



**GETZ EQUIPMENT INNOVATORS**

**PART NO. 4G59274 RECOVERY / RECYCLE SYSTEM  
MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230**

**OPERATIONS MANUAL**



2320 Lakecrest Drive, Pekin, Illinois 61554  
Telephone: 888-747-4389 Fax: 309-495-0625  
Website: [www.getzequipment.com](http://www.getzequipment.com)

## Limited Warranty

Products manufactured by Getz Equipment Innovators (with exception of electrical products or components) will be free from defects for a period of one year from shipment date. Electrical products and/or components used in manufactured products will have a (6) month warranty from shipment date. During the warranty period, customers who experience any manufacture-related service issues with our products, the product may be returned for repair or replacement. Customer must contact Getz Equipment for approval prior to any product return. Notwithstanding the foregoing, the limited warranty set forth shall be immediately void of customer uses any replacement parts other than those provided by Getz Equipment Innovators. The warranty does not cover normal wear and tear items, defects resulting from modification, alteration, misuse, exposure to corrosive conditions, extremely high temperatures, improper installation or maintenance. Warranties on component items not manufactured by Getz Equipment Innovators are provided by others whose warranty, evaluation and judgment will be final.

All implied warranties, including, but not limited to, warranties of fitness for purpose and merchantability, are limited to the time periods as stated above. In no event shall Getz Equipment Innovators be liable to incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts or the exclusions or limitation of incidental or consequential damages, so that the above limitations or exclusions may not apply to you. Getz Equipment Innovators neither assumes nor authorizes any representative or other person to assume for it any obligation or liability other than as expressly set forth herein.

### **Mobile Service Vehicles:**

#### **The warranty does not cover:**

- Defects in the chassis and or power unit
- Defects in separately manufactured products not produced by Getz Equipment Innovators
- Deterioration due to normal wear, tear, and exposure
- Repairs made necessary by negligent use, misuse, abuse, loading the service vehicle beyond its gross vehicle weight limitations, accident, acts of God, or other contingencies beyond the control of Getz Equipment Innovators.
- Repairs deemed necessary by reason of the failure to follow ordinary maintenance procedures.
- Repairs deemed necessary by reason of alterations done without Getz Equipment Innovators' written approval.

**Warranty Service:** All warranty repairs will be performed by Getz Equipment Innovators in Pekin, IL, unless otherwise authorized by Getz Equipment Innovators.

**Freight:** Getz Equipment Innovators will not be liable for shipping or transportation charges to or from customer's location.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. To obtain performance to the obligation of the warranty, write to Getz Equipment Innovators, 2320 Lakecrest Drive, Pekin IL 61554, USA for instructions.

**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

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**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**BASIC SYSTEM COMPONENTS:**

**AIR POWERED HFC-227/HALON 1301/3M™ NOVEC™ 1230 PUMP**

**CONTROL CONSOLE AND STAND**

**REQUIRED ADAPTERS (4)**

**REQUIRED HOSES**

**OPTIONAL EQUIPMENT:**

<b>P/N 1G52456</b>	<b>10 H.P. AIR COMPRESSOR (OTHER AIR COMPRESSORS AVAILABLE)</b>
<b>P/N 2G0131</b>	<b>DIGITAL SCALE (0 TO 150 LBS. CAPACITY)</b>
<b>P/N 2G0002</b>	<b>BATTERY OPERATED HFC-227/HALON 1301/3M™ NOVEC™ 1230 LEAK DETECTOR</b>
<b>P/N 4G59599</b>	<b>HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECEIVER TANK 250# CAPACITY</b>
<b>P/N 4G59597</b>	<b>HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECEIVER TANK 500# CAPACITY</b>

**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**SYSTEM OPERATION REQUIREMENTS:**

1. “Cast iron air compressor” delivering 100 – 120 PSI at 18 CFM minimum.

**WARNING** – Do not use aluminum air compressors, unrepairable damage will occur.

**Note** – Customer supplied air compressor must have an adjustable pressure regulator and an airline from compressor to the HFC-227/HALON 1301/3M™ NOVEC™ 1230 system.

2. Weighting scales – digital or mechanical

One scale rated for the total full weight capacity of the receiver tank.

One scale rated for the total full weight capacity of the system cylinder.

3. HFC-227/HALON 1301/3M™ NOVEC™ 1230 Liquid/Vapor receiver tank

**WARNING** - Receiver tank must have pressure relief devices and be pressure rated for nitrogen charged HFC-227/HALON 1301/3M™ NOVEC™ 1230 service.

4. Nitrogen cylinder and adjustable pressure regulator (-77 degrees dew point nitrogen)  
(Customer must supply a nitrogen source for pressurizing cylinders)

**AREA REQUIRED:**

**DEPTH - 3 FT.**

**WIDTH - 4 FT.**

**HEIGHT - 5 FT.**

	<b><u>WEIGHT</u></b>	<b><u>DIMENSIONS</u></b>
<b>CONSOLE &amp; STAND</b>	<b>165 LBS.</b>	<b>24" D x 35" W x 40" H</b>

