Specification Sheet



PFP-572

MANUFACTURED BY

KLINGE CORPORATION

4075 EAST MARKET STREET

YORK, PA 17402 USA

Phone: 1-717-840-4500

https://www.thermoking.com/klinge

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UNIT INFORMATION

Construction	PFP-572 is a picture frame electrical refrigeration unit, designed for standard ISO containers as well as DNV. The unit has two complete electrical systems (including thermostats) and two independent refrigeration systems. Each refrigeration system has its own compressor, refrigerant piping, coils, and thermal expansion valve. There are two evaporator fan motors, and condenser fan motors. The unit is designed for cooling, electric heating and defrost, to maintain cargo in a temperature range from +2° to +25°C. The electrical system consists of an all-relay control system for fully automatic operation of all functions (temperature control, defrosting, etc.). The design consists of a single piece condenser / evaporator unit with quality motors and components. The refrigeration frame is constructed of aluminum, treated to resist corrosion induced by salt spray atmosphere. All fasteners: bolts, screws, nuts, washers, and hinges are stainless steel. The evaporator door is removable. Rear bulkhead panels are constructed of aluminum with high inherent corrosion resistance. Most operational components except the evaporator coil, electrical heaters, and expansion valve are replaceable from the front of the unit.
Equipment design	To withstand and operate satisfactorily under sea-going and environmental conditions including: Ocean environment: Salt-laden air, sea spray, high humidity, and severe atmospheric conditions Rolling: Amplitude of 30 degrees on each side, period of 13 seconds Pitching: Amplitude of 6 degrees, period of 8 seconds Permanent list: 10 degrees on each side Shock: Acceleration of 2 G in all directions Vibrations: Of the type encountered on ships or land vehicles and rails
Dimensions	Width: 2025.65 mm / 79.75in Height: 2235.20mm / 88.00in Depth: 455 mm (424mm from back of flange)

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Power supply Main power Control Circuit	 50 Hz; 360VAC min. - 460VAC max. 60 Hz; 400VAC min. - 500VAC max. The nominal frequencies of 50Hz and 60 Hz shall have a tolerance of ± 2.5%. AC, 24/12 Volts (from transformer)
Method of Defrost	Manual, On-Demand and Automatic Timer Back-up
Paint	Powder coated White
Refrigerant / Charge	R-134a / 8.5lbs (3.85kg) per system
Sound Pressure	99dB @ 1M 88dB @ 5M

UNIT CAPACITY

Test method according to ARI standard.

Unit capacity 60 HZ	Net cooling capacity at **38°C** ambient temperature at **60 Hz** power	
Return air temperature	**Cooling Capacity**	**Power Consumption**
+2°C	5860 W	6150 W

STANDARD INFORMATION

Machinery is designed for and suitable for transportation over long voyages of chilled, or heated cargoes.
Machinery will be in full functional operation and work satisfactorily in ambient temperatures from -20°C to +50°C (-4°F to +122°F). Components are made to withstand temperatures up to + 70°C (158°F).

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The unit is built to comply with standards and regulations of major Classification Societies such as:
ARI - test method for rating refrigerated equipment.
Machinery complies with International Customs Regulations for Containers.
Machinery complies with relevant ISO Recommendations.
Machinery complies with rules of B.V., ABS and Lloyds Register, but is certified to ISO 1496-2.
Unit complies with Australia and New Zealand Health Requirements.

UNIT INFORMATION, REFRIGERATION SYSTEM

COMPRESSOR/CONDENSER SECTION		
Compressor	**Type**	Hermetic scroll
	Displacement	508.53 CFH / 14.4m3/h
	Oil	Mobile EAL Arctic 22 cc polyolester oil
	Protection	Automatic reset
Condenser coil	**Tube / Fin Material**	Copper / Copper
	Surface area	12.28 m^2
	Protection	Coil is constructed of copper tubes, salt spray resistance coated fins and marine grade aluminum for housing
Condenser fan motor	**Nominal Hp**	3/4
	Speed	1700 rpm
	Bearing	Ball, sealed
	Protection	Internal thermal automatic reset

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Condenser fan impeller		**Type**	Axial Airfoil Impellers
		No. of blades	5
		Material	Plastic (anti-static)
		Air flow	1500 CFM
REFRIGERATION SYSTEM			
Heat Exchanger	Klinge	**Expansion Valve**	Thermostatic type
Receiver	Vertical with level and moisture indicators	**Filter Drier**	Liquid line filter, remove moisture and acid
		Shut off valve	Diaphragm type
Crankcase pressure regulating valve		Mechanical with adjustable setpoint	
Hot gas solenoid valve		Normally Closed Pilot Operated type	
REFRIGERATION SAFETY CONTROLS			
High pressure switch		Cut-out 31.02 bar / 450psi	
Low pressure switch		Cut-out 0.34 bar / 5psi	
Discharge temperature control		Cut-out +130°C	
Fusible plug (receiver)		221°C	
EVAPORATOR SECTION			
Evaporator coil	Fin and tube type	**Tube / Fin Material**	Copper / Aluminum

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		Surface area	21.21 m^2 (Dual)
Evaporator fan motor	AC, Explosion proof	**Class**	Zone 1, Group IIB
		Nominal Hp	1-1/2 HP
		Speed	3400 rpm
		Bearing	Ball, sealed
		Protection	Internal thermal automatic reset
Evaporator fan impeller		**Type**	Airfoil Impellers - Backward Curved
		Material	Injection molded high strength polyamide
		Max air flow	1861 CFM
Air Flow in container		Bottom air discharge	
Defrost type		Hot gas	

