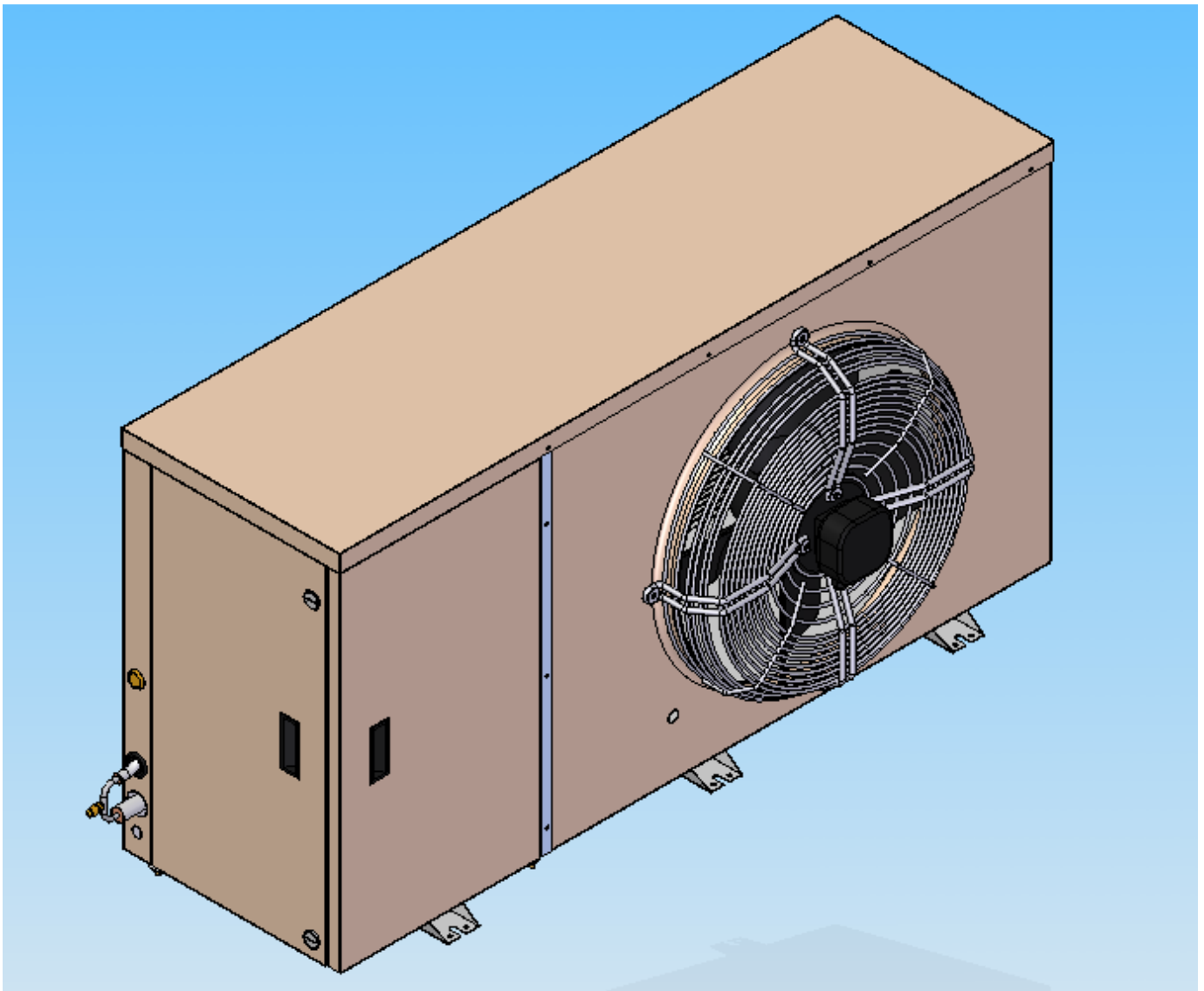


KIRBY FRIDGEBOX WITH DIGITAL SCROLL COMPRESSOR HANDBOOK

THANK YOU FOR CHOOSING THE KIRBY FRIDGEBOX WITH DIGITAL SCROLL CONDENSING UNIT.

TO ENSURE TROUBLE FREE INSTALLATION AND COMMISSIONING, PLEASE REFER TO THE CONTENTS OF THIS HANDBOOK.



IMPORTANT INFORMATION -

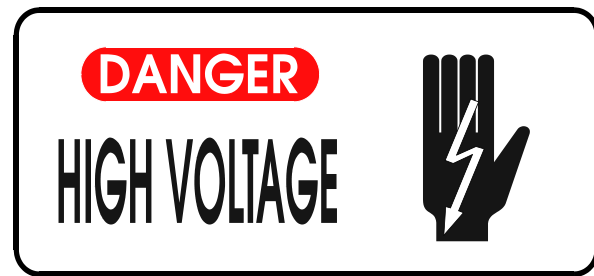
REFER TO THE SECTIONS ON “WARNINGS AND SAFEGUARDS”, AND “INSTALLATION INSTRUCTIONS” BEFORE ATTEMPTING TO COMMISSION THIS CONDENSING UNIT.

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End User Notes



General Notes

KIRBY DIGITAL SCROLL COMPRESSOR FRIDGEBOX condensing units fall under the requirements for commercial electrical equipment as per standards Australia guidelines. Installation and major service of this unit must be carried out by a licensed contractor and in accordance with local regulatory guidelines.



Under no circumstances should anyone other than a qualified person attempt to gain access to the interior of the unit without first ensuring electric power is disconnected.

FRIDGEBOX condensing units have been designed for use in an outdoor or indoor environment.



Auto Start-Up

FRIDGEBOX condensing units may start automatically without any warning. Please see “Installation Instructions” for further details.



Auto Reset

Kirby Fridgebox condensing unit fans and compressors are thermally protected. When tripped, these components will not operate. Once sufficiently cooled however, the component will automatically reset and may operate without warning.

The unit is equipped with a High/Low pressure switch as standard. The switch is either a universal selectable auto or manual reset or fixed auto/auto-reset type on both high and low sides. If universal switch used then it is set to auto/auto at the factory. Please check the unit regarding the appropriate pressure switch.



Routine Maintenance of Unit

Condenser:

The Fridgebox utilises an all-aluminium microchannel condenser coil that is flexibly mounted to the adjoining sheet metal at the non-header end. The mounts should be periodically checked for condition and freedom of movement.

The Condenser should be cleaned at 3 monthly intervals using low pressure water spray. For repair of microchannel coils, please refer to your local KIRBY representative.

System operation:



System operation should be checked every 6 months. Checks should include:

- Operating conditions such as condensing and evaporating temperatures, compressor discharge temperature, superheat and sub-cooling, etc.
- Refrigerant charge, oil level and quality
- Electrical connections, current draw and voltage level, etc.



Warnings and Safeguards

KIRBY is very conscious of safety issues when designing and manufacturing these products, but it is essential that the end user, installer or service personnel also exercises care when working with the units.

