# Temperature Sensors

Information Sheet

Itron temperature sensors are built in highest quality for various applications. A wide selection of direct and pocket installed sensors are a great complement of our thermal energy meters. All temperature sensors are delivered paired, verified by the MID initial calibration. Furthermore, all sensors meet the requirements of DIN EN 1434.

## CHARACTERISTICS

» Your benefits

- Highest accuracy
  Smallest measuring errors
- Great response behavior
  Exact instantaneous values
- Different versions
  Always the right solution

» Properties

- Temperature sensors Pt 100 and Pt 500
- Paired acc. EN1434
- Standard DIN EN 1434 and AGFW
- CE conform (MID)

» Field of applications

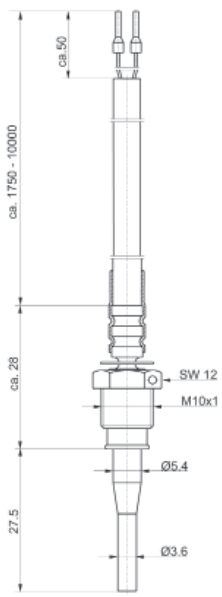
- Direct installation and pocket installation
- Temperature measurement in closed-loop pipe systems of building service areas to measure cooling- and heating energy
- Temperature measurement for energy measurements for district heating and cooling

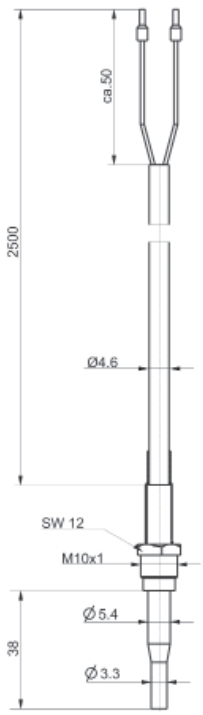
## TEMPERATURE SENSORS – OVERVIEW

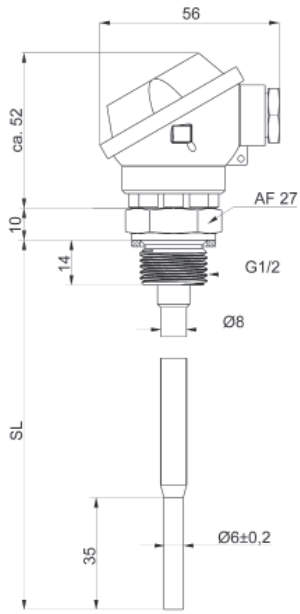
### Direct Installation

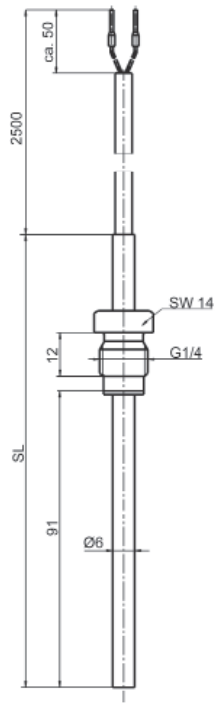
| | TDF 27 | TDF 38 | TDF 85/120/210 | TDF 91/146 |
|---|---|---|---|---|
| Measuring resistance | Pt 100 / Pt 500 | Pt 100 | Pt 100 | Pt 100 |
| Standard compliance | EN 1434 / EN 60751 | EN 1434 / EN 60751 | EN 1434 / EN 60751 | EN 1434 / EN 60751 |
| Connection | 2-wire | 2-wire | 2-/4-wire | 2-wire |
| Temperature range | 0 to 150 °C | 0 to 150 °C | 0 to 180 °C | 0 to 180 °C |
| Temperature difference | 3 to 150 K | 3 to 150 K | 3 to 180 K | 3 to 180 K |
| Responce time T0,5 | 2 s | 2 s | ≤ 6 s | 6 s |
| Environmental tempe-rature | 0 to 70 °C | 0 to 70 °C | 0 to 70 °C | 0 to 70 °C |
| Sleeve diameter | 5,4 / 3,6 mm | 5,4 / 3,3 mm | 8 / 6 mm | 6 mm |
| Fitting length | 27,5 mm | 38 mm | 85 / 120 / 210 mm | 91 / 146 mm |
| Connection thread | M10x1 | M10x1 | G 1/2 | G 1/4 |
| Connection cable | Silicone | Silicone | Silicone | Silicone |
| Cable lengths | 1,75 / 2,5 / 5* / 10* m | 2,5 m | Head Type | 2,5 m |
| Wire cross section | 2x0,34 mm² | 2x0,34 mm² | 2x/4x0,75 mm² | 2x0,34 mm² |
| Protection class | IP 65 | IP 65 | IP 65 | IP 65 |

* only for Pt 500



## TEMPERATURE SENSOR FOR DIRECT INSTALLATION
## TDF 27

### Technical Data

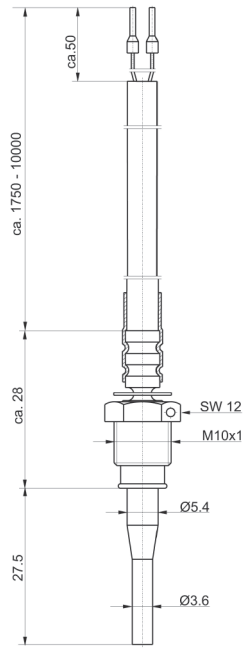
| | |
|---|---|
| Measuring resistance | Pt 100 / Pt 500 |
| Standard compliance | EN 1434 / EN 60751 |
| Connection | 2-wire |
| Temperature range | 0 to 150 °C |
| Temperature difference | 3 to 150 K |
| Response behavior T0,5 | 2 s |
| Environmental temperature | 0 to 70 °C |
| Sleeve diameter | 5,4 stepped down to 3,6 mm |
| Fitting length | 27,5 mm |
| Connection thread | M10x1 |
| Connection cable | Silicone |
| Cable lengths | 1,75 / 2,5 / 5* / 10* m |
| Wire cross section | 2x0,34 mm² |
| Protection class | IP 65 |

