Instruction Manual

For
Haskris R-Series and
WW-Series Systems

Installation
Start-up
Operation
Maintenance

Rev. 7.0 3-31-2014

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Table of Contents

1.1 Technical Support

NOTE!

Have the product Serial Number (HB-1-2-3-4-5) available when you call. The Serial Number can be found on the rear panel of your Haskris system and on the hinged lid of the electrical enclosure, behind the front panel. The Serial Number enables us to address problems quickly and effectively.

If at any time you have questions, encounter problems or need spare parts for your Haskris system, please contact us by any of the following means:

Phone:	001-847-956-6420
Fax:	001-847-956-6595
Email:	service@haskris.com
Website:	www.haskris.com

Our website contains information addressing frequently-asked questions, trouble-shooting guides, and technical documentation.

2.1 Unpacking System

Upon delivery, visually inspect your Haskris system for any obvious damage. If damage is found, and there is reason to believe the system was mishandled, note the damage in detail on the delivery receipt. We recommend taking photographs if possible. Contact the delivering carrier immediately to file a claim. All shipping containers and packaging materials should be retained to help substantiate the claim. We also ask that you call Haskris if the system has been damaged in shipment. We will assist in rectifying the situation.

2.2 Proper System Location

This Haskris system is designed for use in a clean, indoor environment, unless a design for other environmental conditions was specified.

Position the system for clear access to the front panel, where all controls, indicators and readouts are located. Access to the top and side panels is required to fill the reservoir or to perform maintenance and repair procedures.

Water-Cooled Systems: For systems with water-cooled condensers or systems with water-cooled heat exchangers:

These systems are designed to circulate clean, temperature-controlled water through your equipment, while making use of an existing source of *building water* as a means of dissipating heat. As a result, no heat will be introduced into the room. (Building water may be any source of cold water, including city/tap water or in-house chilled water.)

Air-Cooled Systems: For systems with air-cooled condensers:

Acceptable ambient air temperatures are shown in Table 1. Provide sufficient clearance, front and back, to allow for free movement of air across the condenser. A lack of cool/fresh air to the condenser will result in reduced cooling capacity, and possibly the complete shutdown of the refrigeration compressor.

Avoid dusty areas, and periodically check to make sure that the condenser is clean (refer to Section 5.2 for cleaning instructions).

TABLE 1
Ambient Temperature Ranges for Air-Cooled Condensers

MODEL	AMBIENT TEMPERATURE RANGE*	
	Fahrenheit (°F)	Celsius (°C)
R025 – R175	55 – 90	13 - 32
R250 – R1000	40 - 100	4 - 38

* Note: Table 1 does not apply to systems equipped with Options I (for high-temperature ambient air applications) and/or Option J (for low-temperature ambient air applications).

2.3 Leveling Legs

The following procedure will help you level the system if your Haskris system does not come with lockable casters. First, remove the four 3/8" hex-head bolts securing your system to the wooden shipping base. Then attach the factory supplied 3/8" leveling-legs into each corner of the metal base by screwing them in a clockwise direction; adjust the length for leveling as required. Finally, reattach the 3/8" hex nuts (supplied with the leveling-legs) to lock the legs into place.

2.4 Electrical Power

Please refer to the nameplate label on the front cover of this manual for electrical requirements; a copy of the nameplate can be also found on the Haskris system. The wiring diagram for your Haskris system is inside a plastic envelope, attached to the inside of the system (usually on the water tank).

NOTE!

We recommend contacting a licensed electrician to perform the electrical installation. These professionals are familiar with local electrical codes and will be aware of specific requirements that apply to your area.

We recommend a service disconnect switch and time delay fusing be installed, per the wiring diagram, found inside your Haskris. Your system will either use single-phase power with a power cord, single-phase power without a power cord, or three-phase power. Single-phase power will include a power cord unless the recommended fuse size is in excess of 20 Amps.

Systems With a Power Cord: Plug the system in as you would any electrical appliance, making sure to follow the Proper System Location guidelines as outlined in Section 2.2.

Systems Without a Power Cord: (Applies to both single-phase and three-phase systems.) If your system is not supplied with a power cord, check the nameplate label on the cover of the manual (or on the rear panel of the system) to determine if the Haskris system is single-phase or three-phase. Run main power to the top of the compressor contactor (we have attached a manila tag labeled “Main Power” to this contactor for easy identification.) Make sure the electrician confirms the wiring is adequate in the room/area where your Haskris system will be installed.

NOTE!

Crankcase Heater – Leave disconnect ON (energized) overnight prior to system start up. This energizes the crankcase heater and drives out any accumulated liquid refrigerant in the compressor. See Section 3.3 for details.

Correcting Motor Rotation in Systems Using 3-Phase Power

A licensed electrician should interchange any two wires of the three-phase power source ***at the disconnect switch*** to correct improper pump rotation or improper phase displayed by the phase monitor. An illuminated red LED indicates a 3-phase fault. An illuminated green LED on the monitor indicates the phase is correct. Contact Haskris with any questions.

2.5 Circulating Water Connections

Supply and Return Lines

Size all interconnecting hose and piping equal to be equal to or larger than the provided connections to minimize external piping pressure drop. Haskris recommends using an opaque, 150 psi minimum rated reinforced EPDM hose for short runs and to prevent biological growth by eliminating light from entering the cooling water. Clear braided hose is not recommended. Copper piping is recommended for long runs. If copper piping is used, a short segment of hose should be used at each connection point to absorb vibration. Copper piping/tubing (and hose in some instances) should be insulated to prevent condensation.

All piping should comply with local codes. Contact Haskris if you have any questions.

