

## INSTALLATION INSTRUCTIONS OPTION 952 : Thermostat Kronos GA11

### DESCRIPTION

The Kronos GA11 is a weekly programming digital chronothermostat used for the remote control of the ULSA gas-fired air heaters.

**ATTENTION** : Before turning on, check the cables (incorrect wiring may damage the thermostat and compromise safety. Connect and disconnect the control system only in absence of voltage. Avoid exposing to dripping water.



### GENERAL FEATURES

- Graphic LCD display (128x64 px)
- Backlight timer 20 seconds
- LED for diagnostics/signaling
- 7 variable function keys
- Weekly programming
- 4 temperature levels (T0, T1, T2 & T3)
- Resolution (0.5°C temperature set)
- Resolution (0.1°C temperature read)
- Minimum interval programming : 15"
- SELV insulation (Safety Extra Low Voltage)
- Bi-polar connection, non-polarized

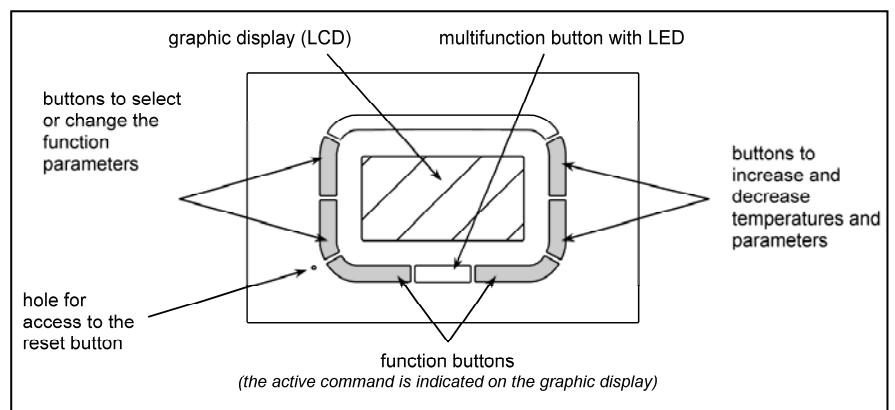


Figure 1

### TECHNICAL DATA

- Operating temperature : 0°C +50°C
- Humidity : 95% maximum at 40°C
- Power supply : low voltage (3V) (via communication with control board of the air heater)
- Protection degree : IP30
- Dimensions : 140x90x32mm
- Compliance : directive 2004/108/CE (EMC) / directive 2006/95/CE (LVD)

### INSTRUCTIONS FOR USE

The buttons have any versatile utilization depending on the selected menu. The use of buttons is facilitated by the indications with text, icons and other graphics that appear on the display.

The vertical buttons on the left : used to navigate the setup menu or to select the parameters

The vertical buttons on the right : used to vary temperature and function increase/decrease (+/-)

The horizontal buttons at the bottom : used to confirm or cancel the settings or to enter/exit the submenus

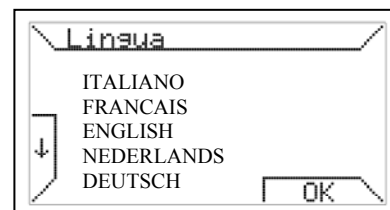
The center button : used for special functions (e.g. unlock heater)

Under the center button there is a LED giving following information :

- Continuous red LED : error or no communication with the heater
- Intermittent red LED : lockout heater
- Intermittent yellow LED : anomaly
- Continuous green LED : chronothermostat is resuming work after power failure

The most frequently used functions by the user are available in the main menu. It is possible to quickly browse through the pages.

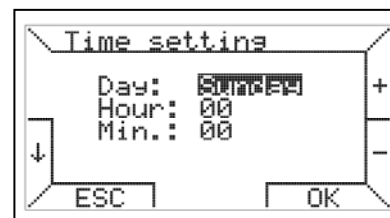
The first time or after a reset, the **language menu** appears on the display. By pushing OK you confirm the selection. Through the SETTING MENU this choice can still be changed later.



Then the **current time** can be entered.

The buttons on the left allow you to select the menu – the buttons on the right allow you to change the values.

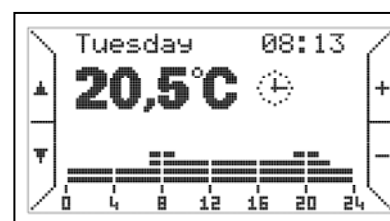
Push the OK button to validate. The ESC button allows you to continue without making changes to the time settings.



### MAIN SCREEN

Following items are shown on the main screen :

- the day of the week (intermittent if not updated)
- the current time (intermittent if not updated)
- the temperature measured (measurement every 10sec)
- an icon indicating the function of the active thermoregulation (automatic, manual, summer or standby)



	Automatic	Temperature control environment according to the weekly program set by the user. Program seen as a graph of the current day.		Manual	Temperature control environment in accordance with user-selected temperature (thermostat function)
	Summer	Temperature control environment disable. Summer ventilation can be activated manually.		Standby	Temperature control environment disable. (no frost protection)

In automatic mode, the chronothermostat performs the temperature control program as set for the current day. The graph is visible at the bottom of the display. The graph is divided into time intervals of 15 minutes, corresponding to a pixel horizontally and appearing in the four programmable temperature levels.

