

TYPE HMRC HERMETIC REFRIGERATION COMPRESSOR (FLAMEPROOF)

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

1.0 SCOPE

This manual details the installation, operation and maintenance instructions for type HMRC hermetic refrigeration compressor (flameproof). This product is ATEX and IECEx certified to meet the requirements for hazardous location equipment.

Carefully read and follow all instructions in this manual to ensure proper installation and safe operation of the compressor.

2.0 SPECIAL NOTICES

Special notices highlight important information in the installation and maintenance instructions. Each serves a special purpose and is displayed in the format as below:

	This symbol indicates a potentially hazardous situation, which, if not avoided, may be a shock hazard.
	This symbol indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.
	This symbol indicates a potentially hazardous situation, which, if not avoided, can result in personal injury or damage to the equipment.
	This symbol indicates a normal notice from the manufacturer.

3.0 GENERAL INFORMATION

3.1 INTRODUCTION

Type HMRC hermetic refrigeration compressor is designed according to IEC/EN 60079-0, IEC/EN 60079-1 and IEC/EN 60079-31 standards. The product is certified for installation in Zone 1 and Zone 2 for gas environment, Zone 21 and Zone 22 for dust environment.



FONTECK INDUSTRIES BV

Glasblazerstraat 12E, 2984 BL Ridderkerk, The Netherlands
Tel: +31 180 396 550

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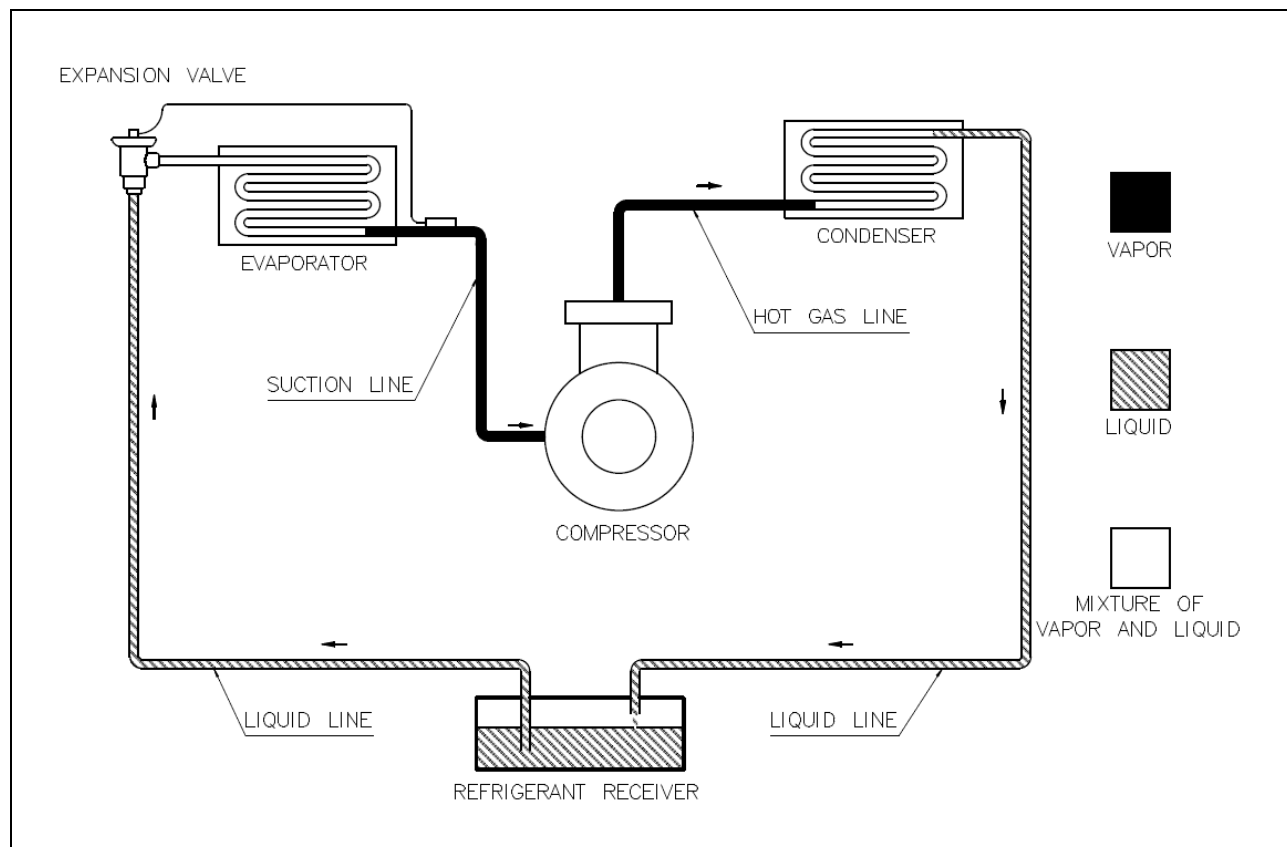
Hermetic compressor is mainly including hermetic reciprocating compressor and hermetic scroll compressor etc. It is assembled together with an electric motor in a closed and sealed shell; both of them share a main shaft inside of the shell. The hermetic structure thus greatly reduces the weight and size of the entire machine; moreover, such structure also has many features like good sealing, easy to use, small vibration and low noise. The hermetic compressor has been widely used in small-size automatic refrigeration and air conditioning system.

HMRC hermetic compressor is designed for using in the application of refrigeration, air conditioning, heating etc. with potentially explosive gas and/or dust. Our compressors are energy-efficient, reliable and for the aim to manufacture the most environmentally friendly compressor. Fonteck could provide customers with exactly the right compressor for their specific application.

