Magnet Power Supply Ramping Up / Down Procedure

Operations

The following procedures suppose that you use the remote control interface (i.e. Cryo Control Panel; CCP). When you use the front panel of the magnet PS, some button operations are different.

Things to-do

- 1. We should get the information of Clamped/Reate-Limit/Quench from the Mercury-iPS to the VI
- 2. We need to be able to ramp-down 0A with 0.5A/m rate, so there should be a preset for that.
- 3. Need a manual override in the VI.
- 4. We need a power-indicator on the shim power supply. These are the shim-coil-power indicators.
- 5. We need a field indicator in the cave.

Precautions

- No operation can be made when the magnet is being filled with LHe.
- The magnet LHe level is so high (>20%??) that LHe remains even if soft quench happens.
- A time to ramp up/down the magnet should be planned in advance, since it takes at least 1.5 hours.
- You should remember that any deviation from the standard procedure might cause quench.
- You are expected to know what should happen at each step and confirm that it happened. You had better go through this procedure with another person who has already carried it out.
- You should search for any indication of quench during the operations, such as error messages on the magnet PS, sudden changes of Tank B, Coil T, Coil B, the magnet pressure, etc.
 - You can use this chart preset: https://e906-gat1.fnal.gov/data-summary/e1039/target-par-preset/magnet_ramp.php

To Ramp Up

- 1. Confirm that the shim PS is powered ON (if you can go in the hall). blocked URL
- 2. Press "To Zero", to confirm that CCP can communicate with the magnet PS.



3. Press the Toggle button of the main switch heater. It turns on the main switch heater and also the two shim switch heaters.

a. When you use the PS front panel, you have to press additionally the two buttons of the shim switch heaters on CCP, to turn them on.



- 4. Confirm that the two LEDs on the shim PS are ON (if you can go into the hall). blocked URL
- 5. Set "2 A/m" and "45 A".
 - a. You can use the "Presets" selector, or enter the values into the text boxes.



6. Press "To Set" and wait until the current becomes the set point (SP) and "HOLD". It takes 23 minutes.



After ~23 minutes.



7. Set "1 A/m" and "63 A".

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Target Current (A): 63 Target Field (II: 4-2312 Target Field (II: 4-2312 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0:	Mercury IPS Status Comms Layer Ethernet TCP/IP v IP Addr. 192.168.24.91 VISA & COM6 v Mig. Shim Relay Status Addr. 192.168.24.184 Port 6722 Mig. Init OK.
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8. Press "To Set" and wait until the current becomes the SP and "HOLD". It takes 18 minutes.



After ~18 minutes



9. Set "0.5 A/m" and "74.51 A".

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Image: Controls Unlocked Image: Controls Unlocked	Output Voltage (v)	PASSWORD: PASSWORD: Special Modes Last Update 2024-01-20 19:27:05
Target Current (A): 74.78 80- Target Field (T): 5.0223 50- Target Frequency (MHz): 213.83 90- 20 40 60- 50- 20 40 60- 50- 20 40 60- 50- 20 40 71-38-30 50- 20 40 60- 50- 20 40 71- 120	He Level N2 Level	Mercury IPS Status Comms Layer Ethernet TCP/IP v IP Addr. 192:168:24:91 VISA & COM6 v Mog.
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exceedin Down to 0 A at 2 A/m hardware Down to 0 A at 2 A/m Hold To Set To Zero	Main Switch Heater (N) Toggle (Charles the main & shim switch heater #1 (N) #2 (N)	AMI1700 Status Addr. 192.168.24.134 Port 7180 LHe Mode CONT Interval (min) 15

10. Press "To Set" and wait until the current becomes the SP and "HOLD". It takes 24 minutes.



After ~24 minutes



11. Switch to the persistent mode, if you want. Follow the steps in the next section.

Reference: UVA elog 154

To Switch to Persistent Mode

1. Press the Toggle button of the main switch heater. It turns off both the main and shim switch heaters.





2. Press "To Zero" and wait until the current becomes 0 A and "HOLD". It takes 4 minutes, where the ramp rate is slow at the beginning.

