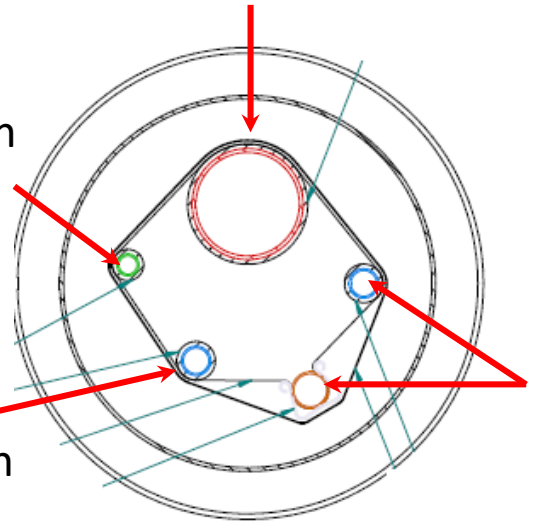
1. Visual inspection from TL012 upper bellow into VB

There does not seem to be anything in contact with this line…



In contact with copper shield

Around each other

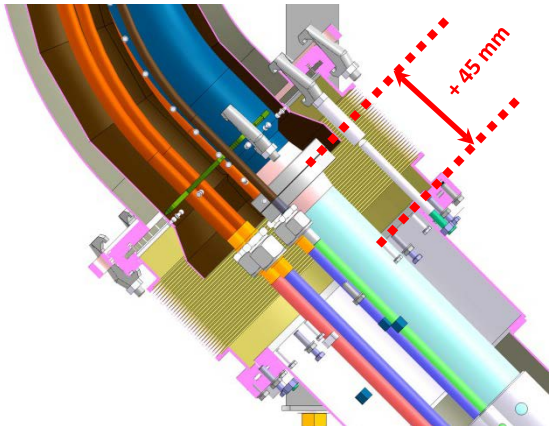
In contact with copper shield

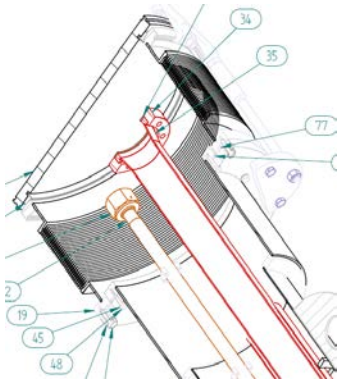
2. Visual inspection from TL012 upper bellow into VCS

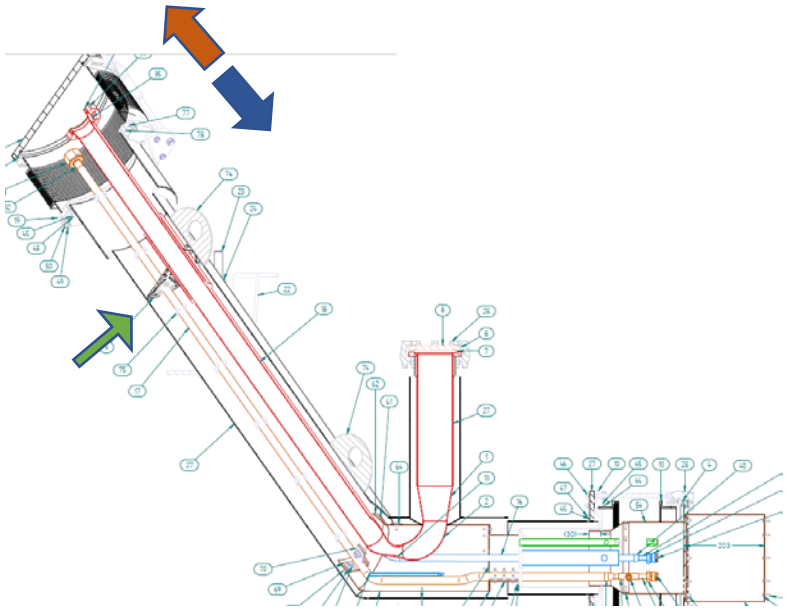
- No copper shield on this part
- Cannot see past the G10 separator (camera does not fit)

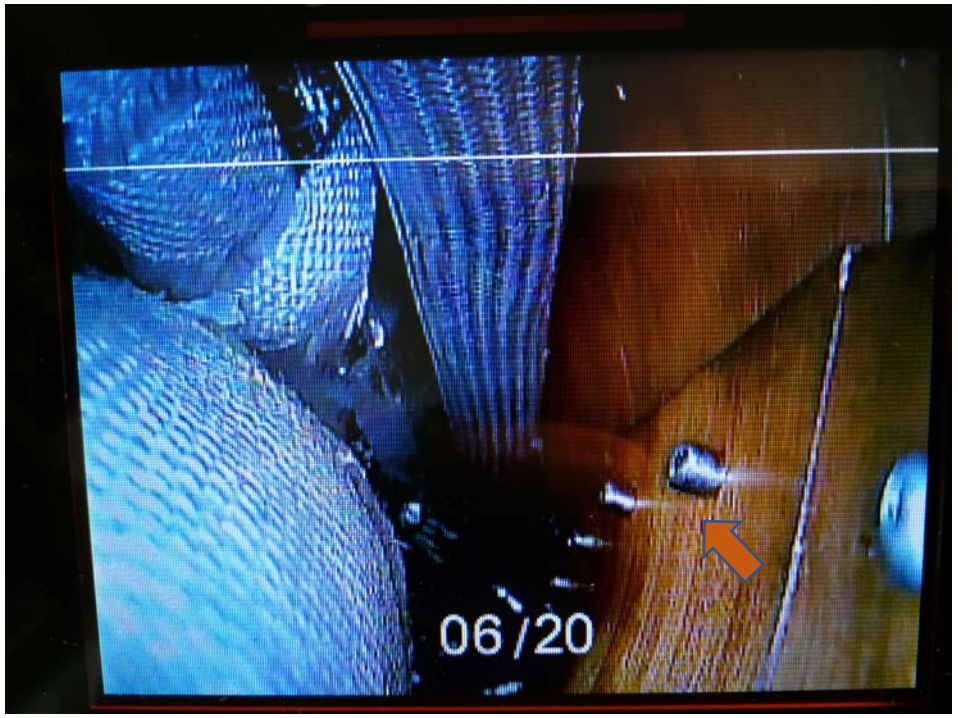
3. Distance measurement from CF flange to bellow flange