 Warning	<p>This indicates contents for which, if disregarded, the possibility of human death or severe injury can be assumed.</p>
 Caution	<p>This indicates contents for which, if disregarded, the possibility of human injury or the possibility of material damage can be assumed.</p>

Important Notes



- **Do NOT remove access panels without isolating power.**
- **Do NOT operate unit with access panels removed due to the presence of rotating equipment.**
- **Do NOT operate unit with access panels removed as it may affect the air flow for the condenser.**
- **All controls are 230/240V.**



No Smoking

KIRBY recommends No Smoking within a distance of 15 metres of the unit.



Warning – Electrical Hazard

A qualified Electrician must carry out all electrical work. All field wiring must conform to the requirements of the equipment and all applicable National and Local Codes.

Always isolate the power to the unit before checking and / or diagnosing the units. Never work on any electrical item without isolating or disconnecting the power supply.



Caution – Unit Pressurized

All units are pressurised with dry air or Nitrogen gas. Care must be taken to discharge the pressurized gas prior to installing or commissioning the equipment.



Caution – Refrigerant Type

All units are designed to work effectively with fluorocarbon refrigerants including R404A and R134a. Under no circumstances can a refrigerant such as R410A, Ammonia, Hydrocarbon, Water or Glycol be used in this product.

Refrigerant can be harmful if it is inhaled and/or makes contact with exposed skin. Refrigerant must be used and recovered responsibly. Extreme care must be taken when handling refrigerant, as personnel injury or death may occur.



Caution – Lubricant Oil Type

All compressors are charged with Polyol Ester (POE) oil. POE can be used with HFC refrigerants, such as R404A, R507, R407C and R134a. Use ONLY POE oil; do NOT mix POE with other oils, when using HFC refrigerants.

**Caution – Sharp Edges**

All units are manufactured with sheet metal and in this process all care is taken to ensure the edges are concealed. Avoid contact with sheet-metal edges and the coil fins. They can be sharp and are a potential personal injury hazard. Please take care when accessing in or around the unit.

**Warning – Qualified Personnel**

All units may only be installed, commissioned, decommissioned and serviced by qualified and trained personnel (refrigeration mechanics and/or electricians) who have sufficient knowledge in this type of equipment. It is the purchaser's responsibility to co-ordinate with qualified personnel as required.

**Personal Protective Equipment**

KIRBY recommends as a secondary safety precaution that all personnel working with the unit wear appropriate Personal Protective Equipment (PPE) such as gloves, eyewear and footwear.

**Caution – Lifting of Unit**

The compressor end of the unit is to the left looking from the front (fan discharge) side. Forks should be placed toward the left hand mounting foot when lifting. Slings can be placed through the mounting feet but care must be taken to adjust the lengths appropriately to account for the weight distribution.

MODEL	APPROX. UNIT WEIGHT	
	UNPACKED	PACKED
FBDH066MHZ1-2	83	103
FBDH088MHZ1-2	93	113
FBDH103MHZ1-2	94	114
FBDH116MHZ1-2	96	116
FBDH125MHZ1-2	97	117
	kg	

Always take care to ensure a proper weight balance before lifting and moving unit.

**Caution – High and Low Temperatures**

Compressor housing and discharge line temperatures may reach 150°C due to failure of system components. Wiring and other materials which could be damaged by these temperatures should not come into contact with the housing or discharge line.

Moreover, even in normal working operation, the unit can generate very high (may exceed 100°C) and very low (below -40°C) temperatures on compressor housing and tubing surfaces resulting in the possibilities of severe contact burns. Special caution must be taken when working around the unit.

**Caution – Deep Vacuum**

Do NOT operate compressors in deep vacuum conditions as this can cause electrical failure. Compressors should never be used to evacuate refrigeration or air conditioning systems.

**Caution – Motor Protection**

WARNING: Do not insert any object into operating fans. Ignoring this warning may result in personal injury and/or severe equipment damage and consequences.

Copeland ZBD scroll compressors, and the fan motors fitted to these units, are fitted with inbuilt motor protection. The protection may be internal line break, or externally connected control break type. After opening, the protector may not reset for several hours until the motor cools sufficiently. Do not assume that the motor has suffered an open circuit failure without first allowing it to cool.

Scroll compressors can only run in one direction. Refer to Installation and Commissioning Instructions for details of how to identify if the compressor is running correctly.

In addition to the above, thermal over-current protection is fitted to the compressor contactor(s), and phase failure protection (KOM-1 OR MP15P) is provided as a standard configuration, this provides protection against,

- Phase asymmetry, phase failure, under voltage, power supply failure
- Automatic restart – if all the conditions are in “OK” order motor will restart automatically

**Caution – Internal Pressure Relief (IPR) Valve**

ZBD scroll compressors include an IPR valve. The IPR valve will open when the discharge pressure exceeds the suction pressure by a certain value, which is set by the compressor manufacturer. When it has opened, the compressor sump will become warm and the compressor will trip out on the motor protector. The unit may take 2 to 3 hours to reset and restart automatically if this happens.

**Do NOT assume that a compressor that is running, but not pumping, is faulty.
Stop the compressor and allow the pressures to balance, and then start the compressor again.**

**Caution – Discharge temperature protection**

Compressors ZBD21K & ZBD29K: These compressors have no internal discharge temperature protection. Therefore they are supplied with a discharge temperature thermostat.

Compressors ZBD38K, ZBD45K & ZBD48K: These compressors are equipped with a discharge temperature sensor (NTC thermistor) that is embedded in the top cap of the compressor. The output of the NTC thermistor is used in the protection module of the digital Scroll controller.

**Caution – Oil watch**

All compressors are fitted with oil watch, which can cause sudden start or stop of compressor based on oil level alarm in oil watch and controller setting.

Purpose

FRIDGEBOX WITH DIGITAL SCROLL COMPRESSOR condensing units are standard OEM products of KIRBY including high, medium temperature application ranges. They are designed for continuously supplying and receiving the refrigerant to and from the evaporator(s), and rejecting the heat extracted from the cold space to the surrounding atmosphere where the units are installed.

FRIDGEBOX condensing units are intended for installing in a typical ventilated indoor or outdoor environment (Refer to the General Arrangement Drawing section for details) with the condensing temperature no greater than 60°C and compressor return vapour temperature no greater than 20°C. They are not intended for environments that may have harmful, corrosive or flammable atmospheres. Marine environments are considered corrosive; please consult KIRBY before installing in this environment.

Standard Design Conditions

MAXIMUM ALLOWABLE PRESSURES (PS, PSS)

Maximum allowable pressure (PS, PSS) is based on the design pressure or maximum allowable pressure of the lowest rated component in the system.

MAXIMUM AMBIENT

Maximum ambient condition is based on calculated maximum condensing pressure for various permitted refrigerants. Calculations have been verified by testing sample units of each unit range.

