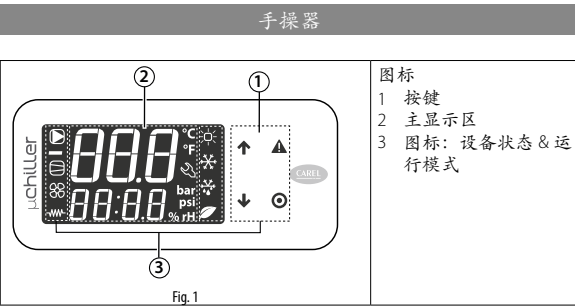


μChiller 冷水/热泵机组电子控制器/ Electronic control for chiller and heat pump



CHI 说明

μChiller是CAREL为全面控制风/水和水/水冷水机组以及热泵机组而开发的新解决方案。最高配置可管理每个回路2台压缩机(开/关式或BLDC变频压缩机)，最多可控制2个回路(在回路2上采用输入和输出点扩展卡)。μChiller最突出的元素在于通过电子膨胀阀和无刷DC压缩机的集成管理实现高效的全面控制，从而确保更好地保护压缩机以及更出色的稳定性，机组的高效率。使用手操器可以利用移动设备进行无线通讯，可集成到板载型，如果采用DIN导轨安装型，则需单独订购。CAREL "APPLICA" 应用，可在Google Play中下载，适用于Android操作系统，进行设施的参数配置以及现场机组调试。详细操作说明请参考μChiller用户手册+ 0300053EN，采购前即可从www.carel.com网站下载。



图标	功能	开启动作	闪烁
	系统泵	动作	手动操作
	源设备状态状态(泵/风机)	动作	手动操作
	压缩机状态	动作	手动操作 (带ExV)
	防雾加热	动作	-
	运行模式	制热	-
		制冷	高温报警
		除霜	除霜后滴水
	服务	自然冷却	-
		超出运行时间外的服务请求	严重报警，需要资质人员处理

按键	UP	DOWN	Alarm	PRG
	功能 浏览：前一个参数 参数设定：增加显示的值	浏览：下一个参数 参数设定：减少显示的值 主菜单： 短时按下：显示机组概况 按下并持续3秒：进入用户信息参数(设定值，机组开-关...)	短时按下：显示动作的报警和使蜂鸣器静音 按下并持续3秒：报警复位 浏览时：进入参数设定菜单 参数设置时： • 短时按下：确认值 • 按下并持续3秒：返回到主菜单	

移动设备

"Applica" 应用可以用于通过移动设备(智能手机，平板电脑)配置μChiller控制器，采用NFC (近场通信)或BLE (或低功耗蓝牙)技术。步骤(修改参数)如下：

- 从Google应用商店下载Android适用的CAREL "Applica"应用；
- (在移动设备上)启用NFC/蓝牙通信以及数据连接；
- 打开引用；

使用NFC

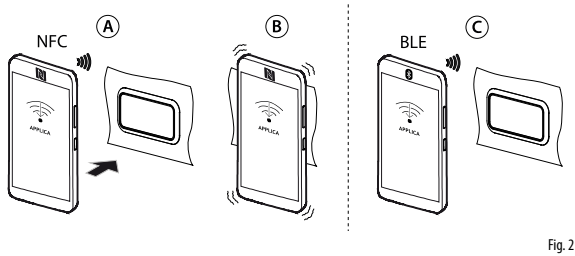
- 将移动设备靠近手操器，最长距离10 mm，以识别配置(Fig. 2 - ref. A)；
- 输入密码(*)；
- 设定所需的参数；
- 将移动设备再次靠近手操器以上载配置参数(Fig. 2 - ref. B)；

使用BLE

- 将移动设备靠近手操器，最长距离10 m，以识别配置(Fig. 2 - ref. C)；
- 输入密码(*)；
- 设定所需的参数；

(*)由冷水机组制造商预分配，为授权服务技术员进行维护专用。

重要：第一次连接时，应用程序通过云连接使其自身与μChiller控制器上的软件版本匹配；这表明至少第一次连接需要移动数据连接。



调试

初次调试的步骤请参考下述说明。

准备

在第一次配置机组前，请先访问KSA (ksa.carel.com)，选择"Configurations" (配置)文件夹，并且：

- 对于μChiller标准版和加强版(使用开/关压缩机)，选择"Refrigerants" (制冷剂)模块，然后是机组充注的制冷剂；
- 对于HE型(使用BLDC压缩机)，导入BLDC配置，选择"BLDC compressors" (BLDC压缩机)模板，然后是安装在机组上的压缩机品牌和型号(已经包含了制冷剂设定)
- 将下载的配置导入到移动设备中。

