MCH200*03 - μC²: 用于2/4压缩机冷水机组（一个或两个回路） 的控制器 / Electronic controller for chillers with 2/4 compressors (one and two circuits)

CAREL

阅读并保存
这份指导说明书
READ AND SAVE
THESE INSTRUCTIONS

配置图示例 / Configuration example

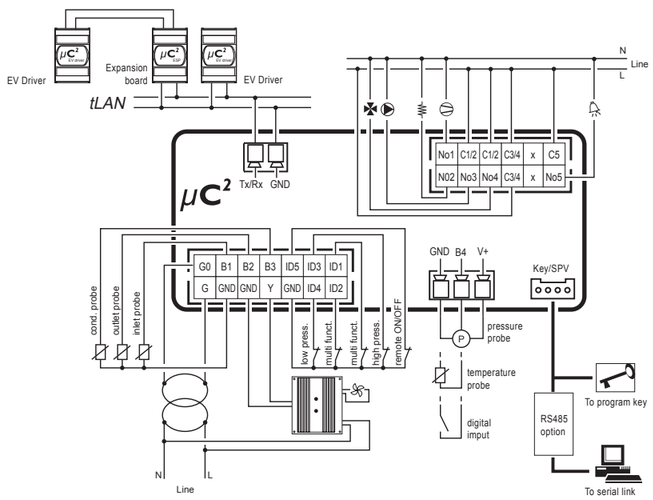


Fig. 1

配置图示例 / Configuration example

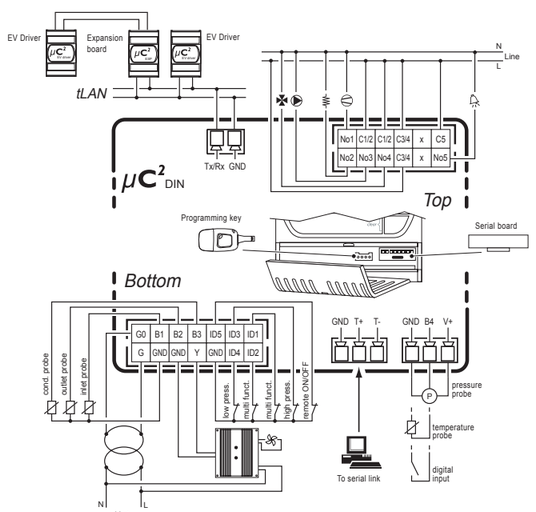


Fig. 2

RC 感谢您选择卡乐产品，我们相信您会对卡乐产品感到满意！

前言

μC²是可编程电子控制器，它用于全面管理那些一个回路(两个涡旋压缩机)的冷水机组、热泵、冷凝机组和风/风机组。其扩展卡 (代码. MCH200002*) 允许最多管理两个回路和四个涡旋压缩机。

连接器的特点

阴性接头(MCH2CON0**)及线缆可以从CAREL 单独购买或者从厂商Molex购买:

接头 Molex代码	插针数量
39-01-2120	12
39-01-2140	14

插针数量为12和14的连接器的触点代码和允许的线缆横截面积 (压线操作请使用代码为69008-0724的专用Molex工具):

Molex触点代码	允许的线缆横截面积
39-00-0077	AWG16 (1.25 mm²)
39-00-0038	AWG18-24 (0.90-0.35 mm²)
39-00-0046	AWG22-28 (0.22-0.06 mm²)

最大通/断数： 25个循环。

卡乐可提供预先压好的线材组件，代码是MCHSMLC***.

