



Orbitrap Exploris 480: Installation

Revision 00 – June 2019

Pre-Installation Visit

- A visit of the customer site to check that the preinstallation requirements have been met is required prior to scheduled installation

Safety Rules

- Wear protective clothing (e.g. steel-capped shoes for lifting)!
- Apply proper lifting techniques when lifting the instrument or heavy parts.

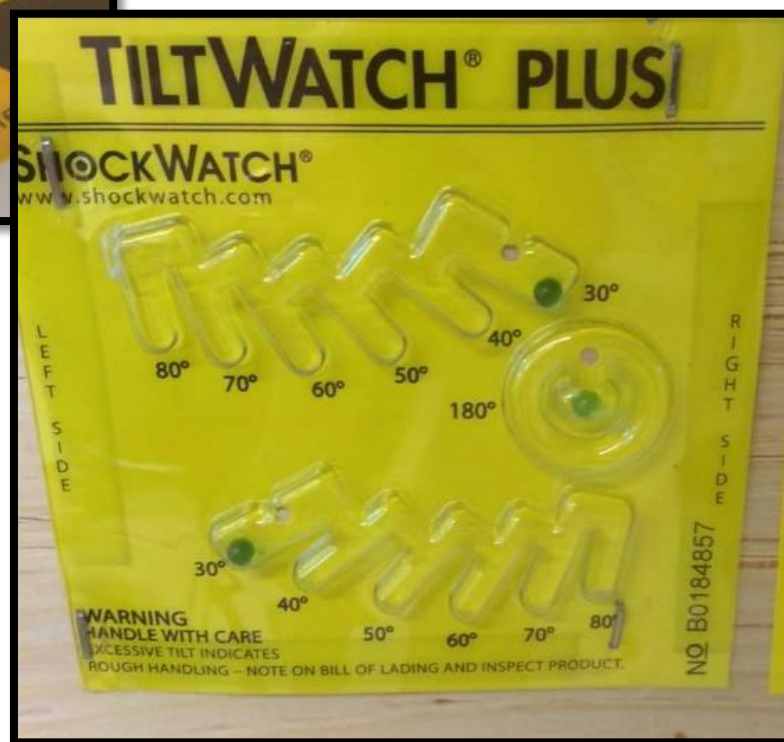
Tools for installation

- 13 mm spanner
- Ratchet set
- Slotted screwdriver
- 2.5, 3, 4, 5, 6, 8 mm Hex keys
- Scissors, Cutter
- Electrical drill with T15 Torx
- Digital Voltmeter
- Capacitance tester (e.g. PeakTech 3705, Agilent U1701A/B) (optional)

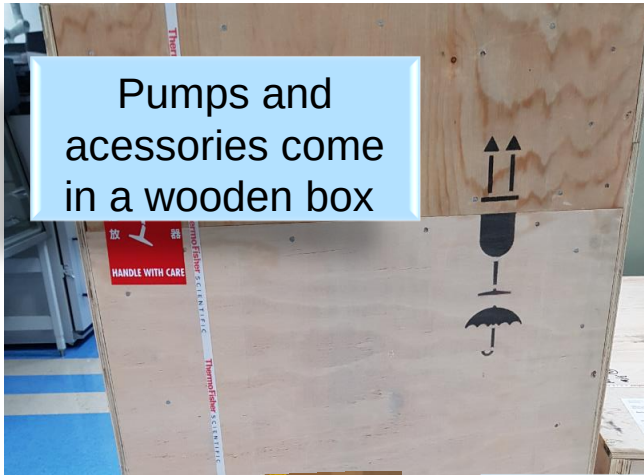
- Check the site preparation according to the Orbitrap 480 Preinstallation Requirements Guide and postpone the installation if requirements are not met!
- Check the power outlets for adequate voltage with a DVM:
There should be three outlets supplying 230V phase-to-neutral (<1V neutral to GND) or 208V phase-to-phase. Please check pre-installation requirements for your specific country. For Peripherals there should be 3 power outlets according your country power requirements.
- The nitrogen supplied should be of >99.999% purity for the HCD gas and >99% for the source gas
- The stable supplied output pressure should be 6 bar (+- 0.5 bar)/87 psi (+-7 psi). Directly connected regulators are highly recommended.
- Plugs will be provided based on country (see country kits)

Day 1 – Before Unpacking

Check the ShockWatch stickers around the crate for signs of poor shipping.



Day 1 – Before Unpacking



Pumps and accessories come in a wooden box



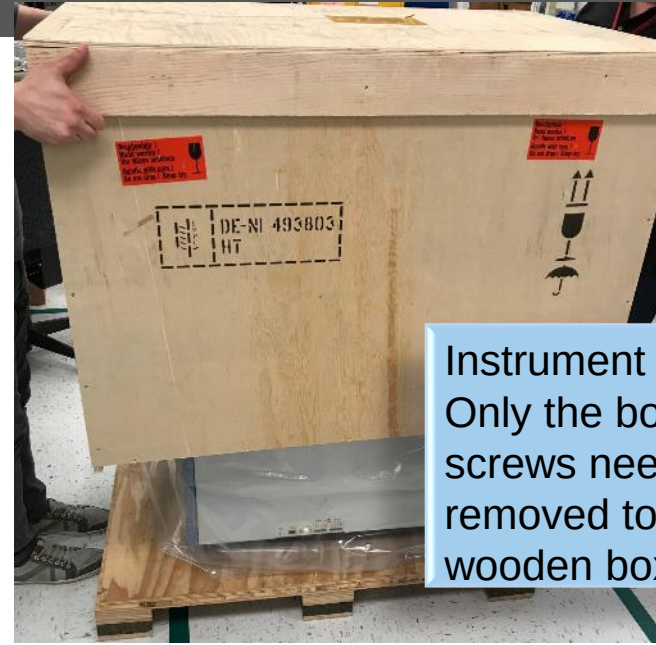
Instrument

In some locations, the instrument arrives in a wooden crate secured with Torx T15 screws. An automatic screwdriver is recommended due to the amount of screws.

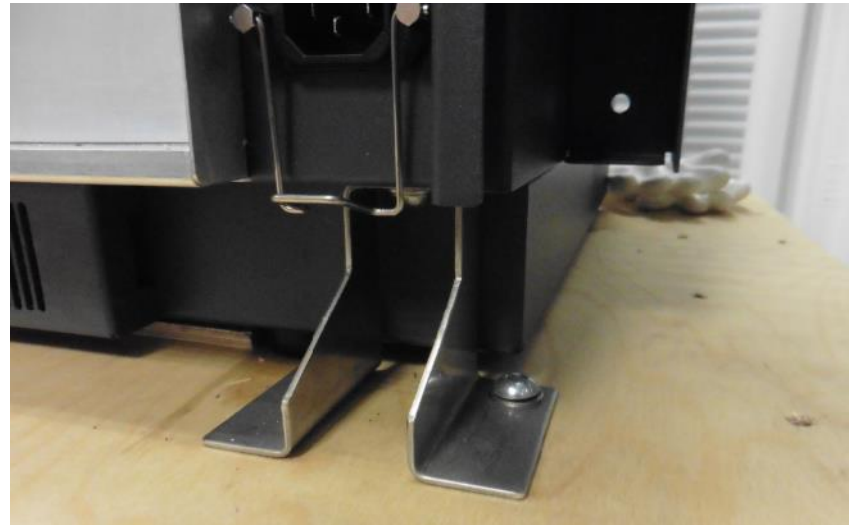


Day 1 - Unpacking

- Unpack the shipping boxes
 - Remove the two holders (5 mm) that keep the instrument fixed on the pallet on the front left and back right.



Instrument box.
Only the bottom Torx screws need to be removed to lift up the wooden box



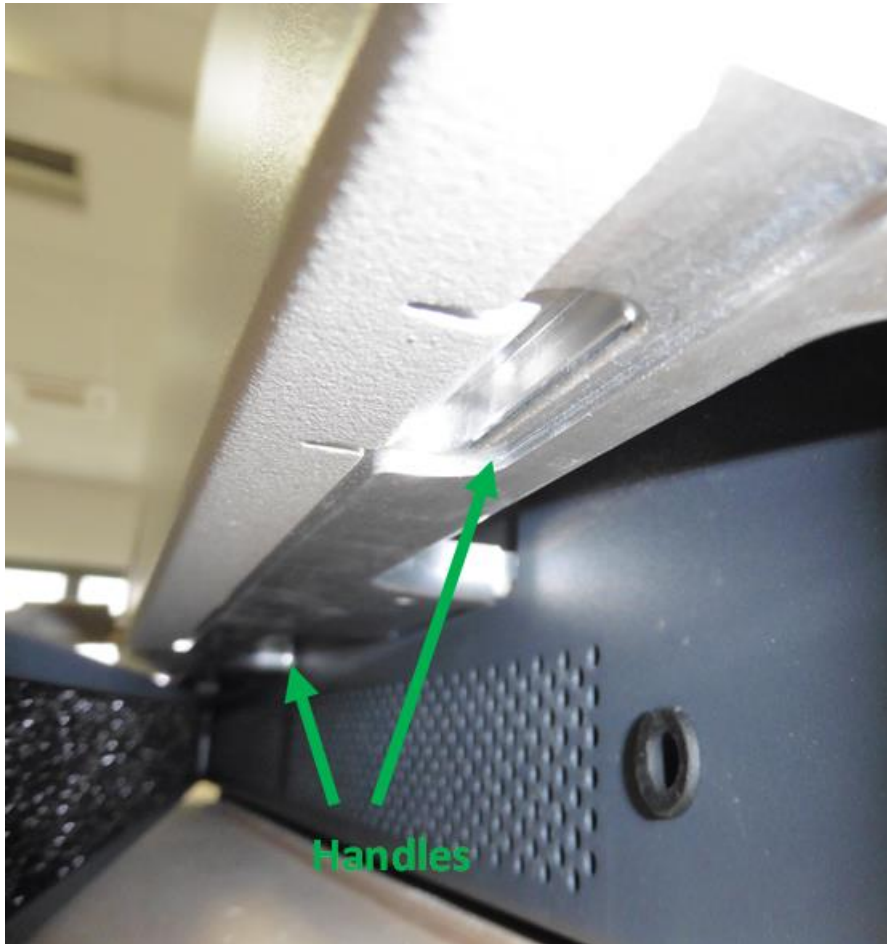
Day 1 - Unpacking

- Remove the front air filter (just clipped in)
- Remove the air filters on both sides of the instrument to reveal the lifting handles (these are also just clipped).



