SQ1 – Valve Box, conditioning He circuits

**Sensors and actuators used:**

- Pressure: PT580

- Valve: FV090, FV091NO, FV092, FV600, FV601, FV602, FV640, FV641, FV642, FV643, Switch valves

- Control valve: CV600, CV601, CV602, CV603, CV580, CV590, CV-He-liquefier, CV644

- Purging system: vacuum pump P090

|  |  |
| --- | --- |
| **The user chooses:** | **Initial conditions:** |
| - Number of cleaning cycle: Nb cycle | - Sequences from 5 to 20 stopped |
| - Delay: tstarting, tvac1, tvac2, tp1, tp2 |  |
| - Mode: Vacuum, Liquid or Magnet |  |
| - Pressure: Pvac, PvacMax, P He, P He min |  |

Stop

Start conditioning

Close FV090, FV092, FV601, FV602 Close CV600, CV601, CV602, CV644, CV603, CV580, FV641, FV643

Helium conditioning stopped

CV580, CV600, CV601, CV602, CV603, CV644 opened

FV601, FV602, FV641, FV643 opened

FV091NO closed, P090 running

CV580, CV600, CV601, CV602, CV603, CV644 opened

FV601, FV602, FV641, FV643 opened

FV091NO closed, P090 running

Close FV090 & FV600

Delay tvac1

Leak test at low pressure

CV580, CV600, CV601, CV602, CV603, CV644 opened FV090, FV601, FV602, FV641, FV643 opened

FV091NO closed, P090 running

CV580, CV600, CV601, CV602, CV603, CV644 opened

FV601, FV602, FV641, FV643 opened

FV090 closed

Close FV090

Pressure

Alarm

Close FV092

“Not possible to pressure the line”

Close FV092

Alarm validated

t > tp2 & PT580<P He

PT580 > P He

Flushing

with GHe

Open FV092 Open FV600

Delay tp2

Vacuum

Alarm

Close FV090

No

Prepare for purging

Close FV600

Valve Box circuits isolated

Pumping

Open FV600

Delay tvac2

Close FV091NO

Open FV090

Start the Pump P090

Start the Pumping

Close FV640, FV642

Open CV600, FV601, FV602

Close CV-He-liquefier, CV590

Open CV580, FV641, FV643,

Open CV601, CV602, CV603, CV644

Close Switch Valves “Valve Box Circuit”

Stop P090

Open FV091NO

Pump stopped

P090 stopped

CV580 closed

FV600 closed

Low level pressure alarm

Alarm validated

PT580 P He min & t < tp1

Yes

No

“Do you want to stop the conditioning?“

t > tstarting & (CV-He-liquefier & CV590) closed

Flushing with

GHe

Open FV092 & FV600

Delay tp2

Yes

“Do you want to keep lines under vacuum?“

“Do you want to stop the conditioning?“

Yes

No

Alarm validated

P090 running

High level vacuum alarm

t > tp2 & PT580<P He

t > tvac2 & PT580 > Pvac

Alarm validated

PT580 > P He min

& t > tp1

& N < Nb cycle

PT580 > P He min

& t > tp1

& N ≥ Nb cycle

PT580 > P He

Leak test at high pressure

Close FV092 & FV600

Delay tp1

PT580 ≥ PvacMax & t < tvac1

PT580 < PvacMax & t > tvac1

Alarm validated

PT580 < Pvac