Near the icon of the operation mode, other icons may appear, meaning following.

- Indicates that heater is turned on (the size of the symbol depends on the modulation level of the flame)
- Lockout of the heater
- Fault
- Connection icon symbol (if no icon appears)

(P.S : if heater is in standby mode and has no problem, no icon will appear)

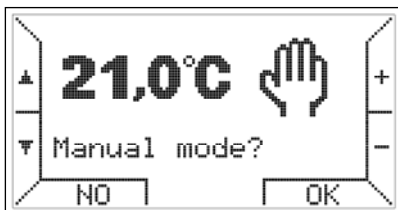
In addition, under the room temperature indication, a text may be shown providing some information as shown next

Starting...	Thermostat is in the process of connection to the heater
Ambient probe error	Room temperature sensor thermostat damaged
Fault code XXX	There is an anomaly or a lockout on the heaters – code XXX
Comm. error	There is a communication error between thermostat and heater
Error ID XX	Faulty interpretation of information sent by heater to the thermostat

Remark : please consult the thermoregulation documentation for detailed description of the fault codes.

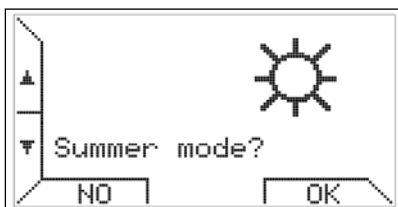
**MANUAL MODE** - The buttons on the right marked with + and -, allow to vary the temperatures required for the automatic program (T0, T1, T2, T3). In manual mode they allow to vary the set point room temperature. By pushing the buttons on the left, marked with arrows, you can browse the pages of first level menu.

When pushing the button ▼ following screen appears.



Pushing the buttons + and - allows to vary the temperature. Activate the manual mode by pushing the OK button.

**SUMMER MODE** - Pushing the ▼ button again activates the summer mode.



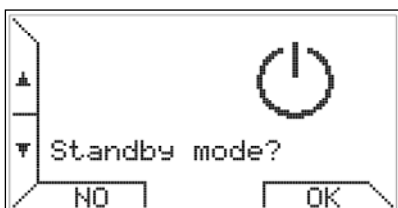
The management of the chronothermostat by the user is much simplified. The functions related to the heater and the functions related to the thermoregulation are not distinct.

If you select the summer mode, you can activate summer ventilation by the function key (Vent) - when activated, a key mark become (V.OFF) and it is possible to stop this function by using the same key.



Constant ventilation TSP P06  
 eg: T1=20°C, P06=20°C, To=16°C  
 during T1 period → T1=P06 → cont. vent  
 during To period → To≠P06 → no cont. vent

**STANDBY MODE** - Pushing the ▼ button again, the standby menu appears



The standby mode allows you to turn off the system (temperature control environment & ventilation are disabled).

The first level menu is circular meaning that all screens are accessible by pushing the ▲

**OVERTIME MODE** - Continuing and pushing the button ▼ again, you can choose to activate the operating mode "Overtime".

In operating mode "Overtime", the room thermoregulation follows a temperature for a duration set by the user.



The duration of one step is 15 minutes, the maximum period is 240 minutes.

Pushing the +/- buttons you can set the temperature and then after pushing OK button you are asked to set the time as shown below.

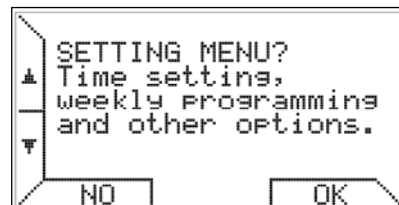
Concluded the time duration of the operating mode "Overtime" the chronothermostat is positioned in the operating mode "Automatic". The operating mode "Overtime" is



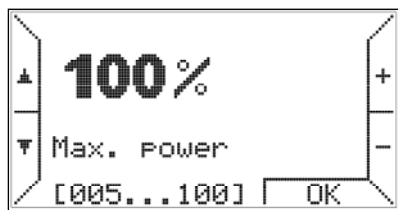
useful when you want to stop the operation mode "Automatic" forcing function thermostatic (overtime) for a specified period.

The first level menu is circular, all the screens described above are accessible by pushing the reverse button ▲.

**SETTING MENU** - Pushing again button ▼ activates the submenu **SETTING MENU**. This menu sets the calendar, the mode of thermoregulation and a weekly schedule (more details are given in a separate paragraph below).



**MAXIMUM POWER** - By pushing the ▼ button again you enter the menu for setting maximum power. Here it is possible to limit the power level required for heating the environment. More details are given in the section 'Thermoregulation'.