AS/NZS5149.2 INFORMATION.	MAX AMB	UNIT DATA		
		PS	PSS	Refrig
ZB-STD	43	2880	2100	A1: R404A/R407F/R134a
ZBD-DIG	43	2880	2100	A1: R404A/R407F/R134a

Medium temperature range condensing units are typically designed, for primary refrigerant R404A, to be used in commercial cool room applications ranging from -20°C to +10°C saturated suction temperature for ZBD compressors. R404A is recommended refrigerant.

For R134a usage, please refer to other sections of this booklet for control setting information etc.

For special design requirements (non-standard conditions and/or refrigerants), please inquire with your local representatives and/or KIRBY local branches, or call our national telephone number 13 23 50 for your nearest available information resources.



Installation Instructions

General Instructions:

This product must be installed and maintained in accordance with the following:

- AS/NZS5149:2016 – Parts 3 & 4 (and amendments as applicable)
- AS4041:1998 – Pressure Piping
- Refrigerant Handling Code of Practice, Part 2

Useful information-

- Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 (and amendments) and Regulations 1995
- AIRAH, DA19 – HVAC&R Maintenance
- CIBSE Code M - Commissioning Management

NOTE- There may be other applicable Codes and Standards that must be considered. It is then responsibility of the Installer and Owner to ensure all requirements are considered and complied with.

Unpacking of Unit

When unpacking, check for any damage to packing material or the unit itself which may affect the unit's performance. **If any such damage is evident, please contact your local KIRBY branch.**

Installation Location (Refer to the General Arrangement Drawing section)

If the unit is to be located in close proximity to a wall or similar obstruction, the minimum distance from the coil face to the obstruction shall comply with the general arrangement drawing. The unit shall be mounted on a horizontal plane surface.

The liquid sight glass is located inside the left hand side compartment (looking from the front). Allow sufficient space around the access panels for opening the panels.

Connection of gauges can be achieved from the compressor compartment of the unit, refer to the section on pressure settings for more detail.

It is particularly important for the units to allow sufficient unobstructed air-discharge space in front of the unit to prevent warm air recirculation to the condenser.

Refrigeration Piping

Refrigeration piping work shall be carried out professionally by qualified refrigeration mechanics in accordance with applicable national and local regulations and in conformance with good engineering practices required for the proper operation of the refrigeration system.

All FRIDGEBOX condensing units manufactured by KIRBY are supplied clean and internally charged with dry air or nitrogen to prevent oxidation and ingress of moisture or foreign matter. Care shall be taken during installation of the piping to prevent entrance of foreign matter or moisture by minimising the time that the piping is uncapped.

The interconnecting refrigeration pipe size is not necessarily the same size as the outlet on the unit. The pipe sizes shall be selected / calculated based on the best compromise of minimizing refrigerant pressure drop and refrigerant velocity to ensure efficient oil return. KIRBY can provide a software program to assist in the calculation of pipe sizes.

Horizontal suction lines shall slope towards to the units to allow the oil return freely to the compressor by gravity. A 1:100 slope is considered sufficient. The use of oil trap and double risers may be necessary on vertical sections. Suction line piping shall be insulated to minimise the superheat effect to the vapour.

If in doubt during the installation, please consult with your local sales representatives and/or application engineers from KIRBY for technical support.

Electrical Connection



All electrical connections must be carried out by a licensed electrical contractor and in accordance with the relevant regulations.

Both the mains supply and the control cabling must be brought into the electrical section from the side of the unit. The cables should be passed through the glands provided before being run to the

terminals (Refer to Wiring Schematic inside electrical box cover). Refer to the name plate for all the information regarding voltage and current for the unit.

Mains supply cabling must be in accordance with relevant standards and / or codes, Control circuit is 240 volts. Terminals are supplied for connection of control circuit (Refer to Wiring Schematic inside electrical box cover).



Warning – Electrical Hazard

Only qualified personnel should attempt to bypass the interlock. Caution must be exercised when working on the unit if the interlock is bypassed.

Lubrication

FRIDGEBOX Copeland Digital ZBD Scroll compressors use polyolester oil. In the field if the original manufacturer's specification oil is not available, the oil level could be topped up with Emkarate RL32. The oil charge must be checked before commissioning (see below). Check the oil level again after a minimum of 10min operation at nominal conditions. This operation should be repeated at least twice to make sure the proper oil level has been achieved.

OIL LEVELS:

Copeland ZBD Scroll Compressors: The oil level should be maintained at 1/2 of the oil sight glass. Compressors are fitted with oil watch as standard.



Caution - Notes on POE Oils

Use only POE oil with HFC refrigerants. Do NOT mix POE oil with other oils when using HFC refrigerants (eg R404A).

Compressor Starting

DOL START

All compressors are 380-420V 3Ph 50Hz Direct-On-Line starting. Care should be taken to establish starting requirements for the larger compressors due to high in-rush current.

Maximum compressor starts per hour
Scroll compressors = 10

Compressor Crankcase heater

The crankcase heater is mounted below the oil removal valve located on the bottom shell. The crankcase heater remains energised during compressor off cycles.

Scroll Compressor Operating Sounds

Start Up - Normal

During the very brief start-up, a short metallic sound may be audible.

Start Up - Incorrect Wiring

Because scroll compressors are directionally dependant, **3 phase compressors must be wired to rotate in the correct direction.** Correct rotation can be verified by observing that a drop in suction pressure and a rise in discharge pressure occurs. Also, **reverse rotation results in a sound level higher than that produced when rotation is correct.**

Note that no damage will be caused by operating scroll compressors in the reverse direction, and after several minutes of operation, the compressor's internal protector will trip.

The rotation direction can be reversed by swapping any two of the phase connections.

Shut Off

During shut off, a brief audible sound may occur.

Scroll System Charging Procedure

Avoid rapid charging from the suction side as this can cause a temporary no-start condition due to scroll component characteristics. The best method for initial charging is to simultaneously charge from both high and low sides (Please refer to Commissioning Section for more details).

Should a scroll compressor fail to start and the above condition is suspected, reverse any two of the 3 phase leads and momentarily power the compressor (1-2 seconds) in the reverse direction.

Internal Pressure Relief Valves (IPR valves)

All FRIDGEBOX compressors are fitted with IPR valves with a discharge to suction differential of 26~31bar.

Scroll Compressor Functional Check

Since scroll compressors do not have internal dynamic suction or discharge valves, it is not necessary to perform valve plate efficiency tests, ie running the compressor with the suction service valve closed. This type of test may damage a scroll compressor.

System Holding Charge

The system as supplied is pressurised at the factory with Dry Air or Nitrogen gas.

If the system is not pressurised on delivery, please contact your KIRBY branch. Care must be taken to release the pressure before attempting to gain access to any part of the refrigeration system.

The unit should be evacuated to a pressure of 500 microns (μmHg) prior to commissioning.

Pressure Settings

PRESSURE RELIEF VALVES (Where required)

High Side- Pressure relief valves must be selected based on the system PS. The maximum allowable pressure of the pressure vessel may not determine the PRV setting if it is not the lowest rated system component. Please note the condensing unit may NOT be the lowest rated component in the system.