**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**SYSTEM SPECIFICATIONS:**

**VACUUM - 15 INCHES MAXIMUM**

**INLET PRESSURE - 1000 PSI MAXIMUM**

**OUTLET PRESSURE - 400 PSI**

**HFC-227/HALON 1301/3M™ NOVEC™ 1230 LIQUID PER MINUTE - 16 LBS. AVERAGE**

**HFC-227/HALON 1301/3M™ NOVEC™ 1230 VAPOR PER MINUTE - 2 LBS. AVERAGE**

**MOISTURE EYE - 10 PPM (GREEN = DRY) 65 PPM (YELLOW = WET)**

**FILTERS - 15 MICRONS PARTICULATE MATTER**

**SYSTEM CAPABILITIES:**

**RECOVER HFC-227/HALON 1301/3M™ NOVEC™ 1230 LIQUID AND VAPOR FROM CYLINDERS**

**RECOVER NITROGEN FROM CYLINDERS**

**RECHARGE LIQUID HFC-227/HALON 1301/3M™ NOVEC™ 1230 AND NITROGEN TO CYLINDERS**

**TRANSFER LIQUID HFC-227/HALON 1301/3M™ NOVEC™ 1230 FROM BULK STORAGE TANK TO CYLINDERS**

**RECOVER AT A MINIMUM 99% EFFICIENCY RATE**

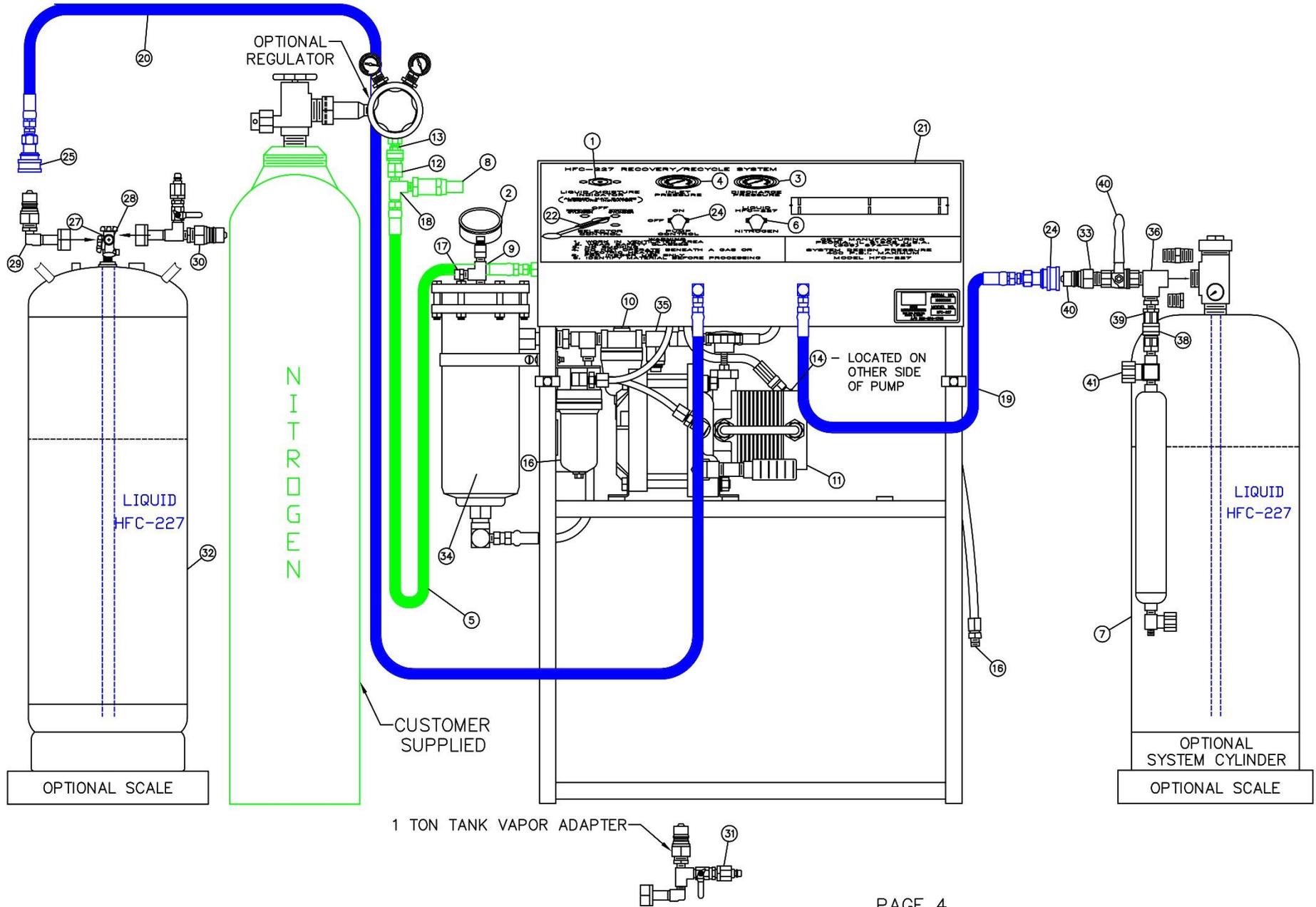
**DETECT MOISTURE IN HFC-227/HALON 1301/3M™ NOVEC™ 1230**