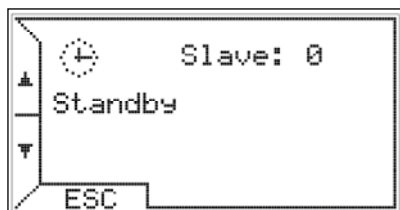


**PARAMETERS MENU** - Pushing the button ▼ again, enters the submenu PARAMETERS MENU.

The parameters menu allows you to see the parameters of the air heaters and permits you to manage advanced functions.



**HEATING MODE** - If you press ▼, the control panel of the heating system appears

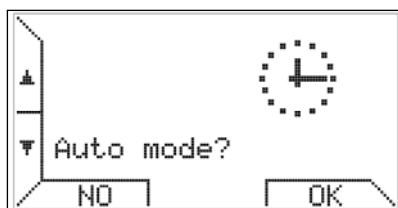


The first row displays the icon illustrating the status of thermoregulation and the heaters and the number of heaters or slaves connected. The second row gives additional information about the status of heaters or anomalies. The third line, if available, shows the value of outdoor temperature or errors related to thermoregulation environment.

This menu has a fixed frame. The options previously seen remain displayed for 20 seconds, then the display returns to the main screen. In this option however if the user does not push ESC or the ▲ ▼ buttons, the chronothermostat continues to show the control panel with the relevant information.

**AUTOMATIC MODE** - By pressing the button ▼ again, you return to the first option.

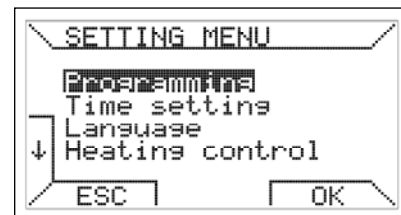
In case the automatic mode is already active, it does not matter whether you push NO or OK.



## SETTING MENU

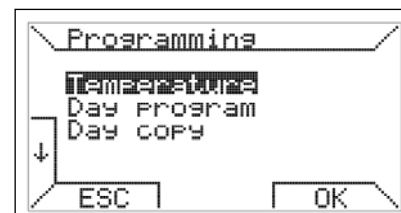
### Programming

This submenu allows you to manage temperature control environment, weekly program, time setting and language choice.



Selecting the option 'Programming' you enter the weekly program submenu.

Choosing the option 'Temperature' you enter in the menu of the 4 temperature levels T0, T1, T2 & T3.

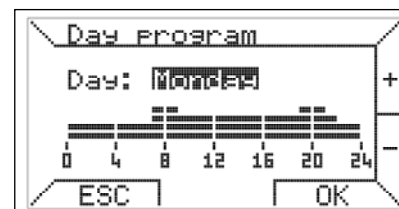


Push the buttons ↑ and ↓ to select the temperature level - to vary the temperature value use the buttons + and -.

The right side of the screen shows the relative position of the current temperature setpoint with respect to minimum (5°C) and maximum (30°C) values.

The highest temperature is associated with T3 and the lowest temperature with T0, the chronothermostat meets the following constraint :  $T0 \leq T1 \leq T2 \leq T3$  and automatically resizes the temperatures.

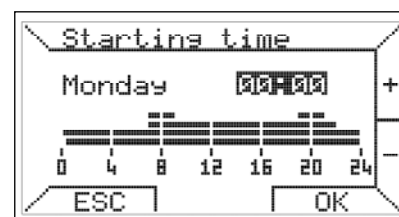
Choosing the option 'Day program' it takes you to following screen :



At the top of the screen you select the day and at the bottom of the screen the day program is displayed. Pressing the + and - buttons you can select the day.

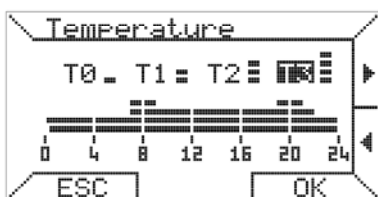
For example, suppose you want to program the day "Monday", pressing OK button you enter the scheduling of time slots.

The time slots are programmed in three steps: initial time, temperature and final time.

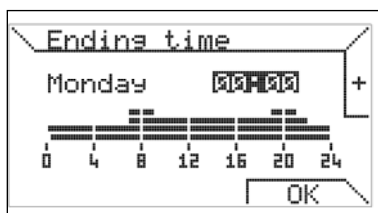


In the first step is set the starting time by pushing the + and - buttons at intervals of at least 15 minutes and you confirm by pushing OK. If you want to quit the programming of the selected day, push ESC.

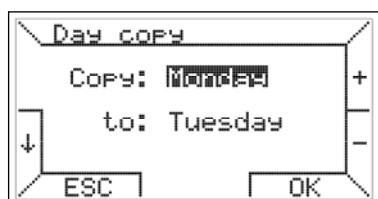
In the second step, pushing the ◀ and ▶ you select which of the four programmed temperatures will be associated to the time slot. Push OK to confirm or ESC to return



In the third step you select the ending time. The final time cannot be less than the initial time.