配置

- 启动应用并进入Manufacturer(制造商)和Service(服务)界面；
- 选择Set-up -> Configuration(设定->配置)并点击+ 图标图标(如图)



- 使用菜单(Fig. a)选择并应用所需的配置；
- 选择Unit Set-up(机组设定) (Fig. b)进行完整的配置(Fig c)。



报警表	
代码	说明
A001	机组：无永久内存写入
A002	机组：永久内存写入
A003	机组：数字量输入点远程报警
A004	机组：传感器远程设定点
A005	机组：用户回水温度传感器
A006	机组：用户供水温度传感器
A008	机组：用户泵1过载
A009	机组：用户泵2过载
A10	机组：流量开关(用户泵1是动作的)
A11	机组：流量开关(用户泵2是动作的)
A12	机组：用户泵组
A13	机组：用户泵1维护
A14	机组：用户泵2维护
A15	机组：高冷却的水温
A16	机组：源回水/回风温度传感器
A17	机组：源泵1维护
A18	机组：自然冷却警告
A19	回路1：排气压力传感器
A20	回路1：冷凝温度传感器
A21	回路1：吸气压力传感器
A22	回路1：蒸发温度传感器
A23	回路1：排气温度传感器
A24	回路1：吸气温度传感器
A25	回路1：高压开关
A26	回路1：高压变速器
A27	回路1：低压变速器
A28	回路1：防雾保护蒸发温度
A30	回路1：压缩机1过载
A31	回路1：压缩机2过载
A32	回路1：压缩机1维护
A33	回路1：压缩机2维护
A34	回路1：源风机维护
A35	EVD回路1：LowSH
A36	EVD回路1：LOP
A37	EVD回路1：MOP
A38	EVD回路1：电机故障
A39	EVD回路1：紧急关闭
A40	EVD回路1：阀门完全关闭
A41	EVD回路1：拌线
A42	回路1：区间报警 + 区域报警
A43	BLDC回路1：启动时高压差分
A44	BLDC回路1：启动时失败
A45	BLDC回路1：低压差分
A46	BLDC回路1：高排气温度
A47	速度驱动器1：拌线
A48	速度驱动器1：报警 + 故障代码
A49	机组：从机拌线
A50	从机：无永久内存写入
A51	从机：永久内存写入
A52	回路2：排气压力传感器
A53	回路2：冷凝温度传感器
A54	回路2：吸气压力传感器
A55	回路2：蒸发温度传感器
A56	回路2：排气温度传感器
A57	回路2：吸气温度传感器
A58	回路2：高压开关
A59	回路2：高压变速器
A60	回路2：低压变速器
A61	回路2：防雾保护蒸发温度
A63	回路2：压缩机1过载
A64	回路2：压缩机2过载
A65	回路2：压缩机1维护
A66	回路2：压缩机2维护
A67	回路2：源风机维护
A68	EVD回路2：LowSH
A69	EVD回路2：LOP
A70	EVD回路2：MOP
A71	EVD回路2：电机故障
A72	EVD回路2：紧急关闭
A73	EVD回路2：阀门完全关闭
A74	EVD回路2：拌线
A75	回路2：区间报警 + 区域报警
A76	BLDC回路2：启动时高压差分
A77	BLDC回路2：启动时失败
A78	BLDC回路2：低压差分
A79	BLDC回路2：高排气温度
A80	速度驱动器2：拌线
A81	速度驱动器2：报警 + 故障代码

技术规格(适用于两个型号)

技术规格, μChiller面板安装型和DIN导轨安装型	
物理规格	
尺寸	参考附图
外壳	聚碳酸酯
装配	UCHBP*: 面板安装型 UCHBD*: DIN导轨安装型
球压测试温度	125°C
防护等级	IP20 (背板，面板安装型) IP65 (前盖板，面板安装型) IP00 (DIN导轨安装型)
表面清洁	使用温和的，非磨损织物和中性清洁剂或水

环境条件	
运行条件	-20~60°C, <90% RH 无凝露
储存条件	-40~85°C, <90% RH 无凝露

电气规格	
额定电压	SELV或PELV 2类电源
工作电压	24 Vac/dc, +10% -15%;

