pCO¹ - 电子控制器PCO1**** / Electronic controller PCO1****

CAREL

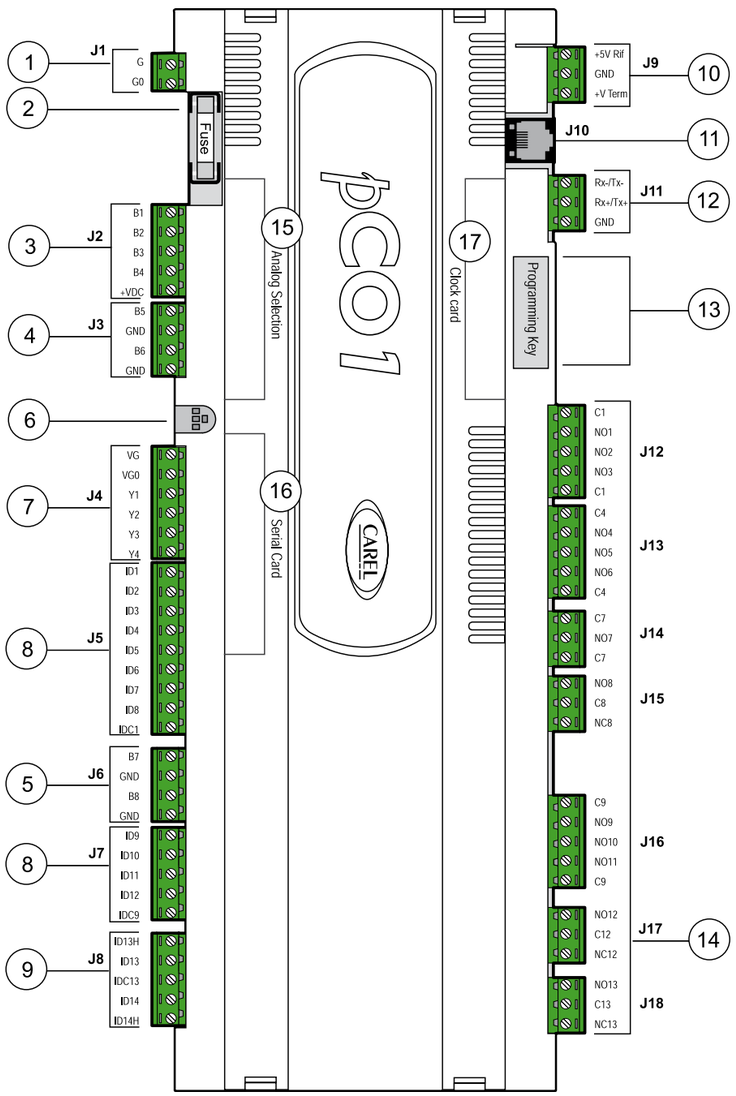


图1

RC 感谢您选择CAREL。我们相信您会对您的选择感到满意！

总体特性：

pCO¹是一种基于微处理器的电子控制器，是CAREL为空调和冷冻领域的诸多应用而开发的。pCO¹可确保实际应用中的多功能性，能够根据客户的要求生产出特定的产品。

pCO¹可运行控制程序，并配有一套连接装置（例如：阀、压缩机、接触器、风机等）所需的端子。

程序和参数保存在闪存中，可确保即使出现电源故障也能保存（无需备份电池）。程序可以通过计算机（WinLoad32）上载到控制器。

pCO¹也可以接入pLAN（pCO局域网），同其它pCO控制器一样。

pLAN是由一系列的控制器和手操器组成的，彼此相互作用，pLAN网络中的所有控制器均能以高传输速率（62.5kbps）交换信息（根据所使用的应用软件，可以是任何开关量或模拟量的变量）。最多可以连接32台（包括pCO控制器和手操器），从而非常有效地共享信息。在pCO¹中插入一个可选串行通讯卡，便可以使用卡乐或Modbus™通信协议接入基于RS485标准的监控/远程维护系统。

左图图标：

1. 电源端子[G(+)，G(-)]；
2. 250Vac，2An慢速熔丝；
3. 通用模拟量输入，NTC、0~1V、0~5V、0~20mA、4~20mA
4. 无源模拟量输入，NTC或开/量
5. 无源模拟量输入，NTC
6. 黄色电源LED及3个LED指示灯
7. 0~1V模拟量输出和PWM调节输出
8. 24Vac/dc开关量输入
9. 230Vac或24Vac/dc开关量输入
10. 用于5V公制比率式传感器的参照接口，和手操器的电源接口
11. 全部标准型PCO*系列手操器连接口，及应用程序下载用连接口
12. pLAN局域网连接端口
13. 程序转载器用接口
14. 继电器开关量输出
15. 选择模拟量输入类型用舱盖
16. 安装串行卡的插槽舱盖：
    - -用于监视器的RS485串行卡
    - -用于监视器的RS485串行卡
    - -网关(协议转换器)
17. 安装实时钟的插槽舱盖

