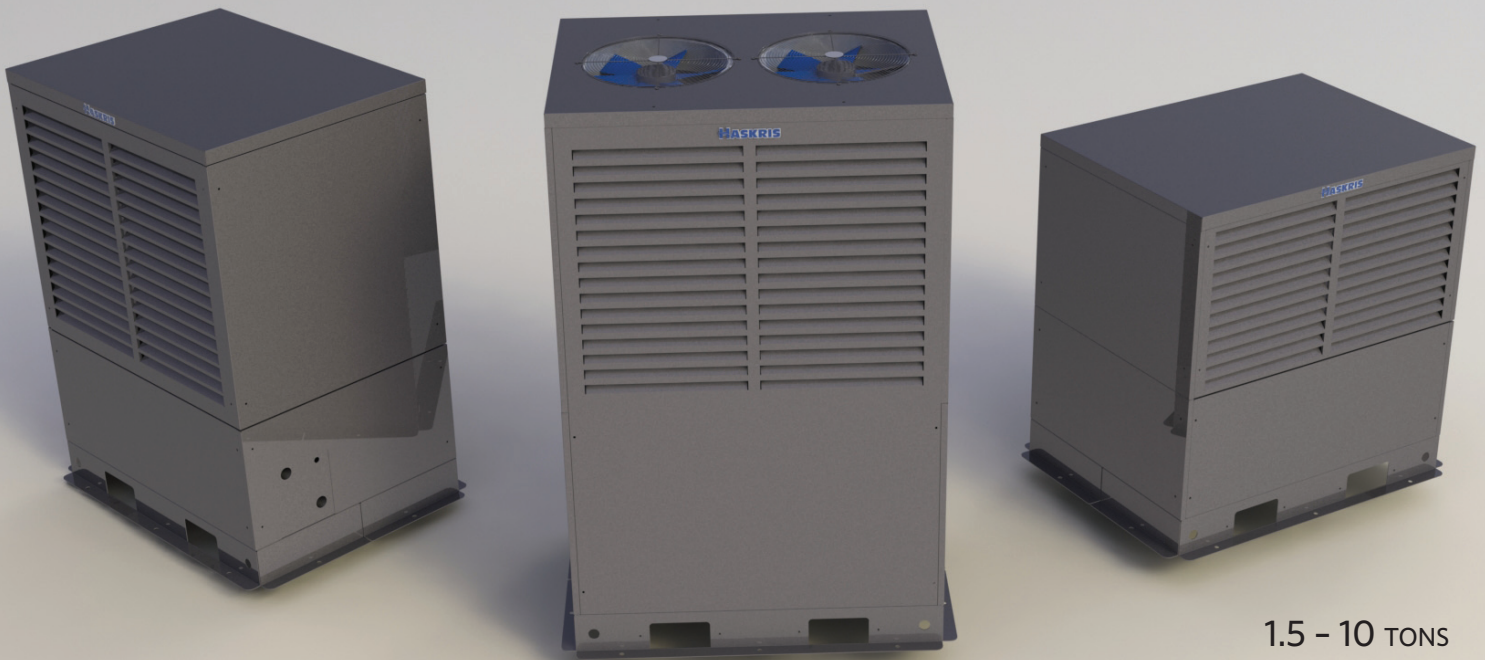


OPC SERIES Outdoor Process Chillers



1.5 - 10 TONS

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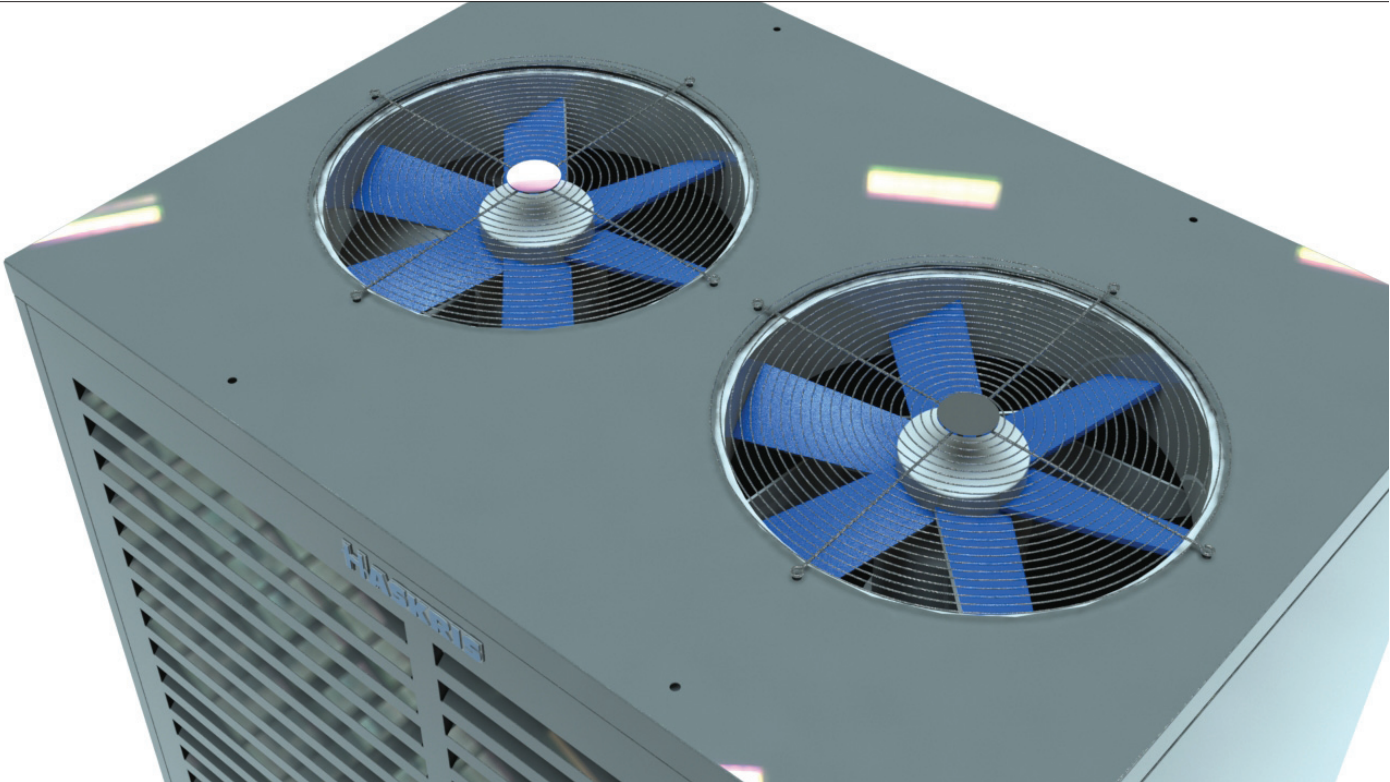
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PLEASE NOTE: Haskris OPC chillers can be customized. Contact Haskris for more information.

Frame and Panels

Consists of an internal welded steel frame and exterior panel system. The frame and panel system is mounted to a heavy gauge steel base. All metal surfaces are powder coated to provide a durable, weather-resistant finish. All exterior exposed surfaces are coated with a UV-resistant powder coat.

Indoor or Outdoor Installation

The weatherproof panels and system components are designed for placement outdoors. Circulating fluid may be specified with propylene or ethylene glycol to adapt the unit to cold climates.

Compressor

The compressor is a fully hermetic, high-efficiency compliant scroll design with overload protection. It has rubber isolated mounting to reduce noise and vibration. A liquid line sight glass/moisture indicator is included as well as a manual reset high-pressure switch. The high-efficiency scroll compressors are standard on OPC units.

Refrigerant Dehydrator

The refrigerant dehydrator assures a moisture-free refrigerant system for extended component life.

Refrigerant Sight Glass

The refrigerant sight glass provides a method of observing the dehydration state of the refrigerant as well as a quick reference check to assure the proper refrigerant charge.

Expansion Valve

The externally equalized thermostatic expansion valve smoothly controls refrigerant flow and provides precise control of superheat.

Hot Gas Bypass Valve

The chiller capacity is regulated by an electronic control system that utilizes a high resolution stepper motor driven hot gas bypass valve. This allows for stable chiller operation over a wide range of loads.

Refrigerant Receiver

The refrigerant receiver provides a liquid seal and storage of refrigerant when the system is operating in ambients from

-30°F to +120°F (-34°C to +49°C). Performance will be reduced above 95°F ambient. Consult factory for derated capacities. The receiver shall be equipped with a pressure relief valve.

Condenser Fan Control

Electronic fan speed controls provide a continuously variable fan speed to match the needs of the refrigeration system over a wide range of ambient conditions. This provides optimum high side pressure for maximum refrigeration efficiency.