输入频率	50/60Hz
最大电流消耗	600 mArms
最小功耗	400mW
时钟	精度 ± 50ppm; 停机后日期/时间保持：72小时
软件等级和结构	A
环境污染等级	3
抗电击保护等级	集成中 I或 II设备
动作和断开类型	I.C
额定脉冲电压	继电器输出：4kV; 24 V 输入0.5 kV
浪涌抗扰度类别	浪涌抗扰度 III类； 24 V输入： II类
控制设备结构	集成设备
连接端子	即插式
控制目的	接线尺寸：参考连接端子表 电子操作控制

用户手操器	
蜂鸣器	面板安装型：集成 DIN导轨安装型：控制器不内置，集成在用户手操器上
显示屏	LED 2行，小数点，多功能图标

通讯	
NFC	最大距离10mm，根据所用的移动设备会变动
低功耗蓝牙	最大距离10m，根据所用的移动设备会变动
BMS串接口	Modbus RS485通讯，非光隔离
FieldBUS串接口	Modbus RS485通讯，非光隔离
HMI接口	Modbus RS485通讯，非光隔离

模拟量输入 (最长距离=10m)	
Ref.	
J2	S1, S2, S3: NTC S5: 0-5V rat /4-20 mA / NTC S4: 0-5V rat /4-20 mA / NTC S6: NTC / 0-5 Vrat / 0-10V / 4-20 mA S7: NTC - 仅DIN导轨安装型适用
	NTC：精度0.1°C；10k Ω @ 25°C； 容差：±1°C，量程 -50T50°C； ±3°C，量程50T90°C 0-10 V：容差为满量程的2%；一般为1% 4-20mA：容差为满量程的5%；一般为1% 0-10 V：容差为满量程的2%；一般为1%

数字量输入	
Ref.	
J2	ID1 (*)
J2	ID2
J3	ID3 (*), ID4, ID5,
J9	ID6 - 仅DIN导轨安装型适用
	无源触点，非光隔离，常闭电流6 mA， 触点打开电压：13 V， 触点电阻最大为50 Ω (*) 快速数字量输入：0-2 kHz；容差为满量程的2%

阀输出	
Ref.	
J14	仅DIN导轨安装型适用
	CAREL E*V 单对极阀电源：最小13 Vdc，线圈电阻40 Ω

模拟量输出	
Ref.	
J2	Y1, Y2
	0-10V: 10 mA最大

数字量输出	
Ref.	
J6	NO1 (5A), NO2 (5A), NO3 (5A), NO4 (5A)
J7	NO5 (5A)
J11	NO6 (5A) - 仅DIN导轨安装型适用
	5A: EN60730: 5 A 阻抗, 250 Vac, 5万次动作; 4(1), 230 Vac, 100k cycles; 3 (1), 230 Vac, 10万次动作 UL60730: 5 A 阻抗, 250 Vac, 3万次动作; 1 FLA, 6 LRA, 250 Vac, 3万次动作; Pilot Duty C300, 3万次动作

备注：NO1, NO2, NO3和NO4触点的电流消耗不能超过8A。

紧急供电	
Ref.	
J10	超级电容模块(可选的，仅DIN导轨安装型适用)
	13 Vdc +/-10%

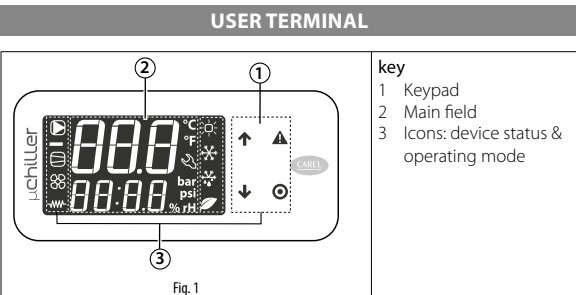
传感器和接线端电源	
5V	5 Vdc ± 2%向0 ~ 5 V公制比率式传感器供电。最大传输电流：10 mA，短路保护
+V	8-11 V向4-20 mA电流传感器供电。最大传输电流：25 mA，短路保护
J8	13 Vdc ± 10%向手操器供电
VL	未使用

