LQXB05 Test Report

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Quench Training

In the first test cycle, MQXB11 quenched at 12236 A (221 T/m[1]) and at 12974 A (233T/m). MQXB08 quenched at 12922 (233 T/m)

Quench training results are compared to previous magnets in Fig. 1. Table 1 is a list of quenches executed as part of quench current studies. Additional quenches were done to study the ramp rated dependence of the quench current.

Summary: The requirements for acceptance are satisfied.

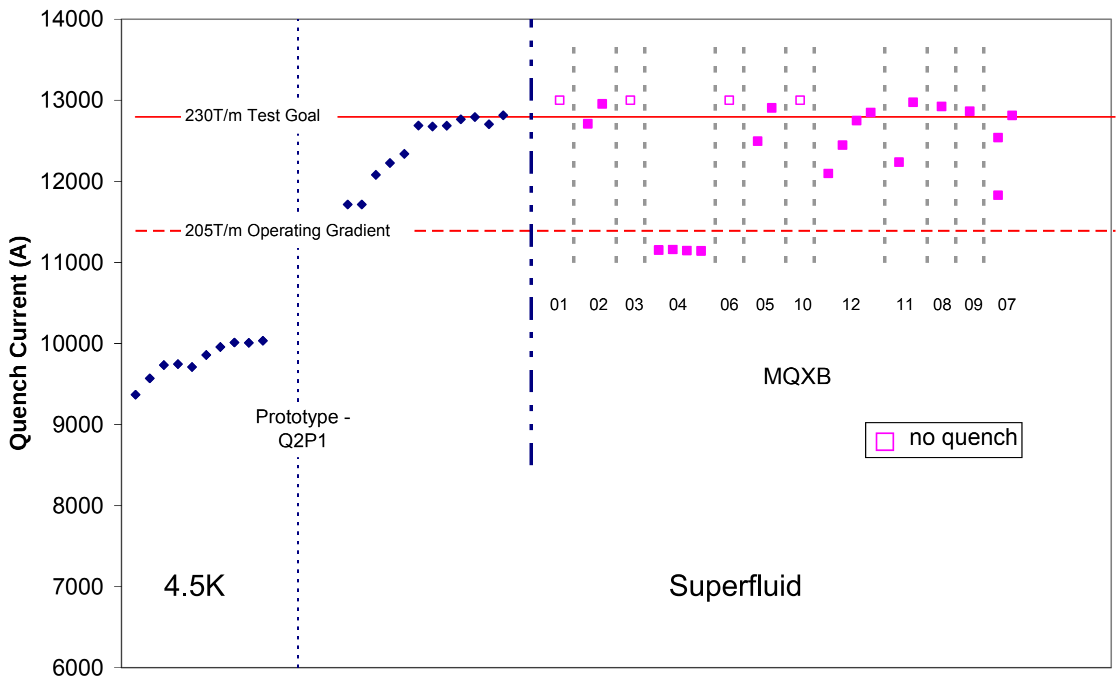

Figure 1: LQXB05 quench training. The horizontal dashed and solid lines correspond to 205 and 230 T/m field gradient respectively.

[1]Gradiant quoted is body gradiant based on HGQ09 body transfer function measurements.

Table 1: List of quenches

date	time	test cycle	current (A)	ramp rate (A/s)	location	gradient (T/m)[2]
MQXB11						
6/21/2004	1819	1	12236	20	Q3	221
6/23/2004	1225	1	12974	20	Q4	233
MQXB08						
6/26/2004	1604	1	12922	20	Q3	233
6/26/2004	1855	1	5171	300	Q2,Q3	97♣
6/26/2004	1930	1	8878	160	?	162♣
6/26/2004	2045	1	10253	20	Q1	186♣

♣These tests were done at ~4.6K. The others are at 1.9-2.0K.

Magnetic Field Quality Measurements

Field quality measurements were made with rotating coils. Integral field measurements were made with a multi-sectioned probe of 3 sections matched to the pitch length of the inner coil with one pitch length between sections. Complete longitudinal scans were made with a probe of length 0.82 m. The program consisted of the following measurement types.

