

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire

Replacement of RD1/RD34 power converters for increased rejection of network perturbations

Hugues Thiesen

LHC-MPP Meeting

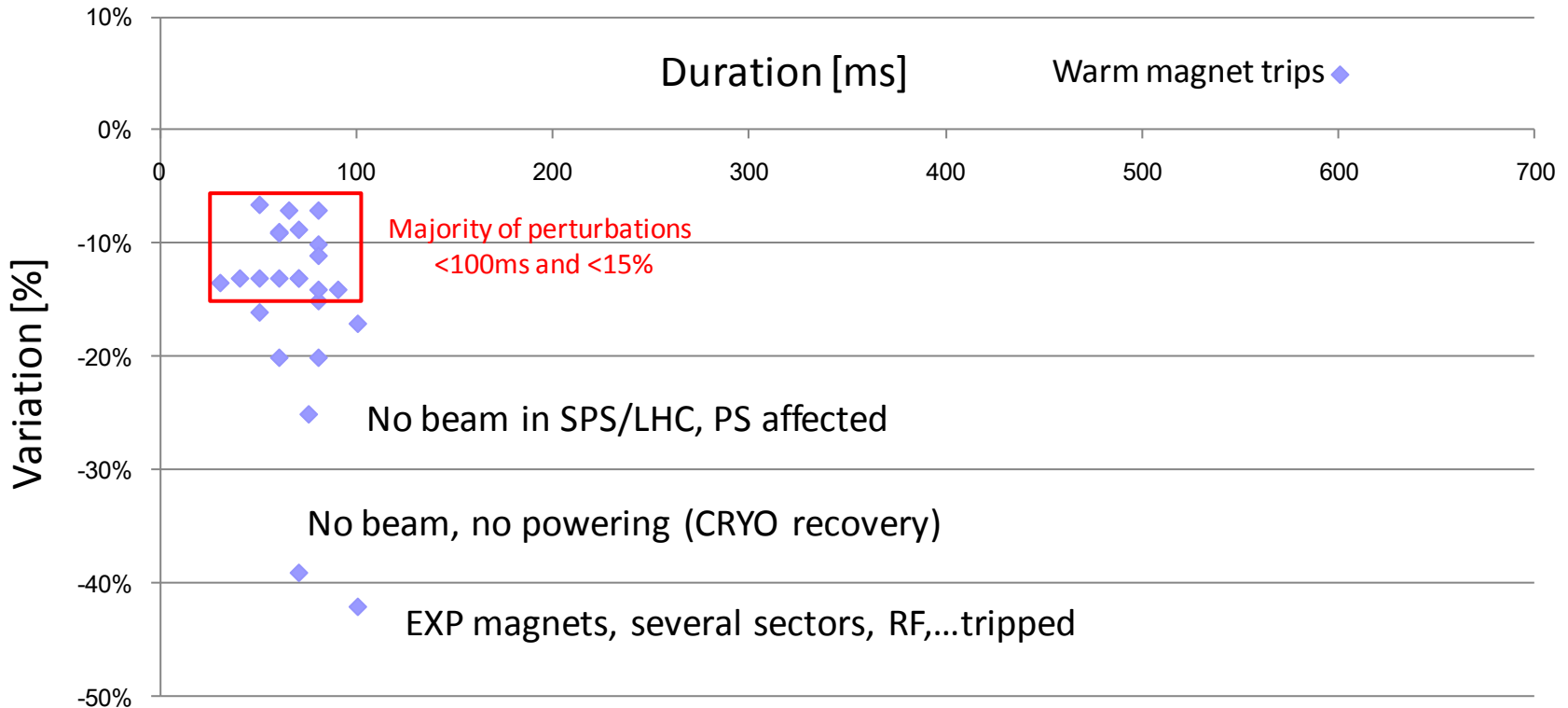
March, 4th 2016

Acknowledgements: M. Zerlauth, I. Romera Ramirez, G. Le Godec, I. Josifovic



AC network perturbations

Perturbations are < 100 ms and < 15%:

