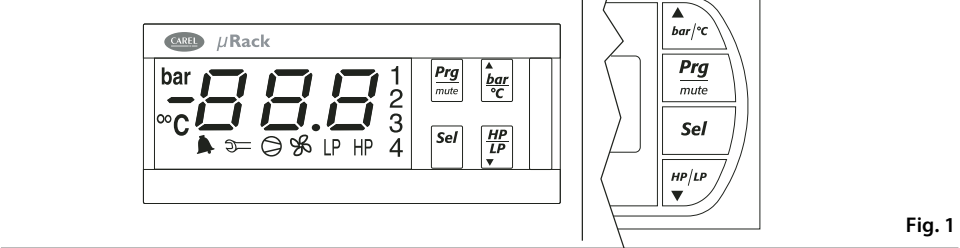


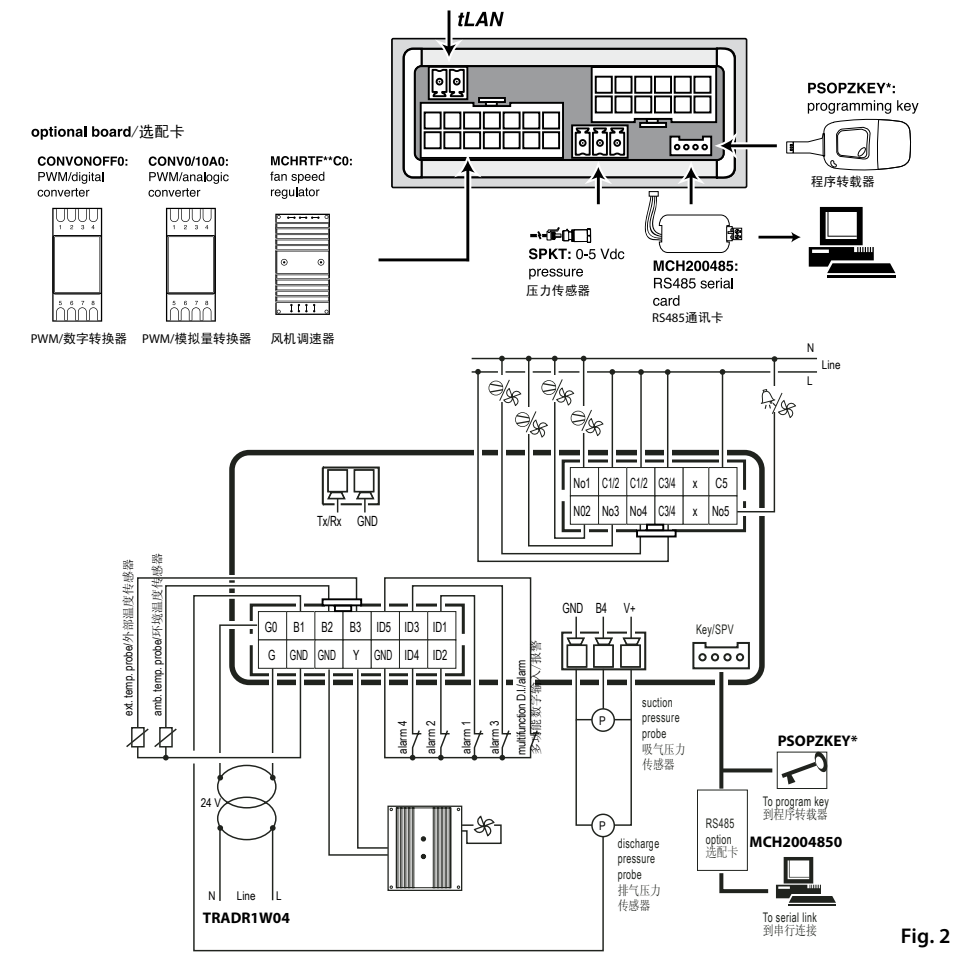
MRK0000*: μRack 用于最多带四台压缩机的压缩机组全面管理的电子控制器 / Electronic controller for the complete management of compressor racks with up to 4 compressors



用户界面 / User interface



电气连接（面板安装型） / Electrical connections (panel version)



友情提示：请将传感器和开关量输入信号线与带电感负荷的线缆和电源线尽可能分开，以避免可能产生的电磁干扰。
不要将电源线（包括电控板接线）和信号线放在同一个导管内。
WARNING: separate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never run power cables (including the electrical panel wiring) and signal cables in the same conduits.

