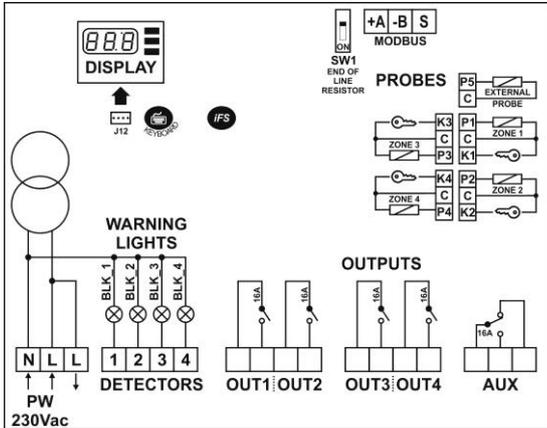# SPACE-RAY®

E1376B2

Thank you for choosing Space-Ray

SCB60B-E1111

UK Programmable chrono-thermostat, suitable to operate 1 / 2 / 3 / 4 heating zones, made of radiants or warm air units with or without air recirculation.

WIRING DIAGRAM

POWER SUPPLY

N - L	Power supply 230Vac

WARNING INDICATOR LIGHTS – BURNER LOCKOUT

1	Warning light 1 - burner lockout (**N**) 230Vac
2	Warning light 2 - burner lockout (**N**) 230Vac
3	Warning light 3 - burner lockout (**N**) 230Vac
4	Warning light 4 - burner lockout (**N**) 230Vac

OUTPUTS

OUT1	OUT1
OUT2	OUT2
OUT3	OUT3
OUT4	OUT4
AUX	AUX, 1st-3rd N.C., 1st-2nd N.O.

OUTSIDE SENSOR

P5 C	(**P5**) Sensor of outside temperature.
	(**C**) Common of outside temperature sensor.

ZONE SENSORS

P1 C K1	(**P1**) Zone 1 - sensor.
	(**C**) Zone 1 - common of sensor and BMS contact.
	(**K1**) Zone 1 – sensor key selector or BMS volt free contact.
P2 C K2	(**P2**) Zone 2 - sensor.
	(**C**) Zone 2 - common of sensor and BMS contact.
	(**K2**) Zone 2 – sensor key selector or BMS volt free contact.
P3 C K3	(**P3**) Zone 3 - sensor.
	(**C**) Zone 3 - common of sensor and BMS contact.
	(**K3**) Zone 3 – sensor key selector or BMS volt free contact.
P4 C K4	(**P4**) Zone 4 - sensor.
	(**C**) Zone 4 - common of sensor and BMS contact.
	(**K4**) Zone 4 – sensor key selector or BMS volt free contact.

MODBUS RS485

+A -B S	RS485 MODBus network connection
SW1	End of line resistor. SW1: ON = 120Ohm resistor enabled

MOUNTING
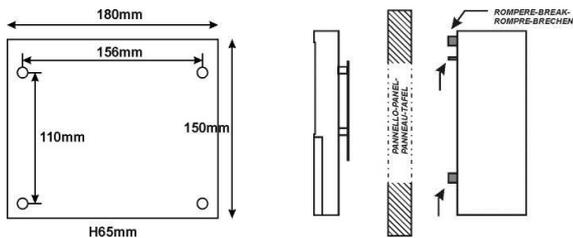
QUICK GUIDE

	Point
INSTALLATION:	
• Warnings	1
• Technical features	2
• Controller configuration:	4
• Thermometric scale	4.1
• Thermostat operation mode	4.2
• RS485 MODBUS port	5
USE:	
• Front panel: keypad / display	6
• Menu / Function / Parameter setup	
• Menu / Parameters setup	7.1
• Language, display backlight	7.2
• Chrono-thermostat ON/OFF	8
• Keypad lock	9
• Display the heating zone	10
• Fnc menu - functions:	
- Winter / Summer mode	11.1
- OFF / Auto / ON mode – timer programs;	11.2
- Burner enable / disable;	11.3
- Reset the hour-meter to zero;	11.4
• Menu inFo	12
• Menu SEt: set-point	13
• Lockout reset	14
• Menu tiME: clock / calendar	15
• Menu alarm: list of errors / alarm messages	16
• Menu PAr: parameters.	17

INSTALLATION

1. WARNINGS

⚠ **BEFORE OPERATING THE CONTROLLER, PLEASE READ CAREFULLY THE INSTRUCTIONS IN THIS MANUAL. KEEP THIS MANUAL IN A SAFE PLACE FOR FUTURE REFERENCE**

Use the controller only for its intended purpose as described in this manual. The Manufacturer declines all responsibility for inappropriate use or incorrect setting of the controls. To ensure safe operation:

• Controller must be properly installed and maintenance must be performed according to this manual;
• Supply voltage and environmental conditions fall within the values specified on the controller data plate.

⚠ **ELECTRIC CONNECTIONS**
THE CONTROLLER IS NOT PROTECTED AGAINST CIRCUIT OVERLOADING: EQUIP POWER SUPPLY INPUT AND ALL OUTPUTS WITH NECESSARY SAFETY CONTROLLERS.