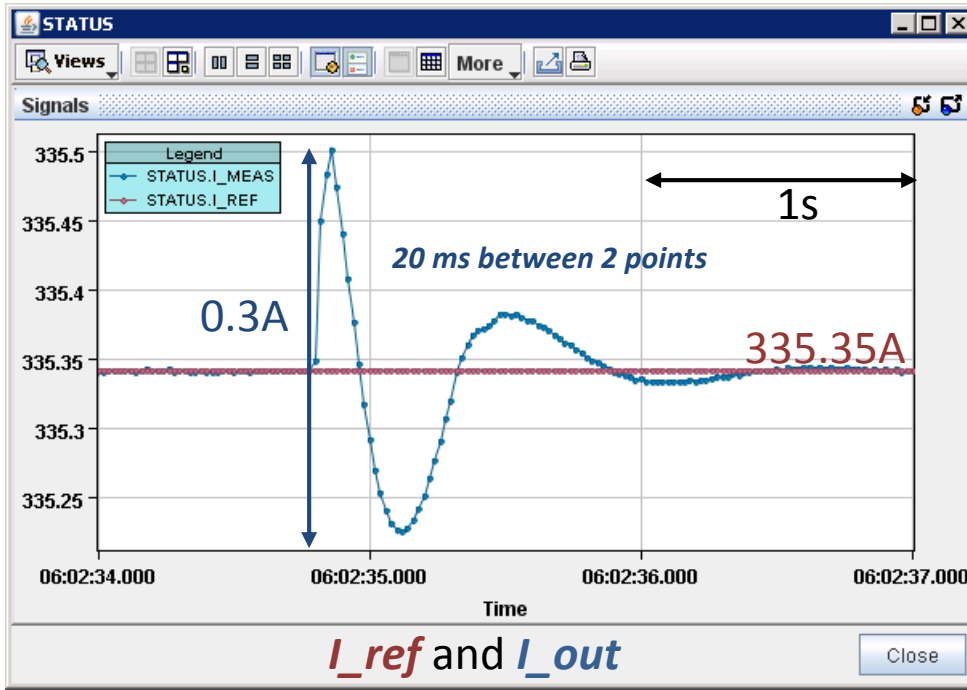


2011



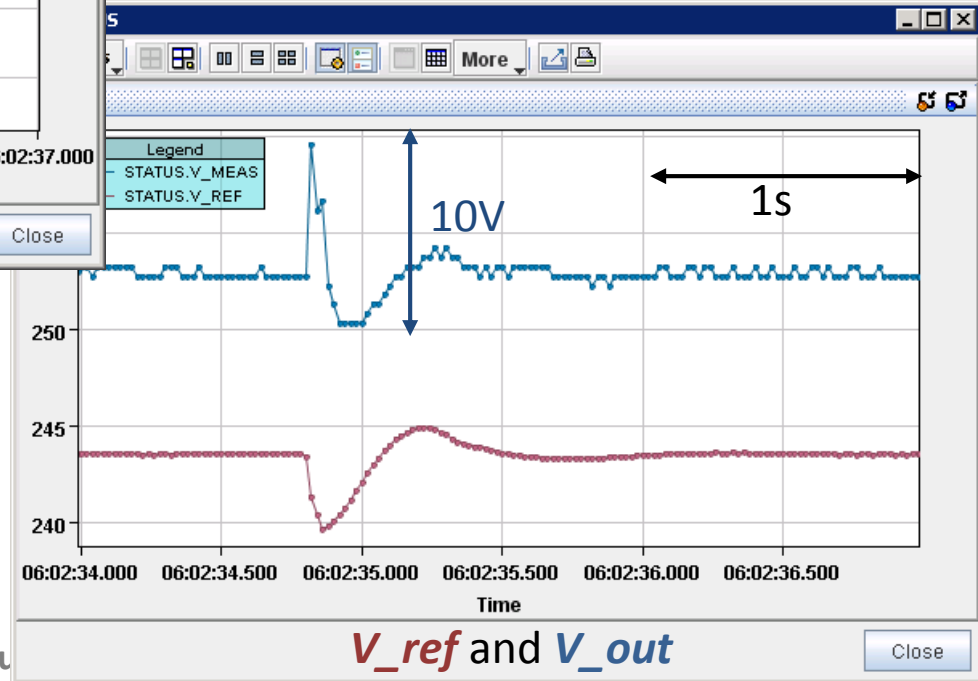
RPTG power converter

Today most sensitive circuits are supplied RPTG power converters



$$\Delta I / I = 0.3 \text{ A} / 335 \text{ A} = 8.95 \text{ E-4}$$

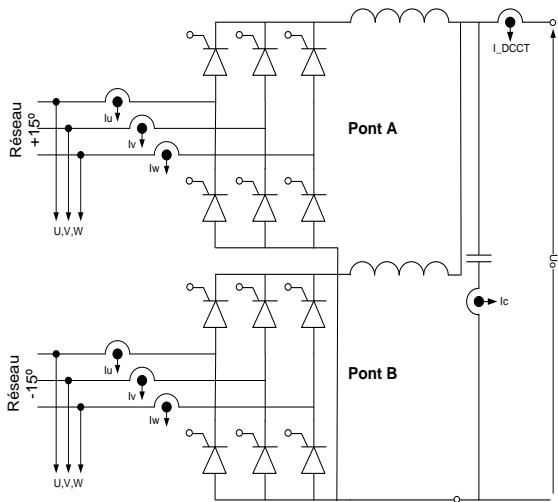
(FMCM threshold = 3.5 E-4)



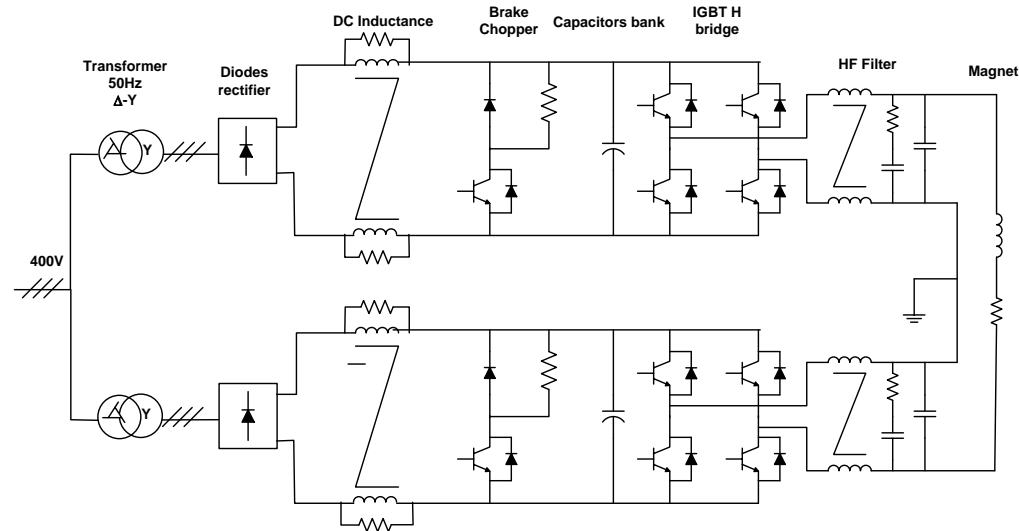
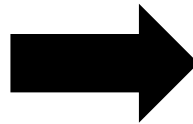
FMCM: RD1.LR1 27/07/2011 at 06:03
E = 3.5 TeV

New RPTG power converter

Current RPTG Thyristor Power Converters



New RPTG Switch Mode Power Converters (Based on B8 Type)



Main characteristics:

Max Output voltage:	950V
Max Output current:	810A
Max RMS current:	810A
Output Power:	769.5kW
Input voltage:	3x18kV/50Hz

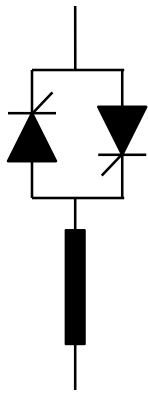
Main characteristics:

Max Output voltage:	700V
Max Output current:	810A
Max RMS current:	810A
Output Power:	567kW
Input voltage:	3x18kV/50Hz

