

Stainless Steel Glove Box with Automatic Humidity Purification

System for Li-ion Battery Assembly

EQ-VGB-5

[Operation manual](#)



860 South 19th Street, Richmond, CA 94804, USA
TEL: (510)525-3070 FAX: (510)525-4705
Web site: www.mtixtl.com Email: info@mtixtl.com

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Thank you for purchasing MTI’s products, please read this manual before using the furnace, we have no responsibility for any damage caused by misuse.

MTI has right to update the product without informing the customer which means the data in this manual may vary some time, please termly visit www.mtixtl.com for the latest information.

Safety Notes

Important Information

This manual contains important operating procedures and safety information. It is strongly recommended that the contents of this manual be read carefully for thorough comprehension prior to operating the equipment.

Warnings

To avoid electrical shock, this glove box must:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Be disconnected from the power supply before servicing.

Unpacking

1. Visually check for any physical damage to the shipping container.
2. Inspect the equipment surfaces that are adjacent to any damaged area.
3. Remove packaging materials and vacuum all dust off the exteriors of the glove box prior to use.
4. Retain the original packaging material in case returns or replacements are necessary.

Operating environment


The following points should be taken into consideration when selecting an environment for operating the machine.

1. The glove box should be placed on dry, hard and flat surface.
2. The glove box is intended for indoor use with sufficient ventilation for air to flow freely and away from direct exposure to sunlight.
3. Glove box should be placed in an environment free of dust.

Introduction

VGB-5 stainless steel glove box provides an effective alternative to Li-ion battery R&D's that involve electrolyte injection and battery case assembly. With its auto-moisture-purification system it can provide an oil-less, inert gas environment with moisture lower than **2 ppm**. Moreover, the customer can freely choose from various chamber sizes (VGB-1, VGB-3 and VGB-4) to meet various requirements.

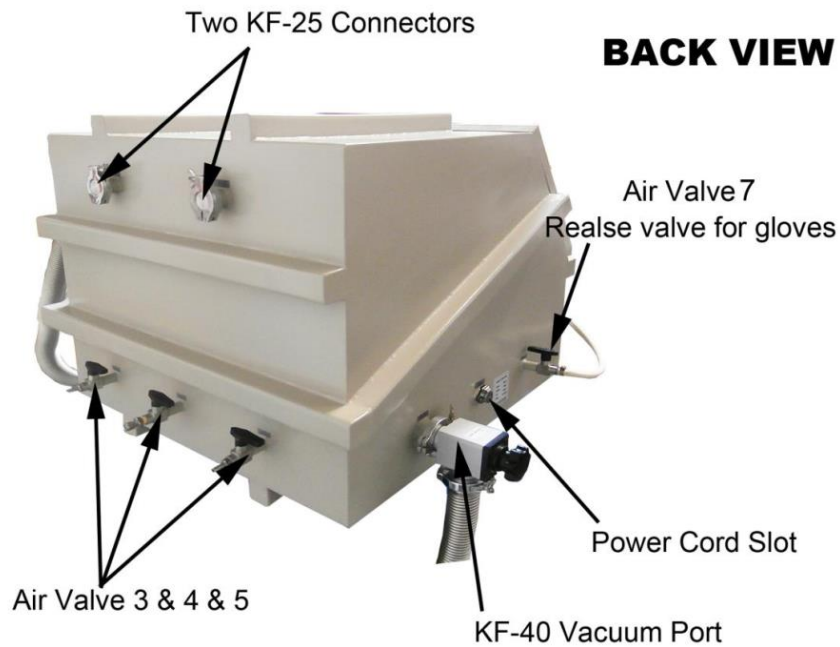
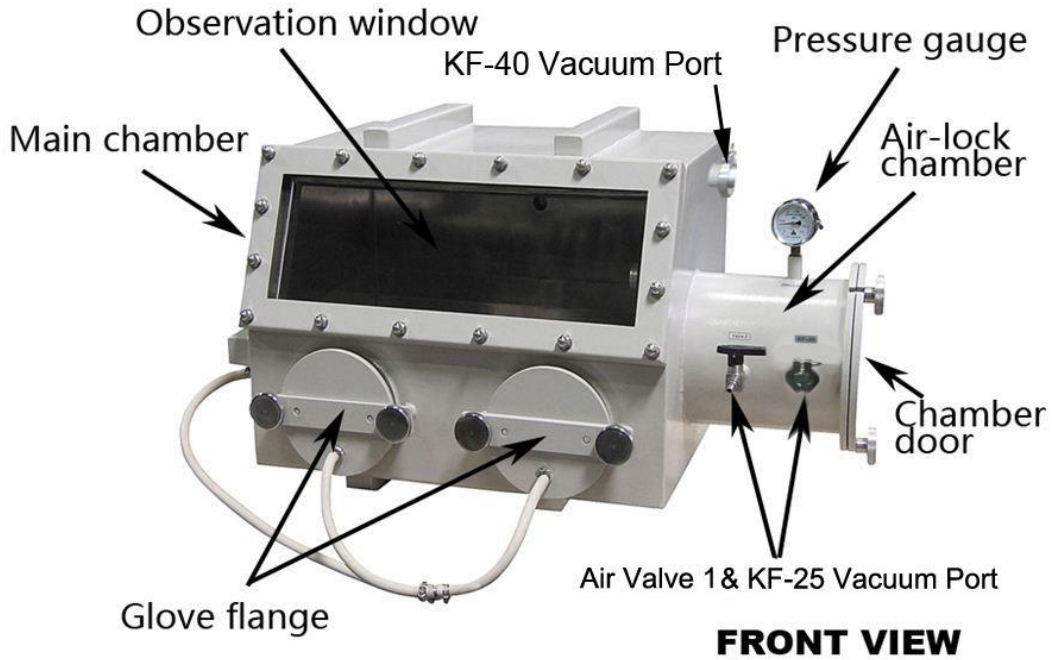
SPECIFICATIONS:

Working Voltage	220V 50/60Hz, Single Phase (110V AC is available at extra cost)
<p>Glove Box Chamber</p> 	<ul style="list-style-type: none"> Glove Box: EQ-VBG-3 Case Material: Made of 11 gauge (3mm thickness) 304 stainless steel sheet with sport frame and plastic painting, which provide heavy duty structure for vacuum Dimensions: 780mm(L) x 700mm(W) x 650mm(H) Max. Positive Pressure: 810 Torr (1.1 atm) <ul style="list-style-type: none"> Note: Gloves cannot work if pressure is higher than 810 Torr Max. Vacuum Level: 0.5 Torr <ul style="list-style-type: none"> Note: Stainless Steel case may deform at higher vacuum level
Vacuum gauge and valves	<ul style="list-style-type: none"> Two vacuum flanges are included for glove box to achieve vacuum to remove moisture and oxygen without expensive inert gas purging Do not operate under vacuum status. Vacuum process is used for purging the glove box chamber before operation. Two KF-25 vacuum fitting ports with Quick Clamps are installed in the back for connecting vacuum pump, electric/fluid feed-through, gas circulating/purifying system, or other testing equipment
Purification System	<ul style="list-style-type: none"> Automatic moisture remove to <10 ppm (Li-Ion battery assembling requires <11 ppm moisture) Precision Humidity Analyzer with KF25 Flange (0-999 ppm) is installed on the Purification System with accuracy +/- 0.1 ppm Large capacity moisture filter built in bottom of mobile cart, which can soak moisture upto 1.5kg Regeneration Temperature Controller is built in for automatically regenerating filter Automatic pressure control system is built in to keep pressure at constant level 6" color PLC touch panel is included which can set and display the humidity and pressure level. (Please click the first picture below for details) The control panel is removable, which can be placed any place for easy operation. (Please click the second picture below for details)
Purification Pipeline	304 stainless steel, KF40 port
Gases Requirement	<ul style="list-style-type: none"> Working gases: Atmospheric Gases, N2, Argon Regeneration Gas: N2

