

BEDIA®

MOTORENTECHNIK



LEVEL MONITORING SENSORS

With approvals of the classification societies

- TYPE CLS 50 12/24 V DC
- TYPE CLS 55 5/12 V DC



THOUGHT-OUT SOLUTIONS AT THE HIGHEST LEVEL



ISO 9001
Certified
Quality Management System
www.tuv-sud.com/ms-cert



ISO 14001
Certified Environmental
Management System
www.tuv-sud.com/ms-cert



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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

2023	currently about 150 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 detect when a filling level is exceeded or falls below a limit.

Water-based liquids 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:

- SHIPS
- 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 already indicates a critical filling level.



■ 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:

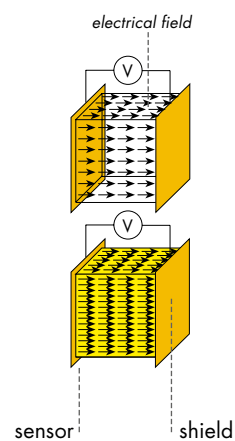
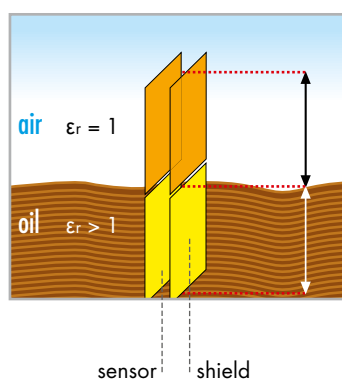
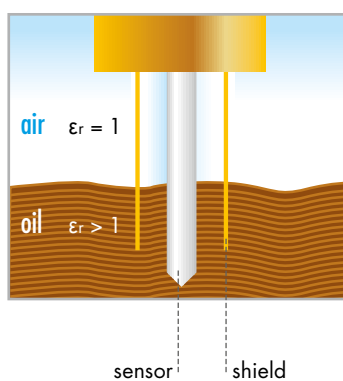
Since they contain no mechanical moving parts, their function will not be influenced by dirt particles or other influences. No electrical current is sent through the medium via an electrode with BEDIA sensors, an electrolysis of the medium is not possible.

MEASURABLE MEDIUMS

Operating principle

The function of the sensor is based on the capacitive principle. It detects the change in capacitance that occurs 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. This signal is processed by a microcontroller-based evaluation circuit which activates or deactivates an output stage.

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

SWITCHING OUTPUTS

Output variants available

Output variants available			Low Voltage (LV) $U_B = 4,5 - 18 \text{ V}$ Type CLS-55	High Voltage (HV) $U_B = 9 - 36 \text{ V}$ Type CLS-50
positive switching (HSS)		The output transistor switches positive potential at the output	—	✓ 1 A short circuit and overload proof
negative switching (LSS)		The output transistor switches negative potential at the output	✓ 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	✓	—

Function control time

After the supply voltage is applied (e.g. ignition being switched on), the output is activated for the function control time, thus signalling operational readiness. If this signal does not appear, the sensor should be checked. The default function control time is 2 seconds. This self-monitoring makes it possible to check the level monitoring sensors from a central point for their operational readiness as well as for cable breaks. Especially in intricate, ramified systems, such as ships, checking conventional level switches may be very difficult.

Other function control times are 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 of seven seconds.

Other indication delay times are available upon request.

INSTALLATION INSTRUCTION

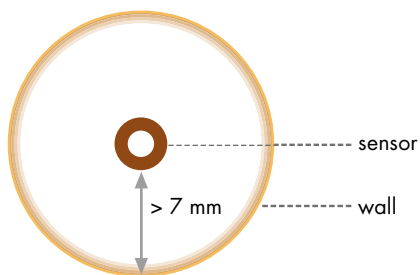
Mounting position

BEDIA level monitoring sensors may be installed in any position.

For properly function the level sensors should be mounted in a calm area of the tank, otherwise a sensor with a fault indication delay should be used.

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.