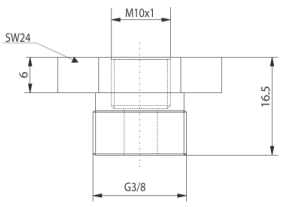
* only for Pt 500

### Items

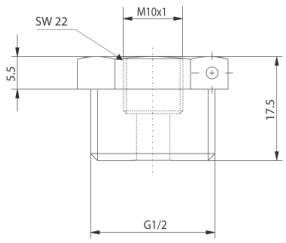
| Type | Cable length | | Article-No. |
|---|---|---|---|
| TDF 27 | 1,75 m | Pt 100 | 2961830006 |
| TDF 27 | 2,50 m | Pt 100 | 2961831306 |
| TDF 27 | 1,75 m | Pt 500 | 2961837006 |
| TDF 27 | 5,00 m | Pt 500 | 2961837506 |
| TDF 27 | 10,0 m | Pt 500 | 2961837706 |

| Adapters for direct sensors acc. EN1434 | | Article-No. |
|---|---|---|
| M10x1 G3/8” | M10 / 3/8” IG | 4825 |
| M10x1 G½” | M10 / ½” IG | 5239 |
| M10x1 screw-in fitting | M10 / M10 | 0930 |

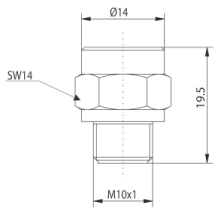



**4825**




**5239**

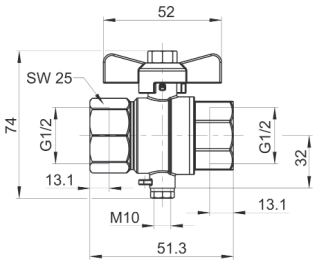



**0930**

### Accessories

| Ball valves | | Article-No. |
|---|---|---|
| Ball valve ½“-D-complete | ½“ IG | 10195 |
| Ball valve ¾“-D-complete | ¾“ IG | 2671 |
| Ball valve 1“-D-complete | 1“ IG | 4795 |

| Technical Data ball valves | |
|---|---|
| Temperature range | -20 to 150°C |
| Maximum pressure | 16 bar (150°C)<br>25 bar (110°C) |

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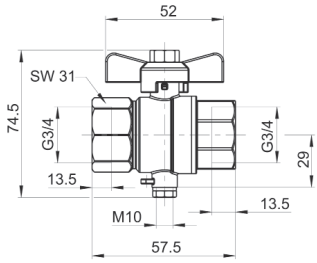
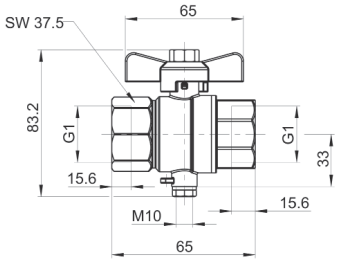



**2671**

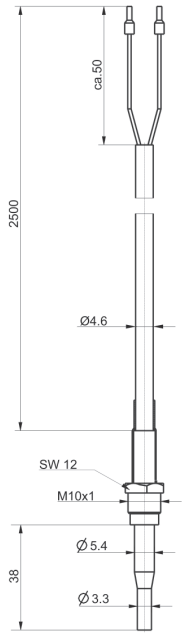



**4795**

## TEMPERATURE SENSOR FOR DIRECT INSTALLATION
## TDF 38

### Technical Data

| | |
|---|---|
| Measuring resistance | Pt 100 |
| Standard compliance | EN 1434 / EN 60751 |
| Connection | 2-wire |
| Temperature range | 0 to 150 °C |
| Temperature difference | 3 to 150 K |
| Response behavior T0,5 | 2 s |
| Environmental temperature | 0 to 70 °C |
| Sleeve diameter | 5,4 stepped down to 3,6 mm |
| Fitting length | 27,5 mm |
| Connection thread | M10x1 |
| Connection cable | Silicone |
| Cable lengths | 2,5 m |
| Wire cross section | 2x0,34 mm² |
| Protection class | IP 65 |

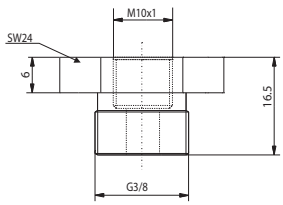



### Items

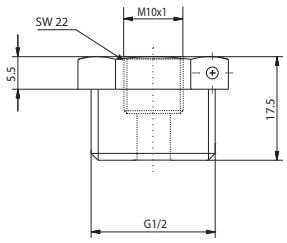
| Type | Cable length | PT* | Article-No. |
|---|---|---|---|
| TDF 38 | 2,50 m | Pt 100 | 2853831306 |

*PT500 and other length available on request

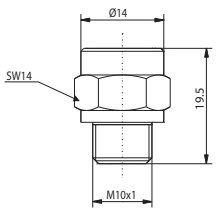
| Adapters for direct sensors acc. EN1434 | | Article-No. |
|---|---|---|
| M10x1 G3/8” | M10 / 3/8” IG | 4825 |
| M10x1 G½” | M10 / ½” IG | 5239 |
| M10x1 screw-in fitting | M10 / M10 | 0930 |




**4825**




**5239**

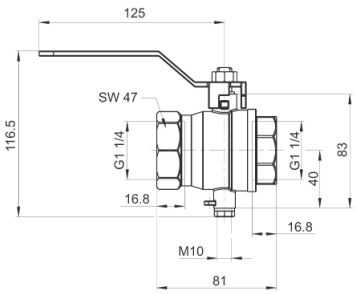



**0930**

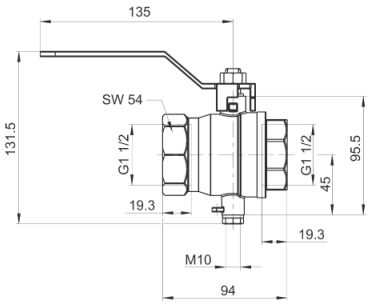
### Accessories

| Ball valves | | Article-No. |
|---|---|---|
| Ball valve 1 ¼“-D-complete | 1 ¼“IG | 14575 |
| Ball valve 1 ½“-D-complete | 1 ½“IG | 14573 |

| Technical Data ball valves | |
|---|---|
| Temperature range | -20 to 150°C |
| Maximum pressure | 16 bar (150°C)<br>25 bar (110°C) |