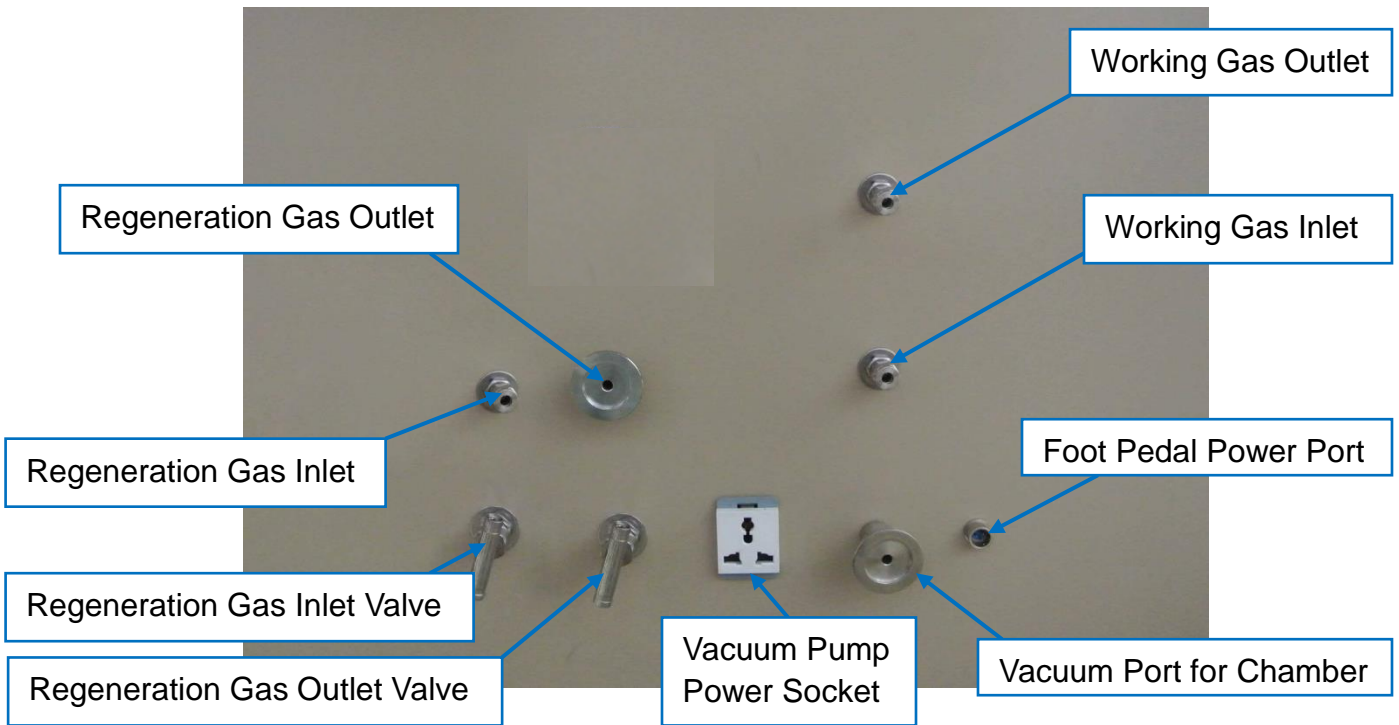
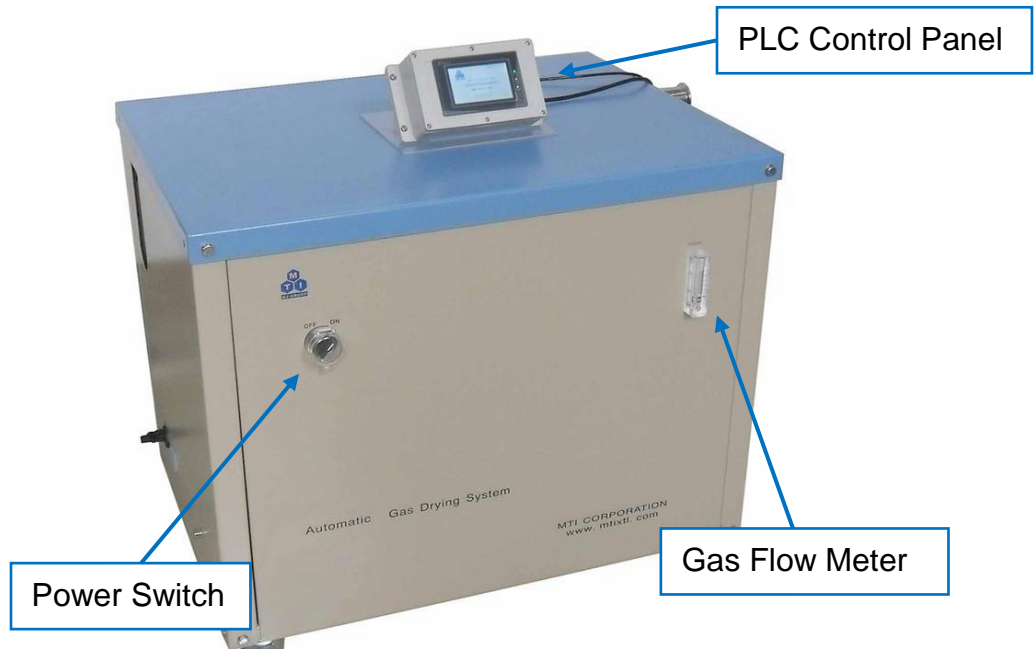
	<ul style="list-style-type: none"> One float meter built in bottom of mobile cart for accurate gas filling
Leakage Rate	< 6 Torr/hour
Power Extension	<ul style="list-style-type: none"> One extension socket (Max power 1500W) is installed in the glove box main chamber. Note: 110V power cord was included for immediate use. (For use under 208~240V power supply, no plug will be included)
Net Weight	120 kg (264 lbs)
Warranty	<ol style="list-style-type: none"> One year limited warranty with lifetime support Rusting and damage due to improper storage condition or maintenance is not covered by warranty
Application Notes	<ul style="list-style-type: none"> Always check the joints, gloves, sealing elements, and pipelines for air-tightness before and during the operation Corrosive gases are prohibited as they will damage the sensors The inlet and outlet of the Air-lock Chamber must not be opened at the same time to prevent contamination by the external gas By closing the vacuum flange, the glove box can be vacuumed by mechanical pump upto 0.5 torr before filling inert gas, (moisture can be below 180 ppm and oxygen below 200 ppm). Then you can save at least 1-2 tank of inert gas from purging at each operation Please call or email us to get price and lead time for multi-pins feed through on the glove box if you need to measure the sample inside the chamber, MTI's technician can provide a solution with no impact on sealing (leaking rate is less than 6 torr/hour) in an affordable price.
Shipping Dimensions	47" x 40" x 50"
Shipping Weight	250 kg (550 lbs)

Structure

Glove Box



Purification System

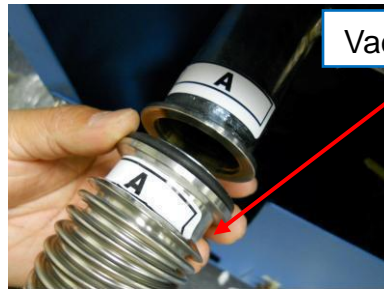


Side View of Gas Purification System (Mobile Cart)

Attention: Regeneration gas valves should only be open during regeneration process.

Installation

1. The two KF-25 connectors are used to connect two KF-25 Vacuum hose to the purifying gas station, please use clamps and refer to the pictures below.



Vacuum Port for Chamber

Note: Please assemble KF-25 Blind Flange on the vacuum port when KF-25 vacuum port is unused.



O-ring



Mount the blank flange

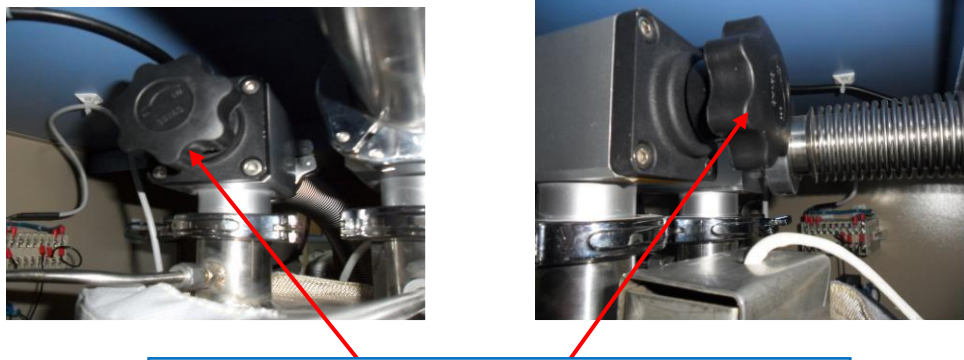
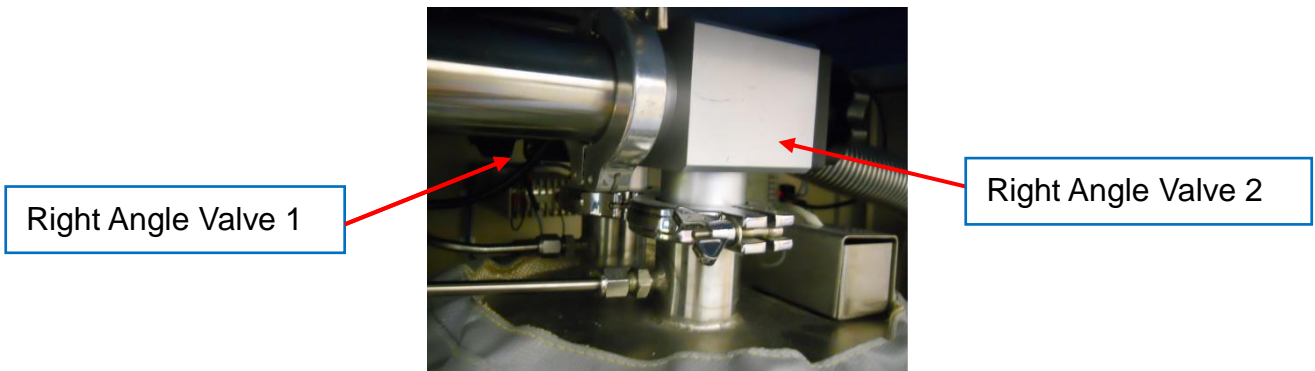
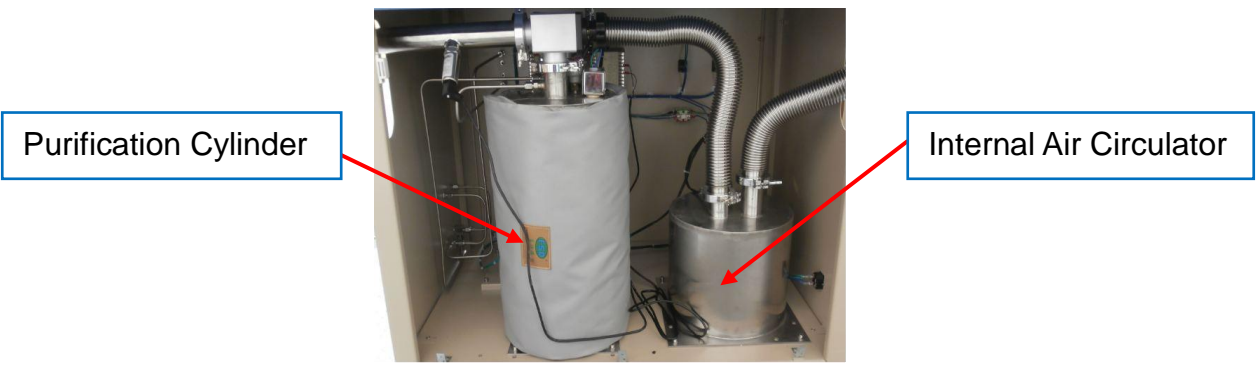


Mount the clamp



Tighten the screw

2. Open the back lid of purification system, find three right angle valves 1&2, then follow the steps below:



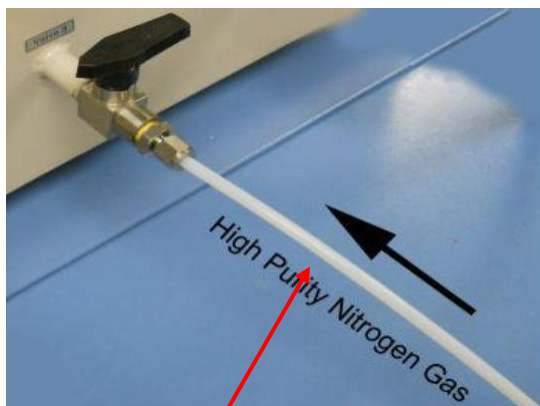
Close the Right Angle Valves 1 & 2,
Clockwise > Close; Anticlockwise > Open

Note: Step 3 Inert Gas Connection is just used for Gas Purging (please refer to “Gas Purging” part in this manual), you can skip step 3 when you use the glove box first time.

