



## Introduction

MasterCella is the new control for static or ventilated refrigerated units. It manages all devices: compressors, fans, defrost, alarms and room light. The high index of protection rating IP95 allows the MasterCella to be installed in high moisture areas. Cable connection is extremely easy thanks to an easily removable front cover. MasterCella belongs to a range of controls able to meet customer requests.

## Mounting

The case can be mounted directly onto wall or easily switchboard panel mounted.

### Panel mounting

- Make a hole in the panel with the following dimensions: 182x153mm.
- Unscrew the two frontal screws (Fig. 2, a, b) and take out the central door (Fig. 2, c).
- Unscrew the two screws (Fig. 2, d, e) that keep the lower and frontal cover of the MasterCella connected and separate the two parts.
- Insert the panel gasket in the front panel, on top of the internal gasket.
- Make two holes in the back part (in the perforated part - Fig. 3, f, g).
- Join the back part and the front, with the panel in between, and fix the whole unit with the two screws (dimensions: 4x20mm) that are contained in the kit.

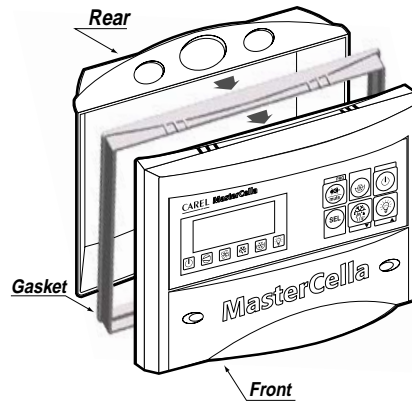


Fig. 1

**N.B.:** It is necessary to remove the two upper fixing teeth (Fig. 2, h) of the frontal part before the panel insertion. Make the hole in the back upper (Fig. 2, i) or lower part (Fig. 2, l) to allow the cable passage. The pitches of the established threads ranges from PG9 (diameter: 16mm) to PG21 (diameter: 29mm). In order to make drilling easier, the use of a drill or a cutter is suggested. Connect the cables to the terminal block. Tighten the screws again (Fig. 2, d, e). Then screw on the door (Fig. 2, c).

### Wall mounting

- Unscrew the two frontal screws (Fig. 2, a, b) and remove the central door (Fig. 2, c).
- Unscrew the two screws (Fig. 2, d, e) that keep the lower and frontal cover of the MasterCella connected and separate the two parts.
- Once having decided where to pass the cable duct or the cables (from above or from below), after making the proper holes (in the part drilled in advance - Fig. 2, i, l) for cablepresses and pipepresses, make three holes (Fig. 3, m, n, o) both in the MasterCella and in the wall itself.
- Insert the wall-nugs, contained in the kit, into the holes made in the wall and then fix the back part of the MasterCella with the three screws (Fig. 3, m, n, o) and the relevant O-Rings to the wall itself.
- Afterwards, fix the cablepresses or pipepresses before mounting the frontal part of the datalogger.
- Subsequently, mount the frontal part, being careful with the positioning of the upper teeth (Fig. 2, h) and the proper fixing of the two screws (Fig. 2, d, e) (do not press excessively in order to avoid plastic deformation).
- After connecting the cables to the terminal block, shut the door (Fig. 2, c).