Low Side (where applicable)- Pressure relief valves must be selected based on system PSS. Please note that the low side of the condensing unit may NOT be lowest rated component in the system.

HP CONTROL SETTING

Compressor HP (where fitted)- Setpoint must be equal to or less than 90% of the compressor PS.

Unit HP- Setpoint must be equal to or less than 90% of the PRV setting (where fitted), or less than or equal to Unit PS if no PRV fitted.

Please note this setting may not be adequate to protect other parts of the system with a lower PS rating. If required the Unit HP may be set to less than or equal to the system HP.

Note when setting the HP control- Consideration must also be given to the type of refrigerant used and the maximum ambient temperature to ensure compliance with AS/NZS5149.2 and avoiding nuisance tripping.

KIRBY also recommends the LP switch to be used as a safety protection device. Depending on the application and compressor, LP cut-in and differential points should be set with the following considerations:

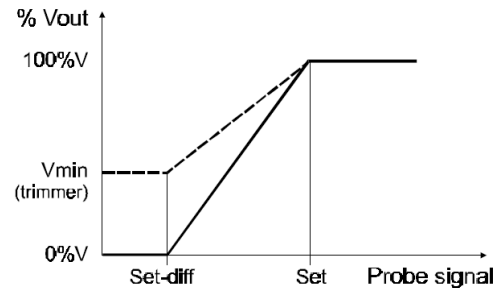
- Set the cut-out points at 3–5 K below the respective minimum design saturated suction temperatures (Refer to the Standard Design Conditions section for saturated suction temperature ranges).
- Set the differential to no more than 2 Bar.
- The cut-out pressure shall be in the positive pressure region.

- When the unit is installed in a cold ambient, the cut-out pressure shall be lower than the pressure corresponding to the ambient temperature.

Access points for gauges are located on post valves in the compressor compartment. They can be accessed from the compressor compartment access panel.

Fan Speed Control

A Dixell fan speed controller (XV105D) is fitted as a standard item to all Fridgebox Digital Scroll condensing units from 2 – 7 hp. Input signal: NTC Probe



XV105D Operation: Calibrate the Set trimmer to the temperature (or) pressure at which the fan runs at the maximum speed. Then calibrate the Diff trimmer to set the temperature (or pressure) differential at which the fan is stopped. E.g. if the Set is 40°C and the Diff is 10°C, when the temperature is above 40° the fan runs at maximum speed, if the temperature is between 30° and 40° the fan speed is controlled, and below 30°C the fan is stopped.

If the input signal increases, the voltage output proportionally increases (condensing or cooling applications). If the input signal is higher than the Set, the output signal is 230 Volt (fans are running at the maximum speed). When the signal decreases and enters the range between the Set and Set-Diff the output signal follows the temperature variation. Below the Set-diff value the output signal is always 0V (if no Vmin has been set).

Trimmer SET: by turning clockwise this trimmer, the set is changed from the minimum to the maximum value. Range: 0-60°C

Trimmer differential: by turning clockwise this trimmer, the differential is changed from the minimum to the maximum value. Range: 1-30°C

Trimmer V min: by turning clockwise this trimmer, the minimum fan speed can be changed from 0 to 50% of the maximum voltage output. (Factory set: 30%)

Trimmer Cut Off: by turning clockwise this trimmer, the fan cutoff can be changed from 10 to 30% of the maximum voltage output.

Green LED: this LED signals when the load is being controlled

For additional information, please refer to the XV105D handbook.



General Commissioning & Decommissioning Guide



Warning – Commissioning

Refrigeration system commissioning shall be carried out professionally by qualified refrigeration mechanics in conformance with good engineering practices required for the proper operation of the refrigeration system.

After all installation and electrical work is completed, the entire refrigeration system must be leak tested. After satisfactory testing of the refrigeration system, then refrigeration lines shall be

insulated as necessary. The insulation located in outdoor environments shall be protected from UV exposure.

Before charging the refrigerant, the entire refrigeration system shall be evacuated by connecting a good, high vacuum pump to both the high-pressure side and low-pressure side service valves or ports.

It is important to apply good engineering practice when charging any refrigerant, but in particular blended (zeotropic) refrigerant, such as R404A, require proper procedures to be observed:

- Initially charge 60 to 80% of the expected refrigerant charge in liquid form into the liquid receiver with the compressor not running (after evacuation to the correct pressure).
- When the system pressure has stabilized, start the compressor & slowly charge the remaining refrigerant quantity into the suction line in liquid form through a gauge manifold or a throttling valve to allow it to vaporize before entering the compressor. If the system is fitted with an accumulator, it is preferable to charge upstream of the accumulator.
- After initial running of the system, check the refrigerant charge condition at the sightglass and add any required refrigerant in the suction side as noted above, or remove excess refrigerant into an approved reclaim cylinder.

KIRBY is dedicated to providing safe products and protecting the environment by complying with all applicable national laws and regulations governing environmental protection. New and used refrigerants cannot be vented into atmosphere. Reclaim all used refrigerants. Ensure your refrigerant handling procedure complies with the relevant regulations.

Double check all field wiring connections and factory terminations. Factory connections can vibrate loose during shipment. Ensure correct fan motor rotation, airflow is induced from coil side and forced out of fan motor side.

If fitted, ensure that the crankcase heater has been energised for a minimum 12 hours before initial start-up and / or after prolonged shutdown periods.

After the successful start up of the system, check:

- Current draw and voltage levels.
- Suction superheat settings and discharge temperatures.
- Abnormal refrigeration piping vibrations.
- Oil level and refrigerant charge.



Warning – Decommissioning

In order to remove the unit from its mounting place, the following procedures need to be carried out professionally by qualified personnel. Failure to do so may result in personal injury or death, property damage by fire or explosion. Discharge of refrigerant to atmosphere is illegal and may result in heavy fines by relevant regulatory authorities.

- Pump down the entire refrigerant charge into the liquid receiver or appropriate container such as reclaim cylinder, and shut related valves. **All reclaimed refrigerant that is not re-used must be taken to an approved refrigerant recycling or destruction facility.** KIRBY Branches will accept the used refrigerant.
- Disconnect the power supply. Remove all necessary field electrical wiring and related components, leaving the earth wire to the last.
- Care must be taken when disconnecting the refrigeration piping because of unbalanced pressure between the unit and ambient. There may be a small amount of refrigerant trapped in the oil, the pressure rise in the system will boil and vaporise the refrigerant resulting in a potential personal injury hazard.
- Cut and solder seal the refrigeration liquid line and suction line pipe connections.
- Remove the unit from its mounting place. Adequate equipment must be provided as per lifting notes.

Material Safety Data Sheets – M.S.D.S.

These are available from your nearest KIRBY Branch for all refrigerants that Kirby Titan condensing units are approved for, and for oils and other materials as needed.