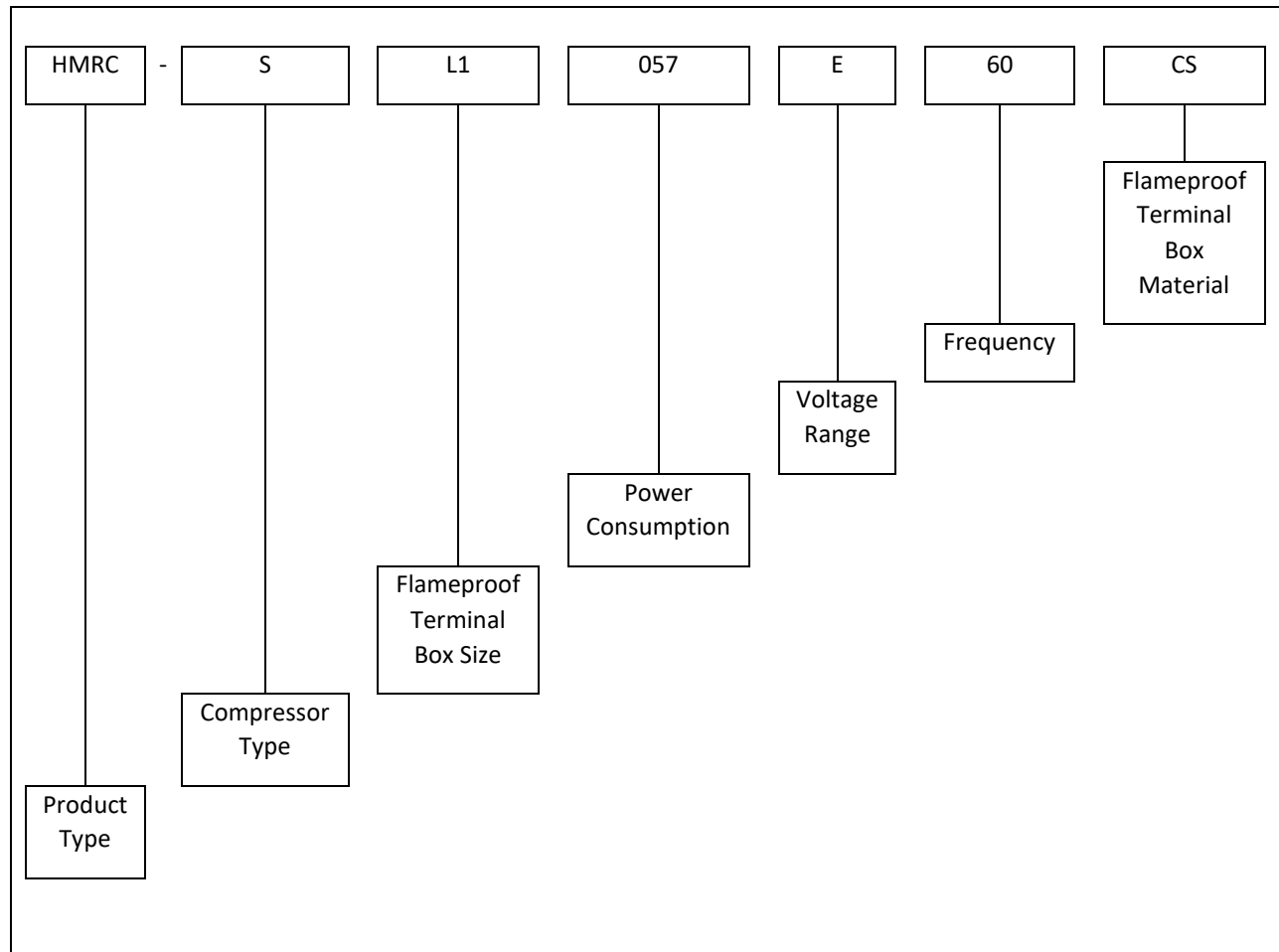
3.2 REFRIGERATION CYCLE

Type HMRC hermetic refrigeration compressor is designed to be used in the refrigeration cycle for air conditioning system.

Refrigeration Cycle Schematic Diagram:



3.3 TYPE EXPLANATION



Ordering Reference:

Product Type	Compressor Type	Flameproof Terminal Box Size	Power Consumption (kW)			Voltage (VAC)	Frequency (Hz)	Flameproof Terminal Box Material
			Hundreds	Tens	Ones			
HMRC	S-Scroll Type	L1-Large 1	0	0	0	A-100-115	50-50	SS-Stainless Steel
				1	1			
		L2-Large 2		2	2	B-200-240		
				3	3			
		M1-Medium 1		4	4	C-380-420		
				5	5			
	R-Reciprocating Type	M2-Medium 2		6	6	D-440-480	60-60	CS-Carbon Steel
				7	7			
		S1-Small 1		8	8	E-500-575		
				9	9			
		S2-Small 2				O-Other Voltage (Specify)		

E.g.: HMRC-SL1057E60CS

HMRC	S	L1	057	E	60	CS
Hermetic Refrigeration Compressor	Scroll Type	Large 1 Size Flameproof Terminal Box	57kW	500-575 VAC	60Hz	Carbon Steel Flameproof Terminal Box



