Programmable Room Thermostat

with Wireless Communication

Danfoss

TP75-RF with integral sensor

Installation & Commissioning Guide

Specification

Control temp. range	:	41°F to 85°F (5°C to 30°C)
Power Supply	:	2 x AA size alkaline batteries
Transmission Frequency	:	433.92 MHz
Range	:	30m typical
Time Keeping Accuracy	:	± 1 minute/month
Low Battery Warning	:	15 days duration
Memory Retention with Batteries Removed	:	one minute
Enclosure Rating	:	IP30
Maximum Ambient Temp	:	113°F
Designed to British Standard	:	BS EN60730-2-9
Overall Dimensions Unit	:	Width: 136mm Height: 88mm Depth: 32mm
Emission Designator	:	2K02D
FCC Identifier	:	P07 TP75RF
FCC Rules	:	15°C

Battery Compartment Flap lowered
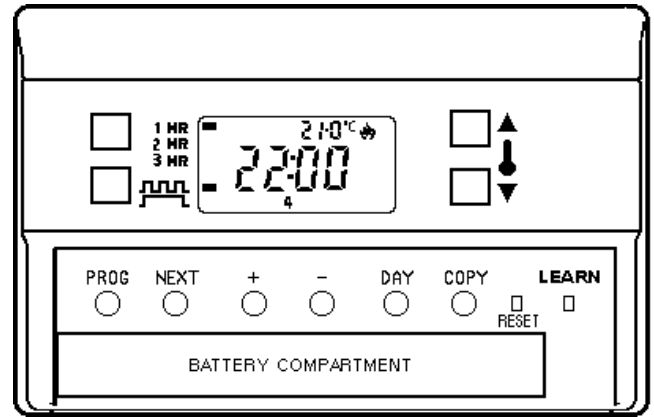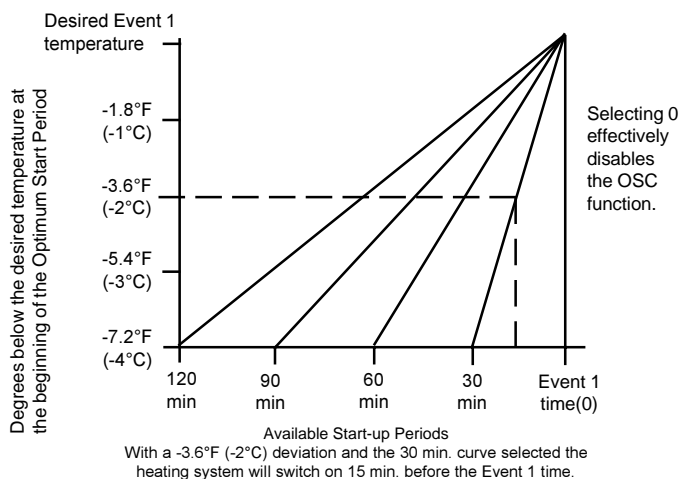
Control Features

The TP75-RF is a wireless communication version of the standard hardwired TP75 programmable thermostat. The TP75-RF, which contains a transmitter, works in conjunction with an RX receiver module which can be located up to 30m from the thermostat.

The TP75-RF Series of programmable room thermostats incorporate two special features that can be enabled at the time of installation - Optimum Start Control and Chrono-proportional Control.

Optimum Start Control (OSC)

With this enabled the event 1 control temperature, (which would normally be an increase from an overnight set-back temperature), may be programmed to be achieved by a desired time. The heating plant will be switched on earlier than the programmed time by a period related to the start-up curve selected and the space temperature sensed at the beginning of the selected start-up period. The diagram below indicates the switch on periods for the available start-up curves.

If OSC is disabled then the unit will operate as a conventional room thermostat, switching on the heating plant at the event 1 time with the event 1 temperature being achieved in a time related to the prevailing conditions.
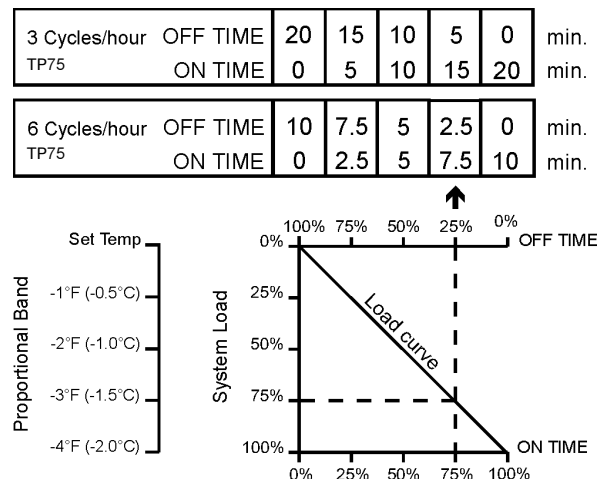
Chrono-proportional Control

Traditional ON/OFF room thermostats control room temperature by switching the circulating pump, and usually the boiler, on and off.

