



MAINTENANCE TRACKING TOOL
PETTRACE800

Date:2024-02-10

Country: Germany	Site: MUN
Intervention:	Programmed maintenance: UBM/CBM <input checked="" type="checkbox"/>
Subsystems:	

PRE-MAINTENANCE

Registration Date: 2024-02-10
Gas flow(sccm): 5.0

TPG Settings Verifications

	Low limit (x10-)	High limit (x10-)
Piranni 1 (TPG300 A1):	0.00E+0	0.00E+0
Piranni 2 (TPG300 A2):	0.00E+0	0.00E+0
Penning:	0.00E+0	0.00E+0

Notes

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Gauge number	Pressure (x10-) without gas	Pressure (x10-) with gas
A1 (mbar):	1.40E+0	5.20E+0
A2 Under Range:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A2:	0.00E+0	0.00E+0
B1 (mbar):	1.80E-7	1.00E-5

System software

Subsystem	Version
Master:	3.6.3
ACS:	4.3.2
Service System:	3.6.0
Manager:	
Informix (only applicable to SUN-Master Station):	

Comments

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Paper Burn Before PM

Photos
There is not photographic evidence

VACUUM

TPG settings verifications

Date: 2024-02-10

Production gas flow: 5.0

Piranni 1 (TPG300 A1)

Pressure with gas	Low limit (x10-)	High limit
-1.00E+0	1.00E-1	0.00E+0

Piranni 2 (TPG300 A2)

Under range	Pressure with gas	Low limit	High limit
<input checked="" type="checkbox"/>	0.00E+0	-2.00E+0	2.00E-1

