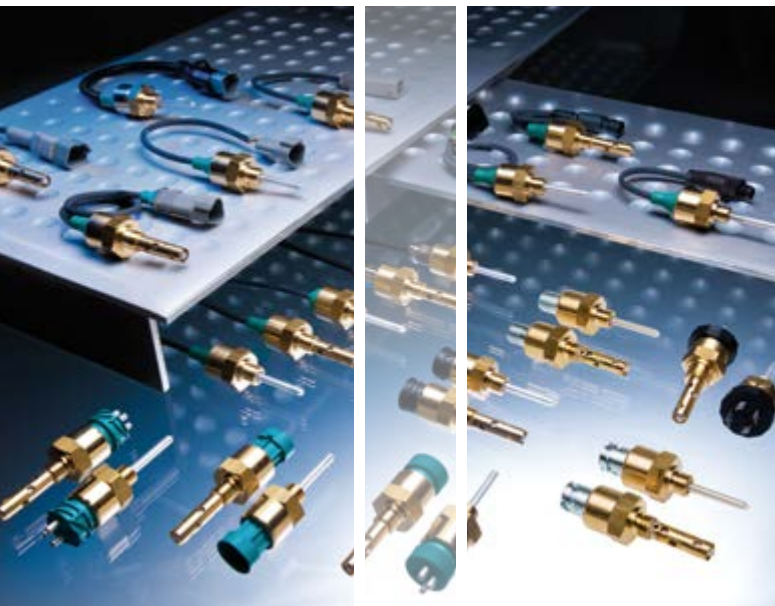


# BEDIA®

MOTORENTECHNIK



## LEVEL MONITORING SENSORS

With  $\text{E1}$  type approval

- TYPE CLS 40 12/24 V DC
- TYPE CLS 45 5/12 V DC

THOUGHT-OUT SOLUTIONS AT THE HIGHEST LEVEL



ISO 9001  
Certified  
Quality Management System  
[www.tuv-sud.com/ms-cert](http://www.tuv-sud.com/ms-cert)



ISO 14001  
Certified Environmental  
Management System  
[www.tuv-sud.com/ms-cert](http://www.tuv-sud.com/ms-cert)



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# BEDIA

## The company

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### 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

2020	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.

# GENERAL DESCRIPTION

## Areas of application and advantages

BEDIA level monitoring sensors are used to monitor the filling levels of liquids. The sensors react when a filling level is exceeded or falls below a limit.

Aqueous mediums like coolants, AdBlue®, fresh water, waste water, bilge water and oil-based liquids like engine oils, hydraulic oils, fuels and brake fluids can be monitored. Due to their rugged design, high IP protection classes and a working temperature range from -40°C to 125°C (-40°F to +257°F) the BEDIA monitoring sensors are primarily used in the following areas:

- ENGINES
- CONSTRUCTION EQUIPMENT
- UTILITY VEHICLES
- AGRICULTURAL MACHINERY
- HYDRAULIC POWER-TRAIN CONTROL SYSTEMS

**Wherever pressure switches or temperature sensors are today used as level monitoring elements, this sensor offers the advantage of indicating a critical condition far earlier:**

Temperature sensors frequently react too late, because the medium to be monitored is no longer present. The rise in temperature is not passed on to the pick-up sensor. Pressure switches do not indicate low oil until there is a total shortage of oil and thus too late to protect the engine. The level sensor issues a warning when there is still enough medium present.



■ Sensor for water-based liquids



■ Sensor for oil-based liquids

**BEDIA Level Monitoring Sensors differ from float-type switches in their compact design and their resistance to vibration:**

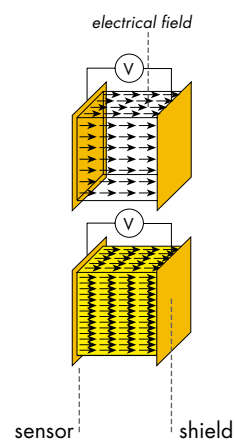
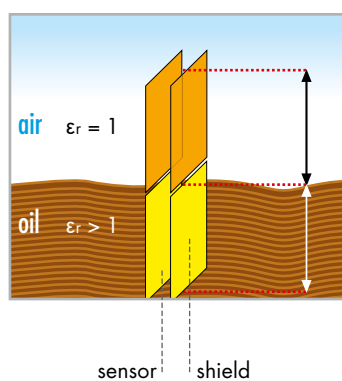
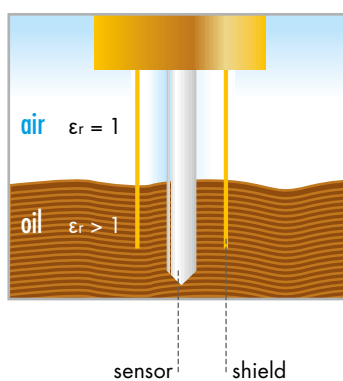
Since they contain no mechanical moving parts, their function will not be influenced by dirt particles or other influences. No electrical current is sent through the medium via an electrode with BEDIA sensors, an electrolysis of the medium is not possible.

# MEASURABLE MEDIUMS

## Operating principle

The function of the sensor is based on the capacitive principle. It detects the change in capacitance that arises when an electrode surrounded by air is immersed into a liquid medium. This change in capacitance at the electrode of the sensor excites an oscillator, causing it to oscillate (at a frequency of approx. 600 kHz). Then this signal is processed by a microprocessor-based evaluation circuit.

## Capacitance measurement


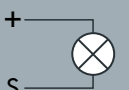
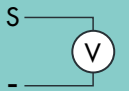
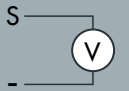


## Types of media

The level monitoring sensors are designed for two different media types:

- **For electrically conductive liquid media**  
with relative permittivity within a range of  $\epsilon_r$  35 ... 85  
(water, coolant, water/glycol mixture)
- **For electrically non-conductive liquid media**  
with relative permittivity within a range of  $\epsilon_r$  1.8 ... 6  
(engine oil, fuels, hydraulic oil)

# SWITCHING OUTPUTS

Output variants available			Low Voltage (LV) $U_B = 4,5 - 18 \text{ V}$ Type CLS-45	High Voltage (HV) $U_B = 9 - 36 \text{ V}$ Type CLS-40
positive switching (HSS)		The output transistor switches positive potential at the outlet	✓ 1 A short circuit and overload proof	✓ 1 A short circuit and overload proof
negative switching (LSS)		The output transistor switches negative potential at the outlet	✓ 0.5 A short circuit and overload proof	✓ 1 A short circuit and overload proof
analog output (AOV)		0.5 V* or 4.5 V* output voltage *other values on request	✓	✓
proportional analog output 30 % / 70 % (AOP)		30 %* or 70 %* respectively of the supply voltage as output voltage *other values on request	✓	—

## Automatic operational check time

The sensors have a two-second operational check built in as standard. When the supply voltage is applied (such as ignition being switched on), this signal appears for two seconds, thus signalling readiness to function. If this signal does not appear, the sensor should be checked. This self-monitoring makes it possible to check the level monitoring sensors from a central point for their readiness to function as well as for cable break. Especially in intricate, rambling systems, such as ships, checking conventional level switches is very difficult.

**Other function control times are also available upon request.**

## Fault indication delay time

To avoid indication errors when the swashing surface produces short fluctuations of the liquid level, the output signal is delayed with the standard fault indication delay time time of seven seconds.

**Other indication delay times are available upon request.**



# INSTALLATION INSTRUCTION

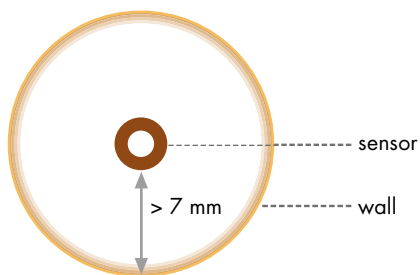
## Mounting position

**BEDIA Level Monitoring Sensors may be installed in any position.**

The level sensors must be installed in a damped zone so that the medium does not constantly moisten the level sensor by sloshing and splashing, which would cause error messages.

This point is usually applicable for installation in gearboxes or for direct installation in engine oil pans during operation. In such cases, the measurement is only possible at engine shutdown.

