SQ13 – Cavity in operation at 2K

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| **Sensors and actuators used:** |  |
| - Pressure: PT584, PT660, PT661 | - Control valve: CV603, CV581, CV582 |
| - Flow rate: FT551 | - Level: LI660, LI670 |
| - Valve: FV642, FV643, FV581, FV582, FV584, FV554, FV555, FV556, Switch valves | - Cryostat-2K: Boolean |

|  |  |
| --- | --- |
| **The user chooses:** | **The initial conditions:** |
| - Level: LI660setpoint, LI660mini, LI660Maxi, LI670setpoint, LI670mini, LI670Maxi | - Liquid or Vacuum insert selected  - Sequences from 1 to 3 stopped  - Sequences 10 and 12 stopped  - Sequence 8 in operation |
| - Pressure: PT660setpoint, PT584setpoint |
| - Flow: FT551limit |
| - Control valve: CV603%opening, CV581%opening, CV582%opening |
| - Mode: regulation or intermittent |

## Liquid mode

LI670 < LI670mini & Yes & **FV551 closed**

LI670 >= LI670mini & Yes & **FV551 closed**

PT660 close to PT660setpoint

Stop 2 K

newPT660setpoint < oldPT660setpoint

Start 2 K Vacuum & (S10 &S12) stopped

The tank 2K is not filled,

“Do you want continue?”

No

Yes

Stop

No

Pumping 2K tank

CV582 opening step by step

Cryostat-2K = true

FV582 opened, **FV555 opened**

**Start 13L**

2K tank pressure

regulated

CV582 regulated

PT660=PT660setpoint OR

PT661=PT660setpoint

Cryostat-2K = true

FV582 opened, **FV555 opened**

Isolating 2K tank

CV581 closing with slope

**FV555 opened**

2K circuit closed

FV554 closed & FV555 open

CV581 opened

FV581 & FV584 closed

Close Switch Valves « Cryostat 4K circuit »

Cryostat-2K = true

Open FV582, **FV555 opened**

Pumps ok (user command)

CV581 closed

Starting pumps

Waiting,

**FV555 opened**, CV581 opened

Prepare the 2K pump

**Close FV554, Open FV555**

CV581 opened

You are starting the 2K pumping. The HNOSS valve **FV551** must be closed.

“Do you want continue?”

“Do you want continue?”

Cryostat connected to the recovery helium circuit

Switch Valves « Cryostat 4K circuit » opened

Open CV581

PT584 ≥ PT584setpoint

Pumps stopped

PT660 > 1020 mbar

FV582 closed

FV556 closed

Stop pumping system and filling

Close FV582, **Stop 13L**

Cryostat-2K = true,

CV582 fully open

**FV555 opened**

Pressure control

CV582 opened

Cryostat-2K = true

Cryostat connected at the recovery He circuit

Open Switch Valves « Cryostat 4K circuit »

Cryostat-2K = false

Open CV581

Close CV582

« 2K pumps stopped ? »

Pump line at atmospheric pressure

**Close FV555**

**Open FV556**

Stop filling line

**Close FV556**

CV581 opened

Stop 13L

LI670 < LI670mini

CV603 opened and controlled

FT551<FT551limit

FV642, FV640 opened

Stop 13L

Intermittent& LI670 < LI670mini

Regulation

Intermittent & (LI670 < LI670mini OR Stop 13L)

Regulation

(LI670 > LI670Maxi) OR Stop 13L

End of

Filling

Close CV603

FV642, FV640 opened

Regulation

Stop Filling

Close CV603

FV642, FV640 opened

Start sequence 13L

CV603 closed

Filling circuit closed

Close FV642, FV640

FV642 closed

Stop

**Sequence 13L**

Filling ready

Open FV642, FV640

Regulation

mode

CV603 regulated

LI670=LI670setPoint

FV642, FV640 opened

Start

Filling

Waiting for level

Close CV603

Intermittent

Regulation OR Stop 13L

LI670 < LI670mini OR Stop 13L