Condenser Flooding Controls

Adjustable condenser flooding valve and receiver pressurization valve are provided to guarantee cold weather start-up and operation.

Non-ferrous Circulating Loop

The circulating loop contains only non-ferrous components to protect against corrosion. This will extend not only the life of the chiller but protect sensitive equipment being cooled by the chiller.

Stainless Steel Pump (OPC-1.5 thru OPC-10)

An enclosed impeller, centrifugal pump is provided. This pump is equipped with an improved shaft seal for extended service and compatibility with a wide variety of fluids.

Bypass valve

The fluid circuit incorporates a continuous duty, adjustable bypass valve to fix a maximum allowable system pressure as well as allowing a wide range of outlet conditions including shut-off to occur without affecting the chiller or pump.

Fluid Pressure Relief Valve

The $\frac{3}{4}$ " (2 cm) FPT brass, high pressure relief valve is mounted on the inlet pipe to the fluid reservoir expansion tank for safety protection against system pressures over 75 psi (517 kPa).

Tank Heater

A stainless steel and Incoloy insertion heater maintains minimum fluid temperature during low ambient conditions or after prolonged off periods. The heater is of a low watt density design to help prevent the breakdown of the thermal

fluid. Heater includes an adjustable temperature set point thermostat.

Fluid Reservoir/Expansion Tank

The fluid reservoir and expansion tank is manufactured of stainless steel, and provides thermal storage to act as a buffer for rapid load changes and to provide an area for fluid expansion. Expansion volume is one gallon (3.8 liters) adjustable; maximum working pressure is 75 psi (517 kPa). The tank will have a sight glass for direct observation of fluid level along with fluid charge and vent valves.

Control System

The chiller is equipped with a complete control system for both the refrigerant loop and fluid loop. Refrigerant safeties, flow, temperature, liquid level are continuously monitored by the control system. A mode selection switch to run pump only, standby (off), or pump and chiller shall be provided.

Fluid Pressure Gauges

An analog gauge for monitoring supply and return pressure is provided. Each gauge is equipped with an isolation shut-off valve.

Isolation Ball Valves

A brass, $\frac{1}{4}$ turn isolation valve is provided on both the supply and return for isolation of fluid piping components in the event of a service necessity. Each main valve is also equipped with a smaller service ball valve with garden hose thread and tethered cap for easy connection of service equipment.

Low Flow Switch

A flow switch provides an alarm and system shut-down when fluid flow falls below a design limit of system operation. This protects the pump and chiller from failure.

Strainer

The system is equipped with an internal fluid wye strainer to protect the fluid loop from contamination and debris. The strainer is equipped with a ball valve with garden hose thread fittings and tethered cap for easy "blow-down" of the strainer screen.

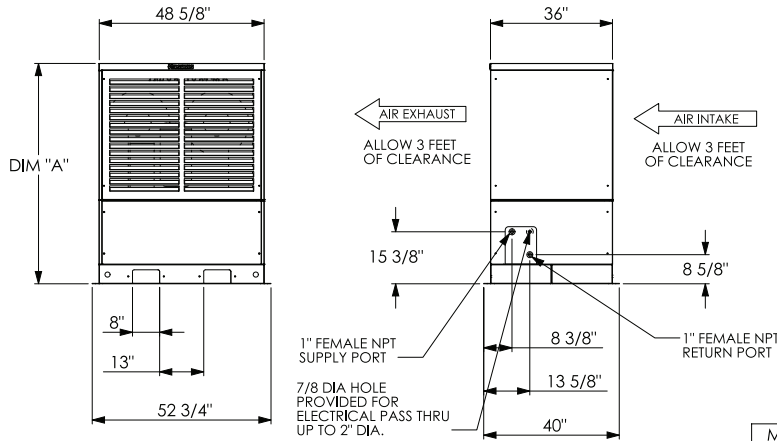
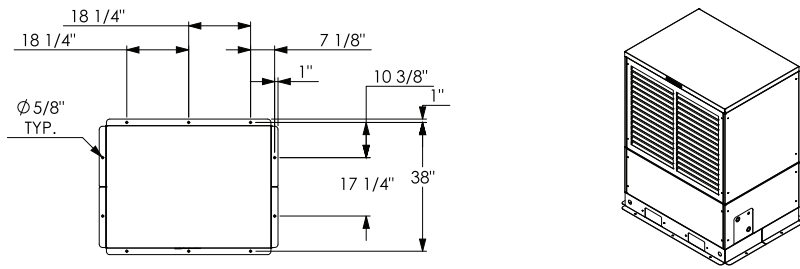
OPC 1.5 TO 10 TECHNICAL DATA

