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Building controls

TEMPERATURE

PRESSURE

HUMIDITY

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# Paul Rüster & Co. GmbH - Quality since 1949

The service range of Paul Rüster & Co. GmbH offers development, engineering, manufacturing, calibration and distribution of sensors and components for temperature and pressure measurement in industrial and HVAC markets, power plants, electrical machines, railway systems, wind energy plants and refrigeration technologies.

The product range includes resistance thermometers, thermocouples, pressure and differential pressure transmitters in various designs. Most types are available as explosion-proof versions - certified to ATEX, IECEx and EAC Ex - or with DNV GL certification.

Furthermore Rüster is the official distributor for FEMA by Honeywell and the italian tradition-rich company Controlli.

FEMA by Honeywell → *Innovative and reliable pressure switches, pressure transmitter and thermostats*

CONTROLLI 1938 → *High-quality valves and actuators for HVAC and industrial markets*

Paul Rüster & Co. GmbH is known for its reliable, individual solutions, for innovation, flexibility as well as high quality. Rüster is certified to DIN EN ISO 9001:2015.

# Contact partners

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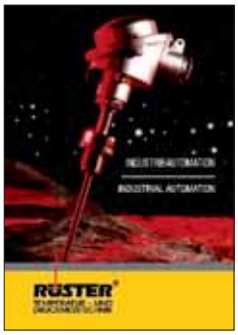
# Product range

## Industrial automation




Resistance thermometers, thermocouples and pressure transmitters for use in power plants,electrical machines, railway systems, wind energy plants, refrigeration technologies as well as in plants of the chemical industry.

Paul Rüster & Co. GmbH offers special solution for individual customer demands.

### Explosion-proof sensors

For applications in explosive gas atmospheres or dust atmospheres we supply temperature and pressure sensors, certified to ATEX, IECEx and Ex EAC.

Temperature sensors with DNV GL certification for the maritime industry. Combination of approvals are possible.

### Controlli vlaves and acutators for HVAC

Paul Rüster & Co. GmbH acts as an **official distributor** of traditional Italian company **CONTROLLI**.

Valves and actuators for building automation applications complement our product portfolio.

### FEMA by Honeywell products

Die Paul Rüster & Co. GmbH acts as an **official distributor** for all products of **FEMA by Honeywell**.

Safety-related pressure switches and field devices for ATEX, IECEx and SIL2 Applications offer conformity and safety for your plant.

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# TEMPERATURE

# ETF1 - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +150°C |
| **Housing** | 64 x 58 x 38 mm, polyamid |
| **Protection tube** | stainless steel Ø 6 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |
| **Process connection** | thermowell, flange or cutting ring fitting (see accessories) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF1-A | Pt100 | 28,90 € |
| ETF1-B | Pt1000 | 28,90 € |
| ETF1-C | Ni1000 | 30,90 € |
| ETF1-D | Ni1000-Tk5000 | 31,50 € |
| ETF1-E | NTC 1,8k | 29,20 € |
| ETF1-F | NTC 3k | 29,20 € |
| ETF1-G | NTC 5k | 29,20 € |
| ETF1-H | NTC 10k | 29,20 € |
| ETF1-I | NTC 10k PRECON | 29,20 € |
| ETF1-J | NTC 20k | 29,20 € |
| ETF1-K | NTC 30k | 29,20 € |
| ETF1-L | NTC 50k | 29,20 € |
| ETF1-ACT* | 0...10V / 4...20mA | 81,60 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 50 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF1 | *ETF1 with Pt100* |
| 2. | -115 | *Length 115 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -2 | *2-wire circuit* |
| 5. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ETF1-A-115-1-2-1 | 29,65 € |

## Accessories

Stainless steel thermowell Ø 9mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA9-50 | 50 mm | 12,50 € |
| for each additional 50 mm | | 1,50 € |

Mounting flange, aluminium

| Order code | Pipe Ø | Price |
|---|---|---|
| AF6.1 | Ø 6 mm | 4,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.6.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.6.3.3 | G1/4" | 20,40 € |
| 100.G1/2.6.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# ETF1S - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +150°C |
| **Housing** | 64 x 58 x 38 mm, polyamid |
| **Protection tube** | stainless steel Ø 6 mm, with fast-response plastic tip |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |
| **Process connection** | thermowell, flange or cutting ring fitting (see accessories) |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF1S-A | Pt100 | 32,10 € |
| ETF1S-B | Pt1000 | 32,10 € |
| ETF1S-ACT* | 0...10V / 4...20mA | 84,80 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

### 2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 50 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

### 3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |

### 4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |

### 5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF1S-B | *ETF1S with Pt1000* |
| 2. | -115 | *Length 115 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -2 | *2-wire circuit* |
| 5. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ETF1S-B-115-1-2-1 | 32,85 € |

## Accessories

Stainless steel thermowell Ø 9mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA9-50 | 50 mm | 12,50 € |
| for each additional 50 mm | | 1,50 € |

Mounting flange, aluminium

| Order code | Pipe Ø | Price |
|---|---|---|
| AF6.1 | Ø 6 mm | 4,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.6.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.6.3.3 | G1/4" | 20,40 € |
| 100.G1/2.6.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# ETF1/4 - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +150°C |
| **Housing** | 64 x 58 x 38 mm, polyamid |
| **Protection tube** | stainless steel Ø 4 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |
| **Process connection** | thermowell or cutting ring fitting (see accessories) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF1/4-A | Pt100 | 29,40 € |
| ETF1/4-B | Pt1000 | 29,40 € |
| ETF1/4-C | Ni1000 | 31,40 € |
| ETF1/4-D | Ni1000-Tk5000 | 31,40 € |
| ETF1/4-E | NTC 1,8k | 29,70 € |
| ETF1/4-F | NTC 3k | 29,70 € |
| ETF1/4-G | NTC 5k | 29,70 € |
| ETF1/4-H | NTC 10k | 29,70 € |
| ETF1/4-I | NTC 10k PRECON | 29,70 € |
| ETF1/4-J | NTC 20k | 29,70 € |
| ETF1/4-K | NTC 30k | 29,70 € |
| ETF1/4-L | NTC 50k | 29,70 € |
| ETF1/4-ACT* | 0...10V / 4...20mA | 82,10 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 50 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF1/4-A | *ETF1/4 with Pt100* |
| 2. | -165 | *Length 165 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -2 | *2-wire circuit* |
| 5. | -2 | *Class A* |

| Total order code | Price |
|---|---|
| ETF1/4-A-165-1-2-2 | 35,40 € |

## Accessories

Stainless steel thermowell Ø 6mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA6-50 | 50 mm | 12,50 € |
| for each additional 50 mm | | 1,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.4.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.4.3.3 | G1/4" | 20,40 € |
| 100.G1/2.4.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# ETF3/4 - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +180°C (standard) |
| **Connection head** | form "J", aluminium |
| **Protection tube** | stainless steel Ø 4 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 2,5 mm² |
| **Protection** | IP 54 |
| **Process connection** | thermowell or cutting ring fitting (see accessories) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF3/4-A | Pt100 | 44,10 € |
| ETF3/4-B | Pt1000 | 44,10 € |
| ETF3/4-C | Ni1000 | 46,10 € |
| ETF3/4-D | Ni1000-Tk5000 | 47,90 € |
| ETF3/4-E | NTC 1,8k | 44,40 € |
| ETF3/4-F | NTC 3k | 44,40 € |
| ETF3/4-G | NTC 5k | 44,40 € |
| ETF3/4-H | NTC 10k | 44,40 € |
| ETF3/4-I | NTC 10k PRECON | 44,40 € |
| ETF3/4-J | NTC 20k | 44,40 € |
| ETF3/4-K | NTC 30k | 44,40 € |
| ETF3/4-L | NTC 50k | 44,40 € |
| ETF3/4-ACT-I* | 4...20mA | 96,80 € |
| Others on request | | |

*Please specify measuring range when ordering

2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 65 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

6. Temperature range

| Order code | | Surcharge |
|---|---|---|
| -A | -30 ... +180°C | - |
| -B | -30 ... +260°C | 10,00 € |
| -C | -30 ... +400°C | 40,00 € |
| -D | -30 ... +600°C | 60,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF3/4-B | *ETF3/4 with Pt1000* |
| 2. | -115 | *Length 115 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -2 | *2-wire circuit* |
| 5. | -1 | *Class B* |
| 6. | -B | *-30...+260°C* |

| Total order code | Price |
|---|---|
| ETF3/4-B-115-1-2-1-B | 54,85 € |

## Accessories

Stainless steel thermowell Ø 6mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA6-50 | 50 mm | 12,50 € |
| for each additional 50 mm | | 1,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.4.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.4.3.3 | G1/4" | 20,40 € |
| 100.G1/2.4.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# ETF3S - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +150°C |
| **Connection head** | form "J", aluminium |
| **Protection tube** | stainless steel Ø 6 mm, with fast-response plastic tip |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 2,5 mm² |
| **Protection** | IP 54 |
| **Process connection** | thermowell, flange or cutting ring fitting (see accessories) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF3S-A | Pt100 | 46,50 € |
| ETF3S-B | Pt1000 | 46,50 € |
| ETF3S-ACT-I* | 4...20mA | 99,20 € |
| Others on request | | |

*Please specify measuring range when ordering

2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 50 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF3S-B | *ETF3S with Pt1000* |
| 2. | -115 | *Length 115 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -2 | *2-wire circuit* |
| 5. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ETF3S-B-115-1-2-1 | 47,25 € |

## Accessories

Stainless steel thermowell Ø 9mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA9-50 | 50 mm | 12,50 € |
| for each additional | 50 mm | 1,50 € |

Mounting flange, aluminium

| Order code | Pipe Ø | Price |
|---|---|---|
| AF6.1 | Ø 6 mm | 4,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.6.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.6.3.3 | G1/4" | 20,40 € |
| 100.G1/2.6.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# ETF3 - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +180°C (standard) |
| **Connection head** | form "J", aluminium |
| **Protection tube** | stainless steel Ø 6 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 2,5 mm² |
| **Protection** | IP 54 |
| **Process connection** | thermowell, flange or cutting ring fitting (see accessories) |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF3-A | Pt100 | 44,60 € |
| ETF3-B | Pt1000 | 44,60 € |
| ETF3-C | Ni1000 | 46,60 € |
| ETF3-D | Ni1000-Tk5000 | 48,40 € |
| ETF3-E | NTC 1,8k | 44,90 € |
| ETF3-F | NTC 3k | 44,90 € |
| ETF3-G | NTC 5k | 44,90 € |
| ETF3-H | NTC 10k | 44,90 € |
| ETF3-I | NTC 10k PRECON | 44,90 € |
| ETF3-J | NTC 20k | 44,90 € |
| ETF3-K | NTC 30k | 44,90 € |
| ETF3-L | NTC 50k | 44,90 € |
| ETF3-ACT-I* | 4...20mA | 97,30 € |
| Others on request | | |