New RPTG power converter

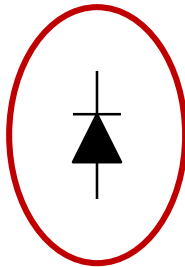
New RPTG

Switch Mode Power Converters (Based on B8 Type)

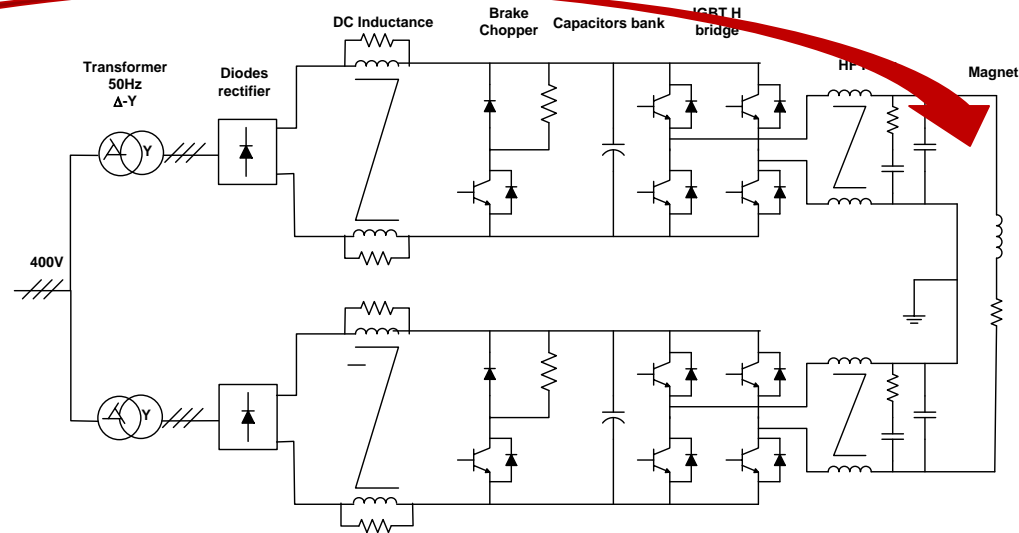


CB

or



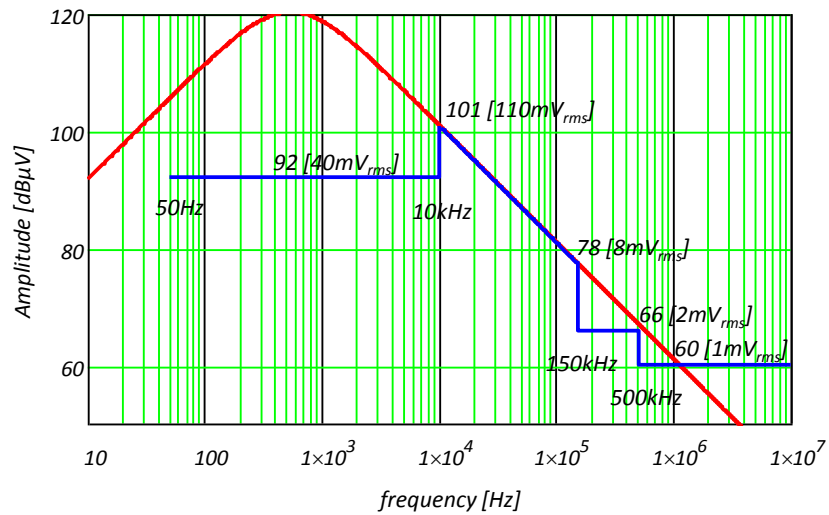
FWD



Main characteristics:

Max Output voltage:	700V
Max Output current:	810A
Max RMS current:	810A
Output Power:	567kW
Input voltage:	3x18kV/50Hz

