GRAVITY PROBE B

PROCEDURE FOR

PAYLOAD VERIFICATION II

(PTP) ECU CHECKOUT

Procedure No. P*540 Rev. C*

1/24/10

Prepared by: *D. Meriwether*

Approvals:

Program Responsibility	Signature	Date
D. Meriwether Test Author		
Bob Farley ECU Analyst		
John Thatcher ECU REE		
D. Murray Test Leader		
B. Muhlfelder ECU Integration Manager		
M. Taber Payload Test Director		
R. Brumley Payload Technical Manager		
B. Bencze Payload Electronics Manager		
R. Whelan System Engineering		
D. Ross GP-B Quality Assurance		

NOTES:

Level of QA required during performance of this procedure:
_X_ Stanford QA Representative
___ Government QA Representative

- Any red lines to the procedure shall require the approval and initial of the Test Author and Stanford QA prior to implementation.
- Stanford QA must be notified at least 24 hour before beginning this procedure.
- ONR must be emailed before beginning this procedure.
- A Quality Assurance representative or their designated representative shall be present during this procedure and shall review any discrepancy noted during assembly or test.
- Test Configuration is not to be changed or broken without approval of QA.
- Upon completion of this procedure, Quality Assurance will certify his/her concurrence that the effort was preformed and accomplished in accordance with the prescribed instructions by signing and dating.
- Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108

Revision Record:

Rev	Rev Date	ECO #	Summary Description
-A	05/09/01	1262	Added remaining ECU Controlled Subsystems & telemetry to Test
-B	06/04/01	1273	Updated P Doc as a result of ECU HLD Panel Addition & updates during Flight ECU / ECU Interface testing and subsequent data analysis, added John Thatcher to signatories
-C	7/13/01	1283	Updated P Doc as a result of redlines if Rev B determined during testing (incorrect limits, spelling errors)

Acronyms and Abbreviations:

Acronym / Abbreviation	Meaning
ECU Monitor Mnemonics	
BE_XXXXX_XXXXXX	Binary Word Monitor
CE_XXXXX_XXXXXX	Current Monitor
DE_XXXXX_XXXXXX	Digital Word Monitor
TE_XXXXX_XXXXXX	Temperature Monitor
TE_XXXXX_X**GT**XXX	GRT TYPE Thermometer
TE_XXXXX_X**PT**XXX	PRT TYPE Thermometer
TE_XXXXX_X**ST**XXX	SDT TYPE Thermometer
TE_XXXXX_XXXXX**D**	Dewer located Thermometer
TE_XXXXX_XXXXX**P**	Probe located Thermometer
TE_XXXXX_XXXXX**Q**	Quartz Block located Thermometer
VE_XXXXX_XXXXXX	Voltage Monitor
AC	Alternate Current
Closed Loop	Hardware Controlled
Command	Software response indicating command sent
Current	Commanded Heater Amperage
DC	Direct Current
Open Loop	Software Controlled
Power	UV Lamp Power Supply readout
Pressure	GMA Pressure Sensor readout
Range	UV Lamp Power Hi Lo Range readout
Signal	UV Lamp Intensity readout
Temperature	Thermometer readout
Voltage	Commanded Heater Voltage

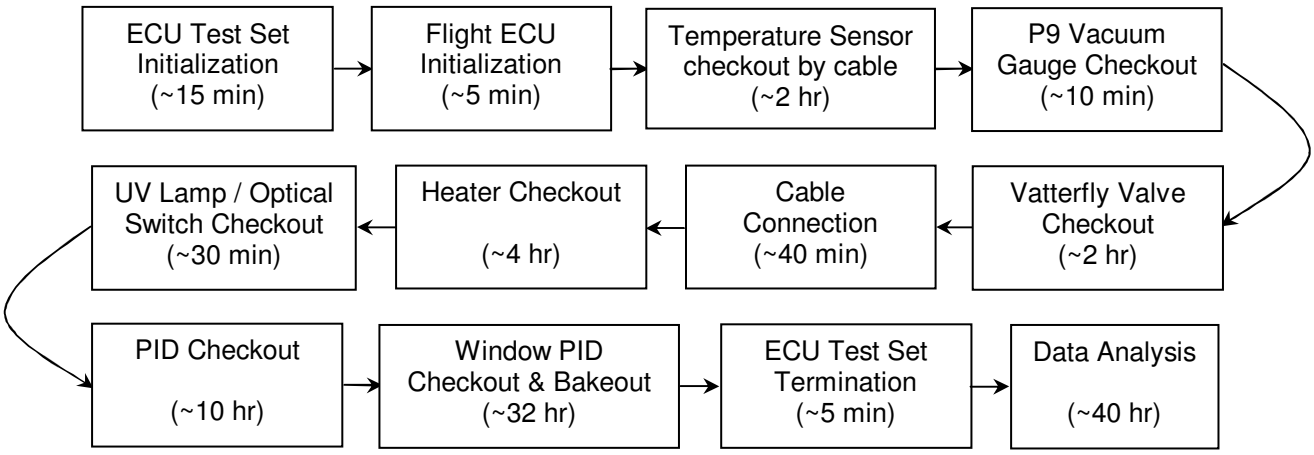
CCCA	Command & Control Computer Assembly
CSTOL	Colorado Spacecraft Test and Operations Language
ECU	Experimental Control Unit
EPS	Electrical Power Subsystem
FEU	Flight Equivalent Unit
FSW	Flight Software
FTP	file transfer protocol
GMA	Gas Management Assembly
GP-B	Gravity Probe B
ICD	Interface Control Document
MOC	Mission Operations Center
MSS	Mission Support Software

OASIS-CC	Operations and Science Instrument Support - Command and Control
ONR	Office of Naval Research
PDU	Power Distribution Unit
QA	Quality Assurance
RTC	Real-Time Commands
SPC	Stored Program Commands
TCP/IP	Transmission Control Protocol over Internet Protocol
Tlm	Telemetry
UPS	Uninteruptable Power System
VAC	Volts AC

Table of Contents

A Scope

This procedure determines the operational status of the ECU controlled components of the GP-B Payload[1]. To initialize the ECU the Flight ECU specific[2] telemetry is examined against its known limits. The procedure then records the passive[3] monitors across a GSE cable, disconnects the GSE cable, connects the appropriate ECU cable[4] and monitors and records the ECU temperatures. The ECU cable is then disconnected and the GSE cable is reconnected. The P9 Vacuum Gauge is turned on and monitored. The Vatterfly Valve cables are connected, one cable at a time[5], each Vatterfly Valve's state is determined then it's opened, stopped and finally closed[6], the Vatterfly Valve cables are then disconnected. The remaining ECU cables required[7] for ECU Heater Operation are then reconnected and each ECU controlled Heater is commanded, one at a time, to One (1.0) volt[8] and then back to Zero (0.0) volts[9]. The fiber optic cables are then connected and the UV Lamp / Optical Switch system is exercised. Finally, The ECU Temperature Control PID algorithm is exercised for a Final Filter, QBS, Cryopump, Vacuum Shell and then Window Heater test. The Window Heaters are left on for 8 hours to raise the temperature of each window per the PLSE 12, section 3.7.3.4.8 requirement and then monitored for a further 8 hours during cool down. The Payload Verification II, phase b, Flight ECU checkout involves the following Payload subsystems:



[1] See ECU3.2.5Report_Excel.xls, Used Worksheet
[2] See ECU3.2.5Report_Excel.xls, ECU Initialization Monitor's & Limits Worksheet
[3] Passive Monitor is one not commandable (includes Thermometers and Magnetometers)
[4] See ECU3.2.5Report_Excel.xls, ECU Monitors per Cable Worksheet
[5] See Drawing 5856124, Payload Cable Interconnect Diagram
[6] Ref. Section C.7, Vatterfly Valve Configuration Requirements
[7] See Section C.8 Flight Hardware required
[8] One tenth of a Volt (0.1V) for the Final Filter Heaters
[9] See ECU Heaters Setpoints, Flight Worksheet

Flight ECU Controlled		P/L Verification II	
Payload Subsystem	**Phase**	**tests**	**Comments**
Cryo Pump Htr's	B,D	P0540, P0542, P0547	Command & Temperature Monitor
Final Filter 1&2, 3&4 Htr's	B,D	P0540, P0542, P0547	Command, Temperature & Voltage Monitor
Flow Control Htr's	B	P0540, P0544	Command, Current & Voltage Monitors.
Flow Meter Htr's	B	P0540	Command, Current, Temperature & Voltage Monitor
GRT Temp Readout	B,D	All	Temperature Monitor
Gyroscope #1, 2, 3, 4 Htr's	B	P0540	Command, Temperature & Voltage Monitor
Heat Pulse Meter Htr's	B	P0540	Command, Current, Temperature & Voltage Monitor
Liquid Point Sensor	B	P0540, P0544	
PID Algorithm	B,D	P0540, P0542, P0547	Closed Loop Temperature Control
Plumbing Line Htr's	B	P0540	Command & Temperature Monitor
PODS	B	P0540, P0544	
Porous Plug Htr's	B	P0540	Command, Current, Temperature & Voltage Monitor
Press Sense Line Htr's	B	P0540	Command & Temperature Monitor
PRT Temp Readout	B,D	All	Temperature Monitor
Payload Magnetometer's	B,D	P0540, P0544	X, Y, Z Axis sensors
QBS Htr's			Command, Temperature & Voltage Monitor
– AC OL	B,D	P0540, P0542, P0547	QBS Htr mode 51, AC Open Loop
– DC OL	B,D	P0540, P0542, P0547	QBS Htr mode 53, DC Open Loop
– AC CL	B,D	P0540, P0542, P0547	QBS Htr mode 50, AC Closed Loop, Temp Setpoint
SDT Temp Readout	B,D	All	Temperature Monitor
UV Lamp	B	P0540, P0544	5V, 15V & 30V power supplies
Optical Switches	B	P0540, P0544	Fiber Optic UV transmission lines
Vacuum Gauge	B	P0540, P0544	Power, Range & Signal Monitors
Vacuum Shell Htr's	B,D	P0540, P0542, P0547	Command & Temperature Monitor
Vatterfly			
Valve Operation		P0540, P0547	Commands: No Op, Open, Close, Stop
Heater's		P0540, P0547	Command & Temperature Monitor
Window #1, 2, 3, 4 Htr's	B	P0540	Command & Temperature Monitor

Not Tested			
GMA			Pwr Status, Valve Select
Heater's			Temperature Monitor
Pressures			Pressure Monitor
Valve Operation			Commands: Open, Closed
ECU Survival Htr			Autonomous 32 degrees Celsius trigger
Proton Monitor			ECU acts as a Bent Pipe
Vehicle time tags			CTU derived monitors

B Requirements Verification

B.1 Requirements Cross Reference

Requirements that are fully verified by or checked by P0540 23 May 2001 R. Whelan

Seq. # (ref.)	Req't Source	Req't #	Requirement (Title and Description)	Ver. Method	Req't Owner	P. Doc Number	P.Doc Title	Test Phase	Taber / Whelan Comments
171	2. T003	12.7	Heaters - The probe shall support heaters for magnetic flux flushing of the SGs (to meet the magnetic requirements), for low temperature bakeout of the QBA (to meet the gyroscope vacuum requirements), and for evaporation of gas condensation on the windows.	T	Muhlfelder Meriwether	P0542 P0547 P0540	ECU Flux Flush ECU Low Temp Bakeout ECU Check out Procedure	Phase B, with ECU	To be verified
172	3. PLSE-12	3.7.2.5.1.3	SQUID Attachment Point Temperature - The temperature of each SQUID platform's attachment points shall meet the requirements specified in 12.8 of T003. T003 12.8 Thermal Requirements - see below	A,T	Muhlfelder Meriwether	P0540 P0544	ECU Check out Procedure * ECU Test Support * this is the primary verification procedure	Phase B, with ECU & SRE	
173	3. PLSE-12	3.7.3.4.5.4	Pressure Sense Line Heating - The probe shall provide heaters with the capability to warm the entire length of the pressure sense line to >= 6 K during helium partial pressure measurements.	A,T	Brumley Meriwether	P0547 P0540	* ECU Low Temp Bakeout ECU Check out Procedure * this is the primary verification procedure	Phase B, with ECU	performed once only confirmed that this is the correct requirement wording 04 24 01
174	3. PLSE-12	3.2.1.4	Thermal Requirements - The Science Payload shall be capable of meeting the SIA thermal requirements specified in 3.4, 11.1, and 12.8 of T003. T003 12.8 Thermal Requirements - see below	I,A,S,T	Murray Burns Muhlfelder Meriwether	P0540	ECU Check out Procedure	Phase B, with ECU	performed once only Barry to write an outline for a comprehensive Sdoc that deals with verification of thermal requirements.
175	3. PLSE-12	3.7.2.5.1.2	Support Flange Temperature Stability -The temperature of the QBS fingers shall meet the requirement specified in 12.8 of T003. Text from Specs (13 Feb 01): From 12.8 of T003 (Thermal Requirements): The probe has a thermal design consistent with the Dewar lifetime requirement (Section 13). During on-orbit operation when the heat power in the QBS meets the requirements in 3.7.2.4.7 of PLSE-12, the probe thermal design shall (a) provide a temperature of the QBS fingers of <= 3.0K with the capability of being maintained with a stability of 1.0 mK rms in a 100 mHz bandwidth and with a stability of 0.2 mK in a 3 mHz bandwidth centered on roll frequency, and it shall (b) provide a temperature at the SQUID bracket attachment point of <= 3.0 K.	A,T	Murray Muhlfelder Meriwether	P0540 P0542 P0544 P0547	ECU Check out Procedure ECU Flux Flush *ECU Test Support ECU Low Temp Bakeout * this is the primary verification procedure	Phase B, with ECU	PCB in work : error in reference to 3.7.2.4.7 should be 3.7.2.5.7 Will be repeated in Phase D (horizontal) if not successful in vertical orientation in Phase B.

Seq. # (ref.)	Req't Source	Req't #	Requirement (Title and Description)	Ver. Method	Req't Owner	P. Doc Number	P.Doc Title	Test Phase	Taber / Whelan Comments
176	3. PLSE-12	3.7.2.5.7.7	Heat Power to QBS in QBS Heater - The maximum heat power into the QBS shall not exceed the values given in the following while Science Data is being collected. Item: #of Items Power(mW)/item Power(mW) QBS Heater 1 2.000 2.000	T	Murray Meriwether	P0540 P0542 P0544 P0547	ECU Check out Procedure ECU Flux Flush *ECU Test Support ECU Low Temp Bakeout * this is the primary verification procedure	Phase B, with ECU	General comment: "while Science Data is being collected" means that the test is conducted under the same conditions as when science data is being collected.
177	2. T003	12.8	Thermal Requirements - The probe has a thermal design consistent with the Dewar lifetime requirement (Section 13). During on-orbit operation when the heat power in the QBS meets the requirements in 3.7.2.4.7 of PLSE-12, the probe thermal design shall (a) provide a temperature of the QBS fingers of <= 3.0K with the capability of being maintained with a stability of 1.0 mK rms in a 100 mHz bandwidth and with a stability of 0.2 mK in a 3 mHz bandwidth centered on roll frequency, and it shall (b) provide a temperature at the SQUID bracket attachment point of <= 3.0 K.	A,T	Muhlfelder Meriwether	P0540 P0544	ECU Check out Procedure ECU Test Support	Phase B, with ECU	ECU raises temp of QBS above nominal and holds.
188	3. PLSE-12	3.7.3.5.2	Vacuum at End of Low Temperature Bakeout Heating - The probe shall provide the capability to reach <= 1.3 x 10-5 Pa (1 x 10-7 torr) after 4-12 hours of pumping during the low-temperature bakeout before temperature is reduced.	T	Taber Meriwether Murray	P0540 P0547	ECU Check Out Procedure * Low Temp Ultra-high Vacuum Bakeout * this is the primary verification procedure (for temps only)	Phase B, with ECU	ECU does not read GSE pressure sensors. P0xxx's needed : 1 for vatt. valves (safing), 1. for manual vatt. valve controller, 1 for pressure monitoring
217	3. PLSE-12	3.7.5.11.1	Heat Pulse Meter - A heat pulse meter shall be provided for measuring the residual superfluid helium in the main tank while in orbit, to within ± 5% of its true value.	T	Taber Murray Meriwether	P0540	Heat Pulse Meter Test Procedure	Phase B, with ECU	his is a repeat of 162.3. This test here looks at ECU functionality. The 5% requirement cannot be verified here; that is completed in the previous run of this verification.
221	3. PLSE-12	3.7.3.4.8	Window Bakeout - The probe shall provide the capability of raising the temperature of the windows, through attached heaters, to the following temperatures within 8 hrs/window: 1) Window 1 (coldest) >= 60 K; 2) Window 2 >= 95 K; 3) Window 3 >= 220 K; 4) Window 4 (warmest) >= 280 K	A,T	Murray Meriwether	P0540	ECU Heater and temperature sensor checkout	Phase B	

B.2 Expected Data for verification per requirement

B.2.1 Excel spreadsheet analysis of the ECU operated telemetry monitors as displayed and recorded on the ECU Test Set

B.2.2 Printout of Ground Support Equipment Temperature Monitoring readout

B.2.3 Flow rate calculation from Flow Meter Heater test

B.2.4 Helium remaining calculation from Heat Pulse Meter Heater test, cross verified using GSE.

C **Configuration Requirements**

C.1 The FIST Ops Test set shall be connected to the ECU via a 1553 bus for data transmission and a timing signal supplied across a S16D connection. Ref: Figure 1, ECU Test Set Interconnect diagram

C.2 The FIST Ops Test set and the ECU shall be provided power through an Uninterruptible Power Supply providing 110 VAC for more than one minute off the commercial power grid. Ref: Figure 1, ECU Test Set Interconnect diagram

C.3 The ECU shall be provided with a 1553 connection, a timing signal (10 Hz) and a 28.0 Volt power supply. Ref: Figure 1, ECU Test Set Interconnect diagram

C.4 The ECU Power Supply and the ECU Test Set High Level Discrete Panel shall be the sole provider of Heater Power to ECU controlled Heaters. Ref: Figure 1, ECU Test Set Interconnect diagram

C.5 The Aft ECU shall be attached via cables to the Forward ECU, Top Hat, FEE Base Plate, Cross Flange & Dewar Support ring. Ref: Drawing 5856124, Payload Cable Interconnect Diagram

C.6 The Forward ECU shall be attached via cables to the Aft ECU, Probe Top Hat, Dewar Top Plate & FEE Base Plate. Ref: Drawing 5856124, Payload Cable Interconnect Diagram

C.7 The Vatterfly Valves shall be covered, sealed and under vacuum or back filled with Helium prior to any operation associated with them.

C.8 Prior to connecting the fiber optic bundles, clean with ethanol and then dry with compressed air.

C.9 All connectors used will have connector savers attached. Protect all electrical connections and/or Connector Savers with ESD dust caps when the connectors are not mated.

C.10 Remove power from cable assemblies before connecting or disconnecting cable connections.

