

CCU Valves Status monitoring
File: H_FCP_CCU_MONV.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to monitor the status of reed contacts from the CCU valves:

- Valves V501 and V503
- Valves V103 and V106
- Valves V504 and V505

Summary of Constraints

In order to acquire the valve status, on the start monitoring command the parameters I1, I2 and I3 (DW#3) must be selected. Then, make sure this data are being monitored before starting the check.

Normally, all the cryostat parameters should be monitored.

Valves V501/V503 and V103/V106 are opened by a command from the launcher and they will always remain opened.

Valves 504/505 will be opened at launch but they will be closed TBD days after.

The state of Valves polarity selection relays is reported in Essential Housekeeping (D_H_HK_EssHR).

The state of Valve status is reported in CCU monitoring packets (D_H_CCU_A/B_M1) i.e. not available at LR1/LR2 telemetry bit rates.

Note that the valves polarity check does not allow to draw a conclusion of the valves status because it only gives the intended direction of operation.

Spacecraft Configuration

Start of Procedure

CCU A/B ON and declared ON and Valid on 1553 bus
Payload management function running
Monitoring status enabled

End of Procedure

CCU A/B ON and declared ON and Valid on 1553 bus
Payload management function running
Monitoring status enabled

Reference File(s)

Input Command Sequences

Output Command Sequences

Referenced Displays

ANDs GRDs SLDs
ZAZ9K999

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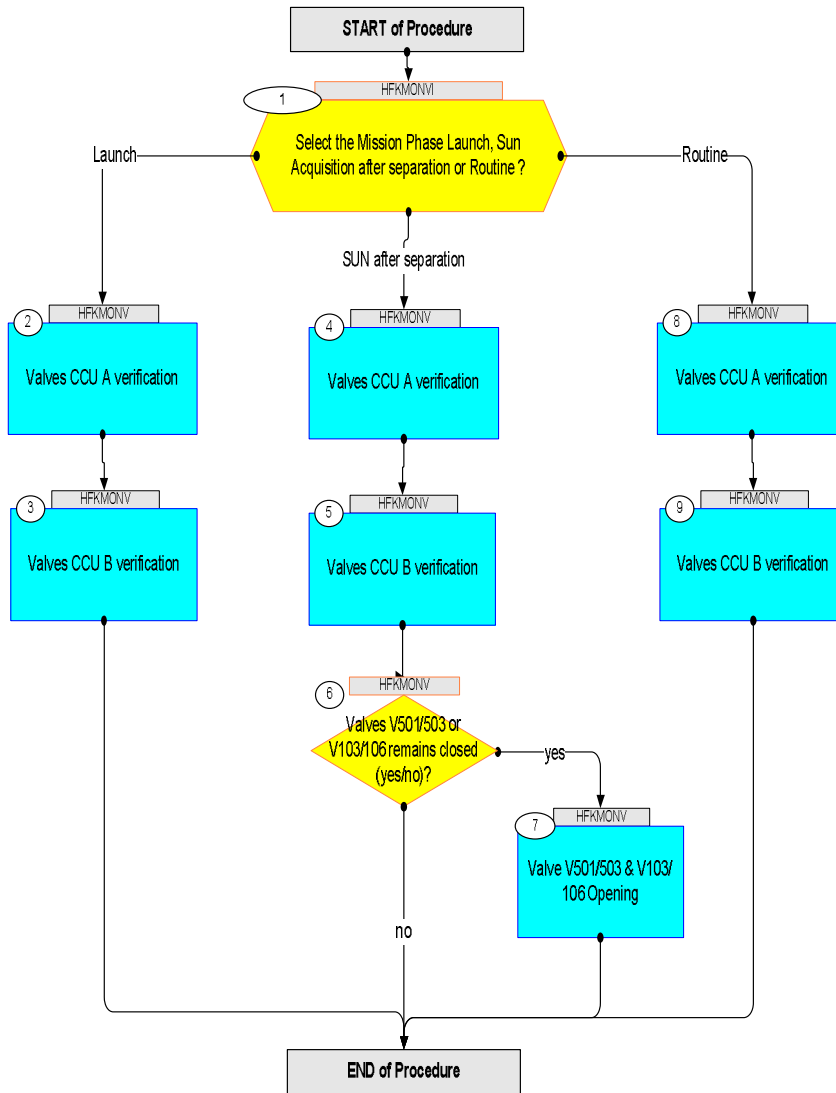
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
29/07/08	1	1	Created	E. Picallo	
21/10/08	2	2	Display mode update	E. Picallo	
17/02/09		3	State of Valve polarity selection relay added	E. Picallo	
02/03/09	2.1	4	Call to H_CRP_CCU_VLV0 in case of contingency added	E. Picallo	
25/03/09	2.2	5	valves polarity check removed from SUN after separation	E. Picallo	
30/03/09		6	Launch Mode config updated according to H-P-2-ASP-TS-1780 issue 2	E. Picallo	
22/04/09	2.3	7	CDMU Her Ess LCH NOGO HP packet enabled in launch pad comment added	E. Picallo	