3.3 LABELING

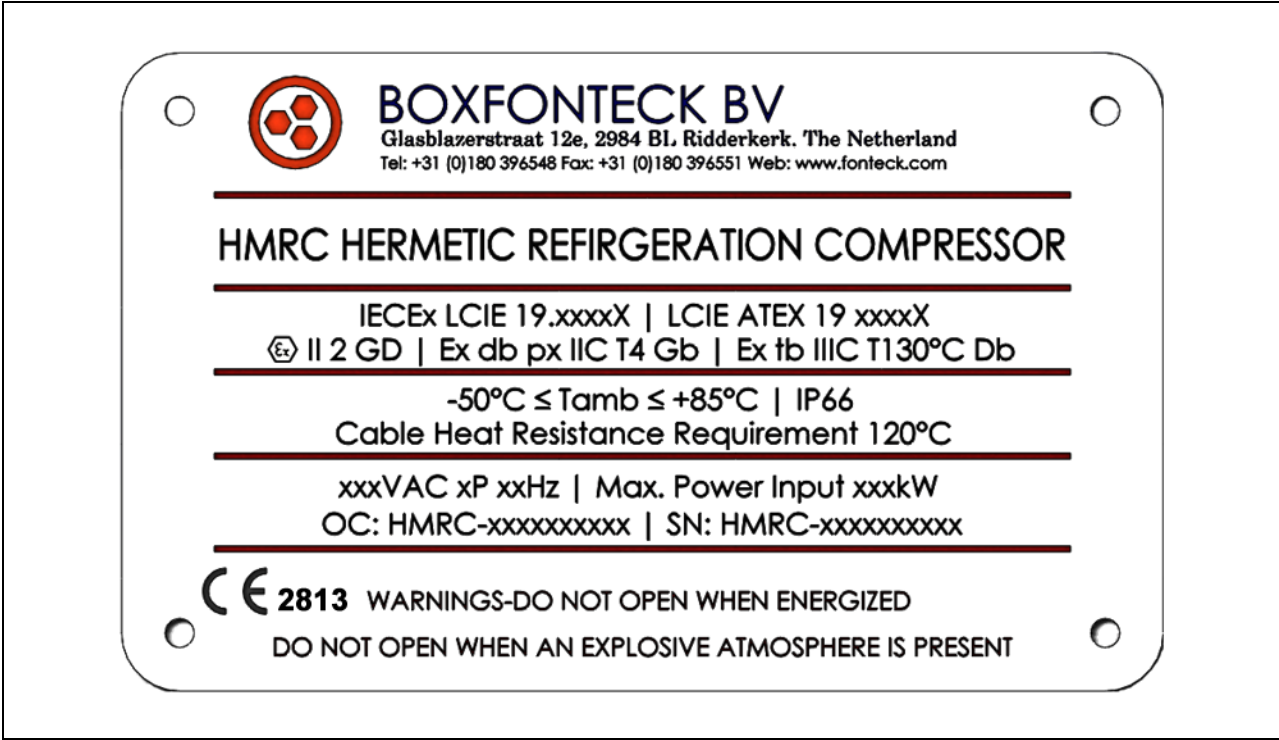
The product name plate carries the following important information:

Maximum Power Output:	57kW
Maximum Working Voltage:	575VAC
Ex Marking:	Ⓔ II 2GD, Ex db px IIC T4 Gb; Extb IIIC T130°C Db
	Ex db px IIC T4 Gb; Extb IIIC T130°C Db
Ingress Protection:	IP66
Ambient Temperature:	-50°C ≤ Tamb ≤ +85°C
IECEX Certificate No.:	IECEX LCIE 19.0016X
ATEX Certificate No.:	LCIE 19 ATEX 3015X
ATEX Mark	Ⓔ
CE Mark:	CE ₂₈₁₃
Notified Body No.:	2813
Warning:	DO NOT OPEN WHEN ENERGIZED; DO NOT OPEN WHEN AN EXPLOSIVE GAS ATMOSPHERE IS PRESENT
	THE COMPRESSOR MAIN BODY ENCLOSURE IS PROTECTED BY STATIC PRESSURIZATION. THE COMPRESSOR MAIN BODY ENCLOSURE SHALL BE FILLED ONLY IN A NON-HAZARDOUS AREA ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
	THE COMPRESSOR MAIN BODY ENCLOSURE CONTAINS INERT GAS AND MAY BE AN ASPHYXIATION HAZARD. THE COMPRESSOR MAIN BODY ENCLOSURE ALSO CONTAINS A FLAMMABLE SUBSTANCE THAT MAY BE WITHIN THE FLAMMALBE LIMITS WHEN EXPOSED TO AIR.
Serial No.:	E.g. HMRC-XXXXXX-XXXX (XX-Day, XX-Month, XX-Year, Product Serial Number-XXXX)





HMRC Name Plate:



Type	IECEx Certificate	Ex Marking	ATEX Certificate	Ex Marking
HMRC Hermetic Refrigeration Compressor	IECEx LCIE 19.xxxxX	Ex db px IIC T4 Gb; Ex tb T130°C Db; -50°C≤Tamb≤+85°C; IP66	LCIE 19 ATEX xxxxxX	Ex 2 GD, Ex db px IIC T4 Gb; Ex tb T130°C Db; -50°C≤Tamb≤+85°C; IP66

Voltage	Power		OC	SN
	Scroll Type	Reciprocating Type		
Max 575VAC	Max 40kW	Max 20kW	HMRC-XXXXXXXXXX	HMRC-XXXXXXXXXX

3.4 APPROVAL STANDARDS

Type HMRC hermetic compressor is approved and issued IECEx and ATEX certificates complying with the following standards:

