



ENAPART



93 S Railroad Avenue Unit C
Bergenfield NJ 07621 USA
www.enapart.com
sales@enapart.com



Via del Canneto 35,
Borgosatollo, Brescia - Italia
www.enapart.it
vendite@enapart.it



Barbaros Mah. Ihlamur Bul. Aĝaoĝlu
My Newwork No:3/15 Ataşehir / İstanbul
www.enapart.net
satis@enapart.net



PRIVADA 10 B SUR #3908 COL.
ANZUREZ, C.P. 72530, PUEBLA, PUE
www.enapart.com.mx
sales@enapart.com.mx



Friedrich-Ebert-Anlage 36, 60325
Frankfurt am Main, Germany
www.enapart.de
anfrage@enapart.de



4 boulevard Carnot, 95400
villiers-le-bel, Paris, France
www.enapart.fr
sales@enapart.fr



65049, ОДЕСА, ВУЛИЦЯ ІВАНА
ФРАНКА, БУДИНОК 55, ПОВЕРХ 3
www.enapart.com.ua
sales@enapart.com.ua



MUNICIPIUL BUCUREȘTI, SECTOR 3,
B-DUL BASARABIA, NR.250, CORP P+5
www.enapart.ro
sales@enapart.ro



〒584-0023 大阪府富田林市若松町
東2丁目2番16号
www.enapart.co.jp
sales@enapart.co.jp



PLAZA NUESTRA SEÑORA DE LAS
NIEVES 12 ,LOCAL ,50012,ZARAGOZA
www.enapart.es
ventas@enapart.es



Складова база „Онгъл“, Склад А2, п.к.
4006, гр. Пловдив, България
www.enapart.bg
sales@enapart.bg



3 Austin Mews, High Street, Hemel
Hempstead, HP1 3AF , United Kingdom
www.enapart.co.uk
sales@enapart.co.uk

BEDIA®

MOTORENTECHNIK



TEMPERATURE SWITCHES AND SENSORS

- BIMETAL TEMPERATURE SWITCHES
- ELECTRONIC TEMPERATURE SWITCHES
- ELECTRONIC TEMPERATURE SENSORS
- SCREW-IN RESISTORS

THOUGHT-OUT SOLUTIONS AT THE HIGHEST LEVEL



ISO 9001
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Quality Management System
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ISO 14001
Certified Environmental
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BEDIA

The company

Measuring with system and passion

As a high performance and innovative company BEDIA develops, produces and distributes well thought out solutions for level and temperature monitoring.

We have been concentrating our skills in the domain of measuring filling levels and temperatures under extreme operating conditions. We are able to offer customized solutions to the specific requirements of our clients for small to large series. In doing so we are combining tried and tested technologies with innovative product ideas. Our expertise and flexibility are well demonstrated in the development of customer specific solutions.

One thing that all our products have in common is the nonexistence of moving or adjustable parts; our parts are not subject to mechanical interference and exhibit exceptional operational reliability.

Since 1986 BEDIA Motorentchnik is a valued partner of numerous manufacturers of agricultural and construction machinery, compressors, engines, power train control systems and utility vehicles.

The high quality requirements of our world wide operating customers are our motivation for the constant improvement of our products and processes. The stable customer relationships of many years standing express the high quality of our products and the satisfaction of our customers.

We hope you will get a comprehensive overview of our products from this catalog. Please feel free to contact us, we will be happy to assist you with our advice and experience.





Company history at a glance

| | |
|------|--|
| 2018 | currently about 140 employees |
| 2016 | 30th company anniversary |
| 2012 | Foundation of BEDIA Sensors USA in Austin, Texas |
| 2009 | Relocation of BEDIA Motorentechnik and BEDIA Kabel to the new corporate building in Altdorf in the industrial park near the A6. |
| 2008 | Takeover of the production for sensors from the business entit E-T-A in Altdorf |
| 2006 | Spin-off of the new BEDIA Kabel business unit from BEDIA Motorentechnik GmbH & Co. KG into BEDIA Kabel GmbH & Co. KG. |
| 2005 | Reorganization of BEDIA Motorentechnik GmbH into BEDIA Motorentechnik GmbH & Co. KG, preparation and the transfer of business administration to Holger Schultheis. |
| 2000 | Sale of the water treatment business unit to Aqua-Concept GmbH. |
| 1994 | Transfer of the Sensor Systems and Water Treatment business unit from BEDIA Maschinenfabrik to BEDIA Motorentechnik. |
| 1986 | Foundation of BEDIA Motorentechnik in Leinburg. Core focus business with vehicle wiring cables and delivery of sensor parts for the Bedia Maschinenfabrik in Bonn. |

Our products at a glance

- capacitive level sensors for a versatile range of applications:
 - CLS 20/25 for railway applications tested according to DIN EN 50155
 - CLS 40/45 for off- and onroad applications with E1-type approval of the KBA
 - CLS 50/55 for maritime applications with approvals of the classification societies
- intelligent, analog tank sensors for fuels and oils
- intelligent, analog hot wire sensors for monitoring oil sump fill levels
- temperature sensors
- mechanical temperature switches
- electronic temperature switches
- electronic temperature sensors
- DC/DC converters

We are certified in accordance with
ISO 9001:2015 and ISO 14001:2015.



BIMETAL TEMPERATURE SWITCHES

Bimetal temperature switches with reset hysteresis ≤ 15 K

Description

In a robust brass or stainless steel housing there is a bimetal disc, which snaps over when nominal switching temperature is reached.

The switching contact can be implemented as a normally closed contact or a normally open contact in the temperature range between -25°C and 190°C .

The switch opens or closes its contact upon rising temperature and resets automatically to the original switching state when the temperature has dropped. The switching temperature cannot be adjusted.

The bimetal disc carries no current, and this eliminates the possibility of arcing.

The reset switching temperature is typically 5...15 K below the switching temperature. Other values on request.

A Normally Open (NO=open in the normal state) switch closes a circuit on reaching the switching temperature.

A Normally Closed (NC= closed in the normal state) switch opens a circuit on reaching the switching temperature.

The type of integral thread, sealing face and the heat transfer pin are to the customer specifications or can be selected from our extensive standard range.

Technical Data

| | |
|---------------------------------------|--|
| Nominal voltage: | 12 VDC / 24 VDC |
| Max. load: | 16 A at 25°C |
| Min. load: | 50 mA with silver-plated contacts (standard) ≥ 10 mA with gold-plated contacts |
| Contact arrangement: | normally closed / normally open |
| Reset type: | automatic |
| Standard response temperature range | |
| stepped in 5 K intervals: | -25°C to $+190^{\circ}\text{C}$ |
| Standard tolerance: | ± 3 K / ± 5 K / ± 8 K |
| Reset hysteresis: | ≤ 15 K min. 5 K, other values on request |
| Standard contact resistance of switch | ≤ 25 m Ω with silver-plated contacts (standard) |
| mechanism: | ≤ 10 m Ω with gold-plated contacts |
| Switch operations at rated current: | 50000 at 12 VDC / 10000 at 24 VDC |
| Vibration 10 Hz to 60 Hz: | 10 g |
| Connector: | see order number overview |
| IP-protection: | depending on the connector type |
| Housing material: | brass (standard), stainless steel on request |

CONNECTORS AND DESIGNS



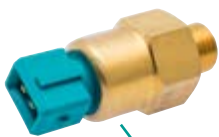
- Connector bayonet according to ISO 15170
Protection class IP 69K according to DIN 40050
without thermal conductivity probe

» Order number overview page 8



- Connector DEUTSCH DT04-2P
Protection class IP 67 according to DIN 40050
without thermal conductivity probe

» Order number overview page 9



- Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
without thermal conductivity probe

» Order number overview page 8



- Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 8



- Connector blade terminal 6,3 x 0,8; 2-pole
Protection class IP 67 according to to DIN 40050
without thermal conductivity probe

» Order number overview page 9



- Connector blade terminal 6,3 x 0,8; 2-pole
Protection class IP 67 according to to DIN 40050
with thermal conductivity probe

» Order number overview page 9



- Connector blade terminal 6,3 x 0,8; 1-pole
Protection class IP 67 according to to DIN 40050
with thermal conductivity probe

» Order number overview page 8



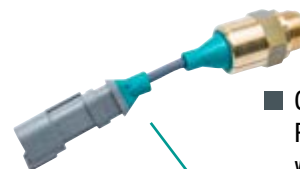
- Connector bayonet 10SL plastic
Protection class IP 67 according to DIN 40050
without thermal conductivity probe

» Order number overview page 8



- Cable with flying leads
Protection class IP 69K according to DIN 40050
without thermal conductivity probe