可提供的型号：

- 小型（代码PCO1000AS0），中型（代码PCO1000AM0）
- 小型（代码PCO1002AS0），中型（代码PCO1004AM0），带固态继电器（SSR）开关量输出；
- 小型（代码PCO1000CS0），中型（代码PCO1000CM0），带扩展内存；
- 小型（代码PCO1002CS0），中型（代码PCO1004CM0），带扩展内存和固态继电器（SSR）开关量输出；

连接端子组件：

- 小型（代码PCO1CON0S0），中型（代码PCO1CON0M0）螺接型；
- 小型（代码PCO1CON1S0），中型（代码PCO1CON1M0）弹簧连接型；

电源：

在装配时，须采用II级安全变压器，容量至少40VA，这是仅用于一台pCO¹控制器的供电电源。

建议pCO¹和手操器(或一系列pCO¹和手操器)供电的电源必须与为同一电控箱中其它电气设备供电的电源分开。

如果变压器的副边要接地，则接地线应与端子G0相连。

如果有多个控制器连接pLAN网络，在给这些pCO¹主板供电时，请务必检查G和G0不得混淆(所有板上的G0应接在一起)。

如果使用pLAN网络，请参阅CAREL pCO¹手册。

如需了解更多说明和信息，请参阅CAREL安装手册（代码+03C220336）。

注意：pCO¹控制器（同pCO³一样），不能向CAREL图形化显示屏PCOT00PGH0示PCOI00PGL0供电，它们需要通过其它来源供电。

技术规格

机械特性

	小型，安装在13 DIN模数上，110x227.5x60mm
尺寸	小型，安装在18 DIN模数上，110x315x60mm
安装	DIN导轨
塑料外壳	
材料	聚合物
阻燃性	V0 (UL94) 和960°C (IEC 695)
球压试验	125°C
抗漏电电流	250V
颜色	RAL7035灰色
根据DIN 43880和CEI EN50022 标准，它可以固定在DIN导轨上	
散热孔	
电气规格	
供电电源(含连接端子)	
CPU	H8S2320，16 bit和14MHz
程序存储区(闪存)	1MB，16 bit结构(可扩展到2MB字节)
数据存储区(静态RAM)	128kb，16 bit结构(可扩展到512K字节)
参数数据存储区	4kb，16 bit结构(每个存储单元可写40万次)
平均复杂程度的应用程序下pCO1工作周期	0.5秒(典型值)

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

General features

pCO¹ is an electronic controller based on a microprocessor designed by CAREL for a wide range of applications in the Air-Conditioning and Refrigeration sectors. pCO¹ is a flexible controller, which can respond to all customer requirements.

pCO¹ carries out the regulation program and it is fitted with a set of terminals that connect it to the controlled devices (for ex. valves, compressors, power contactors, fans).

The program and the parameters are stored on FLASH-MEMORY, thus allowing their permanence even in case of power failure (it is not necessary for you to have a maintenance battery). The program can be loaded through PC or by means of a suitable programming key.

pCO¹ allows the connection to the local pLAN network (pCO Local Area Network) - already provided in the previous versions of the pCO and pCO² controllers.

The pLAN network is made up of several controllers and terminals which interact among themselves. Every controller in the pLAN network can exchange information (any digital and analog variable according to the used application program) at high transmission speed. In order to rapidly exchange information, up to 32 units - pCO¹ and terminals - can be connected to the pLAN network. The connection towards the supervising/ telemaintenance serial line, according to the RS485 standard, is carried out by inserting the optional serial cards on the pCO¹ with the CAREL standard communication protocol or MODBUS™.