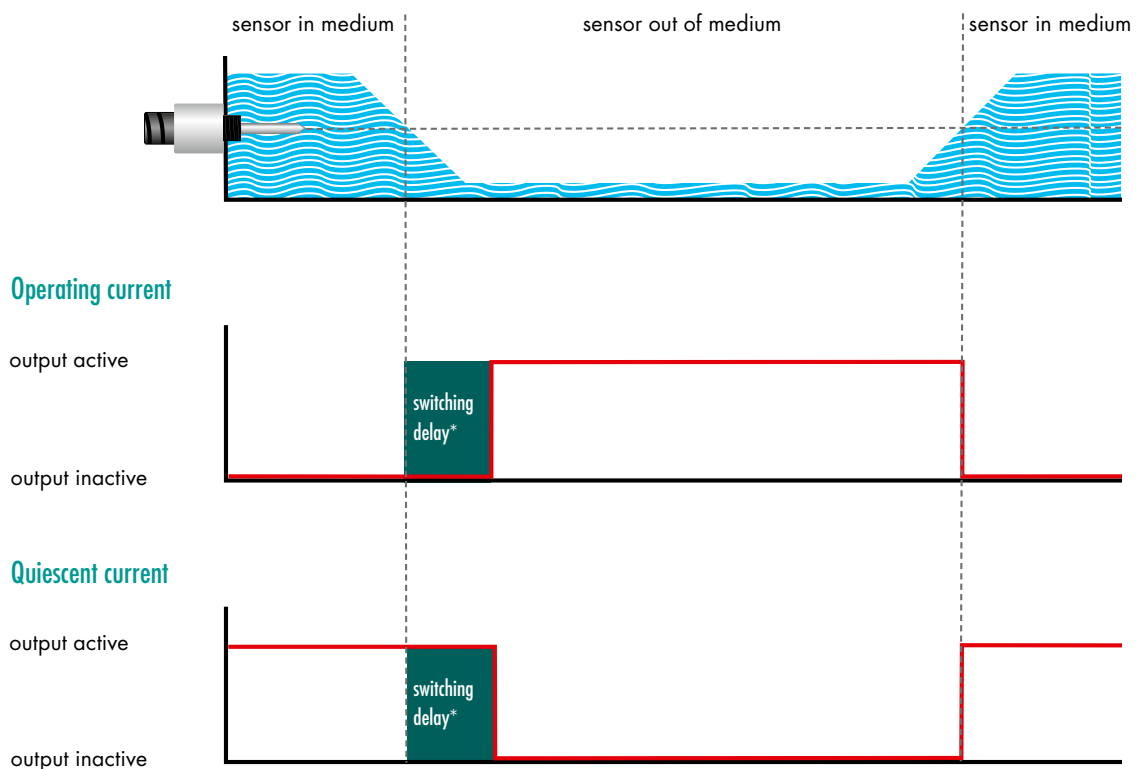
This ensures that a reference potential will be present.

FUNCTIONALITY OVERVIEW

Minimum-Sensors

If a minimum sensor is removed from the medium, the output is activated after the fault indication delay time. For a working current sensor, the output goes low-impedance (active) and the output signal is available. For a quiescent current sensor, the output goes high-impedance (inactive) and the output signal is no longer available.

If a minimum sensor is immersed in the medium, the output is deactivated instantaneously. For a working current sensor, the output goes high-impedance (deactivated) and the output signal is no longer available. For a quiescent current sensor, the output goes low-impedance (active) and the output signal is available.