3. Connect the high purity nitrogen through PTFE 6mm air hose to air valve 4 and connect the hose of glove flange to air valve 7.



PTFE 6mm Air Hose Connect Method



PTFE 6mm air hose



Connect other side to high purity Nitrogen Gas

Make sure the gas source is well connected. For your reference, MTI uses a gas regulator shown in the picture below

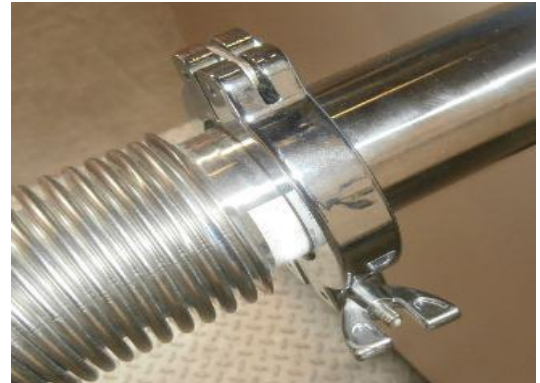
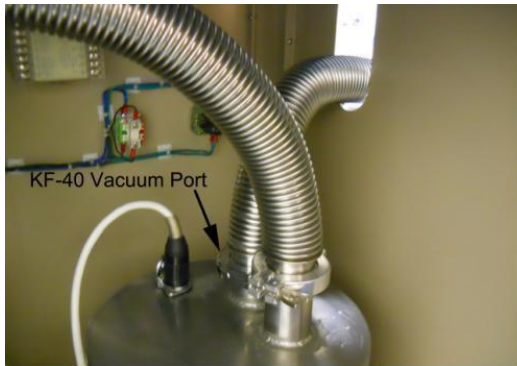
To gas tube controller



To gas source

4. Connect the Internal Air Circulator to the glove box.

Note: the ports on Internal Air Circulator is KF-40 port, please use clamps and O-ring for joining two vacuum hoses



5. Connect the purification cylinder to Air-lock Chamber.

Air valve 2 is already connected to air valve 3 at the factory. This SS tube is used to balance the pressure between the Air-lock and the glove box chamber when loading a new sample into the glove box during operation.



Air Valve 2

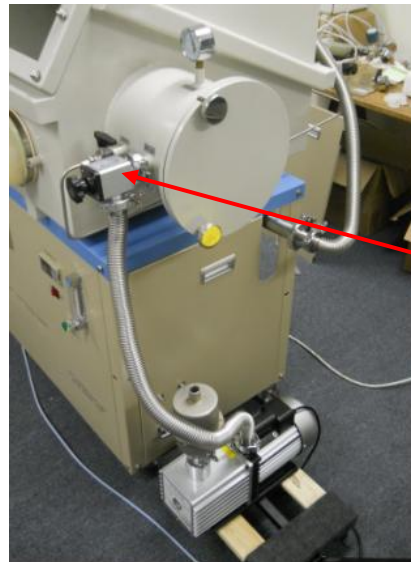
Air Valve 3



Gas Pass **Open**

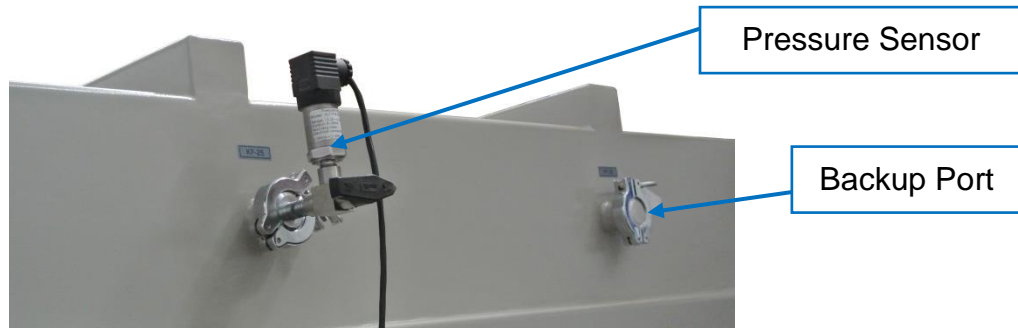


Humidity Analyzing Sensor

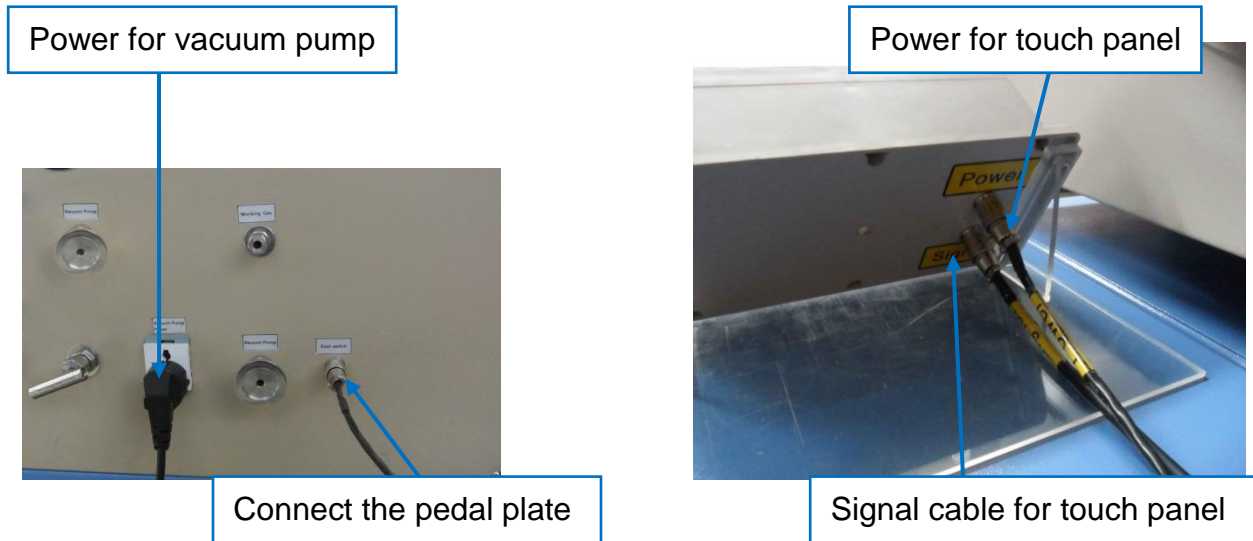


Right Angle valve
KF-25 Port
Connect to vacuum pump (**Vacuum pump is not included in the package, please order it from MTI official website**).