It is mandatory to mount the sensor with a minimum distance of 7 mm to the wall.



## Mounting position for water-sensors

If the sensor is installed from above in a non-conductive, e.g plastic container, erroneous messages might occur due to a missing reference potential.

In all other mounting positions, the housing will come in contact with the medium.

This ensures that a reference potential will be present.

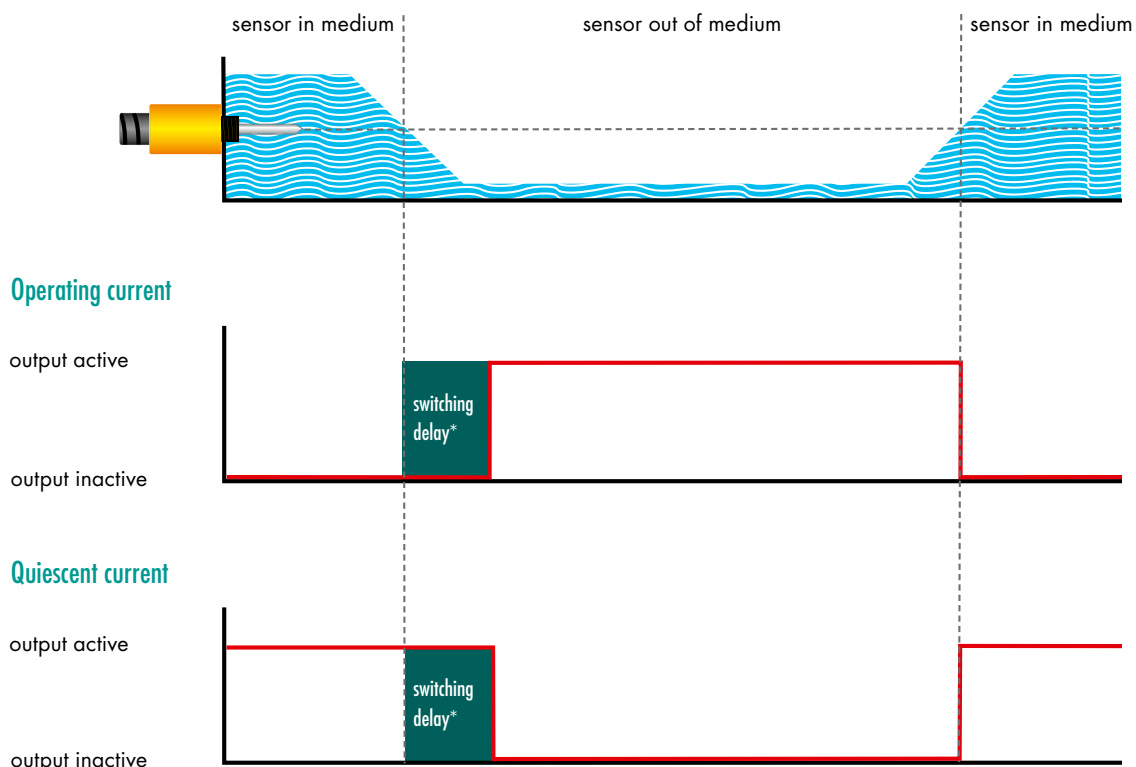
# FUNCTIONALITY OVERVIEW

## Level sensors minimum

### Minimum-Sensors

If a minimum sensor is removed from the medium, its output becomes active after the report delay. If it is a working current sensor, its output becomes low-impedance after the report delay and a signal is available at the output. If it is a quiescent current sensor, its output becomes high-impedance after the report delay and there is no longer a signal available at the output.

If a minimum sensor is immersed in the medium, its output immediately becomes passive. If it is a working current sensor, its output becomes high-impedance after immersion and a signal is no longer available at the output. If it is a quiescent current sensor, its output becomes low-impedance after immersion and there is a signal available at the output.



\* It is possible to select a switching delay of 0 sec for immediate switching.

# FUNCTIONALITY OVERVIEW

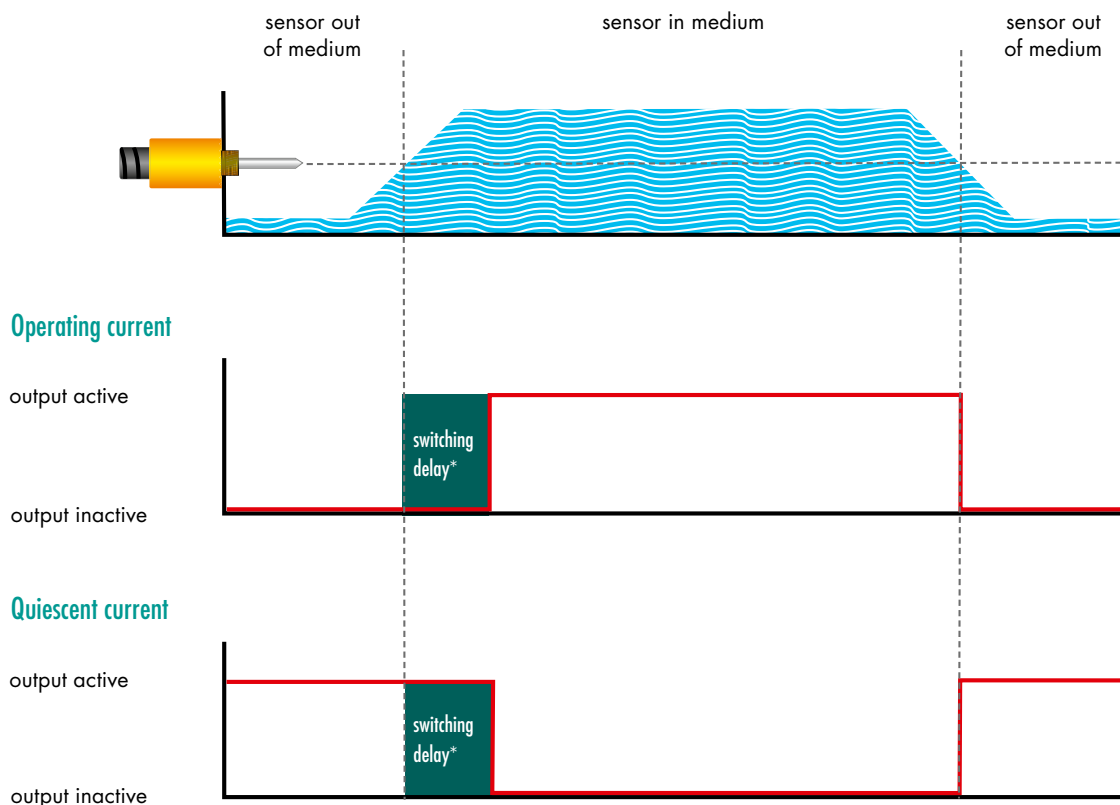
## Level sensors maximum

### Maximum-Sensors

If a maximum sensor is immersed in the medium, its output becomes active after the report delay. If it is a working current sensor, its output becomes low-impedance after the report delay and a signal is available at the output.

If it is a quiescent current sensor, its output becomes high-impedance after the report delay and there is no longer a signal available at the output.

If a maximum sensor is removed from the medium, its output immediately becomes passive. If it is a working current sensor, its output becomes high-impedance after the removal and there is no longer a signal available at the output. If it is a quiescent current sensor, its output becomes low-impedance after removal and a signal is available at the output.



\* It is possible to select a switching delay of 0 sec for immediate switching.

