LCLS Engineering Specification Document # 1.3-103	Linac	Revision 0

LCLS Corrector Magnet Specification

C.E.Rago
(Authors) Signature(s) Date

Paul Emma
(System Physicist Signature Date

(System Manager) Signature Date

Brief Summary: his specification summarizes the engineering requirements for each LCLS Corrector magnet type.

Keywords: Corrector Magnet

Key WBS#'s: 1.3.3.8

This document contains specification sheets that represent the engineering requirements for the different design models of LCLS Linac corrector magnets. Each sheet is a superset of requirements that will define the performance of identical magnets within a design model type. A unique WBS designation, identifying the model type, has been added to the individual specification chosen to represent the model type.

All LCLS magnets will be consistent with the latest version of the Electrical Safety Guidelines in the SLAC ES&H Manuel. Particular attention must be paid to the section concerning Magnet Terminal Covers.

All LCLS magnets will conform to the LCLS Paint and Color Scheme.

All LCLS magnets will attempt to conform with, and will be reviewed against, the latest SLAC designs relating to improved magnet reliability.

All LCLS magnet design must file a SLAC DL design document in the Spires system. All new LCLS magnet designs will have individual Magnetic Measurement Procedures that must be approved by the System Physicist.

LCLS MAGNET

7-May-2004 MAD Deck: LCLS06MAY04

Description: WBS 1.3.3.8 Corrector Magnet (Linac Type 4 = "LCLS-Type-1")

Magnet common name (MAD deck):	***XCA11***	***Operating point***	
Magnetic type (dipole/quad):	**dipole**	nominal bend-angle (mrad):	**0.00000**
Magnet bends in X or Y:	**X**	upper-limit bend-angle (mrad):	3.00
Used as corrector magnet (yes/no):	**yes**	lower-limit bend-angle (mrad):	-3.00
LCLS accelerator area:	L1	nominal excitation current (A):	0.000
Z-location of cntr. w.r.t. cathode (m):	23.360	upper-limit excitation current (A):	1.80
Nominal beam energy (GeV):	0.135	lower-limit excitation current (A):	-1.80
Upper-limit beam energy (GeV):	0.200	nominal integrated field (kG-m):	**0.00000**
Lower-limit beam energy (GeV):	0.090	upper-limit integrated field (kG-m):	0.020
Magnet used for LCLS only (yes/no):	yes	lower-limit integrated field (kG-m):	-0.020
New, Relocated, or Existing magnet:	New	nominal pole-tip field (kG):	0.000
Magnet		nominal bend-angle (deg):	0.000
design designation type:	Linac-4	nominal main coil voltage drop (V):	?
magnet serial number:	?	NA	?
magnet "primary,micro,unit":	XCOR,LI??,?	***Installation***	
effective magnetic length (m):	0.2620	horiz. half-width stay-clear (mm):	12
pole half-height (mm):	?	vert. half-height stay-clear (mm):	12
main coil resistance (ohms):	0	field accuracy w.r.t. nom. (%):	2.00
magnet is water-cooled (yes/no):	(unsure)	*x* alignment tol. (mm):	1.00
includes trim-coil (yes/no):	no	*y* alignment tol. (mm):	1.00
NA	NA	*z* alignment tol. (mm):	5.00
Power-supply		azimuthal roll tol. (mrad):	5.00
power-supply name or type:	?	quad field tol. (% @ r=20 mm):	?
main supply "primary,micro,unit":	XCOR,LI??,?	sext field tol. (% @ r=20 mm):	?
Bipolar or Unipolar main supply:	Bipolar	*N* TC's or klixons on magnet:	?
rms regulation tol. of main (%):	0.01	NA	?
approx. max. required current (A):	2.0	I vs B coeff's (below) Final or Temp:	Temporary
approx. max. voltage of main (V):	?	p_0 (A):	0.000
total *N* magnets on main string (>0):	1	p_1 (A/kG):	90.000
NA		p_2 (A/kG^2):	0.000
		p_3 (A/kG^3):	0.000
controller type:	?	p_4 (A/kG^4):	0.000
needs Shunt, Boost, or Trim supply:	none	p_5 (A/kG^5):	0.000
NA	NA	p_6 (A/kG^6):	0.000
NA		p_7 (A/kG^7):	0.000
NA		p_8 (A/kG^8):	0.000
NA		p_9 (A/kG^9):	0.000

LCLS MAGNET

7-May-2004 MAD Deck: LCLS06MAY04

Description: WBS 1.3.3.8 Corrector Magnet (Linac Type 5 = "LCLS-Type-2")