» Order number overview page 9



- Cable with DEUTSCH DT04-3P
Protection class IP 69K according to DIN 40050
without thermal conductivity probe

» Order number overview page 9



- Cable with DEUTSCH DT04-3P
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 9



- Cable with connector M12x1
Protection class IP 69K according to DIN 40050
without thermal conductivity probe

» Order number overview page 9

ORDER NUMBER OVERVIEW

Bimetal temperature switches with reset hysteresis ≤ 15 K

Connector bayonet according to ISO 15170

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|----------------------------|--------------|-----------------|------------|--------------------|--------------|
| M 14 x 1,5 / 27 | / | 110°C | normally closed | 5 K | potential free | 422 178 |



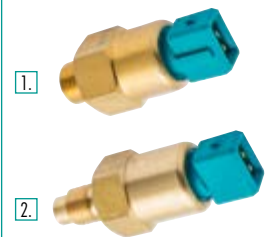
Connector bayonet 10SL plastic

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|----------------------------|--------------|-----------------|------------|--------------------|--------------|
| M 14 x 1,5 / 19 | / | 17°C | normally closed | 6 K | potential free | 420 148 |



Connector minitimer 2,8 x 0,8

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|---------------------|----------------------------|--------------|-----------------|------------|--------------------|------------------------------|
| M 12 x 1,5 / 22 | 5 mm | 40°C | normally open | 8 K | potential free | 422 866 [2.] |
| M 12 x 1,75 / 22 | 15 mm | 80°C | normally closed | 8 K | potential free | 422 863 [2.] |
| M 14 x 1,5 / 22 | 12 mm | 90°C | normally closed | 5 K | potential free | 420 277 [2.] |
| M 22 x 1,5 / 27 | / | 55°C | normally open | 10 K | potential free | 422 857 [1.] |
| M 22 x 1,5 / 27 | / | 85°C | normally open | 5 K | potential free | 422 858 [1.] |
| G 1/4" / 22 | / | 20°C | normally closed | 5 K | potential free | 420 181 [1.] |
| 1/2" - 14 NPTF / 24 | 15 mm | 112°C | normally closed | 10 K | potential free | 422 854 [2.] |



Connector blade terminal 6,3 x 0,8; 1-pole

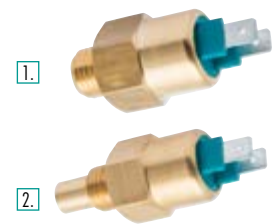
| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|---------------------|----------------------------|--------------|-----------------|------------|--------------------|------------------------------|
| M 14 x 1,5 / 22 | 12 mm | 140°C | normally open | 5 K | Low side switch | 422 875 [2.] |
| M 27 x 2 / 32 | / | 5°C | normally closed | 5 K | Low side switch | 422 169 [1.] |
| 1/4" - 18 NPTF / 22 | 13 mm | 120°C | normally open | 10 K | Low side switch | 422 861 [2.] |



Bimetal temperature switches with reset hysteresis ≤ 15 K

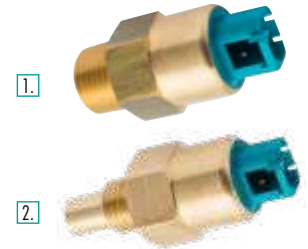
Connector blade terminal 6,3 x 0,8; 2-pole

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|----------------------------|--------------|-----------------|-------------|--------------------|----------------------------|
| M 14 x 1,5 / 22 | / | 55°C | normally open | 8 K | potential free | 422 871 1. |
| M 14 x 1,5 / 22 | / | 70°C | normally open | 5 K | potential free | 422 872 1. |
| M 14 x 1,5 / 22 | 12 mm | 90°C | normally closed | 5 K | potential free | 420 293 2. |
| M 14 x 1,5 / 22 | 12 mm | 95°C | normally closed | ≤ 20 K | potential free | 422 869 2. |
| M 14 x 1,5 / 22 | / | 100°C | normally closed | 5 K | potential free | 422 360 1. |
| M 18 x 1,5 / 22 | / | 90°C | normally open | 8 K | potential free | 421 085 1. |
| 9/16" UNF / 22 | 12 mm | 95°C | normally closed | ≤ 20 K | potential free | 422 870 2. |



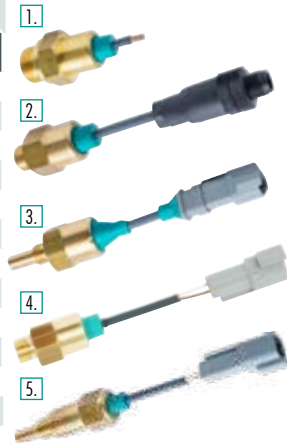
Connector Deutsch DT04-2P

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|---------------------|----------------------------|--------------|-----------------|------------|--------------------|----------------------------|
| M 14 x 1,5 / 27 | 19 mm | 5°C | normally closed | 5 K | potential free | 422 183 2. |
| 1/2" - 14 NPTF / 27 | / | 110°C | normally open | 5 K | potential free | 422 862 1. |



Cable connection

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Cable length | Cable connection type | Order number |
|-----------------|----------------------------|--------------|-----------------|-------------|--------------------|--------------|-----------------------|----------------------------|
| M 12 x 1,5 / 19 | 18 mm | 95°C | normally closed | ≤ 20 K | potential free | 500mm | 2* | 422 855 5. |
| M 12 x 1,5 / 19 | 18 mm | 105°C | normally closed | ≤ 20 K | potential free | 500mm | 2* | 422 856 5. |
| M 14 x 1,5 / 22 | / | 85°C | normally closed | 5 K | potential free | 300mm | 4* | 420 929 2. |
| M 14 x 1,5 / 22 | / | 95°C | normally closed | 15 K | potential free | 570mm | 2* | 422 218 4. |
| M 14 x 1,5 / 22 | / | 100°C | normally closed | 5 K | potential free | 570mm | 2* | 422 217 4. |
| M 14 x 1,5 / 27 | 19 mm | 85°C | normally closed | 5 K | potential free | 350mm | 3* | 422 175 3. |
| M 14 x 1,5 / 27 | 19 mm | 85°C | normally open | 5 K | potential free | 350mm | 3* | 422 158 3. |
| M 14 x 1,5 / 27 | 19 mm | 100°C | normally closed | 5 K | potential free | 350mm | 3* | 422 176 3. |
| M 16 x 1,5 / 27 | 2,5 mm | 92°C | normally open | 5 K | potential free | 350mm | 3* | 422 185 3. |
| M 22 x 1,5 / 27 | 2,5 mm | 92°C | normally open | 5 K | potential free | 325mm | 2* | 422 865 5. |
| M 22 x 1,5 / 27 | 2,5 mm | 92°C | normally open | 5 K | potential free | 350mm | 3* | 422 164 3. |
| M 22 x 1,5 / 27 | 2,5 mm | 105°C | normally open | 5 K | potential free | 350mm | 3* | 422 157 3. |
| G 1/2" / 27 | / | 80°C | normally closed | 5 K | potential free | 400mm | 1* | 422 168 1. |



1* Cable with flying leads
2* Cable with Deutsch connector DT04-2P

3* Cable with Deutsch connector DT04-3P
4* Cable with connector M12x1

BIMETAL TEMPERATURE SWITCHES

Bimetal temperature switches with reset hysteresis ≤ 25 K

Description

These temperature switches operate by means of a thermally sensitive bimetal snap-element which switches a double electrical contact when reaching a pre-set response temperature. They can be normally open or normally closed. The electrical current flows through the bimetal element, which therefore gives a combination of temperature- and current-sensitivity.

The resilient snap action disk ensures excellent performance.

The bimetal will only snap back to its initial condition after the temperature has dropped significantly. Compared to other temperature switches with relatively small hysteresis, the temperature difference between the temperature switch opening and closing is significantly higher. This ensures a more distinct status indication, i.e. longer switch-off times, in the event of a fault condition.