• Avoid crossing cables by separating low voltage wires and connection from line voltage (230Vac).
• Protect the controller power supply and probe inputs from electric disturbances.
• Disconnect the controller from the power supply before carrying out any maintenance;
• Do not EVER open the controller plastic enclosure

2. TECHNICAL FEATURES

Power supply:	230Vac +/-10%, use a 315mA safety fuse
Operation field:	PTC : -50,0…110°C or -58,0…230°F.
Unit consumption:	8 VA
PTC 990Ω accuracy:	~2 °C in between –60T50 °C; ~5 °C in between +50T160 °C;
Housing:	plastic board, 180 x 150 x 65mm
Fixing:	on wall
Data storage:	EEPROM memory
Front protection:	IP44
Employment conditions:	environment temperature –10/+50°C ; storage temperature –20/+70°C
Relative ambient humidity:	30 / 80%, without condensation
Connections:	Power supply: screw-terminals for cables section max 4mm² Lockout lights / relays: screw-terminals for cables section max 2,5mm² / min 1,5mm² Sensors: screw-terminals for cables section max 1,5mm² / min 0,5mm²
Display:	LCD
Inputs:	5 probe inputs PTC 990 Ω @25°C: P1, P2, P3, P4, P5; 4 lockout light inputs: 250vac opto-isolated
Outputs:	OUT1 - 4: SPST 16A 250Vac OUT 5: SPDT 16A 250Vac

Serial communication:	*iFS* serial interface TTL for :

iFS serial interface TTL for :
- Controller firmware upgrade;
- Fast parameter setup (copy / paste);

1 serial port RS-485 for MODBus protocol;

3. MAIN FEATURES

DISPLAY WITH 1 DECIMAL PLACE: Temperature is displayed with 1 decimal place: –99,9 / 99,9;

2-WIRE MODBUS CONNECTION: A two-pole cable is required to connect the controller to MODBus network. This simplifies the connection.

The two-way communication runs along a RS-485 serial line made of a 2-wire twisted shielded cable (i.e. Belden 8762 with PVC sheathing 2 twisted terminals + copper sheathing, 20 AWG, 89pF cables nominal capacity, 161pF cable / copper sheathing nominal capacity). The MODBus network connection must not exceed 1.000m in length;

LCD DISPLAY: A large LCD display helps to keep the thermostat always under control at a glance. Scrolling text messages and symbols describe the operations in progress.

BURNER ENABLE / DISABLE: It is possible to enable/disable one or more burners;

RESET OF A LOCKOUT BURNER: To reset a lockout burner press the *RST* key;

SECURITY IN CASE OF FAULTY PROBE: In the event of faulty probe or temperature beyond the item limits, outputs are automatically switched off;

DATA STORAGE ON EEPROM MEMORY: Programmed running periods are saved on EEPROM memory in order to ensure their permanence also in case of absence of supply;

ON/OFF KEY: It is possible to switch ON/OFF the controller from the on/off key.

EXTERNAL PROBE: The external probe enables/disables the timer program optimization function.

MODBus NETWORK CONNECTION: The controller can be connected to a MODBus network.

4. CONTROLLER CONFIGURATION

⚠ **WARNING! SETUP OF PARAMETERS *rEU* AND *H5* MUST BE EXECUTED BY EXPERT PERSONNEL: A WRONG SETUP WILL COMPROMISE THE CORRECT FUNCTIONING OF THE MASTER AND OF SLAVE MODULES CONNECTED TO IT.**

4.1 THERMOMETRIC SCALE

Go to parameter *rEU* to select the thermometric scale. Set:

rEU = °C for Celsius AND *rEU* = °F for Fahrenheit.

To check it, press ⬅: the display will show the thermometric scale (°C or °F) for 2 secs.

After every new setup of the thermometric scale, verify the following parameters: set-point, set-point differential, alarm thresholds, alarm differential.

4.2 THERMOSTAT OPERATION MODE

Go to parameter *H5* to set the SCB60 operation mode.

NOTE: AFTER A NEW SETUP OF PARAMETER *H5*, RESTART THE CONTROLLER.

- *H5* = **1**: the SCB60 controls 1 heating zone made of 4 independent single stage heaters;
- *H5* = **2**: the SCB60 controls 1 zone made of 4 independent single stage heaters + common exhaust fan;
  CONNECT:
  - The 4 heaters to OUT1, OUT2, OUT3, OUT4;
  - The room sensor to connectors P1 C K1;
  - The common exhaust fan to AUX;

- *H5* = **3**: the SCB60 controls 2 zones made of 2 independent single stage heaters each;
- *H5* = **4**: the SCB60 controls 2 zones made of 2 independent single stage heaters each + common exhaust fan.
  CONNECT:
  - The 2 heaters of zone 1 to OUT1, OUT2;
  - The 2 heaters of zone 2 to OUT3, OUT4;
  - Sensor of zone 1 to P1 C K1;
  - Sensor of zone 2 to P2 C K2;
  - The common exhaust fan to AUX;

- *H5* = **5**: 1 heating zone made of 2 two- stage independent heaters;
- *H5* = **6**: 1 heating zone made of 2 two- stage independent heaters + common fan;
  CONNECT:
  - First stage of heater 1 to OUT1;
  - Second stage of heater 1 to OUT2;
  - First stage of heater 2 to OUT3;
  - Second stage of heater 2 to OUT4
  - Zone sensor to P1 C K1;
  - The common exhaust fan to AUX;

- *H5* = **7**: 2 heating zones made of 1 two- stage independent heater each;
- *H5* = **8**: 2 heating zones made of 1 two- stage independent heater each + common fan;
  CONNECT:
  - First stage of the heater of zone 1 to OUT1;
  - Second flame of the heater of zone 1 to OUT2;
  - First stage of the heater of zone 2 to OUT3;
  - Second stage of the heater of zone 2 to OUT4;
  - Sensor of zone 1 to P1 C K1;
  - Sensor of zone 2 to P2 C K2;
  - The common exhaust fan to AUX;

