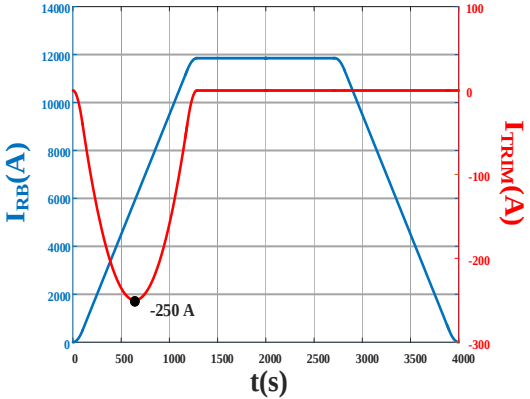
11T Trim Power Converter Connection to Leads

Samer Yammine

TE-EPC Technical Discussion – 2017-11-01

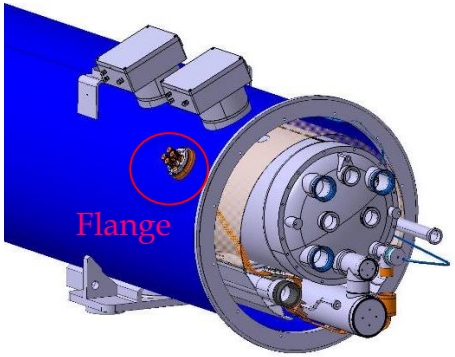
Background

- A demand from WP6a to connect the 11T trim PC to 2 leads/polarity
- Rationale: To use the LHC conduction cooled 120 A leads



11T Trim Current Profile for 7 TeV Operation

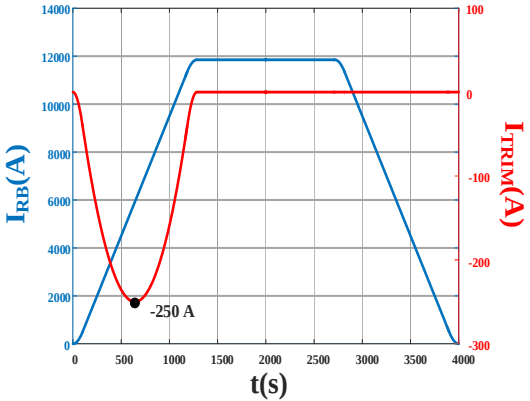
LHC Conduction Cooled Leads



Current Lead Integration

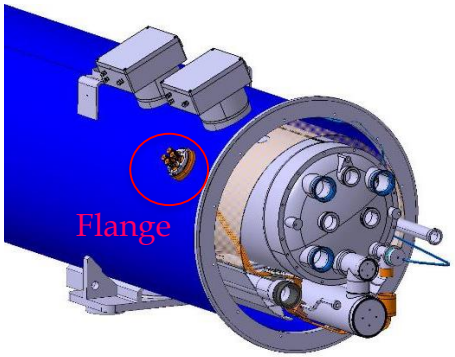
Requirements

- Ensure Protection of leads (voltage threshold): 4 vs 2 in LHC
- Ensure current equilibrium in operation
- Ensure that the current does not surpass 125 A per lead
- If not, discharge the trim circuit under 10s



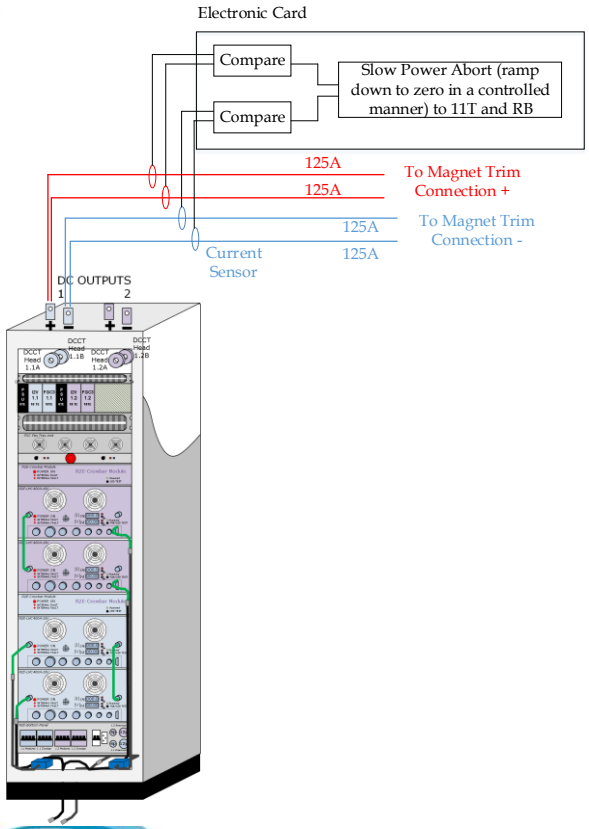
11T Trim Current Profile for 7 TeV Operation

LHC Conduction Cooled Leads



Current Lead Integration

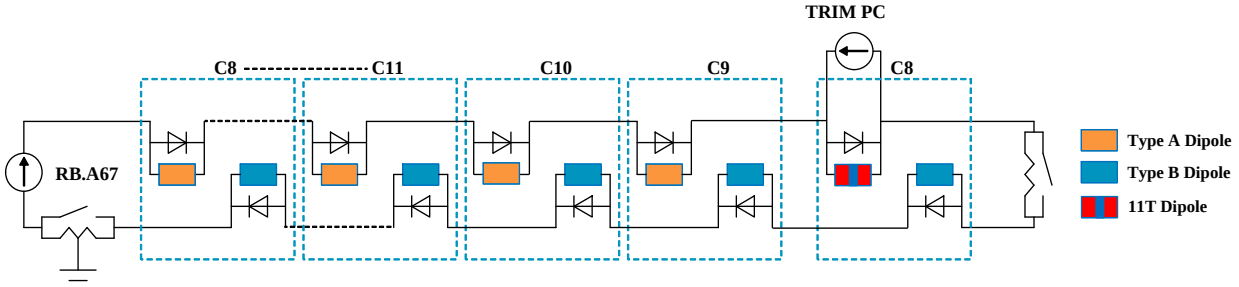
Solution Proposal

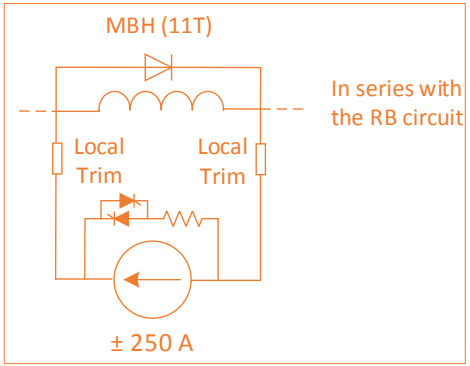


- 2x70mm^2 DC cables per polarity for current equilibrium during operation.
- New radiation-tolerant card + 4 current sensors (1 per DC cable) to generate a slow power abort signal to the PC in case of $\Delta I > 5A$ or $I > 125A$.
- Extension of already existing card that monitors the CLs voltage from 2 inputs to 4.

Slow Power Abort

- The 11T power converter is in parallel to a cold diode
- dI/dt < 5V/0.132H – 20 % margin < 30 A/s
- SPA of 11T: ramp from - 250 A to 0 A with 30 A/s → 8.33 s





Thanks for your attention