Technical Data

| | |
|---------------------------------------|--|
| Nominal voltage: | 12 VDC / 24 VDC |
| Max. load: | 36 VDC / 1,0 A |
| | 24 VDC / 1,5 A |
| Min. load: | 50 mA |
| Contact arrangement: | normally closed / normally open |
| Reset type: | automatic |
| Standard response temperature range | |
| stepped in 5 K intervals: | +50 °C to +180 °C |
| Standard tolerance: | ± 3 K / ± 5 K / ± 10 K |
| Reset hysteresis: | ≤ 25 K |
| Standard contact resistance of switch | |
| mechanism: | ≤ 40 m Ω |
| Switch operations at rated current: | 10000 |
| Vibration 10 Hz to 60 Hz: | 10 g |
| Connector: | see order number overview |
| IP-protection: | depending on the connector type |
| Housing material: | brass (standard), stainless steel on request |

CONNECTORS AND DESIGNS



■ Connector bayonet according to ISO 15170
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 12



■ Connector bayonet 10 SL according to VG 95234
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 12



■ Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 13



■ Connector bayonet 10 SL plastic
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 13



■ Connector blade terminal 6,3 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 14



■ Connector blade terminal 6,3 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 14



■ Cable with flying leads
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 14



■ Cable with DEUTSCH DT06-2S
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 14



■ Cable with flying leads
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 14



■ Cable with DEUTSCH DT04-2P
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 14

ORDER NUMBER OVERVIEW

Bimetal temperature switches with reset hysteresis ≤ 25 K

Connector bayonet according to ISO 15170

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|----------------------------|--------------|-----------------|-------------|--------------------|--------------|
| M 14 x 1,5 / 27 | 11 mm | 50°C | normally open | ≤ 15 K | potential free | 422 874 |
| M 14 x 1,5 / 27 | 11 mm | 60°C | normally closed | ≤ 20 K | potential free | 421 069 |
| M 14 x 1,5 / 27 | 11 mm | 90°C | normally closed | ≤ 20 K | potential free | 422 849 |
| M 14 x 1,5 / 27 | 11 mm | 95°C | normally open | < 20 K | potential free | 422 842 |
| M 14 x 1,5 / 27 | 11 mm | 100°C | normally open | ≤ 20 K | potential free | 422 843 |
| M 14 x 1,5 / 27 | 11 mm | 110°C | normally open | ≤ 20 K | potential free | 422 320 |
| M 14 x 1,5 / 27 | 11 mm | 120°C | normally open | ≤ 20 K | potential free | 422 844 |
| M 14 x 1,5 / 27 | 11 mm | 120°C | normally closed | ≤ 20 K | potential free | 422 847 |
| M 14 x 1,5 / 27 | 11 mm | 150°C | normally open | ≤ 20 K | potential free | 422 321 |



Connector bayonet 10SL according to VG 95234

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|----------------------------|--------------|-----------------|-------------|--------------------|--------------|
| M 14 x 1,5 / 27 | 11 mm | 80°C | normally open | 20 K | potential free | 422 316 |
| M 14 x 1,5 / 27 | 11 mm | 120°C | normally closed | ≤ 15 K | potential free | 421 088 |
| M 14 x 1,5 / 27 | 11 mm | 130°C | normally open | ≤ 20 K | potential free | 422 313 |
| M 14 x 1,5 / 27 | 11 mm | 130°C | normally closed | 20 K | potential free | 420 295 |
| M 18 x 1,5 / 27 | 11 mm | 80°C | normally open | 20 K | potential free | 422 318 |



Bimetal temperature switches with reset hysteresis ≤ 25 K

Connector bayonet 10SL plastic

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|---------------------|----------------------------|--------------|-----------------|-------------|--------------------|--------------|
| 9/16" - 18 UNF / 19 | 15 mm | 50°C | normally open | ≤ 20 K | potential free | 420 186 |
| 9/16" - 18 UNF / 19 | 15 mm | 60°C | normally closed | ≤ 20 K | potential free | 420 224 |
| 9/16" - 18 UNF / 19 | 15 mm | 70°C | normally closed | ≤ 15 K | potential free | 420 190 |
| 9/16" - 18 UNF / 19 | 15 mm | 100°C | normally open | ≤ 20 K | potential free | 420 353 |
| 9/16" - 18 UNF / 19 | 15 mm | 120°C | normally open | ≤ 20 K | potential free | 420 187 |
| 9/16" - 18 UNF / 19 | 15 mm | 150°C | normally open | ≤ 20 K | potential free | 420 191 |
| 3/4" - 16 UNF / 22 | 15 mm | 100°C | normally open | ≤ 20 K | potential free | 420 189 |



Connector minitimer 2,8 x 0,8

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|----------------------------|--------------|-----------------|-------------|--------------------|--------------|
| M 14 x 1,5 / 19 | 18 mm | 50°C | normally closed | ≤ 20 K | potential free | 422 322 |



ORDER NUMBER OVERVIEW

Bimetal temperature switches with reset hysteresis ≤ 25 K

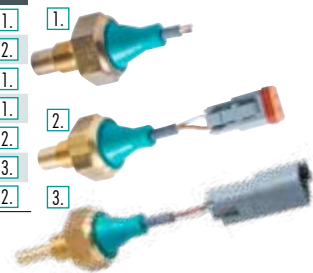
Connector blade terminal 6,3 x 0,8

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|----------------------------|--------------|-----------------|-------------|--------------------|-------------------------|
| M 14 x 1,5 / 19 | 15 mm | 50°C | normally closed | ≤ 20 K | potential free | 421 099 1. |
| M 14 x 1,5 / 19 | 15 mm | 70°C | normally open | ≤ 20 K | potential free | 421 079 1. |
| M 14 x 1,5 / 19 | 15 mm | 95°C | normally open | ≤ 20 K | potential free | 421 077 1. |
| M 14 x 1,5 / 19 | 15 mm | 95°C | normally closed | ≤ 20 K | potential free | 420 133 1. |
| M 14 x 1,5 / 19 | 15 mm | 100°C | normally open | ≤ 20 K | potential free | 420 166 1. |
| M 14 x 1,5 / 19 | 15 mm | 110°C | normally open | ≤ 20 K | potential free | 420 221 1. |
| M 14 x 1,5 / 19 | 15 mm | 115°C | normally closed | ≤ 20 K | potential free | 422 230 1. |
| M 14 x 1,5 / 19 | 15 mm | 120°C | normally open | ≤ 20 K | potential free | 420 155 1. |
| M 14 x 1,5 / 19 | 12 mm | 130°C | normally closed | ≤ 30 K | potential free | 421 067 2. |
| M 16 x 1,5 / 19 | 15 mm | 50°C | normally closed | ≤ 20 K | potential free | 421 087 1. |
| R 1/2" / 22 | 15 mm | 95°C | normally closed | ≤ 20 K | potential free | 422 314 1. |



Cable connection

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Cable length | Cable connection type | Order number |
|-----------------|----------------------------|--------------|---------------|-------------|--------------------|--------------|-----------------------|-------------------------|
| M 14 x 1,5 / 27 | 11 mm | 50°C | normally open | ≤ 15 K | potential free | 1300mm | 1* | 421 096 1. |
| M 14 x 1,5 / 27 | 11 mm | 70°C | normally open | 5 K | potential free | 315mm | 3* | 420 926 2. |
| M 14 x 1,5 / 27 | 11 mm | 70°C | normally open | ≤ 20 K | potential free | 1300mm | 1* | 421 097 1. |
| M 14 x 1,5 / 27 | 13 mm | 80°C | normally open | ≤ 20 K | potential free | 1300mm | 1* | 420 149 1. |
| M 14 x 1,5 / 27 | 6 mm | 110°C | normally open | ≤ 20 K | potential free | 315mm | 3* | 420 206 2. |
| M 14 x 1,5 / 27 | 4 mm | 120°C | normally open | ≤ 20 K | potential free | 320mm | 2* | 420 182 3. |
| M 14 x 1,5 / 27 | 18 mm | 120°C | normally open | ≤ 20 K | potential free | 315mm | 3* | 422 841 2. |



1* Cable with flying leads
 2* Cable with Deutsch connector DT04-2P
 3* Cable with Deutsch connector DT06-2S

Temperature sensors with switch point

Connector bayonet according to ISO 15170

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Check values at | Order number |
|---------------|----------------------------|--------------|---------------|------------|--------------------|---|--------------|
| 5/8"-18UNF/27 | 11 mm | 105°C | normally open | 15 K | Low side switch | 20 °C-698Ω±65Ω 60 °C-144Ω±12Ω 100 °C-39,6Ω±3Ω | 422 319 |



Connector bayonet 10SL plastic

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Check values at | Order number |
|---------------|----------------------------|--------------|---------------|------------|--------------------|---|--------------|
| M 14 x 1,5/19 | 15 mm | 100°C | normally open | ≤ 20 K | Low side switch | 20 °C-698 Ω±74 Ω 60 °C-144 Ω±12 Ω 100 °C-39,6 Ω±3 Ω | 422 333 |



