SALUS

Programmable Thermostatic Radiator Valve Control Head



WARRANTY 2 YEARS

Instruction Manual

Model No's PH60/PH60-1/PH60-C

PI Control

CE

PRODUCT COMPLIANCE

This product complies with the essential requirements of the following EC Directives:

- Electro-Magnetic Compatibility directive 2004/108/EC
- Low Voltage Directive 2006/95/EEC
- EC Marking directive 93/68/EEC

SAFETY INFORMATION

These instructions are applicable to the SALUS Controls model stated on the front cover of this manual only, and must not be used with any other make or model.

These instructions should be followed along with any other statutory obligations - if you are in any doubt, please contact the SALUS Controls technical helpline.

Please leave these instructions with the end user where they should be kept in a safe place for future reference.

INTRODUCTION

A Thermostatic Radiator Valve (TRV) is a self-regulating valve fitted to hot water heating system radiators. The TRV controls the temperature of a room by regulating the flow of hot water to the radiator.

The PH60 from SALUS Controls is a stylish and accurate TRV programmable control head designed for independent control of central heating radiators. It is fitted to a new or existing TRV, and works by controlling the radiator temperature according to a series of programmed settings.

The PH60 is fitted with an easy to read Liquid Crystal Display (LCD) and a five key operating panel, which is coupled with a unique, smart design that makes the PH60 easy to programme and operate.

PI Control

The SALUS PH60 is a PI (Time Proportional & Integral) control product as defined in the Building Regulations, which makes the heating system operate up to 15% more efficient and provides close, accurate control. **Please note there is no span on the PH60 PI.**

Features

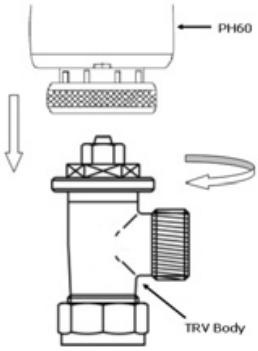
- PI Control for accuaracy and efficiency
- LCD with Backlight
- Stylish Casing
- Simple to Install
- 6 Control Modes
- Temporary Override Function
- Built in Start-up Programmes
- Limescale Protection feature
- 7 day Independent Programming



INSTALLATION

Please read the important safety information at the start of this manual before you begin to install the device.The PH60 is easily installed – whether fitted as part of a new installation, or in place of an existing TRV control head.

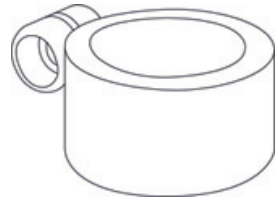




The PH60 is attached to the valve body by screwing the locking collar at the base of the controller onto the threaded section of the TRV body, as shown in this picture. The locking collar only needs to be tightened by hand – do not use a spanner or pipe grips as you may damage the PH60, TRV or both.

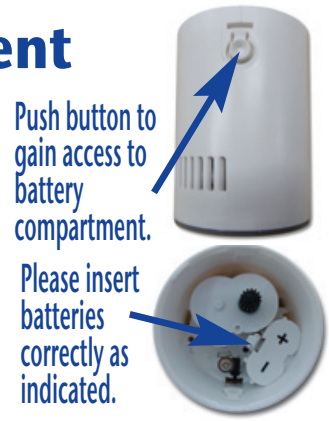
About Valve Compatibility

An adapter for valves from the following manufactuers: Heimeier, Junkers, Landy + Gyr, Honeywell-braukmann, Oventrop M30X1.5 is not required.
For Danfoss valves RA-Series, you may require the following adapter (supplied). Slide the adapter onto the valve completely and tighten the screw.



Battery Installation and Replacement

Installation of the batteries is a straightforward operation. Remove end cap from the PH60 body as shown in this picture, and insert the batteries, please make sure that the batteries are correctly inserted.



