



FA01649-EN



TH/650 WH
TH/650 BK

USE AND INSTALLATION MANUAL

GENERAL PRECAUTIONS FOR INSTALLERS

Important safety instructions. PLEASE READ CAREFULLY. • Installation, programming, commissioning and maintenance must only be carried out by qualified, expert staff and in full compliance with the applicable law. • The installer must ensure that the information for the user, where there is any, is provided and delivered. • Wear anti-static clothing and footwear if performing work on the circuit board. • Before carrying out any cleaning or maintenance, disconnect the device from the power supply. • Only use this product for its intended purpose. Any other use is hazardous. • Came S.p.A. is not liable for any damage caused by improper, erroneous or unreasonable use. • Only use soft, dry or slightly damp cloths to clean the device. Do not use any chemical products. • Do not obstruct the ventilation or heat dissipation vents or slots. • Keep this information. • Do not expose the LCD screen to direct sunlight. • Install the unit in a position which is suitable for correctly measuring the room temperature, preferably on an internal wall. Avoid installing in alcoves, behind doors or curtains, or near heat sources. • Install the device on a flat surface and do not overtighten the screws.

Legislative references

This product complies with the applicable standards in force at the time of manufacturing.

Dismantling and disposal. Dispose of the packaging and the device responsibly at the end of its life cycle, in compliance with the laws in force in the country where the product is used. The recyclable components are marked with a symbol and the material ID marker.

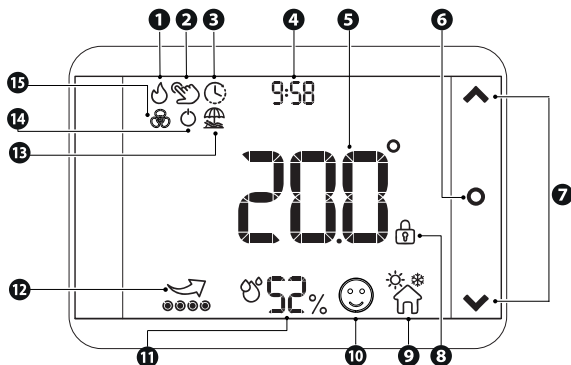
DESCRIPTION

845AA-0160

TH/650 WH Programmable thermostat with soft-touch keys, recess-mounted, white.
Power supply 230 V AC.

845AA-0170

TH/650 BK Programmable thermostat with soft-touch keys, recess-mounted, black. Power supply 230 V AC.



- 1 Heating system in operation
- 2 Thermal zone in manual mode
- 3 Thermal zone in automatic mode
- 4 Clock
- 5 Internal temperature
- 6 Change mode key
- 7 Navigation keys
- 8 Screen lock on
- 9 Heating or cooling mode

- 10 Comfort level

The level of comfort depends on the temperature, humidity and time of year.

- 11 Internal humidity
- 12 Thermal zone in BOOST mode
- 13 Thermal zone in holiday mode
- 14 Thermal zone off
- 15 Cooling system in operation

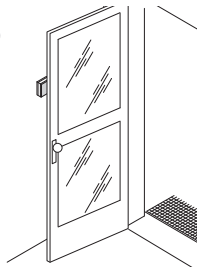
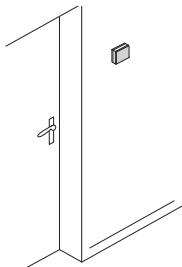
If the programmable thermostat is in standby, tap one of the keys to reactivate it.