*Please specify measuring range when ordering

### 2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 65 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

### 3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

### 4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

### 5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### 6. Temperature range

| Order code | | Surcharge |
|---|---|---|
| -A | -30 ... +180°C | - |
| -B | -30 ... +260°C | 10,00 € |
| -C | -30 ... +400°C | 40,00 € |
| -D | -30 ... +600°C | 60,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF3-B | *ETF3 with Pt1000* |
| 2. | -115 | *Length 115 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -2 | *2-wire circuit* |
| 5. | -1 | *Class B* |
| 6. | -B | *-30...+260°C* |

| Total order code | Price |
|---|---|
| ETF3-B-115-1-2-1-B | 55,35 € |

## Accessories

Stainless steel thermowell Ø 9mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA9-50 | 50 mm | 12,50 € |
| for each additional | 50 mm | 1,50 € |

Mounting flange, aluminium

| Order code | Pipe Ø | Price |
|---|---|---|
| AF6.1 | Ø 6 mm | 4,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.6.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.6.3.3 | G1/4" | 20,40 € |
| 100.G1/2.6.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# ETF5 - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +180°C (standard) |
| **Connection head** | form "BL", aluminium |
| **Protection tube** | stainless steel Ø 6 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 2,5 mm² |
| **Protection** | IP 54 |
| **Process connection** | thermowell, flange or cutting ring fitting (see accessories) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF5-A | Pt100 | 59,20 € |
| ETF5-B | Pt1000 | 59,20 € |
| ETF5-C | Ni1000 | 61,20 € |
| ETF5-D | Ni1000-Tk5000 | 63,00 € |
| ETF5-E | NTC 1,8k | 59,50 € |
| ETF5-F | NTC 3k | 59,50 € |
| ETF5-G | NTC 5k | 59,50 € |
| ETF5-H | NTC 10k | 59,50 € |
| ETF5-I | NTC 10k PRECON | 59,50 € |
| ETF5-J | NTC 20k | 59,50 € |
| ETF5-K | NTC 30k | 59,50 € |
| ETF5-L | NTC 50k | 59,50 € |
| ETF5-ACT-U* | 0...10V | 111,90 € |
| ETF5-ACT-I* | 4...20mA | 111,90 € |

*Please specify measuring range when ordering

2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 65 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

6. Temperature range

| Order code | | Surcharge |
|---|---|---|
| -A | -30 ... +180°C | - |
| -B | -30 ... +260°C | 10,00 € |
| -C | -30 ... +400°C | 40,00 € |
| -D | -30 ... +600°C | 60,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF5-A | *ETF5 with Pt100* |
| 2. | -115 | *Length 115 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -3 | *3-wire circuit* |
| 5. | -1 | *Class B* |
| 6. | -A | *-30...+180°C* |

| Total order code | Price |
|---|---|
| ETF5-A-115-1-3-1-A | 61,45 € |

## Accessories

Stainless steel thermowell Ø 9mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA9-50 | 50 mm | 12,50 € |
| for each additional | 50 mm | 1,50 € |

Mounting flange, aluminium

| Order code | Pipe Ø | Price |
|---|---|---|
| AF6.1 | Ø 6 mm | 4,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.6.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.6.3.3 | G1/4" | 20,40 € |
| 100.G1/2.6.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# ETF5S - duct temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +150°C |
| **Connection head** | form "BL", aluminium |
| **Protection tube** | stainless steel Ø 6 mm, with fast-response plastic tip |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw terminal max. 2,5 mm² |
| **Protection** | IP 54 |
| **Process connection** | thermowell, flange or cutting ring fitting (see accessories) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ETF5S-A | Pt100 | 61,10 € |
| ETF5S-B | Pt1000 | 61,10 € |
| ETF5S-ACT-U* | 0...10V | 112,80 € |
| ETF5S-ACT-I* | 4...20mA | 112,80 € |
| Others on request | | |

*Please specify measuring range when ordering

2. Nominal length*

| Order code | | Surcharge |
|---|---|---|
| -65 | 65 mm | - |
| for each additional 50 mm | | 0,75 € |

*Nominal length = Insertion length of thermowell + 15 mm

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |

## Ordering example

| | | |
|---|---|---|
| 1. | ETF5S-ACT-U | *ETF5S with output 0-10V* |
| 2. | -165 | *Length 165 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -2 | *2-wire circuit* |
| 5. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ETF5S-ACT-U-165-1-2-1 | 114,30 € |

## Accessories

Stainless steel thermowell Ø 9mm, G1/2"

| Order code | Insertion length | Price |
|---|---|---|
| SA9-50 | 50 mm | 12,50 € |
| for each additional | 50 mm | 1,50 € |

Mounting flange, aluminium

| Order code | Pipe Ø | Price |
|---|---|---|
| AF6.1 | Ø 6 mm | 4,50 € |

Stainless steel cutting ring fitting

| Order code | Thread | Price |
|---|---|---|
| 100.M10x1.6.3.3 | M10 x 1 | 18,30 € |
| 100.G1/4.6.3.3 | G1/4" | 20,40 € |
| 100.G1/2.6.3.3 | G1/2" | 24,50 € |
| Others on request | | |

# MWTF3 - averaging temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +80°C |
| **Housing** | 64 x 58 x 38 mm, polyamid |
| **Protection tube** | PVC Ø 3,3 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |
| **Process connection** | with mounting bracket (included in delivery) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| MWTF3-A | Pt100 | 115,00 € |
| MWTF3-B | Pt1000 | 115,00 € |
| MWTF3-C | Ni1000 | 115,00 € |
| MWTF3-ACT* | 0...10V / 4...20mA | 150,00 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Length

| Order code | | Surcharge |
|---|---|---|
| -3000 | 3000 mm | - |
| -6000 | 6000 mm | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | MWTF3-A | *MWTF3 with Pt100* |
| 2. | -3000 | *Length 3000 mm* |
| 3. | -3 | *3-wire circuit* |

| Total order code | Price |
|---|---|
| MWTF3-A-3000-3 | 116,50 € |

## Accessories

Mounting bracket (included in delivery)

| Order code | | Price |
|---|---|---|
| 100.MK | Mounting bracket | - |

# MWTF4 - averaging temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +80°C |
| **Housing** | 64 x 58 x 38 mm, polyamid |
| **Protection tube** | Copper Ø 4 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |
| **Process connection** | with mounting bracket (included in delivery) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| MWTF4-A | Pt100 | 112,00 € |
| MWTF4-B | Pt1000 | 112,00 € |
| MWTF4-C | Ni1000 | 112,00 € |
| MWTF4-ACT* | 0...10V / 4...20mA | 147,00 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Length

| Order code | | Surcharge |
|---|---|---|
| -400 | 400 mm | - |
| -3000 | 3000 mm | 55,00 € |
| -6000 | 6000 mm | 78,00 € |

3. Schaltungsart

| Bestellcode | | Aufpreis |
|---|---|---|
| -2 | 2-Leiterschaltung | - |
| -3 | 3-Leiterschaltung | 1,50 € |
| -4 | 4-Leiterschaltung | 3,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | MWTF4-A | *MWTF4 with Pt100* |
| 2. | -3000 | *Length 3000 mm* |
| 3. | -3 | *3-wire circuit* |

| Total order code | Price |
|---|---|
| MWTF4-A-3000-3 | 168,50 € |

## Accessories

Mounting bracket (included in delivery)

| Order code | | Price |
|---|---|---|
| 100.MK | Mounting bracket | - |

# ATF1 - outdoor temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 … +90°C |
| **Housing** | 64 x 58 x 38 mm, polyamid |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ATF1-A | Pt100 | 14,70 € |
| ATF1-B | Pt1000 | 14,70 € |
| ATF1-C | Ni1000 | 16,70 € |
| ATF1-D | Ni1000-Tk5000 | 18,50 € |
| ATF1-E | NTC 1,8k | 15,00 € |
| ATF1-F | NTC 3k | 15,00 € |
| ATF1-G | NTC 5k | 15,00 € |

| Order code | Sensor | Price |
|---|---|---|
| ATF1-H | NTC 10k | 15,00 € |
| ATF1-I | NTC 10k PRECON | 15,00 € |
| ATF1-J | NTC 20k | 15,00 € |
| ATF1-K | NTC 30k | 15,00 € |
| ATF1-L | NTC 50k | 15,00 € |
| ATF1-ACT* | 0…10V / 4…20mA | 67,40 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | ATF1-A | *ATF1 with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ATF1-A-1-2-1 | 14,70 € |

# ATF2 - outdoor temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +90°C |
| **Housing** | 64 x 58 x 38 mm, polyamid |
| **Protection tube** | stainless steel Ø 6 x 34 |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ATF2-A | Pt100 | 25,70 € |
| ATF2-B | Pt1000 | 25,70 € |
| ATF2-C | Ni1000 | 27,70 € |
| ATF2-D | Ni1000-Tk5000 | 29,50 € |
| ATF2-E | NTC 1,8k | 26,00 € |
| ATF2-F | NTC 3k | 26,00 € |
| ATF2-G | NTC 5k | 26,00 € |

| Order code | Sensor | Price |
|---|---|---|
| ATF2-H | NTC 10k | 26,00 € |
| ATF2-I | NTC 10k PRECON | 26,00 € |
| ATF2-J | NTC 20k | 26,00 € |
| ATF2-K | NTC 30k | 26,00 € |
| ATF2-L | NTC 50k | 26,00 € |
| ATF2-ACT* | 0...10V / 4...20mA | 78,40 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Oder code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | ATF2-A | *ATF2 with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ATF2-A-1-2-1 | 25,70 € |