After Installation

After completing installation and powering up the PH60 for the first time the controller will go through an adaptation procedure to check that the valve has been installed correctly. The PH60 will behave in the following way:

Display	Comments
	All the indicators on the display and the backlight will be turned on for two seconds.
	The internal firmware version will then be displayed for one second (the numbers displayed may be different to the one shown here, depending on the firmware revision of the individual PH60 controller)
	The PH60 will then enter ADAPTATION mode. If there are no problems with the battery or gear assembly, the display will be as shown in this example. The flashing indicator shows the motor is operating and retracting the control pin.
	Once the control pin is fully retracted, the display stops flashing and the display will indicate the valve is open. Install the TRV to the valve. To move to the next stage, press any key.
	The flashing indicator shows the motor is operating and extending the control pin to close the valve.
	Once closed, the display will change as shown in this example. The flashing indicator shows the motor is operating and retracting the control pin again. If this final stage is completed successfully, the PH60 will enter NORMAL mode
	When entering NORMAL mode for the first time or after a RESET), the time and day are set to 00:00 and 1. They are flashing to prompt you to set them to the correct values – to do this, please follow the 'Time Setting Mode' procedure on page 18.

At the start of the adaptation procedure, the controller will check the battery and gear assembly; if there are any problems, the following screens will be displayed:

Display	Error
	This example shows the battery voltage is low.
	This example shows the gear assembly is not installed.

If there is a problem during the adaptation procedure, the controller will stop and restart the process. If the problem still exists, an error code will be displayed;

Error Code	Description
Er1	Stroke too short. During the 'P2' adaptation stage the pin stopped extending before reaching its minimum controllable point.
Er2	Stroke too long. During the 'P2' adaptation stage the pin did not stop extending after reaching its maximum controllable point.
Er3	Unequal stroke. The measured strokes during stages 'P2' and 'P3' are not equal (this is normally caused by weak batteries).
Er4	Operation over time. The motor has been operating for over 100 seconds before reaching the end point.

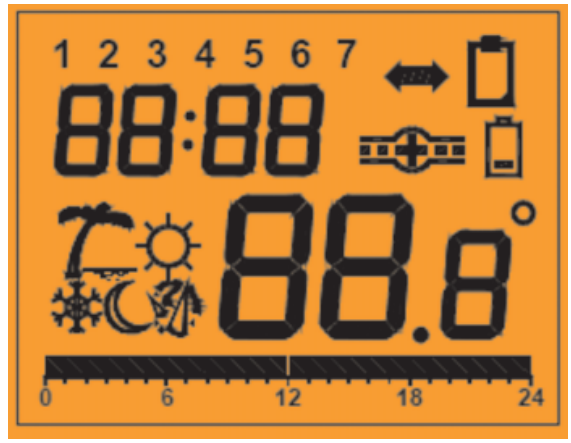
An example of an error message is shown below:

Display	Error Description
	Error 2 (Er2 – stroke too long) occurred during the adaptation process. Pressing any key will restart the adaptation process.

It is also possible to enter **ADAPTATION** mode manually if the PH60 is in **NORMAL** mode. This is done by pressing the **SET** key until 'AdAP' is shown on the display. Releasing the **SET** key will start the adaptation process. If an error is displayed during the manually selected adaptation, pressing any key or waiting 8 seconds without a key press will return the PH60 to **NORMAL** mode.

USER INTERFACE AND CONTROLS

The status and operation of the PH60 can be clearly seen on the backlit Liquid Crystal Display (LCD) - this display allows the user to see at a glance the current status of the valve controller.



The display consists of a combination of symbols and alphanumeric displays. The status indicator symbols and their meanings are shown in the following table:

User Control Function Summary

Indicator	Description	Function
1 2 3 4 5 6 7	Day of Week Indicator	In **NORMAL** mode indicates the current day of the week. In **PROGRAMME** mode indicates the day being programmed. In **PROGRAMME COPY** mode indicates the source and destination day.
88:88	Time Indicator	In **NORMAL** mode indicates the current time. In **PROGRAMME** mode indicates the programme time.