**14575**




**14573**

## TEMPERATURE SENSOR FOR DIRECT INSTALLATION
## TDF 85 / 120 / 210

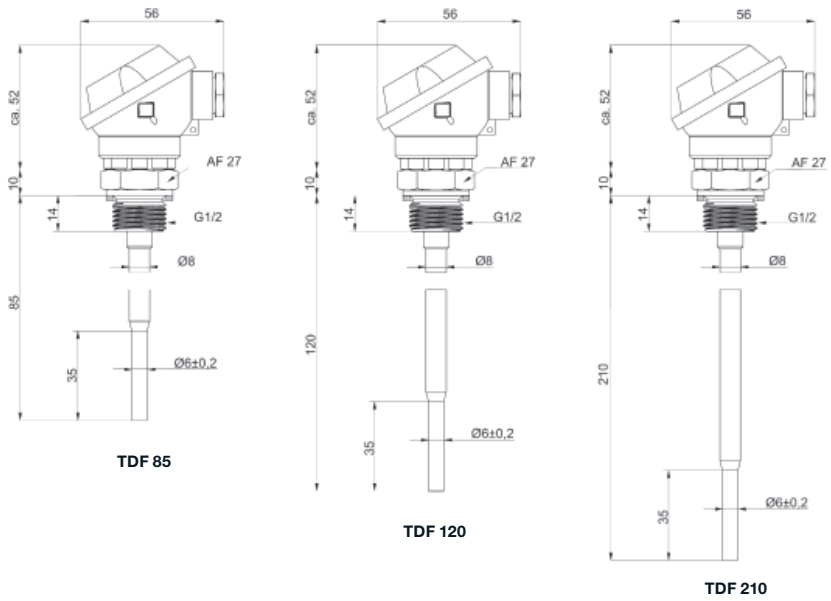
### Technical Data

| | |
|---|---|
| Measuring resistance | Pt 100 |
| Standard compliance | EN 1434 / EN 60751 |
| Connection | 2-wire<br>4-wire |
| Temperature range | 0 to 180 °C |
| Temperature difference | 3 to 180 K |
| Response time T0,5 | ≤ 6 s |
| Environmental temperature | 0 to 70 °C |
| Sleeve diameter | 8 stepped down to 6 mm |
| Fitting length | 85 / 120 / 210 mm |
| Connection thread | G 1/2 |
| Connection cable | Silicone |
| Wire cross section | 2x/4x0,75 mm² |
| Protection class | IP 65 |

### Items

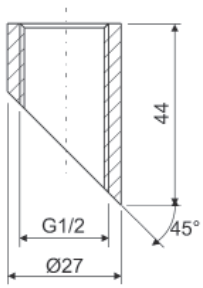
| Type* | PT | Article-No. |
|---|---|---|
| TDF 85 | Pt 100 | 2951513006 |
| TDF 120 | Pt 100 | 2952513006 |
| TDF 210 | Pt 100 | 2953513006 |

*without connection cable, please see accessoriies for possible connection cables




### Accessories

| Welding Sleeve | Article-No. |
|---|---|
| AM ½"x44 mm / 45° | 0649 |

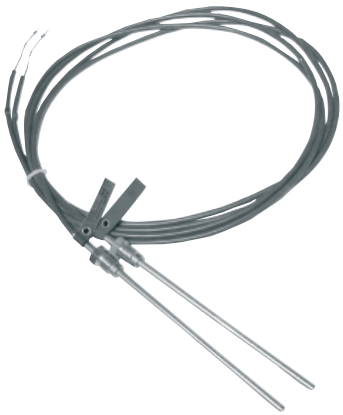



### Connection Cable

| Cable length | 2/4-wire | Article-No. |
|---|---|---|
| 3 m | 2-wire | 0973 |
| 5 m | 2-wire | 4490 |
| 10 m | 2-wire | 4491 |
| 10 m | 4-wire | 10344 |

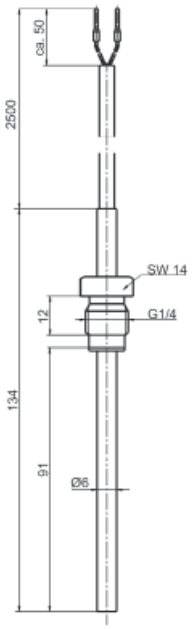
## COMBINED TEMPERATURE SENSOR TDF 91 / 146

- DIRECT & POCKET INSTALLATION
- REPLACES VARIOUS ON MARKET USED TEMPERATURE SENSORS

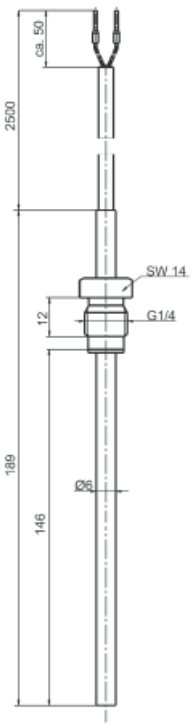


### Technical Data

| | |
|---|---|
| Measuring resistance | Pt 100 |
| Standard compliance | EN 1434 / EN 60751 |
| Connection | 2-wire |
| Temperature range | 0 to 180 °C |
| Temperature difference | 3 to 180 K |
| Response time T0,5 | ≤ 6 s |
| Environmental temperature | 0 to 70 °C |
| Sleeve diameter | 6 mm |
| Fitting length | 91 / 146 mm |
| Connection thread | G 1/4 |
| Connection cable | Silicone |
| Cable lengths | 2,5 m |
| Wire cross section | 2x0,34 mm² |
| Protection class | IP 65 |




