

STF CM-1/CM-2a cool-down test

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Cool-down test of CM-1(8 cavities + quad) + CM-2a(4 cavities)

Start cool-down : 7 October, 2014

Reached to 4K : 17 October, 2014

Will stop cool-down : 28 November, 2014

Cavities low-power-test at 2K : from 20 October to 28 November, 2014

Quad test : 17, 18, 19 November 2014

Cavity low-power-test

Tuner: tuning-range excursion measurement

Input coupler: coupling-range excursion measurement

QL, Qt, Qin, QHOM

Piezo: tuning-range excursion measurement

Piezo: Pulse response

Heat-load: measurement, by using heater for intentional high heating

Cavity position monitoring by stretched wires

5 wire-sensors in CM-1 GRP

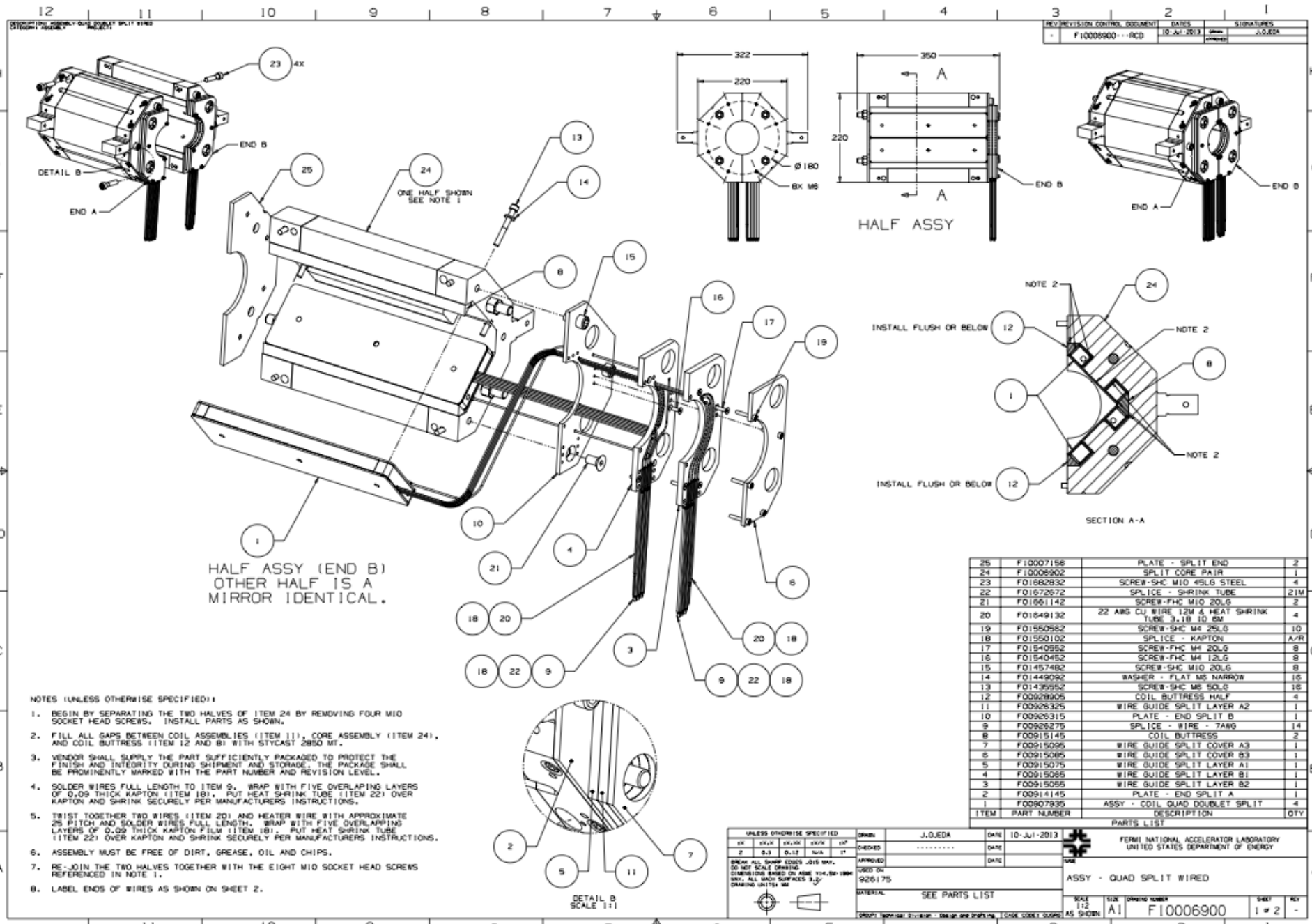
18 wire-sensors in CM-1 cavities & magnet

No wire sensors in CM-2a

Cavity low-power-test close to the cryomodule



Conduction-cooled quadrupole magnet (FNAL magnet)



REV	REVISION CONTROL DOCUMENT	DATE	SIGNATURE
1	F10006900 - RCD	10-Jul-2013	J.O.JEDR

HALF ASSY (END B)
OTHER HALF IS A
MIRROR IDENTICAL.

