

pCO³

电子控制器

electronic controller

CAREL



RC 技术文档

ENG Technical leaflet

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总体特性

pCO³ 是一种基于微处理器的电子控制器，在硬件和软件方面均与pCO²系列兼容。 pCO³是CAREL公司根据欧洲 RoHS指令开发的，为空调和冷冻领域的诸多应用提供了解决方案；可确保实际应用中的多功能性，从而能够按照客户的要求生产出特定的产品。

pCO³ 可运行控制程序，并配有一套连接装置（压缩机、风机……）所需的端子。程序和参数保存在闪速存储器FLASH-MEMORY和E²prom，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（28.8 kbps和115.2 kbps）或特殊的编程钥匙上传。

pCO³ 也可以接入 pLAN（pCO局域网）并且还能与其它pCO³ 控制器、pCO sistema中的所有其他控制器以及所有 pGD 系列手操器相连。pLAN 中的所有控制器均能以高传输速率交换信息（根据所使用的应用软件，可以是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 pCO³ 中插入一个可选串行通讯卡，便可以通过Modbus™通信协议接入基于RS485标准的监控/远程维护串行线路。

其他可选卡可用于连接基于RS485以外标准的监控设备。最后，串行现场总线接口凭借可选串行通讯卡，确保与现场被控装置（例如：阀门、I/O pCO³、扩展卡、电子阀驱动器……）的连接。

- 可提供的版本：
- 小型、中型、大型、超大N.O. 型和超大N.C.型；
 - 带有或不带内置手操器；
 - 带附加的闪速存储器和光电隔离pLAN
 - 带有或不带固态继电器(SSR)开关量输出。

注意：可以通过智能钥匙PCOS00AKY0（见图6）将应用软件下载到闪速存储器 FLASH-MEMORY 上，或者通过 USB-485 适配器“CVSTDUTLFO”和“WINLOAD32”程序（可向CAREL公司订购）下载到计算机上。

电源

如果仅为一台pCO3控制器供电，那么在装配时必须采用最小额定值为50VA的II级安全变压器。为pCO3控制器和手操器供电的电源应当与为同一配电盘中其他电子装置（接触器和其他机电元件）供电的电源分开。如果变压器的副边要接地，则应确保接地线与端子G0相连。这对与pCO3相连的所有装置而言都是如此。如果为接入pLAN的多个pCO3主板供电，则应确保遵循参照点G和G0（对于所有主板而言，都必须遵循参考点G0）。

如果使用pLAN或者需要了解更多说明和信息，请参阅CAREL pCO3手册。

现场总线选购件

光电隔离485	PCO100FD10
tLAN串行卡	PCO100TLN0
MPbus Belimo	PCO100MPB0
调制解调器	PCOS00FD20
hydraulic用CAN串行卡	PCOS00HBF0

BMS 选购件

CANbus	PCOS00HBB0
485/Modbus	PCOS004850
调制解调器	PCO100MDM0
以太网网卡	PCO1000WB0

LonWorks

LonWorks	FTT10	PCO10000F0
LonWorks	FTT10	PCO10001F0
	标准冷水机组	

连接端子

代码示例PC03CON***， 参阅下表说明：

PC03CON	*	*	0
	0= 螺钉 1= 弹簧	S= 小型 M= 中型 L= 大型 Z= 超大型N.O. C= 超大型N.C.	

技术规格

机械特性

尺寸	小型， 配有13 DIN导轨模块， 110 x 227.5 x 60 mm 中型、大型和超大型， 配有18 DIN导轨模块， 110 x 315 x 60 mm
安装	DIN导轨

塑料外壳

- 卡装在DIN 43880和CEI EN 50022标准的导轨上；
- 材料：Techno聚合物；
- 阻燃性：V0（UL94）和1960°C（IEC 695）；
- 球压试验：125°C；
- 抗漏电电流：≥250 V；
- 颜色：灰色 RAL7035；

电气规格

电源（控制器已与手操器相连）	28...36 Vdc +10/-20% 或者24 Vac +10/-15% 50...60 Hz; Pmax= 15 W (Vdc), Pmaz= 40 VA (Vac)
端子排	带插入式外螺纹/内螺纹连接接头， 最大电压250 Vac; 电缆横截面： 最小0,5 mm² – 最大2,5 mm²
CPU	H8S2320， 16位， 24 MHz
存储器（闪存存储器）	2+2 MB； 在增强版中， 存储器为32 MB或更高
数据存储器（静态RAM）	512 kB， 16位（296 kB BIOS； 216应用软件）
参数数据存储器	13 kB， 16位（最高限值： 每个存储位置可写400,000次）， 以及一个附加的 32 kB E2prom（不可接入pLAN）
工作循环持续时间（平均复杂度的应用程序下）	0.2秒（典型值）
带电池的时钟	标准

开关量输入

类型	光电隔离型			
最多个数	根据如下所示组合， 小型、中型和超大N.O./N.C型、大型主板上分别为8、14、18： 24 Vac 50/60 Hz或24 Vdc时的 24 Vac/Vdc或230 Vac（50/60 Hz）时			
		光电隔离型输入个数	的光电隔离型输入个数	输入
	小型	8	无	8
	中型和超大型	12	2	14
	大型	14	4	18
测量电路的分类 (CEI EN 61010-1)	I类(J5, J7, J20) 24 Vac/Vdc III类 (J8, J19) 230 Vac			

重要说明：

- 230 Vac 50/60 Hz (10/-15%) ；
- J8和J12上的两个230/24 Vac输入拥有同一个公共电极， 因此将都是24 Vac/Vdc或都是230 Vac。两个输入之间基本绝缘；
- 对于DC输入， 将负极接至公共端。

注意： 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。

模拟量输入

模数转换类型	CPU内置的10位A/D转换器
最多个数	通用型：（输入B1, B2, B3, B6, B7, B8） CAREL NTC温度传感器（-50~90 °C；在 25 °C R/T 10 kΩ），NTC HT 0~150 °C，电压：0...1 Vdc, 0...5 V 比例式或0...10 Vdc， 电流：0~20 mA 或4~20 mA，可通过软件选择。0~20 mA时的输入电阻=100Ω 无源型：（输入B4, B5, B9, B10） CAREL NTC 温度传感器（参阅通用型）， PT1000 (-100~200 °C；在 0°C R/T 1000 Ω) 或无源电压开关量输入 (5 mA)，可通过软件选择。
每个输入的建立时间	小型：5个；中型和超大N.O.型：8个；大型和超大N.C. 型：10个
精度	0.5 s
测量电路的分类(CEI EN 61010-1)	± 0.3 % 满量程 I类

重要说明：+Vdc端子（J2）上提供的21 Vdc可用于为任何有源传感器供电，最大电流为150 mA，配有短路热保护。如需给0~5 V比例式传感器供电，则使用端子J24上的+5VREF（最大电流：60 mA）。

模拟量输出

类型	0...10 Vdc光电隔离型
最多个数	小型：4个；中型和超大N.O./N.C.型：4个；大型：6个
电源	外部24 Vac/Vdc
分辨率	8 bit
最大负载	1 kΩ (10 mA)
精度	最大输出刻度的 ± 2 %：Y1, Y2, Y3和Y4 最大输出刻度的-2%/+5%：Y5和Y6

开关量输入

类型	继电器
最多个数	小型：8个；中型：13个；大型：18个；超大N.C.型：27个；超大N.O. 型：29个

有关要求，请参阅图3~5（参照点NO*、NC*和C*）。注意：带有转换触点的输出始终保持分开（也就是说，不同输出之间没有公共极端子）。2~5组输出拥有2个“公共”极端子，以方便装配。
确保流经公共端的电流不超过每个端子的额定电流8A。