# OVERVIEW OF THE CONNECTIONS

## Level sensors Type CLS 40/45

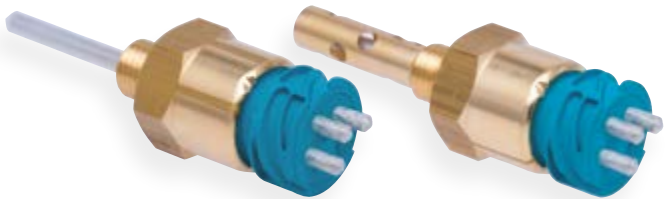


- Connector bayonet ISO 15170  
Protection class IP 69K DIN 40050

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

UL approval refer to order number overview

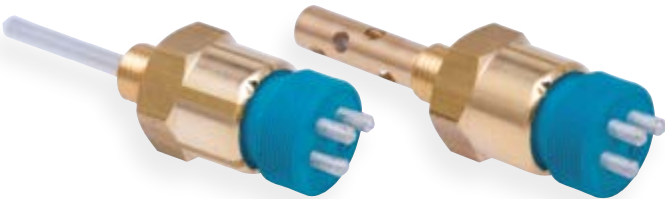
» [Order number overview starting at page 24](#)



- Connector bayonet 16 S  
Protection class IP 67 DIN 40050

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

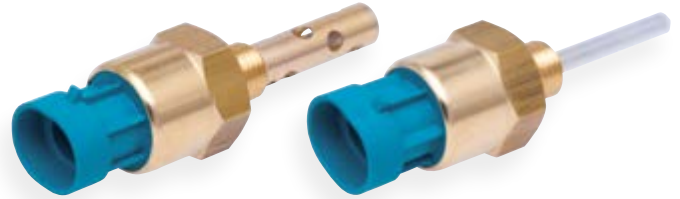
» [Order number overview starting at page 26](#)



- Connector fine thread M 27 x 1  
Protection class IP 67 DIN 40050

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

» [Order number overview starting at page 28](#)



■ **Connector Packard 4-pin Metri Pack**  
**Protection class IP 67 DIN 40050**

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

» [Order number overview starting at page 29](#)



■ **Connector DEUTSCH**  
**Protection class IP 67 DIN 40050**

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

» [Order number overview starting at page 30](#)



■ **Connector bayonet 10 SL VG 95234**  
**Protection class IP 67 DIN 40050**

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

ATEX approval refer to order number overview

» [Order number overview starting at page 31](#)

# OVERVIEW OF THE CONNECTIONS

## Level sensors Type CLS 40/45



- Connector fine thread 5/8-24 UNEF-2A VG 95342  
Protection class IP 67 DIN 40050

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

ATEX approval on request possible

» [Order number overview starting at page 32](#)



- Connector DIN EN 175 301-803-A  
Protection class IP 65 DIN 40050

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

» [Order number overview starting at page 33](#)



- With Cable  
Protection class IP 69K DIN 40050

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

ATEX approval refer to order number overview

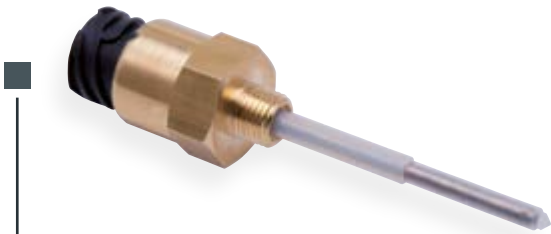
» [Order number overview starting at page 34](#)



- With EMC cable connection and shielded line  
Protection class IP 68 DIN 40050

E1-type approval in accordance with ECE regulation No. 10,  
CE marking in accordance with the EU directive 2004/108/EG

## Special versions



Level monitoring sensor with sensing pin 80 mm long



Level monitoring sensors for high-viscous oils

# ACCESSORIES

## For level monitoring sensors



4-pin bayonet ISO 15170  
straight connector for corrugated tubing NW10

» Order number overview on page 25



4-pin bayonet ISO 15170  
90° angle for corrugated tubing NW10

» Order number overview on page 25



4-pin bayonet ISO 15170  
straight connector for cable

» Order number overview on page 25



4-pin bayonet ISO 15170  
90° angle for cable

» Order number overview on page 25



Ready-made cable Type FL33X33X 3 x 0,75 mm<sup>2</sup>  
with 4-pin bayonet ISO 15170 straight connector

» Order number overview on page 25



Ready-made cable Type FL33X33X 3 x 0,75 mm<sup>2</sup>  
with 4-pin bayonet ISO 15170 90° angle

» Order number overview on page 25





3-pin bayonet 16 S  
straight connector for cable

» Order number overview on page 27



3-pin bayonet connector 16 S  
90° angle for corrugated tubing NW10

» Order number overview on page 27



3-pin bayonet 16 S straight connector  
for corrugated tubing NW10

» Order number overview on page 27



3-pin bayonet 16 S  
90° angle for cable

» Order number overview on page 27



Ready-made cable Type FL33X33X 3 x 0,75 mm<sup>2</sup>  
with 3-pin bayonet connector 16 S straight

» Order number overview on page 27

or with 3-pin connector M 27 x 1 straight

» Order number overview on page 32



Ready-made cable Type FL33X33X 3 x 0,75 mm<sup>2</sup>  
with 3-pin bayonet connector 16 S 90° angle

» Order number overview on page 27

or with 3-pin connector M 27 x 1 90° angle

» Order number overview on page 32

# ACCESSORIES

## For level monitoring sensors



3-pin connector M 27 x 1  
straight for corrugated tubing NW10

» Order number overview on page 28



3-pin connector M 27 x 1  
90° angle for corrugated tubing NW10

» Order number overview on page 28



3-pin connector M 27 x 1  
straight for cable

» Order number overview on page 28



3-pin connector M 27 x 1  
90° angle for cable

» Order number overview on page 28



4-pin Packard connector Metri Pack

» Order number overview on page 29



3-pin plug with centralized screw  
M 3 x 35 DIN EN 175 301-803-A

» Order number overview on page 33



Plug-in connector bayonet 10 SL straight with mounting flange VG 95234

- » Order number overview on page 31 or connector fine thread 5/8-24 UNEF-2A straight VG 95342
- » Order number overview on page 32



Plug-in connector bayonet 10 SL 90° angle with mounting flange VG 95234

- » Order number overview on page 31 or connector fine thread 5/8-24 UNEF-2A 90° angle VG 95342
- » Order number overview on page 32



Ready-made cable Type CL105 3 x 0,75 mm<sup>2</sup> with 3-pin bayonet connector 10 SL VG 95234 straight

- » Order number overview on page 31



Ready-made cable Type CL105 3 x 0,75 mm<sup>2</sup> with 3-pin bayonet connector 10 SL VG 95234 90° angle

- » Order number overview on page 31



Screw-in adapter

- » Order number overview from page 25-31



Braze-on adapter

- » Order number overview from page 25-31

# ACCESSORIES

## for level monitoring sensors in the oil sump



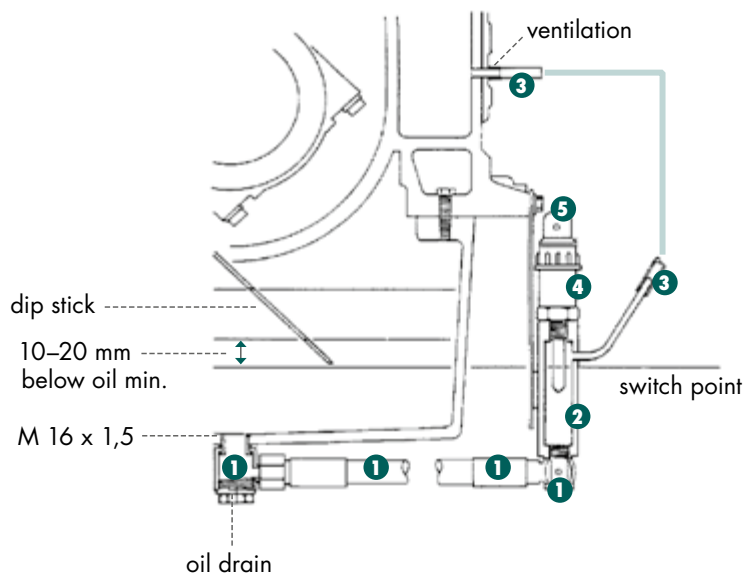
### Proposal for level monitoring in the oil sump

#### **Which are the benefits of a level monitoring system in the oil sump over conventional pressure and temperature sensors?**

Temperature sensors react very slowly. When engine oil is lost, e. g. by tubing breakage, the engine temperature is no longer conducted to the sensor.

The lower limit value of oil pressure switches or sensors is set low (low oil pressure, with the motor running at no load). At rated motor speed and with too little oil in the oil circuit an oil-air mixture may be formed and no alarm signal is given. The engine is no longer sufficiently cooled and lubricated.