Indicator	Description	Function
	Temperature Indicator	In **NORMAL** mode indicates the room temperature. In **PROGRAMME** mode indicates the set temperature. In **TEMPERATURE** mode indicates the set temperature.
	Valve Status Indicator	A 'water flow' animation is shown when the valve is opened. A 'closed valve' animation is shown when the valve is closed. Indicator flashes when the valve is opening.
	Low Battery Indicator	Indicator flashes when the battery voltage is low.
	Programme Copy Indicator	In **PROGRAMME COPY** mode shows the source and destination day.
	Comfort Temperature Mode Indicator	In **AUTO** mode indicates the set temperature is 'Comfort'. In **MANUAL** mode indicates the set temperature is 'Comfort'. In **PROGRAMME SETTING** mode indicates the set temperature selected for the hour is 'Comfort'.

Indicator	Description	Function
	Econ Temperature Mode Indicator	In **AUTO** mode indicates the set temperature is 'Econ'. In **MANUAL** mode indicates the set temperature is 'Econ'. In **PROGRAMME SETTING** mode indicates the set temperature selected for the hour is 'Econ'.
	Party Temperature Mode Indicator	In NORMAL mode indicates the set temperature is 'Party'. In MANUAL mode indicates the set temperature is 'Party'.
	Holiday Temperature Mode Indicator	In NORMAL mode indicates the set temperature is 'Holiday'. In MANUAL mode indicates the set temperature is 'Holiday'.
	Frost Protection Temperature Mode Indicator	In NORMAL mode indicates the set temperature is 'Frost Protection'. In MANUAL mode indicates the set temperature is 'Frost Protection'.

Indicator	Description	Function
	'OFF' Mode Indicator	Indicates the PH60 is operating in 'OFF' mode - a special manual control mode that closes the TRV regardless of the room temperature or set temperature.
	Programme Profile Indicator	In NORMAL mode indicates the controller is running in AUTO (Programme) control mode. In PROGRAMME mode indicates the profile of the selected day. In the PROGRAMME COPY mode it indicates the program profile of the source day.

There are few user controls for the PH60, making the controller very easy to operate. These controls are shown below, along with a description of each of their functions.



User control function summary:

Key / Operation	Functions
+	Increases or changes the selected setting.
-	Decreases or changes the selected setting.
SET	Enters Menu or confirms a menu selection
SELECT	Selects item when in SET mode
AUTO/MANUAL	In NORMAL mode, press to choose the AUTO
	programme, or any of the MANUAL control modes.
Reset Button	Press and hold for more than one second to reset the
	controller to default (original factory) settings.

OPERATION

The PH60 is configured and adjusted by the use of five touch sensitive buttons.



Normal Mode

NORMAL mode is the default operating mode of the PH60.

This is a typical **NORMAL** operating mode display.

- The time is midnight, and the day is 1 (Monday)
- The room temperature is 23 °C
- The valve animation shows that the TRV is open
- The profile indicator at the bottom of the display shows the PH60 is in **AUTO** mode
- The 'Econ' indicator shows the PH60 set temperature mode is 'Econ'



Auto and Manual Control Modes

When the PH60 is operating in **AUTO** mode, TRV control is based on the programme currently set. In **MANUAL** mode, the set temperature is fixed depending on which set temperature mode (Off, Comfort, Econ, Party, Holiday or Frost) has been selected. The temperature mode indicator and programme profile indicator show what mode the PH60 is operating in:

Display	Operation
	In this example, the PH60 is set to operate in ‘Comfort’ mode. The temperature mode indicator will flash if temporary override mode has been selected.
	In this example, the PH60 is set to operate in ‘Econ’ mode.

When operating in MANUAL mode, programmes are not used – the profile indicator is not displayed, and the set temperature is fixed to the temperature selected by the user.

The images below show the PH60 operation in MANUAL mode with the set temperature in ‘Comfort’, ‘Econ’, ‘Party’, ‘Holiday’ and ‘Frost’ modes:



Changing Control Mode

Pressing the **AUTO/MANUAL** key when the PH60 is in **NORMAL** mode will allow you to change between automatic control and the six manual control modes. Pressing the + or – keys allow you to change the set temperature:

Display	Operation
	Press the **AUTO/MANUAL** key once and the PH60 will display 'SEt' and the current control mode. Press and hold the **SET** key or wait for 8 seconds to return to **NORMAL** mode without making any changes.
	Press the **AUTO/MANUAL** key again (or the **SELECT** key) to change the control mode. Use the **AUTO/MANUAL** key to scroll through the control modes (Auto ⑦ Manual Comfort ⑦ Manual Econ ⑦ Manual Party ⑦ Manual Holiday ⑦ Manual Frost ⑦ Manual Off ⑦ Auto). Press the **SET** key or wait for 8 seconds to return to **NORMAL** mode and the PH60 will start to operate in the new mode.
	When choosing the control mode, you can use the + or – keys to change the set temperature setting. You cannot adjust the set temperature if 'Off' mode has been selected.
	Pressing the + or – key in **NORMAL** mode will allow you to review the current set temperature. 'SEt' and the set temperature will be displayed until the key is released. If the + or – key is held for more than two seconds, the display will flash once and change to setting mode.

Accessing the Menus

To access the Mode screens, press the SET key as indicated in the table below:

Display	Operation
	Press and hold the **SET** key for one second to enter the time setting mode. The display will change to show 'CLOC'.
	Press and hold the SET key for four seconds to enter the programme setting mode. The display will change to show 'Pro'.
	Press and hold the SET key for 7 seconds to enter the programme copy mode. The display will change to show 'Pro' and the copy icon.
	Press and hold the SET key for 10 seconds to enter the option setting mode. The display will change to show 'OPn'.
	Press and hold the SET key for 13 seconds to enter the adaptation mode. The display will change to show 'AdAP'.

Press and hold the **SET** key for 16 seconds to return the PH60 to **NORMAL** mode.

Time Setting Mode

The Time Setting mode allows the setting of the day and time – these are the only items displayed on the screen.



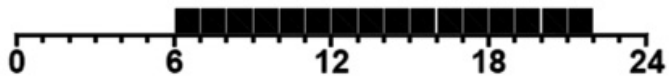
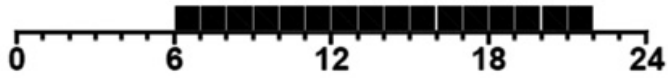
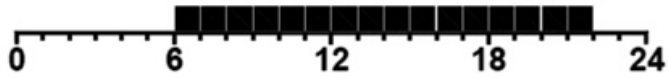
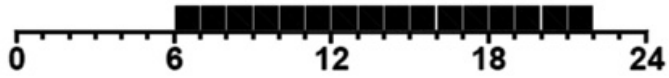
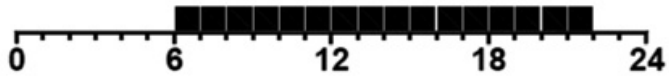
- Initially, the hour will be flashing; press the + or – keys to change the setting.
- Press the **SELECT** key to select the minutes; press the + or – keys to change the setting.
- Press the **SELECT** key to select the day; press the + or – keys to change the setting.

Pressing the **SET** key, or not pressing any keys for 30 seconds will return the PH60 to **NORMAL** mode.

Programme Setting Mode

The PH60 offers great versatility with its programming options, allowing the user to programme the controller to operate on a 7 day individual, 5/2 or 7 day control cycle. The controller has a default set of Programmes that have been designed to meet the needs of most users:

The table below reflects a 24hr day.

Day of Week	Factory Preset Programme
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

In the examples shown above, the time between 0600 to 2200 will represent a 'Comfort' setting (High set point temperature) The blank areas will represent an Econ setting (Low set point temperature)

Please note, Econ temperature cannot be set higher than Comfort temperature setting.

The PH60 has 5 preset set temperature modes:

No	Programme	Description
1	Comfort	A warm, comfortable setting. Adjustable between 7 – 30 °C
2	Econ	A lower setting than 'Comfort' to save energy. Adjustable between 7 – 30 °C
3	Party	An alternative comfortable setting, similar to 'Comfort'. Adjustable between 15 – 30 °C
4	Holiday	A low setting used when the house is not occupied for a long period. Adjustable between 7 – 15 °C
5	Frost	An even lower setting than 'Holiday', just high enough to stop pipes freezing. Adjustable between 4 – 7 °C

All the set temperatures are adjustable in 0.5 °C steps. 'Comfort' and 'Econ' are used in programmes.

