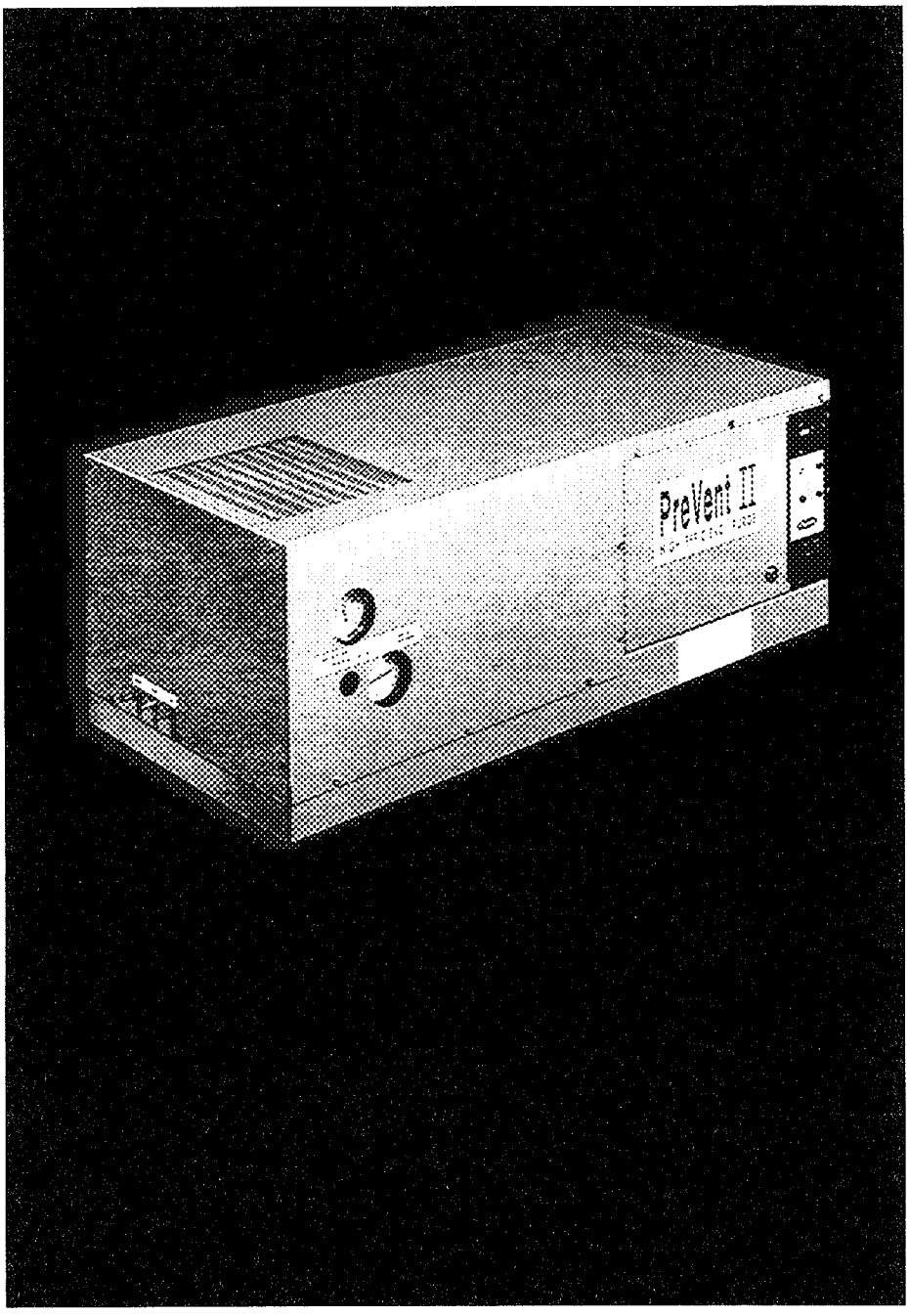
Carrier®

Product Data

19DK
PreVent® II
High Efficiency Purge System
50/60 Hz



Carrier's new Carrier's new PreVent II high efficiency purge system substantially reduces refrigerant losses and conserves existing CFC supplies in low pressure centrifugal chillers. Designed for use with chillers using CFC or HCFC refrigerants, the PreVent II purge unit minimizes emissions during service, thereby saving refrigerant, energy, and time.

The PreVent II purge unit features:

- Patented carbon tank that reduces refrigerant loss to 0.1 lb per pound of air purged (.045 kg per 1 kg of air purged) to ensure maximum environmental protection and significant cost savings.
- Variable on/off cycle settings allow the purge to operate only as needed, saving energy and extending unit life.
- Independent operation permits full purging of noncondensables, even during chiller shutdown, to improve chiller operation and efficiency.
- Fully self-contained unit easily installs on any low-pressure centrifugal chiller, saving installation time and expense.

Features/Benefits

Carrier's high-efficiency purge features a self-contained, bronze, purge separation chamber and time-proven, patented, carbon technology that protect the environment from excessive refrigerant emissions In addition, use of the PreVent II unit encourages frequent leak testing and repair operations that help fulfill the U.S Environmental Protection Agency's Clean Air Act requirements.

