

User's Manual



**Programmable Room Thermostat with RF (Volt Free)
Model 091FLRF**



INTRODUCTION

Your 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 serves for wiring connections and heat on/off control. The Control Centre serves as user interface and temperature sensing/control. The two units are linked by Radio Frequency.

The Receiver is easily installed using the Industry Standard back plate supplied (for mounting purposes only as no wiring is required when installing the control centre).

The back plate can be mounted directly to the wall surface.

Installing & Wiring the Receiver

Caution: Switch off the electric source before installing the receiver. We recommend that the installation be performed by trained personnel.

- 1) This must be 230V AC and fused at 13 amps max.
- 2) Select a suitable indoor location free from water and moisture.
- 3) The receiver should not be shielded from the RF signal in any way, follow 'Testing the RF Transmission' section (PAGE 7) of this manual before deciding on a final location for the receiver and control centre units.

- 4) The 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:



Multiple Thermostat Installations

Please note, if using more than one Receiver in the same installation, be sure that there is at least a 1 metre gap between receiver units to avoid RF interference.

When installing multiple thermostats you should ensure that you assign different address codes for each Receiver following the 'RF Address Code Setting' section of this manual. Each Receiver 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 of this manual. Once you are happy with the operation of one unit you may install the next. Once all Receiver 's are installed, if one unit then seems to function abnormally, try changing the address code of the control centre & its corresponding receiver again taking care that the new code given is different to all others in the installation.

The control centre sends RF On/Off signals every 10 min to ensure the receiver is in the correct state. If for some reason the 1st RF signal is interrupted you may notice the control centre has started/stopped 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 switch.

RF Address Code Setting

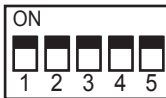
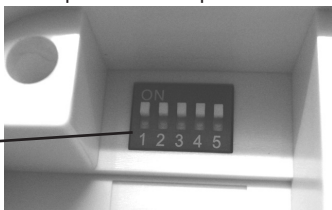
If there is another user nearby, e.g. in the next house, your receiver may be fault triggered by their transmitter. You may select a different RF address code to prevent this. The receiver can only respond to RF transmissions with the same address code setting as its own address code.

1. To adjust address code of Receiver & Control Centre, simply push up or down on the 5 dip switch levers. The leavers are numbered 1 to 5 from left to right.

Note :

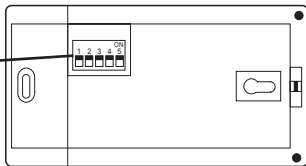
1. Set dip switch on receiver in same ON position as in transmitter. ON position is marked on each part shown in picture.

Address Code Dip
Switch Leavers.



Factory Default Setting Dip switch 1 - 5 in On position.

Address Code Dip
Switch Leavers.



Factory Defaut Setting Dip switch 1 - 5 in On position.

TESTING THE RF TRANSMISSION

It is important to site the Receiver and Control Centre in locations where the RF signal cannot be interrupted. The receiving range between Control Centre and Receiver is 60M in open area. Many factors can affect the RF transmission, shortening the operating distance e.g. shielding by thick walls, foil back plasterboard, metal objects such as filing cabinets, general RF interference etc. However, the range is enough for most household applications.

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.

1. Press UP button until the set-point temperature is higher than room temperature by a few degrees.
2. Wait for a few seconds. The animated fun (heat call indicator) should appear on the bottom right of the LCD on the control centre.
3. Check the green LED on the receiver unit. It should be illuminated.
4. Press Down button to adjust the set-point temperature to be lower than room temperature. Wait for a few seconds. The animated flame (heat call indicator) should disappear and the green LED should switch off.
5. If at step 3 the LED is not illuminated, press RESET and try to place the Control Centre closer to the Receiver, repeating steps 1 to 4.
6. Alternatively you can try and alter the address code following the 'RF Address Code Setting (page 5) of this manual, then repeat steps 1 to 3.

Note that the RESET button on the Control Centre should be pressed after altering the address code.

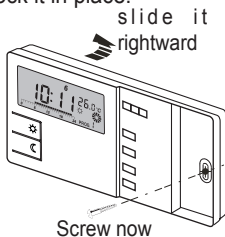
INSTALLAING THE CONTROL CENTRE

Select a suitable location for the control centre. The location of the control centre can greatly affect its performance. If it is located where air circulation cannot reach, or exposed to direct sun light, it will not adjust the room temperature properly.

To ensure proper operation, the control centre should be installed at an inside wall with freely circulating air. Find a place where your family is usually occupied.

