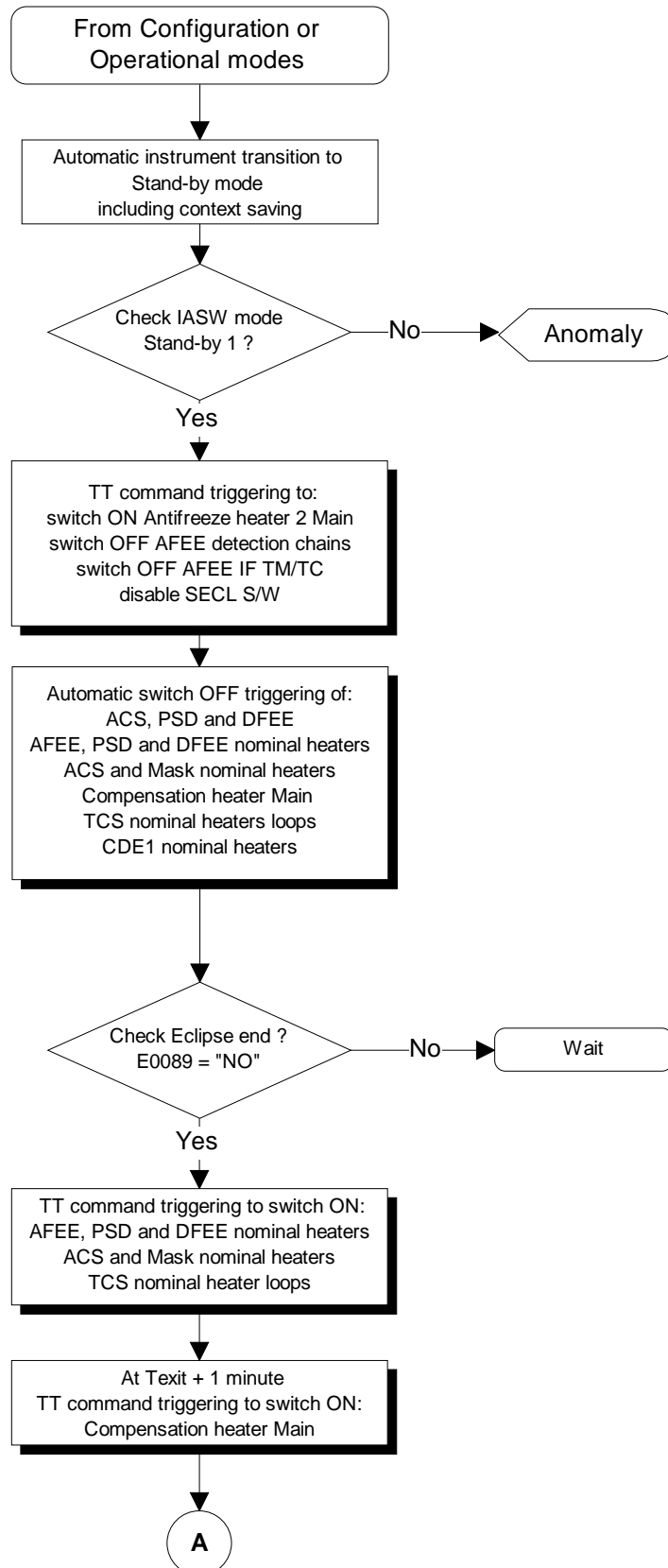


Figure 2.6 - Procedure n° 9 - ECLIPS

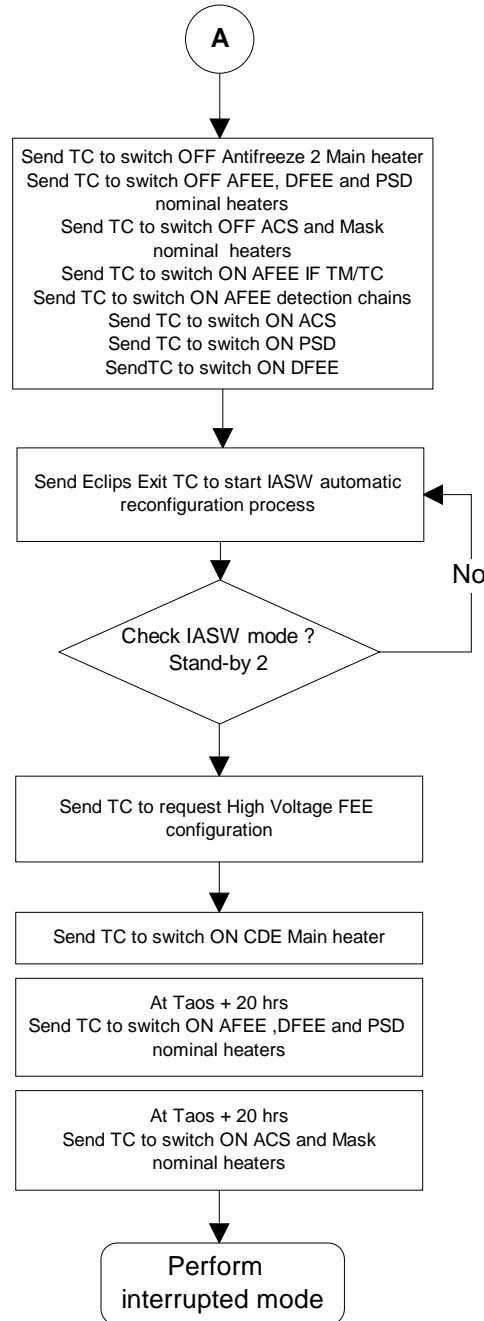


Figure 2.6 - Procedure n° 9 - ECLIPS (cont'd)



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- **Procedure n° 9A ECLIPS-A**
 - Purpose: Eclipse management occurring during Outgassing phase
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: Before eclipse entry signal given by BCP the following telecommands must be sent to switch OFF Heat pipe thaw heater Main and redundant, Annealing heater Main and Redundant and to switch ON Anti-freeze heaters 1 and 2 Main . The initial electrical configuration must be recovered at the end of the automatic reconfiguration process by sending the adapted telecommands.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 5 | | Send TC to switch OFF Heat pipes Thas Main Send TC to switch OFF Heat pipes Thas Red Send TC to switch OFF Annealing heater Main Send TC to switch OFF Annealing heater Red Send TC to switch ON Anti-freeze 1 Main Send TC to switch ON Anti-freeze 2 Main | T5010 T5110 T5015 T5115 T5021 T5026 | TSW_HEATPIP-A_OFF TSW_HEATPIP-B_OFF TSW_ANNEAL-A_OFF TSW_HEATPIP-A_OFF TSW_ANTFRZ1-A_ON TSW_ANTFRZ1-B_ON | 0 0 0 0 1 1 | | T8502 = 0 T8602 = 0 T8503 = 0 T8603 = 0 T8504 = 1 T8505 = 1 | If # execute GR2 |
| 10 | T - 3 min | Automatic instrument transition to Stand-by mode including context saving | | | | 240108 | E0049 = 1 | HK acquisitions are stopped |
| 20 | T - 1 min | Trigger TT command to switch ON Anti-freeze heater n° 2 Trigger TT command to switch OFF AFEE chain detection Trigger TT command to switch OFF AFEE I/F TM/TC Trigger TT command to disable SECL S/W | T5026 P4060 P4040 | TSW_ANTFRZ2-A_ON LCL_AFE2DET-A_OFF LCL_AFE2TMTC-A_OFF | | | T8505 = 1 P2121 = 0 P2115 = 0 | |
| 30 | T | Trigger automatic switch OFF for ACS, PSD, DFEE, nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), Compensation heaters Main OFF TCS nominal heaters loops OFF, CDE M heaters | P4458 T5575 | LCL_SPI_ACS-A_OFF LCL_PSD-A_OFF LCL_DFEE-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF TWS_CDE_HTRA_OFF | | | P2117 = 0 P2120 = 0 P2119 = 0 T8501 = 0 T8507 = 0 P2222 = 0 T8015 = 0 | |
| 40 | T exit | Trigger automatic switch ON for nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), TCS nominal heaters loops ON. | T5006 T5036 | TSW_CAMER_H-A_ON TSW_ACS_MSK-A_ON | | | T8501 = 1 T8507 = 1 | |
| 50 | Textit + 1 min | Compensation heaters Main ON | P4459 | | | | P2222 = 1 | |
| 60 | Textit + Taos | Send TC to switch OFF Anti-freeze 2 heater Send TC to switch OFF AFEE, DFEE, PSD, nominal heaters Send TC to switch OFF ACS and MASK nominal heaters Send TC to switch ON AFEE I/F TM/TC Send TC to switch ON AFEE chain detection Send TC to switch ON ACS Send TC to switch ON PSD Send TC to switch ON DFEE | T5025 T5005 T5035 P4041 P4061 P4049 P4057 P4053 | TSW_ANTFRZ2-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF LCL_AF2TMTC-A_ON LCL_AF2DET-A_ON LCL_SPI_ACS-A_ON LCL_PSD-A_ON LCL_DFEE-A_ON | | | T8505 = 0 T8501 = 0 T8507 = 0 P2115 = 1 P2121 = 1 P2117 = 1 P2120 = 1 P2119 = 1 | SPI is in Stand-by mode without HK acquisition IASW is in Stand-by mode without HK acquisition S/A self-tests performing |
| 70 | | Send TC to start IASW automatic reconfiguration process | E0555 | tc_ecl_exit_iasw | | 63843/11 64039 | E0049=2 | IASW checks the S/A self-tests results and restart HK acquisition set to the mode interrupted by the eclipse |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------|----------------------------------------------------------------------------|----------------------|
| 80 | | IASW eclipse status checking | | | | | E0089 = "NO" | If # come back to 70 |
| 90 | | ACS configuration acquisition request to update the High Voltage Configuration Send TC to request System service 1 (watchdog, test conf, HV conf) Send TC to request System service 2 (watchdog, test conf, HV conf) Send TC to request System service 3 (watchdog, test conf, HV conf) | E0251 E0252 E0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 64007 64008 64009 | | |
| 100 | Taos | Send TC to switch ON CDE heater M | T5576 | TSW_CDE_HTRA_ON | 1 | | T8015 = 1 | |
| 110 | Taos + 20 hrs | Send TC to switch ON AFEE, DFEE, PSD, nominal heaters. | T5006 | TSW_CAMER_H-A_ON | | | T8501 = 1 | |
| 120 | Taos + 20 hrs | Send TC to switch ON ACS and MASK nominal heaters. | T5036 | TSW_ACS_MSK-A_ON | | | T8507 = 1 | |
| 130 | | Send TC to swtich ON Heat pipes Thas Main Send TC to swtich ON Heat pipes Thas Red Send TC to swtich ON Annealing heater Main Send TC to swtich ON Annealing heater Red Send TC to swtich OFF Anti-freeze 1 Main Send TC to swtich OFF Anti-freeze 2 Main | T5011 T5111 T5016 T5116 T5020 T5025 | TSW_HEATPIP-A_ON TSW_HEATPIP-B_ON TSW_ANNEAL-A_ON TSW_HEATPIP-A_ON TSW_ANTFRZ1-A_OFF TSW_ANTFRZ1-B_OFF | | | T8502 = 1 T8602 = 1 T8503 = 1 T8603 = 1 T8504 = 0 T8505 = 0 | If # execute GR2 |



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- **Procedure n° 10 STBANI**
 - Purpose: Stand-by mode in sight to Annealing mode and Annealing process
 - Constraints: detectors must be maintained at $103^{\circ}\text{C} \pm 3^{\circ}\text{C}$. The Camera high voltages are OFF (E190 – E208).
 - Time Criticality: Last around 26 hours to reach the annealing temperature and 24 hours at the dwell temperature assuming the availability of the two annealing lines.
 - System Level Prerequisites:
 - Sub-system Level Prerequisites: The IASW cold plate temperature monitoring is disable.
 - Special Processing: The RTU cold plate thermal sensors T5107 and T5114 are calibrated at 37°C during 2 hours by comparison with the AFEE cold plate thermal sensors E391, E392, E393. This calibration is required in order to reduce the bias error and to control the temperature of the cold plate during the annealing by the SW satellite control loop with an accuracy of $\pm 2^{\circ}\text{C}$. The cold plate can reach up to 107.9°C (overshoot) during a nominal annealing process. The cold plate monitoring threshold by the satellite shall be set at 111°C ($108^{\circ}\text{C} + 1^{\circ}\text{C}$ of margin + 2°C of accuracy).



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|-----------------------------------------------------------------------------|
| 10 | | Send TC Mode change from Stand-by mode to Configuration | E0502 | tc_mode_chg_x | | | | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 3 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 30 | | AFEE TM/TC status checking | | | | 240108 | E3881 = 1 | If # execute ECP13 |
| 33 | | Check that the IASW cold monitoring is disable | | | | | E8963 = 0 | |
| 35 | | Check detectors chains HV are OFF before sending E0004 TC | | | E5190- E5208=? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 40 | Tn | Send TC Chains ON/OFF configuration | E0004 | tc-c_af_ch-oo | ES1710_AF- CH- OO_outgass_0 001.TPF | 63841/4 | | Outgassing configuration Wide range 62 K – 410 K Detectors HV OFF |
| 50 | Tn+25" | Send TC Chains ON/OFF configuration request | E0014 | tc-r_af_ch-oo | | 64003 | E0209 = 0 E0003 = 255 E0004 = 255 | If # E5003 => GR2 If # E5004 => GR2 |
| 51 | | Cryocoolers change mode from operational to Stand-by CDE Send TC to decrease compressors and displacers amplitude CDE 1 step by step until "0" reached Send TC to decrease compressors and displacers amplitude CDE 2 step by step until "0" reached | E9966 E9987 | CDE1_M_CHNG_AMPL CDE2_S_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = CA* Bit8 = 1 Bit9 = 1 E9961 = CA* Bit0 = 1 Bit1 = 1 E9980 = CA* Bit8 = 1 Bit9 = 1 E9981 = CA* | | | Back to Cryocooler Stand-by mode Back to Cryocooler Stand-by mode |
| 52 | | Check CDE compressors drive amplitude | | | | | F9960 = F9961 = v F9980 = F9981 = v | 0 < v < 50 |
| 53 | | Check CDE input current | | | | | P1061 P1063 | 0.5 A < I < 0.6 A |

CA* Current Amplitude



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|----------------------------------------------------------|------------------------------------------------------------|
| 54 | | | | | | | | |
| 55 | | Send TC to set CDE 1 displacers to "0" amplitude | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | Back to Launch Lock Mode |
| 56 | | Send TC to set CDE 2 displacers to "0" amplitude | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9980 = 0 Bit8 = 0 Bit9 = 1 E9981 = 0 | | | Back to Launch Lock Mode |
| | | Check the CDE configuration | | | | | F9971 = F9991 = 1 F9972 = F9992 = 1 | If # execute GR1 |
| | | Check CDE input current | | | | | P1061 P1063 | 0.3 < I < 0.5 Amp |
| 57 | | Send TC to disable CDE 1 compressors and displacers | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Standby Mode |
| 58 | | Send TC to disable CDE 2 compressors and displacers | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | |
| 59 | | Check CDE input current Check the Stand-by/operational status monitor | | | | | P1061 P1063 F9971 = F9991 = 0 F9972 = F9992 = 0 | 0.1 < I < 0.2 A If # execute GR1 |
| 60 | | Send TC Annealing Heater 1 (M) ON | T5016 | TSW_ANNEAL-A_ON | | | T8503 = 1 | Wait E0391, E0392, E0393 > 120 K before performing step 70 |
| 70 | | Send TC Annealing Heater 2 (R) ON | T5116 | TSW_ANNEAL-B_ON | | | T8603 = 1 | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|---------------------------------------------------------------------------------------------------------|----------------|----------------------------------------|---------------------------------------------|-----------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 72 | | Check cold plate temperatures | | | | | E0391 = ? E0392 = ? | When E0391, E0392 > -30°C Perform step 75 |
| 73 | | Send TC to switch OFF Compensation heaters M | P4208 | TSW_ACC_HTR_A_OFF | | | P2269 = 0 | |
| 75 | | Send TC to switch OFF Anti-freeze heater M 2 Send TC to switch OFF Anti-freeze heater M 1 | T5025 T5020 | TSW_ANTFRZ2-A_OFF TSW_ANTFRZ1-A_OFF | | | T8505 = 0 T8504 = 0 | |
| 76 | | Send TC to switch ON Heat pipe thaw heater M Send TC to switch ON Heat pipe thaw heater R | T5011 T5111 | TSW_HEATPIP-A_ON TSW_HEATPIP-B_ON | | | T8502 = 1 T8602 = 1 | |
| 80 | | Wait until E0391, E0392, E0393, E0394 are all over 33°C | | | | 60602/9 | E0391 > 33°C E0392 > 33°C E0393 > 33°C E0394 > 33°C | Regulation range achieved at 33°C |
| 85 | | Cryogenic temperatures checking and PRTU sensor T5107 and T5114 analysis during 2 hours for calibration | | | | 60602/9 | E0391 = 37°C ± 4 E0392 = 37°C ± 4 E0393 = 37°C ± 4 E0394 = 37°C ± 4 | When temperature reached => wait 2 hrs |
| 90 | | Temperatures via PRTU correlation with E0391, E0392 and E0393 | | | | | T5107, T5114 | In flight calibration of T5107 and T5114 by comparison of the mean values with E0391, E0392 and E0393 |
| 100 | | Update the threshold of the S/C cold plate temperature control loop at 111°C (real temperature) | | | | | T5107, T5114 | Used the in flight calibration of T5107 and to limit the maximum cold plate temperature. |
| 105 | | Check HV ON/OFF parameters Setting are "OFF" in TC E0004 | | | E5190 to E5208 = ? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 110 | Tn | Send TC Chains ON/OFF configuration | E0004 | tc-c_af_ch-oo | ES1710_AF- CH- OO_anneal_00 01.TPF | | | Wide range 62 K – 410 K Detectors HV OFF Annealing temperature regulation |
| 120 | Tn+25" | Send TC Chains ON/OFF configuration request | E0014 | tc-r_af_ch-oo | | 64000 | E0003 = 0 E0004 = 0 E0190 to E0208 = 0 | If # E5003 execute GR2 If # E5004 execute GR2 Detectors HV OFF |
| 130 | | Wait until E0391, E0392, E0393, E0394 are all over 100°C | | | | 60601/9 | E0391 > 100°C E0392 > 100°C E0393 > 100°C E0394 > 100°C | Regulation range archived at 100°C |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------|----------------|---------|-----------------|-----------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 160 | | Cryogenic temperature checking during 24 hours | | | | 60601/9 | E0391 = 104°C ± 4° E0392 = 104°C ± 4° E0393 = 104°C ± 4° E0394 = 104°C ± 4° | When all parameters are in the range 104°C ± 4°, wait and check during 24 h that this condition is true |

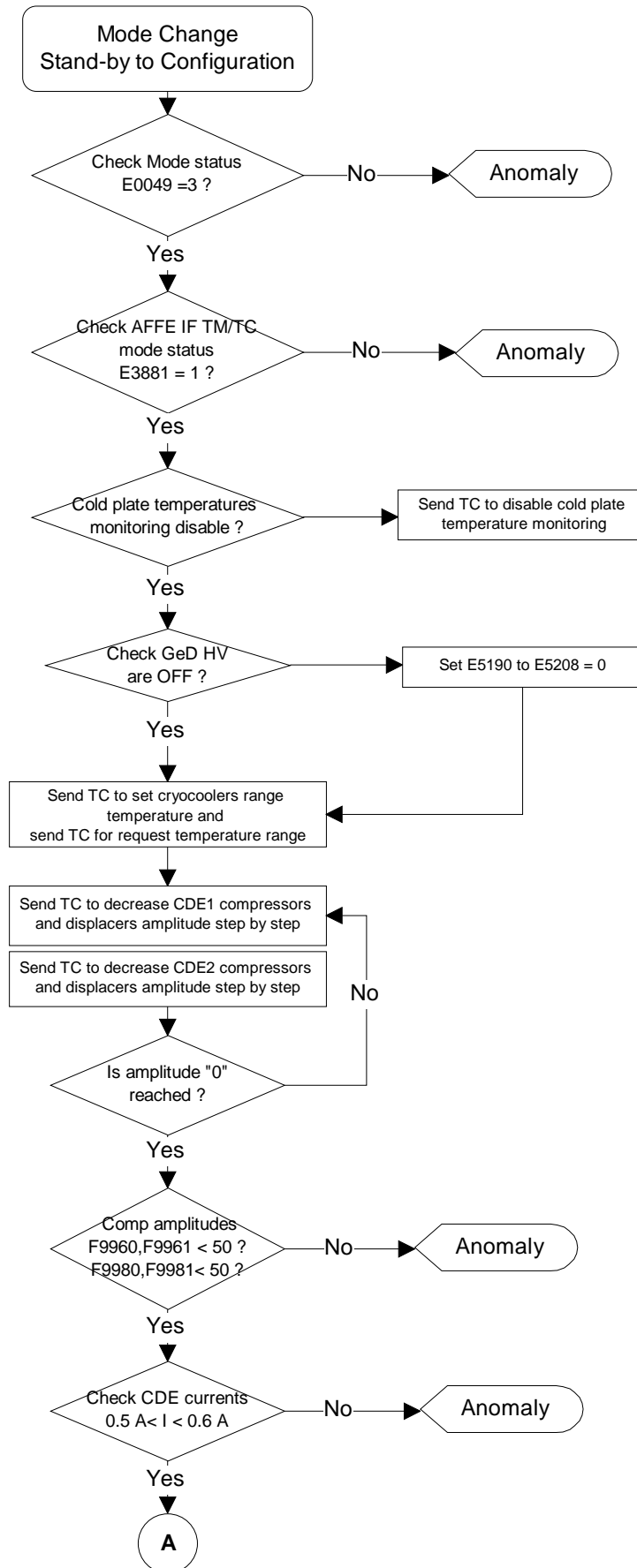


Figure 2.7 - Procedure n° 10 - STBANI

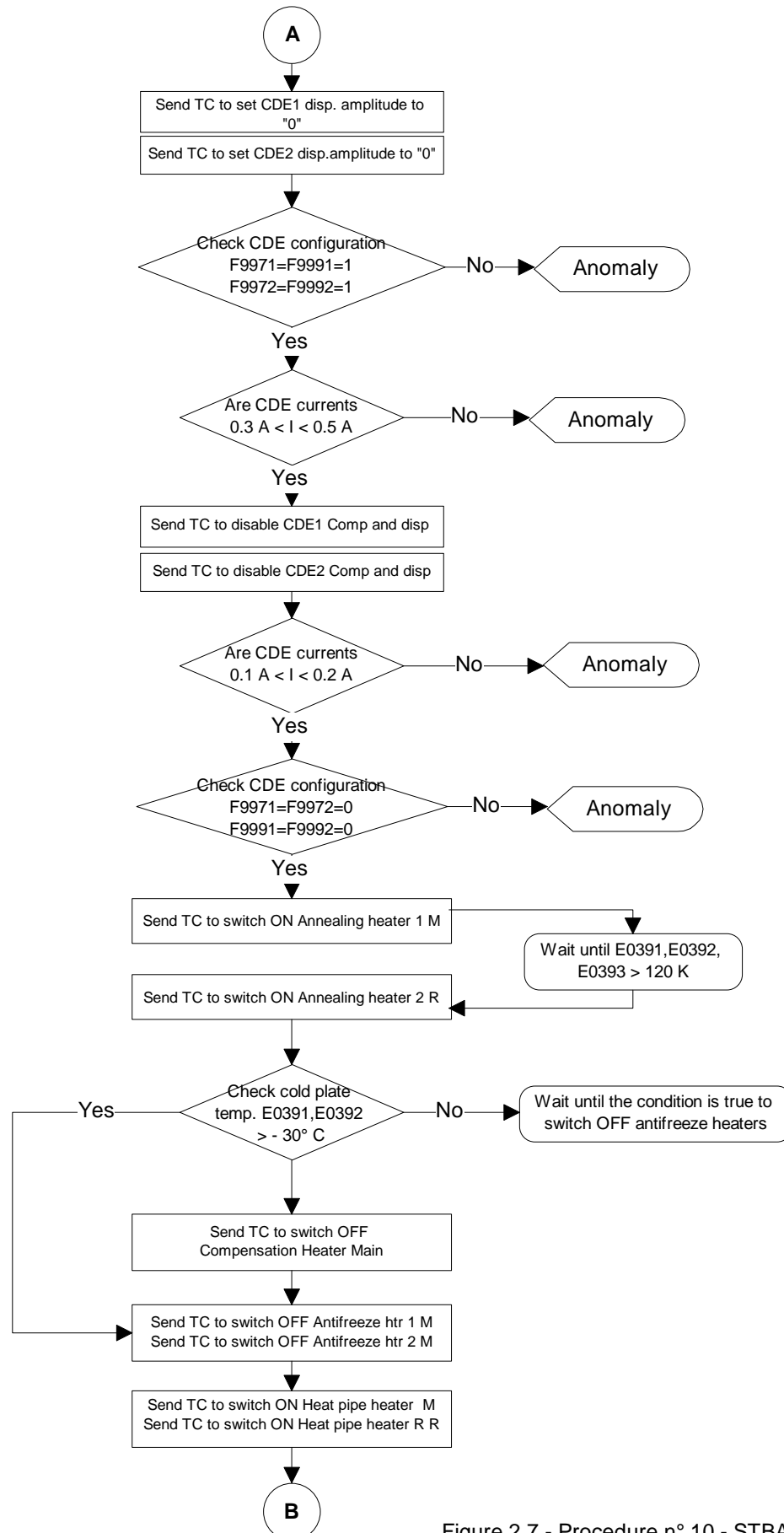


Figure 2.7 - Procedure n° 10 - STBANI (cont'd)

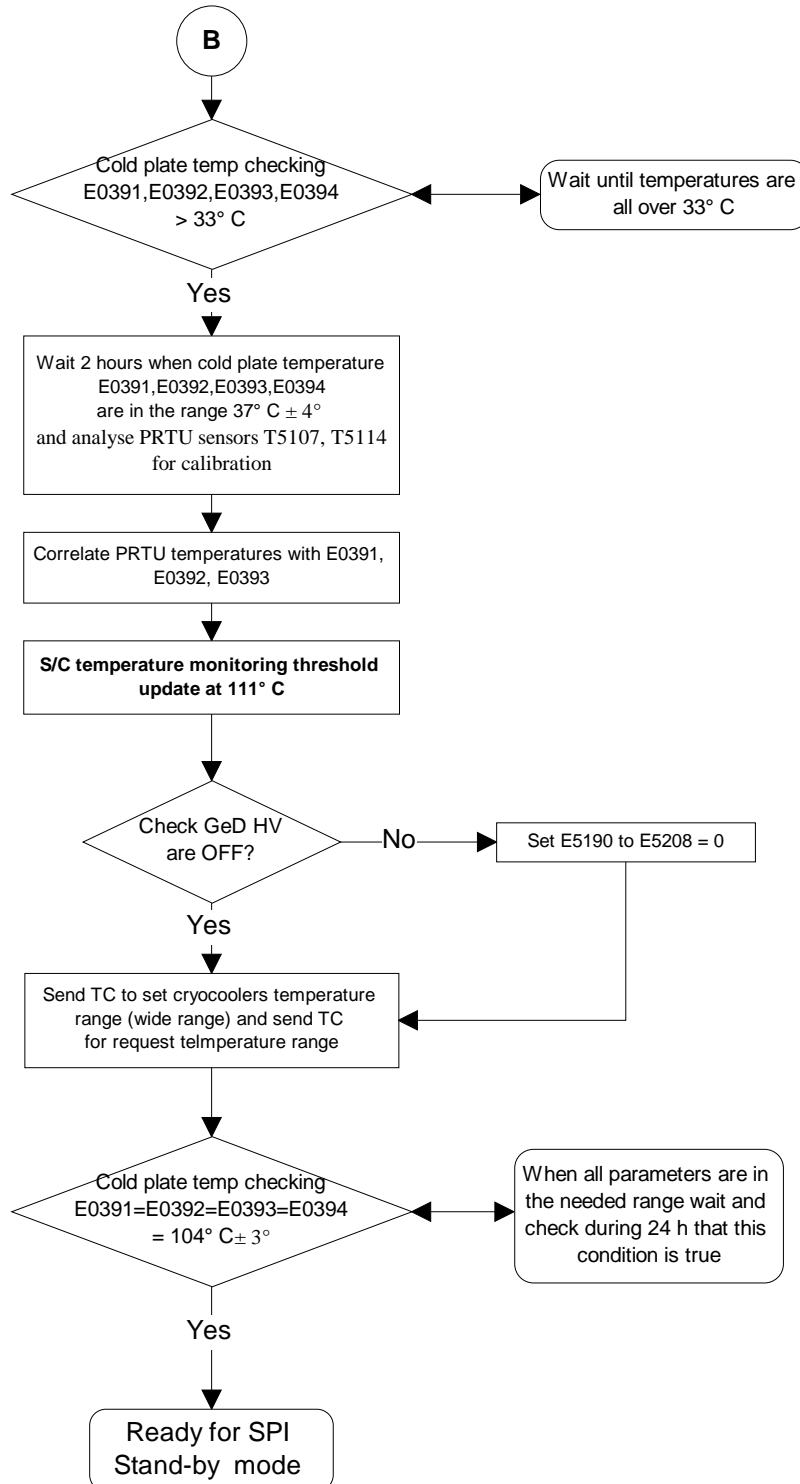


Figure 2.7 - Procedure n° 10 - STBANI (cont'd)



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• **Procedure n° 11 COOSTB**

- Purpose: Back to Stand-by mode from Cooling mode
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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- **Procedure n° 12 BKSTBY**
 - Purpose: Back to Stand-by mode from Configuration, Operational, Calibration and Diagnostic modes. The return to the Stand-by mode is needed when the electrical status of one or more sub-assemblies must be changed. The previous S/A parameters configuration is lost. An up-load of all the parameters is necessary.
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: Switch OFF automatically AFEE HV and PMT HV



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------|----------------|------------------|-----------------|-----------------|-----------------|-----------------------------------------|
| 10 | | Change mode TC Back to Stand-by mode | E0505 | tc_mode_chg_y | | | | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 30 | | Send TC to switch ON the Anti-freeze 2 M | T5026 | TWS_ANTFRZ2-A_ON | | | T8505 = 1 | |



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• **Procedure n° 13-P PHOTON**

- Purpose: Real transition to Operational Photon/Photon Mode: IASW sends Start command to the S/A which are powered
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-----------------------------------------------------|----------------|---------------|-----------------|-----------------|--------------------------------------------------|-----------------------------------------|
| 10 | | Change mode TC Go to Operational Photon/Photon mode | E0501 | tc_mode_chg_s | | | | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 4 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | | | | | | E3881 = 2 E3884 = 2 E3887 = 2 E3890 = 2 | |



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- **Procedure n°** **13-E** **EMCY**
 - Purpose: Real transition to Operational TM Emergency Mode: IASW sends Start command to the S/A which are powered
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------|----------------|-----------------|-----------------|-----------------|--------------------------------------------------|-----------------------------------------|
| 10 | | Mode status checking | | | | 240108 | E0049 = 3 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to modify the parameter E7782 | E0102 | tc-c_df-cl-line | E7782 = 2 | | | |
| 30 | | Send OR corresponding TC | E0112 | tc-r_df-cl-line | | 64004 | E2782 = 2 | |
| 30 | | Change mode TC Go to Operational TM Emergency mode | E0506 | tc_mode_chg_e | | CSSW HK | E0049 | |
| 40 | | Mode status checking | | | | 240108 | E0049 = 6 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | | | | | | E3881 = 2 E3884 = 2 E3887 = 2 E3890 = 2 | |



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- **Procedure n° 14 CAL**
 - Purpose: Real Calibration mode transition
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------|----------------|---------------|-----------------|-----------------|--------------------------------------------------|-----------------------------------------|
| 10 | | Change mode TC Go to Calibration mode | E0503 | tc_mode_chg_c | | | | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 5 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | | | | | | E3881 = 2 E3884 = 2 E3887 = 2 E3890 = 4 | |



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- **Procedure n° 15 DIAG**
 - Purpose: Real Diagnostic mode transition
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------|---------------------------------------------------------------|--------------------------------------------|
| 10 | | Change mode TC Go to Diagnostic mode | E0504 | tc_mode_chg_d | | 240108 | E0049 | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 7 E3881 = 2 E3884 = 3 E3887 = 3 E3890 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 30 | | Send Tc on request for diagnostic configuration sended | E0591 E0592 E0593 E0594 E0595 E0596 | tc-r_diag_n1 tc-r_diag_n2 tc-r_diag_n3 tc-r_diag_n4 tc-r_diag_n5 tc-r_diag_n6 | | 64901 64902 64903 64904 64905 64906 | | |



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- **Procedure n° 16 BKCONF**
 - Purpose: Back to Configuration mode from Operational, Calibration and Diagnostic modes.
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------|----------------|---------------|-----------------|-----------------|--------------------------------------------------|-----------------------------------------|
| 10 | | Change mode TC Back to Configuration | E0502 | tc_mode_chg_x | | | | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 3 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | | | | | | E3881 = 1 E3884 = 1 E3887 = 1 E3890 = 1 | |



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- **Procedure n° 17-1 LDCONF-PSD**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (E49=4).
 - Sub-system Level Prerequisites: To have declared PSD ON on TC E500 (Conf ON/OFF, parameter E8903). If it is not clearly specified, send the configuration TC with parameters values taken into file ES1740_PD-DETED_fmconfig_0001.TPF, ES1741_PD-LWTHR_fmconfig_0001.TPF, ES1742_PD-HGTHR_fmconfig_0001.TPF, ES1743_PD-ADOFS_fmconfig_0001.TPF, ES1744_PD-LIBSL_fmconfig_0001.TPF, ES1745_PD-CV-RT_fmconfig_0001.TPF (see 2.3 in this volume).
 - Special Processing:

| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------|-----------------|---------|
| 10 | | Send TC to set up detectors enable Send the corresponding on-request TC | E0300 E0320 | tc-c_pd_det-enb tc-r_pd_det-enb | ES1740_PD- DETED_fmco nfig_0001.TPF | 64843/1 64029 | | |
| 20 | | Send TC to set up low threshold for energy Send the corresponding on-request TC | E0301 E0302 E0321 E0322 | tc-c_pd_lw-thr1 tc-c_pd_lw-thr2 tc-r_pd_lw-thr1 tc-r_pd_lw-thr2 | ES1741_PD- LWTHR_fmco nfig_0001.TPF | 63843/2 63843/3 64030 64031 | | |
| 30 | | Send TC to set up high threshold for energy Send the corresponding on-request TC | E0303 E0304 E0323 E0324 | tc-c_pd_hg-thr1 tc-c_pd_hg-thr2 tc-r_pd_hg-thr1 tc-r_pd_hg-thr2 | ES1742_PD- HGTHR_fmco nfig_0001.TPF | 63843/4 63843/5 64032 64033 | | |
| 40 | | Send TC to set up A/D offsets Send the corresponding on-request TC | E0305 E0325 | tc-c_pd_ad-ofst tc-r_pd_ad-ofst | ES1743_PD- ADOFs_fmco nfig_0001.TPF | 63843/6 64034 | | |
| 50 | | Send TC to set up definition of library selection and ccontrol 1 Send TC to set up definition of library selection and ccontrol 2 Send TC to set up definition of library selection and ccontrol 3 Send the corresponding on-request TCs | E0306 E0307 E0308 E0326 E0327 E0328 | tc-c_pd_lib-sel1 tc-c_pd_lib-sel2 tc-c_pd_lib-sel3 tc-r_pd_lib-sel1 tc-r_pd_lib-sel2 tc-r_pd_lib-sel3 | ES1744_PD- LIBSL_fmconf ig_0001.TPF | 63843/7 63843/8 63843/9 64035 64036 64037 | | |
| 60 | | Send TC to set up definition of curve transmission rates Send the corresponding on-request TC | E0309 E0329 | tc-c_pd_crv-rte tc-r_pd_crv-rte | ES1745_PD- CV- RT_fmconfig_ 0001.TPF | 63843/10 64038 | | |

• **Procedure n° 17-2 LDCONF-AFEE_HV_OFF**

- Purpose: Configuration loading with AFEE HV OFF.
- Constraints:
- Time Criticality:
- System Level Prerequisites: To be in CONF mode (E49=4).
- Sub-system Level Prerequisites: To have declared AFEE ON on TC E500 (Conf ON/OFF, parameter E8900). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files ES1710_AF-CH-OO_def-grnd_0001.TPF, ES1711_AF-LW-DT_fmconfig_0001.TPF, ES1712_AF-CHPAR_fmconfig_0001.TPF, ES1713_AF-HVSET_def-grnd_0001.TPF (see 2.3 in this volume).
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|-----------|---------------------------------------------------------------------------------------|----------------|----------------------------------|----------------------------------------------------------------------------------------------------------|------------------|----------------------------------|---------|
| 10 | Wait 25'' | Send TC to set up chains ON/OFF configuration Send the corresponding on-request TC | E0004 E0014 | tc-c_af_ch_oo tc-r_af_ch-oo | Values to be taken into ES1710_AF-CH-OO_def-grnd_0001.TPF | 63841/4 64003 | Check that TM equal commanded TC | |
| 20 | | Send TC to set up AFEE low threshold Send the corresponding on-request TC | E0002 E0012 | tc-c_af_lwdt tc-r_af_lwdt | Values to be taken into ES1711_AF-LW-DT_fmconfig_0001.TPF except if specified at the procedure entrance. | 63841/2 64001 | | |
| 30 | | Send TC to set up chain parameter Send the corresponding on-request TC | E0003 E0013 | tc-c_af_ch-par tc-r_af_ch-par | Values to be taken into ES1712_AF-CHPAR_fmconfig_0001.TPF except if specified at the procedure entrance. | 63841/3 64002 | | |
| 40 | | Send TC to set up AFEE high voltage Send the corresponding on-request TC | E0001 E0011 | tc-c_af_hv tc-r_af_hv | Values to be taken into ES1713_AF-HVSET_def-grnd_0001.TPF | 63841/1 64000 | | |



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- **Procedure n° 17-3 LDCONF-AFEE_HV_ON**
 - Purpose: Configuration loading with AFEE HV ON.
 - Constraints: GED temperatures (E391 to E394) must be less than 91K in nominal case or less than 117K (commissioning phase or after annealing). Check that cold plate monitoring is enable (E3963=1). Temperature range must be in narrow range (E209=1). Thresholds (E3964 to E3967) must be in accordance with GED temperature (5K over the corresponding cold plate temperature parameter (E391 to E394)). The AFEE HV shall not be switched ON if PA2 temperatures (E0210-E0228) are outside the nominal range.
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (E49=4)
 - Sub-system Level Prerequisites: To have declared AFEE ON on TC E500 (Conf ON/OFF, parameter E8900). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files ES1710_AF-CH-OO_fmconfig_0001.TPF, ES1711_AF-LW-DT_fmconfig_0001.TPF, ES1712_AF-CHPAR_fmconfig_0001.TPF, ES1713_AF-HVSET_fmconfig_0001.TPF (see 2.3 in this volume).
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------|----------------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------|-------------------------------------------------------------------|
| 10 | | Check GED temperatures Send TC to request GED temperatures | E0031 | tc-r_af_cryo | . | | E391 to E394 < 91K | 117K for commissioning or after annealing |
| 20 | | Check IASW current configuration Send TC to request non exposure parameters | E0523 | tc-r_def_exp_iasw | . | | E3963=1 E391 to E394 <E3964 to E3967 ≤ (E391 to E394) +5 | Narrow range (62-128K) Cold plate monitoring Thresholds |
| 25 | | Check PA2 temperatures Send TC to request PA2 temperatures | E0020 E0028 | tc-r_af_pa2-1 tc-r_af_pa2-2 | | 64640 64648 | E0210 to E0228 | If temperatures are outside the nominal range stop the procedure. |
| 30 | | Prepare synoptics and TC in case of anomaly Display the synoptic DC output voltage as defined in OPER CONSTRAINTS 1 Prepare in case of problem, the E505 TC (go to STBY mode) | | | | | | To be sent only in case of problem (see step TBD) |
| 40 | | Wait for the next 60601 packet downlink | | | | 60601 | | To avoid erroneous spike on synoptics (due to old value) |
| 50 | | Send TC to set up AFEE low threshold Send the corresponding on-request TC | E0002 E0012 | tc-c_af_lwdt tc-r_af_lwdt | Values to be taken into ES1711_AF-LW-DT_fmconfig_0001.TPF except if specified at the procedure entrance. | 63841/2 64001 | | |
| 60 | | Send TC to set up chain parameter Send the corresponding on-request TC | E0003 E0013 | tc-c_af_ch-par tc-r_af_ch-par | Values to be taken into ES1712_AF-CHPAR_fmconfig_0001.TPF except if specified at the procedure entrance. | 63841/3 64002 | | |



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| | | | | | | | | |
|-----|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------|-----------------------------------------------------------|------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 70 | Wait 25" | Send TC to set up chains ON/OFF configuration Send the corresponding on-request TC | E0004 E0014 | tc-c_af_ch_oo tc-r_af_ch-oo | Values to be taken into ES1710_AF-CH-OO_fmconfig_0001.TPF | 63841/4 64003 | | |
| 80 | | Send OR TC to obtain DC output voltages values during 5 minutes approximately around every second | E0026 | | | | | Perform step 90 as soon as the first TCs are sent. |
| 90 | | Send TC to set up AFEE high voltage Send the corresponding on-request TC | E0001 E0011 | tc-c_af_hv tc-r_af_hv | Values to be taken into ES1713_AF-HVSET_fmconfig_0002.TPF | 63841/1 64000 | | |
| 100 | | During execution of steps 80 and 90, check on synoptic DC output voltages for each AFEE In case of spikes on the plots during the signal rising, send immediately the prepared TC E505 in order to switch off the AFEE HV (by going in STBY mode) | | | | | | The voltage values should regularly increase from -2.5 V up to TBD (-0.5 V for ground tests) |
| 110 | | When the normal DC output voltages are reached: Send the OR TC to obtain the HV value | E0021 | | | | E250 to E268 are equal to commanded values E5010 to E5028 ± 100V | |



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- **Procedure n° 17-4 LDCONF-DFEE**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (E49=3).
 - Sub-system Level Prerequisites: To have declared DFEE ON on TC E500 (Conf ON/OFF, parameter E8901). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files ES1720_DF-SWPAR_fmconfig_0001.TPF, ES1721_DF-CLPAR_fmconfig_0003.TPF, ES1722_DF-AFADJ_fmconfig_0003.TPF (see 2.3 in this volume).
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|-------------------------------------------|--------------------|--------------------|---------|
| 10 | | Send TC to set up software parameters setting Send the corresponding on-request TC | E0101 E0111 | tc-c_df_sw-par tc-r_df_sw-par | ES1720_DF- SWPAR_fmco nfig_0001.TPF | 63841/7 64004 | | |
| 20 | | Send TC to set up control lines parameters setting Send the corresponding on-request TC | E0102 E0112 | tc-c_df_cl-line tc-r_df_cl-line | ES1721_DF- CLPAR_fmcon fig_0003.TPF | 63841/5 64005 | | |
| 30 | | Send TC to set up AFEE adjustment state machine conf. lines Send the corresponding on-request TC | E0103 E0113 | tc-c_df_af-adj tc-r_df_af-adj | ES1722_DF- AFADJ_fmcon fig_0003.TPF | 63841/6 64006 | | |



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- **Procedure n°** **17-5** **LDCONF-ALL-CONF**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (E49=3).
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------|----------------|--------------|-----------------|-----------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 10 | | Check SPI state | | | | 240108 | E0049 = 3 E3881 = 1 E3884 = 1 E3887 = 1 E3890 = 1 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 If # execute ECP13/ECP14/ECP15/ ECP16 |
| 20 | | Send TC to load all configuration already loaded | E0556 | tc_send_conf | | | | |



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- **Procedure n° 17-6 LDCONF-ALL-PATCH**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (E49=3).
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------|----------------|---------------|-----------------|-----------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 10 | | Check SPI state | | | | 240108 | E0049 = 3 E3881 = 1 E3884 = 1 E3887 = 1 E3890 = 1 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 If # execute ECP13/ECP14/ECP15/ ECP16 |
| 20 | | Send TC to load all patches already loaded | E0557 | tc_send_patch | | | | |



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- **Procedure n°** **17-7** **LDCONF-ACS**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (E49=3).
 - Sub-system Level Prerequisites: To have declared ACS ON on TC E500 (Conf ON/OFF, parameter E8902). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files ES1730_AS-VTPLS_fmconfig_0001.TPF, ES1731_AS-IS-ED_fmconfig_0001.TPF, ES1732_AS-SERVS_fmconfig_0001.TPF, ES1733_AS-VTCNF_fmconfig_0001.TPF, ES1734_AS-RT-MT_fmconfig_0001.TPF, ES1735_AS-VTDLY_fmconfig_0001.TPF, ES1736_AS-EVTGR_fmconfig_0001.TPF, ES1737_AS-ENDSC_fmconfig_0002.TPF, ES1738_AS-HVSET_fmconfig_0001.TPF (see 2.3 in this volume).
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------|-------------------------|----------------------------------------------------------|-----------------------------------|-------------------------|-----------------|---------|
| 10 | | Send TC to set up veto pulse width, overall veto masked | E0222 | tc-c_as_vto_pls | ES1730_AS-VTPLS_fmconfig_0001.TPF | 63842/14 | | |
| | | Wait 40'' Send the corresponding on-request TC | E0272 | tc-r_as_vto-pls | | 64028 | | |
| 20 | | Send TC to set up ISB communication | E0224 | tc-c_as_isb_oo | ES1731_AS-IS-ED_fmconfig_0001.TPF | 63843/14 | | |
| | | Wait 40'' Send the corresponding on-request TC | E0273 | tc-r_as_isb_oo | | 64046 | | |
| 30 | | Send TC to set up system service 1 (watchdog, test conf, HV conf) | E0201 | tc-c_as_serv1 | ES1732_AS-SERVS_fmconfig_0001.TPF | 63841/8 | | |
| | | Send TC to set up system service 2 (watchdog, test conf, HV conf) | E0202 | tc-c_as_serv2 | | 63841/9 | | |
| | | Send TC to set up system service 3 (watchdog, test conf, HV conf) | E0203 | tc-c_as_serv3 | | 63841/10 | | |
| | | Wait 40'' | | | | | | |
| | | Send the corresponding on-request TC | E0251 E0252 E0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 64007 64008 64009 | | |
| 40 | | Send TC to set up Veto signal configuration n°1 | E0204 | tc-c_as_vto-cnf1 | ES1733_AS-VTCNF_fmconfig_0001.TPF | 63841/11 | | |
| | | Send TC to set up Veto signal configuration n°2 | E0205 | tc-c_as_vto-cnf2 | | 63841/12 | | |
| | | Send TC to set up Veto signal configuration n°3 | E0206 | tc-c_as_vto-cnf3 | | 63841/13 | | |
| | | Wait 40'' | | | | | | |
| | | Send the corresponding on-request TCs | E0254 E0255 E0256 | tc-r_as_vto-cnf1 tc-r_as_vto-cnf2 tc-r_as_vto-cnf3 | | 64010 64011 64012 | | |
| 50 | | Send TC to set up rate meter n°1 FEE 0 to 30 | E0207 | tc-c_as_rate-mt1 | ES1734_AS-RT-MT_fmconfig_0001.TPF | 63841/14 | | |
| | | Send TC to set up rate meter n°2 FEE 31 to 61 | E0208 | tc-c_as_rate-mt2 | | 63841/15 | | |
| | | Send TC to set up rate meter n°3 FEE 62 to 91 | E0209 | tc-c_as_rate-mt3 | | 63842/1 | | |
| | | Wait 40'' | | | | | | |
| | | Send the corresponding on-request TCs | E0257 E0258 E0259 | tc-r_as_rate-mt1 tc-r_as_rate-mt2 tc-r_as_rate-mt3 | | 64013 64014 64015 | | |
| 60 | | Send TC to set up Veto signal delay n°1 FEE 0 to 30 | E0210 | tc-c_as_vto-dly1 | ES1735_AS-VTDLY_fmconfig_0001.TPF | 63842/2 | | |
| | | Send TC to set up Veto signal delay meter n°2 FEE 31 to 61 | E0211 | tc-c_as_vto-dly2 | | 63842/3 | | |
| | | Send TC to set up Veto signal delay meter n°3 FEE 62 to 91 | E0212 | tc-c_as_vto-dly3 | | 63842/4 | | |
| | | Wait 40'' | | | | | | |
| | | Send the corresponding on-request TCs | E0260 E0261 E0262 | tc-r_as_vto-dly1 tc-r_as_vto-dly2 tc-r_as_vto-dly3 | | 64016 64017 64018 | | |



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| | | | | | | | |
|----|------------------------------------------------------------|-------------------------|----------------------------------------------------------|-----------------------------------|-------------------------|--|--|
| 70 | Send TC to set up event trigger threshold for FEE 0 to 30 | E0213 | tc-c_as_evt-trg1 | ES1736_AS-EVTGR_fmconfig_0001.TPF | 63842/5 | | |
| | Send TC to set up event trigger threshold for FEE 31 to 61 | E0214 | tc-c_as_evt-trg2 | | 63842/6 | | |
| | Send TC to set up event trigger threshold for FEE 62 to 91 | E0215 | tc-c_as_evt-trg3 | | 63842/7 | | |
| | Wait 40'' Send the corresponding on-request TC | E0263 E0264 E0265 | tc-r_as_evt-trg1 tc-r_as_evt-trg2 tc-r_as_evt-trg3 | | 64019 64020 64021 | | |
| 80 | Send TC to set up Energy discriminator for FEE 0 to 30 | E0216 | tc-c_as_nrg-dsc1 | ES1737_AS-ENDSC_fmconfig_0002.TPF | 63842/8 | | |
| | Send TC to set up Energy discriminator for FEE 31 to 61 | E0217 | tc-c_as_nrg-dsc2 | | 63842/9 | | |
| | Send TC to set up Energy discriminator for FEE 62 to 91 | E0218 | tc-c_as_nrg-dsc3 | | 63842/10 | | |
| | Wait 40'' Send the corresponding on-request TCs | E0266 E0267 E0268 | tc-r_as_nrg-dsc1 tc-r_as_nrg-dsc2 tc-r_as_nrg-dsc3 | | 64022 64023 64024 | | |
| 90 | Send TC to set up high voltage for FEE 0 to 30 | E0219 | tc-c_as_hv1 | ES1738_AS-HVSET_fmconfig_0001.TPF | 63842/11 | | |
| | Send TC to set up high voltage for FEE 31 to 61 | E0220 | tc-c_as_hv2 | | 63842/12 | | |
| | Send TC to set up high voltage for FEE 62 to 91 | E0221 | tc-c_as_hv3 | | 63842/13 | | |
| | Wait 40'' Send the corresponding on-request TC | E0269 E0270 E0271 | tc-r_as_hv1 tc-r_as_hv2 tc-r_as_hv3 | | 64025 64026 64027 | | |



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- **Procedure n° 17-8 LDCONF-IASW**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in STAND-BY or in CONF mode (E49= 2/3).
 - Sub-system Level Prerequisites: send the configuration TC with parameters values taken into TPF file ES1700_IASW-PAR_fmconfig_0002.TPF (see chapter 2.3 in this volume)
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|----------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------|-------------------------------------------|----------------------|-----------------|------------------------------------------|
| 10 | | Send TC to set up non exposure parameters Configuration Send TC to set up exposure parameters configuration (if needed) | E0518 E0519 | tc_def_cnf-iasw tc_def_exp-iasw | ES1700_IASW - PAR_fmconfig_0002.TPF | 63843/11 63843/12 | | E8963 = 1 (cold plate monitoring enable) |
| 20 | | Send the corresponding on-request TCs | E0523 E0524 | tc-r_def_cnf-iasw tc-r_def_exp-iasw | | 64039 64040 | | |



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- **Procedure n° 18 ANISTB**
 - Purpose: Back to Stand-by mode from Annealing mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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• Procedure n° 19 STBOG

- Purpose: Stand-by mode to Outgassing mode and outgassing process.
- Constraints: . The Camera high voltages are OFF (E190 – E208). This procedure shall be used after procedure P4.
- Time Criticality: Detectors must be maintained at $37^{\circ}\text{C} \pm 4^{\circ}\text{C}$ during 251 hours and at $80^{\circ}\text{C} \pm 2^{\circ}\text{C}$ during 24 hours.
- System Level Prerequisites: AFEE I/F TM/TC initialised annealing threshold temperature set up
- Sub-system Level Prerequisites: The IASW cold plate temperature monitoring is disable.
- Special Processing: The RTU cold plate thermal sensors T5107 and T5114 are calibrated at 37°C during 2 hours by comparison with the AFEE cold plate thermal sensors E391, E392, E393. This calibration is required in order to reduce the bias error of sensors used by the SW satellite control loop and allows a temperature monitoring of the cold plate with an accuracy of $\pm 2^{\circ}\text{C}$. The monitoring threshold shall be set at 111°C (real temperature) in CDMU.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------------|-------------------------------------------------------------------------------------------|----------------|-------------------|-----------------------------------------------|-----------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 10 | | Send TC Mode change from Stand-by mode to Configuration | E0502 | tc_mode_chg_x | | | | |
| 20 | | Mode status checking | | | | 240108 | E0049 = 3 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 21 | | Check AFEE IF TM/TC | | | | 240108 | E3881 = 1 | |
| 23 | | Check that the IASW cold monitoring is disable | | | | | E8963 = 0 | |
| 25 | | Check HV ON/OFF parameters Setting are "OFF" in TC E0004 | | | E5190 to E5208 = 0 | | | If ≠ 0, set E5190 to E5208 to 0 |
| 30 | T ₀ | Send TC Chains ON/OFF configuration | E0004 | tc-c_af_ch-oo | ES1710_AF- CH- OO_outgasng_ 0001.TPF | | | LVPS ON Detectors HV OFF Range 62 K - 410 K Outgassing range regulation |
| 40 | T ₀ + 25" | Send TC Chains ON/OFF configuration request | E0014 | tc-r_af_ch-oo | | 64000 | E0003 E0004 | If # E5003 If # E5004 execute GR1 |
| 50 | | Send TC to switch OFF Anti-freeze heaters 2 Main | T5025 | TSW_ANTFRZ2-A_OFF | 0 | | T8505 = 0 | If # execute GR2 |
| 60 | | Send TC to switch OFF Anti-freeze heaters 1 Main | T5020 | TSW_ANTFRZ1-A_OFF | 0 | | T8504 = 0 | |
| 65 | | Send TC Annealing Heater 1 (M) ON | T5016 | TSW_ANNEAL-A_ON | 1 | | T8503 = 1 | |
| 70 | | Send TC Annealing Heater 2 (R) ON | T5116 | TSW_ANNEAL-B_ON | 1 | | T8603 = 1 | |
| 80 | | Send TC Heat pipes thaw heater M ON | T5011 | TSW_HEATPIP-A_ON | 1 | | T8502 = 1 | |
| 90 | | Send TC Heat pipes thaw heater R ON | T5111 | TSW_HEATPIP-B_ON | 1 | | T8602 = 1 | |
| 100 | | Deleted | | | | | | |
| 105 | | Wait until E0391, E0392, E0393, E0394 are all over 33°C | | | | 60601/9 | E0391 > 33°C E0392 > 33°C E0393 > 33°C E0394 > 33°C | Regulation range archived at 33°C |
| 110 | | Cryogenic temperatures checking and PRTU sensor T5107 and T5114 analysis during 168 hours | | | | 60601/9 | E0391 = 37°C ± 4 E0392 = 37°C ± 4 E0393 = 37°C ± 4 E0394 = 37°C ± 4 | When temperature reached => wait 168 hrs |
| 120 | | Temperatures via PRTU correlation with E0391, E0392 and E0393 | | | | | T5107, T5114 | In flight calibration of T5107 and T5114 by comparison of the mean values with E0391, E0392 and E0393 |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|-------------------------------------------------------------------------------------------------|----------------|------------------|---------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 125 | | Update the threshold of the S/C cold plate temperature control loop at 111°C (real temperature) | | | | | T5107, T5114 | Used the in flight calibration of T5107 and to limit the maximum cold plate temperature. |
| 130 | | Cryogenic temperatures and PRTU sensor T5107 and T5114 checking during 83 hours | | | | 60601/9 | E0391 = 37°C ± 4 E0392 = 37°C ± 4 E0393 = 37°C ± 4 E0394 = 37°C ± 4 T5107 = 37°C ± 5 T5114 = 37°C ± 5 | Wait 83 hrs |
| 140 | | Check HV ON/OFF parameters Setting are "OFF" in TC E0004 | | | E5190 to E5208 = 0 | | | If ≠ 0, set E5190 to E5208 to 0 |
| 150 | Tn | Send TC Chains ON/OFF configuration | E0004 | tc-c_af_ch-oo | ES1710_AF- CH- OO_anneal_00 01.TPF | | | Wide range 62 K – 410 K Detectors HV OFF Annealing temperature regulation |
| 160 | Tn+25s | Send TC Chains ON/OFF configuration request | E0014 | tc-r_af_ch-oo | | 64000 | E0003 E0004 | If # execute GR2 |
| 170 | | When E394 is ≥ 78 °C note the time T0 of the beginning of the hot temperature phase | | | 1 | | E0394 ≤ ? | E0391, E0392 and E0393 shall be ≥ 78 °C Note the time |
| 175 | | Send TC to switch OFF Annealing 1 (M) heater | T5015 | TSW_ANNEAL-A_OFF | | | T8503 = 0 | If # execute GR2 |
| 180 | | Wait until E0394 is ≥ 82 °C | | | 1 | | E0394 ≤ ? | Control by ground Around 50 mn after the previous step |
| 190 | | Send TC to switch OFF Annealing 2 (R) heater | T5115 | TSW_ANNEAL-B_OFF | | | T8603 = 0 | If # execute GR2 |
| 200 | | Wait until E0394 is ≤ 78 °C | | | 1 | | E0394 ≥ ? | Control by ground Around 50 mn after the previous step |
| 210 | | Send TC to switch ON Annealing 2 (R) heater | T5116 | TSW_ANNEAL-B_ON | | | T8603 = 1 | If # execute GR2 |
| 220 | | Return to the step 180 until the hot temperature phase duration= 24 h (T=T ₀ + 24 h) | | | 1 | | E0391 or E0392 or E0393 or E0394 ≤ 78 °C | Note the time |

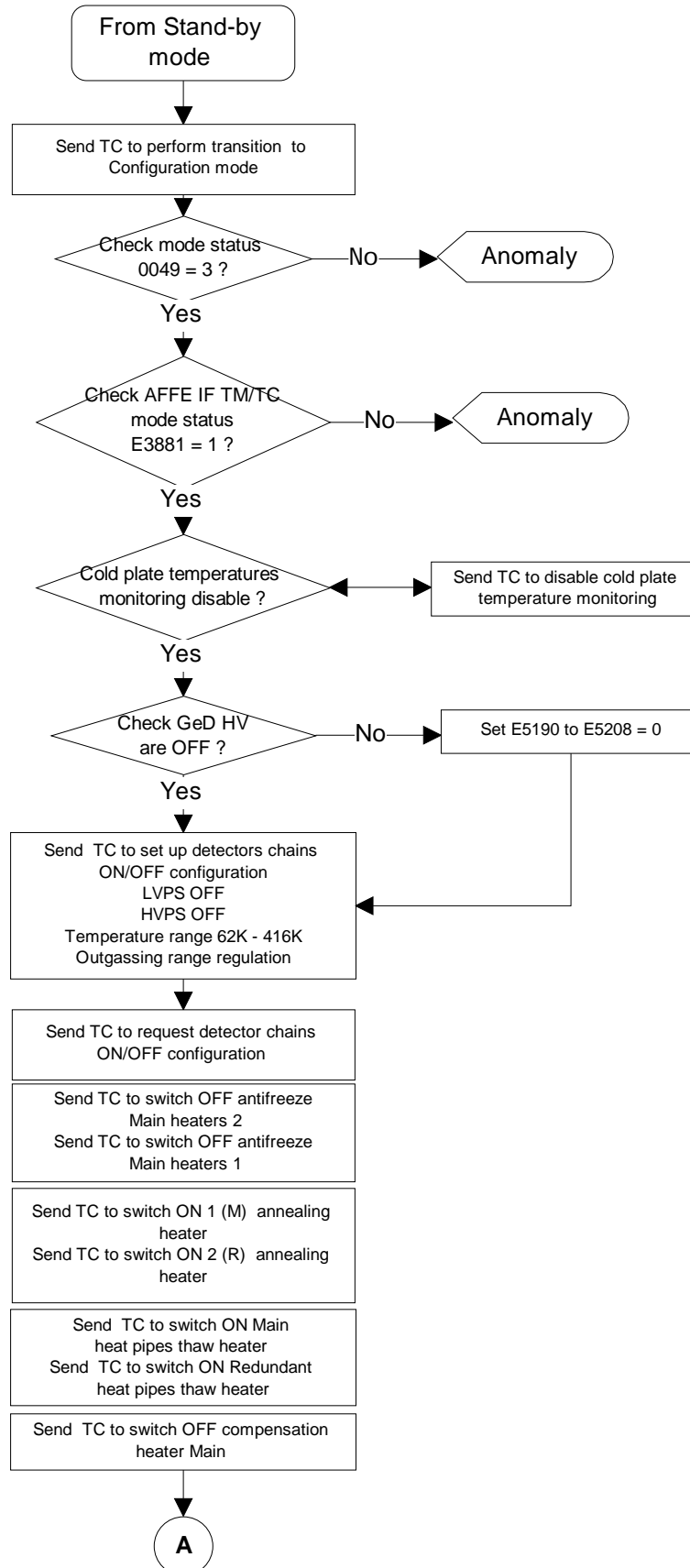


Figure 2.9 - ØProcedure n° 19 - STBOG

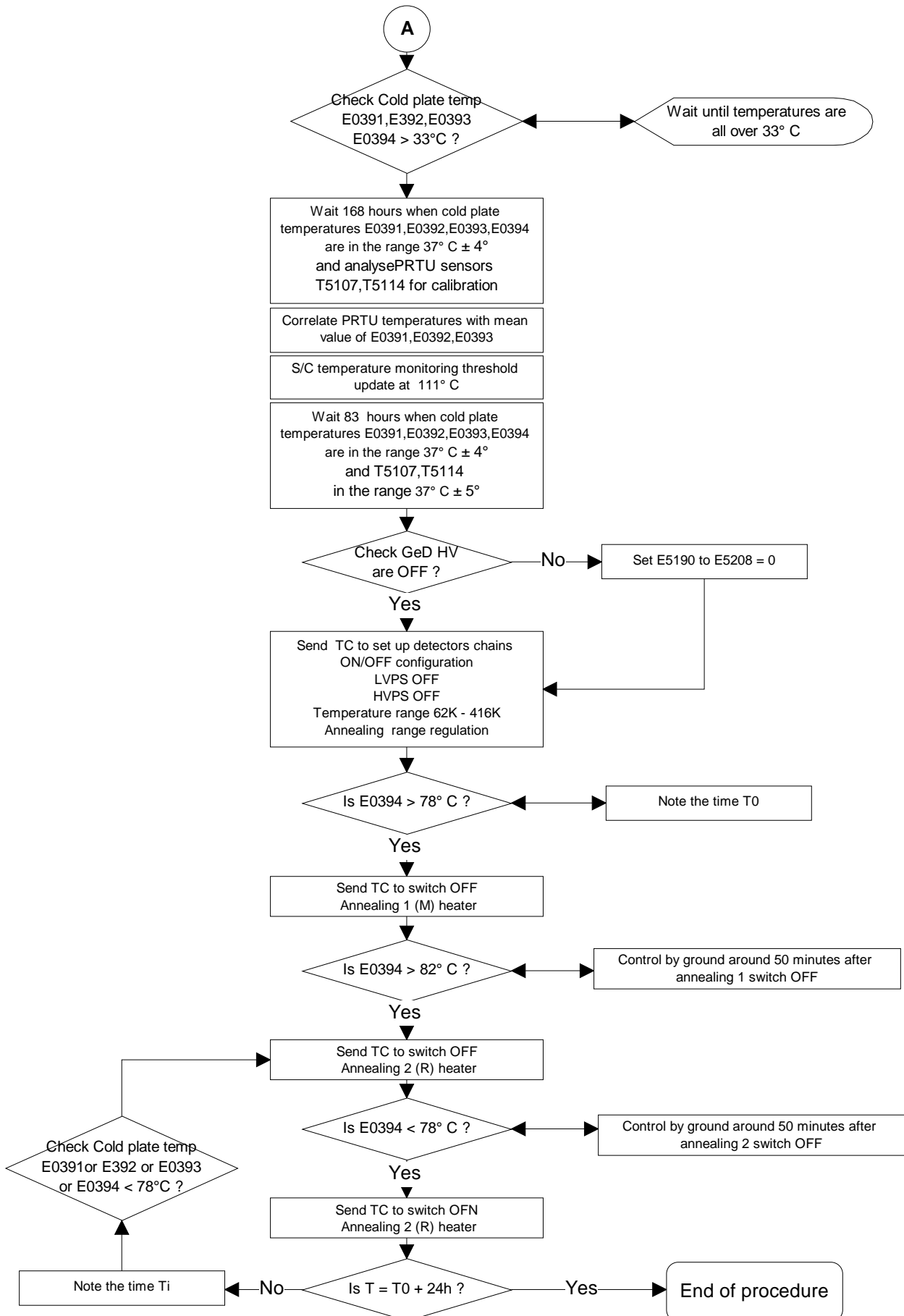


Figure 2.9 - ØProcedure n° 19 - STBOG (cont'd)



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- **Procedure n° 20 OGSTBY**
 - Purpose: Back to Stand-by mode from Outgassing mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------|----------------|-------------------|-----------------|-----------------|-----------------|-----------------------------------------|
| 10 | | Send TC Heat pipes thaw heater M OFF | T5010 | TSW_HEATPIP-A_OFF | 0 | | T8502 = 0 | |
| 20 | | Send TC Heat pipes thaw heater R OFF | T5110 | TSW_HEATPIP-B_OFF | 0 | | T8602 = 0 | |
| 30 | | Send TC Annealing Heater 2 (R)OFF | T5115 | TSW_ANNEAL-B_OFF | 0 | | T8603 = 0 | |
| 40 | | Send TC to switch ON Anti-freeze heaters 1 Main | T5021 | TSW_ANTFRZ1-A_ON | 1 | | T8504 = 1 | If # execute GR2 |
| 50 | | Send TC to switch ON Anti-freeze heaters 2 Main | T5026 | TSW_ANTFRZ2-A_ON | 1 | | T8505 = 1 | |
| 55 | | Send TC to switch ON compensation heater M | P4459 | TSW_ACC_HTR_A_ON | 1 | | P2222 = 1 | |
| 60 | | Change mode TC Back to Stand-by mode | E0505 | tc_mode_chg_y | | | | |
| 70 | | Mode status checking | | | | 240108 | E0049 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |



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- **Procedure n° 21 EXPOSU**
 - Purpose: Exposure parameters updating
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------|-------------------|-----------------|--------------------|--------------------|--------------------|---------------------------|
| 10 | | Exposure parameters configuration | E0519 | tc_def_exp-iasw | E8976=1620 | 63843/12 | E3976=1620 | 1620 is the default value |
| 20 | | Request for exposure configuration | E0524 | tc-r_exp_iasw | | 64040 | E3976=1620 | |



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- **Procedure n°** **22-D** **Dump_IASW**
 - Purpose: IASW memory Dump Needs. Capture a IASW memory image using OBSM
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: DPE running. IASW must be in Stand-by or Configuration mode.
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|----------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|---------------------|-----------------|-----------------|---------|
| 10 | | Check the DPE1 state | | | | | D6503 = Running | |
| 20 | | Check SPI mode | | | | 240108 | E0049 = 2/3 ? | |
| 30 | | On OBSMS Process the image in monitoring/update mode Configure update : make sure that packet 69110 is selected. Start update | | | | | | |
| 40 | | On manual stack: Edit and uplink one or more instances of the CSSW TC (6,2) to dump the required memory areas | | | | | | |
| 50 | | Send TC to dump memory areas | EU9050 | | EU9002 = E9005 = | | | |
| 60 | | Verify that TM (6,2) report packet are received: | | | | 69110 | | |
| 70 | | Verify that the memory is being captured by OBSMS | | | | | | |
| 80 | | On OBSMS: Stop Update when the dump is over Save the image | | | | | | |

- **Procedure n°** **22-L** **Load_IASW**
 - Purpose: IASW memory load new version.
 - Constraints: The PST must contain at least 2 patch & dump slots per second in case DPE fast Memory Device is used. BCP distribution to SPI must be disabled.
 - Time Criticality:
 - System Level Prerequisites: DPE running. IASW must be in Stand-by mode.
 - Sub-system Level Prerequisites: The patch & dump command stack files must be present in the IMCS Manual stack directory. The new memory image must be present in the IMCS OBSMS.
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|----------------------------------------------------------------------------------------------------------------|----------------|---------|-----------------|-----------------|--------------------------------------------------|--------------------------------------------------------------------------------|
| 10 | | Check BCP distribution is disabled | | | | | D5222 = 0 | |
| 20 | | Check SPI state | | | | 240108 | E0049 = 1 E3884 = 0 E3887 = 0 E3890 = 0 | Stand-by 1 Stand-by Stand-by Stand-by |
| 30 | | Check DPE state If not already in WAIT state send TC to perform the transition from RUNNING to WAIT state. | D7203 | | | | D6501 = 1 D6503 = 0 D6500 = 0 | WAIT Not RUNNING Not RESET |
| 40 | | From Manual Stack directory load the required files | | | | | | |
| 50 | | Enable Command Interlock and Command WAIT mode | | | | | | |
| 60 | | Uplink all commands in automatic Check the successful uplink on command history | | | | | | |
| 70 | | Compare the files: Uplink all dump commands in automatic Verify that TM (6,2) report packet are received | | | | 209000 | | |
| 80 | | Check the differences | | | | | | |
| 90 | | Restart DPE CSSW: Open the DPE power supply by sending TC DPE RELAY0 OFF | E9801 | | | | E9801 = OFF | OEM n° 81 |
| 100 | | Close Relay 0 causing DPE empty boot and power saving exit by sending TC DPE RELAY0 ON | E9800 | | | | E9801 = ON | Wait for DPE power-up initialisation completion marked by the OEM : DPE reset. |
| 110 | | Check DPE is in RUNNING state and no error is reported | | | | | D6503 = 1 D6508 = 0 | Running No anomaly |
| 120 | | Send TC (13,1) to test if CSSW is working | E9043 | | | | E9043 = 1 | |
| 130 | | Send TC to synchronize OBT | D3702 | | | | | |
| 140 | | SPI verification time | D3712 | | | | EU9011 = 1 | |
| 150 | | Send TC to start IASW | E9024 | | | 240108 | E0049 = 1 E0069 = 0 E0029 = New version | |



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- **Procedure n°** **23_AS** **OBSMAS**
 - Purpose: ACS sub-assemblies memory Load and Dump Needs
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|-----------|-----------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------|------------------------------------|-------------------------|---------------------------------------------------------------|---------------------------------------------------------------------|
| 30 | | Mode status checking | | | | | E0049 = 3 | If # => use the required procedure to change to configuration mode |
| 40 | | FEE HV status checking If (E5500 to E5592 = 0) perform step 70 | E0251 E0252 E0253 | | | 64007 64008 64009 | P2014 | I = 1.33 A ± 0.07 |
| 50 | | Send TC to switch OFF HV | E0201 E0202 E0203 | tc-c_as_serv1 tc-c_as_serv2 tc-c_as_serv3 | ES1732_AS-SERVS_def-grnd_0001.TPF | 63841/8-10 | | E5500-E5592 = 0 |
| 60 | Wait 40'' | Send TC to request HV status acquisition | E0251 E0252 E0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | | | |
| 70 | | Send TC start maintenance ACS | E0563 | tc_start-mtnc_as | | 240108 | E4339 = 1 E4359 = 3 | If # execute GR1 Cyclic HK from the concerned S/A is stopped |
| 80 | | Send TC to dump reference area | E0514 | tc_dump_as | E8932 E8935 | 64043 | E3908-E3931 | |
| 90 | | Send TC to record or load patch | E0509 E0510 | tc_record_pach-as tc_load_pach-as | E8904 E8907 E8908-E8931 | | | |
| 100 | | Send TC to dump the loaded area | E0514 | tc_dump-as | E8932 E8935 | 64043 | E3908-E3931 | 90 and 100 sequence must be performed as many time as needed |
| 110 | | Send TC to stop maintenance If FEE HV was off at procedure entry, exit the procedure | E0573 | tc_stop-mtnc_as | | 240108 | E4339 = 0 E3881 = 1 E3884 = 1 E3887 = 1 E3890 = 1 | If # execute GR1 Restart cyclic HK acquisition |
| 120 | | Send TC to switch ON HV | E0201 E0202 E0203 | tc-c_as_serv1 tc-c_as_serv2 tc-c_as_serv3 | ES1732_AS-SERVS_fmcon fig_0001.TPF | 63841/8-10 | | E5500-E5592 = 1 |
| 130 | Wait 40'' | Send TC to request HV status acquisition | E0251 E0252 E0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 64007 64008 64009 | | |

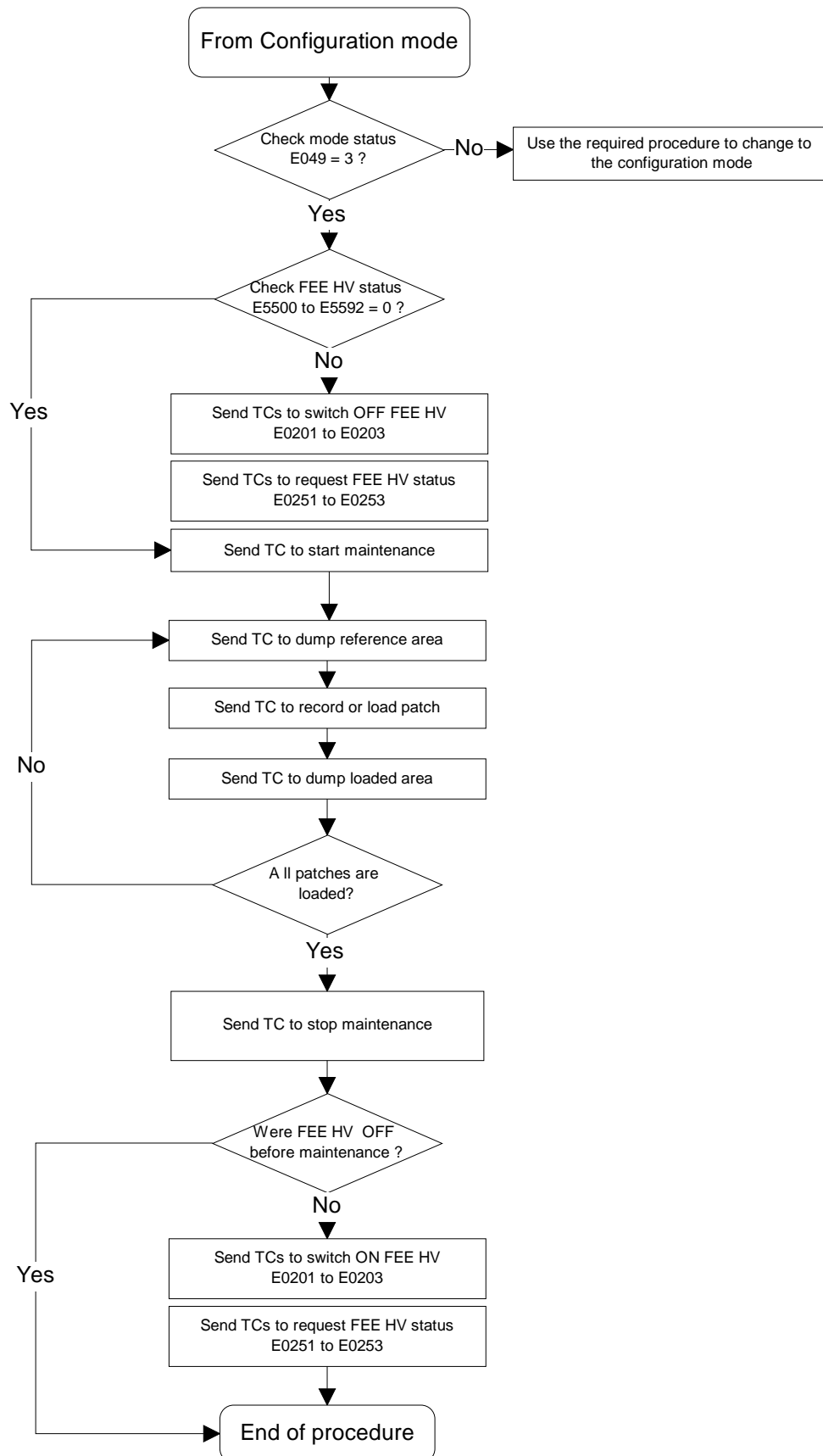


Figure 2.10 - Procedure n° 23-AS OBSMAS



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- **Procedure n°** **23_PD** **OBSMPD**
 - Purpose: PSD sub-assemblies memory Load and Dump Needs
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------|-----------------|--------------------------------------|-------------------------------|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------|
| 10 | | Mode status checking | | | | | E0049 = 3 | If # => use the required procedure to change to configuration mode |
| 20 | | Send TC start maintenance PSD | E0563 | tc_start-mtnc_pd | | 240108 | E4339 = 1 E4359 = 4 | If # execute GR1 Cyclic HK from the concerned S/A is stopped |
| 30 | | Send TC to dump reference area | E0515 | tc_dump_pd | E8932 E8935 | 64044 | E3908-E3931 | |
| 40 | | Send TC to record or load patch | E0511/ E0512 | tc_record_pach-pd tc_load_pach-pd | E8904 E8907 E8908-E8931 | | | |
| 50 | | Send TC to dump the loaded area | E0515 | tc_dump-pd | E8932 E8935 | 64044 | E3908-E3931 | 30 and 40 sequence must be performed as many time as needed |
| 60 | | Send TC to stop maintenance | E0574 | tc_stop-mtnc_pd | | 240108 | E4339 = 0 E3881 = 1 E3884 = 1 E3887 = 1 E3890 = 1 | If # execute GR1 Restart cyclic HK acquisition |



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- **Procedure n°** **23_DF** **OBSMDF**
 - Purpose: DFEE sub-assemblies memory Load and Dump Needs
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------|-----------------|--------------------------------------|-------------------------------|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 30 | | Mode status checking | | | | | E0049 = 3 | If # => use the required procedure to change to configuration mode |
| 40 | | Send TC start maintenance DFEE | E0565 | tc_start-mtnc_df | | 240108 | E4339 = 1 E4359 = 5 | If # execute GR1 Cyclic HK from the concerned S/A is stopped |
| 50 | | Send TC to dump reference area | E0513 | tc_dump_df | E8932 E8935 | 64042 | E3908-E3931 | |
| 60 | | Send TC to record or load patch | E0507/ E0508 | tc_record_pach-df tc_load_pach-df | E8904 E8907 E8908-E8931 | | | |
| 70 | | Send TC to dump the loaded area | E0513 | tc_dump-df | E8932 E8935 | 64042 | E3908-E3931 | 50 and 60 sequence must be performed as many time as needed |
| 80 | | Send TC to stop maintenance | E0575 | tc_stop-mtnc_df | | 240108 | E4339 = 0 E3881 = 1 E3884 = 1 E3887 = 1 E3890 = 1 | If # execute GR1 Restart cyclic HK acquisition Wait 2 seconds before sending an other telecommand |



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- **Procedure n° 24 COOCON**
 - Purpose: Cooling mode to Configuration
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------|-------------------|-------------------|--------------------|--------------------|--------------------|------------------|
| 10 | | Anti-freeze Main n° 2 power OFF | T5025 | TWS_ANTFRZ2-A_OFF | 1 | | T8505 = 0 | If # execute GR2 |



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- **Procedure n° 25 ACSCAL**
 - Purpose: ACS calibration process
 - Constraints: Instrument mode must be in configuration and in all modes when IASW is in Configuration mode (i.e. outgassing, cooling, annealing). Must be scheduled outside the belts.
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: This procedure will be repeated n times (TBD)



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------------------------|--------------------------------------------------------------------------------------------------|----------------|-----------------|-----------------|------------------|------------------------|------------------------------------------------------------------------------|
| 10 | | Check IASW mode | | | | 240108 | E0049 = 3 | If # => procedure exit |
| 20 | | Check calibration status parameter | | | | 240108 | E1399 = 1 | If # check again during next cycle (8s) Then if still # => procedure exit |
| 30 | T _n | Send TC for calibration stating Check calibration status parameter | E0566 | tc_start-cal_as | n/a | 240108 | E1399 = 2 | If # execute GR1 |
| 40 | T _n + 168 s | Check calibration status parameter | | | | 240108 | E1399 = 3 | If # wait next cycle (TBC) or anomaly |
| 50 | | Send TC for calibration dumping Check calibration execution parameter | E0567 | tc-r_cal_as | n/a | 240108 240108 | E1399 = 4 E1396 = 0 | If # execute GR1 |
| | | Send TC for calibration dumping Check TM packet counter Check calibration status parameter | E0567 | tc-r_cal_as | n/a | 64700 | E2033 E1399 = 5 | 183 times Increases by 1 each time End of calibration If # wait |



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• **Procedure n° 26 COOTUN**

- Purpose: Cryocoolers compressors and displacers amplitude tuning. Can be used in case of stroke or temperature adjustment in flight.
- Constraints: CDE must be in normal mode. This procedure shall be called at the end of the cooling mode (P7 – STBCOO)
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Check CDE mode | | | | | F9971=F9991=1 F9972=F9992=0 | If # execute GR1 |
| 20 | | Check relay status | | | | | F9970=F9990=0 | |
| 30 | | Check CDE input current | | | | | P1061 P1063 | 1.6 A < I < 2.3 A |
| 40 | | Reduce pistons strokes to roughly stabilise Ge Detectors Temperatures around 90 K: <u>Gross tuning</u> Send successive TCs to set up step by step CDE 1 compressors and displacers amplitude until 4 x 4.72 mm (eng) i.e 33 bits (raw) target reached: max step 0.429 mm (eng value) i.e. 3 bits (raw value) and min step 0.143 / 1 bit | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = CA* Bit8 = 1 Bit9 = 1 E9961 = CA* | | | Gross Tuning to get: E0391 = 90 K ± 1 K E0392 = 90 K ± 1 K E0393 = 90 K ± 1 K E0394 = 90 K ± 1 K |
| 50 | | Send successive TCs to set up step by step CDE 2 compressors and displacers amplitude until 4 x 4.72 mm (eng) i.e 33 bits (raw) target reached: max step 0.429 mm (eng value) i.e. 3 bits (raw value) and min step 0.143 / 1 bit. | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = CA* Bit8 = 1 Bit9 = 1 E9981 = CA* | | | At end of step 50, Wait 5 hours to observe Detectors temperature drift And resulting requested stroke adjustment for fine tuning operations |
| 60 | | Wait 5 hours to stabilise cryogenic chain and anticipate fine tuning operations with regards to cold plate temperatures drift | | | | | | |
| 80 | | Reduce pistons strokes to stabilise Ge Detectors Temperatures around 90 K: <u>Fine tuning</u> Send one TC to set up CDE 1 compressors and displacers amplitude Step is ± 0.143 mm (eng value) / ± 1 bit (raw) | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = CA* Bit8 = 1 Bit9 = 1 E9961 = CA* | | | Fine Tuning to stabilise (< 0.2 K/day) Detectors in the range: E0391 = 90 K ± 1 K E0392 = 90 K ± 1 K E0393 = 90 K ± 1 K |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Note: Wait 3 hours before each stroke change | | | | | | E0394 = 90 K ± 1 K |
| 90 | | Send One TC to set up CDE 2 compressors and displacers amplitude Step is ± 0.143 mm (eng value) / ± 1 bit (raw) Note: Wait 3 hours before each stroke change | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = CA* Bit8 = 1 Bit9 = 1 E9981 = CA* | | | Fine Tuning to stabilise (< 0.2 K/day) Detectors in the range: E0391 = 90 K ± 1 K E0392 = 90 K ± 1 K E0393 = 90 K ± 1 K E0394 = 90 K ± 1 K |
| 100 | | Check cold plate temperatures Goto step 80 if necessary (repeat fine tuning if detectors do not respect 90 K ± 1 K) | | | | 60602/9 | E0391 = 90 K ± 1 K E0392 = 90 K ± 1 K E0393 = 90 K ± 1 K E0394 = 90 K ± 1 K | |

CA* Current Amplitude

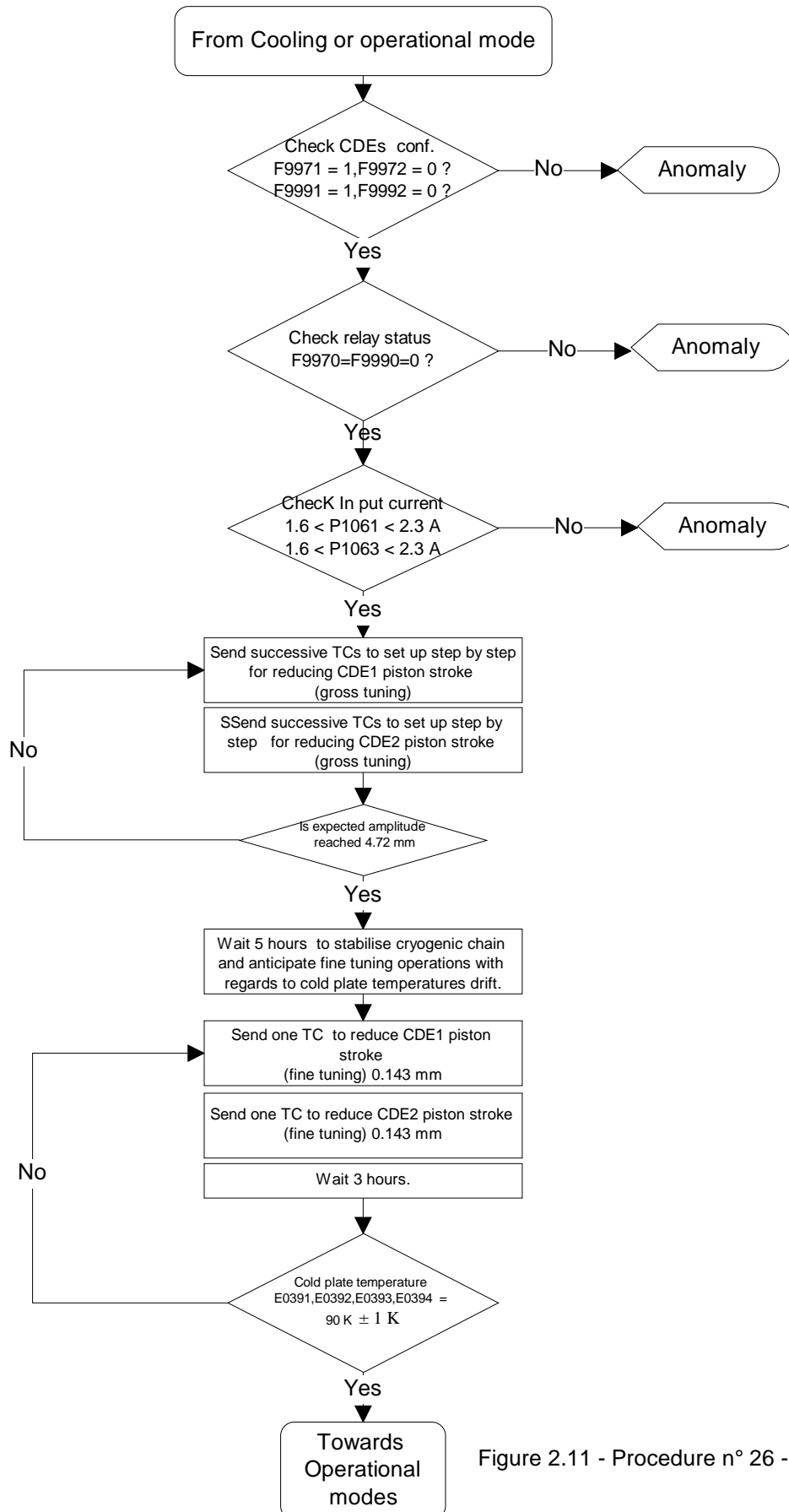


Figure 2.11 - Procedure n° 26 - COOTUN

- **Procedure n° 27 OGCONF**
 - Purpose: go to Configuration mode from Outgassing mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------|----------------|-------------------|-----------------|-----------------|-----------------|------------------|
| 10 | | Send TC Heat pipes thaw heater M OFF | T5010 | TSW_HEATPIP-A_OFF | 0 | | T8502 = 0 | If # execute GR2 |
| 20 | | Send TC Heat pipes thaw heater R OFF | T5110 | TSW_HEATPIP-B_OFF | 0 | | T8602 = 0 | |
| 30 | | Send TC Annealing Heater 2 (R) OFF | T5115 | TSW_ANNEAL-B_OFF | 0 | | T8603 = 0 | |
| 40 | | Send TC to switch ON Anti-freeze heaters 1 Main | T5021 | TSW_ANTFRZ1-A_ON | 1 | | T8504 = 1 | |