Conserves and recovers refrigerant

The PreVent® II is a completely integrated purging system consisting of a purge pump, air-cooled condenser, purge separation chamber, regenerating pump, and carbon tank made of PVC that contains activated charcoal. Carrier's unique design retains refrigerant vapor in the carbon tank while allowing noncondensables to be discharged harmlessly into the atmosphere. The PreVent II purge unit increases chiller efficiency by maintaining refrigerant at optimal levels throughout the purging process. Noncondensables may be removed even when the chiller is not operating. This innovative purging method enables the PreVent II unit to efficiently conserve 0.1 pound of refrigerant per pound of air (.045 kg of refrigerant per 1 kg of air) purged.

Superior components result in standard setting quality

The PreVent II purge is a highly efficient purge separation system that removes air, moisture, and other noncondensables from low-pressure chillers that use CFC-11, CFC-113, or HCFC-123. The unit is easy to install, requires little maintenance, and significantly reduces refrigerant losses during normal purge operation. On chillers using CFC-113 refrigerant, the chiller must be operating to effectively remove noncondensables from the chiller.

The unit's improved design features a cast bronze purge separation chamber for superior corrosion protection and an oil-less, diaphragm purge pump for increased reliability and lower maintenance costs. A new integral fan and coil assembly condenses the refrigerant gas before it enters the purge separation chamber. Designed to save valuable installation time and expense, the PreVent II unit does not require a separate cooling source (such as refrigerant or city water) for purge operation It enables the operator to quickly remove any air and other noncondensables that may have entered the chiller.

Compatible with any low pressure centrifugal chiller

PreVent II purge units can be retrofitted to any low pressure centrifugal chiller. The PreVent II unit's self-contained, bronze, purge separation chamber was specifically designed to replace the chiller's existing purge chamber. Since only minimal piping and wiring connections are required, the PreVent II unit can be easily mounted on or near the chiller. Accessory mounting kits are available to simplify installation, minimize installation expense, and reduce machine downtime.

Simplified installation

PreVent II units easily install on any low pressure centrifugal chiller. Three piping connections (one to take the refrigerant gas, noncondensables, and air mixture from the chiller's condenser to the purge unit, one to return the refrigerant liquid to the cooler, and one to vent the noncondensable gases to the atmosphere) result in convenient installation. Only two electrical connections are required. One connection is for 115 v power and the other connection obtains the run signal from the chiller control panel.

Control panel offers numerous safety features

To help analyze overall purge performance and schedule preventative maintenance, the PreVent II has an easy-to-read control panel that provides a visual display of unit operation to show information such as the number of purge cycles and pump operating hours, the purge operating mode, and fault indication. The purge cycle counter and indicator lights quickly alert users to any system fault or excessive purging conditions Tripping any one of three safety switches will cause a fault indicator to light and the unit to shut down. The safety switches have an automatic reset and are non-adjustable.

High-pressure switch — The high-pressure switch shuts the purge system down if the discharge pressure leaving the purge pump reaches 60 psig (414 kPa). This switch will reset at 40 psig (276 kPa).

High-temperature switch — The high-temperature switch shuts the purge system down if the discharge temperature leaving the condenser coil reaches 135 F (57 C). This switch resets at 100 F (38 C).

Carbon tank vacuum switch — The carbon tank vacuum switch shuts the purge system down when the regenerating pump cannot reach a vacuum of 20 in. Hg (−68 kPa) within 3 minutes of operation. This switch opens at 20 in. Hg (−68 kPa) and closes at 10 in. Hg (−32 kPa).

Minimal servicing

Minimal annual maintenance is required to properly service the PreVent II unit. To fulfill annual maintenance requirements, simply inspect the air filter and purge chamber float valve and leak test the unit. An elapsed-time meter, mounted on the control panel, monitors the purge pump run time and records the number of hours the unit has run so that appropriate maintenance procedures can be established. A steel enclosure with a removable air filter section shields internal components from dust and moisture. To simplify maintenance and serviceability, a hinged control panel and easily accessible side panels are provided on the PreVent II unit. The protective enclosure has a slotted hole design and can be easily removed to access the internal components. In addition, a sight glass and pressure gage, mounted on the front of the panel, allow a visual inspection of the components without removing the cover.