Day 1 - Unpacking

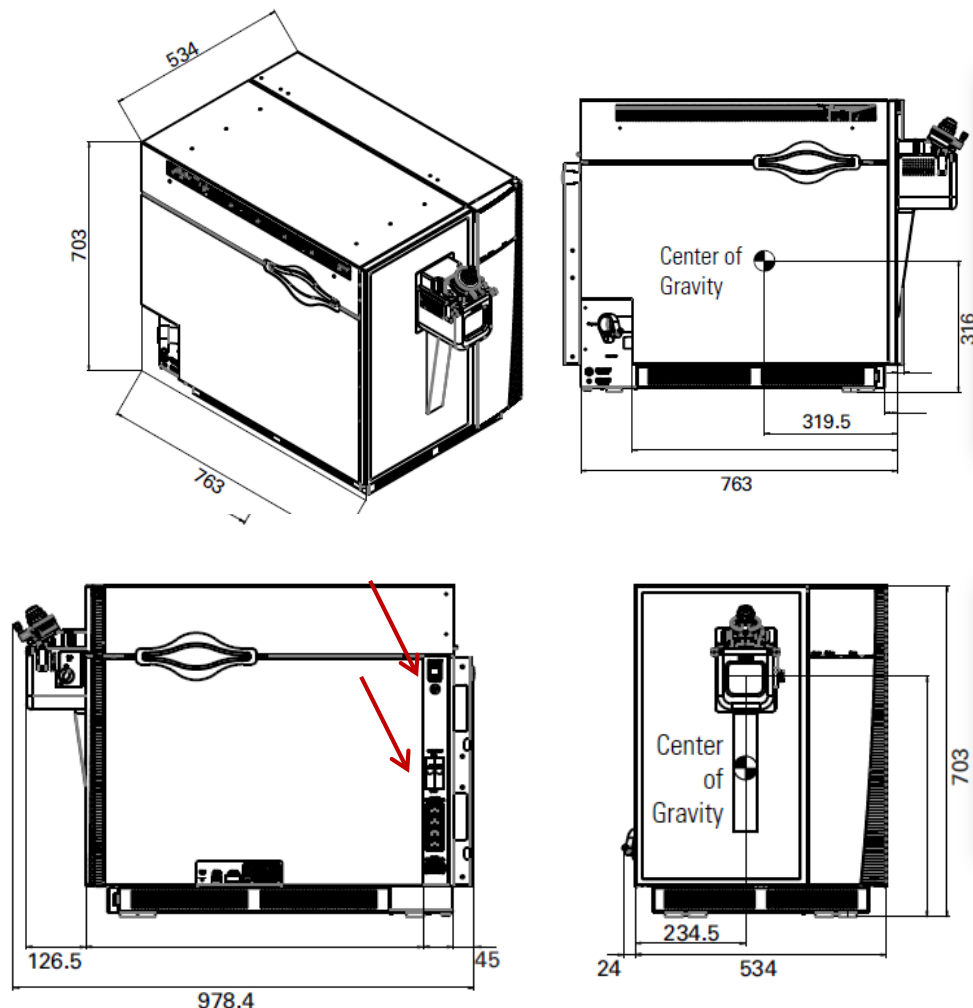
- Now lift the instrument onto the bench with 4 persons.



Warning:
The instrument is heavy
(~120 kg, 265 Lbs). Wear
protective shoes!

Day 1 – Bring System in Position on Table

Stabilize the instrument with the free hands. There are glide pads at the back of the instrument.



Allow at least 15 cm (6 in.) between the left side and the right side of the instrument and any other components -> for proper air circulation and for clearance of the gas lines and electrical connections.

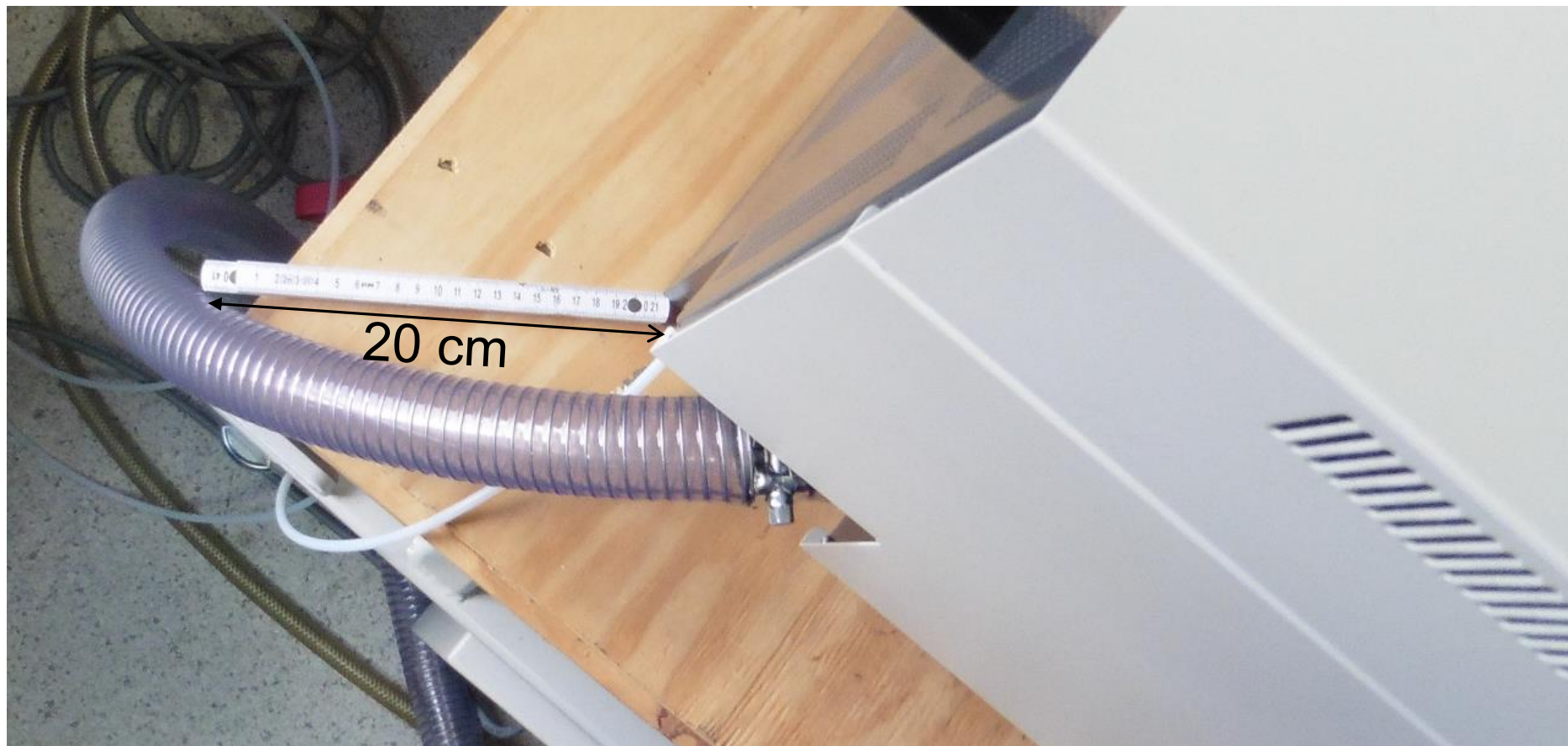
Free access to the power column at the far right side of the instrument (arrow) must be possible at all time

Day 1 - Unpacking

- Remove **2** transportation screws using a slotted screwdriver



Day 1 – Might need to drill hole for Forepump hoses



Day 1 – Contents of the Shipment

Syringe pump

Network switch

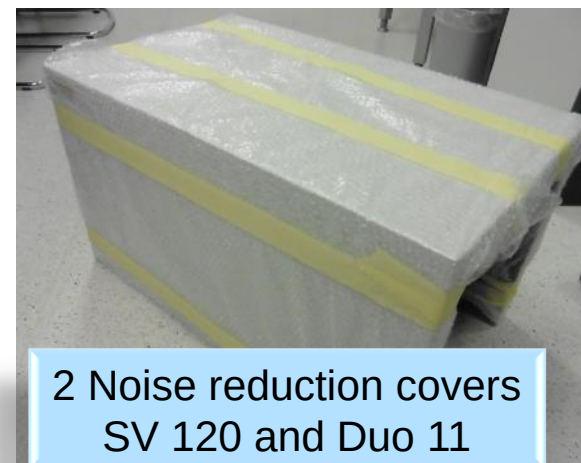
Drip pan with wheels for
Duo 11
(no extra drip pan for the
Sogevac 120)

Optamax
source

Forepump Sogevac 120 BI FC



Instrument PC



2 Noise reduction covers
SV 120 and Duo 11

Day 1 – Contents of the Shipment – Installation Kit



Day 1 – Contents of the Shipment – Installation Kit

Installation kit
Nicht öffnen! Nur für
installierenden
Servicepersonal
Keep closed! For installing
service engineer only