装配说明

NTC/公制比例传感器的最大长度:	10 m
开关量输入连接线缆的最大长度:	10 m
电源输出连接线缆的最大长度:	5 m
风扇控制输出连接线缆的最大长度:	5 m
电源线的最大长度:	3 m
tLAN连接线的最大长度:	10 m

某些输入输出的使用是由参数的配置来确定的。

配置图示例

连接端子排	连接端口	描述
14 针	G-G0	μC²电源
	B1-GND	环境温度传感器（风-风机组），水冷蒸发器进口温度传感器（水冷机组），送风温度传感器
	B2-GND	蒸发器出水温度传感器，防冻加热器控制
	B3-GND	水冷压力传感器，辅助电加热
	ID1-GND	通过参数P8设置输入功能（参看用户手册）
	ID2-GND	通过参数P9设置输入功能（参看用户手册）
	ID3-GND	高压开关
	ID4-GND	低压开关
	ID5-GND	来自外部触点的开机/待机信号，或作为冷凝机组逆向循环运行信号
	Y-GND	PWM信号输出，用作冷凝风机控制
12 针	No1- C1/2	压缩机1
	No2- C1/2	辅助电加热/四通阀1（参数H11）
	No3- C3/4	蒸发器水泵/（风机）(风-风机组)（参数H11）
	No4- C3/4	压缩机2/压缩机1能量控制/四通阀1（参数H11）
	No5- C5	报警
可拆卸2针端子(tLAN)	TxRx - GND	配有一个扩展板可以连接到μC2上用于控制第二回路（代码MCH00002*）和电子膨胀阀驱动模块EVD000040*
可拆卸3针端子(B4/DB4)	B4-GND(V+公制有源压力传感器的电源端)	开关量输入IDB4（参数P13）/公制冷凝压力传感器/室外温度传感器。通过参数"/4"进行配置

参数化编程钥匙选件

面板安装型：在断开控制器电源的情况下，把PSOPZKEY00插入 KEY/SPV 接口。使用可拆卸12针接头（继电器）连接或断开串行选件和编程钥匙。
DIN导轨安装型：在断开控制器电源的情况下，移开底部的封盖把PSOPZKEY00插入专门的接口
注意：配置跳线必须插在A位置（参看技术（MCH200485*）

监控选件

面板安装型： 连接串行选件（MCH200485*）至接口KEY/SPV
DIN导轨安装型：移开底部的封盖，在专门的接口插入监视卡FCSER00000
将485屏蔽电缆（2芯屏蔽）与GND,T+,T-端口连接

警告：

•如果使用寿命单个变压器给μC²SE和其附件供电，为了避免损坏设备，把不同控制器或主控制板上的所有G0端口连接到变压器的次线圈的同一端口上；所有G端口连接到变压器次圈的另一个端口上。
•对于居住环境中使用，需要使用屏蔽电缆用于tLAN连接（N55014-1）。
•避免V+和GND间短路，不要损坏设备。
•把电力电缆与传感器，开关量输入和串行电缆分开。
•使用单独的变压器给电子控制器供电。

抗电击保护和维护注意

在装配，维护和更换设备前需要断开电源。
系统由控制板（MCH200*03*）和其它的选件卡（MCH200002*，MCH200485*，MCHRTF****，CONVONOFF*，CONV0/10a*，EVD000040*），这些设备是整合到I类或I I类设备内。抗电击等级由制造商根据系统的控制设备整合。为了避免因错误的接线引起短路；制造商必须确保设备内控制内置含有该方面的保护。

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

Introduction

The μC² is an electronic controller for the complete management of chillers, heat pumps, condensing units and air/air units with one circuit and 2 hermetic compressors. The expansion board (code MCH200002*) allows the management of up to 2 circuits and 4 hermetic compressors.

