TCS Subsystem Checkout
File: H_FCP_TCS_CHECK.xls
Author: E. Picallo

# Procedure Summary

## Objectives

This procedure describes the steps needed to verify the average temperature of all the thermal control loops, the TCT content and the TCS relevant entries in on board tables (FCCT, MOT, EAT and TCT).

## Summary of Constraints

Control loops 1, 7, 12, 19, 31 and 49 are not used by the Thermal Control function.

It is required to enable the HK Diagnostic ASW 1 Packet in order to monitor the middle temperature parameters of the TCS control loops.

## Spacecraft Configuration

**Start of Procedure**

CDMU in default configuration;

**End of Procedure**

CDMU in default configuration;

## Reference File(s)

**Input Command Sequences**

**Output Command Sequences**

HFTCHECK

## Referenced Displays

**ANDs** **GRDs** **SLDs**



ZAZAA999
ZAZ7M999
ZAZ84999
ZAZ3Z999
ZAZAO999
ZAZ85999
ZAZ86999
ZAZ87999
ZAZ40999
ZAZ88999
ZAZ89999
ZAZ8A999

**Configuration Control Information**

| DATE | FOP ISSUE | VERSION | MODIFICATION DESCRIPTION | AUTHOR | SPR REF |
|---|---|---|---|---|---|
| 29/07/08 | 1 | 1 | Created | E. Picallo | |
| 22/10/08 | | 2 | CDMU ASW v3.6.2 and BSW v2.2 alignment | E. Picallo | |
| 09/01/09 | 2 | 3 | CDMU ASW V3.8 and BSW V2.4 alignment | E. Picallo | |
| 24/02/09 | | 4 | control loops middle temperature TM checks added | E. Picallo | |
| 05/03/09 | 2.1 | 5 | updated with default CDMU ASW 3.8.2 FCCT | E. Picallo | |
| 24/03/09 | 2.2 | 6 | LOW NOP and cold start limit for STR-1 & 2 baffle should be -23ºC on launch and in-flight<br>Avg and Middle temperatures descriptions updated | E. Picallo | |
| 07/04/09 | | 7 | Diagnostic channel acquisition verifcation added<br>Correction: LOW NOP limit for STR-1 & 2 baffle should be -23.5ºC on launch and should not be restored in-flight | E. Picallo | |
| 15/04/09 | | 8 | FCCT align to CDMU OBSW 3.10 default values | E. Picallo | |
| 19/04/09 | 2.3 | 9 | HPSDB OOLs (Ground limits) values checked | E. Picallo | |
| 04/05/09 | 2.4 | 10 | Acquisiton of DPU monitoring only thermistors added<br>Acquisiton of HPS2/17HCS1 related to Propellant Tanks added | E. Picallo | |
| 15/09/09 | 2.5 | 11 | Default FCCT table content align to CDMU ASW V 4.0 | E. Picallo | |

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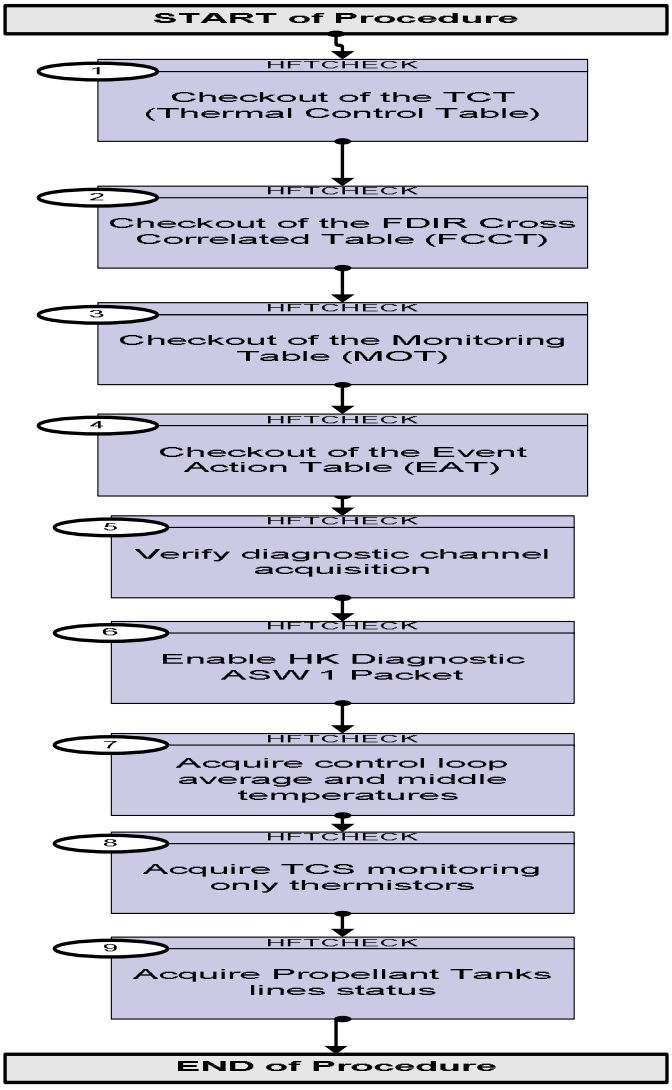
# Procedure Flowchart Overview





| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Beginning of Procedure** | | |
| | | *TC Seq. Name :HFTCHECK* (TCS Checkout)<br>TCS Subsystem Checkout<br><br>*TimeTag Type: N*<br>*Sub Schedule ID:* | | |
| 1 | | *Checkout of the TCT (Thermal Control Table)* | | Next Step:<br>2 |
| | | Execute Procedure:<br>**H_FCP_TCS_REPO**<br>**Thermal Control Status Report** | | |
| | | | | |
| 2 | | *Checkout of the FDIR Cross Correlated Table (FCCT)* | | Next Step:<br>3 |
| | | **If the report FDIR Management Status Report TM(8,6,116) has already been requested, there is not needed to send the next TC(8,5,116)** | | |
| | | Execute Telecommand<br>**ReportFdirManagSts**<br><br>*TC Control Flags :*<br>**GBM IL DSE**<br>**--Y -- ---**<br>*Subsch. ID : 10*<br>Det. descr. : Report Fdir Management Status, TC(8,5,116) | **DCN02170** | |
| | | **The default FCCT table content corresponding to CDMU ASW V 4.0 is attached at the end of the procedure.**<br><br>**Note:**<br>**FCCT ID = 18 + TCT Loop Index**<br>**(just needed TCS entries are included in the FCCT)** | | |
| | | | | |
| 3 | | *Checkout of the Monitoring Table (MOT)* | | Next Step:<br>4 |
| | | **If the report current monitoring list has already been requested, there is not needed to send the next TC(12,8)** | | |
| | | Execute Telecommand<br>**ReportMonitList**<br><br>*TC Control Flags :*<br>**GBM IL DSE**<br>**--Y -- ---**<br>*Subsch. ID : 10*<br>Det. descr. : TEMPLATE Report current monitoring list, TC(12,8) no appl. data | **DC51F170** | |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Verify HPSx [ 1 9] Thermal Control Failure, GRPx [1 18] THERM and decontamination related entries in the MOT** | | |
| | | **Verify the TCS failure monitoring entries:**<br>**Parameter ID — Mon ID — Monitoring Status**<br>HPS1_Thermal_Control_Failure 21 ENABLED<br>HPS2_Thermal_Control_Failure 27 ENABLED<br>HPS3_Thermal_Control_Failure 33 ENABLED<br>HPS4_Thermal_Control_Failure 39 ENABLED<br>HPS5_Thermal_Control_Failure 45 ENABLED<br>HPS6_Thermal_Control_Failure 51 ENABLED<br>HPS7_Thermal_Control_Failure 57 ENABLED<br>HPS8_Thermal_Control_Failure 63 ENABLED<br>HPS9_Thermal_Control_Failure 69 ENABLED | | |
| | | **Verify the TCS HPS temperature entries:**<br>**Parameter ID — Mon ID — Monitoring Status**<br>PCDU GRP1 THERM 78 ENABLED<br>PCDU GRP2 THERM 79 ENABLED<br>PCDU GRP3 THERM 80 ENABLED<br>PCDU GRP4 THERM 81 ENABLED<br>PCDU GRP5 THERM 82 ENABLED<br>PCDU GRP6 THERM 83 ENABLED<br>PCDU GRP7 THERM 84 ENABLED<br>PCDU GRP8 THERM 85 ENABLED<br>PCDU GRP9 THERM 86 ENABLED<br>PCDU GRP10 THERM 87 ENABLED<br>PCDU GRP11 THERM 88 ENABLED<br>PCDU GRP12 THERM 89 ENABLED<br>PCDU GRP13 THERM 90 ENABLED | | |
| | | PCDU GRP14 THERM 91 ENABLED<br>PCDU GRP15 THERM 92 ENABLED<br>PCDU GRP16 THERM 93 ENABLED<br>PCDU GRP17 THERM 94 ENABLED<br>PCDU GRP18 THERM 95 ENABLED | | |
| | | | | |
| 4 | | *Checkout of the Event Action Table (EAT)* | | Next Step: 5 |
| | | **If the report current content of the EAT has already been requested, there is not needed to send the next TC(19,6)** | | |
| | | Execute Telecommand<br>**ReptEvtActTable**<br>*TC Control Flags :*<br>**GBM IL DSE**<br>**--Y -- ---**<br>*Subsch. ID : 10*<br>Det. descr. : TEMPLATE Report The contents of the event/action table TC(19,6) | **DCT86170** | |
| | | **Verify HPSx [1 9] Th Cntrl Failure, HPSx [ 1 18] PROTECT FAIL and decontamination (HASW_EAT_A000/A001) related entries in the EAT.** | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Event Description Ev ID Event Status**<br>HPS1_Th_Cntrl_Failure 0x8013 Enabled<br>HPS2_Th_Cntrl_Failure 0x8023 Enabled<br>HPS3_Th_Cntrl_Failure 0x8033 Enabled<br>HPS4_Th_Cntrl_Failure 0x8043 Enabled<br>HPS5_Th_Cntrl_Failure 0x8053 Enabled<br>HPS6_Th_Cntrl_Failure 0x8063 Enabled<br>HPS7_Th_Cntrl_Failure 0x8073 Enabled<br>HPS8_Th_Cntrl_Failure 0x8083 Enabled<br>HPS9_Th_Cntrl_Failure 0x8093 Enabled | | |
| | | | | |
| 5 | | *Verify diagnostic channel acquisition* | | Next Step:<br>6 |
| | | Verify DIAG5 Interrogation from TH Ref. Voltage (5V) derived from 10V ADC Ref<br>**DIAG5_Interrog DEDKG160** | **>= 4.894 V**<br>**<= 5.106 V** | AND=ZAZAA999 |
| | | **A TM(5,1,99) Diagnostic channel out of range, shall be generated whenever an acquired internal channel is found to be out of limit** | | |
| | | | | |
| 6 | | *Enable HK Diagnostic ASW 1 Packet* | | Next Step:<br>7 |
| | | **It is required to enable the HK Diagnostic ASW 1 Packet in order to monitor the middle temperature parameters of the TCS control loops.** | | |
| | | **Call procedure "Enable or disable the generation of an housekeeping or diagnostic packet" H_FCP_DHS_3033**<br>**1) Acquire the list of the current enabled TM packets**<br>**2) Verify if the HK Diagnostic ASW 1 packet is enabled: subtype=26, packet-ID=99**<br>**3) If it is disabled, enable it** | | |
| | | Execute Procedure:<br>**H_FCP_DHS_3033**<br>**Enable or disable the generation of an housekeeping or diagnostic packet** | | |
| | | | | |
| 7 | | *Acquire control loop average and middle temperatures* | | Next Step:<br>8 |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Note: The following Thermal control loop are not related to TCS class A/B loops:**<br><br>**Thermal control loop 1 dedicated to the Decontamination Heating 1 (HPS1/18 HCS1) is disabled.**<br><br>**Thermal control loop 7 dedicated to the Decontamination Heating 3 (HPS2/17 HCS1) is disabled.**<br><br>**Thermal control loop 12 dedicated to Propellant Tanks (HPS2/17 HCS6) is disabled**.<br><br>**Thermal control loop 19 dedicated to the Decontamination Heating 5 (HPS4/15 HCS1) is disabled.**<br><br>**Thermal control loop 31 dedicated to the Decontamination Heating 7 (HPS6/13 HCS1) is disabled.**<br><br>**Thermal control loop 49 dedicated to the Decontamination Heating 8 (HPS9/10 HCS1) is disabled.** | | |
| | | | | |
| 7.1 | | *Acquire control loop 2 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the XPND 2** | | |
| | | **The relevant line controls the whole XPND (RX+TX) and is driven by the RX Status that is supposed to be always ON** | | |
| | | Verify Telemetry<br>**XpndRx2FuncSts DEL62170** | **ON or OFF** | AND=ZAZ7M999 |
| | | If XPND2 Rx ON verify Telemetry<br>**ATemp02_XPND_2 DEA79170** | **> -10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ84999 |
| | | If XPND2 Rx OFF verify Telemetry<br>**ATemp02_XPND_2 DEA79170** | **> -20.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.2 | | *Acquire control loop 2 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp02_XPND_2 DEA04170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the XPND 2:**<br>**Operative range: Min = -12 ℃; Max = 52 ℃**<br>**Non operative range: Min = -12 ℃; Max = 52 ℃**<br><br>**Which thresholds apply is related to XPND2 RX ON/OFF status.** | | |
| | | | | |
| 7.3 | | *Acquire control loop 3 average temperature* | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Average temperature of thermal control loop dedicated to the FCV A1B** | | |
| | | Verify Telemetry<br>**ATemp03_FCV_A1B DEA7A170** | **> 10.0 <dec><br>< 65.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.4 | | *Acquire control loop 3 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp03_FCV_A1B DEA05170** | **> 10.0 <dec><br>< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the FCV A1B:<br>Operative range: Min = 8 ℃ ; Max = 90 ℃<br>Non operative range: Min = 8 ℃ ; Max = 90 ℃** | | |
| | | | | |
| 7.5 | | *Acquire control loop 4 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV C2B** | | |
| | | Verify Telemetry<br>**ATemp04_FCV_C2B DEA7B170** | **> 10.0 <dec><br>< 65.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.6 | | *Acquire control loop 4 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp04_FCV_C2B DEA06170** | **> 10.0 <dec><br>< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FCV C2B:<br>Operative range: Min = 8 ℃; Max = 90 ℃<br>Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.7 | | *Acquire control loop 5 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the RCS pipe 2** | | |
| | | Verify Telemetry<br>**ATemp05_RCSPipe2 DEA7C170** | **> 10.0 <dec><br>< 50.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.8 | | *Acquire control loop 5 middle temperature* | | □ |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Telemetry<br>**MTemp05_RCSPipe2** **DEA07170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the RCS pipe 2:**<br>**Operative range: Min = 12 ℃; Max = 52 ℃**<br>**Non operative range: Min = 12 ℃; Max = 52 ℃** | | |
| | | | | |
| 7.9 | | *Acquire control loop 6 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the XPND 1** | | |
| | | **The relevant line controls the whole XPND (RX+TX) and is driven by the RX Status that is supposed to be always ON** | | |
| | | Verify Telemetry<br>**XpndRx1FuncSts** **DEL58170** | **ON or OFF** | AND=ZAZ7M999 |
| | | If XPND1 RX ON verify Telemetry<br>**ATemp06_XPND_1** **DEA7D170** | **> -10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ84999 |
| | | If XPND1 RX OFF verify Telemetry<br>**ATemp06_XPND_1** **DEA7D170** | **> -20.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.10 | | *Acquire control loop 6 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp06_XPND_1** **DEA08170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the XPND 1:**<br>**Operative range: Min = -12 ℃; Max = 52 ℃**<br>**Non operative range: Min = -12 ℃; Max = 52 ℃**<br><br>**Which thresholds apply is related to XPND1 Rx ON/OFF status.** | | |
| | | | | |
| 7.11 | | *Acquire control loop 8 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV C1B** | | |
| | | Verify Telemetry<br>**ATemp08_FCV_C1B** **DEA7F170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.12 | | *Acquire control loop 8 middle temperature* | | □ |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Telemetry<br>**MTemp08_FCV_C1B DEA0A170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the FCV C1B:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.13 | | *Acquire control loop 9 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV A2B** | | |
| | | Verify Telemetry<br>**ATemp09_FCV_A2B DEA80170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.14 | | *Acquire control loop 9 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp09_FCV_A2B DEA0B170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the FCV A2B:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.15 | | *Acquire control loop 10 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV C4B** | | |
| | | Verify Telemetry<br>**ATemp10_FCV_C4B DEA81170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ84999 |
| | | | | |
| 7.16 | | *Acquire control loop 10 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp10_FCV_C4B DEA0C170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the FCV C4B:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.17 | | *Acquire control loop 11 average temperature* | | □ |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Average temperature of thermal control loop dedicated to the FPSPU/FPDPU**<br><br>**Which thresholds apply is related to FPDPU ON/OFF status.** | | |
| | | Verify Telemetry<br>**PacsDpuFuncSts** **DEL50171** | **ON or OFF** | AND=ZAZA0999 |
| | | If FPSPU/FPDPU ON Verify Telemetry<br>**ATemp11_FPSPU** **DEA82170** | **> -15.0 <dec>**<br>**< 45.0 <dec>** | AND=ZAZ85999 |
| | | If FPSPU/FPDPU OFF Verify Telemetry<br>**ATemp11_FPSPU** **DEA82170** | **> -30.0 <dec>**<br>**< 45.0 <dec>** | AND=ZAZ85999 |
| | | | | |
| 7.18 | | *Acquire control loop 11 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp11_FPSPU** **DEA0D170** | | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the FPSPU/FPDPU:**<br>**Operative range: Min = -17 ℃; Max = 47 ℃**<br>**Non operative range: Min = -25 ℃; Max = 47 ℃**<br><br>**Which thresholds apply is related to FPDPU ON/OFF status.** | | |
| | | | | |
| 7.19 | | *Acquire control loop 13 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FPBOLC**<br><br>**Which thresholds apply is related to FPBOLC ON/OFF status** | | |
| | | Verify Telemetry<br>**PacsBolc1FuncSt** **DEL54171** | **ON or OFF** | AND=ZAZA0999 |
| | | If FPBOLC ON Verify Telemetry<br>**ATemp13_FPBOLC** **DEA84170** | **> -15.0 <dec>**<br>**< 45.0 <dec>** | AND=ZAZ85999 |
| | | If FPBOLC OFF Verify Telemetry<br>**ATemp13_FPBOLC** **DEA84170** | **> -30.0 <dec>**<br>**< 45.0 <dec>** | AND=ZAZ85999 |
| | | | | |
| 7.20 | | *Acquire control loop 13 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp13_FPBOLC** **DEA0F170** | | AND=ZAZ3Z999 |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **FCCT thresholds dedicated to the FPBOLC:**<br>**Operative range: Min = -17 ℃; Max = 47 ℃**<br>**Non operative range: Min = -21 ℃; Max = 47 ℃**<br><br>**Which thresholds apply is related to FPBOLC ON/OFF status** | | |
| | | | | |
| 7.21 | | *Acquire control loop 14 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the CRS 1**<br><br>**Which thresholds apply is related to CRS1 ON/OFF status.** | | |
| | | Verify Telemetry<br>**Crs1HFuncSts DEN68171** | **ON or OFF** | AND=ZAZAO999 |
| | | If CRS1 ON Verify Telemetry<br>**ATemp14_CRS_1 DEA85170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ85999 |
| | | If CRS1 ON Verify Telemetry<br>**ATemp14_CRS_1 DEA85170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ85999 |
| | | | | |
| 7.22 | | *Acquire control loop 14 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp14_CRS_1 DEA10170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the CRS 1:**<br>**Operative range: Min = 43 ℃; Max = 52 ℃**<br>**Non operative range: Min = 43 ℃; Max = 52 ℃**<br><br>**Which thresholds apply is related to CRS1 ON/OFF status.** | | |
| | | | | |
| 7.23 | | *Acquire control loop 15 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FPDECMEC**<br><br>**Which thresholds apply is related to FPDECMEC ON/OFF status.** | | |
