CAREL

Product selection guide

retail and refrigeration controllers
connectivity/telemaintenance/monitoring systems

Integrated Control Solutions & Energy Savings

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Refrigeration controllers

Cooling control is an essential aspect of the modern food industry, with application in several sectors, including:

- professional catering;
- commercial refrigeration;
- cold rooms or storage systems of various types and sizes;
- processing or preparation.

CAREL's primary objective has always been to respond to and anticipate such needs with innovative solutions.
The need to constantly move forwards and the experience acquired over many years has led to the development of the various types of controllers describe in this guide, specifically designed for each individual application and at the same time, almost as if responding to a challenge, so versatile and easy to use.
Sincere thanks must go to all those who with their support and spirit of improvement have contributed to the development of the products shown in this guide, and who every day continue to make CAREL a leading company in this sector.

Integrated Control Solutions & Energy Savings

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ir33

ir33 represents the maximum technology that CAREL offers in the field of refrigeration applications. The four versions (12 Vac, 12/24 Vac/Vdc, 230 Vac and 115/230 Vac) give rise to a vast range of products in different configurations. The 115/230Vac version is especially innovative, integrating a switching power supply, 4 relays and a clock.

For manufacturers, CAREL proposes the 230 Vac version: more compact than the other versions, with more essential features and consequently more competitive in terms of price.
The 12 Vac and 12/24 Vac/Vdc models represent the evolution of the ir32 series, and are designed to be their natural replacements. The operating logic is the same, and the appearance mirrors some sections of the previous product, however the functions have been upgraded: the changeover from the previous range to the new version is therefore simple and advantageous.

Most of the models are fitted with 16 A (3/4 HP) relays for controlling the compressors.

Advantages

The ir33 series for refrigeration is a complete range of products made up of integrated electronic microprocessor controllers with LED display, designed especially for the control of refrigeration units, with features for use in all types of applications.

The main features are:
- range: to satisfy all control needs, numerous models are available with different outputs (from 1 to 4, up to 5 for ir33 DIN rail) and with 1 or 2 programmable digital inputs (3 for ir33 DIN rail);
- flexibility: models are available with various power supply options: 12 Vac, 12/24 Vac/Vdc, 230 Vac and 110/240 Vac versions for panel installation;
- smart defrost management;
- serial connection: all controllers can be connected to networks for the development of supervisory and telemaintenance systems;
- the controllers can be programmed by: keypad, remote control and programming key;
- optimum LED display with graphic symbols and ergonomic keypad;
- possibility to customise both the software and the appearance: the controller can be ordered with a blue display.

Quality and product certification

The quality and safety of the infrared controllers are guaranteed by the ISO 9001 certified design and production system, as well as by the CE, UL and VDE marks.

Certification

The ir33 series fitted with the standard CAREL NTC sensor is compliant, as required by EC regulation 37/2005 of 12 January 2005, with standard EN 13485 on thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream.

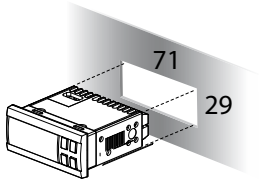
ir33 power

ir33 power has an internal 2 HP power relay for the control of high power refrigeration compressors.
The Top version has 3 relays, clock, infrared option and 230 Vac power supply.
This demonstrates the high technological content achieved by CAREL in encompassing such high power control components in such little space.

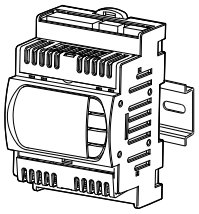
ir33 DIN

ir33 DIN rail (DN33*) is the CAREL proposal for the control of refrigeration units when a solution with DIN rail mounting is required. These devices are completely compatible with the ir33 range in terms of both software and functions. The hardware supplie is very powerful and allows the direct control of up to 2 HP compressors and the management of defrost heaters with 16 A relays.
The top-of-the-range version has 5 relays, while all models come as standard with 2 probe inputs and 3 digital inputs (the latter can be configured for probes, if required by the application).

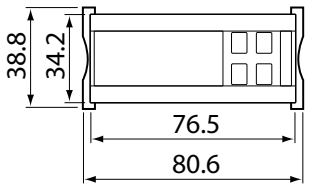
Flush mount

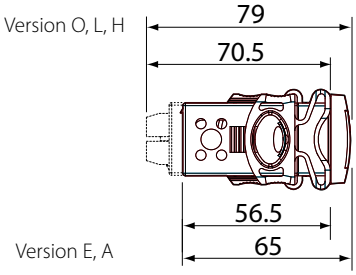


DIN rail mount

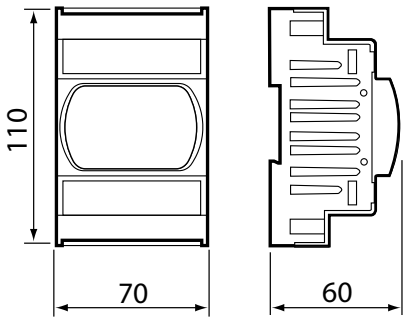


Dimensions (mm)





Dimensions (mm)



Thermometer

IR33M*

The ir33 series thermometers are fitted with a buzzer and serial connector for the complete programming of the instrument by key. The audible buzzer is especially useful for monitoring critical situations that may generate alarms. The instrument can be set using the programming key, via supervisor or remote control, if the infrared option is featured.

Technical specifications

Power supply:
- IR33M00*: 12 Vac (-15% to +10%), 50/60 Hz,
- IR33M0E*: 230 Vac (-15% to +10%), 50/60 Hz

Inputs (for all models): 2 for NTC probe, 1 multifunction digital input

Control range:
- -50T90 °C with standard CAREL NTC probes,
- -40T150 °C with extended range NTC probes;
- -50T150 °C with PTC probes

Installation: flush mount

Index of protection: IP65 when flush mounted

Accessories and options

☑ ir33 ☑ ir33 power ☐ ir33DIN

VPM Visual Parameter Manager (VPMSTDKY*)

This is a kit made up programming key, USB converter and software for managing special configurations. Using a PC, the selected configuration can be loaded directly onto the key, which is then used to program the instrument.

☑ ir33 ☑ ir33 power ☑ ir33DIN

RS485 serial connection (IROPZ48500, IROPZ485S0)

These fit directly into the connector that normally is used for programming via key; all models available can be connected to the supervisory system. Model IROPZ485S0 in particular features a microprocessor and can automatically recognise the TxRx+ and TxRx- signals. These options have been designed to remain outside of the controller and consequently can be installe it any time, even subsequently, if the system requires.

☑ ir33 ☑ ir33 power ☑ ir33DIN

Remote control (IRTRRES000)

The remote control, which is essential for some applications, has become more powerful and compact, as well as easier to use.
This accessory provides direct access to the main functions and configuration parameters, allowing ir33 to be programmed from a remote position using a group of buttons that exactly repeat the instrument keypad.

☑ ir33 ☑ ir33 power ☐ ir33DIN

Custom front panel (IROPZF*10)

This range of instruments also features customised front panels, with different logos and colours. This possibility is especially useful for manufacturers who wish to customise the instrument according to their own layout requirements.

☑ ir33 ☑ ir33 power ☑ ir33DIN

Master/Slave supervisory network (SYNCHRO*)

Synchro can be used for the intelligent supervision of up to 6 instruments in a Master/Slave network.
The following network control functions are managed for the ir33 series, ir33 DIN (correctly set): light activation, auxiliary relay activation, ON/OFF, alarm management, defrost, temperature setting, copy parameters and supervision.
Note: to make the management parameters available to the master/slave network, the programming software code PSOPZPRG00 is required.

☑ ir33 ☐ ir33 power ☑ ir33DIN

Terminal display option (IROPZDSP00 and IR00R*0000 displays)

The configuration interface can be connected, via a special optional board, to a display for reading and controlling the values measured by the third probe, locate in the hottest point of the cabinet, as specified by standard EN 441-13.
The terminal displays are available in red (IR00RR0000) and green (IR00RG0000).
The PSTCON*B0 connection cables are used, available in different lengths.
Important: the 230 Vac models with built-in transformer do not support the repeater display.

☑ ir33 ☑ ir33 power ☑ ir33DIN

Programming key (IROPZKEY*)

The programming key allows the ir33 controller to be programmed quickly, even when not powered, reducing the risk of making errors.
This accessory reduces the number of product codes handled, is a rapid and effective tool for service operations, and allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line.
Up to 6 sets of parameters can be programmed.
Versions are available with battery or external power supply.

☐ ir33 ☐ ir33 power ☑ ir33DIN

RS485 serial board (IROPZSER30)

The IROPZSER30 board allows the ir33 DIN to be connected via the RS485 serial network to the PlantVisor supervisory system, as well as direct connection of the instrument to the repeater display using a PSTC0N*B0 cable.

Table of ir33 models

Specifications	Models											
	IR33M00*	IR33M0E*	IR33S0*	IR33S0L*	IR33S0E*	IR33Y0*	IR33Y0L*	IR33Y0E*	IR33C00*	IR33C*L*	IR33C*H*	IR33F*E*
Power supply												
12 Vac/Vdc (-15 to 10%), 50/60 Hz	●	-	●	-	-	●	-	-	●	-	-	-
12/24 Vac (-15 to 10%), 50/60 Hz	-	-	-	●		-	●	-	-	●	-	-
230 Vac (-15 to 10%), 50/60 Hz	-	●	-	-	●	-	-	●	-	-	-	●
115/230 Vac (-15 to 10%), 50/60 Hz	-	-	-	-	-	-	-	-	-	-	●	-
Power input	4 VA	3 VA	4 VA	4 VA	3 VA	4 VA	4 VA	4 VA	4 VA	4 VA	6 VA	3 VA
Precision												
Std. CAREL NTC: -50T50 °C -50T90 °C	1 °C 3 °C											
High temp. NTC: -20T115 °C	1.5 °C (outside of the range in question 4 °C)											
PTC: -50T50 °C -50T150 °C	2 °C 4 °C											
Control/defrost/product probe												
Std. CAREL NTC (10 kΩ at 25 °C), -50T90 °C	●	●	●	●	●	●	●	●	●	●	●	●
High temp. NTC (50 kΩ at 25 °C), -40T150 °C	●	●	●	●	●	●	●	●	●	●	●	●
PTC (985 kΩ at 0 °C), -50T150 °C	only on IR33*7* models											
User interface												
display	LED 3 digits plus icons											
keypad	-	-	ergonomic 4 buttons									
Outputs												
compressor (depending on the model)	-	-	8 A, 16 A, 2 HP			16 A, 2 HP			16 A, 2 HP			8 A, 2 HP
defrost	-	-	-	-	-	16 A, 8 A			8 A			8 A
fan	-	-	-	-	-	-	-	-	8 A			5 A
aux/light	-	-	8 A on model IR33S0EA*			5 A on model IRY0EP*			8 A			-
Programming												
keypad	-	-	as standard									
remote control	-	infrared sensor only available on some models: IR*(R,B,M,T,Q,U,X,Z)*, and on models IR33 power: IR*(I, F, K, W)*										
key	-	as standard										
Special functions												
HACCP / Real Time Clock	-	-	function can be enabled with Real Time Clock option on models: IR*(C,B,L,T,S,U,Y,Z)*, and on models IR33 power: IR*(E,F.0,W)*									
buzzer	●	●	●	●	●	●	●	●	●	●	●	●
repeater display	-	-	standard for models with power supply: 12 Vac, 12 to 24 Vac, 115 to 230 Vac. **Important:** models with 230 Vac or 115 Vac power supply (built-in transformer) do not support the repeater display									
decimal point	●	●	●	●	●	●	●	●	●	●	●	●
CAREL network serial interface	●	●	●	●	●	●	●	●	●	●	●	●
Other												
Quality & precision: in-circuit testing	●	●	●	●	●	●	●	●	●	●	●	●
UL mark	●	●	●	●	●	●	●	●	●	●	●	●
VDE mark	●	●	●	●	●	●	●	●	●	●	●	●
Standard EN 13485 (standard on thermometers)	●	●	●	●	●	●	●	●	●	●	●	●

Relay rating as per EN60703-1:
8 A, 8 (4) A
16 A, 12(2) A
2 HP, 10(10) A
(*) ambient temperature up to 60 °C

● as standard

Table of ir33 power models

Specifications	Models			
	IR330EHA0	IR33Y0EHA0	IR33F0EHA0	IR33F0EFA0
Power supply	230 Vac			
Outputs				
compressor	2 HP, 12(10) A			
defrost	-	8 A	8 A	8 A
evaporator fan	-	-	5 A	5 A
Inputs				
ambient temperature	●	●	●	●
defrost temperature	●	●	●	●
digital input/probe 3	●	●	●	●
Plus				
HACCP	-	-	-	●
programming by key	●	●	●	●
high efficiency display	●	●	●	●
buzzer	●	●	●	●
infrared	-	-	-	●
Real Time Clock	-	-	-	●
RS485 option	●	●	●	●

Relay rating as per EN60703-1:
8 A, 8 (4) A
16 A, 12(2) A
2 HP, 10(10) A
(*) ambient temperature up to 60 °C

● as standard

Table of ir33DIN models

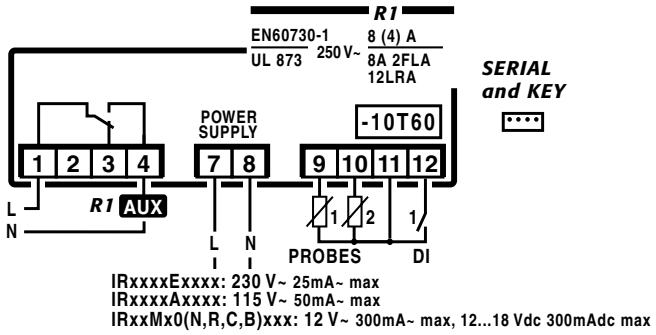
Specifications	Models								
	DN33S*0*	DN33S*L*	DN33S*E*	DN33S*H*	DN33C*L*	DN33C*H*	DN33F*E*	DN33H*0*	DN33H*H*
Alimentazione									
12 Vac/Vdc (-15 to 10%), 50/60 Hz	●	-	-	-	-	-	-	●	-
12/24 Vac (-15 to 10%), 50/60 Hz	-	●	-	-	●	-	-	-	-
230 Vac (-15 to 10%), 50/60 Hz	-	-	●	-	-	-	●	-	-
115/230 Vac (-15 to 10%), 50/60 Hz	-	-	-	●	-	●	-	-	-
Power input	4 VA	4 VA	3 VA	6 VA	4 VA	6 VA	3 VA	4 VA	6 VA
Precision									
Std. CAREL NTC: -50T50 °C -50T90 °C	1 °C 3 °C								
High temp. NTC: -20T115 °C	1.5 °C (outside of the range in question 4 °C)								
PTC: -50T50 °C -50T150 °C	2 °C 4 °C								
Control/defrost/product probe									
Std. CAREL NTC (10 kΩ at 25 °C), -50T90 °C	●	●	●	●	●	●	●	●	●
High temp. NTC (50 kΩ at 25 °C), -40T150 °C	●	●	●	●	●	●	●	●	●
PTC (985 kΩ at 0 °C), -50T150 °C	only on models DN33*7*								
User interface									
display	LED 3 digits plus icons								
keypad	ergonomic 4 buttons								
Outputs									
compressor	16 A	16 A	16 A	2 HP	16 A	2 HP	16 A	16 A	2 HP
defrost	-	-	-	-	16 A	16 A	16 A	16 A	16 A
fan					8 A	8 A	8 A	8 A	8 A
aux/light	8 A on model DN33S*0A*		8 A on model DN33S*EA*	8 A on model DN33S*HA*	8 A	8 A	8 A on models DN33F*EA* DN33F*EL* Dn33F*ET*	8 A	8 A
Programming									
keypad	●	●	●	●	●	●	●	●	●
remote control	infrared sensor only available on some models: DN*(R,B,M,T)*, and on models DN33: DN*(I,F,K,W)*								
key	●	●	●	●	●	●	●	●	●
Special functions									
HACCP / Real Time Clock	function can be enabled with Real Time Clock option on models: DN*(C,B,L,T)*, and on models DN33 power: DN*(E,F.0,W)*								
buzzer	●	●	●	●	●	●	●	●	●
repeater display	standard for models with power supply: 12 Vac, 12 to 24 Vac, 115 to 230 Vac. **Important:** models with 230 Vac or 115 Vac power supply (built-in transformer) do not support the repeater display								
decimal point	●	●	●	●	●	●	●	●	●
CAREL network serial interface	●	●	●	●	●	●	●	●	●
Other									
Quality & precision: in-circuit testing	●	●	●	●	●	●	●	●	●
UL mark	●	●	●	●	●	●	●	●	●
VDE mark	●	●	●	●	●	●	●	●	●
Standard EN 13485 (standard on thermometers)	●	●	●	●	●	●	●	●	●

Relay rating as per EN60703-1:
8 A, 8 (4) A
16 A, 12(2) A
2 HP, 10(10) A
(*) ambient temperature up to 60 °C

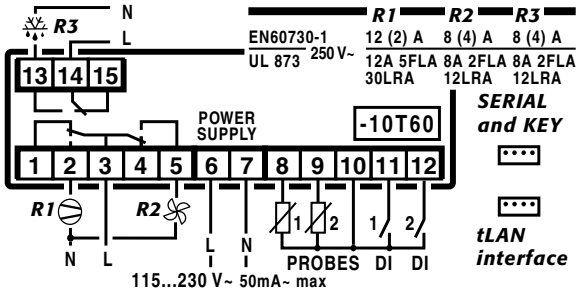
● as standard

ir33 wiring diagrams: main models

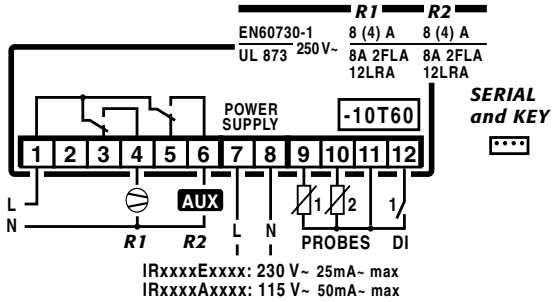
IR33S*



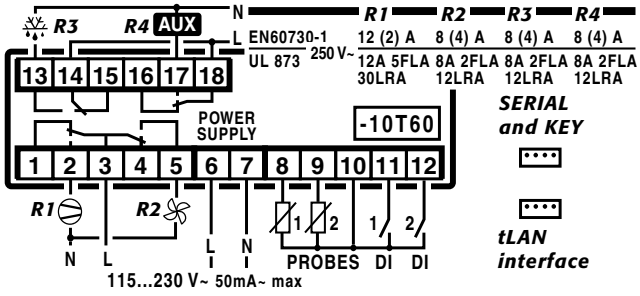
IR33F*



IR33Y*

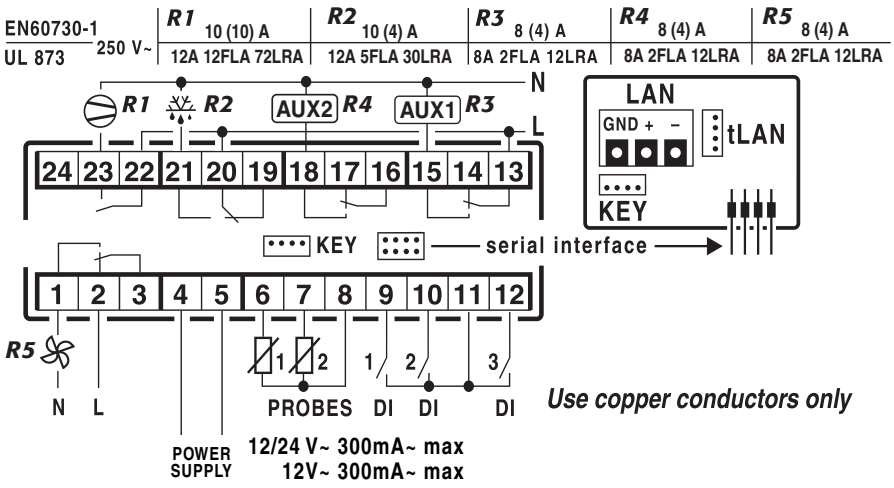


IR33C*



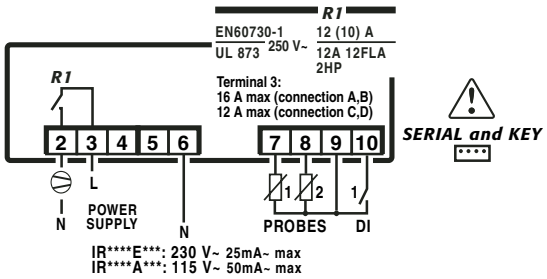
ir33DIN wiring diagrams: main models

DN33C*

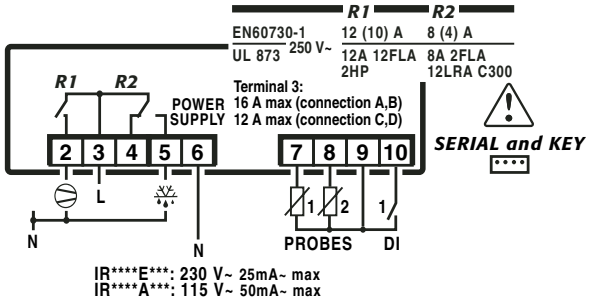


ir33power wiring diagrams: main models

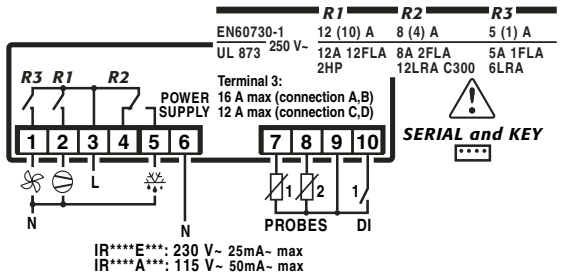
IR33S*



IR33Y*



IR33F*



easy series

In-depth knowledge of the applications in the sector and the needs of the market has allowed CAREL to design a technologically advanced product with a simple approach.

easy is the expression of CAREL's decades of experience in refrigeration and the special care it has always paid to details.

With easy, CAREL offers the market a product designed specifically for refrigeration control in bar, catering, display cabinet and refrigerated showcase applications, designed directly based on requirements "from the field", with an elegant and modern design.

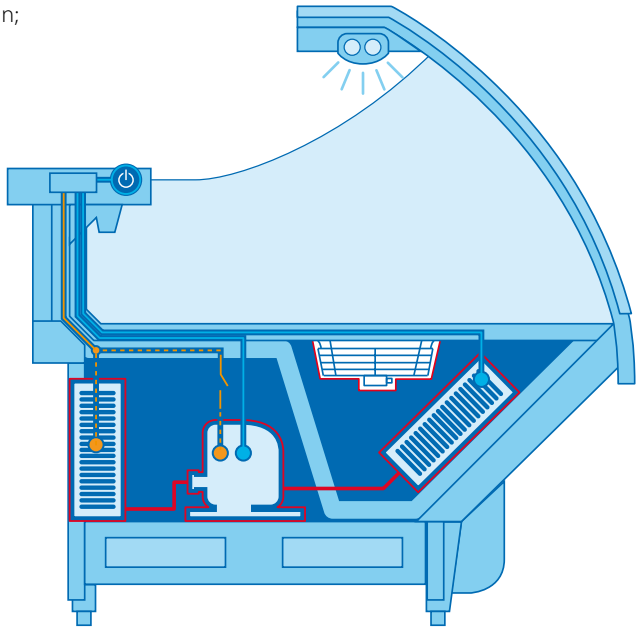
easy is a range with a wide choice of models, including a compact version that is ideal for rooms in which space is a crucial element.

easy is the best choice for simply and effectively managing the complex world of refrigeration control.

easy simplifies the initial configuration phase of the unit and features new technology for creating special models with custom functions.

Advantages

- easy programming of the parameters, with 4 predefined sets of parameters available;
- easy installation using the front mounting system;
- easy wiring, thanks to the built-in transformer and the relays with power rating up to 2 HP;
- easy to identify the best solution, thanks to the vast range of models available;
- even the software is easy to customise, thanks to its flexible design;
- easy to clean, thanks to the perfectly flat keypad;
- easy to read, high efficiency display and digits that are 27 % larger than traditional displays.



easy

PJEZ*

easy represent a range of electronic microprocessor controllers with LED display developed for the management of refrigerating units, display cabinets and showcases.
The unit can be switched on/off either from digital input or directly from the keypad.
The keypa is one of the most innovative aspects of this instrument. The completely flat surface allows easy cleaning and ensures a greater hygiene, in complete compliance with the HACCP directive.

easy compact

PJEZ*

The PJEZS* compact models are designed for the management of static refrigerating units (no fan on the evaporator) operating at temperatures above 0 °C. The PJEZM* compact models are the thermometer versions.

easy compact is the ideal solution for applications where the space available for housing the controller is limited: the depth occupie internally is just 31 mm, while still featuring 2 HP relay outputs for the control of refrigeration compressors without requiring additional intermediate relays.

Technical specifications: easy & easy compact

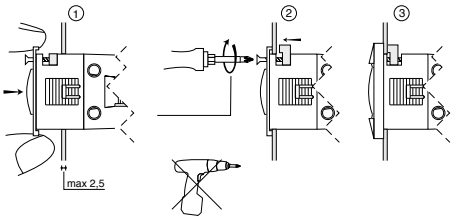
Power supply:
- easy: NTC or PTC probe (depending on the model) 1 or 3 inputs. Digital input as alternative to third probe;
- easy compact: 230 V 1~, -10% +15% 50/60 Hz 115 V 1~, -10% +15% 50/60Hz; 12 Vdc ±10% o 12 Vac, ±10% 50/60 Hz (only on PJEZM* no AUX relay);

Operating conditions:
-10T50 °C, humidity <90% rH non-condensing
Storage conditions:
-20T70 °C, humidity <90% rH non-condensing
Inputs (depending on the model):
- easy: NTC or PTC probe (depending on the model) 1 or 3 inputs;
- easy compact: NTC or PTC probe (depending on the model) 1 or 2 inputs

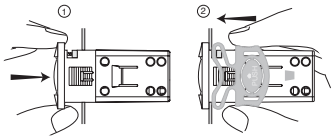
Digital inputs: easy: as alternative to third probe
Terminal installation: using screws from front or rear brackets
Index of protection: panel mount with gasket IP65

DIN rail mount

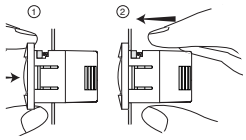
Front



Rear

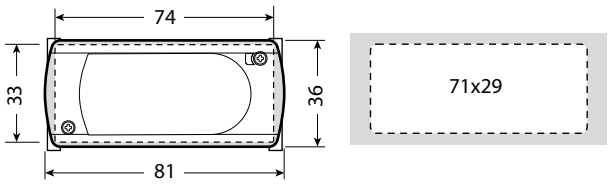


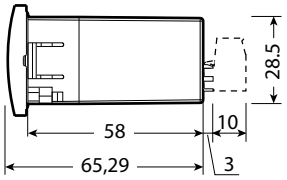
easy



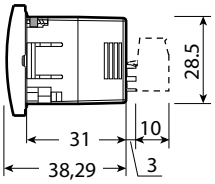
easy compact

Dimensions (mm)





easy



easy compact

Accessories and options

Temperature probes with NTC thermistor (NTC*)

Temperature probes with NTC thermistor
The precision achieved due to the technical solutions adopte in the development of the sensor, and the reliability resulting from the tests performed, make the CAREL NTC probes reliable and affordable transducers for measuring temperature.

Removable faceplate (PEOPZ*)

Nowadays it is essential on the latest generation instruments to be able to customise the appearance of the controller by simply replacing the faceplate, adding the desired colour or the company logo.

RS485 serial connection (IROPZ48500, IROPZ485S0)

These fit directly into the connector that normally is used for programming via key; all models available can be connected to the supervisory system.
Model IROPZ485S0 in particular features a microprocessor and can automatically recognise the TxRx+ and TxRx- signals. These options have been designed to remain outside of the controller and consequently can be installe it any time, even subsequently, if the system requires..

Programming key (IROPZKEY*)

The programming key allows the controller to be programmed quickly, even when not powered, reducing the risk of making errors.
This accessory reduces the number of product codes handled, is a rapid and effective tool for service operations, and allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line.
Up to 6 sets of parameters can be programmed.
Versions are available with battery or external power supply.

VPM Visual Parameter Manager (VPMSTDKY)

This is a kit made up programming key, USB converter and software for managing special configurations.
Using a PC, the selected configuration can be loaded directly onto the key, which is then used to program the instrument.

Models

Specifications	compressor	defrost	evaporator fans	auxiliary output	ambient temperature	defrost temperature	digital input/ probe 3	RTC	serial output	display	buzzer	front mounting	fastening brackets	plug-in terminals
easy compact 230 Vac														
PJEZMNN0E0	-	-	-	-	●	-	-	-	-	red	-	●	-	-
PJEZSNP0E0	16 A	-	-	-	●	-	-	-	-	red	-	●	-	-
PJEZSNP010	16 A	-	-	-	●	●	-	-	●	red	-	●	●	-
PJEZSNP000	16 A	-	-	-	●	●	-	-	●	red	-	●	●	●
PJEZSNH0E0	2 HP	-	-	-	●	-	-	-	-	red	-	●	-	-
PJEZSNH010	2 HP	-	-	-	●	●	-	-	●	red	-	●	●	-
PJEZSNH000	2 HP	-	-	-	●	●	-	-	●	red	-	●	●	●
easy 12 Vac														
PJEZS002E0	8 A	-	-	-	●	-	-	-	-	red	●	●	-	-
PJEZY002E0	8 A	8 A	-	-	●	-	-	-	-	red	●	●	-	-
easy 115 Vac														
PJEZS00100	8 A	-	-	-	●	●	●	-	●	red	●	●	●	●
PJEZS0P1E0	16 A	-	-	-	●	-	-	-	-	red	●	●	-	-
PJEZS0P100	16 A	-	-	-	●	●	●	-	●	red	●	●	●	●
PJEZS0G100	2 HP	-	-	8 A	●	●	●	-	●	red	●	●	●	●
PJEZC00100	8 A	8 A	8 A	-	●	●	●	-	●	red	●	●	●	●
easy 230 Vac														
PJEZM0N010	-	-	-	-	●	●	●	-	●	red	●	●	●	-
PJEZS000E0	8 A	-	-	-	●	-	-	-	-	red	●	●	-	-
PJEZS00000	8 A	-	-	-	●	●	●	-	●	red	●	●	●	●
PJEZS0P0E0	16 A	-	-	-	●	-	-	-	-	red	●	●	-	-
PJEZS0P000	16 A	-	-	-	●	●	●	-	●	red	●	●	●	●
PJEZS0A000	8 A	-	-	8 A	●	●	●	-	●	red	●	●	●	●
PJEZS0H000	2 HP	-	-	-	●	●	●	-	●	red	●	●	●	●
PJEZS0G000	2 HP	-	-	8 A	●	●	●	-	●	red	●	●	●	●
PJEZS0GG00	2 HP	-	-	8 A	●	●	●	-	●	green	●	●	●	●
PJEZS0GB00	2 HP	-	-	8 A	●	●	●	-	●	blue	●	●	●	●
PJEZX00000	8 A	8 A	-	-	●	●	●	-	●	red	●	●	●	●
PJEZY00000	8 A	8 A	-	-	●	●	●	-	●	red	●	●	●	●
PJEZY00010	8 A	8 A	-	-	●	●	●	-	●	red	●	●	●	-
PJEZY0H000	2 HP	8 A	-	-	●	●	●	-	●	red	●	●	●	●
PJEZC00000	8 A	8 A	8 A	-	●	●	●	-	●	red	●	●	●	●
PJEZC0P000	16 A	8 A	8 A	-	●	●	●	-	●	red	●	●	●	●
PJEZC0M000	2 HP	8 A	8 A	-	●	●	●	●	●	red	●	●	●	●
PJEZC0MG00	2 HP	8 A	8 A	-	●	●	●	●	●	green	●	●	●	●
PJEZC0MB00	2 HP	8 A	8 A	-	●	●	●	●	●	blue	●	●	●	●

E198839

Solutions for blast chillers and freezers

Blast Chiller is a complete range of controllers and user terminals that, in the top version with graphic display, can satisfy the needs of even the most demanding users looking for innovative solutions.