Technical data

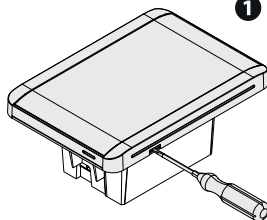
MODELS	TH/650 WH	TH/650 BK
Protection rating (IP)	30	
Power supply (V)	230 AC	
Frequency (Hz)	50/60	
Maximum absorption (mA)	20	
Autonomous life without power supply (hours)	4	
Operating temperature (°C)	0-40	
Maximum relative operating humidity (%)	93 No condensation	
Regulatory compliance	LV Directive, EMC Directive.	
Software class	A	
Energy class*	IV	
Dimensions (mm)	126 x 87 x 12	
Item	ABS	
Maximum current with resistive load and 250V relay (A)	5	
Maximum current with inductive load and 250V relay (A)	2	
Number of relay outputs	1 x (NO-C-NC)	
Type of relay action	1B-U	
Temperature reading resolution (°C)	0,1	
Accuracy of internal probe (°C)	±0.5	
Maximum control unit temperature (°C)	40	
Room-temperature detection interval (s)	15	

*  Relevant to the Italian market ONLY.

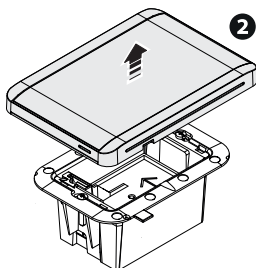
INSTALLATION



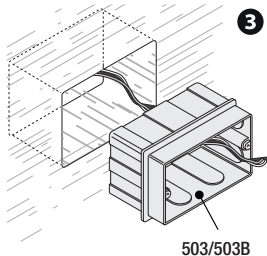
1



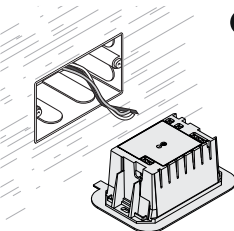
2



3



4



ELECTRICAL CONNECTIONS

 Make the electrical connections according to the device controlled by the programmable thermostat. Please consult the technical documentation for the device to be controlled.

 In the event of a loss of power, the relay maintains the status it had prior to the power outage.

KEY

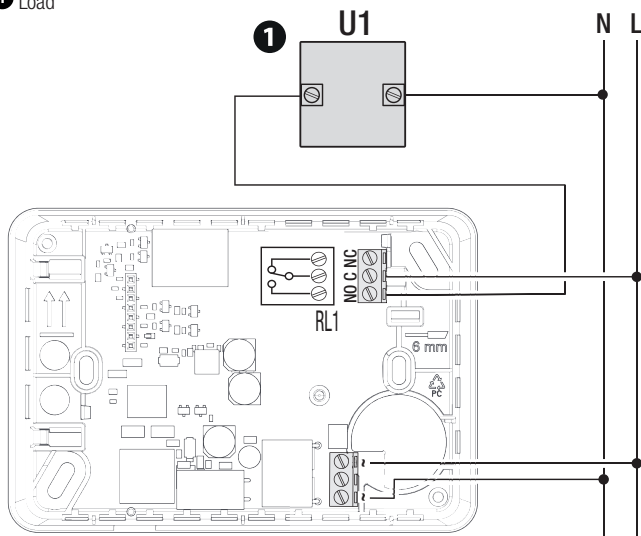
U1 = Burner, circulation pump, solenoid valve, etc.

U2 = Motorised valve

RL1 = Relay associated with the heating/cooling function

Example 1

1 Load



USING THE DEVICE

When first switched on, the programmable thermostat is in automatic heating mode. The temperature measured appears on the display.

Weekly preset temperature programming

To get started quickly with the programmable thermostat, you can use the preset programming both for heating and cooling.

