

KLINGE



MODEL PFR-571-Z2 CONTAINER REFRIGERATION UNIT FOR ZONE 2 HAZARDOUS LOCATIONS CERTIFIED TO ATEX ZONE 2

Ex II 3 G

Ex db eb h mb nA nC IIB T3 Gc



ATEX MANUAL

MANUFACTURED BY KLINGE CORPORATION

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Use of this Manual

This manual must be used in conjunction with the current revision of Klinge Corporation manual PFR-571 Z2 Basic Manual.

The use of this manual is intended for the safe operation of the equipment described. It is therefore reasoned that persons who have the occasion to use this manual have a knowledge of mechanical and electrical systems and components addressed by its' contents. However, efforts have been made to enable persons less familiar with these systems to use this manual.

The equipment may be installed in a number of configurations. Each may have optional items and differing external details provided by third parties. The specific electrical circuit and pipe diagram are posted on the unit as decals.

Most external and internal pipework parts are standard commercially available pipe fittings and not covered here. For external pipe fitting, replace like for like, taking care to replace stainless steel with stainless steel.

Suggestions as to improvement in content and format are welcome and should be addressed to engineering@klingecorp.com. Corrections and improvements will be included on dated revisions – the latest of which will be available upon request.

Service Request

Requests for Service should be directed to the Klinge Service Team. The below link should be used to place all requests for service and will afford the quickest response time.

<https://klingecorp.com/request-service/>

This form will help us determine model and age of the equipment, location, basic details about the issue, who to contact and how to best handle the issues with the equipment. A service ticket number will be provided in a response email once the form is received and processed. If the equipment is out of warranty, charges may apply for extensive technical support.

Additionally, our Service Department can be reached via email at technical@klingecorp.com.

Spare Parts Request

Requests for Spare Parts should be directed to our Parts Department via email at spares@klingecorp.com. Please have available at the time of the request the Serial Number of the equipment to ensure that the proper part is provided.

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1. Refrigeration unit

The Klinge Model PFR-571-Z2 refrigeration unit is designed specifically for operating in Zone 2 Hazardous Locations. It handles fresh and frozen loads in world-wide ambient temperatures.

The unit is charged with R-404A, R-452A or R-134a refrigerant. See the unit's Data Plate to identify the refrigerant.

The unit, of lightweight aluminum frame construction, is an all-electric, all-in-one cooling and heating unit. The unit is designed to fit into the front of a container and to serve as the container front wall. Forklift pockets are provided for the installation and removal of the unit.

The cargo space temperature is controlled by a microprocessor thermostat. Once the temperature is set at a desired container temperature, the unit will operate automatically to maintain the desired temperature within a narrow range.

WARNING

The control box can only be opened in a hazardous location when the flow of power has been cut using the Main Power Disconnect Switch.

This unit is designed to maintain temperatures from -20°C (-4°F) to +29°C (84°F) automatically, utilizing cooling and heating cycles.

The unit is designed to operate on 400/480 volt AC +/-10%, 3 phase 50/60 Hz +/-2.5%.

Control System power is provided by a single-phase transformer which steps down the high voltage power source to 230 volt, 24 volt and 12 volt AC single phase.

A self-diagnostic function test checks the condition of the refrigeration unit automatically and is performed by the microprocessor thermostat. This saves labor costs and makes pre-trip inspections reliable.

A phase sequence sensing and control system is installed in the electrical control section; this system will automatically reverse two of the phases if required to correct component rotation, regardless of the incoming phase sequence of the power.

All motors, including the compressor, are equipped with automatic reset internal thermal overload protection.

Air is discharged from the bottom of the unit and returns to the unit at the top of the container. The evaporator fans run continuously, except on the defrost cycle.

Heating and defrost is provided by the use of a hot gas solenoid valve. When this valve is activated the hot gas from the high-pressure side of the compressor goes directly to the evaporator coil.

Defrost is automatically activated by the microprocessor thermostat when the temperatures of the return air probe and the defrost probe reach a determined difference, or it can be started manually from the control panel. The termination is automatic in either case, when the temperature of the defrost probe rises to a preset temperature (approximately 35°C / 95°F).

The unit is delivered complete with a charge of refrigerant, compressor lubricating oil, mode-indicating LEDs, and microprocessor thermostat, factory tested and ready for operation upon installation.

A fresh air make-up vent is located at the upper left corner of the unit. The purpose of the vent is to provide ventilation for commodities that require fresh air circulation and must be closed when transporting frozen goods.