Installation Kit

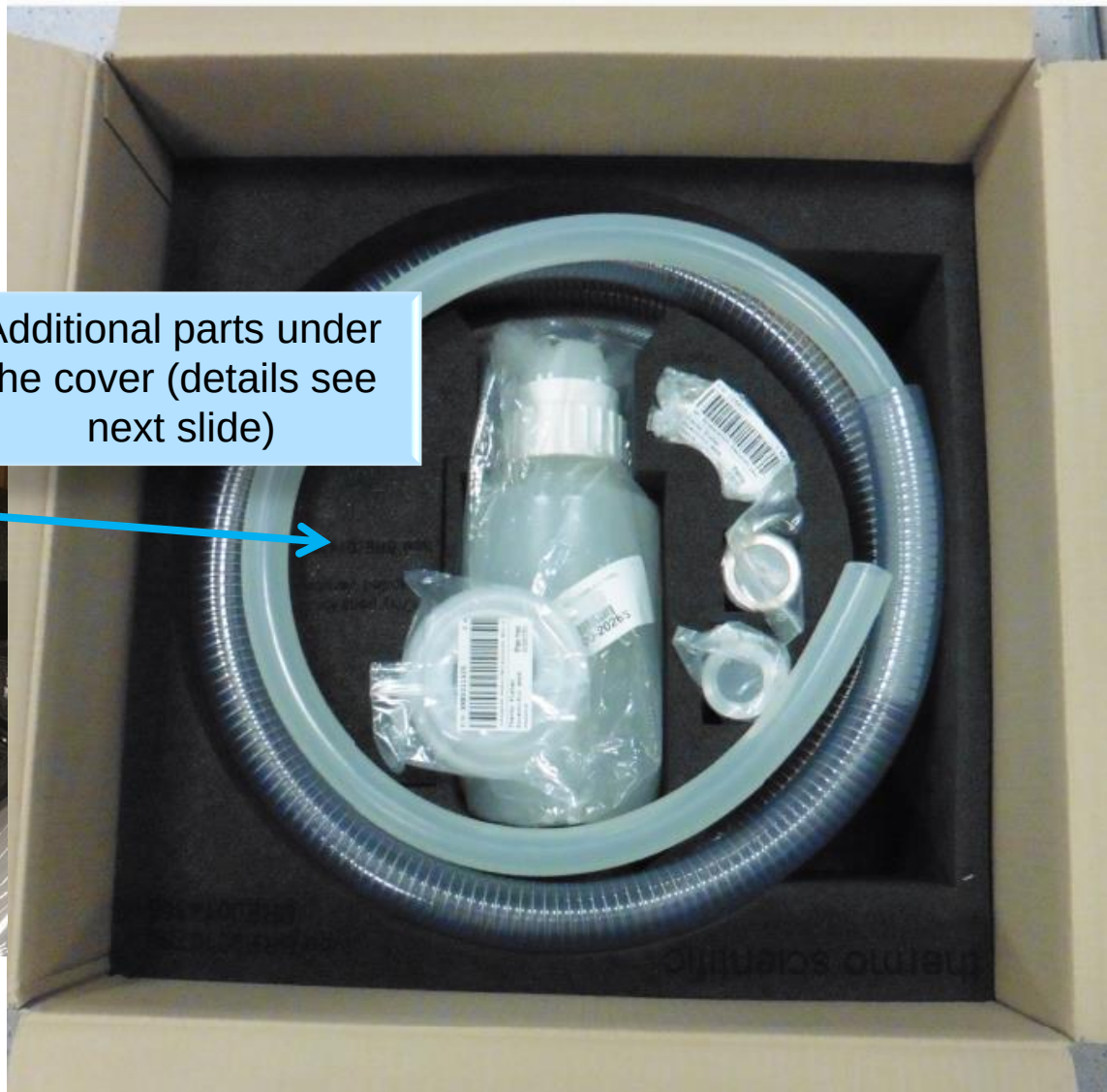


Day 1 – Contents of the Shipment – Installation Kit

Installation Kit

Installation kit
Nicht öffnen! Nur für
Installateuren/
Serviceingenieur
Keep closed! For installing
service engineer only

Additional parts under
the cover (details see
next slide)



Day 1 – Contents of the Shipment – Installation Kit

Installation Kit

Installation kit
Nicht öffnen! Nur für
installierenden
Servicepersonal
Keep closed! For installing
service engineer only

Additional
parts



Day 1 – Contents of the Shipment – Installation Kit



Installation kit
Nicht öffnen! Nur für
Installateure und
Servicepersonal
Keep closed! For installing
service engineer only

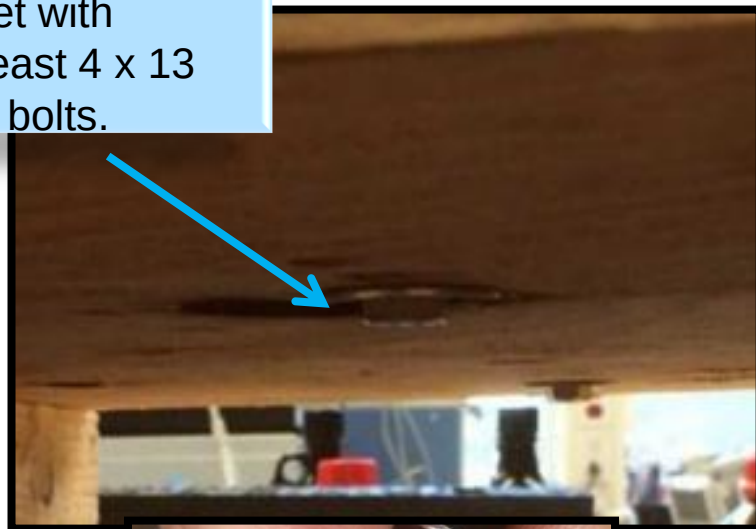
Installation Kit



Day 1 – Unpacking the Leybold Sogevac 120 BI FC



The Fore-Pump is secured to the pallet with At least 4 x 13 mm bolts.



The Fore-Pump comes on a trolley



!!! Warning !!!
Pump weighs
98 kg



Day 1: Unpacking the Leybold Sogevac 120 BI FC



Remove the Screws from the holder to release the pump



Use the screws and change the orientation of the handles

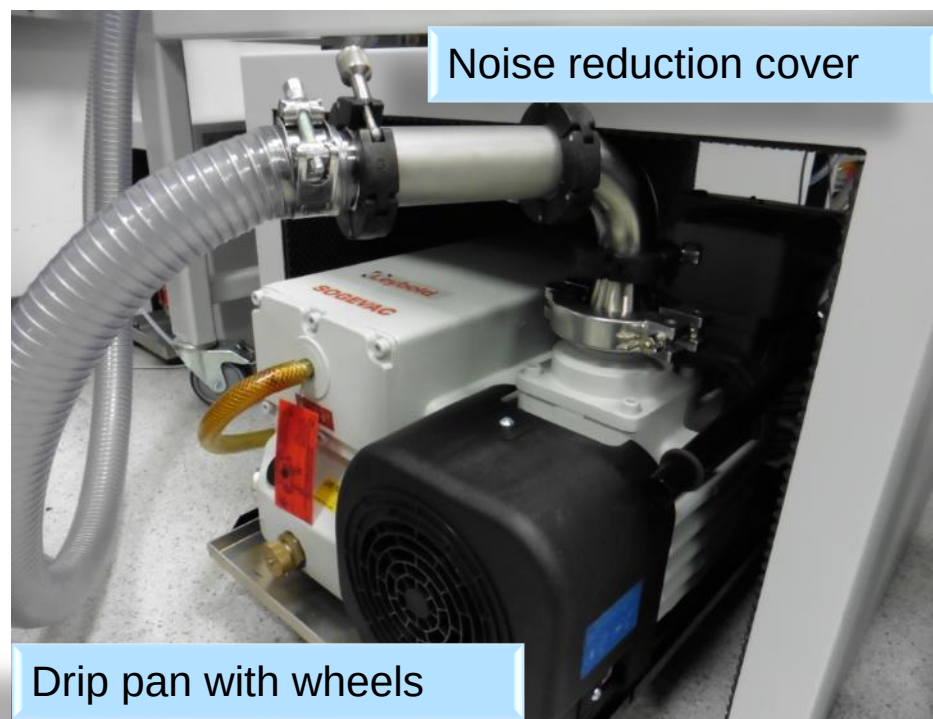
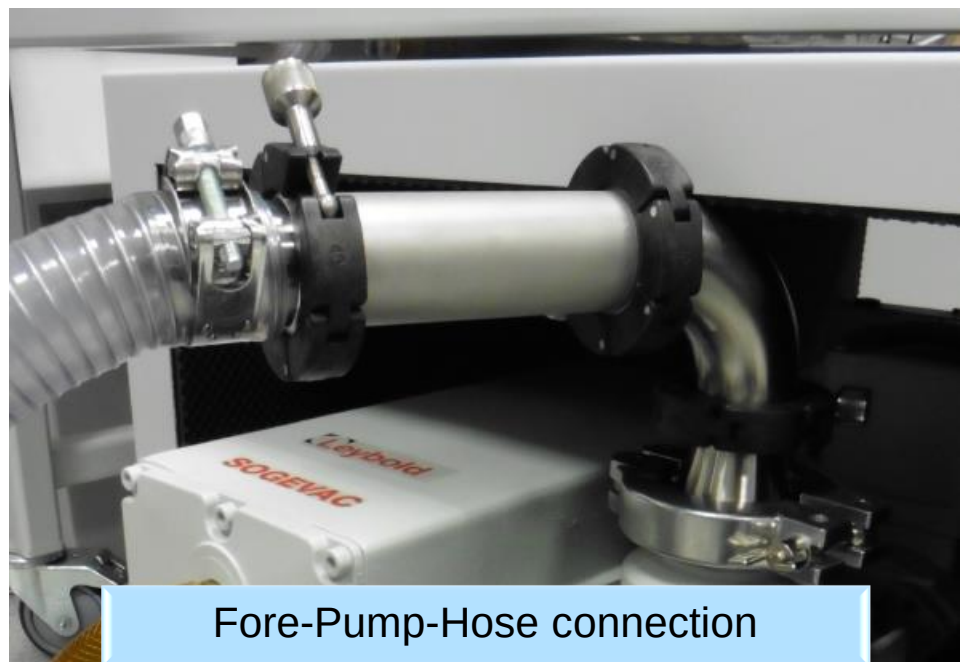


Use the board of the wooden box as a ramp to remove the pump from the box

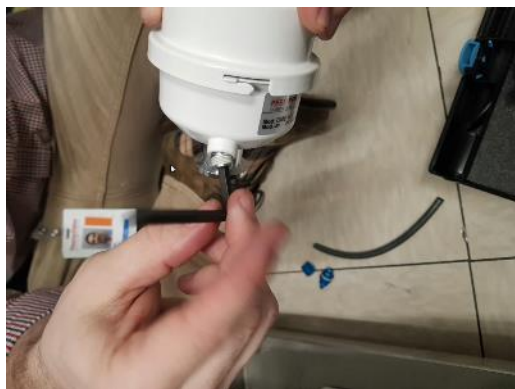
For installation leave the pump on the drip pan with wheels and change back the handles to their original orientation