Avoid close proximity to heat generating appliances (e.g. TV, heater, refrigerator) or exposed to direct sunlight. Do not install near a door where the thermostat will suffer from vibration.

Using the template provided, drill two $\varnothing 6\text{mm}$ holes in the wall. Insert the wall anchors and tighten the left screw with 3mm clearance. Fix the control centre by putting it over the screwhead and slide it rightward (note the keyhole-like opening at the back of the thermostat). Tighten the remain screw to lock it in place.



Note: If the wall is made of wood, there is no need to use the wall anchors. Drill two $\varnothing 2.7\text{mm}$ holes instead of $\varnothing 6\text{mm}$.

USING YOUR NEW CONTROL CENTRE

The following procedures show how to operate the control centre. It is recommended that you follow the instructions and try to operate once before connecting it to the heating or cooling system.

1, Start

There is a sliding door on the right half of the thermostat. If you open the door, you can see some buttons. This door is removable for the replacement of batteries.

The control centre is operated by two AA alkaline batteries. Please remove the front cover and install two new batteries.

When the batteries are installed, the control centre should be operating and you can see the LCD active. If the control centre does not work properly, please check the batteries if wrong polarities, press the reset button by using a ball-point pen.

The LCD after start or reset:



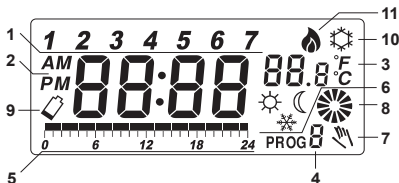
During normal mode, the first press on any key is to turn on the backlight.

Note:

- I, Temperature may not be 20°C as the diagram shown and the Output-On indicator may activate after a few seconds, depending on different situations.
- II, Do not use a pencil to push the reset button. The graphite residue of a pencil can cause a short circuit and damage the control centre.

LCD

- 1 Day of the week Indicator
- 2 Time
- 3 Temperature
- 4 Program Number
- 5 Program Profile Indicator
- 6 Frost Protection
- 7 Manual Override Indicator
- 8 Output-On Indicator – will be displayed and rotates if the output is on. It will disappear if the output is off
- 9 Low Battery Indicator – will be displayed if the voltage of the batteries drop to a certain level. Please change the batteries as soon as possible.
10. Cool mode
11. Heat mode



Temperature mode

You can see ☀ and ☾ on both the buttons and the LCD. ☀ means comfort temperature and ☾ means economy temperature. These two temperatures are user changeable. Furthermore, there is a fixed defrost temperature (7°C) indicated by ❄ on the LCD. Throughout the operation of the thermostat we will refer to them as comfort, economy or defrost temperature instead of numeric values.



Program

This is a programmable thermostat. It can automatically adjust the room temperature to a comfortable level when you are at home, and lower it to save energy when you go out or sleep. What you have to do is to program the thermostat so that it knows when to raise the temperature. There are altogether nine programs contained in the memory of the thermostat. Six of them are preset in the factory and the remaining three are user changeable.

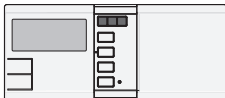
Manual override

If you want to change the temperature temporarily and do not want to alter the programs you have set, you can simply touch a button to override the current program.

2, Set day/time

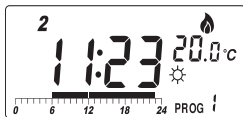
To set day, press **d**. Similarly, press **h** to set hour and **m** to set minute.

Buttons used:



Example:

When start or after reset, the time is 00:00, Sunday. To set the clock to current time (e.g., 11:23, Tuesday), press **d** 2 times, **h** 11 times and **m** 23 times.



Note: When you press and hold the keys for few seconds, the day/time will change rapidly. Release when the desired setting comes.

3, View/Change temperature

Press **Temp**, and the thermostat enter View/Change temperature mode. The LCD will show the setting of the current temperature mode (☀, ☾ or ❄) which will be flashing. Press ☀ or ☾ to review or change the temperature. Press OK to directly return to normal operation mode. Buttons used:

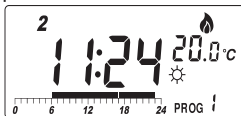


Example:

I, In normal mode...



III, To change, press ☀. For example, to change to 20.0°C, press ☀ 5 times:



II, Press **Temp**. The setting of comfort temperature is flashing:



IV, To review economy temperature, press C :



V, You can press C key again to set the economy temperature, or press **OK** to return to normal operation mode.