| | | Verify Telemetry<br>**PacsDec1FuncSts DEL44171** | **ON or OFF** | AND=ZAZAO999 |
| | | If FPDECMEC ON Verify Telemetry<br>**ATemp15_FPDECMEC DEA86170** | **> -15.0 <dec>**<br>**< 45.0 <dec>** | AND=ZAZ85999 |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | If FPDECMEC OFF Verify Telemetry<br>**ATemp15_FPDECMEC DEA86170** | **> -30.0 <dec><br>< 45.0 <dec>** | AND=ZAZ85999 |
| | | | | |
| 7.24 | | *Acquire control loop 15 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp15_FPDECMEC DEA11170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FPDECMEC:<br>Operative range: Min = -17 ℃; Max = 47 ℃<br>Non operative range: Min = -22 ℃; Max = 47 ℃<br><br>Which thresholds apply is related to FPDECMEC ON/OFF status.** | | |
| | | | | |
| 7.25 | | *Acquire control loop 16 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the RCS pipe 1** | | |
| | | Verify Telemetry<br>**ATemp16_RCSPipe1 DEA87170** | **> 10.0 <dec><br>< 50.0 <dec>** | AND=ZAZ85999 |
| | | | | |
| 7.26 | | *Acquire control loop 16 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp16_RCSPipe1 DEA12170** | **> 10.0 <dec><br>< 50.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the RCS pipe 1:<br>Operative range: Min = 20 ℃; Max = 52 ℃<br>Non operative range: Min = 20 ℃; Max = 52 ℃** | | |
| | | | | |
| 7.27 | | *Acquire control loop 17 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the CCU<br>Which thresholds apply is related to CCU A/B ON/OFF status.** | | |
| | | Verify Telemetry<br>**CcuAFuncSts DEL97171** | **ON or OFF** | AND=ZAZAO999 |
| | | Verify Telemetry<br>**CcuBFuncSts DEL96171** | **ON or OFF** | AND=ZAZAO999 |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | If CCU A or CCU B ON Verify Telemetry<br>**ATemp17_CCU** **DEA88170** | **> -10.0 <dec>**<br>**< 40.0 <dec>** | AND=ZAZ85999 |
| | | If CCU A or CCU B OFF Verify Telemetry<br>**ATemp17_CCU** **DEA88170** | **> -35.0 <dec>**<br>**< 40.0 <dec>** | AND=ZAZ85999 |
| | | | | |
| 7.28 | | *Acquire control loop 17 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp17_CCU** **DEA13170** | | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the CCU:**<br>**Operative range: Min = 11 ℃; Max = 42 ℃**<br>**Non operative range: Min = 11 ℃; Max = 42 ℃**<br><br>**Which thresholds apply is related to CCU A/B ON/OFF status.** | | |
| | | | | |
| 7.29 | | *Acquire control loop 18 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the Gyro**<br>**Which thresholds apply is related to Gyro ON/OFF status.** | | |
| | | Verify Telemetry<br>**Gyro1FuncSts** **DEH38171** | **ON or OFF** | AND=ZAZAO999 |
| | | If Gyro ON Verify Telemetry<br>**ATemp18_GYRO** **DEA89170** | **> -20.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ85999 |
| | | If Gyro OFF Verify Telemetry<br>**ATemp18_GYRO** **DEA89170** | **> -25.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ85999 |
| | | | | |
| 7.30 | | *Acquire control loop 18 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp18_GYRO** **DEA14170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the Gyro:**<br>**Operative range: Min = 9 ℃; Max = 65 ℃**<br>**Non operative range: Min = 9 ℃; Max = 65 ℃**<br><br>**Which thresholds apply is related to Gyro ON/OFF status.** | | |
| | | | | |
| 7.31 | | *Acquire control loop 20 average temperature* | | □ |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Average temperature of thermal control loop dedicated to the FHWOV**<br>**Which thresholds apply is related to FHWOV ON/OFF status.** | | |
| | | Verify Telemetry<br>**HifiWovFuncSts DEL49171** | **ON or OFF** | AND=ZAZAO999 |
| | | If FHWOV ON Verify Telemetry<br>**ATemp20_FHWOV DEA8B170** | **< 10.0 <dec>**<br>**> 2.0 <dec>** | AND=ZAZ86999 |
| | | If FHWOV ON Verify Telemetry<br>**ATemp20_FHWOV DEA8B170** | **< 10.0 <dec>**<br>**> -25.0 <dec>** | AND=ZAZ86999 |
| | | | | |
| 7.32 | | *Acquire control loop 20 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp20_FHWOV DEA16170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FHWOV:**<br>**Operative range: Min = 2 ℃; Max = 12 ℃**<br>**Non operative range: Min = -20 ℃; Max = 12 ℃**<br><br>**Which thresholds apply is related to FHWOV ON/OFF status.** | | |
| | | | | |
| 7.33 | | *Acquire control loop 21 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the RCS pipe 6** | | |
| | | Verify Telemetry<br>**ATemp21_RCSPipe6 DEA8C170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ86999 |
| | | | | |
| 7.34 | | *Acquire control loop 21 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp21_RCSPipe6 DEA17170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thersholds dedicated to the RCS pipe 6:**<br>**Operative range: Min = 11 ℃; Max = 52 ℃**<br>**Non operative range: Min = 11 ℃; Max = 52 ℃** | | |
| | | | | |
| 7.35 | | *Acquire control loop 22 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV A1A** | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Telemetry<br>**ATemp22_FCV_A1A DEA8D170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ86999 |
| | | | | |
| 7.36 | | *Acquire control loop 22 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp22_FCV_A1A DEA18170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FCV A1A:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.37 | | *Acquire control loop 23 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FCV C2A** | | |
| | | Verify Telemetry<br>**ATemp23_FCV_C2A DEA8E170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ86999 |
| | | | | |
| 7.38 | | *Acquire control loop 23 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp23_FCV_C2A DEA19170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FCV C2A:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.39 | | *Acquire control loop 24 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the RCS pipe 7** | | |
| | | Verify Telemetry<br>**ATemp24_RCSPipe7 DEA8F170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ86999 |
| | | | | |
| 7.40 | | *Acquire control loop 24 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp24_RCSPipe7 DEA1A170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ3Z999 |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **FCCT thresholds dedicated to the RCS pipe 7:**<br>**Operative range: Min = 11 ℃; Max = 52 ℃**<br>**Non operative range: Min = 11 ℃; Max = 52 ℃** | | |
| | | | | |
| 7.41 | | *Acquire control loop 25 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the CRS 2**<br>**Which thresholds apply is related to CRS2 ON/OFF status.** | | |
| | | Verify Telemetry<br>**Crs2HFuncSts DEN69171** | **ON or OFF** | AND=ZAZAO999 |
| | | If CRS2 ON Verify Telemetry<br>**ATemp25_CRS_2 DEA90170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ86999 |
| | | If CRS2 OFF Verify Telemetry<br>**ATemp25_CRS_2 DEA90170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ86999 |
| | | | | |
| 7.42 | | *Acquire control loop 25 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp25_CRS_2 DEA1B170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the CRS 2:**<br>**Operative range: Min = 43 ℃; Max = 52 ℃**<br>**Non operative range: Min = 43 ℃; Max = 52 ℃**<br><br>**Which thresholds apply is related to CRS2 ON/OFF status.** | | |
| | | | | |
| 7.43 | | *Acquire control loop 26 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FHHRH**<br>**Which thresholds apply is related to FHHRH ON/OFF status** | | |
| | | Verify Telemetry<br>**HifiHrhFuncSts DEL46171** | **ON or OFF** | AND=ZAZAO999 |
| | | If FHHRH ON Verify Telemetry<br>**ATemp26_FHHRH DEA91170** | **> 12.0 <dec>**<br>**< 40.0 <dec>** | AND=ZAZ86999 |
| | | If FHHRH OFF Verify Telemetry<br>**ATemp26_FHHRH DEA91170** | **> -25.0 <dec>**<br>**< 40.0 <dec>** | AND=ZAZ86999 |
| | | | | |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| 7.44 | | *Acquire control loop 26 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp26_FHHRH DEA1C170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FHHRH:**<br>**Operative range: Min = 25 ℃; Max = 31 ℃**<br>**Non operative range: Min = -22 ℃; Max = 31 ℃**<br><br>**Which thresholds apply is related to FHHRH ON/OFF status** | | |
| | | | | |
| 7.45 | | *Acquire control loop 27 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FHWEV**<br>**Which thresholds apply is related to FHWEV ON/OFF status.** | | |
| | | Verify Telemetry<br>**HifiWevFuncSts DEL53171** | **ON or OFF** | AND=ZAZA0999 |
| | | If FHWEV ON Verify Telemetry<br>**ATemp27_FHWEV DEA92170** | **> 0.0 <dec>**<br>**< 30.0 <dec>** | AND=ZAZ86999 |
| | | If FHWEV OFF Verify Telemetry<br>**ATemp27_FHWEV DEA92170** | **> -25.0 <dec>**<br>**< 30.0 <dec>** | AND=ZAZ86999 |
| | | | | |
| 7.46 | | *Acquire control loop 27 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp27_FHWEV DEA1D170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FHWEV:**<br>**Operative range: Min = -2 ℃; Max = 32 ℃**<br>**Non operative range: Min = -22 ℃; Max = 32 ℃**<br><br>**Which thresholds apply is related to FHWEV ON/OFF status.** | | |
| | | | | |
| 7.47 | | *Acquire control loop 28 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FCV C3B** | | |
| | | Verify Telemetry<br>**ATemp28_FCV_C3B DEA93170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ87999 |
| | | | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| 7.48 | | *Acquire control loop 28 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp28_FCV_C3B DEA1E170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the FCV C3B:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.49 | | *Acquire control loop 29 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the RCS pipe 8** | | |
| | | Verify Telemetry<br>**ATemp29_RCSPipe8 DEA94170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ87999 |
| | | | | |
| 7.50 | | *Acquire control loop 29 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp29_RCSPipe8 DEA1F170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the RCS pipe 8:**<br>**Operative range: Min = 16 ℃; Max = 52 ℃**<br>**Non operative range: Min = 16 ℃; Max = 52 ℃** | | |
| | | | | |
| 7.51 | | *Acquire control loop 30 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the RCS PT unit** | | |
| | | Verify Telemetry<br>**ATemp30_LV_1_2 DEA95170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ87999 |
| | | | | |
| 7.52 | | *Acquire control loop 30 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp30_LV_1_2 DEA20170** | **> 10.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the RCS PT unit:**<br>**Operative range: Min = 7 ℃; Max = 52 ℃**<br>**Non operative range: Min = 7 ℃; Max = 52 ℃** | | |
| | | | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| 7.53 | | *Acquire control loop 32 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the RWL 4**<br>**Which thresholds apply is related to RWL4 ON/OFF status.** | | |
| | | Verify Telemetry<br>**Rw4FuncSts DEG33171** | **ON or OFF** | AND=ZAZAO999 |
| | | If RWL4 ON Verify Telemetry<br>**ATemp32_RWL_4 DEA97170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ87999 |
| | | If RWL4 OFF Verify Telemetry<br>**ATemp32_RWL_4 DEA97170** | **> -10.0 <dec>**<br>**< 55.0 <dec>** | AND=ZAZ87999 |
| | | | | |
| 7.54 | | *Acquire control loop 32 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp32_RWL_4 DEA22170** | | AND=ZAZ3Z999 |
| | | **FCCT thresholds dedicated to the RWL 4:**<br>**Operative range: Min = -2 ℃; Max = 57 ℃**<br>**Non operative range: Min = -6 ℃; Max = 57 ℃**<br><br>**Which thresholds apply is related to RWL4 ON/OFF status.** | | |
| | | | | |
| 7.55 | | *Acquire control loop 33 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the RWL 1**<br>**Which thresholds apply is related to RWL1 ON/OFF status.** | | |
| | | Verify Telemetry<br>**Rw1FuncSts DEL38171** | **ON or OFF** | AND=ZAZAO999 |
| | | If RWL1 ON Verify Telemetry<br>**ATemp33_RWL_1 DEA98170** | **> 0.0 <dec>**<br>**< 55.0 <dec>** | AND=ZAZ87999 |
| | | If RWL1 OFF Verify Telemetry<br>**ATemp33_RWL_1 DEA98170** | **> -10.0 <dec>**<br>**< 55.0 <dec>** | AND=ZAZ87999 |
| | | | | |
| 7.56 | | *Acquire control loop 33 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp33_RWL_1 DEA23170** | | AND=ZAZ40999 |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **FCCT thresholds dedicated to the RWL 1:**<br>**Operative range: Min = -2℃; Max = 57 ℃**<br>**Non operative range: Min = -6 ℃; Max = 57 ℃**<br><br>**Which thresholds apply is related to RWL1 ON/OFF status.** | | |
| | | | | |
| 7.57 | | *Acquire control loop 34 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the RWL 3**<br>**Which thresholds apply is related to RWL3 ON/OFF status.**<br><br>**Operative range: Min = -2 ℃; Max = 57 ℃**<br>**Non operative range: Min = -6 ℃; Max = 57 ℃** | | |
| | | Verify Telemetry<br>**Rw3FuncSts DEL36171** | **ON or OFF** | AND=ZAZA0999 |
| | | If RWL3 ON Verify Telemetry<br>**ATemp34_RWL_3 DEA99170** | **> 0.0 <dec>**<br>**< 55.0 <dec>** | AND=ZAZ87999 |
| | | If RWL3 OFF Verify Telemetry<br>**ATemp34_RWL_3 DEA99170** | **> -10.0 <dec>**<br>**< 55.0 <dec>** | AND=ZAZ87999 |
| | | | | |
| 7.58 | | *Acquire control loop 34 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp34_RWL_3 DEA24170** | | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the RWL 3:**<br>**Operative range: Min = -2 ℃; Max = 57 ℃**<br>**Non operative range: Min = -6 ℃; Max = 57 ℃**<br><br>**Which thresholds apply is related to RWL3 ON/OFF status.** | | |
| | | | | |
| 7.59 | | *Acquire control loop 35 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FHIFV**<br>**Which thresholds apply is related to FHIFV ON/OFF status.** | | |
| | | Verify Telemetry<br>**HifiIfvFuncSts DEL39171** | **ON or OFF** | AND=ZAZA0999 |
| | | If FHIFV ON Verify Telemetry<br>**ATemp35_FHIFV DEA9A170** | **> -10.0 <dec>**<br>**< 40.0 <dec>** | AND=ZAZ87999 |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | If FHIFV OFF Verify Telemetry<br>**ATemp35_FHIFV DEA9A170** | **> -20.0 <dec><br>< 40.0 <dec>** | AND=ZAZ87999 |