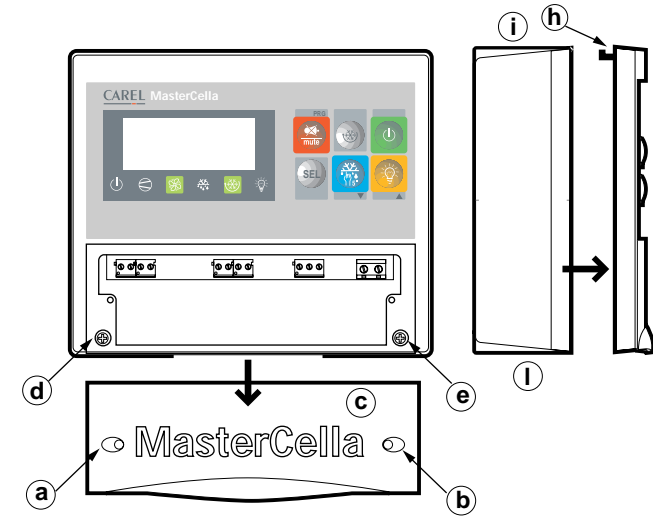


Fig. 2

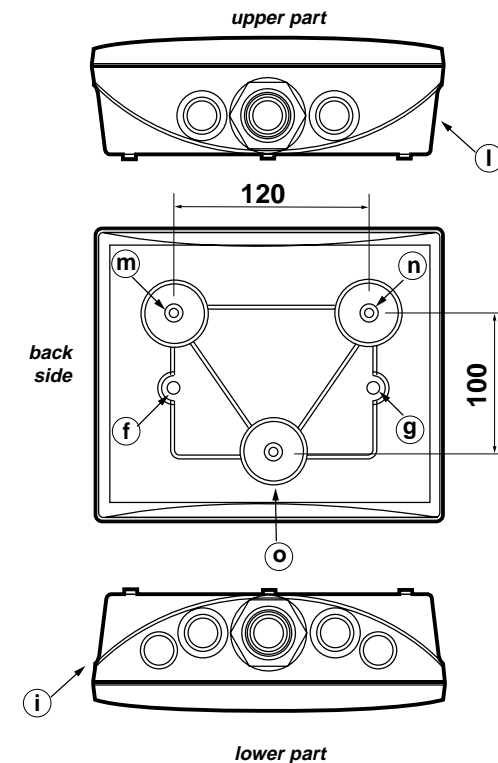


Fig. 3

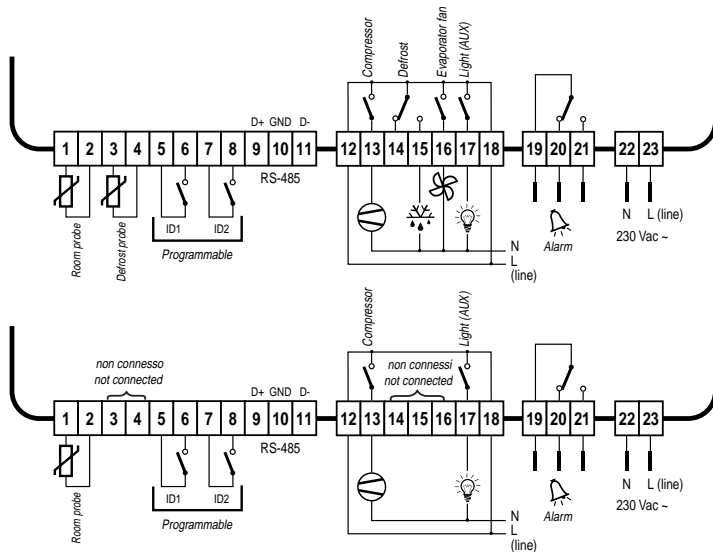
**Important:**

- Avoid mounting the instrument in rooms with the following characteristics:
  - wide and fast fluctuations in ambient temperature;
  - relative humidity exceeding 80%;
  - exposure to direct water jets under pressure;
  - significant magnetic and/or radio frequency interference (e.g. transmitting antennas).
- Utilize lugs suited to the terminal block in use. Loosen each screw and insert into them the lugs, afterwards tighten the screws. Finally, gently pull the cables to check their correct clamping.
- Separate as much as possible the cables of the probe signals and of the digital inputs from the power and inductive load cables in order to avoid possible electromagnetic noise. Absolutely do not introduce into the same cable ducts (included those of the electric cables) power cables and probe cables. Avoid the probe cables being installed close to power devices (contactors, magnetothermals, or other devices).
- Reduce as much as possible the course of the probe cables in order to prevent the occurrence of spiral courses enclosing power devices. To extend the probe cables, utilize cables with a minimum cross-section of 0.5mm<sup>2</sup>.
- Do not touch the electronic components mounted on the cards with your fingers in order to avoid stray currents (extremely harmful) passing from the operator to the components themselves.

**Furthermore, to respect safety regulations carefully follow the instructions below :**

- cables to be connected to the controller contacts should resist the maximum operating temperature calculated considering the expected maximum ambient temperature + the controller auto-heating equal to 20°C;
- control supply: it is necessary to protect the control with a 1A, 250V ~ fuse. An improper power supply connection can seriously damage the system.
- before carrying out the connections to the control, provide for proper protections, fuse or magnetothermal, which must be dimensioned according to the connected loads.