- A “DC loop” in which the magnet was ramped in a series of steps with the field characterized at DC field at each level on the up and down ramp which we use to establish both the upramp and the geometric component of the harmonic. This is done with the integral probe. No such measurement was made as they are redundant with the longitudinal scans with the short probe.
- A prototypical accelerator cycle in which the field was measured during a conditioning pre-cycle to full field followed by a ramp down, a stop at an extended injection porch with a ramp to full field afterwards. This serves to characterize the field at injection including decay and snapback effects. These are typical done with the integral probe; however in these 2 magnets we did cycles with the short probe in the magnet body and in the magnet ends.
- Continuous measurements during a series of ramps to full field and back at different ramp rates to check for eddy current effects. These are done with the integral probe. (Note that the aforementioned accelerator cycle is a 10 A/s loop; 40 and 80 A/s loops were also done.)
- A DC loop with a longitudinal scan at each stopping point. This allows body-end field separation. These scans may be integrated to provide a characterization of the entire magnet.
- A cleansing quench preceded the accelerator cycle measurement with the integral probe.

[2] This is the equivalent body gradient based on HGQ09 measurements. The linear fit parameters to the high current transfer function are slope 0.0174 and intercept 7.34.

A list of the measurements made is given in Appendix A. Data is posted at the following URL.

http://wwwtsmtf.fnal.gov/~dimarco/usrAnalysisLQX/web_summaries/LQXB06/magneticMeasurements/LQXB06_mag_meas.html

Tables 2-4 summarize the field quality measurements with respect to the harmonics acceptance criteria[3] for the magnet.

Table 2: Integral Field Harmonics for LQXB05

	LQXB05		
	669 A (12.3 T/m)	11345 A (205 T/m)	Unit
TF	0.20243	0.19826	T/A
ML	11.028	11.029	m
FD	0	0	mrad
b3	0.28	0.28	units
b4	0.14	-0.39	units
b5	0.15	-0.11	units
b6	-1.29	0.09	units
b7	0.06	0.06	units
b8	0.07	0.06	units
b9	-0.09	-0.10	units
b10	-0.13	-0.02	units
a3	-0.32	-0.04	units
a4	0.27	0.33	units
a5	1.14	-0.03	units
a6	0.24	-0.46	units
a7	-0.02	-0.01	units
a8	0.06	0.06	units
a9	0.13	0.05	units
a10	-0.10	-0.09	units

[3] Acceptance criteria for harmonics are from v7 of the acceptance document. Acceptance bands are from v3.2 of the reference harmonics table. The method for calculation of integral harmonics is given in Appendix D.

Table 3: Integral Field Harmonics for MQXB08

	MQXB08		
	669 A (12.3 T/m)	11345 A (205 T/m)	Unit
TF	n.a.	n.a.	T/A
ML	n.a.	n.a.	m
FD	0	0	mrad
b03	-0.43	-0.34	units
b04	0.33	0.05	units
b05	0.24	-0.08	units
b06	-1.29	-0.11	units
b07	0.02	0.00	units
b08	0.05	0.04	units
b09	-0.05	-0.08	units
b10	-0.16	-0.03	units
a03	-0.89	-0.74	units
a04	-0.04	0.09	units
a05	0.98	0.41	units
a06	0.30	-0.65	units
a07	0.03	0.05	units
a08	0.00	0.01	units
a09	0.12	0.04	units
a10	-0.10	-0.10	units

Table 4: Integral Field Harmonics for MQXB11

	MQXQ11		
	669 A (12.3 T/m)	11345 A (205 T/m)	Unit
TF	n.a.	n.a.	T/A
ML	n.a.	n.a.	m
FD	0	0	mrad
b03	-0.99	-0.91	units
b04	-0.05	-0.83	units
b05	-0.06	0.14	units
b06	-1.30	0.29	units
b07	-0.10	-0.12	units
b08	0.09	0.09	units
b09	0.12	0.11	units
b10	-0.10	-0.01	units
a03	0.25	0.66	units
a04	-0.58	-0.57	units
a05	1.30	-0.47	units
a06	-0.18	0.28	units
a07	-0.06	-0.07	units
a08	-0.11	-0.11	units
a09	0.15	0.06	units
a10	0.09	0.09	units

Summary: Field quality is good. Most harmonics are within one sigma of the target. The higher order harmonics outside the 3 sigma limit are not likely real but due to limits in the resolution of the measurement system.