If these default programmes are not suitable for your particular situation, reprogramming the PH60 with your own settings is a very straightforward operation.

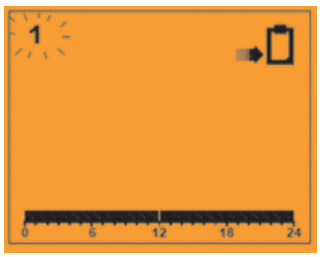
After entering the Programme Setting mode, the programme settings are adjusted as follows:

Display	Operation
	Initially, day 1 (Monday) will be displayed. The clock hour will be flashing, along with a flashing cursor on the profile indicator at the bottom of the display.
	Press SELECT to change the programme time. In this example, the time has changed to 11:00, and the set temperature is using the 'Comfort' programme, set at 21 °C
	To change the set temperature, press the + key to change the temperature mode to 'Comfort', or the – key to change to 'Econ'. The set time will then advance by 1 hour.
	Press the SET key to advance to the next day. The sequence is 1 – 2 – 3 – 4 – 5 – 6 – 7 – (1 – 5) – (6 – 7) – (1 – 7). Press SET again to return to NORMAL mode. (1 – 5), (6 – 7) and (1 – 7) are called day groups – all the days included are programmed together. The programming method is the same as single day programming.
	If the programme settings of the involved days are different, the temperature indicator, set temperature, and programme profile are not displayed. If the + or – keys are pressed to change the programme all the days of the displayed day group will be reset to the default programme setting. The temperature indicator, set temperature and programme profile will then be displayed to allow you to continue adjusting the programme settings.

If no keys are pressed for 30 seconds, the PH60 will automatically return to NORMAL mode.

Programme Copy Mode

The PH60 programme copy mode allows the user to copy one day's programme settings to another day.

Display	Operation
	On entering programme copy mode, day 1 (Monday) is displayed and flashing. The programme copy indicator is also displayed with an animated pointer pointing towards the clipboard. Press the + or – keys to select and copy other days, then press the SET key to go to the next screen.
	Initially, the same day that was chosen as the source is also set as the destination. Press the + or – keys to select other days as the destination. Press the SET key to complete the copy operation and return to NORMAL mode. Groups of days can be selected as the destination, so that several days can be programmed together. This example shows that all the weekdays have been set as the copy destination.

If no keys are pressed for 30 seconds, the copy will be cancelled andthe PH60 will automatically return to NORMAL mode.

Option Setting Mode

There are 5 user option modes available: Language, Stroke Position, Open Window Detection Sensitivity, Temperature Offset and Limescale Protection:

Display	Operation
	The first option is Language. "LAnG" for English. "SPrA" for German. The current language setting is displayed. The default language setting for the PH60 is English ('EnG'). Pressing the + or – keys will allow you to change the setting. Pressing the **SET** key will confirm the choice and move to the next screen.
	This is adjusted and set automatically in adaptive mode, see AdAP page 5. There is no change required.
	The third option is the Open Window Detection Sensitivity. 'OPEn' and the current sensitivity time setting is displayed. Pressing the + or – keys will allow you to change the setting to the options of 0, 1, 2 or 3. (0 turns off the option, 1 – 3 indicates low to high sensitivity). Pressing the SET key will confirm the choice and move to the next screen.

Display	Operation
	The fourth option is the Temperature Offset. 'OFS' and the current offset temperature setting is displayed. Pressing the + or – keys will allow you to change the setting between – 3.5 to + 3.5 °C in 0.5 °C steps. Pressing the SET key will confirm the choice and move to the next screen.
	The fifth option is the Limescale Protection. 'LInE' and the current setting is displayed. Pressing the + or – keys will allow you to change the setting to the options of 'YES' or 'NO'. Pressing the SET key will confirm the choice and return the PH60 to NORMAL mode.

If no keys are pressed for 30 seconds, the PH60 will automatically return to NORMAL mode.

Adaptation Mode

It is possible to enter **ADAPTATION** mode manually if the PH60 is in **NORMAL** mode. This is done by pressing the **SET** key until 'AdAP' is shown on the display.