Advantages

- **user friendliness:** Intuitive graphic display complete with icons that guides the user with instructions and tips;
- **hygiene:** easy to clean thanks to the user interface designed for applications in environments where foodstuffs are handled;
- **customisation:** wide choice of easy-to-customise options thanks to the plastic faceplate and the membrane keypad;
- **multifunction:** standard or custom cycles with up to 3 completely configurable phases;
- **standards compliance:** availability of complete HACCP reports for the monitoring of foodstuffs;
- **energy saving:** by selecting or creating the most suitable cycle for the product.

Energy saving & HACCP

Compared to traditional management, Blast Chiller guarantees a reduction in power consumption, thus reducing costs and respecting the environment.

Once the most suitable chilling or freezing cycle has started, the controller ensures that the foodstuffs are brought to the desired temperature within the set time limits.

This solution guarantees control of the temperature of the foodstuffs store in compliance with the HACCP standards.
If needed, critical situations can be signalled, relating to both the temperature and time limits.

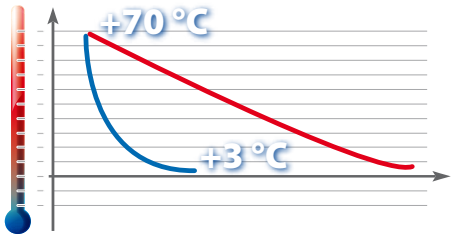
Custom appearance

The removable plastic faceplate (6 buttons) for assembly from the front, and the membrane keypad (8 buttons + 3 LEDs) for assembly from the rear, completely customisable, allow the instrument to be installe in perfect harmony with the design of the application.

Piercing probes (NTCINF*)

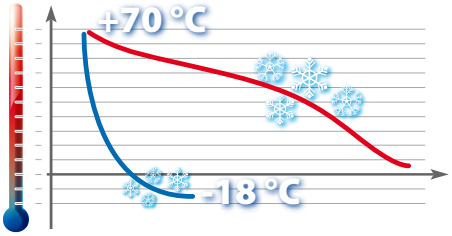
Piercing probes are available for measuring the temperature in the heart of the product, in versions with or without preheater..

Quick chill



without blast chiller
with blast chiller: reduces the time that the product is exposed to the high-risk temperature (for bacterial proliferation)

Quick freeze



without blast chiller
with blast chiller: avoids the formation of macrocrystals, assisting the formation of microcrystals

Blast Chiller

BC00S*, BC00X*

Blast Chiller is based on the pCO series programmable platform and features a graphic interface (pGD[1] series) offering a simple menu (including multiple languages) and complete icons.
Main functions:

- chilling and freezing cycles in compliance with standards (time or temperature, hard or soft);
- conservation phase;
- Management of special functions or settings:
- creation of completely customisable cycles;
- smart defrosts for energy saving;
- optimum time management thanks to the built-in clock.

The top-of-the-range version, as well as being more powerful due to the higher number of inputs/outputs, can also manage PT1000 sensors, allowing higher temperatures to be measured (in particular for the piercing probe).

Access levels

Blast Chiller features three different levels of access, protected by password:

- **typical user level:** the chef has access to the main functions, such as the chilling/freezing cycles, the storage phase, the HACCP reports and the sterilisation of the unit, using a simple and user-friendly graphic menu;
- **installer/maintenance level:** offers the possibility to configure the main unit operating parameters;
- **expert user level:** to customise/adapt the controller to the unit through more detailed configuration of the parameters.

Technical specifications

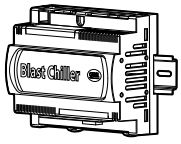
Low end

Power supply: 24 Vac 10 to -15% 50/60 Hz & 24 to 48 Vdc 10 to -20%
Power input: 8 W
Digital inputs: maximum 6 not optically isolated with voltage-free contact;
Analogue inputs: maximum 4
Digital outputs: maximum 2 SSR outputs (outputs 4 & 5)
Analogue outputs: maximum 2 not optically isolated
Operating conditions: -10T60 °C, 90% rH non-condensing (standard vers.) -25T70 °C, 90% rH non-condensing (extended range vers.)
Storage conditions: -20T70, 90% rH non-condensing (standard vers.) -40T70 °C, 90% rH non-condensing (extended range vers.)
Index of protection: IP20, IP40 front panel only

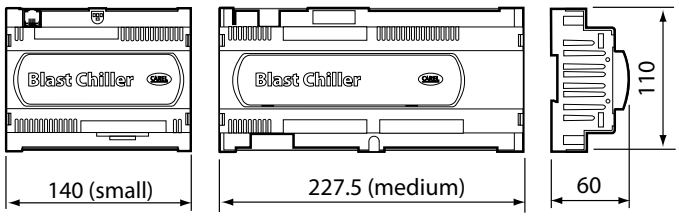
Top end

Power supply: 24 Vac 10 to -15% 50/60 Hz & 28 to 36 Vdc 10 to -20%
Maximum power input with terminal connected: 40 VA (Vac), 15 W (Vdc)
Digital inputs: maximum 8 optically isolated
Analogue inputs: maximum 5
Digital outputs: maximum 1 SSR output (output 7)
Analogue outputs: maximum 4 optically isolated, 0 to 10 Vdc
Operating conditions: -05T70 °C, 90% rH non-condensing
Storage conditions: -40T70 °C, 90% rH non-condensing
Index of protection: IP20, IP40 front panel only

DIN rail mount



Dimensions (mm)



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E198839

Comply with EN13485

PJ32C split 2 HP version

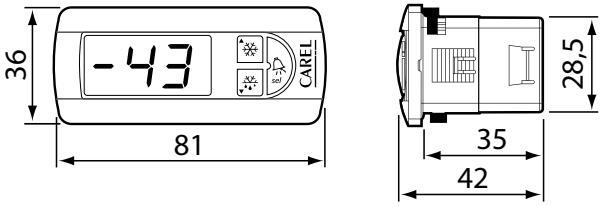
PJ32C0*0*

This is further step forward in the reduction of wiring and components. The power board has been designed to eliminate the need for the auxiliary terminal block. This is in fact the forerunner of a new generation of controllers that combine the control and power components of the unit. As well as the typical advantages of the plug-in series, one feature worth highlighting is the management of up to two 2 HP compressors, with the start of the second compressor delayed from the first by 4 seconds. The defrost relay is rated for up to 3200 W.

Technical specifications

Power supply: 230 Vac (-15 to 10%), 50/60 Hz
Power input: 4 VA
Control range: -50T90 °C; resolution 1 °C
Outputs: 1 relay 14 (2) A (defrost); 1 relay 6 (2) A (fan); 2 relays 10 (10) A (compressor 2 HP)
Type of probe: NTC or PTC depending on the model
Connections: fixed screw terminals or plug-in terminals
Maximum rated current per terminal: 12 A
Installation: flush mount with fastening from front or rear brackets (terminal); wall mounting, 4 screws with spacing 101x151 mm (power board)
Plastic case dimensions (power board): 190x140x70 mm
Index of protection: IP65 with flush mount and gasket inserted

Dimensions (mm)



Accessories and options

Optional RS485 module (PJOPZ485*)

This allows the plug-in series instruments, "top" versions, to be connected to CAREL supervisory systems. It in fact provides a RS485 serial port used by the CAREL supervisory network.
The module features a plastic container with DIN rail mounting that can be easily fitte inside the electrical panel and connected to the instrument using the special cable with connector (L=50 cm). This serial accessory is optically isolated from the RS485 line..

Optional HACCP module (PJOPZHACP*)

The optional module with "HACCP" Real Time Clock is an essential accessory for ensuring the temperature control of stored food products in compliance with the requirements of the HACCP standards. The controller automatically monitors the unit, signalling any critical situations. It provides a warning signal if the set limits are exceeded, saving the temperature reache ind the duration of the event to EEPROM (permanent memory). Furthermore, it signals power failures in the event where this affects the maintenance of the required temperature.

Programming key (PJOPZKEY*)

The programming key allows the instrument to be programmed quickly when not powered, with the certainty of not having made errors. It reduces the number of product codes handle ind allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line. This is certainly also an important tool for the service network.

Package of 30 frames (PJOPZF*)

The frames are available in a vast range of colours, and can be customise iccording to different requirements, with the logo and/or name of the manufacturer. They can also be personalise in terms of layout, including, for example, an ON/OFF switch, light switch, fuses, etc. In this way, the OEM, without compromising on the standardisation of the components and the processing of the refrigeration unit, can easily integrate the controller into the design of their products.

Accessories

A series of accessories is available, including:
- long frames with the possibility of including mechanical switches/butt (PJOPZFG*);
- mechanical switches or buttons (PJOPZS*);
- transparent protection cover (PBOPZCTR*);
- resin-bonded hole cover labels, with the CAREL logo, with the hole on the right or left (PJOPZLR*).

E198839

Comply with EN13485

PJ heating/cooling

PJ32 heating/cooling is a complete range of thermostats, with models featuring 1 to 3 relays, NTC or PTC probes.
This product can also manage applications that are not strictly "cooling" only, but also generic applications with control temperatures from -50 to 150 °C, specifically in the catering sector. The version with 1 output performs the function of a thermostat, while the model with 2 outputs also allows the management of a second probe, with dead zone operation, alarm relay and change set point from digital input. The model with 3 outputs always features the alarm output, as well as the control outputs. Models are also available for the control of "wine coolers" (PJNZ*), featuring a heating output and a coiling output with defrost management.

Advantages

- integrate the cooling controller with applications related to heating;
- maintain the same "family" feel as the PJ32 series for refrigeration;
- feature the same hardware performance as the PJ32 series for refrigeration;
- manage two independent set points, with two probes and two control relays (dual thermostat functions);
- assembly from the front for the rapid installation of the instrument;
- programming key;
- ergonomic keypad with three buttons;
- CE and UL quality certification.

pj32

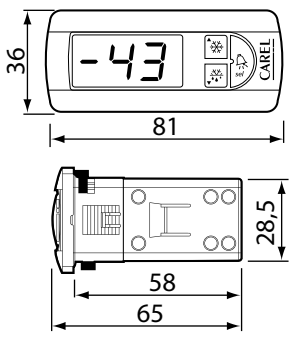
PJ32V*, PJ32W*, PJ32Z*, PJNZ*

Technical specifications

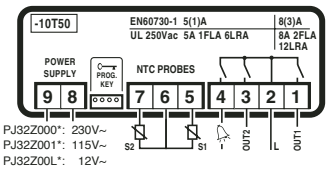
- **Power supply:**
  PJ32*V*: 12 Vac (-15 to +10%) or 12 Vdc, 50/60 Hz;
- PJ32*W*: 230 Vac (-15 to +10%), 50/60 Hz;
- PJ32*Z*: 115 Vac (-15 to +10%), 50/60 Hz

Operating cond.: -10T50 °C, <90% rH non-cond.
Stotìrage cond.: -20T70 °C, <90% rH non-cond.
Inputs: 1 or 2 for NTC or PTC probe; 1 digital input as alternative to second probe
Outputs: up to 2 control relays & 1 alarm relay depending on the model
Installation: flush mount
Index of protection: IP65 when flush mounted & gasket inserted

Dimensions (mm)



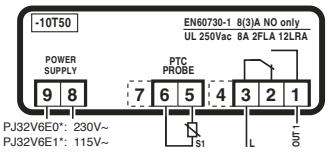
PJ32Z00*



PJ32Z000*: 230V~
PJ32Z001*: 115V~
PJ32Z00L*: 12V~

0=NTC probes
6= PTC probes

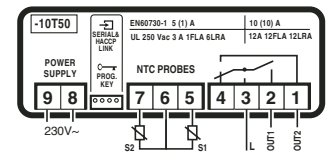
PJ32V6E*



PJ32V6E0*: 230V~
PJ32V6E1*: 115V~

0=NTC probes
6= PTC probes

PJNZW00*



0=NTC probes
6= PTC probes
& PJNZW*
(wine coolers)

Accessories and options

Programming key (PJOPZKEY*)

The programming key allows the instrument to be programmed quickly when not powered, with the certainty of not having made errors. It reduces the number of product codes handle ind allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line. This is certainly also an important tool for the service network.

Package of 30 frames (PJOPZF*)

The frames are available in a vast range of colours, and can be customise iccording to different requirements, with the logo and/or name of the manufacturer. They can also be personalise in terms of layout, including, for example, an ON/OFF switch, light switch, fuses, etc. In this way, the OEM, without compromising on the standardisation of the components and the processing of the refrigeration unit, can easily integrate the controller into the design of their products.

E198839

Comply with EN13485

powersplit

powersplit is the new controller for multiplexed cabinets with on-board compressors. Thanks to the continuous monitoring of a series of features, such as: critical events (HACCP), the local network, the connection to the supervisory and telemaintenance systems, the power relay outputs, the terminal block on the board and the optical light sensor, the powersplit controller represents the top of the range. powersplit is not just a controller, but rather a range of products, available in configurations with 4 or 6 outputs, and with or without built-in clock.

Advantages

- Reduction in wiring and components inside the electrical panel;
- programming key;
- works in a local network for the management of synchronised defrosts (1 master + 5 slaves);
- in the models fitted with Real Time Clock, the HACCP functions are incorporated;
- pleasant appearance;
- removable and customisable faceplate;
- display with limited case depth;
- serial communication between the display and power boards to guarantee greater immunity against electromagnetic disturbance.

The local network

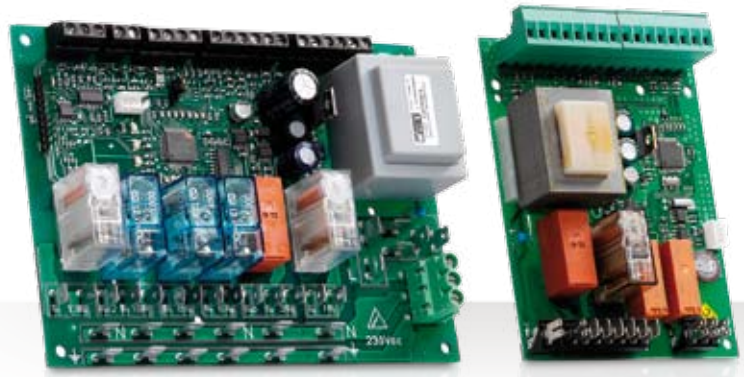
powersplit allows the unit to be manage is a series of sections via a local network.
The use of a powersplit local network allows a reduction in wiring and more rational management of the sections. With the local network, in fact, the control functions can be centralised on just one display. This means that when pressing the light button, the command is transferred via the serial line to all the boards, which activate the light relay at the same time, all without requiring additional wiring. The same is true for the ON/OFF, manual defrost, continuous cycle and AUX commands. The local network also allows the alarms from the various controllers, that is, the different sections of the cabinet, to be centralised onto just one terminal. In addition, the defrosts can be synchronised: the defrost starts at the same time in all the sections, and ends independently according to the status of each section.
The following refrigeration phase is starte it the same time for all the sections when the defrost process is complete.

EN 441 conformity

powersplit satisfies the requirements of the EN441 standard that defines the criteria for temperature measurement on the refrigeration units. This provides precise indications regarding the position of the temperature probe, which must be able to display the "hot point" (this does not normally coincide with the controlled temperature). powersplit accepts the third probe for the "hot point".

Certification:

The powersplit series fitted with the standard CAREL NTC sensor is compliant, as required by EC regulation 37/2005 of 12 January 2005, with standard EN 13485 on thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream.



powersplit

PSB*: controller for multiplexed cabinets with on-board compressorsor

Available in configurations with 4 or 6 outputs, and with or without built-in clock. powersplit is designed to reduce wiring and the power components required, with a consequent reduction in the number of codes manage ind therefore costs.
All with the maximum reliability of a standard product. The power board has been designed to eliminate the use of the support terminal block.

powersplit small

powersplit is available in a compact version of powersplit with 4 relay outputs: powersplit small.
In this new model, the RS485 serial and clock boards have been integrated directly into the printed circuit and consequently are include is standard. New software functions have also been added that make this product ideal for applications such as supermarket showcases.

HACCP conformity

In the models fitted with a clock, HACCP management is standard. This guarantees the temperature control of stored food products in compliance with the requirements of the HACCP system. The parameters are set directly in the instrument, and the limits of time and temperature required by the standards for stored food can also be set. The controller automatically monitors the unit, signalling any critical situations. It provides a warning signal if the set limits are exceeded, saving the temperature reache ind the duration of the event to EEPROM (permanent memory). Furthermore, it signals power failures in the event where this affects the maintenance of the required temperature. All the data can be easily read on the instrument, and the alarm events are signalle iutomatically

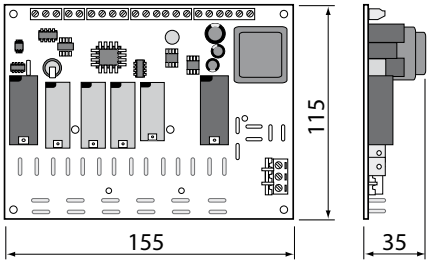
Technical specifications

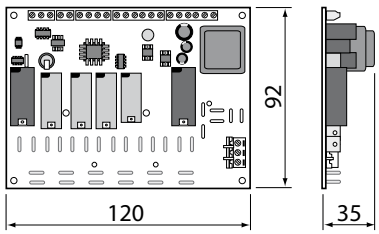
Power supply: 230 Vac (±10%), 50/60 Hz or 115 Vac (PSB*11100)
Control range:
-50T90 °C, resolution 0.1 °C
Inputs: 3 for NTC probes; 2 digital for voltage-free contact, not optically isolated
Outputs:
- 1 NO relay 10 (10) A 250 Vac (compressor 2 HP);
- 1 SPDT relay 14 (2) A 250 Vac (defrost);
- 2 relays 4 (2) A (fan & alarm);
- 1 relay 10 (10) A 250 Vac (aux 1 & light); 1 relay 4 (2) A (aux 2)

Outputs on powersplit small:
- 1 SPDT relay 6 (4) A (compressor);
- 1 SPDT relay 12 (2) A & 14 (2) A 250 Vac (defrost);
- 1 NO relay 10 (10) A 250 Vac (light);
- 1 SPDT relay 2 (2) A changeover or 6 (4) A (alarm/aux)

Connections: max. continuous current for all relay activated 25 A total
Serial connection: LAN, two wire AWG22-24 max. 10 m; powersplit small: LAN three-wire max 10 m.; RS485 three-wire max. 500 m
Clock (when featured): RTC management of dd: hh: mm: ss: weekday (0-7), RTC data stored with rechargeable lithium battery 7 mA/h, complete recharge in around 20 hours (equivalent to around 6 months operation at full charge)
Installation: wall mounted using plastic or metal spacers.

Dimensions (mm)





user terminals

PST*

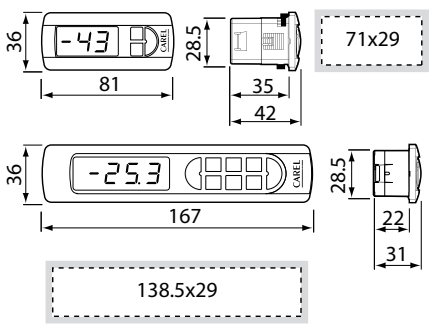
Small display

This terminal has the same appearance and drilling template (32x74 mm) as all the controllers in the plug-in series. The innovations introduced with this new-concept controller have been focussed on maintaining the same "family feeling" for those who use the instruments in the plug-in range. This is important in both aesthetic and functional terms, as new users of this controller require very little time to be able to fully exploit all the functions.

Large display

As well as being aesthetically pleasing, this display features numerous functions. The display has 4 digits, the keypad has silicone buttons and is thus more ergonomic and reliable than the classic polycarbonate version, the buttons are backlit and easy to use, providing direct access to the functions: HACCP, light, defrost and continuous cycle. This display can also be easily and economically customised, thanks to the removable faceplate.
One very important dimension is the depth: just 22 mm.

Dimensions (mm)



Accessories and options

Programming key (PJOPZKEY*)

The programming key allows the instrument to be programmed quickly when not powered, with the certainty of not having made errors. It reduces the number of product codes handle ind allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line. This is certainly also an important tool for the service network.

RS485 serial option (FCSER*)

powersplit has been designed for the management of plug-in showcases, and offers serial connection to a local network as standard. The local network allows optimised operation of units with a series of evaporators.
By adding the RS485 option, the local network connection for PlantVisor supervisory and remote management system is no longer required.

Terminal display (PST*VR*)

This can be connecte in parallel with the interface for setting the parameters.
It displays the temperature of the third probe locate in the hottest point of the cabinet, as envisaged by standard EN 441-13.

Light sensor (PSOPZLHT*)

This measures the variations in light inside the refrigerated compartment, thus allowing the controller to activate the functions feature is a response to the opening of the door.
This represents a significant advantage, considering that just one sensor replaces a series of micro-switches on the doors.

VPM Visual Parameter Manager (VPMSTDKY)

This is a kit made up programming key, USB converter and software for managing special configurations.
Using a PC, the selected configuration can be loaded directly onto the key, which is then used to program the instrument.

Master/Slave supervisory network (SYNCHRO*)

Synchro can be used for the intelligent supervision of up to 6 instruments in a Master/Slave network. The following network control functions are managed for the ir33 series, ir33 DIN (correctly set): light activation, auxiliary relay activation, On/Off, alarm management, defrost, temperature setting, copy parameters and supervision.

Note: to make the management parameters available to the master/slave network, the programming software code PSOPZPRG00 is required.

Large cover (PBOPZCTR*)

This transparent cover is available in single packages and multiple packages.

powersplit table

PS* models						
Specifications	**B*0000**	**B*1000**	**B*0100**	**B*1100**	**B*11100**	**powersplit small B*1S10**
Power supply						
230 Vac ±10% 50/60 Hz	●	●	●	●	-	●
115 Vac ±10% 50/60 Hz	-	-	-	-	●	-
Inputs						
ambient temperature	●	●	●	●	●	●
defrost temperature	●	●	●	●	●	●
product temperature	●	●	●	●	●	●
ON/OFF	●	●	●	●	●	-
Outputs (relay rating: see instruction sheet)						
compressor	2 HP	2 HP	2 HP	2 HP	2 HP	8 A
defrost	16 A	16 A	16 A	16 A	16 A	16 A
alarm	16 A	16 A	10 A	10 A	10 A	-
evaporator fan	10 A	10 A	10 A	10 A	10 A	-
light/aux1	-	-	16 A	16 A	16 A	-
aux2	-	-	10 A	10 A	10 A	-
light	-	-	-	-	-	16 A
alarm/aux1	-	-	-	-	-	8 A
Special functions						
HACCP	-	●	-	●	●	●
easy link (connectors for key & serial card)	●	●	●	●	●	●
Real Time Clock	-	●	-	●	●	●
LAN connection	●	●	●	●	●	●
RS485 option	●	●	●	●	●	●

● as standard

User terminals table

PST* display models				
Specifications	**VR1***	**LR2***	**LR4***	**SR3***
Inputs				
ambient temperature	-	-	-	●
ON/OFF	●	-	-	●
Special functions				
quick mounting	●	-	-	●
backlit keypad	●	-	●	●
buzzer	-	●	●	●
RS485 option	●	●	●	●
infrared receiver	-	●	-	-

● as standard

c UL us
E198839

Comply with EN13485

powercompact series

powercompact is the new CAREL proposal for the control of stand-alone refrigeration units; it is especially suitable for applications that require high power for switching the loads, a significant number of outputs, functions and control with direct access from the keypad, a high IP of the front panel and at the same time a compact design that significantly reduces overall dimensions.
This series is a complete range of products and accessories that ensure ease-of-use for the installer and optimise production times for the manufacturer, typically in the case of mass production.
Configurations are available with 2, 3, 4 and 5 relays, including 2 HP relays for the compressors, and featuring a switching power supply with an extended voltage range (115/230 Vac).
The continuous monitoring of critical events (HACCP), the possibility of connection to supervisory and telemaintenance systems, the presence of power relay outputs, the connection terminal block fitted on the rear of the board, the programming key as standard, and the repeater display, are all characteristics that place the powercompact at the top of the CAREL range of refrigeration controllers

Large display

powercompact is fitted with a very powerful and attractive display, featuring 3 digits plus decimal point, a plus/minus sign and an icon, simplifying the reading of the values and the operating status. The ergonomic silicon keypad allows direct access to the HACCP, light, defrost and continuous cycle functions.

RTC

This accessory is used to log detailed data, as well as to program real time defrost cycles (rather than preset defrost intervals). The RTC ensures compliance with the HACCP standards.

Connection terminal block

powercompact features a power terminal block for the direct connection of the loads, without the presence of the common terminal. In addition, the use of relays with changeover contacts ensures maximum flexibility in the connections to the panel. The terminal block is available with screw terminals or removable spade connectors so as to satisfy the needs of all manufacturers and installers.

Extended range switching power supply

The possibility to operate over an extended range of power supply voltages (115 Vac to 230 Vac) in the range of refrigeration controllers ensures maximum performance, reducing dimensions and costs. In addition, it allows the powercompact to operate at temperatures as high as 65 °C.

Certification

The powercompact series fitted with the standard CAREL NTC sensor is compliant, as required by EC regulation 37/2005 of 12/012005, with standard EN13485 on thermometers air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream.

powercompact basic and top

PB00*

Basic version

This version with 230 Vac power supply directly from the mains has 2 or 3 relay outputs. The controller features a built-in transformer that guarantees double insulation, and can be programmed from the keypad or using an external key that allows the configuration of the instrument without needing to plug it in to the power supply.

Top version

This version features 4 or 5 relay outputs, depending on the model. All the models are fitted with a switching power supply, which allows the instrument to operate directly from 115 to 230 Vac. A repeater temperature display can be connected to all models, while some versions are available with built-in clock and infrared remote control to access the control parameters.

The standard supply includes a series of digital inputs that can alternatively be configure is NTC probe inputs. This dual possibility allows the following functions:

- third temperature point monitoring (the reading can be shown on a repeater display);
- complete and independent "end defrost" management, by configuring additional parameters;
- condenser fan management using the auxiliary output;
- signalling of high temperature alarms and the need for maintenance on the unit.

Technical specifications

Power supply:

- PB00*E*: 230 Vac ±10%, 50/60 Hz;
- PB00*H*: 115/230 Vac ±10%, 50/60 Hz

Operating conditions:
-10T65 °C, <90% rH non-cond.

Storage conditions:
-20T70 °C, <90% rH non-cond.

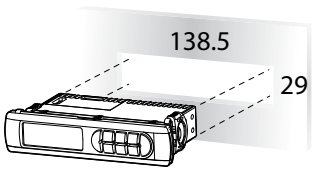
Inputs: 2 for NTC or PTC probes, 2 digital configurable as probe inputs

Outputs:

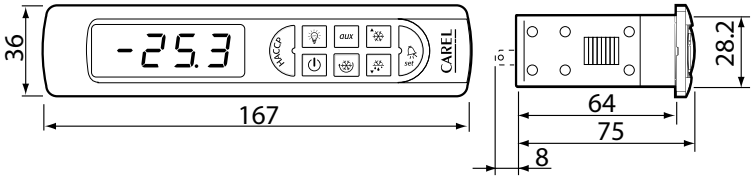
- PB00*E*:
  1 relay 8 (4) A 250 Vac (compressor);
  1 relay 8 (4) A 250 Vac (defrost);
  1 relay 5 (1) A 250 Vac (fan);
  1 relay 8 (4) A 250 Vac (light/aux1) depending on the model;
- PB00*H*:
  1 relay 12 (2) A 250 Vac (comp. 16 A) or 1 relay 10 (10) A 250 Vac (comp. 2 HP);
  1 relay 12 (2) A or 6 (4) A 250 Vac (defrost);
  1 relay 8 (4) A 250 Vac (fan);
  1 relay 8 (4) A 250 Vac (light/aux1);
  1 relay 8 (4) A 250 Vac (aux2) depending on the model

Installation: flush mount
Index of protection: IP65, when flush mounted & gasket inserted

Flush mount with fastening from front



Dimensions (mm)



powercompact small

PB00*S*

powercompact small is the ideal solution for applications where the space available to house the controller is particularly limited, and the ambient operating conditions are quite difficult; the depth occupie inside the electrical panel is just 40 mm.

Currently, the range is made up of a version for normal temperature cabinets, and two versions for low temperature applications, including a Top model fitted with real time clock.

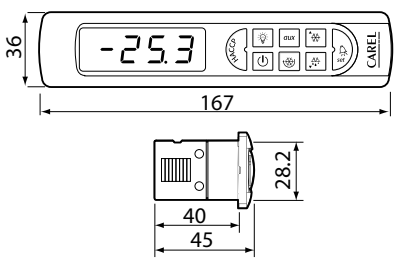
All the versions feature an uprated relay for controlling refrigeration compressors up to 2 HP.

Technical specifications

Power supply: 115/230 Vac (switching), 50/60 Hz
Operating conditions:
-10T65 °C, <90% rH non-cond.
Storage conditions:
-20T70 °C, <90% rH non-cond.
Inputs: 2 for NTC or PTC probes, 2 digital configurable as probe inputs
Outputs (depending on the model):
- 1 relay 250 Vac, 12 (10) A (compressor 2 HP);
- 1 relay 250 Vac, 8 (4) A (defrost);
- 1 relay 250 Vac, 5 (1) A (fan);
- 1 relay 250 Vac, 8 (4) A or 5 (1) A (aux1)

Installation: flush mount
Index of protection: IP65, when flush mounted & gasket inserted

Dimensions (mm)



powercompact wide

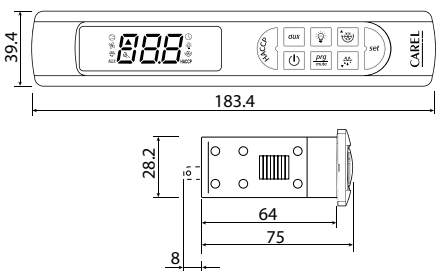
PB00*

The wide version makes this family of instruments even more complete and flexible: as well as being compatible with the CAREL standard, this version is compatible with the assembly spaces used for other instruments available on the market (drilling template).

The wide model will also fit the stainless steel faceplate for perfect integration with the refrigeration unit, especially in professional catering applications.

Available also with blue LEDs.

Dimensions (mm)



powercompact with polycarbonate

PB00*

The unique features of this version, designed specifically for the food industry, include an attractive design and perfectly flat ergonomics, making it easy to clean the instrument and providing a high index of protection on the front panel. This model is designed to be completely and seamlessly integrate into the application.

One very important feature is the possibility to customise of the keypad/polycarbonate, based on customer requirements (e.g. reducing the number of buttons).

Accessories and options

Master/Slave supervisory network (SYNCHRO*)

Synchro can be used for the intelligent supervision of up to 6 instruments in a Master/Slave network. The following network control functions are managed for the ir33 series, ir33 DIN (correctly set): light activation, auxiliary relay activation, On/Off, alarm management, defrost, temperature setting, copy parameters and supervision.

Note: to make the management parameters available to the master/slave network, the programming software code PSOPZPRG00 is required.

RS485 serial connection (IROPZ48500, IROPZ485S0)

This is easily fitted to the same connector that is normally used for the programming key; all models available can be connected to the supervisory system.
Model IROPZ485S0 in particular features a microprocessor and can automatically recognise the TxRx+ and TxRx- signals.
These options have been designed to remain outside of the controller and consequently can be installe it any time, even subsequently, if the system requires.

Terminal display option (IROPZDSP00 and IR00R*0000 displays)

The configuration interface can be connected, via a special optional board, to a display for reading and controlling the values measured by the third probe, locate in the hottest point of the cabinet, as specified by standard EN 441-13.

The terminal displays are available in red (IR00RR0000) and green (IR00RG0000).
The PSTCON*B0 connection cables are used, available in different lengths.
Important: the 230 Vac models with built-in transformer do not support the repeater display.

Programming key (PJOPZKEY*)

The programming key allows the instrument to be programmed quickly when not powered, with the certainty of not having made errors. It reduces the number of product codes handle ind allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line. This is certainly also an important tool for the service network..

Remote control (IRTRRES000)

The remote control, which is essential for some applications, has become more powerful and compact, as well as easier to use.
This accessory provides direct access to the main functions and configuration parameters, allowing the instrument to be programmed from a remote position using a group of buttons that exactly repeat the instrument keypad..

VPM Visual Parameter Manager (VPMSTDKY)

This is a kit made up programming key, USB converter and software for managing special configurations.
Using a PC, the selected configuration can be loaded directly onto the key, which is then used to program the instrument.