2.6 Building Water Recommendations

To ensure the reliable operation of water-cooled systems:

- Furnish building water to the Haskris with piping ID (inside diameter) equivalent to or larger than the connection sizes furnished by Haskris.
- Provide a minimum differential pressure of 25 psi and maximum differential pressure of 50 psi between the building water inlet and outlet.

Figure 2-1 Label is typically located at rear base of the Haskris unit.

- Maximum inlet pressure is 100 psi (6 bar), unless otherwise specified under Option (K). Be sure to check back pressure on the outlet side. A high inlet pressure alone will not ensure adequate flow. Connect building water per Figure 2-1 above.
- Required differential pressure will vary among installations, depending on the temperature of the source water and the type of condenser furnished (refer to Chart 1).
- Install a hand valve in an accessible location in the building water inlet and outlet lines. A plumbing “Y” strainer, with an 80 mesh screen at the inlet (not a filter), is recommended to limit debris from entering the water regulating valve and the water-cooled condenser.
- In-line filters are not recommended. They clog easily and restrict water flow, reducing chiller cooling capacity. This leads to compressor cycling on the refrigerant pressure control, or in newer systems, requiring a manual reset of the refrigerant pressure control.

Table 2 Condenser Water Quality Information

Component	Allowable Quantity
Iron	<3 ppm
Manganese	<3 ppm
Aluminum	<0.1 ppm
Free Carbon Dioxide	5 ppm
Ammonia	2 mg/L
pH	>8
Dissolved Oxygen	<3 ppm
Sulfate to Chloride Ratio	<3:1

Automatic Water Regulating Valve

Your Haskris unit will control building water flow through the water-cooled condenser by means of a modulating, pressure-actuated water regulating valve (see Figure 2-2).

Function

This valve controls building water flow to a minimum of usage and maintains a factory set refrigerant pressure in the condenser while the refrigeration compressor is running. When the compressor cycles OFF, the valve closes and automatically stops the flow of building water.

Figure 2-2 Automatic Water Regulating Valve

CAUTION! The water regulating valve can easily be damaged by water flowing in the reverse direction (see arrow on casting) or rough treatment of the capillary tube which senses refrigerant pressure. The valve should not require field adjustment; it has been adjusted and tested prior to shipment.

2.6 Building Water Recommendations (cont.)

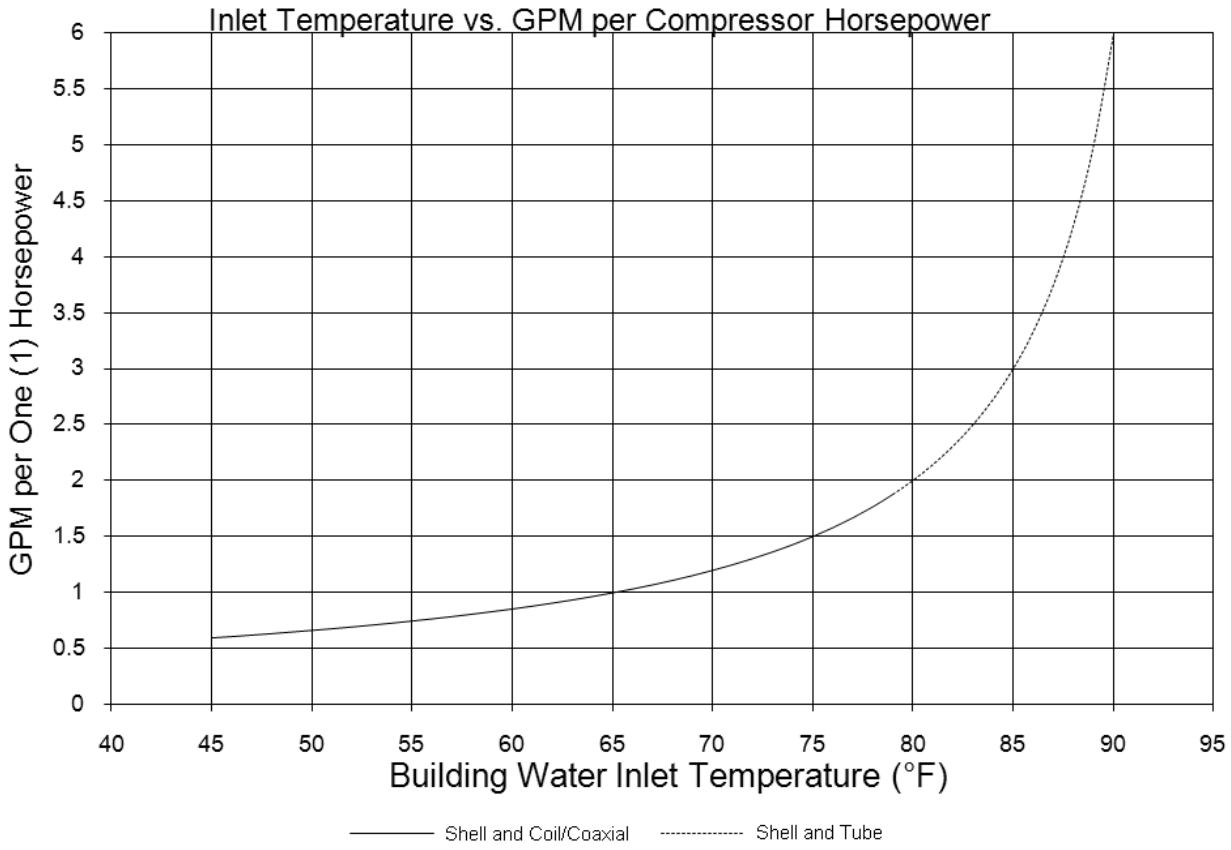
Hot Gas Bypass

The automatic water regulating valve modulates closed when the compressor stops running, conserving water. Systems equipped with hot gas bypass [Option (G) or Option (H)] have a continuously running compressor, requiring a constant flow of building water through the water-cooled condenser.