**FILTER MOISTURE DOWN TO 10 PPM**

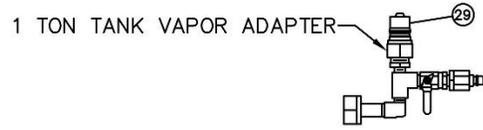
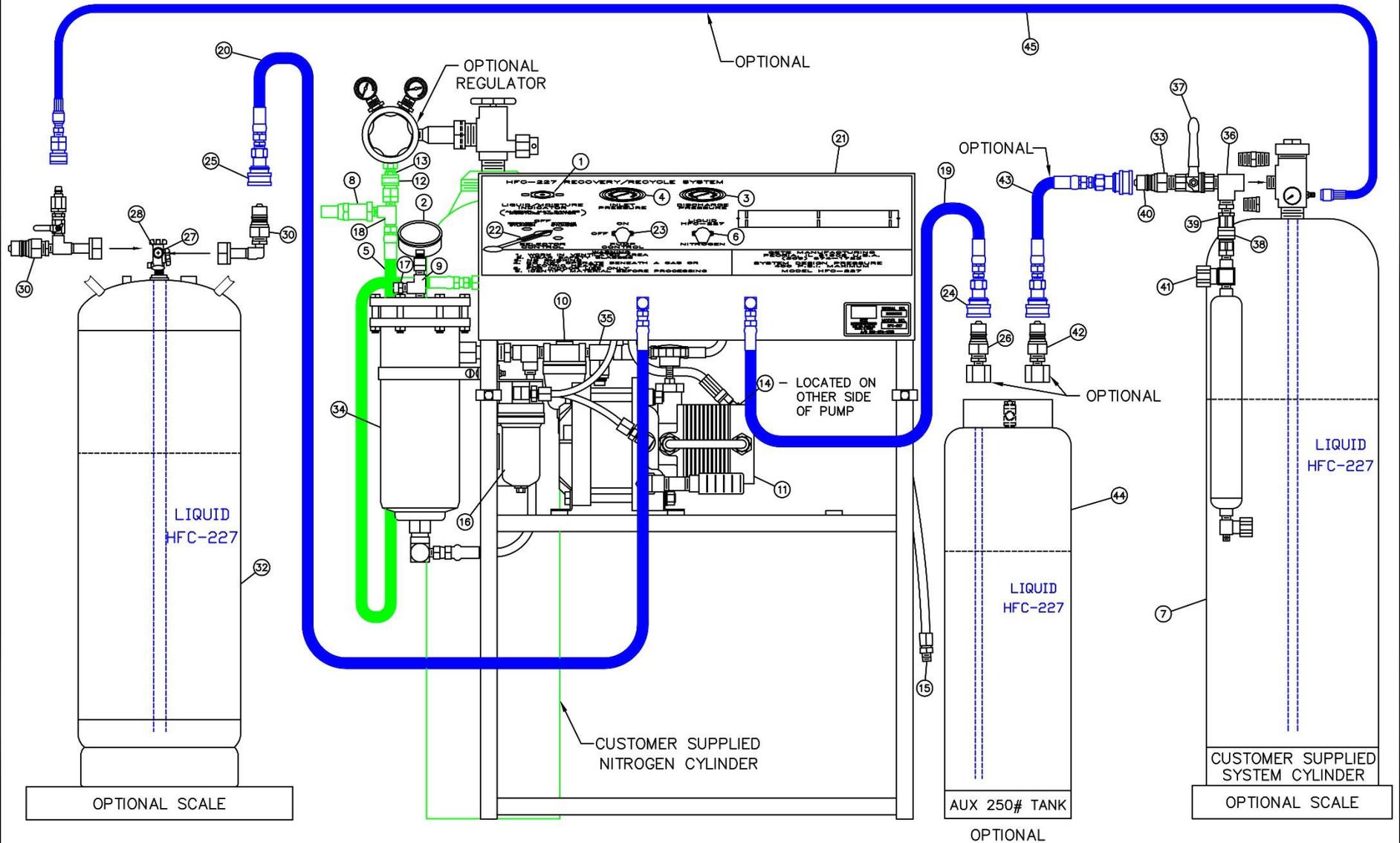
**FILTER PARTICULATE MATTER DOWN TO 15 MICRONS**

**FILTERS ACID, WAX, SLUDGE**

SEALED SIPHON TUBE RECOVERY PROCEDURE/OBTAINING HFC-227 TEST SAMPLE



SEALED SIPHON TUBE RECOVERY PROCEDURE/OBTAINING HFC-227 TEST SAMPLE



**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**ITEM NUMBERS / DESCRIPTION:**

1. MOISTURE INDICATOR – 1G52495
2. PRESSURE / VACUUM GAUGE – 1G52500
3. DISCHARGE PRESSURE GAUGE – 1G52485
4. INLET PRESSURE GAUGE – 1G52485
5. NITROGEN SUPPLY HOSE – 1G51412
6. HFC-227/HALON 1301/3M™ NOVEC™ 1230 LIQ NIT VALVE – 1G51902
7. HFC-227/HALON 1301/3M™ NOVEC™ 1230 CYLINDER
8. 850 PSI PRESSURE RELIEF (NITROGEN HOSE)- 1G0274
9. 1/4" BRASS ST TEE (FILTER CAP - ITEM 37)- 1G0428
10. HIGH PRESSURE REDUCING VALVE – 1G52493
11. HFC-227/HALON 1301/3M™ NOVEC™ 1230 PUMP – 1G51744
12. FEMALE QUICK COUPLER (NITROGEN HOSE) – 1G0189
13. MALE QUICK COUPLER (NITROGEN HOSE) – 1G0030
14. BRASS STRAINER (ON PUMP) (NOT SHOWN) – 1G51849
15. 1/4" NPT PLASTIC CONNECTOR (AIR INLET) - 1G0116
16. MOISTURE FILTER - 1G51314
17. 425 PSI PRESSURE RELIEF - 1G51939
18. 1/4" BRASS TEE (NITROGEN HOSE) - 1G0428
19. SYSTEM CYLINDER HOSE - 1G51412
20. RECEIVER TANK HOSE - 1G51412
21. CONTROL CONSOLE - 1G52486
22. SELECTOR VALVE - 1G0462
23. PUMP VALVE - 1G51908
24. FEMALE QUICK COUPLER (SYSTEM CYLINDER HOSE) - 1G58762