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• Procedure n° 28 CONCOO

- Purpose: Configuration mode to Cooling mode and cooling process. The cooling occurs at the first just after the outgassing mode. Otherwise it could be occurred either after an annealing mode or a restart of the spectrometer following a contingency case.
- Constraints: Compressors temperatures must be less than 40°C and the thermal control of the cryocooler shall be enable to allow switching on the compressors (T5006, T5007, T5024, T5025 between - 22°C and 38°C; E0397 and E0398 < 35° C).
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites: Stand-by mode
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|-----------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 10 | | Check that cold plate monitoring is disable | E0523 | | | | E3963 = 0 | |
| 20 | | Send TC to switch ON Anti-freeze 2 M | T5026 | TSW_ANTFRZ2-A_ON | | | T8505 = 1 | TSW status |
| 30 | | Check detectors chains HV are OFF before sending E0004 TC | | | E5190-E5208=? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 40 | Tn | Send TC Cold plate and Thermal braids temperature range setting | E0004 | tc-c_af_ch-oo | ES1710_AF-CH-OO_outgass_0001.TPF | 63841/4 | E0209 = 0 | ES1710_AF-CH-OO_def-grnd_0001.TPF with E209=0 (large range) |
| 50 | Tn+25" | Send TC Temperature range request | E0014 | tc-r_af_ch-oo | | 64003 | E0209 = 0 | |
| 60 | | Check compressors temperatures CDE 1 | | | | | a<T5006<b a<T5024<b | a = -22 ° C ; b =+ 38 ° C |
| 70 | | Check compressors temperatures CDE 2 | | | | | a<T5007<b a<T5025<b | a = -22 ° C ; b =+ 38 ° C if temp T5006, T5007 T5024, T5025 ok => continue |
| 80 | | Check Thermal braids temperatures | | | | | E0397<35°C E0398<35°C | If nok => anomaly Don't active CDEs |
| 90 | | Check cold plate temperature | | | | | E0391 ≥ 89 K E0392 ≥ 89 K E0393 ≥ 89 K E0394 ≥ 89 K | |
| 100 | | Send TC to switch OFF CDE heater M | T5575 | TWS_CDE_HTRA_OFF | 0 | | T8015 = 0 | |
| 110 | | Check CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp |
| 120 | | Send TC to set up CDE 1 as master | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | F9971=F9972 = 0 | |
| 130 | | Send TC to set up CDE 2 as slave | E9983 | CDE1_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | F9991=F9992 = 0 | |
| 140 | | Send TC to set up CDE 1 Master in nominal mode | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 1 Bit9 = 1 E9961 = 0 | | F9960 < 50 190 < F9964 < 210 F9961 < 50 200 < F9965 < 220 | CDE 1 is assumed to be Master Comp/Disp1 drive enable |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 150 | | Send TC to set up CDE 2 Slave in nominal mode | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = 0 Bit8 = 1 Bit9 = 1 E9981 = 0 | | F9980 < 50 180 < F9984 < 200 F9981 < 50 215 < F9985 < 235 | CDE Redundant is assumed to be Slave Comp/Disp1 drive enable |
| 160 | | Check CDE1 configuration | | | | | F9971 = 1 F9972 = 0 | CDE1 nominal mode |
| 170 | | Check CDE2 configuration | | | | | F9991 = 1 F9992 = 0 | CDE2 nominal mode |
| 180 | | Send TC to set up compressors and displacers amplitude CDE 1 step by step until expected amplitude reached (7 mm TBC ie 50 bits TC raw value). (as many time as necessary) | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = TBD Bit8 = 1 Bit9 = 1 E9961 = TBD | | 130 < F9960, F9961 < 180 160 < F9964 < 215 145 < F9965 < 195 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 190 | | Send TC to set up compressors and displacers amplitude CDE 2 engine step by step until expected amplitude reached (7 mm TBC ie 50 bits TC raw value). (as many time as necessary) | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = TBD Bit8 = 1 Bit9 = 1 E9981 = TBD | | 130 < F9980 < 180 105 < F9981 < 155 140 < F9984 < 180 150 < F9985 < 200 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 200 | | Check cold plate temperatures If (E0391 or E0392 or E0393 or E0394 ≤ 125K) | | | | 60602/9 | E0391 or E0392 or E0393 or E0394 ≤ 125 K | If true change the temperature range 62 K to 128 K |
| 210 | Tn | Send TC to change temperature range | E0004 | tc-c_af_ch-oo | ES1710_AF-CH-OO_def-grnd_0001.TPF | 63841/4 | E0209 = 1 | |
| 220 | Tn+25" | Send TC Temperature range request And stay at this step while the temperatures are more than the corresponding thresholds | E0014 | tc-r_af_ch-oo | | 64003 60602/9 | E0209 = 1 E0391 < E3964 E0392 < E3965 E0393 < E3966 E0394 < E3967 | If T5006 or T5024 > 38 °C reduce the stroke step 180, If T5007 or T5025 > 38 °C reduce the stroke step 190, |

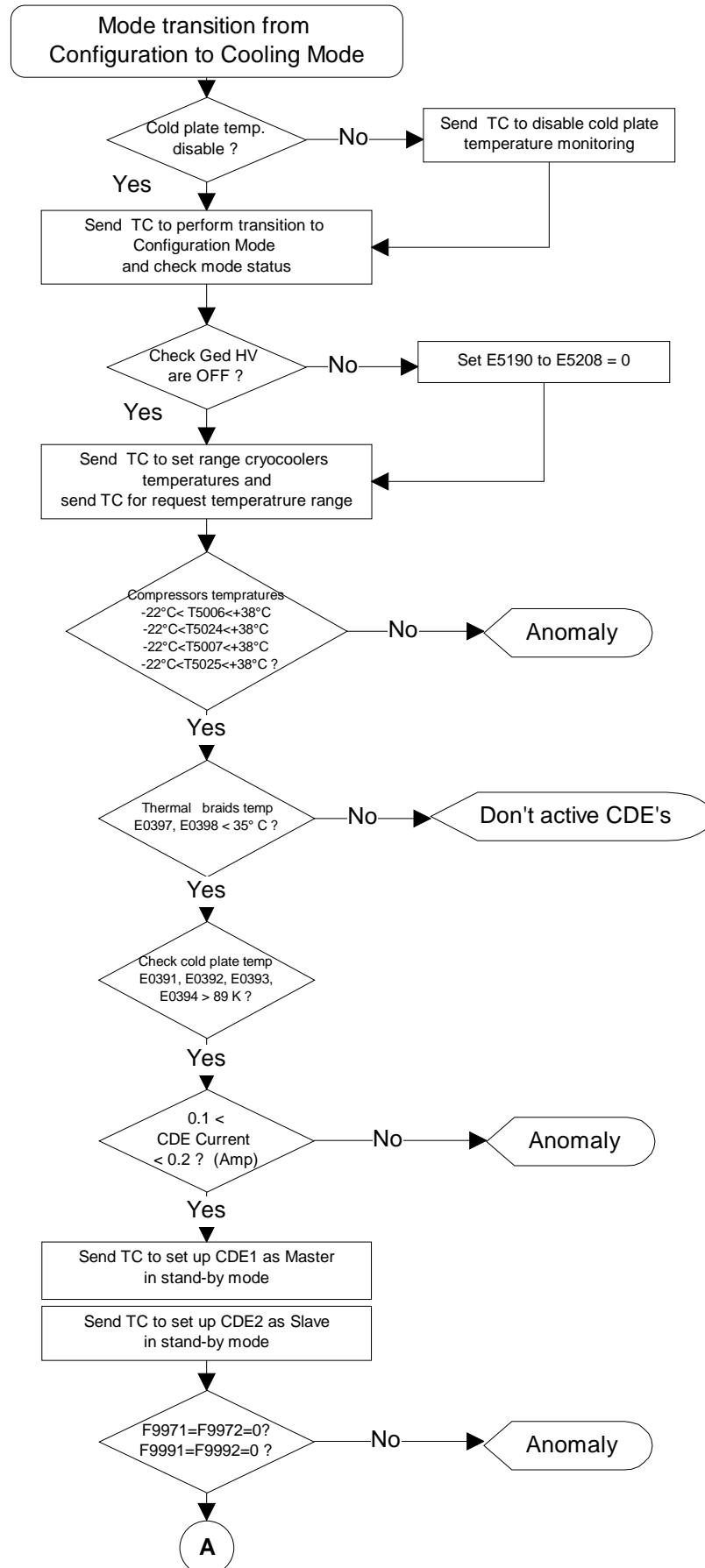


Figure 2.12 - Procedure n° 28 - CONCOO

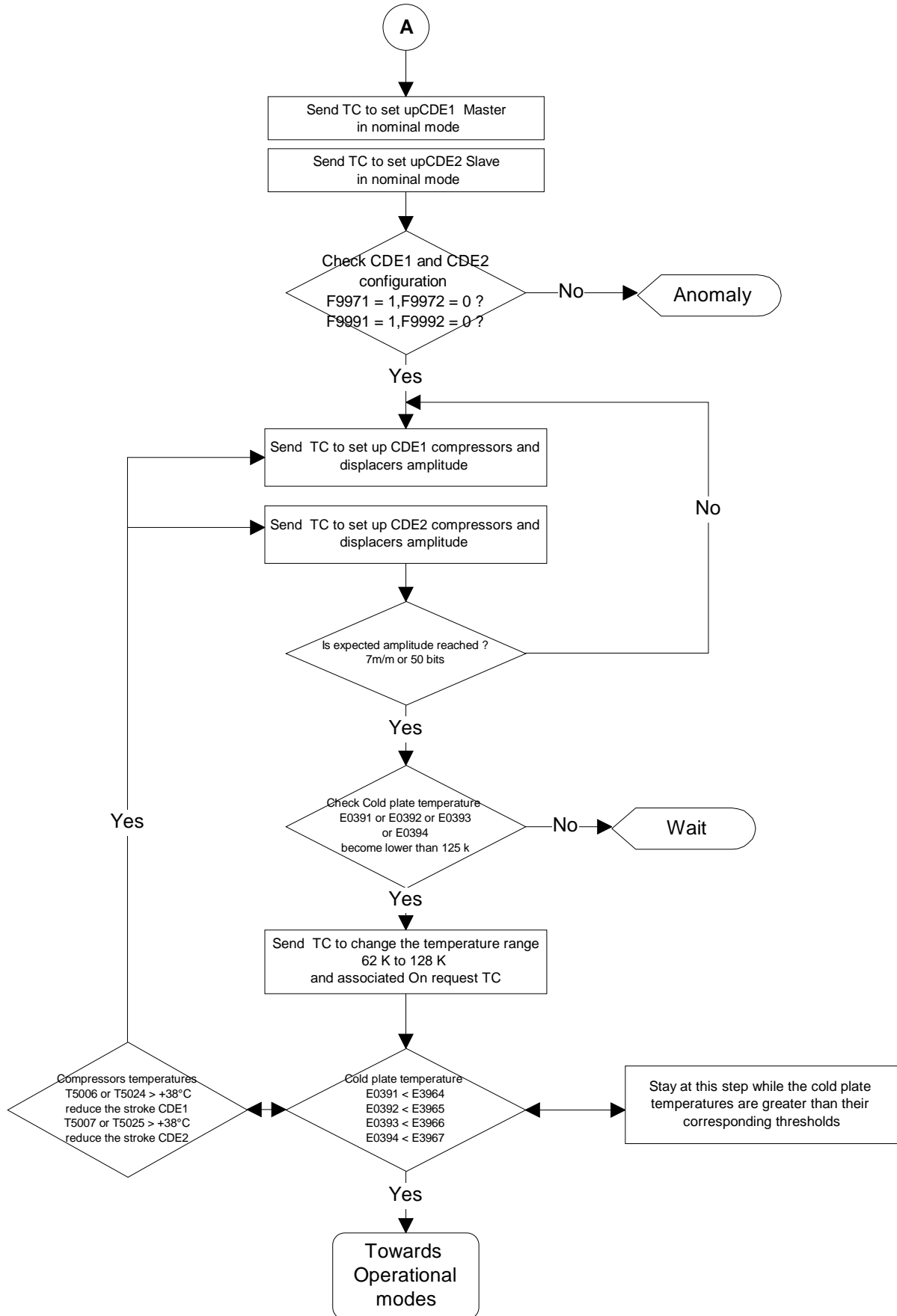


Figure 2.12 - Procedure n° 28 - CONCOO (cont'd)



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- **Procedure n° 30-B RECINB**
 - Purpose: Automatic reconfiguration inhibition during radiation belts passage
 - Constraints: Under radiation belts
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|----------------|------------------|-----------------------------------------------------------------------------------|-----------------|---------------------------------------------------------|-------------------------------------------------------------------|
| 10 | | Mode status checking | | | | 240108 | E0049 = 3 E0069 = 2 E0129 = 1 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 Radiation belts |
| 20 | | Send TC to set up non exposure parameters | E0518 | tc_def_conf_iasw | ES1700_IASW - PAR_fmconfig _0002.TPF except E8944 = 0 E8946 = 0 | 240108 | E3944 = 0 E3946 = 0 E0069 = 0 E0129 = 0 OEM | If # execute GR2 Flare end |



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- **Procedure n°** **30-E** **RECINB**
 - Purpose: Automatic reconfiguration inhibition during radiation belts passage and after eclipse exit
 - Constraints: Under radiation belts
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|----------------|------------------|------------------------|-----------------|---------------------------------------------------------|--------------------------------------------|
| 10 | | Mode status checking | | | | 240108 | E0049 = 2 E0069 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | | | | | | E0129 = 1 | Radiation belts |
| 30 | | Send TC to set up non exposure parameters | E0518 | tc_def_conf_iasw | E8944 = 0 E8946 = 0 | 240108 | E3944 = 0 E3946 = 0 E0069 = 0 E0129 = 0 OEM | If # execute GR2 Flare end |



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- **Procedure n° 31 RECACT**
 - Purpose: Automatic reconfiguration reactivation after radiation belts passage
 - Constraints: Should be activated after radiation belts exit
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|-----------|-------------------------------------------|-------------------------|-------------------------------------------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------------------------------------------------|
| 10 | | Mode status checking | | | | 240108 | E0049 = 3 E0069 = 0 E0129 = 0 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 Commanded Radiation belts |
| 20 | | Send TC to set up non exposure parameters | E0518 | tc_def_conf_iasw | ES1700_IASW - PAR_fmconfig_0002.TPF | 240108 | E3944 = 1 E3946 = 1 E0069 = 0 | If # execute GR2 |
| 30 | | Send TC to load all patches | E0557 | tc_send_patch | | | | |
| 40 | | Send TC to load all conf | E0556 | tc_send_conf | | | | |
| 45 | | Send TC on request for HV configuration | E0251 E0252 E0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 64007 64008 64009 | | If HV are set at operational values go to step 70 |
| 50 | | Send TC to set up ACS HV | E0219 E0220 E0221 | tc-c_as_hv1 tc-c_as_hv2 tc-c_as_hv3 | ES1738_AS-HVSET_fmconfig_0001.TPF | | | E6700-E6792 |
| 60 | Wait 40'' | Send TC ACS HV request | E0269 E0270 E0271 | tc-r_as_hv1 tc-r_as_hv2 tc-r_as_hv3 | | 64025 64026 64027 | E1700-E1792 | |
| 70 | | Send TC to change mode to OPER mode | E0501 | tc_mode_chg_s | | 240108 | E0049 = 4 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |



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- **Procedure n° 32 FPATCH**
 - Purpose: Flush recorded S/A patches in DPE memory when dedicated DPE memory is full (E111=512) or not sufficient for planed patches
 - Constraints: Use procedures P23_XX to record useful patches after this operation
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------------------------|
| 10 | | Mode status checking | | | | 240108 | E0049 = 3 | if # execute procedure 16: BKCONF |
| 20 | | Send TC to erase all S/A patches in DPE memory | E516 | tc_reset_patch | | | E0111=0 | |



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- **Procedure n° 100 OFFINA**

- Purpose: Instrument set up for Inactive mode. This procedure is normally only used for instrument ground testing or after a switch-off due to an on-board anomaly.

Steps 10 to 100 are dedicated to cryocoolers and CDE management

Steps 110 to 180 are dedicated to SPI heaters management

- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC to switch ON Compressor heater M | T5001 | LCL_COMP_H-A_ON | | | T8500 | |
| 20 | | Send TC to select relay configuration CDE 1 | E9969 | CDE1_LCL1RELON | | | | |
| 30 | | Send TC to select relay configuration CDE 2 | E9989 | CDE2_LCL1RELON | | | | |
| 40 | | Send TC to switch ON CDE 1 | P3031 | CDE1_A_LCL1_ON | | | P1161 = 1 P1160 = 0 | |
| 50 | | Send TC to switch ON CDE 2 | P3271 | CDE2_B_LCL1_ON | | | P1163 = 1 P1162 = 0 | |
| 55 | | Check the CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp |
| 60 | | Check CDE relay status | | | | | F9970 = 0 F9990 = 0 | |
| 70 | | Send TC to switch ON CDE heater Red | T5676 | TWS_CDE_HTRB_ON | | | T8115 = 1 | |
| 75 | | Send TC to switch ON CDE heater Main | T5576 | TWS_CDE_HTRA_ON | | | T8015 = 1 | |
| 80 | | Send TC to set up CDE 1 in Stand-by mode as Master and compressors/displacers disable | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | CDE Main is assumed to be Master Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 90 | | Send TC to set up CDE 2 in Stand-by mode as Slave and compressors/displacers disable | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | CDE Redundant is assumed to be Slave Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 100 | | Check the CDE input current Check CDE configuration mod | | | | | P1061 P1063 F9971=F9972 = 0 F9991=F9992 = 0 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------|----------------|------------------|-----------------|-----------------|--------------------|------------------|
| 110 | | Send TC to switch ON Thermal Control Main | P4089 | | | | | |
| 120 | | Send TC to switch ON Thermal Control Red | P4339 | | | | | |
| 130 | | Send TC to switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | T8501 = 1 P2011 | |
| 140 | | Send TC to switch ON Mask, ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | T8507 = 1 | |
| 150 | | Send TC to switch ON AFEE, DFEE, PSD heaters Red | T5106 | LCL_CAMER_H-B_ON | | | T8601 = 1 P2061 | If # execute GR2 |
| 160 | | Send TC to switch ON Mask, ACS heaters Red | T5136 | TWS_ACS_MSK-B_ON | | | T8607 = 1 | |
| 170 | | Send TC to switch ON Anti-freeze 1 M | T5021 | TWS_ANTFRZ1-A_ON | | | T8504 = 1 | |
| 180 | | Send TC to switch ON Anti-freeze 2 M | T5026 | TWS_ANTFRZ2-A_ON | | | T8505 = 1 | |

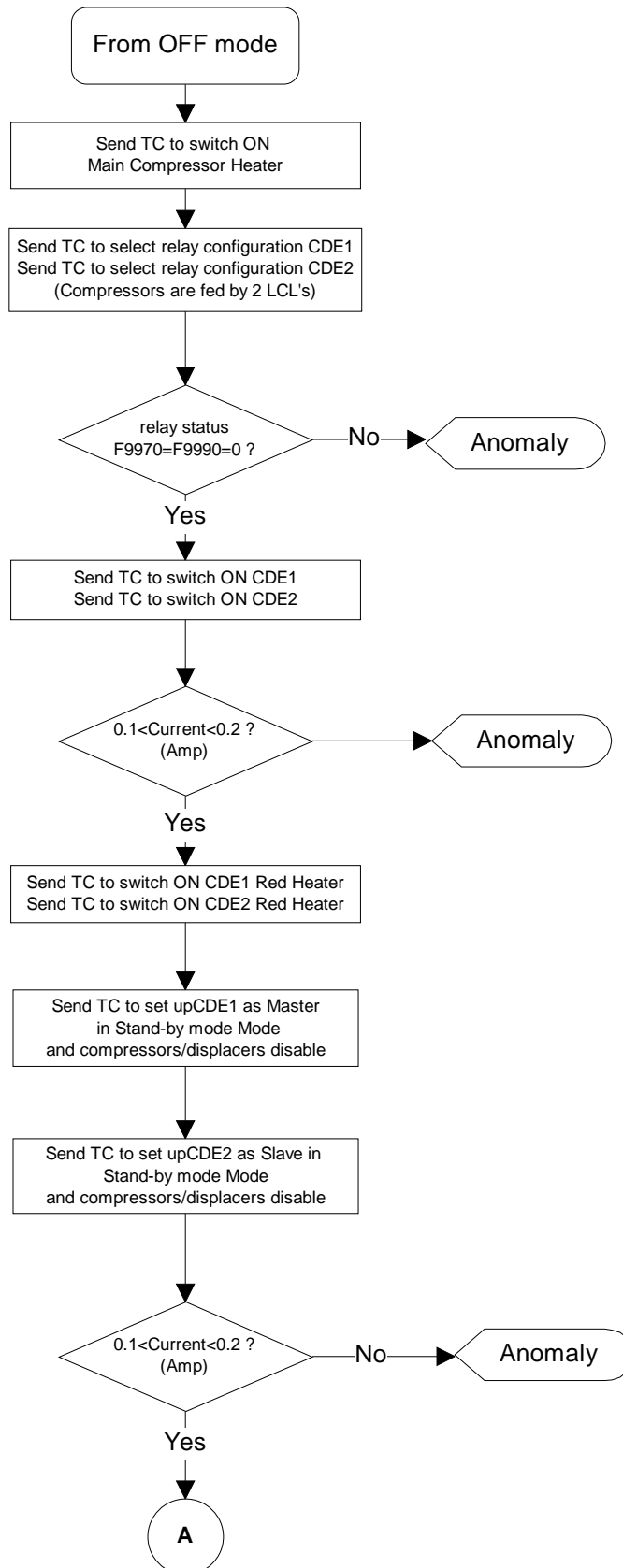


Figure 2.13 - Procedure n° 100 - OFFINA

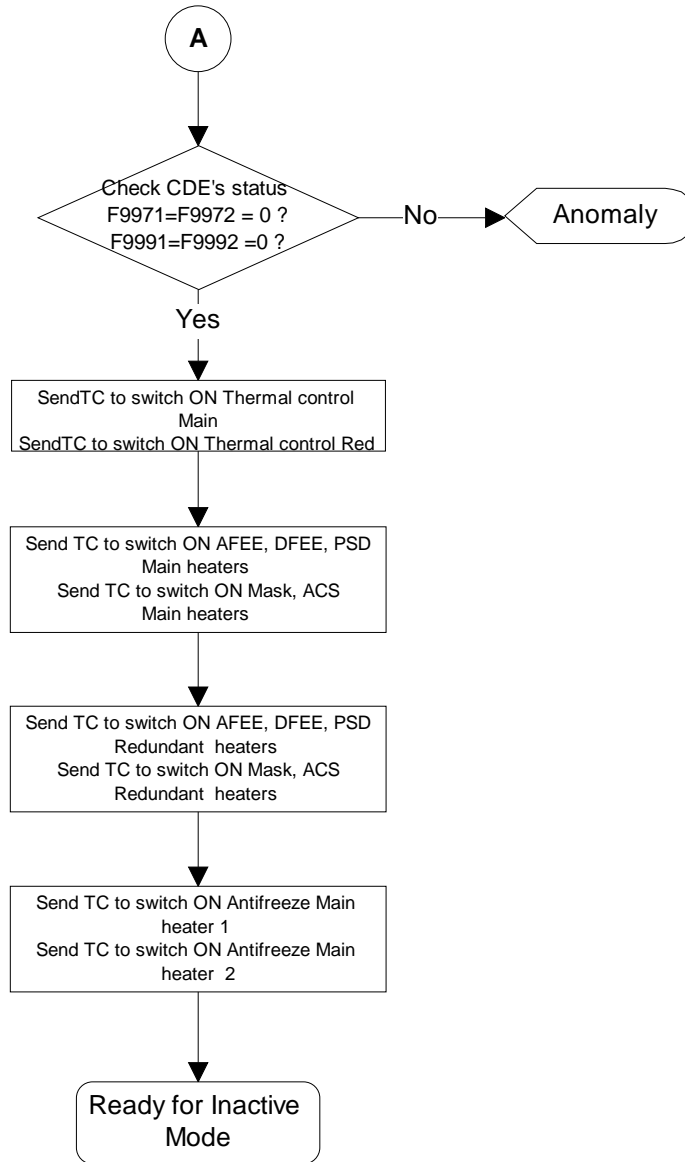


Figure 2.13 - Procedure n° 100 - OFFINA (cont'd)

- **Procedure n° 101 INAOFF**
 - Purpose: Instrument switched OFF from Inactive mode.

Steps 10 to 100 are dedicated to SPI heaters management and DPE switch OFF.

Steps 101 to 140 are dedicated to cryocoolers and CDE management
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: The cryocoolers strokes shall be reduced by steps of 0,429 mm ie 3 in raw value, until the commanded strokes are less than: 0,429 mm ie 3 in raw value, then set them to 0.

This procedure should allow transition from INACTIVE to OFF whatever we are in:

- Nominal mode (4 coolers operating)
- Back-up mode (2 coolers operating: CDE1 or CDE2)
- 3 coolers mode configuration.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|-------------------|--------------------------------------------------------------------|-----------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC DPE1 power OFF | P4044 | LCL_SDPE1_OFF | | | P2116 = 0 | |
| 20 | | Send TC to switch OFF Anti-freeze 2 M | T5025 | TWS_ANTFRZ2-A_OFF | | | T8505 = 0 | |
| 30 | | Send TC to switch OFF Anti-freeze 1 M | T5020 | TWS_ANTFRZ1-A_OFF | | | T8504 = 0 | |
| 40 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Main | T5005 | LCL_CAMER_H-A_OFF | | | T8501 = 0 P2011 = 0 | |
| 50 | | Send TC to switch OFF Mask, ACS heaters Main | T5035 | TWS_ACS_MSK-A_OFF | | | T8507 = 0 | |
| 60 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Red | T5105 | LCL_CAMER_H-B_OFF | | | T8601 = 0 P2061 = 0 | If # execute GR2 |
| 70 | | Send TC to switch OFF Mask, ACS heaters Red | T5135 | TWS_ACS_MSK-B_OFF | | | T8607 = 0 | |
| 80 | | Send TC to switch OFF Thermal Control LCL Main | P4048 | BD 4 A LCL 2 | | | P2122 = 0 | |
| 90 | | Send TC to switch OFF Thermal Control LCL Red | P4338 | BD 4 B LCL 2 | | | P2172 = 0 | |
| 100 | | Send TC to switch OFF Compressor heater M | T5000 | LCL_COMP_H-A_OFF | | | T8500 = 0 | |
| 101 | | Check CDE electrical status If (P1161=P1160=P1163=P1162=0) Go to step 125 | | | | | P1161 ? P1160 ? P1163 ? P1162 ? | |
| 102 | | Check CDE 1 mode If (F9971 = F9972 = 0) or (P1161 = 0) Go to step 107 | | | | | F9971, F9972 | Operations depend on CDE1 status If # execute GR1 CDE1 is in Stand-by mode or is OFF |
| 103 | | If (F9971 = 1 and F9972 = 0) | | | | | | CDE1 is in Nominal mode If # anomaly |
| 104a | | Send TC to decrease E9960 and E9961 compressors amplitude CDE 1 step by step until E9960 = 0 and E9961 = 0. | E9966 | CDE1_M_CHG_AMPL | Bit0 = 0 Bit1 = 1 E9960 Bit8 = 1 Bit9 = 1 E9961 | | F9960 decreases F9961 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 104b | | Check CDE1 compressors drive amplitude | | | | | F9960 ; F9961 < 50 | |
| 104c | | Check CDE 1 input current | | | | | P1061 | 0.5 A < I < 0.6 A |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 105a | | Send TC to set CDE 1 displacers to "0" amplitude In launch lock mode | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 105b | | Check the CDE 1 configuration Check CDE1 input current | | | | | F9971 = F9972 = 1 P1061 | If # execute GR1 0.30 A < I < 0.5 A |
| 106a | | Send TC to set CDE 1 in Stand-by mode | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Cryocooler Stand-by mode CDE1 Master |
| 106b | | Check CDE 1 input current | | | | | P1061 | 0.10 A < I < 0.20 A |
| 106c | | Check CDE 1 configuration | | | | | F9971 = 0 F9972 = 0 | If # execute GR1 |
| 107 | | Check CDE 2 mode If (F9991 = F9992 = 0) or (P1163 = 0) Go to step 120 | | | | | F9991, F9992 | Operations depend on CDE1 status CDE2 is in Stand-by mode or is OFF |
| 108 | | If (F9991 = 1 and F9992 = 0) | | | | | | CDE2 is in Nominal mode If # execute GR1 |
| 109a | | Send TC to decrease E9980 and E9981 compressors amplitude CDE 2 step by step until E9980 = 0 and E9981 = 0. | E9987 | CDE2_S_CHG_AMPL | Bit0 = 1 Bit1 = 1 E9980 Bit8 = 1 Bit9 = E9981 | | F9980 decreases F9981 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 109b | | Check CDE2 compressors drive amplitude | | | | | F9980 ; F9981 < 50 | |
| 109c | | Check CDE 2 input current | | | | | P1063 | 0.5 A < I < 0.6 A |
| 110a | | Send TC to set CDE 2 displacers to "0" amplitude In launch lock mode | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------|----------------|-------------------|------------------------------------------------------------------------|-----------------|----------------------------|------------------------------------------------|
| 110b | | Check the CDE configuration Check CDE input current | | | | | F9991 = F9992 = 1 P1063 | If # execute GR2 0.30 A < I < 0.5 A |
| 115a | | Send TC to set CDE 2 in Stand-by mode | E9963 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to Cryocooler Stand-by mode CDE2 Slave |
| 115b | | Check CDE 2 input current | | | | | P1063 | 0.10 A < I < 0.20 A |
| 115c | | Check CDE 2 configuration | | | | | F9991 = 0 F9992 = 0 | If # execute GR1 |
| 120 | | Send TC to switch OFF CDE 1 | P3030 | CDE1_A_LCL1_OFF | | | P1161 = 0 PP1160 = 0 | |
| 120a | | Send TC to switch OFF CDE 2 | P3270 | CDE2_B_LCL1_OFF | | | P1163 = 0 P1162 = 0 | |
| 125 | | Send TC to switch off Compensation heater M | P4458 | TSW_ACC_HTR_A_OFF | | | P2222 = 0 | |
| 130 | | Send TC to switch OFF CDE heater M | T5575 | TWS_CDE_HTRA_OFF | | | T8015 = 0 | |
| 140 | | Send TC to switch OFF CDE heater R | T5675 | TWS_CDE_HTRB_OFF | | | T8115 = 0 | |

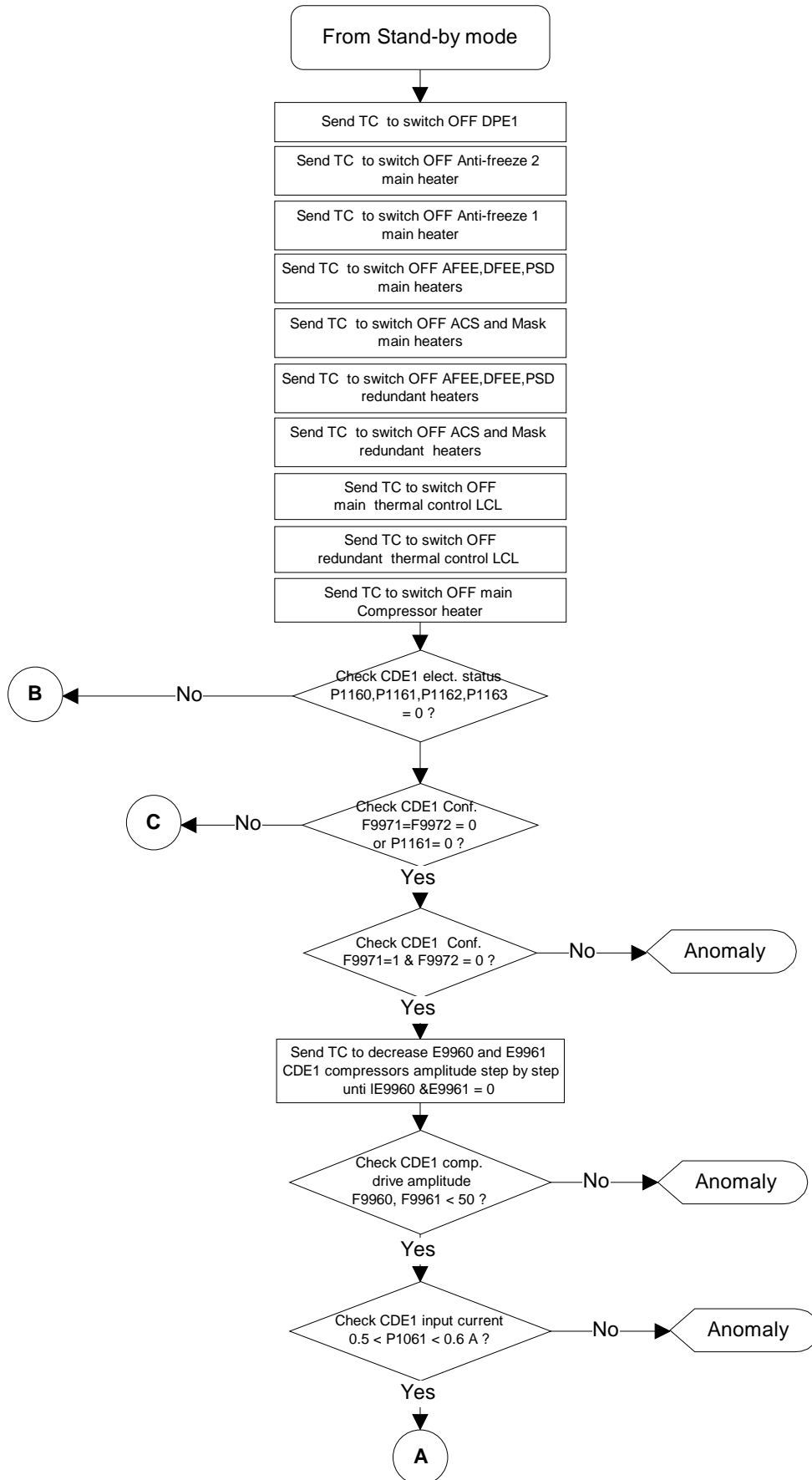


Figure 2.14 - Procedure n° 101- INAOFF

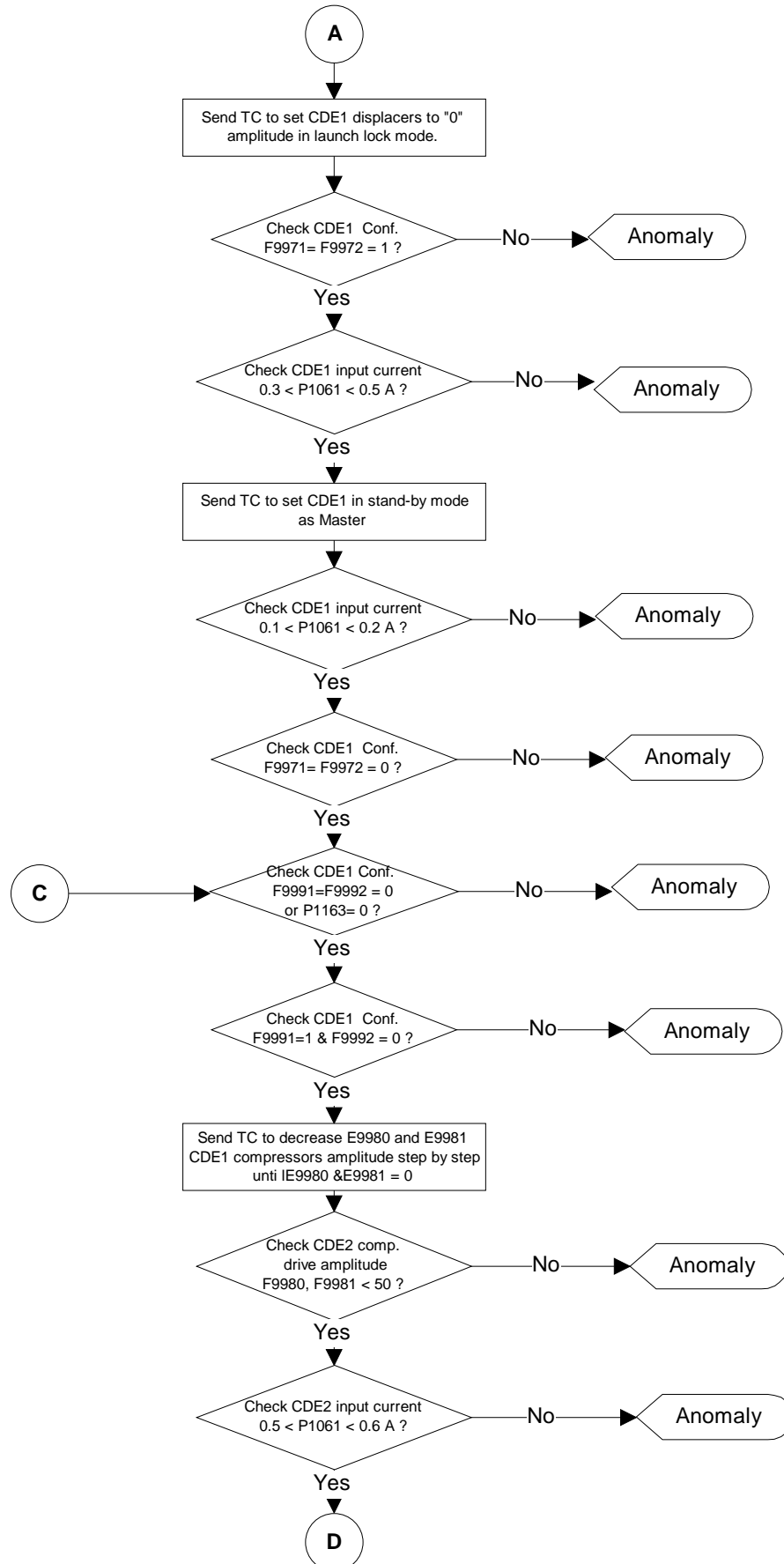


Figure 2.14 - Procedure n° 101- INAOFF (cont'd)

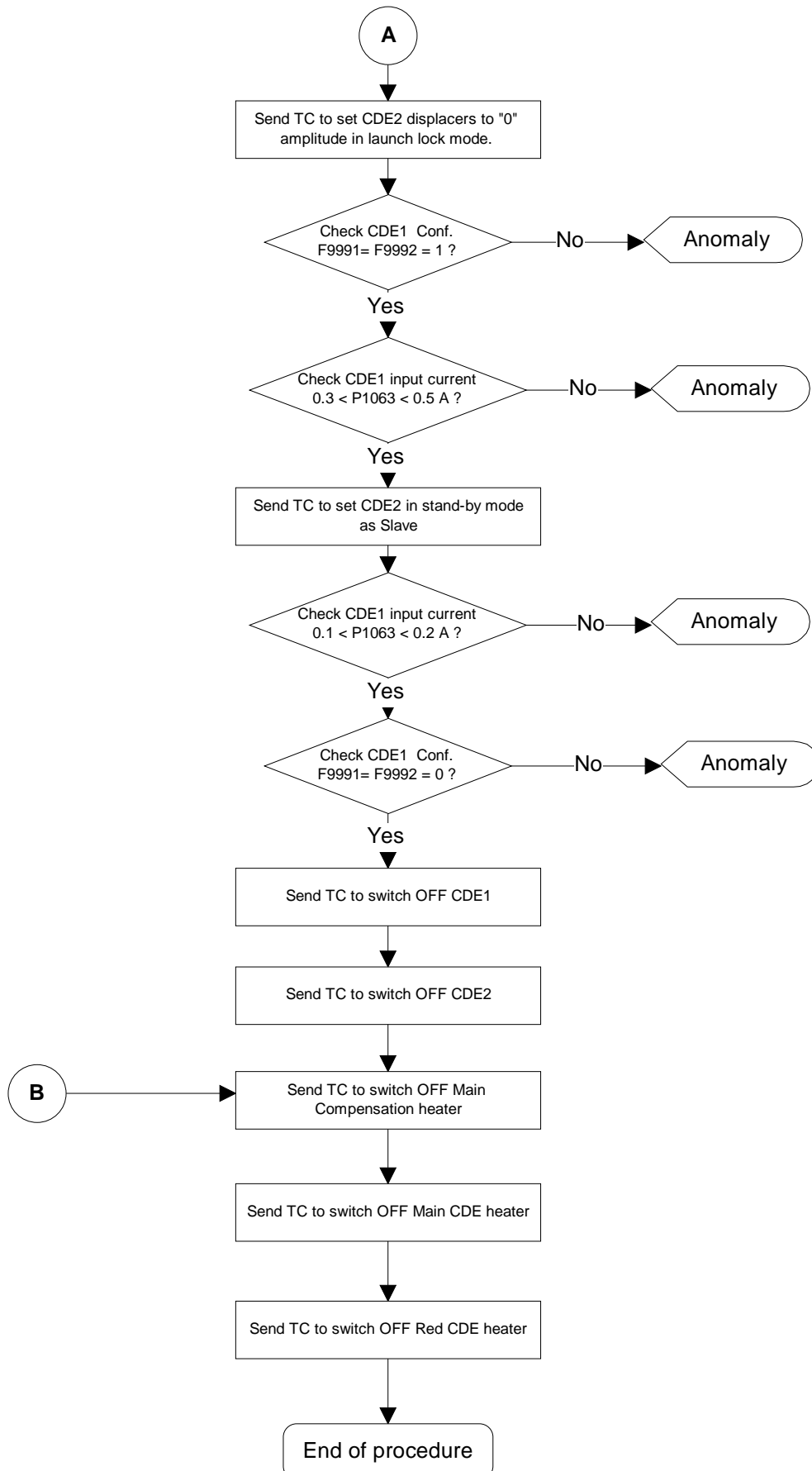


Figure 2.14 - Procedure n° 101- INAOFF (cont'd)



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- **Procedure n° 102 ISOINA**
 - Purpose: Instrument switched OFF after Imminent switch off detection. This procedure is only used for instrument ground testing with the EGSE
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------|----------------|-------------------|-----------------|-----------------|-----------------|------------------|
| 10 | | Send TC DPE1 power OFF | P4044 | LCL_SDPE1_OFF | | | P2116 = 0 | If # execute GR2 |
| 20 | | Send TC to switch OFF AFEE detection chains | P4060 | LCL_AF2 DET-A_OFF | | | P2013 = 0 | |
| 30 | | Send TC to switch OFF ACS | P4048 | LCL_SPI_ACS-A_OFF | | | P2017 = 0 | |
| 40 | | Send TC to switch OFF PSD | P4056 | LCL_PSD-A_OFF | | | P2014 = 0 | |
| 50 | | Send TC to switch OFF AFEE I/F TM/TC | P4040 | LCL_AF2TMTC-A_OFF | | | P2016 = 0 | |
| 60 | | Send TC to switch OFF DFEE | P4052 | LCL_DFEE-A_OFF | | | P2012 = 0 | |
| 70 | | CDE power down See P101 step 101 to step 140 | | | | | P2015 = 0 | |

2.2.3. Typical nominal sequences (TBC)

2.2.3.1. Nominal operation sequence

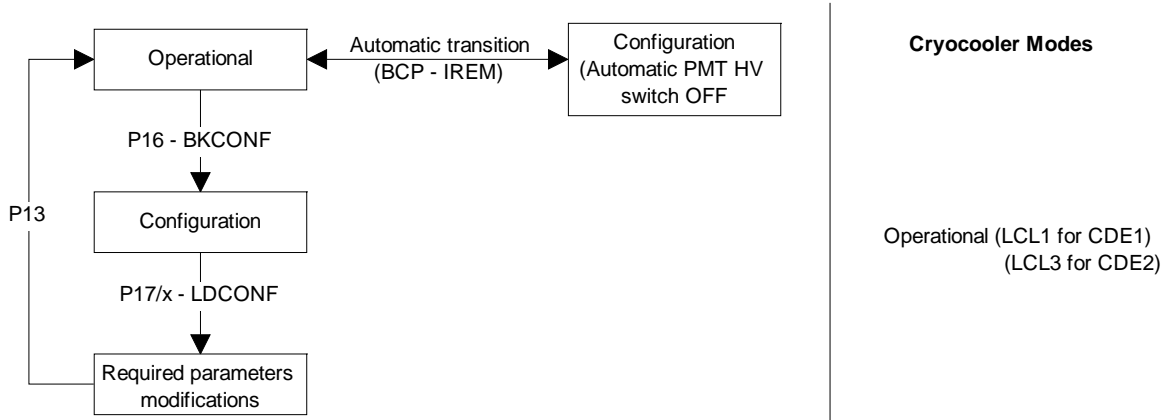
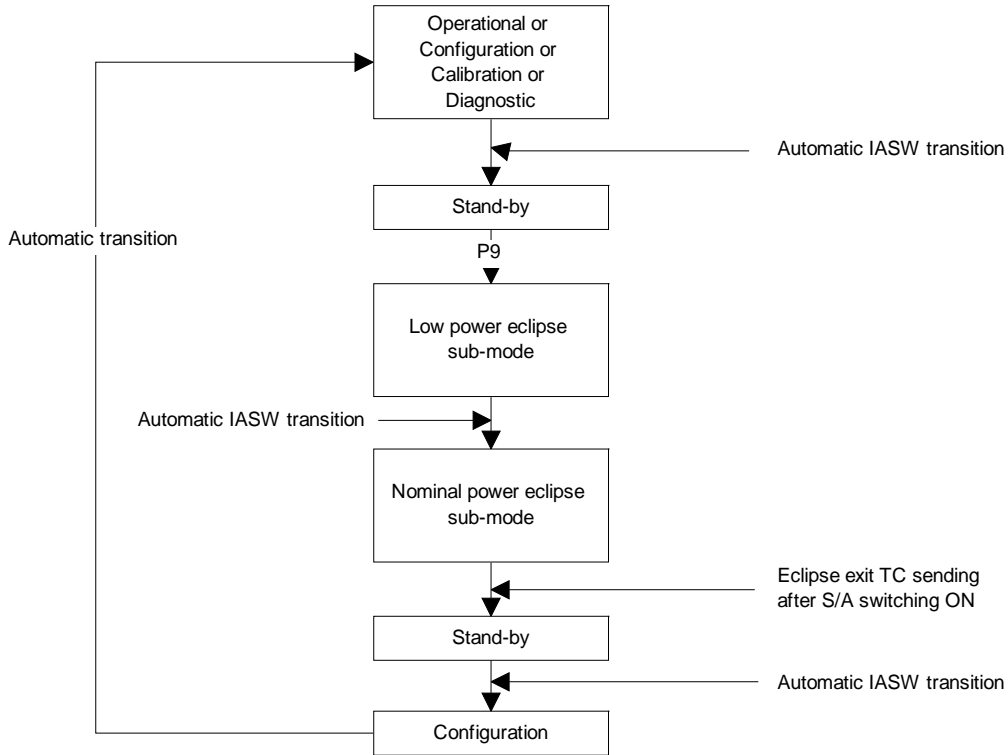
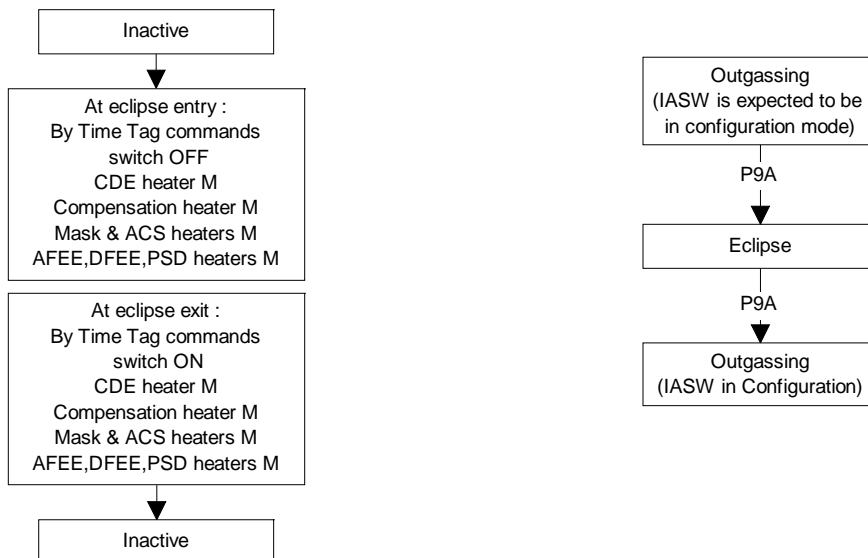


Figure 2.16 - Nominal operation sequence

2.2.3.2. Eclipse phase sequence



Nominal eclipse sequence



Eclipse sequence when in Inactive

Eclipse sequence when in Outgassing

Figure 2.17 - Eclipse operations sequences

2.2.3.3. Annealing phase sequence

Cryocooler Modes

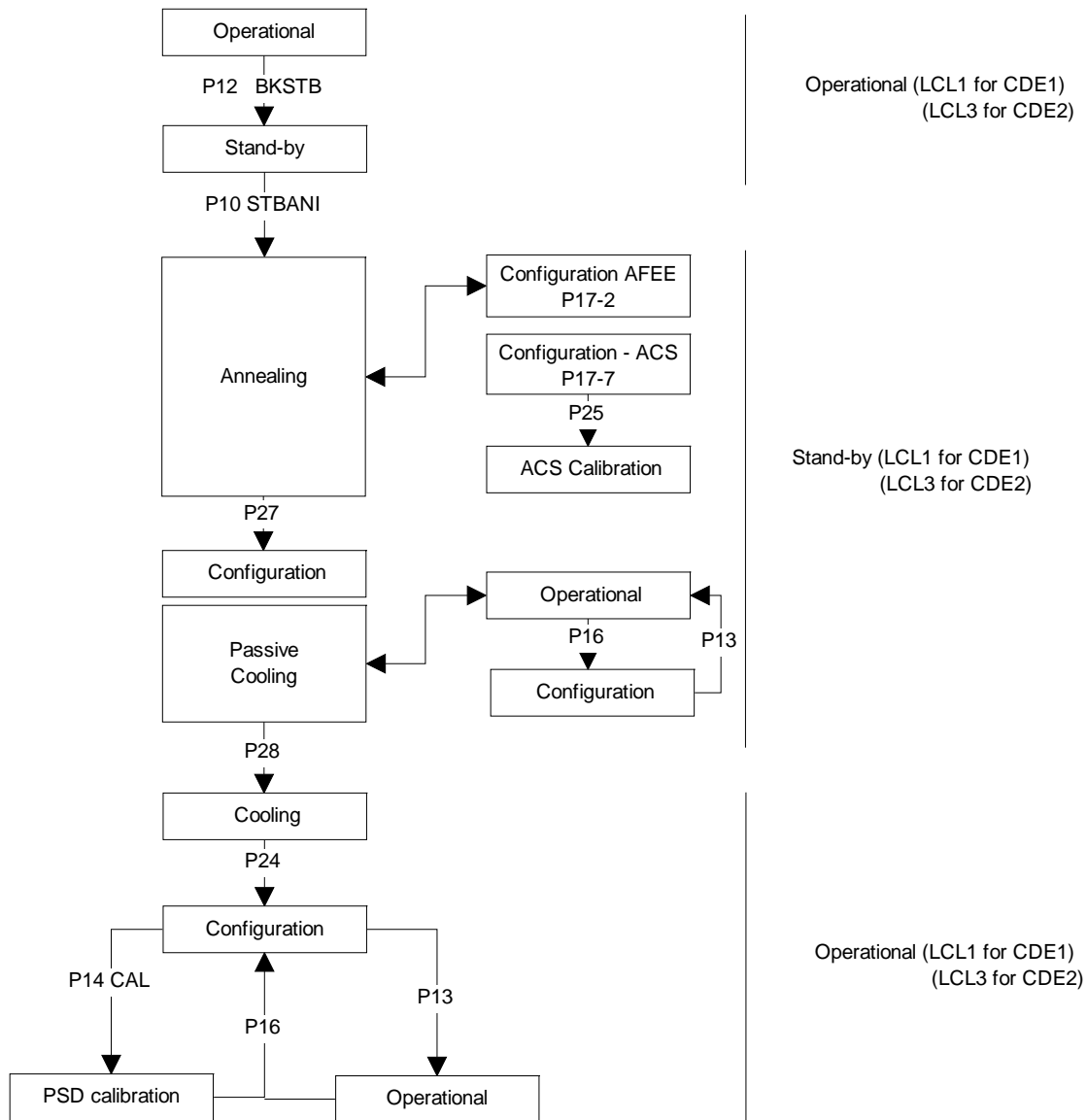


Figure 2.18 - Annealing phase sequence

2.2.3.4. Thawing

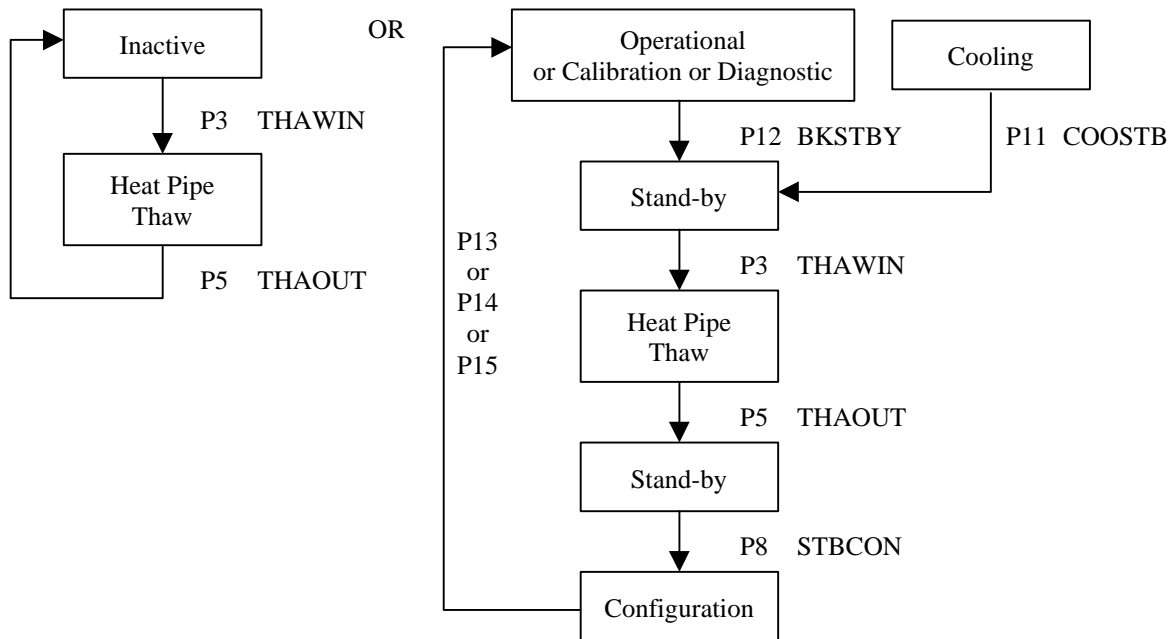


Figure 2.19 - Thawing

2.2.3.5. Photon/photon to TM emergency

The change decision to activate TM Emergency mode from Photon/Photon will be taken in two cases (TBC):

- High events activity
- No nominal telemetry rate

The following sequence will be (if there is no need to modify the configuration):

- Procedure P16 Back to Configuration Mode
- Procedure P13-E Real transition to TM Emergency mode

2.2.3.6. Exposure parameters change

The following sequence will be:

- Procedure P16 Back to Configuration Mode
- Procedure P21 Exposure parameters update
- Procedure P13-P Real transition to Operational Photon/Photon mode



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2.2.4 Values of TC parameters (TPF files)

2.2.4.1. ES1700_IASW-PAR_fmconfig_0004.TPF

ES1700 S
M F 35

ES1700_IASW-PAR_fmconfig_0004.TPF - 2003-02-13T15:56:19Z - SPI1 IASW Configuration Parameters

| | | | | |
|-------|-------------|------|------------|------------------------------------------------------------------|
| E8936 | E CONF | | TM E3936 | R SW RAD-MOD L - Radiation mode |
| E8937 | E DISABLE | | TM E3937 | R SW BGD-CAP L - High background count |
| E8938 | R 50000 | | D TM E3938 | R SW TH-RD-OV L - Counting threshold for radiation overflow |
| E8939 | R 3 | | D TM E3939 | R SW FT-RD-OV L - Counting filter for radiation overflow |
| E8940 | R 40000 | | D TM E3940 | R SW TH-RD-NO L - Counting threshold for radiation nominal level |
| E8941 | R 3 | | D TM E3941 | R SW FT-RD-NO L - Counting filter for radiation nominal level |
| E8942 | R 3 | | D TM E3942 | R SW CNT-FTR L - Counting filter for cold plate monitoring |
| E8943 | E AUTOMATIC | | TM E3943 | R SW AF-NRG L - AFEE energy mode |
| E8944 | E ENABLE | | TM E3944 | R SW RCONF-CAP L - Automatic reconfiguration capability |
| E8946 | E ENABLE | | TM E3946 | R SW RAD-CAP L - Radiation belts crossing detection capability |
| E8953 | E ENABLE | | TM E3953 | R SW IM-EC L - Imminent eclipse detection |
| E8947 | E 8 | sec | TM E3947 | R SW DY-BF-RD L - Delay before radiation belts |
| E8950 | E 8 | sec | TM E3950 | R SW DY-AF-RD L - Delay after radiation belts |
| E8954 | E 8 | sec | TM E3954 | R SW DY-BF-EC L - Delay before eclipse |
| E8949 | E 1 | sec | TM E3949 | R SW AS-MEM-DY L - ACS ROM / RAM delay |
| E8952 | E 0.125 | sec | TM E3952 | R SW PD-MEM-DY L - PSD ROM / RAM delay |
| E8956 | E 9 | sec | TM E3956 | R SW DF-MEM-DY L - DFEE ROM / RAM delay |
| E8960 | E DISABLE | | TM E3960 | R SW IM-SW L - Imminent switch off detection capability |
| E8961 | E ENABLE | | TM E3961 | R SW ESAM L - ESAM detection capability |
| E8962 | E ENABLE | | TM E3962 | R SW AF-LV-TP L - AFEE LV temperature monitoring capability |
| E8963 | E ENABLE | | TM E3963 | R SW COLD-CAP L - Cold plate temperature monitoring capability |
| E8964 | E 90 | degK | TM E3964 | R SW COLD-THR L1 - Cold plate temperature threshold |
| E8965 | E 90 | degK | TM E3965 | R SW COLD-THR L2 - Cold plate temperature threshold |
| E8966 | E 90 | degK | TM E3966 | R SW COLD-THR L3 - Cold plate temperature threshold |
| E8967 | E 90 | degK | TM E3967 | R SW COLD-THR L4 - Cold plate temperature threshold |
| E8968 | E ENABLE | | TM E3968 | R SW COR-CAP L - Correlation capability |
| E8969 | R 1 | | D TM E3969 | R SW HK-AQ-RT L - HK acquisition rate |
| E8970 | R 3072 | | D TM E3970 | R SW LG-HL-DF L - Length of the block HSL DFEE |
| E8971 | R 3 | | D TM E3971 | R SW LSL-ERR L - Cyclic LSL error filter |
| E8972 | E 8 | sec | TM E3972 | R SW DY-BF-AT L - Delay before auto-test configuration |
| E8973 | E 32 | sec | TM E3973 | R SW DY-BF-CF L - Delay before configuration acquisition |
| E8974 | E ALL PE | | TM E3974 | R SW SPECTRA L - Constituents of the spectra |
| E8977 | E 328.6 | degK | TM E3977 | R SW AF-LV-TH L - AFEE LV monitoring threshold |
| E8978 | R 3 | | D TM E3978 | R SW AF-LV-FT L - AFEE LV monitoring filter |
| E8976 | R 3600 | | D TM E3976 | R SW SP-AC-DU-L - Spectra accumulation duration |



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2.2.4.2. ES1700_IASW-PAR_coldpdis_0004.TPF

ES1700 S
M F 35

ES1700_IASW-PAR_coldpdis_0004.TPF - 2003-10-02T11:11:55Z - SPI1 IASW Configuration Parameters

| | | | | |
|-------|-------------|------|------------|------------------------------------------------------------------|
| E8936 | E CONF | | TM E3936 | R SW RAD-MOD L - Radiation mode |
| E8937 | E DISABLE | | TM E3937 | R SW BGD-CAP L - High background count |
| E8938 | R 200 | | D TM E3938 | R SW TH-RD-OV L - Counting threshold for radiation overflow |
| E8939 | R 3 | | D TM E3939 | R SW FT-RD-OV L - Counting filter for radiation overflow |
| E8940 | R 50 | | D TM E3940 | R SW TH-RD-NO L - Counting threshold for radiation nominal level |
| E8941 | R 3 | | D TM E3941 | R SW FT-RD-NO L - Counting filter for radiation nominal level |
| E8942 | R 3 | | D TM E3942 | R SW CNT-FTR L - Counting filter for cold plate monitoring |
| E8943 | E AUTOMATIC | | TM E3943 | R SW AF-NRG L - AFEE energy mode |
| E8944 | E ENABLE | | TM E3944 | R SW RCONF-CAP L - Automatic reconfiguration capability |
| E8946 | E ENABLE | | TM E3946 | R SW RAD-CAP L - Radiation belts crossing detection capability |
| E8953 | E ENABLE | | TM E3953 | R SW IM-EC L - Imminent eclipse detection |
| E8947 | E 8 | sec | TM E3947 | R SW DY-BF-RD L - Delay before radiation belts |
| E8950 | E 8 | sec | TM E3950 | R SW DY-AF-RD L - Delay after radiation belts |
| E8954 | E 8 | sec | TM E3954 | R SW DY-BF-EC L - Delay before eclipse |
| E8949 | E 1 | sec | TM E3949 | R SW AS-MEM-DY L - ACS ROM / RAM delay |
| E8952 | E 0.125 | sec | TM E3952 | R SW PD-MEM-DY L - PSD ROM / RAM delay |
| E8956 | E 9 | sec | TM E3956 | R SW DF-MEM-DY L - DFEE ROM / RAM delay |
| E8960 | E DISABLE | | TM E3960 | R SW IM-SW L - Imminent switch off detection capability |
| E8961 | E ENABLE | | TM E3961 | R SW ESAM L - ESAM detection capability |
| E8962 | E ENABLE | | TM E3962 | R SW AF-LV-TP L - AFEE LV temperature monitoring capability |
| E8963 | E DISABLE | | TM E3963 | R SW COLD-CAP L - Cold plate temperature monitoring capability |
| E8964 | E 109 | degK | TM E3964 | R SW COLD-THR L1 - Cold plate temperature threshold |
| E8965 | E 109 | degK | TM E3965 | R SW COLD-THR L2 - Cold plate temperature threshold |
| E8966 | E 109 | degK | TM E3966 | R SW COLD-THR L3 - Cold plate temperature threshold |
| E8967 | E 109 | degK | TM E3967 | R SW COLD-THR L4 - Cold plate temperature threshold |
| E8968 | E ENABLE | | TM E3968 | R SW COR-CAP L - Correlation capability |
| E8969 | R 1 | | D TM E3969 | R SW HK-AQ-RT L - HK acquisition rate |
| E8970 | R 5120 | | D TM E3970 | R SW LG-HL-DF L - Length of the block HSL DFEE |
| E8971 | R 3 | | D TM E3971 | R SW LSL-ERR L - Cyclic LSL error filter |
| E8972 | E 8 | sec | TM E3972 | R SW DY-BF-AT L - Delay before auto-test configuration |
| E8973 | E 32 | sec | TM E3973 | R SW DY-BF-CF L - Delay before configuration acquisition |
| E8974 | E ALL PE | | TM E3974 | R SW SPECTRA L - Constituents of the spectra |
| E8977 | E 328.6 | degK | TM E3977 | R SW AF-LV-TH L - AFEE LV monitoring threshold |
| E8978 | R 3 | | D TM E3978 | R SW AF-LV-FT L - AFEE LV monitoring filter |
| E8976 | R 0 | | D TM E3976 | R SW SP-AC-DU-L - Spectra accumulation duration |



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2.2.4.3. ES1750_DIAG-PAR_fmconfig_0001.TPF

ES1750 S
M F 192

2002-05-17T18:55:41Z - SPI1 Diagnostic Parameters

| | | | |
|-------|--------|------------|------------------------------|
| E6901 | E AFEE | TM E1901 | R DIAG SA-ID L1 - DIAG SA1 |
| E8401 | R FF | H TM E3401 | R DIAG HK L1 - DIAG HK1 |
| E6902 | E AFEE | TM E1902 | R DIAG SA-ID L2 - DIAG SA2 |
| E8402 | R FF | H TM E3402 | R DIAG HK L2 - DIAG HK2 |
| E6903 | E AFEE | TM E1903 | R DIAG SA-ID L3 - DIAG SA3 |
| E8403 | R FF | H TM E3403 | R DIAG HK L3 - DIAG HK3 |
| E6904 | E AFEE | TM E1904 | R DIAG SA-ID L4 - DIAG SA4 |
| E8404 | R FF | H TM E3404 | R DIAG HK L4 - DIAG HK4 |
| E6905 | E AFEE | TM E1905 | R DIAG SA-ID L5 - DIAG SA5 |
| E8405 | R FF | H TM E3405 | R DIAG HK L5 - DIAG HK5 |
| E6906 | E AFEE | TM E1906 | R DIAG SA-ID L6 - DIAG SA6 |
| E8406 | R FF | H TM E3406 | R DIAG HK L6 - DIAG HK6 |
| E6907 | E AFEE | TM E1907 | R DIAG SA-ID L7 - DIAG SA7 |
| E8407 | R FF | H TM E3407 | R DIAG HK L7 - DIAG HK7 |
| E6908 | E AFEE | TM E1908 | R DIAG SA-ID L8 - DIAG SA8 |
| E8408 | R FF | H TM E3408 | R DIAG HK L8 - DIAG HK8 |
| E6909 | E AFEE | TM E1909 | R DIAG SA-ID L9 - DIAG SA9 |
| E8409 | R FF | H TM E3409 | R DIAG HK L9 - DIAG HK9 |
| E6910 | E AFEE | TM E1910 | R DIAG SA-ID L10 - DIAG SA10 |
| E8410 | R FF | H TM E3410 | R DIAG HK L10 - DIAG HK10 |
| E6911 | E AFEE | TM E1911 | R DIAG SA-ID L11 - DIAG SA11 |
| E8411 | R FF | H TM E3411 | R DIAG HK L11 - DIAG HK11 |
| E6912 | E AFEE | TM E1912 | R DIAG SA-ID L12 - DIAG SA12 |
| E8412 | R FF | H TM E3412 | R DIAG HK L12 - DIAG HK12 |
| E6913 | E AFEE | TM E1913 | R DIAG SA-ID L13 - DIAG SA13 |
| E8413 | R FF | H TM E3413 | R DIAG HK L13 - DIAG HK13 |
| E6914 | E AFEE | TM E1914 | R DIAG SA-ID L14 - DIAG SA14 |
| E8414 | R FF | H TM E3414 | R DIAG HK L14 - DIAG HK14 |
| E6915 | E AFEE | TM E1915 | R DIAG SA-ID L15 - DIAG SA15 |
| E8415 | R FF | H TM E3415 | R DIAG HK L15 - DIAG HK15 |
| E6916 | E AFEE | TM E1916 | R DIAG SA-ID L16 - DIAG SA16 |
| E8416 | R FF | H TM E3416 | R DIAG HK L16 - DIAG HK16 |
| E6917 | E AFEE | TM E1917 | R DIAG SA-ID L17 - DIAG SA17 |
| E8417 | R FF | H TM E3417 | R DIAG HK L17 - DIAG HK17 |
| E6918 | E AFEE | TM E1918 | R DIAG SA-ID L18 - DIAG SA18 |
| E8418 | R FF | H TM E3418 | R DIAG HK L18 - DIAG HK18 |
| E6919 | E AFEE | TM E1919 | R DIAG SA-ID L19 - DIAG SA19 |



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| | | | |
|-------|--------|------------|------------------------------|
| E8419 | R FF | H TM E3419 | R DIAG HK L19 - DIAG HK19 |
| E6920 | E AFEE | TM E1920 | R DIAG SA-ID L20 - DIAG SA20 |
| E8420 | R FF | H TM E3420 | R DIAG HK L20 - DIAG HK20 |
| E6921 | E AFEE | TM E1921 | R DIAG SA-ID L21 - DIAG SA21 |
| E8421 | R FF | H TM E3421 | R DIAG HK L21 - DIAG HK21 |
| E6922 | E AFEE | TM E1922 | R DIAG SA-ID L22 - DIAG SA22 |
| E8422 | R FF | H TM E3422 | R DIAG HK L22 - DIAG HK22 |
| E6923 | E AFEE | TM E1923 | R DIAG SA-ID L23 - DIAG SA23 |
| E8423 | R FF | H TM E3423 | R DIAG HK L23 - DIAG HK23 |
| E6924 | E AFEE | TM E1924 | R DIAG SA-ID L24 - DIAG SA24 |
| E8424 | R FF | H TM E3424 | R DIAG HK L24 - DIAG HK24 |
| E6925 | E AFEE | TM E1925 | R DIAG SA-ID L25 - DIAG SA25 |
| E8425 | R FF | H TM E3425 | R DIAG HK L25 - DIAG HK25 |
| E6926 | E AFEE | TM E1926 | R DIAG SA-ID L26 - DIAG SA26 |
| E8426 | R FF | H TM E3426 | R DIAG HK L26 - DIAG HK26 |
| E6927 | E AFEE | TM E1927 | R DIAG SA-ID L27 - DIAG SA27 |
| E8427 | R FF | H TM E3427 | R DIAG HK L27 - DIAG HK27 |
| E6928 | E AFEE | TM E1928 | R DIAG SA-ID L28 - DIAG SA28 |
| E8428 | R FF | H TM E3428 | R DIAG HK L28 - DIAG HK28 |
| E6929 | E AFEE | TM E1929 | R DIAG SA-ID L29 - DIAG SA29 |
| E8429 | R FF | H TM E3429 | R DIAG HK L29 - DIAG HK29 |
| E6930 | E AFEE | TM E1930 | R DIAG SA-ID L30 - DIAG SA30 |
| E8430 | R FF | H TM E3430 | R DIAG HK L30 - DIAG HK30 |
| E6931 | E AFEE | TM E1931 | R DIAG SA-ID L31 - DIAG SA31 |
| E8431 | R FF | H TM E3431 | R DIAG HK L31 - DIAG HK31 |
| E6932 | E AFEE | TM E1932 | R DIAG SA-ID L32 - DIAG SA32 |
| E8432 | R FF | H TM E3432 | R DIAG HK L32 - DIAG HK32 |
| E6933 | E AFEE | TM E1933 | R DIAG SA-ID L33 - DIAG SA33 |
| E8433 | R FF | H TM E3433 | R DIAG HK L33 - DIAG HK33 |
| E6934 | E AFEE | TM E1934 | R DIAG SA-ID L34 - DIAG SA34 |
| E8434 | R FF | H TM E3434 | R DIAG HK L34 - DIAG HK34 |
| E6935 | E AFEE | TM E1935 | R DIAG SA-ID L35 - DIAG SA35 |
| E8435 | R FF | H TM E3435 | R DIAG HK L35 - DIAG HK35 |
| E6936 | E AFEE | TM E1936 | R DIAG SA-ID L36 - DIAG SA36 |
| E8436 | R FF | H TM E3436 | R DIAG HK L36 - DIAG HK36 |
| E6937 | E AFEE | TM E1937 | R DIAG SA-ID L37 - DIAG SA37 |
| E8437 | R FF | H TM E3437 | R DIAG HK L37 - DIAG HK37 |
| E6938 | E AFEE | TM E1938 | R DIAG SA-ID L38 - DIAG SA38 |
| E8438 | R FF | H TM E3438 | R DIAG HK L38 - DIAG HK38 |
| E6939 | E AFEE | TM E1939 | R DIAG SA-ID L39 - DIAG SA39 |
| E8439 | R FF | H TM E3439 | R DIAG HK L39 - DIAG HK39 |
| E6940 | E AFEE | TM E1940 | R DIAG SA-ID L40 - DIAG SA40 |
| E8440 | R FF | H TM E3440 | R DIAG HK L40 - DIAG HK40 |
| E6941 | E AFEE | TM E1941 | R DIAG SA-ID L41 - DIAG SA41 |
| E8441 | R FF | H TM E3441 | R DIAG HK L41 - DIAG HK41 |
| E6942 | E AFEE | TM E1942 | R DIAG SA-ID L42 - DIAG SA42 |



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|-------|--------|------------|------------------------------|
| E8442 | R FF | H TM E3442 | R DIAG HK L42 - DIAG HK42 |
| E6943 | E AFEE | TM E1943 | R DIAG SA-ID L43 - DIAG SA43 |
| E8443 | R FF | H TM E3443 | R DIAG HK L43 - DIAG HK43 |
| E6944 | E AFEE | TM E1944 | R DIAG SA-ID L44 - DIAG SA44 |
| E8444 | R FF | H TM E3444 | R DIAG HK L44 - DIAG HK44 |
| E6945 | E AFEE | TM E1945 | R DIAG SA-ID L45 - DIAG SA45 |
| E8445 | R FF | H TM E3445 | R DIAG HK L45 - DIAG HK45 |
| E6946 | E AFEE | TM E1946 | R DIAG SA-ID L46 - DIAG SA46 |
| E8446 | R FF | H TM E3446 | R DIAG HK L46 - DIAG HK46 |
| E6947 | E AFEE | TM E1947 | R DIAG SA-ID L47 - DIAG SA47 |
| E8447 | R FF | H TM E3447 | R DIAG HK L47 - DIAG HK47 |
| E6948 | E AFEE | TM E1948 | R DIAG SA-ID L48 - DIAG SA48 |
| E8448 | R FF | H TM E3448 | R DIAG HK L48 - DIAG HK48 |
| E6949 | E AFEE | TM E1949 | R DIAG SA-ID L49 - DIAG SA49 |
| E8449 | R FF | H TM E3449 | R DIAG HK L49 - DIAG HK49 |
| E6950 | E AFEE | TM E1950 | R DIAG SA-ID L50 - DIAG SA50 |
| E8450 | R FF | H TM E3450 | R DIAG HK L50 - DIAG HK50 |
| E6951 | E AFEE | TM E1951 | R DIAG SA-ID L51 - DIAG SA51 |
| E8451 | R FF | H TM E3451 | R DIAG HK L51 - DIAG HK51 |
| E6952 | E AFEE | TM E1952 | R DIAG SA-ID L52 - DIAG SA52 |
| E8452 | R FF | H TM E3452 | R DIAG HK L52 - DIAG HK52 |
| E6953 | E AFEE | TM E1953 | R DIAG SA-ID L53 - DIAG SA53 |
| E8453 | R FF | H TM E3453 | R DIAG HK L53 - DIAG HK53 |
| E6954 | E AFEE | TM E1954 | R DIAG SA-ID L54 - DIAG SA54 |
| E8454 | R FF | H TM E3454 | R DIAG HK L54 - DIAG HK54 |
| E6955 | E AFEE | TM E1955 | R DIAG SA-ID L55 - DIAG SA55 |
| E8455 | R FF | H TM E3455 | R DIAG HK L55 - DIAG HK55 |
| E6956 | E AFEE | TM E1956 | R DIAG SA-ID L56 - DIAG SA56 |
| E8456 | R FF | H TM E3456 | R DIAG HK L56 - DIAG HK56 |
| E6957 | E AFEE | TM E1957 | R DIAG SA-ID L57 - DIAG SA57 |
| E8457 | R FF | H TM E3457 | R DIAG HK L57 - DIAG HK57 |
| E6958 | E AFEE | TM E1958 | R DIAG SA-ID L58 - DIAG SA58 |
| E8458 | R FF | H TM E3458 | R DIAG HK L58 - DIAG HK58 |
| E6959 | E AFEE | TM E1959 | R DIAG SA-ID L59 - DIAG SA59 |
| E8459 | R FF | H TM E3459 | R DIAG HK L59 - DIAG HK59 |
| E6960 | E AFEE | TM E1960 | R DIAG SA-ID L60 - DIAG SA60 |
| E8460 | R FF | H TM E3460 | R DIAG HK L60 - DIAG HK60 |
| E6961 | E AFEE | TM E1961 | R DIAG SA-ID L61 - DIAG SA61 |
| E8461 | R FF | H TM E3461 | R DIAG HK L61 - DIAG HK61 |
| E6962 | E AFEE | TM E1962 | R DIAG SA-ID L62 - DIAG SA62 |
| E8462 | R FF | H TM E3462 | R DIAG HK L62 - DIAG HK62 |
| E6963 | E AFEE | TM E1963 | R DIAG SA-ID L63 - DIAG SA63 |
| E8463 | R FF | H TM E3463 | R DIAG HK L63 - DIAG HK63 |
| E6964 | E AFEE | TM E1964 | R DIAG SA-ID L64 - DIAG SA64 |
| E8464 | R FF | H TM E3464 | R DIAG HK L64 - DIAG HK64 |
| E6965 | E AFEE | TM E1965 | R DIAG SA-ID L65 - DIAG SA65 |



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| E8465 | R FF | H TM E3465 | R DIAG HK L65 - DIAG HK65 |
| E6966 | E AFEE | TM E1966 | R DIAG SA-ID L66 - DIAG SA66 |
| E8466 | R FF | H TM E3466 | R DIAG HK L66 - DIAG HK66 |
| E6967 | E AFEE | TM E1967 | R DIAG SA-ID L67 - DIAG SA67 |
| E8467 | R FF | H TM E3467 | R DIAG HK L67 - DIAG HK67 |
| E6968 | E AFEE | TM E1968 | R DIAG SA-ID L68 - DIAG SA68 |
| E8468 | R FF | H TM E3468 | R DIAG HK L68 - DIAG HK68 |
| E6969 | E AFEE | TM E1969 | R DIAG SA-ID L69 - DIAG SA69 |
| E8469 | R FF | H TM E3469 | R DIAG HK L69 - DIAG HK69 |
| E6970 | E AFEE | TM E1970 | R DIAG SA-ID L70 - DIAG SA70 |
| E8470 | R FF | H TM E3470 | R DIAG HK L70 - DIAG HK70 |
| E6971 | E AFEE | TM E1971 | R DIAG SA-ID L71 - DIAG SA71 |
| E8471 | R FF | H TM E3471 | R DIAG HK L71 - DIAG HK71 |
| E6972 | E AFEE | TM E1972 | R DIAG SA-ID L72 - DIAG SA72 |
| E8472 | R FF | H TM E3472 | R DIAG HK L72 - DIAG HK72 |
| E6973 | E AFEE | TM E1973 | R DIAG SA-ID L73 - DIAG SA73 |
| E8473 | R FF | H TM E3473 | R DIAG HK L73 - DIAG HK73 |
| E6974 | E AFEE | TM E1974 | R DIAG SA-ID L74 - DIAG SA74 |
| E8474 | R FF | H TM E3474 | R DIAG HK L74 - DIAG HK74 |
| E6975 | E AFEE | TM E1975 | R DIAG SA-ID L75 - DIAG SA75 |
| E8475 | R FF | H TM E3475 | R DIAG HK L75 - DIAG HK75 |
| E6976 | E AFEE | TM E1976 | R DIAG SA-ID L76 - DIAG SA76 |
| E8476 | R FF | H TM E3476 | R DIAG HK L76 - DIAG HK76 |
| E6977 | E AFEE | TM E1977 | R DIAG SA-ID L77 - DIAG SA77 |
| E8477 | R FF | H TM E3477 | R DIAG HK L77 - DIAG HK77 |
| E6978 | E AFEE | TM E1978 | R DIAG SA-ID L78 - DIAG SA78 |
| E8478 | R FF | H TM E3478 | R DIAG HK L78 - DIAG HK78 |
| E6979 | E AFEE | TM E1979 | R DIAG SA-ID L79 - DIAG SA79 |
| E8479 | R FF | H TM E3479 | R DIAG HK L79 - DIAG HK79 |
| E6980 | E AFEE | TM E1980 | R DIAG SA-ID L80 - DIAG SA80 |
| E8480 | R FF | H TM E3480 | R DIAG HK L80 - DIAG HK80 |
| E6981 | E AFEE | TM E1981 | R DIAG SA-ID L81 - DIAG SA81 |
| E8481 | R FF | H TM E3481 | R DIAG HK L81 - DIAG HK81 |
| E6982 | E AFEE | TM E1982 | R DIAG SA-ID L82 - DIAG SA82 |
| E8482 | R FF | H TM E3482 | R DIAG HK L82 - DIAG HK82 |
| E6983 | E AFEE | TM E1983 | R DIAG SA-ID L83 - DIAG SA83 |
| E8483 | R FF | H TM E3483 | R DIAG HK L83 - DIAG HK83 |
| E6984 | E AFEE | TM E1984 | R DIAG SA-ID L84 - DIAG SA84 |
| E8484 | R FF | H TM E3484 | R DIAG HK L84 - DIAG HK84 |
| E6985 | E AFEE | TM E1985 | R DIAG SA-ID L85 - DIAG SA85 |
| E8485 | R FF | H TM E3485 | R DIAG HK L85 - DIAG HK85 |
| E6986 | E AFEE | TM E1986 | R DIAG SA-ID L86 - DIAG SA86 |
| E8486 | R FF | H TM E3486 | R DIAG HK L86 - DIAG HK86 |
| E6987 | E AFEE | TM E1987 | R DIAG SA-ID L87 - DIAG SA87 |
| E8487 | R FF | H TM E3487 | R DIAG HK L87 - DIAG HK87 |
| E6988 | E AFEE | TM E1988 | R DIAG SA-ID L88 - DIAG SA88 |



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|-------|---|------|---|----|-------|---|------|-------|-----|---|------|------|
| E8488 | R | FF | H | TM | E3488 | R | DIAG | HK | L88 | - | DIAG | HK88 |
| E6989 | E | AFEE | | TM | E1989 | R | DIAG | SA-ID | L89 | - | DIAG | SA89 |
| E8489 | R | FF | H | TM | E3489 | R | DIAG | HK | L89 | - | DIAG | HK89 |
| E6990 | E | AFEE | | TM | E1990 | R | DIAG | SA-ID | L90 | - | DIAG | SA90 |
| E8490 | R | FF | H | TM | E3490 | R | DIAG | HK | L90 | - | DIAG | HK90 |
| E6991 | E | AFEE | | TM | E1991 | R | DIAG | SA-ID | L91 | - | DIAG | SA91 |
| E8491 | R | FF | H | TM | E3491 | R | DIAG | HK | L91 | - | DIAG | HK91 |
| E6992 | E | AFEE | | TM | E1992 | R | DIAG | SA-ID | L92 | - | DIAG | SA92 |
| E8492 | R | FF | H | TM | E3492 | R | DIAG | HK | L92 | - | DIAG | HK92 |
| E6993 | E | AFEE | | TM | E1993 | R | DIAG | SA-ID | L93 | - | DIAG | SA93 |
| E8493 | R | FF | H | TM | E3493 | R | DIAG | HK | L93 | - | DIAG | HK93 |
| E6994 | E | AFEE | | TM | E1994 | R | DIAG | SA-ID | L94 | - | DIAG | SA94 |
| E8494 | R | FF | H | TM | E3494 | R | DIAG | HK | L94 | - | DIAG | HK94 |
| E6995 | E | AFEE | | TM | E1995 | R | DIAG | SA-ID | L95 | - | DIAG | SA95 |
| E8495 | R | FF | H | TM | E3495 | R | DIAG | HK | L95 | - | DIAG | HK95 |
| E6996 | E | AFEE | | TM | E1996 | R | DIAG | SA-ID | L96 | - | DIAG | SA96 |
| E8496 | R | FF | H | TM | E3496 | R | DIAG | HK | L96 | - | DIAG | HK96 |

2.2.4.4. ES1710_AF-CH-OO_def-grnd_0001.TPF

ES1710 S
M F 41

2002-05-17T18:42:41Z - SPI1 AFEE Chains On/Off Config

| | | | | | | | | | | | | | | |
|-------|---|-----|----|-------|---|----|---------|-----|---|----------|-----|-------------------|--------|---------|
| E5177 | E | ON | TM | E0177 | R | AF | LVPS-00 | L7 | - | Detector | #7 | Low Power Supply | ON/OFF | command |
| E5176 | E | ON | TM | E0176 | R | AF | LVPS-00 | L6 | - | Detector | #6 | Low Power Supply | ON/OFF | command |
| E5175 | E | ON | TM | E0175 | R | AF | LVPS-00 | L5 | - | Detector | #5 | Low Power Supply | ON/OFF | command |
| E5174 | E | ON | TM | E0174 | R | AF | LVPS-00 | L4 | - | Detector | #4 | Low Power Supply | ON/OFF | command |
| E5173 | E | ON | TM | E0173 | R | AF | LVPS-00 | L3 | - | Detector | #3 | Low Power Supply | ON/OFF | command |
| E5172 | E | ON | TM | E0172 | R | AF | LVPS-00 | L2 | - | Detector | #2 | Low Power Supply | ON/OFF | command |
| E5171 | E | ON | TM | E0171 | R | AF | LVPS-00 | L1 | - | Detector | #1 | Low Power Supply | ON/OFF | command |
| E5170 | E | ON | TM | E0170 | R | AF | LVPS-00 | L0 | - | Detector | #0 | Low Power Supply | ON/OFF | command |
| E5185 | E | ON | TM | E0185 | R | AF | LVPS-00 | L15 | - | Detector | #15 | Low Power Supply | ON/OFF | command |
| E5184 | E | ON | TM | E0184 | R | AF | LVPS-00 | L14 | - | Detector | #14 | Low Power Supply | ON/OFF | command |
| E5183 | E | ON | TM | E0183 | R | AF | LVPS-00 | L13 | - | Detector | #13 | Low Power Supply | ON/OFF | command |
| E5182 | E | ON | TM | E0182 | R | AF | LVPS-00 | L12 | - | Detector | #12 | Low Power Supply | ON/OFF | command |
| E5181 | E | ON | TM | E0181 | R | AF | LVPS-00 | L11 | - | Detector | #11 | Low Power Supply | ON/OFF | command |
| E5180 | E | ON | TM | E0180 | R | AF | LVPS-00 | L10 | - | Detector | #10 | Low Power Supply | ON/OFF | command |
| E5179 | E | ON | TM | E0179 | R | AF | LVPS-00 | L9 | - | Detector | #9 | Low Power Supply | ON/OFF | command |
| E5178 | E | ON | TM | E0178 | R | AF | LVPS-00 | L8 | - | Detector | #8 | Low Power Supply | ON/OFF | command |
| E5188 | E | ON | TM | E0188 | R | AF | LVPS-00 | L18 | - | Detector | #18 | Low Power Supply | ON/OFF | command |
| E5187 | E | ON | TM | E0187 | R | AF | LVPS-00 | L17 | - | Detector | #17 | Low Power Supply | ON/OFF | command |
| E5186 | E | ON | TM | E0186 | R | AF | LVPS-00 | L16 | - | Detector | #16 | Low Power Supply | ON/OFF | command |
| E5197 | E | OFF | TM | E0197 | R | AF | HVPS-00 | L7 | - | Detector | #7 | High Power Supply | ON/OFF | command |