绝缘距离	继电器根据绝缘的级别可分为不同的组。注意：同一组内的继电器必须使用同一供电电源（通常24或230 Vac）。							
分组	版本	具有相同绝缘的继电器						
	小型	1...7	8	-	-	-		
	中型	1...7	8	9...13	-	-		
	大型	1...7	8	9...13	14...18	-		
	超大N.O.型	1...7	8	9...13	14...16	17...20	21...24	25...29
	超大N.C.型	1...7	8	9...13	14...16	17...20	21...24	25...27
可转换触点	1个：小型（继电器8）；3个：中型和超大N.O./N.C.型：（继电器8、12和13）；5个：大型（继电器8、12、13、14和15）							
触点	警告：继电器输出因pCO ² 的型号而具有不同的特性。							
	继电器A类	继电器类型：SPDT，2000 VA，250 Vac，8 A阻性电流 pCO ² 许可：UL873：2.5 A 阻性电流，2 A FLA，12 A LRA，250 Vac，C300导向器负载（30000个循环） EN 60730-1：2 A 阻性电流，2 A感性电流，cosφ= 0.6，2(2) A (100000次操作)						
	继电器B类	继电器类型：SPDT，1250 VA，250 Vac，5 A阻性电流 pCO ² 许可：UL873：1 A阻性电流，1 A FLA，6 A LRA，250 Vac，D300 导向器负载（30000次操作） EN 60730-1：1 A阻性电流，1 A感性电流 cosφ= 0.6，1(1) A (100000次操作)						
	继电器C类	继电器类型：SPDT，1250 VA，250 Vac，5 A阻性电流 pCO ² 许可：UL873：1 A阻性电流，1 A FLA，6 A LRA，250 Vac，D300导向器负载（30000个循环） EN 60730-1：1 A阻性电流，1 A感性电流，cosφ= 0.6，1(1) A (100000次操作)						
	SSR 输出	1个：小型 (输出7)；2个：中型和超大N.O./N.C.型 (输出7和12)；3个：大型 (输出7, 12和14) 工作电压：24 Vac/Vdc；最大功率：10 W						

AWG与电线横截面之间的关系

AWG	横截面(mm²)	电流
20	0.5	2
15	1.5	6
14	2.5	8

pLAN/用户手操器连接

类型	RS485 半双工异步
传输速度	62.5 Kbps或115.2 Kbps， 可通过软件选择
手操器连接接头	6芯电话连接接头(J10)
pLAN/图形手操器/aria手操器连接接头	3芯插入式连接接头 (J11)

pCO 与用户手操器之间的最大距离如下表所示：

电缆类型	供电距离	电源
电话电缆	50 m	取自pCO (150 mA)
AWG24 屏蔽电缆	200 m	取自pCO (150 mA)
AWG20/22 屏蔽电缆	500 m	经由TCONN6J000提供额外的电源

pCO³控制器与AWG20/22屏蔽电缆之间的最大距离为500 m。

注意：

- 最多可以连接一个或两个手操器（pCOT、pCOI、pGD0、pGD1）；连接两个手操器时，不得使用显示屏上的背光灯。pCO³的其中一个版本可以采用光电隔离的方式接入pLAN。
- 图形手操器和aria手操器应始终通过独立的电源供电。
- +Vterm（J24）上的21 Vdc可用于给最大输入功率为2W的外部手操器供电。除了接至端子J10的以外，只可以连接1个手操器（例如PLD手操器或ARIA手操器）。

其他说明

储存条件	-40 ~ 70 °C， 90% rH（无冷凝）
工作条件	-25 ~ 70 °C， 90% rH（无冷凝）
防护规格	整体IP20， 前面板IP40
环境污染	正常
抗电击等级	可以并入I级和/或II级设备中
绝缘材料的PTI	250 V
绝缘部件的电压作用时间	长期
继电器动作类型	1C
断开或电子开关类型	微电子开关式
隔热及阻燃类别	D类 (UL94 - V0)
防浪涌电压类别	I类
老化特性（工作小时数）	80000
自动工作循环次数	100000 (EN 60730-1)； 30000 (UL 873)
软件结构和类型	A 级
抗电压干扰类别 (CEI EN 61000-4-5)	III 类
该装置并非设计为手持操作	

重要说明：

- 对于易受强烈振动（1.5 mm pk-pk 10/55 Hz）的应用领域，会影响设备使用，故推荐离接口约3cm处用夹子紧固接至pCO³的电缆。
- 如果本产品安装在工业环境中（EN 61000-6-2标准的应用），输出连接的长度必须少于30m。
- 必须根据所在国有效的标准和法规进行安装。
- 出于安全原因，该装置必须安装在配电盘内，以确保只有显示屏和控制键盘可以接触。
- 所有低电压的连接（24 Vac/Vdc模拟量和开关量输入、模拟量输出、串行总线连接、功率）必须加强与主电源绝缘或者采用双重绝缘。
- 出现故障时，不要试图修理该装置，而应当与CAREL服务中心联系。
- 在家用环境中，pCO³和手操器之间的连接电缆必须屏蔽。

尺寸

小型、中型、大型和超大N.O./N.C型pCO₃尺寸

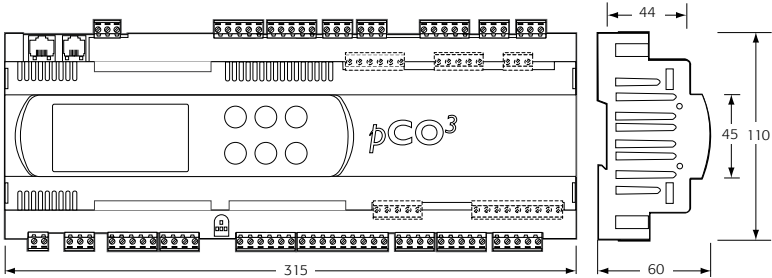


图. 1

小型pCO₃ 尺寸

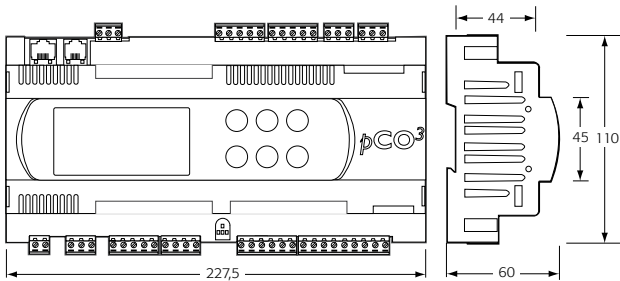
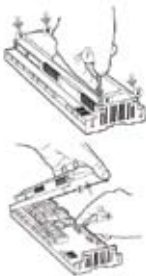


图. 2

产品认证

- CEI EN 50155标准：“铁路应用——铁路车辆上使用的电子设备”；
- UL 873和C22.2 No. 24-93：“温度指示和调节设备”；
- 2005年1月12日的EC法规37/2005；尤其要指出的是，如果电子控制器配有标准的CAREL NTC传感器，则表示符合EN13485标准——“测量冷藏、冷冻及深冷食品和冰激凌贮存和销售过程中空气和产品温度的温度计”。