**Connections:**



**Description of the buttons**

The function buttons feature an easy to use format. In particular, buttons no. 1, 5, 6 can have more functions, as following described.

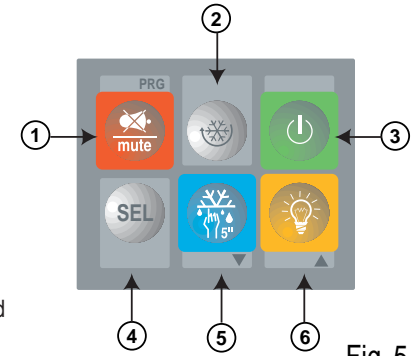


Fig. 5

- Silences the buzzer, while the alarm code remains as long as the alarm condition remains:

  - if pressed during programming, it records the new parameters and programming ends;
  - if pressed when turning On the instrument: allows selection of default parameters (see section “alarms and signalling”);
  - if pressed for more than 5 seconds: allows access to the frequent parameters selection menu;
  - if pressed for more than 5 seconds together with the SEL button: allows access to the configuration menu (see section “parameters second level”);
- if pressed for more than 5 seconds: activates/deactivates a continuous cycle, that is the forced activation of the compressor for a period to be selected (see parameter “cc” duration of continuous cycle);
- allows the switching On/Off of the refrigerating unit.

**Warning:** when the controller is OFF, all outputs, with the exception of the light button and the light output, will be deactivated and the OFF led will be flashing. It is necessary to select the ‘c2’ parameter to ensure that, between one switching Off and the following switching On, the minimum time the compressor is Off is maintained. **The ON/OFF button can be deactivated:** it is sufficient to select one digital input as remote ON/OFF (see digital input configuration page 22).
- selects the set-point (see “set-point” section);

displays the value of the selected parameter (see “parameter modification” section);

  - if pressed for more than 5 seconds together with the prg button: allows access to the configuration menu (see “parameter second level” section);
- decreases the value of data on the display during selection of set-point and parameters;

  - if pressed for more than 5 seconds: it forces a manual defrosting cycle;
- activates/deactivates the unit lights (or any other aux. output connected to the 4th relay);

increases the value of parameter on the display during selection of set-point and parameters.

**LED indicators**

- cooling on
- fan evaporator activated
- defrosting in progress
- lights ON
- ‘continuous cycle’ functioning
- unit deactivated (“OFF unit”)

If a LED flashes, refer to the section “alarms and signals” on page 25.



## Functioning


### Display

During normal functioning the display shows the value read by the ambient probe. In case of alarm the temperature values will flash alternately with the alarm code. When the controller is deactivated (OFF status) the 'OFF' led flashes while the display shows the temperature read by the probe.


### Set-Point

1. Press for one second the  button to visualise the set-point value;
2. after some seconds, the selected value will flash;


3. either increase or decrease the set-point value by pressing the buttons  and 

4. press the  button again to confirm the newly set value.

### Manual Defrosting

Press the  button for more than 5 seconds to force a defrosting cycle which will be activated only if the conditions are favourable (for example, the defrost probe should be lower than the selected defrost end temperature. For further information see the technical manual).

### Buzzer Silencing

Press the  button. Besides silencing the buzzer, the alarm relay is reset, while the alarm code remains memorised until the cause of the alarm has been removed.

### Enabling of Auxiliary Output:

Press the  button to activate/deactivate the lights or any other auxiliary output.

### Continuous Cycle


To activate the 'continuous cycle' functioning press the  button for at least 5 seconds (compressor activated for the time selected with the 'cc, parameter = duration of 'continuous cycle').

So as to deactivate the continuous cycle functioning, press the  button again for 5 seconds.






## Parameters

The parameters have been organised into two levels:

- **FIRST LEVEL: frequent parameters.** They are indicated with F in the table and the password is not necessary to gain access to them. To modify them operate as follows:

1. press the  button for about 10 seconds (in case of alarm, first silence the buzzer);
2. the display shows the code of the first parameter to be modified.
3. To modify the parameters see the "parameter modification" section .









- **SECOND LEVEL: configuration parameters.** They are indicated with C in the table and it is necessary to insert the password for any modification, as indicated here below:

1. press simultaneously the  and  buttons for about 10 seconds;
2. the display shows 00;
3. press the  and  buttons until 22 (password) is displayed;
4. confirm by pressing  button;
5. the display shows the code of the first parameter to be modified.

