thT

Electronic thermostat for residential applications

CAREL

ITA Manuale d'uso

ENG User manual

LEGGI E CONSERVA QUESTE ISTRUZIONI
READ AND SAVE THESE INSTRUCTIONS

Integrated Control Solutions For Energy Savings

AVVERTENZE

Gli umidificatori CAREL S.p.A. sono prodotti avanzati, il cui funzionamento è specificato nella documentazione tecnica fornita col prodotto o scaricabile, anche anteriormente all'acquisto, dal sito internet www.carel.com. Ogni prodotto CAREL S.p.A., in relazione al suo avanzato livello tecnologico, necessita di una fase di qualifica/configurazione/programmazione affinché possa funzionare al meglio per l'applicazione specifica. La mancanza di tale fase di studio, come indicata nel manuale, può generare malfunzionamenti nei prodotti finali di cui CAREL S.p.A. non potrà essere ritenuta responsabile.
Il cliente (costruttore, progettista o installatore dell'equipaggiamento finale) si assume ogni responsabilità e rischio in relazione alla configurazione del prodotto per il raggiungimento dei risultati previsti in relazione all'installazione e/o equipaggiamento finale specifico. CAREL S.p.A. in questo caso, previ accordi specifici, può intervenire come consulente per la buona riuscita della installazione/start-up macchina/utilizzo, ma in nessun caso può essere ritenuta responsabile per il buon funzionamento dell'umidificatore ed impianto finale qualora non siano state seguite le avvertenze o raccomandazioni descritte in questo manuale o in altra documentazione tecnica del prodotto. In particolare, senza esclusione dell'obbligo di osservare le anzidette avvertenze o raccomandazioni, per un uso corretto del prodotto si raccomanda di prestare attenzione alle seguenti avvertenze:

- **PERICOLO SCOSSE ELETTRICHE**
- L'umidificatore contiene componenti sotto tensione elettrica. Togliere l'alimentazione di rete prima di accedere a parti interne o in caso di manutenzione e durante l'installazione;
- **PERICOLO PERDITE D'ACQUA**
- l'umidificatore carica/scarica automaticamente e costantemente quantità d'acqua. Malfunzionamenti nei collegamenti o nell'umidificatore possono causare perdite;
- **Negli umidificatori isotermici: PERICOLO DI USTIONE**
- L'umidificatore contiene componenti ad alta temperatura (100°C/212°F);
- **Negli umidificatori isotermici a gas: PERICOLO FUGHE DI GAS**
- L'umidificatore è allacciato alla rete del gas. Malfunzionamenti nei collegamenti o nell'umidificatore possono causare perdite.
- L'installazione del prodotto deve obbligatoriamente comprendere una connessione di terra, utilizzando l'apposito morsetto di colore giallo-verde presente nell'umidificatore.
- Condizioni ambientali e tensione di alimentazione devono essere conformi ai valori specificati nelle etichette 'dati di targa' del prodotto.
- Il prodotto è progettato esclusivamente per umidificare ambienti in modo diretto o mediante sistemi di distribuzione (condotte). Inoltre per gli umidificatori-adiabatici-atomizzatori-ad-acqua-in-pressione è prevista anche l'umidificazione attraverso il telaio di atomizzazione.
- Installazione, utilizzo e manutenzione devono essere eseguite da personale qualificato, consapevole delle precauzioni necessarie e in grado di effettuare correttamente le operazioni richieste.
- Per la produzione di vapore si deve utilizzare esclusivamente acqua con caratteristiche indicate nel presente manuale.
- Attenzione, in caso di umidificatori-adiabatici-atomizzatori-ad-acqua-in-pressione è obbligatorio utilizzare acqua potabile demineralizzata (come specificato nel manuale). Inoltre, è necessario raccogliere le particelle d'acqua non assorbite dall'aria, attraverso la vasca raccogligoccia (nella parte di umidificazione) e il separatore di gocce (nella parte di fine umidificazione).
- Tutte le operazioni sul prodotto devo essere eseguite secondo le istruzioni contenute nel presente manuale e nelle etichette applicate al prodotto. Usi e modifiche non autorizzati dal produttore sono da considerarsi impropri. CAREL S.p.A. non si assume alcuna responsabilità per tali utilizzi non autorizzati.
- Non tentare di aprire l'umidificatore in modi diversi da quelli indicati nel manuale.
- Attenersi alle normative vigenti nel luogo in cui si installa l'umidificatore.
- Tenere l'umidificatore fuori dalla portata di bambini e animali.
- Non installare e utilizzare il prodotto nelle vicinanze di oggetti che possono danneggiarsi a contatto con l'acqua (o condensa d'acqua). CAREL S.p.A. declina ogni responsabilità per danni conseguiti o diretti a seguito di perdite d'acqua dell'umidificatore.
- Non utilizzare prodotti chimici corrosivi, solventi o detergenti aggressivi per pulire le parti Interne ed esterne dell'umidificatore, salvo non vi siano indicazioni specifiche nei manuali d'uso.
- Non fare cadere, battere o scuotere l'umidificatore, poiché le parti interne e di rivestimento potrebbero subire danni irreparabili.
- Per prodotti umidificatori-adiabatici-atomizzatori-ad-acqua-in-pressione: la distribuzione dell'acqua atomizzata deve essere condotta attraverso apposito 'rack' di atomizzazione o attraverso sistemi di distribuzione previsti da CAREL S.p.A.
- Per i prodotti isotermici: sono progettati per produrre vapore a pressione atmosferica, e non vapore in pressione. CAREL S.p.A. sconsiglia e declina ogni responsabilità per l'uso di dispositivi di distribuzione diversi da quelli previsti.