Key

1. power supply connector [G (+), G0 (-)]
2. 250 Vac, 2 A delayed fuse (T2 A)
3. universal analog inputs NTC, 0 to 1V, 0 to 5V, 0 to 20mA, 4 to 20mA
4. passive analog inputs NTC and ON/OFF
5. passive analog inputs NTC
6. yellow LED showing power supply voltage and 3 signalling LEDs
7. analog outputs 0 to 10V and PWM phase-cutting outputs
8. 24 Vac/Vdc digital inputs
9. 230 Vac or 24 Vac/Vdc digital inputs
10. connector with Vrif for the power supply of the 5 V ratiometric probes and V Term for the terminal power supply
11. connector for all pCO series standard terminals and for the application program download*
12. pLAN local network connector
13. connector for the connection to the programming key
14. relay digital outputs
15. hatch for selecting the type of the analogical inputs
16. hatch for inserting the serial card: - RS485 for the supervisor
- RS232 for the modem interface
- Gateway (protocol converter)
17. hatch for inserting the clock card

Available models:

- *SMALL (cod. PCO1000AS0), MEDIUM (cod. PCO1000AM0)*
- *SMALL (cod. PCO1002AS0), MEDIUM (cod. PCO1004AM0), with solid status relay digital outputs (SSR)*
- *SMALL (cod. PCO1000CS0), MEDIUM (cod. PCO1000CM0) expanded memory version*
- *SMALL (cod. PCO1002CS0), MEDIUM (cod. PCO1004CM0) expanded memory and solid status relay digital outputs (SSR) versions*

Connectors kit:

- *SMALL (cod. PCO1CON0S0), MEDIUM (cod. PCO1CON0M0) screw*
- *SMALL (cod. PCO1CON1S0, MEDIUM (cod. PCO1CON1M0) spring*

Power supply

During installation a safety Class II transformer rated at least 40 VA must be used to supply only one pCO¹ controller.
It is advisable to keep separate the pCO¹ controller and terminal (or more pCO¹ and terminals) from the power supply of the other electric devices (contactors and other electromechanical components) in the electric panel.
If the transformer secondary winding is grounded, check that the ground cable is connected to G0 terminal.
If more than one pCO¹ board, connected to the pLAN, must be powered, please check if G and G0 references are observed (G0 reference must be kept in every board).
If using the pLAN network, ask for the CAREL pCO¹ user's manual.

Further information can be found in the installation manual - code +030220335.

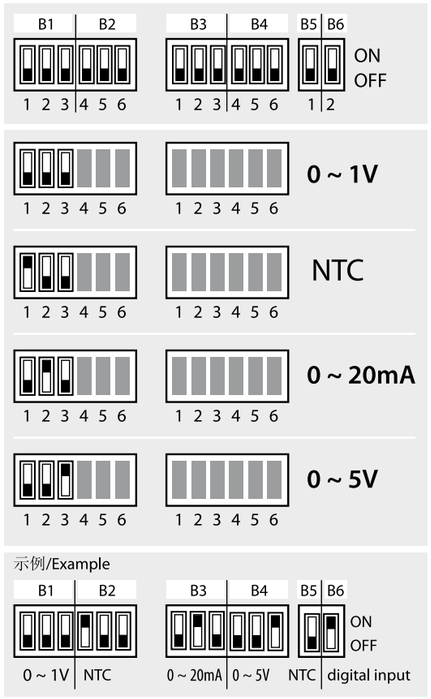
***WARNING:** pCO¹ (as pCO²)can not supply the graphic terminals PCOT00PGH0 and PCOI00PGL0, which can be supplied by other sources.*

Technical Specifications

Mechanical Specifications

	SMALL board models can be mounted on 13 DIN modules, 110x227.5x60mm
dimensions	*MEDIUM board models can be mounted on 18 DIN modules, 110x315x60mm*
mounting	*on DIN rail*
Plastic case	
material	*technopolymer*
self-extinguishing	*V0 (complying with UL94) and 960°C (complying with IEC 695)*
ball pressure test	*125°C*
comparative tracking index	*250V*
colour	*RAL7035 grey*
it can be fastened on DIN rail according to DIN 43880 and CEI EN50022 standards	
cooling vent-holes	
Electrical specifications	
power (controller with terminal connected)	*22 to 38Vdc and 24Vac ±15% 50/60/Hz - P= 13 W maximum absorption*
terminal block	*with removable-screw male/female connectors - max. voltage: 250 Vac*
	cable cross section: min. 0.5mm2 – max. 2.5 mm2
CPU	*H8S2320, 16 bit and 14MHz*
program memory (on FLASH MEMORY)	*1MB organized in 16 bit (2MB in expandend memory version)*
data memory (static RAM)	*128kb organized in 16 bit (512kB in expandend memory version)*
parameter data memory	*4kb organized in 16 bit (max limit: 400.000 writings per memory location)*
operating cycle duration (middle complexity applica-	*0.5s (typical value)*

