

## VF00, VF10, VF20, LF00, LF10, LF20

### IMMERSION AND AIR-DUCT TEMPERATURE SENSORS

#### PRODUCT DATA



#### GENERAL

These immersion and air-duct temperature sensors can be employed for hot and cold water as well as for air-duct applications in systems using Pt 1000, NTC 10k, or NTC 20k temperature sensing elements.

The sensors with a stainless steel immersion well are also suitable for registering potable water temperature.

#### FEATURES

- Pt 1000, NTC 10k, or NTC 20k temperature sensing element
- Wide sensing range
- High accuracy
- Choice of three different probe lengths: 65, 150, 300, and 400 mm
- Models available with either IP54 or IP65 rating
- Bayonet ¼ turn cover screws for fast installation
- External mounting holes, no need to remove cover

#### SENSOR SPECIFICATION

##### Nominal value

|         |                                |
|---------|--------------------------------|
| Pt 1000 | 1000 $\Omega$ at 0 °C (32 °F)  |
| NTC 10k | 10 k $\Omega$ at 25 °C (77 °F) |
| NTC 20k | 20 k $\Omega$ at 25 °C (77 °F) |

##### Accuracy

|                          |                              |
|--------------------------|------------------------------|
| Pt 1000 (IEC751 Class B) | $\pm 0.3$ K at 0 °C (32 °F)  |
| NTC 10k, NTC 20k         | $\pm 0.2$ K at 25 °C (77 °F) |

##### Sensitivity

|         |                                                 |
|---------|-------------------------------------------------|
| Pt 1000 | $\approx 3.85 \Omega / K$ (linear)              |
| NTC 10k | $-440 \Omega / K$ at 25 °C (non-linear)         |
| NTC 20k | $\approx -934.5 \Omega / K$ at 25 °C (non-lin.) |

**NOTE:** See also Temp. Sensors / Temperature-Resistance Curves - Product Data (EN0B-0476GE51).

##### Time constant $\tau_{63}$

< 30 s using brass / stainless steel immersion well  
< 1 min, duct sensor at 3 m/s air velocity

##### Electrical connection

|             |                                             |
|-------------|---------------------------------------------|
| Connection  | terminals for 2 x 1.5 mm <sup>2</sup> cable |
| Cable gland | M16x1.5, UL 94-V2                           |

##### Ambient limits (housing)

|                     |                              |
|---------------------|------------------------------|
| Storage temperature | -30...+70 °C (-22...+158 °F) |
| Humidity            | 5...95% rh, non-condensing   |

##### Safety (terminal box)

|                  |                             |
|------------------|-----------------------------|
| Protection class | IP54 / IP65 as per EN 60529 |
|------------------|-----------------------------|

##### Flame retardant

UL94-V0 rated plastic enclosure  
 $T_{max} = 120$  °C (enclosure)

##### Dimensions

See section "Dimensions" below.

#### IMMERSION WELL SPECIFICATION

|                       |                                                                                |
|-----------------------|--------------------------------------------------------------------------------|
| Operating temperature | -40 ... +150 °C                                                                |
| Humidity              | 5...95% rh, non-condensing                                                     |
| Material              |                                                                                |
| WB                    | brass, nickel-plated<br>tube: CuZn37-CW508L (Ms63)<br>nipple: CuZn39Pb3 (Ms58) |
| WS                    | stainless steel<br>tube: 1.4571 / 316Ti<br>nipple: 1.4404 / 316L               |