感谢您选择CAREL，我们相信您会对您的选择感到满意。

简介

μRack是一款电子控制器，用于带最多4台压缩机的压缩机组的全面管理。

连接器的特点

连接器可以单独从CAREL订购(MCH2CON0**)或从生产商Molex®订购：

接触器代码以及到12 pin和14pin连接器的连接线的截面（如要对连接线做弯边，请使用特殊的Molex®工具，69008-0724）：

Molex连接器代码	pin数	Molex连接器代码	允许的线缆截面
39-01-2120	12	39-00-0077	AWG16 (1.308 mm²)
39-01-2140	14	39-00-0038	AWG18-24 (0.823...0.205 mm²)
		39-00-0046	AWG22-28 (0.324...0.081 mm²)

连接/断开连接的最多次数：25次。还可订购预制线缆组件MCHSMLC***。MCHSMLC***。

装配说明：

NTC/公制比例式传感器，最长连接线：	10 m
数字输入，最长连接线：	10 m
电源输出，最长连接线：	5 m
风机控制输出，最长连接线：	5 m
电源线，最长连接线：	3 m

部分输入/输出点的使用取决于参数的设置。

设置示例（带2台压缩机+2台冷凝风机的机组）

连接器	连接端	含义
14 pin	G-G0	μRack电源
	B1-GND	排气压力/温度传感器
	B2-GND	房间温度传感器
	B3-GND	外部温度传感器
	B4-GND	吸气压力传感器
	ID1-GND	压缩机1：热过载输入
	ID2-GND	压缩机2：热过载输入
	ID3-GND	风机1：热过载输入
	ID4-GND	风机2：热过载输入
	ID5-GND	由参数设置的多功能输入（参考用户手册）
12 pin	Y-GND	PWM输出，用于调节冷凝风机运行
	No1-C1/2	压缩机1
	No2-C1/2	压缩机2
	No3-C3/4	风机1
	No4-C3/4	风机2
3 pin	No5-C5	报警
	GND-B4-V+	到公制比例式传感器的V+电源

参数编辑钥匙选配卡

面板安装型：当控制器关闭时，将编辑钥匙PSOPZKEY00插入到连接端KEY/SPV。连接和断开通讯以及编辑钥匙选配卡，将12-pin连接器（继电器）拆下。
DIN导轨型：当控制器关闭时，拆下底板，将编辑钥匙PSOPZKEY00插入到专用的连接端。

监控器选配卡

面板安装型：连接通讯卡（代码为MCH200485*）到连接端KEY/SPV。
DIN导轨型：拆下底板，将监控卡FCSER00000插入到专用的连接端。
连接485屏蔽线缆（2芯屏蔽线）到端口GND, T+, T-。

特别提示

- 如果μRack和附件使用一个独立的电源变压器，连接多个控制器或控制板的所有G0端到次级变压器的同一端，并且所有G端到次级变压器的其它端，以避免损坏装置。
- 避免V+ 和 GND之间短路，从而避免损坏装置。
- 将电源线（继电器输出）与传感器、数字输入和通讯线分开。
- 电源变压器完全专用于电子控制器。

防电击保护和维护说明

装配、维护和更换操作时，在主板工作之前请断开电源。
由控制板(MCH200000*)和其它选配卡(MCH200002*, MCH200485*, MCHRTF****, CONVONOFF*, CONV0/10A*, EVD000040*)组成的系统代表了归入I类或II类装置的一种控制设备。防电击保护的等级取决于控制设备是如何被集成到由制造商生产的机组中。由于配线有问题的防短路保护，必须由控制设备所嵌入的装置制造商来保证。

用户界面

绿色3位数字显示（加上图标和小数点），黄色运行信号和红色报警信号。

图标	颜色	含义
1,2,3,4	黄色	压缩机1,2,3,4开
☀	黄色	至少一台压缩机开
☂	黄色	至少一台冷凝风机开
HP	黄色	排气压力显示被启用
LP	黄色	吸气压力显示被启用
⚡	红色	报警动作
bar °C	黄色	以单位Bar显示
°C	红色	以单位摄氏度显示

Thank you for your choice. We trust you will be satisfied with your purchase.