- 45 mm displacement towards VB wrt drawing








06/20


09/20


10/20

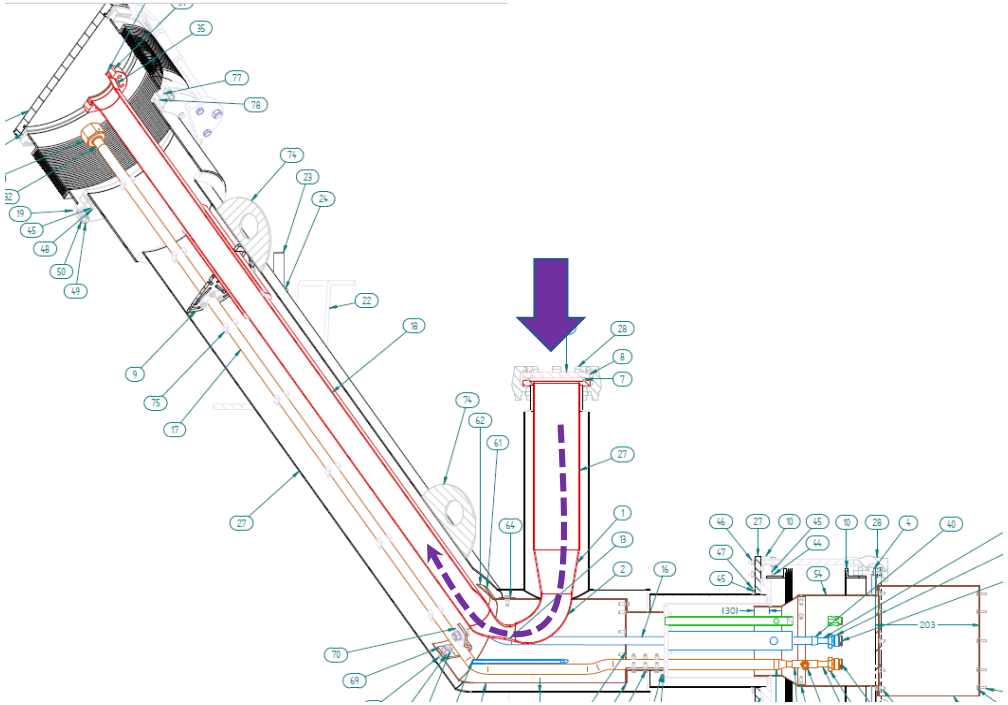

05/20


03/20

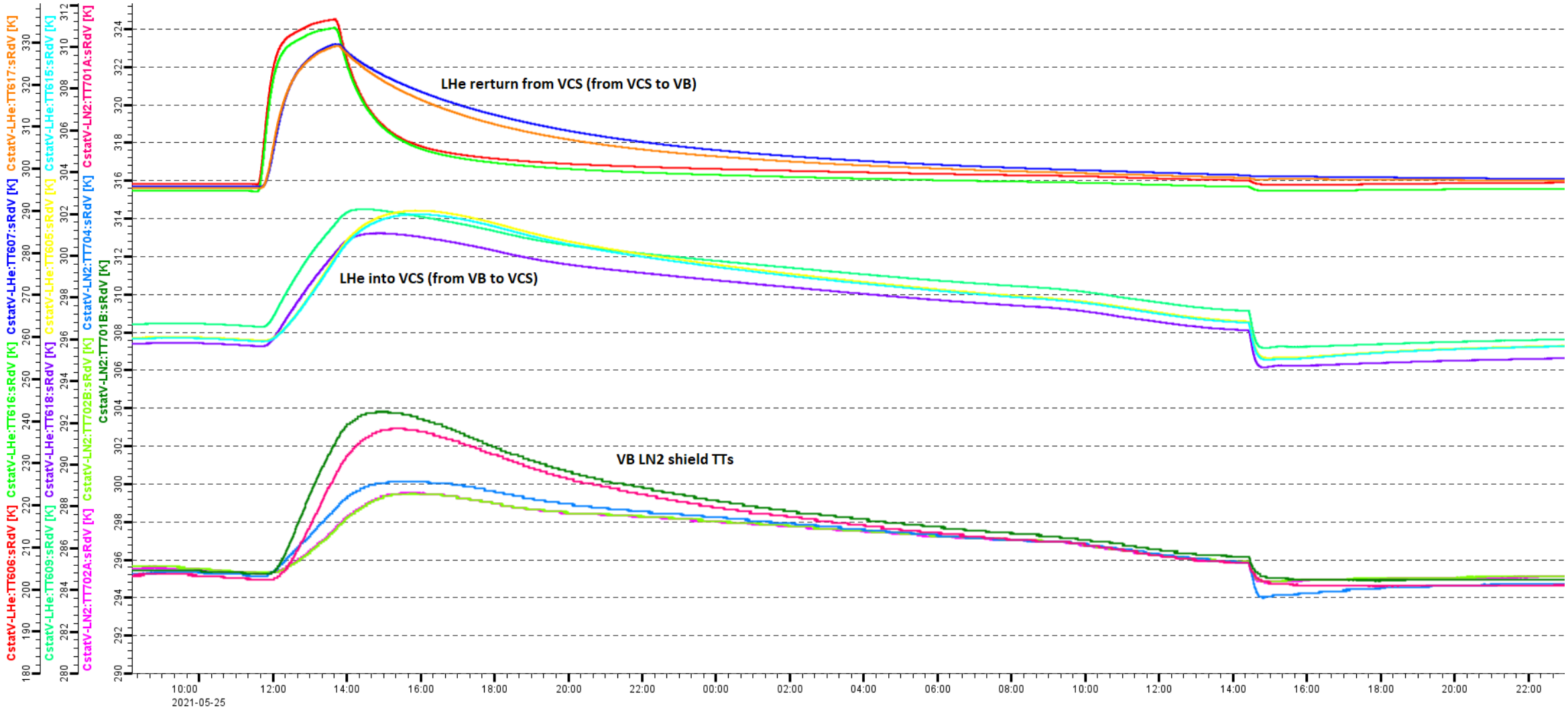
4. Blow hot air (ca. 50C) through bayonnet and let air out after TL016 outlet in VB (see graph next page)

- Pumping circuit at ca. 330 K
- Other LHe circuit at ca. 300 K
- Thermal shield TTs at ca. 300 K
- Did not see any hot spot on the joints where the bayonet meets the TL

VB, VCS and TL012 **NOT** under vacuum

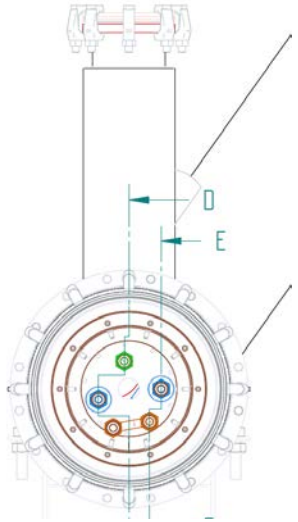


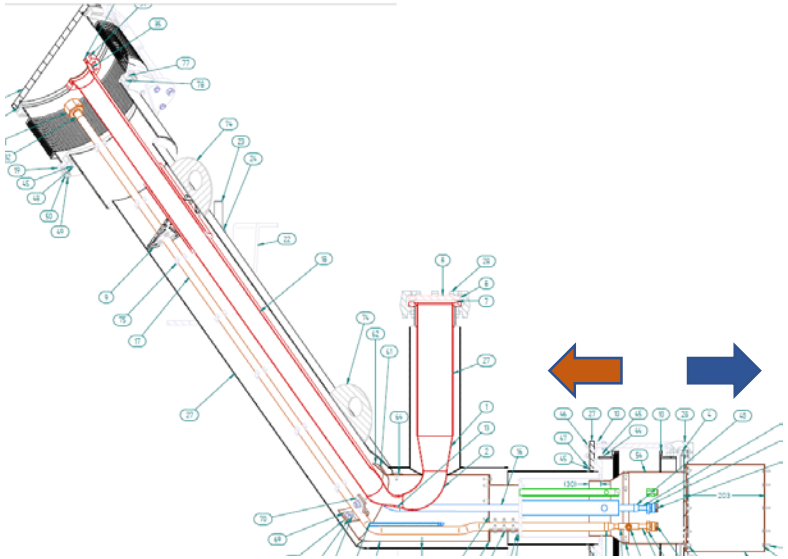
VB, VCS and TL012 **NOT** under vacuum



5. Visual inspection from TL012 lower bellow into VB

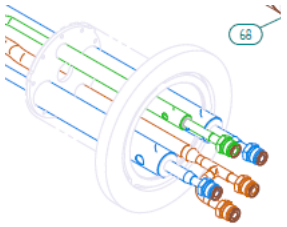
- Lines are separated thanks to the spacer, but
- Between the spacer and the bayonnet
  - One seems to be in contact with the copper shield
  - They are round each other, not sure if in contact



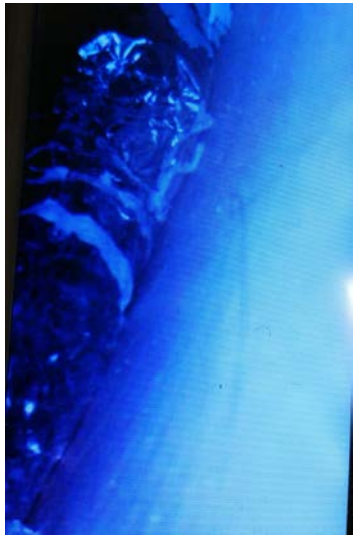


6. Visual inspection from TL012 lower bellow into VCS

- SCHe line touches a bit the thermal shield
- Both Lhe lines are touching LN2 lines