2. ATEX Compliance

The Model PFR-571-Z2 Container Refrigeration Unit complies with the following:

EN 60079-0: 2012	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-1: 2014	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
EN 60079-7: 2015/A1:2018	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
EN 60079-18: 2015	Explosive atmospheres - Part 18: Equipment protection by encapsulation "m"
EN 14986: 2017	Design of fans working in potentially explosive atmospheres
EN ISO 80079-36:2016	Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements
EN ISO 80079-37:2016	Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety 'c', control of ignition sources "b", liquid immersion "k"

3. ATEX Certification

The Klinge Model PFR-571-Z2 refrigeration unit has received ATEX Certification for use in Zone 2 Hazardous Locations.

Zone 2 is defined as an area in which ignitable concentrations of flammable gases or vapors:

- Are not likely to exist under normal operating conditions,
- May exist for short periods.

The PFR-571-Z2 system uses components that will not cause ignition of explosive gases or vapors.

Description of ATEX Certification

⊕ II 3 G

Ex db eb h mb nA nC IIB T3 Gc

-20°C ≤ Ta ≤ +50°C

⊕ Specific marking for Explosion Protection

II Equipment Group

3 Equipment Category

G	Environment	Gas
Ex	Explosion Protection	
db	Type of Protection	Flameproof
eb	Type of Protection	Increased Safety No arcs, sparks or hot surfaces
h	Type of Protection	Constructional Safety Control of ignition source
mb	Type of Protection	Encapsulation
nA	Type of Protection	Increased Safety Enclosure IP54 or better
nC	Type of Protection	Increased Safety Type 'n' (Hermetically Sealed)
IIB	Gas Group	Gases, Vapors and Mists - Ethylene
T3	Temperature Class	200°C (392°F)
Gc	Equipment Protection Level	Suitable for Zone 2

-20°C ≤ Ta ≤ +50°C Ambient temperature range of operation

4. Special conditions of safe use for PFR-571-Z2 certificate –

- Disconnect (Part Number K25-26760-01).
- While connecting the Lighting Junction Box (Part Number K25-26764-01) the following instructions must be followed:
 - Insulation of conductors must extend to within 1 mm of the metal of the terminal throat
 - No more than one single or multi-stranded lead shall be connected to either side of any terminal unless multiple conductors have been joined in a suitable manner, e.g. two conductors into a single insulated bootlace ferrule.
- Ensure that the solenoid coil cover panel (Part Number 060-10962-35) is in place during operation of equipment.
- Solenoid coil, compressor junction box, condenser fan and evaporator fans should only be contacted using a moist cloth.
- Evaporator door should only be opened during service operations and ensure that evaporator door is closed during normal operation to reduce sun exposure to the evaporator blower wheels.
- Do not use external earth terminal of the solenoid coil to connect to the earth or bonding system.
- The equipment should be installed in accordance with EN 60079-14 and EN 60079-17.
- Before energizing the system, ensure the electrical control box cover is secured, with all fastening bolts tightened to a torque of 88.1 N m (65 lb.-ft.) when dry. If bolts are lubricated (use only petroleum jelly), the torque value is 67.8 N m (50 lb.-ft.).

- Before energizing the system, ensure the cover of the auxiliary junction box (if so equipped) is secured, with all fastening bolts tightened to a torque of 47.5 N m (35 lb.-ft.) when dry. If bolts are lubricated (use only petroleum jelly), the torque value is 36.6 N m (27 lb.-ft.).

5. Conditions where the equipment shall not be used –

- IIC (Hydrogen, Acetylene, etc.)
- The system shall not be operated in an outdoor environment without all cover panels in place.
- The system shall not be operated in a hazardous environment if there are signs of worn or frayed cables.

6. Ignition Hazard Assessment

Potential Ignition Source

- Hot Surfaces – The system was designed and has proven through testing to maintain surface temperatures less than T3 maximum, while in an ambient temperature of 50°C.
- Mechanically Generated Sparks – Minimum clearance requirements between rotating and stationary parts are maintained per EN 14986 also meeting the material requirements of EN 60079-0.
- Electrical Arcing – Certified EX components or enclosures have been used in the design of the system.
- Static Electrical Discharge – When contacting the solenoid coil, compressor junction box, condenser fan or evaporator fans a clean moist cloth must be used.
- Stray Electric Currents – Metal to metal contact of electrical components protects the system from stray electric currents, maintaining equal electrical potential.