- NOTES (UNLESS OTHERWISE SPECIFIED):
- BEGIN BY SEPARATING THE TWO HALVES OF ITEM 24 BY REMOVING FOUR M10 SOCKET HEAD SCREWS. INSTALL PARTS AS SHOWN.
 - FILL ALL GAPS BETWEEN COIL ASSEMBLIES (ITEM 11), CORE ASSEMBLY (ITEM 24), AND COIL BUTTRESS (ITEM 12 AND B) WITH STYCAST 2850 MP.
 - VENDOR SHALL SUPPLY THE PART SUFFICIENTLY PACKAGED TO PROTECT THE FINISH AND INTEGRITY DURING SHIPMENT AND STORAGE. THE PACKAGE SHALL BE PROMINENTLY MARKED WITH THE PART NUMBER AND REVISION LEVEL.
 - SOLDER WIRES FULL LENGTH TO ITEM 9. WRAP WITH FIVE OVERLAPPING LAYERS OF 0.09 THICK KAPTON (ITEM 18). PUT HEAT SHRINK TUBE (ITEM 22) OVER KAPTON AND SHRINK SECURELY PER MANUFACTURERS INSTRUCTIONS.
 - TWIST TOGETHER TWO WIRES (ITEM 20) AND HEATER WIRE WITH APPROXIMATE 25 PITCH AND SOLDER WIRES FULL LENGTH. WRAP WITH FIVE OVERLAPPING LAYERS OF 0.09 THICK KAPTON FILM (ITEM 18). PUT HEAT SHRINK TUBE (ITEM 22) OVER KAPTON AND SHRINK SECURELY PER MANUFACTURERS INSTRUCTIONS.
 - ASSEMBLY MUST BE FREE OF DIRT, GREASE, OIL AND CHIPS.
 - RE-JOIN THE TWO HALVES TOGETHER WITH THE EIGHT M10 SOCKET HEAD SCREWS REFERENCED IN NOTE 1.
 - LABEL ENDS OF WIRES AS SHOWN ON SHEET 2.

ITEM	PART NUMBER	DESCRIPTION	QTY
25	F10007158	PLATE - SPLIT END	2
24	F10006902	SPLIT CORE PAIR	1
23	F01682832	SCREW-SHC M10 45LG STEEL	4
22	F01672572	SPLICE - SHRINK TUBE	2[M
21	F01661142	SCREW-FHC M10 20LG	2
20	F01649132	22 AWG CU WIRE 12W & HEAT SHRINK TUBE 3.18 ID 6M	4
19	F01550582	SCREW-SHC M4 25LG	10
18	F01550102	SPLICE - KAPTON	A/R
17	F01540552	SCREW-FHC M4 20LG	8
16	F01540452	SCREW-FHC M4 12LG	8
15	F01457482	SCREW-SHC M10 20LG	8
14	F01449082	WASHER - FLAT MS 18X8X2	16
13	F01439952	SCREW-SHC M8 50LG	16
12	F00928905	COIL BUTTRESS HALF	4
11	F00926325	WIRE GUIDE SPLIT LAYER A2	1
10	F00926315	PLATE - END SPLIT B	1
9	F00926275	SPLICE - WIRE - 7ANG	14
8	F00915145	COIL BUTTRESS	2
7	F00915095	WIRE GUIDE SPLIT COVER A3	1
6	F00915085	WIRE GUIDE SPLIT COVER B3	1
5	F00915075	WIRE GUIDE SPLIT LAYER A1	1
4	F00915065	WIRE GUIDE SPLIT LAYER B1	1
3	F00915055	WIRE GUIDE SPLIT LAYER B2	1
2	F00914145	PLATE - END SPLIT A	1
1	F00907935	ASSY - COIL QUAD DOUBLET SPLIT	4