The last item on the "Programming" menu allows you to copy the program day to another day.

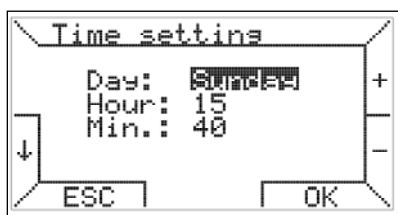


At the top you select the source day in the lower you select the destination day, You can also copy a program of the day all week and have the same program every day, to do this select as target the "ALL". When you press OK, a message confirms your copy of the program.

### **Time setting**

Allows the adjustment of the current time and day of the week.

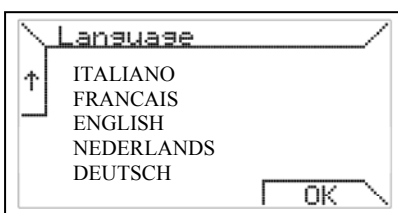
Pushing the ↓ and ↑ buttons you select the item you want to change, while pushing the + and - buttons you change the value. Pushing the OK button confirms the changes.



### **Language setting**

Allows to select the language on the chronothermostat.

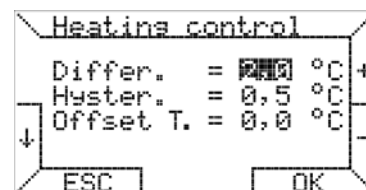
As seen above this setting is required when you first start or after a reset of the chronothermostat.



### **Heating**

#### **control**

This submenu concerns the method used by the chronothermostat for controlling room temperature.



This menu allows you to set the differential, which can vary between 0.2 °C and 5.0 °C (default value: 2.0 °C). d is the thermal differential, Max is the maximum rate, Ti and Ta stand for respectively room temperature set and room temperature measured.

The required percentage P is calculated as follows:

if  $T_a \leq T_i - d$  then  $P = \text{Max}$

if  $T_i - d < T_a < T_i$  then  $P = (\text{Max} / d) \times (T_i - T_a)$

if  $T_a \geq T_i$  then  $P = 0$

#### **Example 1:**

$T_i = 20,0^\circ\text{C}$

$\text{Max} = 100\%$

$d = 0,5^\circ\text{C}$

If  $T_a \leq 19,5^\circ\text{C}$  then  $P = 100\%$ ;

If  $19,5^\circ\text{C} < T_a < 20,0^\circ\text{C}$  then  $P = (100 / 0,5) \times (20 - T_a) \%$

if  $T_a \geq 20^\circ\text{C}$  then  $P = 0$ .

On the same page you can enter the hysteresis value (asymmetric) in order to avoid frequent restart heaters. Hysteresis may vary in steps of 0.1 °C between 0.1 °C and 50% of the set differential value.

After reaching the set temperature  $T_i$ , the chronothermostat controls the switching off of the heaters, the following restart will take place only if the temperature falls under the set temperature decreased hysteresis ( $T_i$ -hysteresis). The default hysteresis is 0.1 °C

#### **Example 2:**

$T_i = 20,0^\circ\text{C}$

$\text{Max} = 100\%$

$d = 0,9^\circ\text{C}$

$\text{hysteresis} = 0,4^\circ\text{C}$  (hysteresis can vary between 0,1°C e  $\text{diff} / 2 = 0,4^\circ\text{C}$ )

When  $T_a \geq 20^\circ\text{C}$  then  $P = 0$ , and the heaters are turned off.

A restart occurs if  $T_a \leq (T_i - \text{hysteresis}) = 19,6^\circ\text{C}$ ; in

particular if  $19,1^\circ\text{C} < T_a \leq 19,6^\circ\text{C}$  then  $P = (100 / 0,9) \times (20 - T_a) \%$ ,

while if  $T_a \leq 19,1^\circ\text{C}$  then  $P = 100\%$ .

From software version 1RZ005 on, it is possible to set an OFFSET temperature between -5.0°C and +5.0°C (default = 0.0°C)

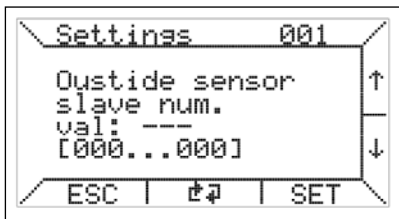
**PARAMETERS MENU**

This submenu permits the remote managing of the air heaters (see also relevant section at p 9).



By pushing the up ↑ and down ↓ buttons you scroll through the various items.

**\*Settings (password 10)** : allows you to view and set the parameters on the remote system. By pushing OK you activate the first page of reading parameters.



To change a parameter, you must navigate to the settings page with keys ↑ and ↓, and pushing the SET button you can enter with the + and - buttons the selected value between the minimum and maximum, shown in brackets.