| | | | | |
| 7.60 | | *Acquire control loop 35 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp35_FHIFV DEA25170** | | AND=ZAZ40999 |
| | | **FCCT thersholds dedicated to the FHIFV:<br>Operative range: Min = -12 ℃; Max = 42 ℃<br>Non operative range: Min = -12 ℃; Max = 42 ℃<br><br>Which thresholds apply is related to FHIFV ON/OFF status.** | | |
| | | | | |
| 7.61 | | *Acquire control loop 36 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the RWL 2<br>Which thresholds apply is related to RWL2 ON/OFF status.** | | |
| | | Verify Telemetry<br>**Rw2FuncSts DEL37171** | **ON or OFF** | AND=ZAZAO999 |
| | | If RWL2 ON Verify Telemetry<br>**ATemp36_RWL_2 DEA9B170** | **> 0.0 <dec><br>< 55.0 <dec>** | AND=ZAZ87999 |
| | | If RWL2 OFF Verify Telemetry<br>**ATemp36_RWL_2 DEA9B170** | **> -10.0 <dec><br>< 55.0 <dec>** | AND=ZAZ87999 |
| | | | | |
| 7.62 | | *Acquire control loop 36 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp36_RWL_2 DEA26170** | | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the RWL 2:<br>Operative range: Min = -2 ℃; Max = 57 ℃<br>Non operative range: Min = -6 ℃; Max = 57 ℃<br><br>Which thresholds apply is related to RWL2 ON/OFF status.** | | |
| | | | | |
| 7.63 | | *Acquire control loop 37 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the Star Trackers mounting plate<br>Operative range: Min = -3 ℃; Max = 30 ℃<br>Non operative range: Min = -10 ℃; Max = 30 ℃** | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Note that the thermal control sees only one STR, unit. The unit status seen for STR by the thermal control is ON if either of the STR A or B is ON. i.e. it is sufficient that one STR is on for the TCS to apply the operative thresholds.** | | |
| | | Verify Telemetry **Str1FuncSts DEG01170** | **ON or OFF** | AND=ZAZAO999 |
| | | Verify Telemetry **Str2FuncSts DEG00170** | **ON or OFF** | AND=ZAZAO999 |
| | | If STR1 or STR2 ON Verify Telemetry **ATemp37_STRs DEA9C170** | **> -20.0 <dec> < 50.0 <dec>** | AND=ZAZ88999 |
| | | If STR1 or STR2 OFF Verify Telemetry **ATemp37_STRs DEA9C170** | **> -20.0 <dec> < 50.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.64 | | *Acquire control loop 37 middle temperature* | | |
| | | Verify Telemetry **MTemp37_STRs DEA27170** | **> -20.0 <dec> < 50.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the Star Trackers mounting plate:**<br>**Operative range: Min = -3 ℃; Max = 30 ℃**<br>**Non operative range: Min = -10 ℃; Max = 30 ℃**<br><br>**Which thresholds apply is related to STR 1/2 ON/OFF status.** | | |
| | | | | |
| 7.65 | | *Acquire control loop 38 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the Battery** | | |
| | | Verify Telemetry **ATemp38_Battery DEA9D170** | **> 0.0 <dec> < 35.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.66 | | *Acquire control loop 38 middle temperature* | | |
| | | Verify Telemetry **MTemp38_Battery DEA28170** | **> 0.0 <dec> < 35.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the Battery:**<br>**Operative range: Min =-2 ℃; Max = 37 ℃**<br>**Non operative range: Min = -2 ℃; Max = 37 ℃** | | |
| | | | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| 7.67 | | *Acquire control loop 39 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FHWOH**<br>**Which thresholds apply is related to FHWOH ON/OFF status.** | | |
| | | Verify Telemetry<br>**HifiWohFuncSts DEL40171** | **ON or OFF** | AND=ZAZAO999 |
| | | If FHWOH ON Verify Telemetry<br>**ATemp39_FHWOH DEA9E170** | **> 1.0 <dec>**<br>**< 9.0 <dec>** | AND=ZAZ88999 |
| | | If FHWOH OFF Verify Telemetry<br>**ATemp39_FHWOH DEA9E170** | **> -25.0 <dec>**<br>**< 9.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.68 | | *Acquire control loop 39 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp39_FHWOH DEA29170** | | AND=ZAZ40999 |
| | | **FCCt thresholds dedicated to the FHWOH:**<br>**Operative range: Min = 1 ℃; Max = 11 ℃**<br>**Non operative range: Min = -15 ℃; Max = 11 ℃**<br><br>**Which thresholds apply is related to FHWOH ON/OFF status.** | | |
| | | | | |
| 7.69 | | *Acquire control loop 40 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FHWEH**<br><br>**Which thresholds apply is related to FHWEH ON/OFF status** | | |
| | | Verify Telemetry<br>**HifiWehFuncSts DEL48171** | **ON or OFF** | AND=ZAZAO999 |
| | | If HIFIWEH ON Verify Telemetry<br>**ATemp40_FHWEH DEA9F170** | **> 0.0 <dec>**<br>**< 30.0 <dec>** | AND=ZAZ88999 |
| | | If HIFIWEH OFF Verify Telemetry<br>**ATemp40_FHWEH DEA9F170** | **> -25.0 <dec>**<br>**< 30.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.70 | | *Acquire control loop 40 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp40_FHWEH DEA2A170** | | AND=ZAZ40999 |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **FCCT thresholds dedicated to the FHWEH:**<br>**Operative range: Min = -2 ℃; Max = 32 ℃**<br>**Non operative range: Min = -7 ℃; Max = 32℃**<br><br>**Which thresholds apply is related to FHWEH ON/OFF status** | | |
| | | | | |
| 7.71 | | *Acquire control loop 41 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV C1A** | | |
| | | Verify Telemetry<br>**ATemp41_FCV_C1A DEAA0170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.72 | | *Acquire control loop 41 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp41_FCV_C1A DEA2B170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the FCV C1A:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.73 | | *Acquire control loop 42 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV A2A** | | |
| | | Verify Telemetry<br>**ATemp42_FCV_A2A DEAA1170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.74 | | *Acquire control loop 42 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp42_FCV_A2A DEA2C170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thersholds dedicated to the FCV A2A:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.75 | | *Acquire control loop 43 average temperature* | | □ |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Average temperature of thermal control loop dedicated to the FHHRV**<br>**Which thresholds apply is related to FHHRV ON/OFF status.** | | |
| | | Verify Telemetry<br>**HifiHrvFuncSts DEL41171** | **ON or OFF** | AND=ZAZA0999 |
| | | If FHHRV ON Verify Telemetry<br>**ATemp43_FHHRV DEAA2170** | **> 21.0 <dec>**<br>**< 40.0 <dec>** | AND=ZAZ88999 |
| | | If FHHRV OFF Verify Telemetry<br>**ATemp43_FHHRV DEAA2170** | **> -25.0 <dec>**<br>**< 40.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.76 | | *Acquire control loop 43 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp43_FHHRV DEA2D170** | | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the FHHRV:**<br>**Operative range: Min = 19 ℃; Max = 25 ℃**<br>**Non operative range: Min = -25 ℃; Max = 25 ℃**<br><br>**Which thresholds apply is related to FHHRV ON/OFF status.** | | |
| | | | | |
| 7.77 | | *Acquire control loop 44 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV C3A** | | |
| | | Verify Telemetry<br>**ATemp44_FCV_C3A DEAA3170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ88999 |
| | | | | |
| 7.78 | | *Acquire control loop 44 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp44_FCV_C3A DEA2E170** | **> 10.0 <dec>**<br>**< 65.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the FCV C3A:**<br>**Operative range: Min = 8 ℃; Max = 90 ℃**<br>**Non operative range: Min = 8 ℃; Max = 90 ℃** | | |
| | | | | |
| 7.79 | | *Acquire control loop 45 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the RCS pipe 3** | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Telemetry<br>**ATemp45_RCSPipe3 DEAA4170** | **> 10.0 <dec><br>< 50.0 <dec>** | AND=ZAZ89999 |
| | | | | |
| 7.80 | | *Acquire control loop 45 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp45_RCSPipe3 DEA2F170** | **> 10.0 <dec><br>< 50.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the RCS pipe 3:<br>Operative range: Min = 11 ℃; Max = 52 ℃<br>Non operative range: Min = 11 ℃; Max = 52 ℃** | | |
| | | | | |
| 7.81 | | *Acquire control loop 46 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the STR 2 Baffle<br>Which thresholds apply is related to STR2 ON/OFF status.** | | |
| | | Verify Telemetry<br>**Str2FuncSts DEG00170** | **ON or OFF** | AND=ZAZA0999 |
| | | If STR2 ON Verify Telemetry<br>**ATemp46_STR2_Baf DEAA5170** | **> 0.0 <dec><br>< 50.0 <dec>** | AND=ZAZ89999 |
| | | If STR2 OFF Verify Telemetry<br>**ATemp46_STR2_Baf DEAA5170** | **> 0.0 <dec><br>< 50.0 <dec>** | AND=ZAZ89999 |
| | | | | |
| 7.82 | | *Acquire control loop 46 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp46_STR2_Baf DEA30170** | **> 0.0 <dec><br>< 50.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the STR 2 Baffle:<br>Operative range: Min = 11 ℃; Max = 30 ℃<br>Non operative range: Min = -23.5 ℃; Max = 30 ℃<br><br>Which thresholds apply is related to STR2 ON/OFF status.** | | |
| | | | | |
| 7.83 | | *Acquire control loop 47 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the RCS pipe 5** | | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Telemetry<br>**ATemp47_RCSPipe5 DEAA6170** | **> 10.0 <dec><br>< 50.0 <dec>** | AND=ZAZ89999 |
| | | | | |
| 7.84 | | *Acquire control loop 47 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp47_RCSPipe5 DEA31170** | **> 10.0 <dec><br>< 50.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the RCS pipe 5:<br>Operative range: Min = 20 °C; Max = 52 °C<br>Non operative range: Min = 20 °C; Max = 52 °C** | | |
| | | | | |
| 7.85 | | *Acquire control loop 48 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the FHLCU/FHIFH<br>Which thresholds apply is related to FHLCU ON/OFF status** | | |
| | | Verify Telemetry<br>**HifiLcuFuncSts DEL55171** | **ON or OFF** | AND=ZAZAO999 |
| | | If HIFILCU ON Verify Telemetry<br>**ATemp48_FHLCU DEAA7170** | **> -10.0 <dec><br>< 40.0 <dec>** | AND=ZAZ89999 |
| | | If HIFILCU OFF Verify Telemetry<br>**ATemp48_FHLCU DEAA7170** | **> -25.0 <dec><br>< 40.0 <dec>** | AND=ZAZ89999 |
| | | | | |
| 7.86 | | *Acquire control loop 48 middle temperature* | | |
| | | Verify Telemetry<br>**MTemp48_FHLCU DEA32170** | | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the FHLCU/FHIFH:<br>Operative range: Min = 8 °C; Max = 42 °C<br>Non operative range: Min = -20 °C; Max = 42 °C<br><br>Which thresholds apply is related to FHLCU ON/OFF status** | | |
| | | | | |
| 7.87 | | *Acquire control loop 50 average temperature* | | |
| | | **Average temperature of thermal control loop dedicated to the Tank -Y** | | |
| | | Verify Telemetry<br>**ATemp50_Tank_-Y DEAA9170** | **> 10.0 <dec><br>< 45.0 <dec>** | AND=ZAZ89999 |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | | | |
| 7.88 | | *Acquire control loop 50 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp50_Tank_-Y DEA34170** | **> 10.0 <dec><br>< 45.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the Tank -Y:<br>Operative range: Min = 8 °C; Max = 40 °C<br>Non operative range: Min = 8 °C; Max = 40 °C** | | |
| | | | | |
| 7.89 | | *Acquire control loop 51 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FCV C4A** | | |
| | | Verify Telemetry<br>**ATemp51_FCV_C4A DEAAA170** | **> 10.0 <dec><br>< 65.0 <dec>** | AND=ZAZ89999 |
| | | | | |
| 7.90 | | *Acquire control loop 51 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp51_FCV_C4A DEA35170** | **> 10.0 <dec><br>< 65.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the FCV C4A:<br>Operative range: Min = 8 °C; Max = 90 °C<br>Non operative range: Min = 8 °C; Max = 90 °C** | | |
| | | | | |
| 7.91 | | *Acquire control loop 52 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the FHLSU<br>Which thresholds apply is related to LSU ON/OFF status.** | | |
| | | Verify Telemetry<br>**HifiLsuFuncSts DEL42171** | **ON or OFF** | AND=ZAZAO999 |
| | | If LSU ON Verify Telemetry<br>**ATemp52_FHLSU DEAAB170** | **> 10.0 <dec><br>< 35.0 <dec>** | AND=ZAZ89999 |
| | | If LSU OFF Verify Telemetry<br>**ATemp52_FHLSU DEAAB170** | **> -15.0 <dec><br>< 35.0 <dec>** | AND=ZAZ89999 |
| | | | | |
| 7.92 | | *Acquire control loop 52 middle temperature* | | □ |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Telemetry<br>**MTemp52_FHLSU DEA36170** | | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the FHLSU:**<br>**Operative range: Min = 8 ℃; Max = 37 ℃**<br>**Non operative range: Min = -13 ℃; Max = 37 ℃**<br><br>**Which thresholds apply is related to LSU ON/OFF status.** | | |
| | | | | |
| 7.93 | | *Acquire control loop 53 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the STR 1 baffle**<br>**Which thresholds apply is related to STR1 ON/OFF status.** | | |
| | | Verify Telemetry<br>**Str1FuncSts DEG01170** | **ON or OFF** | AND=ZAZAO999 |
| | | If STR1 ON Verify Telemetry<br>**ATemp53_STR1_Baf DEAAC170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ89999 |
| | | If STR1 OFF Verify Telemetry<br>**ATemp53_STR1_Baf DEAAC170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ89999 |
| | | | | |
| 7.94 | | *Acquire control loop 53 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp53_STR1_Baf DEA37170** | **> 0.0 <dec>**<br>**< 50.0 <dec>** | AND=ZAZ40999 |
| | | **FCCT thresholds dedicated to the STR 1 baffle:**<br>**Operative range: Min = 11 ℃; Max = 30 ℃**<br>**Non operative range: Min = -23.5 ℃; Max = 30 ℃**<br><br>**Which thresholds apply is related to STR1 ON/OFF status.** | | |
| | | | | |
| 7.95 | | *Acquire control loop 54 average temperature* | | □ |
| | | **Average temperature of thermal control loop dedicated to the Tank +Y** | | |
| | | Verify Telemetry<br>**ATemp54_Tank_+Y DEAAD170** | **> 10.0 <dec>**<br>**< 45.0 <dec>** | AND=ZAZ8A999 |
| | | | | |
| 7.96 | | *Acquire control loop 54 middle temperature* | | □ |
| | | Verify Telemetry<br>**MTemp54_Tank_+Y DEA38170** | **> 10.0 <dec>**<br>**< 45.0 <dec>** | AND=ZAZ40999 |



| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **FCCT thresholds dedicated to the Tank +Y:**<br>**Operative range: Min = 8 ℃; Max = 40 ℃**<br>**Non operative range: Min = 8 ℃; Max = 40 ℃** | | |
| | | | | |
| 8 | | *Acquire TCS monitoring only thermistors* | | Next Step:<br>9 |
| | | Verify FPDPU (monitoring only) temperature Telemetry<br>**THM_52_PropTank TM052601** | | AND=ZAZ85999 |
| | | Verify FPDPU (monitoring only) temperature Telemetry<br>**THM_100_PropTank TM100601** | | AND=ZAZ85999 |
| | | | | |
| 9 | | *Acquire Propellant Tanks lines status* | | Next Step:<br>END |
| | | **Thermal control loop 12 dedicated to Propellant Tanks (HPS2/17 HCS6) is disabled and their monitoring frequencies set to 0, thus the loops are considered as spare.** | | |
| | | **The Propellant Tanks lines are not controlled by CDMS. They are use to maintain a permanent thermal gradient between gas side and propellant side of the tank.**<br><br>**It need to be switched ON as part of the pre-Launch activities.**<br><br>**The CDMU ASW assumes they are ON and only switches the related HCS of the HPS 'in use' in case of reconfiguration or when switching to Survival Mode.** | | |
| | | Verify Telemetry<br>**tanks_G2H6_S WM21F565** | | AND=ZAZ85999 |
| | | Verify Telemetry<br>**tanks_G17H6_S WM91M565** | | AND=ZAZ85999 |
| | | | | |
| | | | | |
| | | **End of Procedure** | | |

