Data sheet

Thermostatic sensors type RTC / RTD



RTC 4400 | RTC 4402 | RTC 4450 MAX | RTC 4452 MAX | RTD 3560

Application

The RTC/RTD series is a comprehensive programme of radiator thermostats designed for central and individual water-based heating systems.
RTC/RTD is a self-actuating proportional controller with a small P-band. The RTC/RTD series comprises RTC and RTD sensors, RTD-N presetting valves and RTD-G high capacity valves.

RTC/RTD sensors:
The RTC/RTD sensor range includes:

- RTC 4400: built-in sensor with frost protection, temperature range 8-28°C.

- RTC 4402: remote sensor with frost protection, temperature range 8-28°C.

- RTC 4450 MAX: built-in sensor with maximum temperature setting at 21 °C and frost protection, temperature range 8-21°C.

- RTC 4452 MAX: remote sensor with maximum temperature setting at 21 °C and frost protection, temperature range 8-21°C.

RTC 4402 and RTC 4452: Within the sensor housing 2 m of ultra-thin capillary tube is coiled up. After sensor mounting capillary tube is pulled out to the required length.

- RTD 3560 Series: remote setting element with frost protection. Temperature range 8-28°C.
  RTD 3562: length of capillary tube 2 m
  RTD 3565: length of capillary tube 5 m
  RTD 3568: length of capillary tube 8 m

All RTC/RTD thermostatic sensors can be combined with all RTD valve bodies.

A nickel-plated union nut establishes a simple but strong connection between sensor and valve body.
Anti-theft protection prevents the sensor from unauthorised removal. (See accessories).

The technical data for RTD valve bodies in combination with RTC/RTD sensors meet Euronorm EN 215-1.

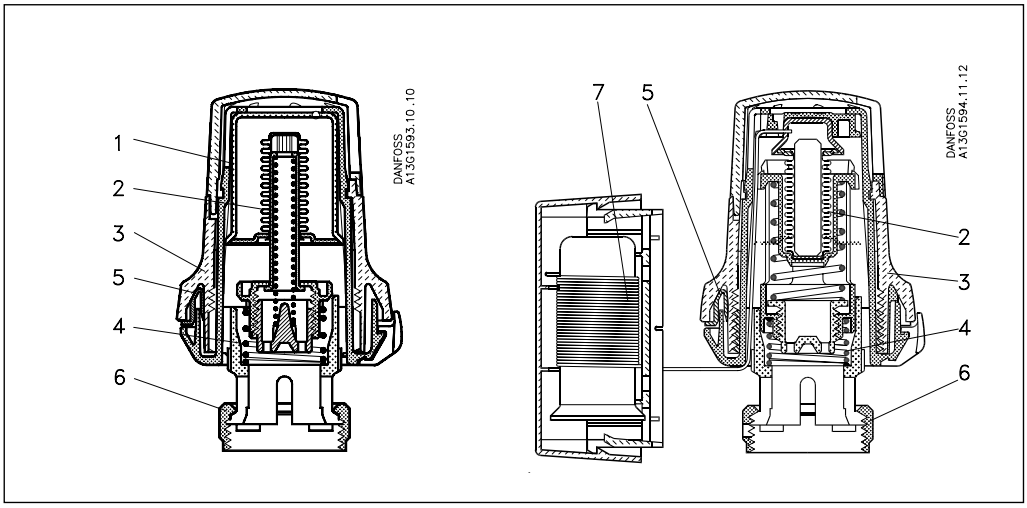
Ordering and specifications

RTC/RTD thermostatic sensors

Type	**Code no.**	Model	Cap. tube	Temp. range [2]
RTC 4400	**013L4400**	Built-in sensor	-	8-28 °C
RTC 4402	**013L4402**	Remote sensor	0-2 m [1]	8-28 °C
RTC 4450	**013L4450**	Max. limitation, built-in sensor	-	8-21 °C
RTC 4452	**013L4452**	Max. limitation, remote sensor	0-2 m [1]	8-21 °C
RTD 3562	**013L3562**	Remote setting element	2 m	8-28 °C
RTD 3565	**013L3565**	Remote setting element	5 m	8-28 °C
RTD 3568	**013L3568**	Remote setting element	8 m	8-28 °C

1) The remote sensor is delivered with all of the capillary tube coiled up within the sensor. When mounting the sensor, only the capillary tube required is uncoiled.
2) Temperatures stated for Xp = 2K, i.e. the valve is closed at 2 °C higher room temperature.