Important Notes

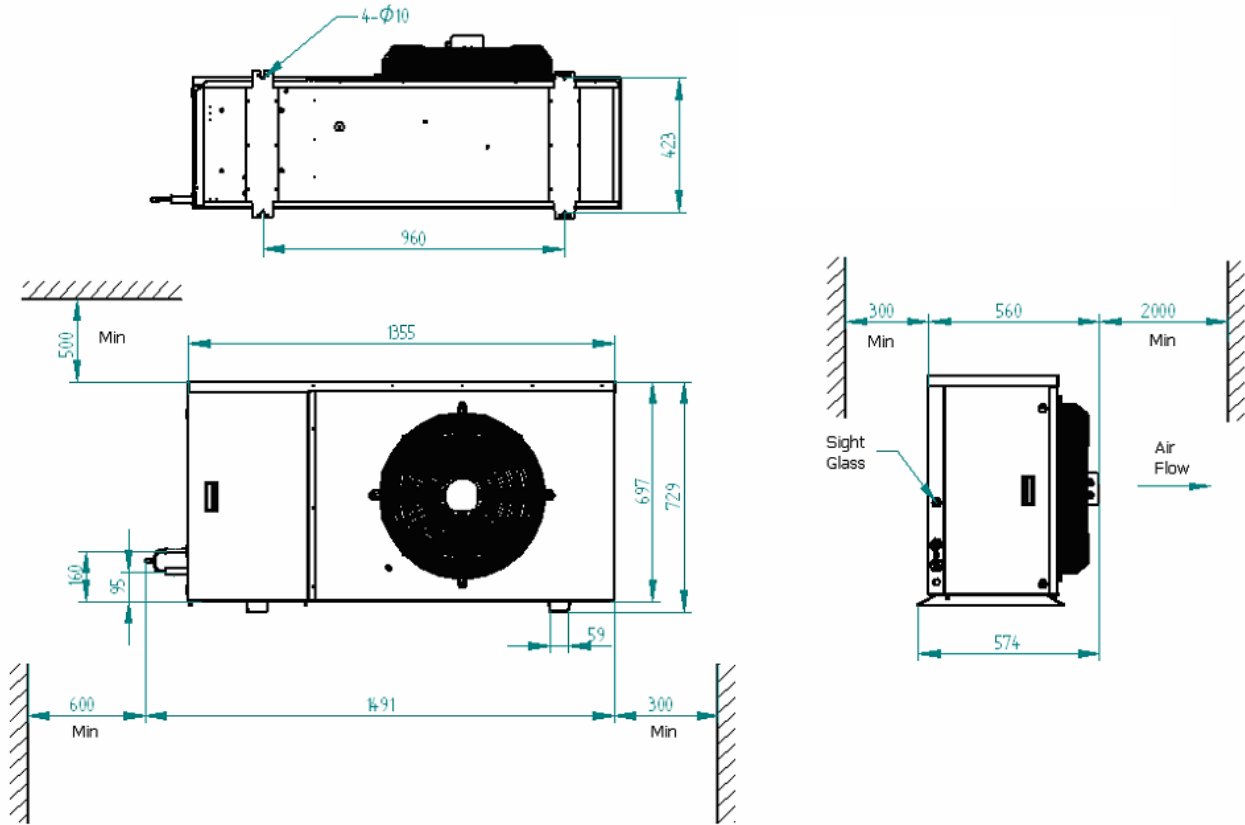
To ensure FRIDGEBOX SERIES IV condensing units operate efficiently and for a long working life, always obtain genuine replacement parts from your local KIRBY Wholesale Branch. Genuine replacement parts are covered by the warranty. Refer to the Standard Terms & Conditions of Sale in the Price Guide for warranty statements.

Continuous product improvement is our company policy. KIRBY reserves the right to make changes in product specifications and/or this instruction manual without notice.

KIRBY is dedicated to providing safe products and protecting the environment by complying with all applicable national laws and regulations governing environmental protection. New and used refrigerants cannot be vented into atmosphere. Reclaim all used refrigerants. EPA regulations are constantly updated. Ensure your refrigerant handling procedure complies with the relevant regulations.



General Arrangement Drawing



Wiring & Programming

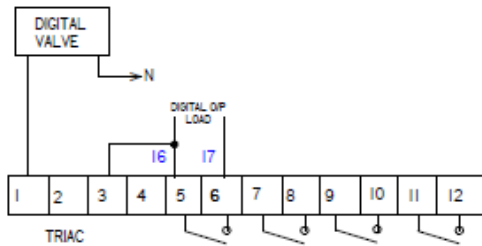
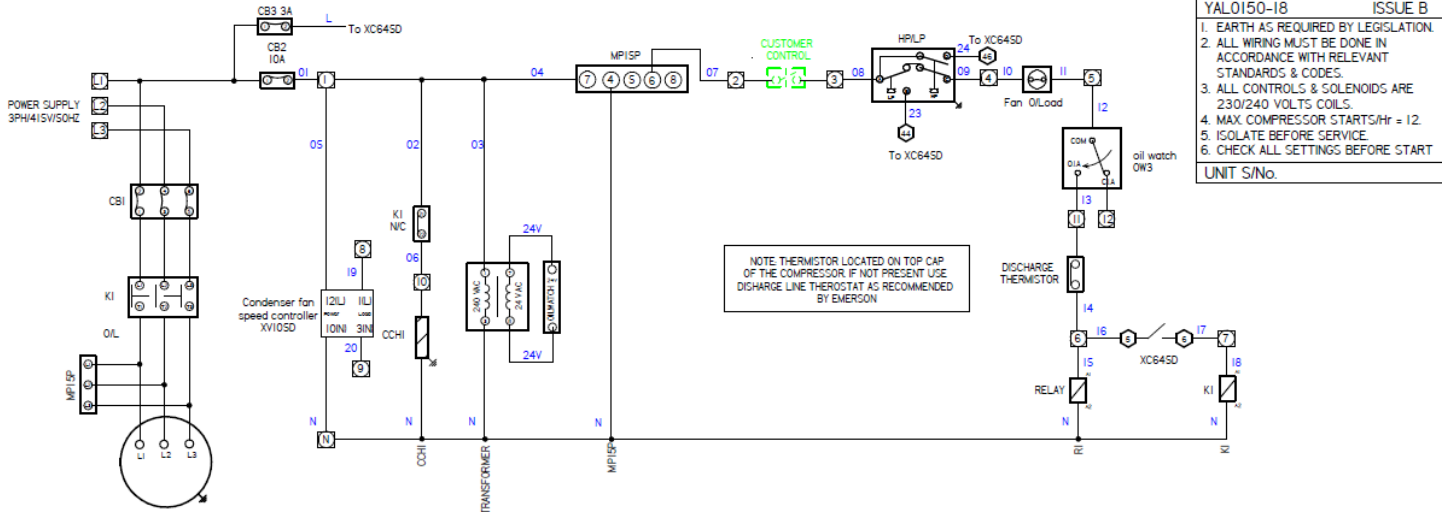
FRIDGEBOX W. DIG SCROLL 1x 500mm Fan



