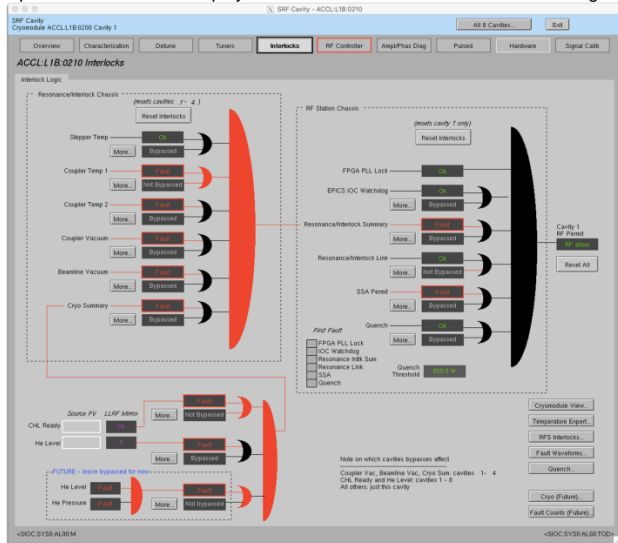


# CM Pre-Cooldown Checklist

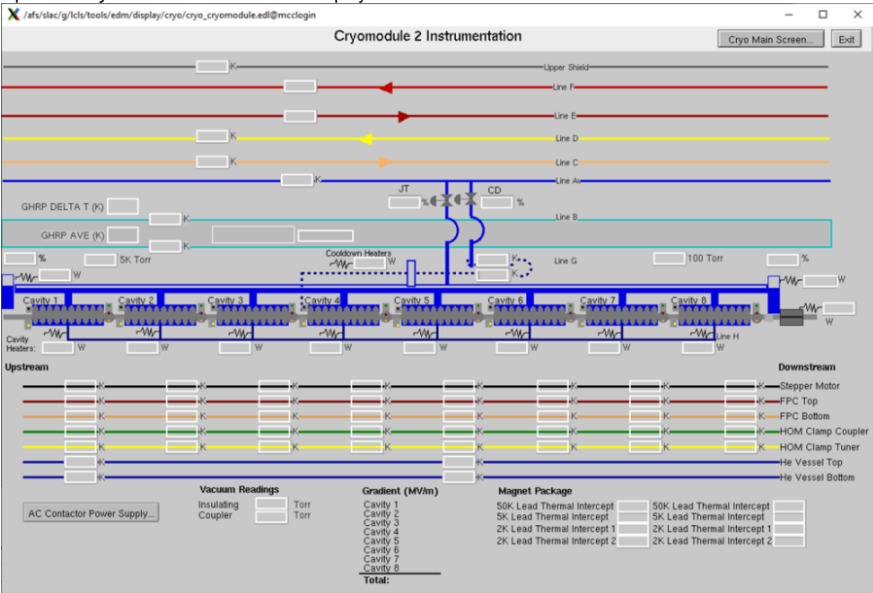
Title	LCLSII Production Cryomodule Pre-Cool Down Checklist			
Abstract	LCLSII Acceptance Test. This Traveler controls preparation of the cryomodule for SRF testing including cool down.			
Revision	R0			
Authors	Legg, Nelson, Aderhold			
Date	10 June 2020			
NCR Emails	Nelson, Aderhold			
Approval Names	B Legg	J Nelson	S Aderhold	A Burrill
Approval Signatures				
Approval Dates				
Approval Title	Author	Reviewer	Area Physicist	System Manager

Step No	Description	Initials	Date	Comments
1	Cryomodule Position (CM01, CM16, etc.)			
2	<p>Before cooldown of cryomodule under test, enter housing and check module for connected cables:</p> <p>Cavity 1 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			
3	<p>Cavity 2 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			
4	<p>Cavity 3 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			
5	<p>Cavity 4 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			
6	<p>Cavity 5 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			
7	<p>Cavity 6 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			

