

Head, Project Mechanical Engineering
Head, Technical Support
ES&H Coordinator
Quality Assurance
Electrical Systems
Design Engineering
Cognizant Physicist

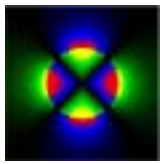
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11/23/2015
11/30/2015
12/02/2015
12/03/2015
11/24/2015
12/03/2015
11/23/2015

Serial No	Part No	Part	P/L	ECN	Rev	P/L	ECN	Rev	P/L
Work Order #: _____				Deviation & Waiver: _____					

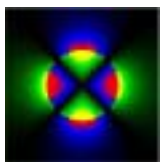
OP	Description	Name/Life #	Date	DR
5	Reference Documents: 25-2043020 Revision A			
10	This traveler covers only the work described herein. Moving, lifting, or reorienting the magnet is not a part of the work described here.			
20	The technicians shall be instructed by their cognizant technical supervisor in the operation of the required electrical test equipment and the electrical testing procedures.			
30	Hipot ("Hypot") and impulse testing pose an electrical hazard. At least two properly trained technicians must be present to perform this testing. When testing, a trained technician shall be stationed at any point where the item under test is accessible to unauthorized people, and barriers shall be set up. Signs shall be posted reading "DANGER HIGH VOLTAGE" and warning lights shall be turned on.			





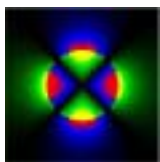
OP	Description	Name/Life #	Date	DR
40	<p>The technician is responsible for notifying the technical supervisor and/or the cognizant engineer of any discrepancies occurring during the performance of this procedure. All discrepancies shall be identified and reported in accordance with SMD-MAG-1003.</p> <p>Measuring and test equipment used for this procedure shall contain a valid calibration label in accordance with the SBMS Subject Area 'Calibration', where applicable.</p>			
50	<p>Technicians performing Pressure Testing shall be instructed in the procedures prescribed by the SBMS Subject Areas by the Cognizant Engineer or Technical Supervisor:</p> <ul style="list-style-type: none"> * Compressed Gas Cylinders and Related Systems * Pressure Safety * Cryogenics Safety <p>All relief devices and gauges used for pressure tests shall meet the requirements of the SBMS Subject Area. Examine all pressure test equipment before pressure is applied to ensure it is tightly connected.</p> <p>Suitable precautions shall be taken during pressure testing to eliminate hazards to personnel in the proximity of the test in the event of a rupture. The area shall be roped off.</p>			
60	<p>All work performed herein shall be done in a manner compliant with the document "Work Plan for S-Phenix Magnet". All work which has not been categorized as 'worker planned work' shall require an approved work permit.</p>			
70	<p>Electrical Checkout at Room Temperature</p> <ol style="list-style-type: none"> 1. Measure lead resistances to ground with meter. 2. Hipot to ground at 520 V of magnet leads. 3. Impulse test at 400 V of separate layers and full coil. 4. DC voltage series resistance measurements at 1 A. 5. 1 A level shift test to check data acquisition system. 			
80	<p>Connect magnet to power supply.</p>			





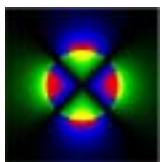
OP	Description	Name/Life #	Date	DR
90	Ramp magnet to 2 A at 0.1 A/s and measure magnet total voltage and inner and outer layer voltages in order to determine the inductances.			
100	Checkout of Quench Detector (QD) - validate stop signal 1. Half Coil Difference - inner and outer layer voltage difference; 2. Current Derivative (Idot)- total coil voltage and L(dI/dt) difference			
110	Set slow logger for 1 min sampling intervals. Monitor LHe level, temperatures, and strains during cooldown.			
120	Signoff by cognizant scientist OK to proceed. _____ Notify cryogenics personnel to start cooldown. Cryogenic operation for this test is covered under separate procedure by R. Than.			
130	Cooldown to 4.5 K Monitor LHe level, temperatures, and strains during cooldown. Slow logger at 1 min. Signoff by cognizant cryogenic engineer ok at 4.5K _____			





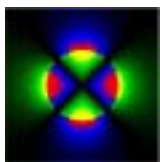
OP	Description	Name/Life #	Date	DR
140	<p>Electrical Checkout at 4.5 K</p> <ol style="list-style-type: none"> 1. Measure lead resistances to ground. 2. Perform Hipot to ground at 520 V of magnet leads. 3. AC voltage tap measurements at 1 A. 4. Impulse test at 400 V of separate layers and full coil. 5. Connect magnet to power supply. Use inductance result from OP 90 as starting point for power supply regulation. 6. Set fast data logger at 1 kHz sampling rate (1 ms intervals). Slow data logger at 1 s intervals. Monitor LHe level, temperatures, strains, and voltages of magnet, coils, SC leads, and gas-cooled leads. Adjust lead flow if necessary. 7. Ramp to 10 A at 1 A/s. Determine the total, inner, and outer inductances and adjust Idot QD and Delta QD as necessary to balance for the difference in the inner and outer layer inductances; determine the Idot QD voltage threshold. Adjust lead flow if necessary. 8. Ramp to 25 A at 1 A/s. Verify results from Step 7. Shut off power supply (manual QD trip) and analyze voltage tap data signals for proper operation of instrumentation and hardware. Adjust lead flow if necessary. 9. Repeat Step 8 at 50 A. Adjust lead flow if necessary. 			





