MasterCella

Foglio istruzioni

GB *Technical leaflet*

F **Notice d'instructions**

D *Gebrauchsanleitungen*

ES **Hoja de instrucciones**

P *Folha instruções*

CAREL

Technology & Evolution

Contents

(I) **Smaltimento del prodotto**
L'apparecchiatura (o il prodotto) deve essere oggetto di raccolta separata in conformità alle vigenti normative locali in materia di smaltimento

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

(F) **Élimination du produit**
L'équipement (ou le produit) doit faire l'objet d'un ramassage particulier en conformité avec les normes en vigueur locales en matière d'élimination des déchets

(D) ***Entsorgung des Produktes***
Das Gerät (oder Produkt) muss im Mülltrennungsverfahren in Übereinstimmung mit den örtlichen Entsorgungsnormen entsorgt werden.

(ES) **Reciclage del producto**
Los componentes (o el producto) deben ser tratados separadamente en conformidad a la normativa local vigente en materia de reciclaje

(P) ***Descarte do produto***
O dispositivo (ou o produto) deve ser disposto separadamente de acordo com a legislação local para resíduos

(I) **AVVERTENZE IMPORTANTI**

Il prodotto CAREL è un prodotto avanzato, il cui funzionamento è specificato nella documentazione tecnica fornita col prodotto o scaricabile, anche anteriormente all'acquisto, dal sito internet www.Carel.com. Il cliente (costruttore, progettista o installatore dell'equipaggiamento finale) si assume ogni responsabilità e rischio in relazione alla fase di configurazione del prodotto per il raggiungimento dei risultati previsti in relazione all'installazione e/o equipaggiamento finale specifico. La mancanza di tale fase di studio, la quale è richiesta/indicata nel manuale d'uso, può generare malfunzionamenti nei prodotti finali di cui CAREL non potrà essere ritenuta responsabile. Il cliente finale deve usare il prodotto solo nelle modalità descritte nella documentazione relativa al prodotto stesso.
La responsabilità di CAREL in relazione al proprio prodotto è regolata dalle condizioni generali di contratto CAREL editate nel sito www.Carel.com e/o da specifici accordi con i clienti.

(GB) ***IMPORTANT WARNINGS***

The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.Carel.com. The client (builder, developer or installer of the final equipment) assumes every responsibility and risk relating to the phase of configuration the product in order to reach the expected results in relation to the specific final installation and/or equipment. The lack of such phase of study, which is requested/indicated in the user manual, can cause the final product to malfunction of which CAREL can not be held responsible. The final client must use the product only in the manner described in the documentation related to the product itself. The liability of CAREL in relation to its own product is regulated by CAREL's general contract conditions edited on the website www.Carel.com and/or by specific agreements with clients.

(F) **AVERTISSEMENTS IMPORTANTS**

Le produit CAREL est un produit avancé dont le fonctionnement est spécifié dans la documentation technique fournie avec le produit ou téléchargeable, même avant l'achat, du site Internet www.carel.com. Le client (constructeur, concepteur ou installateur de l'équipement final) assume toutes les responsabilités et risques quant à la configuration du produit pour l'obtention des résultats prévus quant à l'installation et/ou à l'équipement final spécifique.
L'absence de cette phase d'étude qui est requise/indiquée dans le manuel d'instructions peut provoquer des dysfonctionnements des produits finals dont CAREL ne pourra en aucun cas être jugée responsable. Le client final doit utiliser le produit exclusivement selon les modes décrits dans la documentation correspondant au produit. La responsabilité de CAREL en ce qui concerne son produit est réglée par les conditions générales de contrat CAREL publiées sur le site www.carel.com et/ou par des accords spécifiques stipulés avec les clients

(D) ***WICHTIGE HINWEISE***

Das CAREL Produkt ist ein Produkt nach dem neuesten Stand der Technik, dessen Betriebsanleitungen in den dem Produkt beiliegenden technischen Spezifikationen enthalten sind oder - auch vor dem Kauf - von der Internetseite www.carel.com heruntergeladen werden können.
Der Kunde (Hersteller, Planer oder Installateur der Endausstattung) übernimmt jede Haftung und Risiken in Bezug auf die Produktkonfiguration zur Erzielung der bei der Installation und/oder spezifischen Endausstattung vorgesehenen Resultate. Die Unterlassung dieser Phase, die im Benutzerhandbuch verlangt/angegeben ist, kann zu Funktionsstörungen der Endprodukte führen, für welche CAREL nicht verantwortlich gemacht werden kann. Der Endkunde darf das Produkt nur auf die in den Produktspezifikationen beschriebenen Weisen verwenden. Die Haftung CARELS für die eigenen Produkte ist von den allgemeinen CAREL Vertragsbedingungen (siehe Internetseite www.carel.com) und/oder durch spezifische Vereinbarungen mit den Kunden geregelt.

(ES) **ADVERTENCIAS IMPORTANTES**

El producto CAREL es un producto avanzado, cuyo funcionamiento está especificado en la documentación técnica suministrada con el producto o descargable, incluso antes de la compra, desde el sitio de internet www.carel.com. El cliente (constructor, proyectista o instalador del equipo final) asume toda la responsabilidad y el riesgo relativos a la fase de configuración del producto con el fin de los resultados previstos en relación a la instalación y/o equipamiento final específico. Pasar por alto dicha fase de estudio, la cual es solicitada/indicada en el manual de uso, puede generar funcionamientos anómalos en los productos finales, de los cuales no se podrá responsabilizar a CAREL. El cliente final debe utilizar el producto sólo en las modalidades descritas en la documentación relativa al producto en sí. La responsabilidad de CAREL en relación a su producto propio está regulada por las condiciones generales del contrato de CAREL editadas en el sitio www.carel.com y/o por los acuerdos específicos con los clientes.

(P) ***ADVERTÊNCIAS IMPORTANTES***

O produto CAREL é um produto avançado, cujo funcionamento está descrito na documentação técnica fornecida com o produto ou que pode ser descarregada, mesmo antes da aquisição do produto, a partir do site www.Carel.com. O cliente (fabricante, projectista ou instalador do equipamento final) assume qualquer tipo de responsabilidade e de risco relativos à fase de configuração do produto para a obtenção dos resultados previstos em relação à instalação e/ou equipamento final específico. A falta desta fase de estudo, como exigida/indicada no manual de uso, pode gerar mau funcionamentos nos produtos finais pelos quais a CAREL não poderá ser julgada responsável. O cliente final deve utilizar o produto somente nas modalidades descritas na documentação relativa ao produto. A responsabilidade da CAREL em relação ao próprio produto é regulada pelas condições gerais de contrato CAREL editadas no site www.Carel.com e/ou por específicos acordos com os clientes.

1. INTRODUCTION

MasterCella is the new electronic controller for static or ventilated refrigerating units, able to manage all the actuators normally featured, such as: compressors, fans, defrost, alarms and lights. The MasterCella case is IP65 and the electrical wiring is especially simple, due to the fact that the front panel can be removed. The MasterCella case allows installation either on the panel or on the wall.