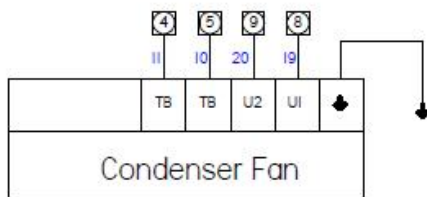
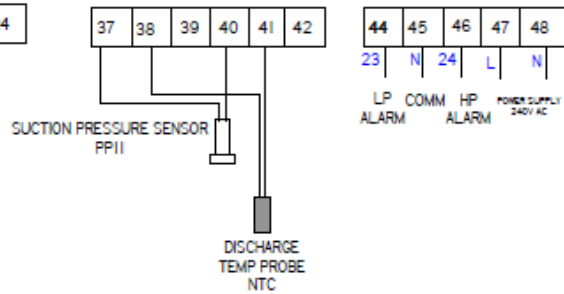
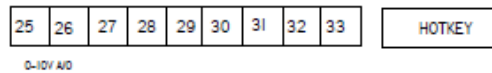
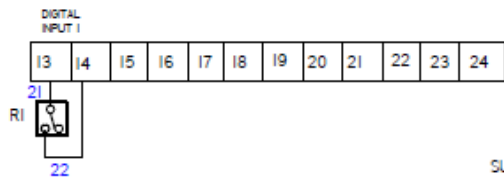
Warning



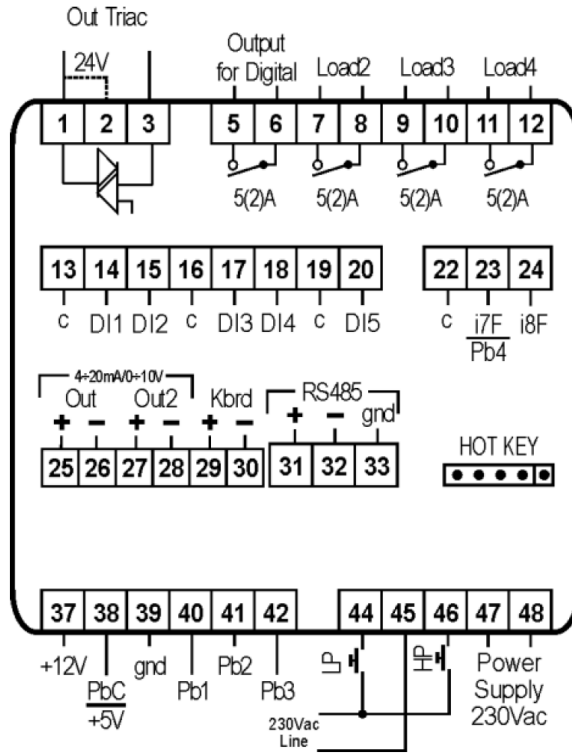
Electrical 380 / 420 Volt



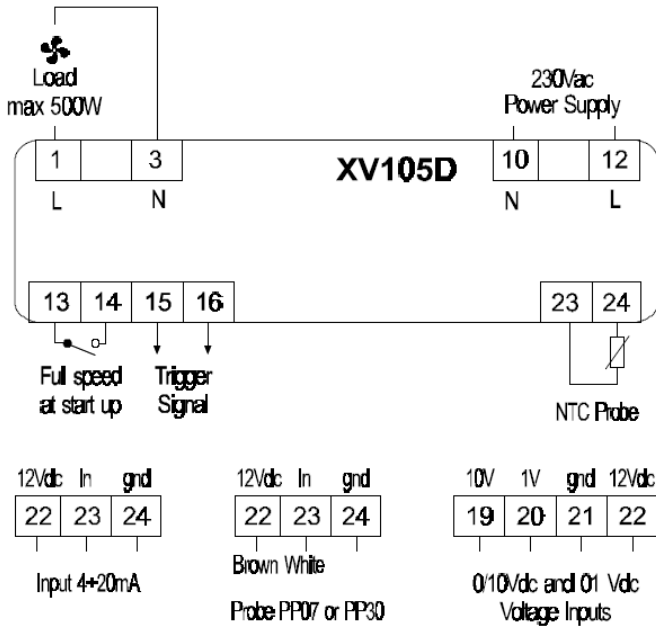
**XC645D
TERMINALS
LAYOUT**



EMERSON XC645D TERMINAL LAYOUT



DIXELL XV105D FAN SPEED CONTROLLER TERMINAL LAYOUT



PROGRAMMING & SETUP EMERSON XC645D**To enter the “Pr1” parameter list, user accessible, operate as follows:**

1. Hold pressed the **SET** and **DOWN** key for 3s.
2. The controller displays the name of the parameter in the Lower display, its value on the Upper display.
3. Press the “**SET**” key: the value of the parameter will start blinking.
4. Use “**UP**” or “**DOWN**” to change the value.
5. Press “**SET**” to store the new value and move to the following parameter.

To exit: Press **SET** + **UP** or wait 30s without pressing a key.

NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

How to enter in parameters list “Pr2”

The “Pr2” parameter list is protected by a security code (Password).

SECURITY CODE is 3210

To access parameters in “Pr2”:

1. Enter the “Pr1” level.
2. Select “Pr2” parameter and press the “**SET**” key.
3. The flashing value “0 ---” is displayed.
4. Use **o** or **n** to input the security code and confirm the figure by pressing “**SET**” key.
5. Repeat operations 2 and 3 for the other digits.

NOTE: each parameter in “Pr2” can be removed or put into “Pr1” (user level) by pressing “SET”

+ n. When a parameter is present also in “Pr1” decimal point of the lower display is on.

How to change parameter values

1. Enter the Programming mode.
2. Select the required parameter with **o** or **n**.
3. Press the “**SET**” key the value start blinking.
4. Use **o** or **n** to change its value.
5. Press “**SET**” to store the new value and move to the following parameter.

To exit: Press **SET** + **UP** or wait 15s without pressing a key.

NOTE: the new programming is stored even when the procedure is exited by waiting the time-out.