- *H5* = **9**: 1 heating zone made of 4 independent warm air units.
  WARNING: when in *summer* mode, OUT1/2/3/4 will be always off and AUX will work as set in the timer programs.
  CONNECT:
  - The 4 warm air units to OUT1, OUT2, OUT3, OUT4;
  - Sensor of zone 1 to P1 C K1;
  - The summer ventilation to AUX; (if present)

- *H5* = **10**: the SCB60 controls 2 zones:
  - zone 1: 2 independent single stage heaters each + common exhaust fan;
  - zone 2: 2 independent single stage heaters;
  CONNECT:
  - The 2 heaters of zone 1 to OUT1, OUT2;
  - The 2 heaters of zone 2 to OUT3, OUT4;
  - Sensor of zone 1 to P1 C K1;
  - Sensor of zone 2 to P2 C K2;
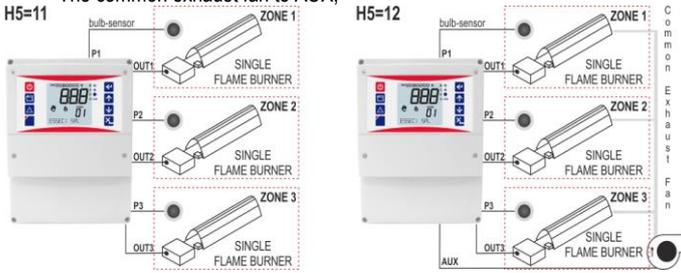 - The common exhaust fan to AUX;

- *H5* = **11**: 3 zones made of 1 single- stage independent heater each;
- *H5* = **12**: 3 zones made of 1 single- stage independent heater each + common exhaust fan.
  CONNECT:
  - The heater of zone 1 to OUT1;
  - The heater of zone 2 to OUT2;
 - The heater of zone 3 to OUT3;

- Sensor of zone 1 to P1 C K1;
- Sensor of zone 2 to P2 C K2;
- Sensor of zone 3 to P3 C K3;
- The common exhaust fan to AUX;

- **H5 = 13**: 4 zones made of 1 single- stage independent heater each;
- **H5 = 14**: 4 zones made of 1 two- stage independent heater each;
  CONNECT:
  - The heater of zone 1 to OUT1;
  - The heater of zone 2 to OUT2;
  - The heater of zone 3 to OUT3;
  - The heater of zone 4 to OUT4;
  - Sensor of zone 1 to P1 C K1;
  - Sensor of zone 2 to P2 C K2;
  - Sensor of zone 3 to P3 C K3;
  - Sensor of zone 4 to P4 C K4;
  - The common exhaust fan to AUX;
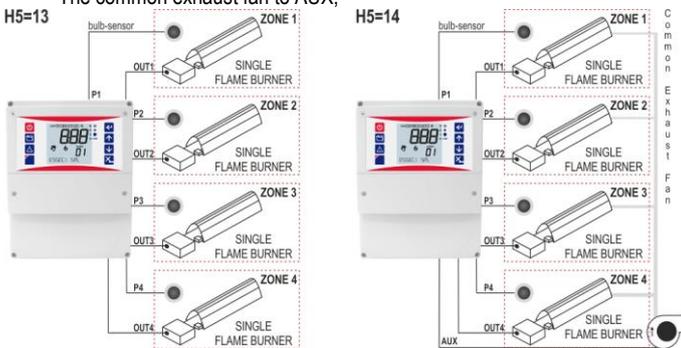
5. RS485 MODBus PORT

Go to parameter **H9P** to enable the second communication port of SCB60:
- **H9P = 0**: RS485 serial communication port enabled;
- **H9P = 1**: serial communication port enabled for communication protocol MODBus, 9600bdr. See datasheet E1313M for the list of available MODBus commands.

WARNINGS:
- Beware to not invert the **+A** and **–B** wires;
- Make a series network connection: not parallel, star, ring or tree.
- Assign a unique address to each SCB60, parameter **H9M.**
- SW1 enables the end of line resistor. Set SW1 to ON in the last SCB60 of the network.

USE

6. FRONT PANEL
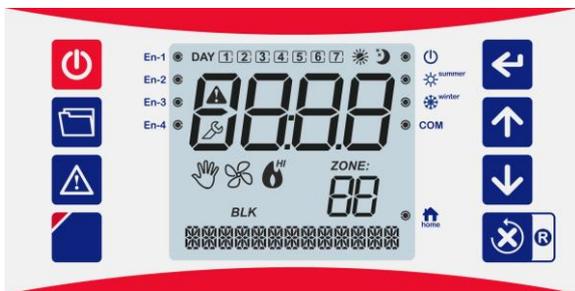
KEYBOARD

⏻	**ON / OFF:** to switch ON the controller or to put it in stand by mode. (ONLY IF **Hb=YES**)
🗁	**MENU:** push briefly for menus: tiME / SEt / inFo / PAr / Fnc.
⚠	**ALARM:** push for alarm menu / to silence the alarm buzzer if ON. You can only access the ALARM MENU during an alarm condition
◣	**DISPLAY LCD:** display parameter list: language, backlight, buzzer, speed text

---

↵	**ENTER:** During setup it works like "ENTER" button. • To enter the displayed menu/parameters; • To confirm/start the displayed functions. During the normal activity, press it briefly to see the thermometric scale
↑	**UP:** During setup to scroll the menu and parameter lists, to increase displayed values. During the normal activity, it scrolls the available heating zones.
↓	**DOWN:** During setup to scroll the menu and parameter lists, to decrease displayed values. During the normal activity, it scrolls the available heating zones.
⊗®	**ESC / RST:** During setup it works like "Esc" button. During the normal activity hold it to reset lockout burners of the displayed zone.