TCS Subsystem Checkout
File: H_FCP_TCS_CHECK.xls
Author: E. Picallo

| Check ID | Name | Param1 | Param2 | Param3 | Param4 | Param5 | Param6 | Output Flag | NOTE | TCS Line(ref. H-P-TN-AI-0069) | Loop Index (ref..to TCT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chkld_17 | FCCT_XPND1_RX_Power | XPND1 RX FCL current Min=0 | XPND1 RX FCL current Max=0.38 | XPND1 RX supply voltage Min (Volt)=4.5 | XPND1 RX supply voltage Max (Volt)=5.5 | Not Used | Not Used | XPND1 RX Power: DID_ASW_CCC_RES_5:6 | XPND1 RX FCL current <>limits AND XPND1 RX supply voltage <>limit | N/A | N/A |
| Chkld_18 | FCCT_XPND2_RX_Power | XPND2 RX FCL current Min=0 | XPND2 RX FCL current Max=0.38 | XPND2 RX supply voltage Min (Volt)=4.5 | XPND2 RX supply voltage Max (Volt)=5.5 | Not Used | Not Used | XPND2 RX Power: DID_ASW_CCC_RES_5:7 | XPND2 RX FCL current <>limits AND XPND2 RX supply voltage <>limit | N/A | N/A |
| Chkld_20 | FCCT_XPND2_HPS1_HCS2 | FDIR LOW_NOP[ °C] = -12 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =-12 | FDIR LOW_OP [ °C] =-12 | FDIR HIGH_OP [ °C] =52 | XPND2 TCS Failure HPS1_HCS2 DID_ASW_CCC_RES_2:14 | This group of FCCT result is monitored by the Monitorng Entry with Id =21 | TcsLine02 | 2 |
| Chkld_21 | FCCT_FCVA1B_HPS1_HCS3 | FDIR LOW_NOP[ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV A1B TCS Failure HPS1_HCS23 DID_ASW_CCC_RES_2:13 | | TcsLine39 | 3 |
| Chkld_22 | FCCT_FCVC2B_HPS1_HCS4 | FDIR LOW_NOP[ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C2B TCS Failure HPS1_HCS4 DID_ASW_CCC_RES_2:12 | | TcsLine40 | 4 |
| Chkld_23 | FCCT_RCS pipe2_HPS1_HCS5 | FDIR LOW_NOP[ °C] =12 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =12 | FDIR LOW_OP [ °C] =12 | FDIR HIGH_OP [ °C] =52 | RCS piping #2 TCS Failure HPS1_HCS5 DID_ASW_CCC_RES_2:11 | | TcsLine11 | 5 |
| Chkld_24 | FCCT_XPND1_HPS1_HCS6 | FDIR LOW_NOP[ °C] =-12 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =-12 | FDIR LOW_OP [ °C] =-12 | FDIR HIGH_OP [ °C] =52 | XPND1 TCS Failure HPS1_HCS6 DID_ASW_CCC_RES_2:10 | | TcsLine01 | 6 |
| Chkld_26 | FCCT_FCVC1B_HPS2_HCS2 | FDIR LOW_NOP[ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C1B TCS Failure HPS2_HCS2 DID_ASW_CCC_RES_2:6 | This group of FCCT result is monitored by the Monitorng Entry with Id =27 | TcsLine41 | 8 |
| Chkld_27 | FCCT_FCVA2B_HPS2_HCS3 | FDIR LOW_NOP[ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV A2B TCS Failure HPS2_HCS3 DID_ASW_CCC_RES_2:5 | | TcsLine42 | 9 |
| Chkld_28 | FCCT_FCVC4B_HPS2_HCS4 | FDIR LOW_NOP[ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C4B TCS Failure HPS2_HCS4 DID_ASW_CCC_RES_2:4 | | TcsLine43 | 10 |
| Chkld_29 | FCCT_DPU-SPU_HPS2_HCS5 | FDIR LOW_NOP[ °C] =-25 | FDIR HIGH_NOP [ °C] =47 | time-out [sec]=64800 | Cold Start Temp [ °C] =-25 | FDIR LOW_OP [ °C] =-17 | FDIR HIGH_OP [ °C] =47 | FPDPU/FPSPU TCS Failure HPS2_HCS5 DID_ASW_CCC_RES_2:3 | | TcsLine05 | 11 |
| Chkld_31 | FCCT_FPBOLC_HPS3_HCS1 | FDIR LOW_NOP[ °C] =-21 | FDIR HIGH_NOP [ °C] =47 | time-out [sec]=64800 | Cold Start Temp [ °C] =-21 | FDIR LOW_OP [ °C] =-17 | FDIR HIGH_OP [ °C] =47 | FPBOLC TCS Failure HPS3_HCS1 DID_ASW_CCC_RES_3:15 | This group of FCCT result is monitored by the Monitorng Entry with Id =33 | TcsLine06 | 13 |
| Chkld_32 | FCCT_CRS_1_HPS3_HCS2 | FDIR LOW_NOP[ °C] =43 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =43 | FDIR LOW_OP [ °C] =43 | FDIR HIGH_OP [ °C] =52 | CRS-1 TCS Failure HPS3_HCS2 Loop 07 DID_ASW_CCC_RES_3:14 | | TcsLine07 | 14 |