C.11 Flight hardware required

Description	Part No.	Finite Lifetime Object	No. Req'd
Flight GP-B Dewar		N/A	1
Flight GP-B Probe		N/A	1
Flight ECU – Fwd	8A01313-101		1
Flight ECU – Aft	8A00922-101		1
Fwd ECU to Top Hat master Ground Cable Assembly	8A01467-101		1
Aft ECU to Top Hat master Ground Cable Assembly	8A01467-102		1
Fwd ECU J1 to Top Hat I1 Cable Assembly	8A00532-101		1
Fwd ECU J3 to Top Hat I3 Cable Assembly	8A01318-101		1
Aft ECU J30, J31 to FEE Base Plate Cable Harness	8A01959-101		1
FEE J12A to Top Hat I2 Cable Assembly	8A00533-101		1
Fwd ECU J5 to Top Hat I5 Cable Assembly	8A01289-101		1
Fwd ECU J6 to Top Hat I6 Cable Assembly	8A01290-101		1
Fwd ECU J7 to Top Hat I7 Cable Assembly	8A01291-101		1
Fwd ECU J10 to Dewar J805, FEE J805A Cable	8A01418-101		1
Cross Flange I10 to FEE J805A Cable Assembly	8A01551-101		1
Magnetometer #1 & #3 Cable	8A01548-101		1
Magnetometer #2 & #4 Cable	8A01549-101		1
Fwd ECU J8 to Dewar J801 Cable Assembly	8A01315-101		1
Fwd ECU J9 to Dewar J802, FEE J802A Cable Assembly	8A01268-101		1
Aft ECU J3 to Dewar Support Ring J814, FEE J9B, J9D Cable	8A01550-101		1
P9 Press Sense Cable J9B to Plumb Pallet P9A Cable Assembly	8A01962-101		1
P9 Press Sense Cable J9D to Plumb Pallet P9C Cable Assembly	8A01962-102		1
Leakage Valve #1 to Aft ECU Cable Assembly	8A01546-101		1
Leakage Valve #2 to Aft ECU Cable Assembly	8A01547-101		1
Exhaust Valve #1, #2 Extension Cable	8A01416-101		1
Exhaust Valve #3, #4 Extension Cable	8A01417-101		1
Fiber Optic Cable Bundle	8A01960-101	Y	1
Fiber Optic Cable Bundle	8A01960-102	Y	1
Fiber Optic Cable Bundle	8A01960-103	Y	1

C.12 Commercial test equipment

Manufacturer	Model	Serial Number	Calibr. Exp. Date
SUN Workstation (Test Set)	Ultra 1 3D Creator	637F09FB	
FLIGHT ECU Power Supply	Lambda LA 250	LA2-AA25-859	
Wavetek 10 Hz Oscillator	GDM-20E20	297101	

C.13 Mechanical/Electrical Special test equipment

Description	Part No.	Certification Date
Interrupt Test Aid	S16D	
HLD Panel		

C.14 Tools

Description	No. Req'd
8 mm tape drive	1

C.15 Expendables

Description	Quantity
8 mm tape	1

D **Software Required**

D.1 Flight Software

Flight Software Name	Version No.
MSS (Mission Support Software)	3.2.5S

D.2 CSTOL Scripts

CSTOL Script Name	Version No.
adc_vac_br.prc	V 1.2 : 05/21/01
cal1_br.prc	V 1.1 : 03/07/99
cal2_br.prc	V 1.2 : 02/10/99
dwrtemp_br.prc	V 1.1 : 03/07/99
default_pid.prc	V 1.1 : 04/27/01
default_win_pid.prc	V 1.2 : 05/23/01
ecu_p0540.prc	V 1.4 : 06/06/01
ecu_seg.prc	V 1.2 : 06/26/01
ecu_unsg.prc	V 1.2 : 07/13/01
ecumisc_br.prc	V 1.1 : 01/15/99
pida_p0540.prc	V 1.1 : 04/27/01
pidb_p0540.prc	V 1.2 : 05/21/01
ecupods_br.prc	V 1.1 : 02/11/99
gain1_pid.prc	V 1.3 : 05/23/01
gain2_pid.prc	V 1.2 : 05/23/01
gma1_br.prc	V 1.1 : 02/06/99
gmatemp_br.prc	V 1.1 : 02/10/99
htr1_br.prc	V 1.1 : 01/15/99
htr2_br.prc	V 1.1 : 01/15/99
htr3_br.prc	V 1.1 : 01/15/99
htr4_br.prc	V 1.1 : 01/15/99
load_br.prc	V 1.13 05/23/01
mag_uv_br.prc	V 1.1 : 02/10/99
mux1agn1.prc	V 1.2 : 06/27/01
mux1agn2.prc	V 1.3 : 06/27/01
mux1bgn1.prc	V 1.2 : 07/13/01
mux1bgn2.prc	V 1.1 : 01/31/01
mux2agn1.prc	V 1.1 : 01/31/01
mux2agn2.prc	V 1.1 : 01/31/01
mux2bgn1.prc	V 1.1 : 01/31/01
mux2bgn2.prc	V 1.1 : 01/31/01
mux3gn1.prc	V 1.1 : 01/31/01
mux3gn2.prc	V 1.1 : 01/31/01
mux4gn1.prc	V 1.1 : 01/31/01
mux4gn2.prc	V 1.1 : 01/31/01
muxgain_br.prc	V 1.1 : 02/11/99
muxio_br.prc	V 1.1 : 02/11/99
pid1_br.prc	V 1.1 : 02/11/99
pid2_br.prc	V 1.2 : 02/11/99
pid3_br.prc	V 1.1 : 02/11/99
pid4_br.prc	V 1.1 : 02/12/99
probetemp_br.prc	V 1.1 : 01/15/99
qbstemp_br.prc	V 1.1 : 02/12/99
wina_pid_p0540.prc	V 1.2 : 05/23/01
winb_pid_p0540.prc	V 1.2 : 05/23/01

D.3 SPC Scripts

SPC Script Name	Version No.
N/A	

D.4 Test Support Software

Test Software Name	Version No.
Oasis (Operating System Software)	V 2.4.5
Framex (front end software)	Framexs

E Procedures Required

Procedure Name	Procedure No.
(PTP) ECU Temperature Sensor and Heater Verification	P0540

F Equipment Pretest Requirements

Equipment	Serial No.	Test Required	Proc. No.	Test Performed Date	By
FLIGHT Fwd ECU	8A01313-ECU GSE	FLIGHT Certification	ecu_box_tlm.prc	4/17/01	HDM
FLIGHT Aft ECU	8A00922-ECU GSE	FLIGHT Certification	ecu_box_htr.prc	4/17/01	HDM

G Personnel Requirements

G.1 As a general requirement, all operations involving flight equipment require at least two persons at all times.

G.2 The test leader for this procedure is Dr. Dave Murray <Beeper *650-317-7914, 1281893* >, or his appointed representative.

G.3 The Payload Test Director for all activities conducted in FIST Ops is Dr. Mike Taber <Beeper *650-599-8033, 1286139* >, or his appointed representative. The Payload Test Director is also responsible in general for the coordination of all payload tests, and will therefore schedule appropriate times for the performance of this procedure.

G.4 The Stanford Quality Assurance representative is Dorrene Ross <Beeper *650-317-7922, 1283969* > or her appointed representative.

G.5 The Office of Naval Research representative is Abe Sabbag < Sabbaga@onr.navy.mil> or his appointed representative.

G.6 The following personnel are qualified to perform this procedure using the FIST Ops test set:

G.6.1 Dave Meriwether <Beeper 650-317-7912 >

G.6.2 Thomas Wai <Phone 650-354-5644>

G.6.3 Denys Vanrenen <Phone 725-5769>

H Safety Requirements

H.1 Standard safety practices to ensure safety of personnel and prevent damage to equipment shall be observed during performance of this test.

H.2 Read the CARD's[10] appropriate to ECU Operations before running this test.

H.3 Grounded wrist straps are to be worn prior to removal of connector caps or covers and during cable mating/demating operations.

H.4 Examine all mating connections before attempting to mate them. Remove any foreign particles. Look for any damaged pins or sockets. Do not force the coupling action if excessive resistance is encountered. Ensure that key ways are aligned.

I General Instructions

I.1 Test operators shall read this procedure in its entirety and resolve any apparent ambiguities prior to beginning this test.

I.2 This procedure operates systems throughout the GP-B satellite. Knowledge of the systems effected, caution in their operation and attention to information displayed must be applied at all times during these operations or Flight Hardware damaged may result.

I.3 This procedure shall be conducted on a formal basis to its latest approved and released version.

I.4 Tests will be conducted under the environmental conditions existing in the FIST Ops, HEPL Lab at Stanford University.

I.5 This procedure operates Flight Hardware. All use of software associated with this procedure must conform to the GP-B Configuration Control process.

I.6 In order to expedite test operations, unless specifically noted, the sequence in which major sections or subsections are preformed may be altered at the discretion of the Test Leader or his representative.

I.7 Upon completion of the test, all data on the FIST Ops test set under the /opt/usr6/lab and sub-directories shall be transferred to the data archive on the Payload Server. Upon confirmation that the FIST Ops test set data has been successfully archived, the data in the /opt/usr6/lab/bridge, /snaps, /messages and /oasis_raw_data directories may be deleted.

[10] Constraints and Restrictions Document

J References and Applicable Documents

J.1 SCIT-01 System Design, Verification, Integration & Test Plans

J.2 SCSE 06 Command and Telemetry Handbook, App B sw_cmd 3.2.0

J.3 SCSE 16 SECTION 9, Flight Software Design Specification, External Interface Detailed Design, Version Dm

J.4 PLSE-12, Science Payload Specification, Version 4.3

J.5 MSS3.2.5_Report_Excel.xls; Telemetry Monitor List for MSS 3.2.5

J.6 Probe C Drawings

J.6.1 1C34300, (Cryopump Htr)

J.6.2 1C34142, (Cryopump Htr)

J.6.3 1C34883, (Probe schematics)

J.6.4 1C34298, (Window Htr)

J.6.5 1C34169, (Window 1,2,3 Assembly)

J.6.6 1C34160, (Window 4 Assembly)

J.6.7 1C34355, (Top Hat & Cross Flange Interfaces)

J.6.8 1C34383, (Press. Sense Htr)

J.6.9 1C34111, (Neck Tube Wiring)

J.6.10 25091, (Science Telescope)

J.6.11 1C34141, (Heat Station Assembly)

J.6.12 1C34299, (QBS Htr)

J.6.13 23171, (QBS / Final Filter Assembly)

J.6.14 1C34301, (Plumbing Htr)

J.6.15 1C34124, (Vacuum Shell Htr)

J.6.16 1C34197, (Final Filter Htr 1&2)

J.6.17 1C34133, (Final Filter Htr 3&4)

J.6.18 1C34135, (Press Sense & Plumb Saddle Line Heaters location

J.6.19 1C34112, (Probe B Installation – Final Filter)

J.7 Dewar Drawings

J.7.1 5833394, (Dewer Layout)

J.7.2 5833506, (Probe B SMD Isometrics)

J.7.3 5856124, (Payload Cable Interconnect)

J.7.4 5833911, (Flow Control Htr)

J.7.5 5833348, (Flow Meter Htr)

J.7.6 , (Heat Pulse Meter Htr)

J.7.7 5833195, (Porous Plug Heater diagram)

J.8 ECU Drawings

J.8.1 8A01940, ECU Aft Master Wire List

J.8.2 8A01941, ECU Forward Master Wire List

K **Operations:**

Record all instances of ECU Initialization procedures K.1 and K.2

Table 1: ECU Initialization Record

Item No.	Date/Time Started	Comment (Skipped, Ended at Section #
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

K.1 ECU Test Set Initialization:

K.1.1 Connect the ECU Test Set to the Flight ECU. Ref: Operating Instructions for ECU Spacecraft Emulator.

K.1.2 Power on the Flight Aft SRE.

K.1.3 Start the Temperature Sensor and Heater Verification CSTOL procedure:

K.1.3.1 CSTOL ACTIONS:

K.1.3.2 TYPE Go to start ecu_p0540.prc.

K.1.3.3 Oasis Binary and Message File recording started

K.1.3.4 MSS 3.2.5 ECU format loaded (nominal Format ID: F3250ECU32A).

CSTOL HOLD:

K.1.3.4.1 RECORD Message File name (*.event_messages):

_____

K.1.3.4.2 ECU state Monitors displayed

K.1.3.4.3 ECU state change recording started.

K.2 Flight ECU Initialization:

CSTOL ACTIONS:

K.2.1.1 Type Go to Command on the ECU Processing.

CSTOL HOLD:

K.2.1.2 Turn on the FLIGHT ECU Power Distribution unit Circuit Breaker.

K.2.1.3 Turn on power to the HP DC Power Supply.

K.2.1.4 Boot the PC and standby until the LabView ECU Test program comes up.

K.2.1.5 Turn on Power to SC Emulator (SN 001).

K.2.1.6 In LabView, click “Power Settings” button to “ON”

K.2.1.6.1 *Confirm that the ECU A-side 28V is Off*

K.2.1.6.2 *Confirm that the ECU B-side 28V is Off*

K.2.1.6.3 *Confirm 28V on HP Power Supply*

K.2.1.6.4 *Check that Undervoltage Light is On.*

K.2.1.6.5 HLD Initialization

K.2.1.6.51. Toggle A-side 1553 switch to B-side then A-side

K.2.1.6.52. Toggle A-side Power Converter On then Off

K.2.1.6.53. Toggle B-side Power Converter On then Off

K.2.1.6.54. Click on All ECU to A Power

K.2.1.6.55. Toggle A-side Heat Pulse Enable On then Off

K.2.1.6.56. Toggle B-side Heat Pulse Enable On then Off

K.2.1.6.57. Click on all 8 Disable HLD's (Dewer htr's, SIA htr's, GMA htr's, UV htr's)

K.2.1.6.6 Reset Undervoltage trip. (powers on ECU Unswitched Power)

K.2.1.6.61. Confirm Vehicle Time is updating

K.2.1.6.7 Click ECU A-side 28V On

K.2.1.6.71. Confirm Rollover counters are updating and synchronous

K.2.1.6.8 Click A-side Power Converters On

K.2.1.6.9 Click A-side All Enable

K.2.1.6.10 Click B-side All Enable

K.2.1.6.11 Confirm 28V on HP Power Supply

RECORD: HP DC Power Supply Voltage _____(Nominal 28 Volts)

RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

K.2.1.6.12 In the LabView "Power Settings" window, confirm DC Voltage is 28V and Current Limit is 4A.

CSTOL ACTIONS:

K.2.1.7 Type Go to Switch to 1553 bus Port 1 or Port 2

K.2.1.8 Limit check ECU Electronics Port 1 or 2 monitor (`BC_Ecu_1_2_Sel`) as displayed in VES_IoDirective1 (nominal = Port_1).

K.2.1.9 Check for and record SRE timing signal presence.

K.2.1.10 Limit check ECU state and locked ADC monitor (`DE_Ecu_Status`) as displayed in ECU_Critical_1 (nominal = 10000000).

K.2.1.11 Limit check Rollover Counter status (`BE_Failure_A, BE_Failure_B)` as displayed in FSW_SM_DI_10hz_1 (nominal = false).

K.2.1.12 Limit check Active ECU Side (`BC_1553_A_B_Sel`) in VES_IoDirective1 (nominal = Side_A).

CSTOL HOLD:

K.2.1.13 Review the ECU_Critical_1 display and confirm that both ECU Rollover Counters (`DE_Roll_Cntr__A, DE_Roll_Cntr__B`) are in synch and incrementing

K.2.1.14 Review the Startlab xterm window and check for any new errors.

K.2.1.15 CONFIRM: Startlab window errors (BC_SEND BC RECEIVE) have stopped updating: _____

CSTOL ACTIONS:

K.2.1.16 Type Go to Limit check ECU Initialization monitors[11]

[11] Ref: ECU3.2.5Report_Excel.xls, ECU Initialization Monitor's & Limits

K.3 Flight ECU Temperature checkout by cable:

K.3.1 Fwd ECU J1 to Top Hat & Fwd ECU J3 to Top Hat I1I3 Cable Assembly checkout (CABLEI1I3)

K.3.1.1 RECORD: FDAS Readings for the following Monitors.

Monitor #	Description	ID	Temperature
172	QB forwd nr Tele	T18Q	
171	QB G3/G4 -X	T07Q	
101	Gyro #1 S-half	T01Q	
102	Gyro #2 S-half	T02Q	
103	Gyro #3 S-half	T03Q	
104	QB G3/G4 +X	T05Q	
105	QB FLANGE	T06Q	
110	QB Forwd end	T17Q	

K.3.1.1.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.1.1.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.1.2 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.1.3 OPERATOR: Disconnect FDAS cables I1 and I3 and Connect the Fwd ECU J1 to Top Hat I1 & Fwd ECU J3 to Top Hat I3 Cable Assembly. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.3.1.4 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.1.4.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts)

K.3.1.4.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.1.5 TYPE: GO to start recording the Fwd ECU J1 to Top Hat I1 & Fwd ECU J3 to Top Hat I3 monitors. (Ref: ECU3.2.5Report_Excel.xls, Cables Worksheet)

CSTOL HOLD:

K.3.1.6 RECORD the following ECU Temperature Monitors.

Monitor Name	Description	Count	Temperature
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q		
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q		
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q		
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q		
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q		
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q		
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q		
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q		
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q		

K.3.1.6.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.1.6.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.1.7 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.1.8 OPERATOR: Disconnect Fwd ECU J1 to Top Hat & Fwd ECU J3 to Top Hat I1I3 Cable Assembly and reconnect FDAS cables I1 and I3.

K.3.2 Aft ECU J30, J31 to PJ12A FEE Base Plate & FEE Base Plate J12A to Top Hat I2 Cable Assembly checkout (CABLEI2)

K.3.2.1 RECORD: FDAS Monitor Readings for the following Monitors

Monitor #	Description	ID	Temperature
111	Filter G1&G2/a	T06P	
112	Filter G1&G2/b	T07P	
113	Filter G3&G4/a	T08P	
114	Filter G3&G4/b	T09P	

K.3.2.2 OPERATOR: Disconnect FDAS cable I2 and Connect the Aft ECU J30, J31 to PJ12A FEE Base Plate & FEE Base Plate J12A to Top Hat I2 Cable Assembly (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.3.2.2.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.2.2.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.2.3 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.2.4 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.2.5 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

K.3.2.6 HP DC Power Supply

CSTOL ACTIONS:

K.3.2.7 TYPE: GO to start recording the Aft ECU J30, J31 to PJ12A FEE Base Plate & FEE Base Plate J12A to Top Hat I2 Cable Assembly monitors. (Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet)

CSTOL HOLD:

K.3.2.8 RECORD the following ECU Temperature Monitors.

Monitor Name	Description	Count	Temperature
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P		
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P		
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P		
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P		

K.3.2.8.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.2.8.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.2.9 OPERATOR: Turn OFF the FLIGHT ECU Power Supply and disconnect the Positive (Red) lead into the power supply.

K.3.2.10 OPERATOR: Disconnect Aft ECU J30, J31 to PJ12A FEE Base Plate & FEE Base Plate J12A to Top Hat I2 Cable Assembly (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable I2.

K.3.3 Fwd ECU J5 to Top Hat I5 Cable checkout (CABLEI5)

K.3.3.1 RECORD: FDAS Monitor Readings for the following Monitors

Monitor #	Description	ID	Temperature
121	QBS fingers/a	T10P	
122	QBS fingers/b	T11P	
124	Tel Top Pl/270d	T13Q	
123	Tel Top Pl/125d	T15Q	
125	Tel Top Pl/325d	T12Q	
150	Tel Top Pl/225d	T16Q	
126	Tel DPA +Y	T21Q	
148	Press sense ln/a	T19P	
149	Press sense ln/b	T20P	
116	Tel Top Pl/180d	T14Q	

K.3.3.2 OPERATOR: Disconnect FDAS cable I5 and connect Fwd ECU J5 to Top Hat I5 Cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram).

K.3.3.3 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.3.3.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.3.3.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.3.4 TYPE: GO to start recording the Fwd ECU J5 to Top Hat I5 Cable monitors. Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet

CSTOL HOLD:

K.3.3.5 RECORD the following ECU Temperature Monitors.

Monitor Name	Description	Count	Temperature
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P		
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P		
TE_TelD_2_GT13Q	Telescope detector #2 GRT: T-13Q		
TE_TelCP_2GT15Q	Telescope corrector plate #2 GRT: T-15Q		
TE_TelD_1_GT12Q	Telescope detector #1 GRT: T-12Q		
TE_SciTel_ST16Q	Science telescope SDT: T-16Q		
TE_TelDM_YGT21Q	Telescope detector mount +Y GRT: T-21Q		
TE_PrSLn_aST19P	Pressure sense line STA156 SDT/a: T-19P		
TE_PrSLn_bST20P	Pressure sense line SDT/b: T-20P		
TE_TelCP_1GT14Q	Telescope corrector plate #1 GRT: T-14Q		

K.3.3.5.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.3.5.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.3.6 OPERATOR: Turn Off the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.3.7 OPERATOR: Disconnect ECU Fwd ECU J5 to Top Hat I5 Cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable I5.

K.3.4 Fwd ECU J6 to Top Hat I6 Cable checkout (CABLEI6)

K.3.4.1 RECORD: FDAS Monitor Readings for the following Monitors

Monitor #	Description	ID	Temperature
118	HEX-0 /a	T05P	
119	HEX-0 /b	T28P	
141	HEX-1 / Probe	T01P	
142	HEX-2 / Probe	T02P	
143	HEX-3 / Probe	T03P	
144	HEX-4 / Probe	T04P	
145	QBA Support/S200	T12P	
146	Vac Shell /a 41	T13P	
147	Vac Shell /b 41	T14P	

K.3.4.1.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.4.1.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.4.2 OPERATOR: Disconnect FDAS cable I6 and connect Fwd ECU J6 to Top Hat I6 Cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram).

K.3.4.3 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.4.3.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.4.3.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.4.4 TYPE: GO to commence recording the Fwd ECU J6 to Top Hat I6 Cable monitors as listed in K.3.4.5.

