



MAINTENANCE TRACKING TOOL

PETTRACE800

Date:2023-10-16

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

PRE-MAINTENANCE

Registration Date: 2023-10-1300

Gas flow(sccm): 5.0

TPG Settings Verifications

	Low limit (x10-)	High limit (x10-)
Piranni 1 (TPG300 A1):	1.00E-1	1.00E-1
Piranni 2 (TPG300 A2):	7.00E-2	7.00E-2
Penning:	4.00E-5	8.00E-5

Notes

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Gauge number	Pressure (x10-) without gas	Pressure (x10-) with gas
A1 (mbar):		5.1e-2
A2 Under Range:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A2:		
B1 (mbar):	9.0e-8	1.2e-5

System software

Subsystem	Version
Master:	
ACS:	
Service System:	
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: 2023-10-16

Production gas flow: 5.0

Piranni 1 (TPG300 A1)

Pressure with gas	Low limit (x10-)	High limit
5.10E-2	1.00E-1	7.00E-1

Piranni 2 (TPG300 A2)

Under range	Pressure with gas	Low limit	High limit
<input checked="" type="checkbox"/>	0.00E+0	7.00E-2	7.00E-2

Penning

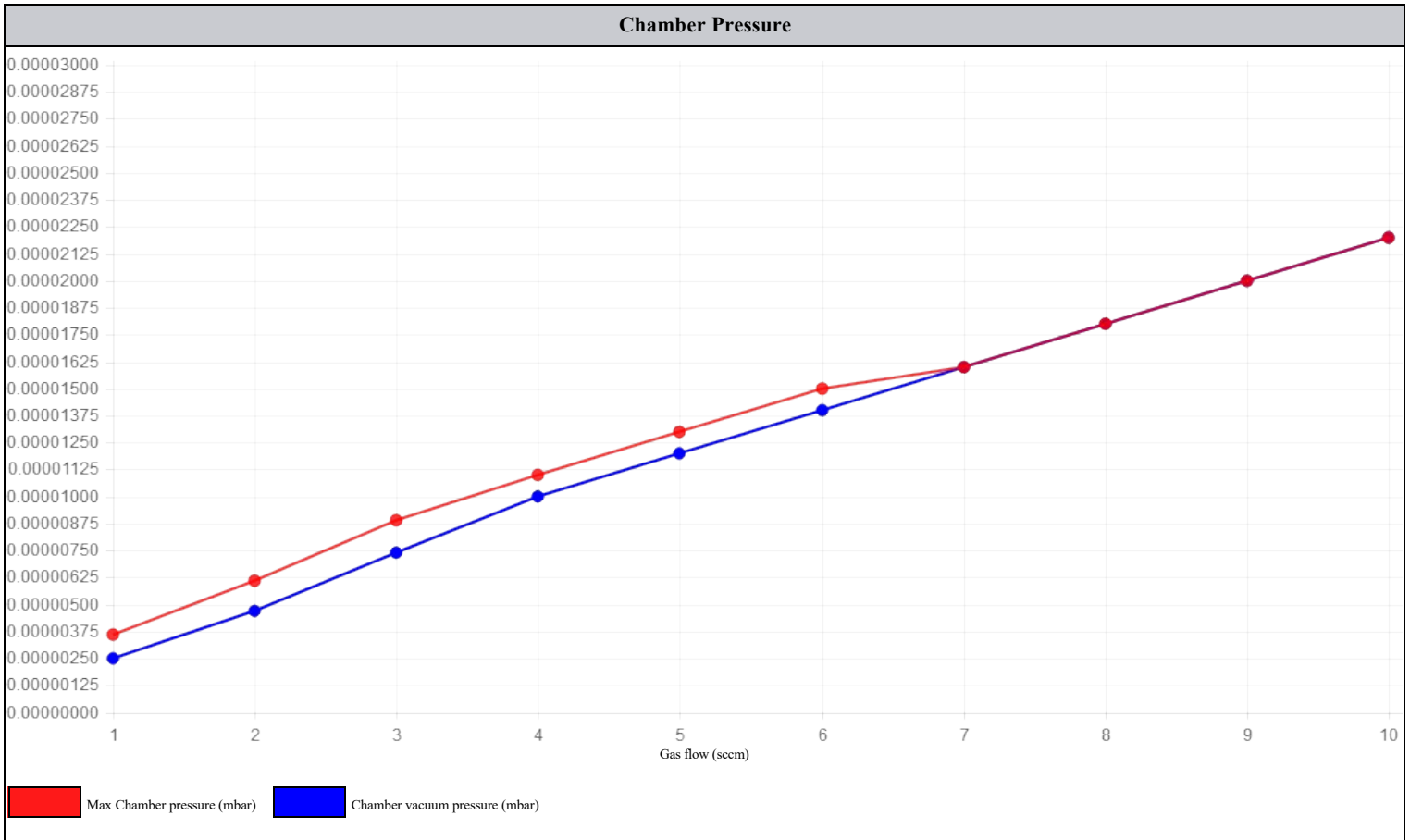
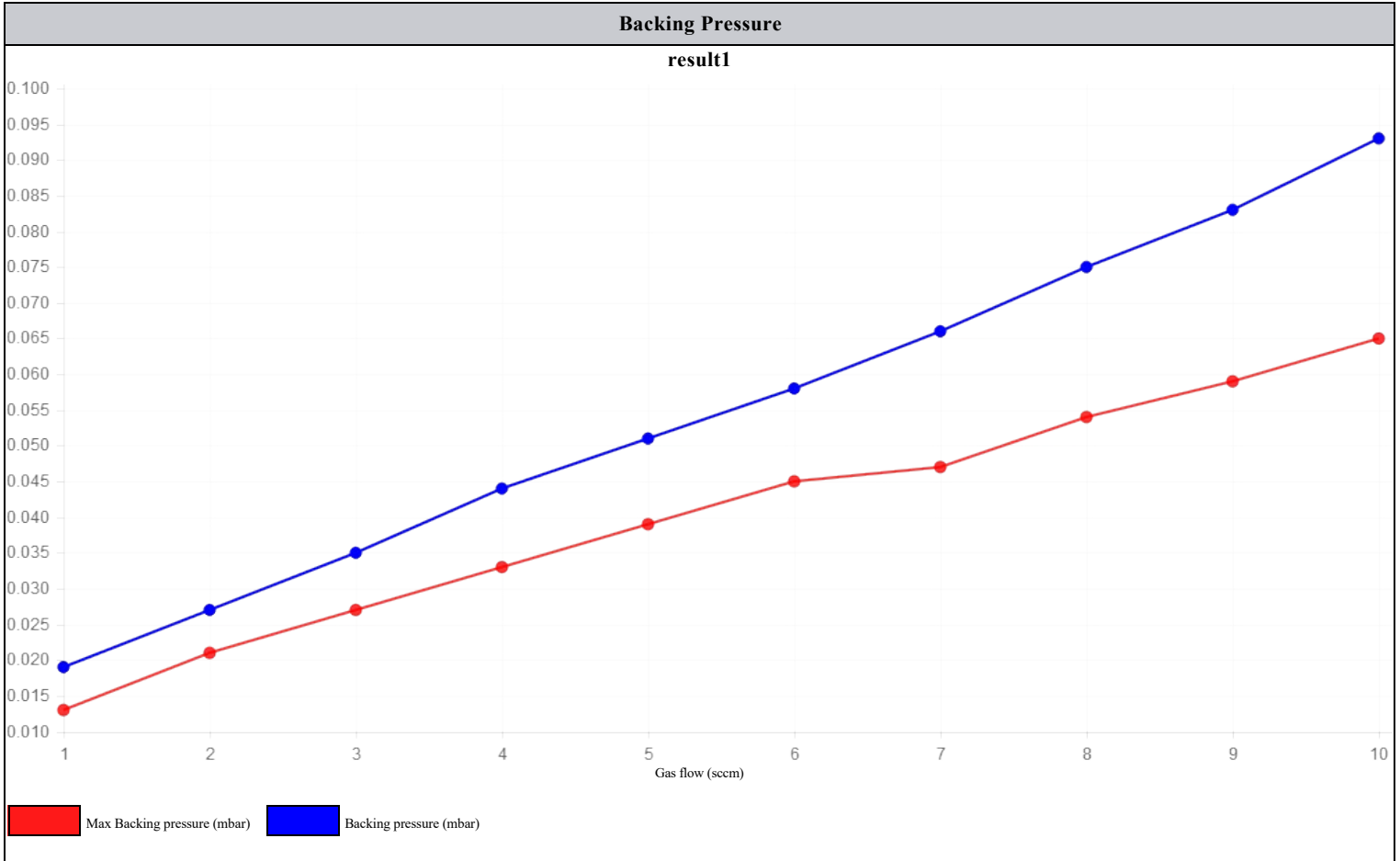
Pressure with gas	Low limit	High limit
1.20E-5	4.00E-5	8.00E-5