**ITEM NUMBERS / DESCRIPTION:**

25. FEMALE QUICK COUPLER (RECEIVER TANK HOSE) - 1G58762
26. LIQUID ADAPTER ASSEMBLY (AUXILIARY TANK) - 3G59050
27. RECEIVER TANK LIQUID PORT - 3G59050
28. RECEIVER TANK VAPOR PORT - 3G59050
29. LIQUID FILL ADAPTER ASSEMBLY - 3G59050
30. VAPOR ADAPTER ASSEMBLY (VERTICAL TANK) - 3G59050
31. VAPOR ADAPTER ASSEMBLY (HORIZONTAL TANK) - 3G59050
32. 1301 RECEIVER TANK (OPTIONAL)
33. 1/2" BALL VALVE ASSEMBLY - 3G59050
34. FILTER CANISTER - 1G0416
35. BRASS STRAINER (BEHIND REAR ACCESS COVER) - 1G52494
36. TEST SAMPLE TEE ASSEMBLY - 1G0416
37. 1/2" BALL VALVE (TEST SAMPLE TEE)
38. FEMALE QUICK COUPLER (TEST SAMPLE CYLINDER)
39. MALE QUICK COUPLER (TEST SAMPLE CYLINDER)
40. MALE QUICK COUPLER (TEST SAMPLE TEE)
41. NEEDLE VALVE (TEST SAMPLE CYLINDER)
42. VAPOR ADAPTER ASSEMBLY (AUX TANK) – 1G51412,1G51325
43. LIQUID HOSE ASSEMBLY (AUXILIARY TANK) - 1G51412
44. AUXILIARY 250# TANK (OPTIONAL) – 1G52541
45. VAPOR HOSE ASSEMBLY (SYSTEM CYLINDER/RECEIVER) - 1G51412

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### SET-UP PROCEDURE:

1. After all carton and boxes have been opened and all parts and components unwrapped, lay out all items for ease of assembly. Carefully check all parts for evidence of concealed damage. Notify the delivering carrier immediately if anything appears to have shipping damage.
2. Start with the receiver tank (item 32). Install the liquid adapter assembly (item 29) to the liquid valve of the receiver tank.
3. Install vapor adapter assembly (item 30) on a vertical tank or (item 31) on a horizontal tank, to the vapor valve on the receiver tank (item 33).
4. Connect the female quick coupler (item 25) to the male quick coupler on the liquid adapter assembly (item 29).
5. The nitrogen regulator must be set to zero (0) PSI output pressure during assembly. Install the male quick coupler (item 13) in your nitrogen regulator's outlet port. Connect the female quick coupler (item 12) on the nitrogen supply hose (item 5) to the male quick coupler (item 13).
6. Turn pump valve (item 23) on the control console (item 21) to the *OFF* position. Turn the liquid/nitrogen valve (item 6) on the control console to the *LIQUID* position. Connect the ¼" NPT plastic connector (item 15) to your air compressor's pressure regulator. Set nitrogen regulator to 100 – 120 PSI.
7. Place the receiver tank on a scale of adequate weighting capacity to inform the operator when the receiver tank has reached the full liquid weight capacity and over filling does not occur.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### RECOMMENDED ITEMS FOR OBTAINING A HFC-227/HALON 1301/3M™ NOVEC™ 1230 TEST SAMPLE: (Example)

**WARNING** - Test cylinder, shut valve, and quick connect must have a pressure rating equal to or higher than the system cylinder the sample is being obtained from.

- A. Test cylinder with shutoff valve and quick connect.  
(Test cylinder and tee assembly must be clean and a vacuum pulled on both components prior to obtaining a sample).
- B. Test sample tee assembly with shutoff valve and quick couples.

### PROCEDURE FOR OBTAINING A HFC-227/HALON 1301/3M™ NOVEC™ 1230 TEST SAMPLE PRIOR TO RECOVERING OR RECYCLING: (Example)

1. Install the manufacturers recommended discharge adapter assembly in the system cylinder valve. Install the test sample tee assembly (item 36) onto the discharge adapter. Close the ½" ball valve (item 37).
2. Connect the female quick coupler (item 38) on the test sample cylinder to the male quick coupler (item 39) on the test sample tee assembly.
3. Connect the female quick coupler (item 24) in the system cylinder hose to the male quick coupler (item 40) on the test sample tee assembly.
4. Open the needle valve (item 41) on the test cylinder and discharge the system cylinder valve. After one (1) minute, close the needle valve (item 41) on the test sample cylinder and close the system cylinder valve.

**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**PROCEDURE FOR OBTAINING A HFC-227/HALON 1301/3M™ NOVEC™ 1230 TEST SAMPLE (CONT):**

5. Open the ball valve (item 37) on the test sample tee assembly. Turn the selector valve (item 22) on the control console to the **RECOVERY CYLINDER** position. Open the liquid valve on the receiver tank and turn the pump valve (item 23) to the *ON* position. Monitor the pressure/vacuum gauge (item 2) until a reading of 10 inches of vacuum is obtained. Turn the pump valve (item 23) to the *OFF* position and disconnect the test sample cylinder, test sample tee assembly, and the system cylinder hose.
6. Label the test sample cylinder and system cylinder as follows:
  - A. Date sample was obtained
  - B. Serial number of the system cylinder obtained from
  - C. Test laboratory sent to

**TEST LABORATORIES FOR ANALYZING SAMPLES:**

- A **INTEGRAL SCIENCES INCORPORATED**  
**2818 FISHER ROAD**  
**COLUMBUS, OHIO 43204-3538**  
**PHONE #: (614) 279-8090**
- B **ETL TESTING LABORATORIES, INC.**  
**U.S. ROUTE 11 INDUSTRIAL PARK**  
**CORTLAND, NEW YORK 1305-0950**  
**PHONE #: (607) 753-6711**

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### RECOVERY PROCEDURE FOR CYLINDERS WITH SEALED SIPHON TUBES:

1. **WARNING** - Before the contents of any cylinder is allowed to enter this system, a respective sample, needs to be analyzed for the determination of its contents.