DISPLAY:

⚠ **ALARM**	**ALARM**: alarm in progress.
🔧	**Configuration LED:** The symbol light is on when the display shows the parameter/menu label. The symbol blinks when the display shows the parameter value
ZONE: — —	**Zone:** it is the heating zone to which data on display are referred (i.e.: 02=zone 2)
DAY 1 2 3 4 5 6 7	**Day of the week**: (**1** = Monday,.. , **7** = Sunday).
⏻	**ON/OFF**: chrono-thermostat status ⏻ ○: chrono-thermostat ON. ⏻ ◉: chrono-thermostat OFF mode: it is not a power cut off, it is rather a STAND BY mode. The controller keeps powered at 230Vac. In OFF mode: - it does not maintain the reduced set-point, rt; - the display shows the message CONTROLLER OFF
☀	**Summer**: ☼ ◉: chrono-thermostat in summer/cool mode. (direct action)
❄	**Winter**: ❄ ◉: chrono-thermostat in winter/heat mode. (reverse action)
COM	**Communication**: it shows the status of the RS-485 communication port MODBus. **COM** ◉ : serial communication in progress
🏠 home	**HOME:** chrono-thermostat home page 🏠 ◉: the display shows the temperature of the displayed zone.
En-1	**Burner 1: Enable / Disable** **En-1** ◉: burner 1 enabled
En-2	**Burner 2: Enable / Disable** **En-2** ◉: burner 2 enabled
En-3	**Burner 3: Enable / Disable** **En-3** ◉: burner 3 enabled
En-4	**Burner 4: Enable / Disable** **En-4** ◉: burner 4 enabled
✋	**Manual / automatic mode:** ✋ON: the displayed zone is in manual ON or OFF mode by parameter **A-M**; ✋ blinking: the displayed zone is in manual mode by key selector or BMS; ✋ OFF: the displayed zone is in automatic mode;
BLK	**Burner lockout:** **BLK** ON: the controller detects a flame failure in the zone
🔥 🔥ᴴᴵ	**Burner output(s):** 🔥 ON: burner or first stage ON. 🔥ᴴᴵ ON: burner second stage ON
✼	**Common exhaust fan output:** ✼ ON: output of common exhaust fan ON
☼	**Timer program ON - SP:** Timer program of burner ON with set-point temperature SP (SP1/SP2/SP3/SP4)
☽	**Timer program off - rt:** Timer program of burner OFF, the burner maintains just the frost protection set-point. **rt**=0 no frost protection setpoint, burner outputs OFF

7. MENU / FUNCTION / PARAMETER SETUP
7.1 MENU– PARAMETER SETUP

To access to menus and parameters, proceed as follows:

- Make sure you are in the thermostat home page, 🏠 ◉;

- Press 🗁: the symbol 🏠 ○ switches off and the display shows the menu: $tiME$;

  tiME

- Press ↑ or ↓ to scroll the menu:
  - SEt: set-point menu;
  - $inFo$: info menu;
  - Fnc: function menu;

  MENU OROLOGIO

o PAr: parameters menu, to enter PAr insert the correct password, para. n°17;
o $t\ IME$: clock menu;

A short description will be shown at the bottom of the display, i.e.: "tiME - clock menu".

- press ⬅ to open the selected menu; the display shows the first parameter and the setup LED "🔧" light is on.
- press ⬆ or ⬇ to scroll the parameter list. A short description will be shown at the bottom of the display;
- press ⬅: the display shows for 3s the parameter value and the LED "🔧" blinks;
- press ⬆ or ⬇ to change the value;
- press ⬅ to confirm the value and go back to the parameter list;
- to exit and save changes either press ⊗® or wait for 15s.

NO access to the menus when the keypad is locked or thermostat in stand-by.

7.2 LANGUAGE, DISPLAY BACKLIGHT

Hold ~3s. the ▮ button to go to the list of the keyboard functions:
- **LANGUAGE**:
  IT = Italian;   **UK** = English;
- **BACKLIGHT**:
  NO = backlight OFF;
  YES = backlight ON for 30s. after keypress;
  ALWAYS = backlight always ON;
- **BIP**:
  YES = Buzzer ON;   **NO** = Buzzer OFF;
- **SCROLL SPEED**:
  MEDIUM = medium speed; **FAST** = fast speed;
- **NEW PARAGRAPH**:
  NO = new paragraph disabled, scrolling text active;
  YES = new paragraph active; long texts will not scroll, but display in two shots.
- Press ⬆ or ⬇ to scroll the parameter list
- Press ⬅ to display the parameter's value;
- Press ⬆ or ⬇ to modify the displayed value;
- Press ⬅ to confirm the entered value.

Press ⊗® or wait for 30s. to go back to the normal functioning.

8. CHRONO-THERMOSTAT ON / OFF - STAND-BY

To switch the controller ON / OFF, hold the ⏻ key for about 2 seconds. When the controller is in OFF mode, it shows the message "**CONTROLLER OFF"** and the "⏻" light is ON.

⚠ THE CONTROLLER KEEPS POWERED EVEN WHEN IN OFF / STAND-BY MODE.

In stand by mode it is possible:
- to enable/disable the key ⏻ from parameter **Hb;**
- to switch ON/OFF the chrono-thermostat by MODBus.

9. KEYPAD LOCK

To lock the keypad, set **HL**=YES.

With the keypad locked, the following operations are NOT allowed:
- Switching ON/OFF the controller from keypad;
- Checking the thermometric scale;
- Access to all parameters: $t\ IME$: SEt, $inFo$,
- Selecting the heating zone to display.
- Resetting burners

When the keypad is locked, the message Loc will be displayed anytime a key is pressed.

