SQ10 – Cavity cooling down

**Sensors and actuators used:**

- Pressure: PT660

- Flow rate: FT581

- Valve: FV640, FV641, FV642, FV643

- Control valve: CV601, CV602, CV581

- Level: LI660 (LT660+LT661), LI670 (LT670+LT671)

|  |  |
| --- | --- |
| **The user chooses:** | **Initial conditions:** |
| - Level: LI660setpoint, LI660mini, LI660Maxi, LI670setpoint, LI670mini, LI670Maxi | - Liquid or Vacuum insert selected  - Sequences from 1 to 3 stopped  - Sequences from 12 to 13 stopped  - Sequences 6 & 8 in operation |
| - Pressure: PT660setpoint |
| - Flow: FT581limit |
| - Control valve: CV601%opening, CV602%opening, CV581%opening |
| - Mode: Regulation or Intermittent |

B

LI660>LI660Maxi

Stop

Intermittent

FV641, FV643 opened

CV602 %opening and controlled

FT581<FT581limit

CV581 regulated

PT660=PT660setpoint

Stop

Intermittent& LI660 < LI660mini

Regulation

Intermittent & (LI660<LI660mini OR Stop)

)

Regulation

(LI660>LI660Maxi) OR Stop

End of

Filling

FV641, FV643 opened

Close CV602

CV581 regulated

PT660=PT660setpoint

Regulation

CV601 fully closed

FV641, FV643 opened

CV581 regulated

PT660=PT660setpoint

Preparation to regulate

Cryostat

Filling

End of

Cool down

Close CV601, FV641, FV643 opened

CV581 regulated

PT660=PT660setpoint

Stop

Cooling

Close FV641, FV643

Close CV602

CV581 regulated

PT660=PT660setpoint

CV602 fully closed

Cooling cavity

Open FV641, FV643

CV601 %opening and controlled by

FT581<FT581limit

CV581 regulated

PT660=PT660setpoint

A

Waiting for level

Close CV602

LI660<LI660mini

Regulation OR Stop

Regulation

mode

FV641, FV643 opened

CV602 regulated

LI660=LI660setPoint

CV581 regulated

PT660=PT660setpoint

## Vacuum mode

## Liquid mode

Yes

LI670>LI670Maxi

Stop

LI670<LI670mini

FV640, FV642 opened

CV602 %opening and controlled

FT581<FT581limit

CV581 regulated

PT660=PT660setpoint

Stop

Intermittent& LI670 < LI670mini

Regulation

Intermittent & (LI670<LI670mini OR Stop)

Regulation

(LI670>LI670Maxi) OR Stop

End of

Filling

FV640, FV642 opened

Close CV602

CV581 regulated

PT660=PT660setpoint

Regulation

CV601 fully closed

FV640, FV642 opened

CV581 regulated

PT660=PT660setpoint

Preparation to regulate

Cryostat

Filling

End of

Cool down

Close CV601, FV640, FV642 opened

CV581 regulated

PT660=PT660setpoint

Stop

Cooling

Close FV640, FV642

Close CV602

CV581 regulated

PT660=PT660setpoint

CV602 fully closed

stop

Start

“ Have you chosen the recovery circuit for the cryostat? “

B

Vacuum & Yes

Liquid & Yes

Cooling cavity

Open FV640, FV642

CV601 %opening and controlled by

FT581<FT581limit

CV581 regulated

PT660=PT660setpoint

A

Waiting for level

Close CV602

Regulation OR Stop

Intermittent

Regulation

mode

FV640, FV642 opened

CV602 regulated

LI670=LI670setPoint

CV581 regulated

PT660=PT660setpoint

LI670<LI670mini OR Stop

Waiting level