TDF 91



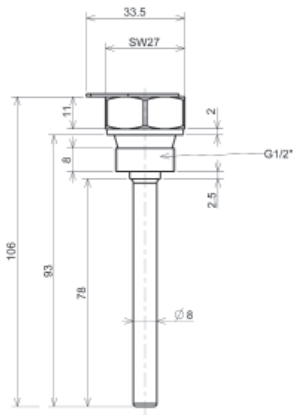

TDF 146

### Items

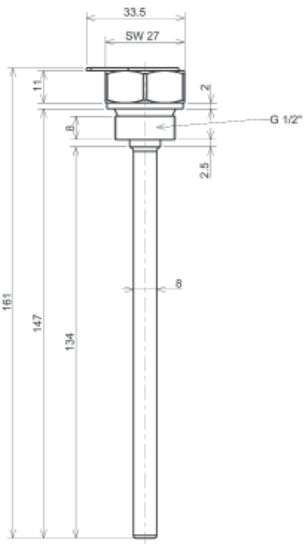
| Type | Cable length | PT | Article-No. |
|---|---|---|---|
| TDF 91 | 2,50 m | Pt 100 | 5524531306 |
| TDF 146 | 2,50 m | Pt 100 | 5525531306 |

### Accessories

| Pockets | PN | Article-No. |
|---|---|---|
| TH ½" x 91 mm | PN 40 | 11278 |
| TH ½" x 146 mm | PN 40 | 11690 |




11278

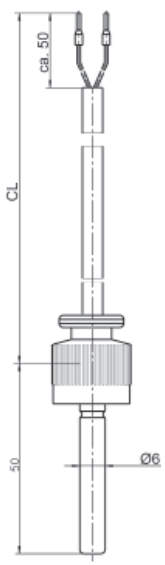


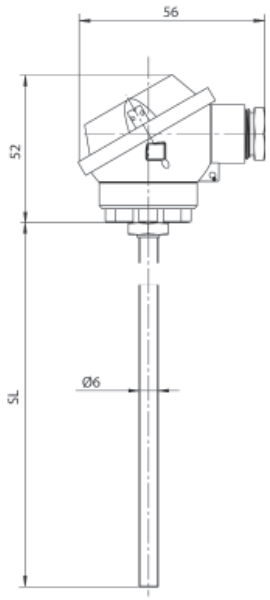

11690

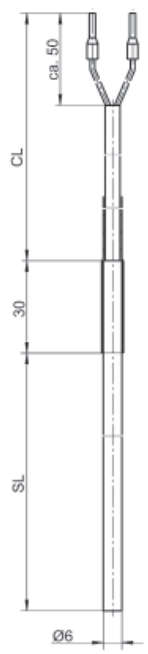
## Pocket Installation

| | THF 50 | THF 105/140/230 | THF C105/C140/C230 |
|---|---|---|---|
| Measuring resistance | Pt 100 / Pt 500 | Pt 100 | Pt 100 / Pt 500 |
| Fulfilled regulations | EN 1434 / EN 60751 | EN 1434 / EN 60751 | EN 1434 / EN 60751 |
| Measuring insert | 2-wire | 2-wire | 2-/4-wire |
| Temperature range | 0 to 150 °C | 0 to 150 °C | 0 to 150 °C |
| Temperature difference | 3 to 150 K | 3 to 150 K | 3 to 150 K |
| Response time T0,5 | 2 s | ≤ 6 s | ≤ 6 s |
| Climatic conditions | 0 to 70 °C | 0 to 70 °C | 0 to 70 °C |
| Sleeve diameter | 6 mm | 6 mm | 6 mm |
| Fitting length | 50 mm | 105 / 140 / 230 mm | 105 / 140 / 230 mm |
| Connection thread | M10x1 | M16x1,5 | M16x1,5 |
| Connection cable | Silicone | Silicone | Silicone |
| Cable lengths | 1,75 / 2,5 / 5* / 10* m | Head Type | 2,5 / 5 m |
| Wire cross section | 2x0,34 mm² | 2x0,34 mm² | 2x/4x0,34 mm² |
| Protection class | IP 65 | IP 65 | IP 65 |

* only for Pt 500



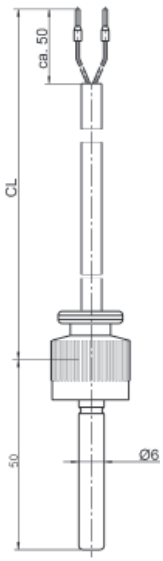



## TEMPERATURE SENSOR FOR POCKET INSTALLATION THF 50

### Technical Data

| | |
|---|---|
| Measuring resistance | Pt 100 / Pt 500 |
| Standard compliance | EN 1434 / EN 60751 |
| Connection | 2-wire |
| Temperature range | 0 to 150 °C |
| Temperature difference | 3 to 150 K |
| Response time T0,5 | 2 s (installed in pocket 15 s) |
| Environmental temperature | 0 to 70 °C |
| Sleeve diameter | 6 mm |
| Fitting length | 50 mm |
| Connection thread | M10x1 |
| Connection cable | Silicone (Spiral = PUR) |
| Cable lengths | 1,75 / 2,5 / 5 / 10 m |
| Wire cross section | 2x0,34 mm²<br>(spiral cable 2x0,25 mm²) |
| Protection class | IP 65 |
| Maximum pressure | PN 25 |



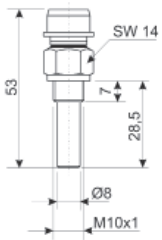

### Items

| Type | Cable length | Pt | Article-No. |
|---|---|---|---|
| THF 50 | 1,10 m* | Pt 100 | 2960230006 |
| THF 50 | 1,75 m | Pt 100 | 2960830006 |
| THF 50 | 2,50 m | Pt 100 | 2960831306 |
| THF 50 | 1,75 m | Pt 500 | 2960837006 |
| THF 50 | 5,00 m | Pt 500 | 2960837506 |
| THF 50 | 10,0 m | Pt 500 | 2960837706 |