2. OPTION CODES

CODE	DESCRIPTION
IRTRRES000	small infrared remote control
IROPZSEM10	RS485 serial board with automatic recognition of the polarity +/-
IROPZSEM30	RS485 serial board with automatic recognition of the polarity +/- and connection of repeater display
PST00VR100	remote repeater display
IR00RG0000	remote repeater display ir33 range green display
IR00RR0000	remote repeater display ir33 range red display
PSTCON0300	connection cables to the repeater display, one end with screw, 3 metres long
PSTCON1000	connection cables to the repeater display, one end with screw, 10 metres long
PSOPZKEY00	parameter programming key with 12V batteries included
PSOPZKEYA0	parameter programming key with external 230 Vac power supply
IROPZKEY00	parameter programming key with extended memory and 12V batteries included
IROPZKEYA0	parameter programming key with extended memory and external 230 Vac power supply
VPMSTDKY*0(1,2)	programming key kit
MDOPZCA000	optional board with 3 repeat connectors
MDOPZCB000	optional board with 5 repeat connectors
0402512CEL	Disconnecting switch 32 A
0402515CEL	Shaft H= 85 mm
0402517CEL	Yellow/red disconnecting switch

Tab.2.a

3. DISPLAY

MasterCella is fitted with a three digit LED display for the temperature, and icons for displaying the operating status. It can also be connected, using a special interface, to a further display, used, for example, to show the reading of the third probe.

3.1 Signals on the display

Icon	Function	Normal Operation			Startup
		ON	OFF	flashing	
	COMPRESS.	compressor on	compressor off	compressor call	
	FAN	fan on	fan off	fan call	
	DEFROST	defrost in progress	no defrost call	defrost call	
aux	AUX	AUX auxiliary output active	AUX auxiliary output not active	anti-sweat heater function active	
	ALARM	delayed external alarm (before the time A7' has elapsed)	no alarm present	alarms in norm. operation (e.g. high/low temperature) or alarm from external digital input, immediate or delayed	
	CLOCK	if at least one timed defrost has been set	no timed defrost set	clock alarm	ON if Real-Time Clock present
	LIGHT	LIGHT auxiliary output active	LIGHT auxiliary output not active	anti-sweat heater function active	
	SERVICE		no malfunction	malfunction (e.g. EEPROM error or probes faulty)	
HACCP	HACCP	HACCP function enabled	HACCP function not enabled	HACCP alarm saved (HA and/or HF)	
	CYCLE	CONTINUOUS CYCLE function activated	CONTINUOUS CYCLE function not activated	CONTINUOUS CYCLE function call	

Tab. 3.a

The flashing status indicates that the function has been called but cannot be run until the delay timers expire.

3.2 Buttons on the keypad

Icon	Button	Normal operation		Start-up	Automatic address assignment request
		Pressing the button alone	Pressing together with other buttons		
HACCP	HACCP	enters the menu to display and delete of the HACCP alarms			
	ON/OFF	if pressed for more than 5 s, switches the unit on/off			
prg	PRG/MUTE	if pressed for more than 5 s, accesses the menu for setting the type "F" parameters (Frequent). In the event of alarms: mutes the audible alarm (buzzer) and deactivates the alarm relay	• if pressed for more than 5s together with the SET button, accesses the menu for setting the type "C" parameters (Confi guration) or downloading the parameters. • if pressed for more than 5s together with the UP/CC button, resets any alarms with manual reset	if pressed for more than 5 s at start-up, activates the procedure for restoring the default parameters	if pressed for more than 1 s, starts the automatic serial address assignment procedure
▲	UP/CC	if pressed for more than 5 s, activates/ deactivates the continuous cycle	• if pressed for more than 5s together with the SET button, starts the report printing procedure (function available but management to be implemented) • if pressed for more than 5s together with the PRG/MUTE button, resets any alarms with manual reset		
	LUCE	if pressed for more than 1 s, activates/ deactivates auxiliary output 2			
aux	AUX	if pressed for more than 1 s, activates deactivates auxiliary output 1			
▼	DOWN/DEF	if pressed for more than 5 s, activates/ deactivates a manual defrost			
	SET	if pressed for more than 1 s, displays and/or sets the set point	• if pressed for more than 5s together with the PRG/MUTE button, accesses the menu for setting type "C" parameters (Configuration) or downloading the parameters • if pressed for more than 5s together with the UP/CC button, starts the report printing procedure (function available but management to be implemented)		

Tab. 3.b

Setting the set point (desired temperature value)

To display or set the set point, proceed as follows:
1) press the **set** button for more than 1 second to display the set point;
2) increase or decrease the value of the set point with the ▲ and ▼ buttons respectively, until reaching the desired value;
3) press the set button again to confi rm the new value.

Resetting alarms with manual reset

All the alarms with manual reset can be reset by pressing the **prg** and ▲ buttons together for more than 5 s.

Manual defrost

As well as the automatic defrost, a manual defrost can be started if the temperature conditions are right, by pressing the button ▼ for 5 seconds.

ON/OFF button

Pressing the button ⏻ for 5 seconds switches the unit on/off. When the controller is off it is in standby mode, therefore before performing maintenance on the unit, power must be disconnected.

HACCP function

MasterCella is compliant with the HACCP standards, as it monitors the temperature of the food stored. Alarm "HA"= maximum threshold exceeded: in addition, up to three HA events are saved (HA, HA1, HA2), respectively from the most recent (HA) to the oldest (HA2), with a signal HAn that displays the number of HA events that have occurred. Alarm "HF"= power failure for more than 1 minute and maximum threshold AH exceeded: up to three HF events are saved (HF, HF1, HF2), respectively from the most recent (HF) to the oldest (HF2), with a signal HFn that displays the number of HF events that have occurred. Setting the HA/HF alarm: parameter AH (high temp. threshold); Ad and Htd (Ad + Htd = HACCP alarm delay).

Displaying the details

1) When pressing the **HACCP** button for more than one second, the display shows the name of the fi rst parameter relating to the HA and HF alarms;
2) Use the ▲ and ▼ buttons to scroll the parameters relating to the HA and HF alarms;
3) Once having reached the desired parameter, press set to display the value;
4) If the selected parameter is HA or HF, press the ▲ and ▼ buttons to display the year, month, day, hour, minute and duration of the last alarm HA or HF activated.

Example: y03 ▼ M07 ▼ d22 ▼ h23 ▼ m57 ▼ t99 ▼ start again...
The sequence indicates that the last HA or HF alarm was activated on 22 July 2003 at 23:57 and lasted 99 hours;
5) Pressing **set** again returns to the list of param. relating to the HA and HF alarms; the following functions are available from inside the menu:
- delete the HACCP alarm, by pressing the **HACCP** button for more than 5 seconds (the message 'rES' indicates the alarm has been deleted, the HACCP LED stops fl ashing, the HA and/or HF signal is reset and the monitoring of HA resumes);
- delete the HACCP alarm and the alarms saved (HAn, HA, HA1, HA2, HFn, HF, HF1, HF2), by pressing the **HACCP** and ▲ buttons for more than 5

ENGLISH

seconds (the message 'rES' indicates the alarms have been deleted, the HACCP LED stops fl ashing, the HA and/or HF signal is reset, the HAn, HA, HA1, HA2, HFn, HF, HF1, HF2 alarms saved are cancelled and the monitoring of HA resumes);

6) To return to normal operation at any time, press the **prg** *button for 3 s, or wait for the session to expire by timeout (60 s) without pressing any button.*

Continuous cycle

To activate the continuous cycle function, press the ▲ button for more than 5 s. During operation in continuous cycle, the compressor continues to operate for the entire duration, and will stop for cycle timeout or when reaching the minimum temperature established (AL = minimum temperature alarm threshold). Setting the continuous cycle: parameter "cc" (continuous cycle duration): "cc"= 0 never active; parameter "c6" (alarm bypass after continuous cycle): excludes or delays the low temperature alarm at the end of the continuous cycle.

