

SALUS

Programmable Room Thermostat With RF



Instruction Manual
Model No RT500RF



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 are intended to apply in the United Kingdom only, and should be followed along with any other statutory obligations.

This accessory must be fitted by a Competent person, and installation must comply with the guidance provided in the current editions of BS7671 (IEE Wiring Regulations) and Part 'P' of the Building Regulations. Failure to comply with the requirements of these publications could lead to prosecution.

Always isolate the AC Mains supply before opening or removing the unit from the wall or wall box.

When fitting batteries don't mix old and new batteries together. Do not use rechargeable batteries.

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

INTRODUCTION

A programmable thermostat is a device that combines the functions of both a room thermostat and heating controller into a single unit. The programmable thermostat is used to switch the heating system in your home on and off as needed. It works by controlling the temperature according to a series of programmed settings that take effect at different times of the day.



The RT500RF from Salus Controls is a stylish and accurate 5/2 or 7 day programmable electronic thermostat with a large, easy to read Liquid Crystal Display (LCD). This programmable thermostat has been specifically designed to be used for both Volt Free and AC heating applications. This programmable thermostat can replace most common residential thermostats and is designed to be used with electric, gas or oil heating control systems. Unlike ordinary single unit design thermostats, this is a new type of thermostat separating the operational functions into two units.

The Receiver is used for wiring connections and heat on/off control. The Control Centre provides the user interface and temperature sensing / control. The two units are linked together by a Radio Frequency (RF) signal.

Features

- Volt free switching option
- 5/2 or 7 day programming flexibility
- Built-in start up programming for quick installation
- Frost protection
- Large, easy to read LCD with blue backlight
- Burner on symbol
- Easy to use programming
- User friendly

INSTALLATION

Please read the important safety information at the start of this manual before you begin to install the device.

The RT500RF Control Centre is easily installed using the Industry Standard back plate supplied with the unit – this is used purely for mounting purposes, as no wiring is needed for the Control Centre. The back plate can be mounted directly to the wall surface.

The ideal position to locate the RT500RF Control Centre is about 1.5m above floor level. It should be mounted in a location where the thermostat is accessible, reasonably lit and free from extremes of temperature and draughts. Do not mount the thermostat on an outside wall, above a radiator or in a location where it may be subjected to direct sunlight.

To ensure trouble free operation of the Radio Frequency (RF) signal, always ensure that the programmable thermostat is mounted away from any possible sources of interference (such as radios, TV sets, computers, etc.), and is not mounted on or in close proximity to large metal objects. Installing the RT500RF in enclosed areas such as cellars and basements is not recommended.

CONNECTING THE RT500RF RECEIVER

NOTE: All electrical installation work should be carried out by a suitably qualified Electrician or other competent person.

If you are not sure how to install this programmable thermostat consult either with a qualified electrician, heating engineer or your boiler / heating system supplier for advice on how to continue.

The RT500RF Receiver should be mounted in a suitable location that is both accessible for the connection of mains and control wiring, and allows good reception of the RF signal. The Receiver needs a 230V AC mains supply to operate, and this should be fused appropriately (13A max.). The Receiver should be mounted in a location where it will not come into contact with water, moisture or condensation.

The Receiver On/Off switch is accessible from the front face of the Receiver, as shown in this picture:



On the front cover of the Receiver you will see that there is the On/Off switch and two Light Emitting diodes (LEDs). The switch allows you to turn off the Receiver if necessary to prevent it calling for heat. The top LED (red) will illuminate when the switch is in the 'On' position and the unit is receiving power. The bottom LED (green) illuminates when the Receiver unit is receiving a heat call transmission from the Control Centre.