Characteristics of the connectors

The connectors can be purchased separately from CAREL (MCH2CON0**) or from the manufacturer, Molex:

Molex connector code	number of pins
39-01-2120	12
39-01-2140	14

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 contact code	Cross-section of the cables allowed
39-00-0077	AWG16 (1.25 mm²)
39-00-0038	AWG18-24 (0.90-0.35 mm²)
39-00-0046	AWG22-28 (0.22-0.06 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
Maximum length of tLAN connection cables:	10 m

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

Configuration example

Connector	Connection	Meaning
14 pin	G-G0	μC2 power supply
	B1-GND	Ambient air probe (air-air units), evaporator water inlet probe (water chillers), outlet air probe
	B2-GND	Evaporator water outlet probe, anti-freeze heater control
	B3-GND	Condensing pressure control probe, auxiliary heater
	ID1-GND	Multifunction input configured by parameter P8 (see user manual)
	ID2-GND	Multifunction input configured by parameter P9 (see user manual)
	ID3-GND	High pressure switch
	ID4-GND	Low pressure switch
	ID5-GND	ON/STANDBY from external contact, reverse cycle in operation as condensing unit
	Y-GND	PWM output for condenser fan module operation
12 pin	No1- C1/2	Compressor 1
	No2- C1/2	Auxiliary heater/ reversing valve 1 (parameter H11)
	No3- C3/4	Evaporator pump /(fan) (air/air units) (parameter H11)
	No4- C3/4	Compressor 2 / capacity-control comp. 1 / reversing valve 1 (parameter H11)
	No5- C5	Alarm
removable 2 pin (tLAN)	TxRx - GND	It allows connecting μC2 with the expansion board for the management of the second circuit (code MCH00002*) and valve driver module EVD000040*
removable 3 pin (B4/IDB4)	B4 - GND (V+ power supply ratiometric probe)	Digital input IDB4 (parameter P13)/ Ratiometric condensing pressure probe / Outside temperature probe Can be configured by parameter "/4"

Parameter programming key option

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.

Note: the configuration jumper must be inserted in position A (technical leaflet MCH200485*)

Supervisor option

Connect the serial option (code MCH200485*) to the connector KEY/SPV.

Warnings

- If using a single power transformer for the μC²SE 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;
- For use in residential environments, a shielded cable (conductor + shield) is required for the tLAN connections (EN 55014-1);
- 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 (MCH200*03*) 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.

用户界面/ User interface

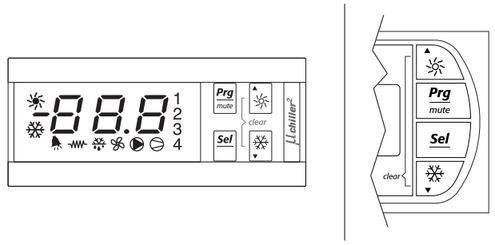
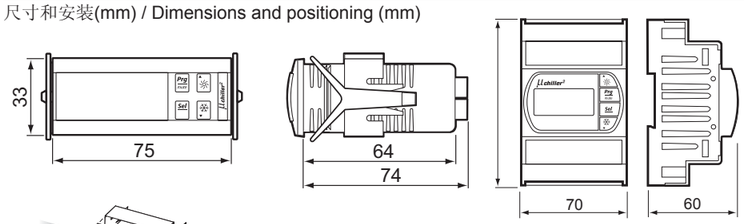
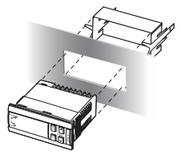


Fig. 3

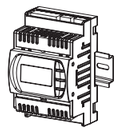
尺寸和安装(mm) / Dimensions and positioning (mm)