LABEL	DEFAULT	CHANGED	DESCRIPTION	
StC1	-10.0	-4	Set point for compressors	LSE÷HSE
SEtF	35.0	40	Set point for fans	LSF÷HSF
OA1	dGS	dGS	Load 1 configuration	nu - CPr1 - CPr2 - StP - dGS - 6dG - dGSt - InC1 - InC2 - FAn - InF - LIn - ALr
OA2	CPr	FAn	Load 2 configuration	nu - CPr1 - CPr2 - StP - dGS - 6dG - dGSt - InC1 - InC2 - FAn - InF - LIn - ALr
OA3	FAn	nu	Load 3 configuration	nu - CPr1 - CPr2 - StP - dGS - 6dG - dGSt - InC1 - InC2 - FAn - InF - LIn - ALr
OA4	FAn	nu	Load 4 configuration	nu - CPr1 - CPr2 - StP - dGS - 6dG - dGSt - InC1 - InC2 - FAn - InF - LIn - ALr
dGty	SCrL		Kind of digital compressor	SCrL - StrM
StP	oP	CL	Valve output polarity	OP - CL
FtyP	404	404	Refrigerant gas type	r22 - 404 - 407A - 407C - 407F - 410 - 507 - 134 - CO2
Stv	vES		Compressor Sequence type	no - vES
rot	vES		Fan Sequence type	no - vES
P1C	Cur		P1 probe setting (4/20mA, 0-5V, ntc)	nP - Cur - tEn - ntc
PA04	-0.5	-7	4mA or 0.5V readout for P1 probe	(-1.0 ÷ PA20)BAR; (-15 ÷ PA20)PSI; (-100 ÷ PA20)KPA
PA20	11.0	159	20mA or 4.5V readout for P1 probe	(PA04 ÷ 51.0)BAR; (PA04 ÷ 750)PSI; (PA04 ÷ 5100)KPA
CAL	0.0	0	P1 probe offset	-12.0÷12.0(°C); -20÷20 (°F); 12.0÷12.0 (bar); - 200÷200 (PSI) -999÷999 (kPA)
P2C	Cur	NTC	P2 probe setting (4/20mA, 0-5V, ntc)	nP - Cur - tEn - ntc
FA04	0.0		4mA or 0.5V readout for P2 probe	(-1.0 ÷ FA20)BAR; (-15 ÷ FA20)PSI; (-100 ÷ FA20)KPA
FA20	30.0	435	20mA or 4.5V readout for P2 probe	(FA04 ÷ 51.0)BAR; (FA04 ÷ 750)PSI;(FA04 ÷ 5100)KPA
FCAL	0.0		P2 probe offset	-12.0÷12.0(°C); -20÷20 (°F); 12.0÷12.0 (bar); - 200÷200 (PSI) -999÷999 (kPA)
P3C	nP		P3 probe setting (4/20mA, 0-5V, ntc)	nP - Cur - tEn - ntI0 - nt86
3P04	-0.5		4mA or 0.5V readout for P3 probe	(-1.0 ÷ FA20)BAR; (-15 ÷ FA20)PSI; (-100 ÷

LABEL	DEFAULT	CHANGED	DESCRIPTION	
				FA20)KPA
3P20	11.0		20mA or 4.5V readout for P3 probe	(FA04 ÷ 51.0)BAR; (FA04 ÷ 750)PSI;(FA04 ÷ 5100)KPA
O3	0.0		P3 probe offset	-12.0÷12.0(°C); -20÷20 (°F); 12.0÷12.0 (bar); - 200÷200 (PSI) -999÷999 (kPa)
P4C	nP		P4 probe setting (NTC 10K, NTC 86K)	nP - nt10 - nt86
O4	0.0		P4 probe offset	-12.0÷12.0(°C); -20÷20 (°F)
FPb	P2		Probe setting for fan	nP - P1 - P2 - P3
iF07	ES	nu	Configurable digital input i1F function (terminals 22-23)	nu - OA1 - OA2 - OA3 - OA4 - OA5 - OA6 - InF - LP1 - LP2 - HP - ES - OFF - LL - SIL - EAL
iF08	LL	nu	Configurable digital input i2F function (terminals 22-24):	nu - OA1 - OA2 - OA3 - OA4 - OA5 - OA6 - InF - LP1 - LP2 - HP - ES - OFF - LL - SIL - EAL
iP01	cL	OP	Safety input for Load 1 polarity (13-14):	OP - CL
iP02	cL	OP	Safety input for Load 2 polarity (13-15):	OP - CL
iP03	cL		Safety input for Load 3 polarity (16-17):	OP - CL
iP04	cL		Safety input for Load 4 polarity (16-18):	OP - CL
iP07	cL		Configurable digital input i1F polarity (22-23):	OP - CL
iP08	cL		Configurable digital input i2F polarity (22-24)	OP - CL
iP09	cL		Polarity of High pressure-switch alarm (terminals 45-46)	OP - CL
iP10	cL		Polarity of Low pressure-switch alarm (terminals 44-45)	OP - CL
did	20		Liquid level alarm, signaling delay	0 ÷ 255 (min.)
didA	20		External alarm, signaling delay:	0 ÷ 255 (min.)
ALMr	no		Manual reset for compressor/fan alarms	no - yES
dEU	tPr		Displaying measurement unit: pressure or temperature	tMP - PrS
CF	°C		Measurement unit for temperature	°C - °F
PMU	Bar	PSI	Measurement unit for pressure	BAR - PSI - PA
rES	dE		Resolution for display and parameters	in - dE
dFE	no	YES	Pressure filter enabling	no - yES
dEU1	tPr		Upper display: pressure or temperature selection	tMP - PrS
dSP2	P2		Lower display default visualization	nu - P1 - P2 - P3 - P4 - StC1 - StC2 - SEtF
dEU2	tPr		Lower display: pressure or temperature selection	tMP - PrS
Pbd	5.0		Proportional band for compressors regulation	0.1÷30.0(°C); 1÷50 (°F);0.1÷10.0(BAR); 1÷150(PSI) 10÷1000(KPA)
rS	0.0	-2	Band offset	-12.0÷12.0(°C) -20÷20(°F) - 12.0÷12.0(BAR) -200÷ 200(PSI) -999÷999(KPA)
inC	500		Integral time	0 ÷ 999 sec
dGSP	no	YES	Digital compressor always activated as first compressor	no - yES
SUt	2		Digital input valve on at start up	0 ÷ 3s
tdS	15	10	Cycle time for digital compressor	10 ÷ 40s
PM	30		Minimum capacity for digital compressor	10 ÷ PMA(dGty=ScrL) 0 ÷ PMA(dGty=StrM)
PMA	100		Maximum capacity for digital compressor	PM ÷ 100
ton	60	10	Time with digital compr. at PMA value before starting a load	0 ÷ 255s
toF	5		Time with digital compr. at PM before turning off a load	0 ÷ 255s
MinP	0		Minimum capacity threshold to start the	0 ÷ 100