# ALTF2 - contact temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 … +90°C |
| **Housing** | 64 x 58 x 38 mm, polyamid with stainless steel bar |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | screw clamps max. 1,5 mm² |
| **Protection** | IP 65 |
| **Process connection** | pipe clamp Ø 50-110 mm (included in delivery) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ALTF2-A | Pt100 | 17,50 € |
| ALTF2-B | Pt1000 | 17,50 € |
| ALTF2-C | Ni1000 | 19,50 € |
| ALTF2-D | Ni1000-Tk5000 | 21,30 € |
| ALTF2-E | NTC 1,8k | 17,80 € |
| ALTF2-F | NTC 3k | 17,80 € |
| ALTF2-G | NTC 5k | 17,80 € |
| ALTF2-H | NTC 10k | 17,80 € |
| ALTF2-I | NTC 10k PRECON | 17,80 € |
| ALTF2-J | NTC 20k | 17,80 € |
| ALTF2-K | NTC 30k | 17,80 € |
| ALTF2-L | NTC 50k | 17,80 € |
| ALTF2-ACT* | 0…10V / 4…20mA | 70,20 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### Ordering example

| | | |
|---|---|---|
| 1. | ALTF2-B | *ALTF2 with Pt1000* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ALTF2-B-1-2-1 | 17,50 € |

# ALTF1 - contact temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +90°C |
| **Probe** | aluminium block<br>radius 15 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable<br>with ferrules |
| **Protection** | IP 54 |
| **Process connection** | pipe clamp Ø 50-110 mm<br>(included in delivery) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ALTF1-A | Pt100 | 14,50 € |
| ALTF1-B | Pt1000 | 14,50 € |
| ALTF1-C | Ni1000 | 16,50 € |
| ALTF1-D | Ni1000-Tk5000 | 18,30 € |
| ALTF1-E | NTC 1,8k | 14,80 € |
| ALTF1-F | NTC 3k | 14,80 € |
| ALTF1-G | NTC 5k | 14,80 € |

| Order code | Sensor | Price |
|---|---|---|
| ALTF1-H | NTC 10k | 14,80 € |
| ALTF1-I | NTC 10k PRECON | 14,80 € |
| ALTF1-J | NTC 20k | 14,80 € |
| ALTF1-K | NTC 30k | 14,80 € |
| ALTF1-L | NTC 50k | 14,80 € |
| ALTF1-ACT* | 0...10V / 4...20mA | 75,20 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | ALTF1-B | *ALTF1 with Pt1000* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -2PP | *2m PVC/PVC cable* |

| Total order code | Price |
|---|---|
| ALTF1-B-1-2-1-2PP | 15,60 € |

5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# OFTF - surface temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -20 ... +70°C |
| **Probe** | 30 x 6 x 6 mm, hole Ø 3 mm<br>incl. self-adhesive cap |
| **Measuring current** | max. 1 mA |
| **Insulation current** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable<br>with ferrules |
| **Protection** | IP 54 |
| **Process connection** | with self-adhesive cap or<br>screw connection (hole Ø 3 mm) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| OFTF-A | Pt100 | 18,40 € |
| OFTF-B | Pt1000 | 18,40 € |
| OFTF-C | Ni1000 | 20,40 € |
| OFTF-D | Ni1000-Tk5000 | 22,20 € |
| OFTF-E | NTC 1,8k | 18,70 € |
| OFTF-F | NTC 3k | 18,70 € |
| OFTF-G | NTC 5k | 18,70 € |

| Order code | Sensor | Price |
|---|---|---|
| OFTF-H | NTC 10k | 18,70 € |
| OFTF-I | NTC 10k PRECON | 18,70 € |
| OFTF-J | NTC 20k | 18,70 € |
| OFTF-K | NTC 30k | 18,70 € |
| OFTF-L | NTC 50k | 18,70 € |
| OFTF-ACT* | 0...10V / 4...20mA | 71,10 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

3. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | OFTF-A | *OFTF with Pt100* |
| 2. | -2 | *2-wire circuit* |
| 3. | -2 | *Class A* |
| 4. | -3TT | *3m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| OFTF-A-2-2-3TT | 29,50 € |

4. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# KSTF - cable shoe temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +90°C |
| **Probe** | cable show, CU-ETP<br>hole Ø 8,4 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable<br>with ferrules |
| **Protection** | IP 54 |
| **Process connection** | screw connection (Ø 8,4 mm) |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| KSTF-A | Pt100 | 16,50 € |
| KSTF-B | Pt1000 | 16,50 € |
| KSTF-C | Ni1000 | 18,50 € |
| KSTF-D | Ni1000-Tk5000 | 20,30 € |
| KSTF-E | NTC 1,8k | 16,80 € |
| KSTF-F | NTC 3k | 16,80 € |
| KSTF-G | NTC 5k | 16,80 € |
| KSTF-H | NTC 10k | 16,80 € |
| KSTF-I | NTC 10k PRECON | 16,80 € |
| KSTF-J | NTC 20k | 16,80 € |
| KSTF-K | NTC 30k | 16,80 € |
| KSTF-L | NTC 50k | 16,80 € |
| KSTF-ACT* | 0...10V / 4...20mA | 69,20 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

### 2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

### 3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

### 4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### Ordering example

| | | |
|---|---|---|
| 1. | KSTF-A | *KSTF with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -2 | *Class A* |
| 5. | -1TT | *1m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| KSTF-A-1-2-2-1TT | 23,20 € |

### 5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# RPTF1 - pendulum temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +90°C |
| **Protection tube** | stainless steel Ø 15 x 100 mm<br>others on request |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable<br>with ferrules |
| **Protection** | IP 65 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| RPTF1-A | Pt100 | 47,00 € |
| RPTF1-B | Pt1000 | 47,00 € |
| RPTF1-C | Ni1000 | 49,00 € |
| RPTF1-D | Ni1000-Tk5000 | 50,80 € |
| RPTF1-E | NTC 1,8k | 47,30 € |
| RPTF1-F | NTC 3k | 47,30 € |
| RPTF1-G | NTC 5k | 47,30 € |

| Order code | Sensor | Price |
|---|---|---|
| RPTF1-H | NTC 10k | 47,30 € |
| RPTF1-I | NTC 10k PRECON | 47,30 € |
| RPTF1-J | NTC 20k | 47,30 € |
| RPTF1-K | NTC 30k | 47,30 € |
| RPTF1-L | NTC 50k | 47,30 € |
| RPTF1-ACT* | 0...10V / 4...20mA | 99,70 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | RPTF1-A | *RPTF1 with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -1TT | *1m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| RPTF1-A-1-2-1-1TT | 49,20 € |

5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# RPTF2 - pendulum temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +90°C |
| **Bulb** | aluminium (black)<br>Ø 70 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable<br>with ferrule |
| **Protection** | IP 65 |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| RPTF2-A | Pt100 | 52,90 € |
| RPTF2-B | Pt1000 | 52,90 € |
| RPTF2-C | Ni1000 | 54,90 € |
| RPTF2-D | Ni1000-Tk5000 | 56,70 € |
| RPTF2-E | NTC 1,8k | 53,20 € |
| RPTF2-F | NTC 3k | 53,20 € |
| RPTF2-G | NTC 5k | 53,20 € |

| Order code | Sensor | Price |
|---|---|---|
| RPTF2-H | NTC 10k | 53,20 € |
| RPTF2-I | NTC 10k PRECON | 53,20 € |
| RPTF2-J | NTC 20k | 53,20 € |
| RPTF2-K | NTC 30k | 53,20 € |
| RPTF2-L | NTC 50k | 53,20 € |
| RPTF2-ACT* | 0...10V / 4...20mA | 105,60 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

### 2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

### 3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

### 4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### Ordering example

| | | |
|---|---|---|
| 1. | RPTF2-A | *RPTF2 with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -3PP | *3m PVC/PVC cable* |

| Total order code | Price |
|---|---|
| RPTF2-A-1-2-1-3PP | 54,55 € |

### 5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# RPTF1/9 - pendulum temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +90°C |
| **Protection tube** | stainless steel Ø 9 x 100 mm<br>others on request |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable<br>with ferrules |
| **Protection** | IP 65 |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| RPTF1/9-A | Pt100 | 46,50 € |
| RPTF1/9-B | Pt1000 | 46,50 € |
| RPTF1/9-C | Ni1000 | 48,50 € |
| RPTF1/9-D | Ni1000-Tk5000 | 50,30 € |
| RPTF1/9-E | NTC 1,8k | 46,80 € |
| RPTF1/9-F | NTC 3k | 46,80 € |
| RPTF1/9-G | NTC 5k | 46,80 € |

| Order code | Sensor | Price |
|---|---|---|
| RPTF1/9-H | NTC 10k | 46,80 € |
| RPTF1/9-I | NTC 10k PRECON | 46,80 € |
| RPTF1/9-J | NTC 20k | 46,80 € |
| RPTF1/9-K | NTC 30k | 46,80 € |
| RPTF1/9-L | NTC 50k | 46,80 € |
| RPTF1/9-ACT* | 0...10V / 4...20mA | 99,20 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

### 2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

### 3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

### 4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### Ordering example

| | | |
|---|---|---|
| 1. | RPTF1/9-A | *RPTF1/9 with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -1TT | *1m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| RPTF1/9-A-1-2-1-1TT | 48,70 € |

### 5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# DTF - ceiling temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +60°C |
| **Housing** | aluminium (white) |
| | Ø 23 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | 135 mm silicone cable |
| | 2-wire circuit |
| **Protection** | IP 30 |
| **Mounting** | in subceiling |
| | with 2 tension springs |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| DTF-A | Pt100 | 32,40 € |
| DTF-B | Pt1000 | 32,40 € |
| DTF-C | Ni1000 | 34,40 € |
| DTF-D | Ni1000-Tk5000 | 36,20 € |
| DTF-E | NTC 1,8k | 32,70 € |
| DTF-F | NTC 3k | 32,70 € |
| DTF-G | NTC 5k | 32,70 € |

| Order code | Sensor | Price |
|---|---|---|
| DTF-H | NTC 10k | 32,70 € |
| DTF-I | NTC 10k PRECON | 32,70 € |
| DTF-J | NTC 20k | 32,70 € |
| DTF-K | NTC 30k | 32,70 € |
| DTF-L | NTC 50k | 32,70 € |
| | | |
| Others on request | | |

2. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### Ordering example

| | | |
|---|---|---|
| 1. | DTF-A | *DTF with Pt100* |
| 2. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| DTF-A-1 | 32,40 € |

