

REG_ROB

INTERFACE AND THERMOREGULATION DEVICE FOR HOT AIR GENERATOR



DESCRIPTION

REG_ROB is a thermoregulation device suitable for hot air generators and space heaters: thanks to a friendly interface, the user can adjust thermoregulation parameters, manage the state (ON or OFF) and select the operating mode (heating or summer ventilation); a serial interface permits to create cascade systems controlled by only one chronothermostat (BRAHMA type GA11), with good advantages in terms of thermoregulation (especially in case of big space managing).

FEATURES

The main features of the device are as follows:

- Double 7 segments led display
- 2 leds for diagnostic and operating signalling
- 4 push-buttons for settings
- 1 NTC to measure the ambient temperature
- 3 high voltage outputs:
 - Heat request
 - Summer ventilation
 - Reset for burner control unit
- 2 high voltage inputs (feedbacks from the heat generator):
 - Operating signal
 - Lockout signal from the burner control unit
- 2 channels OpenTherm® interface to realize cascade systems
- MODBUS-RS485 interface to realize cascade systems (on request, with option "M")

TECHNICAL DATA

Supply voltage:	220-240V~ 50-60Hz
Operating temperature:	-20°C ÷ + 60°C
Storage temperature:	-40°C ÷ + 85°C
Umidity:	95% MAX. @ 40°C
Protection degree:	IP 30
Weight:	250g
Temperature regulation range:	5 ÷ 30 °C
Temperature measuring range:	0 ÷ 40 °C

Outputs (220-240V~ 50-60Hz):

- Heat request (REQ):	max. 2A cos φ ≥ 0.4
<i>On request (opt. "H1"):</i>	max. 5A cos φ ≥ 0.4
- Output for fan (FAN):	max. 2A cos φ ≥ 0.4
<i>On request (opt. "H2"):</i>	max. 5A cos φ ≥ 0.4
- Reset (RES):	max. 1A cos φ ≥ 0.4

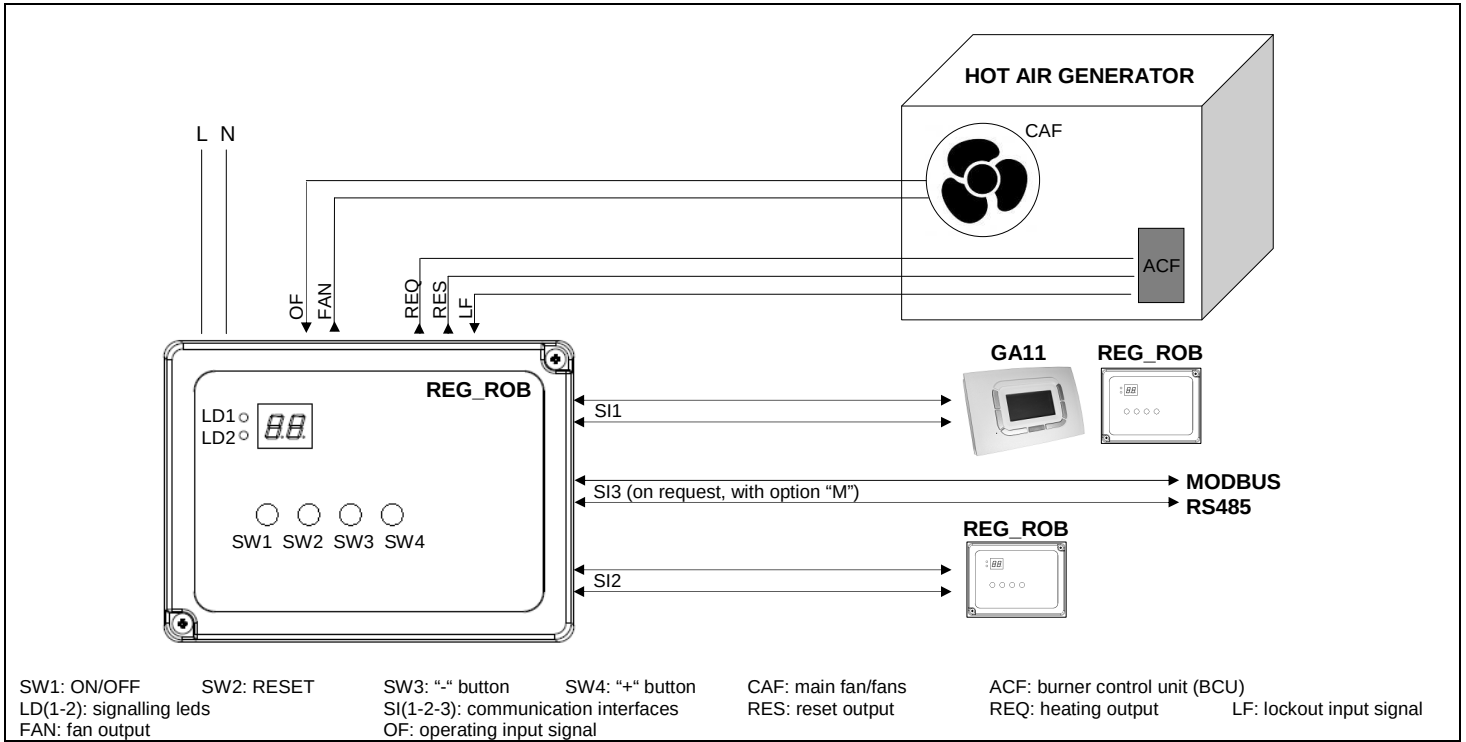
Inputs (220-240V~ 50-60Hz):