Condenser Selection

The curved plot in Chart 1 below indicates safe water velocities per manufacturer recommendations for the two condenser types shown. The plot assumes 100% water. A shell and coil condenser is not designed to be used for water temperatures above 78°F.

Chart 1 - Building Water Flow



3.1 Water Tank Filling

1) Carefully remove the packing paper from the inside of the water tank.

2) Fill the tank with clean, potable (drinkable) distilled water.

3) Stop filling when the water level is just below the piping bulkhead fittings near the top of the tank and above the heat exchanger (Fig. 3-1).

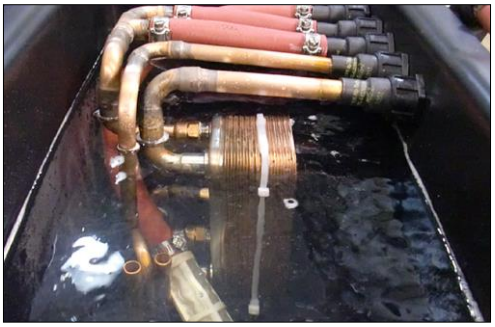


Figure 3-1 Tank Fill Level

3.2 Water Pump Priming

First, turn off the chiller. Then de-energize the main power disconnect switch or unplug the power cord from the wall outlet.

Systems with a PD Pump

1) Lift the suction strainer out of the tank and remove it from the hose by loosening the hose clamp (Fig. 3-2).

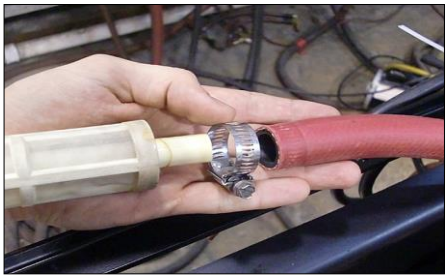


Figure 3-2 Suction Strainer Removal

2) Pour potable (drinkable) distilled water into the hose to fill the pump (Fig. 3-3).

3) When the water reaches the top of the hose, place your thumb over the end of the hose, and submerge the hose into the water. Doing this ensures the water stays inside the hose.

Figure 3-3 Priming the Pump

4) Replace the suction strainer and secure the hose clamp. Proceed to page 8, Confirming Pump Flow and Pressure.

Systems with a Turbine Pump

1) With the water tank filled as described in section 3.1, locate the air vent plug on the head of the pump, as shown circled in Figure 3-4. The air vent screw opening is shown in Figure 3-5.

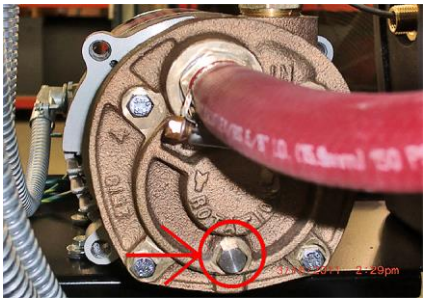


Figure 3-4 Priming Air Vent Screw

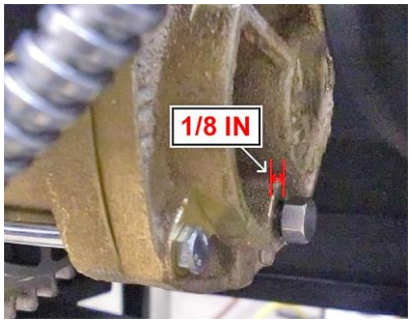


Figure 3-5 Air Vent Screw Opening

3.2 Water Pump Priming (cont.)

3) Use a 7/16” wrench to loosen (counter-clockwise) the vent plug enough to allow water to exit through the threads without vent plug removal.

4) During the priming process, a small amount of water will drip from the screw hole. This purges the air from within the pump head. To avoid spillage, place a small paper towel under the pump head (Fig. 3-6).

Figure 3-6 Paper Towel Placement

5) Remove the suction strainer (Fig. 3-2 previously) and hose from the tank.

6) Loosen the hose clamp with a flat head screwdriver and remove the suction strainer from the end of the hose. If suction strainer is not present proceed to step 7.

7) Raise the hose in the air and pour water into the hose (Fig. 3-3 previously).

8) Continue pouring water until there is a steady drip from the priming air vent plug and the hose is full, and then securely tighten the vent plug (clockwise).

9) If applicable, replace the suction strainer on the end of the hose and securely tighten the hose clamp.

10) Replace the strainer and hose into the tank (Fig. 3-7). Proceed to page 8, Confirming Pump Flow and Pressure.

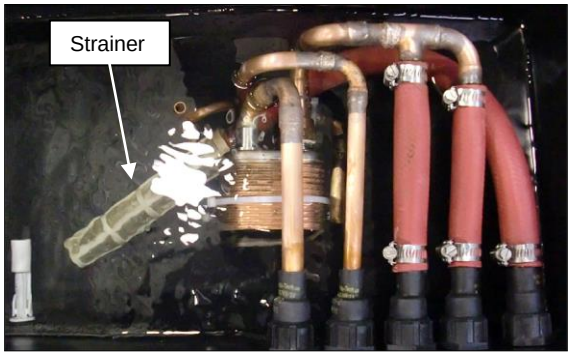


Figure 3-7 Suction Strainer Placement for R175

Systems With Primary/Standby Pumps

1) Lift the strainer out of the tank and remove it from the hose by loosening the hose clamp (Fig. 3-2 previously).

2) Pour potable (drinkable) distilled water into the hose to fill each pump (Fig. 3-3 previously).