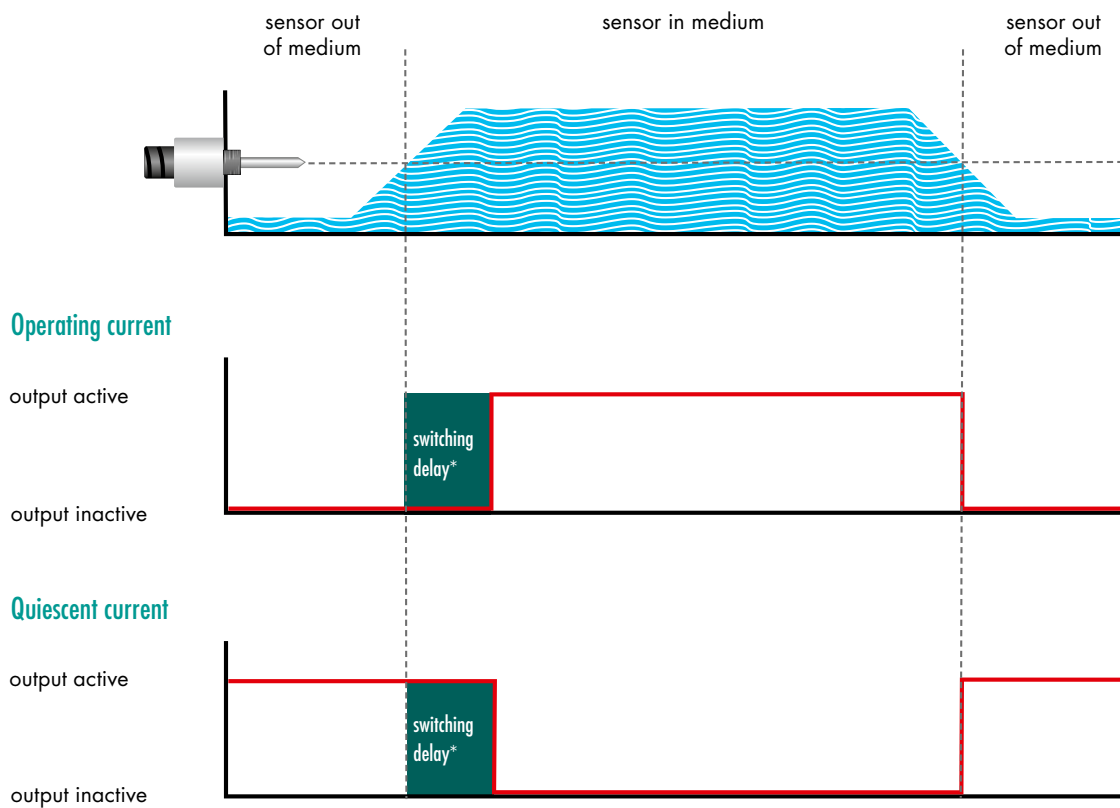
It is possible to select a fault indication delay time of 0 seconds for instantaneous switching.

FUNCTIONALITY OVERVIEW

Maximum-Sensors

If a maximum sensor is immersed in the medium, the output is activated after the fault indication delay time. For a working current sensor, the output goes low-impedance (active) and the output signal is available. For a quiescent current sensor, the output goes high-impedance (inactive) and the output signal is no longer available.

If a maximum sensor is removed from the medium, the output is deactivated instantaneously. For a working current sensor, the output goes high-impedance (deactivated) and the output signal is no longer available. For a quiescent current sensor, the output goes low-impedance (active) and the output signal is available.



It is possible to select a fault indication delay time of 0 seconds for instantaneous switching.

OVERVIEW OF THE CONNECTIONS

Level sensors Type CLS 50/55



■ **Connector bayonet ISO 15170**
Protection class IP 69K DIN 40050

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG

» [Order number overview starting at page 18](#)



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

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG

ATEX approval refer to order number overview

» [Order number overview starting at page 19](#)



■ **Connector bayonet 12 S VG 95234**
Protection class IP 67 DIN 40050

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG

ATEX approval on request available

» [Order number overview starting at page 20](#)



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

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG

ATEX approval refer to order number overview

» [Order number overview starting at page 21](#)

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

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG



» Order number overview starting at page 22

■ With Cable Protection class IP 69K / IP 68 up to 30 m DIN 40050

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG

ATEX approval refer to order number overview



» Order number overview starting at page 23

Special versions



With EMC cable connection for shielded lines, protection class IP 68, up to 10 bar in accordance with DIN 40050

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG

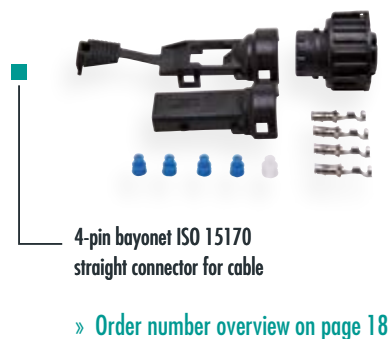


Level monitoring sensors for high-viscous oils

With approval of the 10 classification societies
CE marking in accordance with the EU directive 2004/108/EG