Magnetic lengths are too large to be believed. A preliminary investigation shows that this is may be because the body strength measured in MQXB08 is too small.

Magnetic Field Strength Measurements

SSW measured integral field strength with magnets powered in series is given in Table 3. The first 4 entries are taken on the up ramp and the last on the down ramp.

Table 5: Field strength vs. current.

	integral gradient transfer function (T/kA)	integral field strength(T)
Current (A)	Q2a+Q2b	Q2a+Q2b
668.3	202.43	135.29
5459.9	201.04	1097.66
11345.4	198.26	2249.34
11923.6	197.83	2358.85
5459.9	200.99	1097.39

Summary: The strength at 11345 A is within the acceptance band of 2254.8±5.7. (This corresponds to the band of 1127±4 T for a single cold mass.)

Alignment

LQXB05 had alignment measurements at each stage of testing at MTF: dates are summarized in the table below.

Warm before TC1	11Jun04
Cold TC1	30Jun04
Warm after TC1	06Jul04

There were also measurements and lug adjustment during mounting of the magnet prior to 11Jun04 to optimize warm alignment.

The magnet positions changed significantly during first cool down with both ends of Q2b and the far end of Q2a changing vertically by about 0.5mm. There were also large changes horizontally, with the far end of Q2a shifting by about 0.5mm. There was also a change in the roll angle of about 0.3mrad during initial cool-down. The cold mass positions did not return to the initial conditions upon warm-up after TC1, and there were still sizable motions especially at the Q2a far end vertically and Q2b far end horizontally. The roll returned to its former warm value

Strength measurements on the combined Q2a+Q2b were performed at 1.9K.

At the time of this report, no adjustment of the lugs was performed after cold testing.

Summary: Significant changes were seen horizontally and vertically in the cold masses during cool down and the cold masses did not return to their initial positions after the first TC. The cold alignment looks fairly good, though further lug adjustment may be necessary after review with respect to tolerances.

Data are posted at the following URL.

http://wwwtsmtf.fnal.gov/~dimarco/usrAnalysisLQX/LQXB05/SSW/LQXB05_align.html

A summary plot showing the changes in cold mass positions at various points in testing is shown in Fig. 1. The positions are given relative to the Cold TC1 measurements being on the average axis.

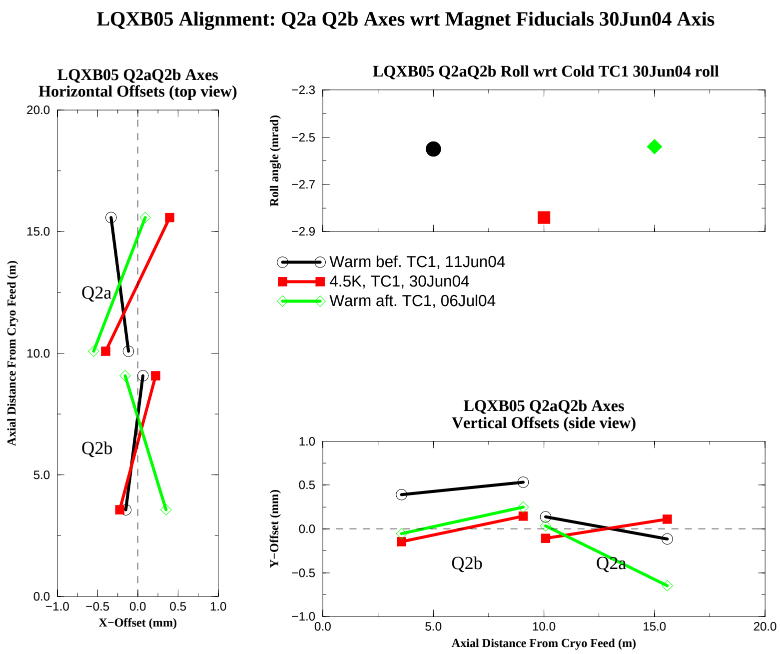

Figure 2: Summary of magnet alignment

Relative alignment of the magnet assemblies compared to AP requirements is given in Table 7. The relative alignment of the two assemblies is similar to LQXB04. The relative roll of the correctors is ok.