CAREL S.p.A. adotta una politica di continuo sviluppo. Pertanto si riserva il diritto di effettuare modifiche e miglioramenti a qualsiasi prodotto descritto nel presente documento senza preavviso. I dati tecnici presenti nel manuale possono subire modifiche senza obbligo di preavviso.
La responsabilità di CAREL S.p.A. in relazione al proprio prodotto è regolata dalle condizioni generali di contratto CAREL S.p.A. pubblicate nel sito www.carel.com e/o da specifici accordi con i clienti; in particolare, nella misura consentita dalla normativa applicabile, in nessun caso CAREL S.p.A., i suoi dipendenti o le sue filiali/ affiliate saranno responsabili di eventuali mancati guadagni o vendite, perdite di dati e di informazioni, costi di merci o servizi sostitutivi, danni a cose o persone, interruzioni di attività, o eventuali danni diretti, indiretti, incidentali, patrimoniali, di copertura, punitivi, speciali o consequenziali in qualunque modo causati, siano essi contrattuali, extra contrattuali o dovuti a negligenza o altra responsabilità derivanti dall' utilizzo del prodotto o dalla sua installazione, anche se CAREL S.p.A. o le sue filiali/ affiliate siano state avvisate della possibilità di danni.

SMALTIMENTO

L'umidificatore è composto da parti di metallo e parti di plastica. In riferimento alla Direttiva 2002/96/CE del Parlamento Europeo e del Consiglio del 27 gennaio 2003 e alle relative normative nazionali di attuazione, Vi informiamo che:

1. sussiste l'obbligo di non smaltire i RAEE come rifiuti urbani e di effettuare, per detti rifiuti, una raccolta separata;
2. per lo smaltimento vanno utilizzati i sistemi di raccolta pubblici o privati previsti dalla leggi locali. È inoltre possibile riconsegnare al distributore l'apparecchiatura a fine vita in caso di acquisto di una nuova;
3. questa apparecchiatura può contenere sostanze pericolose: un uso improprio o uno smaltimento non corretto potrebbe avere effetti negativi sulla salute umana e sull'ambiente;
4. il simbolo (contenitore di spazzatura su ruote barrato) riportato sul prodotto o sulla confezione e sul foglio istruzioni indica che l'apparecchiatura è stata immessa sul mercato dopo il 13 Agosto 2005 e che deve essere oggetto di raccolta separata;
5. in caso di smaltimento abusivo dei rifiuti elettrici ed elettronici sono previste sanzioni stabilite dalle vigenti normative locali in materia di smaltimento.

Garanzia sui materiali: 2 anni (dalla data di produzione, escluse le parti di consumo).

Omologazioni: la qualità e la sicurezza dei prodotti CAREL S.P.A. sono garantite dal sistema di progettazione e produzione certificato ISO 9001, nonché dai marchi (inserire marchi specifici del prodotto).

Content

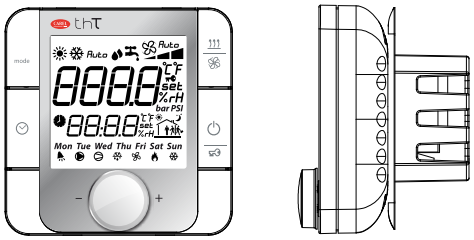
1. GENERAL FEATURES

ThT Thermostat is the CAREL room thermostat that allows users to control the temperature in residential or light commercial environments, providing of simplified interface that is ideal for end users. Temperature set is simple and intuitive, using the knob on the front panel. thT also allows the user to make some settings, such as the operating mode and time bands. Compact dimensions and elegant design make it suitable for all types of rooms, as well as being ideal both as a simplified HMI (Human Unit Interface) for heat pumps, rooftop units, AHUs, etc. and as zone controller display for centralised systems.
The RS485 serial connection over Modbus® protocol means architecture can be implemented in which multiple displays are connected to a controller to create synergic control logic with programmable controllers.
It can works in stand–alone mode as ambient thermostat or connected to programmable controllers as zone control in the radiator systems too.
Depending on the model, thT thermostat is fitted for Flush or Wall mounting and power supply is 230 Vac.
A temperature sensor is available in all models in order to manage the comfort in the residential ambient, and a Humidity sensor only on specific models.
thT is compatible with the main flush mount distribution boxes available on the market.

1.1 Models

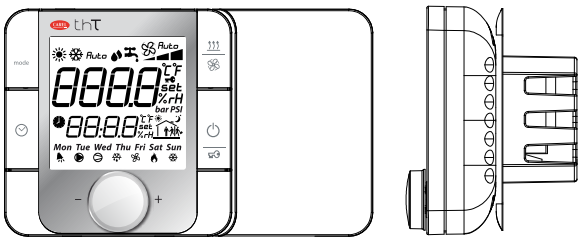
Codes FLUSH MOUNTING:

THB000AAF0	tht thermostat temperature - flush mounting - neutral version
THB000ACF0	tht thermostat temperature and humidity - flush mounting - neutral version



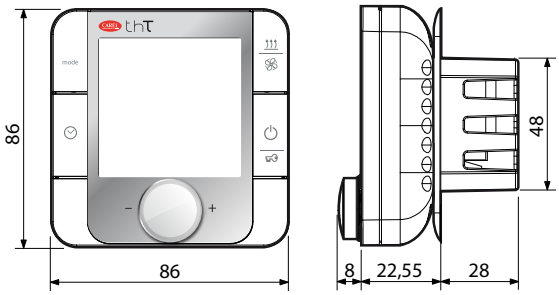
Codes WALL MOUNTING:

THB000AAW0	tht thermostat temperature - wall mounting - neutral version
THB000ACW0	tht thermostat temperature and humidity - wall mounting - neutral version