**In the two events described above, the alarm signal is available either too late or even not at all so that the engine will be damaged. The level monitoring sensor gives the alarm before a serious oil deficiency occurs. The oil deficiency is indicated as soon as the oil level has fallen 10 to 20 mm below the minimum marking on the dipstick.**



#### Special accessories for level sensors type CLS 40 and type CLS 45

Order No.	Description	Length	Picture-Nr. (see illustration)
421 660	Tubing complete with 350 mm pipe coupling	350 mm	1
421 661	Tubing complete with 450 mm pipe coupling	450 mm	1
421 659	Tubing complete with 550 mm pipe coupling	550 mm	1
454 134	Sensor support		2
421 662	PA pipe, available in meters		3
320 431	Level monitoring sensor	OIL MIN 9–36 V	4
320 454	Level monitoring sensor	OIL MAX 9–36 V	4
420 703	Connector ISO 15170	straight	5
420 702	Connector ISO 15170	90° angle	5
420 707	Connector ISO 15170	straight with cable 1000 mm	5
420 706	Connector ISO 15170	90° angle with cable 1000 mm	5

#### Installation instructions

1. Drain the engine oil.
2. Fasten adjustable corner swivelling screw-fitting to the engine with hose line and sensor bracket.  
The sensor holder has to be adjustable by the slots to determine the minimum point.
3. Install the ventilation to the crankcase (such as inspection hole cover)
4. Install and connect the sensor.
5. Check for correct electrical function. The minimum sensor must indicate now.
6. Refill the oil up to the minimum marking on the dip stick.
7. Move the sensor and support slowly down until the signal is no longer available.  
The switch point of the sensor is now exactly at the minimum oil level of the motor.
8. Move the sensor down by another 10 to 20 mm and fix it. The signal „oil level too low“ will now be put out when the level is approx. 10 to 20 mm below the minimum marking on the dipstick.

# TECHNICAL DATA

## For level monitoring sensors CLS 40

Medium	water / oil
Function	minimum / maximum
Operating voltage	12 / 24 V (-25% / +50%) (9 - 36 V DC)
Current consumption	typ. < 8mA
Output	low-side switch / high-side switch / analog voltage ≤ 1 A over the whole temperature range. Short-circuit and over-load protected over the ambient temperature range. For inductive loads freewheeling diode e.g. 1N4007, has to be mounted at the load.
Mounting thread	see order number overview
Function control time	see order number overview
Fault indication delay time	see order number overview
Connection	see overview of the connections
Housing material	standard brass, CuZn38Pb2, EN12146; CW608N optional stainless steel X5Cr Ni 1810, EN10088-3, 1.4301 housing capacitive connected to ground
Sensor coating	Tefzel® ETFE
Sensor protection	IP 65 - 69K to DIN40050 (depending on connector type)
Switch point hysteresis	typ. < 3 mm
Medium temperature	-40°C to +125°C water / +150°C oil (-40°F to +257°F/302°F)
Ambient temperature	-40°C to +125°C (-40°F to +257°F)
Storage temperature	-50°C to +125°C (-58°F to +257°F)
Mounting position	any
Reverse polarity protection	built-in, between positive and negative terminal

### Caution!

With low-side switching sensors do not connect **minus potential** to the signal terminal and plus potential to the minus terminal. With high-side switching sensors do not connect **plus potential** to the signal terminal and minus potential to the plus terminal.

Approval	Ⓔ 10R – 03 5459
Customs tariff number	90261029

### Environmental simulations

Vibration	ISO 16750-3:2007 10 Hz - 2000 Hz 20 g
Free Fall	IEC 16750
Mechanical Shock	DIN EN 60068-2-27:1995; 100 g / 11 ms
Dry Cold	DIN EN 60068-2-1:2006; -40°C / 24 h (-40°F / 24 h)
Dry Heat	DIN EN 60068-2-1:2008; -125°C / 96 h (+257°F / 96 h)
Temperature cycling	DIN EN 60068-2-14:2000
Damp Heat	DIN EN 60068-7-78:2002
Damp Heat, steady state	DIN EN 60068-2-30:2006
Salt spray	DIN EN 60068-2-52:1996
Pressure resistance	2,5 Mpa (25 bar / 362,6 psi) (25°C / 77°F / 1 h)

### EMC

Radiated emission	2004/104/EG 30 MHz - 1 GHz; 1 m
Conducted transient emission	ISO 7637-2:2004
Immunity to RF electromagnetic fields	ISO 11452-1/-2/-5 20 MHz - 2000 MHz; 150 V / m (rms)
Transient immunity test on power lines	ISO 7637-2/2004 pulses 1, 2a, 2b, 3a, 3b, 4

# TECHNICAL DATA

## For level monitoring sensors CLS 45

Medium	water / oil
Function	minimum / maximum
Operating voltage	5 / 12 V (-10% / +50%) (4,5 - 18 VDC)
Current consumption	typ. < 8mA
Output	low-side switch / high-side switch / analog voltage ≤ 0,5 A over the whole temperature range. (1 A at high-side switch) Short-circuit and overload protected over the ambient temperature range. For inductive loads freewheeling diode e.g. 1N4007, has to be mounted at the load.
Mounting thread	see order number overview
Function control time	see order number overview
Fault indication delay time	see order number overview
Connection	see connector type
Housing material	standard brass, CuZn38Pb2, EN12146; CW608N optional stainless steel X5Cr Ni 1810, EN10088-3, 1.4301 housing capacitive connected to ground
Sensor coating	Tefzel® ETFE
Sensor protection	IP 65 - 69K to DIN40050 (depending on connector type)
Switch point hysteresis	typ. < 3mm
Medium temperature	-40°C to +125°C water / +150°C oil (-40°F to +257°F/302°F)
Ambient temperature	-40°C to +125°C (-40°F to +257°F)
Storage temperature	-50°C to +125°C (-58°F to +257°F)
Mounting position	any
Reverse polarity protection	built-in, between positive and negative terminal

### Caution!

With low-side switching sensors do not connect **minus potential** to the signal terminal and plus potential to the minus terminal.

Approval	Ⓔ 10R - 03 5459
Customs tariff number	90261029

### Environmental simulations

Vibration	ISO 16750-3:2007 10 Hz - 2000 Hz 20g
Free Fall	IEC 16750
Machanical Shock	DIN EN 60068-2-27:1995; 100 g / 11ms
Dry Cold	DIN EN 60068-2-1:2006; -40°C / 24 h (-40°F / 24 h)
Dry Heat	DIN EN 60068-2-1:2008; -125°C / 96 h (+257°F / 96 h)
Temperature cycling	DIN EN 60068-2-14:2000
Damp Heat	DIN EN 60068-2-78:2002
Damp Heat, steady state	DIN EN 60068-2-30:2006
Salt spray	DIN EN 60068-2-52:1996
Pressure resistance	2,5 Mpa (25 bar / 362,6 psi) (25°C / 77°F / 1 h)

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Radiated emission	2004/104/EG 30 MHz - 1 GHz; 1 m
Conducted transient emission	ISO 7637-2:2004
Immunity to RF electromagnetic fields	ISO 11452-1/-2/-5 20 MHz - 2000 MHz; 150 V / m (rms)
Transient immunity test on power lines	ISO 7637-2/2004 pulses 1, 2a, 3a, 3b, 4