- Operating feedback (OF):	≈ 2mA
- Lockout feedback (LF):	≈ 2mA

NTC probe: 10K@25°C β=3435

Dimensions: 150 x 110 x 40 mm

CONNECTION DIAGRAM



OPERATING

Thanks to its high voltage inputs/outputs, REG_ROB device is simple to connect both to old and new appliances.

Its operating modes are as follows:

- LOCAL
- REMOTE ASSISTED
- REMOTE INDEPENDENT

and all of them allow the following states:

- Off state (OFF)
- Summer ventilation (activation of main fan/fans)
- Heating (activation of the burner)

In all cases it's possible to force the OFF state of the single machine by SW1 push-button and perform reset of its burner control unit by SW2 push-button.

LOCAL mode

Local mode is suitable for stand-alone appliances.

Using SW3 and SW4 push buttons it's possible to adjust the room setpoint temperature (inside the range 5÷30 °C) or activate summer ventilation (below 5 °C).

Using summer ventilation mode, main fan/fans is/are maintained always in "ON" state; using heating mode, ambient temperature (measured by NTC probe) is always compared with local setpoint, managing the state of the burner (on or off) as described on the following diagram:

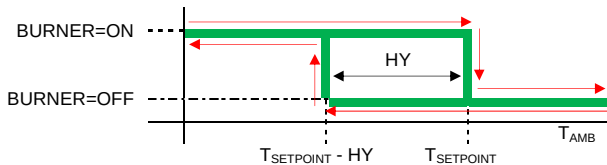


Figure 1 – Relation between ambient temperature and burner state

where "HY" is the temperature hysteresis, a special threshold used to avoid continuous switchings of the burner when the ambient temperature is close to the setpoint (this parameter can be adjusted by user interface, see "PARAMETERS MENU" for more details).

REMOTE ASSISTED MODE

In this mode serial interfaces are used to receive/transmit information from/to compatible devices, as shown on figure no. 2.

Managing of the appliance is performed by only one control device (BRAHMA type GA11 or MASTER-MODBUS device), that can:

- Set the state of the heater/heaters (OFF – Summer Ventilation – Heating)
- Detect anomalies or failures of the heater/heaters
- Perform reset of the heater/heaters in case of anomalies

Ambient temperature measured by NTC sensor is not considered and operating of the heater/heaters is fully assisted by control device.

REMOTE ASSISTED mode can be selected by parameters menu and it is suitable for appliances where control device is inside (or near to) the comfort zone.

REMOTE INDEPENDENT MODE

This mode is like REMOTE ASSISTED type but ambient temperature measured by NTC sensor is compared with setpoint required by remote control device to set the state of the burner.

Managing of the burner is the same as described on figure no. 1 but hysteresis is set by control device.

