SPS Software Test Cases

PFS-SPS-PRU300005-01

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Contents

1 Version and Changelog

The version of this document is **0.1** .

Version	Date	Author	Description
0.1	2019-07-10	H Siddiqui	First version

2 Introduction

This document describes the test cases used for demonstrating the validity of the software used for SPS commanding, prior to delivery of the SM1 module to Subaru at the end of 2019.

The intention is for these test cases to be run at during the summer of 2019. A report of the outcome would then be provided to the Project Office, who would then decide whether the software is of an adequate level for use at Subaru.

3 Test Case SPS-ALERT-CTHIGH-010: Cooler Temperature Too High

3.1 Description

Checks that expected alarm is raised when the cooler temperature exceeds the allowed upper limit.

3.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when temperature is above the allowed limit.

Fail Any result otherwise. For example:

1. The expected alert is *not* raised when the temperature exceeds the limit.
2. An unexpected alert raised when temperature is in fact *within* the allowed range.

3.3 Hardware constraints

Cryostat is cooled?

3.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

3.5 Procedure

1. Set temporary range override: `alerts override key=coolerTemps field=0 limits=null,20` (see notes below)
2. Start alerts actor and SM module with temperature board activated
3. Monitor alerts
4. Restore nominal temperature range: `alerts dropOverride key=coolerTemps field=0`

3.6 Additional Notes

The temperature range is temporarily overridden to allow the alarm to be triggered without having to force a hardware change - ie., a change to the ambient temperature.

4 Test Case SPS-ALERT-PPOWER1-020: PCM UPS Input Power Outside Range

4.1 Description

Checks that expected alarm is raised when the PCM UPS Input Power is outside range.

4.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when power is outside range

Fail Any result otherwise. For example:

1. No alert raised when voltage is outside range
2. Unexpected alert raised while power is in fact *within* allowed range

4.3 Hardware constraints

Cryostat is cooled?

4.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

4.5 Procedure

Repeat procedure described in 3.5, with `key=pcmPower1` and `limits=27,null`.

4.6 Additional Notes

None.

5 Test Case SPS-ALERT-PPOWER2-030: PCM AUX Input Power Outside Range

5.1 Description

Checks that expected alarm is raised when the PCM AUX Input Power is outside range.

5.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when power is outside range

Fail Any result otherwise. For example:

1. No alert raised when voltage is outside range
2. Unexpected alert raised while power is in fact *within* allowed range

5.3 Hardware constraints

Cryostat is cooled?

5.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

5.5 Procedure

Repeat procedure described in 3.5, with `key=pcmPower2` and `limits=27,null`.

5.6 Additional Notes

None.

6 Test Case SPS-ALERT-PPOWER2-040: Ion Gauge Pressure Outside Range

6.1 Description

Checks that expected alarm is raised when the Ion Gauge Pressure is outside range.

6.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when power is outside range

Fail Any result otherwise. For example:

1. No alert raised when ion gauge pressure is outside range
2. Unexpected alert raised while pressure is in fact *within* allowed range

6.3 Hardware constraints

Cryostat is cooled?

6.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

6.5 Procedure

Repeat procedure described in 3.5, with `key=pressure` and `limits=1e-10, 1e-02`.

6.6 Additional Notes

None.

7 Test Case SPS-ALERT-TURBO-050: Turbo Speed Outside Range

7.1 Description

Checks that expected alarm is raised when the turbo speed is outside range.

7.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when turbo speed is outside range

Fail Any result otherwise. For example:

1. No alert raised when turbo speed is outside range
2. Unexpected alert raised while turbo speed is in fact *within* allowed range

7.3 Hardware constraints

Cryostat is cooled?

7.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

7.5 Procedure

Repeat procedure described in 3.5, with `key=turboSpeed` and `limits=89000, null`.

7.6 Additional Notes

None.

8 Test Case SPS-ALERT-ION1-060: Ion Pump 1 Outside Range

8.1 Description

Checks that expected alarm is raised when the ion pump 1 is outside range.

8.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when ion pump 1 is outside range

Fail Any result otherwise. For example:

1. No alert raised when ion pump is outside range
2. Unexpected alert raised while ion pump is in fact *within* allowed range

8.3 Hardware constraints

Cryostat is cooled?

8.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

8.5 Procedure

Repeat procedure described in 3.5, with `key=ionpump1` and `1e-10, 1e-05`.

8.6 Additional Notes

None.

9 Test Case SPS-ALERT-ION2-070: Ion Pump 2 Outside Range

9.1 Description

Checks that expected alarm is raised when the ion pump 2 is outside range.

9.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when ion pump 2 is outside range

Fail Any result otherwise. For example:

1. No alert raised when ion pump is outside range
2. Unexpected alert raised while ion pump is in fact *within* allowed range

9.3 Hardware constraints

Cryostat is cooled?

9.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

9.5 Procedure

Repeat procedure described in 3.5, with `key=ionpump2` and `1e-10, 1e-05`.

9.6 Additional Notes

None.

10 Test Case SPS-ALERT-CTEMP-080: Cooler temperature Outside Range

10.1 Description

Checks that expected alarm is raised when the cooler temperature is outside range.

10.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when the cooler temperature is outside range

Fail Any result otherwise. For example:

1. No alert raised when cooler temperature is outside range
2. Unexpected alert raised while cooler temperature is in fact *within* allowed range

10.3 Hardware constraints

Cryostat is cooled?

10.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

10.5 Procedure

Repeat procedure described in 3.5, with `key=coolerTemps` and `null, 32`.

10.6 Additional Notes

None.

11 Test Case SPS-ALERT-CPOWER-090: Cooler Power Outside Range

11.1 Description

Checks that expected alarm is raised when the cooler power is outside range.