Status : Version 11 - Unchanged
Last Checkin: 15/09/09

Status : Version 11 - Unchanged
Last Checkin: 15/09/09

TCS Subsystem Checkout
File: H_FCP_TCS_CHECK.xls
Author: E. Picallo

| Check ID | Name | Param1 | Param2 | Param3 | Param4 | Param5 | Param6 | Output Flag | NOTE | TCS Line(ref. H-P-TN-AI-0069) | Loop Index (ref..to TCT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chkid_33 | FCCT_FPDECMEC_HPS3_HCS3 | FDIR LOW_NOP [ °C] =-22 | FDIR HIGH_NOP [ °C] =47 | time-out [sec]=64800 | Cold Start Temp [ °C] =-22 | FDIR LOW_OP [ °C] =-17 | FDIR HIGH_OP [ °C] =47 | FPDECMEC TCS Failure HPS3_HCS3 DID_ASW_CCC_RES_3:13 | This group of FCCT result is monitored by the Monitorng Entry with Id =33 | TcsLine08 | 15 |
| Chkid_34 | FCCT_RCS pipe1_HPS3_HCS4 | FDIR LOW_NOP [ °C] =20 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =20 | FDIR LOW_OP [ °C] =20 | FDIR HIGH_OP [ °C] =52 | RCS piping #1 TCS Failure HPS3_HCS4 DID_ASW_CCC_RES_3:12 | | TcsLine09 | 16 |
| Chkid_35 | FCCT_CCU_HPS3_HCS5 | FDIR LOW_NOP [ °C] =11 | FDIR HIGH_NOP [ °C] =42 | time-out [sec]=64800 | Cold Start Temp [ °C] =11 | FDIR LOW_OP [ °C] =11 | FDIR HIGH_OP [ °C] =42 | CCU TCS Failure HPS3_HCS5 DID_ASW_CCC_RES_3:11 | | TcsLine10 | 17 |
| Chkid_36 | FCCT_GYRO_HPS3_HCS6 | FDIR LOW_NOP [ °C] =9 | FDIR HIGH_NOP [ °C] =65 | time-out [sec]=64800 | Cold Start Temp [ °C] =9 | FDIR LOW_OP [ °C] =9 | FDIR HIGH_OP [ °C] =65 | GYRO TCS Failure HPS3_HCS6 DID_ASW_CCC_RES_3:10 | | TcsLine38 | 18 |
| Chkid_38 | FCCT_FHWOV_HPS4_HCS2 | FDIR LOW_NOP [ °C] =-20 | FDIR HIGH_NOP [ °C] =12 | time-out [sec]=64800 | Cold Start Temp [ °C] =-20 | FDIR LOW_OP [ °C] =2 | FDIR HIGH_OP [ °C] =12 | FHWOV TCS Failure HPS4_HCS2 DID_ASW_CCC_RES_3:6 | This group of FCCT result is monitored by the Monitorng Entry with Id =39 | TcsLine12 | 20 |
| Chkid_39 | FCCT_RCS pipe6_HPS4_HCS3 | FDIR LOW_NOP [ °C] =11 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =11 | FDIR LOW_OP [ °C] =11 | FDIR HIGH_OP [ °C] =52 | RCS piping # 6 TCS Failure HPS4_HCS3 DID_ASW_CCC_RES_3:5 | | TcsLine45 | 21 |
| Chkid_40 | FCCT_FCVA1A_HPS4_HCS4 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV A1A&A1B TCS Failure HPS4_HCS4 DID_ASW_CCC_RES_3:4 | | TcsLine29 | 22 |
| Chkid_41 | FCCT_FCV C2A_HPS4_HCS5 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C2A&C2B TCS Failure HPS4_HCS5 DID_ASW_CCC_RES_3:3 | | TcsLine30 | 23 |
| Chkid_42 | FCCT_RCS pipe7_HPS4_HCS6 | FDIR LOW_NOP [ °C] =11 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =11 | FDIR LOW_OP [ °C] =11 | FDIR HIGH_OP [ °C] =52 | RCS piping # 7 TCS Failure HPS4_HCS6 DID_ASW_CCC_RES_3:2 | | TcsLine46 | 24 |
| Chkid_43 | FCCT_CRS_2_HPS5_HCS1 | FDIR LOW_NOP [ °C] =43 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =43 | FDIR LOW_OP [ °C] =43 | FDIR HIGH_OP [ °C] =52 | CRS-2 TCS Failure HPS5_HCS1 DID_ASW_CCC_RES_4:15 | This group of FCCT result is monitored by the Monitorng Entry with Id =45 | TcsLine49 | 25 |
| Chkid_44 | FCCT_FHHRH_HPS5_HCS2 | FDIR LOW_NOP [ °C] =-22 | FDIR HIGH_NOP [ °C] =31 | time-out [sec]=64800 | Cold Start Temp [ °C] =-22 | FDIR LOW_OP [ °C] =25 | FDIR HIGH_OP [ °C] =31 | FHHRH TCS Failure HPS5_HCS2 DID_ASW_CCC_RES_4:14 | | TcsLine18 | 26 |
| Chkid_45 | FCCT_FHWEVICU_HPS5_HCS3 | FDIR LOW_NOP [ °C] =-22 | FDIR HIGH_NOP [ °C] =32 | time-out [sec]=64800 | Cold Start Temp [ °C] =-22 | FDIR LOW_OP [ °C] =-2 | FDIR HIGH_OP [ °C] =32 | FHWEVIFHICU TCS Failure HPS5_HCS3 DID_ASW_CCC_RES_4:13 | | TcsLine15 | 27 |
| Chkid_46 | FCCT_FCVC3B_HPS5_HCS4 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C3B TCS Failure HPS5_HCS4 DID_ASW_CCC_RES_4:12 | | TcsLine44 | 28 |
| Chkid_47 | FCCT_RCS pipe8_HPS5_HCS5 | FDIR LOW_NOP [ °C] =10 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =10 | FDIR LOW_OP [ °C] =10 | FDIR HIGH_OP [ °C] =52 | RCS piping #8 TCS Failure HPS5_HCS5 DID_ASW_CCC_RES_4:11 | | TcsLine47 | 29 |