Releasing the **SET** key will start the adaptation process. If an error is displayed during the manually selected adaptation, pressing any key or waiting 8 seconds without a key press will return the PH60 to **NORMAL** mode.

OTHER FUNCTIONS AND CONTROLS

Valve Status Indication

The status of the TRV is displayed on the PH60 is shown by the valve status indicator:

Display	Status
	When the TRV is closed, the PH60 will display a ‘closed valve’ indicator.
	When the TRV is open, the PH60 will display a ‘water flow’ animation.
	When the TRV is operating, the PH60 will display a flashing valve indicator.

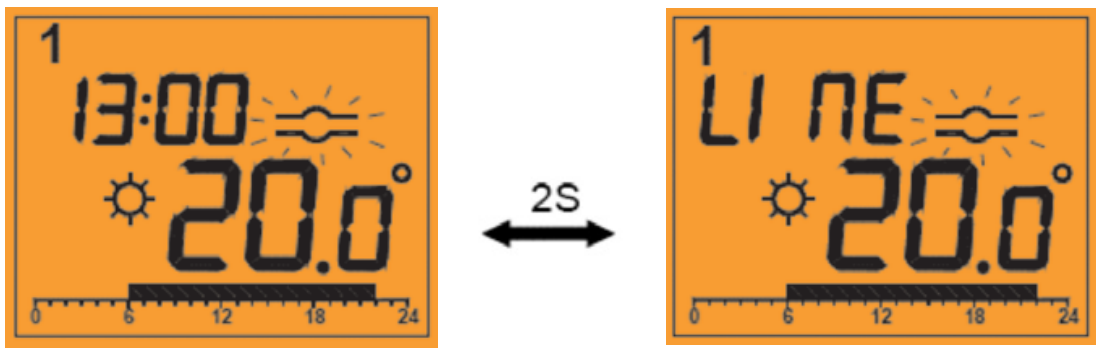
Backlight

The backlight of the PH60 is switched on automatically whenever any of the keys are pressed. The backlight will remain illuminated for 10 seconds after the last key press. The backlight does not operate if the PH60 is in **ADAPTATION** mode, or if the battery is low.

Limescale Protection

If the TRV is not operated for long periods, limescale deposits can build up in the valve and prevent correct operation. The PH60 has an inbuilt limescale protection mode to prevent this problem.

When limescale protection mode is enabled, the PH60 will operate the TRV at least once a day.
At 13:00 every day, if the valve has not been operated in the last 24 hours the PH60 will open and close the valve once. This will be indicated on the display as shown:



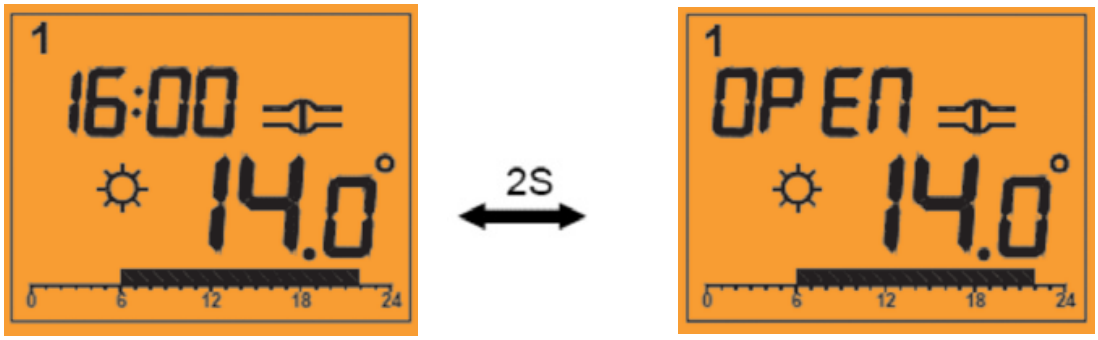
When enabled, limescale protection will continue to operate even if the 'Off' programme has been selected.

Open Window Detection

If a door or window is opened, this may cause a sudden drop in the room temperature and cause the TRV to be opened by the controller. This drop in room temperature is usually temporary, and in this situation it is usually better to turn off the heating.