**WARNING** - Pressure rated tanks used for the purpose of receiving the HFC-227/HALON 1301/3M™ NOVEC™ 1230/nitrogen charge must be placed on a scale of precise weighting ability, to inform the operator when the liquid level inside the tank becomes full.

2. Install the manufactures recommended discharge adapter assembly onto the system cylinder valve, install the 1/2” ball valve assembly (item 34) onto the discharge adapter. Connect the female quick coupler (item 24) to the male quick coupler on the ball valve assembly.
3. Place system cylinder (item 7) on a scale of precise weighting ability.
4. Turn the selector valve (item 22) on the control console to the *RECOVERY CYLINDER* position. Fully open the liquid valve on the receiver tank.
5. Locate the liquid/nitrogen valve (item 6) on the control console and turn the handle to the *LIQUID* position.
6. Discharge the system cylinder and open the 1/2" ball valve (item 33) on the discharge adapter. Watch the clear glass moisture indicator (item 1) if the liquid flowing through the indicator is anything other than clear, refer to the “Recycle Procedure” (page 18).
7. Turn pump valve (item 23) on the control console to the *ON* position when the inlet pressure gauge (item 4) and the discharge pressure gauge (item 3) reads within 50 PSI of equaling pressure.
8. Continue pumping, as you watch the clear glass moisture indicator (item 1). The clear glass moisture indicator will be flowing liquid and then turn to pumping vapor.

**Note** – If the clear glass moisture indicator turns yellow, refer to the “Recycle Procedure” (page 16).

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### RECOVERY PROCEDURE FOR CYLINDERS WITH SEALED SIPHON TUBES (CONT.):

9. When the inlet pressure gauge (item 4) declines to zero (0), monitor the pressure/vacuum gauge (item 2) until a reading of 13 inches of vacuum is obtained. Turn the pump valve (item 23) to the *OFF* position. Verify the system cylinder has been recovered by checking the scale weight reading to the empty weight stamped on the system cylinder.

Note – More than one cylinder may be recovered until the discharge pressure gauge (item 3) reads approximately 400 PSI, or the scale weight reading indicates the receiver tank to be at 75 LBS/FT liquid fill density.

WARNING - Any cylinder or tank used for the purpose of receiving pure liquid HFC-227/HALON 1301/3M™ NOVEC™ 1230 or nitrogen charged HFC-227/HALON 1301/3M™ NOVEC™ 1230 must be either D.O.T or ASME approved to withstand the high pressures and expansion characteristics associated with liquefied gases. These cylinder or tanks, must contain pressure relief devices in accordance with D.O.T.

10. Before attempting to recharge cylinders wait 15 minutes. This will allow the clear glass moisture indicator (item 1) to react if moisture is present in the HFC-227/HALON 1301/3M™ NOVEC™ 1230 receiver tank. The moisture indicator will change from *GREEN* to *YELLOW* if moisture is present. If moisture is indicated, refer to the “Recycle Procedure” (page 16).
11. Disconnect female quick coupler (item 24) from 1/2" ball valve assembly (item 33).
12. Proceed to the next operating procedure or close all valves.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### RECOVERY PROCEDURE FOR CYLINDERS WITH PINNED SIPHON TUBES:

**WARNING** - Before the contents of any cylinder is allowed to enter this system, a respective sample needs to be analyzed for determination of contents.

**WARNING** - Pressure rated tanks used for the purpose of receiving a HFC-227/HALON 1301/3M™ NOVEC™ 1230/nitrogen charge must be placed on a scale of precise weighting ability to inform the operator when the liquid level inside the tank becomes full.

1. Install the manufacturers recommended discharge adapter assembly on the system cylinder valve. Install the 1/2" ball valve assembly (item 33) on the discharge adapter. Close the 1/2" ball valve.
2. Install the liquid fill adapter (item 29) onto the liquid valve port of the receiver tank. Install the vapor adapter (item 30 and 31) onto the vapor valve port of the receiver tank. "tighten adapters securely".
3. Install liquid adapter assembly (item 26) on the liquid valve port of the auxiliary tank. Install vapor adapter assembly (item 42) on the vapor valve port of the auxiliary tank. Connect the auxiliary liquid hose assembly (item 43) from the 1/2" ball valve assembly (item 33) on the system cylinder to the vapor adapter on the auxiliary tank (item 44). "tighten securely".
4. Turn the selector valve (item 22) on the control console to the *SYSTEM CYLINDER* position. Turn the liquid/nitrogen valve (item 6) to the *LIQUID* position. Turn the pump valve (item 23) to the *ON* position. Cycle the system as you monitor the pressure/vacuum gauge (item 2) until a reading of 5" of vacuum is obtained. Turn the pump valve (item 23) to the *OFF* position.
5. Connect female quick coupler (item 25) on receiver tank hose to the liquid adapter assembly (item 29) on the receiver tank. Fully open the liquid and vapor valves on the receiver tank.
6. Turn the selector valve (item 22) to the *RECOVERY CYLINDER* position. Turn the pump valve (item 23) to the *ON* position. Cycle the system until the pressure/vacuum gauge (item 2) obtains a reading of 5" of vacuum. Turn the pump valve (item 23) to the *OFF* position.
7. Connect the female quick coupler on the system cylinder hose (item 19) to the liquid adapter assembly (item 26) on the auxiliary tank. Fully open the liquid and vapor valves on the auxiliary tank.