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| E5196 | E OFF | TM E0196 | R AF HVPS-00 L6 - Detector | #6 High Power Supply ON/OFF command |
| E5195 | E OFF | TM E0195 | R AF HVPS-00 L5 - Detector | #5 High Power Supply ON/OFF command |
| E5194 | E OFF | TM E0194 | R AF HVPS-00 L4 - Detector | #4 High Power Supply ON/OFF command |
| E5193 | E OFF | TM E0193 | R AF HVPS-00 L3 - Detector | #3 High Power Supply ON/OFF command |
| E5192 | E OFF | TM E0192 | R AF HVPS-00 L2 - Detector | #2 High Power Supply ON/OFF command |
| E5191 | E OFF | TM E0191 | R AF HVPS-00 L1 - Detector | #1 High Power Supply ON/OFF command |
| E5190 | E OFF | TM E0190 | R AF HVPS-00 L0 - Detector | #0 High Power Supply ON/OFF command |
| E5205 | E OFF | TM E0205 | R AF HVPS-00 L15 - Detector | #15 High Power Supply ON/OFF command |
| E5204 | E OFF | TM E0204 | R AF HVPS-00 L14 - Detector | #14 High Power Supply ON/OFF command |
| E5203 | E OFF | TM E0203 | R AF HVPS-00 L13 - Detector | #13 High Power Supply ON/OFF command |
| E5202 | E OFF | TM E0202 | R AF HVPS-00 L12 - Detector | #12 High Power Supply ON/OFF command |
| E5201 | E OFF | TM E0201 | R AF HVPS-00 L11 - Detector | #11 High Power Supply ON/OFF command |
| E5200 | E OFF | TM E0200 | R AF HVPS-00 L10 - Detector | #10 High Power Supply ON/OFF command |
| E5199 | E OFF | TM E0199 | R AF HVPS-00 L9 - Detector | #9 High Power Supply ON/OFF command |
| E5198 | E OFF | TM E0198 | R AF HVPS-00 L8 - Detector | #8 High Power Supply ON/OFF command |
| E5208 | E OFF | TM E0208 | R AF HVPS-00 L18 - Detector | #18 High Power Supply ON/OFF command |
| E5207 | E OFF | TM E0207 | R AF HVPS-00 L17 - Detector | #17 High Power Supply ON/OFF command |
| E5206 | E OFF | TM E0206 | R AF HVPS-00 L16 - Detector | #16 High Power Supply ON/OFF command |
| E5209 | E 62K/128K | TM E0209 | R CR CRY-RNG L - Temperature range selection for Cold Plate and Thermal Braids | |
| E5003 | E OUTGASSING | TM E0003 | R CR ANLG-1 L - Outgassing/annealing selection for system 1 | |
| E5004 | E OUTGASSING | TM E0004 | R CR ANLG-2 L - Outgassing/annealing selection for system 2 | |

2.2.4.5. ES1710_AF-CH-OO_outgasng_0001.TPF

ES1710 S
M F 41

2002-05-17T19:00:58Z - SPI1 AFEE Chains On/Off Config

| | | | | |
|-------|------|----------|-----------------------------|-------------------------------------|
| E5177 | E ON | TM E0177 | R AF LVPS-00 L7 - Detector | #7 Low Power Supply ON/OFF command |
| E5176 | E ON | TM E0176 | R AF LVPS-00 L6 - Detector | #6 Low Power Supply ON/OFF command |
| E5175 | E ON | TM E0175 | R AF LVPS-00 L5 - Detector | #5 Low Power Supply ON/OFF command |
| E5174 | E ON | TM E0174 | R AF LVPS-00 L4 - Detector | #4 Low Power Supply ON/OFF command |
| E5173 | E ON | TM E0173 | R AF LVPS-00 L3 - Detector | #3 Low Power Supply ON/OFF command |
| E5172 | E ON | TM E0172 | R AF LVPS-00 L2 - Detector | #2 Low Power Supply ON/OFF command |
| E5171 | E ON | TM E0171 | R AF LVPS-00 L1 - Detector | #1 Low Power Supply ON/OFF command |
| E5170 | E ON | TM E0170 | R AF LVPS-00 L0 - Detector | #0 Low Power Supply ON/OFF command |
| E5185 | E ON | TM E0185 | R AF LVPS-00 L15 - Detector | #15 Low Power Supply ON/OFF command |
| E5184 | E ON | TM E0184 | R AF LVPS-00 L14 - Detector | #14 Low Power Supply ON/OFF command |
| E5183 | E ON | TM E0183 | R AF LVPS-00 L13 - Detector | #13 Low Power Supply ON/OFF command |
| E5182 | E ON | TM E0182 | R AF LVPS-00 L12 - Detector | #12 Low Power Supply ON/OFF command |
| E5181 | E ON | TM E0181 | R AF LVPS-00 L11 - Detector | #11 Low Power Supply ON/OFF command |
| E5180 | E ON | TM E0180 | R AF LVPS-00 L10 - Detector | #10 Low Power Supply ON/OFF command |
| E5179 | E ON | TM E0179 | R AF LVPS-00 L9 - Detector | #9 Low Power Supply ON/OFF command |
| E5178 | E ON | TM E0178 | R AF LVPS-00 L8 - Detector | #8 Low Power Supply ON/OFF command |



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|-------|--------------|-----------------------------------------------------------------------------------------|--------------------------------------|
| E5188 | E ON | TM E0188 R AF LVPS-00 L18 - Detector | #18 Low Power Supply ON/OFF command |
| E5187 | E ON | TM E0187 R AF LVPS-00 L17 - Detector | #17 Low Power Supply ON/OFF command |
| E5186 | E ON | TM E0186 R AF LVPS-00 L16 - Detector | #16 Low Power Supply ON/OFF command |
| E5197 | E OFF | TM E0197 R AF HVPS-00 L7 - Detector | #7 High Power Supply ON/OFF command |
| E5196 | E OFF | TM E0196 R AF HVPS-00 L6 - Detector | #6 High Power Supply ON/OFF command |
| E5195 | E OFF | TM E0195 R AF HVPS-00 L5 - Detector | #5 High Power Supply ON/OFF command |
| E5194 | E OFF | TM E0194 R AF HVPS-00 L4 - Detector | #4 High Power Supply ON/OFF command |
| E5193 | E OFF | TM E0193 R AF HVPS-00 L3 - Detector | #3 High Power Supply ON/OFF command |
| E5192 | E OFF | TM E0192 R AF HVPS-00 L2 - Detector | #2 High Power Supply ON/OFF command |
| E5191 | E OFF | TM E0191 R AF HVPS-00 L1 - Detector | #1 High Power Supply ON/OFF command |
| E5190 | E OFF | TM E0190 R AF HVPS-00 L0 - Detector | #0 High Power Supply ON/OFF command |
| E5205 | E OFF | TM E0205 R AF HVPS-00 L15 - Detector | #15 High Power Supply ON/OFF command |
| E5204 | E OFF | TM E0204 R AF HVPS-00 L14 - Detector | #14 High Power Supply ON/OFF command |
| E5203 | E OFF | TM E0203 R AF HVPS-00 L13 - Detector | #13 High Power Supply ON/OFF command |
| E5202 | E OFF | TM E0202 R AF HVPS-00 L12 - Detector | #12 High Power Supply ON/OFF command |
| E5201 | E OFF | TM E0201 R AF HVPS-00 L11 - Detector | #11 High Power Supply ON/OFF command |
| E5200 | E OFF | TM E0200 R AF HVPS-00 L10 - Detector | #10 High Power Supply ON/OFF command |
| E5199 | E OFF | TM E0199 R AF HVPS-00 L9 - Detector | #9 High Power Supply ON/OFF command |
| E5198 | E OFF | TM E0198 R AF HVPS-00 L8 - Detector | #8 High Power Supply ON/OFF command |
| E5208 | E OFF | TM E0208 R AF HVPS-00 L18 - Detector | #18 High Power Supply ON/OFF command |
| E5207 | E OFF | TM E0207 R AF HVPS-00 L17 - Detector | #17 High Power Supply ON/OFF command |
| E5206 | E OFF | TM E0206 R AF HVPS-00 L16 - Detector | #16 High Power Supply ON/OFF command |
| E5209 | E 62K/410K | TM E0209 R CR CRY-RNG L - Temperature range selection for Cold Plate and Thermal Braids | |
| E5003 | E OUTGASSING | TM E0003 R CR ANLG-1 L - Outgassing/annealing selection for system 1 | |
| E5004 | E OUTGASSING | TM E0004 R CR ANLG-2 L - Outgassing/annealing selection for system 2 | |

2.2.4.6. ES1710_AF-CH-OO_annealng_0001.TPF

ES1710 S
M F 41

2002-05-21T16:33:52Z - SPI1 AFEE Chains On/Off Config

| | | | | |
|-------|---|----|--------------------------------------|-------------------------------------|
| E5177 | E | ON | TM E0177 R AF LVPS-00 L7 - Detector | #7 Low Power Supply ON/OFF command |
| E5176 | E | ON | TM E0176 R AF LVPS-00 L6 - Detector | #6 Low Power Supply ON/OFF command |
| E5175 | E | ON | TM E0175 R AF LVPS-00 L5 - Detector | #5 Low Power Supply ON/OFF command |
| E5174 | E | ON | TM E0174 R AF LVPS-00 L4 - Detector | #4 Low Power Supply ON/OFF command |
| E5173 | E | ON | TM E0173 R AF LVPS-00 L3 - Detector | #3 Low Power Supply ON/OFF command |
| E5172 | E | ON | TM E0172 R AF LVPS-00 L2 - Detector | #2 Low Power Supply ON/OFF command |
| E5171 | E | ON | TM E0171 R AF LVPS-00 L1 - Detector | #1 Low Power Supply ON/OFF command |
| E5170 | E | ON | TM E0170 R AF LVPS-00 L0 - Detector | #0 Low Power Supply ON/OFF command |
| E5185 | E | ON | TM E0185 R AF LVPS-00 L15 - Detector | #15 Low Power Supply ON/OFF command |
| E5184 | E | ON | TM E0184 R AF LVPS-00 L14 - Detector | #14 Low Power Supply ON/OFF command |
| E5183 | E | ON | TM E0183 R AF LVPS-00 L13 - Detector | #13 Low Power Supply ON/OFF command |
| E5182 | E | ON | TM E0182 R AF LVPS-00 L12 - Detector | #12 Low Power Supply ON/OFF command |



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|--------|---|-----------|----------------------------------------------------------------------------------|--------------------------------------|
| E5181 | E | ON | TM E0181 R AF LVPS-00 L11 - Detector | #11 Low Power Supply ON/OFF command |
| E5180 | E | ON | TM E0180 R AF LVPS-00 L10 - Detector | #10 Low Power Supply ON/OFF command |
| E5179 | E | ON | TM E0179 R AF LVPS-00 L9 - Detector | #9 Low Power Supply ON/OFF command |
| E5178 | E | ON | TM E0178 R AF LVPS-00 L8 - Detector | #8 Low Power Supply ON/OFF command |
| E5188 | E | ON | TM E0188 R AF LVPS-00 L18 - Detector | #18 Low Power Supply ON/OFF command |
| E5187 | E | ON | TM E0187 R AF LVPS-00 L17 - Detector | #17 Low Power Supply ON/OFF command |
| E5186 | E | ON | TM E0186 R AF LVPS-00 L16 - Detector | #16 Low Power Supply ON/OFF command |
| E5197 | E | OFF | TM E0197 R AF HVPS-00 L7 - Detector | #7 High Power Supply ON/OFF command |
| E5196 | E | OFF | TM E0196 R AF HVPS-00 L6 - Detector | #6 High Power Supply ON/OFF command |
| E5195 | E | OFF | TM E0195 R AF HVPS-00 L5 - Detector | #5 High Power Supply ON/OFF command |
| E5194 | E | OFF | TM E0194 R AF HVPS-00 L4 - Detector | #4 High Power Supply ON/OFF command |
| E5193 | E | OFF | TM E0193 R AF HVPS-00 L3 - Detector | #3 High Power Supply ON/OFF command |
| E5192 | E | OFF | TM E0192 R AF HVPS-00 L2 - Detector | #2 High Power Supply ON/OFF command |
| E5191 | E | OFF | TM E0191 R AF HVPS-00 L1 - Detector | #1 High Power Supply ON/OFF command |
| E5190 | E | OFF | TM E0190 R AF HVPS-00 L0 - Detector | #0 High Power Supply ON/OFF command |
| E5205 | E | OFF | TM E0205 R AF HVPS-00 L15 - Detector | #15 High Power Supply ON/OFF command |
| E5204 | E | OFF | TM E0204 R AF HVPS-00 L14 - Detector | #14 High Power Supply ON/OFF command |
| E5203 | E | OFF | TM E0203 R AF HVPS-00 L13 - Detector | #13 High Power Supply ON/OFF command |
| E5202 | E | OFF | TM E0202 R AF HVPS-00 L12 - Detector | #12 High Power Supply ON/OFF command |
| E5201 | E | OFF | TM E0201 R AF HVPS-00 L11 - Detector | #11 High Power Supply ON/OFF command |
| E5200 | E | OFF | TM E0200 R AF HVPS-00 L10 - Detector | #10 High Power Supply ON/OFF command |
| E5199 | E | OFF | TM E0199 R AF HVPS-00 L9 - Detector | #9 High Power Supply ON/OFF command |
| E5198 | E | OFF | TM E0198 R AF HVPS-00 L8 - Detector | #8 High Power Supply ON/OFF command |
| E5208 | E | OFF | TM E0208 R AF HVPS-00 L18 - Detector | #18 High Power Supply ON/OFF command |
| E5207 | E | OFF | TM E0207 R AF HVPS-00 L17 - Detector | #17 High Power Supply ON/OFF command |
| E5206 | E | OFF | TM E0206 R AF HVPS-00 L16 - Detector | #16 High Power Supply ON/OFF command |
| E5209 | E | 62K/410K | TM E0209 R CR CRY-RNG L - Temperature range selection for Cold Plate and Thermal | |
| Braids | | | | |
| E5003 | E | ANNEALING | TM E0003 R CR ANLG-1 L - Outgassing/annealing selection for system 1 | |
| E5004 | E | ANNEALING | TM E0004 R CR ANLG-2 L - Outgassing/annealing selection for system 2 | |

2.2.4.7. ES1740_PD-DETED_fmconfig_0002.TPF

ES1740 S
M F 48

2002-05-17T18:52:46Z - SPI1 PSD Detectors Enable/Disable

| | | | |
|-------|---|--------|---------------------------------------------------------|
| E8657 | E | ENABLE | TM E3657 R PD DE-OP L7 - Disable/enable for detector #7 |
| E8656 | E | ENABLE | TM E3656 R PD DE-OP L6 - Disable/enable for detector #6 |
| E8655 | E | ENABLE | TM E3655 R PD DE-OP L5 - Disable/enable for detector #5 |
| E8654 | E | ENABLE | TM E3654 R PD DE-OP L4 - Disable/enable for detector #4 |
| E8653 | E | ENABLE | TM E3653 R PD DE-OP L3 - Disable/enable for detector #3 |
| E8652 | E | ENABLE | TM E3652 R PD DE-OP L2 - Disable/enable for detector #2 |
| E8651 | E | ENABLE | TM E3651 R PD DE-OP L1 - Disable/enable for detector #1 |



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|-------|---|---------|------------|---|----|---------|-----|----------------------------------------------------------|
| E8650 | E | ENABLE | TM E3650 | R | PD | DE-OP | L0 | - Disable/enable for detector #0 |
| E8665 | E | ENABLE | TM E3665 | R | PD | DE-OP | L15 | - Disable/enable for detector #15 |
| E8664 | E | ENABLE | TM E3664 | R | PD | DE-OP | L14 | - Disable/enable for detector #14 |
| E8663 | E | ENABLE | TM E3663 | R | PD | DE-OP | L13 | - Disable/enable for detector #13 |
| E8662 | E | ENABLE | TM E3662 | R | PD | DE-OP | L12 | - Disable/enable for detector #12 |
| E8661 | E | ENABLE | TM E3661 | R | PD | DE-OP | L11 | - Disable/enable for detector #11 |
| E8660 | E | ENABLE | TM E3660 | R | PD | DE-OP | L10 | - Disable/enable for detector #10 |
| E8659 | E | ENABLE | TM E3659 | R | PD | DE-OP | L9 | - Disable/enable for detector #9 |
| E8658 | E | ENABLE | TM E3658 | R | PD | DE-OP | L8 | - Disable/enable for detector #8 |
| E8604 | E | 6.9 MV | TM E3604 | R | PD | LWD-OP | L1 | - Low level discriminator for OPER and CAL modes (LSB) |
| E8603 | E | 2.5 MV | TM E3603 | R | PD | TRG-OP | L | - Global front end trigger for operational and CAL modes |
| E8668 | E | ENABLE | TM E3668 | R | PD | DE-OP | L18 | - Disable/enable for detector #18 |
| E8667 | E | ENABLE | TM E3667 | R | PD | DE-OP | L17 | - Disable/enable for detector #17 |
| E8666 | E | ENABLE | TM E3666 | R | PD | DE-OP | L16 | - Disable/enable for detector #16 |
| E8607 | E | 0/2 MEV | TM E3607 | R | PD | GNC-OP | L | - Gain control for OPER and CAL modes |
| E8606 | E | 354 NS | TM E3606 | R | PD | TIME-OP | L | - Time window for OPER and CAL modes |
| E8605 | R | 0 | D TM E3605 | R | PD | LWD-OP | L2 | - Low level discriminator for OPER and CAL modes(MSB) |
| E8617 | E | ENABLE | TM E3617 | R | PD | DE-DG | L7 | - DIS/ENA for detector #7 for DIAG mode |
| E8616 | E | ENABLE | TM E3616 | R | PD | DE-DG | L6 | - DIS/ENA for detector #6 for DIAG mode |
| E8615 | E | ENABLE | TM E3615 | R | PD | DE-DG | L5 | - DIS/ENA for detector #5 for DIAG mode |
| E8614 | E | ENABLE | TM E3614 | R | PD | DE-DG | L4 | - DIS/ENA for detector #4 for DIAG mode |
| E8613 | E | ENABLE | TM E3613 | R | PD | DE-DG | L3 | - DIS/ENA for detector #3 for DIAG mode |
| E8612 | E | ENABLE | TM E3612 | R | PD | DE-DG | L2 | - DIS/ENA for detector #2 for DIAG mode |
| E8611 | E | ENABLE | TM E3611 | R | PD | DE-DG | L1 | - DIS/ENA for detector #1 for DIAG mode |
| E8610 | E | ENABLE | TM E3610 | R | PD | DE-DG | L0 | - DIS/ENA for detector #0 for DIAG mode |
| E8625 | E | ENABLE | TM E3625 | R | PD | DE-DG | L15 | - DIS/ENA for detector #15 for DIAG mode |
| E8624 | E | ENABLE | TM E3624 | R | PD | DE-DG | L14 | - DIS/ENA for detector #14 for DIAG mode |
| E8623 | E | ENABLE | TM E3623 | R | PD | DE-DG | L13 | - DIS/ENA for detector #13 for DIAG mode |
| E8622 | E | ENABLE | TM E3622 | R | PD | DE-DG | L12 | - DIS/ENA for detector #12 for DIAG mode |
| E8621 | E | ENABLE | TM E3621 | R | PD | DE-DG | L11 | - DIS/ENA for detector #11 for DIAG mode |
| E8620 | E | ENABLE | TM E3620 | R | PD | DE-DG | L10 | - DIS/ENA for detector #10 for DIAG mode |
| E8619 | E | ENABLE | TM E3619 | R | PD | DE-DG | L9 | - DIS/ENA for detector #9 for DIAG mode |
| E8618 | E | ENABLE | TM E3618 | R | PD | DE-DG | L8 | - DIS/ENA for detector #8 for DIAG mode |
| E8630 | E | 6.9 MV | TM E3630 | R | PD | LWD-DG | L1 | - Low level discriminator for DIAG mode (LSB) |
| E8629 | E | 2.5 MV | TM E3629 | R | PD | TRG-DG | L | - Global Front End trigger for DIAG mode |
| E8628 | E | ENABLE | TM E3628 | R | PD | DE-DG | L18 | - DIS/ENA for detector #18 for DIAG mode |
| E8627 | E | ENABLE | TM E3627 | R | PD | DE-DG | L17 | - DIS/ENA for detector #17 for DIAG mode |
| E8626 | E | ENABLE | TM E3626 | R | PD | DE-DG | L16 | - DIS/ENA for detector #16 for DIAG mode |
| E8633 | E | 0/2 MEV | TM E3633 | R | PD | GNC-DGL | L | - Gain control for DIAG mode |
| E8632 | E | 354 NS | TM E3632 | R | PD | TIME-DG | L | - Time window for DIAG mode |
| E8631 | R | 0 | D TM E3631 | R | PD | LWD-DG | L2 | - Low level discriminator for DIAG mode(MSB) |

2.2.4.8. ES1741_PD-LWTHR_fmconfig_0003.TPF



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ES1741_PD-LWTHR_fmconfig_0002.TPF - 2002-06-13T16:00:27Z - SPI1 PSD Energy Low Thresholds

| | | |
|-------|-----|----------------------------------------------------------------------------|
| E8758 | R 2 | D TM E3758 R PD NB-EV-8H L - Number of postprocessed events after 8Hz edge |
| E8670 | E 0 | TM E3670 R PD LOW-TH L0 - Low Threshold for detector 0 |
| E8671 | E 0 | TM E3671 R PD LOW-TH L1 - Low Threshold for detector 1 |
| E8672 | E 0 | TM E3672 R PD LOW-TH L2 - Low Threshold for detector 2 |
| E8673 | E 0 | TM E3673 R PD LOW-TH L3 - Low Threshold for detector 3 |
| E8674 | E 0 | TM E3674 R PD LOW-TH L4 - Low Threshold for detector 4 |
| E8675 | E 0 | TM E3675 R PD LOW-TH L5 - Low Threshold for detector 5 |
| E8676 | E 0 | TM E3676 R PD LOW-TH L6 - Low Threshold for detector 6 |
| E8677 | E 0 | TM E3677 R PD LOW-TH L7 - Low Threshold for detector 7 |
| E8678 | E 0 | TM E3678 R PD LOW-TH L8 - Low Threshold for detector 8 |
| E8679 | E 0 | TM E3679 R PD LOW-TH L9 - Low Threshold for detector 9 |
| E8680 | E 0 | TM E3680 R PD LOW-TH L10 - Low Threshold for detector 10 |
| E8681 | E 0 | TM E3681 R PD LOW-TH L11 - Low Threshold for detector 11 |
| E8682 | E 0 | TM E3682 R PD LOW-TH L12 - Low Threshold for detector 12 |
| E8683 | E 0 | TM E3683 R PD LOW-TH L13 - Low Threshold for detector 13 |
| E8684 | E 0 | TM E3684 R PD LOW-TH L14 - Low Threshold for detector 14 |
| E8685 | E 0 | TM E3685 R PD LOW-TH L15 - Low Threshold for detector 15 |
| E8686 | E 0 | TM E3686 R PD LOW-TH L16 - Low Threshold for detector 16 |
| E8687 | E 0 | TM E3687 R PD LOW-TH L17 - Low Threshold for detector 17 |
| E8688 | E 0 | TM E3688 R PD LOW-TH L18 - Low Threshold for detector 18 |

2.2.4.9. ES1742_PD-HGTHR_fmconfig_0002.TPF

ES1742 S
M F 19

2002-05-17T18:53:40Z - SPI1 PSD Energy High Thresholds

| | | |
|-------|-------|------------------------------------------------------------|
| E8690 | E 511 | TM E3690 R PD HIGH-TH L0 - High Threshold for detector 0 |
| E8691 | E 511 | TM E3691 R PD HIGH-TH L1 - High Threshold for detector 1 |
| E8692 | E 511 | TM E3692 R PD HIGH-TH L2 - High Threshold for detector 2 |
| E8693 | E 511 | TM E3693 R PD HIGH-TH L3 - High Threshold for detector 3 |
| E8694 | E 511 | TM E3694 R PD HIGH-TH L4 - High Threshold for detector 4 |
| E8695 | E 511 | TM E3695 R PD HIGH-TH L5 - High Threshold for detector 5 |
| E8696 | E 511 | TM E3696 R PD HIGH-TH L6 - High Threshold for detector 6 |
| E8697 | E 511 | TM E3697 R PD HIGH-TH L7 - High Threshold for detector 7 |
| E8698 | E 511 | TM E3698 R PD HIGH-TH L8 - High Threshold for detector 8 |
| E8699 | E 511 | TM E3699 R PD HIGH-TH L9 - High Threshold for detector 9 |
| E8700 | E 511 | TM E3700 R PD HIGH-TH L10 - High Threshold for detector 10 |
| E8701 | E 511 | TM E3701 R PD HIGH-TH L11 - High Threshold for detector 11 |
| E8702 | E 511 | TM E3702 R PD HIGH-TH L12 - High Threshold for detector 12 |



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|-------|-------|------------------------------------------------------------|
| E8703 | E 511 | TM E3703 R PD HIGH-TH L13 - High Threshold for detector 13 |
| E8704 | E 511 | TM E3704 R PD HIGH-TH L14 - High Threshold for detector 14 |
| E8705 | E 511 | TM E3705 R PD HIGH-TH L15 - High Threshold for detector 15 |
| E8706 | E 511 | TM E3706 R PD HIGH-TH L16 - High Threshold for detector 16 |
| E8707 | E 511 | TM E3707 R PD HIGH-TH L17 - High Threshold for detector 17 |
| E8708 | E 511 | TM E3708 R PD HIGH-TH L18 - High Threshold for detector 18 |

2.2.4.10. ES1743_PD-ADOFS_fmconfig_0001.TPF

ES1743 S
M F 8

2002-05-17T18:54:09Z - SPI1 PSD AD Offsets

| | | |
|-------|-----|------------------------------------------------------------------|
| E8643 | R 0 | D TM E3643 R PD GN-CONV L0 - Gain adjustement for converter 0 |
| E8647 | R 0 | D TM E3647 R PD OFS-CONV L0 - Offset adjustement for converter 0 |
| E8644 | R 0 | D TM E3644 R PD GN-CONV L1 - Gain adjustement for converter 1 |
| E8648 | R 0 | D TM E3648 R PD OFS-CONV L1 - Offset adjustement for converter 1 |
| E8645 | R 0 | D TM E3645 R PD GN-CONV L2 - Gain adjustement for converter 2 |
| E8649 | R 0 | D TM E3649 R PD OFS-CONV L2 - Offset adjustement for converter 2 |
| E8646 | R 0 | D TM E3646 R PD GN-CONV L3 - Gain adjustement for converter 3 |
| E8709 | R 0 | D TM E3709 R PD OFS-CONV L3 - Offset adjustement for converter 3 |

2.2.4.11. ES1744_PD-LIBSL_fmconfig_0002.TPF

ES1744 S
M F 95

2002-05-17T18:54:40Z - SPI1 PSD Library Selection and Control

| | | |
|-------|------|------------------------------------------------------------------|
| E8711 | R 0 | D TM E3711 R PD EVWK5 L0 - Event word decode K5 for detector 0 |
| E8710 | R 0 | D TM E3710 R PD LIB-SEL L0 - Library selection for detector 0 |
| E8712 | R 64 | D TM E3712 R PD NB-STEP L0 - Number of time steps for detector 0 |
| E8713 | R 23 | D TM E3713 R PD NB-TMPL L0 - Number of templates for detector 0 |
| E8714 | R 0 | D TM E3714 R PD PARAK3 L0 - Decode parameter K3 for detector 0 |
| E8716 | R 0 | D TM E3716 R PD EVWK5 L1 - Event word decode K5 for detector 1 |
| E8715 | R 0 | D TM E3715 R PD LIB-SEL L1 - Library selection for detector 1 |
| E8717 | R 64 | D TM E3717 R PD NB-STEP L1 - Number of time steps for detector 1 |
| E8718 | R 23 | D TM E3718 R PD NB-TMPL L1 - Number of templates for detector 1 |
| E8719 | R 0 | D TM E3719 R PD PARAK3 L1 - Decode parameter K3 for detector 1 |
| E8721 | R 0 | D TM E3721 R PD EVWK5 L2 - Event word decode K5 for detector 2 |
| E8720 | R 0 | D TM E3720 R PD LIB-SEL L2 - Library selection for detector 2 |
| E8722 | R 64 | D TM E3722 R PD NB-STEP L2 - Number of time steps for detector 2 |
| E8723 | R 23 | D TM E3723 R PD NB-TMPL L2 - Number of templates for detector 2 |
| E8724 | R 0 | D TM E3724 R PD PARAK3 L2 - Decode parameter K3 for detector 2 |



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| | | |
|-------|------|--------------------------------------------------------------------|
| E8726 | R 0 | D TM E3726 R PD EVWK5 L3 - Event word decode K5 for detector 3 |
| E8725 | R 0 | D TM E3725 R PD LIB-SEL L3 - Library selection for detector 3 |
| E8727 | R 64 | D TM E3727 R PD NB-STEP L3 - Number of time steps for detector 3 |
| E8728 | R 23 | D TM E3728 R PD NB-TMPL L3 - Number of templates for detector 3 |
| E8729 | R 0 | D TM E3729 R PD PARAK3 L3 - Decode parameter K3 for detector 3 |
| E8731 | R 0 | D TM E3731 R PD EVWK5 L4 - Event word decode K5 for detector 4 |
| E8730 | R 0 | D TM E3730 R PD LIB-SEL L4 - Library selection for detector 4 |
| E8732 | R 64 | D TM E3732 R PD NB-STEP L4 - Number of time steps for detector 4 |
| E8733 | R 23 | D TM E3733 R PD NB-TMPL L4 - Number of templates for detector 4 |
| E8734 | R 0 | D TM E3734 R PD PARAK3 L4 - Decode parameter K3 for detector 4 |
| E8736 | R 0 | D TM E3736 R PD EVWK5 L5 - Event word decode K5 for detector 5 |
| E8735 | R 0 | D TM E3735 R PD LIB-SEL L5 - Library selection for detector 5 |
| E8737 | R 64 | D TM E3737 R PD NB-STEP L5 - Number of time steps for detector 5 |
| E8738 | R 23 | D TM E3738 R PD NB-TMPL L5 - Number of templates for detector 5 |
| E8739 | R 0 | D TM E3739 R PD PARAK3 L5 - Decode parameter K3 for detector 5 |
| E8741 | R 0 | D TM E3741 R PD EVWK5 L6 - Event word decode K5 for detector 6 |
| E8740 | R 0 | D TM E3740 R PD LIB-SEL L6 - Library selection for detector 6 |
| E8742 | R 64 | D TM E3742 R PD NB-STEP L6 - Number of time steps for detector 6 |
| E8743 | R 23 | D TM E3743 R PD NB-TMPL L6 - Number of templates for detector 6 |
| E8744 | R 0 | D TM E3744 R PD PARAK3 L6 - Decode parameter K3 for detector 6 |
| E8291 | R 0 | D TM E3291 R PD EVWK5 L7 - Event word decode K5 for detector 7 |
| E8290 | R 0 | D TM E3290 R PD LIB-SEL L7 - Library selection for detector #7 |
| E8292 | R 64 | D TM E3292 R PD NB-STEP L7 - Number of time steps for detector #7 |
| E8293 | R 23 | D TM E3293 R PD NB-TMPL L7 - Number of templates for detector #7 |
| E8294 | R 0 | D TM E3294 R PD PARAK3 L7 - Decode parameter K3 for detector #7 |
| E8296 | R 0 | D TM E3296 R PD EVWK5 L8 - Event word decode K5 for detector #8 |
| E8295 | R 0 | D TM E3295 R PD LIB-SEL L8 - Library selection for detector #8 |
| E8297 | R 64 | D TM E3297 R PD NB-STEP L8 - Number of time steps for detector #8 |
| E8298 | R 23 | D TM E3298 R PD NB-TMPL L8 - Number of templates for detector #8 |
| E8299 | R 0 | D TM E3299 R PD PARAK3 L8 - Decode parameter k3 for detector #8 |
| E8311 | R 0 | D TM E3311 R PD EVWK5 L9 - Event word decode K5 for detector 9 |
| E8310 | R 0 | D TM E3310 R PD LIB-SEL L9 - Library selection for detector 9 |
| E8312 | R 64 | D TM E3312 R PD NB-STEP L9 - Number of steps for detector 9 |
| E8313 | R 23 | D TM E3313 R PD NB-TMPL L9 - Number of templates for detector 9 |
| E8314 | R 0 | D TM E3314 R PD PARAK3 L9 - Decode parameter K3 for detector 9 |
| E8316 | R 0 | D TM E3316 R PD EVWK5 L10 - Event word decode K5 for detector 10 |
| E8315 | R 0 | D TM E3315 R PD LIB-SEL L10 - Library electio for detector 10 |
| E8317 | R 64 | D TM E3317 R PD NB-STEP L10 - Number of time steps for detector 10 |
| E8318 | R 23 | D TM E3318 R PD NB-TMPL L10 - Number of templates for detector 10 |
| E8319 | R 0 | D TM E3319 R PD PARAK3 L10 - Decode parameter K3 for detector 10 |
| E8502 | R 0 | D TM E3502 R PD EVWK5 L11 - Event decode K5 for detector 11 |
| E8501 | R 0 | D TM E3501 R PD LIB-SEL L11 - Library selection for detector 11 |
| E8503 | R 64 | D TM E3503 R PD NB-STEP L11 - Number of time steps for detector 11 |
| E8504 | R 23 | D TM E3504 R PD NB-TMPL L11 - Number of templates for detector 11 |
| E8505 | R 0 | D TM E3505 R PD PARAK3 L11 - Decode parameter K3 for detector 11 |
| E8507 | R 0 | D TM E3507 R PD EVWK5 L12 - Event word decode K5 for detector 12 |



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| E8506 | R 0 | D TM E3506 R PD LIB-SEL L12 - Library selection for detector 12 |
| E8508 | R 64 | D TM E3508 R PD NB-STEP L12 - Number of time steps for detector 12 |
| E8509 | R 23 | D TM E3509 R PD NB-TMPL L12 - Number of templates for detector 12 |
| E8510 | R 0 | D TM E3510 R PD PARAK3 L12 - Decode parameter K3 for detector 12 |
| E8521 | R 0 | D TM E3521 R PD EVWK5 L13 - Event word decode K5 for detector 13 |
| E8520 | R 0 | D TM E3520 R PD LIB-SEL L13 - Library selection for detector 13 |
| E8522 | R 64 | D TM E3522 R PD NB-STEP L13 - Number of time steps for detector 13 |
| E8523 | R 23 | D TM E3523 R PD NB-TMPL L13 - Number of templates for detector 13 |
| E8524 | R 0 | D TM E3524 R PD PARAK3 L13 - Decode parameter K3 for detector 13 |
| E8526 | R 0 | D TM E3526 R PD EVWK5 L14 - Event word decode K5 for detector 14 |
| E8525 | R 0 | D TM E3525 R PD LIB-SEL L14 - Library selection for detector 14 |
| E8527 | R 64 | D TM E3527 R PD NB-STEP L14 - Number of time steps for detector 14 |
| E8528 | R 23 | D TM E3528 R PD NB-TMPL L14 - Number of templates for detector 14 |
| E8529 | R 0 | D TM E3529 R PD PARAK3 L14 - Decode parameter K3 for detector 14 |
| E8534 | R 0 | D TM E3534 R PD EVWK5 L15 - Event word decode K5 for detector 15 |
| E8533 | R 0 | D TM E3533 R PD LIB-SEL L15 - Library selection for detector 15 |
| E8535 | R 64 | D TM E3535 R PD NB-STEP L15 - Number of time steps for detector 15 |
| E8536 | R 23 | D TM E3536 R PD NB-TMPL L15 - Number of templates for detector 15 |
| E8537 | R 0 | D TM E3537 R PD PARAK3 L15 - Decode parameter K3 for detector 15 |
| E8539 | R 0 | D TM E3539 R PD EVWK5 L16 - Event word decode K5 for detector 16 |
| E8538 | R 0 | D TM E3538 R PD LIB-SEL L16 - Library selection for detector 16 |
| E8540 | R 64 | D TM E3540 R PD NB-STEP L16 - Number of time steps for detector 16 |
| E8541 | R 23 | D TM E3541 R PD NB-TMPL L16 - Number of templates for detector 16 |
| E8542 | R 0 | D TM E3542 R PD PARAK3 L16 - Decode parameter K3 for detector 16 |
| E8553 | R 0 | D TM E3553 R PD EVWK5 L17 - Event word decode K5 for detector 17 |
| E8552 | R 0 | D TM E3552 R PD LIB-SEL L17 - Library selection for detector 17 |
| E8554 | R 64 | D TM E3554 R PD NB-STEP L17 - Number of time steps for detector 17 |
| E8555 | R 23 | D TM E3555 R PD NB-TMPL L17 - Number of templates for detector 17 |
| E8556 | R 0 | D TM E3556 R PD PARAK3 L17 - Decode parameter k3 for detector 17 |
| E8558 | R 0 | D TM E3558 R PD EVWK5 L18 - Event word decode k5 for detector 18 |
| E8557 | R 0 | D TM E3557 R PD LIB-SEL L18 - Library selection for detector 18 |
| E8559 | R 64 | D TM E3559 R PD NB-STEP L18 - Number of time steps for detector 18 |
| E8560 | R 23 | D TM E3560 R PD NB-TMPL L18 - Number of templates for detector 18 |
| E8561 | R 0 | D TM E3561 R PD PARAK3 L18 - Decode parameter K3 for detector 18 |

2.2.4.12. ES1745_PD-CV-RT_fmconfig_0001.TPF

ES1745 S
M F 4

2002-05-17T18:55:12Z - SPI1 PSD Curve Transmission Rates

| | | |
|-------|------|-------------------------------------------------------------------------------------------|
| E8893 | R 0 | D TM E3893 R PD NB-CRV-OP L - Nb of curves per 8Hz cycle for OPER mode |
| E8894 | R 32 | D TM E3894 R PD PY-8H-OP L - Periodicity (in 8Hz cycles) for searching one curve for OPER |
| E8895 | R 5 | D TM E3895 R PD NB-CRV-CD L - Nb of curves per 8Hz cycle for CAL and DIAG mode |



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E8896 R 0

D TM E3896 R PD PY-8H-CD L - Periodicity (in 8Hz cycles) for searching one curve for CAL/DIAG modes

2.2.4.13. ES1710_AF-CH-OO_def-grnd_0001.TPF

ES1710 S
M F 41

2002-05-17T18:42:41Z - SPI1 AFEE Chains On/Off Config

| | | | | |
|-------|-------|----------|-----------------------------|--------------------------------------|
| E5177 | E ON | TM E0177 | R AF LVPS-00 L7 - Detector | #7 Low Power Supply ON/OFF command |
| E5176 | E ON | TM E0176 | R AF LVPS-00 L6 - Detector | #6 Low Power Supply ON/OFF command |
| E5175 | E ON | TM E0175 | R AF LVPS-00 L5 - Detector | #5 Low Power Supply ON/OFF command |
| E5174 | E ON | TM E0174 | R AF LVPS-00 L4 - Detector | #4 Low Power Supply ON/OFF command |
| E5173 | E ON | TM E0173 | R AF LVPS-00 L3 - Detector | #3 Low Power Supply ON/OFF command |
| E5172 | E ON | TM E0172 | R AF LVPS-00 L2 - Detector | #2 Low Power Supply ON/OFF command |
| E5171 | E ON | TM E0171 | R AF LVPS-00 L1 - Detector | #1 Low Power Supply ON/OFF command |
| E5170 | E ON | TM E0170 | R AF LVPS-00 L0 - Detector | #0 Low Power Supply ON/OFF command |
| E5185 | E ON | TM E0185 | R AF LVPS-00 L15 - Detector | #15 Low Power Supply ON/OFF command |
| E5184 | E ON | TM E0184 | R AF LVPS-00 L14 - Detector | #14 Low Power Supply ON/OFF command |
| E5183 | E ON | TM E0183 | R AF LVPS-00 L13 - Detector | #13 Low Power Supply ON/OFF command |
| E5182 | E ON | TM E0182 | R AF LVPS-00 L12 - Detector | #12 Low Power Supply ON/OFF command |
| E5181 | E ON | TM E0181 | R AF LVPS-00 L11 - Detector | #11 Low Power Supply ON/OFF command |
| E5180 | E ON | TM E0180 | R AF LVPS-00 L10 - Detector | #10 Low Power Supply ON/OFF command |
| E5179 | E ON | TM E0179 | R AF LVPS-00 L9 - Detector | #9 Low Power Supply ON/OFF command |
| E5178 | E ON | TM E0178 | R AF LVPS-00 L8 - Detector | #8 Low Power Supply ON/OFF command |
| E5188 | E ON | TM E0188 | R AF LVPS-00 L18 - Detector | #18 Low Power Supply ON/OFF command |
| E5187 | E ON | TM E0187 | R AF LVPS-00 L17 - Detector | #17 Low Power Supply ON/OFF command |
| E5186 | E ON | TM E0186 | R AF LVPS-00 L16 - Detector | #16 Low Power Supply ON/OFF command |
| E5197 | E OFF | TM E0197 | R AF HVPS-00 L7 - Detector | #7 High Power Supply ON/OFF command |
| E5196 | E OFF | TM E0196 | R AF HVPS-00 L6 - Detector | #6 High Power Supply ON/OFF command |
| E5195 | E OFF | TM E0195 | R AF HVPS-00 L5 - Detector | #5 High Power Supply ON/OFF command |
| E5194 | E OFF | TM E0194 | R AF HVPS-00 L4 - Detector | #4 High Power Supply ON/OFF command |
| E5193 | E OFF | TM E0193 | R AF HVPS-00 L3 - Detector | #3 High Power Supply ON/OFF command |
| E5192 | E OFF | TM E0192 | R AF HVPS-00 L2 - Detector | #2 High Power Supply ON/OFF command |
| E5191 | E OFF | TM E0191 | R AF HVPS-00 L1 - Detector | #1 High Power Supply ON/OFF command |
| E5190 | E OFF | TM E0190 | R AF HVPS-00 L0 - Detector | #0 High Power Supply ON/OFF command |
| E5205 | E OFF | TM E0205 | R AF HVPS-00 L15 - Detector | #15 High Power Supply ON/OFF command |
| E5204 | E OFF | TM E0204 | R AF HVPS-00 L14 - Detector | #14 High Power Supply ON/OFF command |
| E5203 | E OFF | TM E0203 | R AF HVPS-00 L13 - Detector | #13 High Power Supply ON/OFF command |
| E5202 | E OFF | TM E0202 | R AF HVPS-00 L12 - Detector | #12 High Power Supply ON/OFF command |
| E5201 | E OFF | TM E0201 | R AF HVPS-00 L11 - Detector | #11 High Power Supply ON/OFF command |
| E5200 | E OFF | TM E0200 | R AF HVPS-00 L10 - Detector | #10 High Power Supply ON/OFF command |
| E5199 | E OFF | TM E0199 | R AF HVPS-00 L9 - Detector | #9 High Power Supply ON/OFF command |
| E5198 | E OFF | TM E0198 | R AF HVPS-00 L8 - Detector | #8 High Power Supply ON/OFF command |
| E5208 | E OFF | TM E0208 | R AF HVPS-00 L18 - Detector | #18 High Power Supply ON/OFF command |



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|-------|--------------|----------|--------------------------------------------------------------------------------|
| E5207 | E OFF | TM E0207 | R AF HVPS-00 L17 - Detector #17 High Power Supply ON/OFF command |
| E5206 | E OFF | TM E0206 | R AF HVPS-00 L16 - Detector #16 High Power Supply ON/OFF command |
| E5209 | E 62K/128K | TM E0209 | R CR CRY-RNG L - Temperature range selection for Cold Plate and Thermal Braids |
| E5003 | E OUTGASSING | TM E0003 | R CR ANLG-1 L - Outgassing/annealing selection for system 1 |
| E5004 | E OUTGASSING | TM E0004 | R CR ANLG-2 L - Outgassing/annealing selection for system 2 |

2.2.4.14. ES1711_AF-LW-DT_fmconfig_0001.TPF

ES1711 S
M F 19

2002-05-17T18:44:01Z - SPI1 AFEE Low Thresholds

| | | | | |
|-------|------|-----|----------|-------------------------------------------------------------------------------------------------|
| E5030 | E 20 | keV | TM E0030 | R AF LWDT L0 - Low detection threshold for detector #0 in the range 20-300Kev by step of 3Kev |
| E5031 | E 20 | keV | TM E0031 | R AF LWDT L1 - Low detection threshold for detector #1 in the range 20-300Kev by step of 3Kev |
| E5032 | E 20 | keV | TM E0032 | R AF LWDT L2 - Low detection threshold for detector #2 in the range 20-300Kev by step of 3Kev |
| E5033 | E 20 | keV | TM E0033 | R AF LWDT L3 - Low detection threshold for detector #3 in the range 20-300Kev by step of 3Kev |
| E5034 | E 20 | keV | TM E0034 | R AF LWDT L4 - Low detection threshold for detector #4 in the range 20-300Kev by step of 3Kev |
| E5035 | E 20 | keV | TM E0035 | R AF LWDT L5 - Low detection threshold for detector #5 in the range 20-300Kev by step of 3Kev |
| E5036 | E 20 | keV | TM E0036 | R AF LWDT L6 - Low detection threshold for detector #6 in the range 20-300Kev by step of 3Kev |
| E5037 | E 20 | keV | TM E0037 | R AF LWDT L7 - Low detection threshold for detector #7 in the range 20-300Kev by step of 3Kev |
| E5038 | E 20 | keV | TM E0038 | R AF LWDT L8 - Low detection threshold for detector #8 in the range 20-300Kev by step of 3Kev |
| E5039 | E 20 | keV | TM E0039 | R AF LWDT L9 - Low detection threshold for detector #9 in the range 20-300Kev by step of 3Kev |
| E5040 | E 20 | keV | TM E0040 | R AF LWDT L10 - Low detection threshold for detector #10 in the range 20-300Kev by step of 3Kev |
| E5041 | E 20 | keV | TM E0041 | R AF LWDT L11 - Low detection threshold for detector #11 in the range 20-300Kev by step of 3Kev |
| E5042 | E 20 | keV | TM E0042 | R AF LWDT L12 - Low detection threshold for detector #12 in the range 20-300Kev by step of 3Kev |
| E5043 | E 20 | keV | TM E0043 | R AF LWDT L13 - Low detection threshold for detector #13 in the range 20-300Kev by step of 3Kev |
| E5044 | E 20 | keV | TM E0044 | R AF LWDT L14 - Low detection threshold for detector #14 in the range 20-300Kev by step of 3Kev |
| E5045 | E 20 | keV | TM E0045 | R AF LWDT L15 - Low detection threshold for detector #15 in the range 20-300Kev by step of 3Kev |
| E5046 | E 20 | keV | TM E0046 | R AF LWDT L16 - Low detection threshold for detector #16 in the range 20-300Kev by step of 3Kev |
| E5047 | E 20 | keV | TM E0047 | R AF LWDT L17 - Low detection threshold for detector #17 in the range 20-300Kev by step of 3Kev |
| E5048 | E 20 | keV | TM E0048 | R AF LWDT L18 - Low detection threshold for detector #18 in the range 20-300Kev by step of 3Kev |

2.2.4.15. ES1712_AF-CHPAR_fmconfig_0002.TPF

ES1712 S
M F 95

2002-05-17T18:45:26Z - SPI1 AFEE Chain Parameters

| | | | |
|-------|-------------|----------|------------------------------------------------------------------------------------------|
| E5050 | E ON | TM E0050 | R AF HNRG-00 L0 - High energy clamping OFF (desaturating impulse) for detector #0 |
| E5070 | E 0MEV/8MEV | TM E0070 | R AF WRK-RNG L0 - Selection of the detector #0 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5090 | E AUTO | TM E0090 | R AF WRK-M/A L0 - Manual or automatic selection of the detector #0 working range setting |
| E5130 | E DISABLE | TM E0130 | R AF REDT-DF L0 - Redundant AFEE output #0 selection to DFEE |



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|-------|-------------|----------|-----------------|--------------------------------------------------------------------------|
| E5150 | E ENABLE | TM E0150 | R AF MAIN-DF L0 | - Main AFEE output #0 selection to DFEE |
| E5051 | E ON | TM E0051 | R AF HNRG-OO L1 | - High energy clamping OFF (desaturating impulse) for detector #1 |
| E5071 | E 0MEV/8MEV | TM E0071 | R AF WRK-RNG L1 | - Selection of the detector #1 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5091 | E AUTO | TM E0091 | R AF WRK-M/A L1 | - Manual or automatic selection of the detector #1 working range setting |
| E5131 | E DISABLE | TM E0131 | R AF REDT-DF L1 | - Redundant AFEE output #1 selection to DFEE |
| E5151 | E ENABLE | TM E0151 | R AF MAIN-DF L1 | - Main AFEE output #1 selection to DFEE |
| E5052 | E ON | TM E0052 | R AF HNRG-OO L2 | - High energy clamping OFF (desaturating impulse) for detector #2 |
| E5072 | E 0MEV/8MEV | TM E0072 | R AF WRK-RNG L2 | - Selection of the detector #2 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5092 | E AUTO | TM E0092 | R AF WRK-M/A L2 | - Manual or automatic selection of the detector #2 working range setting |
| E5132 | E DISABLE | TM E0132 | R AF REDT-DF L2 | - Redundant AFEE output #2 selection to DFEE |
| E5152 | E ENABLE | TM E0152 | R AF MAIN-DF L2 | - Main AFEE output #2 selection to DFEE |
| E5053 | E ON | TM E0053 | R AF HNRG-OO L3 | - High energy clamping OFF (desaturating impulse) for detector #3 |
| E5073 | E 0MEV/8MEV | TM E0073 | R AF WRK-RNG L3 | - Selection of the detector #3 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5093 | E AUTO | TM E0093 | R AF WRK-M/A L3 | - Manual or automatic selection of the detector #3 working range setting |
| E5133 | E DISABLE | TM E0133 | R AF REDT-DF L3 | - Redundant AFEE output #3 selection to DFEE |
| E5153 | E ENABLE | TM E0153 | R AF MAIN-DF L3 | - Main AFEE output #3 selection to DFEE |
| E5054 | E ON | TM E0054 | R AF HNRG-OO L4 | - High energy clamping OFF (desaturating impulse) for detector #4 |
| E5074 | E 0MEV/8MEV | TM E0074 | R AF WRK-RNG L4 | - Selection of the detector #4 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5094 | E AUTO | TM E0094 | R AF WRK-M/A L4 | - Manual or automatic selection of the detector #4 working range setting |
| E5134 | E DISABLE | TM E0134 | R AF REDT-DF L4 | - Redundant AFEE output #4 selection to DFEE |
| E5154 | E ENABLE | TM E0154 | R AF MAIN-DF L4 | - Main AFEE output #4 selection to DFEE |
| E5055 | E ON | TM E0055 | R AF HNRG-OO L5 | - High energy clamping OFF (desaturating impulse) for detector #5 |
| E5075 | E 0MEV/8MEV | TM E0075 | R AF WRK-RNG L5 | - Selection of the detector #5 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5095 | E AUTO | TM E0095 | R AF WRK-M/A L5 | - Manual or automatic selection of the detector #5 working range setting |
| E5135 | E DISABLE | TM E0135 | R AF REDT-DF L5 | - Redundant AFEE output #5 selection to DFEE |
| E5155 | E ENABLE | TM E0155 | R AF MAIN-DF L5 | - Main AFEE output #5 selection to DFEE |
| E5056 | E ON | TM E0056 | R AF HNRG-OO L6 | - High energy clamping OFF (desaturating impulse) for detector #6 |
| E5076 | E 0MEV/8MEV | TM E0076 | R AF WRK-RNG L6 | - Selection of the detector #6 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5096 | E AUTO | TM E0096 | R AF WRK-M/A L6 | - Manual or automatic selection of the detector #6 working range setting |
| E5136 | E DISABLE | TM E0136 | R AF REDT-DF L6 | - Redundant AFEE output #6 selection to DFEE |
| E5156 | E ENABLE | TM E0156 | R AF MAIN-DF L6 | - Main AFEE output #6 selection to DFEE |
| E5057 | E ON | TM E0057 | R AF HNRG-OO L7 | - High energy clamping OFF (desaturating impulse) for detector #7 |
| E5077 | E 0MEV/8MEV | TM E0077 | R AF WRK-RNG L7 | - Selection of the detector #7 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5097 | E AUTO | TM E0097 | R AF WRK-M/A L7 | - Manual or automatic selection of the detector #7 working range setting |
| E5137 | E DISABLE | TM E0137 | R AF REDT-DF L7 | - Redundant AFEE output #7 selection to DFEE |
| E5157 | E ENABLE | TM E0157 | R AF MAIN-DF L7 | - Main AFEE output #7 selection to DFEE |
| E5058 | E ON | TM E0058 | R AF HNRG-OO L8 | - High energy clamping OFF (desaturating impulse) for detector #8 |
| E5078 | E 0MEV/8MEV | TM E0078 | R AF WRK-RNG L8 | - Selection of the detector #8 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5098 | E AUTO | TM E0098 | R AF WRK-M/A L8 | - Manual or automatic selection of the detector #8 working range setting |
| E5138 | E DISABLE | TM E0138 | R AF REDT-DF L8 | - Redundant AFEE output #8 selection to DFEE |
| E5158 | E ENABLE | TM E0158 | R AF MAIN-DF L8 | - Main AFEE output #8 selection to DFEE |
| E5059 | E ON | TM E0059 | R AF HNRG-OO L9 | - High energy clamping OFF (desaturating impulse) for detector #9 |
| E5079 | E 0MEV/8MEV | TM E0079 | R AF WRK-RNG L9 | - Selection of the detector #9 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5099 | E AUTO | TM E0099 | R AF WRK-M/A L9 | - Manual or automatic selection of the detector #9 working range setting |
| E5139 | E DISABLE | TM E0139 | R AF REDT-DF L9 | - Redundant AFEE output #9 selection to DFEE |



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|-------|---|-----------|----|-------|---|----|---------|-----|---|-------------------------------------------------------------------------|
| E5159 | E | ENABLE | TM | E0159 | R | AF | MAIN-DF | L9 | - | Main AFEE output #9 selection to DFEE |
| E5060 | E | ON | TM | E0060 | R | AF | HNRG-OO | L10 | - | High energy clamping OFF (desaturating impulse) for detector #10 |
| E5080 | E | OMEV/8MEV | TM | E0080 | R | AF | WRK-RNG | L10 | - | Selection of the detector #10 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5100 | E | AUTO | TM | E0100 | R | AF | WRK-M/A | L10 | - | Manual or automatic selection of the detector #10 working range setting |
| E5140 | E | DISABLE | TM | E0140 | R | AF | MAIN-DF | L10 | - | Redundant AFEE output #10 selection to DFEE |
| E5160 | E | ENABLE | TM | E0160 | R | AF | MAIN-DF | L10 | - | Main AFEE output #10 selection to DFEE |
| E5061 | E | ON | TM | E0061 | R | AF | HNRG-OO | L11 | - | High energy clamping OFF (desaturating impulse) for detector #11 |
| E5081 | E | OMEV/8MEV | TM | E0081 | R | AF | WRK-RNG | L11 | - | Selection of the detector #11 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5101 | E | AUTO | TM | E0101 | R | AF | WRK-M/A | L11 | - | Manual or automatic selection of the detector #11 working range setting |
| E5141 | E | DISABLE | TM | E0141 | R | AF | REDT-DF | L11 | - | Redundant AFEE output #11 selection to DFEE |
| E5161 | E | ENABLE | TM | E0161 | R | AF | MAIN-DF | L11 | - | Main AFEE output #11 selection to DFEE |
| E5062 | E | ON | TM | E0062 | R | AF | HNRG-OO | L12 | - | High energy clamping OFF (desaturating impulse) for detector #12 |
| E5082 | E | OMEV/8MEV | TM | E0082 | R | AF | WRK-RNG | L12 | - | Selection of the detector #12 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5102 | E | AUTO | TM | E0102 | R | AF | WRK-M/A | L12 | - | Manual or automatic selection of the detector #12 working range setting |
| E5142 | E | DISABLE | TM | E0142 | R | AF | MAIN-DF | L12 | - | Redundant AFEE output #12 selection to DFEE |
| E5162 | E | ENABLE | TM | E0162 | R | AF | MAIN-DF | L12 | - | Main AFEE output #12 selection to DFEE |
| E5063 | E | ON | TM | E0063 | R | AF | HNRG-OO | L13 | - | High energy clamping OFF (desaturating impulse) for detector #13 |
| E5083 | E | OMEV/8MEV | TM | E0083 | R | AF | WRK-RNG | L13 | - | Selection of the detector #13 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5103 | E | AUTO | TM | E0103 | R | AF | WRK-M/A | L13 | - | Manual or automatic selection of the detector #13 working range setting |
| E5143 | E | DISABLE | TM | E0143 | R | AF | MAIN-DF | L13 | - | Redundant AFEE output #13 selection to DFEE |
| E5163 | E | ENABLE | TM | E0163 | R | AF | MAIN-DF | L13 | - | Main AFEE output #13 selection to DFEE |
| E5064 | E | ON | TM | E0064 | R | AF | HNRG-OO | L14 | - | High energy clamping OFF (desaturating impulse) for detector #14 |
| E5084 | E | OMEV/8MEV | TM | E0084 | R | AF | WRK-RNG | L14 | - | Selection of the detector #14 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5104 | E | AUTO | TM | E0104 | R | AF | WRK-M/A | L14 | - | Manual or automatic selection of the detector #14 working range setting |
| E5144 | E | DISABLE | TM | E0144 | R | AF | MAIN-DF | L14 | - | Redundant AFEE output #14 selection to DFEE |
| E5164 | E | ENABLE | TM | E0164 | R | AF | MAIN-DF | L14 | - | Main AFEE output #14 selection to DFEE |
| E5065 | E | ON | TM | E0065 | R | AF | HNRG-OO | L15 | - | High energy clamping OFF (desaturating impulse) for detector #15 |
| E5085 | E | OMEV/8MEV | TM | E0085 | R | AF | WRK-RNG | L15 | - | Selection of the detector #15 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5105 | E | AUTO | TM | E0105 | R | AF | WRK-M/A | L15 | - | Manual or automatic selection of the detector #15 working range setting |
| E5145 | E | DISABLE | TM | E0145 | R | AF | MAIN-DF | L15 | - | Redundant AFEE output #15 selection to DFEE |
| E5165 | E | ENABLE | TM | E0165 | R | AF | MAIN-DF | L15 | - | Main AFEE output #15 selection to DFEE |
| E5066 | E | ON | TM | E0066 | R | AF | HNRG-OO | L16 | - | High energy clamping OFF (desaturating impulse) for detector #16 |
| E5086 | E | OMEV/8MEV | TM | E0086 | R | AF | WRK-RNG | L16 | - | Selection of the detector #16 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5106 | E | AUTO | TM | E0106 | R | AF | WRK-M/A | L16 | - | Manual or automatic selection of the detector #16 working range setting |
| E5146 | E | DISABLE | TM | E0146 | R | AF | MAIN-DF | L16 | - | Redundant AFEE output #16 selection to DFEE |
| E5166 | E | ENABLE | TM | E0166 | R | AF | MAIN-DF | L16 | - | Main AFEE output #16 selection to DFEE |
| E5067 | E | ON | TM | E0067 | R | AF | HNRG-OO | L17 | - | High energy clamping OFF (desaturating impulse) for detector #17 |
| E5087 | E | OMEV/8MEV | TM | E0087 | R | AF | WRK-RNG | L17 | - | Selection of the detector #17 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5107 | E | AUTO | TM | E0107 | R | AF | WRK-M/A | L17 | - | Manual or automatic selection of the detector #17 working range setting |
| E5147 | E | DISABLE | TM | E0147 | R | AF | MAIN-DF | L17 | - | Redundant AFEE output #17 selection to DFEE |
| E5167 | E | ENABLE | TM | E0167 | R | AF | MAIN-DF | L17 | - | Main AFEE output #17 selection to DFEE |
| E5068 | E | ON | TM | E0068 | R | AF | HNRG-OO | L18 | - | High energy clamping OFF (desaturating impulse) for detector #18 |
| E5088 | E | OMEV/8MEV | TM | E0088 | R | AF | WRK-RNG | L18 | - | Selection of the detector #18 working range: 20Kev-2Mev / 2Mev-8Mev |
| E5108 | E | AUTO | TM | E0108 | R | AF | WRK-M/A | L18 | - | Manual or automatic selection of the detector #18 working range setting |
| E5148 | E | DISABLE | TM | E0148 | R | AF | MAIN-DF | L18 | - | Redundant AFEE output #18 selection to DFEE |
| E5168 | E | ENABLE | TM | E0168 | R | AF | MAIN-DF | L18 | - | Main AFEE output #18 selection to DFEE |



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2.2.4.16. ES1713_AF-HVSET_def-grnd_0001.TPF

ES1713 S
M F 19

2002-05-17T18:46:00Z - SPI1 AFEE High Voltage Settings

| | | | | | |
|-------|-----|----|----------|-------------|----------------------------------------------------------------------------|
| E5010 | E 0 | kV | TM E0010 | R AF HV L0 | - High Voltage level for detector #0 in the range 0-5000V by step of 100V |
| E5011 | E 0 | kV | TM E0011 | R AF HV L1 | - High Voltage level for detector #1 in the range 0-5000V by step of 100V |
| E5012 | E 0 | kV | TM E0012 | R AF HV L2 | - High Voltage level for detector #2 in the range 0-5000V by step of 100V |
| E5013 | E 0 | kV | TM E0013 | R AF HV L3 | - High Voltage level for detector #3 in the range 0-5000V by step of 100V |
| E5014 | E 0 | kV | TM E0014 | R AF HV L4 | - High Voltage level for detector #4 in the range 0-5000V by step of 100V |
| E5015 | E 0 | kV | TM E0015 | R AF HV L5 | - High Voltage level for detector #5 in the range 0-5000V by step of 100V |
| E5016 | E 0 | kV | TM E0016 | R AF HV L6 | - High Voltage level for detector #6 in the range 0-5000V by step of 100V |
| E5017 | E 0 | kV | TM E0017 | R AF HV L7 | - High Voltage level for detector #7 in the range 0-5000V by step of 100V |
| E5018 | E 0 | kV | TM E0018 | R AF HV L8 | - High Voltage level for detector #8 in the range 0-5000V by step of 100V |
| E5019 | E 0 | kV | TM E0019 | R AF HV L9 | - High Voltage level for detector #9 in the range 0-5000V by step of 100V |
| E5020 | E 0 | kV | TM E0020 | R AF HV L10 | - High Voltage level for detector #10 in the range 0-5000V by step of 100V |
| E5021 | E 0 | kV | TM E0021 | R AF HV L11 | - High Voltage level for detector #11 in the range 0-5000V by step of 100V |
| E5022 | E 0 | kV | TM E0022 | R AF HV L12 | - High Voltage level for detector #12 in the range 0-5000V by step of 100V |
| E5023 | E 0 | kV | TM E0023 | R AF HV L13 | - High Voltage level for detector #13 in the range 0-5000V by step of 100V |
| E5024 | E 0 | kV | TM E0024 | R AF HV L14 | - High Voltage level for detector #14 in the range 0-5000V by step of 100V |
| E5025 | E 0 | kV | TM E0025 | R AF HV L15 | - High Voltage level for detector #15 in the range 0-5000V by step of 100V |
| E5026 | E 0 | kV | TM E0026 | R AF HV L16 | - High Voltage level for detector #16 in the range 0-5000V by step of 100V |
| E5027 | E 0 | kV | TM E0027 | R AF HV L17 | - High Voltage level for detector #17 in the range 0-5000V by step of 100V |
| E5028 | E 0 | kV | TM E0028 | R AF HV L18 | - High Voltage level for detector #18 in the range 0-5000V by step of 100V |

2.2.4.17. ES1710_AF-CH-OO_fmconfig_0001.TPF

ES1710 S
M F 41

2002-05-21T14:15:08Z - SPI1 AFEE Chains On/Off Config

| | | | | |
|-------|------|----------|------------------|------------------------------------------------|
| E5177 | E ON | TM E0177 | R AF LVPS-00 L7 | - Detector #7 Low Power Supply ON/OFF command |
| E5176 | E ON | TM E0176 | R AF LVPS-00 L6 | - Detector #6 Low Power Supply ON/OFF command |
| E5175 | E ON | TM E0175 | R AF LVPS-00 L5 | - Detector #5 Low Power Supply ON/OFF command |
| E5174 | E ON | TM E0174 | R AF LVPS-00 L4 | - Detector #4 Low Power Supply ON/OFF command |
| E5173 | E ON | TM E0173 | R AF LVPS-00 L3 | - Detector #3 Low Power Supply ON/OFF command |
| E5172 | E ON | TM E0172 | R AF LVPS-00 L2 | - Detector #2 Low Power Supply ON/OFF command |
| E5171 | E ON | TM E0171 | R AF LVPS-00 L1 | - Detector #1 Low Power Supply ON/OFF command |
| E5170 | E ON | TM E0170 | R AF LVPS-00 L0 | - Detector #0 Low Power Supply ON/OFF command |
| E5185 | E ON | TM E0185 | R AF LVPS-00 L15 | - Detector #15 Low Power Supply ON/OFF command |



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E5184 E ON TM E0184 R AF LVPS-00 L14 - Detector #14 Low Power Supply ON/OFF command
E5183 E ON TM E0183 R AF LVPS-00 L13 - Detector #13 Low Power Supply ON/OFF command
82 E ON TM E0182 R AF LVPS-00 L12 - Detector #12 Low Power Supply ON/OFF command
E5181 E ON TM E0181 R AF LVPS-00 L11 - Detector #11 Low Power Supply ON/OFF command
E5180 E ON TM E0180 R AF LVPS-00 L10 - Detector #10 Low Power Supply ON/OFF command
E5179 E ON TM E0179 R AF LVPS-00 L9 - Detector #9 Low Power Supply ON/OFF command
E5178 E ON TM E0178 R AF LVPS-00 L8 - Detector #8 Low Power Supply ON/OFF command
E5188 E ON TM E0188 R AF LVPS-00 L18 - Detector #18 Low Power Supply ON/OFF command
E5187 E ON TM E0187 R AF LVPS-00 L17 - Detector #17 Low Power Supply ON/OFF command
E5186 E ON TM E0186 R AF LVPS-00 L16 - Detector #16 Low Power Supply ON/OFF command
E5197 E ON TM E0197 R AF HVPS-00 L7 - Detector #7 High Power Supply ON/OFF command
E5196 E ON TM E0196 R AF HVPS-00 L6 - Detector #6 High Power Supply ON/OFF command
E5195 E ON TM E0195 R AF HVPS-00 L5 - Detector #5 High Power Supply ON/OFF command
E5194 E ON TM E0194 R AF HVPS-00 L4 - Detector #4 High Power Supply ON/OFF command
E5193 E ON TM E0193 R AF HVPS-00 L3 - Detector #3 High Power Supply ON/OFF command
E5192 E ON TM E0192 R AF HVPS-00 L2 - Detector #2 High Power Supply ON/OFF command
E5191 E ON TM E0191 R AF HVPS-00 L1 - Detector #1 High Power Supply ON/OFF command
E5190 E ON TM E0190 R AF HVPS-00 L0 - Detector #0 High Power Supply ON/OFF command
E5205 E ON TM E0205 R AF HVPS-00 L15 - Detector #15 High Power Supply ON/OFF command
E5204 E ON TM E0204 R AF HVPS-00 L14 - Detector #14 High Power Supply ON/OFF command
E5203 E ON TM E0203 R AF HVPS-00 L13 - Detector #13 High Power Supply ON/OFF command
E5202 E ON TM E0202 R AF HVPS-00 L12 - Detector #12 High Power Supply ON/OFF command
E5201 E ON TM E0201 R AF HVPS-00 L11 - Detector #11 High Power Supply ON/OFF command
E5200 E ON TM E0200 R AF HVPS-00 L10 - Detector #10 High Power Supply ON/OFF command
E5199 E ON TM E0199 R AF HVPS-00 L9 - Detector #9 High Power Supply ON/OFF command
E5198 E ON TM E0198 R AF HVPS-00 L8 - Detector #8 High Power Supply ON/OFF command
E5208 E ON TM E0208 R AF HVPS-00 L18 - Detector #18 High Power Supply ON/OFF command
E5207 E ON TM E0207 R AF HVPS-00 L17 - Detector #17 High Power Supply ON/OFF command
E5206 E ON TM E0206 R AF HVPS-00 L16 - Detector #16 High Power Supply ON/OFF command
E5209 E 62K/128K TM E0209 R CR CRY-RNG L - Temperature range selection for Cold Plate and Thermal Braids
E5003 E OUTGASSING TM E0003 R CR ANLG-1 L - Outgassing/annealing selection for system 1
E5004 E OUTGASSING TM E0004 R CR ANLG-2 L - Outgassing/annealing selection for system 2

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2.2.4.18. ES1713_AF-HVSET_fmconfig_0004.TPF

ES1713 S
M F 19

ES1713_AF-HVSET_fmconfig_0002.TPF - 2002-07-08T14:10:09Z - SPI1 AFEE High Voltage Settings

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E5010 E 4 kV TM E0010 R AF HV L0 - High Voltage level for detector #0 in the range 0-5000V by step of 100V
E5011 E 4 kV TM E0011 R AF HV L1 - High Voltage level for detector #1 in the range 0-5000V by step of 100V
E5012 E 4 kV TM E0012 R AF HV L2 - High Voltage level for detector #2 in the range 0-5000V by step of 100V
E5013 E 4 kV TM E0013 R AF HV L3 - High Voltage level for detector #3 in the range 0-5000V by step of 100V
E5014 E 4 kV TM E0014 R AF HV L4 - High Voltage level for detector #4 in the range 0-5000V by step of 100V

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| | | | | |
|-------|-----|----|----------|----------------------------------------------------------------------------------------|
| E5015 | E 4 | kV | TM E0015 | R AF HV L5 - High Voltage level for detector #5 in the range 0-5000V by step of 100V |
| E5016 | E 4 | kV | TM E0016 | R AF HV L6 - High Voltage level for detector #6 in the range 0-5000V by step of 100V |
| E5017 | E 4 | kV | TM E0017 | R AF HV L7 - High Voltage level for detector #7 in the range 0-5000V by step of 100V |
| E5018 | E 4 | kV | TM E0018 | R AF HV L8 - High Voltage level for detector #8 in the range 0-5000V by step of 100V |
| E5019 | E 4 | kV | TM E0019 | R AF HV L9 - High Voltage level for detector #9 in the range 0-5000V by step of 100V |
| E5020 | E 4 | kV | TM E0020 | R AF HV L10 - High Voltage level for detector #10 in the range 0-5000V by step of 100V |
| E5021 | E 4 | kV | TM E0021 | R AF HV L11 - High Voltage level for detector #11 in the range 0-5000V by step of 100V |
| E5022 | E 4 | kV | TM E0022 | R AF HV L12 - High Voltage level for detector #12 in the range 0-5000V by step of 100V |
| E5023 | E 4 | kV | TM E0023 | R AF HV L13 - High Voltage level for detector #13 in the range 0-5000V by step of 100V |
| E5024 | E 4 | kV | TM E0024 | R AF HV L14 - High Voltage level for detector #14 in the range 0-5000V by step of 100V |
| E5025 | E 4 | kV | TM E0025 | R AF HV L15 - High Voltage level for detector #15 in the range 0-5000V by step of 100V |
| E5026 | E 4 | kV | TM E0026 | R AF HV L16 - High Voltage level for detector #16 in the range 0-5000V by step of 100V |
| E5027 | E 4 | kV | TM E0027 | R AF HV L17 - High Voltage level for detector #17 in the range 0-5000V by step of 100V |
| E5028 | E 4 | kV | TM E0028 | R AF HV L18 - High Voltage level for detector #18 in the range 0-5000V by step of 100V |

2.2.4.19. ES1720_DF-SWPAR_fmconfig_0001.TPF

ES1720 S
M F 6

2002-05-17T18:46:30Z - SPI1 DFEE Software Parameters

| | | | |
|-------|-------------|------------|------------------------------------------------------------|
| E7697 | E NONINIBIT | TM E2697 | R DT INIB-CODE L - Inhibition auto-test CODE |
| E7698 | E NONINIBIT | TM E2698 | R DT INIB-ASIC L - Inhibition auto-test ASIC |
| E7699 | E NONINIBIT | TM E2699 | R DT INIB-RAM L - Inhibition auto-test RAM |
| E7700 | R 3 | D TM E2700 | R DT ER-THR L - Nb HSL error threshold (NbHslErrThreshold) |
| E7695 | E ENABLE | TM E2695 | R DF ENHSLER L - EnHslErrAct |
| E7696 | R 2 | D TM E2696 | R DF ENHSLERF L - NhsLErrActThreshold |

2.2.4.20. ES1721_DF-CLPAR_fmconfig_0005.TPF

ES1721 S
M F 85

ES1721_DF-CLPAR_fmconfig_0003.TPF - 2002-09-04T10:07:21Z - SPI1 DFEE Control Lines Parameters

| | | | |
|-------|------------|----------|--------------------------------------------------------|
| E7701 | E NO RESET | TM E2701 | R DF RST-TFR L - Reset Front Tframe (RstFrontFrame) |
| E7702 | E NO RESET | TM E2702 | R DF RST-DTO L - Reset Front Veto (RstFrontVeto) |
| E7703 | E NO RESET | TM E2703 | R DF RST-PSD L - Reset Front PSD (RstFrontPsd) |
| E7722 | E NO RESET | TM E2722 | R DF FR-AF L18 - Reset Front AFEE n. 18 (RstFrontAfee) |
| E7721 | E NO RESET | TM E2721 | R DF FR-AF L17 - Reset Front AFEE n. 17 (RstFrontAfee) |
| E7720 | E NO RESET | TM E2720 | R DF FR-AF L16 - Reset Front AFEE n. 16 (RstFrontAfee) |
| E7719 | E NO RESET | TM E2719 | R DF FR-AF L15 - Reset Front AFEE n. 15 (RstFrontAfee) |



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|-------|----------------|----------|--------------------------------------------------------------------|
| E7718 | E NO RESET | TM E2718 | R DF FR-AF L14 - Reset Front AFEE n. 14 (RstFrontAfee) |
| E7717 | E NO RESET | TM E2717 | R DF FR-AF L13 - Reset Front AFEE n. 13 (RstFrontAfee) |
| E7716 | E NO RESET | TM E2716 | R DF FR-AF L12 - Reset Front AFEE n. 12 (RstFrontAfee) |
| E7715 | E NO RESET | TM E2715 | R DF FR-AF L11 - Reset Front AFEE n. 11 (RstFrontAfee) |
| E7714 | E NO RESET | TM E2714 | R DF FR-AF L10 - Reset Front AFEE n. 10 (RstFrontAfee) |
| E7713 | E NO RESET | TM E2713 | R DF FR-AF L9 - Reset Front AFEE n. 9 (RstFrontAfee) |
| E7712 | E NO RESET | TM E2712 | R DF FR-AF L8 - Reset Front AFEE n. 8 (RstFrontAfee) |
| E7711 | E NO RESET | TM E2711 | R DF FR-AF L7 - Reset Front AFEE n. 7 (RstFrontAfee) |
| E7710 | E NO RESET | TM E2710 | R DF FR-AF L6 - Reset Front AFEE n. 6 (RstFrontAfee) |
| E7709 | E NO RESET | TM E2709 | R DF FR-AF L5 - Reset Front AFEE n. 5 (RstFrontAfee) |
| E7708 | E NO RESET | TM E2708 | R DF FR-AF L4 - Reset Front AFEE n. 4 (RstFrontAfee) |
| E7707 | E NO RESET | TM E2707 | R DF FR-AF L3 - Reset Front AFEE n. 3 (RstFrontAfee) |
| E7706 | E NO RESET | TM E2706 | R DF FR-AF L2 - Reset Front AFEE n. 2 (RstFrontAfee) |
| E7705 | E NO RESET | TM E2705 | R DF FR-AF L1 - Reset Front AFEE n. 1 (RstFrontAfee) |
| E7704 | E NO RESET | TM E2704 | R DF FR-AF L0 - Reset Front AFEE n. 0 (RstFrontAfee) |
| E7723 | E NO RESET | TM E2723 | R DF CNT-VPSD L - Reset Count VPSD (RstCountVpsd) |
| E7742 | E NO RESET | TM E2742 | R DF CNT-AF L18 - Reset Count AFEE n. 18 (RstCountAfee) |
| E7741 | E NO RESET | TM E2741 | R DF CNT-AF L17 - Reset Count AFEE n. 17 (RstCountAfee) |
| E7740 | E NO RESET | TM E2740 | R DF CNT-AF L16 - Reset Count AFEE n. 16 (RstCountAfee) |
| E7739 | E NO RESET | TM E2739 | R DF CNT-AF L15 - Reset Count AFEE n. 15 (RstCountAfee) |
| E7738 | E NO RESET | TM E2738 | R DF CNT-AF L14 - Reset Count AFEE n. 14 (RstCountAfee) |
| E7737 | E NO RESET | TM E2737 | R DF CNT-AF L13 - Reset Count AFEE n. 13 (RstCountAfee) |
| E7736 | E NO RESET | TM E2736 | R DF CNT-AF L12 - Reset Count AFEE n. 12 (RstCountAfee) |
| E7735 | E NO RESET | TM E2735 | R DF CNT-AF L11 - Reset Count AFEE n. 11 (RstCountAfee) |
| E7734 | E NO RESET | TM E2734 | R DF CNT-AF L10 - Reset Count AFEE n. 10 (RstCountAfee) |
| E7733 | E NO RESET | TM E2733 | R DF CNT-AF L9 - Reset Count AFEE n. 9 (RstCountAfee) |
| E7732 | E NO RESET | TM E2732 | R DF CNT-AF L8 - Reset Count AFEE n. 8 (RstCountAfee) |
| E7731 | E NO RESET | TM E2731 | R DF CNT-AF L7 - Reset Count AFEE n. 7 (RstCountAfee) |
| E7730 | E NO RESET | TM E2730 | R DF CNT-AF L6 - Reset Count AFEE n. 6 (RstCountAfee) |
| E7729 | E NO RESET | TM E2729 | R DF CNT-AF L5 - Reset Count AFEE n. 5 (RstCountAfee) |
| E7728 | E NO RESET | TM E2728 | R DF CNT-AF L4 - Reset Count AFEE n. 4 (RstCountAfee) |
| E7727 | E NO RESET | TM E2727 | R DF CNT-AF L3 - Reset Count AFEE n. 3 (RstCountAfee) |
| E7726 | E NO RESET | TM E2726 | R DF CNT-AF L2 - Reset Count AFEE n. 2 (RstCountAfee) |
| E7725 | E NO RESET | TM E2725 | R DF CNT-AF L1 - Reset Count AFEE n. 1 (RstCountAfee) |
| E7724 | E NO RESET | TM E2724 | R DF CNT-AF L0 - Reset Count AFEE n. 0 (RstCountAfee) |
| E7743 | E NO RESET | TM E2743 | R DF ASSO L - Reset ASSO SM (RstAssoSm) |
| E7744 | E NO RESET | TM E2744 | R DF POBJ L - Reset POBJ SM (RstPobjSm) |
| E7745 | E NO RESET | TM E2745 | R DF RCVE L - Reset RCVE SM (RstRcveSm) |
| E7746 | E NO RESET | TM E2746 | R DF SERIAL L - Reset RCVE Serial (RstRcveSerial) |
| E7747 | E NO RESET | TM E2747 | R DF ACQ L - Reset ACQ SM (RstAcqSm) |
| E7748 | E NO RESET | TM E2748 | R DF DIAL L - Reset Dial SM (RstDialSm) |
| E7749 | E ENABLE | TM E2749 | R DF DT-AF L - Enable count Dead Time AFEE (EnCntDtAfee) |
| E7750 | E ENABLE | TM E2750 | R DF DT-AFST L - Enable count Dead Time AFEE SAT (EnCntDtAfeeSat) |
| E7751 | E ENABLE | TM E2751 | R DF DT-VGT L - Enable count Dead Time Veto gate (EnCntDtVetoGate) |
| E7787 | E NORMALRESCLK | TM E2787 | R DT LOW-MOD L - Mode resolution (lowResMode) |



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E7786 R 15 D TM E2786 R DT DROP-NRJ L - (toutScaleDropNrj)
E7753 E 350 ns TM E2753 R DF WDW L - CFG ASSO Multi Window Size (AssoMultWinSize)
E7788 E ACON TM E2788 R DT AC-MOD L - Anti-coincidence mode (AcMode)
E7756 E YES TM E2756 R DF ENB-PD L - CFG ASSO EnablePSD (AssoEnablePsd)
E7775 E YES TM E2775 R DF ENB-AF L18 - CFG ASSO Enable AFEE n. 18 (AssoEnableAfee)
E7774 E YES TM E2774 R DF ENB-AF L17 - CFG ASSO Enable AFEE n. 17 (AssoEnableAfee)
E7773 E YES TM E2773 R DF ENB-AF L16 - CFG ASSO Enable AFEE n. 16 (AssoEnableAfee)
E7772 E YES TM E2772 R DF ENB-AF L15 - CFG ASSO Enable AFEE n. 15 (AssoEnableAfee)
E7771 E YES TM E2771 R DF ENB-AF L14 - CFG ASSO Enable AFEE n. 14 (AssoEnableAfee)
E7770 E YES TM E2770 R DF ENB-AF L13 - CFG ASSO Enable AFEE n. 13 (AssoEnableAfee)
E7769 E YES TM E2769 R DF ENB-AF L12 - CFG ASSO Enable AFEE n. 12 (AssoEnableAfee)
E7768 E YES TM E2768 R DF ENB-AF L11 - CFG ASSO Enable AFEE n. 11 (AssoEnableAfee)
E7767 E YES TM E2767 R DF ENB-AF L10 - CFG ASSO Enable AFEE n. 10 (AssoEnableAfee)
E7766 E YES TM E2766 R DF ENB-AF L9 - CFG ASSO Enable AFEE n. 9 (AssoEnableAfee)
E7765 E YES TM E2765 R DF ENB-AF L8 - CFG ASSO Enable AFEE n. 8 (AssoEnableAfee)
E7764 E YES TM E2764 R DF ENB-AF L7 - CFG ASSO Enable AFEE n. 7 (AssoEnableAfee)
E7763 E YES TM E2763 R DF ENB-AF L6 - CFG ASSO Enable AFEE n. 6 (AssoEnableAfee)
E7762 E YES TM E2762 R DF ENB-AF L5 - CFG ASSO Enable AFEE n. 5 (AssoEnableAfee)
E7761 E YES TM E2761 R DF ENB-AF L4 - CFG ASSO Enable AFEE n. 4 (AssoEnableAfee)
E7760 E YES TM E2760 R DF ENB-AF L3 - CFG ASSO Enable AFEE n. 3 (AssoEnableAfee)
E7759 E YES TM E2759 R DF ENB-AF L2 - CFG ASSO Enable AFEE n. 2 (AssoEnableAfee)
E7758 E YES TM E2758 R DF ENB-AF L1 - CFG ASSO Enable AFEE n. 1 (AssoEnableAfee)
E7757 E YES TM E2757 R DF ENB-AF L0 - CFG ASSO Enable AFEE n. 0 (AssoEnableAfee)
E7776 R 7 D TM E2776 R DF MS-NRG L - CFG RVCVE Time Out Miss Energy (ToutValMissNrj)
E7777 E YES TM E2777 R DF SE L - CFG ACQ KEEPSE (EvtKeepSE)
E7778 E YES TM E2778 R DF ME L - CFG ACQ KEEPME (EvtKeepME)
E7779 E YES TM E2779 R DF PE L - CFG ACQ KEEPPE (EvtKeepPE)
E7780 E NO TM E2780 R DF PP L - CFG ACQ KeepPP (EvtKeepPP)
E7784 E NO TM E2784 R DF FMTPE L - EvtSetTimeFmtPE
E7781 E NO TM E2781 R DF EVT-NVTO L - CFG ACQ Evt Force No vetoed (EvtForceNVeto)
E7785 E NO TM E2785 R DF PROCPE L - EvtForceProcPE
E7782 E VETO ONLY TM E2782 R DF SP-MOD L - CFG ACQ Spectra Storage Mode (SpeStorageMode)
E7783 R 3072 D TM E2783 R DF TR-LGTH L - CFG DIAL HSL Transfert length bit (HslXferLength)

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2.2.4.21. ES1722_DF-AFADJ_fmconfig_0005.TPF

ES1722 S
M F 45

ES1722_DF-AFADJ_fmconfig_0003.TPF - 2002-07-12T13:44:53Z - SPI1 DFEE AFEE Config Lines Adjustment

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E7838 E 0 nsec TM E2838 R DF TG-AF L18 - Adjust Delay for Time Tag AFEE (DelayAfeeTT)
E7818 E 500 nsec TM E2818 R DF SAF-AF L18 - Adjust Delay for AFEE saturated (DelayAfeeSat)