**\*Reset** : this item allows you to use the unlock command.

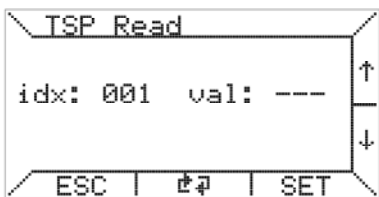


**Error codes** : see page 9

As shown in the above page, in case a heater is locked, it is possible to send a request for remote reset. Since this is a safety function, the unlocking of the heater can take place only with the consent of the safety logic control board.

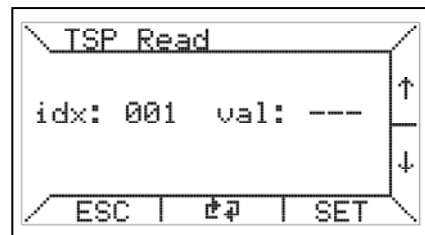
**SPECIAL SETTINGS**

**\*TSP (pos 10)**  
Selecting the TSP option, you can operate on Transparent Slave Parameter (TSP).



The chronothermostat makes available the function of reading and writing of TSP. To change a TSP, you must select the index "idx" desired, using the ↑ and ↓ keys, and push the SET button.

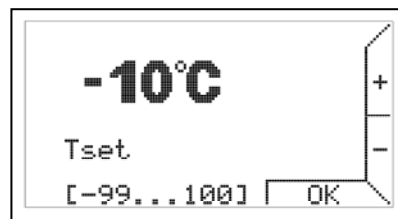
After that following screen appears, where you can enter, with the + and - buttons, the desired value.



In the event, that the board does not include the writing of this TSP (read only) the changes made to it will have no effect. The number of TSP depends on the control board of the slave (hot air generator), the chronothermostat will support a maximum of 255.

**\*TSET**

The fourth option, of the "MENU PARAMETERS", if available, allows you to enter the temperature Tset:

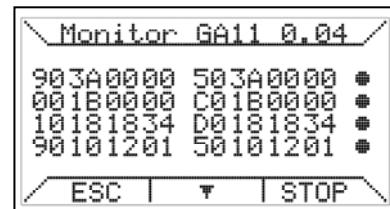


Refer to the documentation of the control board to understand the meaning of Tset.

**The last two items of the "MENU PARAMETERS" are useful functions during installation and maintenance of the control system.**

**\*OT Monitor** :

The item "OT monitor" is dedicated to advanced diagnostics OpenTherm



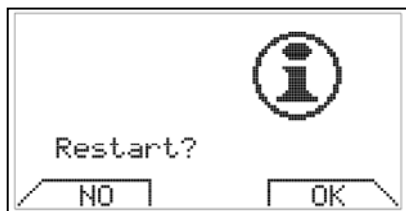
communication, as it makes visible the data exchanged between chrothermostat and control board and shows the analysis of the communication made from the chrothermostat (master side).

In particular, next to the data shows the following symbols:

- '•' correct data exchange
- 'T' RX timeout error
- 'R' RX error
- '?' generic error (unknow)
- 'P' parity error
- 'E' syntax error

**Restart :**

The function "Restart", serves to reconfigure the chronothermostat in the case has been made an intervention

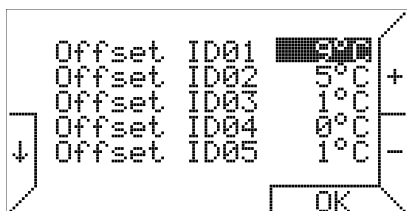


hardware or software in the control board of the generator. Activate the reconnection is equivalent to physically disconnect the communications connector from the chronothermostat and then reinsert it.

**OFFSET :** In the submenu "Write SA Offset" you can set an offset value to give to the room temperature setpoint for each slave.

This can be useful when the hot air generators are installed in places colder or warmer than the point where the chronothermostat is installed. It can be useful to overcome the problems of stratification of the ambient temperature.

There are shown a number of offsets equal to the number of slaves connected up



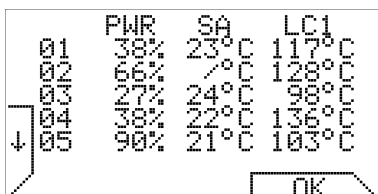
to a maximum of 10 slaves.

For example, looking at the image above and offsets set, if the room temperature set in one of the following operating modes automatic, manual, overtime is 22 ° C, then the slave working setpoint is for slave 1 22°C+9°C=31°C, for slave 2 22°C+5°C=27°C and so on.

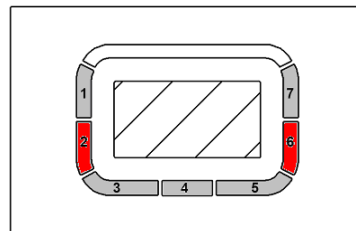
We emphasize that at calculate the level of power in relation to the set room temperature and measured are the electronic control units of the slaves.