11.2 Pass/Fail Condition(s)

Pass Expected alert seen on GUI and written to log when the cooler power is outside range

Fail Any result otherwise. For example:

1. No alert raised when cooler power is outside range
2. Unexpected alert raised while cooler power is in fact *within* allowed range

11.3 Hardware constraints

Cryostat is cooled?

11.4 Initial conditions

SM module and temperature board deactivated. AlertsActor deactivated.

11.5 Procedure

Repeat procedure described in 3.5, with `key=coolerPowerXX` and range `XX, XX`.

11.6 Additional Notes

None.

12 Test Case SPS-LOG-110: Process logging

12.1 Description

Checks that logging is active for a typical process.

12.2 Pass/Fail Condition(s)

Pass Logging of INFO, FAIL and WARN messages are correctly written to the expected log file

Fail Any result otherwise.

12.3 Hardware constraints

None.

12.4 Initial conditions

`/data` and `/software` volumes are created.

12.5 Procedure

None..

Step	Description	Pass/FAIL	Comment
1	TBW		

12.6 Additional Notes

A test script installed in the `/software` folder would address this test effectively.

13 Test Case SPS-IO-120: Test File I/O

13.1 Description

Checks that data can be read and written from the input and output directories.

13.2 Pass/Fail Condition(s)

Pass Data can be written to and read from the /data volume, and software can be written to and read from the /software volume.

Fail Any result otherwise.

13.3 Hardware constraints

None.

13.4 Initial conditions

/data and /software volumes are created.

13.5 Procedure

For each volume:

Step	Description	Pass/FAIL	Comment
1	Create small files		
2	Read those files		
3	Copy those files to new locations within same volume and check that they are readable.		

13.6 Additional Notes

A test script installed in the /software folder would address this test effectively.

14 Test Case SPS-TPROBE-130: Check temperature probes

14.1 Description

Checks that the temperature probes for the CCD, cryostat and OBA are functioning.

14.2 Pass/Fail Condition(s)

Pass Temperature values read from the probes are in the expected range (1-100 K)

Fail If the temperature reads `NaN` or zero.

14.3 Hardware constraints

None.

14.4 Initial conditions

TBW.

14.5 Procedure

For each probe:

Step	Description	Pass/FAIL	Comment
1	On GUI check temperature value.		

14.6 Additional Notes

None.

15 Test Case SPS-PGAUGE-140: Check pressure gauge probes

15.1 Description

Checks that the pressure gauge is functioning correctly.

15.2 Pass/Fail Condition(s)

Pass The pressure gauge reads a realistic value.

Fail If the pressur reads `NaN` or zero.

15.3 Hardware constraints

None.

15.4 Initial conditions

TBW.

15.5 Procedure

For each probe:

Step	Description	Pass/FAIL	Comment
1	On GUI check pressure gauge value.		

15.6 Additional Notes

None.

16 Test Case SPS-SHUTTER-150: Shutter control

16.1 Description

Checks the SpS shutter movement

16.2 Pass/Fail Condition(s)

Pass Shutters open/close as expected

Fail Any result otherwise.

16.3 Hardware constraints

None.

16.4 Initial conditions

All shutter are in the closed position.

16.5 Procedure

For each shutter:

Step	Description	Pass/FAIL	Comment
1	Open Shutter		
2	Check that monitor shows that the shutter door is open		
3	Close shutter		
4	Check that the monitor confirms that the shutter door is closed		

16.6 Additional Notes

None..

17 Test Case SPS-SLIT-160: Slit movement

17.1 Description

Check the slit movement such that the expected positions are reached.

17.2 Pass/Fail Condition(s)

Pass The slit position is as intended, within the given tolerance.

Fail Any result otherwise.

17.3 Hardware constraints

None?

17.4 Initial conditions

None.

17.5 Procedure

1. for each position A, B, C, D, E:
   (a) command slit to be moved to that position
   (b) check whether the expected position is reached within tolerance 1 micron
   (c) monitor slit movement throughout.

Step	Description	Pass/FAIL	Comment
1	Position A		
2	Position B		
3	Position C		
4	Position D		
5	Position E		

17.6 Additional Notes

None..

18 Test Case SPS-REXM-170: Red exchange mechanism movement

18.1 Description

Checks that the red exchange mechanism moves as expected.

18.2 Pass/Fail Condition(s)

Pass The REXM switches to the expected mode.

Fail Any result otherwise.

18.3 Hardware constraints

None?

18.4 Initial conditions

None.

18.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Move REXM to low resolution mode		
2	Check position		
3	Move REXM to high resolution mode		
4	Check position		

18.6 Additional Notes

None..

19 Test Case SPS-BIA-180: Check Back Illumination Assembly Photoresistance

19.1 Description

Check photoresistance of BIA.

19.2 Pass/Fail Condition(s)

Pass The photoresistance is measured as expected.

Fail Any result otherwise.

19.3 Hardware constraints

None?

19.4 Initial conditions

None.

19.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Check from the monitors that the protoresistance is 'saturated'.		

19.6 Additional Notes

None..

20 Test Case SPS-CCD-190: Check CCD bias/darks

20.1 Description

None.

20.2 Pass/Fail Condition(s)

Pass The CCD bias and darks are processed correctly.

Fail Processing fails.

20.3 Hardware constraints

None?

20.4 Initial conditions

None.

20.5 Procedure

Step	Description	Pass/FAIL	Comment
1	Take the bias and dark exposures.		
2	Check the FITS headers of the bias and dark files for any non-conformance.		
3	Process the CCD bias and darks against the 2D DRP pipeline.		

20.6 Additional Notes

None..

Acronyms

SPS Spectrograph System.

Glossary

Spectrograph System The software which commands cobra motions.