CSTOL HOLD:

K.3.4.5 RECORD the following ECU Temperature Monitors. Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet

Monitor Name	Description	Count	Temperature
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P		
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P		
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P		
TE_HEX2Pr_ST02P	HEX-2 probe SDT: T-02P		
TE_HEX3Pr_ST03P	HEX-3 probe SDT: T-03P		
TE_HEX4Pr_ST04P	HEX-4 probe SDT: T-04P		
TE_QBS_SDTST12P	Quartz block support SDT: T-12P		
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P		
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P		

K.3.4.5.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.4.5.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.4.6 OPERATOR: Turn OFF the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.4.7 OPERATOR: Disconnect Fwd ECU J6 to Top Hat I6 Cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable I6.

K.3.5 Fwd ECU J7 to Top Hat I7 Cable checkout (CABLEI7)

K.3.5.1 RECORD: FDAS Monitor Readings for the following Monitors

Monitor #	Description	ID	Temperature
127	Cryo Pump /a	T15P	
128	Cryo Pump /b	T16P	
151	Plumbing Sad /a	T17P	
152	Plumbing Sad /b	T18P	
153	Window #1 /a	T21P	
154	Window #1 /b	T22P	
155	Window #2 /a	T23P	
156	Window #2 /b	T24P	
157	Window #3 /a	T25P	
158	Window #3 /b	T26P	
159	HEX-4 Int	T27P	

K.3.5.1.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.5.1.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.5.2 OPERATOR: Turn OFF the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.5.3 OPERATOR: Disconnect FDAS cable I7 and connect Fwd ECU J7 to Top Hat I7 Cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram).

K.3.5.4 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.5.4.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.5.4.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.5.5 TYPE: GO to commence recording the Fwd ECU J7 to Top Hat I7 Cable monitors as listed in K.3.5.6.

CSTOL HOLD:

K.3.5.6 RECORD the following ECU Temperature Monitors. Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet

Monitor Name	Description	Count	Temperature
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P		
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P		
TE_PlSad_aST17P	Plumbing saddle STA194 SDT/a: T-17P		
TE_PlSad_bST18P	Plumbing saddle SDT/b: T-18P		
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P		
TE_Win_1_bST22P	Window #1 SDT/b: T-22P		
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P		
TE_Win_2_bST24P	Window #2 SDT/b: T-24P		
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P		
TE_Win_3_bST26P	Window #3 SDT/b: T-26P		
TE_HEX4Pr_ST27P	HEX-4 probe SDT: T-27P		

K.3.5.6.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.5.6.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.5.7 OPERATOR: Turn OFF the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.5.8 OPERATOR: Disconnect Fwd ECU J7 to Top Hat I7 Cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable I7

K.3.6 Fwd ECU J10 to Dewar J805 Temp Sensor (ST17D) & FEE J805A to Cross Flange I10 Cable Assembly checkout (CABLEI10)

K.3.6.1 OPERATOR: Connect the Fwd ECU J10 to Dewar J805 Temp Sensor (ST17D) & FEE J805A to Cross Flange I10 Cable Assembly. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.3.6.2 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.6.2.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.6.2.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.6.3 TYPE: GO to commence recording the Fwd ECU J10 to Dewar J805 Temp Sensor (ST17D) & FEE J805A to Cross Flange I10 Cable Assembly monitors as listed in K.3.6.4.

CSTOL HOLD:

K.3.6.4 RECORD the following ECU Temperature Monitors. Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet

Monitor Name	Description	Count	Temperature
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P		
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P		
TE_TpPltDwST17D	Dewar top plate SDT: T-17D		

K.3.6.4.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.6.4.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.6.5 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.6.6 OPERATOR: Disconnect Fwd ECU J10 to Dewar J805 Temp Sensor (ST17D) & FEE J805A to Cross Flange I10 Cable Assembly. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable J805.

K.3.7 Aft ECU J10 to Magnetometer #1 and #3 checkout (CABLEJ10)

K.3.7.1 OPERATOR: Connect the Aft ECU J10 to Magnetometer #1 and #3 cable. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.3.7.2 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.7.2.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.7.2.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.7.3 TYPE: GO to commence recording the Aft ECU J10 to Magnetometer #1 and #3 monitors as listed in K.3.6.4.

CSTOL HOLD:

K.3.7.4 RECORD the following ECU Magnetometer Monitors. Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet

Monitor Name	Description	Count
DE_MAG1_X_OUT	Magnetometer-1 X-out	
DE_MAG1_Y_OUT	Magnetometer-1 Y-out	
DE_MAG1_Z_OUT	Magnetometer-1 Z-out	
DE_MAG3_X_OUT	Magnetometer-3 X-out	
DE_MAG3_Y_OUT	Magnetometer-3 Y-out	
DE_MAG3_Z_OUT	Magnetometer-3 Z-out	

K.3.7.4.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.7.4.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.7.5 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.7.6 OPERATOR: Disconnect Aft ECU J10 to Magnetometer #1 and #3 Cable. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable J805.

K.3.8 Aft ECU J11 to Magnetometer #2 and #4 checkout (CABLEJ11)

K.3.8.1 OPERATOR: Connect the Aft ECU J11 to Magnetometer #2 and #4 cable. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.3.8.2 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.8.2.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.8.2.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.8.3 TYPE: GO to commence recording the Aft ECU J11 to Magnetometer #2 and #4 monitors as listed in K.3.6.4.

CSTOL HOLD:

K.3.8.4 RECORD the following ECU Magnetometer Monitors. Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet

Monitor Name	Description	Count
DE_MAG2_X_OUT	Magnetometer-2 X-out	
DE_MAG2_Y_OUT	Magnetometer-2 Y-out	
DE_MAG2_Z_OUT	Magnetometer-2 Z-out	
DE_MAG4_X_OUT	Magnetometer-4 X-out	
DE_MAG4_Y_OUT	Magnetometer-4 Y-out	
DE_MAG4_Z_OUT	Magnetometer-4 Z-out	

K.3.8.4.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.8.4.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.8.5 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.8.6 OPERATOR: Disconnect Aft ECU J11 to Magnetometer #2 and #4 cable. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable J805.

K.3.9 Fwd ECU J8 to Dewar J801 Cable checkout (CABLEJ8)

K.3.9.1 RECORD: FDAS Monitor Readings for the following Monitors

Monitor #	Description	ID	Temperature
26	Flow Meter /a	T18D	
27	Flow Meter /b	T19D	
25	Guard Tank /b	T16D	
05	Hex-1 Dewar	T03D	
06	Hex-2 Dewar	T06D	
07	Hex-3 Dewar	T07D	
08	Hex-4 Dewar	T08D	
20	Main Tank Top /a	T10D	
21	Main Tank Top /b	T11D	
22	P Plug dwnstm /a	T12AD	
23	P Plug dwnstm /b	T12BD	
01	Sta 200 Dewar /a	T01D	
02	Sta 200 Dewar /b	T02D	
04	VCS-1 Bottom	T05D	
03	VCS-1 Middle	T04D	
85	PODS-1 Cont.-Ohm	R01D	
86	PODS-2 Cont.-Ohm	R02D	
87	PODS-3 Cont.-Ohm	R03D	
88	PODS-4 Cont.-Ohm	R04D	
89	PODS-5 Cont.-Ohm	R05D	
90	PODS-6 Cont.-Ohm	R06D	

K.3.9.1.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.9.1.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.9.2 OPERATOR: Disconnect FDAS cable J801 and connect Fwd ECU J8 to Dewar J801 cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram).

K.3.9.3 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.9.3.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.9.3.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.9.4 TYPE: GO to start recording the Fwd ECU J8 to Dewar J801 cable monitors, Ref: ECU3.2.5Report_excel.xls, Cable Worksheet CSTOL HOLD:

K.3.9.5 Display and RECORD the following ECU Temperature Monitors.

Monitor Name	Description	Count	Temperature
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D		
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D		
TE_GrdTk__ST16D	Guard tank bottom SDT: T-16D		
TE_HEX1Dw_ST03D	HEX-1 dewar SDT: T-03D		
TE_HEX2Dw_ST06D	HEX-2 dewar SDT: T-06D		
TE_HEX3Dw_ST07D	HEX-3 dewar SDT: T-07D		
TE_HEX4Dw_ST08D	HEX-4 dewar SDT: T-08D		
TE_MtkIn_aGT10D	Main tank internal GRT/a: T-10D		
TE_MtkIn_bGT11D	Main tank internal GRT/b: T-11D		
TE_PPEx_aGT12AD	Porous plug exit GRT/a: T-12AD		
TE_PPEx_bGT12BD	Porous plug exit GRT/b: T-12BD		
TE_St2Dw_aGT01D	Station 200 dewar GRT/a: T-01D		
TE_St2Dw_bGT02D	Station 200 dewar GRT/b: T-02D		
TE_VCS1Bt_ST05D	VCS1 bottom SDT: T-05D		
TE_VCS1Md_ST04D	VCS1 middle SDT: T-04D		
DE_PODS1___R01D	PODS#1 continuity: R-01D		
DE_PODS2___R02D	PODS#2 continuity: R-02D		
DE_PODS3___R03D	PODS#3 continuity: R-03D		
DE_PODS4___R04D	PODS#4 continuity: R-04D		
DE_PODS5___R05D	PODS#5 continuity: R-05D		
DE_PODS6___R06D	PODS#6 continuity: R-06D		

K.3.9.6 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.9.7 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.9.7.1 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.9.8 OPERATOR Disconnect the Fwd ECU J8 to Dewar J801 cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable J801

K.3.10 Fwd ECU J9 to Dewar J802, FEE J802A Cable Assembly checkout (CABLEJ9)

K.3.10.1 RECORD: FDAS Monitor Readings for the following Monitors

Monitor #	Description	ID	Count
91	PODS-7 Cont.-Ohm	R07D	
92	PODS-8 Cont.-Ohm	R08D	
93	PODS-9 Cont.-Ohm	R09D	
94	PODS-10 Cont.-Ohm	R10D	
95	PODS-11 Cont.-Ohm	R11D	
96	PODS-12 Cont.-Ohm	R12D	

K.3.10.2 OPERATOR: Disconnect FDAS cable J802 and connect Fwd ECU J9 to Dewar J802, FEE J802A Cable Assembly (Ref: Drawing 5856124, Payload Cable Interconnect Diagram).

K.3.10.2.1**CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.10.2.2**CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.10.2.3 **WARNING**: The Liquid Point Sensor MAY act as a heat source and pull liquid helium through the Porous Plug. Monitor the Liquid Point sensor plot (**ECU_V_QBS_LiqPS**) for a decreasing voltage and be prepared to power down the ECU if it is determined that liquid helium is in the porous plug.

K.3.10.3 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.3.10.3.1RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.3.10.3.2RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.3.10.4 TYPE: GO to start recording the Fwd ECU J9 to Dewar J802, FEE J802A Cable Assembly monitors. Ref: ECU3.2.0 Report_excel.xls, Cable Worksheet.

CSTOL HOLD:

K.3.10.5 Display and RECORD the following ECU Temperature Monitors.

Monitor Name	Description	Count	Eng. Values
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01		
DE_PODS7___R07D	PODS#7 continuity: R-07D		
DE_PODS8___R08D	PODS#8 continuity: R-08D		
DE_PODS9___R09D	PODS#9 continuity: R-09D		
DE_PODS10__R10D	PODS#10 continuity: R-10D		
DE_PODS11__R11D	PODS#11 continuity: R-11D		
DE_PODS12__R12D	PODS#12 continuity: R-12D		

K.3.10.5.1**CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.3.10.5.2**CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.3.10.6 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.3.10.7 OPERATOR Disconnect Fwd ECU J9 to Dewar J802, FEE J802A (Ref: Drawing 5856124, Payload Cable Interconnect Diagram) and reconnect FDAS cable J802.

K.3.11 Aft ECU J3 to Dewar Support Ring J814 & FEE Cable J9B to Plumbing Pallet Cable Assembly checkout (CABLEJ3)

K.3.11.1 Connect the Aft ECU J3 to Dewar Support Ring J814 & FEE Base Plate Cable J9B, J9D to Plumbing Pallet P9 Gage Cable Assembly. (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

CSTOL ACTIONS:

K.3.11.2 TYPE GO to start Bridge File recording.

CSTOL HOLD:

K.3.11.3 Display and RECORD the following ECU Temperature Monitors. Ref: ECU3.2.5Report_excel.xls, Cable Worksheet

Monitor Name	Description	Count	Temperature
DE_VSDwSRgST13D	Support ring vacuum shell: T-13D		
DE_VSDwBotST14D	Bottom vacuum shell: T-14D		
TE_VCS_GR_ST30D	Vac shell graphite ring SDT/a: T-30D		
TE_VCS_GR_ST31D	Vac shell graphite ring SDT/a: T-31D		
TE_VCS_GR_ST32D	Vac shell graphite ring SDT/a: T-32D		

K.3.11.4 PAUSE, Wait for Operator input to end temperature monitoring and initiate the P9 Vacuum Gauge checkout.

K.4 P9 Vacuum Gauge Measurement (P9ON)

CSTOL ACTIONS:

K.4.1 TYPE GO to Start P9 Vacuum Gauge recording.

CSTOL HOLD:

K.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			0	
DE_VACG_P9A_PWR	Vacuum Gauge Power			<100	
DE_VACG_P9A_RNG	Vacuum Gauge Range			<100	
DE_VACG_P9A_SIG	Vacuum Gauge Signal			<100	
DE_VACG_P9B_PWR	Vacuum Gauge Power			<100	
DE_VACG_P9B_RNG	Vacuum Gauge Range			<100	
DE_VACG_P9B_SIG	Vacuum Gauge Signal			<100	
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				

CSTOL ACTIONS:

K.4.3 TYPE GO to Command the P9A Vacuum Gauge On. (P9A)

CSTOL HOLD:

K.4.4 RECORD the following P9 Vacuum Gauge Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			1	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			0	
DE_VACG_P9A_PWR	Vacuum Gauge Power			14395 - 15911	
DE_VACG_P9A_RNG	Vacuum Gauge Range			2791 - 3085, 14395 - 15911	
DE_VACG_P9A_SIG	Vacuum Gauge Signal			100 - 200, 14395 - 15911	
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				

CSTOL ACTIONS:

K.4.5 TYPE GO to Command the P9B Vacuum Gauge On. (P9B)

CSTOL HOLD:

K.4.6 RECORD the following P9 Vacuum Gauge Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			1	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			1	
DE_VACG_P9B_PWR	Vacuum Gauge Power			14395 - 15911	
DE_VACG_P9B_RNG	Vacuum Gauge Range			2791 - 3085, 14395 - 15911	
DE_VACG_P9B_SIG	Vacuum Gauge Signal			100 - 200, 14395 - 15911	
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				

CSTOL ACTIONS:

K.4.7 TYPE GO to Command P9 Vacuum Gauge Off. (P9OFF)

CSTOL HOLD:

K.4.8 RECORD the following P9 Vacuum Gauge Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			0	
DE_VACG_P9A_PWR	Vacuum Gauge Power			<100	
DE_VACG_P9A_RNG	Vacuum Gauge Range			<100	
DE_VACG_P9A_SIG	Vacuum Gauge Signal			<100	
DE_VACG_P9B_PWR	Vacuum Gauge Power			<100	
DE_VACG_P9B_RNG	Vacuum Gauge Range			<100	
DE_VACG_P9B_SIG	Vacuum Gauge Signal			<100	
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				

CSTOL ACTIONS:

K.4.9 TYPE GO to End the P9 Vacuum Gauge Measurement and initiate the Vatterfly Valve / Heater checkout CSTOL Procedure.

K.5 Flight ECU Vatterfly Valve / Heater checkout: (VAT_VALVE)

K.5.1 Start Vatterfly Valve recording.

CSTOL HOLD:

K.5.2 Ensure that a Manual Vatterfly Valve Controller is available, on location and has a signed off procedure.

K.5.3 OPERATOR: Confirm that the Vatterfly Valves LV1, LV2, EV1, EV2, EV3 and EV4 are Covered, Leak Checked and both sides of the Valves are either in a Vacuum or Helium environment.

K.5.3.1 **WARNING**: Opening a Vatterfly Valve, on the ground, without a leak free cover and either a Vacuum or Helium environment IS EXTREMELY DANGEROUS.

K.5.4 **The following people MUST Initial below, signifying that Vatterfly Valves LV1, LV2, EV1, EV2, EV3 and EV4 are safe to Operate on the Ground, before continuing with Vatterfly Valve Checkout.**

K.5.4.1 **Payload Technical Manager (or delegate):**_____

K.5.4.2 **Payload Test Director (or delegate):**_____

K.5.4.3 **Test Leader (or delegate):**_____

K.5.4.4 **Test Operator:**_____

K.5.4.5 **Quality Assurance (or delegate):**_____

K.5.4.6 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.5.4.7 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.5.5 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.5.6 Connect the Aft ECU J8 to Cross Flange LV#1 and FEE Base Plate P2 cable assembly and the FEE Base Plate J2 to EV#1, EV#2 extension cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.5.7 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.5.7.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.5.7.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

K.5.8 Vatterfly Valve State Check

CSTOL ACTIONS:

K.5.8.1 TYPE GO to send the LV1a no-op command (LV1A_STATE)

CSTOL HOLD:

K.5.8.2 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		1	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.8.3 TYPE GO to send the LV1b no-op command (LV1B_STATE)

CSTOL HOLD:

K.5.8.4 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		1	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.8.5 TYPE GO to send the EV1a no-op command (EV1A_STATE)

CSTOL HOLD:

K.5.8.6 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		3	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.8.7 TYPE GO to send the EV1b no-op command (EV1B_STATE)

CSTOL HOLD:

K.5.8.8 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		3	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.8.9 TYPE GO to send the EV2a no-op command (EV2A_STATE)

CSTOL HOLD:

K.5.8.10 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		4	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.8.11 TYPE GO to send the EV2b no-op command (EV2B_STATE)

CSTOL HOLD:

K.5.8.12 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		4	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

K.5.9 Leakage Valve 1, Side A Checkout (LV1A)

K.5.9.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_LV1_SDTa	Leakage valve 1 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_LV1_SDTb	Leakage valve 1 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.9.2 If the Leakage Valve 1 temperature is not within the required temperature limits as defined above.

K.5.9.2.1 When prompted to, TYPE GO to Command On the LV1a Heater

K.5.9.2.2 Once the Leakage Valve 1 temperature is within the required temperature limits, the LV1a Heater is Commanded Off. When prompted to, TYPE GO to send the Vatterfly Valve No-Op command

K.5.9.3 If the Leakage Valve 1 temperature is within the required temperature limits as defined in Section K.5.9.1

K.5.9.3.1 When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.9.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		1	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_LV1_SDTa	Leakage valve 1 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_LV1_SDTb	Leakage valve 1 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.9.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.9.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		F1 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.9.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.9.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C1 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.9.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.9.10 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		31	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.9.11 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.9.12 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C1 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.9.13 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.9.14 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		31	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_LV1_SDTa	Leakage valve 1 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_LV1_SDTb	Leakage valve 1 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.10 Leakage Valve 1, Side B Checkout (LV1B)

K.5.10.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_LV1_SDTa	Leakage valve 1 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_LV1_SDTb	Leakage valve 1 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.10.2 If the Leakage Valve 1 temperature is outside of the required temperature limits as defined above.

K.5.10.2.1When prompted to, TYPE GO to Command On the LV1b Heater

K.5.10.2.2Once the Leakage Valve 1 temperature is within the required temperature limits, the LV1b Heater IS Commanded Off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.10.3 If the Leakage Valve 1 temperature is within the required temperature limits, as defined above.

K.5.10.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.10.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		1	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_LV1_SDTa	Leakage valve 1 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_LV1_SDTb	Leakage valve 1 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.10.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.10.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		F1 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.10.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.10.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C1 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.10.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.10.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		31	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.10.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.10.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C1 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.10.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.10.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		31	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_LV1_SDTa	Leakage valve 1 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_LV1_SDTb	Leakage valve 1 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.11 Exhaust Valve 1, Side A Checkout (EV1A)

K.5.11.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV1_SDTa	Exhaust valve 1 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV1_SDTb	Exhaust valve 1 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.11.2 If the Exhaust Valve 1 temperature is outside of the required temperature limits as defined above.

K.5.11.2.1When prompted to, TYPE GO to Command On the EV1a Heater

K.5.11.2.2Once the Exhaust Valve 1 temperature is within the required temperature limits, the EV1a Heater is Commanded On. TYPE GO to send the Vatterfly Valve No-Op command

K.5.11.3 If the Exhaust Valve 1 temperature is within the required temperature limits, as defined above.

K.5.11.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.11.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		3	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV1_SDTa	Exhaust valve 1 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV1_SDTb	Exhaust valve 1 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.11.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.11.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		F3 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.11.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.11.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C3 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.11.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.11.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		33	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.11.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.11.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C3 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.11.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.11.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		33	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV1_SDTa	Exhaust valve 1 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV1_SDTb	Exhaust valve 1 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.12 Exhaust Valve 1, Side B Checkout (EV1B)

K.5.12.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV1_SDTa	Exhaust valve 1 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV1_SDTb	Exhaust valve 1 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.12.2 If the Exhaust Valve 1 temperature is outside of the required temperature limits as defined above.

