



## Features & Benefits

- Universal mounting
- Easy adjustment of set point
- Setting indicator
- Volt Free Contacts
- IP65 housing option
- Manual reset versions have an exposed push button on the front cover so no tools needed to reset

## Technical Overview

The ST-FRE range of thermostats provide a low cost switch output based on the average temperature detected along a 6 meter or 2 meter capillary sensor.

The most common application is for frost protection on fresh air intakes or air-conditioning systems, to prevent the icing up of filters, fans and coils. The capillary is fixed in a matrix across the duct, in a position downstream of the pre-heater or frost coil.

## Product Codes

|                 |  |
|-----------------|--|
| <b>ST-FRE-1</b> | <b>IP44, 6-Meter capillary, auto reset</b> |
| ST-FRE-2        | IP44, 6-Meter capillary, manual reset      |
| ST-FRE-3        | IP44, 2-Meter capillary, auto reset        |
| ST-FRE-4        | IP44, 2-Meter capillary, manual reset      |
|                 |  |
| ST-FRE-1-IP65   | IP65, 6-Meter capillary, auto reset        |
| ST-FRE-2-IP65   | IP65, 6-Meter capillary, manual reset      |
| ST-FRE-3-IP65   | IP65, 2-Meter capillary, auto reset        |
| ST-FRE-4-IP65   | IP65, 2-Meter capillary, manual reset      |

### Accessories

|         |                                     |
|---------|-------------------------------------|
| ST-DFK* | Additional duct fixing clips 6-pack |
| BRK     | Mounting bracket                    |

6 meter thermostats include 6 capillary fixing clips as standard, 2 meter versions 1 capillary fixing clip.

## Specification

|                             |  |
|-----------------------------|--|
| <b>Control range</b>        | <b>-30 to +10°C</b>                        |
| <b>Differential:</b>        |  |
| <b>ST-FRE-1 &amp; 3</b>     | <b>2 to 16°C</b>                           |
| ST-FRE-2 & 4                | 2.5°C (fixed)                              |
| <b>Switch rating:</b>       |  |
| <b>230Vac</b>               | <b>24(10)A</b>                             |
| <b>24Vdc</b>                | <b>3A</b>                                  |
| Manual reset                | On low temperature (ST-FRE-2 & 4)          |
| Housing material            | ABS  |
| Housing dimensions          | 86 x 75 x 44mm<br>130 x 130 x 100mm (IP65) |
| <b>Capillary:</b>           |  |
| <b>Material</b>             | <b>Copper</b>                              |
| <b>Charge</b>               | <b>Vapour</b>                              |
| <b>Max. temp</b>            | <b>+150°C</b>                              |
| <b>Dimensions</b>           | <b>6m</b> or 2m x 1.8mm dia.               |
| Ambient range:              |  |
| Housing                     | -50 to +70°C                               |
| Storage                     | -50 to +70°C                               |
| Sensing range               | -55 to +180°C                              |
| <b>Vibration resistance</b> | <b>4g (10 to 1000 Hz)</b>                  |
| <b>Protection</b>           | <b>IP44</b> (IP65 enclosure kit option)    |
| Country of origin           | Czech Republic                             |



The body of the device must be located at a point where it will not be subjected to temperatures lower than the set point.

### WEEE Directive:



At the end of the products useful life, please dispose as per the local regulations.  
Do not dispose of with normal household waste.  
Do not burn.



The products referred to in this data sheet meet the requirements of 2014/35/EU

## Installation

1. The ST-FRE should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)
2. Ensure that all power is disconnected before carrying out any work on the ST-FRE.
3. Maximum cable is 2.5mm<sup>2</sup>, care must be taken not to over tighten terminals.
4. Mount the ST-FRE on a flat surface or using the optional bracket (BRK) using the screws supplied.  
CAUTION: If other screws are used, ensure that they do not penetrate into the control more than 8mm. Prevent distortion of the housing and ensure that there is sufficient room to adjust controls. You should avoid mounting the thermostat where it will be subjected to mechanical vibration.
5. Fix the capillary in the sensing location, not more than 100mm of the capillary should be located outside the control temperature. Unit trips when 300mm of capillary falls below set point temperature. The body of the device must be located at a point where it will not be subjected to temperatures lower than the set point.
6. The capillary should be secured using capillary clips (supplied) to prevent excessive vibration and must not be twisted or kinked. Any bends in the capillary must have a minimum radius of 25mm.
7. Feed the electrical cable through the rubber grommet, alternatively this can be replaced with a standard PG 13.5 cable gland.
8. Make electrical connections as required (terminal torque settings 1.2Nm max.).
9. Set the switching point and differential (ST-FRE1 & 3 only) by adjusting the screws on top of the ST-FRE.