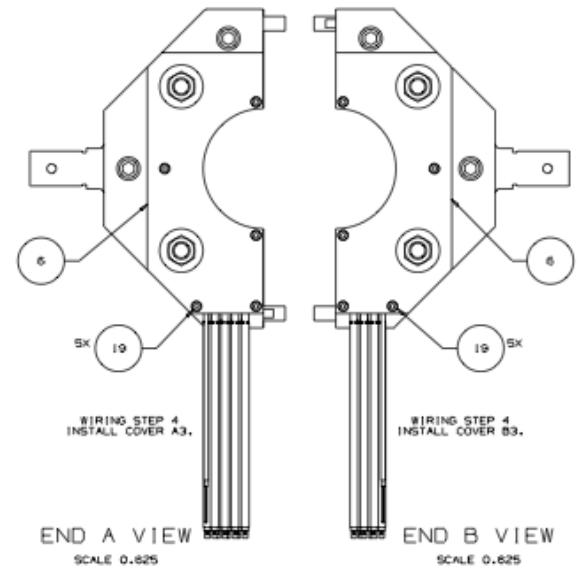
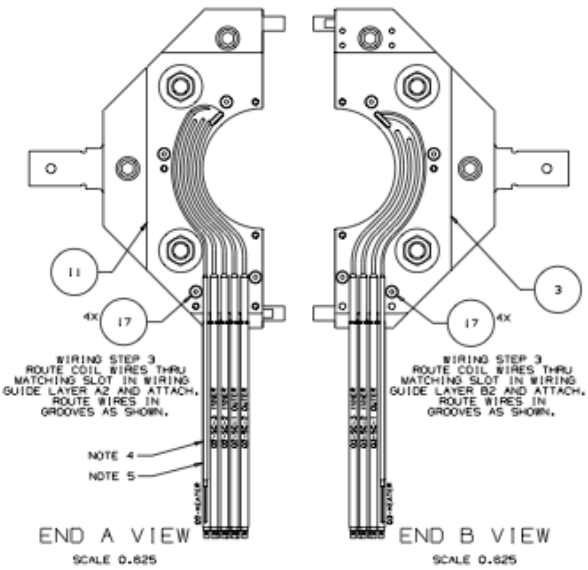
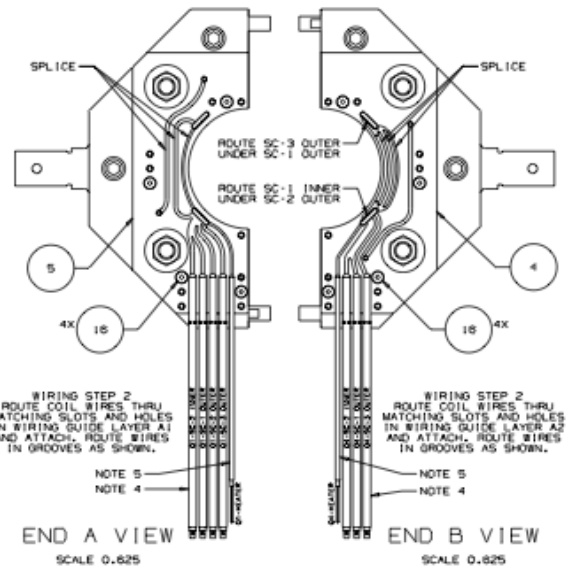
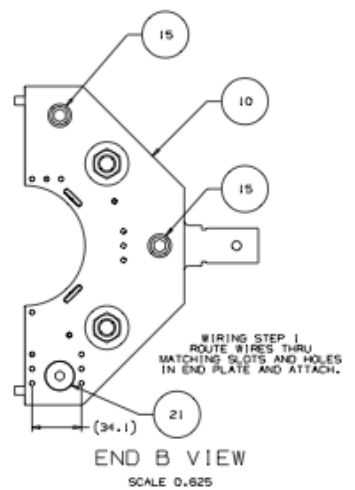
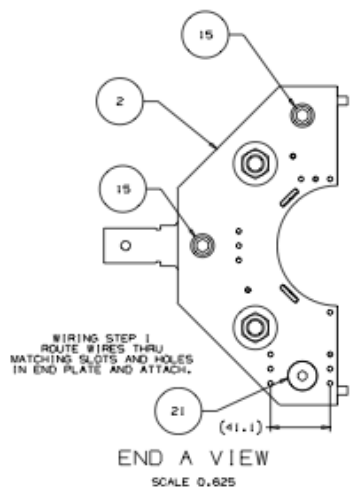
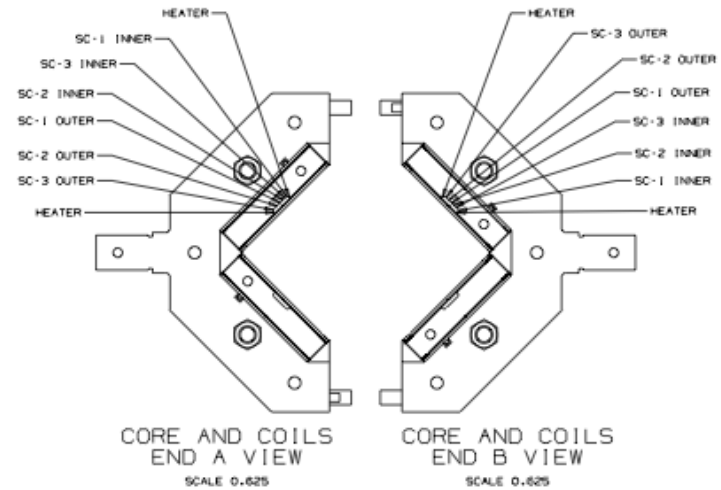
UNLESS OTHERWISE SPECIFIED				DESIGN	J.O.JEDR	DATE	10-Jul-2013
XX	XX.X	XX.XX	XX/XX	INP	CHECKED	DATE	
2	0.3	0.12	1/4	1"	APPROVED	DATE	
DRAWN: ALL SHARP EDGES 0.15 MAX. DO NOT SCALE DRAWING. DIMENSIONS BASED ON ASSE Y14.50-1994 UNLESS OTHERWISE SPECIFIED. DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED.							
MATERIAL				SEE PARTS LIST			
SCALE				1:2			
SHEET				1 of 2			
PARTS LIST				F10006900			