ACCESSORIES

For level monitoring sensors





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

» [Order number overview on page 22](#)



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

» [Order number overview on page 19](#)
or connector fine thread 5/8-24 UNEF-2A
straight VG 95342
» [Order number overview on page 21](#)



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

» [Order number overview on page 19](#)
or connector fine thread 5/8-24 UNEF-2A
90° angle VG 95342
» [Order number overview on page 21](#)



Ready-made cable Type CL105 3 x 0,75 mm²
with 3-pin bayonet connector 10 SL VG 95234 straight

» [Order number overview on page 19](#)



Ready-made cable Type CL105 3 x 0,75 mm²
with 3-pin bayonet connector 10 SL VG 95234 90° angle

» [Order number overview on page 19](#)

TECHNICAL DATA

For level monitoring sensors CLS 50

Medium	Water / Oil
Function	Minimum - Maximum
Operating voltage	12 / 24 V (-25% / +50%) (9 - 36 V DC)
Current consumption	typic < 8 mA
Output	low-side switch / high-side switch / analog switching ≤ 1 A over the hole 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 order number overview
Housing material	stainless steel X5CrNi 1810, EN 10088-3, 1.4301 housing capacitive connected to ground
Sensor coating	Tefzel ® ETFE
Sensor protection	IP 65 - 69K nach DIN 40050 (depending on connector type)
Switch point hysteresis	typic < 3 mm
Medium temperature	-40°C to +125°C (-40°F to +257°F) water -40°C to +150°C (-40°F to +302°F) oil
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 switchin sensors do not connect **plus potential** to the signal terminal and minus potential to the plus terminal.

Approvals	ABS, BV, CCS, DNV, GL, KRS, LR, NKK, RINA, RMRS
Customs tariff number	90261029

Environmental simulations

Vibration	ISO 16750-3:2007 10 Hz - 2000 Hz 20 g
Free Fall	IEC 16750
Machanical Shock	DIN EN 60068-2-27:1995; 100 g / 11 ms
Dry Cold	DIN EN 60068-2-1:2006; -40°C (-40°F) / 24 h
Dry Heat	DIN EN 60068-2-2:2008; +125°C (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
Flame Retardant	DIN 75 200
Pressure resistance	2,5 Mpa (25 bar) (362,6 psi) at 25 °C (75°F) / 1 h

EMC

Conducted emission form the power port	IEC 60945	10 kHz - 30 MHz
Electric field radiated emmissions	IEC 60945	150 kHz - 2 GHz
RF electromagnetic fields	EN 61000-4-3	1 MHz - 2 GHz; 100 V/m
Conducted Interference RF	EN 61000-4-6	150 kHz - 80 MHz; 10 V
Conducted Interference AF	IEC 60533	50 Hz - 10 kHz; 3 V / 0,5 V
ESD	EN 61000-4-2	± 8 kV Contact / Air discharge
Burst	EN 61000-4-4	± 2 kV DC powerport / signal lines
Surge	EN 61000-4-5	± 1 kV lines <-> ground ± 0,5 kV lines <-> lines
High Voltage	IEC 60092-504	550 V
Power supply, variations and interruptions	EN 61000-4-11	U _g +50% / -25%

TECHNICAL DATA

For level monitoring sensors CLS 55

Medium	Water / Oil
Function	Minimum / Maximum
Operating voltage	5 / 12 V (-10% / +50%) (4,5 - 18 V DC)
Current consumption	typic < 8 mA
Output	low-side switch / analog switching ≤ 0,5 A over the hole 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 order number overview
Housing material	stainless steel X5CrNi 1810, EN 10088-3, 1.4301 housing capacitive connected to ground
Sensor coating	Tefzel ® ETFE
Sensor protection	IP 65 - 69K nach DIN 40050 (depending on connector type)
Switch point hysteresis	typic < 3 mm
Medium temperature	-40°C to +125°C (-40°F to +257°F) water -40°C to +150°C (-40°F to +302°F) oil
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	ABS, BV, CCS, DNV, GL, KRS, LR, NKK, RINA, RMRS
Customs tariff number	90261029