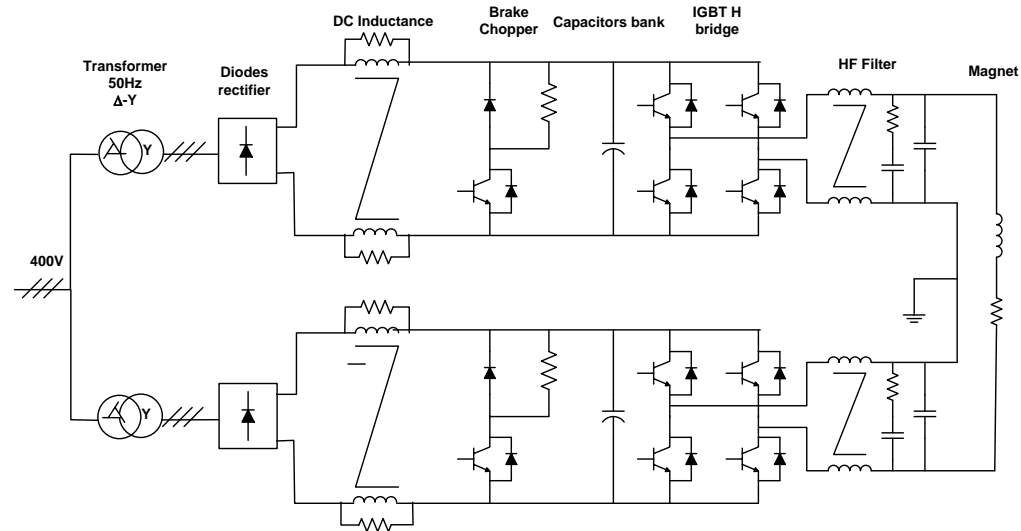
New RPTG power converter



--- 1 mA peak-peak constraint

--- Output voltage ripple constraint

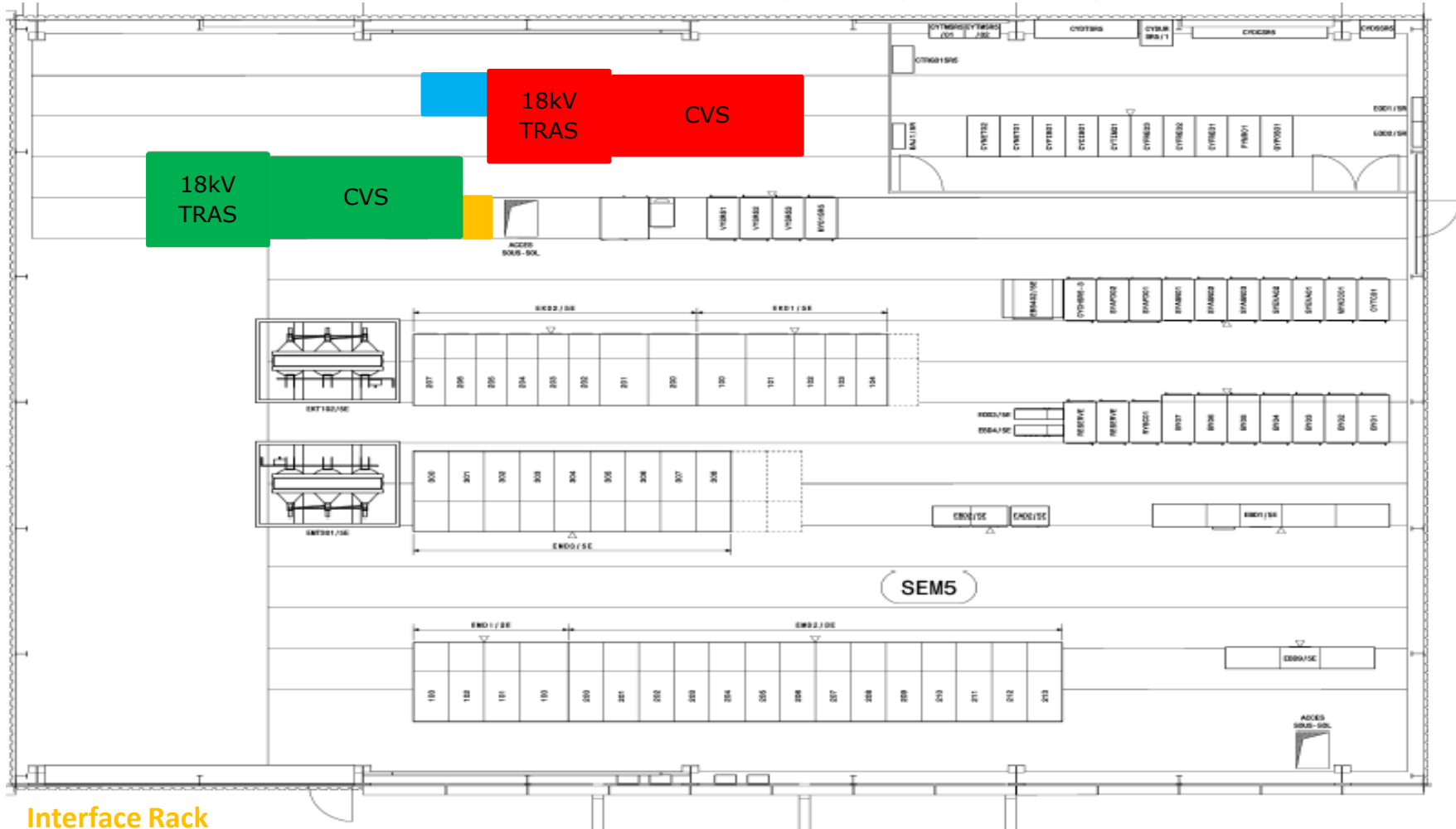
New RPTG Switch Mode Power Converters (Based on B8 Type)