# ORDER NUMBER OVERVIEW

## Connector bayonet ISO 15170

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 14 x 1,5	9-36 V DC	MIN	2	7	320 400	-	320 431	-	320 401	-	320 432	350 371
M 14 x 1,5	9-36 V DC	MIN	2	0	-	-	320 476	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	2	2	-	-	-	-	-	-	-	350 278
M 14 x 1,5	9-36 V DC	MIN	0	7	320 459	320 402	320 446	320 433	350 448	320 403	-	320 428
M 14 x 1,5	4,5-18 V DC	MIN	0	7	-	350 199	-	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	0	0	320 487	320 467	350 434	320 571	320 477	-	350 245	-
M 14 x 1,5	9-36 V DC	MAX	0	0	-	-	320 454	320 495	320 413	350 493	320 414	-
M 14 x 1,5	9-36 V DC	MAX	0	2	-	-	-	-	-	-	350 217	-
M 14 x 1,5	9-36 V DC	MAX	0	7	-	-	-	350 261	322 535	320 425	-	-
M 14 x 1,5	9-36 V DC	MIN	0	2	320 419	350 132	320 447	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	1	17	320 451	-	-	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	2	60	-	-	320 449	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	2	3600	-	-	320 444	-	-	-	-	-
M 18 x 1,5	9-36 V DC	MIN	2	7	320 404	-	320 435	-	320 405	-	320 436	-
M 18 x 1,5	9-36 V DC	MIN	0	7	320 417	320 406	-	320 437	-	320 407	-	320 438
M 18 x 1,5	4,5-18 V DC	MIN	0	7	-	350 306	-	-	-	-	-	-
M 18 x 1,5	4,5-18 V DC	MAX	0	0	350 117	-	350 118	-	-	-	-	-
M 18 x 1,5	9-36 V DC	MAX	0	0	320 422	-	320 430	350 316	350 115	-	350 116	-
M 18 x 1,5	9-36 V DC	MAX	0	7	350 142	-	322 538	-	-	-	-	-
M 18 x 1,5	9-36 V DC	MAX	2	7	350 435	-	320 464	320 465	-	-	-	-
1/4" NPTF	9-36 V DC	MIN	2	7	320 408	-	320 439	-	320 409	-	320 440	-
1/4" NPTF	9-36 V DC	MIN	0	7	320 418	320 410	-	320 441	-	320 411	320 443	320 442
1/4" NPTF	9-36 V DC	MIN	1	17	320 415	-	-	-	320 486	-	-	-
1/4" NPTF	9-36 V DC	MIN	0	0	-	-	320 463	-	-	-	-	-
1/4" NPTF	9-36 V DC	MAX	0	0	320 429	-	-	-	-	-	-	-
1/4" NPTF	9-36 V DC	MAX	2	7	-	-	320 456	-	-	-	-	-
1/4" NPTF	9-36 V DC	MAX	2	0	-	-	320 470	-	-	-	-	-
1/2" NPTF	9-36 V DC	MIN	2	2	-	-	-	-	350 134	-	350 133	-
1/2" NPTF	9-36 V DC	MIN	2	2	-	-	-	-	-	-	350 280 **	-
1/2" NPTF	9-36 V DC	MIN	0	7	-	-	-	350 460	-	-	-	-
1/2" NPTF	9-36 V DC	MAX	2	2	-	-	-	-	350 135	-	350 198	-
1/2" NPTF	9-36 V DC	MAX	2	2	-	-	-	-	-	-	350 281 **	-
1/2" NPT	9-36 V DC	MIN	2	7	322 541	-	-	-	-	-	-	-
G 1/4"	9-36 V DC	MAX	0	7	-	-	-	-	-	320 473	-	-
G 1/4"	9-36 V DC	MAX	0	0	-	-	-	-	320 482	350 363	-	-
G 3/8"	9-36 V DC	MIN	0	0	320 466	-	-	320 481	-	-	-	-
G 3/8"	9-36 V DC	MIN	0	7	-	-	350 433	-	-	-	-	-
G 3/8"	9-36 V DC	MIN	2	7	322 640	-	-	-	-	-	-	-
G 3/8"	9-36 V DC	MAX	0	7	320 420	-	-	-	-	-	-	-
G 3/8"	9-36 V DC	MAX	0	0	320 416	-	-	-	-	-	320 448	-
3/8" NPTF	9-36 V DC	MIN	0	0	-	-	-	320 458	-	-	-	-
3/8" NPTF	9-36 V DC	MIN	0	7	-	320 613	-	-	-	-	-	-
3/8" NPTF	9-36 V DC	MIN	2	7	-	-	320 478	-	-	-	-	-
R 1/2"	9-36 V DC	MIN	0	7	-	320 426	-	-	-	-	-	-
R 1/2"	9-36 V DC	MAX	2	7	-	-	-	-	-	-	350 248	-

\*\* with UL approval



## ACCESSORIES

Connector				
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			
420703	4-pin bayonet ISO 15170 straight connector for cable			
420702	4-pin bayonet ISO 15170 90° angle for cable			
Cable with connector				
Order-Nr.	Description	Length	Connection	
420 694	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	150 mm	1*	
420 705	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	300 mm	2*	
420 792	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	300 mm	4*	
420 707	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	1000 mm	1*	
420 709	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	2000 mm	1*	
420 717	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	3000 mm	1*	
420 714	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	5000 mm	1*	
619 091	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	5000 mm	4*	
420 719	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	6000 mm	1*	
420 755	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	7000 mm	1*	
421 730	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 straight connector	10000 mm	1*	
420 694	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	150 mm	1*	
420 704	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	300 mm	2*	
420 706	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	1000 mm	1*	
420 764	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	2000 mm	1*	
420 708	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	3000 mm	1*	
420 756	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	4000 mm	1*	
420 718	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	5000 mm	1*	
420 716	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	6000 mm	1*	
420 715	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	10000 mm	1*	
420 795	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 4-pin bayonet ISO 15170 90° angle	12000 mm	1*	
423 158	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> 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

Screw-in adapter			
Order-Nr.	Thread outside	Thread inside	
421 696	M 16 x 1,5	M 14 x 1,5	
421 640	M 22 x 1,5	M 14 x 1,5	
421 884	M 22 x 1,5	1/4" NPTF	
421 695	G 1/2"	M 14 x 1,5	
421 694	R 1/2"	M 14 x 1,5	
421 967	R 1"	M 14 x 1,5	
421 639	R 1"	M 18 x 1,5	

Brazed-on adapter		
Order-Nr.	Thread inside	
421 644	M 14 x 1,5	
421 648	M 18 x 1,5	
421 641	1/4" NPTF	

# ORDER NUMBER OVERVIEW

## Connector bayonet 16 S

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 12 x 1	9-36 V DC	MIN	2	7	321 404	321 400	321 593	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	2	7	321 575	321 411	321 595	-	325 002	-	325 003	-
M 14 x 1,5	9-36 V DC	MIN	0	7	321 564	321 579	321 590	321 599	-	350 207	325 034	325 005
M 14 x 1,5	9-36 V DC	MIN	0	0	322 528	-	322 529	-	350 404	-	-	-
M 14 x 1,5	9-36 V DC	MIN	2	0	-	-	321 562	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	2	2	322 502	-	322 508	-	-	-	322 510	-
M 14 x 1,5	9-36 V DC	MIN	2	15	321 637	-	-	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MAX	0	0	-	-	322 511	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MAX	2	2	-	-	322 509	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MAX	0	2	-	-	-	-	325 004	-	-	-
M 18 x 1,5	9-36 V DC	MIN	2	7	321 570	-	321 572	-	325 006	-	325 007	-
M 18 x 1,5	9-36 V DC	MIN	0	7	-	321 571	322 031	321 573	-	325 008	-	325 009
M 18 x 1,5	9-36 V DC	MAX	0	7	-	-	-	-	-	-	-	325 033
1/4" NPTF	9-36 V DC	MIN	2	7	321 577	-	321 597	-	325 010	-	325 011	-
1/4" NPTF	9-36 V DC	MIN	0	7	321 581	320 993	-	324 999	325 000	325 013	-	325 012
1/4" NPTF	9-36 V DC	MIN	2	15	321 401	-	-	-	-	-	-	-
1/4" NPTF	9-36 V DC	MIN	0	20	321 636	-	-	-	-	-	-	-
1/4" NPTF	9-36 V DC	MAX	2	7	350 430	-	-	-	-	-	-	-
3/8" NPTF	9-36 V DC	MIN	2	7	320 992	-	320 994	-	325 014	-	325 015	-
3/8" NPTF	9-36 V DC	MIN	0	7	-	-	-	-	-	-	325 001	325 029