Heating

Heating programming table from Monday to Friday

Time	Setpoint temperature level
Midnight to 6 am	T1 = 16°C
6 am to 8 am	T3 = 20°C
8 am to 11 am	T1 = 16°C
11 am to 1 pm	T3 = 20°C
1 pm to 5 pm	T2 = 18°C
5 pm to 10 pm	T3 = 20°C
10 pm to midnight	T1 = 16°C

Heating programming table for Saturday and Sunday

Time	Setpoint temperature level
Midnight to 7 am	T1 = 16°C
7 am to 2 pm	T3 = 20°C
2 pm to 5 pm	T2 = 18°C
5 pm to 10 pm	T3 = 20°C
10 pm to midnight	T1 = 16°C

Cooling

Cooling programming table from Monday to Sunday

Time	Setpoint temperature level
Midnight to 6 am	T3 = 28°C
6 am to 10 pm	T1 = 24°C
10 pm to midnight	T3 = 28°C

Operating modes

AUTOMATIC mode

The first time you switch on the device, in AUTOMATIC mode you can use the programmable thermostat with predefined time programming in heating or cooling mode, at three preset temperature levels.

Learning phase

To modify the weekly thermal profile, access the learning mode, which will allow you to save the changes made to the temperature at any time of day, on any day of the week.



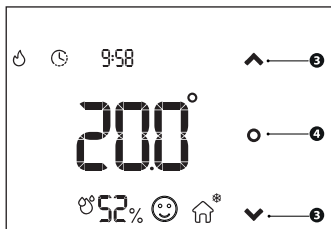
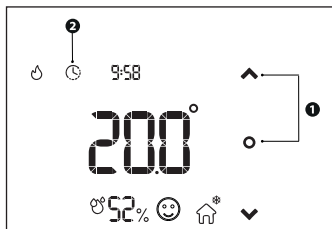
You can access learning from AUTOMATIC mode ONLY.

Use the device as though it were in manual mode, increasing or decreasing the desired temperature when necessary. The learning phase lasts one week, after which the device returns to AUTOMATIC mode, according to the desired weekly thermal profile. The learning phase can be interrupted and restarted at any time.

The programmable thermostat only saves the changes made during the learning phase, overwriting the weekly profile.



You can access the learning phase at any time. The profile (user or default) will be overwritten every time.



Access the self-learning phase by pressing and holding the **1** keys together for more than 3 seconds.

The **2** icon will flash once a second to indicate that learning has started. Use the **3** keys to change the set temperature. The device saves all changes made.

The **4** key is disabled to prevent any accidental mode changes which would end learning before it has finished.

The self-learning phase is exited automatically after a week.

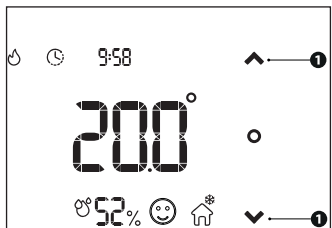
To force exit, press and hold the **1** keys together for more than 3 seconds.

The **2** icon will no longer flash to indicate that learning has finished.

Once learning is complete, the programmable thermostat will adjust the temperature according to the user profile created.

Refining the thermal profile

In automatic mode, the programmable thermostat registers any changes the user makes to the temperature; it adapts the thermal profile only where repeated changes are made in the same time span over a period of two consecutive weeks.

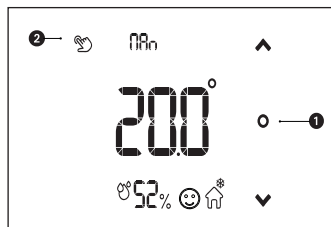


Use the **1** keys to change the set temperature.

The change will be valid for a limited time according to the [n Factor] parameter set in the SETUP menu.

MANUAL mode

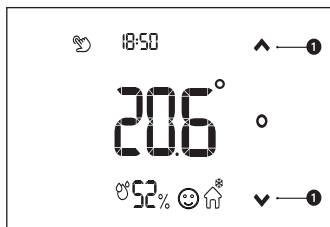
With this mode, you can adjust the temperature quickly.



1 Change mode key

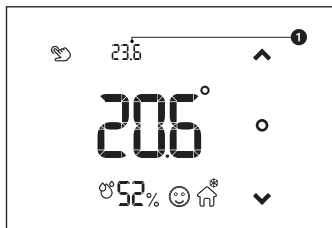
2 Thermal zone in manual mode

Press **1** repeatedly until the **2** icon appears.