Environmental simulations

Vibration	ISO 16750-3:2007 10 Hz - 2000 Hz 20 g
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 (-40°F) / 24 h
Dry Heat	DIN EN 60068-2-2:2008; +125°C (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
Flame Retardant	DIN 75 200
Pressure resistance	2,5 Mpa (25 bar) (362,6 psi) at 25 °C (75°F) / 1 h

EMC

Conducted emission form the power port	IEC 60945	10 kHz - 30 MHz
Electric field radiated emmissions	IEC 60945	150 kHz - 2 GHz
RF electromagnetic fields	EN 61000-4-3	1 MHz - 2 GHz; 100 V/m
Conducted Interference RF	EN 61000-4-6	150 kHz - 80 MHz; 10 V
Conducted Interference AF	IEC 60533	50 Hz - 10 kHz; 3 V / 0,5 V
ESD	EN 61000-4-2	± 8 kV Contact / Air discharge
Burst	EN 61000-4-4	± 2 kV DC powerport / signal lines
Surge	EN 61000-4-5	± 1 kV lines <-> ground ± 0,5 kV lines <-> lines
High Voltage	IEC 60092-504	550 V
Power supply, variations and interruptions	EN 61000-4-11	U _B +50% / -25%

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
M14 x 1,5	9-36 V DC	MIN	0	7	-	-	-	-	-	500 320	500 113	500 314
M18 x 1,5	9-36 V DC	MIN	0	0	-	500 170	-	-	-	-	-	500 114
M18 x 1,5	9-36 V DC	MAX	0	0	-	-	500 063	500 171	500 313	-	-	500 297
M18 x 1,5	9-36 V DC	MAX	0	3	-	-	-	-	-	-	500 108	-
M18 x 1,5	9-36 V DC	MIN	0	7	-	-	-	-	500 038	-	500 110	500 265
M18 x 1,5	9-36 V DC	MAX	0	7	500 014	-	500 068	-	-	-	500 115	500 112
M18 x 1,5	9-36 V DC	MAX	2	3	-	-	-	500 257	-	-	-	-
M18 x 1,5	9-36 V DC	MIN	2	7	500 015	500 091	500 065	500 069	500 039	500 041	500 188	500 189
M18 x 1,5	9-36 V DC	MAX	2	7	500 010	500 013	500 064	500 067	500 040	500 190	500 111	500 191
M18 x 1,5	9-36 V DC	MIN	0	20	-	-	-	-	-	-	-	500 109
M18 x 1,5	9-36 V DC	MAX	0	20	500 011	-	500 070	-	-	-	-	-
M18 x 1,5	9-36 V DC	MIN	2	20	500 012	-	500 066	-	-	-	-	-
G 1/2"	9-36 V DC	MIN	2	7	-	-	-	500 270	-	-	-	-

ACCESSORIES

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

Cable with connector			
Order-Nr.	Description	Length	Connection
420 800	Ready-made cable type CL105 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector	2000 mm	1*
420 801	Ready-made cable type CL105 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector	5000 mm	1*
420 808	Ready-made cable type CL105 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector	7000 mm	1*
421 713	Ready-made cable type CL105 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 straight connector	10000 mm	ISO 15170 straight
420 802	Ready-made cable type CL105 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle connector	2000 mm	1*
420 803	Ready-made cable type CL105 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle connector	5000 mm	1*
420 807	Ready-made cable type CL105 3 x 0,75 mm ² with 4-pin bayonet ISO 15170 90° angle connector	15000 mm	1*

1* Cable with flying leads

Connector Cable	
Order-Nr.	Description
418 047	Type CL105 3 x 0,75 mm ² with type approval, sold by meter