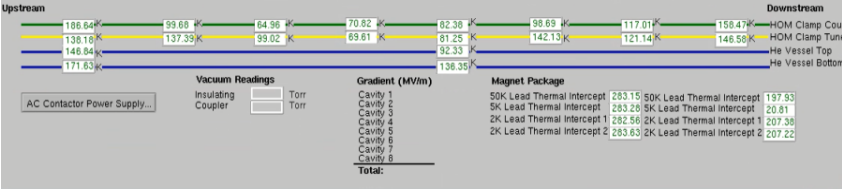
8	<p>Cavity 7 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			
9	<p>Cavity 8 Flange: Connectors A-01, A-02, A-03, B-01 and B-07</p> <p>Flange 'B': N type connector. PROBE cable</p> <p>These are for the 50 ohm loads for HOMs. N type connectors. HOM1 and HOM2</p>			
10	Flange 'C': These are for the magnets. Connectors C-01-A, C-02-A, C-03-A, C-04			
11	Flange 'D': These are for the BPM. Connectors D-01 (top), D-02(right), D-03(bot), D-04 (left)			
Step No	Description	Initials	Date	Comments
12	Flange 'D': These are for the cool down heater. Connectors D-07, D-08 (LL heater)			
13	Flange 'E': These are for the liquid level DS probes. Connector E2-01 and Pressure sensor. Verify there is external He gas to these flanges.			
14	Flange 'L': These are for the liquid level US probes. Connector L2-01 and Pressure sensor Verify there is external He gas to these flanges.			
15	Flange 'F': These are for the temp sensors for magnet package. Connector F-01 and F-02			
16	Flange 'K': These are for the temp sensors for Cryo. Connector K-01, K-02, K-03 and K-04 (heater)			
17	WR650: Verify all cavity waveguides are complete.			
18	Verify forward and reverse power cables are connected to the directional couplers for all eight cavities Note any problems or unusual conditions in the comment block.			
19	<b>Go to klyston gallery.</b> Verify the WR650 is still pressurized and connected to the SSAs for cryomodule under test			
20	Inspect cable connections to RF racks for disconnected cables. DO NOT OPEN DOORS OF RACKS. If there is a concern, note in comments and call LLRF Group.			

Step No	Description	Initials	Date	Comments
21	<p><b>Go to Operator console.</b> Open <b>LLRF Interlocks</b> Display. Click on each "More" for each interlock to go to detail screen.</p> 			
22	Note any disconnected PVs in the comment box.			

23	Push the 'Reset Interlocks' button. Note any faults which do not clear or reappear in the comments block.			
24	Verify that the <b>Beamline Vacuum</b> signal readback is correct. Record the Beamline Vacuum pressure in Torr. Note any problems in the comment block.			

Step No	Description	Initials	Date	Comments
25	Open the <i>Cryomodule Instrumentation</i> display. 			
26	Verify that the <b>Coupler Vacuum</b> signal readback is correct. Record the Coupler Vacuum pressure in Torr. Note any problems in the comment block.			
27	Verify that the <b>Stepper Motor temperature</b> readbacks is correct. At room temperature it should be about ~300K. Note any unusual readbacks in the comments block.			
28	Verify that the <b>FPC Top and Bottom</b> Temperature readbacks are correct. At room temperature it should be about ~300K. Note any unusual readbacks in the comments block.			

Step No	Description	Initials	Date	Comments
29	Verify that the <b>Helium Lines (Shield, F, E, D, C, A and B) temperature instrumentation</b> readback is correct. At room temperature they should read about ~300K. Note any unusual readbacks in the comments block.			
30	Verify that the <b>Helium Vessel and HOM Copper Clamp RTD</b> readbacks are correct. Note any problems in the Comment block.			
31	Verify <b>Downstream Liquid Level Probe</b> and <b>Upstream Liquid Level Probe</b> readbacks are correct. May read "100%" at room temperature. Note any problems in the Comment block.			
32	Verify that <b>Pressure Transducers</b> (100 Torr and 5000 Torr) are properly connected to the cryomodule and that each readback is correct. Note any problems in the comment block.			
33	Verify that <b>Liquid level heaters</b> are properly connected to the cryomodule and that each readback is correct. Prior to cooldown they should read "0". Note any problems in the comment block.			
34	Verify that <b>Cavity heaters</b> are properly connected to the cryomodule and that each readback is correct. Prior to cooldown they should read "0". Note any problems in the comment block.			
35	Verify that <b>Cooldown and magnet heaters</b> are properly connected to the cryomodule and that each readback is correct. Prior to cooldown they should read "0". Note any problems in the comment block.			
36	Verify that <b>JT and CD Valve Actuator</b> is reading back properly. List any problems in the comment block.			

37	Scroll to bottom of <i>Cryomodule Instrumentation</i> display 			
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38	Verify <b>Magnet temperatures</b> are connected to data acquisition. Verify that each readback is correct. At room temperature all values should be ~300K. Note any problems in the Comment block.			
39	Verify that all preceding <b>Cool Down Preparation</b> steps have been completed and that all requested information has been entered into the appropriate fields.			
40	Transmit completed checklist to Area Physicist.			