线缆长度	
模拟量输入/输出，数字量输入/输出，传感器电源	<10m (*) (**) (*)对于面板安装型，如果在住宅环境中使用VL电源，线缆最长为2 m (**)对于115 Vac DIN导轨安装型，如果在住宅环境中使用+V电源，线缆最长为2 m
阀	< 2 m, < 6 m 使用屏蔽线
BMS和Fieldbus串行线	<500m，使用屏蔽线

合规性	
电气安全	EN/UL 60730-1, EN/UL 60335-1
电磁兼容性	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4
与可然制冷剂气体应用	EN/UL 60079-15, EN/UL 60335-2-34, EN/UL 60335-2-40, EN/UL 60335-2-89
无线	RED, FCC, IC

ENG **Description**

μChiller is the Carel solution for complete management of air/water and water/water chillers and heat pumps. The maximum configuration manages 2 compressors per circuit (On/Off or BLDC), up to a maximum of 2 circuits (using an expansion card for the inputs and outputs on circuit 2). The distinctive element of μChiller is complete control of high-efficiency units through integrated management of electronic expansion valves and brushless DC compressor, thus ensuring greater compressor protection and reliability, together with high unit efficiency. The user terminal allows wireless connectivity with mobile devices and is integrated into the panel-mounted models, or purchased separately on DIN rail mounted models. The CAREL "APPLICA" app, available on Google Play for the Android operating system, facilitates configuration of the parameters and unit commissioning in the field. The operation of μChiller is described in the user manual + 0300053EN downloadable, even prior to purchase, from the website www.carel.com.



Icons			
Icon	Function	On	Flashing
	System pump	Active	Manual operation
	Source device status (pump/fan)	Active	Manual operation
	Compressor status	Active	Manual operation (with ExV)
	Frost protection heater	Active	-
	Operating mode	Heating	-
		Cooling	High water temperature alarm
		Defrost	Dripping after defrost
	Service	Free cooling	-
		Service request on exceeding operating hours	Serious alarm, action required by qualified personnel

Keypad	
Button	Function
	UP Navigation: previous parameter Parameter setting: increase value
	DOWN Navigation: next parameter Parameter setting: decrease value displayed.
	MAIN MENU: Pressed briefly: unit overview display Pressed and held (3 s): access user profile parameters (set point, unit on-off, ...)
	Alarm Pressed briefly: display active alarms and mute buzzer. Pressed and held (3 s): reset alarms.
	PRG During navigation: access the parameter setting menu During parameter setting: • pressed briefly: confirm the value • pressed and held (3 s): return to the main menu

MOBILE DEVICE

The "Applica" app can be used to configure the μChiller controller from a mobile device (smartphone, tablet), via NFC (Near Field Communication) or BLE (Bluetooth Low Energy). Procedure (modify parameters):

- download the CAREL "Applica" app for Android devices from Google Play Store;
- (on the mobile device) activate NFC/Bluetooth communication and data connection;
- open Applica;

Using NFC

- move the mobile device near to the user terminal, maximum distance 10 mm, so as to recognise the configuration (Fig. 2 - ref. A);
- enter the password (*);
- set the parameters as needed;
- move the mobile device near to the user terminal again to upload the configuration parameters (Fig. 2 - ref. B);

Using BLE

- move the mobile device near to the user terminal, maximum distance 10 m, to recognise the configuration (Fig. 2 - ref. C);
- enter the password (*);
- set the parameters as needed.

(*) pre-assigned by the chiller manufacturer to allow maintenance only by authorised service technicians.

Important: during the first connection, Applca aligns itself with the software version on the µChiller controller via a cloud connection; this means a mobile data connection is needed at least for this first connection.

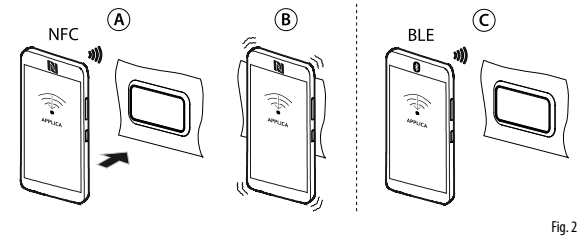


Fig.2

COMMISSIONING

The procedure for initial commissioning is described below.

PREPARATION

Before configuring the unit the first time, access KSA (ksa.carel.com), select the "Configurations" folder and:

- for the µChiller Standard and Enhanced models (with On/Off compressor) select the "Refrigerants" section and then the refrigerant charged in the unit;
- for HE models (with BLDC compressor), import the BLDC configuration, selecting the "BLDC compressors" section and then the brand and model of compressor installed on the unit (this already includes the refrigerant setting)
- import the downloaded configuration into the mobile device.