3) When the water reaches the top of the hose, place your thumb over the end of the hose and submerge the hose in the water. Doing this ensures that the water stays inside the hose. Proceed to page 8, Confirming Pump Flow and Pressure

Confirming Pump Flow and Pressure

1) Energize the main power disconnect or circuit breaker, or plug the chiller power cord back into the wall outlet.

2) Turn chiller main power switch to the ON position. The pump(s) should start, unless locked out by a high water temperature safety. See section 4.4.1 for troubleshooting help, or call Haskris.

Systems with Single and Dual Pumps

Verify proper flow and pressure through the system piping for each pump. The needle in the pressure gauge mounted on the bypass valve indicates operating water pressure.

Systems with Primary/Standby Pumps

Turn pump 1 on and depress the Schraeder valve on the pump discharge until a solid stream of water emerges (Fig. 3-8). Once complete, turn on pump 2 and follow the same steps. This will allow water to fill the circuit and remove all the air from around the check valves. Verify flow and pressure.

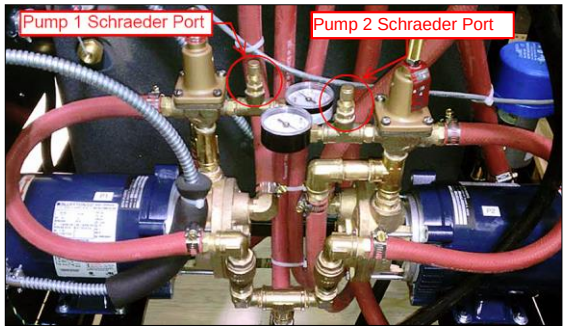


Figure 3-8 Primary/Standby Two-Pump Chiller with Schraeder Valves

3) Add water to the tank as necessary to maintain the level above the heat exchanger and below the bulk head fittings.

4) Check for leaks.

5) Continue with the remainder of the startup procedures.

3.3 Safe System Start Up

(Refrigerated Systems Only)

Crankcase Heater

To keep liquid refrigerant out of the compressor when the system is shut down for an extended period of time (overnight and during the weekend), Platforms R075 through R1000 include a crankcase heater to evaporate any liquid refrigerant in the compressor. As long as main power is supplied to the Haskris system, the crankcase heater will be energized, even if the main power switch is in the OFF position.

Platforms R025 through R050 do not require or include crankcase heaters.

Safely Starting the Compressor

To safely displace any accumulated liquid refrigerant inside the refrigeration compressor during shipping, use one of the following methods to start and stop the compressor 3 or 4 times before permanently switching the system on.

Using the Main Power Switch

1) Turn the system power ON until the compressor starts.

2) Cycle the system Off and On 3 or 4 times before permanently switching the system on.

Using the Option (M) Timer

1) Turn the system power ON using the on/off mechanism of the timer, by rotating the switch to the “HOLD” position until the compressor starts. Do not rotate the knob through the timer section; go directly to “HOLD” from the “OFF” position.

2) Rotate the timer knob between the “HOLD” and “OFF” positions 3 or 4 times before permanently switching the system on.

3.4 Final Inspection

Water Tank Level

Once the system is ON, the water pump will fill the closed loop piping with water, displacing all the air inside. Have an extra supply of water on hand to replenish the water in the reservoir, as the water level in the storage tank will drop as the interconnecting hose and pipe fill with water. Continue filling the reservoir until the water level in the reservoir reaches the bulkhead fittings near the top of the reservoir.

Leaks and Line Debris

Check to make sure all external piping is leak-tight and that the system is operating satisfactorily. During initial operation the circulating water will flush debris from the closed loop and deposit it into the reservoir. If necessary, drain the reservoir and refill it with clean water. A convenient gravity drain has been provided on the underside of the reservoir for this purpose.

Inspection for Algae

Check the system after one week of operation. If algae start to form (be sure to check the pump strainer too), the system will need to be cleaned and disinfected before refilling with clean, potable (drinkable) distilled water. Please keep in mind you need the instrument manufacturer's approval before using any water additive formulated to minimize biological growth in the cooling water. Consult Section 5 of this manual (or the Haskris website) for maintenance recommendations, flushing instructions and/or recommendations on approved additives for use in Haskris systems.

4.1 Temperature Control

4.1.1 Adjusting the Supply Water Temperature

1) Match the appropriate control mechanism for your Haskris system with the pictures in Section 4.1.2, Table 4-1.

2) Note the section for adjustment instructions for the controls that match your system.

3) Turn to the appropriate section and follow the designated instructions.

NOTES:

Temperature is Pre-Set: Haskris has pre-set the supply water temperature per your specifications. On initial start-up, apply the actual heat load and wait 15-30 minutes for the temperature to stabilize.

Allowable Adjustments: The following procedures are intended for supply water temperature adjustments only. All other control parameters are factory set for optimum performance and should not be adjusted. If it appears that “tuning” is required, please contact Haskris for further information.

Adjust While System is Running: Make all water temperature adjustments while the system is running under the actual heat load.

Permissible Temperature Settings: The standard supply water temperature range is 58 to 72°F (14 to 22°C). If a temperature setting outside of this range is required, please contact Haskris and we will advise you of precautions and the proper procedures to follow.

Response Time for Adjustments: While each Haskris system varies, and individual design specifications may call for a rapid response in temperature adjustment, owners of systems with common configurations should allow up to 15 minutes for any temperature adjustments to take effect. This is due to the thermal mass of the system and the nature of the cooling system.