Notes

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Vacuum MFC curve test

SCCM	Chamber pressure	Backing pressure
1	2.50E-6	1.90E-2
2	4.70E-6	2.70E-2
3	7.40E-6	3.50E-2
4	1.00E-5	4.40E-2
5	1.20E-5	5.10E-2
6	1.40E-5	5.80E-2
7	1.60E-5	6.60E-2
8	1.80E-5	7.50E-2
9	2.00E-5	8.30E-2
10	2.20E-5	9.30E-2



Vacuum leak test

Seconds since push standby	Chamber pressure	Max. Chamber pressure
0	9.00E-8	1.80E-07
10	1.10E-6	1.00E-06
20	1.70E-6	1.50E-06
30	2.50E-6	1.90E-06
40	3.10E-6	2.30E-06
50	3.70E-6	2.70E-06
60	4.30E-6	3.00E-06
70	4.90E-6	3.30E-06
80	5.60E-6	3.60E-06
90	6.30E-6	3.90E-06
100	7.00E-6	4.20E-06
110	7.70E-6	4.60E-06
120	8.40E-6	4.90E-06

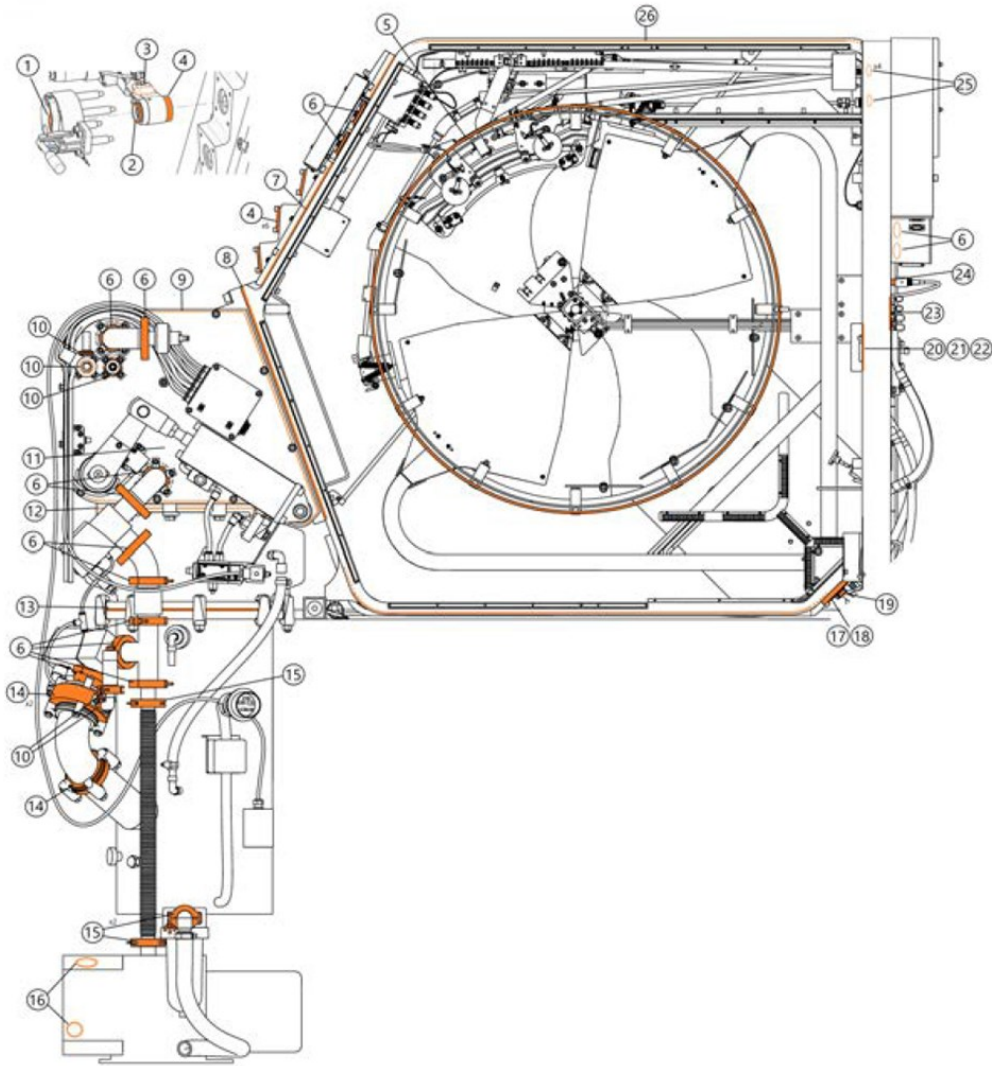
Chamber Pressure

OtherTest

Name the test	He leakcheck