Procedure for setting the default parameters

To set the default parameters on the controller, proceed as follows:

- *If "Hdn" = 0: 1) disconnect power from the instrument; 2) reconnect power to the instrument holding the* **prg** *button until the message "Std" appears on the display.* ***Note:*** *the default values are only set for the visible parameters (C and F). For further details see the Summary table of operating parameters.*
- *If "Hdn" < > 0: 1) disconnect power from the instrument; 2) reconnect power to the instrument holding the* **prg** *button until the value 0 appears;*

  3) select the set of default parameters, between 0 and "Hdn", using the ▲ and ▼ buttons; 4) press the **prg** *button until the message "Std" appears on the display.*

Automatic serial address assignment

This is a special procedure that uses an application installed on a PC to simply set and manage the addresses of all the instruments (that feature this function) connected to the CAREL network. The procedure is very simple:

1) Using the remote software, start the "Network defi nition" procedure; the application starts sending a special message ('<!ADR>') to the CAREL network, containing the network address;

2) Pressing the **prg** *button on an instrument activates the recognition of this message, which automatically sets the address to the desired value and sends a confirmation message to the application, containing the unit code and the fi rmware revision (message 'V'). Upon recognition of the message sent by the remote application, the instrument displays the message 'Add' for 5 seconds, followed by the value of the serial address assigned;*

3) The application, once the confi rmation message has been received from one of the units, saves the information received to its database, increments the serial address and starts sending the '<!ADR>' message again;

4) At this point, repeat the procedure from point 2 on another unit, until defi ning the addresses of the entire network.

Note: *once the address has been assigned on an instrument, operation is disabled on the unit for 1 minute, for safety reasons, during which time a different address cannot be assigned to the instrument.*

Accessing the confi guration parameters (type C)

1) Press the **prg** *and* **set** *buttons together for more than 5 seconds, the display will show "0" (the password prompt);*

2) Use the ▲ or ▼ button to display the number "22" (password to access the parameters);

3) Confi rm with the **set** *button;*

4) The display shows the first modifiable "C" parameter.

Accessing the configuration parameters (type F)

1) Press the **prg** *button for more than 5 sec. (in the event of alarms, fi rst mute the buzzer), the display shows the first modifiable "F" param.*

Modifying the parameters

After having displayed the parameter, either type "C" or type "F", proceed as follows:

1) Use the ▲ or ▼ button to scroll the parameters until reaching the one to be modifi ed; when scrolling, an icon on the display comes on to show the category the parameter belongs to;

2) Alternatively, press **prg** *to display the "categories" menu and quickly access the family of parameters to be modified;*

3) Scroll the menu with the ▲ and ▼ buttons, the display shows the codes of the various categories of parameters (see the Summary table of operating parameters), accompanied by the corresponding icon on the display (if present);

4) Once having reached the desired category, press **set** *to directly access the first parameter in the chosen category (if none of these parameters are visible, pressing* **set** *will have no effect);*

5) At this point, continue to scroll the parameters or return to the "Categories" menu with the **prg** *button;*

6) Press **set** *to display the value associated with the parameter;*

7) Increase or decrease the value with the ▲ or ▼ button respectively;

8) Press set to temporarily save the new value and return to the display of the parameter;

9) Repeat the operations from point 1 or from point 2;

10) If the parameter has sub-parameters, press **set** *to display the fi rst sub-parameter;*

11) Press the ▲ or ▼ button to display all the sub-parameters;

12) Press **set** *to display the associated value;*

13) Increase ▲ or ▼ decrease the value with the or button respectively;

14) Press **set** *to temporarily save the new value and return to the display of the sub-parameter code;*

15) Press **prg** *to return to the display of the parent parameter.*

Saving the new values assigned to the parameters

To defi nitively save the new values of the modified parameters, press the **prg** *button for more than 5 seconds, thus exiting the parameter programming procedure. All the modifi cations made to the parameters, and temporarily saved to the RAM can be cancelled, returning to "normal operation", by not pressing any button for 60 seconds, and allowing the session to expire by timeout. If power is disconnected from the instrument before pressing the* **prg** *button, all the changes made to the parameters and temporarily saved will be lost.*

Direct access to the parameters by selecting the category

The configuration parameters can also be accessed via the category, as listed in the table below. The summary of operating parameters also shows the corresponding category for each parameter. To access the categories menu, press **prg** *when the parameter symbol is displayed. Then use UP and DOWN to scroll the categories. Press* **set** *to display the first parameter in the selected category.*

Category	*Parameters*	*Text*	*Icon*
Probe parameters	*/*	*'Pro'*	
Control parameters	*r*	*'CtL'*	
Compressor parameters	*c*	*'CMP'*	
Defrost parameters	*d*	*'dEF'*	
Alarm parameters	*A*	*'ALM'*	
Fan parameters	*F*	*'FAn'*	
Confi guration parameters	*H configuration*	*'CnF'*	aux
HACCP parameters	*H HACCP*	*'HcP'*	HACCP
RTC parameters	*rtc*	*'rtc'*	

Tab. 3.c

ENGLISH

Probe confi guration (/A2 to /A4)

In the MasterCella series, these parameters are used to confi gure the operating mode of the probes: 0 = probe absent; 1 = product probe (display only); 2 = defrost probe; 3 = condenser probe; 4 = antifreeze probe.

Digital input confi guration (A4, A5, A9)

In the MasterCella, this parameter and the model of controller used defi ne the meaning of the digital input:

0 = input not active;
1 = immediate external alarm, normally closed: open = alarm;
2 = delayed external alarm, normally closed;
3 = enable defrost from external contact: open = disabled (an external contact can be connected to the multifunction input to enable or disable the defrost).
4 = start defrost when closing the external contact;
5 = door switch with compressor and fans off: open = door open;
6 = remote ON/OFF: closed = ON;
7 = curtain switch: closed = curtain lowered;
8 = low pressure switch input for pump-down: open = low pressure;
9 = door switch with fans only off: open = door open;
10 = direct/reverse operation: open = direct;
11 = light sensor;
12 = activation of AUX output (if configured with the parameters H1 or H5): opening = deactivation;
13 = door switch with compressor and fans OFF and light not managed;
14 = door switch with fans OFF and light not managed.

Confi guration of AUX1 and AUX2 relay outputs (H1 and H5)

This establishes whether the fourth and the fi fth relay (present only if featured on the model) are used as auxiliary outputs (e.g. demister fan or other ON/OFF actuator), as an alarm output, as a light output, as a defrost actuator for the auxiliary evaporator, as a control for the Pump-Down valve or as an output for the condenser fan.

0 = alarm output: normally energised; the relay is de-energised when an alarm occurs;
1 = alarm output: normally de-energised; the relay is energised when an alarm occurs;
2 = auxiliary output;
3 = light output;
4 = auxiliary evaporator defrost output;
5 = Pump-Down valve output;
6 = condenser fan output;
7 = delayed compressor output;
8 = auxiliary output with switch off;
9 = light output with switch off;
10 = output disabled;
11 = reverse output in control with dead band;
12 = second compressor step output;
13 = second compressor step output with rotation.

Warning: *mode H1/H5=0 is useful for signalling the alarm status even when power is cut off.*

Note: in the models fi tted with only one auxiliary output, to associate the button to this output, set H1 = 10 and H5 = 3. In addition, the available relay needs to be assigned for the auxiliary functions to AUX2 rather than AUX1. The operation can be performed using the programming kit PSOPZ-PRG00 and the programming key PSOPZKEY00/A0.

