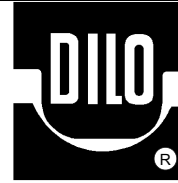


Instruction Manual

D-320-R006/B143R01 Gas Reclaimer



This instruction manual is written for:

Mini Plus SF₆ Gas Reclaimer
Model No.: D-320-R006/B143R01

Serial # : _____

Please read this manual completely before using this device. The more you understand about its operation, the better you will be able to utilize the D-320-R006/B143R01 Series.

The manufacturer does not accept any responsibility for damages resulting from not following instructions given in this manual.

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DILO Company, Inc. SF ₆ Maintenance Equipment West Pasco Industrial Park 11642 Pyramid Drive Odessa, FL 33556 U.S.A	Tel.: (727) 376-5593 Fax: (727) 372-0277 e-mail: dilo@dilo.com http://www.dilo.com
DILO Armaturen und Anlagen GmbH Frundsbergstr. 36 D-87727 Babenhausen Germany	Tel.: (49) 8333 302-0 Fax: (49) 8333 302-52 e-mail: info@dilo-gmbh.de http://www.dilo.com

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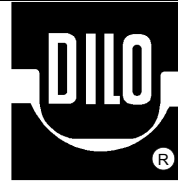


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Revision History

Date	Revision Description	Comments
06/18/12	Update of Instruction Manual	Reinhold Probst

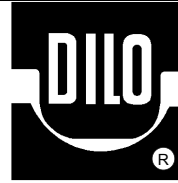


IMPORTANT GENERAL SAFETY PROCEDURES

- All hoses may contain gas/liquid under high pressure. Disconnect hoses with extreme caution and replace damaged or worn parts immediately.
 - Always open ball valves slowly.
 - Do not recover SF₆ into a non-refillable tank. All recovery tanks must be designed for at least 725 psig (50 bar) with) ***. Max. filling ratio of 1 kg of SF₆ per 1l storage volume is to be adhered to!**
 - DO NOT fill the cylinders beyond the recommended fill weight.
 - Never store the B143R01 unit with more than 500 PSIG internal pressure. Cylinders however, may be left fully pressurized.
 - Disconnect power supply before servicing. Replace frayed worn or damaged power cords immediately.
 - Do not use the B143R01 or any of its components for any functions other than those described in this manual.
 - If the recovered SF₆ contains any decomposition by products, storing the Mini Plus with this gas can lead to excessive corrosion and damage to internal components. Immediately after completing the process the system should be flushed by recovering a minimum of 5 lbs of clean/new SF₆
- * Appropriate DOT approval (i.e. DOT 3AA 1800 or greater) required for transportation within the U.S. and Canada.**
For other countries, use storage vessels that meet that country's code.

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B143R01 Overview:

Primary Functions

The primary functions of the B143R01 SF₆ gas reclaimer are:

- Recovery and liquid storage of SF₆ (Sulfur Hexafluoride) gas from insulated equipment.
- Cleansing/filtering of SF₆ during the recovery/storage process.
- Refilling of SF₆ into enclosed equipment containing SF₆.
- Cleansing/filtering of SF₆ during the refilling process.
- Air evacuation using the on-board vacuum pump.

Additional Functions

The B143R01 can also perform additional functions like:

- Self-evacuation/cleanup.
- Transferring SF₆ from one storage vessel to another.
- Top off enclosed equipment containing SF₆.

Key components and functions:

Component	Functions involved
Two Oil-less compressors	Pumping/compressing of SF ₆ gas
Filter/dryer cartridge	Removal of moisture and gaseous decomposition products from SF ₆
DILO Self-sealing ports	Connect hoses to unit without gas loss
Pressure regulator	Safely backfilling SF ₆ into equipment to correct operating pressure
Solenoid valves	Electronically controls direction of gas flow
Ball valves	Establish gas paths to equipment, storage tanks, etc.
Pressure gauges	Monitor operating conditions, i.e. breaker pressure, tank pressure, backfill pressure, etc.
Vacuum Pump	Removing air from serviced equipment
Inlet filter	Removing of particles and dust from SF ₆



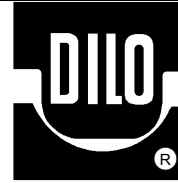
Familiarize yourself with the B143R01

The B143R01 processing unit has been engineered to be a self-contained unit. It contains all equipment and features needed for safe, easy and successful SF₆ recycling. Like all machinery, it is essential for the operator to be familiar with the various components and their functions.

- The B143R01 control panel utilizes a two-position, four-way valve. This four way valve is used to route the gas flow between the functions “Filling of SF₆” and “Recovery and Storing of SF₆”
- All other valves are solenoid valves and do not require any manual operation.
- All four temporary connections on the control panel are DILLO self sealing VK/BG-03/8 connectors. Cylinder connectors are standard SF₆ cylinder connections depending on the region where the unit was dedicated for (for North America these will be CGA-590 nipples).
- Each of the four ports on the control panel has separate, distinct functions (filling, recovery, air evacuation, and external storage).
- The gauges located on the compressor units (7a + 7b) are inlet pressure gauges only. They do not reflect discharge pressures (shown on COMPRESSOR OUTLET PRESSURE gauge). During parallel operation, both gauges should indicate identical readings. While in series operation, the compressor on the left side may have a lower pressure reading than the right compressor.
- The “SF₆ Recovery” connection port is equipped with a pressure regulator. This limits the maximum pressure that can be applied to the inlet of the compressor units to 7 bar / 100 psig.
- If the gas pressure in the connected gas volume is lower than 7 bar / 100 psig the pressure regulator is automatically by-passed to ensure maximum possible suction speeds.
- On each compressor, a red light designates “HIGH PRESSURE CUT-OFF”. If these illuminate, the compressor has generated its maximum pressure. The compressors will restart once the high pressure is removed.
- There are four breakers on the side of the control cabinet, one controls the main power of the unit, and the three others protect major components.
- The compressor units also employ an internal protective relay, which trips if the compressor cannot start. This relay will automatically reset after approx. 10 minutes.
- An SF₆ scrubbing filter (15) is used during recovery and refilling processes. The filter material can adsorb gaseous SF₆ by-products and moisture from the processed SF₆ gas. The filter core must be replaced periodically (see section “Maintenance: SF₆ Filter page 22)
- An adjustable pressure regulator (12) is used to fill a connected gas volume to the desired pressure. The fill pressure can be monitored by the fill pressure gauge
- The vacuum pump (1) is used for evacuation of air and moisture. It is equipped with a solenoid valve (3) that interrupts gas flow if the pump is turned off. This eliminates siphoning of vacuum pump oil back into the connected gas volume. An electronic vacuum indicator (2) is used to monitor the vacuum.

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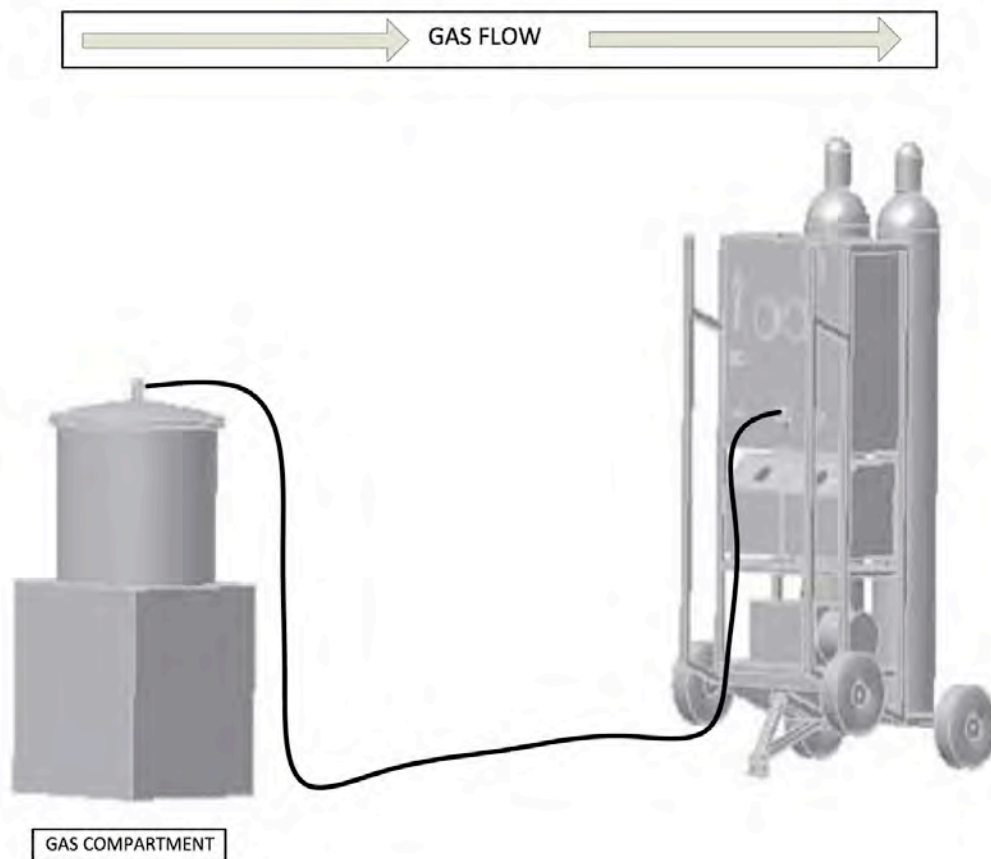


General Operating Procedures

The B143R01 is designed to safely perform all functions associated with SF₆ reclaiming from SF₆ insulated equipment such as circuit breakers. The reclaimer is connected to the SF₆ equipment using a flexible hose with self-sealing fittings on both ends. SF₆ gas cylinders provide the storage medium.