产品处置说明

请不要将这个产品作为日常垃圾处理；必须在专业的废品处理中心进行处理。

这个产品内置了一块电池，在处理这个产品前，必须按照本文档中提供的指导说明将电池从产品上拆下来。

不当使用或不当处理这个产品可能会对人体健康和环境产生不良影响。

产品处置必须由本地法规确定的公共的或私有的废品回收系统进行。

在对电子废品的处置违法时，相关的处罚措施遵照当地废品处理法规的定义。

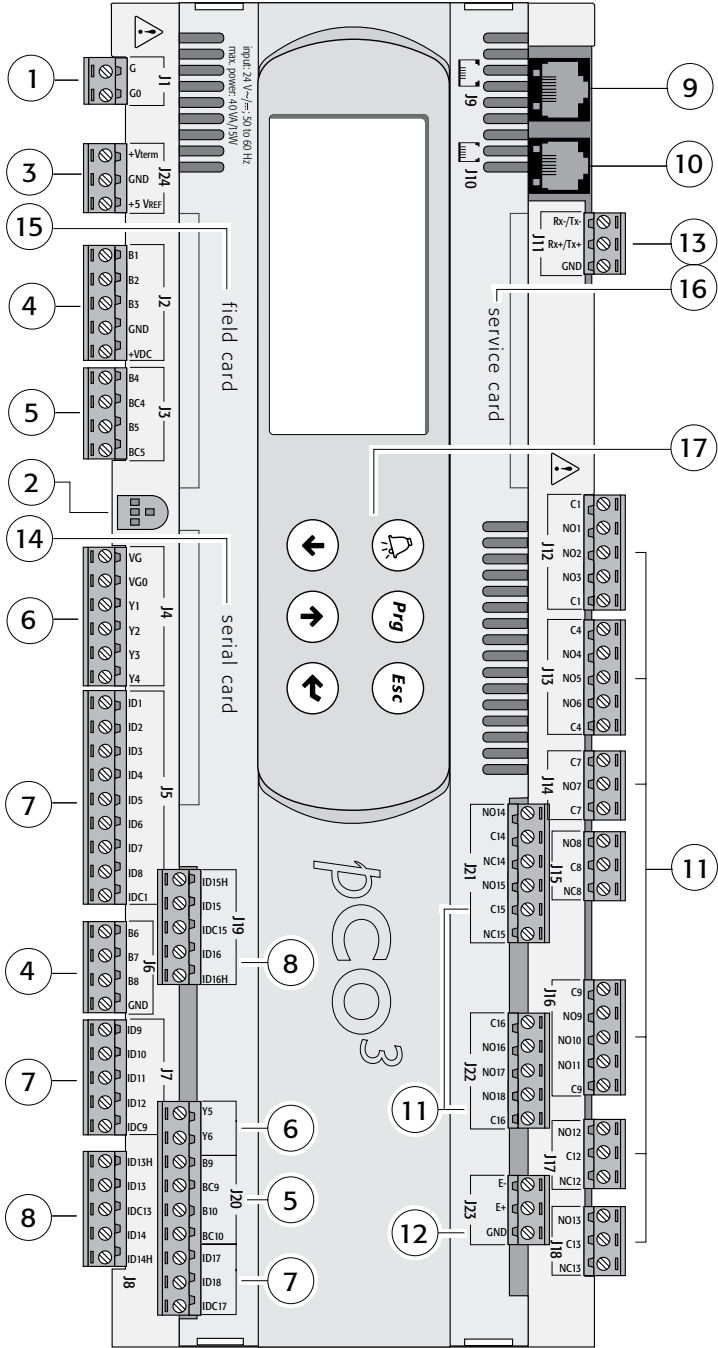


图. 3

超大N.O.型

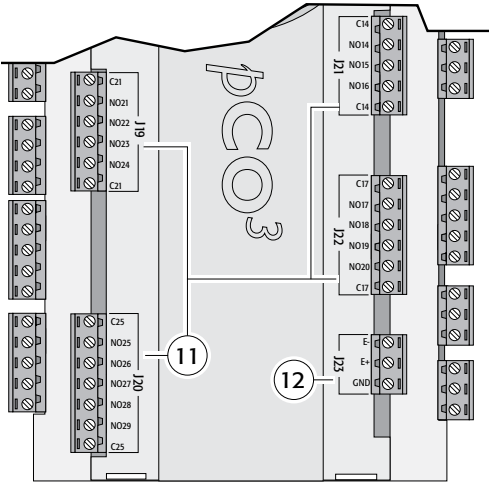


图. 4

超大N.C.型

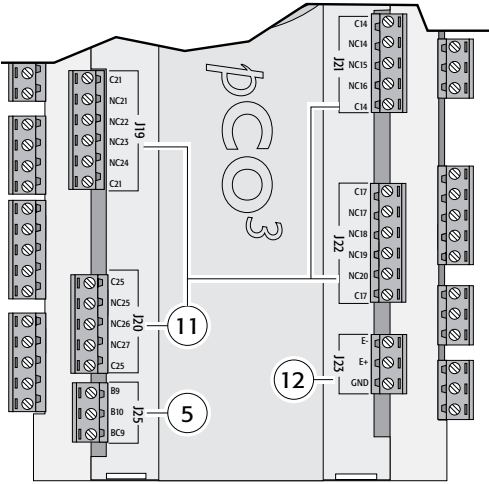


图. 5

编号(图.3...5)

- | | |
|-----|--|
| 1. | 电源端子[G (+), G0 (-)]； |
| 2. | 黄色电源LED和3个pLAN指示灯； |
| 3. | 附加电源（最大200mA）给手操器和0~5V比例式传感器； |
| 4. | 通用型模拟量输入：NTC，0~1 V，0~5 V比例式，0~10 V，0~20 mA，4~20 mA |
| 5. | 无源型模拟量输入：NTC，PT1000，开关量输入； |
| 6. | 0...10 V模拟量输出； |
| 7. | 24 Vac/Vdc开关量输入； |
| 8. | 230 Vac或24 Vac/Vdc开关量输入； |
| 9. | 终端显示屏（带直接信号的外部面板）用端口； |
| 10. | 所有标准pCO系列显示器以及程序下载用插口； |
| 11. | 继电器开关量输出； |
| 12. | I/O扩展卡用连接接头； |
| 13. | pLAN 局域网用连接接头 |
| 14. | 安装可选监控串行卡插槽舱盖； |
| 15. | 安装可选现场卡插槽舱盖； |
| 16. | 安装可选服务卡插槽舱盖； |
| 17. | 内置手操器（LCD、按钮和LED）。 |

安装初步注意事项：pCO³与pCO²之间的比较

- pCO³系列控制器没有使用代码PCO201KEY0的编程钥匙插口。对控制器进行编程时，使用2005年9月以后的新智能钥匙（PCOS00AKY0）。然而出现以下情况时，使用3.35版或更高版的WINLOAD：



图. 6

应用软件无法通过智能钥匙运行；

- pCO³与pCO²不同，J1和J2之间没有保险丝。所有pCO³系列控制器均拥有电源内部热保护器。无需使用外部保险丝；
- pCO³设有端子J24（取代保险丝），用于为比例式传感器（+5 VREF）供电，以及为aria手操器（TAT***）等辅助手操器提供20Vdc电源；
- 第一台pCO³模型中的端子J11（接入pLAN）只有3.81的节距，而不是pCO²上的5.08；
- pLAN地址设置用拨位开关附近的LED在端子J3和J4之间移动；
- 红色传感器电源超载LED已经拆除。

pCO³模拟器：

如果使用模拟器对pCO³进行测试，请注意不能用pCO²模拟器代替pCO³。将来是否可用与CAREL公司联系。

设置控制器和手操器地址的步骤

设置控制器地址

pCO³控制器没有用于设置pLAN地址的拨位开关。象pCO¹/pCO⁶一样，必须通过软件来设置地址。步骤如下所述：

- 关闭pCO³电源；
- 准备一个标准的CAREL手操器，将地址设为0（如果使用的是pCO³内置手操器，则没有必要）。有关此操作，请参阅以下段落；
- 将手操器与pCO³相连；
- 断开pLAN中与pCO³相连的任何其他装置（端子J11）；
- 给pCO³供电时，并同时按下UP（向上）+ALARM（报警）按钮。这一按钮组合与内置手操器上的相同。相应地，在pCO³手操器上，使用  和 .
- 数秒后，以下屏幕将显示：

```
PLAN ADDRESS: 0
UP:    INCREASE
DOWN:  DECREASE
ENTER: SAVE & EXIT
```