# HTF1 - cable temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable type (see chart 5.) |
| **Protection tube** | stainless steel Ø 6 x 46 mm crimped |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable with ferrules |
| **Protection** | IP 54 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| HTF1-A | Pt100 | 11,90 € |
| HTF1-B | Pt1000 | 11,90 € |
| HTF1-C | Ni1000 | 13,90 € |
| HTF1-D | Ni1000-Tk5000 | 15,70 € |
| HTF1-E | NTC 1,8k | 12,20 € |
| HTF1-F | NTC 3k | 12,20 € |
| HTF1-G | NTC 5k | 12,20 € |

| Order code | Sensor | Price |
|---|---|---|
| HTF1-H | NTC 10k | 12,20 € |
| HTF1-I | NTC 10k PRECON | 12,20 € |
| HTF1-J | NTC 20k | 12,20 € |
| HTF1-K | NTC 30k | 12,20 € |
| HTF1-L | NTC 50k | 12,20 € |
| HTF1-ACT* | 0...10V / 4...20mA | 64,60 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | HTF1-A | *HTF1 with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -3 | *3-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -1TT | *1m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| HTF1-A-1-3-1-1TT | 16,20 € |

5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# HTF2 - cable temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable type (see chart 5.) |
| **Protection tube** | stainless steel Ø 6 x 46 mm rolled |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable with ferrules |
| **Protection** | IP 65 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| HTF2-A | Pt100 | 13,50 € |
| HTF2-B | Pt1000 | 13,50 € |
| HTF2-C | Ni1000 | 15,50 € |
| HTF2-D | Ni1000-Tk5000 | 17,30 € |
| HTF2-E | NTC 1,8k | 13,80 € |
| HTF2-F | NTC 3k | 13,80 € |
| HTF2-G | NTC 5k | 13,80 € |

| Order code | Sensor | Price |
|---|---|---|
| HTF2-H | NTC 10k | 13,80 € |
| HTF2-I | NTC 10k PRECON | 13,80 € |
| HTF2-J | NTC 20k | 13,80 € |
| HTF2-K | NTC 30k | 13,80 € |
| HTF2-L | NTC 50k | 13,80 € |
| HTF2-ACT* | 0...10V / 4...20mA | 66,20 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 3-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | HTF2-A | *HTF2 with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -1TT | *1m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| HTF2-A-1-2-1-1TT | 15,70 € |

5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# HTFp - cable temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable type (see chart 5.) |
| **Protection tube** | stainless steel Ø 6 x 46 mm perforated |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable with ferrules |
| **Protection** | IP 20 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| HTFp-A | Pt100 | 14,00 € |
| HTFp-B | Pt1000 | 14,00 € |
| HTFp-C | Ni1000 | 16,00 € |
| HTFp-D | Ni1000-Tk5000 | 17,80 € |
| HTFp-E | NTC 1,8k | 14,30 € |
| HTFp-F | NTC 3k | 14,30 € |
| HTFp-G | NTC 5k | 14,30 € |

| Order code | Sensor | Price |
|---|---|---|
| HTFp-H | NTC 10k | 14,30 € |
| HTFp-I | NTC 10k PRECON | 14,30 € |
| HTFp-J | NTC 20k | 14,30 € |
| HTFp-K | NTC 30k | 14,30 € |
| HTFp-L | NTC 50k | 14,30 € |
| HTFp-ACT* | 0...10V / 4...20mA | 66,70 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | HTFp-A | *HTFp with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -2 | *2-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -1TT | *1m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| HTFp-A-1-2-1-1TT | 16,20 € |

5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# CUTF - contact temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 … +180°C |
| **Probe** | copper, 10 x 12 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | PTFE twisted, 2-wire circuit with ferrules |
| **Protection** | IP 20 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| CUTF-A | Pt100 | 18,40 € |
| CUTF-B | Pt1000 | 18,40 € |
| CUTF-C | Ni1000 | 20,40 € |
| CUTF-D | Ni1000-Tk5000 | 22,20 € |
| CUTF-E | NTC 1,8k | 18,70 € |
| CUTF-F | NTC 3k | 18,70 € |
| CUTF-G | NTC 5k | 18,70 € |

| Order code | Sensor | Price |
|---|---|---|
| CUTF-H | NTC 10k | 18,70 € |
| CUTF-I | NTC 10k PRECON | 18,70 € |
| CUTF-J | NTC 20k | 18,70 € |
| CUTF-K | NTC 30k | 18,70 € |
| CUTF-L | NTC 50k | 18,70 € |
| CUTF-ACT* | 0…10V / 4…20mA | 71,10 € |
| Other on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

3. Connection cable

| Order code* | | Temperature | 2-wire/m |
|---|---|---|---|
| -Tv | PTFE, twisted | 180°C | 1,20 € |

*Add cable length (meter) to the order code

### Ordering example

| | | |
|---|---|---|
| 1. | CUTF-B | *CUTF with Pt1000* |
| 2. | -1 | *Class B* |
| 3. | -4Tv | *4m PTFE, twisted* |

| Total order code | Price |
|---|---|
| CUTF-B-1-4Tv | 23,20 € |

# MGTF - magnetic Temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | -30 ... +180°C |
| **Housing** | stainless steel, Ø 25 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | Connection cable with ferrules |
| **Protection** | IP 65 |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| MGTF-A | Pt100 | 44,80 € |
| MGTF-B | Pt1000 | 44,80 € |
| MGTF-C | Ni1000 | 46,80 € |
| MGTF-D | Ni1000-Tk5000 | 48,60 € |
| MGTF-E | NTC 1,8k | 45,10 € |
| MGTF-F | NTC 3k | 45,10 € |
| MGTF-G | NTC 5k | 45,10 € |

| Order code | Sensor | Price |
|---|---|---|
| MGTF-H | NTC 10k | 45,10 € |
| MGTF-I | NTC 10k PRECON | 45,10 € |
| MGTF-J | NTC 20k | 45,10 € |
| MGTF-K | NTC 30k | 45,10 € |
| MGTF-L | NTC 50k | 45,10 € |
| MGTF-ACT* | 0...10V / 4...20mA | 97,50 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

3. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

4. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | MGTF-A | *MGTF with Pt100* |
| 2. | -1 | *1 x Sensor* |
| 3. | -3 | *3-wire circuit* |
| 4. | -1 | *Class B* |
| 5. | -1TT | *1m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| MGTF-A-1-3-1-1TT | 49,10 € |

5. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# WTF - angle temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable Type |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | 1 m 2-wire circuit PVC cabel |
| **Process connection** | 2xM6x18 mm(hole distance 17 mm) |
| **Protection** | IP65 |
| **Protection tube** | Stainless steel Ø 5 mm |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| WTF-A | Pt100 | 82,60 € |
| WTF-B | Pt1000 | 82,60 € |
| WTF-C | Ni1000 | 84,60 € |
| WTF-D | Ni1000-Tk5000 | 86,40 € |
| WTF-E | NTC 1,8k | 82,90 € |
| WTF-F | NTC 3k | 82,90 € |
| WTF-G | NTC 5k | 82,90 € |
| WTF-H | NTC 10k | 82,90 € |
| WTF-I | NTC 10k PRECON | 82,90 € |
| WTF-J | NTC 20k | 82,90 € |
| WTF-K | NTC 30k | 82,90 € |
| WTF-L | NTC 50k | 82,90 € |
| WTF-ACT* | 0...10V / 4...20mA | 135,30 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

### 2. Insertion length

| Order code | | Surcharge |
|---|---|---|
| -50 | 50 mm | - |
| for each additional 50 mm | | 1,60 € |

### 3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

### 4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

### 5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### Ordering example

| | | |
|---|---|---|
| 1. | WTF-A | *WTF with Pt100* |
| 2. | -100 | *Insertion length 100 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -3 | *3-wire circuit* |
| 5. | -1 | *Class B* |
| 6. | -2TT | *2m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| WTF-A-100-1-3-1-2TT | 91,30 € |

### 6. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# BTF - bayonet temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable type (see chart 6.) |
| **Protection tube** | stainless steel Ø 6 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | connection cable with ferrules |
| **Protection** | IP 65 |
| **Process connection** | bayonet cap Ø12,Ø14 mm |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| BTF-A | Pt100 | 68,00 € |
| BTF-B | Pt1000 | 68,00 € |
| BTF-C | Ni1000 | 70,00 € |
| BTF-D | Ni1000-Tk5000 | 71,80 € |
| BTF-E | NTC 1,8k | 68,30 € |
| BTF-F | NTC 3k | 68,30 € |
| BTF-G | NTC 5k | 68,30 € |
| BTF-H | NTC 10k | 68,30 € |
| BTF-I | NTC 10k PRECON | 68,30 € |
| BTF-J | NTC 20k | 68,30 € |
| BTF-K | NTC 30k | 68,30 € |
| BTF-L | NTC 50k | 68,30 € |
| BTF-ACT* | 0...10V / 4...20mA | 120,70 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

### 2. Insertion length

| Order code | | Surcharge |
|---|---|---|
| -50 | 50 mm | - |
| for each additional 50 mm | | 1,60 € |

### 3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

### 4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

### 5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### 7. Bayonet cap

| Order code | | Surcharge |
|---|---|---|
| -1 | Ø12 mm | - |
| -2 | Ø14 mm | - |

### Ordering example

| | | |
|---|---|---|
| 1. | BTF-A | *BTF with Pt100* |
| 2. | -150 | *Insertion length 150 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -3 | *3-wire circuit* |
| 5. | -1 | *Class B* |
| 6. | -2TT | *2m PTFE/PTFE cable* |
| 7. | -1 | *Bayonet cap Ø12 mm* |

| Total order code | price |
|---|---|
| BTF-A-150-1-3-1-2TT-1 | 78,30 € |

### 6. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# ESTFM12 - screw-in temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable Type |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | M12 connector |
| **Process connection** | G 1/4" (others on request) |
| **Protection** | IP65 |
| **Protection tube** | Stainless steel Ø 6 mm |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ESTFM12-A | Pt100 | 89,00 € |
| ESTFM12-B | Pt1000 | 89,00 € |
| ESTFM12-C | Ni1000 | 91,00 € |
| ESTFM12-D | Ni1000-Tk5000 | 92,80 € |
| ESTFM12-E | NTC 1,8k | 89,30 € |
| ESTFM12-F | NTC 3k | 89,30 € |
| ESTFM12-G | NTC 5k | 89,30 € |

| Order code | Sensor | Price |
|---|---|---|
| ESTFM12-H | NTC 10k | 89,30 € |
| ESTFM12-I | NTC 10k PRECON | 89,30 € |
| ESTFM12-J | NTC 20k | 89,30 € |
| ESTFM12-K | NTC 30k | 89,30 € |
| ESTFM12-L | NTC 50k | 89,30 € |
| Others on request | | |
| *Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C | | |