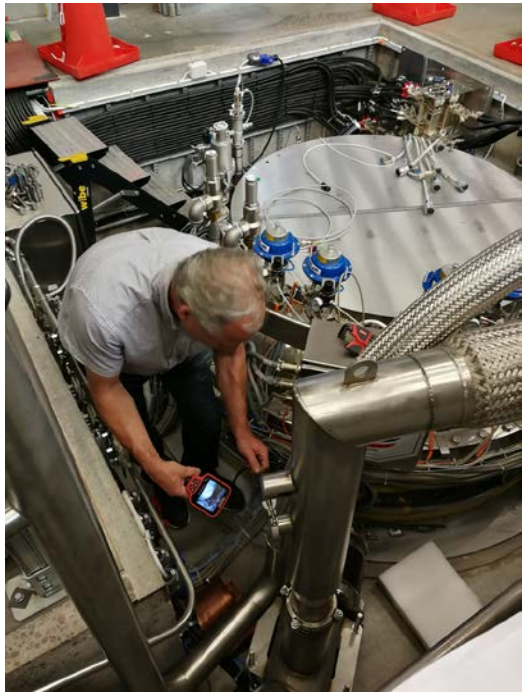



06 /20




04 /20


13 /20



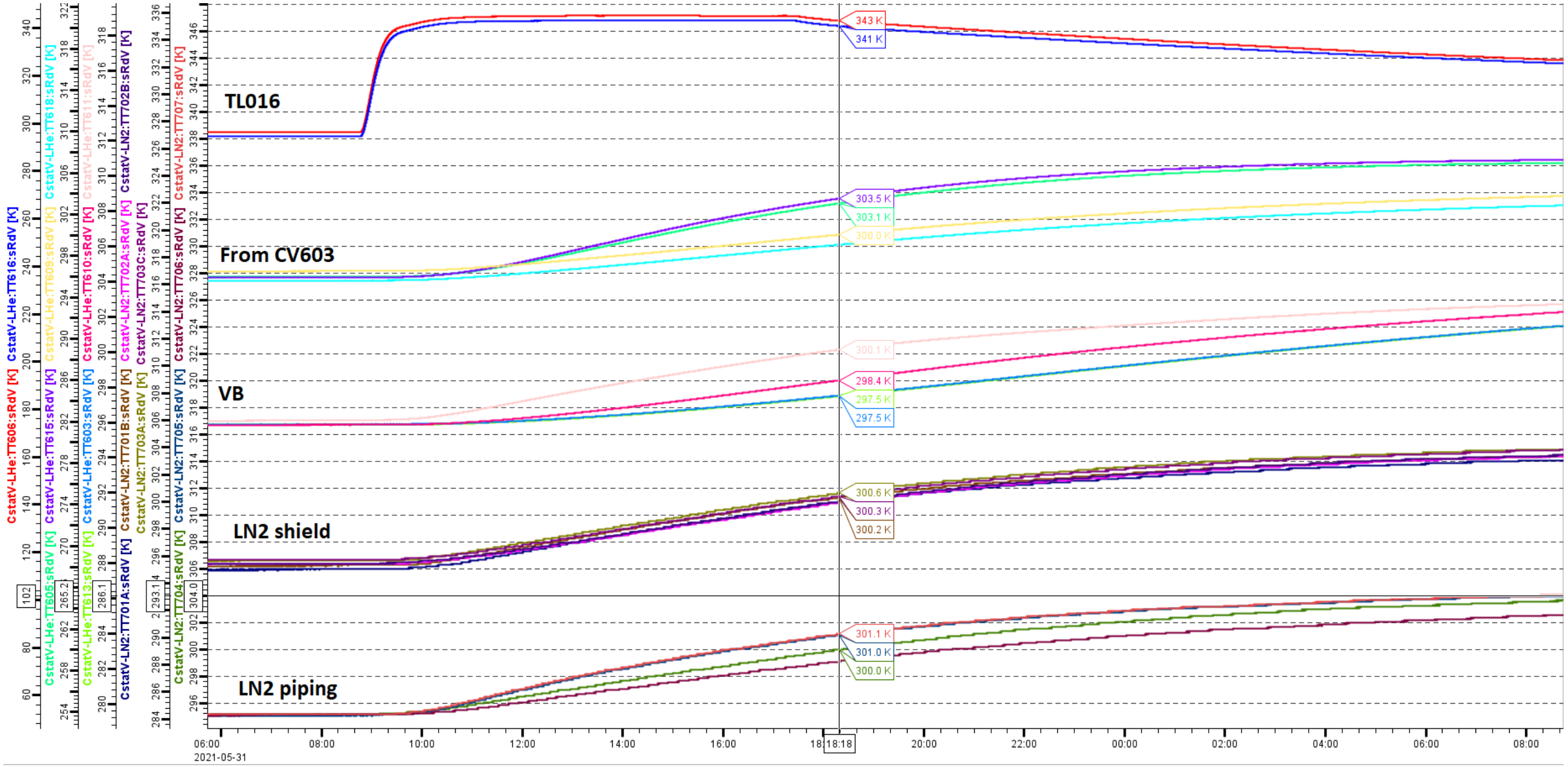
7. Blow hot air (ca. 50C) through bayonnet and let air out after TL016 outlet in VB (see graph next page)

- Pumping circuit at 347 K
- Other LHe circuit at 303 K
- 4K tank at 297 K
- LN2 shield TTs at 300 K
- LN2 piping at 301 K

VB, VCS and TL012 **UNDER** vacuum

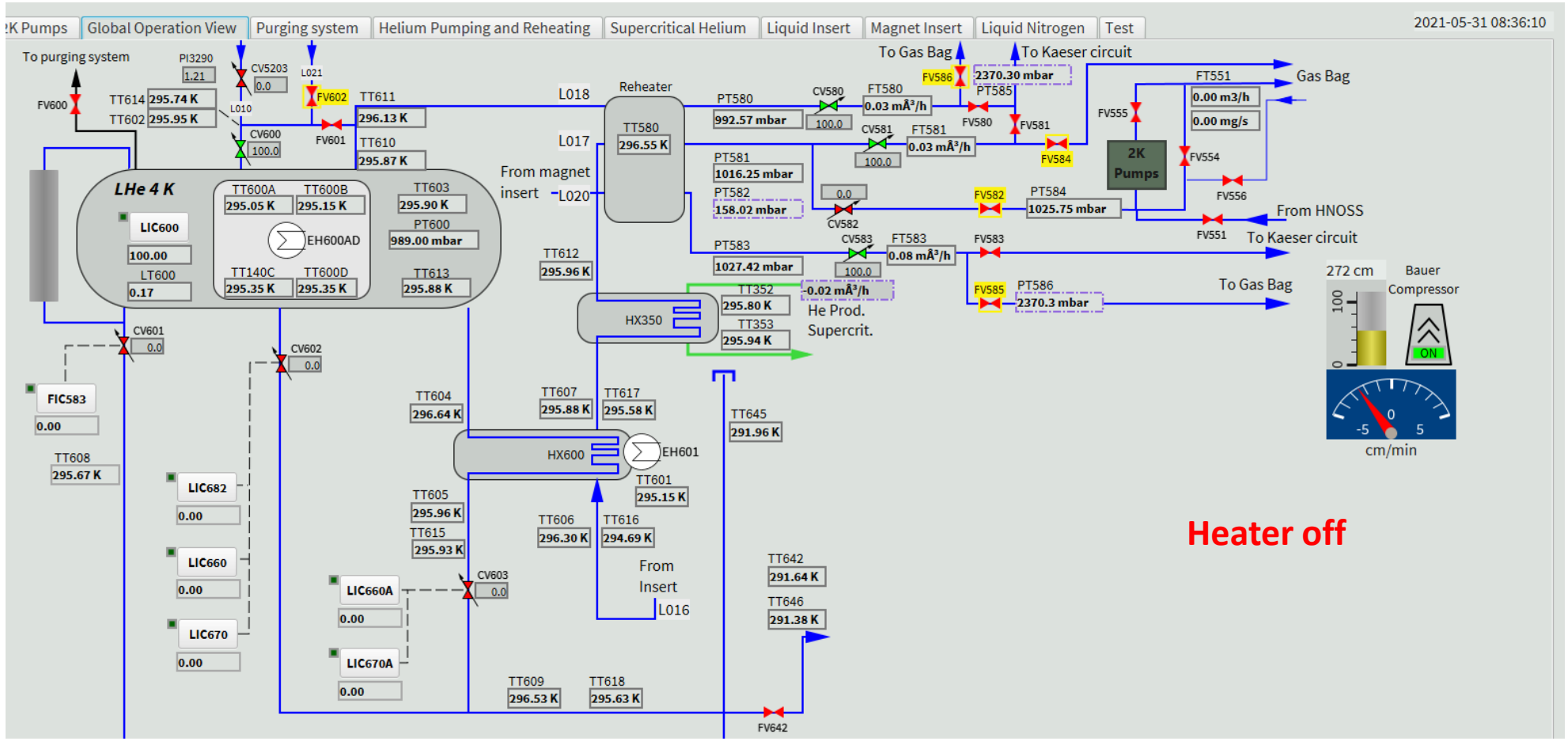
Stopped after a few hours. Did not want to leave the hot air running through the night.