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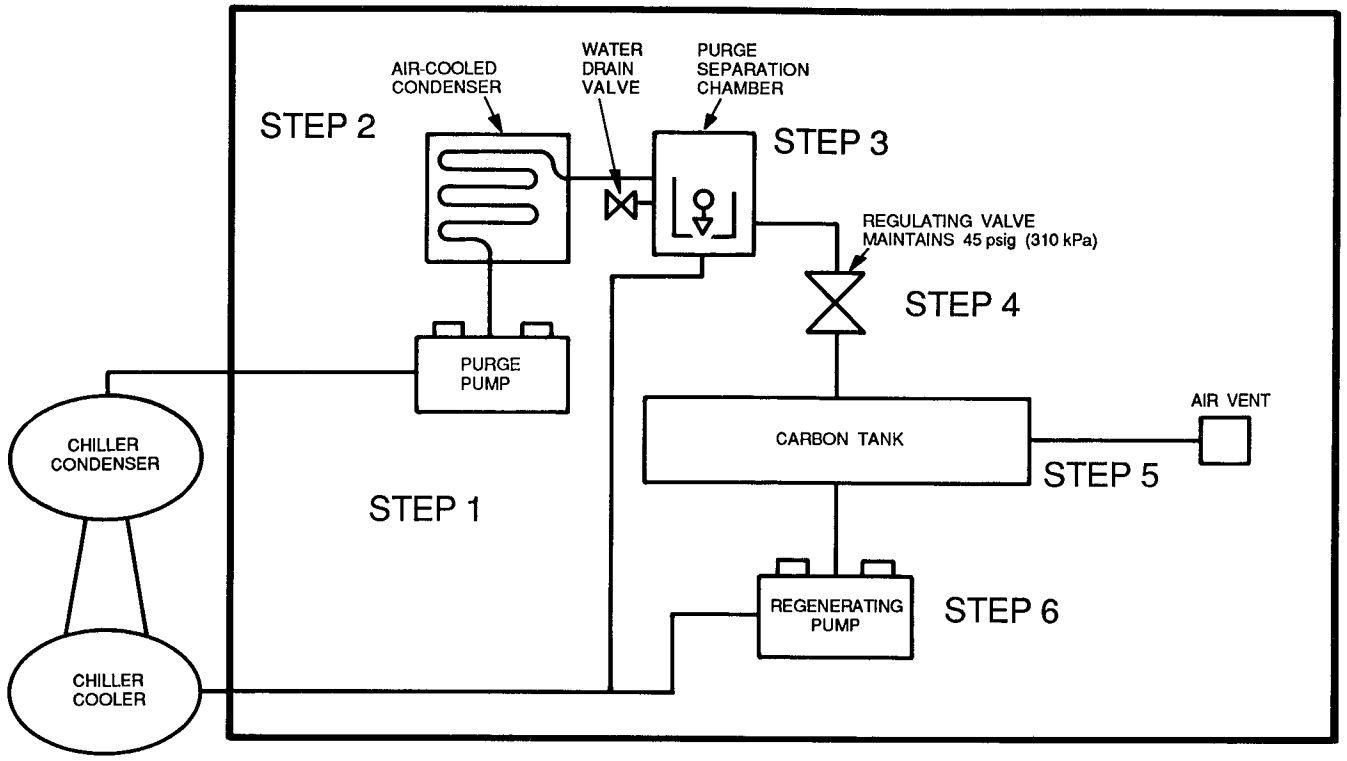


Step 1
Purge pump removes refrigerant, air, and water vapor from the chiller's condenser and compresses the mixture to 45 psig (310 kPa).

Step 2
Air-cooled condenser condenses compressed refrigerant gas and water vapor into a liquid

Step 3
Purge chamber separates liquid refrigerant and water from air and refrigerant mixture leaving the condenser

Step 4
Air and refrigerant gases enter the carbon tank. Carbon in tank adsorbs refrigerant gas.

Step 5
Carbon tank air vent opens at 10 psig (69 kPa) Accumulated air is released to atmosphere

Step 6
Air vent closes Regenerating pump cycles on for 5 minutes and creates a vacuum to remove refrigerant vapor from the carbon and return it to the chiller

OPERATION SEQUENCE OF PREVENT® II PURGE UNIT WITH CHILLER

Model number nomenclature

ITEM	PART NUMBER	QUANTITY REQUIRED
PREVENT II PURGE UNIT	19DK011154	1
CONDENSER MOUNTING KIT*	19DK660027	1
FLOOR MOUNTING KIT†	19DK660028	1
SUCTION ACCUMULATOR†	KH71KK120	1
SHUTDOWN SOLENOID†	EF13CQ062	1
220/115 V TRANSFORMER**	HT01AH884	1

*Required for condenser mounting.
†Required for floor mounting.
**When only 220 v power is available, a 220/115 v transformer is required.

Machine components

Carrier's exclusive purge pump extracts a mixture of refrigerant gas, air, and other noncondensables from the chiller's condenser. It has a design pressure of 60 psig (414 kPa) and a maximum operating pressure of 45 psig (310 kPa). The oil-less diaphragm pump increases pressure in the purge separation chamber to 45 psig (310 kPa).