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|-------|-------------|------|----------|------------------|--------------------------------------------------|
| E7837 | E 50 | nsec | TM E2837 | R DF TG-AF L17 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7817 | E 600 | nsec | TM E2817 | R DF SAF-AF L17 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7836 | E 0 | nsec | TM E2836 | R DF TG-AF L16 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7816 | E 500 | nsec | TM E2816 | R DF SAF-AF L16 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7835 | E 0 | nsec | TM E2835 | R DF TG-AF L15 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7815 | E 550 | nsec | TM E2815 | R DF SAF-AF L15 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7834 | E 0 | nsec | TM E2834 | R DF TG-AF L14 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7814 | E 500 | nsec | TM E2814 | R DF SAF-AF L14 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7833 | E 0 | nsec | TM E2833 | R DF TG-AF L13 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7813 | E 500 | nsec | TM E2813 | R DF SAF-AF L13 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7832 | E 0 | nsec | TM E2832 | R DF TG-AF L12 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7812 | E 350 | nsec | TM E2812 | R DF SAF-AF L12 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7831 | E 0 | nsec | TM E2831 | R DF TG-AF L11 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7811 | E 450 | nsec | TM E2811 | R DF SAF-AF L11 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7830 | E 0 | nsec | TM E2830 | R DF TG-AF L10 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7810 | E 550 | nsec | TM E2810 | R DF SAF-AF L10 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7829 | E 0 | nsec | TM E2829 | R DF TG-AF L9 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7809 | E 350 | nsec | TM E2809 | R DF SAF-AF L9 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7828 | E 0 | nsec | TM E2828 | R DF TG-AF L8 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7808 | E 500 | nsec | TM E2808 | R DF SAF-AF L8 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7827 | E 0 | nsec | TM E2827 | R DF TG-AF L7 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7807 | E 550 | nsec | TM E2807 | R DF SAF-AF L7 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7826 | E 0 | nsec | TM E2826 | R DF TG-AF L6 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7806 | E 500 | nsec | TM E2806 | R DF SAF-AF L6 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7825 | E 50 | nsec | TM E2825 | R DF TG-AF L5 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7805 | E 550 | nsec | TM E2805 | R DF SAF-AF L5 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7824 | E 50 | nsec | TM E2824 | R DF TG-AF L4 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7804 | E 600 | nsec | TM E2804 | R DF SAF-AF L4 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7823 | E 0 | nsec | TM E2823 | R DF TG-AF L3 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7803 | E 550 | nsec | TM E2803 | R DF SAF-AF L3 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7822 | E 50 | nsec | TM E2822 | R DF TG-AF L2 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7802 | E 600 | nsec | TM E2802 | R DF SAF-AF L2 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7821 | E 50 | nsec | TM E2821 | R DF TG-AF L1 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7801 | E 600 | nsec | TM E2801 | R DF SAF-AF L1 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7820 | E 0 | nsec | TM E2820 | R DF TG-AF L0 | - Adjust Delay for Time Tag AFEE (DelayAfeeTT) |
| E7800 | E 550 | nsec | TM E2800 | R DF SAF-AF L0 | - Adjust Delay for AFEE saturated (DelayAfeeSat) |
| E7840 | E 400 | nsec | TM E2840 | R DF DLY-VTFIRST | - Delay Veto First (DelayVetoFirst) |
| E7841 | E 1050 | nsec | TM E2841 | R DF DLY-VTSEC | - Delay Veto Second (DelayVetoSecond) |
| E7842 | E 2100 | nsec | TM E2842 | R DF XGTE-TH L | - Veto extension threshold (XtndThresh) |
| E7844 | E 2950 | nsec | TM E2844 | R DF XGTE-AB L | - Veto extension above threshold |
| E7845 | E 550 | nsec | TM E2845 | R DF XGTE-BL L | - Veto extension below threshold |
| E7843 | E 550 | nsec | TM E2843 | R DF DLY-PD L | - Delay PSD (DlyPsd) |
| E7848 | E NOROUTING | nsec | TM E2848 | R DT ROUT-MOD L | - (RouteMode) |



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2.2.4.22. ES1730_AS-VTPLS_fmconfig_0001.TPF

ES1730 S

M F 962002-05-21T18:13:41Z - SPI1 ACS Pulse Width/Masking

| | | |
|-------|---------------|--------------------------------------------------------------|
| E6898 | E 187NS | TM E1898 R AS VTO-PLSR L - FEE veto pulse width |
| E6807 | E VETO ENABLE | TM E1807 R AS VTO-MSK L7 - FEE veto signal masked/no masked |
| E6806 | E VETO ENABLE | TM E1806 R AS VTO-MSK L6 - FEE veto signal masked/no masked |
| E6805 | E VETO ENABLE | TM E1805 R AS VTO-MSK L5 - FEE veto signal masked/no masked |
| E6804 | E VETO ENABLE | TM E1804 R AS VTO-MSK L4 - FEE veto signal masked/no masked |
| E6803 | E VETO ENABLE | TM E1803 R AS VTO-MSK L3 - FEE veto signal masked/no masked |
| E6802 | E VETO ENABLE | TM E1802 R AS VTO-MSK L2 - FEE veto signal masked/no masked |
| E6801 | E VETO ENABLE | TM E1801 R AS VTO-MSK L1 - FEE veto signal masked/no masked |
| E6800 | E VETO ENABLE | TM E1800 R AS VTO-MSK L0 - FEE veto signal masked/no masked |
| E6815 | E VETO ENABLE | TM E1815 R AS VTO-MSK L15 - FEE veto signal masked/no masked |
| E6814 | E VETO ENABLE | TM E1814 R AS VTO-MSK L14 - FEE veto signal masked/no masked |
| E6813 | E VETO ENABLE | TM E1813 R AS VTO-MSK L13 - FEE veto signal masked/no masked |
| E6812 | E VETO ENABLE | TM E1812 R AS VTO-MSK L12 - FEE veto signal masked/no masked |
| E6811 | E VETO ENABLE | TM E1811 R AS VTO-MSK L11 - FEE veto signal masked/no masked |
| E6810 | E VETO ENABLE | TM E1810 R AS VTO-MSK L10 - FEE veto signal masked/no masked |
| E6809 | E VETO ENABLE | TM E1809 R AS VTO-MSK L9 - FEE veto signal masked/no masked |
| E6808 | E VETO ENABLE | TM E1808 R AS VTO-MSK L8 - FEE veto signal masked/no masked |
| E6823 | E VETO ENABLE | TM E1823 R AS VTO-MSK L23 - FEE veto signal masked/no masked |
| E6822 | E VETO ENABLE | TM E1822 R AS VTO-MSK L22 - FEE veto signal masked/no masked |
| E6821 | E VETO ENABLE | TM E1821 R AS VTO-MSK L21 - FEE veto signal masked/no masked |
| E6820 | E VETO ENABLE | TM E1820 R AS VTO-MSK L20 - FEE veto signal masked/no masked |
| E6819 | E VETO ENABLE | TM E1819 R AS VTO-MSK L19 - FEE veto signal masked/no masked |
| E6818 | E VETO ENABLE | TM E1818 R AS VTO-MSK L18 - FEE veto signal masked/no masked |
| E6817 | E VETO ENABLE | TM E1817 R AS VTO-MSK L17 - FEE veto signal masked/no masked |
| E6816 | E VETO ENABLE | TM E1816 R AS VTO-MSK L16 - FEE veto signal masked/no masked |
| E6831 | E VETO ENABLE | TM E1831 R AS VTO-MSK L31 - FEE veto signal masked/no masked |
| E6830 | E VETO ENABLE | TM E1830 R AS VTO-MSK L30 - FEE veto signal masked/no masked |
| E6829 | E VETO ENABLE | TM E1829 R AS VTO-MSK L29 - FEE veto signal masked/no masked |
| E6828 | E VETO ENABLE | TM E1828 R AS VTO-MSK L28 - FEE veto signal masked/no masked |
| E6827 | E VETO ENABLE | TM E1827 R AS VTO-MSK L27 - FEE veto signal masked/no masked |
| E6826 | E VETO ENABLE | TM E1826 R AS VTO-MSK L26 - FEE veto signal masked/no masked |
| E6825 | E VETO ENABLE | TM E1825 R AS VTO-MSK L25 - FEE veto signal masked/no masked |
| E6824 | E VETO ENABLE | TM E1824 R AS VTO-MSK L24 - FEE veto signal masked/no masked |
| E6839 | E VETO ENABLE | TM E1839 R AS VTO-MSK L39 - FEE veto signal masked/no masked |
| E6838 | E VETO ENABLE | TM E1838 R AS VTO-MSK L38 - FEE veto signal masked/no masked |
| E6837 | E VETO ENABLE | TM E1837 R AS VTO-MSK L37 - FEE veto signal masked/no masked |
| E6836 | E VETO ENABLE | TM E1836 R AS VTO-MSK L36 - FEE veto signal masked/no masked |
| E6835 | E VETO ENABLE | TM E1835 R AS VTO-MSK L35 - FEE veto signal masked/no masked |
| E6834 | E VETO ENABLE | TM E1834 R AS VTO-MSK L34 - FEE veto signal masked/no masked |
| E6833 | E VETO ENABLE | TM E1833 R AS VTO-MSK L33 - FEE veto signal masked/no masked |
| E6832 | E VETO ENABLE | TM E1832 R AS VTO-MSK L32 - FEE veto signal masked/no masked |



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|-------|---------------|----------|------------------|------------------------------------|
| E6847 | E VETO ENABLE | TM E1847 | R AS VTO-MSK L47 | - FEE veto signal masked/no masked |
| E6846 | E VETO ENABLE | TM E1846 | R AS VTO-MSK L46 | - FEE veto signal masked/no masked |
| E6845 | E VETO ENABLE | TM E1845 | R AS VTO-MSK L45 | - FEE veto signal masked/no masked |
| E6844 | E VETO ENABLE | TM E1844 | R AS VTO-MSK L44 | - FEE veto signal masked/no masked |
| E6843 | E VETO ENABLE | TM E1843 | R AS VTO-MSK L43 | - FEE veto signal masked/no masked |
| E6842 | E VETO ENABLE | TM E1842 | R AS VTO-MSK L42 | - FEE veto signal masked/no masked |
| E6841 | E VETO ENABLE | TM E1841 | R AS VTO-MSK L41 | - FEE veto signal masked/no masked |
| E6840 | E VETO ENABLE | TM E1840 | R AS VTO-MSK L40 | - FEE veto signal masked/no masked |
| E6855 | E VETO ENABLE | TM E1855 | R AS VTO-MSK L55 | - FEE veto signal masked/no masked |
| E6854 | E VETO ENABLE | TM E1854 | R AS VTO-MSK L54 | - FEE veto signal masked/no masked |
| E6853 | E VETO ENABLE | TM E1853 | R AS VTO-MSK L53 | - FEE veto signal masked/no masked |
| E6852 | E VETO ENABLE | TM E1852 | R AS VTO-MSK L52 | - FEE veto signal masked/no masked |
| E6851 | E VETO ENABLE | TM E1851 | R AS VTO-MSK L51 | - FEE veto signal masked/no masked |
| E6850 | E VETO ENABLE | TM E1850 | R AS VTO-MSK L50 | - FEE veto signal masked/no masked |
| E6849 | E VETO ENABLE | TM E1849 | R AS VTO-MSK L49 | - FEE veto signal masked/no masked |
| E6848 | E VETO ENABLE | TM E1848 | R AS VTO-MSK L48 | - FEE veto signal masked/no masked |
| E6863 | E VETO ENABLE | TM E1863 | R AS VTO-MSK L63 | - FEE veto signal masked/no masked |
| E6862 | E VETO ENABLE | TM E1862 | R AS VTO-MSK L62 | - FEE veto signal masked/no masked |
| E6861 | E VETO ENABLE | TM E1861 | R AS VTO-MSK L61 | - FEE veto signal masked/no masked |
| E6860 | E VETO ENABLE | TM E1860 | R AS VTO-MSK L60 | - FEE veto signal masked/no masked |
| E6859 | E VETO ENABLE | TM E1859 | R AS VTO-MSK L59 | - FEE veto signal masked/no masked |
| E6858 | E VETO ENABLE | TM E1858 | R AS VTO-MSK L58 | - FEE veto signal masked/no masked |
| E6857 | E VETO ENABLE | TM E1857 | R AS VTO-MSK L57 | - FEE veto signal masked/no masked |
| E6856 | E VETO ENABLE | TM E1856 | R AS VTO-MSK L56 | - FEE veto signal masked/no masked |
| E6871 | E VETO ENABLE | TM E1871 | R AS VTO-MSK L71 | - FEE veto signal masked/no masked |
| E6870 | E VETO ENABLE | TM E1870 | R AS VTO-MSK L70 | - FEE veto signal masked/no masked |
| E6869 | E VETO ENABLE | TM E1869 | R AS VTO-MSK L69 | - FEE veto signal masked/no masked |
| E6868 | E VETO ENABLE | TM E1868 | R AS VTO-MSK L68 | - FEE veto signal masked/no masked |
| E6867 | E VETO ENABLE | TM E1867 | R AS VTO-MSK L67 | - FEE veto signal masked/no masked |
| E6866 | E VETO ENABLE | TM E1866 | R AS VTO-MSK L66 | - FEE veto signal masked/no masked |
| E6865 | E VETO ENABLE | TM E1865 | R AS VTO-MSK L65 | - FEE veto signal masked/no masked |
| E6864 | E VETO ENABLE | TM E1864 | R AS VTO-MSK L64 | - FEE veto signal masked/no masked |
| E6879 | E VETO ENABLE | TM E1879 | R AS VTO-MSK L79 | - FEE veto signal masked/no masked |
| E6878 | E VETO ENABLE | TM E1878 | R AS VTO-MSK L78 | - FEE veto signal masked/no masked |
| E6877 | E VETO ENABLE | TM E1877 | R AS VTO-MSK L77 | - FEE veto signal masked/no masked |
| E6876 | E VETO ENABLE | TM E1876 | R AS VTO-MSK L76 | - FEE veto signal masked/no masked |
| E6875 | E VETO ENABLE | TM E1875 | R AS VTO-MSK L75 | - FEE veto signal masked/no masked |
| E6874 | E VETO ENABLE | TM E1874 | R AS VTO-MSK L74 | - FEE veto signal masked/no masked |
| E6873 | E VETO ENABLE | TM E1873 | R AS VTO-MSK L73 | - FEE veto signal masked/no masked |
| E6872 | E VETO ENABLE | TM E1872 | R AS VTO-MSK L72 | - FEE veto signal masked/no masked |
| E6887 | E VETO ENABLE | TM E1887 | R AS VTO-MSK L87 | - FEE veto signal masked/no masked |
| E6886 | E VETO ENABLE | TM E1886 | R AS VTO-MSK L86 | - FEE veto signal masked/no masked |
| E6885 | E VETO ENABLE | TM E1885 | R AS VTO-MSK L85 | - FEE veto signal masked/no masked |
| E6884 | E VETO ENABLE | TM E1884 | R AS VTO-MSK L84 | - FEE veto signal masked/no masked |
| E6883 | E VETO ENABLE | TM E1883 | R AS VTO-MSK L83 | - FEE veto signal masked/no masked |
| E6882 | E VETO ENABLE | TM E1882 | R AS VTO-MSK L82 | - FEE veto signal masked/no masked |



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|-------|----------------|----------|---------------------------------------------------------------|
| E6881 | E VETO ENABLE | TM E1881 | R AS VTO-MSK L81 - FEE veto signal masked/no masked |
| E6880 | E VETO ENABLE | TM E1880 | R AS VTO-MSK L80 - FEE veto signal masked/no masked |
| E7000 | E FEE CMD ECHO | TM E2000 | S AS VCU/HW L - Configuration Data switch VCU RAM/FEE HW Conf |
| E7025 | E ENABLE | TM E2025 | R AS VCUWDG-ED L - VCU Watchdog enable/disable |
| E7001 | E ENABLE | TM E2001 | R AS OVL-MSK 1 - Overall veto mask |
| E6891 | E VETO ENABLE | TM E1891 | R AS VTO-MSK L91 - FEE veto signal masked/no masked |
| E6890 | E VETO ENABLE | TM E1890 | R AS VTO-MSK L90 - FEE veto signal masked/no masked |
| E6889 | E VETO ENABLE | TM E1889 | R AS VTO-MSK L89 - FEE veto signal masked/no masked |
| E6888 | E VETO ENABLE | TM E1888 | R AS VTO-MSK L88 - FEE veto signal masked/no masked |

2.2.4.23. ES1731_AS-IS-ED_fmconfig_0001.TPF

ES1731 S
M F 92

ES1731_AS-IS-ED_fmconfig_0001.TPF - 2002-06-14T11:56:10Z - SPI1 ACS ISB communication Enable/Disable

| | | | |
|-------|----------|----------|---------------------------------------------------------|
| E7407 | E ENABLE | TM E2407 | R AS ISB-ED L7 - ISB enabled/disabled for each FEE #7 |
| E7406 | E ENABLE | TM E2406 | R AS ISB-ED L6 - ISB enabled/disabled for each FEE #6 |
| E7405 | E ENABLE | TM E2405 | R AS ISB-ED L5 - ISB enabled/disabled for each FEE #5 |
| E7404 | E ENABLE | TM E2404 | R AS ISB-ED L4 - ISB enabled/disabled for each FEE #4 |
| E7403 | E ENABLE | TM E2403 | R AS ISB-ED L3 - ISB enabled/disabled for each FEE #3 |
| E7402 | E ENABLE | TM E2402 | R AS ISB-ED L2 - ISB enabled/disabled for each FEE #2 |
| E7401 | E ENABLE | TM E2401 | R AS ISB-ED L1 - ISB enabled/disabled for each FEE #1 |
| E7400 | E ENABLE | TM E2400 | R AS ISB-ED L0 - ISB enabled/disabled for each FEE #0 |
| E7415 | E ENABLE | TM E2415 | R AS ISB-ED L15 - ISB enabled/disabled for each FEE #15 |
| E7414 | E ENABLE | TM E2414 | R AS ISB-ED L14 - ISB enabled/disabled for each FEE #14 |
| E7413 | E ENABLE | TM E2413 | R AS ISB-ED L13 - ISB enabled/disabled for each FEE #13 |
| E7412 | E ENABLE | TM E2412 | R AS ISB-ED L12 - ISB enabled/disabled for each FEE #12 |
| E7411 | E ENABLE | TM E2411 | R AS ISB-ED L11 - ISB enabled/disabled for each FEE #11 |
| E7410 | E ENABLE | TM E2410 | R AS ISB-ED L10 - ISB enabled/disabled for each FEE #10 |
| E7409 | E ENABLE | TM E2409 | R AS ISB-ED L9 - ISB enabled/disabled for each FEE #9 |
| E7408 | E ENABLE | TM E2408 | R AS ISB-ED L8 - ISB enabled/disabled for each FEE #8 |



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|-------|---|--------|----|-------|---|----|--------|-----|---|-----|------------------|-----|------|-----|-----|
| E7423 | E | ENABLE | TM | E2423 | R | AS | ISB-ED | L23 | - | ISB | enabled/disabled | for | each | FEE | #23 |
| E7422 | E | ENABLE | TM | E2422 | R | AS | ISB-ED | L22 | - | ISB | enabled/disabled | for | each | FEE | #22 |
| E7421 | E | ENABLE | TM | E2421 | R | AS | ISB-ED | L21 | - | ISB | enabled/disabled | for | each | FEE | #21 |
| E7420 | E | ENABLE | TM | E2420 | R | AS | ISB-ED | L20 | - | ISB | enabled/disabled | for | each | FEE | #20 |
| E7419 | E | ENABLE | TM | E2419 | R | AS | ISB-ED | L19 | - | ISB | enabled/disabled | for | each | FEE | #19 |
| E7418 | E | ENABLE | TM | E2418 | R | AS | ISB-ED | L18 | - | ISB | enabled/disabled | for | each | FEE | #18 |
| E7417 | E | ENABLE | TM | E2417 | R | AS | ISB-ED | L17 | - | ISB | enabled/disabled | for | each | FEE | #17 |
| E7416 | E | ENABLE | TM | E2416 | R | AS | ISB-ED | L16 | - | ISB | enabled/disabled | for | each | FEE | #16 |
| E7431 | E | ENABLE | TM | E2431 | R | AS | ISB-ED | L31 | - | ISB | enabled/disabled | for | each | FEE | #31 |
| E7430 | E | ENABLE | TM | E2430 | R | AS | ISB-ED | L30 | - | ISB | enabled/disabled | for | each | FEE | #30 |
| E7429 | E | ENABLE | TM | E2429 | R | AS | ISB-ED | L29 | - | ISB | enabled/disabled | for | each | FEE | #29 |
| E7428 | E | ENABLE | TM | E2428 | R | AS | ISB-ED | L28 | - | ISB | enabled/disabled | for | each | FEE | #28 |
| E7427 | E | ENABLE | TM | E2427 | R | AS | ISB-ED | L27 | - | ISB | enabled/disabled | for | each | FEE | #27 |
| E7426 | E | ENABLE | TM | E2426 | R | AS | ISB-ED | L26 | - | ISB | enabled/disabled | for | each | FEE | #26 |
| E7425 | E | ENABLE | TM | E2425 | R | AS | ISB-ED | L25 | - | ISB | enabled/disabled | for | each | FEE | #25 |
| E7424 | E | ENABLE | TM | E2424 | R | AS | ISB-ED | L24 | - | ISB | enabled/disabled | for | each | FEE | #24 |
| E7439 | E | ENABLE | TM | E2439 | R | AS | ISB-ED | L39 | - | ISB | enabled/disabled | for | each | FEE | #39 |
| E7438 | E | ENABLE | TM | E2438 | R | AS | ISB-ED | L38 | - | ISB | enabled/disabled | for | each | FEE | #38 |
| E7437 | E | ENABLE | TM | E2437 | R | AS | ISB-ED | L37 | - | ISB | enabled/disabled | for | each | FEE | #37 |
| E7436 | E | ENABLE | TM | E2436 | R | AS | ISB-ED | L36 | - | ISB | enabled/disabled | for | each | FEE | #36 |
| E7435 | E | ENABLE | TM | E2435 | R | AS | ISB-ED | L35 | - | ISB | enabled/disabled | for | each | FEE | #35 |
| E7434 | E | ENABLE | TM | E2434 | R | AS | ISB-ED | L34 | - | ISB | enabled/disabled | for | each | FEE | #34 |
| E7433 | E | ENABLE | TM | E2433 | R | AS | ISB-ED | L33 | - | ISB | enabled/disabled | for | each | FEE | #33 |
| E7432 | E | ENABLE | TM | E2432 | R | AS | ISB-ED | L32 | - | ISB | enabled/disabled | for | each | FEE | #32 |
| E7447 | E | ENABLE | TM | E2447 | R | AS | ISB-ED | L47 | - | ISB | enabled/disabled | for | each | FEE | #47 |
| E7446 | E | ENABLE | TM | E2446 | R | AS | ISB-ED | L46 | - | ISB | enabled/disabled | for | each | FEE | #46 |
| E7445 | E | ENABLE | TM | E2445 | R | AS | ISB-ED | L45 | - | ISB | enabled/disabled | for | each | FEE | #45 |
| E7444 | E | ENABLE | TM | E2444 | R | AS | ISB-ED | L44 | - | ISB | enabled/disabled | for | each | FEE | #44 |
| E7443 | E | ENABLE | TM | E2443 | R | AS | ISB-ED | L43 | - | ISB | enabled/disabled | for | each | FEE | #43 |
| E7442 | E | ENABLE | TM | E2442 | R | AS | ISB-ED | L42 | - | ISB | enabled/disabled | for | each | FEE | #42 |
| E7441 | E | ENABLE | TM | E2441 | R | AS | ISB-ED | L41 | - | ISB | enabled/disabled | for | each | FEE | #41 |
| E7440 | E | ENABLE | TM | E2440 | R | AS | ISB-ED | L40 | - | ISB | enabled/disabled | for | each | FEE | #40 |
| E7455 | E | ENABLE | TM | E2455 | R | AS | ISB-ED | L55 | - | ISB | enabled/disabled | for | each | FEE | #55 |
| E7454 | E | ENABLE | TM | E2454 | R | AS | ISB-ED | L54 | - | ISB | enabled/disabled | for | each | FEE | #54 |
| E7453 | E | ENABLE | TM | E2453 | R | AS | ISB-ED | L53 | - | ISB | enabled/disabled | for | each | FEE | #53 |
| E7452 | E | ENABLE | TM | E2452 | R | AS | ISB-ED | L52 | - | ISB | enabled/disabled | for | each | FEE | #52 |



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| E7451 | E | ENABLE | TM E2451 | R | AS | ISB-ED | L51 | - | ISB | enabled/disabled | for | each | FEE | #51 |
| E7450 | E | ENABLE | TM E2450 | R | AS | ISB-ED | L50 | - | ISB | enabled/disabled | for | each | FEE | #50 |
| E7449 | E | ENABLE | TM E2449 | R | AS | ISB-ED | L49 | - | ISB | enabled/disabled | for | each | FEE | #49 |
| E7448 | E | ENABLE | TM E2448 | R | AS | ISB-ED | L48 | - | ISB | enabled/disabled | for | each | FEE | #48 |
| E7463 | E | ENABLE | TM E2463 | R | AS | ISB-ED | L63 | - | ISB | enabled/disabled | for | each | FEE | #63 |
| E7462 | E | ENABLE | TM E2462 | R | AS | ISB-ED | L62 | - | ISB | enabled/disabled | for | each | FEE | #62 |
| E7461 | E | ENABLE | TM E2461 | R | AS | ISB-ED | L61 | - | ISB | enabled/disabled | for | each | FEE | #61 |
| E7460 | E | ENABLE | TM E2460 | R | AS | ISB-ED | L60 | - | ISB | enabled/disabled | for | each | FEE | #60 |
| E7459 | E | ENABLE | TM E2459 | R | AS | ISB-ED | L59 | - | ISB | enabled/disabled | for | each | FEE | #59 |
| E7458 | E | ENABLE | TM E2458 | R | AS | ISB-ED | L58 | - | ISB | enabled/disabled | for | each | FEE | #58 |
| E7457 | E | ENABLE | TM E2457 | R | AS | ISB-ED | L57 | - | ISB | enabled/disabled | for | each | FEE | #57 |
| E7456 | E | ENABLE | TM E2456 | R | AS | ISB-ED | L56 | - | ISB | enabled/disabled | for | each | FEE | #56 |
| E7471 | E | ENABLE | TM E2471 | R | AS | ISB-ED | L71 | - | ISB | enabled/disabled | for | each | FEE | #71 |
| E7470 | E | ENABLE | TM E2470 | R | AS | ISB-ED | L70 | - | ISB | enabled/disabled | for | each | FEE | #70 |
| E7469 | E | ENABLE | TM E2469 | R | AS | ISB-ED | L69 | - | ISB | enabled/disabled | for | each | FEE | #69 |
| E7468 | E | ENABLE | TM E2468 | R | AS | ISB-ED | L68 | - | ISB | enabled/disabled | for | each | FEE | #68 |
| E7467 | E | ENABLE | TM E2467 | R | AS | ISB-ED | L67 | - | ISB | enabled/disabled | for | each | FEE | #67 |
| E7466 | E | ENABLE | TM E2466 | R | AS | ISB-ED | L66 | - | ISB | enabled/disabled | for | each | FEE | #66 |
| E7465 | E | ENABLE | TM E2465 | R | AS | ISB-ED | L65 | - | ISB | enabled/disabled | for | each | FEE | #65 |
| E7464 | E | ENABLE | TM E2464 | R | AS | ISB-ED | L64 | - | ISB | enabled/disabled | for | each | FEE | #64 |
| E7479 | E | ENABLE | TM E2479 | R | AS | ISB-ED | L79 | - | ISB | enabled/disabled | for | each | FEE | #79 |
| E7478 | E | ENABLE | TM E2478 | R | AS | ISB-ED | L78 | - | ISB | enabled/disabled | for | each | FEE | #78 |
| E7477 | E | ENABLE | TM E2477 | R | AS | ISB-ED | L77 | - | ISB | enabled/disabled | for | each | FEE | #77 |
| E7476 | E | ENABLE | TM E2476 | R | AS | ISB-ED | L76 | - | ISB | enabled/disabled | for | each | FEE | #76 |
| E7475 | E | ENABLE | TM E2475 | R | AS | ISB-ED | L75 | - | ISB | enabled/disabled | for | each | FEE | #75 |
| E7474 | E | ENABLE | TM E2474 | R | AS | ISB-ED | L74 | - | ISB | enabled/disabled | for | each | FEE | #74 |
| E7473 | E | ENABLE | TM E2473 | R | AS | ISB-ED | L73 | - | ISB | enabled/disabled | for | each | FEE | #73 |
| E7472 | E | ENABLE | TM E2472 | R | AS | ISB-ED | L72 | - | ISB | enabled/disabled | for | each | FEE | #72 |
| E7487 | E | ENABLE | TM E2487 | R | AS | ISB-ED | L87 | - | ISB | enabled/disabled | for | each | FEE | #87 |
| E7486 | E | ENABLE | TM E2486 | R | AS | ISB-ED | L86 | - | ISB | enabled/disabled | for | each | FEE | #86 |
| E7485 | E | ENABLE | TM E2485 | R | AS | ISB-ED | L85 | - | ISB | enabled/disabled | for | each | FEE | #85 |
| E7484 | E | ENABLE | TM E2484 | R | AS | ISB-ED | L84 | - | ISB | enabled/disabled | for | each | FEE | #84 |
| E7483 | E | ENABLE | TM E2483 | R | AS | ISB-ED | L83 | - | ISB | enabled/disabled | for | each | FEE | #83 |
| E7482 | E | ENABLE | TM E2482 | R | AS | ISB-ED | L82 | - | ISB | enabled/disabled | for | each | FEE | #82 |
| E7481 | E | ENABLE | TM E2481 | R | AS | ISB-ED | L81 | - | ISB | enabled/disabled | for | each | FEE | #81 |
| E7480 | E | ENABLE | TM E2480 | R | AS | ISB-ED | L80 | - | ISB | enabled/disabled | for | each | FEE | #80 |
| E7491 | E | ENABLE | TM E2491 | R | AS | ISB-ED | L91 | - | ISB | enabled/disabled | for | each | FEE | #91 |
| E7490 | E | ENABLE | TM E2490 | R | AS | ISB-ED | L90 | - | ISB | enabled/disabled | for | each | FEE | #90 |



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E7489 E ENABLE TM E2489 R AS ISB-ED L89 - ISB enabled/disabled for each FEE #89
E7488 E ENABLE TM E2488 R AS ISB-ED L88 - ISB enabled/disabled for each FEE #88

2.2.4.24. ES1732_AS-SERVS_fmconfig_0001.TPF

ES1732 S
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| | | | |
|-------|----------------|----------|-------------------------------------------------------------|
| E5500 | E ON | TM E0500 | R AS HV-OO L0 - FEE switch High Voltage ON/OFF |
| E6000 | E NOTEST PULSE | TM E1000 | R AS VTO-TST L0 - FEE veto test signal configuration |
| E5600 | E ENABLE | TM E0600 | R AS WDOG-ED L0 - FEE watchdog configuration Enable/Disable |
| E5700 | E ENABLE | TM E0700 | R AS RESP-ED L0 - FEE response condition enable/disable |
| E5501 | E ON | TM E0501 | R AS HV-OO L1 - FEE switch High Voltage ON/OFF |
| E6001 | E NOTEST PULSE | TM E1001 | R AS VTO-TST L1 - FEE veto test signal configuration |
| E5601 | E ENABLE | TM E0601 | R AS WDOG-ED L1 - FEE watchdog configuration Enable/Disable |
| E5701 | E ENABLE | TM E0701 | R AS RESP-ED L1 - FEE response condition enable/disable |
| E5502 | E ON | TM E0502 | R AS HV-OO L2 - FEE switch High Voltage ON/OFF |
| E6002 | E NOTEST PULSE | TM E1002 | R AS VTO-TST L2 - FEE veto test signal configuration |
| E5602 | E ENABLE | TM E0602 | R AS WDOG-ED L2 - FEE watchdog configuration Enable/Disable |
| E5702 | E ENABLE | TM E0702 | R AS RESP-ED L2 - FEE response condition enable/disable |
| E5503 | E ON | TM E0503 | R AS HV-OO L3 - FEE switch High Voltage ON/OFF |
| E6003 | E NOTEST PULSE | TM E1003 | R AS VTO-TST L3 - FEE veto test signal configuration |
| E5603 | E ENABLE | TM E0603 | R AS WDOG-ED L3 - FEE watchdog configuration Enable/Disable |
| E5703 | E ENABLE | TM E0703 | R AS RESP-ED L3 - FEE response condition enable/disable |
| E5504 | E ON | TM E0504 | R AS HV-OO L4 - FEE switch High Voltage ON/OFF |
| E6004 | E NOTEST PULSE | TM E1004 | R AS VTO-TST L4 - FEE veto test signal configuration |
| E5604 | E ENABLE | TM E0604 | R AS WDOG-ED L4 - FEE watchdog configuration Enable/Disable |
| E5704 | E ENABLE | TM E0704 | R AS RESP-ED L4 - FEE response condition enable/disable |
| E5505 | E ON | TM E0505 | R AS HV-OO L5 - FEE switch High Voltage ON/OFF |
| E6005 | E NOTEST PULSE | TM E1005 | R AS VTO-TST L5 - FEE veto test signal configuration |
| E5605 | E ENABLE | TM E0605 | R AS WDOG-ED L5 - FEE watchdog configuration Enable/Disable |
| E5705 | E ENABLE | TM E0705 | R AS RESP-ED L5 - FEE response condition enable/disable |
| E5506 | E ON | TM E0506 | R AS HV-OO L6 - FEE switch High Voltage ON/OFF |
| E6006 | E NOTEST PULSE | TM E1006 | R AS VTO-TST L6 - FEE veto test signal configuration |
| E5606 | E ENABLE | TM E0606 | R AS WDOG-ED L6 - FEE watchdog configuration Enable/Disable |
| E5706 | E ENABLE | TM E0706 | R AS RESP-ED L6 - FEE response condition enable/disable |
| E5507 | E ON | TM E0507 | R AS HV-OO L7 - FEE switch High Voltage ON/OFF |
| E6007 | E NOTEST PULSE | TM E1007 | R AS VTO-TST L7 - FEE veto test signal configuration |
| E5607 | E ENABLE | TM E0607 | R AS WDOG-ED L7 - FEE watchdog configuration Enable/Disable |
| E5707 | E ENABLE | TM E0707 | R AS RESP-ED L7 - FEE response condition enable/disable |
| E5508 | E ON | TM E0508 | R AS HV-OO L8 - FEE switch High Voltage ON/OFF |
| E6008 | E NOTEST PULSE | TM E1008 | R AS VTO-TST L8 - FEE veto test signal configuration |
| E5608 | E ENABLE | TM E0608 | R AS WDOG-ED L8 - FEE watchdog configuration Enable/Disable |



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|-------|---|--------|-------|-------|-------|----|---------|---------|-----|-----|----------|---------------|----------------|--------|---------------|
| E5708 | E | ENABLE | TM | E0708 | R | AS | RESP-ED | L8 | - | FEE | response | condition | enable/disable | | |
| E5509 | E | ON | TM | E0509 | R | AS | HV-OO | L9 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6009 | E | NOTEST | PULSE | TM | E1009 | R | AS | VTO-TST | L9 | - | FEE | veto | test | signal | configuration |
| E5609 | E | ENABLE | TM | E0609 | R | AS | WDOG-ED | L9 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5709 | E | ENABLE | TM | E0709 | R | AS | RESP-ED | L9 | - | FEE | response | condition | enable/disable | | |
| E5510 | E | ON | TM | E0510 | R | AS | HV-OO | L10 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6010 | E | NOTEST | PULSE | TM | E1010 | R | AS | VTO-TST | L10 | - | FEE | veto | test | signal | configuration |
| E5610 | E | ENABLE | TM | E0610 | R | AS | WDOG-ED | L10 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5710 | E | ENABLE | TM | E0710 | R | AS | RESP-ED | L10 | - | FEE | response | condition | enable/disable | | |
| E5511 | E | ON | TM | E0511 | R | AS | HV-OO | L11 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6011 | E | NOTEST | PULSE | TM | E1011 | R | AS | VTO-TST | L11 | - | FEE | veto | test | signal | configuration |
| E5611 | E | ENABLE | TM | E0611 | R | AS | WDOG-ED | L11 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5711 | E | ENABLE | TM | E0711 | R | AS | RESP-ED | L11 | - | FEE | response | condition | enable/disable | | |
| E5512 | E | ON | TM | E0512 | R | AS | HV-OO | L12 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6012 | E | NOTEST | PULSE | TM | E1012 | R | AS | VTO-TST | L12 | - | FEE | veto | test | signal | configuration |
| E5612 | E | ENABLE | TM | E0612 | R | AS | WDOG-ED | L12 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5712 | E | ENABLE | TM | E0712 | R | AS | RESP-ED | L12 | - | FEE | response | condition | enable/disable | | |
| E5513 | E | ON | TM | E0513 | R | AS | HV-OO | L13 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6013 | E | NOTEST | PULSE | TM | E1013 | R | AS | VTO-TST | L13 | - | FEE | veto | test | signal | configuration |
| E5613 | E | ENABLE | TM | E0613 | R | AS | WDOG-ED | L13 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5713 | E | ENABLE | TM | E0713 | R | AS | RESP-ED | L13 | - | FEE | response | condition | enable/disable | | |
| E5514 | E | ON | TM | E0514 | R | AS | HV-OO | L14 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6014 | E | NOTEST | PULSE | TM | E1014 | R | AS | VTO-TST | L14 | - | FEE | veto | test | signal | configuration |
| E5614 | E | ENABLE | TM | E0614 | R | AS | WDOG-ED | L14 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5714 | E | ENABLE | TM | E0714 | R | AS | RESP-ED | L14 | - | FEE | response | condition | enable/disable | | |
| E5515 | E | ON | TM | E0515 | R | AS | HV-OO | L15 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6015 | E | NOTEST | PULSE | TM | E1015 | R | AS | VTO-TST | L15 | - | FEE | veto | test | signal | configuration |
| E5615 | E | ENABLE | TM | E0615 | R | AS | WDOG-ED | L15 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5715 | E | ENABLE | TM | E0715 | R | AS | RESP-ED | L15 | - | FEE | response | condition | enable/disable | | |
| E5516 | E | ON | TM | E0516 | R | AS | HV-OO | L16 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6016 | E | NOTEST | PULSE | TM | E1016 | R | AS | VTO-TST | L16 | - | FEE | veto | test | signal | configuration |
| E5616 | E | ENABLE | TM | E0616 | R | AS | WDOG-ED | L16 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5716 | E | ENABLE | TM | E0716 | R | AS | RESP-ED | L16 | - | FEE | response | condition | enable/disable | | |
| E5517 | E | ON | TM | E0517 | R | AS | HV-OO | L17 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6017 | E | NOTEST | PULSE | TM | E1017 | R | AS | VTO-TST | L17 | - | FEE | veto | test | signal | configuration |
| E5617 | E | ENABLE | TM | E0617 | R | AS | WDOG-ED | L17 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5717 | E | ENABLE | TM | E0717 | R | AS | RESP-ED | L17 | - | FEE | response | condition | enable/disable | | |
| E5518 | E | ON | TM | E0518 | R | AS | HV-OO | L18 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6018 | E | NOTEST | PULSE | TM | E1018 | R | AS | VTO-TST | L18 | - | FEE | veto | test | signal | configuration |
| E5618 | E | ENABLE | TM | E0618 | R | AS | WDOG-ED | L18 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5718 | E | ENABLE | TM | E0718 | R | AS | RESP-ED | L18 | - | FEE | response | condition | enable/disable | | |
| E5519 | E | ON | TM | E0519 | R | AS | HV-OO | L19 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6019 | E | NOTEST | PULSE | TM | E1019 | R | AS | VTO-TST | L19 | - | FEE | veto | test | signal | configuration |
| E5619 | E | ENABLE | TM | E0619 | R | AS | WDOG-ED | L19 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5719 | E | ENABLE | TM | E0719 | R | AS | RESP-ED | L19 | - | FEE | response | condition | enable/disable | | |
| E5520 | E | ON | TM | E0520 | R | AS | HV-OO | L20 | - | FEE | switch | High | Voltage | ON/OFF | |



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| E6020 | E | NOTEST | PULSE | TM | E1020 | R | AS | VTO-TST | L20 | - | FEE | veto | test | signal | configuration |
| E5620 | E | ENABLE | | TM | E0620 | R | AS | WDOG-ED | L20 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5720 | E | ENABLE | | TM | E0720 | R | AS | RESP-ED | L20 | - | FEE | response | condition | enable/disable | |
| E5521 | E | ON | | TM | E0521 | R | AS | HV-OO | L21 | - | FEE | switch | High | Voltage | ON/OFF |
| E6021 | E | NOTEST | PULSE | TM | E1021 | R | AS | VTO-TST | L21 | - | FEE | veto | test | signal | configuration |
| E5621 | E | ENABLE | | TM | E0621 | R | AS | WDOG-ED | L21 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5721 | E | ENABLE | | TM | E0721 | R | AS | RESP-ED | L21 | - | FEE | response | condition | enable/disable | |
| E5522 | E | ON | | TM | E0522 | R | AS | HV-OO | L22 | - | FEE | switch | High | Voltage | ON/OFF |
| E6022 | E | NOTEST | PULSE | TM | E1022 | R | AS | VTO-TST | L22 | - | FEE | veto | test | signal | configuration |
| E5622 | E | ENABLE | | TM | E0622 | R | AS | WDOG-ED | L22 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5722 | E | ENABLE | | TM | E0722 | R | AS | RESP-ED | L22 | - | FEE | response | condition | enable/disable | |
| E5523 | E | ON | | TM | E0523 | R | AS | HV-OO | L23 | - | FEE | switch | High | Voltage | ON/OFF |
| E6023 | E | NOTEST | PULSE | TM | E1023 | R | AS | VTO-TST | L23 | - | FEE | veto | test | signal | configuration |
| E5623 | E | ENABLE | | TM | E0623 | R | AS | WDOG-ED | L23 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5723 | E | ENABLE | | TM | E0723 | R | AS | RESP-ED | L23 | - | FEE | response | condition | enable/disable | |
| E5524 | E | ON | | TM | E0524 | R | AS | HV-OO | L24 | - | FEE | switch | High | Voltage | ON/OFF |
| E6024 | E | NOTEST | PULSE | TM | E1024 | R | AS | VTO-TST | L24 | - | FEE | veto | test | signal | configuration |
| E5624 | E | ENABLE | | TM | E0624 | R | AS | WDOG-ED | L24 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5724 | E | ENABLE | | TM | E0724 | R | AS | RESP-ED | L24 | - | FEE | response | condition | enable/disable | |
| E5525 | E | ON | | TM | E0525 | R | AS | HV-OO | L25 | - | FEE | switch | High | Voltage | ON/OFF |
| E6025 | E | NOTEST | PULSE | TM | E1025 | R | AS | VTO-TST | L25 | - | FEE | veto | test | signal | configuration |
| E5625 | E | ENABLE | | TM | E0625 | R | AS | WDOG-ED | L25 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5725 | E | ENABLE | | TM | E0725 | R | AS | RESP-ED | L25 | - | FEE | response | condition | enable/disable | |
| E5526 | E | ON | | TM | E0526 | R | AS | HV-OO | L26 | - | FEE | switch | High | Voltage | ON/OFF |
| E6026 | E | NOTEST | PULSE | TM | E1026 | R | AS | VTO-TST | L26 | - | FEE | veto | test | signal | configuration |
| E5626 | E | ENABLE | | TM | E0626 | R | AS | WDOG-ED | L26 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5726 | E | ENABLE | | TM | E0726 | R | AS | RESP-ED | L26 | - | FEE | response | condition | enable/disable | |
| E5527 | E | ON | | TM | E0527 | R | AS | HV-OO | L27 | - | FEE | switch | High | Voltage | ON/OFF |
| E6027 | E | NOTEST | PULSE | TM | E1027 | R | AS | VTO-TST | L27 | - | FEE | veto | test | signal | configuration |
| E5627 | E | ENABLE | | TM | E0627 | R | AS | WDOG-ED | L27 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5727 | E | ENABLE | | TM | E0727 | R | AS | RESP-ED | L27 | - | FEE | response | condition | enable/disable | |
| E5528 | E | ON | | TM | E0528 | R | AS | HV-OO | L28 | - | FEE | switch | High | Voltage | ON/OFF |
| E6028 | E | NOTEST | PULSE | TM | E1028 | R | AS | VTO-TST | L28 | - | FEE | veto | test | signal | configuration |
| E5628 | E | ENABLE | | TM | E0628 | R | AS | WDOG-ED | L28 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5728 | E | ENABLE | | TM | E0728 | R | AS | RESP-ED | L28 | - | FEE | response | condition | enable/disable | |
| E5529 | E | ON | | TM | E0529 | R | AS | HV-OO | L29 | - | FEE | switch | High | Voltage | ON/OFF |
| E6029 | E | NOTEST | PULSE | TM | E1029 | R | AS | VTO-TST | L29 | - | FEE | veto | test | signal | configuration |
| E5629 | E | ENABLE | | TM | E0629 | R | AS | WDOG-ED | L29 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5729 | E | ENABLE | | TM | E0729 | R | AS | RESP-ED | L29 | - | FEE | response | condition | enable/disable | |
| E5530 | E | ON | | TM | E0530 | R | AS | HV-OO | L30 | - | FEE | switch | High | Voltage | ON/OFF |
| E6030 | E | NOTEST | PULSE | TM | E1030 | R | AS | VTO-TST | L30 | - | FEE | veto | test | signal | configuration |
| E5630 | E | ENABLE | | TM | E0630 | R | AS | WDOG-ED | L30 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5730 | E | ENABLE | | TM | E0730 | R | AS | RESP-ED | L30 | - | FEE | response | condition | enable/disable | |
| E5531 | E | ON | | TM | E0531 | R | AS | HV-OO | L31 | - | FEE | switch | High | Voltage | ON/OFF |
| E6031 | E | NOTEST | PULSE | TM | E1031 | R | AS | VTO-TST | L31 | - | FEE | veto | test | signal | configuration |
| E5631 | E | ENABLE | | TM | E0631 | R | AS | WDOG-ED | L31 | - | FEE | watchdog | configuration | Enable/Disable | |



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| E5731 | E | ENABLE | TM | E0731 | R | AS | RESP-ED | L31 | - FEE response condition enable/disable |
| E5532 | E | ON | TM | E0532 | R | AS | HV-OO | L32 | - FEE switch High Voltage ON/OFF |
| E6032 | E | NOTEST PULSE | TM | E1032 | R | AS | VTO-TST | L32 | - FEE veto test signal configuration |
| E5632 | E | ENABLE | TM | E0632 | R | AS | WDOG-ED | L32 | - FEE watchdog configuration Enable/Disable |
| E5732 | E | ENABLE | TM | E0732 | R | AS | RESP-ED | L32 | - FEE response condition enable/disable |
| E5533 | E | ON | TM | E0533 | R | AS | HV-OO | L33 | - FEE switch High Voltage ON/OFF |
| E6033 | E | NOTEST PULSE | TM | E1033 | R | AS | VTO-TST | L33 | - FEE veto test signal configuration |
| E5633 | E | ENABLE | TM | E0633 | R | AS | WDOG-ED | L33 | - FEE watchdog configuration Enable/Disable |
| E5733 | E | ENABLE | TM | E0733 | R | AS | RESP-ED | L33 | - FEE response condition enable/disable |
| E5534 | E | ON | TM | E0534 | R | AS | HV-OO | L34 | - FEE switch High Voltage ON/OFF |
| E6034 | E | NOTEST PULSE | TM | E1034 | R | AS | VTO-TST | L34 | - FEE veto test signal configuration |
| E5634 | E | ENABLE | TM | E0634 | R | AS | WDOG-ED | L34 | - FEE watchdog configuration Enable/Disable |
| E5734 | E | ENABLE | TM | E0734 | R | AS | RESP-ED | L34 | - FEE response condition enable/disable |
| E5535 | E | ON | TM | E0535 | R | AS | HV-OO | L35 | - FEE switch High Voltage ON/OFF |
| E6035 | E | NOTEST PULSE | TM | E1035 | R | AS | VTO-TST | L35 | - FEE veto test signal configuration |
| E5635 | E | ENABLE | TM | E0635 | R | AS | WDOG-ED | L35 | - FEE watchdog configuration Enable/Disable |
| E5735 | E | ENABLE | TM | E0735 | R | AS | RESP-ED | L35 | - FEE response condition enable/disable |
| E5536 | E | ON | TM | E0536 | R | AS | HV-OO | L36 | - FEE switch High Voltage ON/OFF |
| E6036 | E | NOTEST PULSE | TM | E1036 | R | AS | VTO-TST | L36 | - FEE veto test signal configuration |
| E5636 | E | ENABLE | TM | E0636 | R | AS | WDOG-ED | L36 | - FEE watchdog configuration Enable/Disable |
| E5736 | E | ENABLE | TM | E0736 | R | AS | RESP-ED | L36 | - FEE response condition enable/disable |
| E5537 | E | ON | TM | E0537 | R | AS | HV-OO | L37 | - FEE switch High Voltage ON/OFF |
| E6037 | E | NOTEST PULSE | TM | E1037 | R | AS | VTO-TST | L37 | - FEE veto test signal configuration |
| E5637 | E | ENABLE | TM | E0637 | R | AS | WDOG-ED | L37 | - FEE watchdog configuration Enable/Disable |
| E5737 | E | ENABLE | TM | E0737 | R | AS | RESP-ED | L37 | - FEE response condition enable/disable |
| E5538 | E | ON | TM | E0538 | R | AS | HV-OO | L38 | - FEE switch High Voltage ON/OFF |
| E6038 | E | NOTEST PULSE | TM | E1038 | R | AS | VTO-TST | L38 | - FEE veto test signal configuration |
| E5638 | E | ENABLE | TM | E0638 | R | AS | WDOG-ED | L38 | - FEE watchdog configuration Enable/Disable |
| E5738 | E | ENABLE | TM | E0738 | R | AS | RESP-ED | L38 | - FEE response condition enable/disable |
| E5539 | E | ON | TM | E0539 | R | AS | HV-OO | L39 | - FEE switch High Voltage ON/OFF |
| E6039 | E | NOTEST PULSE | TM | E1039 | R | AS | VTO-TST | L39 | - FEE veto test signal configuration |
| E5639 | E | ENABLE | TM | E0639 | R | AS | WDOG-ED | L39 | - FEE watchdog configuration Enable/Disable |
| E5739 | E | ENABLE | TM | E0739 | R | AS | RESP-ED | L39 | - FEE response condition enable/disable |
| E5540 | E | ON | TM | E0540 | R | AS | HV-OO | L40 | - FEE switch High Voltage ON/OFF |
| E6040 | E | NOTEST PULSE | TM | E1040 | R | AS | VTO-TST | L40 | - FEE veto test signal configuration |
| E5640 | E | ENABLE | TM | E0640 | R | AS | WDOG-ED | L40 | - FEE watchdog configuration Enable/Disable |
| E5740 | E | ENABLE | TM | E0740 | R | AS | RESP-ED | L40 | - FEE response condition enable/disable |
| E5541 | E | ON | TM | E0541 | R | AS | HV-OO | L41 | - FEE switch High Voltage ON/OFF |
| E6041 | E | NOTEST PULSE | TM | E1041 | R | AS | VTO-TST | L41 | - FEE veto test signal configuration |
| E5641 | E | ENABLE | TM | E0641 | R | AS | WDOG-ED | L41 | - FEE watchdog configuration Enable/Disable |
| E5741 | E | ENABLE | TM | E0741 | R | AS | RESP-ED | L41 | - FEE response condition enable/disable |
| E5542 | E | ON | TM | E0542 | R | AS | HV-OO | L42 | - FEE switch High Voltage ON/OFF |
| E6042 | E | NOTEST PULSE | TM | E1042 | R | AS | VTO-TST | L42 | - FEE veto test signal configuration |
| E5642 | E | ENABLE | TM | E0642 | R | AS | WDOG-ED | L42 | - FEE watchdog configuration Enable/Disable |
| E5742 | E | ENABLE | TM | E0742 | R | AS | RESP-ED | L42 | - FEE response condition enable/disable |
| E5543 | E | ON | TM | E0543 | R | AS | HV-OO | L43 | - FEE switch High Voltage ON/OFF |



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| E6043 | E | NOTEST | PULSE | TM | E1043 | R | AS | VTO-TST | L43 | - FEE veto test signal configuration |
| E5643 | E | ENABLE | | TM | E0643 | R | AS | WDOG-ED | L43 | - FEE watchdog configuration Enable/Disable |
| E5743 | E | ENABLE | | TM | E0743 | R | AS | RESP-ED | L43 | - FEE response condition enable/disable |
| E5544 | E | ON | | TM | E0544 | R | AS | HV-OO | L44 | - FEE switch High Voltage ON/OFF |
| E6044 | E | NOTEST | PULSE | TM | E1044 | R | AS | VTO-TST | L44 | - FEE veto test signal configuration |
| E5644 | E | ENABLE | | TM | E0644 | R | AS | WDOG-ED | L44 | - FEE watchdog configuration Enable/Disable |
| E5744 | E | ENABLE | | TM | E0744 | R | AS | RESP-ED | L44 | - FEE response condition enable/disable |
| E5545 | E | ON | | TM | E0545 | R | AS | HV-OO | L45 | - FEE switch High Voltage ON/OFF |
| E6045 | E | NOTEST | PULSE | TM | E1045 | R | AS | VTO-TST | L45 | - FEE veto test signal configuration |
| E5645 | E | ENABLE | | TM | E0645 | R | AS | WDOG-ED | L45 | - FEE watchdog configuration Enable/Disable |
| E5745 | E | ENABLE | | TM | E0745 | R | AS | RESP-ED | L45 | - FEE response condition enable/disable |
| E5546 | E | ON | | TM | E0546 | R | AS | HV-OO | L46 | - FEE switch High Voltage ON/OFF |
| E6046 | E | NOTEST | PULSE | TM | E1046 | R | AS | VTO-TST | L46 | - FEE veto test signal configuration |
| E5646 | E | ENABLE | | TM | E0646 | R | AS | WDOG-ED | L46 | - FEE watchdog configuration Enable/Disable |
| E5746 | E | ENABLE | | TM | E0746 | R | AS | RESP-ED | L46 | - FEE response condition enable/disable |
| E5547 | E | ON | | TM | E0547 | R | AS | HV-OO | L47 | - FEE switch High Voltage ON/OFF |
| E6047 | E | NOTEST | PULSE | TM | E1047 | R | AS | VTO-TST | L47 | - FEE veto test signal configuration |
| E5647 | E | ENABLE | | TM | E0647 | R | AS | WDOG-ED | L47 | - FEE watchdog configuration Enable/Disable |
| E5747 | E | ENABLE | | TM | E0747 | R | AS | RESP-ED | L47 | - FEE response condition enable/disable |
| E5548 | E | ON | | TM | E0548 | R | AS | HV-OO | L48 | - FEE switch High Voltage ON/OFF |
| E6048 | E | NOTEST | PULSE | TM | E1048 | R | AS | VTO-TST | L48 | - FEE veto test signal configuration |
| E5648 | E | ENABLE | | TM | E0648 | R | AS | WDOG-ED | L48 | - FEE watchdog configuration Enable/Disable |
| E5748 | E | ENABLE | | TM | E0748 | R | AS | RESP-ED | L48 | - FEE response condition enable/disable |
| E5549 | E | ON | | TM | E0549 | R | AS | HV-OO | L49 | - FEE switch High Voltage ON/OFF |
| E6049 | E | NOTEST | PULSE | TM | E1049 | R | AS | VTO-TST | L49 | - FEE veto test signal configuration |
| E5649 | E | ENABLE | | TM | E0649 | R | AS | WDOG-ED | L49 | - FEE watchdog configuration Enable/Disable |
| E5749 | E | ENABLE | | TM | E0749 | R | AS | RESP-ED | L49 | - FEE response condition enable/disable |
| E5550 | E | ON | | TM | E0550 | R | AS | HV-OO | L50 | - FEE switch High Voltage ON/OFF |
| E6050 | E | NOTEST | PULSE | TM | E1050 | R | AS | VTO-TST | L50 | - FEE veto test signal configuration |
| E5650 | E | ENABLE | | TM | E0650 | R | AS | WDOG-ED | L50 | - FEE watchdog configuration Enable/Disable |
| E5750 | E | ENABLE | | TM | E0750 | R | AS | RESP-ED | L50 | - FEE response condition enable/disable |
| E5551 | E | ON | | TM | E0551 | R | AS | HV-OO | L51 | - FEE switch High Voltage ON/OFF |
| E6051 | E | NOTEST | PULSE | TM | E1051 | R | AS | VTO-TST | L51 | - FEE veto test signal configuration |
| E5651 | E | ENABLE | | TM | E0651 | R | AS | WDOG-ED | L51 | - FEE watchdog configuration Enable/Disable |
| E5751 | E | ENABLE | | TM | E0751 | R | AS | RESP-ED | L51 | - FEE response condition enable/disable |
| E5552 | E | ON | | TM | E0552 | R | AS | HV-OO | L52 | - FEE switch High Voltage ON/OFF |
| E6052 | E | NOTEST | PULSE | TM | E1052 | R | AS | VTO-TST | L52 | - FEE veto test signal configuration |
| E5652 | E | ENABLE | | TM | E0652 | R | AS | WDOG-ED | L52 | - FEE watchdog configuration Enable/Disable |
| E5752 | E | ENABLE | | TM | E0752 | R | AS | RESP-ED | L52 | - FEE response condition enable/disable |
| E5553 | E | ON | | TM | E0553 | R | AS | HV-OO | L53 | - FEE switch High Voltage ON/OFF |
| E6053 | E | NOTEST | PULSE | TM | E1053 | R | AS | VTO-TST | L53 | - FEE veto test signal configuration |
| E5653 | E | ENABLE | | TM | E0653 | R | AS | WDOG-ED | L53 | - FEE watchdog configuration Enable/Disable |
| E5753 | E | ENABLE | | TM | E0753 | R | AS | RESP-ED | L53 | - FEE response condition enable/disable |
| E5554 | E | ON | | TM | E0554 | R | AS | HV-OO | L54 | - FEE switch High Voltage ON/OFF |
| E6054 | E | NOTEST | PULSE | TM | E1054 | R | AS | VTO-TST | L54 | - FEE veto test signal configuration |
| E5654 | E | ENABLE | | TM | E0654 | R | AS | WDOG-ED | L54 | - FEE watchdog configuration Enable/Disable |



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| E5754 | E | ENABLE | TM | E0754 | R | AS | RESP-ED | L54 | - FEE response condition enable/disable |
| E5555 | E | ON | TM | E0555 | R | AS | HV-OO | L55 | - FEE switch High Voltage ON/OFF |
| E6055 | E | NOTEST PULSE | TM | E1055 | R | AS | VTO-TST | L55 | - FEE veto test signal configuration |
| E5655 | E | ENABLE | TM | E0655 | R | AS | WDOG-ED | L55 | - FEE watchdog configuration Enable/Disable |
| E5755 | E | ENABLE | TM | E0755 | R | AS | RESP-ED | L55 | - FEE response condition enable/disable |
| E5556 | E | ON | TM | E0556 | R | AS | HV-OO | L56 | - FEE switch High Voltage ON/OFF |
| E6056 | E | NOTEST PULSE | TM | E1056 | R | AS | VTO-TST | L56 | - FEE veto test signal configuration |
| E5656 | E | ENABLE | TM | E0656 | R | AS | WDOG-ED | L56 | - FEE watchdog configuration Enable/Disable |
| E5756 | E | ENABLE | TM | E0756 | R | AS | RESP-ED | L56 | - FEE response condition enable/disable |
| E5557 | E | ON | TM | E0557 | R | AS | HV-OO | L57 | - FEE switch High Voltage ON/OFF |
| E6057 | E | NOTEST PULSE | TM | E1057 | R | AS | VTO-TST | L57 | - FEE veto test signal configuration |
| E5657 | E | ENABLE | TM | E0657 | R | AS | WDOG-ED | L57 | - FEE watchdog configuration Enable/Disable |
| E5757 | E | ENABLE | TM | E0757 | R | AS | RESP-ED | L57 | - FEE response condition enable/disable |
| E5558 | E | ON | TM | E0558 | R | AS | HV-OO | L58 | - FEE switch High Voltage ON/OFF |
| E6058 | E | NOTEST PULSE | TM | E1058 | R | AS | VTO-TST | L58 | - FEE veto test signal configuration |
| E5658 | E | ENABLE | TM | E0658 | R | AS | WDOG-ED | L58 | - FEE watchdog configuration Enable/Disable |
| E5758 | E | ENABLE | TM | E0758 | R | AS | RESP-ED | L58 | - FEE response condition enable/disable |
| E5559 | E | ON | TM | E0559 | R | AS | HV-OO | L59 | - FEE switch High Voltage ON/OFF |
| E6059 | E | NOTEST PULSE | TM | E1059 | R | AS | VTO-TST | L59 | - FEE veto test signal configuration |
| E5659 | E | ENABLE | TM | E0659 | R | AS | WDOG-ED | L59 | - FEE watchdog configuration Enable/Disable |
| E5759 | E | ENABLE | TM | E0759 | R | AS | RESP-ED | L59 | - FEE response condition enable/disable |
| E5560 | E | ON | TM | E0560 | R | AS | HV-OO | L60 | - FEE switch High Voltage ON/OFF |
| E6060 | E | NOTEST PULSE | TM | E1060 | R | AS | VTO-TST | L60 | - FEE veto test signal configuration |
| E5660 | E | ENABLE | TM | E0660 | R | AS | WDOG-ED | L60 | - FEE watchdog configuration Enable/Disable |
| E5760 | E | ENABLE | TM | E0760 | R | AS | RESP-ED | L60 | - FEE response condition enable/disable |
| E6061 | E | NOTEST PULSE | TM | E1061 | R | AS | VTO-TST | L61 | - FEE veto test signal configuration |
| E5661 | E | ENABLE | TM | E0661 | R | AS | WDOG-ED | L61 | - FEE watchdog configuration Enable/Disable |
| E5561 | E | ON | TM | E0561 | R | AS | HV-OO | L61 | - FEE switch High Voltage ON/OFF |
| E5761 | E | ENABLE | TM | E0761 | R | AS | RESP-ED | L61 | - FEE response condition enable/disable |
| E5562 | E | ON | TM | E0562 | R | AS | HV-OO | L62 | - FEE switch High Voltage ON/OFF |
| E6062 | E | NOTEST PULSE | TM | E1062 | R | AS | VTO-TST | L62 | - FEE veto test signal configuration |
| E5662 | E | ENABLE | TM | E0662 | R | AS | WDOG-ED | L62 | - FEE watchdog configuration Enable/Disable |
| E5762 | E | ENABLE | TM | E0762 | R | AS | RESP-ED | L62 | - FEE response condition enable/disable |
| E5563 | E | ON | TM | E0563 | R | AS | HV-OO | L63 | - FEE switch High Voltage ON/OFF |
| E6063 | E | NOTEST PULSE | TM | E1063 | R | AS | VTO-TST | L63 | - FEE veto test signal configuration |
| E5663 | E | ENABLE | TM | E0663 | R | AS | WDOG-ED | L63 | - FEE watchdog configuration Enable/Disable |
| E5763 | E | ENABLE | TM | E0763 | R | AS | RESP-ED | L63 | - FEE response condition enable/disable |
| E5564 | E | ON | TM | E0564 | R | AS | HV-OO | L64 | - FEE switch High Voltage ON/OFF |
| E6064 | E | NOTEST PULSE | TM | E1064 | R | AS | VTO-TST | L64 | - FEE veto test signal configuration |
| E5664 | E | ENABLE | TM | E0664 | R | AS | WDOG-ED | L64 | - FEE watchdog configuration Enable/Disable |
| E5764 | E | ENABLE | TM | E0764 | R | AS | RESP-ED | L64 | - FEE response condition enable/disable |
| E5565 | E | ON | TM | E0565 | R | AS | HV-OO | L65 | - FEE switch High Voltage ON/OFF |
| E6065 | E | NOTEST PULSE | TM | E1065 | R | AS | VTO-TST | L65 | - FEE veto test signal configuration |
| E5665 | E | ENABLE | TM | E0665 | R | AS | WDOG-ED | L65 | - FEE watchdog configuration Enable/Disable |
| E5765 | E | ENABLE | TM | E0765 | R | AS | RESP-ED | L65 | - FEE response condition enable/disable |
| E5566 | E | ON | TM | E0566 | R | AS | HV-OO | L66 | - FEE switch High Voltage ON/OFF |



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| E6066 | E | NOTEST | PULSE | TM | E1066 | R | AS | VTO-TST | L66 | - FEE veto test signal configuration |
| E5666 | E | ENABLE | | TM | E0666 | R | AS | WDOG-ED | L66 | - FEE watchdog configuration Enable/Disable |
| E5766 | E | ENABLE | | TM | E0766 | R | AS | RESP-ED | L66 | - FEE response condition enable/disable |
| E5567 | E | ON | | TM | E0567 | R | AS | HV-OO | L67 | - FEE switch High Voltage ON/OFF |
| E6067 | E | NOTEST | PULSE | TM | E1067 | R | AS | VTO-TST | L67 | - FEE veto test signal configuration |
| E5667 | E | ENABLE | | TM | E0667 | R | AS | WDOG-ED | L67 | - FEE watchdog configuration Enable/Disable |
| E5767 | E | ENABLE | | TM | E0767 | R | AS | RESP-ED | L67 | - FEE response condition enable/disable |
| E5568 | E | ON | | TM | E0568 | R | AS | HV-OO | L68 | - FEE switch High Voltage ON/OFF |
| E6068 | E | NOTEST | PULSE | TM | E1068 | R | AS | VTO-TST | L68 | - FEE veto test signal configuration |
| E5668 | E | ENABLE | | TM | E0668 | R | AS | WDOG-ED | L68 | - FEE watchdog configuration Enable/Disable |
| E5768 | E | ENABLE | | TM | E0768 | R | AS | RESP-ED | L68 | - FEE response condition enable/disable |
| E5569 | E | ON | | TM | E0569 | R | AS | HV-OO | L69 | - FEE switch High Voltage ON/OFF |
| E6069 | E | NOTEST | PULSE | TM | E1069 | R | AS | VTO-TST | L69 | - FEE veto test signal configuration |
| E5669 | E | ENABLE | | TM | E0669 | R | AS | WDOG-ED | L69 | - FEE watchdog configuration Enable/Disable |
| E5769 | E | ENABLE | | TM | E0769 | R | AS | RESP-ED | L69 | - FEE response condition enable/disable |
| E5570 | E | ON | | TM | E0570 | R | AS | HV-OO | L70 | - FEE switch High Voltage ON/OFF |
| E6070 | E | NOTEST | PULSE | TM | E1070 | R | AS | VTO-TST | L70 | - FEE veto test signal configuration |
| E5670 | E | ENABLE | | TM | E0670 | R | AS | WDOG-ED | L70 | - FEE watchdog configuration Enable/Disable |
| E5770 | E | ENABLE | | TM | E0770 | R | AS | RESP-ED | L70 | - FEE response condition enable/disable |
| E5571 | E | ON | | TM | E0571 | R | AS | HV-OO | L71 | - FEE switch High Voltage ON/OFF |
| E6071 | E | NOTEST | PULSE | TM | E1071 | R | AS | VTO-TST | L71 | - FEE veto test signal configuration |
| E5671 | E | ENABLE | | TM | E0671 | R | AS | WDOG-ED | L71 | - FEE watchdog configuration Enable/Disable |
| E5771 | E | ENABLE | | TM | E0771 | R | AS | RESP-ED | L71 | - FEE response condition enable/disable |
| E5572 | E | ON | | TM | E0572 | R | AS | HV-OO | L72 | - FEE switch High Voltage ON/OFF |
| E6072 | E | NOTEST | PULSE | TM | E1072 | R | AS | VTO-TST | L72 | - FEE veto test signal configuration |
| E5672 | E | ENABLE | | TM | E0672 | R | AS | WDOG-ED | L72 | - FEE watchdog configuration Enable/Disable |
| E5772 | E | ENABLE | | TM | E0772 | R | AS | RESP-ED | L72 | - FEE response condition enable/disable |
| E5573 | E | ON | | TM | E0573 | R | AS | HV-OO | L73 | - FEE switch High Voltage ON/OFF |
| E6073 | E | NOTEST | PULSE | TM | E1073 | R | AS | VTO-TST | L73 | - FEE veto test signal configuration |
| E5673 | E | ENABLE | | TM | E0673 | R | AS | WDOG-ED | L73 | - FEE watchdog configuration Enable/Disable |
| E5773 | E | ENABLE | | TM | E0773 | R | AS | RESP-ED | L73 | - FEE response condition enable/disable |
| E5574 | E | ON | | TM | E0574 | R | AS | HV-OO | L74 | - FEE switch High Voltage ON/OFF |
| E6074 | E | NOTEST | PULSE | TM | E1074 | R | AS | VTO-TST | L74 | - FEE veto test signal configuration |
| E5674 | E | ENABLE | | TM | E0674 | R | AS | WDOG-ED | L74 | - FEE watchdog configuration Enable/Disable |
| E5774 | E | ENABLE | | TM | E0774 | R | AS | RESP-ED | L74 | - FEE response condition enable/disable |
| E5575 | E | ON | | TM | E0575 | R | AS | HV-OO | L75 | - FEE switch High Voltage ON/OFF |
| E6075 | E | NOTEST | PULSE | TM | E1075 | R | AS | VTO-TST | L75 | - FEE veto test signal configuration |
| E5675 | E | ENABLE | | TM | E0675 | R | AS | WDOG-ED | L75 | - FEE watchdog configuration Enable/Disable |
| E5775 | E | ENABLE | | TM | E0775 | R | AS | RESP-ED | L75 | - FEE response condition enable/disable |
| E5576 | E | ON | | TM | E0576 | R | AS | HV-OO | L76 | - FEE switch High Voltage ON/OFF |
| E6076 | E | NOTEST | PULSE | TM | E1076 | R | AS | VTO-TST | L76 | - FEE veto test signal configuration |
| E5676 | E | ENABLE | | TM | E0676 | R | AS | WDOG-ED | L76 | - FEE watchdog configuration Enable/Disable |
| E5776 | E | ENABLE | | TM | E0776 | R | AS | RESP-ED | L76 | - FEE response condition enable/disable |
| E5577 | E | ON | | TM | E0577 | R | AS | HV-OO | L77 | - FEE switch High Voltage ON/OFF |
| E6077 | E | NOTEST | PULSE | TM | E1077 | R | AS | VTO-TST | L77 | - FEE veto test signal configuration |
| E5677 | E | ENABLE | | TM | E0677 | R | AS | WDOG-ED | L77 | - FEE watchdog configuration Enable/Disable |



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| E5777 | E | ENABLE | TM | E0777 | R | AS | RESP-ED | L77 | - | FEE | response | condition | enable/disable | | |
| E5578 | E | ON | TM | E0578 | R | AS | HV-OO | L78 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6078 | E | NOTEST | PULSE | TM | E1078 | R | AS | VTO-TST | L78 | - | FEE | veto | test | signal | configuration |
| E5678 | E | ENABLE | TM | E0678 | R | AS | WDOG-ED | L78 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5778 | E | ENABLE | TM | E0778 | R | AS | RESP-ED | L78 | - | FEE | response | condition | enable/disable | | |
| E5579 | E | ON | TM | E0579 | R | AS | HV-OO | L79 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6079 | E | NOTEST | PULSE | TM | E1079 | R | AS | VTO-TST | L79 | - | FEE | veto | test | signal | configuration |
| E5679 | E | ENABLE | TM | E0679 | R | AS | WDOG-ED | L79 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5779 | E | ENABLE | TM | E0779 | R | AS | RESP-ED | L79 | - | FEE | response | condition | enable/disable | | |
| E5580 | E | ON | TM | E0580 | R | AS | HV-OO | L80 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6080 | E | NOTEST | PULSE | TM | E1080 | R | AS | VTO-TST | L80 | - | FEE | veto | test | signal | configuration |
| E5680 | E | ENABLE | TM | E0680 | R | AS | WDOG-ED | L80 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5780 | E | ENABLE | TM | E0780 | R | AS | RESP-ED | L80 | - | FEE | response | condition | enable/disable | | |
| E5581 | E | ON | TM | E0581 | R | AS | HV-OO | L81 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6081 | E | NOTEST | PULSE | TM | E1081 | R | AS | VTO-TST | L81 | - | FEE | veto | test | signal | configuration |
| E5681 | E | ENABLE | TM | E0681 | R | AS | WDOG-ED | L81 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5781 | E | ENABLE | TM | E0781 | R | AS | RESP-ED | L81 | - | FEE | response | condition | enable/disable | | |
| E5582 | E | ON | TM | E0582 | R | AS | HV-OO | L82 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6082 | E | NOTEST | PULSE | TM | E1082 | R | AS | VTO-TST | L82 | - | FEE | veto | test | signal | configuration |
| E5682 | E | ENABLE | TM | E0682 | R | AS | WDOG-ED | L82 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5782 | E | ENABLE | TM | E0782 | R | AS | RESP-ED | L82 | - | FEE | response | condition | enable/disable | | |
| E5583 | E | ON | TM | E0583 | R | AS | HV-OO | L83 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6083 | E | NOTEST | PULSE | TM | E1083 | R | AS | VTO-TST | L83 | - | FEE | veto | test | signal | configuration |
| E5683 | E | ENABLE | TM | E0683 | R | AS | WDOG-ED | L83 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5783 | E | ENABLE | TM | E0783 | R | AS | RESP-ED | L83 | - | FEE | response | condition | enable/disable | | |
| E5584 | E | ON | TM | E0584 | R | AS | HV-OO | L84 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6084 | E | NOTEST | PULSE | TM | E1084 | R | AS | VTO-TST | L84 | - | FEE | veto | test | signal | configuration |
| E5684 | E | ENABLE | TM | E0684 | R | AS | WDOG-ED | L84 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5784 | E | ENABLE | TM | E0784 | R | AS | RESP-ED | L84 | - | FEE | response | condition | enable/disable | | |
| E5585 | E | ON | TM | E0585 | R | AS | HV-OO | L85 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6085 | E | NOTEST | PULSE | TM | E1085 | R | AS | VTO-TST | L85 | - | FEE | veto | test | signal | configuration |
| E5685 | E | ENABLE | TM | E0685 | R | AS | WDOG-ED | L85 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5785 | E | ENABLE | TM | E0785 | R | AS | RESP-ED | L85 | - | FEE | response | condition | enable/disable | | |
| E5586 | E | ON | TM | E0586 | R | AS | HV-OO | L86 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6086 | E | NOTEST | PULSE | TM | E1086 | R | AS | VTO-TST | L86 | - | FEE | veto | test | signal | configuration |
| E5686 | E | ENABLE | TM | E0686 | R | AS | WDOG-ED | L86 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5786 | E | ENABLE | TM | E0786 | R | AS | RESP-ED | L86 | - | FEE | response | condition | enable/disable | | |
| E5587 | E | ON | TM | E0587 | R | AS | HV-OO | L87 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6087 | E | NOTEST | PULSE | TM | E1087 | R | AS | VTO-TST | L87 | - | FEE | veto | test | signal | configuration |
| E5687 | E | ENABLE | TM | E0687 | R | AS | WDOG-ED | L87 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5787 | E | ENABLE | TM | E0787 | R | AS | RESP-ED | L87 | - | FEE | response | condition | enable/disable | | |
| E5588 | E | ON | TM | E0588 | R | AS | HV-OO | L88 | - | FEE | switch | High | Voltage | ON/OFF | |
| E6088 | E | NOTEST | PULSE | TM | E1088 | R | AS | VTO-TST | L88 | - | FEE | veto | test | signal | configuration |
| E5688 | E | ENABLE | TM | E0688 | R | AS | WDOG-ED | L88 | - | FEE | watchdog | configuration | Enable/Disable | | |
| E5788 | E | ENABLE | TM | E0788 | R | AS | RESP-ED | L88 | - | FEE | response | condition | enable/disable | | |
| E5589 | E | ON | TM | E0589 | R | AS | HV-OO | L89 | - | FEE | switch | High | Voltage | ON/OFF | |



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|-------|---|--------------|----|-------|---|----|-------------|----------------------------------------------|
| E6089 | E | NOTEST PULSE | TM | E1089 | R | AS | VTO-TST L89 | - FEE veto test signal configuration |
| E5689 | E | ENABLE | TM | E0689 | R | AS | WDOG-ED L89 | - FEE watchdog configuration Enable/Disable |
| E5789 | E | ENABLE | TM | E0789 | R | AS | RESP-ED L89 | - FEE response condition enable/disable |
| E5590 | E | ON | TM | E0590 | R | AS | HV-OO L90 | - FEE switch High Voltage ON/OFF |
| E6090 | E | NOTEST PULSE | TM | E1090 | R | AS | VTO-TST L90 | - FEE veto test signal configuration |
| E5690 | E | ENABLE | TM | E0690 | R | AS | WDOG-ED L90 | - FEE watchdog configuration Enable/Disable |
| E5790 | E | ENABLE | TM | E0790 | R | AS | RESP-ED L90 | - FEE response condition enable/disable |
| E5591 | E | ON | TM | E0591 | R | AS | HV-OO L91 | - FEE switch High Voltage ON/OFF PSAC HV1 |
| E5592 | E | ON | TM | E0592 | R | AS | HV-OO L92 | - FEE switch High Voltage ON/OFF PSAC HV2 |
| E6091 | E | NOTESTPULSES | TM | E1091 | R | PS | VTO-TST L91 | - Test Pulses Burst |
| E5791 | E | ENABLE | TM | E0791 | R | AS | RESP-ED L91 | - FEE response condition enable/disable PSAC |

2.2.4.25. ES1733_AS-VTCNF_fmconfig_0002.TPF

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ES1733_AS-VTCNF_fmconfig_0002.TPF - 2002-06-14T12:07:42Z - SPI1 ACS Veto Signal Config

| | | | | | | | | |
|-------|---|----------|----|-------|---|----|------------|-------------------------------------------------------|
| E5400 | E | STANDARD | TM | E0400 | R | AS | VTO-CND L0 | - Extended veto generation forced/standard |
| E6200 | E | ENABLE | TM | E1200 | R | AS | VTO-NML L0 | - FEE extended veto signal generation Enable/disable |
| E6100 | E | STANDARD | TM | E1100 | R | AS | VTO-OVG L0 | - FEE veto signal generation Forced/standard |
| E5900 | E | ENABLE | TM | E0900 | R | AS | VTO-DRV L0 | - FEE veto signal driver configuration Enable/Disable |
| E5800 | E | ENABLE | TM | E0800 | R | AS | VTO-ED L0 | - FEE veto signal configuration Enable/Disable |
| E5401 | E | STANDARD | TM | E0401 | R | AS | VTO-CND L1 | - Extended veto generation forced/standard |
| E6201 | E | ENABLE | TM | E1201 | R | AS | VTO-NML L1 | - FEE extended veto signal generation Enable/disable |
| E6101 | E | STANDARD | TM | E1101 | R | AS | VTO-OVG L1 | - FEE veto signal generation Forced/standard |
| E5901 | E | ENABLE | TM | E0901 | R | AS | VTO-DRV L1 | - FEE veto signal driver configuration Enable/Disable |
| E5801 | E | ENABLE | TM | E0801 | R | AS | VTO-ED L1 | - FEE veto signal configuration Enable/Disable |
| E5402 | E | STANDARD | TM | E0402 | R | AS | VTO-CND L2 | - Extended veto generation forced/standard |
| E6202 | E | ENABLE | TM | E1202 | R | AS | VTO-NML L2 | - FEE extended veto signal generation Enable/disable |
| E6102 | E | STANDARD | TM | E1102 | R | AS | VTO-OVG L2 | - FEE veto signal generation Forced/standard |
| E5902 | E | ENABLE | TM | E0902 | R | AS | VTO-DRV L2 | - FEE veto signal driver configuration Enable/Disable |
| E5802 | E | ENABLE | TM | E0802 | R | AS | VTO-ED L2 | - FEE veto signal configuration Enable/Disable |
| E5403 | E | STANDARD | TM | E0403 | R | AS | VTO-CND L3 | - Extended veto generation forced/standard |
| E6203 | E | ENABLE | TM | E1203 | R | AS | VTO-NML L3 | - FEE extended veto signal generation Enable/disable |
| E6103 | E | STANDARD | TM | E1103 | R | AS | VTO-OVG L3 | - FEE veto signal generation Forced/standard |
| E5903 | E | ENABLE | TM | E0903 | R | AS | VTO-DRV L3 | - FEE veto signal driver configuration Enable/Disable |
| E5803 | E | ENABLE | TM | E0803 | R | AS | VTO-ED L3 | - FEE veto signal configuration Enable/Disable |
| E5404 | E | STANDARD | TM | E0404 | R | AS | VTO-CND L4 | - Extended veto generation forced/standard |
| E6204 | E | ENABLE | TM | E1204 | R | AS | VTO-NML L4 | - FEE extended veto signal generation Enable/disable |
| E6104 | E | STANDARD | TM | E1104 | R | AS | VTO-OVG L4 | - FEE veto signal generation Forced/standard |
| E5904 | E | ENABLE | TM | E0904 | R | AS | VTO-DRV L4 | - FEE veto signal driver configuration Enable/Disable |
| E5804 | E | ENABLE | TM | E0804 | R | AS | VTO-ED L4 | - FEE veto signal configuration Enable/Disable |
| E5405 | E | STANDARD | TM | E0405 | R | AS | VTO-CND L5 | - Extended veto generation forced/standard |



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|-------|---|----------|----|-------|---|----|---------|-----|---|----------|----------|------------|-----------------|-----------------|----------------|
| E6205 | E | ENABLE | TM | E1205 | R | AS | VTO-NML | L5 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6105 | E | STANDARD | TM | E1105 | R | AS | VTO-OVG | L5 | - | FEE | veto | signal | generation | Forced/standard | |
| E5905 | E | ENABLE | TM | E0905 | R | AS | VTO-DRV | L5 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5805 | E | ENABLE | TM | E0805 | R | AS | VTO-ED | L5 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5406 | E | STANDARD | TM | E0406 | R | AS | VTO-CND | L6 | - | Extended | veto | generation | forced/standard | | |
| E6206 | E | ENABLE | TM | E1206 | R | AS | VTO-NML | L6 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6106 | E | STANDARD | TM | E1106 | R | AS | VTO-OVG | L6 | - | FEE | veto | signal | generation | Forced/standard | |
| E5906 | E | ENABLE | TM | E0906 | R | AS | VTO-DRV | L6 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5806 | E | ENABLE | TM | E0806 | R | AS | VTO-ED | L6 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5407 | E | STANDARD | TM | E0407 | R | AS | VTO-CND | L7 | - | Extended | veto | generation | forced/standard | | |
| E6207 | E | ENABLE | TM | E1207 | R | AS | VTO-NML | L7 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6107 | E | STANDARD | TM | E1107 | R | AS | VTO-OVG | L7 | - | FEE | veto | signal | generation | Forced/standard | |
| E5907 | E | ENABLE | TM | E0907 | R | AS | VTO-DRV | L7 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5807 | E | ENABLE | TM | E0807 | R | AS | VTO-ED | L7 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5408 | E | STANDARD | TM | E0408 | R | AS | VTO-CND | L8 | - | Extended | veto | generation | forced/standard | | |
| E6208 | E | ENABLE | TM | E1208 | R | AS | VTO-NML | L8 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6108 | E | STANDARD | TM | E1108 | R | AS | VTO-OVG | L8 | - | FEE | veto | signal | generation | Forced/standard | |
| E5908 | E | ENABLE | TM | E0908 | R | AS | VTO-DRV | L8 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5808 | E | ENABLE | TM | E0808 | R | AS | VTO-ED | L8 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5409 | E | STANDARD | TM | E0409 | R | AS | VTO-CND | L9 | - | Extended | veto | generation | forced/standard | | |
| E6209 | E | ENABLE | TM | E1209 | R | AS | VTO-NML | L9 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6109 | E | STANDARD | TM | E1109 | R | AS | VTO-OVG | L9 | - | FEE | veto | signal | generation | Forced/standard | |
| E5909 | E | ENABLE | TM | E0909 | R | AS | VTO-DRV | L9 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5809 | E | ENABLE | TM | E0809 | R | AS | VTO-ED | L9 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5410 | E | STANDARD | TM | E0410 | R | AS | VTO-CND | L10 | - | Extended | veto | generation | forced/standard | | |
| E6210 | E | ENABLE | TM | E1210 | R | AS | VTO-NML | L10 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6110 | E | STANDARD | TM | E1110 | R | AS | VTO-OVG | L10 | - | FEE | veto | signal | generation | Forced/standard | |
| E5910 | E | ENABLE | TM | E0910 | R | AS | VTO-DRV | L10 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5810 | E | ENABLE | TM | E0810 | R | AS | VTO-ED | L10 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5411 | E | STANDARD | TM | E0411 | R | AS | VTO-CND | L11 | - | Extended | veto | generation | forced/standard | | |
| E6211 | E | ENABLE | TM | E1211 | R | AS | VTO-NML | L11 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6111 | E | STANDARD | TM | E1111 | R | AS | VTO-OVG | L11 | - | FEE | veto | signal | generation | Forced/standard | |
| E5911 | E | ENABLE | TM | E0911 | R | AS | VTO-DRV | L11 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5811 | E | ENABLE | TM | E0811 | R | AS | VTO-ED | L11 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5412 | E | STANDARD | TM | E0412 | R | AS | VTO-CND | L12 | - | Extended | veto | generation | forced/standard | | |
| E6212 | E | ENABLE | TM | E1212 | R | AS | VTO-NML | L12 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6112 | E | STANDARD | TM | E1112 | R | AS | VTO-OVG | L12 | - | FEE | veto | signal | generation | Forced/standard | |
| E5912 | E | ENABLE | TM | E0912 | R | AS | VTO-DRV | L12 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5812 | E | ENABLE | TM | E0812 | R | AS | VTO-ED | L12 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5413 | E | STANDARD | TM | E0413 | R | AS | VTO-CND | L13 | - | Extended | veto | generation | forced/standard | | |
| E6213 | E | ENABLE | TM | E1213 | R | AS | VTO-NML | L13 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6113 | E | STANDARD | TM | E1113 | R | AS | VTO-OVG | L13 | - | FEE | veto | signal | generation | Forced/standard | |
| E5913 | E | ENABLE | TM | E0913 | R | AS | VTO-DRV | L13 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5813 | E | ENABLE | TM | E0813 | R | AS | VTO-ED | L13 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5414 | E | STANDARD | TM | E0414 | R | AS | VTO-CND | L14 | - | Extended | veto | generation | forced/standard | | |
| E6214 | E | ENABLE | TM | E1214 | R | AS | VTO-NML | L14 | - | FEE | extended | veto | signal | generation | Enable/disable |



