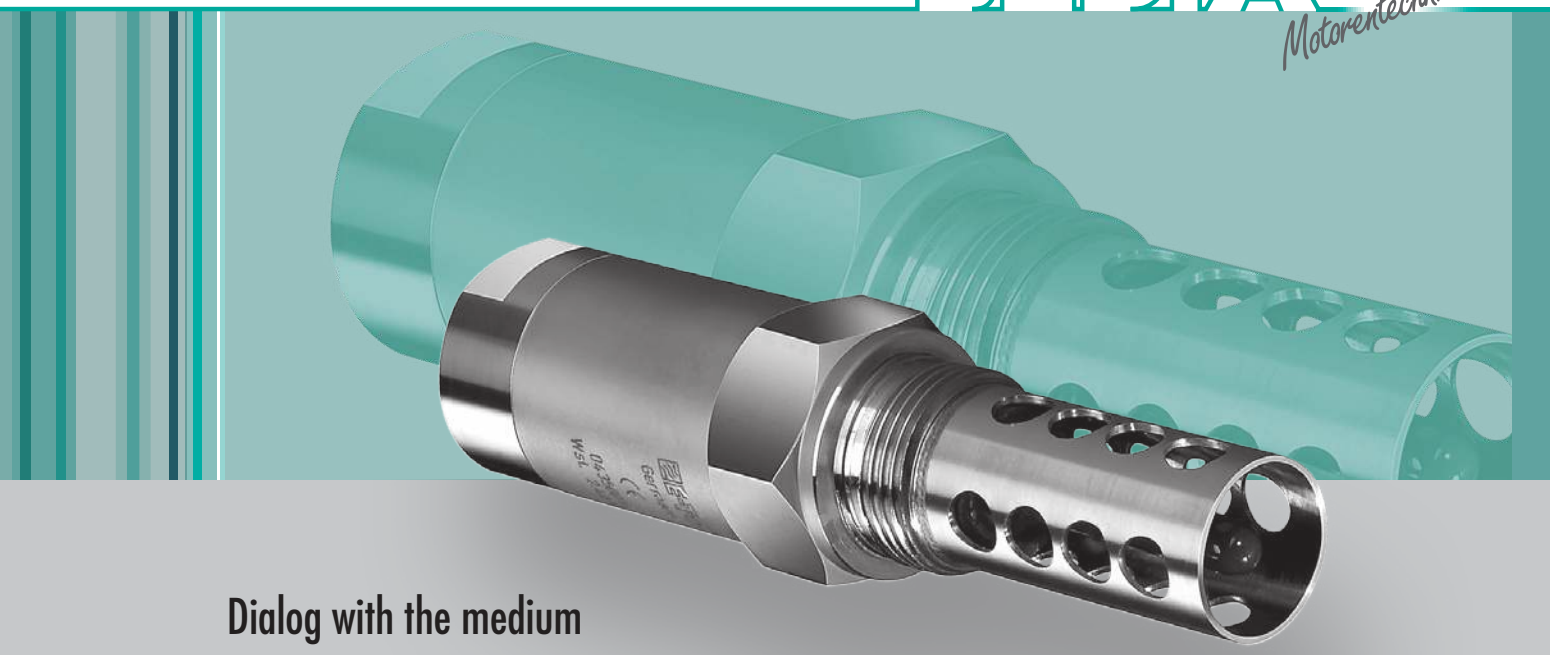
BEDIA®
Motorentechnik



Dialog with the medium

» BEDIA Capacitive Level Sensors
for industrial applications

Rev. 01 GB 18.04.2008

TÜV SÜD ISO 9001

» Contents

» Capacitive Level Sensors

BEDIA Capacitive Level Sensors

BEDIA level sensors are of high quality, practically maintenance free and have a wide operating temperature range. They respond to the change of capacitance occurring when an electrode surrounded by air is immersed into the medium to be monitored.
This capacitance change causes a circuit to oscillate which is processed electronically.
The different versions can be used as MIN/MAX sensors with closed circuit principle.

The level sensors are factory-preset as a minimum or maximum sensor with a open circuit or closed circuit principle.

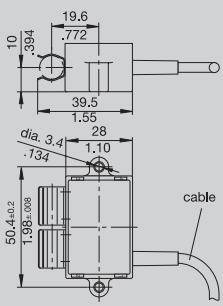
The probes have a short-cicuit-proof switching transistor output and are available as minus switching or plus switching.