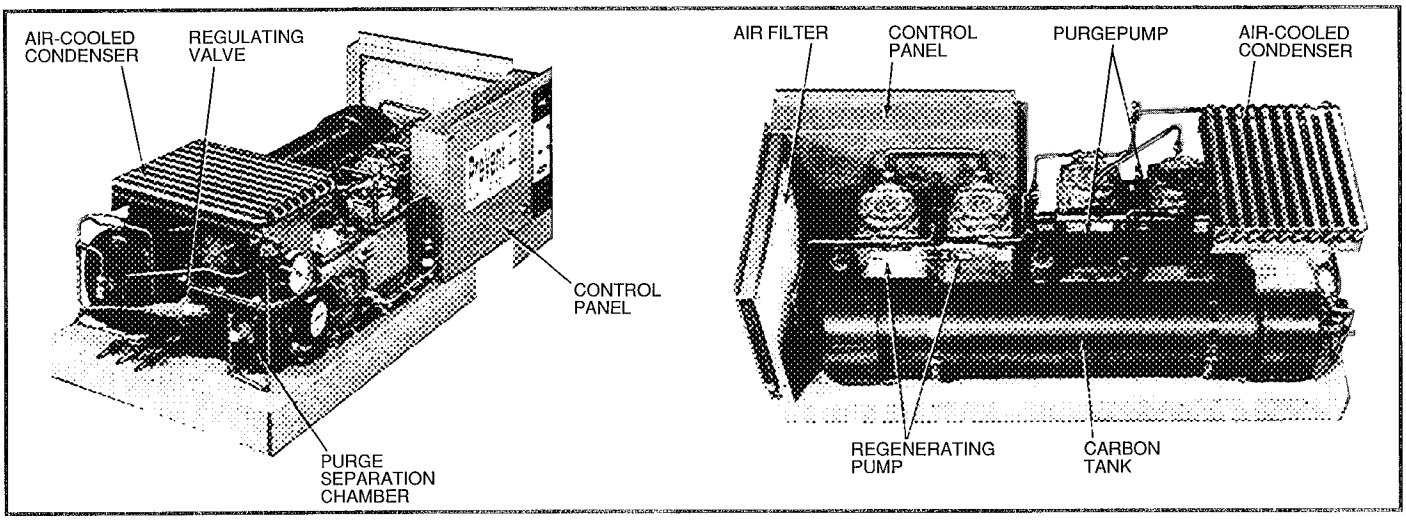
An air-cooled condenser condenses most of the refrigerant gas and water vapor (discharged from the purge pump) into a liquid before it enters the purge separation chamber. The condenser coil is made of copper and has aluminum fins.

The purge separation chamber separates air and water from refrigerant that is discharged from the air-cooled condenser. It is constructed of cast aluminum bronze to provide superior corrosion protection and ensure long component life.

The regulating valve modulates open and closed to maintain the pressure in the purge separation chamber and air-cooled condenser. It is factory set and field adjustable to maintain the purge separation chamber pressure at 45 psig (310 kPa).

A PVC carbon tank filled with activated charcoal is used to adsorb refrigerant and collect noncondensables. Its pressure relief is factory set at 25 psid (173 kPa). The carbon tank has a maximum operating pressure of 10 psig (69 kPa).

A regenerating pump removes refrigerant vapor that was adsorbed in the carbon tank and returns it to the chiller. The 1/2 hp diaphragm pump is equipped with a permanent split capacitor motor that has a motor voltage of 115-1-50/60 Hz.



Physical data

19DK UNIT (50/60 Hz)	ENGLISH	(SI)
DRY WEIGHT lbs (kg)	208	(95)
CARBON TANK		
Design Pressure psig (kPa)	15	(103)
Max. Operating Pressure psig (kPa)	10	(69)
PURGE PUMP		
Design Pressure psig (kPa)	60	(414)
Max. Operating Pressure psig (kPa)	45	(310)
Suction Connection (in.)	3/8*	(3/8*)
Flow Rate		
50 Hz cfm(L/s)	.91	(.43)
60 Hz cfm (L/s)	1.1	(52)
Horsepower (kW)	.25	(19)
REGENERATING PUMP		
Design Pressure psig (kPa)	10	(69)
Max. Operating Pressure psig (kPa)	2	(14)
Flow Rate		
50 Hz cfm (L/s)	1 7	(.8)
60 Hz cfm (L/s)	2 0	(95)
Max. Vacuum in. Hg (kPa)	29	(–98)
Horsepower (kW)	5	(37)
PURGE SEPARATION CHAMBER		
Design Pressure psig (kPa)	60	(414)
Max. Operating Pressure psig (kPa)	45	(310)
AIR-COOLED CONDENSER		
Design Pressure psig (kPa)	60	(414)
Max. Operating Pressure psig (kPa)	45	(310)
Motor Horsepower (kW)	012	(.009)