Test explanation	Vent the cyclotron. Connect the He leak detector to the penning exhaust. Start pumping with the machine. Wait vacuum is low enough and stable, and He concentration recorded low and stable. Apply He gas next to the seal you want to test and wait for detector response (between 30 and 60 minutes). If no increase of concentration, the seal is defective.

PETtrace800 O-Rings analysis

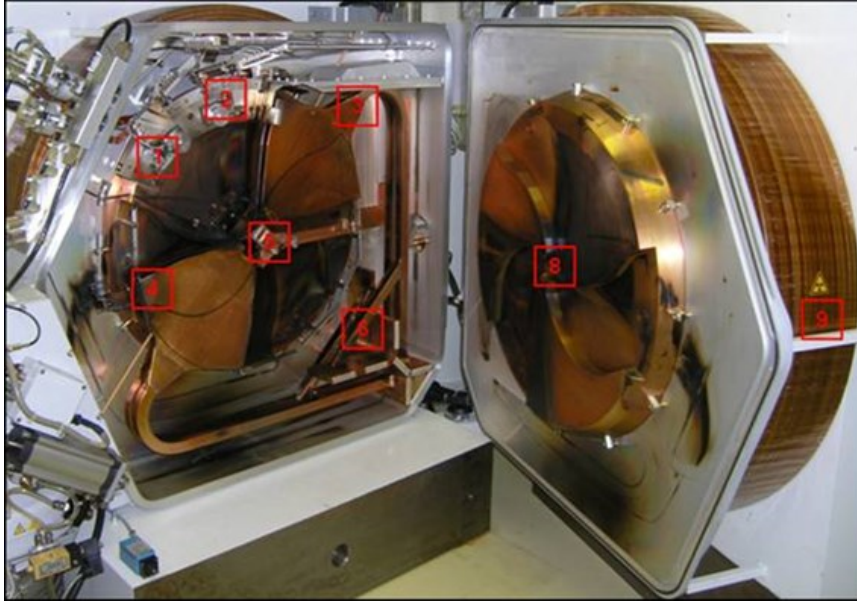
Pins



CHAMBER

Chamber Opening

Measure yoke play, adjust if needed: 0.0

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

Position 1: At 36 cm from Extraction trolley	0.107
Position 2: At 36 cm from Carousel	0.115
Position 3: At 36 cm from Dee 2-stem junction	0.1
Position 4: At 36 cm from Deel upper corner	0.125
Position 5: At 36 cm from Central region	0.11
Position 6: At 36 cm from Stems coupler	0.107
Position 7: At contact with central region	0.14
Position 8: At 36 cm from magnet pole	0.09
Position 9: At contact of magnet coil	0.145