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| E6114 | E STANDARD | TM E1114 | R AS VTO-OVG L14 - FEE veto signal generation Forced/standard |
| E5914 | E ENABLE | TM E0914 | R AS VTO-DRV L14 - FEE veto signal driver configuration Enable/Disable |
| E5814 | E ENABLE | TM E0814 | R AS VTO-ED L14 - FEE veto signal configuration Enable/Disable |
| E5415 | E STANDARD | TM E0415 | R AS VTO-CND L15 - Extended veto generation forced/standard |
| E6215 | E ENABLE | TM E1215 | R AS VTO-NML L15 - FEE extended veto signal generation Enable/disable |
| E6115 | E STANDARD | TM E1115 | R AS VTO-OVG L15 - FEE veto signal generation Forced/standard |
| E5915 | E ENABLE | TM E0915 | R AS VTO-DRV L15 - FEE veto signal driver configuration Enable/Disable |
| E5815 | E ENABLE | TM E0815 | R AS VTO-ED L15 - FEE veto signal configuration Enable/Disable |
| E5416 | E STANDARD | TM E0416 | R AS VTO-CND L16 - Extended veto generation forced/standard |
| E6216 | E ENABLE | TM E1216 | R AS VTO-NML L16 - FEE extended veto signal generation Enable/disable |
| E6116 | E STANDARD | TM E1116 | R AS VTO-OVG L16 - FEE veto signal generation Forced/standard |
| E5916 | E ENABLE | TM E0916 | R AS VTO-DRV L16 - FEE veto signal driver configuration Enable/Disable |
| E5816 | E ENABLE | TM E0816 | R AS VTO-ED L16 - FEE veto signal configuration Enable/Disable |
| E5417 | E STANDARD | TM E0417 | R AS VTO-CND L17 - Extended veto generation forced/standard |
| E6217 | E ENABLE | TM E1217 | R AS VTO-NML L17 - FEE extended veto signal generation Enable/disable |
| E6117 | E STANDARD | TM E1117 | R AS VTO-OVG L17 - FEE veto signal generation Forced/standard |
| E5917 | E ENABLE | TM E0917 | R AS VTO-DRV L17 - FEE veto signal driver configuration Enable/Disable |
| E5817 | E ENABLE | TM E0817 | R AS VTO-ED L17 - FEE veto signal configuration Enable/Disable |
| E5418 | E STANDARD | TM E0418 | R AS VTO-CND L18 - Extended veto generation forced/standard |
| E6218 | E ENABLE | TM E1218 | R AS VTO-NML L18 - FEE extended veto signal generation Enable/disable |
| E6118 | E STANDARD | TM E1118 | R AS VTO-OVG L18 - FEE veto signal generation Forced/standard |
| E5918 | E ENABLE | TM E0918 | R AS VTO-DRV L18 - FEE veto signal driver configuration Enable/Disable |
| E5818 | E ENABLE | TM E0818 | R AS VTO-ED L18 - FEE veto signal configuration Enable/Disable |
| E5419 | E STANDARD | TM E0419 | R AS VTO-CND L19 - Extended veto generation forced/standard |
| E6219 | E ENABLE | TM E1219 | R AS VTO-NML L19 - FEE extended veto signal generation Enable/disable |
| E6119 | E STANDARD | TM E1119 | R AS VTO-OVG L19 - FEE veto signal generation Forced/standard |
| E5919 | E ENABLE | TM E0919 | R AS VTO-DRV L19 - FEE veto signal driver configuration Enable/Disable |
| E5819 | E ENABLE | TM E0819 | R AS VTO-ED L19 - FEE veto signal configuration Enable/Disable |
| E5420 | E STANDARD | TM E0420 | R AS VTO-CND L20 - Extended veto generation forced/standard |
| E6220 | E ENABLE | TM E1220 | R AS VTO-NML L20 - FEE extended veto signal generation Enable/disable |
| E6120 | E STANDARD | TM E1120 | R AS VTO-OVG L20 - FEE veto signal generation Forced/standard |
| E5920 | E ENABLE | TM E0920 | R AS VTO-DRV L20 - FEE veto signal driver configuration Enable/Disable |
| E5820 | E ENABLE | TM E0820 | R AS VTO-ED L20 - FEE veto signal configuration Enable/Disable |
| E5421 | E STANDARD | TM E0421 | R AS VTO-CND L21 - Extended veto generation forced/standard |
| E6221 | E ENABLE | TM E1221 | R AS VTO-NML L21 - FEE extended veto signal generation Enable/disable |
| E6121 | E STANDARD | TM E1121 | R AS VTO-OVG L21 - FEE veto signal generation Forced/standard |
| E5921 | E ENABLE | TM E0921 | R AS VTO-DRV L21 - FEE veto signal driver configuration Enable/Disable |
| E5821 | E ENABLE | TM E0821 | R AS VTO-ED L21 - FEE veto signal configuration Enable/Disable |
| E5422 | E STANDARD | TM E0422 | R AS VTO-CND L22 - Extended veto generation forced/standard |
| E6222 | E ENABLE | TM E1222 | R AS VTO-NML L22 - FEE extended veto signal generation Enable/disable |
| E6122 | E STANDARD | TM E1122 | R AS VTO-OVG L22 - FEE veto signal generation Forced/standard |
| E5922 | E ENABLE | TM E0922 | R AS VTO-DRV L22 - FEE veto signal driver configuration Enable/Disable |
| E5822 | E ENABLE | TM E0822 | R AS VTO-ED L22 - FEE veto signal configuration Enable/Disable |
| E5423 | E STANDARD | TM E0423 | R AS VTO-CND L23 - Extended veto generation forced/standard |
| E6223 | E ENABLE | TM E1223 | R AS VTO-NML L23 - FEE extended veto signal generation Enable/disable |
| E6123 | E STANDARD | TM E1123 | R AS VTO-OVG L23 - FEE veto signal generation Forced/standard |



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| E5923 | E | ENABLE | TM | E0923 | R | AS | VTO-DRV | L23 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5823 | E | ENABLE | TM | E0823 | R | AS | VTO-ED | L23 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5424 | E | STANDARD | TM | E0424 | R | AS | VTO-CND | L24 | - | Extended | veto | generation | forced/standard | | |
| E6224 | E | ENABLE | TM | E1224 | R | AS | VTO-NML | L24 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6124 | E | STANDARD | TM | E1124 | R | AS | VTO-OVG | L24 | - | FEE | veto | signal | generation | Forced/standard | |
| E5924 | E | ENABLE | TM | E0924 | R | AS | VTO-DRV | L24 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5824 | E | ENABLE | TM | E0824 | R | AS | VTO-ED | L24 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5425 | E | STANDARD | TM | E0425 | R | AS | VTO-CND | L25 | - | Extended | veto | generation | forced/standard | | |
| E6225 | E | ENABLE | TM | E1225 | R | AS | VTO-NML | L25 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6125 | E | STANDARD | TM | E1125 | R | AS | VTO-OVG | L25 | - | FEE | veto | signal | generation | Forced/standard | |
| E5925 | E | ENABLE | TM | E0925 | R | AS | VTO-DRV | L25 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5825 | E | ENABLE | TM | E0825 | R | AS | VTO-ED | L25 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5426 | E | STANDARD | TM | E0426 | R | AS | VTO-CND | L26 | - | Extended | veto | generation | forced/standard | | |
| E6226 | E | ENABLE | TM | E1226 | R | AS | VTO-NML | L26 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6126 | E | STANDARD | TM | E1126 | R | AS | VTO-OVG | L26 | - | FEE | veto | signal | generation | Forced/standard | |
| E5926 | E | ENABLE | TM | E0926 | R | AS | VTO-DRV | L26 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5826 | E | ENABLE | TM | E0826 | R | AS | VTO-ED | L26 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5427 | E | STANDARD | TM | E0427 | R | AS | VTO-CND | L27 | - | Extended | veto | generation | forced/standard | | |
| E6227 | E | ENABLE | TM | E1227 | R | AS | VTO-NML | L27 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6127 | E | STANDARD | TM | E1127 | R | AS | VTO-OVG | L27 | - | FEE | veto | signal | generation | Forced/standard | |
| E5927 | E | ENABLE | TM | E0927 | R | AS | VTO-DRV | L27 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5827 | E | ENABLE | TM | E0827 | R | AS | VTO-ED | L27 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5428 | E | STANDARD | TM | E0428 | R | AS | VTO-CND | L28 | - | Extended | veto | generation | forced/standard | | |
| E6228 | E | ENABLE | TM | E1228 | R | AS | VTO-NML | L28 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6128 | E | STANDARD | TM | E1128 | R | AS | VTO-OVG | L28 | - | FEE | veto | signal | generation | Forced/standard | |
| E5928 | E | ENABLE | TM | E0928 | R | AS | VTO-DRV | L28 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5828 | E | ENABLE | TM | E0828 | R | AS | VTO-ED | L28 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5429 | E | STANDARD | TM | E0429 | R | AS | VTO-CND | L29 | - | Extended | veto | generation | forced/standard | | |
| E6229 | E | ENABLE | TM | E1229 | R | AS | VTO-NML | L29 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6129 | E | STANDARD | TM | E1129 | R | AS | VTO-OVG | L29 | - | FEE | veto | signal | generation | Forced/standard | |
| E5929 | E | ENABLE | TM | E0929 | R | AS | VTO-DRV | L29 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5829 | E | ENABLE | TM | E0829 | R | AS | VTO-ED | L29 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5430 | E | STANDARD | TM | E0430 | R | AS | VTO-CND | L30 | - | Extended | veto | generation | forced/standard | | |
| E6230 | E | ENABLE | TM | E1230 | R | AS | VTO-NML | L30 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6130 | E | STANDARD | TM | E1130 | R | AS | VTO-OVG | L30 | - | FEE | veto | signal | generation | Forced/standard | |
| E5930 | E | ENABLE | TM | E0930 | R | AS | VTO-DRV | L30 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5830 | E | ENABLE | TM | E0830 | R | AS | VTO-ED | L30 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5431 | E | STANDARD | TM | E0431 | R | AS | VTO-CND | L31 | - | Extended | veto | generation | forced/standard | | |
| E6231 | E | ENABLE | TM | E1231 | R | AS | VTO-NML | L31 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6131 | E | STANDARD | TM | E1131 | R | AS | VTO-OVG | L31 | - | FEE | veto | signal | generation | Forced/standard | |
| E5931 | E | ENABLE | TM | E0931 | R | AS | VTO-DRV | L31 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5831 | E | ENABLE | TM | E0831 | R | AS | VTO-ED | L31 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5432 | E | STANDARD | TM | E0432 | R | AS | VTO-CND | L32 | - | Extended | veto | generation | forced/standard | | |
| E6232 | E | ENABLE | TM | E1232 | R | AS | VTO-NML | L32 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6132 | E | STANDARD | TM | E1132 | R | AS | VTO-OVG | L32 | - | FEE | veto | signal | generation | Forced/standard | |
| E5932 | E | ENABLE | TM | E0932 | R | AS | VTO-DRV | L32 | - | FEE | veto | signal | driver | configuration | Enable/Disable |



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| E5832 | E | ENABLE | TM | E0832 | R | AS | VTO-ED | L32 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5433 | E | STANDARD | TM | E0433 | R | AS | VTO-CND | L33 | - | Extended | veto | generation | forced/standard | | |
| E6233 | E | ENABLE | TM | E1233 | R | AS | VTO-NML | L33 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6133 | E | STANDARD | TM | E1133 | R | AS | VTO-OVG | L33 | - | FEE | veto | signal | generation | Forced/standard | |
| E5933 | E | ENABLE | TM | E0933 | R | AS | VTO-DRV | L33 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5833 | E | ENABLE | TM | E0833 | R | AS | VTO-ED | L33 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5434 | E | STANDARD | TM | E0434 | R | AS | VTO-CND | L34 | - | Extended | veto | generation | forced/standard | | |
| E6234 | E | ENABLE | TM | E1234 | R | AS | VTO-NML | L34 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6134 | E | STANDARD | TM | E1134 | R | AS | VTO-OVG | L34 | - | FEE | veto | signal | generation | Forced/standard | |
| E5934 | E | ENABLE | TM | E0934 | R | AS | VTO-DRV | L34 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5834 | E | ENABLE | TM | E0834 | R | AS | VTO-ED | L34 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5435 | E | STANDARD | TM | E0435 | R | AS | VTO-CND | L35 | - | Extended | veto | generation | forced/standard | | |
| E6235 | E | ENABLE | TM | E1235 | R | AS | VTO-NML | L35 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6135 | E | STANDARD | TM | E1135 | R | AS | VTO-OVG | L35 | - | FEE | veto | signal | generation | Forced/standard | |
| E5935 | E | ENABLE | TM | E0935 | R | AS | VTO-DRV | L35 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5835 | E | ENABLE | TM | E0835 | R | AS | VTO-ED | L35 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5436 | E | STANDARD | TM | E0436 | R | AS | VTO-CND | L36 | - | Extended | veto | generation | forced/standard | | |
| E6236 | E | ENABLE | TM | E1236 | R | AS | VTO-NML | L36 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6136 | E | STANDARD | TM | E1136 | R | AS | VTO-OVG | L36 | - | FEE | veto | signal | generation | Forced/standard | |
| E5936 | E | ENABLE | TM | E0936 | R | AS | VTO-DRV | L36 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5836 | E | ENABLE | TM | E0836 | R | AS | VTO-ED | L36 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5437 | E | STANDARD | TM | E0437 | R | AS | VTO-CND | L37 | - | Extended | veto | generation | forced/standard | | |
| E6237 | E | ENABLE | TM | E1237 | R | AS | VTO-NML | L37 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6137 | E | STANDARD | TM | E1137 | R | AS | VTO-OVG | L37 | - | FEE | veto | signal | generation | Forced/standard | |
| E5937 | E | ENABLE | TM | E0937 | R | AS | VTO-DRV | L37 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5837 | E | ENABLE | TM | E0837 | R | AS | VTO-ED | L37 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5438 | E | STANDARD | TM | E0438 | R | AS | VTO-CND | L38 | - | Extended | veto | generation | forced/standard | | |
| E6238 | E | ENABLE | TM | E1238 | R | AS | VTO-NML | L38 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6138 | E | STANDARD | TM | E1138 | R | AS | VTO-OVG | L38 | - | FEE | veto | signal | generation | Forced/standard | |
| E5938 | E | ENABLE | TM | E0938 | R | AS | VTO-DRV | L38 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5838 | E | ENABLE | TM | E0838 | R | AS | VTO-ED | L38 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5439 | E | STANDARD | TM | E0439 | R | AS | VTO-CND | L39 | - | Extended | veto | generation | forced/standard | | |
| E6239 | E | ENABLE | TM | E1239 | R | AS | VTO-NML | L39 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6139 | E | STANDARD | TM | E1139 | R | AS | VTO-OVG | L39 | - | FEE | veto | signal | generation | Forced/standard | |
| E5939 | E | ENABLE | TM | E0939 | R | AS | VTO-DRV | L39 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5839 | E | ENABLE | TM | E0839 | R | AS | VTO-ED | L39 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5440 | E | STANDARD | TM | E0440 | R | AS | VTO-CND | L40 | - | Extended | veto | generation | forced/standard | | |
| E6240 | E | ENABLE | TM | E1240 | R | AS | VTO-NML | L40 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6140 | E | STANDARD | TM | E1140 | R | AS | VTO-OVG | L40 | - | FEE | veto | signal | generation | Forced/standard | |
| E5940 | E | ENABLE | TM | E0940 | R | AS | VTO-DRV | L40 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5840 | E | ENABLE | TM | E0840 | R | AS | VTO-ED | L40 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5441 | E | STANDARD | TM | E0441 | R | AS | VTO-CND | L41 | - | Extended | veto | generation | forced/standard | | |
| E6241 | E | ENABLE | TM | E1241 | R | AS | VTO-NML | L41 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6141 | E | STANDARD | TM | E1141 | R | AS | VTO-OVG | L41 | - | FEE | veto | signal | generation | Forced/standard | |
| E5941 | E | ENABLE | TM | E0941 | R | AS | VTO-DRV | L41 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5841 | E | ENABLE | TM | E0841 | R | AS | VTO-ED | L41 | - | FEE | veto | signal | configuration | Enable/Disable | |



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| E5442 | E STANDARD | TM E0442 | R AS VTO-CND L42 - Extended veto generation forced/standard |
| E6242 | E ENABLE | TM E1242 | R AS VTO-NML L42 - FEE extended veto signal generation Enable/disable |
| E6142 | E STANDARD | TM E1142 | R AS VTO-OVG L42 - FEE veto signal generation Forced/standard |
| E5942 | E ENABLE | TM E0942 | R AS VTO-DRV L42 - FEE veto signal driver configuration Enable/Disable |
| E5842 | E ENABLE | TM E0842 | R AS VTO-ED L42 - FEE veto signal configuration Enable/Disable |
| E5443 | E STANDARD | TM E0443 | R AS VTO-CND L43 - Extended veto generation forced/standard |
| E6243 | E ENABLE | TM E1243 | R AS VTO-NML L43 - FEE extended veto signal generation Enable/disable |
| E6143 | E STANDARD | TM E1143 | R AS VTO-OVG L43 - FEE veto signal generation Forced/standard |
| E5943 | E ENABLE | TM E0943 | R AS VTO-DRV L43 - FEE veto signal driver configuration Enable/Disable |
| E5843 | E ENABLE | TM E0843 | R AS VTO-ED L43 - FEE veto signal configuration Enable/Disable |
| E5444 | E STANDARD | TM E0444 | R AS VTO-CND L44 - Extended veto generation forced/standard |
| E6244 | E ENABLE | TM E1244 | R AS VTO-NML L44 - FEE extended veto signal generation Enable/disable |
| E6144 | E STANDARD | TM E1144 | R AS VTO-OVG L44 - FEE veto signal generation Forced/standard |
| E5944 | E ENABLE | TM E0944 | R AS VTO-DRV L44 - FEE veto signal driver configuration Enable/Disable |
| E5844 | E ENABLE | TM E0844 | R AS VTO-ED L44 - FEE veto signal configuration Enable/Disable |
| E5445 | E STANDARD | TM E0445 | R AS VTO-CND L45 - Extended veto generation forced/standard |
| E6245 | E ENABLE | TM E1245 | R AS VTO-NML L45 - FEE extended veto signal generation Enable/disable |
| E6145 | E STANDARD | TM E1145 | R AS VTO-OVG L45 - FEE veto signal generation Forced/standard |
| E5945 | E ENABLE | TM E0945 | R AS VTO-DRV L45 - FEE veto signal driver configuration Enable/Disable |
| E5845 | E ENABLE | TM E0845 | R AS VTO-ED L45 - FEE veto signal configuration Enable/Disable |
| E5446 | E STANDARD | TM E0446 | R AS VTO-CND L46 - Extended veto generation forced/standard |
| E6246 | E ENABLE | TM E1246 | R AS VTO-NML L46 - FEE extended veto signal generation Enable/disable |
| E6146 | E STANDARD | TM E1146 | R AS VTO-OVG L46 - FEE veto signal generation Forced/standard |
| E5946 | E ENABLE | TM E0946 | R AS VTO-DRV L46 - FEE veto signal driver configuration Enable/Disable |
| E5846 | E ENABLE | TM E0846 | R AS VTO-ED L46 - FEE veto signal configuration Enable/Disable |
| E5447 | E STANDARD | TM E0447 | R AS VTO-CND L47 - Extended veto generation forced/standard |
| E6247 | E ENABLE | TM E1247 | R AS VTO-NML L47 - FEE extended veto signal generation Enable/disable |
| E6147 | E STANDARD | TM E1147 | R AS VTO-OVG L47 - FEE veto signal generation Forced/standard |
| E5947 | E ENABLE | TM E0947 | R AS VTO-DRV L47 - FEE veto signal driver configuration Enable/Disable |
| E5847 | E ENABLE | TM E0847 | R AS VTO-ED L47 - FEE veto signal configuration Enable/Disable |
| E5448 | E STANDARD | TM E0448 | R AS VTO-CND L48 - Extended veto generation forced/standard |
| E6248 | E ENABLE | TM E1248 | R AS VTO-NML L48 - FEE extended veto signal generation Enable/disable |
| E6148 | E STANDARD | TM E1148 | R AS VTO-OVG L48 - FEE veto signal generation Forced/standard |
| E5948 | E ENABLE | TM E0948 | R AS VTO-DRV L48 - FEE veto signal driver configuration Enable/Disable |
| E5848 | E ENABLE | TM E0848 | R AS VTO-ED L48 - FEE veto signal configuration Enable/Disable |
| E5449 | E STANDARD | TM E0449 | R AS VTO-CND L49 - Extended veto generation forced/standard |
| E6249 | E ENABLE | TM E1249 | R AS VTO-NML L49 - FEE extended veto signal generation Enable/disable |
| E6149 | E STANDARD | TM E1149 | R AS VTO-OVG L49 - FEE veto signal generation Forced/standard |
| E5949 | E ENABLE | TM E0949 | R AS VTO-DRV L49 - FEE veto signal driver configuration Enable/Disable |
| E5849 | E ENABLE | TM E0849 | R AS VTO-ED L49 - FEE veto signal configuration Enable/Disable |
| E5450 | E STANDARD | TM E0450 | R AS VTO-CND L50 - Extended veto generation forced/standard |
| E6250 | E ENABLE | TM E1250 | R AS VTO-NML L50 - FEE extended veto signal generation Enable/disable |
| E6150 | E STANDARD | TM E1150 | R AS VTO-OVG L50 - FEE veto signal generation Forced/standard |
| E5950 | E ENABLE | TM E0950 | R AS VTO-DRV L50 - FEE veto signal driver configuration Enable/Disable |
| E5850 | E ENABLE | TM E0850 | R AS VTO-ED L50 - FEE veto signal configuration Enable/Disable |
| E5451 | E STANDARD | TM E0451 | R AS VTO-CND L51 - Extended veto generation forced/standard |



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| E6251 | E | ENABLE | TM | E1251 | R | AS | VTO-NML | L51 | - FEE extended veto signal generation Enable/disable |
| E6151 | E | STANDARD | TM | E1151 | R | AS | VTO-OVG | L51 | - FEE veto signal generation Forced/standard |
| E5951 | E | ENABLE | TM | E0951 | R | AS | VTO-DRV | L51 | - FEE veto signal driver configuration Enable/Disable |
| E5851 | E | ENABLE | TM | E0851 | R | AS | VTO-ED | L51 | - FEE veto signal configuration Enable/Disable |
| E5452 | E | STANDARD | TM | E0452 | R | AS | VTO-CND | L52 | - Extended veto generation forced/standard |
| E6252 | E | ENABLE | TM | E1252 | R | AS | VTO-NML | L52 | - FEE extended veto signal generation Enable/disable |
| E6152 | E | STANDARD | TM | E1152 | R | AS | VTO-OVG | L52 | - FEE veto signal generation Forced/standard |
| E5952 | E | ENABLE | TM | E0952 | R | AS | VTO-DRV | L52 | - FEE veto signal driver configuration Enable/Disable |
| E5852 | E | ENABLE | TM | E0852 | R | AS | VTO-ED | L52 | - FEE veto signal configuration Enable/Disable |
| E5453 | E | STANDARD | TM | E0453 | R | AS | VTO-CND | L53 | - Extended veto generation forced/standard |
| E6253 | E | ENABLE | TM | E1253 | R | AS | VTO-NML | L53 | - FEE extended veto signal generation Enable/disable |
| E6153 | E | STANDARD | TM | E1153 | R | AS | VTO-OVG | L53 | - FEE veto signal generation Forced/standard |
| E5953 | E | ENABLE | TM | E0953 | R | AS | VTO-DRV | L53 | - FEE veto signal driver configuration Enable/Disable |
| E5853 | E | ENABLE | TM | E0853 | R | AS | VTO-ED | L53 | - FEE veto signal configuration Enable/Disable |
| E5454 | E | STANDARD | TM | E0454 | R | AS | VTO-CND | L54 | - Extended veto generation forced/standard |
| E6254 | E | ENABLE | TM | E1254 | R | AS | VTO-NML | L54 | - FEE extended veto signal generation Enable/disable |
| E6154 | E | STANDARD | TM | E1154 | R | AS | VTO-OVG | L54 | - FEE veto signal generation Forced/standard |
| E5954 | E | ENABLE | TM | E0954 | R | AS | VTO-DRV | L54 | - FEE veto signal driver configuration Enable/Disable |
| E5854 | E | ENABLE | TM | E0854 | R | AS | VTO-ED | L54 | - FEE veto signal configuration Enable/Disable |
| E5455 | E | STANDARD | TM | E0455 | R | AS | VTO-CND | L55 | - Extended veto generation forced/standard |
| E6255 | E | ENABLE | TM | E1255 | R | AS | VTO-NML | L55 | - FEE extended veto signal generation Enable/disable |
| E6155 | E | STANDARD | TM | E1155 | R | AS | VTO-OVG | L55 | - FEE veto signal generation Forced/standard |
| E5955 | E | ENABLE | TM | E0955 | R | AS | VTO-DRV | L55 | - FEE veto signal driver configuration Enable/Disable |
| E5855 | E | ENABLE | TM | E0855 | R | AS | VTO-ED | L55 | - FEE veto signal configuration Enable/Disable |
| E5456 | E | STANDARD | TM | E0456 | R | AS | VTO-CND | L56 | - Extended veto generation forced/standard |
| E6256 | E | ENABLE | TM | E1256 | R | AS | VTO-NML | L56 | - FEE extended veto signal generation Enable/disable |
| E6156 | E | STANDARD | TM | E1156 | R | AS | VTO-OVG | L56 | - FEE veto signal generation Forced/standard |
| E5956 | E | ENABLE | TM | E0956 | R | AS | VTO-DRV | L56 | - FEE veto signal driver configuration Enable/Disable |
| E5856 | E | ENABLE | TM | E0856 | R | AS | VTO-ED | L56 | - FEE veto signal configuration Enable/Disable |
| E5457 | E | STANDARD | TM | E0457 | R | AS | VTO-CND | L57 | - Extended veto generation forced/standard |
| E6257 | E | ENABLE | TM | E1257 | R | AS | VTO-NML | L57 | - FEE extended veto signal generation Enable/disable |
| E6157 | E | STANDARD | TM | E1157 | R | AS | VTO-OVG | L57 | - FEE veto signal generation Forced/standard |
| E5957 | E | ENABLE | TM | E0957 | R | AS | VTO-DRV | L57 | - FEE veto signal driver configuration Enable/Disable |
| E5857 | E | ENABLE | TM | E0857 | R | AS | VTO-ED | L57 | - FEE veto signal configuration Enable/Disable |
| E5458 | E | STANDARD | TM | E0458 | R | AS | VTO-CND | L58 | - Extended veto generation forced/standard |
| E6258 | E | ENABLE | TM | E1258 | R | AS | VTO-NML | L58 | - FEE extended veto signal generation Enable/disable |
| E6158 | E | STANDARD | TM | E1158 | R | AS | VTO-OVG | L58 | - FEE veto signal generation Forced/standard |
| E5958 | E | ENABLE | TM | E0958 | R | AS | VTO-DRV | L58 | - FEE veto signal driver configuration Enable/Disable |
| E5858 | E | ENABLE | TM | E0858 | R | AS | VTO-ED | L58 | - FEE veto signal configuration Enable/Disable |
| E5459 | E | STANDARD | TM | E0459 | R | AS | VTO-CND | L59 | - Extended veto generation forced/standard |
| E6259 | E | ENABLE | TM | E1259 | R | AS | VTO-NML | L59 | - FEE extended veto signal generation Enable/disable |
| E6159 | E | STANDARD | TM | E1159 | R | AS | VTO-OVG | L59 | - FEE veto signal generation Forced/standard |
| E5959 | E | ENABLE | TM | E0959 | R | AS | VTO-DRV | L59 | - FEE veto signal driver configuration Enable/Disable |
| E5859 | E | ENABLE | TM | E0859 | R | AS | VTO-ED | L59 | - FEE veto signal configuration Enable/Disable |
| E5460 | E | STANDARD | TM | E0460 | R | AS | VTO-CND | L60 | - Extended veto generation forced/standard |
| E6260 | E | ENABLE | TM | E1260 | R | AS | VTO-NML | L60 | - FEE extended veto signal generation Enable/disable |



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| E6160 | E STANDARD | TM E1160 | R AS VTO-OVG L60 - FEE veto signal generation Forced/standard |
| E5960 | E ENABLE | TM E0960 | R AS VTO-DRV L60 - FEE veto signal driver configuration Enable/Disable |
| E5860 | E ENABLE | TM E0860 | R AS VTO-ED L60 - FEE veto signal configuration Enable/Disable |
| E5461 | E STANDARD | TM E0461 | R AS VTO-CND L61 - Extended veto generation forced/standard |
| E6261 | E ENABLE | TM E1261 | R AS VTO-NML L61 - FEE extended veto signal generation Enable/disable |
| E6161 | E STANDARD | TM E1161 | R AS VTO-OVG L61 - FEE veto signal generation Forced/standard |
| E5961 | E ENABLE | TM E0961 | R AS VTO-DRV L61 - FEE veto signal driver configuration Enable/Disable |
| E5861 | E ENABLE | TM E0861 | R AS VTO-ED L61 - FEE veto signal configuration Enable/Disable |
| E5462 | E STANDARD | TM E0462 | R AS VTO-CND L62 - Extended veto generation forced/standard |
| E6262 | E ENABLE | TM E1262 | R AS VTO-NML L62 - FEE extended veto signal generation Enable/disable |
| E6162 | E STANDARD | TM E1162 | R AS VTO-OVG L62 - FEE veto signal generation Forced/standard |
| E5962 | E ENABLE | TM E0962 | R AS VTO-DRV L62 - FEE veto signal driver configuration Enable/Disable |
| E5862 | E ENABLE | TM E0862 | R AS VTO-ED L62 - FEE veto signal configuration Enable/Disable |
| E5463 | E STANDARD | TM E0463 | R AS VTO-CND L63 - Extended veto generation forced/standard |
| E6263 | E ENABLE | TM E1263 | R AS VTO-NML L63 - FEE extended veto signal generation Enable/disable |
| E6163 | E STANDARD | TM E1163 | R AS VTO-OVG L63 - FEE veto signal generation Forced/standard |
| E5963 | E ENABLE | TM E0963 | R AS VTO-DRV L63 - FEE veto signal driver configuration Enable/Disable |
| E5863 | E ENABLE | TM E0863 | R AS VTO-ED L63 - FEE veto signal configuration Enable/Disable |
| E5464 | E STANDARD | TM E0464 | R AS VTO-CND L64 - Extended veto generation forced/standard |
| E6264 | E ENABLE | TM E1264 | R AS VTO-NML L64 - FEE extended veto signal generation Enable/disable |
| E6164 | E STANDARD | TM E1164 | R AS VTO-OVG L64 - FEE veto signal generation Forced/standard |
| E5964 | E ENABLE | TM E0964 | R AS VTO-DRV L64 - FEE veto signal driver configuration Enable/Disable |
| E5864 | E ENABLE | TM E0864 | R AS VTO-ED L64 - FEE veto signal configuration Enable/Disable |
| E5465 | E STANDARD | TM E0465 | R AS VTO-CND L65 - Extended veto generation forced/standard |
| E6265 | E ENABLE | TM E1265 | R AS VTO-NML L65 - FEE extended veto signal generation Enable/disable |
| E6165 | E STANDARD | TM E1165 | R AS VTO-OVG L65 - FEE veto signal generation Forced/standard |
| E5965 | E ENABLE | TM E0965 | R AS VTO-DRV L65 - FEE veto signal driver configuration Enable/Disable |
| E5865 | E ENABLE | TM E0865 | R AS VTO-ED L65 - FEE veto signal configuration Enable/Disable |
| E5466 | E STANDARD | TM E0466 | R AS VTO-CND L66 - Extended veto generation forced/standard |
| E6266 | E ENABLE | TM E1266 | R AS VTO-NML L66 - FEE extended veto signal generation Enable/disable |
| E6166 | E STANDARD | TM E1166 | R AS VTO-OVG L66 - FEE veto signal generation Forced/standard |
| E5966 | E ENABLE | TM E0966 | R AS VTO-DRV L66 - FEE veto signal driver configuration Enable/Disable |
| E5866 | E ENABLE | TM E0866 | R AS VTO-ED L66 - FEE veto signal configuration Enable/Disable |
| E5467 | E STANDARD | TM E0467 | R AS VTO-CND L67 - Extended veto generation forced/standard |
| E6267 | E ENABLE | TM E1267 | R AS VTO-NML L67 - FEE extended veto signal generation Enable/disable |
| E6167 | E STANDARD | TM E1167 | R AS VTO-OVG L67 - FEE veto signal generation Forced/standard |
| E5967 | E ENABLE | TM E0967 | R AS VTO-DRV L67 - FEE veto signal driver configuration Enable/Disable |
| E5867 | E ENABLE | TM E0867 | R AS VTO-ED L67 - FEE veto signal configuration Enable/Disable |
| E5468 | E STANDARD | TM E0468 | R AS VTO-CND L68 - Extended veto generation forced/standard |
| E6268 | E ENABLE | TM E1268 | R AS VTO-NML L68 - FEE extended veto signal generation Enable/disable |
| E6168 | E STANDARD | TM E1168 | R AS VTO-OVG L68 - FEE veto signal generation Forced/standard |
| E5968 | E ENABLE | TM E0968 | R AS VTO-DRV L68 - FEE veto signal driver configuration Enable/Disable |
| E5868 | E ENABLE | TM E0868 | R AS VTO-ED L68 - FEE veto signal configuration Enable/Disable |
| E5469 | E STANDARD | TM E0469 | R AS VTO-CND L69 - Extended veto generation forced/standard |
| E6269 | E ENABLE | TM E1269 | R AS VTO-NML L69 - FEE extended veto signal generation Enable/disable |
| E6169 | E STANDARD | TM E1169 | R AS VTO-OVG L69 - FEE veto signal generation Forced/standard |



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| E5969 | E | ENABLE | TM | E0969 | R | AS | VTO-DRV | L69 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5869 | E | ENABLE | TM | E0869 | R | AS | VTO-ED | L69 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5470 | E | STANDARD | TM | E0470 | R | AS | VTO-CND | L70 | - | Extended | veto | generation | forced/standard | | |
| E6270 | E | ENABLE | TM | E1270 | R | AS | VTO-NML | L70 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6170 | E | STANDARD | TM | E1170 | R | AS | VTO-OVG | L70 | - | FEE | veto | signal | generation | Forced/standard | |
| E5970 | E | ENABLE | TM | E0970 | R | AS | VTO-DRV | L70 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5870 | E | ENABLE | TM | E0870 | R | AS | VTO-ED | L70 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5471 | E | STANDARD | TM | E0471 | R | AS | VTO-CND | L71 | - | Extended | veto | generation | forced/standard | | |
| E6271 | E | ENABLE | TM | E1271 | R | AS | VTO-NML | L71 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6171 | E | STANDARD | TM | E1171 | R | AS | VTO-OVG | L71 | - | FEE | veto | signal | generation | Forced/standard | |
| E5971 | E | ENABLE | TM | E0971 | R | AS | VTO-DRV | L71 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5871 | E | ENABLE | TM | E0871 | R | AS | VTO-ED | L71 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5472 | E | STANDARD | TM | E0472 | R | AS | VTO-CND | L72 | - | Extended | veto | generation | forced/standard | | |
| E6272 | E | ENABLE | TM | E1272 | R | AS | VTO-NML | L72 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6172 | E | STANDARD | TM | E1172 | R | AS | VTO-OVG | L72 | - | FEE | veto | signal | generation | Forced/standard | |
| E5972 | E | ENABLE | TM | E0972 | R | AS | VTO-DRV | L72 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5872 | E | ENABLE | TM | E0872 | R | AS | VTO-ED | L72 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5473 | E | STANDARD | TM | E0473 | R | AS | VTO-CND | L73 | - | Extended | veto | generation | forced/standard | | |
| E6273 | E | ENABLE | TM | E1273 | R | AS | VTO-NML | L73 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6173 | E | STANDARD | TM | E1173 | R | AS | VTO-OVG | L73 | - | FEE | veto | signal | generation | Forced/standard | |
| E5973 | E | ENABLE | TM | E0973 | R | AS | VTO-DRV | L73 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5873 | E | ENABLE | TM | E0873 | R | AS | VTO-ED | L73 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5474 | E | STANDARD | TM | E0474 | R | AS | VTO-CND | L74 | - | Extended | veto | generation | forced/standard | | |
| E6274 | E | ENABLE | TM | E1274 | R | AS | VTO-NML | L74 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6174 | E | STANDARD | TM | E1174 | R | AS | VTO-OVG | L74 | - | FEE | veto | signal | generation | Forced/standard | |
| E5974 | E | ENABLE | TM | E0974 | R | AS | VTO-DRV | L74 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5874 | E | ENABLE | TM | E0874 | R | AS | VTO-ED | L74 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5475 | E | STANDARD | TM | E0475 | R | AS | VTO-CND | L75 | - | Extended | veto | generation | forced/standard | | |
| E6275 | E | ENABLE | TM | E1275 | R | AS | VTO-NML | L75 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6175 | E | STANDARD | TM | E1175 | R | AS | VTO-OVG | L75 | - | FEE | veto | signal | generation | Forced/standard | |
| E5975 | E | ENABLE | TM | E0975 | R | AS | VTO-DRV | L75 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5875 | E | ENABLE | TM | E0875 | R | AS | VTO-ED | L75 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5476 | E | STANDARD | TM | E0476 | R | AS | VTO-CND | L76 | - | Extended | veto | generation | forced/standard | | |
| E6276 | E | ENABLE | TM | E1276 | R | AS | VTO-NML | L76 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6176 | E | STANDARD | TM | E1176 | R | AS | VTO-OVG | L76 | - | FEE | veto | signal | generation | Forced/standard | |
| E5976 | E | ENABLE | TM | E0976 | R | AS | VTO-DRV | L76 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5876 | E | ENABLE | TM | E0876 | R | AS | VTO-ED | L76 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5477 | E | STANDARD | TM | E0477 | R | AS | VTO-CND | L77 | - | Extended | veto | generation | forced/standard | | |
| E6277 | E | ENABLE | TM | E1277 | R | AS | VTO-NML | L77 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6177 | E | STANDARD | TM | E1177 | R | AS | VTO-OVG | L77 | - | FEE | veto | signal | generation | Forced/standard | |
| E5977 | E | ENABLE | TM | E0977 | R | AS | VTO-DRV | L77 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5877 | E | ENABLE | TM | E0877 | R | AS | VTO-ED | L77 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5478 | E | STANDARD | TM | E0478 | R | AS | VTO-CND | L78 | - | Extended | veto | generation | forced/standard | | |
| E6278 | E | ENABLE | TM | E1278 | R | AS | VTO-NML | L78 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6178 | E | STANDARD | TM | E1178 | R | AS | VTO-OVG | L78 | - | FEE | veto | signal | generation | Forced/standard | |
| E5978 | E | ENABLE | TM | E0978 | R | AS | VTO-DRV | L78 | - | FEE | veto | signal | driver | configuration | Enable/Disable |



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| E5878 | E | ENABLE | TM | E0878 | R | AS | VTO-ED | L78 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5479 | E | STANDARD | TM | E0479 | R | AS | VTO-CND | L79 | - | Extended | veto | generation | forced/standard | | |
| E6279 | E | ENABLE | TM | E1279 | R | AS | VTO-NML | L79 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6179 | E | STANDARD | TM | E1179 | R | AS | VTO-OVG | L79 | - | FEE | veto | signal | generation | Forced/standard | |
| E5979 | E | ENABLE | TM | E0979 | R | AS | VTO-DRV | L79 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5879 | E | ENABLE | TM | E0879 | R | AS | VTO-ED | L79 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5480 | E | STANDARD | TM | E0480 | R | AS | VTO-CND | L80 | - | Extended | veto | generation | forced/standard | | |
| E6280 | E | ENABLE | TM | E1280 | R | AS | VTO-NML | L80 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6180 | E | STANDARD | TM | E1180 | R | AS | VTO-OVG | L80 | - | FEE | veto | signal | generation | Forced/standard | |
| E5980 | E | ENABLE | TM | E0980 | R | AS | VTO-DRV | L80 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5880 | E | ENABLE | TM | E0880 | R | AS | VTO-ED | L80 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5481 | E | STANDARD | TM | E0481 | R | AS | VTO-CND | L81 | - | Extended | veto | generation | forced/standard | | |
| E6281 | E | ENABLE | TM | E1281 | R | AS | VTO-NML | L81 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6181 | E | STANDARD | TM | E1181 | R | AS | VTO-OVG | L81 | - | FEE | veto | signal | generation | Forced/standard | |
| E5981 | E | ENABLE | TM | E0981 | R | AS | VTO-DRV | L81 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5881 | E | ENABLE | TM | E0881 | R | AS | VTO-ED | L81 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5482 | E | STANDARD | TM | E0482 | R | AS | VTO-CND | L82 | - | Extended | veto | generation | forced/standard | | |
| E6282 | E | ENABLE | TM | E1282 | R | AS | VTO-NML | L82 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6182 | E | STANDARD | TM | E1182 | R | AS | VTO-OVG | L82 | - | FEE | veto | signal | generation | Forced/standard | |
| E5982 | E | ENABLE | TM | E0982 | R | AS | VTO-DRV | L82 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5882 | E | ENABLE | TM | E0882 | R | AS | VTO-ED | L82 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5483 | E | STANDARD | TM | E0483 | R | AS | VTO-CND | L83 | - | Extended | veto | generation | forced/standard | | |
| E6283 | E | ENABLE | TM | E1283 | R | AS | VTO-NML | L83 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6183 | E | STANDARD | TM | E1183 | R | AS | VTO-OVG | L83 | - | FEE | veto | signal | generation | Forced/standard | |
| E5983 | E | ENABLE | TM | E0983 | R | AS | VTO-DRV | L83 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5883 | E | ENABLE | TM | E0883 | R | AS | VTO-ED | L83 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5484 | E | STANDARD | TM | E0484 | R | AS | VTO-CND | L84 | - | Extended | veto | generation | forced/standard | | |
| E6284 | E | ENABLE | TM | E1284 | R | AS | VTO-NML | L84 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6184 | E | STANDARD | TM | E1184 | R | AS | VTO-OVG | L84 | - | FEE | veto | signal | generation | Forced/standard | |
| E5984 | E | ENABLE | TM | E0984 | R | AS | VTO-DRV | L84 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5884 | E | ENABLE | TM | E0884 | R | AS | VTO-ED | L84 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5485 | E | STANDARD | TM | E0485 | R | AS | VTO-CND | L85 | - | Extended | veto | generation | forced/standard | | |
| E6285 | E | ENABLE | TM | E1285 | R | AS | VTO-NML | L85 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6185 | E | STANDARD | TM | E1185 | R | AS | VTO-OVG | L85 | - | FEE | veto | signal | generation | Forced/standard | |
| E5985 | E | ENABLE | TM | E0985 | R | AS | VTO-DRV | L85 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5885 | E | ENABLE | TM | E0885 | R | AS | VTO-ED | L85 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5486 | E | STANDARD | TM | E0486 | R | AS | VTO-CND | L86 | - | Extended | veto | generation | forced/standard | | |
| E6286 | E | ENABLE | TM | E1286 | R | AS | VTO-NML | L86 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6186 | E | STANDARD | TM | E1186 | R | AS | VTO-OVG | L86 | - | FEE | veto | signal | generation | Forced/standard | |
| E5986 | E | ENABLE | TM | E0986 | R | AS | VTO-DRV | L86 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5886 | E | ENABLE | TM | E0886 | R | AS | VTO-ED | L86 | - | FEE | veto | signal | configuration | Enable/Disable | |
| E5487 | E | STANDARD | TM | E0487 | R | AS | VTO-CND | L87 | - | Extended | veto | generation | forced/standard | | |
| E6287 | E | ENABLE | TM | E1287 | R | AS | VTO-NML | L87 | - | FEE | extended | veto | signal | generation | Enable/disable |
| E6187 | E | STANDARD | TM | E1187 | R | AS | VTO-OVG | L87 | - | FEE | veto | signal | generation | Forced/standard | |
| E5987 | E | ENABLE | TM | E0987 | R | AS | VTO-DRV | L87 | - | FEE | veto | signal | driver | configuration | Enable/Disable |
| E5887 | E | ENABLE | TM | E0887 | R | AS | VTO-ED | L87 | - | FEE | veto | signal | configuration | Enable/Disable | |



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| E5488 | E STANDARD | TM E0488 | R AS VTO-CND L88 - Extended veto generation forced/standard |
| E6288 | E ENABLE | TM E1288 | R AS VTO-NML L88 - FEE extended veto signal generation Enable/disable |
| E6188 | E STANDARD | TM E1188 | R AS VTO-OVG L88 - FEE veto signal generation Forced/standard |
| E5988 | E ENABLE | TM E0988 | R AS VTO-DRV L88 - FEE veto signal driver configuration Enable/Disable |
| E5888 | E ENABLE | TM E0888 | R AS VTO-ED L88 - FEE veto signal configuration Enable/Disable |
| E5489 | E STANDARD | TM E0489 | R AS VTO-CND L89 - Extended veto generation forced/standard |
| E6289 | E ENABLE | TM E1289 | R AS VTO-NML L89 - FEE extended veto signal generation Enable/disable |
| E6189 | E STANDARD | TM E1189 | R AS VTO-OVG L89 - FEE veto signal generation Forced/standard |
| E5989 | E ENABLE | TM E0989 | R AS VTO-DRV L89 - FEE veto signal driver configuration Enable/Disable |
| E5889 | E ENABLE | TM E0889 | R AS VTO-ED L89 - FEE veto signal configuration Enable/Disable |
| E5490 | E STANDARD | TM E0490 | R AS VTO-CND L90 - Extended veto generation forced/standard |
| E6290 | E ENABLE | TM E1290 | R AS VTO-NML L90 - FEE extended veto signal generation Enable/disable |
| E6190 | E STANDARD | TM E1190 | R AS VTO-OVG L90 - FEE veto signal generation Forced/standard |
| E5990 | E ENABLE | TM E0990 | R AS VTO-DRV L90 - FEE veto signal driver configuration Enable/Disable |
| E5890 | E ENABLE | TM E0890 | R AS VTO-ED L90 - FEE veto signal configuration Enable/Disable |
| E6191 | E STANDARD | TM E1191 | R AS VTO-OVG L91 - Fee veto signal generation Forced/Standard PSAC |
| E5991 | E ENABLE | TM E0991 | R AS VTO-DRV L91 - FEE veto signal driver configuration PSAC |
| E5891 | E ENABLE | TM E0891 | R AS VTO-ED L91 - FEE veto signal configuration PSAC |

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|-------|---------------|----------|-----------------------------------------------------------------|
| E7500 | E VETO PULSES | TM E2500 | S AS CYL-CT L0 - FEE veto pulse integration cycles count |
| E6300 | E 1.048 | sec | TM E1300 R AS RATE-MT L0 - FEE veto rate meter measurement time |
| E7501 | E VETO PULSES | TM E2501 | S AS CYL-CT L1 - FEE veto pulse integration cycles count |
| E6301 | E 1.048 | sec | TM E1301 R AS RATE-MT L1 - FEE veto rate meter measurement time |
| E7502 | E VETO PULSES | TM E2502 | S AS CYL-CT L2 - FEE veto pulse integration cycles count |
| E6302 | E 1.048 | sec | TM E1302 R AS RATE-MT L2 - FEE veto rate meter measurement time |
| E7503 | E VETO PULSES | TM E2503 | S AS CYL-CT L3 - FEE veto pulse integration cycles count |
| E6303 | E 1.048 | sec | TM E1303 R AS RATE-MT L3 - FEE veto rate meter measurement time |
| E7504 | E VETO PULSES | TM E2504 | S AS CYL-CT L4 - FEE veto pulse integration cycles count |
| E6304 | E 1.048 | sec | TM E1304 R AS RATE-MT L4 - FEE veto rate meter measurement time |
| E7505 | E VETO PULSES | TM E2505 | S AS CYL-CT L5 - FEE veto pulse integration cycles count |
| E6305 | E 1.048 | sec | TM E1305 R AS RATE-MT L5 - FEE veto rate meter measurement time |
| E7506 | E VETO PULSES | TM E2506 | S AS CYL-CT L6 - FEE veto pulse integration cycles count |
| E6306 | E 1.048 | sec | TM E1306 R AS RATE-MT L6 - FEE veto rate meter measurement time |
| E7507 | E VETO PULSES | TM E2507 | S AS CYL-CT L7 - FEE veto pulse integration cycles count |
| E6307 | E 1.048 | sec | TM E1307 R AS RATE-MT L7 - FEE veto rate meter measurement time |
| E7508 | E VETO PULSES | TM E2508 | S AS CYL-CT L8 - FEE veto pulse integration cycles count |
| E6308 | E 1.048 | sec | TM E1308 R AS RATE-MT L8 - FEE veto rate meter measurement time |
| E7509 | E VETO PULSES | TM E2509 | S AS CYL-CT L9 - FEE veto pulse integration cycles count |



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| E6309 | E 1.048 | sec | TM E1309 | R AS RATE-MT L9 - FEE veto rate meter measurement time |
| E7510 | E VETO PULSES | | TM E2510 | S AS CYL-CT L10 - FEE veto pulse integration cycles count |
| E6310 | E 1.048 | sec | TM E1310 | R AS RATE-MT L10 - FEE veto rate meter measurement time |
| E7511 | E VETO PULSES | | TM E2511 | S AS CYL-CT L11 - FEE veto pulse integration cycles count |
| E6311 | E 1.048 | sec | TM E1311 | R AS RATE-MT L11 - FEE veto rate meter measurement time |
| E7512 | E VETO PULSES | | TM E2512 | S AS CYL-CT L12 - FEE veto pulse integration cycles count |
| E6312 | E 1.048 | sec | TM E1312 | R AS RATE-MT L12 - FEE veto rate meter measurement time |
| E7513 | E VETO PULSES | | TM E2513 | S AS CYL-CT L13 - FEE veto pulse integration cycles count |
| E6313 | E 1.048 | sec | TM E1313 | R AS RATE-MT L13 - FEE veto rate meter measurement time |
| E7514 | E VETO PULSES | | TM E2514 | S AS CYL-CT L14 - FEE veto pulse integration cycles count |
| E6314 | E 1.048 | sec | TM E1314 | R AS RATE-MT L14 - FEE veto rate meter measurement time |
| E7515 | E VETO PULSES | | TM E2515 | S AS CYL-CT L15 - FEE veto pulse integration cycles count |
| E6315 | E 1.048 | sec | TM E1315 | R AS RATE-MT L15 - FEE veto rate meter measurement time |
| E7516 | E VETO PULSES | | TM E2516 | S AS CYL-CT L16 - FEE veto pulse integration cycles count |
| E6316 | E 1.048 | sec | TM E1316 | R AS RATE-MT L16 - FEE veto rate meter measurement time |
| E7517 | E VETO PULSES | | TM E2517 | S AS CYL-CT L17 - FEE veto pulse integration cycles count |
| E6317 | E 1.048 | sec | TM E1317 | R AS RATE-MT L17 - FEE veto rate meter measurement time |
| E7518 | E VETO PULSES | | TM E2518 | S AS CYL-CT L18 - FEE veto pulse integration cycles count |
| E6318 | E 1.048 | sec | TM E1318 | R AS RATE-MT L18 - FEE veto rate meter measurement time |
| E7519 | E VETO PULSES | | TM E2519 | S AS CYL-CT L19 - FEE veto pulse integration cycles count |
| E6319 | E 1.048 | sec | TM E1319 | R AS RATE-MT L19 - FEE veto rate meter measurement time |
| E7520 | E VETO PULSES | | TM E2520 | S AS CYL-CT L20 - FEE veto pulse integration cycles count |
| E6320 | E 1.048 | sec | TM E1320 | R AS RATE-MT L20 - FEE veto rate meter measurement time |
| E7521 | E VETO PULSES | | TM E2521 | S AS CYL-CT L21 - FEE veto pulse integration cycles count |
| E6321 | E 1.048 | sec | TM E1321 | R AS RATE-MT L21 - FEE veto rate meter measurement time |
| E7522 | E VETO PULSES | | TM E2522 | S AS CYL-CT L22 - FEE veto pulse integration cycles count |
| E6322 | E 1.048 | sec | TM E1322 | R AS RATE-MT L22 - FEE veto rate meter measurement time |
| E7523 | E VETO PULSES | | TM E2523 | S AS CYL-CT L23 - FEE veto pulse integration cycles count |
| E6323 | E 1.048 | sec | TM E1323 | R AS RATE-MT L23 - FEE veto rate meter measurement time |
| E7524 | E VETO PULSES | | TM E2524 | S AS CYL-CT L24 - FEE veto pulse integration cycles count |
| E6324 | E 1.048 | sec | TM E1324 | R AS RATE-MT L24 - FEE veto rate meter measurement time |
| E7525 | E VETO PULSES | | TM E2525 | S AS CYL-CT L25 - FEE veto pulse integration cycles count |
| E6325 | E 1.048 | sec | TM E1325 | R AS RATE-MT L25 - FEE veto rate meter measurement time |
| E7526 | E VETO PULSES | | TM E2526 | S AS CYL-CT L26 - FEE veto pulse integration cycles count |
| E6326 | E 1.048 | sec | TM E1326 | R AS RATE-MT L26 - FEE veto rate meter measurement time |
| E7527 | E VETO PULSES | | TM E2527 | S AS CYL-CT L27 - FEE veto pulse integration cycles count |
| E6327 | E 1.048 | sec | TM E1327 | R AS RATE-MT L27 - FEE veto rate meter measurement time |
| E7528 | E VETO PULSES | | TM E2528 | S AS CYL-CT L28 - FEE veto pulse integration cycles count |
| E6328 | E 1.048 | sec | TM E1328 | R AS RATE-MT L28 - FEE veto rate meter measurement time |
| E7529 | E VETO PULSES | | TM E2529 | S AS CYL-CT L29 - FEE veto pulse integration cycles count |
| E6329 | E 1.048 | sec | TM E1329 | R AS RATE-MT L29 - FEE veto rate meter measurement time |
| E7530 | E VETO PULSES | | TM E2530 | S AS CYL-CT L30 - FEE veto pulse integration cycles count |
| E6330 | E 1.048 | sec | TM E1330 | R AS RATE-MT L30 - FEE veto rate meter measurement time |
| E7531 | E VETO PULSES | | TM E2531 | S AS CYL-CT L31 - FEE veto pulse integration cycles count |
| E6331 | E 1.048 | sec | TM E1331 | R AS RATE-MT L31 - FEE veto rate meter measurement time |
| E7532 | E VETO PULSES | | TM E2532 | S AS CYL-CT L32 - FEE veto pulse integration cycles count |



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| E6332 | E 1.048 | sec | TM E1332 | R AS RATE-MT L32 - FEE veto rate meter measurement time |
| E7533 | E VETO PULSES | | TM E2533 | S AS CYL-CT L33 - FEE veto pulse integration cycles count |
| E6333 | E 1.048 | sec | TM E1333 | R AS RATE-MT L33 - FEE veto rate meter measurement time |
| E7534 | E VETO PULSES | | TM E2534 | S AS CYL-CT L34 - FEE veto pulse integration cycles count |
| E6334 | E 1.048 | sec | TM E1334 | R AS RATE-MT L34 - FEE veto rate meter measurement time |
| E7535 | E VETO PULSES | | TM E2535 | S AS CYL-CT L35 - FEE veto pulse integration cycles count |
| E6335 | E 1.048 | sec | TM E1335 | R AS RATE-MT L35 - FEE veto rate meter measurement time |
| E7536 | E VETO PULSES | | TM E2536 | S AS CYL-CT L36 - FEE veto pulse integration cycles count |
| E6336 | E 1.048 | sec | TM E1336 | R AS RATE-MT L36 - FEE veto rate meter measurement time |
| E7537 | E VETO PULSES | | TM E2537 | S AS CYL-CT L37 - FEE veto pulse integration cycles count |
| E6337 | E 1.048 | sec | TM E1337 | R AS RATE-MT L37 - FEE veto rate meter measurement time |
| E7538 | E VETO PULSES | | TM E2538 | S AS CYL-CT L38 - FEE veto pulse integration cycles count |
| E6338 | E 1.048 | sec | TM E1338 | R AS RATE-MT L38 - FEE veto rate meter measurement time |
| E7539 | E VETO PULSES | | TM E2539 | S AS CYL-CT L39 - FEE veto pulse integration cycles count |
| E6339 | E 1.048 | sec | TM E1339 | R AS RATE-MT L39 - FEE veto rate meter measurement time |
| E7540 | E VETO PULSES | | TM E2540 | S AS CYL-CT L40 - FEE veto pulse integration cycles count |
| E6340 | E 1.048 | sec | TM E1340 | R AS RATE-MT L40 - FEE veto rate meter measurement time |
| E7541 | E VETO PULSES | | TM E2541 | S AS CYL-CT L41 - FEE veto pulse integration cycles count |
| E6341 | E 1.048 | sec | TM E1341 | R AS RATE-MT L41 - FEE veto rate meter measurement time |
| E7542 | E VETO PULSES | | TM E2542 | S AS CYL-CT L42 - FEE veto pulse integration cycles count |
| E6342 | E 1.048 | sec | TM E1342 | R AS RATE-MT L42 - FEE veto rate meter measurement time |
| E7543 | E VETO PULSES | | TM E2543 | S AS CYL-CT L43 - FEE veto pulse integration cycles count |
| E6343 | E 1.048 | sec | TM E1343 | R AS RATE-MT L43 - FEE veto rate meter measurement time |
| E7544 | E VETO PULSES | | TM E2544 | S AS CYL-CT L44 - FEE veto pulse integration cycles count |
| E6344 | E 1.048 | sec | TM E1344 | R AS RATE-MT L44 - FEE veto rate meter measurement time |
| E7545 | E VETO PULSES | | TM E2545 | S AS CYL-CT L45 - FEE veto pulse integration cycles count |
| E6345 | E 1.048 | sec | TM E1345 | R AS RATE-MT L45 - FEE veto rate meter measurement time |
| E7546 | E VETO PULSES | | TM E2546 | S AS CYL-CT L46 - FEE veto pulse integration cycles count |
| E6346 | E 1.048 | sec | TM E1346 | R AS RATE-MT L46 - FEE veto rate meter measurement time |
| E7547 | E VETO PULSES | | TM E2547 | S AS CYL-CT L47 - FEE veto pulse integration cycles count |
| E6347 | E 1.048 | sec | TM E1347 | R AS RATE-MT L47 - FEE veto rate meter measurement time |
| E7548 | E VETO PULSES | | TM E2548 | S AS CYL-CT L48 - FEE veto pulse integration cycles count |
| E6348 | E 1.048 | sec | TM E1348 | R AS RATE-MT L48 - FEE veto rate meter measurement time |
| E7549 | E VETO PULSES | | TM E2549 | S AS CYL-CT L49 - FEE veto pulse integration cycles count |
| E6349 | E 1.048 | sec | TM E1349 | R AS RATE-MT L49 - FEE veto rate meter measurement time |
| E7550 | E VETO PULSES | | TM E2550 | S AS CYL-CT L50 - FEE veto pulse integration cycles count |
| E6350 | E 1.048 | sec | TM E1350 | R AS RATE-MT L50 - FEE veto rate meter measurement time |
| E7551 | E VETO PULSES | | TM E2551 | S AS CYL-CT L51 - FEE veto pulse integration cycles count |
| E6351 | E 1.048 | sec | TM E1351 | R AS RATE-MT L51 - FEE veto rate meter measurement time |
| E7552 | E VETO PULSES | | TM E2552 | S AS CYL-CT L52 - FEE veto pulse integration cycles count |
| E6352 | E 1.048 | sec | TM E1352 | R AS RATE-MT L52 - FEE veto rate meter measurement time |
| E7553 | E VETO PULSES | | TM E2553 | S AS CYL-CT L53 - FEE veto pulse integration cycles count |
| E6353 | E 1.048 | sec | TM E1353 | R AS RATE-MT L53 - FEE veto rate meter measurement time |
| E7554 | E VETO PULSES | | TM E2554 | S AS CYL-CT L54 - FEE veto pulse integration cycles count |
| E6354 | E 1.048 | sec | TM E1354 | R AS RATE-MT L54 - FEE veto rate meter measurement time |
| E7555 | E VETO PULSES | | TM E2555 | S AS CYL-CT L55 - FEE veto pulse integration cycles count |



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| E6355 | E 1.048 | sec | TM E1355 | R AS RATE-MT L55 - FEE veto rate meter measurement time |
| E7556 | E VETO PULSES | | TM E2556 | S AS CYL-CT L56 - FEE veto pulse integration cycles count |
| E6356 | E 1.048 | sec | TM E1356 | R AS RATE-MT L56 - FEE veto rate meter measurement time |
| E7557 | E VETO PULSES | | TM E2557 | S AS CYL-CT L57 - FEE veto pulse integration cycles count |
| E6357 | E 1.048 | sec | TM E1357 | R AS RATE-MT L57 - FEE veto rate meter measurement time |
| E7558 | E VETO PULSES | | TM E2558 | S AS CYL-CT L58 - FEE veto pulse integration cycles count |
| E6358 | E 1.048 | sec | TM E1358 | R AS RATE-MT L58 - FEE veto rate meter measurement time |
| E7559 | E VETO PULSES | | TM E2559 | S AS CYL-CT L59 - FEE veto pulse integration cycles count |
| E6359 | E 1.048 | sec | TM E1359 | R AS RATE-MT L59 - FEE veto rate meter measurement time |
| E7560 | E VETO PULSES | | TM E2560 | S AS CYL-CT L60 - FEE veto pulse integration cycles count |
| E6360 | E 1.048 | sec | TM E1360 | R AS RATE-MT L60 - FEE veto rate meter measurement time |
| E7561 | E VETO PULSES | | TM E2561 | S AS CYL-CT L61 - FEE veto pulse integration cycles count |
| E6361 | E 1.048 | sec | TM E1361 | R AS RATE-MT L61 - FEE veto rate meter measurement time |
| E7562 | E VETO PULSES | | TM E2562 | S AS CYL-CT L62 - FEE veto pulse integration cycles count |
| E6362 | E 1.048 | sec | TM E1362 | R AS RATE-MT L62 - FEE veto rate meter measurement time |
| E7563 | E VETO PULSES | | TM E2563 | S AS CYL-CT L63 - FEE veto pulse integration cycles count |
| E6363 | E 1.048 | sec | TM E1363 | R AS RATE-MT L63 - FEE veto rate meter measurement time |
| E7564 | E VETO PULSES | | TM E2564 | S AS CYL-CT L64 - FEE veto pulse integration cycles count |
| E6364 | E 1.048 | sec | TM E1364 | R AS RATE-MT L64 - FEE veto rate meter measurement time |
| E7565 | E VETO PULSES | | TM E2565 | S AS CYL-CT L65 - FEE veto pulse integration cycles count |
| E6365 | E 1.048 | sec | TM E1365 | R AS RATE-MT L65 - FEE veto rate meter measurement time |
| E7566 | E VETO PULSES | | TM E2566 | S AS CYL-CT L66 - FEE veto pulse integration cycles count |
| E6366 | E 1.048 | sec | TM E1366 | R AS RATE-MT L66 - FEE veto rate meter measurement time |
| E7567 | E VETO PULSES | | TM E2567 | S AS CYL-CT L67 - FEE veto pulse integration cycles count |
| E6367 | E 1.048 | sec | TM E1367 | R AS RATE-MT L67 - FEE veto rate meter measurement time |
| E7568 | E VETO PULSES | | TM E2568 | S AS CYL-CT L68 - FEE veto pulse integration cycles count |
| E6368 | E 1.048 | sec | TM E1368 | R AS RATE-MT L68 - FEE veto rate meter measurement time |
| E7569 | E VETO PULSES | | TM E2569 | S AS CYL-CT L69 - FEE veto pulse integration cycles count |
| E6369 | E 1.048 | sec | TM E1369 | R AS RATE-MT L69 - FEE veto rate meter measurement time |
| E7570 | E VETO PULSES | | TM E2570 | S AS CYL-CT L70 - FEE veto pulse integration cycles count |
| E6370 | E 1.048 | sec | TM E1370 | R AS RATE-MT L70 - FEE veto rate meter measurement time |
| E7571 | E VETO PULSES | | TM E2571 | S AS CYL-CT L71 - FEE veto pulse integration cycles count |
| E6371 | E 1.048 | sec | TM E1371 | R AS RATE-MT L71 - FEE veto rate meter measurement time |
| E7572 | E VETO PULSES | | TM E2572 | S AS CYL-CT L72 - FEE veto pulse integration cycles count |
| E6372 | E 1.048 | sec | TM E1372 | R AS RATE-MT L72 - FEE veto rate meter measurement time |
| E7573 | E VETO PULSES | | TM E2573 | S AS CYL-CT L73 - FEE veto pulse integration cycles count |
| E6373 | E 1.048 | sec | TM E1373 | R AS RATE-MT L73 - FEE veto rate meter measurement time |
| E7574 | E VETO PULSES | | TM E2574 | S AS CYL-CT L74 - FEE veto pulse integration cycles count |
| E6374 | E 1.048 | sec | TM E1374 | R AS RATE-MT L74 - FEE veto rate meter measurement time |
| E7575 | E VETO PULSES | | TM E2575 | S AS CYL-CT L75 - FEE veto pulse integration cycles count |
| E6375 | E 1.048 | sec | TM E1375 | R AS RATE-MT L75 - FEE veto rate meter measurement time |
| E7576 | E VETO PULSES | | TM E2576 | S AS CYL-CT L76 - FEE veto pulse integration cycles count |
| E6376 | E 1.048 | sec | TM E1376 | R AS RATE-MT L76 - FEE veto rate meter measurement time |
| E7577 | E VETO PULSES | | TM E2577 | S AS CYL-CT L77 - FEE veto pulse integration cycles count |
| E6377 | E 1.048 | sec | TM E1377 | R AS RATE-MT L77 - FEE veto rate meter measurement time |
| E7578 | E VETO PULSES | | TM E2578 | S AS CYL-CT L78 - FEE veto pulse integration cycles count |



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| E6378 | E 1.048 | sec | TM E1378 | R AS RATE-MT L78 - FEE veto rate meter measurement time |
| E7579 | E VETO PULSES | | TM E2579 | S AS CYL-CT L79 - FEE veto pulse integration cycles count |
| E6379 | E 1.048 | sec | TM E1379 | R AS RATE-MT L79 - FEE veto rate meter measurement time |
| E7580 | E VETO PULSES | | TM E2580 | S AS CYL-CT L80 - FEE veto pulse integration cycles count |
| E6380 | E 1.048 | sec | TM E1380 | R AS RATE-MT L80 - FEE veto rate meter measurement time |
| E7581 | E VETO PULSES | | TM E2581 | S AS CYL-CT L81 - FEE veto pulse integration cycles count |
| E6381 | E 1.048 | sec | TM E1381 | R AS RATE-MT L81 - FEE veto rate meter measurement time |
| E7582 | E VETO PULSES | | TM E2582 | S AS CYL-CT L82 - FEE veto pulse integration cycles count |
| E6382 | E 1.048 | sec | TM E1382 | R AS RATE-MT L82 - FEE veto rate meter measurement time |
| E7583 | E VETO PULSES | | TM E2583 | S AS CYL-CT L83 - FEE veto pulse integration cycles count |
| E6383 | E 1.048 | sec | TM E1383 | R AS RATE-MT L83 - FEE veto rate meter measurement time |
| E7584 | E VETO PULSES | | TM E2584 | S AS CYL-CT L84 - FEE veto pulse integration cycles count |
| E6384 | E 1.048 | sec | TM E1384 | R AS RATE-MT L84 - FEE veto rate meter measurement time |
| E7585 | E VETO PULSES | | TM E2585 | S AS CYL-CT L85 - FEE veto pulse integration cycles count |
| E6385 | E 1.048 | sec | TM E1385 | R AS RATE-MT L85 - FEE veto rate meter measurement time |
| E7586 | E VETO PULSES | | TM E2586 | S AS CYL-CT L86 - FEE veto pulse integration cycles count |
| E6386 | E 1.048 | sec | TM E1386 | R AS RATE-MT L86 - FEE veto rate meter measurement time |
| E7587 | E VETO PULSES | | TM E2587 | S AS CYL-CT L87 - FEE veto pulse integration cycles count |
| E6387 | E 1.048 | sec | TM E1387 | R AS RATE-MT L87 - FEE veto rate meter measurement time |
| E7588 | E VETO PULSES | | TM E2588 | S AS CYL-CT L88 - FEE veto pulse integration cycles count |
| E6388 | E 1.048 | sec | TM E1388 | R AS RATE-MT L88 - FEE veto rate meter measurement time |
| E7589 | E VETO PULSES | | TM E2589 | S AS CYL-CT L89 - FEE veto pulse integration cycles count |
| E6389 | E 1.048 | sec | TM E1389 | R AS RATE-MT L89 - FEE veto rate meter measurement time |
| E7590 | E VETO PULSES | | TM E2590 | S AS CYL-CT L90 - FEE veto pulse integration cycles count |
| E6390 | E 1.048 | sec | TM E1390 | R AS RATE-MT L90 - FEE veto rate meter measurement time |
| E6391 | E 1.048 | sec | TM E1391 | R AS RATE-MT L91 - FEE veto rate meter measurement time |

2.2.4.27. ES1735_AS-VTDLY_fmconfig_0001.TPF

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| E6401 | E 25 | nsec | TM E1401 | R AS VTO-DLY L1 - FEE veto delay setting #1 |
| E6400 | E 25 | nsec | TM E1400 | R AS VTO-DLY L0 - FEE veto delay setting #0 |
| E6403 | E 25 | nsec | TM E1403 | R AS VTO-DLY L3 - FEE veto delay setting #3 |
| E6402 | E 25 | nsec | TM E1402 | R AS VTO-DLY L2 - FEE veto delay setting #2 |
| E6405 | E 25 | nsec | TM E1405 | R AS VTO-DLY L5 - FEE veto delay setting #5 |
| E6404 | E 25 | nsec | TM E1404 | R AS VTO-DLY L4 - FEE veto delay setting #4 |
| E6407 | E 25 | nsec | TM E1407 | R AS VTO-DLY L7 - FEE veto delay setting #7 |
| E6406 | E 25 | nsec | TM E1406 | R AS VTO-DLY L6 - FEE veto delay setting #6 |
| E6409 | E 25 | nsec | TM E1409 | R AS VTO-DLY L9 - FEE veto delay setting #9 |
| E6408 | E 25 | nsec | TM E1408 | R AS VTO-DLY L8 - FEE veto delay setting #8 |
| E6411 | E 25 | nsec | TM E1411 | R AS VTO-DLY L11 - FEE veto delay setting #11 |



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| E6410 | E 10 | nsec | TM | E1410 | R AS | VTO-DLY | L10 | - FEE | veto | delay | setting | #10 |
| E6413 | E 25 | nsec | TM | E1413 | R AS | VTO-DLY | L13 | - FEE | veto | delay | setting | #13 |
| E6412 | E 25 | nsec | TM | E1412 | R AS | VTO-DLY | L12 | - FEE | veto | delay | setting | #12 |
| E6415 | E 10 | nsec | TM | E1415 | R AS | VTO-DLY | L15 | - FEE | veto | delay | setting | #15 |
| E6414 | E 25 | nsec | TM | E1414 | R AS | VTO-DLY | L14 | - FEE | veto | delay | setting | #14 |
| E6417 | E 25 | nsec | TM | E1417 | R AS | VTO-DLY | L17 | - FEE | veto | delay | setting | #17 |
| E6416 | E 25 | nsec | TM | E1416 | R AS | VTO-DLY | L16 | - FEE | veto | delay | setting | #16 |
| E6419 | E 46 | nsec | TM | E1419 | R AS | VTO-DLY | L19 | - FEE | veto | delay | setting | #19 |
| E6418 | E 25 | nsec | TM | E1418 | R AS | VTO-DLY | L18 | - FEE | veto | delay | setting | #18 |
| E6421 | E 46 | nsec | TM | E1421 | R AS | VTO-DLY | L21 | - FEE | veto | delay | setting | #21 |
| E6420 | E 46 | nsec | TM | E1420 | R AS | VTO-DLY | L20 | - FEE | veto | delay | setting | #20 |
| E6423 | E 46 | nsec | TM | E1423 | R AS | VTO-DLY | L23 | - FEE | veto | delay | setting | #23 |
| E6422 | E 46 | nsec | TM | E1422 | R AS | VTO-DLY | L22 | - FEE | veto | delay | setting | #22 |
| E6425 | E 25 | nsec | TM | E1425 | R AS | VTO-DLY | L25 | - FEE | veto | delay | setting | #25 |
| E6424 | E 25 | nsec | TM | E1424 | R AS | VTO-DLY | L24 | - FEE | veto | delay | setting | #24 |
| E6427 | E 46 | nsec | TM | E1427 | R AS | VTO-DLY | L27 | - FEE | veto | delay | setting | #27 |
| E6426 | E 46 | nsec | TM | E1426 | R AS | VTO-DLY | L26 | - FEE | veto | delay | setting | #26 |
| E6429 | E 25 | nsec | TM | E1429 | R AS | VTO-DLY | L29 | - FEE | veto | delay | setting | #29 |
| E6428 | E 46 | nsec | TM | E1428 | R AS | VTO-DLY | L28 | - FEE | veto | delay | setting | #28 |
| E6430 | E 25 | nsec | TM | E1430 | R AS | VTO-DLY | L30 | - FEE | veto | delay | setting | #30 |
| E6432 | E 46 | nsec | TM | E1432 | R AS | VTO-DLY | L32 | - FEE | veto | delay | setting | #32 |
| E6431 | E 46 | nsec | TM | E1431 | R AS | VTO-DLY | L31 | - FEE | veto | delay | setting | #31 |
| E6434 | E 25 | nsec | TM | E1434 | R AS | VTO-DLY | L34 | - FEE | veto | delay | setting | #34 |
| E6433 | E 46 | nsec | TM | E1433 | R AS | VTO-DLY | L33 | - FEE | veto | delay | setting | #33 |
| E6436 | E 10 | nsec | TM | E1436 | R AS | VTO-DLY | L36 | - FEE | veto | delay | setting | #36 |
| E6435 | E 25 | nsec | TM | E1435 | R AS | VTO-DLY | L35 | - FEE | veto | delay | setting | #35 |
| E6438 | E 10 | nsec | TM | E1438 | R AS | VTO-DLY | L38 | - FEE | veto | delay | setting | #38 |
| E6437 | E 25 | nsec | TM | E1437 | R AS | VTO-DLY | L37 | - FEE | veto | delay | setting | #37 |
| E6440 | E 10 | nsec | TM | E1440 | R AS | VTO-DLY | L40 | - FEE | veto | delay | setting | #40 |
| E6439 | E 25 | nsec | TM | E1439 | R AS | VTO-DLY | L39 | - FEE | veto | delay | setting | #39 |
| E6442 | E 25 | nsec | TM | E1442 | R AS | VTO-DLY | L42 | - FEE | veto | delay | setting | #42 |
| E6441 | E 10 | nsec | TM | E1441 | R AS | VTO-DLY | L41 | - FEE | veto | delay | setting | #41 |
| E6444 | E 10 | nsec | TM | E1444 | R AS | VTO-DLY | L44 | - FEE | veto | delay | setting | #44 |
| E6443 | E 25 | nsec | TM | E1443 | R AS | VTO-DLY | L43 | - FEE | veto | delay | setting | #43 |
| E6446 | E 10 | nsec | TM | E1446 | R AS | VTO-DLY | L46 | - FEE | veto | delay | setting | #46 |
| E6445 | E 25 | nsec | TM | E1445 | R AS | VTO-DLY | L45 | - FEE | veto | delay | setting | #45 |
| E6448 | E 10 | nsec | TM | E1448 | R AS | VTO-DLY | L48 | - FEE | veto | delay | setting | #48 |
| E6447 | E 10 | nsec | TM | E1447 | R AS | VTO-DLY | L47 | - FEE | veto | delay | setting | #47 |
| E6450 | E 25 | nsec | TM | E1450 | R AS | VTO-DLY | L50 | - FEE | veto | delay | setting | #50 |
| E6449 | E 10 | nsec | TM | E1449 | R AS | VTO-DLY | L49 | - FEE | veto | delay | setting | #49 |
| E6452 | E 10 | nsec | TM | E1452 | R AS | VTO-DLY | L52 | - FEE | veto | delay | setting | #52 |
| E6451 | E 10 | nsec | TM | E1451 | R AS | VTO-DLY | L51 | - FEE | veto | delay | setting | #51 |
| E6454 | E 25 | nsec | TM | E1454 | R AS | VTO-DLY | L54 | - FEE | veto | delay | setting | #54 |
| E6453 | E 10 | nsec | TM | E1453 | R AS | VTO-DLY | L53 | - FEE | veto | delay | setting | #53 |
| E6456 | E 46 | nsec | TM | E1456 | R AS | VTO-DLY | L56 | - FEE | veto | delay | setting | #56 |
| E6455 | E 25 | nsec | TM | E1455 | R AS | VTO-DLY | L55 | - FEE | veto | delay | setting | #55 |



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E6458 E 25 nsec TM E1458 R AS VTO-DLY L58 - FEE veto delay setting #58
E6457 E 46 nsec TM E1457 R AS VTO-DLY L57 - FEE veto delay setting #57
E6460 E 25 nsec TM E1460 R AS VTO-DLY L60 - FEE veto delay setting #60
E6459 E 25 nsec TM E1459 R AS VTO-DLY L59 - FEE veto delay setting #59
E6461 E 25 nsec TM E1461 R AS VTO-DLY L61 - FEE veto delay setting #61
E6463 E 25 nsec TM E1463 R AS VTO-DLY L63 - FEE veto delay setting #63
E6462 E 25 nsec TM E1462 R AS VTO-DLY L62 - FEE veto delay setting #62
E6465 E 10 nsec TM E1465 R AS VTO-DLY L65 - FEE veto delay setting #65
E6464 E 25 nsec TM E1464 R AS VTO-DLY L64 - FEE veto delay setting #64
E6467 E 25 nsec TM E1467 R AS VTO-DLY L67 - FEE veto delay setting #67
E6466 E 25 nsec TM E1466 R AS VTO-DLY L66 - FEE veto delay setting #66
E6469 E 25 nsec TM E1469 R AS VTO-DLY L69 - FEE veto delay setting #69
E6468 E 25 nsec TM E1468 R AS VTO-DLY L68 - FEE veto delay setting #68
E6471 E 25 nsec TM E1471 R AS VTO-DLY L71 - FEE veto delay setting #71
E6470 E 25 nsec TM E1470 R AS VTO-DLY L70 - FEE veto delay setting #70
E6473 E 25 nsec TM E1473 R AS VTO-DLY L73 - FEE veto delay setting #73
E6472 E 46 nsec TM E1472 R AS VTO-DLY L72 - FEE veto delay setting #72
E6475 E 46 nsec TM E1475 R AS VTO-DLY L75 - FEE veto delay setting #75
E6474 E 46 nsec TM E1474 R AS VTO-DLY L74 - FEE veto delay setting #74
E6477 E 10 nsec TM E1477 R AS VTO-DLY L77 - FEE veto delay setting #77
E6476 E 46 nsec TM E1476 R AS VTO-DLY L76 - FEE veto delay setting #76
E6479 E 46 nsec TM E1479 R AS VTO-DLY L79 - FEE veto delay setting #79
E6478 E 46 nsec TM E1478 R AS VTO-DLY L78 - FEE veto delay setting #78
E6481 E 46 nsec TM E1481 R AS VTO-DLY L81 - FEE veto delay setting #81
E6480 E 46 nsec TM E1480 R AS VTO-DLY L80 - FEE veto delay setting #80
E6483 E 25 nsec TM E1483 R AS VTO-DLY L83 - FEE veto delay setting #83
E6482 E 25 nsec TM E1482 R AS VTO-DLY L82 - FEE veto delay setting #82
E6485 E 25 nsec TM E1485 R AS VTO-DLY L85 - FEE veto delay setting #85
E6484 E 46 nsec TM E1484 R AS VTO-DLY L84 - FEE veto delay setting #84
E6487 E 46 nsec TM E1487 R AS VTO-DLY L87 - FEE veto delay setting #87
E6486 E 46 nsec TM E1486 R AS VTO-DLY L86 - FEE veto delay setting #86
E6489 E 46 nsec TM E1489 R AS VTO-DLY L89 - FEE veto delay setting #89
E6488 E 46 nsec TM E1488 R AS VTO-DLY L88 - FEE veto delay setting #88
E6491 E 0 NS TM E1491 R AS VTO-DLYP L1 - FEE veto delay setting (3 first bits) #91
E6492 E +13.5 NS TM E1492 R AS VTO-DLYP L2 - FEE PSAC veto delay setting (last bit) #91
E6490 E 46 nsec TM E1490 R AS VTO-DLY L90 - FEE veto delay setting #90

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2.2.4.28. ES1736_AS-EVTGR_fmconfig_0002.TPF

ES1736 S
M F 92

2002-05-17T18:51:11Z - SPI1 ACS FEE Event Trigger Threshold
E6500 E 74.8 mV TM E1500 R AS EVT-TGR L0 - FEE event trigger Threshold #0



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|-------|--------|----|----------|----------------------------------------------------|
| E6501 | E 74.8 | mV | TM E1501 | R AS EVT-TGR L1 - FEE event trigger Threshold #1 |
| E6502 | E 74.8 | mV | TM E1502 | R AS EVT-TGR L2 - FEE event trigger Threshold #2 |
| E6503 | E 74.8 | mV | TM E1503 | R AS EVT-TGR L3 - FEE event trigger Threshold #3 |
| E6504 | E 74.8 | mV | TM E1504 | R AS EVT-TGR L4 - FEE event trigger Threshold #4 |
| E6505 | E 74.8 | mV | TM E1505 | R AS EVT-TGR L5 - FEE event trigger Threshold #5 |
| E6506 | E 74.8 | mV | TM E1506 | R AS EVT-TGR L6 - FEE event trigger Threshold #6 |
| E6507 | E 74.8 | mV | TM E1507 | R AS EVT-TGR L7 - FEE event trigger Threshold #7 |
| E6508 | E 74.8 | mV | TM E1508 | R AS EVT-TGR L8 - FEE event trigger Threshold #8 |
| E6509 | E 74.8 | mV | TM E1509 | R AS EVT-TGR L9 - FEE event trigger Threshold #9 |
| E6510 | E 74.8 | mV | TM E1510 | R AS EVT-TGR L10 - FEE event trigger Threshold #10 |
| E6511 | E 74.8 | mV | TM E1511 | R AS EVT-TGR L11 - FEE event trigger Threshold #11 |
| E6512 | E 74.8 | mV | TM E1512 | R AS EVT-TGR L12 - FEE event trigger Threshold #12 |
| E6513 | E 74.8 | mV | TM E1513 | R AS EVT-TGR L13 - FEE event trigger Threshold #13 |
| E6514 | E 74.8 | mV | TM E1514 | R AS EVT-TGR L14 - FEE event trigger Threshold #14 |
| E6515 | E 74.8 | mV | TM E1515 | R AS EVT-TGR L15 - FEE event trigger Threshold #15 |
| E6516 | E 74.8 | mV | TM E1516 | R AS EVT-TGR L16 - FEE event trigger Threshold #16 |
| E6517 | E 74.8 | mV | TM E1517 | R AS EVT-TGR L17 - FEE event trigger Threshold #17 |
| E6518 | E 74.8 | mV | TM E1518 | R AS EVT-TGR L18 - FEE event trigger Threshold #18 |
| E6519 | E 74.8 | mV | TM E1519 | R AS EVT-TGR L19 - FEE event trigger Threshold #19 |
| E6520 | E 74.8 | mV | TM E1520 | R AS EVT-TGR L20 - FEE event trigger Threshold #20 |
| E6521 | E 74.8 | mV | TM E1521 | R AS EVT-TGR L21 - FEE event trigger Threshold #21 |
| E6522 | E 74.8 | mV | TM E1522 | R AS EVT-TGR L22 - FEE event trigger Threshold #22 |
| E6523 | E 74.8 | mV | TM E1523 | R AS EVT-TGR L23 - FEE event trigger Threshold #23 |
| E6524 | E 74.8 | mV | TM E1524 | R AS EVT-TGR L24 - FEE event trigger Threshold #24 |
| E6525 | E 74.8 | mV | TM E1525 | R AS EVT-TGR L25 - FEE event trigger Threshold #25 |
| E6526 | E 74.8 | mV | TM E1526 | R AS EVT-TGR L26 - FEE event trigger Threshold #26 |
| E6527 | E 74.8 | mV | TM E1527 | R AS EVT-TGR L27 - FEE event trigger Threshold #27 |
| E6528 | E 74.8 | mV | TM E1528 | R AS EVT-TGR L28 - FEE event trigger Threshold #28 |
| E6529 | E 74.8 | mV | TM E1529 | R AS EVT-TGR L29 - FEE event trigger Threshold #29 |
| E6530 | E 74.8 | mV | TM E1530 | R AS EVT-TGR L30 - FEE event trigger Threshold #30 |
| E6531 | E 74.8 | mV | TM E1531 | R AS EVT-TGR L31 - FEE event trigger Threshold #31 |
| E6532 | E 74.8 | mV | TM E1532 | R AS EVT-TGR L32 - FEE event trigger Threshold #32 |
| E6533 | E 74.8 | mV | TM E1533 | R AS EVT-TGR L33 - FEE event trigger Threshold #33 |
| E6534 | E 74.8 | mV | TM E1534 | R AS EVT-TGR L34 - FEE event trigger Threshold #34 |
| E6535 | E 74.8 | mV | TM E1535 | R AS EVT-TGR L35 - FEE event trigger Threshold #35 |
| E6536 | E 74.8 | mV | TM E1536 | R AS EVT-TGR L36 - FEE event trigger Threshold #36 |
| E6537 | E 74.8 | mV | TM E1537 | R AS EVT-TGR L37 - FEE event trigger Threshold #37 |
| E6538 | E 74.8 | mV | TM E1538 | R AS EVT-TGR L38 - FEE event trigger Threshold #38 |
| E6539 | E 74.8 | mV | TM E1539 | R AS EVT-TGR L39 - FEE event trigger Threshold #39 |
| E6540 | E 74.8 | mV | TM E1540 | R AS EVT-TGR L40 - FEE event trigger Threshold #40 |
| E6541 | E 74.8 | mV | TM E1541 | R AS EVT-TGR L41 - FEE event trigger Threshold #41 |
| E6542 | E 74.8 | mV | TM E1542 | R AS EVT-TGR L42 - FEE event trigger Threshold #42 |
| E6543 | E 74.8 | mV | TM E1543 | R AS EVT-TGR L43 - FEE event trigger Threshold #43 |
| E6544 | E 74.8 | mV | TM E1544 | R AS EVT-TGR L44 - FEE event trigger Threshold #44 |
| E6545 | E 74.8 | mV | TM E1545 | R AS EVT-TGR L45 - FEE event trigger Threshold #45 |
| E6546 | E 74.8 | mV | TM E1546 | R AS EVT-TGR L46 - FEE event trigger Threshold #46 |