IEC 60079-0:2011 (EN 60079-0:2018): General requirements

IEC 60079-1:2014 (EN 60079-1:2014): Equipment protection by flameproof enclosures "d"

IEC 60079-2:2014 (EN 60079-2:2014): Equipment protection by pressurized enclosure "p"

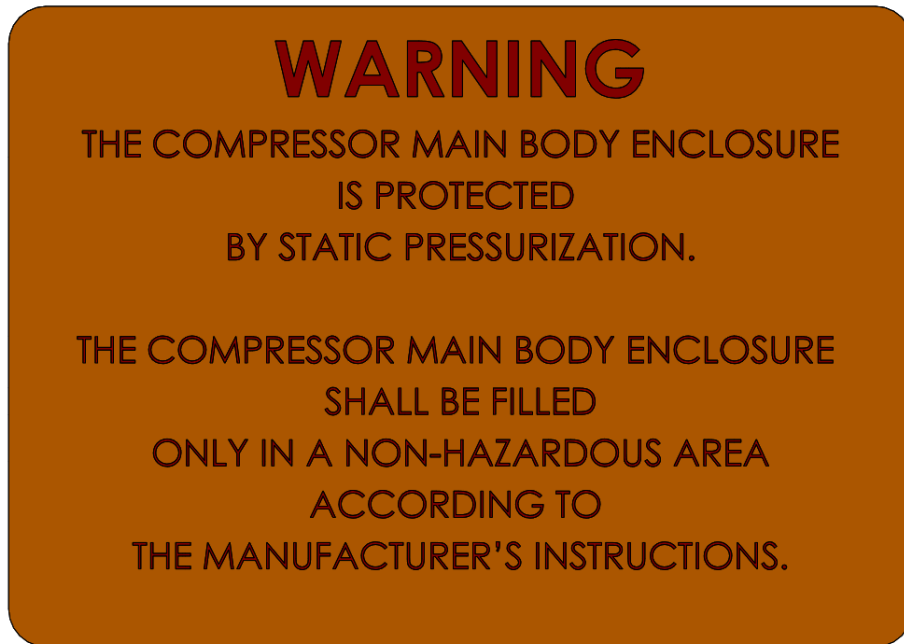
IEC 60079-31:2013 (EN 60079-31:2022): Equipment dust ignition protection by enclosure "t"



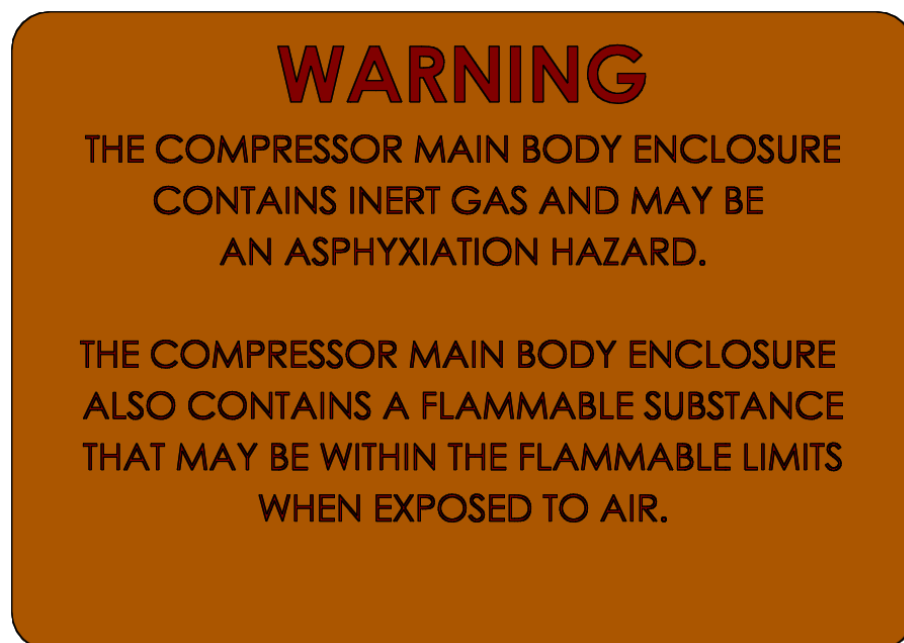
For ATEX certificates, gap analysis has been conducted by us. No substantial technical changes in relation to the products design have been found. The products comply with the newest standards.

HMRC Warning Marking:

Compressor Main Body Enclosure Warning Marking-1:



Compressor Main Body Enclosure Warning Marking-2:



3.5 ZONES, GROUP, CATEGORY AND TEMPERATURE CLASSIFICATION

The explosion-proof classification for HMRC hermetic refrigeration compressor is:

ATEX:  II 2GD, Ex db px IIC T4 Gb; Ex tb IIIC T130°C Db

IECEx: Ex db IIC T4 Gb; Ex tb IIIC T130°C Db

This means the product can be installed in locations with the following conditions:

Area Classification:

Zone 1: Explosive gas air mixture likely to occur in normal operation.

Zone 2: Explosive gas air mixture not likely to occur, and if it does, it will only exist for a short time.

Zone 21: Explosive mixture is likely to occur in normal operation.

Zone 22: Explosive mixture is not likely to occur in normal operation and if it occurs it will exist only for a short time.

Gas Grouping:

Group IIC (Hydrogen and Acetylene etc.); (Group IIB (Ethylene etc.); Group IIA (Propane etc.)