*Piping connections are 3/8 in O D copper tubing

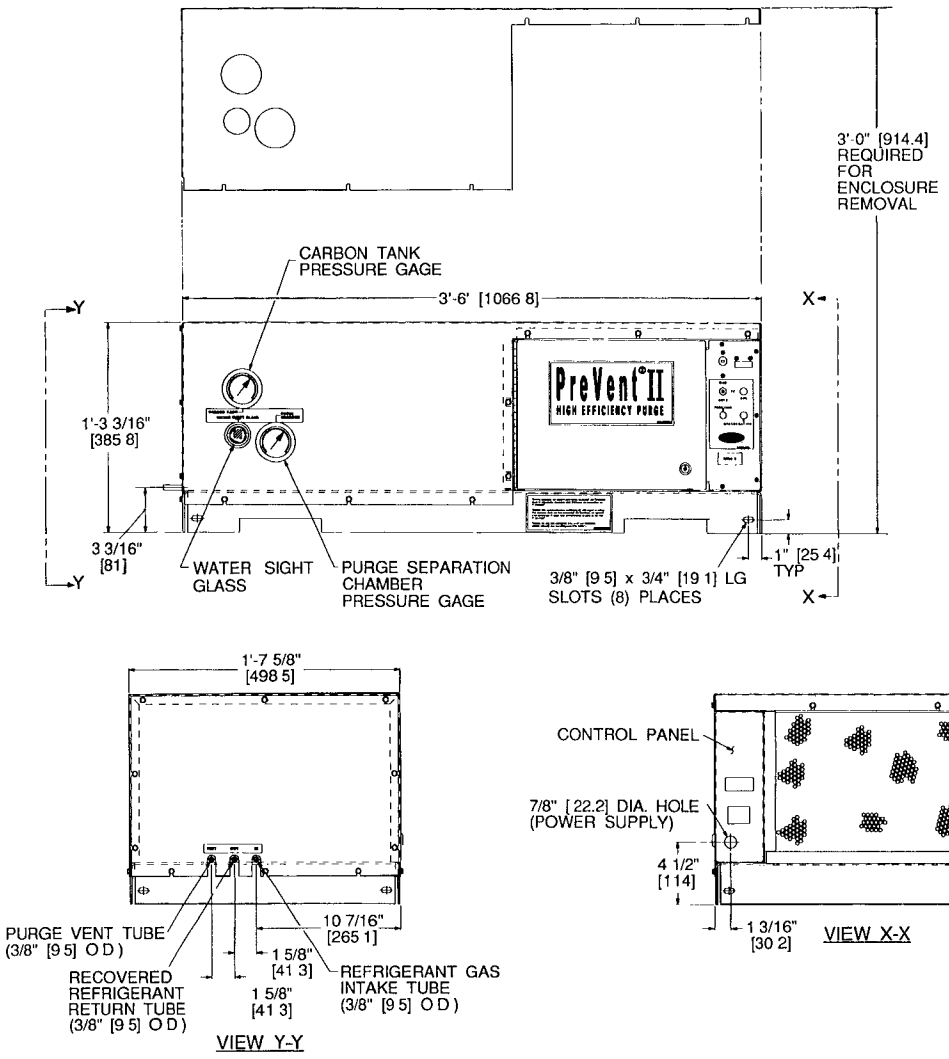
Performance data

The PreVent® II unit will maintain high efficiency levels whether the chiller is operating or shutdown. On chillers that use CFC-113 refrigerant, the chiller must be running to effectively remove air from the system Purge performance is measured in accordance with ARI (Air Conditioning & Refrigeration Institute) standard 580P-D5 and is rated in exhaust gas concentration (expressed by lb [kg] refrigerant per lb [kg] of air). A patented refrigerant adsorption and regeneration process delivers efficiencies of approximately 0.1 lb of refrigerant per pound of air (.045 kg of refrigerant per 1 kg of air) when tested at rated conditions Purge efficiency remains constant during any chiller load or ambient temperature to maintain maximum chiller operating efficiency

Electrical data

MODEL NUMBER	19DK011154
POWER	115-1-50/60
MAXIMUM FLA	4.9/5.5
MINIMUM SUPPLY CIRCUIT AMPACITY	15 A
MAXIMUM FUSE/CIRCUIT BREAKER TIME DELAY	15 A

Dimensions



NOTES:
1 Cover is open on both ends.
2 Dimensions in [ ] are in millimeters.

Application data

Application versatility

The PreVent® II unit is a fully-contained system that operates on any low pressure centrifugal chiller. It does not require the use of any components from the chiller's purge system. An oil-less diaphragm pump extracts a mixture of refrigerant, air, and water vapors from the chiller's condenser, eliminating the need for an oil recovery system and annual oil changes.

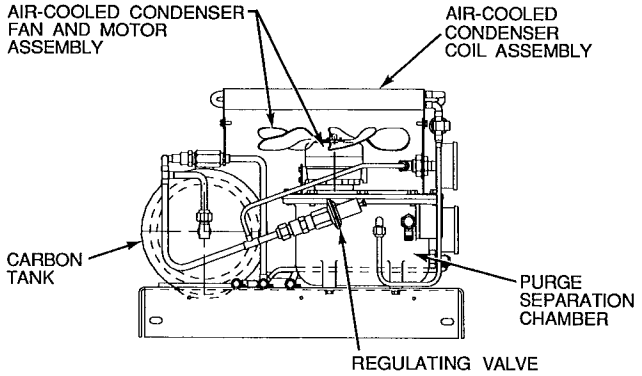
The PreVent II unit consists of a first-stage, bronze, purge separation chamber that is used to separate liquid refrigerant and water from the air and refrigerant gases that are being discharged from the air-cooled condenser. The purge separation chamber is designed to operate at 45 psig (310 kPa). It contains a sight glass and drain valve to view and remove any accumulation of water that was removed from the refrigerant. The water may then be manually removed. A copper float ball and brass valve assembly return liquid refrigerant to the chiller's evaporator. Chamber pressure is shown on a pressure gage mounted on the purge separation chamber.

