**17/19 Series
50/60 Hz
PreVent™ High Efficiency Purge**

Installation, Operating and Maintenance Instructions

For Use With Low-Pressure Centrifugal Liquid Chillers

SAFETY CONSIDERATIONS

Centrifugal liquid chillers are designed to provide safe and reliable service when operated within design specifications. When operating this equipment, use good judgment and safety precautions to avoid damage to equipment and property or injury to personnel.

Be sure you understand and follow the procedures and safety precautions contained in the machine instructions as well as those listed in this guide.

⚠ DANGER

DO NOT VENT refrigerant relief valves within a building. Outlet from rupture disc or relief valve must be vented outdoors in accordance with the latest edition of ANSI/ASHRAE 15 (Safety Code for Mechanical Refrigeration). The accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation.

PROVIDE adequate ventilation in accordance with ANSI/ASHRAE 15, especially for enclosed and low overhead spaces. Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Misuse can be fatal. Vapor is heavier than air and reduces the amount of oxygen available for breathing Product causes eye and skin irritation. Decomposition products are hazardous.

DO NOT USE OXYGEN to purge lines or to pressurize a machine for any purpose. Oxygen gas reacts violently with oil, grease, and other common substances.

NEVER EXCEED specified test pressures, VERIFY the allowable test pressure by checking the instruction literature and the design pressures on the equipment nameplate.

DO NOT USE air for leak testing. Use only refrigerant or dry nitrogen.

DO NOT VALVE OFF any safety device.

BE SURE that all pressure relief devices are properly installed and functioning before operating any machine.

⚠ WARNING

DO NOT WELD OR FLAMECUT any refrigerant line or vessel until all refrigerant *(liquid and vapor)* has been removed from chiller. Traces of vapor should be displaced with dry air or nitrogen and the work area should be well ventilated. *Refrigerant in contact with an open flame produces toxic gases.*

DO NOT USE eyebolts or eyebolt holes to rig machine sections or the entire assembly.

DO NOT work on high-voltage equipment unless you are a qualified electrician.

DO NOT WORK ON electrical components, including control panels, switches, starters, or oil heater until you are sure ALL POWER IS OFF and no residual voltage can leak from capacitors or solid-state components.

LOCK OPEN AND TAG electrical circuits during servicing. IF WORK IS INTERRUPTED, confirm that all circuits are deenergized before resuming work.

DO NOT syphon refrigerant by mouth.

AVOID SPILLING liquid refrigerant on skin or getting it into the eyes. USE SAFETY GOGGLES. Wash any spills from the skin with soap and water. If any enters the eyes, IMMEDIATELY FLUSH EYES with water and consult a physician.

NEVER APPLY an open flame or live steam to a refrigerant cylinder. Dangerous overpressure can result. When necessary to heat refrigerant, use only warm (110 F [43 C]) water.

DO NOT REUSE disposable (nonreturnable) cylinders or attempt to refill them. It is DANGEROUS AND ILLEGAL. When cylinder is emptied, evacuate remaining gas pressure, loosen the collar and unscrew and discard the valve stem. DO NOT INCINERATE.

CHECK THE REFRIGERANT TYPE before adding refrigerant to the machine. The introduction of the wrong refrigerant can cause damage or malfunction to this machine.

Operation of this equipment with refrigerants other than those cited herein should comply with ANSI/ASHRAE-15 (latest edition). Contact Carrier for further information on use of this machine with other refrigerants.

DO NOT ATTEMPT TO REMOVE fittings, covers, etc., while machine is under pressure or while machine is running. Be sure pressure is at 0 psig (0 kPa) before breaking any refrigerant connection.

CAREFULLY INSPECT all relief devices, rupture discs, and other relief devices AT LEAST ONCE A YEAR. If machine operates in a corrosive atmosphere, inspect the devices at more frequent intervals.

DO NOT ATTEMPT TO REPAIR OR RECONDITION any relief device when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found within the valve body or mechanism. Replace the device.

DO NOT install relief devices in series or backwards.

USE CARE when working near or in line with a compressed spring. Sudden release of the spring can cause it and objects in its path to act as projectiles.

⚠ CAUTION

DO NOT STEP on refrigerant lines. Broken lines can whip about and cause personal injury.

DO NOT climb over a machine. Use platform, catwalk, or staging. Follow safe practices when using ladders.

USE MECHANICAL EQUIPMENT (crane, hoist, etc.) to lift or move inspection covers or other heavy components. Even if components are light, use such equipment when there is a risk of slipping or losing your balance.

BE AWARE that certain automatic start arrangements CAN ENGAGE THE STARTER. Open the disconnect *ahead of* the starter in addition to shutting off the machine or pump.

USE only repair or replacement parts that meet the code requirements of the original equipment.

DOUBLE-CHECK that coupling nut wrenches, dial indicators, or other items have been removed before rotating any shafts.

DO NOT LOOSEN a packing gland nut before checking that the nut has a positive thread engagement.

PERIODICALLY INSPECT all valves, fittings, and piping for corrosion, rust, leaks, or damage.

Book 2 Tab 5a | PC 211 | Catalog No 531-934 | Printed in U.S.A | Form 19DK-4SI | Pg 1 | 5-92 | Replaces: New

CONTENTS

INTRODUCTION

The PreVent high-efficiency purge enhancement has been designed to substantially reduce refrigerant emissions on low-pressure chillers during the purging process. The distinguishing feature of the PreVent unit is the adsorption of refrigerant gas in a carbon tank. This is the same gas that would be exhausted to the atmosphere by conventional purge units. The PreVent purge uses an innovative method to obtain efficiencies of 96% air by weight and 99% air by volume during the purging cycle.

Application — The PreVent purge has been designed to operate on chillers containing R-11, R-113, and R-114. Special provisions must be made for use with R-113. These provisions are noted where applicable in this manual.

The PreVent purge will only operate on chillers that are equipped with a stainless steel purge condensing chamber. This chamber has been a standard item on all Carrier low-pressure chillers (some model 19DA chillers and all chillers from 19DG through 19DR). Some of the Carrier chillers that were not built with the stainless steel condensing chamber (models 17M, 19C, 19D, and some 19DA chillers) may have already been retrofitted in the field. However, if the current chiller in service does not have or has not been retrofitted with the stainless steel condensing chamber, the chamber can be ordered separately and must be installed with the PreVent purge.

This manual addresses the installation, operation, and maintenance instructions for factory and field-installed PreVent purge units. Table 1 addresses the field and factory-installed options. The sections which address the operation sequence, controls and safety sequence, maintenance, replacement parts, and troubleshooting are common to the factory or field-installed PreVent purge units except where noted.

Machine Description — The PreVent purge is a self-contained unit which consists of five major components. See Fig. 1.

An elementary diagram describing the operation of a PreVent unit with a chiller is shown in Fig. 2. Refer to Table 2 for physical data.