Large cover (PBOPZCTR*)

This transparent cover is available in single packages and multiple packages.

powercompact tabel

PB00* models										
	standard								small	
Specifications	S0EA*0	Y0EN*0	F0EN*0	F0HA*0	C0HN*0	C0HB*0	H0HN*0	H0HB*	S*S*	C*S*
Power supply										
230 Vac ±10% 50/60 Hz	●	●	●	-	-	-	-	-	-	-
115/230 Vac ±10% 50/60 Hz	-	-	-	●	●	●	●	●	●	●
Inputs										
ambient temperature	●	●	●	●	●	●	●	●	●	●
defrost temperature	●	●	●	●	●	●	●	●	●	●
digital input / probe 3	●	●	●	●	●	●	●	●	●	●
digital input / probe 4	●	●	●	●	●	●	●	●	●	●
Outputs										
compressor	8 A	8 A	8 A	16 A	2 HP	2 HP	2 HP	2 HP	2 HP	2 HP
defrost	-	80 A	8 A	8 A	16 A	16 A	16 A	16 A	-	8 A
evaporator fan	-	-	5 A	8 A	8 A	8 A	8 A	8 A	-	5 A
light/aux1	8 A	-	-	8 A	8 A	8 A	8 A	8 A	8 A	5 A
aux2	-	-	-	-	-	-	8 A	8 A	-	-
Special functions										
HACCP	-	-	-	-	-	●	-	●	-	-
programming key	●	●	●	●	●	●	●	●	●	●
high efficiency display	●	●	●	●	●	●	●	●	●	●
buzzer	●	●	●	●	●	●	●	●	●	●
infrared	-	-	-	-	-	●	-	●	-	■
Real Time Clock	-	-	-	-	-	●	-	●	-	■
display terminal	-	-	-	●	●	●	●	●	●	●
RS485 option	●	●	●	●	●	●	●	●	●	●

● as standard; ■ optional depending on the model

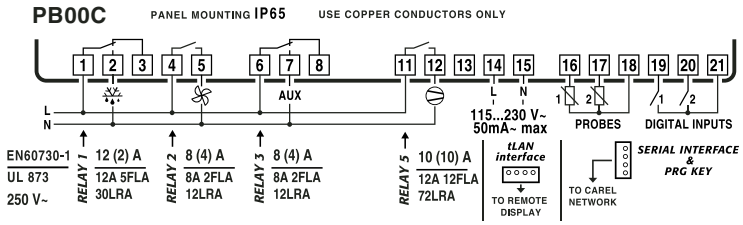
powercompact wide tabel

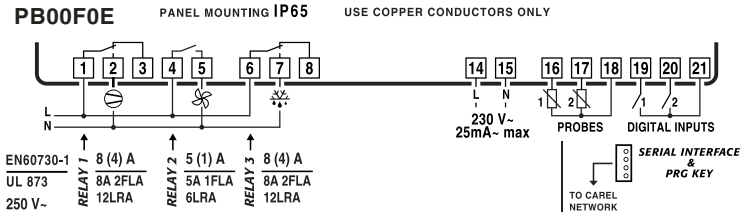
Wide models										
	wide								wide small	
Specifications	C0HBAA	C0HNBA	C0HND0	F0EPDA	H0HBC0	H0HNAA	S0EAAA	Y0EVD0	C0SNFA	S0SAFA
Blue LED display	●	●	-	●	-	●	●	-	●	●
Red LED display	-	-	●	-	●	-	-	●	-	-

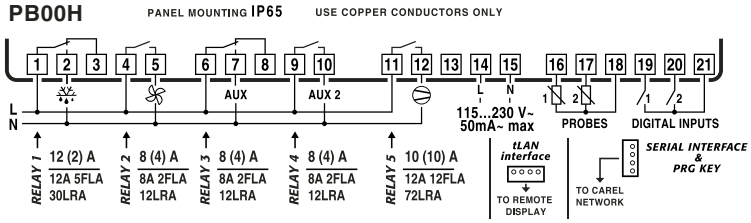
● as standard; ■ optional depending on the model

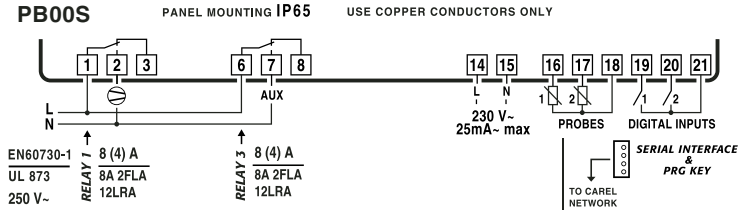
Wiring diagrams

powercompact

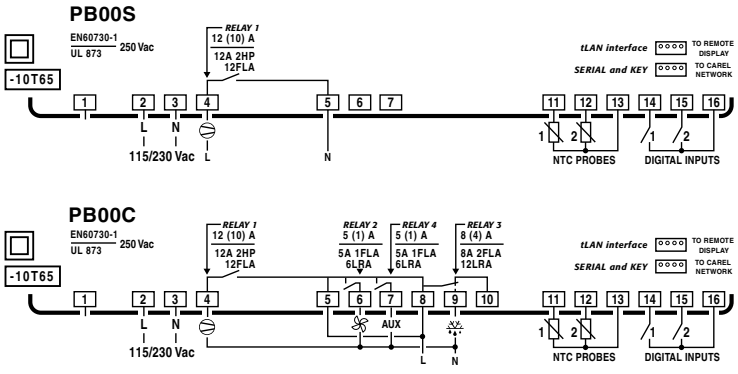








powercompact small



MasterCella

MasterCella represents the complete electronic solution for single-phase/three-phase, static or ventilated cold rooms. It directly manages single-phase units with compressor of up to 2 HP. The powerful relays also allow the control of the other actuators: evaporator fans, defrost, lights, alarm relay and auxiliary output. The high index of protection - IP65 - means that MasterCella can also be installe in particularly humid environments. The case can be installed directly on the wall at the front of the cold room.
The electrical wiring is simplified by the access door on the front panel.
MasterCella can be connected to CAREL supervisor systems.

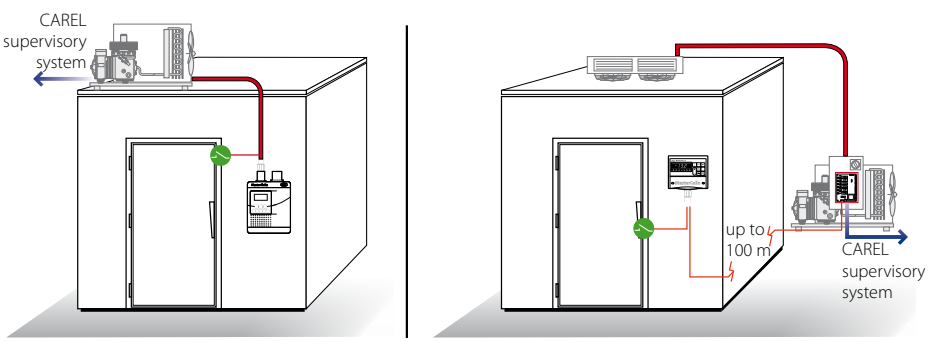
- Simple and complete user interface:
  - large easy-to-read LED display;
  - signalling of the status of the installation;
  - user-friendly ergonomic keypad;
- possibility of programming by remote control;
- panel and/or wall installation.

HACCP compliance

HACCP: that is, Hazard Analysis and Control Critical Point (EU Directive 93/43 – Italian decree law no.155/156, 1997) is a method for controlling processes to ensure the safety of food. Temperature is undoubtedly one of the critical variables that needs to be controlled. The MasterCella series simplifies the "HACCP" procedures, in that it informs the user of the correct temperature trend, activating a local alarm (buzzer) and remote alarm (special relay) if the maximum set limit is exceeded. The MasterCella is in fact fitted with a dedicated HACCP signal LE ind button. The function is also activate in the absence of power for a period that may compromise the correct conservation of the product. With the Clock option, pressing the HACCP button lets the user know when the problem occurred.

Certification

The MasterCella series fitted with the standard CAREL NTC sensor is compliant, as required by EC regulation 37/2005 of 12 January 2005, with standard EN13485 on thermometers air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream.



MasterCella new series

MD33*

MasterCella represents one of the leading products in the refrigeration range offered by CAREL. Exploiting the experience acquired over recent years, MasterCella has been upgrade ind propose in a modern design, so as to better respond to customer expectations.

The new generation MasterCella is the response to the need for integrated cold room solutions.

- more space available for wiring;
- possibility to install a main switch;
- cables enter from below or above;
- clock for real time defrosts;
- HACCP functions;
- large number of customisation options, thanks to the removable plastic front panel.

These features ensure that MasterCella is the best solution available on the market.

Solutions with interlock disconnect switch

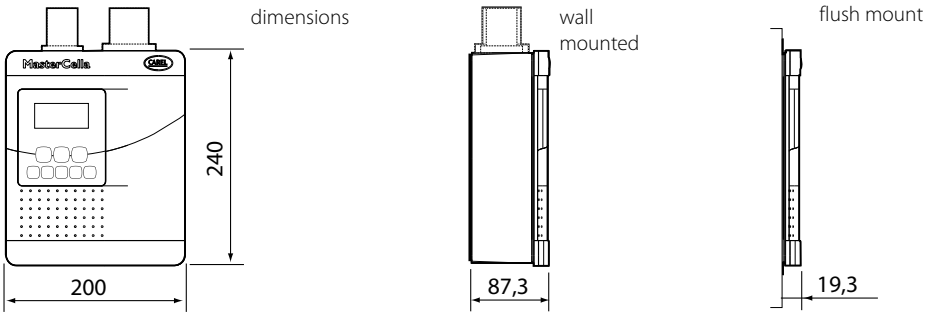
MasterCella new series models are available with an optional 24 A interlock disconnect switch. This solution makes the controller a complete electrical panel.

Technical specifications

Power supply: 115/230 Vac (-15 to +10%), 50/60 Hz
Storage conditions:
-20T70 °C, <90% rH non-cond.
Inputs: 3 for NTC probes; 3 digital for voltage-free contacts, not optically isolated
Outputs:

- MD33A*0: 3 relays: compressor: 16 A or 30 A (depending on the model); auxiliary/light 1: 8 A; auxiliary/light 2: 16 A or 2 HP (depending on the model);
- MD33D*0: 5 relays: compressor: 16 A or 30 A (depending on the model); defrost: 16 A; fan: 8 A; auxiliary/light 1: 8 A; auxiliary/light 2: 16 A or 2 HP (depending on the model).

Dimensions (mm) & assembly



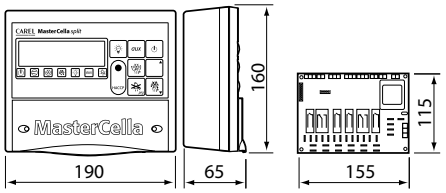
MasterCella split

MTSB*, MTST*, PST*LR200 terminal

MasterCella split is the simple and complete solution for the control of single-phase/three-phase cold rooms with remote refrigeration unit. MasterCella split can be configured using the keypad, or by using an electronic programming key. The power board can be located up to 100 metres away, and can thus be installe in the electrical panel of the condensing unit. In this way, the MasterCella split user interface becomes the cold room panel. The power board is wired quickly, using faston connections.
The MasterCella Split power board is fitted with 6 relays for the complete control of: compressors of up to 2 HP, evaporator fans, defrost heaters, lights, auxiliary outputs, alarms.

Technical specifications see the table
Outputs: 6 relays
Terminals: MTST00V100: terminal with 8 buttons, 1 input for NTC probe, 2 digital inputs; PST00LR200: 8 buttons, red display, IR buzzer (MTSB000110 only)

Dimensions (mm)



Accessories and options

☑ MCella new series
☐ MCella split

Terminal display option (IROPZDSP00 and IR00R*0000 displays)

The configuration interface can be connected, via a special optional board, to a display for reading and controlling the values measured by the third probe, locate in the hottest point of the cabinet, as specified by standard EN 441-13.
The terminal displays are available in red (IR00RR0000) and green (IR00RG0000).
The PSTCON*B0 connection cables are used, available in different lengths.
Important: the 230 Vac models with built-in transformer do not support the repeater display.

☑ MCella new series
☐ MCella split

Interlock disconnect switch

(0402512CEL: 32 A disconnect switch
0402515CEL: shaft h= 85 mm
0402517CEL: yellow/re indicators)

MasterCella can be installed with a 32 A interlock disconnect switch for complete unit on/off management; this device allows operation to be locke in the "OFF" position, guaranteeing complete safety during maintenance operations.

☑ MCella new series
☐ MCella split

RS485 serial boards (IROPZSEM10/30)

The IROPZSEM10/30 boards are used to connect MasterCella (MD33*) via the RS485 serial network to the PlantVisor supervisory system. The IROPZSEM30 board can also be used to connect the repeater display directly to MasterCella, using a PSTCON**00 cable.

☑ MCella new series
☐ MCella split

Wiring terminal blocks (MDOPZC*000)

These are used to group together the neutral, live and earth connections on a single board installe inside MasterCella. The models available have 3 and 5 rows of terminals. Specifically, the latter option allows direct access to this board with the load cables (live, neutral, earth), avoiding having to take the connections during installation to the MasterCella auxiliary terminal block.

☐ MCella new series
☑ MCella split

RS485 serial boards (MTCSER* - MasterCella compact, FCSER* MasterCella split)

The RS485 option is used to connect MasterCella to the CAREL supervisory system.

☑ MCella new series
☑ MCella split

Programming key (PJOPZKEY*)

The programming key allows the instrument to be programmed quickly when not powered, with the certainty of not having made errors. It reduces the number of product codes handle ind allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line. This is certainly also an important tool for the service network.

☑ MCella new series
☑ MCella split

VPM Visual Parameter Manager (VPMSTDKY)

This is a kit made up programming key, USB converter and software for managing special configurations. Using a PC, the selected configuration can be loaded directly onto the key, which is then used to program the instrument.

☑ MCella new series
☐ MCella split

Master/Slave supervisory network (SYNCHRO*)

Synchro can be used for the intelligent supervision of up to 6 instruments in a Master/Slave network. The following network control functions are managed for the ir33 series, ir33 DIN (correctly set): light activation, auxiliary relay activation, ON/OFF, alarm management, defrost, temperature setting, copy parameters and supervision.
Note: to make the management parameters available to the master/slave network, the programming software code PSOPZPRG00 is required.

MasterCella table

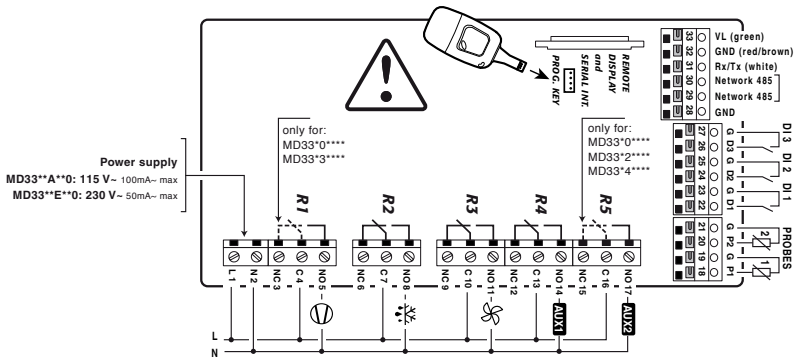
Specifications	MasterCella new series		MasterCella split	
M* models	**D33A***	**D33D***	**TSB*100**	**TST*110**
Power supply				
230 Vac ±10% 50/60 Hz	●	●	-	-
Power input	6 VA	7 VA	5 VA	-
Probes				
Standard CAREL NTC (range: -50T90 °C; error: 1 °C in -50T50 °C, 3 °C in 50T90 °C)	●	●	●	●
High temp. NTC (range: -40T150 °C; error: 1.5 °C in -20T115 °C, 4 °C in range outside of -20T115 °C)	●	●	●	●
PTC (range: -50T150 °C; error: 2 °C in -50T50 °C, 4 °C in 50T150 °C)	●	●	●	●
digital input / probe 4	●	●	●	●
User interface				
4 digits, 7 segment green LEDs	●	●	-	-
Probe inputs	2	2	3	3
ambient temperature probe	yes	yes	yes	yes
defrost temperature probe	yes	yes	yes	yes
product temperature probe	yes	yes	yes	yes
light sensor	configurable		-	-
Outputs				
compressor	8 A	8 A	2 HP	2 HP
defrost	-	80 A	-	8 A
evaporator fan	-	-	-	5 A
light/aux1	8 A	-	8 A	5 A
aux2	-	-	-	-
Special functions				
Real Time Clock	■	■	●	●
buzzer	●	●	-	-
infreared	■	■	-	-
programming key	●	●	●	●
high efficiency display	●	●	-	-
optional hot point display	●	●	-	-
optional RS485 board	●	●	-	-
door interlock included	-	models MD33DF*	-	-
Operating conditions				
open board	-10T65 °C <90% rH non-condensing		-	
with plastic case	-10T50 °C <90% rH non-condensing		-	

● as standard; ■ optional

☑ MCella new series
☐ MCella split

Remote control (IRTRRES000)

The remote control, which is essential for some applications, has become more powerful and compact, as well as easier to use. This accessory provides direct access to the main functions and configuration parameters, allowing the instrument to be programmed from a remote position using a group of buttons that exactly repeat the instrument keypad.



EN12380

Datalogger

It is easy to comply with the European directives on the conservation of food: indeed, you no longer need to worry about filing print-outs, replacing paper disks or pen points. The CAREL Datalogger stores all the temperature values from the last year, automatically and in compliance with the EEC directives, allowing them to be transferred to a PC using the download module. The CAREL Datalogger continuously records the temperature from two probes, and immediately signals any malfunctions. The instrument is extremely simple and quick to install. The IP65 plastic case has been designed to resist condensate, at low and high temperatures.
The backlit LCD display shows the data saved even in poor light; the large buttons are extremely user-friendly.

Advantages

- Independent recording of two temperatures for over one year;
- possibility to look up the values saved directly on the display;
- dual data download mode: infrare ind serial;
- possibility to store and print the data saved directly from a PC.

Datalogger (DLOG2N0*)

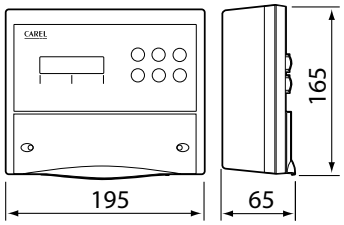
The instrument saves the temperature from two points of measurement, at set time intervals.
The data can also be transferred to a PC in two different modes:

- by creating a fixed connection
- by transferring the data to a portable infrared receiver for subsequent downloading to a computer.

Technical specifications

Power supply: 230 Vac (-15 to 10%), 50/60 Hz
Power input: 5 VA
Operating cond.: 0T50 °C, 20 to 80% rH non-cond.
Storage conditions:
-30T70 °C, 20 to 80% rH non-cond.
Inputs: 2 for NTC probes & 2 digital, configurable
Outputs: 1 alarm relay & 1 RS485 serial for download
Display: backlit LCD 16 columns x 2 rows (area 16x61 mm)
Resolution: 0.5 °C
Data recording capacity: more than one year for each probe saving at intervals ≥14 min
Installation: wall mounting
Index of protection: IP65

Dimensions (mm)



Accessories and options

PC connection kit (DLOGSER*)

DLOGSER allows the data to be transferred from one or more Dataloggers to a PC, where it can then be examine ind printed using the special WINLOG software (included). The connection of the Datalogger to the PC using this module also allows the inputs, the parameters and the configuration of the Datalogger to be monitore in real time, and the parameters to be modified from the PC.
The DLOGSER kit includes:

- telephone cable to connect the DLOGSER to the Datalogger;
- RS485-RS232 converter;
- modem-PC cable (connects converter to PC)
- WinLog software
- 230 Vac/12 Vac, 3 VA transformer.

IR download kit (DLOGPC*)

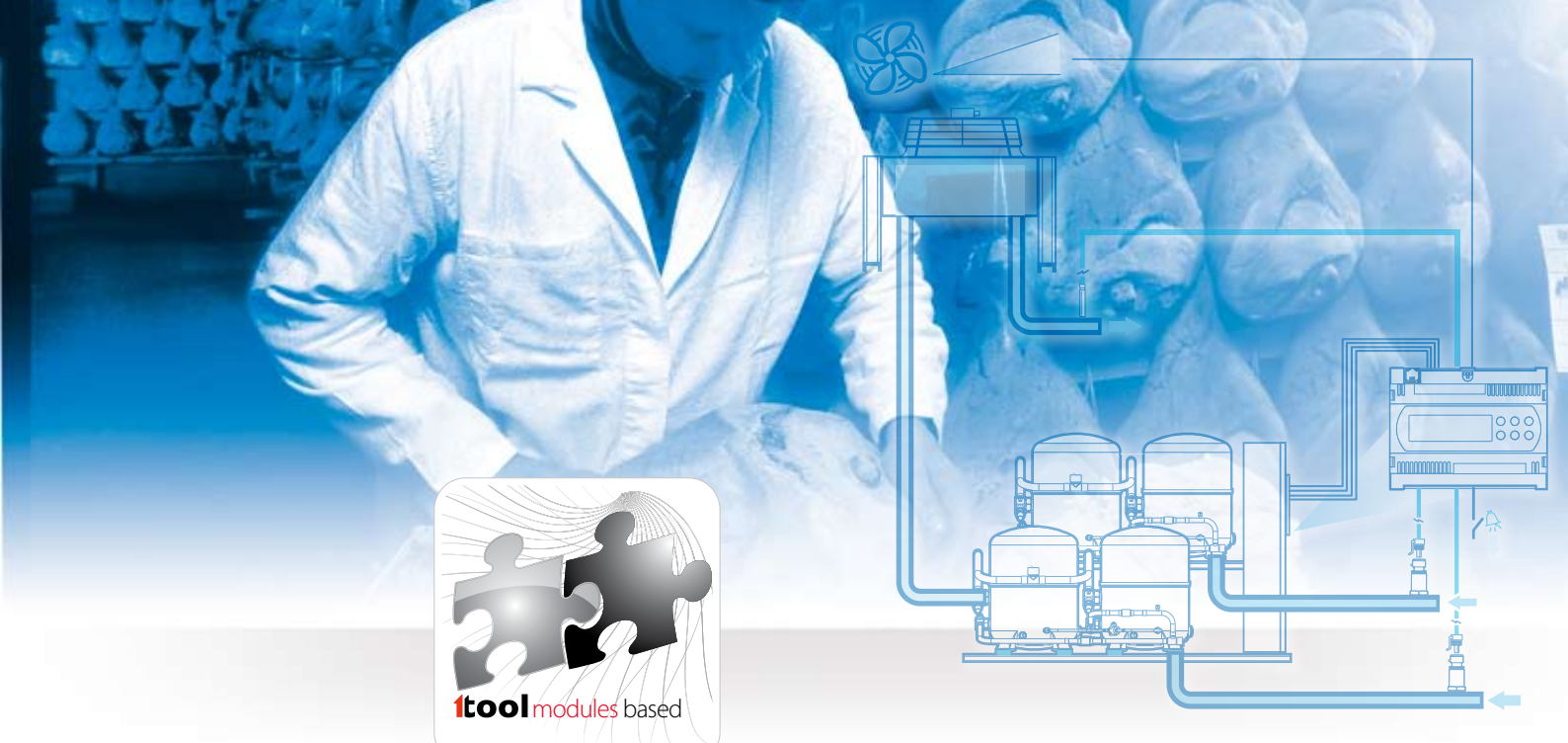
This is a portable electronic instrument that allows, by simply pressing one button, the data saved from a series of CAREL Dataloggers to be collected.
The DLOGPC kit contains: DOWNLOAD module to download the data saved from a series of Dataloggers (by infrared); IR port for the Datalogger (DLOGIR*); Modem-PC cable; WinLog software; 230 Vac/12 Vac, 3 VA transformer.

NTC probe for Datalogger (DLOGNTC*)

This high precision NTC probe is ideal for the Datalogger series temperature recorders.

Certification

Datalogger is compliant, as required by EC regulation 37/2005 of 12 January 2005, with standard EN 12380 on temperature recorders for the transport, conservation and sale of refrigerated, frozen and deep-frozen food and ice cream. Datalogger is also compliant with standard EN13485.



application programs for refrigeration

Maturing room control solutions

Application program for the pCO series controllers that can manage the temperature and humidity control functions in salami, sausage, cheese and fruit maturing rooms.

It manages the compressor, the maturing room fan, the electric heaters and modulating cold and hot water valves. This application also allows the control of an external humidifier by digital contact, and the opening of the outside damper.

The application, as well as displaying and controlling the temperature and humidity values, also provides complete management of the alarms, of the maturing cycles and the daily inlet of fresh air, thanks to the installation of the optional clock board.

Universal stage controller

This application program can manage several different actuators or loads with control algorithms based on one or more temperature/pressure probe readings.
It is used to configure the outputs so as to adapt the control functions to the number of loads (including different capacities or capacity-controlled).
The solution can readily be used for the management of simple compressor racks.
Indeed, this application program controls the protection and automatic rotation times for the loads so as to balance out the operating hours, and moreover converts the temperature and pressure readings based on the refrigerant used.

Retail

Retail sistema meets all requirements for the control, integration and supervision of food refrigeration and ambient air-conditioning systems.
It ensures significant reductions in energy costs for refrigeration and air-conditioning.

Retail sistema responds to the market requirements for the improvement of global system management in mass retail applications. The supervisor solutions detect and signal all alarm situations. By using the remote connection to a service centre, each alarm signal is notifie ind recorded for the optimisation of service operations.

Retail sistema retail sistema guarantees compliance with the safety standards on the control and management of cooling. Furthermore, it applies solutions that ensure lower energy consumption and less polluting emissions.

Integrated Control Solutions & Energy Savings

MPXPRO and mpx series

The mpx series controllers are designed for the control of multiplexed refrigeration units or systems made up of groups of units that need to operate in a "coordinated" manner. The group is coordinated by the unit define is the "Master", which synchronises and optimises the operation of the other units, the "Slaves".

The main information for the operation of the zone is share icross the local network.
This means that only the Master unit needs to be connected to the supervisor network thus reducing installation costs: the Slave units will be visible to the main supervisor network as if they were connected directly.

MPXPRO and mpx are two distinct platforms with different technical specifications and functions, yet that in common feature fast installation and configuration, and special care paid to the design of the user terminals.

MPXPRO, the more complete of the two series of products, allows a level of configuration, programmability and energy saving functions that is not common in this class of controllers; just to mention some of the functions: direct and integrated management of electronic expansion valves, optimisation of anti-sweat heaters with monitoring of the dewpoint and continuous modulation of the evaporator fans.

The two platforms apply different methods for optimising the installation and connection procedures:

- mpx is a compact instrument designed for the installation on the front panel of the unit and features wiring with Molex®. quick connectors. The user terminal and controller are built into the same assembly and this configuration minimises the space required for the control of the unit;
- MPXPRO has been designed for installation in the electrical panel, with simple and inexpensive connection to remote user terminals.

This is a split solution: the control section, inputs and outputs are separate from the terminal.
Despite being compact for the control power provided, this is the solution for those who don't want to compromise on energy optimisation and the performance of their units.
Common features on both platforms include:

- management multi-evaporator utilities via the local network (multiplexed cabinets, cold rooms with multiple evaporators);
- defrosts at set times by internal clock with battery (RTC);
- connection to a supervisory network at the same time as the local synchronisation network;
- multiple probe inputs for monitoring and control;
- conformity to EN 13485 as required by EC regulation 37/2005;
- simultaneous management of a user terminal and a remote display/repeater (without keypad for programming).

MPXPRO

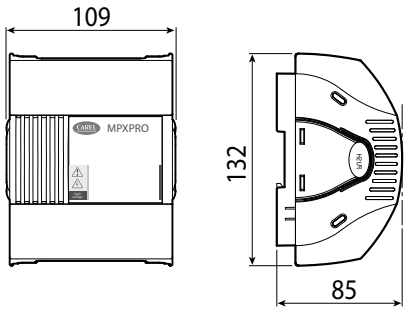
MX20*

The MPXPRO platform has been designed for the complete control of multiplexed showcases, with special focus not only on energy performance and flexibility, but also on simplicity of use and installation.
It is available in the Master version with RTC (battery) and RS485 option included, or the Slave version (convertible to master by fitting the options).

Main functions:

- the local network is used to manage and synchronise the operation of 6 sections (1 master + 5 slaves) with a terminal and display for each section or shared between the master and slaves;
- front access cover for commissioning, parameter setting and updating the software;
- built-in and optional driver for CAREL E²V proportional electronic expansion valves so as to maximise energy efficiency and allow floating evaporation and condensing pressure control for the compressors;
- the pressure probe can be shared between the Master and the Slaves;
- codes are available with the EEV option already installe ind configured with the ideal parameters to get started quickly;
- modulating management of the anti-sweat heaters via low voltage PWM output: control is performed by monitoring or calculating the glass temperature and comparing the value against the temperature and dew point on the outside (thus requires temperature and relative humidity probes connected to the Supervisor, and the special serial sharing module);
- dedicated output for advance ind innovative fan management with modulation via 0 to 10 Vdc signal;
- IR remote control for access to the parameters and specific functions for commissioning and checking the installation/wiring/programming procedures (override outputs, move EEV, rapid digital input status and temperature display);
- simplifie ind configurable start-up procedure for fast programming and safe unit start-up;
- Visual Parameter Manager software, with specific sections for:
- creating a custom set of parameters;
- direct control of the outputs and simulation of probe values;
- updating the control software.
- up to six sets of parameters for the pre-configuration of different control routines, with immediate availability for use in the field; three levels of parameter visibility and access for even simpler use;
- native compatibility with CAREL or Modbus® supervisor protocol;
- up to five digital outputs and eight configurable analogue/digital inputs to allow the most advanced control algorithms;
- possibility to manage up to four probes and an additional virtual input via the supervisory network.

Dimensions (mm)



Technical specifications

Power supply:
- MX*E*: 230 Vac, 50/60 Hz;
- MX*A*: 115 Vac, 50/60 Hz

Power input
- MX*E*: 11.5 VA, 50 mA max.;
- MX*A*: 11.5 VA, 100 mA max.

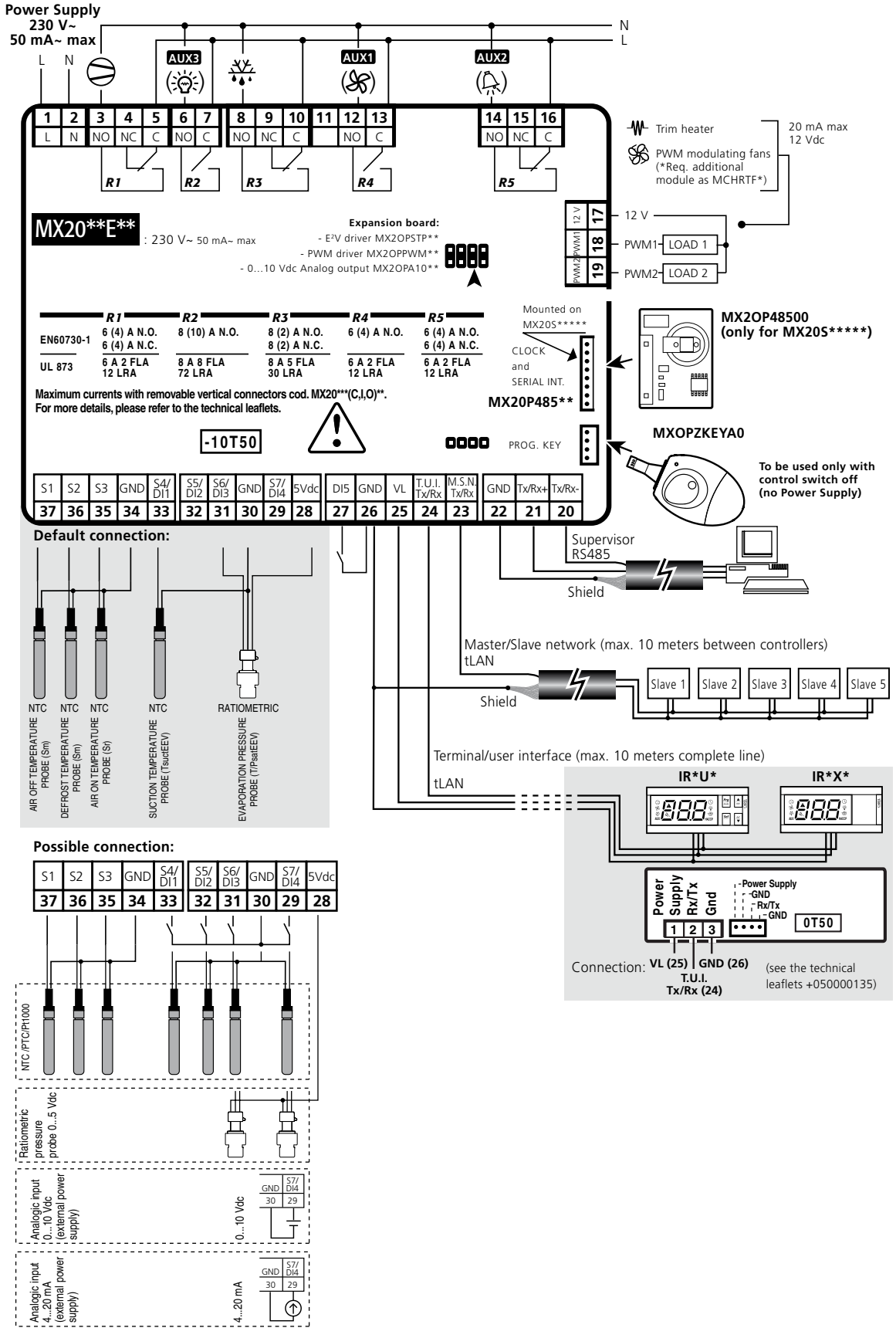
Operating conditions:
- MX*(A,B,C,G,I): 10T60 °C, <90% rH non-cond.;
- MX*(M,N,O): -10T50 °C, <90% rH non-cond.