Recovery of SF₆

The SF₆ gas from the equipment is pumped into the storage vessel via the processing unit's oil-less compressors.



During this recovery process, the SF₆ gas passes through filters to remove foreign particles, moisture and decomposition products.

The temperature of the SF₆ gas is reduced by an air-cooled radiator before entering the storage tank, this allows maximum use of the storage capacity. The oil-less compressors can achieve a pressure differential of 50:1 when in parallel, and 1000:1 when in series. In other words, if the SF₆ pressure in the storage tank is 35 bar / 500 PSI, the final pressure within the circuit breaker is 50 mbar (35 mmHg). The compressors can generate a maximum pressure of 50 bar / 725 PSIG. Each compressor alone, however, can only pull down to 1 bar / 15 psig in the breaker, while maintaining 50 bar / 725 psig output pressure. To overcome this limitation, the compressors automatically switch into series when the pressure in the breaker drops between 0.4-0.7 bar /

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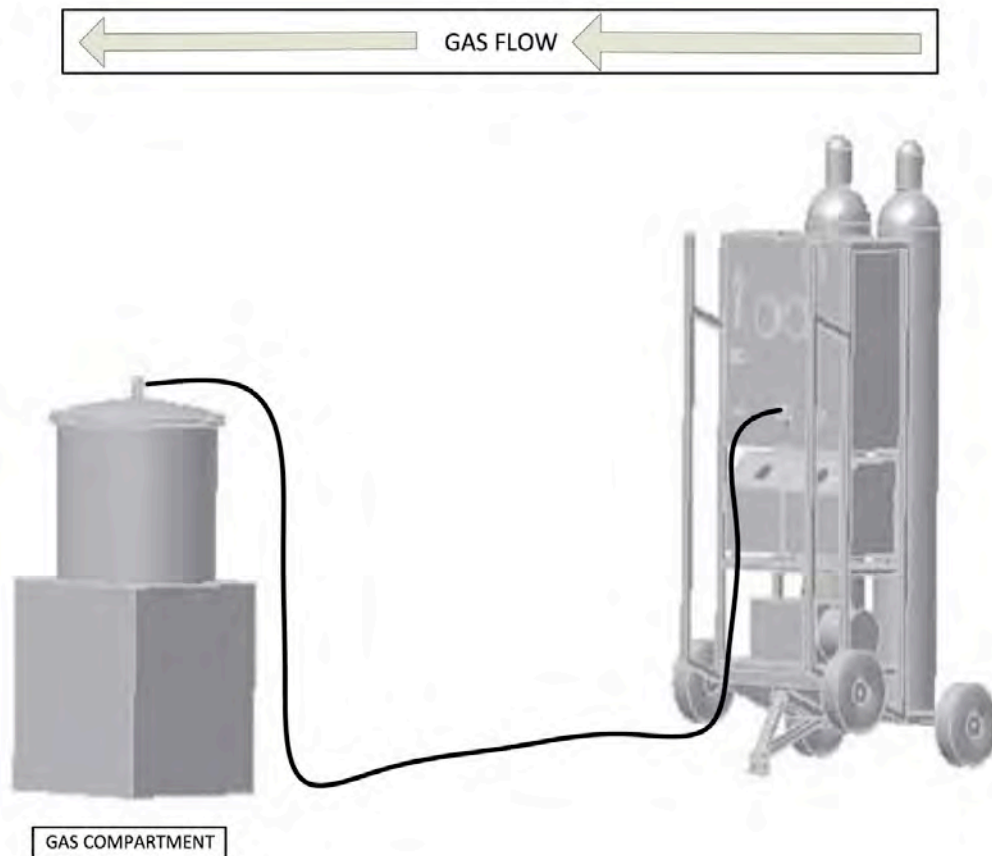


5 -10 psig. This allows one compressor to obtain 50 bar / 725 PSIG, while the other achieves a very substantial vacuum.

Evacuation of Air

Using the on-board vacuum pump, the B143R01 can remove air and moisture from gas insulated equipment prior to refilling with SF_6 . Prior to any refilling, the operator must confirm that a sufficient vacuum has been obtained. Without this step, considerable air contamination may result.

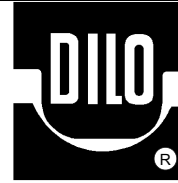
Filling Breaker with SF_6



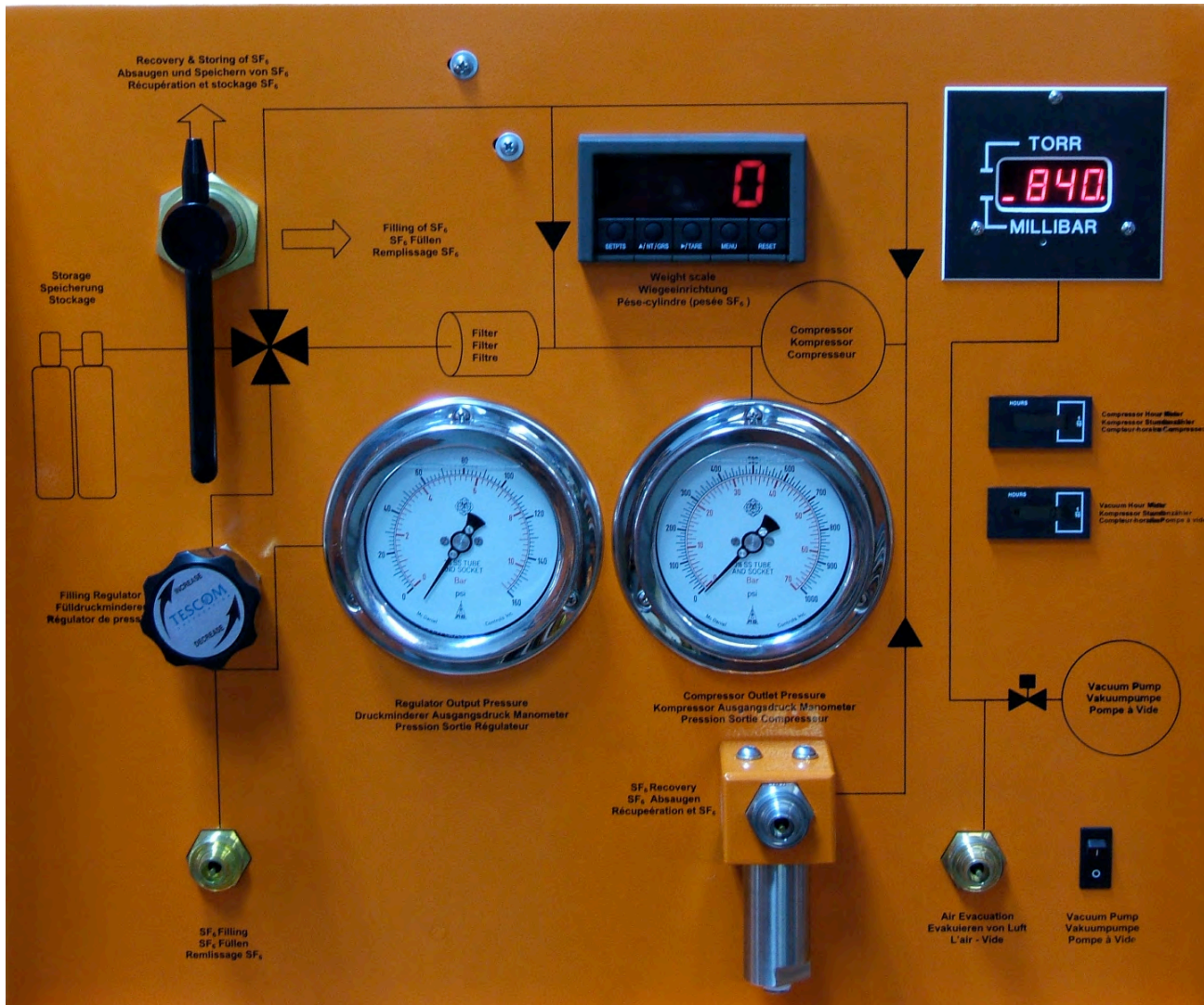
The B143R01 can also fill from a storage vessel into the enclosed equipment. The function "Filling" allows SF_6 gas from the storage tank to be filled through a self-contained pressure regulator into any enclosed equipment. If the breaker is not under vacuum before filling, it is essential to evacuate air and moisture using the installed vacuum pump (on bottom shelf of dolly).