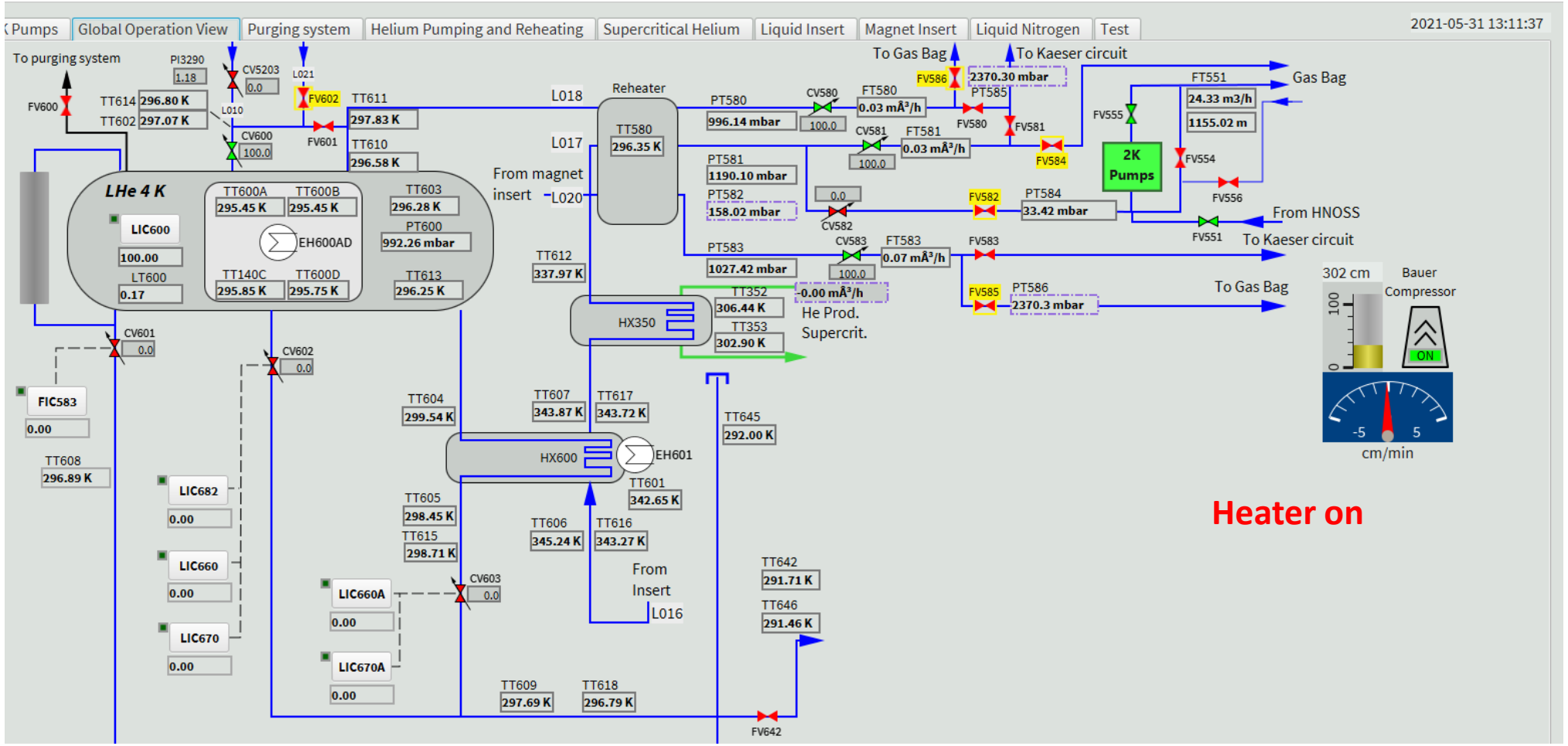
VB, VCS and TL012 **UNDER** vacuum

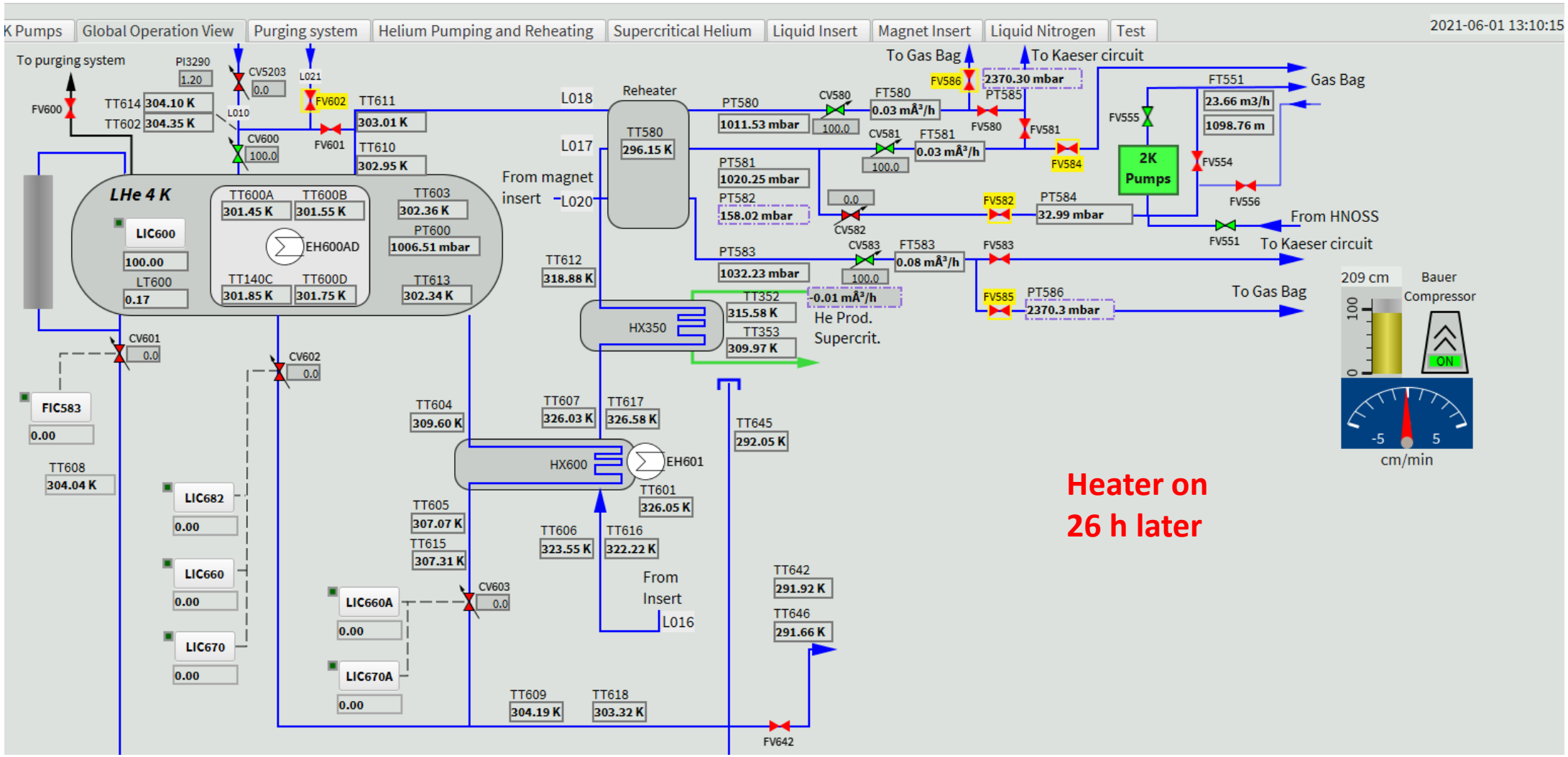


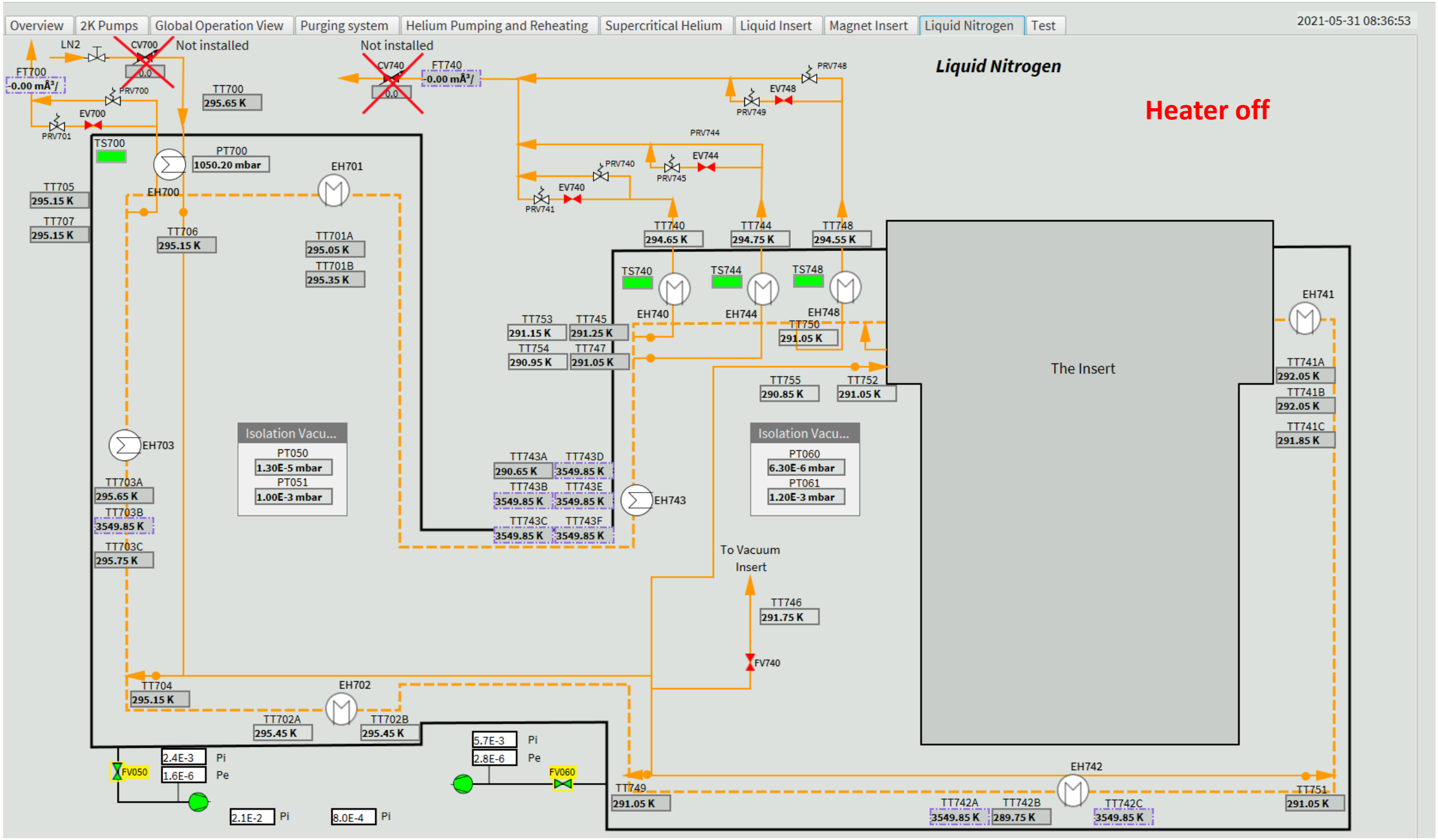
OUTCOME of TESTS

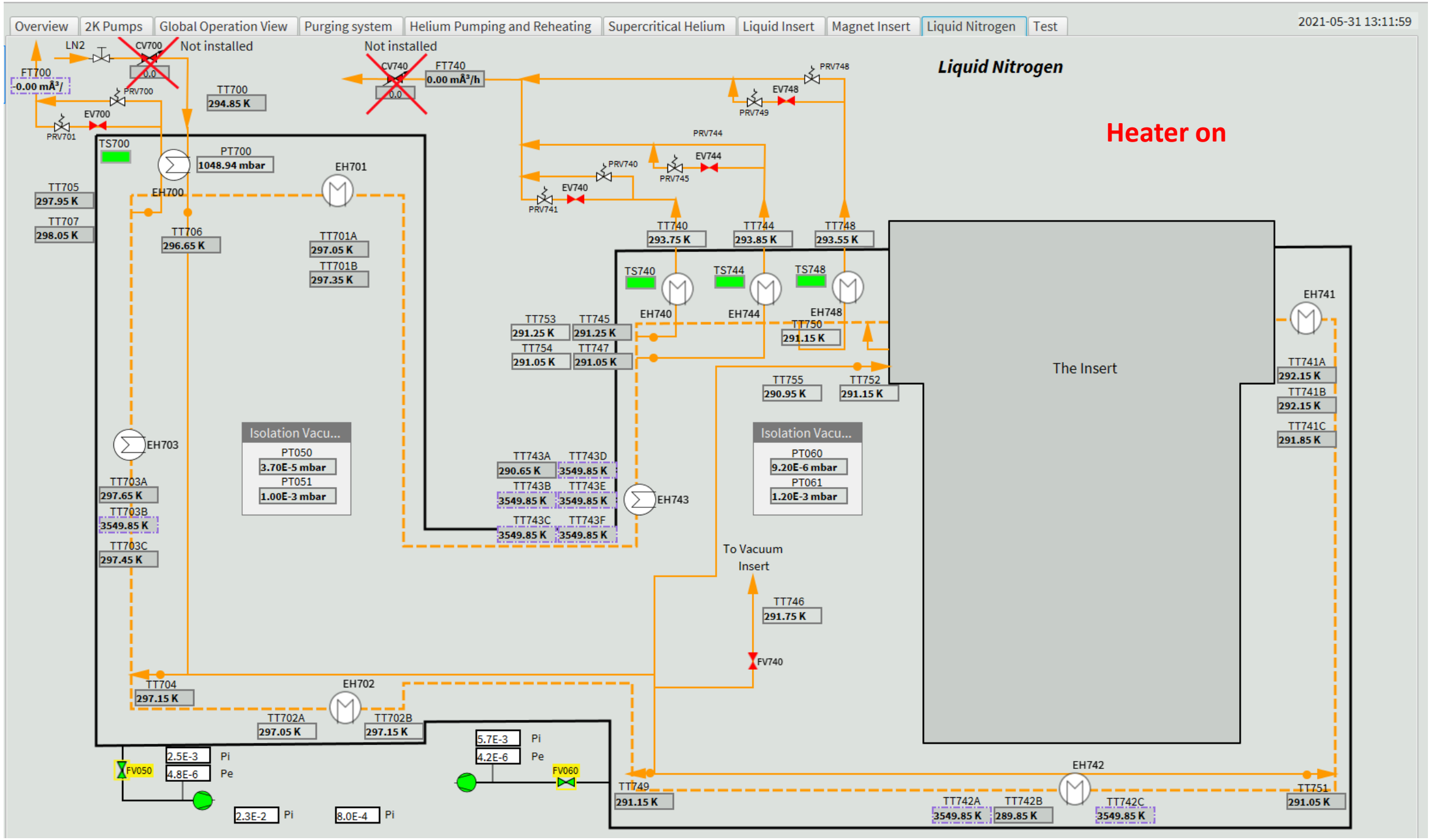
- **Visual inspection:**
  - Lines inside TL012 are round each other and some times in contact with either other lines or the copper shield
  - The copper shield is only present in some places and the LN2 line is in contact with it and with no MLI
  - The lines at either side of the TL are too long, except for the pumping line (moved upwards 45 mm)
- T profile
  - Increase in temperature in LHe piping in contact with TL016 might be normal from conduction point of view.
  - **Increase in temperature in any part of the thermal shield or the LN2 piping is not normal.**