To temporarily unlock the keypad hold ⬆ and ⬇ for at least 3 secs until the message UnL is displayed. The keypad re-locks automatically after 15 secs of inactivity.

It is possible to set the function **"keypad always locked"** by MODBus.

10. DISPLAY OF THE HEATING ZONE

The SCB60 can be programmed to control up to 4 heating zones (see point 4, par. **H5**).

To scroll the different heating zones press ⬆ or ⬇ during the normal functioning, i.e.:

ZONE 1 shows: 01.   ZONE 2 shows: 02.

Should the controller be programmed to control just 1 zone, the display shows just:
01

11. MENU Fnc: FUNCTIONS

The menu Fnc includes the following parameters:
- $A-Π1$ / $A-Π2$ / $A-Π3$ $A-Π4$: automatic or manual ON or OFF function for the enabled zone 1 – 4, according to the chrono-thermostat setting;
- $H-C$: summer / winter mode selection.
- $En1$ / $En2$ / ... / $En4$: enable / disable the available burners 1 – 4, according to network configuration;
- $Cn-E$: hour meter zeroing;
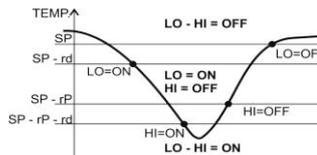
Follow point n°7.1 to access the Fnc menu.

11.1 WINTER / SUMMER MODE

The $H-C$ parameter sets the WINTER / SUMMER mode:
- $H-C = HEAt$: reverse action, WINTER - HEATING.
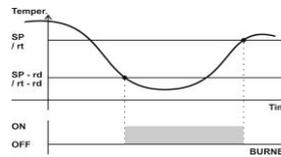
OUT 1 = burner 1 or 1st stage activates for temperature t≤**SP-rd** and turns off when it reaches the set-point temperature **SP** = **SP1/ SP2/ SP3/ SP4** or **rt** (if **rt**≠0).

In case of dual stage burners, the value of parameter **rP** has to be deducted from set-point **SP** in order to enable OUT HI, second stage, as shown on the left. **rP**=0: second stage disabled.

- $H-C = CooL$: direct action, SUMMER mode.
  Burner outputs (OUT1-4) will be always OFF. If **H5=9,** FAN output (AUX) will be ON according to thermostat setup.

⚠ **COMMON EXHAUST FAN:**
- It can only be operated by specific working modes, see 4.
- It activates when at least 1 burner is ON

COMMON EXHAUST FAN – PARAMETERS:
- **Fb**: Exhaust fan stop time before a burner activates. Is the time needed to reset the air pressure switch any time a burner calls for heat;
- **FbF**: Exhaust fan stop time after the burner ignition. Is meant to increase the burner ignition efficiency. To benefit of parameter **FbF**, set **Fb**>0.

Anytime a burner starts up, the common exhaust fan and the other burners in operation will switch off for a period of time equal to **Fb**. (if **Fb ≠ 0**)

At the end of the time **Fb**:
- **FbF** = **0** all enabled burners and the common exhaust fan, switch on simultaneously.
- **FbF ≠ 0** all the enabled burners will switch on, and then, after the **FbF** time the common exhaust fan will switch on too.

11.2 HEATING ZONE: AUTOMATIC / MANUAL MODE

Parameters $A-Π1$, $A-Π2$, $A-Π3$, $A-Π4$ set the operation mode of the specific heating zones.
- **A-Mx = oFF**: The heating zone is in Manual OFF mode, disabled. Burners in that zone will be OFF, they will just maintain the frost protection setpoint if **rt** > 0;
- **A-Mx = $AUtO$**: The heating zone is in Automatic mode. Burners activate according to the set timer programs;
- **A-Mx = on**: The heating zone is in Manual ON mode. Burners just maintain the COMFORT set-point, **SP1 / SP2 / SP3 / SP4**.

Menu Fnc: Shows only the parameters **A-Mx** (**x** = zone 1, 2, 3, 4) of the enabled zones, see parameter **H5**.

ON/OFF BY THE KEY SELECTOR OF THE SENSOR OR BY BMS CONTACT:
The **/Pb** parameter sets the functioning of the K1-C / K2-C / K3-C / K4-C terminals:
NOTE: The key selectors / BMS will always have priority over parameter **AM-x**. (x = 1, 2, 3, 4)

If **/Pb=1** connect the key selector of a probe to the contacts Kx-C (with x=1 or 2 or 3 or 4).
The heating zone can be manually started by the key placed on the zone probe, set to:
- **AUTO**: The chrono-thermostat activates according to the timer programs set for the selected zone;
- **ON**: Timer is excluded in the selected zone, burner/s activate to maintain the comfort set-point **SP1**;
- **OFF:** Timer is excluded in the selected zone, burner/s activate to maintain the frost protection set-point **rt**;

If **/Pb=2** connect a volt free contact of a BMS to the contacts Kx-C (with x=1, 2, 3, 4).
The heating zone can be manually started by the BMS contact:
- if **close**: Burner/s activate to maintain the comfort set-point **SP1**;

- if **open:** Burner/s off, they activate only to maintain the frost protection set-point *rt*;

TIMER PROGRAMS:

A timer program is a command of burner ON / OFF. The SCB60 sorts them by day and time and runs them cyclically.
Each heating zone has its specific timer programs, up to 16 different programs a zone.
To access to the timer programs:
- Select the parameter A-Mx of the desired zone.
- Press ⏎ to confirm
- Set *A-Mx* = $RUED$ by using ↑ or ↓ and press ⏎ to confirm. The display shows the first timer program set for the selected zone. The display shows the message "- - : - -" in case no timer programs are set.