Dust Grouping:

Group IIIC (Metal Dusts); Group IIIB (Carbonaceous and Non-conductive Dusts); Group IIIA (Fibers and Flyings)

Equipment Category (ATEX):

II 2 G D

Temperature Class:

T4 (135°C)

Application Temperature Class:

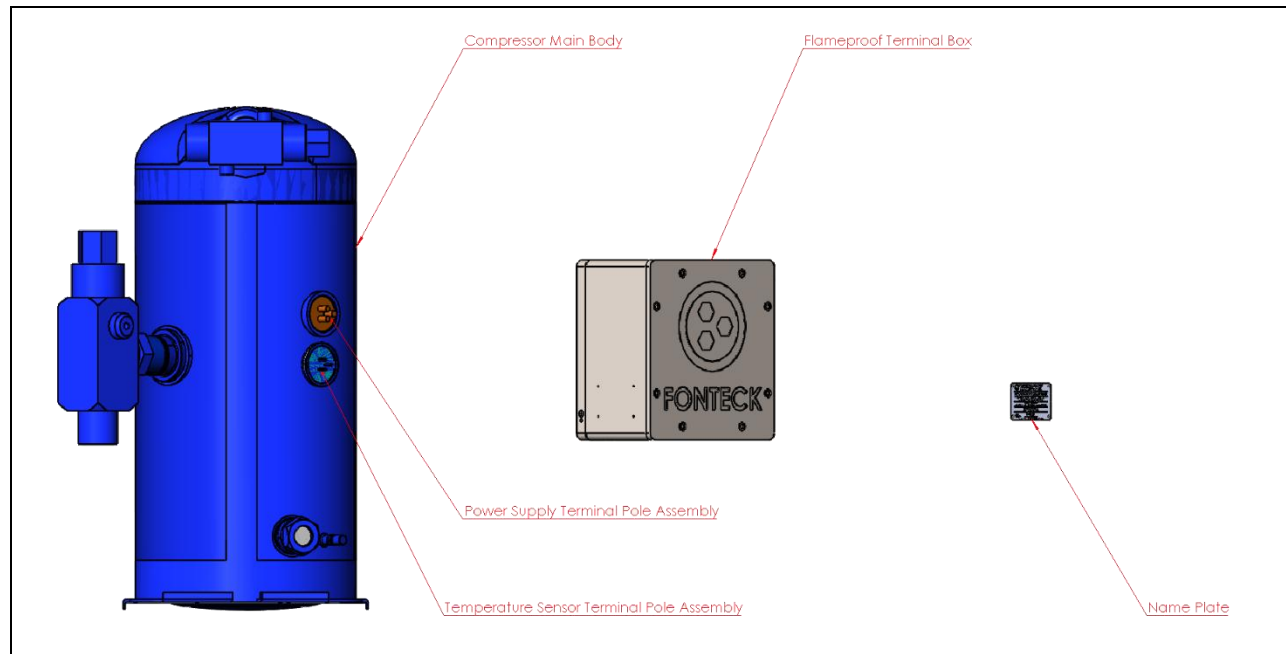
T4 (130°C)



3.6 PARTS AND ACCESSORIES

Hermetic Refrigeration Compressor:

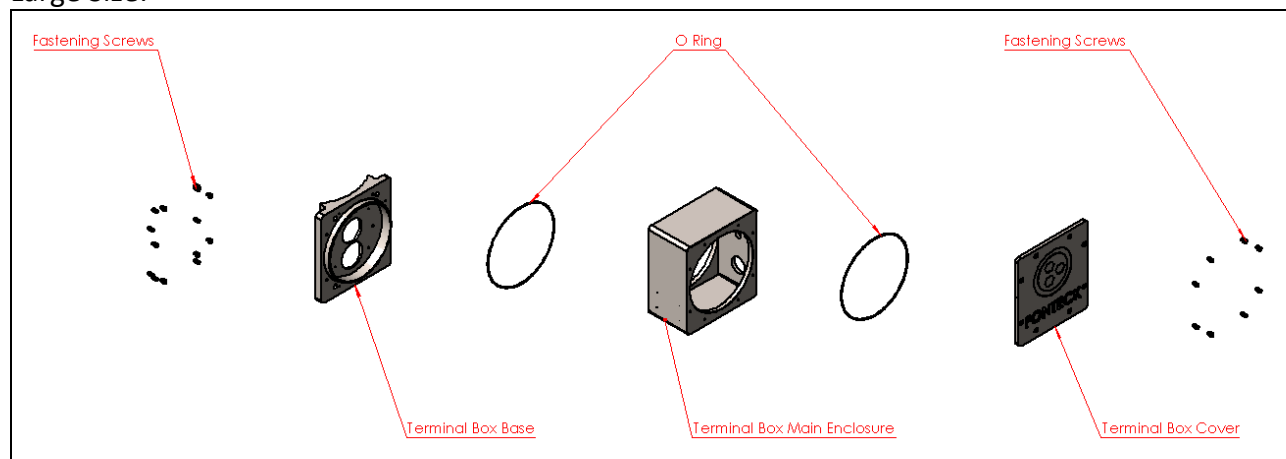
Item	Part Name	Qty.	Remarks
01	Name Plate	1	
02	Compressor Main Body	1	
03	Compressor Terminal Pole	1	
04	Temperature Sensor Terminal Pole	1	
05	Flameproof Terminal Box	1	