**Read slave :** The last item "Read Slave" of the "PARAMETERS MENU" you can view the percentage the value of the respective temperature probe of power, and the LC1 temperature of hot air generators.

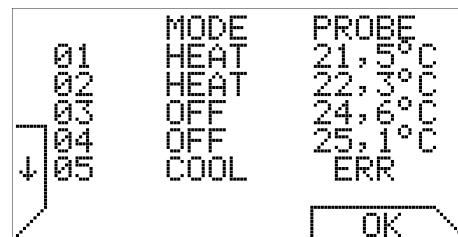
You are shown a number of rows corresponding to the number of slaves connected up to a maximum of 10 slaves.



In addition pushing from the main screen, simultaneously the buttons 5 and 6 shown below, in any operating mode, even with key lockout on, you can display the "Read Slave".



If Kronos GA11 is connected to the electronic control unit REG\_ROB instead of to the electronic control unit TC340, the information displayed in the "Read Slave" vary as shown below.

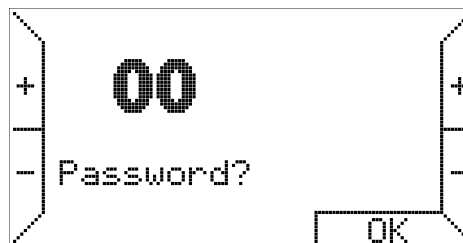


In the "Read Slave" in this case is displays the operating status and the probe value of their connected slaves. Also are displayed a number of rows corresponding to the number of slaves connected up to a maximum of 10 slaves.

**SPECIFIC FUNCTION - KEYS LOCK AND PASSWORD**

To avoid that accidentally pushed buttons go to change configuration settings, in one of four operating modes except mode

"overtime", after 1 minute of operation without having pushing any



button, you activate the keys lockout.

To proceed with unlocking a password is required. The password to unlock the keys is 13. Reset unlock is always enabled with the keys lockout activated. So, you can send a reset to the control unit of air generators without having to enter the password and unlock the keys.

## USE OF BATTERIES/BACKLIGHT

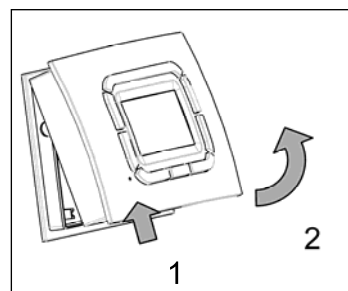
The chronothermostat is provided with an internal energy store which can compensate for a power cut-off for a few hours; in this way the user will not have to set the current time, room temperatures and week program again. However, the internal energy store consumption time varies depending on the room temperature and humidity, as well as on the ageing of components. In order for the internal energy store to be fully effective, the chronothermostat must have been correctly energized for a couple of days at least without interruption. If frequent and/or long cut-offs of the boiler power supply are expected, it is possible to avoid losing chronothermostat data by installing two alkaline batteries type AAA LR03 1,5V into the appropriate slot on the fixing base. In this way, the additional internal energy store, made by new batteries, enables to preserve data for a period even longer than one year under no power supply conditions. It is advisable not to keep batteries inside the chronothermostat for a long time during normal operation (power supply presence) to prevent any battery liquid leakage from damaging the chronothermostat itself. Finally, please note that Kronos GA11 does not provide any information about the presence of batteries or their charging status.

**WARNINGS ABOUT THE BACKLIGHT** The display backlight is obtained from the reserve described in the previous paragraph. It is possible, therefore, that in case of newly connected chronothermostat the brightness is minimal or absent because of insufficient internal charge: this must not alarm as they are just a few hours of connection, because the backlight to begin to be efficient. You can, if desired, to remedy this temporary lack of backlighting installing alkaline batteries, making sure the polarity and following the instructions in the previous paragraph.

## INSTALLATION ON THE WALL

First step, remove the cover containing the electronic board by pushing the appropriate button that says "PUSH", located on the lower unit and rotating the cover itself up, until it is fully removed, as shown in figure 2. For the fixing on the wall it is possible to use many holes provided on the bottom of the base, in this case, see figure 3.

Figure 2



Then is possible to wire the circuit board unit using the appropriate terminal, regardless of the polarity (the two conductors can be exchanged). It is recommended to use a twisted pair cable (example H03RR-F o H03VV-F) size between 0,5 mm<sup>2</sup> and 2,5 mm<sup>2</sup>, the length should not exceed 50m (eg : GA11 – 50m – unit 1 – 50m – unit 2 – 50m – unit 3). The resistance of each conductor, in any case, should not exceed 5  $\omega$ . In environments with electromagnetic interference it is recommended to use a shielded twisted pair cable.