**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**RECOVERY PROCEDURE FOR CYLINDERS WITH PINNED SIPHON TUBES (CONT.):**

8. Place the receiver tank on a scale of adequate weighting capacity and record the empty weight of the receiver tank.
9. Connect the auxiliary vapor hose (item 45) from the vapor valve adapter (item 30 or 31) on the receiver tank to the nitrogen fill port on the system cylinder.
10. Release the discharge lever or pin on the system cylinder and open the 1/2" ball valve assembly (item 33) on the discharge adapter. Turn the pump valve (item 23) to the *ON* position.
11. Watch the clear glass moisture indicator (item 1). If the liquid flowing through the indicator is discolored or the color dot turns yellow, refer to the recycle procedure (page 18).
12. Monitor the pressure gauge on the system cylinder and the inlet pressure gauge (item 4). When both gauges are reading equal pressure, close the 1/2" ball valve (item 33) on the system cylinder discharge adapter. Continue to allow the pump to cycle.
13. Open the 1/4" ball valve on the vapor adapter assembly (item 30 or 31) until the system cylinder pressure gauge stops climbing or indicates full pressurized. Close the 1/4" ball valve.
14. When the inlet pressure gauge (item 4) reads 100 PSI, open the 1/2" ball valve assembly (item 34) on the system cylinder discharge adapter. Repeat procedures 11, 12, and 13 until there is no indication of HFC-227/HALON 1301/3M™ NOVEC™ 1230 liquid flowing through the clear glass moisture indicator.
15. Continue the pumping process as you monitor the pressure/vacuum gauge (item 2) until a reading of 13 inches of vacuum is obtained. Verify the system cylinder to be empty by checking the scale weight reading to the empty weight stamped on the system cylinder.
16. Turn the pump valve (item 23) to the *OFF* position and close the liquid and vapor valves on the auxiliary tank.
17. Continue to the next procedure or close all valves.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### RECHARGE PROCEDURE:

1. Complete all HFC-227/HALON 1301/3M™ NOVEC™ 1230 cylinder internal inspection and maintenance procedures in accordance with manufacturers recommendations. Install proper recharge adapter in the cylinder valve. Tighten securely. Install 1/2" ball valve assembly (item 33) onto the recharge adapter.
2. Turn the selector valve (item 22) toward the *RECOVERY CYLINDER* position. Fully open the liquid valve on the receiver tank.
3. Turn the pump valve (item 23) to the *ON* position. Allow the pump to cycle until the pressure/vacuum gauge (item 2) is reading 5 inches of vacuum. Turn the pump valve (item 24) to the *OFF* position.
4. Connect the female quick coupler (item 24) on the system cylinder hose (item 19) to the 1/2" ball valve assembly (item 33) and open the 1/2" ball valve.
5. Open the cylinder valve on the cylinder to be filled. Place the cylinder on the scale platform. If you are using a digital scale, "tare" extinguisher weight or for a mechanical scale, not the "tare" weight and lbs. Needed to achieve full weight
6. Turn the selector valve (item 22) on the control console to the *SYSTEM CYLINDER* position. This will allow liquid 1301 HFC-227/HALON 1301/3M™ NOVEC™ 1230 to gravity feed into the cylinder being filled. "Check" recharge adapter, cylinder valve, and quick couplers for leaks.
7. When the inlet pressure gauge (item 4) and discharge pressure gauge (item 3) are reading within 50 PSI of each other, turn pump valve (item 23) on the control console to the *ON* position. Check scale for increased weight readings. As the cylinder weight reading approaches within one (1) pound calculated charge weight, turn pump valve (item 23) to the *OFF* position and turn selector valve (item 22) to the *OFF* position, stopping the flow of the HFC-227/HALON 1301/3M™ NOVEC™ 1230 to the cylinder.
8. Set the regulator on nitrogen cylinder to the manufactures recommended pressure gauge reading for the cylinder being pressurized. Turn the liquid/nitrogen valve (item 6) to the nitrogen position and watch the cylinder pressure gauge. When the correct cylinder pressure gauge reading is obtained, agitate the cylinder to mix the HFC-227/HALON 1301/3M™ NOVEC™ 1230 and nitrogen. Repeat step 7 if pressure drop below the manufacturers recommended pressure.

**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**RECHARGE PROCEDURE (CONT.):**

9. Close the cylinder valve according to the manufacturers recommended procedure on the filled cylinder. Turn the liquid/nitrogen valve (item 6) to the *LIQUID* position and turn the selector valve (item 22) to the *RECOVERY CYLINDER* position. Turn the pump valve to the *ON* position and watch the pressure/vacuum gauge (item 2) until 5 inches of vacuum is obtained. Turn the pump valve (item 23) to the *OFF* position. Verify there is no pressure indication on the inlet pressure gauge (item 4). If a pressure reading is indicated, the cylinder valve may not have seated when closed. Reclose the cylinder valve and repeat step 8. After no pressure reading is indicated, disconnect the quick coupler (item 24) for the 1/2" ball valve assembly (item 33).
10. Remove manufacturers recharge adapter from cylinder valve and continue cylinder recharge procedures.
11. Proceed to the next operating procedure or close all valves.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### RECYCLE PROCEDURE:

#### (FOR REMOVAL OF MOISTURE, PARTICULATE, AND/OR COLOR)

**CAUTION:** If the clear moisture indicator (item 1) on the control console is **YELLOW** or the HFC-227/HALON 1301/3M™ NOVEC™ 1230 is any color except clear, the HFC-227/HALON 1301/3M™ NOVEC™ 1230 must be recycled through the system before you refill the cylinder