CONFIGURATION

- start Applca and access the Manufacturer and Service profiles;
- select Set-up -> Configuration and click the + icon (see image)



- use the menu (Fig. a) to select and apply the desired configuration;
- select Unit Set-up (Fig. b) to proceed with the complete configuration (Fig c).



ALARM TABLE

Code	Description
A001	Unit: no. permanent memory writes
A002	Unit: permanent memory writes
A003	Unit: remote alarm from digital input
A004	Unit: remote set point probe
A005	Unit: user return water temperature probe
A006	Unit: user delivery water temperature probe
A008	Unit: user pump 1 overload
A009	Unit: user pump 2 overload
A10	Unit: flow switch (with user pump 1 active)
A11	Unit: flow switch (with user pump 2 active)
A12	Unit: user pump group
A13	Unit: user pump 1 maintenance
A14	Unit: user pump 2 maintenance
A15	Unit: high chilled water temperature
A16	Unit: source return water/air temperature probe
A17	Unit: source pump 1 maintenance
A18	Unit: free cooling warning
A19	Circuit 1: discharge pressure probe
A20	Circuit 1: condensing temperature probe
A21	Circuit 1: suction pressure probe
A22	Circuit 1: evaporation temperature probe
A23	Circuit 1: discharge temperature probe
A24	Circuit 1: suction temperature probe
A25	Circuit 1: high pressure switch
A26	Circuit 1: high pressure transducer
A27	Circuit 1: low pressure transducer
A28	Circuit 1: frost protection evaporation temperature
A30	Circuit 1: compressor 1 overload
A31	Circuit 1: compressor 2 overload
A32	Circuit 1: compressor 1 maintenance
A33	Circuit 1: compressor 2 maintenance

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Disposal of the product: The appliance (or the product) must be disposed of separately in accordance with the local waste disposal legislation in force.

产品处置：本装置(或产品)必须依照当地关于废弃物处理的有效法规单独进行处理。

Connectivity	
NFC	Max distance 10mm, variable according to the mobile device used
Bluetooth Low Energy	Max distance 10m, variable according to the mobile device used
BMS serial interface	Modbus over RS485, not opto-isolated
FieldBUS serial interface	Modbus over RS485, not opto-isolated
HMI interface	Modbus over RS485, not opto-isolated

Analogue inputs (Lmax=10m)

Ref.		
J2	S1, S2, S3: NTC S5: 0-5V rat /4-20 mA / NTC S4: 0-5V rat /4-20 mA / NTC S6: NTC / 0-5 Vrat / 0-10 V / 4-20 mA	NTC: resolution 0.1° C; 10k @ 25°C; error: ±1°C in the range -50T50°C, ±3°C in the range 50T90°C 0-10 V: error 2% fs, typical 1% 4-20mA: error 5% fs, typical 1% 0-10 V: error 2% fs, typical 1%
J9	S7: NTC - available only on DIN version	

Digital inputs

Ref.		
J2	ID1 (*)	Voltage-free contact, not opto-isolated, typical closing current 6 mA,
J2	ID2	
J3	ID3 (*), ID4, ID5,	open contact voltage 13 V, contact resistance max 50 Ω.
J9	ID6 - available only on DIN version	(*) Fast digital input: 0-2 kHz; error 2% fs

Valve output

Ref.		
J14	available only on DIN version	CAREL E°V unipolar valve power supply: 13 Vdc, min. winding resistance 40 Ω

Analogue outputs

Ref.		
J2	Y1, Y2	0-10V: 10 mA max

Digital outputs

Ref.		
J6	NO1 (5A), NO2 (5A), NO3 (5A), NO4 (5A)	5A: EN60730: 5 A resistive, 250 Vac, 50k cycles; 4(1), 230 Vac, 100k cycles; 3 (1), 230 Vac, 100k cycles
J7	NO5 (5A)	
J11	NO6 (5A)- available only on DIN version	UL60730: 5 A resistive, 250 Vac, 30k cycles; 1 FLA, 6 LRA, 250 Vac, 30k cycles; Pilot Duty C300, 30k cycles

Note: the sum of the current drawn by NO1, NO2, NO3 and NO4 must not exceed 8A.