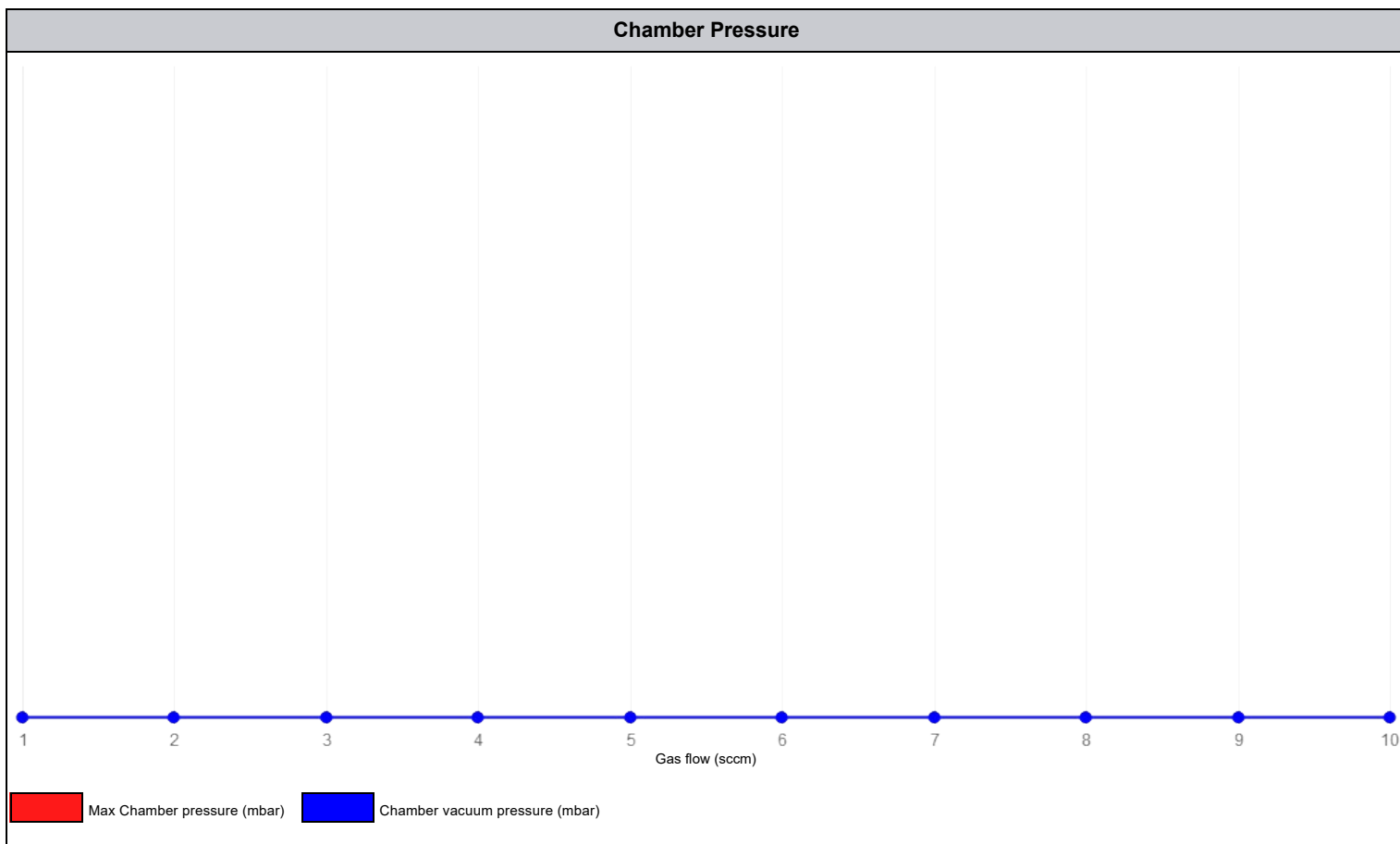
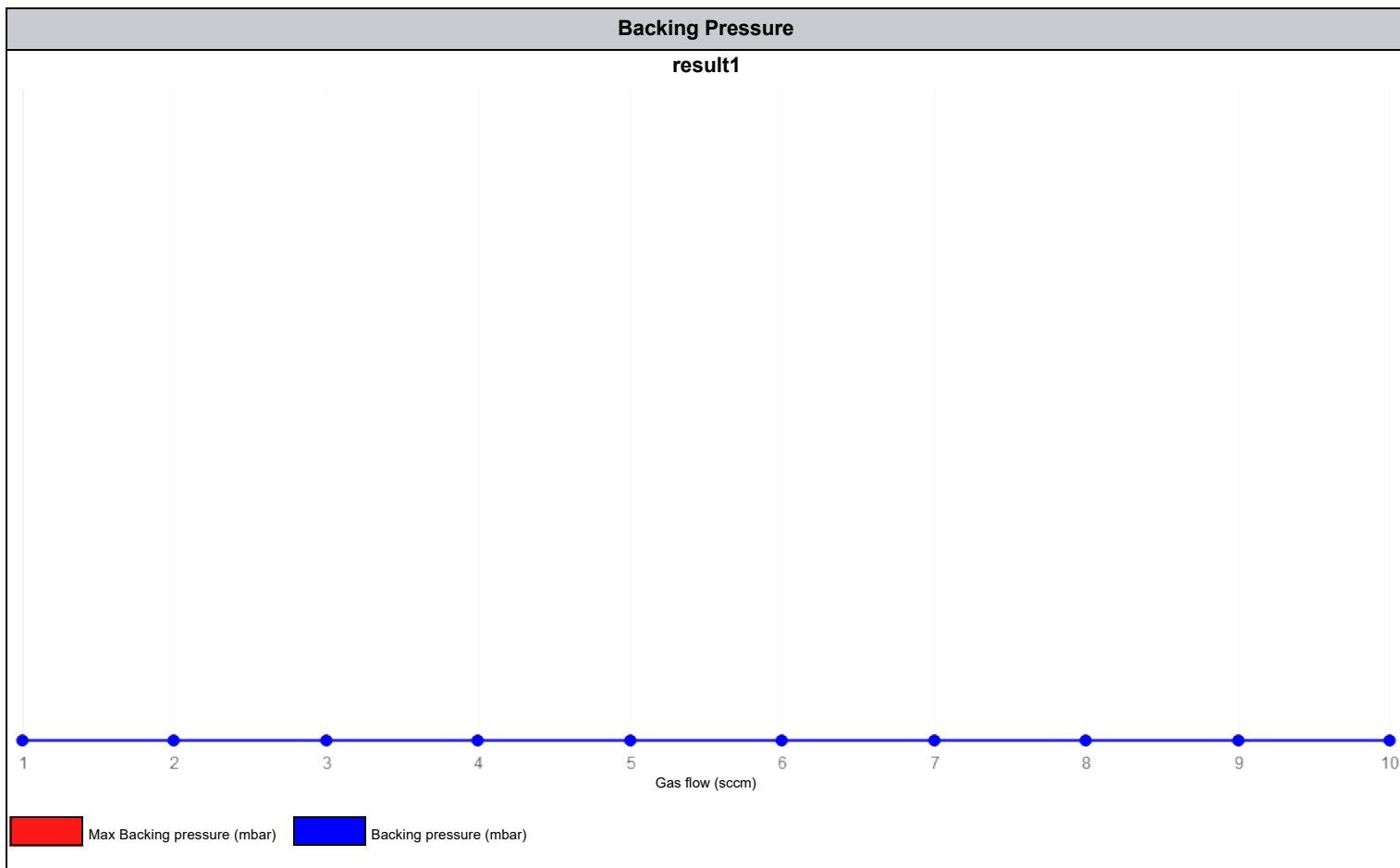
Penning