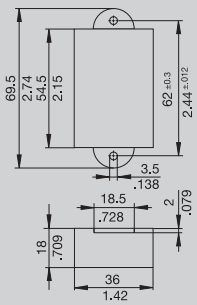
All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

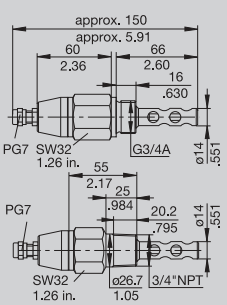
» Level Sensors

Type No.	TLS100-...	NR80-...	NR150-...
Description	water and similar media, non-invasive sensing	water and media with high relative dielectric constant ε_r 35..85 at electrically non-conductivecontainers with a wall thickness up to 5 mm. Non-invasive sensing.	oil and media with low relative dielectric constant ε_r 1,8...6 (reference media parafin ε_r 2,1).
Input voltage/ power consumption	DC 9 ... 36 V typ. 8 mA	DC 6...36 V typ. 8 mA	DC 9...36 V typ. 15 mA
Output	max. 1 A, LSS minus switching (or HSS plus switching); short-circuit proof and overload protected over the entire temperature range, with free-wheeling diode	max. 1 A, LSS minus switching (or HSS plus switching); short-circuit proof and overload protected over the entire temperature range, with free-wheeling diode	max. 1 A, LSS minus switching (or HSS plus switching); short-circuit proof and overload protected over the entire temperature range, with free-wheeling diode
Ambient temperature	-20 °C...+80 °C (-4...+176 °F)	0 °C...+70 °C (+32...+158 °F)	-20°C...+125°C (-4...+257 °F)
Medium temperature	-20 °C...+90 °C (-4...+194 °F)	0 °C...+70 °C (+32...+158 °F) (max. +80 °C (+176 °F) short-time)	-20°C...+125°C (-4...+257 °F), for a short period (1 minute) up to 150°C (+302 °F)
Pressure resistance	–	–	25 bar/367.5 PSI
Material			
Probe	Aluminium AlMg3	–	ETFE=Tefzel®
Fitting	–	–	V4A DIN 1.4571/AISI 316Ti
Sealing (O ring) or sensor and fitting	–	–	EPDM70
Housing	Ultramid	ABS = Acrylonitrile butadine styrene	V4A, DIN 1.4571 / AISI 316Ti
Housing Cover	–	–	PA6-3T = Trogamide
Electrical connection	Cable / Connector 3P M8	Cable	Cable / Connector 3P M12
Technical Data	see pages 2 - 5 to 2 - 8	see pages 2 - 9 to 2 - 10	see pages 2 - 13 to 2 - 16