Sensor operation principle



1. Thermostatic sensor
2. Bellows
3. Setting dial
4. Setting spring
5. Limiter tabs
6. Union nut
7. Remote sensor

Max. ambient sensor temperature: 60 °C.

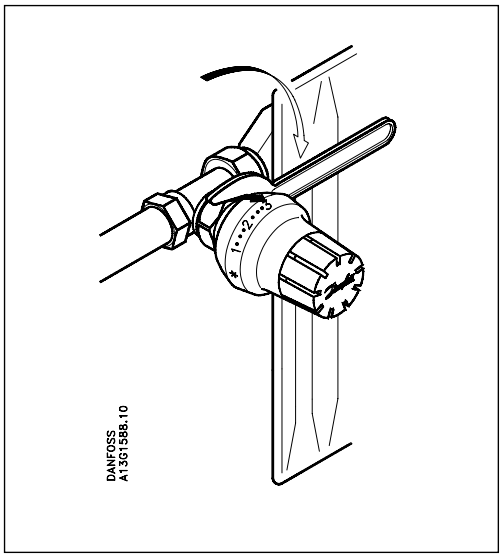
The thermostatic sensor provides proportional regulation. The sensor is actuated by ambient temperature. The calibrated pressure in the bellows corresponds to the temperature of the charge. This pressure is balanced by the force of a regulating spring. On a rise in ambient temperature the pressure rises in the bellows, moving the valve cone towards the closed position until equilibrium exists between the bellows and the spring.
On a drop in ambient temperature the pressure falls, allowing the bellows to contract and the valve cone to move towards the open position until a state of equilibrium is re-established.

The radiator thermostat will always respond to changes in room temperature and will not be affected by the water temperature itself. However, when the air around the valve is heated by the pipework temperature, then the sensor may register a higher temperature than that of the rest of the room. For this reason Danfoss recommends that the sensor is mounted horizontally, wherever possible.
Alternatively, a sensor with remote sensor is used.

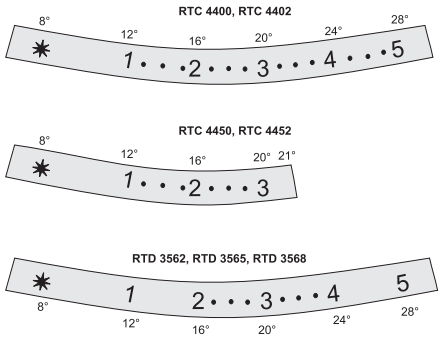
Mounting the RTC thermostatic sensor

The nickel-plated valve body is designed for mounting in the inlet of the radiator observing the direction of the flow arrow.
When using a built-in sensor, the valve body should be mounted with the gland seal horizontal.
During the construction period, before the sensor is mounted, the heating can be manually regulated by means of the protective cap on the valve body.

An open-end spanner is used for mounting the sensor onto the valve body. Instructions for installation is enclosed.
The sensor should always be placed where the room air can circulate freely around it.
On remote sensors all of the capillary tube is coiled up within the remote sensor housing when delivered. During installation only the required length of capillary tube need to be pulled out.