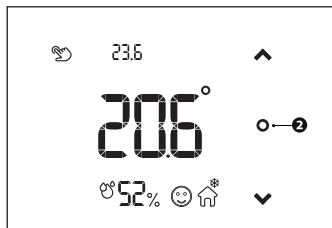


1 Navigation keys

Set the desired temperature using the **1** keys.



1 Set temperature



2 Change mode key

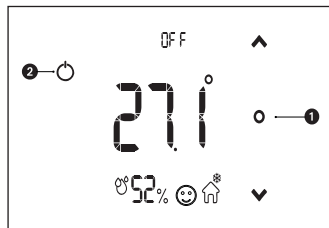
If the programmable thermostat is in standby, tap one of the keys to reactivate the screen.

 The set temperature will show in place of the time for a few seconds **1**.

Press **2** to go to the next mode.

 If no keys are pressed, after a few seconds the time will show on the programmable thermostat.

OFF - Exclusion from thermal control

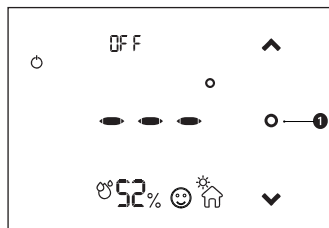


1 Change mode key

2 Thermal zone off

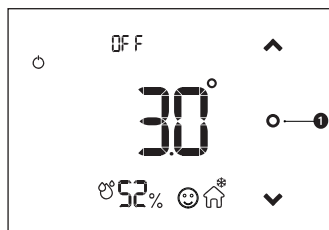
Press 1 repeatedly until the 2 icon appears.

Press 1 to go to the next mode.



If the system is in COOLING mode, thermal control is excluded.

For a few seconds the temperature is not shown, then the current time and temperature detected are displayed.

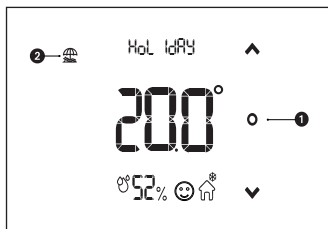


If the system is in HEATING mode, the antifreeze function remains active.

For a few seconds the temperature set for the antifreeze function is shown, then the current time and temperature detected are displayed.

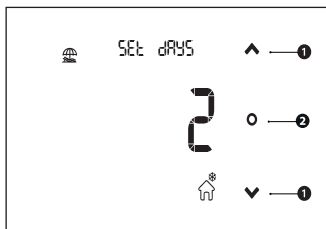
HOLIDAY mode

With holiday mode, you can set a temperature to be maintained for a chosen number of days.



- ① Change mode key
- ② Thermal zone in holiday mode

Press ① repeatedly until the ② icon appears.



- ① Navigation keys
- ② Change mode key

Set the number of days using the ① keys. Set the temperature to be maintained in the days interval previously set by pressing the ② key.

 Press and hold the ① keys to set the number of days more quickly.

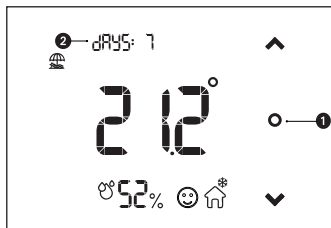


- ① Navigation keys
- ② Change mode key

Set the desired temperature using the ① keys.

Press ② to confirm the temperature.

 **Press and hold the ① keys to set the temperature more quickly.**

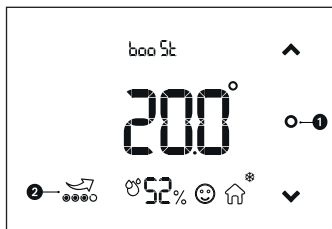


- ① Change mode key
- ② When the screen is activated, the remaining number of holiday days is displayed.

 **When the set number of days have passed, the programmable thermostat returns to automatic operation mode.**
Press ① to go to the next mode.