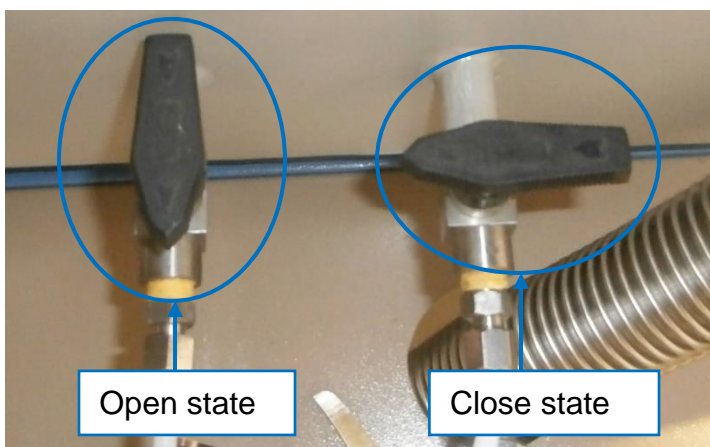
6. Connect to the Pressure Sensor



7. Connect other devices



8. Usage of On/Off Valve



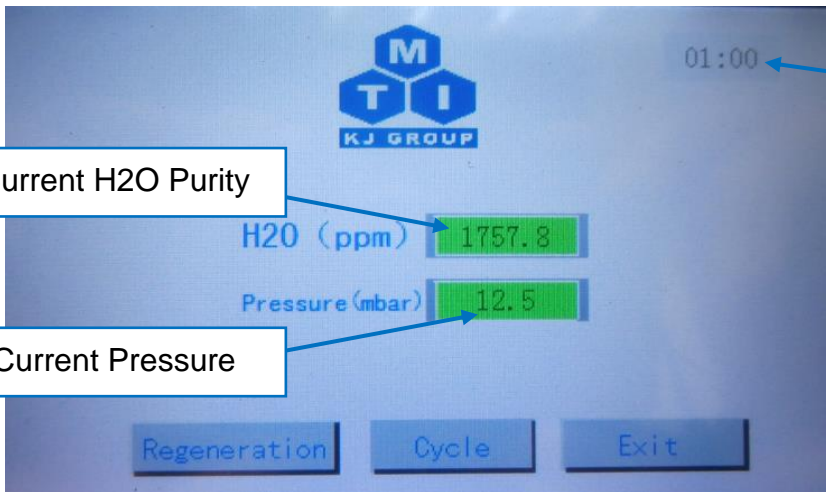
Operation

1. Operation Instruction of PLC Touch Panel

1) Introduction of the touch panel



Press 'Enter' to next screen

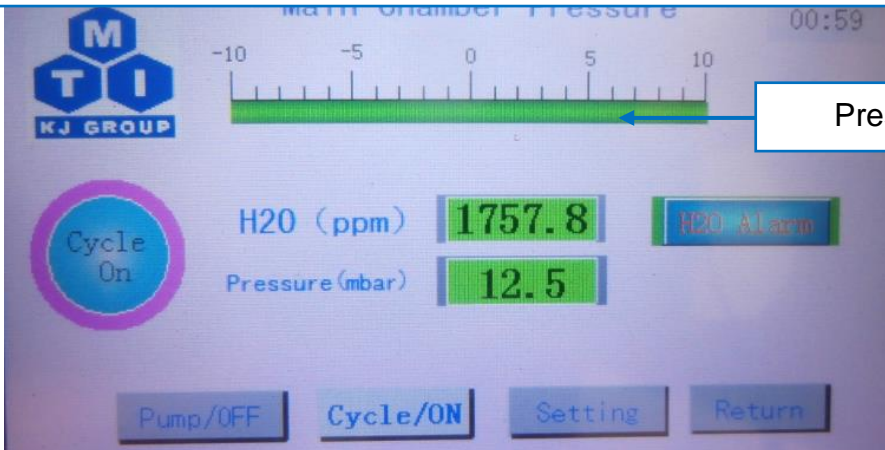


Current H2O Purity

Current Time

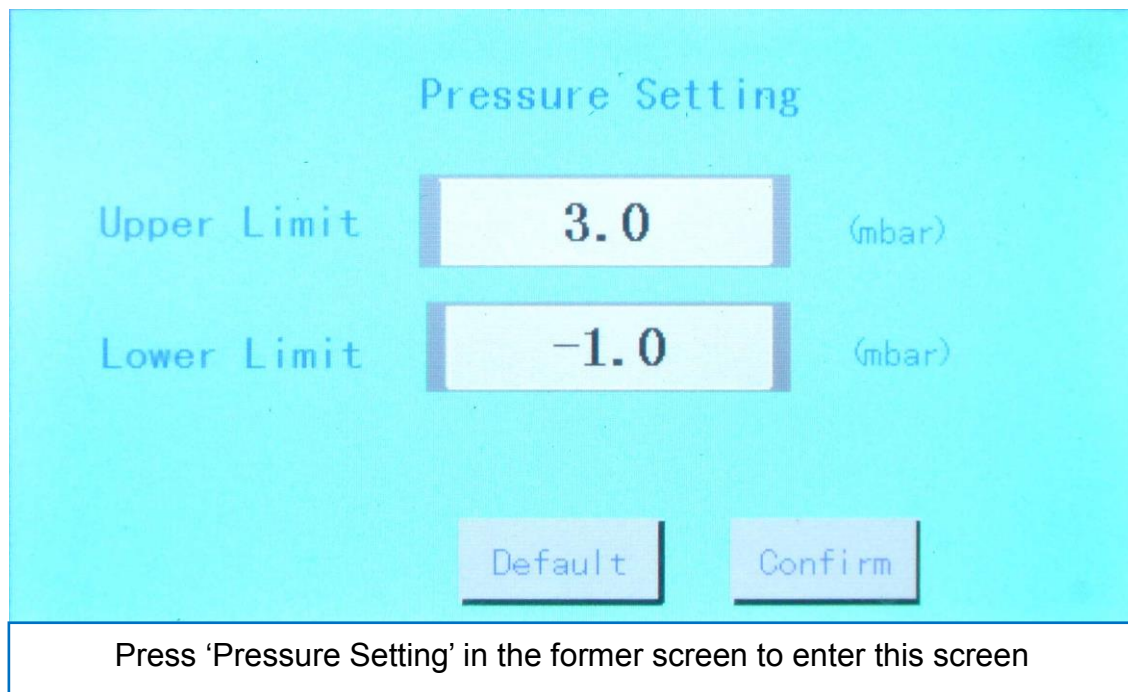
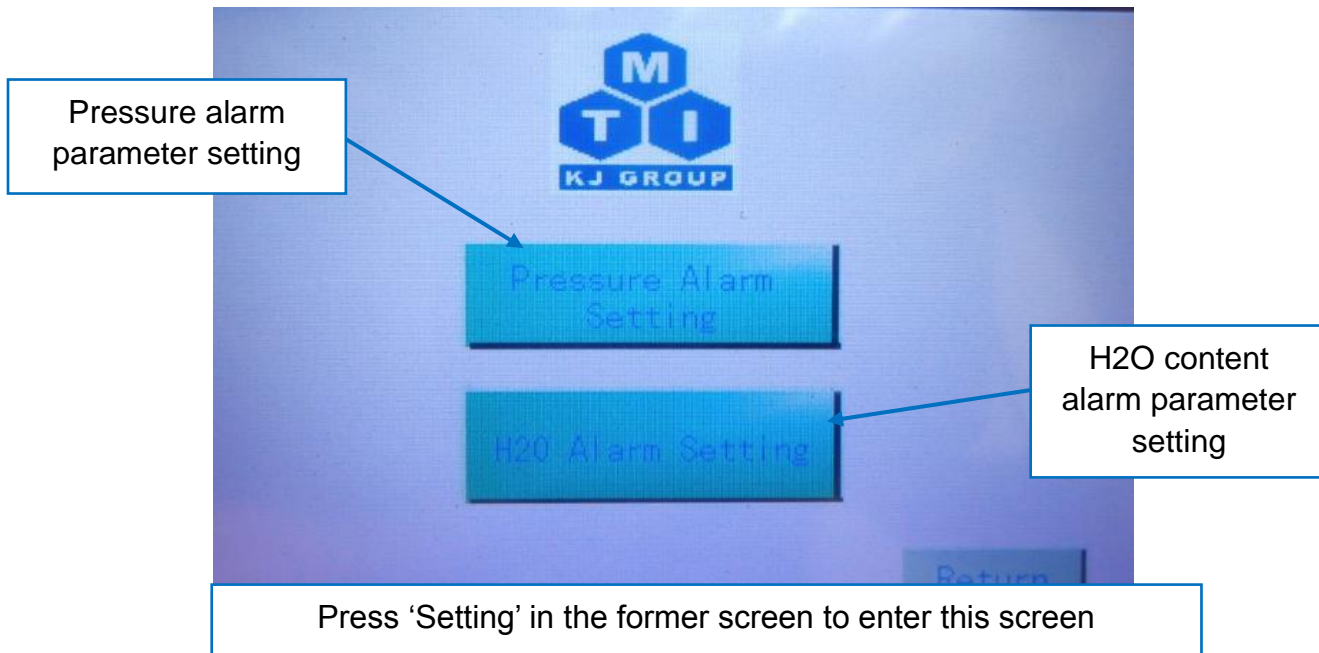
Current Pressure

Press 'Cycle' to next screen



Pressure Bar

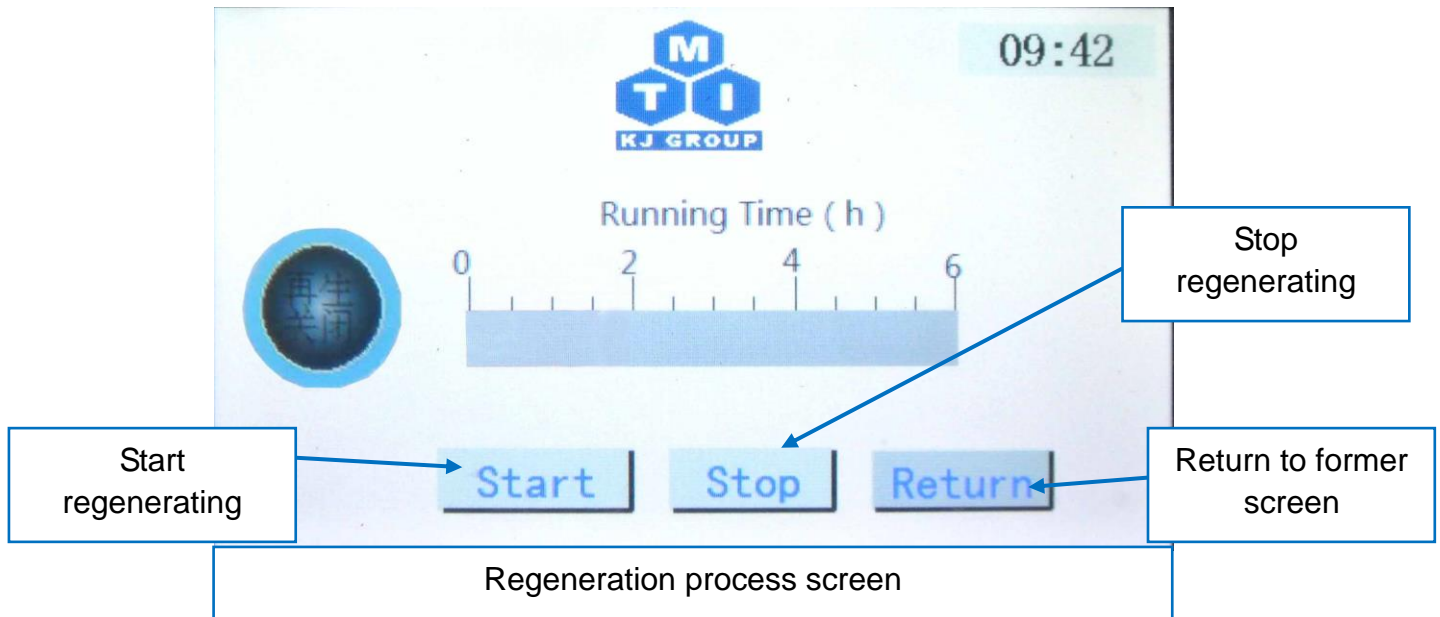
- “Pump/OFF”: On/Off button for vacuuming
- “Cycle/OFF”: On/Off button for circulation
- “Setting”: Press it to enter parameter setting screen
- “H2O Alarm”: Indicate whether the H2O content reaches the alarm limit value