1. Turn the selector valve (item 22) on the control console to the *RECOVERY CYLINDER* position.
  2. Turn the liquid/nitrogen valve (item 6) on the control console to the *LIQUID* position.
  3. Fully open the liquid valve on the receiver tank (item 32).
  4. Turn the pump valve (item 23) on the control console to the **ON** position and allow the system to cycle until the pressure/vacuum gauge (item 2) reads 5 inches of vacuum.
  5. With the system cycling, connect the female quick coupler (item 24) on the system cylinder hose (item 19) to the male quick coupler on the vapor adapter assembly (item 30 or 31).
  6. Fully open the vapor valve on the receiver tank. Turn the selector valve (item 22) on control console to the *SYSTEM CYLINDER* position.
  7. Allow the system to circulate the HFC-227/HALON 1301/3M™ NOVEC™ 1230 through the filters until the clear glass moisture indicator (item 1) turns *GREEN* or the HFC-227/HALON 1301/3M™ NOVEC™ 1230 looks clear though the moisture indicator glass.
- NOTE:** Refer to the “filter replacement procedure” (page 17) if the moisture indicator (item 1) does not change to *GREEN* or the color does not return to *CLEAR* within one hour.
8. Recycle procedure is complete when moisture eye (item 1) is *GREEN* or the HFX-227 is clear flowing through the clear glass moisture eye
  9. Turn the selector valve (item 22) to the *RECOVERY CLYINDER* position. Allow the system to cycle for 1 minute, close the vapor valve on the receiver tank, and monitor the pressure/ vacuum gauge (item 2) until a reading of 5 inches of vacuum is obtained. Disconnect female quick coupler (item 24) and turn the pump valve (item 23) on the control console to the *OFF* position.
  10. Close all valve or proceed to the next procedure.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM

### PROCEDURE FOR FILTER REPLACEMENT AND CLEANING BRASS STRAINERS:

1. Turn the pump valve (item 23) on the control console to the *OFF* position.
2. Close any valve that is in line with the female quick coupler (item 24). Turn the selector the valve (item 22) on the control console to the *RECOVERY CYLINDER* position.
3. Turn the liquid/nitrogen valve (item 6) on the control console to the Liquid position. Turn the liquid valve on the receiver tank fully open. Turn the pump valve (item 23) to the *ON* position.
4. Allow the system to cycle until the pressure/vacuum gauge (item 2) read 5 inches of vacuum.
5. Turn the pump valve (item 23) to the *OFF* position and close the liquid valve on the receiver tank.

**WARNING** - If either of the gauges in step 6 are indicating a pressure reading, **Do not attempt to service the filters.**

6. Verify that the inlet pressure gauge (item 4) and the pressure/vacuum gauge (items 2) are at a (0) PSI pressure reading. Repeat steps 1 thru 6 is a pressure reading is indicated on either gauge. Refer to the trouble shooting guide on page 21-22 if steps 1 thru 6 do not correct the pressure reading.
7. Remove the bolts from the filter canister (item 35). Lift the filter cap away from the filter canister and replace filter cores. Follow replacement procedures found on each replacement filter core canister.
8. Turn the brass hex nut from strainer bodies (item 14 & 35) counter clockwise. Remove and clean the fine mesh screens using an air gun at 30 PSI air pressure.

**WARNING** - Replace the fine mesh screen on either strainer if bent, torn, or frayed. **System damage will results if not maintained.**

9. Proceed to the next operating procedure or close all valves.

**WARNING: FOLLOW PURGE PROCEDURE TO AVOID MIXING OF CLEAN AGENTS**

**PURGE PROCEDURE FOR SWITCHING CLEAN AGENTS:**

1. Turn the selector valve (item 22) on the control console to the RECEIVER position. Open the liquid valve on the receiver tank. Turn the pump valve (item 23) to *ON* and allow the system to cycle until the pressure/vacuum gauge (item 2) reads 5 inches of vacuum. Turn the pump valve (item 24) to *OFF*.
2. Connect the female quick connect (item 24) to the receiver tank vapor port adapter (item 30).
3. Open the vapor valve on the receiver tank.
4. Turn the pump valve (item 23) to *ON*. Allow the pump to run for 1 minute to purge all liquid from the system.
5. Close the vapor valve on the receiver tank and allow the system to cycle until the pressure/vacuum gauge (item 2) reads 5 inches of vacuum. Turn the pump valve (item 23) to *OFF*.
6. Connect the female quick connect (item 24) to the male quick connect (item 13) using the adapter.
7. Set the pressure reducing regulator to zero (0) output pressure, and open the supply valve on the nitrogen cylinder.
8. Set regulator to 20 PSI above reading on pressure gauge (item 3) but not to exceed maximum receiver tank pressure.
9. Allow the nitrogen to flow until the pressure on gauge (item 3) equals the pressure on the regulator.
10. Set the pressure reducing regulator to zero (0) output pressure, and close the supply valve on the nitrogen cylinder. Turn the pump valve (item 23) to *ON*. Allow the system to cycle until the pressure/vacuum gauge (item 2) reads 5 inches of vacuum. Turn the pump valve (item 23) to *OFF*. Close the liquid valve on the receiver tank.
11. You may now use a different clean agent.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECHARGE SYSTEM

### RECOMMENDED PERIODIC MAINTENANCE:

(Minimum recommendations – perform more frequently if required)

1. Every day, lubricate all male and female quick couplers (items 24, 25 & 33) with a light coat of HFC-227/HALON 1301/3M™ NOVEC™ 1230 compatible O-ring lubricant.
2. Every day, empty the airline moisture filter (item 17).
3. Every day, remove the brass hex nut on the strainer body (item 14 & 35). Clean and inspect for damage. Refer to “procedure for filter replacement and cleaning brass strainer” on page 19.

### WARNING - SYSTEM DAMAGE WILL RESULT IF NOT MAINTAINED.

4. Once per month, check the complete system for leaks while “performing the recycling procedure” using a HFC-227/HALON 1301/3M™ NOVEC™ 1230 leak detector or leak detecting fluid.

CAUTION: If a leak detecting fluid is utilized, proper care should be observed to remove all excess fluid after testing.