- 如需修改地址，只要使用UP（向上）和DOWN（向下）按钮，然后按下ENTER（回车）确认即可。
- 接下来设置手操器的pLAN地址，并对pLAN进行配置。

设置手操器地址

pCO¹/pCO⁶手操器

该手操器地址通过其后部的拨位开关设置。

pGD0/1/2/3手操器

该手操器地址的默认值是32。

该手操器地址只可以在手操器通过电话接口上电后才能设置。

对于所有版本，同时按下  按钮（即使手操器已经打开）至少5秒钟进入配置模式，将显示以下屏幕，光标在左上角闪烁：

```
Display address
setting.....:nn
I/O Board address:xx
```

- 如需修改手操器地址（显示地址设置），按一次  ：光标将移向地址字段（nn）。

- 使用↓↑按钮选择所需数值，并通过按下 按钮确认。如果所选的数值不同于先前保存的数值，以下屏幕将显示，并且新的数值将保存到永久性存储器中。

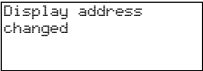


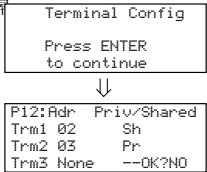
图. 6

如果字段nn被设为数值0，手操器将通过“点对点”协议与pCO³控制器通信（而不是pLAN），并且“I/O卡地址：xx”字段将不会显示，因为它不再具有任何意义。

pCO³：分配专用型和共享型手操器列表

在这一阶段，如需修改与每个pCO³主板相关的手操器列表，请按以下步骤进行：

- 如以上段落所述，按下 按钮进入配置模式；
- 按下 按钮，直到光标到达xx字段（I/O卡地址）；
- 使用↓↑按钮选择pCO³主板的所需地址。可以选择的数值请参阅联机有效的pCO³主板。如果pLAN运行不正确或者没有pCO³主板，xx字段将无法被修改，并且将仅显示“—”；
- 再次按下 按钮，依次显示以下屏幕



- 这里依旧使用 按钮将光标从某个字段移至另一字段，并使用↓↑按钮改变当前字段的数值。P:xx字段显示所选择的主板地址；在图示实例中，选择了地址12；
- 如需退出配置程序并保存数据，选择“OK（确认）？”字段并将其设为“YES（是）”，然后按下 按钮确认。“Adr”栏内的字段代表与pCO³主板地址12相关的手操器地址，而Priv/Shared（专用/共享）栏表示手操器类型。

重要提示：无法将pGD手操器配置为“Sp”（共享打印机），因为它们没有打印机输出。
如果手操器没有任何操作（没有按下任何按钮）超过30秒钟，配置程序将自动结束，并且不保存任何变更。

使用WINLOAD、BOOT和BIOS时的注意事项

应当始终使用最新版的WinLoad。WinLoad 3.35版支持pCO³的管理，可以从<http://ksa.carel.com>上获得。
自3.36版起，pCO³的Bios和应用软件的下载速度已从标准的28800位/秒增加到115200位/秒，而这一改变并不需要用户进行任何新的设置。
pCO³的BIOS和BOOT都是特定的文件，不同于pCO¹和pCO²的BIOS和BOOT文件。因此，这些都无法上载到pCO³上，并且很明显，pCO¹和pCO²的BOOT和BIOS文件无法上载到pCO³上。

重要警告：

CAREL产品是最先进的产品，其操作方法在随附的技术文件中有所说明，您甚至可以在购买前从www.carel.com网站下载。
为了达到特定的最终装置和/或设备的预期效果，客户（最终设备的制造商、开发商或工程商）承担与本产品的配置阶段相关的所有责任和风险。如果没有用户手册中要求/指定的这一研究阶段，则会给最终产品带来CAREL无法承担的故障。
最终客户必须仅以本产品相关文件规定的方法使用本产品。
CAREL就其产品应承担的责任在CAREL一般合同条款中有所说明，可以从www.carel.com网站上和/或与客户签订的特定协议中获得。

Note: _____

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal black lines running across the width of the page, providing a guide for handwriting or typing. The background is a solid off-white color.

Note: _____

[illegible]

GENERAL CHARACTERISTICS

pCO³ is a microprocessor-based electronic controller compatible in both hardware and software terms with the pCO² family. Developed by REHAU in compliance with the European RoHS directives, it provides a solution for many applications in the air-conditioning and refrigeration sectors. It ensures absolute versatility, allowing specific products to be created to customer request.

pCO³ runs the control program, and is fitted with the set of terminals required for connection to the devices (compressors, fans...). The program and the parameters are saved to FLASH-MEMORY and E²prom, ensuring they are stored even in the event of power failures (without requiring a backup battery).

The program can be loaded using a PC (28.8 kbps and 115.2 kbps) or the special programming key.

pCO³ also allows connection to the pLAN (pCO Local Area Network) and can be connected, as well as to other pCO³ controllers, to all the other controllers in the pCO sistema and all the pGD family terminals. All the controllers in the pLAN can exchange information (variables, digital or analogue, depending on the application software used) at high transmission speed. Up to 32 units can be connected, including pCO controllers and terminals, so as to share the information effectively.

The connection to the supervisor/telemaintenance serial line, via the REHAU or Modbus™ communication protocol over the RS485 standard, is performed by inserting an optional serial board in the pCO³.

Other optional cards can be used to connect to a supervisor via standards other than RS485. Finally, the serial field bus interface, using the optional board, ensures connection to the field devices controlled (for example: valves, pCOe I/O expansions, electronic valve drivers...).

Versions available:

- SMALL, MEDIUM, LARGE, EXTRALARGE N.O. and EXTRALARGE N.C.;
- with or without Built-In terminal;
- with additional flash memory and optically-isolated pLAN;
- with or without solid state relay (SSR) digital outputs.

Note: the application software can be downloaded to the flash memory using the smart key PCOS00AKY0, see Fig. 6; or a PC using the USB-485 adapter "CVSTDUTLFO" and the "WINLOAD32" program, to be ordered from REHAU.

Power supply

A Class II safety transformer with a minimum rating of 50 VA must be used in the installation to supply just one pCO³ controller. The power supply to the μ pCO³ controller and terminal (or pCO³ controllers and terminals) should be separated from the power supply to the other electrical devices (contactors and other electromechanical components) inside the electrical panel. If the secondary of the transformer is earthed, make sure that the earth wire is connected to terminal G0. This is true for all the devices connected to the pCO³. If powering more than one pCO³ board connected in the pLAN network, make sure that the references G and G0 are observed (the reference G0 must be maintained for all the boards).

If using the pLAN network and for further explanations and information, please refer to the REHAU manual pCO³.

Field Bus options

optically isolated 485	PCO100FD10
tLAN	PCO100TLN0
Belimo MPbus	PCO100MPB0
modem	PCOS00FD20
CAN hydronic	PCOS00HBF0

BMS options

CANbus	PCOS00HBB0
485/Modbus	PCOS004850
modem	PCO100MDM0
Ethernet board	PCO1000WB0

LonWorks

LonWorks	FTT10	PCO10000F0
LonWorks	FTT10 standard chiller profile	PCO10001F0

Connectors

Example of coding: PCO3CON***, see the following table for the description:

PCO3CON	*	*	0
	0= screw 1= spring	S= small M= medium L= large Z= extra large N.O. C= extra large N.C.	