REMOTE INDEPENDENT mode allows more comfort when remote control device is far from comfort zone: for this reason, it is used as default in case of serial/cascade connections.

NTC PROBE

NTC probe permits to read the ambient temperature: it comes out of the lower border of the box by a special cable (length: about 7 cm) and it can be adjusted by offset parameter (oF), that permits to subtract a fixed gradient to compensate heating due to ambient/installation conditions.

Its fault doesn't permit to proceed with heating function, except in case of Remote Assisted Mode (in this case NTC probe readings are not used).

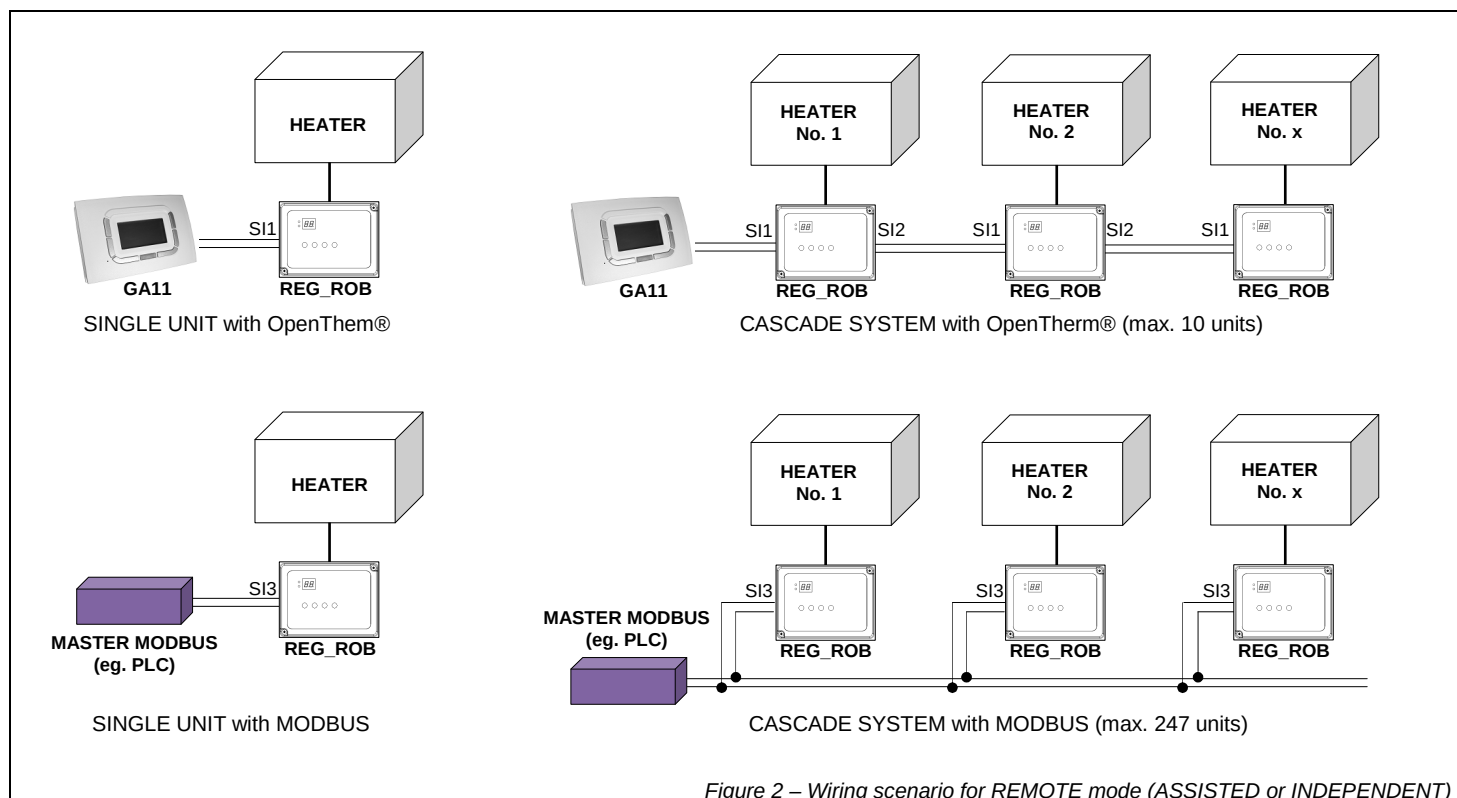


Figure 2 – Wiring scenario for REMOTE mode (ASSISTED or INDEPENDENT)

USER INTERFACE

REG_ROB has a friendly interface that permit to understand the operating state of the managed heater and set its parameters. All parts of the interface are described below.