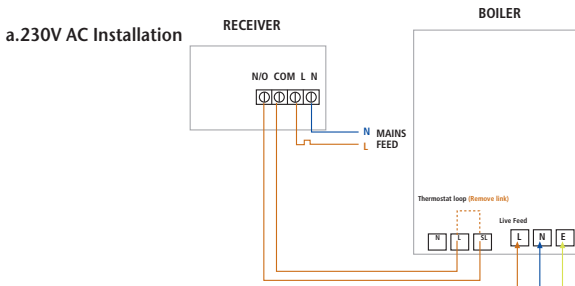
The wiring terminals and RF Address Code setting DIP switches are located on the rear of the Receiver, as shown in this picture:



RECEIVER WIRING TERMINALS

Terminal	Identifier	Description
1	NO	Normally Open [N/O]
2	COM	Linked Live feed (230V AC heating applications only)
3	L	Live feed (230V AC)
4	N	Neutral

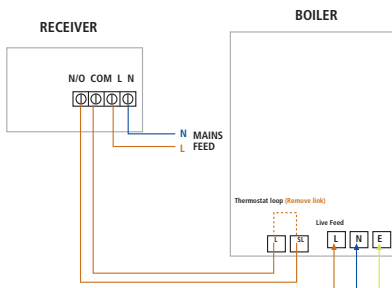
TYPICAL WIRING INSTALLATIONS



Notes:

- Receiver unit should have a permanent 230V AC main supply
- Confirm that the Boiler has an external thermostat loop and is configured for 230V switching
- If the boiler has two terminals for the thermostat, remove the link from the boiler

b. 24V Installation



Notes:

- Receiver unit should have a permanent 230V AC main supply
- Confirm that the Boiler has an external thermostat loop and is **NOT** configured for 230V switching
- If the boiler has two terminals for the thermostat, remove the link from the boiler

CONTROL CENTRE JUMPER SETTINGS

Changes to the jumper settings should only be made by the Engineer carrying out the installation or other qualified person.

The installer should select the jumper positions required if changes need to be made to the factory default settings. These jumpers are found on the rear of the Control Centre.



Jumper	Function
Program	Jumper for 5-2 (factory default setting) or 7 individual days programming.
Span	Movable jumper for selecting temperature span of $\pm 0.5^{\circ}\text{C}$ (factory default setting) or $\pm 1.0^{\circ}\text{C}$
1,2,3,4,5	Removable jumpers for altering the RF address code when used in conjunction with the corresponding DIP switch on the Receiver.

NOTE: The Reset button must be pressed after changing jumper positions.

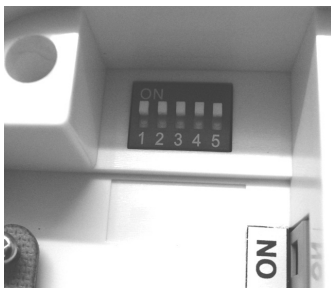
RF ADDRESS CODE SETTING

If there is another unit being used nearby, e.g. in the next house or as part of a multiple installation, your Receiver may be fault triggered by the other Control Unit. You can change the RF Address Code to help prevent this problem.

Each Receiver can only respond to RF transmissions from a Control Centre that has the same RF address code setting.

Disconnect any AC power to the Receiver, and remove the batteries from the Control Centre before attempting any adjustment of the RF Address Code switches and jumpers. If you are not sure how to carry out this operation correctly, consult either with a qualified electrician or heating engineer.

To adjust the RF address code of the Receiver, simply push up one or more of the 5 DIP switch levers on the DIP switch bank located on the back of the receiver (the levers are numbered 1 to 5 from bottom to top, as shown in the picture below), and then make a note of the setting of each switch:



To adjust the RF address code of the Control Centre, remove one or more of the jumper caps located on the back of the unit (labelled 1,2,3,4 and 5, and shown in the picture below) so that the jumper settings match the settings made on the receiver:



For example, if the DIP switches on the Receiver were set as follows:

- | | | |
|---|---|-----|
| 1 | - | ON |
| 2 | - | OFF |
| 3 | - | OFF |
| 4 | - | OFF |
| 5 | - | ON |

Then you would need to remove jumper caps 2, 3 and 4 on the Control Centre to make sure that they are both set with the same RF address code. Please make sure that you keep any of the jumper caps you remove in a safe place, in case you later need to change the RF address setting again.

