Activation of C75 FPC waveguide NEXTorr pump

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Document Owner:	G. Ciovati		

1.0 Purpose and Scope

This procedure describes the steps required to properly activate the combination NEG+ion pump (NEXTorr D 200-5, SAES Getters) installed in the warm section of the FPC waveguide of each cavity installed in a C75 cryomodule. The same procedure applied for the periodic re-activation of the NEG pump.

2.0 References

JL0064915 – Fundamental waveguide manifold assembly

NIOP-03 User's Manual

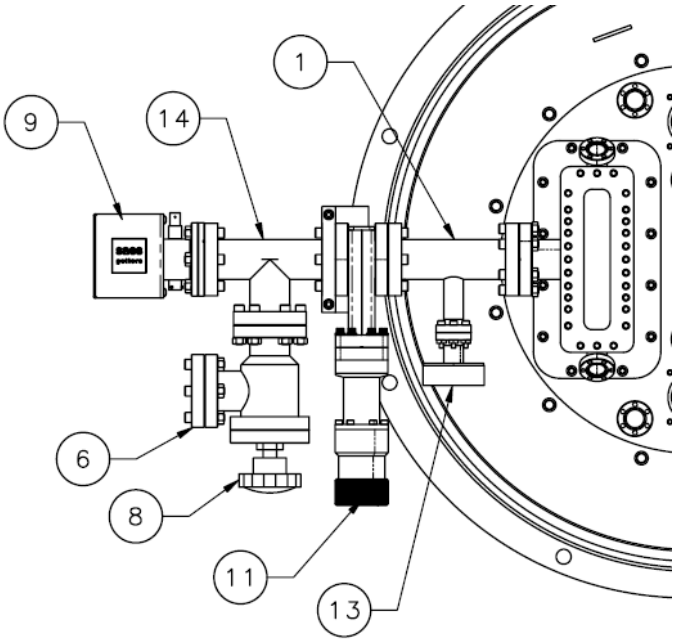
Spec 11141S0029REV B - Small items vacuum leak test

3.0 Terms and Definitions

1. **NEG** – Non Evaporable Getter.
2. **IP** – Ion pump
3. **NP** – NEG pump.

4.0 Process Details

A drawing of the vacuum installation connecting the combination NEG+Ion pump NEXTorr D 200-5 of SAES Getters to the FPC waveguide is shown in Fig. 1.

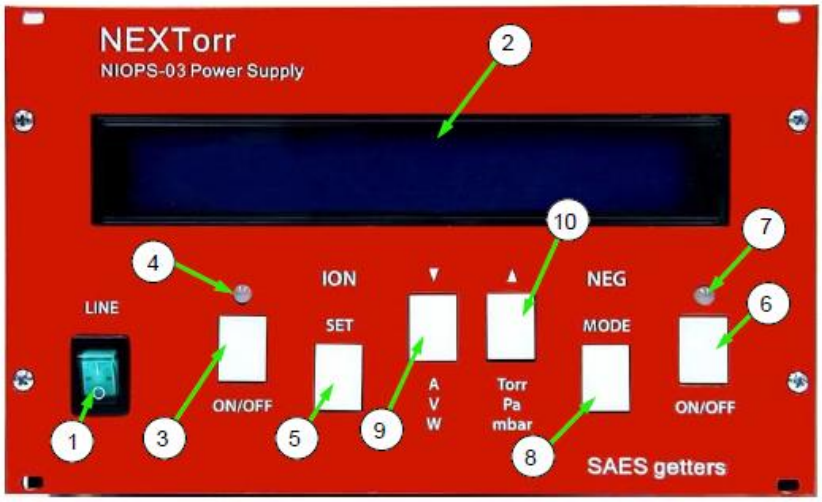


Legend:

1) Reducing Tee
6) Blank flange – connection to turbo-pump cart
8) Angle valve
9) NEXTorr model D200-5
11) Gate valve
13) Burst disk
14) Tee

Fig 1. Drawing of the vacuum manifolds connecting the NEXTorr pump to the FPC waveguide.

The power supply NIOPS-03 from SEAS Getters is used for the activation of the NEG pump and operation of the ion pump. Please refer to the link to the Operating Manual of the NIOPS-03 power supply for a detailed description of any function listed in this procedure. The front panel of the power supply and items' legend are shown in Fig. 2.



1. the mains voltage switch **LINE**,
2. alphanumeric two line display.

Items of front panel for **IP** supply purpose (situated below inscription **ION**):

3. pushbutton **ON/OFF**,
4. red/green/yellow led indicator,
5. pushbutton **SET**.

Items of front panel for **NP** supply purpose (situated below inscription **NEG**):

6. pushbutton **ON/OFF**,
7. red/green/yellow led indicator,
8. pushbutton **MODE**.