FERMILAB NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

ASSY - QUAD SPLIT WIRED

SC lead extracted from side panel

REV	REVISION CONTROL DOCUMENT	DATE	SIGNATURE
-	F10006900-RCD	10-JUL-2013	J.O.EDA



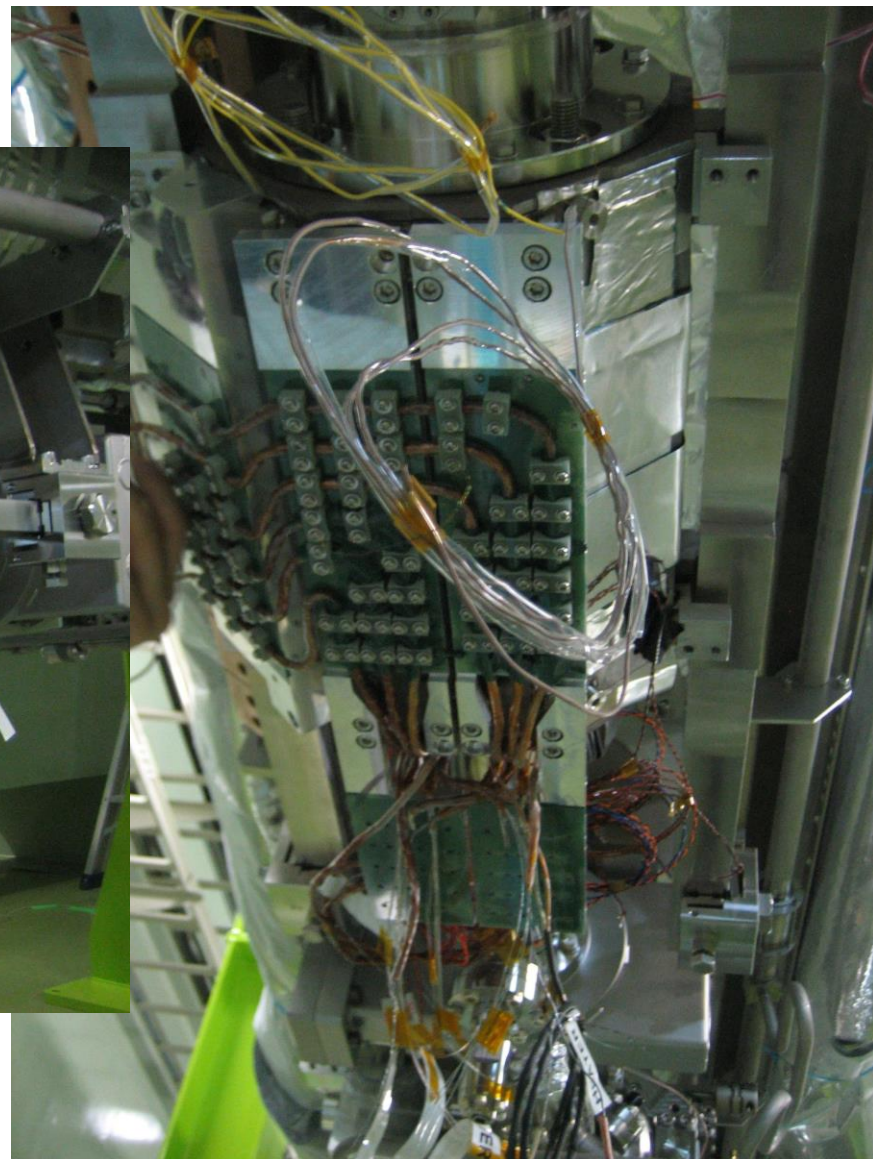
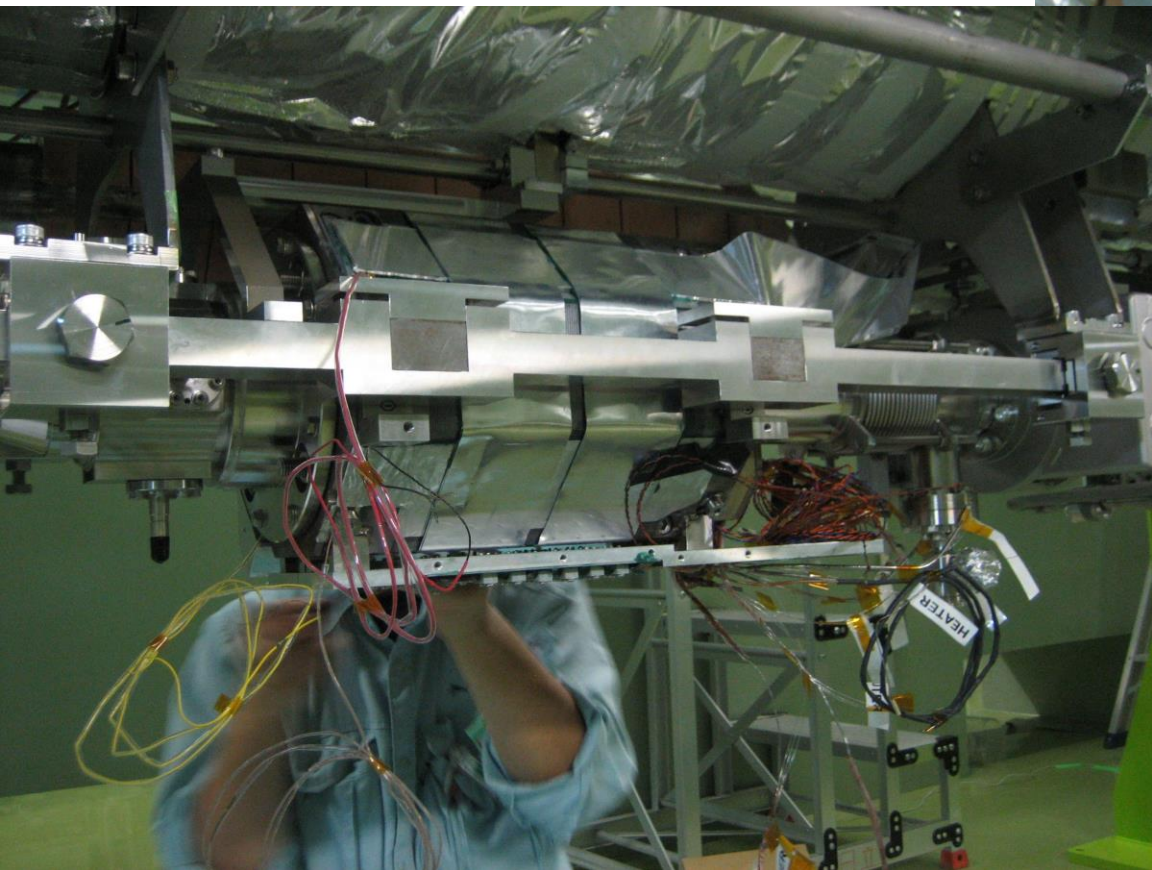
UNLESS OTHERWISE SPECIFIED				DRWS	J.O.EDA	DATE	10-JUL-2013								
1X	1X/2	2X/10	4X/4	1X/1	DRAWN	DATE									
2	3,3	0,12	N/A	1"	APPROVED	DATE									
BREAK ALL SHARP EDGES .015 MAX. 50 REF SCALE OPERATING DIMENSIONS BASED ON ASME Y14.5M-1994 UNLESS ALL DIMENSIONS 1/2" DRAWING UNITS: IN				MATERIAL		SEE PARTS LIST									
<table border="1"> <tr> <td>SCALE</td> <td>1:1</td> <td>DRAWING NUMBER</td> <td>F10006900</td> </tr> <tr> <td>SHEET</td> <td>2</td> <td>REV</td> <td>2</td> </tr> </table>				SCALE	1:1	DRAWING NUMBER	F10006900	SHEET	2	REV	2	FERMIL NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY ASSY - QUAD SPLIT WIRED			
SCALE	1:1	DRAWING NUMBER	F10006900												
SHEET	2	REV	2												

This copper block was welded upstream/downstream reversely!
So, we need different AL conductor adapter to touch SC wires, from the planned one.