## ACCESSORIES

Connector				
Order-Nr.	Description			
421 672	3-pin bayonet 16 S straight connector for corrugated tubing NW10			
421 673	3-pin bayonet connector 16 S 90° angle for corrugated tubing NW10			
421 772	3-pin bayonet 16 S straight connector for cable			
421 773	3-pin bayonet 16 S 90° angle for cable			
Cable with connector				
Order-Nr.	Description	Length	Connection	
421 670	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	300 mm	2*	
421 871	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	500 mm	13*	
421 891	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	800 mm	2*	
421 018	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	1015 mm	2*	
421 586	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	1300 mm	2*	
421 668	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	3000 mm	2*	
421 775	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	5000 mm	2*	
421 774	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S straight	15000 mm	2*	
421 671	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S 90° angle	300 mm	2*	
421 017	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S 90° angle for corrugated tubing NW10	300 mm	12*	
421 709	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S 90° angle	770 mm	13*	
421 585	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S 90° angle	1300 mm	2*	
421 669	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S 90° angle	5000 mm	1*	
420 809	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S 90° angle	10000 mm	1*	
421 587	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 16 S 90° angle	10000 mm	12*	

1\* Cable with flying leads    2\* Cable with 3 pole blade terminals 6.3 in housing    12\* Cable end without housing with flat quick-connect terminations 6.3 x 0.8  
 13\* Cable end with DEUTSCH connector DT04-3P

Screw-in adapter			
Order-Nr.	Thread outside	Thread inside	
421 696	M 16 x 1,5	M 14 x 1,5	
421 640	M 22 x 1,5	M 14 x 1,5	
421 884	M 22 x 1,5	1/4" NPTF	
421 695	G 1/2"	M 14 x 1,5	
421 694	R 1/2"	M 14 x 1,5	
421 967	R 1"	M 14 x 1,5	
421 639	R 1"	M 18 x 1,5	

Brazed-on adapter		
Order-Nr.	Thread inside	
421 644	M 14 x 1,5	
421 648	M 18 x 1,5	
421 641	1/4" NPTF	

# ORDER NUMBER OVERVIEW

## Connector fine thread M 27 x 1

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 14 x 1,5	9-36 V DC	MIN	2	7	321 603	-	321 623	321 533	-	-	-	-
M 14 x 1,5	9-36 V DC	MAX	2	0	320 484	-	-	-	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	0	7	-	321 611	321 634	321 631	-	-	-	-
M 14 x 1,5	9-36 V DC	MIN	2	20	321 617	-	-	-	-	-	-	-
M 18 x 1,5	9-36 V DC	MIN	2	7	321 200	-	-	-	-	-	-	-
1/4" NPTF	9-36 V DC	MIN	2	7	321 607	-	321 627	-	-	-	-	-
1/4" NPTF	9-36 V DC	MIN	0	7	-	325 316	-	325 336	-	-	-	-
1/2" NPTF	9-36 V DC	MIN	0	7	-	350 209	-	-	-	-	-	-

## ACCESSORIES

### Connector

Order-Nr.	Description
421 642	3-pin connector M 27 x 1 straight for corrugated tubing NW10
421 643	3-pin connector M 27 x 1 90° angle for corrugated tubing NW10
421 742	3-pin connector M 27 x 1 straight for cable
421 743	3-pin connector M 27 x 1 90° angle for cable

### Cable with connector

Order-Nr.	Description	Length	Connection
421 988	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin connector M 27 x 1 straight	300 mm	2*
421 038	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin connector M 27 x 1 90° angle	300 mm	2*
421 588	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin connector M 27 x 1 straight	10000 mm	1*

1\* Cable with flying leads

2\* Cable end with blade terminals 6.3

### Screw-in adapter

Order-Nr.	Thread outside	Thread inside
421 696	M 16 x 1,5	M 14 x 1,5
421 640	M 22 x 1,5	M 14 x 1,5
421 884	M 22 x 1,5	1/4" NPTF
421 695	G 1/2"	M 14 x 1,5
421 694	R 1/2"	M 14 x 1,5
421 967	R 1"	M 14 x 1,5
421 639	R 1"	M 18 x 1,5

### Braze-on adapter

Order-Nr.	Thread inside
421 644	M 14 x 1,5
421 648	M 18 x 1,5
421 641	1/4" NPTF

# ORDER NUMBER OVERVIEW

## Connector Packard 4-pin Metri Pack

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 14 x 1,5	9-36 V DC	MIN	2	7	320 551	-	320 552	-	320 553	-	320 554	-
M 14 x 1,5	9-36 V DC	MAX	0	0	320 555	-	320 556	-	320 557	-	320 558	-
M 18 x 1,5	9-36 V DC	MIN	2	7	320 563	-	320 564	-	320 565	-	320 566	-
M 18 x 1,5	9-36 V DC	MAX	0	0	320 567	-	320 568	-	320 569	-	320 570	-
1/4" NPTF	9-36 V DC	MIN	2	7	320 576	-	320 577	-	320 578	-	320 579	-
1/4" NPTF	9-36 V DC	MAX	0	0	320 580	-	320 581	-	320 582	-	320 583	-
1/4" NPTF	9-36 V DC	MIN	0	10	350 212	350 410	-	-	-	-	-	-
3/8" NPTF	9-36 V DC	MIN	2	7	320 590	-	320 591	-	320 592	-	320 593	-
3/8" NPTF	9-36 V DC	MAX	0	0	320 594	-	320 595	-	320 596	-	320 597	-
7/8" UNF	9-36 V DC	MIN	2	7	320 542	-	320 544	-	320 545	-	320 546	-
7/8" UNF	9-36 V DC	MAX	0	0	320 547	-	320 548	-	320 549	-	320 550	-
1/2" NPT	9-36 V DC	MIN	2	7	350 208	-	350 365	-	-	-	-	-
1/2" NPTF	9-36 V DC	MIN	0	2	350 299	-	-	-	-	-	-	-
1/2" NPTF	4,5-18 V DC	MIN	2	7	350 416	-	-	-	-	-	-	-

## ACCESSORIES

### Connector

Order-Nr.	Description
421 763	4-pin Packard connector

### Screw-in adapter

Order-Nr.	Thread outside	Thread inside
421 696	M 16 x 1,5	M 14 x 1,5
421 640	M 22 x 1,5	M 14 x 1,5
421 884	M 22 x 1,5	1/4" NPTF
421 695	G 1/2"	M 14 x 1,5
421 694	R 1/2"	M 14 x 1,5
421 967	R 1"	M 14 x 1,5
421 639	R 1"	M 18 x 1,5

### Braze-on adapter

Order-Nr.	Thread inside
421 644	M 14 x 1,5
421 648	M 18 x 1,5
421 641	1/4" NPTF

# ORDER NUMBER OVERVIEW

## Connector DEUTSCH

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 14 x 1,5	9-36 V DC	MIN	2	7	350 143	-	350 144	-	350 145	-	350 146	-
M 14 x 1,5	9-36 V DC	MAX	0	0	350 147	-	350 148	-	350 149	-	350 150	-
M 14 x 1,5	9-36 V DC	MAX	0	2	-	-	-	-	350 436	-	-	-
M 14 x 1,5	9-36 V DC	MAX	0	7	-	-	-	-	350 247	-	-	-
M 14 x 1,5	9-36 V DC	MIN	0	0	-	-	-	-	-	350 383	-	-
M 14 x 1,5	9-36 V DC	MIN	0	7	-	350 477	-	-	350 384	-	-	-
M18 x 1,5	9-36 V DC	MIN	2	7	350 151	-	350 152	-	350 153	-	350 154	-
M18 x 1,5	9-36 V DC	MAX	0	0	350 155	-	350 156	-	350 157	-	350 158	-
1/4" NPTF	9-36 V DC	MIN	0	7	350 225	-	-	-	-	-	-	-
1/4" NPTF	9-36 V DC	MIN	2	7	350 159	-	350 160	-	350 161	-	350 162	-
1/4" NPTF	9-36 V DC	MAX	0	0	350 163	-	350 164	-	350 165	-	350 166	-
3/8" NPTF	9-36 V DC	MIN	2	7	350 167	-	350 168	-	350 169	-	350 170	-
3/8" NPTF	9-36 V DC	MAX	0	0	350 171	-	350 172	-	350 173	-	350 174	-
7/8" UNF	9-36 V DC	MIN	2	7	350 175	-	350 176	-	350 177	-	350 178	-
7/8" UNF	9-36 V DC	MAX	0	0	350 179	-	350 180	-	350 181	-	350 182	-

