

CREC_MANUAL Manually recycle the SPIRE Sorption Cooler
 File: H_COP_SPI_MACR.xls
 Author: L.Lucas-hp



Procedure Summary

Objectives

The purpose of this procedure is to manually perform a cooler recycle.

Note: At various stages it is necessary to wait, either for TM changes or ICC input.

Based on procedure:
 Name:CREC_MANUAL
 Version number:1
 Generated:14/04/2009

Summary of Constraints

Functional Tests have been completed.

Has to be performed manually during DTCP

Spacecraft Configuration

Start of Procedure

Mode = REDY

End of Procedure

Mode = REDY

Reference File(s)

Input Command Sequences

Output Command Sequences

HCSMACR

Referenced Displays

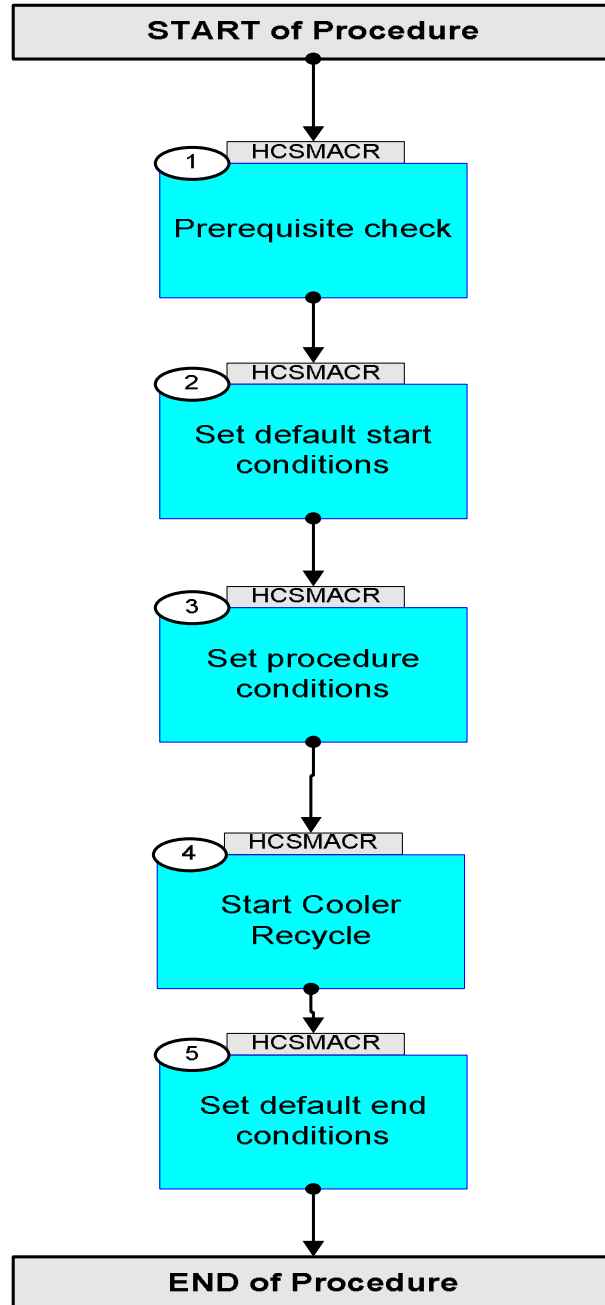
ANDs	GRDs	SLDs
ZAZ90999	SGK0_520	
SA_6_559	ZGZ46999	
ZAZ9R999	ZGZ47999	

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
19/04/09		1	Created	L.Lucas-hp	
21/04/09	2.3	1.01	Validation : Text Update	L.Lucas-hp	
04/05/09	2.4	2	Removed ET	L.Lucas-hp	



Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
TC Seq. Name : HCSMACR (CREC_MANUAL)				
TimeTag Type: Y Sub Schedule ID: <input type="checkbox"/>				
1		Prerequisite check		Next Step: 2
1.1		HSC/ICC input		<input type="checkbox"/>
		Verify that the HSC has supplied a valid OBSID value: OBS_ID = 0xnnnn nnnn		
2		Set default start conditions		Next Step: 3
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands		
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SP03N500	SC003500 0 <hex>
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500	SC001500 80010001 <hex>
		Verify Telemetry BBFULLTYPE	SM2LN500	= ClearObs AND=ZAZ90999
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SP03N500	SC003500 1 <hex>