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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name : HFKMONVI (CCU Valve Monitoring) CCU Valves Status Monitoring TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
1		Select the Mission Phase Launch, Sun Acquisition after separation or Routine ?		Next Step: Launch 2 SUN after separation 4 Routine 8
TC Seq. Name : HFKMONV (CCU Valve MonLaunch) CCU Valves Status Monitoring during Launch mode TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>				
2		Valves CCU A verification		Next Step: 3
		The state of Valves polarity selection relays is reported in Essential Housekeeping (D_H_HK_EssHR). The state of Valve status is reported in CCU monitoring packets (D_H_CCU_A/B_M1) i.e. not available at LR1/LR2 telemetry bit rates.		
2.1		CCU A Valves polarity status verification		<input type="checkbox"/>
		Verify V103 polarity selection relays ; VS1 (A) Polarity_V103 KM111300	= Closed	AND=ZAZ9K999
		Verify V501 polarity selection relays ; VS2 (A) Polarity_V501 KM121300	= Closed	AND=ZAZ9K999
		Verify V504 polarity selection relays ; VS3 (A) Polarity_V504 KM131300	= Open	AND=ZAZ9K999
2.2		CCU A Valves status verification		<input type="checkbox"/>
		Verify VS103 Status monitoring ; VS1 (A) Valv_Stat_VS103 KM269302	= CLOSED	AND=ZAZ9K999
		Verify VS501 Status monitoring ; VS2 (A) Valv_Stat_VS501 KM270302	= CLOSED	AND=ZAZ9K999
		Verify VS504 Status monitoring ; VS3 (A) Valv_Stat_VS504 KM271302	= OPEN	AND=ZAZ9K999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
3		Valves CCU B verification		Next Step: END
		The state of Valves polarity selection relays is reported in Essential Housekeeping (D_H_HK_EssHR). The state of Valve status is reported in CCU monitoring packets (D_H_CCU_A/B_M1) i.e. not available at LR1/LR2 telemetry bit rates.		
3.1		CCU B Valves polarity status verification		<input type="checkbox"/>
		Verify V106 polarity selection relays ; VS 1 (B) Polarity_V106 KM111301	= Closed	AND=ZAZ9K999
		Verify V503 polarity selection relays ; VS2 (B) Polarity_V503 KM121301	= Closed	AND=ZAZ9K999
		Verify V505 polarity selection relays ; VS3 (B) Polarity_V505 KM131301	= Open	AND=ZAZ9K999
3.2		CCU B Valves status verification		<input type="checkbox"/>
		Verify VS106 Status monitoring ; VS1 (B) Valv_Stat_VS106 KM269303	= CLOSED	AND=ZAZ9K999
		Verify VS503 Status monitoring ; VS2 (B) Valv_Stat_VS503 KM270303	= CLOSED	AND=ZAZ9K999
		Verify VS505 Status monitoring ; VS3 (B) Valv_Stat_VS505 KM271303	= OPEN	AND=ZAZ9K999
		At launch, the cryostat will be with the following state of commandable valves: <ul style="list-style-type: none"> - CLOSED: V103, V106, V501, V503 - OPEN: V504, V505 After the cryostat flushing is stopped in the BAF, the ventline (between valves V501, V503, V502, V506, V105, V701, V103, V106, V104, V102, V702 and the filling port) will be closed, and its pressure will increase due to the cryostat warm up. Therefore the line shall be vented from time to time.		
		The procedure is the following command V501 shall be made upon monitoring of P501 (acquired by the Cryo COTE) when P501 reaches 1.2 bar V501 is OPENED for 8 sec then is CLOSED again. It is expected that at the time of the first launch attempt, the time elapsed from one opening to another is about 2 hours or more. In order to avoid an operation of V501 during the automatic sequence, V501 will be opened and closed as described above at H0 – 20 min.		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<p>TC Seq. Name : HFKMONV (CCU Valve Mon SUNa/s) CCU Valves Status Monitoring during SUN after separation</p> <p>TimeTag Type: N Sub Schedule ID:</p> <p>□</p>				
4		Valves CCU A verification		Next Step: 5
		<p>The state of Valve status is reported in CCU monitoring packets (D_H_CCU_A/B_M1) i.e. not available at LR1/LR2 telemetry bit rates.</p> <p>To allow a valve status verification at first AOS the CDMU Her Ess LCH NOGO HK Parameter will be enabled on the launch pad.</p>		
		Verify VS103 Status monitoring ; VS1 (A) Valv_Stat_VS103 KM269302	= OPEN	AND=ZAZ9K999
		Verify VS501 Status monitoring ; VS2 (A) Valv_Stat_VS501 KM270302	= OPEN	AND=ZAZ9K999
		Verify VS504 Status monitoring ; VS3 (A) Valv_Stat_VS504 KM271302	= OPEN	AND=ZAZ9K999
5		Valves CCU B verification		Next Step: 6
		<p>The state of Valve status is reported in CCU monitoring packets (D_H_CCU_A/B_M1) i.e. not available at LR1/LR2 telemetry bit rates.</p> <p>To allow a valve status verification at first AOS the CDMU Her Ess LCH NOGO HK Parameter will be enabled on the launch pad.</p>		
		Verify VS106 Status monitoring ; VS1 (B) Valv_Stat_VS106 KM269303	= OPEN	AND=ZAZ9K999
		Verify VS503 Status monitoring ; VS2 (B) Valv_Stat_VS503 KM270303	= OPEN	AND=ZAZ9K999
		Verify VS505 Status monitoring ; VS3 (B) Valv_Stat_VS505 KM271303	= OPEN	AND=ZAZ9K999
6		Valves V501/503 or V103/106 remains closed (yes/no)?		Next Step: yes 7 no END