Day 1 – Forepump Installation – Leybold Sogevac 120 BI FC

- Leybold Sogevac 120 BI FC
- 180-264V, 50 & 60 Hz
- Use Leybold LV 700 oil only



Day 1 – Forepump Installation – Pfeiffer Duo 11: Oil mist filter

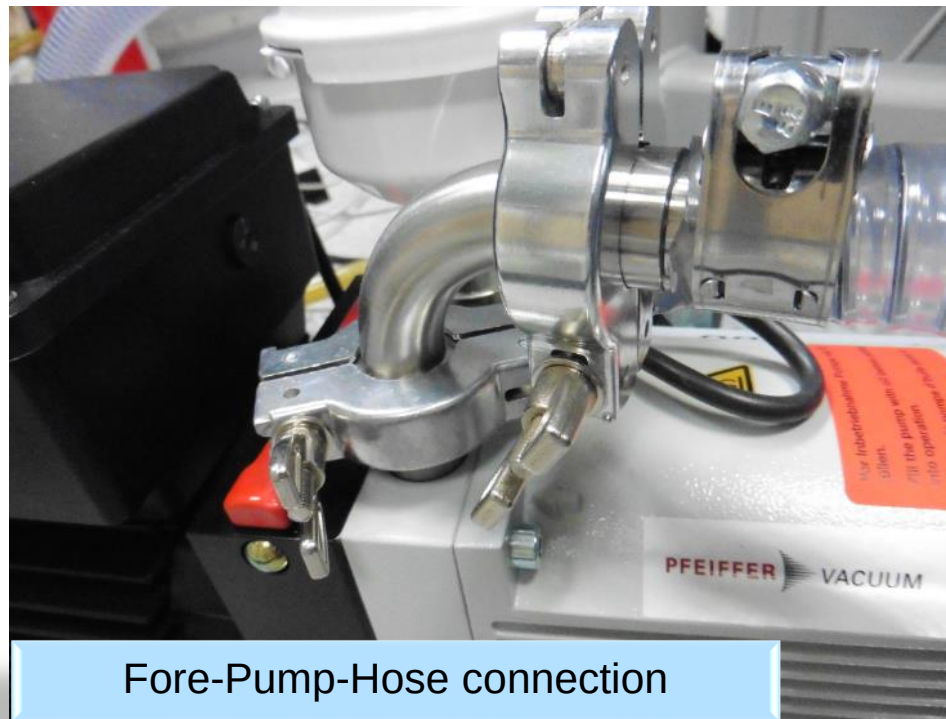


Day 1 – Forepump Installation – Pfeiffer Duo 11



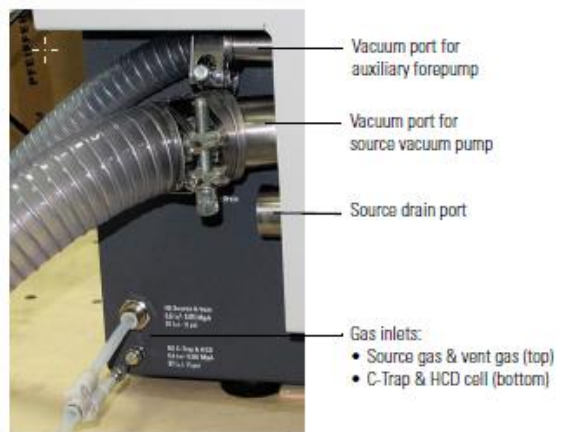
Drip pan, with wheels

Duo pump needs to be filled with P3 oil before use

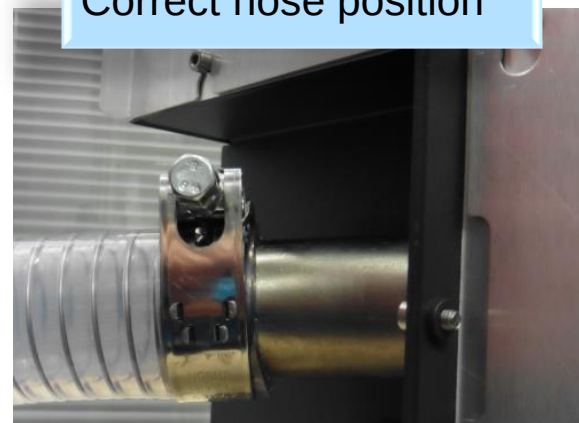


Fore-Pump-Hose connection

Day 1 – Connect Pump Hoses at Instrument



Correct hose position



Connection to Duo Pump



Connection to SV 120

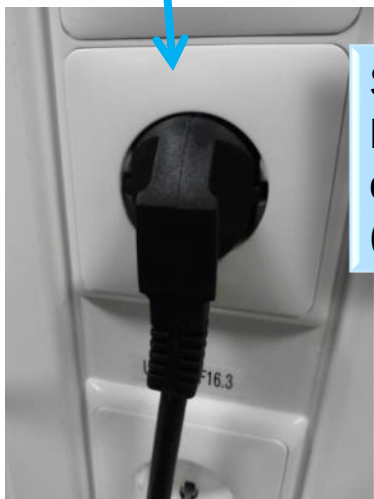
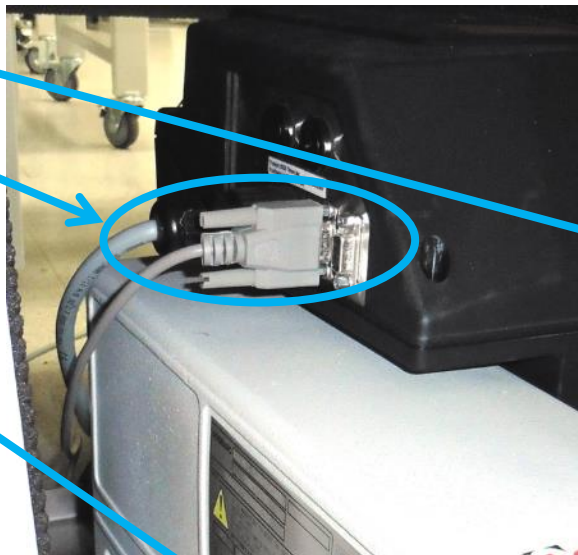
Day 1 – Prepare the Forepumps

Connect the RS232 cable to the pumps.

Connect the RS232 to the instrument.

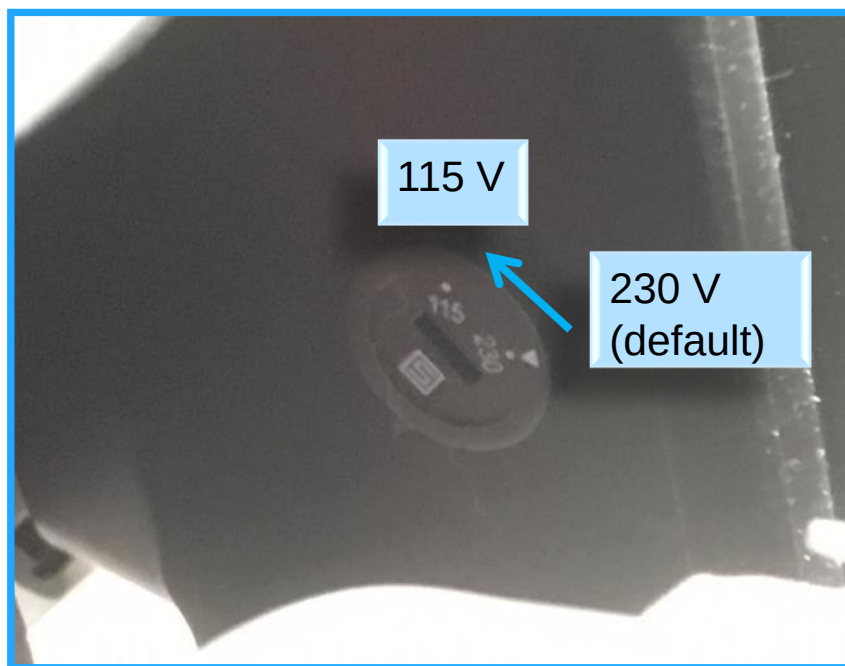
Connect the Forepump power cables to the wall outlet.

Set the power setting switch on the DUO11 pump according to your country power requirements (for NA see next slide)



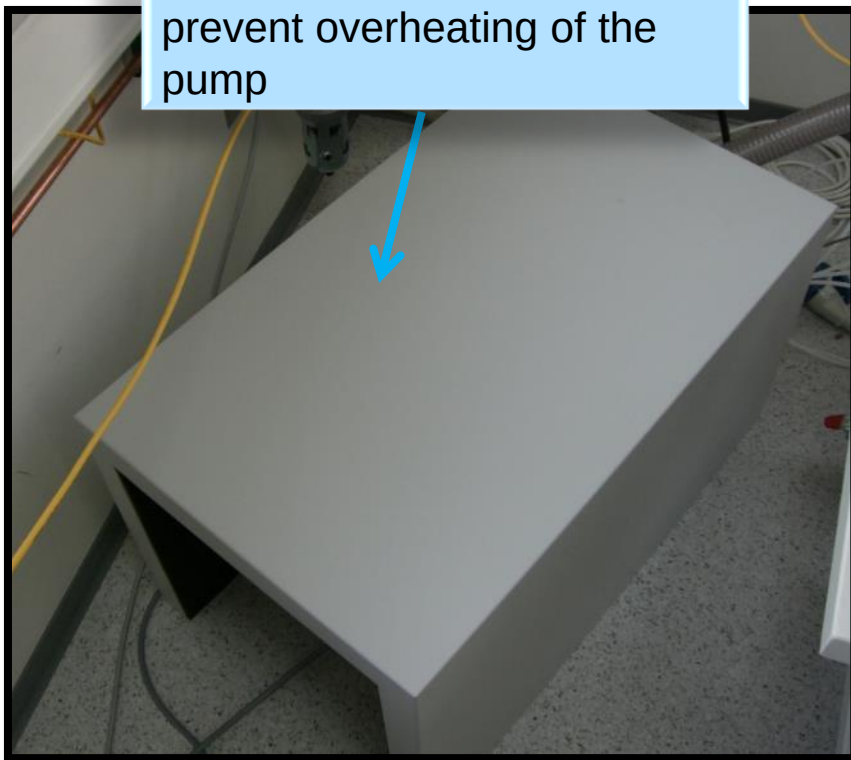
ATTENTION: North America

- Set the power setting (little arrow) on the DUO11 pump to **115V**

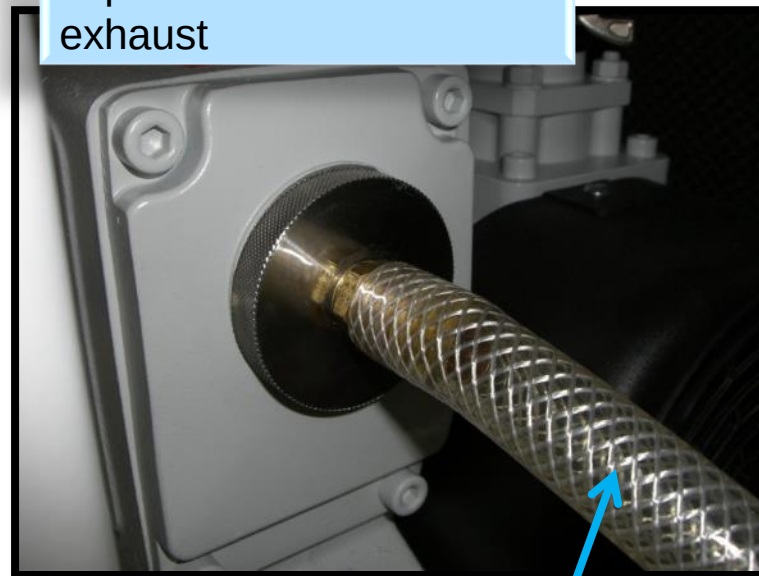


Day 1 – Prepare the Forepump

The forepump noise reduction cover is not designed to support body weight. If the lab environment is too warm you may consider not using the noise reduction cover to prevent overheating of the pump