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
M18 x 1,5	9-36 V DC	MAX	0	0	-	500 229	-	500 231	-	500 234	500 104	500 236
M18 x 1,5	9-36 V DC	MIN	0	7	-	500 230	-	500 232	-	500 035	500 107	500 088
M18 x 1,5	9-36 V DC	MAX	0	7	500 007	500 203	500291	500 207	500 034	500 211	500 100	500 213
M18 x 1,5	9-36 V DC	MAX	0	7	500 289*	-	-	-	-	-	-	-
M18 x 1,5	9-36 V DC	MIN	2	7	500 008	500 192	500 061	-	500 037	500 036	500 106	500 089
M18 x 1,5	9-36 V DC	MAX	2	7	500 009	-	500 059	-	500 233	-	500 235	-
M18 x 1,5	9-36 V DC	MIN	0	20	-	-	-	500 062	-	-	500 087	500 086
M18 x 1,5	9-36 V DC	MAX	0	20	-	-	-	-	-	-	500 103	-
G 1/2"	9-36 V DC	MIN	2	7	500 201	-	500 205	-	500 209	-	500 101	-
G 1/2"	9-36 V DC	MAX	2	7	500 200	-	500 204	-	500 208	-	500 085	-

* with ATEX approval

ACCESSORIES

Connector				
Order-Nr.	Description			
421 652	Plug-in connector bayonet 10 SL VG 95234 straight connector			
421 885	Plug-in connector bayonet 10 SL VG 95234 90° angle connector			
Cable with connector				
Order-Nr.	Description	Length	Connection	
421 653	Ready-made cable type CL105 3 x 0,75 mm ² with 3 pin bayonet 10 SL VG 95234 straight connector	2000 mm	1*	
421 657	Ready-made cable type CL105 3 x 0,75 mm ² with 3 pin bayonet 10 SL VG 95234 straight connector	5000 mm	1*	
423 641	Ready-made cable type CL105 3 x 0,75 mm ² with 3 pin bayonet 10 SL VG 95234 straight connector	10000 mm	1*	
421 658	Ready-made cable type CL105 3 x 0,75 mm ² with 3 pin bayonet 10 SL VG 95234 90° angle connector	2000 mm	1*	
421 841	Ready-made cable type CL105 3 x 0,75 mm ² with 3 pin bayonet 10 SL VG 95234 90° angle connector	3000 mm	1*	
421 697	Ready-made cable type CL105 3 x 0,75 mm ² with 3 pin bayonet 10 SL VG 95234 90° angle connector	5000 mm	1*	
420 805	Ready-made cable type CL105 3 x 0,75 mm ² with 3 pin bayonet 10 SL VG 95234 90° angle connector	15000 mm	1*	

1* Cable with flying leads

Connecting Cable	
Order-No.	Description
418 047	Type CL105 3 x 0,75 mm ² with type approval, sold by meter

ORDER NUMBER OVERVIEW

Connector bayonet 12 S 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
M18 x 1,5	9-36 V DC	MIN	2	7	500 202	-	500 206	-	500 210	-	500 215	-
M18 x 1,5	9-36 V DC	MAX	2	7	500 220	-	500 237	-	500 238	-	500 239	-
G 1/2"	9-36 V DC	MIN	2	7	500 240	-	500 241	-	500 242	-	500 243	-
G 1/2"	9-36 V DC	MAX	2	7	500 244	-	500 245	-	500 246	-	500 247	-
1/2"NPTF	9-36 V DC	MIN	2	7	500 248	-	500 249	-	500 250	-	500 251	-
1/2"NPTF	9-36 V DC	MAX	2	7	500 252	-	500 253	-	500 254	-	500 255	-

ACCESSORIES

Connector			
Order-Nr.	Description		
422 197	mating connector bayonet 12 S straight		
422 198	mating connector bayonet 12 S 90° angle		

Cable with connector			
Order-Nr.	Description	Length	Connection
423 609	Ready-made cable Type CL105 3 x 0,75 mm ² with 4-pin bayonet 12 S connector straight	3000 mm	1*

1* Cable with flying leads

Connecting Cable	
Order-Nr.	Description
418 047	Type CL105 3 x 0,75 mm ² with type approval, sold by meter