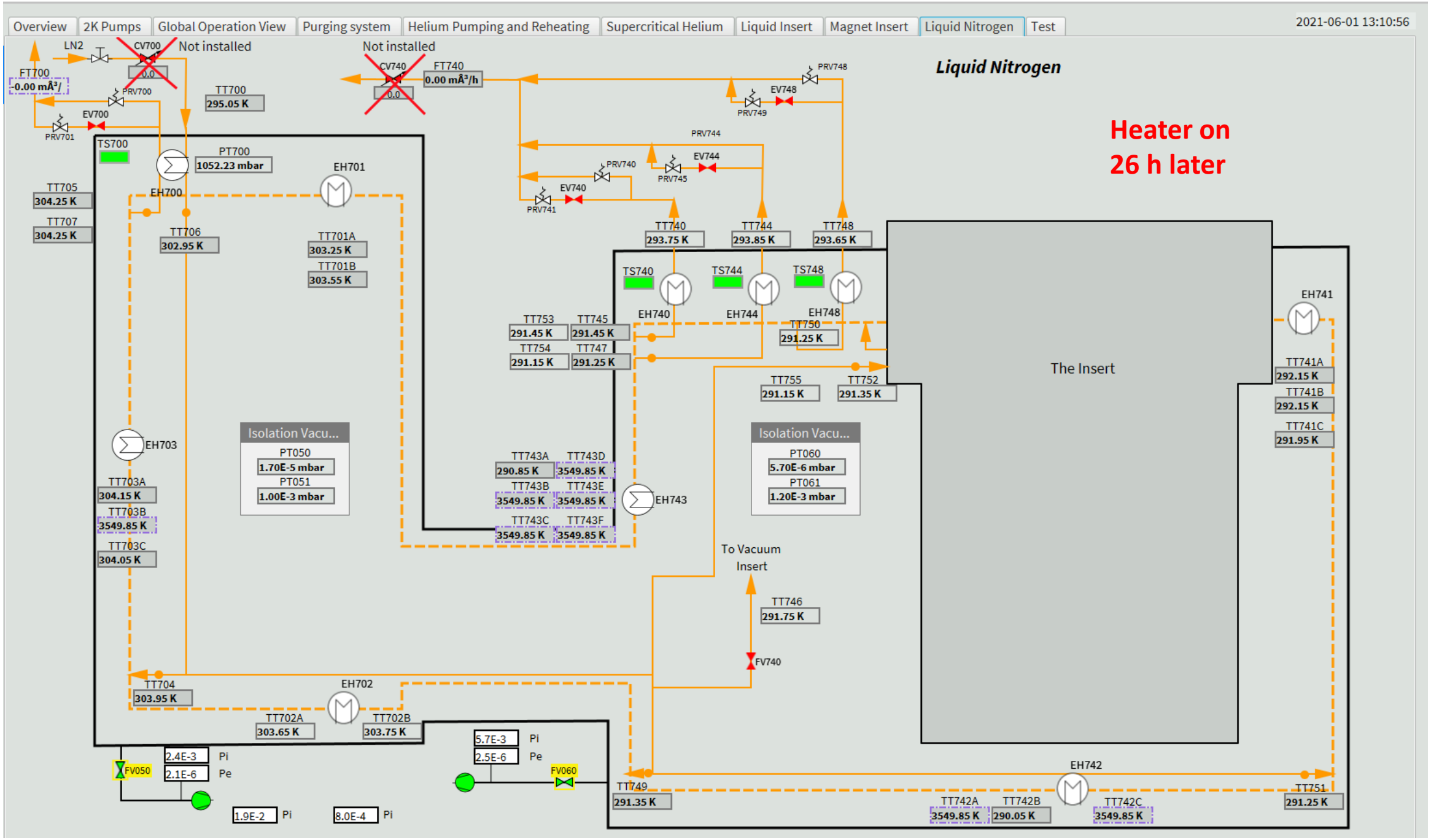

K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-05-31 08:36:10
To purging system
PI3290
1.21
CV5203
0.0
L021
FV602
TT611
296.13 K
L010
FV600
TT614
295.74 K
TT602
295.95 K
CV600
100.0
FV601
TT610
295.87 K
LHe 4 K
TT600A
295.05 K
TT600B
295.15 K
TT603
295.90 K
EH600AD
PT600
989.00 mbar
LIC600
100.00
LT600
0.17
TT140C
295.35 K
TT600D
295.35 K
TT613
295.88 K
From magnet insert
L020
L018
L017
Reheater
TT580
296.55 K
PT580
992.57 mbar
CV580
100.0
FT580
0.03 mÂ³/h
To Gas Bag
FV586
2370.30 mbar
To Kaeser circuit
PT585
FV580
FV581
CV581
100.0
FT581
0.03 mÂ³/h
FV584
FV555
2K Pumps
FT551
0.00 m3/h
0.00 mg/s
Gas Bag
FV554
FV556
PT581
1016.25 mbar
PT582
158.02 mbar
0.0
CV582
FV582
PT584
1025.75 mbar
From HNOSS
FV551
To Kaeser circuit
TT612
295.96 K
PT583
1027.42 mbar
CV583
100.0
FT583
0.08 mÂ³/h
FV583
To Gas Bag
TT352
295.80 K
-0.02 mÂ³/h
He Prod.
Supercrit.
HX350
TT353
295.94 K
FV585
PT586
2370.3 mbar
272 cm
Bauer
Compressor
100
0
ON
-5
0
5
cm/min
CV601
0.0
CV602
0.0
FIC583
0.00
TT608
295.67 K
TT604
296.64 K
TT607
295.88 K
TT617
295.58 K
TT645
291.96 K
HX600
EH601
TT601
295.15 K
LIC682
0.00
TT605
295.96 K
TT615
295.93 K
TT606
296.30 K
TT616
294.69 K
LIC660
0.00
From Insert
L016
CV603
0.0
LIC660A
0.00
TT642
291.64 K
TT646
291.38 K
LIC670
0.00
LIC670A
0.00
TT609
296.53 K
TT618
295.63 K
FV642
Heater off

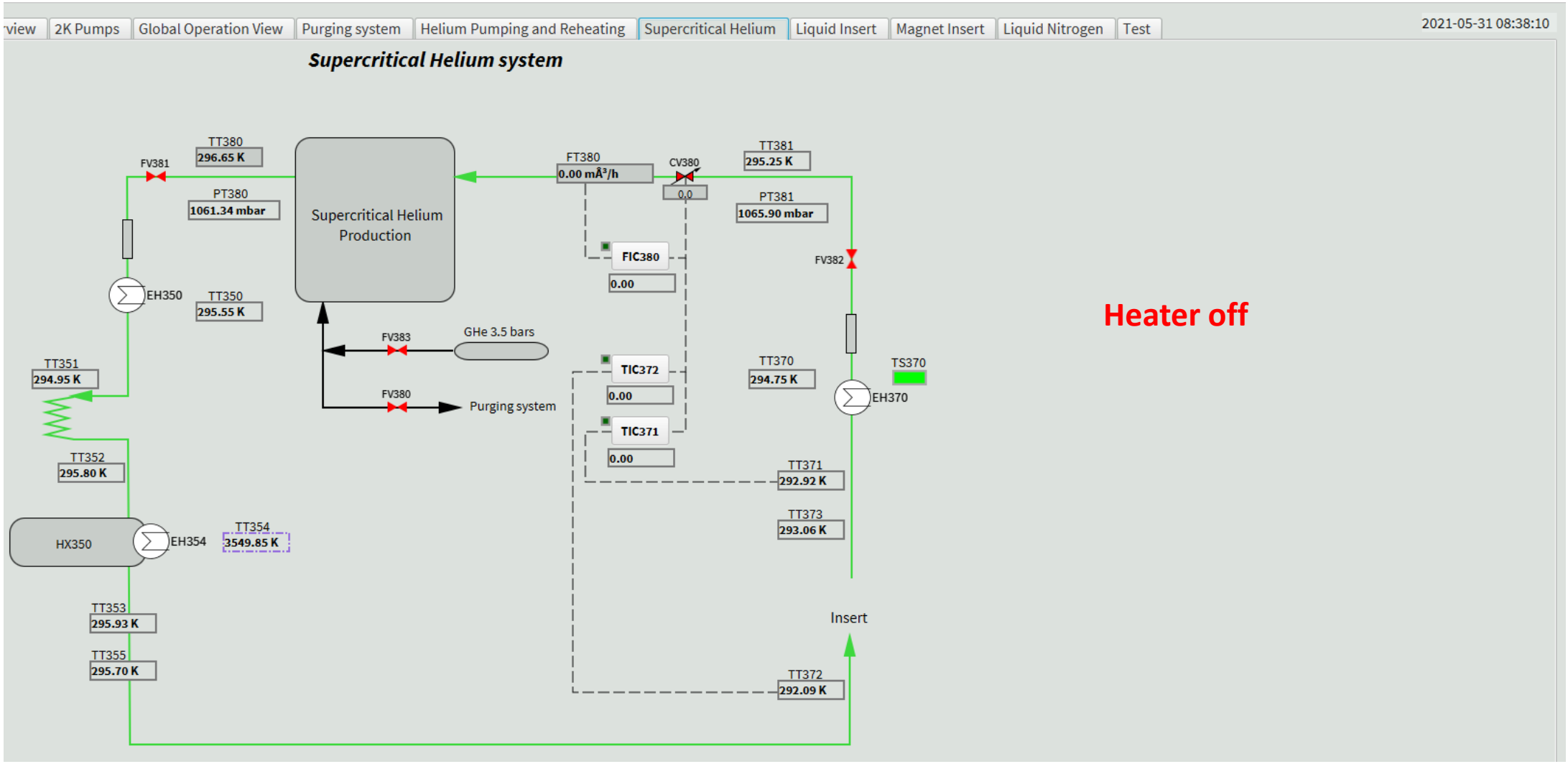

Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-05-31 13:11:37
To purging system
PI3290
1.18
CV5203
0.0
L021
FV600
TT614 296.80 K
TT602 297.07 K
L010
FV602
TT611
297.83 K
CV600
100.0
FV601
TT610
296.58 K
LHe 4 K
TT600A
295.45 K
TT600B
295.45 K
TT603
296.28 K
PT600
992.26 mbar
EH600AD
LIC600
100.00
LT600
0.17
TT140C
295.85 K
TT600D
295.75 K
TT613
296.25 K
L018
Reheater
TT580
296.35 K
L017
From magnet insert
L020
PT580
996.14 mbar
CV580
100.0
FT580
0.03 mÂ³/h
To Gas Bag
FV586
2370.30 mbar
PT585
To Kaeser circuit
FV580
FV581
FV555
FT551
24.33 m3/h
1155.02 m
Gas Bag
PT581
1190.10 mbar
CV581
100.0
FT581
0.03 mÂ³/h
FV584
2K Pumps
FV554
PT582
158.02 mbar
0.0
CV582
FV582
PT584
33.42 mbar
FV556
From HNOSS
FV551
To Kaeser circuit
PT583
1027.42 mbar
CV583
100.0
FT583
0.07 mÂ³/h
FV583
TT612
337.97 K
TT352
306.44 K
0.00 mÂ³/h
He Prod.
Supercrit.
HX350
TT353
302.90 K
FV585
PT586
2370.3 mbar
To Gas Bag
302 cm
Bauer
Compressor
100
0
ON
-5
5
cm/min
CV601
0.0
CV602
0.0
FIC583
0.00
TT608
296.89 K
TT604
299.54 K
TT607
343.87 K
TT617
343.72 K
TT645
292.00 K
HX600
EH601
TT601
342.65 K
LIC682
0.00
TT605
298.45 K
TT606
345.24 K
TT616
343.27 K
TT615
298.71 K
LIC660
0.00
From Insert
L016
CV603
0.0
LIC660A
0.00
TT642
291.71 K
TT646
291.46 K
LIC670
0.00
LIC670A
0.00
TT609
297.69 K
TT618
296.79 K
FV642
Heater on