Connector minitimer 2,8 x 0,8

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Check values at | Order number |
|---------------|----------------------------|--------------|---------------|------------|--------------------|---|--------------|
| M 14 x 1,5/19 | 13 mm | 110°C | normally open | ≤ 20 K | Low side switch | 20 °C-698 Ω±65 Ω 60 °C-141 Ω±12 Ω 100 °C-39,6 Ω±3 Ω | 422 229 |



Temperature sensors with switch point

Connector blade terminal 6,3 x 0,8

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Check values at | Order number |
|-----------------|----------------------------|--------------|---------------|------------|--------------------|---|--------------|
| M 14 x 1,5 / 19 | 15 mm | 80°C | normally open | ≤ 20 K | Low side switch | 20 °C-698 Ω±74 Ω 60 °C-144 Ω±12 Ω 100 °C-39,6 Ω±3 Ω | 420 156 |
| M 14 x 1,5 / 19 | 15 mm | 95°C | normally open | ≤ 20 K | Low side switch | 20 °C-698 Ω±74 Ω 60 °C-144 Ω±12 Ω 100 °C-39,6 Ω±3 Ω | 420 152 |
| M 14 x 1,5 / 19 | 15 mm | 100°C | normally open | ≤ 20 K | Low side switch | 20 °C-698 Ω±74 Ω 60 °C-144 Ω±12 Ω 100 °C-39,6 Ω±3 Ω | 421 094 |
| M 14 x 1,5 / 19 | 15 mm | 110°C | normally open | ≤ 20 K | Low side switch | 20 °C-698 Ω±74 Ω 60 °C-144 Ω±12 Ω 100 °C-39,6 Ω±3 Ω | 421 095 |



Cable connection

| Thread/HEX | thermal conductivity probe | Switch point | Function | Hysteresis | Electric potential | Check values at | Cable length | Cable connection type | Order number |
|-----------------|----------------------------|--------------|---------------|------------|--------------------|---|--------------|-----------------------|--------------|
| M 14 x 1,5 / 19 | 11 mm | 80°C | normally open | ≤ 20 K | Low side switch | 20 °C-698Ω±65Ω 60 °C-144Ω±12Ω 100 °C-39,6Ω±3Ω | 100mm | 2* | 420 262 |

* Cable with Deutsch connector DT04-2P



ACCESSORIES

Connector minitimer 2,8 mm x 0,8 mm

| Order-Nr. | Description |
|-----------|-------------------------|
| 420 125 | Female connector 2-pole |

Connector bayonet 10 SL according to VG 95234

| Order-Nr. | Description |
|-----------|---|
| 421 652 | Female bayonet connector 10 SL straight according to VG 95234 |
| 421 885 | Female bayonet connector 10 SL 90° according to VG 95234 |

Connector bayonet 10SL plastic

| Order-Nr. | Description |
|-----------|---|
| 420 760 | Female bayonet connector 10 SL straight |
| 420 761 | Female bayonet connector 10 SL 90° |

Connector bayonet according to ISO 15170

| Order-Nr. | Description |
|-----------|---|
| 420 700 | 4-pin bayonet ISO 15170 straight connector for corrugated tubing NW10 |
| 420 701 | 4-pin bayonet ISO 15170 90° angle for corrugated tubing NW10 |
| 420 703 | 4-pin bayonet ISO 15170 straight connector for cable |
| 420 702 | 4-pin bayonet ISO 15170 90° angle for cable |

Cable with connector bayonet according to ISO 15170

| Order-Nr. | Description | Length | Connection |
|-----------|--|---------|------------|
| 420 750 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 300 mm | 1* |
| 420 722 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 1000 mm | 1* |
| 420 724 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 3000 mm | 1* |
| 420 752 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 5000 mm | 1* |
| 420 739 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 300 mm | 1* |
| 420 732 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 1000 mm | 1* |
| 420 731 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 3000 mm | 1* |
| 420 751 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 5000 mm | 1* |
| 420 765 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 6000 mm | 1* |

1* Cable with flying leads 2* Cable with 3 pole blade terminals 6.3 in housing 3* Cable end with 3-pin DEUTSCH connector 4* Cable with 3-pin M 12 x 1 connector

ELECTRONIC TEMPERATURE SWITCHES

Technical description

The electronic temperature switch of BEDIA is fitted with thin-film resistor Pt1000 in a bridge circuit. This sensor element provides close switch point tolerances and a quick response. Switch point and reset hysteresis may be selected within the admissible operating range when ordering so as to allow the monitoring of both very wide and very close temperature ranges. The switching output is protected from short-circuit and overload.

The short-circuit current is limited by the output transistor switching off in the event of a fault. It will automatically reset as soon as the fault has been remedied.

The switch is available with low-side, high-side or potential-free DC switching output.

The switch is open in the event of power failure or disconnection of the power supply, independent of the switching function. It is available both as normally open (NO) or normally closed (NC) switch.

Technical data

| | |
|----------------------------|--|
| Nominal voltage: | 12 VDC / 24 VDC (-25 %/+50 %) (9-36 VDC) |
| Current consumption: | < 10 mA |
| Operating temperature: | -40 °C to +125 °C |
| Medium temperature: | -50 °C to +150 °C |
| Sensor element: | Pt1000 Klasse B |
| Max. switching current: | 1 A |
| Voltage drop: | < 1,5 V (1 A) |
| Max. switching voltage: | 36 VDC |
| Off-state leakage current: | 10 µA (25 °C) |
| Switch point: | freely selectable between -50 °C and +150 °C |
| Standard tolerance: | ±3 K |
| Hysteresis: | freely selectable, ≥ 1 K |
| Switching mode: | a) potential free DC switch, either normally close or normally open b) low-side switch, either normally close or normally open c) high-side switch, either normally close or normally open |
| Measuring media: | lubricating oil, hydraulic oil, fuel, cooling water |
| Connector: | see order number overview |
| IP-protection: | depending on the connector type |
| Housing material: | brass (standard), stainless steel on request |
| EMC: | according to to e1 standard 72/245/EWG |

CONNECTORS AND DESIGNS



■ Connector bayonet according to ISO 15170
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 20



■ Connector bayonet according to ISO 15170
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 20



■ Connector bayonet 10SL according to VG 95234
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 20



■ Connector DIN EN 175301-803-A
Protection class IP 65 according to DIN 40050
with thermal conductivity probe

» Order number overview page 20



■ Cable with flying leads
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 21



■ Cable with flying leads
Protection class IP 69K according to DIN 4005
with thermal conductivity probe

» Order number overview page 21



■ Cable connection with bayonet according to ISO 15170 overmoulded
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 21

ORDER NUMBER OVERVIEW

Electronic temperature switches

Connector bayonet according to ISO 15170

| Thread/HEX | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|--------------|-----------------|------------|--------------------|--------------|
| M 14 x 1,5 / 27 | 0 °C | normally open | 5K | potential free | 420 151 |
| M 14 x 1,5 / 27 | 5 °C | normally open | 3K | potential free | 420 215 |
| M 14 x 1,5 / 27 | 10 °C | normally closed | 1K | potential free | 420 509 |
| M 14 x 1,5 / 27 | 15 °C | normally closed | 5K | potential free | 420 216 |
| M 14 x 1,5 / 27 | 25 °C | normally open | 15K | High side switch | 420 510 |
| M 14 x 1,5 / 27 | 75 °C | normally closed | 7K | High side switch | 420 518 |
| M 14 x 1,5 / 27 | 75 °C | normally open | 3K | Low side switch | 420 507 |
| M 14 x 1,5 / 27 | 82 °C | normally open | 8K | Low side switch | 420 131 |
| M 14 x 1,5 / 27 | 86 °C | normally open | 1K | Low side switch | 420 176 |
| M 14 x 1,5 / 27 | 87 °C | normally open | 1K | Low side switch | 420 139 |
| M 14 x 1,5 / 27 | 92 °C | normally open | 1K | Low side switch | 420 142 |
| M 14 x 1,5 / 27 | 96 °C | normally open | 1K | Low side switch | 420 137 |
| M 14 x 1,5 / 27 | 120 °C | normally closed | 1K | Low side switch | 420 399 |
| G 3/8" / 27 | 5 °C | normally open | 5K | High side switch | 420 499 |
| G 3/8" / 27 | 15 °C | normally open | 1K | High side switch | 420 120 |
| G 3/8" / 27 | 40 °C | normally open | 15K | High side switch | 420 199 |
| G 3/8" / 27 | 50 °C | normally open | 1K | High side switch | 420 178 |
| G 3/8" / 27 | 60 °C | normally open | 1K | High side switch | 420 121 |
| G 3/8" / 27 | 80 °C | normally open | 1K | High side switch | 420 179 |
| G 3/8" / 27 | 80 °C | normally open | 15K | High side switch | 420 195 |