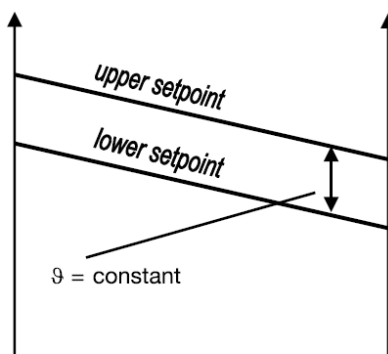
ST-FRE-1 & 3 are adjustable controls with adjustment spindles for range and differential. By turning the range spindle, the upper set point is defined and by adjusting the differential spindle, the differential and hence the lower set point is defined. The dependency between upper and lower set point is always as follows:

$$\text{Lower set point} = \text{Upper set point} - \text{Differential}$$

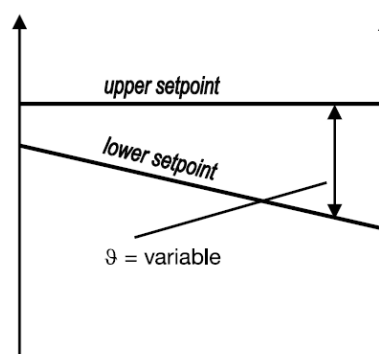
The following two rules should be kept in mind:

- An adjustment of the range spindle always affects both, upper and lower set point.
- An adjustment of the differential spindle affects the lower set point, only.

The following diagrams depict this dependency:



Effect of turning range spindle

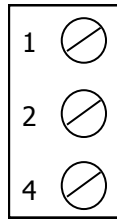


Effect of turning differential spindle

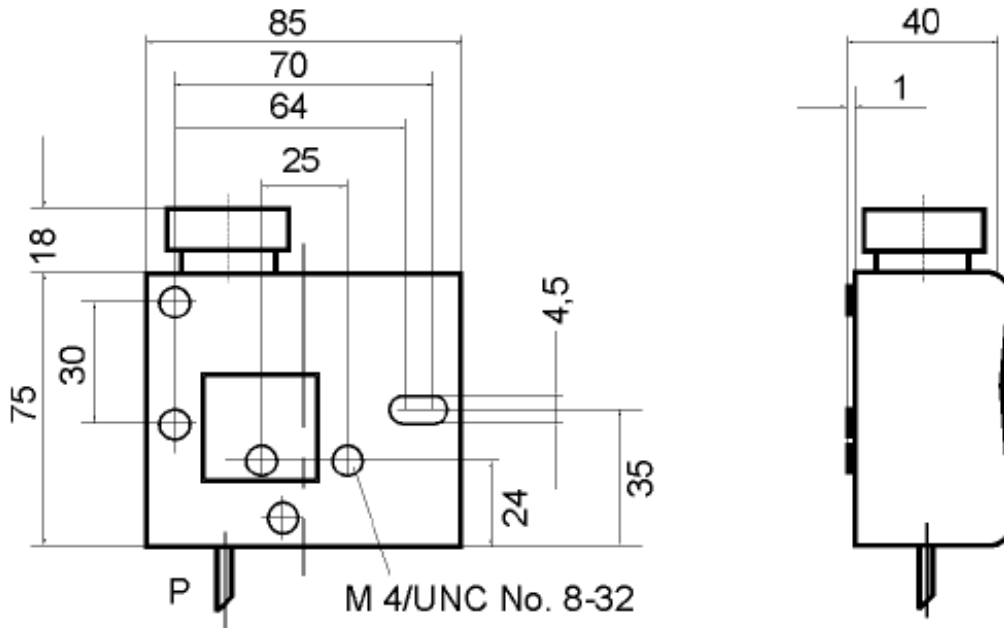
10. To test the switch, use the check-out lever to manually override the electrical contact position.

Connections

- 1 Common
- 2 Rising temperature
- 4 Falling temperature



Dimensions



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