A pressure regulating valve is directly mounted between the purge separation chamber and the carbon tank Factory set at 45 psig (310 kPa), the valve modulates open to vent the mixture of air and refrigerant gas to the carbon tank.

During the second stage, a carbon filled tank adsorbs the remaining refrigerant from the gas mixture leaving the purge separation chamber. The remaining gas is primarily composed of air The air is vented. Then, a regenerating pump recovers the refrigerant that was adsorbed in the carbon tank and returns it to the chiller.

Refrigerant requirements

The PreVent II high efficiency purge system operates with any low-pressure centrifugal chiller that uses CFC-11, CFC-113, or HCFC-123. On chillers that use CFC-113 refrigerant, the chiller must be running to effectively remove air from the system.



PURGE SEPARATION SYSTEM (2-STAGES OF REFRIGERANT/AIR SEPARATION)

Controls

The unit can be turned on by placing the 3-position toggle switch in the MANUAL or AUTO position. The MANUAL position turns the unit on whether the chiller is on or off. When the unit is in the AUTO position, the unit will only turn on if the chiller is running. The purge pump is controlled by a cycle timer when the PreVent® II unit is operating

The purge pump draws noncondensable gases from the chiller's condenser causing the pressure in the purge separation chamber to increase. Once the pressure reaches 45 psig (310 kPa), a regulating valve opens and discharges a mixture of air and refrigerant gas into the carbon tank. When the pressure in the carbon tank reaches 10 psig (69 kPa), the pump shuts off, and the air vent solenoid (S2) opens and releases air from the tank. When the pressure is reduced to 2 psig (14 kPa), solenoid (S2) closes, the regenerating pump turns on, and the regenerating pump solenoid (S1) opens After 5 minutes, the regenerating pump shuts off, solenoid S1 closes, and the purge pump cycle timer is energized, thereby completing one purge cycle.

Features

Safety cutouts:

Purge Pump High-Pressure Switch
Condenser High Temperature Switch
Circuit Breaker with Manual Reset
Carbon Tank Relief Valve
Carbon Tank Vacuum Switch

System control:

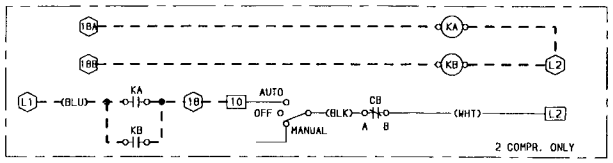
Purge Separation Chamber Regulating Valve (Adjustable)
Carbon Tank Pressure Switch
Auto.-Off-Manual Toggle Switch
Cycle Timer
Vacuum Timer
Regenerating Timer

System indicators:

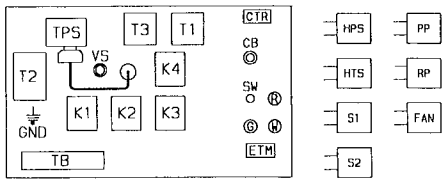
Purge Counter
Elapse Time Meter (Purge Pump)
Carbon Tank Pressure Gage
Purge Chamber Pressure Gage
Water Level Sight Glass
Indicating lights:

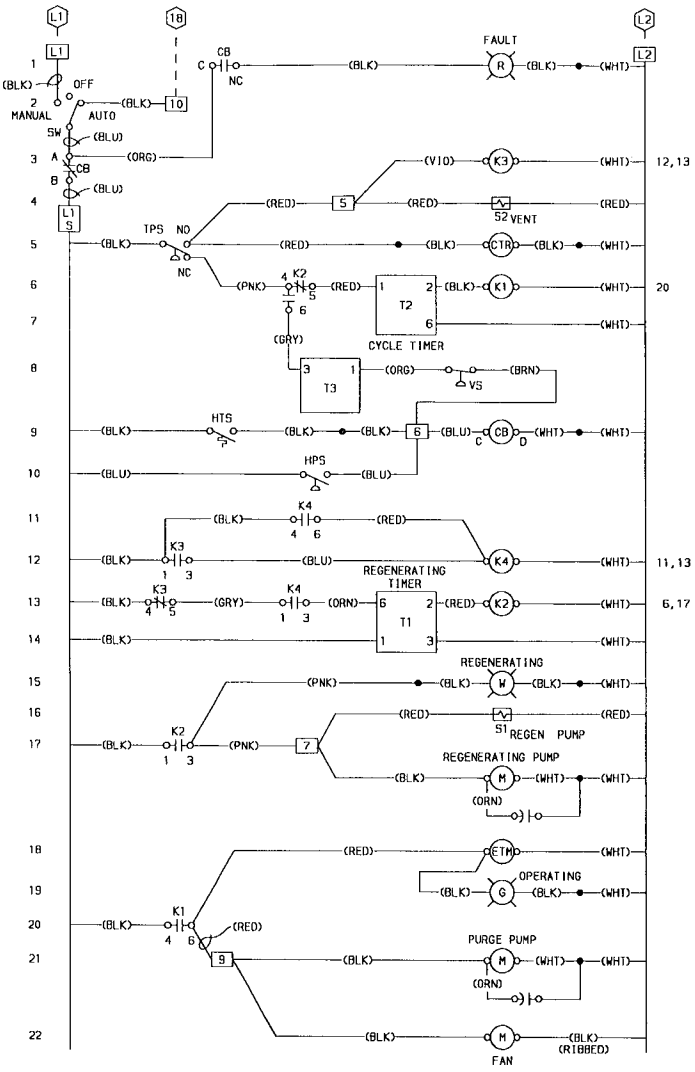
- operating (green)
- regenerating (white)
- fault (red)