Display

2 digits display allows to show ambient or setpoint temperature, thermoregulation parameters or anomalies as listed on the following table (flashing views are highlighted in red).

MESSAGE	DESCRIPTION
	OFF state (settable by ON/OFF push-button, in all cases)
	Rotary segment (system initialization: only after power-on)
	Ambient temperature (measured by NTC sensor)
	Setpoint temperature (pressing SW3/SW4): "CL" indication is used for Summer Ventilation
	Error no. 1 – Lockout of burner control unit
	Error no. 2 – Anomaly of NTC sensor
	Error no. 3 – No operating after heating request (reading of OF input)
	Error no. 4 – 5 remote resets in 15 minutes reached

LD1 led (red) – Operating signalling

LD1 led shows the operating state of the heater: following table lists all the messages expected for this led.

	HEATING mode: ignition cycle in progress
	HEATING mode: running position of the heater
	SUMMER mode: Fan/fans activated
	All the other state (off state)

Figure 3 – LD1 messages

LD2 led (green) – BUS signalling

LD2 led indicates presence of serial communication (OpenTherm® or MODBUS) as shown on Figure 4. In case of MODBUS communication (option "M") the reception of valid data from remote control is shown by a short led pulse.

	LOCAL mode (off state)
	REMOTE mode (OpenTherm® or MODBUS)
	Reception of valid data from remote control (only with MODBUS)

Figure 4 – LD2 messages

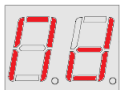
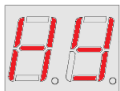
Push-buttons

Functions associated to push-buttons are listed on the following table.

BUTTON	FUNCTIONS
SW1	<u>ON/OFF push-button</u> ON/OFF switching of the heater (in all operating modes)
SW2	<u>RESET push-button</u> - Reset of the burner control unit (press it for at least 3 seconds) - Access to parameters menu (press it for at least 10 seconds) "go forward" command inside parameters menu
SW3	<u>DECREASE (-) push-button</u> - Decrease of setpoint temperature (LOCAL mode) - Activate of summer ventilation (LOCAL mode) - Change (decrease) of current parameter
SW4	<u>INCREASE (+) push-button</u> - Increase of setpoint temperature (LOCAL mode) - De-activate of summer ventilation (LOCAL mode) - Change (increase) of current parameter

PARAMETERS MENU

This menu permits to adjust several parameters used by thermoregulation functions. Procedure to access, modify and save parameters is described below.

1)	Press SW2 push-button for at least 10s, until this flashing message is shown  <u>Setting of "MODE" parameter (Md)</u> After 2s message will disappear and setting of remote mode will be possible. Push SW3/SW4 button to decrease/increase the value of the parameter. <table border="1"> <tr> <td>Default value:</td><td>0 (REMOTE INDEPENDENT)</td></tr> <tr> <td>Regulation range:</td><td>0 (REMOTE INDEPENDENT) or 1 (REMOTE ASSISTED)</td></tr> </table>	Default value:	0 (REMOTE INDEPENDENT)	Regulation range:	0 (REMOTE INDEPENDENT) or 1 (REMOTE ASSISTED)
Default value:	0 (REMOTE INDEPENDENT)				
Regulation range:	0 (REMOTE INDEPENDENT) or 1 (REMOTE ASSISTED)				
2)	Press SW2 push-button to proceed with parameters. Following flashing message will be displayed  <u>Setting of "HYSTERESIS" parameter (HY)</u> After 2s message will disappear and setting of hysteresis will be possible. Push SW3/SW4 button to decrease/increase the value of the parameter. <table border="1"> <tr> <td>Default value:</td><td>0.5 (0.5 °C)</td></tr> <tr> <td>Regulation range:</td><td>0.1 (0.1 °C) ... 1.0 (1.0 °C)</td></tr> </table>	Default value:	0.5 (0.5 °C)	Regulation range:	0.1 (0.1 °C) ... 1.0 (1.0 °C)
Default value:	0.5 (0.5 °C)				
Regulation range:	0.1 (0.1 °C) ... 1.0 (1.0 °C)				
3)	Press SW2 push-button to proceed with parameters. Following flashing message will be displayed  <u>Setting of "OFFSET" for NTC probe (oF)</u> After 2s message will disappear and setting of the offset will be possible. Push SW3/SW4 button to decrease/increase the value of the parameter. <table border="1"> <tr> <td>Default value:</td><td>1.5 (-1.5 °C)</td></tr> <tr> <td>Regulation range:</td><td>0.0 (-0.0 °C) ... 5.0 (-5.0 °C)</td></tr> </table>	Default value:	1.5 (-1.5 °C)	Regulation range:	0.0 (-0.0 °C) ... 5.0 (-5.0 °C)
Default value:	1.5 (-1.5 °C)				
Regulation range:	0.0 (-0.0 °C) ... 5.0 (-5.0 °C)				