选择传感器类型的Dip开关 / *Dip-switch for selecting the probe type*



Input B1, B2, B3, B4

			Input
OFF	OFF	OFF	0 ~ 1V
ON	OFF	OFF	NTC
OFF	ON	OFF	0 ~ 20mA
OFF	OFF	ON	0 ~ 5V

Input B5, B6

	Input
ON	digital input
OFF	NTC

Fig. 2

pCO¹中型，18 DIN模数/ *pCO¹ MEDIUM model 18 DIN modules*

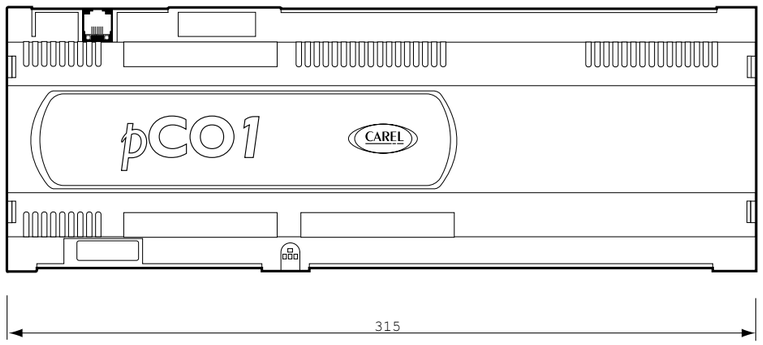


Fig. 3

pCO¹小型，13 DIN模数/ *pCO¹ SMALL model 13 DIN modules*

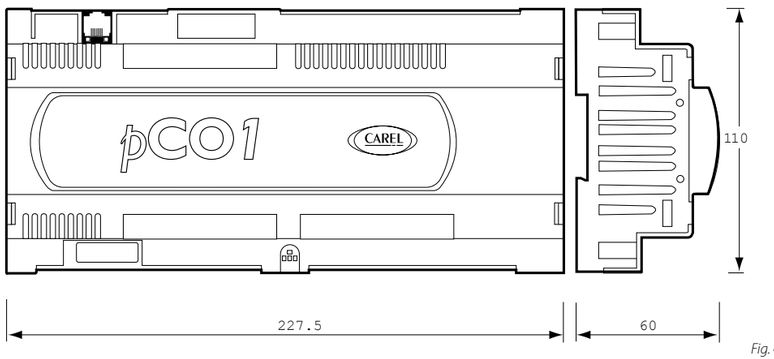


Fig. 4

模拟量输入

模拟量转换	CPU中的10位A/D转换器
类型	无源型：CAREL NTC温度传感器(-50~90℃；在25 ℃时为R/T 10 kΩ)，(输入B5, B6, B7,B8)或无源触点开关量输入(5 mA)，可通过dip(B5, B6) 开关选择 通用型：CAREL NTC温度传感器(参考无源型)，电压信号：0~1 Vdc或0~5 Vdc，电流信号：0~20 mA或4~20 mA，可通过dip(B1, B2, B3, B4输入)开关选择
输入点最多数量	小型、中型控制器上分别为6个、8个
每个输入的时间常数	1秒
0~20 mA输入内电阻	100Ω

警告：+Vdc 端子（J2）上提供的24Vdc可用于为任何有源传感器供电，最大电流为100 mA，配有短路热保护。
与pCOB不同，0~1 Vdc信号是在0~1 V区间范围内的，因此它通常不兼容来自CAREL传感器的标准10m V/°C信号（如果温度低于零度或温度高于100°C时，可能会出现一个传感器报警）；因而使用4-20 mA或NTC用于温度信号。

开关量输入

类型	光隔离		
输入点最多数量	根据下面的组合，小型、中型控制器上分别为8个、14个：		
	在24 Vac 50 ~ 60 Hz或24 Vdc时光隔离输入点数量	在24 Vac/Vdc或230 Vac (50/60 Hz) 时光隔离输入点数量	总输入点
小型	8	无	8
中型	8+4	2	14

警告：
- 230 Vac 50/60 Hz (10/-15%);
- 两个230/24 Vac输入拥有同一个公共极，因此将都是24 Vac/Vdc或都是230 Vac。两个输入之间基本绝缘；
- 尽可能将传感器和开关量输入信号电缆与电感负载电缆和电源电缆分开，以避免可能的电磁干扰。