Photo documentation & visual inspection

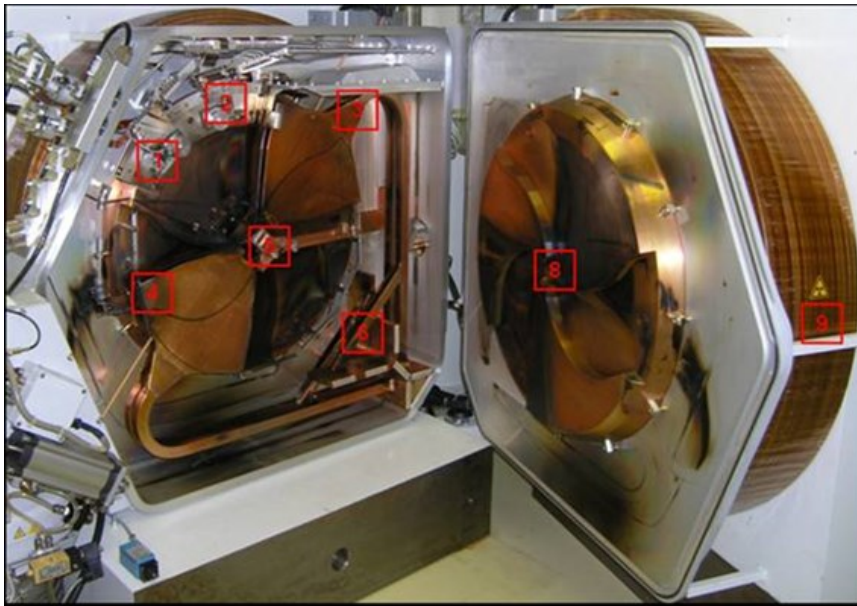
There is not photographic evidence

CHAMBER

Chamber Opening

Measure yoke play, adjust if needed: 0.0

Dose rate mapping (positions 1-9, [μ Sv/h])



Position 1: At 36 cm from Extraction trolley	0.107
Position 2: At 36 cm from Carousel	0.115
Position 3: At 36 cm from Dee 2-stem junction	0.1
Position 4: At 36 cm from Deel upper corner	0.125
Position 5: At 36 cm from Central region	0.11
Position 6: At 36 cm from Stems coupler	0.107
Position 7: At contact with central region	0.14
Position 8: At 36 cm from magnet pole	0.09
Position 9: At contact of magnet coil	0.145

Photo documentation & visual inspection
There is not photographic evidence

Beam exit valve tests

Visual inspection of opening/closing	<input checked="" type="checkbox"/>
Visual inspection of tubing	<input checked="" type="checkbox"/>
Target port O-ring replacement	<input checked="" type="checkbox"/>

Flaps**Flap 1**

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	-99
MaximumCurrentMA	94

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

0% value [mm]	4.7999999999999998
50% value [mm]	12.5
100% value [mm]	12.5

Flap 2

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	-90
MaximumCurrentMA	77

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

0% value [mm]	4.5
50% value [mm]	12.199999999999999
100% value [mm]	12.199999999999999

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]
52.799999999999997	47.700000000000003	47.399999999999999	100.0	0.0

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]
0.65000000000000002	0.25	0.25	1.2

Visual inspection and photo of H-puller	<input checked="" type="checkbox"/>
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If needed: H-puller replacement	<input checked="" type="checkbox"/>
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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	<input checked="" type="checkbox"/>
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A [mm]	B [mm]	C [mm]	D [mm]
0.59999999999999998	0.25	0.59999999999999998	1.2

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]
52.399999999999999	47.5	46.600000000000001	37.5

Pictures	
Image	Comments

Dees

Visual inspection of dees, internal and external baffles	<input checked="" type="checkbox"/>
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	Measure dee thickness	Measure dee height
A	34.0	47.10000000000001
B	34.39999999999999	75.70000000000003
C	33.70000000000003	47.20000000000003
D	33.39999999999999	46.29999999999997
E	33.5	74.40000000000006
F	34.70000000000003	47.29999999999997
G	34.39999999999999	74.79999999999997
H	33.60000000000001	73.79999999999997