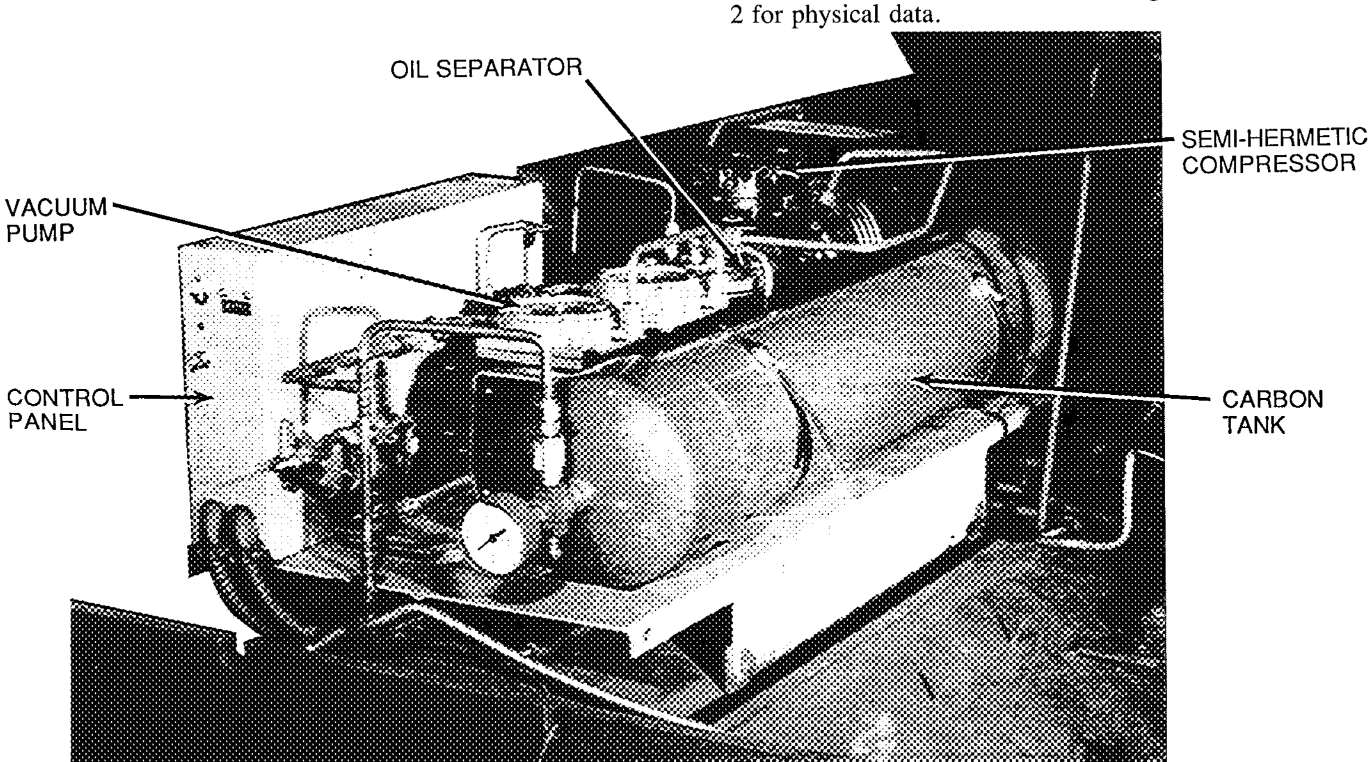


Fig. 1 — PreVent Purge Components

Table 1 — Options and Accessories†

Item	Qty	Factory Installed	Field Installed
Junction Box	1	X	X
Junction Box Cover	1	X	X
Regulating Valve			
R-11 and R-114	1	X	X
R-113	1	X	X
Pressure Gage (0-60 psi/414 kPa)	1	X	X
High-Pressure Switch	1	X	X
Low-Pressure Switch	1	X	X
Loss of Cooling Switch			
for ½-in. tube (12.70)	2	X	
for ⅝-in. tube (15.86)	1		X
*Suction Accumulator	1		X
*Shutdown Solenoid	1		X
*Isolation Relay (KA and KB) (17/19 dual DR only)	2	X	X
*Orifice	2		X
*Single Coil Condensing Chamber	1		X
*Dual Coil Condensing Chamber			
With Safeties		X	X
Without Safeties		X	X

*Ordered separately as needed and noted in these instructions
†For part no. refer to PreVent Replacement Parts catalog.

Table 2 — Physical Data

50/60 Hz		English	(SI)
DRY WEIGHT	lbs (Kg)	230	(104)
CARBON TANK			
Design Pressure	psig (kPa)	15	(103)
Max Operating Pressure	psig (kPa)	10	(69)
COMPRESSOR			
Design Pressure	psig (kPa)	60	(414)
Max Operating Pressure		45	(310)
Suction Connection	in.	⅜*	
Flow Rate			
50 Hz	cfm (m^3/s)	2.3	(.0012)
60 Hz	cfm (m^3/s)	2.2	(.001)
Horsepower		.5	
VACUUM PUMP			
Design Pressure	psig (kPa)	10	(69)
Max Operating Pressure	psig (kPa)	2	(14)
Flow Rate			
50 Hz	cfm (m^3/s)	1 7	(.0008)
60 Hz	cfm (m^3/s)	2.0	(.0009)
Max. Vacuum	in. Hg (kPa)	29	(98)
Horsepower		.5	

*Male flare

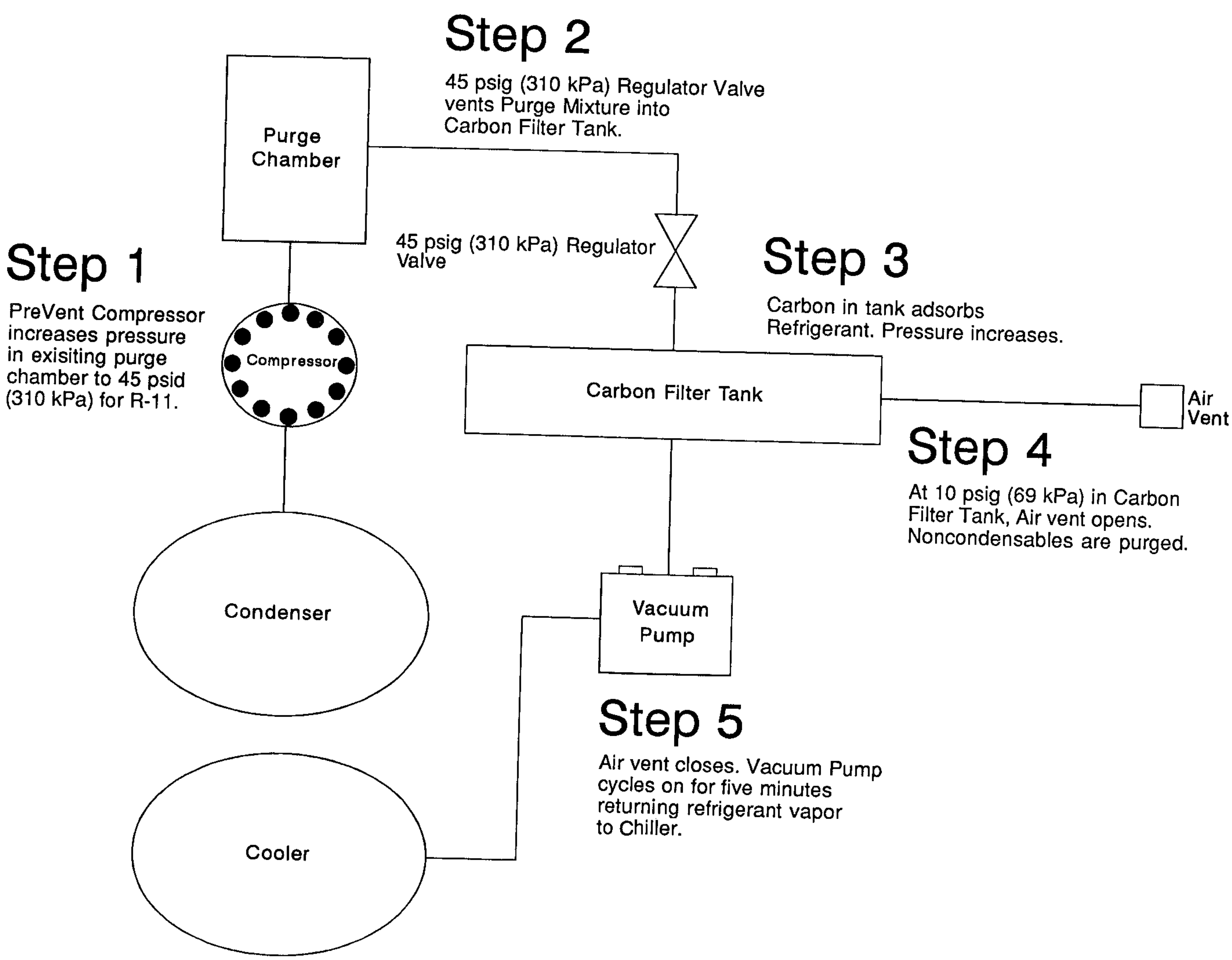


Fig. 2 — Operation Sequence of PreVent™ Purge with Chiller

FACTORY-MOUNTED PREVENT™ PURGE INSTALLATION

This unit requires field-installed water piping to the purge condensing chamber. This water piping will be a cooling source for purge operation when the chiller is in the off mode.

Refer to Fig. 3 which shows the location of city water connections to the purge condensing chamber. A shutoff valve should be installed at the coil inlet. The coil piping is ½ in. (12.70 mm) copper.

INSTALLATION OF FIELD-INSTALLED PREVENT PURGE

General — The PreVent unit may be installed on chillers that have a stainless steel purge condensing chamber.

Check Equipment and Prepare for Installation

IDENTIFY UNIT — Identify the model number and serial number printed on the sticker located on the side of the purge cover. See Fig. 4. Check this information against job data.

When field installing a PreVent unit there are a total of 4 different assemblies that can be ordered depending on the application.

Application 1 — PreVent Unit Installed with a Single Cooling Coil Condensing Chamber — The PreVent unit assembly may be installed on chillers that have a single coil condensing chamber, (whether chamber is existing or retrofit) and is available for applications operating at 50 or 60 Hz.