K.5.12.2.1When prompted to, TYPE GO to Command On the EV1b Heater

K.5.12.2.2Once the Exhaust Valve 1 temperature is within the required temperature limits, the EV1b Heater is commanded off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.12.3 If the Exhaust Valve 1 temperature is within the required temperature limits, as defined above.

K.5.12.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.12.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		3	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV1_SDTa	Exhaust valve 1 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV1_SDTb	Exhaust valve 1 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.12.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.12.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		F3 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.12.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.12.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C3 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.12.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.12.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		33	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.12.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.12.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C3 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.12.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.12.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		33	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV1_SDTa	Exhaust valve 1 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV1_SDTb	Exhaust valve 1 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.13 Exhaust Valve 2, Side A Checkout (EV2A)

K.5.13.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV2_SDTa	Exhaust valve 2 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV2_SDTb	Exhaust valve 2 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.13.2 If the Exhaust Valve 2 temperature is outside of the required temperature limits as defined above.

K.5.13.2.1When prompted to, TYPE GO to Command On the EV2a Heater

K.5.13.2.2Once the Exhaust Valve 2 temperature is within the required temperature limits, the EV2a Heater is Commanded Off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.13.3 If the Exhaust Valve 2 temperature is within the required temperature limits, as defined above.

K.5.13.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.13.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		4	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV2_SDTa	Exhaust valve 2 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV2_SDTb	Exhaust valve 2 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.13.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.13.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		F4 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.13.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.13.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C4 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.13.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.13.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		34	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.13.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.13.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C4 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.13.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.13.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		34	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV2_SDTa	Exhaust valve 2 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV2_SDTb	Exhaust valve 2 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.14 Exhaust Valve 2, Side B Checkout (EV2B)

K.5.14.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV2_SDTa	Exhaust valve 2 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV2_SDTb	Exhaust valve 2 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.14.2 If the Exhaust Valve 2 temperature is outside of the required temperature limits as defined above.

K.5.14.2.1When prompted to, TYPE GO to Command On the EV2b Heater

K.5.14.2.2Once the Exhaust Valve 2 temperature is within the required temperature limits, the EV2b Heater is Commanded Off. TYPE GO to send the Vatterfly Valve command

K.5.14.3 If the Exhaust Valve 2 temperature is within the required temperature limits, as defined above.

K.5.14.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.14.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		4	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV2_SDTa	Exhaust valve 2 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV2_SDTb	Exhaust valve 2 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.14.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.14.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		F4 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.14.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.14.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C4 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.14.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.14.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		34	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.14.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.14.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C4 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.14.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.14.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		34	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV2_SDTa	Exhaust valve 2 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV2_SDTb	Exhaust valve 2 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.14.15**CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.5.14.16**CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.5.15 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.5.16 Disconnect the Aft ECU J8 to Cross Flange LV#1 and FEE Base Plate P2 cable assembly and the FEE Base Plate J2 to EV#1, EV#2 extension cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.5.17 Connect the Aft ECU J9 to Cross Flange LV#2 and FEE Base Plate P3 cable assembly and the FEE Base Plate J3 to EV#3, EV#4 extension cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.5.18 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.5.18.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.5.18.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

K.5.19 Vatterfly Valve State Check

CSTOL ACTIONS:

K.5.19.1 TYPE GO to send the LV2a no-op command (LV2A_STATE)

CSTOL HOLD:

K.5.19.2 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		2	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.19.3 TYPE GO to send the LV2b no-op command (LV2B_STATE)

CSTOL HOLD:

K.5.19.4 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		2	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.19.5 TYPE GO to send the EV3a no-op command (EV3A_STATE)

CSTOL HOLD:

K.5.19.6 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		5	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.19.7 TYPE GO to send the EV3b no-op command (EV3B_STATE)

CSTOL HOLD:

K.5.19.8 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		5	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.19.9 TYPE GO to send the EV4a no-op command (EV4A_STATE)

CSTOL HOLD:

K.5.19.10RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		6	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.19.11TYPE GO to send the EV4b no-op command (EV4B_STATE)

CSTOL HOLD:

K.5.19.12RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		6	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

K.5.20 Leakage Valve 2, Side A Checkout (LV2A)

K.5.20.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_LV2_SDTa	Leakage valve 2 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_LV2_SDTb	Leakage valve 2 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.20.2 If the Leakage Valve 2 temperature is not within the required temperature limits as defined above.

K.5.20.2.1When prompted to, TYPE GO to Command On the LV2a Heater

K.5.20.2.2Once the Leakage Valve 2 temperature is within the required temperature limits, the LV2a Heater is Commanded Off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.20.3 If the Leakage Valve 2 temperature is within the required temperature limits as defined in Section K.5.80.1

K.5.20.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.20.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		2	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_LV2_SDTa	Leakage valve 2 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_LV2_SDTb	Leakage valve 2 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.20.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.20.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		F2 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.20.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.20.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C2 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.20.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.20.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		32	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.20.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.20.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C2 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.20.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.20.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		32	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_LV2_SDTa	Leakage valve 2 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_LV2_SDTb	Leakage valve 2 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.21 Leakage Valve 2, Side B Checkout (LV2B)

K.5.21.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_LV2_SDTa	Leakage valve 2 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_LV2_SDTb	Leakage valve 2 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.21.2 If the Leakage Valve 2 temperature is outside of the required temperature limits as defined above.

K.5.21.2.1When prompted to, TYPE GO to Command On the LV2b Heater

K.5.21.2.2Once the Leakage Valve 2 temperature is within the required temperature limits, the LV2b Heater is Commanded Off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.21.3 If the Leakage Valve 2 temperature is within the required temperature limits, as defined above.

K.5.21.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.21.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		2	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_LV2_SDTa	Leakage valve 2 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_LV2_SDTb	Leakage valve 2 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.21.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.21.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		F2 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.21.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.21.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C2 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.21.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.21.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		32	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.21.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.21.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C2 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.21.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.21.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		32	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_LV2_SDTa	Leakage valve 2 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_LV2_SDTb	Leakage valve 2 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.22 Exhaust Valve 3, Side A Checkout (EV3A)

K.5.22.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV3_SDTa	Exhaust valve 3 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV3_SDTb	Exhaust valve 3 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.22.2 If the Exhaust Valve 3 temperature is outside of the required temperature limits as defined above.

K.5.22.2.1When prompted to, TYPE GO to Command On the EV3a Heater

K.5.22.2.2Once the Exhaust Valve 3 temperature is within the required temperature limits, the EV3a Heater is Commanded Off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.22.3 If the Exhaust Valve 3 temperature is within the required temperature limits, as defined above.

K.5.22.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.22.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		5	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV3_SDTa	Exhaust valve 3 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV3_SDTb	Exhaust valve 3 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.22.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.22.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		F5 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.22.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.22.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C5 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.22.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.22.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		35	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.22.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.22.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C5 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.22.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.22.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		35	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV3_SDTa	Exhaust valve 3 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV3_SDTb	Exhaust valve 3 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.23 Exhaust Valve 3, Side B Checkout (EV3B)

K.5.23.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV3_SDTa	Exhaust valve 3 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV3_SDTb	Exhaust valve 3 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.23.2 If the Exhaust Valve 3 temperature is outside of the required temperature limits as defined above.

K.5.23.2.1When prompted to, TYPE GO to Command On the EV3b Heater

K.5.23.2.2Once the Exhaust Valve 3 temperature is within the required temperature limits, the EV3b Heater is Commanded Off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.23.3 If the Exhaust Valve 3 temperature is within the required temperature limits, as defined above.

K.5.23.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.23.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		5	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV3_SDTa	Exhaust valve 3 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV3_SDTb	Exhaust valve 3 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.23.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.23.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		F5 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.23.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.23.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C5 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.23.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.23.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		35	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.23.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.23.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C5 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.23.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.23.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		35	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV3_SDTa	Exhaust valve 3 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV3_SDTb	Exhaust valve 3 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.24 Exhaust Valve 4, Side A Checkout (EV4A)

K.5.24.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV4_SDTa	Exhaust valve 4 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV4_SDTb	Exhaust valve 4 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.24.2 If the Exhaust Valve 4 temperature is outside of the required temperature limits as defined above.

K.5.24.2.1When prompted to, TYPE GO to Command On the EV4a Heater

K.5.24.2.2Once the Exhaust Valve 4 temperature is within the required temperature limits, the EV4a Heater is Commanded Off. TYPE GO to send the Vatterfly Valve No-Op command

K.5.24.3 If the Exhaust Valve 4 temperature is within the required temperature limits, as defined above.

K.5.24.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.24.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		6	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV4_SDTa	Exhaust valve 4 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV4_SDTb	Exhaust valve 4 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.24.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.24.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		F6 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.24.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.24.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C6 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.24.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.24.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		36	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	

CSTOL ACTIONS:

K.5.24.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.24.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		C6 (hex)	
VE_VAT_A_CLOSED	Vatt valve-A closed		<100	
VE_VAT_A_OPEN	Vatt valve-A open		15565-17203	

CSTOL ACTIONS:

K.5.24.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.24.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfA	Vatterfly Valves Select On/Off /A		36	
VE_VAT_A_CLOSED	Vatt valve-A closed		15565-17203	
VE_VAT_A_OPEN	Vatt valve-A open		<100	
TE_VAT_EV4_SDTa	Exhaust valve 4 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV4_SDTb	Exhaust valve 4 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.25 Exhaust Valve 4, Side B Checkout (EV4B)

K.5.25.1 RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Count	Temp (K)	Limit
TE_VAT_EV4_SDTa	Exhaust valve 4 SDT/a			217.5K(−56°C) − 313.5K(+40°C)
TE_VAT_EV4_SDTb	Exhaust valve 4 SDT/b			217.5K(−56°C) − 313.5K(+40°C)

CSTOL ACTIONS:

K.5.25.2 If the Exhaust Valve 4 temperature is outside of the required temperature limits as defined above.

K.5.25.2.1When prompted to, TYPE GO to Command On the EV4b Heater

K.5.25.2.2Once the Exhaust Valve 4 temperature is within the required temperature limits, the EV4b Heater is Commanded Off. TYPE GO to send the Vatterfly Valve command

K.5.25.3 If the Exhaust Valve 4 temperature is within the required temperature limits, as defined above.

K.5.25.3.1When prompted to, TYPE GO to Send the Vatterfly Valve No-Op command.

CSTOL HOLD:

K.5.25.4 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		6	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV4_SDTa	Exhaust valve 4 SDT/a		217.5K(−56°C) − 313.5K(+40°C)	
TE_VAT_EV4_SDTb	Exhaust valve 4 SDT/b		217.5K(−56°C) − 313.5K(+40°C)	

CSTOL ACTIONS:

K.5.25.5 TYPE GO to send the Open command, and then 10 seconds later, the Stop command.

CSTOL HOLD:

K.5.25.6 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		F6 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.25.7 TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.25.8 Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C6 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.25.9 TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.25.10Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		36	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	

CSTOL ACTIONS:

K.5.25.11TYPE GO to send the Vatterfly Valve Open command.

CSTOL HOLD:

K.5.25.12Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		C6 (hex)	
VE_VAT_B_CLOSED	Vatt valve-B closed		<100	
VE_VAT_B_OPEN	Vatt valve-B open		15565-17203	

CSTOL ACTIONS:

K.5.25.13TYPE GO to send the Vatterfly Valve Close command.

CSTOL HOLD:

K.5.25.14Once prompted, RECORD the following Vatterfly Valve Monitors:

Monitor Name	Description	Value	Expected Value	Pass/Fail
BE_VflyVSeOnOfB	Vatterfly Valves Select On/Off /B		36	
VE_VAT_B_CLOSED	Vatt valve-B closed		15565-17203	
VE_VAT_B_OPEN	Vatt valve-B open		<100	
TE_VAT_EV4_SDTa	Exhaust valve 4 SDT/a		217.5K(-56°C) - 313.5K(+40°C)	
TE_VAT_EV4_SDTb	Exhaust valve 4 SDT/b		217.5K(-56°C) - 313.5K(+40°C)	

K.5.25.15**CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.5.25.16**CAUTION**: The ECU is to be powered down during cable mating/demating operations.

CSTOL HOLD:

K.5.26 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.5.27 Disconnect cables Aft ECU to LV#2/FEE P3 cable assembly and FEE J3 to EV#3/#4 extension cable (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.5.28 Snap & Remove Vatterfly Valve Monitors Displays.

CSTOL ACTIONS:

K.5.29 TYPE GO to End Vatterfly Valve recording.

K.6 Flight ECU Heater Checkout

CSTOL HOLD:

K.6.1 ECU to Dewar & Probe Cable Connection

K.6.1.1 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.6.1.2 Connect the following cables (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

K.6.1.2.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.6.1.2.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.6.1.2.3 **WARNING**: The Liquid Point Sensor MAY act as a heat source and pull liquid helium through the Porous Plug. Monitor the Liquid Point sensor plot (**ECU_V_QBS_LiqPS**) for a decreasing voltage and be prepared to power down the ECU if it is determined that liquid helium is in the porous plug. Ref.: ECU Specification, Section 3.2.3.12 Dewar Liquid Point Sensor

Cable
Fwd ECU J1 to Top Hat I1 Cable Assembly
Fwd ECU J3 to Top Hat I3 Cable Assembly
Aft ECU J30, J31 to FEE Base Plate (Final Filter) Cable Harness
FEE J12A to Top Hat I2 Cable Assembly
Fwd ECU J5 to Top Hat I5 Cable Assembly
Fwd ECU J6 to Top Hat I6 Cable Assembly
Fwd ECU J7 to Top Hat I7 Cable Assembly
Fwd ECU J10 to Dewar J805 Temperature Sensor, FEE J805A Cable
FEE J805A to Cross Flange I10 Cable Assembly
Fwd ECU J8 to Dewar J801 Cable Assembly
Fwd ECU J9 to Dewar J802, FEE J802A Cable Assembly
Fiber Optic Cable Bundle
Fiber Optic Cable Bundle
Fiber Optic Cable Bundle

K.6.1.3 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.6.1.3.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.6.1.3.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

CSTOL ACTIONS:

K.6.1.4 TYPE GO to continue the ECU Checkout CSTOL Procedure and start the Flight ECU Heater Checkout.

Quartz Block Support Heaters (QBS)

K.6.2 Start QBS Heater (H-05P, -06P) Checkout

K.6.2.1 Start QBS bridge file recording. Ref: ECU3.2.5Report_excel.xls, Heaters Worksheet

CSTOL HOLD:

K.6.2.2 RECORD the following QBS Monitors:

Monitor Name	Description	Eng. Values	Count
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P		
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P		
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P		
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P		
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q		
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q		
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q		
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q		
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P		
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P		
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q		
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q		
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q		
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q		
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q		
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P		
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P		
TE_QBS_SDTST12P	Quartz block support SDT: T-12P		
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P		
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P		

K.6.2.3 Side A QBS AC Open Loop Heater Control Checkout. (QBSACOLA)

CSTOL ACTIONS:

K.6.2.3.1 TYPE GO to Command the Side A QBS Heater to AC Open Loop Control mode. (Mode 81)

K.6.2.3.2 Command the Side A QBS Heater Setpoint to 0 Volts.

CSTOL HOLD:

K.6.2.3.3 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			81	
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	

CSTOL ACTIONS:

K.6.2.3.4 TYPE GO to Command the Side A QBS Heater Setpoint to 0.1 Volts (QBS Heater Setpoint = 19). Ref: ECU Htr Setpoints.xls, Flight Worksheet

CSTOL HOLD:

K.6.2.3.5 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			19	
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			1751 - 2140	

CSTOL ACTIONS:

K.6.2.3.6 TYPE GO to Command the Side A QBS Heater Setpoint to 0 Volts.

K.6.2.3.7 Command Side A QBS Heater Off. (Mode 82)

CSTOL HOLD:

K.6.2.3.8 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	

K.6.2.4 Side B QBS AC Open Loop Heater Control Checkout. (QBSACOLB)

CSTOL ACTIONS:

K.6.2.4.1 TYPE GO to Command Side B QBS Heater to AC Open Loop Control mode. (Mode 81)

K.6.2.4.2 Command the Side B QBS Heater Setpoint to 0 Volts.

CSTOL HOLD:

K.6.2.4.3 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			81	
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.4.4 TYPE GO to Command the Side B QBS Heater Setpoint to 0.1 Volts (QBS Heater Setpoint = 19). Ref: ECU Htr Setpoints.xls, Flight Worksheet

CSTOL HOLD:

K.6.2.4.5 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____B	HSP QBS /B: H-06P			19	
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
VE_QBS_H_b_H06P	QBS htr V: H-06P			1751 - 2140	

CSTOL ACTIONS:

K.6.2.4.6 TYPE GO to Command the Side B QBS Heater Setpoint to 0 Volts.

K.6.2.4.7 Command Side B QBS Heater Off. (Mode 82)

CSTOL HOLD:

K.6.2.4.8 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			82	
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

K.6.2.5 Side A QBS AC Closed Loop Temperature Control Checkout. (QBSACCLA)

Determine the Side A QBS Temperature Control Setpoint.

CSTOL ACTIONS:

K.6.2.5.1 TYPE GO to Command Side A QBS Heater to Off (Mode 82).

K.6.2.5.2 Command Side A QBS Temperature Setpoint to Zero (0)

CSTOL HOLD:

K.6.2.5.3 RECORD the following QBS Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			82	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.5.4 TYPE GO to Incrementally increase the Side A QBS Temperature Setpoint until the Side A QBS Heater Voltage (**VE_QBS_H_a_H05P**) rises.

CSTOL HOLD:

K.6.2.5.5 Once the Voltage rises, RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P				
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			25294 - 29185	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.5.6 TYPE GO to Command the Side A QBS Temperature Setpoint to Zero (0)

CSTOL HOLD:

K.6.2.5.7 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.5.8 TYPE GO to Command Side A QBS Heater to AC Closed Loop Control mode. (Mode 80)

CSTOL HOLD:

K.6.2.5.9 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			80	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			82	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.5.10 TYPE GO to Command the Side A QBS Temperature Setpoint to 2 points below the Side A QBS Temperature Control Setpoint as RECORDED in step K.6.2.5

CSTOL HOLD:

K.6.2.5.11 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P				
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.5.12 TYPE GO to Command the Side A QBS Temperature Setpoint to the Temperature Control Setpoint as Recorded in step K.6.2.2.5

CSTOL HOLD:

K.6.2.5.13 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P				
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			100 - 29185	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.5.14 TYPE GO to Command the Side A QBS Temperature Setpoint to 2 points above the Side A QBS Temperature Control Setpoint as Recorded in step K.6.2.5

K.6.2.5.15 Bring up Plot: **ECU_V_QBS_LiqPS** and MONITOR the Side A QBS Heater Voltage (**VE_QBS_H_a_H05P**)

CSTOL HOLD:

K.6.2.5.16 Once the Side A QBS Heater Voltage (**VE_QBS_H_a_H05P**) first significantly decreases (> 2 Volt drop), RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P				
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
VE_QBS_H_b_H06P	QBS htr V: H-05P			<100	
VE_QBS_H_a_H05P	QBS htr V: H-06P			100- 29185	

CSTOL ACTIONS:

K.6.2.5.17 TYPE GO to Command Side A QBS Heater Temperature Setpoint to Zero (0).

K.6.2.5.18 Command Side A QBS Heater to Off (Mode 82)

CSTOL HOLD:

K.6.2.5.19 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			82	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

K.6.2.6 Side B QBS AC Closed Loop Temperature Control Checkout. (QBSACCLB)

Determine the Side B QBS Temperature Control Setpoint.

CSTOL ACTIONS:

K.6.2.6.1 TYPE GO to Command Side B QBS Heater to Off (Mode 82).

K.6.2.6.2 Command Side B QBS Temperature Setpoint to Zero (0)

CSTOL HOLD:

K.6.2.6.3 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			82	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.6.4 TYPE GO to Incrementally increase the Side B QBS Temperature Setpoint until the Side B QBS Heater Voltage (**VE_QBS_H_b_H06P**) rises.