- 4) Only with option "M" (MODBUS)
Press SW2 push-button to proceed with parameters. Following flashing message will be displayed



Setting of "ADDRESS" parameter (Ad)

After 2s the message will disappear and it will possible to set the MODBUS address of the device (**WARNING: hexadecimal value**). Push SW3/SW4 button to decrease/increase the value of the parameter.

Default value:	01
Regulation range:	01 ... F7



IMPORTANT NOTE

Each device connected on MODBUS interface must have an univocal address, different from any other.

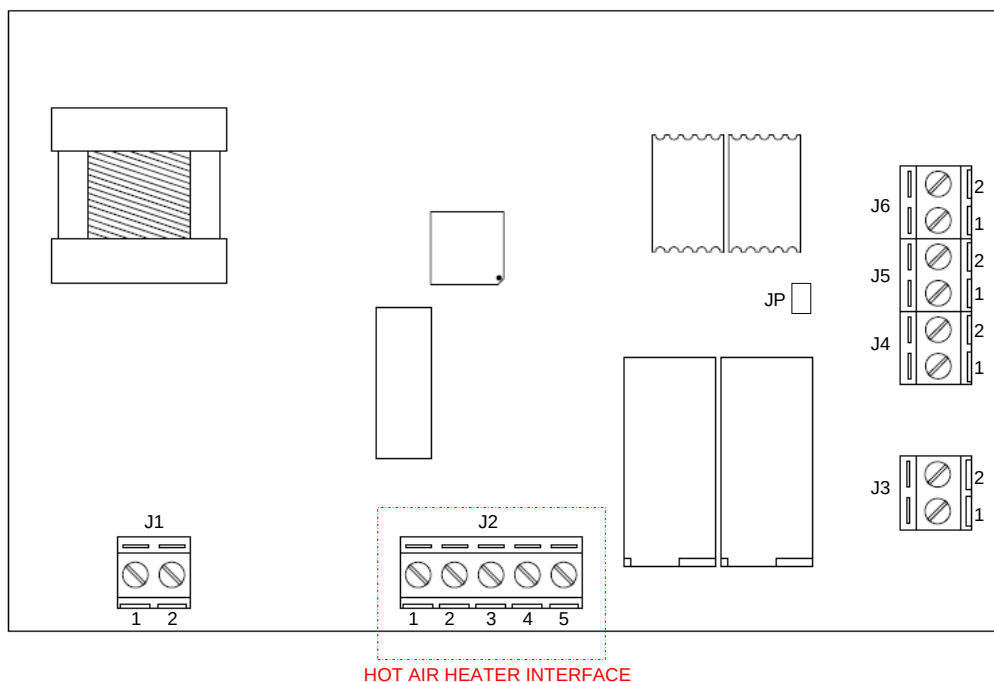
- 5) Press SW2 push-button to exit from parameters menu and save new settings.