Figure 3 : Fixing holes

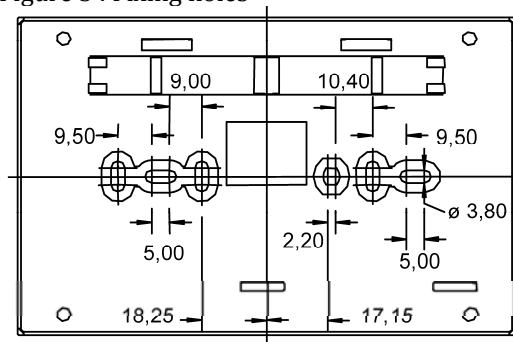
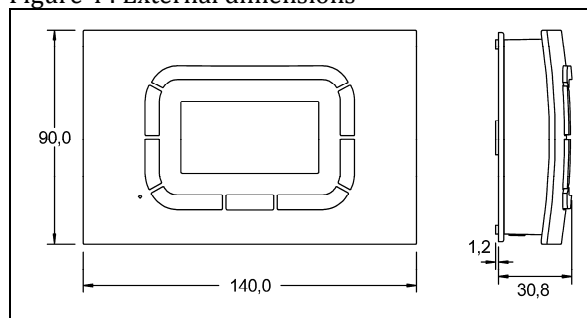


Figure 4 : External dimensions





## PARAMETERS - overview

Parameter	Value	Control range	Default	Unit of measurements
P03	Mode / DT1_DT4	0 ... 10	0	[ - / °C ]
<b>ON/OFF control (setting = 0), 0-10V mode (setting = 1) or duct mode (values from 2 to 10)</b>				
P04	Cv_temperature	0 ... 30	0	[ °C ]
<b>Setting Cv temperature : value = 0 = OFF; / value between 1 and 30 = ON (constant ventilation function)</b>				
Constant ventilation if value of temp. $\neq 0^{\circ}\text{C}$ (eg : value $< 20^{\circ}$ → pas de ventil. / value $> 20^{\circ}\text{C}$ → vent.				
P05	Offset_EF_MAX	0 ... 50	0	[ % ]
<b>To reduce maximum speed venter motor (factory setting)</b>				
<b>Example:</b>				
Max. speed = 7200 RPM				
P05 = 25				
Max speed = $7200 * (1 - 0.25) = 5400$ RPM				
P06	Offset_EF_MIN	0 ... 200	0	[ % ]
<b>To increase minimum speed venter motor (factory setting)</b>				
<b>Example:</b>				
Min. speed = 1350 RPM				
P06 = 50				
Min. speed = $1350 * (1 + 0.5) = 2025$ RPM				
P07	0-10V threshold	0.5 ... 5.0	1.0	[ V ]
<b>Setting threshold value for 0-10V signal</b>				
P08	Max voltage main fan (EC motor)	1.0...10	5.9	[ V ]
<b>Do not set lower than standard setting</b>				
P09	Min voltage main fan (EC motor)	1.0...10	2.5	[ V ]

## ERROR CODES

	Description	Solution
001 ... 005	Internal fault	Contact technical department
007 ... 009		
6	OpenTherm™ reset disabled	If more than 5 reset attempts in 15 minutes occurs from OpenTherm™ (GA11), device can only be unloc
10	Lockout for no ignition	After 5 ignition attempts lockout
11	Lockout for safety limit thermostat intervention	Lockout if LC3 is open (ts)
14	Lockout for no air during prepurge (option Q10, for RPM absence)	Error fault PWM signla venter - bad connection in cable between venter and board (J11 signal 2-3-4-5) - broken board?
15	Lockout for parasite flame (option K10)	After 10s of sperious flame you get error 15 (lockout)
17	Lockout (this value should occur after first power-on)	
101	Lockout for wrong RPM signal after pre-purge time	If venter speed has not reached te preset speed or is to far out of bounds
19	APS opened during operating	Delta p (S3) is open --> main fan not running after ± 100s after heat cycle
20	Unexpected RPM signal on start-up	Venter is working even when it is in off state - wiring problem (J11 signal 2-3-4-5) - J11 signal 4 is broken --> bad print -can be bad venter motor (venter can also be in thermal lockout wait 1hour and try again)
27	SR opened or not connected (forced purge)	LC1 open or not connected
60	Parasite flame (forced purge)	Sperious flame at start-up you don't get lockout only if this stays for 10s this will change to error 15
81	Internal communication fault	Bad print should be returned to manufacturer
82	LC1 short circuit	led is orange (remove power supply, fix the lc1, supply power again)
87	Switch-Off Temperature Threshold exceeded	LC1 has reached its setpoint, error is gone when temp is again under this value
88	Resistor for menu selection (J19) not connected/short circuited	The resistor needs to be placed on the print at first power up This is to choose the correct setup (led is orange)
29	internal hardware error	Return to manufacturer
22	special software "option q60.hex" : code 22 is no error code but a reporting code (wait) indicating that venter motor is not active and that unit only will restart at restart of v	

## 5 different methods to control unit

### Option 1: standard

Control via 0-10V signal (to be installed by customer) or through digital thermostat GA11