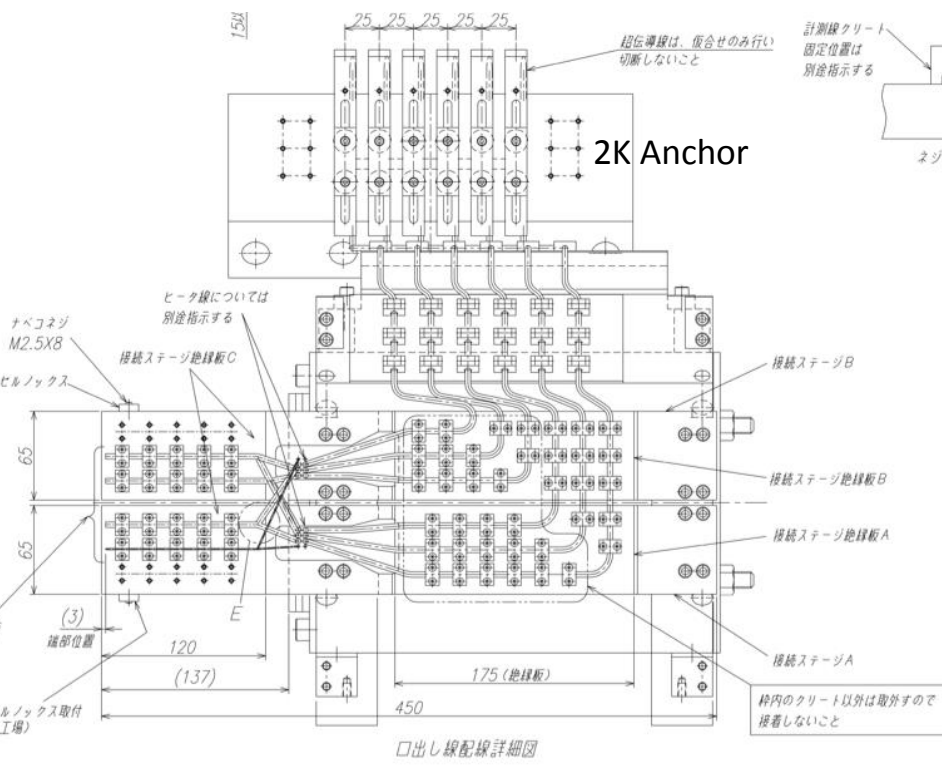
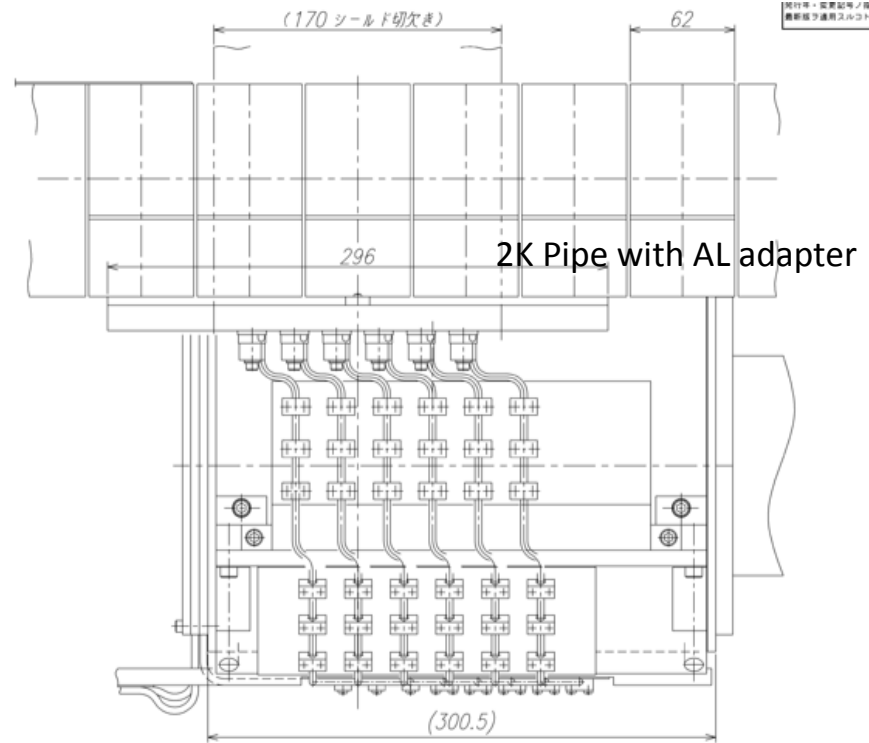
No bolt taps
in this side.
But
other side.