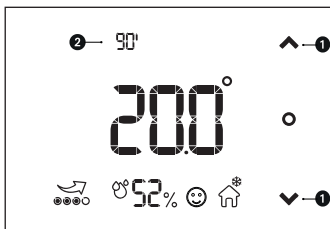
BOOST mode

In BOOST mode, you can activate heating or cooling for a limited period of 30, 60, 90 or 120 minutes, regardless of the programming set and the room temperature.



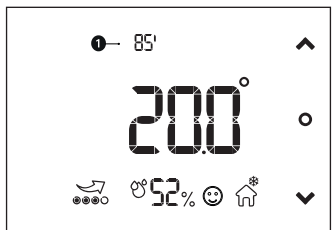
- 1 Change mode key
- 2 Thermal zone in BOOST mode

Press and hold 1 until the 2 icon appears.



- 1 Navigation keys
- 2 Activation time

Set the activation time 2 using the 1 keys.



- 1 The programmable thermostat will begin a countdown.

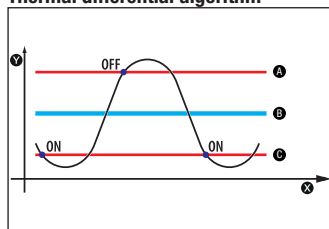
The countdown is visible when the screen is in standby mode.

Press one of the keys to activate the display; the current time is displayed.

After the set time has passed, the programmable thermostat resumes operation in the mode set previously.

Thermal control algorithm and smart backlight

Thermal differential algorithm



For systems with different thermal inertias. The thermal differential can be adjusted between 0.1°C and 1°C.

- X** Time
- Y** Temperature
- A** = Setpoint + differential
- B** = Setpoint
- C** = Setpoint - differential

Proportional-Integral algorithm

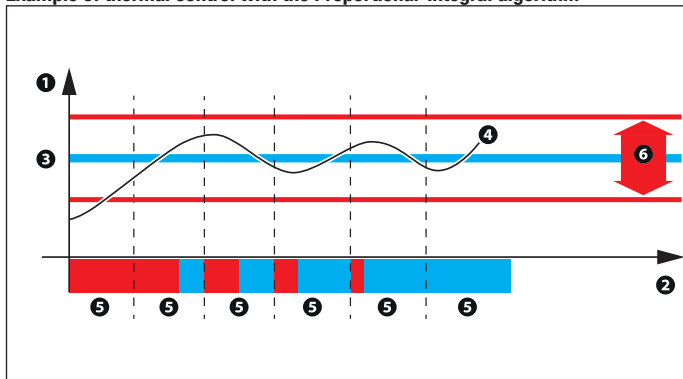
For systems with significant variations in the outdoor temperature.

Optimise consumption and reduce boiler ignition times by setting a minimum boiler ignition time as part of a cycle.

There are 3 pre-configured programmes and 1 manual programme available for setting parameters.

Programme	Cycle duration in minutes	Minimum boiler ignition time in minutes	Proportional band in degrees Centigrade	Types of system inertia
P1	10	1	1,5	Average inertia (e.g. radiators)
P2	5	1	1,5	Fast inertia (e.g. fan coil units)
P3	20	2	1,5	Slow inertia (e.g. floor heating systems)
P4	5 ÷ 40	1 ÷ 5	1 ÷ 3	-

Example of thermal control with the Proportional-Integral algorithm



❶ Proportional band in degrees

Centigrade

❷ Time in minutes

❸ Temperature setpoint

❹ Internal temperature trend

❺ Cycle

❻ Proportional band in degrees

Centigrade

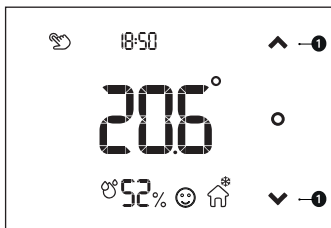
Smart backlight

The 3 smart backlight modes help you to understand the system status.