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|-------|--------|----|----------|------------------|-----------------------------------|
| E6547 | E 74.8 | mV | TM E1547 | R AS EVT-TGR L47 | - FEE event trigger Threshold #47 |
| E6548 | E 74.8 | mV | TM E1548 | R AS EVT-TGR L48 | - FEE event trigger Threshold #48 |
| E6549 | E 74.8 | mV | TM E1549 | R AS EVT-TGR L49 | - FEE event trigger Threshold #49 |
| E6550 | E 74.8 | mV | TM E1550 | R AS EVT-TGR L50 | - FEE event trigger Threshold #50 |
| E6551 | E 74.8 | mV | TM E1551 | R AS EVT-TGR L51 | - FEE event trigger Threshold #51 |
| E6552 | E 74.8 | mV | TM E1552 | R AS EVT-TGR L52 | - FEE event trigger Threshold #52 |
| E6553 | E 74.8 | mV | TM E1553 | R AS EVT-TGR L53 | - FEE event trigger Threshold #53 |
| E6554 | E 74.8 | mV | TM E1554 | R AS EVT-TGR L54 | - FEE event trigger Threshold #54 |
| E6555 | E 74.8 | mV | TM E1555 | R AS EVT-TGR L55 | - FEE event trigger Threshold #55 |
| E6556 | E 74.8 | mV | TM E1556 | R AS EVT-TGR L56 | - FEE event trigger Threshold #56 |
| E6557 | E 74.8 | mV | TM E1557 | R AS EVT-TGR L57 | - FEE event trigger Threshold #57 |
| E6558 | E 74.8 | mV | TM E1558 | R AS EVT-TGR L58 | - FEE event trigger Threshold #58 |
| E6559 | E 74.8 | mV | TM E1559 | R AS EVT-TGR L59 | - FEE event trigger Threshold #59 |
| E6560 | E 74.8 | mV | TM E1560 | R AS EVT-TGR L60 | - FEE event trigger Threshold #60 |
| E6561 | E 74.8 | mV | TM E1561 | R AS EVT-TGR L61 | - FEE event trigger Threshold #61 |
| E6562 | E 74.8 | mV | TM E1562 | R AS EVT-TGR L62 | - FEE event trigger Threshold #62 |
| E6563 | E 74.8 | mV | TM E1563 | R AS EVT-TGR L63 | - FEE event trigger Threshold #63 |
| E6564 | E 74.8 | mV | TM E1564 | R AS EVT-TGR L64 | - FEE event trigger Threshold #64 |
| E6565 | E 74.8 | mV | TM E1565 | R AS EVT-TGR L65 | - FEE event trigger Threshold #65 |
| E6566 | E 74.8 | mV | TM E1566 | R AS EVT-TGR L66 | - FEE event trigger Threshold #66 |
| E6567 | E 74.8 | mV | TM E1567 | R AS EVT-TGR L67 | - FEE event trigger Threshold #67 |
| E6568 | E 74.8 | mV | TM E1568 | R AS EVT-TGR L68 | - FEE event trigger Threshold #68 |
| E6569 | E 74.8 | mV | TM E1569 | R AS EVT-TGR L69 | - FEE event trigger Threshold #69 |
| E6570 | E 74.8 | mV | TM E1570 | R AS EVT-TGR L70 | - FEE event trigger Threshold #70 |
| E6571 | E 74.8 | mV | TM E1571 | R AS EVT-TGR L71 | - FEE event trigger Threshold #71 |
| E6572 | E 74.8 | mV | TM E1572 | R AS EVT-TGR L72 | - FEE event trigger Threshold #72 |
| E6573 | E 74.8 | mV | TM E1573 | R AS EVT-TGR L73 | - FEE event trigger Threshold #73 |
| E6574 | E 74.8 | mV | TM E1574 | R AS EVT-TGR L74 | - FEE event trigger Threshold #74 |
| E6575 | E 74.8 | mV | TM E1575 | R AS EVT-TGR L75 | - FEE event trigger Threshold #75 |
| E6576 | E 74.8 | mV | TM E1576 | R AS EVT-TGR L76 | - FEE event trigger Threshold #76 |
| E6577 | E 74.8 | mV | TM E1577 | R AS EVT-TGR L77 | - FEE event trigger Threshold #77 |
| E6578 | E 74.8 | mV | TM E1578 | R AS EVT-TGR L78 | - FEE event trigger Threshold #78 |
| E6579 | E 74.8 | mV | TM E1579 | R AS EVT-TGR L79 | - FEE event trigger Threshold #79 |
| E6580 | E 74.8 | mV | TM E1580 | R AS EVT-TGR L80 | - FEE event trigger Threshold #80 |
| E6581 | E 74.8 | mV | TM E1581 | R AS EVT-TGR L81 | - FEE event trigger Threshold #81 |
| E6582 | E 74.8 | mV | TM E1582 | R AS EVT-TGR L82 | - FEE event trigger Threshold #82 |
| E6583 | E 74.8 | mV | TM E1583 | R AS EVT-TGR L83 | - FEE event trigger Threshold #83 |
| E6584 | E 74.8 | mV | TM E1584 | R AS EVT-TGR L84 | - FEE event trigger Threshold #84 |
| E6585 | E 74.8 | mV | TM E1585 | R AS EVT-TGR L85 | - FEE event trigger Threshold #85 |
| E6586 | E 74.8 | mV | TM E1586 | R AS EVT-TGR L86 | - FEE event trigger Threshold #86 |
| E6587 | E 74.8 | mV | TM E1587 | R AS EVT-TGR L87 | - FEE event trigger Threshold #87 |
| E6588 | E 74.8 | mV | TM E1588 | R AS EVT-TGR L88 | - FEE event trigger Threshold #88 |
| E6589 | E 74.8 | mV | TM E1589 | R AS EVT-TGR L89 | - FEE event trigger Threshold #89 |
| E6590 | E 74.8 | mV | TM E1590 | R AS EVT-TGR L90 | - FEE event trigger Threshold #90 |
| E6591 | E 67.5 | mV | TM E1591 | R AS EVT-TGR L91 | - FEE event trigger Threshold #91 |



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2.2.4.29. ES1737_AS-ENDSC_fmconfig_0008.TPF

ES1737 S

M F 92

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ES1737_AS-ENDSC_fmconfig_0002.TPF - 2002-07-12T17:47:16Z - SPI1 ACS FEE Energy Discriminator
E6600 E 312 mV TM E1600 R AS NRG-DSC L0 - FEE Energy discriminator #0
E6601 E 312 mV TM E1601 R AS NRG-DSC L1 - FEE Energy discriminator #1
E6602 E 546 mV TM E1602 R AS NRG-DSC L2 - FEE Energy discriminator #2
E6603 E 546 mV TM E1603 R AS NRG-DSC L3 - FEE Energy discriminator #3
E6604 E 624 mV TM E1604 R AS NRG-DSC L4 - FEE Energy discriminator #4
E6605 E 312 mV TM E1605 R AS NRG-DSC L5 - FEE Energy discriminator #5
E6606 E 468 mV TM E1606 R AS NRG-DSC L6 - FEE Energy discriminator #6
E6607 E 624 mV TM E1607 R AS NRG-DSC L7 - FEE Energy discriminator #7
E6608 E 468 mV TM E1608 R AS NRG-DSC L8 - FEE Energy discriminator #8
E6609 E 780 mV TM E1609 R AS NRG-DSC L9 - FEE Energy discriminator #9
E6610 E 468 mV TM E1610 R AS NRG-DSC L10 - FEE Energy discriminator #10
E6611 E 468 mV TM E1611 R AS NRG-DSC L11 - FEE Energy discriminator #11
E6612 E 780 mV TM E1612 R AS NRG-DSC L12 - FEE Energy discriminator #12
E6613 E 468 mV TM E1613 R AS NRG-DSC L13 - FEE Energy discriminator #13
E6614 E 624 mV TM E1614 R AS NRG-DSC L14 - FEE Energy discriminator #14
E6615 E 702 mV TM E1615 R AS NRG-DSC L15 - FEE Energy discriminator #15
E6616 E 546 mV TM E1616 R AS NRG-DSC L16 - FEE Energy discriminator #16
E6617 E 546 mV TM E1617 R AS NRG-DSC L17 - FEE Energy discriminator #17
E6618 E 468 mV TM E1618 R AS NRG-DSC L18 - FEE Energy discriminator #18
E6619 E 624 mV TM E1619 R AS NRG-DSC L19 - FEE Energy discriminator #19
E6620 E 234 mV TM E1620 R AS NRG-DSC L20 - FEE Energy discriminator #20
E6621 E 390 mV TM E1621 R AS NRG-DSC L21 - FEE Energy discriminator #21
E6622 E 390 mV TM E1622 R AS NRG-DSC L22 - FEE Energy discriminator #22
E6623 E 624 mV TM E1623 R AS NRG-DSC L23 - FEE Energy discriminator #23
E6624 E 390 mV TM E1624 R AS NRG-DSC L24 - FEE Energy discriminator #24
E6625 E 546 mV TM E1625 R AS NRG-DSC L25 - FEE Energy discriminator #25
E6626 E 1014 mV TM E1626 R AS NRG-DSC L26 - FEE Energy discriminator #26
E6627 E 468 mV TM E1627 R AS NRG-DSC L27 - FEE Energy discriminator #27
E6628 E 312 mV TM E1628 R AS NRG-DSC L28 - FEE Energy discriminator #28
E6629 E 468 mV TM E1629 R AS NRG-DSC L29 - FEE Energy discriminator #29
E6630 E 156 mV TM E1630 R AS NRG-DSC L30 - FEE Energy discriminator #30
E6631 E 546 mV TM E1631 R AS NRG-DSC L31 - FEE Energy discriminator #31
E6632 E 858 mV TM E1632 R AS NRG-DSC L32 - FEE Energy discriminator #32
E6633 E 858 mV TM E1633 R AS NRG-DSC L33 - FEE Energy discriminator #33
E6634 E 780 mV TM E1634 R AS NRG-DSC L34 - FEE Energy discriminator #34
E6635 E 312 mV TM E1635 R AS NRG-DSC L35 - FEE Energy discriminator #35
E6636 E 78 mV TM E1636 R AS NRG-DSC L36 - FEE Energy discriminator #36

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| E6637 | E 78 | mV | TM E1637 | R AS NRG-DSC L37 | - FEE Energy discriminator #37 |
| E6638 | E 312 | mV | TM E1638 | R AS NRG-DSC L38 | - FEE Energy discriminator #38 |
| E6639 | E 390 | mV | TM E1639 | R AS NRG-DSC L39 | - FEE Energy discriminator #39 |
| E6640 | E 78 | mV | TM E1640 | R AS NRG-DSC L40 | - FEE Energy discriminator #40 |
| E6641 | E 390 | mV | TM E1641 | R AS NRG-DSC L41 | - FEE Energy discriminator #41 |
| E6642 | E 156 | mV | TM E1642 | R AS NRG-DSC L42 | - FEE Energy discriminator #42 |
| E6643 | E 312 | mV | TM E1643 | R AS NRG-DSC L43 | - FEE Energy discriminator #43 |
| E6644 | E 312 | mV | TM E1644 | R AS NRG-DSC L44 | - FEE Energy discriminator #44 |
| E6645 | E 390 | mV | TM E1645 | R AS NRG-DSC L45 | - FEE Energy discriminator #45 |
| E6646 | E 468 | mV | TM E1646 | R AS NRG-DSC L46 | - FEE Energy discriminator #46 |
| E6647 | E 234 | mV | TM E1647 | R AS NRG-DSC L47 | - FEE Energy discriminator #47 |
| E6648 | E 234 | mV | TM E1648 | R AS NRG-DSC L48 | - FEE Energy discriminator #48 |
| E6649 | E 234 | mV | TM E1649 | R AS NRG-DSC L49 | - FEE Energy discriminator #49 |
| E6650 | E 312 | mV | TM E1650 | R AS NRG-DSC L50 | - FEE Energy discriminator #50 |
| E6651 | E 780 | mV | TM E1651 | R AS NRG-DSC L51 | - FEE Energy discriminator #51 |
| E6652 | E 312 | mV | TM E1652 | R AS NRG-DSC L52 | - FEE Energy discriminator #52 |
| E6653 | E 234 | mV | TM E1653 | R AS NRG-DSC L53 | - FEE Energy discriminator #53 |
| E6654 | E 234 | mV | TM E1654 | R AS NRG-DSC L54 | - FEE Energy discriminator #54 |
| E6655 | E 234 | mV | TM E1655 | R AS NRG-DSC L55 | - FEE Energy discriminator #55 |
| E6656 | E 936 | mV | TM E1656 | R AS NRG-DSC L56 | - FEE Energy discriminator #56 |
| E6657 | E 546 | mV | TM E1657 | R AS NRG-DSC L57 | - FEE Energy discriminator #57 |
| E6658 | E 546 | mV | TM E1658 | R AS NRG-DSC L58 | - FEE Energy discriminator #58 |
| E6659 | E 858 | mV | TM E1659 | R AS NRG-DSC L59 | - FEE Energy discriminator #59 |
| E6660 | E 936 | mV | TM E1660 | R AS NRG-DSC L60 | - FEE Energy discriminator #60 |
| E6661 | E 390 | mV | TM E1661 | R AS NRG-DSC L61 | - FEE Energy discriminator #61 |
| E6662 | E 468 | mV | TM E1662 | R AS NRG-DSC L62 | - FEE Energy discriminator #62 |
| E6663 | E 1014 | mV | TM E1663 | R AS NRG-DSC L63 | - FEE Energy discriminator #63 |
| E6664 | E 780 | mV | TM E1664 | R AS NRG-DSC L64 | - FEE Energy discriminator #64 |
| E6665 | E 780 | mV | TM E1665 | R AS NRG-DSC L65 | - FEE Energy discriminator #65 |
| E6666 | E 1638 | mV | TM E1666 | R AS NRG-DSC L66 | - FEE Energy discriminator #66 |
| E6667 | E 702 | mV | TM E1667 | R AS NRG-DSC L67 | - FEE Energy discriminator #67 |
| E6668 | E 390 | mV | TM E1668 | R AS NRG-DSC L68 | - FEE Energy discriminator #68 |
| E6669 | E 1014 | mV | TM E1669 | R AS NRG-DSC L69 | - FEE Energy discriminator #69 |
| E6670 | E 468 | mV | TM E1670 | R AS NRG-DSC L70 | - FEE Energy discriminator #70 |
| E6671 | E 624 | mV | TM E1671 | R AS NRG-DSC L71 | - FEE Energy discriminator #71 |
| E6672 | E 780 | mV | TM E1672 | R AS NRG-DSC L72 | - FEE Energy discriminator #72 |
| E6673 | E 624 | mV | TM E1673 | R AS NRG-DSC L73 | - FEE Energy discriminator #73 |
| E6674 | E 858 | mV | TM E1674 | R AS NRG-DSC L74 | - FEE Energy discriminator #74 |
| E6675 | E 1014 | mV | TM E1675 | R AS NRG-DSC L75 | - FEE Energy discriminator #75 |
| E6676 | E 546 | mV | TM E1676 | R AS NRG-DSC L76 | - FEE Energy discriminator #76 |
| E6677 | E 1092 | mV | TM E1677 | R AS NRG-DSC L77 | - FEE Energy discriminator #77 |
| E6678 | E 624 | mV | TM E1678 | R AS NRG-DSC L78 | - FEE Energy discriminator #78 |
| E6679 | E 624 | mV | TM E1679 | R AS NRG-DSC L79 | - FEE Energy discriminator #79 |
| E6680 | E 702 | mV | TM E1680 | R AS NRG-DSC L80 | - FEE Energy discriminator #80 |
| E6681 | E 468 | mV | TM E1681 | R AS NRG-DSC L81 | - FEE Energy discriminator #81 |
| E6682 | E 312 | mV | TM E1682 | R AS NRG-DSC L82 | - FEE Energy discriminator #82 |



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|-------|--------|----|----------|-------------------------------------------------|
| E6683 | E 156 | mV | TM E1683 | R AS NRG-DSC L83 - FEE Energy discriminator #83 |
| E6684 | E 702 | mV | TM E1684 | R AS NRG-DSC L84 - FEE Energy discriminator #84 |
| E6685 | E 468 | mV | TM E1685 | R AS NRG-DSC L85 - FEE Energy discriminator #85 |
| E6686 | E 780 | mV | TM E1686 | R AS NRG-DSC L86 - FEE Energy discriminator #86 |
| E6687 | E 624 | mV | TM E1687 | R AS NRG-DSC L87 - FEE Energy discriminator #87 |
| E6688 | E 390 | mV | TM E1688 | R AS NRG-DSC L88 - FEE Energy discriminator #88 |
| E6689 | E 1638 | mV | TM E1689 | R AS NRG-DSC L89 - FEE Energy discriminator #89 |
| E6690 | E 2028 | mV | TM E1690 | R AS NRG-DSC L90 - FEE Energy discriminator #90 |
| E6691 | E 763 | mV | TM E1691 | R AS NRG-DSC L91 - PSAC Energy discriminator |

2.2.4.30. ES1738_AS-HVSET_fmconfig_0002.TPF

ES1738 S
M F 93

ES1738_AS-HVSET_fmconfig_0002.TPF - 2002-06-14T12:14:55Z - SPI1 ACS FEE High Voltage

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|-------|-----------|---|----------|----------------------------------------------|
| E6700 | E 1196.8 | V | TM E1700 | R AS HV L0 - High voltage level for FEE #0 |
| E6701 | E 1129.05 | V | TM E1701 | R AS HV L1 - High voltage level for FEE #1 |
| E6702 | E 1088.4 | V | TM E1702 | R AS HV L2 - High voltage level for FEE #2 |
| E6703 | E 1169.7 | V | TM E1703 | R AS HV L3 - High voltage level for FEE #3 |
| E6704 | E 1156.15 | V | TM E1704 | R AS HV L4 - High voltage level for FEE #4 |
| E6705 | E 1129.05 | V | TM E1705 | R AS HV L5 - High voltage level for FEE #5 |
| E6706 | E 1223.9 | V | TM E1706 | R AS HV L6 - High voltage level for FEE #6 |
| E6707 | E 1223.9 | V | TM E1707 | R AS HV L7 - High voltage level for FEE #7 |
| E6708 | E 1129.05 | V | TM E1708 | R AS HV L8 - High voltage level for FEE #8 |
| E6709 | E 1251 | V | TM E1709 | R AS HV L9 - High voltage level for FEE #9 |
| E6710 | E 1047.75 | V | TM E1710 | R AS HV L10 - High voltage level for FEE #10 |
| E6711 | E 1251 | V | TM E1711 | R AS HV L11 - High voltage level for FEE #11 |
| E6712 | E 1129.05 | V | TM E1712 | R AS HV L12 - High voltage level for FEE #12 |
| E6713 | E 1264.55 | V | TM E1713 | R AS HV L13 - High voltage level for FEE #13 |
| E6714 | E 1210.35 | V | TM E1714 | R AS HV L14 - High voltage level for FEE #14 |
| E6715 | E 1142.6 | V | TM E1715 | R AS HV L15 - High voltage level for FEE #15 |
| E6716 | E 1115.5 | V | TM E1716 | R AS HV L16 - High voltage level for FEE #16 |
| E6717 | E 1196.8 | V | TM E1717 | R AS HV L17 - High voltage level for FEE #17 |
| E6718 | E 1210.35 | V | TM E1718 | R AS HV L18 - High voltage level for FEE #18 |
| E6719 | E 1088.4 | V | TM E1719 | R AS HV L19 - High voltage level for FEE #19 |
| E6720 | E 993.55 | V | TM E1720 | R AS HV L20 - High voltage level for FEE #20 |
| E6721 | E 1251 | V | TM E1721 | R AS HV L21 - High voltage level for FEE #21 |
| E6722 | E 1210.35 | V | TM E1722 | R AS HV L22 - High voltage level for FEE #22 |
| E6723 | E 1156.15 | V | TM E1723 | R AS HV L23 - High voltage level for FEE #23 |
| E6724 | E 1034.2 | V | TM E1724 | R AS HV L24 - High voltage level for FEE #24 |
| E6725 | E 1264.55 | V | TM E1725 | R AS HV L25 - High voltage level for FEE #25 |
| E6726 | E 980 | V | TM E1726 | R AS HV L26 - High voltage level for FEE #26 |



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|-------|-----------|---|----------|-------------|----------------------------------|
| E6727 | E 993.55 | V | TM E1727 | R AS HV L27 | - High voltage level for FEE #27 |
| E6728 | E 1183.25 | V | TM E1728 | R AS HV L28 | - High voltage level for FEE #28 |
| E6729 | E 1115.5 | V | TM E1729 | R AS HV L29 | - High voltage level for FEE #29 |
| E6730 | E 993.55 | V | TM E1730 | R AS HV L30 | - High voltage level for FEE #30 |
| E6731 | E 1183.25 | V | TM E1731 | R AS HV L31 | - High voltage level for FEE #31 |
| E6732 | E 1264.55 | V | TM E1732 | R AS HV L32 | - High voltage level for FEE #32 |
| E6733 | E 1074.85 | V | TM E1733 | R AS HV L33 | - High voltage level for FEE #33 |
| E6734 | E 1007.1 | V | TM E1734 | R AS HV L34 | - High voltage level for FEE #34 |
| E6735 | E 1115.5 | V | TM E1735 | R AS HV L35 | - High voltage level for FEE #35 |
| E6736 | E 993.55 | V | TM E1736 | R AS HV L36 | - High voltage level for FEE #36 |
| E6737 | E 1088.4 | V | TM E1737 | R AS HV L37 | - High voltage level for FEE #37 |
| E6738 | E 1156.15 | V | TM E1738 | R AS HV L38 | - High voltage level for FEE #38 |
| E6739 | E 1237.45 | V | TM E1739 | R AS HV L39 | - High voltage level for FEE #39 |
| E6740 | E 1047.75 | V | TM E1740 | R AS HV L40 | - High voltage level for FEE #40 |
| E6741 | E 1251 | V | TM E1741 | R AS HV L41 | - High voltage level for FEE #41 |
| E6742 | E 1156.15 | V | TM E1742 | R AS HV L42 | - High voltage level for FEE #42 |
| E6743 | E 1129.05 | V | TM E1743 | R AS HV L43 | - High voltage level for FEE #43 |
| E6744 | E 1115.5 | V | TM E1744 | R AS HV L44 | - High voltage level for FEE #44 |
| E6745 | E 1223.9 | V | TM E1745 | R AS HV L45 | - High voltage level for FEE #45 |
| E6746 | E 1223.9 | V | TM E1746 | R AS HV L46 | - High voltage level for FEE #46 |
| E6747 | E 1007.1 | V | TM E1747 | R AS HV L47 | - High voltage level for FEE #47 |
| E6748 | E 1156.15 | V | TM E1748 | R AS HV L48 | - High voltage level for FEE #48 |
| E6749 | E 993.55 | V | TM E1749 | R AS HV L49 | - High voltage level for FEE #49 |
| E6750 | E 1047.75 | V | TM E1750 | R AS HV L50 | - High voltage level for FEE #50 |
| E6751 | E 1074.85 | V | TM E1751 | R AS HV L51 | - High voltage level for FEE #51 |
| E6752 | E 993.55 | V | TM E1752 | R AS HV L52 | - High voltage level for FEE #52 |
| E6753 | E 1034.2 | V | TM E1753 | R AS HV L53 | - High voltage level for FEE #53 |
| E6754 | E 1047.75 | V | TM E1754 | R AS HV L54 | - High voltage level for FEE #54 |
| E6755 | E 1156.15 | V | TM E1755 | R AS HV L55 | - High voltage level for FEE #55 |
| E6756 | E 1129.05 | V | TM E1756 | R AS HV L56 | - High voltage level for FEE #56 |
| E6757 | E 1223.9 | V | TM E1757 | R AS HV L57 | - High voltage level for FEE #57 |
| E6758 | E 1223.9 | V | TM E1758 | R AS HV L58 | - High voltage level for FEE #58 |
| E6759 | E 1237.45 | V | TM E1759 | R AS HV L59 | - High voltage level for FEE #59 |
| E6760 | E 1020.6 | V | TM E1760 | R AS HV L60 | - High voltage level for FEE #60 |
| E6761 | E 1223.9 | V | TM E1761 | R AS HV L61 | - High voltage level for FEE #61 |
| E6762 | E 1061.3 | V | TM E1762 | R AS HV L62 | - High voltage level for FEE #62 |
| E6763 | E 1088.4 | V | TM E1763 | R AS HV L63 | - High voltage level for FEE #63 |
| E6764 | E 1088.4 | V | TM E1764 | R AS HV L64 | - High voltage level for FEE #64 |
| E6765 | E 1156.15 | V | TM E1765 | R AS HV L65 | - High voltage level for FEE #65 |
| E6766 | E 980 | V | TM E1766 | R AS HV L66 | - High voltage level for FEE #66 |
| E6767 | E 1101.95 | V | TM E1767 | R AS HV L67 | - High voltage level for FEE #67 |
| E6768 | E 1183.25 | V | TM E1768 | R AS HV L68 | - High voltage level for FEE #68 |
| E6769 | E 1034.2 | V | TM E1769 | R AS HV L69 | - High voltage level for FEE #69 |
| E6770 | E 1196.8 | V | TM E1770 | R AS HV L70 | - High voltage level for FEE #70 |
| E6771 | E 1156.15 | V | TM E1771 | R AS HV L71 | - High voltage level for FEE #71 |
| E6772 | E 1034.2 | V | TM E1772 | R AS HV L72 | - High voltage level for FEE #72 |



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|-------|-----------|---|---------------------------------------------------------------|
| E6773 | E 1129.05 | V | TM E1773 R AS HV L73 - High voltage level for FEE #73 |
| E6774 | E 1061.3 | V | TM E1774 R AS HV L74 - High voltage level for FEE #74 |
| E6775 | E 1088.4 | V | TM E1775 R AS HV L75 - High voltage level for FEE #75 |
| E6776 | E 1007.1 | V | TM E1776 R AS HV L76 - High voltage level for FEE #76 |
| E6777 | E 1020.65 | V | TM E1777 R AS HV L77 - High voltage level for FEE #77 |
| E6778 | E 1129.05 | V | TM E1778 R AS HV L78 - High voltage level for FEE #78 |
| E6779 | E 1047.75 | V | TM E1779 R AS HV L79 - High voltage level for FEE #79 |
| E6780 | E 1115.5 | V | TM E1780 R AS HV L80 - High voltage level for FEE #80 |
| E6781 | E 1129.05 | V | TM E1781 R AS HV L81 - High voltage level for FEE #81 |
| E6782 | E 1129.05 | V | TM E1782 R AS HV L82 - High voltage level for FEE #82 |
| E6783 | E 993.55 | V | TM E1783 R AS HV L83 - High voltage level for FEE #83 |
| E6784 | E 1115.5 | V | TM E1784 R AS HV L84 - High voltage level for FEE #84 |
| E6785 | E 993.55 | V | TM E1785 R AS HV L85 - High voltage level for FEE #85 |
| E6786 | E 1210.35 | V | TM E1786 R AS HV L86 - High voltage level for FEE #86 |
| E6787 | E 1047.75 | V | TM E1787 R AS HV L87 - High voltage level for FEE #87 |
| E6788 | E 1034.2 | V | TM E1788 R AS HV L88 - High voltage level for FEE #88 |
| E6789 | E 980 | V | TM E1789 R AS HV L89 - High voltage level for FEE #89 |
| E6790 | E 1237.45 | V | TM E1790 R AS HV L90 - High voltage level for FEE #90 |
| E6791 | E 1102 | V | TM E1791 R PS-HV-/1 - High voltage level of each FEE PSAC PS1 |
| E6792 | E 1102 | V | TM E1792 R PS-HV-/2 - High voltage level of each FEE PSAC PS2 |

2.2.4.31. ES1732_AS-SERVS_def-grnd_0001.TPF

ES1732 S
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2002-05-17T18:48:49Z - SPI1 ACS System Services

| | | |
|-------|----------------|----------------------------------------------------------------------|
| E5500 | E OFF | TM E0500 R AS HV-OO L0 - FEE switch High Voltage ON/OFF |
| E6000 | E NOTEST PULSE | TM E1000 R AS VTO-TST L0 - FEE veto test signal configuration |
| E5600 | E ENABLE | TM E0600 R AS WDOG-ED L0 - FEE watchdog configuration Enable/Disable |
| E5700 | E ENABLE | TM E0700 R AS RESP-ED L0 - FEE response condition enable/disable |
| E5501 | E OFF | TM E0501 R AS HV-OO L1 - FEE switch High Voltage ON/OFF |
| E6001 | E NOTEST PULSE | TM E1001 R AS VTO-TST L1 - FEE veto test signal configuration |
| E5601 | E ENABLE | TM E0601 R AS WDOG-ED L1 - FEE watchdog configuration Enable/Disable |
| E5701 | E ENABLE | TM E0701 R AS RESP-ED L1 - FEE response condition enable/disable |
| E5502 | E OFF | TM E0502 R AS HV-OO L2 - FEE switch High Voltage ON/OFF |
| E6002 | E NOTEST PULSE | TM E1002 R AS VTO-TST L2 - FEE veto test signal configuration |
| E5602 | E ENABLE | TM E0602 R AS WDOG-ED L2 - FEE watchdog configuration Enable/Disable |
| E5702 | E ENABLE | TM E0702 R AS RESP-ED L2 - FEE response condition enable/disable |
| E5503 | E OFF | TM E0503 R AS HV-OO L3 - FEE switch High Voltage ON/OFF |
| E6003 | E NOTEST PULSE | TM E1003 R AS VTO-TST L3 - FEE veto test signal configuration |
| E5603 | E ENABLE | TM E0603 R AS WDOG-ED L3 - FEE watchdog configuration Enable/Disable |
| E5703 | E ENABLE | TM E0703 R AS RESP-ED L3 - FEE response condition enable/disable |
| E5504 | E OFF | TM E0504 R AS HV-OO L4 - FEE switch High Voltage ON/OFF |



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|-------|---|--------|-------|----|-------|---|----|---------|-----|---|-----|----------|---------------|----------------|---------------|
| E6004 | E | NOTEST | PULSE | TM | E1004 | R | AS | VTO-TST | L4 | - | FEE | veto | test | signal | configuration |
| E5604 | E | ENABLE | | TM | E0604 | R | AS | WDOG-ED | L4 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5704 | E | ENABLE | | TM | E0704 | R | AS | RESP-ED | L4 | - | FEE | response | condition | enable/disable | |
| E5505 | E | OFF | | TM | E0505 | R | AS | HV-OO | L5 | - | FEE | switch | High | Voltage | ON/OFF |
| E6005 | E | NOTEST | PULSE | TM | E1005 | R | AS | VTO-TST | L5 | - | FEE | veto | test | signal | configuration |
| E5605 | E | ENABLE | | TM | E0605 | R | AS | WDOG-ED | L5 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5705 | E | ENABLE | | TM | E0705 | R | AS | RESP-ED | L5 | - | FEE | response | condition | enable/disable | |
| E5506 | E | OFF | | TM | E0506 | R | AS | HV-OO | L6 | - | FEE | switch | High | Voltage | ON/OFF |
| E6006 | E | NOTEST | PULSE | TM | E1006 | R | AS | VTO-TST | L6 | - | FEE | veto | test | signal | configuration |
| E5606 | E | ENABLE | | TM | E0606 | R | AS | WDOG-ED | L6 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5706 | E | ENABLE | | TM | E0706 | R | AS | RESP-ED | L6 | - | FEE | response | condition | enable/disable | |
| E5507 | E | OFF | | TM | E0507 | R | AS | HV-OO | L7 | - | FEE | switch | High | Voltage | ON/OFF |
| E6007 | E | NOTEST | PULSE | TM | E1007 | R | AS | VTO-TST | L7 | - | FEE | veto | test | signal | configuration |
| E5607 | E | ENABLE | | TM | E0607 | R | AS | WDOG-ED | L7 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5707 | E | ENABLE | | TM | E0707 | R | AS | RESP-ED | L7 | - | FEE | response | condition | enable/disable | |
| E5508 | E | OFF | | TM | E0508 | R | AS | HV-OO | L8 | - | FEE | switch | High | Voltage | ON/OFF |
| E6008 | E | NOTEST | PULSE | TM | E1008 | R | AS | VTO-TST | L8 | - | FEE | veto | test | signal | configuration |
| E5608 | E | ENABLE | | TM | E0608 | R | AS | WDOG-ED | L8 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5708 | E | ENABLE | | TM | E0708 | R | AS | RESP-ED | L8 | - | FEE | response | condition | enable/disable | |
| E5509 | E | OFF | | TM | E0509 | R | AS | HV-OO | L9 | - | FEE | switch | High | Voltage | ON/OFF |
| E6009 | E | NOTEST | PULSE | TM | E1009 | R | AS | VTO-TST | L9 | - | FEE | veto | test | signal | configuration |
| E5609 | E | ENABLE | | TM | E0609 | R | AS | WDOG-ED | L9 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5709 | E | ENABLE | | TM | E0709 | R | AS | RESP-ED | L9 | - | FEE | response | condition | enable/disable | |
| E5510 | E | OFF | | TM | E0510 | R | AS | HV-OO | L10 | - | FEE | switch | High | Voltage | ON/OFF |
| E6010 | E | NOTEST | PULSE | TM | E1010 | R | AS | VTO-TST | L10 | - | FEE | veto | test | signal | configuration |
| E5610 | E | ENABLE | | TM | E0610 | R | AS | WDOG-ED | L10 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5710 | E | ENABLE | | TM | E0710 | R | AS | RESP-ED | L10 | - | FEE | response | condition | enable/disable | |
| E5511 | E | OFF | | TM | E0511 | R | AS | HV-OO | L11 | - | FEE | switch | High | Voltage | ON/OFF |
| E6011 | E | NOTEST | PULSE | TM | E1011 | R | AS | VTO-TST | L11 | - | FEE | veto | test | signal | configuration |
| E5611 | E | ENABLE | | TM | E0611 | R | AS | WDOG-ED | L11 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5711 | E | ENABLE | | TM | E0711 | R | AS | RESP-ED | L11 | - | FEE | response | condition | enable/disable | |
| E5512 | E | OFF | | TM | E0512 | R | AS | HV-OO | L12 | - | FEE | switch | High | Voltage | ON/OFF |
| E6012 | E | NOTEST | PULSE | TM | E1012 | R | AS | VTO-TST | L12 | - | FEE | veto | test | signal | configuration |
| E5612 | E | ENABLE | | TM | E0612 | R | AS | WDOG-ED | L12 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5712 | E | ENABLE | | TM | E0712 | R | AS | RESP-ED | L12 | - | FEE | response | condition | enable/disable | |
| E5513 | E | OFF | | TM | E0513 | R | AS | HV-OO | L13 | - | FEE | switch | High | Voltage | ON/OFF |
| E6013 | E | NOTEST | PULSE | TM | E1013 | R | AS | VTO-TST | L13 | - | FEE | veto | test | signal | configuration |
| E5613 | E | ENABLE | | TM | E0613 | R | AS | WDOG-ED | L13 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5713 | E | ENABLE | | TM | E0713 | R | AS | RESP-ED | L13 | - | FEE | response | condition | enable/disable | |
| E5514 | E | OFF | | TM | E0514 | R | AS | HV-OO | L14 | - | FEE | switch | High | Voltage | ON/OFF |
| E6014 | E | NOTEST | PULSE | TM | E1014 | R | AS | VTO-TST | L14 | - | FEE | veto | test | signal | configuration |
| E5614 | E | ENABLE | | TM | E0614 | R | AS | WDOG-ED | L14 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5714 | E | ENABLE | | TM | E0714 | R | AS | RESP-ED | L14 | - | FEE | response | condition | enable/disable | |
| E5515 | E | OFF | | TM | E0515 | R | AS | HV-OO | L15 | - | FEE | switch | High | Voltage | ON/OFF |
| E6015 | E | NOTEST | PULSE | TM | E1015 | R | AS | VTO-TST | L15 | - | FEE | veto | test | signal | configuration |
| E5615 | E | ENABLE | | TM | E0615 | R | AS | WDOG-ED | L15 | - | FEE | watchdog | configuration | Enable/Disable | |



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| E5715 | E | ENABLE | TM | E0715 | R | AS | RESP-ED | L15 | - FEE response condition enable/disable |
| E5516 | E | OFF | TM | E0516 | R | AS | HV-OO | L16 | - FEE switch High Voltage ON/OFF |
| E6016 | E | NOTEST PULSE | TM | E1016 | R | AS | VTO-TST | L16 | - FEE veto test signal configuration |
| E5616 | E | ENABLE | TM | E0616 | R | AS | WDOG-ED | L16 | - FEE watchdog configuration Enable/Disable |
| E5716 | E | ENABLE | TM | E0716 | R | AS | RESP-ED | L16 | - FEE response condition enable/disable |
| E5517 | E | OFF | TM | E0517 | R | AS | HV-OO | L17 | - FEE switch High Voltage ON/OFF |
| E6017 | E | NOTEST PULSE | TM | E1017 | R | AS | VTO-TST | L17 | - FEE veto test signal configuration |
| E5617 | E | ENABLE | TM | E0617 | R | AS | WDOG-ED | L17 | - FEE watchdog configuration Enable/Disable |
| E5717 | E | ENABLE | TM | E0717 | R | AS | RESP-ED | L17 | - FEE response condition enable/disable |
| E5518 | E | OFF | TM | E0518 | R | AS | HV-OO | L18 | - FEE switch High Voltage ON/OFF |
| E6018 | E | NOTEST PULSE | TM | E1018 | R | AS | VTO-TST | L18 | - FEE veto test signal configuration |
| E5618 | E | ENABLE | TM | E0618 | R | AS | WDOG-ED | L18 | - FEE watchdog configuration Enable/Disable |
| E5718 | E | ENABLE | TM | E0718 | R | AS | RESP-ED | L18 | - FEE response condition enable/disable |
| E5519 | E | OFF | TM | E0519 | R | AS | HV-OO | L19 | - FEE switch High Voltage ON/OFF |
| E6019 | E | NOTEST PULSE | TM | E1019 | R | AS | VTO-TST | L19 | - FEE veto test signal configuration |
| E5619 | E | ENABLE | TM | E0619 | R | AS | WDOG-ED | L19 | - FEE watchdog configuration Enable/Disable |
| E5719 | E | ENABLE | TM | E0719 | R | AS | RESP-ED | L19 | - FEE response condition enable/disable |
| E5520 | E | OFF | TM | E0520 | R | AS | HV-OO | L20 | - FEE switch High Voltage ON/OFF |
| E6020 | E | NOTEST PULSE | TM | E1020 | R | AS | VTO-TST | L20 | - FEE veto test signal configuration |
| E5620 | E | ENABLE | TM | E0620 | R | AS | WDOG-ED | L20 | - FEE watchdog configuration Enable/Disable |
| E5720 | E | ENABLE | TM | E0720 | R | AS | RESP-ED | L20 | - FEE response condition enable/disable |
| E5521 | E | OFF | TM | E0521 | R | AS | HV-OO | L21 | - FEE switch High Voltage ON/OFF |
| E6021 | E | NOTEST PULSE | TM | E1021 | R | AS | VTO-TST | L21 | - FEE veto test signal configuration |
| E5621 | E | ENABLE | TM | E0621 | R | AS | WDOG-ED | L21 | - FEE watchdog configuration Enable/Disable |
| E5721 | E | ENABLE | TM | E0721 | R | AS | RESP-ED | L21 | - FEE response condition enable/disable |
| E5522 | E | OFF | TM | E0522 | R | AS | HV-OO | L22 | - FEE switch High Voltage ON/OFF |
| E6022 | E | NOTEST PULSE | TM | E1022 | R | AS | VTO-TST | L22 | - FEE veto test signal configuration |
| E5622 | E | ENABLE | TM | E0622 | R | AS | WDOG-ED | L22 | - FEE watchdog configuration Enable/Disable |
| E5722 | E | ENABLE | TM | E0722 | R | AS | RESP-ED | L22 | - FEE response condition enable/disable |
| E5523 | E | OFF | TM | E0523 | R | AS | HV-OO | L23 | - FEE switch High Voltage ON/OFF |
| E6023 | E | NOTEST PULSE | TM | E1023 | R | AS | VTO-TST | L23 | - FEE veto test signal configuration |
| E5623 | E | ENABLE | TM | E0623 | R | AS | WDOG-ED | L23 | - FEE watchdog configuration Enable/Disable |
| E5723 | E | ENABLE | TM | E0723 | R | AS | RESP-ED | L23 | - FEE response condition enable/disable |
| E5524 | E | OFF | TM | E0524 | R | AS | HV-OO | L24 | - FEE switch High Voltage ON/OFF |
| E6024 | E | NOTEST PULSE | TM | E1024 | R | AS | VTO-TST | L24 | - FEE veto test signal configuration |
| E5624 | E | ENABLE | TM | E0624 | R | AS | WDOG-ED | L24 | - FEE watchdog configuration Enable/Disable |
| E5724 | E | ENABLE | TM | E0724 | R | AS | RESP-ED | L24 | - FEE response condition enable/disable |
| E5525 | E | OFF | TM | E0525 | R | AS | HV-OO | L25 | - FEE switch High Voltage ON/OFF |
| E6025 | E | NOTEST PULSE | TM | E1025 | R | AS | VTO-TST | L25 | - FEE veto test signal configuration |
| E5625 | E | ENABLE | TM | E0625 | R | AS | WDOG-ED | L25 | - FEE watchdog configuration Enable/Disable |
| E5725 | E | ENABLE | TM | E0725 | R | AS | RESP-ED | L25 | - FEE response condition enable/disable |
| E5526 | E | OFF | TM | E0526 | R | AS | HV-OO | L26 | - FEE switch High Voltage ON/OFF |
| E6026 | E | NOTEST PULSE | TM | E1026 | R | AS | VTO-TST | L26 | - FEE veto test signal configuration |
| E5626 | E | ENABLE | TM | E0626 | R | AS | WDOG-ED | L26 | - FEE watchdog configuration Enable/Disable |
| E5726 | E | ENABLE | TM | E0726 | R | AS | RESP-ED | L26 | - FEE response condition enable/disable |
| E5527 | E | OFF | TM | E0527 | R | AS | HV-OO | L27 | - FEE switch High Voltage ON/OFF |



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| E6027 | E | NOTEST | PULSE | TM | E1027 | R | AS | VTO-TST | L27 | - | FEE | veto | test | signal | configuration |
| E5627 | E | ENABLE | | TM | E0627 | R | AS | WDOG-ED | L27 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5727 | E | ENABLE | | TM | E0727 | R | AS | RESP-ED | L27 | - | FEE | response | condition | enable/disable | |
| E5528 | E | OFF | | TM | E0528 | R | AS | HV-OO | L28 | - | FEE | switch | High | Voltage | ON/OFF |
| E6028 | E | NOTEST | PULSE | TM | E1028 | R | AS | VTO-TST | L28 | - | FEE | veto | test | signal | configuration |
| E5628 | E | ENABLE | | TM | E0628 | R | AS | WDOG-ED | L28 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5728 | E | ENABLE | | TM | E0728 | R | AS | RESP-ED | L28 | - | FEE | response | condition | enable/disable | |
| E5529 | E | OFF | | TM | E0529 | R | AS | HV-OO | L29 | - | FEE | switch | High | Voltage | ON/OFF |
| E6029 | E | NOTEST | PULSE | TM | E1029 | R | AS | VTO-TST | L29 | - | FEE | veto | test | signal | configuration |
| E5629 | E | ENABLE | | TM | E0629 | R | AS | WDOG-ED | L29 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5729 | E | ENABLE | | TM | E0729 | R | AS | RESP-ED | L29 | - | FEE | response | condition | enable/disable | |
| E5530 | E | OFF | | TM | E0530 | R | AS | HV-OO | L30 | - | FEE | switch | High | Voltage | ON/OFF |
| E6030 | E | NOTEST | PULSE | TM | E1030 | R | AS | VTO-TST | L30 | - | FEE | veto | test | signal | configuration |
| E5630 | E | ENABLE | | TM | E0630 | R | AS | WDOG-ED | L30 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5730 | E | ENABLE | | TM | E0730 | R | AS | RESP-ED | L30 | - | FEE | response | condition | enable/disable | |
| E5531 | E | OFF | | TM | E0531 | R | AS | HV-OO | L31 | - | FEE | switch | High | Voltage | ON/OFF |
| E6031 | E | NOTEST | PULSE | TM | E1031 | R | AS | VTO-TST | L31 | - | FEE | veto | test | signal | configuration |
| E5631 | E | ENABLE | | TM | E0631 | R | AS | WDOG-ED | L31 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5731 | E | ENABLE | | TM | E0731 | R | AS | RESP-ED | L31 | - | FEE | response | condition | enable/disable | |
| E5532 | E | OFF | | TM | E0532 | R | AS | HV-OO | L32 | - | FEE | switch | High | Voltage | ON/OFF |
| E6032 | E | NOTEST | PULSE | TM | E1032 | R | AS | VTO-TST | L32 | - | FEE | veto | test | signal | configuration |
| E5632 | E | ENABLE | | TM | E0632 | R | AS | WDOG-ED | L32 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5732 | E | ENABLE | | TM | E0732 | R | AS | RESP-ED | L32 | - | FEE | response | condition | enable/disable | |
| E5533 | E | OFF | | TM | E0533 | R | AS | HV-OO | L33 | - | FEE | switch | High | Voltage | ON/OFF |
| E6033 | E | NOTEST | PULSE | TM | E1033 | R | AS | VTO-TST | L33 | - | FEE | veto | test | signal | configuration |
| E5633 | E | ENABLE | | TM | E0633 | R | AS | WDOG-ED | L33 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5733 | E | ENABLE | | TM | E0733 | R | AS | RESP-ED | L33 | - | FEE | response | condition | enable/disable | |
| E5534 | E | OFF | | TM | E0534 | R | AS | HV-OO | L34 | - | FEE | switch | High | Voltage | ON/OFF |
| E6034 | E | NOTEST | PULSE | TM | E1034 | R | AS | VTO-TST | L34 | - | FEE | veto | test | signal | configuration |
| E5634 | E | ENABLE | | TM | E0634 | R | AS | WDOG-ED | L34 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5734 | E | ENABLE | | TM | E0734 | R | AS | RESP-ED | L34 | - | FEE | response | condition | enable/disable | |
| E5535 | E | OFF | | TM | E0535 | R | AS | HV-OO | L35 | - | FEE | switch | High | Voltage | ON/OFF |
| E6035 | E | NOTEST | PULSE | TM | E1035 | R | AS | VTO-TST | L35 | - | FEE | veto | test | signal | configuration |
| E5635 | E | ENABLE | | TM | E0635 | R | AS | WDOG-ED | L35 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5735 | E | ENABLE | | TM | E0735 | R | AS | RESP-ED | L35 | - | FEE | response | condition | enable/disable | |
| E5536 | E | OFF | | TM | E0536 | R | AS | HV-OO | L36 | - | FEE | switch | High | Voltage | ON/OFF |
| E6036 | E | NOTEST | PULSE | TM | E1036 | R | AS | VTO-TST | L36 | - | FEE | veto | test | signal | configuration |
| E5636 | E | ENABLE | | TM | E0636 | R | AS | WDOG-ED | L36 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5736 | E | ENABLE | | TM | E0736 | R | AS | RESP-ED | L36 | - | FEE | response | condition | enable/disable | |
| E5537 | E | OFF | | TM | E0537 | R | AS | HV-OO | L37 | - | FEE | switch | High | Voltage | ON/OFF |
| E6037 | E | NOTEST | PULSE | TM | E1037 | R | AS | VTO-TST | L37 | - | FEE | veto | test | signal | configuration |
| E5637 | E | ENABLE | | TM | E0637 | R | AS | WDOG-ED | L37 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5737 | E | ENABLE | | TM | E0737 | R | AS | RESP-ED | L37 | - | FEE | response | condition | enable/disable | |
| E5538 | E | OFF | | TM | E0538 | R | AS | HV-OO | L38 | - | FEE | switch | High | Voltage | ON/OFF |
| E6038 | E | NOTEST | PULSE | TM | E1038 | R | AS | VTO-TST | L38 | - | FEE | veto | test | signal | configuration |
| E5638 | E | ENABLE | | TM | E0638 | R | AS | WDOG-ED | L38 | - | FEE | watchdog | configuration | Enable/Disable | |



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| E5738 | E | ENABLE | TM | E0738 | R | AS | RESP-ED | L38 | - FEE response condition enable/disable |
| E5539 | E | OFF | TM | E0539 | R | AS | HV-OO | L39 | - FEE switch High Voltage ON/OFF |
| E6039 | E | NOTEST PULSE | TM | E1039 | R | AS | VTO-TST | L39 | - FEE veto test signal configuration |
| E5639 | E | ENABLE | TM | E0639 | R | AS | WDOG-ED | L39 | - FEE watchdog configuration Enable/Disable |
| E5739 | E | ENABLE | TM | E0739 | R | AS | RESP-ED | L39 | - FEE response condition enable/disable |
| E5540 | E | OFF | TM | E0540 | R | AS | HV-OO | L40 | - FEE switch High Voltage ON/OFF |
| E6040 | E | NOTEST PULSE | TM | E1040 | R | AS | VTO-TST | L40 | - FEE veto test signal configuration |
| E5640 | E | ENABLE | TM | E0640 | R | AS | WDOG-ED | L40 | - FEE watchdog configuration Enable/Disable |
| E5740 | E | ENABLE | TM | E0740 | R | AS | RESP-ED | L40 | - FEE response condition enable/disable |
| E5541 | E | OFF | TM | E0541 | R | AS | HV-OO | L41 | - FEE switch High Voltage ON/OFF |
| E6041 | E | NOTEST PULSE | TM | E1041 | R | AS | VTO-TST | L41 | - FEE veto test signal configuration |
| E5641 | E | ENABLE | TM | E0641 | R | AS | WDOG-ED | L41 | - FEE watchdog configuration Enable/Disable |
| E5741 | E | ENABLE | TM | E0741 | R | AS | RESP-ED | L41 | - FEE response condition enable/disable |
| E5542 | E | OFF | TM | E0542 | R | AS | HV-OO | L42 | - FEE switch High Voltage ON/OFF |
| E6042 | E | NOTEST PULSE | TM | E1042 | R | AS | VTO-TST | L42 | - FEE veto test signal configuration |
| E5642 | E | ENABLE | TM | E0642 | R | AS | WDOG-ED | L42 | - FEE watchdog configuration Enable/Disable |
| E5742 | E | ENABLE | TM | E0742 | R | AS | RESP-ED | L42 | - FEE response condition enable/disable |
| E5543 | E | OFF | TM | E0543 | R | AS | HV-OO | L43 | - FEE switch High Voltage ON/OFF |
| E6043 | E | NOTEST PULSE | TM | E1043 | R | AS | VTO-TST | L43 | - FEE veto test signal configuration |
| E5643 | E | ENABLE | TM | E0643 | R | AS | WDOG-ED | L43 | - FEE watchdog configuration Enable/Disable |
| E5743 | E | ENABLE | TM | E0743 | R | AS | RESP-ED | L43 | - FEE response condition enable/disable |
| E5544 | E | OFF | TM | E0544 | R | AS | HV-OO | L44 | - FEE switch High Voltage ON/OFF |
| E6044 | E | NOTEST PULSE | TM | E1044 | R | AS | VTO-TST | L44 | - FEE veto test signal configuration |
| E5644 | E | ENABLE | TM | E0644 | R | AS | WDOG-ED | L44 | - FEE watchdog configuration Enable/Disable |
| E5744 | E | ENABLE | TM | E0744 | R | AS | RESP-ED | L44 | - FEE response condition enable/disable |
| E5545 | E | OFF | TM | E0545 | R | AS | HV-OO | L45 | - FEE switch High Voltage ON/OFF |
| E6045 | E | NOTEST PULSE | TM | E1045 | R | AS | VTO-TST | L45 | - FEE veto test signal configuration |
| E5645 | E | ENABLE | TM | E0645 | R | AS | WDOG-ED | L45 | - FEE watchdog configuration Enable/Disable |
| E5745 | E | ENABLE | TM | E0745 | R | AS | RESP-ED | L45 | - FEE response condition enable/disable |
| E5546 | E | OFF | TM | E0546 | R | AS | HV-OO | L46 | - FEE switch High Voltage ON/OFF |
| E6046 | E | NOTEST PULSE | TM | E1046 | R | AS | VTO-TST | L46 | - FEE veto test signal configuration |
| E5646 | E | ENABLE | TM | E0646 | R | AS | WDOG-ED | L46 | - FEE watchdog configuration Enable/Disable |
| E5746 | E | ENABLE | TM | E0746 | R | AS | RESP-ED | L46 | - FEE response condition enable/disable |
| E5547 | E | OFF | TM | E0547 | R | AS | HV-OO | L47 | - FEE switch High Voltage ON/OFF |
| E6047 | E | NOTEST PULSE | TM | E1047 | R | AS | VTO-TST | L47 | - FEE veto test signal configuration |
| E5647 | E | ENABLE | TM | E0647 | R | AS | WDOG-ED | L47 | - FEE watchdog configuration Enable/Disable |
| E5747 | E | ENABLE | TM | E0747 | R | AS | RESP-ED | L47 | - FEE response condition enable/disable |
| E5548 | E | OFF | TM | E0548 | R | AS | HV-OO | L48 | - FEE switch High Voltage ON/OFF |
| E6048 | E | NOTEST PULSE | TM | E1048 | R | AS | VTO-TST | L48 | - FEE veto test signal configuration |
| E5648 | E | ENABLE | TM | E0648 | R | AS | WDOG-ED | L48 | - FEE watchdog configuration Enable/Disable |
| E5748 | E | ENABLE | TM | E0748 | R | AS | RESP-ED | L48 | - FEE response condition enable/disable |
| E5549 | E | OFF | TM | E0549 | R | AS | HV-OO | L49 | - FEE switch High Voltage ON/OFF |
| E6049 | E | NOTEST PULSE | TM | E1049 | R | AS | VTO-TST | L49 | - FEE veto test signal configuration |
| E5649 | E | ENABLE | TM | E0649 | R | AS | WDOG-ED | L49 | - FEE watchdog configuration Enable/Disable |
| E5749 | E | ENABLE | TM | E0749 | R | AS | RESP-ED | L49 | - FEE response condition enable/disable |
| E5550 | E | OFF | TM | E0550 | R | AS | HV-OO | L50 | - FEE switch High Voltage ON/OFF |



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| E6050 | E | NOTEST | PULSE | TM | E1050 | R | AS | VTO-TST | L50 | - | FEE | veto | test | signal | configuration |
| E5650 | E | ENABLE | | TM | E0650 | R | AS | WDOG-ED | L50 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5750 | E | ENABLE | | TM | E0750 | R | AS | RESP-ED | L50 | - | FEE | response | condition | enable/disable | |
| E5551 | E | OFF | | TM | E0551 | R | AS | HV-OO | L51 | - | FEE | switch | High | Voltage | ON/OFF |
| E6051 | E | NOTEST | PULSE | TM | E1051 | R | AS | VTO-TST | L51 | - | FEE | veto | test | signal | configuration |
| E5651 | E | ENABLE | | TM | E0651 | R | AS | WDOG-ED | L51 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5751 | E | ENABLE | | TM | E0751 | R | AS | RESP-ED | L51 | - | FEE | response | condition | enable/disable | |
| E5552 | E | OFF | | TM | E0552 | R | AS | HV-OO | L52 | - | FEE | switch | High | Voltage | ON/OFF |
| E6052 | E | NOTEST | PULSE | TM | E1052 | R | AS | VTO-TST | L52 | - | FEE | veto | test | signal | configuration |
| E5652 | E | ENABLE | | TM | E0652 | R | AS | WDOG-ED | L52 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5752 | E | ENABLE | | TM | E0752 | R | AS | RESP-ED | L52 | - | FEE | response | condition | enable/disable | |
| E5553 | E | OFF | | TM | E0553 | R | AS | HV-OO | L53 | - | FEE | switch | High | Voltage | ON/OFF |
| E6053 | E | NOTEST | PULSE | TM | E1053 | R | AS | VTO-TST | L53 | - | FEE | veto | test | signal | configuration |
| E5653 | E | ENABLE | | TM | E0653 | R | AS | WDOG-ED | L53 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5753 | E | ENABLE | | TM | E0753 | R | AS | RESP-ED | L53 | - | FEE | response | condition | enable/disable | |
| E5554 | E | OFF | | TM | E0554 | R | AS | HV-OO | L54 | - | FEE | switch | High | Voltage | ON/OFF |
| E6054 | E | NOTEST | PULSE | TM | E1054 | R | AS | VTO-TST | L54 | - | FEE | veto | test | signal | configuration |
| E5654 | E | ENABLE | | TM | E0654 | R | AS | WDOG-ED | L54 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5754 | E | ENABLE | | TM | E0754 | R | AS | RESP-ED | L54 | - | FEE | response | condition | enable/disable | |
| E5555 | E | OFF | | TM | E0555 | R | AS | HV-OO | L55 | - | FEE | switch | High | Voltage | ON/OFF |
| E6055 | E | NOTEST | PULSE | TM | E1055 | R | AS | VTO-TST | L55 | - | FEE | veto | test | signal | configuration |
| E5655 | E | ENABLE | | TM | E0655 | R | AS | WDOG-ED | L55 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5755 | E | ENABLE | | TM | E0755 | R | AS | RESP-ED | L55 | - | FEE | response | condition | enable/disable | |
| E5556 | E | OFF | | TM | E0556 | R | AS | HV-OO | L56 | - | FEE | switch | High | Voltage | ON/OFF |
| E6056 | E | NOTEST | PULSE | TM | E1056 | R | AS | VTO-TST | L56 | - | FEE | veto | test | signal | configuration |
| E5656 | E | ENABLE | | TM | E0656 | R | AS | WDOG-ED | L56 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5756 | E | ENABLE | | TM | E0756 | R | AS | RESP-ED | L56 | - | FEE | response | condition | enable/disable | |
| E5557 | E | OFF | | TM | E0557 | R | AS | HV-OO | L57 | - | FEE | switch | High | Voltage | ON/OFF |
| E6057 | E | NOTEST | PULSE | TM | E1057 | R | AS | VTO-TST | L57 | - | FEE | veto | test | signal | configuration |
| E5657 | E | ENABLE | | TM | E0657 | R | AS | WDOG-ED | L57 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5757 | E | ENABLE | | TM | E0757 | R | AS | RESP-ED | L57 | - | FEE | response | condition | enable/disable | |
| E5558 | E | OFF | | TM | E0558 | R | AS | HV-OO | L58 | - | FEE | switch | High | Voltage | ON/OFF |
| E6058 | E | NOTEST | PULSE | TM | E1058 | R | AS | VTO-TST | L58 | - | FEE | veto | test | signal | configuration |
| E5658 | E | ENABLE | | TM | E0658 | R | AS | WDOG-ED | L58 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5758 | E | ENABLE | | TM | E0758 | R | AS | RESP-ED | L58 | - | FEE | response | condition | enable/disable | |
| E5559 | E | OFF | | TM | E0559 | R | AS | HV-OO | L59 | - | FEE | switch | High | Voltage | ON/OFF |
| E6059 | E | NOTEST | PULSE | TM | E1059 | R | AS | VTO-TST | L59 | - | FEE | veto | test | signal | configuration |
| E5659 | E | ENABLE | | TM | E0659 | R | AS | WDOG-ED | L59 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5759 | E | ENABLE | | TM | E0759 | R | AS | RESP-ED | L59 | - | FEE | response | condition | enable/disable | |
| E5560 | E | OFF | | TM | E0560 | R | AS | HV-OO | L60 | - | FEE | switch | High | Voltage | ON/OFF |
| E6060 | E | NOTEST | PULSE | TM | E1060 | R | AS | VTO-TST | L60 | - | FEE | veto | test | signal | configuration |
| E5660 | E | ENABLE | | TM | E0660 | R | AS | WDOG-ED | L60 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5760 | E | ENABLE | | TM | E0760 | R | AS | RESP-ED | L60 | - | FEE | response | condition | enable/disable | |
| E6061 | E | NOTEST | PULSE | TM | E1061 | R | AS | VTO-TST | L61 | - | FEE | veto | test | signal | configuration |
| E5661 | E | ENABLE | | TM | E0661 | R | AS | WDOG-ED | L61 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5561 | E | OFF | | TM | E0561 | R | AS | HV-OO | L61 | - | FEE | switch | High | Voltage | ON/OFF |



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| E5761 | E | ENABLE | TM | E0761 | R | AS | RESP-ED | L61 | - FEE response condition enable/disable |
| E5562 | E | OFF | TM | E0562 | R | AS | HV-OO | L62 | - FEE switch High Voltage ON/OFF |
| E6062 | E | NOTEST PULSE | TM | E1062 | R | AS | VTO-TST | L62 | - FEE veto test signal configuration |
| E5662 | E | ENABLE | TM | E0662 | R | AS | WDOG-ED | L62 | - FEE watchdog configuration Enable/Disable |
| E5762 | E | ENABLE | TM | E0762 | R | AS | RESP-ED | L62 | - FEE response condition enable/disable |
| E5563 | E | OFF | TM | E0563 | R | AS | HV-OO | L63 | - FEE switch High Voltage ON/OFF |
| E6063 | E | NOTEST PULSE | TM | E1063 | R | AS | VTO-TST | L63 | - FEE veto test signal configuration |
| E5663 | E | ENABLE | TM | E0663 | R | AS | WDOG-ED | L63 | - FEE watchdog configuration Enable/Disable |
| E5763 | E | ENABLE | TM | E0763 | R | AS | RESP-ED | L63 | - FEE response condition enable/disable |
| E5564 | E | OFF | TM | E0564 | R | AS | HV-OO | L64 | - FEE switch High Voltage ON/OFF |
| E6064 | E | NOTEST PULSE | TM | E1064 | R | AS | VTO-TST | L64 | - FEE veto test signal configuration |
| E5664 | E | ENABLE | TM | E0664 | R | AS | WDOG-ED | L64 | - FEE watchdog configuration Enable/Disable |
| E5764 | E | ENABLE | TM | E0764 | R | AS | RESP-ED | L64 | - FEE response condition enable/disable |
| E5565 | E | OFF | TM | E0565 | R | AS | HV-OO | L65 | - FEE switch High Voltage ON/OFF |
| E6065 | E | NOTEST PULSE | TM | E1065 | R | AS | VTO-TST | L65 | - FEE veto test signal configuration |
| E5665 | E | ENABLE | TM | E0665 | R | AS | WDOG-ED | L65 | - FEE watchdog configuration Enable/Disable |
| E5765 | E | ENABLE | TM | E0765 | R | AS | RESP-ED | L65 | - FEE response condition enable/disable |
| E5566 | E | OFF | TM | E0566 | R | AS | HV-OO | L66 | - FEE switch High Voltage ON/OFF |
| E6066 | E | NOTEST PULSE | TM | E1066 | R | AS | VTO-TST | L66 | - FEE veto test signal configuration |
| E5666 | E | ENABLE | TM | E0666 | R | AS | WDOG-ED | L66 | - FEE watchdog configuration Enable/Disable |
| E5766 | E | ENABLE | TM | E0766 | R | AS | RESP-ED | L66 | - FEE response condition enable/disable |
| E5567 | E | OFF | TM | E0567 | R | AS | HV-OO | L67 | - FEE switch High Voltage ON/OFF |
| E6067 | E | NOTEST PULSE | TM | E1067 | R | AS | VTO-TST | L67 | - FEE veto test signal configuration |
| E5667 | E | ENABLE | TM | E0667 | R | AS | WDOG-ED | L67 | - FEE watchdog configuration Enable/Disable |
| E5767 | E | ENABLE | TM | E0767 | R | AS | RESP-ED | L67 | - FEE response condition enable/disable |
| E5568 | E | OFF | TM | E0568 | R | AS | HV-OO | L68 | - FEE switch High Voltage ON/OFF |
| E6068 | E | NOTEST PULSE | TM | E1068 | R | AS | VTO-TST | L68 | - FEE veto test signal configuration |
| E5668 | E | ENABLE | TM | E0668 | R | AS | WDOG-ED | L68 | - FEE watchdog configuration Enable/Disable |
| E5768 | E | ENABLE | TM | E0768 | R | AS | RESP-ED | L68 | - FEE response condition enable/disable |
| E5569 | E | OFF | TM | E0569 | R | AS | HV-OO | L69 | - FEE switch High Voltage ON/OFF |
| E6069 | E | NOTEST PULSE | TM | E1069 | R | AS | VTO-TST | L69 | - FEE veto test signal configuration |
| E5669 | E | ENABLE | TM | E0669 | R | AS | WDOG-ED | L69 | - FEE watchdog configuration Enable/Disable |
| E5769 | E | ENABLE | TM | E0769 | R | AS | RESP-ED | L69 | - FEE response condition enable/disable |
| E5570 | E | OFF | TM | E0570 | R | AS | HV-OO | L70 | - FEE switch High Voltage ON/OFF |
| E6070 | E | NOTEST PULSE | TM | E1070 | R | AS | VTO-TST | L70 | - FEE veto test signal configuration |
| E5670 | E | ENABLE | TM | E0670 | R | AS | WDOG-ED | L70 | - FEE watchdog configuration Enable/Disable |
| E5770 | E | ENABLE | TM | E0770 | R | AS | RESP-ED | L70 | - FEE response condition enable/disable |
| E5571 | E | OFF | TM | E0571 | R | AS | HV-OO | L71 | - FEE switch High Voltage ON/OFF |
| E6071 | E | NOTEST PULSE | TM | E1071 | R | AS | VTO-TST | L71 | - FEE veto test signal configuration |
| E5671 | E | ENABLE | TM | E0671 | R | AS | WDOG-ED | L71 | - FEE watchdog configuration Enable/Disable |
| E5771 | E | ENABLE | TM | E0771 | R | AS | RESP-ED | L71 | - FEE response condition enable/disable |
| E5572 | E | OFF | TM | E0572 | R | AS | HV-OO | L72 | - FEE switch High Voltage ON/OFF |
| E6072 | E | NOTEST PULSE | TM | E1072 | R | AS | VTO-TST | L72 | - FEE veto test signal configuration |
| E5672 | E | ENABLE | TM | E0672 | R | AS | WDOG-ED | L72 | - FEE watchdog configuration Enable/Disable |
| E5772 | E | ENABLE | TM | E0772 | R | AS | RESP-ED | L72 | - FEE response condition enable/disable |
| E5573 | E | OFF | TM | E0573 | R | AS | HV-OO | L73 | - FEE switch High Voltage ON/OFF |



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|-------|---|--------|-------|----|-------|---|----|---------|-----|---|-----|----------|---------------|----------------|---------------|
| E6073 | E | NOTEST | PULSE | TM | E1073 | R | AS | VTO-TST | L73 | - | FEE | veto | test | signal | configuration |
| E5673 | E | ENABLE | | TM | E0673 | R | AS | WDOG-ED | L73 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5773 | E | ENABLE | | TM | E0773 | R | AS | RESP-ED | L73 | - | FEE | response | condition | enable/disable | |
| E5574 | E | OFF | | TM | E0574 | R | AS | HV-OO | L74 | - | FEE | switch | High | Voltage | ON/OFF |
| E6074 | E | NOTEST | PULSE | TM | E1074 | R | AS | VTO-TST | L74 | - | FEE | veto | test | signal | configuration |
| E5674 | E | ENABLE | | TM | E0674 | R | AS | WDOG-ED | L74 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5774 | E | ENABLE | | TM | E0774 | R | AS | RESP-ED | L74 | - | FEE | response | condition | enable/disable | |
| E5575 | E | OFF | | TM | E0575 | R | AS | HV-OO | L75 | - | FEE | switch | High | Voltage | ON/OFF |
| E6075 | E | NOTEST | PULSE | TM | E1075 | R | AS | VTO-TST | L75 | - | FEE | veto | test | signal | configuration |
| E5675 | E | ENABLE | | TM | E0675 | R | AS | WDOG-ED | L75 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5775 | E | ENABLE | | TM | E0775 | R | AS | RESP-ED | L75 | - | FEE | response | condition | enable/disable | |
| E5576 | E | OFF | | TM | E0576 | R | AS | HV-OO | L76 | - | FEE | switch | High | Voltage | ON/OFF |
| E6076 | E | NOTEST | PULSE | TM | E1076 | R | AS | VTO-TST | L76 | - | FEE | veto | test | signal | configuration |
| E5676 | E | ENABLE | | TM | E0676 | R | AS | WDOG-ED | L76 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5776 | E | ENABLE | | TM | E0776 | R | AS | RESP-ED | L76 | - | FEE | response | condition | enable/disable | |
| E5577 | E | OFF | | TM | E0577 | R | AS | HV-OO | L77 | - | FEE | switch | High | Voltage | ON/OFF |
| E6077 | E | NOTEST | PULSE | TM | E1077 | R | AS | VTO-TST | L77 | - | FEE | veto | test | signal | configuration |
| E5677 | E | ENABLE | | TM | E0677 | R | AS | WDOG-ED | L77 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5777 | E | ENABLE | | TM | E0777 | R | AS | RESP-ED | L77 | - | FEE | response | condition | enable/disable | |
| E5578 | E | OFF | | TM | E0578 | R | AS | HV-OO | L78 | - | FEE | switch | High | Voltage | ON/OFF |
| E6078 | E | NOTEST | PULSE | TM | E1078 | R | AS | VTO-TST | L78 | - | FEE | veto | test | signal | configuration |
| E5678 | E | ENABLE | | TM | E0678 | R | AS | WDOG-ED | L78 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5778 | E | ENABLE | | TM | E0778 | R | AS | RESP-ED | L78 | - | FEE | response | condition | enable/disable | |
| E5579 | E | OFF | | TM | E0579 | R | AS | HV-OO | L79 | - | FEE | switch | High | Voltage | ON/OFF |
| E6079 | E | NOTEST | PULSE | TM | E1079 | R | AS | VTO-TST | L79 | - | FEE | veto | test | signal | configuration |
| E5679 | E | ENABLE | | TM | E0679 | R | AS | WDOG-ED | L79 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5779 | E | ENABLE | | TM | E0779 | R | AS | RESP-ED | L79 | - | FEE | response | condition | enable/disable | |
| E5580 | E | OFF | | TM | E0580 | R | AS | HV-OO | L80 | - | FEE | switch | High | Voltage | ON/OFF |
| E6080 | E | NOTEST | PULSE | TM | E1080 | R | AS | VTO-TST | L80 | - | FEE | veto | test | signal | configuration |
| E5680 | E | ENABLE | | TM | E0680 | R | AS | WDOG-ED | L80 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5780 | E | ENABLE | | TM | E0780 | R | AS | RESP-ED | L80 | - | FEE | response | condition | enable/disable | |
| E5581 | E | OFF | | TM | E0581 | R | AS | HV-OO | L81 | - | FEE | switch | High | Voltage | ON/OFF |
| E6081 | E | NOTEST | PULSE | TM | E1081 | R | AS | VTO-TST | L81 | - | FEE | veto | test | signal | configuration |
| E5681 | E | ENABLE | | TM | E0681 | R | AS | WDOG-ED | L81 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5781 | E | ENABLE | | TM | E0781 | R | AS | RESP-ED | L81 | - | FEE | response | condition | enable/disable | |
| E5582 | E | OFF | | TM | E0582 | R | AS | HV-OO | L82 | - | FEE | switch | High | Voltage | ON/OFF |
| E6082 | E | NOTEST | PULSE | TM | E1082 | R | AS | VTO-TST | L82 | - | FEE | veto | test | signal | configuration |
| E5682 | E | ENABLE | | TM | E0682 | R | AS | WDOG-ED | L82 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5782 | E | ENABLE | | TM | E0782 | R | AS | RESP-ED | L82 | - | FEE | response | condition | enable/disable | |
| E5583 | E | OFF | | TM | E0583 | R | AS | HV-OO | L83 | - | FEE | switch | High | Voltage | ON/OFF |
| E6083 | E | NOTEST | PULSE | TM | E1083 | R | AS | VTO-TST | L83 | - | FEE | veto | test | signal | configuration |
| E5683 | E | ENABLE | | TM | E0683 | R | AS | WDOG-ED | L83 | - | FEE | watchdog | configuration | Enable/Disable | |
| E5783 | E | ENABLE | | TM | E0783 | R | AS | RESP-ED | L83 | - | FEE | response | condition | enable/disable | |
| E5584 | E | OFF | | TM | E0584 | R | AS | HV-OO | L84 | - | FEE | switch | High | Voltage | ON/OFF |
| E6084 | E | NOTEST | PULSE | TM | E1084 | R | AS | VTO-TST | L84 | - | FEE | veto | test | signal | configuration |
| E5684 | E | ENABLE | | TM | E0684 | R | AS | WDOG-ED | L84 | - | FEE | watchdog | configuration | Enable/Disable | |



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|-------|---|--------------|----|-------|---|----|---------|-----|---|------|----------|---------------|----------------|---------------|------|-----|--|
| E5784 | E | ENABLE | TM | E0784 | R | AS | RESP-ED | L84 | - | FEE | response | condition | enable/disable | | | | |
| E5585 | E | OFF | TM | E0585 | R | AS | HV-OO | L85 | - | FEE | switch | High | Voltage | ON/OFF | | | |
| E6085 | E | NOTEST PULSE | TM | E1085 | R | AS | VTO-TST | L85 | - | FEE | veto | test | signal | configuration | | | |
| E5685 | E | ENABLE | TM | E0685 | R | AS | WDOG-ED | L85 | - | FEE | watchdog | configuration | Enable/Disable | | | | |
| E5785 | E | ENABLE | TM | E0785 | R | AS | RESP-ED | L85 | - | FEE | response | condition | enable/disable | | | | |
| E5586 | E | OFF | TM | E0586 | R | AS | HV-OO | L86 | - | FEE | switch | High | Voltage | ON/OFF | | | |
| E6086 | E | NOTEST PULSE | TM | E1086 | R | AS | VTO-TST | L86 | - | FEE | veto | test | signal | configuration | | | |
| E5686 | E | ENABLE | TM | E0686 | R | AS | WDOG-ED | L86 | - | FEE | watchdog | configuration | Enable/Disable | | | | |
| E5786 | E | ENABLE | TM | E0786 | R | AS | RESP-ED | L86 | - | FEE | response | condition | enable/disable | | | | |
| E5587 | E | OFF | TM | E0587 | R | AS | HV-OO | L87 | - | FEE | switch | High | Voltage | ON/OFF | | | |
| E6087 | E | NOTEST PULSE | TM | E1087 | R | AS | VTO-TST | L87 | - | FEE | veto | test | signal | configuration | | | |
| E5687 | E | ENABLE | TM | E0687 | R | AS | WDOG-ED | L87 | - | FEE | watchdog | configuration | Enable/Disable | | | | |
| E5787 | E | ENABLE | TM | E0787 | R | AS | RESP-ED | L87 | - | FEE | response | condition | enable/disable | | | | |
| E5588 | E | OFF | TM | E0588 | R | AS | HV-OO | L88 | - | FEE | switch | High | Voltage | ON/OFF | | | |
| E6088 | E | NOTEST PULSE | TM | E1088 | R | AS | VTO-TST | L88 | - | FEE | veto | test | signal | configuration | | | |
| E5688 | E | ENABLE | TM | E0688 | R | AS | WDOG-ED | L88 | - | FEE | watchdog | configuration | Enable/Disable | | | | |
| E5788 | E | ENABLE | TM | E0788 | R | AS | RESP-ED | L88 | - | FEE | response | condition | enable/disable | | | | |
| E5589 | E | OFF | TM | E0589 | R | AS | HV-OO | L89 | - | FEE | switch | High | Voltage | ON/OFF | | | |
| E6089 | E | NOTEST PULSE | TM | E1089 | R | AS | VTO-TST | L89 | - | FEE | veto | test | signal | configuration | | | |
| E5689 | E | ENABLE | TM | E0689 | R | AS | WDOG-ED | L89 | - | FEE | watchdog | configuration | Enable/Disable | | | | |
| E5789 | E | ENABLE | TM | E0789 | R | AS | RESP-ED | L89 | - | FEE | response | condition | enable/disable | | | | |
| E5590 | E | OFF | TM | E0590 | R | AS | HV-OO | L90 | - | FEE | switch | High | Voltage | ON/OFF | | | |
| E6090 | E | NOTEST PULSE | TM | E1090 | R | AS | VTO-TST | L90 | - | FEE | veto | test | signal | configuration | | | |
| E5690 | E | ENABLE | TM | E0690 | R | AS | WDOG-ED | L90 | - | FEE | watchdog | configuration | Enable/Disable | | | | |
| E5790 | E | ENABLE | TM | E0790 | R | AS | RESP-ED | L90 | - | FEE | response | condition | enable/disable | | | | |
| E5591 | E | OFF | TM | E0591 | R | AS | HV-OO | L91 | - | FEE | switch | High | Voltage | ON/OFF | PSAC | HV1 | |
| E5592 | E | OFF | TM | E0592 | R | AS | HV-OO | L92 | - | FEE | switch | High | Voltage | ON/OFF | PSAC | HV2 | |
| E6091 | E | NOTESTPULSES | TM | E1091 | R | PS | VTO-TST | L91 | - | Test | Pulses | Burst | | | | | |
| E5791 | E | ENABLE | TM | E0791 | R | AS | RESP-ED | L91 | - | FEE | response | condition | enable/disable | PSAC | | | |



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2.3 REDUNDANT OPERATIONAL PROCEDURES

2.3.1. Redundant procedures list.

| Procedure n° | Procedure Name | Description |
|--------------|----------------------|-----------------------------------------------------------------------------------------------------------|
| R-P1A | R-PRELAUNCH | Instrument setting up for Pre-Launch configuration |
| R-P1B | R-LAUNCH | Instrument setting up for Launch configuration |
| R-P2 | R-INACTI | Launch mode to Inactive mode |
| R-P3 | R-THAWIN | Inactive mode to heat pipes Thaw mode. It is used in case of anomaly which has led to ice the heat pipes. |
| R-P4 | R-INASTB | Inactive mode to Stand-by mode |
| R-P5 | R-THAOUT | Back to Inactive or Stand-by mode from Thaw mode |
| R-P6 | R-STBINA | Back to Inactive mode from Stand-by mode |
| R-P7 | R-STBCOO | Stand-by mode to Cooling mode |
| R-P8 | R-STBCON | Stand-by mode to Configuration mode |
| R-P9 | R-ECLIPS | Eclipse management |
| R-P9 | R-ECLIPS-A | Eclipse occurring during outgassing phase |
| R-P10 | R-STBANI | Stand-by mode to Annealing mode |
| R-P11 | R-COOSTB | Back to Stand-by mode from Cooling mode |
| R-P12 | R-BKSTBY | Back to Stand-by mode from Configuration, Operational, Calibration and Diagnostic modes |
| R-P13-P | R-PHOTON | Configuration mode to Operational Photon/Photon mode |
| R-P13-E | R-EMCY | Configuration mode to Operational TM Emergency mode (EMCY) |
| R-P14 | R-CAL | Configuration mode to Calibration mode |
| R-P15 | R-DIAG | Configuration mode to Diagnostic mode |
| R-P16 | R-BKCONF | Back to Configuration mode from Operational, Calibration and Diagnostic modes |
| R-P17-1 | R-LDCONF-PSD | PSD configuration loading |
| R-P17-2 | R-LDCONF-AFEE-HV-OFF | AFEE configuration loading with HV OFF |
| R-P17-3 | R-LDCONF-AFEE-HV-ON | AFEE configuration loading with HV ON |
| R-P17-4 | R-LDCONF-DFEE | DFEE configuration loading |
| R-P17-5 | R-LDCONF-ALL-CONF | All configurations loading |
| R-P17-6 | R-LDCONF-ALL-PATCH | All patches loading |
| R-P17-7 | R-LDCONF-ACS | ACS configuration loading |
| R-P17-8 | R-LDCONF-IASW | IASW configuration loading |
| R-P18 | R-ANISTB | Back to Stand-by mode from Annealing mode |
| R-P19 | R-STBOG | Stand-by mode to Outgassing mode |
| R-P20 | R-OGSTBY | Outgassing mode to Stand-by mode |
| R-P21 | R-EXPOSU | Exposure parameters update |
| R-P22-D | R-DUMP-IASW | On-board Software Maintenance for IASW - Dump |
| R-P22-L | R-LOAD-IASW | On-board Software Maintenance for IASW - New version loading |
| R-P23_AS | R-OBSMAS | On-board Software Maintenance for ACS |
| R-P23_PD | R-OBSMPD | On-board Software Maintenance for PSD |
| R-P23_DF | R-OBSMDF | On-board Software Maintenance for DFEE |
| R-P24 | R-COOCON | Cooling mode to Configuration mode |
| R-P25 | R-ACSCAL | ACS calibration |
| R-P26 | R-COOTUN | Compressor and displacers amplitude adjustment |
| R-P27 | R-OGCONF | Transition to Configuration mode from Outgassing mode |
| R-P28 | R-CONCOO | Transition to Cooling mode from Configuration mode and cooling process |
| R-P30-B | R-RECINB | Automatic reconfiguration inhibition (belts) |
| R-P30-E | R-RECINB | Automatic reconfiguration inhibition (eclipse) |
| R-P31 | R-REACT | Automatic reconfiguration reactivation |
| R-P32 | R-FPATCH | Flush recorded S/A patches in DPE memory |
| R-P100 | R-OFFINA | From OFF mode to Inactive mode (ground test procedure) |
| R-P101 | R-INAOFF | Back to OFF mode from Inactive (ground test procedure) |
| R-P102 | R-ISOINA | Instrument switch off after imminent switch off detection |



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2.3.2. Redundant procedures description

- **Procedure n° 1A R-PRELAUNCH**
 - Purpose: Instrument set up for Launch configuration
 - Constraints: This procedure will be performed before Launch
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-----------------------------------------------------------|----------------|----------------------------------|----------------------------------------------------------------------------|-----------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC to select relay configuration CDE 1 | E9968 | CDE1_LCL1/2RELON | | | | Compressors are fed by 2 LCL's |
| 20 | | Send TC to select relay configuration CDE 2 | E9988 | CDE2_LCL1/2RELON | | | | |
| 25 | | Check CDE relay status | | | | | F9970 = 1 F9990 = 1 | CDE1 supplied by LCL1+2 CDE2 supplied by LCL1+2 |
| 30 | | Send TC to switch ON CDE 1 | P3031 P3061 | CDE1_A_LCL1_ON CDE1_A_LCL2_ON | | | P1161 = 1 P1160 = 1 | |
| 40 | | Send TC to switch ON CDE 2 | P3271 P3301 | CDE2_B_LCL1_ON CDE2_B_LCL2_ON | | | P1163 = 1 P1162 = 1 | |
| 50 | | Send TC to switch ON CDE heater Red | T5676 | TWS_CDE_HTRB_ON | | | T8115 = 1 | |
| 70 | | | | | | | | |
| 80 | | | | | | | | |
| 90 | | Send TC to switch ON Thermal Control Line Red | P4339 | BD4 B LCL 2 | | | P2172 = 1 P2068 | |
| 100 | | | | | | | | |
| 110 | | | | | | | | |
| 120 | | Send TC to switch ON AFEE, DFEE, PSD heaters Red | T5106 | LCL_CAMER_H-B_ON | | | T8601 = 1 P2061 | No consumption |
| 130 | | Send TC to switch ON Mask, ACS heaters Red | T5136 | TWS_ACS_MSK-B_ON | | | T8607 = 1 | |
| 140 | | Check the CDE input current | | | | | P1061 P1060 P1063 P1062 | 005 A < I < 0.10 A 0.05 A < I < 0.10 A 0.05 A < I < 0.10 A 0.05 A < I < 0.10 A |
| 150 | | Send TC to set up CDE 1 in the Launch Lock mode as Master | E9960 | CDE1_M_LAUNCH_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | F9960/F9964 < 30 F9961/F9965 < 30 | CDE Main is Master Comp/Disp1 drive enable Comp 1 amplitude Launch Lock mode selected Comp/Disp2 drive enable Comp 2 amplitude |
| 160 | | Send TC to set up CDE 2 in the Launch Lock mode as Master | E9980 | CDE2_M_LAUNCH_LOCK | Bit0 = 0 Bit1 = 1 E9980 = 0 Bit8 = 0 Bit9 = 1 E9981 = 0 | | F9980/F9984 < 30 F9981/F9985 < 30 | CDE Redundant is Master Comp/Disp1 drive enable Comp 1 amplitude Launch Lock mode selected Comp/Disp2 drive enable Comp 2 amplitude |
| 170 | | Check the CDE input current | | | | | P1061 P1060 P1063 P1062 | 0.15 A < I < 0.3 A 0.15 A < I < 0.3 A 0.15 A < I < 0.3 A 0.15 A < I < 0.3 A |
| | | Check the launch lock status | | | | | F9972 = F9971 = 1 F9992 = F9991 = 1 | If # execute GR1 If # execute GR1 |



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• Procedure n° 1B R-LAUNCH

- Purpose: Instrument set up for Launch configuration. All the commands will be automatically triggered on board. The following sequence is given for information in order to show the operations coherence.
- Constraints: This procedure will be performed after solar arrays opening
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------|----------------|------------------|-----------------|-----------------|--------------------|---------|
| 70 | | Automatic switch ON Compensation heater M | P4209 | TSW_ACC_H-A_ON | | | T8500 = 1 | |
| 80 | | Automatic switch ON Thermal Control Line Main | P4089 | BD4 A LCL 2 | | | P2122 = 1 P2018 | |
| 100 | | Automatic switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | T8501 = 1 P2011 | |
| 110 | | Automatic switch ON Mask, ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | T8507 | |
| 120 | | Automatic switch ON CDE heater Main A | T5576 | TWS_CDE_HTRA_ON | | | T8015 = 1 | |



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- **Procedure n° 2 R-INACTI**
 - Purpose: Transition from Launch mode to Inactive mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------------|----------------|------------------------------------|----------------------------------------------------------------------------|-----------------|------------------------|------------------------------------------------------------------|
| 10 | | Send TC to set CDE 1 in Stand-by mode as Master | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to CDE1 in Stand-by mode Mandatory before switch off |
| 20 | | Send TC to set CDE 2 in Stand-by mode as Master | E9982 | CDE2_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to CDE2 in Stand-by mode Mandatory before switch off |
| 30 | | Check CDE 1 configuration | | | | | F9971 = 0 F9972 = 0 | If # execute GR1 |
| 40 | | Check CDE 2 configuration | | | | | F9991 = 0 F9992 = 0 | If # execute GR1 |
| 50 | | Send TC to switch OFF CDE 1 | P3030 P3060 | CDE1_A_LCL1_OFF CDE1_A_LCL2_OFF | | | P1161 = 0 P1160 = 0 | |
| 60 | | Send TC to switch OFF CDE 2 | P3270 P3300 | CDE2_B_LCL1_OFF CDE2_B_LCL2_OFF | | | P1163 = 0 P1162 = 0 | |
| 70 | | Send TC to select relay configuration CDE 1 | E9969 | CDE1_LCL1RELON | | | | CDEs must be fed by 1 LCL |
| 80 | | Send TC to select relay configuration CDE 2 | E9989 | CDE2_LCL1RELON | | | | |
| 90 | | Send TC to switch ON CDE 1 | P3031 | CDE1_A_LCL1_ON | | | P1161 = 1 P1160 = 0 | |
| 100 | | Send TC to switch ON CDE 2 | P3271 | CDE2_B_LCL1_ON | | | P1163 = 1 P1162 = 0 | |
| 105 | | Check CDE relay status | | | | | F9970 = 0 F9990 = 0 | CDE1 supplied by LCL1 only CDE2 supplied by LCL1 only |
| 110 | | Send TC to set CDE 1 in Stand-by mode as Master and compressors/displacers disable | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|-------------|-----------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|--------------------------------|------------------------------------------------|
| 115 | | Send TC to set CDE 2 in Stand-by mode as Slave and compressors/displacers disable | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | |
| 120 | | Send TC to switch ON CDE heater main A | T5576 | TWS_CDE_HTRA_ON | 1 | | T8015 = 1 | |
| 125 | | Check CDE1 and CDE2 input current | | | | | P1061 P1063 | 0.1 < I < 0.2 A 0.1 < I < 0.2 A |
| 130 | | Check CDE1 and CDE2 configuration | | | | | F9971=F9972=0 F9991=F9992=0 | CDE1 in Stand-by mode CDE2 in Stand-by mode |
| 140 | SAD + 10 hr | Send TC to switch ON Anti-freeze 1 M | T5021 | TSW_ANTFRZ1-A_ON | | | T8504 = 1 | TSW status |
| 150 | SAD + 10 hr | Send TC to switch ON Anti-freeze 2 M | T5026 | TSW_ANTFRZ2-A_ON | | | T8505 = 1 | TSW status |



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- **Procedure n° 3 R-THAWIN**
 - Purpose: Transition from Inactive or Stand-by mode to Heat pipes Thaw mode. It is used in case of anomaly which has led into an Inactive mode for a long time or in case of failure of Antifreeze system. In this case the heat pipes could be iced.
 - Constraints: Must be activated after checking heat pipes (adiabatic area) temperature, if they are not in the correct range
 - Time Criticality:
 - System Level Prerequisites: RTU ON, DPE2 ON, IASW and AFEE IF TM/TC in Stand-by mode
 - Sub-system Level Prerequisites: Passive cooling: t_pc_heatpp_r (F3992 or F3996) temperature < - 82°C or the PAC temperature T5104 or T5111 < -80°C.
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------------|----------------|-------------------|-----------------|-------------------------------------------------------------------------|------------------|
| 10 | | Check temperatures of the heat pipes and of the PAC radiator | | | | F3992 < - 82°C or F3996 < - 82°C T5104 or T5111 < -80°C | t_pc_heatpp_r |
| 20 | | Send TC to switch OFF Anti-freeze 1 M | T5020 | TSW_ANTFRZ1-A_OFF | | T8504 = 0 | If # execute GR2 |
| 30 | | Send TC to switch OFF Anti-freeze 2 M | T5025 | TSW_ANTFRZ2-A_OFF | | T8505 = 0 | |
| 40 | | Switch ON Heat Pipes heater M | T5011 | TSW_HEATPIP-A_ON | | T8502 = 1 | |
| 50 | | Perform procedure n° 5 (THAOUT) | | | | | |



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- **Procedure n° 4 R-INASTB**
 - Purpose: Transition from Inactive mode to Stand-by mode.
 - Constraints: The IASW configuration is FS1700_IASW-PAR_fmconfig_0002.TPF with F8963=0 (cold plate monitoring disable) and F1750_DIAG-PAR_fmconfig_0001.TPF. A TPF file is created for convenience: FS1700_IASW-PAR_coldpdis_0001.TPF;
 - Time Criticality:
 - System Level Prerequisites: The DPE2 could be ON or OFF before the procedure entrance.
 - Sub-system Level Prerequisites:
 - Special Processing: By default, all S/A should be powered ON. If it is not the case (anomaly or specific test) apply the following before sending TC Conf ON/OFF (F500):
 - AFEE OFF: set parameter F8900=0 and do not execute steps 140 and 150
 - DFEE OFF: set parameter F8901=0 and do not execute step 160
 - ACS OFF: set parameter F8902=0 and do not execute step 180
 - PSD OFF: set parameter F8903=0 and do not execute step 200



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------|
| 10 | | DPE2 LCL status checking: if P2166 = 0 and P2063 = 0 go to step 30 | | | | | P2166 ? P2063 ? | |
| 20 | | If E49 = 1 go to step 52 | | | | | F49 ? | |
| 30 | | Send TC DPE2 power On | P4295 | LCL_SDPE2_ON | | | P2166 = 1 P2063 | I = 0.28 A ± 0.2 A |
| 40 | | Send TC DPE2 +5V Aux Supply Relay 0 ON | F9800 | SDPE2_RELAYO_ON | | | F9801 = 1 | |
| 50 | | DPE2 status checking | | | | | D6503 = 1 | Running state |
| 52 | | Time synchronisation checking | | | | | APID = 129 | CDMU time |
| 55 | | If (CDMU time ≠ DPE time) Send TC for DPE2 time synchronisation | D3703 | | APID=1153 | | APID = 1153 | DPE time |
| 56 | | Time synchronisation checking | | | | | APID = 129 APID = 1153 D3713 | CDMU time DPE time |
| 60 | | Checking IASW status | | | | 520108 | F0049 = 0 | Check at least two time cycle If IASW nok ⇒ execute ECP9 |
| 69 | | If (F0049 = 1) go to step 110 | | | | | | |
| 70 | | Starting IASW | F9024 | TRAN_TO_NOMINAL | | | | IASW start-up |
| 80 | | Checking IASW mode and version | | | | 520108 | F0049 = 1 F0029 | If # ⇒ Execute ECP9 Version number |
| 110 | | Send TC for IASW general and Diag configuration | F0518 F0519 F0581 F0582 F0583 F0584 F0585 F0586 | tc_def_conf_iasw tc_def_exp_iasw tc_diag_n1 tc_diag_n2 tc_diag_n3 tc_diag_n4 tc_diag_n5 tc_diag_n6 | FS1700_IASW-PAR_coldpdis_0001.TPF | 68843/11 68843/11 | | Default parameters except cold plate monitoring disable |
| 120 | | Send TC on-request for IASW general and Diag configuration to check the TC conformance. | F0523 F0524 F0591 F0592 F0593 F0594 F0595 F0596 | tc-r_conf_iasw tc-r_exp_iasw tc-r_diag_n1 tc-r_diag_n2 tc-r_diag_n3 tc-r_diag_n4 tc-r_diag_n5 tc-r_diag_n6 | FS1750_DIAG-PAR_fmconfig_0001.TPF | 69039 69040 69901 69902 69903 69904 69905 69906 | E3963=0 | |
| 130 | T ₀ | Send TC to switch OFF AFEE, DFEE, PSD | T5005 | LCL_CAMER_H-A_OFF | | | T8501 = 0 | |

| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|-------------------------|---------------------------------------------------------------------------------|----------------|-------------------|------------------------------------------|-----------------|----------------------------------|--------------------------------|
| | | heaters Main | | | | | P2011 | |
| 135 | T ₀ | Send TC to switch OFF Mask and ACS heaters Main | T5035 | TWS_ACS_MSK-A_OFF | | | T8507 = 0 | |
| 140 | | Send TC AFEE I/F TM/TC power ON AFEE I/F TM/TC self-test status checking | P4291 | LCL_AF2TMTC-B_ON | | 520108 | P2165 = 1 P2062 F3882 = 0 | 0.14A ± 0.01If # execute ECP13 |
| 150 | | Send TC AFEE detection chain power ON | P4311 | LL_AF2DET-B_ON | | | P2171 = 1 P2067 | 0 ± 0.01 |
| 160 | | Send TC DFEE power ON | P4303 | LCL_DFEE-B_ON | | | P2169 = 1 P2065 | 0.19A ± 0.02 |
| 170 | | DFEE self-test status checking | | | | 520108 | F3885 = 0 | If # execute ECP16 |
| 180 | | Send TC ACS power ON | P4299 | LCL_SPI_ACS_B_ON | | | P2167 = 1 P2064 | 1.33A ± 0.13A |
| 190 | | ACS self-test status checking | | | | 520108 | F3888 = 0 | If # execute ECP14 |
| 200 | | Send TC PSD power ON | P4307 | LCL_PSD_B_ON | | | P2170 = 1 P2066 | 0.45 ± 0.04A |
| 210 | | PSD self-test status checking | | | | 520108 | F3891 = 0 | If # execute ECP15 |
| 220 | | Send TC | F0500 | tc_on_off_conf | F8900=? F8901=? F8902=? F8903=? | | | By default all S/A are ON |
| 230 | | Send TC S/A status request | F0525 | tc-r_on_off_conf | | 69041 | F3900 F3901 F3902 F3903 | If TM # TC execute GR2 |
| 240 | | Send TC to switch ON Compensation heater M | P4209 | TSW_ACC_HTR_A_ON | | | P2222 = 1 | |
| 250 | T ₀ + 20 hrs | Send TC to switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | T8501 = 1 P2011 | |
| 260 | T ₀ + 20 hrs | Send TC to switch ON Mask and ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | T8507 = 1 | |



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- **Procedure n° 5 R-THAOUT**
 - Purpose: Back to Inactive or Stand-by mode from Thaw mode
 - Constraints: When the heat pipes are thawed
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites: All the parameters T5102, T5103, T5109, T5110, T5104 and T5111 > -47°C
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | Parameter Value | Remarks |
|---------|------|--------------------------------------------|----------------|-------------------|-----------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 10 | | Check temperatures of passive cooling | | | | T5102 > -47°C T5103 > -47°C T5109 > -47°C T5110 > -47°C T5104 > -47°C T5111 > -47°C | Continue when all parameters condition are true |
| 20 | | Send TC to switch OFF heat pipes heaters M | T5010 | TSW_HEATPIP-A_OFF | | T8502 = 0 | if # execute GR2 |
| 30 | | Send TC to switch ON Anti-freeze 1 M | T5021 | TSW_ANTFRZ1-A_ON | | T8504 = 1 | |
| 40 | | Send TC to switch ON Anti-freeze 2 M | T5026 | TSW_ANTFRZ2-A_ON | | T8505 = 1 | |



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• Procedure n° 6 R-STBINA

- Purpose: Back to Inactive mode from Stand-by mode. For several reasons, the instrument must return properly to Inactive mode.
- Constraints: The DPE2 should be maintained ON as much as possible. Only if it is necessary to switch it OFF, the step 135 shall be executed. This procedure can be used when the four machines are running.
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing: The cryocoolers strokes shall be reduced by steps of 0,429 mm ie 3 in raw value, until the commanded strokes are less than : 0,429 mm ie 3 in raw value, then set them to 0.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------------|-------------------------------------------------------------------------------------------------------------|----------------|-------------------|--------------------------------------------------------------------|-----------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 10 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | T ₀ | Send TC ON/OFF configuration | F0500 | tc_on_off_conf | F8900 = 0 F8901 = 0 F8902 = 0 F8903 = 0 | | | |
| 30 | | Send TC ON/OFF configuration request | F0525 | tc-r_on_off_conf | | 69041 | F3900 = 0 F3901 = 0 F3902 = 0 F3903 = 0 | If TM # TC execute GR2 |
| 40 | | AFEE detection chain LCL status checking | | | | | P2171 | |
| 50 | | If (P2171 = 1) send TC AFEE detection chain power OFF | P4310 | LCL_AF2DET-A_OFF | | | P2171 = 0 | |
| 55 | | AFEE2 I/F TM/TC LCL status checking | | | | | P2165 | |
| 58 | | If (P2165 = 1) send TC AFEE I/F TM/TC power OFF | P4290 | LCL_AF2TMTC-A_OFF | | | P2165 = 0 | |
| 60 | | ACS LCL status checking | | | | | P2167 | |
| 70 | T ₀ + 5 s | If (P2167 = 1) send TC ACS power OFF | P4298 | LCL_SPI_ACS_A_OFF | | | P2167 = 0 | |
| 80 | | PSD LCL status checking | | | | | P2170 | |
| 90 | | If (P2170 = 1) send TC PSD power OFF | P4306 | LCL_PSD_A_OFF | | | P2170 = 0 | |
| 100 | | | | | | | | |
| 110 | | | | | | | | |
| 120 | | DFEE LCL status checking | | | | | P2169 | |
| 130 | | If (P2119 = 1) send TC DFEE power OFF | P4302 | LCL_DFEE-A_OFF | | | P2169 = 0 | |
| 135 | | If really required Send TC to switch off DPE 2 | P4294 | LCL_SDPE1_OFF | | | P2166 = 0 P2063 = 0 | Amp |
| 140 | | Check CDE 1 and CDE 2 configuration | | | | | F9972 ? | |
| 150 | | If (F9971 = F9991 = F9972 = F9992 = 0) Perform step 230 | | | | | | CDE's are in Stand-by mode |
| 155 | | If (F9971 = F9991 = 1 and F9972 = F9992 = 0) | | | | | | CDE's are in Normal mode |
| 160 | | Send TC to decrease E9960 and E9961 compressors amplitude CDE 1 step by step until E9960 = 0 and E9961 = 0. | E9966 | CDE1_M_CHG_AMPL | Bit0 = 0 Bit1 = 1 E9960 Bit8 = 1 Bit9 = 1 E9961 | | F9960 decreases F9961 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 170 | | Send TC to decrease E9980 and E9981 compressors amplitude CDE 2 step by step until E9980 = 0 and E9981 = 0. | E9987 | CDE2_S_CHG_AMPL | Bit0 = 1 Bit1 = 1 E9980 Bit8 = 1 Bit9 = E9981 | | F9980 decreases F9981 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 175 | | Check compressor and displacers drive amplitude | | | | | F9960 ; F9961 < 50 F9980 ; F9981 < 50 | |
| 180 | | Check CDE 1 input current | | | | | P1061 | 0.5 A < I < 0.6 A (TBC) |
| | | Check CDE 2 input current | | | | | P1063 | 0.5 A < I < 0.6 A (TBC) |
| 181 | | | | | | | | |
| 182 | | Send TC to set CDE 1 displacers to "0" amplitude In launch lock mode | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 183 | | Send TC to set CDE 2 displacers to "0" amplitude In launch lock mode | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 184 | | Check the CDE configuration Check CDE input current | | | | | F9971 = F9991 = 1 F9972 = F9992 = 1 P1061 P1063 | If # execute GR1 0.30 A < I < 0.5 A |
| 190 | | Send TC to set CDE 1 in Stand-by mode | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Cryocooler Stand-by mode CDE1 Master |
| 200 | | Send TC to set CDE 2 in Stand-by mode | E9963 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to Cryocooler Stand-by mode CDE2 Slave |
| 205 | | Check CDE 1 input current | | | | | P1061 | 0.10 A < I < 0.20 A |
| | | Check CDE 2 input current | | | | | P1063 | 0.10 A < I < 0.20 A |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------|----------------|-------------------|-----------------|-----------------|------------------------|------------------|
| 210 | | Check CDE 1 configuration | | | | | F9971 = 0 F9972 = 0 | If # execute GR1 |
| 220 | | Check CDE 2 configuration | | | | | F9991 = 0 F9992 = 0 | If # execute GR1 |
| 230 | | Send TC to switch off Compensation heater M | P4208 | TSW_ACC_HTR_A_OFF | | | P2222 = 0 | |



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• Procedure n° 7 R-STBCOO

- Purpose: Stand-by mode to Cooling mode and cooling process. The cooling occurs at the first time just after the outgassing mode but via configuration mode (not with this procedure cf. P28). This procedure will be used after an annealing mode or a restart of the spectrometer following a contingency case.
- Constraints: Compressors and thermal braids temperatures must be less than 40°C and the thermal control of the cryocooler shall be enable to allow switching on the compressors (T5006, T5007, T5024, T5025 between - 22°C and 38°C; F0397 and F0398 < 35°C).