Connector bayonet 10SL according to VG 95234

| Thread/HEX | Switch point | Function | Hysteresis | Electric potential | Order number |
|-----------------|--------------|-----------------|------------|--------------------|--------------|
| M 14 x 1,5 / 27 | 0 °C | normally open | 4K | Low side switch | 420 229 |
| M 14 x 1,5 / 27 | 0 °C | normally closed | 10K | Low side switch | 421 084 |
| M 14 x 1,5 / 27 | 10 °C | normally open | 10K | potential free | 420 138 |
| M 14 x 1,5 / 27 | 96 °C | normally open | 1K | Low side switch | 420 157 |



Connector DIN EN 175301-803-A

| Thread/HEX | Switch point | Function | Hysteresis | Electric potential | Order number |
|-------------|--------------|-----------------|------------|--------------------|--------------|
| G 1/4" / 27 | 80 °C | normally closed | 10K | High side switch | 420 352 |



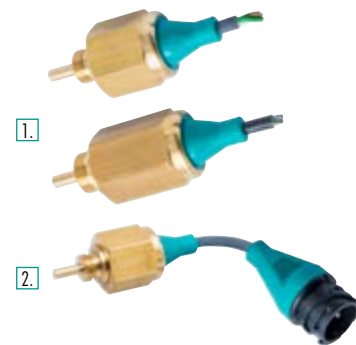
Electronic temperature switches

Cable connection

| Thread/HEX | Switch point | Function | Hysteresis | Electric potential | Cable length | Cable connection type | Order number |
|-----------------|--------------|-----------------|------------|--------------------|--------------|-----------------------|-----------------------------|
| M 14 x 1,5 / 27 | 3 °C | normally open | 1K | Low side switch | 2000 mm | 1* | 420 249 [1] |
| M 14 x 1,5 / 27 | 15 °C | normally open | 1K | Low side switch | 2000 mm | 1* | 420 297 [1] |
| M 14 x 1,5 / 27 | 45 °C | normally open | 1K | Low side switch | 10000 mm | 1* | 420 144 [1] |
| M 14 x 1,5 / 27 | 45 °C | normally open | 1K | High side switch | 4000 mm | 2* | 420 146 [2] |
| M 14 x 1,5 / 27 | 100 °C | normally closed | 1K | Low side switch | 10000 mm | 1* | 420 145 [1] |
| M 14 x 1,5 / 27 | 100 °C | normally closed | 1K | High side switch | 4000 mm | 2* | 420 147 [2] |
| M 14 x 1,5 / 27 | 100 °C | normally closed | 1K | High side switch | 1000 mm | 2* | 420 374 [2] |
| M 16 x 1,5 / 27 | 40 °C | normally closed | 10 K | High side switch | 10000 mm | 1* | 420 313 [1] |
| M 16 x 1,5 / 27 | 80 °C | normally closed | 10 K | High side switch | 10000 mm | 1* | 420 351 [1] |
| G 3/8" / 27 | 3 °C | normally open | 0,5 K | potential free | 1000 mm | 1* | 420 140 [1] |
| G 3/8" / 27 | 20 °C | normally closed | 5 K | potential free | 1000 mm | 1* | 420 141 [1] |

1* Cable with flying leads

2* Cable with bayonet according to ISO 15170 overmolded



ACCESSORIES

Connector bayonet 10 SL according to VG 95234

| Order-Nr. | Description |
|-----------|---|
| 421 652 | Plug-in connector bayonet 10 SL straight with mounting flange VG 95234 |
| 421 885 | Plug-in connector bayonet 10 SL 90° angle with mounting flange VG 95234 |

Cable with connector bayonet 10 SL according to VG 95234

| Order-Nr. | Description | Length | Connection |
|-----------|--|---------|------------|
| 421 653 | Ready-made cable Type CL105 3 x 0,75 mm ² with 3-pin bayonet connector 10 SL VG 95234 straight | 2000 mm | 1* |
| 421 657 | Ready-made cable Type CL105 3 x 0,75 mm ² with 3-pin bayonet connector 10 SL VG 95234 straight | 5000 mm | 1* |
| 421 658 | Ready-made cable Type CL105 3 x 0,75 mm ² with 3-pin bayonet connector 10 SL VG 95234 90° angle | 2000 mm | 1* |
| 421 841 | Ready-made cable Type CL105 3 x 0,75 mm ² with 3-pin bayonet connector 10 SL VG 95234 90° angle | 3000 mm | 1* |
| 421 697 | Ready-made cable Type CL105 3 x 0,75 mm ² with 3-pin bayonet connector 10 SL VG 95234 90° angle | 5000 mm | 1* |
| 420 805 | Ready-made cable Type CL105 3 x 0,75 mm ² with 3-pin bayonet connector 10 SL VG 95234 90° angle | 5000 mm | 1* |

1* Cable with flying leads

Connector bayonet according to ISO 15170

| Order-Nr. | Description |
|-----------|-------------|
| | see page 17 |

Cable with connector bayonet according to ISO 15170

| Order-Nr. | Description | Length | Connection |
|-----------|-------------|--------|------------|
| | see page 17 | | |

ELECTRONIC TEMPERATURE SENSORS

Technical description

This temperature sensor is for measuring the temperature of liquid in engines, sets of machines and utility vehicles.

A Pt1000 thin-film precision resistor is used as the measuring element. The temperature-dependent resistance of the Pt1000 is evaluated by an electronic circuit and outputted as a temperature-dependent voltage at the sensor's output. The interrelationship between temperature and voltage corresponds to the characteristic curve for the Pt100 and is thus nearly linear.

The assignment between temperature and output voltage is nearly freely selectable, the lesser temperature corresponding to the lesser output voltage. The sensor's lowest possible output voltage is 0.5 V and its greatest is 10 V. The output is overload-proof and short-circuit-proof.

The sensor has no mechanical moving parts and so is not susceptible to vibration and soiling.

Technical data

| | |
|------------------------|---|
| Nominal voltage: | 18 bis 32 VDC |
| Current consumption: | < 10 mA |
| Operating temperature: | -40 °C to +125 °C |
| Medium temperature: | -50 °C to +150 °C |
| Sensor element: | Pt1000 Klasse B |
| Measuring range: | freely selectable between -50 °C and +150 °C |
| Output voltage range: | freely selectable between 0,5V and 10V |
| Standard tolerance: | ±0,5 K at 0 °C, ± 2 K at +150 °C |
| Measuring media: | lubricating oil, hydraulic oil, fuel, cooling water |
| Connector: | see order number overview |
| IP-protection: | depending on the connector type |
| Housing material: | brass (standard), stainless steel on request |
| EMC: | according to to e1 standard 72/245/EWG |

CONNECTORS AND DESIGNS



■ Connector bayonet according to ISO 15170
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 24



■ Connector DEUTSCH DT04-3P
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 24



■ Cable with flying leads
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 25



■ Cable with flying leads
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 25



■ Cable with bayonet according to ISO 15170 overmoulded
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 25



■ Cable with DEUTSCH DT04-4P
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 25



■ Cable with connection M12x1
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 25

ORDER NUMBER OVERVIEW

Electronic temperature sensors

Connector bayonet according to ISO 15170

| Thread/HEX | Measuring temperature | Output signal | Order number |
|-----------------|-----------------------|---------------|--------------|
| M 14 x 1,5 / 27 | -40°C...60°C | 0,5...5V | 420 508 |
| M 14 x 1,5 / 27 | -30°C...130°C | 2...9V | 420 135 |
| M 14 x 1,5 / 27 | -30°C...130°C | 0,5...9,5V | 420 372 |
| M 14 x 1,5 / 27 | -30°C...130°C | 0,5...9,5V | 420 503 |
| M 14 x 1,5 / 27 | -30°C...130°C | 0,5...9,5V | 420 515 |
| M 14 x 1,5 / 27 | -20°C...130°C | 0,01...10V | 420 371 |
| M 14 x 1,5 / 27 | -20°C...100°C | 0,5...10V | 420 398 |
| M 14 x 1,5 / 27 | -20°C...85°C | 1...9V | 420 377 |
| M 14 x 1,5 / 27 | -20°C...85°C | 1...9V | 420 500 |
| M 14 x 1,5 / 27 | -20°C...50°C | 2...9V | 420 134 |
| M 14 x 1,5 / 27 | 0°C...150°C | 0...10V | 420 501 |
| M 14 x 1,5 / 27 | 0°C...120°C | 0,1...5V | 420 504 |
| M 14 x 1,5 / 27 | 0°C...120°C | 0,1...5V | 420 502 |
| M 22 x 1,5 / 27 | -30°C...150°C | 0,5...9,5V | 420 514 |
| M 22 x 1,5 / 27 | -20°C...130°C | 0,01V...10V | 420 370 |
| G 3/8" / 27 | -30°C...130°C | 0,5...4,5V | 420 505 |
| G 3/8" / 27 | -30°C...130°C | 0,5...8,5V | 420 393 |