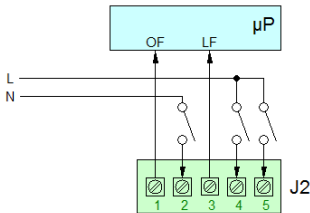
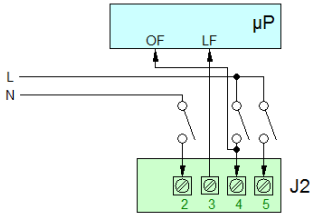
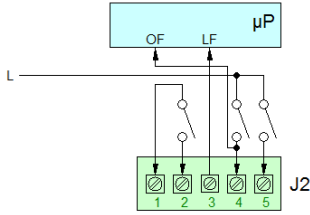
After entering parameters menu, if changes are not saved within 10 minutes system will come back to main menu ignoring new settings.

MODBUS PARAMETERS

MODBUS allows to manage REG_ROB or to read parameters from it: this can be performed by specific commands and messages, see BRAHMA technical note no. 26357 ("BRAHMA type REG_ROB - MODBUS settings and functions") for more details.

CONNECTIONS



Connector	Terminal	Type of signal	Description	
J1	1	INPUT	<u>L</u> - Supply voltage (line)	
	2	INPUT	<u>N</u> - Supply voltage (neutral)	
J2	STANDARD			
		1	INPUT	<u>OF</u> – Operating feedback of the heater
		2	OUTPUT	<u>RES</u> – Reset signal for burner control unit
		3	INPUT	<u>LF</u> – Lockout signal from burner control unit
		4	OUTPUT	<u>FAN</u> - Output for main fan/fans
		5	OUTPUT	<u>REQ</u> – Heat request for burner control unit
	OPT. "U"			
		2	OUTPUT	<u>RES</u> – Reset signal for burner control unit
		3	INPUT	<u>LF</u> – Lockout signal from burner control unit
		4	OUTPUT + INPUT	<u>FAN</u> - Output for main fan/fans + <u>OF</u> – Operating feedback of the heater
		5	OUTPUT	<u>REQ</u> – Heat request for burner control unit
	OPT. "UC"			
		1-2	OUTPUT	<u>RES</u> - Reset signal for burner control unit (free-contact)
		3	INPUT	<u>LF</u> – Lockout signal from burner control unit
		4	OUTPUT + INPUT	<u>FAN</u> - Output for main fan/fans + <u>OF</u> – Operating feedback of the heater
		5	OUTPUT	<u>REQ</u> – Heat request for burner control unit

Connector	Terminal	Type of signal	Description
J3	1	INPUT / OUTPUT	SI2 - OpenTherm® MASTER channel (to the next REG_ROB of the chain)
	2		
J4 (with OPT. "M")	1	INPUT / OUTPUT	SI3 – Modbus RS-485 serial interface (Terminal 1 = "B" signal – Terminal 2 = "A" signal)
	2		
J5	1	INPUT	Input for NTC probe
	2		
J6	1	INPUT / OUTPUT	SI1 - OpenTherm® SLAVE channel (from BRAHMA type GA11 or previous REG_ROB of the chain)
	2		
JP (with OPT. "M")	/	INPUT	Selection jumper for "120 Ω impedance"

PART-NUMBER AND OPTIONS

REG_ROB Opt. (1) (2) (3) (4) (5)

OPTIONS

(1) Type of connections

/: screw terminals (maximum cable section: 2.5 mm²)
F: Molex® type 3001 connectors (or equivalent)

(2) Hot heater interface configuration (J2)

/: J2 connector with 3 independent outputs + 2 independent inputs. Reset referred to neutral
U: J2 connector with "FAN" output and "OF" input in common. Reset referred to neutral
UC: J2 connector with "FAN" output and "OF" input in common. Reset with free-contact

(3) Heat request output (REQ)

/: output for loads up to 2A cos φ ≥ 0.4
H1: output for loads up to 5A cos φ ≥ 0.4

(4) Fan output (FAN)

/: output for loads up to 2A cos φ ≥ 0.4
H2: output for loads up to 5A cos φ ≥ 0.4

