# HiLumi P1/P5, Cryogenic interfaces for sc links, DFX 2nd review

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# Content

Presentation limited to what has changed for Cryogenics since Review held in January 2019

*All these points are considered in following talks and presentations*

⇒ Double concentric bath system

- LHe level gauges required for both bath (Delta P for internal, supra for outer)

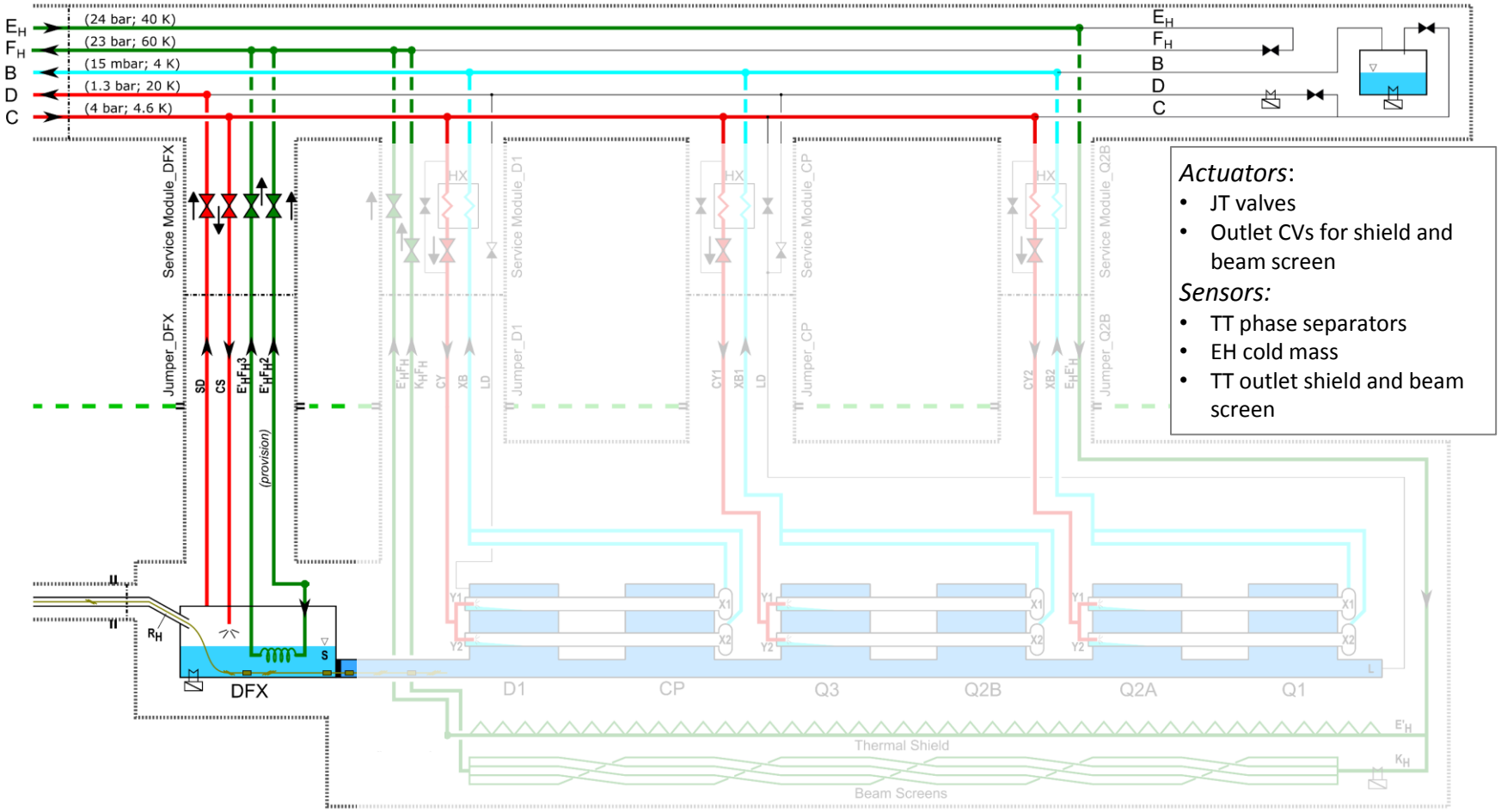
+ position of electrical heaters and thermometers on LHe vessel clarified (low point + LHe nominal interface)

⇒ No more thermal shield in DFX, but E-F required for “GHe heater”

- Jumper vacuum jacket could be reduced w.r.t 380mm standard LHC jumpers, DN200/250 should do the job
- Mechanical interface being defined and integrated

⇒ Recently Identified “Low” design pressure, with global Delta P to be looked at from DFX to WRL. Particular attention to choice of overpressure protection.

# IT nominal 1.9 K




Updated P & F diagram, considered here for nominal operation mode

LEGEND

- HTS ($MgB_2$) Bus Bar
- LTS (NbTi) Bus Bar
- Electrical Heater
- Valve
- Heat Exchanger
- LHe *1.8 K* pressurized
- LHe 4.5 K saturated
- LHe *1.8 K, 15 mbar* saturated
- Vacuum barrier

Operation mode: ***Nominal 1.9 K***

| Header | ṁ *[g/s]* | p *[bar]* | T *[K]* | Remarks |
|---|---|---|---|---|
| B | 55.6 | 0.015 | 4 | |
| C | 63.4 | 4 | 4.6 | |
| D | 0.4 | 1.3 | 20 | |
| $E_H$ | 43.4 | 24 | 40 | |
| $F_H$ | 43.4 | 23 | 60 | |
| WRL | 7.4 | 1.1 | 300 | |

# Summary

- Since January 2019, continued team effort to properly define and assess LHe volumes, => OK by now

- Interface with QXL jumper as last mechanical interface to be finalised together, with concept identified (above QXL)

- Operational pressure range now identified, possibly as small as present LHC RF cryomodules,

  => it works but it is very sensitive to pressure fluctuations

Thank you for your attention !