



Modification of the Nitrogen Injection Line for TDE in UD62 and UD68

ECR: LHC-V-EC-0005
EDMS 1715672

TE-VSC-BVO

Main reason for the upgrade

The installation of a **new membrane gauge** (High pressure) at the entrance of the TCDEL part will allow a much more precise and direct N₂ pressure reading of TDE part.

N₂ filling time is expected to be reduced: currently several days to fine tune the pressure

Pressure reading when the beam is dumped is expected to be more accurate.

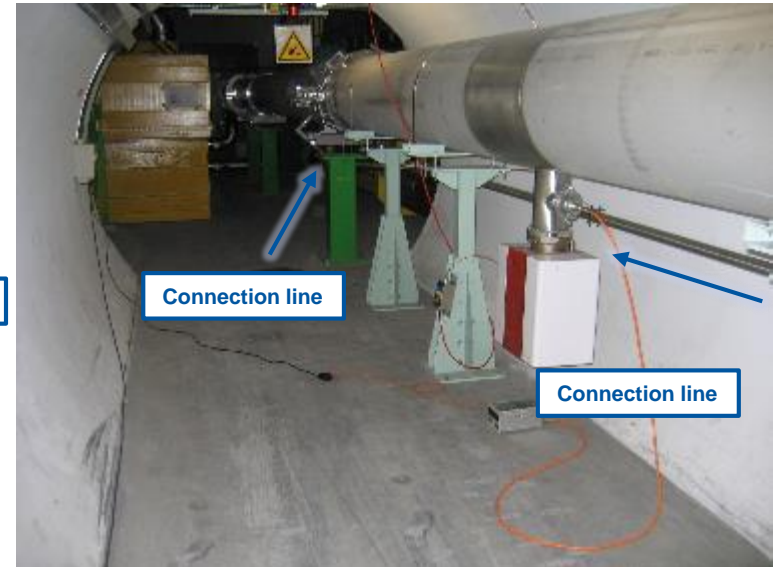
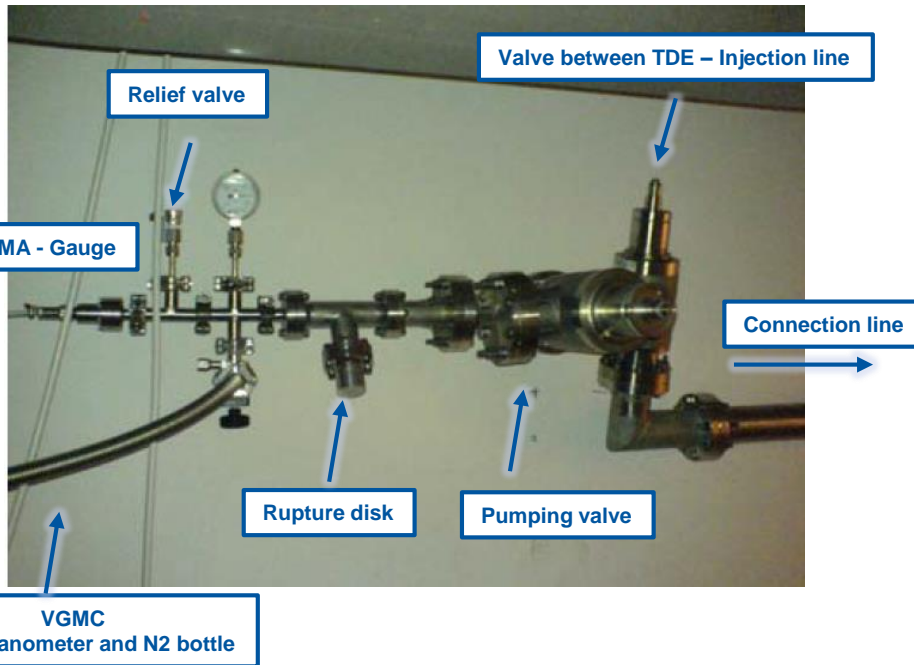
The current **relief valve** is removed from the injection line and installed also at the entrance of the TCDEL part allowing a more direct evacuation of the gas in case of overpressure.