2. Insertion length

| Order code | | Surcharge |
|---|---|---|
| -50 | 50 mm | - |
| for each additional 50 mm | | 1,60 € |

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

**Ordering example**

| | | |
|---|---|---|
| 1. | ESTFM12-A | *ESTF6 with Pt100* |
| 2. | -100 | *Insertion length 100 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -3 | *3-wire circuit* |
| 5. | -1 | *Class B* |

| Total order code | Price |
|---|---|
| ESTFM12-A-100-1-3-1 | 92,10 € |

# ESTF4 - screw-in temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable type (see chart 6.) |
| **Protection tube** | stainless steel Ø 4 mm |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | connection cable with ferrules |
| **Protection** | IP 65 |
| **Process connection** | G1/4" (others on request) |

1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ESTF4-A | Pt100 | 30,80 € |
| ESTF4-B | Pt1000 | 30,80 € |
| ESTF4-C | Ni1000 | 32,80 € |
| ESTF4-D | Ni1000-Tk5000 | 34,60 € |
| ESTF4-E | NTC 1,8k | 31,10 € |
| ESTF4-F | NTC 3k | 31,10 € |
| ESTF4-G | NTC 5k | 31,10 € |
| ESTF4-H | NTC 10k | 31,10 € |
| ESTF4-I | NTC 10k PRECON | 31,10 € |
| ESTF4-J | NTC 20k | 31,10 € |
| ESTF4-K | NTC 30k | 31,10 € |
| ESTF4-L | NTC 50k | 31,10 € |
| ESTF4-ACT* | 0...10V / 4...20mA | 83,20 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

2. Insertion length

| Order code | | Surcharge |
|---|---|---|
| -50 | 50 mm | - |
| for each additional 50 mm | | 1,60 € |

3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

## Ordering example

| | | |
|---|---|---|
| 1. | ESTF4-A | *ESTF4 with Pt100* |
| 2. | -150 | *Insertion length 150 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -3 | *3-wire circuit* |
| 5. | -1 | *Class B* |
| 6. | -2TT | *2m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| ESTF4-A-150-1-3-1-2TT | 41,10 € |

6. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

# ESTF6 - screw-in temperature sensor

## Technical Data

| | |
|---|---|
| **Measuring range** | depends on chosen cable Type |
| **Measuring current** | max. 1 mA |
| **Insulation resistance** | > 100 MOhm @ 20°C (500Vdc) |
| **Electrical connection** | 1 m 2-wire circuit PVC cabel |
| **Process connection** | G 1/2" (others on request) |
| **Protection** | IP65 |
| **Protection tube** | Stainless steel Ø 6 mm |

### 1. Sensor

| Order code | Sensor | Price |
|---|---|---|
| ESTF6-A | Pt100 | 28,80 € |
| ESTF6-B | Pt1000 | 28,80 € |
| ESTF6-C | Ni1000 | 30,80 € |
| ESTF6-D | Ni1000-Tk5000 | 32,60 € |
| ESTF6-E | NTC 1,8k | 29,10 € |
| ESTF6-F | NTC 3k | 29,10 € |
| ESTF6-G | NTC 5k | 29,10 € |
| ESTF6-H | NTC 10k | 29,10 € |
| ESTF6-I | NTC 10k PRECON | 29,10 € |
| ESTF6-J | NTC 20k | 29,10 € |
| ESTF6-K | NTC 30k | 29,10 € |
| ESTF6-L | NTC 50k | 29,10 € |
| ESTF6-ACT* | 0...10V / 4...20mA | 81,50 € |
| Others on request | | |

*Ranges: -50..+50°C, 0..+50°C, 0..+100°C, 0..+160°C

### 2. Insertion length

| Order code | | Surcharge |
|---|---|---|
| -50 | 50 mm | - |
| for each additional 50 mm | | 1,60 € |

### 3. Sensor quantity

| Order code | | Surcharge |
|---|---|---|
| -1 | 1x | - |
| -2 | 2x | 18,00 € |

### 4. Wiring

| Order code | | Surcharge |
|---|---|---|
| -2 | 2-wire circuit | - |
| -3 | 3-wire circuit | 1,50 € |
| -4 | 4-wire circuit | 3,00 € |

### 5. Accuracy

| Order code | Class | Surcharge |
|---|---|---|
| -1 | B (DIN EN 60751) | - |
| -2 | A (DIN EN 60751) | 4,50 € |
| -3 | AA (DIN EN 60751) | 10,00 € |
| -4 | 1/10 B (DIN EN 60751) | 20,00 € |

### 6. Connection cable

| Order code* | | Temperature | 2-wire/m | 3-wire/m | 4-wire/m |
|---|---|---|---|---|---|
| -PP | PVC / PVC | 90°C | 0,55 € | 0,75 € | 0,90 € |
| -TS | PTFE / Silicone | 180°C | 1,30 € | 1,70 € | 2,50 € |
| -TT | PTFE / PTFE | 260°C | 2,20 € | 2,80 € | 3,40 € |
| -GGD | glassfiber/glassfiber/braided | 350°C | 2,80 € | 3,40 € | 4,00 € |

*Add cable length (meter) to the order code

### Ordering example

| | | |
|---|---|---|
| 1. | ESTF6-A | *ESTF6 with Pt100* |
| 2. | -100 | *Insertion length 100 mm* |
| 3. | -1 | *1 x Sensor* |
| 4. | -3 | *3-wire circuit* |
| 5. | -1 | *Class B* |
| 6. | -2TT | *2m PTFE/PTFE cable* |

| Total order code | Price |
|---|---|
| ESTF6-A-100-1-3-1-2TT | 37,50 € |

# PRESSURE

# DPT3 - differential pressure transmitter

## *3 measuring ranges*

**Technical Data**

| | | |
|---|---|---|
| **Outputs** | Voltage | 0 ... 10 V |
| | Current | 4 ... 20 mA |
| **Supply** | at output voltage (0...10 V): | 13...32 Vdc / 13...24 Vac |
| | at output current (4...20 mA): | 14...30 Vdc |
| **Housing** | 65 x 50 x 35 mm, ABS | |
| **Process connection** | 4 mm / 6 mm | |
| **Measuring range** | 0...5000 Pa (standard) | |
| | optional mbar | |
| | on request: -5000 Pa...+5000 Pa | |
| **Linearity error** | +/- 1% FS | |
| **Standard error @ 25°C** | < +/- 0,4% FS | |
| **Accuracy** | +/- 1,5% FS | |
| **Operating temperature** | -10 °C...+50 °C | |
| **Media** | Dry air and non-aggressive gases | |

1. Output

| Order code | output signal | Price |
|---|---|---|
| DPT3-U | 0..10 V | 99,80 € |
| DPT3-I | 4...20 mA | 99,80 € |

2. Measuring range

| Order code | Measuring range | Surcharge |
|---|---|---|
| .0/200 | 0-100 / 200 / 400 Pa | - |
| .0/500 | 0-250 / 500 / 1000 Pa | - |
| .0/2500 | 0-1250 / 2500 / 5000 Pa | - |

**Ordering example**

| | | |
|---|---|---|
| 1. | DPT3-U | *DPT3, Output 0-10V* |
| 2. | .0/200 | *0-100/200/400 Pa* |

| Total order code | Price |
|---|---|
| DPT3-U.0/200 | 132,00 € |

**Accessories**

| Order code | Description | Price |
|---|---|---|
| DBZ06 | Connection set | 4,00 € |

# DPTD3 - differential pressure transmitter

## *with display - 3 measuring ranges*

**Technical Data**

| | | |
|---|---|---|
| **Outputs** | Voltage | 0 ... 10 V |
| | Current | 4 ... 20 mA |
| **Supply** | at output voltage (0...10 V): | 13...32 Vdc / 13...24 Vac |
| | at output current (4...20 mA): | 14...30 Vdc |
| **Housing** | 65 x 50 x 35 mm, ABS | |
| **Process connection** | 4 mm / 6 mm | |
| **Measuring range** | 0...5000 Pa (standard)<br>optional mbar<br>on request: -5000 Pa...+5000 Pa | |
| **Display** | 4-Digit LCD | |
| **Linearity error** | +/- 1% FS | |
| **Standard error @ 25°C** | < +/- 0,4% FS | |
| **Accuracy** | +/- 1,5% FS | |
| **Operating temperature** | -10 °C...+50 °C | |
| **Media** | Dry air and non-aggressive gases | |

PRESSURE

1. Output

| Order code | output signal | Price |
|---|---|---|
| DPTD3-U | 0..10 V | 119,80 € |
| DPTD3-I | 4...20 mA | 119,80 € |

2. Measuring range

| Order code | Measuring range | Surcharge |
|---|---|---|
| .0/200 | 0-100 / 200 / 400 Pa | - |
| .0/500 | 0-250 / 500 / 1000 Pa | - |
| .0/2500 | 0-1250 / 2500 / 5000 Pa | - |

**Ordering example**

| | | |
|---|---|---|
| 1. | DPTD3-U | *DPTD3, Output 0-10V* |
| 2. | .0/200 | *0-100/200/400 Pa* |

| Total order code | Price |
|---|---|
| DPTD3-U.0/200 | 162,00 € |

**Accessories**

| Order code | Description | Price |
|---|---|---|
| DBZ06 | Connection set | 4,00 € |

# DPT8 - differential pressure transmitter

## *8 measuring ranges*

**Technical Data**

| | |
|---|---|
| **Measuring range** | 8 measuring ranges (see table) |
| **Output** | 0-10 V or 4...20 mA (selectable with DIP-Switch) |
| **Supply voltage** | at output voltage (0...10 V): 16...32 VDC / 24 VAC ±10%<br>at output current (4...20 mA): 32 VDC |
| **Protection** | IP65 |
| **Process connection** | 2x5,5 mm |
| **Accuracy** | max. +/- 1% FS / ±4 Pa at ≤ 250 Pa |
| **Damping** | 0,5 s/2 s/4 s/8 s (selectable with DIP-Switch) |
| **Zero point calibration** | push button |
| **Operating temperature** | -10 °C...+60 °C |
| **Media** | dry air and non-aggressive gases |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU |

| Order code | Measuring range | Price |
|---|---|---|
| DPT8-250 | ±25/25/±50/50/±100/100/±150/250 Pa | 126,10 € |
| DPT8-2500 | ±100/100/300/500/1000/1500/2000/2500 Pa | 114,30 € |
| DPT8-7000 | 1000/1500/2000/2500/3000/4000/5000/7000 Pa | 114,30 € |