	OPC1.5	OPC2	OPC3	OPC4	OPC5	OPC8	OPC10
Fluid Circuit							
Coolant Flow Rate—GPM (LPM)	2.5 (9.5)	3.5 (13.25)	5.5 (20.82)	8.0 (30.28)	10.5 (39.75)	16 (60.57)	25 (94.6)
Pump HP	3/4	3/4	3/4	1	1	3	3
Water Connection Size (NPT)	1"	1"	1"	1"	1"	1-1/2"	1-1/2"
Reservoir Volume (Gal. Nominal)	25	25	25	25	25	25	25
Circulating Fluid—Water							
Net Cooling Capacity—BTUH (kW)							
45°F (7.2°C) LWT	12000 (3.5)	16990 (5.0)	27000 (7.9)	39120 (11.5)	50830 (14.9)	77620 (22.7)	92250 (27.0)
50°F (10°C) LWT	13433 (3.9)	19394 (5.7)	30000 (8.8)	42747 (12.5)	57237 (16.8)	84495 (24.7)	102700 (30.1)
55°F (12.8°C) LWT	14867 (4.4)	21260 (6.2)	33000 (9.7)	46373 (13.6)	63643 (18.6)	90950 (26.6)	113400 (33.2)
60°F (15.6°C) LWT	16300 (4.8)	24150 (7.1)	36000 (10.5)	50000 (14.6)	70050 (20.5)	98250 (28.8)	123000 (36.0)
Circulating Fluid—40% Ethylene Glycol							
Net Cooling Capacity—BTUH (kW)							
45°F (7.2°C) LGT	10884 (3.2)	15410 (4.5)	24489 (7.2)	35482 (10.4)	46100 (13.5)	70400 (20.6)	83670 (24.5)
50°F (10°C) LGT	12318 (3.6)	17743 (5.2)	27511 (8.1)	39201 (11.5)	52479 (15.4)	77480 (22.7)	94175 (27.6)
55°F (12.8°C) LGT	13767 (4.0)	19687 (5.8)	30556 (8.9)	42938 (12.6)	58933 (17.3)	84200 (24.7)	105000 (30.7)
60°F (15.6°C) LGT	15485 (4.5)	22943 (6.7)	34193 (10.0)	47490 (13.9)	66450 (19.5)	93330 (27.3)	116850 (34.2)
Circulating Fluid—40% Propylene Glycol							
Net Cooling Capacity—BTUH (kW)							
45°F (7.2°C) LGT	10380 (3.0)	14690 (4.3)	23355 (6.8)	33839 (9.9)	43960 (12.9)	67140 (19.7)	79790 (23.4)
50°F (10°C) LGT	11817 (3.5)	17065 (5.0)	26398 (7.7)	37615 (11.0)	50364 (14.7)	74355 (21.8)	90375 (26.5)
55°F (12.8°C) LGT	13149 (3.9)	18815 (5.5)	29200 (8.5)	41033 (12.0)	56314 (16.5)	80490 (23.6)	100350 (29.4)
60°F (15.6°C) LGT	14992 (4.4)	22218 (6.5)	33120 (9.7)	46000 (13.5)	64445 (18.9)	90390 (26.5)	113160 (33.1)
Dimensional Data							
Dimensions (W x D x H)	49 x 36 x 52 in.	49 x 36 x 52 in.	49 x 36 x 52 in.	49 x 36 x 65 in.	49 x 36 x 65 in.	49 x 36 x 75 in.	49 x 36 x 76 in.
	124 x 91 x 132 cm.	124 x 91 x 132 cm.	124 x 91 x 132 cm.	124 x 91 x 165 cm.	124 x 91 x 165 cm.	124 x 91 x 191 cm.	124 x 91 x 191 cm.
Shipping Weight							
	1040 Lbs. (472 Kg)	1040 Lbs. (472 Kg)	1040 Lbs. (472 Kg)	1590 Lbs. (721 Kg)	1590 Lbs. (721 Kg)	1700 Lbs. (771 Kg)	1700 Lbs. (771 Kg)
Power Requirements							
Available power options	208-230 V-1-60Hz	208-230 V-1-60Hz	208-230 V-1-60Hz				
	208-230 V-3-60Hz	208-230 V-3-60Hz	208-230 V-3-60Hz	208-230 V-3-60Hz	208-230 V-3-60Hz		
	460V-3-60Hz	460V-3-60Hz	460V-3-60Hz	460V-3-60Hz	460V-3-60Hz	460V-3-60Hz	460V-3-60Hz

NOTE: Specifications subject to change. Consult Haskris at time of sale for selection assistance.