CSTOL HOLD:

K.6.2.6.5 Once the Voltage rises, RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			25294 - 29185	

CSTOL ACTIONS:

K.6.2.6.6 TYPE GO to Command the Side B QBS Temperature Setpoint to Zero (0)

CSTOL HOLD:

K.6.2.6.7 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.6.8 TYPE GO to Command Side B QBS Heater to AC Closed Loop Control mode. (Mode 80)

CSTOL HOLD:

K.6.2.6.9 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			80	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.6.10 TYPE GO to Command the Side B QBS Temperature Setpoint to 2 points below the Side B QBS Temperature Control Setpoint as Recorded in step K.6.2.24

CSTOL HOLD:

K.6.2.6.11 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P				
DE_HSP_QBS____B	HSP QBS /B: H-06P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.6.12 TYPE GO to Command the Side B QBS Temperature Setpoint to the Temperature Control Setpoint as Recorded in step K.6.2.24

CSTOL HOLD:

K.6.2.6.13 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P				
DE_HSP_QBS____B	HSP QBS /B: H-06P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100, 25294 - 29185	

CSTOL ACTIONS:

K.6.2.6.14 TYPE GO to Command the Side B QBS Temperature Setpoint to 2 points above the Side B QBS Temperature Control Setpoint as Recorded in step K.6.2.24

K.6.2.6.15 Bring up Plot: **ECU_V_QBS_LiqPS** and MONITOR the Side B QBS Heater Voltage (**VE_QBS_H_b_H06P**).

CSTOL HOLD:

K.6.2.6.16 When the Side B QBS Heater Voltage (VE_QBS_H_b_H06P) first significantly decreases (> 2 Volt drop), RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100, 25294 - 29185	

CSTOL ACTIONS:

K.6.2.6.17 TYPE GO to Command Side B QBS Temperature Setpoint to zero (0).

K.6.2.6.18 Command Side B QBS Heater to Off (Mode 82)

CSTOL HOLD:

K.6.2.6.19 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			82	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

K.6.2.7 Side A QBS DC Open Loop Heater Control Checkout. (QBSDCOLA)

CSTOL ACTIONS:

K.6.2.7.1 TYPE GO to Command Side A QBS Heater to DC Open Loop Control mode. (Mode 83)

CSTOL HOLD:

K.6.2.7.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			83	

CSTOL ACTIONS:

K.6.2.7.3 TYPE GO to Command the Side A QBS Heater Setpoint to 1.0 Volts (QBS Heater Setpoint = 10). Ref: ECU Htr Setpoints.xls, Flight Worksheet

CSTOL HOLD:

K.6.2.7.4 Once prompted, RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			10	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			83	
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
VE_QBS_H_a_H05P	QBS htr V: H-05P			911 - 1113	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.7.5 TYPE GO to Command the Side A QBS Heater Setpoint to 0 Volts.

K.6.2.7.6 Command Side A QBS Heater Off. (Mode 82)

CSTOL HOLD:

K.6.2.7.7 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

K.6.2.8 Side B QBS DC Open Loop Heater Control Checkout. (QBSDCOLB)

CSTOL ACTIONS:

K.6.2.8.1 TYPE GO to Command Side B QBS Heater to DC Open Loop Control mode. (Mode 83)

CSTOL HOLD:

K.6.2.8.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			83	

CSTOL ACTIONS:

K.6.2.8.3 TYPE GO to Command the Side B QBS Heater Setpoint to 1.0 Volts (QBS Heater Setpoint = 10). Ref: ECU Htr Setpoints.xls, Flight Worksheet

CSTOL HOLD:

K.6.2.8.4 RECORD the following QBS Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____B	HSP QBS /B: H-06P			10	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			83	
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			911 - 1113	

CSTOL ACTIONS:

K.6.2.8.5 TYPE GO to Command the Side B QBS Heater Setpoint to 0 Volts.

K.6.2.8.6 Command Side B QBS Heater Off. (Mode 82)

CSTOL HOLD:

K.6.2.8.7 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			82	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			82	
VE_QBS_H_a_H05P	QBS htr V: H-05P			<100	
VE_QBS_H_b_H06P	QBS htr V: H-06P			<100	

CSTOL ACTIONS:

K.6.2.9 TYPE GO to End QBS monitor recording.

K.6.3 Final Filter Heater (H-01P, -02P, -03P, -04P) Checkout. (FFILTER)

K.6.3.1 Start Final Filter monitor recording. Ref: ECU3.2.5Report_Excel.xls, Heaters Worksheet

CSTOL HOLD:

K.6.3.2 RECORD the following Final Filter Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_1_2_A	HSP Gas Inlet Filter: H-01P			0	
DE_HSP_Fi_1_2_B	HSP Gas Inlet Filter: H-02P			0	
DE_HSP_Fi_3_4_A	HSP Gas Inlet Filter: H-03P			0	
DE_HSP_Fi_3_4_B	HSP Gas Inlet Filter: H-03P			0	
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P			<100	
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P			<100	
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			<100	
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			<100	

K.6.3.3 Side A Final Filter 3 & 4 Heater (H-3P) Checkout. (FFILTER34A)

CSTOL ACTIONS:

K.6.3.3.1 TYPE GO to Command H-3P to 0.1 Volts (Setpoint = 1).[12]

CSTOL HOLD:

K.6.3.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_3_4_A	HSP Gas Inlet Filter: H-03P			1	
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			59 - 71	
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			<100	

CSTOL ACTIONS:

K.6.3.3.3 TYPE GO to Command H-3P Setpoint 0 Volts (Setpoint = 0)

CSTOL HOLD:

K.6.3.3.4 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_3_4_A	HSP Gas Inlet Filter: H-03P			0	
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			<100	
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			<100	

[12] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.3.4 Side B Final Filter 3 & 4 Heater (H-4P) Checkout. (FFILTER34B)

CSTOL ACTIONS:

K.6.3.4.1 TYPE GO to Command H-4P to 0.1 Volts (Setpoint = 1).[9]

CSTOL HOLD:

K.6.3.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_3_4_B	HSP Gas Inlet Filter: H-04P			1	
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			<100	
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			55 - 67	

CSTOL ACTIONS:

K.6.3.4.3 TYPE GO to Command H-4P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.3.4.4 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_3_4_B	HSP Gas Inlet Filter: H-04P			0	
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			<100	
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			<100	

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.3.5 Side A Final Filter 1 & 2 Heater (H-1P) Checkout. (FFILTER12A)

CSTOL ACTIONS:

K.6.3.5.1 TYPE GO to Command H-1P to 0.1 Volts (Setpoint = 1).[9]

CSTOL HOLD:

K.6.3.5.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_1_2_A	HSP Gas Inlet Filter: H-01P			1	
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P			58 - 70	
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P			<100	

CSTOL ACTIONS:

K.6.3.5.3 TYPE GO to Command H-1P to 0 Volts (Setpoint = 0)

CSTOL HOLD:

K.6.3.5.4 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_1_2_A	HSP Gas Inlet Filter: H-01P			0	
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P			<100	
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P			<100	

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.3.6 Side B Final Filter 1 & 2 Heater (H-2P) Checkout. (FFILTER12B)

CSTOL ACTIONS:

K.6.3.6.1 TYPE GO to Command H-2P to 0.1 Volts (Setpoint = 1).[9]

CSTOL HOLD:

K.6.3.6.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_1_2_B	HSP Gas Inlet Filter: H-02P			1	
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P			<100	
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P			59 - 71	

CSTOL ACTIONS:

K.6.3.6.3 TYPE GO to Command H-2P to 0 Volts (Setpoint = 0)

CSTOL HOLD:

K.6.3.6.4 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Fi_1_2_A	HSP Gas Inlet Filter: H-01P			0	
DE_HSP_Fi_1_2_B	HSP Gas Inlet Filter: H-02P			0	
DE_HSP_Fi_3_4_A	HSP Gas Inlet Filter: H-03P			0	
DE_HSP_Fi_3_4_B	HSP Gas Inlet Filter: H-03P			0	
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P			<100	
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P			<100	
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			<100	
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			<100	

K.6.3.7 End Final Filter bridge file recording.

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.4 Gyro Heater (H-01Q, -03Q, -05Q, -07Q) Checkout. (GYROS)

CSTOL ACTIONS:

K.6.4.1 TYPE GO to Start Gyro bridge file recording.

CSTOL HOLD:

K.6.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro1_OLA	HSP Gyro 1: H-01Q			0	
DE_HSPGyro2_OLA	HSP Gyro 2: H-03Q			0	
DE_HSPGyro3_OLB	HSP Gyro 3: H-05Q			0	
DE_HSPGyro4_OLB	HSP Gyro 4: H-07Q			0	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
VE_Gyr1_HTR_V_A	Gyro 1 Htr V/a: H-01Q			<100	
VE_Gyr2_HTR_V_A	Gyro 2 Htr V/a: H-03Q			<100	
VE_Gyr3_HTR_V_B	Gyro 3 Htr V/b: H-05Q			<100	
VE_Gyr4_HTR_V_B	Gyro4 Htr V/b: H-07Q			<100	

K.6.4.3 Gyroscope 4 Heater (H-7Q) Checkout. (GYRO4)

CSTOL ACTIONS:

K.6.4.3.1 TYPE GO to Command H-7Q to 1.0 Volts (Setpoint = 17).[9]

CSTOL HOLD:

K.6.4.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro4_OLB	HSP Gyro 4: H-07Q			17	
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
VE_Gyr4_HTR_V_B	Gyro4 Htr V/b: H-07Q			1574 - 1924	

CSTOL ACTIONS:

K.6.4.3.3 TYPE GO to Command H-7Q to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.4.3.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro4_OLB	HSP Gyro 4: H-07Q			0	
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
VE_Gyr4_HTR_V_B	Gyro4 Htr V/b: H-07Q			<100	

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.4.4 Gyroscope 3 Heater (H-5Q) Checkout. (GYRO3)

CSTOL ACTIONS:

K.6.4.4.1 TYPE GO to Command H-5Q to 1.0 Volts (Setpoint = 17).[9]

CSTOL HOLD:

K.6.4.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro3_OLB	HSP Gyro 3: H-05Q			17	
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
VE_Gyr3_HTR_V_B	Gyro 3 Htr V/b: H-05Q			1574 - 1924	

CSTOL ACTIONS:

K.6.4.4.3 TYPE GO to Command H-5Q to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.4.4.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro3_OLB	HSP Gyro 3: H-05Q			0	
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
VE_Gyr3_HTR_V_B	Gyro 3 Htr V/b: H-05Q			<100	

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.4.5 Gyroscope 2 Heater (H-3Q) Checkout. (GYRO2)

CSTOL ACTIONS:

K.6.4.5.1 TYPE GO to Command H-3Q to 1 Volts (Setpoint = 18)[9]

CSTOL HOLD:

K.6.4.5.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro2_OLA	HSP Gyro 2: H-03Q			18	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
VE_Gyr2_HTR_V_A	Gyro 2 Htr V/a: H-03Q			1574 - 1924	

CSTOL ACTIONS:

K.6.4.5.3 TYPE GO to Command H-3Q to 0 Volts (Setpoint = 0)

CSTOL HOLD:

K.6.4.5.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro2_OLA	HSP Gyro 2: H-03Q			0	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
VE_Gyr2_HTR_V_A	Gyro 2 Htr V/a: H-03Q			<100	

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.4.6 Gyroscope 1 Heater (H-1Q) Checkout. (GYRO1)

CSTOL ACTIONS:

K.6.4.6.1 TYPE GO to Command H-1Q to 1 Volts (Setpoint = 17)[9]

CSTOL HOLD:

K.6.4.6.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro1_OLA	HSP Gyro 1: H-01Q			17	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
VE_Gyr1_HTR_V_A	Gyro 1 Htr V/a: H-01Q			1574 - 1924	

CSTOL ACTIONS:

K.6.4.6.3 TYPE GO to Command H-1Q to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.4.6.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSPGyro1_OLA	HSP Gyro 1: H-01Q			0	
DE_HSPGyro2_OLA	HSP Gyro 2: H-03Q			0	
DE_HSPGyro3_OLB	HSP Gyro 3: H-05Q			0	
DE_HSPGyro4_OLB	HSP Gyro 4: H-07Q			0	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
VE_Gyr1_HTR_V_A	Gyro 1 Htr V/a: H-01Q			<100	
VE_Gyr2_HTR_V_A	Gyro 2 Htr V/a: H-03Q			<100	
VE_Gyr3_HTR_V_B	Gyro 3 Htr V/b: H-05Q			<100	
VE_Gyr4_HTR_V_B	Gyro4 Htr V/b: H-07Q			<100	

CSTOL ACTIONS:

K.6.4.7 TYPE GO to End Gyro bridge file recording

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.5 Probe Vacuum Shell Heater (H-08P, -09P) Checkout. (VSHELL)

K.6.5.1 Start Vacuum Shell bridge file recording.

CSTOL HOLD:

K.6.5.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_VS_____A	HSP Vacuum Shell /A: H-09P			0	
DE_HSP_VS_____B	HSP Vacuum Shell /B: H-08P			0	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P				
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P				

K.6.5.3 Side A Probe Vacuum Shell Heater (H-9P) Checkout. (VSHELLA)

CSTOL ACTIONS:

K.6.5.3.1 TYPE GO to Command H-9P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.5.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_VS_____A	HSP Vacuum Shell /A: H-09P			9	
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P				
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P				

CSTOL ACTIONS:

K.6.5.3.3 TYPE GO to Command H-9P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.5.3.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_VS_____A	HSP Vacuum Shell /A: H-09P			0	
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P				
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.5.4 Side B Probe Vacuum Shell Heater (H-8P) Checkout. (VSHELLB)

CSTOL ACTIONS:

K.6.5.4.1 TYPE GO to Command H-8P to 1.0 Volts (Setpoint = 8).[9]

CSTOL HOLD:

K.6.5.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_VS_____B	HSP Vacuum Shell /B: H-08P			8	
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P				
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P				

CSTOL ACTIONS:

K.6.5.4.3 TYPE GO to Command H-8P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.5.4.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_VS_____A	HSP Vacuum Shell /A: H-09P			0	
DE_HSP_VS_____B	HSP Vacuum Shell /B: H-08P			0	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_Gyro_1_GT01Q	Gyroscope #1 GRT: T-01Q				
TE_Gyro_2_GT02Q	Gyroscope #2 GRT: T-02Q				
TE_Gyro_3_GT03Q	Gyroscope #3 GRT: T-03Q				
TE_Gyro_4_GT04Q	Gyroscope #4 GRT: T-04Q				
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P				
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P				

CSTOL ACTIONS:

K.6.5.5 TYPE GO to End Vacuum Shell Bridge File recording.

Probe Heaters[13]. (PROBEHTRS)

K.6.5.6 Start Probe bridge file recording. Ref: ECU3.2.5Report_Excel.xls, Heaters Worksheet and Temperatures Worksheet

CSTOL HOLD:

K.6.5.7 RECORD the following Probe Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P			0	
DE_HSP_CryPm__B	HSP Cryo Pump /B: H-10P			0	
DE_HSP_Pl_____A	HSP Plumbing /A: H-13P			0	
DE_HSP_Pl_____B	HSP Plumbing /B: H-12P			0	
DE_HSP_PrsSen_A	HSP Press Sense Line /A: H-15P			0	
DE_HSP_PrsSen_B	HSP Press Sense Line /B: H-14P			0	
DE_HSP_Win1___A	HSP Window #1 /A: H-17P			0	
DE_HSP_Win1___B	HSP Window #1 /B: H-16P			0	
DE_HSP_Win2___A	HSP Window #2 /A: H-19P			0	
DE_HSP_Win2___B	HSP Window #2 /B: H-18P			0	
DE_HSP_Win3___A	HSP Window #3 /A: H-21P			0	
DE_HSP_Win3___B	HSP Window #3 /B: H-20P			0	
DE_HSP_Win4___A	HSP Window #4 /A: H-23P			0	
DE_HSP_Win4___B	HSP Window #4 /B: H-22P			0	

[13] Pressure Sense Line, Plumbing Saddle, Cryopump, Window 1-4

K.6.5.8 RECORD the following Probe Temperature Monitors:

Monitor Name	Description	Eng. Values	Count
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P		
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P		
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D		
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P		
TE_HEX2Dw_ST06D	HEX-2 Dewar SDT: T-06D		
TE_HEX2Pr_ST02P	HEX-2 probe SDT: T-02P		
TE_HEX3Dw_ST07D	HEX-3 Dewar SDT: T-07D		
TE_HEX3Pr_ST03P	HEX-3 probe SDT: T-03P		
TE_HEX4Dw_ST08D	HEX-4 Dewar SDT: T-08D		
TE_HEX4Pr_ST04P	HEX-4 probe SDT: T-04P		
TE_HEX4Pr_ST27P	HEX-4 probe SDT: T-27P		
TE_QBS_a__GT10P	QB support GRT/a: T-10P		
TE_QBS_b__GT11P	QB support GRT/b: T-11P		
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P		
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P		
TE_PrSLn_aST19P	PrSLn STA156 SDT/a: T-19P		
TE_PrSLn_bST20P	PrSLn SDT/b: T-20P		
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D		
TE_St2Dw_bGT02D	Station 200 Dewar GRT/b: T-02D		
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P		
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P		
TE_TelD_1_GT12Q	Tele detector #1 GRT: T-12Q		
TE_TelD_2_GT13Q	Tele detector #2 GRT: T-13Q		
TE_TelCP_1GT14Q	Tele corrector plate #1 GRT: T-14Q		
TE_TelCP_2GT15Q	Tele corrector plate #2 GRT: T-15Q		
TE_SciTel_ST16Q	Science Tele SDT: T-16Q		
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q		
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q		
TE_TelDM_YGT21Q	Tele detector mount +Y GRT: T-21Q		
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P		
TE_Win_1_bST22P	Window #1 SDT/b: T-22P		
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P		
TE_Win_2_bST24P	Window #2 SDT/b: T-24P		
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P		
TE_Win_3_bST26P	Window #3 SDT/b: T-26P		
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P		
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P		

K.6.6 Pressure Sense Line Heater (H-14P, -15P) Checkout. (PSLINE)

CSTOL ACTIONS:

K.6.6.1 TYPE GO to Start Pressure Sense Line bridge file recording.

CSTOL HOLD:

K.6.6.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_PrsSen_A	HSP Press Sense Line /A: H-15P			0	
DE_HSP_PrsSen_B	HSP Press Sense Line /B: H-14P			0	
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_a__GT10P	QB support GRT/a: T-10P				
TE_QBS_b__GT11P	QB support GRT/b: T-11P				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_TelD_1_GT12Q	Tele detector #1 GRT: T-12Q				
TE_TelD_2_GT13Q	Tele detector #2 GRT: T-13Q				
TE_TelCP_1GT14Q	Tele corrector plate #1 GRT: T-14Q				
TE_TelCP_2GT15Q	Tele corrector plate #2 GRT: T-15Q				
TE_SciTel_ST16Q	Science Tele SDT: T-16Q				
TE_TelDM_YGT21Q	Tele detector mount +Y GRT: T-21Q				
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				

K.6.6.3 Side A Pressure Sense Line Heater (H-15P) Checkout. (PSLINEA)

CSTOL ACTIONS:

K.6.6.3.1 TYPE GO to Command H-15P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.6.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_PrsSen_A	HSP Press Sense Line /A: H-15P			9	
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_a__GT10P	QB support GRT/a: T-10P				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				

CSTOL ACTIONS:

K.6.6.3.3 TYPE GO to Command H-15P to 0 Volts (Setpoint = 0).

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

CSTOL HOLD:

K.6.6.3.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_PrsSen_A	HSP Press Sense Line /A: H-15P			0	
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				

K.6.6.4 Side B Pressure Sense Line Heater (H-14P) Checkout. (PSLINEB)

CSTOL ACTIONS:

K.6.6.4.1 TYPE GO to Command H-14P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.6.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_PrsSen_B	HSP Press Sense Line /B: H-14P			9	
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_b__GT11P	QB support GRT/b: T-11P				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				

CSTOL ACTIONS:

K.6.6.4.3 TYPE GO to Command H-14P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.6.4.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_PrsSen_A	HSP Press Sense Line /A: H-15P			0	
DE_HSP_PrsSen_B	HSP Press Sense Line /B: H-14P			0	
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_QBS_a__GT10P	QB support GRT/a: T-10P				
TE_QBS_b__GT11P	QB support GRT/b: T-11P				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_TelD_1_GT12Q	Tele detector #1 GRT: T-12Q				
TE_TelD_2_GT13Q	Tele detector #2 GRT: T-13Q				
TE_TelCP_1GT14Q	Tele corrector plate #1 GRT: T-14Q				
TE_TelCP_2GT15Q	Tele corrector plate #2 GRT: T-15Q				
TE_SciTel_ST16Q	Science Tele SDT: T-16Q				
TE_TelDM_YGT21Q	Tele detector mount +Y GRT: T-21Q				
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				

CSTOL ACTIONS:

K.6.6.4.5 TYPE GO to End Pressure Sense Line Bridge File recording.

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.7 Plumbing Saddle Heater (H-12P, -13P) Checkout. (PLINE)

K.6.7.1 Start Plumbing Saddle bridge file recording.