Assembly 1 — 19DK 111 794 (50 Hz)
Assembly 2 — 19DK 111 804 (60 Hz)

The following parts are included when ordering Assembly 1 or Assembly 2:

- PreVent unit
- regulating valve
- pressure gage
- junction box
- junction box cover
- screws (junction box cover)
- low-pressure switch
- high-pressure switch
- loss of cooling switch

Application 2 — PreVent Unit Installed with a Dual Cooling Coil Condensing Chamber — This PreVent unit assembly may be installed on chillers that have been retrofitted with a dual coil condensing chamber, and is available for applications operating at 50 or 60 Hz.

Assembly 3 — 19DK 111 814 (50 Hz)
Assembly 4 — 19DK 111 824 (60 Hz)

The following is included when ordering Assembly 3 or Assembly 4:

- PreVent unit

(The dual coil condensing chamber with all the safeties must be ordered separately.)

NOTE: If the PreVent unit is to be mounted below the condenser's purge probe or on a 17/19 DR chiller, a suction accumulator and a shutdown solenoid must be ordered separately and installed.

INSPECT SHIPMENT

⚠ WARNING

Turn off all power to the chiller prior to installation of PreVent purge.

Inspect unit for shipping damage while it is still on the shipping conveyance. If the unit appears damaged, have it inspected by the transportation inspectors before removal. Forward claim papers directly to the transportation company. *Manufacturer is not responsible for damage incurred in transit.*

Check all items against the parts list in Identify Unit section. Notify your Carrier order correspondent immediately if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

CHECK SHIPPING PRESSURE — The PreVent unit is shipped with a 5 psi (34 kPa) nitrogen holding charge. If the gage is reading less, a leak may have developed during shipment. To check for leaks that may have occurred during shipment, pressurize with dry nitrogen to 5 psi (34 kPa) and check all joints with a soap bubble solution.

PROVIDE MACHINE PROTECTION — If the machine will not be installed immediately, it is very important to use a drop cloth or plastic covering to protect the unit from construction dirt and moisture.

RIGGING — The PreVent unit weighs 230 lbs (104 kg) in its shipping crate. One end of the unit is heavier than the other. The shipping crate is marked accordingly.

⚠ WARNING

Lifting unit from points other than those specified may result in serious damage and personal injury.

Rigging equipment and procedures must be adequate for unit weight (Table 2).

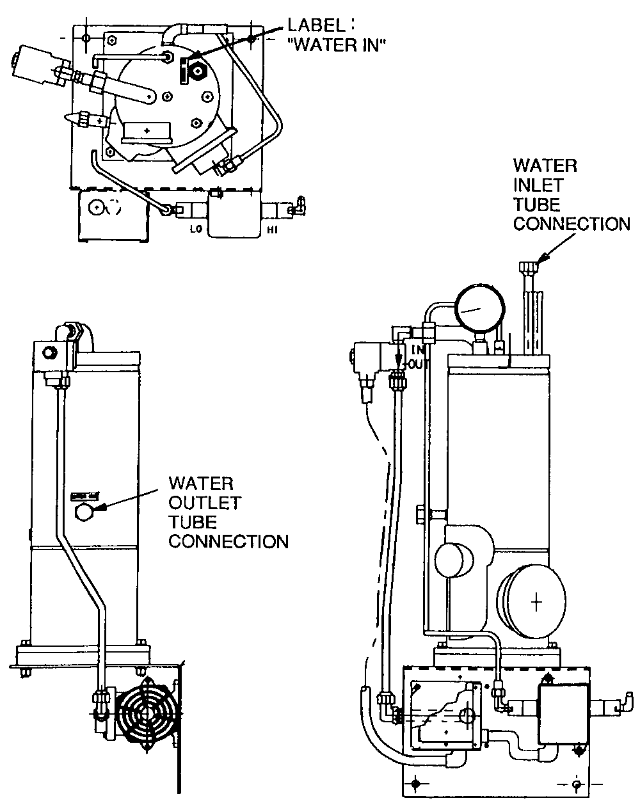
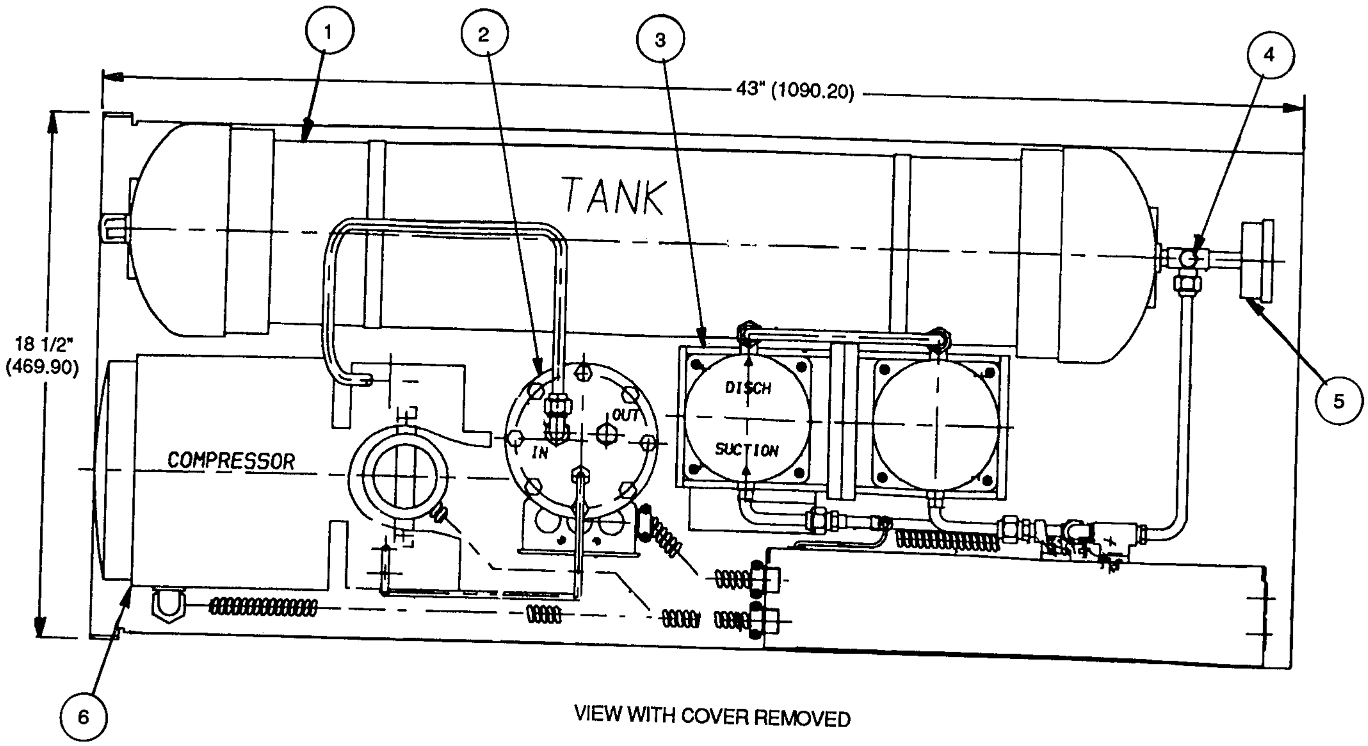
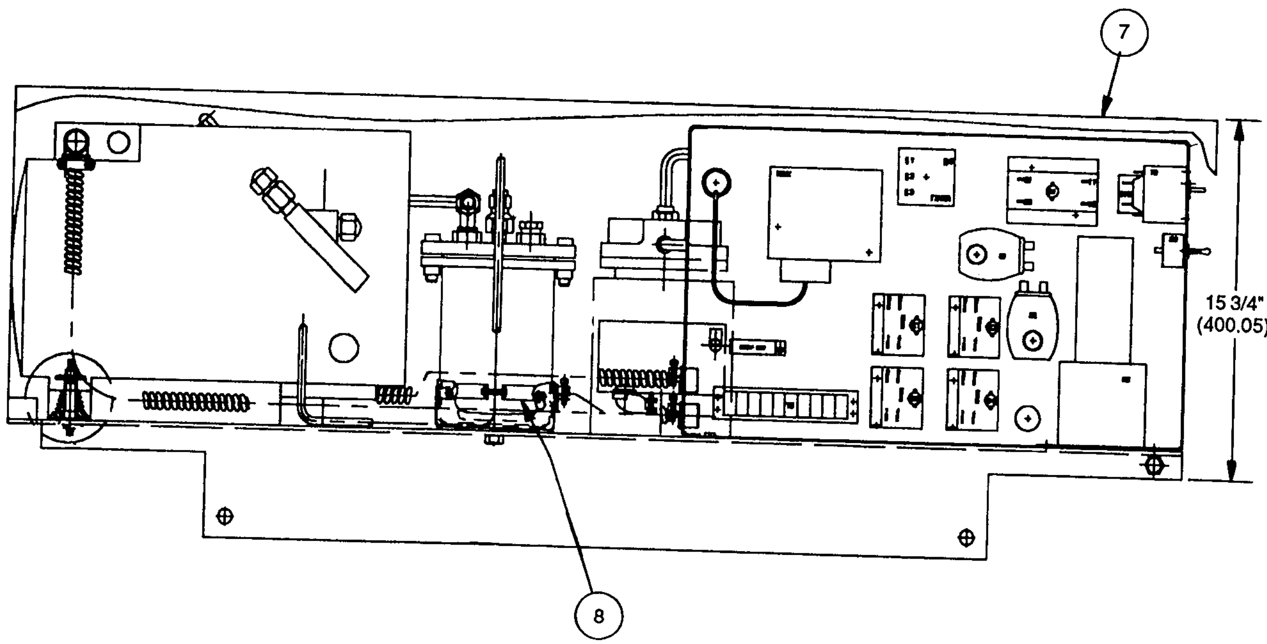