Introduction

μRack is an electronic controller for the complete management of compressor racks with up to 4 compressors.

Characteristics of the connectors

The connectors can be purchased separately from CAREL (MCH2CON0**) or from the manufacturer, Molex®: Contact code and cross-section of the connection cables to the 12- and 14-pin connectors (for crimping, use the special Molex tool, 69008-0724):

Molex connector code	number of pins	Molex contact code	Cross-section of the cables allowed
39-01-2120	12	39-00-0077	AWG16 (1.308 mm²)
39-01-2140	14	39-00-0038	AWG18-24 (0.823 to 0.205 mm²)
		39-00-0046	AWG22-28 (0.324 to 0.081 mm²)

Maximum number of connections/disconnections: 25 cycles. The pre-wired kits MCHSMLC*** are also available.

Assembly instructions

Maximum connection cable length, NTC/Ratiometric probes:	10 m
Maximum connection cable length, digital inputs:	10 m
Maximum connection cable length, power outputs:	5 m
Maximum connection cable length, fan control output:	5 m
Maximum length, power cables:	3 m

The use of some inputs/outputs depends on the configuration of the parameters.

Configuration example (unit with 2 compressors + 2 condenser fans)

Connector	Connection	Meaning
14 pin	G-G0	μRack power supply
	B1-GND	Discharge pressure/temperature probe
	B2-GND	Room temperature probe
	B3-GND	Outside temperature probe
	B4-GND	Suction pressure probe
	ID1-GND	Compressor 1 thermal overload input
	ID2-GND	Compressor 2 thermal overload input
	ID3-GND	Fan 1 thermal overload input
	ID4-GND	Fan 2 thermal overload input
	ID5-GND	Multifunction input configured by parameter (see user manual)
12 pin	Y-GND	PWM output for modulating condenser fan operation
	No1-C1/2	Compressor 1
	No2-C1/2	Compressor 2
	No3-C3/4	Fan 1
	No4-C3/4	Fan 2
3 pin	No5-C5	Alarm
	GND-B4-V+	V+ power supply to ratiometric probe

Parameter programming key option

Panel version: with the controller OFF, insert the key PSOPZKEY00 in the connector KEY/SPV. Connect and disconnect the serial and programming key options with the 12-pin connector (relay) removed.
DIN rail version: with the controller off, remove the bottom cover and insert the key PSOPZKEY00 in the special connector.

Supervisor option

Panel version: connect the serial option (code MCH200485*) to the connector KEY/SPV.
Note: the configuration jumper must be inserted in position A (technical leaflet MCH200485*)
DIN rail version: remove the bottom cover and insert the supervisor card FCSER00000 in the special connector. Connect the 485 shielded cable (2 wires + shield) to terminals GND, T+, T-.

Warnings

- If using a single power transformer for the μRack and the accessories, connect all the G0 terminals on the various controllers or boards to the same terminal on the secondary, and all the G terminals to the other terminal on the secondary, to avoid damaging the instrument.
- Avoid short-circuits between V+ and GND so as to not damage the instrument.
 - Separate the power cables (relay outputs) from the probe, digital input and serial cables.
 - Use the power transformer exclusively dedicated to the electronic controllers.