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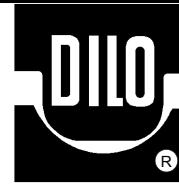


Operating Panel – B143R01

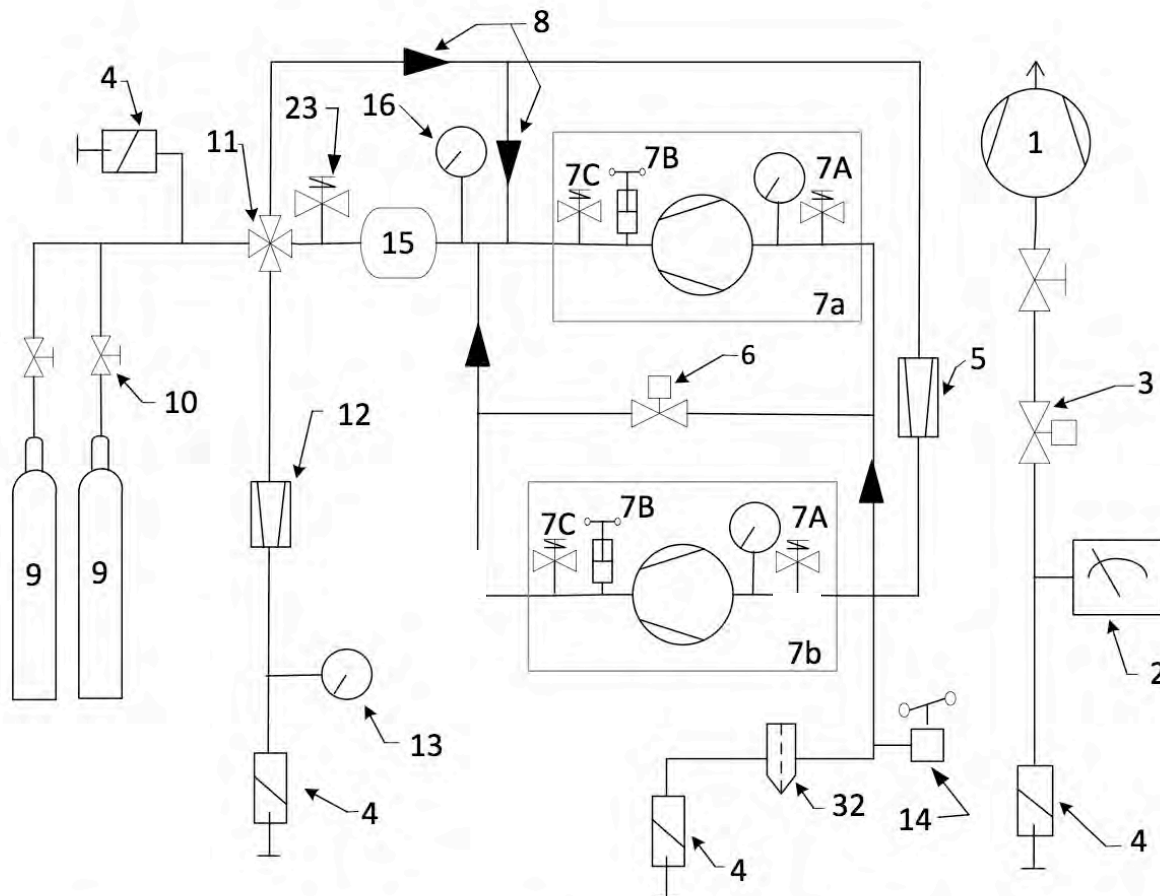


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Gas Flow Diagram



BALL VALVE	ONE WAY VALVE	PRESSURE SWITCH	VACUUM PUMP
SOLENOID VALVE	DRY FILTER	SAFETY VALVE	COMPRESSOR
4 WAY VALVE	GAUGE	PRESSURE SWITCH	COUPLING, DILO DN8
VACUUM CONTROLLER	PRESSURE REDUCER	PARTICLE FILTER	STORAGE CYLINDER

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B143R01 Parts List

Pos.	qty.	Description	Part #
1a	1	14 m ³ /h / 08 CFM vacuum pump 220V/50-60Hz (Ritchie)	93583
1b	1	14 m/h / 08 CFM vacuum pump 120V/50-60Hz (Ritchie)	93480
02	01	Electronic vacuum gauge and tube	801W, TG-531
03a	01	Solenoid valve -30"Hg - 150 psig (anti-suck back protection on vacuum system) 230V/50-60Hz	OFSP8263G206 230V
03b	1	Solenoid valve -30"Hg - 150 psig (anti-suck back protection on vacuum system) 120V/50-60Hz	OFSP8263G206 120V
04	04	DILO coupling groove part DN 08 (self-sealing ports at bottom of control panel)	VK/BG-03/8 2.0401
04a	04	Covering caps DN 08 (for self-sealing ports)	VK/KN-04/8 Alu
05	03	Regulator for compressor return loop (set to 6.9 bar / 100 psig) **2 additional regulators not shown on diagram.**	R83-200-NNNA
06	01	Solenoid valve 0-500 psig normally closed (switches series/parallel operation) 230V/50-60Hz	S301YF04E8BC5
07	02	Oil-less compressor unit 0-50 bar / 0-725 psig 230V/50-60Hz	MPC-05-B
07.A	02	Pressure relief device, 11 bar / 160 psig	05-1200-R053
07.B	02	Pressure switch, 50 bar / 725 psig	209769
07 C	2	safety relief valve 55 bar / 798 psig	05-1200-R052
08	04	One way valve	4Z(A)-4CL-1/3-BN-B
09	02	SF6 cylinder (storage vessel)	Option
10	02	¼ turn ball valve with CGA 590 connection (valve at cylinder manifold)	A201 ¼"
11	01	2 position 4 way valve, (Main function valve)	BV-BV4F-8N
12	01	Filling Regulator for refilling SF into equipment (adjustable 0-160 PSIG)	PR-2F11AH114
13	01	4" gauge 0-11 bar / 0-160 psig LBM/FF, SS 213.53 (Regulator Output Pressure)	EEPB-GF
14	01	Pressure switch 5-25 psig (series/parallel switch sensor)	209767
15	01	SF6 Filter housing	GCC-4907-A
15a	01	Replacement Filter Element with o-ring	6-1077-R003
15b	01	Replacement O-Ring for SF6 Filter	05-0057-R112
16	01	4" gauge 0-1000 psi LBM/FF,SS, 213.53 (Compressor Outlet Pressure)	EKPB-GF
17	01	Dolly with enclosure	B143R01
18	01	Filling regulator by-pass (set to 160 psi)	ACV-4PB-B-160
19	04	10" steel tire/ wheel 4.10 / 3.5	Wheel 10"
21	08	Rubber feet (for compressors)	9378K16
22	02	AC Voltage Hour Meter	17305484
23	1	safety relief valve 55 bar / 798 psig	05-1200-R052
24	02	Female CGA 590 parking stands	A-611
25	01	Inlet by-pass pressure switch 100 psig	209768
26	01	Inlet regulator (set to 100 psi)	R-83-200-NNNA
27	01	Inlet by-pass solenoid valve 230V/50-60Hz	S301YF04E3BE7
28	01	Series/parallel regulator (set to 9,9 bar / 100 psi)	R-83-200-NNNA
29	01	Main breaker (20 Amps)	PB260-ND
30	01	10 CFM Option Vacuum pump breaker (15 Amps)	PB262-ND
30a	01	14 CFM Option Vacuum pump breaker (20 Amps)	PB260-ND
31	02	Compressor breaker (10 Amps)	PB261-ND
32	01	Inlet particle filter	401301
32a	01	Inlet particle filter element	6T04-023