Fig. 3 — Purge Condensing Chamber



VIEW WITH COVER REMOVED



NOTE COVER IS OPEN ON BOTH ENDS

NO.	QTY.	ITEM
1	1	Carbon Tank
2	1	Oil Separator
3	1	Vacuum Pump
4	1	Relief Valve
5	1	Pressure Gage
6	1	Compressor Assembly
7	1	Purge Cover
8	1	Oil Separator Heater
9	1	Compressor Oil (not shown)

NOTES:
1. For part no refer to PreVent Replacement Parts catalog
2. Dimensions in ( ) are in millimeters

Fig. 4 — Purge Component Identification

Purge Installation with Single Coil Condensing Chamber for Refrigerants R-11, R-114, and R-113 — If the chiller has a stainless steel single coil condensing chamber it can be used with the PreVent™ unit.

Prior to piping the PreVent unit to the existing condensing chamber a number of tasks must be completed.

PRE-PIPING INSTALLATION

1. Remove the existing 0-30 psig (206 kPa) pressure gage from the top of the condensing chamber.
2. Remove insulation from the top of the condensing chamber.
3. Install the 0-60 psig (414 kPa) pressure gage provided.
4. Remove the existing purge pump.
5. Remove the ⅛ NPT fitting on top of the condensing chamber that was used for the existing operating switch.
6. a. Place the junction box that has been provided for the temperature and pressure safety controls on top of the condensing chamber. The ¾ in. (19.05 mm) hole in the top and bottom of the junction box is for the cooling coil inlet tube. This tube will have to be cut to install the box. Once the box is on top of the chamber, line up the hole in the bottom of the box with the ⅛ NPT hole in the top of the chamber. Use the third hole in the box as a template to mark a hole to be drilled and tapped into the top of the purge chamber.
   b. Remove the junction box, drill and tap a ⅛-27 NPT hole in the top of the chamber.
   c. Place the box back on top of the condensing chamber. If the cooling coil inlet tube is not long enough to protrude from the top of the box, extra tubing must be added.
7. Once the junction box is in place, attach the loss of cooling (LOC) switch provided. Place it on the cooling coil inlet tube inside the box. This switch is made to fit a ⅝ in-tube (15.86 mm).
8. a. *R-11 and R-114 only*
   Thread the low-pressure switch and high-pressure switch into the two ⅛ NPT holes in the box These switches will thread into the top of the purge condensing chamber. Tighten the switches to hold the junction box in position Use a refrigerant thread sealant for a leak tight connection. Refer to Fig. 5.
   b. *R-113 only*
   Thread the high pressure switch as described in Step 8a.
   Since R-113 is a lower pressure refrigerant than R-11, the low-pressure switch used with R-11 will not work with R-113. This pressure switch is not adjustable. Do not drill and tap a hole for a low-pressure switch. Omit the installation of this switch.
   Set the pressure regulating valve which is mounted on top of the condensing chamber for 15 psig (103 kPa).
   NOTE: This regulating valve must be ordered separately. See Table 1.

PIPING CONNECTIONS

1. Install a ½ in. (12.70 mm) copper tube from the oil separator discharge to the gas inlet tube of the condensing chamber. This tube is located in the middle of the top of the chamber.
2. Install the regulating valve provided with the PreVent unit at the gas outlet of the chamber. The gas outlet will be the last tube that remains unconnected. It is located on the top of the condensing chamber near the side wall. Refer to Fig. 6 for the top view of the condensing chamber.
3. Pipe the discharge of the pressure regulator to the inlet of the carbon tank. The tank inlet is located on the same side as the compressor. The regulator has two inlet ports, one on each side. One of the inlet ports must be plugged. There is one outlet port on the bottom. Refer to Fig. 7.
4. A relief valve is located at the outlet of the carbon tank. This valve must be piped back to the chiller.
5. The discharge of the vacuum pump must also be piped back to the chiller. The discharge from the vacuum pump and the carbon tank relief valve must be piped to the purge chamber's refrigerant cooling coil outlet. The condensing chamber cooling coil outlet returns to the evaporator. If the cooling coil contains water as the cooling source, do not pipe these returns into the water coil return.

⚠ WARNING

Water must be within design flow limits, clean, and treated to ensure proper machine performance and reduce the potential of tubing damage due to corrosion, scaling, or erosion. Carrier assumes no responsibility for chiller damage resulting from untreated or improperly treated water.

6. The condensing chamber can be cooled by liquid refrigerant or by water. If the existing liquid refrigerant is used it will not allow the PreVent™ unit to operate when the chiller is off. Therefore, cooling water is recommended in order for the single coil condensing chamber to operate the PreVent unit while the chiller is off or on. The cooling water should be supplied from the chilled water system. The purge chamber must receive water at the inlet connection located at the top of the condensing chamber. This water must come from the chilled water entering the machine. The cooling water exiting the chamber should be returned to the chiller's leaving chilled water pipe.
7. City water can be piped into the chilled water cooling line entering the purge coil. This piping will provide a cooling source to operate the PreVent unit when the chiller is off. City water exiting the cooling coil should be piped to a floor drain.
8. The refrigerant that condenses in the condensing chamber returns to the evaporator through a float assembly. This tube should be piped to the same return as the vacuum pump, carbon tank relief valve, and refrigerant cooling coil return.
9. Install a ½ in. (12.70 mm) copper tube to the gas sampling line that comes from the purge probe. Connect this line to the suction side of the compressor. If the PreVent unit is to be installed lower than the purge probe (as may be the case with Carrier 19C or 17M chillers or certain Trane models) install a ⅛ in. (3.18 mm) orifice and a shutdown solenoid at the outlet of the purge probe. Then, install an accumulator at the suction side of the compressor.
10. The Carrier 17/19 DR chiller will also need a ⅛ in. (3.18 mm) orifice, shutdown solenoid and an accumulator even though the PreVent may be installed above the purge probe.
11. Insulate the gas sampling line and the suction accumulator.

Inspect Piping Connections — Refer to the piping diagram in Fig. 5. Be sure that flow directions are correct and that all piping specifications are met.