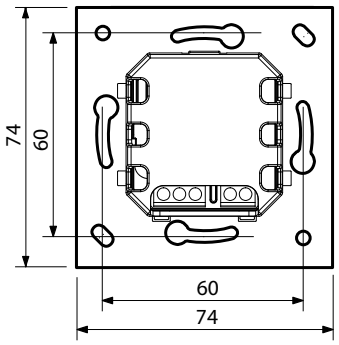


1.2 Dimensioni

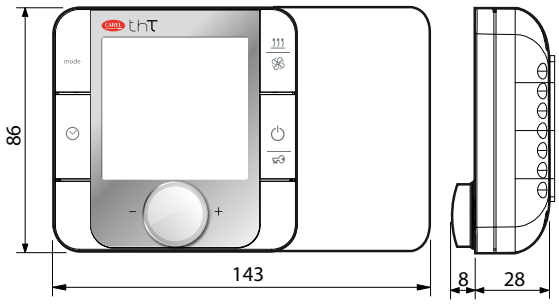
Dimension flush mounting



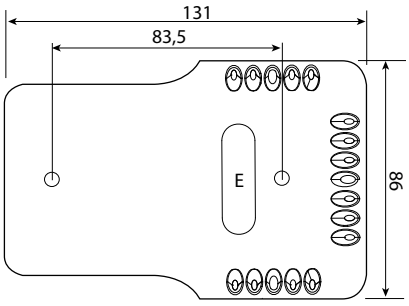
Dimensions of rear part (mm)



Dimension wall mounting



Dimensions of rear part (mm)



Installation warnings

- These thT thermostats have been designed for wall or flush mount assembly, on distribution boxes compliant with the standards in force;
- before performing any operations on the thermostat, disconnect the power supply from the device by switching the main switch on the electrical panel OFF. Then remove the front part of the thermostat from the rear to make the electrical connections;

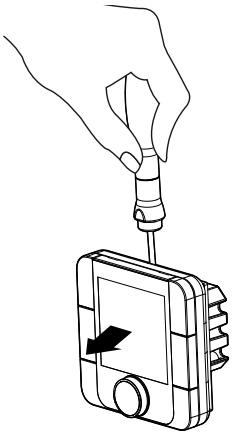
- for the serial connection use three-wire shielded cable, AWG 20-22. The length of the network must not exceed 500 m. For extended networks fit a 120 Ohm resistor between RX/TX+ and RX/TX- on the first and last device, to avoid possible communication problems.

Assembly for the flush mounting

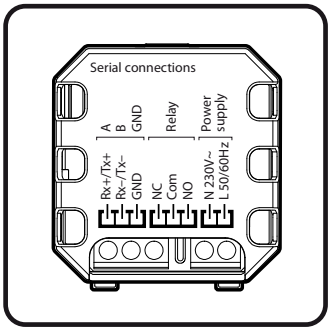
To fit the rear part of the terminal use a flush mount box with a min. diameter of 65 mm and a minimum depth of 31 mm.

1. Detach the front from the rear of the thT thermostat using a screwdriver;
2. Make the electrical connections according with the schematic;
3. Fasten the rear to the flush mount box using the 2 screws supplied:
4. Finally reposition the thT thermostat the original position and ensure to fix it with clicks into place.