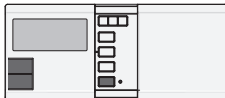


Note:

- I, The temperature setting range is 5° to 30°C.
- II, To lower the setting, enter View/Change temperature mode and press C or C until it reaches 30°C and then the setting will return to 5°C. Continue to pressing until the desired setting comes.
- III, The setting will change rapidly by pressing and holding the keys.
- IV, Please note the temperature mode indicator. A C means the comfort temperature is being viewed or changed. A C indicates economy temperature. If C is shown, it is defrost temperature. Defrost temperature is always at 7°C and is not changeable.
- V, It is not always necessary to use the **OK** key to return to normal operation mode. After couple seconds of no key pressed it will automatically return to normal mode.

4, Manual Override

Press ☀ to select comfort temperature. Press ☾ to select economy temperature. The current temperature mode will be overrode until the next set point of the program comes. Press **OK** to clear override. Buttons used :



Example:

1, In normal operation mode, press ☾ to change the current comfort setting to economy setting:



The temperature is now set to economy mode. This mode will be held until 23:00. (It is because the program for the day is PROG 1. At 23:00 the temperature will change from comfort to economy, which matches the override setting.)



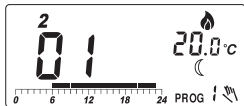
Time hold

Timer hold is an alternative to manual override. Press and hold ☀ (or ☾) key for few seconds, the hold time will appear. Press the key again to set the hold time. Press **OK** to return to normal operation mode. The maximum can be set is 24 hours. In the hold period the temperature will not be affected by the program.

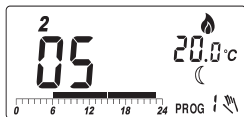
When timer hold is active, pressing the corresponding temperature mode key (e.g., ☀ if comfort mode is being held) will show the remaining hold time. The remaining hold time can also be changed by using the same key. If another temperature mode key is pressed (e.g., if comfort mode is being held), the timer hold will be cleared.

Example:

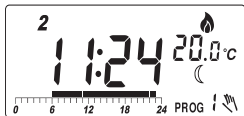
I, To change the current setting from comfort to economy for 5 hours, press and hold ☾ for few seconds. The hold time will appear.



II, The hold time is 1 hour. Press ☾ to change the hold time to 5:



III, Press **OK** or just leave no key pressed, the thermostat will return to normal mode



Note:

- I, A 'hand' appears when the current temperature mode is being overrode.
- II, The setting will change rapidly by pressing and holding the keys.

5, View/Change Programs

Press **Prog**, the program of the current day is ready to be changed. Press **Prog** again to advance to the next day and the program of that day will be shown.

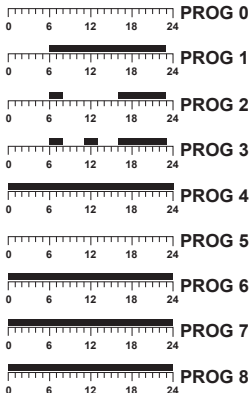
Press **Prog#** to change the program.

Program 6, 7 and 8 are user-define programs. You can use ☀ or ☾ to change the distribution of comfort or economy temperature and **h** to review the setting. Press **OK** to return to normal operation mode.

Buttons used:



There are altogether nine programs available, as the diagram shown:



Program 0 is a special program. It will set the whole day to defrost temperature (7°C). (If cooling mode is selected, it will turn off the system. See Part 8, Controlling a cooling system.)

Program 1, 2, and 3 are some typical schedules of a day. You can select them if you find them suitable.

Program 4 sets the whole day to comfort temperature while program 5 sets it to economy.

Program 6, 7 and 8 are user-define programs. They can be modified to suit your need.

Example:

1, Assume you want to assign program 6 to Saturday and want to set the whole day to economy temperature except from 13:00 to 18:00. Press **Prog**. The thermostat enters program mode and the program of the current day (e.g., Tuesday) is ready to be programmed. The display shows that the program set for Tuesday is program 1, with the temperature at 00:00 at economy temperature (15°C).



II, Press **Prog** 4 times to set the indicator to Saturday:



III, Press **Prog#** 5 times the program from program 1 to program 6:



IV, Now you can set the time shown to economy temperature by pressing ☾, or press ☀ to set it to comfort temperature. Or you can use **h** key to pass through the time without changing the setting. Since we want to set 13:00 to 18:00 to comfort temperature and the remains to economy temperature, press ☾ from 00:00 to 12:00 will be programmed to economy temperature:



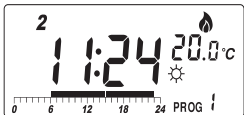
V, Press **h** or ☀ 6 times to move the flashing point to 19:00:



VI, Finally, press Ⓢ 5 times to set the remains of the day to economy temperature:



VII, By pressing **OK** or leaving no key pressed, the thermostat will return to normal operation mode.