**Accessories**

| Order code | | Price |
|---|---|---|
| DBZ06 | connection set | 4,00 € |

# DPTD8 - differential pressure transmitter

## *with display - 8 measuring ranges*

**Technical Data**

| | |
|---|---|
| **Measuring range** | 8 measuring ranges (see table) |
| **Output** | 0-10 V or 4...20 mA (selectable with DIP-Switch) |
| **Supply voltage** | at output voltage (0...10 V): 16...32 VDC / 24 VAC ±10%<br>at output current (4...20 mA): 32 VDC |
| **Protection** | IP65 |
| **Process connection** | 2x5,5 mm |
| **Accuracy** | max. +/- 1% FS / ±4 Pa at ≤ 250 Pa |
| **Damping** | 0,5 s/2 s/4 s/8 s (selectable with DIP-Switch) |
| **Zero point calibration** | push button |
| **Operating temperature** | -10 °C...+60 °C |
| **Media** | dry air and non-aggressive gases |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU |

| Order code | Measuring range | Price |
|---|---|---|
| DPTD8-250 | ±25/25/±50/50/±100/100/±150/250 Pa | 146,10 € |
| DPTD8-2500 | ±100/100/300/500/1000/1500/2000/2500 Pa | 134,30 € |
| DPTD8-7000 | 1000/1500/2000/2500/3000/4000/5000/7000 Pa | 134,30 € |

**Accessories**

| Order code | | Price |
|---|---|---|
| DBZ06 | connection set | 4,00 € |

# SHD - pressure transmitter

## Technical Data

| | |
|---|---|
| **Outputs** | 0...10V / 4...20mA |
| **Supply** | 12...26 Vac / 14...30 Vdc |
| **Process connection** | G 1/4"<br>optional G1/2" or NPT 1/2"<br>(with adapter ADAP) |
| **Measuring ranges** | -1 ... 24 bar<br>0 ... 600 mbar<br>0 ... 100 bar |
| **Accuracy** | < +/- 0,5% @ 25°C (+/- 5°C) |
| **Operating temperature** | -40°C...+125°C |
| **Membrane** | Stainless steel |

1. Output

| Order code | Output signal | Price |
|---|---|---|
| SHD-U | 0...10V | 135,00 € |
| SHD-I | 4...20mA | 138,00 € |

2. Measuring range

| Order code | Measuring range | Surcharge |
|---|---|---|
| .-1/0 | -1...0 bar | 53,00 € |
| .-1/1,5 | -1...1,5 bar | 53,00 € |
| .-1/5 | -1...5 bar | 53,00 € |
| | | |
| .0/160mb | 0...160 mbar | 56,00 € |
| .0/250mb | 0...250 mbar | 56,00 € |
| .0/600mb | 0...600 mbar | 56,00 € |
| | | |
| .0/1 | 0...1 bar | - |
| .0/6 | 0...6 bar | - |
| .0/10 | 0...10 bar | - |
| .0/16 | 0...16 bar | - |
| .0/25 | 0...25 bar | - |
| .0/60 | 0...60 bar | - |
| .0/100 | 0...100 bar | - |

Other measuring ranges on request

### Ordering example

| | | |
|---|---|---|
| 1. | SHD-I | *SHD, Output 4-20mA* |
| 2. | .0/10 | *0...10 bar* |

| Total order code | Price |
|---|---|
| SHD-I.0/10 | 138,00 € |

### Accessories

| Order code | Description | Price |
|---|---|---|
| ADAP-G1/2 | Adapter to G1/2" | 12,50 € |
| ADAP-NPT1/2 | Adapter to NPT1/2" | 12,50 € |

# SHD2 - pressure transmitter

## Technical Data

| | |
|---|---|
| **Outputs** | 0...10V / 4...20mA |
| **Supply** | 12...26 Vac / 14...30 Vdc |
| **Process connection** | G 1/4"<br>optional G1/2" or NPT 1/2"<br>(with adapter ADAP) |
| **Measuring ranges** | -1 ... 24 bar<br>0 ... 600 mbar<br>0 ... 100 bar |
| **Accuracy** | < +/- 0,5% @ 25°C (+/- 5°C) |
| **Operating temperature** | -40°C...+125°C |
| **Membrane** | Stainless steel |

PRESSURE

1. Output

| Order code | Output signal | Price |
|---|---|---|
| SHD2-U | 0...10V | 136,00 € |
| SHD2-I | 4...20mA | 139,00 € |

2. Measuring range

| Order code | Measuring range | Surcharge |
|---|---|---|
| .-1/0 | -1...0 bar | 53,00 € |
| .-1/1,5 | -1...1,5 bar | 53,00 € |
| .-1/5 | -1...5 bar | 53,00 € |
| | | |
| .0/160mb | 0...160 mbar | 56,00 € |
| .0/250mb | 0...250 mbar | 56,00 € |
| .0/600mb | 0...600 mbar | 56,00 € |
| | | |
| .0/1 | 0...1 bar | - |
| .0/6 | 0...6 bar | - |
| .0/10 | 0...10 bar | - |
| .0/16 | 0...16 bar | - |
| .0/25 | 0...25 bar | - |
| .0/60 | 0...60 bar | - |
| .0/100 | 0...100 bar | - |

Other measuring ranges on request

### Ordering example

| | | |
|---|---|---|
| 1. | SHD2-I | *SHD2, Output 4-20mA* |
| 2. | .0/10 | *0...10 bar* |

| Total order code | Price |
|---|---|
| SHD2-I.0/10 | 139,00 € |

### Accessories

| Order code | Description | Price |
|---|---|---|
| ADAP-G1/2 | Adapter to G1/2" | 12,50 € |
| ADAP-NPT1/2 | Adapter to NPT1/2" | 12,50 € |

# SHD3 - pressure transmitter

## Technical Data

| | |
|---|---|
| **Outputs** | 0...10V / 4...20mA |
| **Supply** | 12...26 Vac / 14...30 Vdc |
| **Process connection** | G 1/4"<br>optional G1/2" or NPT 1/2"<br>(with adapter ADAP) |
| **Measuring ranges** | -1 ... 24 bar<br>0 ... 600 mbar<br>0 ... 100 bar |
| **Accuracy** | < +/- 0,5% @ 25°C (+/- 5°C) |
| **Operating temperature** | -40°C...+125°C |
| **Membrane** | Stainless steel |

### 1. Output

| Order Code | Output signal | Price |
|---|---|---|
| SHD3-U | 0...10V | 140,00 € |
| SHD3-I | 4...20mA | 143,00 € |

### 2. Measuring range

| Order code | Measuring range | Surcharge |
|---|---|---|
| .-1/0 | -1...0 bar | 53,00 € |
| .-1/1,5 | -1...1,5 bar | 53,00 € |
| .-1/5 | -1...5 bar | 53,00 € |
| | | |
| .0/160mb | 0...160 mbar | 56,00 € |
| .0/250mb | 0...250 mbar | 56,00 € |
| .0/600mb | 0...600 mbar | 56,00 € |
| | | |
| .0/1 | 0...1 bar | - |
| .0/6 | 0...6 bar | - |
| .0/10 | 0...10 bar | - |
| .0/16 | 0...16 bar | - |
| .0/25 | 0...25 bar | - |
| .0/60 | 0...60 bar | - |
| .0/100 | 0...100 bar | - |

Other measuring ranges on request

### 3. Cable length

| Order code | | Surcharge |
|---|---|---|
| -1000 | 1000 mm | - |
| each additional | 1000 mm for SHD3-U | 2,10 € |
| each additional | 1000 mm for SHD3-I | 2,50 € |

### Ordering example

| | | |
|---|---|---|
| 1. | SHD3-I | *SHD3, Output 4-20mA* |
| 2. | .0/10 | *0...10 bar* |
| 3. | -1000 | *1000 mm* |

| Total order code | Price |
|---|---|
| SHD3-I.0/10-1000 | 143,00 € |

### Accessories

| Order code | Description | Price |
|---|---|---|
| ADAP-G1/2 | Adapter to G1/2" | 12,50 € |
| ADAP-NPT1/2 | Adapter to NPT1/2" | 12,50 € |

# SHD4 - pressure transmitter

## Technical Data

| | |
|---|---|
| **Outputs** | 0...10V / 4...20mA |
| **Supply** | 12...26 Vac / 14...30 Vdc |
| **Process connection** | G 1/4"<br>optional G1/2" or NPT 1/2"<br>(with adapter ADAP) |
| **Measuring ranges** | -1 ... 24 bar<br>0 ... 600 mbar<br>0 ... 100 bar |
| **Accuracy** | < +/- 0,5% @ 25°C (+/- 5°C) |
| **Operating temperature** | -40°C...+125°C |
| **Membrane** | Stainless steel |

PRESSURE

1. Output

| Order code | Output signal | Price |
|---|---|---|
| SHD4-U | 0...10V | 138,00 € |
| SHD4-I | 4...20mA | 141,00 € |

2. Measuring range

| Order code | Measuring range | Surcharge |
|---|---|---|
| .-1/0 | -1...0 bar | 53,00 € |
| .-1/1,5 | -1...1,5 bar | 53,00 € |
| .-1/5 | -1...5 bar | 53,00 € |
| | | |
| .0/160mb | 0...160 mbar | 56,00 € |
| .0/250mb | 0...250 mbar | 56,00 € |
| .0/600mb | 0...600 mbar | 56,00 € |
| | | |
| .0/1 | 0...1 bar | - |
| .0/6 | 0...6 bar | - |
| .0/10 | 0...10 bar | - |
| .0/16 | 0...16 bar | - |
| .0/25 | 0...25 bar | - |
| .0/60 | 0...60 bar | - |
| .0/100 | 0...100 bar | - |