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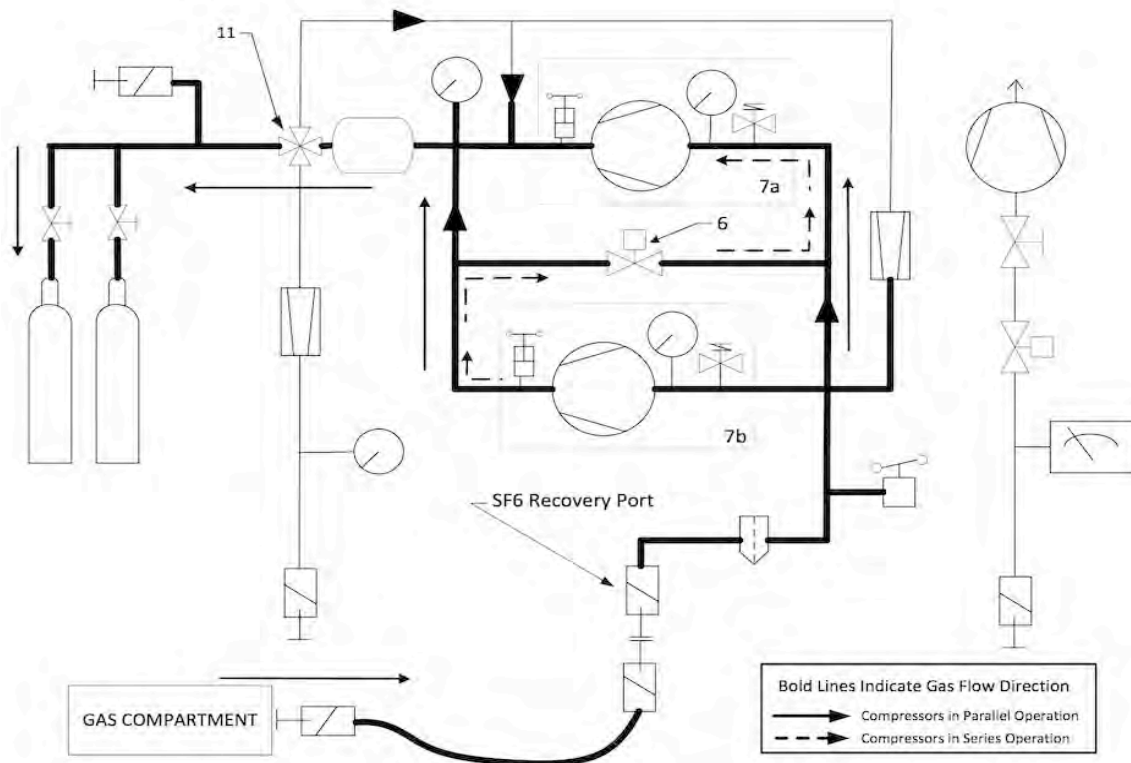


Detailed Instructions for Individual Working Steps

Recovery and Storage of SF₆

This procedure removes SF₆ from insulated equipment and stores it in the on-board (or external) cylinders.

NOTE: If it is suspected that the gas contains high levels of decomposition/by-products of SF₆, it is strongly recommended to use an optional pre-filter. Please contact Dilo Company, Inc. for additional Information.



Follow these steps:

1. Place main valve (pos. 11) in the "SUCTIONING AND STORING OF SF₆" position.
2. If there is neither SF₆, nor a vacuum in the hose, connect hose to the "EVACUATION" port, and pull vacuum on the hose
3. Connect supplied hose to "SF₆ RECOVERY" port; connect other end to breaker and establish gas flow.
4. Insure that the storage cylinder valves are opened.
5. Start both compressors – one at a time (order does not matter).
6. Continue to monitor storage cylinder weights/pressures.
7. When the inlet pressure gauge on the LEFT compressor unit (pos. 7b) shows -30"Hg, the recovery operation is complete.
8. Turn both compressors off and remove hose.

NOTE:

Do not store the Mini Plus If the recovered SF₆ contains any decomposition by products. Doing so may result in excessive corrosion and damage to internal components. If the unit is to be stored for an extended time, please flush the unit with new and dry SF₆ gas.

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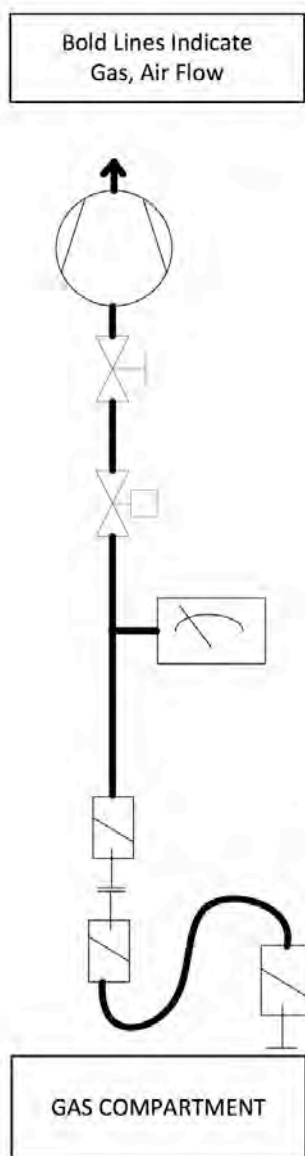
Evacuating Gas Compartment

This procedure allows the operator to evacuate the contents of the gas insulated equipment, hosing, and all volumes attached to the "EVACUATION OF AIR" port (right most port). The evacuation is performed via the supplied vacuum pump.

Note: All of the evacuated gas/air is discharged to atmosphere at the vacuum pump.

This procedure is necessary for:

- A) Removal of air and moisture from gas insulated equipment, prior to re-filling SF₆.
- B) Removal of air and moisture from any hoses, which may contain gases other than SF₆.



Follow these steps:

1. Confirm that pressures within the gas insulated equipment are 0.2 bar / 3 PSIG or less.

CAUTION: All vacuum pumps are extremely sensitive to overpressure. Extreme caution must be used when connecting to the evacuation port of the B143R01. Any positive pressure must be reduced to insure pump is not damaged.

2. Turn on vacuum pump (power switch is located to the right of the evacuation port).

Note: If the vacuum pump fails to start immediately or is slow to start, open the ballast valve then turn on the pump. Once the pump is running close the ballast valve.

3. **SLOWLY** open the isolation valve on the vacuum pump*.
4. The vacuum pump is now actively pulling vacuum on the gas insulated equipment. Wait until the digital Vacuum Gauge indicates sufficient vacuum.

Note: The vacuum sensor is located within close proximity of the vacuum pump. Vacuum readings will be better than actual, unless the pump is either turned off, or the isolation valve* is closed.

5. Once substantial vacuum has been achieved, close the isolation valve*.
6. Turn off pump
7. Remove hose

* Manually operated Isolation valve does not exist on 400 lpm / 14 CFM vacuum pump

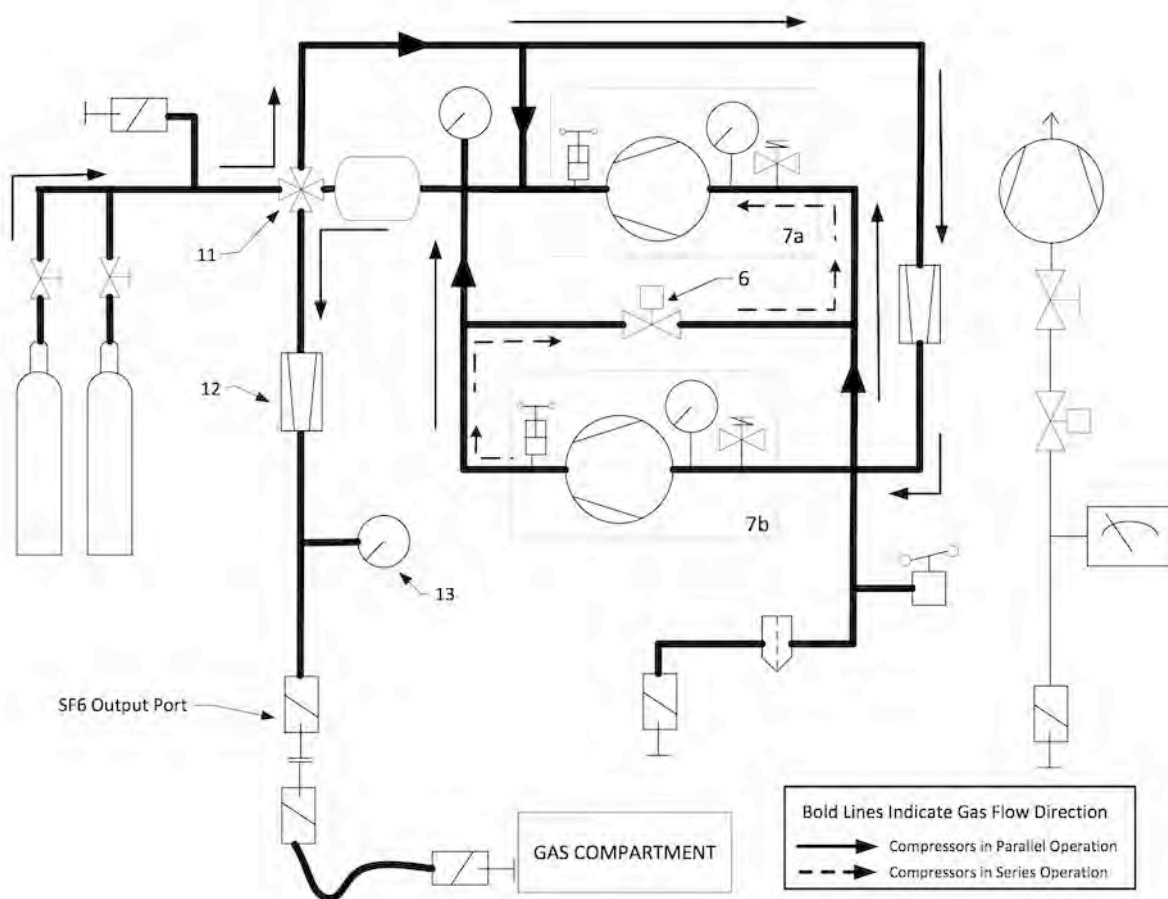
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Filling SF₆ Back into Equipment

This procedure is used to fill insulated equipment with SF₆ from either the on-board cylinders, or an external cylinder. SF₆ is passed through an adjustable regulator (pos. 12) in order to protect the equipment from being over pressurized.