Exhaust outlet of the forepump is to be fitted to exhaust system of the lab; separated from source exhaust



Exhaust Hose Part Number **0690720**.
13 × 3.5, PVC

Day 1 – Connect Gases

Prepare the nitrogen inlet. Typical usage will use a T-Piece to split the nitrogen flow to source and trapping gas.

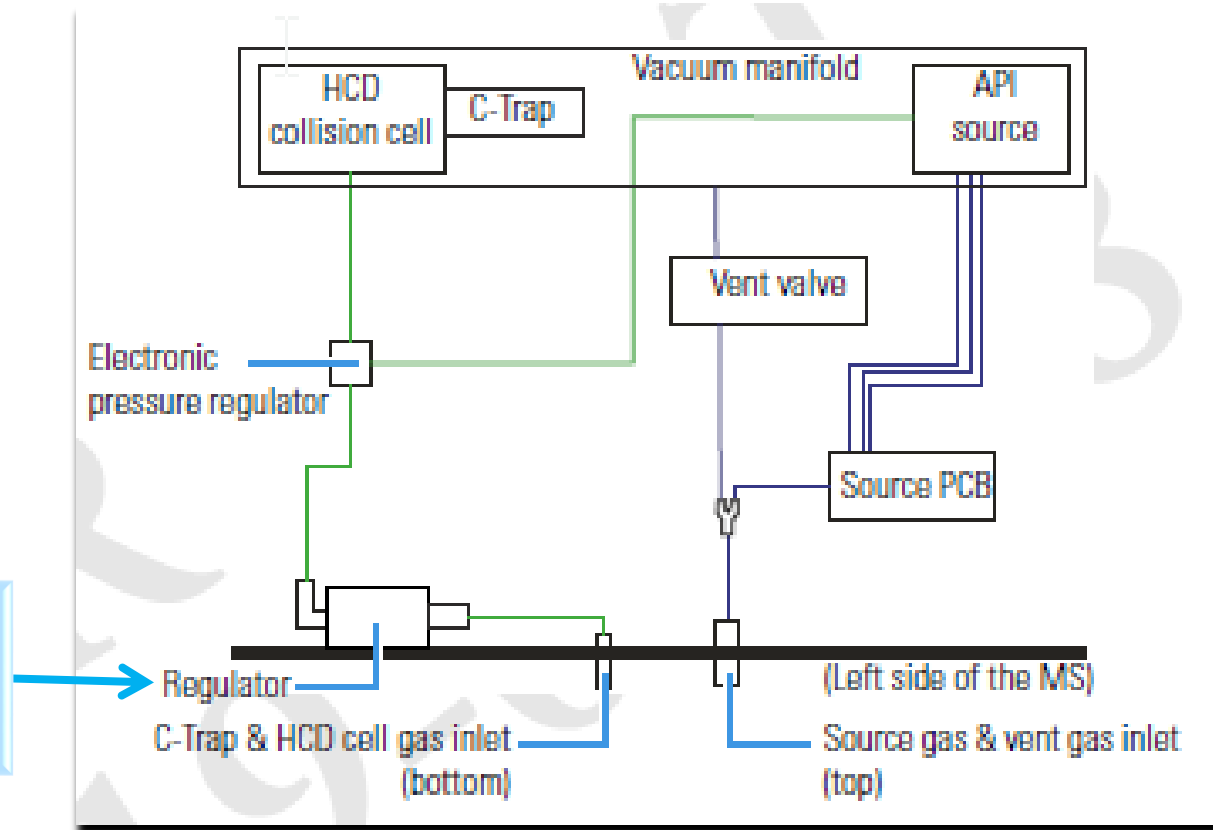
For this, use the T-Piece and a short segment of 6mm ID tubing for the source & vent line, and the 6mm ID to 4mm union, 4mm to 1/16" union, a short piece of stainless steel tubing and two sets of fitting and ferrule to make the connection between the union and the instrument.

Nitrogen purity specification:
>99.999% for HCD gas
>99% for source gas



You can use different N2 sources for HCD and source

Internal Gas Plumbing



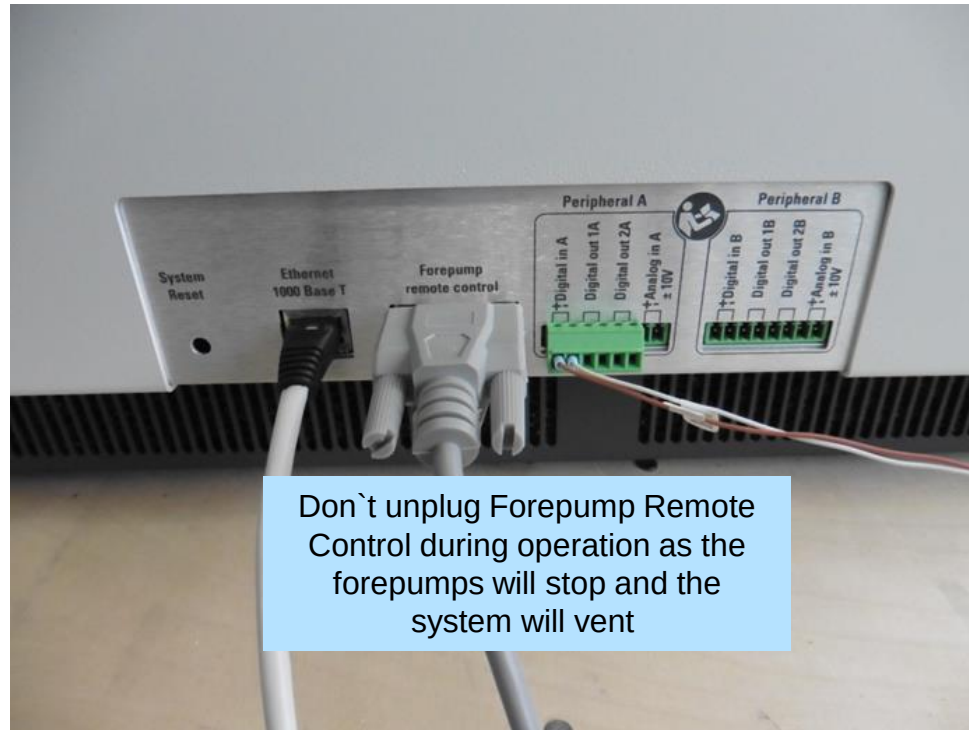
Day 1 - Connect Power, Network Cable and Syringe Pump

- Connect the power line to the instrument.
- Plug the power cord to the pump (first step)
- Use one of the “Power Out” outlets to connect the power supply for the syringe pump.
- Place the syringe pump in the cabinet on the instrument.
- Connect the communication cable to one of the free USB ports on the instrument.



Day 1 - Connect Power, Network Cable and Syringe Pump

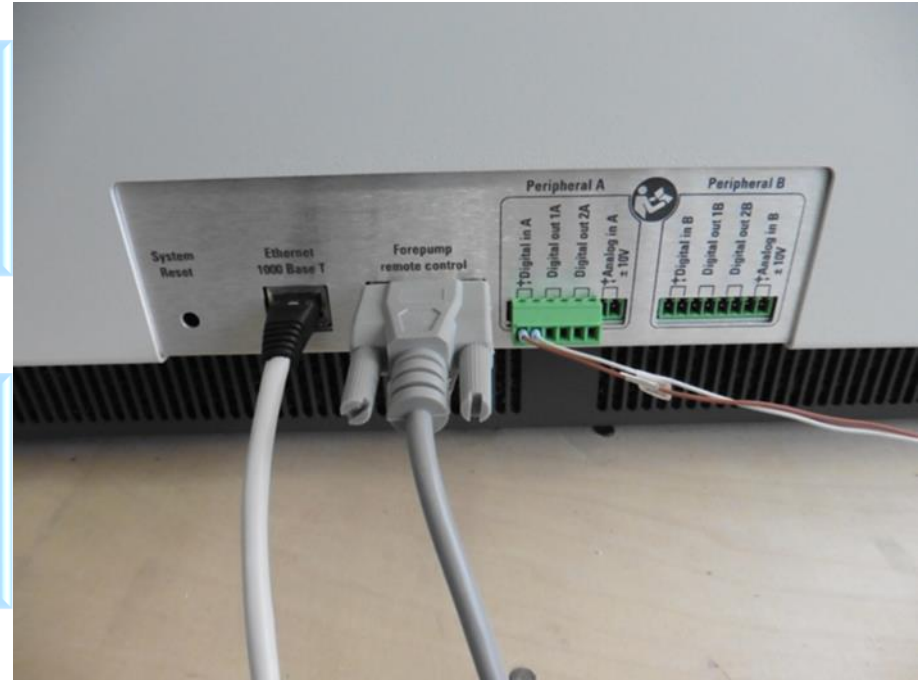
- Connect the pump control cable on the instrument's side panel.
- Also connect an Ethernet cable to the Ethernet port.
- Contact closure @ pins 1 and 2 if required



Day 1 - Connect Power, Network Cable and Syringe Pump

Unpack and install the Dell data system.
Connect the PC to the switch

Connect the Ethernet cable from the instrument to switch and install a cable from the switch to the Dell PC.