- Upper Limit: Pressure upper limit alarm value
- Lower Limit: Pressure lower limit alarm value

- Default: Factory reset
- Confirm: Press it to confirm the parameter setting

2) Operation Screen



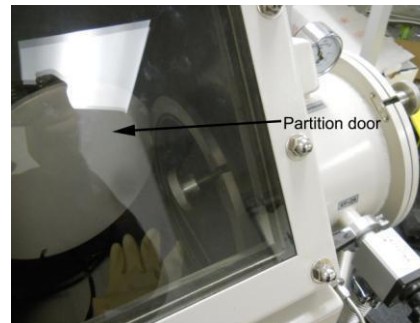
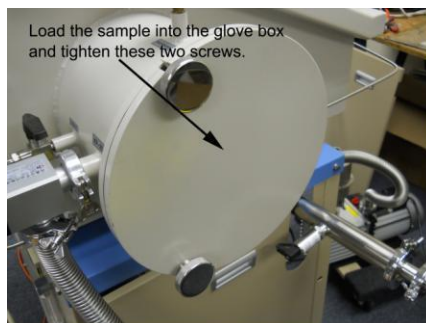
2. Pre-regeneration

After installation is finished, we strongly suggest you to do regeneration process to ensure better circulation performance before the **first time** you operating on the glove box VGB-5. ([please refer to the later section Regeneration for detail operating process.](#))

3. Circulation

Please directly do circulation step to lower the H₂O content to 1ppm, this is a more effective way for Li-ion battery R&D's where electrolyte injection and battery case assembly are necessary processes.

- 1) Open the air-lock chamber door, load the sample into the main chamber, then use gloves close the Partition door inside the chamber, then close the air-lock chamber door.



- 2) Close all the air valves, chamber door, glove box flange and check the sealing of the glove box.
- 3) Open the right angle valves 1 & 2. With the circulation path opened, the connection between the purifying cylinder and the glove box chamber is established.



Open the Right Angle Valves 1 & 2, Circulation path OPEN

- 4) Turn on the power supply and enter the PLC screen.

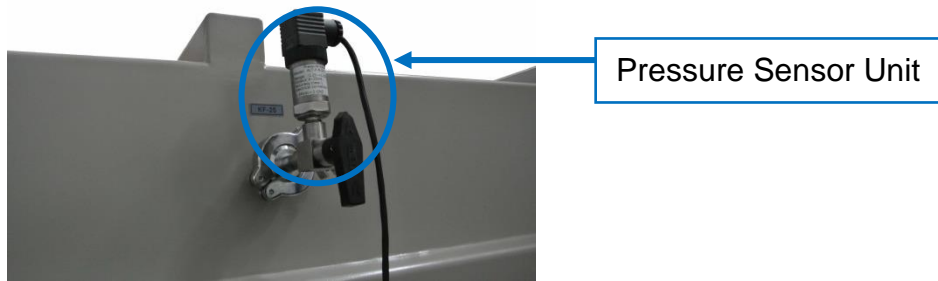


Power Switch



PLC touch panel first screen

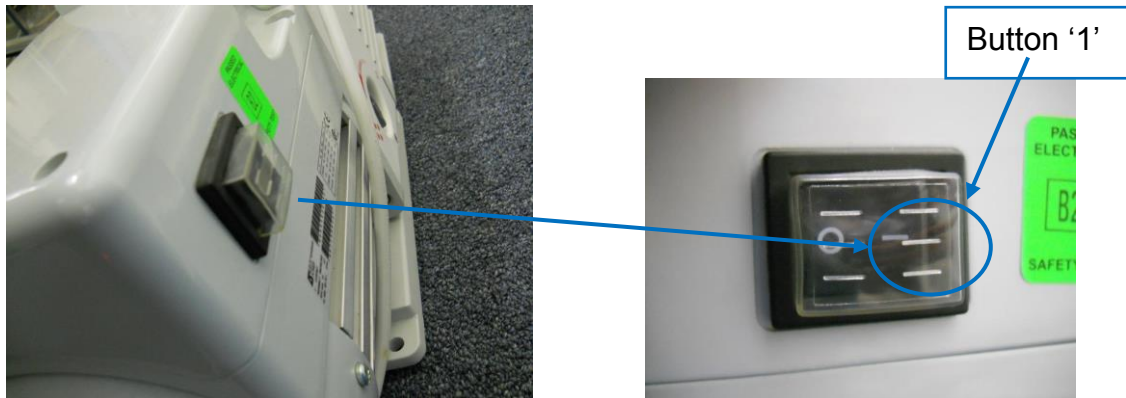
5) Open the pressure sensor unit valve



6) Set the pressure alarm via PLC touch panel:

Press "Enter" → "Cycle" → "Setting" → "Pressure Alarm Setting"
→ Press "Default" → Press "Confirm"

7) Keep the pump "power button" on 1, and the controller will automatically control it's on/off via power cable.



8) Start circulating via PLC touch panel:

- Press "Enter" → "Cycle" → "Cycle/OFF": Start circulating
- **Note1:** To achieve a concentration below 2 ppm for H₂O, the circulation time should be longer than 20 hours
- **Note2:** The humidity will be further lower as the circulation time increasing, after 48 hours circulation, the H₂O concentration will reach below 2 ppm.
- **Note3:** After 48 hours circulation time, the air pressure inside the glove box will increase a little (above the atmosphere level), please do **Vacuuming** step in air-lock chamber (**details refer to the following section**), open Air Valve 2 & 3 to balance pressure between main chamber and air-lock chamber, then observe digital pressure gauge to keep the air pressure

inside the glove box to 720-750 torr. (a little lower than the atmosphere level 760torr). At this pressure you will feel comfortable when you use gloves inside the glove box chamber.

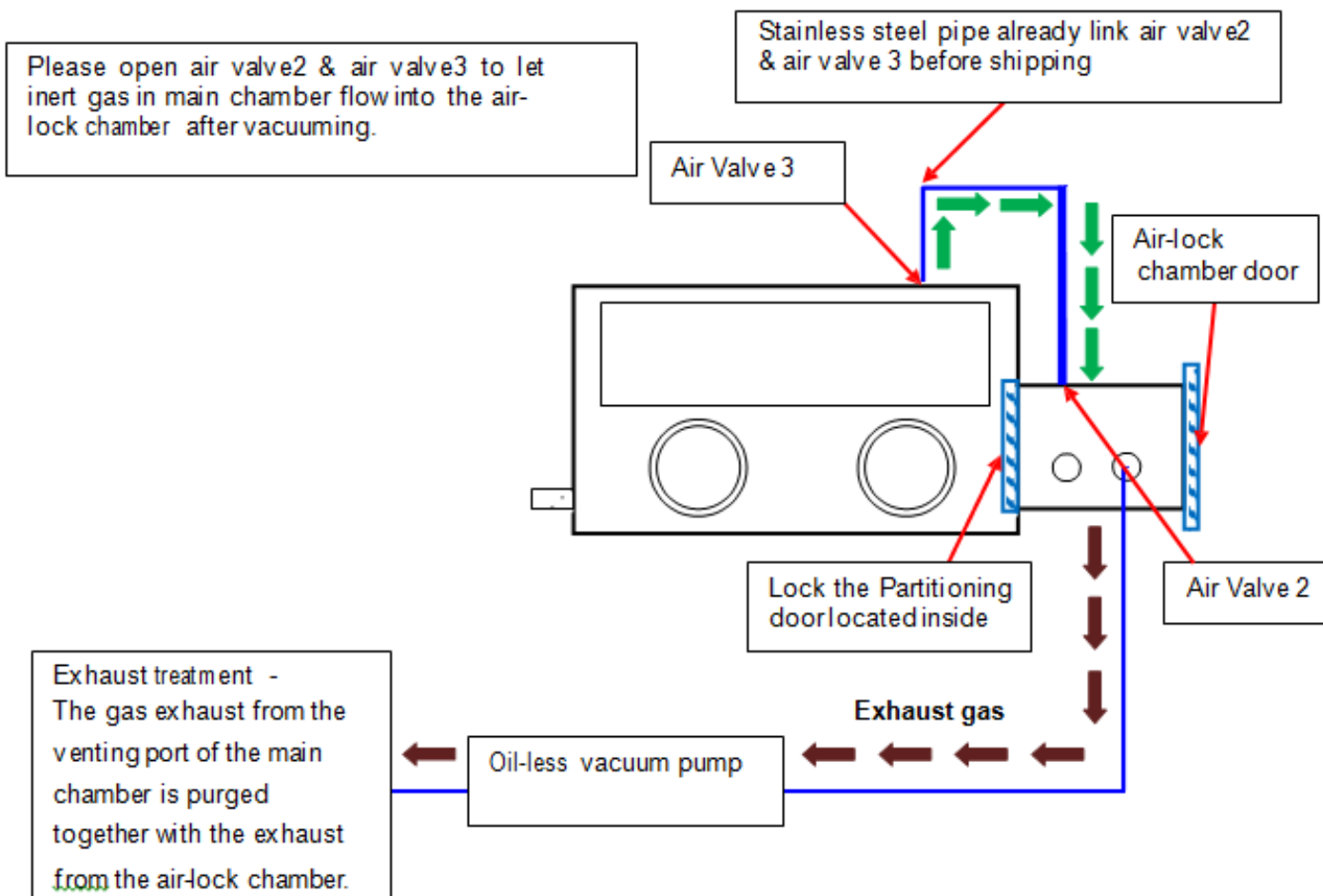
- Note4: Please keep circulate the glove box during the experiment process, otherwise the moister inside the chamber will increase significantly.
- During the operation inside the chamber, customer can use foot pedal to control the pressure inside the chamber.