## ACCESSORIES

### Connector

Order-Nr.	Description
420 733	3-pin connector DT06-3S

### Screw-in adapter

Order-Nr.	Thread outside	Thread inside
421 696	M 16 x 1,5	M 14 x 1,5
421 640	M 22 x 1,5	M 14 x 1,5
421 884	M 22 x 1,5	1/4" NPTF
421 695	G 1/2"	M 14 x 1,5
421 694	R 1/2"	M 14 x 1,5
421 967	R 1"	M 14 x 1,5
421 639	R 1"	M 18 x 1,5

### Braze-on adapter

Order-Nr.	Thread inside
421 644	M 14 x 1,5
421 648	M 18 x 1,5
421 641	1/4" NPTF

# ORDER NUMBER OVERVIEW

## Connector bayonet 10 SL VG 95234

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 14 x 1,5	9-36 V DC	MIN	2	7	321 403	-	321 504	-	321 505	-	321 506	-
M 14 x 1,5	9-36 V DC	MAX	2	7	350 224	-	-	-	350 394	-	-	-
M 14 x 1,5	9-36 V DC	MIN	0	7	-	-	-	-	-	-	-	321 516
M 14 x 1,5	9-36 V DC	MIN	0	0	-	-	-	350 264	-	321 508	-	-
M 18 x 1,5	9-36 V DC	MIN	2	7	322 512	-	322 513	-	321 500	-	321 501	-
M 18 x 1,5	9-36 V DC	MIN	0	7	-	321 989	-	321 990	-	321 502	321 985	321 503
M 18 x 1,5	9-36 V DC	MIN	0	0	-	-	-	-	-	-	321 514	-
M 18 x 1,5	9-36 V DC	MAX	0	0	-	-	-	-	-	-	321 509	-
M 18 x 1,5	9-36 V DC	MAX	2	7	-	-	322 514	-	350 301	-	-	-
1/4" NPTF	9-36 V DC	MIN	0	7	-	-	-	321 909	-	-	-	-
1/4" NPTF	9-36 V DC	MIN	2	7	321 907	-	321 908	-	321 498	-	321 499	-
1/4" NPTF	9-36 V DC	MIN	2	7	350 357 *	-	-	-	-	-	-	-
1/2" UNF	9-36 V DC	MIN	2	7	-	-	321 584	-	-	-	-	-

### ACCESSORIES

\* with ATEX approval

#### Connector

##### 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

Order-Nr.	Description	Length	Connection
421 653	Ready-made cable Type CL105 3 x 0,75 mm <sup>2</sup> 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 <sup>2</sup> with 3-pin bayonet connector 10 SL VG 95234 straight	5000 mm	1*
423 641	Ready-made cable Type CL105 3 x 0,75 mm <sup>2</sup> with 3-pin bayonet connector 10 SL VG 95234 straight	10000 mm	1*
421 658	Ready-made cable Type CL105 3 x 0,75 mm <sup>2</sup> 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 <sup>2</sup> 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 <sup>2</sup> 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 <sup>2</sup> with 3-pin bayonet connector 10 SL VG 95234 90° angle	5000 mm	1*

1\* Cable with flying leads

#### Screw-in adapter

Order-Nr.	Thread outside	Thread inside
421 696	M 16 x 1,5	M 14 x 1,5
421 640	M 22 x 1,5	M 14 x 1,5
421 884	M 22 x 1,5	1/4" NPTF
421 695	G 1/2"	M 14 x 1,5
421 694	R 1/2"	M 14 x 1,5
421 967	R 1"	M 14 x 1,5
421 639	R 1"	M 18 x 1,5

#### Braze-on adapter

Order-Nr.	Thread inside
421 644	M 14 x 1,5
421 648	M 18 x 1,5
421 641	1/4" NPTF

# ORDER NUMBER OVERVIEW

## Connector fine thread 5/8-24 UNEF-2A VG 95342

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 14 x 1,5	9-36V DC	MIN	2	7	350 183	-	350 184	-	350 185	-	350 186	-
M 14 x 1,5	9-36V DC	MAX	0	0	350 187	-	350 188	-	350 189	-	350 190	-
M 18 x 1,5	9-36V DC	MIN	2	7	322 544	-	320 461	-	350 191	-	350 192	-
M 18 x 1,5	9-36V DC	MAX	0	7	322 555	-	350 193	-	350 194	-	350 195	-
M 18 x 1,5	9-36V DC	MAX	2	7	350 447	-	-	-	-	-	-	-

## ACCESSORIES

### Connector

Order-Nr.	Description
421 645	Plug-in connector fine thread straight VG 95342
421 649	Plug-in connector fine thread 90° angle VG 95342

### Screw-in adapter

Order-Nr.	Thread outside	Thread inside
421 696	M 16 x 1,5	M 14 x 1,5
421 640	M 22 x 1,5	M 14 x 1,5
421 695	G 1/2"	M 14 x 1,5
421 694	R 1/2"	M 14 x 1,5
421 967	R 1"	M 14 x 1,5
421 639	R 1"	M 18 x 1,5

### Braze-on adapter

Order-Nr.	Thread inside
421 644	M 14 x 1,5
421 648	M 18 x 1,5



# ORDER NUMBER OVERVIEW

## Connector DIN EN 175 301-803-A

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Order number for low-side switch				Order number for high-side switch			
					Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
					Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 14 x 1,5	9-36V DC	MIN	2	7	320 600	-	320 620	-	320 601	-	320 621	-
M 14 x 1,5	9-36V DC	MIN	0	7	-	320 602	-	320 622	-	320 603	-	320 623
M 14 x 1,5	9-36V DC	MIN	0	0	-	-	-	-	-	350 235	-	350 236
M 14 x 1,5	9-36V DC	MAX	2	7	320 612	-	-	-	-	-	-	-
M 18 x 1,5	9-36V DC	MIN	2	7	320 604	-	320 624	-	320 605	-	320 625	-
M 18 x 1,5	9-36V DC	MIN	0	7	-	320 606	-	320 626	-	320 607	-	320 627
1/4" NPTF	9-36V DC	MIN	2	7	320 608	-	320 628	-	320 609	-	320 629	-
1/4" NPTF	9-36V DC	MIN	0	7	-	320 610	-	320 630	-	320 611	-	320 631
R 3/8"	9-36V DC	MAX	0	0	320 633	-	320 632	-	-	-	-	-
G 3/8"	9-36V DC	MAX	0	0	350 402	-	-	-	350 242	-	320 650	-

## ACCESSORIES

### Connector

Order-Nr.	Description
421 880	3-pin plug with centralized screw M 3 x 35 DIN EN 175 301-803-A

### Cable with connector

Order-Nr.	Description	Length	Connection
421 965	Ready-made cable Type FLR33X33X 3 x 0,75 mm <sup>2</sup> with 3-pin plug with centralized screw M 3 x 35 DIN EN 175 301-803-A	5000 mm	1*

1\* Cable with flying leads

### Screw-in adapter

Order-Nr.	Thread outside	Thread inside
421 696	M 16 x 1,5	M 14 x 1,5
421 640	M 22 x 1,5	M 14 x 1,5
421 884	M 22 x 1,5	1/4" NPTF
421 695	G 1/2"	M 14 x 1,5
421 694	R 1/2"	M 14 x 1,5
421 967	R 1"	M 14 x 1,5
421 639	R 1"	M 18 x 1,5