Storage conditions:
-20T70 °C, <90% rH non-cond.

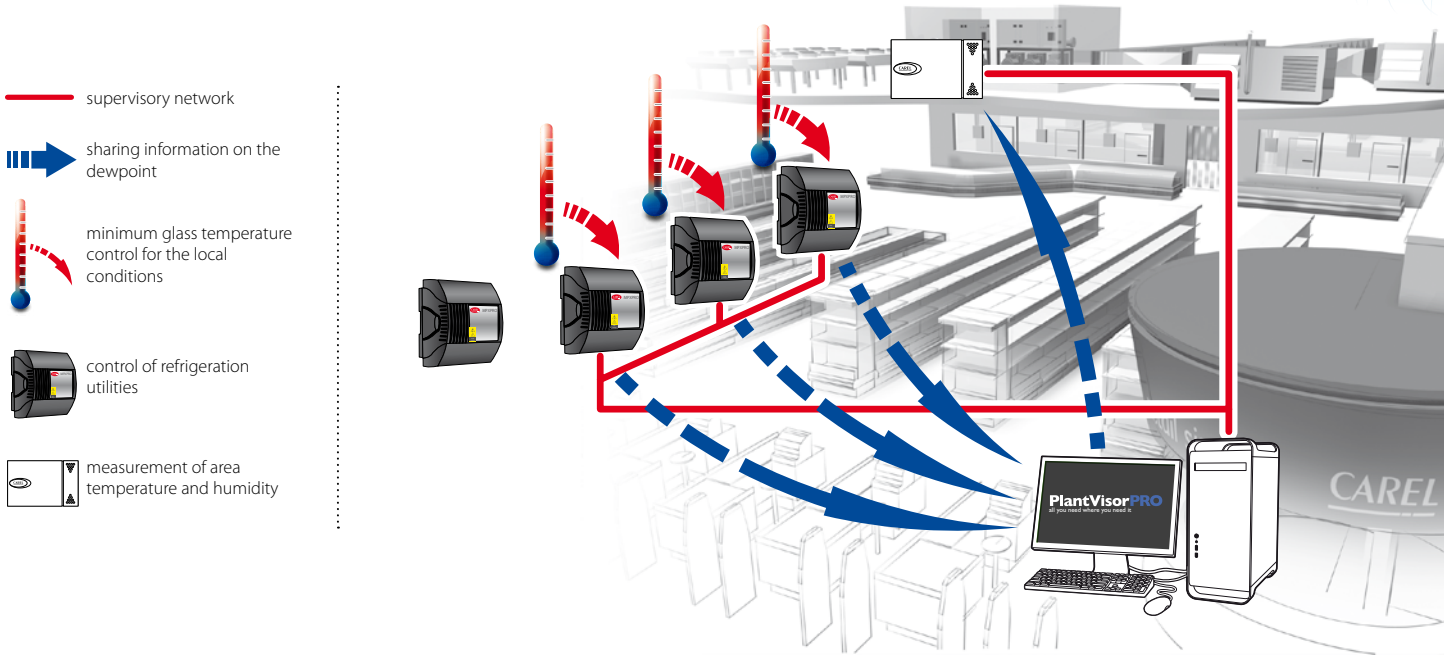
Installation:
- MX*(A,B,C): on plastic spacers;
- MX*(G,I,M,N,O): DIN rail

Index of protection: IP00

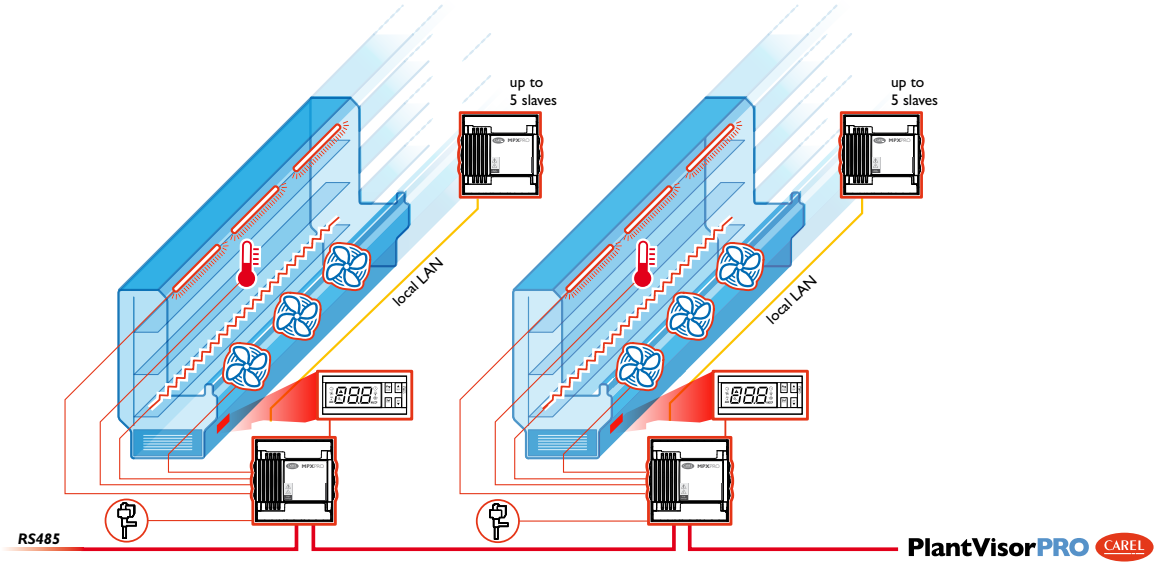
Connection diagrams



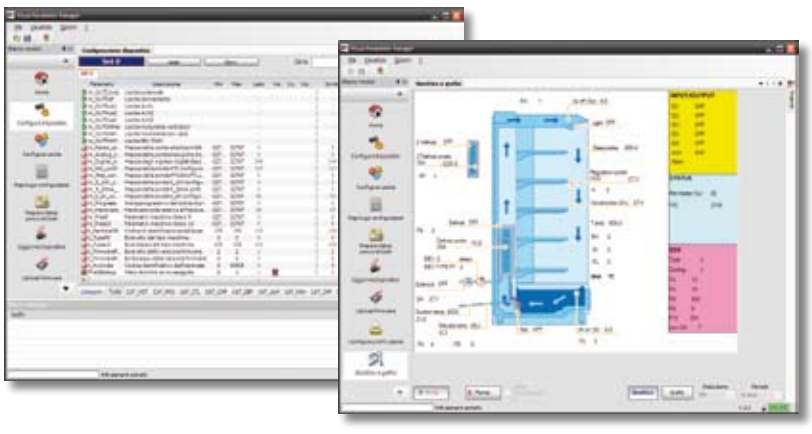
Optimisation of anti-sweat heaters



Example system diagram



VPM screenshots



mpx: master and slave

IRMPX*

mpx is the entry-level solution for the management of multiplexed units or where local synchronisation is required for the management of defrosts and other shared functions. Specifically designed for panel installation and space saving.

Management of 1 Master and 5 Slaves, with the Master only connected to the supervisor network.

Remote control with direct access to the control parameters for immediate configuration of the controller.

Up to 6 sets of parameters for the pre-configuration of different control routines, with immediate availability for use in the field. Molex® connectors with wiring kits available, lugs already fitted.

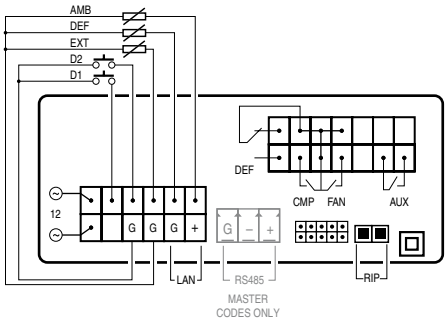
Up to 4 digital outputs and 3 analogue inputs.

Technical specifications

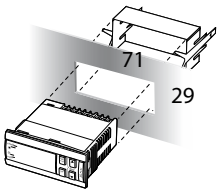
Power supply: 12 Vac
Power input: 3 VA
Operating conditions:
0T50 °C, <90% rH non-cond.
Storage conditions:
-10T70 °C, <90% rH non-cond.
Precision: ±0.5 °C
Inputs:
- probe:1 control, 1 defrost, 1 hot point
- digital: 2 multifunction

Outputs:
- compressor: SPST relay 3 (2) A res., 250 Vac
- defrost: SPDT relay 3 (2) A res., 250 Vac
- fan: SPST relay 3 (2) A res., 250 Vac
- aux/alarm: SPST relay 3 (2) A res., 250 Vac

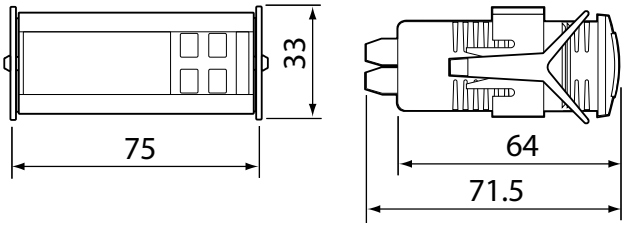
Real Time Clock: optional with rechargeable battery (duration 72 hours)
Index of protection: IP65 (front panel)



Flush mount



Dimensions (mm)



Certification

The mpx series fitted with the standard CAREL NTC sensor is compliant, as required by EC regulation 37/2005 of 12 January 2005, with standard EN13485 on thermometers air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream.

Accessories and options

☑ MPXPRO
☐ mpx

Stepper EEV expansion board (MX2OPSTP**)

Option used to control a CAREL E²V electronic expansion valve activated by a stepper motor. Model MX2OPSTP0* also features a modulating 0 to 10 Vdc analogue output for the control of external actuators.
Installed on the main board using special holes and fastening spacers.

☑ MPXPRO
☐ mpx

PWM (Pulse-Width Modulation) EEV expansion board (MX2OPPWM**)

Option that is used to control an AC or DC PWM electronic expansion valve. Model MX2OPPWM0* also features a modulating 0 to 10 Vdc analogue output for the control of external actuators.
Installed on the main board using special holes and fastening spacers.

☑ MPXPRO
☐ mpx

0 to 10 Vdc expansion board (MX2OPA100*)

Option providing a modulating 0 to 10 Vdc analogue output for the control of external actuators.
Installed on the main board using special holes and fastening spacers.

☑ MPXPRO
☐ mpx

RTC and RS485 interface (MX2OP48500)

The optional board is used to add RTC and RS485 interface functions to the MPXPRO slave models. The Master versions already feature this option as standard.

☑ MPXPRO
☐ mpx

USB/I2C converter for programming key (IROPZPRG00)

Interface converter between the PC and the standard CAREL programming key IROPZKEY00/A0 (using special software).

☑ MPXPRO
☐ mpx

USB/tLAN converter for commissioning tool (IROPZTLN00)

Interface converter between the PC and the MPXPRO device (using special "commissioning" tool software.

☑ MPXPRO
☐ mpx

Small terminal (IR**U*****)

Remote user terminal with 3 digits and 4 buttons for displaying the status and configuring the device parameters.

☑ MPXPRO
☐ mpx

Small display (IR**X*****)

User display that shows the status of a variable set directly on the instrument.

☑ MPXPRO
☐ mpx

Programming key (MPXOPZKEYYA0)

The MPXPRO programming key is used to copy the complete set of parameters. The MXOPZKEYA0, programming key can set up to seven different parameter configurations on the instrument. The key must be connected to the connector (4 pin AMP) available on the MPXPRO control.

☑ MPXPRO
☐ mpx

Remote control (IRTRMPX)

The MPXPRO remote control is a device developed to simplify the programming and setup of an MPXPRO. As well as the traditional remote keypad, it includes a series of functions for overriding the status of outputs and inputs, allowing the connections and the operation of the application to be fully tested.

☐ MPXPRO
☑ mpx

Remote display (TTDISPLR*)

Allows double display of the unit operating temperature and auxiliary signals.

☐ MPXPRO
☑ mpx

Connectors and cables (MCHSMLCON*, MCHSMLCAB*)

Molex® connectors and kits of 24 cables already fitted with lugs for Molex® terminals are available.

☑ MPXPRO
☐ mpx

VPM Visual Parameter Manager (VPMSTDKY)

This is a kit made up programming key, USB converter and software for managing special configurations.
Using a PC, the selected configuration can be loaded directly onto the key, which is then used to program the instrument.

MasterCase^3

MasterCase^3 represents the most advanced solution for the complete control of refrigerating utilities, such as showcases and cold rooms, and is therefore ideal for applications in supermarkets and for more complex units in terms of control and inputs/outputs.

This platform of controllers can be connecte in a local network for the master/slave management of multiplexed showcases (1 Master and 5 Slaves) and can each be connected to the supervisor, if required, via the specific port.

MasterCase^3 uses the pGD^1 display (6 buttons) as the user interface, as well as the series of standard PST small terminals (3 digits and 3 buttons).

The wizard makes it easier to quickly program and start the unit in complete safety, drawing maximum benefit form the pGD1 graphic user interface.

MasterCase^3 can control a PWM ON/OFF electronic expansion valve or alternatively, with the optional driver board, an expansion valve with stepper motor, such as the CAREL E^{2}V for even more optimised control of the refrigeration utilities.

In addition, the most innovative energy optimisation algorithms are available, including modulating management of the anti-sweat heaters with ambient dewpoint monitoring (0 to 10 Vdc modulating output for control of the FCS series).

Complete and advanced management of hot gas defrosts: up to 4 dedicate iuxiliary outputs (Hot gas, Soft gas, Balancing and Suction) with set times and in relation to the other outputs.

Extended connectivity based on hardware compatibility with the pCO sistema options (TCP/IP, LON, ...); check the possibilities available in the latest SW version.

Up to 7 probes can be connected, configure is NTC, PT1000, ratiometric pressure probes and 4 to 20 mA probes (not for the control of the EEV), while there are 8 relay outputs for the control of compressors/solenoids, evaporator fans, defrost, alarm, anti-sweat heaters, lights, aux1, aux2.

Possibility of manage up to four additional virtual probes via supervisory network.

Native compatibility with CAREL or Modbus® supervisor protocol.

MasterCase^3

MC3*

Software features

- Master-Slave configuration via the pLAN network connection (pCO Local Network);
- HACCP function;
- control of 2 different types of electronic expansion valves: ON/OFF PWM, or stepper i.e. CAREL E^{2}V;
- possibility to read the superheat with two temperature probes (low-end application);
- skip defrost management.

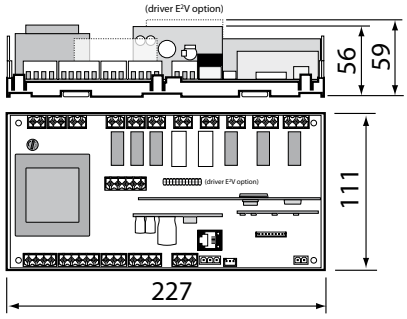
User interface

MasterCase^3 uses the pGD^1 display (6 buttons) and the series of standard PST small terminals (3 digits and 3 buttons) as the user interface. The terminals can be used to program the instrument, can be fitted up to 10 m away from the instrument and are "hot pluggable" (can be connected with the instrument on).

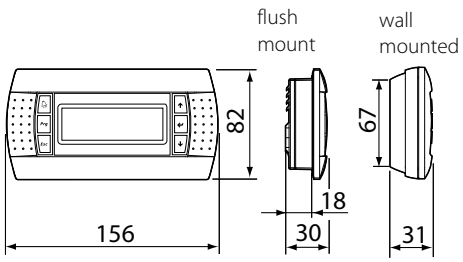
Technical specifications

Power supply: 230 Vac (-15% to +10%), 50/60 Hz
Inputs: 7 analogue inputs for PT1000 probes (MC3*) or for standard CAREL NTC probes (MC3*); 3 multifunction digital inputs
Outputs: 8 relays, configurable
Index of protection: IP00
Operating conditions:
-10T60 °C, <90% rH non-condensing
Storage conditions:
-20T70 °C, <90% rH non-condensing

Dimensions (mm)



Installation



Accessories and options

RS485 serial board (PCOS004850)

Direct optically-isolate interface to an RS485 network. The maximum baud rate available is 19200 baud (settable via software).
The CAREL and Modbus® RTU protocols are available on the pCO.

pGD[1] (PGD1M3FX0)

Series of terminals designed with semi-graphic LCD for added versatility and customisation capacity. Special attention has been focused on ensuring simple programming and quality performance, while maintaining a high aesthetic standard.

Clock board (PCO100CLK0)

Option used to manage the time and date and provide RAM with battery backup for the application program.

3 button PST (PST00VR100)

The innovations introduced with this new-concept controller are based on maintaining the same "family feeling" for those who use the plug-in range of instruments. This is important both from the aesthetic and functional point of view, as those who use this controller can fully exploit all the functions in very little time.

Connector kit (MC200CON*)

Plug-in screw or spring connector kits are available, with vertical or horizontal outlet.

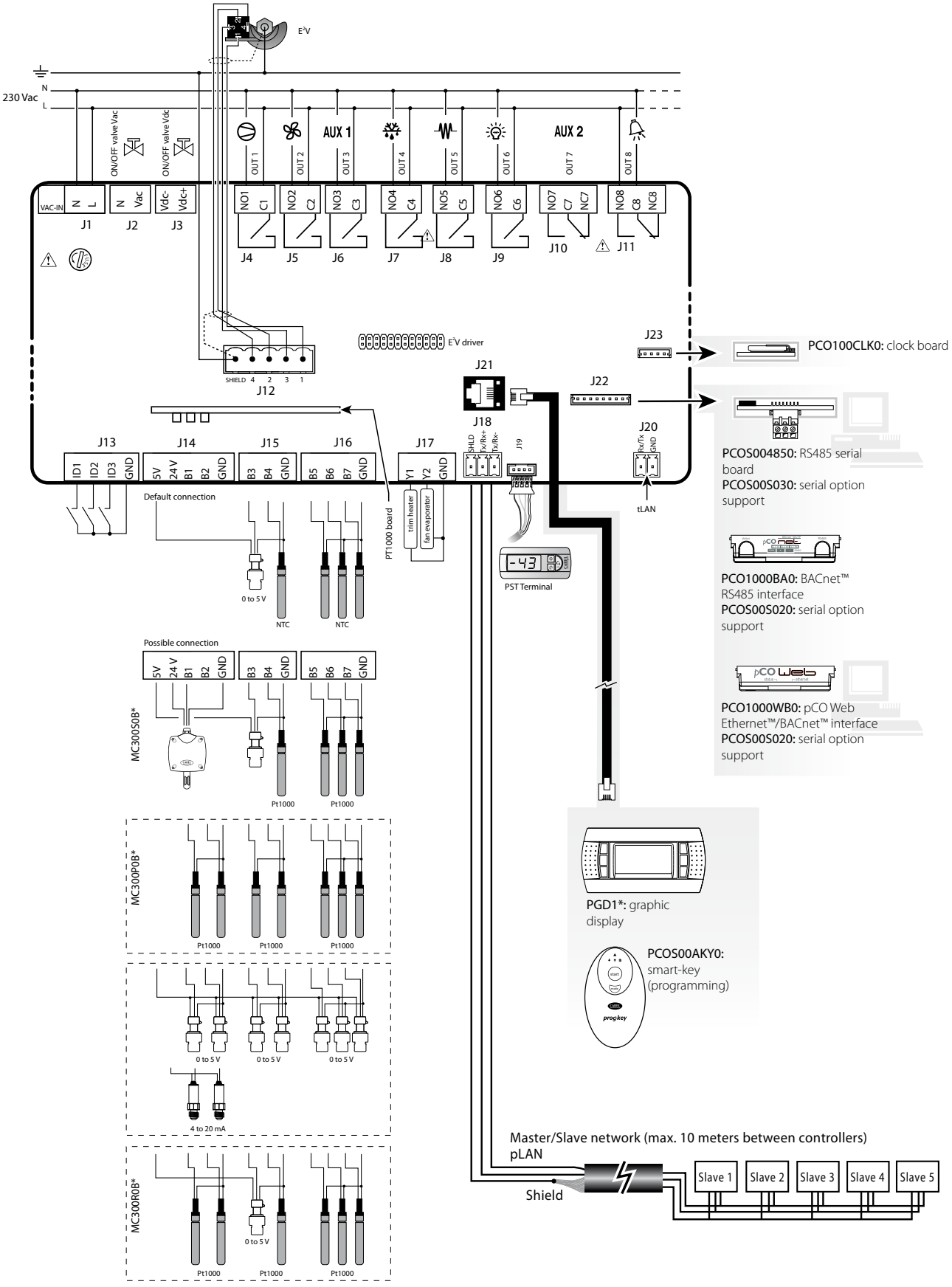
pCOWeb Ethernet™ interface board (PCO1000WB0)

Used to interface the pCO controllers with the Ethernet™, IP, SNMP V1, 2, 3, FTP and HTTP protocols.

Key option (PCOS00AKY0)

Used to copy the settings and the operating parameters between devices and between the key and the device and vice-versa.

MascterCase³ wiring diagram



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Solutions for compressor racks

The compressor rack is the most important and complex electromechanical device in the refrigeration system: this delivers cooling for the foodstuffs to all the refrigeration utilities and the related processing rooms.

The CAREL retail sistema has been designed to be flexible and customised.
We can provide OEMs and installers a complete line that matches the results of their design efforts, maximising the results.

From limited numbers of simple hermetic compressors or large racks, to inverter driven or capacity-controlled semi-hermetic and hermetic compressors.

In terms of energy saving, the compressor rack has a wide range of operation, as the installed power is very significant: all our solutions have been designed with the focus on this aspect, with the aim of minimising electricity consumption.

The use of E^2V proportional electronic expansion valves in the refrigeration utilities at the point of sale exploits the maximum advantages of the energy saving functions in the compressor rack controller.

The CAREL solution:

- **rack Controller** is the standard CAREL solution for the control of compressor racks: a line of controllers designed for the more complex and advanced systems;
  - the availability of inputs and outputs covers the requirements of the most sophisticated compressor racks in terms of the number and the function of the required control algorithms;
  - modulating capacity control using special inverter outputs for the compressors and/or inverter/phase control outputs for the condenser fan;
  - management of compressors with different capacities and capacity control;
  - management of refrigerant leaks with dedicate ilarms and probes (leaks and liquid level);
  - drastic reduction in the cost of electrical connections to remote fans;
  - control software in six languages, compatible with the different sizes of hardware, satisfies both the most common control requirements as well as the more advance ipplications.
- **µRack** is a series of series of compact and economical parametric controllers that are simple to use and install, for the complete control of small compressor racks, with the possibility to manage up to 5 relay outputs for controlling devices such as the compressors and fans;
  - compressor racks with floating condensing pressure control can be manage if the installation (showcase-cold room) is fitted with electronic valves; one very innovative feature allows the same controller to manage mixed systems of compressor racks with two refrigerant circuits, a single condenser and two suction set points;
  - a series of optional modules widens the range of performance of the instrument, allowing rapid programming using the hardware key even when the instrument is off, and connection to the supervisory system for the complete monitoring of the unit.

rack Controller

Operation with floating condensing and evaporation (requires compatible CAREL supervision software) pressure to increase the efficiency and the performance of the compressor racks.
Possibility to separate compressor and fan control on one single user interface, with local network connection between the controllers.

Connectivity

Hardware compatibility with the pCO sistema options (TCP/IP, LON,...); check the possibilities available in the latest SW version (native compatibility with CAREL or Modbus® supervisor protocol).
Management of external modems, including GSM modems for sending SMS messages.

Maximum configuration

(depends on the size and the type of hardware used)

Compressor control

- 12 compressors with the same capacity (without capacity control);
- 8 compressors with the same capacity (max. 3 capacity-control steps, max. 4 compressor outputs);
- 6 compressors with different capacities (without capacity control);
- 1 modulating 0 to 10 V output for inverter control;
- 3 compressor alarm inputs.

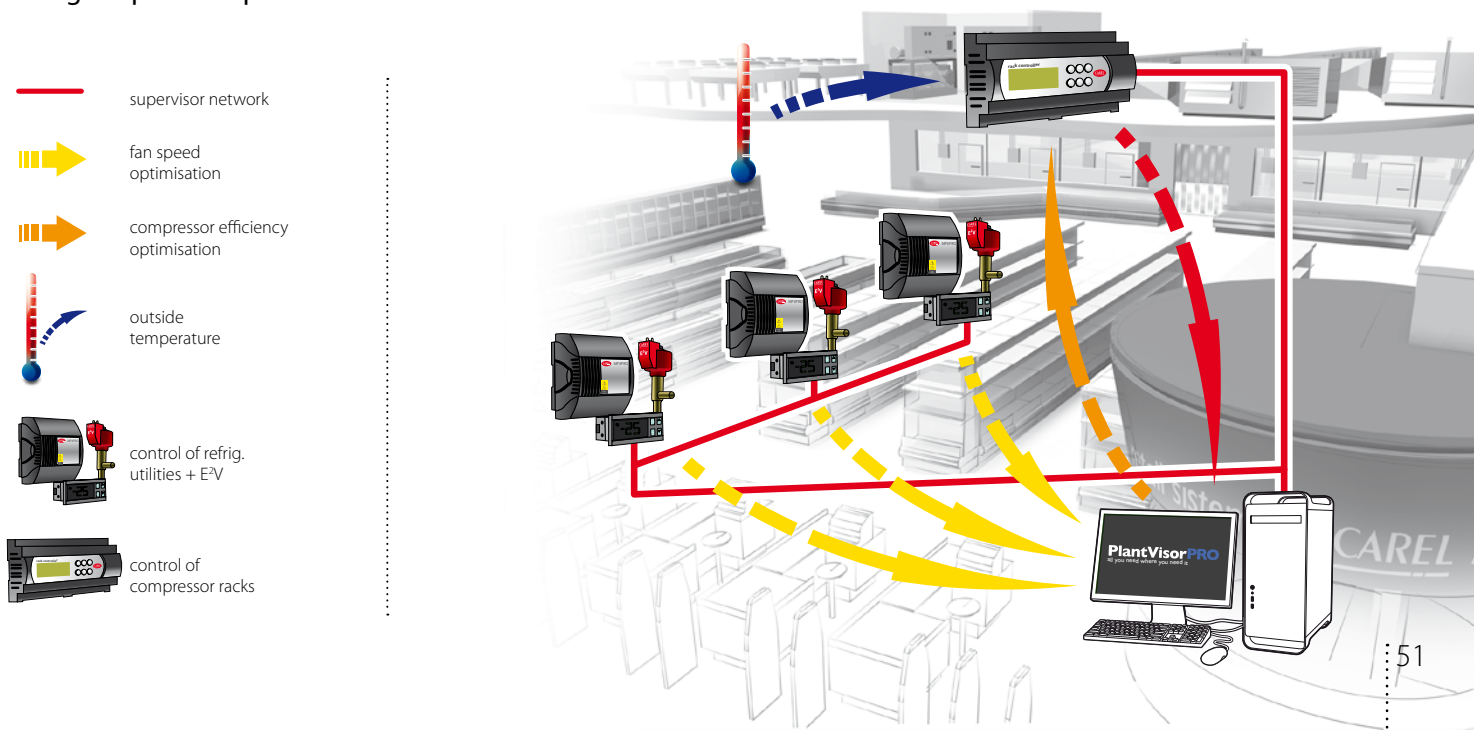
Fan control

- 16 fans;
- 1 modulating 0 to 10 V output for inverter control;
- 1 modulating PWM output for phase control.

Compatibile hardware specifications *

description	pCO^{XS}	pCO^3 small	pCO^3 medium	pCO^3 large
digital outputs	5	8	13	18
analogue outputs	3	4	4	6
analogue inputs	4	5	8	10
digital inputs	6	8	14	18

Floating evaporation pressure



µRack

MRACK*

µRack uses a high efficiency LED display to show the values monitored, and icons representing the status of the devices and the operating modes.

The electrical connections have quick couplings for the fast and safe connection of the instrument, and cable kits can be created when the controller is installed on the production line.

Using the PWM output, the controller can also manage condenser fan speed control.

Main functions

- suction pressure control;
- discharge pressure control;
- floating condensing pressure control;
- fan speed control;
- complete alarm management;
- connection to supervisory systems;
- management of compressor racks with two suction circuits and single condenser.

Advantages

- compact dimensions;
- model for panel or DIN rail mounting;
- high reliability ensured by the use of a standard hardware platform;
- ergonomic and high efficiency display with ICONS;
- simple wiring;
- complete management of the compressor rack.

Devices controlled:

- compressors (up to 4);
- fans (up to 4);
- alarm relay;
- PWM fan speed control

Programming

CAREL offers the possibility to configure all the parameters on the unit not only using the keypad on the front panel, but also: using the hardware key (even when the unit is off) or via the serial line.

Parameters

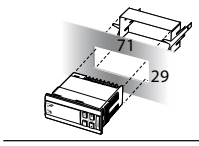
- display and control the values measured, on the high efficiency LED display;
- three levels of protection for displaying and programming the parameters: SEL (user), PRG (installer), SEL+PRG (manufacturer);
- possibility to move the parameters between the user, installer and manufacturer levels.

Technical specifications

Power supply: 24 Vac (-15 to 10%), 50/60 Hz
Power input: 3 W
Operating conditions:
-10T55 °C, <90% rH non-cond.
Storage conditions:
-10T70 °C, <80% rH non-cond.
Analogue inputs: 4 (2 inputs NTC + 2 ratiometric)
Digital inputs: 5 from voltage-free contacts
Analogue outputs: 1 PWM output
Digital outputs: 5 relays with NO contacts, 250 Vac 3 A res. 2 A
Installation: flush mount or DIN rail
Index of protection: IP55 front panel

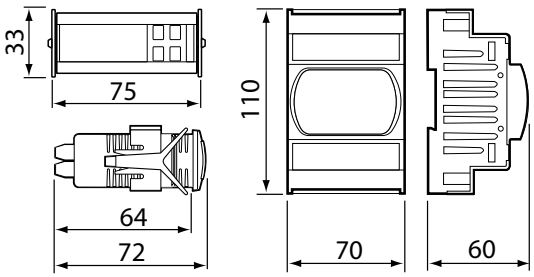
Installation

flush mount



DIN rail

Dimensions (mm)



Accessories and options

☑ rack Controller
☐ µRack

Ethernet™ interface board (PCO1000WB0)

Used to interface the pCO controllers with the BACnet™ Ethernet™, IP, SNMP V1, 2, 3, FTP and HTTP protocols.

☑ rack Controller
☐ µRack

Modem board on FieldBus (PCOS00FD20)

Used to interface the controller with a PSTM or GSM modem, or alternatively a serial printer, on the FieldBus serial port.

☐ rack Controller
☑ µRack

µRack kits

(MRK*DK: kit with µRack DIN rail version MRK*0K: kit with µRack built-in version)

The complete CAREL solution for the control of compressor racks is µRack in the kit version. This represents an advantageous solution above all for the installer, who can order µRack and the accessories with just one product code.
Each kit includes µRack in the built-in or DIN rail version, the transformer, pressure transducers, connection cables and, in the more complete versions, the connector kit.

☐ rack Controller
☑ µRack

FCS: IP55 three-phase speed controllers

(FCS3*0* and MCHRTF*A0)

Using the PWM output, µRack can manage three-phase or single-phase speed controllers.