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
M18 x 1,5	9-36 V DC	MIN	0	7	-	500 004	-	500 006	-	500 217	-	500 090
M18 x 1,5	9-36 V DC	MAX	0	0	-	-	500 310	-	-	-	-	-
M18 x 1,5	9-36 V DC	MAX	0	7	500 003	500 214	500 056	500 216	500 311	500 218	500 102	500 219
M18 x 1,5	9-36 V DC	MAX	0	7	500 271 *	-	-	-	-	-	-	-
M18 x 1,5	9-36 V DC	MIN	2	7	500 005	-	500 058	500 187	500 033	-	500 105	-
M18 x 1,5	9-36 V DC	MIN	2	7	500 272 *	-	-	-	-	-	-	-
M18 x 1,5	9-36 V DC	MAX	2	7	500 222	-	500 057	-	500 032	-	500 221	-
G 1/2"	9-36 V DC	MAX	2	0	-	-	-	-	-	-	500 084	-
G 1/2"	9-36 V DC	MAX	0	7	-	-	500 304	-	-	500 330	-	-

* with ATEX approval

ACCESSORIES

Connector				
Order-Nr.	Description			
421 645	Plug-in connector fine thread VG 95342 straight			
421 649	Plug-in connector fine thread VG 95342 90° angle			
Cable with connector				
Order-Nr.	Description	Length	Connection	
421 647	Ready-made cable type CL105 3x0,75mm ² with plug-in connector fine thread VG 95342 straight	2000 mm	1*	
421 776	Ready-made cable type CL105 3x0,75mm ² with plug-in connector fine thread VG 95342 straight	3000 mm	1*	
421 654	Ready-made cable type CL105 3x0,75mm ² with plug-in connector fine thread VG 95342 straight	5000 mm	1*	
421 666	Ready-made cable type CL105 3x0,75mm ² with plug-in connector fine thread VG 95342 straight	6000 mm	1*	
421 980	Ready-made cable type CL105 3x0,75mm ² with plug-in connector fine thread VG 95342 straight	10000 mm	1*	
421 655	Ready-made cable type CL105 3x0,75mm ² with plug-in connector fine thread VG 95342 90° angle	2000 mm	1*	
421 656	Ready-made cable type CL105 3x0,75mm ² with plug-in connector fine thread VG 95342 90° angle	5000 mm	1*	

1* Cable with flying leads

Connecting Cable	
Order-Nr.	Description
418 047	Type CL105 3 x 0,75 mm ² with type approval, sold by meter

ORDER NUMBER OVERVIEW

Connector DIN EN 175301-803-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
M18x1,5	9-36 V DC	MAX	0	0	-	500 224	-	500 071	500 177	500 227	500 131	500 127
M18x1,5	9-36 V DC	MAX	1	0	-	-	-	-	-	-	500 137	-
M18x1,5	9-36 V DC	MIN	0	7	-	500 026	-	500 076	500 046	500 043	500 138	500 223
M18x1,5	9-36 V DC	MAX	0	7	500 017	500 225	500 075	500 226	-	500 048	-	500 117
M18x1,5	9-36 V DC	MAX	1	7	-	-	500 073	-	-	-	-	-
M18x1,5	9-36 V DC	MIN	1	7	500 021	-	-	-	-	-	-	-
M18x1,5	9-36 V DC	MIN	2	7	500 023	-	500 072	500 172	500 042	-	500 133	-
M18x1,5	9-36 V DC	MAX	2	7	500 024	-	500 074	-	500 049	500 045	500 228	500 116
M18x1,5	9-36 V DC	MIN	0	20	-	-	-	-	-	-	-	500 126
1/2" NPTF	9-36 V DC	MIN	2	7	500 025	500 278	500 016	500 280	500 020	-	500 118	-
1/2" NPTF	9-36 V DC	MAX	2	7	500 018	500 279	-	500 281	-	-	-	-
G 1/4"	9-36 V DC	MAX	0	0	-	-	-	-	-	-	-	500 139
G 3/8"	9-36 V DC	MAX	2	7	-	-	-	-	-	-	500 136	-
G 1/2"	9-36 V DC	MIN	0	0	-	-	-	500 273	500 352	-	500 092	-
G 1/2"	9-36 V DC	MAX	2	0	-	-	-	-	-	-	500 134	-
G 1/2"	9-36 V DC	MIN	2	2	-	500 019	-	-	-	-	500 135	-
G 1/2"	9-36 V DC	MAX	2	3	-	-	-	-	-	-	500 129	-
G 1/2"	9-36 V DC	MIN	0	7	-	-	-	-	-	-	-	500 132
G 1/2"	9-36 V DC	MAX	0	7	-	-	500 306	-	-	-	-	500 130
G 1/2"	9-36 V DC	MIN	2	7	500 022	-	-	-	500 044	500 047	500 128	-
G 1/2"	9-36 V DC	MAX	2	2	-	-	-	-	-	-	500 125	-