TECHNICAL SPECIFICATIONS

Mechanical characteristics

dimensions	SMALL version fitted on 13 DIN rail modules, 110 x 227.5 x 60 mm MEDIUM, LARGE and EXTRALARGE version fitted on 18 DIN rail modules, 110 x 315 x 60 mm
installation	DIN rail

Plastic case

- fitted on DIN rail according to DIN 43880 and CEI EN 50022 standards;
- material: technopolymer;
- flame retardancy: V0 (UL94) and 960°C (IEC 695);
- ball pressure test: 125°C;
- resistance to creeping current: ≥ 250 V;
- colour: grey RAL7035;

Electrical specifications

power supply (controller with terminal connected)	28 TO 36 Vdc +10/-20% and 24 Vac +10/-15% 50 to 60 HZ maximum power input P= 15 W (24 Vdc power supply), P= 40 VA (24 Vac)
terminal block	with plug-in male/female connectors, max voltage 250 Vac; cable cross-section: min. 0.5 mm ² - max 2.5 mm ²
CPU	H8S2320, 16 bit, 24 MHz
memory (FLASH MEMORY)	2+2 MB; in the extended versions further memory of 32 MB or higher
data memory (static RAM)	512 kB at 16 bit (296 kB BIOS; 216 application sw)
parameter data memory	13 kB at 16 bit (max. limit: 400,000 writes per memory location) and a further 32 kB E ² prom (not available to the pLAN)
working cycle duration (applications of average complexity)	0.2 s (typical)
clock with battery	standard

Digital inputs

type	optically-isolated			
maximum number	8, 14, 18, respectively on the SMALL, MEDIUM and EXTRALARGE N.O and N.C., LARGE boards, according to the combinations shown below:			
		optoinsulated input no. to 24 Vac 50/60 Hz or 24 Vdc	optoinsulated input no. to 24 Vac/Vdc or 230 Vac (50/60 Hz)	inputs
	SMALL	8	none	8
	MEDIUM/ EXTRALARGE	12	2	14
	LARGE	14	4	18
classification of the measuring circuits (CEI EN 61010-1)	Category I (J5, J7, J20) 24 Vac/Vdc Category III (J8, J19) 230 Vac			

WARNINGS:

- 230 Vac 50/60 Hz (10/-15%);
- the two 230/24 Vac inputs present on J8 and J12 have the same common pole and consequently will be both 24 Vac/Vdc or both 230 Vac. Basic insulation between the two inputs;
- for DC inputs, connect the negative pole to the common terminal.

Note: separate as much as possible the probe and digital input signal cables from the cables carrying the inductive loads and the power cables, to avoid possible electromagnetic disturbance.

Analogue inputs

analogue conversion type	10 bit A/D converter in the CPU universal: (inputs B1, B2, B3, B6, B7, B8) REHAU NTC temperature sensor (-50T90°C; R/T 10 kΩ at 25°C), HT NTC 0T150°C, voltage: 0 to 1 Vdc, 0 to 5 V ratiometric or 0 to 10 Vdc, current: 0 to 20 mA or 4 to 20 mA, selectable via software. Input resistance in 0 to 20 mA= 100Ω passive: (inputs B4, B5, B9, B10) REHAU NTC temp. sensor (see universal type), PT1000 (-100T200°C; R/T 1000 Ω at 0°C) or voltage-free digital input (5 mA), selectable via software;
maximum number	5, 8, 10, on the SMALL, MEDIUM and EXTRALARGE N.O., LARGE and EXTRALARGE N.C. boards respectively
time constant for each input	0.5 s
precision	± 0.3 % of full scale
classification of the measuring circuits (CEI EN 61010-1)	Category I

WARNING: the 21 Vdc available at the +Vdc terminal (J2) can be used to power any active probes, the maximum current is 150 mA, thermally protected against short-circuits. To supply the ratiometric 0 to 5 V probes, use the +5V_{REF} (I_{max}: 60 mA) present at terminal J24.

Analogue outputs

type	0 to 10 Vdc optically-isolated
maximum number	4, 4, 6, on the SMALL, MEDIUM and EXTRALARGE N.O./N.C., LARGE boards respectively
power supply	external 24 Vac/Vdc
resolution	8 bit
maximum load	1 kΩ (10 mA)
precision	± 2 % of end scale on outputs: Y1, Y2, Y3 and Y4 -2%/+5% of end scale on: Y5 and Y6

Digital outputs

type	relay
maximum number	8, 13, 18, 27, 29, on the SMALL, MEDIUM, LARGE, EXTRALARGE N.C., EXTRALARGE N.O. boards respectively

For the requirements refer to Figs. 3 to 5 (reference NO*, NC* and C*). Note the presence of outputs with changeover contacts kept separately (that is, without the poles shared between different outputs). Groups from 2 to 5 outputs have 2 "common" poles for easy assembly.

Make sure that the current running through the common terminals does not exceed the rated current of each individual terminal, that is 8A.

Insulation distance	the outputs can be divided into groups. There is double insulation between groups (between cells in the table). Note: the relays in the same group must have the same power supply (24 or 230 Vac).							
Makeup of the groups	version	relays with same insulation						
	SMALL	1...7	8	-	-	-		
	MEDIUM	1...7	8	9...13	-	-		
	LARGE	1...7	8	9...13	14...18	-		
	EXTRALARGE N.O.	1...7	8	9...13	14...16	17...20	21...24	25...29
	EXTRALARGE N.C.	1...7	8	9...13	14...16	17...20	21...24	25...27
	Note: the relays in the individual cells of the table have basic insulation between them, while between groups (cell-cell) there is double insulation.							
Changeover contacts	1, 3, 5, on the SMALL, MEDIUM and EXTRALARGE N.O./N.C., LARGE boards respectively							
Switchable power	warning: the relay outputs have different characteristics according to the model of pCO ³							
	relay type A	type of relay: SPDT, 2000 VA, 250 Vac, 8 A resistive pCO ³ approval: UL873: 2.5 A resistive, 2 A FLA, 12 A LRA, 250 Vac, C300 pilot duty (30000 cycles) EN 60730-1: 2 A resistive, 2 A inductive, cos φ= 0.6, 2(2) A (100000 cycles)						
	relay type B	type of relay: SPDT, 1250 VA, 250 Vac, 5 A resistive pCO ³ approval: UL873: 1 A resistive, 1 A FLA, 6 A LRA, 250 Vac, D300 pilot duty (30000 cycles) EN 60730-1: 1 A resistive, 1 A inductive, cos φ= 0.6, 1(1) A (100000 cycles)						
	relay type C	type of relay: SPDT, 1250 VA, 250 Vac, 5 A resistive pCO ³ approval: UL873: 1 A resistive, 1 A FLA, 6 A LRA, 250 Vac, D300 pilot duty (30000 cycles) EN 60730-1: 1 A resistive, 1 A inductive, cos φ= 0.6, 1(1) A (100000 cycles)						
SSR outputs	1: SMALL (output 7); 2: MEDIUM - EXTRALARGE N.O./N.C. (outputs 7, 12); 3: LARGE (OUTPUTS 7, 12, 14), operating voltage, 24 Vac/Vdc; maximum power: 10 W							

Relation between AWG and wire cross-section

AWG	Cross-section (mm ²)	Current
20	0.5	2
15	1.5	6
14	2.5	8

pLAN network/user terminal connection

type	RS485 half-duplex asynchronous
transmission speed	62.5 Kbps or 115.2 Kbps, selectable via software
terminal connector	6 pin telephone (J10)
pLAN network/graphic terminal/aria terminal connector	3 pin plug-in connector (J11)

The maximum distance between the pCO and user terminal is shown in the following table.

cable type	power supply distance	power supply
telephone	50 m	taken from the pCO (150 mA)
AWG24 shielded cable	200 m	taken from the pCO (150 mA)
AWG20/22 shielded cable	500 m	separate power supply via TCONN6J000

The maximum distance between two pCO³ controllers with AWG20/22 shielded cable is 500 m.

Note:

- a maximum of one terminal (pCOT, pCOI, pGD0, pGD1) can be connected, or two terminals but without using the backlighting on display. One version of the pCO³ features optically-isolated connection to the pLAN network.
- the graphic terminal and aria terminal should be always powered with a separate power supply.
- the 21 Vdc present at +Vterm (J24) can be used to power an external terminal with a maximum input of 2 W. Only one terminal can be connected (for example PLD terminal or ARIA terminal) in addition to the one connected to terminal J10.