Connector DT04-3P

| Thread/HEX | Measuring temperature | Output signal | Order number |
|-----------------|-----------------------|---------------|--------------|
| M 14 x 1,5 / 27 | -30°C...100°C | 0,5...5V | 420 511 |



Electronic temperature sensors

Cable connection

| Thread/HEX | Measuring temperature | Output signal | Cable length | Cable connection type | Order number |
|-----------------|-----------------------|---------------|--------------|-----------------------|--|
| M 14 x 1,5 / 27 | -30°C...130°C | 0,1...10V | 1000mm | 1* | 420 373 1. |
| G 1/2" / 27 | -30°C...130°C | 0,5...8V | 800mm | 2* | 420 397 2. |

1* Cable with flying leads

2* Cable with bayonet according to ISO 15170 overmoulded



ACCESSORIES

Connector bayonet according to ISO 15170

| Order-Nr. | Description |
|-----------|---|
| 420 700 | 4-pin bayonet ISO 15170 straight connector for corrugated tubing NW10 |
| 420 701 | 4-pin bayonet ISO 15170 90° angle for corrugated tubing NW10 |
| 420 703 | 4-pin bayonet ISO 15170 straight connector for cable |
| 420 702 | 4-pin bayonet ISO 15170 90° angle for cable |

Cable with connector bayonet according to ISO 15170

| Order-Nr. | Description | Length | Connection |
|-----------|--|----------|------------|
| 420 705 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 300 mm | 2* |
| 420 792 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 300 mm | 4* |
| 420 707 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 1000 mm | 1* |
| 420 709 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 2000 mm | 1* |
| 420 717 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 3000 mm | 1* |
| 420 714 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 5000 mm | 1* |
| 619 091 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 5000 mm | 4* |
| 420 719 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 6000 mm | 1* |
| 420 755 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 7000 mm | 1* |
| 421 730 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 10000 mm | 1* |
| 420 694 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 150 mm | 1* |
| 420 704 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 300 mm | 2* |
| 420 706 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 1000 mm | 1* |
| 420 764 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 2000 mm | 1* |
| 420 708 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 3000 mm | 1* |
| 420 756 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 4000 mm | 1* |
| 420 718 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 5000 mm | 1* |
| 420 716 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 6000 mm | 1* |
| 420 715 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 10000 mm | 1* |
| 420 795 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 12000 mm | 1* |
| 423 158 | Ready-made cable Type FLR33X33X 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 15000 mm | 1* |

1* Cable with flying leads

2* Cable with 3 pole blade terminals 6.3 in housing

3* Cable end with 3-pin DEUTSCH connector

4* Cable with 3-pin M 12 x 1 connector

Connector DT06-3S

| Order-Nr. | Description |
|-----------|-------------------|
| 420 733 | Connector DT06-3S |

SCREW-IN RESISTORS

Screw-in resistors

Technical description

In many sectors, temperature measurement is one of the most important physically defined parameter to determine product quality, safety and reliability. Temperature sensors are produced with different technologies to fit specific application requirements.

Despite this, precise temperature measurement is one of the most difficult tasks in motor technology. To meet the constantly increasing requirements for improved motor performance, higher efficiency and reduced emissions, it is necessary to use reliable and precise sensors in modern motor control systems. Temperature has a decisive influence on process efficiency, energy consumption and other parameters. Also the service life of machines, equipment and motors is affected by temperature conditions. In many industry sectors, the most important factor is to use the information from reliable temperature measurements for control and regulation functions.

The increased requirements over the last few years regarding measurement accuracy and reliability of temperature measurements has meant that many equipment operators must reconsider the suitability and capability of their temperature measurement equipment.

Screw-in resistors can be used between -50°C and $+200^{\circ}\text{C}$. BEDIA shockproofed screw-in resistors permit temperature measurement in commercial vehicles, compressors, engine and transmission construction, oil level measurement, biogas plants, wind turbines, plant engineering, ship building and motor test benches.

An optimal thermal coupling of the temperature sensor to the housing ensures a rapid response behavior and high measurement accuracy despite its small installation length.

The insert is normally fitted with a Pt100 temperature sensor according to EN 60751, Class B. Versions with Pt500, Pt1000, Ni100, Ni1000 as well as KTY silicon sensors or NTC thermistors can also be supplied.

Measurement resistors can be fitted with 2-, 3- or 4-wire technology (standard is 2-wire technology).

The connection thread can be made to customer specifications (the standard is M 14 x 1,5).

The change of resistance in operation can occur by temperature change in the environment (external heating) or by self-heating due to excessive measuring current. Therefore, it is very important to comply with specified maximum performance.

SCREW-IN RESISTORS

Platinum Temperature Sensors

The temperature sensor consists of a high-purity platinum meander structured on a ceramic substrate. The resistivity is laser-trimmed and precisely adjusted to the final value. The resistive structure is covered with a glass passivation layer protecting the sensor against mechanical and chemical damages.

Positive features:

- **FAST REPOSE TIME**
- **EXCELLENT LONG-TERM STABILITY**
- **LOW SELF-HEATING**
- **VIBRATION AND TEMPERATURE SHOCK RESISTANT**

Nickel Temperature Sensors

The temperature sensor consists of a high-purity nickel meander structured on a ceramic substrate. The resistivity is laser-trimmed and precisely adjusted to the final value. The resistive structure is covered with a passivation layer protecting the sensor against mechanical and chemical damages.

Positive features:

- **FAST REPOSE TIME**
- **EXCELLENT LONG-TERM STABILITY**
- **LOW SELF-HEATING**
- **SIMPLE LINEARIZATION**
- **VIBRATION AND TEMPERATURE SHOCK RESISTANT**

The change in ohmic value after 1000 hrs at maximum operating temperature amounts to less than 0.1%.

SCREW-IN RESISTORS

KTY Silicon Sensors

Silicon sensors of the KTY series are devices with a semiconductor layer. They possess, similar to PTC thermistors, a positive temperature coefficient but in contrast they show an approximate linear characteristic.

KTY sensors are lower-priced alternative to Pt sensors, where a non-linear characteristic is acceptable.

The tolerance range at reference temperature is between 1% and 5% accuracy depending on construction, much larger than a Pt resistance thermometer.

The resistance characteristics show a positive behavior, which means that the resistance value increases with increasing temperature (but not linearly).

NTC Thermistors

The NTC thermistor is a temperature dependent semiconductor resistor, whose resistance value decreases with increasing temperature. The Negative Temperature Coefficient (NTC) is about -2 to -6% per Kelvin and thus about ten times larger than for metals. NTC thermistors are therefore well suited for temperature measurements.

The change of resistance in operation can occur by temperature change in the environment (external heating) or by self-heating due to excessive measuring current. Therefore, it is very important to comply with the specified maximum performance of the thermistor.

Thermistors (NTC) are mainly used to monitor resistance over a wide temperature range. The characteristic of a thermistor is showing a non-linear behavior compared to platinum sensors due to the temperature dependency of the resistance.