To modify the parameters see the following section, "parameter modification".

### Parameter Modification:

To modify a parameter operate as follows:

1. press  and/or  until the parameter to be modified is displayed (refer to the parameters table);
2. press the  button to visualise the value associated to the parameter;
3. modify its value by pressing the  and/or  buttons until the desired value is displayed;
4. press the  button to temporarily confirm the newly set value and to go back to the parameter code display;
5. repeat all operations from the point "press  and/or " to modify other parameters values;

### New Set Values Store:

Press the  button to store all new set values and exit the procedure.

**To exit without modifying parameters: do not press any button for at least 60 seconds (TIME OUT exit).**

If the button  is not pressed after modifying operations, all effected modifications will be lost

## Digital Input Configuration

Digital inputs ID1 and ID2 can take on different functioning modes according to the value given to the parameter A4 (relative to ID1 input), and to A5 (relative to ID2). The main functions are:

Value A4 / A5	Meaning	Functioning
0	Input non active	
1	Immediate external alarm	Open Contact = alarm active
2	External alarm with delay	Open contact = alarm active. Delay: see parameter A7
3	Enabling of defrost	Open contact = defrost not enabled
4	Start of defrost	Defrost is activated when the contact closes.
5	Door switch	Open contact = door open. When the door is opened the compressor and the fan are turned off. If H1=0: the Aux output is activated to switch on the lights. If the door stays open for a time longer than 'd8', the display flashes, and the control restarts the normal functioning (fan on and compressor on at the occurrence)
6	Remote On-Off	Closed contact = On. (If A4=6 and A5=6 the control is on with both contacts closed). By selecting a digital input as on/off the on/off button on the keypad is automatically inhibited.
7	Curtain switch	Contact close = curtain down. With r4=3.0 (value (pre-programmed) the set-point is increased of 3 degrees with respect to the used value with open curtain. If the auxiliary output is used for lights management, the curtain down switches automatically off the lights while the curtain up switches it on.

### Selection of Duty Setting (Parameters c4 and A6)

If the control probe alarm (E0 flashing) is activated, the parameter c4 allows the compressor to function:

- c4=value between 1 and 99: states the compressor On-time (expressed in minutes), followed by a fixed Off-time equal to 15 min;
- c4=0: compressor always Off;
- c4=100: compressor always On.

If an external alarm (IA or dA flashing) is activated on the digital input (A4=1; A4=2), the parameter A6 allows the compressor to function:

- A6= value between 1 and 99: states the compressor On-time (expressed in minutes), followed by a fixed Off-time equal to 15 min;
- A6=0: compressor always Off;
- A6=100: compressor always On.