Magnet common name (MAD deck):	***XCVB2***	***Operating point***	
Magnetic type (dipole/quad):	**dipole**	nominal bend-angle (mrad):	**0.00000**
Magnet bends in X or Y:	**X**	upper-limit bend-angle (mrad):	0.20
Used as corrector magnet (yes/no):	**yes**	lower-limit bend-angle (mrad):	-0.20
LCLS accelerator area:	DL2	nominal excitation current (A):	0.000
Z-location of cntr. w.r.t. cathode (m):	1224.485	upper-limit excitation current (A):	5.44
Nominal beam energy (GeV):	14.100	lower-limit excitation current (A):	-5.44
Upper-limit beam energy (GeV):	17.000	nominal integrated field (kG-m):	**0.00000**
Lower-limit beam energy (GeV):	3.000	upper-limit integrated field (kG-m):	0.113
Magnet used for LCLS only (yes/no):	yes	lower-limit integrated field (kG-m):	-0.113
New, Relocated, or Existing magnet:	New	nominal pole-tip field (kG):	0.000
Magnet		nominal bend-angle (deg):	0.000
design designation type:	Linac-5	nominal main coil voltage drop (V):	?
magnet serial number:	?	NA	?
magnet "primary,micro,unit":	XCOR,??,?	***Installation***	
effective magnetic length (m):	0.2620	horiz. half-width stay-clear (mm):	8
pole half-height (mm):	?	vert. half-height stay-clear (mm):	8
main coil resistance (ohms):	0	field accuracy w.r.t. nom. (%):	2.00
magnet is water-cooled (yes/no):	(unsure)	*x* alignment tol. (mm):	1.00
includes trim-coil (yes/no):	no	*y* alignment tol. (mm):	1.00
NA	NA	*z* alignment tol. (mm):	5.00
Power-supply		azimuthal roll tol. (mrad):	4.00
power-supply name or type:	?	quad field tol. (% @ r=20 mm):	?
main supply "primary,micro,unit":	XCOR,??,?	sext field tol. (% @ r=20 mm):	?
Bipolar or Unipolar main supply:	Bipolar	*N* TC's or klixons on magnet:	?
rms regulation tol. of main (%):	0.01	NA	?
approx. max. required current (A):	6.0	I vs B coeff's (below) Final or Temp:	Temporary
approx. max. voltage of main (V):	?	p_0 (A):	0.000
total *N* magnets on main string (>0):	1	p_1 (A/kG):	48.000
NA		p_2 (A/kG^2):	0.000
		p_3 (A/kG^3):	0.000
controller type:	?	p_4 (A/kG^4):	0.000
needs Shunt, Boost, or Trim supply:	none	p_5 (A/kG^5):	0.000
NA	NA	p_6 (A/kG^6):	0.000
NA		p_7 (A/kG^7):	0.000
NA		p_8 (A/kG^8):	0.000
NA		p_9 (A/kG^9):	0.000

LCLS MAGNET

7-May-2004 MAD Deck: LCLS06MAY04

Description: WBS 1.3.3.8 Corrector Magnet (DR Type 2 = "LCLS-Type-3")

Magnet common name (MAD deck):	***XCVM2***	***Operating point***	
Magnetic type (dipole/quad):	**dipole**	nominal bend-angle (mrad):	**0.00000**
Magnet bends in X or Y:	**X**	upper-limit bend-angle (mrad):	0.32
Used as corrector magnet (yes/no):	**yes**	lower-limit bend-angle (mrad):	-0.32
LCLS accelerator area:	DL2	nominal excitation current (A):	0.000
Z-location of cntr. w.r.t. cathode (m):	1211.774	upper-limit excitation current (A):	7.31
Nominal beam energy (GeV):	14.100	lower-limit excitation current (A):	-7.31
Upper-limit beam energy (GeV):	17.000	nominal integrated field (kG-m):	**0.00000**
Lower-limit beam energy (GeV):	3.000	upper-limit integrated field (kG-m):	0.181
Magnet used for LCLS only (yes/no):	yes	lower-limit integrated field (kG-m):	-0.181
New, Relocated, or Existing magnet:	New	nominal pole-tip field (kG):	0.000
Magnet		nominal bend-angle (deg):	0.000
design designation type:	DR Type 2	nominal main coil voltage drop (V):	?
magnet serial number:	?	NA	?
magnet "primary,micro,unit":	XCOR,??,?	***Installation***	
effective magnetic length (m):	0.2318	horiz. half-width stay-clear (mm):	8
pole half-height (mm):	?	vert. half-height stay-clear (mm):	8
main coil resistance (ohms):	0	field accuracy w.r.t. nom. (%):	2.00
magnet is water-cooled (yes/no):	(unsure)	*x* alignment tol. (mm):	1.00
includes trim-coil (yes/no):	no	*y* alignment tol. (mm):	1.00
NA	NA	*z* alignment tol. (mm):	5.00
Power-supply		azimuthal roll tol. (mrad):	4.00
power-supply name or type:	?	quad field tol. (% @ r=20 mm):	?
main supply "primary,micro,unit":	XCOR,??,?	sext field tol. (% @ r=20 mm):	?
Bipolar or Unipolar main supply:	Bipolar	*N* TC's or klixons on magnet:	?
rms regulation tol. of main (%):	0.01	NA	?
approx. max. required current (A):	8.0	I vs B coeff's (below) Final or Temp:	Temporary
approx. max. voltage of main (V):	?	p_0 (A):	0.000
total *N* magnets on main string (>0):	1	p_1 (A/kG):	40.300
NA		p_2 (A/kG^2):	0.000
		p_3 (A/kG^3):	0.000
controller type:	?	p_4 (A/kG^4):	0.000
needs Shunt, Boost, or Trim supply:	none	p_5 (A/kG^5):	0.000
NA	NA	p_6 (A/kG^6):	0.000
NA		p_7 (A/kG^7):	0.000
NA		p_8 (A/kG^8):	0.000
NA		p_9 (A/kG^9):	0.000