Other measuring ranges on request

### Ordering example

| | | |
|---|---|---|
| 1. | SHD4-I | *SHD4, Output 4-20mA* |
| 2. | .0/10 | *0...10 bar* |

| Total order code | Price |
|---|---|
| SHD4-I.0/10 | 141,00 € |

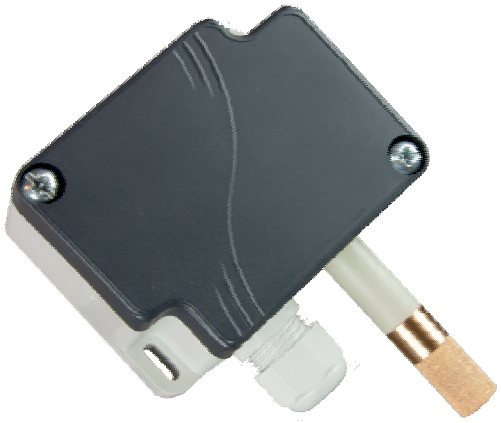
### Accessories

| Order code | Description | Price |
|---|---|---|
| ADAP-G1/2 | Adapter to G1/2" | 12,50 € |
| ADAP-NPT1/2 | Adapter to NPT1/2" | 12,50 € |

# HUMIDITY

# AFF1 - Outdoor humidity sensor

## 1 active output



### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0...100%<br>Absolute humidity: 0...300 g/m³<br>dew point temperature: -30 °C...+80 °C<br>Temperature output: 0 °C...+50 °C oder -20 °C...+80 °C | |
| **Number of outputs** | 1 active | |
| **Output signal** | 0...10 V or 4...20 mA (selectable with DIP-switches) | |
| **Supply** | at output voltage 0...10 V:<br>at output current 4..20 mA: | 16...32 VDC / 24 VAC ± 10%<br>32 VDC |
| **Accuracy** | Humidity, typically:<br>Temperature, typically: | +/- 2% r.h. (10...90% r.h.)<br>+/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request<br>restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C...+60 °C (Transmitter) / -20 °C...+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

| Order code | Output | Price |
|---|---|---|
| AFF1 | 0...10 V or 4-20 mA | 109,00 € |

**Optional service**

Calibration on request

# AFFD2 - Outdoor humidity sensor

## 1 active output + display

HUMIDITY

### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0…100%<br>Absolute humidity: 0…300 g/m³<br>dew point temperature: -30 °C…+80 °C<br>Temperature output: 0 °C…+50 °C oder -20 °C…+80 °C | |
| **Number of outputs** | 1 active output<br>1 display | |
| **Output signal** | 0…10 V or 4…20 mA (selectable with DIP-switches) | |
| **Display** | 4-digit display | |
| **Supply** | at output voltage 0…10 V:<br>at output current 4..20 mA: | 16…32 VDC / 24 VAC ± 10%<br>32 VDC |
| **Accuracy** | Humidity, typically:<br>Temperature, typically: | +/- 2% r.h. (10…90% r.h.)<br>+/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request<br>restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C…+60 °C (Transmitter) / -20 °C…+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

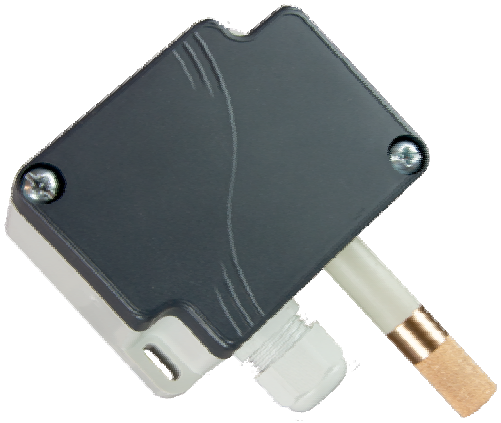
| Order code | Output | Price |
|---|---|---|
| AFFD2 | 0…10 V or 4-20 mA | 132,00 € |

**Optional service**

Calibration on request

# AFF2 - Outdoor humidity sensor

## 2 active outputs



### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0...100%<br>Absolute humidity: 0...300 g/m³<br>dew point temperature: -30 °C...+80 °C<br>Temperature output: 0 °C...+50 °C oder -20 °C...+80 °C | |
| **Number of outputs** | 2 active | |
| **Output signal** | 2 x 0...10 V or 2 x 4...20 mA (selectable with DIP-switches) | |
| **Supply** | at output voltage 0...10 V:<br>at output current 4..20 mA: | 16...32 VDC / 24 VAC ± 10%<br>32 VDC |
| **Accuracy** | Humidity, typically:<br>Temperature, typically: | +/- 2% r.h. (10...90% r.h.)<br>+/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request<br>restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C...+60 °C (Transmitter) / -20 °C...+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

| Order code | Output | Price |
|---|---|---|
| AFF2 | 0...10 V or 4-20 mA | 139,00 € |

**Optional service**

| |
|---|
| Calibration on request |

# AFFD3 - Outdoor humidity sensor

## 2 active outputs + display

### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0…100%<br>Absolute humidity: 0…300 g/m³<br>dew point temperature: -30 °C…+80 °C<br>Temperature output: 0 °C…+50 °C oder -20 °C…+80 °C | |
| **Number of outputs** | 2 active output<br>1 display | |
| **Output signal** | 2 x 0…10 V or 2 x 4…20 mA (selectable with DIP-switches) | |
| **Display** | 4-digit display | |
| **Supply** | at output voltage 0…10 V:<br>at output current 4..20 mA: | 16…32 VDC / 24 VAC ± 10%<br>32 VDC |
| **Accuracy** | Humidity, typically:<br>Temperature, typically: | +/- 2% r.h. (10…90% r.h.)<br>+/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request<br>restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C…+60 °C (Transmitter) / -20 °C…+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

| Order code | Output | Price |
|---|---|---|
| AFFD3 | 0…10 V or 4-20 mA | 162,00 € |

**Optional service**

Calibration on request

# KFF1 - Duct humidity sensor

## 1 active output

### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0…100% | |
| | Absolute humidity: 0…300 g/m³ | |
| | dew point temperature: -30 °C…+80 °C | |
| | Temperature output: 0 °C…+50 °C oder -20 °C…+80 °C | |
| **Number of outputs** | 1 active | |
| **Output signal** | 0…10 V or 4…20 mA (selectable with DIP-switches) | |
| **Supply** | at output voltage 0…10 V: | 16…32 VDC / 24 VAC ± 10% |
| | at output current 4..20 mA: | 32 VDC |
| **Accuracy** | Humidity, typically: | +/- 2% r.h. (10…90% r.h.) |
| | Temperature, typically: | +/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request | |
| | restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C…+60 °C (Transmitter) / -20 °C…+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

| Order code | Output | Price |
|---|---|---|
| KFF1 | 0…10V or 4-20mA | 114,00 € |

**Optional service**

Calibration on request

# KFFD2 - Duct humidity sensor

## 1 active output + display

HUMIDITY

### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0…100%<br>Absolute humidity: 0…300 g/m³<br>dew point temperature: -30 °C…+80 °C<br>Temperature output: 0 °C…+50 °C oder -20 °C…+80 °C | |
| **Number of outputs** | 1 active output<br>1 display | |
| **Output signal** | 0…10 V or 4…20 mA (selectable with DIP-switches) | |
| **Display** | 4-digit display | |
| **Supply** | at output voltage 0…10 V:<br>at output current 4..20 mA: | 16…32 VDC / 24 VAC ± 10%<br>32 VDC |
| **Accuracy** | Humidity, typically:<br>Temperature, typically: | +/- 2% r.h. (10…90% r.h.)<br>+/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request<br>restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C…+60 °C (Transmitter) / -20 °C…+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

| Order code | Output | Price |
|---|---|---|
| KFFD2 | 0…10V or 4-20mA | 137,00 € |

**Optional service**

Calibration on request

# KFF2 - Duct humidity sensor

## 2 active outputs

### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0...100%<br>Absolute humidity: 0...300 g/m³<br>dew point temperature: -30 °C...+80 °C<br>Temperature output: 0 °C...+50 °C oder -20 °C...+80 °C | |
| **Number of outputs** | 2 active | |
| **Output signal** | 2 x 0...10 V or 2 x 4...20 mA (selectable with DIP-switches) | |
| **Supply** | at output voltage 0...10 V:<br>at output current 4..20 mA: | 16...32 VDC / 24 VAC ± 10%<br>32 VDC |
| **Accuracy** | Humidity, typically:<br>Temperature, typically: | +/- 2% r.h. (10...90% r.h.)<br>+/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request<br>restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C...+60 °C (Transmitter) / -20 °C...+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

| Order code | Output | Price |
|---|---|---|
| KFF2 | 0...10V or 4-20mA | 144,00 € |

**Optional service**

Calibration on request

# KFFD3 - Duct humidity sensor

## 2 active outputs + Display

HUMIDITY

### Technical data

| | | |
|---|---|---|
| **Output values** (selectable for the number of outputs) | Relative humidity: 0...100% | |
| | Absolute humidity: 0...300 g/m³ | |
| | dew point temperature: -30 °C...+80 °C | |
| | Temperature output: 0 °C...+50 °C oder -20 °C...+80 °C | |
| **Number of outputs** | 2 active output<br>1 display | |
| **Output signal** | 2 x 0...10 V or 2 x 4...20 mA (selectable with DIP-switches) | |
| **Display** | 4-digit display | |
| **Supply** | at output voltage 0...10 V: | 16...32 VDC / 24 VAC ± 10% |
| | at output current 4..20 mA: | 32 VDC |
| **Accuracy** | Humidity, typically: | +/- 2% r.h. (10...90% r.h.) |
| | Temperature, typically: | +/- 0,3 K |
| **adjustable humidity offset** | ±2%, others on request | |
| | restore to factory setting via push-button | |
| **Protection** | IP65 | |
| **Process connection** | Filter element 100 µm, probe 50 mm, Ø12 mm | |
| **Operating temperature** | -10 °C...+60 °C (Transmitter) / -20 °C...+80 °C (Sensor probe) | |
| **Standards** | EN 61326:2013 / EMC directive 2014/30/EU | |

| Order code | Output | Price |
|---|---|---|
| KFFD3 | 0...10V or 4-20mA | 167,00 € |

**Optional service**

Calibration on request

# Notes

# General Terms and Conditions

**1. Scope**

1.1 Supply contracts shall, as far as not expressly agreed to differently, be accepted and carried out according to the following sales and delivery conditions. This applies also to all subsequent contracts without further reference. Precious metal sales, repairs and assembly are subject to special conditions.
1.2 We (from now on called the supplier) contradict expressly all commercial trade conditions of the purchaser.
1.3 Arrangements amending these conditions shall be stated in writing. Verbal agreements shall immediately be confirmed in writing.
1.4 These conditions regulate the conduct of business.