## Table of parameters

	Parameter	Kind	Min	Max	U.M.	Def
PA	PASSWORD	C	00	+199	-	22
<b>/ PROBE PARAMETERS</b>						
/C	Ambient probe calibration	F	-20	+20	°C/°F	0.0
/2	Measurement stability	C	1	15	-	4
/3	Probe reading speed	C	1	15	-	8
/4	Probes average (see installation manual)	C	0	100	-	0
/5	°C /°F (0=°C, 1=°F)	C	0	1	flag	0
/6	Enabling of decimal point (0=yes, 1=no)	C	0	1	flag	0
<b>r CONTROL PARAMETERS</b>						
rd	Control differential (hysteresis)	F	0.1	+19.9	°C/°F	2
r1	Minimum set allowed	C	-50	r2	°C/°F	-50
r2	Maximum set allowed	C	r1	+199	°C/°F	60
r3	Enabling of Ed alarm defrost interrupted because max. duration has been reached, param. DP; (0=no, 1=yes)	C	0	1	flag	0
r4	Automatic set-point variation during night functioning (that is when the curtain switch is closed, with either A4 or A5=7)	C	0	+20	°C/°F	3.0
r5	Enabling of min./max. temp. monitoring (0=no, 1=yes)	C	0	1	flag	0
rt	Actual interval in max./min. temperature reading	F	0	199	hours	-
rH	Maximum temperature read in the rt interval	F	-	-	°C/°F	-
rL	Minimum temperature read in the rt interval	F	-	-	°C/°F	-
<b>c COMPRESSOR PARAMETERS</b>						
c0	Compressor start-up delay after unit start-up	C	0	15	min	0
c1	Minimum interval between two compressor start-up	C	0	15	min	0
c2	Minimum compressor off-time	C	0	15	min	0
c3	Minimum compressor on-time	C	0	15	min	0
c4	Relay safety (0=OFF, 100=ON). See Duty setting	C	0	100	min	0
cc	Duration of continuous cycle	C	0	15	hours	4
c6	Alarm cut-out after continuous cycle	C	0	15	hours	2
<b>d DEFROST PARAMETERS</b>						
d0	Type of defrost (0=heater, 1=hot gas, 2=water/resistance by time, 3=hot gas by time)	C	0	3	flag	0
dl	Interval between two defrost phases	F	0	199	hours	8
dt	End defrost temperature set	F	-50	+199	°C/°F	4
dP	Maximum duration of defrost or real duration for d0=2 or 3	F	1	199	min	30
d4	Defrost on unit start-up (0=no, 1=yes)	C	0	1	flag	0
d5	Defrost delay after unit start-up or digital input (A4 or A5 =4)	C	0	199	min	0
d6	Display override during defrost (0=no, 1=yes)	C	0	1	flag	1
dd	Dripping time after defrost	F	0	15	min	2
d8	Duration of alarm cut-out after defrost and, if A4 or A5=5: max. delay for compressor stop and temperature alarm	F	0	15	hours	1
d9	Defrost has priority over compressor protection (0=no, 1=yes)	C	0	1	flag	0
d/	Defrost temperature probe reading	F	-	-	°C/°F	-
dC	Time basis (0=hours/min, 1=min/s)	C	0	1	flag	0

## A ALARM PARAMETERS

A0	Alarm and fan differential	C	0.1	+20	°C/°F	0.2
AL	Low temperature alarm (indicates the max. allowed deviation from the set- point). If=0 disables the low temperature alarm	F	0	+199	°C/°F	0
AH	High temperature alarm (indicates the max. allowed deviation from the set-point). If=0 disables the high temperature alarm	F	0	+199	°C/°F	0
Ad	Temperature alarm delay	C	0	199	min	120
A4	Digital input n.1 configuration	C	0	7	-	0
A5	Digital input n.2 configuration	C	0	7	-	0
A6	Cut-out of compressor by external alarm: 0=OFF,100=ON. Enabled if either A4 or A5 is 1 or 2. See Duty setting and digital input	C	0	100	min	0
A7	Delay in registration of the input "delayed alarm" (A4 or A5=2)	C	0	199	min	0

## F FAN PARAMETERS

F0	Management of fans: 0: always activated except on specific phases (see parameters F2, F3, and Fd) 1: controlled by a thermostat according to the difference between ambient temp. and evaporator temperature 2: controlled by a thermostat according to the evaporator temperature	C	0	2	flag	0
F1	Fans ON Set-Point : F0=1 fans activated if evap. T. < (ambient T - F1-A0) and OFF if evap. T. > (ambient T. - F1) F0=2 fans ON if evap. T. < (F1-A0); and OFF with evap. T. > F1	F	-50	199	°C/°F	5
F2	Stop fans when compressor is Off (0=no,1=yes). Active if F0=0	C	0	1	flag	1
F3	Stop fans during defrost (0=no,1=yes). Active for any value of F0	C	0	1	flag	1
Fd	Stop after dripping. Active for any value of F0	F	0	15	min	1

## H OTHER SETTINGS

H0	Address within network	C	0	15	-	1
H1	Selection of AUX (light) relay functioning: 0=auxiliary output (light default) 1=alarm: normally de-energised relay 2=alarm: normally energised relay	C	0	1	flag	0
H2	0=buttons inhibited; 2=buttons & IR inhibited; 3=IR inhibited	C	0	3	flag	1
H3	Code to enable remote programming	C	00	199	-	00
H4	1=disabled buzzer	C	0	1	flag	0

**Note 1:** for parameters indicated with a grey-shaded background, it is recommended to check before installing if the default values are suitable for the required use.

**Note 2:** for the set times to become operative, the instrument must be switched OFF and ON again.

**Nota 3:** on MTCA models the following values have to be assigned to the next parameters:

- r3: must be 0
- dt: irrelevant
- d0: 2 or 3 (default: d0= 2)
- dl: 0

## Alarms and signals

### FLASHING LED: actuator set delay

Insertion of the relative function is delayed for a period while awaiting an external signal or while held up by another process still in progress.