**Sensor Models**

| OS-no.      | length mm (inch) L <sub>PROBE</sub> | IP rating | sensor type | sensing temperature limits (probe) | immersion well (ordered separately) |
|-------------|-------------------------------------|-----------|-------------|------------------------------------|-------------------------------------|
| VF00-1B54NW | 150 (5.91)                          | IP54      | Pt 1000     | -40...+150 °C                      | WB150, WS150                        |
| VF00-1B65NW | 150 (5.91)                          | IP65      | Pt 1000     | -40...+150 °C                      | WB150, WS150                        |
| VF00-3B54NW | 300 (11.81)                         | IP54      | Pt 1000     | -40...+150 °C                      | WB300, WS300                        |
| VF00-3B65NW | 300 (11.81)                         | IP65      | Pt 1000     | -40...+150 °C                      | WB300, WS300                        |
| VF00-5B54NW | 65 (2.56)                           | IP54      | Pt 1000     | -40...+150 °C                      | WB50, WS50                          |
| VF00-5B65NW | 65 (2.56)                           | IP65      | Pt 1000     | -40...+150 °C                      | WB50, WS50                          |
| VF01-1B54NW | 150 (5.91)                          | IP54      | Ni 1000     | -40...+150 °C                      | WB150, WS150                        |
| VF10-1B54NW | 150 (5.91)                          | IP54      | NTC 10k     | -40...+110 °C                      | WB150, WS150                        |
| VF10-1B65NW | 150 (5.91)                          | IP65      | NTC 10k     | -40...+110 °C                      | WB150, WS150                        |
| VF10-3B54NW | 300 (11.81)                         | IP54      | NTC 10k     | -40...+110 °C                      | WB300, WS300                        |
| VF10-3B65NW | 300 (11.81)                         | IP65      | NTC 10k     | -40...+110 °C                      | WB300, WS300                        |
| VF10-5B54NW | 65 (2.56)                           | IP54      | NTC 10k     | -40...+110 °C                      | WB50, WS50                          |
| VF10-5B65NW | 65 (2.56)                           | IP65      | NTC 10k     | -40...+110 °C                      | WB50, WS50                          |
| VF20-1B54NW | 150 (5.91)                          | IP54      | NTC 20k     | -40...+150 °C                      | WB150, WS150                        |
| VF20-1B65NW | 150 (5.91)                          | IP65      | NTC 20k     | -40...+150 °C                      | WB150, WS150                        |
| VF20-3B54NW | 300 (11.81)                         | IP54      | NTC 20k     | -40...+150 °C                      | WB300, WS300                        |
| VF20-3B65NW | 300 (11.81)                         | IP65      | NTC 20k     | -40...+150 °C                      | WB300, WS300                        |
| VF20-5B54NW | 65 (2.56)                           | IP54      | NTC 20k     | -40...+150 °C                      | WB50, WS50                          |
| VF20-5B65NW | 65 (2.56)                           | IP65      | NTC 20k     | -40...+150 °C                      | WB50, WS50                          |
| LF00-4B54   | 400 (3.93)                          | IP54      | Pt 1000     | -40...+150 °C                      | LF-MF flange included (no well)     |
| LF10-4B54   | 400 (3.93)                          | IP54      | NTC 10k     | -40...+110 °C                      | LF-MF flange included (no well)     |
| LF20-4B54   | 400 (3.93)                          | IP54      | NTC 20k     | -40...+150 °C                      | LF-MF flange included (no well)     |

**Immersion Well Models (sold separately)**

| OS-no. | material             | length mm (inch) L <sub>WELL</sub> | connection        | P <sub>max</sub> | max. flow speed* |
|--------|----------------------|------------------------------------|-------------------|------------------|------------------|
| WS50   | stainless steel      | 50 (1.97)                          | R1/2" / ISO, PN25 | 25 bar           | 30 m/s           |
| WB50   | brass, nickel-plated | 50 (1.97)                          |                   | 13 bar           | 26 m/s           |
| WS150  | stainless steel      | 135 (5.31)                         |                   | 25 bar           | 7.5 m/s          |
| WB150  | brass, nickel-plated | 135 (5.31)                         |                   | 13 bar           | 5 m/s            |
| WS300  | stainless steel      | 285 (11.22)                        |                   | 25 bar           | 2 m/s            |
| WB300  | brass, nickel-plated | 285 (11.22)                        |                   | 13 bar           | 1.2 m/s          |

\*At flow speeds above 1 m/s, the temperature profile in the water is flat, thus reducing the required immersion depth.