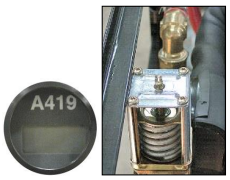
Condensation Reminder: If the temperature setting is below the ambient dew point in the room, the water lines should be insulated to prevent condensation. Setting temperature below the room dew point could also cause condensation on the surfaces of the equipment being cooled, with resultant damage. Consult a dew point chart to calculate the dew point in your environment.

4.1.2 Controller Selection

Select the controller from Table 4-1 on the next page that matches the one in your system and follow the instructions in the designated section.

4.1 Temperature Control (cont.)

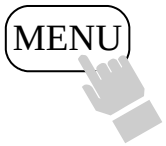
Table 4-1 Selection Guide
Common Temperature Control Options

Controller	Instruction Section	Identifying Photograph(s)
Electronic Temperature Control *(Accessible A419 Thermostat)*	Section 4.1.3	
Electronic ON-OFF Controller	Section 4.1.9	
Electronic (PID) Controller (Small)	Section 4.1.8	
Electronic (PID) Controller (Large)	Section 4.1.4	
Manual Temperature Control for Non-Refrigerated Systems	Section 4.1.5	
Manual Close-Temperature Control Option (G) for Refrigerated Systems	Section 4.1.6	
Electronic PID or Temperature Controller	Section 4.1.7	

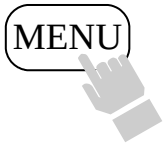
4.1.3 Electronic Temperature Control
(Accessible A419 Thermostat)

Water temperature is controlled by an adjustable thermostat. It senses tank water temperature and is preset to turn the refrigeration compressor OFF at your requested set-point. The ON temperature has been preset 4°F (2°C) higher, fixing the temperature cycling differential at plus/minus 2.0°F (plus/minus 1.1°C).

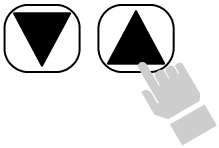
To view and adjust the temperature set-point follow these steps:



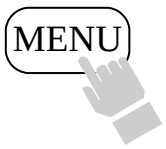
1) Press and hold the MENU button until the display changes to flashing “SP” (set-point). This will take about 2 seconds. Note: If no entries are made for 30 seconds, the control reverts back to the temperature display.



2) Press the MENU button again. The current set-point is displayed.



3) Press the UP or DOWN arrow buttons to adjust the temperature set-point.



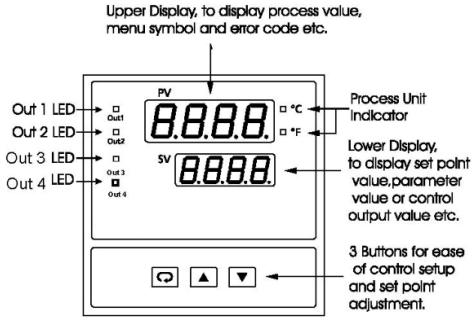
4) Press the MENU button to save the new set-point. The display then returns to indicating the actual reservoir temperature.

Note: If the MENU button is not pressed after changing the set-point (as step 4 above), the controller reverts back to the set-point value that was previously programmed.

4.1 Temperature Control (cont.)

4.1.4 Electronic (PID) Controller

Press the UP or DOWN arrow button to adjust the temperature set-point. Set-point (SV) will be displayed on the lower display. See Main Display.



Controller	
Parameter	Wiring terminals
A1SP	7,8,9
A2SP	11,12

Figure 4.1 Controller Layout and Alarm Wiring

4.1.5 Manual Temperature Control

(for Non-Refrigerated Systems with Modulating Valve and Inaccessible A419 Thermostat)

Water temperature is controlled by a modulating valve installed in the cooling water circuit. This valve varies the flow of cooling water to maintain a constant supply water temperature to the equipment being cooled. When the heat load is removed, it will modulate toward a closed position.

Adjustment Procedure

1) Locate the adjustment screw of the valve which is visible through the system lid and labeled “Modulating Water Temperature Control Valve.”

2) To lower the supply water temperature, use a screwdriver to turn the adjustment screw clockwise. To raise the supply water temperature, turn the adjustment screw counterclockwise.

4.1.6 Manual Close-Temperature Control

Option (G) for Refrigerated Systems with Hot-Gas Bypass Valve and Inaccessible A419 Thermostat

In the case of a malfunction of the bypass system, or a sharp reduction in the heat load, the freeze-protection thermostat serves as a back-up control that will cycle the compressor approximately 10°F (6°C) below the design temperature of the supply water.

If the actual heat load is less than the heat load used by Haskris to set the supply water temperature, the resultant supply water temperature will be lower; conversely, if the heat load is greater, the supply water temperature will be higher.

Adjustment Procedure

1) Loosen the lock-nut at the base of the adjusting stem of the hot gas bypass valve.

2) Turn the stem clockwise to raise, or counterclockwise to lower the supply water temperature. We suggest one-quarter turn for each 2.0°F (1.1°C) adjustment. (*cont’d next page*)

4.1 Temperature Control (cont.)

3) Wait at least 15 minutes to see if the desired temperature has been reached before making the next adjustment.

4.1.7 Electronic PID or Temperature Controller

Adjustment Procedure

The upper display of the control is the actual measured temperature of the supply water. This is referred to as the PV (Process Value). The lower display is the desired supply water temperature that the Haskris system will try to maintain. This is referred as the SV (Set-point Value).

1) To adjust the SV press either the up or down arrow key until the lower display indicates your desired supply water temperature.

2) Once the desired supply water temperature is reached, press to finalize the SV selection. The SV value will stop flashing when the new value is entered.

4.1.8 Electronic (PID) Controller (small)

Adjustment Procedure

The upper display of the control is the actual measured temperature of the supply water. This is referred to as the PV (Process Value). The lower display is the desired supply water temperature that the Haskris system will try to maintain. This is referred to as the SV (Set-point Value). To adjust the SV press either the up or down key until the lower display indicates your desired supply water temperature.