Day 1 – Prepare Instrument

- Remove the protective cover from the source inlet and install the source housing with HESI source.
- Remember to adjust the spray shield screws as they were tightened for shipping



Don't discard the protective cover. It is useful to keep the internal environment free of particulate when the system is open for cleaning.

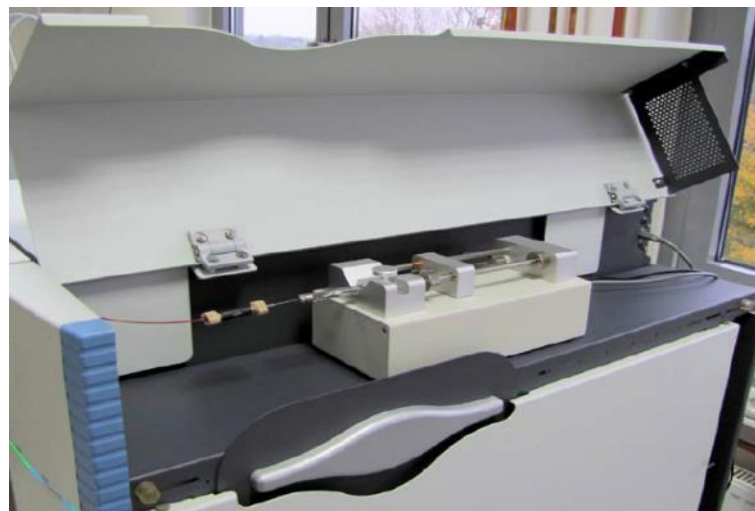
Day 1 – Prepare Instrument

- As the final step, connect the power cable from the instrument to the wall outlets.
- Switch the “Main Power” switch and “Electronics” switch on.
- Ensure that the pump is starting up and no hissing noises is heard. Indicating a major leak.



Instrument power cable

Day 1 – Syringe Pump



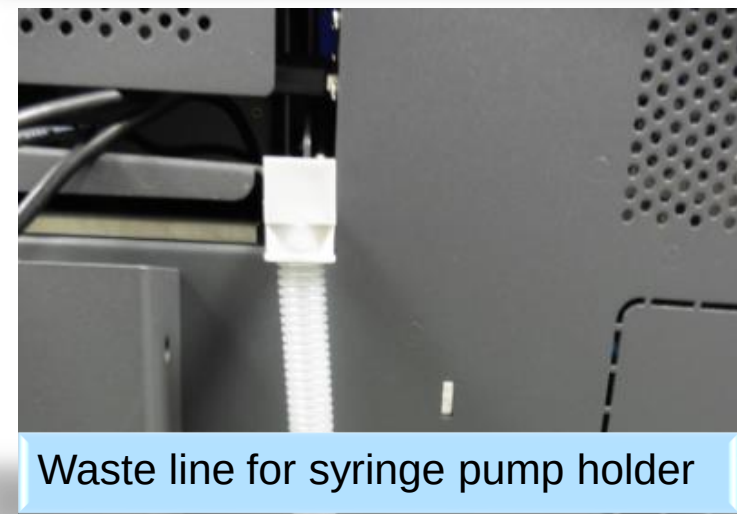
Syringe Pump Chemyx SKE10
Part Number BRE0013939



Power supply holding bracket



USB port is used for connection.
Power Port (black)



Waste line for syringe pump holder

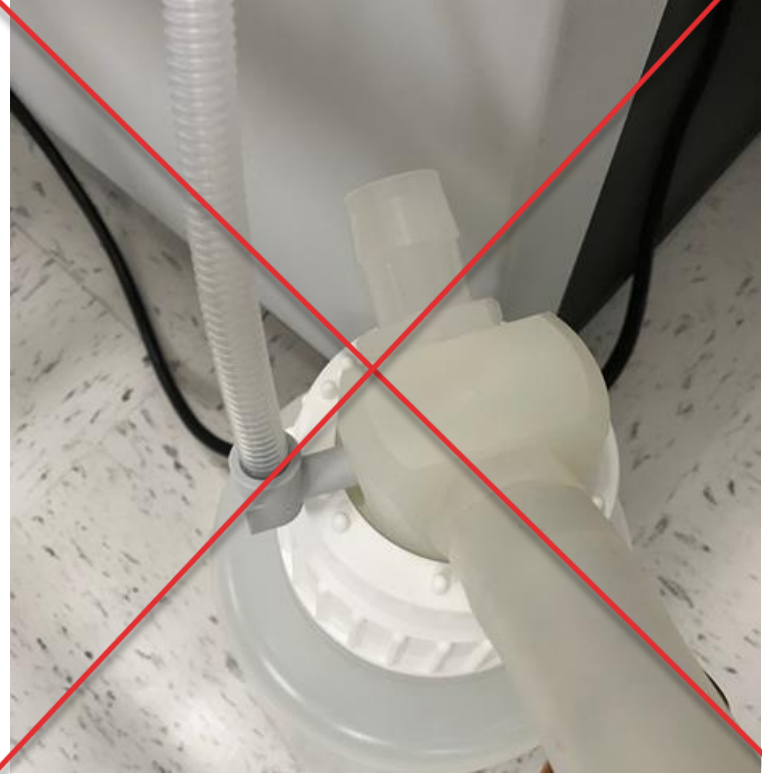
LAST STEP:
Plug the power in
the Power Out
outlet at the
instrument



Day 1 – Waste Line for Syringe Pump Holder – Don't Do:



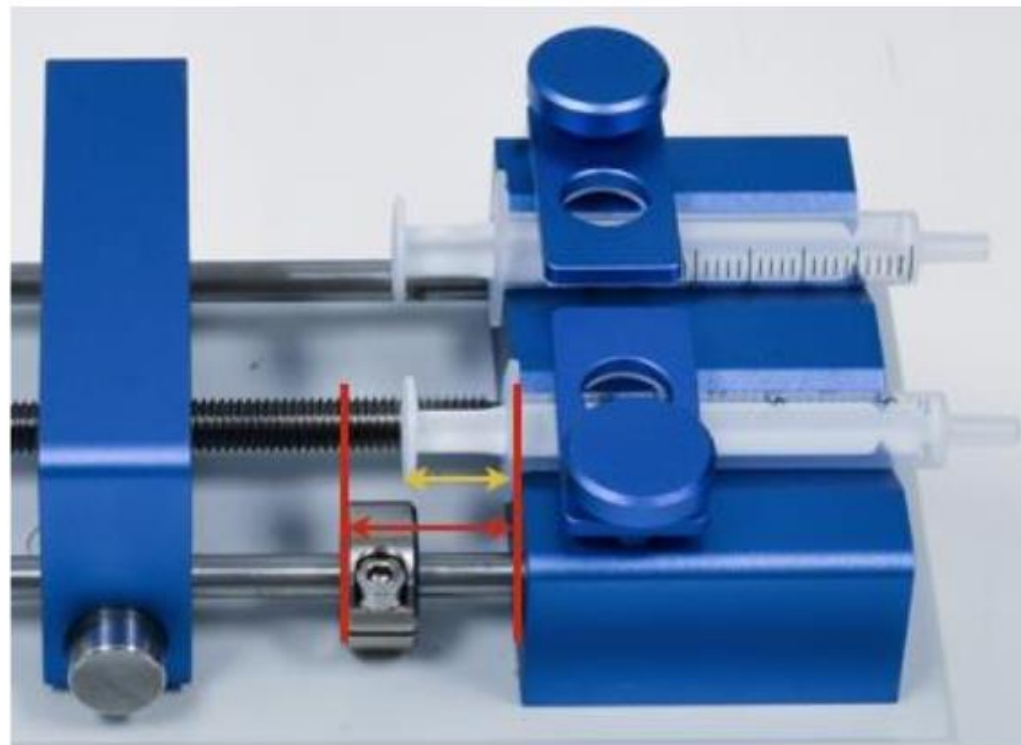
Use elbow to connect waste line



Use separate waste bottle for syringe pump holder waste.

Day 1 – Syringe pump

Adjusting the safety collar requires the use of the hex key, which is conveniently stored on the back left of the pump, right above the power switch. Loosening the hex screw on the safety collar allows for the collar to be slid freely along the guide rod and then securely tightened at the desired position. The position of the safety collar should be set slightly further from the syringe-block holder than the top of syringe plunger when fully depressed.