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
421 875	Ready-made cable type CL105 3 x 0,75 mm ² with 3-pin plug with centralized screw M 3 x 35 DIN 175 301-803-A	2000 mm	1*
421 876	Ready-made cable type CL105 3 x 0,75 mm ² with 3-pin plug with centralized screw M 3 x 35 DIN 175 301-803-A	5000 mm	1*

1* Cable with flying leads

Connector Cable

Order-Nr.	Description
418 047	Type CL105 3 x 0,75 mm ² with type approval, sold by meter

ORDER NUMBER OVERVIEW

Sensors with cable

Protection class IP 69K / IP 68 up to 30 m 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
M14 x 1,5	9-36 V DC	MAX	0	0	5000	1*	-	-	500 081	-	-	-	-	
M18 x 1,5	9-36 V DC	MIN	0	0	5000	1*	-	-	-	500 077	-	-	-	
M18 x 1,5	9-36 V DC	MAX	0	0	5000	1*	500 030	500 031	-	500 275	-	-	500 162	
M18 x 1,5	9-36 V DC	MAX	0	0	10000	1*	-	-	-	-	500176	-	-	
M18 x 1,5	9-36 V DC	MIN	0	2	5000	1*	-	-	500 079	-	-	-	-	
M18 x 1,5	9-36 V DC	MIN	0	7	5000	1*	-	-	500 078	-	-	500 053	500 153	
M18 x 1,5	9-36 V DC	MIN	0	7	5000	1*	-	-	-	-	500 277 *	-	-	
M18 x 1,5	9-36 V DC	MIN	0	7	7000	1*	-	-	-	-	-	-	500 154	
M18 x 1,5	9-36 V DC	MIN	0	7	10000	1*	-	-	-	500 256	500 051	-	500 149	
M18 x 1,5	9-36 V DC	MAX	0	7	5000	1*	500 027	-	-	-	500 054	500 284	500 150	
M18 x 1,5	9-36 V DC	MAX	0	7	5000	1*	-	-	-	-	-	-	500 303 *	
M18 x 1,5	9-36 V DC	MAX	0	7	5000	1*	500 282 *	-	-	-	-	-	-	
M18 x 1,5	9-36 V DC	MAX	0	7	10000	1*	-	-	-	-	-	-	500 293	
M18 x 1,5	9-36 V DC	MAX	0	7	10000	1*	500 318 *	-	-	-	-	-	-	
M18 x 1,5	9-36 V DC	MIN	0	7	10000	1*	-	-	-	500 296 *	-	500 333 *	-	
M18 x 1,5	9-36 V DC	MIN	2	7	950	1*	-	-	500 165	-	-	-	-	
M18 x 1,5	9-36 V DC	MIN	2	7	5000	1*	500 028	-	500 080	500 082	-	-	500 151	
M18 x 1,5	9-36 V DC	MAX	2	7	5000	1*	-	500 050	-	500 152	500 052	-	-	
M18 x 1,5	9-36 V DC	MIN	0	20	5000	1*	-	-	-	-	-	-	500 140	
G 1/2"	9-36 V DC	MIN	2	7	5000	1*	-	-	-	500 173	500 029	-	-	
G 1/2"	9-36 V DC	MIN	0	7	5000	1*	-	-	-	-	-	-	500 094	
1/2"NPTF	9-36 V DC	MIN	2	7	5000	1*	-	-	-	-	-	-	500 093	

1* Cable with flying leads

* with ATEX approval

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