Pressure with gas	Low limit	High limit
-1.00E+0	1.80E-5	2.00E+0

Notes

Vacuum MFC curve test

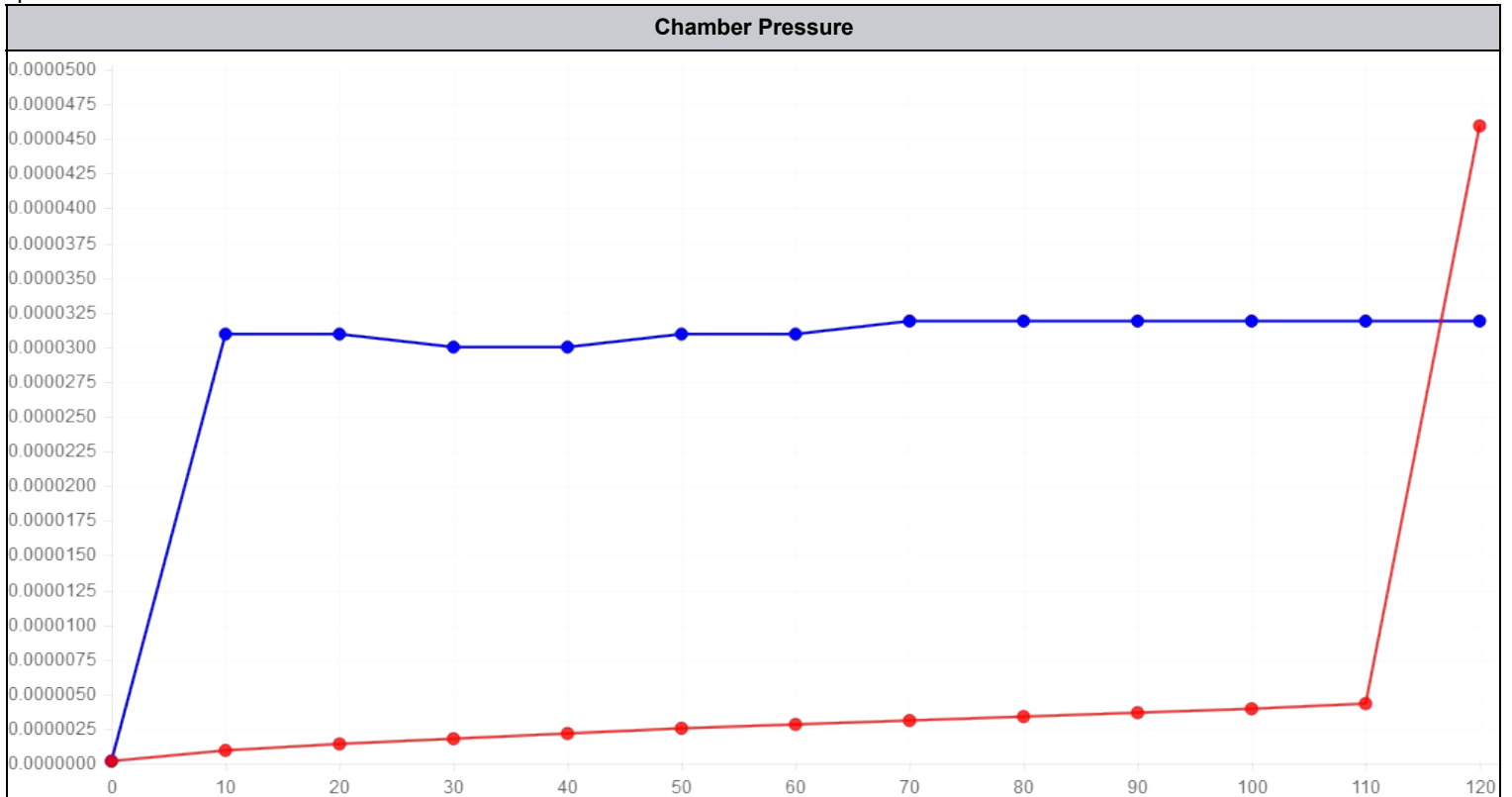
SCCM	Chamber pressure	Backing pressure
5	5.20E-2	1.00E-5



Vacuum leak test

Seconds since push standby	Chamber pressure	Max. Chamber pressure
0	1.90E-7	1.80E-07
10	3.30E-5	1.00E-06
20	3.30E-5	1.50E-06
30	3.20E-5	1.90E-06
40	3.20E-5	2.30E-06
50	3.30E-5	2.70E-06
60	3.30E-5	3.00E-06
70	3.40E-5	3.30E-06
80	3.40E-5	3.60E-06
90	3.40E-5	3.90E-06
100	3.40E-5	4.20E-06
110	3.40E-5	4.60E-06
120	3.40E-5	4.90E-06

sprintf



RP & DP pump oil condition

Date last rotary oil change: 2023-07-11

Roughing pump oil mist filter cleaned	Roughing pump oil is in good color and condition

Last DP maintenance:

DP oil is in good color and condition	
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RP Photo



RP Photo



RP Photo



Photos

There is not photographic evidence

Notes

Date last rotary oil change: 2023-07-11

Roughing pump oil mist filter cleaned

Roughing pump oil is in good color and condition

Last DP maintenance:

DP oil is in good color and condition

RP Photo



RP Photo



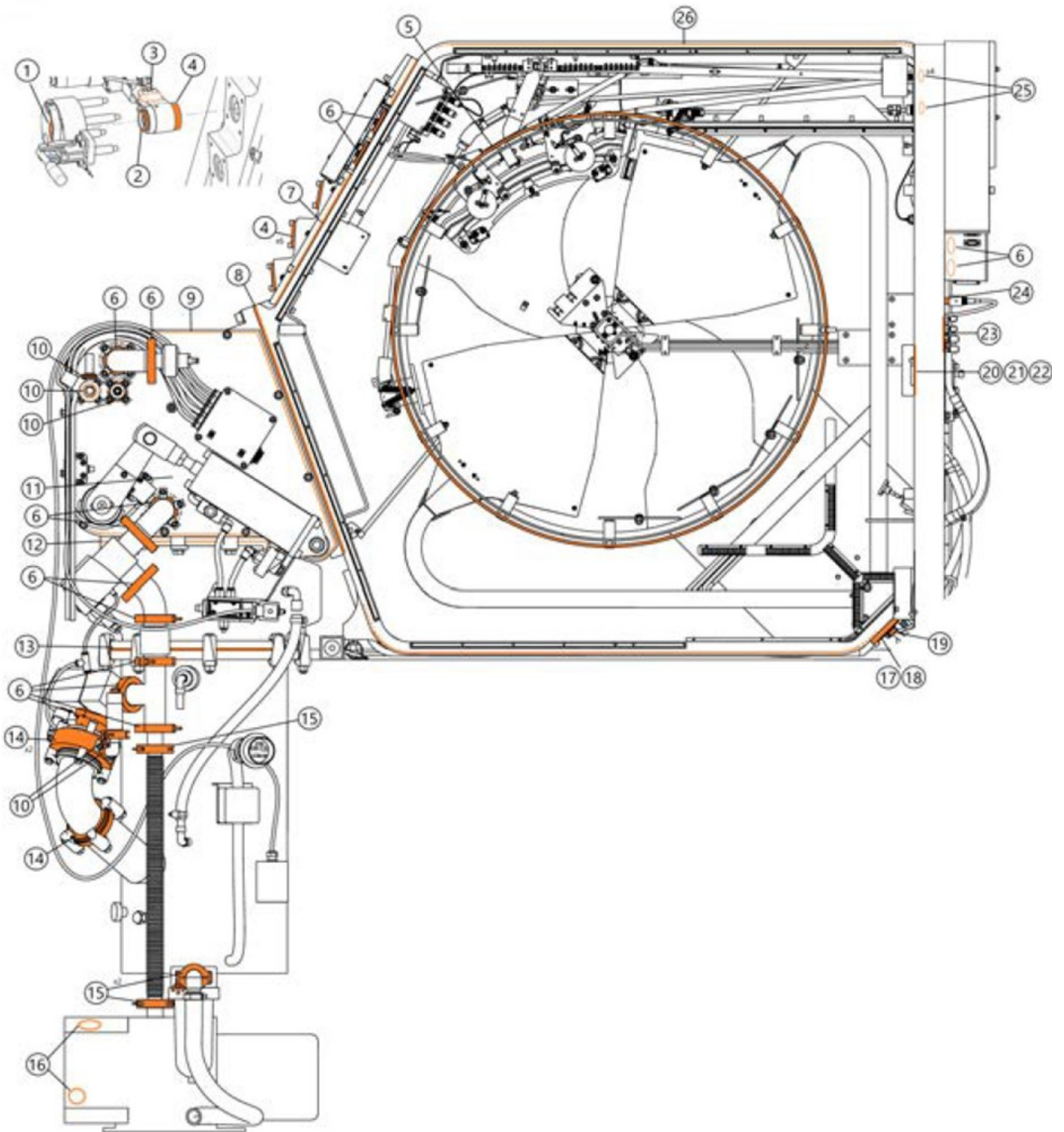
Photos

There is not photographic evidence

Notes

PETtrace800 O-Rings analysis

Pins

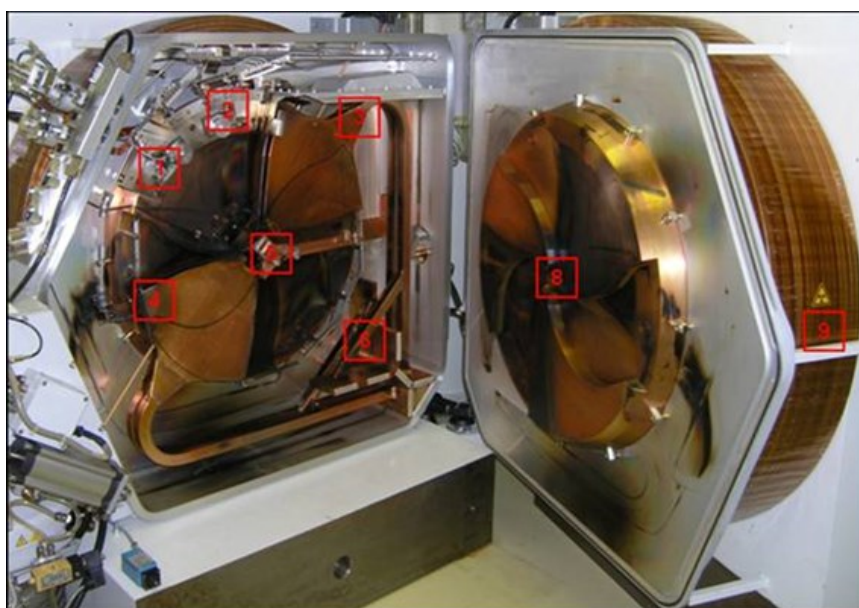


CHAMBER

Chamber Opening

Remove targets	✓
Close target cooling water lines	✓
Visual inspection of door bolts and motor	✓

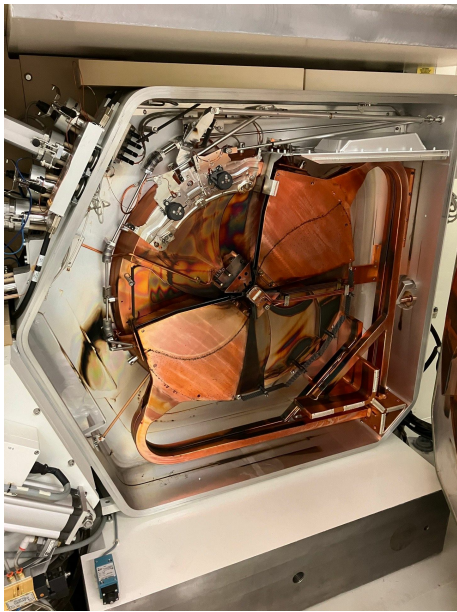
Measure yoke play, adjust if needed: 2.00E-1