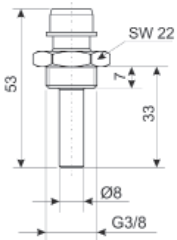
*Spiral cable

### Accessories

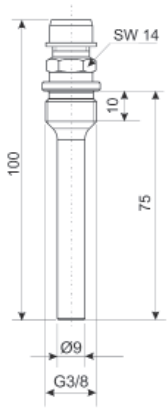
| Pockets | AG | PN | Article-No. |
|---|---|---|---|
| TH M10 x 1 x 28,5 mm | M10 AG | PN 10 | 9079 |
| TH 3/8" x 33 mm | 3/8" AG | PN 10 | 9080 |
| TH 3/8" x 75 mm | 3/8" AG | PN 10 | 9089 |
| TH ¼" x 28 mm | ¼" AG | PN 10 | 6811 |
| TH ½" x 33,5 mm | ½" AG | PN 10 | 2680 |
| TH ½" x 75 mm | ½" AG | PN 10 | 15141 |



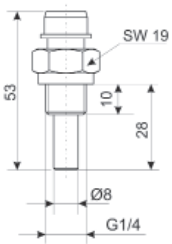

9079



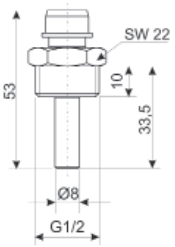

9080



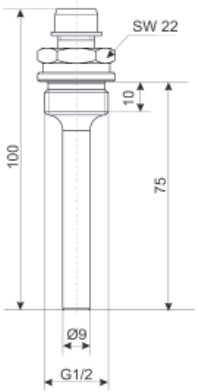

9089




6811



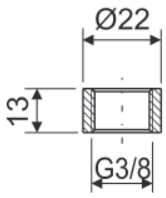

2680



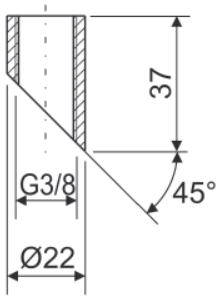

15141

## TEMPERATURE SENSOR FOR POCKET INSTALLATION
## THF 50

| Welding Sleeves | | Article-No. |
|---|---|---|
| AM 3/8" x 12 mm | for TH 3/8" x 40 | 9082 |
| AM 3/8" x 37 mm / 45° | for TH 3/8" x 75 | 9090 |

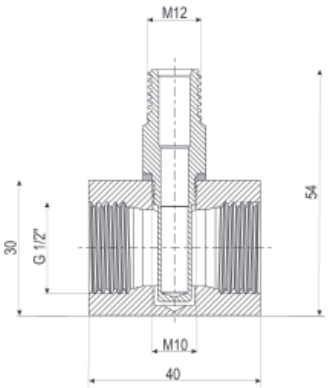



9082

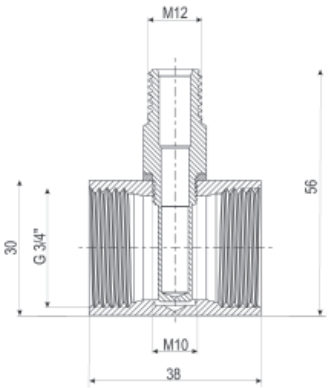



9090

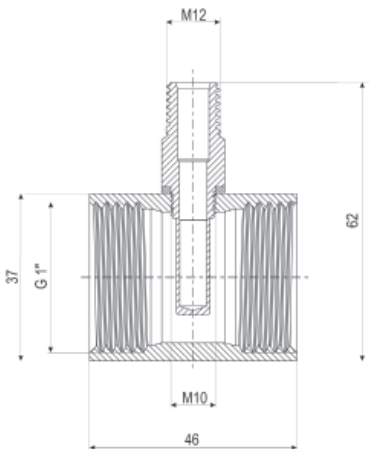
| Supply pipe pockets | | PN | Article-No. |
|---|---|---|---|
| VTTH ½" | ½" IG | PN 10 | 13861 |
| VTTH ¾" x 38 mm | ¾" IG | PN 10 | 1838 |
| VTTH 1" x 46 mm | 1" IG | PN 10 | 9166 |




13861




1838




9166

## TEMPERATURE SENSOR FOR POCKET INSTALLATION THF 105 / 140 / 230

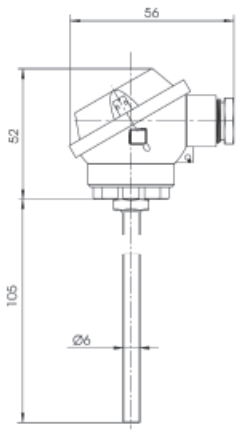
### Technical Data

| | |
|---|---|
| Measuring resistance | Pt 100 |
| Standard compliance | EN 1434 / EN 60751 |
| Connection | 2-wire |
| Temperature range | 0 to 150 °C |
| Temperature difference | 3 to 150 K |
| Response time T0,5 | ≤ 6s (installed in pocket ≤ 12s) |
| Environmental temperature | 0 to 70 °C |
| Sleeve diameter | 6 mm |
| Fitting length | 105 / 140 / 230 mm |
| Connection thread | M16x1,5 |
| Connection cable | Silicone |
| Wire cross section | 2x0,34 mm² |
| Protection class | IP 65 |

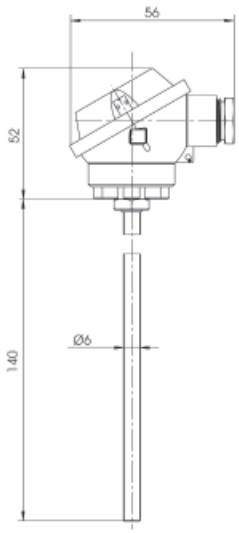
### Items

| Type* | Pt | Article-No. |
|---|---|---|
| THF 105 | Pt 100 | 5520833006 |
| THF 140 | Pt 100 | 5521833006 |
| THF 230 | Pt 100 | 5522833006 |