Date and day of defrost event (parameters td1 to td8)

0= no event; 1 to 7= Monday to Sunday; 8= from Monday to Friday; 9= from Monday to Saturday; 10= Saturday and Sunday; 11= every day.

4. SUMMARY OF OPERATING PARAMETERS

UOM = Unit of measure; Def. = Default value

ENGLISH

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	Pw	Password	AD	-	C	0	200	22
	/2	Measurement stability	AD	-	C	1	15	4
	/3	Probe display response	AD	-	C	0	15	0
	/4	Virtual probe	AD	-	C	0	100	0
	/5	Select °C or °F	AD	flag	C	0	1	0
		0: °C						
		1: °F						
	/6	Decimal point	AD	flag	C	0	1	0
		with tenths of a degree						0
		without tenths of a degree						1
	/tI	Display on internal terminal	AD	-	C	1	7	1
		1: virtual probe						
		2: probe 1						
		3: probe 2						
		4: probe 3						
		5: probe 4						
		6: probe 5						
		7: set point						
	/tE	Display on external terminal	AD	-	C	0	6	0
		remote terminal not present						0
		1: virtual probe						1
		2: probe 1						2
		3: probe 2						3
		4: probe 3						4
		5: probe 4						5
		6: probe 5						6
	/P	Select type of probe	AD	-	C	0	2	0
		NTC standard with range -50T90 °C						0
		NTC enhanced with range -40T150 °C						1
		PTC standard with range -50T150 °C						2
	/A2	Configuration of probe 2 (S2)	D	-	C	0	4	2
			A	-	C	0	4	0
		0: Probe absent						
		1: Product probe (display only)						
		2: Defrost probe						
		3: Condenser probe						
		4: Antifreeze probe						
	/A3	Configuration of probe 3 (S3/DI1)	AD	-	C	0	4	0
		As for /A2						
	/A4	Configuration of probe 4 (S4/DI2)	AD	-	C	0	4	0
		As for /A2						
	/A5	Configuration of probe 5 (S5/DI3)	AD	-	C	0	4	0
		As for /A2						
	/c1	Calibration of probe 1	AD	°C/°F	C	-20	20	0.0
	/c2	Calibration of probe 2	AD	°C/°F	C	-20	20	0.0
	/c3	Calibration of probe 3	AD	°C/°F	C	-20	20	0.0
	/c4	Calibration of probe 4	AD	°C/°F	C	-20	20	0.0
	/c5	Calibration of probe 5	AD	°C/°F	C	-20	20	0.0

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	St	Temperature Set point	AD	°C/°F	F	r1	r2	0.0
	rd	Control delta	AD	°C/°F	F	0.1	20	2.0
	rn	Dead band	AD	°C/°F	C	0.0	60	4.0
	rr	Reverse differential for control with dead band	AD	°C/°F	C	0.1	20	2.0
	r1	Minimum set point allowed	AD	°C/°F	C	-50	r2	-50
	r2	Maximum set point allowed	AD	°C/°F	C	r1	200	60
	r3	Operating mode	AD	flag	C	0	2	0
		0: Direct (cooling) with defrost control						
		1: Direct (cooling)						
		2: Reverse-cycle (heating)						
	r4	Automatic night-time set point variation	AD	°C/°F	C	-20	20	3.0
	r5	Enable temperature monitoring	AD	flag	C	0	1	0
		0: Disabled						
		1: Enabled						
	rt	Temperature monitoring interval	AD	ore	F	0	999	-
	rH	Maximum temperature read	AD	°C/°F	F	-	-	-
	rL	Minimum temperature read	AD	°C/°F	F	-	-	-

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	c0	Comp., fan and AUX delay on start-up in dead band	AD	min	C	0	15	0
	c1	Minimum time between successive starts	AD	min	C	0	15	0
	c2	Minimum compressor OFF time	AD	min	C	0	15	0
	c3	Minimum compressor ON time	AD	min	C	0	15	0
	c4	Duty setting	AD	min	C	0	100	0
	cc	Continuous cycle duration	AD	ore	C	0	15	0
	c6	Alarm bypass after continuous cycle	AD	ore	C	0	250	2
	c7	Maximum pump down time	AD	s	C	0	900	0
	c8	Comp. start delay after open PD valve (factory set to 0 and not visible)	AD	s	C	0	60	5
	c9	Enable autostart function in PD	AD	flag	C	0	1	0
	c10	Select Pump down by time or pressure	AD	flag	C	0	1	0
		0: Pump down by pressure						
		1: Pump down by time						
	c11	Second compressor delay	AD	s	C	0	250	4

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	d0	Type of defrost	AD	flag	C	0	4	0
		0: Electric heater defrost by temperature						
		1: Hot gas defrost by temperature						
		2: Electric heater defrost by time						
		3: Hot gas defrost by time						
		4: Electric heater defrost thermostat by time						
	dI	Interval between defrosts	AD	ore	F	0	250	8
	dt1	End defrost temperature, evaporator	AD	°C/°F	F	-50	200	4.0
	dt2	End defrost temperature, aux evap.	AD	°C/°F	F	-50	200	4.0
	dP1	Maximum defrost duration, evaporator	AD	min	F	1	250	30
	dP2	Maximum defrost duration, aux evap.	AD	min	F	1	250	30
	d3	Defrost start delay	AD	Min	C	0	250	0
	d4	Enable defrost on start-up	AD	flag	C	0	1	0
		0: No defrost is performed when the instrument is switched on						
		1: A defrost is performed when the instrument is switched on						
	d5	Defrost delay on start-up	AD	min	C	0	250	0
	d6	Display on hold during defrost	AD	-	C	0	2	1
		0: Alternating display of dEF and probe value						
		1: Display of the last temp. shown						
		2: Display of dEF steady						
	dd	Dripping time after defrost	AD	min	F	0	15	2
	d8	Alarm bypass after defrost	AD	ore	F	0	15	1
	d8d	Alarm bypass after door open	AD	ore/min	C	0	250	0
	d9	Defrost priority over compressor protectors	AD	flag	C	0	1	0
		0: The protection times c1, c2 and c3 are observed						
		1: The protection times c1, c2 and c3 are not observed						
	d/1	Display of defrost probe 1	AD	°C/°F	F	-	-	-
	d/2	Display of defrost probe 2	AD	°C/°F	F	-	-	-
	dC	Time base for defrost	AD	flag	C	0	1	0
		0: dI in hours, dP1 and dP2 in minutes						
		1: dI in minutes, dP1 and dP2 in seconds						
	d10	Compressor running time	AD	ore	C	0	250	0
	d11	Running time temperature threshold	AD	°C/°F	C	-20	20	1.0
	d12	Advanced defrost	AD	-	C	0	3	0
	dn	Nominal defrost duration	AD	-	C	1	100	65
	dH	Proportional factor, variation in dI	AD	-	C	0	100	50