Dose rate mapping (positions 1-9, [$\mu\text{Sv/h}$])


Position 1: At 36 cm from Extraction trolley	1.00E-1
Position 2: At 36 cm from Carousel	1.60E-1
Position 3: At 36 cm from Dee 2-stem junction	1.70E-1
Position 4: At 36 cm from Deel upper corner	7.00E-2
Position 5: At 36 cm from Central region	1.10E-1
Position 6: At 36 cm from Stems coupler	1.50E-1
Position 7: At contact with central region	2.30E-1
Position 8: At 36 cm from magnet pole	6.00E-2
Position 9: At contact of magnet coil	0.00E+0

Photo documentation & visual inspection

Vacuum chamber



Magnet pole

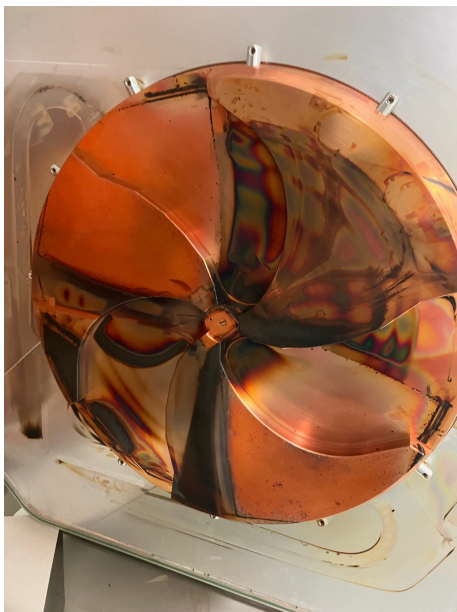
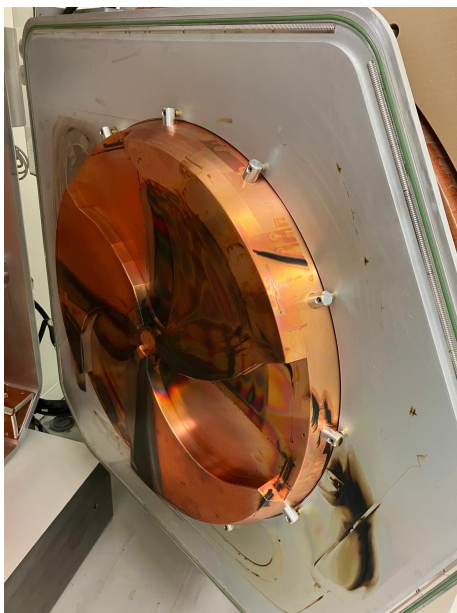