Protection against electric shock and warnings for maintenance

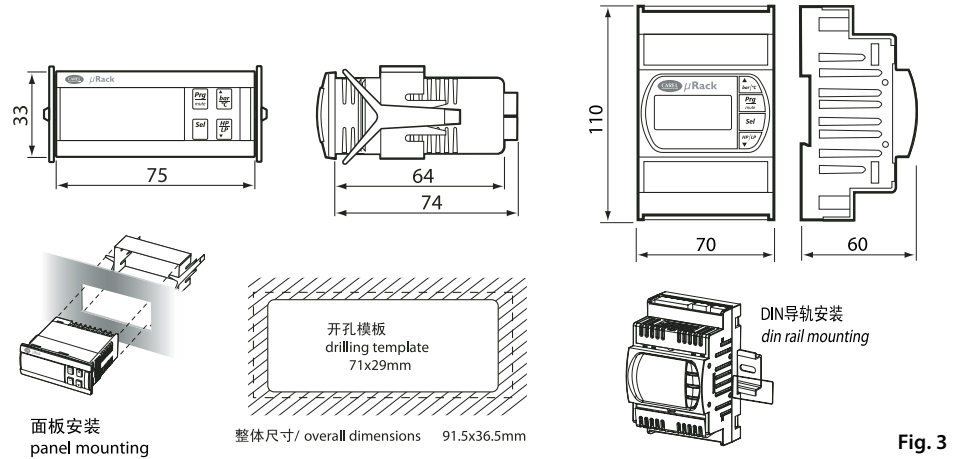
Disconnect the power supply before working on the board during the assembly, maintenance and replacement operations. The system made up of the control board (MCH200000*) and the other optional cards (MCH200002*, MCH200485*, MCHRTF****, CONVONOFF*, CONV0/10A*, EVD000040*) represents a control device to be incorporated in class I or class II equipment. The class of protection against electric shock depends on how the control device is integrated into the unit made by the manufacturer. The protection against short-circuits, due to defective wiring, must be guaranteed by the manufacturer of the equipment that the control device is built into.

User interface

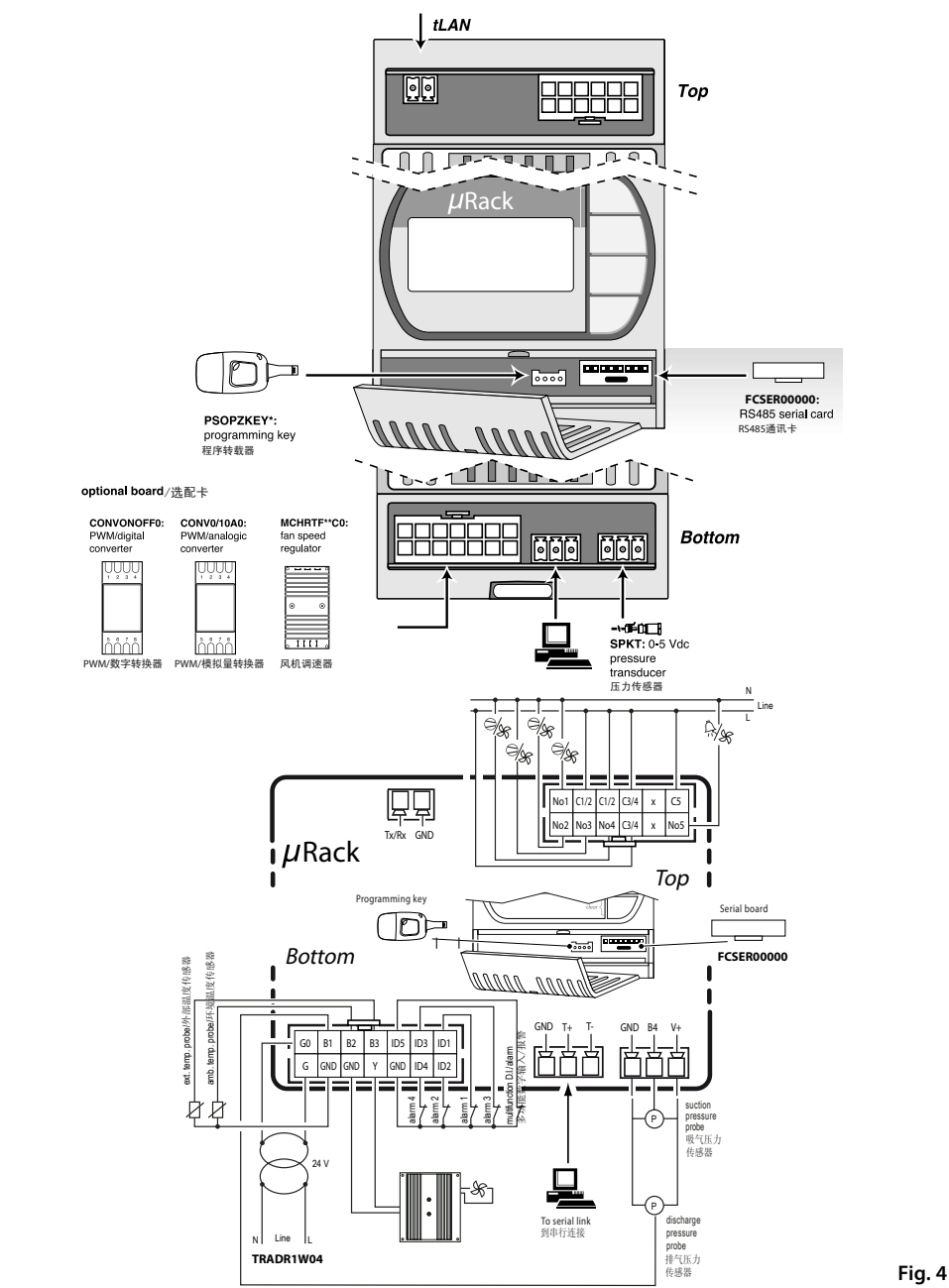
Green 3 digit display (plus sign and decimal point), amber operating signals and red alarm signal.