Use FS1710_AF-CH-OO_def-grnd_0001.TPF file with E5209=0 (range 62-410K) at the beginning of the procedure (while GED cold plate temperatures > 125K). A specific TPF file FS1710_AF-CH-OO_outgass_0001.TPF can be used for convenience.

- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites: Stand-by mode
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|-----------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 10 | | Check that cold plate monitoring is disable | F0523 | | | | F3963 = 0 | |
| 20 | | Change mode TC Stand-by to Configuration | F0502 | tc_mode_chg_x | | | | |
| 30 | | Mode status checking | | | | | F0049 = 3 | If # 3 execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 40 | | Check detectors chains HV are OFF before sending F0004 TC | | | E5190-E5208=? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 50 | Tn | Send TC Cold plate and Thermal braids temperature range setting | F0004 | tc-c_af_ch-oo | FS1710_AF-CH-OO_outgass_0001.TPF | 68841/4 | E0209 = 0 | With other parameters from default_ground_AFEE_FM |
| 60 | Tn+25" | Send TC Temperature range request | F0014 | tc-r_af_ch-oo | | 69003 | E0209 = 0 | |
| 70 | | Check compressors temperatures CDE 1 | | | | | a<T5006<b a<T5024<b | a = -22 ° C ; b =+ 38 ° C |
| 60 | | Check compressors temperatures CDE 2 | | | | | a<T5007<b a<T5025<b | a = -22 ° C ; b =+ 38 ° C if temp T5006, T5007 T5024, T5025 ok ⇒ continue |
| 80 | | Check Thermal braids temperatures | | | | | F0397<35°C F0398<35°C | If nok ⇒ anomaly Don't switch on CDEs |
| 90 | | Check cold plate temperature | | | | | F0391 ≥ 89 K F0392 ≥ 89 K F0393 ≥ 89 K F0394 ≥ 89 K | |
| 100 | | Send TC to switch OFF CDE heater M | T5575 | TWS_CDE_HTRA_OFF | | | T8015 = 0 | |
| 110 | | | | | | | | |
| 120 | | Check CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp |
| 130 | | Send TC to set up CDE 1 as master | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | F9971=F9972 = 0 | If # execute GR1 |
| 140 | | Send TC to set up CDE 2 as slave | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | F9991=F9992 = 0 | If # execute GR1 |
| 150 | | Send TC to set up CDE 1 Master in nominal mode | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 1 | | F9960 < 50 190 < F9964 < 210 F9961 < 50 | CDE 1 is assumed to be Master Comp/Disp1 drive enable |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| | | | | | Bit9 = 1 E9961 = 0 | | 200 < F9965 < 220 | |
| 160 | | Send TC to set up CDE 2 Slave in nominal mode | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = 0 Bit8 = 1 Bit9 = 1 E9981 = 0 | | F9980 < 50 180 < F9984 < 200 F9981 < 50 215 < F9985 < 235 | CDE Redundant is assumed to be Slave Comp/Disp1 drive enable |
| 170 | | Check CDE 1 Configuration | | | | | F9971 = 1 F9972 = 0 | CDE1 Nominal mode |
| 180 | | Check CDE 2 Configuration | | | | | F9991 = 1 F9992 = 0 | CDE2 Nominal mode |
| 190 | | Send TC to set up compressors and displacers amplitude CDE 1 step by step until expected amplitude reached (7 mm TBC ie 50 bits TC raw value). Apply 12 steps of 0.429m/m (3 bits) then 2 steps of 0.123 m/m (1 bit) (as many time as necessary) | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = TBD Bit8 = 1 Bit9 = 1 E9961 = TBD | | 130 < F9960, F9961 < 180 160 < F9964 < 215 145 < F9965 < 195 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 200 | | Send TC to set up compressors and displacers amplitude CDE 2 engine step by step until expected amplitude reached(7 mm TBC ie 50 bits TC raw value). Apply 12 steps of 0.429m/m (3 bits) then 2 steps of 0.123 m/m (1 bit) (as many time as necessary) | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = TBD Bit8 = 1 Bit9 = 1 E9981 = TBD | | 130 < F9980 < 180 105 < F9981 < 155 140 < F9984 < 180 150 < F9985 < 200 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 210 | | Check cold plate temperatures If (F0391 or F0392 or F0393 or F0394 ≤ 125K) | | | | 65602/9 | F0391 or F0392 or F0393 or F0394 ≤ 125 K | If true change the temperature range 62 K to 128 K |
| 220 | Tn | Send TC to change temperature range | F0004 | tc-c_af_ch-oo | FS1710_AF-CH-OO_def-grnd_0001.TPF | 68841/4 | E0209 = 1 | |
| 230 | Tn+25" | Send TC Temperature range request And stay at this step while the temperatures are more than the corresponding thresholds | F0014 | tc-r_af_ch-oo | | 69003 65602/9 | E0209 = 1 F0391 < F3964 F0392 < F3965 F0393 < F3966 F0394 < F3967 | If T5006 or T5024 > 38 °C reduce the stroke step 190, If T5007 or T5025 > 38 °C reduce the stroke step 200, |



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- **Procedure n° 8 R-STBCON**

- Purpose: Stand-by mode to Configuration Mode
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|----------------|------|--------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------|-----------------|-----------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 15 20 | | Mode change from Stand-by mode to Configuration Send TC to reload all S/A configuration Mode status checking | F0502 F0556 | tc_mode_chg_x tc_send_conf | | 520108 | F0049 = 3 F3881 = 1 F3887 = 1 F3890 = 1 F3884 = 1 T8505 = 0 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 Only if units configuration have been already loaded If # execute GR2 For power consumption saving |
| 30 | | Send TC to switch OFF antifreeze 2 heater M | T5025 | TWS_ANTRFZ-A_OFF | | | | |



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- **Procedure n° 9 R-ECLIPS**

- Purpose: Eclipse management
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 10 | T - 3 min | Automatic instrument transition to Stand-by mode including context saving | | | | 520108 | F0049 = 1 | HK acquisitions are stopped |
| 20 | T - 1 min | Trigger TT command to switch ON Antifreeze heater n° 2 Trigger TT command to switch OFF AFEE chain detection Trigger TT command to switch OFF AFEE I/F TM/TC Trigger TT command to disable SECL S/W | T5026 P4310 P4290 | TSW_ANTFRZ2-A_ON LCL_AFE2DET-B_OFF LCL_AFE2TMTC-B_OFF | | | T8505 = 1 P2171 = 0 P2165 = 0 | |
| 30 | T | Trigger automatic switch OFF for ACS, PSD, DFEE, nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), Compensation heaters Main OFF TCS nominal heaters loops OFF, CDE M heaters | P4208 T5575 | LCL_SPI_ACS-A_OFF LCL_PSD-A_OFF LCL_DFEE-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF TWS_CDE_HTRA_OFF | | | P2117 = 0 P2120 = 0 P2119 = 0 T8501 = 0 T8507 = 0 P2222 = 0 T8015 = 0 | |
| 40 | T exit | Trigger automatic switch ON for nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), TCS nominal heaters loops ON. | T5106 T5136 | TSW_CAMER_H-A_ON TSW_ACS_MSK-A_ON | | | T8501 = 1 T8507 = 1 | |
| 50 | Textit + 1 min | Compensation heaters Main ON | P4209 | | | | P2222 = 1 | |
| 60 | Textit + Taos | Send TC to switch OFF Antifreeze 2 heater Send TC to switch OFF AFEE, DFEE, PSD, nominal heaters Send TC to switch OFF ACS and MASK nominal heaters Send TC to switch ON AFEE I/F TM/TC Send TC to switch ON AFEE chain detection Send TC to switch ON ACS Send TC to switch ON PSD Send TC to switch ON DFEE | T5025 T5005 T5035 P4291 P4311 P4299 P4307 P4303 | TSW_ANTFRZ2-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF LCL_AF2TMTC-B_ON LCL_AF2DET-B_ON LCL_SPI_ACS-B_ON LCL_PSD-B_ON LCL_DFEE-B_ON | | | T8505 = 0 T8501 = 0 T8507 = 0 P2165 = 1 P2171 = 1 P2167 = 1 P2170 = 1 P2169 = 1 | SPI is in Stand-by mode without HK acquisition IASW is in Stand-by mode without HK acquisition S/A self-tests performing |
| 70 | | Send TC to start IASW automatic reconfiguration process | F0555 | tc_ecl_exit_iasw | | 68843/11 69039 | F0049=2 | IASW checks the S/A self-tests results and restart HK acquisition set to the mode interrupted by the eclipse |
| 80 | | IASW eclipse status checking | | | | | F0089 = "NO" | If # come back to 70 |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|---------------|---------------------------------------------------------------------------------------|----------------|------------------|-----------------|-----------------|-----------------|---------|
| 90 | | ACS configuration acquisition request to update the High Voltage Configuration | | | | | | |
| | | Send TC to request System service 1 (watchdog, test conf, HV conf) | F0251 | tc-r_as_serv1 | | 69007 | | |
| | | Send TC to request System service 2 (watchdog, test conf, HV conf) | F0252 | tc-r_as_serv2 | | 69008 | | |
| | | Send TC to request System service 3 (watchdog, test conf, HV conf) | F0253 | tc-r_as_serv3 | | 69009 | | |
| 100 | Taos | Send TC to switch ON CDE heater M | T5576 | TSW_CDE_HTRA_ON | 1 | | T8015 = 1 | |
| 110 | Taos + 20hrs | Send TC to switch ON AFEE, DFEE, PSD, nominal heaters | T5006 | TSW_CAMER_H-A_ON | | | T8501 = 1 | |
| 120 | Taos + 20 hrs | Send TC to switch ON ACS and MASK nominal heaters. | T5036 | TSW_ACS_MSK-A_ON | | | T8507 = 1 | |



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- **Procedure n° 9-A R-ECLIPS-A**
 - Purpose: Eclipse management occurring during Outgassing phase
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: Before eclipse entry signal given by BCP the following telecommands must be sent to switch OFF Heat pip thaw heaters Main and Redundant, Annealing heater ain and Redundant and to switch ON Anti-freeze heaters 1 and 2 Main. The initial electrical configuration must be recovered at the end of the automatic reconfiguration process by sending the adapted telecommands.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 5 | | Send TC to switch OFF Heat pipes Thas Main Send TC to switch OFF Heat pipes Thas Red Send TC to switch OFF Annealing heater Main Send TC to switch OFF Annealing heater Red Send TC to switch ON Anti-freeze 1 Main Send TC to switch ON Anti-freeze 2 Main | T5010 T5110 T5015 T5115 T5021 T5026 | TSW_HEATPIP-A_OFF TSW_HEATPIP-B_OFF TSW_ANNEAL-A_OFF TSW_HEATPIP-A_OFF TSW_ANTFRZ1-A_ON TSW_ANTFRZ1-B_ON | 0 0 0 0 1 1 | | T8502 = 0 T8602 = 0 T8503 = 0 T8603 = 0 T8504 = 1 T8505 = 1 | If # execute GR2 |
| 10 | T – 3 min | Automatic instrument transition to Stand-by mode including context saving | | | | 520108 | F0049 = 1 | HK acquisitions are stopped |
| 20 | T – 1 min | Trigger TT command to switch ON Antifreeze heater n° 2 Trigger TT command to switch OFF AFEE chain detection Trigger TT command to switch OFF AFEE I/F TM/TC Trigger TT command to disable SECL S/W | T5026 P4310 P4290 | TSW_ANTFRZ2-A_ON LCL_AFE2DET-B_OFF LCL_AFE2TMTC-B_OFF | | | T8505 = 1 P2171 = 0 P2165 = 0 | |
| 30 | T | Trigger automatic switch OFF for ACS, PSD, DFEE, nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), Compensation heaters Main OFF TCS nominal heaters loops OFF, CDE M heaters | P4208 T5575 | LCL_SPI_ACS-A_OFF LCL_PSD-A_OFF LCL_DFEE-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF TWS_CDE_HTRA_OFF | | | P2117 = 0 P2120 = 0 P2119 = 0 T8501 = 0 T8507 = 0 P2222 = 0 T8015 = 0 | |
| 40 | T exit | Trigger automatic switch ON for nominal heaters (AFEE, PSD, DFEE), nominal heaters (ACS and MASK), TCS nominal heaters loops ON. | T5106 T5136 | TSW_CAMER_H-A_ON TSW_ACS_MSK-A_ON | | | T8501 = 1 T8507 = 1 | |
| 50 | Textit + 1 min | Compensation heaters Main ON | P4209 | | | | P2222 = 1 | |
| 60 | Textit + Taos | Send TC to switch OFF Antifreeze 2 heater Send TC to switch OFF AFEE, DFEE, PSD, nominal heaters Send TC to switch OFF ACS and MASK nominal heaters Send TC to switch ON AFEE I/F TM/TC Send TC to switch ON AFEE chain detection Send TC to switch ON ACS Send TC to switch ON PSD Send TC to switch ON DFEE | T5025 T5005 T5035 P4291 P4311 P4299 P4307 P4303 | TSW_ANTFRZ2-A_OFF TSW_CAMER_H-A_OFF TSW_ACS_MSK-A_OFF LCL_AF2TMTC-B_ON LCL_AF2DET-B_ON LCL_SPI_ACS-B_ON LCL_PSD-B_ON LCL_DFEE-B_ON | | | T8505 = 0 T8501 = 0 T8507 = 0 P2165 = 1 P2171 = 1 P2167 = 1 P2170 = 1 P2169 = 1 | SPI is in Stand-by mode without HK acquisition IASW is in Stand-by mode without HK acquisition S/A self-tests performing |
| 70 | | Send TC to start IASW automatic reconfiguration | F0555 | tc_ecl_exit_iasw | | 68843/11 | F0049=2 | IASW checks the S/A |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| | | process | | | | 69039 | | self-tests results and restart HK acquisition set to the mode interrupted by the eclipse |
| 80 | | IASW eclipse status checking | | | | | F0089 = "NO" | If # come back to 70 |
| 90 | | ACS configuration acquisition request to update the High Voltage Configuration | | | | | | |
| | | Send TC to request System service 1 (watchdog, test conf, HV conf) | F0251 | tc-r_as_serv1 | | 69007 | | |
| | | Send TC to request System service 2 (watchdog, test conf, HV conf) | F0252 | tc-r_as_serv2 | | 69008 | | |
| | | Send TC to request System service 3 (watchdog, test conf, HV conf) | F0253 | tc-r_as_serv3 | | 69009 | | |
| 100 | Taos | Send TC to switch ON CDE heater M | T5576 | TSW_CDE_HTRA_ON | 1 | | T8015 = 1 | |
| 110 | Taos + 20hrs | Send TC to switch ON AFEE, DFEE, PSD, nominal heaters | T5006 | TSW_CAMER_H-A_ON | | | T8501 = 1 | |
| 120 | Taos + 20 hrs | Send TC to switch ON ACS and MASK nominal heaters. | T5036 | TSW_ACS_MSK-A_ON | | | T8507 = 1 | |
| 130 | | Send TC to swtich ON Heat pipes Thas Main Send TC to swtich ON Heat pipes Thas Red Send TC to swtich ON Annealing heater Main Send TC to swtich ON Annealing heater Red Send TC to swtich OFF Anti-freeze 1 Main Send TC to swtich OFF Anti-freeze 2 Main | T5011 T5111 T5016 T5116 T5020 T5025 | TSW_HEATPIP-A_ON TSW_HEATPIP-B_ON TSW_ANNEAL-A_ON TSW_HEATPIP-A_ON TSW_ANTFRZ1-A_OFF TSW_ANTFRZ1-B_OFF | | | T8502 = 1 T8602 = 1 T8503 = 1 T8603 = 1 T8504 = 0 T8505 = 0 | If # execute GR2 |



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- **Procedure n° 10 R-STBANI**
 - Purpose: Stand-by mode in sight to Annealing mode and Annealing process
 - Constraints: detectors must be maintained at $103^{\circ}\text{C} \pm 3^{\circ}\text{C}$. The Camera high voltages are OFF (E190 – E208).
 - Time Criticality: Last around 26 hours to reach the annealing temperature and 24 hours at the dwell temperature assuming the availability of the two annealing lines.
 - System Level Prerequisites:
 - Sub-system Level Prerequisites: The IASW cold plate temperature monitoring is disable.
 - Special Processing: The RTU cold plate thermal sensors T5107 and T5114 are calibrated at 37°C during 2 hours by comparison with the AFEE cold plate thermal sensors F0391, F0392, F0393. This calibration is required in order to reduce the bias error and to control the temperature of the cold plate during the annealing by the SW satellite control loop with an accuracy of $\pm 2^{\circ}\text{C}$. The cold plate can reach up to 107.9°C (overshoot) during a nominal annealing process. The cold plate monitoring threshold by the satellite shall be set at 111°C ($108^{\circ}\text{C} + 1^{\circ}\text{C}$ of margin + 2°C of accuracy).

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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------|---------------------------------------------------------------------------------|
| 10 | | Send TC Mode change from Stand-by mode to Configuration | F0502 | tc_mode_chg_x | | | | |
| 20 | | Mode status checking | | | | 520108 | F0049 = 3 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 30 | | AFEE TM/TC status checking | | | | 520108 | F3881 = 1 | If # execute ECP13 |
| 33 | | Check that the IASW cold monitoring is disable | | | | | F8963 = 0 | |
| 35 | | Check detectors chains HV are OFF before sending F0004 TC | | | E5190- E5208=? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 40 | Tn | Send TC Chains ON/OFF configuration | F0004 | tc-c_af_ch-oo | FS1710_AF- CH-OO_ Outgass_0001.T PF | 68841/4 | | Outgassing configuration Wide range 62 K – 416 K Detectors HV OFF |
| 50 | Tn+25" | Send TC Chains ON/OFF configuration request | F0014 | tc-r_af_ch-oo | | 69003 | E0209 = 0 E0003 = 255 E0004 = 255 | If # E5003 execute GR2 If # E5004 execute GR2 |
| 51 | | Cryocoolers change mode from operational to Stand-by CDE Send TC to decrease compressors and displacers amplitude CDE 1 step by step until "0" reached Send TC to decrease compressors and displacers amplitude CDE 2 step by step until "0" reached | E9966 E9987 | CDE1_M_CHNG_AMPL CDE2_S_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = CA* Bit8 = 1 Bit9 = 1 E9961 = CA* Bit0 = 1 Bit1 = 1 E9980 = CA* Bit8 = 1 Bit9 = 1 E9981 = CA* | | | Back to Cryocooler Stand-by mode Back to Cryocooler Stand-by mode |

* CA* Current Amplitude



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|----------------------------------------------------------|-----------------------------------------|
| 52 | | Check CDE compressors drive amplitude | | | | | F9960 = F9961 = v F9980 = F9981 = v | 0 < v < 50 |
| 53 | | Check CDE input current | | | | | P1061 P1063 | 0.5 A < I < 0.6 A |
| 54 | | | | | | | | |
| 55 | | Send TC to set CDE 1 displacers to "0" amplitude | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | Back to Launch Lock Mode |
| 56 | | Send TC to set CDE 2 displacers to "0" amplitude | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9980 = 0 Bit8 = 0 Bit9 = 1 E9981 = 0 | | | Back to Launch Lock Mode |
| | | Check the CDE configuration | | | | | F9971 = F9991 = 1 F9972 = F9992 = 1 | If # execute GR1 |
| | | Check CDE input current | | | | | P1061 P1063 | 0.3 < I < 0.5 Amp |
| 57 | | Send TC to disable CDE 1 compressors and displacers | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Standby Mode |
| 58 | | Send TC to disable CDE 2 compressors and displacers | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | |
| 59 | | Check CDE input current Check the Stand-by/operational status monitor | | | | | P1061 P1063 F9971 = F9991 = 0 F9972 = F9992 = 0 | 0.1 < I < 0.2 A If # execute GR1 |
| 60 | | Send TC Annealing Heater 1 (M) ON | T5016 | TSW_ANNEAL-A_ON | | | T8503 = 1 | Wait F0391, F0392, F0393 > |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------------------------------------------------------------|----------------|----------------------------------------|---------------------------------------------|-----------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| | | | | | | | | 120 K before performing step 70 |
| 70 | | Send TC Annealing Heater 2 (R) ON | T5116 | TSW_ANNEAL-B_ON | | | T8603 = 1 | |
| 72 | | Check cold plate temperatures | | | | | F0391 = ? F0392 = ? | When E0391, E0392 > -30°C Perform step 75 |
| 73 | | Send TC to switch OFF Compensation heaters M | P4208 | TSW_ACC_HTR_A_OFF | | | P2222 = 0 | |
| 75 | | Send TC to switch OFF Antifreeze heater M 2 Send TC to switch OFF Antifreeze heater M 1 | T5025 T5020 | TSW_ANTFRZ2-A_OFF TSW_ANTFRZ1-A_OFF | | | T8505 = 0 T8504 = 0 | |
| 76 | | Send TC to switch ON Heat pipe thaw heater M Send TC to switch ON Heat pipe thaw heater R | T5011 T5111 | TSW_HEATPIP-A_ON TSW_HEATPIP-B_ON | | | T8502 = 1 T8602 = 1 | |
| 80 | | Wait until E0391, E0392, E0393, E0394 are all over 33°C | | | | 65601/9 | F0391 > 33°C F0392 > 33°C F0393 > 33°C F0394 > 33°C | Regulation range achieved at 33°C |
| 85 | | Cryogenic temperatures checking and PRTU sensor T5107 and T5114 analysis during 2 hours for calibration | | | | 65601/9 | F0391 = 37°C ± 4 F0392 = 37°C ± 4 F0393 = 37°C ± 4 F0394 = 37°C ± 4 | When temperature reached => wait 2 hrs |
| 90 | | Temperatures via PRTU correlation with E0391, E0392 and E0393 | | | | | T5107 , T5114 | In flight calibration of T5107 and T5114 by comparison of the mean values with E0391, E0392 and E0393 |
| 100 | | Update the threshold of the S/C cold plate temperature control loop at 111°C (real temperature) | | | | | T5107 , T5114 | Used the in flight calibration of T5107 and to limit the maximum cold plate temperature.. |
| 105 | | Check HV ON/OFF parameters Setting are "OFF" in TC F0004 | | | E5190 to E5208 = ? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 110 | Tn | Send TC Chains ON/OFF configuration | F0004 | tc-c_af_ch-oo | FS1710_AF- CH- OO_anneal_000 1.TPF | | | Wide range 62 K – 416 K Detectors HV OFF Annealing temperature |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|----------------------------------------------------------|----------------|---------------|-----------------|-----------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| | | | | | | | | regulation |
| 120 | Tn+25" | Send TC Chains ON/OFF configuration request | F0014 | tc-r_af_ch-oo | | 69000 | E0003 = 0 E0004 = 0 E0190 to E0208 = 0 | If # E5003 execute GR2 If # E5004 execute GR2 Detectors HV OFF |
| 130 | | Wait until E0391, E0392, E0393, E0394 are all over 100°C | | | | 69601/9 | F0391 > 100°C F0392 > 100°C F0393 > 100°C F0394 > 100°C | Regulation range archived at 100°C |
| 160 | | Cryogenic temperature checking during 24 hours | | | | 69601/9 | F0391 = 104°C ± 4° F0392 = 104°C ± 4° F0393 = 104°C ± 4° F0394 = 104°C ± 4° | When all parameters are in the range 104°C ± 4°, wait and check during 24 h that this condition is true |



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- **Procedure n° 11 R-COOSTB**

- Purpose: Back to Stand-by mode from Cooling mode
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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• **Procedure n° 12 R-BKSTBY**

- Purpose: Back to Stand-by mode from Configuration, Operational, Calibration and Diagnostic modes.

The return to the Stand-by mode is needed when the electrical status of one or more sub-assemblies must be changed. The previous S/A parameters configuration is lost. An up-load of all the parameters is necessary.

- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing: Switch OFF automatically AFEE HV and PMT HV



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|----------|------|--------------------------------------------------------------|----------------|------------------|-----------------|-----------------|---------------------------------------------------------------|--------------------------------------------|
| 10 20 | | Change mode TC Back to Stand-by mode Mode status checking | F0505 | tc_mode_chg_y | | 520108 | F0049 = 2 F3881 = 0 F3884 = 0 F3887 = 0 F3890 = 0 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 30 | | Send TC to switch ON the antifreeze 2 M | T5026 | TWS_ANTFRZ2-A_ON | | | T8505 = 1 | |



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- **Procedure n°** **13-P** **R-PHOTON**
 - Purpose: Real transition to Operational Photon/Photon Mode: IASW sends Start command to the S/A which are powered
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------|----------------|---------------|-----------------|-----------------|---------------------------------------------------------------|--------------------------------------------|
| 10 | | Change mode TC Go to Operational | F0501 | tc_mode_chg_s | | | | |
| 20 | | Photon/Photon mode Mode status checking | | | | 520108 | F0049 = 4 F3881 = 2 F3884 = 2 F3887 = 2 F3890 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |



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• **Procedure n° 13-E R-EMCY**

- Purpose: Real transition to Operational TM Emergency Mode: IASW sends Start command to the S/A which are powered
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 3 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to modify the parameter E7782 | F0102 | tc-c_df-cl-line | E7782 = 2 | | | |
| 30 | | Send OR corresponding TC | F0112 | tc-r_df-cl-line | | 64004 | E2782 = 2 | |
| 30 | | Change mode TC Go to Operational | F0506 | tc_mode_chg_e | | CSSW HK | F0049 | |
| 40 | | TM Emergency mode | | | | 240108 | F0049 = 6 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | Mode status checking | | | | | F3881 = 2 | |
| | | | | | | | F3884 = 2 | |
| | | | | | | | F3887 = 2 | |
| | | | | | | | F3890 = 2 | |



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- **Procedure n° 14 R-CAL**

- Purpose: Real Calibration mode transition
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------|----------------|---------------|-----------------|-----------------|--------------------------------------------------|-----------------------------------------|
| 10 | | Change mode TC Go to Calibration mode | F0503 | tc_mode_chg_c | | | | |
| 20 | | Mode status checking | | | | 520108 | F0049 = 5 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | | | | | | F3881 = 2 F3884 = 2 F3887 = 2 F3890 = 4 | |



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- **Procedure n° 15 R-DIAG**
 - Purpose: Real Diagnostic mode transition
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------|---------------------------------------------------------------|--------------------------------------------|
| 10 | | Change mode TC Go to Diagnostic mode | F0504 | tc_mode_chg_d | | 520108 | F0049 | |
| 20 | | Mode status checking | | | | 520108 | F0049 = 7 F3881 = 2 F3884 = 3 F3887 = 3 F3890 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 30 | | Send Tc on request for diagnostic configuration sended | F0591 F0592 F0593 F0594 F0595 F0596 | tc-r_diag_n1 tc-r_diag_n2 tc-r_diag_n3 tc-r_diag_n4 tc-r_diag_n5 tc-r_diag_n6 | | 69901 69902 69903 69904 69905 69906 | | |



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- **Procedure n° 16 R-BKCONF**
 - Purpose: Back to Configuration mode from Operational, Calibration and Diagnostic modes.
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------|----------------|---------------|-----------------|-----------------|--------------------------------------------------|-----------------------------------------|
| 10 | | Change mode TC Back to Configuration | F0502 | tc_mode_chg_x | | | | |
| 20 | | Mode status checking | | | | 520108 | F0049 = 3 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| | | | | | | | F3881 = 1 F3884 = 1 F3887 = 1 F3890 = 1 | |



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- **Procedure n° 17-1 R-LDCONF-PSD**
- Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
- Constraints:
- Time Criticality:
- System Level Prerequisites: To be in CONF mode (F49=4).
- Sub-system Level Prerequisites: To have declared PSD ON on TC F500 (Conf ON/OFF, parameter F8903). If it is not clearly specified, send the configuration TC with parameters values taken into file FS1740_PD-DETED_fmconfig_0001.TPF, FS1741_PD-LWTHR_fmconfig_0001.TPF, FS1742_PD-HGTHR_fmconfig_0001.TPF, FS1743_PD-ADOFS_fmconfig_0001.TPF, FS1744_PD-LIBSL_fmconfig_0001.TPF, FS1745_PD-CV-RT_fmconfig_0001.TPF (see §2.3.1. in this volume).
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------|-----------------------------------------------|-------------------|-----------------|---------|
| 10 | | Send TC to set up detectors enable Send the corresponding on-request TC | F0300 F0320 | tc-c_pd_det-enb tc-r_pd_det-enb | FS1740_PD- DETED_fmco nfig_0001.TPF | 69843/1 69029 | | |
| 20 | | Send TC to set up low threshold for energy Send the corresponding on-request TC | F0301 F0321 | tc-c_pd_lw-thr1 tc-r_pd_lw-thr1 | FS1741_PD- LWTHR_fmco nfig_0001.TPF | 68843/2 69030 | | |
| 30 | | Send TC to set up low threshold for energy Send the corresponding on-request TC | F0302 F0322 | tc-c_pd_lw-thr2 tc-r_pd_lw-thr2 | | 68843/3 69031 | | |
| 40 | | Send TC to set up high threshold for energy Send the corresponding on-request TC | F0303 F0323 | tc-c_pd_hg-thr1 tc-r_pd_hg-thr1 | FS1742_PD- HGTHR_fmco nfig_0001.TPF | 68843/4 69032 | | |
| 50 | | Send TC to set up high threshold for energy Send the corresponding on-request TC | F0304 F0324 | tc-c_pd_hg-thr2 tc-r_pd_hg-thr2 | | 68843/5 69033 | | |
| 60 | | Send TC to set up A/D offsets Send the corresponding on-request TC | F0305 F0325 | tc-c_pd_ad-ofst tc-r_pd_ad-ofst | FS1743_PD_A DOFS_fmconfi g_0001.TPF | 68843/6 69034 | | |
| 70 | | Send TC to set up definition of library selection and control 1 Send the corresponding on-request TC | F0306 F0326 | tc-c_pd_lib-sel1 tc-r_pd_lib-sel1 | FS1744_PD- LIBSL_fmconf ig_0001.TPF | 68843/7 69035 | | |
| 80 | | Send TC to set up definition of library selection and control 2 Send the corresponding on-request TC | F0307 F0327 | tc-c_pd_lib-sel2 tc-r_pd_lib-sel2 | | 68843/8 69036 | | |
| 90 | | Send TC to set up definition of library selection and control 3 Send the corresponding on-request TC | F0308 F0328 | tc-c_pd_lib-sel3 tc-r_pd_lib-sel3 | | 68843/9 69037 | | |
| 100 | | Send TC to set up definition of curve transmission rates Send the corresponding on-request TC | F0309 F0329 | tc-c_pd_crv-rte tc-r_pd_crv-rte | FS1745_PD- CV- RT_fmconfig_ 0001.TPF | 68843/10 69038 | | |



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- **Procedure n° 17-2 R-LDCONF-AFEE_HV_OFF**
 - Purpose: Configuration loading with AFEE HV OFF.
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (F49=4).
 - Sub-system Level Prerequisites: To have declared AFEE ON on TC F500 (Conf ON/OFF, parameter F8900). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files FS1710_AF-CH-OO_def-grnd_0001.TPF, FS1711_AF-LW-DT_fmconfig_0001.TPF, FS1712_AF-CHPAR_fmconfig_0001.TPF, FS1713_AF-HVSET_def-grnd_0001.TPF (see § 2.3.1 in this volume).
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------------------------------------------------------|---------------------------------------------------------------------------------------|----------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------|----------------------------------|---------|
| 10 | T ₀ T _n =T ₀ + 25" | Send TC to set up chains ON/OFF configuration Send the corresponding on-request TC | F0004 F0014 | tc-c_af_ch_oo tc-r_af_ch-oo | Values taken into account into FS1710_AF-CH-OO_def-grnd_0001.TPF | 68841/4 69003 | Check that TM equal commanded TC | |
| 20 | | Send TC to set up AFEE low threshold Send the corresponding on-request TC | F0002 F0012 | tc-c_af_lwdt tc-r_af_lwdt | Values taken into account into FS1711_AF-LW-DT_fmconfig_0001.TPF Except if specified at the procedure entrance | 68841/2 69001 | | |
| 30 | | Send TC to set up chain parameter Send the corresponding on-request TC | F0003 F0013 | tc-c_af_ch-par tc-r_af_ch-par | Values taken into account into FS1712_AF-CHPAR_fmconfig_0001.TPF Except if specified at the procedure entrance | 68841/3 69002 | | |
| 40 | | Send TC to set up AFEE high voltage Send the corresponding on-request TC | F0001 F0011 | tc-c_af_hv tc-r_af_hv | Values taken into account into FS1713_AF-HVSET_def-grnd_0001.TPF Except if specified at the procedure entrance | 68841/1 69000 | | |



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- **Procedure n°** **17-3** **R-LDCONF-AFEE_HV_ON**
 - Purpose: Configuration loading with AFEE HV ON.
 - Constraints: GED temperatures (F391 to F394) must be less than 91K in nominal case or less than 117K (commissioning phase or after annealing). Check that cold plate monitoring is enable (F3963=1). Temperature range must be in narrow range (E209=1). Thresholds (F3964 to F3967) must be in accordance with GED temperature (5K over the corresponding cold plate temperature parameter (F0391 to F0394)). The AFEE HV shall not be switched ON if PA2 temperatures (F0210-F0228) are outside the nominal range.
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (F49=4)
 - Sub-system Level Prerequisites: To have declared AFEE ON on TC F500 (Conf ON/OFF, parameter F8900). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files FS1710_AF-CH-OO_fmconfig_0001.TPF, FS1711_AF-LW-DT_fmconfig_0001.TPF, FS1712_AF-CHPAR_fmconfig_0001.TPF, FS1713_AF-HVSET_fmconfig_0001.TPF (see § 2.3.1 in this volume).
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------|-------------------------------------------------------------------|
| 10 | | Check GED temperatures Send TC to request GED temperatures | F0031 | tc-r_af_cryo | . | | F0391 to F0394 < 91K | 117K for commissioning or after annealing |
| 20 | | Check IASW current configuration Send TC to request non exposure parameters | F0523 | tc-r_def_exp_iasw | . | | F3963=1 F0391 to F0394 <E3964 to E3967 ≤ (F0391 to F0394) +5 | Narrow range (62-128K) Colsd plate monitoring Thresholds |
| 25 | | Check PA2 temperatures Send TC to request PA2 temperatures | F0020 F0028 | tc-r_af_pa2-1 tc-r_af_pa2-2 | | 69640 69640 | F0210 to F0228 | If temperatures are outside the nominal range stop the procedure. |
| 30 | | Prepare synoptics and TC in case of anomaly Display the synoptic DC output voltage as defined in OPER CONSTRAINTS 1 Prepare in case of problem, the F505 TC (go to STBY mode) | | | | | | To be sent only in case of problem (see step TBD) |
| 40 | | Wait for the next 65601 packet downlink | | | | 65601 | | To avoid erroneous spike on synoptics (due to old value) |
| 50 | | Send TC to set up AFEE low threshold Send the corresponding on-request TC | F0002 F0012 | tc-c_af_lwdt tc-r_af_lwdt | Values taken into account into FS1711_AF-LW-DT_fmconfig_0001.TPF Except if specified at the procedure entrance | 68841/2 69001 | | |
| 60 | | Send TC to set up chain parameter Send the corresponding on-request TC | F0003 F0013 | tc-c_af_ch-par tc-r_af_ch-par | Values taken into account into FS1712_AF-CHPAR_fmconfig_0001.TPF Except if specified at the procedure entrance | 68841/3 69002 | | |



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| | | | | | | | | |
|-----|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 70 | T_0 $T_n = T_0 + 25''$ | Send TC to set up chains ON/OFF configuration Send the corresponding on-request TC | F0004 F0014 | tc-c_af_ch_oo tc-r_af_ch-oo | Values taken into account into FS1710_AF-CH-OO_fmconfig_0001.TPF Except if specified at the procedure entrance | 68841/4 69003 | | |
| 80 | | Send OR TC to obtain DC output voltages values during 5 minutes approximately around every second | F0026 | | Values taken into account into FS1713_AF-HVSET_fmconfig_0002.TPF | | | Perform step 90 as soon as the first TCs are sent. |
| 90 | | Send TC to set up AFEE high voltage Send the corresponding on-request TC | F0001 F0011 | tc-c_af_hv tc-r_af_hv | | 68841/1 69000 | | |
| 100 | | During execution of steps 80 and 90, check on synoptic DC output voltages for each AFEE In case of spikes on the plots during the signal rising, send immediately the prepared TC F505 in order to switch off the AFEE HV (by going in STBY mode) | | | | | | The voltage values should regularly increase from -2.5 V up to TBD (-0.5 V for ground tests) |
| 110 | | When the normal DC output voltages are reached : Send the OR TC to obtain the HV value | F0021 | | | | F0250 to F0268 are equal to commanded values E5010 to E5028 $\pm 100V$ | |



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- **Procedure n° 17-4 R-LDCONF-DFEE**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (F49=3).
 - Sub-system Level Prerequisites: To have declared DFEE ON on TC F500 (Conf ON/OFF, parameter F8901). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files FS1720_DF-SWPAR_fmconfig_0001.TPF, FS1721_DF-CLPAR_fmconfig_0003.TPF, FS1722_DF-AFADJ_fmconfig_0001.TPF (see § 2.3.1. in this volume).
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------------------------------------------------------|-------------------|------------------------------------|-------------------------------------------|--------------------|--------------------|---------|
| 10 | | Send TC to set up software parameters setting Send the corresponding on-request TC | F0101 F0111 | tc-c_df_sw-par tc-r_df_sw-par | FS1720_DF- SWPAR_fmco nfig_0001.TPF | 68841/7 69004 | | |
| 20 | | Send TC to set up control lines parameters setting Send the corresponding on-request TC | F0102 F0112 | tc-c_df_cl-line tc-r_df_cl-line | FS1721_DF- CLPAR_fmcon fig_0003.TPF | 68841/5 69005 | | |
| 30 | | Send TC to set up AFEE adjustment state machine conf. lines Send the corresponding on-request TC | F0103 F0113 | tc-c_df_af-adj tc-r_df_af-adj | FS1722_DF- AFADJ_fmcon fig_0003.TPF | 69841/6 69006 | | |



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- **Procedure n°** **17-5** **R-LDCONF-ALL-CONF**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (F49=3).
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------|----------------|--------------|-----------------|-----------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 10 | | Check SPI state | | | | 520108 | F0049 = 3 F3881 = 1 F3884 = 1 F3887 = 1 F3890 = 1 | If # excute P16 or ECP1/ECP3/ECP5/ECP7 If # execute ECP13/ECP14/ECP15/ ECP16 |
| 20 | | Send TC to load all configuration already loaded | F0556 | tc_send_conf | | | | |



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- **Procedure n°** **17-6** **R-LDCONF-ALL-PATCH**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (F49=3).
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------|----------------|---------------|-----------------|-----------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 10 | | Check SPI state | | | | 520108 | F0049 = 3 F3881 = 1 F3884 = 1 F3887 = 1 F3890 = 1 | If # excute P16 or ECP1/ECP3/ECP5/ECP7 If # execute ECP13/ECP14/ECP15/ ECP16 |
| 20 | | Send TC to load all patches already loaded | F0557 | tc_send_patch | | | | |



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- **Procedure n°** **17-7** **R-LDCONF-ACS**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in CONF mode (F49=3).
 - Sub-system Level Prerequisites: To have declared ACS ON on TC F500 (Conf ON/OFF, parameter F8902). If it is not clearly specified, send the configuration TC with parameters values taken into TPF files ES1730_AS-VTPLS_fmconfig_0001.TPF, FS1731_AS-HV-ED_fmconfig_0001.TPF, ES1732_AS-SERVS_fmconfig_0001.TPF, ES1733_AS-VTCONF_fmconfig_0001.TPF, FS1734_AS-RT-MT_fmconfig_0001.TPF, FS1735_AS-VTDLY_fmconfig_0001.TPF, FS1736_AS-EVTGR_fmconfig_0001.TPF, FS1737_AS-ENDSC_fmconfig_0001.TPF, FS1738_AS-HVSET_fmconfig_0001.TPF (see § 2.3.1 in this volume).
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------------------|-------------------------------------------------------------------|----------------|------------------|-----------------------------------|-----------------|-----------------|---------|
| 10 | Wait 40'' | Send TC to set up veto pulse width, overall veto masked | F0222 | tc-c_as_vto_pls | FS1730_AS-VTPLS_fmconfig_0001.TPF | 68842/14 | | |
| | | Send the corresponding on-request TC | F0272 | tc-r_as_vto-pls | | 69028 | | |
| 20 | Wait 40'' | Send TC to set up high voltage enabled/disabled | F0224 | tc-c_as_hv-ed | FS1731_AS-HV-ED_fmconfig_0001.TPF | 68843/14 | | |
| | | Send the corresponding on-request TC | F0273 | tc-r_as_hv-ed | | 69046 | | |
| 30 | Wait 40'' | Send TC to set up system service 1 (watchdog, test conf, HV conf) | F0201 | tc-c_as_serv1 | FS1732_AS-SERVS_fmconfig_0001.TPF | 68841/8 | | |
| | | Send TC to set up system service 2 (watchdog, test conf, HV conf) | F0202 | tc-c_as_serv2 | | 68841/9 | | |
| | | Send TC to set up system service 3 (watchdog, test conf, HV conf) | F0203 | tc-c_as_serv3 | | 68841/10 | | |
| | | Send the corresponding on-request TC | F0251 | tc-r_as_serv1 | | 69007 | | |
| | | | F0252 | tc-r_as_serv2 | | 69008 | | |
| F0253 | tc-r_as_serv3 | 69009 | | | | | | |
| 40 | Wait 40'' | Send TC to set up Veto signal configuration n°1 | F0204 | tc-c_as_vto-cnf1 | FS1733_AS-VTCNF_fmconfig_0001.TPF | 68841/11 | | |
| | | Send TC to set up Veto signal configuration n°2 | F0205 | tc-c_as_vto-cnf2 | | 68841/12 | | |
| | | Send TC to set up Veto signal configuration n°3 | F0206 | tc-c_as_vto-cnf3 | | 68841/13 | | |
| | | Send the corresponding on-request TC | F0254 | tc-r_as_vto-cnf1 | | 69010 | | |
| | | | F0255 | tc-r_as_vto-cnf2 | | 69011 | | |
| F0256 | tc-r_as_vto-cnf3 | 69012 | | | | | | |
| 50 | Wait 40'' | Send TC to set up rate meter n°1 FEE 0 to 30 | F0207 | tc-c_as_rate-mt1 | FS1734_AS_RT-MT_fmconfig_0001.TPF | 68841/14 | | |
| | | Send TC to set up rate meter n°2 FEE 31 to 61 | F0208 | tc-c_as_rate-mt2 | | 68841/15 | | |
| | | Send TC to set up rate meter n°3 FEE 62 to 91 | F0209 | tc-c_as_rate-mt3 | | 68841/16 | | |
| | | Send the corresponding on-request TC | F0257 | tc-r_as_rate-mt1 | | 69013 | | |
| | | | F0258 | tc-r_as_rate-mt2 | | 69014 | | |
| F0259 | tc-r_as_rate-mt3 | 69015 | | | | | | |
| 60 | Wait 40'' | Send TC to set up Veto signal delay n°1 FEE 0 to 30 | F0210 | tc-c_as_vto-dly1 | FS1735_AS-VTDLY_fmconfig_0001.TPF | 68842/2 | | |
| | | Send TC to set up Veto signal delay meter n°2 FEE 31 to 61 | F0211 | tc-c_as_vto-dly2 | | 68842/3 | | |
| | | Send TC to set up Veto signal delay meter n°3 FEE 62 to 91 | F0212 | tc-c_as_vto-dly3 | | 68842/4 | | |
| | | Send the corresponding on-request TC | F0260 | tc-r_as_vto-dly1 | | 69016 | | |
| | | | F0261 | tc-r_as_vto-dly2 | | 69017 | | |
| F0262 | tc-r_as_vto-dly3 | 69018 | | | | | | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------|------------------------------------------------------------|----------------|------------------|------------------------------------|-----------------|-----------------|---------|
| 70 | Wait 40" | Send TC to set up event trigger threshold for FEE 0 to 30 | F0213 | tc-c_as_evt-trg1 | FS1736_AS-EVTR_fmconfi_g_0001.TPF | 68842/5 | | |
| | | Send TC to set up event trigger threshold for FEE 31 to 61 | F0214 | tc-c_as_evt-trg2 | | 68842/6 | | |
| | | Send TC to set up event trigger threshold for FEE 62 to 91 | F0215 | tc-c_as_evt-trg3 | | 68842/7 | | |
| | | Send the corresponding on-request TC | F0263 | tc-r_as_evt-trg1 | | 69019 | | |
| | | | F0264 | tc-r_as_evt-trg2 | | 69020 | | |
| | | | F0265 | tc-r_as_evt-trg3 | 69021 | | | |
| 80 | Wait 40" | Send TC to set up Energy discriminator for FEE 0 to 30 | F0216 | tc-c_as_nrg-dsc1 | FS1738_AS-HVSET_fmconfi_g_0001.TPF | 68842/8 | | |
| | | Send TC to set up Energy discriminator for FEE 31 to 61 | F0217 | tc-c_as_nrg-dsc2 | | 68842/9 | | |
| | | Send TC to set up Energy discriminator for FEE 62 to 91 | F0218 | tc-c_as_nrg-dsc3 | | 68842/10 | | |
| | | Send the corresponding on-request TC | F0266 | tc-r_as_nrg-dsc1 | | 69022 | | |
| | | | F0267 | tc-r_as_nrg-dsc2 | | 69023 | | |
| | | | F0268 | tc-r_as_nrg-dsc3 | 69024 | | | |
| 90 | Wait 40" | Send TC to set up high voltage for FEE 0 to 30 | F0219 | tc-c_as_hv1 | FS1738_AS-HVSET_fmconfi_g_0001.TPF | 68842/11 | | |
| | | Send TC to set up high voltage for FEE 31 to 61 | F0220 | tc-c_as_hv2 | | 68842/12 | | |
| | | Send TC to set up high voltage for FEE 62 to 91 | F0221 | tc-c_as_hv3 | | 68842/13 | | |
| | | Send the corresponding on-request TC | F0269 | tc-r_as_hv1 | | 69025 | | |
| | | | F0270 | tc-r_as_hv2 | | 69026 | | |
| | | | F0271 | tc-r_as_hv3 | 69027 | | | |



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- **Procedure n° 17-8 R-LDCONF-IASW**
 - Purpose: Configuration loading: set up the needed parameters values which are different from on board default values
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in STAND-BY or in CONF mode F49= 2/3).
 - Sub-system Level Prerequisites: send the configuration TC with parameters values taken into TPF file FS1700_IASW-PAR_fmconfig_0002.TPF (see § 2.3.1 in this volume)
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|----------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------|----------------------------------------------|----------------------|-----------------|---------|
| 10 | | Send TC to set up non exposure parameters Configuration Send TC to set up exposure parameters configuration (if needed) | F0518 F0519 | tc_def_cnf-iasw tc_def_exp-iasw | FS1700- IASW- PARfmconfig_ 0002.TPF | 68843/11 68843/12 | | |
| 20 | | Send the corresponding on-request TC | F0523 F0524 | tc-r_def_cnf-iasw tc-r_def_exp-iasw | | 69039 69040 | | |



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- **Procedure n° 18 R-ANISTB**
 - Purpose: Back to Stand-by mode from Annealing mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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- **Procedure n° 19 R-STBOG**
 - Purpose: Stand-by mode to Outgassing mode and outgassing process.
 - Constraints: . The Camera high voltages are OFF (E0190 – E0208). This procedure shall be used after procedure P4
 - Time Criticality: Detectors must be maintained at $37^{\circ}\text{C} \pm 4^{\circ}\text{C}$ during 251 hours and at $80^{\circ}\text{C} \pm 2^{\circ}\text{C}$ during 24 hours.
 - System Level Prerequisites: AFEE I/F TM/TC initialised annealing threshold temperature set up
 - Sub-system Level Prerequisites: The IASW cold plate temperature monitoring is disable.
 - Special Processing: The RTU cold plate thermal sensors T5107 and T5114 are calibrated at 37°C during 2 hours by comparison with the AFEE cold plate thermal sensors F0391, F0392, F0393. This calibration is required in order to reduce the bias error of sensors used by the SW satellite control loop and allows a temperature monitoring of the cold plate with an accuracy of $\pm 2^{\circ}\text{C}$. The monitoring threshold shall be set at 111°C (real temperature) in CDMU.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|-------------------------|-------------------------------------------------------------------------------------------|----------------|-------------------|-----------------------------------|-----------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC Mode change from Stand-by mode to Configuration | F0502 | tc_mode_chg_x | | | | |
| 20 | | Mode status checking | | | | 520108 | F0049 = 3 | If # 3 execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 23 | | Check that the IASW cold monitoring is disable | | | | | F8963 = 0 | |
| 25 | | Check HV ON/OFF parameters Setting are "OFF" in TC F0004 | | | E5190 to E5208 = 0 | | | If ≠ 0, set E5190 to E5208 to 0 |
| 30 | T ₀ | Send TC Chains ON/OFF configuration | F0004 | tc-c_af_ch-oo | FS1710_AF-CH-OO_outgasng_0001.TPF | | | Outgassing LVPS ON Detectors HV OFF Range 62 K - 416 K Outgassing range regulation |
| 40 | Tn=T ₀ + 25" | Send TC Chains ON/OFF configuration request | F0014 | tc-r_af_ch-oo | | 69000 | E0003 E0004 | If # E5003 If # E5004 execute GR1 |
| 50 | | Send TC to switch OFF antifreeze heaters 2 Main | T5025 | TSW_ANTFRZ2-A_OFF | 0 | | T8505 = 0 | If # execute GR2 |
| 60 | | Send TC to switch OFF antifreeze heaters 1 Main | T5020 | TSW_ANTFRZ1-A_OFF | 0 | | T8504 = 0 | |
| 65 | | Send TC Annealing Heater 1 (M) ON | T5016 | TSW_ANNEAL-A_ON | 1 | | T8503 = 1 | |
| 70 | | Send TC Annealing Heater 2 (R) ON | T5116 | TSW_ANNEAL-B_ON | 1 | | T8603 = 1 | |
| 80 | | Send TC Heat pipes thaw heater M ON | T5011 | TSW_HEATPIP-A_ON | 1 | | T8502 = 1 | |
| 90 | | Send TC Heat pipes thaw heater R ON | T5111 | TSW_HEATPIP-B_ON | 1 | | T8602 = 1 | |
| 100 | | Deleted | | | | | | |
| 105 | | Wait until F0391, F0392, F0393, F0394 are all over 33°C | | | | 65601/9 | F0391 > 33°C F0392 > 33°C F0393 > 33°C F0394 > 33°C | Regulation range archived at 33°C |
| 110 | | Cryogenic temperatures checking and PRTU sensor T5107 and T5114 analysis during 168 hours | | | | 65601/9 | F0391 = 37°C ± 4 F0392 = 37°C ± 4 F0393 = 37°C ± 4 F0394 = 37°C ± 4 | When temperature reached => wait 168 hrs |
| 120 | | Temperatures via PRTU correlation with F0391, F0392 and F0393 | | | | | T5107 , T5114 | In flight calibration of T5107 and T5114 by |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|-------------------------------------------------------------------------------------------------|----------------|------------------|---------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | | | | | | | | comparison of the mean values with F0391, F0392 and F0393 |
| 125 | | Update the threshold of the S/C cold plate temperature control loop at 111°C (real temperature) | | | | | T5107 , T5114 | Used the in flight calibration of T5107 and to limit the maximum cold plate temperature.. |
| 130 | | Cryogenic temperatures and PRTU sensor T5107 and T5114 checking during 83 hours | | | | 65601/9 | F0391 = 37°C ± 4 F0392 = 37°C ± 4 F0393 = 37°C ± 4 F0394 = 37°C ± 4 T5107 = 37°C ± 5 T5114 = 37°C ± 5 | Wait 83 hrs |
| 140 | | Check HV ON/OFF parameters Setting are "OFF" in TC F0004 | | | E5190 to E5208 = 0 | | | If ≠ 0, set E5190 to E5208 to 0 |
| 150 | Tn | Send TC Chains ON/OFF configuration | F0004 | tc-c_af_ch-oo | FS1710_AF- CH- OO_anneal_00 01.TPF | | | Wide range 62 K – 416 Detectors HV OF Annealing temperature regulation |
| 160 | Tn+25s | Send TC Chains ON/OFF configuration request | F0014 | tc-r_af_ch-oo | | 69000 | E0003 E0004 | If # execute GR2 |
| 170 | | When F394 is ≥ 78 °C note the time T0 of the beginning of the hot temperature phase | | | 1 | | F0394 ≤ ? | F0391, F0392 and F0393 shall be ≥ 78 °C Note the time |
| 175 | | Send TC to switch OFF Annealing 1 (M) heater | T5015 | TSW_ANNEAL-A_OFF | | | T8503 = 0 | If # execute GR2 |
| 180 | | Wait until F0394 is ≥ 82 °C | | | 1 | | F0394 ≤ ? | Control by ground Around 50 mn after the previous step |
| 190 | | Send TC to switch OFF Annealing 2 (R) heater | T5115 | TSW_ANNEAL-B_OFF | | | T8603 = 0 | If # execute GR2 |
| 200 | | Wait until F0394 is ≤ 78 °C | | | 1 | | F0394 ≥ ? | Control by ground Around 50 mn after the previous step |
| 210 | | Send TC to switch ON Annealing 2 (R) heater | T5116 | TSW_ANNEAL-B_ON | | | T8603 = 1 | If # execute GR2 |
| 220 | | Return to the step 180 until the hot temperature phase duration= 24 h (T=T ₀ + 24 h) | | | 1 | | F0391 or F0392 or F0393 or F0394 ≤ 78 °C | Note the time |



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- **Procedure n° 20 R-OGSTBY**
 - Purpose: Back to Stand-by mode from Outgassing mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------|----------------|-------------------|-----------------|-----------------|-----------------|----------------------------------------------|
| 10 | | Send TC Heat pipes thaw heater M OFF | T5010 | TSW_HEATPIP-A_OFF | 0 | | T8502 = 0 | If # execute GR2 |
| 20 | | Send TC Heat pipes thaw heater R OFF | T5110 | TSW_HEATPIP-B_OFF | 0 | | T8602 = 0 | |
| 30 | | Send TC Annealing Heater redundant OFF | T5115 | TSW_ANNEAL-B_OFF | 0 | | T8603 = 0 | |
| 40 | | Send TC to switch ON antifreeze heaters 1 Main | T5021 | TSW_ANTFRZ1-A_ON | 1 | | T8504 = 1 | |
| 50 | | Send TC to switch ON antifreeze heaters 2 Main | T5026 | TSW_ANTFRZ2-A_ON | 1 | | T8505 = 1 | |
| 60 | | Change mode TC Back to Stand-by mode | F0505 | tc_mode_chg_y | | | | If # 3 execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 70 | | Mode status checking | | | | 520108 | F0049 = 2 | |



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- **Procedure n° 21 R-EXPOSU**

- Purpose: Exposure parameters updating
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------|-------------------|-----------------|--------------------|--------------------|--------------------|---------------------------|
| 10 | | Exposure parameters configuration | F0519 | tc_def_exp_iasw | F8976=1620 | 68843/12 | F3976=1620 | 1620 is the default value |
| 20 | | Request for exposure configuration | F0524 | tc-r_exp_iasw | | 69040 | F3976=1620 | |



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- **Procedure n°** **22-D** **R-Dump_IASW**
 - Purpose: IASW memory Dump Needs. Capture a IASW memory image using OBSM
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: DPE running. IASW must be in Stand-by or Configuration mode.
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|----------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|---------------------|-----------------|-----------------|---------|
| 10 | | Check the DPE2 state | | | | | D6603 = Running | |
| 20 | | Check SPI mode | | | | 520108 | F0049 = 2/3 ? | |
| 30 | | On OBSMS Process the image in monitoring/update mode Configure update : make sure that packet 69110 is selected. Start update | | | | | | |
| 40 | | On manual stack: Edit and uplink one or more instances of the CSSW TC (6,2) to dump the required memory areas | | | | | | |
| 50 | | Send TC to dump memory areas | EU9050 | | EU9002 = E9005 = | | | |
| 60 | | Verify that TM (6,2) report packet are received: | | | | 69610 | | |
| 70 | | Verify that the memory is being captured by OBSMS | | | | | | |
| 80 | | On OBSMS: Stop Update when the dump is over Save the image | | | | | | |



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- **Procedure n°** **22-L** **R-Load_IASW**
 - Purpose: IASW memory load new version.
 - Constraints: The PST must contain at least 2 patch & dump slots per second in case DPE fast Memory Device is used. BCP distribution to SPI must be disabled.
 - Time Criticality:
 - System Level Prerequisites: DPE running. IASW must be in Stand-by mode.
 - Sub-system Level Prerequisites: The patch & dump command stack files must be present in the IMCS Manual stack directory. The new memory image must be present in the IMCS OBSMS.
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|----------------------------------------------------------------------------------------------------------------|----------------|---------|-----------------|-----------------|--------------------------------------------------|--------------------------------------------------------------------------------|
| 10 | | Check BCP distribution is disabled | | | | | D5222 = 0 | |
| 20 | | Check SPI state | | | | 520108 | F0049 = 1 F3884 = 0 F3887 = 0 F3890 = 0 | Stand-by 1 Stand-by Stand-by Stand-by |
| 30 | | Check DPE2 state If not already in WAIT state send TC to perform the transition from RUNNING to WAIT state. | D7303 | | | | D6601 = 1 D6603 = 0 D6600 = 0 | WAIT Not RUNNING Not RESET |
| 40 | | From Manual Stack directory load the required files | | | | | | |
| 50 | | Enable Command Interlock and Command WAIT mode | | | | | | |
| 60 | | Uplink all commands in automatic Check the successful uplink on command history | | | | | | |
| 70 | | Compare the files: Uplink all dump commands in automatic Verify that TM (6,2) report packet are received | | | | 209001 | | |
| 80 | | Check the differences | | | | | | |
| 90 | | Restart DPE CSSW: Open the DPE power supply by sending TC DPE RELAY0 OFF | E9801 | | | | E9801 = OFF | OEM n° 81 |
| 100 | | Close Relay 0 causing DPE empty boot and power saving exit by sending TC DPE RELAY0 ON | E9800 | | | | E9801 = ON | Wait for DPE power-up initialisation completion marked by the OEM : DPE reset. |
| 110 | | Check DPE is in RUNNING state and no error is reported | | | | | D6603 = 1 D6608 = 0 | Running No anomaly |
| 120 | | Send TC (13,1) to test if CSSW is working | F9043 | | | | F9043 = 1 | |
| 130 | | Send TC to synchronize OBT | D3703 | | | | | |
| 140 | | SPI verification time | D3713 | | | | EU9011 = 1 | |
| 150 | | Send TC to start IASW | F9024 | | | | F0049 = 1 F0069 = 0 F0029 = New version | |



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- **Procedure n°** **23_AS** **R-OBSMAS**
 - Purpose: ACS sub-assemblies memory Load and Dump Needs
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks | |
|---------|----------|-----------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------|------------------------------------|-------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 30 | | Mode status checking | | | | | F0049 = 3 | If # => use the required procedure to change to configuration mode I = 1.33 A ± 0.07 | |
| 40 | | FEE HV status checking If (E5500 to E5592 = 0) perform step 40 | F0251 F0252 F0253 | | | 69007 69008 69009 | P2014 | | |
| 50 | | Send TC to switch OFF HV | F0201 F0202 F0203 | tc-c_as_serv1 tc-c_as_serv2 tc-c_as_serv3 | FS1732_AS-SERVS_def-grnd_0001.TPF | 68841/8-10 | | | |
| 60 | Wait 40" | Send TC to request HV status acquisition | | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | | | | |
| 70 | | Send TC start maintenance ACS | F0563 | tc_start-mtnc_as | | 520108 | E4339 = 1 F4359 = 3 | | If # execute GR1 |
| 80 | | Send TC to dump reference area | F0514 | tc_dump_as | F8932 F8935 | 69043 | F3908-F3931 | | Cyclic HK from the concerned S/A is stopped |
| 90 | | Send TC to record or load patch | F0509 F0510 | tc_record_pach-as tc_load_pach-as | F8904 F8907 F8908-F8931 | | | | |
| 100 | | Send TC to dump the loaded area | F0514 | tc_dump-as | F8932 F8935 | 69043 | F3908-F3931 | | m and n sequence must be performed as many time as needed |
| 110 | | Send TC to stop maintenance If FEE HV was off at procedure entry, exit the procedure | F0573 | tc_stop-mtnc_as | | 520108 | E4339 = 0 F3881 = 1 F3884 = 1 F3887 = 1 F3890 = 1 | | If # execute GR1 Restart cyclic HK acquisition |
| 120 | | Send TC to switch ON HV | F0201 F0202 F0203 | tc-c_as_serv1 tc-c_as_serv2 tc-c_as_serv3 | FS1732_AS-SERVS_fmcon fig_0001.TPF | 6841/8-10 | | | |
| 130 | | Send TC to request HV status acquisition | F0251 F0252 F0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 69007 69008 69009 | | | |



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- **Procedure n°** **23_PD** **R-OBSMPD**
 - Purpose: PSD sub-assemblies memory Load and Dump Needs
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------|-----------------|--------------------------------------|-------------------------------|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------|
| 10 | | Mode status checking | | | | | F0049 = 3 | If # => use the required procedure to change to configuration mode |
| 20 | | Send TC start maintenance PSD | F0563 | tc_start-mtnc_pd | | 520108 | E4339 = 1 F4359 = 4 | If # execute GR1 Cyclic HK from the concerned S/A is stopped |
| 30 | | Send TC to dump reference area | F0515 | tc_dump_pd | F8932 F8935 | 69044 | F3908-F3931 | |
| 40 | | Send TC to record or load patch | F0511/ F0512 | tc_record_pach-pd tc_load_pach-pd | F8904 F8907 F8908-F8931 | | | |
| 50 | | Send TC to dump the loaded area | F0515 | tc_dump-pd | F8932 F8935 | 69044 | F3908-F3931 | m and n sequence must be performed as many time as needed |
| 60 | | Send TC to stop maintenance | F0574 | tc_stop-mtnc_pd | | 520108 | E4339 = 0 F3881 = 1 F3884 = 1 F3887 = 1 F3890 = 1 | If # execute GR1 Restart cyclic HK acquisition |



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- **Procedure n°** **23_DF** **R-OBSMDF**
 - Purpose: DFEE sub-assemblies memory Load and Dump Needs
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites: To be in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------|-----------------|--------------------------------------|-------------------------------|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 30 | | Mode status checking | | | | | F0049 = 3 | If # => use the required procedure to change to configuration mode |
| 40 | | Send TC start maintenance DFEE | F0565 | tc_start-mtnc_df | | 520108 | E4339 = 1 F4359 = 5 | If # execute GR1 Cyclic HK from the concerned S/A is stopped |
| 50 | | Send TC to dump reference area | F0513 | tc_dump_df | F8932 F8935 | 69042 | F3908-F3931 | |
| 60 | | Send TC to record or load patch | F0507/ F0508 | tc_record_pach-df tc_load_pach-df | F8904 F8907 F8908-F8931 | | | |
| 70 | | Send TC to dump the loaded area | F0513 | tc_dump-df | F8932 F8935 | 69042 | F3908-F3931 | m and n sequence must be performed as many time as needed |
| 80 | | Send TC to stop maintenance | F0575 | tc_stop-mtnc_df | | 520108 | E4339 = 0 F3881 = 1 F3884 = 1 F3887 = 1 F3890 = 1 | If # execute GR1 Restart cyclic HK acquisition Wait 2 seconds before sending an other telecommand |



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- **Procedure n° 24 R-COOCON**
 - Purpose: Cooling mode to Configuration
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------|-------------------|-------------------|--------------------|--------------------|--------------------|------------------|
| 10 | | Antifreeze Main n° 2 power OFF | T5025 | TWS_ANTFRZ2-A_OFF | 1 | | T8505 = 0 | If # execute GR2 |



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- **Procedure n° 25 R-ACSCAL**
 - Purpose: ACS calibration process
 - Constraints: Instrument mode must be in configuration and in all modes when IASW is in Configuration mode (i.e outgassing, cooling, annealing). Must be scheduled outside the belts.
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: This procedure will be repeated n times (about 50 runs)



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------------------------|--------------------------------------------------------------------------------------------------|----------------|-----------------|-----------------|------------------|------------------------|------------------------------------------------------------------------------|
| 10 | | Check IASW mode | | | | 520108 | F0049 = 3 | If # => procedure exit |
| 20 | | Check calibration status parameter | | | | 520108 | F1399 = 1 | If # check again during next cycle (8s) Then if still # => procedure exit |
| 30 | T _n | Send TC for calibration stating Check calibration status parameter | F0566 | tc_start-cal_as | n/a | 520108 | F1399 = 2 | If # execute GR1 |
| 40 | T _n + 168 s | Check calibration status parameter | | | | 520108 | F1399 = 3 | If # wait next cycle (TBC) or anomaly |
| 50 | | Send TC for calibration dumping Check calibration execution parameter | F0567 | tc-r_cal_as | n/a | 520108 520108 | F1399 = 4 F1396 = 0 | If # execute GR1 |
| 60 | | Send TC for calibration dumping Check TM packet counter Check calibration status parameter | F0567 | tc-r_cal_as | n/a | 69700 | E2033 F1399 = 5 | 183 times Increases by 1 each time End of calibration If # wait |



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- **Procedure n° 26 R-COOTUN**
 - Purpose: Cryocoolers compressors and displacers amplitude tuning. Can be used in case of stroke or temperature adjustment in flight.
 - Constraints: CDE must be in normal mode. This procedure shall be called at the end of the cooling mode (R-P7 – R-STBCOO)
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Check CDE mode | | | | | F9971=F9991=1 F9972=F9992=0 | If # execute GR1 |
| 20 | | Check relay status | | | | | F9970=F9990=0 | If # anomaly |
| 30 | | Check CDE input current | | | | | P1061 P1063 | 1.6 A < I < 2.3 A |
| 40 | | Reduce pistons strokes to roughly stabilise Ge Detectors Temperatures around 90 K : <u>Gross tuning</u> Send successive TCs to set up step by step CDE 1 compressors and displacers amplitude until 4 x 4.72 mm (eng) i.e 33 bits (raw) target reached : max step 0.429 mm (eng value) i.e. 3 bits (raw value) and min step 0.143 / 1 bit | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = CA* Bit8 = 1 Bit9 = 1 E9961 = CA* | | | Gross Tuning to get : F0391 = 90 K ± 1 K F0392 = 90 K ± 1 K F0393 = 90 K ± 1 K F0394 = 90 K ± 1 K |
| 50 | | Send successive TCs to set up step by step CDE 2 compressors and displacers amplitude until 4 x 4.72 mm (eng) i.e 33 bits (raw) target reached : max step 0.429 mm (eng value) i.e. 3 bits (raw value) and min step 0.143 / 1 bit. | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = CA* Bit8 = 1 Bit9 = 1 E9981 = CA* | | | At end of step 50, Wait 5 hours to observe Detectors temperature drift And resulting requested stroke adjustment for fine tuning operations |
| 60 | | Wait 5 hours to stabilise cryogenic chain and anticipate fine tuning operations with regards to cold plate temperatures drift | | | | | | |
| 80 | | Adjust pistons strokes to stabilise Ge Detectors Temperatures around 90 K : <u>Fine tuning</u> Send one TC to set up CDE 1 compressors and displacers amplitude Step is ± 0.143 mm (eng value) / ± 1 bit (raw) Note : Wait 3 hours before each stroke change | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = CA* Bit8 = 1 Bit9 = 1 E9961 = CA* | | | Fine Tuning to stabilise (< 0.2 K/day) Detectors in the range : F0391 = 90 K ± 1 K F0392 = 90 K ± 1 K F0393 = 90 K ± 1 K F0394 = 90 K ± 1 K |
| 90 | | Send One TC to set up CDE 2 compressors and displacers amplitude | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 | | | Fine Tuning to stabilise (< 0.2 K/day) Detectors in |

* CA* Current Amplitude



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------------------------------------------------------------------------------|----------------|---------|----------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| | | Step is ± 0.143 mm (eng value) / ± 1 bit (raw) Note : Wait 3 hours before each stroke change | | | E9980 = CA* Bit8 = 1 Bit9 = 1 E9981 = CA* | | | the range : F0391 = 90 K \pm 1 K F0392 = 90 K \pm 1 K F0393 = 90 K \pm 1 K F0394 = 90 K \pm 1 K |
| 100 | | Check cold plate temperatures Goto step 80 if necessary (repeat fine tuning if detectors do not respect 90 K \pm 1 K) | | | | 60602/9 | F0391 = 90 K \pm 1 K F0392 = 90 K \pm 1 K F0393 = 90 K \pm 1 K F0394 = 90 K \pm 1 K | |

* CA* Current Amplitude



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- **Procedure n° 30-B R-RECINB**
 - Purpose: Automatic reconfiguration inhibition during radiations belts passage
 - Constraints: Under radiations belts
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|----------------|------------------|-------------------------------------------------------------------------|-----------------|---------------------------------------------------------|------------------------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 3 F0069 = 2 F0129 = 1 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | FS1700_IASW - PAR_fmconfig _0001.TPF F8944 = 0 F8946 = 0 | 520108 | F3944 = 0 F3946 = 0 F0069 = 0 F0129 = 0 OEM | Radiation belts If # execute GR2 Flare end |



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• **Procedure n° 30-E R-RECINB**

- Purpose: Automatic reconfiguration inhibition during radiations belts passage and after eclipse exit
- Constraints: Under radiations belts
- Time Criticality: No
- System Level Prerequisites: SPI in configuration mode
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|----------------------------------------------------------------------|-------------------------------------------|----------------|------------------|------------------------|-----------------|-----------------|--------------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | F8944 = 0 F8946 = 0 | 520108 | F0069 = 2 | Radiation belts If # execute GR2 |
| 30 | F0129 = 1 F3944 = 0 F3946 = 0 F0069 = 0 F0129 = 0 OEM | | | | | | Flare end | |



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- **Procedure n° 31 R-RECACT**
 - Purpose: Automatic reconfiguration reactivation after radiations belts passage
 - Constraints: Should be activated after radiation belts exit
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|-------------------------|-------------------------------------------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------------------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 3 F0069 = 0 F0129 = 0 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 Commanded Radiation belts |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | FS1700_IASW - PAR_fmconfig_0002.TPF | 520108 | F3944 = 1 F3946 = 1 F0069 = 0 | If # execute GR2 |
| 30 | | Send TC to load all patches | F0557 | tc_send_patch | | | | |
| 40 | | Send TC to load all conf | F0556 | tc_send_conf | | | | |
| 45 | | Send TC on request for HV configuration | F0251 F0252 F0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 69007 69008 69009 | | If HV are set at operational values go to step 70 |
| 50 | | Send TC to set up ACS HV | F0219 F0220 F0221 | tc-c_as_hv1 tc-c_as_hv2 tc-c_as_hv3 | FS1738_AS-HVSET_fmconfig_0001.TPF | | | |
| 60 | | Send TC ACS HV request | F0269 F0270 F0271 | tc-r_as_hv1 tc-r_as_hv2 tc-r_as_hv3 | | 69025 69026 69027 | E1700-E1792 | |
| 70 | | Send TC to change mode to OPER mode | F0501 | tc_mode_chg_s | | 520108 | F0049 = 4 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |



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- **Procedure n° 32 R-FPATCH**
 - Purpose: Flush recorded S/A patches in DPE memory when dedicated DPE memory is full or not sufficient for planed patches
 - Constraints: Use procedures P23_XX to record useful patches after this operation
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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- **Procedure n° 100 R-OFFINA**

- Purpose: Instrument set up for Inactive mode. This procedure is normally only used for instrument ground testing or after a switch-off due to an on-board anomaly.

Steps 10 to 100 are dedicated to cryocoolers and CDE management

Steps 110 to 180 are dedicated to SPI heaters management

- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC to switch ON Compressor heater M | T5001 | LCL_COMP_H-A_ON | | | T8500 | |
| 20 | | Send TC to select relay configuration CDE 1 | E9969 | CDE1_LCL1RELON | | | | |
| 30 | | Send TC to select relay configuration CDE 2 | E9989 | CDE2_LCL1RELON | | | | |
| 40 | | Send TC to switch ON CDE 1 | P3031 | CDE1_A_LCL1_ON | | | P1161 = 1 P1160 = 0 | |
| 50 | | Send TC to switch ON CDE 2 | P3271 | CDE2_B_LCL1_ON | | | P1163 = 1 P1162 = 0 | |
| 55 | | Check the CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp |
| 60 | | Check CDE relay status | | | | | F9970 = 0 F9990 = 0 | |
| 70 | | Send TC to switch ON CDE heater Red | T5676 | TWS_CDE_HTRB_ON | | | T8115 = 1 | |
| 75 | | Send TC to switch ON CDE heater Main | T5576 | TWS_CDE_HTRA_ON | | | T8015 = 1 | |
| 80 | | Send TC to set up CDE 1 in Stand-by mode as Master and compressors/displacers disable | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | CDE Main is assumed to be Master Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 90 | | Send TC to set up CDE 2 in Stand-by mode as Slave and compressors/displacers disable | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | CDE Redundant is assumed to be Slave Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 100 | | Check the CDE input current Check CDE configuration mod | | | | | P1061 P1063 F9971=F9972 = 0 F9991=F9992 = 0 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp If # anomaly |
| 110 | | Send TC to switch ON Thermal Control Main | P4089 | | | | | |
| 120 | | Send TC to switch ON Thermal Control Red | P4339 | | | | | |
| 130 | | Send TC to switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | T8501 = 1 P2011 | If # execute GR2 |
| 140 | | Send TC to switch ON Mask, ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | T8507 = 1 | |



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|---------|------|--------------------------------------------------|----------------|------------------|-----------------|-----------------|--------------------|---------|
| 150 | | Send TC to switch ON AFEE, DFEE, PSD heaters Red | T5106 | LCL_CAMER_H-B_ON | | | T8601 = 1 P2061 | |
| 160 | | Send TC to switch ON Mask, ACS heaters Red | T5136 | TWS_ACS_MSK-B_ON | | | T8607 = 1 | |
| 170 | | Send TC to switch ON Anti-freeze 1 M | T5021 | TWS_ANTFRZ1-A_ON | | | T8504 = 1 | |
| 180 | | Send TC to switch ON Anti-freeze 2 M | T5026 | TWS_ANTFRZ2-A_ON | | | T8505 = 1 | |



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- **Procedure n° 101 R-INAOFF**
 - Purpose: Instrument switched OFF from Inactive mode.
Steps 10 to 100 are dedicated to SPI heaters management and DPE switch OFF.
Steps 101 to 140 are dedicated to cryocoolers and CDE management
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: The cryocoolers strokes shall be reduced by steps of 0,429 mm ie 3 in raw value, until the commanded strokes are less than : 0,429 mm ie 3 in raw value, then set them to 0.