MTI recommend the correct operation pressure inside the glove box is about 720-750 torr. (Micro Negative Pressure)

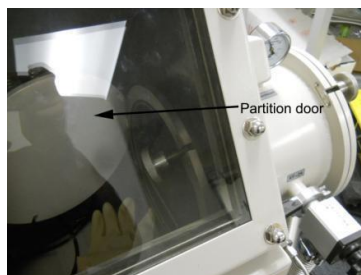
4. Vacuuming after circulation

After circulation, please do vacuuming steps to balance the air pressure inside the glove box.



Vacuum in Air-lock Chamber After Circulation

- 1) Connect vacuum pump on KF25-port 1 as picture shown above.
- 2) Close Air Valve 2 & 3.
- 3) Close the partition door (located between the main chamber and the air-lock chamber) and check the sealing.



- 4) Turn on the pump and open its corresponding valve (right angel valve) to **decrease** the air pressure till the pressure inside the air-lock chamber down to Vacuum Limit (about 20m torr)



- 5) After the air-lock pressure down to vacuum limit, wait for 5min, open Air Valve 2 & 3 to let gas in main chamber flow into the air lock chamber to increase the pressure.
- 6) Observe the digital vacuum gauge above the air-lock chamber. Wait till pressure inside returns to the atmosphere pressure (about +720-750 torr). Now the main chamber is **READY to use**.

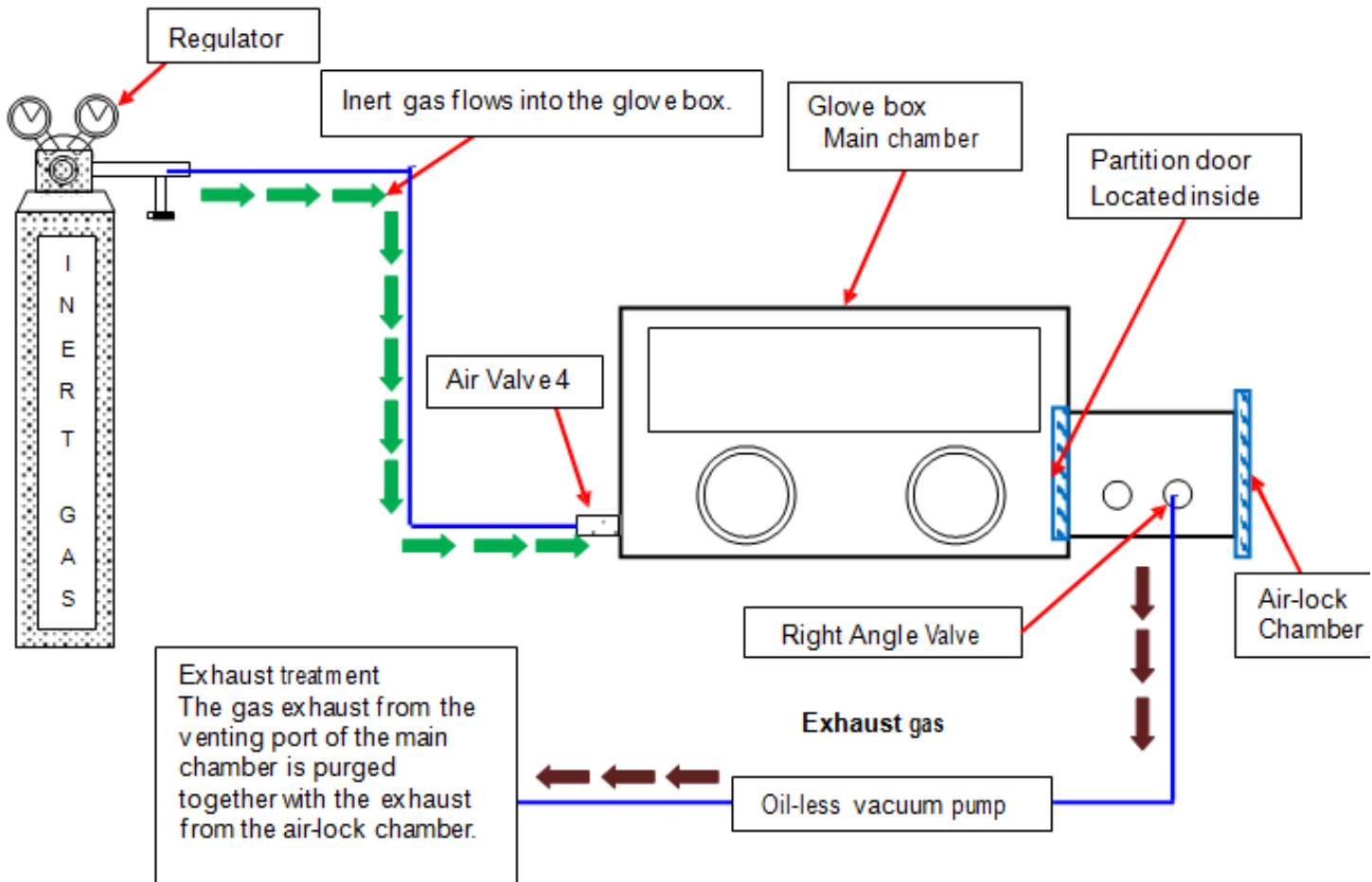
5. Sample Loading

During Li-ion battery R&D experiment, you may need to load new sample into the glove box, purging the air-lock needs to be performed each time when loading sample into the main chamber that can make sure the moisture inside the make sure won't be influenced.

- 1) Make sure the pressure inside the glove box is at atmosphere pressure (720-750 torr).
- 2) Make sure air valve 2 & air valve 3 are closed.
- 3) Close the partitioning door by using the gloves inside the main chamber.
- 4) Open the air-lock chamber door.
- 5) Place the sample inside the air-lock chamber.
- 6) Close the air-lock chamber door.
- 7) Connect the pump to the air-lock chamber and perform the vacuuming procedure.
- 8) Observe the pressure gauge and close the valve connected to KF 25 port (to isolate the vacuum pump) when the gauge reaches -0.1Mpa.
- 9) Open the air valve 2 & 3 and let gas from main chamber flow into air-lock chamber.
- 10) Close the valve 2 & 3 when the pressure inside the air-lock chamber returns to atmosphere pressure.
- 11) Repeat the step 7) to 10) several times. Finally make the pressure inside the air-lock chamber to be at atmosphere pressure (720-750 torr).
- 12) Wear the gloves to open the partition door.

- 13) Move the samples into the main chamber.
- 14) Close the partition door.
- 15) Loading finished.

6. Gas Purging and Vacuum in main chamber (optional)



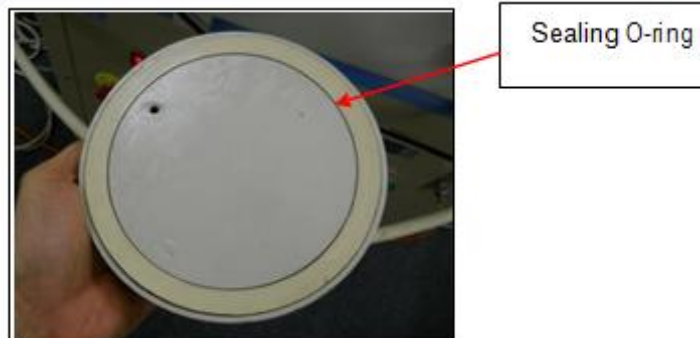
Inert Gas Purging and Vacuuming Before Circulation

This section will demonstrate the inert gas purging and vacuuming process. If conditions allow, MTI suggest you to use inert gas do gas purging and vacuuming several times before the circulation process, instead of using atmosphere air to do circulation directly. It may bring the moisture inside the glove box down to 200ppm so that it can reduce the circulation time before using.

⚠ WARNING

When do vacuuming the main chamber to decrease the air pressure. You MUST open the release vale for gloves at the left side of the glove box to keep the pressure inside the glove box and inside the main chamber in equilibrium. Or the gloves will being inflated under vacuum status and finally burst in the worst case.

Note: It is impossible to operate while vacuuming. Please always return the pressure inside the glove box to normal atmosphere pressure before opening the release valve for gloves.



Note: Please install the sealing o-rings on glove flange to avoid moisture leaking into the glove box during the vacuuming process. If possible, apply some [High Vacuum Silicone Grease](#) on the o-rings for best sealing results. Additional information on High Vacuum Silicone Grease can be found on our Website:

<http://mtixtl.com/highvacuumsiliconegreaseforsealinggloveboxeq-gb-vg.aspx>

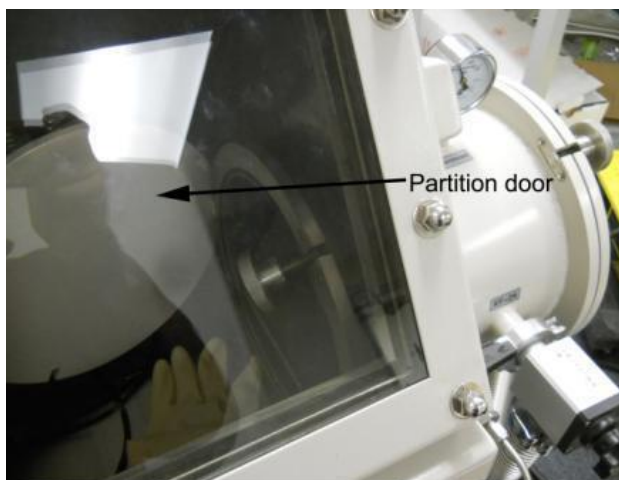
High Vacuum Silicone Grease



Tighten the screws on glove flanges to ensure pressure equilibrium

Here are the Gas Purging and Vacuuming process in main chamber:

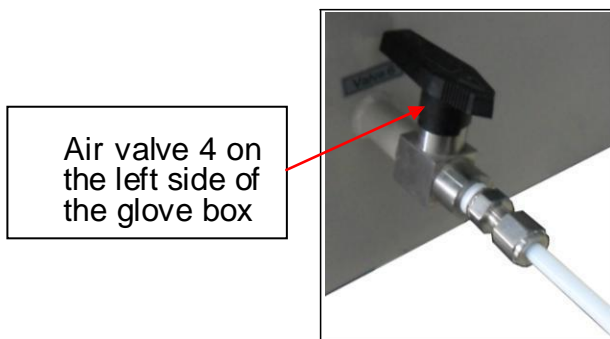
- 1) Connect the inert gas supply, vacuum pump and glove box in the order shown in the figure above.
- 2) Open the partition door (located between the main chamber and the air-lock chamber).