Table 7: Relative alignment of magnet assemblies (cold).

relative alignment of MQX magnets in composite Q2			relative alignment	
			x	y
Q2a/Q2b transverse alignment	500	μm	947	260
Q2a/Q2b relative roll	1	mrad (rms)	0.37	
Q2a/Q2b relative pitch	0.1	mrad	-0.01	
Q2a/Q2b relative yaw	0.1	mrad	0.06	
relative alignment of MCBX to Q2				
corrector displace-ment	500	μm	n.a.	
corrector roll	5	mrad		
b1			4.19	
a1			1.65	

Other tests performed

Other items of interest

Appendix A: List of field quality measurements

Note that a longitudinal scan of the magnetic field with a rotating coil of the warm collared coil and cold mass were made during production as part of the quality assurance program but are not listed here.

q2a	MQXB11			
size of the unpacked file	date of measurement	file name (unpacked file)	probe (IP=integral; SP=short)	remarks
23740776	Jun 23 2004	q2a_loop10As.odb	IP	Integral probe 10 A/s loop
20640440	Jun 23 2004	q2a_loop40As.odb	IP	Integral probe 40 A/s loop
11777480	Jun 23 2004	q2a_loop80As.odb	IP	Integral probe 80 A/s loop
23740816	Jun 23 2004	q2a_accProfile.odb	IP	Integral probe Acc. Profile
29593264	Jun 24 2004	q2a_accprofile_short.odb	SP	Short probe Acc. Profile
11445936	Jun 24 2004	q2a_11345up.odb	SP	Z-scan at 11345 A down
13378552	Jun 24 2004	q2a_11922.odb	SP	Z-scan at 11922 A
10659328	Jun 24 2004	q2a_5459do.odb	SP	Z-scan at 5459 A down
10614016	Jun 24 2004	q2a_5459up.odb	SP	Z-scan at 5459 A up
10242472	Jun 24 2004	q2a_669up.odb	SP	Z-scan at 669 A up
q2b	MQXB08			
size of the unpacked file	date of measurement	file name (unpacked file)	probe (IP=integral; SP=short)	remarks
21066688	Jun 28 2004	q2b_loop40As.odb	IP	Integral probe 40 A/s loop
11390728	Jun 28 2004	q2b_loop80As.odb	IP	Integral probe 80 A/s loop
23349496	Jun 28 2004	q2b_accProfile.odb	IP	Integral probe Acc. Profile
26710528	Jun 28 2004	q2b_accprofile_short.odb	SP	Short probe Acc. Profile
11044952	Jun 28 2004	q2b_11345up.odb	SP	Z-scan at 11345 A up
10659328	Jun 28 2004	q2b_11345do.odb	SP	Z-scan at 11345 A down
10659328	Jun 28 2004	q2b_11922.odb	SP	Z-scan at 11922 A
10659328	Jun 28 2004	q2b_5459do.odb	SP	Z-scan at 5459 A down
11055864	Jun 28 2004	q2b_5459up.odb	SP	Z-scan at 5459 A up
8376624	Jun 28 2004	q2b_669up.odb	SP	Z-scan at 669 A up
10775456	Jun 28 2004	q2b_669do.odb	SP	Z-scan at 669 A down

Appendix B: List of alignment measurements

LQXB05 SSW Measurements Log

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(Column 1 is status: R   indicates used directly for results; "a" indicates ancillary)