Symbol	Colour	LED on	Meaning
1,2,3,4	Amber	LED on	Compressor 1,2,3,4 on
☀	Amber	LED flashing	Awaiting start, delayed by timers
☂	Amber	LED flashing	At least one compressor on
HP	Amber	LED flashing	Together with the ALARM LED identifies an alarm on the compressors
☂	Amber	LED flashing	At least one condenser fan one
HP	Amber	LED flashing	Together with the ALARM LED identifies an alarm on the fans
LP	Amber	LED flashing	Discharge pressure display activated
LP	Amber	LED flashing	Together with the ALARM LED identifies a discharge alarm HP
⚡	Amber	LED flashing	Suction pressure display activated
⚡	Amber	LED flashing	Together with the ALARM LED identifies a suction alarm HL
bar °C	Red	Active alarm	
°C	Amber	Display in bar	
°C	Red	Display in degrees Celsius	

尺寸和定位(mm) / Dimensions and positioning (mm)



电气连接(DIN导轨安装) / Electrical connections (DIN rail mounting)



按钮的功能

按钮	机组状态
Prg mute	a) 当开启装置时按下这个按钮, 直到“DEF”出现在显示屏上, 加载默认值到系统中。 b) 按下这个按钮持续5秒, 设定访问“installer” (安装商) 参数的密码; c) 当显示一个参数的数字值时按下这个按钮, 不保存变更直接退出; d) 在参数列表中时按下这个按钮持续3秒钟, 保存变更后返回到主显示界面 (控制压力/温度); e) 当显示参数组的列表时, “-/-”, “-C-”, “-r-”, “-A-”, “-M-”, 按下这个按钮持续3秒钟, 保存变更后返回到主显示界面 (控制压力/温度)。
bar °C	a) 按下这个按钮持续5秒, 在显示值“BAR”或“°C”之间切换。 b) 在参数列表中时按下这个按钮, 将转到下一个参数。 c) 当显示一个参数的数字值时, 按下这个按钮将增加这个参数的值。 d) 当显示一个数字值(Y-N)时, 按下这个按钮, 变更选择。
Sel	a) 按下这个按钮持续5秒, 设定访问“user” (用户) 参数的密码。 b) 在参数列表中时按下这个按钮, 显示参数的数字值。 c) 当显示一个参数的数字值时, 按下这个按钮保存数字值并返回到参数列表。
HP LP ▼	a) 按下这个按钮, 显示其它控制值。首先显示的是传感器的“标签”, 然后是数字值。 例如: 机组“A”单回路 - 标准LP1 - 箭头用于显示HP-S3 -S4 - 标准LP1 - 箭头用于显示LP2-HP-S4 b) 按下这个按钮持续5秒, 选择要永久显示的传感器作为主传感器。 c) 在参数列表中时按下这个按钮, 将转到上一个参数。 d) 当显示一个参数的数字值时, 按下这个按钮将减少这个参数的值。 e) 当显示一个数字值(Y-N)时, 按下这个按钮, 变更选择。
Prg + mute Sel	同时按下这两个按钮, 设定访问“MANUFACTURER” (工厂) 参数的密码, 从而设置控制器
HP LP ▼	同时按下这两个按钮, 当显示下列参数中的一个的数字值时: 1. 压缩机/风机/变频器设点 2. 高/低阈值 3. 报警阈值 在同一参数的显示单位BAR到°C之间切换