- 3) Open the release valve for gloves. Turn on the pump and open its corresponding valve (right angle valve) to **decrease** the air pressure till the digital gauge down to 20 mtorr.



- 4) Wait about 10-20 minutes after vacuuming the main chamber.
- 5) Open the valve in the gas supply and adjust the regulator to set the flow gas pressure to $\leq 0.5\text{Mpa}$ to **increase** the air pressure. Adjust the flow meter to set the flow rate to $\leq 10\text{L/min}$. Open air valve 4 to fill inert gas into the glove box.



- 6) Observe the digital vacuum gauge in the glove box. Observe the pressure gauge till pressure inside returns to the atmosphere pressure (about +720-750 torr)
- 7) Repeat steps 2 to 7 until H₂O contents inside the glove meet the processing requirement. (It may vary depending on the purity of the inert gas. Recommend using 99.999% purity nitrogen gas).

Note: Steps 2 to 7 should be repeated at least 3 times for achieving a concentration of around 200ppm for the H₂O content. (This reference only applies when using 99.999% purity nitrogen gas.)

Note: Gas Purging and Vacuum is also suitable for adjusting the pressure inside the glove box when pressure inside the gloves change unexpectedly.

Notes & Maintenance

1. The box should never be operated under vacuuming status as it is impossible to do so.
2. While using the glove box, please pay attention not to wear watches, rings or anything that can penetrate the gloves. Also, pay extra care not to damage the gloves with sharp objects.
3. Please always make the pressure inside the glove box return to atmosphere pressure

before opening the release valve for gloves.

4. If the glove box is leaking somewhere:
 - 1) Please check whether the air-lock chamber door has been tightened sufficiently.
 - 2) Then check the o-ring of the air-lock chamber and partition doors; replace the o-ring if damaged.
 - 3) Check the joint of the valves and pressure gauge. Apply some vacuum grease at the joints.
5. If the gloves keep inflating during vacuuming.
 - 1) First make sure the release valve for the gloves is opened completely.
 - 2) If the gloves still get inflated please turn off the vacuum pump immediately.
 - 3) Check whether the glove flanges are tightened enough.
 - 4) Check the o-ring installed in the glove flanges and replace if damaged.
 - 5) Check the pipe connecting the release valve and glove flanges.
6. Please pay attention to the inert gas left in gas bottle, replace the gas bottle before it is depleted.
7. Every valve on the glove chamber can be used for air inflation or air exhaustion.

Regeneration

The purification materials in purification cylinder will lose their effectiveness after several usages (depending on the experiment requirement). In general, if you find H₂O content above 50ppm after long circulation time, please follow the steps below to replenish the materials.

Note: Before regeneration, the circulation emergency stop button must be pressed to close the right angle valve 2 & 3 for isolating the purifying cylinder from the circulation path.



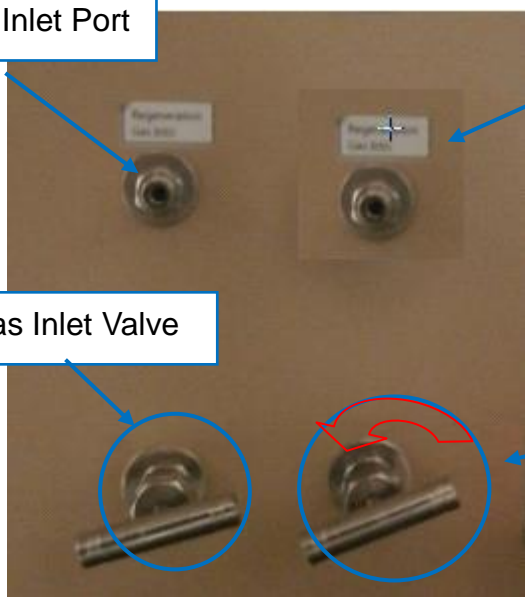
Close the Right Angle Valves 1 & 2,
Clockwise > Close; Antidockwise > Open

Regeneration Gas Inlet Port

Regeneration Gas Outlet Port

Regeneration Gas Inlet Valve

Regeneration Gas Outlet Valve



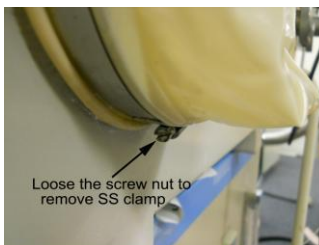
- 1) Press "Enter" → "Regeneration" → "Start": The system begins to heat, in the meantime please open the regeneration gas outlet valve to avoid over pressurization the main chamber due to gas thermo expansion from purification cylinder.
- 2) After heating 3h, open the regeneration gas inlet valve to let the regeneration gas be filled in and please continuous filling this gas for 3h.

The gas flow should be controlled between 15-20L/min shown by regeneration flowmeter. (During this process, please ensure the flow rate constant)

- 3) Close two of the regeneration gas valves and close the regulator on gas cylinder after filling the gas for 3h.

Warning:

- Please make sure the circulation program has been shut off.
- Please ensure a continuous regeneration process and regeneration gas.
- Do not touch the top of purification cylinder in case of scalding.



- If the regeneration process is stopped by accident, please do not perform any regeneration and circulation process in the next 6 hours, otherwise it'll damage the device.

Gloves Installation

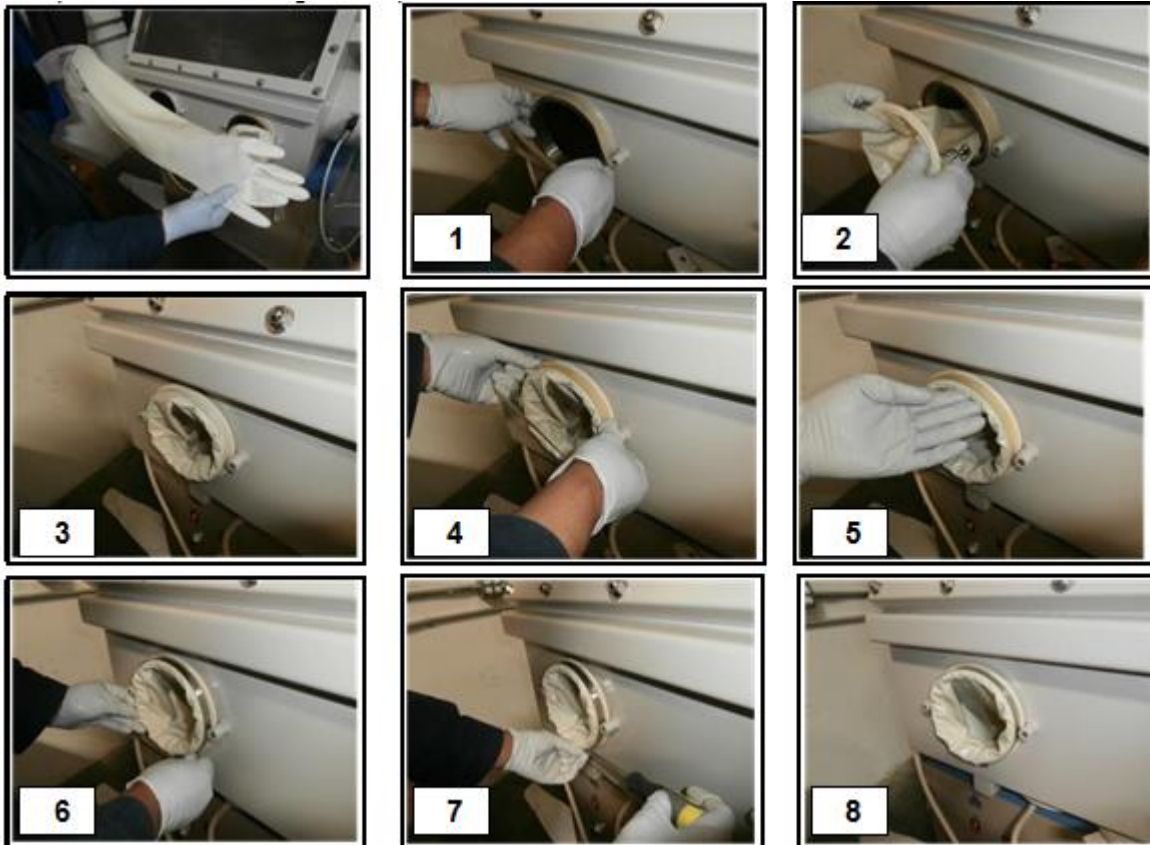
The gloves need to be replaced after the glove box has been used several times. Please follow the procedures below to replace the gloves.

- 1) Turn off the glove box and make sure the pressure inside the glove chamber is at atmosphere level
- 2) Remove the SS clamps by loosening the screw nuts and take the old gloves out off the glove ports.
- 3) Compress the new gloves as much as possible to exhaust the air inside the gloves.
- 4) Install the new gloves onto the glove ports, and check the sealing between them. If necessary, apply some High Vacuum Silicone Grease for best sealing. Apply High Vacuum Silicone Grease for best sealing.