CSTOL HOLD:

K.6.7.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Pl_____A	HSP Plumbing Saddle /A: H-13P			0	
DE_HSP_Pl_____B	HSP Plumbing Saddle /B: H-12P			0	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P				

K.6.7.3 Side A Plumbing Saddle Heater (H-13P) Checkout. (PLINEA)

CSTOL ACTIONS:

K.6.7.3.1 TYPE GO to Command H-13P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.7.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Pl_____A	HSP Plumbing /A: H-13P			9	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				

CSTOL ACTIONS:

K.6.7.3.3 TYPE GO to Command H-13P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.7.3.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_PrsSen_A	HSP Press Sense Line /A: H-15P			0	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.7.4 Side B Plumbing Saddle Heater (H-12P) Checkout. (PLINEB)

CSTOL ACTIONS:

K.6.7.4.1 TYPE GO to Command H-12P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.7.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Pl_____B	HSP Plumbing Saddle /B: H-12P			9	
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P				

CSTOL ACTIONS:

K.6.7.4.3 TYPE GO to Command H-12P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.7.4.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Pl_____A	HSP Plumbing Saddle /A: H-13P			0	
DE_HSP_Pl_____B	HSP Plumbing Saddle /B: H-12P			0	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P				

CSTOL ACTIONS:

K.6.7.4.5 TYPE GO to End Plumbing Saddle Bridge File recording.

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.8 Cryopump Heater (H-10P, -11P) Checkout. (CPUMP)

K.6.8.1 Start Cryopump bridge file recording.

CSTOL HOLD:

K.6.8.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P			0	
DE_HSP_CryPm__B	HSP Cryo Pump /B: H-10P			0	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P				
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D				
TE_St2Dw_bGT02D	Station 200 Dewar GRT/b: T-02D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				

K.6.8.3 Side A Cryopump Heater (H-11P) Checkout. (CPUMPA)

CSTOL ACTIONS:

K.6.8.3.1 TYPE GO to Command H-11P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.8.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P			9	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				

CSTOL ACTIONS:

K.6.8.3.3 TYPE GO to Command H-11P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.8.3.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P			0	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.8.4 Side B Cryopump Heater (H-10P) Checkout. (CPUMPB)

CSTOL ACTIONS:

K.6.8.4.1 TYPE GO to Command H-10P to 1.0 Volts (Setpoint = 8).[9]

CSTOL HOLD:

K.6.8.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_CryPm__B	HSP Cryo Pump /B: H-10P			8	
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P				
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_St2Dw_bGT02D	Station 200 Dewar GRT/b: T-02D				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				

CSTOL ACTIONS:

K.6.8.4.3 TYPE GO to Command H-10P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.8.4.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P			0	
DE_HSP_CryPm__B	HSP Cryo Pump /B: H-10P			0	
TE_PlSad_aST17P	Plumb saddle STA194 SDT/a: T-17P				
TE_PlSad_bST18P	Plumb saddle SDT/b: T-18P				
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P				
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D				
TE_St2Dw_bGT02D	Station 200 Dewar GRT/b: T-02D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				

CSTOL ACTIONS:

K.6.8.4.5 TYPE GO to End Cryopump Bridge File recording.

K.6.9 Window Heater (H-16P, -17P, -18P, -19P, -20P, -21P, -22P, -23P) Checkout. (WIN)

K.6.9.1 Start Window bridge file recording.

CSTOL HOLD:

K.6.9.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win1___A	HSP Window #1 /A: H-17P			0	
DE_HSP_Win1___B	HSP Window #1 /B: H-16P			0	
DE_HSP_Win2___A	HSP Window #2 /A: H-19P			0	
DE_HSP_Win2___B	HSP Window #2 /B: H-18P			0	
DE_HSP_Win3___A	HSP Window #3 /A: H-21P			0	
DE_HSP_Win3___B	HSP Window #3 /B: H-20P			0	
DE_HSP_Win4___A	HSP Window #4 /A: H-23P			0	
DE_HSP_Win4___B	HSP Window #4 /B: H-22P			0	
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P				
TE_Win_1_bST22P	Window #1 SDT/b: T-22P				
TE_HEX2Dw_ST06D	HEX-2 Dewar SDT: T-06D				
TE_HEX2Pr_ST02P	HEX-2 probe SDT: T-02P				
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P				
TE_Win_2_bST24P	Window #2 SDT/b: T-24P				
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P				
TE_Win_3_bST26P	Window #3 SDT/b: T-26P				
TE_HEX3Dw_ST07D	HEX-3 Dewar SDT: T-07D				
TE_HEX3Pr_ST03P	HEX-3 probe SDT: T-03P				
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P				
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P				
TE_HEX4Dw_ST08D	HEX-4 Dewar SDT: T-08D				
TE_HEX4Pr_ST04P	HEX-4 probe SDT: T-04P				
TE_HEX4Pr_ST27P	HEX-4 probe SDT: T-27P				
TE_TpPltDwST17D	Dewar top plate SDT: T-17D				

K.6.9.3 Side A Window 1 Heater (H-17P) Checkout. (WIN1A)

CSTOL ACTIONS:

K.6.9.3.1 TYPE GO to Command H-17P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.9.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win1___A	HSP Window #1 /A: H-17P			9	
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P				

CSTOL ACTIONS:

K.6.9.3.3 TYPE GO to Command H-17P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.9.3.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win1___A	HSP Window #1 /A: H-17P			0	
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P				

K.6.9.4 Side B Window 1 Heater (H-16P) Checkout. (WIN1B)

CSTOL ACTIONS:

K.6.9.4.1 TYPE GO to Command H-16P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.9.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win1___B	HSP Window #1 /B: H-16P			9	
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_bST22P	Window #1 SDT/b: T-22P				

CSTOL ACTIONS:

K.6.9.4.3 TYPE GO to Command H-16P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.9.4.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win1___B	HSP Window #1 /B: H-16P			0	
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_bST22P	Window #1 SDT/b: T-22P				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.9.5 Side A Window 2 Heater (H-19P) Checkout. (WIN2A)

CSTOL ACTIONS:

K.6.9.5.1 TYPE GO to Command H-19P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.9.5.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win2___A	HSP Window #2 /A: H-19P			9	
TE_HEX2Dw_ST06D	HEX-2 Dewar SDT: T-06D				
TE_HEX2Pr_ST02P	HEX-2 probe SDT: T-02P				
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P				

CSTOL ACTIONS:

K.6.9.5.3 TYPE GO to Command H-19P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.9.5.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win2___A	HSP Window #2 /A: H-19P			0	
TE_HEX2Dw_ST06D	HEX-2 Dewar SDT: T-06D				
TE_HEX2Pr_ST02P	HEX-2 probe SDT: T-02P				
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P				

K.6.9.6 Side B Window 2 Heater (H-18P) Checkout. (WIN2B)

CSTOL ACTIONS:

K.6.9.6.1 TYPE GO to Command H-18P to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.9.6.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win2___B	HSP Window #2 /B: H-18P			9	
TE_HEX2Dw_ST06D	HEX-2 Dewar SDT: T-06D				
TE_HEX2Pr_ST02P	HEX-2 probe SDT: T-02P				
TE_Win_2_bST24P	Window #2 SDT/b: T-24P				

CSTOL ACTIONS:

K.6.9.6.3 TYPE GO to Command H-18P to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.9.6.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win2___B	HSP Window #2 /B: H-18P			0	
TE_HEX2Dw_ST06D	HEX-2 Dewar SDT: T-06D				
TE_HEX2Pr_ST02P	HEX-2 probe SDT: T-02P				
TE_Win_2_bST24P	Window #2 SDT/b: T-24P				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.9.7 Side A Window 3 Heater (H-21P) Checkout. (WIN3A)

CSTOL ACTIONS:

K.6.9.7.1 TYPE GO to Command H-21P to 30.0 Volts (On).[9]

CSTOL HOLD:

K.6.9.7.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win3___A	HSP Window #3 /A: H-21P			1	
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P				
TE_HEX3Dw_ST07D	HEX-3 Dewar SDT: T-07D				
TE_HEX3Pr_ST03P	HEX-3 probe SDT: T-03P				

CSTOL ACTIONS:

K.6.9.7.3 TYPE GO to Command H-21P to 0 Volts (Off).

CSTOL HOLD:

K.6.9.7.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win3___A	HSP Window #3 /A: H-21P			0	
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P				
TE_HEX3Dw_ST07D	HEX-3 Dewar SDT: T-07D				
TE_HEX3Pr_ST03P	HEX-3 probe SDT: T-03P				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.9.8 Side B Window 3 Heater (H-20) Checkout. (WIN3B)

CSTOL ACTIONS:

K.6.9.8.1 TYPE GO to Command H-20P to 30.0 Volts (On).[9]

CSTOL HOLD:

K.6.9.8.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win3___B	HSP Window #3 /B: H-20P			1	
TE_Win_3_bST26P	Window #3 SDT/b: T-26P				
TE_HEX3Dw_ST07D	HEX-3 Dewar SDT: T-07D				
TE_HEX3Pr_ST03P	HEX-3 probe SDT: T-03P				

CSTOL ACTIONS:

K.6.9.8.3 TYPE GO to Command H-20P to 0 Volts (Off).

CSTOL HOLD:

K.6.9.8.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win3___B	HSP Window #3 /B: H-20P			0	
TE_Win_3_bST26P	Window #3 SDT/b: T-26P				
TE_HEX3Dw_ST07D	HEX-3 Dewar SDT: T-07D				
TE_HEX3Pr_ST03P	HEX-3 probe SDT: T-03P				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.9.9 Side A Window 4 Heater (H-23P) Checkout. (WIN4A)

CSTOL ACTIONS:

K.6.9.9.1 TYPE GO to Command H-23P to 30.0 Volts (On).[9]

CSTOL HOLD:

K.6.9.9.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win4___A	HSP Window #4 /A: H-23P			1	
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P				
TE_HEX4Dw_ST08D	HEX-4 Dewar SDT: T-08D				
TE_HEX4Pr_ST04P	HEX-4 probe SDT: T-04P				
TE_HEX4Pr_ST27P	HEX-4 probe SDT: T-27P				
TE_TpPltDwST17D	Dewar top plate SDT: T-17D				

CSTOL ACTIONS:

K.6.9.9.3 TYPE GO to Command H-23P to 0 Volts (Off).

CSTOL HOLD:

K.6.9.9.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win4___A	HSP Window #4 /A: H-23P			0	
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P				
TE_HEX4Dw_ST08D	HEX-4 Dewar SDT: T-08D				
TE_HEX4Pr_ST04P	HEX-4 probe SDT: T-04P				
TE_HEX4Pr_ST27P	HEX-4 probe SDT: T-27P				
TE_TpPltDwST17D	Dewar top plate SDT: T-17D				

K.6.9.10 Side B Window 4 Heater (H-22P) Checkout. (WIN4B)

CSTOL ACTIONS:

K.6.9.10.1TYPE GO to Command H-22P to 30.0 Volts (On).[9]

CSTOL HOLD:

K.6.9.10.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win4___B	HSP Window #4 /B: H-22P			1	
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P				
TE_HEX4Dw_ST08D	HEX-4 Dewar SDT: T-08D				
TE_HEX4Pr_ST04P	HEX-4 probe SDT: T-04P				
TE_HEX4Pr_ST27P	HEX-4 probe SDT: T-27P				
TE_TpPltDwST17D	Dewar top plate SDT: T-17D				

CSTOL ACTIONS:

K.6.9.10.3 TYPE GO to Command H-22P to 0 Volts (Off).

CSTOL HOLD:

K.6.9.10.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_Win4___B	HSP Window #4 /B: H-22P			0	
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P				
TE_HEX4Dw_ST08D	HEX-4 Dewar SDT: T-08D				
TE_HEX4Pr_ST04P	HEX-4 probe SDT: T-04P				
TE_HEX4Pr_ST27P	HEX-4 probe SDT: T-27P				
TE_TpPltDwST17D	Dewar top plate SDT: T-17D				

CSTOL ACTIONS:

K.6.9.10.5 TYPE GO to End Window Bridge File recording.

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

Dewar Heaters[14]

CSTOL HOLD:

K.6.9.11 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_ah05ad	Flow meter htr current/a: (H-05AD)			>100	
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)			>100	
DE_HSP_FlM____A	HSP Flow Meter /A: H-05AD			0	
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD			0	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D				
TE_St2Dw_bGT02D	Station 200 Dewar GRT/b: T-02D				
TE_GrdTk__ST16D	Guard tank bottom SDT: T-16D				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P				
TE_Win_1_bST22P	Window #1 SDT/b: T-22P				
VE_FlMH_a_H05AD	Flow meter htr voltage/a: H-05AD			>100	
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD			>100	
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				

[14] Mass Flow Meter, Porous Plug, Flow Control, Heat Pulse Meter Heaters

K.6.10 Mass Flow Meter Heater (H-5AD, -5BD) Checkout. (FMETER)

K.6.10.1 Start Mass Flow Meter bridge file recording.

K.6.10.2 Side A Mass Flow Meter Heater (H-05AD) Checkout. (FMETERA)

CSTOL ACTIONS:

K.6.10.2.1 TYPE GO to Command H-05AD to 1.0 Volts (Setpoint = 27).[9]

CSTOL HOLD:

K.6.10.2.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_ah05ad	Flow meter htr current/a: (H-05AD)			1497 - 1830	
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)			0	
DE_HSP_FlM____A	HSP Flow Meter /A: H-05AD			27	
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD			0	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D				
TE_St2Dw_bGT02D	Station 200 Dewar GRT/b: T-02D				
TE_GrdTk__ST16D	Guard tank bottom SDT: T-16D				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P				
TE_Win_1_bST22P	Window #1 SDT/b: T-22P				
VE_FlMH_a_H05AD	Flow meter htr voltage/a: H-05AD			1305 - 1442	
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD			<100	
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				

CSTOL ACTIONS:

K.6.10.2.3 TYPE GO to Command H-05AD to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.10.2.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_ah05ad	Flow meter htr current/a: (H-05AD)			<100	
DE_HSP_FlM____A	HSP Flow Meter /A: H-05AD			0	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
VE_FlMH_a_H05AD	Flow meter htr voltage/a: H-05AD			<100	

CSTOL ACTIONS:

K.6.10.3 When prompted to, TYPE in the Heater SetPoint (Count) to Command H-05AD to a Heater Setpoint as prescribed by the Test Leader. (FMETERATEST)

CSTOL HOLD:

K.6.10.3.1 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_ah05ad	Flow meter htr current/a: (H-05AD)				
DE_HSP_FlM____A	HSP Flow Meter /A: H-05AD				
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
VE_FlMH_a_H05AD	Flow meter htr voltage/a: H-05AD				

CSTOL ACTIONS:

K.6.10.4 Repeat as necessary

K.6.10.5 When prompted to, TYPE in the Heater Set Point (Count) to Command H-05AD to a Heater Setpoint as prescribed by the Test Leader.

CSTOL HOLD:

K.6.10.5.1 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_ah05ad	Flow meter htr current/a: (H-05AD)				
DE_HSP_FlM____A	HSP Flow Meter /A: H-05AD				
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
VE_FlMH_a_H05AD	Flow meter htr voltage/a: H-05AD				

CSTOL ACTIONS:

K.6.10.6 When prompted to, TYPE 0 to command H-05AD off and start the Side B Mass Flow Meter Heater (H-05BD) Checkout.

CSTOL HOLD:

K.6.10.6.1 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_ah05ad	Flow meter htr current/a: (H-05AD)				
DE_HSP_FlM____A	HSP Flow Meter /A: H-05AD				
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
VE_FlMH_a_H05AD	Flow meter htr voltage/a: H-05AD				

K.6.10.7 RECORD the Calculated Flow Rate_____

K.6.10.8 Side B Mass Flow Meter Heater (H-05BD) Checkout. (FMETERB)

CSTOL ACTIONS:

K.6.10.8.1 TYPE GO to Command H-05BD to 1.0 Volts (Setpoint = 27).[9]

CSTOL HOLD:

K.6.10.8.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)			1497 - 1830	
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD			27	
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD			1305 - 1442	

CSTOL ACTIONS:

K.6.10.8.3 TYPE GO to Command H-05BD to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.10.8.4 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)			< 100	
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD			0	
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD			0	

CSTOL ACTIONS:

K.6.10.9 When prompted to, TYPE in the Heater Set Point (Count) to Command H-05BD to a Heater Setpoint as prescribed by the Test Leader. (FMETERBTEST)

CSTOL HOLD:

RECORD the following Heater Monitors: CSTOL HOLD:

K.6.10.9.1 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)				
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD				

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

CSTOL ACTIONS:

K.6.10.10 Repeat as necessary

K.6.10.11 When prompted to, TYPE in the Heater Set Point (Count) to Command H-05BD to a Heater Setpoint as prescribed by the Test Leader.

CSTOL HOLD:

RECORD the following Heater Monitors: CSTOL HOLD:

K.6.10.11.1 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)				
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD				

CSTOL ACTIONS:

K.6.10.12 When prompted to, TYPE in the Heater Set Point (Count) to Command H-05BD to a Heater Setpoint as prescribed by the Test Leader.

CSTOL HOLD:

RECORD the following Heater Monitors: CSTOL HOLD:

K.6.10.12.1 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)				
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD				

CSTOL ACTIONS:

K.6.10.13 When prompted to, TYPE 0 to command H-05AD off and start the Side A Flow Control Heater (H-10D) Checkout.

CSTOL HOLD:

K.6.10.13.1 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlMHI_ah05ad	Flow meter htr current/a: (H-05AD)			>100	
CE_FlMHI_bh05bd	Flow meter htr current/b: (H-05BD)			>100	
DE_HSP_FlM____A	HSP Flow Meter /A: H-05AD			0	
DE_HSP_FlM____B	HSP Flow Meter /B: H-05BD			0	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_St2Pr_aGT05P	Station 200 probe GRT: T-05P				
TE_St2Pr_bGT28P	STA 200 probe GRT/b: T-28P				
TE_St2Dw_aGT01D	Station 200 Dewar GRT/a: T-01D				
TE_St2Dw_bGT02D	Station 200 Dewar GRT/b: T-02D				
TE_GrdTk__ST16D	Guard tank bottom SDT: T-16D				
TE_HEX1Dw_ST03D	HEX-1 Dewar SDT: T-03D				
TE_HEX1Pr_ST01P	HEX-1 probe SDT: T-01P				
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P				
TE_Win_1_bST22P	Window #1 SDT/b: T-22P				
VE_FlMH_a_H05AD	Flow meter htr voltage/a: H-05AD			>100	
VE_FlMH_b_H05BD	Flow meter htr voltage/b: H-05BD			>100	
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				

K.6.10.14RECORD the Calculated Flow Rate_____

CSTOL ACTIONS:

K.6.10.14.1 TYPE GO to End Mass Flow Meter Bridge File recording.

K.6.11 Flow Control Heater (H-10D, -11D) Checkout. (FCONTROL)

K.6.11.1 Start Flow Control bridge file recording.

CSTOL HOLD:

K.6.11.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlCH_I_ah10d	Flow control htr current/a: (H-10D)			<1000	
CE_FlCH_I_bh11d	Flow control htr current/b: (H-11D)			<1000	
DE_HSP_FlC____A	HSP Flow Control /A: H-10D			0	
DE_HSP_FlC____B	HSP Flow Control /B: H-11D			0	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_MTkIn_aGT10D	Main tank internal GRT/a: T-10D				
TE_MTkIn_bGT11D	Main tank internal GRT/b: T-11D				
TE_PPEx_aGT12AD	Porous plug exit GRT/a: T-12AD				
TE_PPEx_bGT12BD	Porous plug exit GRT/b: T-12BD				
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				
VE_FlCH_a__H10D	Flow control htr voltage/a: H-10D			<200	
VE_FlCH_b__H11D	Flow control htr voltage/b: H-11D			<200	

K.6.11.3 Side A Flow Control (H-10D) Checkout. (FCONTROLA)

CSTOL ACTIONS:

K.6.11.3.1 TYPE GO to Command H-10D to 1.0 Volts (Setpoint = 10).[9]

CSTOL HOLD:

K.6.11.3.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlCH_I_ah10d	Flow control htr current/a: (H-10D)			500 - 2000	
DE_HSP_FlC____A	HSP Flow Control /A: H-10D			10	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_MTkIn_aGT10D	Main tank internal GRT/a: T-10D				
TE_PPEx_aGT12AD	Porous plug exit GRT/a: T-12AD				
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				
VE_FlCH_a__H10D	Flow control htr voltage/a: H-10D			500 - 1000	

CSTOL ACTIONS:

K.6.11.3.3 TYPE GO to Command H-05AD to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.11.3.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlCH_I_ah10d	Flow control htr current/a: (H-10D)			<1000	
DE_HSP_FlC____A	HSP Flow Control /A: H-10D			0	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_MTkIn_aGT10D	Main tank internal GRT/a: T-10D				
TE_PPEx_aGT12AD	Porous plug exit GRT/a: T-12AD				
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				
VE_FlCH_a__H10D	Flow control htr voltage/a: H-10D			<200	

K.6.11.4 Side B Flow Control Heater (H-11D) Checkout. (FCONTROLB)

CSTOL ACTIONS:

K.6.11.4.1 TYPE GO to Command H-11D to 1.0 Volts (Setpoint = 9).[9]

CSTOL HOLD:

K.6.11.4.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlCH_I_bh11d	Flow control htr current/b: (H-11D)			500 - 2000	
DE_HSP_FlC____B	HSP Flow Control /B: H-11D			9	
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_MTkIn_bGT11D	Main tank internal GRT/b: T-11D				
TE_PPEx_bGT12BD	Porous plug exit GRT/b: T-12BD				
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				
VE_FlCH_b__H11D	Flow control htr voltage/b: H-11D			500 - 1000	

CSTOL ACTIONS:

K.6.11.4.3 TYPE GO to Command H-11D to 0 Volts (Setpoint = 0).