Emergency power supply

Ref.		
J10	Ultracap module (optional, only available on the DIN versions)	13 Vdc +/-10% the DIN versions)

Probe and terminal power supply

5V	5 Vdc ± 2% to power the 0 to 5 V ratiometric probes. Maximum current delivered: 10 mA protected against short-circuits
+V	8-11 V to power the 4-20 mA current probes. Max current delivered: 25 mA protected against short-circuits
J8	13 Vdc ± 10% to power the user terminal
VL	not used

Cable lengths

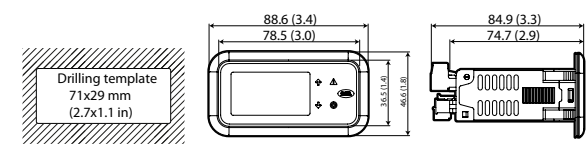
	<10m (*) (**) (*) in the panel version, if using the VL power supply in household environments, the maximum cable length is 2 m. (**) in the DIN version powered at 115 Vac, if using +V in household environments, the maximum cable length is 2 m.
Valve	< 2 m, < 6 m with shielded cable
BMS and Fieldbus serial cables	<500m with shielded cable

Conformity

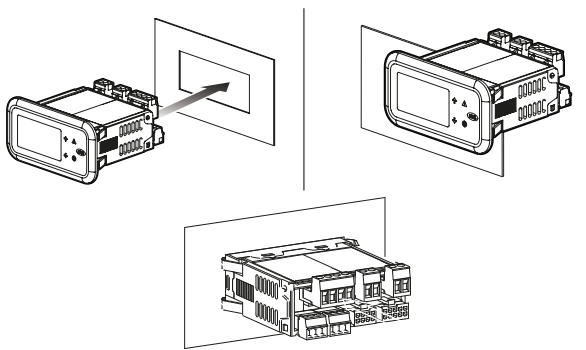
Electrical safety	EN/UL 60730-1, EN/UL 60335-1
Electromagnetic compatibility	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4
Applications with flammable refrigerant gases	EN/UL 60079-15, EN/UL 60335-2-34, EN/UL 60335-2-40, EN/UL 60335-2-89
Wireless	RED, FCC, IC

面板安装型 / PANEL MOUNTIG MODEL

尺寸 / Dimensions - mm (in)



安装 / Mounting



将控制器放到开孔中，轻轻按下侧面的卡扣，然后是前盖板，直到控制器完全插入(侧面卡扣将弯曲，卡钩将控制器固定在面板上)。重要：前盖板防护等级IP65仅当下列条件满足后才能达到：

- 矩形开孔与水平面最大偏差：≤ 0,5 mm；
- 电控板金属片厚度：0.8 ... 2 mm；
- 应用垫圈的表面的粗糙度：≤ 120 µm。

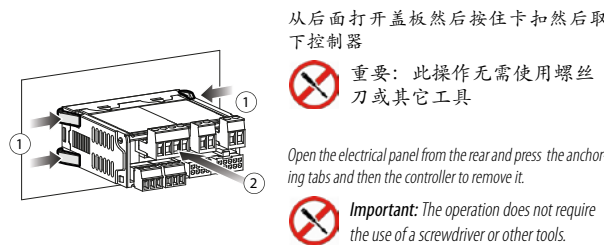
注意：用于制造电控板的金属片厚度(或材料)必须足够确保安全和稳定的安装产品。

Place the controller in the opening, press lightly on the side tabs and then on the front until fully inserted (the side tabs will bend, and the catches will attach the controller to the panel). Important: IP65 front protection is guaranteed only if the following conditions are met:

- maximum deviation of the rectangular opening from flat surface: ≤ 0.5 mm;
- thickness of the electrical panel sheet metal: 0.8-2 mm;
- maximum roughness of the surface where the gasket is applied: ≤ 120 µm.

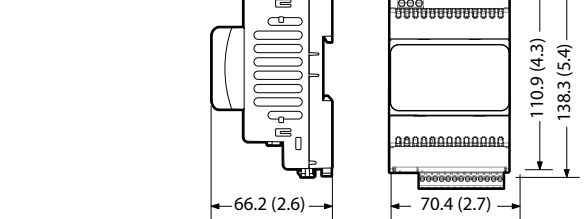
Note: the thickness of the sheet metal (or material) used to make the electrical panel must be adequate to ensure safe and stable mounting of the product.