☐ rack Controller
☑ µRack

RS485 serial board

(MCH2004850 and FCSER00000)

This is used to interface µRack to an RS485 supervisory network. The codes vary according to the installation (panel or DIN rail).

☐ rack Controller
☑ µRack

Programming key (PJOPZKEY*)

The programming key allows the instrument to be programmed quickly when not powered, with the certainty of not having made errors. It reduces the number of product codes handle ind allows the controller to be programme in just a few seconds, even during the testing phase at the end of the production line. This is certainly also an important tool for the service network.

☐ rack Controller
☑ µRack

Output signal converters

(CONONOFF0 and CONV0/10A0)

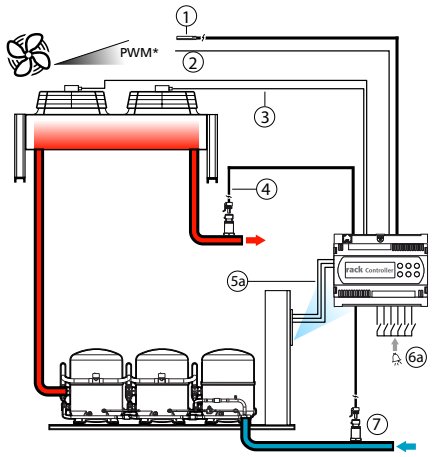
µRack can be fitted with an ON/OFF conversion board for controlling fans, and the PWM signal conversion module, with 0 to 10 V and 4 to 20 mA analogue output.

☐ rack Controller
☑ µRack

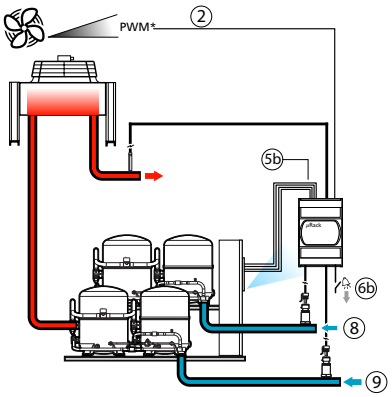
Connector kit (MCH2CON*)

Connector kits are available for µRack built-in version (MCH2CON001) and µRack DIN rail version (MCH2CON011).

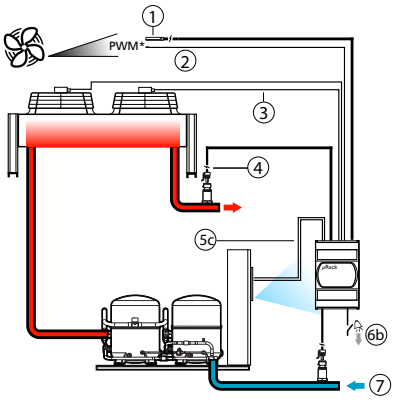
Rack controller: example of one suction line



µRack: example of two suction lines



µRack: example of one suction line



1	outside temperature for floating condensing pressure
2	modulating fans
3	2 fan outputs
4	condensing pressure
5a	3 compressor outputs
5b	4 compressor outputs
5c	2 compressor outputs
6a	6 alarm outputs
6b	1 alarm output
7	suction pressure
8	MT suction pressure
9	LT suction pressure

ACC

The ACC device is a microprocessor controller that prevents the formation of condensate on cold surfaces by measuring the ambient dewpoint and heating the cold surface so as to keep it at a higher temperature than the dewpoint. The heating is performed by controlling the voltage applied to special heaters, using the phase control output on the device.

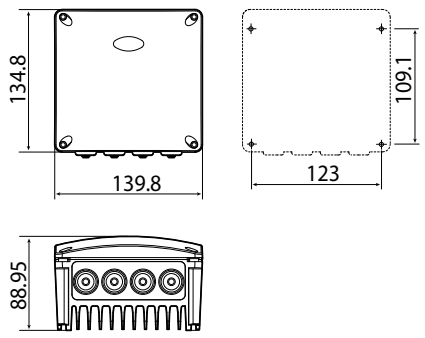
Main features:

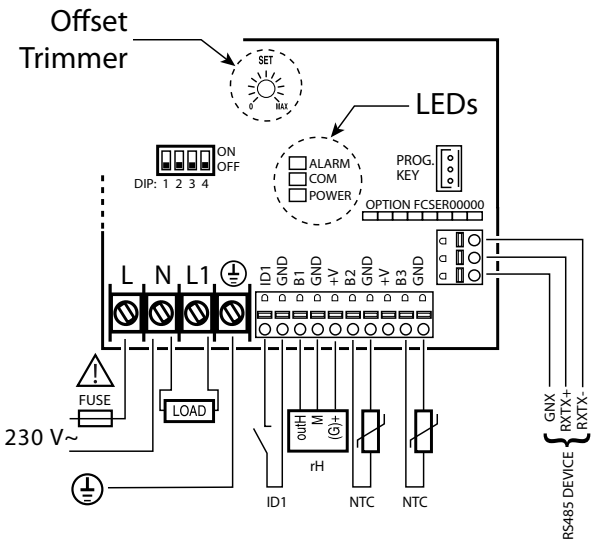
- dewpoint calculation;
- manual offset;
- programmable digital input (alarm or enable);
- Master/Slave function;
- serial interface for connection to supervisory systems or Master/Slave local network;
- auto-adaptation to mains frequency (50/60 Hz).

Technical specifications

Power supply: 230 Vac (-15 to +10 %) single-phase 50/60 Hz
Power input: 2.7 VA
Operating conditions:
-10T50 °C, <90 % rH non-condensing
Storage conditions:
-20T70 °C, <90% rH non-condensing
Installation: Metal case mounted on panel or wall using 4 screws Ø 3.5/4 mm
Index of protection: IP43 (upgradable to IP54)

Dimensions (mm)





E198839

Comply with EN13485

I/O management module

(IOM*)

This can be connecte in parallel to devices made by other manufacturers or electromechanical controllers to acquire the main operating parameters from compressor racks, air-conditioning systems, condensing units. The module can manage:

- up to 4 NTC temperature probes, or alternatively 2 NTC probes and two 4 to 20 mA or 0 to 5 Vdc transducers;
- digital contacts: 2 optically-isolated, 2 with voltage-free contacts (alternative to the NTC probes);
- one relay output to activate actuators or local alarm systems.

The module can be connected to PlantVisor, PlantWatch and Web-GATE.

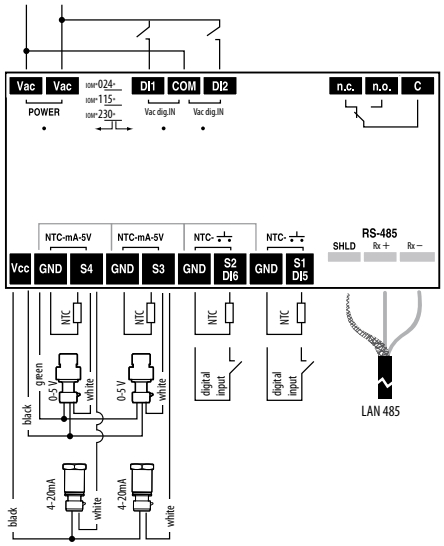
Technical specifications

Power supply:

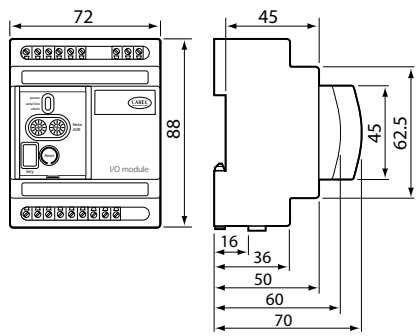
- IOM*230*: 230 Vac;
- IOM*115*: 115 Vac;
- IOM*024*: 24 Vac ±10%, 50/60 Hz;

Power input: 2,7 VA
Operating conditions:
0T50 °C, 20 to 80% rH non-cond.
Storage conditions:
-20T70 °C, 0 to 80% rH non cond
Installation: DIN rail
Index of protection: IP20 for devices not installe inside electrical panel

mod. IOM0023000 = 230Vac
mod. IOM0011500 = 115Vac
mod. IOM0002400 = 24Vac



Dimensions (mm)



Certification

I/O module fitted with the standard CAREL NTC probe is compliant, as required by EC regulation 37/2005 of 12/01/2005, with standard EN 13485 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.

Solutions for the Master-Slave management of multiplexed units

(SYN*)

Synchro 485 is the ideal solution for the supervision in Master-Slave networks of up to 6 parametric instruments from the ir33 and powersplit platforms, installed on refrigeration units such as multiplexe islands in supermarkets.
Synchro is configure in a master/slave network of CAREL controllers (local network) and can manage commands such as: light activation, auxiliary relay activation, alarm management, defrost and others, by reading the status of the instrument designate is the master during configuration. Based on the type of instruments connected, Synchro attributes the roles of network master and corresponding slaves. In supervision mode, Synchro controls the data traffic between the supervisor and the peripherals, and works transparently in the management of the master/slave network commands.

Advantages

- compact and easy to install solution;
- master/slave network management;
- gateway function to the supervisor;
- ideal solution for retrofit applications.

Network commands managed

Depending on the type of instrument connected:

- light; auxiliary relay management; On/Off; defrost, continuous cycle, temperature setting; copy parameters; supervision.

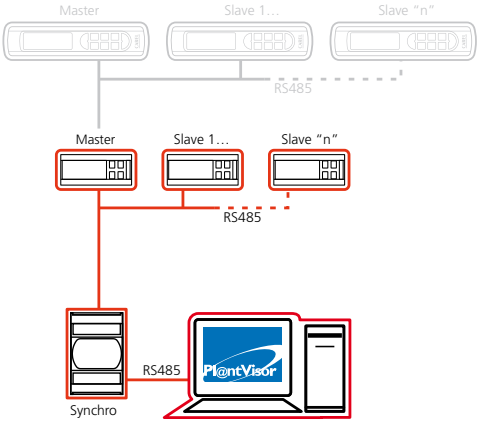
Devices supported by the Synchro system:

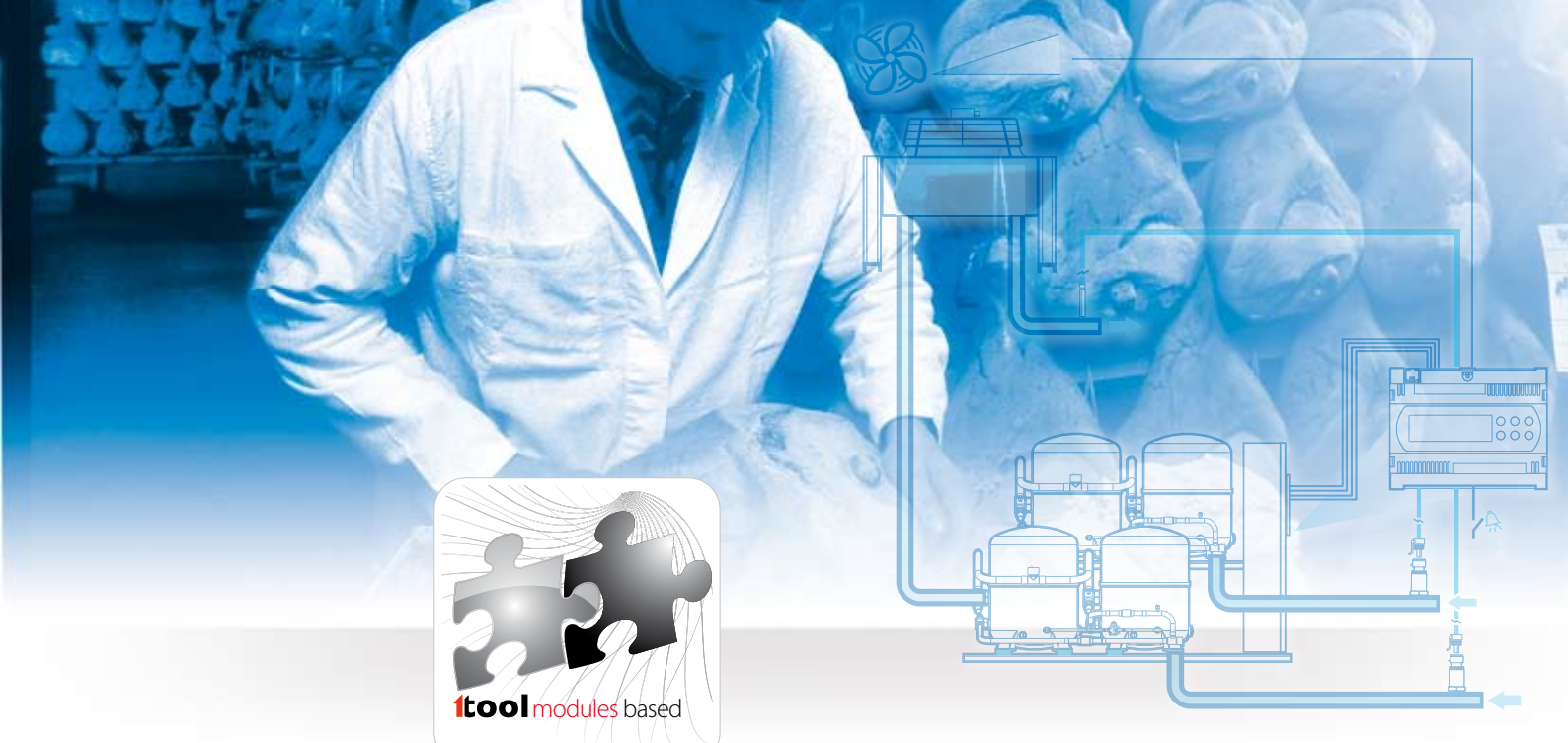
- ir33 platform (*) (ir33 series, powercompact series, MasterCella new version);
- powersplit; (*)
- other instruments with the CAREL protocol.

(*) to make the management parameters available to the master/slave network, the programming software code PSOPZPRG00 is required.

Technical specifications

Power supply: 230 Vac (-10 to +10%), 50/60 Hz;
Rated power: 2.7 VA
Relay output: 2000 VA, 250 Vac - UL873: 8 A resistive, 2 A FLA, 12 A LRA - EN 60730-1: 2 A resistive, 2 A inductive, 2 (2) A, cosφ= 0.4
Button: device configuration
Connections: plug-in terminal for "LOCAL LAN 485" communication: max cable cross-sect. 1.5 mm^2, (use shielded cable with shield connected to GND). Plug-in terminal for "SUPERVISOR LAN 485" communication: max cable cross-sect. 1.5 mm^2, (use shielded cable with shield connected to GND). Plug-in terminal for power supply to expansion board max 12 Vdc 100 mA: max cable cross-sect. 1.5 mm^2.
Installation: electrical panel on DIN rail
Status display: red LED alarms, green LED "Local LAN", green LED "supervisor"
Operating conditions:
0T50 °C, 20 to 80% rH non-condensing
Storage conditions:
-20T70 °C, 0 to 80% rH non-condensing
Index of protection: IP20 for devices not installe inside electrical panel





retail application programs

Control solutions for AHUs

Standard application programs for the control of air handling units.
These manage all the cooling, heating, humidification, dehumidification and post-heating functions, as well as freecooling, enthalpy control, set point compensation, heat recovery and air change. The fans, air filters and external devices (refrigeration units) are protected by a complete alarm management system.
In addition, the fan speed can be controlled by inverter, so as to maintain a constant outlet and return pressure in systems with variable flow-rate, optimising the consumption of energy.
Different versions of display are used to read the data both on the unit and from a distance. Finally, all the parameters can be modifie ind are protected by three levels of password: user, installer and manufacturer. The application can be integrate into the PlantVisor or PlantWatch supervisory system by RS485 serial connection, and can also interface to the Modbus® protocol.

Control solutions for chillers

Standard application program for managing air/water or water/water chillers, with tandem scroll compressors, semi-hermetic compressors or screw compressors featuring continuous or stepped capacity control.
The maximum configuration includes 8 hermetic or semi-hermetic compressors or 2 screw compressors for each unit, with a limit of 4 units.
Based on the type of compressors, various pCO sistema controllers can be used to create the best configuration in terms of I/Os.
The condenser fans can also be managed, with stepped or modulating control, using the CAREL FCS.
As well as connection to the most commonly used BMS, SMS messages can also be sent and received via a GSM modem to and from cellular phones.

Control solutions for roof-top units

Standard program to manage the temperature and humidity in roof-top units with two compressors.
The free cooling and free heating functions allow energy savings by exploiting the temperature of the outside air.
The maximum configuration features 2 capacity-controlled compressors, 2 heaters, and a built-in or external humidifier.
Connection is available to the leading BMS, and SMS messages can be sent and received to and from mobile phones using a GSM modem.
The alarm and event log is saved to the memory expansion and can be viewed on the LCD display or from a PC with an RS485 connection.

Temperature, humidity and pressure control solutions

CAREL offers increasingly advanced control solutions in the field of parametric controllers for HVAC/R applications. Specific commitment is dedicated to universal controllers, which provide the user a powerful and flexible instrument that easily can be configured. Starting from extremely simple control strategies the user can, by modifying just a few parameters, adopt control algorithms that are much more sophisticated and innovative, for example PID with AutoTuning.

The comtool software can be used to configure the parameters on the controllers directly from a personal computer.

Simple installation is also an important factor, both as regards assembly and wiring, using standard templates and quick connectors.

Finally, all universal controllers can interface with CAREL supervisory systems and open supervisory systems.

Integrated Control Solutions & Energy Savings

РОСС IT.АИ50.B09036

Universal controllers

The Infrared Universale series (IR32/IRDR, IR33/DN33) is a range of instruments for controlling the temperature, pressure and humidity values in air-conditioning, refrigeration and heating units.

The instruments can work with the most common temperature, humidity and pressure probes (NTC, PT100, type J or K thermocouples, 0 to 20 mA, 4 to 20 mA, 0 to 1 Vdc).
The controllers are available with one, two or four outputs, both in the version with changeover relay (8 A resistive), or with 0 to 10 Vdc outputs for managing external solid state relays (SSR).

The case can be chosen to best suit each application.

The instruments in the Infrared Universale series are in fact available in two different formats: the version for flush mounting with IP65 front panel, and the version for DIN rail mounting.

Advantages

The features of the Infrared Universale series controllers include:

- nine different programs, already configured to best manage each control situation;
- most of the controllers can be powered at between 12 and 24 V, alternating or direct current. In addition, there are also versions with 110 or 230 Vac power supply;
- all models are fitted with 1 or 2 digital inputs to simplify alarm management (including delays), changing the set point (from external clock or switch), remote ON/OFF, heating/cooling selection, etc.;
- the thermostats with NTC probes (thermistor) allow the use of a second probe with special functions;
- the IR33/DN33 series can be fitted with internal RTC and feature PID algorithms with AutoTuning;
- low consumption switching power supply.
- the controllers can be programmed in three ways: on the keypad of the instrument, from a PC and using a convenient and exclusive remote control.

IR33 & DN33: universal thermostats with 1, 2 & 4 outputs (relays, SSR, 0 to 10 Vdc)

IR33V*, IR33W*, IR33Z*
& DN33V*, DN33W*, DN33Z*

This series of "universal" controllers can be used with different types of temperature probes (NTC, PT100, thermocouples), while a second probe enables compensation operation (cooling or heating) differential operation (difference between the two temperatures), or freecooling operation (logic enabled based on set point for the second probe). They feature two digital inputs that can be configured to manage functions such as an immediate or delayed external alarm, and remote ON/OFF. Programming is made extremely simple by the 9 selectable operating modes (e.g.: direct, reverse, dead zone, PWM, etc.). All controllers feature a PID algorithm with AutoTuning and can be purchased complete with RTC (clock). A low consumption switching power supply is used on both the 12/24 Vac and 115/230 Vac versions.

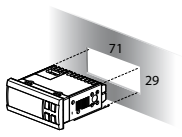
IR33D*, IR33A*, DN33A*, IR33B*, IR33E*, DN33B*, DN33E*

As for the other thermostats in the "Universale" series, these too can be used with different types of temperature probes (NTC, PTC, PT1000). The fundamental characteristic of this series is the possibility to control the most commonly available solid state relays, or alternatively the optional CAREL modules (CONVONOFF0 and CONV0/10A0), or alternatively with mixed configurations (relay + 0 to 10 Vdc output).
These instruments are effective in a range of different applications, such as the control of ovens, modulating valves, or on/off and modulating actuators.

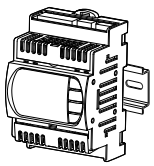
Power supply:
IR33*H*, DN33*H*: 115/230 Vac (±10%), 50/60 Hz;
IR33*LR*, DN33*LR*: 12/24 Vac/Vdc (±10%), 50/60 Hz;
Power input:
IR33*H*, DN33*H*: 6 VA; IR33*LR*, DN33*LR*: 4 VA
Operating conditions:
-10T60 °C, <90% rH non-condensing
Storage conditions:
-20T70 °C, <90% rH non-condensing
Inputs:
2 NTC/PTC/PT1000
NTC (-50T90 °C);
High temperature NTC (-40T150 °C);
PTC (-50T150 °C)
PT1000 (-50T150 °C);
2 digital from voltage-free contact, programmable
Outputs:
IR33V* & DN33V*: 1 relay, 250 Vac 8 A res.;
IR33W* & DN33W*: 2 relays, 250 Vac 8 A res.;
IR33Z* & DN33Z*: 4 relays, 250 Vac 8 A res.
IR33D*: 1 SSR; max. current 15 mA; resistance 660 Ω;
IR33A*, DN33A*: 1 SSR; max. current 15 mA; resistance 660 Ω;
IR33B* & DN33B*: 1 relay + 1 x 0 to 10 Vdc analogue;
IR33E* & DN33E*: 2 relays + 2 x 0 to 10 Vdc analogue;
Display: 3 digit with decimal point & sign
Installation:
IR33*: flush mount;
DN33*: DIN rail
Index of protection on front panel:
IR33*: IP65;
DN33*: IP40

Installation

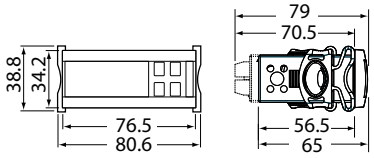
flush mount

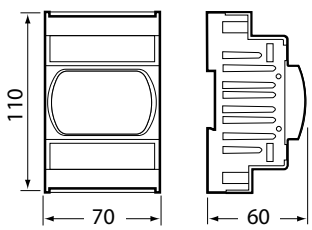


DIN rail



Dimensions (mm)





IR32 & IRDR: universal humidistats and pressure switches with 1, 2, 4 outputs

IR32V*, IR32W*, IR32Z*
& IRDRV*, IRDRW*, IRDRZ*

These IR Universale models can also be connected to any transducer able to supply a current (0 to 20 mA or 4 to 20 mA) or voltage signal (0 to 1 Vdc) for the measurement and control of physical values such as the pressure and humidity.
The models with voltage inputs, using the additional CONV0/L000 module, can also accept transducers with a 0 to 10 Vdc output signal.
They feature one digital input (two in the DIN rail version) that can be configured to manage functions such as an immediate or delayed external alarm, and remote ON/OFF.
The models with 4 outputs (IR32Z*, IRDRZ*) allow the rotation of the actuators, an especially useful function for compressor management.

IR32D*, IR32A*, IRDRA*

These IR Universale models can also be connected to any transducer able to supply a current (0 to 20 mA or 4 to 20 mA) or voltage signal (0 to 1 Vdc) for the measurement and control of physical values.
The models with voltage inputs, using the additional CONV0/L000 module, can also accept transducers with a 0 to 10 Vdc output signal.
The fundamental characteristic of this series is the possibility to control the most commonly available solid state relays, or alternatively the optional CAREL modules (CONVONOFF0 and CONV0/10A0). Each output can be connected to a different CONV* module for the management of mixed configurations (relay, 0 to 10 Vdc, 4 to 20 mA, solid state relay).

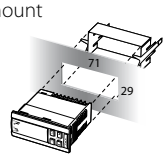
Technical specifications

Power supply:
IR32V*E, IR32V*L, IR*A & IR32D*: 12/24 Vac/Vdc (±10%), 50/60 Hz;
IR32V*H: 110/230 Vac (±10%), 50/60 Hz;
IR32W*, IR*Z*: 12/24 Vac/Vdc (±10%), 50/60 Hz;
IRDRV* & IRDRW*: 24 Vac (±10%), 230 Vac (±15%), 50/60 Hz

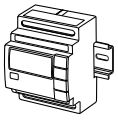
Power input:
IR32D*: 2 VA; IR32A*: 3 VA; IRDRA*: 4 VA
Operating conditions:
0T50 °C, <90% rH non-condensing
Storage conditions:
-10T70 °C, <90% rH non-condensing
Inputs:
IR*0*: NTC probe (-50T90 °C);
IR*1*: PT100 probe (-99T600 °C);
IR*2*: TcK (-99T999 °C) & TcJ (-99T800 °C);
IR*3*: 0 to 20 or 4 to 20 mA;
IR*4*: -0.5 to 1 Vdc
IR32*: 1 digital from voltage-free contact, programmable; IRDRA*: 2 digital from voltage-free contact, programmable
Outputs:
IR*V*: 1 relay, 250 Vac 8 A res.;
IR*W*: 2 relays, 250 Vac 8 A res.;
IR*Z*: 4 relays, 250 Vac 8 A res.
IR32D*: 1 SSR relay; maximum current 15 mA; resistance 660 Ω;
IR*A*: 4 SSR relays; maximum current 15 mA; resistance 660 Ω
Display: 3 digit with decimal point & sign
Precision: IR*A* & IR32D: ±1% of full scale
IR*V*, IR*W* & IR*Z*: ±1% on set limits
Installation: IR32*: flush mount; IRDR*: DIN rail
Index of protection: IR32*: IP65; IRDR*: IP40

Installation

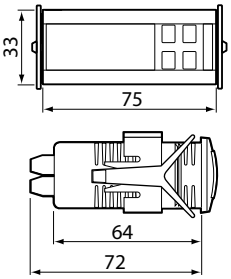
flush mount

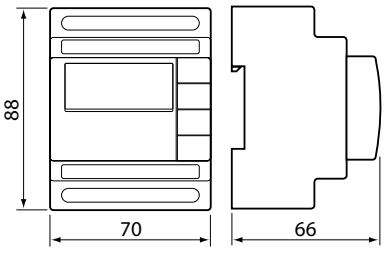


DIN rail



Dimensions (mm)







PJ heating/cooling

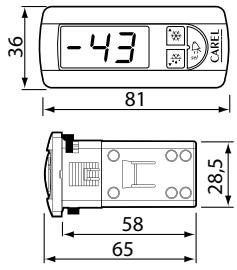
PJ32V*, PJ32W*, PJ32Z*, PJNZ*

PJ32 heating/cooling is a complete range of thermostats, with models featuring 1 to 3 relays, NTC or PTC probes. The version with 1 output performs the function of a thermostat, while the model with 2 outputs also allows the management of a second probe. The model with 3 outputs always features the alarm output, as well as the control outputs. Models are also available developed for the control of wine coolers (PJNZ*), featuring a heating output and a coiling output with defrost management.

Technical specifications

Power supply:
PJ32*V*: 12 Vac (-15 to 10%) or 12 Vdc, 50/60Hz;
PJ32*W*: 230 Vac (-15 to 10%), 50/60Hz;
PJ32*Z*: 115 Vac (-15 to 10%), 50/60Hz
Op. conditions: -10T50 °C, <90% rH non-cond.
Storage cond.: -20T70 °C, <90% rH non-cond.
Range of measurement: -50T90 °C, resolution 1 °C/°F
Inputs: 1 or 2 for NTC or PTC probe; 1 digital input as alternative to second probe
Outputs: up to 2 control relays & 1 alarm relay depending on the model
Installation: flush mount
Index of protection: IP65 flush mounted & with gasket inserted

Dimensions (mm)



clima

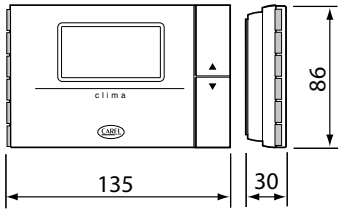
ADC*

Electronic instrument for controlling ambient temperature and humidity. It can be used in various operating modes. Special attention has been focused on the advanced algorithms in heating, cooling or automatic operation. Special functions for the control of underfloor heating, radiant floors in cooling mode and temperature compensation functions. Timer and RTC clock for day and night operation. The remote control option (by purchasing accessory IROPZ48500) allows the data from the instrument to be monitored and saved using a supervisor.

Technical specifications

Power supply: 24 Vac +10 to -15% 50/60Hz 1 VA, 22-35 Vdc 0.5W
Operating conditions:
0T60°C , 10 to 90% rH non-condensing
Storage conditions:
-20T70°C , 10-90% rH non-condensing
Index of protection: IP20

Dimensions (mm)



Special modules

CONV*

These have been developed to be connected directly to the Infrared Universale series instruments (version D and A). They can in any case be used with other controllers, for example with the µchiller series. There are three models:

- CONV0/10A0: converts the PWM signal supplied by the instrument into a standard analogue signal ((0 to 10 Vdc or 4 to 20 mA);
- CONVONOFF0: converts the PWM signal into an ON/OFF signal via relay;
- CONV0/1L00: powers other transducers and converts a 0 to 10 Vdc signal into a 0 to 1V signal as per the CAREL standard.

Technical specifications

Power supply: 24 Vac (±10%), 50/60 Hz
CONV0/10A0: 50 mA; CONVONOFF0: 30 mA;
CONV0/1L00: 180 mA
Operating conditions:
0T50 °C, <90% rH non-condensing
Storage conditions:
-10T70 °C, <90% rH non-condensing
Index of protection: IP20

Dimensions (mm)

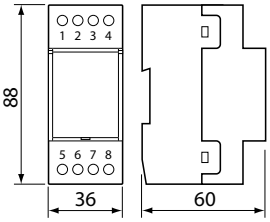


Table of IR33 Universale & DIN version models

Specifications	Models						
	IR33V* DN33V*	IR33W* DN33W*	IR33Z* DN33Z*	IR33A* DN33A*	IR33D* -	IR33B* DN33B*	IR33E* DN33E*
Power supply							
12/24 Vac ±10%, 50/60 Hz, 12/30 Vdc	●	●	●	●	●	●	●
115/230 Vac ±10%, 50/60 Hz	●	●	●	●	●	●	●
Power input	6 VA	6 VA	6 VA	6 VA	6 VA	6 VA	4 VA
Inputs							
control probe - NTC/PTC/PT1000	2	2	2	2	2	2	2
digital inputs	2	2	2	2	2	2	2
Outputs							
relays	1	2	4	-	-	1	2
SSR	-	-	-	4	1	-	-
0…10 Vdc	-	-	-	-	-	1	2
User interface							
3-digit LED display	●	●	●	●	●	●	●
Resolution							
0.1 from -9.9 to 99.9	●	●	●	●	●	●	●
Precision							
±0.5% of full scale	●	●	●	●	●	●	●
Index of protection on front panel							
IP65 (flush)	●	●	●	●	●	●	●
IP40 (DIN rail)	●	●	●	●	-	●	●
Programming							
keypad	●	●	●	●	●	●	●
remote control	●	●	●	●	●	●	●
serial	●	●	●	●	●	●	●
programming key	●	●	●	●	●	●	●
Special functions							
signal buzzer	●	●	●	●	●	●	●
multifunction digital inputs	●	●	●	●	●	●	●
serial connection	●	●	●	●	●	●	●
PID with AutoTuning	●	●	●	●	●	●	●
alarm log (models with clock)	●	●	●	●	●	●	●
clock	●	●	●	●	●	●	●
decimal point	●	●	●	●	●	●	●

● as standard

Table of IR32 Universale models

Specifications	Models								
	IR32A*	IRDRA*	IR32D*	IRE32V*	IRDRV*	IR32W*	IRDRW*	IR32Z*	IRDRZ*
Power supply									
12 Vac/Vdc ±10%, 50/60 Hz	●	●	●	●	-	●	-	●	●
24 & 230 Vac ±10%, 50/60 Hz	-	-	-	-	●	-	●	-	-
110/230 Vac ±10%, 50/60 Hz	-	-	-	●	-	-	-	-	-
Power input	3 VA	3 VA	2 VA	2 VA	3 VA	3 VA	3 VA	3 VA	4 VA
Inputs									
NTC control probe	2	2	2	2	2	2	2	2	2
PT100 control probe	1	1	1	1	1	1	1	1	1
J-K thermocouple control probe	1	1	1	1	1	1	1	1	1
4 to 20 mA control probe	1	1	1	1	1	1	1	1	1
-0.5 to 1 Vdc control probe	1	1	1	1	1	1	1	1	1
digital inputs	1	2	1	1	2	1	2	1	2
Outputs									
relays (NTC model)	-	-	-	1	1	2	2	4	4
relays (other models)	-	-	-	1	1	2	2	4	4
SSR	4	4	1	-	-	-	-	-	-
User interface									
3-digit LED display	●	●	●	●	●	●	●	●	●
Resolution									
0.1 from -9.9 to 99.9	●	●	●	●	●	●	●	●	●
Precision									
±0.5% of full scale	●	●	●	●	●	●	●	●	●
Index of protection on front panel									
IP65 (flush)	●	-	●	●	-	●	-	●	-
IP40 (DIN rail)	-	●	-	-	●	-	●	-	●
Programming									
keypad	●	●	●	●	●	●	●	●	●
remote control	●	●	●	●	●	●	●	●	●
serial	●	●	●	●(*)	●	●	●	●	●
Special functions									
signal buzzer	●	●	●	●	●	●	●	●	●
multifunction inputs	●	●	●	●	●	●	●	●	●
serial connection	●	●	●	●(*)	●	●	●	●	●
decimal point	●	●	●	●	●	●	●	●	●

(*) not on IR32V*H*

● as standard

Sensors and protection devices

Sensors and protection devices are components used in refrigeration units

They measure a physical value (temperature, humidity, pressure, etc.) and convert the reading into an electrical signal to be sent to the electronic controller, allowing the unit to work within the required operating limits.