When Open Window detection is enabled, the PH60 will automatically monitor the room temperature. If the temperature falls quickly (within a user selectable setting of 1.0, 1.5 or 2.5 °C) the PH60 will enter Open Window mode and close the TRV. If the room temperature stops falling (or starts to rise) the Open Window mode will stop and reset the detection state.

When Open Window mode is operating, it will be indicated on the display as shown below:



The Open Window state is automatically cancelled after 15 minutes, or if any key is pressed.

Reset Button

The Reset Button is provided as a way to restore the PH60 to its default factory settings. Pressing this button will delete any previously entered settings.

The default factory settings for the PH60 are:

Function	Default Setting
Operating Mode	Adaptation mode
Clock	00:00, 1
Programme	Reset to default
Control Mode	Auto
Room Temperature	Depends on current room temperature
Room Temperature Offset	0.0 °C
Set Temperature	Depends on current programme
'Comfort' Set Temperature	21 °C
'Econ' Set Temperature	16 °C
'Party' Set Temperature	21 °C
'Holiday' Set Temperature	10 °C
'Frost' Set Temperature	5 °C
Backlight	Off
Keylock	Disabled
Span	0.5 °C
Window Open Detection Sensitivity	2 (medium)
Temperature Offset	0.0 °C
Limescale Protection	Enabled
Battery Low Warning	Based on current battery condition
Valve Status	Open (after completion of adaptation)

Keylock

The PH60 keypad can be locked to prevent any accidental changing of the controller settings.
The keylock mode can be turned on when the PH60 is in NORMAL mode by pressing and holding the SELECT key for three seconds. Once active, pressing any key will show 'LOC' on the display, as shown below:

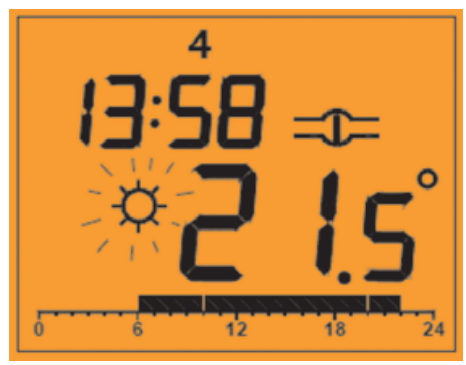


If you are unable to change any of the controller settings, check that the keylock mode is not turned on. To disable the keylock, press and holding the SELECT key again for three seconds.

Temporary Override Mode

When the PH60 is in **AUTO** mode, the user can temporarily override the current set temperature. This override will remain active until the next programmed set temperature becomes active.

When Temporary Override mode is set, the **TEMPERATURE** mode indicator ('Comfort' or 'Econ') will flash. To end the temporary override, press the **AUTO/MANUAL** key and reselect the **AUTO** mode.



Low Battery Detection

The PH60 constantly monitors battery voltage. When battery voltage falls below a preset point, the low battery indicator will be shown on the display as shown below:



The low battery indicator will continue to be displayed until the battery voltage returns to normal levels. The display backlight will not operate when the battery level is low. When the low battery indicator is displayed, you should replace the batteries as soon as possible.

The PH60 will also monitor the maximum motor speed achieved when the valve is being operated. If the motor speed is too low, the PH60 will assume that the battery is low or there is some problem with the valve actuator.