**2. Sales, sales brochures and commercial protection**

2.1 Sale offers, unless stated differently, are valid for a period of 4 weeks or until stocks last. The supplier is only obliged to supply after an expressly issued confirmation of the order.
2.2 In the absence of any particular reference in the sales offer, technical data, material used etc and standard values used in the trade should be assumed. Notification in the case of a variation will only be given when the product integrity warranty is affected.
2.3 All documentation provided to the customer by the supplier remains the property of the supplier. It should not be made available to third parties without the prior written permission of the supplier. If an order is not placed with the supplier and if requested by the supplier, all documentation including any copies that may have been made must be returned to the supplier without delay.
2.4 It is the responsibility of the purchaser to check all data contained in catalogues, sales brochures and published documentation that the intended application is suitable and appropriate, before acceptance and use. This also applies to the choice of suitable materials. The purchaser must ensure that the use of the product is appropriate.
2.5 The supplier is not duty-bound to check the correctness and/or legal conformity of the requirements and/or assumptions of the purchaser, as this is the sole responsibility of the purchaser. This applies in particular in the case of possible litigation for a breach of commercial protection laws.
2.6 The purchaser guarantees, that the execution of the contract does not result in any breach of commercial law by the use of components, drawings or samples supplied by the purchaser or third parties. The purchaser will conduct any possible defense procedures at his own expense and will compensate the supplier for any expenses resulting from such action.
2.7 Drawings, developments and discussion papers, which are generated in the course of contractual negotiations as an advisory service, are not binding. The purchaser cannot make demands based on such documents or services given by the supplier or his agents, except in the case of culpable intent or gross negligence.
2.8 Requested samples shall be billed by the supplier according to expense incurred.

**3. Contract order**

Orders constitute a valid contract only after written confirmation of the supplier. The extent of the contract, thus generated, is determined by the actual text of the confirmation. The purchaser is obliged to check all relevant detail and draw attention to any discrepancy in writing.

**4. Delivery period and extent**

4.1 The delivery period starts when all technical and commercial questions have been resolved and terminates with the dispatch or the notification of dispatch. Keeping to delivery schedules assumes the keeping of obligations by the purchaser, particularly in respect to payments.
4.2 Purchaser initiated amendments to the supply contract cause the delivery schedule to recommence with the date of the revised confirmation of the order.
4.3 The supplier does not accept responsibility for any delivery delays in respect to acts of God or events not caused or predicted by the supplier, such as non-issue of permits by government instrumentalities, strikes etc. Delivery schedules are extended by the extent of the difficulty.
4.4 The supplier accepts liability for not maintaining the delivery schedule or for delayed delivery, including delivery scheduled by the supplier only in the case of willful intent, gross negligence or a breach of essential contractual duty. However, this implies no change in the requirement of proof at the disadvantage of the purchaser.
4.5 The right of the purchaser to cancel an order after the passing of an appropriate delivery deadline agreed to by the supplier is not affected.
4.6 Part delivery is deemed acceptable at minor inconvenience to the purchaser.

**5. Point of delivery, risk transfer**

5.1 Delivery is affected from the place of production of the supplier at the expense and risk of the purchaser. The means of delivery is chosen at the discretion of the supplier according to usual practice, unless the purchaser has made a particular request.
5.2 In the case of delivery without any installation or erection, the risk in respect of the delivered items,even if free delivery had been agreed to, transfers to the purchaser, transport company or transport driver, or at the latest at the point of leaving the factory or store. If acceptance by the purchaser is delayed, the risk is transferred at the point of readiness to deliver, even if the delay of acceptance occurs after readiness to deliver. The supplier may insure delivery against breakage, transport or fire damage at the request and at cost of the purchaser.
5.3 In the case of delivery with installation or erection, the risk in respect of the delivery transfers to the purchaser on the day of acceptance.

**6. Prices**

6.1 All prices are ex store, freight/postage, packing, insurance and the respective applicable VAT are added that may legally apply for commissioning, installation, adjustment and similar services, which are listed separately on the account.
6.2 In the case of precious metals, the official stock exchange day trading rate on the day of delivery will be invoiced.

**7. Settlement of accounts**

7.1 The agreed price is to be paid in full in EURO. The terms of payment are set in the acknowledgement. Risk and payment costs are born by the purchase.
7.2 The supplier reserves the right to add an extra charge of 35,00 EUR net for orders of less than 100,00 EUR net value of goods.
7.3 In the case of late payment, an additional 8 percentage points over and above the base rate of the European Central Bank is added to the account. The purchaser cannot vary this clause.
7.4 The purchaser has the right to counter demands only in the case of indisputable or legally determined demands.
7.5 Costs incurred to ascertain credit, letters of credit in dealings with foreign countries or similar are at the expense of the purchaser.

**8 Warranty for Material Defects**

8.1 The purchaser should check goods immediately after receipt for possible defects. Obvious defects are to be reported to the supplier within 5 working days in writing, hidden defects within 5 days after detection.
8.2 The supplier has the discretion to repair or replace defects, which are reported to the supplier within 12 months after commissioning but not later than 15 months after delivery. This discretion is not waived even after repeated unsatisfactory repairs. The supplier must be given appropriate time and access to affect repairs.
8.3 The purchaser has the right to rescind the purchase order or demand a price reduction (decrease in the order value), if the defect cannot be repaired in an appropriate period of time.
8.4 In the case of defects, which could have been determined by the purchaser with little inconvenience before inclusion or use, all under warranty claims for defective materials are voided as soon as the product is included or used. This does not apply in the case of culpable intent, gross negligence or injury to life, body or health by the supplier, leading employee, consultant or contractor, or a liability for the breach of a major contractual duty or of a mandatory product liability.
8.5 No warranty claims will be accepted for a predetermined life of products especially under extreme or unknown operating conditions. Claims for the premature failure of the product are excluded.
8.6 In the case of products, which were manufactured to customer drawings and specifications,supplier warranty for materials defects only extends to include compliance with the specification. Legal liability according to the product liability laws as well as liability for intentional and gross negligence is not affected.
8.7 The warranty for material defects does not cover normal wear and tear or damage caused by faulty or negligent maintenance or inappropriate use outside the specifications or contract.
8.8 Material defects, which reduce the value or the useability only minimally or not at all, a liability is excluded.
8.9 Rights to referred warranty provisions according to §§ 478, 479 of Federal Common Law (BGB) only allow the consumer to make claims within the scope of the legislation and do not regulate the understanding of good will provisions with the supplier and assume that any party with referred warranty rights will duly observe their duty, in particular the duty to report defects.

**9. Liability**

9.1 All claims for damages and compensation of the purchaser are excluded . whatever the legal base, including claims as to illegal action or material defect or damage caused by the defect, or culpable neglect of associated contractual duties or the loss of income. This does not apply if the supplier, leading employee, consultant or contractor is guilty of culpable intent, gross negligence or injury to life, body or health or a liability for the breach of a major contractual duty or of a mandatory product liability exists.
9.2 In the case of a major breach of contractual liability, which does not involve intent or gross negligence and which does not involve an injury to life, body or health or the product integrity warranty, the liability shall be limited to compensation to the extent of assessable damage, which is typical in these contractual contexts.
9.3 Materials, which the purchaser is supplying to the supplier for the manufacture of products ordered by the purchaser, are only insured against theft. The supplier is liable for the loss or deterioration of such goods only in the case of intent or gross negligence.
9.4 Advice given to the purchaser by the supplier, particularly as to the usage of products, is binding only if given or confirmed in writing.
9.5 The legal requirements as to the need of proof are not affected.

**10. Joint ownership**

10.1 The finished product (from now on called the joint product) remains the property of the supplier until paid in full and all due demands, which the supplier derives from the business relationship with the purchaser, have been met. During this period of the joint ownership no seizure, nor transfer nor ceding of the demands from the purchaser without the express permission of the supplier may take place. The supplier is to be notified without delay in case of a seizure by a third party.
10.2 If the purchaser processes the joint product into a new product, the processed article remains the property of the supplier. The transfer of ownership is excluded under Federal Law (BGB) § 950. By processing, mixing or reconstructing the joint product with other products, not the property of the supplier, the supplier gains shared ownership of the resultant product in proportion of the monetary value of the joint product and other component products at the time of processing. It is the duty of the purchaser to store and control the resultant product with appropriate care.
10.3 Therefore, under these conditions, the resultant product is treated the same as the joint product. In the case of a sale of the resultant joint product, the purchaser reduces his claim on the product value by the amount proportioned according to the purchase value of the joint product of the supplier in respect to all other products contained in the resultant product. In the case of the sale of the resultant product, together with other components not owned by the supplier for a total all-inclusive price the purchaser shall pay the supplier the proportion of the total price that represents the share of the supplier.
10.4 The purchaser also accedes to a claim of the supplier in respect to any third party, if the joint product is incorporated in real estate property.
10.5 The purchaser is empowered, unless the power is revoked, to satisfy claims resulting from the resale in the course of normal business transactions. Furthermore, the supplier has the right to independently seek an order, if the purchaser has not fulfilled his contractual duty, in particular to settle due accounts on time. The purchaser must name, if requested, the debtors of outstanding claims and show the amounts owing. Making a claim on the reserved ownership goods and in particular a demand to transfer same constitutes a contract cancellation.
10.6 The supplier undertakes upon request by the purchaser to free the purchaser from any obligation to accede to claims of the supplier exceeding 10% of the actual value of the goods.

**11. Legal Venues**

11.1 The laws of the Federal Republic of Germany are exclusively valid, excluding UN Commercial Laws (UNCITRAL- Commercial Laws). Contract language is German.
11.2 In the case of the purchaser being a purchasing agent, a legal representative of the public instrumentality or utility, also for all disputes involving documents, exchange and cheque transactions, the legal venue for both parties is the local court of the supplier. The supplier has the right to take legal action against the purchaser in any other legal court.

**12. General Clause**

Invalidation of any one of the clauses in this contract does not affect the validity of other paragraphs. Should a clause be or become ineffective, the contractual parties to this contract shall endeavour to replace the ineffective clause with a new agreed clause, to reflect as fully as possible the commercial and legal purpose.

All information in this catalogue subject to change. Erros excepted.

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**HANNOVER MESSE**

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