Setting the temperature



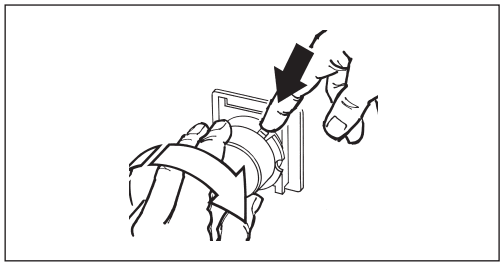
✶ = Frost protection setting

Room temperature scales for Xp = 2 °C

The required room temperature is set by turning the setting dial. The temperature scales show the correlation between scale values and the room temperature. The temperature values stated are for guidance only as the obtained room temperature will often be influenced by installation conditions.

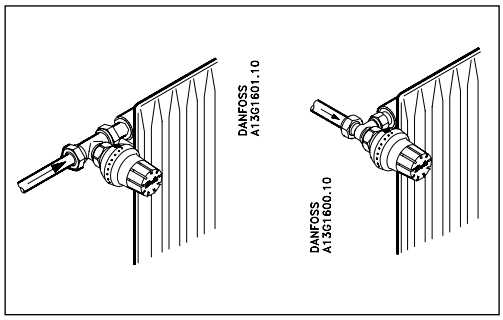
The temperature scales are stated according to European standards at Xp = 2°C. This means that the radiator thermostats close at a sensor temperature which is 2°C higher than stated on the temperature scales.

Locking and max./min. limitation of the remote setting adjuster type RTD 3560 are carried out by the limiter tabs. The limiter tabs will be covered by the setting dial.
The procedure is described in the instruction.



Radiator thermostats with built-in sensor

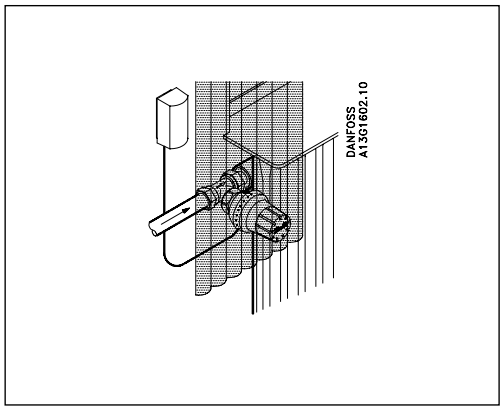
The thermostatic sensor should be selected on the basis of the following criteria:
The sensor must always be able to register the temperature of the ambient air.
Built-in sensors should always be fitted horizontally so that the ambient air can pass freely over the sensor.
Danfoss does not recommend the fitting of a built-in sensor in vertical position because heat effect from the valve body and possibly surface pipes will cause incorrect operation of the thermostat.



Radiator thermostats with remote sensor

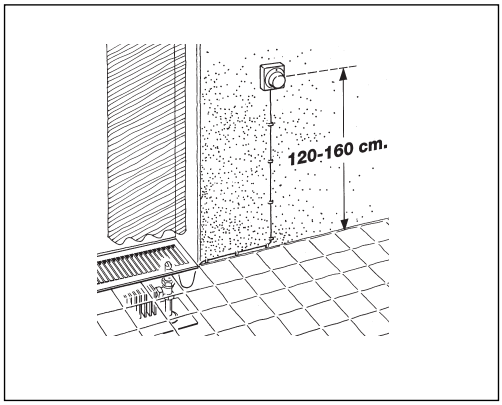
These should be used when:
- Curtains cover the sensor
- Sensor is affected by surface pipes
- Sensor is affected by draught
- It is necessary to mount the sensor in vertical position if there are adjacent obstructions.

The remote sensor must be mounted on the wall, away from curtains, or on the skirting board beneath the radiator if free of surface pipes. All remote sensors are now supplied with ultra-thin capillary tube. Simply pull out the length required (2 m maximum) and fix using clips provided or special tacker gun.