These components carry out a key role in the improvement of control and the optimised management of the installation.

They can interface with and be adapted to controllers supplied by third parties with standard output signals.

РОСС IT.АИ50.В09036

Sensors and protection devices

CAREL offers increasingly advanced and complete global solutions.

For this reason, CAREL has designed an entire range of probes that respond to the needs of HVAC/R installers and manufacturers, as well as for the control of its own line of humidifiers.

The range includes temperature and humidity sensors for various applications, with installation in sockets or ducts, in residential or industrial environments, guaranteeing high performance and compatibility with all CAREL controllers.

The range has been enriched with the most innovative technological solutions, offering new international standards at increasingly competitive prices.

Advantages

CAREL sensors, as well as featuring the recognised performance that sets them apart, are very versatile and can satisfy various market requirements.

Indeed, all the sensors have been especially designed to be compatible not only with all CAREL controllers, but also with the most commonly used standards around the world.

The temperature and humidity probes are available with different operating ranges and in special versions for corrosive or polluting environments.

The new pressure transducers, as well as being available in a ratiometric version, now offer improved performance in terms of precision, better supporting of overpressure, extended operating temperature range and resistance to acceleration.

The new air quality sensors offer installers and manufacturers of AHUs an important new accessory, with the certainty of CAREL quality.

Furthermore, CAREL provides a series of protection modules: thermal protectors for the compressors (THP), especially for scroll units, and phase sequence controllers (RSF), ideal for systems in which the correct sequence of the phases is fundamental for the correct operation of the installation.

The new smoke/fire and flood detectors are compact devices with automatic calibration, meaning they can adapt to all environments without a reduction in the precision of activation.

Active temperature, humidity and temperature/ humidity sensors

DPW*: for room installations
DPD*: for duct installations

Particularly suitable for civil and commercial environments with precise design requirements. Used in ducted heating and air-conditioning systems. The range also includes models with RS485 connection using the CAREL or Modbus® protocol.

Technical specifications

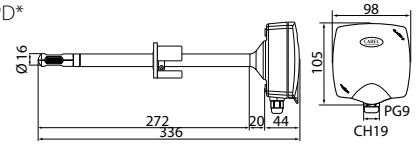
Power supply: 12/24 Vac (-10 to +15%), 9 to 30 Vdc (±10%)
Operating conditions:
- DPW*: -10T60 °C, <100% rH non-condensing
- DPD*: -10T60 °C, -20T70, <100% rH non-cond.

Storage conditions:
-20T70 °C, <90% rH non-condensing
Connections: screw terminal blocks for cables up to 1.5 mm²
Installation:
- DPW*: wall-mounted
- DPD*: duct

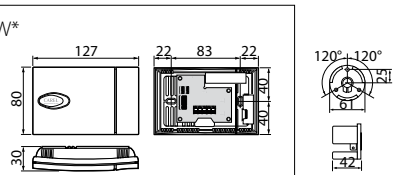
Index of protection:
- DPW*: IP30
- DPD*: IP55, IP40 sensor

Dimensions (mm)

DPD*



DPW*



Active temperature/ humidity sensors

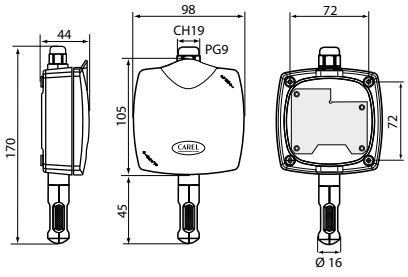
DPP*: for industrial environments

Specifically designed to measure high humidity levels with great precision.
The range also includes models with RS485 connection using the CAREL or Modbus® protocol.

Technical specifications

Power supply: 12/24 Vac (-10 to +15%), 9 to 30 Vdc (±10%)
Operating conditions:
-10T60 °C, -20T70, <100% rH non-condensing
Storage conditions:
-20T70 °C, <100% rH non-condensing
Connections: screw terminal blocks for cables up to 1.5 mm²
Installation: wall-mounted
Index of protection: IP55 (case); IP54 (sensor)

Dimensions (mm)



Active immersion temperature probes

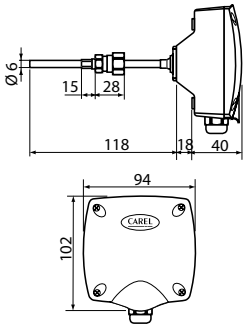
ASIT*: immersion

The ASIT* immersion sensors are used to measure the temperature inside cooling or heating circuits.
These are especially suitable when the sensor is in direct contact with the fluid being measured.

Technical specifications

Power supply: 12/24 Vac (-10 to 15%), 9 to 30 Vdc (±10%)
Operating conditions:
-10T70 °C, <100% rH non-condensing
Storage conditions:
-20T70 °C, <100% rH non-condensing
Connections: screw terminal blocks for cables up to 1.5 mm²
Installation: direct or with socket
Index of protection: IP55 (case); IP67 (sensor)

Dimensions (mm)



Universal active temperature sensors

ASET*: universal

The universal temperature sensors can be used in a multitude of applications; in particular, version ASET03* features an electronic amplifier, protected by an IP55 plastic case, which allows remote installation up to 200 m with a 4 to 20 mA output signal.

Technical specifications

Power supply: 12/24 Vac (-10 to 15%), 9 to 30 Vdc (±10%)
Operating conditions:
-30T90 °C or 30T150 °C, <100% rH non-condensing
Storage conditions:
-20T70 °C, <100% rH non-condensing
Connections: screw terminal blocks for cables up to 1.5 mm²
Installation: direct or with socket
Index of protection: IP55 (case); IP67 (sensor)

Air quality sensors: VOC, CO_2, CO_2+VOC

DPWQ*: for room installations
DPPQ*: for duct installations

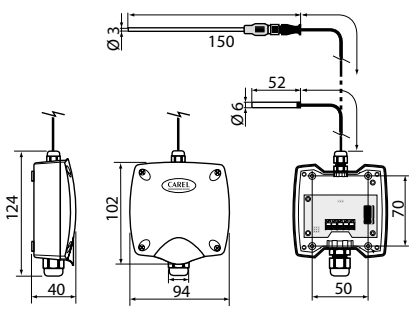
These analyse air quality and are ideal for ventilation systems and air handling units in domestic and commercial environments.

Main functions:
- measuring air quality;
- quantitative analysis of contamination by polluting gases;
- setting a sensitivity threshold according to the maximum level;
- ventilating rooms only when necessary, so as to guarantee energy saving.

Technical specifications

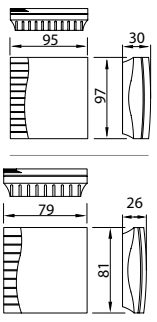
Power supply: 24 Vac/dc ±10%, 50/60 Hz
Operating conditions:
0T50 °C, 10 to 90% rH non-condensing
Storage conditions:
-20T70 °C, 10 to 90% rH non-condensing
Outputs: 10 Vdc or 4 to 20 mA based on the model

Dimensions (mm)

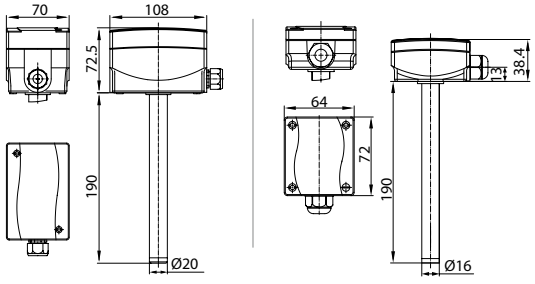


Dimensions (mm)

DPWQ*



DPDQ*



Temperature probes with NTC thermistor

NTC*HP*, NTC*WP*, NTC*WF*,
NTC*HF & NTC*HT, NTCINF*

For the various controllers, CAREL proposes a range of sensors with different features, suitable for different applications mainly in the HVAC/R sector.

The precision achieved by the technical solutions adopted in the development of the sensor, and the reliability resulting from the tests performed, make the CAREL NTC sensors reliable transducers for measuring temperature, at an affordable cost.

Piercing probes are also available, with or without preheating element, for measuring the core temperature of the product.

Immersion probes

TSN* and TSC* = NTC version
TST* and TSM* = PT1000 version
TSOPZ= accessories (connectors, fittings, sockets…)

CAREL proposes the new TS* range of immersion probes, in models with NTC and PT1000 sensors, suitable exclusively for hydronic applications.
Fast installation, rapid sensor response and an excellent price/performance ratio are the main features of this product range.
The probes are available complete with connectors, cables, fittings and sockets.

Temperature probes with PTC, Pt100, Pt1000 sensor, J and K thermocouples

PTC*

The PTC temperature probes represent a solution for both refrigeration and heating applications, measuring temperatures in the range from -50T100 °C and 0T150 °C.

PT100*

The PT100 sensors represent the ideal solution for all applications in which the temperature must be measured over an extended range, from -50°C to 400°C (depending on the model).

TSQ* & TSH*

The PT1000 sensor (TSQ* and TSH*) is ideal for all applications in which the temperature must be measured over an extended range, from -50 to 250 °C (TSQ*) and from -50 to 90 °C (TSH), while maintaining precision even over long distances for remote installation.

4 to 20 mA pressure transducers

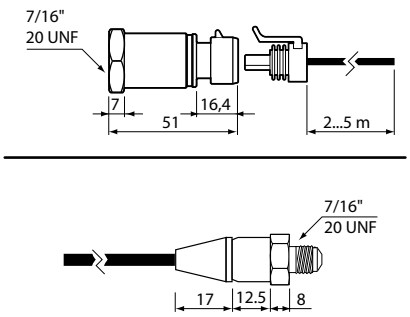
SPKT*C*, SPK1*, SPK2*, SPK3*

These pressure transducers provide a standard analogue current signal (4 to 20 mA).
They are used above all in refrigeration and air-conditioning applications to measure the pressure in the refrigerant circuits, however their high performance also makes them ideal for many other applications. They can also be used in refrigerant circuits containing ammonia.
Available with male and female fittings.

Technical specifications

Power supply: 8 to 28 Vdc ±20%
Operating conditions: -25T80 °C (male), -40T135 °C (female)
Connector thread: 7/16" 20 UNF
Precision: ±2.5% FS (male), ±4% FS (female)
Index of protection: IP65 (IP67 with built-in connector)

Dimensions (mm)



0 to 5 V ratiometric pressure transducers

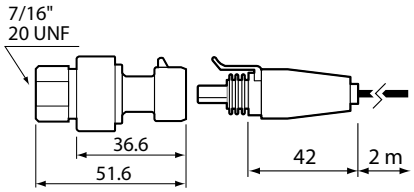
SPKT*R* & SPKC00*

These pressure transducers provide a 0 to 5 V ratiometric signal (automotive standard).
Like the 4 to 20 mA pressure transducers, these can be used in air-conditioning and refrigeration systems, excluding those containing ammonia.
Available with female fitting only.

Technical specifications

Power supply: 4.5 to 5.5 Vdc
Operating conditions: -40T135 °C
Outputs: 0.5 to 4,5 Vdc
Precision: ±1.2% FS
Temperature error: ±0.013% /°C
Connector thread: 7/16" 20 UNF
Index of protection: IP65

Dimensions (mm)



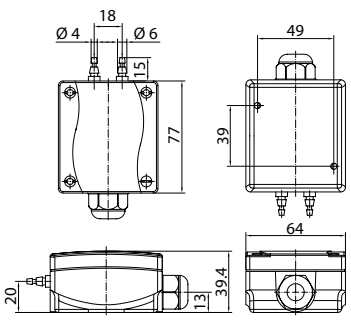
Differential pressure transducers

SPKT00*5N0

The differential pressure transducers use a new ceramic sensor that provides a voltage or current signal calibrated and compensated according to the temperature. Ideal for measuring low pressure values in air-conditioning systems, rooms, laboratories and clean rooms (air and non-corrosive gases).
The main features are:

- compact construction;
- easy installation thanks to the built-in mounting bracket;
- clip-on cover with fastening screw.

Dimensions (mm)



Differential pressure switch

DCPD0*0*00

CAREL supplies differential air pressure control units for filters, fans, air ducts, air-conditioning and ventilation systems. The pressure switch is ideal for control and safety functions in air-conditioning systems to signal that the fans have stopped or the filters are blocked. It can be installed in environments with non-aggressive and non-flammable atmospheres, and comes in the version with assembly kit.

Air flow switch

DCFL000100

CAREL supplies flow switches for controlling the flow of air or non-aggressive gases inside the distribution ducts of air-conditioning or air handling systems.
These devices feature a galvanised plate base and a sealed ABS cover, IP65 (on the side towards the outside of the duct), according to the EN60529 standard, class of protection 1 - EN 60335-1 standard.

Thermal protector

THP*

The THP motor protection module has been especially designed for scroll compressors. According to the DIN 44081/082 standards, up to nine PTC temperature sensors, with different rated response temperatures, can be connected in series to the input of the measurement circuit. As soon as the temperature in one of the monitored areas exceeds the rated response temperature of the corresponding PTC sensor, the THP motor protector module is activated, and consequently de-energises the relay. When the protector is activated a timer is started; the protection mechanism cannot be reset until 30 seconds have passed, and when the PTC signals (the resistance of the sensors) have fallen below the reset threshold.

Flood detector

FLOE*

The flood detecting device is able to sense the presence of water in an environment.
It is generally used to protect against flooding in computer rooms, offices, laboratories, special environments. It is made up of a detector (normally fitted on the electrical panel) and a sensor (installed in the position being controlled).
When the sensor is wet by the water, the alarm is automatically activated on the detector, switching the status of the relay.

Antifreeze thermostat

DCTF000320

Designed to protect heat exchangers (evaporator coils) and electric heaters in air-conditioning and refrigeration systems.

It can be used in all applications where the temperature needs to be checked at a specific point in the system, to prevent it falling below of a set safety value.

The thermostat also provides automatic protection in the event of a sensor fault.

Smoke and fire detector

SFF*

The smoke and fire detectors are electronic devices that promptly measure dangerous and sudden rises in temperature or increases in the presence of smoke. Their unique feature is the auto-calibration function, which guarantees the activation of the device over time, while perfectly adapting to different environmental conditions without losing sensitivity.

Phase sequence controller

RSF*

The RSF modules control the correct sequence of the input phases L1, L2 and L3 and measure the voltage for the three phases. They are fitted with a relay that is energised when the phase sequence is correct and the measurement of each individual phase is within ±10% of the rated voltage (depending on the model). The dimensions are compact and modular (DIN standard).
These modules are therefore ideal for equipment, systems or units where the correct sequence of the phases is fundamental for correct operation.

Active temperature and humidity sensors

Specifications

Models	temperature range	range of measurement	output
Active room sensors, power supply 9 to 30 Vdc/12 to 24 Vac			
DPWT010000	-10T60 °C		select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPWT011000	-10T60 °C		NTC 10 K at 25 °C
DPWC111000	-10T60 °C	10 to 90% rH	• NTC 10 K at 25 °C (temperature) • select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA (humidity)
DPWC110000	-10T60 °C	10 to 90% rH	select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPWC115000	-10T60 °C	10 to 90% rH	• NTC 10 K at 25 °C (temperature) • 0 to 10 Vdc (humidity)
DPWC112000	-10T60 °C	10 to 90% rH	0 to 10 Vdc
DPWC114000	-10T60 °C	10 to 90% rH	opto-isolated RS485 serial
DPWT014000	-10T60 °C		opto-isolated RS485 serial
Active sensors for industrial environments, power supply 9 to 30 Vdc/12 to 24 Vac			
DPPT010000	-20T70 °C		select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPPT011000	-20T70 °C		NTC 10 K at 25 °C
DPPC111000	-10T60 °C	10 to 90% rH	• NTC 10 K at 25 °C (temperature) • select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA (humidity)
DPPC110000	-10T60 °C	10 to 90% rH	select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPPC210000	-20T70 °C	0 to 100% rH	select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPPC112000	-10T60 °C	10 to 90% rH	0 to 10 Vdc
DPPC212000	-20T70 °C	0 to 100% rH	0 to 10 Vdc
DPPT014000	-10T60 °C	10 to 90% rH	opto-isolated RS485 serial
DPPC114000	-10T60 °C	10 to 90% rH	opto-isolated RS485 serial
DPPC214000	-20T70 °C	0 to 100% rH	opto-isolated RS485 serial
Active duct sensors, power supply 9 to 30 vdc/12 to 24 Vac			
DPDT010000	-20T70 °C		select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPDT011000	-20T70 °C		NTC 10 K at 25 °C
DPDC111000	-10T60 °C	10 to 90% rH	• NTC 10 K at 25 °C (temperature) • select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA (humidity)
DPDC110000	-10T60 °C	10 to 90% rH	select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPDC210000	-20T70 °C	0 to 100% rH	select. 0 to 1 V/-0.5 to 1 Vdc/4 to 20 mA
DPDC112000	-10T60 °C	10 to 90% rH	0 to 10 Vdc
DPDC212000	-20T70 °C	0 to 100% rH	0 to 10 Vdc
DPDT014000	-20T70 °C		opto-isolated RS485 serial
DPDC114000	-10T60 °C	10 to 90% rH	opto-isolated RS485 serial
DPDC214000	-20T70 °C	0 to 100% rH	opto-isolated RS485 serial

Case index of protection	IP55 for DPD, DPP IP30 for DPW	(for duct and ind. env.) (wall-mounted)
Sensor index of protection	IP30 IP40 IP54	for DPW for DPD for DPP
Temperature time constant	in still air in moving air (3 m/s)	300 s 60 s
Humidity time constant	in still air in moving air (3 m/s)	60 s 20 s

Specifications

Models	range of measurement	output
Active immersion sensors, power supply 9 to 30 Vdc/12 to 24 Vac		
ASIT030000	-30T90 °C	select. -0.5 to 1 Vdc/4 to 20 mA
Universal active sensors, power supply 9 to 30 vdc/12 to 24 Vac		
ASET030000	-30T90 °C	select. -0.5 to 1 Vdc/4 to 20 mA
ASET030001	-30T90 °C	select. -0.5 to 1 Vdc/4 to 20 mA
ASET030002	-30T150 °C	select. -0.5 to 1 Vdc/4 to 20 mA

Passive temperature probes

Specifications				
Models	**range**	**precision**	**constants (time)**	**IP**
NTC*				
NTC0*HP00	-50T105 °C -50T50 °C (in fluid)	25 °C: ±1%	75 s (in air)	IP67
NTC0*WF00	-50T105 °C	25 °C: ±1%	4.5 s (in fluid)	IP68
NTC0*WP00	-50T105 °C	25 °C: ±1%	10 s (in fluid)	IP68
NTC0*WG00	-50T105 °C	25 °C: ±1%	4.5 s (in fluid)	●
NTC0*HT00	0T120 °C (air) 150 °C X 3000 hours	±0.5 °C, -10T50 °C - 25 °C: ±1.0 °C; -50T85 °C ±1.6 °C; +85T120 °C - ±2.1 °C; +120T150 °C	60 s (in air)	IP55
NTC0*HF00	-50T90 °C	±0.5 to 25 °C; ±1.0 °C from -50T90 °C	75 s (in air)	IP55
NTCINF	-50T110 °C	25 °C: ±1%	10 s (in fluid) 60 s (in air)	IP67
TSN*	-40T120 °C	25 °C: ±1%	5 s (in fluid)	O
TSC*	-40T90 °C	25 °C: ±1%	5 s (in fluid)	O
PT100*				
PT100000A1	-50T250 °C	IEC 751 class B	75 s (in air)	IP65
PT100000A2	-50T400 °C	IEC 751 class B	75 s (in air)	IP65
PT100000A3	-50T200 °C	IEC 751 class B	75 s (in air)	IP67
PT1000				
TSH*HF*	-50T90 °C	±0,8 °C, -50T90 °C	75 s (in air)	IP67
TSQ15MAB00	-50T250 °C	IEC 751 class B	2.5 s (in fluid)	IP65
TST*	-40T120 °C	IEC 751 class B	5 s (in fluid)	O
TSM*	-40T90 °C	IEC 751 class B	5 s (in fluid)	O
PTC				
PTC0*0000	0T150 °C	±2 °C; 0T50 °C - ±3 °C; -50T90 °C - ±4 °C; 90T120 °C	60 s (in air)	IP65
PTC0*W*	-50T100 °C	±2 °C; 0T50 °C - ±3 °C; -50T90 °C - ±4 °C; 90T120 °C	60 s (in air)	IP67
PTC03000*1	-50T120 °C	±2 °C; 0T50 °C - ±3 °C; -50T90 °C - ±4 °C; 90T120 °C	60 s (in air)	IP67

● glass temperature sensor
O immersion probe

Pressure transducers

Specifications

Models	power supply	operating temperature	range	precision	output signal	constants (time)	IP
SPKT00-R0: 0 to 5 V ratiometric - female							
53	4.5 to 5.5 Vdc	-40T120 °C	4.2 bars absolute	±1.2%	0.5 to 4.5 V	10 ms	IP65
13	4.5 to 5.5 Vdc	-40T120 °C	9.3 bars absolute	±1.2%	0.5 to 4.5 V	10 ms	IP65
33	4.5 to 5.5 Vdc	-40T120 °C	34.5 bars absolute	±1.2%	0.5 to 4.5 V	10 ms	IP65
43	4.5 to 5.5 Vdc	-40T120 °C	17.3 bars absolute	±1.2%	0.5 to 4.5 V	10 ms	IP65
B6	4.5 to 5.5 Vdc	-40T120 °C	45.0 bars absolute	±1.2%	0.5 to 4.5 V	10 ms	IP65
SPK*: 4 to 20 mA - male							
*1000000	8 to 28 Vdc	-25T80 °C	-0.5 to 7 bars	±2.5% fs	4 to 20 mA	-	IP67
*2500000	8 to 28 Vdc	-25T80 °C	0 to 25 bars	±2.5% fs	4 to 20 mA	-	IP67
*3000000	8 to 28 Vdc	-25T80 °C	0 to 30 bars	±2.5% fs	4 to 20 mA	-	IP67
SPK*C*: 4 to 20 mA - female							
*T0021C0	8 to 28 Vdc	-40T135 °C	-0.5 to 7 bars	±1% fs; 0T50 °C	4 to 20 mA	<10 ms	IP65 [1]
*T0011C0	8 to 28 Vdc	-40T135 °C	0 to 10 bars	±1% fs; 0T50 °C	4 to 20 mA	<10 ms	IP65 [1]
*T0031C0	8 to 28 Vdc	-40T135 °C	0 to 30 bars	±1% fs; 0T50 °C	4 to 20 mA	<10 ms	IP65 [1]
*T0041C0	8 to 28 Vdc	-40T135 °C	0 to 18.2 bars	±1% fs; 0T50 °C	4 to 20 mA	<10 ms	IP65 [1]
*T00B1C0	8 to 28 Vdc	-40T135 °C	0 to 44.8 bars	±1% fs; 0T50 °C	4 to 20 mA	<10 ms	IP65 [1]

[1] IP67 with built-in connector

Air quality sensors

Specifications

Models	type	output
Room 24 Vac/15-36 Vdc		
DPWQ306000	V.O.C.	0 to 10 Vdc or 4 to 20 mA
DPWQ402000	CO_2	0 to 10 Vdc
DPWQ502000	V.O.C. e CO_2	0 to 10 Vdc
Duct 24 Vac/15-36 Vdc		
DPDQ306000	V.O.C.	0 to 10 Vdc or 4 to 20 mA
DPDQ402000	CO_2	0 to 10 Vdc
DPDQ502000	V.O.C. e CO_2	0 to 10 Vdc

Differential air pressure transducers

Specifications

Models	power supply	power input	differential pressure range	differential pressure full scale precision	output signal	differential pressure constants (time)	IP
SPKT00C5N0	15 to 30 Vdc	≥20 mA	0 to 0.5 mbars	±3%	4 to 20 mA	0.055 s	IP65
SPKT0065N0	15 to 30 Vdc	≥20 mA	0 to 10 mbars	±3%	4 to 20 mA	0.055 s	IP65
SPKT0075N0	15 to 30 Vdc	≥20 mA	0 to 25 mbars	±3%	4 to 20 mA	0.055 s	IP65

Pressure switches and flow switches

Specifications

operating conditions	sensor	range	precision	maximum current	output signal	type of contacts	IP
DCPD0*0100: duct pressure switches							
-25T85 °C max 50 mbar	silicone membrane	0.5 to 5 mbar	0.2 ± 15% mbars	1.5 (A) 25 Vac 0.1 A 24 Vac	NO / NC voltage-free contact	sealed switch, AgCdO contacts	IP54
DCPD0*1100: duct pressure switches							
-20T85 °C max 50 mbar	silicone membrane	0.2 to 2 mbar	0.2 ± 15% mbars	1.5 (A) 25 Vac 0.1 A 24 Vac	NO / NC voltage-free contact	sealed switch, AgCdO contacts	IP54
DCFL000100: flow switches							
-40T85 °C	silicone membrane	2.5 to 9.2 m/s (start) 1 to 8 m/s (stop)		15 (8) A 24/250 Vac	NO / NC voltage-free contact	sealed switch	IP65

*: "1" with assembly kit

Remote management and communication solutions

Systems of monitoring and supervision carry out a role key in the management incorporated of the systems HVAC/R.

These are essential instruments for continuously and effectively controlling the status of field devices and recording temperature and events in compliance with HACCP regulations.
They can perform scheduled actions (e.g. lights on/off, etc.) and optimise the organisation of maintenance operations through effective alarm management.
The immediate signalling of alarms by SMS, e-mail and/or fax means the installation is always under control, while the remote system can be used to resolve several problems quickly, without need to go on-site, ensuring economic savings and faster response times.
The system offers various reporting options, including standards-compliant print-outs at programmable times.
In addition, critical situations can be highlighted relating to the trend in values such as temperature, pressure and power consumption, comparing values between different utilities.

Integrated Control Solutions & Energy Savings

Connectivity

Connectivity is the result of CAREL's years of experience in the design and manufacture of programmable controllers for HVACR units. CAREL constantly follows the technological advances in communications, focusing on several fundamental concepts.

Connectivity

Interfacing and compatibility with the more commonly-used BMS (Building Management Systems): BACnet™, LonWorks®, Modbus®, SNMP. This ensures:

- remote management of the unit via modem and the Internet, including using a simple browser.
- authorised personnel, wherever they may, are notified of any alarm situations, including by SMS and e-mail.
- simple creation of alarms and graphs for prompt unit diagnostics.

Interoperability

Ability to work and cooperate in a distributed intelligence system and with integrated solutions, acquiring from and sharing information with third party devices for:

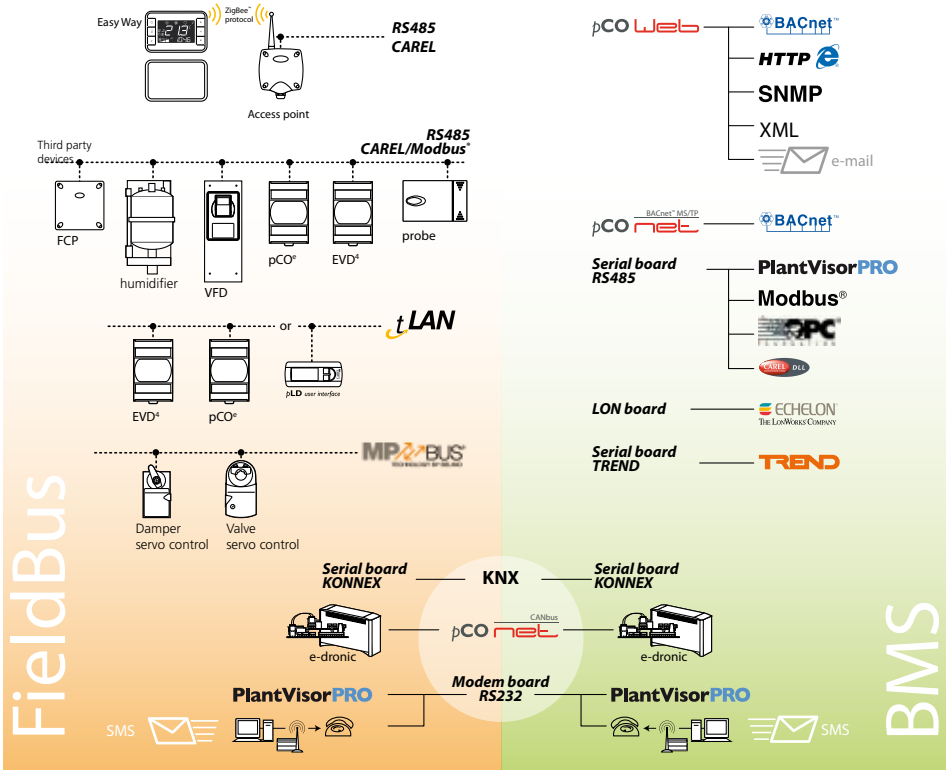
- optimised management of the unit.
- high efficiency of the installation (energy saving)

Security

Risk-free transmission of information and data exchange, an important factor above all when using networks that are universally accessible.

The CAREL devices can be configured for:

- differentiated access to the unit for maintenance personnel or supervision.
- secure access via internet or VPN (virtual private network).



Supernode

SN*

The new Supernode series is the result of the need for a controller than can manage considerable information flows.
This feature adds to the numerous advantages of a programmable controller.
Supernode is the first CAREL controller with 32-bit microprocessor and embedded 4 MB flash memory.
The unit is compact (6 DIN modules) with built-in negative blue 132x64 pixel display.
The keypad, placed horizontally underneath the display and without screen printing, allows the functions associated with each button (as shown on the bottom line of the display) to be customised and different for each screen.
Supernode is a product:

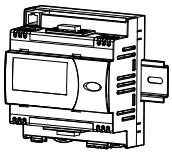
- flexible: ideal for more demanding applications, using the numerous I/Os available and a modern and functional semi-graphic display;
- powerful: the power of the new platform makes the management of information fast and reliable;
- connectable: 6 serial ports:
  - 2 built-in RS485 ports, one of which optically isolated;
  - 2 slots for BMS plug-in cards;
  - 2 USB ports (Master and Slave).

The fast digital input, standard on all versions, can be used to directly read energy counters.
Ideal as a system coordinator, simultaneous access by two supervisory systems and the master function for multiple serial connections make it adaptable to all kinds of applications and needs.