4.1.9 Electronic ON-OFF Controller

Water temperature is controlled by an adjustable thermostat. It senses tank water temperature and is preset to turn the refrigeration compressor OFF at the appropriate point for your application. The ON temperature has been preset 4°F (2°C) higher, fixing the temperature cycling differential at plus/minus 2.0°F (plus/minus 1.1°C).

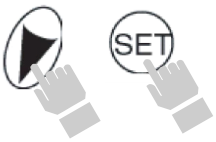
Adjustment Procedure

1) Press and release the “SET” button. SP (Set-Point) text appears on the display.

2) Press the “SET” button again. Temperature set point value is shown on the display.

3) Modify the temperature set-point value using the UP and DOWN arrow keys.

4) Press the “SET” and “DOWN” arrow key simultaneously to quit programming, or wait one (1) minute for the TIMEOUT.



4.2 Water Bypass/Relief Valve

Your system is provided with *one* of the four types of bypass/relief valves shown below, depending on the flow rate requirements of your system. These valves modulate and do not snap open and closed.

Figure 4-1 Bypass/Relief Valve Styles

Valve Functions

1) Its primary function is to divert the water pump discharge flow whenever the pump pressure reaches the bypass pressure setting. The water is diverted through the bypass line, through the cooling coil and into the storage tank. This reaction occurs when the closed-loop becomes restricted, such as when a solenoid valve on your equipment closes, or some other flow restriction develops. The bypass would also open if the pressure relief setting was not set above the required pressure to overcome the resistance to flow (pressure drop) in the closed loop.

2) As a secondary function, the valve can be used for partial-flow diversion. If the flow characteristics of the pump cause excessive pressure drop through the heat exchanger in the equipment being cooled, this valve can be adjusted to bypass some of the excess water. This reduces the flow through the equipment, thereby reducing the pressure required to complete the circuit.

Valve Setting Procedure

The valve has been preset for a maximum pressure in order to limit the pressure of the cooling water flowing to your equipment.

1) To find the pressure setting of the bypass valve, restrict the flow of supply water from the Haskris system (completely pinch the hose or close the supply hand valve if supplied). The pressure gauge will then indicate the valve pressure setting.

2) To access the adjustment stem, remove the knurled brass cap on top of the valve and loosen the locking nut at the base of the adjustment stem.

3) To change the pressure setting, rotate the screw inward (clockwise) to increase the water pressure required to open the valve, or rotate the screw outward (counter-clockwise) to decrease the water pressure required open the valve.

NOTE!

When rotating the screw outward to decrease the water pressure, make sure you do not completely remove the screw; this prevents the valve from leaking.

4) To finish, tighten the locknut at the base of the adjustment stem.

As noted above, the valve does not snap open and closed. It will crack open at approximately 10-15 psi (0.7-1.0 bar) below its set-point, depending on the valve. The valve continues to open gradually, increasing the amount of bypass, as pressure approaches the valve set-point. When the set-point is reached, all of the flow from the pump is being bypassed. For this reason the valve should be set, at a minimum, 15 psi (1.0 bar) above the normal operating pressure to ensure full flow of the pump through the closed loop.

4.3 Refrigerant Sight Glass/ Moisture Indicator

(Refrigerated Systems Only)

A liquid-line sight glass/moisture indicator has been installed to help you identify when the system is low on refrigerant and to assist the refrigeration mechanic when recharging the system.

The sight glass/moisture indicator is located near the bottom of the system and is visible when the service panel is removed, as shown in Figure 4-2. When the compressor is running, bubbles flowing through the sight glass indicate that the Haskris system is low on refrigerant.

Figure 4-2 Sight Glass

Turbulence and bubbles inside the sight glass are normal immediately after the compressor turns on, and immediately after it turns off. The sight glass should be clear when the compressor is energized and running.

4.4 Refrigerant Pressure Control

(Refrigerated Systems Only)

<u>The refrigerant pressure control is a safety device.</u> The refrigerant pressure control de-energizes the compressor motor when refrigerant operating pressures are outside the safe limits set by Haskris. The pressure control (Fig. 4-3) can be found at the base of the Haskris system, near the front, and can usually be seen through the front grill.

Figure 4-3 Refrigerant Pressure Control (Dual model shown)

NOTE!

Adjustments to the safe operating limits of any refrigeration pressure control should be made only after a qualified refrigeration technician installs refrigerant pressure gauges on the high and low sides of the refrigeration system.

Low Pressure Control

All refrigerated platforms include a low pressure control. This control, whether single or part of a dual control, de-energizes the refrigerant compressor when a significant amount of refrigerant has leaked out of the system, or when a restriction has occurred in the refrigeration circuit. The low pressure control also serves as an added level of freeze-protection. The low pressure control automatically resets when the refrigerant pressure increases to a safe level.

High Pressure Control

All refrigerated platforms with water-cooled condensers, air-cooled R175 and larger platforms, and platforms furnished with remote air-cooled condensers include a high-refrigerant pressure safety cutout with manual reset (all remaining platforms include an automatic reset.) The high pressure control de-energizes the refrigerant compressor when there is insufficient building water flow through a water-cooled condenser or insufficient airflow through an air-cooled condenser. The high pressure control must be manually reset after the refrigerant pressure decreases to a safe level.

4.4.1 Refrigerant Compressor Troubleshooting

If the mechanical refrigeration compressor is short-cycling (turning on and off rapidly), or the compressor will not come on at all when cooling is required, the compressor may have been safely locked out by the refrigerant pressure control or a high water temperature safety. Refer to the sections below or call Haskris Co. at 847-956-6420 for troubleshooting compressor operation.