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	A0	Alarm and fan differential	AD	°C/°F	C	0.1	20	2.0
	A1	Type of threshold 'AL' and 'AH'	AD	flag	C	0	1	0
		0: AL and AH are relative thresholds						
		1: AL and AH are absolute thresholds						
	AL	Low temperature alarm threshold	AD	°C/°F	F	-50	200	0.0
	AH	High temperature alarm threshold	AD	°C/°F	F	-50	200	0.0
	Ad	Low and high temperature signal delay	AD	min	F	0	250	120
	A4	Digital input 1 configuration	A	-	C	0	14	0
			D	-	C	0	14	3
		0: Input not active						
		1: Immediate external alarm						
		2: Delayed external alarm						
		3: If model M, probe selection						
		3: Other models enable defrost						
		4: Start defrost						
		5: Door switch with compressor and fan stop						
		6: Remote on/off						
		7: Curtain switch						

	8: Low pressure switch						
	9: Door switch with fan stop only						
	10: Direct/reverse						
	11: Light sensor						
	12: Activation of the AUX output						
	13: Door switch with compressor and fans off and light not managed						
	14: Door switch with fans only off and light not managed						
A5	Digital input 2 configuration	AD	-	C	0	14	0
	As for A4						
A6	Stop compressor from external alarm	AD	min	C	0	100	0
A7	External alarm detection delay	AD	min	C	0	250	0
A8	Enable alarms 'Ed1' and 'Ed2'	AD	flag	C	0	1	0
	0: Alarm signals Ed1 and Ed2 enabled						
	1: Alarm signals Ed1 and Ed2 disabled						
A9	Digital input 3 configuration	AD	-	C	0	14	0
	As for A4						
Ado	Light management mode with door switch	AD	flag	C	0	1	0
	0: With normal algorithm						
	1: With extended algorithm						
Ac	High condenser temperature alarm	AD	°C/°F	C	0.0	200	70.0
AE	High condenser temperature alarm differential	AD	°C/°F	C	0.1	20	10
Acd	High condenser temperature alarm delay	AD	min	C	0	250	0
AF	Light sensor OFF time	AD	s	C	0	250	0
ALF	Antifreeze alarm threshold	AD	°C/°F	C	-50	200	-5.0
AdF	Antifreeze alarm delay	AD	min	C	0	15	1

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	F0	Fan management	D	flag	C	0	2	0
		0: Fans always on						
		1: Fans controlled according to the temperature difference between the virtual control probe and the evaporator temperature						
		2: Fans controlled according to the evaporator temperature						
	F1	Fan start temperature	D	°C/°F	F	-50	200	5.0
	F2	Fan OFF with compressor OFF	D	flag	C	0	1	1
		0: Fans always on						
		1: Fans off with compressor off						
	F3	Fans in defrost	D	flag	C	0	1	1
		0: Fans operate during defrosts						
		1: Fans do not operate during defrosts						
	Fd	Fan OFF after dripping	D	min	F	0	15	1
	F4	Condenser fan stop temperature	AD	°C/°F	C	-50	200	40
	F5	Condenser fan start differential	AD	°C/°F	C	0.1	20	5.0

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	H0	Serial address	AD	-	C	0	207	1
	H1	Function of relay 4	AD	flag	C	0	13	1
		0: Alarm output usually energised						
		1: Alarm output usually de-energised						
		2. Auxiliary output						
		3: Light output						
		4: Auxiliary evaporator defrost output						
		5: Pump down valve output						
		6: Condenser fan output						
		7: Delayed compressor output						
		8: Auxiliary output with deactivation when OFF						
		9: Light output with deactivation when OFF						
		10: No function associated with the output						
		11: Reverse output in control with dead band						
		12: Second compressor step output						
		13: Second compressor step output with rotation						
	H2	Disable keypad/IR	AD	flag	C	1	6	1

Parameter "H2"	LIGHT	ON/OFF	AUX	HACCP	PRG/MUTE	UP/CC	DOWN/DEF	SET	Parameter F modification	Set point modification	Remote control
0									•	•	
1											
2									•	•	•
3											•
4		•				•	•		•		
5		•				•	•		•	•	
6						•	•		•	•	

Keypad function

"•" = Disabled

	H3	Remote control enabling code	AD	-	C	0	255	0
	H4	Disable buzzer	AD	flag	C	0	1	0
		0: Buzzer enabled						
		1: Buzzer disabled						
	H5	Function of relay 5	AD	flag	C	0	13	1
		As for H1						
	H6	Lock keypad	AD	-	C	0	255	0
	H8	Select activation of output with time band	AD	flag	C	0	1	0
		0: Time band linked to output configured for light						
aux		1: Time band linked to output configured for aux						
	H9	Enable set point variation with time band	AD	flag	C	0	1	0
		0: Set point variation with time band disabled						
		1: Set point variation with time band enabled						
	Hdh	Anti-sweat heater offset	AD	°C/°F	C	-50	200	0.0

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	HAn	Number of HA events recorded	AD	-	C	0	15	0
	HA	Date/time of last HA event	AD	-	C		-	-
	y__	Year		years		0	99	0
	M__	Month		months		0	12	1
	d__	Day		days		0	7	1
	h__	Hour		hours		0	23	0
	n__	Minute		minutes		0	59	0
	t__	Duration		hours		0	99	0
	HA1	Date/time of penultimate HA event	AD	-	C	-	-	-
HACCP	HA2	Date/time of third-to-last HA event	AD	-	C	-	-	-
	HFn	Number of HF events recorded	AD	-	C	0	15	0
	HF	Date/time of last HF event	AD	-	C	-	-	-
	y__	Year		years		0	99	0
	M__	Month		months		0	12	1
	d__	Day		days		0	7	1
	h__	Hour		hours		0	23	0
	n__	Minute		minutes		0	59	0
	t__	Duration		hours		0	99	0
	HF1	Date/time of penultimate HF event	AD	-	C	-	-	-
	HF2	Date/time of third-to-last HF event	AD	-	C	0	-	-
	Htd	HACCP alarm delay	AD	minutes	C	0	250	0

Simbol	Code	Parameter	AD	U.O.M.	Type	Min	Max	Def.
	td1	Defrost time band 1	AD	-	C	-	-	-
	d__	Day		days		0	11	0
	h__	Hour		hours		0	23	0
	n__	Minute		minutes		0	59	0
	td2	Defrost time band 2	AD	-	C	-	-	-
	td3	Defrost time band 3	AD	-	C	-	-	-
	td4	Defrost time band 4	AD	-	C	-	-	-
	td5	Defrost time band 5	AD	-	C	-	-	-
	td6	Defrost time band	AD	-	C	-	-	-
	td7	Defrost time band 7	AD	-	C	-	-	-
	td8	Defrost time band 8	AD	-	C	-	-	-
	ton	Light/aux on time band, variation set point	AD	-	C	-	-	-
	d__	Day		days		0	11	0
	h__	Hour		hours		0	23	0
	n__	Minute		minutes		0	59	0
	toF	Light/aux off time band, variation set point	AD	-	C	-	-	-
	d__	Day		days		0	11	0
	h__	Hour		hours		0	23	0
	n__	Minute		minutes		0	59	0
	tc	RTC date/time setting	AD	-	C	-	-	-
	y__	Year		years	0	0	99	0
	M__	Month		months	1	1	12	1
	d__	Day of the month		days	1	1	31	1
	u__	Day of the week		hours	6	6	7	1
	h__	Hour		minutes	0	0	23	0
	n__	Minute		hours	0	0	59	0

Tab. 4.a

Important warning: *for the set times to become immediately operational, turn the instrument on and off again. If the instrument is not switched off, the times will only become operational when next used, when the internal timers are set.*

ENGLISH

5. TABLE OF ALARMS AND SIGNALS: display, buzzer and relay

The following table describes the alarms and the signals on the controller, with the corresponding description, status of the buzzer, the alarm relay and the reset mode.