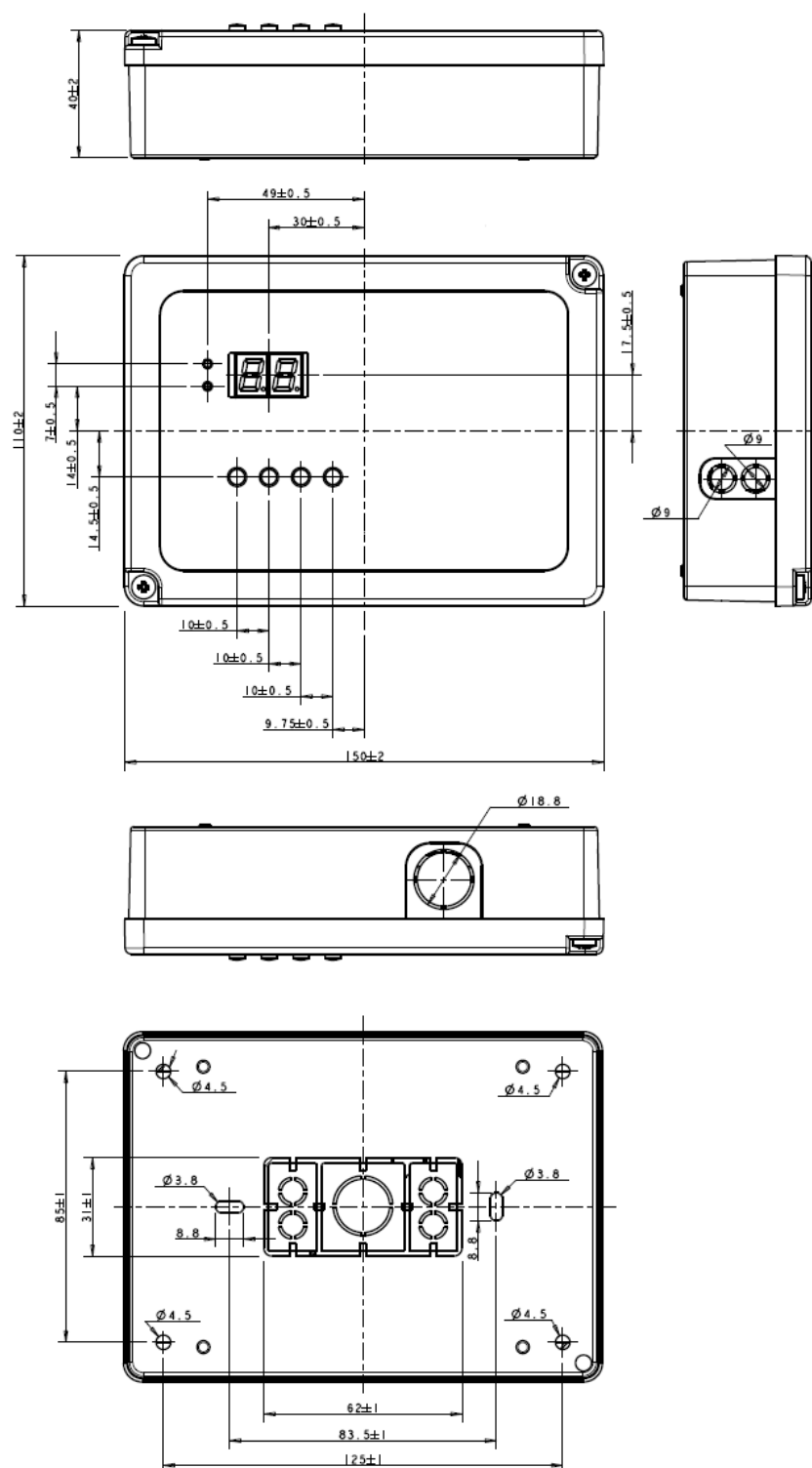
(5) MODBUS RS-485 interface

/: not available
M: available



NOTES FOR THE DISPOSAL OPERATION

The controller contains electronic components and it must not be disposed of as a domestic waste. For the disposal operation refer to the local rules concerning special waste.

MECHANICAL DIMENSIONS


All dimensions are in millimeters (mm)

WARNING!!! Company Brahma S.p.A. declines any responsibility for any damage resulting from the Customer's interfering with the device

BRAHMA

Via del Pontiere, 31
37045 Legnago (VR) – ITALY
Tel. +39 0442 635211 – Fax +39 0442 25683
<http://www.brahma.it>
E-mail: brahma@brahma.it

April 4th, 2017 - Subject to amendments without notice