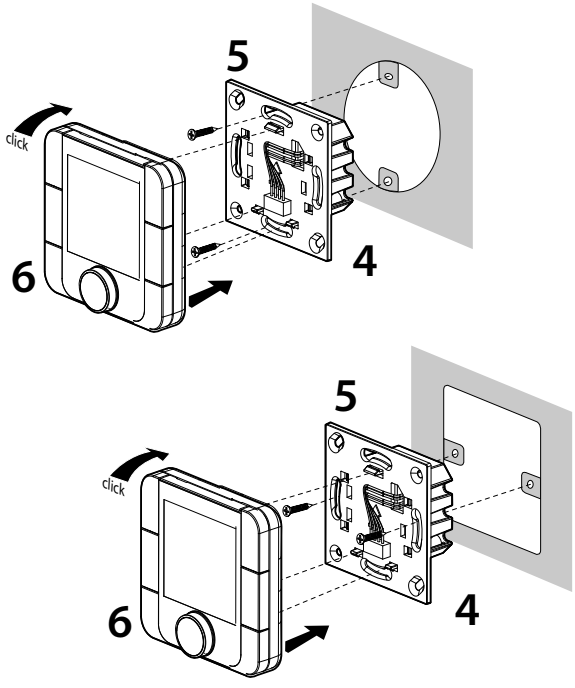
Dismantling



Wiring



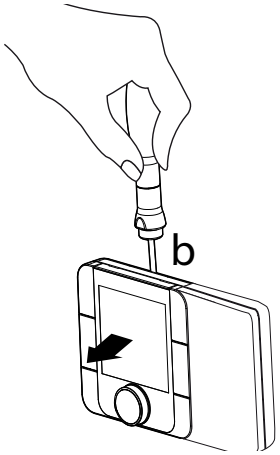
Exploded



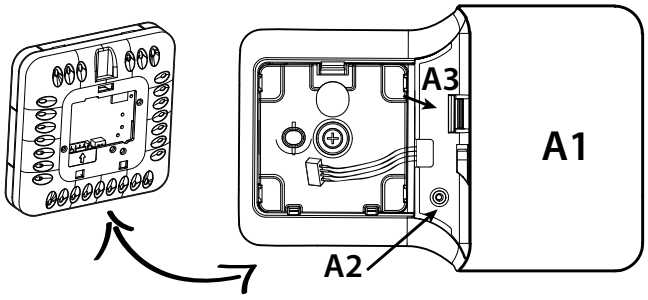
Assembly for the wall mounting

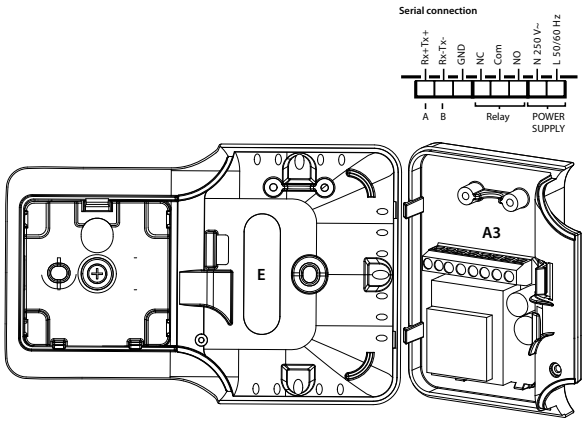
1. Separate the front from the rear of the terminal using a screwdriver;
2. To remove cover A1, unscrew screw A2 and press the point of attachment; access terminal block A3;
3. Drill the holes in the wall (dia. 5 mm); then insert the plugs and screws supplied, making sure that the electrical wires pass through hole E;
4. Make the electrical connections according with the schematic;
5. Close cover A1, completing the same operations as described above in reverse;
6. Finally reposition the thT thermostat the original position and ensure to fix it with clicks into place.

Dismantling



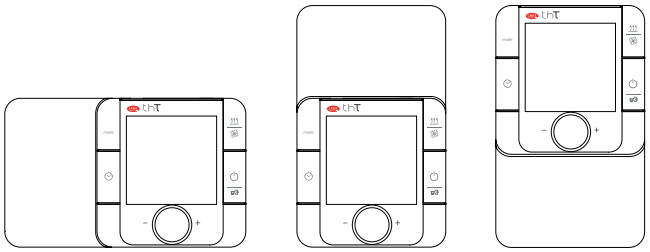
Cover dismantling





Is It Possible to change the rotation of the display moving the base in the other three possible positions:

1. remove the screw;
2. remove the base;
3. turn the base and place it in the right position;
4. tighten the screw;



Dismantling

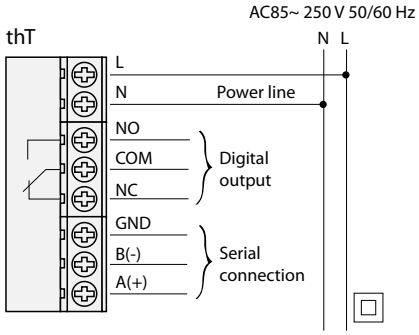
Insert a screwdriver into the clot at the top and press downwards to detach the display.

General notes

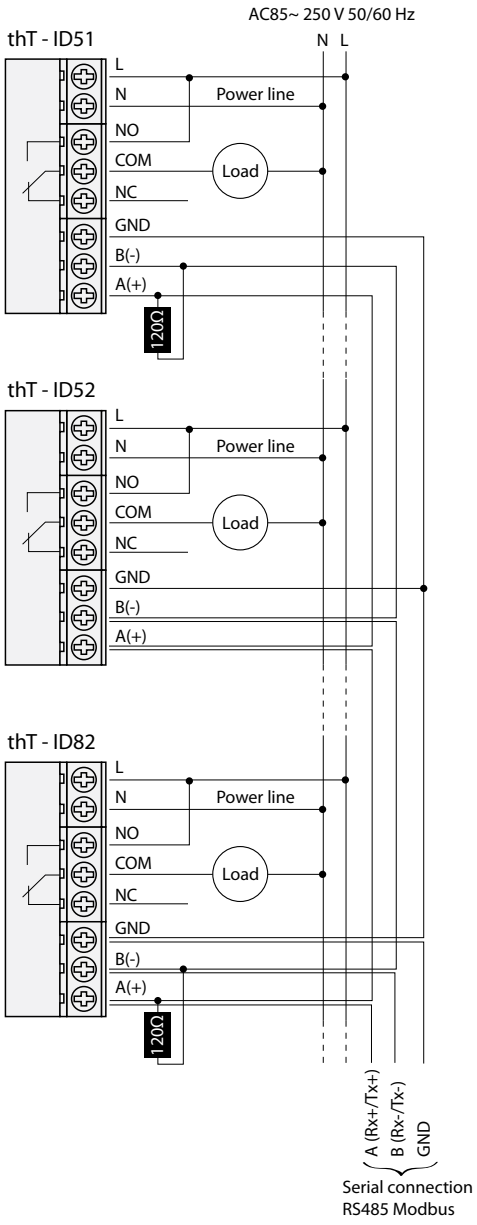
Avoid installing the terminal in environments with the following characteristics:

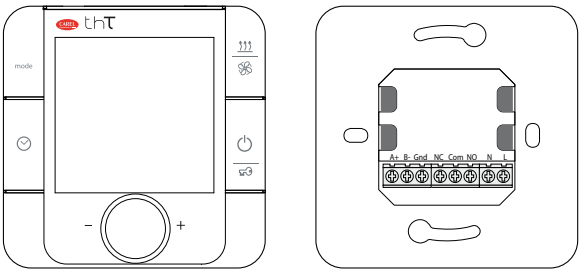
- relative humidity greater than the value specified;
- strong vibrations or knocks;
- exposure to water sprays;
- exposure to aggressive and polluting atmospheres (e.g.: sulphur and ammonia fumes, saline mist, smoke) so as to avoid corrosion and/or oxidation;
- strong magnetic and/or radio frequency interference (for example, near transmitting antenna);
- exposure to direct sunlight or the elements in general;
- large and rapid fluctuations in the room temperature;
- environments where explosives or mixes of flammable gases are present;
- exposure to dust (formation of corrosive patina with possible oxidation and reduction of insulation).