Pictures of SC wiring

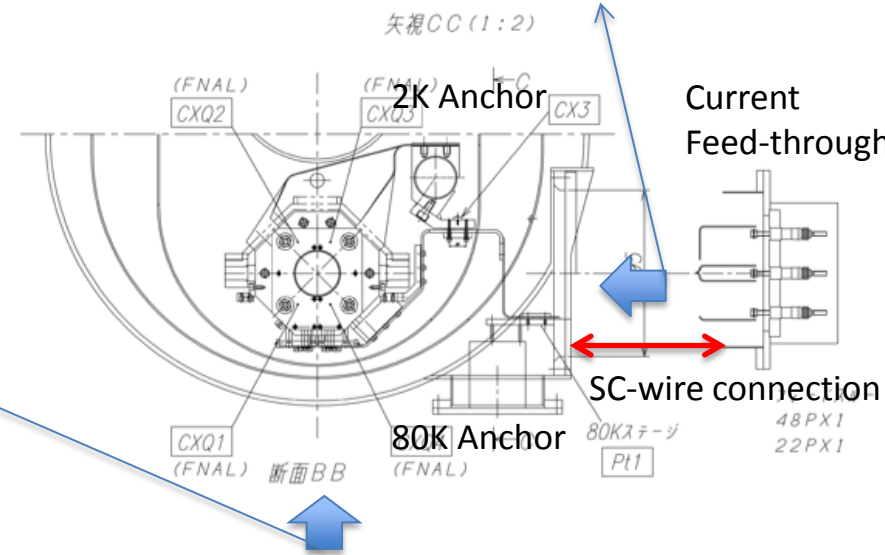


See from bottom

SC wiring (see from side)



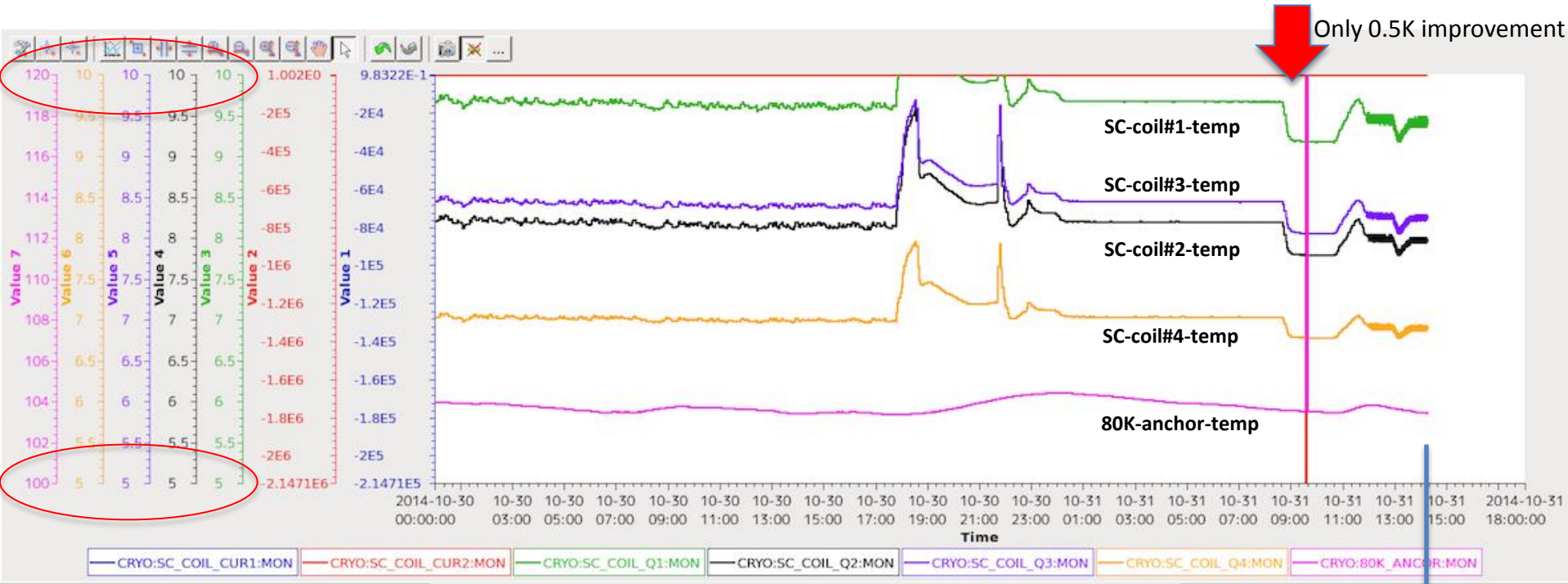
SC wiring (see from bottom)



Current feedthrough adapter



Trial for more cool-down by increasing LHe level of 2k-pipe



Target coil temperature is 6K

Temp. reached:
coil=7 – 9K
2K anchor=7K
80K anchor=103K

2014/10/31 14:15:41

	temperature	raw
SC-Coil-Q1	9.456K	859.000uV
SC-Coil-Q2	8.002K	869.000uV
SC-Coil-Q3	8.271K	1.123mV
SC-Coil-Q4	6.927K	918.000uV
Coil-splice-1	10.130K	2.261mV
Coil-splice-2	12.113K	2.158mV
2K ancor	7.414K	11.130mV
80K ancor	103.455K	37.740mV
Heater		0.000V