You must press RESET on the Control Centre after making any changes to the RF address code settings.

TESTING THE RF TRANSMISSION

It is important to site both the Receiver and Control Centre in locations where the RF signal cannot be interrupted.

The receiving range between Control Centre and Receiver is approximately 30 metres indoors, however many factors can affect the RF transmission and shorten the operating distance, e.g. shielding by thick walls, foil back plasterboard, metal objects such as filing cabinets, general RF interference, and so on.

The range is generally large enough for most household applications, but it is advisable to test the RF transmission from the intended Control Centre location to the Receiver location before fixing the Control Centre to the wall. To check the RF reception, follow the following steps:

1. Press the UP button on the Control Centre until the set point temperature is higher than room temperature by a few degrees.
2. Wait for a few seconds. The Burner on (heat call) indicator should appear on the bottom left of the LCD on the Control Centre.
3. Check the green LED on the receiver unit - it should be lit.
4. Press the DOWN button to adjust the set point temperature to be lower than room temperature.
5. Wait for a few seconds, and the Burner on (heat call) indicator should disappear and the green LED should switch off.
6. If at step 3 the green LED is not illuminated, press the RESET button on the Control centre and try to place the Control Centre closer to the Receiver.
7. Repeat steps 1 to 5.

If you are unable to get a stable RF connection between the Receiver and Control Centre, check that the Receiver is both switched on and has a mains supply (red LED lit). If this isn't the problem you can also alter the RF address code by following the 'RF Address Code Setting' section of this manual, and then repeat steps 1 to 5 (note that the RESET button on the Control Centre should be pressed after altering the address code).

MULTIPLE THERMOSTAT INSTALLATIONS

If you are using more than one RT500RF programmable thermostat in the same installation, be sure that there is at least a 1 metre gap between receiver units to avoid crosstalk and other RF interference.

When installing multiple thermostats, you should assign different RF address codes for each RT500RF by following the instructions in the 'RF Address Code Setting' section of this manual. Each RT500RF should be introduced to the installation one at a time with all other Receiver units switched off. Also make sure that the batteries are removed from all other Control Centres.

Install each unit following the 'Testing the RF Transmission' section above - once you are happy with the operation of one unit you can install the next.

Once all the RT500RF units have been installed, if one unit then seems to function abnormally, try changing the RF address code of that unit's Control Centre and its corresponding Receiver, making sure that the new RF address code is different to all others in the installation.

The control centre sends RF On/Off signals every 10 minutes to ensure the Receiver is in the correct state. If for some reason the first RF signal is interrupted you may notice the Control Centre has stopped or started calling for heat but the Receiver hasn't switched. Simply wait 10 minutes until the next RF signal is transmitted and the receiver unit should then switch correctly.

AFTER INSTALLATION

The following table shows the settings of the RT500RF programmable thermostat after Power on, or after RESET is pressed:

Function	Status After Reset or Power On
Operation Mode	Normal mode
Room Temperature	22.0 °C, updated within 5 seconds
°C indicator	On
Clock	12:00
AM/PM indicator	AM
Day of Week indicator	M
Program	Default factory setting
Set Point Temperature	Default factory setting
Program Number indicator	1
SET indicator	Off
PROG indicator	Off
Frost Protection indicator	Off
Heat indicator	Off
Low-Battery Warning indicator	Off, updated within 5 seconds
Output Relay	Off

After Power on, the thermostat will operate in **Normal** mode (Normal mode is when the thermostat is displaying the room temperature):

- The set point temperature is reset to the default setting
- The room temperature display is updated within 5 seconds
- The control process starts
- The programme number is updated to indicate the running program

If the Reset Button is pressed, the RT500RF will behave in the same way as described above, except that any previously saved user settings stored in the internal memory will be deleted and overwritten with the default settings, and all programmable thermostat control settings will be returned to default values.