Please visit <http://www.mtixtl.com/highvacuumsiliconegreaseforsealinggloveboxeq-gb-vg.aspx>

for more information about High Vacuum Silicone Grease.

Steps for Gloves Installation:



Quick Troubleshooting

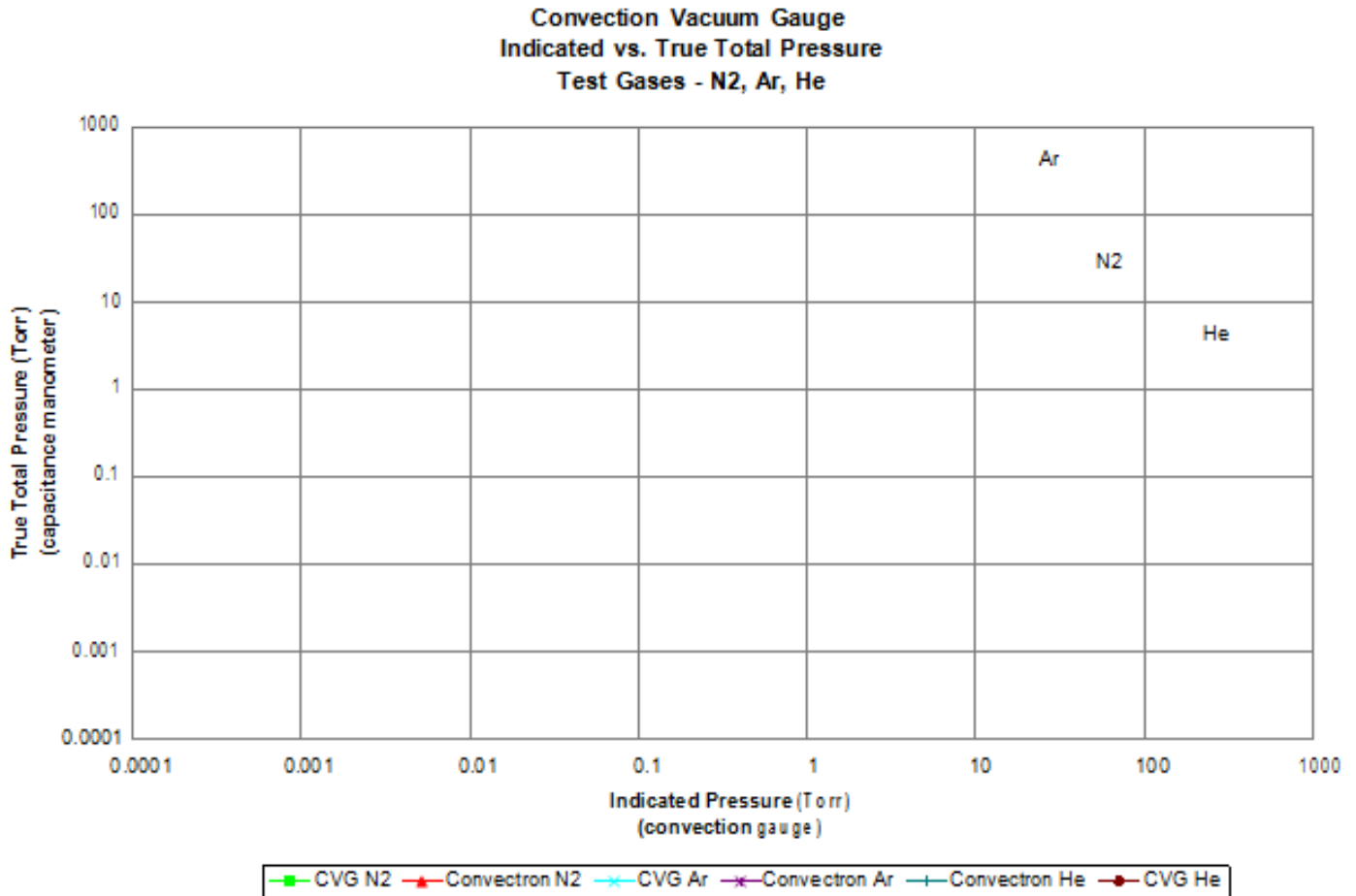
1. If the chamber leaks, check the door of the preceding chamber immediately to confirm whether it is tightened and whether the lever of the two doors of the airlock transition chamber is properly positioned into the locating slot. In case the leakage keeps on, check the vacuum gauge seat, valve, O rings of the two doors and the vacuum rubber. The O ring of the door of the airlock chamber must be regularly replaced according to the user's operation frequency.
2. If the glove blows out in pumping, check whether all the valves are open; slowly open the valves while charging inert gases, and pay attention to the condition of the glove. The gas may be pumped in or out through any one of the valve of the box.

MTI Support

1. MTI Corporation provides one year limited warranty from date that we shipped the goods. If you find any defective part caused by manufacturer please feel free to contact us. We

will replace defective part and instruct you how to change the part by yourselves during warranty period. However, MTI Corp is not responsible for any damage or consequence damage caused by misuse. After warranty, MTI will continue to provide technical support and spare parts at a reasonable cost.

- If you have any question, please contact us at info@mtixtl.com or call us at 1-888-5253070. MTI Engineers will instruct you how to use and maintain the machine.



Gas Correction Chart

The Y- Axis is actual pressure, measured by a capacitance manometer, a diaphragm gauge that measures true total pressure, independent of gas composition.

The X-Axis is the pressure reading indicated by the convection gauge under test.

The chart shows readings for an InstruTech CVG as well as for a GP Convector[®] gauge, to illustrate that the response of the gauges to these different gases is virtually indistinguishable. (Caution: Do not assume this data applies to other convection gauges, which may or may not be the same.)

If the gas is N₂, when the true total pressure is 100 Torr, the gauge will read 100 Torr

If the gas is Ar, when the true pressure is 100 Torr, the gauge will read only 10 Torr.

If you are backfilling your vacuum system with Ar, when your system reaches atmospheric pressure of 760 Torr true pressure, your gauge will be reading about 20 Torr. If you continue to backfill your system, attempting to increase the reading up to 760, you will overpressure your chamber and probably blow up your vacuum system !

If the gas is He, the gauge will read 1000 Torr when pressure reaches about 10 Torr actual pressure.

You probably won't blow up the vacuum system, but opening the chamber to atmosphere prematurely may present other hazards for both people and product.

What these examples illustrate is that, without proper precautions,

use of different gases can result in injury to personal and/or damage to equipment.

Table 1 - Non-Linear Analog Output Voltage vs Pressure, for Selected Gases

The following Stinger part numbers ending with the letter "A" provide a Non-Linear Analog output:

CVM211GAA, CVM211GBA to...CVM211GHA . Refer to next page if you have ordered a Stinger with a Log-Linear Analog output.

True Total Pressure	N	A	H	O	CO2	K	Freon	Freon	D	N	CH4
0	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
0.1	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
0.2	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
0.5	0.37	0.37	0.37	0.38	0.38	0.37	0.38	0.38	0.38	0.37	0.38
1	0.38	0.38	0.38	0.38	0.38	0.37	0.38	0.38	0.38	0.38	0.38
2	0.39	0.38	0.38	0.39	0.39	0.38	0.40	0.40	0.39	0.38	0.40
5	0.41	0.40	0.40	0.41	0.41	0.39	0.43	0.43	0.42	0.40	0.43
10	0.45	0.42	0.44	0.45	0.46	0.41	0.48	0.48	0.47	0.43	0.49
20	0.52	0.47	0.49	0.52	0.53	0.45	0.58	0.56	0.54	0.48	0.58
50	0.68	0.59	0.63	0.67	0.70	0.54	0.77	0.76	0.72	0.60	0.79
100	0.87	0.74	0.81	0.86	0.90	0.66	1.00	0.99	0.94	0.76	1.05
200	1.15	0.96	1.06	1.14	1.17	0.84	1.31	1.29	1.26	1.00	1.39
500	1.68	1.38	1.58	1.66	1.66	1.19	1.82	1.80	1.91	1.46	2.01
1	2.21	1.81	2.16	2.19	2.17	1.53	2.25	2.24	2.60	1.97	2.63
2	2.84	2.33	2.93	2.81	2.69	1.92	2.64	2.66	3.50	2.63	3.31
5	3.67	3.02	4.38	3.67	3.31	2.42	3.02	3.09	5.05	3.71	
10	4.20	3.48	5.77	4.22	3.67	2.73	3.20	3.33	6.36	4.60	4.69
20	4.57	3.80	7.31	4.62	3.90	2.96	3.30	3.41		5.40	5.17
50	4.84	4.03		4.91	4.07	3.07	3.43	3.50		6.15	5.58
100	4.94	4.12		5.02	4.15	3.13	3.61	3.66		6.48	5.72
200	5.01	4.19		5.10	4.33	3.26	3.82	3.88		6.66	5.86
300	5.11	4.28		5.20	4.50	3.38	3.93	4.00		6.72	
400	5.22	4.38		5.31	4.62	3.46	4.01	4.08		6.76	6.10
500	5.32	4.47		5.42	4.70	3.52	4.07	4.15		6.80	
600	5.41	4.55		5.51	4.77	3.57	4.12	4.20		6.84	6.34
700	5.49	4.61		5.59	4.83	3.61	4.16	4.24		6.89	
760	5.53	4.64		5.63	4.86	3.63	4.19	4.27		6.92	
800	5.55	4.66		5.65	4.87	3.64	4.20	4.28		6.94	6.51
900	5.61	4.70		5.71	4.91	3.67	4.23	4.32		7.00	
1000	5.65	4.74		5.76	4.95	3.69	4.27	4.35		7.05	6.64

Note: By design, these values are identical to the outputs from Helix/Granville-Phillips Convectron[®] gauges, Mini-Convectron[®] modules, and Controllers, so that equivalent units can be interchanged without affecting your process system or software.