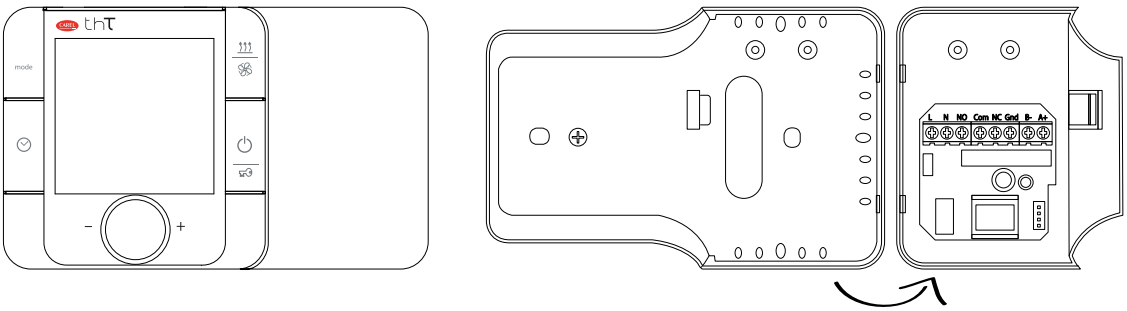
Electrical connections



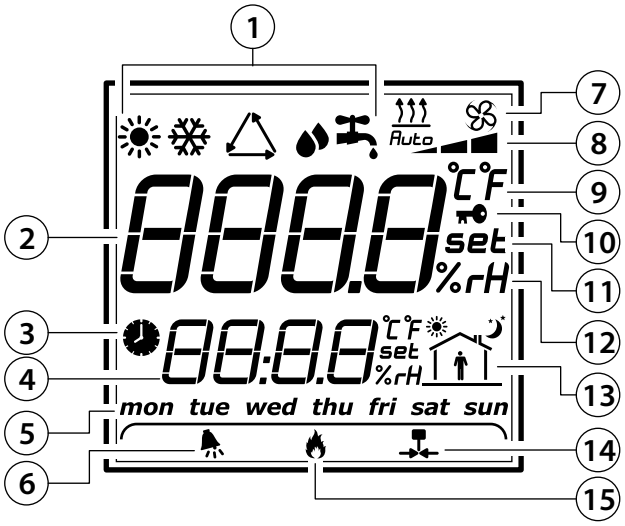
Example of network connections







Display



Key:

1. Operating mode
2. Main field
3. Time Band active
4. Secondary field
5. Day of week
6. Alarm
7. Fan/Heating function
8. Fan speed/Forced heating time
9. Temperature unit
10. Key locked
11. Set point
12. Humidity
13. Current time band
14. Valve on
15. Forced heating

Key Function

Key	Description	Function
mode	Select mode	Press shortly, you can select different mode you need.
	Check humidity	Press for 3 seconds, you can check the current humidity with the display "XX%rH", if there is no humidity sensor, the display will show "no H"
	Fan	If it is Fan key, you can select different fan speed by pressing it.
	Heating	If it is Heating key, you can select force heating time by pressing it.
	Clock	Press shortly, you can enable time band, Eco or Party, and cancel them. Press for 3 seconds, you can select clock setting, time band setting, Eco set point or Party set point.
	On/Off key	Press shortly, you can turn on/off the thermostat.
	Lock key	Press 3 seconds, you can lock/unlock all the keys.
	Knob	By rotating the knob, you can adjust the parameter or set point.
mode +	Parameter setting	If you want to set parameter, you can operate as following a. turn off the thermostat b. press and hold "mode +" for 5 seconds c. rotate the knob, set the password to 22 d. select parameter and change its value by rotating and press the knob.
		Exit form menu: • Waiting 20s without any operation; • Confirm with any of the 4 key pressed;

Humidity Check

Turn on the thermostat (model with humidity version), press and hold "mode" for 3 seconds, the LCD will display "%rH value", if thT is only temperature sensor (no humidity), the display will show "no H".

Key Fan/Heating

The key " " is configured as Fan ( ) or Heating ( ) mode according with parameter FH (Fan – Heating).

- FH = 00 -> Fan
- FH = 01 -> Heating

This information is sent by modbus (Coil 53).

When "FH" = 0

Pressing the button , we can select the desired speed (min, med, max) or automatic (Auto) and send this information through Modbus RTU (Register 7)

Min speed fan

Medium speed fan

Maximum speed fan

Auto speed fan

When "FH" = 1

The button is configured for managing heating device, pressing it we can select the time where the unit will be forced 100% (20, 40 or 60 min). This information is sent by Modbus RTU (Register 8)

Pressing the button, we can set the desired time of heating forced. Every press of the button, increment the time to: 20, 40, 60 min, and on the display will be shown.

20 min

40 min

60 min

When relay is active the icon is shown.

- If "FS" parameter is = 0 (thermostat control), the fan / heating button status is decided by thermostat.
- If "FS" parameter is = 1 (supervisor control) and "FH" = 0, the button is configured as "fan speed button" and status is decided by supervisor (Registers 70).
- If "FS" parameter is = 1 (supervisor control) and "FH" = 1, the button is configured as "heating button" and status is decided by supervisor (Registers 71).

Clock Setting

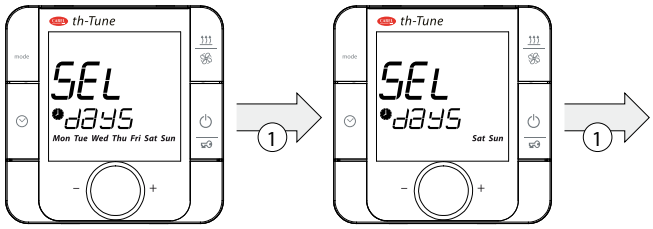
Turn on the thermostat, press and hold " " for 5 seconds, the secondary field display "hh:mm", now , press " " ,

- hh blinking, rotate the knob to adjust the hour and press it to confirm,
- then the mm blinking, rotate the knob to adjust the minute and press it to confirm,
- then the day of week blinking, rotate the knob to adjust the day and press it to confirm.