USER INTERFACE AND CONTROLS

The status and operation of the RT500RF is clearly shown on the large backlit Liquid Crystal Display (LCD).

This display allows the user to see at a glance the current status of the heating system, the current time and day of the week, as well as a clear indication of the current room temperature.

There are few user controls for the RT500RF, making the programmable thermostat very easy to operate. These controls are shown below, along with a description of each of their functions.



USER CONTROL FUNCTION SUMMARY

Key / Operation	Symbol	Functions
UP key	⬆	Increases the selected setting
DOWN key	⬇	Decreases the selected setting
BACKLIGHT / FROST key	💡❄	Manually turns on the LCD backlight for 5 seconds, or activates / deactivates Frost Protection
SELECT key	⦿	Selects a clock or programme setting
SET key	⦿	Sets a clock or programme setting
RESET button	● RESET	Resets the programmable thermostat to default (original factory) settings

OPERATION

The RT500RF is configured and adjusted by the use of a minimal number of user controls, and an intuitive user interface.

The backlit Liquid Crystal Display (LCD) gives a highly visible, easily readable indication of the programmable thermostat status.



SETTING THE TIME



Press and hold SET and SELECT when the RT500RF is in Normal mode for a few seconds to enter the Clock setting mode. Release both keys and the display will look like the image below:

The Time and Day are displayed along with a SET indicator, with all other indicators cleared from the display. The hour part of the time is flashing to indicate that it is the currently selected item and is ready to be adjusted.

- Press the UP or DOWN keys to increase or decrease the 'hour' setting – the selected item will stop flashing while a key is pressed, and will resume flashing when you release the key.
- Press the SELECT key to select the 'minutes' section of the time. Set the minutes in the same way as the hour by using the UP and DOWN keys.
- Press SELECT again to select the Day, and again change the setting with the UP and DOWN keys.
- Press the SET key to confirm the new time and day settings. This will store the changes and return the RT500RF to Normal mode.

The RT500RF Control Centre will also return to Normal mode (and save the clock settings) if no keys are pressed for more than 15 seconds.

PROGRAMMING THE RT500RF

The RT500RF offers great versatility with its programming options, allowing the user to programme the unit to operate on a 5/2 or 7 day control cycle. The programmable thermostat has a default set of Programmes that have been designed to meet the needs of most users. If these default programmes are not suitable for your particular situation, reprogramming the RT500RF with your own settings is a very straightforward operation.

Selection of the default programming mode (5/2 or 7 day) is made by changing the jumper setting on the rear of the RT500RF Control Unit, as previously described within the Installation section of this manual.

5/2 DAY MODE

5/2 day mode is the default programming mode for the RT500RF. With this mode selected, five different sets of time and set point temperatures can be set for Weekdays or Weekends.

To review or change a programme, press the SET key when the RT500RF is in Normal mode. This will change the unit status to Programme Setting mode.

The LCD display will display programme number 1 and SET PROG, with all other indicators cleared. The weekdays will be flashing to indicate they are the selected item and are ready to be adjusted:



Press the UP or DOWN key to select the programme set for either Weekday or Weekend to be reviewed or adjusted. Pressing the SET key at any time when in programming mode will return the RT500RF into Normal mode.

Press the SELECT key to confirm the Weekday or Weekend selection. Once this is set, the 'Hour' will flash to indicate that it is the selected item and is the next item to be adjusted:



Press the UP or DOWN key to adjust the hour setting to the desired value, and confirm your selection by pressing the SELECT key.