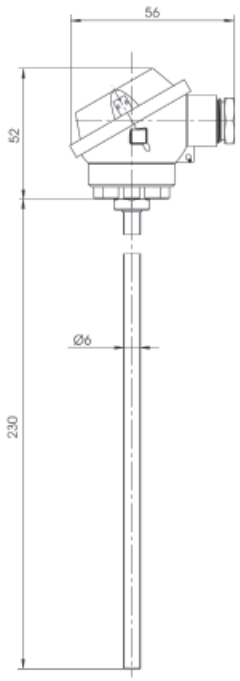
*without connection cable, please see accessories for possible connection cables




THF 105




THF 140




THF 230

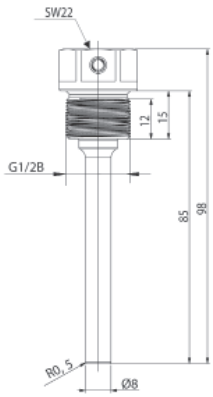
## TEMPERATURE SENSOR FOR POCKET INSTALLATION
## THF 105 / 140 / 230

### Accessories

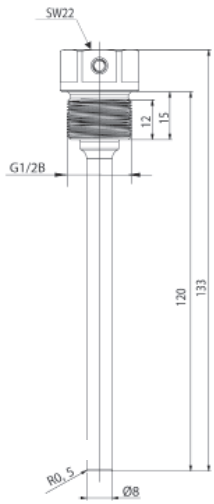
Connection Cable

| Cable length | 2/4-wire | Article-No. |
|---|---|---|
| 3 m | 2-wire | 0973 |
| 5 m | 2-wire | 4490 |
| 10 m | 2-wire | 4491 |
| 10 m | 4-wire | 10344 |

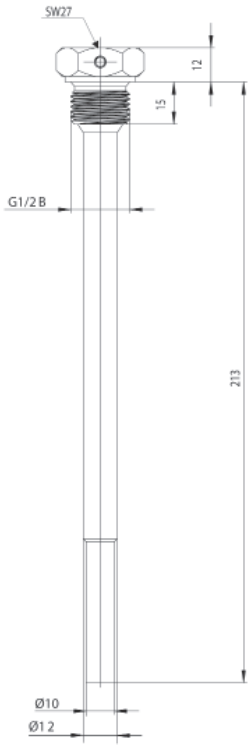
| Pockets | AG | PN | Article-No. |
|---|---|---|---|
| TH ½" x 85 mm | ½" AG | PN 25 | 7265 |
| TH ½" x 120 mm | ½" AG | PN 25 | 7266 |
| TH ½" x 210 mm | ½" AG | PN 40 | 13802 |




7265

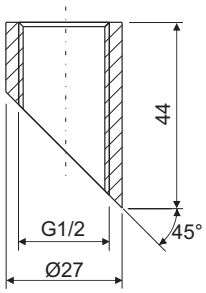



7266




13802

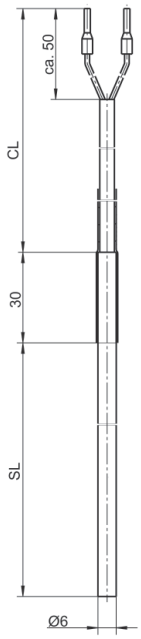
| | |
|---|---|
| AM ½" x 44 mm / 45° | 0649 |



## TEMPERATURE SENSOR FOR POCKET INSTALLATION
## THF C105 / C140 / C230

### Technical Data

| | |
|---|---|
| Measuring resistance | Pt 100 / Pt 500 |
| Standard compliance | EN 1434 / EN 60751 |
| Connection | 2-wire |
| 4-wire | 0 to 150 °C |
| Temperature range | 0 to 150 °C |
| Temperature difference | 3 to 150 K |
| Response time T0,5 | ≤ 6s (installed in pocket ≤ 12s) |
| Environmental temperature | 0 to 70 °C |
| Sleeve diameter | 6 mm |
| Fitting length | 105 / 140 / 230 mm |
| Connection thread | M16x1,5 |
| Connection cable | Silicone |
| Cable lengths | 2,5 / 5 m |
| Wire cross section | 2x/4x0,34 mm² |
| Protection class | IP 65 |




### Items

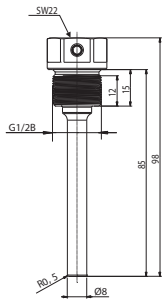
| Type | Cable length* | Pt | 2/4-wire | Article-No. |
|---|---|---|---|---|
| THF-C105 | 2,50 m | Pt 100 | 2-wire | 5530831306 |
| THF-C105 | 5,00 m | Pt 100 | 4-wire | 5530838506 |
| THF-C105 | 2,50 m | Pt 500 | 2-wire | 5529837106 |
| THF-C105 | 5,00 m | Pt 500 | 4-wire | 5529839506 |
| THF-C105 | 10,00 m | Pt 500 | 2-wire | 5529837706 |
| THF-C140 | 2,50 m | Pt 100 | 2-wire | 5531831306 |
| THF-C140 | 5,00 m | Pt 100 | 4-wire | 5531838506 |
| THF-C140 | 2,50 m | Pt 500 | 2-wire | 5531837106 |
| THF-C140 | 5,00 m | Pt 500 | 4-wire | 5531839506 |
| THF-C140 | 10,00 m | Pt 500 | 2-wire | 5531837706 |
| THF-C230 | 2,50 m | Pt 100 | 2-wire | 5532831306 |
| THF-C230 | 5,00 m | Pt 100 | 4-wire | 5532838506 |
| THF-C230 | 2,50 m | Pt 500 | 2-wire | 5532837106 |
| THF-C230 | 5,00 m | Pt 500 | 4-wire | 5532839506 |

