

Procedure for Exchanging FC501B and FCA

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This procedure is to exchange

- FC501B = The inlet flow controller of Liquefier B and
- FCA = The outlet flow controller of Liquefier A

on the QT manifold at NM4. The reason for the exchange is that the specification of FCA (upstream = 15 psi, downstream = 10 psi) is suitable for the inlet side.

Conditions

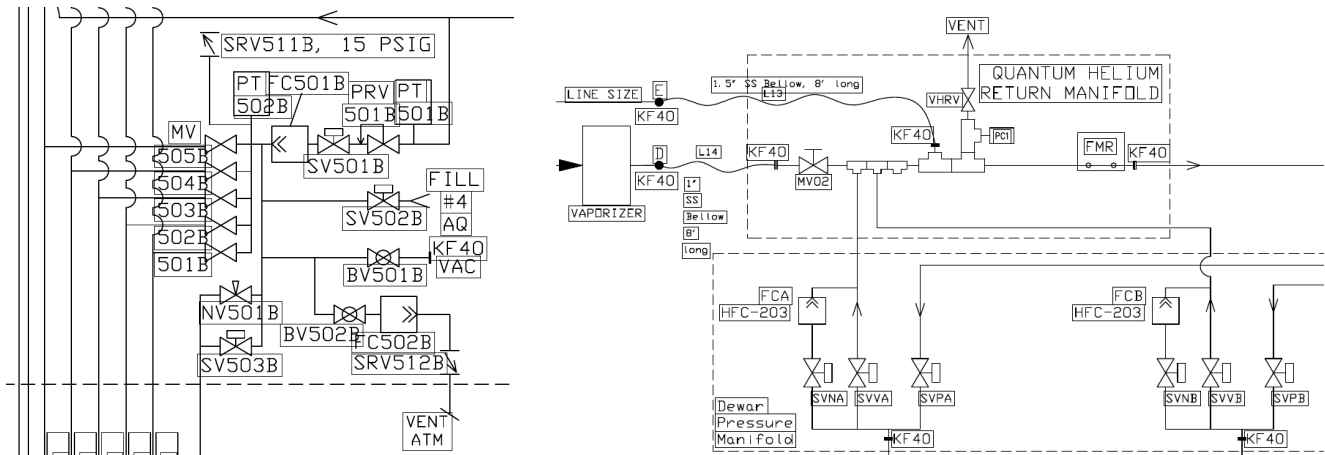
- Liquefier A (Liq A) is in the Idle mode and cold (~5 K).
- Liquefier B (Liq B) is in the Idle mode and warm (~300 K).
- Initial valve settings:

NV501B	Partially opened
SV503B	Closed
SV501B	Opened
MV50[1-5]B	Opened
FC501B	Opened
BV502B	Closed
FC502B	Closed
SVNA	Opened
SVVA	Closed
SVPA	Closed
FCA	Opened
SVNB	Opened
SVVB	Closed
SVPB	Closed
FCB	Opened

MV02 (a.k.a. GV02)	Opened
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Concepts

- To purge the gas lines around the flow controllers, we use
 - The Dewar line (thru SVNA) for the outlet of Liq A, and
 - The "High Pressure Inlet" line (thru SV501B) for the inlet of Liq B.
- The gas from Liq A thru SVNA is warm even though Liq A is cold, because the gas is warmed up in the long flex hose.



Procedures

- Adjust or confirm the system pressures.
 - Set the Liq-A pressure to 0.5-1.0 psi.
 - Confirm that the pressure at PC1 is 0.5-1.0 psi, which is maintained by HR3.
- Unmount the Inlet of Liq B.
 - Close NV501B.
 - Close SV501B.
 - Close MV50[1-5]B.
 - Remove the communication cable from FC501B.
 - Remove FC501B from the gas line.
- Unmount the outlet of Liq A.
 - Close SVNA.
 - Close SVNB and FCB (not A).
 - Close MV02 (a.k.a. GV02).
 - Remove the communication cable from FCA.
 - Remove FCA from the gas line.
 - Attach a Swagelok plug to the downstream line, while the gas is flowing out.
- Mount the outlet of Liq A.

- 4.1. Connect the upstream side of the new FCA.
- 4.2. Connect the communication cable to FCA, and open FCA at ~10 SLM.
- 4.3. Open SVNA. The gas starts flowing.
- 4.4. Wait for 5 min.
- 4.5. Remove the Swagelok plug, and connect the downstream side of the new FCA, while the gas is flowing out from the two ends.
- 4.6. Open MV02 (a.k.a GV02).
- 4.7. Open SVNB.
5. Mount the Inlet of Liq B.
 - 5.1. Connect the upstream & downstream sides of the new FC501B.
 - 5.2. Connect the communication cable to FC501B, and open FC501B fully.
 - 5.3. Connect the purity meter to FC502B.
 - 5.4. Open BV502B and FC502B.
 - 5.5. Open SV501B. The gas starts flowing.
 - 5.6. Wait for 10 min or until the purity meter shows ~100%.
 - 5.7. Close BV502B and FC502B.
 - 5.8. Open MV50[1-5]B.
 - 5.9. Open NV501B.
 - 5.10. Remove the purity meter from FC502B.
6. Confirm the final valve settings as follows:

NV501B	Partially opened
SV503B	Closed
SV501B	Opened
MV50[1-5]B	Opened
FC501B	Opened
BV502B	Closed
FC502B	Closed
SVNA	Opened
SVVA	Closed
SVPA	Closed
FCA	Opened
SVNB	Opened
SVVB	Closed
SVPB	Closed

FCB	Opened
MV02 (a.k.a. GV02)	Opened