This procedure should allow transition from INACTIVE to OFF whatever we are in :

- Nominal mode (4 coolers operating)
- Back-up mode (2 coolers operating : CDE1 or CDE2)
- 3 coolers mode configuration.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|-------------------|--------------------------------------------------------------------|-----------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC DPE1 power OFF | P4044 | LCL_SDPE1_OFF | | | P2116 = 0 | If # execute GR2 |
| 20 | | Send TC to switch OFF Anti-freeze 2 M | T5025 | TWS_ANTFRZ2-A_OFF | | | T8505 = 0 | |
| 30 | | Send TC to switch OFF Anti-freeze 1 M | T5020 | TWS_ANTFRZ1-A_OFF | | | T8504 = 0 | |
| 40 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Main | T5005 | LCL_CAMER_H-A_OFF | | | T8501 = 0 P2011 = 0 | |
| 50 | | Send TC to switch OFF Mask, ACS heaters Main | T5035 | TWS_ACS_MSK-A_OFF | | | T8507 = 0 | |
| 60 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Red | T5105 | LCL_CAMER_H-B_OFF | | | T8601 = 0 P2061 = 0 | |
| 70 | | Send TC to switch OFF Mask, ACS heaters Red | T5135 | TWS_ACS_MSK-B_OFF | | | T8607 = 0 | |
| 80 | | Send TC to switch OFF Thermal Control LCL Main | P4048 | BD 4 A LCL 2 | | | P2122 = 0 | |
| 90 | | Send TC to switch OFF Thermal Control LCL Red | P4338 | BD 4 B LCL 2 | | | P2172 = 0 | |
| 100 | | Send TC to switch OFF Compressor heater M | T5000 | LCL_COMP_H-A_OFF | | | T8500 = 0 | |
| 101 | | Check CDE electrical status If (P1161=P1160=P1163=P1162=0) Go to step 125 | | | | | P1161 ? P1160 ? P1163 ? P1162 ? | |
| 102 | | Check CDE 1 mode If (F9971 = F9972 = 0) or (P1161 = 0) Go to step 107 | | | | | F9971, F9972 | Operations depend on CDE1 status CDE1 is in Stand-by mode or is OFF |
| 103 | | If (F9971 = 1 and F9972 = 0) | | | | | | CDE1 is in Nominal mode If # anomaly |
| 104a | | Send TC to decrease E9960 and E9961 compressors amplitude CDE 1 step by step until E9960 = 0 and E9961 = 0. | E9966 | CDE1_M_CHG_AMPL | Bit0 = 0 Bit1 = 1 E9960 Bit8 = 1 Bit9 = 1 E9961 | | F9960 decreases F9961 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 104b | | Check CDE1 compressors drive amplitude | | | | | F9960 ; F9961 < 50 | |
| 104c | | Check CDE 1 input current | | | | | P1061 | 0.5 A < I < 0.6 A (TBC) |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 105a | | Send TC to set CDE 1 displacers to "0" amplitude In launch lock mode | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 105b | | Check the CDE 1 configuration Check CDE1 input current | | | | | F9971 = F9972 = 1 P1061 | If # execute GR1 0.30 A < I < 0.5 A |
| 106a | | Send TC to set CDE 1 in Stand-by mode | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Cryocooler Stand-by mode CDE1 Master |
| 106b | | Check CDE 1 input current | | | | | P1061 | 0.10 A < I < 0.20 A |
| 106c | | Check CDE 1 configuration | | | | | F9971 = 0 F9972 = 0 | if # anomaly |
| 107 | | Check CDE 2 mode If (F9991 = F9992 = 0) or (P1163 = 0) Go to step 120 | | | | | F9991, F9992 | Operations depend on CDE1 status CDE2 is in Stand-by mode or is OFF |
| 108 | | If (F9991 = 1 and F9992 = 0) | | | | | | CDE2 is in Nominal mode If # anomaly |
| 109a | | Send TC to decrease E9980 and E9981 compressors amplitude CDE 2 step by step until E9980 = 0 and E9981 = 0. | E9987 | CDE2_S_CHG_AMPL | Bit0 = 1 Bit1 = 1 E9980 Bit8 = 1 Bit9 = E9981 | | F9980 decreases F9981 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 109b | | Check CDE2 compressors drive amplitude | | | | | F9980 ; F9981 < 50 | |
| 109c | | Check CDE 2 input current | | | | | P1063 | 0.5 A < I < 0.6 A (TBC) |
| 110a | | Send TC to set CDE 2 displacers to "0" amplitude In launch lock mode | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 | | | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------|----------------|-------------------|------------------------------------------------------------------------|-----------------|----------------------------|------------------------------------------------|
| | | | | | E9961 = 0 | | | |
| 110b | | Check the CDE configuration Check CDE input current | | | | | F9991 = F9992 = 1 P1063 | If # execute GR2 0.30 A < I < 0.5 A |
| 115a | | Send TC to set CDE 2 in Stand-by mode | E9963 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to Cryocooler Stand-by mode CDE2 Slave |
| 115b | | Check CDE 2 input current | | | | | P1063 | 0.10 A < I < 0.20 A |
| 115c | | Check CDE 2 configuration | | | | | F9991 = 0 F9992 = 0 | If # execute GR1 |
| 120 | | Send TC to switch OFF CDE 1 | P3030 | CDE1_A_LCL1_OFF | | | P1161 = 0 PP1160 = 0 | |
| 120a | | Send TC to switch OFF CDE 2 | P3270 | CDE2_B_LCL1_OFF | | | P1163 = 0 P1162 = 0 | |
| 125 | | Send TC to switch off Compensation heater M | P4208 | TSW_ACC_HTR_A_OFF | | | P2222 = 0 | |
| 130 | | Send TC to switch OFF CDE heater M | T5575 | TWS_CDE_HTRA_OFF | | | T8015 = 0 | |
| 140 | | Send TC to switch OFF CDE heater R | T5675 | TWS_CDE_HTRB_OFF | | | T8115 = 0 | |



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- **Procedure n° 102 R-ISOINA**
 - Purpose: Instrument switched OFF after Imminent switch off detection. This procedure is only used for instrument ground testing with the EGSE (TBC)
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-----------------------------------------------------|----------------|--------------------|-----------------|-----------------|-----------------|------------------|
| 10 | | Send TC DPE2 power OFF | P4294 | LCL_SDPE2_OFF | | | P2166 = 0 | If # execute GR2 |
| 20 | | Send TC to switch OFF AFEE detection chains | P4310 | LCL_AF2 DET-B_OFF | | | P2063 = 0 | |
| 30 | | Send TC to switch OFF ACS | P4298 | LCL_SPI_ACS-B_OFF | | | P2071 = 0 | |
| 40 | | Send TC to switch OFF PSD | P4306 | LCL_PSD-B_OFF | | | P2064 = 0 | |
| 50 | | Send TC to switch OFF AFEE I/F TM/TC | P4290 | LCL_AF2TMTTC-B_OFF | | | P2066 = 0 | |
| 60 | | Send TC to switch OFF DFEE | P4302 | LCL_DFEE-B_OFF | | | P2062 = 0 | |
| 60 | | | | | | | P2065 = 0 | |
| 70 | | CDE power down (See R-P101 step 101 to step 140) | | | | | | |



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- **Procedure n° 27 R-OGCONF**
 - Purpose: go to Configuration mode from Outgassing mode
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|------------------------------------------------|----------------|-------------------|-----------------|-----------------|-----------------|------------------|
| 10 | | Send TC Heat pipes thaw heater M OFF | T5010 | TSW_HEATPIP-A_OFF | 0 | | T8502 = 0 | If # execute GR2 |
| 20 | | Send TC Heat pipes thaw heater R OFF | T5110 | TSW_HEATPIP-B_OFF | 0 | | T8602 = 0 | |
| 30 | | Send TC Annealing Heater redundant OFF | T5115 | TSW_ANNEAL-B_OFF | 0 | | T8603 = 0 | |
| 40 | | Send TC to switch ON antifreeze heaters 1 Main | T5021 | TSW_ANTFRZ1-A_ON | 1 | | T8504 = 1 | |
| 50 | | Send TC to switch ON antifreeze heaters 2 Main | T5026 | TSW_ANTFRZ2-A_ON | 1 | | T8505 = 1 | |



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• **Procedure n° 28 R-CONCOO**

- Purpose: Configuration mode to Cooling mode and cooling process. The cooling occurs at the first just after the outgassing mode. Otherwise it could be occurred either after an annealing mode or a restart of the spectrometer following a contingency case.
- Constraints: Compressors temperatures must be less than 40°C and the thermal control of the cryocooler shall be enable to allow switching on the compressors (T5006, T5007, T5024, T5025 between - 22°C and 38°C; F0397 to F0398 < 35° C).
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites: Stand-by mode
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|-----------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 10 | | Check that cold plate monitoring is disable | F0523 | | | | F3963 = 0 | |
| 20 | | Send TC to switch ON Anti-freeze 2 M | T5026 | TSW_ANTFRZ2-A_ON | | | T8505 = 1 | TSW status |
| 30 | | Check detectors chains HV are OFF before sending F0004 TC | | | E5190-E5208=? | | | If ≠ 0, set E5190 to E5208 to 0 |
| 40 | Tn | Send TC Cold plate and Thermal braids temperature range setting | F0004 | tc-c_af_ch-oo | FS1710_AF-CH-OO_outgass_0001.TPF | 68841/4 | E0209 = 0 | With other parameters from default_ground_AFEE_FM |
| 50 | Tn+25" | Send TC Temperature range request | F0014 | tc-r_af_ch-oo | | 69003 | E0209 = 0 | |
| 60 | | Check compressors temperatures CDE 1 | | | | | a<T5006<b a<T5024<b | a = -22 ° C ; b =+ 38 ° C |
| 70 | | Check compressors temperatures CDE 2 | | | | | a<T5007<b a<T5025<b | a = -22 ° C ; b =+ 38 ° C if temp T5006, T5007 T5024, T5025 ok ⇒ continue |
| 80 | | Check Thermal braids temperatures | | | | | F0397<35°C F0398<35°C | If nok ⇒ anomaly Don't switch on CDEs |
| 90 | | Check cold plate temperature | | | | | F0391 ≥ 89 K F0392 ≥ 89 K F0393 ≥ 89 K F0394 ≥ 89 K | |
| 100 | | Send TC to switch OFF CDE heater M | T5575 | TWS_CDE_HTRA_OFF | 0 | | T8015 = 0 | |
| 110 | | Check CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp |
| 120 | | Send TC to set up CDE 1 as master | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | F9971=F9972 = 0 | |
| 130 | | Send TC to set up CDE 2 as slave | E9983 | CDE1_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | F9991=F9992 = 0 | |
| 140 | | Send TC to set up CDE 1 Master in nominal mode | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 1 Bit9 = 1 E9961 = 0 | | F9960 < 50 190 < F9964 < 210 F9961 < 50 200 < F9965 < 220 | CDE 1 is assumed to be Master Comp/Disp1 drive enable |
| 150 | | Send TC to set up CDE 2 Slave in nominal mode | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = 0 | | F9980 < 50 180 < F9984 < 200 | CDE Redundant is assumed to be Slave Comp/Disp1 drive enable |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| | | | | | Bit8 = 1 Bit9 = 1 E9981 = 0 | | F9981 < 50 215 < F9985 < 235 | |
| 160 | | Check CDE 1 configuration | | | | | F9971 = 1 F9972 = 0 | CDE1 nominal mode |
| 170 | | Check CDE 2 configuration | | | | | F9991 = 1 F9992 = 0 | CDE2 nominal mode |
| 180 | | Send TC to set up compressors and displacers amplitude CDE 1 step by step until expected amplitude reached (7 mm TBC ie 50 bits TC raw value). (as many time as necessary) | E9966 | CDE1_M_CHNG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = TBD Bit8 = 1 Bit9 = 1 E9961 = TBD | | 130 < F9960, F9961 < 180 160 < F9964 < 215 145 < F9965 < 195 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 190 | | Send TC to set up compressors and displacers amplitude CDE 2 engine step by step until expected amplitude reached (7 mm TBC ie 50 bits TC raw value). (as many time as necessary) | E9987 | CDE2_S_CHNG_AMPL | Bit0 = 1 Bit1 = 1 E9980 = TBD Bit8 = 1 Bit9 = 1 E9981 = TBD | | 130 < F9980 < 180 105 < F9981 < 155 140 < F9984 < 180 150 < F9985 < 200 | Comp/Disp1 drive enable Comp 1 amplitude needed Nominal mode selected Comp/Disp2 drive enable Comp 2 amplitude needed |
| 200 | | Check cold plate temperatures If (F0391 or F0392 or F0393 or F0394 ≤ 125K) | | | | 65602/9 | F0391 or F0392 or F0393 or F0394 ≤ 125 K | If true change the temperature range 62 K to 128 K |
| 210 | Tn | Send TC to change temperature range | F0004 | tc-c_af_ch-oo | FS1710_AF- CH-OO_def- gmd_0001.TPF | 6841/4 | E0209 = 1 | |
| 220 | Tn+25" | Send TC Temperature range request And stay at this step while the temperatures are more than the corresponding thresholds | F0014 | tc-r_af_ch-oo | | 6903 6502/9 | E0209 = 1 F0391 < F3964 F0392 < F3965 F0393 < F 3966 F0394 < F397 | If T5006 or T5024 > 38 °C reduce the stroke step 180, If T5007 or T5025 > 38 °C reduce the stroke step 190, |



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- **Procedure n° 30-B R-RECINB**
 - Purpose: Automatic reconfiguration inhibition during radiations belts passage
 - Constraints: Under radiations belts
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|----------------|------------------|-------------------------------------------------------------------------|-----------------|---------------------------------------------------------|------------------------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 3 F0069 = 2 F0129 = 1 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | FS1700_IASW - PAR_fmconfig _0001.TPF F8944 = 0 F8946 = 0 | 520108 | F3944 = 0 F3946 = 0 F0069 = 0 F0129 = 0 OEM | Radiation belts If # execute GR2 Flare end |



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• **Procedure n° 30-E R-RECINB**

- Purpose: Automatic reconfiguration inhibition during radiations belts passage and after eclipse exit
- Constraints: Under radiations belts
- Time Criticality: No
- System Level Prerequisites: SPI in configuration mode
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|---------------------------------------------------------|-------------------------------------------|----------------|------------------|------------------------|-----------------|-----------------|-----------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | F8944 = 0 F8946 = 0 | 520108 | F0069 = 2 | Radiation belts If # execute GR2 |
| 30 | F3944 = 0 F3946 = 0 F0069 = 0 F0129 = 0 OEM | | | | | | Flare end | |



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- **Procedure n° 31 R-REACT**
 - Purpose: Automatic reconfiguration reactivation after radiations belts passage
 - Constraints: Should be activated after radiation belts exit
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|-------------------------|-------------------------------------------------|-------------------------------------------|-------------------------|-------------------------------------|-------------------------------------------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 3 F0069 = 0 F0129 = 0 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 Commanded Radiation belts |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | FS1700_IASW - PAR_fmconfig_0002.TPF | 520108 | F3944 = 1 F3946 = 1 F0069 = 0 | If # execute GR2 |
| 30 | | Send TC to load all patches | F0557 | tc_send_patch | | | | |
| 40 | | Send TC to load all conf | F0556 | tc_send_conf | | | | |
| 45 | | Send TC on request for HV configuration | F0251 F0252 F0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 69007 69008 69009 | | If HV are set at operational values go to step 70 |
| 50 | | Send TC to set up ACS HV | F0219 F0220 F0221 | tc-c_as_hv1 tc-c_as_hv2 tc-c_as_hv3 | FS1738_AS- HVSET_fmcon fig_0001.TPF | | | |
| 60 | | Send TC ACS HV request | F0269 F0270 F0271 | tc-r_as_hv1 tc-r_as_hv2 tc-r_as_hv3 | | 69025 69026 69027 | E1700-E1792 | |
| 70 | | Send TC to change mode to OPER mode | F0501 | tc_mode_chg_s | | 520108 | F0049 = 4 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |



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- **Procedure n° 32 R-FPATCH**
 - Purpose: Flush recorded S/A patches in DPE memory when dedicated DPE memory is full or not sufficient for planed patches
 - Constraints: Use procedures P23_XX to record useful patches after this operation
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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• **Procedure n° 100 R-OFFINA**

- Purpose: Instrument set up for Inactive mode. This procedure is normally only used for instrument ground testing or after a switch-off due to an on-board anomaly.

Steps 10 to 100 are dedicated to cryocoolers and CDE management

Steps 110 to 180 are dedicated to SPI heaters management

- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC to switch ON Compressor heater M | T5001 | LCL_COMP_H-A_ON | | | T8500 | |
| 20 | | Send TC to select relay configuration CDE 1 | E9969 | CDE1_LCL1RELON | | | | |
| 30 | | Send TC to select relay configuration CDE 2 | E9989 | CDE2_LCL1RELON | | | | |
| 40 | | Send TC to switch ON CDE 1 | P3031 | CDE1_A_LCL1_ON | | | P1161 = 1 P1160 = 0 | |
| 50 | | Send TC to switch ON CDE 2 | P3271 | CDE2_B_LCL1_ON | | | P1163 = 1 P1162 = 0 | |
| 55 | | Check the CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp |
| 60 | | Check CDE relay status | | | | | F9970 = 0 F9990 = 0 | |
| 70 | | Send TC to switch ON CDE heater Red | T5676 | TWS_CDE_HTRB_ON | | | T8115 = 1 | |
| 75 | | Send TC to switch ON CDE heater Main | T5576 | TWS_CDE_HTRA_ON | | | T8015 = 1 | |
| 80 | | Send TC to set up CDE 1 in Stand-by mode as Master and compressors/displacers disable | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | CDE Main is assumed to be Master Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 90 | | Send TC to set up CDE 2 in Stand-by mode as Slave and compressors/displacers disable | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | CDE Redundant is assumed to be Slave Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 100 | | Check the CDE input current Check CDE configuration mod | | | | | P1061 P1063 F9971=F9972 = 0 F9991=F9992 = 0 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp If # anomaly |
| 110 | | Send TC to switch ON Thermal Control Main | P4089 | | | | | |
| 120 | | Send TC to switch ON Thermal Control Red | P4339 | | | | | |



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| | | | | | | | |
|-----|---------------------------------------------------|-------|------------------|--|--|--------------------|------------------|
| 130 | Send TC to switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | T8501 = 1 P2011 | If # execute GR2 |
| 140 | Send TC to switch ON Mask, ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | T8507 = 1 | |
| 150 | Send TC to switch ON AFEE, DFEE, PSD heaters Red | T5106 | LCL_CAMER_H-B_ON | | | T8601 = 1 P2061 | |
| 160 | Send TC to switch ON Mask, ACS heaters Red | T5136 | TWS_ACS_MSK-B_ON | | | T8607 = 1 | |
| 170 | Send TC to switch ON Anti-freeze 1 M | T5021 | TWS_ANTFRZ1-A_ON | | | T8504 = 1 | |
| 180 | Send TC to switch ON Anti-freeze 2 M | T5026 | TWS_ANTFRZ2-A_ON | | | T8505 = 1 | |



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- **Procedure n° 101 R-INAOFF**
 - Purpose: Instrument switched OFF from Inactive mode.
Steps 10 to 100 are dedicated to SPI heaters management and DPE switch OFF.
Steps 101 to 140 are dedicated to cryocoolers and CDE management
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: The cryocoolers strokes shall be reduced by steps of 0,429 mm ie 3 in raw value, until the commanded strokes are less than : 0,429 mm ie 3 in raw value, then set them to 0.

This procedure should allow transition from INACTIVE to OFF whatever we are in :

- Nominal mode (4 coolers operating)
- Back-up mode (2 coolers operating : CDE1 or CDE2)
- 3 coolers mode configuration.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|-------------------|--------------------------------------------------------------------|-----------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC DPE1 power OFF | P4044 | LCL_SDPE1_OFF | | | P2116 = 0 | If # execute GR2 |
| 20 | | Send TC to switch OFF Anti-freeze 2 M | T5025 | TWS_ANTFRZ2-A_OFF | | | T8505 = 0 | |
| 30 | | Send TC to switch OFF Anti-freeze 1 M | T5020 | TWS_ANTFRZ1-A_OFF | | | T8504 = 0 | |
| 40 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Main | T5005 | LCL_CAMER_H-A_OFF | | | T8501 = 0 P2011 = 0 | |
| 50 | | Send TC to switch OFF Mask, ACS heaters Main | T5035 | TWS_ACS_MSK-A_OFF | | | T8507 = 0 | |
| 60 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Red | T5105 | LCL_CAMER_H-B_OFF | | | T8601 = 0 P2061 = 0 | |
| 70 | | Send TC to switch OFF Mask, ACS heaters Red | T5135 | TWS_ACS_MSK-B_OFF | | | T8607 = 0 | |
| 80 | | Send TC to switch OFF Thermal Control LCL Main | P4048 | BD 4 A LCL 2 | | | P2122 = 0 | |
| 90 | | Send TC to switch OFF Thermal Control LCL Red | P4338 | BD 4 B LCL 2 | | | P2172 = 0 | |
| 100 | | Send TC to switch OFF Compressor heater M | T5000 | LCL_COMP_H-A_OFF | | | T8500 = 0 | |
| 101 | | Check CDE electrical status If (P1161=P1160=P1163=P1162=0) Go to step 125 | | | | | P1161 ? P1160 ? P1163 ? P1162 ? | |
| 102 | | Check CDE 1 mode If (F9971 = F9972 = 0) or (P1161 = 0) Go to step 107 | | | | | F9971, F9972 | Operations depend on CDE1 status CDE1 is in Stand-by mode or is OFF |
| 103 | | If (F9971 = 1 and F9972 = 0) | | | | | | CDE1 is in Nominal mode If # anomaly |
| 104a | | Send TC to decrease E9960 and E9961 compressors amplitude CDE 1 step by step until E9960 = 0 and E9961 = 0. | E9966 | CDE1_M_CHG_AMPL | Bit0 = 0 Bit1 = 1 E9960 Bit8 = 1 Bit9 = 1 E9961 | | F9960 decreases F9961 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 104b | | Check CDE1 compressors drive amplitude | | | | | F9960 ; F9961 < 50 | |
| 104c | | Check CDE 1 input current | | | | | P1061 | 0.5 A < I < 0.6 A (TBC) |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 105a | | Send TC to set CDE 1 displacers to "0" amplitude In launch lock mode | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 105b | | Check the CDE 1 configuration Check CDE1 input current | | | | | F9971 = F9972 = 1 P1061 | If # execute GR1 0.30 A < I < 0.5 A |
| 106a | | Send TC to set CDE 1 in Stand-by mode | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Cryocooler Stand-by mode CDE1 Master |
| 106b | | Check CDE 1 input current | | | | | P1061 | 0.10 A < I < 0.20 A |
| 106c | | Check CDE 1 configuration | | | | | F9971 = 0 F9972 = 0 | if # anomaly |
| 107 | | Check CDE 2 mode If (F9991 = F9992 = 0) or (P1163 = 0) Go to step 120 | | | | | F9991, F9992 | Operations depend on CDE1 status CDE2 is in Stand-by mode or is OFF |
| 108 | | If (F9991 = 1 and F9992 = 0) | | | | | | CDE2 is in Nominal mode If # anomaly |
| 109a | | Send TC to decrease E9980 and E9981 compressors amplitude CDE 2 step by step until E9980 = 0 and E9981 = 0. | E9987 | CDE2_S_CHG_AMPL | Bit0 = 1 Bit1 = 1 E9980 Bit8 = 1 Bit9 = E9981 | | F9980 decreases F9981 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 109b | | Check CDE2 compressors drive amplitude | | | | | F9980 ; F9981 < 50 | |
| 109c | | Check CDE 2 input current | | | | | P1063 | 0.5 A < I < 0.6 A (TBC) |
| 110a | | Send TC to set CDE 2 displacers to "0" amplitude In launch lock mode | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 | | | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------|----------------|-------------------|------------------------------------------------------------------------|-----------------|----------------------------|------------------------------------------------|
| | | | | | E9961 = 0 | | | |
| 110b | | Check the CDE configuration Check CDE input current | | | | | F9991 = F9992 = 1 P1063 | If # execute GR2 0.30 A < I < 0.5 A |
| 115a | | Send TC to set CDE 2 in Stand-by mode | E9963 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to Cryocooler Stand-by mode CDE2 Slave |
| 115b | | Check CDE 2 input current | | | | | P1063 | 0.10 A < I < 0.20 A |
| 115c | | Check CDE 2 configuration | | | | | F9991 = 0 F9992 = 0 | If # execute GR1 |
| 120 | | Send TC to switch OFF CDE 1 | P3030 | CDE1_A_LCL1_OFF | | | P1161 = 0 PP1160 = 0 | |
| 120a | | Send TC to switch OFF CDE 2 | P3270 | CDE2_B_LCL1_OFF | | | P1163 = 0 P1162 = 0 | |
| 125 | | Send TC to switch off Compensation heater M | P4208 | TSW_ACC_HTR_A_OFF | | | P2222 = 0 | |
| 130 | | Send TC to switch OFF CDE heater M | T5575 | TWS_CDE_HTRA_OFF | | | T8015 = 0 | |
| 140 | | Send TC to switch OFF CDE heater R | T5675 | TWS_CDE_HTRB_OFF | | | T8115 = 0 | |



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- **Procedure n° 102 R-ISOINA**
 - Purpose: Instrument switched OFF after Imminent switch off detection. This procedure is only used for instrument ground testing with the EGSE (TBC)
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-----------------------------------------------------|----------------|-------------------|-----------------|-----------------|-----------------|------------------|
| 10 | | Send TC DPE2 power OFF | P4294 | LCL_SDPE2_OFF | | | P2166 = 0 | If # execute GR2 |
| 20 | | Send TC to switch OFF AFEE detection chains | P4310 | LCL_AF2 DET-B_OFF | | | P2063 = 0 | |
| 30 | | Send TC to switch OFF ACS | P4298 | LCL_SPI_ACS-B_OFF | | | P2071 = 0 | |
| 40 | | Send TC to switch OFF PSD | P4306 | LCL_PSD-B_OFF | | | P2064 = 0 | |
| 50 | | Send TC to switch OFF AFEE I/F TM/TC | P4290 | LCL_AF2TMTC-B_OFF | | | P2066 = 0 | |
| 60 | | Send TC to switch OFF DFEE | P4302 | LCL_DFEE-B_OFF | | | P2062 = 0 | |
| 60 | | Send TC to switch OFF DFEE | P4302 | LCL_DFEE-B_OFF | | | P2065 = 0 | |
| 70 | | CDE power down (See R-P101 step 101 to step 140) | | | | | | |



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- **Procedure n° 30-B R-RECINB**
 - Purpose: Automatic reconfiguration inhibition during radiations belts passage
 - Constraints: Under radiations belts
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|----------------|------------------|-------------------------------------------------------------------------|-----------------|---------------------------------------------------------|------------------------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 3 F0069 = 2 F0129 = 1 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | FS1700_IASW - PAR_fmconfig _0002.TPF F8944 = 0 F8946 = 0 | 520108 | F3944 = 0 F3946 = 0 F0069 = 0 F0129 = 0 OEM | Radiation belts If # execute GR2 Flare end |



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• **Procedure n° 30-E R-RECINB**

- Purpose: Automatic reconfiguration inhibition during radiations belts passage and after eclipse exit
- Constraints: Under radiations belts
- Time Criticality: No
- System Level Prerequisites: SPI in configuration mode
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|----------------|------------------|------------------------|-----------------|----------------------------------------------------------------------|-----------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 2 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | F8944 = 0 F8946 = 0 | 520108 | F0069 = 2 | Radiation belts If # execute GR2 |
| 30 | | | | | | | F0129 = 1 F3944 = 0 F3946 = 0 F0069 = 0 F0129 = 0 OEM | |



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- **Procedure n° 31 R-RECACT**
 - Purpose: Automatic reconfiguration reactivation after radiations belts passage
 - Constraints: Should be activated after radiation belts exit
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------|-------------------------|-------------------------------------------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------------------------------------------------|
| 10 | | Mode status checking | | | | 520108 | F0049 = 3 F0069 = 0 F0129 = 0 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 Commanded Radiation belts |
| 20 | | Send TC to set up non exposure parameters | F0518 | tc_def_conf_iasw | FS1700_IASW - PAR_fmconfig_0002.TPF | 520108 | F3944 = 1 F3946 = 1 F0069 = 0 | If # execute GR2 |
| 30 | | Send TC to load all patches | F0557 | tc_send_patch | | | | |
| 40 | | Send TC to load all conf | F0556 | tc_send_conf | | | | |
| 45 | | Send TC on request for HV configuration | F0251 F0252 F0253 | tc-r_as_serv1 tc-r_as_serv2 tc-r_as_serv3 | | 69007 69008 69009 | | If HV are set at operational values go to step 70 |
| 50 | | Send TC to set up ACS HV | F0219 F0220 F0221 | tc-c_as_hv1 tc-c_as_hv2 tc-c_as_hv3 | FS1738_AS-HVSET_fmconfig_0001.TPF | | | |
| 60 | | Send TC ACS HV request | F0269 F0270 F0271 | tc-r_as_hv1 tc-r_as_hv2 tc-r_as_hv3 | | 69025 69026 69027 | E1700-E1792 | |
| 70 | | Send TC to change mode to OPER mode | F0501 | tc_mode_chg_s | | 520108 | F0049 = 4 | If # execute P16 or ECP1/ECP3/ECP5/ECP7 |



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- **Procedure n° 32 R-FPATCH**
 - Purpose: Flush recorded S/A patches in DPE memory when dedicated DPE memory is full or not sufficient for planed patches
 - Constraints: Use procedures P23_XX to record useful patches after this operation
 - Time Criticality: No
 - System Level Prerequisites: SPI in configuration mode
 - Sub-system Level Prerequisites:
 - Special Processing:



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- **Procedure n° 100 R-OFFINA**

- Purpose: Instrument set up for Inactive mode. This procedure is normally only used for instrument ground testing or after a switch-off due to an on-board anomaly.

Steps 10 to 100 are dedicated to cryocoolers and CDE management

Steps 110 to 180 are dedicated to SPI heaters management

- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------------------------------------------|----------------|------------------|----------------------------------------------------------------------------|-----------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC to switch ON Compressor heater M | T5001 | LCL_COMP_H-A_ON | | | T8500 | |
| 20 | | Send TC to select relay configuration CDE 1 | E9969 | CDE1_LCL1RELON | | | | |
| 30 | | Send TC to select relay configuration CDE 2 | E9989 | CDE2_LCL1RELON | | | | |
| 40 | | Send TC to switch ON CDE 1 | P3031 | CDE1_A_LCL1_ON | | | P1161 = 1 P1160 = 0 | |
| 50 | | Send TC to switch ON CDE 2 | P3271 | CDE2_B_LCL1_ON | | | P1163 = 1 P1162 = 0 | |
| 55 | | Check the CDE input current | | | | | P1061 P1063 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp |
| 60 | | Check CDE relay status | | | | | F9970 = 0 F9990 = 0 | |
| 70 | | Send TC to switch ON CDE heater Red | T5676 | TWS_CDE_HTRB_ON | | | T8115 = 1 | |
| 75 | | Send TC to switch ON CDE heater Main | T5576 | TWS_CDE_HTRA_ON | | | T8015 = 1 | |
| 80 | | Send TC to set up CDE 1 in Stand-by mode as Master and compressors/displacers disable | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | CDE Main is assumed to be Master Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 90 | | Send TC to set up CDE 2 in Stand-by mode as Slave and compressors/displacers disable | E9983 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | CDE Redundant is assumed to be Slave Comp/Disp1 drive disable Comp 1 amplitude Comp/Disp2 drive disable Comp 2 amplitude |
| 100 | | Check the CDE input current Check CDE configuration mod | | | | | P1061 P1063 F9971=F9972 = 0 F9991=F9992 = 0 | 0.1 < I < 0.2 Amp 0.1 < I < 0.2 Amp If # anomaly |
| 110 | | Send TC to switch ON Thermal Control Main | P4089 | | | | | |
| 120 | | Send TC to switch ON Thermal Control Red | P4339 | | | | | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|---------------------------------------------------|----------------|------------------|-----------------|-----------------|--------------------|------------------|
| 130 | | Send TC to switch ON AFEE, DFEE, PSD heaters Main | T5006 | LCL_CAMER_H-A_ON | | | T8501 = 1 P2011 | If # execute GR2 |
| 140 | | Send TC to switch ON Mask, ACS heaters Main | T5036 | TWS_ACS_MSK-A_ON | | | T8507 = 1 | |
| 150 | | Send TC to switch ON AFEE, DFEE, PSD heaters Red | T5106 | LCL_CAMER_H-B_ON | | | T8601 = 1 P2061 | |
| 160 | | Send TC to switch ON Mask, ACS heaters Red | T5136 | TWS_ACS_MSK-B_ON | | | T8607 = 1 | |
| 170 | | Send TC to switch ON Anti-freeze 1 M | T5021 | TWS_ANTFRZ1-A_ON | | | T8504 = 1 | |
| 180 | | Send TC to switch ON Anti-freeze 2 M | T5026 | TWS_ANTFRZ2-A_ON | | | T8505 = 1 | |



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- **Procedure n° 101 R-INAOFF**
 - Purpose: Instrument switched OFF from Inactive mode.
Steps 10 to 100 are dedicated to SPI heaters management and DPE switch OFF.
Steps 101 to 140 are dedicated to cryocoolers and CDE management
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing: The cryocoolers strokes shall be reduced by steps of 0,429 mm ie 3 in raw value, until the commanded strokes are less than : 0,429 mm ie 3 in raw value, then set them to 0.

This procedure should allow transition from INACTIVE to OFF whatever we are in :

- Nominal mode (4 coolers operating)
- Back-up mode (2 coolers operating : CDE1 or CDE2)
- 3 coolers mode configuration.



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|-------------------|--------------------------------------------------------------------|-----------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 10 | | Send TC DPE1 power OFF | P4044 | LCL_SDPE1_OFF | | | P2116 = 0 | If # execute GR2 |
| 20 | | Send TC to switch OFF Anti-freeze 2 M | T5025 | TWS_ANTFRZ2-A_OFF | | | T8505 = 0 | |
| 30 | | Send TC to switch OFF Anti-freeze 1 M | T5020 | TWS_ANTFRZ1-A_OFF | | | T8504 = 0 | |
| 40 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Main | T5005 | LCL_CAMER_H-A_OFF | | | T8501 = 0 P2011 = 0 | |
| 50 | | Send TC to switch OFF Mask, ACS heaters Main | T5035 | TWS_ACS_MSK-A_OFF | | | T8507 = 0 | |
| 60 | | Send TC to switch OFF AFEE, DFEE, PSD heaters Red | T5105 | LCL_CAMER_H-B_OFF | | | T8601 = 0 P2061 = 0 | |
| 70 | | Send TC to switch OFF Mask, ACS heaters Red | T5135 | TWS_ACS_MSK-B_OFF | | | T8607 = 0 | |
| 80 | | Send TC to switch OFF Thermal Control LCL Main | P4048 | BD 4 A LCL 2 | | | P2122 = 0 | |
| 90 | | Send TC to switch OFF Thermal Control LCL Red | P4338 | BD 4 B LCL 2 | | | P2172 = 0 | |
| 100 | | Send TC to switch OFF Compressor heater M | T5000 | LCL_COMP_H-A_OFF | | | T8500 = 0 | |
| 101 | | Check CDE electrical status If (P1161=P1160=P1163=P1162=0) Go to step 125 | | | | | P1161 ? P1160 ? P1163 ? P1162 ? | |
| 102 | | Check CDE 1 mode If (F9971 = F9972 = 0) or (P1161 = 0) Go to step 107 | | | | | F9971, F9972 | Operations depend on CDE1 status CDE1 is in Stand-by mode or is OFF |
| 103 | | If (F9971 = 1 and F9972 = 0) | | | | | | CDE1 is in Nominal mode If # anomaly |
| 104a | | Send TC to decrease E9960 and E9961 compressors amplitude CDE 1 step by step until E9960 = 0 and E9961 = 0. | E9966 | CDE1_M_CHG_AMPL | Bit0 = 0 Bit1 = 1 E9960 Bit8 = 1 Bit9 = 1 E9961 | | F9960 decreases F9961 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 104b | | Check CDE1 compressors drive amplitude | | | | | F9960 ; F9961 < 50 | |
| 104c | | Check CDE 1 input current | | | | | P1061 | 0.5 A < I < 0.6 A (TBC) |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-------------------------------------------------------------------------------------------------------------|----------------|------------------|------------------------------------------------------------------------|-----------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 105a | | Send TC to set CDE 1 displacers to "0" amplitude In launch lock mode | E9960 | CDE1_M_LAUN_LOCK | Bit0 = 0 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 E9961 = 0 | | | |
| 105b | | Check the CDE 1 configuration Check CDE1 input current | | | | | F9971 = F9972 = 1 P1061 | If # execute GR1 0.30 A < I < 0.5 A |
| 106a | | Send TC to set CDE 1 in Stand-by mode | E9962 | CDE1_MASTER_STBY | Bit0 = 0 Bit1 = 0 E9960 = 0 Bit8 = 0 Bit9 = 0 E9961 = 0 | | | Back to Cryocooler Stand-by mode CDE1 Master |
| 106b | | Check CDE 1 input current | | | | | P1061 | 0.10 A < I < 0.20 A |
| 106c | | Check CDE 1 configuration | | | | | F9971 = 0 F9972 = 0 | if # anomaly |
| 107 | | Check CDE 2 mode If (F9991 = F9992 = 0) or (P1163 = 0) Go to step 120 | | | | | F9991, F9992 | Operations depend on CDE1 status CDE2 is in Stand-by mode or is OFF |
| 108 | | If (F9991 = 1 and F9992 = 0) | | | | | | CDE2 is in Nominal mode If # anomaly |
| 109a | | Send TC to decrease E9980 and E9981 compressors amplitude CDE 2 step by step until E9980 = 0 and E9981 = 0. | E9987 | CDE2_S_CHG_AMPL | Bit0 = 1 Bit1 = 1 E9980 Bit8 = 1 Bit9 = E9981 | | F9980 decreases F9981 decreases | Comp/Disp1 drive enable Comp1 amplitude Nominal mode selected Comp/Disp2 drive enable Comp2 amplitude |
| 109b | | Check CDE2 compressors drive amplitude | | | | | F9980 ; F9981 < 50 | |
| 109c | | Check CDE 2 input current | | | | | P1063 | 0.5 A < I < 0.6 A (TBC) |
| 110a | | Send TC to set CDE 2 displacers to "0" amplitude In launch lock mode | E9981 | CDE2_S_LAUN_LOCK | Bit0 = 1 Bit1 = 1 E9960 = 0 Bit8 = 0 Bit9 = 1 | | | |



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|--------------------------------------------------------|----------------|-------------------|------------------------------------------------------------------------|-----------------|----------------------------|------------------------------------------------|
| | | | | | E9961 = 0 | | | |
| 110b | | Check the CDE configuration Check CDE input current | | | | | F9991 = F9992 = 1 P1063 | If # execute GR2 0.30 A < I < 0.5 A |
| 115a | | Send TC to set CDE 2 in Stand-by mode | E9963 | CDE2_SLAVE_STBY | Bit0 = 1 Bit1 = 0 E9980 = 0 Bit8 = 0 Bit9 = 0 E9981 = 0 | | | Back to Cryocooler Stand-by mode CDE2 Slave |
| 115b | | Check CDE 2 input current | | | | | P1063 | 0.10 A < I < 0.20 A |
| 115c | | Check CDE 2 configuration | | | | | F9991 = 0 F9992 = 0 | If # execute GR1 |
| 120 | | Send TC to switch OFF CDE 1 | P3030 | CDE1_A_LCL1_OFF | | | P1161 = 0 PP1160 = 0 | |
| 120a | | Send TC to switch OFF CDE 2 | P3270 | CDE2_B_LCL1_OFF | | | P1163 = 0 P1162 = 0 | |
| 125 | | Send TC to switch off Compensation heater M | P4208 | TSW_ACC_HTR_A_OFF | | | P2222 = 0 | |
| 130 | | Send TC to switch OFF CDE heater M | T5575 | TWS_CDE_HTRA_OFF | | | T8015 = 0 | |
| 140 | | Send TC to switch OFF CDE heater R | T5675 | TWS_CDE_HTRB_OFF | | | T8115 = 0 | |



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- **Procedure n° 102 R-ISOINA**

- Purpose: Instrument switched OFF after Imminent switch off detection. This procedure is only used for instrument ground testing with the EGSE (TBC)
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:



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| Step n° | Time | Step Description | TC Ident MF n° | TC Name | Parameter Value | TM Ident TPN n° | Parameter Value | Remarks |
|---------|------|-----------------------------------------------------|----------------|-------------------|-----------------|-----------------|------------------------|------------------|
| 10 | | Send TC DPE2 power OFF | P4294 | LCL_SDPE2_OFF | | | P2166 = 0 P2063 = 0 | If # execute GR2 |
| 20 | | Send TC to switch OFF AFEE detection chains | P4310 | LCL_AF2 DET-B_OFF | | | P2071 = 0 | |
| 30 | | Send TC to switch OFF ACS | P4298 | LCL_SPI_ACS-B_OFF | | | P2064 = 0 | |
| 40 | | Send TC to switch OFF PSD | P4306 | LCL_PSD-B_OFF | | | P2066 = 0 | |
| 50 | | Send TC to switch OFF AFEE I/F TM/TC | P4290 | LCL_AF2TMTC-B_OFF | | | P2062 = 0 | |
| 60 | | Send TC to switch OFF DFEE | P4302 | LCL_DFEE-B_OFF | | | P2065 = 0 | |
| 70 | | CDE power down (See R-P101 step 101 to step 140) | | | | | | |



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2.3.3. Values of TC parameters (TPF files)

2.4 CONTINGENCIES PROCEDURES

2.4.1. Different kinds of anomalies

- 1 – Anomalies reported by an On Event Message (see chapter 1.2 volume 2)
- 2 – Anomalies highlighted by warnings and alarms (see the following chapter)
- 3 – Non-expected TM values after TC sending (electrical status, bad memory reading and so on.)

2.4.2. General rules

In case of warnings or alarms :

- 1 – send an on request TC in order to confirm the value of the parameter,
- 2 – Only in case of alarm perform the contingency activities defined here after,
- 3 – inform the SPI expert of the event and of the performed activities even if the problem has disappeared or if no contingency activity has been defined.

2.4.3. Reactions in some general cases (TBC)

| Anomaly description | Activities to be performed | Procedure to be used |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------|
| Wrong status after sending CDE configuration TC (F9971, F9972, F9991, F9992). | Send again the telecommand which was executed badly. If the failure remains, inform the SPI expert. | GR1* |
| Wrong status after sending electrical switching TC. | Send again the telecommand which was executed badly. If the failure remains, inform the S/C engineer. | GR2 |
| Wrong status after starting IASW. | Switch OFF DPE and switch ON again | ECP9 |
| TM values not compliant with the corresponding TC values. | Send again the telecommand which was executed badly. If the failure remains, inform the S/C engineer. | GR2 |
| Non-expected mode after sending Stand-by to Configuration and Back to Stand-by TC | Send again the telecommand which was executed badly. If the failure remains, inform the SPI expert. | GR1* |

* GR means General Reaction

2.4.4. Reactions to contingencies

| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|---------------------|-----------------------------------------------------------|----------------------|
| E0001 | AFEE current source | Continue the current activities and inform the SPI expert | |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| E0002 | AFEE TM/TC board temperature LSL channel | <u>In case of alarm min</u> : check that the AFEE heaters lines (main and redundant) are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP20 |
| | | <u>In case of alarm max</u> : reset the AFEE (TM/TC and analog chains) according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP1 |
| | | If the alarm max remains , switch OFF the AFEE (TM/TC and analog chains) according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP2 |
| E0210-E0228 | PA 2 temperature (operational) | If the warning min occurs check that anti-freeze 1 Main is ON and check the consumption. If not, switch it ON. If the alarm occurs again, switch ON the antifreeze 2 Main. If all was correct check if the condition to perform P3 is reached, if yes put SPI in Stand-by mode (P12), then perform P3 and P5 and inform the SPI expert. If the condition to perform P3 is not reached inform the SPI. If the alarm min occurs after all the defined actions, after the warning, have been done perform and inform the SPI expert. | P3 + P5 |
| | | If the warning max occurs inform the SPI. | |
| | | In case of alarm max (>+50°C) in No fine tuning condition and LPVS on (X6554 = 1), - we have to switch off the PA2: go in configuration mode P8 or P16 depending of the current; send the AFEE on/off status configuration defined in ES1710_AF-CH-OO_an-lvoff_0001.TPF (send the TC E0004 and the corresponding on-request E0014); - and inform the SPI expert. In case of alarm max (>-57°C) in fine tuning condition and LPVS on (X6524 = 1), - check that not unexpected heat pipe heater or annealing heater is on. If yes : switch it off. If no : go in stand-by (P12) to switch off the detector HV; - and inform the SPI expert. | |
| E0250 to E0268 | GeD High Voltage level | Return to Stand-by mode and keep all the S/A ON including the AFEE analog chains. Inform the SPI expert. | P12 |
| E0290 to E0308 | AFEE LVPS voltage | On alarm min or max, reset the AFEE (TM/TC and analog chains) according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP10 |
| | | If the alarm remains, switch OFF the AFEE analog chains (only keep the AFEE TM/TC I/F ON) and keep SPI in Stand-by mode and inform the SPI expert. | ECP11 |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| E0310 to E0328 | AFEE LVPS temperature | <u>In case of alarm min</u> : continue and inform the SPI expert. | |
| | | <u>In case of alarm max</u> : Reset the AFEE (TM/TC and analog chains) according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP10 |
| | | If the alarm max remains, switch OFF the AFEE analog chains (only keep the AFEE TM/TC I/F ON) and keep SPI in Stand-by mode and inform the SPI expert. | ECP11 |
| E0330 to E0348 | AFEE CAN temperature | <u>In case of alarm min</u> : continue and inform the SPI expert. | |
| | | <u>In case of alarm max</u> : Reset the AFEE (TM/TC and analog chains) according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP10 |
| | | If the alarm max remains, switch OFF the AFEE analog chains (only keep the AFEE TM/TC I/F ON) and keep SPI in Stand-by mode and inform the SPI expert. | ECP11 |
| E0391 to E0393 | GeD temperature Fine tuning and narrow range condition | <p>The warning or alarm is valid if :</p> <ul style="list-style-type: none"> - 2 or more sensors are respectively in warning or in alarm - the parameter E0001 is correct <p>If the alarm is valid:</p> <ul style="list-style-type: none"> - for an alarm min, decrease the stroke of 2 cryocoolers (A and B, or C and D) by 0.143 mm (1 bit) following the fine tuning procedure; - for an alarm max, increase the stroke of the 4 cryocoolers by 1 bit. <p>Inform the SPI expert after 2 successive alarms high occurred (but go on with operations).</p> | P26 |
| E0391 to E0393 | GeD temperature No cryocooler in OPER and UNLOCK, not Fine tuning and wide range condition | <p>The warning or alarm is valid if :</p> <ul style="list-style-type: none"> - 2 or more sensors are respectively in warning or in alarm - the parameter E0001 is correct <p>If the alarm is valid : in case of alarm min check that the cryocooler are not really in oper and unlock, if the cooling is in progress modify the cryocooler stroke following the dedicated procedure. (stroke decrease for an alert min). In case of alarm max switch off the annealing heater lines A and B and inform the SPI expert.</p> | |
| E0391 to E0393 | GeD temperature No Fine tuning and wide range and any cryocooler in OPER and UNLOCK condition | <p>The warning or alarm is valid if :</p> <ul style="list-style-type: none"> - 2 or more sensors are respectively in warning or in alarm - the parameter E0001 is correct <p>If the alarm is valid : in case of alarm min modify the cryocooler stroke following the dedicated procedure. (stroke decrease for an alert min). In case of alarm max and the switch off the annealing heater lines A and B, the heat pipe heater lines A and B, and inform the SPI expert.</p> | |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|----------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| E0391 to E0393 | GeD temperature No Fine tuning and wide range and any cryocooler in OPER and UNLOCK condition | The warning or alarm is valid if : - 2 or more sensors are respectively in warning or in alarm - the parameter E0001 is correct If the alarm is valid : in case of alarm min modify the cryocooler stroke following the dedicated procedure. (stroke decrease for an alert min). In case of alarm max and the switch off the annealing heater lines A and B, the heat pipe heater lines A and B, and inform the SPI expert. | |
| E0397 and E0398 | Thermal temperatures | The warning or alarm is valid if : - both sensors are identical within 2 K. - the parameter E0001 is correct If the alarm is valid: in case of alarm min modify the cryocooler stroke following the dedicated procedure (stroke decrease for an alert min). In case of alarm max and the switch off the annealing heater lines A and B, the heat pipe heater lines A and B, and inform the SPI expert. | |
| E2002 to E2024 E2064 to E2100 | FEE HV status | If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E2101 to E2109 | ACS shields temperatures | <u>In case of alarm min</u> : check that the S/A heaters lines and thermal control heaters lines are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP22 |
| | | <u>In case of alarm max</u> : compare the 3 values of E2101, E2102, E2103 and the 6 values of E2104 to E2109. If there are identical within 3°C, the alarm is declared valid. In this case reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities and inform the SPI expert. If the alarm remains, switch OFF the ACS according to the dedicated procedure. Keep SPI in Stand-by mode with ACS OFF and inform the SPI expert. If the alarm of one sensor is not confirmed by the other sensors , inform the SPI expert | ECP7 ECP8 |
| E2110 to E2112 | ACS LVS temperature | <u>In case of alarm min</u> : check that the S/A heaters lines and thermal control heaters lines are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP22 |



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|-----------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| | | <p><u>In case of alarm max</u> : compare the value of E2110, E2111 and E2113 to valid the alarm. If there are identical within 3°C, the alarm is declared valid. In this case reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities and inform the SPI expert.</p> <p>If the alarm remains, switch OFF the ACS according to the dedicated procedure. Keep SPI in Stand-by mode with ACS OFF and inform the SPI expert.</p> <p>If the alarm of one sensor is not confirmed by the 2 other sensors , inform the SPI expert.</p> | <p>ECP7</p> <p>ECP8</p> |
| E2114 to E2116 | PSAC temperature | <p><u>In case of alarm min</u> : check that the ACS and Mask heaters lines (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP22 |
| | | <p><u>In case of alarm max</u> : compare the 3 values of E2114, E2115, E2116. If there are identical within 3°C, the alarm is declared valid. In this case reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> <p>If the alarm remains, switch OFF the ACS according to the dedicated procedure. Keep SPI in Stand-by mode with ACS OFF and inform the SPI expert.</p> <p>If the alarm of one sensor is not confirmed by the 2 other sensors , inform the SPI expert.</p> | <p>ECP7</p> <p>ECP8</p> |
| E2121 | VCU AC bus current HV OFF or HV ON | <p>Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP7 |
| | | <p>If the alarm remains , switch OFF the ACS according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP8 |
| E2122 | VCU AC bus voltage LSL channel | <p>Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP7 |
| | | <p>If the alarm remains , switch OFF the ACS according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP8 |
| E2123 | VCU 5 V supply | <p>Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP7 |
| | | <p>If the alarm remains , switch OFF the ACS according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP8 |



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|-------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| E2150 to E2240 E2241 | FEE digital status 5 V PSAC digital status 5 V | If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E2250 to E2340 E2341 | FEE analog status 5 V PSAC analog status ± 9 V | If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E2350 to E2399 | FEE analog status – 5 V | If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E2594 to E2596 | AFEE HK00 alarms | If the alarm is confirm during 5 min. Reset the AFEE (TM/TC and analog chains) according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP1 |
| | | If the alarm remains , switch OFF the AFEE (TM/TC and analog chains) according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP2 |
| E2597 to E2599 | ACS HK00 alarms | If the alarm is confirm during 5 min. Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E2600 to E2690 | FEE alert status | If <u>one value equals 2, 3, 6 or 7</u> , the corresponding FEE HV is declared to high : Set the corresponding HV to 0 and continue the previous activities | ECP23 |



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|-------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| | | <p>If one value equals 1 or 5, a FEE watchdog reset has occurred.</p> <p>If this event not occurs after a Stand-by mode transition, Continue the activities but inform ISDC and the SPI expert .</p> | N/A |
| E2790 to E2793 | DFEE HK00 alarms | <p>If the alarm is confirm during 5 min.</p> <p>Reset the DFEE according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> <p>If the alarm remains, switch OFF the DFEE according to the dedicated procedure, keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP5 ECP6 |
| E2796 | PSD ACK/NACK | <p>When a NACK is received : Reset the PSD according the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP3 |
| | | <p>If the alarm remains, switch OFF the PSD according the dedicated procedure, continue the observation with PSD OFF and inform th SPI expert.</p> | ECP4 |
| E2797 | AFEE HK00 alarms | <p>If the alarm is confirm during 5 min.</p> <p>Reset the AFEE (TM/TC and analog chains) according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP1 |
| | | <p>If the alarm remains , switch OFF the AFEE (TM/TC and analog chains) according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP2 |
| E2798 | ACS HK00 alarms | <p>If the alarm is confirm during 5 min.</p> <p>Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP7 |
| | | <p>If the alarm remains , switch OFF the ACS according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP8 |
| E3121 to E3161 E3162 | FEE analog status – 5 V PSAC 28 V status | <p>If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP7 |
| | | <p>If the alarm remains , switch OFF the ACS according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP8 |
| E3164 to E3254 | FEE temperature status | <p>If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities.</p> | ECP7 |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|----------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E3256 to E3286 | FEE HV status | If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E3287/E3288 E3289 | PSAC HV1/HV2 status PSAC aux. Analog status | If the value checked from TM packet 60601 is not « 10 » binary : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E3824 | PSD 5 V digital | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3825 | PSD + 5 V analog | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3826 | PSD – 5 V analog | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3827 | PSD A/D global offset | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |



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|-----------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| E3828 | PSD DSP temperature | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3829 | PSD ADC temperature | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3830 | PSD analog MUX1 temp. | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3831 | PSD analog MUX2 temp. | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3981 to E3984 | 200 K cold box temperature | The alarm or warning is valid if the 4 sensors are identical within 3°C. | |
| | | If the warning min occurs check that anti-freeze 1 Main is ON and check the power consumption. If not, switch it ON. If the alarm occurs again, switch ON the antifreeze 2 Main. If there is consumption keep SPI in Stand-by mode and inform the SPI expert. If the alarm min occurs check that anti-freeze 1 Main is ON and check the power consumption. If necessary switch ON anti-freeze 1 Main. If there is consumption keep SPI in Stand-by mode, perform the thawing procedure and inform the SPI expert. | P3 + P5 |
| | | Alarm max when X6542 = 1 (No cryocoolers in Oper and unlock and heatpipes heaters OFF): Wait and inform the SPI expert | |



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|-----------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| | | <p>Alarm max when X6521 = 1 (Any heatpipe heater ON):</p> <p>Check that only 1 of the heatpipes heaters is ON (T8502 = 0 or T8602 = 0):</p> <ul style="list-style-type: none"> - If not, switch OFF the redundant heatpipe heater line. - If only one heatpipe heater line is on, switch it OFF. <p style="text-align: center;">Inform the SPI expert.</p> | |
| | | <p>Alarm max when X6524 = 1 (Any cryocoolers in Oper and unlock and heatpipes heaters OFF):</p> <p>Check that no unexpected heatpipes heaters is ON (T8502 = 1 or T8602 = 1):</p> <ul style="list-style-type: none"> - If not, switch OFF the antifreeze heaters which are ON and switch ON the redundant antifreeze heater 1. - If yes (one heatpipe heater line is on), switch it OFF. <p>Inform the SPI expert.</p> | |
| E3985 | TM/TC LVPS | Reset the AFEE (TM/TC and analog chains) according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP1 |
| | | <p>If the alarm remains , switch OFF the AFEE (TM/TC and analog chains) according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP2 |
| E3986 | DFEE box temperature mRTU channel | If the value is confirmed by T5012 ($\pm 3^\circ \text{C}$) | |
| | | <p><u>If case of alarm min</u> : check that the DFEE heaters lins (main and redundant) are ON .</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP20 |
| | | <p><u>In case of alarm max</u> : switch OFF the DFEE according to the dedicated procedure, keep SPI in stand-by mode and inform the SPI expert.</p> | ECP6 |
| E3987 | DFEE LVPS | Reset the DFEE according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP5 |
| | | <p>If the alarm remains , switch OFF the DFEE according to the dedicated procedure.</p> <p>And keep SPI in Stand-by mode and inform the SPI expert.</p> | ECP6 |
| E3988 | PSD box temperature mRTU channel | If the value is confirmed by T5013 ($\pm 3^\circ \text{C}$) | |
| | | <p><u>If case of alarm min</u> : check that the PSD heaters lins (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP20 |



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|-----------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| | | <u>In case of alarm max</u> : switch OFF the PSD according to the dedicated procedure, continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3989 | PSD LVPS | Reset the PSD according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP3 |
| | | If the alarm remains , switch OFF the PSD according to the dedicated procedure. And continue the observation with PSD OFF and inform the SPI expert. | ECP4 |
| E3990 | VCU AC bus voltage MRTU channel | Compare with E2122 (after sending the On request TC E0280). If E2122 is in warning or alarm range reset the ACS according to the dedicated procedure. If alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| | | If E2122 is normal, ignore the alarm but inform the SPI expert. | N/A |
| E3991 | VCU box temp. mRTU channel | <u>In case of alarm min</u> : check that the ACS heaters lines (main and redundant) are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP22 |
| | | <u>In case of alarm max</u> : Reset the ACS according to the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP7 |
| | | If the alarm remains , switch OFF the ACS according to the dedicated procedure. And keep SPI in Stand-by mode and inform the SPI expert. | ECP8 |
| E3992 | Heat pipes temperatures | If the warning min occurs check that anti-freeze 1 Main is ON and check the consumption. If not, switch it ON. If the alarm occurs again, switch ON the antifreeze 2 Main. If there is consumption keep SPI in Stand-by mode and inform the SPI expert. If the alarm min occurs check that anti-freeze 1 Main is ON and check the consumption. If necessary switch ON anti-freeze 1 Main. If there is consumption keep SPI in Stand-by mode, perform the thawing procedure and inform the SPI expert. | P3 + P5 |
| E3993 | Cold link temperature | No limit has to be applied | |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| E3994 | Active cooling radiator | No limit has to be applied | |
| E3995 | AFEE TM/TC power supply board temperature mRTU channel | <p><u>In case of alarm min</u> : check that the AFEE heaters lines (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP20 |
| | | <p><u>In case of alarm max</u> : return to Stand-by mode and switch OFF the AFEE (TM/TC and analog chains) according to the dedicated procedure.</p> <p>Inform the SPI expert.</p> | ECP2 |
| E3996 | Heat pipes temperatures | <p>Same actions as for E3992</p> <p>If the warning min occurs check that anti-freeze 1 Main is ON and check the consumption. If not, switch it ON. If the alarm occurs again, switch ON the antifreeze 2 Main. If there is consumption keep SPI in Stand-by mode and inform the SPI expert.</p> <p>If the alarm min occurs check that anti-freeze 1 Main is ON and check the consumption. If necessary switch ON anti-freeze 1 Main. If there is consumption keep SPI in Stand-by mode, perform the thawing procedure and inform the SPI expert.</p> | |
| E3997 | Active cooling radiator | No limit has to be applied | |
| E3998 | Analog reference channel 22 | Reset the DPE following the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP9 |
| | | If the alarm remains, keep SPI in Stand-by mode including DPE and inform the SPI expert. | |
| E3999 | Analog reference channel 23 | Reset the DPE following the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP9 |
| | | If the alarm remains, keep SPI in Stand-by mode including DPE and inform the SPI expert. | |
| E4000 | Analog reference channel 30 | Reset the DPE following the dedicated procedure. If the alarm has disappeared continue the previous activities. | ECP9 |
| | | If the alarm remains, keep SPI in Stand-by mode including DPE and inform the SPI expert. | |
| T5001 | Mask temperature | <p><u>In case of alarm min</u> : check that the ACS heaters lines (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP22 |
| | | <p><u>In case of alarm max</u> : continue the observation and inform the SPI expert.</p> | |
| T5002 | LSA temperature | Inform the SPI expert | |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| T5003 T5004 | ACS structural rings temperature | Compare with E2101 to E2109 and <u>In case of alarm min</u> : check that the S/A heaters lines and thermal control heaters lines are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP22 |
| | | <u>In case of alarm max</u> : switch OFF the ACS according to the dedicated procedure. Keep SPI in Stand-by mode with ACS OFF and inform the SPI expert. | ECP8 |
| T5005 | PSAC ring temperature | <u>In case of alarm min</u> : check that the ACS heaters lines (main and redundant) are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP22 |
| | | <u>In case of alarm max</u> : return to Stand-by mode and switch OFF the ACS chains according the dedicated procedure, keep SPI in Stand-by mode and inform the SPI expert | ECP8 |
| T5010 | AFEE1 box temperature | <u>In case of alarm min</u> : check that the AFEE heaters lines (main and redundant) are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP20 |
| | | <u>In case of alarm max</u> : return to Stand-by mode and switch OFF the AFEE (TM/TC and analog chains) according the dedicated procedure, switch OFF the anti-freeze lines and the annealing lines, keep SPI in Stand-by mode and inform the SPI expert | ECP2 |
| T5011 | AFEE2 box temperature | <u>In case of alarm min</u> : check that the AFEE heaters lines (main and redundant) are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP20 |
| | | <u>In case of alarm max</u> : return to Stand-by mode and switch OFF the AFEE analog chains according the dedicated procedure, keep SPI in Stand-by mode and inform the SPI expert | ECP11 |
| T5012 | DFEE box temperature | If the value is confirmed by E3986 ($\pm 3^\circ \text{C}$) <u>In case of alarm min</u> : check that the DFEE heaters lines (main and redundant) are ON. If not perform the referenced procedure and inform the operational engineer on duty. | ECP20 |
| | | <u>In case of alarm max</u> : return to Stand-by mode and switch OFF the DFEE according the dedicated procedure, keep SPI in Stand-by mode and inform the SPI expert | ECP6 |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| T5013 | PSD box temperature | <p>If the value is confirmed by E3986 ($\pm 3^\circ \text{C}$)</p> <p><u>In case of alarm min</u> : check that the PSD heaters lines (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP20 |
| | | <p><u>In case of alarm max</u> : return to Stand-by mode and switch OFF the PSD according the dedicated procedure, keep SPI continue the the observation with PSD OFF and inform the SPI expert</p> | ECP4 |
| T5019 | Mask temperature | <p><u>In case of alarm min</u> : check that the ACS heaters lines (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP22 |
| | | <p><u>In case of alarm max</u> : continue the observation and inform the SPI expert.</p> | N/A |
| T5020 | LSA temperature | Inform the SPI expert | |
| T5021 | ACS structural rings temperature | <p>Compare with E2101 to E2109 and</p> <p><u>In case of alarm min</u> : check that the S/A heaters lines and thermal control heaters lines are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP22 |
| | | <p><u>In case of alarm max</u> : switch OFF the ACS according to the dedicated procedure. Keep SPI in Stand-by mode with ACS OFF and inform the SPI expert.</p> | ECP8 |
| T5022 | ACS box temperature | <p>If the value is confirmed by E2113 ($\pm 3^\circ \text{C}$)</p> <p><u>In case of alarm min</u> : check that the ACS heaters lines (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP22 |
| | | <p><u>In case of alarm max</u> : return to Stand-by mode and switch OFF the ACS according the dedicated procedure, keep SPI in Stand-by mode and inform the SPI expert</p> | ECP8 |
| T5023 | PSAC ring temperature | <p><u>In case of alarm min</u> : check that the ACS heaters lines (main and redundant) are ON.</p> <p>If not perform the referenced procedure and inform the operational engineer on duty.</p> | ECP22 |
| | | <p><u>In case of alarm max</u> : return to Stand-by mode and switch OFF the ACS chains according the dedicated procedure, keep SPI in Stand-by mode and inform the SPI expert</p> | ECP8 |
| T5104 –T5111 | Passive radiator | The alarm or warning is valid if the 2 sensors are identical within 3°C and the other T parameters are not all in alarm (in this case reset the RTU). | |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| | | <p>Alarm min when X6542 = 1 (No cryocoolers in Oper and unlock and heatpipes heaters OFF):</p> <p>Check if the antifreeze heater 1 is ON (T8504 or T8604 = 1):</p> <ul style="list-style-type: none"> - If not, switch ON the main antifreeze heater line and perform the heatpipe thaw procedure - If yes: perform the heatpipe thaw procedure, switch OFF the main heatpipe heater lines 1 and 2, switch ON the redundant heatpipe heater lines 1. <p>Inform the SPI expert</p> | P3 + P5 |
| | | <p>Alarm min when X6521 = 1 (Any heatpipe heater ON):</p> <p>Check that one heatpipe heater line is ON and the corresponding cryostat thermal control line is ON with a power consumption > 0.5 A ((T8502 = 1 and P2122 = 1 and P2018 > 0.5 A) or (T8602 = 1 and P2172 = 1 P2068 > 0.5 A)):</p> <ul style="list-style-type: none"> - if not, the configuration is not correct, perform P3 then P5. - if yes perform R-P3 then R-P5 with the redundant line. <p>Inform the SPI expert</p> | P3 + P5 R-P3 + R-P5 |
| | | <p>Alarm max when X6542 = 1 (No cryocoolers in Oper and unlock and heatpipes heaters OFF):</p> <p>Wait and inform the SPI expert</p> | |
| | | <p>Alarm max when X6521 = 1 (Any heatpipe heater ON):</p> <p>Check that only 1 of the heatpipes heaters is ON (T8502 = 0 or T8602 = 0):</p> <ul style="list-style-type: none"> - If not, switch OFF the redundant heatpipe heater line. - If only one heatpipe heater line is on, switch it OFF. <p>Inform the SPI expert.</p> | |
| | | <p>Alarm max when X6524 = 1 (Any cryocoolers in Oper and unlock and heatpipes heaters OFF):</p> <p>Check that no unexpected heatpipes heaters is ON (T8502 = 1 or T8602 = 1):</p> <ul style="list-style-type: none"> - If not, switch OFF the antifreeze heaters which are ON and switch ON the redundant antifreeze heater 1. - If yes one heatpipe heater line is on, switch it OFF. <p>Inform the SPI expert.</p> | |



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| Par. Identifier | Description | Activities to be performed | Procedure to be used |
|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| P1060 | LCL2 – CDE1 | In case of alarm min: Inform immediately the SPI expert | |
| P1061 | LCL1 – CDE1 | In case of alarm max: <u>When in cooling mode</u> : decrease the stroke amplitude by one bit on all the machines. If the alarm remain decrease by one more bit. Inform the SPI expert. | ECP17 |
| P1062 | LCL2 – CDE2 | <u>When in operational mode</u> : Inform immediately the SPI expert | |
| P1063 | LCL1 – CDE2 | | |

2.4.5. Procedures

The Elementary Contingency Procedures (ECP) are listed below :

| Procudure n° | Description |
|--------------|-----------------------------------------------------------------------|
| ECP1 | AFEE reset |
| ECP2 | AFEE switching OFF |
| ECP3 | PSD reset |
| ECP4 | PSD switching OFF |
| ECP5 | DFEE reset |
| ECP6 | DFEE switching OFF |
| ECP7 | ACS reset |
| ECP8 | ACS switching OFF |
| ECP9 | DPE reset |
| ECP10 | AFEE reset after power supply anomaly |
| ECP11 | AFEE analog chains switching OFF |
| ECP12 | Low voltage monitoring parameters (E8977 and E8978) setting |
| ECP13 | AFEE reset with delay before autotest acquisition change (E8972) |
| ECP14 | PSD reset with delay before autotest acquisition change (E8972) |
| ECP15 | DFEE reset with delay before autotest acquisition change (E8972) |
| ECP16 | ACS reset with delay before autotest acquisition change (E8972) |
| ECP17 | CDE stroke amplitude decrease |
| ECP18 | |
| ECP19 | |
| ECP20 | AFEE, DFEE and PSD heaters switch ON |
| ECP21 | Annealing heaters switch ON |
| ECP22 | Mask and ACS heaters switch ON |
| ECP23 | FEE High Voltage setting |
| ECP24 | AFEE reset with delay before configuration acquisition change (E8973) |
| ECP25 | PSD reset with delay before configuration acquisition change (E8973) |
| ECP26 | DFEE reset with delay before configuration acquisition change (E8973) |
| ECP27 | ACS reset with delay before configuration acquisition change (E8973) |
| ECP28 | ACS reset with ROM/RAM delay change (E8949) |
| ECP29 | PSD reset with ROM/RAM delay change (E8952) |
| ECP30 | DFEE reset with ROM/RAM delay change (E8956) |



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• Procedure n° ECP1

- Purpose: AFEE reset
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------|-----------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 0 | E3900 = 0 | AFEE OFF |
| Send TC to switch OFF AFEE analog chains | P4060 | | P2121 = 0 | |
| Send TC to switch OFF AFEE TM/TC I/F | P4040 | | P2115 = 0 | |
| Send TC to switch ON AFEE TM/TC I/F | P4041 | | P2115 = 1 | |
| Send TC to switch ON AFEE analog chains | P4061 | | P2121 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 1 | E3900 = 1 | AFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |



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- **Procedure n° ECP2**
 - Purpose: AFEE switching OFF
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------|----------------|--------------------|--------------------|----------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 0 | E3900 = 0 | AFEE OFF |
| Send TC to switch OFF AFEE analog chains | P4060 | | P2121 = 0 | |
| Send TC to switch OFF AFEE TM/TC I/F | P4040 | | P2115 = 0 | |



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Procedure n° ECP3

- Purpose: PSD reset
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = | |
| Send TC to change configuration of S/A | E0500 | E8903 = 0 | E3903 = 0 | PSD OFF |
| Send TC to switch OFF PSD | P4056 | | P2120 = 0 | |
| Send TC to switch ON PSD | P4057 | | P2120 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8903 = 1 | E3903 = 1 | PSD ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |



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- **Procedure n° ECP4**

- Purpose: PSD switching OFF
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------|----------------|--------------------|--------------------|---------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8903 = 0 | E3903 = 0 | PSD OFF |
| Send TC to switch OFF PSD | P4056 | | P2120 = 0 | |



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• **Procedure n° ECP5**

- Purpose: DFEE reset
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------|-----------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 0 | E3901 = 0 | DFEE OFF |
| Send TC to switch OFF DFEE | P4052 | | P2119 = 0 | |
| Send TC to switch ON DFEE | P4053 | | P2119 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 1 | E3901 = 1 | DFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |



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• **Procedure n° ECP6**

- Purpose: DFEE switching OFF
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------|----------------|--------------------|--------------------|----------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 0 | E3901 = 0 | DFEE OFF |
| Send TC to switch OFF DFEE | P4052 | | P2119 = 0 | |

- **Procedure n°** **ECP7**
 - Purpose: ACS reset
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------------|-----------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 0 | E3902 = 0 | ACS OFF |
| Send TC to switch OFF ACS | P4048 | | P2117 = 0 | |
| Send TC to switch ON ACS | P4049 | | P2117 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 1 | E3902 = 1 | ACS ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous S/A configuration | E0556 | | | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP8**

- Purpose: ACS switching OFF
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------|----------------|--------------------|--------------------|---------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 0 | E3902 = 0 | ACS OFF |
| Send TC to switch OFF PSD | P4048 | | P2117 = 0 | |



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- **Procedure n° ECP9**
 - Purpose: DPE reset
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:



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| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Transition from Stand-by mode to Inactive mode | | | | |
| Send TC to change S/A ON/OFF configuration | E0500 | E8900 = 0 E8901 = 0 E8902 = 0 E8903 = 0 | | |
| Send TC ON/OFF configuration request | E0525 | | E3900 = 0 E3901 = 0 E3902 = 0 E3903 = 0 | If # anomaly If # anomaly If # anomaly If # anomaly |
| AFEE detection chain LCL status checking | | | P2121 | |
| If (P2121 = 1) send TC AFEE detection chain power OFF | P4060 | | P2121 = 0 | |
| AFEE2 I/F TM/TC LCL status checking | | | P2115 | |
| If (P2115 = 1) send TC AFEE I/F TM/TC power OFF | P4040 | | P2115 = 0 | |
| ACS LCL status checking | | | P2117 | |
| If (P2117 = 1) send TC ACS power OFF | P4048 | | P2117 = 0 | |
| PSD LCL status checking | | | P2120 | |
| If (P2120 = 1) send TC PSD power OFF | P4056 | | P2120 = 0 | |
| | | | | |
| DFEE LCL status checking | | | P2119 | |
| If (P2119 = 1) send TC DFEE power OFF | P4052 | | P2119 = 0 | |
| Send TC to switch off DPE 1 | P4044 | | P2116 = 0 P2013 = 0 | Amp |
| Transition from Inactive mode to Stand-by mode | | | | See nominal procedure P4 Except the step to switch ON the compensation heaters |
| Send TC DPE1 power On | P4045 | | P2116 = 1 P2013 | I = 0.28 A ± 0.2 A |
| Send TC DPE1 +5V Aux Supply Relay 0 ON | E9800 | | E9801 = 1 | |
| DPE1 status checking | | | D6503 = 1 | Running state |
| Time synchronisation checking | | | APID = 129 | CDMU time |
| If (CDMU time ≠ DPE time) Send TC for DPE time synchronisation | TBD | APID=1024 | APID = 1024 | DPE time |
| Time synchronisation checking | | | APID = 129 APID = 1024 | CDMU time DPE time |
| Checking IASW status | | | E0049 = 0 | Check at least two time cycle If IASW nok ⇒ anomaly |
| If (E0049 = 1) go to step 110 | | | | |
| Starting IASW | E9024 | | | IASW start-up |
| Checking IASW mode and version | | | E0049 = 1 E0029 | If # ⇒ anomaly Version number |
| Send TC for IASW general and Diag configuration | E0518 E0519 E0581 E0582 E0583 E0584 E0585 E0586 | Default_ground_ IASW_FM except E8963=0 | | Default parameters except cold plate monitoring disable |
| Send TC on-request for IASW general and Diag configuration to check the TC conformance. | E0523 E0524 E0591 E0592 E0593 | | E3963=0 | |



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| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|-----------------------------------------------------------------------------|-------------------------|------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------|
| | E0594 E0595 E0596 | | | |
| Send TC AFEE I/F TM/TC power ON AFEE I/F TM/TC self-test status checking | P4041 | | P2115 = 1 P2012 E3882 = 0 | 0.14A ± 0.01 If # ⇒ anomaly |
| Send TC AFEE detection chain power ON | P4061 | | P2121 = 1 P2017 | 0 ± 0.01 |
| Send TC DFEE power ON | P4053 | | P2119 = 1 P2015 | 0.19A ± 0.02 |
| DFEE self-test status checking | | | E3885 = 0 | If # ⇒ anomaly |
| Send TC ACS power ON | P4049 | | P2117 = 1 P2014 | 1.33A ± 0.13A |
| ACS self-test status checking | | | E3888 = 0 | If # ⇒ anomaly |
| Send TC PSD power ON | P4057 | | P2120 = 1 P2016 | 0.45 ± 0.04A |
| PSD self-test status checking | | | E3891 = 0 | If # ⇒ anomaly |
| Send TC | E0500 | E8900=? E8901=? E8902=? E8903=? | | By default all S/A are ON |
| Send TC S/A status request | E0525 | | E3900 E3901 E3902 E3903 | If E8900 # E3900 ⇒ anomaly If E8901 # E3901 ⇒ anomaly If E8902 # E3902 ⇒ anomaly If E8903 # E3903 ⇒ anomaly |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous S/A configuration | E0556 | | | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |



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- **Procedure n° ECP10**
 - Purpose: AFEE reset after power supply anomaly
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|-----------------------------------------------------|-----------------------|------------------------------------|------------------------------------|-------------------------------------------------------|
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to configure AFEE with LVPS and HVPS OFF | | | | |
| Transition to Stand-by mode | E0505 | | | |
| Send TC to change configuration of S/A | E0500 | E8900 = 0 | E3900 = 0 | AFEE OFF |
| Send TC to switch OFF AFEE analog chains | P4060 | | P2121 = 0 | |
| Send TC to switch OFF AFEE TM/TC I/F | P4040 | | P2115 = 0 | |
| Send TC to switch ON AFEE TM/TC I/F | P4041 | | P2115 = 1 | |
| Send TC to switch ON AFEE analog chains | P4061 | | P2121 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 1 | E3900 = 1 | AFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Send TC to configure AFEE with LVPS ON and HVPS OFF | E0004 | E5170-E5188 = 1 E5190-E5208 = 0 | | If the anomaly has disappeared continue the procedure |
| Send TC to request AFEE configuration | E0014 | | E0170-E0188 = 1 E0190-E0208 = 0 | |
| Send TC to configure AFEE with LVPS ON and HVPS ON | E0004 | E5170-E5188 = 1 E5190-E5208 = 1 | | |
| Send TC to request AFEE configuration | E0014 | | E0170-E0188 = 1 E0190-E0208 = 1 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous S/A configuration | E0556 | | | Control DC output voltage transition |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | |

• **Procedure n° ECP11**

- Purpose: AFEE analog chains switching OFF
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------|----------------|--------------------|--------------------|---------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to switch OFF AFEE analog chains | P4060 | | P2121 = 0 | |

- **Procedure n° ECP12**
 - Purpose: Low voltage monitoring parameters setting
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------------------------------------|-----------------------|------------------------|------------------------|---------------------------|
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to modify AFEE LV monitoring threshold and associated filter | E0518 | E8977 = * E8978 = * | | * the requested new value |
| Send on request TC | E0523 | | E3977 = * E3978 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | |

• **Procedure n° ECP13**

- Purpose: AFEE reset with delay before auto-test acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 0 | E3900 = 0 | AFEE OFF |
| Send TC to switch OFF AFEE analog chains | P4060 | | P2121 = 0 | |
| Send TC to switch OFF AFEE TM/TC I/F | P4040 | | P2115 = 0 | |
| Send TC to switch ON AFEE TM/TC I/F | P4041 | | P2115 = 1 | |
| Send TC to switch ON AFEE analog chains | P4061 | | P2121 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 1 | E3900 = 1 | AFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify delay before auto-test acquisition | E0518 | E8972 = * | | * requested new value |
| Send on request TC | E0523 | | E3972 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP14**

- Purpose: PSD reset with delay before auto-test acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = | |
| Send TC to change configuration of S/A | E0500 | E8903 = 0 | E3903 = 0 | PSD OFF |
| Send TC to switch OFF PSD | P4056 | | P2120 = 0 | |
| Send TC to switch ON PSD | P4057 | | P2120 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8903 = 1 | E3903 = 1 | PSD ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify delay before auto-test acquisition | E0518 | E8972 = * | | * requested new value |
| Send on request TC | E0523 | | E3972 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP15**

- Purpose: DFEE reset with delay before autotest acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------------------|-----------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 0 | E3901 = 0 | DFEE OFF |
| Send TC to switch OFF DFEE | P4052 | | P2119 = 0 | |
| Send TC to switch ON DFEE | P4053 | | P2119 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 1 | E3901 = 1 | DFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify delay before auto-test acquisition | E0518 | E8972 = * | | * requested new value |
| Send on request TC | E0523 | | E3972 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP16**

- Purpose: ACS reset with delay before auto-test acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 0 | E3902 = 0 | ACS OFF |
| Send TC to switch OFF ACS | P4048 | | P2117 = 0 | |
| Send TC to switch ON ACS | P4049 | | P2117 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 1 | E3902 = 1 | ACS ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous S/A configuration | E0556 | | | |
| Send TC to modify delay before auto-test acquisition | E0518 | E8972 = * | | * requested new value |
| Send on request TC | E0523 | | E3972 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

- **Procedure n° ECP17**
 - Purpose: CDE stroke amplitude decrease
 - Constraints: CDE must be in normal mode.
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------------------------------------|----------------|----------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Check CDE mode | | | F9971=F9991=1 F9972=F9992=0 | |
| Check CDE Input current | | | P1061 P1063 | I < 6.9 A |
| Send TC to decrease by one step the compressors and displacers amplitude | E9966 | CDE1_M_CH NG_AMPL | Bit0 = 0 Bit1 = 1 E9960 = CA* - 1 bit Bit8 = 1 Bit9 = 1 E9961 = CA* - 1 bit | |
| Send TC to decrease by one step the compressors and displacers amplitude | E9987 | CDE2_S_CHN G_AMPL | Bit0 = 1 Bit1 = 1 E9960 = CA* - 1 bit Bit8 = 1 Bit9 = 1 E9961 = CA* - 1 bit | |
| Check CDE Input current | | | P1061 P1063 | I < 6.9 A If the anomaly has disappeared continue the normal work, otherwise decrease again by on step |

• **Procedure n° ECP20**

- Purpose: AFEE, DFEE and PSD heaters switch ON
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------------------------|----------------|--------------------|--------------------|---------|
| Check camera LCL status main | | | T8501 ? | |
| If T8501=0 send TC to switch ON camera heaters Main | T5006 | | T8501 = 1 P2018 | |
| Check camera LCL status redundant | | | T8601 ? | |
| If T8601=0 send TC to switch ON camera heaters Redundant | T5106 | | T8601 = 1 P2061 | |

- **Procedure n° ECP21**
 - Purpose: Annealing heaters switch ON
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|-------------------------------------------------------------|----------------|--------------------|--------------------|---------|
| Check annealing LCL status main | | | T8503 ? | |
| If T8503=0 send TC to switch ON annealing heaters Main | T5016 | | T8503 = 1 | |
| Check annealing LCL status redundant | | | T8603 ? | |
| If T8603=0 send TC to switch ON annealing heaters Redundant | T5116 | | T8603 = 1 | |

• **Procedure n° ECP22**

- Purpose: Mask and ACS heaters switch ON
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------------------------------|----------------|--------------------|--------------------|---------|
| Check Mask and ACS LCL status main | | | T8507 ? | |
| If T8501=0 send TC to switch ON Mask and ACS heaters Main | T5036 | | T8507 = 1 | |
| Check Mask and ACS LCL status redundant | | | T8607 ? | |
| If T8601=0 send TC to switch ON Mask and ACS heaters Redundant | T5136 | | T8607 = 1 | |

- **Procedure n° ECP23**
 - Purpose: FEE High Voltage setting
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------------------|-------------------------|----------------------------------------------------|----------------------------------------------------|----------------|
| Transition to configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to request the current FEE high voltage values | E0269 E0270 E0271 | | E1700 to E1730 E1731 to E1761 E1762 to E1790 | |
| Define which FEE should be set to 0 | | | | E6700 to E6790 |
| Send TC to update FEE high voltage values | E0219 E0220 E0221 | E6700 to E6730 E6731 to E6761 E6762 to E6790 | | |
| Send TC to request the updated FEE high voltage values | E0269 E0270 E0271 | | E1700 to E1730 E1731 to E1761 E1762 to E1790 | |
| Transition to the initial mode | E0501/E0503 /E0504 | | | |
| Mode status checking | | | E0049 = 4/5/7 | |

• **Procedure n° ECP24**

- Purpose: AFEE reset with delay before configuration acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 0 | E3900 = 0 | AFEE OFF |
| Send TC to switch OFF AFEE analog chains | P4060 | | P2121 = 0 | |
| Send TC to switch OFF AFEE TM/TC I/F | P4040 | | P2115 = 0 | |
| Send TC to switch ON AFEE TM/TC I/F | P4041 | | P2115 = 1 | |
| Send TC to switch ON AFEE analog chains | P4061 | | P2121 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8900 = 1 | E3900 = 1 | AFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify delay before configuration acquisition | E0518 | E8973 = * | | * requested new value |
| Send on request TC | E0523 | | E3973 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP25**

- Purpose: PSD reset with delay before configuration acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = | |
| Send TC to change configuration of S/A | E0500 | E8903 = 0 | E3903 = 0 | PSD OFF |
| Send TC to switch OFF PSD | P4056 | | P2120 = 0 | |
| Send TC to switch ON PSD | P4057 | | P2120 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8903 = 1 | E3903 = 1 | PSD ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify delay before configuration acquisition | E0518 | E8973 = * | | * requested new value |
| Send on request TC | E0523 | | E3973 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP26**

- Purpose: DFEE reset with delay before configuration acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 0 | E3901 = 0 | DFEE OFF |
| Send TC to switch OFF DFEE | P4052 | | P2119 = 0 | |
| Send TC to switch ON DFEE | P4053 | | P2119 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 1 | E3901 = 1 | DFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify delay before configuration acquisition | E0518 | E8973 = * | | * requested new value |
| Send on request TC | E0523 | | E3973 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP27**

- Purpose: ACS reset with delay before configuration acquisition change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|----------------------------------------------------------|-----------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 0 | E3902 = 0 | ACS OFF |
| Send TC to switch OFF ACS | P4048 | | P2117 = 0 | |
| Send TC to switch ON ACS | P4049 | | P2117 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 1 | E3902 = 1 | ACS ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous S/A configuration | E0556 | | | |
| Send TC to modify delay before configuration acquisition | E0518 | E8973 = * | | * requested new value |
| Send on request TC | E0523 | | E3973 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

• **Procedure n° ECP28**

- Purpose: ACS reset with ROM/RAM delay change
- Constraints:
- Time Criticality:
- System Level Prerequisites:
- Sub-system Level Prerequisites:
- Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|------------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 0 | E3902 = 0 | ACS OFF |
| Send TC to switch OFF ACS | P4048 | | P2117 = 0 | |
| Send TC to switch ON ACS | P4049 | | P2117 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8902 = 1 | E3902 = 1 | ACS ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous S/A configuration | E0556 | | | |
| Send TC to modify ROM/RAM delay | E0518 | E8949 = * | | * requested new value |
| Send on request TC | E0523 | | E3949 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

- **Procedure n° ECP29**
 - Purpose: PSD reset with ROM/RAM delay change
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------|--------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = | |
| Send TC to change configuration of S/A | E0500 | E8903 = 0 | E3903 = 0 | PSD OFF |
| Send TC to switch OFF PSD | P4056 | | P2120 = 0 | |
| Send TC to switch ON PSD | P4057 | | P2120 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8903 = 1 | E3903 = 1 | PSD ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify ROM/RAM delay | E0518 | E8952 = * | | * requested new value |
| Send on request TC | E0523 | | E3952 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |

- **Procedure n° ECP30**
 - Purpose: DFEE reset with ROM/RAM delay change
 - Constraints:
 - Time Criticality:
 - System Level Prerequisites:
 - Sub-system Level Prerequisites:
 - Special Processing:

| Step Description | TC Ident MF n° | TC Parameter Value | TM Parameter Value | Remarks |
|--------------------------------------------|-----------------------|--------------------|--------------------|--------------------------------|
| Transition to Stand-by mode | E0505 | | | |
| Mode status checking | | | E0049 = 2 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 0 | E3901 = 0 | DFEE OFF |
| Send TC to switch OFF DFEE | P4052 | | P2119 = 0 | |
| Send TC to switch ON DFEE | P4053 | | P2119 = 1 | |
| Send TC to change configuration of S/A | E0500 | E8901 = 1 | E3901 = 1 | DFEE ON |
| Transition to Configuration mode | E0502 | | | |
| Mode status checking | | | E0049 = 3 | |
| Send TC to load all the patches | E0557 | | | |
| Send TC to load the previous configuration | E0556 | | | |
| Send TC to modify ROM/RAM delay | E0518 | E8956 = * | | * requested new value |
| Send on request TC | E0523 | | E8956 = * | |
| Transition to the initial mode | E0501/E0503 /E0504 | | E0049 = 4/5/7 | If the anomaly has disappeared |