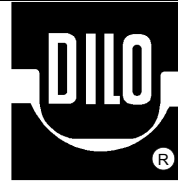


Follow these steps:

1. Confirm that NO hoses are attached to the three fittings on the front of the B143R01. You will need to have a cylinder(s) connected to any of the storage connections on the left side of the unit.
2. Close the pressure regulator by rotating the handle counter clockwise.
3. Open the storage cylinder valves (if closed).
4. Switch the main valve (Pos. 11) on the control panel to "FILLING OF SF₆".
5. Adjust the set point on the regulator by turning the handle clockwise until the REGULATOR OUTPUT PRESSURE gauge (pos. 13) reads the desired pressure
Connect the hose to the " SF₆ OUTPUT" port and open valve on gas compartment (if applicable).

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6. The SF6 gas will now begin to stream from the storage vessel into the gas compartment due to its pressure differential. Wait with step 8) until the gas-flow has equalized before turning on the compressors. Running the compressor before gas pressures have equalized will cause undue stress and the high pressure cut-off could be activated.
7. Start the compressors once pressure has equalized between the gas storage cylinders and the gas compartment to be filled.
8. When the pressure in the breaker reaches the correct fill pressure, the regulator will stop the flow of gas to the equipment, at which point the compressors must be turned off. The compressors will continue to run, even though the gas compartment has reached its correct fill pressure. Do not leave the compressors running after filling is complete.

Note: During the filling process it is likely that the temperature in the storage cylinders will drop significantly. To prevent excessive loss of heat, and therefore, loss of pressure, it is recommended that additional, external heat be added to each of the storage cylinders. This can be accomplished using standard cylinder heating blankets (HB-120, HB-220). Please contact Dilo Company, Inc. for more information.

9. Close valve on gas compartment (if applicable) and remove the hose.
10. Close the storage cylinder valves.

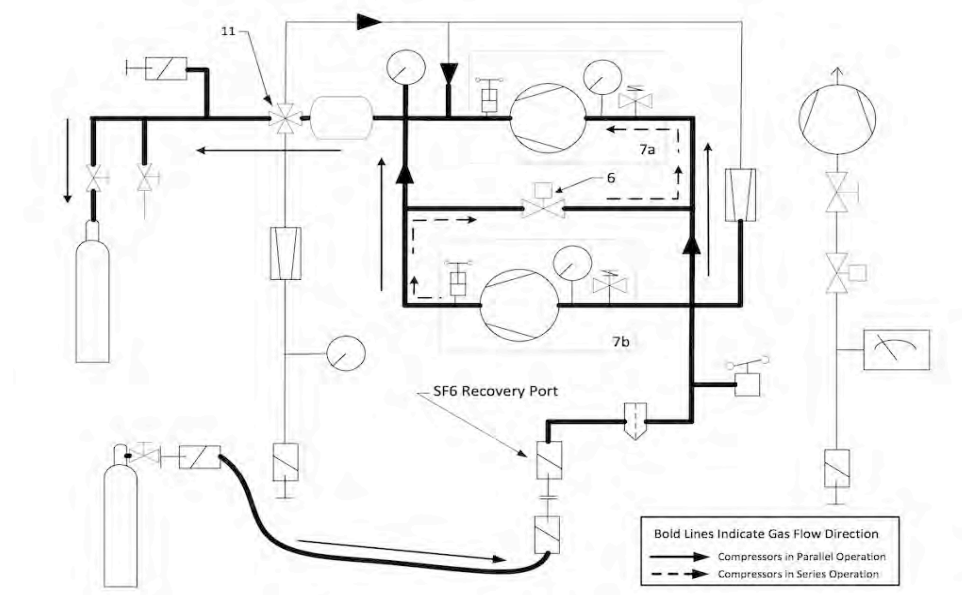
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Cylinder Consolidation

This procedure is used to transfer gas from one cylinder to another and can be used to consolidate partial cylinders into one cylinder.

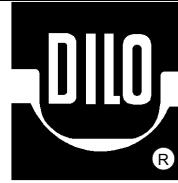


Follow these steps:

1. Place 4-way valve (pos. 11) in the "RECOVERY AND STORING OF SF₆" position.
2. If there is neither SF₆, nor a vacuum in the hose to be connected to the Source Cylinder, connect the hose to the "AIR EVACUATION" port, and pull vacuum on the hose.
3. Connect one of the supplied hoses equipped with the CGA 590 and ¼ turn ball valve on the left side of the gas reclaimer to the Destination Cylinder. * Refer to "**IMPORTANT GENERAL SAFETY PROCEDURES**" section for cylinder filling recommendations.*
4. Use the hose (from step B) equipped with the CGA 590 and ¼ turn ball valve, connect between the Source Cylinder and the "SF₆ RECOVERY" port; leaving the valve on the cylinder closed.
5. Open the valve on the Destination Cylinder and the ¼ ball-valve.
6. Start both compressors, one at a time (order does not matter).
7. Open the valve on the Source Cylinder and the ¼ turn ball valve. Be sure to monitor the Destination Cylinder's weight/pressure.
8. When the inlet pressure gauge on the LEFT compressor unit (pos. 7b) shows -30"Hg, the source cylinder is empty. Close the valve on the Source Cylinder.
9. Turn both compressors off (order does not matter). *It is best to make sure the compressors' inlet pressure gauges read 10 psig or less to allow easier compressor restart.*
10. Remove hose from B143R01 and the Destination Cylinder.

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Self Evacuation Procedures:

Under normal circumstances self evacuation is NOT required.

Self evacuation is only required when the cart has been exposed to air. (i.e. changing filter, part replacement, or internal plumbing modification).

Checking for Pressure

This procedure is necessary to properly check for positive pressure in the recovery unit prior to self evacuating the unit. Testing for positive pressure is necessary to prevent damage to the vacuum pump as well as prevent possible explosion of the vacuum pump.

Follow these steps:

1. Turn the 4-way valve to the "Recovery and Storage SF6" position.
2. Check all gauges on the unit for pressure.
3. If you find pressure please proceed to **Depressurizing** section of the manual.
4. If no pressure is found please proceed to the next step.
5. Turn the 4-way valve to the "Filling of SF6 " position.
6. Open the regulator all the way by turning the knob clockwise.
7. Check the "Regulator Output Pressure" gauge for pressure.
8. If you find pressure please proceed to **Depressurizing** section of the manual.
9. If no pressure is found please proceed to the **Self Evacuation** section of the manual.

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Depressurizing:

Note: Unless a second recovery system is used, only about 80 % of the internal gas will be salvaged.
ONLY PROCEED IF ABSOLUTELY NECESSARY.

This procedure allows the operator to evacuate positive pressure in processing unit, all attached hoses, and equipment prior to self evacuating the unit.

Depressurizing the B143R01 should be done:

- Prior to a self evacuation.
- Prior to performing maintenance.

Follow these steps

1. Turn the 4-way valve to the "Filling of SF6" position.
2. Connect an SF6 storage cylinder that is not full to the DN 8 fitting on the filter housing.
3. Close the ¼ turn ball valve on the filter housing.
4. Open the ball valve on the cylinder.
5. Connect the supplied service hose as a jumper, connect one end to the "Filling of SF6" port and the other to the "Recovery & Storing of SF6" port.
6. Open the regulator completely by turning the knob clockwise.
7. Turn on the compressors, and pump the gas into the cylinder.
8. Let the compressors run until the pressure on the "Regulator Output Pressure" gauge reaches 0 psig or less.
9. Turn off the compressors.
10. Close both the ball valve to the cylinder, and the cylinder valve.