Red smart backlight	Blue smart backlight	White smart backlight
Heating is active.	Cooling is active.	The system is not active.

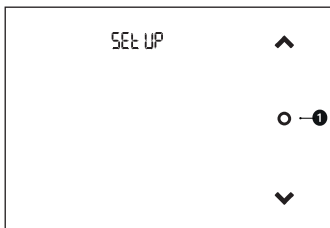
MODE	White screen backlighting	Red smart backlight	Blue smart backlight	White smart backlight
STANDARD	In standby mode, backlighting is active at low intensity. The screen switches on if you press a key.	The light is on if heating is active.	The light is on if cooling is active.	The light switches on if the system is not active only if you press a key.
COURTESY LIGHT	In standby mode, backlighting is off. The screen switches on if you press a key.	The light is on if heating is active.	The light is on if cooling is active.	The light is on if the system is not active.
NIGHT	In standby mode, backlighting is off. The screen switches on if you press a key.	The light switches on if heating is active, only if you press a key.	The light switches on if cooling is active, only if you press a key.	The light switches on if the system is not active only if you press a key.

SETUP MENU



1 Navigation keys

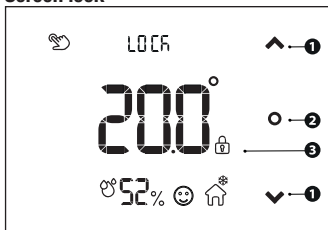
From the main screen, press and hold the **1** keys to enter the [SETUP] menu.



1 Change mode key

Use the **1** key to navigate through the menu.

Screen lock



- 1 Navigation keys
- 2 Change mode key
- 3 Screen lock

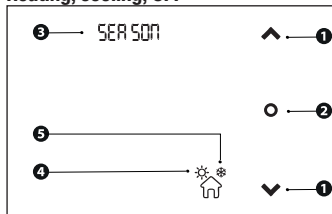
From the SETUP menu, choose [LOCK] using the **2** key.

Use the **1** keys to enable or disable the screen lock.

 When [LOCK] is enabled, the **3** icon is displayed on the main screen.

To unlock the screen, go to the SETUP menu and set [LOCK] to OFF.

Heating, cooling, OFF



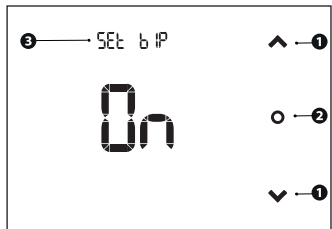
- 1 Navigation keys
- 2 Change mode key
- 3 [SEASON] menu
- 4 Cooling mode
- 5 Heating mode
- 6 OFF



From the [SETUP] menu, choose [SEASON] using the **2** key.

Use the **1** keys to choose between the heating, cooling and OFF system operating modes.

Key sounds



- 1 Navigation keys
- 2 Change mode key
- 3 [SET BIP] menu

From the [SETUP] menu, choose [SET BIP] using the **2** key.

Use the **1** keys to choose between [ON] and [OFF].

Choose [ON] to enable key sounds.

Choose [OFF] to disable key sounds.

Date/Time



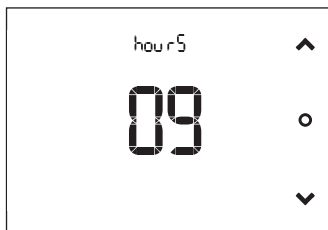
- 1 Navigation keys
- 2 Change mode key
- 3 [CLOCK] menu



From the [SETUP] menu, choose [CLOCK] using the 2 key.

Press one of the two 1 keys to open the submenu.

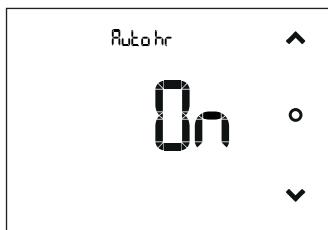
Set the desired value using the 1 keys.