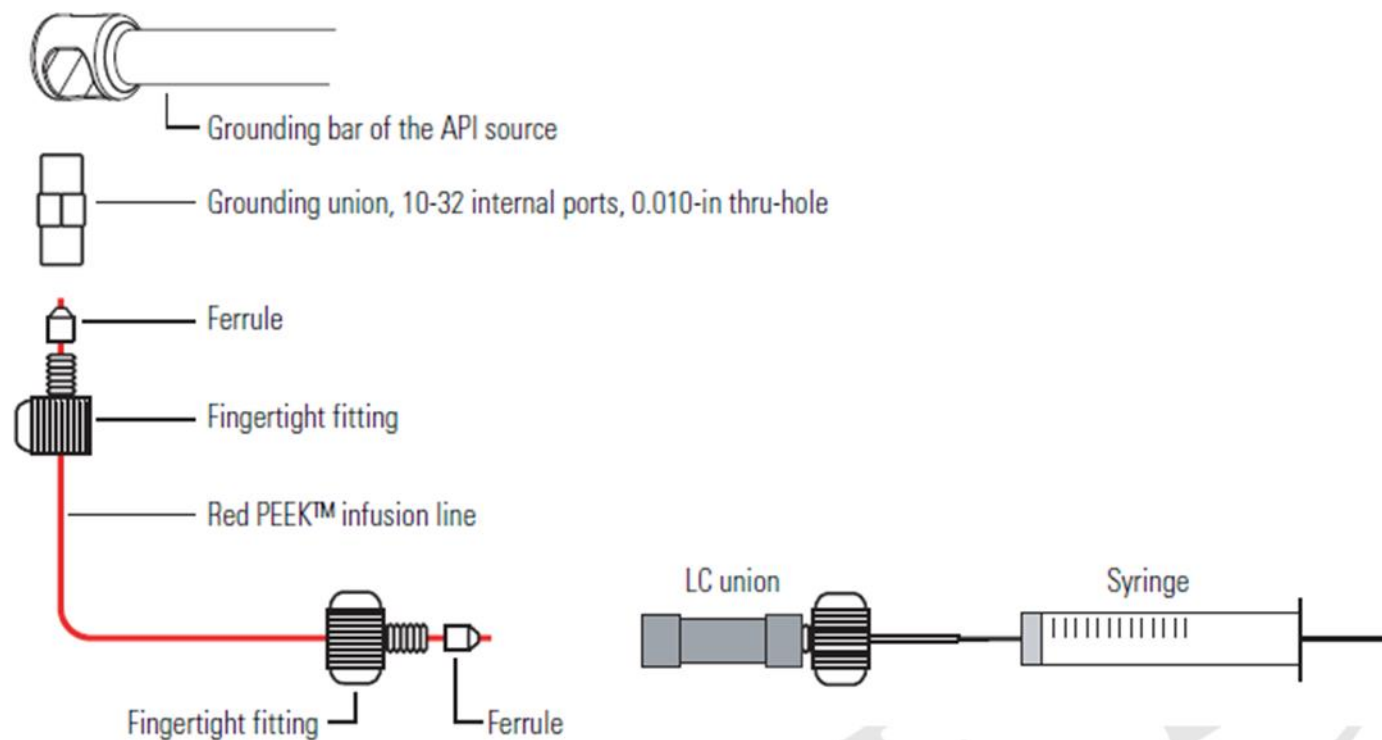


Safety collar adjustment

Information required? Refer to syringe pump manual

Day 1 – Installing the Lines

Connecting frequently used



Day 1 – Installing the Waste Bottle



to Drain/Waste port
of MS

Remove cap to
vent bottle



Straps to fix
the bootle

Ensure there is
no hosing
internal to the
bottle.

Filling/venting cap

Solvent waste
container



to laboratory
exhaust system

Waste line needs to be connected to dedicated exhaust system

Day 1 – Bake out

- Check if pump is up to speed (~1000 Hz)
- Start Bake-Out (10 h)
- Might start automatically
- System LEDs – White Flashing

Instrument	Electronics - Source Board - Cover Light Sensor - Cover is taken off (act.) - Rig
Tree Tools	
Current Scan	
Control	
System	HW Parts ID & Tracking - Electronics - Boards - Embedded FTPCU - ID data nc
Analysis Graph	
Performance	Affected: Base Calibration - Basics - Positive Ion - Analyzer Accuracy (pos) - C
Electronics	Source Board - Cover Light Sensor - Cover is taken off (act.) - Right Cover Ala
Instrument Control Board	
[USB Link]	Ok
Service Info	
[Config/ID Mem]	
Base Plane I/O	
Board Internals	
Sequence & Buffer Variables	
Broadcast & Sequence Triggers	
Supply Read Backs	
Vacuum Control	
Power-on Time (act.)	21.45 h
Analyzer HV Settling Time (act.)	0.00 min
Vacuum System Status (act.)	0x2A
HV Reported Status (set)	0x0
Turbopump Control	
Forepump Control	
Heaters	
Vacuum Gauges	
UHV Pressure (act.)	1.07e-08 mbar
HCD Cell Pressure (act.)	0.00e+00 mbar
Fore-vacuum Pressure (act.)	2.15e+00 mbar
IF Region Pressure (act.)	1.87e-01 mbar

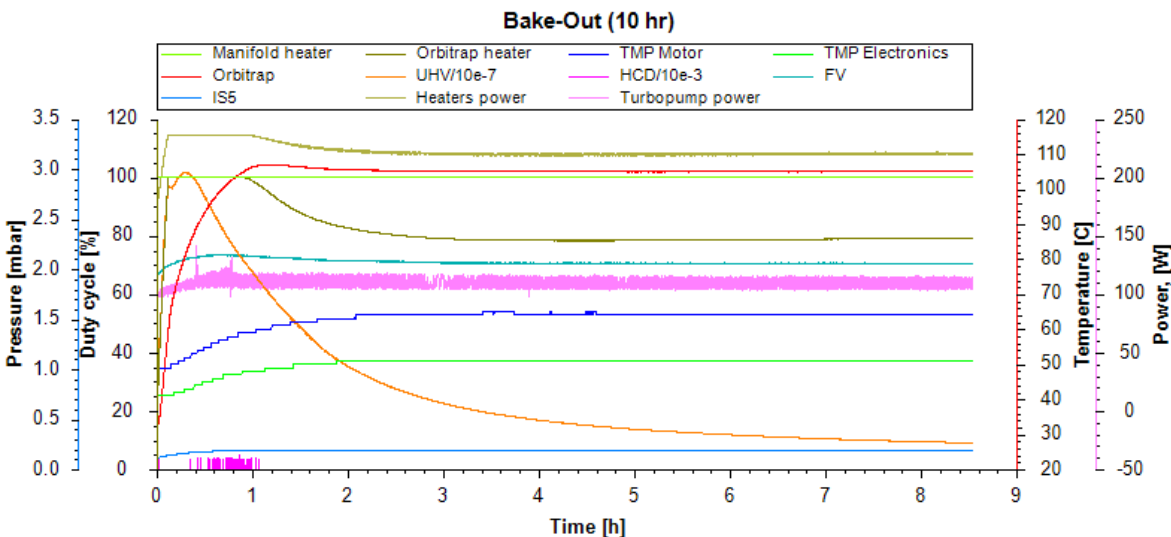
Pre-bake
Vacuum

HV Reported Status (set)	0x1
Turbopump Control	
Turbopump Flags (act.)	
Start/Stop control	0x1
Start/Stop error	no data
Turbopump Operating Hours (act.)	82 h
Turbopump Motor Temp. (act.)	47 C
RPTTempElectronic	40 C
Turbopump Speed (act.)	994 Hz
Turbopump Current (act.)	4 A
Turbopump Power (act.)	88 W
RTPVolt	24 V
RTPStatus	0x502B4
Turbopump Power Stage Temp. (act.)	
Turbopump Bearings Temp. (act.)	

After-bake
Vacuum

Vacuum Gauges	
UHV Pressure (act.)	5.49e-10 mbar
HCD Cell Pressure (act.)	1.09e-02 mbar
Fore-vacuum Pressure (act.)	3.98e+00 mbar
IF Region Pressure (act.)	1.85e-01 mbar
IS5 Region Pressure (filtered)	0.185 mBar

Day 2 – After Bake out

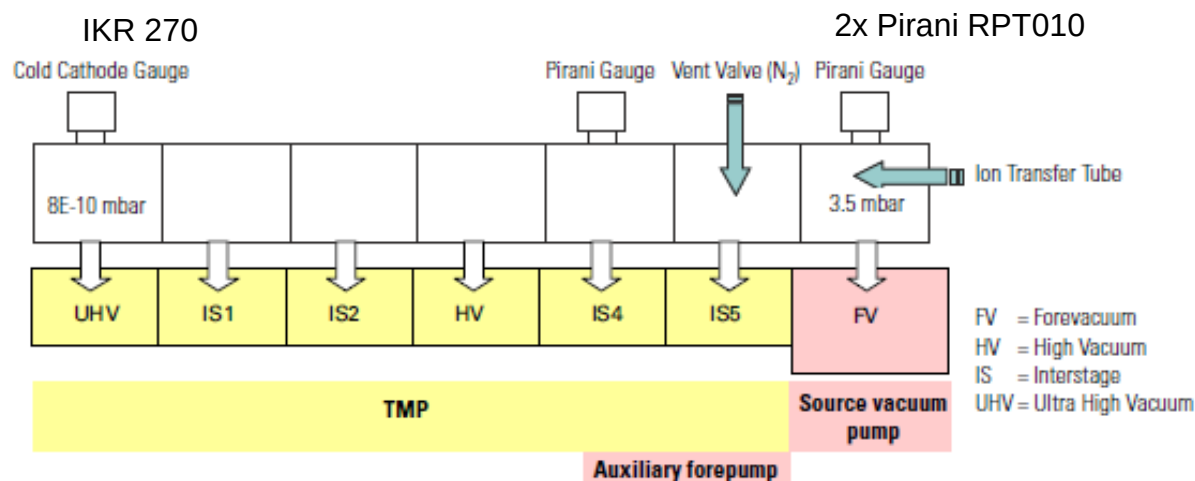


Typical vacuum pressures

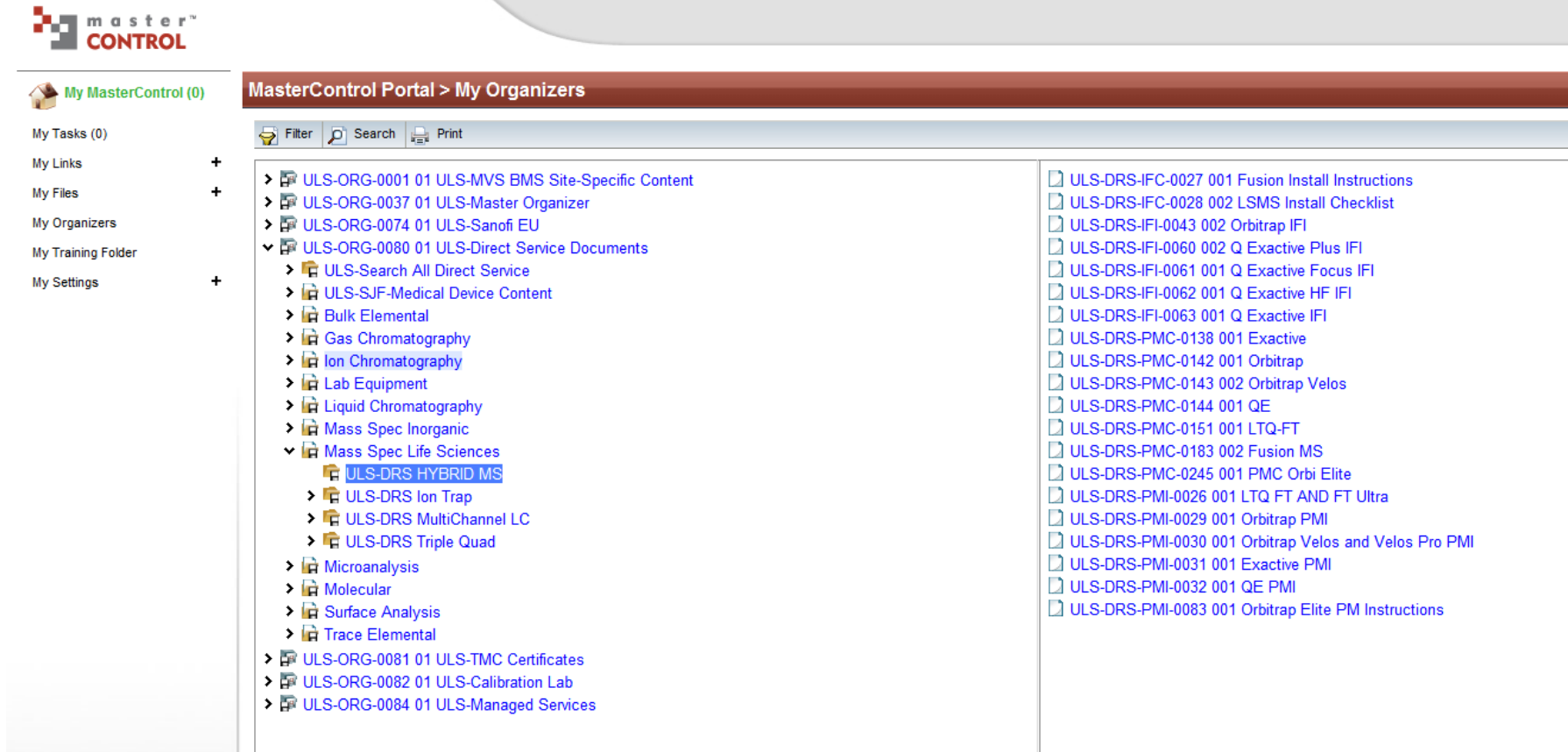
Table 2. Vacuum specification with HCD gas switch valve open