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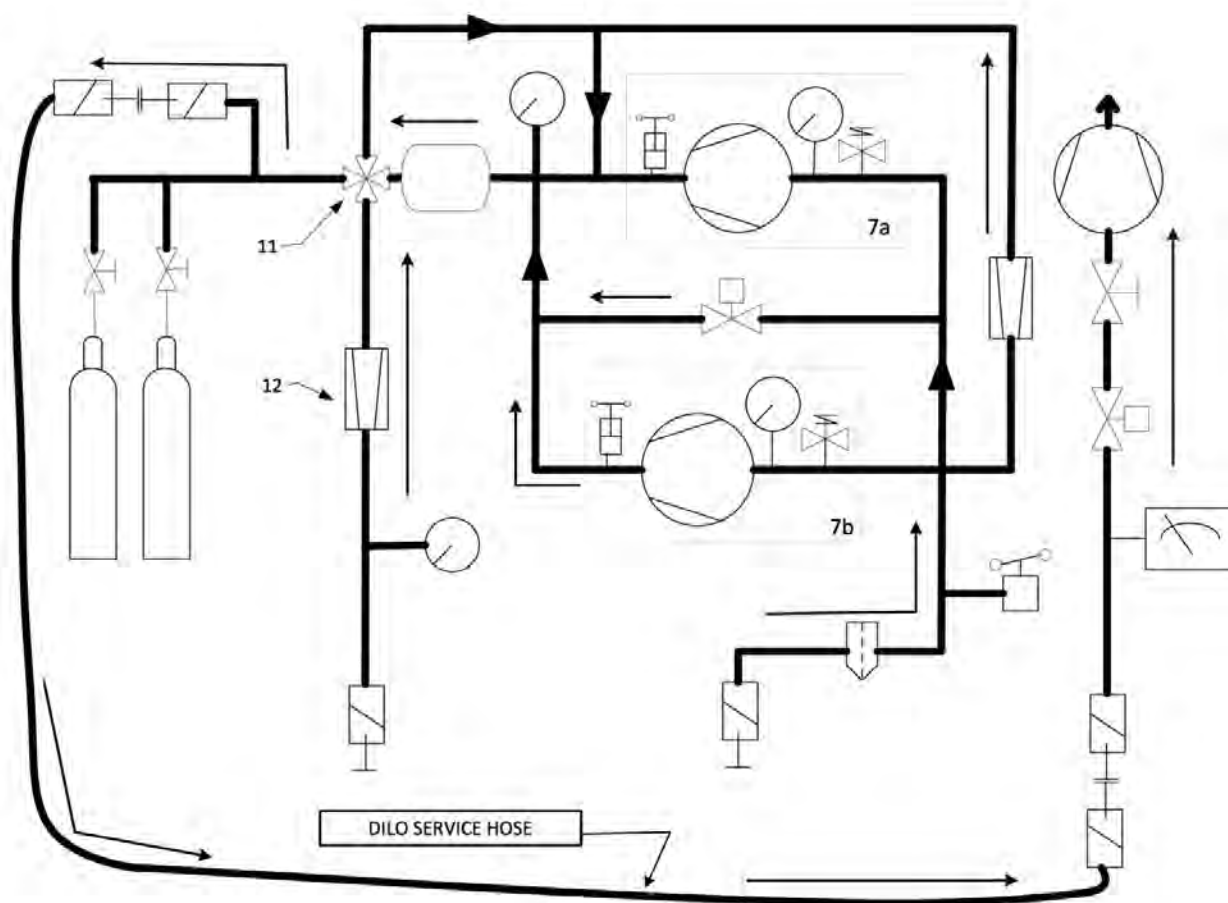


Under normal circumstances self evacuation is NOT required.

Self Evacuation Procedures:

This procedure allows the operator to evacuate the contents of the processing unit, all attached hoses, and equipment.

Note: *all of the evacuated gas/air is discharged to atmosphere at the vacuum pump. If there is more than 3 psig in the system, return to Depressurizing section.*



Follow these steps:

** Unless a second recovery system is used only about 80% of the internal gas will be salvaged. **ONLY PROCEED IF ABSOLUTELY NECESSARY.** **

1. Place the main valve in the "FILLING OF SF₆" position, and open the OUTPUT PRESSURE REGULATOR (pos. 12).

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2. Check for pressure on the REGULATOR OUTPUT PRESSURE gauge. If the needle rises above 3 PSIG, stop opening the regulator. In such a case, evacuation of the entire cart may not be necessary. If gas in the storage cylinders is intact, close valves on cylinders, manifold, and regulator.
3. Using the supplied DILO hose, connect the "External Storage Connection Port" to the "AIR EVACUATION" port.
4. Turn the four-way valve to the "Recovery and Storing of SF6" position.
5. Turn on the vacuum pump.

Note: If the vacuum pump fails to start immediately or is slow to start, open the ballast valve then turn on the pump. Once the pump is running close the ballast valve.

6. **Slowly** open the isolation valve located on the vacuum pump*.
7. Wait until the Vacuum Gauge indicates sufficient vacuum.

Note: THE ISOLATION VALVE MUST BE IN THE CLOSED POSITION BEFORE TURNING THE PUMP ON OR OFF. *

Note: the vacuum sensor is located within close proximity to the vacuum pump. Vacuum readings will be better than actual, unless the pump is either turned off, or the isolation valve* is closed.

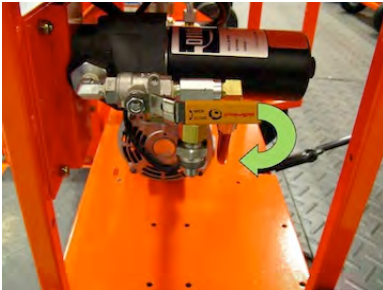
* Manually operated Isolation valves do not exist on 14CFM vacuum pumps.



Depressurizing the Gas Reclaimer for Transportation

Follow these steps:

1. Disconnect or isolate any gas cylinders connected to the external storage connection ports. If this is not done, any gas in these cylinders will be removed in the following steps.
2. Put the main four-way valve in the “Filling of SF6” position.
3. Connect an empty, evacuated, SF6 storage cylinder to the DN 8 coupling on the filter housing.
4. Close the ball valve on the filter housing by turning the yellow handle to the downward position.



5. Slowly open the ball valve for the external cylinder and wait until gas no longer flows into the attached cylinder.
6. Connect a service hose from the “SF6 Filling” port to the “SF6 Recovery” port.
7. Open the regulator by turning the adjustment knob clockwise.
8. Turn on the compressors and pump the gas into the cylinder.
9. Let the compressors run until the pressure on the “Regulator Output Pressure” gauge reaches 0 bar / 0 psig.
10. Turn the compressors off.
11. Close both the ball valve to the external cylinder, and the external cylinder valve.
12. Open the ball valve on the filter housing.
13. Once pressure has equalized, the service hose between the cylinder and filter port can be removed.

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Troubleshooting

Symptom	Cause	Solution
The compressor(s) do/does not start but cooling fan motors run.	Motor start relay tripped out	Turn off power switch to affected compressor. Wait until relay resets (may take up to 10 minutes).
“High Pressure Cutout” lamp illuminated	High pressure cut-off. Pressure switches within the unit have detected discharge (storage pressure) in excess of 725 psig.	Relieve discharge pressure. If either the filter isolation valve or the valves of the attached storage vessels are closed, open them. If attached storage vessels are full, add additional storage capacity.
“High Pressure Cutout” lamp not illuminated	The compressor motors draw relative high current upon starting.	Avoid use of extension cords. If needed use at least 12 gauge (1,5 mm ²) cable.
The compressor(s) do/does not start and cooling fan motors do not run.	No Power	Provide appropriate power supply, 120VAC, 60 Hz, 20 amp service or 220 V 50-60 Hz, 10 amp service. Check the label on the front panel for your voltage requirements. Check condition of cables, extension cords (at least 12 gauge), and all breakers. Check that power connections on back of compressors are fully plugged in.
	Set point 1 on weight scale has been exceeded	Switch to new cylinder or adjust set point 1 to correct cut-off weight.
“High Pressure Cut Off” light comes on during Recovery of SF ₆ .	Storage cylinder is full	Switch to new cylinder.
	Check-valve in cylinder prevents refilling.	Switch to new non-check valve cylinder.
	Storage cylinder/manifold valves closed	Open respective valves.
“High Pressure Cut Off” light comes on during Filling of SF ₆ .	Regulator is closed (or has reached set point) during filling process	Adjust regulator to proper fill pressure. When complete, turn unit off to avoid excessive pressure.
Vacuum pump can not reach low vacuum	If there is no considerable volume to be evacuated, i.e. nothing is connected to the evacuation port, the vanes in the pump head may not seal completely	Attach a volume to the inlet port.
	¼ turn valve on pump is closed (if equipped)	Open valve.
	Leak	Close valve on pump and observe the vacuum gauge. If pressure rises continuously, it could indicate a leak.
	Dirty or contaminated oil	Change vacuum pump oil.