OP	Description	Name/Life #	Date	DR
150	<p>Ramp Testing</p> <p>Set Delta QD at 50 mV. Set Idot QD at previously determined threshold.</p> <p>Fast data at 1 KHz. Slow logger at 1 s. 1 A/s ramp rate.</p> <ol style="list-style-type: none"> Ramp to 100 A at 1A/s. Verify inductances. Monitor leads and adjust flow if necessary. Shut off power supply. Analyze voltage tap data signals. 5 power cycles from 0 A to 100 A at 1 A/s. 1 hour at 100 A. Monitor leads and coil voltages. If no QD trip occurs, repeat power cycles at 2.5 A/s, first to 50 A, then to 100 A. If no QD trip occurs, warm up magnet to room temperature. If QD trip occurs, analyze voltage tap signals to determine nature of trigger event. If signals show no anomalies, repeat tests to 100 A. When tests have been completed, set slow logger for 1 min sampling intervals. Monitor LHe level, temperatures, and strains during warmup. Notify cryogenics personnel to start warmup to room temperature. 			
160	<p>Warmup to Room Temperature</p> <p>Monitor LHe level, temperatures, and strains during warmup. Slow logger at 1 min.</p>			
310	<p>Verify All Traveler Operations Complete</p>			
991	<p>Revision History: Rev. A: Initial Release 11/9/15</p>			

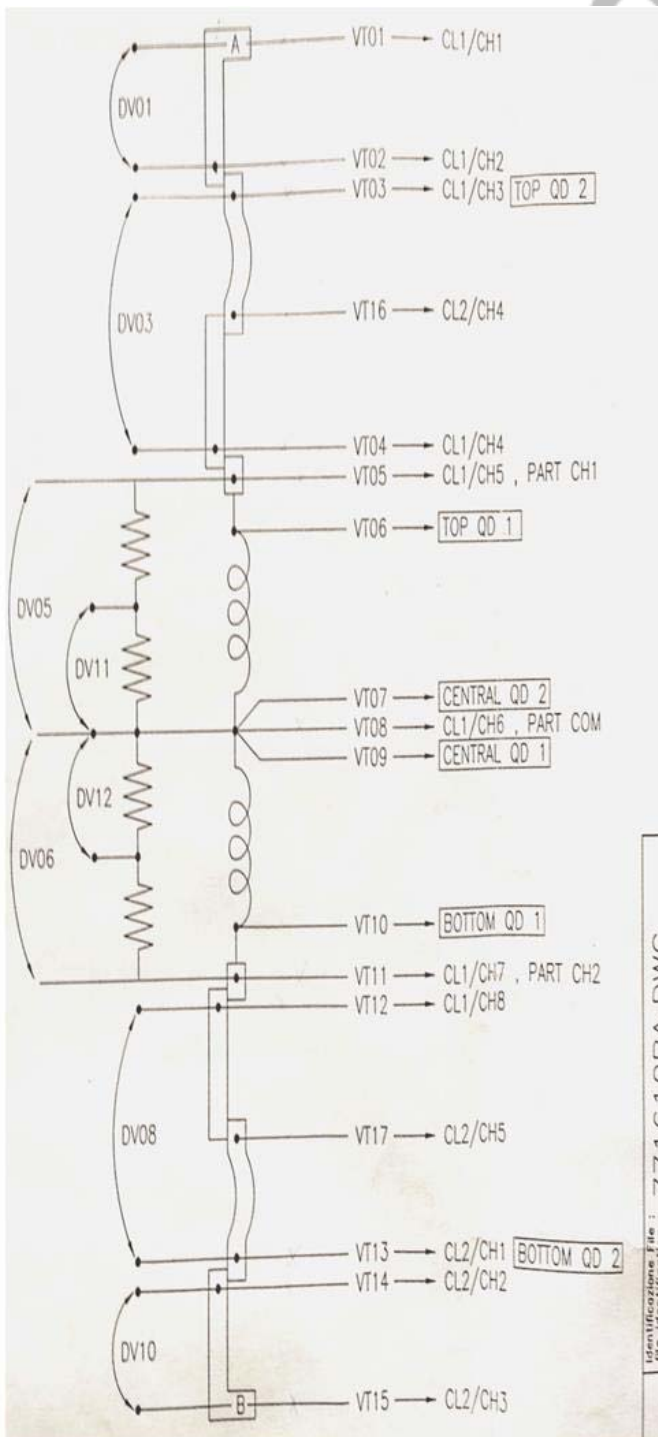




OP	Description	Name/Life #	Date	DR
1000				

Babar Voltage Drops @ 1amp
Table 1

Tap	Description	Value
VT01		
VT02		
VT03	Top QD 2	
VT16		
VT04		
VT05		
VT06	Top QD 1	
VT07	Central QD 2	
VT08		
VT09	Central QD 1	
VT10	Bottom QD 1	
VT11		
VT12		
VT17		
VT13	Bottom QD 2	
VT14		
VT15		
DV	Description	Value
DV01		
DV03		
DV05		
DV06		
DV08		
DV10		
DV11		
DV12		



Identification file: 771610BA.DWG