面板安装
panel mounting

全部尺寸/overall dimensions 91.5x36.5mm



din 导轨安装
din rail mounting

Fig. 4

继电器触点电气特性
Electrical specifications of the relay contacts

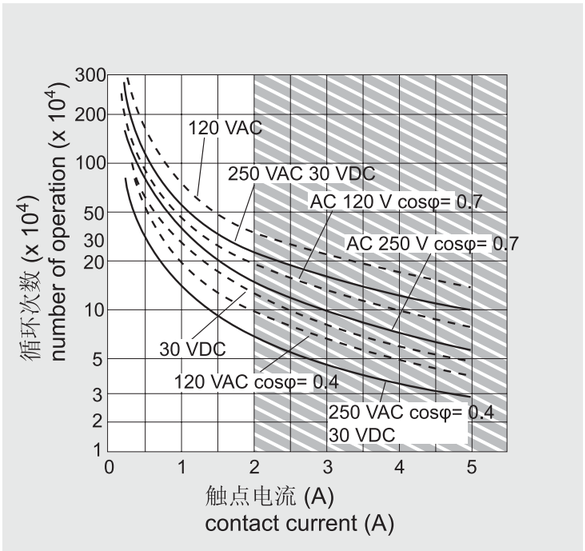


Fig. 5

废品处理

该装置（或产品）必须按照当地现行的废品处置方法进行单独处理

Disposal of the product

The appliance (for the product) must be disposed of separately in acordance with the local waste disposal legislation in force.

用户界面

三位数码显示（有正负号和小数点），黄色运行信号和红色报警信号。

图标	颜色	含义		参考回路
		LED灯亮	LED闪烁	
1,2	黄色	压缩机1和/或2开机	启动请求	1
3,4	黄色	压缩机3和/或4开机	启动请求	2
	黄色	至少有一个压缩机开机		1和/或2
	黄色	水泵/出风风机开启		1和/或2
	黄色	冷凝风机开机		1和/或2
	黄色	除霜动作	启动请求	1和/或2
	黄色	电加热工作		1和/或2
	红色	报警动作		1和/或2
	黄色	热泵模式 (P6= 0)		1和2
	黄色	制冷模式 (P6= 0)		1和2

按键功能

按键	机组状态	按键按压模式
Prg mute	上载默认值	机组上电时按压
	可进入编程区域，直到退出（保存更改至E2PROM）	按压一次
	在报警事件中，蜂鸣器消音（如存在），取消报警继电器	按压一次
Sel	访问直接参数	按压5秒
	选择编程项，显示直接参数的值/确认参数的更改	按压一次
Prg mute + Sel	输入口令后的编程参数	按压5秒
	在编程区域选择高级项目	按压一次或一直按
	增加数值	按压一次或一直按
	从待机状态转成制冷状态（P6=0）和相反	按压5秒
	在编程区域选择低级项目	按压一次或一直按
	减少数值	按压一次或一直按
	从待机状态转成热泵状态（P6=0）和相反	按压5秒
+	手动报警复位	按压5秒
	立即复位小时计时器	按压5秒
Sel +	两个回路强制手动除霜	按压5秒

技术参数

“A组”在下面的技术参数中定义成如下输出组：阀，水泵，压缩机，电加热器。

电源	24 Vac, –15+10 %; 50/60 Hz
	最大电流输出: 3 W
	μC²回路上的所配保险丝为: 315 mAT
12针接头	每一个继电器输出的最大电流为2A；有一个输出可扩大为3A
继电器	在250Vac情况下:
	EN60730：电阻：3A；电感: 2 A cos φ= 0.4 60000循环
	UL：电阻：3A，1FLA , 6 LRA cos φ= 0.4 30000循环
	对于更多信息参看图5特性图
	开关循环间（每一个继电器）的最小间隔：12S
	继电器的微型开关类型：1C
	继电器A组的间的绝缘：基本型
	继电器A组与低压绝缘部间的绝缘：增强型
	继电器A组与信号继电器间的绝缘：初级
	信号继电器与低压绝缘部间的绝缘：增强型
	继电器与前面板间的绝缘：增强型
开关量输入 ID1...ID5, IDB4	电气标准：无源干触点
	对地闭合电流：5mA
	最大闭合电阻：50W
模拟量输入	B1，B2，B3，B4：卡乐NTC型温度传感器（25℃时10kW）
	反应时间取决于所使用的元件，典型数值是90S
	B4：NTC型传感器（25℃时10kW）或卡乐0-5V电源温度传感器或无源触点型公制压力传感器
风机输出	卡乐MCHRTF****,CONVONOFF*和CONV0/10A*R的控制信号
	脉冲信号调节（设置振幅）或值日循环调节，参看用户手册的配置参数部分
	无负载电压：5V±10%
	短路电流：30mA
	最小输出负载：1KW
前面板防护等级	IP55
存储条件	-10-70 °C - 湿度 80% rH;无凝露
运行条件	-10T55 °C - 湿度 <90% rH;无凝露
污染等级	正常
阻燃特性	D (UL94 V0)
绝缘材料的PTI	≥ 250 V
软件结构和等级	A
绝缘部件抗电击周期	长