UNIT INFORMATION, ELECTRICAL SYSTEM

ELECTRIC SAFETY CONTROLS	
Main power circuit breaker	25A
Transformer circuit breaker	2A
Heater circuit breaker	6A
Control circuit breaker	8A
Battery charger circuit breaker	4A

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Compressor, condenser, and evaporator motor	Internal thermal automatic reset
INTERNAL ELECTRIC PANEL COMPONENTS	
Contactors	Compressor, condenser fan, evaporator fan, heater
Display panel lights (L.E.D.)	On, alarm on, defrost, cooling, heating, probe failure, temperature failure, dehumidification mode, humidity is high
Circuit breakers	Main power, transformer, heater
Transformer	Primary 400 VAC
	Secondary 24/14 VAC
EXTERNAL ELECTRIC PANEL COMPONENTS	
Switches	Unit ON – OFF, manual defrost/function test – silence horn
Circuit breakers	Control circuit, battery charger

CONTROL SYSTEM

CONTROL INFORMATION

Temperature controller is based on microprocessor technology. System prevents discharge air from going below predetermined settings. Temperature settings are in 1oC increments from 0°C to 29°C.

On demand defrost is controlled by a probe mounted on the suction line following the coil to measure the temperature of the coil, which measures the temperature of the refrigerant in the copper tubes.

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The controller is based on microprocessor technology and consists of 3 parts:

1. Operator control panel
2. Printed circuit board (PCB)
3. Temperature probes (2 pcs)

All parts are mounted in the control box except for the probes, which are mounted in the return air and on the suction line following the evaporator coil. The microprocessor technology design provides permanent accuracy, reliability, and increased flexibility in functions. There is a permanent base program built into the controller, but also a non-volatile memory for additions or changes in programming is available. The controller automatically locks out the heating cycle, when the temperature set point is below -6°C.

OPERATION

The compressor will cycle off at set point. Evaporator fan will continue to run. Compressor will cycle back on at 0.5°C above set point, running unloaded. The secondary system evaporator fan motor is OFF when setpoint temperature is reached and back ON when cooling or heating. When compressor cycles off there is a 60 second time delay before compressor can cycle back on. This has priority over the thermostat signal and prevents rapid cycling of the compressor. If the temperature drops 1°C below set point the heating contactor will be energized and remain energized until return air temperature reaches set point.

TEMPERATURE PROBES

Each temperature sensing probe is a thermistor-based device placed within a flameproof enclosure, which is connected to a two conductor SO cable. Temperature signal from the probe is relayed to the controller through this cable. One probe is mounted on the suction line following the coil to measure the temperature of the coil. The second probe is mounted in the return air stream measuring the temperature coming back from the container. The third probe is mounted on the discharge line downstream of the compressor. The fourth probe is mounted in the supply air distribution channel.

DEFROST

Normally initiated when temperature difference between return air probe and coil temperature probe reaches a predetermined value. Temperature difference to be measured when compressor has been running for at least (2) minutes and defrost temperature probe value is lower than return temperature by predefined value.

Evaporator fan, and condenser fan are off, and compressor is on during defrost.

Defrost probe terminates defrost at +25°C suction line surface temperature.

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If compressor runs for 24 hours without defrost cycle, defrost will be initiated automatically. Timer is locked out if temperature is above 7.2°C.

If defrost probe is out of range (open or shorted) alarm light will be energized and defrost will occur automatically after compressor has run for 24 hours.

If defrost is not terminated by probe it will terminate after (1) hour and give an alarm.

Defrost can be initiated by manual defrost input (hold momentary toggle switch closed for 5 sec.) and terminated as indicated above.

At initial start up defrost will occur after 6 continuous hours of compressor run time.

If defrost lasts for more than (1) hour, alarm light will light and defrost LED will flash.

If demand defrost cycle is initiated again in less than 1/2 hours, alarm light will light and defrost LED will flash.

After the defrost secondary system is assigned as primary and start operating in cooling mode.

DEHUMIDIFICATION MODE

Dehumidification mode reduces relative humidity value to 60 by dehumidification process activated automatically. Hygrostat calls microprocessor controller when dehumidification is required. Dehumidification mode is active only when setpoint temperature is reached in cooling or heating modes. After performing dehumidification mode for 2 hours unit defrosts automatically.

UNLOAD SYSTEM (HOT GAS BYPASS VALVE)

Discharge bypass valves are used to prevent the suction pressure from going below the minimum value to prevent cargo from freezing. This can happen under low ambient temperature conditions. Normally Open (N/O) solenoid valve is located before discharge bypass valve in the line, which closes in dehumidification mode.

MISCELLANEOUS FEATURES

- Full size removable evaporator door for ease of inspection and serviceability
- Manual resettable circuit breakers used in place of fuses
- Auto function tests and fault diagnostics
- Microprocessor and digital display
- Motor start sequence delay to avoid full load in-rush
- No wood used in the construction of the unit
- Only 424 mm deep from back of flange
- Power saving "On demand" auto defrost system
- Bottom air discharge for better temperature distribution throughout load.

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- Optional container lighting.
- Optional container door switch.
- Optional Emergency Stop switch (within container).
- Optional remote monitoring.
- Dehumidification function
- Auto heat

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REVISION RECORD

Rev	Description	Date	Approved
A	Updated after first build	9-11-2024	BES
B	Added Sound Pressure to Unit Information	1-28-2025	BES
C	Updated cargo temperature range (pg 3)	3-20-2026	BES

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