Pictures	
Image	Comments

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

	✓
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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]	-104.0	-111.0	-97.0
Maximum current [mA]	108.0	129.0	98.0

Diagnostic system checks

Target ID	
Visual inspection of collimators and collimator cables	✓
Check collimator screws tightness	✓
Measure flip-in probe resistance	29.41
Target Resistance	
Lower Collimator Resistance	
Upper Collimator Resistance	
Horizontal Collimator Opening	
VerticalCollimatorOpening	

	Resistance Measurement	Insulation Measurement
Extraction 1	29.440000000000001	0.0
Extraction 2	29.559999999999999	0.0

Comments	
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Chamber Clean-up

Carousel repositioning

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

Full picture of vacuum chamber
Image_16.jpg

Chamber clean-up

Clean dees and magnet poles	<input checked="" type="checkbox"/>
Regrease door o-ring	<input checked="" type="checkbox"/>
Check for left items	<input checked="" type="checkbox"/>
Inspect RF finger contacts	<input checked="" type="checkbox"/>
Close magnet door	<input checked="" type="checkbox"/>

Cabinets

Cabinets PSMC**PSMC**

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

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 [$M\Omega$]
0.40000000000000002	2.2999999999999998	2.2999999999999998

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, Ramp up the magnet to the H- configuration value, read and record the ramping time

Record on sequence ramping speed	Record on sequence ramping up time to maximum	Record on sequence ramping up time to configuration value
6.0	105.0	12.0

Verify PSMC performance for H-config value

Set current	0.0
Output current [A]	0.0
Voltage read PSS [V]	0.0
Coil voltage [V]	0.0
Firing sequence [number of peaks in 20ms]	0.0
Ripple [mV rms]	0.0

Verify PSMC performance for 499A

Set current	499.5
Output current [A]	499.5
Voltage read PSS [V]	77.400000000000006
Coil voltage [V]	78.5
Firing sequence [number of peaks in 20ms]	12.0
Ripple [mV rms]	425.0

Verify PSMC performance for 250A

Set current	250.0
Output current [A]	250.0
Voltage read PSS [V]	37.700000000000003
Coil voltage [V]	39.659999999999997
Firing sequence [number of peaks in 20ms]	12.0
Ripple [mV rms]	625.0

Verify PSMC performance for 50A

Set current	50.0
Output current [A]	50.0
Voltage read PSS [V]	0.0
Coil voltage [V]	7.9000000000000004
Firing sequence [number of peaks in 20ms]	12.0
Ripple [mV rms]	435.0

Turn off PSMC and measure off sequence ramping down time	<input checked="" type="checkbox"/>
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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
24.050000000000001	15.07	-15.08	5.0300000000000002	0.25

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]
5.0	5.0

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)
440.0	36.0	39.0	5.0	<input checked="" type="checkbox"/>

Record Ion Source Performance

IS current [mA]	IS voltage [V]	Flip in probe current [μ A]
25.0	1252.0	7.2000000000000002
50.0	1360.0	41.299999999999997
75.0	1243.0	105.2
100.0	1092.0	176.5
125.0	971.0	247.5
150.0	874.0	311.0

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_5.jpg Image_6.jpg

If needed, adjust collimators and repeat	Collimators lifted up by 0.6mm each (T1 and T5)
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LTF

Identifier	
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	V2,Syringe,V4,V3

Starting pressure [psi]	Pressure drop [psi / h]
369.10000000000002	0.0

If needed: Perform target fill tests and adjustment for each target	0.0
If needed, adjust and repeat test, record adjustment value	0.0

Pictures	
Image	Comments
Image_5.jpg	

Beam Conditioning

Photo name	Add Comment
Image_10.jpg	

PMDebriefing

Record additional tasks performed not recorded elsewhere	Record open tasks and issues	Record spare parts / consumables to be ordered	Record worker dosimetry
	Sweedwater motor noisy. To be replaced PDU contactor taken inside the cabinet. New one to ordre Old TPG ont tested		0.0