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	
	ET=+ UT=+00.00.01	SET_OBSID Command Parameter(s) : OBSERVATION_ID Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SET_OBSID SP00N500 00000000 <hex>	SC000500	
		Verify Telemetry OBSID	SM10N500 = 00000000 <hex>	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SP03N500 0 <hex>	SC003500	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500 80000000 <hex>	SC001500	
		Verify Telemetry BBFULLTYPE	SM2LN500 = Null	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SP03N500 0 <hex>	SC003500	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500 80020001 <hex>	SC001500	
		Verify Telemetry BBFULLTYPE	SM2LN500 = StartObs	AND=ZAZ90999	
3		Set procedure conditions		Next Step: 4	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	RESET_DRCU_COUNTERS Subsch. ID : 370 Det. descr. : RESET DRCU COUNTERS	SCD00505	
		Verify that the TRESET parameter has the same value as the THSK parameter TRESET SM01T500	same as THSK	AND=ZAZ90999
		THSK SM00T500	any	AND=ZAZ90999
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands		
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 1 <hex>	
	ET=+ UT=+00.00.01	SET_OBSID Command Parameter(s) : OBSERVATION_ID SP00N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SC000500 OBS_ID	
		Verify Telemetry OBSID SM10N500	OBS_ID	AND=ZAZ90999
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 0 <hex>	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 80000000 <hex>	
		Verify Telemetry BBFULLTYPE SM2LN500	= Null	AND=ZAZ90999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 TC Control Flags : Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SC003500 0 <hex>	
4		Start Cooler Recycle		Next Step: 5
4.1		Flag Start of Cooler Recycle		<input type="checkbox"/>
		Flag the start of cooler recycle. Set ObsMode to CREC		
	ET=+ UT=+00.00.02	SET_OBS_MODE Command Parameter(s) : OBSERVING_MODE SP02N500 TC Control Flags : Subsch. ID : 370 Det. descr. : SET OBSERVING MODE	SET_OBS_MODE SC002500 600 <hex>	
		Verify Telemetry MODE SM00M500	= CREC	AND=SA_6_559
4.2		Obs Step 1		<input type="checkbox"/>
		Set OBS STEP to 1		
	ET=+ UT=+00.00.01	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 TC Control Flags : Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SC003500 1 <hex>	
		Check if the Pump Heat Switch is off (0V) If Heat Pump is OFF, skip next command (step 4.2.1)		
		Verify Telemetry SPHSV SMH0A520	= 0.0 mV	AND=ZAZ9R999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
4.2.1		Switch OFF heat Pump, if necessary		<input type="checkbox"/>
		Switch OFF Pump Heat Switch This command is irrelevant if Pump Heat Switch is already off		
	ET=+ UT=+00.00.01	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C40000 <hex> 0 <hex> (Def)	
		Verify heat Pump is OFF, telemetry reads 0V. SPHSV SMH0A520	= 0.0 mV	AND=ZAZ9R999
4.2.2		Power the Evaporator		<input type="checkbox"/>
		Apply 1.4 mA to the Evaporator Heat Switch		
	ET=+ UT=+00.00.02	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C50DEB <hex> 0 <hex> (Def)	
		Verify Telemetry is approx ~ EVHSV SMT0A520	= 560.0 mV	AND=ZAZ9R999
4.3		Obs Step 2		<input type="checkbox"/>
		Set OBS STEP to 2		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.01	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 2 <hex>	
		Monitor the PUMPHSTEMP WAIT for telemetry to decrease below 12K before proceeding to next step. PUMPHSTEMP SMF1K520	< 12.0 K	AND=ZAZ9R999
4.3.1		Pump Heater 400 mW		<input type="checkbox"/>
		Monitor the PUMPHSTEMP WAIT for telemetry to decrease below 12K before proceeding. PUMPHSTEMP SMF1K520	< 12.0 K	GRD=SGK0_520
		Apply 400 mW to the Pump heater.		
	ET=+ UT=+00.00.02	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C70A25 <hex> 0 <hex> (Def)	
		Verify Telemetry is approx ~ SPHTRV SMT1A520	= 12.7 V	AND=ZAZ9R999
4.4		OBS STEP 3		<input type="checkbox"/>
		Set OBS STEP to 3		
	ET=+ UT=+00.00.01	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 3 <hex>	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Monitor TM. WAIT for value to increase to ~45 K before proceeding to next step. PUMPHTRTEMP SMF0K520	= 45.0 K	AND=ZAZ9R999
4.4.1		<i>Pump Heater Power</i>		☐
		Monitor TM. WAIT for value to increase to ~45 K before proceeding to next step. PUMPHTRTEMP SMF0K520	= 45.0 K	AND=ZAZ9R999
		Reduce the pump heater power to 40 mW once TM check is reached.		
	ET=+ UT=+00.00.20	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C70339 <hex> 0 <hex> (Def)	
		Verify Telemetry is approx ~ SPHTRV SMT1A520	= 5.1 V	AND=ZAZ9R999
4.5		<i>OBS STEP 4</i>		☐
		Set OBS STEP to 4		
	ET=+ UT=+00.00.01	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 4 <hex>	
		Monitor SUBKTEMP Wait for it to decrease below 2K before proceeding with the next step SUBKTEMP SMK0K520	< 2.0 K	GRD=ZGZ46999
4.5.1		<i>Pump Heater & Evaporator Heat Switch OFF</i>		☐
		Monitor SUBKTEMP Wait for it to decrease below 2K before proceeding with switching OFF the Pump Heater and the Evaporator Heat Switch SUBKTEMP SMK0K520	< 2.0 K	GRD=ZGZ46999