To scroll the set timer programs or locate the first free place of memory:
- Press the ↑ button. The first free place of memory is signalled as ""– –:– –".

To set a timer program:
- Hold ⏎ until the digits of hours "– –:" of the new timer program blink.
- Press ↑ or ↓ to select the starting hour of the timer program.
- Press ⏎ to confirm the value; the digits of minutes ":– –" blink.
- Press ↑ or ↓ to select the minutes, they move forward / backward by 10;
- Press ⏎ to confirm the value; the signals ①②③④⑤⑥⑦ blink;
- Press ↑ or ↓ to select the day(s) when the timer program should be active, i.e.:

②	①②③④⑤
Only 2 = Tuesday	Weekdays: Monday to Friday

- Press ⏎ to confirm the value. the timer program type will be displayed:
  - ☀ + D_n = comfort set-point, it is a timer program of outputs ON.
    If the SCB60 is in heating mode, reverse action: it is a program of burner ON with set-point.
    If the SCB60 is in summer-fan mode: it is a program of fan ON (only if **H5=13**).
  - ☽ + DFF = frost protection set point, it is a program of output OFF.
    If the SCB60 is in heating mode, reverse action: it is a program of burner OFF with frost protection set point, only if *rt* ≠ 0.
    If the SCB60 is in summer-fan mode: it is a program of fan OFF (only if **H5=13**).
- press ↑ or ↓ to set the desired timer program;
- Press ⏎ to confirm and save the timer program just set;
- Press ↑ to go to the next space of memory;

To delete _ONE_ or _ALL_ selected timer programs:
Go to the timer program menu as described in the previous paragraph;
- To delete ONE program:
  - Press ↑ to select the scheduled timer program to be cancelled
  - Hold ↑ or ↓ for 3s until *"- - : - -"* will be displayed.
- To delete ALL the saved TIMER programs:
  - Hold ↑ or ↓ for 6s until *"EALL"* will be displayed.

To *exit* the timer program menu wait for 10s.

Timer is overridden:
- By ON / OFF *manual function*, parameter $R-\Pi$ menu Fnc;
  - $R-\Pi$**x** = DFF function "manual OFF": burners activate to maintain the frost protection set-point *rt* in the *x* zone.
  - $R-\Pi$**x** = on function "manual ON": burners activate to maintain the set-point *SP* in the *x* zone.
  Timer programs are overridden when the manual OFF or ON functions are active, LED ✋ is on.
- By switching OFF the SCB60 by pressing ⏻. If the SCB60 is in stand-by mode, the burners do NOT activate to maintain the frost protection set-point *rt*;
- By the zone probe key selector, if available.
- By the BMS contact if available, parameter */Pb=2*.

TIMER PROGRAMS OPTIMIZATION – ONLY IF /P5 = YES:

When the chrono-thermostat is in *AUTO* mode it is possible to select the working period optimisation. Through this function, it is possible to reach the desired temperature at a fixed time. This will considerably reduce power wastages. This is the result of a constant control of the ambient temperature in every single zone, of the set point value, which is set by the user for that specific zone, of the system temperature increase in Grades/Hour and of the value of the outside temperature. In this way, the system is able to set out and if necessary to revise the pre-start period required to reach the desired temperature. The absence of any connections to external events in defining the starting period erases all possible interferences caused by internal or external climatic changes in the room. In the event of an unexpected increase of the system heating efficiency, due for instance to a different humidity value of the air, the electricity supply will immediately be interrupted until the next analysis.

The parameters for this function [*t0*, *tr*] are set by the manufacturer to standard levels. Please check them with regard to the specific controller.

11.3 BURNER ENABLE / DISABLE

Should there be some unused area inside a heating zone, you can disable a specific burner and get an impressive energetic saving.
To enable / disable a burner connected to the SCB60, proceed as follows:
- En l: enable / disable burner 1:
  no: burner 1 OFF, disabled; YES: burner 1 ON, enabled, **En-1** ◉;
- •
- $\ddot{E}n-4$: enable / disable burner 4:
  no: burner 4 OFF, disabled; YES: burner 4 ON, enabled, **En-4** ◉;
⚠ IF BURNER IS DISABLED, **NO** FROST PROTECTION SP *rt* WILL BE MAINTAINED.

11.4 RESET THE HOUR METER TO ZERO

Parameter $Cn-C$ resets the hour meter to zero.
To zero the hour meter, set $Cn-C$ to YES and press ⏎.

12. inFo MENU

$inFo$ menu includes the following info:
- EPS = temperature of outside sensor (if available)
- $Cn-l, Cn-2, Cn-3, Cn-4$ = hour-meter of OUT1, OUT2, OUT3, OUT4;

LIMITS OF HOUR-METER:
- The hour-meter values are saved every 3 hours. Any interruption of power supply in the meanwhile causes the loss of any data partially saved;
- To assess the burner activity, control the status of the output relay;
- The assessment of burner activity stops after 9999 hours.
See point n°7.1 to locate the $inFo$ menu.

13. SEt MENU: SET-POINT

The SEE menu includes the parameters *SP1, SP2, SP3, SP4*= comfort set-point of heating zone 1, 2, 3, 4;

Parameter SPx sets the comfort temperature set-point of the burners located in the *x* heating zone, *x* = 1, 2, 3, 4 according to the heating zone. *SPx* allowed value range is in between [*rL*, *rH*].
The SEE menu shows only the *SP* of the available zones, parameter */H5*.
See point n°7.1 to locate and set the SEE menu.

14. BURNER/S RESET

To reset the burners connected to the SCB60:
- hold ✖ until the display shows rSE, then press ⏎:
  - the display shows *00*: set it to *01* then press ⏎ or just wait 3s.;
  - now the SCB60 executes the burner reset.
It is an electric reset: OUT1 / OUT2 / OUT3 / OUT4 deactivate for a time equal to *L2*.