Compressor Restart–Air-Cooled Platforms

(R175 or Platforms with Remote Condensers only)

1) Confirm ambient air temperature is within range (Section 2.2, Table 1).

2) Confirm the condenser fins are clean and allow ambient air flow through the condenser.

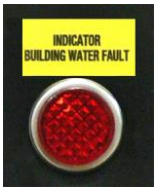
3) Verify the inlet to condenser is at least 8” from the wall.

4) Confirm that another application is not directing hot air into the condenser inlet and the water pump is circulating cooling water (pressure gauge needle indicates discharge pressure or other means).

5) Manually reset the refrigerant pressure control by pressing the black reset button on top of the dual pressure control unit (Figure 4-3).

Compressor Restart–Water-Cooled Platforms

A Building Water Fault Indicator is included with all Haskris platforms furnished with a water-cooled condenser (see Figure 4-4).



The building water fault indicator illuminates when insufficient flow of building water through the water-cooled condenser trips the high pressure side of the refrigeration pressure control.

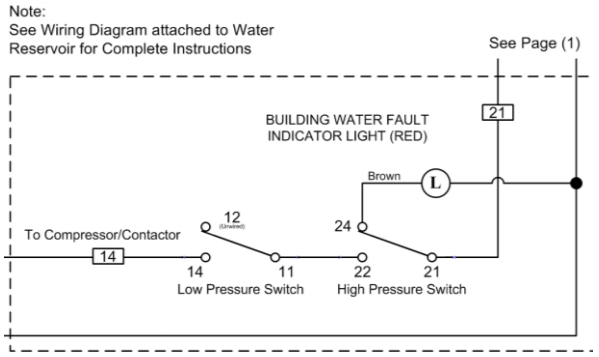


Figure 4-4 Water Fault Indicator Schematic

1) Investigate possible causes of insufficient building water flow.

Possible Causes	Corrective Action
Dirty strainer on the building water (do not use a filter)	Clean strainer and/or Contact Facilities
Unplanned building water shutdown	Contact Facilities
Imbalanced building water loop condition (sudden change of differential pressure and/or temperature)	Contact Facilities

2) After the insufficient flow issue is identified and resolved, record the original setting of the high-water temperature safety [Option (B) or Option (N)] installed on your Haskris system, then increase the setting above the current water temperature in the reservoir. This will re-start the pump motor.

3) Press the manual reset button on top of the high refrigerant pressure safety cutout, located at the bottom of the chiller behind the front panel. (See Figure 4-3)

4) The refrigeration compressor should restart. If the compressor will not start, there may still be a fault condition in the building water circuit. Please contact Haskris if you have difficulty resolving this fault condition.

5) Return the high-water temperature safety back to the original setting.

Call Haskris (847-956-6420) if persistent building water faults occur at your location.

4.5 Water Level "Full" Pilot Light

For your convenience, a pilot light has been installed on the control panel (Fig. 4-5).

NOTE!

The storage tank is sufficiently filled when the pilot light is on. When the light is off, the storage tank water is below the recommended operating level. Refill the tank according to the instructions in Section 3.2.

Figure 4-5 Water Level Pilot Light

Refrigerated systems with 5, 6 or 9 gallon (19, 23 or 34 liter, respectively) tanks are furnished with a liquid-level interlock relay. When the water level drops, the liquid level interlock relay opens, shutting the system down (refer to the wiring diagram located inside your Haskris system, on the tank).

4.6 Option (A) Flow Meter

Many OEM configured Haskris systems include Haskris Option (A), Flow Meter, providing a visual display of the cooling water flowing to or from the application. To determine the volumetric flow, read the graduated scale at the widest part of the float.

Remember, some of the flow can be diverted through the water pressure bypass valve. See section 4.2 Water Pressure Bypass Valve to determine if any cooling water is flowing through the bypass valve.

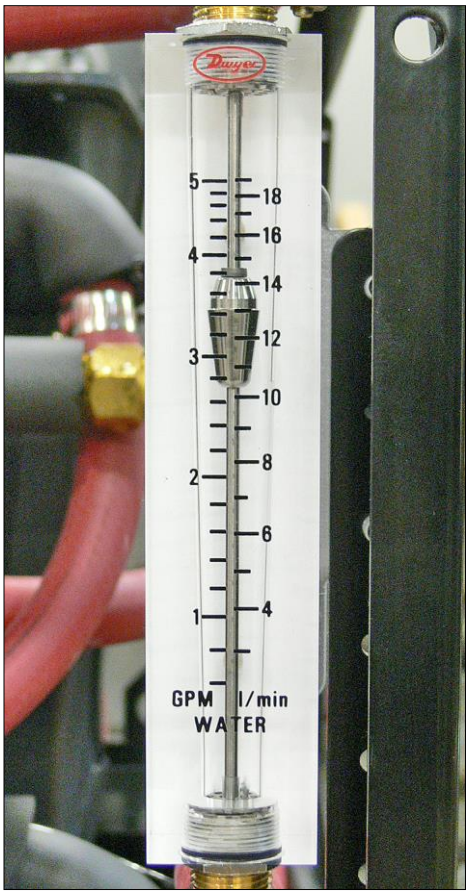


Figure 4-6 Option (A) Flow Meter

5.1 Water Storage Tank

5.1.1 Tank Inspection

Periodically inspect the tank to make sure that the water is clear and that there has been no accumulation of debris.

5.1.2 Frequency of Water Changes

The frequency of required water changes varies according to the condition of the water at your individual environment; however, Haskris recommends that the water in the tank be changed once or twice per year at a minimum.