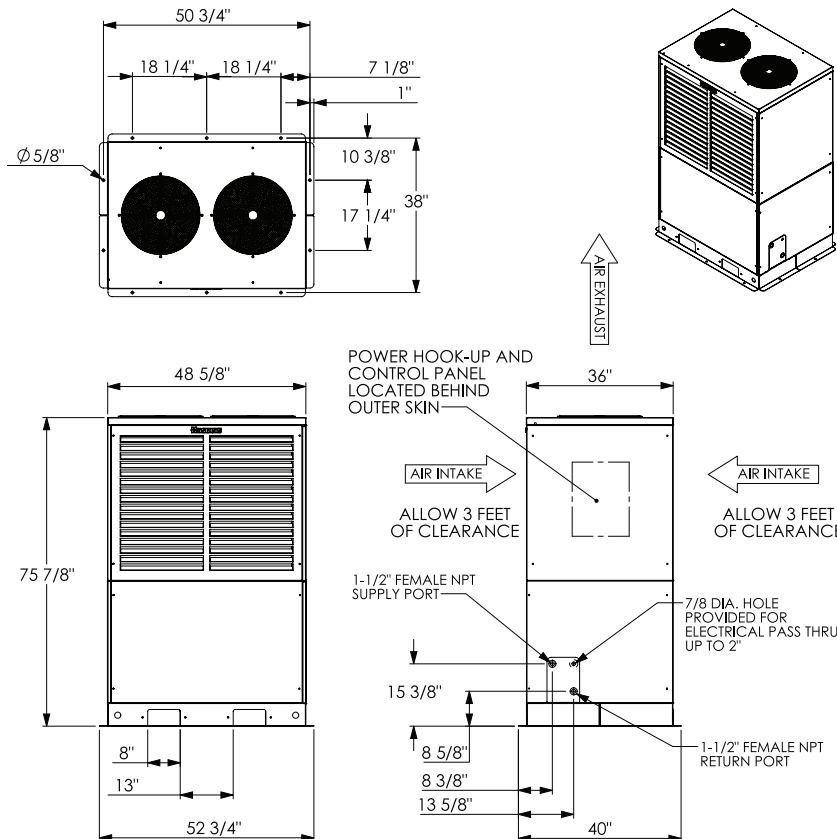
Dimensional Data

OPC 1.5 - 5



MODEL NUMBER	DIMENSION "A"
OPC 1.5	52"
OPC 2	52"
OPC 3	52"
OPC 4	65"
OPC 5	65"

OPC 8 AND 10



MODEL #	FULL LOAD AMPS		
	230V-1-60Hz	230V-3-60Hz	460V-3-60Hz
OPC-1.5	31.2	19.2	11.5
OPC-2	35.9	22.7	12.1
OPC-3	49.1	35.7	16.7
OPC-4	-	29.6	17.5
OPC-5	-	39.8	21.9
OPC-8	-	-	28.5
OPC-10	-	-	31.1

1.0 GENERAL

1.1 Summary

These specifications describe requirements for a self-contained air-cooled process fluid chiller system.

1.2 Design Requirements

The chiller shall be a HASKRIS model OPC-_____, self-contained air-cooled chiller system. Each system shall have a net cooling capacity of _____ BTU/HR (kW), based on a leaving coolant fluid temperature of _____ °F (°C), and 95°F ambient air temperature. The cooling fluid shall be _____% propylene glycol, ethylene glycol, or water. Unit is to be supplied with _____ volts, _____ ph, _____ Hz power supply.

1.3 Submittals

Submittals shall be provided with the proposal and shall include: Dimensional, Electrical, and Capacity data; Piping and Electrical connection drawings.

2.0 PRODUCT

2.1 Cabinet Construction

The cabinet shall be made up of a chassis and removable panel system. They shall be constructed of painted weatherized steel. The removable access panels shall open to a second cover that protects all line voltage components. Service access shall be provided on all sides.

2.1.1 Chassis

The chassis or frame for the OPC shall be constructed of welded steel that is weatherized by having been treated with powder coating.

