CCU Anomaly
File: H_CRP_CCU_CCUR.xls
Author: E. Picallo

Procedure Summary

Objectives

This procedure describes the steps needed to assest a CCU A or CCU B anomaly. In case a not normal behabiur is identified the failed CCU is switched OFF.

Switch OFF the failed CCU after detection of an anomaly on CCU A or CCU B, e.g:
- No MIL bus RT response to commands from CCU.
- LCL for CCU does not stay on.
- HK, DLCM and monitoring data are not updated.
- Status in HK data indicates strange behaviour.
- Status in HK data indicates unsuccessful operation from valves or DLCM.
- Latch-up status bit in HK data remains set.
- Status of valves or DLCM arming remains ON in HK data.
- Unexpected measurement results from sensors in monitoring or DLCM data sets
- Measurement results from temperature/pressure sensors or calibration resistors are zero or at full scale in monitoring data set.

A detailed analysis of CCU failures is found in HP-2-PANT-AN-0032.

This procedure shall also be called if an RT error flag is permanently reported from CCU RT 1553 Status Word, indicating a possible RT or internal CCU problem

Summary of Constraints

If a CCU anomaly occurs during decontamination, the triplet of thermistors used for the decontamination control should be modified, selecting only the thermistors acquired by the healthy CCU. For the full Decontamination Recovery follow the contigney procedure H_CRP_SYS_DECR.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration
CCU A and CCU B ON

End of Procedure

CDMU in default configuration
CCU A / CCU B status updated if a permanent anomaly has been detected

Reference File(s)

Input Command Sequences

Output Command Sequences

Referenced Displays

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ANDs	GRDs	SLDs
	ZGZ3E999	

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
31/07/08	1	1	Created	E. Picallo	
26/11/08	2	2	Modify thermistors used for decontamination added	E. Picallo	
20/02/09	2.1	3	Add list of possible CCU anomalies that can be detected Warning on switching CCU OFF during decontamination added	E. Picallo	
20/04/09	2.3	4	In case of CCU A failed (step 11): select A" B' B" for M1 (T332, T336, T338)	E. Picallo	

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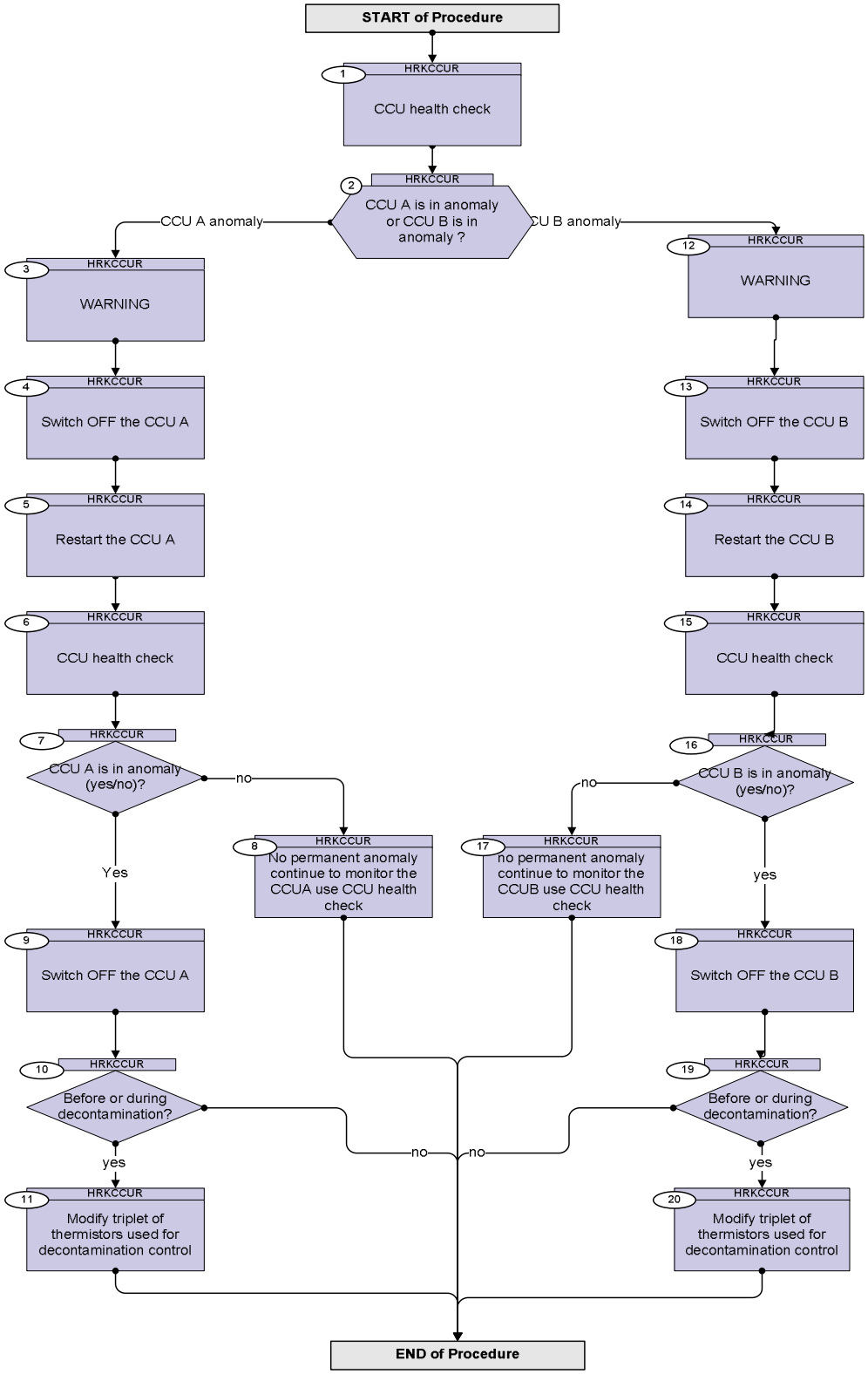
Procedure Flowchart Overview



Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Beginning of Procedure		
		TC Seq. Name :HRKCCUR (CCU Anomaly) *TimeTag Type: N* *Sub Schedule ID:*		
1		*CCU health check*		Next Step: 2
		Execute Procedure: **H_FCP_CCU_CHECK** **CCU subsystem checkout**		
2		*CCU A is in anomaly or CCU B is in anomaly ?*		Next Step: CCU A anomaly 3 CCU B anomaly 12
		Note: To recover from a CCU A or CCU B Non-Vital RT Invalid follow the H_CRP_CCU_RTR contigency procedure first.		
3		*WARNING*		Next Step: 4
		If decontamiantion is on-going switching CCU A OFF would result in stopping the decontamination due to FDIR triggering. **The default thermal sensors to be used for M2 decontamination are TH X (T339), TH Y (T341), TH Z (T342) where T339 and T341 are acuired by CCU A.** **Thus is CCU is swiched OFF the M2 median temperature can not be properlly calculated. Then the associated FDIR sequence will trigger, switching OFF both HPS1 and HPS 10 involved in M2 decontamination heating.**		
4		*Switch OFF the CCU A*		Next Step: 5
		Select to Switch CCU A OFF		
		Execute Procedure: **H_CRP_CCU_AB00** **CCU Switch OFF**		
5		*Restart the CCU A*		Next Step: 6

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Select to Switch CCU A ON		
		Execute Procedure: **H_CRP_CCU_AB01** **CCU Switch ON**		
6		*CCU health check*		Next Step: 7
		Execute Procedure: **H_FCP_CCU_CHECK** **CCU subsystem checkout**		
7		*CCU A is in anomaly (yes/no)?*		Next Step: no 8 Yes 9
8		*No permanent anomaly continue to monitor the CCUA use CCU health check*		Next Step: END
9		*Switch OFF the CCU A*		Next Step: 10
		Select to Switch CCU A OFF		
		Execute Procedure: **H_CRP_CCU_AB00** **CCU Switch OFF**		
10		*Before or during decontamination?*		Next Step: yes 11 no END
11		*Modify triplet of thermistors used for decontamination control*		Next Step: END
		Select the new thermistors triplet to be used for the decontamination control, which must be acquired by CCU B: **A" B' B" for M1 (T332, T336, T338)** **Z Z Z for M2 (T342, T342, T342)**		

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: **H_CRP_SYS_DECP** **Decontamination Heating parameters Update**		
		Analyze the evolution of the thermistors values and median temperature before and after the failure, and check if the thermistor temperature shows incoherent values with respect to the others.		
		Verify M1 median temperature Telemetry **DhM1Temp DE800171**		GRD=ZGZ3E999
		Verify M2 median temperature Telemetry **DhM2Temp DE801171**		GRD=ZGZ3E999
12		*WARNING*		Next Step: 13
		If decontamination is on-going switching CCU B OFF would result not acquing some of the thermal sensors to be used for M1/M2 decontamination. **The default thermal sensors to be used for M1 decontamination are TH A (T331), TH A'' (T332), TH C (T335) where T332 is acquired by CCU B.** **The default thermal sensors to be used for M2 decontamination are TH X (T339), TH Y (T341), TH Z (T342) where T342 is acquired by CCU B.**		
13		*Switch OFF the CCU B*		Next Step: 14
		Select to Switch CCU B OFF		
		Execute Procedure: **H_CRP_CCU_AB00** **CCU Switch OFF**		
14		*Restart the CCU B*		Next Step: 15
		Select to Switch CCU B ON		
		Execute Procedure: **H_CRP_CCU_AB01** **CCU Switch ON**		
15		*CCU health check*		Next Step: 16

Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Procedure: **H_FCP_CCU_CHECK** **CCU subsystem checkout**		
16		*CCU B is in anomaly (yes/no)?*		Next Step: no 17 yes 18
17		*no permanent anomaly continue to monitor the CCUB use CCU health check*		Next Step: END
18		*Switch OFF the CCU B*		Next Step: 19
		Select to Switch CCU B OFF		
		Execute Procedure: **H_CRP_CCU_AB00** **CCU Switch OFF**		
19		*Before or during decontamination?*		Next Step: yes 20 no END
20		*Modify triplet of thermistors used for decontamination control*		Next Step: END
		Select the new thermistors triplet to be used for the decontamination control, which must be acquired by CCU A: **A A' C for M1 (T331, T333, T335)** **X Y X for M2 (T339, T341, T339)**		
		Execute Procedure: **H_CRP_SYS_DECP** **Decontamination Heating parameters Update**		
		Analyze the evolution of the thermistors values and median temperature before and after the failure, and check if the thermistor temperature shows incoherent values with respect to the others.		
		Verify M1 median temperature Telemetry **DhM1Temp** **DE800171**		GRD=ZGZ3E999
		Verify M2 median temperature Telemetry **DhM2Temp** **DE801171**		GRD=ZGZ3E999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
End of Procedure				