技术规格

“组A”以下列规格定义, 作为下列输出的分组: 压缩机1, 压缩机2, 风机1, 风机2, 报警。

电源	24 Vac, 范围 -15% ~ +10%; 50/60 Hz 最大电流输出: 3 W 与μRack电源串联安装的熔丝: 315 mA 与μRack电源串联安装的熔丝: 315 mA
12 pin 连接器	每个继电器输出的最大电流为2A, 一个输出点可扩充到3A
继电器	在250Vac时的最大电流 EN60730: 阻抗: 3 A, 电感: 2 A cos (φ)= 0.4 60000 次动作 UL: 阻抗: 3 A, 1 FLA, 6 LRA cos (φ)= 0.4 30000 次动作 开关动作之间的最小间隔 (每个继电器): 12秒 (此装置所嵌入的机组制造商必须确保与本规格保持一致的正确设置) 继电器的微型开关类型: 1C 组A内继电器之间的绝缘: 功能性的 组A内继电器与非常低压的部件之间的绝缘: 加强的 组A内继电器与信号继电器之间的绝缘: 初级的 信号继电器和非常低压部件之间的绝缘: 加强的 继电器和前面板之间的绝缘: 加强的 电气标准: 无源触点 到地的闭合电流: 5 mA 最大闭合电阻: 50 W
模拟量输入	B2, B3: CAREL NTC 温度传感器 (在25 °C时为10 kΩ) 响应时间取决于所使用的元器件, 典型的值为90秒 B1: NTC 温度传感器 (在25 °C时为10 kΩ)或CAREL 0~5 V或无源公制比例式压力传感器 B4: CAREL 0~5 V或无源公制比例式压力传感器 用于CAREL MCHRTF****, CONVONOFF*, CONV0/10A* 和 FCS模块的控制信号 脉冲位置的调节 (设定振幅) 或轮值循环的调节。 请参考用户手册中的参数设置 无负载电压: 5 Vdc ± 10% 短路电流: 30 mA 最小输出负载: 1 kΩ
风机输出	
前面板防护等级	IP55
储存条件	-10~70 °C - 相对湿度80%, 无凝露
工作条件	-10~55 °C - 相对湿度<90%, 无凝露
环境污染	正常
耐热和耐火等级	D (UL94 V0)
绝缘材料的PTI	≥250 V
软件结构和类别	A
通过绝缘部件的电应力周期	长

注意: 必须将所有继电器的公共端(C1/2, C3/4)连接在一起, 如图Fig. 1和2所示。

功能性规格	
模拟量输入的分辨率	温度传感器: 量程 -40~80°C, 0.1 °C
温度测量偏差	量程 -20~20°C, ±0.5 °C (除传感器外) 量程 -40~80°C, ±1.5 °C (除传感器外)
压力测量偏差	输入端电压偏差%, 在0.5~4.5 Vdc之间为± 2% (除传感器外)

Functions of the buttons

Button	Unit status
Prg mute	a) Pressing this button when switching the instrument on, until the string “DEF” appears on the display, loads the default values into the system. b) Pressing this button for more than 5 sec sets the password for accessing the INSTALLER parameters. c) Pressing this button when displaying the numeric value of a parameter, exits without saving the changes d) Pressing this button for more than 3 sec when inside the list of parameters, accepts the changes and returns to the main display (control pressure/temperature) e) Pressing this button for more than 3 sec when the list of parameter groups is displayed, “-/-”, “-C-”, “-r-”, “-A-”, “-M-”, accepts the changes and returns to the main display (control pressure/temperature)
bar °C	a) Pressing this button for more than 5 sec toggles between displaying the values in “BAR” or “°C”. b) Pressing this button when inside the list of parameters, moves to the next parameter. c) Pressing this button when displaying the numeric value of a parameter, increases the value. d) Pressing this button when displaying a digital value (Y-N), changes the selection
Sel	a) Pressing this button for more than 5 sec sets the password for accessing the USER parameters. b) Pressing this button when inside the list of parameters, displays the numeric value of the parameter. c) Pressing this button when displaying the numeric value of a parameter, accepts the numeric value and returns to the list of parameters.
HP LP ▼	a) Pressing this button displays the other controlled values. First the “label” of the probe is displayed, and then the numeric value. Example: Unit “A” single circuit -standard LP1 -the arrows are used to display HP-S3 -S4 Unit “B” two circuit -standard LP1 -the arrows are used to display LP2-HP-S4 b) Pressing this button for more than 5 sec selects the probe displayed permanently as the main probe. c) Pressing this button when inside the list of parameters, moves to the previous parameter d) Pressing this button when displaying the numeric value of a parameter, decreases the value. e) Pressing this button when displaying a digital value (Y-N), changes the selection
Prg + mute Sel	Pressing the two buttons indicated together sets the PSW for accessing the MANUFACTURER parameters and configuring the controller.
HP LP ▼	Pressing the two buttons indicated together when the numeric value of one of the following parameters is displayed: 1. comp/fan/inverter set point 2. high/low threshold 3. alarm thresholds toggles the display of the same parameter from BAR to °C.