### TEMPERATURE FLASHING: door switch broken or door open for a period longer than the d8 parameter

Close the door or check the door switch.

### E0 FLASHING: control probe error

Probe not compatible with the equipment; probe cable interrupted or short circuit.

Faulty sensor: disconnect the probe from the instrument and measure the resistance (NTC: 0°C=27K Ohms)

### E1 FLASHING: evaporator probe error

Probe not compatible with the equipment;probe cable interrupted or short circuit.

Faulty sensor: disconnect the probe from the instrument and measure the resistance (NTC: 0°C=27KΩ).

### IA FLASHING: alarm from digital input

Check 'Multi-function' inputs and parameters A4 and A5.

### dA FLASHING: delayed alarm from digital input

Check 'Multi-function' inputs and parameters A4, A5 and A7.

### LO FLASHING: low temperature alarm (temperature lower than SET-AL-A0)

Check parameters AL, Ad and A0. The alarm will cease as soon as the temperature returns within the limits selected.

### HI FLASHING: high temperature alarm (temperature higher than SET+AH+A0)


Check parameters AH, Ad and A0. The alarm will cease as soon as the temperature returns within the limits selected.

### EA, EB, EE: data acquisition error. RESET procedure

In order to restore normal working conditions, reset the default value of the parameters, using this procedure:

- turn off the control;



- press the  button and, keeping it pressed, turn on the controller;
- the display shows "-c-";
- after a few seconds, the instrument enters the RESET procedure and allows the modification of parameters;



- should EE persist, press the  button until the message disappears.

Any modification made before the reset procedure will be lost.

Now it is possible to set the instrument.

### Ed FLASHING: defrost end by timeout

- check parameters dt, dP and d4;
- check effectiveness of the defrost;
- if necessary inhibit the Ed alarm through the r3 parameter.

### dF FLASHING: defrosting in progress

This is not an alarm signal, but it indicates that the instrument is carrying out a defrost. Appears only if parameter d6=0.

## Technical Specifications

### Inputs

Temperature:	ambient probe (NTC CAREL 10K $\Omega$ a 25°C) defrost probe (NTC CAREL 10K $\Omega$ a 25°C)
Working range:	-50T50 (-50÷50 °C, -58÷+122 °F)
Precision:	±1°C
Resolution:	0.1°C (0.1°F) tra -19.9 e 19.9, 1 in the other range
Digital:	2 configurable inputs, by external dry contact (not optinsulated)

### Outputs

Models:	MTCA000000	MTCD000000	MTCD200000
Relay outputs (all):	Disconnection of type 1B according to ECC EN 60730-1		
Compressor:	SPST relay, 250Vac ~ 8A res. AC1 2A ind. AC3	SPST relay, 250Vac ~ 8A res. AC1 2A ind. AC3	SPST relay, 250Vac ~ 16A res. 70A max. (1 s) 36A max (3 s)
Defrost:		SPDT relay, 250Vac ~ 16A res. AC1 4A ind. AC3	SPDT relay, 250Vac ~ 16A res. AC1 4A ind. AC3
Fans:		SPST relay, 250Vac ~ 10A res. AC1 2A ind. AC3	SPST relay, 250Vac ~ 10A res. AC1 2A ind. AC3
Light/Aux:	SPST relay, 250Vac ~ 16A res. AC1 4A ind. AC3	SPST relay, 250Vac ~ 16A res. AC1 4A ind. AC3	SPST relay, 250Vac ~ 16A res. AC1 4A ind. AC3
Alarm output	SPDT relay, 250Vac ~ 8A res. AC1 2A ind. AC3	SPDT relay, 250Vac ~ 8A res. AC1 2A ind. AC3	SPDT relay, 250Vac ~ 8A res. AC1 2A ind. AC3

**Serial connection:** to Carel supervisory system, through external serial board IRDRSER00E

### Power supply

Voltage:	230VAC, ±15%, 50/60Hz
Consumption:	7 VA

Immunity of the device  
against voltage surges: category 3

**Parameter modification:** using keypad, IR transmitter

**Software structure:** class A

**Display:** 2 1/2 digits

### Signalling

luminous:	compressor, continuous cycle, defrost, fan, light, ON
acoustic:	alarm buzzer