模拟量输出

输出点最多数量和类型	2个0 ~ 10 Vdc光隔离输出(Y1和Y2)和2个5V脉冲下PWM单相脉宽调制输出 (Y3和Y4)，可编程持续性
电源	外部24 Vac/Vdc
分辨率	8 bit
最大负载	对于0 ~ 10 V输出为1kΩ(10 mA)，对于PWM输出为470Ω(10 mA)

开关量输出

输出点最多数量	小型、中型控制器上分别为8个、13个，类型：继电器

这些输出端分为3个组，每组都有两个公共极端子以方便电气装配。确保流经公共端的电流不超过每个端子的额定电流，对于可拆卸的螺接端子即：8A。继电器输出根据绝缘距离被分成组。同一组内的继电器间仅有单级绝缘，故必须使用同一供电电压 (通常是24Vac或230Vac)。组与组之间具有双重绝缘，因此不同的组能在不同的电压下工作。
任何时候，在每一个开关量输出端口和控制器的其他部分之间都有双重绝缘。

组	1, 2, 3, 4, 5, 6 - 7 - 8 (报警继电器) - 9, 10, 11, 12, 13.
可切换触点：	小型、中型控制器上分别为1个、3个
可通断功率：	2000 VA, 250 Vac, 8 A阻性电流，2 A FLA, 12 A LRA，根据UL873，(30000次动作) 2 A阻性电流，2 A感性电流，cosφ= 0,6, 2(2) A，根据EN 60730-1，(100000次动作)
SSR输出：	2个，继电器7和8两个可供选择(小型)；4个，继电器7、8、12、13是4个可供选择(中型)；24 Vac/Vdc，最大功率P_{max}=10W

连接用户手操器

类型	半双工异步双绞线
手操器接口	6芯电话连接接头
pLAN接口	3芯插入式连接接头
驱动器	CMR 7V差动平衡式(RS485)

pCO¹控制器与手操器间允许的最大距离如下表所示：

使用电话线		使用AWG24屏蔽电缆	
通过线缆的电阻(Ω/m)	最大距离(m)	通过线缆的电阻(Ω/m)	最大距离(m)
≤ 0.14	600	≤0.078	600
≤ 0.25	400		

*注意：与pCOB和pCO3控制器不同， pCO¹的pLAN地址不是用DIP开关设置的，而是使用手操器上的一连贯操作。具体操作请参考软件使用手册。

其它规格

储存条件	-20~70，90 %r.H. 无凝露
工作条件	-10~60，90 %r.H. 无凝露
环境污染	2类
抗电击等级	应该并入I级和/或II级设备中
绝缘材料的PTI	PCB: PTI 250；绝缘材料PTI 175
绝缘部件耐压时间	长
继电器动作类型	1C
断开类型或微型开关	微型开关
隔热和阻燃类型	D类 (UL94 - V0)
抗电压浪涌类别	II类
使用寿命（工作小时数）	80000次
继电器自动工作次数	100000次 (EN 60730-1) 30,000 (UL873)
软件结构和类型	A类
该装置并非设计用于手持操作	

警告：对于易受强烈振动（1.5 mm pk-pk 10/55 Hz）的应用，建议在距离连接接头约3cm处，用夹箍紧固接至pCO¹的电缆。应用横须可以通过密钥从闪存中下载，或在PC机上使用软件"WINLOAD32"下载。

Analog inputs

analog conversion	*10 bit A/D converter, built-in CPU*
type	*passive: CAREL NTC temp. probe sensor, (-50T90 °C; R/T 10 kΩ at 25 °C), (input B5, B6, B7,B8) or free contact digital input (5 mA), that can be selected via dip-switch (B5, B6)* *universal: CAREL NTC temp. probe (see passive type), voltage: 0 to 1 Vdc or 0 to 5 Vdc, current: 0 to 20 mA or 4 to 20 mA, that can be selected via dip-switch (B1, B2, B3, B4 inputs)*
max. number	*6, 8, on SMALL, MEDIUM, boards respectively*
time constant for each input	*1 s*
0 to 20 mA inputs internal resistance	*100Ω*

WARNING: *for powering any active probe, it is possible to use the 24 Vdc placed on +Vdc terminal; the max. current that can be delivered is 100 mA thermally protected against short circuits. Unlike pCOB the signal 0 to 1Vdc is limited to the restricted range 0 to 1 V, so it is not always compatible with the standard signal 10 mV/°C of CAREL probes (if the temperature is below zero or higher than 100 °C, it can cause probe alarm). So, for the temperature signals use 4 to 20 mA or NTC.*