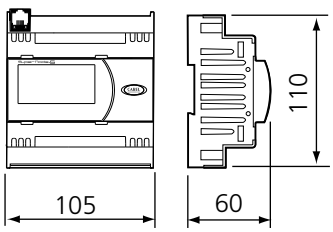
Technical specifications

Power supply: 24 Vac (10 to -15%) 50/60 Hz
48 Vdc (36 to 72 Vdc)
Power input: 11 W (13VA)
Operating conditions:
-10T60°, 90% rH non-condensing
Storage conditions:
-20T70°C, 90% U.R. non-condensing
Index of protection: IP20 – front panel IP40

DIN rail mount

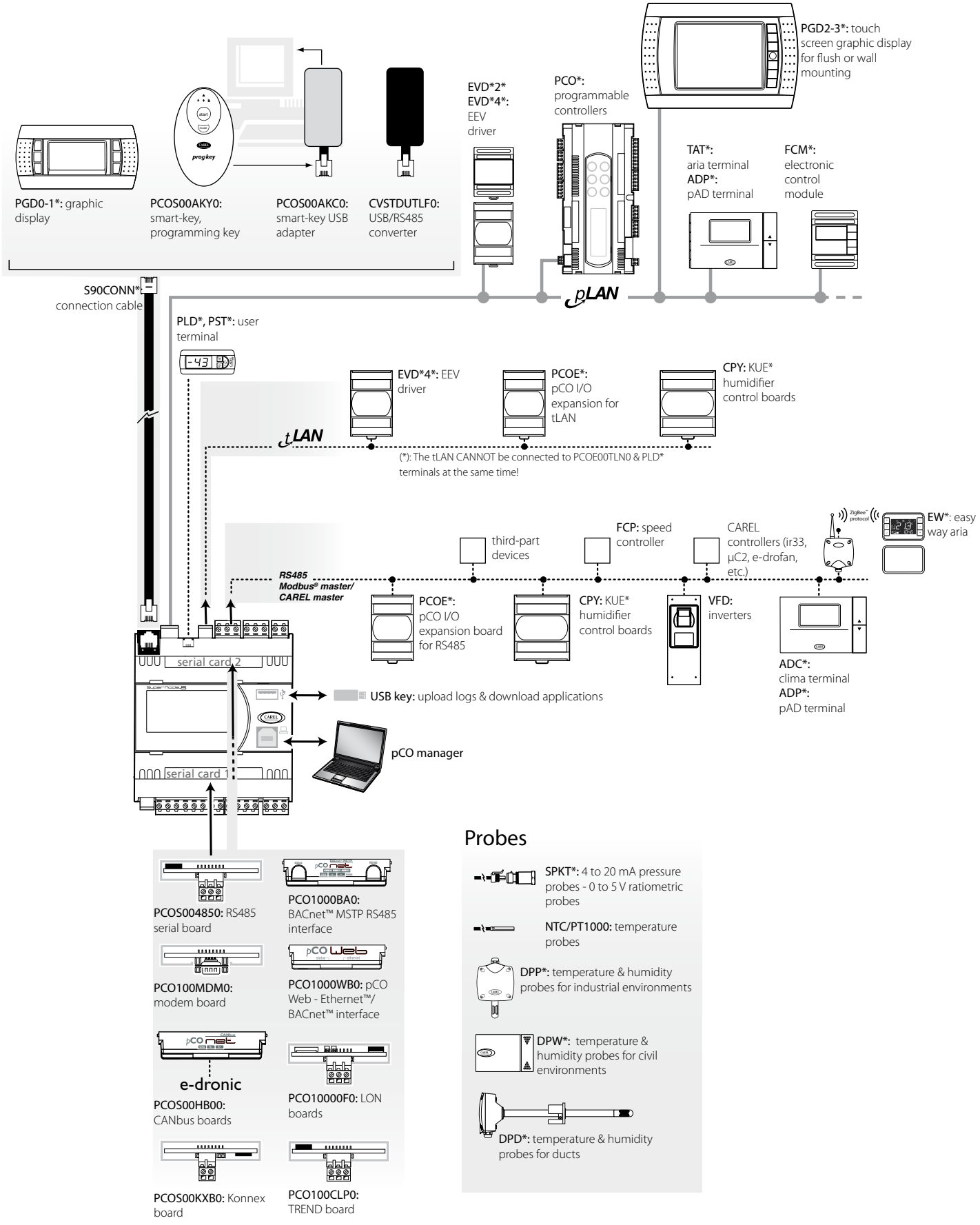


Dimensions (mm)



6 DIN modules

OVERVIEW DRAWING



Probes

SPKT*: 4 to 20 mA pressure probes - 0 to 5 V ratiometric probes

NTC/PT1000: temperature probes

DPP*: temperature & humidity probes for industrial environments

DPW*: temperature & humidity probes for civil environments

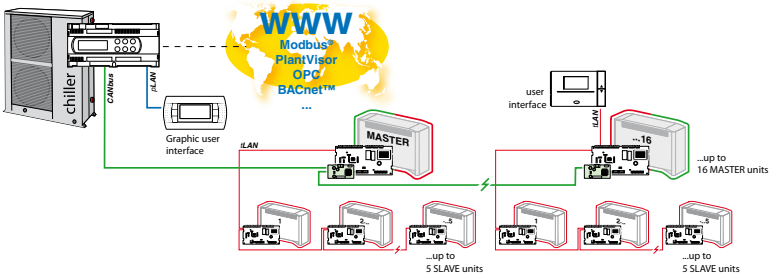
DPD*: temperature & humidity probes for ducts

Models		
Specifications	SNS*M	SNS*L
4 Mb flash memory	●	●
8 Mb flash memory	■	■
512 kb RAM	●	●
2 Mb RAM	■	■
32 Mb NAND flash	●	●
Real Time Clock	●	●
Max. no. of serial ports	6	5
pLAN	●	●
Opto-isolated RS485/tLAN/PST-PLD	●	●
Serial board 1 connector	●	●
Serial board 2 connector	●	
Master USB port	■	■
Slave USB port	■	■
Ready for programming key	●	●
Negative blue built-in display 132x64 pixels	■	■
User interface with 6 LEDs + 1 button built-in	■	■
Black Box	●	●
Max. no. of inputs	7	10
PT1000 inputs	2	2
0 to 10 V inputs	6	6
0 to 1 V inputs	6	6
4 to 20 mA or 0 to 20 mA inputs	2	2
NTC inputs	6	8
0 to 5 Vdc ratiometric inputs	6	6
Fast digital inputs with voltage-free contacts	3	6
Select inputs by software	1	1
Max. no. of analogue outputs	●	●
0 to 10 Vdc outputs	2	2
PWM outputs (phase control)	1	1
Max. no. of digital outputs	1	1
SPST relay outputs	2	7
SPDT relay outputs	1	6
Max. no. of SSR outputs	1	1
48 Vdc power supply	2	3
24 Vac power supply	●	●
Alimentazione 24 Vac	●	●

● standard - ■ optional

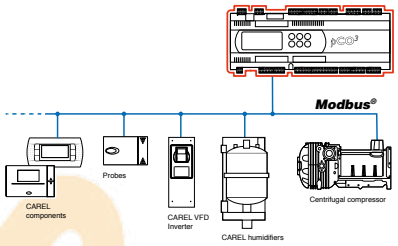
FieldBus connectivity

From the viewpoint of communication between controllers made by different companies, CAREL also offers a wide variety of solutions for interfacing the pCO family controllers with field devices such as valves, VFDs, serial sensors, Belimo actuators etc. In this way, the pCO sistema series controllers not only manage the individual units, but the entire air-conditioning/refrigeration installation.



CANbus (BMS: PCOS00HBB0, FieldBus: PCOS00HBF0)

The CANbus option allows the pCO controllers to be connected to the CAREL fan coil management system (e-drofan), thus ensuring simpler management of the installation and optimising, through synergy between the controllers, comfort and running costs
Available for both FieldBus and BMS serial port.

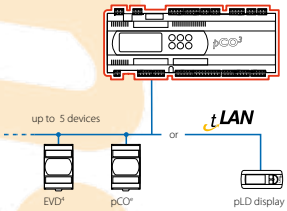


RS485 (PCO100FD10)

The RS485 serial option on the FieldBus serial interface can be used with the Modbus® Master or CAREL Master protocol.

FieldBus: Ⓐ

FieldBus: Ⓐ
BMS: ⒷⒸ



tLAN (PCO100TLN0)

The tLAN option is used to connect to CAREL devices, such as I/O expansions (pCOe) or electronic valve drivers (EVD4), up to a maximum of 5. Alternatively, this option can be used to connect to the PLD/PST display.

FieldBus: Ⓐ

MP-BUS® (PCO100MPB0)

The MP-BUS® protocol can be used to manage up to 8 Belimo servo controls via a simple two-wire connection cable.

FieldBus: Ⓐ

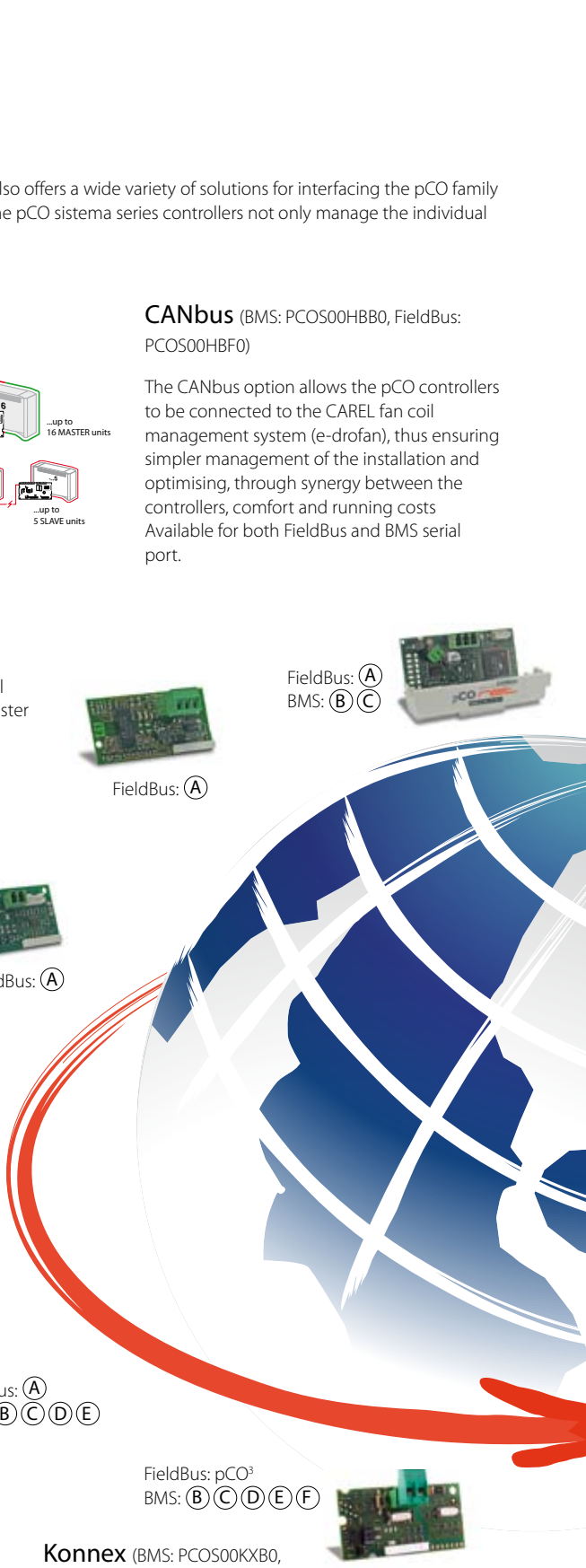
Modem (BMS: PCO100MDM0, FieldBus: PCOS00FD20)

FieldBus: Ⓐ
BMS: ⒷⒸⒹⒺ

Direct connection to a traditional or GSM modem, allowing:
- remote supervision by PlantVisorPRO;
- remote connection via Winload.

The use of a GSM modem also offers the possibility to communicate via SMS (short message service), so as to:
- send alarms and information;
- receive commands to reset alarms;
- perform any actions without having to physically go to the installation.

Available for both FieldBus and BMS serial port.



FieldBus: pCO³
BMS: ⒷⒸⒹⒺⒻ

Konnex (BMS: PCOS00KXB0, FieldBus: PCOS00KXF0)

The KNX technological standard is now widely used in building automation and control for commercial and residential use.
CAREL is member of the KNX Association (www.knx.org).
The CAREL Konnex board is compatible with all KNX/EIB devices and can be installed on the following ports:
- BMS, for the pCO sistema or e-drofan controllers;
- FieldBus, for the pCO³ controllers.

The K-Set tool (can be downloaded from ksa.carel.com) is used to create an XML file for the custom profiles.

Can be used in Fieldbus and/or BMS

Ⓐ= pCO³ e pCO¹
Ⓑ= pCO³ /pCO¹ /pCOXS /pCOC
Ⓒ= Supernode
Ⓓ= Mastercase3/ pCOrack *
Ⓔ= humiSteam X-plus / gaSteam / MC *
Ⓕ= e-drofan
Ⓖ= altri

* check compatibility with the application program

BMS connectivity

CAREL controllers can be connected to the BMS in the following ways:
- directly, thanks to the ability of the pCO sistema series controllers to select the protocol used (CAREL, Modbus®);
- using a serial board that communicates with the protocol used by the BMS (BACnet™, SNMP, LON…);
- integrating the driver for the management of the CAREL proprietary protocol into the (OPC®, CAREL DLL).

RS485 (PCOS004850)

The RS485 option for BMS serial port can be used for interfacing to supervisory systems, such as PlantVisorPRO, OPC, Modbus or proprietary (CAREL DLL), using the CAREL slave or Modbus RTU slave protocols.

BMS: Ⓑ Ⓒ Ⓓ Ⓔ

Modbus®

Introduced in the 1970s and now one of the most widely-used BMS protocols. The pCO sistema series controllers are Modbus® native.

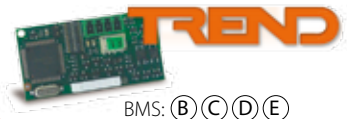
This is an industrial standard created by a consortium of companies, in collaboration with Microsoft® to standardise the drivers for proprietary devices. Using the CAREL OPC server, any Windows® OPC client application (SCADA, supervisors, management software, etc.) can communicate with all CAREL devices in user-friendly OPC mode, without requiring a gateway.

CAREL provides a DLL that manages communication with CAREL controllers. In particular, using the services supplied by the routines contained in the CAREL DLL (available for download from ksa.CAREL.com), supervision software can be developed for receiving and sending data from/to all CAREL peripherals without needing to know the protocol that these adopt.

BMS: Ⓑ Ⓒ Ⓓ Ⓔ

LonWorks® LON (PCO10000F0)

The LonWorks® system, developed by Echelon® is one of the dominant solutions in the market of automation and control in industry, offices, homes and transport. Electrical standard supported:FTT10. CAREL is a LonMark® Partner. The LONset tool (available for download from ksa.carel.com) can be used to create the LON files (NXE and XIF) for the custom profiles. Info: lon@carel.com



BMS: Ⓑ Ⓒ Ⓓ Ⓔ

TREND is a building automation system that is very widely used in English-speaking countries and in Europe in general. For further information on the supply and configuration of the interface board, contact trend@carel.com.

BMS: Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ

pCOWeb (PCO1000WB0)

Interface with the emerging protocols in the HVAC sector and based on the Ethernet™ standard.
Connection to the following networks:
- SNMP v1,v2,v3 networks with TRAP;
- BACnet™ Ethernet, BACnet™ /IP networks;
- LAN or Internet.

Using the Web-Server function embedded in the pCOWeb, the user can download the HTML pages relating to their own application via FTP and then use a browser for the remote management of the installation. The embedded LINUX™ operating system allows the addition of plug-ins developed by the user for their own requirements. The pCO application can therefore now be downloaded from a remote station across the Ethernet network, in maximum security. It also features a logger for creating log files (.CSV) and graphs (.BMP) of limited numbers of variables. These files can be received daily via e-mail.
info: pcoweb@carel.com

BMS: Ⓑ Ⓒ Ⓓ Ⓔ

pCOnet (PCO1000BA0)

Interface with the BACnet™ MS/TP protocol based on the EIA-485 standard.
Info: pcoweb@carel.com

BACnet™

This is the protocol designated in 1995 by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) as the organisation's official protocol.
Type of protocol supported:
- BACnet™ Ethernet™ ISO8802-2 over 8802-3;
- BACnet™/IP;
- BACnet™ MS/TP; EIA-485 communication standard.

The BACset tool (available for download from ksa.carel.com) can be used to configure and test the boards. pCOWeb and pCOnet are certified by the BTL (BACnet Test Laboratory).
www.bacnetinternational.org.

BMS: Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ Ⓖ

Web-GATE: TCP/IP interface (WEBG0000B0)

Connection to a local Ethernet™-TCP/IP network at 10 Mbps. Connection to the following networks:
- SNMP v1 networks;
- LAN or Internet.

Using the Web-Server function of the Web-GATE, the user can download the HTML pages relating to the application via FTP and then open a browser for the remote management of the installation.

Remote management and monitoring systems

The need for the use of a remote management system is often dictated by standards, as well as to ensure rapid alarm management and optimise routine and special maintenance operations.

CAREL meets these needs by fitting many of its instruments with an RS485 serial connection.
In this way, the user can access the control parameters and the device status from a remote supervisor.

CAREL proposes solutions for different types of installation:
- PlantWatch and PlantWatchPRO, PC-free solutions for small refrigeration and air-conditioning systems of up to 32 (PlantWatch) and 100 devices (PlantWatchPRO);
- PlantVisorPRO, a PC-based solution, for refrigeration and air-conditioning systems with a maximum of 400 utilities.

Advantages

PlantVisorPRO is the innovative CAREL supervisory system that exploits the latest web technology. The data are saved in a database, ensuring reliability and portability. This ensures the user a powerful, easy-to-use and highly customisable tool for all different needs/applications.

PlantVisorPRO is surprisingly easy to use, both regarding configuration and access to the parameters of the instruments.
It can connect to all CAREL instruments, both for refrigeration and air-conditioning.
This means that complex installations featuring commercial or industrial refrigeration and air-conditioning systems can be grouped into one single application.

The powerful alarm management scheduler ensures that any service requests are sent to the appropriate recipient.

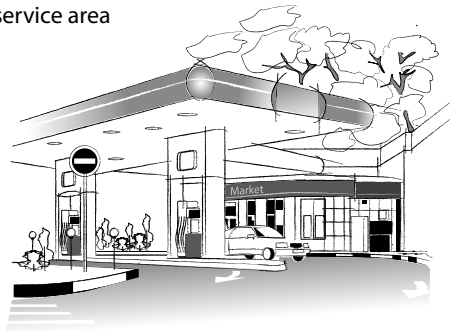
PlantVisorPRO local, available in the embedded version, represents a perfect solution plug&play, simplifying the installation operations on-site.
The Pc-GATE converter and cables are included in the packaging.

PlantVisorPRO simplifies HACCP management, being able to produce temperature and alarm printouts for all the supervised instruments.
The temperature data are saved in a powerful database.

Certification

PlantVisorPRO and PlantWatchPRO are compliant, as required by EC regulation 37/2005 of 12 January 2005, with standard EN 12380 on temperature recorders for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream.
PlantVisorPRO is also compliant with EN13485.

service area



PlantWatchPRO is the ideal solution for monitoring the temperature and managing the alarms on the refrigeration utilities in small installations, such as service stations or small stores in general (discount stores, local shops).
The GSM modem can be used to send alarm signals via SMS to the service network.

Refrigeration utilities | Energy measurement

control centre

PlantVisorPRO Remote can be used to access one or more local sites running PlantWatchPRO or PlantVisorPRO to check alarm situations, view graphs, set parameters and print reports.
The alarms are immediately managed by the PlantVisorPRO Remote system, and each local service centre is immediately notified via fax or SMS so as to ensure optimised management of the service operations.

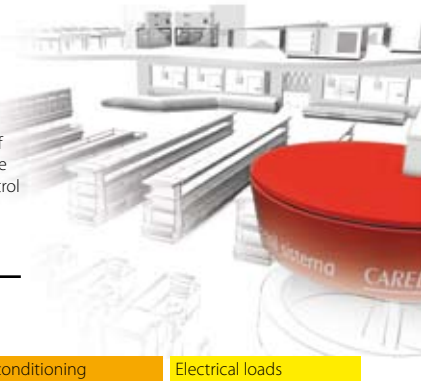
small supermarket

Refrigeration utilities | Compressor racks | Energy measurement

PlantWatchPRO is also an excellent solution for medium-sized supermarkets where the control and supervision requirements are the same as for larger installations.
PlantWatchPRO can integrate the monitoring not only of refrigeration utilities, but also the air-conditioning and power consumption measuring systems.
PlantWatchPRO allows temperature monitoring in compliance with the HACCP standards, and indeed alarm management and the possibility to connect to the remote service centre are standard functions available in the product.

large supermarket

PlantVisorPRO is the ideal solution for large installations with a considerable number of number of utilities in the field and extensive control requirements.



Refrigeration utilities | Compressor racks | Air-conditioning | Electrical loads

PlantVisorPRO local embedded

PPSTD*

PlantVisorPRO is the innovative CAREL supervisory and monitoring system for small and large installations.
PlantVisorPRO offers:

- monitoring and energy saving management functions;
- HACCP reports and graphs;
- simple and intuitive alarm management;
- local and remote connectivity;
- activity scheduling and controls for instruments or groups of instruments.

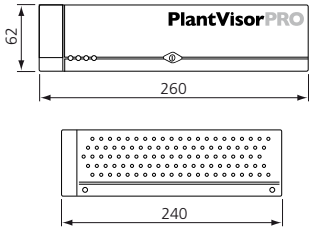
All alarm situations are detected by PlantVisorPRO and signalled in both the local system and the remote system. E-mails, faxes and SMS messages can be sent immediately to inform the service centre of any problems, so as to be able to optimise service operations.
A different level of importance can be defined for each alarm, with the information sent to multiple recipients, based on time bands.
PlantVisorPRO proposes an intuitive, effective and pleasant navigation interface, with cutting edge features: relational database, user profiling and access control, XML protocol for exchanging data between applications, Modbus®, connectivity, web interface.
PlantVisorPRO local is available in the PC-embedded version in the basic, small and advanced models, so as to respond to the needs of different types of installation.
This plug & play solution simplifies installation in the field; avoids hardware compatibility problems with the peripherals, such as modems, and reduces overall cost (maintenance, selection of components, installation of the software).

Version	No. instruments	Functions
Small	20	standard
Basic	400	standard
Advanced	400	Plus: • management of logical instruments • management of AREAS-GROUPS • "Plant Perfomance Indicator" module"

Technical specifications

Power supply: 230 Vac;
Connection cables & pc-Gate: included;
RS232 serial port for PC-Gate (to CAREL instruments);
Parallel port (printer);
Telephone jack for analogue modem/fax;
USB ports (printers, modem, pendrive, etc.);
Ethernet™ 10/100 network connector (LAN, WAN, Internet);
VGA connector (1024x768 monitor);
PS2 port for mouse and keypad

Dimensions (mm)



PlantVisorPRO remote

PPSTD*

PlantVisorPRO remote is used to manage a series of installations located in different geographical areas from one single station. Available in two versions: for the supervision of 20 sites and 50 sites. Solutions for more than 50 sites can be developed to order by CAREL or its VAR network so as to offer the maximum in terms of system management and integration of customer requirements. The remote system can be used to resolve many problems without need to go on site.

PlantVisorPRO IDE

PPIDE*

PlantVisorPRO IDE is the integrated development environment for the construction of custom versions of PlantVisorPRO. This software package can be used to enter system layouts, add new custom programmable controllers, introduce a new language and other additional modules to enhance the performance of the supervisory system.

* IDE products are released following completion of training at CAREL headquarters. Contact your local CAREL agent.

PlantWatchPRO

PWPRO*

PlantWatchPRO is the new solution from CAREL for the supervision of small-medium installations.
Complete network and alarm configuration, simple navigation and an attractive design are some of the features that make PlantWatchPRO the cutting edge product in its category.
A colour LCD touchscreen, and the use of practical menus, guide the user simply and intuitively, without the use of a PC (however a PC can be connected if necessary), thus providing a practical solution for all those environments that do not have room for a computer.
Other innovative features of PlantWatchPRO include:

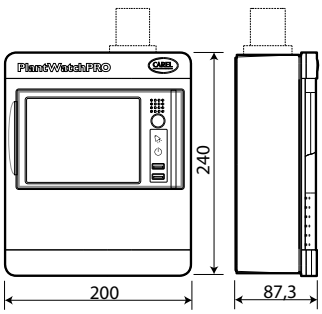
- possibility to connect and control up to 100 devices;
- use of the CAREL or Modbus® protocols for connection;
- recording of around 100 variables, sampled every 15 minutes, for more than one year;
- IP65 index of protection;
- ready for connection to the PlantVisorPRO Remote supervisor system;
- three output relays, for alarm signals or activating lights and defrosts;
- possibility to export data (alarms, events, system and model configurations and variable reports) using a USB memory key (the data are downloaded in a format that is compatible with Microsoft® Excel and Microsoft® Word);
- import new standard or custom devices;
- display graphs;
- external buzzer management;
- complete alarm configuration;
- phone book for SMS contacts, fax numbers, e-mail addresses;
- active defrost management;
- possibility for multiple users to access the system, with different privileges (administrator, normal user, user with privileges);
- instrument suitable for technical environments, no moving parts.

PlantWatchPRO is also available in the version with built-in modem.

Technical specifications

Power supply: 90-240 V, 50-60 Hz
Power input: 6.7 W (typ), 9 W (max)
Operating conditions:
5T50 °C, 20 to 80 % rH
Storage conditions:
-20T60 °C, 20 to 80 % rH
Installation: wall-mounted
Index of protection: IP65 (with cover closed)

Dimensions (mm)

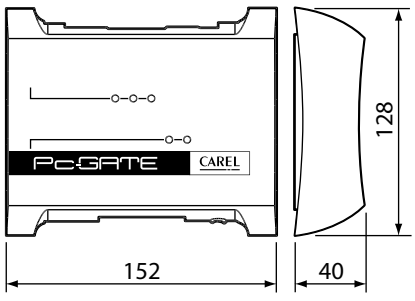


Pc-GATE

The new RS232/RS485 converter is a device with a number of functions: serial conversion from RS232 to RS485, PC-network communication watchdog, junction for star connections, amplifier to increase the length of the line over one kilometre.

CVSTD00000 converter/amplifier only, with RS232 or RS485 input and two RS485 outputs to the network, one digital input and one alarm output.

Dimensions (mm)



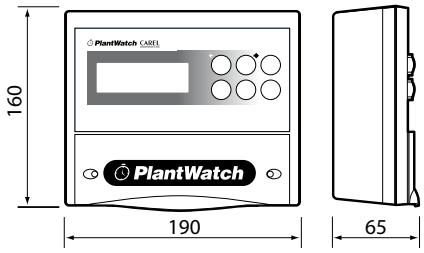
PlantWatch

PLW00*: integrated monitoring and remote management solution.

Ideal for compact systems, PlantWatch is a versatile data recorder, a formidable surveillance system and an exceptional instrument for remote control. PlantWatch allows installers, managers, technicians and maintenance personnel complete control of refrigeration, air-conditioning, heating and other systems. PlantWatch can manage up to 32 instruments and displays the data in five languages. It is also available with built-in modem (PSTN). For each possible critical situation, the user can decide whether PlantWatch should signal the event by buzzer, send a fax or SMS message to a GSM mobile phone, simply save the event, print it or call the service centre running PlantVisor Enhanced.* PlantVisor Enhanced remote* is the default program for downloading the values and the alarms saved.

*product available until June 2008.

Dimensions (mm)



PlantWatch printer module (PLW0PPR*)

The module allows a parallel printer (with resident fonts) to be connected to the CAREL RS485 supervisory network.
The module receives the information on the print operations and modes from PlantWatch.
It can also be used to signal any lack of activity on the network (network "watchdog") for more than 20 minutes.

Kit for direct RS232 serial connection to a PC (PLW0PPC*)

The kit includes the "PlantWatch manager" configuration software, an RJ45-DB9 female adapter with DCE connections (meaning it can be fitted directly to the PC's serial port) and a 5-metre long 8-wire flat cable.

Kit for connection to an external modem (PLW0PMD*)

The kit contains a 5-metre long 8-wire flat telephone cable, an RJ45-DB25 male adapter and an RJ45-DB9 male adapter, both with DTE connections for direct insertion into the female connector on the modem.

Synchro wireless

SYN*

The Synchro wireless version represents the most advanced technology used to simply and quickly setup supervision for large systems such as supermarkets. Wireless technology is used for communication between the controllers and the supervisory system, thus avoiding the problems and costs related to laying the cables. The technology used for wireless transmission is based on the Mesh networks, which are highly efficient and can overcome/get around any obstacles in the area.

Specifications

Power supply: 12 Vac/Vdc (-10…10%), 50/60 Hz;
Current input: 50 mA
Connections: plug-in terminal for communication with peripherals: max cable size 1.5 mm^2, (use shielded cable with shield connected to GND)
Plug-in power supply terminal: max cable size 1.5 mm^2
Assembly: wall-mounted by screws
Status display: three LEDs for status and operation:

- LED indicating the type of device (master or slave);
- on the master LED indicating wireless transmission, on the slave device validated;
- on the master LED indicating wireless reception, on the slave wireless activity.

Operating conditions:
0T50 °C; 20 to 80% rH non-condensing
Storage conditions:
-20T70 °C; 20 to 80% rH non-condensing
Index of protection: IP55.

Energy²

ENERGY*

Energy optimisation is fundamental in achieving significant improvements in the energy balance and consequent reductions in the running costs of systems. CAREL offers a panel-mounted microprocessor-based electronic controller especially designed to acquire data on electricity usage, so as to analyse and manage electrical loads. Energy² analyses the electricity consumption and intervenes when the mean value envisaged exceeds the maximum set. The control functions momentarily deactivate any loads that are not strictly necessary, so as to bring the power consumption back within the set limits. The devices that are switched off are restarted as soon as the conditions of the installation allow. The priority and disconnection mode can be set for each electrical load monitored.

Advantages:

- centralised management using just one controller of all the data corresponding to energy consumption, ensuring precise monitoring;
- limit where possible the exceeding of the contracted power supply rating through the intelligent management of the loads, avoiding penalties;
- improve the use of electricity by activating the loads at preset times, applying programmable time bands to highlight and eliminate any energy wastage;
- optimise certain loads, such as the air-conditioning or heating system, with functions such as Optimum start-stop and Duty cycling.

Features of the Large version (ENERGY2120)

- management of up to 15 loads that can be intelligently deactivated;
- one alarm output;
- up to three 4 to 20mA inputs for monitoring power consumption;
- one analogue output for managing a 3-way valve
- up to 3 NTC probes for optimising the air-conditioning or heating system.

Features of the XS version (ENERGY7060)

- management of up to 4 loads that can be intelligently deactivated;
- one alarm output;
- up to two 4 to 20mA inputs for monitoring power consumption;
- up to 3 NTC probes for optimising the air-conditioning or heating system.

Current transducer (0907554AXX)

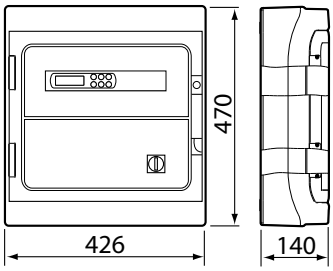
Electronic current transducer for low voltages, with 500 A end scale and 4 to 20 mA output.

Mains analyser (6714505AXX)

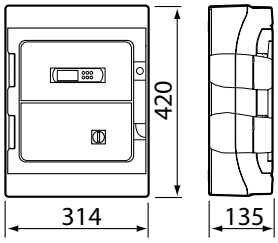
Three-phase mains analyser for measuring the electrical values in low voltage applications.

Dimensions (mm)

ENERGY2120*



ENERGY7060



E^{x}V system

CAREL presents his solution for electronic expansion valves (E^{x}V) with proportional modulation and excellent technical and functional characteristics.

The E^{x}V series can be used in many applications in the fields of air-conditioning and refrigeration at low and normal temperatures, and ensures compatibility with the most commonly used refrigerants.

The use of E^{x}V technology ensures energy saving compared to a mechanical expansion valve, paying for itself in a very short time.

In addition, it has been proven and validated in the field that in commercial refrigeration and computer room air-conditioning applications the reduction in consumption achievable using E^{x}V is on average 15 to 20% annually, based on the application, with seasonal peaks of up to30%.

Integrated Control Solutions & Energy Savings

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E^XV electronic expansion valve and driver

The flow of refrigerant is modulated through a calibrated hole fitted with a conical movable element, driven by a stepper motor, and the internal mechanism is suspended on calibrated springs with ball bearings: control is consequently very precise, stable and reliable over time, eliminating the risk of locking.

The E^XV is entirely manufactured using laser welding and quality materials (AISI 316L and high performance plastics), and each piece is functionally tested.