Time Band Setting

Turn on the thermostat, press and hold " " for 5 seconds, rotate the knob, when the secondary field display "F5-2", press it. Now, you can set the time band as following:

- Select workday or weekend by rotating the knob and confirm by pressing it.



5 days 2 days

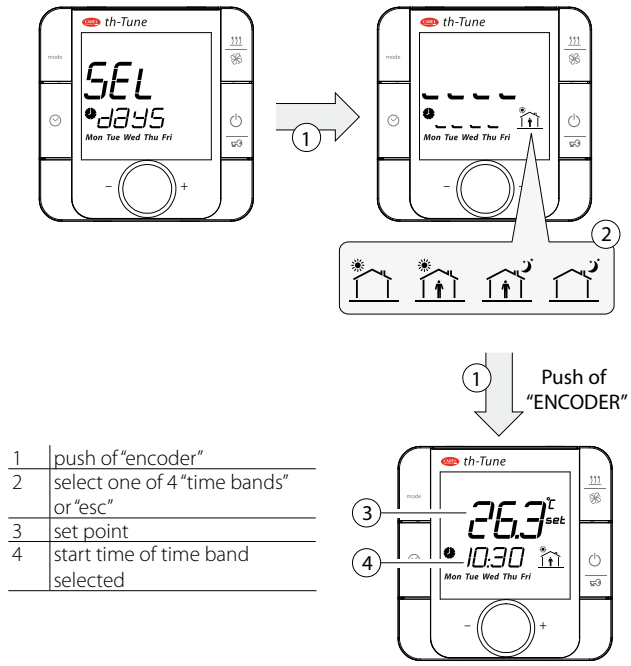
1. "encoder" rotation

- Select one time band by rotating the knob and confirm by pressing it.
- Adjust the start time by rotating the knob and confirm by pressing it.
- Adjust the set point by rotating the knob and confirm by pressing it.

The default value in the thermostat is following:

	time 1	time 2	time 3	time 4
working day/ weekend	Start/St	Start/St	Start/St	Start/St
Working (mon-friday)	7:00/15.0	17:00/22.0	21:00/20.0	22:00/18.0
Weekend (sat-sun)	7:00/22.0	09:00/20.0	17:00/22.0	22:00/18.0

Note: the sequence of time bands is fixed and it is possible to view and finish it only following this sequence (i.e. to go back it's necessary to keep rotating the encoder to start again and repeat from the beginning.



1	push of "encoder"
2	select one of 4 "time bands" or "esc"
3	set point
4	start time of time band selected

Note: information "hh", "mm" and "week" is sent by modbus RS485:

- hh - Register 6
- mm - Register 7
- day - Register 8

Time band/Eco/Party function selection

Turn on the thermostat, press the " ", you can select the function. What functions are availably depends on the value of "tE".

Eco Setting

Activating this function it is possible have a different, predefined temperature lower than set point in save energy mode.

Turn on the thermostat, press and hold " " for 5 seconds, rotate the knob, when the secondary field display "F Lo", press it. Now, you can set the Eco set point by rotating the knob and confirm by pressing it.
Eco set point is -3°C in winter and +3°C in summer time.
"eco setpoint" information is sent by modbus RS485 (Register 52)

Party Setting

Activating this function it is possible have a different, predefined temperature higher than set point to activate in extraordinary situation.

Turn on the thermostat, press and hold " " for 5 seconds, rotate the knob, when the secondary field display "F Hi", press it. Now, you can set the Party set point by rotating the knob and confirm by pressing it.

Set point

Turn on the thermostat, turn right the knob, increase the set point, turn left the knob, reduce the set point in step of 0.5 °C.

Differential

To enable this operation, enter in the dF (differential) menu and select the new value with step 0,5. (0,5 – 1,0 – 1,5 – 2,0 °C).

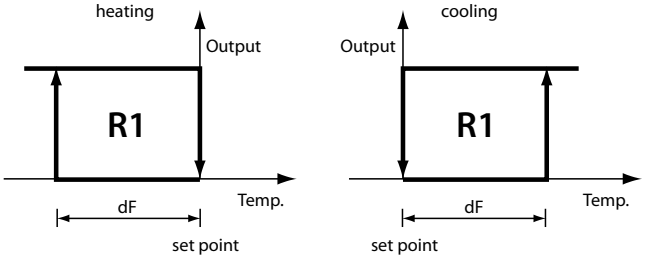
Output Control

The control mode is available in both cooling and heating mode and it is managed by user.

- Winner set point (icon on LCD display " ")
- Summer Set point (icon on LCD " ")

dF (differential) is a parameter to set in the parameter set menu and it is a relay differential in cooling/heating mode.

Regulation is based on embedded temperature sensor. The set points need to be defined.



Parameter Setting

Turn off the thermostat, press and hold "mode + " for 5 seconds, insert the password and press the knob to confirm. The parameter list is following.