Pressing the SELECT key allows you to step through each of the items to be reviewed or adjusted within the programmes in the following sequence:

Programme	Function Sequence		
1	Hour	Minutes	Set point temperature
2	Hour	Minutes	Set point temperature
3	Hour	Minutes	Set point temperature
4	Hour	Minutes	Set point temperature
5	Hour	Minutes	Set point temperature

...before then allowing you to cycle back to Programme 1. Pressing the SET key at any time will confirm the setting and return to the programme set selection.

7 DAY MODE

The RT500RF also offers a 7 day programming mode, which allows you to programme five different sets of time and set point temperatures for each day of the week to give a total of 35 separate programme settings.

To review or change a programme, press the SET key when the RT500RF is in **Normal** mode. This will change the unit status to Programme Setting mode.

The LCD display will display programme number 1 and SET PROG, with all other indicators cleared. The weekdays will be flashing to indicate they are the selected item and are ready to be adjusted.



Press the UP or DOWN key to change the display to indicate the single day you want to programme:

Pressing the SET key at any time when in programming mode will return the RT500RF into Normal mode. Press the SELECT key to confirm the Day selection. Once this is set, the 'Hour' will flash to indicate that it is the selected item and is the next item to be adjusted:



Press the UP or DOWN key to adjust the hour setting to the desired value, and confirm your selection by pressing the SELECT key.

Pressing the SELECT key allows you to step through each of the items to be reviewed or adjusted within the programmes in the following sequence:

Programme	Function Sequence		
1	Hour	Minutes	Set point temperature
2	Hour	Minutes	Set point temperature
3	Hour	Minutes	Set point temperature
4	Hour	Minutes	Set point temperature
5	Hour	Minutes	Set point temperature

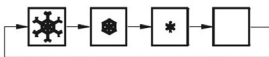
...before then allowing you to cycle back to Programme 1. Pressing the SET key at any time will confirm the setting and return to the programme set selection. Each programme for all the other days of the week is set in exactly the same way – just repeat the steps shown above, after entering programming mode and selecting the day you want to programme.

Regardless of which programming mode the RT500RF is set for (5/2 or 7 day), not pressing any keys for 15 seconds will automatically save any programming changes and exit to **Normal** mode. You can also review or change programme settings when Frost Protection is enabled.

FROST PROTECTION

To enable the Frost Protection mode, press and hold the BACKLIGHT / FROST button for three seconds with the RT500RF in Normal mode. Once Frost Protection is enabled, the set point temperature is automatically set to 5°C to provide protection from the risk of freezing.

Whenever Frost Protection is activated, the Frost Protection indicator will flash in the sequence shown below:



While Frost Protection is activated, it will override any programme settings until the mode is changed. To turn off Frost Protection mode, press and hold the BACKLIGHT / FROST button for three seconds.

REVIEWING SET POINT TEMPERATURE

You can view the set point temperature at any time by pressing either the UP or DOWN key.



When any programme is running, the LCD display will show the programme set point temperature with the SET indicator displayed:



When operating in Frost Protection mode, the LCD display will show a reading of 5 °C and also display the Frost Protection indicator:



When operating in Temporary Override mode, the LCD display will show the temporary set point temperature:

To exit from the set point review, press any key except the UP or DOWN keys, or don't press any keys for approximately four seconds – either of these actions will return the RT500RF to **Normal** mode.

TEMPORARY OVERRIDE

It is possible to temporarily override the current set temperature of the RT500RF. There are two ways to do this:

- While reviewing set point temperature: Pressing the UP or DOWN key while reviewing the set point temperature will increase or decrease the set point temperature in 0.5 °C steps.
- In Normal mode: press and hold either the UP or DOWN key to display the set point temperature. After two seconds, the RT500RF will enter Temporary Override mode and allow increase or decrease of the set point temperature. If the key is released within two seconds then you will only be able to review the set point temperature.

Once in Temporary Override mode, the clock and day are displayed, along with the SET indicator; all other indicators are cleared from the display. The set point temperature will flash to indicate that it can be changed:



Pressing the UP or DOWN key will increase or decrease the set point temperature in 0.5 °C steps - the set point temperature can be adjusted within a set range of 10 °C to 35 °C.