Code	Icon on the display	Alarm relay	Buzzer	Reset	Description
'rE'	flashing	active	active	automatic	virtual control probe fault
'E0'	flashing	off	off	automatic	room probe S1 fault
'E1'	flashing	off	off	automatic	defrost probe S2 fault
'E2'-3-4	flashing	off	off	automatic	probe S3-4-5 fault
'___'	no	off	off	automatic	probe not enabled
'LO'	flashing	active	active	automatic	low temperature alarm
'HI'	flashing	active	active	automatic	high temperature alarm
'AFr'	flashing	active	active	manual	antifreeze alarm
'IA'	flashing	active	active	automatic	immediate alarm from external contact
'dA'	flashing	active	active	automatic	delayed alarm from external contact
'dEF'	on	off	off	automatic	defrost running
'Ed1'-2	no	off	off	autom./manual	defrost on evaporator 1-2 ended by timeout
'Pd'	flashing	active	active	autom./manual	maximum pump-down time alarm
'LP'	flashing	active	active	autom./manual	low pressure alarm
'AtS'	flashing	active	active	autom./manual	autostart in pump-down
'cht'	no	off	off	autom/manual	high condenser temperature pre-alarm
'CHT'	flashing	active	active	manual	high condenser temp.
'dor'	flashing	active	active	automatic	door open for too long alarm
'Etc'	flashing	off	off	autom./manual	real time clock fault
'EE'	flashing	off	off	automatic	unit parameter EEPROM error
'EF'	flashing	off	off	automatic	operating parameter EEPROM error
'HA'	HACCP flashing	off	off	manual	HACCP alarm type 'HA'
'HF'	HACCP flashing	off	off	manual	HACCP alarm type 'HF'
'rCt'	Signal				Instrument enabled for programming from remote control
'Add'	Signal				Automatic address assignment procedure in progress
'Prt'	Signal				Report being printed
'LrH'	Signal				Activation of the low relative humidity procedure
'HrH'	Signal				Activation of the high rH procedure
'ccb'	Signal				Request start continuous cycle
'ccE'	Signal				Request end continuous cycle
'dFb'	Signal				Request start defrost
'dFE'	Signal				Request end defrost
'On'	Signal				Switch ON
'OFF'	Signal				Switch OFF
'rES'	Signal				Reset alarms with man. reset; Reset HACCP alarms; Reset temp. monitoring
'n1' to 'n6'	flashing	active	active	automatic	Indicates alarm on unit 1 to 6 present in the network
'dnL'	Signal				Download in progress
'd1' to 'd6'	flashing	off	off		Download with errors on unit 1 to 6

Tab. 5.a

Notes: *The buzzer is activated if enabled by parameter 'H4'.*
The alarm relay is activated if one of the auxiliary outputs, AUX ('H1') or AUX2 ('H5'), has been assigned the alarm relay function (normally energised or de-energised).

6. ELETTRICAL SPECIFICATIONS

	Model	Voltage	Power
Power supply	E	230 V~, 50-60Hz	11,3VA, 50mA~ max
	A	115 V~, 50-60Hz	11,3VA, 100mA~ max
	H not avalaible	115-230 V~, 50-60Hz	12VA, 110mA~ max

Insulation guaranted by the power supply			reinforced
			6mm clearance, 8 creepage
		insulation in reference to very low voltage parts	3750V insulation
			basic
	E, A, (H not avalaible)		3mm clearance, 4 creepage
		insulation from relay outputs	1250V insulation

Inputs	S1	NTC or PTC (depending on the model)
	S2	NTC or PTC (depending on the model)
	DI1	free contact, contact resistance < 10ohm, closing current 6mA
	S3	NTC or PTC (depending on the model)
	DI2	free contact, contact resistance < 10ohm, closing current 6mA
	S4	NTC or PTC (depending on the model)
	DI3	free contact, contact resistance < 10ohm, closing current 6mA
	S5	NTC or PTC (depending on the model)
	Maximum ditance of probes and digital inputs less than 10 m. Note: during installation keep the power and loads connection separate from probe cables, digital inputs, repeater display and supervisory system.	

Probe type		10kΩ a 25°C, range from –50°C to +90°C	
			1°C in the range from –50° C to +50°C
	NTC std. CAREL	measurement error:	3°C in the range from +50° C to +90°C
		50kΩ a 25°C, range from –40°C a +150°C	
	NTC high temperature		1,5°C in the range from –20° C to +115°C
		measurement error:	4°C in the range from -20° C to +115°C
		985 Ω a 25°C, range da -50°C a 150°C	
	PTC std. Carel (specific model)		2°C in the range from –50° C to +50°C
		measurement error:	4°C in the range from +50° C to +150°C

Relè outputs	depending on the model				
		EN60730-1		UL 873	
		250V~	operating cycle	250V~	operating cycle
	8 A (**)	8 (4) A su N.O. 6 (4) A su N.C. 2 (2) A su N.O. e N.C.	100000	8A res 2FLA 12LRA C300	30000
	16 A (**)	10 (4) A fino a 60°C su N.O. 12 (2) A su N.O. e N.C.	100000	12A res 5FLA 30LRA C300	30000
	2HP	10 (10) A	100000	12A res 12FLA 72LRA	30000
	30 A (**)	12 (10) A	100000	12A res 2HP 12FLA	30000
	(**) Relay not suitable for fluorescent loads (neon lights, ...) that use starters (ballasts) with phase-shift capacitors. Fluorescent lamps with electronic control devices or without phase-shift capacitors can be used, within the operating limits specified for each type of relay.				

		rinforced
		6mm clearance, 8 creepage
	insulation from very low voltage parts	3750V insulation
		principale
	insulation between relay outputs indipendent	3mm clearance, 4 creepage
		1250V insulation

Connection	Type of connection	Sections	Cross sections max current
	screw removible for screw blocks faston	for cable from 0,5 to 2,5 mm^2	12A
	Section conduttors for probes and digital inputs	from 0,5 to 2,5 mm^2 (da 20 a 13 AWG)	
	Section conduttors for power supply and loads	from 1,5 to 2,5 mm^2 (da 15 a 13 AWG)	
	the installer has to provide the correct dimensioning of the power supply and cable connection between the instruments and the loads. Depending on the model, the maximum current in the common terminals 1, 3 and 5 is 12 A. When using the controller at maximum operating temperature and full load, use cables featuring a maximum operating temperature of 105 °C at least.		