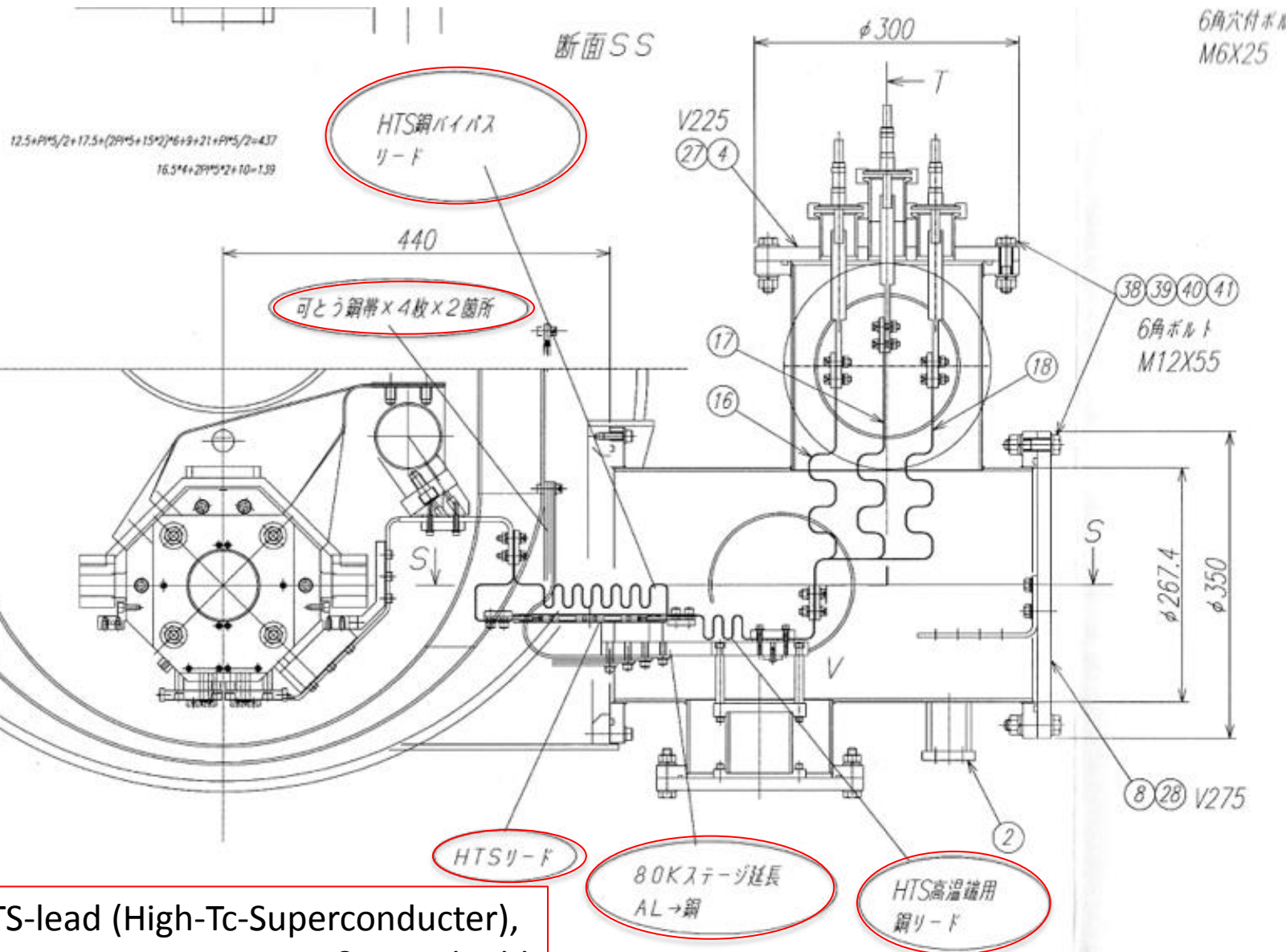
Test with Mike Tartaglia(FNAL)

Nov. 17,18,19 2014, NK and AY

- (1) Coil temperature was around 8K (higher than expected 6K)**
- (2) Heat load was 2.7W (consistent with calculated value 2.6W)**
- (3) Quench happened at 7A (smaller than expected operation 50A)**
- (4) Excitation speed 1.5A/sec**

We will improve the heat load by introducing HTS leads.

2015 Improvement plan for more Heat-load-reduction



Introducing HTS-lead (High-Tc-Superconductor),
 With more strong connection to 5K & 80K shield

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