Because of the thermal inertia of the heating equipment and the relatively large switching differentiials of on/off devices large space temperature variations often occur, resulting in poor comfort conditions.

Chrono-proportional Control as implemented in the TP75-RF overcomes the problem by ensuring that the boiler fires regularly for periods calculated to maintain radiator temperature without overheating and to prevent the radiator temperature falling to a level which can allow down draughts from cold surfaces, e.g. windows, to cause discomfort.

The control logic works on a proportional band of 4°F which assumes that the boiler will operate at full load when the sensed space temperature is 4°F or more lower than the programmed set point.

The following graph shows the relative on/off periods per cycle against variances in deviation from the set point.

3 Cycles/hour TP75	OFF TIME	20	15	10	5	0	min.
	ON TIME	0	5	10	15	20	min.

6 Cycles/hour TP75	OFF TIME	10	7.5	5	2.5	0	min.
	ON TIME	0	2.5	5	7.5	10	min.

Available Start-up Periods
With a -3.6°F (-2°C) deviation and the 30 min. curve selected the heating system will switch on 15 min. before the Event 1 time.

TP75-RF Installation

The TP75-RF is supplied with a wallplate for ease of mounting. The wallplate is used solely for fixing the electronics module to the wall and contains no terminals.
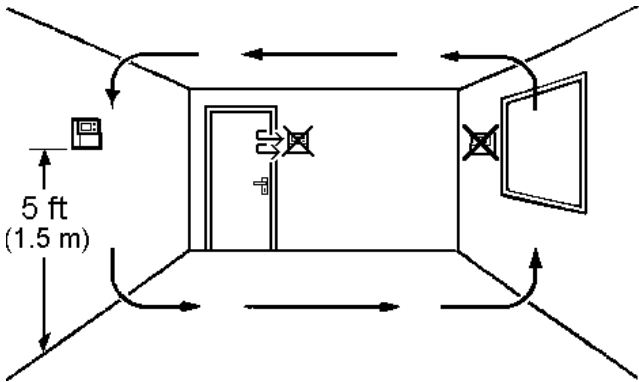
Fixing

Fig. 2 TP75-RF or TS2 location

1. **TP75-RF** Select the desired fixing position. (This should adhere to normal room thermostat practice, see Fig. 2).
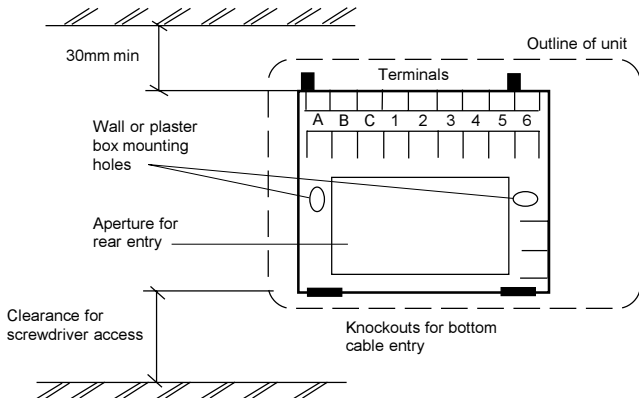

Fig. 3 Wallplate fixing clearances.

2. When fixing the heating controller wallplate note that the terminals are at the top and the vertical centre line of the heating controller is at the right hand edge of the terminal 4 recess. Observe the clearance required for fitting and removal, Fig. 3.

3. Fix the wallplate to the wall.

4. Before fixing the unit on to its wallplate, ensure that the four DIP switches on the rear of the unit (see Fig. 4) have been moved to the required settings; the choices are:-

Fig. 4
Factory pre-set DIP switch settings.

Switch No. 1- 5/2 DAY or 7 DAY.

When the switch is in the 7 DAY position each day may be programmed with different switching times and temperatures. Placing the switch in the 5/2 DAY position enables Monday to Friday to be programmed with one set of switching times and temperatures, and Saturday and Sunday to be programmed with a different set.

Switch No. 2 - OSC ON or OSC OFF

This is used to enable or disable the optimum start control (OSC) function for event 1. To cater for different types of building construction with differing fabric constants there are four start-up curves from which to choose, (see the diagram over the page). These curves dictate how long before event 1 the heating equipment will be switched on. The selectable start-up durations are 0:00, 0:30, 1:00, 1:30 or 2:00 (2 hours). (Selecting 0 effectively disables the function).

Once initiated the difference between the space temperature and the event 1 temperature is used to generate a pre-heat period proportional to the OSC period selected. The closer the space temperature is to the event 1 temperature, the shorter the pre-heat period. Refer to the earlier section on Optimum Start Control for more detail.

It is recommended that the initial setting of the OSC is 30 minutes. See the section on post-commissioning.

Switch No. 3 - CHRONO or ON/OFF

With this switch set to ON/OFF the TP75 will act as a conventional room thermostat, switching the heating plant to maintain the programmed temperature. When set to CHRONO the control function selected by switch No. 4 is enabled.