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Maintenance

SF₆ Filter:

The filter cartridge with O-Ring (PN: 6-1077-R003) should be exchanged when the quality of the gas is no longer being improved, if a contaminated batch of gas has been run through the system or at least once a year.

1. Disconnect or isolate any gas cylinders connected to the external storage connection ports. If this is not done, any gas in these cylinders will be removed in the following steps.
2. Put the main four-way valve in the "Filling of SF₆" position.
3. Connect an empty, evacuated, SF₆ storage cylinder to the DN 8 coupling on the filter housing.
4. Close the ball valve on the filter housing by turning the yellow handle to the downward position. (Illustration 1)
5. Slowly open the ball valve for the external cylinder and wait until gas no longer flows into the attached cylinder.
6. Connect a service hose from the "SF₆ Filling" port to the "SF₆ Recovery" port.
7. Open the regulator by turning the adjustment knob clockwise.
8. Turn on the compressors and pump the gas into the cylinder.
9. Let the compressors run until the pressure on the "Regulator Output Pressure" gauge reaches 0 bar / 0 psig, then Turn them off.
10. Close both the ball valve to the external cylinder, and the external cylinder valve

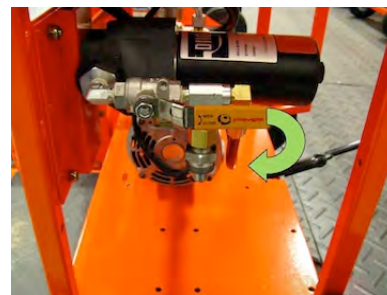


Illustration 1:



Illustration 2



Illustration 3

11. **Make sure you wear proper personal protective equipment before opening the filter housing.**

12. Open the black aluminium end cap from the filter housing by turning it counter clockwise (see Illustration 2).

Attention: Do not open if there is still positive pressure on the filter housing

13. Pull out and dispose of the used cartridge (Illustration 3).

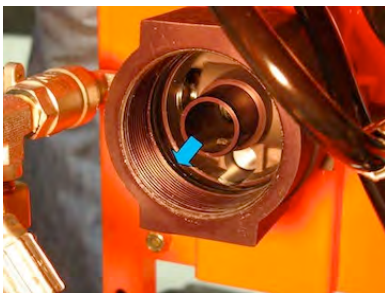


Illustration 4



Illustration 5

14. Clean any debris from the inside of the filter housing and the bowl.
15. Apply o-ring lube to the O-Rings, in the filter housing and the new element. (Illustration 4 and 5)

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16. Install new filter core and filter bowl hand tight. Torque filter bowl to 40 ft'lb (54 Nm).

(Illustration 6 and 7)

17. Service the Inlet Particle Filter element (see chapter "Inlet Particle Filter")

18. Connect hose between "Air Evacuation" and the "SF6 Filling" port.

19. Ensure that the four-way valve is in the "Filling of SF6" position, and the filling regulator is open.

20. Start the vacuum pump, then open the isolation valve (if equipped)

21. After reaching sufficient vacuum, close the isolation valve, turn off the pump, and disconnect the service hose between the two ports.



Illustration 6



Illustration 7

22. Confirm that the valve is closed on the external cylinder and open the ball valve on the filter housing.

23. Once pressure has equalized, the service hose between the cylinder and filter port can be removed.

24. Check the filter housing for leaks.

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Inlet Particle Filter:

The inlet particle filter element (6T04-023) needs to be inspected and cleaned or changed periodically. A clogged filter will result in slower gas recovery. To change the cartridge, do the following:

1. Disconnect any hoses from the “SF₆ Recovery Port”.
2. Put the main four-way valve in the “SF₆ Recovery” position.
3. Some positive pressure on the compressor outlet gauge (pos. 16) is acceptable when changing the inlet filter. If there is less than 400 psi (25 bar) showing on the gauge, step D can be omitted.
4. If there is more than 400 psi (25 bar) showing on the gauge, connect a cylinder with enough space for 1-2 lbs. (1 kg) of gas to the external storage port and open the valves.
5. Turn on the compressors.
6. Let the compressors run until the compressor inlet gauges reach -30” Hg.
7. Turn off the compressors.
8. Close both the ball valve to the external cylinder, and the external cylinder valve.
9. Depressurize the inlet particle filter by attaching a female DILO SF₆ valve to the “SF₆ Recovery” port. The inlet gauges of the compressors will rise from -30”Hg to 0 psi (0 bar).

Do not open the inlet filter housing if the compressor inlet gauges show any positive pressure.

10. Unscrew the entire filter housing bowl (not just the plug at the end of the bowl) from the filter body. (Picture 01)
11. Clean any loose particulates from the inside of the bowl.
12. Remove the thumb nut that secures the filter element and remove the element. (Picture 02 and 03)
13. Make sure that the o-ring seal is still in place above the threads in the filter head.
14. Clean and / or replace the o-ring as needed and re-install.
15. Clean and / or replace the element as needed and re-install.
16. Secure the element with the thumb nut.
17. Replace the filter bowl tighten until you feel the bowl reach the end of the threads. With a wrench apply just enough pressure to snug the cap. The seal is made by the o-ring. Further tightening will not make a better seal.



Picture 01



Picture 02



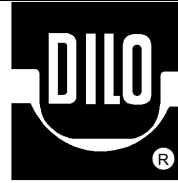
Picture 03



Picture 04

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18. Connect the service hose between "Air Evacuation" and the "SF₆ Filling" port.
19. Ensure that the four-way valve is in the "Recovery and Storage of SF₆" position.
20. Start the vacuum pump, then open the isolation valve.**
21. After reaching sufficient vacuum, close the isolation valve and turn off the pump.**
22. Disconnect the service hose between the two ports.
23. Check for leaks.

** Manually operated Isolation valve does not exist on 14CFM vacuum pumps.

Compressor:

The compressors should be refurbished every 100 operating hours. DILO offers a maintenance parts kit.

Vacuumpump

The pump oil should be exchanged after 100 operating hours.
(see attached separate manual for the vacuum pump)



(Optional) Weighing Scale Instructions

Operation:

Place the B143R01 SF₆ Gas Reclaimer on a level surface and supply the appropriate voltage. Ensure that the jack has been adjusted so the unit is completely level, otherwise an accurate weight cannot be measured. The internal scale is calibrated by DILO before shipment. The digital scale will now indicate the gross weight of the storage cylinder. If calibration is required, follow procedure listed below.

Setting the scale to zero (Tare Weight)

To zero the scale press the button on the digital scale marked "TARE". The scale will now indicate the actual weight of gas being added to the cylinder. To toggle between the gross and net (tare) weight, press the button marked "NT/GRS". *Before zeroing the scale, compare the gross weight displayed, with the Tare Weight stamped on the cylinder. This is to determine if the cylinder contains any gas.*

Calibrating

The scale is calibrated by DILO before shipment. The weighing system usually requires calibration only once. However, should calibration be required, follow these steps:

1. Remove the storage cylinder from the weighing platform. Nothing should be touching or resting on the platform (except for the strap)
2. Press the MENU button until the display shows "R.D.S.O"
3. Press the ►/TARE button. The meter shows "IN 1"
4. Press the ►/TARE button again. The meter shows the last stored value for Input 1.
5. Press the ►/TARE button once more. The meter shows the actual signal being received.
6. Press the MENU button to store this value as "IN 1". The meter shows "RD1" (Read 1).
7. Press the ►/TARE button. The meter shows the last stored value for Read 1.
8. Press the ►/NT/GRS button to change the value of your digits to display ZERO (0000).
9. Press ►/TARE button to scroll horizontally to the next digit.
10. Press the MENU button to store this value as "RD1" (Read 1). The meter shows "IN2" (Input 2).
11. Place the permanent storage cylinder on the platform. Strap it into place, and connect the storage hose.
12. Press the ►/TARE button. The meter shows the last stored value for Input 2.
13. Press the ►/TARE button once more. The meter shows the actual signal being received.
14. Press the MENU button to store Input 2 value. The meter shows "RD2" (Read 2).
15. Press the ►/TARE button. The meter shows the last stored value for "RD2"
16. Press the ►/NT/GRS button to change the value of your digits to the exact weight of the cylinder (see tare weight stamped on cylinder).
17. *Press the ►/TARE button to scroll horizontally to the next digit.*

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18. Press the MENU button to store this value as “RD2”. The meter momentarily shows “STRD”, followed by “RD.CF”. Meter calibration is now complete