Photo documentation & visual inspection

Magnet pole



Central region



Photo documentation & visual inspection

Extraction



Extraction

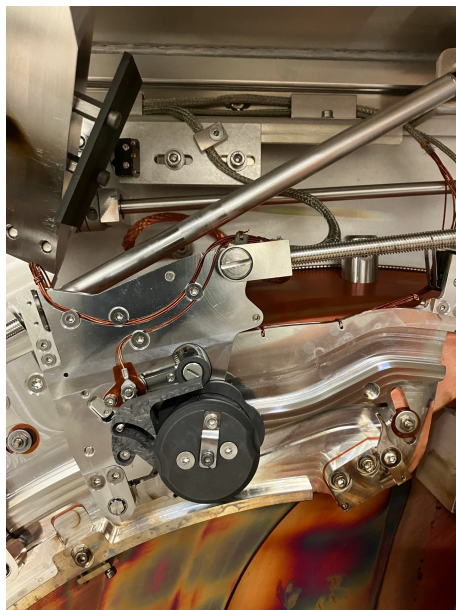


Photo documentation & visual inspection

Extraction

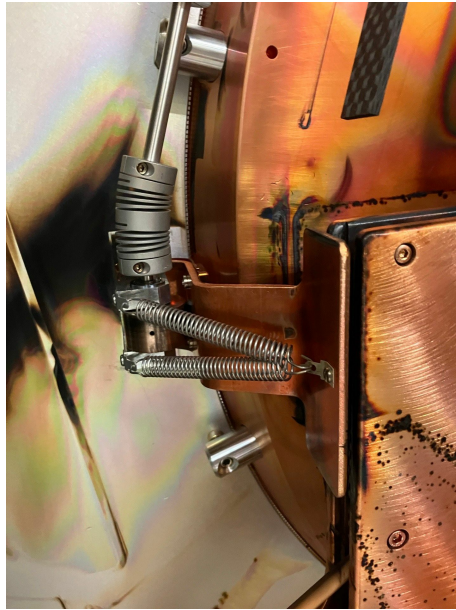


Screen plate beam passage



Photo documentation & visual inspection

Flap 1

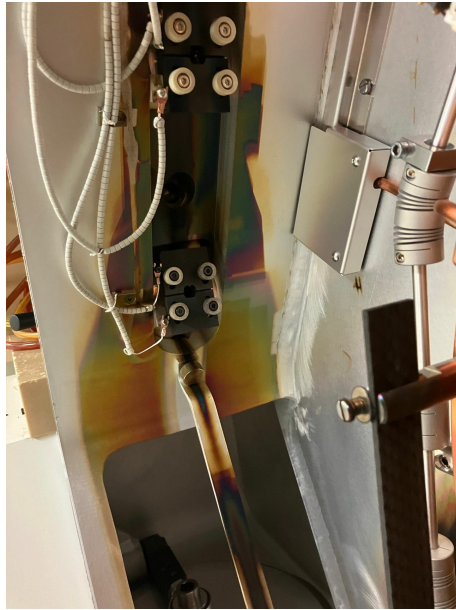


Flap 2



Photo documentation & visual inspection

Collimators



Collimators

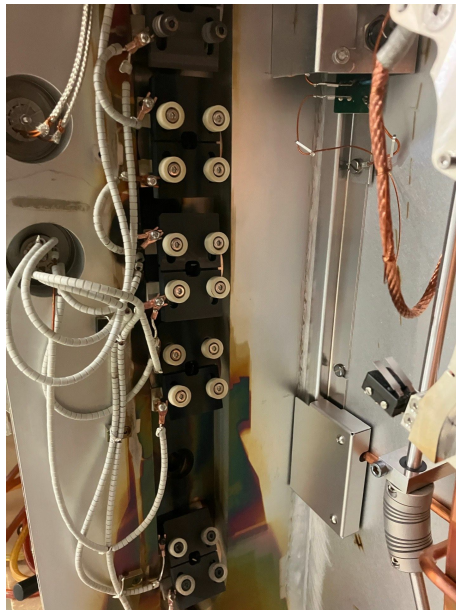
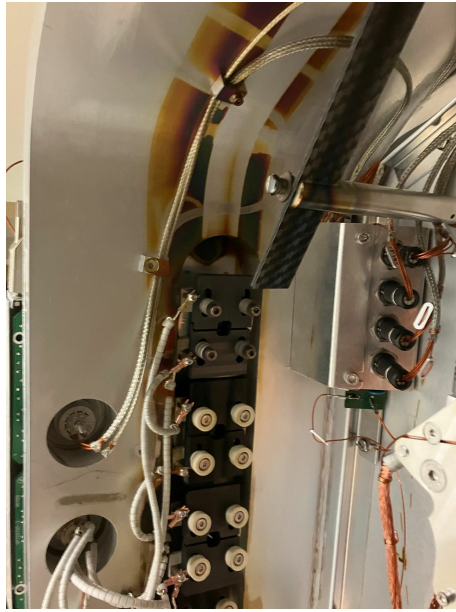


Photo documentation & visual inspection

Collimators



Others



Photo documentation & visual inspection

Others



Others

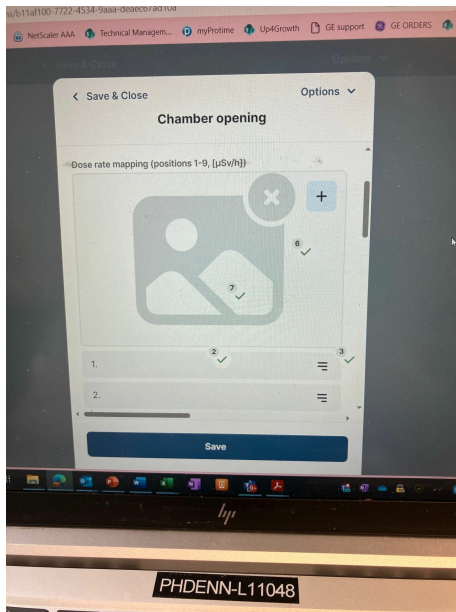


Photo documentation & visual inspection

Others



Others

Beam exit valve tests

Visual inspection of opening/closing	<input checked="" type="checkbox"/>
Visual inspection of tubing	<input checked="" type="checkbox"/>
Tubing replacement if needed	<input checked="" type="checkbox"/>
BEV replacement if needed	<input checked="" type="checkbox"/>

FlapsFlap 1

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	
MaximumCurrentMA	

Record flap to dee distances for 0%, 50%, 100%

0% value [mm]	
50% value [mm]	
100% value [mm]	

Flap 2

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	-9.40E+1
MaximumCurrentMA	1.06E+2

Record flap to dee distances for 0%, 50%, 100%

0% value [mm]	4.61E+0
50% value [mm]	1.35E+1
100% value [mm]	1.35E+1

Central Region

Visual inspection of flip-in probe	<input checked="" type="checkbox"/>
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Measure flip-in probe position (a,b,c,d,e)

A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
5.21E+1	4.65E+1	4.79E+1	8.07E+1	0.00E+0

Dismount ion source and mount dummy ion source	<input checked="" type="checkbox"/>
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Measure central region distances (A, B, C, D) [mm]

A [mm]	B [mm]	C [mm]	D [mm]
1.00E+0	3.50E-1	4.00E-1	9.00E-1

Visual inspection and photo of H-puller	<input checked="" type="checkbox"/>
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If needed: H-puller replacement	
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If needed: Adjustment of central region and record A, B, C, D again