================================================================================
Measurements in MTF
================================================================================
/usr/analysis/LQX/LQXB05/SSW
================================================================================
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R 040115_09:29 ICB/initialTest/QA/040115_09:29.sag
a 040115_15:09 ICB/initialTest/QA/040115_15:09.checkXY_aveOnly
R 040115_16:53 ICB/initialTest/QA/040115_16:53.checkXY_roll_repeat/040115_16:53.checkXY_roll
R 040115_16:53 ICB/initialTest/QA/040115_16:53.checkXY_roll_repeat/040115_17:57.checkXY_roll
R 040115_16:53 ICB/initialTest/QA/040115_16:53.checkXY_roll_repeat
R 040116_11:13 ICB/initialTest/QA/040116_11:13.roll
R 040116_16:32 ICB/initialTest/QA/040116_16:32.roll_aftAdj2
R 040120_10:38 ICB/initialTest/QA/040120_10:38.checkXY_aftAdj2
a 040114_09:07 ICB/initialTest/QB/040114_09:07.sag
R 040114_16:49 ICB/initialTest/QB/040114_16:49.sag
a 040115_15:23 ICB/initialTest/QB/040115_15:23.checkXY_aveOnly
a 040115_15:41 ICB/initialTest/QB/040115_15:41.roll
R 040116_06:47 ICB/initialTest/QB/040116_06:47.checkXY
R 040116_10:11 ICB/initialTest/QB/040116_10:11.roll
R 040116_17:25 ICB/initialTest/QB/040116_17:25.roll_aftAdj2
R 040120_09:52 ICB/initialTest/QB/040120_09:52.checkXY_aftAdj2
a 040211_08:12 ICB/afterWeld/QA/040211_08:12.sag
a 040211_09:49 ICB/afterWeld/QA/040211_09:49.checkXY
a 040211_11:06 ICB/afterWeld/QA/040211_11:06.checkXY
R 040211_17:21 ICB/afterWeld/QA/040211_17:21.checkXY_unclamped
R 040211_17:45 ICB/afterWeld/QA/040211_17:45.roll
R 040212_10:40 ICB/afterWeld/QA/040212_10:40.checkXY_afterWeldAdj1
a 040212_14:53 ICB/afterWeld/QA/040212_14:53.checkXY_afterWeldAdj1_shim1
a 040213_10:22 ICB/afterWeld/QA/040213_10:22.checkXY_afterWeldAdj1_shim2
a 040213_10:53 ICB/afterWeld/QA/040213_10:53.checkXY_afterWeldAdj1_shim2_onAvgAxis
R 040213_13:36 ICB/afterWeld/QA/040213_13:36.checkXY_afterWeldAdj1_shim2_onAvgAxis_repeat
a 040210_17:31 ICB/afterWeld/QB/040210_17:31.sag
R 040211_10:44 ICB/afterWeld/QB/040211_10:44.checkXY
R 040211_18:28 ICB/afterWeld/QB/040211_18:28.checkXYRoll
R 040212_10:18 ICB/afterWeld/QB/040212_10:18.checkXY_aftWeldAdj1
R 040212_15:33 ICB/afterWeld/QB/040212_15:33.checkXY_aftWeldAdj1_shim1
a 040213_10:03 ICB/afterWeld/QB/040213_10:03.checkXY_aftWeldAdj1_shim2
R 040213_11:16 ICB/afterWeld/QB/040213_11:16.checkXY_aftWeldAdj1_shim2_onAvgAxis
R 040213_12:11 ICB/afterWeld/QB/040213_12:11.checkXY_aftWeldAdj1_shim2_onAvgAxis_repeat
a 040323_16:29 ICB/afterRepair/QA/040323_16:29.checkXY
a 040323_14:53 ICB/afterRepair/QA/040323_14:53.sag
a 040323_17:05 ICB/afterRepair/QA/040323_17:05.checkXY
a 040405_13:59 ICB/afterRepair/QA/040405_13:59.checkXY_afterThermalShock
a 040405_16:12 ICB/afterRepair/QA/040405_16:12.checkXY_afterThermalShock
a 040405_16:12 ICB/afterRepair/QA/040405_16:12.checkXY_afterThermalShock_adjustedToStagePosCold
a 040412_12:26 ICB/afterRepair/QA/040412_12:26.checkXY_afterShim
a 040412_12:52 ICB/afterRepair/QA/040412_12:52.checkXY_afterShim
a 040412_16:28 ICB/afterRepair/QA/040412_16:28.checkXY_afterShim_rePos
a 040413_10:55 ICB/afterRepair/QA/040413_10:55.checkXY_afterShim_inY
a 040413_12:58 ICB/afterRepair/QA/040413_12:58.checkY_aveAxis
a 040413_13:14 ICB/afterRepair/QA/040413_13:14.checkY_aveAxis
a 040413_13:34 ICB/afterRepair/QA/040413_13:34.checkX_aveAxis
a 040413_14:36 ICB/afterRepair/QA/040413_14:36.checkY_backTo1055
a 040413_17:20 ICB/afterRepair/QA/040413_17:20.checkX_backTo1055
a 040413_17:32 ICB/afterRepair/QA/040413_17:32.checkXY
a 040414_08:14 ICB/afterRepair/QA/040414_08:14.checkXY
a 040331_11:16 ICB/afterRepair/QA/040331_11:16.checkXY_thermalShock-120F
a 040323_17:05 ICB/afterRepair/QA/040323_17:05.checkXY_adjustedToStagePosCold
a 040323_12:37 ICB/afterRepair/QB/040323_12:37.testX
a 040323_13:39 ICB/afterRepair/QB/040323_13:39.sag
a 040324_06:24 ICB/afterRepair/QB/040324_06:24.checkXY_repeat/040324_06:24.checkXY
a 040324_06:24 ICB/afterRepair/QB/040324_06:24.checkXY_repeat/040324_06:41.checkXY