### Operating conditions

Operating conditions:	0÷50°C (32÷122°F)
Storage conditions:	-30÷70°C (-22÷158°F)
Ambient relative humidity:	20÷80 % r.H. non-condensing, both when operating and in storage
Environmental pollution:	normal
Electrical stress across insulating parts:	long period utilized for continuous use
Insulation:	class II
PTI of materials used for insulation:	250V
Disposal of the product:	avoid disposing the device in domestic waste. To dispose of the device refer to the environmental protection laws in force in your country

### Mechanical characteristics:

Instrument connections:	panel or wall mounting
Containers:	plastic self-extinguishing (according to UL94-V0)
Index of protection:	IP65
Connections:	through screw terminals with a maximum section of 2.5mm <sup>2</sup> and minimum section 0.5mm <sup>2</sup>
Dimensions:	190x160x65mm
Heat and fire resistance category	D category
Number of automatic cycles for each automatic action	100,000
Ageing period (operating hours)	60,000 hours
Type of action-disconnection	1B
Probe response time	70 s. in still air

**N.B.:** when cleaning do not use ethylic alcohol, hydrocarbons (oil), ammonia and its derivatives. It is advisable to use neutral detergents and water.

**Dimensions (mm):**

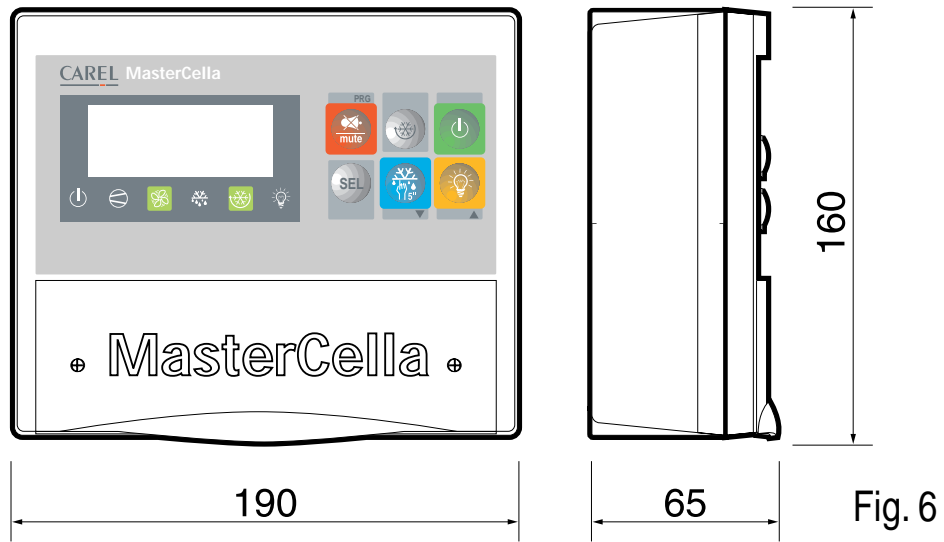


Fig. 6

**Hole dimensions for panel mounting**

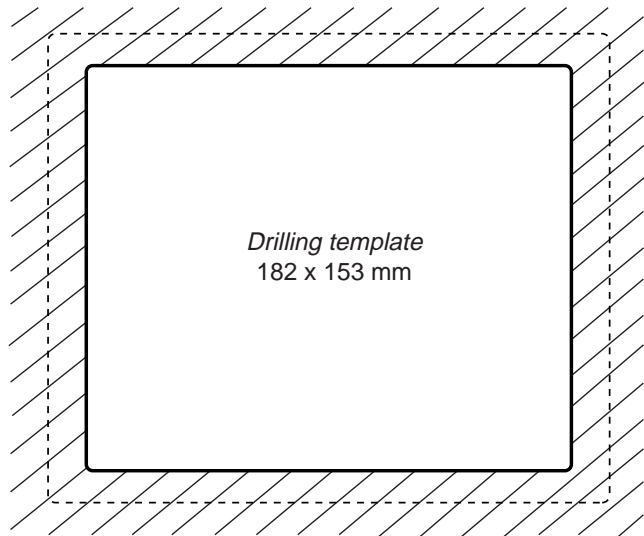


Fig. 7