Digital inputs

type	*optoinsulated*		
max. number	*8, 14 on SMALL and MEDIUM boards respectively according to the combinations shown below:*		
	No. of optoins. inputs at 24 Vac 50 to 60 Hz or 24 Vdc	*No. of optoins. inputs at 24 Vac/Vdc*	*total inputs*
SMALL	*8*	*none*	*8*
MEDIUM	*8+4*	*2*	*14*

WARNING: *- 230 Vac 50/60 Hz (10/-15 %)*
- the two 230/24Vac inputs have the same common pole, so they both will be at 24 Vac or 230 Vac. The insulation is principal.
- please keep probe and digital input leads as far as possible from power cables to avoid possible electromagnetic noise.

Analog outputs

type and max. number	*2 outputs (Y1 and Y2) optoinsulated 0 to 10 Vdc and 2 outputs (Y3 and Y4) PWM phase-cutting with impulse at 5 V programmable duration*
power supply	*24 Vac/Vdc external*
resolution	*8 bit*
max. load	*1kΩ (10 mA) for 0 to 10V and 470Ω (10 mA) for PWM*

Digital outputs

max. number	*8, 13, on SMALL, MEDIUM boards respectively, type relay*

They are grouped in 3 with two common pole termin. in order to assemble the common poles easily. Be careful to the current flowing in common termin., because it must not exceed the rated current of each single termin., that is: 8 A for removable-screw terminals. The relays are divided into groups, according to the insulat. distance. Inside each group the relays have their single own main insulat., so they must be exposed to the same voltage (in general 24 Vac or 230 Vac). Among the groups there is double-insulat., therefore the groups can be of different voltage. Anyway the double-insulat. does exist towards the rest of the control. and its presence is guaranteed among digital output termin.

groups:	*1, 2, 3, 4, 5, 6 - 7 - 8 (alarm relay) - 9, 10, 11, 12, 13.*
changeover contacts:	*1,3 respectively on the SMALL, MEDIUM versions*
commutable power:	*2000 VA, 250 Vac, 8 A resistive, 2 A FLA, 12 A LRA according to UL873, (30,000 cycles)* *2 A resistive, 2 A inductive, cosφ= 0,6, 2(2) A according to EN 60730-1, (100,000 cycles)*
outputs at SSR:	*2 instead of the rel. no° 7 and 8 (SMALL), 4 instead of the rel. no° 7, 8, 12 and 13 (MEDIUM);* *24 Vac/Vdc, P_{max}=10W*

Connection to the user terminal

type	*asynchronous 2-lead half duplex dedicated*
connector for terminal	*6-way telephone cable*
connector for pLAN	*3-way plug-in connector*
driver	*CMR 7V balanced differential (type RS485)*

The maximum distances between the terminal and pCO1 are described in the following table:

with telephone-type cable		*with AWG24 shielded cable*	
cable resistance (Ω/m)	*max. distance (m)*	*cable resistance (≤/m)*	*max. distance (m)*
≤ 0.14	*600*	*≤0.078*	*600*
≤ 0.25	*400*		

** Note: unlike pCOB and pCO2 the pLAN addressing doesn't take place through dip switch but through operation sequences on the display. With regards to this, please refer to the software manual.*

Other specifications

storage conditions	*-20T70, 90 %r.H. non-condensing*
operating conditions	*-10T60, 90 %r.H. non-condensing*
environmental pollution	*2*
classification according to protection against electric shock	*should be integrated into Class I and/or II devices*
PTI of insulating materials	*PCB: PTI 250; insulation material PTI 175*
period of electric stress across insulating parts	*long*
type of actions	*1C*
type of disconnection or microinterruption	*microinterruption*
category of resistance to heat and fire	*D (UL94 - V0) category*
immunity against voltage surges	*category II*
ageing period (operating hours)	*80,000*
no. of automatic operating cycles	*100,000 (EN 60730-1) 30,000 (UL873)*
software Class and structure	*Class A*
The device is not intended to be hand-held.	

Warning: *for applications subject to strong vibrations (1.5 mm pk-pk 10/55 Hz), we suggest you to fasten, through fastening clamps, the cables connected to the pCO1 at about 3 cm of distance from the connectrors. The application program can be downloaded from the flash memory through the key "PCO100KEY0" or a PC using the program "WINLOAD32" to be required to CAREL.*

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本装置（或本产品）必须按照当地关于废品处理的强制法规单独进行处理。
The appliance (or the product) must be disposed of separately in compliance with the local legislation in force on waste disposal.

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