Technical specifications

“Group A” is defined in the following specifications as the grouping of the following outputs: compressor 1, compressor 2, fan 1, fan 2, alarm.

Power supply	24 Vac, range -15% ~ +10%; 50/60 Hz Maximum current output: 3 W Fuse to be fitted in series with the power supply of the μRack: 315 mA
12-pin connector	Max current 2 A for each relay output, extendable to 3 A for one output
Relays	Max current at 250 Vac: EN60730: Resistive: 3 A, Inductive: 2 A cos (φ)= 0.4 60000 cycles UL: Resistive 3 A, 1 FLA, 6 LRA cos (φ)= 0.4 30000 cycles Minimum interval between switching cycles (each relay): 12 s (the manufacturer of the unit that the device is built into must ensure the correct configuration to respond to this specification) Type of micro-switching of the relay: 1 C Insulation between relays in group A: functional Insulation between relays in group A and the very low voltage parts: reinforced Insulation between relays in group A and the signal relay: primary Insulation between the signal relay and the very low voltage parts: reinforced Insulation between relays and the front panel: reinforced
Digital inputs ID1 to ID5, IDB4	Electrical standard: voltage-free contact Closing current to ground: 5 mA Maximum closing resistance: 50 Ω
Analogue inputs	B1, B2, B3, B4: CAREL NTC temperature probes (10 kΩ at 25 °C) The response time depends on the component used, typical value 90 sec. B1: NTC temp. probes (10 kΩ at 25 °C) or CAREL 0 to 5 V or free contact ratiometric pressure probes B4: CAREL 0 to 5 V or free contact ratiometric pressure probes
Fan output	Control signal for CAREL MCHRTF****, CONVONOFF*, CONV0/10A* and FCS modules. Modulation of impulse position (set amplitude) or modulation of the duty-cycle. Refer to the user manual for the configuration of the parameters Loadless voltage: 5V ± 10% Short-circuit current: 30 mA Minimum output load: 1 kΩ
Front panel index of protection	IP55
Storage conditions	-10T70°C -- humidity 80% r.H., non-condensing
Operating conditions	-10T50°C - humidity <90% r.H., non-condensing
Degree of pollution	normal
Cat. of resist. to heat and fire	D (UL94 V0)
PTI of the insulating materials	≥ 250 V
Class and structure of the software	A
Period of electrical stress	long
across the insulating parts	

Note: All the relays must have the commons (C1/2, C3/4) connected together, as shown in Fig. 1 and 2.

Functional specifications	
Resolution of analogue inputs	Temperature probes: range -40T80°C, 0.1 °C
Temperature measurement error	Range -20T20 °C, ±0.5 °C (excluding probe) Range -40T80 °C, ±1.5 °C (excluding probe)
Pressure measurement error	The voltage % error in the input range of 0.5 to 4.5 Vdc is ± 2% (excluding probe).

本装置 (产品) 必须按照当地关于 “废弃物品处理的强制规范” 单独处理。
“The appliance (or the product) must be disposed of separately in accordance with the local waste disposal legislation in force”



CAREL INDUSTRIES S.r.l. Società Unipersonale
Via dell'Industria, 11 - 35020 Brugine - Padova (Italy)
Tel. (+39) 049.9716611 - Fax (+39) 049.9716600
e-mail: carel@carel.com - www.carel.com

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