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To Switch from Persistent Mode

- If this is a ramping-down for the first time after a long time (i.e magnet was ramped-up after a long time since it was turned-OFF), then you should verify the magnetic field as the first step.
 Skip to the Step #2 if this is not the case.
- Verify that the shim PS (the bottom one in the following picture) is powered ON. If not, turn it on and check why it was off. blocked URL
- 3. Confirm that the main and shim switch heaters are OFF. If not, something is wrong. Also, the two LED bulbs Z1 and ZY-Z2 are OFF (see the bottom module of the above picture).

Main Switch Heater OFF To	oggle	This toggle button changes the main & shim switch heater
Shim Switch Heater #1 OFA	#2 OFA	together.

4. Set "74.78 A", using the Presets selector. The ramp rate becomes "0.5 A/m" but it will not matter.



5. Press "To Set" and wait until the current becomes the SP and "HOLD". It takes 2.5 minutes.





6. Confirm that "Clamped" nor "Quench" is not red (if you can go into the hall).



7. Press the Toggle button of the main switch heater. It turns on both the main and shim switch heaters.



When you do this step, you should see the two LED bulbs Z1 and ZY-Z2 are ON.



To Ramp Down

Switch back from the persistent mode, if necessary, by following the previous section.
 Set "0.5 A/m" and "63 A".

Set "0.5 A/m" and "63 A".	_
None	
Up to 45 A at 2 A/m	
Up to 63 A at 1 A/m	
Up to 74.78 A at 0.5 A/m	
Down to 63 A at 0.5 A/m	
Down to 45 A at 1 A/m	
✓ Down to 0 A at 2 A/m	

3. Press "To Set" and wait until the current becomes the SP and "HOLD". It takes 24 minutes.



after ~24 minutes

If you are in the NM4 Hall, and you see that the display shows "Rate Limit" in RED, then wait for a few minutes and observe the strip charts and this module's display.





After a few minutes, the display should look like the following.

Current (A) 74.4592	Amp	Hold
Magnet (A) 74 4592	Heaster Onl	To Set
Voltage (V) -0.0037	Clamped Rate Limit	To Zero
	Quench	Zaxis

Wait until the VI indicates that it switched to "HOLD"



4. Set "1 A/m" and "45 A".



5. Press "To Set" and wait until the current becomes the SP and "HOLD". It takes 18 minutes.



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6. Set "2 A/m" and "0 A", then Press "To Set". Then, the screen should be similar to the following screen.

 Magnet,P5,Main.vi



7. Wait until the current becomes the SP and "HOLD". It takes 23 minutes. Then, the screen should be similar to the following screen. 돈 Magnet_PS_Main.vi

File Edit View Project Operate Tools Windo	w Help		
Target Species: Proton	et Power Supply ceed EMERGENCY Stop tput Current (A) Persistent Current (A) Output Volt 0.05 0.05 -0.00	age (V)	PASSWORD: Special Modes Last Update 2024-01-13 14:59:56
Target Carrent (A): Target Field (T): 0 Target Frequency (MH2): 0 Carget frequenc	80- 60- 0- 0- 0- 0- 0- 0- 0- 0- 0-	He Level N2 Level	Mercury IPS Status Comms Layer Ethemet TCP/IP IP Addr. 192.168.24.91 VISA COM6 Shim Relay Status Addr. 192.168.24.184 Port 6722 Msg. Init OK.
Incramp rate is auto-lowered when exceeding the limit that is defined in hardware as a function of output current. Hold To Set To Zero	Hold To Set To Zero Main Swite	th Heater ON Toggle This toggle button changes the main & shim switch heaters	AMI1700 Status
	Shim Swite	together.	LHe Mode CONT Interval (min) 15

8. Press the Toggle button of the main switch heater. It turns off both the main and shim switch heaters. The following screenshot was taken during the process after pressing the toggle button.



At the end, if you can access the NM4 hall, then ensure that the two LED bulbs Z1 and ZY-Z2 are OFF. Also ensure the Mercury-IPS shows ZEROs for Current(A), Magnet(A), Voltage(V) as shown in the following picture. blocked URL

Reference: UVA elog 174

Documents

- ORC 2049 ORC of Super conducting magnet electronic connectors (in the target cave)
- oxford_seppo_magnet_cryostat_handbook.pdf oxford_seppo_work_notes.pdf •
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