Case	plastic	dimensions	200x240x93 mm
		board dimensions	178x86x40 mm
	board and frontal	frontal dimensions	100x90x12 mm

Mounting	wall (with plastic case)	with screw	interasse 162,5x218,5 mm
	panel (with frontal case)	with screw	interasse 159,5x197,5 mm
	board	with screw	
		with screw	

Display	digits	3 digit LED
	display range	from –99 to 999
	operating status	indicated by graphic icon on the display
Tastiera	8 mechanics buttons, polycarbonate keyboard on the plastic case	
Ricevitore infrarossi	depending on the model	
Orologio con batteria tampone	depending on the model	
Buzzer	avaible in all the models	

Clock	error at 25°C	± 10ppm (±5,3min/year)	
	range temperature error –10/60 °C	- 50ppm (-27min/year)	
	agening	< ±5ppm (±2,7min/year)	
	discharge time	typical 6 months (max 8 months)	
	recharge time	typical 5 hours (< max 8 hours)	
Operating temperature	board		-10T65 °C
	plastic case with the following elettrical configurations: Relay 1 12A, Relay 2 0A, Relay 3 4A, Relay 4 4A, Relay 5 4A Relay 1 0A, Relay 2 12A, Relay 3 4A, Relay 4 4A, Relay 5 4A depending on the relay used these elettrical configuration will be reduced.		-10T50 °C
Operating humidity	board		
	with plastic case		<90% r.H. non-condensing

Storage temperature	-20T70 °C	
Storage humidity	<90% r.H. non-condensing	
Front panel degree of protection	with plastic case	IP65 without power switch IP54 with power switch
	panel mounting with plastic frontal	
Control pollution status	2 (normal situation)	
PTI of the insulating material	printed circuit board 250, insulation 175	
Period of electric stress across insulating parts	long	
Heat and fire resistance category	category D and category B (UL 94-V0)	
Class of protection against voltage surges	category II	
Type of disconnection or interruption	1.B relay contacts (micro-disconnection)	
Construction of control	incorporated control, electronically	
Classification according to protection against electric shock	Class II, by appropriate incorporation	
The control is either to be hand-held or is intented for a hand-held equipment	no	
Software class and structure	Class A	
Front panel cleaning	use only neutral detergents and water	

Serial interface for CAREL network	external, available on all models

Interface for repeater display	external, available on IRxxxx(0,L,H)xxxx
Maximum distance between interface and display	10m

Power supply switch	available on the domand in all models with plastic case

Programming key	available on all models

7. RECOMMENDED CURRENT ACCORDING TO THE CROSS-SECTION OF THE WIRES

AWG	Cross-section (mm²)	Current
24	0.21	0.8
23	0.26	1
22	0.33	1.3
21	0.41	1.6
	0.5	2
20	0.52	2.1
19	0.65	2.6
18	0.82	3.3
17	1	4
16	1.31	5.3
	1.5	6
15	1.65	6.8
14	2.1	9
	2.5	12
13	2.63	12.8
12	3.31	16.1

Tab. 6.a

8. CONNESSIONI ELETTRICHE/*ELECTRICAL CONFIGURATIONS*/ BRANCHEMENTS ÉLECTRIQUES/*ELEKTRISCHE ANSCHLÜSSE*/CONEXIONES ELÉCTRICAS/*LIGAÇÕES ELECTRICAS*

MD33(A,D) (0,1,2,3,4,5) (A,B,E,F) (N,R,C,B) (0,1,2,3,4,5,6,7) 0

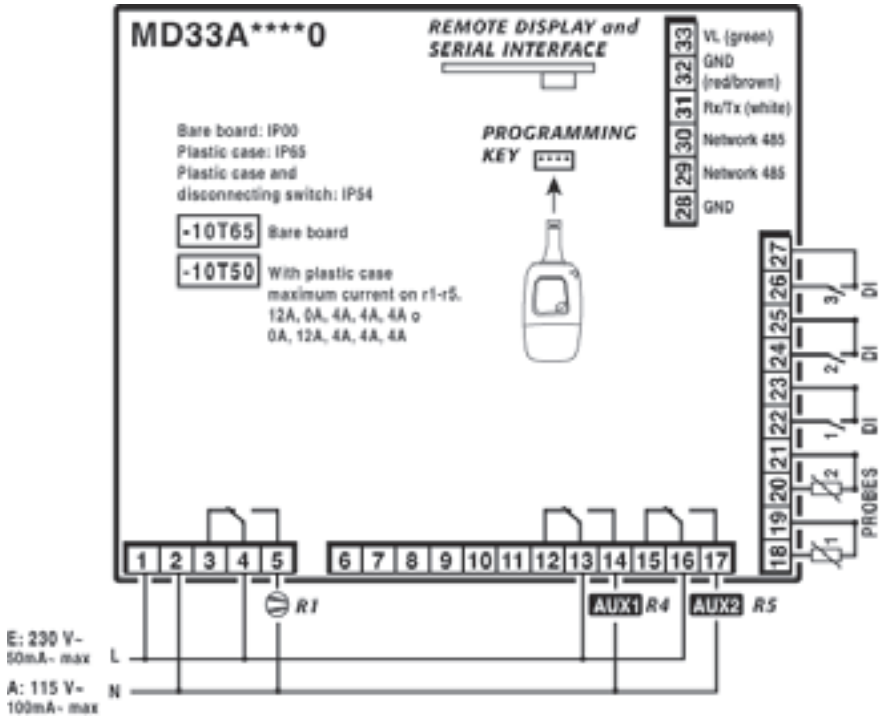

Fig. 7.a

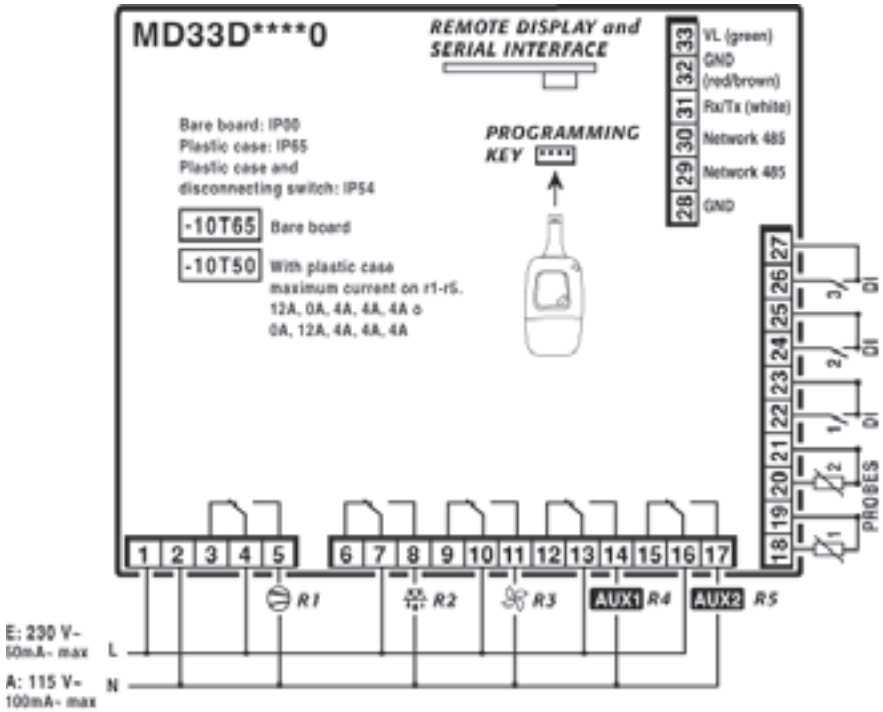
MD33D****0
REMOTE DISPLAY and SERIAL INTERFACE
PROGRAMMING KEY
Bare board: IP00
Plastic case: IP65
Plastic case and disconnecting switch: IP54
-10T65 Bare board
-10T50 With plastic case
maximum current on r1-r5.
12A, 0A, 4A, 4A, 4A o
0A, 12A, 4A, 4A, 4A
33 VL (green)
32 GND (red/brown)
31 Rx/Tx (white)
30 Network 485
29 Network 485
28 GND
27 26 25 24 23 22 21 20 19 18 PROBES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
R1 R2 R3 AUX1 R4 AUX2 R5
E: 230 V~ 50mA~ max
A: 115 V~ 100mA~ max
L
N