LABEL	DEFAULT	CHANGED	DESCRIPTION	
			safety lubrication function	
tMin	180		Max time at MinP to start the safety lubrication function	1 ÷ 255 min
tMAS	3		Time at PMA for digital compressor to restore the right lubrication	1 ÷ 255 min
ESC	0.0		Energy saving for compressors regulation	-50.0 ÷ 50.0(°C) -90 ÷ 90(°F) - 20.0 ÷ 20.0(BAR) - 300 ÷ 300(Psi) -2000 ÷ 2000(KPA)
OnOn	5		Minimum delay between 2 switching on of the same compressor	0 ÷ 255 (min.)
OFOn	1		Delay between the switching off and on of the same compressor	0 ÷ 255 (min.)
don	01:00		Time delay between the insertion of two different loads	0 ÷ 99.5 (min. 10sec)
doF	00:10		Time delay between switching off of two different compressors	0 ÷ 99.5 (min. 10sec)
donF	00:30		Minimum time a stage stays ON	0 ÷ 99.5 (min. 10sec)
MAon	0		Maximum time a stage stays switched ON	0 ÷ 24 (hour)
FdLy	no		'don' delay enabled also for the first request	no - yES
FdLF	no		'doF' delay enabled also for the first switching off	no - yES
odo	20	2	Regulation delay at power on	0 ÷ 255 (sec.)
LSE	-40.0		Minimum set point (compressors)	-50.0 ÷ HSE(°C) -58.0 ÷ HSE(°F) PA04 ÷ HSE(BAR, PSI, KPA)
HSE	10.0		Maximum set point (compressors)	LSE ÷ 150.0(°C) LSE ÷ 302(°F) LSE ÷ PA20(BAR, PSI, KPA)
Lit	90.0	50	Set point for liquid injection	0.0 ÷ 180.0(°C) 32 ÷ 356(°F)
Lid	10.0		Differential for liquid injection	0.1 ÷ 25.5(°C) 1 ÷ 50(°F)
LiPr	nP		Probe selection for liquid injection	nP - P3 - P4
Pb	5.0	20	Proportional band for fan regulation	0.1 ÷ 30.0(°C) 1 ÷ 50(°F) 0.1 ÷ 10.0(BAR) 1 ÷ 150(Psi) 10 ÷ 1000(KPA)
ESF	0.0		Energy saving differential for fan regulation	-50.0 ÷ 50.0(°C) -90 ÷ 90(°F) - 20.0 ÷ 20.0(BAR) - 300 ÷ 300(Psi) - 2000 ÷ 2000(KPA)
PbES	0.0		Band offset for fan regulation in ES	-50.0 ÷ 50.0(°C) -90 ÷ 90(°F) - 20.0 ÷ 20.0(BAR) - 300 ÷ 300(Psi) -2000 ÷ 2000(KPA)
Fon	30		Time delay between the insertion of two different fan	0 ÷ 255 (sec)
FoF	15		Time delay between switching off of two different fan	0 ÷ 255 (sec)
LSF	10.0		Minimum set point (fan)	-50.0 ÷ HSF(°C) -58.0 ÷ HSF(°F) FA04(FPb) ÷ HSF(BAR, PSI, KPA)
HSF	50.0		Maximum set point (fan)	LSF ÷ 150.0(°C) LSF ÷ 302(°F) LSF ÷ FA20 (BAR, PSI, KPA)
PAO	30		Alarm probe delay at power on	0 ÷ 255 (min.)
LAL	-40.0		Pressure alarm set low limit (compressors)	-50.0 ÷ HAL(°C); -58 ÷ HAL(°F); PA04 ÷ HAL(BAR, PSI, KPA)
HAL	10.0		Pressure alarm set high limit (compressors)	LAL ÷ 150.0(°C); LAL ÷ 302(°F); LAL ÷ PA20(BAR, PSI, KPA)
tAo	15	14	Pressure/temperature alarm delay (compressors)	0 ÷ 255 (min.)
ELP	-45.0		Electronic pressure switch threshold	-50.0 ÷ STC1(°C) -58 ÷ STC1(°F) PA04 ÷ STC1(BAR, PSI, KPA)
SEr	999		Working hour alarm set (tenth of ours)	1 ÷ 999(0 = disabled)(10hour)
PEn	5		Pressure switch maximum activations	0 ÷ 15

LABEL	DEFAULT	CHANGED	DESCRIPTION	
PEI	60		Pressure switch activations time	0 ÷ 255 (min.)
SPr	1		Compressors ON with faulty probe	0 ÷ 6
dtL	110		DLT high temperature alarm threshold	0 ÷ 180°C 32 ÷ 356°F
dLd	5		DLT high temperature alarm delay	0 ÷ 15min
dLH	15.0		DLT high temperature alarm differential for recovery	0.1 ÷ 25.5°C 1 ÷ 50°F
dtLi	nP		Probe selection for DLT control	nP - P3 - P4
dtLP	50		Digital Compressor Capacity percentage in case of discharge line temperature alarm	0 ÷ 80(%)
LAF	0.0		Low pressure alarm set (fan)	-50.0 ÷ HAF(°C); -58 ÷ HAF(°F); FA04 ÷ HAF(BAR_PSL_KPA)
HAF	60.0		High pressure alarm set (fan)	LAF ÷ 150.0(°C) LAF ÷ 302(°F) LAF ÷ FA20(BAR_PSL_KPA)
AFd	5		Pressure alarm delay	0 ÷ 255 (min)
HFc	YES		Compressor off with high pressure (temperature) alarm	no - yES
HFdP	50		Digital Compressor Capacity percentage in case of high pressure	0 ÷ 80(%)
dHF	5		Interval between 2 compressors turning off with high pressure (temperature) alarm	1 ÷ 24 (sec.)
PnF	5		Fan pressure switch maximum	0 ÷ 15
PiF	60		Fan pressure switch activations time	0 ÷ 255 (min)
FPr	1		Fan ON with faulty probe	0 ÷ 6
dSEP	nP		Dynamic Set point function enabled	nP - P3 - P4
dSES	35.0		External temperature set for DYNAMIC SET POINT function	-50.0 ÷ 150.0 (°C) -58 ÷ 302 (°F)
dSEb	10.0		Proportional band DYNAMIC SET POINT	-50.0 ÷ 50.0(°C) -90 ÷ 90(°F)
dSEd	0.0		Differential for DYNAMIC SET POINT	-50.0 ÷ 50.0(°C) -90 ÷ 90(°F) - 20.0 ÷ 20.0(BAR) -300 ÷ 300(Psi) - 2000 ÷ 2000(KPA)
AOC	Cur	tEn	Analogue output working mode	Cur - tEn
AOF	nu	nu	Analogue output 1 function	nu - InC1 - InC2 - InF
AOM	40		Minimum value of analogue output	0 ÷ 100 (%)
AOt	5		Time with analog output at max when after exceeding AOM	0 ÷ 15s
MPM	100		Maximum % variation per minute	nu, 1 ÷ 100%
SAO	80		Percentage of analog output in case of probe failure	0 ÷ 100 (%)
AOH	70		Maximum analog output percentage when silence mode function is enabled	0 ÷ 100 (%)
tbA	YES		Alarm relay silencing	no - yES
OAP	cL		Polarity alarm relay	OP - CL
oFF	no		off function enabled	no - yES
bUr	YES		Buzzer enabled	no - yES
Adr	1		Serial address	1 ÷ 247
rEL	3.0		Release firmware	Readable only
Ptb			Parameter table code	Readable only
Pr2	-		Pr2 access	Readable only

COMMISSIONING NOTES

UNIT SERIAL NUMBER

UNIT INSTALLATION/COMMISSIONING DATES



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