

CONCEPTUAL SPECIFICATION

INJECTION KICKER MAGNET

[HL-LHC MKI]

Equipment/system description

LHC injection kickers: pulsed magnets for injection in Point 2 (Beam 1) and Point 8 (Beam 2). During Run I of the LHC beam induced heating of the ferrites of these kicker magnets have impacted on LHC operation. The beam impedance of these kickers has been reduced in LS1, but it cannot be guaranteed that this is sufficient for High Lumi operation. For this reason a proto-type MKI magnet with additional cooling and and different ferrite types will be developed for testing in the LHC. In addition, the exchange of an MKI during TS3 2012, and subsequent operation of the LHC, demonstrated that electron-cloud in the ceramic tube limited beam intensity until conditioning had occurred (~250 hours of beam). Thus research and development of special coatings of the ceramic tube is being carried out and it is planned to include a coating on the tube of the prototype MKI.

Layout Versions	LHC sectors concerned	CDD Drawings root names (drawing storage):
V1.1	LSS2, LSS8	LHC-MKIMA

TRACEABILITY

Project Engineer in charge of the equipment M.Barnes	WP Leader in charge of the equipment J.Uythoven
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Main Points

- Research on proto-type magnet:
 - Cooling of magnet (radiation cooling, water cooling) related to *beam induced heating*
 - Different type of ferrites with higher T_c
 - ***Electron cloud***: coating of ceramic tube to reduce SEY
- This concerns a single proto-type only, to be installed in LS2
- The aim is to have the technology ready when needed
- The series of magnets (2 x 4 + 4 spares = 12 magnets) is ***not*** in the present budget

Beam Parameters assumed

Table 1: Equipment parameters

Characteristics	Units	Value
Bunch spacing	ns	25 / 50
Maximum number of bunches		2808
Maximum single bunch intensity	Protons	$2.4 \cdot 10^{11}$ / $3.5 \cdot 10^{11}$
Bunch length, (4 sigma)	ns	1.0 – 1.25

Experience during Run 2 will large determine the measures required for Run 3