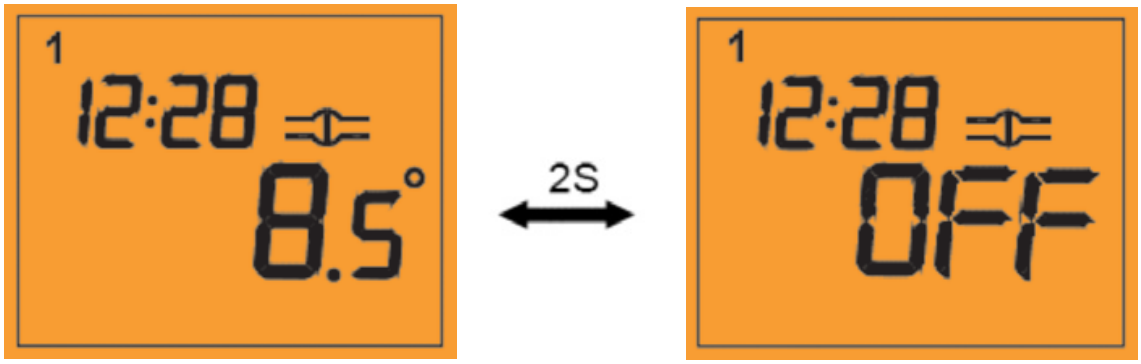
In this situation, the PH60 will stop normal operation and enter battery protection mode, as shown in the image. The PH60 will set the TRV to a half open position – the valve will stay in this condition until the PH60 is reset by the user.



Off Mode

The PH60 has a special manual control mode (‘Off’ mode) that will close the TRV regardless of the room temperature or set temperature.

Off mode is generally used when heating is not needed, for example in the summer. When Off mode is operating, it will be indicated on the display as shown below:



If limescale protection is enabled, it will still be active in Off mode. Open Window mode is disabled if the PH60 is operating in Off mode.

ENERGY TIP

One way to set and use your heating system is to find the lowest temperature setting that you are comfortable with in each room, and then leave it set at this temperature. You can do this by setting the PH60 to a low temperature, (for example 17 °C) and then increasing the setting by one degree each day until you are comfortable with the room temperature - you won't have to adjust the thermostat further, as adjustment above this setting will waste energy - a 1 °C increase in temperature is equal to 3% of your heating costs.

MAINTENANCE

The PH60 programmable TRV controller requires no special maintenance. Periodically, the outer casing can be wiped clean using a dry cloth (please DO NOT use solvents, polishes, detergents or abrasive cleaners, as these can damage the controller).

There are no user serviceable parts within the unit; any servicing or repairs should only be carried out by Salus Controls or their appointed agents.

Should the PH60 TRV controller fail to function correctly, check:

- The batteries are the correct type, fitted correctly and are not exhausted - fit new batteries if in doubt.
- Heating system is switched on.
- If the PH60 is still not functioning correctly, press the Reset Button.

PRODUCT SPECIFICATION

Model:	PH60
Type:	Electronic programmable thermostat for radiator valve control.

Clock

Display Modes:	24 hour clock with Day of Week display.
Tolerance:	±60 seconds per month

Programming

Programming Modes:	User selectable for 7 day individual, 5/2 or 7 day options Hourly programming to 'Comfort' or 'Econ' set points Group programming function
Override Facility:	User selectable programme override facility.

Temperature

Scale:	Celsius
Tolerance:	Less than ± 0.5 °C at 25 °C
Display Range:	0.0 °C to 40.0 °C
Display Resolution:	0.5 °C

Control Modes

Operating Modes:	Auto (program) or Manual (in manual mode, user can select one of 6 preset temperature modes)

Programme	Range	Step
Off	N/A	N/A
Comfort	7 – 30 °C	0.5 °C
Econ	7 – 30 °C	0.5 °C
Party	15 – 30 °C	0.5 °C
Holiday	7 – 15 °C	0.5 °C
Frost	4 – 7 °C	0.5 °C

Power Supply

Power Source:	2 x AA (LR6) alkaline batteries
Battery Life:	Approximately 1 year

Memory and Operating Backup

Memory Backup:	Electrically Erasable Programmable Read Only Memory (EEPROM)

Environment

Operating Temperature:	0 °C to + 50 °C
Storage Temperature:	- 20 °C to + 60 °C

PH60 Warranty

Salus Controls warrants that this product will be free from any defect in materials or workmanship, and shall perform in accordance with its specification, for a period of two years from the date of purchase. Salus Controls sole liability for breach of this warranty will be (at its option) to repair or replace the defective product.

Customer Name: .....

Customer Address: .....

.....

Post Code: ..... Tel No: .....

Email: .....

Engineers Company: .....

Tel No: .....

Email: .....

Intallation Date: .....

Engineers Name: .....

Engineers Signature: .....

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