In case of operation with exhaust fume fan, *H5* = *2*, *4*, *6*, *8*, *10*, the burner reset time is *Fb*, and the FAN output reset time is *Fb* + *FbF,* no matter *L2*.

15. tiME MENU: CLOCK / CALENDAR

To _display_ the set time, go to the E $I\Pi E$ menu, see point n.8.1. Ex: Wednesday, 2:32pm: it displays…

DAY ☐☐3☐☐☐
14:32

To _adjust_ the set time:
- go to the E $I\Pi E$ menu: press ⏎, the hour digits blink;
- press ↑ or ↓ to set the current hour;
- press ⏎ to confirm it; the minute digits blink;
- press ↑ or ↓ to set the current hour;
- press ⏎ to confirm it; the day set blinks, the other week days are off;
- press ↑ or ↓ to set the current day, es :

DAY ①	DAY ②	DAY	⑥ DAY	⑦
1=Monday	2 =Tuesday	6 = Saturday	7 = Sunday	

- press ⏎ to confirm it; the digits of the year "$YY00$" blink;
- press ↑ or ↓ to set the current year;
- press ⏎ to confirm it; the digits of the month "$\Pi\Pi0l$" blink;
- press ↑ or ↓ to set the current month;
- press ⏎ to confirm it; the digits of the day of month "$d\Pi0l$" blink;
- press ↑ or ↓ to set the current day of month,
- press ⏎ to confirm it;
To exit either press the ✖ button or wait for 30 s.

16. ALARM MENU: LIST OF ERRORS / ALARM MESSAGES

In case of alarm/ failure, the display shows the LED "⚠" and the message "ALARM IN PROGRESS". The SCB60 signals up to 10 alarm events.
Alarm menu is only available and accessible in presence of alarm / error events.
To check the list of pending alarm / error events:

- press ⚠, the first alarm / error event will be displayed;
- press ↑ or ↓ to browse the list of pending alarm / error events.

ALARM SIGNALS

Display	LED	Description
A 10	⚠	Eeprom fault, switch the thermostat off and on again
A 13	⚠	Clock error. Check date and time.
A 60	⚠	Burner lockout, warning light 1.
A 61	⚠	Burner lockout, warning light 2.
A 62	⚠	Burner lockout, warning light 3.
A 63	⚠	Burner lockout, warning light 4.
A 20	⚠	Probe P1 in short-circuit or not connected or temperature beyond limits. In case of faulty P1, all outputs related to zone 1 are OFF.
A 21	⚠	(IF AVAIL.) Probe P2 in short-circuit or not connected or temperature beyond limits. In case of faulty P2, all outputs related to zone 2 are OFF.
A 22	⚠	(IF AVAIL.) Probe P3 in short-circuit or not connected or temperature beyond limits. In case of faulty P3, all outputs related to zone 3 are OFF.
A 23	⚠	(IF AVAIL.) Probe P4 in short-circuit or not connected or temperature beyond limits. In case of faulty P4, all outputs related to zone 4 are OFF.
A 30	⚠	(IF AVAIL.) Outside probe in short-circuit or not connected or temperature beyond instrument limits. Check the cable to the probe. The alarm stops when the temperature goes back to normal values.
A 40	⚠	Temperature alarm.
A 64	⚠	ZONE 1: High temperature alarm.
A 65	⚠	ZONE 1: Low temperature alarm.
A 66	⚠	ZONE 2: High temperature alarm.
A 67	⚠	ZONE 2: Low temperature alarm.
A 68	⚠	ZONE 3: High temperature alarm.
A 69	⚠	ZONE 3: Low temperature alarm.
A 70	⚠	ZONE 4: High temperature alarm.
A 71	⚠	ZONE 4: Low temperature alarm.

To mute the buzzer (if **Ab**= 1), press any key; the alarm condition keeps showing on display until removal of the alarm cause.

TEMPERATURE ALARMS
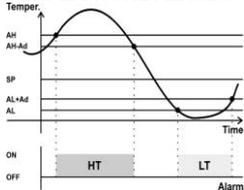
Parameter **AL** and **AH** values are the alarm absolute limits of low temperature, **Lt**, and high temperature, **Ht** of all zones. They are fixed and don't track the set-point value as it is changed.
AL=**LSL** (*LSL*=bottom end of scale): the low temperature alarm is equal to probe fault alarm, **E1**.
AL=**LSH** (*LSH*=top end of scale) the high temperature alarm is equal to probe fault alarm, **E1**

OTHER ALARM SIGNALS:

Loc keypad locked (see point n°9)
 controller in stand-by mode.
oFF WARNING: the controller keeps powered even when switched OFF (OFF mode)

17. PAr MENU: PARAMETERS

THERE ARE 3 PARAMETER LISTS: "USER" / "INSTALLER" / "FACTORY".
THE "USER" PARAMETERS CAN BE SET BY USER, PARAMETER **PA1**.
Go to the "*PAr*" menu, see point 7.1.

- The display shows "**PA**". Press ↵: the standard password value will be displayed, "**00**";
- Press ↑ or ↓ to set a new password (for different passwords see end of paragraph). The thermostat stays accessible and remembers the password for 4 minutes.
- Press ↵: the display shows the first parameter of the list enabled by the password.
- To scroll and set the parameters proceed as described in point 7.1.

When scrolling the parameter list, the "🖉" light is ON; when the display shows the parameter value, the "🖉" light flashes.