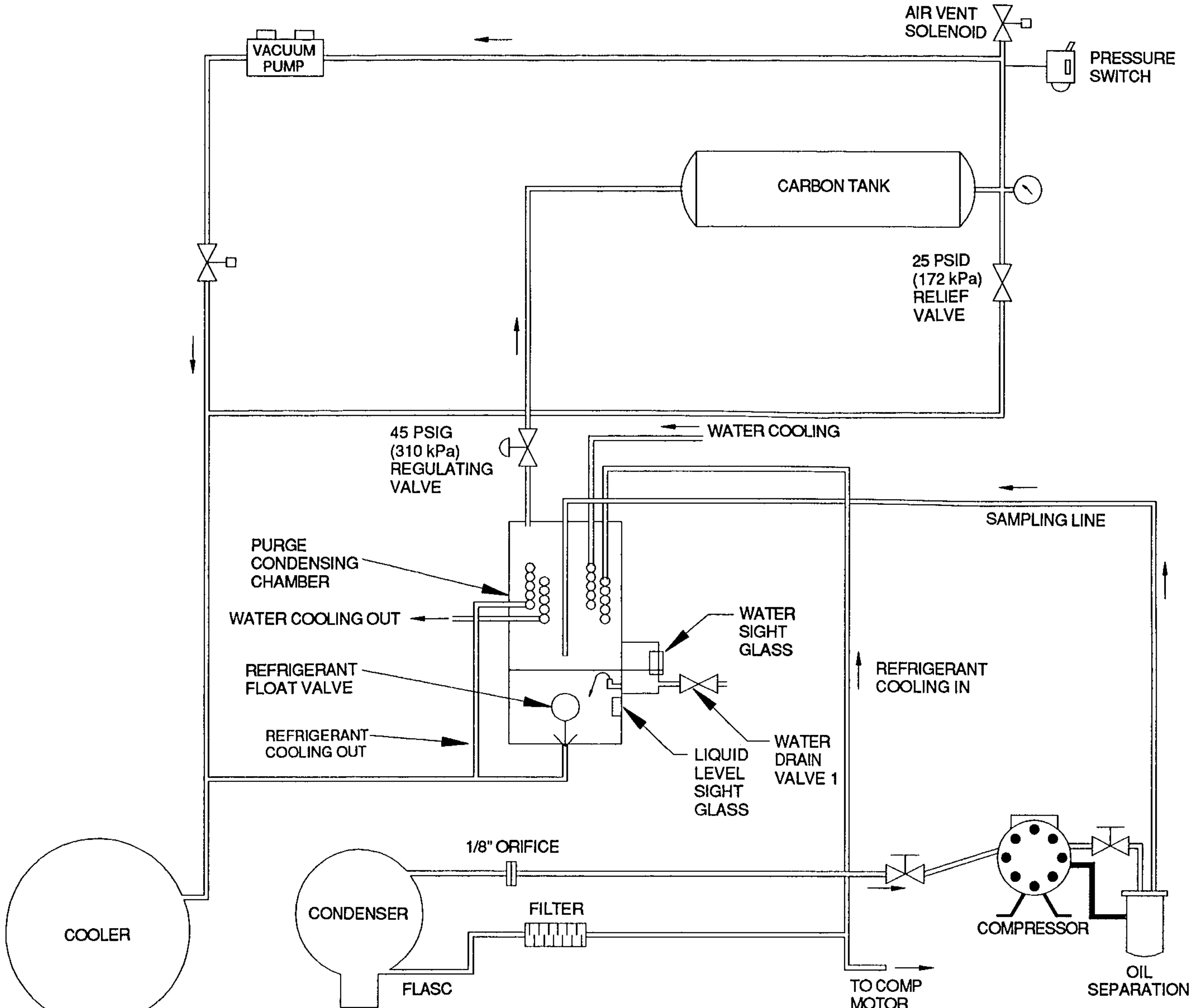
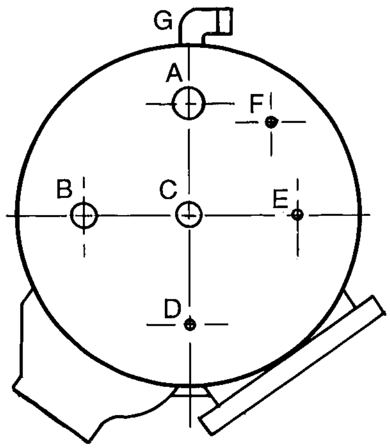


Fig. 5 — Basic Piping Schematic



A. Cooling Coil Inlet Tube
B. Gas Outlet Tube
C. Gas Inlet Tube
D. 1/8 NPT Hole for the Pressure Gage
E. 1/8 NPT Hole Used for Existing Operating Switch. The High-Pressure Switch Should be Installed Here
F. 1/8 NPT Hole to be Drilled and Tapped for the Low-Pressure Switch
G. Cooling Coil Outlet Tube

Fig. 6 — Top View Condensing Chamber

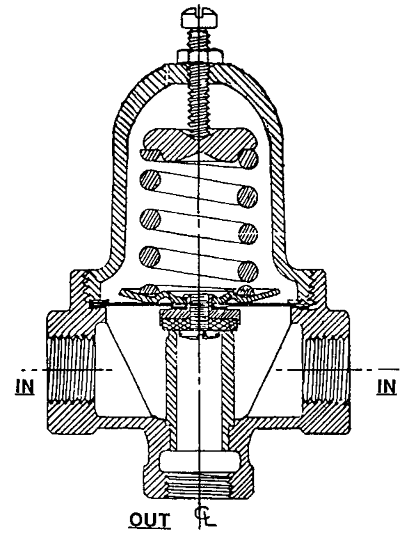


Fig. 7 — Regulator

ELECTRICAL CONNECTIONS — The PreVent™ purge unit operates with 120 v at either 50 or 60 hz. The only component that is not dual frequency is the compressor. Connect electrical power in accordance with the minimum circuit amps and maximum overcurrent protection amps as specified on the unit nameplate. Be sure that the unit is connected and grounded in accordance with applicable codes. See Table 3.

Supply power to the PreVent unit should be provided from the chiller control panel. The control transformer, located in the chiller starter which supplies the chiller control panel, must be at least 2 kva. If it is not large enough, a separate power source must be provided.

Refer to Fig. 8 and 9 to make the proper terminations.

The top portion of the PreVent unit wiring diagram shows relays KA and KB. These two relays are used when installing a PreVent unit on a dual 17/19 DR chiller. These relays will enable the PreVent to operate when either compressor is running. These relays can be installed in the chiller control panel.

NOTE: The KA and KB relays are not shipped with the PreVent unit. They must be ordered separately as needed.

Figure 8 shows the temperature and pressure safeties on lines 3, 4, and 5. These safeties must be wired from the junction box on top of the purge chamber to the purge control panel. Refer to Fig. 10. The single coil condensing chambers will only have one LOC switch.

A shutdown solenoid needs to be installed for some chiller models. Wire this solenoid in parallel with the K4 relay. When the toggle switch is placed in the auto/on position the solenoid will energize and open the sample gas line to the compressor.

Inspect Electrical Connections — Examine wiring for conformance to job wiring diagrams and applicable electrical codes.

Table 3 — Electrical Data

Hz	NOMINAL V-PH-HZ	COMPR (Each)		POWER SUPPLY
		RLA	LRA	MCA
60	115-1-60	7.8	45.0	15
50	115-1-50	7.1	45.2	15

LEGEND

COMPR — Compressor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
Complies with National Electrical Code (U S A.), Section 430-24.
RLA — Rated Load Amps

NOTES:
1 The MCA values are calculated in accordance with National Electrical Code Article 440 (U.S.A. Standard)
2. Motor RLA and LRA values are established in accordance with Underwriters' Laboratories Standard 46S (U.S.A. Standard).

Purge Installation with Dual Coil Condensing Chamber for Refrigerants R-11, R-113, and R-114 — The dual coil condensing chamber is shipped from the factory with a regulating valve and temperature and pressure switches in the junction box, already mounted on the top of the condensing chamber.

PIPING CONNECTIONS — Install a ½ in. (12.70 mm) copper tube to the gas sampling line that comes from the purge probe. Connect this line to the suction side of the compressor. If the PreVent unit is to be installed lower than the purge probe (as may be the case with Carrier 19C or 17M chillers or certain Trane models) install a ⅛ in. (3.18 mm) orifice and a shutdown solenoid at the outlet of the purge probe. Then, install an accumulator at the suction side of the compressor.

The Carrier 17/19 DR chiller will also need a ⅛ in. (3.18 mm) orifice, shutdown solenoid and an accumulator even though the PreVent unit may be installed above the purge probe.

Insulate the gas sampling line and the suction accumulator. When piping dual condensing coil chambers, the outer coil will be refrigerant cooled and the inner coil will be water cooled by using a city water supply.

The liquid refrigerant supplying the cooling coil should come from a subcooled source at a pressure higher than cooler pressure. The Carrier 19D series chillers already have a source of subcooled liquid available. When installing on a 19C chiller subcooled liquid can be found at the liquid level above the low side float valve.

Inspect Piping — Refer to the piping diagram in Fig. 5. Be sure that all flow directions are correct and that all piping specifications are met.

ELECTRICAL CONNECTIONS — The PreVent™ purge unit operates with 120 v at either 50 or 60 hz. The only component that is not dual frequency is the compressor.

Connect electrical power in accordance with the minimum circuit amps and maximum overcurrent protection amps as specified on the unit nameplate. Be sure that the unit is connected and grounded in accordance with applicable codes. See Table 3.

Supply power to the PreVent unit should be provided from the chiller control panel. The control transformer located in the chiller starter supplying the chiller control panel must be at least 2 kva. If it is not large enough a separate power source must be provided.

Refer to Fig. 8 and 9 to make the proper terminations.

The top portion of the PreVent unit wiring diagram shows relays KA and KB. These two relays are used when installing a PreVent unit on a dual 17/19 DR chiller. These relays will enable the PreVent to operate when either compressor is running. These relays can be installed in the chiller control panel.