Status : Version 11 - Unchanged
Last Checkin: 15/09/09

TCS Subsystem Checkout
File: H_FCP_TCS_CHECK.xls
Author: E. Picallo

| Check ID | Name | Param1 | Param2 | Param3 | Param4 | Param5 | Param6 | Output Flag | NOTE | TCS Line(ref. H-P-TN-AI-0069) | Loop Index (ref..to TCT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ChkId_48 | FCCT_PTLFLV12_HPS5_HCS6 | FDIR LOW_NOP [ °C] =7 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =7 | FDIR LOW_OP [ °C] =7 | FDIR HIGH_OP [ °C] =52 | PT/LF/LV1/LV2 TCS Failure HPS5_HCS6 DID_ASW_CCC_RES_4:10 | This group of FCCT result is monitored by the Monitorng Entry with Id =45 | TcsLine48 | 30 |
| ChkId_50 | FCCT_RWL4_HPS6_HCS2 | FDIR LOW_NOP [ °C] =-6 | FDIR HIGH_NOP [ °C] =57 | time-out [sec]=64800 | Cold Start Temp [ °C] =-6 | FDIR LOW_OP [ °C] =-2 | FDIR HIGH_OP [ °C] =57 | RWL4 TCS Failure HPS6_HCS2 DID_ASW_CCC_RES_4:6 | This group of FCCT result is monitored by the Monitorng Entry with Id =51 | TcsLine22 | 32 |
| ChkId_51 | FCCT_RWL1_HPS6_HCS3 | FDIR LOW_NOP [ °C] =-6 | FDIR HIGH_NOP [ °C] =57 | time-out [sec]=64800 | Cold Start Temp [ °C] =-6 | FDIR LOW_OP [ °C] =-2 | FDIR HIGH_OP [ °C] =57 | RWL1 TCS Failure HPS6_HCS3 DID_ASW_CCC_RES_4:5 | | TcsLine23 | 33 |
| ChkId_52 | FCCT_RWL3_HPS6_HCS4 | FDIR LOW_NOP [ °C] =-6 | FDIR HIGH_NOP [ °C] =57 | time-out [sec]=64800 | Cold Start Temp [ °C] =-6 | FDIR LOW_OP [ °C] =-2 | FDIR HIGH_OP [ °C] =57 | RWL3 TCS Failure HPS6_HCS4 DID_ASW_CCC_RES_4:4 | | TcsLine24 | 34 |
| ChkId_53 | FCCT_FHIFV_HPS6_HCS5 | FDIR LOW_NOP [ °C] =-12 | FDIR HIGH_NOP [ °C] =42 | time-out [sec]=64800 | Cold Start Temp [ °C] =-12 | FDIR LOW_OP [ °C] =-12 | FDIR HIGH_OP [ °C] =42 | FHIFV TCS Failure HPS6_HCS5 DID_ASW_CCC_RES_4:3 | | TcsLine28 | 35 |
| ChkId_54 | FCCT_RWL2_HPS6_HCS6 | FDIR LOW_NOP [ °C] =-6 | FDIR HIGH_NOP [ °C] =57 | time-out [sec]=64800 | Cold Start Temp [ °C] =-6 | FDIR LOW_OP [ °C] =-2 | FDIR HIGH_OP [ °C] =57 | RWL2 TCS Failure HPS6_HCS6 DID_ASW_CCC_RES_4:2 | | TcsLine21 | 36 |
| ChkId_55 | FCCT_STRs_HPS7_HCS1 | FDIR LOW_NOP [ °C] =-10 | FDIR HIGH_NOP [ °C] =30 | time-out [sec]=64800 | Cold Start Temp [ °C] =-10 | FDIR LOW_OP [ °C] =-3 | FDIR HIGH_OP [ °C] =30 | STR's TCS Failure HPS7_HCS1 DID_ASW_CCC_RES_6:15 | This group of FCCT result is monitored by the Monitorng Entry with Id =57 | TcsLine27 | 37 |
| ChkId_56 | FCCT_BATTERY_HPS7_HCS2 | FDIR LOW_NOP [ °C] =-2 | FDIR HIGH_NOP [ °C] =37 | time-out [sec]=64800 | Cold Start Temp [ °C] =-2 | FDIR LOW_OP [ °C] =-2 | FDIR HIGH_OP [ °C] =37 | BATTERY TCS Failure HPS7_HCS2 DID_ASW_CCC_RES_6:14 | | TcsLine03 | 38 |
| ChkId_57 | FCCT_FHWOH_HPS7_HCS3 | FDIR LOW_NOP [ °C] =-15 | FDIR HIGH_NOP [ °C] =11 | time-out [sec]=64800 | Cold Start Temp [ °C] =-15 | FDIR LOW_OP [ °C] =1 | FDIR HIGH_OP [ °C] =11 | FHWOH TCS Failure HPS7_HCS3 DID_ASW_CCC_RES_6:13 | | TcsLine16 | 39 |
| ChkId_58 | FCCT_FHWEH_HPS7_HCS4 | FDIR LOW_NOP [ °C] =-7 | FDIR HIGH_NOP [ °C] =32 | time-out [sec]=64800 | Cold Start Temp [ °C] =-7 | FDIR LOW_OP [ °C] =-2 | FDIR HIGH_OP [ °C] =32 | FHWEH TCS Failure HPS7_HCS4 DID_ASW_CCC_RES_6:12 | | TcsLine17 | 40 |
| ChkId_59 | FCCT_FCV C1A_HPS7_HCS5 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C1A&C1BTCS Failure HPS7_HCS5 DID_ASW_CCC_RES_6:11 | | TcsLine31 | 41 |
| ChkId_60 | FCCT_FCV A2A_HPS7_HCS6 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV A2A&A2B TCS Failure HPS7_HCS6 DID_ASW_CCC_RES_6:10 | | TcsLine32 | 42 |
| ChkId_61 | FCCT_FHHRV_HPS8_HCS1 | FDIR LOW_NOP [ °C] =-25 | FDIR HIGH_NOP [ °C] =25 | time-out [sec]=64800 | Cold Start Temp [ °C] =-25 | FDIR LOW_OP [ °C] =19 | FDIR HIGH_OP [ °C] =25 | FHHRV TCS Failure HPS8_HCS1 DID_ASW_CCC_RES_6:7 | This group of FCCT result is monitored by the Monitorng Entry | TcsLine13 | 43 |
| ChkId_62 | FCCT_FCV C3A_HPS8_HCS2 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C3A&C3B TCS Failure HPS8_HCS2 DID_ASW_CCC_RES_6:6 | | TcsLine34 | 44 |

Status : Version 11 - Unchanged
Last Checkin: 15/09/09

TCS Subsystem Checkout
File: H_FCP_TCS_CHECK.xls
Author: E. Picallo

| Check ID | Name | Param1 | Param2 | Param3 | Param4 | Param5 | Param6 | Output Flag | NOTE | TCS Line(ref. H-P-TN-AI-0069) | Loop Index (ref.to TCT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chkld_63 | FCCT_RCS pipe3_HPS8_HCS3 | FDIR LOW_NOP [ °C] =11 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =11 | FDIR LOW_OP [ °C] =11 | FDIR HIGH_OP [ °C] =52 | RCS piping #3 TCS Failure HPS8_HCS3 DID_ASW_CCC_RES_6:5 | with Id =63 | TcsLine35 | 45 |
| Chkld_64 | FCCT_STR2_PRBF_HPS8_HCS4 | FDIR LOW_NOP [ °C] =-23.5 | FDIR HIGH_NOP [ °C] =30 | time-out [sec]=64800 | Cold Start Temp [ °C] =-23.5 | FDIR LOW_OP [ °C] =11 | FDIR HIGH_OP [ °C] =30 | STR 2 Primary Baffle TCS Failure HPS8_HCS4 DID_ASW_CCC_RES_6:4 | | TcsLine36 | 46 |
| Chkld_65 | FCCT_RCS pipe5_HPS8_HCS5 | FDIR LOW_NOP [ °C] =16 | FDIR HIGH_NOP [ °C] =52 | time-out [sec]=64800 | Cold Start Temp [ °C] =16 | FDIR LOW_OP [ °C] =16 | FDIR HIGH_OP [ °C] =52 | RCS piping #5TCS Failure HPS8_HCS5 DID_ASW_CCC_RES_6:3 | | TcsLine37 | 47 |
| Chkld_66 | FCCT_FHLCU_HPS8_HCS6 | FDIR LOW_NOP [ °C] =-20 | FDIR HIGH_NOP [ °C] =42 | time-out [sec]=64800 | Cold Start Temp [ °C] =-20 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =42 | FHLCU TCS Failure HPS8_HCS6 DID_ASW_CCC_RES_6:2 | | TcsLine19 | 48 |
| Chkld_68 | FCCT_Tank-Y_HPS9_HCS2 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =40 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =40 | Tank -Y TCS Failure HPS9_HCS2 DID_ASW_CCC_RES_5:14 | This group of FCCT result is monitored by the Monitorng Entry with Id =69 | TcsLine26 | 50 |
| Chkld_69 | FCCT_FCV C4A_HPS9_HCS3 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =90 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =90 | FCV C4A&C4B TCS Failure HPS9_HCS3 DID_ASW_CCC_RES_5:13 | | TcsLine33 | 51 |
| Chkld_70 | FCCT_FHLSU_HPS9_HCS4 | FDIR LOW_NOP [ °C] =-13 | FDIR HIGH_NOP [ °C] =37 | time-out [sec]=64800 | Cold Start Temp [ °C] =-13 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =37 | FHLSU TCS Failure HPS9_HCS4 DID_ASW_CCC_RES_5:12 | | TcsLine20 | 52 |
| Chkld_71 | FCCT_STR1_PRBF_HPS9_HCS5 | FDIR LOW_NOP [ °C] =-23.5 | FDIR HIGH_NOP [ °C] =30 | time-out [sec]=64800 | Cold Start Temp [ °C] =-23.5 | FDIR LOW_OP [ °C] =11 | FDIR HIGH_OP [ °C] =30 | STR_1 Primary Baffle TCS Failure HPS9_HCS5 DID_ASW_CCC_RES_5:11 | | TcsLine14 | 53 |
| Chkld_72 | FCCT_Tank+Y_HPS9_HCS6 | FDIR LOW_NOP [ °C] =8 | FDIR HIGH_NOP [ °C] =40 | time-out [sec]=64800 | Cold Start Temp [ °C] =8 | FDIR LOW_OP [ °C] =8 | FDIR HIGH_OP [ °C] =40 | Tank +Y TCS Failure HPS9_HCS6 DID_ASW_CCC_RES_5:10 | | TcsLine25 | 54 |
| Chkld_73 | FCCT_Ins_TM_Monitoring | Delta T = 30sec=30 | Not Used | Not Used | Not Used | Not Used | Not Used | DID_ASW_PACS_TM_CNT<br>DID_ASW_SPIRE_TM_CNT<br>DID_ASW_HIFI_TM_CNT<br>DID_ASW_HFI_TM_CNT<br>DID_ASW_SCS_TM_CNT<br>DID_ASW_LFI_TM_CNT | The Delta-T parameter is used by the ASW define a period to update the instrument TM counters. Every delta-T seconds the ASW computes the difference between previous value and current value of instrument TM counters. The difference is then put into the listed Data Pool id and monitored by MOT. | N/A | N/A |

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