Valves with remote temperature adjuster

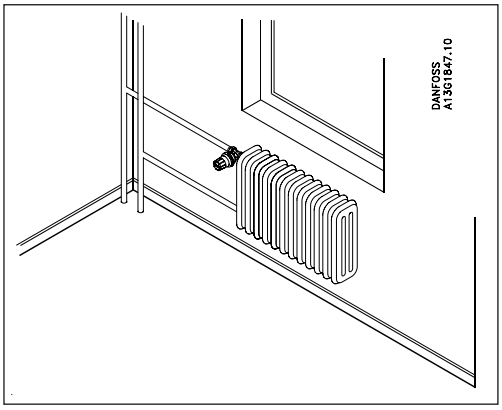
The remote temperature adjuster is used on radiators or convectors which are hidden in a cabinet or in other ways inaccessible to the user.
The sensor and the setting part of a remote setting unit are integrated.
The remote temperature adjuster is placed in an easily accessible place where the ambient air can at the same time pass freely over the sensor. This is ideal where the valve is inaccessible to the user.
The temperature adjuster should be mounted between 1.2 and 1.6 m above the floor.

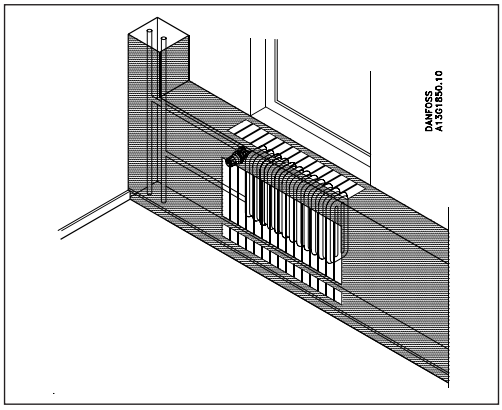


Installing the radiator: How to get the best heat emission from the radiator

Free standing radiator with radiator thermostat placed under the window for optimum room comfort.
This is the preferred and recommended way of installation because the room air can circulate freely around both the radiator and the thermostatic sensor.

A radiator under cover must have an opening at the top and at the bottom to ensure a good circulation of room air around the radiator and the thermostatic sensor for optimum comfort.





When the radiator is covered with some kind of enclosure or casing, the heat emission is reduced.

The illustration shows how much the different kinds of enclosures and casings reduce the heat emission compared to a freely standing radiator.

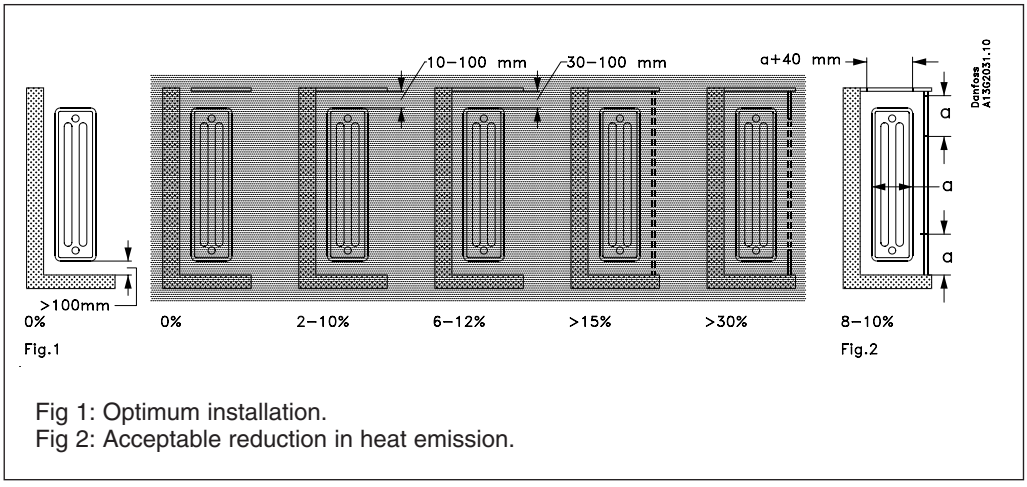


Fig 1: Optimum installation.
Fig 2: Acceptable reduction in heat emission.

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