### Braze-on adapter

Order-Nr.	Thread inside
421 644	M 14 x 1,5
421 648	M 18 x 1,5
421 641	1/4" NPTF

# ORDER NUMBER OVERVIEW

## Sensors with cable Protection class IP 69K DIN 40050

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Cable length mm	Cable connection type	Order number for low-side switch				Order number for high-side switch			
							Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
							Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
M 12 x 1	9-36V DC	MIN	0	7	1000	1*	321 580	-	-	-	-	-	-	-
M 14 x 1,5	9-36V DC	MAX	0	0	1000	1*	-	-	-	-	325 300	-	325 301	-
M 14 x 1,5	9-36V DC	MAX	0	0	15000	1*	-	-	-	-	350 449	-	-	-
M 14 x 1,5	9-36V DC	MAX	0	7	1000	1*	-	-	-	-	350 244	-	-	-
M 14 x 1,5	9-36V DC	MIN	0	0	250	1*	-	322 558	-	322 557	-	-	-	-
M 14 x 1,5	9-36V DC	MAX	0	0	1000	9*	-	-	-	-	-	-	321 530	-
M 14 x 1,5	9-36V DC	MAX	0	0	1000	8*	-	-	-	-	-	-	321 529	-
M 14 x 1,5	9-36V DC	MIN	0	2	500	1*	-	-	321 507	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	0	2	220	6*	-	321 569	-	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	0	7	250	1*	-	321 582	-	321 993	-	325 018	-	325 019
M 14 x 1,5	9-36V DC	MIN	0	7	2500	1*	-	-	322 298	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	0	7	300	2*	321 519	-	-	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	0	7	500	4*	-	-	322 507	-	-	-	-	-
M 14 x 1,5	9-36V DC	MAX	0	7	250	6*	-	-	321 568	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	3	250	3*	-	-	322 527	-	-	-	322 547	-
M 14 x 1,5	9-36V DC	MIN	2	7	2000	1*	-	-	321 929	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	2500	1*	322 297	-	-	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	250	1*	322 537	-	321 991	-	325 016	-	325 017	-
M 14 x 1,5	9-36V DC	MIN	2	7	300	2*	321 601	-	321 518	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	270	4*	-	-	322 525	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	300	4*	321 531	-	-	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	250	6*	-	-	321 072	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	265	7*	318 154	-	-	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	250	3*	321 070	-	-	-	-	-	-	-
M 14 x 1,5	9-36V DC	MIN	2	7	15000	1*	-	-	350 372 *	-	-	-	-	350 296 *
M 18 x 1,5	9-36V DC	MIN	0	0	360	4*	325 035	-	-	-	-	-	-	-
M 18 x 1,5	9-36V DC	MAX	0	0	360	4*	325 036	-	-	-	-	-	-	-
M 18 x 1,5	9-36V DC	MAX	0	0	350	5*	350 125	-	350 126	-	-	-	-	-
M 18 x 1,5	9-36V DC	MAX	0	0	1000	1*	325 305	-	325 304	-	-	-	-	-
M 18 x 1,5	9-36V DC	MAX	0	0	2000	1*	-	-	325 312	-	-	-	-	-
M 18 x 1,5	9-36V DC	MIN	0	7	2000	1*	-	-	-	325 309	-	-	-	-
M 18 x 1,5	9-36V DC	MIN	0	7	1000	1*	-	-	-	325 308	-	-	-	-
M 18 x 1,5	9-36V DC	MIN	0	7	250	1*	-	-	-	-	325 022	-	325 023	-
M 18 x 1,5	9-36V DC	MIN	2	7	1000	1*	-	-	321 591	-	-	-	-	-
M 18 x 1,5	9-36V DC	MIN	2	7	270	2*	322 503	-	322 504	-	325 020	-	325 021	-
M 18 x 1,5	9-36V DC	MIN	2	7	360	4*	322 515	-	-	-	-	-	-	-
M 18 x 1,5	9-36V DC	MAX	2	7	360	4*	322 516	-	-	-	-	-	-	-
1/4" NPTF	9-36V DC	MAX	0	0	170	1*	350 239	-	-	-	-	-	-	-
1/4" NPTF	9-36V DC	MIN	0	0	250	1*	321 566	-	321 567	-	-	-	-	-
1/4" NPTF	9-36V DC	MIN	2	0	250	1*	321 412	-	-	-	-	-	-	-
1/4" NPTF	9-36V DC	MIN	2	0	360	2*	-	-	321 524	-	-	-	-	-
1/4" NPTF	9-36V DC	MIN	0	7	250	1*	-	321 999	321 561	321 997	-	325 026	-	325 027
1/4" NPTF	9-36V DC	MAX	0	7	250	1*	321 532	-	-	350 228	-	-	-	350 227
1/4" NPTF	9-36V DC	MAX	0	7	500	1*	350 364	-	-	-	-	-	-	-
1/4" NPTF	9-36V DC	MIN	0	7	500	4*	-	322 521	-	322 522	-	-	325 303	-
1/4" NPTF	9-36V DC	MIN	0	7	270	4*	-	-	-	-	-	-	-	322 550
1/4" NPTF	9-36V DC	MIN	2	7	120	1*	-	-	318 159	-	-	-	350 271	-

Thread	Operating voltage	Function	Function control time sec	Fault indication delay time sec	Cable length mm	Cable connection type	Order number for low-side switch				Order number for high-side switch			
							Water-based liquids		Oil-based liquids		Water-based liquids		Oil-based liquids	
							Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current	Operating current	Quiescent current
1/4" NPTF	9-36V DC	MIN	2	7	250	1*	321 402	-	321 992	322 559	325 024	-	-	-
1/4" NPTF	9-36V DC	MIN	2	7	300	2*	321 605	-	321 625	-	-	-	-	-
1/4" NPTF	9-36V DC	MIN	2	7	500	4*	322 225	-	322 226	-	-	-	-	322 345
3/8" NPTF	9-36V DC	MAX	0	0	170	1*	-	-	350 238	-	-	-	-	-
3/8" NPTF	9-36V DC	MIN	0	0	180	11*	-	-	-	300 001	-	-	-	-
3/8" NPTF	9-36V DC	MIN	0	1	350	4*	-	-	-	350 105	-	-	-	-
3/8" NPTF	9-36V DC	MIN	0	7	250	1*	-	-	-	-	-	-	-	325 031
1/2" NPT	9-36V DC	MIN	0	0	300	10*	-	-	-	-	-	-	322 531	-
1/2" NPT	9-36V DC	MIN	2	4	300	10*	-	-	-	-	322 532	-	-	-
1/2" NPT	9-36V DC	MIN	2	7	170	1*	322 540	-	-	-	-	-	-	-
1/2" NPT	9-36V DC	MAX	2	7	170	1*	322 539	-	-	-	-	-	-	-
G 3/8"	9-36V DC	MAX	0	0	360	4*	-	-	321 510	-	-	-	-	-
G 3/8"	9-36V DC	MIN	0	0	2000	1*	-	322 534	-	322 533	-	-	-	-
G 3/8"	9-36V DC	MIN	0	7	250	1*	350 243	-	-	-	-	-	-	-
G 3/8"	9-36V DC	MAX	2	20	3000	1*	-	-	-	-	350 275 *	-	-	-
G 1/2"	9-36V DC	MIN	2	7	270	2*	321 515	-	-	-	-	-	-	-
G 1/2"	9-36V DC	MAX	0	0	2000	1*	318 155	-	-	-	-	-	-	-

\* with ATEX approval

## ACCESSORIES

### Screw-in adapter

Order-Nr.	Thread outside	Thread inside
421 696	M 16 x 1,5	M 14 x 1,5
421 640	M 22 x 1,5	M 14 x 1,5
421 884	M 22 x 1,5	1/4" NPTF
421 695	G 1/2"	M 14 x 1,5
421 694	R 1/2"	M 14 x 1,5
421 967	R 1"	M 14 x 1,5
421 639	R 1"	M 18 x 1,5

### Braze-on adapter

Order-Nr.	Thread inside
421 644	M 14 x 1,5
421 648	M 18 x 1,5
421 641	1/4" NPTF

- 1\* Cable with flying leads
- 2\* Cable with 3 pole blade terminals 6.3 in housing
- 3\* Cable end with blade terminals 6.3
- 4\* Cable with 3 pin DEUTSCH connector
- 5\* Cable with 3 pin DEUTSCH connector overmoulded
- 6\* Cable with 3 pin Delphi Metri-Pack connector
- 7\* Cable with 3 pin AMP Mate-N-Lock connector

- 8\* Cable with 3 pin AMP Superseal connector
- 9\* Cable with 3 pin AMP JPT connector
- 10\* Cable with 3 pin Sure Seal connector
- 11\* Cable with 3 pin Delphi Weather Pack Tower Connector, sealed

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