Other specifications

storage conditions	-40T70 °C, 90% RH non-condensing
operating conditions	-25T70 °C, 90% RH non-condensing
index of protection	IP20, IP40 front panel only
environmental pollution	normal
class according to protection against electric shock	to be incorporated into Class I and/or II appliances
PTI of the insulating materials	250 V
period of stress across the insulating parts	long
type of action	1C
type of disconnection or microswitching	microswitching
category of resistance to heat and fire	category D (UL94 - V0)
immunity against voltage surges	category 1
ageing characteristics (operating hours)	80,000
no. of automatic operating cycles	100,000 (EN 60730-1); 30,000 (UL 873)
software class and structure	Class A
category of immunity to voltage surges (CEI EN 61000-4-5)	Category III
The device is not designed to be hand-held	

WARNING

- for applications subject to strong vibrations (1.5 mm pk-pk 10/55 Hz), secure the cables connected to the pCO³ using clamps placed around 3 cm from the connectors
- If the product is installed in industrial environments (application of the EN 61000-6-2 standard) the length of the output connections must be less than 30 m.
- installation must be performed according to the standards and legislation in force in the country where the appliance is used;
- for safety reasons the appliance must be housed inside an electrical panel, so that the only accessible part is the display and the control keypad;
- all the very low voltage connections (analogue and digital inputs at 24 Vac/Vdc, analogue outputs, serial bus connections, power) must have reinforced or double insulation from the mains;
- in the event of malfunctions do not attempt to repair the appliance, but rather contact the REHAU service centre;
- in domestic environments, the connection cable between the pCO³ and the terminal must be shielded.

DIMENSIONS

Dimensions pCO³ MEDIUM, LARGE, EXTRALARGE N.O. and N.C.

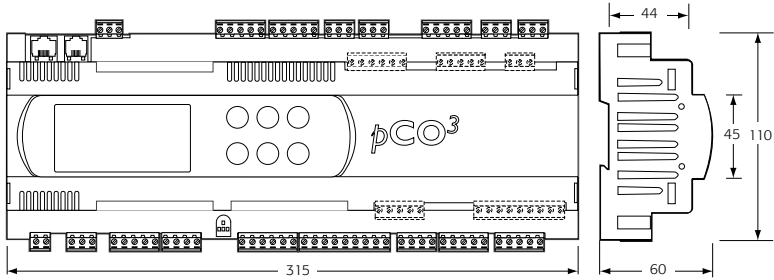


Fig. 4

Dimensions pCO³ SMALL

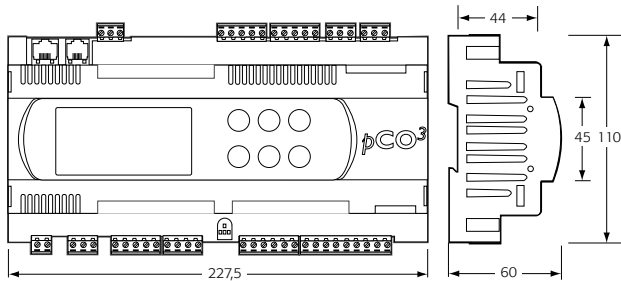


Fig. 5

PRODUCT CERTIFICATION

- CEI EN 50155 standard: "Railway applications – Electronic equipment used on rolling stock";
- UL 873 and C22.2 No. 24-93: "Temperature-Indicating and -Regulating Equipment";
- EC regulations 37/2005 of 12 January 2005; in particular, if the electronic controller is fitted with standard REHAU NTC probes, it is compliant with standard EN13485 on "Thermometers for measuring the air temperature in applications on units for the conservation and sale of refrigerated, frozen and deep-frozen food and ice cream".



GUIDELINES FOR DISPOSAL

- Do not dispose of the product as municipal waste; it must be disposed of through specialist waste disposal centres.
- The product contains a battery that must be removed and separated from the rest of the product according to the instructions provided, before disposing of the product.
- Improper use or incorrect disposal of the product may have negative effects on human health and on the environment.
- The public or private waste collection systems defined by local legislation must be used for disposal.
- In the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

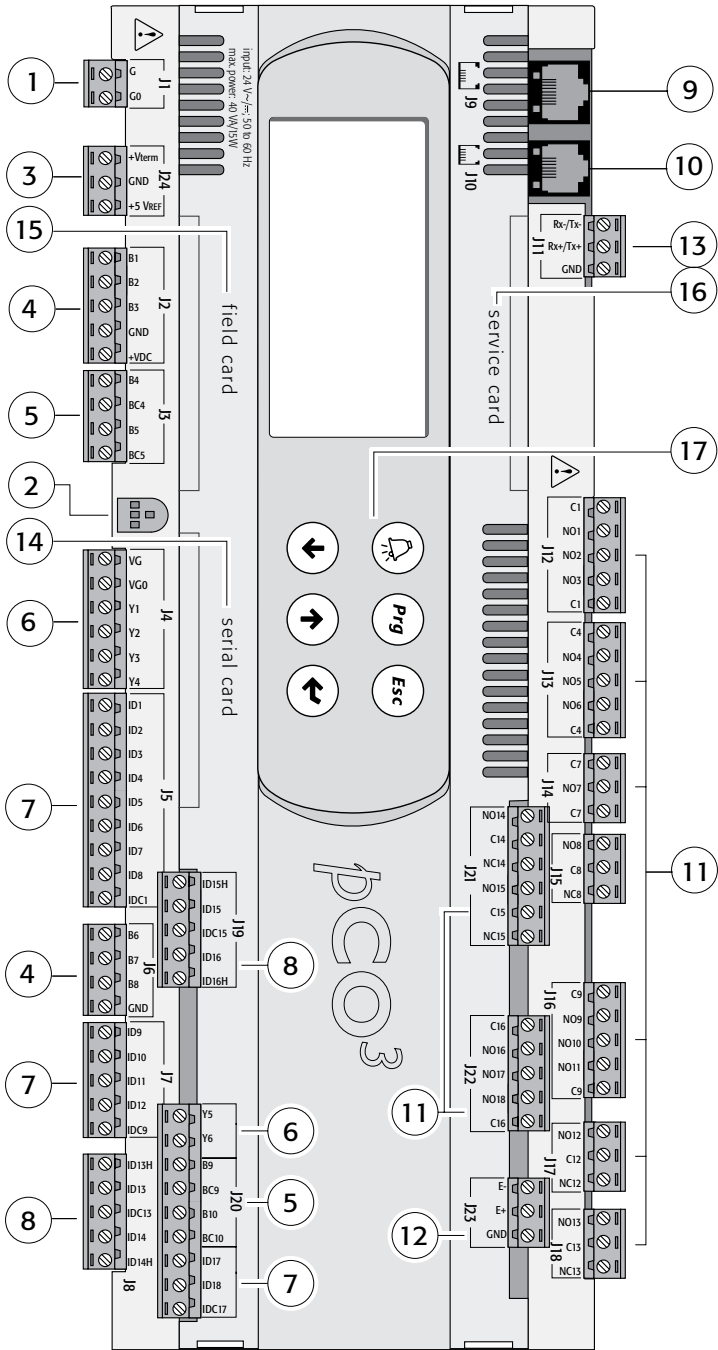


Fig. 3

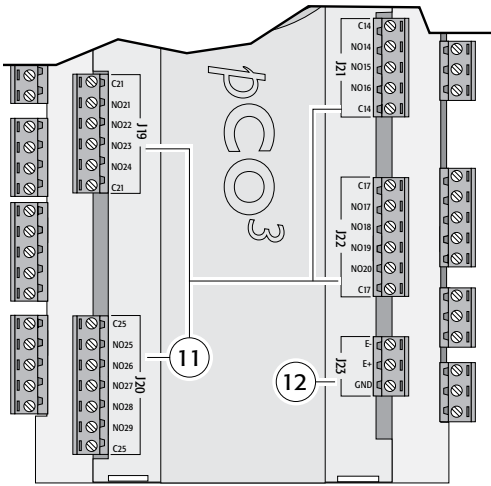


Fig. 4

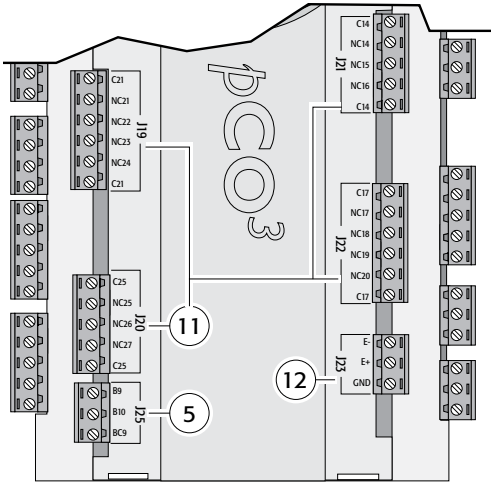


Fig. 5

Key (Figs. 3 to 5)