a 040324_06:24 ICB/afterRepair/QB/040324_06:24.checkXY_repeat/040324_06:41.checkXY_adjustedToStagePosCold
a 040324_06:24 ICB/afterRepair/QB/040324_06:24.checkXY_repeat
a 040331_10:45 ICB/afterRepair/QB/040331_10:45.checkXY_thermalShock-120F
a 040405_13:13 ICB/afterRepair/QB/040405_13:13.checkXY_afterThermalShock
a 040405_13:31 ICB/afterRepair/QB/040405_13:31.checkXY_afterThermalShock
a 040413_12:43 ICB/afterRepair/QB/040413_12:43.checkY_aveAxis
a 040405_13:31 ICB/afterRepair/QB/040405_13:31.checkXY_afterThermalShock_adjustedToStagePosCold
a 040412_13:16 ICB/afterRepair/QB/040412_13:16.checkXY_afterShim
a 040412_16:03 ICB/afterRepair/QB/040412_16:03.checkXY_afterShim_rePos
a 040413_11:31 ICB/afterRepair/QB/040413_11:31.checkXY_afterShim_inY
a 040413_13:56 ICB/afterRepair/QB/040413_13:56.checkX_aveAxis
a 040413_14:53 ICB/afterRepair/QB/040413_14:53.checkXY_backTo1055
a 040413_16:55 ICB/afterRepair/QB/040413_16:55.checkXY_backTo1055
a 040413_18:16 ICB/afterRepair/QB/040413_18:16.checkXY_backTo1055_repeat/040413_18:16.checkXY_backTo1055
a 040413_18:16 ICB/afterRepair/QB/040413_18:16.checkXY_backTo1055_repeat/040413_18:31.checkXY_backTo1055
a 040413_18:16 ICB/afterRepair/QB/040413_18:16.checkXY_backTo1055_repeat/040413_18:47.checkXY_backTo1055
a 040413_18:16 ICB/afterRepair/QB/040413_18:16.checkXY_backTo1055_repeat
a 040922_10:30 ICB/afterMTF_22Sep04/QA/040922_10:30.sag
R 040922_11:07 ICB/afterMTF_22Sep04/QA/040922_11:07.checkXY_aveOnly
R 040922_12:46 ICB/afterMTF_22Sep04/QA/040922_12:46.checkXY_onAveAxis
a 040922_09:01 ICB/afterMTF_22Sep04/QB/040922_09:01.test
a 040922_09:06 ICB/afterMTF_22Sep04/QB/040922_09:06.sag
a 040922_12:00 ICB/afterMTF_22Sep04/QB/040922_12:00.checkXY_aveOnly
R 040922_12:14 ICB/afterMTF_22Sep04/QB/040922_12:14.checkXY_onAveAxis
a 040528_06:35 MTF/mounting_28May04/QA/040528_06:35.checkXY_aveOnly
R 040528_06:55 MTF/mounting_28May04/QA/040528_06:55.checkXY
R 040528_09:18 MTF/mounting_28May04/QA/040528_09:18.checkXY_aftAdj1
R 040528_14:40 MTF/mounting_28May04/QA/040528_14:40.checkXY_aftAdj2
a 040528_06:14 MTF/mounting_28May04/QB/040528_06:14.checkXY
R 040528_07:16 MTF/mounting_28May04/QB/040528_07:16.checkXY
R 040528_09:01 MTF/mounting_28May04/QB/040528_09:01.checkXY_aftAdj1
a 040528_15:07 MTF/mounting_28May04/QB/040528_15:07.checkXY_aftAdj2
R 040528_15:34 MTF/mounting_28May04/QB/040528_15:34.checkXY_aftAdj2
a 040611_11:46 MTF/warmBefTC1_11Jun04/QA/040611_11:46.checkXY_aveOnly
R 040611_12:43 MTF/warmBefTC1_11Jun04/QA/040611_12:43.checkXY_onAveAxis
R 040611_16:25 MTF/warmBefTC1_11Jun04/QA/040611_16:25.roll