Control wiring schematic



COMPONENT ARRANGEMENT



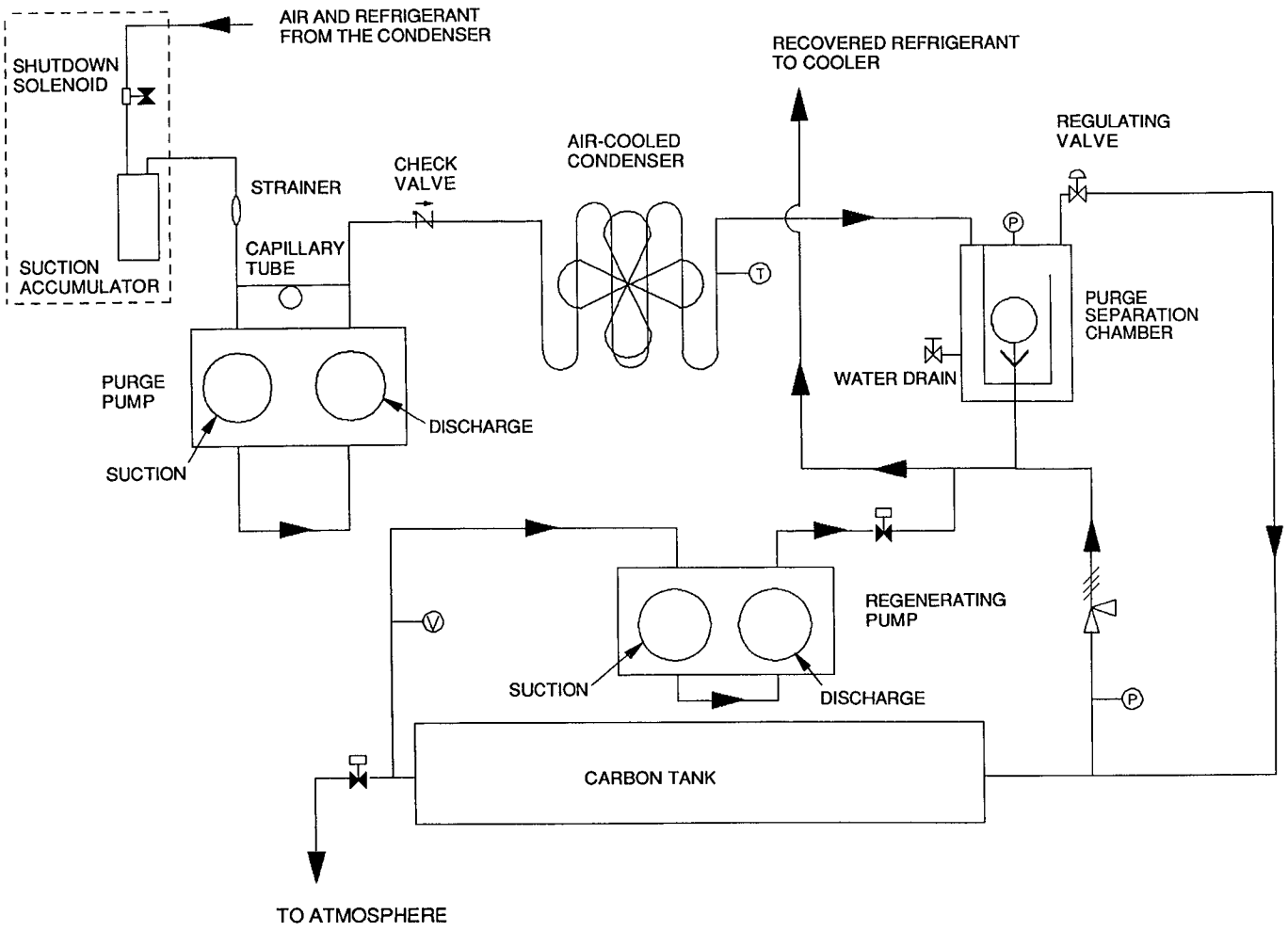


LEGEND

CB	—	Circuit Breaker
CTR	—	Counter
ETM	—	Elapsed Time Meter
FAN	—	Air Cooled Condenser Fan Motor
GND	—	Ground
HPS	—	High-Pressure Switch
HTS	—	High-Temperature Switch
K	—	Relay
M	—	Motor
PP	—	Purge Pump
RP	—	Regenerating Pump
S	—	Solenoid
SW	—	Switch Auto/Off/Manual
T	—	Timer
TANK	—	Carbon Tank
TB	—	Terminal Block

TPS —	Carbon Tank Pressure Switch
VS —	Vacuum Switch
———	Factory Wiring
- - - -	Field Wiring
(X)	Coil
(M)	Motor
●	Splice
X	Purge Control Box Terminal
⊗	Chiller Control Panel Terminal, 115 volts 50/60 Hz

Typical piping



LEGEND

P – Pressure Gage
T – Temperature Switch
V – Vacuum Switch

Solenoid Valve

Regulating Valve

Check Valve

Relief Valve

– – – – Indicates field installation of accumulator and shutdown solenoid for PreVent® II unit

——— Indicates factory installed refrigerant lines.