5. Once per month, retighten all bolts and nuts securing component parts to the system.
6. Once per month, or if the pump slows while operating, lubricate spool valve in the HFC-227/HALON 1301/3M™ NOVEC™ 1230 pump. Refer to the “HFC-227/HALON 1301/3M™ NOVEC™ 1230 pump operation and maintenance manual”, pages 24-30.
7. Once every six months or if clear glass moisture indicator (item 1) will not turn green, change the filter elements P/N 51250 (in item 34). Refer to the “Procedure for filter replacement and cleaning brass strainer” on page 17.
8. Once per year, dismantle the pump. Clean and lube the O-ring on the air drive piston. Refer to the “HFC-227/HALON 1301/3M™ NOVEC™ 1230 pump operation and maintenance manual”, pages 24-30.
9. Once per year, have your nitrogen regulator on the nitrogen supply cylinder cleaned and recalibrated.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECHARGE SYSTEM

### TROUBLE SHOOTING GUIDE:

#### PROBLEM:

- A. HFC-227/HALON 1301/3M™ NOVEC™ 1230 flows slowly or not at all through the system
- B. HFC-227/HALON 1301/3M™ NOVEC™ 1230 leaks from female quick couplers
- C. Pump cycle is slow.
- D. Pump valve or liquid/nitrogen valve is leaking agent
- E. Pump cycles but will not build pressure.
- F. Moisture indicator will not turn green or is white.

#### SOLUTION:

- A.
  1. Make sure all liquid valves are open and selector valve is in the proper position.
  2. Check or change filters inside of filter housing (item 34) and clean brass strainers (item 14 & 35). Refer to procedure on page 17.
- B. Replace o’ring seal on the inside of the quick coupler or replace the female quick coupler.
- C.
  1. Check incoming air pressure to system. Set at 100 to 120 PSI and 13 CFM minimum.
  2. Refer to spool valve lubricating instructions in HFC-227 pump maintenance manual. (Refer to procedure on pages 24-30)
- D. Insert Allen wrench in set screw on the side of the handle and turn counter clockwise until handle is free. Lift handle off valve and tighten slotted packing nut around valve stem slightly. Replace handle and retighten set screw clockwise or replace valve.
- E. Refer to “Operations Manual” on the procedure you are performing and verify all valves are properly positioned and all fittings are properly connected.
- F.
  1. Refer to the “Procedure for filter replacement and cleaning brass strainers” on page 17.
  2. If moisture indicator is WHITE, replace with new moisture indicator. Relieve all internal pressure in accordance with procedure on page 17.

## MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECHARGE SYSTEM

### TROUBLE SHOOTING GUIDE (CONT.):

#### PROBLEM:

- G. Relief valve (item 18) exhausts HFC-227/HALON 1301/3M™ NOVEC™ 1230.
- H. Pump cycles but will not build a vacuum.
- I. HFC-227/HALON 1301/3M™ NOVEC™ 1230 leaks around tank valve adapters (items 26, 29, 30, 31, 44)
- J. HFC-227/HALON 1301/3M™ NOVEC™ 1230 leaks out of pump.
- K. System cylinder begins building weight but stops or builds pressure but little or no weight.
- L. Cylinder is recharged but pressure gauge on cylinder drops below manufacturers recommended gauge pressure.

#### SOLUTION:

- G. Refer to “Operations Manual” on the procedure you are performing. Verify that all valves are in the proper position and all fitting are properly connected.
- H. Leaks test system with HFC-227/HALON 1301/3M™ NOVEC™ 1230 leak detector, repair leaks as necessary.
- I. Tighten adapters or replace gasket in adapters.
- J. Refer to HFC-227/HALON 1301/3M™ NOVEC™ 1230 pup maintenance manual on pages 24-30.
- K. There may be no liquid HFC-227/HALON 1301/3M™ NOVEC™ 1230 in the receiver tank (item 32).
- L. Add nitrogen to the filled cylinder, and re-agitate the HFC-227/HALON 1301/3M™ NOVEC™ 1230 and nitrogen until pressure gauge stabilizes. Leak test the filled cylinder valve.

**MODEL HFC-227/HALON 1301/3M™ NOVEC™ 1230 RECOVERY/RECYCLE SYSTEM**

**RECOMMENDED MAINTENANCE KIT OR SPARE PARTS:**

<b><u>QUANTITY</u></b>	<b><u>PART #</u></b>	<b><u>DESCRIPTION</u></b>
1 EACH	3G58941	KIT MAINTENANCE HR-200 PUMP AIR
1 EACH	3G58800	REPLACEMENT MOISTURE EYE CARTRIDGE
2 EACH	1G0418	FILTER CORE ELEMENTS
1 EACH	1G52534	FINE MESH REPLACEMENT FILTER (STRAINER)
2 EACH	1G51344	GASKET FOR RECEIVER TANK ADAPTERS
1 EACH	1G51445	SEAL KIT FOR CONTROL VALVE ON HFC-227/HALON 1301/3M™ NOVEC™ 1230 PUMP
1 EACH	1G58846	DOWEL ROD FOR SPOOL VALVE REMOVAL
4 EACH	1G58801	O-RING SEAL FOR FEMALE QUICK COUPLER
4 EACH	1G58802	O-RING SEAL FOR MALE QUICK CONNECT
1 TUBE	1G51515	SEAL LUBRICANT FOR HFC-227/HALON 1301/3M™ NOVEC™ 1230 PUMP AIR DRIVE
1 EACH	3G56326	BRASS NUT & REPLACEMENT MESH FILTER (STRAINER)
1 EACH	1G58835	ORING FOR BRASS NUT & REPLACEMENT MESH FILTER
1 EACH	1G52540	SELECTOR VALVE REPAIR KIT