### Option 2: On/off function (0 or 100%) (factory set)

Individual on/off control

OP 954 has to be clicked on the order form

### Option 3: (no additional setting required)

1 GA11 for 4 units (no extra sensors on units)

Control through set point + room temperature by GA11



### Option 4: (no additional setting required)

1 GA11 for 4 units

unit 1 : no additional sensor

unit 2 : additional sensor

unit 3: no additional sensor

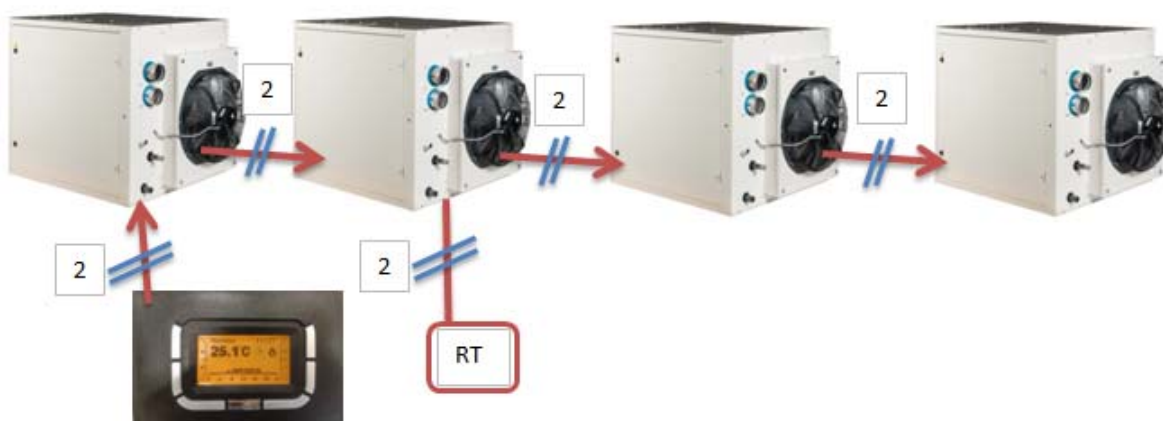
unit 4 : no additional sensor

unit 1 control through set point + room temperature by GA11

unit 2 control through set point GA11 and room temperature (SA) = temperature sensor

unit 3 control through set point + room temperature by GA11

unit 4 control through set point+ room temperature by GA11



### *Example:*

Set point GA11 = 25°C

Room temperature GA11 = 24°C

SA unit 2 = 23°C

diff = 2°C

unit 1 is working at 50%

unit 2 is working at 100%

unit 3 is working at 50%

unit 4 is working at 50%

**Option 5:** (no additional setting required)

1 GA11 for 4 units

unit 1 additional sensor

unit 2 additional sensor

unit 3 additional sensor

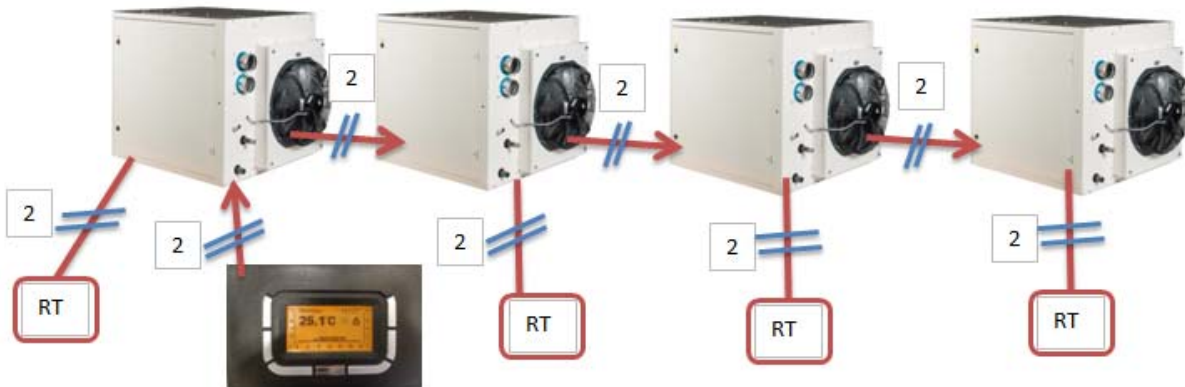
unit 4 additional sensor

unit 1 controlled through setpoint GA11 and room temperature (SA) = temperature sensor

unit 2 controlled through setpoint GA11 and room temperature (SA) = temperature sensor

unit 3 controlled through setpoint GA11 and room temperature (SA) = temperature sensor

unit 4 controlled through setpoint GA11 and room temperature (SA) = temperature sensor

*Example:*

Setpoint GA11 = 25°C

Room temperature GA11 = 24°C (is van geen belang)

SA unit 1 = 23°C

SA unit 2 = 25°C

SA unit 3 = 23.5

SA unit 4 = 22°C

diff = 2°C

unit 1 is working at 100%

unit 2 is working at 0%

unit 3 is working at 75%

**Subject to modifications****NORTEK GLOBAL HVAC Belgium**

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