Fig. 7.b

9. ESEMPI DI CONNESSIONE SCHEDE MORSETTI/*EXAMPLES OF TERMINAL BOARDS CONNECTION*/EXEMPLE DE CÂBLAGE DE LA CARTE DE CONNEXION/*ANSCHLUSSBEISPIEL FUER DIE STECKVERBINDUNGEN*/ EJEMPLOS DE CONEXIÓN TARJETAS BORNES/*EXEMPLO DI LIGAÇÃO DA PLACA DE CONECTORES*

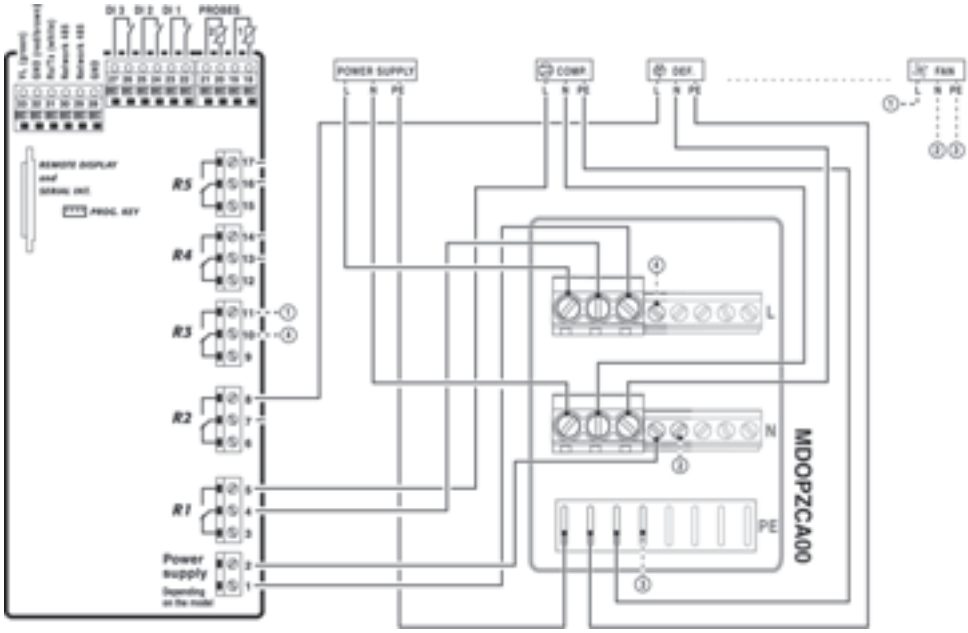

Fig. 8.a

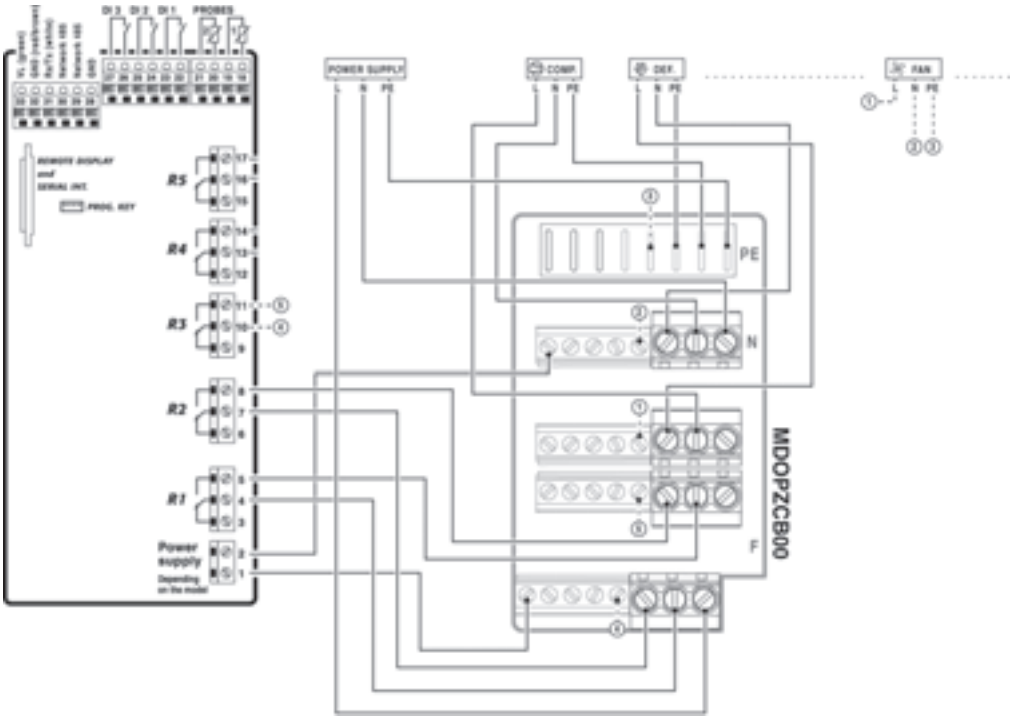
DI 3
DI 2
DI 1
PROBES
REMOTE DISPLAY and SERIAL INT.
PROG. KEY
R5
R4
R3
R2
R1
Power supply
Depending on the model
POWER SUPPLY
L N PE
COMP.
DEF.
FAN
PE
N
F
MDOPZCB00

Fig. 8.b

10. DIMENSIONI/DIMENSIONS/DIMENSIONS/ABMESSUNGEN/ DIMENSIONES/DIMENSÕES

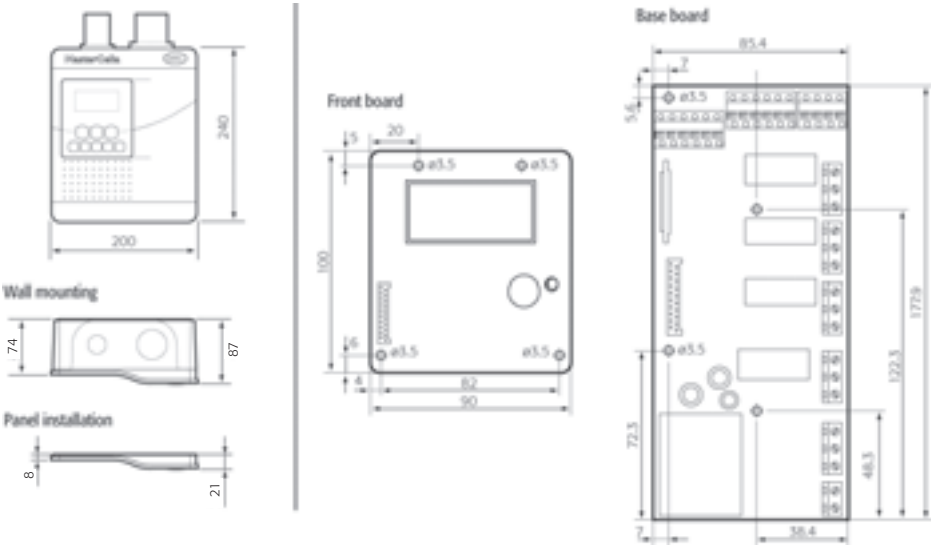

Fig. 9.a

CAREL

Technology & Evolution

CAREL S.p.A.
Via dell'Industria, 11 - 35020 Brugine - Padova (Italy)
Tel. (+39) 049.9716611 - Fax (+39) 049.9716600
e-mail: CAREL@CAREL.com - www.CAREL.com

Agenzia/*Agency*

+050004105 rel. 2.2 - 26.09.2007