Items of front panel for both **IP** and **NP** purpose:

9. pushbutton **A/V/W/▼**,
10. pushbutton **Torr/Pa/mbar/▲**.

Fig 2. Front panel of the NIOPS-03 power supply and legend of items.

The FPC waveguide and the vacuum manifold shown in Fig. 1 shall be evacuated to a pressure < 10^{-6} mbar using a turbo-molecular pump, and the whole vacuum assembly should be leak-checked in accordance with CEBAF Specification 11141S0029REV_A prior to beginning activation of the NP.

1) The turbo-pump cart (which should include a vacuum gage) is kept actively pumping the vacuum manifold and waveguide (angle valve open, item 8) throughout the activation process.
2) Connect the IP element cable and the NP element cable between the NIOPS-03 power supply and the NEXTorr pump.
3) Close the gate valve (item 11), isolating the FPC waveguide from the pumps.

4) Turn on the NIOPS-03 power supply.
5) Press the **MODE** button until ***Tmd Conditioning*** (timed conditioning) is shown on the 2nd line of the display.
6) Press the **ON/OFF** button in the **NEG** section to start a 1 h conditioning of the NEG element (15 W power). Power to the NEG element will automatically turn off after 1 h.
7) After the conditioning cycle has been completed, press the **ON/OFF** button in the **ION** section to turn on the IP. After 2 sec, press again the **ON/OFF** button in the **ION** section to turn off the IP. This step "flashes" the ion pump to clean it.
8) Press the **MODE** button until ***Tmd Activation*** (timed activation) is shown on the 2nd line of the display.
9) Press the **ON/OFF** button in the **NEG** section to start a 1 h activation of the NEG element (60 W power). Power to the NEG element will automatically turn off after 1 h. CAUTION: the tee (item 14 in Fig. 1) will be hot during activation, do not touch!
10) After the activation is completed, open the gate valve.
11) The pressure measured by the vacuum gage on the turbo-pump cart should be $< 10^{-6}$ mbar. Press the **ON/OFF** button in the **ION** section to turn on the IP. The pressure is now shown on the 1st line of the display.
12) Close the angle valve.
13) Turn off the turbo-pump cart, vent to 1 atm and disconnect from the angle valve.
14) Press the **ON/OFF** button in the **ION** section to turn off the IP. Turn off the NIOPS-03 power supply and disconnect the cables connected to the ion and NEG connectors on the NEXTorr pump.
15) Connect one of the available ion pump power supply to the ion-pump connector on the NEXTorr. **ATTENTION: Make sure that the output voltage of the ion pump power supply being used is set to 5 kV!**
16) Turn on the ion-pump power supply.

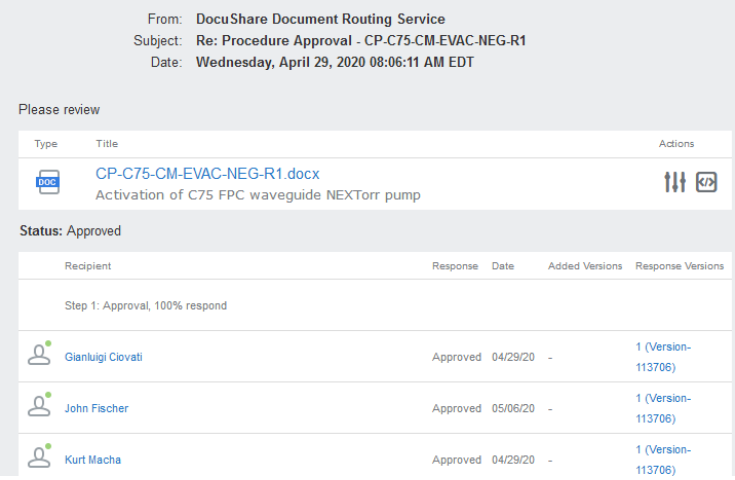
Based on the estimated gas load during operation, it is estimated that the NP will saturate after about 3 years of continuous operation, after which a re-activation is required. The procedure for re-activation of the NP is the same as described above, except steps 5)-7) (timed conditioning and flashing of the ion pump) should be skipped.

5.0 Revision History

Rev #	Revision or update:	Effective:
Release	Initial Release	4/09/2020

6.0 Approvals

Approved by:	Signature:	Date:
Document Owner	G. Ciovati	
Approver 1	J. Fischer	
Project Manager	K. Macha	



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Recipient	Response	Date	Added Versions	Response Versions
Step 1: Approval, 100% respond				
Gianluigi Ciovati	Approved	04/29/20	-	1 (Version-113706)
John Fischer	Approved	05/06/20	-	1 (Version-113706)
Kurt Macha	Approved	04/29/20	-	1 (Version-113706)