a 040611_11:14 MTF/warmBefTC1_11Jun04/QB/040611_11:14.checkXY_aveOnly_newTensionCalib
R 040611_13:15 MTF/warmBefTC1_11Jun04/QB/040611_13:15.checkXY_onAveAxis
R 040611_14:26 MTF/warmBefTC1_11Jun04/QB/040611_14:26.roll
a 040611_15:41 MTF/warmBefTC1_11Jun04/QB/040611_15:41.rotWire
a 040629_12:52 MTF/coldTC1_4.5K_align_29Jun04/QA/040629_12:52.checkXY_aveOnly
R 040629_13:05 MTF/coldTC1_4.5K_align_29Jun04/QA/040629_13:05.checkXY_onAveAxis
R 040629_16:46 MTF/coldTC1_4.5K_align_29Jun04/QA/040629_16:46.checkY_aveAxis_adj2
a 040629_15:18 MTF/coldTC1_4.5K_align_29Jun04/QA/040629_15:18.checkXY_aveAxis_repeat
a 040629_15:52 MTF/coldTC1_4.5K_align_29Jun04/QA/040629_15:52.checkXY_aveAxis_adj1
a 040629_12:23 MTF/coldTC1_4.5K_align_29Jun04/QB/040629_12:23.checkXY_aveOnly
a 040629_12:35 MTF/coldTC1_4.5K_align_29Jun04/QB/040629_12:35.checkXY_aveOnly
a 040629_14:51 MTF/coldTC1_4.5K_align_29Jun04/QB/040629_14:51.CounterDirectional
R 040629_16:11 MTF/coldTC1_4.5K_align_29Jun04/QB/040629_16:11.checkXY_onAveAxis_adj1
R 040629_16:34 MTF/coldTC1_4.5K_align_29Jun04/QB/040629_16:34.checkY_onAveAxis_adj2
R 040630_16:13 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_16:13.str_669A_up_850g
R 040630_18:40 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_18:40.strX_11923A_vsT
R 040630_16:15 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_16:15.str_669A_up_850g
R 040630_16:23 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_16:23.roll_669A_up
R 040630_16:50 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_16:50.strXY_669A_up_vsT
R 040630_17:27 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_17:27.strX_5460A_up_vsT
R 040630_17:48 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_17:48.strX_11345A_up_vsT
R 040630_18:13 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_18:13.strXY_11923A_vsT
a 040630_18:59 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_18:59.strX_5460A_dn_vsT
R 040630_19:13 MTF/coldTC1_1.9K_str_30Jun04/QAQB/040630_19:13.strX_5460A_dn_vsT
a 040706_11:29 MTF/warmAftTC1_06Jul04/QB/040706_11:29.checkXY_aveOnly
R 040706_13:11 MTF/warmAftTC1_06Jul04/QB/040706_13:11.checkXY_onAveAxis
R 040707_07:41 MTF/warmAftTC1_06Jul04/QB/040707_07:41.roll
a 040708_12:01 MTF/warmAftTC1_06Jul04/QB/040708_12:01.checkXCN_onQBaxis
R 040708_12:16
MTF/warmAftTC1_06Jul04/QB/040708_12:16.checkXCN_onQBaxis_repeat/040708_12:16.checkXCN_onQBaxis
R 040708_12:16
MTF/warmAftTC1_06Jul04/QB/040708_12:16.checkXCN_onQBaxis_repeat/040708_12:23.checkXCN_onQBaxis
a 040708_12:16
MTF/warmAftTC1_06Jul04/QB/040708_12:16.checkXCN_onQBaxis_repeat/040708_12:30.checkXCN_onQBaxis