2.1.2 Panels

The exterior of the chassis shall be fitted with removable steel panels. These panels are to be weatherized with powder coating that is to be UV stabilized.

2.2 Coolant Delivery System

The chiller shall have a factory installed close-coupled centrifugal pump with a ball bearing motor designed for continuous duty. The circulating pump shall be _____ HP. The pump shall provide _____ GPM (l/m) at _____ feet of water (kPa) total head. The internal coolant delivery system shall include isolating ball valves on the supply and return. There shall also be service ball valves on the supply and return equipped with GHT fittings and tethered caps to aid in system fluid charging and maintenance. Internal chilled water piping shall be factory insulated.

2.2.1 Bypass relief

There shall be included a continuous duty, adjustable bypass relief valve. This valve will prevent pump "dead heading" by recirculating the fluid internally. This valve will also establish the maximum supply fluid pressure.

2.2.2 Strainer

The system shall be equipped with an internal fluid wye strainer. This strainer shall be equipped with a ball valve with GHT fittings and tethered cap for "blow-down" of the strainer screen.

2.2.3 Gauges

There shall be included an internal pressure gauge and isolation valve for the gauge on both the supply and return side of the fluid loop.

2.3 Fluid reservoir

There shall be included an internal stainless steel fluid reservoir. The reservoir will be equipped with a sight level gauge and low liquid level float switch.

2.3.1 Reservoir heater

The reservoir shall be equipped with an electric resistance heater. This heater shall be constructed to provide low

watt-density heating of the fluid so as to not allow breaking down of the fluid. There shall also be included an adjustable thermostat to control the heater.

2.4 Refrigeration System

The refrigeration system shall be direct expansion with fully insulated stainless steel brazed plate evaporator. The system shall include service ports, liquid line filter dryer, refrigerant sight glass and moisture indicator. The system shall also include an adjustable, externally equalized expansion valve. The system shall be continuous run of the compressor with temperature control maintained by an electronically controlled hot gas bypass valve. The internal condensing unit shall be factory tested and charged with refrigerant and shall include two direct-drive fans. The condenser coil shall be constructed of copper tubes and aluminum fins. No piping, brazing, dehydration or charging of the refrigeration system shall be required in the field.

2.4.1 Low Ambient Winter Control System

The winter control system will allow start-up and positive head pressure control with ambient temperatures as low as -30°F (-34.4°C). The winter control system shall include an adjustable condenser flooding valve and receiver pressurization valve. The condenser fans will be variable speed continuously adjusted by an automatic electronic controller.

2.5 Compressor

The unit shall have a hermetic scroll compressor with suction gas cooled motor, vibration isolators, thermal overloads, crankcase heater, and shall operate at 3500 RPM @ 60 Hz.

2.6 Control System

The control system shall consist of a digital electronic fluid temperature control, manual reset high pressure switch,

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low ambient start relay, 24 volt transformer, and remote shut down terminals for unit shut-down via a maintained NC contact. The line voltage system shall include pump contactor, pump overload relay (3-phase units only), compressor/fan contactors and phase monitor (3-phase units only).

2.6.1 Digital electronic temperature control

The temperature controller will provide digital readout of the process value temperature and the set point value temperature. It shall be a microprocessor based digital controller. It will provide a high accuracy output signal to the electric hot gas valve controller.

2.6.2 Mode selector switch

The control system shall include a mode selector switch. This is a 3-position switch to allow for pump only operation, standby (off) and pump with cooling modes.

2.6.3 Low liquid level

The controls system shall include a low liquid level float switch in the reservoir that upon a low fluid condition will de-energize the circulating pump, refrigeration compressor, and condenser fans. An indicator light on the main control panel will illuminate to identify a low liquid level condition.

3.0 EXECUTION

3.1 Installation of Process Fluid Chiller

3.1.1 General

Install process fluid chiller in accordance with the manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated and maintain manufacturer's recommended clearances.

3.1.2 Electrical Wiring

Install and connect electrical devices furnished by manufacturer but specified to be field installed. Furnish copy of manufacturer's electrical connection diagram to electrical contractor.

3.1.3 Field Quality Control

Start up process fluid chiller units in accordance with manufacturer's start up instructions. Test controls and demonstrate compliance with requirements.

4.0 OPTIONAL EQUIPMENT, ACCESSORIES AND CUSTOMIZATION

4.1 Contact Haskris

100 Kelly Street
Elk Grove Village, IL 60007
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Fx: 847-956-6595
email: info@haskris.com
web: www.haskris.com