CONNECTORS AND DESIGNS



■ Connector bayonet ISO 15170
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 32



■ Connector bayonet ISO 15170
Protection class IP 69K according to DIN 40050
with thermally isolated thermal conductivity probe

» Order number overview page 32



■ Connector bayonet ISO 15170
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 32



■ Connector bayonet 10 SL according to VG 95234
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 34



■ Connector DEUTSCH DT04-2P
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 33



■ Connector DEUTSCH DT04-2P
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 33



■ Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 33



■ Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 33



■ Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
with thermally isolated thermal conductivity probe

» Order number overview page 33



■ Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
with thermally isolated thermal conductivity probe

» Order number overview page 33



■ Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 33

CONNECTORS AND DESIGNS



■ Connector Packard
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 32



■ Connector blade terminal 6,3 x 0,8
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 32



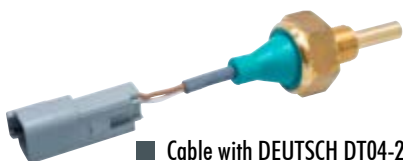
■ Connector pin contact Ø 4
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 33



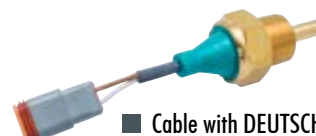
■ Cable with flying leads
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 34



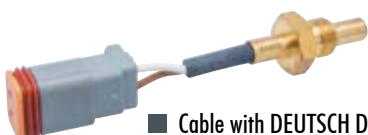
■ Cable with DEUTSCH DT04-2P
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 34



■ Cable with DEUTSCH DT06-2S
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 34



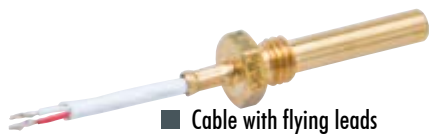
■ Cable with DEUTSCH DT06-2S
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 34



■ Cable with connector M 8x1
Protection class IP 69K according to DIN 40050
with thermal conductivity probe

» Order number overview page 34



■ Cable with flying leads
Protection class IP 67 according to DIN 40050
with thermal conductivity probe

» Order number overview page 34



■ Connector minitimer 2,8 x 0,8
Protection class IP 67 according to DIN 40050
for air temperature

» Order number overview page 33



■ Connector M12x1
Protection class IP 67 according to DIN 40050
for air temperature

» Order number overview page 34

CHARACTERISTICS FOR SENSOR ELEMENTS

Sensor elements – Basic values for platinum and nickel

| Temperature / °C | Pt100 Ω DIN IEC 751 | Pt500 Ω DIN IEC 751 | Pt1000 Ω DIN IEC 751 | Ni100 Ω DIN IEC 43760 | Ni1000 Ω DIN IEC 43760 |
|------------------|--------------------------|------------------------|-------------------------|--------------------------|---------------------------|
| | Resistance at °C TK / C° | | | | |
| -70 | 72,33 | | | | |
| -60 | 76,33 | 381,64 | 763,28 | 69,5 | 695 |
| -50 | 80,31 | | | 74,3 | 743 |
| -40 | 84,27 | 421,36 | 842,71 | 79,1 | 791 |
| -30 | 88,22 | | | 84,2 | 842 |
| -20 | 92,16 | 460,8 | 921,6 | 89,3 | 893 |
| -10 | 96,09 | | | 94,6 | 946 |
| 0 | 100 | 500 | 1000 | 100 | 1000 |
| 10 | 103,9 | | 1039,02 | 105,6 | 1056 |
| 20 | 107,79 | 538,96 | 1077,93 | 111,2 | 1112 |
| 30 | 111,67 | | 1116,71 | 117,1 | 1171 |
| 40 | 115,54 | 577,7 | 1155,39 | 123 | 1230 |
| 50 | 119,4 | | 1193,95 | 129,1 | 1291 |
| 60 | 123,24 | 616,2 | 1232,39 | 135,3 | 1353 |
| 70 | 127,07 | | 1270,71 | 141,7 | 1417 |
| 80 | 130,89 | 654,46 | 1308,93 | 148,2 | 1482 |
| 90 | 134,7 | | 1347,02 | 154,9 | 1549 |
| 100 | 138,5 | 692,5 | 1385 | 161,8 | 1618 |
| 110 | 142,29 | | 1422,86 | 168,8 | 1688 |
| 120 | 146,06 | 730,4 | 1460,61 | 176 | 1760 |
| 130 | 149,82 | | 1498,24 | 183,3 | 1833 |
| 140 | 153,58 | 767,88 | 1535,76 | 190,9 | 1909 |
| 150 | 157,31 | | 1573,16 | 198,6 | 1986 |
| 160 | 161,04 | 805,22 | 1610,54 | 206,6 | 2066 |
| 170 | 164,76 | | 1647,62 | 214,8 | 2148 |
| 180 | 168,46 | 842,32 | 1684,67 | 223,2 | 2232 |
| 190 | 172,16 | | 1721,61 | 231,8 | 2318 |
| 200 | 175,84 | 9879,28 | 1758,43 | 240,7 | 2407 |

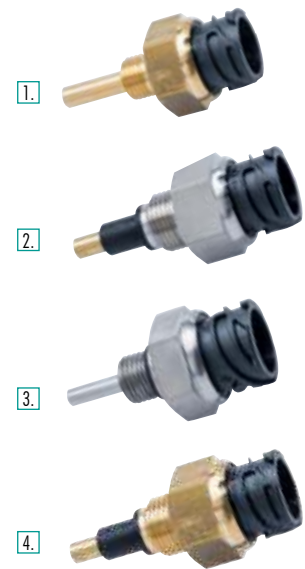
ORDER NUMBER OVERVIEW

Screw-in resistors

Connector bayonet according to ISO 15170

| Thread/HEX | thermal conductivity probe | sensing element | Temperature ranges | Mode of connection | Order number |
|-------------------|----------------------------|-----------------|--------------------|--------------------|--|
| M 14 x 1,5 / 27* | 18 mm | Pt100 | -50°C...200°C | 2-Wire | 422 326 3. |
| M 14 x 1,5 / 27* | 18 mm | Pt100 | -50°C...200°C | 2-Wire | 420 852 3. |
| M 14 x 1,5 / 27 | 23 mm | Pt100 | -50°C...200°C | 2-Wire | 420 105 1. |
| M 14 x 1,5 / 27 | 23 mm | Pt100 | -50°C...200°C | 4-Wire | 422 181 1. |
| G 1/2" / 27 | 21 mm | Pt100 | -50°C...200°C | 2-Wire | 420 108 1. |
| M 14 x 1,5 / 27* | 18 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 106 3. |
| M 14 x 1,5 / 27 | 23 mm | Pt1000 | -50°C...200°C | 2-Wire | 422 325 1. |
| M 12 x 1,5 / 27 | 21 mm | Ni1000 | -50°C...200°C | 2-Wire | 420 112 1. |
| M 14 x 1,5 / 27 | 23 mm | Ni1000 | -50°C...200°C | 2-Wire | 420 109 1. |
| M 10 x 1 / 27* | 12 mm | KTY | -50°C...150°C | 2-Wire | 420 857 3. |
| M 18 x 1,5 / 27** | 23 mm | KTY | -50°C...150°C | 2-Wire | 420 856 2. |
| M 14 x 1,5 / 27 | 23 mm | KTY | -50°C...150°C | 2-Wire | 420 116 1. |
| M 14 x 1,5 / 27** | 16 mm | NTC | -50°C...180°C | 2-Wire | 420 200 4. |
| M 14 x 1,5 / 27** | 26 mm | NTC | -50°C...180°C | 2-Wire | 420 201 4. |
| M 14 x 1,5 / 27** | 26 mm | NTC | -50°C...180°C | 2-Wire | 420 202 4. |

* housing stainless steel
**thermally decoupled



Connector Packard

| Thread/HEX | thermal conductivity probe | sensing element | Temperature ranges | Mode of connection | Order number |
|-------------|----------------------------|-----------------|--------------------|--------------------|--------------|
| 3/8"-18NPTF | 17 mm | KTY | -50°C...150°C | 2-Wire | 422 177 |

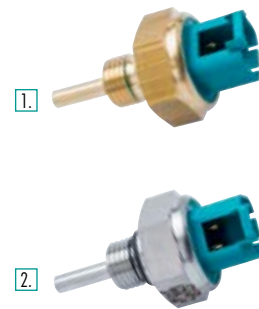


Screw-in resistors

Connector DT04-2P

| Thread/HEX | thermal conductivity probe | sensing element | Temperature ranges | Mode of connection | Order number |
|------------------|----------------------------|-----------------|--------------------|--------------------|-----------------------------|
| M 10 x 1 / 27* | 13 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 269 [2] |
| M 10 x 1 / 27 | 75 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 357 [1] |
| M 14 x 1,5 / 27 | 18 mm | Pt100 | -50°C...200°C | 2-Wire | 422 187 [1] |
| M 14 x 1,5 / 27* | 18 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 343 [2] |
| M 14 x 1,5 / 27 | 18 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 346 [1] |
| M 16 x 1,5 / 27 | 17 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 863 [1] |
| G 1/2" / 27 | 21 mm | Pt100 | -50°C...200°C | 2-Wire | 420 355 [1] |
| 1/2" NPTF / 27 | 18 mm | Pt100 | -50°C...200°C | 2-Wire | 420 366 [1] |
| 1/2" NPTF / 27 | 18 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 347 [1] |