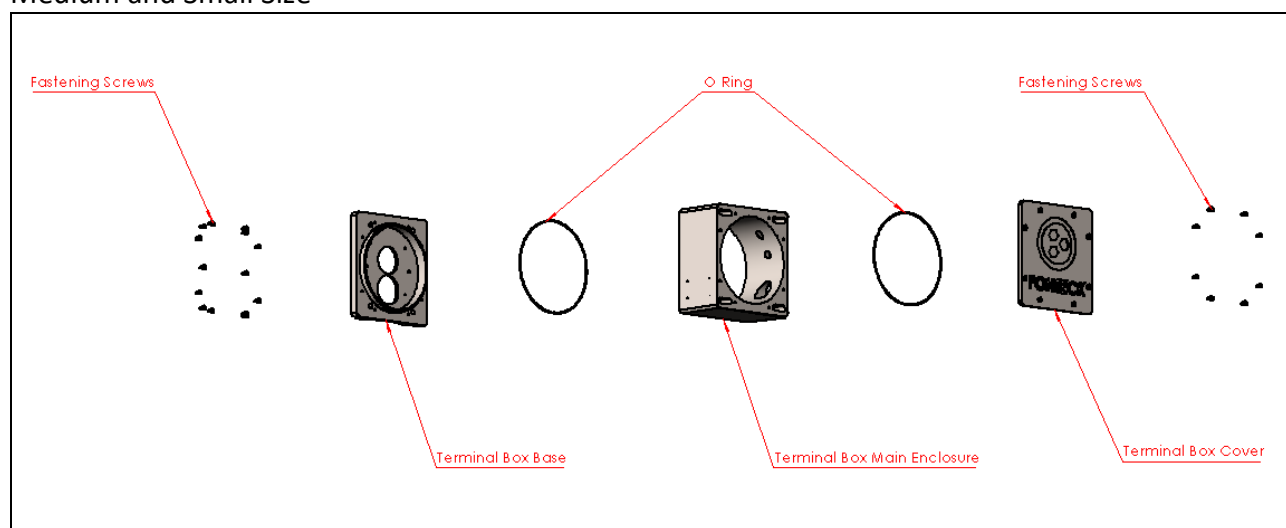
Flameproof Terminal Box:

Item	Part Name	Qty.	Remarks
01	Flameproof Terminal Box Base/Main Enclosure	1	
02	Flameproof Terminal Box Main Enclosure	1	
03	Flameproof Terminal Box Cover	1	
04	O Ring	2	
05	Socket Head Screw	Set	

Large Size:



Medium and Small Size



4.0 PRE-INSTALLATION

4.1 Inspect the hermetic refrigeration compressor for possible damage due to shipping and handling. Claims for shipping damages shall be placed with the carrier.

4.2 Check the hermetic refrigeration compressor name plate to ensure that the area classification, gas and/or dust grouping and temperature code are suitable for the hazardous area classification.

4.3 Verify that the name plate voltage, frequency, phase and wattage are as ordered and are the same as the electrical power supply available.



DO NOT CONNECT THE COMPRESSOR TO AN ELECTRICAL SUPPLY VOLTAGE OTHER THAN WHAT SHOWN ON THE NAME PLATE.



REVIEW THIS MANUAL CONTAINED WITHIN PRIOR TO INSTALLATION, WIRING OR OPERATION OF THE COMPRESSOR.

5.0 INSTALLATION

The compressor must be installed by qualified personnel in strict compliance with the electrical code and hazardous locations standards.

5.1 DIMENSION

Installation dimensions vary for each product due to customers' request. Particular installation dimension drawing will be provided to customers for each product ordered separately.

5.2 INSTALLATION



DO NOT TOUCH COMPRESSOR PIPE TUBES. DANGER OF DAMAGE. USE EYEBOLTS FOR LIFTING.



HANGING LOAD. DO NOT STAND UNDER MACHINE.



COMPRESSOR IS UNDER PRESSURE WITH HOLDING CHARGE. INJURY OF SKIN AND EYES POSSIBLE. WEAR SAFETY GOGGLES WHILE WORKING ON COMPRESSOR. DO NOT OPEN CONNECTIONS BEFORE PRESSURE HAS BEEN RELEASED.





ABSOLUTELY AVOID PENETRATION OF AIR. THE SHUT-OFF VALVES SHOULD REMAIN CLOSED UNTIL EVACUATING.

5.2.1 Transport the compressor either screwed on a pallet or lifts it using the eyebolts.

5.2.2 PLACE OF INSTALLATION:

For stationary system, the compressor has to be installed horizontally.

For marine application, a definite inclined mounting in direction of the longitudinal axis of the boat may be required. Consult the manufacturer according to detailed situation.

For operation under extreme conditions such as aggressive or corrosive atmosphere and low ambient temperature, suitable measures must be taken and consult the according to detailed situation.

5.2.3 ANTI-VIBRATION

The compressor can be mounted rigidly. In the following situations, the anti-vibration pad especially matched to the compressor is recommended to be used:

- To reduce the transmission of noise
- Avoid rupture of tube heat exchangers which caused by vibration
- Install the compressor directly to the water cooled condenser

5.2.4 PIPE LINES

Use tubes and components which are clean and dry inside (free from slag, rust, and phosphate coatings) and are delivered with an air tight seal.

Pipelines should be laid out so that the compressor can't be flooded with oil or liquid refrigerant during standstill.

Liquid injection (LI) and/or economizer (ECO) must first rise vertically from the injection point to avoid oil migration and damage of components due to hydraulic pressure peaks.

6.0 WIRING



WHENEVER HAZARDOUS MATERIALS ARE PRESENT, ENSURE THAT THE FLAMEPROOF TERMINAL BOX COVER, PLUGS ETC. ARE SECURED (BUT NOT OVER-TIGHTENED) BEFORE ENERGIZING THE COMPRESSOR.