*other cable length on request

## TEMPERATURE SENSOR FOR POCKET INSTALLATION
## THF C105 / C140 / C230

### Accessories

| Pockets | AG | PN | Article-No. |
|---|---|---|---|
| TH ½" x 85 mm | ½" AG | PN 25 | 7265 |
| TH ½" x 120 mm | ½" AG | PN 25 | 7266 |
| TH ½" x 210 mm | ½" AG | PN 40 | 13802 |



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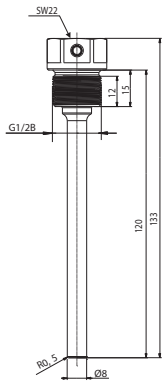
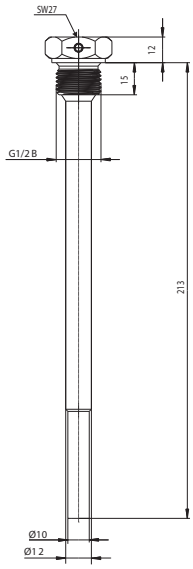
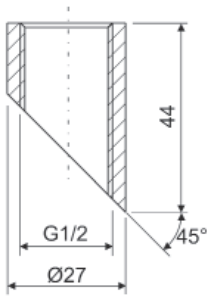


7266



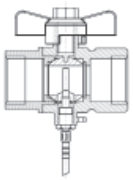
13802

| Welding Sleeves | Article-No. |
|---|---|
| AM ½" x 44 mm / 45° | 0649 |



## MOUNTING OPTIONS FOR TEMPERATURE SENSORS

1

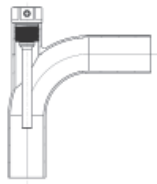


### Option 1 – Installation in threaded pipe fitting and ball valve

» direct installation

» probe axis perpendicular to axis of fitting and in same plane

2



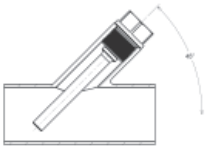
### Option 2 – Installation in Bend

» direct installation

» pocket installation

» probe axis coincident with pipe axis

3



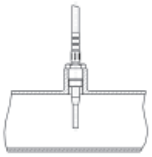
### Option 3 – Installation in angled probe

» direct installation

» pocket installation

» temperature sensing element inserted to pipe axis or beyond

4



### Option 4 – Installation in perpendicular probe

» direct installation

» pocket installation

» probe axis perpendicular to pipe axis and in the same plane

## RECOMMENDATIONS FOR INSTALLATION OF THE TEMPERATURE SENSORS

» Temperature sensors for thermal energy applications are paired according to EN1434 accuracy requirements. In case of change the complete pair must be changed.

» One temperature sensor should be installed near to the outlet of the flow meter. Flow meters DN15 and 20 offer a measuring point directly integrated in the flow meter (downstream position).

» Both supply and return temperature sensors should be installed in a similar way to ensure symmetric measurement and therefore best accuracy. Don´t mix direct installation with installation in pockets.

» In 2-wire measurement the connection cable of both temperature probes must have the same cable length (same wire resistance).

» When laying the cables a minimum distance of 50 mm to main power cables and/or sources of electromagnetic interferences should be respected.

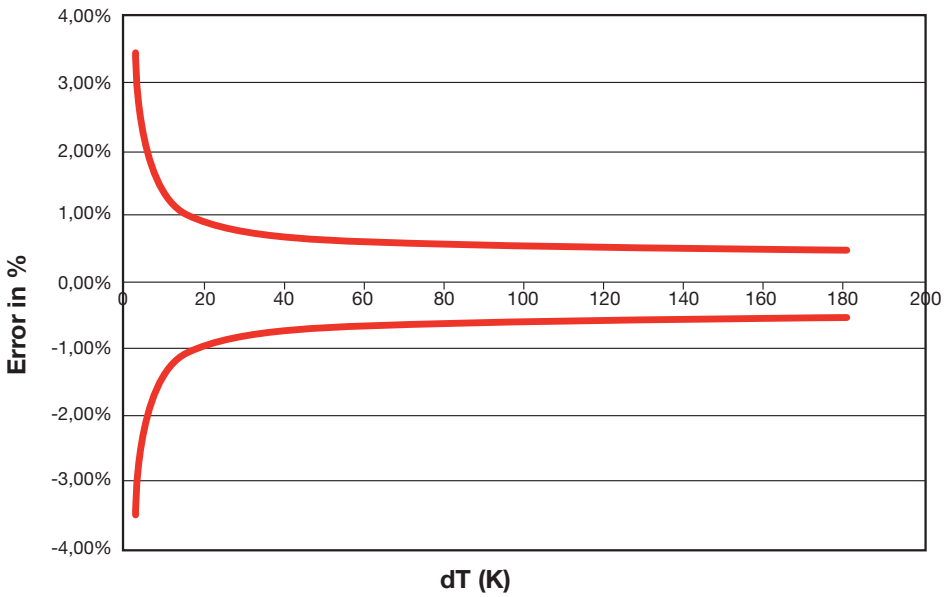
» In case of strong sources for electromagnetic disturbances (e.g. high power machines and pumps, frequency and power converters, power switches, neon tubes) it´s recommended to increase the minimum distance to meter signal cables to 50 cm.

» To achieve highest accuracy, the tip of the probes/pockets should reach the center of the pipe.