注意：所有继电器的公共端（C1/C2,C3/C4）必须连接在一起，参看图2。

功能方面技术参数

模拟量输入精度	温度传感器：范围 -40-80 °C, 0.1 °C
温度测量误差	范围 -20-20 °C, ±0.5 °C (不包括传感器)
	范围 -40-80 °C, ±1.5 °C (不包括传感器)
压力测量误差	输入范围为0.5—4.5Vdc的电压误差为±2%(不包括传感器)。根据参数的设置/9，/10，/11，/12，转换的数值可能有变化（参看用户手册）

User interface

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

Symbol	Colour	Meaning		Reference refrigerant circuit
		with LED on	with LED flashing	
1,2	Amber	Compressor 1 and/or 2 On	Start request	1
3,4	Amber	Compressor 3 and/or 4 On	Start request	2
	Amber	At least one compressor on		1 and/or 2
	Amber	Pump/air outlet fan on		1 and/or 2
	Amber	Condenser fan on		1 and/or 2
	Amber	Defrost active	Defrost request	1 and/or 2
	Amber	Heater on		1 and/or 2
	Red	Alarm active		1 and/or 2
	Amber	Heat pump mode (P6=0)		1 and 2
	Amber	Chiller mode (P6=0)		1 and 2

Functions of the buttons

Button	Unit status	Button press mode
Prg mute	Loading default values	Press at power on
	Go up a sub-group inside the programming area, until exiting (saving changes to E2PROM)	Press once
	In the event of alarms, mute the buzzer (if present) and deactivate the alarm relay	Press once
Sel	Access the direct parameters	Press for 5 s
	Select item inside the programming area and display value of direct parameters / confirm the changes to the parameter	Press once
Prg mute + Sel	Program parameters after entering password	Press for 5 s
	Select top item inside the programming area	Press once or press and hold
	Increase value	Press once or press and hold
	Switch from standby to chiller mode (P6=0) and vice-versa	Press for 5 s
	Select bottom item inside the programming area	Press once or press and hold
	Decrease value	Press once or press and hold
	Switch from standby to heat pump mode (P6=0) and vice-versa	Press for 5 s
+	Manual alarm reset	Press for 5 s
	Immediately reset the hour counter (inside the programming area)	Press for 5 s
Sel +	Force manual defrost on both circuits	Press for 5 s

Technical specifications

“Group A” is defined in the following specifications as the grouping of the following outputs: valve, pump, compressor, heater.

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 μC2: 315 mAT
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 cosφ= 0.4 60000 cycles
	UL: Resistive 3 A, 1 FLA , 6 LRA cos φ= 0.4 30000 cycles
	For further information, refer to the characteristic shown in Fig. 5
	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 W
Analogue inputs	B1, B2, B3, B4: CAREL NTC temperature probes (10 kW at 25 °C)
	The response time depends on the component used, typical value 90 s
	B4: NTC temp. probes (10 kW at 25 °C) or CAREL 0 to 5 V or free contact ratiometric pressure probes
Fan output	Control signal for CAREL MCHRTF****, CONVONOFF* and CONV0/10A* 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 kW
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 across the insulating parts	long

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

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). The error in the converted value may vary according to the setting of the parameters /9, /10, /11, /12 (see user manual)

CAREL S.p.A.
Via dell'Industria, 11 - 35020 Brugine - Padova (Italy)
Tel. (+39) 0499716611 – Fax (+39) 0499716600
http://www.carel.com – e-mail: carel@carel.com

+05C002870 - rel. 1.3 - 17.11.2005