	CABLES ARE TO BE FUSED WITH APPROPRIATELY SIZED HRC FUSING.
	USE CERTIFIED CABLE GLANDS AND PLUGS AS REQUIRED (EXD IIC, EXTB IIIC) BY HAZARDOUS LOCATION STANDARDS FOR CABLE ENTRIES.
	ENSURE THAT NO POWER IS CONNECTED TO THE EQUIPMENT PRIOR TO MAKING ANY CONNECTIONS.
	USE STANDARD CABLE BUSHINGS ONLY AND ENSURE PROPER SEAIING WHEN MOUNTING.
	WRONG WIRING WILL LEAD TO THE DANGER OF MOTOR BURNOUT.

6.1 Voltage and frequency data on the name plate should be compared to the electrical supply data. The motor could be connected when these coincide.

6.2 Wire the motor terminals according to the indications on the terminal box cover.

7.0 COMMISSIONING

7.1 PRESSURE STRENGTH TEST

The compressor has been tested by the manufacturer for pressure strength before delivery. If the entire system is subjected to an additional pressure strength test, the test shall be conducted according to EN 378-2 or a corresponding safety standard.

	THE COMPRESSOR MUST ONLY BE PRESSURIZED USING NITROGEN (N₂). NEVER PRESSURIZE WITH OXYGEN OR OTHER GASES!
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7.2 LEAKAGE TEST

The compressor has been tested by the manufacturer for leakage before delivery. If the entire system is subjected to an additional leakage test, the test shall be conducted according to EN 378-2 or a corresponding safety standard.





DO NOT MIX ANY REFRIGERANT WITH THE NITROGEN (N2). THIS COULD CAUSE THE IGNITION LIMIT TO SHIFT INTO THE CRITICAL RANGE.

7.3 TIGHTNESS TEST

Filling dry nitrogen into the entire pipeline system and make it under the position of positive pressure, and then evaluate the tightness.

The pressure of tightness testing must be within the limits of the pressure value on the compressor nameplate. If necessary, leave the shut-off valves closed.

7.4 EVACUATION

Energize the oil heater. Open all shut-off valves and solenoid valves. Evacuate the entire system including compressor using a vacuum pump connected to the high and low pressure sides. When the pump is switched off a 'standing vacuum' of less than 1.5 mbar must be maintained. If necessary, repeat this procedure several times.



DO NOT START COMPRESSOR UNDER VACUUM.

7.5 REFRIGERANT FILLING PROCEDURE



FILL THE REFRIGERANT ONLY IN A NON-HAZARDOUS AREA.

7.5.1 Refrigerants:

R134a, R404A, R407A, R407C, R407F, R507A, R22 etc. refrigerants can be used for type SHRC semi-hermetic refrigeration compressor.

7.5.2 Fill only permitted refrigerants.

7.5.3 Before refrigerant is filled:

- Energize the oil heater
- Check the compressor oil level
- Do not switch on the compressor



7.5.4 Fill liquid refrigerant directly into the condenser receiver. For systems with flooded evaporator refrigerant can be also charged into the evaporator.

7.5.5 After commissioning it may be necessary to add refrigerant. Fill the refrigerant from the suction side while the compressor is in operation. Fill preferably at the evaporator inlet. Blends must be taken from the charging cylinder as “solid liquid”.

 WARNING	VALVE MUST BE CLOSED AFTER FILLING REFRIGERANT!
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 WARNING	DO NOT OVERFILL THE SYSTEM WITH REFRIGERANT!
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NOTICE	THE TEMPERATURE AT THE INLET OF THE COMPRESSOR MAIN BODY ENCLOSURE IS ALWAYS LOWER THAN 40°C.
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8.0 OPERATION

 WARNING	DO NOT OPERATE HERMETIC COMPRESSOR AT VOLTAGE HIGHER THAN THE RATING SPECIFIED ON THE NAME PLATE. FAILURE TO DO THIS WILL CAUSE ELEVATED TEMPERATURES.
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 WARNING	OPERATE SCREW COMPRESSORS ONLY IN THE PRESCRIBED ROTATING DIRECTION.
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8.1 Check that all connections are tight.

8.2 Check the rotating direction.

8.3. Check lubrication/oil.

8.4 Check the operating data and prepare data sheet.

8.4.1 Check evaporating temperature.

8.4.2 Check suction gas temperature.

8.4.3 Check condensing temperature.



8.4.4 Check discharge gas temperature.

- At least 30K (R22, R407C) or at least 20K (R134a, R404A and R507A) above condensing temperature.
- Max. 120°C outside the discharge pipe.

8.4.5 Check oil temperature.

8.4.6 Check starting up frequency.

8.4.7 Check voltage.

9.0 MAINTENANCE



DISCONNECT ALL POWER SUPPLY TO THE EQUIPMENT PRIOR TO SERVICING.

9.1 Periodically inspect the hermetic refrigeration compressor installation to ensure that all connections, fitting, cable glands, plugs, screws and covers etc. are tight and free of corrosion.

9.2 Acidity inspect should be carried out when compressor occurs breakdown or motor burnout. Cleaning should be adopted if necessary.

9.3 If suction filter (with acid absorption function) is installed in the compressor, replace oil and oil filter.

9.4 After hours of operation, if necessary, replace the filter and refrigerant oil again and discharge gas.

9.5 Regular checks for the following points:

Operating data; lubrication/oil; protection devices and all compressor monitoring parts; integrated check valve; electrical cable connections and screwed joints on tight fitting; tightening torques; refrigerant charge, and tightness test; update data protocol.