PARAMETR LIST

Cod	Parameters	Type	Range	UM	Def
/	**Regulating probe parameters**				
/C1	Probe P1 calibration	☺	**LLD...LHD**	°C/°F	0,0
/C2	Probe P2 calibration	☺	**LLD...LHD**	°C/°F	0,0
/C3	Probe P3 calibration	☺	**LLD...LHD**	°C/°F	0,0
/C4	Probe P4 calibration	☺	**LLD...LHD**	°C/°F	0,0
/C5	Probe P5 calibration – external probe	☺	**LLD...LHD**	°C/°F	0,0
/P5	Presence of external probe. NO / YES	I	no...YES	-	no
/Pb	K-C input/s for probe with key selector or for BMS. 1= key selector of the probe; 2= BMS contact;	I	1...2	-	1
/S	Inputs reading stability	I	0...5	-	2
r	**Regulator parameters**				
rd	Set-point differential	☺	0,1...**LHD**	°C/°F	0,5
rEU	Thermometric scale: **°C**= Celsius; **°F**= Fahrenheit	I	°C...°F	-	°C
rt	Safety set-point. 0=outputs off	☺	0...**LHD**	°C/°F	6
rL	Low temperature limit **SPx** (x=1,2,3,4)	I	**LLD..rH**	°C/°F	10
rH	High temperature limit **SPx** (x=1,2,3,4)	I	**rL..LHD**	°C/°F	30
rP	2 stage set-point (available in 2 stage burner)	I	0,1...**LHD**	°C/°F	0
L	**Output parameters**				
L0	Output time delay at power on	F	15...250	Sec	15
L2	Reset pulse duration.	F	1...59	Sec	3
F	**Fan parameters**				
Fb	Stop time of common fan and burners before any burner ignition	F	2...250	Sec	5
FbF	Stop time of common fan and burners after any burner ignition	F	2...60	Sec	5
A	**Alarm parameters**				
Ab	Activate and mute buzzer: 0= no buzzer, when an alarm occurs. 1= buzzer will activate when an alarm occurs. Press a key to mute the buzzer alarm.	I	0...1	-	1
Ad	Alarm differential	I	0,1..**LHD**	°C/°F	5
AL	Low temperature alarm. It shows the value beyond which an alarm condition is activated	☺	**LLD..AH**	°C/°F	-50
AH	High temperature alarm. It shows the value beyond which an alarm condition is activated	☺	**AL..LHD**	°C/°F	99,9
A3	Alarm delay at SCB60 power on	☺	0...250	Min.	0
t	**Timer parameters**				
t0	Maximal pre-start time of programs. 0=function of pre-start excluded	☺	0...6	Hours	0
tr	Efficiency of heating system	I	0,1...12 0,1...24,8	°C*Hr °F*Hr	3,0
H	**Other parameters**				
Hb	Enable/disable ON/OFF key. 0 = ON/OFF key disabled; 1 = ON/OFF key enabled;	I	no...YES	-	YES
HH	**READ ONLY**: Firmware release	☺	-	-	-
H5 **(*)**	Working mode of SCB60: 1= 1 zone of 4 burners; 2= 1 zone of 4 burners + common fan; 3= 2 zones of 2 burners a zone; 4= 2 zones of 2 burners a zone + common fan; 5= 1 zone of 2 two-stage burners; 6= 1 zone of 2 two-stage burners + common fan; 7= 2 zones of 1 two-stage burner; 8= 2 zones of 1 two-stage burner + common fan; 9= 1 zone of 4 warm air generators; 10= 2 zones. Zone1: 2 burners + common fan Zone2: 2 burners; 11= 3 zones of 1 burner a zone; 12= 3 zones of 1 burner a zone + common fan; 13= 4 zones of 1 burner a zone; 14= 4 zones of 1 burner a zone + common fan;	F	1...14	-	1
H9M	MODBus serial address.	I	1...247	-	1

H9P	Enable/disable serial port: 0=port not enabled; 1=port enabled MODBus communication; 9600Bdr;	I	0…1	-	0
HL	Keyboard lock: no; YES;	☺	no…YES	-	no
PA1	User parameter password	☺	0…250	-	0

NOTE: *LLD* and *LHD* are the bottom and top ends of scale. They vary according to the thermometric scale °C/°F, see parameter *rEU*. With PTC sensor, they are.
- *LLD*= -99.9°C / -178°F
- *LHD*= 99.9°C / 178°F

(*): At any new setup of *H5*, we recommend to restart the SCB60

TYPE OF PARAMETERS AND RELATED PASSWORD:

Type	*Description*	*PA*
☺	**USER** parameters	*Par PA1*
I	**INSTALLER** parameters. Before changing them, read carefully the instructions.	95
F	**FACTORY** parameters. These parameters are factory set, the default values can be different from the suggested ones. Modifying these parameters can cause a controller malfunction. FACTORY parameters include INSTALLER and USER parameters.	59

18. GUARANTEE

Warranty on materials: 1 year (from production date, excluding consumables).
The Company shall only repair or replace products, which are found to be defective after inspection by Space-Ray's technical service. The Company shall not be under any liability and gives no warranty in the event of defects due to exceptional conditions of use, misuse or tampering. All warranty claims returned to Space-Ray must have prior return authorization. Customer will be responsible for all return shipping charges and fees.

19. DISPOSAL

The controller must be disposed of in compliance with local standards regarding the collection of electric and electronic equipment.

RoHS COMPLIANT 2002/95/EC	**Space-Ray** **Gas Fired Products (UK) Limited** **Chaple Lane, Claydon - Ipswich, Suffolk, IP6 0JL** **Tel: +44 (0)1473 830551 - Fax: +44 (0)1473 832055**