Guide specifications

PreVent® II High Efficiency Purge System

HVAC Guide Specifications

Carrier Model Number: **19DK**

Part 1 — General

1.01 SYSTEM DESCRIPTION

A. A high-efficiency purge system shall be installed on existing low-pressure centrifugal chiller to effectively remove air, moisture, and other noncondensables from the chiller's refrigerant charge.

B. The high-efficiency purge system shall be designed for use with any low-pressure chiller. The system shall provide conservation of low-pressure CFC and HCFC refrigerants and prevent their release into the atmosphere during chiller purging operation. The high-efficiency purge system shall reduce refrigerant loss to 0.1 lb of refrigerant per pound of air (.045 kg of refrigerant per 1 kg of air) purged. The purge system shall allow purging when the centrifugal chiller is operating or idle.

C. The system shall contain a carbon adsorption tank and regeneration system which removes refrigerant from the activated charcoal and returns it to the chiller.

1.02 QUALITY ASSURANCE

The equipment must be certified for safety and construction by ETL.

1.03 DELIVERY, STORAGE AND HANDLING

The unit shall be shipped, stored, handled, installed, operated, and maintained in accordance with the manufacturer's instructions.

Part 2 — Products

2.01 EQUIPMENT

A. General:

1. The high-efficiency purge system shall consist of an oil-less purge pump, air-cooled condenser, purge separation chamber, regenerating pump, carbon tank, and control panel. The unit shall be housed in a steel enclosure with a removable air filter section to protect and keep the internal components clean. The enclosure shall have a viewing window to provide for visible inspection of the carbon tank pressure gage, purge chamber pressure gage, and water indicating sight glass. The control panel shall have a hinged and latched door to simplify maintenance and serviceability. There shall be a manually operated 3-position control switch, purge cycle counter, run-hour meter and indicating lights accessible and visible on the front panel.
2. The purge system shall not only remove noncondensables, but will also remove moisture from the refrigerant in the chiller. The purge shall be a fully-contained unit and will incorporate an air-cooled condenser to allow for purging when the chiller is off. The purge system shall include a purge separation chamber used for separating air and moisture from the refrigerant.

B. Installation:

Installation of the high-efficiency purge system shall be in accordance with all state and local, mechanical and electrical codes. The purge unit shall be capable of being connected to the existing purge connections and can be mounted on top of the chiller's condenser or mounted on the floor at any convenient location near the chiller. No cutting or drilling to either shell is needed and no chilled water piping is required.

C. Purge Pump:

The purge system shall use an oil-less, diaphragm type pump to remove and pressurize noncondensable gases from the chiller. The purge pump must be designed to operate at 45 psig (310 kPa). The pump shall utilize a ¼ hp, 120 v, 1 phase, 50/60 Hz, four-pole motor operating at 1500 rpm to assure performance and maximum diaphragm life.

D. Purge Separation Chamber:

The unit shall have a purge separation chamber made from cast bronze and designed to operate at 45 psig (310 kPa). The purge chamber shall have a sight glass for viewing moisture accumulation, a valve for removing water, and a float ball and valve assembly that returns refrigerant to the chiller.

E. Carbon Adsorption Tank:

The high-efficiency purge system shall utilize an activated carbon tank for enhanced efficiency. The efficiency shall be sustained over the life of the purge. The carbon tank shall be made of 6 in., schedule 80 PVC pipe and shall use the activated carbon to retain the refrigerant vapor before exhausting air and other noncondensables to the atmosphere.

F. Regenerating Pump:

The purge shall use a regenerating pump designed to remove refrigerant from the activated carbon and return it to the chiller. The regenerating pump shall be a diaphragm type with a ½ hp, 120 v, 1 phase, 50/60 Hz, two-pole motor. It shall operate at 3000 rpm. The pump shall be capable of achieving a 29 in. Hg vacuum (−98 kPa).

G. Control Panel Safety Features:

1. The purge control system shall provide protection against over-pressurization and high temperature situations by utilizing a circuit breaker with an instantaneous trip and manual reset The control panel shall provide a visual display of unit operation including purge pump operation, regenerating pump operation, number of purge cycles, run time on the purge pump and system fault indication.
2. The control panel shall include a vacuum switch to protect against liquid build-up in the carbon tank and to indicate when design vacuum is not occuring.
3. A pressure relief valve shall be installed on the carbon tank sized in accordance with ASHRAE 15, latest edition.
4. The control circuit shall include a timer with variable on/off cycle settings to allow the unit to operate only when purging is needed.