Press and hold the 1 keys to set the desired value more quickly

Use the 2 key to confirm the value set and move on to the next parameter.

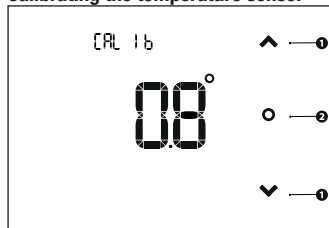
 The parameters that can be set are: minutes, hours, year, month and day of the month.



 To activate the automatic clock change, use the 1 keys to choose the [Auto hr] mode.

Press the 2 key to confirm and move to the next menu.

Calibrating the temperature sensor



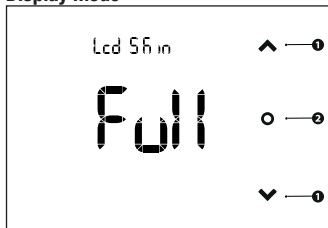
1 Navigation keys

2 Change mode key

Use the **1** keys to set the temperature sensor calibration to between -3.0°C and $+3.0^{\circ}\text{C}$.

Press the **2** key to move to the next menu.

Display mode

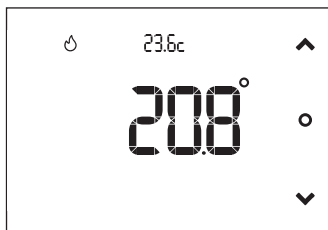


You can choose between a simplified view (temperature setpoint, internal temperature detected and system status) and a full view.

- ➊ Navigation keys
- ➋ Change mode key

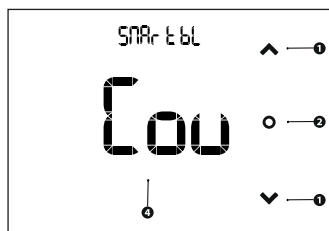
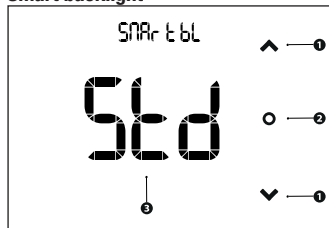


Use the ➊ keys to set the display mode, choosing between [Full] or [Lite]. Press the ➋ key to move to the next menu.



Simplified display example.

Smart backlight



Use the **1** keys to set the display smart backlight mode, choosing from [Std] (=standard), [Cou] (=courtesy) or [nig] (=night).

Press the **2** key to move to the next menu.

3 [Std] (=standard)

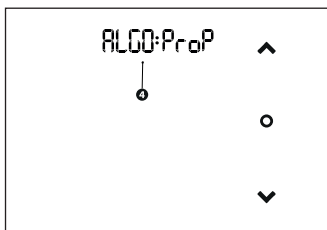
4 [Cou] (=courtesy)

5 [nig] (=night)

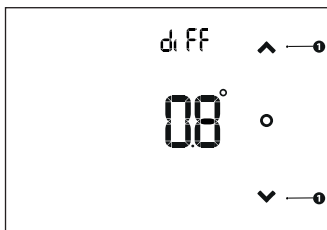
Choosing the temperature algorithm



Use the **1** keys to choose between [ALGO:diFF] (=Thermal Differential algorithm) and [ALGO:ProP] (=Proportional-Integral algorithm). Press the **2** key to access the submenus.



3 [ALGO:diFF] (=Thermal Differential algorithm)
4 [ALGO:ProP] (=Proportional-Integral algorithm)



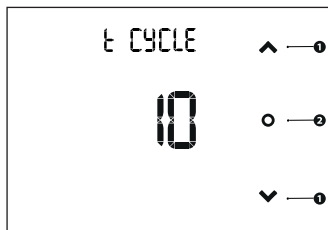
From the [ALGO:diFF] submenu, use the **1** keys to set the differential to between 0.0°C to +1.0°C.