LCD display	Description	Default value	Note
PS	Password	00	Password is: 22
FH	FAN/HEATING configuration	00	• 00:FAN • 01:HEATING
Co	Configuration "mode" button	3	Range 1 to 511
tC	Temperature sensor calibration	0.0 °C	-5.0 to 5.0 °C
HC	Humidity sensor calibration	0.0% rH	-10.0% to 10.0% rH
FE	Frost mode enable	01	• 00:Disable • 01:Enable
Ft	Frost temperature	5.0 °C	5 to 17 °C
Id	BMS address	51	51 to 82
Br	Baud rate	00	• 00:19200 • 01:9600 • 02:4800
bE	Buzzer Enable	01	• 00:Disable • 01:Enable
dF	Differential	0.5 °C	• 0.5 °C • 1.0 °C • 1.5 °C • 2.0 °C
LE	Key Lock Enable	0	• 00:Disable • 01:Enable
rC	Relay management	00	• 00:Automayic • 01:Manual
Ar	Auto recovery	01	fixed
tE	Configuration clock button	07	01 to 07
tM	ON/OFF button by	00	• 00:Thermostat • 01:RS485
IE	Number of variables to show on display	00	00 to 05
dS	Mode button by	00	• 00:Thermostat • 01:RS485
FS	FAN/HEATING button by	00	• 00:Thermostat • 01:RS485

Temperature sensor calibration

To adjust the temperature calibration, enter in the TC (Temperature Calibration) menu. The minimum temperature sensor variations by rotary encoder is ± 0,1 K from -5 to +5 °C;

Humidity sensor calibration

Available only for the models with humidity sensor. To adjust the humidity calibration, enter in the HC (Humidity Calibration) menu.
The minimum humidity sensor variations by rotary encoder is ± 0,1 rH% from -10 to +10 rH%;

Frost mode

If enable the frost function (FE - Frost Enable set to 01), when the thermostat is turned off, and the temperature is lower than "Ft", the output will switch on the relay, and the LCD display "❄"; when the temperature is up to "Ft+2" °C, the output will switch off the relay with the "❄" disappear.

Frost temperature

To enable this operation, enter in the Ft (Frost temperature) menu and select the new value from 5,0 to 17,0 °C.

Buzzer enable

To enable this operation, enter in the BE (Buzzer Enable) menu and confirm:
- 0= Disable;
- 1= Enable;

Key Lock

To enable this operation, enter in the LE (Lock Enable) menu and confirm the new value
- 0 = Disable;
- 1 = Enable;

Auto recovery

For internal use. It is fix to 1;

Key Clock

To select the sequence of icons to show on display, enter in the Parameters Menu and configure the parameter "tE" and with rotary encoder select the new value turning right or left, then press "  " to confirm.

The symbols can be turn on separately or in pairs and the sequence is defined setting to "1" the different bits of configuration parameter.

Bit Number	Value	Symbol	Action
00	0 / 1	+ Act time band icon	Enable Time Band
01	0 / 1		Eco set point enable
02	0 / 1		Party set point enable

Example:
If bits 00, 01 and 02 are set to "1" the configuration variable value = 7 (converted binary code to decimal code) and the sequence pressing "clock" button is:
No Time Band -> -> -> and act band icon
(no icon shown)

Pressing the button, we can select the desired time band.
The logic is to change the different time bands pressing the button and the related cycle can manage 4 different choices :
1. No Time Band (no icons shown)
2. Time Band (icons activated are "" and the icon related to actual time band)
3. Eco (icon activated is "")
4. Party (icon activated is "")

ON/OFF the thermostat

The thermostat on-off is managed by thermostat or by supervisor. The choice is decided in parameters menu (parameter "tm").
If "tM" parameter is = 0 (thermostat control)
Press "⏻" to turn on, press "⏻" again to turn off thermostat and its output.
If "tM" parameter is= 1 (supervisor control) -> Coil 58
The thermostat on-off is decided by supervisor (Coil 50).
The On-off status is sent by RS485 (Coil 8).

Alarm

When there is one of the follow alarm, display will show the error code on LCD will buzzer switch on (in accord with the parameter bE - Buzzer enable). And relay output will be closed with "🔔" appear.

LCD abbreviation	Alarm
E1	Sensor short circuit alarm
E2	Sensor open circuit alarm
EE	eeprom fault
HI	Temperature higher than 55 °C
LO	Temperature lower than 0 °C
AC	Clock alarm

cn message on display

After power on, the first 30 s once data traffic is detected, this thermostat will be recognized as network mode. When communication drops off or cable is cut or disconnected and is 30s timeout in the second field of the display it will blink between "CN" message and clock (10 seconds for clock and 2 seconds for CN).

1.3 Technical specifications

Power supply	From 85 to 260 Vac, 50/60 Hz
Power consumption	2 VA
Operating Conditions	0 up to +45 °C
5% up to 90% rH	
Storage conditions	-10 up to +55 °C
5% up to 90% rH	
Index of protection	IP 20
Display	LCD (white backlight)
Temperature value displayed	-10 ÷ 60 °C -> ± 0,1 K
Precision of temperature measurement	0 up to 45 °C -> ± 0,5 K
Precision of humidity measurement	20 to 80% rH: ±5% rH
Current load relay	Max 5 A (Resistive) / 2 A (Inductive)
Norm	according to EN60730 – Category II
	REACH Compliant
	RoHS Compliant
Data stored	3 years
Type of relay	SPDT (N.O / N.C.)
Voltage relay	230 Vac

RS485 Connections

RS485 serial: AWG 20 to 22, shielded cable, Lmax=500 m
Power supply: Cross-section of the wires: 0.5 mm2 to 1.5 mm2

Comunication mode

Protocol type: RTU
Data bit: 8
Stop bit: 2
Parity: None

BMS Baud rate

To enable this operation, enter in the Br (Baud rate) menu and confirm the Baud rate:

- 0= 19200 (default)
- 1= 9600
- 2= 4800

RS485 Address Set

To enable this operation, select the Id (Identify device) parameter to confirm the thermostat RS485 address.
It is possible connect up to 32 thermostats. The serial address defined in the range 51 to 82 (Default 51).