- | | |
|-----|---|
| 1. | power supply connector [G (+), G0 (-)]; |
| 2. | yellow power LED and 3 LEDs for the pLAN networks; |
| 3. | additional power supply (max. 200 mA) for the terminal and 0 to 5 V ratiometric probes; |
| 4. | universal NTC, 0 to 1 V, 0 to 5 V ratiometric, 0 to 10 V, 0 to 20 mA, 4 to 20 mA analogue inputs; |
| 5. | passive NTC, PT1000, ON/OFF analogue inputs; |
| 6. | 0 to 10 V analogue outputs; |
| 7. | 24 Vac/Vdc digital inputs; |
| 8. | 230 Vac or 24 Vac/Vdc digital inputs; |
| 9. | connector for terminal display (external panel with direct signals); |
| 10. | connector for all the standard pCO series terminals and for downloading the application software; |
| 11. | digital relay outputs; |
| 12. | connector for the I/O board expansion; |
| 13. | pLAN connector; |
| 14. | cover for inserting the optional supervisor serial board; |
| 15. | cover for inserting the optional field board; |
| 16. | cover for inserting the optional service board; |
| 17. | Built-in terminal (LCD, buttons and LEDs). |

PRELIMINARY NOTES FOR THE INSTALLER: COMPARISON BETWEEN pCO³ AND pCO²

- the pCO³ family controllers do not have the connector using the programming key code PCO201KEY0. To program the controller, use the new Smart Key (PCOS00AKY0) available from September 2005. Otherwise use WinLoad ver. 3.35 and higher:



Fig. 6

- An application cannot be run from the Smart Key;
- unlike the pCO², there is no fuse between J1 and J2. All pCO³ family controllers have an internal thermal protector on the power supply. No external fuse is required;
- a further terminal J24 (in place of the fuse) is provided for the power supply to the ratiometric probes (+5 VREF), as well as 20 Vdc to supply a secondary terminal, such as the aria terminal (TAT***), in alternative to the standard one;
- the terminal J11 (connection to the pLAN network) in the first prototypes of the pCO³ only has a pitch of 3.81, rather than the 5.08 on the pCO²;
- the LEDs near the dipswitches for setting the pLAN address have been moved between connectors J3 and J4;
- the red probe power supply overload LED has been removed.

pCO³ simulator:

If testing the pCO³ with a simulator, note that the pCO² simulator cannot be used in place of the pCO³ simulator. Contact REHAU for the availability of the latter.

Procedure for setting the address of the controller and terminal

Setting the address of the controller

The pCO³ controller does NOT have dipswitches for setting the pLAN address. The address must be set by software, as for the pCO^{1/XS}.

The procedure is as follows:

- switch the pCO³ off;
- prepare a standard REHAU terminal with the address set to 0 (not necessary if the pCO³ Built-In terminal is used). For this operation, see the following paragraph;
- connect the terminal to the pCO³;
- disconnect any other devices connected in the pLAN from the pCO³ (terminal J11);
- switch the pCO³ on, pressing the UP + ALARM buttons at the same time. This combination of buttons is the same on the built in terminal. Alternatively, on the PCOT terminals, use the combination of the  and  buttons.
- after a few seconds, the following screen will be displayed:

```
PLAN ADDRESS: 0
UP:   INCREASE
DOWN: DECREASE
ENTER: SAVE & EXIT
```

- to modify the address simply use the UP and DOWN buttons and then press ENTER to confirm.
- now set the pLAN address of the terminal and configure the pLAN network.

Setting the address of the terminal

pCOI/pCOT terminal

The address of the terminal is set using the DIPSWITCHES on the rear of the terminal.

pGD0/1/2/3 terminal

The default value of the address is 32.

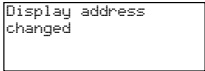
The address of the terminal can only be set after having connected the power supply via the telephone connector.

To enter configuration mode, press the   buttons at the same time (even when the terminal is already on), in all the versions, for at least 5 seconds; the following screen will be displayed, with the cursor flashing in the top left corner:

```
Display address
setting.....nn
I/O Board address:xx
```

to modify the address of the terminal (display address setting) press the  button once: the cursor will move to the address field (nn).

- use the ↓ ↑ buttons to select the desired value, and confirm by pressing the  button. If the value selected is different than the value saved previously, the screen shown below will be displayed, and the new value will be saved to permanent memory.

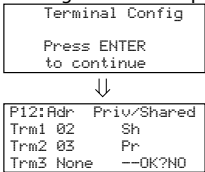


If the field nn is set to the value 0, the terminal will communicate with the pCO³ controller using the “point-to-point” protocol (not pLAN) and the “I/O Board address: xx” field will not be displayed, as it no longer has meaning.

pCO³: assigning the list of private and shared terminals

At this stage, to modify the list of terminals associated with each individual pCO³ board, proceed as follows:

- enter configuration mode by pressing the ↓ ↑ buttons, as described in the previous paragraph;
- press the  button until the cursor reaches the field xx (I/O board address) ;
- use the ↓ ↑ buttons to select the desired address of the pCO³ board. The values that can be selected refer to the pCO³ boards that are effectively on line. If the pLAN network is not operating correctly, or alternatively no pCO³ board is connected, the field will not be able to be modified and will only show “—”;
- pressing the  button again displays the following screens in sequence:



- here too the  button moves the cursor from one field to another, and the ↓ ↑ buttons change the value of the current field. The field P:xx shows the address of the board selected; in the example shown in figure, the address 12 has been selected;
 - to exit the configuration procedure and save the data, select the field “OK ?” and set to Yes, then confirm by pressing the  button.
- The fields in the “Adr” column represent the addresses of the terminals associated with the pCO3 board address 12, while the Priv/Shared column indicates the type of terminal.
Important: the pGD terminals cannot be configured as “Sp” (shared printer), as they do not have the printer output.
If the terminal remains inactive (no button pressed) for more than 30 seconds, the configuration procedure is automatically ended without saving any changes.