## DN AND CORRESPONDING TEMPERATURE SENSOR

| Type | DN 15 - DN 25 | DN 32 - DN 40 | DN 50 - DN 80 | DN 100 - DN 200 | DN 250 - DN 500 |
|---|---|---|---|---|---|
| Installation in Termowells/Pockets | THF 50 with dedicated Accessories | THF 50 with dedicated Accessories | THF 105<br>THF C105 | THF 140<br>THF C140 | THF 230<br>THF C230 |
| Direct Installation | TDF 27 | TDF 38 | TDF 85 | TDF 120 | TDF 210 |

## ACCURACY PAIR OF TEMPERATURE SENSORS



## INSTALLATION KITS

### Direct installation

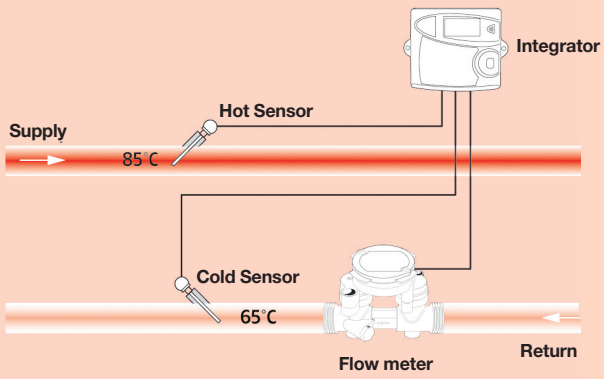
| Kits | Type | Article-No. |
|---|---|---|
| EBS DN15 G¾”x110-D-KH | J | 2433000106 |
| EBS DN15 G¾”x110-D | I | 2434000106 |
| EBS DN20 G1”x130-D-KH | J | 2431000106 |
| EBS DN20 G1”x130-D | I | 2432000106 |
| EBS DN20 G1”x190-D-KH | J | 2481000106 |
| EBS DN20 FL 190-D | K | 2483000106 |
| EBS DN25 G1¼”x150-D-KH | O | 2426007006 |
| EBS DN25 G1¼”x 260-D-KH | O | 2426007006 |
| EBS DN25 G1¼”-D-KH | N | 2436007206 |
| EBS DN25 FL 260-D-KH | P | 2484007006 |
| EBS DN25 FL-D-KH | Q | 2436007306 |
| EBS DN32 G1½”x -D-KH | N | 2437007206 |
| EBS DN40 FL 300-D-KH | P | 2485007006 |
| EBS DN40 FL-D-KH | Q | 2438007306 |
| EBS DN40 G2”x 200-D-KH | O | 2430007006 |
| EBS DN40 G2”-D-KH | N | 2438007206 |
| EBS DN40 G2”x 300-D-KH | O | 2427007006 |

### Pocket installation

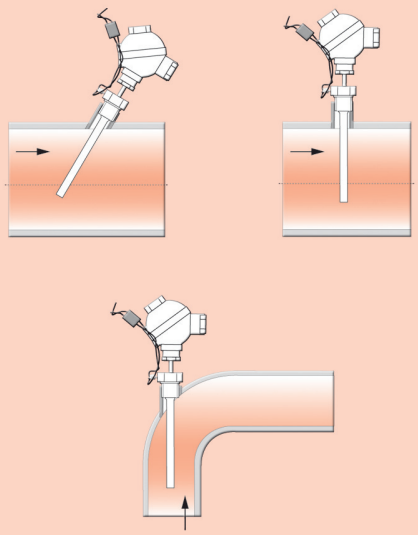
| Kits | Type | Article-No. |
|---|---|---|
| EBS DN50 FLx270 | G | 2451000006 |
| EBS DN50-80 | H | 2463000006 |
| EBS DN50 FLx200 | G | 2455000006 |
| EBS DN65 FLx200 | G | 2456000006 |
| EBS DN65 FLx300 | G | 2452000006 |
| EBS DN80 FLx300 | G | 2453000006 |
| EBS DN80 FLx225 | G | 2457000006 |
| EBS DN100 FLx250 | G | 2458000006 |
| EBS DN100 FLx360 | H | 2454000006 |
| EBS DN100-200 Tauchh. | H | 2464000006 |

| Kits | G | H | I | J | K | N | O | P | Q |
|---|---|---|---|---|---|---|---|---|---|
| Ball valve with DS measuring entry | | | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 2 x Ball valve | | | | ✔ | | | | | |
| 2 x Ball valve (one with DS measuring entry) | | | | | | ✔ | ✔ | ✔ | ✔ |
| 2 x Pocket and welding piece | ✔ | ✔ | | | | | | | |
| Connector set | | | ✔ | | | ✔ | ✔ | | |
| Distance pipe | ✔ | | ✔ | ✔ | ✔ | | ✔ | ✔ | |

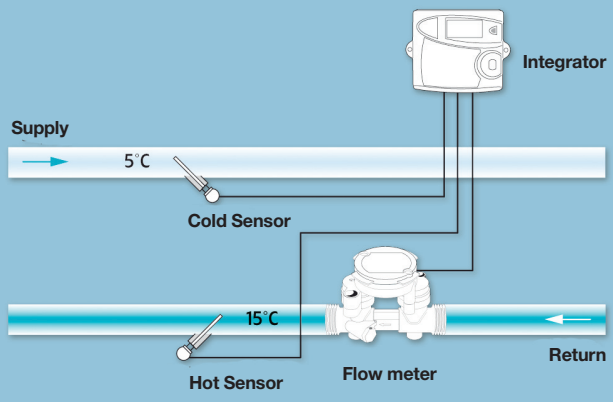
## HEATING APPLICATION



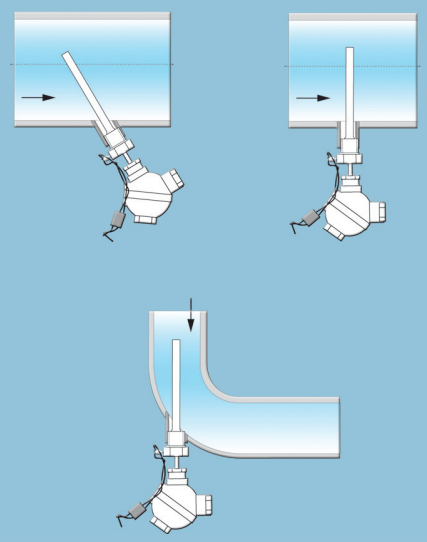

> **Temperature sensors installation best practices for Heating application**
- Sensor pockets and connected sleeves must be installed head upwards.



## COOLING APPLICATION




> **Temperature sensors installation best practices for Cooling and Combined applications**
- To prevent water condensation, sensor pockets and connected sleeves must be installed head downwards.
- To prevent rusted terminals, head temperature sensors should be potted with resin.
- Never use oil or grease to lubricate pockets. Use silicon instead.



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