Fore pressure*	$3.7 < p < 4.5$ mbar
UHV	$\leq 5 \times 10^{-10}$ mbar
Δ UHV	$\leq 3.5 \times 10^{-10}$ mbar

HCD Cell Pressure when instrument in ON:
~1.1-1.2*E-02 mbar



Day 2 – Start the Acceptance Tests



master CONTROL

My MasterControl (0)

My Tasks (0)

My Links +

My Files +

My Organizers

My Training Folder

My Settings +

MasterControl Portal > My Organizers

Filter Search Print

- > ULS-ORG-0001 01 ULS-MVS BMS Site-Specific Content
- > ULS-ORG-0037 01 ULS-Master Organizer
- > ULS-ORG-0074 01 ULS-Sanofi EU
- ▼ ULS-ORG-0080 01 ULS-Direct Service Documents
 - > ULS-Search All Direct Service
 - > ULS-SJF-Medical Device Content
 - > Bulk Elemental
 - > Gas Chromatography
 - > Ion Chromatography
 - > Lab Equipment
 - > Liquid Chromatography
 - > Mass Spec Inorganic
 - ▼ Mass Spec Life Sciences
 - ULS-DRS HYBRID MS
 - > ULS-DRS Ion Trap
 - > ULS-DRS MultiChannel LC
 - > ULS-DRS Triple Quad
 - > Microanalysis
 - > Molecular
 - > Surface Analysis
 - > Trace Elemental
- > ULS-ORG-0081 01 ULS-TMC Certificates
- > ULS-ORG-0082 01 ULS-Calibration Lab
- > ULS-ORG-0084 01 ULS-Managed Services

- ULS-DRS-IFC-0027 001 Fusion Install Instructions
- ULS-DRS-IFC-0028 002 LSMS Install Checklist
- ULS-DRS-IFI-0043 002 Orbitrap IFI
- ULS-DRS-IFI-0060 002 Q Exactive Plus IFI
- ULS-DRS-IFI-0061 001 Q Exactive Focus IFI
- ULS-DRS-IFI-0062 001 Q Exactive HF IFI
- ULS-DRS-IFI-0063 001 Q Exactive IFI
- ULS-DRS-PMC-0138 001 Exactive
- ULS-DRS-PMC-0142 001 Orbitrap
- ULS-DRS-PMC-0143 002 Orbitrap Velos
- ULS-DRS-PMC-0144 001 QE
- ULS-DRS-PMC-0151 001 LTQ-FT
- ULS-DRS-PMC-0183 002 Fusion MS
- ULS-DRS-PMC-0245 001 PMC Orbi Elite
- ULS-DRS-PMI-0026 001 LTQ FT AND FT Ultra
- ULS-DRS-PMI-0029 001 Orbitrap PMI
- ULS-DRS-PMI-0030 001 Orbitrap Velos and Velos Pro PMI
- ULS-DRS-PMI-0031 001 Exactive PMI
- ULS-DRS-PMI-0032 001 QE PMI
- ULS-DRS-PMI-0083 001 Orbitrap Elite PM Instructions

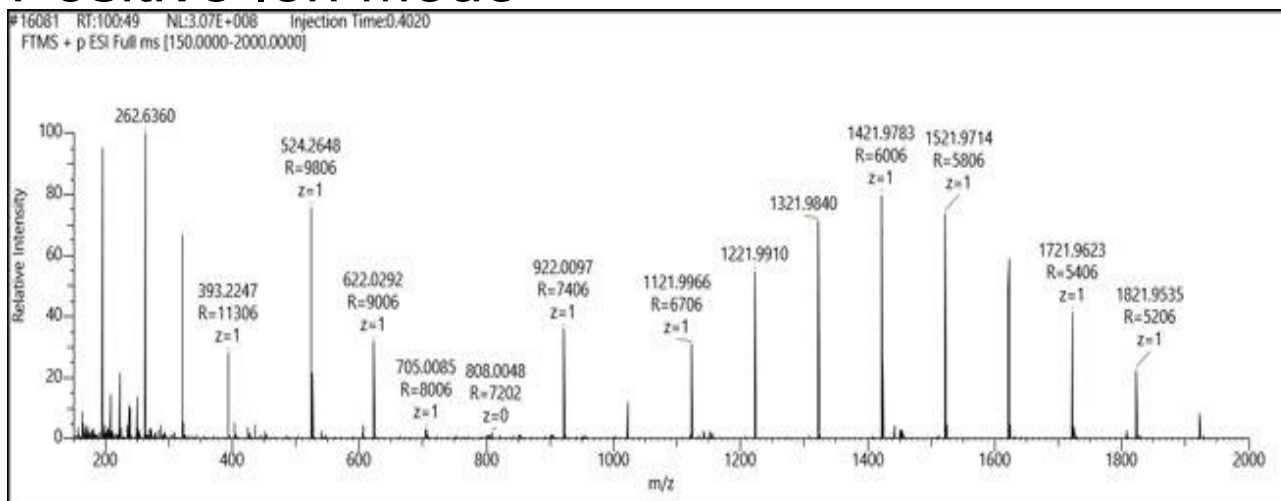
- You need the LSMS Install Checklist and the instrument specific installation & familiarization instruction

Day 2: Preparation: Stable Spray

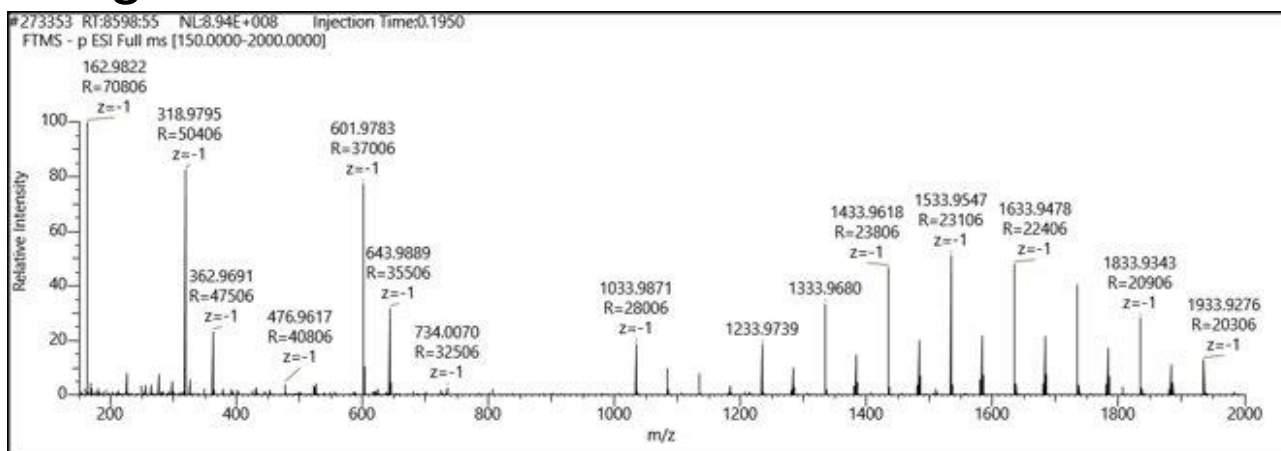
- Prepare the syringe with FlexMix calibration standard (Hazmat-01-00130; Pierce A39239)

Table 3.API source conditions for stable spray	
	Positive ion mode
Pos Ion Spray Voltage (V)	2500 to 3500
Ion Spray Current Readback*	0.4-0.5 μ A
Sheath Gas (Arb)	0
Aux Gas (Arb)	7
Sweep Gas (Arb)	0
Ion Transfer Tube Temp (°C)	320
Vaporizer Temperature (°C)	35
Funnel RF (%)	50
	Negative ion mode
Neg Ion Spray Voltage (V)	2500 to 3500
Ion Spray Current Readback*	0.2-0.3 μ A

Positive Ion Mode



Negative Ion Mode



Day 2: Calibration & Evaluations

- Run the positive Calibration and Evaluation Procedures in SDT in the status tree under Instrument → Procedures → By Sequence → Service → Installation Acceptance Procedures → Positive Ion Mode acceptance Procedure with right click and “run procedures”
- If the calibration of the collision gas “Calibrate HCD gas supply” is failing, remove the Covers on the right-hand site, pull the pre-regulator out and adjust it according to the procedure.
- If one calibration fails, the procedures will stop and has every procedure have to be restarted from the failing calibration on in the status tree
- If one or more of the evaluation are failing (procedure tree will be continued), restart the particular evaluation/s again
- Same for negative ion mode
- Either manually log the results of the procedures or take a copy of “C:\ProgramData\Thermo\Exploris\instrument\” folder to your laptop and use the report generation tool.