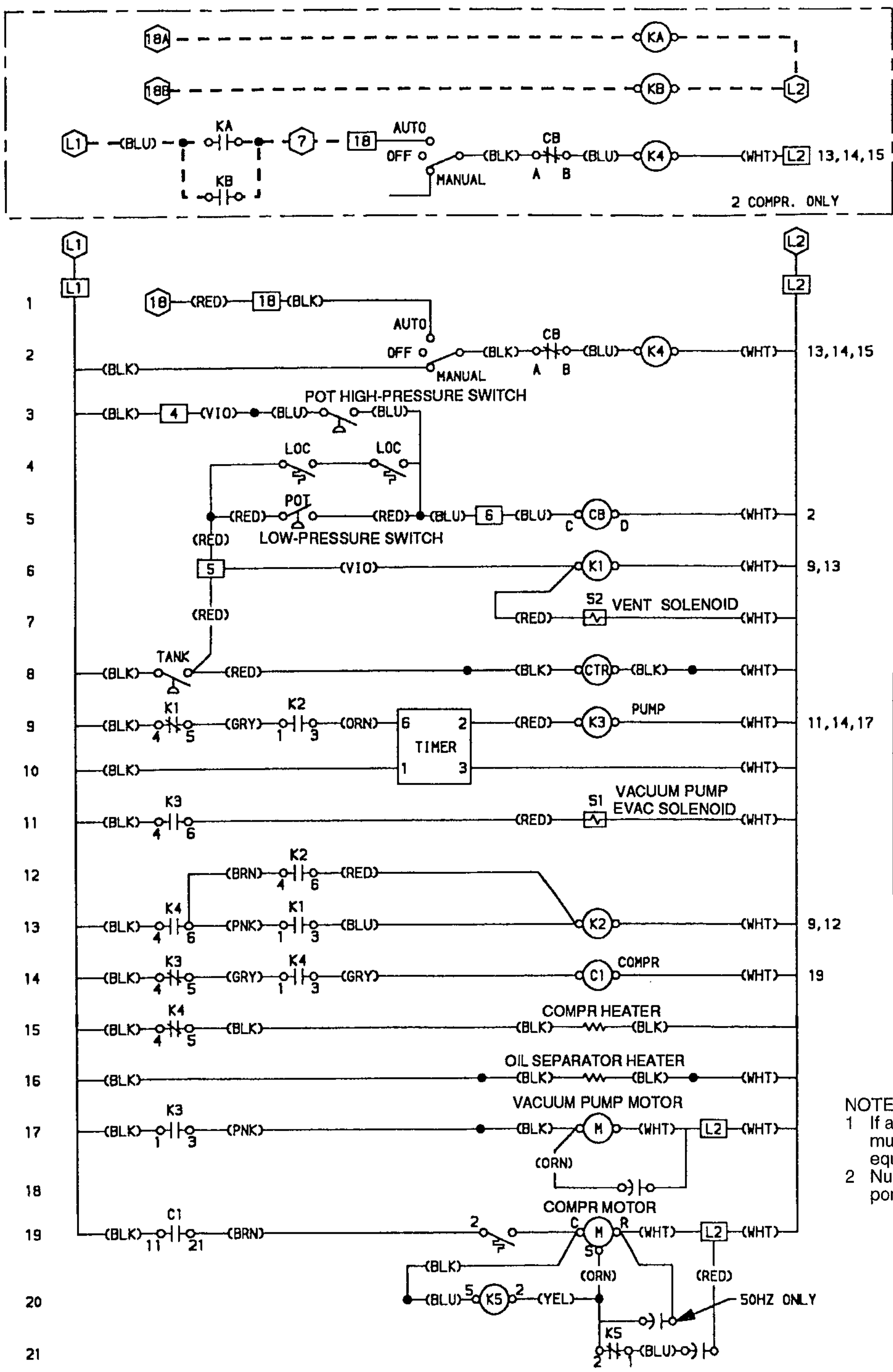
NOTE: The KA and KB relays are not shipped with the PreVent unit. They must be ordered separately as needed.

The external safety wiring diagram shows the temperature and pressure safeties on lines 3, 4, and 5. The dual coil condensing chambers have 2 LOC switches. These safeties must be wired from the junction box on top of the purge chamber to the purge control panel.

A shutdown solenoid is necessary for certain applications as described in piping connections section. Wire this solenoid in parallel with the K4 relay. When the toggle switch is placed in the auto/on position the solenoid will energize and open the sample gas line to the compressor.

Inspect Electrical Connections — Examine wiring for conformance to job wiring diagrams and applicable electrical codes.

CONTROL SCHEMATIC

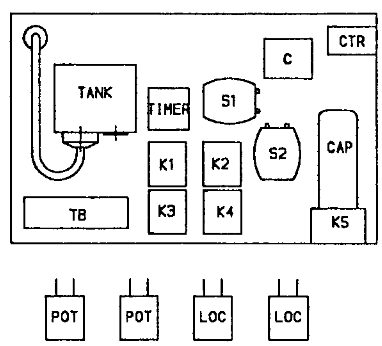


LEGEND

- ——— Factory Wiring
- - - - Field Wiring
- Coil
- Motor
- ● Splice
- Purge Control Box Terminal
- Chiller Control Panel Terminal, 115 Volts 50/60 HZ

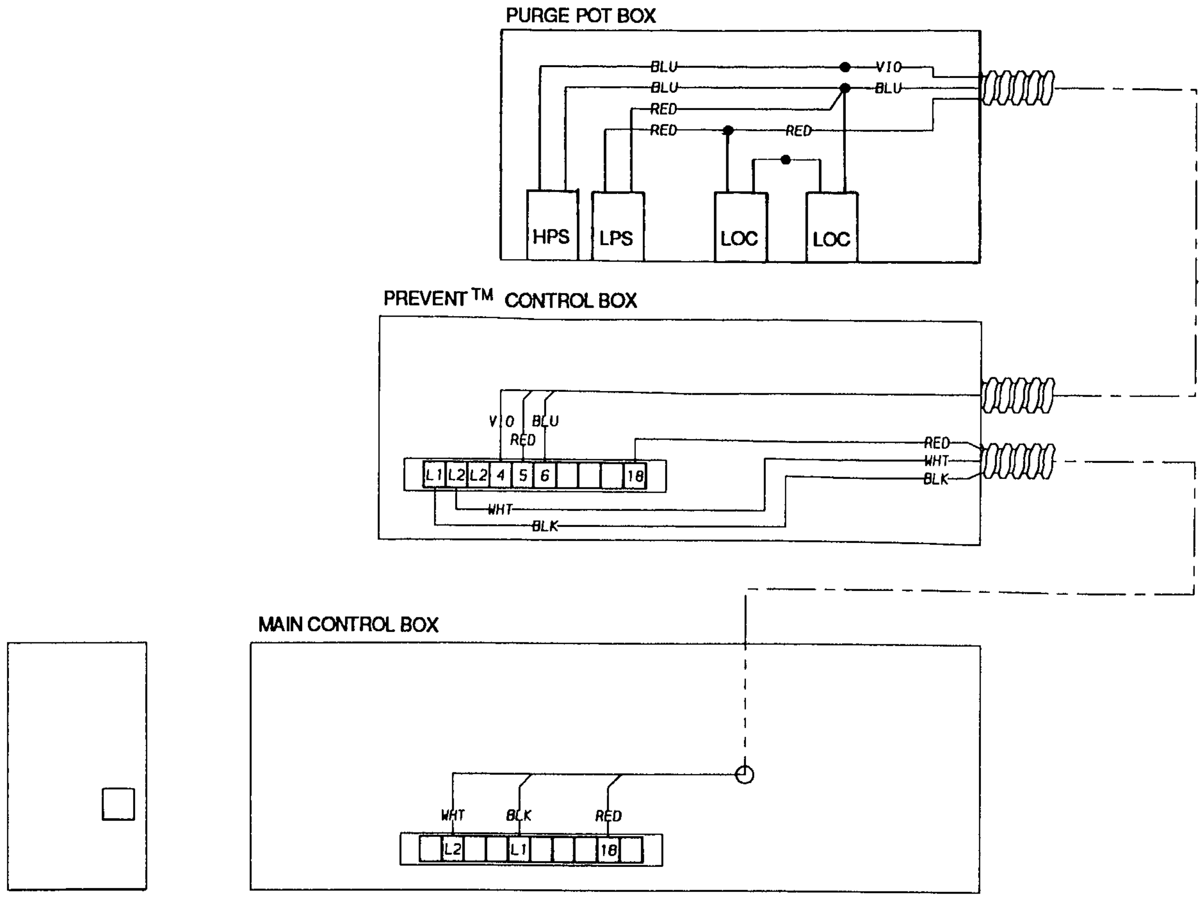
C — Compressor Contactor
CAP — Capacitor
CB — Circuit Breaker
COMPR — Compressor
CTR — Counter
K — Relay
KA — Isolation Relay for Compressor A
KB — Isolation Relay for Compressor B
LOC — Loss of Cooling Switch
M — Motor
POT — Purge Pot
PUMP — Vacuum Pump
S — Solenoid
SEP — Separator
TANK — Carbon Tank

COMPONENT ARR.