You can press SET at any time to confirm the new Temporary Override setting and return to **Normal** mode, or press no keys at all and wait approximately four seconds.


Temporary Override mode remains active until the clock or programme settings are adjusted, Frost Protection is activated or the next programme time / temperature set point is reached.

OTHER FUNCTIONS AND CONTROLS

Backlight

The backlight of the RT500RF is switched on automatically whenever any of the keys are pressed. The backlight will remain illuminated for approximately 5 seconds after the last key press, except if you are changing settings within the Clock, Programme or Temporary Override modes – in this case, the backlight will remain illuminated throughout the setting change process. The backlight will not illuminate if the RT500RF battery is low.

Battery Status

The RT500RF checks the battery voltage frequently during normal operation. If the battery voltage is sensed as being low (this is normally when the battery voltage falls to a level of around 2.6V), the low battery indicator  will be displayed on the screen.

Although the programmable thermostat will continue to operate normally at this stage, you should replace the batteries as soon as possible to prevent any possible operating problems.

Reset Button

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

Sleep Mode

By pressing both the UP and DOWN keys together, the RT500RF will enter SLEEP mode. In this mode, all the RT500RF functions will be paused to save battery power, with the exception of the clock which will continue to run in the background.

While in SLEEP mode:

- The LCD display will be blank.
- All output from the Control Unit will be turned off immediately.

Press any key to wake up the RT500RF and cancel SLEEP mode.

ENERGY TIP

One way to set and use your room thermostat is to find the lowest temperature setting that you are comfortable with, and then leave it set at this temperature. You can do this by setting the room thermostat 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 RT500RF programmable thermostat 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 thermostat).

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 RT500RF programmable thermostat 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.
- The RT500RF Receiver is switched on.
- If the RT500RF is still not functioning correctly, press the Reset Button.

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.

PRODUCT SPECIFICATION

Model: RT500RF
Type: Electronic programmable thermostat, designed for Volt Free and AC heating applications.
Frequency 868 MHz

Programming

Programming Modes: User selectable for 5/2 or 7 day option
Number of Programmes: Five (5) user programmes plus factory default programme.
Override Facility: User selectable programme override facility.

Default Programmes

Programme	Output	Weekday	Weekend
1	ON	6:00 AM	6:00 AM
	TEMP	21 °C	21 °C
2	ON	8:00 AM	8:00 AM
	TEMP	17 °C	21 °C
3	ON	4:00 PM	4:00 PM
	TEMP	21 °C	21 °C
4	ON	6:00 PM	6:00 PM
	TEMP	21 °C	21 °C
5	ON	10:00 PM	10:00 PM
	TEMP	17 °C	17 °C

Temperature

Scale: Celsius
Range: 5 °C to 35 °C
Resolution: 0.5 °C
Tolerance: Less than ± 0.5 °C at 25 °C
Display Range: 5.0 °C to 45.0 °C
Display Resolution: 0.5 °C

Clock

Accuracy: ± 1 minute per month
 Display: 12 hour

Frost Protection

Setting: 5 °C
 Setpoint Temperature Range: 5 °C to 35 °C
 Measured Air Temperature Range: 5 °C to 45 °C (Displayed on LCD)
 If room temp is higher than 45°C, will show HI on the LCD, if less than 5°C will show LO on the LCD



Control Centre

Power Source: 2 x AA alkaline batteries
 (don't use rechargeable batteries)

Receiver

Power Source: 230V AC / 50Hz

Switch Rating

Switching Voltage: 230V AC / 50Hz
 Switching Current: 16A resistive, 5A inductive
 Protection Rating: IP30

Environment

Operating Temperature: 0 °C to + 40 °C
 Storage Temperature: - 10 °C to + 60 °C

RT500RF 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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