Use the **1** keys to set the program, choosing from [P1], [P2], [P3] or [P4].

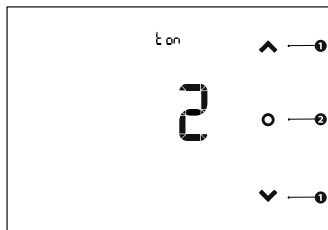
⚠ You can only access the submenu if you select P4 (can be set by the user).

📖 Press the **2 key to access another submenu to set the parameters below.**



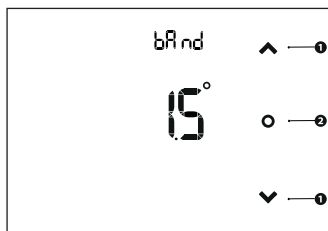
Use the **1** keys to set [t CyCLE] (=cycle time) to between 5 and 40 minutes in increments of 5 minutes.

Press the **2** key to confirm and move to the next parameter.



Use the **1** keys to set [t on] (=minimum relay activation time) to between 1 and 5 minutes.

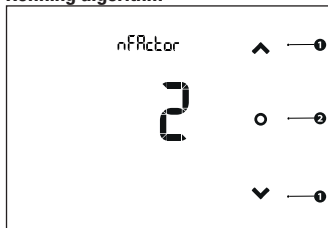
Press the **2** key to confirm and move to the next parameter.



Use the **1** keys to set the [bAnd] (=proportional band) to between +1.0°C and +3.0°C.

Press the **2** key to confirm and move to the next parameter.

Refining algorithm



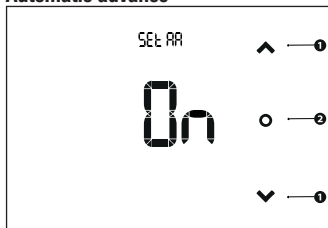
Use the **1** keys to set [n Factor] (=n factor) to between 1 (=30 minutes) and 6 (=180 minutes). Default n=2 (=60 minutes).

Press the **2** key to confirm and move to the next menu.

 **The parameter identifies the number of time spans (30 minutes each) during which a manual temperature change made in automatic mode is kept constant.**

For example, if n=3, the change is active for 90 minutes.

Automatic advance



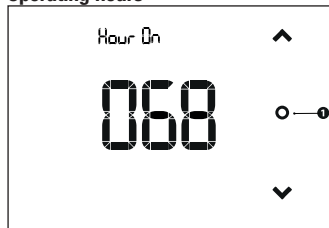
Use the **1** keys to enable [On] or disable [Off] the automatic advance.

Press the **2** key to confirm and move to the next menu.

 **This function enables the device to automatically adapt the system start-up time in order to have the desired temperature at the time set.**

The advance is calculated according to the difference between the temperature detected and the one set.

Operating hours



Press and hold the **1** key to reset the operating hours. After the beep, [000] shows on the display.

Tap the same key to go to the next menu.

Firmware version

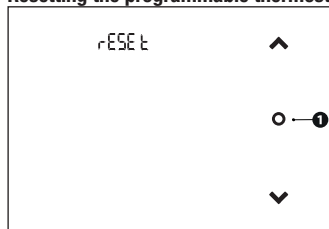


1 Change mode key

From the [SETUP] menu, choose [Ver] using the **1** key.

The screen shows the firmware version for the programmable thermostat.

Resetting the programmable thermostat



From the [SETUP] menu, choose [RESET] using the **1** key.

To reset, press and hold the **1** until the programmable thermostat restarts.



CAME.COM

CAME S.P.A.

Via Martiri della Libertà, 15

31030 Dosson di Casier

Treviso - Italy

Tel. (+39) 0422 4940/Fax (+39) 0422 4941