**Flanges (compatible with all devices; sold separately)**

| OS-no. | description                                        |
|--------|----------------------------------------------------|
| LF-MF  | Mounting flange for air-duct use, BULK – 10 pieces |

## DIMENSIONS

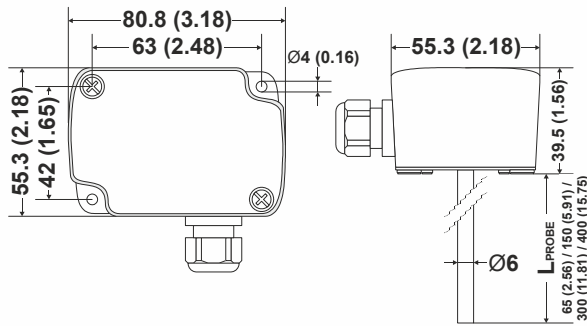
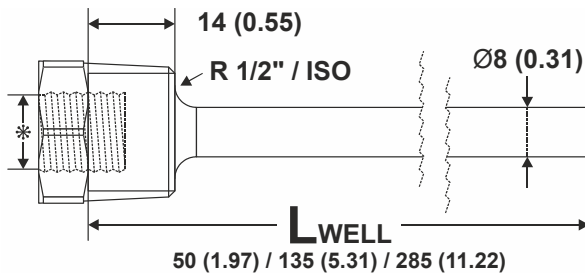


Fig. 1. Housing, dimensions in mm (inches)



\* THREAD FOR CABLE GLAND M12x1.5  
ACCESSIBLE AFTER REMOVING SPRING

Fig. 2. Immersion well, dimensions in mm (inches)

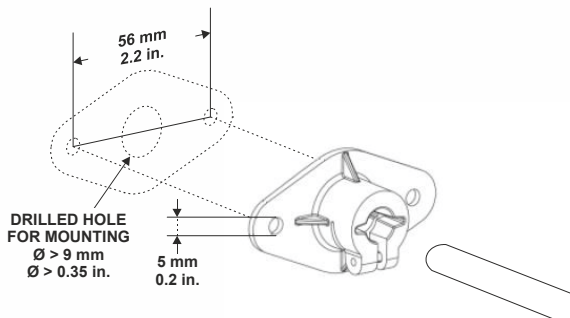


Fig. 3. Flange mounting on duct (mm, inches)

## INSTALLATION

| wiring run           | max. length    |
|----------------------|----------------|
| Sensor to controller | 200 m (660 ft) |

Offset due to wire resistance per 10 m of distance from sensor to controller, when using the VF00 or LF00 (Pt 1000):

| type of wire                | temperature offset Pt 1000 |
|-----------------------------|----------------------------|
| 0.5 mm <sup>2</sup> (AWG20) | 0.18 °C (0.324 °F)         |
| 1.0 mm <sup>2</sup> (AWG17) | 0.09 °C (0.162 °F)         |
| 1.5 mm <sup>2</sup> (AWG15) | 0.06 °C (0.108 °F)         |

**NOTE:** Use shielded wiring in areas with high EMI.  
Keep 15 cm (5.9") minimum distance between sensor lines and 230 Vac power lines.

## Coldwater Application

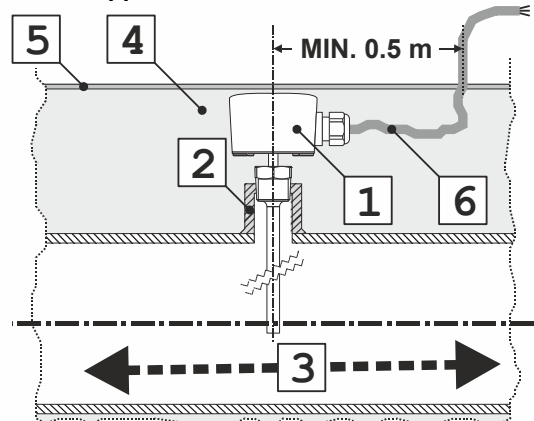


Fig. 4. DN65...150, coldwater application

1. Temperature sensor
2. Weld junction with 1/2" thread
3. Flow in either direction
4. Insulation material
5. Water vapor barrier
6. Minimum 0.5 meter before exit through water vapor barrier.

## ELECTRICAL CONNECTION

The wiring of the temperature sensor must be in accordance with the overall wiring circuit diagram.  
The terminals are not polarized. Thus, connecting the wires in reverse will not result in any malfunction.

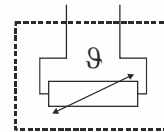


Fig. 5. VF00, VF10, VF20, LF00, LF10, LF20 wiring

**Honeywell**

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EN0B-0724GE51 R0120

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