NOTE: LINES
1 If any of the original wire furnished must be replaced, it must be replaced with an exact replacement wire or equivalent
2 Number(s) indicates the line location of electrical components contactors, relays, pumps, switches, etc

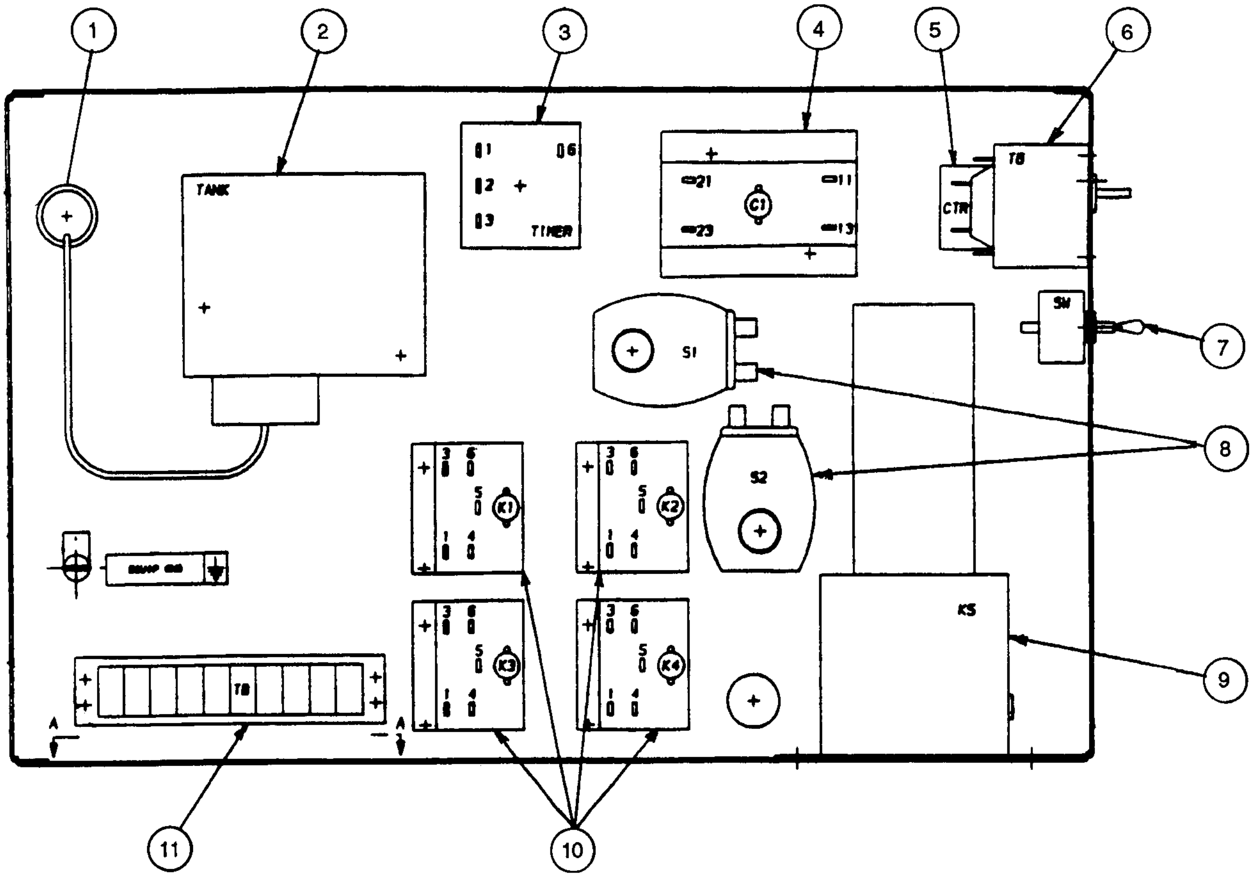
Fig. 8 — Purge Control Schematic



LEGEND

HPS — High-Pressure Switch
LPS — Low-Pressure Switch

Fig. 9 — Safety Wiring Schematic



NO.	QTY.	ITEM
1	1	Grommet
2	1	Pressure Switch (carbon tank)
3	1	Time Delay Relay
4	1	Compressor Contactor
5	1	Purge Counter
6	1	Circuit Breaker
7	1	Toggle Switch
8	2	Solenoid (vacuum pump, vent)
9	1	Capacitor and K5 Relay Assembly
10	4	Relay (K1, K2, K3, K4)
11	1	Terminal Block

*For part no., refer to PreVent™ Replacement Parts catalog

Fig. 10 — Purge Control Panel Assembly*

OPERATING SEQUENCE OF FACTORY AND FIELD-INSTALLED PURGE

The PreVent purge can operate while the chiller is running or shutdown. If air enters the chiller while it is not operating, the PreVent purge will provide the operator the ability to remove the air prior to startup.

NOTE: When using the PreVent unit, the removal of air will take longer when the chiller is off than when the chiller is running.

A three position toggle switch (manual, off, auto) is located on the side of the control panel. The manual position will energize the unit when the chiller is off. Water must be supplied to the cooling coil in the stainless steel condensing chamber when PreVent unit is operating with the chiller off. This is a manual operation. When the auto position is selected the PreVent unit will only operate when the chiller is running. If the condensing chamber is of the new design (containing a water and refrigerant coil) the refrigerant will be supplied automatically to the refrigerant cooling coil while the chiller is running. This will occur due to the differential in pressure between the chiller condenser and evaporator. The off mode will turn the unit off whether the chiller is running or not.

When the PreVent unit is operating and the semi-hermetic compressor is running, a continuous flow of gas is drawn from the chiller condenser through the purge probe. The purge probe is located in a section of the condenser where air is most likely to accumulate while the chiller is running. This gas, composed of air and refrigerant, is compressed and discharged to an oil separator. The separator will return oil that is carried with the compressor discharge gas back to the compressor crankcase. The sampling gas leaves the separator and enters the purge condensing chamber.

The condensing chamber is a stainless steel device that will contain one or two condensing coils, 2 sight glasses and a float valve assembly. As the gas enters the chamber a majority of the gas will condense due to the cooling coil being below the saturation temperature of the refrigerant. The condensed refrigerant will drain to the chamber float valve. Moisture will be seen in the upper sight glass and then removed from the condensing chamber. The moisture will float on top of the refrigerant and can be removed by slowly opening the water drain valve located next to the upper sight glass. The bottom sight glass shows refrigerant being drained back to the cooler.

Air entering the condensing chamber will not condense but will accumulate in the top of the chamber. As more air enters the chamber the pressure will increase. Once the pressure increases to 45 psig (310 kPa) for R-11 and R-114, 15 psig (69 kPa) for R-113, the regulating valve located on top of the chamber will open. Air and some refrigerant gas will be bled to the carbon tank. The pressure in the condensing chamber is indicated by the gage mounted on top of the chamber.

NOTE: If the pressure regulating valve must be readjusted, it can be adjusted by loosening the locknut at the base of the threaded adjustment screw. Clockwise rotation will increase the pressure and counterclockwise rotation will decrease the pressure. Retighten the locknut.

As gas enters the tank the carbon will adsorb the refrigerant and not the air. As more air enters the tank the pressure will increase. Once the pressure reaches 10 psig (69 kPa) the air vent solenoid opens and bleeds air from the tank until the pressure drops to 2 psig (14 kPa). The air vent solenoid then closes and the vacuum pump will energize. The vacuum pump removes refrigerant from the carbon tank and returns it to the evaporator. The purge cycle has ended and a new cycle begins.

CONTROL AND SAFETY SEQUENCE OF FIELD-INSTALLED PURGE

The PreVent unit is supplied with 120 v power obtained from the chiller control panel. Refer to Fig. 8 during the explanation of the control and safety sequence.

Circuit breaker (CB) (line 5) must be closed for the PreVent unit to operate. This circuit breaker is of the manual reset type. The auto mode of operation is standard. When the toggle switch is in the auto mode, power is being supplied through the chiller control panel and relay K4 (line 2) is energized in the PreVent unit control panel. Normally open (N.O.) K4 contact (line 14) closes energizing relay C1. Normally open contact C1 (line 19) closes energizing the semi-hermetic compressor. Normally closed (N.C.) K4 contact (line 15) opens deenergizing the compressor oil sump heater (heater is always on when the PreVent unit is off). The oil separator heater (line 16) is always energized.