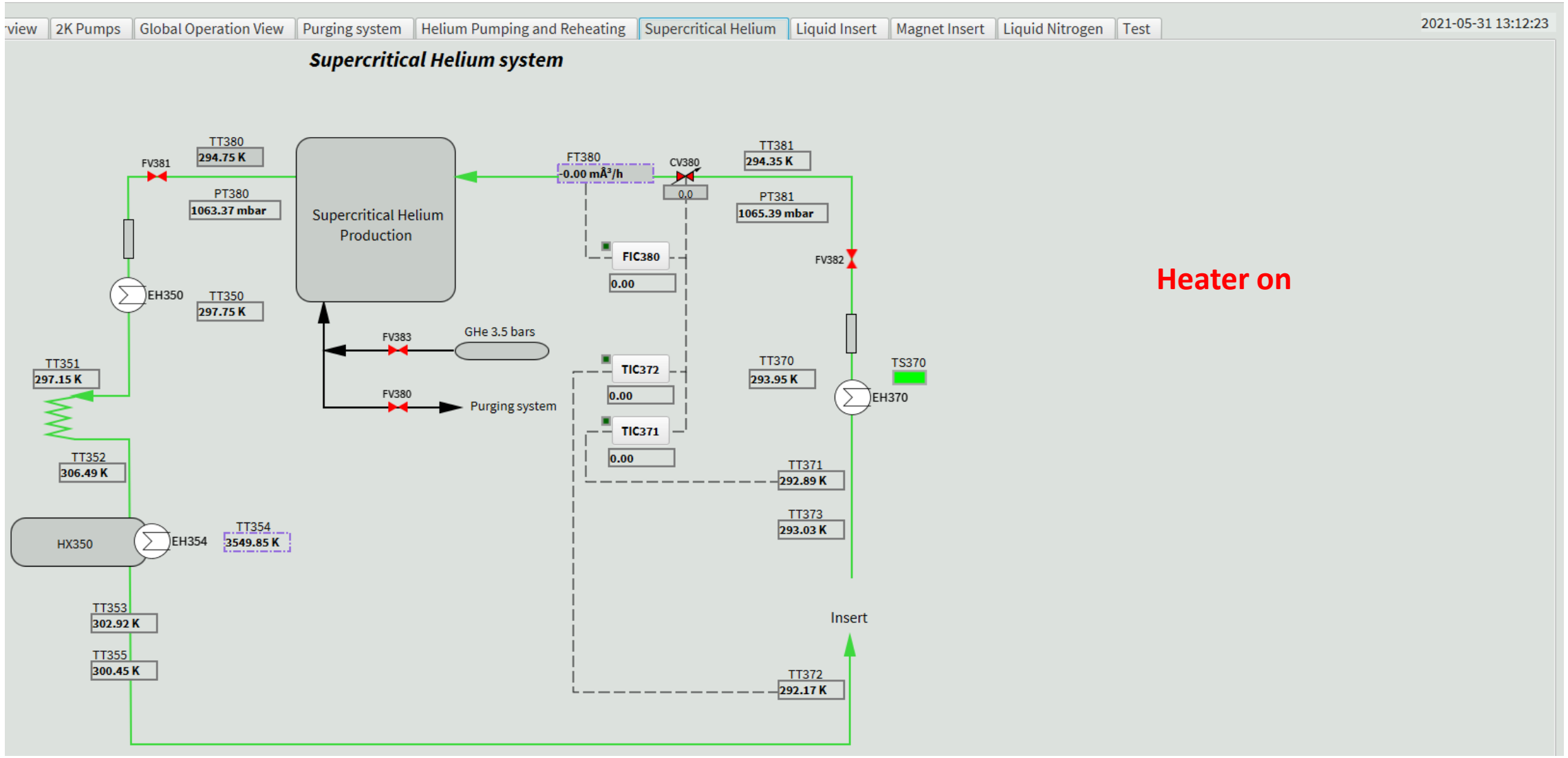

K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-06-01 13:10:15
To purging system
PI3290
1.20
CV5203
0.0
L021
FV602
TT611
303.01 K
L018
Reheater
TT580
296.15 K
PT580
1011.53 mbar
CV580
100.0
FT580
0.03 mÂ³/h
To Gas Bag
FV586
2370.30 mbar
To Kaeser circuit
FT551
23.66 m3/h
1098.76 m
Gas Bag
FV600
TT614
304.10 K
TT602
304.35 K
L010
CV600
100.0
FV601
TT610
302.95 K
L017
From magnet insert
L020
PT585
FV580
FV581
FV584
FV555
2K Pumps
FV554
FV556
FV551
From HNOSS
To Kaeser circuit
LHe 4 K
LIC600
100.00
LT600
0.17
TT600A
301.45 K
TT600B
301.55 K
EH600AD
TT140C
301.85 K
TT600D
301.75 K
TT603
302.36 K
PT600
1006.51 mbar
TT613
302.34 K
PT581
1020.25 mbar
PT582
158.02 mbar
CV581
100.0
FT581
0.03 mÂ³/h
0.0
CV582
FV582
PT584
32.99 mbar
PT583
1032.23 mbar
CV583
100.0
FT583
0.08 mÂ³/h
FV583
FV585
PT586
2370.3 mbar
To Gas Bag
TT612
318.88 K
HX350
TT352
315.58 K
TT353
309.97 K
-0.01 mÂ³/h
He Prod.
Supercrit.
209 cm
Bauer
Compressor
100
0
ON
-5
5
cm/min
CV601
0.0
CV602
0.0
FIC583
0.00
TT608
304.04 K
TT604
309.60 K
TT607
326.03 K
TT617
326.58 K
TT645
292.05 K
HX600
EH601
TT601
326.05 K
LIC682
0.00
LIC660
0.00
LIC670
0.00
TT605
307.07 K
TT615
307.31 K
TT606
323.55 K
TT616
322.22 K
From Insert
L016
CV603
0.0
LIC660A
0.00
LIC670A
0.00
TT642
291.92 K
TT646
291.66 K
TT609
304.19 K
TT618
303.32 K
FV642
Heater on
26 h later