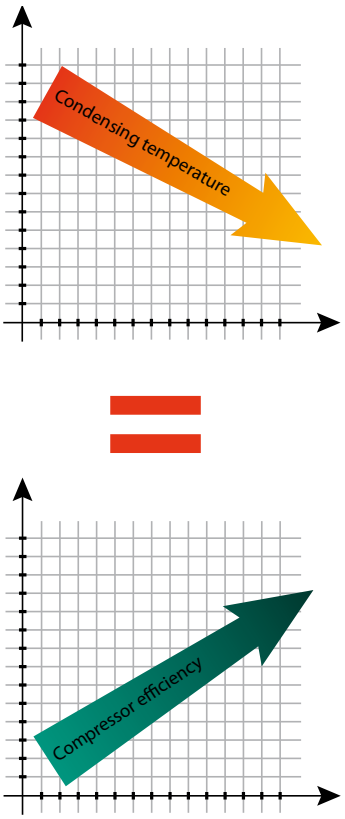
Given the current increase in installations using high pressure refrigerants, the E^XV series has been designed to ensure operation up to 35 bars differential and 42 bars suction pressure, thanks to the high thrust force. In addition, the expansion capacity in both directions allows the layout of the refrigerating circuit to be simplified in reverse-cycle heat pumps and reduces installation costs: only one expansion valve is required, and non-return valves are not needed.

Energy saving and precision

The extended range of operation and the precision in terms of control (from 10 to 100% of rated capacity) allow significant energy savings.

As well as this characteristic, E^XV stands out for its significant control quality and the capacity to quickly reach and then maintain stable conditions when starting and upon changes in demand.

The latter aspect is ideal for precision air-conditioning and industrial refrigeration applications, where as well as ensuring energy savings, E^XV also increases performance and provides very stable operation.

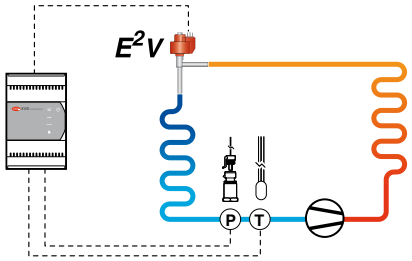


Control systems

CAREL offers a number of solutions for the management of the E^{X}V electronic expansion valves.

The operation of the E^{X}V is based on controlling the superheat of the refrigerant, with some additional functions (MOP, LOP, LOW SUPERHEAT): in order to calculate these parameters, a pressure probe and a temperature probe need to be installed at the evaporator outlet.

The expansion of the refrigerant is controlled using the CAREL control algorithm, which in real time calculates the optimum position of the valve stopper and, using a driver, moves it with the built-in stepper motor (see the diagram on the side).

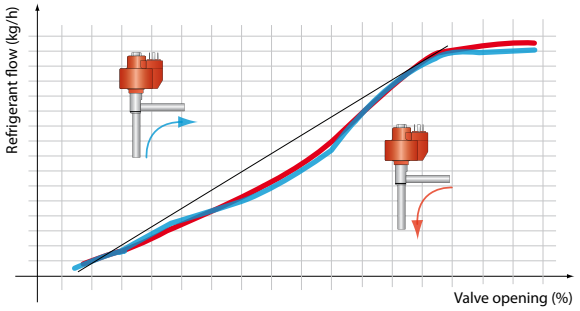


The reading of the probes, the control algorithm and the movement driver can be managed either using built-in devices or separate modules.
In the former case, the devices are integrated into the main controller (for example MPXPRO with built-in driver).

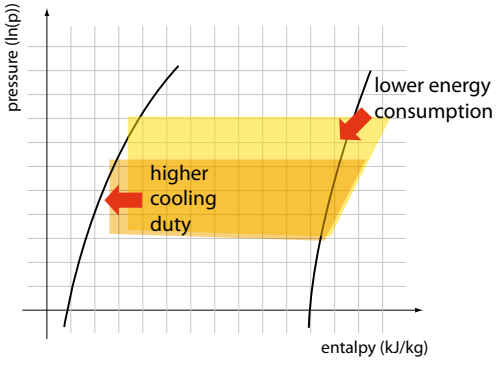
In the latter case, the separate EVD evolution module can be integrated with:
- a pCO series programmable controller;
- an instrument made by CAREL or other manufacturers that sends a digital signal to the EVD evolution module to start stand-alone control;
- for integration with µC^{2} use model EVD400.

If programmable controllers are used, the 1tool system makes it possible to customise the control algorithm so as to adapt management to specific requirements of the installation (pump down, dehumidification...). For parametric controllers, on the other hand, the functions provided represent a complete offering for the needs of standard systems.

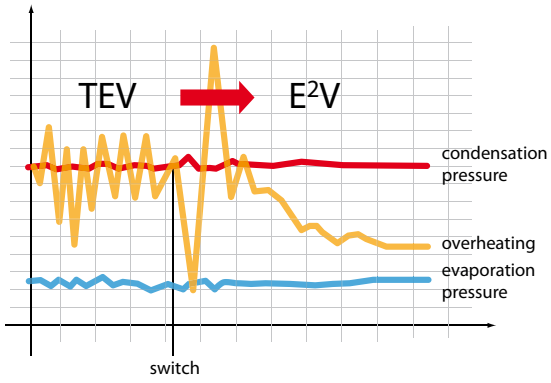
In addition, preventive maintenance and efficient alarm management are available by monitoring, using the supervisory system, the refrigerant superheat value and consequently the degree that the E^{X}V is open, as well as other parameters from the various inputs on the controller.



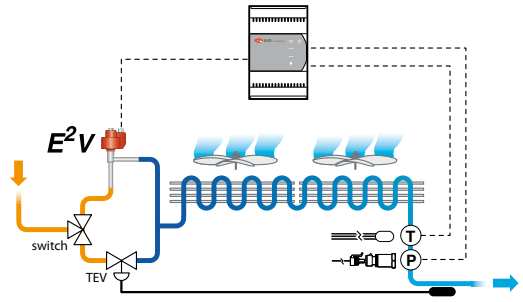
The proportional variation of the refrigerant flow-rate to the degree of opening of E^{X}V in both directions ensures high precision control in all applications, even at low flow-rates.



The extended control range of the E^{X}V allows the refrigerating unit to operate with floating condensing pressure and therefore at the minimum allowed by the ambient temperature. This means signficant energy saving in all refrigeration applications.



Effect on the stability of a system following the changeover from control with TEV to E^{X}V.



E^{X}V: electronic expansion valve

E2V*; E3V*; E4V*

E^{2}V, E^{3}V and E^{4}V are proportional electronic expansion valves activated by a two-pole stepper motor. Control is performed using a calibrated stem that slides through on an opening, with 14 mm travel. The stem is positioned by a stepper motor with a range of around 500 steps. The correct mechanical balance guarantees significant stability of superheat control according to the set point and a rapid response to transient situations. The proportional control also ensures no pulsation in pressure on the refrigerant lines and greater control over the return of liquid to the compressor.
E^{X}V is available in different sizes, with cooling capacities of up to 250 kW, with different types of fittings (copper, brass, stainless steel). The most suitable size valve can be selected easily using the E^{2}V SELECTION software available from ksa.carel.com, or alternatively by referring to the shortcut tables, as shown in the brochure and on the company website www.carel.com.

Technical specifications

Compatibility: R22, R134a, R404a, R407c, R410a, R744, R507a
Max. operating Pressure (MOP): Up to 42 bars
Max. operating Pressure P (MOPD): 35 bars
P.E.D.: N/A: Gr. 1, art. 3, par. 3
Refrigerant temperature: -20T65 °C (-40T65 °C for E^{2}V)
Room temperature: -10T50 °C (-30T65 °C for E^{2}V)

STATOR: two pole low voltage stator (2 phases)
Phase current: 450 mA
Drive frequency: 50 Hz ±10
Phase resistance (25 °C / 77 °F): 36 Ω ±10%
Index of protection:
• IP65 with connector E2VCON*;
• IP67 with cable E2VCAB*
Control steps: 480

E^{2}V dimensions

valve type	A	B	C	D
	mm (inch)			
option 1				
E2V**BS000 stainless steel 10-10	internal 9/external 10 (0.35/0.39)		127 (5)	73.70 (2.90)
option 2				
E2VB**BSF00 copper 12-12 mm ODF	internal 12,1/external 14 (0.47/0.55)		121.90 (4.79)	68.70 (2.70)
E2V**BSM00 copper 16-16 mm ODF	internal 16/external 18 (0.63/0.71)		123.9 (4.87)	70.7 (2.78)
option 3				
E2V**BRB00 brass 3/8" - 1/2" SAE	internal 9/filet. 3/4" (0.35 fil. 3/4")		139.9 (5.51)	86.7 (3.41)

E^{3}V dimensions

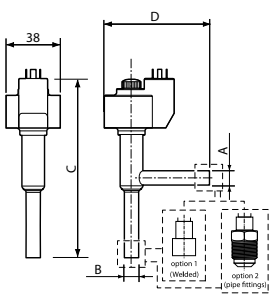
valve type	A	B	C	D	E mm (inch)
	mm (inch)				
E3V45ASR00	18 (0.71)	22 (0.87)	139 (5.47)	67 (2.64)	56 (2.20)
E3V55ASR00	18 (0.71)	22 (0.87)	139 (5.47)	67 (2.64)	56 (2.20)
E3V65ASS00	22 (0.87)	28 (1.10)	149 (5.87)	76 (2.99)	56 (2.20)

E^{4}V dimensions

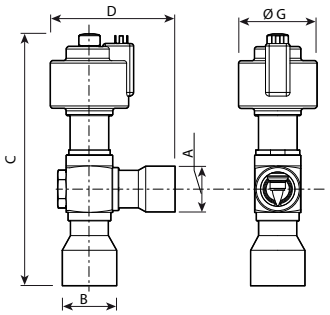
valve type	A	B	C	D	E mm (inch)
	mm (inch)				
E4V85AST00	28 (1.10)	35 (1.38)	198 (7.80)	88 (3.46)	64 (2.52)
E4V95AST00/10	35 (1.38)	42 (1.65)	206 (8.11)	102 (4.02)	64 (2.52)

Dimensions (mm)

E^{2}V



E^{3}V & E^{4}V



EVD evolution

EVD*

The EVD evolution series of controllers for electronic valves is the latest step in the development of the famous CAREL drivers for superheat control.
Compared to the standard EVD, this instrument adds advanced functions and a new user interface that makes it even easier to use and configure.

A new graphic display and a simple programming procedure allow the controller to be started by selecting just 4 parameters: refrigerant used, model of valve, type of pressure probe and application (chiller, display cabinet, etc.), selected from the multiple choice menus.

EVD evolution is complete with LEDs for controlling the main functions, and can house a removable LCD display for the configuration and monitoring of all the variables.

EVD evolution can be connected to the pCO series controllers or PlantVisorPRO for the integrated management of the driver via tLAN (EVD0000E00), pLAN (EVD0000E10) or RS485/Modbus® (EVD0000E20); it can also operate independently (stand-alone version) using a digital input to switch the device ON/OFF. EVD evolution can also act as a simple positioner, with a 4 to 20 mA or 0 to 10 V analogue input signal.

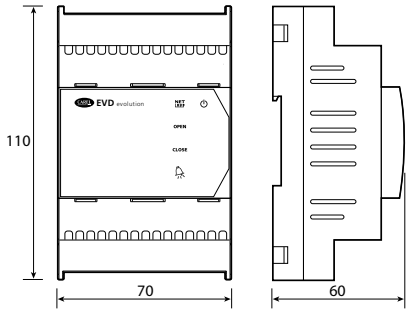
The new EVD evolution series can manage other functions in addition to superheat control, such as hot gas bypass, evaporator pressure control (EPR) and control of the valve downstream of the gas cooler in circuits with CO_2 transcritical cycle; other control functions include the management of the condenser pressure or the "modulating thermostat" function.

Technical specifications

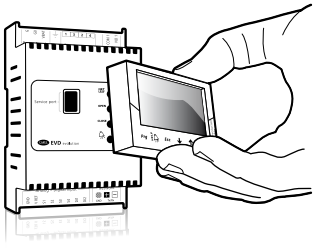
Power supply: 24 Vac (+10/-15%) 50/60 Hz
Emergency power supply: 22 Vdc+/-5%.
(If optional module EVBAT00200/300 is installed)
Power to active sensors (V_{REF}): programmable output: +5 Vdc ±2% o 12 Vdc ±10%
Power input: 30 VA
Operating conditions: -10T60°C; <90% rH non-condensing
Storage conditions: -20T70 °C
Probes:
- **S1:** ratiometric pressure, electronic pressure, combined ratiometric pressure;
- **S2:** low temperature NTC, high temperature NTC, combined NTC;
- **S3:** ratiometric pressure, electronic pressure, combined ratiometric pressure;
- **S4:** low temperature NTC, high temperature NTC, combined NTC

Relay output: normally open contact, 5 A 250 Vac resistive load, 2 A 250 Vac inductive load
Connection: shielded cable
Mounting: DIN rail
Index of protection: IP20

Dimensions (mm)



Removable display



Example of sizing the E^{X}V

Below is an example of selecting the EXV valves based on the specified conditions, typical of centralised air-conditioning and refrigeration applications. For further information, see the instruction sheet available at www.carel.com (code +050001225).

The values in the tables correspond to around 80% of the maximum effective cooling capacity. An overall pressure drop of the refrigerant in the high and low pressure branches of no more than 2 to 3 bars has been allowed for.

Application: Air-conditioning

Operating conditions

Saturated condensing temperature: 54.4 °C
Saturated evaporation temperature: 7.2 °C
Subcooling: 8.3 °C

Rated cooling capacity (kW)

Model of valve	R22	R134a	R407c	R410A
E2V09B	2.9	2.2	3.0	3.4
E2V11B	5.1	3.8	5.2	6.1
E2V14B	7.9	5.9	8.0	9.3
E2V18B	11.2	8.4	11.4	13.2
E2V24B	22.3	16.7	22.7	26.2
E2V35B	44.8	33.6	45.7	52.8
E3V45A	78.2	58.6	79.8	92.2
E3V55A	115.9	86.8	118.3	136.6
E3V65A	159.2	119.3	162.5	187.7
E4V85A	206.9	155.0	211.2	243.9
E4V95A	287.6	215.4	293.6	-

Application: Centralised refrigeration

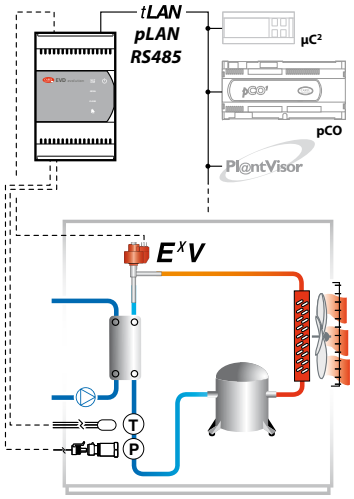
Operating conditions

Saturated condensing temperature: 32.2 °C
Saturated evaporation temperature: -40T-20 °C
Subcooling: 11.1 °C

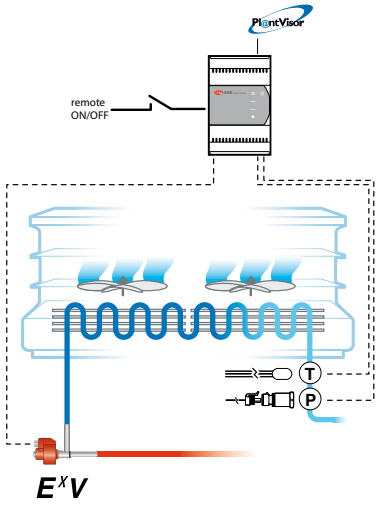
Rated cooling capacity (kW)

Model of valve	R404A	R507a
E2V09B	2.1	2.1
E2V11B	3.8	3.7
E2V14B	5.8	5.7
E2V18B	8.2	8.1
E2V24B	16.4	16.1
E2V35B	33.0	32.5

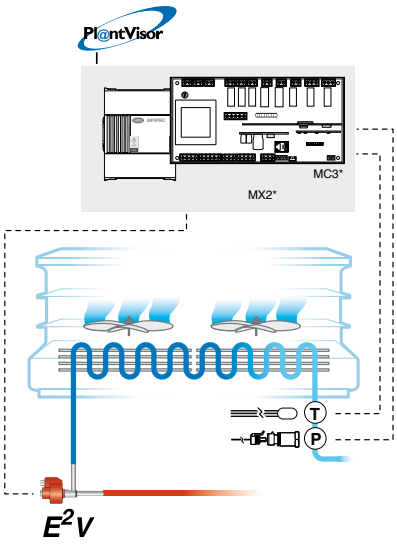
Example of application on a chiller



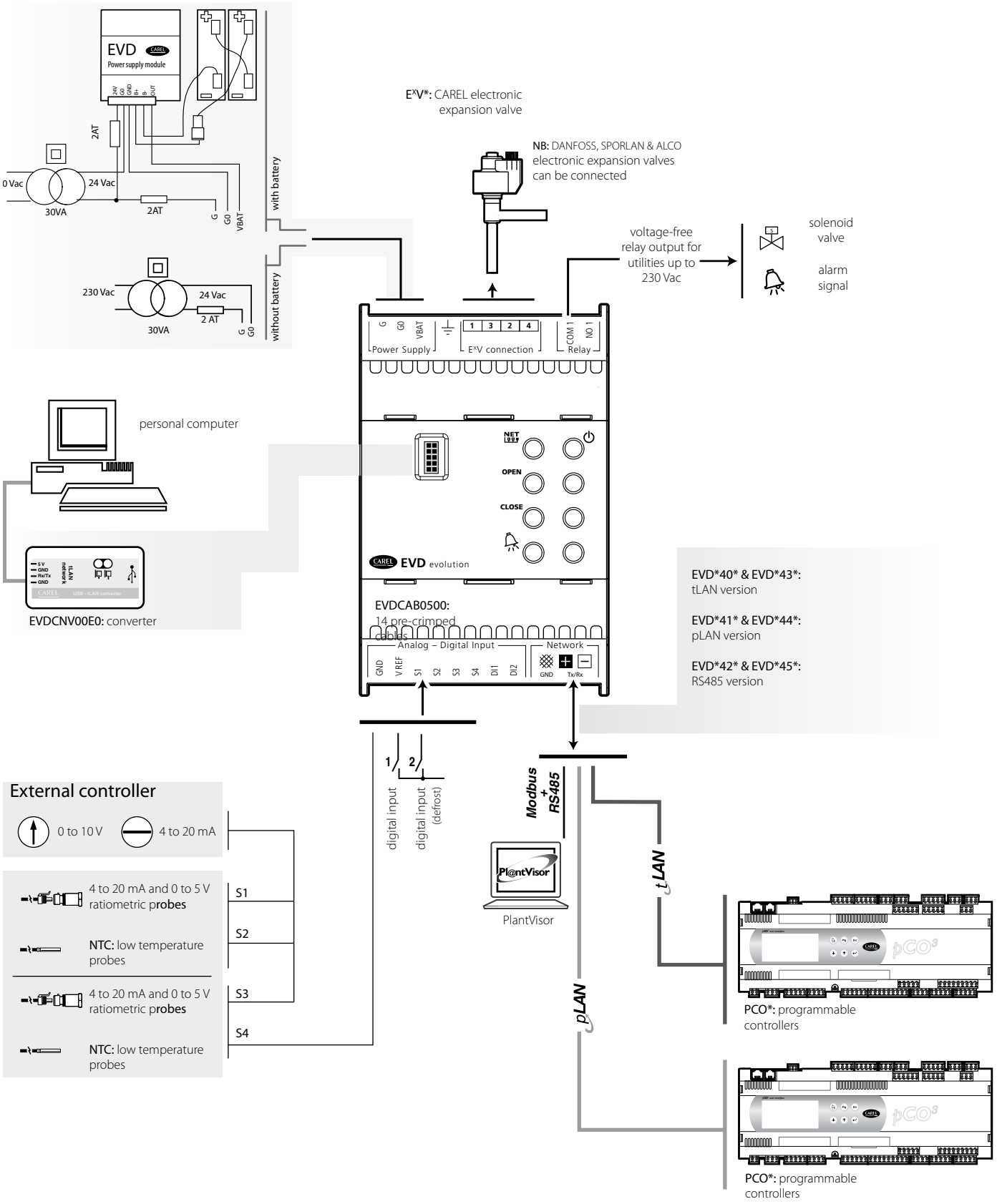
Example of application on a display cabinet with stand-alone driver



Example of application on a display cabinet with stand-alone driver



OVERVIEW DRAWING



Condenser controllers and inverters

Speed controllers represent a solution for controlling electric motors.

They are typically used on condensing units, in compressors or pumps, to modulate the speed and optimise the efficiency of the unit, achieving considerable energy saving.

Devices are available in the single-phase and three-phase versions, and with varying index of protection (IP).

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Condenser controllers and variable frequency driver

Completing its range of products, CAREL offers a series of modules designed for special applications on HVAC/R units.
In fact, optional modules are available that have been specifically designed, and therefore optimised, for increasingly important functions in current air-conditioning and refrigeration units

Air-conditioning and refrigeration processes feature a number of very delicate stages that determine the correct operation of the installation, the correct maintenance of the desired temperature and humidity and the protection of the expensive equipment used for these applications.

Knowing the critical points of the installation allows preventive action to be taken so as to prevent problems from arising that may even cause the entire system to shutdown.

CAREL offers a complete series of devices for controlling the condenser and providing protection, to be used in combination with its controllers.
As regards the control of the condenser, the solution offered involves the FCS series controllers, which feature the possibility of operating in the stand-alone configuration with the FCM control module, or connected to a pCO sistema series controller.
This series features devices available for all needs: three-phase and single-phase versions, with different index of protection (IP 00, 20, 55).

As regards the parametric controllers, such as the µchiller series, CAREL offers the MCHRTF range, ideal for this type of controller.
These speed controllers are also compatible with the pCO sistema programmable controllers. They can manage single-phase fans with current ratings of 2, 4, 6 and 8 A, 203 Vac.

The new range of variable frequency drives (VFD), the NXL series, is designed specifically for applications such as:
- variable speed of fans in air handling systems;
- modulation of compressor operation;
- variable flow-rate of system supply pumps and evaporator pumps on chillers;
- control of condensing pressure in fan assemblies.

Inverters are used on the electric motors that drive water pumps or fans to modulate the load and achieve precise and energy-efficient process control. The variation in compressor speed by inverter guarantees a correct flow of refrigerant inside the circuit, allowing the continuous operation of the compressor, bringing benefits in terms of cooling efficiency and considerable overall energy saving.

РОСС IT.АИ50.В09036

4, 8, 10 and 12 A single-phase speed controllers

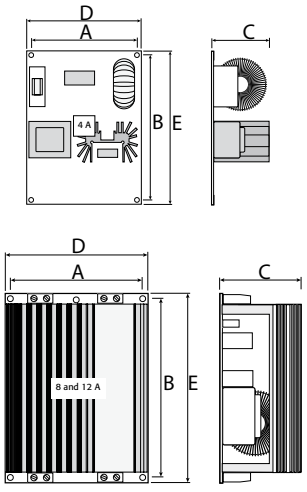
FCS1* & MCHRTF*

The FCS and MCHRTF series single-phase controllers have been designed to control the fan speed on condensing units according to the signal from the controller. Specifically, the FCS series receives a 0 to 10 V signal, while the MCHRTF series controllers receive a PWM signal.

Technical specifications

Models available: 4, 8, 10 & 12 A/230 Vac
Index of protection: IP00

Dimensions (mm)



Model	A	B	C	D	E	F
FCSM042300	75	100	40	82	82	-
FCSM082300	75	100	58	82	107	-
FCSM122300	75	100	58	82	107	-
MCHRTF04C0	43	100	40	50	107	-
MCHRTF08C0	75	100	58	82	107	-
MCHRTF12C0	75	100	58	82	107	-

FCS: IP20 three-phase speed controllers

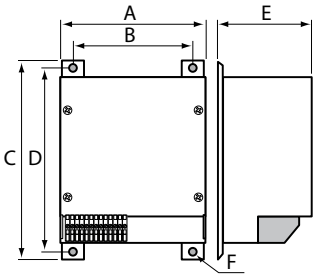
FCS3*10

The IP20 range, suitable for panel installation, can be controlled by a 0 to 10 Vdc analogue signal from evolved controllers such as the FCM or pCO sistema, or a PWM signal (pulse width modulation) from the µChiller series. These controllers can manage motors with ratings from 9 to 40 A, and feature a control board that distributes the power to the load, in linear or quadratic mode, with the cut off, threshold, and minimum and maximum speed functions set using the trimmers on the board.

Technical specifications

Power supply: 400 Vac (-15 to 10%), 50/60 Hz
Operating conditions: -10T50 °C
Storage conditions: -20T70 °C
Control signal: 0 to 10 Vdc/PWM
Input signal impedance: 10 kΩ
Index of protection: IP20

Dimensions (mm)



Model	A	B	C	D	E	F
FCS3094010	170	144	265	250	155	7
FCS3124010	170	144	265	250	115	7
FCS3204010	198	174	265	250	140	7
FCS3404010	198	174	265	250	175	7

FCS: IP55 three-phase speed controllers

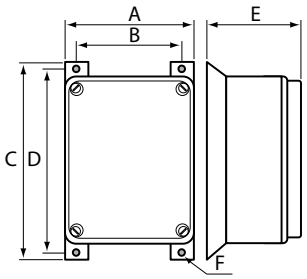
FCS3*00

The three-phase series with IP55 index of protection are ideal for outside installation, and can be controlled by a 0 to 10 Vdc analogue signal from evolved controllers such as the FCM or pCO sistema, or by a PWM signal (pulse width modulation) from the µChiller series. The range, which includes the control of motors with ratings from 6 to 40 A, features a control board that distributes the power to the load, in linear or quadratic mode, with the cut off, threshold, and minimum and maximum speed functions set using the trimmers on the board.

Technical specifications

Power supply: 400 Vac (-15 to 10%), 50/60 Hz
Operating conditions: -10T50 °C
Storage conditions: -20T70 °C
Control signal: 0 to 10 Vdc/PWM
Input signal impedance: 10 kΩ
Index of protection: IP55

Dimensions (mm)



Model	A	B	C	D	E	F
FCS3064000	158	133	225	200	115	7
FCS3124000	205	180	280	255	130	7
FCS3204000	198	174	280	255	158	7
FCS3404000	245	219	340	315	200	7

FCM: electronic control module

FCM*

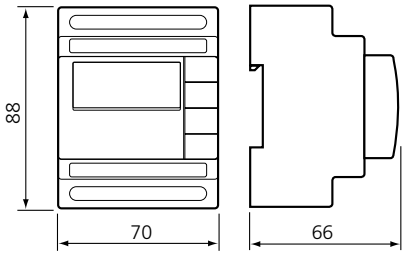
The FCM series controllers are used to manage the main physical values (temperature, pressure, humidity). Special attention has been focused on their use as condensing temperature/pressure controllers, through the control of the fan speed on condensing units. The output of the controller is a 0 to 10 V analogue signal. In addition, they feature one control relay and two digital inputs with programmable functions. Three models are available, which differ according to the type of analogue inputs (probes):

- with inputs for CAREL NTC temperature probes;
- with 0 to 10 V inputs;
- with 0 to 20 or 4 to 20 mA inputs.

Technical specifications

Power supply: 24 Vac/Vdc (-20 to 10%), 50/60 Hz
Operating conditions:
0T50° C, <90% rH non-condensing
Storage conditions:
-10T70 °C, <90% rH non-condensing
Installation: DIN rail
Index of protection: IP20, (IP40 flush mount)

Dimensions (mm)



Speed controllers for stand-alone condensing units

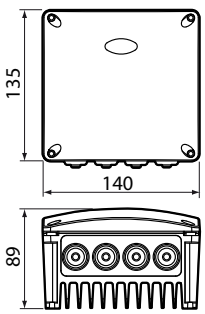
FCP*

FCP is a speed controller for single-phase fans on stand-alone units with up to two circuits. It controls the fan speed according to the variation in pressure in the condenser circuit, so as to maintain the set point, via a 0 to 5 V signal from the ratiometric pressure transducer (SPKT*R0) positioned in the water circuit. This device is installed directly on the condensing unit. It can control asynchronous electric motors (specific for phase control), with a load of up to 8 A / 230 Vac. Available in the Master/Slave or power version (as for the current MCHRTF80A0, IP54 version).

Technical specifications

Power supply: 230 Vac (-15 to 10%), 50/60 Hz with autosensing
Maximum current: 8 A at -20T50 °C
Operating conditions:
-20T50 °C, <85% rH non-condensing
Storage conditions:
-20T70 °C, <85% rH non-condensing
Analogue inputs: 0 to 5 Vdc ratiometric, 8 mA or NTC
Index of protection: IP54

Dimensions (mm)



Inverters

NXL*

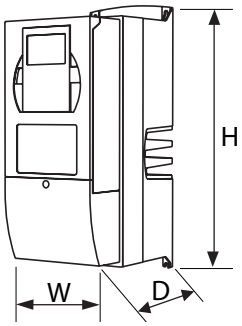
The NXL series is available in power ratings from 0.37 to 30 kW, with single/three-phase power supply and three-phase output, index of protection up to IP54, for all variable flow-rate applications.

Control can be performed using a 0 to 10 V or 4 to 20 mA analogue signal or alternatively Modbus® standard via serial communication, thus integrating the functions of the device with the software for managing the pCO series controllers or the PlantVisor supervisor.

The range can also be used with a removable control panel with remote RS232 serial connection. A PC can be used as an alternative to the control panel for managing the inverter.

Other advantages include: wide operating range, easy installation and use, low noise levels, high index of protection against electromagnetic disturbance, compact and thin 'book-style' design.

Dimensions (mm)



µVFD

NXM

The NXL series is the ideal solution for all environments, completing and enhancing the range of CAREL products for maximum efficiency and energy saving in HVAC/R systems.

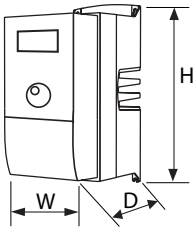
Technical specifications

Single-phase power supply:
208 to 240 V, 0.37 kW to 1.5 kW;
Three-phase power supply:
380 to 500 V, 0.55 kW to 30 kW;
Control panel: optional, 4 buttons & multilanguage LCD;
Control signal: settable
0 to 10 V or 4 to 20 mA

size	WxHxD
MF2	60x130x150
MF3	84x220x172
MF4	128x292x190
MF5	144x391x214
MF6	195x519x237

µVFD is the new CAREL range of compact inverters for HVAC/R applications with power ratings up to 2.2 kW for single-phase power supply and 5.5 kW for three-phase.
µVFD is a inverter that is small in size, easy to program and start, and low cost.
The many advantages of the µVFD include a new modular conception, meaning only the part of the hardware required to integrate the pCO sistema series programmable controller needs to be used: thus the µVFD Power Module, with no display, I/Os or control electronics; the software and user interface are in fact part of the pCO controller, thus making the CAREL solution economical and simple to install and manage.
The µVFD is fully integrated into the pCO is total: the 1tool module manages the inverter via Modbus® serial connection, the user interface and application reside on the pCO, while the µVFD simply handles the power part.
The version of the µVFD complete with user interface and control board for the management software is suitable for general purpose applications integrated into the pCO sistema, responding to the requirements of compactness and competitiveness in terms of purchase cost.

Dimensions (mm)

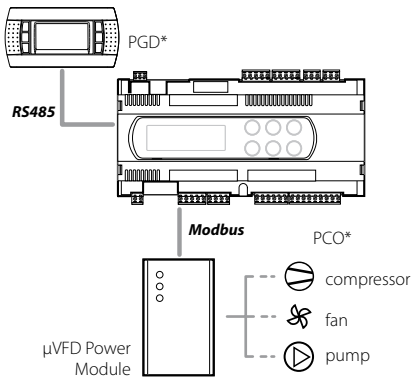


size	WxHxD
MI1	65.5x156.5x98.5
MI2	90x195x101.5
MI3	100x262.5x108.5

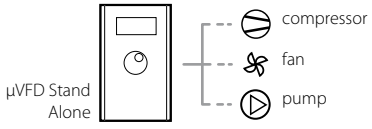
Technical specifications

Single-phase power supply: 208 to 240 V, 0.25 to 2.2 kW
Three-phase power supply: 380 to 480 V, 0.55 to 5.5 kW
Index of protection: IP20
Control signal: settable 0 to 10 V or 4 to 20 mA
Models available:
- stand alone;
- power module

Example of Power Module integration



Example of stand alone application



Concept: **CAREL**
Styling: **CAREL**

Headquarters ITALY

CAREL S.p.A.
Via dell'Industria, 11 - 35020 Brugine - Padova (Italy)
Tel. (+39) 0499 716611 - Fax (+39) 0499 716600
www.carel.com

+80002001 - 1.2 - 01.10.2008

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