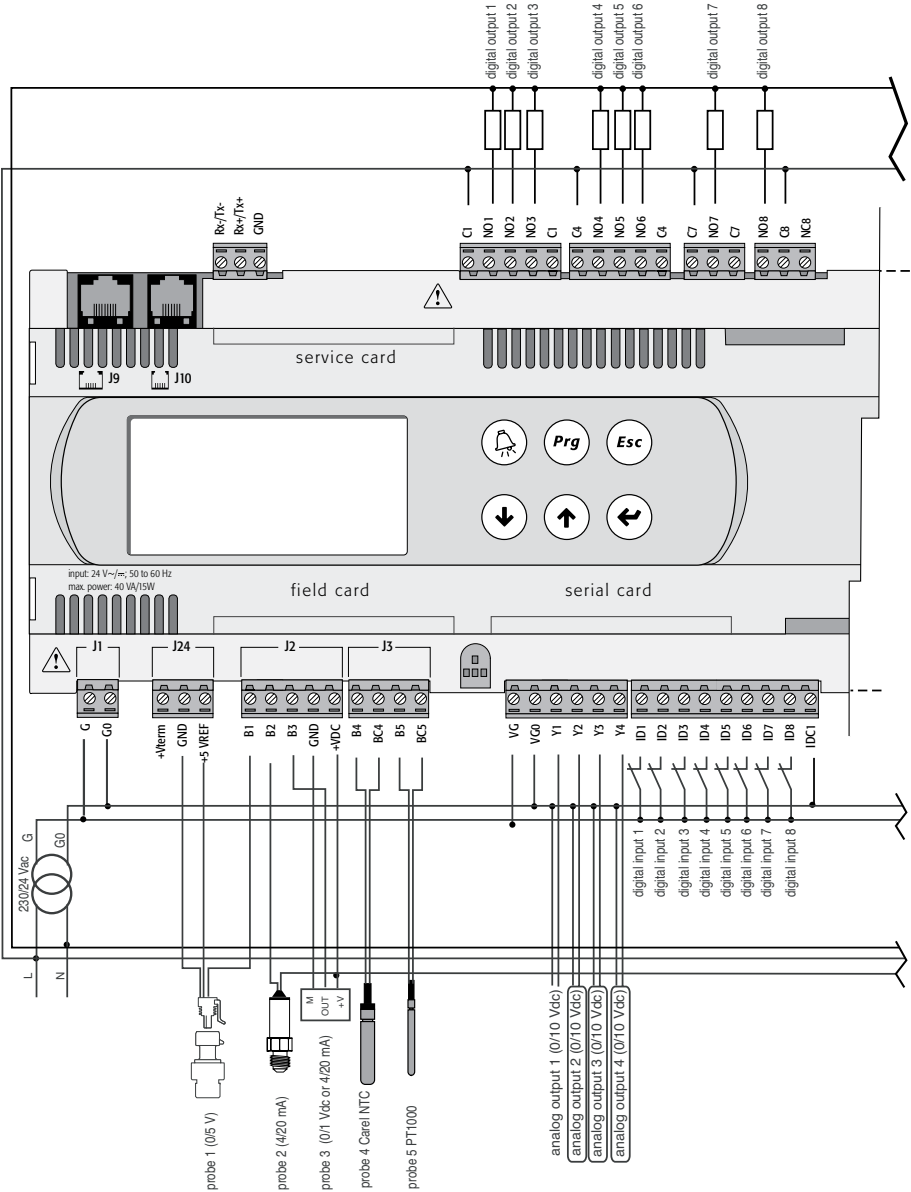
NOTES ON USING WINLOAD, BOOT AND BIOS

The most recent version of WinLoad should always be used. Management of the pCO³ is supported by WinLoad version 3.35.
From version 3.36, the download speed for the Bios and the application to the pCO³ has been increased to 115200 bit/s from the standard speed of 28800 bit/s, however this change does not require any new settings by the user. The pCO³ BIOS and the BOOT are specific files, and different from the pCO¹ and pCO² BIOS and BOOT files. Consequently, these cannot be loaded onto the pCO³, and, obviously, the pCO¹ and pCO² BOOT and BIOS cannot be loaded onto the pCO³.

IMPORTANT WARNINGS

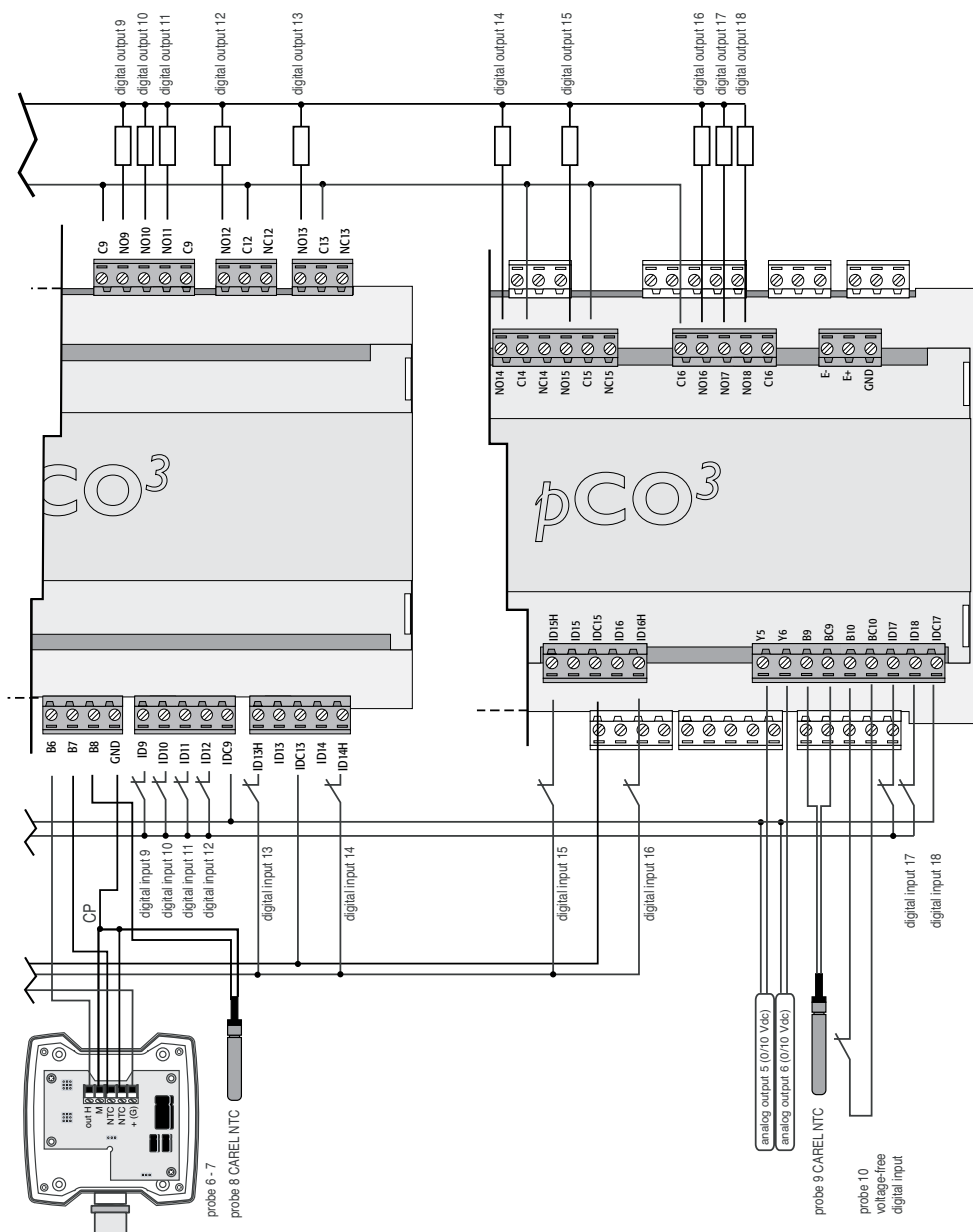
The REHAU product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.rehau.com. The client (builder, developer or installer of the final equipment) assumes every responsibility and risk relating to the phase of configuration the product in order to reach the expected results in relation to the specific final installation and/or equipment. The lack of such phase of study, which is requested/indicated in the user manual, can cause the final product to malfunction of which REHAU can not be held responsible.
The final client must use the product only in the manner described in the documentation related to the product itself.
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SMALL



MEDIUM

LARGE



Note: _____

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal black lines running across the width of the page, providing a guide for handwriting or typing. The background is a solid off-white color.

CAREL

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