If needed: Adjustment of central region and record A, B, C, D again	
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A [mm]	B [mm]	C [mm]	D [mm]
0.00E+0	0.00E+0	0.00E+0	0.00E+0

If needed: Ion source maintenance or replacement	<input checked="" type="checkbox"/>
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Install back ion source	<input checked="" type="checkbox"/>
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Restore and record flip-in probe position

Restore and record flip-in probe position	<input checked="" type="checkbox"/>
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A [mm]	B [mm]	C [mm]	D [mm]
0.00E+0	0.00E+0	0.00E+0	0.00E+0

Pictures	
Image	Comments
CentralRegion_1.jpg	Puller ok

Dees

Visual inspection of dees, internal and external baffles	<input checked="" type="checkbox"/>
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	Measure dee thickness	Measure dee height
A	3.23E+1	4.60E+1
B	3.30E+1	7.50E+1
C	3.20E+1	4.60E+1
D	3.00E+1	4.50E+1
E	3.20E+1	7.30E+1
F	3.30E+1	4.50E+1
G	3.40E+1	7.40E+1
H	3.29E+1	7.30E+1

Pictures	
Image	Comments
No photo taken	Sums up values (not ok), 73.66 is stated as 73 mm.
No photo taken	Does not show if value is in range or not.

Verify tightness of dee- and stem screws	<input checked="" type="checkbox"/>
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Extraction

Replace extraction foils of carousels	<input checked="" type="checkbox"/>
Visual inspection of extraction cables	<input checked="" type="checkbox"/>
Test each microswitch of extraction system	<input checked="" type="checkbox"/>

Calibrate balance, record minimum and maximum motor current [mA]

	Calibrate balance, record minimum and maximum motor current	Calibrate extraction 1, record minimum and maximum motor current [mA]	Calibrate extraction 2, record minimum and maximum motor current [mA]
Minimum current [mA]	-8.80E+1	-9.80E+1	-8.70E+1
Maximum current [mA]	9.60E+1	1.17E+2	1.40E+2

Diagnostic system checks

Target ID	1
Visual inspection of collimators and collimator cables	<input checked="" type="checkbox"/>
Check collimator screws tightness	<input checked="" type="checkbox"/>
Measure flip-in probe resistance	2.90E+1
Target Resistance	2.01E+1
Lower Collimator Resistance	2.94E+1
Upper Collimator Resistance	2.94E+1
Horizontal Collimator Opening	1.00E+1
VerticalCollimatorOpening	9.46E+0

	Resistance Measurement	Insulation Measurement
Extraction 1	2.95E+1	2.95E+1
Extraction 2	2.94E+1	2.95E+1

Comments	T1: NB27 Self shielded
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Target ID	3
Visual inspection of collimators and collimator cables	
Check collimator screws tightness	
Measure flip-in probe resistance	2.94E+1
Target Resistance	2.01E+1
Lower Collimator Resistance	2.94E+1
Upper Collimator Resistance	2.94E+1
Horizontal Collimator Opening	1.00E+1
VerticalCollimatorOpening	1.00E+1

	Resistance Measurement	Insulation Measurement
Extraction 1	2.95E+1	2.95E+1
Extraction 2	2.90E+1	2.95E+1

Comments	T3: 11C Gas target
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Target ID	4
Visual inspection of collimators and collimator cables	<input checked="" type="checkbox"/>
Check collimator screws tightness	<input checked="" type="checkbox"/>
Measure flip-in probe resistance	2.94E+1
Target Resistance	2.00E+1
Lower Collimator Resistance	2.94E+1
Upper Collimator Resistance	2.94E+1
Horizontal Collimator Opening	1.00E+1
VerticalCollimatorOpening	9.95E+0

	Resistance Measurement	Insulation Measurement
Extraction 1	2.95E+1	2.95E+1
Extraction 2	2.94E+1	2.95E+1

Comments	T4: NB27 Shielded
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Target ID	5
Visual inspection of collimators and collimator cables	<input checked="" type="checkbox"/>
Check collimator screws tightness	<input checked="" type="checkbox"/>
Measure flip-in probe resistance	2.94E+1
Target Resistance	2.01E+1
Lower Collimator Resistance	2.94E+1
Upper Collimator Resistance	2.94E+1
Horizontal Collimator Opening	1.00E+1
VerticalCollimatorOpening	9.65E+0

	Resistance Measurement	Insulation Measurement
Extraction 1	2.95E+1	2.95E+1
Extraction 2	2.94E+1	2.95E+1

Comments	T5: Solid-target Protons
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Target ID	6
Visual inspection of collimators and collimator cables	<input checked="" type="checkbox"/>
Check collimator screws tightness	<input checked="" type="checkbox"/>
Measure flip-in probe resistance	2.94E+1
Target Resistance	2.01E+1
Lower Collimator Resistance	2.94E+1
Upper Collimator Resistance	2.94E+1
Horizontal Collimator Opening	1.00E+1
VerticalCollimatorOpening	0.00E+0

	Resistance Measurement	Insulation Measurement
Extraction 1	2.95E+1	2.95E+1
Extraction 2	2.94E+1	2.95E+1

Comments	T6: NB 25 Non shielded
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Chamber Clean-up

Carousel repositioning

Install back carousels	<input checked="" type="checkbox"/>
Foil change test on each carousel	<input checked="" type="checkbox"/>
Reset foil counter	<input checked="" type="checkbox"/>