Working with Set-points

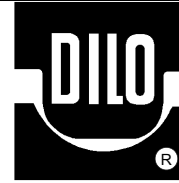
Set points allow the scale to turn off the compressors on the SF₆ recovery system, using the D-301-R002's internal relay. The internal relay will interrupt power to the compressors, once the set point # 1 has been reached. Only set point #1 is used to control the recovery system. Set points can be verified/adjusted as follows:

Controlling SF₆ Recovery Systems

1. Press the “SETPTS” button (far left).
2. Using the ►/TARE and ►/NT/GRS buttons and set the value to the maximum desired weight.
3. Press SETPTS again. This brings up set point # 2.
4. Set point #2 is inactive. Simply press the RESET button twice.
5. Regular operation is now restored.
6. When the set point is reached, a red number one (1) will appear just below the display. When this happens, power to the compressors on the B143R01 will shut off.
7. To restore power, the set point must be adjusted to a value higher than what is currently displayed, or the weight must be reduced to a value lower than the set point

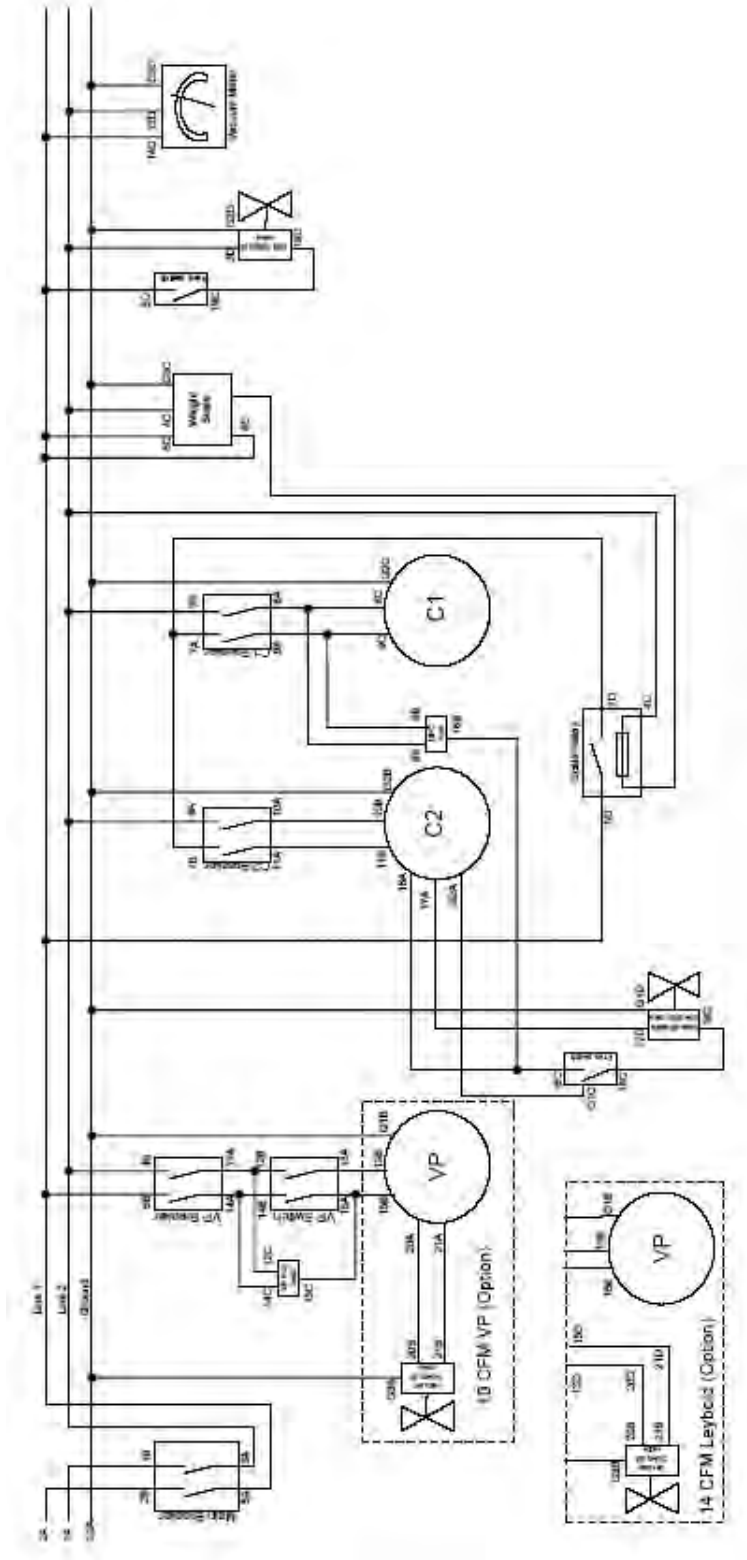
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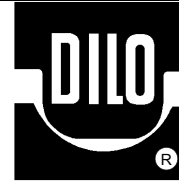
Wiring Schematics:

208-240 VAC, WITH INTEGRATED
SCALE (C7)

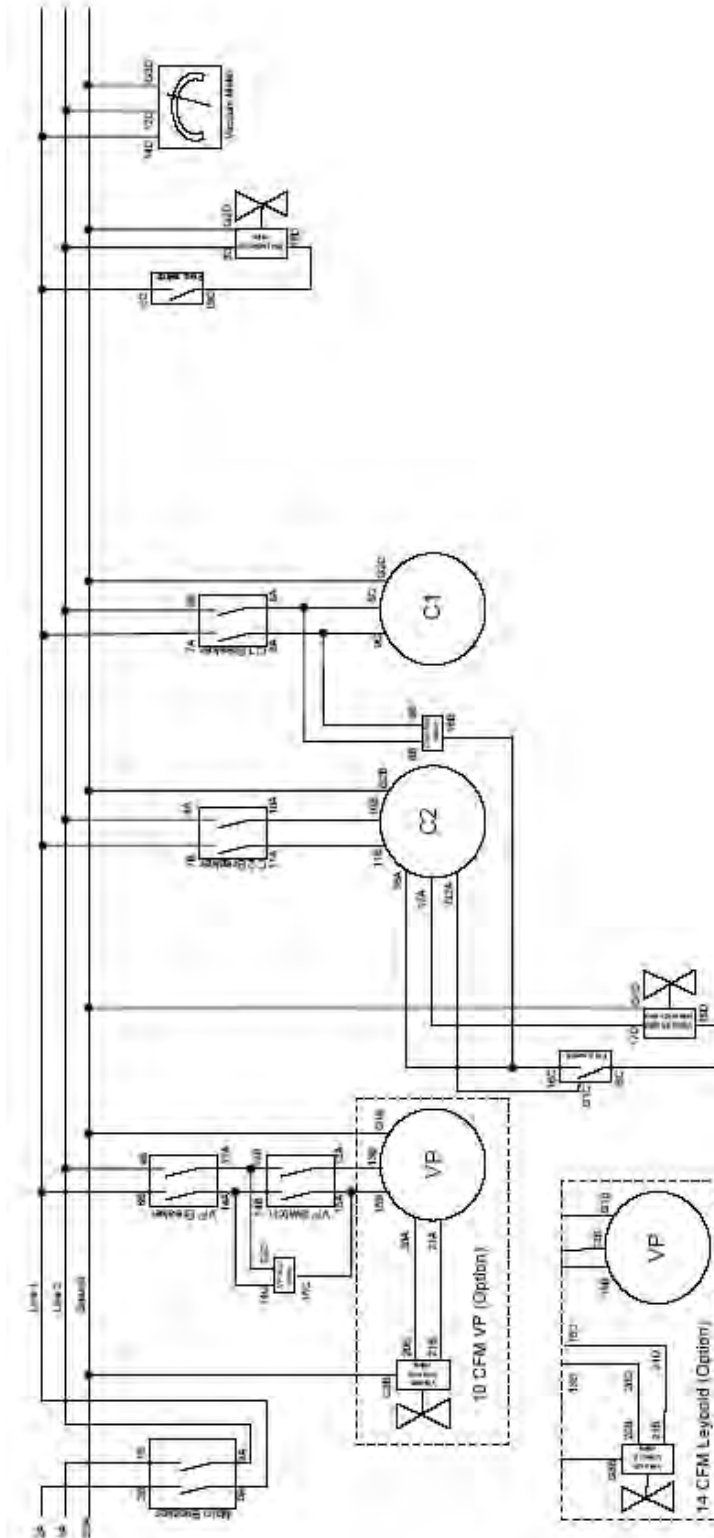


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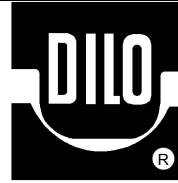
D-320-R006/B143R01 Gas Reclaimer



Wiring Schematics (cont'd) 208-240 VAC, WITHOUT INTEGRATED SCALE (C7)



D-320-R006/B143R01 Gas Reclaimer



Notes:

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