9.6 If corrosion is indicated in the terminal enclosure, check terminal enclosure O-ring and replace if necessary. Check conduit layout to correct conditions that allow moisture to enter the terminal enclosure.



9.7 Field repairs of flameproof joints should not be undertaken by the end user. In the event that flameproof joint must be repaired, contact the manufacturer. Repairs of flameproof joints must be made in compliance with the structural specifications in manufacturer's drawings. Repairs must NOT be made on the basis of values specified in tables 1 and 2 of IEC/EN 60079-1.

9.8 Type HMRC hermetic refrigeration compressor is not field-serviceable. If your product requires servicing, please consult the manufacturer.

10.0 MAIN EXPLOSION-PROOF CHARACTERISTICS

10.1 FLAMEPROOF STRUCTURE

Type HMRC hermetic refrigeration compressor comprises compressor main body and a terminal box. The enclosure of the compressor main body is protected by static pressurization. The enclosure of the terminal box is flameproof. The material for the compressor main body is cast iron. The material for the terminal box is stainless steel or carbon steel.

10.2 EX OR EX RELATED PARTS

Compressor main body enclosure, compressor terminal pole, temperature sensor terminal pole, flameproof terminal box base, flameproof terminal box main enclosure, flameproof terminal box cover etc. are explosion-proof or explosion-proof related parts. The O-ring is ingress protection related part.

10.3 FLAMEPROOF JOINTS

The length, gap, surface roughness of the flameproof joints and the electrical clearance, creepage distance between the bare wires, the conductors and the enclosure must be guaranteed.

Field repairs of flameproof joints should not be undertaken by the end user. In the event that flameproof joint must be repaired, contact the manufacturer. Repairs of flameproof joints must be made in compliance with the structural specifications in manufacturer's drawings. Repairs must NOT be made on the basis of values specified in tables 3 and 4 of IEC/EN 60079-1.

10.4 FASTENERS

The material for all fasteners of the heater is stainless steel. Mechanical properties of fasteners must meet the requirements in the below table.



Fastener Material	Property Class	Nominal Tensile Strength (Mpa)	Minimum Tensile Strength (Mpa)	Nominal Yield Stress (Mpa)	Minimum Yield Stress (Mpa)
Stainless Steel (austenitic)	A*-70	-	700	-	450

The bolts on the flameproof enclosure have been equipped with spring washers to avoid loosening.

10.5 CABLE ENTRY

Cable entry type and size vary due to customers' request. Particular information will be provided to customers for each product ordered separately.

10.6 SPECIAL CONDITIONS FOR SAFE USE

	OPERATING AMBIENT TEMPERATURE: -50 °C ~ + 85 °C.
	USE CABLES SUITABLE FOR TEMPERATURE NOT LESS THAN 120 °C.
	MAXIMUM STATIC OVERPRESSOR FOR SCROLL TYPE COMPRESSOR MAIN BODY IS 4.5MPA. MAXIMUM STATIC OVERPRESSOR FOR RECIPROCATING TYPE COMPRESSOR MAIN BODY IS 3.2MPA.
	THE ENTRY HOLES OF TERMINAL BOX MUST BE INSTALLED ATEX/IECEx CERTIFIED CABLE GLAND OR STOPPING PLUG.
	THE PRESSURE OF THE COMPRESSOR DISCHARGE HOUSING SHOULD BE MONITORED.
	IF TEMPERATURE SENSOR NEEDS TO BE INSTALLED FOR OVER-HEATED PROTECTION, IT MUST BE ATEX/IECEx CERTIFIED AND IT SHOULD BE INSTALLED TO THE REFRIGERANT OUTLET WHICH IS THE HOTTEST POINT OF COMPRESSOR.





IF PRESSURE SENSOR/TRANSMITTER NEEDS TO BE INSTALLED FOR PRESSURE MONITORING, IT MUST BE ATEX/IECEX CERTIFIED AND IT SHOULD BE INSTALLED TO THE REFRIGERANT INLET OF COMPRESSOR.



IF SOLENOID VALVE(S) NEED TO BE INSTALLED FOR PRESSURE RELIEF, THE SOLENOID COIL(S) MUST BE ATEX/IECEX CERTIFIED.



IF IMMERSION HEATER NEEDS TO BE INSTALLED TO HEAT THE OIL INSIDE THE CRANKCASE OF COMPRESSOR, IT MUST BE ATEX/IECEX CERTIFIED.





EU DECLARATION OF CONFORMITY

We, BoxFonteck BV, the manufacturer, hereby declare under our sole responsibility that, the products listed below comply with the essential health and safety requirements of Directive 2014/34/EU.

Products: Type HMRC Hermetic Refrigeration Compressor

ATEX Certificate No.: LCIE 19 ATEX 3015X

Notification Body: CSA Group Netherlands BV

CE Conformity:  ₂₈₁₃

Ex Marking:  II 2 G D
Ex db px IIC T4 Gb
Ex tb IIIC T130°C Db
IP66
 $-50^{\circ}\text{C} \leq T_{\text{amb}} \leq +85^{\circ}\text{C}$

Harmonized Standards: EN 60079-0:2018
EN 60079-1:2014
EN 60079-2:2014
EN 60079-31:2022

Gap analysis has been conducted by us. No substantial technical changes in relation to the products design have been found. The products comply with the newest standards.

Authorized Signature

Authorized Person:
R. Wang

Place and Date:
Ridderkerk, The Netherlands
05. 2026



Fonteck Industries BV

Glasblazerstraat 12E, 2984 BL Ridderkerk, The Netherlands

Tel: +31 180 396 550

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