IMPORTANT. For systems with motorised zone valves ON/OFF mode is recommended.

Switch No. 4 - Chrono 6 or Chrono 3

This switch configures the TP75-RF to control different forms of heating system, typically as follows:

Use Chrono 3 for high thermal inertia systems, e.g. floor standing cast iron boilers.

Use Chrono 6 for low thermal inertia systems, e.g. low water content boilers and combi. boilers.

See the earlier section on Chrono-proportional Control for more detail.

5. Position the slots in the top surface of the module over the lugs at the top of the wallplate, and hinge downwards until the module is pressed fully against the wallplate. Tighten the two screws from below to fix the module to the wallplate.

6. Before setting the programmes the unit and circuits should be checked. Refer to the following Commissioning Instructions.

Commissioning

12. Lower the front flap and remove the anti-discharge paper strip from between the batteries and their contacts, and ensure the mains power to the control circuit is switched on.

13. Press and release the recessed RESET button to ensure the factory pre-set programme is active.

14. Once the programming has been completed, communication between the thermostat and the receiver module has to be established.

a) **SINGLE ZONE SYSTEM WITH RX1 RECEIVER**

1 - Press and hold the LEARN button of the TP75-RF for at least 3 seconds. The thermostat will now transmit a continuous signal which contains its unique identity for a period of 5 minutes.

2 - Within the 5 minute period go to the RX1 receiver module and press both "PROG" and "CH1" buttons together and hold for at least 3 seconds, then release.

During this process the RX1 receiver will have learnt the unique transmission code of the thermostat and will in future react to all transmissions from that thermostat.

To stop the continuous transmission on the TP75-RF unit press the ▲ button.

b) **TWO ZONE SYSTEM WITH RX2 RECEIVER**

1 - Repeat as above for zone one (CH1).

2 - Repeat steps one and two above for zone two, remembering to press "PROG" and "CH2" on the RX2 receiver.

c) **THREE ZONE SYSTEM WITH RX3 RECEIVER**

1 - Repeat as above for zones 1 and 2 (CH1 and CH2).

2 - Repeat as above for zone 3, remembering to press "PROG" and "CH3" on the RX3 receiver.

15. Establish with the customer the requirements for the operating mode, and adjust as follows:

Clock type - 24 hour or 12 hour with AM/PM indication.

The factory pre-set is 24 hour. To convert to 12 hour, press and hold down the NEXT and DAY buttons until the display changes, then release. (Repeat to return to a 24 hour clock.)

Temperature display - °C or °F

The factory pre-set is °C. To convert to display all temperatures in °F, press and hold down the DAY and COPY buttons until the display changes. (Repeat to return to a °C display.)

16. Check the existing space temperature by pressing and holding down the two buttons: NEXT and COPY, until the display changes from time to temperature.

17a. If the set temperature is below the space temperature, use the ▲ button to raise the set temperature. The flame symbol will appear in the display. Check that the heating plant operates correctly.

17b. If the set temperature is above the space temperature, use the ▼ button to lower the set temperature below the space temperature. The flame symbol will disappear. Check that the heating plant does not operate.

18. These models are supplied with a factory pre-set programme which will be active after a RESET has been performed. The pre-set programme is shown in the chart with the Setting Instructions. The chart also has spaces for users own times and temperatures as required by them.

19. The time and programme memory are maintained by the batteries which should last more than two years. Every 24 months the batteries should be renewed. Internal circuitry retains the time and programme memory for one minute, long enough for the batteries to be changed.

If the batteries volts drop, before a change is due, a battery symbol will blink in the display. When this occurs the TP75-RF will operate normally for 2 weeks. After the 15th midnight all relays will switch to OFF, the unit will shut down with just the time shown. When new batteries are fitted the unit will start to operate normally again.

Advise the User to enter their own times and temperatures in the chart on the Setting Instructions.

Post-commissioning

Optimum Start Control

If this has been enabled, initially set to the recommended 30 minutes start-up duration and the event 1 temperature is not achieved by the event 1 time, then refer to the Setting Instructions and increase the start-up duration one stage, i.e. to 1 hour.

If the space temperature at the beginning of an Optimum Start sequence is consistently lower than the programmed event 1 temperature by more that 2°F, then the event 1 temperature may not be achieved by the event 1 time. In this case the event 1 time should be brought forward sufficiently to compensate, so that the comfort temperature is achieved when actually required.

Intelligent Anticipator

If, when the heating equipment is switched on, the room temperature is 4°F or more lower than the programmed temperature the electronic anticipation function measures the rate of rise in the sensed temperature and will switch the heating plant off before the programmed temperature is reached. The residual heat in the system after the heating plant has shut down will ensure that the comfort temperature is achieved. This will improve the comfort conditions and minimise fuel consumption.

FCC Notice: This device complies with Pt 15 of the FCC rules. Operation is subject to the following conditions:
1) This device may not cause harmful interference
2) This device must accept any interference received including that which may cause undesired operation.

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