Main characteristics:

Max Output voltage:	700V
Max Output current:	810A
Max RMS current:	810A
Output Power:	567kW
Input voltage:	3x18kV/50Hz

Installation

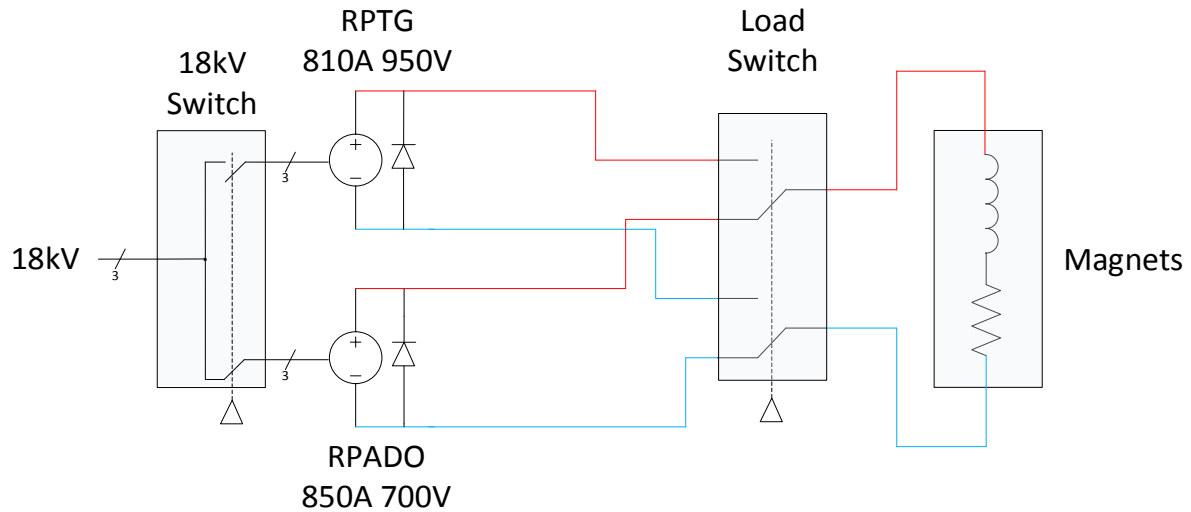


- Interface Rack
- Switch 18kV
- Old_RPTG
- New_RPTG

Installation

Interfaces with the safety systems

- ✓ FMCM
- ✓ WIC
- ✓ EIS
- ✓ CCC
- ✓ EL





Planning

- LS1
 - ✓ 18 kV switch
- 2016
 - ✓ Production of the load switches and power converters
- EYTS
 - ✓ Installation and commissioning