* housing stainless steel



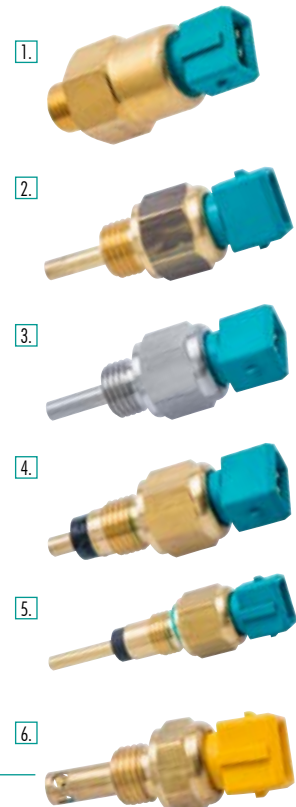
Connector minitimer 2,8 x 0,8

| Thread/HEX | thermal conductivity probe | sensing element | Temperature ranges | Mode of connection | Order number |
|--------------------|----------------------------|-----------------|--------------------|--------------------|-----------------------------|
| M 14 x 1,5 / 19 | 17 mm | Pt100 | -50°C...200°C | 2-Wire | 420 104 [2] |
| M 14 x 1,5 / 19* | 17 mm | Pt100 | -50°C...200°C | 2-Wire | 420 549 [3] |
| G 1/2" / 27 | 17 mm | Pt100 | -50°C...200°C | 2-Wire | 422 331 [2] |
| G 3/8" / 19 | 17 mm | Pt100 | -50°C...200°C | 2-Wire | 420 329 [2] |
| G 3/8" / 19* | 17 mm | Pt100 | -50°C...200°C | 2-Wire | 420 102 [3] |
| M 12 x 1 / 19 | 17 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 851 [2] |
| M 12 x 1,5 / 19 | 17 mm | Pt1000 | -50°C...200°C | 2-Wire | 422 179 [2] |
| M 14 x 1,5 / 19 | 17 mm | Pt1000 | -50°C...200°C | 2-Wire | 420 239 [2] |
| M 14 x 1,5 / 19 | 18 mm | Pt1000 | -50°C...200°C | 2-Wire | 422 341 [2] |
| G 1/4" / 19 | 17 mm | Pt1000 | -50°C...200°C | 2-Wire | 422 340 [2] |
| M 14 x 1,5 / 19** | 8 mm | Ni1000 | -50°C...200°C | 2-Wire | 420 286 [4] |
| M 14 x 1,5 / 19 | 17 mm | Ni1000 | -50°C...200°C | 2-Wire | 420 238 [2] |
| M 14 x 1,5 / 19* | 18 mm | Ni1000 | -50°C...200°C | 2-Wire | 420 110 [3] |
| M 14 x 1,5 / 19** | 26 mm | Ni1000 | -50°C...200°C | 2-Wire | 420 205 [5] |
| M 14 x 1,5 / 19** | 49,5 mm | Ni1000 | -50°C...200°C | 2-Wire | 420 204 [5] |
| M 10 x 1 / 19 | 17 mm | KTY | -50°C...150°C | 2-Wire | 420 858 [2] |
| M 14 x 1,5 / 19 | 17 mm | KTY | -50°C...150°C | 2-Wire | 420 861 [2] |
| M 14 x 1,5 / 19*** | 17,5 mm | KTY | -50°C...150°C | 2-Wire | 420 931 [6] |
| M 14 x 1,5 / 19 | 13 mm | NTC | -40°C...120°C | 2-Wire | 422 361 [3] |
| M 14 x 1,5 / 19 | 17 mm | NTC | -40°C...140°C | 2-Wire | 420 298 [2] |
| M 14 x 1,5 / 19** | 39,5 mm | NTC | -50°C...150°C | 2-Wire | 420 203 [5] |

* housing stainless steel

** thermally decoupled

*** air sensor



ORDER NUMBER OVERVIEW

Screw-in resistors

Connector M 12 x 1

| Thread/HEX | thermal conductivity probe | sensing element | Temperature ranges | Mode of connection | Order number |
|--------------------------|----------------------------|-----------------|--------------------|--------------------|--------------|
| M 12 x 1 / 13 *** / **** | 16 mm | NTC | -40°C...125°C | 3-Wire | 420 920 |

*** air sensor
**** plastic housing



Connector bayonet 10 SL VG 95234

| Thread/HEX | thermal conductivity probe | sensing element | Temperature ranges | Mode of connection | Order number |
|-------------------|----------------------------|-----------------|--------------------|--------------------|--------------|
| M 14 x 1,5 / 27 * | 34 mm | Pt100 | -50°C...200°C | 3-Wire | 420 498 |

* housing stainless steel

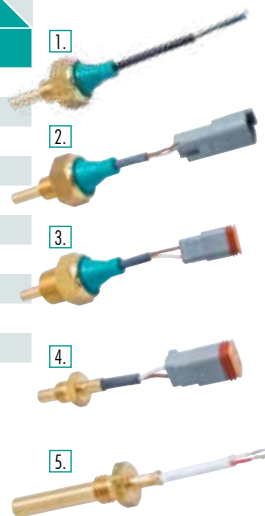


Cable connection

| Thread/HEX | thermal conductivity probe | sensing element | Temperature ranges | Mode of connection | Cable length | Cable connection type | Order number |
|-----------------|----------------------------|-----------------|--------------------|--------------------|--------------|-----------------------|--------------|
| M 14 x 1,5 / 27 | 10 mm | Pt100 | -50°C...200°C | 4-Wire | 5000 mm | 1* | 420 107 |
| M 14 x 1,5 / 19 | 17 mm | Pt100 | -50°C...200°C | 2-Wire | 4000 mm | 1* | 422 323 |
| M 14 x 1,5 / 27 | 23 mm | Pt100 | -50°C...200°C | 4-Wire | 275 mm | 1* | 420 237 |
| G 1/2" / 27 | 21 mm | Pt100 | -50°C...200°C | 2-Wire | 275 mm | 1* | 420 100 |
| G 1/2" / 27 | 21 mm | Pt100 | -50°C...200°C | 4-Wire | 275 mm | 1* | 420 236 |
| G 1/2" / 27 | 21 mm | Pt100 | -50°C...200°C | 2-Wire | 400 mm | 1* | 420 280 |
| M 10 x 1,5 / 14 | 31 mm | Pt1000 | -50°C...250°C | 2-Wire | 250 mm | 1* | 420 522 |
| M 10 x 1 / 14 | 10 mm | KTY | -50°C...200°C | 2-Wire | 300 mm | 3* | 420 862 |
| M 14 x 1,5 / 27 | 23 mm | KTY | -50°C...150°C | 2-Wire | 275 mm | 2* | 420 115 |
| 1/2" NPTF / 27 | 18 mm | KTY | -50°C...150°C | 2-Wire | 300 mm | 3* | 420 250 |

1* Cable with flying leads
2* Cable with Deutsch connector DT04-2P

3* Cable with Deutsch connector DT06-2S



ACCESSORIES

Connector minitimer 2,8 mm x 0,8 mm

| Order-Nr. | Description |
|-----------|-------------------------|
| 420 125 | Female connector 2-pole |

Connector bayonet 10SL plastic

| Order-Nr. | Description |
|-----------|---|
| 420 760 | Female bayonet connector 10 SL straight |
| 420 761 | Female bayonet connector 10 SL 90° |

Connector bayonet according to ISO 15170

| Order-Nr. | Description |
|-----------|---|
| 420 700 | 4-pin bayonet ISO 15170 straight connector for corrugated tubing NW10 |
| 420 701 | 4-pin bayonet ISO 15170 90° angle for corrugated tubing NW10 |
| 420 703 | 4-pin bayonet ISO 15170 straight connector for cable |
| 420 702 | 4-pin bayonet ISO 15170 90° angle for cable |

Cable with connector bayonet according to ISO 15170

| Order-Nr. | Description | Length | Connection |
|-----------|--|---------|------------|
| 420 750 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 300 mm | 1* |
| 420 722 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 1000 mm | 1* |
| 420 724 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 3000 mm | 1* |
| 420 752 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector | 5000 mm | 1* |
| 420 739 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 300 mm | 1* |
| 420 732 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 1000 mm | 1* |
| 420 731 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 3000 mm | 1* |
| 420 751 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 5000 mm | 1* |
| 420 765 | Ready-made cable Type FLR33X33X 2 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle | 6000 mm | 1* |

1* Cable with flying leads 2* Cable with 3 pole blade terminals 6.3 in housing 3* Cable end with 3-pin DEUTSCH connector 4* Cable with 3-pin M 12 x 1 connector

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BEDIA Motorentchnik GmbH & Co. KG

Im Erlet 1
D-90518 Altdorf bei Nürnberg

Phone +49 (0) 9187 9509 632
Fax +49 (0) 9187 9509 1632

bedia-sales@bedia.com
www.bedia.com