Summary table of operating parameters

Coils List

Address	Type	R or R/W	Variable Description	Data interpretation
1	Coil	R	Probe - Short circuit	0 normal 1 fault
2	Coil	R	Probe - Open circuit	0 normal 1 fault
3	Coil	R	E^2 Fault	0 normal 1 fault
4	Coil	R	High temperature alarm	0 normal 1 fault
5	Coil	R	Low temperature alarm	0 normal 1 fault
6	Coil	R	Alarm Status	0: No Alarms 1: Alarm
7	Coil	R	On/Off Status	0: Off 1: On
8	Coil	R	Thermostat On/Off Status	0: Off 1: On
50	Coil	R / W	Thermostat on-off control	0: Off 1: On
51	Coil	R / W	Relay management configuration	0:automatic (default) 1:manual
52	Coil	R / W	Relay regulation in manual mode	0: Off 1: On
53	Coil	R / W	Fan / Heating button configuration	0: Fan 1: Heating
54	Coil	R / W	Frost mode enable	0: Off 1: Enabled
55	Coil	R / W	Keys lock function enable	0: Off 1: Enabled
56	Coil	R / W	Buzzer enable	0: Off 1: Enabled
57	Coil	R / W	Time band enable	0: Off 1: Enabled
58	Coil	R / W	Thermostat on-off selection	0: Off 1: On
59	Coil	R / W	Mode button selection	0: by Thermostat 1: by Serial line RS485
60	Coil	R / W	Fan / Heating - button selection	0: by Thermostat 1: by Serial line RS485

Holding registers / Input registers Commands

Address	Type	R or R/W	Variable Description	Data interpretation
1	Register	R	Machine code	Fixed to 314
2	Register	R	Hardware and Firmware revision	01.01
3	Register	R	Firmware release	Depends on firmware release (e.g.:10 for firmware 1.0)
4	Register	R	Room Temperature	Temperature value (0T60 °C)
5	Register	R	Room Humidity	
6	Register	R	Mode Status	Variable value
7	Register	R	Fan mode	00 High 01 Med 02 Low 03 Auto
8	Register	R	Heating mode	00 Disabled 01 20 minutes 02 40 minutes 03 60 minutes
9	Register	R / W	Hour (setting)	From 0 to 23
10	Register	R / W	Minute (setting)	From 00 to 59
11	Register	R / W	Day of the week (setting)	0= Sunday … 6= Saturday
51	Register	R / W	Temperature Set point	Temperature value (5,0…35,0 °C)
52	Register	R / W	Eco Set point	Temperature value (from 5,0 to 35,0 °C)
53	Register	R / W	Party Set point	Temperature value (from 5,0 to 35.0 °C)
54	Register	R / W	Mode button Configuration	Integer value
55	Register	R / W	Clock button Configuration	Integer value
56	Register	R / W	Temperature sensor calibration	Temperature value (from -5.0 to +5,0 °C)
57	Register	R / W	Humidity sensor calibration	Humidity value (from -10,0 to +10,0 rH%)
58	Register	R / W	Differential	0,5-1,0-1,5-2,0 °C
59	Register	R / W	Frost temperature	From 5 to 17 °C
60	Register	R / W	Information menu setting	From 0 to 5
61	Register	R / W	Information menu – variable 1 value	
62	Register	R / W	Information menu – variable 2 value	
63	Register	R / W	Information menu – variable 3 value	
64	Register	R / W	Information menu – variable 4 value	
65	Register	R / W	Information menu – variable 5 value	
69	Register	R / W	Mode button setting	
70	Register	R / W	Fan button setting	00 High 01 Med 02 Low 03 Auto

Address	Type	R or R/W	Variable Description	Data interpretation
71	Register	R / W	Heating button setting	00 Disabled 01 20 minutes 02 40 minutes 03 60 minutes
101	Register	R / W	hh Time 1 Monday-Friday	00 - 24
102	Register	R / W	mm Time 1 Monday-Friday	00 - 59
103	Register	R / W	Set point Time 1 Monday-Friday	5,0 – 35,0
104	Register	R / W	hh Time 2 Monday-Friday	00 - 24
105	Register	R / W	mm Time 2 Monday-Friday	00 - 59
106	Register	R / W	Set point Time 2 Monday-Friday	5,0 – 35,0
107	Register	R / W	hh Time 3 Monday-Friday	00 - 24
108	Register	R / W	mm Time 3 Monday-Friday	00 - 59
109	Register	R / W	Set point Time 3 Monday-Friday	5,0 – 35,0
110	Register	R / W	hh Time 4 Monday-Friday	00 - 24
111	Register	R / W	mm Time 4 Monday-Friday	00 - 59
112	Register	R / W	Set point Time 4 Monday-Friday	5,0 – 35,0
113	Register	R / W	hh Time 1 Saturday-Sunday	00 - 24
114	Register	R / W	mm Time 1 Saturday-Sunday	00 - 59
115	Register	R / W	Set point Time 1 Saturday- Sunday	5,0 – 35,0
116	Register	R / W	hh Time 2 Saturday-Sunday	00 - 24
117	Register	R / W	mm Time 2 Saturday-Sunday	00 - 59
118	Register	R / W	Set point Time 2 Saturday- Sunday	5,0 – 35,0
119	Register	R / W	hh Time 3 Saturday-Sunday	00 - 24
120	Register	R / W	mm Time 3 Saturday-Sunday	00 - 59
121	Register	R / W	Set point Time 3 Saturday- Sunday	5,0 – 35,0
122	Register	R / W	hh Time 4 Saturday-Sunday	00 - 24
123	Register	R / W	mm Time 4 Saturday-Sunday	00 - 59
124	Register	R / W	Set point Time 4 Saturday- Sunday	5,0 – 35,0

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