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C70000 <hex> 0 <hex> (Def)	
		Verify Telemetry SPHTRV SMT1A520	= 0.0 V	GRD=ZGZ47999
	ET=+ UT=+00.00.01	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C50000 <hex> 0 <hex> (Def)	
		Verify Telemetry EVHSV SMT0A520	= 0.0 mV	AND=ZAZ9R999
4.6		OBS STEP 5		<input type="checkbox"/>
		Set OBS STEP to 5		
	ET=+ UT=+00.00.01	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 5 <hex>	
		Monitor TM Wait for it to decrease below 16K before proceeding with the next step EVAPHSTEMP SMF2K520	< 16.0 K	GRD=SGK0_520
4.6.1		Switch ON Pump Heat Switch		<input type="checkbox"/>
		Monitor TM Wait for it to decrease below 16K before proceeding with switching on the Heat Switch Pump EVAPHSTEMP SMF2K520	< 16.0 K	GRD=SGK0_520

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C40DEB <hex> 0 <hex> (Def)	
		Verify Telemetry approx ~ SPHSV SMH0A520	= 560.0 mV	AND=ZAZ9R999
4.7		Reduce Pump Heat Switch Dissipation -IF required		<input type="checkbox"/>
		Check with the Instrument Team The next command is to reduce the Pump Heat Switch dissipation if required - Check with the Instrument Team before sending it		
	ET=+ UT=+00.00.02	SEND_DRCU_COMMAND SEND_DRCU_COMMAND Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505 A0C40A2A <hex> 0 <hex> (Def)	
		Verify Telemetry approx ~ SPHSV SMH0A520	= 411.0 mV	AND=ZAZ9R999
		Monitor TM Wait for it to decrease below 300mK before proceeding. SUBKTEMP SMK0K520	< 0.3 K	GRD=SGK0_520
4.8		Flag End of Cooler Recycle		<input type="checkbox"/>
		Monitor TM Wait for it to decrease below 300mK before proceeding to flag the end of Cooler Recycle. SUBKTEMP SMK0K520	< 0.3 K	GRD=SGK0_520
		Flag the end of cooler recycle. Set Obs Mode back to REDY		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
	ET=+ UT=+00.00.02	SET_OBS_MODE SET_OBS_MODE Command Parameter(s) : OBSERVING_MODE SP02N500 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 370 Det. descr. : SET OBSERVING MODE	SC002500 200 <hex>	
		Verify Telemetry MODE SM00M500	= REDY	AND=SA_6_559
5		Set default end conditions		Next Step: END
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands		
	ET=+ UT=+00.00.00	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 0 <hex>	
	ET=+ UT=+00.00.01	SET_BBID SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 80000000 <hex>	
		Verify Telemetry BBFULLTYPE SM2LN500	= Null	AND=ZAZ90999
	ET=+ UT=+00.00.00	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 0 <hex>	
	ET=+ UT=+00.00.01	SET_BBID SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 80030001 <hex>	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry BBFULLTYPE SM2LN500	= EndObs	AND=ZAZ90999
	ET=+ UT=+00.00.00	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 1 <hex>	
	ET=+ UT=+00.00.01	SET_OBSID SET_OBSID Command Parameter(s) : OBSERVATION_ID SP00N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SC000500 00000000 <hex>	
		Verify Telemetry OBSID SM10N500	= 00000000 <hex>	AND=ZAZ90999
	ET=+ UT=+00.00.00	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 0 <hex>	
	ET=+ UT=+00.00.01	SET_BBID SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 80000000 <hex>	
		Verify Telemetry BBFULLTYPE SM2LN500	= Null	AND=ZAZ90999
End of Procedure				