When the pressure in the carbon tank reaches 10 psig (69 kPa), the tank pressure switch (line 8) closes. The vent solenoid S2 opens (line 7) and vents the air from the tank. The counter (CTR) (line 8) advances one time and the K1 relay (line 6) energizes. Normally closed K1 contact (line 9) opens and N.O. contact K1 contact (line 13) closes. The relay K2 (line 13) energizes, closing N.O. contact K2 (line 9). Once the tank pressure decreases from 10 psig (69 kPa) to 2 psig (14 kPa), the tank pressure switch opens deenergizing solenoid S2 and relay K1. Contact K1 (line 9) closes, energizing the single shot timer energizing relay K3 (line 9). Normally open contact K3 (line 11) closes energizing vacuum pump discharge solenoid S2 (line 7). The N.O. contact K3 (line 17) closes energizing the vacuum pump motor (line 17). Normally closed contact K3 (line 14) opens deenergizing compressor relay C1 (line 14). Normally open contact C1 (line 19) opens and the compressor deenergizes. The timer will operate the vacuum pump for 5 minutes and then the cycle will begin again.

There are a number of safety features designed into the control circuit (see Table 4). If any of these safety controls close they will energize circuit breaker CB (line 5) and deenergize the entire unit.

If the pressure regulating valve fails to open, a high-pressure switch mounted on the condensing chamber will close at 60 psig (414 kPa) and shut down the unit. This switch will reset at 40 psig (276 kPa).

If the cooling flow to the refrigerant or water coil should stop, a temperature switch located on each coil entering the condensing chamber will close at 90 F (32 C). It will reset at 75 F (23 C). This safety will shut down the PreVent unit only when the carbon tank pressure switch is closed.

If the pressure regulating valve fails to close, a low-pressure switch mounted on top of the condensing chamber will close at 15 psig (103 kPa) and trip the circuit breaker. It will open at 30 psig (207 kPa).

Table 4 — Operating Control and Safety Switch Settings and Tolerances

COMPONENT	SET POINT (±)	ADJUSTMENTS
High-pressure switch (R-11, R-113 & R-114)	Opens at 40 ± 3 psig. (276 kPa ± 21 kPa) Closes at 60 ± 5 psig (414 kPa ± 34 kPa)	Automatic reset Non-Adjustable
Low-pressure switch (R-11 & R-114)	Opens at 30 ± 5 psig (207 kPa ± 34 kPa) Closes at 15 ± 3 psig (103 kPa ± 21 kPa)	Automatic reset Non-Adjustable
Carbon tank pressure switch	Opens at 2.5 ± psig (17 kPa ± 14 kPa) Closes at 10 ± 2 psig (69 kPa ± 14 kPa)	Automatic reset Adjustable setpoint and differential
Loss of cooling switch (LOC)	Opens at 75 ± 5° F. (23 C ± 1°C) Closes at 90 ± 5° F. (32 C ± 1° C)	Automatic reset Non-Adjustable
Time delay relay	5 ± .5 minutes	One shot time delay. Relay output is energized when the timer is energized. Output is deenergized after 5 minutes. Relay is reset when timer is deenergized. Non-adjustable
Condensing chamber regulating valve (R-11 & R-114)	Opens at 45 ± 5 psig (310 kPa ± 34 kPa)	Adjustable set point.
Circuit Breaker	On/Off	Instantaneous trip Manual reset
Carbon tank relief valve	25 ± 1.5 psid (172 kPa ± 10 kPa)	Non-adjustable

MAINTENANCE

Periodic maintenance of the PreVent™ purge unit is needed for continued high performance and minimum equipment downtime.

Compressor — Maintain oil level between 1/2 and 3/4 of the sight glass. Change the oil every 5000 hours of operation.

Use 22 oz (623 g) of 3GS oil.

Oil Separator — Change oil every 5000 hours of operation. Use 15 oz (425 g) of 3GS oil.

Vacuum Pump — Replace diaphragm and filters every 5 years.

Control Panel — Inspect and clean as necessary. Verify that all components operate properly on an annual basis.

Purge Unit — Leak test all joints annually.

TESTING PREVENT DISCHARGE EFFICIENCY

A test of the vented gas from the carbon tank is the only way to verify the PreVent unit efficiency. Refer to Fig. 11 for collection of purge vent gas samples.

The purge vent solenoid must be closed. Install a "T" in the vent line. Connect one end of the "T" with a shutoff valve to a vacuum pump. Connect the other end to a clean sample bottle.

Evacuate the bottle and tubing using a vacuum pump. Close the pump isolation valve and turn off the pump. When the sample discharges into the bottle, close the bottle valve and remove the hose.

The sample can be sent to an approved testing laboratory. The sample should be measured as percent of air and percent of refrigerant by weight.

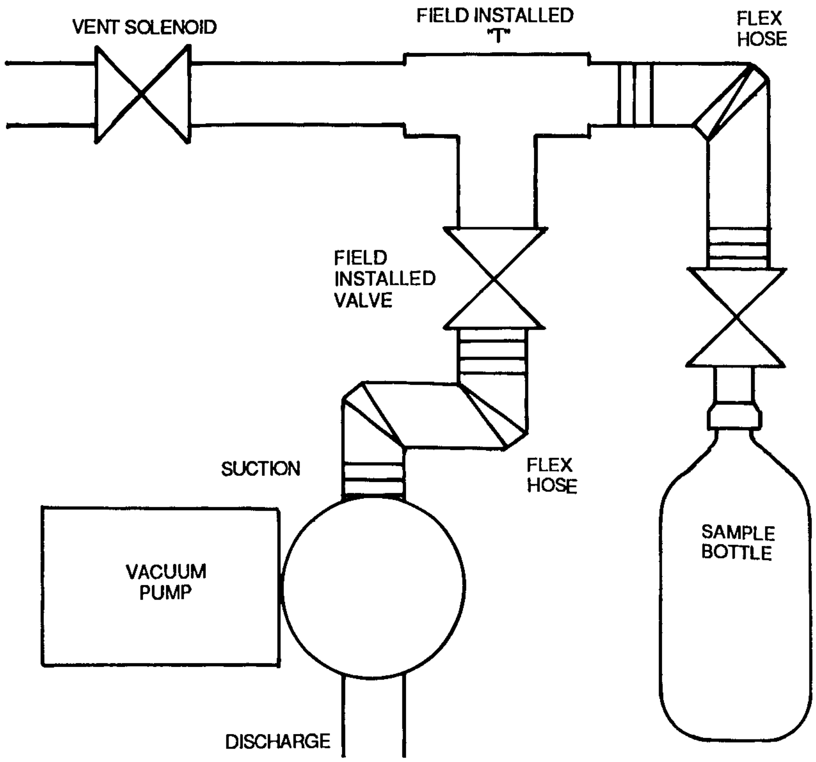


Fig. 11 — PreVent Purge Gas Sampling Schematic

TROUBLESHOOTING

SYMPTOM	CAUSE	CORRECTION
Compressor will not run.	Compressor failure K4 relay failure. C1 contactor failure.	Replace failed components.
Carbon tank will not regenerate. Vacuum pump will not run.	Single shot timer failed. K3 relay failed. Vacuum pump failed.	Replace failed components
Air will not vent when carbon tank reaches 10 psig (69 k Pa)	Vent solenoid failed. Pressure switch incorrectly set.	Replace solenoid. Reset the pressure switch.
Unit shutdown on loss of cooling switch.	Inadequate cooling flow to condensing chamber coil.	Check for restrictions in the refrigerant or water flow to the coil.
Pressure in condensing chamber is excessively high.	Regulating valve is out of adjustment.	Turn adjusting screw clockwise to raise the pressure and counter clockwise to lower the pressure
Unit shutdown on low-pressure switch. (R-11 and R-114)	Regulating valve will not close Pressure will not increase higher than 30 psig (207 kPa) in condensing chamber and pressure reaches 10 psig (69 kPa) in carbon tank.	Run vacuum pump to regenerate the carbon tank. Replace regulating valve if defective
Unit shutdown of high pressure. (R-11 and R-114)	Regulating valve failed to open at 60 psig (414 kPa)	Adjust for lower pressure or replace the valve.
Compressor knocking.	Lack of oil in the crankcase Liquid refrigerant in gas sampling line.	Add 3GS oil. Sight glass should show a level of 1/2 to 3/4 full. Verify sampling line contains a 1/8" orifice and a suction accumulator. If liquid persists add a 50-w band heater to the accumulator.
PreVent unit will not operate when toggle switch is in on/auto position.	Circuit breaker has been tripped.	Determine cause Then reset the circuit breaker.
Liquid refrigerant discharges from the vent solenoid.	Condensing chamber is not condensing refrigerant. Vacuum pump discharge solenoid fails to open Regulating valve will not close.	Establish proper flow to coil. Replace solenoid valve. Adjust or replace valve