CSTOL HOLD:

K.6.11.4.4 RECORD the following Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
CE_FlCH_I_ah10d	Flow control htr current/a: (H-10D)			<1000	
CE_FlCH_I_bh11d	Flow control htr current/b: (H-11D)			<1000	
DE_HSP_FlC____A	HSP Flow Control /A: H-10D			0	
DE_HSP_FlC____B	HSP Flow Control /B: H-11D			0	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_MTkIn_aGT10D	Main tank internal GRT/a: T-10D				
TE_MTkIn_bGT11D	Main tank internal GRT/b: T-11D				
TE_PPEx_aGT12AD	Porous plug exit GRT/a: T-12AD				
TE_PPEx_bGT12BD	Porous plug exit GRT/b: T-12BD				
VE_LiqPnt_LP01D	Liquid point sensor voltage: LP-01				
VE_FlCH_a__H10D	Flow control htr voltage/a: H-10D			<200	
VE_FlCH_b__H11D	Flow control htr voltage/b: H-11D			<200	

CSTOL ACTIONS:

K.6.11.5 TYPE GO to End Flow Control Bridge File recording.

[9] Ref: ECU Htr Setpoint.xls, Flight Worksheet

K.6.12 Heat Pulse Meter Heater (H-01D, -02D) Checkout. (HPMH)

K.6.12.1 Start Heat Pulse Meter bridge file recording.

CSTOL HOLD:

K.6.12.2 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
BE_HPM___OnOffA	Heat Pulse Meter On/Off /A			0	
BE_HPM___OnOffB	Heat Pulse Meter On/Off /B			0	
CE_HPMH_I_ah01d	HPM htr current/a: (H-01D)			<100	
CE_HPMH_I_bh02d	HPM htr current/b: (H-02D)			<100	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_MTkIn_aGT10D	Main tank internal GRT/a: T-10D				
TE_MTkIn_bGT11D	Main tank internal GRT/b: T-11D				
TE_PPEx_aGT12AD	Porous plug exit GRT/a: T-12AD				
TE_PPEx_bGT12BD	Porous plug exit GRT/b: T-12BD				
VE_HPMH_a__H01D	HPM htr Volt/a: H-01D			<100	
VE_HPMH_b__H02D	HPM htr Volt/b: H-02D			<100	
VE_LiqPnt_LP01D	Liq Pt Sensor Voltage: LP-01				

K.6.12.3 Send the HLD to Power on the Side A Heat Pulse Meter

K.6.12.4 Side A Heat Pulse Meter Heater Checkout. (HPMATEST)

CSTOL ACTIONS:

K.6.12.4.1 TYPE GO to Command ON the Side A Heat Pulse Meter Heater (30 Volts).

K.6.12.4.2 OPERATOR monitor Main tank internal GRT/a: TE_MtkIn_aGT10D. When the temperature of T-10D rises by 5 mK (0.005)K, TYPE GO to Command OFF the Side A Heat Pulse Meter Heater (0 Volts).

CSTOL HOLD:

Record the starting and ending time and T-10D temperature

Start Time:_____ Start Temperature:_____

End Time:_____ End Temperature:_____

K.6.12.4.3 RECORD the following Heat Pulse Meter Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_HPM___OnOffA	Heat Pulse Meter On/Off /A			1	
CE_HPMH_I_ah01d	HPM htr current/a: (H-01D)			12427 - 13735	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_MTkIn_aGT10D	Main tank internal GRT/a: T-10D				
TE_PPEx_aGT12AD	Porous plug exit GRT/a: T-12AD				
VE_HPMH_a__H01D	HPM htr Volt/a: H-01D			20672 - 22848	
VE_LiqPnt_LP01D	Liq Pt Sensor Voltage: LP-01				

K.6.12.5 Side B Heat Pulse Meter Heater Checkout. (HPMBTEST)

CSTOL HOLD:

K.6.12.6 Send the HLD to Power on the Side A Heat Pulse Meter

CSTOL ACTIONS:

K.6.12.6.1 TYPE GO to Command ON the Side B Heat Pulse Meter Heater (30 Volts).

K.6.12.6.2 OPERATOR monitor Main tank internal GRT/b: TE_MtkIn_bGT11D. When the temperature of T-11D rises by 5 mK (0.005)K, TYPE GO to Command OFF the Side B Heat Pulse Meter Heater (0 Volts).

CSTOL HOLD:

Record the starting and ending time and T-11D temperature

Start Time:_____ Start Temperature:_____

End Time:_____ End Temperature:_____

CSTOL HOLD:

K.6.12.7 RECORD the following Heat Pulse Meter Heater Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_HPM___OnOffB	Heat Pulse Meter On/Off /B			1	
CE_HPMH_I_bh02d	HPM htr current/b: (H-02D)			12427 - 13735	
TE_FlM_a__GT18D	Flow meter vent line GRT/a: T-18D				
TE_FlMtr_bGT19D	Flow meter vent line GRT/b: T-19D				
TE_MTkIn_bGT11D	Main tank internal GRT/b: T-11D				
TE_PPEx_bGT12BD	Porous plug exit GRT/b: T-12BD				
VE_HPMH_b__H02D	HPM htr Volt/b: H-02D			20672 - 22848	
VE_LiqPnt_LP01D	Liq Pt Sensor Voltage: LP-01				

CSTOL ACTIONS:

K.6.12.8 TYPE GO to End Heat Pulse Meter Bridge File recording.

K.7 UV Lamp / Optical Switches Checkout[15] (UV)

CSTOL HOLD:

K.7.1 OPERATOR: Turn Off the FLIGHT ECU Power Supply per Operating Instructions for ECU Spacecraft Emulator, Power Off the ECU Emulator Section.

K.7.1.1 **CAUTION**: Grounded wrist straps are to be worn during cable mating/demating operations.

K.7.1.2 **CAUTION**: The ECU is to be powered down during cable mating/demating operations.

K.7.1.3 **CAUTION**: The UV Lamp should only be operated within the temperature range of 0° C (273 K) – 50° C (323 K).

K.7.1.4 **WARNING**: Wipe the Fiber Optic Cable Bundle ends with ethanol and then dry with compressed air before cable mating operations.

K.7.2 OPERATOR: Connect the following cables (Ref: Drawing 5856124, Payload Cable Interconnect Diagram)

Cable	Initial
Fiber Optic Cable Bundle W300P16	
Fiber Optic Cable Bundle W301P17	
Fiber Optic Cable Bundle W302P18	

K.7.3 OPERATOR: Turn on the FLIGHT ECU Power Supply, ensure that it is set to 28 Volts.

K.7.3.1 RECORD: HP DC Power Supply Voltage: _____ (Nominal: 28.0 Volts).

K.7.3.2 RECORD: HP DC Power Supply Current _____(Nominal 0.88 Amps)

K.7.4 Record the following monitors

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp				
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp				
CE_UVLampA_I	UV Lamp-A current				<100
CE_UVLampB_I	UV Lamp-B current				<100
DE_UVLampA_OUT	UV Lamp-A output				<100
DE_UVLampB_OUT	UV Lamp-B output				<100
TE_UV_BASE_SDTa	UV-A base SDT/a				
TE_UV_BASE_SDTb	UV-B base SDT/b				
TE_UVLampA_T2	UV Lamp-A bulb temp				
TE_UVLampB_T2	UV Lamp-B bulb temp				

[15] Ref. Section H.3, Safety Requirements – Fiber Optic Bundle Connection

CSTOL ACTIONS:

K.7.5 TYPE GO to Set Optical Switches 1A to the B Side UV Lamp (OS1A)

K.7.5.1 Pulse Optical Switches

CSTOL HOLD:

K.7.5.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			10	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			0	

CSTOL ACTIONS:

K.7.6 TYPE GO to Set Optical Switches 1B to the B Side UV Lamp (OS1B)

K.7.6.1 Pulse Optical Switches

CSTOL HOLD:

K.7.6.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			10	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			10	

CSTOL ACTIONS:

K.7.7 TYPE GO to Set Optical Switches 2A to the B Side UV Lamp (OS2A)

K.7.7.1 Pulse Optical Switches

CSTOL HOLD:

K.7.7.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			30	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			10	

CSTOL ACTIONS:

K.7.8 TYPE GO to Set Optical Switches 2B to the B Side UV Lamp (OS2B)

K.7.8.1 Pulse Optical Switches

CSTOL HOLD:

K.7.8.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			30	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			30	

CSTOL ACTIONS:

K.7.9 TYPE GO to Set Optical Switches 3A to the B Side UV Lamp (OS3A)

K.7.9.1 Pulse Optical Switches

CSTOL HOLD:

K.7.9.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			70	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			30	

CSTOL ACTIONS:

K.7.10 TYPE GO to Set Optical Switches 3B to the B Side UV Lamp (OS3B)

K.7.10.1 Pulse Optical Switches

CSTOL HOLD:

K.7.10.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			70	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			70	

CSTOL ACTIONS:

K.7.11 TYPE GO to Set Optical Switches 4A to the B Side UV Lamp (OS4A)

K.7.11.1 Pulse Optical Switches

CSTOL HOLD:

K.7.11.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			F0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			70	

CSTOL ACTIONS:

K.7.12 TYPE GO to Set Optical Switches 4B to the B Side UV Lamp (OS4B)

K.7.12.1 Pulse Optical Switches

CSTOL HOLD:

K.7.12.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			F0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			F0	

CSTOL ACTIONS:

K.7.13 TYPE GO to Command on the B Side 15 Volt UV Lamp (UV15VB)

CSTOL HOLD:

K.7.13.1 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			F8	
CE_UVLampB_I	UV Lamp-B current			<100	
DE_UVLampB_OUT	UV Lamp-B output			<100	
TE_UV_BASE_SDTb	UV-B base SDT/b				
TE_UVLampB_T2	UV Lamp-B bulb temp				

CSTOL ACTIONS:

K.7.14 TYPE GO to Command on the B Side 5 Volt UV Lamp (UV5VB)

CSTOL HOLD:

K.7.15 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			FC	
CE_UVLampB_I	UV Lamp-B current			<100	
DE_UVLampB_OUT	UV Lamp-B output			<100	
TE_UV_BASE_SDTb	UV-B base SDT/b				
TE_UVLampB_T2	UV Lamp-B bulb temp				

CSTOL ACTIONS:

K.7.15.1 **CAUTION**: The UV Lamp is a limited life object. Log all On and Off times of the UV Lamp 30 Volt Power Supply.

K.7.16 TYPE GO to Command on the B Side 30 Volt UV Lamp. (UV30VB)

K.7.16.1 Log the 30 Volt UV Lamp ON Time_____

K.7.16.2 TIMED CSTOL HOLD (2 minutes)

K.7.16.3 When PROMPTED to, RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			FE	
CE_UVLampB_I	UV Lamp-B current				
DE_UVLampB_OUT	UV Lamp-B output				
TE_UV_BASE_SDTb	UV-B base SDT/b				
TE_UVLampB_T2	UV Lamp-B bulb temp				

CSTOL ACTIONS:

K.7.17 TYPE GO to Command off the B Side 30 Volt UV Lamp. (UVBOFF)

CSTOL HOLD:

K.7.17.1 Log the 30 Volt UV Lamp OFF Time_____

K.7.17.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			FC	
CE_UVLampB_I	UV Lamp-B current			<100	
DE_UVLampB_OUT	UV Lamp-B output			<100	
TE_UV_BASE_SDTb	UV-B base SDT/b				
TE_UVLampB_T2	UV Lamp-B bulb temp				

K.7.17.3 Command off the B Side 5 Volt UV Lamp.

K.7.17.4 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			F8	
CE_UVLampB_I	UV Lamp-B current			<100	
DE_UVLampB_OUT	UV Lamp-B output			<100	
TE_UV_BASE_SDTb	UV-B base SDT/b				
TE_UVLampB_T2	UV Lamp-B bulb temp				

K.7.17.5 Command off the B Side 15 Volt UV Lamp.

K.7.17.6 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			F0	
CE_UVLampB_I	UV Lamp-B current			<100	
DE_UVLampB_OUT	UV Lamp-B output			<100	
TE_UV_BASE_SDTb	UV-B base SDT/b				
TE_UVLampB_T2	UV Lamp-B bulb temp				

CSTOL ACTIONS:

K.7.18 TYPE GO to Set Optical Switches 1A to the A Side UV Lamp (OS1A1)

K.7.18.1 Pulse Optical Switches

CSTOL HOLD:

K.7.18.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			E0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			F0	

CSTOL ACTIONS:

K.7.19 TYPE GO to Set Optical Switches 1B to the A Side UV Lamp (OS1B1)

K.7.19.1 Pulse Optical Switches

CSTOL HOLD:

K.7.19.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			E0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			E0	

CSTOL ACTIONS:

K.7.20 TYPE GO to Set Optical Switches 2A to the A Side UV Lamp (OS2B1)

K.7.20.1 Pulse Optical Switches

CSTOL HOLD:

K.7.20.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			C0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			E0	

CSTOL ACTIONS:

K.7.21 TYPE GO to Set Optical Switches 2B to the A Side UV Lamp (OS2B1)

K.7.21.1 Pulse Optical Switches

CSTOL HOLD:

K.7.21.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			C0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			C0	

CSTOL ACTIONS:

K.7.22 TYPE GO to Set Optical Switches 3A to the A Side UV Lamp (OS3A1)

K.7.22.1 Pulse Optical Switches

CSTOL HOLD:

K.7.22.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			80	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			C0	

CSTOL ACTIONS:

K.7.23 TYPE GO to Set Optical Switches 3B to the A Side UV Lamp (OS3B1)

K.7.23.1 Pulse Optical Switches

CSTOL HOLD:

K.7.23.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			80	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			80	

CSTOL ACTIONS:

K.7.24 TYPE GO to Set Optical Switches 4A to the A Side UV Lamp (OS4A1)

K.7.24.1 Pulse Optical Switches

CSTOL HOLD:

K.7.24.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			80	

CSTOL ACTIONS:

K.7.25 TYPE GO to Set Optical Switches 4B to the A Side UV Lamp (OS4B1)

K.7.25.1 Pulse Optical Switches

CSTOL HOLD:

K.7.25.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			0	
BE_OpSwUVLpVacB	Optical switches to lamps, UV lamp			0	

CSTOL ACTIONS:

K.7.26 TYPE GO to Command on the A Side 15 Volt UV Lamp (UV15VA)

CSTOL HOLD:

K.7.26.1 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			8	
CE_UVLampA_I	UV Lamp-A current				
DE_UVLampA_OUT	UV Lamp-A output				
TE_UV_BASE_SDTa	UV-A base SDT/a				
TE_UVLampA_T2	UV Lamp-A bulb temp				

CSTOL ACTIONS:

K.7.27 TYPE GO to Command on the A Side 5 Volt UV Lamp (UV5VA)

CSTOL HOLD:

K.7.27.1 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			C	
CE_UVLampA_I	UV Lamp-A current			<100	
DE_UVLampA_OUT	UV Lamp-A output			<100	
TE_UV_BASE_SDTa	UV-A base SDT/a				
TE_UVLampA_T2	UV Lamp-A bulb temp				

CSTOL ACTIONS:

K.7.27.2 **CAUTION**: The UV Lamp is a limited life object. Log all On and Off times of the UV Lamp 30 Volt Power Supply.

K.7.28 TYPE GO to Command on the A Side 30 Volt UV Lamp. (UV30VA)

K.7.28.1 Log the 30 Volt UV Lamp ON Time_____

K.7.28.2 TIMED CSTOL HOLD (2 minutes)

K.7.28.3 When PROMPTED to, RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			E	
CE_UVLampA_I	UV Lamp-A current			<100	
DE_UVLampA_OUT	UV Lamp-A output			<100	
TE_UV_BASE_SDTa	UV-A base SDT/a				
TE_UVLampA_T2	UV Lamp-A bulb temp				

CSTOL ACTIONS:

K.7.29 TYPE GO to Command off the A Side 30 Volt UV Lamp (UVAOFF)

CSTOL HOLD:

K.7.29.1 Log the 30 Volt UV Lamp OFF Time_____

K.7.29.2 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			C	
CE_UVLampA_I	UV Lamp-A current			<100	
DE_UVLampA_OUT	UV Lamp-A output			<100	
TE_UV_BASE_SDTa	UV-A base SDT/a				
TE_UVLampA_T2	UV Lamp-A bulb temp				

K.7.29.3 Command off the A Side 5 Volt UV Lamp.

K.7.29.4 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			8	
CE_UVLampA_I	UV Lamp-A current			<100	
DE_UVLampA_OUT	UV Lamp-A output			<100	
TE_UV_BASE_SDTa	UV-A base SDT/a				
TE_UVLampA_T2	UV Lamp-A bulb temp				

K.7.29.5 Command off the A Side 15 Volt UV Lamp.

K.7.29.6 RECORD the following Optical Switch Monitors:

Monitor Name	Description	Eng. Values	Count	Expected Count	Pass/Fail
BE_OpSwUVLpVacA	Optical switches to lamps, UV lamp			0	
CE_UVLampA_I	UV Lamp-A current			<100	
DE_UVLampA_OUT	UV Lamp-A output			<100	
TE_UV_BASE_SDTa	UV-A base SDT/a				
TE_UVLampA_T2	UV Lamp-A bulb temp				

K.8 ECU Thermal Control PID Algorithm Checkout (PROBEPID)

K.8.1 ECU Thermal Control PID Algorithm Initialization

CSTOL ACTIONS:

K.8.1.1 TYPE GO to Start the PID bridge file recording.

CSTOL HOLD:

K.8.1.2 RECORD the following Command Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P			0	
DE_HSP_CryPm__B	HSP Cryo Pump /B: H-10P			0	
DE_HSP_Fi_1_2_A	HSP Gas Inlet Filter: H-01P			0	
DE_HSP_Fi_1_2_B	HSP Gas Inlet Filter: H-02P			0	
DE_HSP_Fi_3_4_A	HSP Gas Inlet Filter: H-03P			0	
DE_HSP_Fi_3_4_B	HSP Gas Inlet Filter: H-04P			0	
DE_HSP_QBS____A	HSP QBS /A: H-05P			0	
DE_HSP_QBS____B	HSP QBS /B: H-06P			0	
DE_QBSHOpClLp_A	QBS htr Open/Closed Loop AC/DC			52	
DE_QBSHOpClLp_B	QBS htr Open/Closed Loop AC/DC			52	
DE_HSP_VS_____A	HSP Vacuum Shell /A: H-09P			0	
DE_HSP_VS_____B	HSP Vacuum Shell /B: H-08P			0	

K.8.1.3 RECORD the following Temperature & Voltage Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P				
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P				
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P				
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P				
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P				
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P				
TE_PrSLn_aST19P	Press sense line STA156 SDT/a: T-19P				
TE_PrSLn_bST20P	Press sense line SDT/b: T-20P				
TE_Q_Aft__GT05Q	Quartz block aft end GRT: T-05Q				
TE_Q_Flng_GT06Q	Quartz block flange GRT: T-06Q				
TE_Q_ForEGGT17Q	Quartz block forward end GRT: T-17Q				
TE_Q_ForESST18Q	Quartz block forward end SDT: T-18Q				
TE_Q_G3_G4ST07Q	Quartz block G3/G4 SDT: T-07Q				
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P				
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P				
TE_QBS_SDTST12P	Quartz block support SDT: T-12P				
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P				
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P				
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P			<100	
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P			<100	
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			<100	
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			<100	
VE_QBS_H_a_H05P	Quartz block support htr V: H-05P			<100	
VE_QBS_H_b_H06P	Quartz block support htr V: H-06P			<100	

K.8.1.4 RECORD the following PID Algorithm Monitors:

Monitor Name	Description	Eng. Values	Count	Limit	Pass/Fail
SE_EcuPidError	Error word				
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout				
RE_ConfigApp_1	1 If App Is On			0	
RE_ConfigApp_2	1 If App Is On			0	
RE_ConfigApp_3	1 If App Is On			0	
RE_ConfigApp_4	1 If App Is On			0	
RE_ConfigApp_5	1 If App Is On			0	
RE_TempControl1	Computed temps				
RE_TempControl2	Computed temps				
RE_TempControl3	Computed temps				
RE_TempControl4	Computed temps				
RE_TempControl5	Computed temps				

K.8.2 Side A Cryopump PID test PID_CPUMPA)

CSTOL ACTIONS:

K.8.2.1 TYPE GO to start the Side A Cryopump PID Checkout.