Note:

- I, Program 0, 1, 2, 3, 4, 5 are preset programs. ☀ and Ⓢ cannot be used to edit them. But the **h** key is still active.
- II, The nine programs are common to all seven days. This includes the three user-defined programs. This means that if you change one of the user-defined programs of a day, the same program of the other days will also be changed.
- III, The setting will change rapidly by pressing and holding the keys.

6, Reset button

There is a small hole at the right of the **OK** key. This is the reset button. Pressing it can reset the thermostat into initial status:

Time – 00:00:00; Day – Sunday; Temperature – Comfort: 19°C, Economy: 15°C; Programs – All seven days set to PROG 1; User-define programs – Set to comfort; Manual override – All cleared; Output – Off, Heat mode, Delay off, Span 1°C

Note: Do not use a pencil to push the reset button because the graphite residue can cause a short circuit and damage the thermostat.

Under an environment with high (+/- 8KV) electrostatic discharge, the product may not be operated as in normal conditions. The user maybe required to reset the unit.

7, Selections of Heat/Cool, 5 min Delay Off/On, Span 0.5/1C

Press OK button for approximate 5S for these selections

Heat Mode : Heat icon flashing, press OK to confirm Heat mode or press Comfort or Econmic, then press OK to change to Cool mode.

To select whether a heating or a cooling system to be controlled. Note that normally for a heating system the comfort temperature is higher than the economy temperature, while it is reverse for a cooling system.

Delay Off: press OK to confirm Delay Off mode, or press Comfort or Econmic, then press OK to change to Delay On mode.

With this switch set to On, the external system will switch on only if it has been off for more than 5 minutes. If cooling system is selected, this function will be activated automatically.

Span 1.0 C: press OK to confirm Span 1.0C, or press Comfort or Economic, then press OK to change to Span 0.5C.

Span is the temperature difference between the turn on temperature and turn off temperature. 0.5°C or 1°C of span can be selected and the effect is summarized in the following table:

Span		Heating System	Cooling System
0.5°C	On when.....	$Tr \leq Ts - 0.2$	$Tr \geq Ts + 0.2$
	Off when.....	$Tr \geq Ts + 0.2$	$Tr \leq Ts - 0.2$
1°C	On when.....	$Tr \leq Ts - 0.4$	$Tr \geq Ts + 0.4$
	Off when.....	$Tr \geq Ts + 0.4$	$Tr \leq Ts - 0.4$

Ts: Set temperature

Tr: Room temperature

For example, if you set the temperature to 20°C and span = 1, the heater will operate when the room temperature drops to 19.6°C and turns off when the temperature rises to 20.4°C

8, Controlling a cooling system

Your thermostat can be used to control a cooling system. The operation is similar to that of heating system. However, there are some differences between them, as the following list:

- 1, In general the comfort temperature of a cooling system is lower than the economy temperature.
- 2, The switching is reversed: The thermostat switches on the system when the room temperature is higher than the set temperature.
- 3, There is no more defrost temperature. The snow (❄) and 7°C will not be displayed. If you select program 0 the thermostat will switch off the cooling system.
- 4, The 5 minute minimum cycle time is enabled automatically.

Inside the packaging you should find

- | | |
|---------------------------|--------------------|
| 1 x Receiver | 1 x Control Centre |
| 4 x #6 x 1" screws | 4 x wall anchors |
| 1 x drilling template | 1 x user manual |
| 2 x AA alkaline batteries | |

Salus Controls plc

Salus House,

Dodworth Business Park South,

Dodworth, Barnsley, S75 3SP

Web: www.salus-controls.eu

Specification

Switch Rating	: Volt free 230V AC 10 (5)A max
Power Supply	: 2 x AA size Alkaline batteries
Operating Temperature	: 0°C - 40°C
Temperature Setting Range	: 5°C - 30°C in 0.2°C steps
Storage Conditions	: -20°C - 60°C to 90% RH/non condensing
Frost Protection Temperature	: 7°C
Temperature Control Accuracy	: +/- 0.5°C at 25°C
Operating Humidity	: 0 to 90% RH/non condensing
Time Display	: 24 hour
Clock Accuracy	: +/- 70s month
Protection	: Auto cut off at over 35°C
Memory	: Memory hold up: 5 minutes
Agency Approval	: CE / R&TTE
Micro disconnection on operation	: Type 1.B control action
Rated Impulse Voltage	: 4kV
Frequency	: 868MHz

www.salus-tech.com

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