a 040708_12:16 MTF/warmAftTC1_06Jul04/QB/040708_12:16.checkXCN_onQBaxis_repeat
a 040706_11:47 MTF/warmAftTC1_06Jul04/QA/040706_11:47.checkXY_aveOnly
R 040706_12:18 MTF/warmAftTC1_06Jul04/QA/040706_12:18.checkXY_onAveAxis
R 040707_08:20 MTF/warmAftTC1_06Jul04/QA/040707_08:20.roll
R 040707_09:55 MTF/warmAftTC1_06Jul04/Correctors/040707_09:55.cor_leads12
a 040707_11:04 MTF/warmAftTC1_06Jul04/Correctors/040707_11:04.cor_leads12_rot
a 040707_11:35 MTF/warmAftTC1_06Jul04/Correctors/040707_11:35.cor_leads34
a 040707_12:05 MTF/warmAftTC1_06Jul04/Correctors/040707_12:05.cor_leads34
R 040707_14:25 MTF/warmAftTC1_06Jul04/Correctors/040707_14:25.cor_leads34
a 040707_15:10 MTF/warmAftTC1_06Jul04/Correctors/040707_15:10.cor_leads34_x
a 040707_15:57 MTF/warmAftTC1_06Jul04/Correctors/040707_15:57.cor_leads34_rot
R 040708_11:37 MTF/warmAftTC1_06Jul04/Correctors/040708_11:37.cor_leads12_Y_repeat/040708_11:38.cor_leads12_Y
R 040708_11:37 MTF/warmAftTC1_06Jul04/Correctors/040708_11:37.cor_leads12_Y_repeat/040708_11:41.cor_leads12_Y
R 040708_11:37 MTF/warmAftTC1_06Jul04/Correctors/040708_11:37.cor_leads12_Y_repeat/040708_11:44.cor_leads12_Y
R 040708_11:37 MTF/warmAftTC1_06Jul04/Correctors/040708_11:37.cor_leads12_Y_repeat/040708_11:48.cor_leads12_Y
R 040708_11:37 MTF/warmAftTC1_06Jul04/Correctors/040708_11:37.cor_leads12_Y_repeat/040708_11:51.cor_leads12_Y
R 040708_11:37 MTF/warmAftTC1_06Jul04/Correctors/040708_11:37.cor_leads12_Y_repeat

Appendix C: Q2A/Q2B->MQXB11/MQXB08

Inside LQXB05, Q2A, closest to the MTF return can, the CDF side of the building, is MQXB11. Q2B, closest to the MTF feed can, away from CDF, is MQXB08.

Appendix D: Calculation of Integral Field Harmonics

Integral field harmonics are computed from the data taken during the longitudinal scan of the magnets as described in earlier reports.

Appendix E: Calculation of Magnetic Length

In the past, strengths were computed from nominal rather than actual measured currents. We have changed to using currents as measured (by the SSW system during the integral measurement of strength and by the harmonics measurement system in each magnet for the body strength) in this computation. (Note that what is reported by the measurers is transfer function.) This effects the reported integral field strength and the magnetic length.

Appendix F: Calculation of Magnetic Length

There is a calibration factor applied to the rotating coil measurement of the body transfer function of 1.0094. This is based on comparison of integral probe measurements with integral SSW measurements in MQXB03, 05, 06. This value is the same as was used for LQXB03 and LQXB04.