K.8.2.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.2.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_4	1 If App Is On		1	
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P			
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P			
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P			
RE_TempControl4	Computed temps			

K.8.2.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_4	1 If App Is On		0	
DE_HSP_CryPm__A	HSP Cryo Pump /A: H-11P		0	
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P			
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P			
RE_TempControl4	Computed temps			

K.8.3 Side A Final Filter 1 & 2 PID test (PID_FF12A)

CSTOL ACTIONS:

K.8.3.1 TYPE GO to start the Side A Final Filter 1 & 2 PID Checkout.

K.8.3.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.3.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_1	1 If App Is On		1	
DE_HSP_Fi_1_2_A	HSP Gas Inlet Filter: H-01P			
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P			
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P			
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P			
RE_TempControl1	Computed temps			

K.8.3.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_1	1 If App Is On		0	
DE_HSP_Fi_1_2_A	HSP Gas Inlet Filter: H-01P		0	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P			
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P			
VE_FF1_2_aH01P	Final Filter 1&2 Htr V/a : H-01P		<100	
RE_TempControl1	Computed temps			

K.8.4 Side A QBS PID test (PID_QBSA)

CSTOL ACTIONS:

K.8.4.1 TYPE GO to start the Side A QBS PID Checkout.

K.8.4.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.4.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_3	1 If App Is On		1	
DE_HSP_QBS____A	HSP QBS /A: H-05P			
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P			
VE_QBS_H_a_H05P	Quartz block support htr V: H-05P			
RE_TempControl3	Computed temps			

K.8.4.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_3	1 If App Is On		0	
DE_HSP_QBS____A	HSP QBS /A: H-05P		0	
TE_QBS_a__GT10P	Quartz block support GRT/a: T-10P			
VE_QBS_H_a_H05P	Quartz block support htr V: H-05P		<100	
RE_TempControl3	Computed temps			

K.8.5 Side A Vacuum Shell PID test (PID_VACSHA)

CSTOL ACTIONS:

K.8.5.1 TYPE GO to start the Side A Vacuum Shell PID Checkout.

K.8.5.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.5.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_5	1 If App Is On		1	
DE_HSP_VS_____A	HSP Vacuum Shell /A: H-09P			
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P			
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P			
RE_TempControl5	Computed temps			

K.8.5.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_5	1 If App Is On		0	
DE_HSP_VS_____A	HSP Vacuum Shell /A: H-09P		0	
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P			
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P			
RE_TempControl5	Computed temps			

K.8.6 Side A Final Filter 1 & 2 PID test (PID12B)

CSTOL ACTIONS:

K.8.6.1 TYPE GO to start the Side B Final Filter 1 & 2 PID Checkout.

K.8.6.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.6.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_1	1 If App Is On		1	
DE_HSP_Fi_1_2_B	HSP Gas Inlet Filter: H-02P			
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P			
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P			
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P			
RE_TempControl1	Computed temps			

K.8.6.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_1	1 If App Is On		0	
DE_HSP_Fi_1_2_B	HSP Gas Inlet Filter: H-02P		0	
TE_Fi1_2_aGT06P	Final filter 1&2 GRT/a: T-06P			
TE_Fi1_2_bGT07P	Final filter 1&2 GRT/b: T-07P			
VE_FF1_2_bH02P	Final Filter 1&2 Htr V/b : H-02P		<100	
RE_TempControl1	Computed temps			

K.8.7 Side B QBS PID test (PID_QBS)

CSTOL ACTIONS:

K.8.7.1 TYPE GO to start the Side B QBS PID Checkout.

K.8.7.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.7.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_3	1 If App Is On		1	
DE_HSP_QBS____B	HSP QBS /B: H-06P			
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P			
VE_QBS_H_b_H06P	Quartz block support htr V: H-06P			
RE_TempControl3	Computed temps			

K.8.7.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_3	1 If App Is On		0	
DE_HSP_QBS____B	HSP QBS /B: H-06P		0	
TE_QBS_b__GT11P	Quartz block support GRT/b: T-11P			
VE_QBS_H_b_H06P	Quartz block support htr V: H-06P		<100	
RE_TempControl3	Computed temps			

K.8.8 Side A Final Filter 3 & 4 PID test (PID_FF34A)

CSTOL ACTIONS:

K.8.8.1 TYPE GO to start the Side A Final Filter 3 & 4 PID Checkout.

K.8.8.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.8.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_2	1 If App Is On		1	
DE_HSP_Fi_3_4_A	HSP Gas Inlet Filter: H-03P			
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P			
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P			
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P			
RE_TempControl2	Computed temps			

K.8.8.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_2	1 If App Is On		0	
DE_HSP_Fi_3_4_A	HSP Gas Inlet Filter: H-03P		0	
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P			
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P			
VE_FF3_4_aH03P	Final Filter 3&4 Htr V/a : H-03P		<100	
RE_TempControl2	Computed temps			

K.8.9 Side B Vacuum Shell PID test (PID_VACSHB)

CSTOL ACTIONS:

K.8.9.1 TYPE GO to start the Side B Vacuum Shell PID Checkout.

K.8.9.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.9.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_5	1 If App Is On		1	
DE_HSP_VS_____B	HSP Vacuum Shell /B: H-08P			
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P			
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P			
RE_TempControl5	Computed temps			

K.8.9.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_5	1 If App Is On		0	
DE_HSP_VS_____B	HSP Vacuum Shell /B: H-08P		0	
TE_VSPr_a_ST13P	Vacuum shell probe SDT/a: T-13P			
TE_VSPr_b_ST14P	Vacuum shell probe SDT/b: T-14P			
RE_TempControl5	Computed temps			

K.8.10 Side B Final Filter 3 & 4 PID test (PID_FF34B)

CSTOL ACTIONS:

K.8.10.1 TYPE GO to start the Side B Final Filter 3 & 4 PID Checkout.

K.8.10.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.10.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_2	1 If App Is On		1	
DE_HSP_Fi_3_4_B	HSP Gas Inlet Filter: H-03P			
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P			
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P			
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P			
RE_TempControl2	Computed temps			

K.8.10.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_2	1 If App Is On		0	
DE_HSP_Fi_3_4_B	HSP Gas Inlet Filter: H-03P		0	
TE_Fi3_4_aGT08P	Final filter 3&4 GRT/a: T-08P			
TE_Fi3_4_bGT09P	Final filter 3&4 GRT/b: T-09P			
VE_FF3_4_bH04P	Final Filter 3&4 Htr V/b : H-04P		<100	
RE_TempControl2	Computed temps			

K.8.11 Side B Cryopump PID test (PID_CPUMPB)

CSTOL ACTIONS:

K.8.11.1 TYPE GO to start the Side B Cryopump PID Checkout.

K.8.11.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.8.11.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_4	1 If App Is On		1	
DE_HSP_CryPm__B	HSP Cryo Pump /B: H-10P			
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P			
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P			
RE_TempControl4	Computed temps			

K.8.11.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
RE_ConfigApp_4	1 If App Is On		0	
DE_HSP_CryPm__B	HSP Cryo Pump /B: H-10P		0	
TE_CryPm_aGT15P	Cryo-pump GRT/a: T-15P			
TE_CryPm_bGT16P	Cryo-pump GRT/b: T-16P			
RE_TempControl4	Computed temps			

K.9 Window thermal control PID algorithm Checkout and Bakeout.

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Section 3.7.3.4.8 Window Bakeout

The probe shall provide the capability of raising the temperature of the windows, through attached heaters, to the following temperatures within 8 hrs/window:
1) Window 1 (coldest) >= 60 K;
2) Window 2 >= 95 K;
3) Window 3 >= 220 K;
4) Window 4 (warmest) >= 280 K

Rev: 3.3

Reference PCB item #8. The temperatures were raised and window 4 added per PCB #160. The time was changed to 8 hrs/window, with approval of J. Turneaure and M. Keiser. Window bakeout may be sequential or simultaneous.

K.9.1 Window thermal control PID algorithm Initialization

K.9.1.1 Record the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win1___A	HSP Window #1 /A: H-17P		0	
DE_HSP_Win1___B	HSP Window #1 /B: H-16P		0	
DE_HSP_Win2___A	HSP Window #2 /A: H-19P		0	
DE_HSP_Win2___B	HSP Window #2 /B: H-18P		0	
DE_HSP_Win3___A	HSP Window #3 /A: H-21P		0	
DE_HSP_Win3___B	HSP Window #3 /B: H-20P		0	
DE_HSP_Win4___A	HSP Window #4 /A: H-23P		0	
DE_HSP_Win4___B	HSP Window #4 /B: H-22P		0	
RE_ConfigApp_1	1 If App Is On		0	
RE_ConfigApp_2	1 If App Is On		0	
RE_ConfigApp_3	1 If App Is On		0	
RE_ConfigApp_4	1 If App Is On		0	
RE_TempControl1	Computed temps			
RE_TempControl2	Computed temps			
RE_TempControl3	Computed temps			
RE_TempControl4	Computed temps			
SE_EcuPidError	Error word			
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout			
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P			
TE_Win_1_bST22P	Window #1 SDT/b: T-22P			
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P			
TE_Win_2_bST24P	Window #2 SDT/b: T-24P			
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P			
TE_Win_3_bST26P	Window #3 SDT/b: T-26P			
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P			
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P			

K.9.2 Side A Window 1 Bakeout (PID_WIN1A)

CSTOL ACTIONS:

K.9.2.1 TYPE GO to start the Side A Window 1 Bakeout

K.9.2.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.2.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win1___A	HSP Window #1 /A: H-17P			
SE_EcuPidError	Error word			
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout1 For Pid, 2 For Window Bakeout		2	
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P			
RE_TempControl1	Computed temps			

K.9.2.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win1___A	HSP Window #1 /A: H-17P		0	
TE_Win_1_aST21P	Window #1 frame SDT/a: T-21P			
RE_TempControl1	Computed temps			

K.9.3 Side A Window 2 Bakeout (PID_WIN2A)

CSTOL ACTIONS:

K.9.3.1 TYPE GO to start the Side A Window 2 Bakeout

K.9.3.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.3.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win2___A	HSP Window #2 /A: H-19P			
RE_ConfigApp_3	1 If App Is On		1	
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout		2	
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P			
RE_TempControl2	Computed temps			

K.9.3.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win2___A	HSP Window #2 /A: H-19P		0	
RE_ConfigApp_3	1 If App Is On		0	
TE_Win_2_aST23P	Window #2 frame SDT/a: T-23P			
RE_TempControl2	Computed temps			

K.9.4 Side A Window 3 Bakeout (PID_WIN3A)

CSTOL ACTIONS:

K.9.4.1 TYPE GO to start the Side A Window 3 Bakeout

K.9.4.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.4.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win3___A	HSP Window #3 /A: H-21P			
RE_ConfigApp_3	1 If App Is On		1	
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout		2	
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P			
RE_TempControl3	Computed temps			

K.9.4.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win3___A	HSP Window #3 /A: H-21P		0	
RE_ConfigApp_3	1 If App Is On		0	
TE_Win_3_aST25P	Window #3 frame SDT/a: T-25P			
RE_TempControl3	Computed temps			

K.9.5 Side A Window 4 Bakeout (PID_WIN4A)

CSTOL ACTIONS:

K.9.5.1 TYPE GO to start the Side A Window 4 Bakeout

K.9.5.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.5.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win4___A	HSP Window #4 /A: H-23P			
RE_ConfigApp_4	1 If App Is On		1	
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout		2	
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P			
RE_TempControl4	Computed temps			

K.9.5.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win4___A	HSP Window #4 /A: H-23P		0	
RE_ConfigApp_4	1 If App Is On		0	
TE_Win_4_aPT29P	Window #4 frame PRT/a: T-29P			
RE_TempControl4	Computed temps			

K.9.6 Side B Window 1 Bakeout (PID_WIN1B)

CSTOL ACTIONS:

K.9.6.1 TYPE GO to start the Side B Window 1 Bakeout

K.9.6.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.6.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win1___B	HSP Window #1 /B: H-16P			
SE_EcuPidError	Error word			
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout		2	
TE_Win_1_bST22P	Window #1 SDT/b: T-22P			
RE_TempControl1	Computed temps			

K.9.6.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win1___B	HSP Window #1 /B: H-16P		0	
TE_Win_1_bST22P	Window #1 SDT/b: T-22P			
RE_TempControl1	Computed temps			

K.9.7 Side B Window 2 Bakeout (PID_WIN2B)

CSTOL ACTIONS:

K.9.7.1 TYPE GO to start the Side B Window 2 Bakeout

K.9.7.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.7.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win2___B	HSP Window #2 /B: H-18P			
RE_ConfigApp_3	1 If App Is On		1	
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout		2	
TE_Win_2_bST24P	Window #2 SDT/b: T-24P			
RE_TempControl2	Computed temps			

K.9.7.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win2___B	HSP Window #2 /B: H-18P		0	
RE_ConfigApp_3	1 If App Is On		0	
TE_Win_2_bST24P	Window #2 SDT/b: T-24P			
RE_TempControl2	Computed temps			

K.9.8 Side B Window 3 Bakeout (PID_WIN3B)

CSTOL ACTIONS:

K.9.8.1 TYPE GO to start the Side B Window 3 Bakeout

K.9.8.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.8.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win3___B	HSP Window #3 /B: H-20P			
RE_ConfigApp_3	1 If App Is On		1	
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout		2	
TE_Win_3_bST26P	Window #3 SDT/b: T-26P			
RE_TempControl3	Computed temps			

K.9.8.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win3___B	HSP Window #3 /B: H-20P		0	
RE_ConfigApp_3	1 If App Is On		0	
TE_Win_3_bST26P	Window #3 SDT/b: T-26P			
RE_TempControl3	Computed temps			

K.9.9 Side B Window 4 Bakeout (PID_WIN4B)

CSTOL ACTIONS:

K.9.9.1 TYPE GO to start the Side B Window 4 Bakeout

K.9.9.2 TYPE GO to Command PID Algorithm On.

CSTOL HOLD:

K.9.9.3 RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win4___B	HSP Window #4 /B: H-22P			
RE_ConfigApp_4	1 If App Is On		1	
SE_EcuPidMode	1 For Pid, 2 For Window Bakeout		2	
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P			
RE_TempControl4	Computed temps			

K.9.9.4 Wait until the PID Algorithm completes and then RECORD the following Monitors:

Monitor Name	Description	Eng. Values	Expected Value	Pass/Fail
DE_HSP_Win4___B	HSP Window #4 /B: H-22P		0	
RE_ConfigApp_4	1 If App Is On		0	
TE_Win_4_bPT30P	Window #4 frame PRT/b: T-30P			
RE_TempControl4	Computed temps			

K.9.10 Load the default ECU PID P0540 Window Database and monitor Window Temperatures for 8 hours.

K.9.11 ECU Temperature Sensor and Heater checkout completion

K.9.11.1 TYPE: GO to End ECU Temperature Sensor and Heater checkout.

CSTOL ACTIONS:

K.9.11.2 Snap & Clear Monitors.

K.9.11.3 Command Off ECU.

K.9.11.4 Snap & Clear ECU Monitors.

K.9.11.5 End ECU Message File Recording.

K.9.11.6 End Bridge File Recording.

K.9.11.7 End Oasis Binary File Recording.

K.9.11.8 OPERATOR: Power Off the ECU HLD panel power supply, per Operating Instructions for ECU Spacecraft Emulator, Power Off for ECU Emulator section.

K.9.11.9 RECORD: HP DC Power Supply Voltage:_____ (Nominal: 0.0 Volts).

K.9.11.10 RECORD: HP DC Power Supply Current _____(Nominal 0 Amps)

K.9.11.11 Data Analysis

K.9.11.12 Load Data into Excel spreadsheet

K.9.11.13 Sort data into Monitors and graph Heater Set Point

K.9.11.14 Attach data charts and a sample of the data to this document

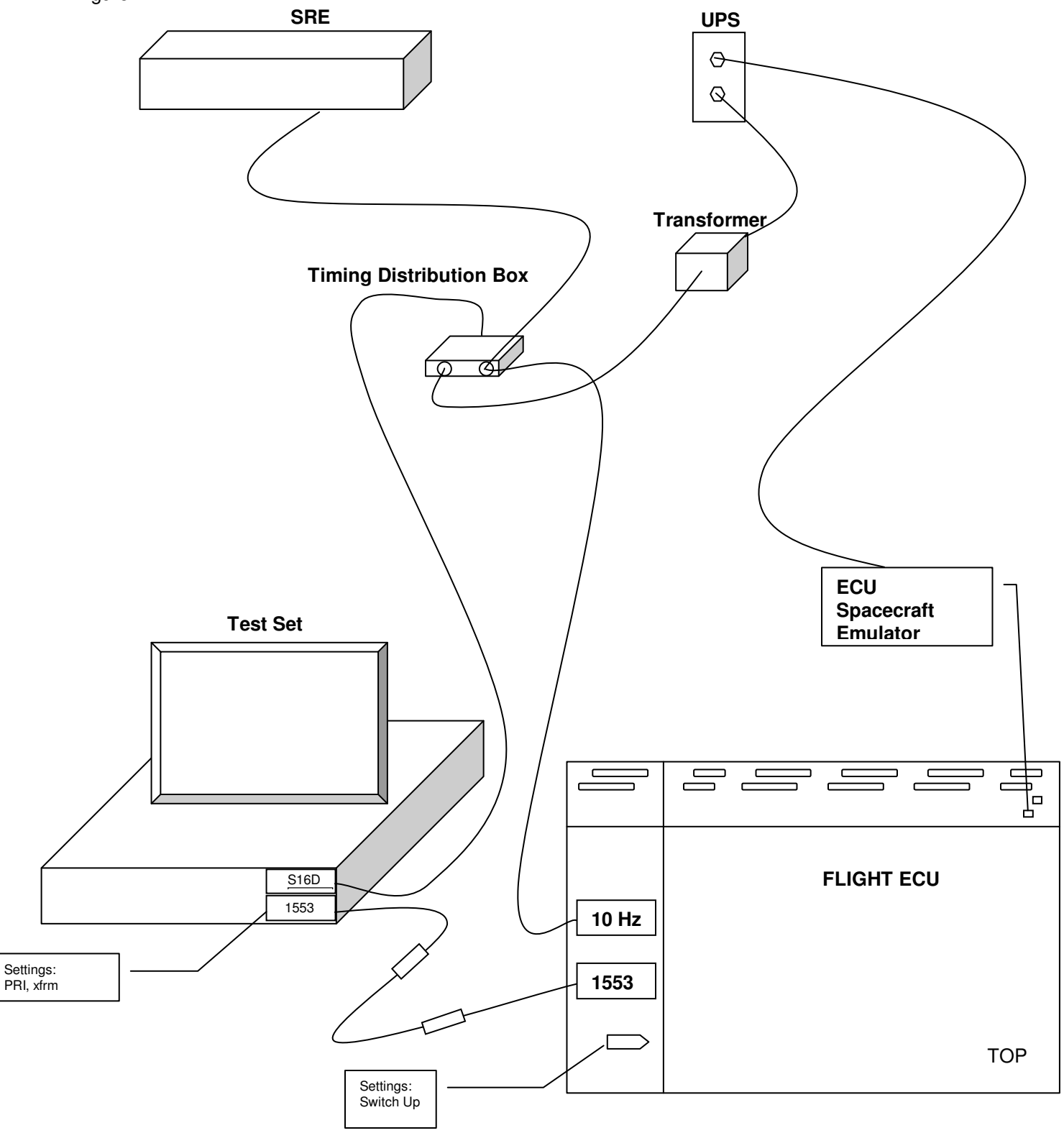
K.9.11.15 Test completed:

Completed by:_____
Witnessed by:_____
Date:_____
Time:_____

Test Leader: _____
Date: _____
Time: _____

Quality Engineer: _____
Date: _____
Time: _____

Figure 1


SRE
UPS
Transformer
Timing Distribution Box
ECU
Spacecraft
Emulator
Test Set
S16D
1553
Settings:
PRI, xfrm
FLIGHT ECU
10 Hz
1553
TOP
Settings:
Switch Up