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>During the launch of the Herschel satellite, four commands to each CCU will be initiated by the Ariane 5 launcher.</p> <p>Nominally the status of the valves V501/V503 and V103/V106 should be OPEN at 1st AOS.</p> <p>In case of dry loop commnad failure one of these valves may remain CLOSED.</p>		
7		Valve V501/503 & V103/106 Opening		Next Step: END
		Call contingency procedure H_CRP_CCU_VLV0 to force CCU valves V501/V503 and V103/V106 opening		
		Execute Procedure: H_CRP_CCU_VLV0 Reinforce V501/503 & V103/106 Opening		
<p>TC Seq. Name : HFKMONV (CCU Valve Monit Nom) CCU Valves Status Monitoring during Routine phase</p> <p>TimeTag Type: N Sub Schedule ID: <input type="checkbox"/></p>				
8		Valves CCU A verification		Next Step: 9
		<p>The state of Valves polarity selection relays is reported in Essential Housekeeping (D_H_HK_EssHR).</p> <p>The state of Valve status is reported in CCU monitoring packets (D_H_CCU_A/B_M1) i.e. not available at LR1/LR2 telemetry bit rates.</p>		
8.1		CCU A Valves polarity status verification		<input type="checkbox"/>
		Verify V103 polarity selection relays ; VS1 (A) Polarity_V103 KM111300	= Open	AND=ZAZ9K999
		Verify V501 polarity selection relays ; VS2 (A) Polarity_V501 KM121300	= Open	AND=ZAZ9K999
		Verify V504 polarity selection relays ; VS3 (A) Polarity_V504 KM131300	= Closed	AND=ZAZ9K999
8.2		CCU A Valves status verification		<input type="checkbox"/>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify VS103 Status monitoring ; VS1 (A) Valv_Stat_VS103 KM269302	= OPEN	AND=ZAZ9K999
		Verify VS501 Status monitoring ; VS2 (A) Valv_Stat_VS501 KM270302	= OPEN	AND=ZAZ9K999
		Verify VS504 Status monitoring ; VS3 (A) Valv_Stat_VS504 KM271302	= CLOSED	AND=ZAZ9K999
9		Valves CCU B verification		Next Step: END
		The state of Valves polarity selection relays is reported in Essential Housekeeping (D_H_HK_EssHR). The state of Valve status is reported in CCU monitoring packets (D_H_CCU_A/B_M1) i.e. not available at LR1/LR2 telemetry bit rates.		
9.1		CCU B Valves polarity status verification		□
		Verify V106 polarity selection relays ; VS 1 (B) Polarity_V106 KM111301	= Open	AND=ZAZ9K999
		Verify V503 polarity selection relays ; VS2 (B) Polarity_V503 KM121301	= Open	AND=ZAZ9K999
		Verify V505 polarity selection relays ; VS3 (B) Polarity_V505 KM131301	= Closed	AND=ZAZ9K999
9.2		CCU B Valves status verification		□
		Verify VS106 Status monitoring ; VS1 (B) Valv_Stat_VS106 KM269303	= OPEN	AND=ZAZ9K999
		Verify VS503 Status monitoring ; VS2 (B) Valv_Stat_VS503 KM270303	= OPEN	AND=ZAZ9K999
		Verify VS505 Status monitoring ; VS3 (B) Valv_Stat_VS505 KM271303	= CLOSED	AND=ZAZ9K999
End of Procedure				