装配 / Disassembly

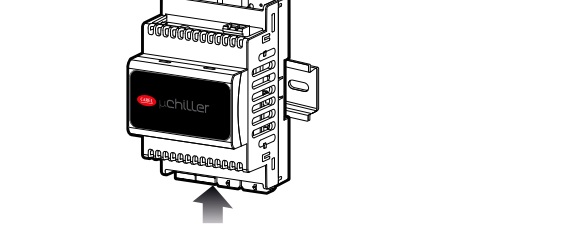


DIN 导轨安装型 / DIN RAIL MOUNTIG

尺寸 / Dimensions- mm(in)

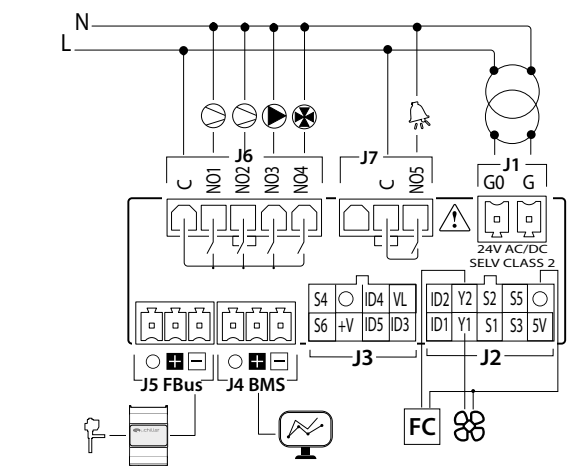


安装 / Mounting

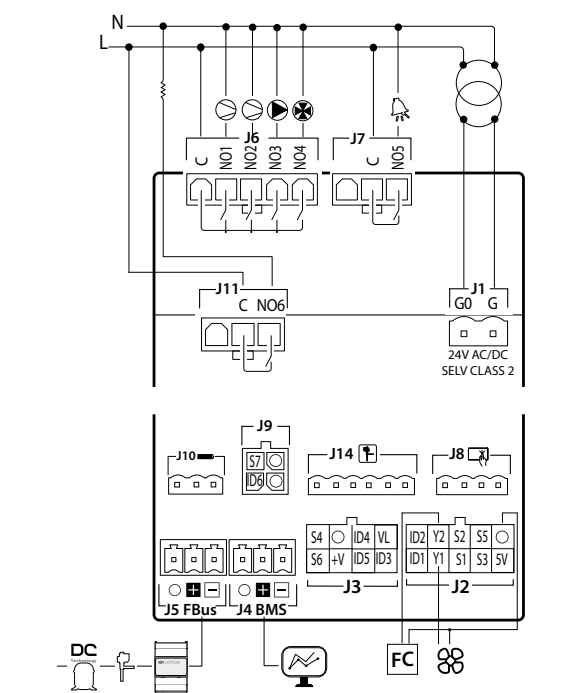


接线 / WIRING CONNECTION

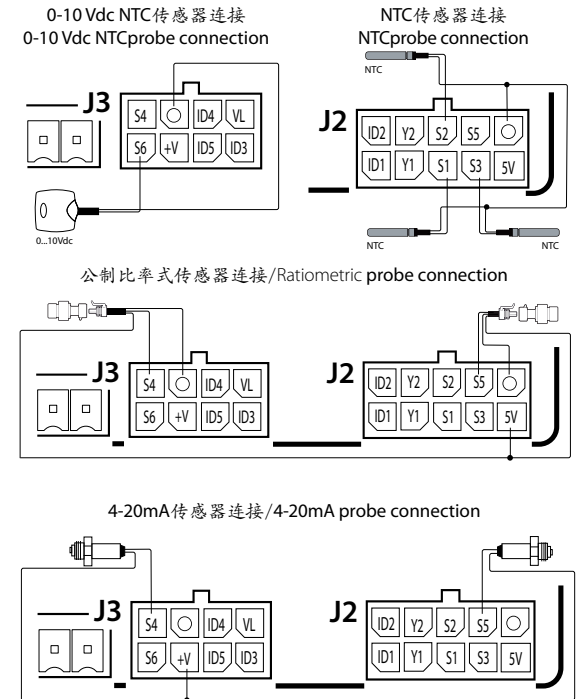
连接：面板安装型 / Connection: panel mounting



连接：DIN 导轨安装型 / Connection: DIN rail mounting



传感器连接(所有型号) / Probe connection (all mod.)



备注/Note: ○ = GND