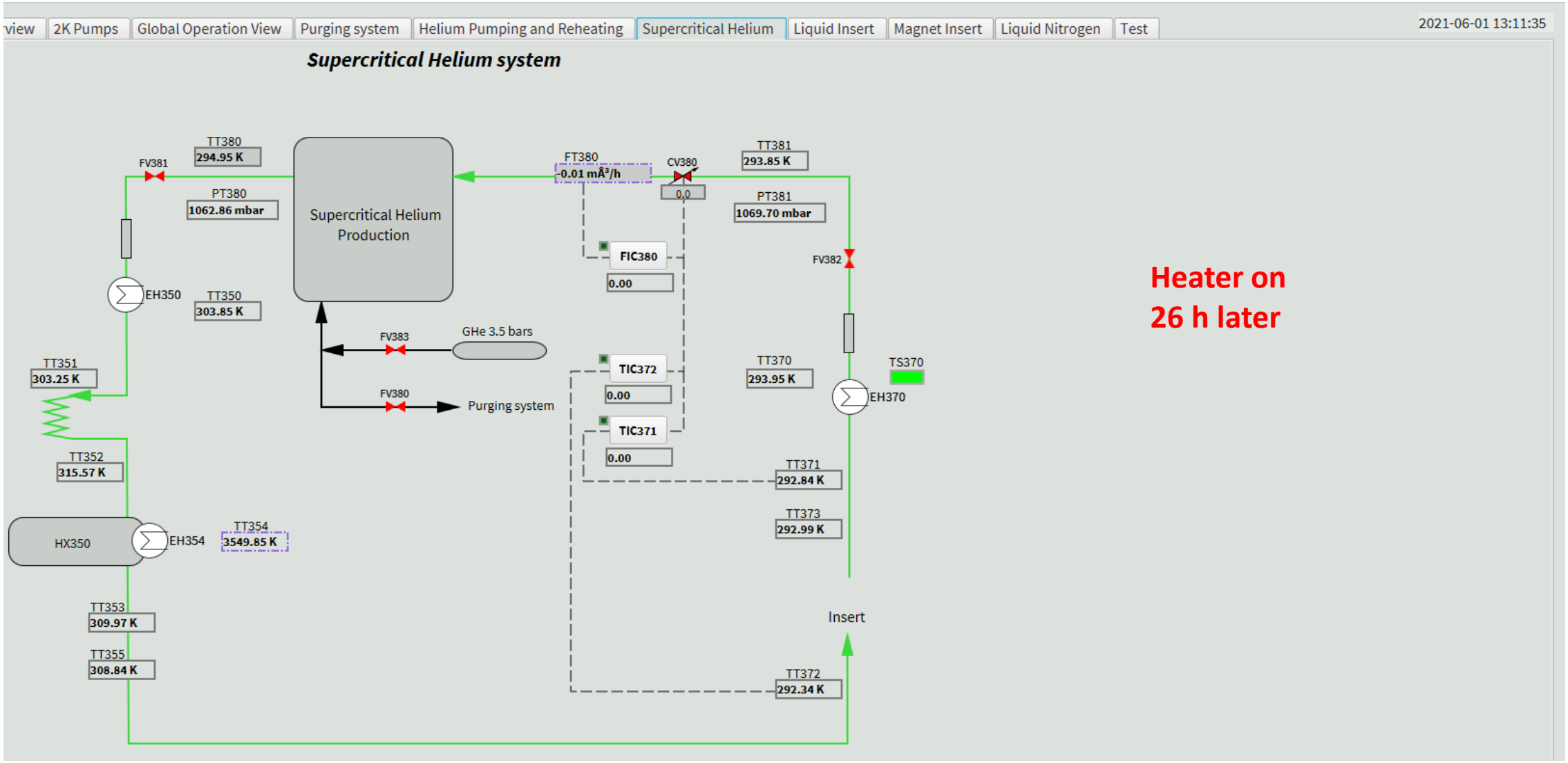

Overview
2K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-05-31 08:36:53
Liquid Nitrogen
Heater off
LN2
CV700
Not installed
FT700
-0.00 mÅ³/
PRV700
EV700
PRV701
TT700
295.65 K
Not installed
CV740
FT740
-0.00 mÅ³/
PRV748
EV748
PRV749
PRV744
EV744
PRV745
PRV740
EV740
PRV741
TS700
PT700
1050.20 mbar
EH701
EH700
TT705
295.15 K
TT707
295.15 K
TT706
295.15 K
TT701A
295.05 K
TT701B
295.35 K
TT740
294.65 K
TT744
294.75 K
TT748
294.55 K
TS740
TS744
TS748
EH740
EH744
EH748
TT753
291.15 K
TT745
291.25 K
TT754
290.95 K
TT747
291.05 K
TT750
291.05 K
TT755
290.85 K
TT752
291.05 K
The Insert
EH741
TT741A
292.05 K
TT741B
292.05 K
TT741C
291.85 K
EH703
Isolation Vacu...
PT050
1.30E-5 mbar
PT051
1.00E-3 mbar
TT703A
295.65 K
TT703B
3549.85 K
TT703C
295.75 K
TT743A
290.65 K
TT743D
3549.85 K
TT743B
3549.85 K
TT743E
3549.85 K
TT743C
3549.85 K
TT743F
3549.85 K
EH743
Isolation Vacu...
PT060
6.30E-6 mbar
PT061
1.20E-3 mbar
To Vacuum
Insert
TT746
291.75 K
FV740
TT704
295.15 K
EH702
TT702A
295.45 K
TT702B
295.45 K
2.4E-3
Pi
1.6E-6
Pe
FV050
5.7E-3
Pi
2.8E-6
Pe
FV060
2.1E-2
Pi
8.0E-4
Pi
EH742
TT749
291.05 K
TT742A
3549.85 K
TT742B
289.75 K
TT742C
3549.85 K
TT751
291.05 K


Overview
2K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-05-31 13:11:59
Liquid Nitrogen
Heater on
LN2
CV700
Not installed
FT700
-0.00 mÂ³/
PRV700
EV700
PRV701
TT700
294.85 K
Not installed
CV740
FT740
0.00 mÂ³/h
PRV748
EV748
PRV749
PRV744
PRV740
EV744
PRV745
EV740
PRV741
TS700
PT700
1048.94 mbar
EH701
EH700
TT705
297.95 K
TT707
298.05 K
TT706
296.65 K
TT701A
297.05 K
TT701B
297.35 K
TT740
293.75 K
TT744
293.85 K
TT748
293.55 K
TS740
TS744
TS748
EH740
EH744
EH748
TT753
291.25 K
TT745
291.25 K
TT754
291.05 K
TT747
291.05 K
TT750
291.15 K
TT755
290.95 K
TT752
291.15 K
The Insert
EH741
TT741A
292.15 K
TT741B
292.15 K
TT741C
291.85 K
EH703
Isolation Vacu...
PT050
3.70E-5 mbar
PT051
1.00E-3 mbar
TT703A
297.65 K
TT703B
3549.85 K
TT703C
297.45 K
TT743A
290.65 K
TT743D
3549.85 K
TT743B
3549.85 K
TT743E
3549.85 K
TT743C
3549.85 K
TT743F
3549.85 K
EH743
Isolation Vacu...
PT060
9.20E-6 mbar
PT061
1.20E-3 mbar
To Vacuum
Insert
TT746
291.75 K
FV740
TT704
297.15 K
EH702
TT702A
297.05 K
TT702B
297.15 K
2.5E-3
Pi
4.8E-6
Pe
FV050
5.7E-3
Pi
4.2E-6
Pe
FV060
2.3E-2
Pi
8.0E-4
Pi
TT749
291.15 K
EH742
TT742A
3549.85 K
TT742B
289.85 K
TT742C
3549.85 K
TT751
291.05 K


Overview
2K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-06-01 13:10:56
Liquid Nitrogen
Heater on
26 h later
LN2
CV700
Not installed
FT700
-0.00 mÂ³/
PRV700
EV700
PRV701
TT700
295.05 K
Not installed
CV740
FT740
0.00 mÂ³/h
PRV748
EV748
PRV749
PRV744
EV744
PRV745
PRV740
EV740
PRV741
TS700
PT700
1052.23 mbar
EH700
EH701
TT705
304.25 K
TT707
304.25 K
TT706
302.95 K
TT701A
303.25 K
TT701B
303.55 K
TT740
293.75 K
TT744
293.85 K
TT748
293.65 K
TS740
TS744
TS748
EH740
EH744
EH748
TT753
291.45 K
TT745
291.45 K
TT754
291.15 K
TT747
291.25 K
TT750
291.25 K
TT755
291.15 K
TT752
291.35 K
The Insert
EH741
TT741A
292.15 K
TT741B
292.15 K
TT741C
291.95 K
EH703
Isolation Vacu...
PT050
1.70E-5 mbar
PT051
1.00E-3 mbar
TT703A
304.15 K
TT703B
3549.85 K
TT703C
304.05 K
TT743A
290.85 K
TT743D
3549.85 K
TT743B
3549.85 K
TT743E
3549.85 K
TT743C
3549.85 K
TT743F
3549.85 K
EH743
Isolation Vacu...
PT060
5.70E-6 mbar
PT061
1.20E-3 mbar
To Vacuum
Insert
TT746
291.75 K
FV740
TT704
303.95 K
EH702
TT702A
303.65 K
TT702B
303.75 K
2.4E-3
Pi
2.1E-6
Pe
FV050
5.7E-3
Pi
2.5E-6
Pe
FV060
1.9E-2
Pi
8.0E-4
Pi
TT749
291.35 K
EH742
TT742A
3549.85 K
TT742B
290.05 K
TT742C
3549.85 K
TT751
291.25 K


view
2K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-05-31 08:38:10
Supercritical Helium system
TT380
296.65 K
FV381
PT380
1061.34 mbar
Supercritical Helium Production
FT380
0.00 mÂ³/h
CV380
0.0
TT381
295.25 K
PT381
1065.90 mbar
FV382
FIC380
0.00
EH350
TT350
295.55 K
FV383
GHe 3.5 bars
FV380
Purging system
TT351
294.95 K
TIC372
0.00
TT370
294.75 K
TS370
EH370
TIC371
0.00
TT352
295.80 K
TT371
292.92 K
TT373
293.06 K
HX350
EH354
TT354
3549.85 K
TT353
295.93 K
Insert
TT355
295.70 K
TT372
292.09 K
Heater off


view
2K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-05-31 13:12:23
Supercritical Helium system
TT380
294.75 K
FV381
PT380
1063.37 mbar
Supercritical Helium Production
FT380
-0.00 mÂ³/h
CV380
0.0
TT381
294.35 K
PT381
1065.39 mbar
FV382
FIC380
0.00
EH350
TT350
297.75 K
FV383
GHe 3.5 bars
FV380
Purging system
TT351
297.15 K
TIC372
0.00
TT370
293.95 K
TS370
EH370
TIC371
0.00
TT352
306.49 K
TT371
292.89 K
TT373
293.03 K
HX350
EH354
TT354
3549.85 K
TT353
302.92 K
Insert
TT355
300.45 K
TT372
292.17 K
Heater on


view
2K Pumps
Global Operation View
Purging system
Helium Pumping and Reheating
Supercritical Helium
Liquid Insert
Magnet Insert
Liquid Nitrogen
Test
2021-06-01 13:11:35
Supercritical Helium system
TT380
294.95 K
FV381
PT380
1062.86 mbar
Supercritical Helium Production
FT380
0.01 mÂ³/h
CV380
0.0
TT381
293.85 K
PT381
1069.70 mbar
FV382
FIC380
0.00
EH350
TT350
303.85 K
FV383
GHe 3.5 bars
TT351
303.25 K
TIC372
0.00
TT370
293.95 K
TS370
EH370
FV380
Purging system
TIC371
0.00
TT352
315.57 K
TT371
292.84 K
TT373
292.99 K
HX350
EH354
TT354
3549.85 K
TT353
309.97 K
Insert
TT355
308.84 K
TT372
292.34 K
Heater on
26 h later