5.1.3 Biological Growth

Haskris recommends using opaque hose, between the Haskris system and the equipment being cooled, to minimize light introduced into the system, thus minimizing biological growth.

If your system exhibits biological growth, we offer the following recommendations:

NOTE!

It is EXTREMELY important that you check with the manufacturer of the equipment being cooled to ensure that the use of any biologically inhibiting chemicals or additives is compatible with their equipment.

System Flushing

Flush the system by using one of the following 2 methods:

Method 1 - Original equipment manufacturer does NOT allow the use of chemicals in the system: Run a short hose directly from the supply to the return line in a closed loop in order to flush the Haskris system out.

Method 2 - Original equipment manufacturer allows the use of hydrogen peroxide: Add one (1) pint (0.5 liters) of 3% hydrogen peroxide per 15 gallons (57 liters) of water. Circulate the water for 20-30 minutes. Drain the system and refill with clean, potable (drinkable) distilled water.

Chemical Additives

Haskris recommends that additives are only used as a means of last resort. Various concentrations of a variety of chemicals can be used to minimize (or eliminate) biological growth on an ongoing basis.

For a list of approved additives together with instructions on how to use them, please consult the FAQ section on the Haskris website:

http://www.haskris.com/Documents/Haskris_WaterTreatment.pdf

Water Filtration

A 5-micron filter is very helpful in keeping the water recirculation system clean. Section 5.4 further describes this mechanism.

5.2 Air-Cooled Condenser

Haskris systems with air-cooled condensers draw a substantial amount of air across the condenser fins and coils. As dust and debris collect, heat transfer becomes less efficient, resulting in the loss of cooling capacity. To remove the accumulation of debris, vacuum the condenser fins thoroughly on a regular basis. A brush may be used to loosen compacted debris.

5.3 Pump Motor Lubrication

Turbine pump motors and newer Positive Displacement Pump (PDP) motors do not require lubrication. Some older motors used in conjunction with PDP models 10047, 10048 and 10049 require lubrication once per year. To lubricate, remove the plastic plug at the end of the motor and add 3-4 drops of SAE #10 motor oil. Check the motor nameplate if unsure.

5.4 Strainers and Filters

5.4.1 Nylon Suction Strainer

NOTE!

Cavitation due to improper strainer maintenance will damage the pump and is not covered under warranty.

Positive Displacement Pumps (PD pump models 102L060, 102L100, 104L215) and several T-Series Turbine Pumps use a Nylon Suction Strainer (Fig. 5-1). This strainer is located inside the water storage tank of your system and prevents debris from damaging the pump impeller.

Figure 5-1 Nylon Suction Strainer
Part Number 1040

Ordering Replacement Strainers

Replacement strainers may be purchased from Haskris. Order Haskris part number 1040 when ordering a single replacement strainer, or part number 9040 when ordering a 3-pack of strainers. Contact Haskris to confirm the strainer part number if you are unsure.

When to Clean the Strainer

After initial start-up, check the strainer on a monthly basis. The mesh should be clean. If the mesh feels slippery or “slimy”, this is an indication of biological growth. If water cannot pass through the end of the strainer, the pump will cavitate and water flow will be diminished. **Cavitation due to improper strainer maintenance will damage the pump and is not covered under warranty.** Clean the strainer whenever there is a significant accumulation of debris or an indication of biological growth on the strainer.

To Replace or Clean the Strainer

To replace or clean the strainer, **place the main power switch to the OFF position**, lift the strainer out of the reservoir, loosen the hose clamp, and remove the strainer from the hose. Remove debris from the mesh using a cleaning agent and water. A soft-bristled brush can be to used loosen the debris. Be careful not to tear the nylon mesh. If debris accumulates inside the strainer or if the strainer becomes damaged in some way, replace the strainer. Prime the pump per section 3.2 before reattaching the strainer to the hose in the reservoir. Tighten the hose clamp securely.

5.4.2 Supply Line Filter Option (L) (as applicable)

A supply-line filter (Fig. 5-2) is similar to a strainer, but it is located in the supply water line (either external or internal to the system frame.) This filter will help prevent debris from entering the system and can also provide significant protection against algae growth in the tank (*cont’d next page*)

Figure 5-2
Supply Line
Filter

5.4.2 Supply Line Filters (cont.)

Replacing a Supply-Line Filter

Record the operating water pressure during start-up of your Haskris system, when the filter element is clean. The operating water pressure can be read by viewing the water pressure gauge (furnished). Replace the filter when the pressure increases 5-6 psi (0.3 - 0.4 bar) above the initial start-up pressure. Replacement filter elements may be ordered by contacting Haskris.

6.1 Standard Product Warranty

Limited Warranty: Haskris' warranty is limited to the following provisions and does not apply to claims where the product has been mishandled or used in a manner inconsistent with this instruction manual. Haskris makes no other warranty, express or implied, including all implied warranties of merchantability and fitness for a particular purpose.

Term & Conditions Provisions: Warranty extends for one (1) year from date of start-up or shipment (from Haskris), in no event longer than 18-months from the date of shipment. The warranty includes parts and on-site labor. Any warranty labor must be authorized by Haskris, in writing, prior to proceeding with the repairs.

Parts Provisions: Parts warranty does not include consumable items such as filtration elements. Replacement parts furnished during the system warranty are covered until the system warranty expires. Parts purchased after the system warranty expires will be covered for a period of 90-days. Defective parts must be returned, transportation prepaid, to Haskris Company. Normal outgoing surface transportation charges will be paid by Haskris.

Service Notes

Maintenance Action:	Performed By:	Date:

Sales - 001-847-956-6420 - sales@haskris.com

Service - 001-847-956-6420 - service@haskris.com

Technical Documents - www.haskris.com