Installation of a **new pirani gauge** (Atmospheric pressure down to 10⁻³ mbar) would be used during pump down and leak detection and allow having a monitor of the TDE part. At the moment we just rely on the reading of the leak detection itself. This gauge will be used with a local cable when necessary.



N₂ Injection line schematic

Historical: TE-VSC built the injection line and gave the pressure monitoring



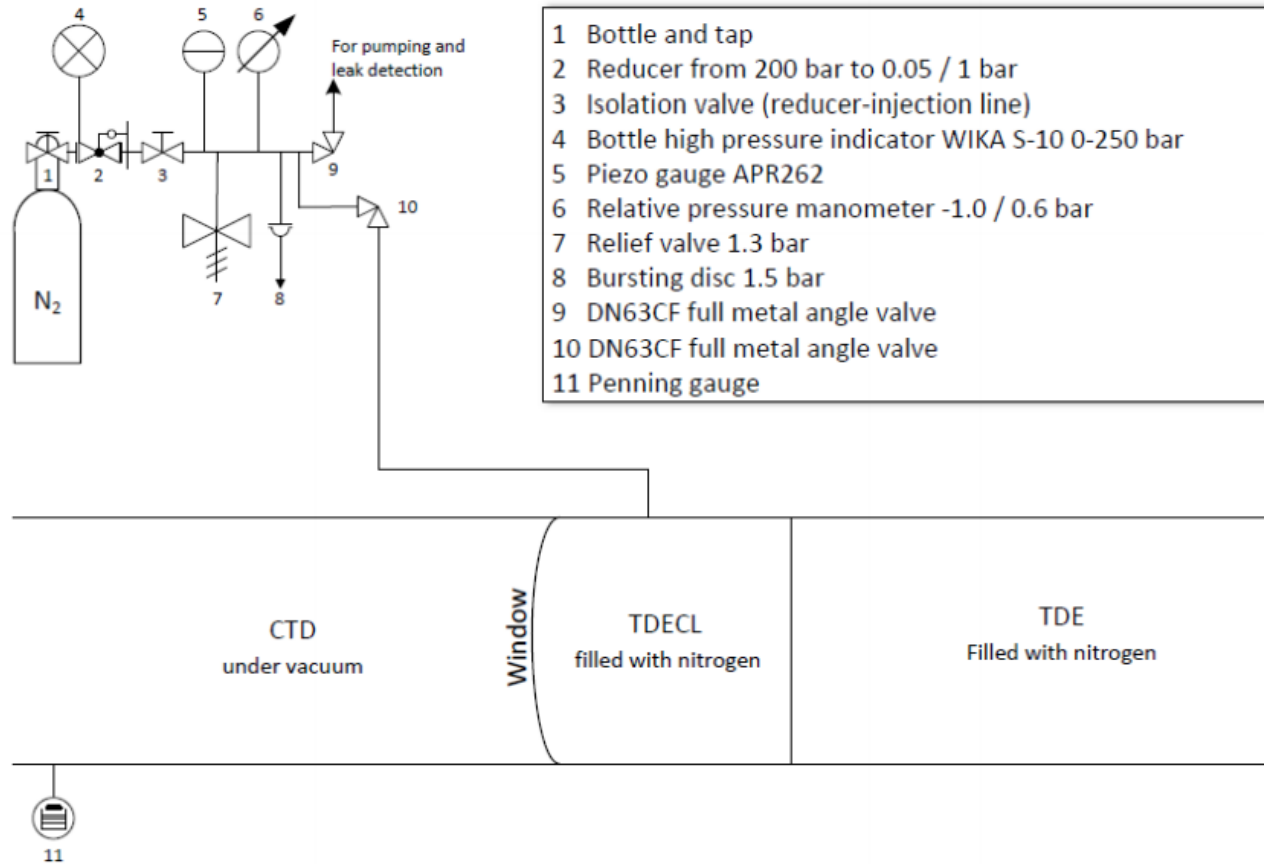
Two distinctive pressure reading:

VGMA: Membrane gauge – Range of pressure 0 – 2 bar – Precision of ± 5 mbar

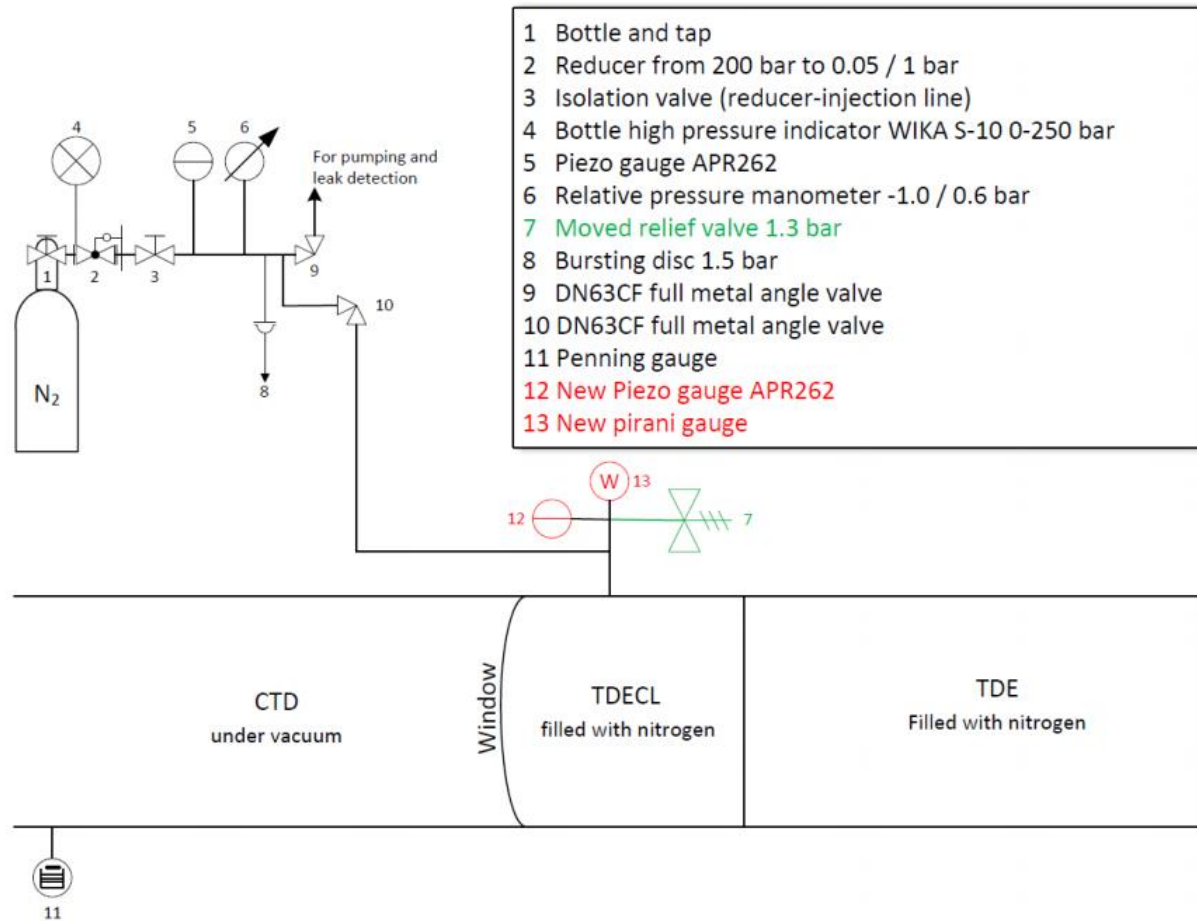
VGMC: Manometer – Range of pressure 1 – 250 bar – Precision of 0.5%

Safety valve: Open-Closed state – Calibrated ≈ 1.3 bar

N₂ Injection line schematic



Updated N₂ Injection line



Conclusion

- With new gauge:
 - ✓ Improve accuracy of the pressure reading in the TDE
 - ✓ Allow a fast injection & possible leak detection analysis if requested
 - ✓ Improve the accuracy of the overpressure with and without beam
- New pressure in the TDE \approx 1150-1180 mbar
 - \approx 150 mbar of over pressure
- No Hardware interlock is foreseen:
 - Request should come from equipment owner or OP