Cabinets

Cabinets PSMC**PSMC**

Switch off PSMC main power, log out & tag out, Open PSMC back door and side covers, Inspect for water leaks, burn marks and broken parts, Check and tighten all terminal screws

Verify the resistance values with the installation tester

Resistance between negative and positive [Ω]	Resistance between negative and ground [$M\Omega$]	Resistance between positive and ground [$M\Omega$]
4.00E-1	1.50E+0	1.50E+0

Real time measurements

Install multimeter probes on positive and negative, guide them through the air outlet grid, connect oscilloscope, Install back all covers, Turn on PSMC main power, Verify fan functionality, Verify interlock functionality

Record on sequence ramping speed	Record on sequence ramping up time to maximum	Record on sequence ramping up time to configuration value
0.00E+0	0.00E+0	0.00E+0

Verify PSMC performance for H-config value

Set current	0.00E+0
Output current [A]	0.00E+0
Voltage read PSS [V]	0.00E+0
Coil voltage [V]	0.00E+0
Firing sequence [number of peaks in 20ms]	0.00E+0
Ripple [mV rms]	0.00E+0

Verify PSMC performance for 499A

Set current	0.00E+0
Output current [A]	0.00E+0
Voltage read PSS [V]	0.00E+0
Coil voltage [V]	0.00E+0
Firing sequence [number of peaks in 20ms]	0.00E+0
Ripple [mV rms]	0.00E+0

Verify PSMC performance for 250A

Set current	0.00E+0
Output current [A]	0.00E+0
Voltage read PSS [V]	0.00E+0
Coil voltage [V]	0.00E+0
Firing sequence [number of peaks in 20ms]	0.00E+0
Ripple [mV rms]	0.00E+0

Verify PSMC performance for 50A

Set current	0.00E+0
Output current [A]	0.00E+0
Voltage read PSS [V]	0.00E+0
Coil voltage [V]	0.00E+0
Firing sequence [number of peaks in 20ms]	0.00E+0
Ripple [mV rms]	0.00E+0

Turn off PSMC and measure off sequence ramping down time	
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Cabinets ACU

Record ACU voltages GND_IO / 24	Record ACU voltages GND_IO / +15V	Record ACU voltages GND_IO / -15V	Record ACU voltages GND / +5V	Record ACU voltages Chassis / GND_IO
2.40E+1	1.53E+1	-1.51E+1	4.99E+0	2.50E-1

Cabinets PDU

Visual inspection	<input checked="" type="checkbox"/>
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Pictures	
Image	Comments

Check and tighten all terminal screws	<input checked="" type="checkbox"/>
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Ion Source

Record H2 gas pressure

Set point [bar]	Reading at MFC [bar]
2.00E+0	2.00E+2

Turn on Magnet, set probe in, turn on RF, turn on gas.

Magnet current [A]	DEE1 voltage [kV]	DEE2 voltage [kV]	Gas flow [sccm]	If ion source was maintained, perform ion source conditioning (ramp up from 30 mA to 100 mA in 30 minutes and from 100mA to 200mA in 10 minutes)
4.23E+2	3.45E+1	3.70E+1	5.00E+0	<input checked="" type="checkbox"/>

Record Ion Source Performance

IS current [mA]	IS voltage [V]	Flip in probe current [μ A]
5.00E+1	1.33E+3	4.02E+1
7.00E+1	1.26E+3	9.09E+1
1.00E+2	1.00E+3	1.71E+2
1.20E+2	1.00E+3	2.29E+2
1.40E+2	9.16E+2	2.77E+2

Paper Burn Test

Install paper burn target	<input checked="" type="checkbox"/>
Perform paper burn test in SB and DB	<input checked="" type="checkbox"/>



Install paper burn target
Image_2.jpg Image_3.jpg Image_4.jpg Image_5.jpg Image_6.jpg
If needed, adjust collimators and repeat

LTF

Identifier	LTF4
LTF	Replace target water-18 peek line and connectors,If needed, replace LTF peek lines and connectors,Install back targets
Inspect the movement of all LTF compressed air actuators	

Starting pressure [psi]	Pressure drop [psi / h]
0.00E+0	0.00E+0

If needed: Perform target fill tests and adjustment for each target	0.00E+0
If needed, adjust and repeat test, record adjustment value	0.00E+0

Pictures	
Image	Comments
No photo taked	Complete rebuild of LTF 1,4,6 No option to select more LTF only 1&4
Image_3.jpg	Complete rebuild LTF4
Image_4.jpg	Complete rebuild LTF4
Image_5.jpg	LTF 6 complete rebuild
Image_6.jpg	LTF6 complete rebuild

Autoshield

Check compressor oil level and operational hours	
Autoshield	
Verify tank water level and float switches functionality, top up water level/repair and/or replace switches as required	✓
Verify functionality of micro switches for: Door closed	✓
Read and record door lift timing for left door	
Read and record door lift timing for right door	
Verify functionality of skirt microswitches and that the skirts seats properly on the micro switches	✓
Verify tightening of the upper and the lower socket heads screws	✓
Check the hinges of left and right door	✓

Pictures	
Image	Comments

Beam Conditioning

Photo name	Add Comment
Image_1.jpg	No comments