Dimensions



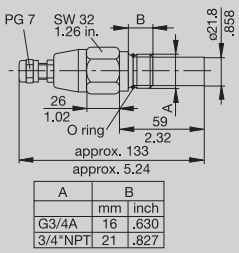




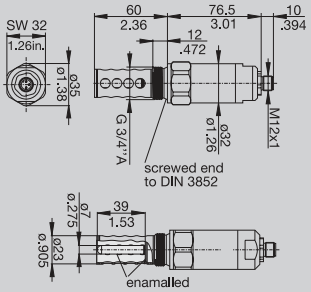
» Level Sensors

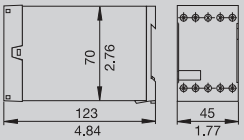
Type No.	NR160-...	NR260-...	NG03-...
Description	water and media with high relative dielectric constant ε_r 35...85	liquids (distilled water, de-ionised water, aggressive media)	power supply with relay output
Input voltage/ power consumption	DC 9...36 V typically 17 mA	DC 9...36 V typically 17 mA	AC 115/AC 230 V/AC 240 V +10%/-15%, typ. < 4 VA
Output	max. 1 A, LSS minus switching (or HSS plus switching); short-circuit proof and overload protected over the entire temperature range, with free-wheeling diode	max. 1 A, LSS minus switching (or HSS plus switching); short-circuit proof and overload protected over the entire temperature range, with free-wheeling diode	for Level Sensors NR 60, NR 80, NR 150, NR 160 DC 24 V, 50 mA
Ambient temperaturer	-20°C...+125°C (-4...+257 °F)	-30 °C...125 °C (-22...+257 °F)	0 °C...70 °C (+32...+158 °F)
Medium temperaturer	-20°C...+125°C (-4...+257 °F), for a short period (1 minute) up to 150°C (+302 °F)	-30 °C...+125°C (-22...+257 °F) for a short period (1 minute) up to 150°C (+302 °F)	–
Pressure resistance	25 bar/367.5 PSI	25 bar/367.5 PSI	–
Material			
Probe	PA12-Gf = Polyamid with glass fibre	Enamel	–
Fitting	V4A, DIN 1.4571	V4A, DIN 1.4571	–
Sealing (O ring) or sensor and fitting	–	Enamel ait tight	–
Housing	PA6-3-T = Trogamide	housing: Hastelloy C4 2.4610	–
Housing Cover	–	–	–
Electrical connection	Cable / Connector 3P M12	Connector 3P M12	–
Technical data	see pages 2 - 17 to 2 - 20	see pages 2 - 21 to 2 - 23	see pages 2 - 25

Dimensions



A	B	
	mm	inch
G3/4A	16	.630
3/4"NPT	21	.827





» Level Sensors

Selector chart	TLS100	NR80	NR150	NR160	NR260
Medium					
water	•	•		•	•
oil			•		•
powder				•	
Mounting method					
invasive			•	•	•
non-invasive [1]	•	•			
Function					
MIN oder MAX	•	•	•	•	•
Output					
PNP transitor	•	•	•	•	•
NPN transitor	•	•	•	•	•
LED display					
yes	•	•	•	•	
no					•
Input voltage					
DC 9 V...36 V	•	•	•	•	•
Medium temperature					
0...70 °C (80 °C) [2]		•			
-20...90 °C (125 °C) [2]	•				
-20...125 °C (150 °C) [2]			•	•	•
Ambient temperature					
0...70 °C		•			
-20...80 °C	•				
-20...125 °C			•	•	•
Process connector					
G3/4A			•	•	•
3/4" NPT			•	•	
Mounting clip:	•				
Pressure resistance					
25 bar/367.5 Psi			•	•	•

[1] non-metallic containers, [2] short-time

» Tube Sensor TLS100

Description

TLS100 (cable version)

The TLS100 tube sensor works on the capacitive measuring principle and detects the presence of a liquid in a plastic tube. These plastic tubes may also be mounted as a by-pass on a compensator in order to signal the required medium level in containers. The sensor is simply snapped onto the tube at the ideal level of the medium and provides versatile usage for a wide range of applications in medical equipment, the food stuffs industry etc. The sensor can additionally be fixed by means of the two mounting lugs to ensure a tight fit on the tube.

Ordering information

Type	Media	Process connection/tube diameter	Function	Output signal	Response delay [1]	Cable Connection	Specification of medium (option)	
TLS100	tube sensor (DC 9...36 V)							
	W	water (other liquids upon request)						
		A10	mounting clips/10 mm					
		A15	mounting clips/15 mm					
		A25	mounting clips/25 mm					
			A	Minimum OC (open circuit principle)				
			B	Maximum OC (open circuit principle)				
			C	Minimum RC (closed circuit principle)				
			D	Maximum RC (closed circuit principle)				
				L	LSS minus switching			
				H	HSS plus switching			
					0	500 ms		
					3	3 s		
						A	Cable (type: LVCC, AWG 24, 3 x 0,25 mm²), 2 m (standard)[2]	
						B	Connector M8 IEC 60947-5-2 3-pole [3] Specification of medium (option)	
							xxx	factory pre-set
TLS100	W	A10	A	L	0	A 2 m	xxx	ordering example

[1] Other delay periods upon request. [2] Other lengths upon request.
[3] Cable type 25 required – see accessories.

Caution

- The switch point is factory pre-set so as to lie exactly between the two mounting clips. When readjusting the switch point, please observe that it again lies between the two clips.
- A mass surface in the proximity (< 10 mm) may influence the switch point and may necessitate a readjustment
- For outdoor use we recommend mounting the level sensor TLS100 in a protective enclosure so as to avoid substantial fluctuation of the medium temperature and condensation between the capacitor plates.

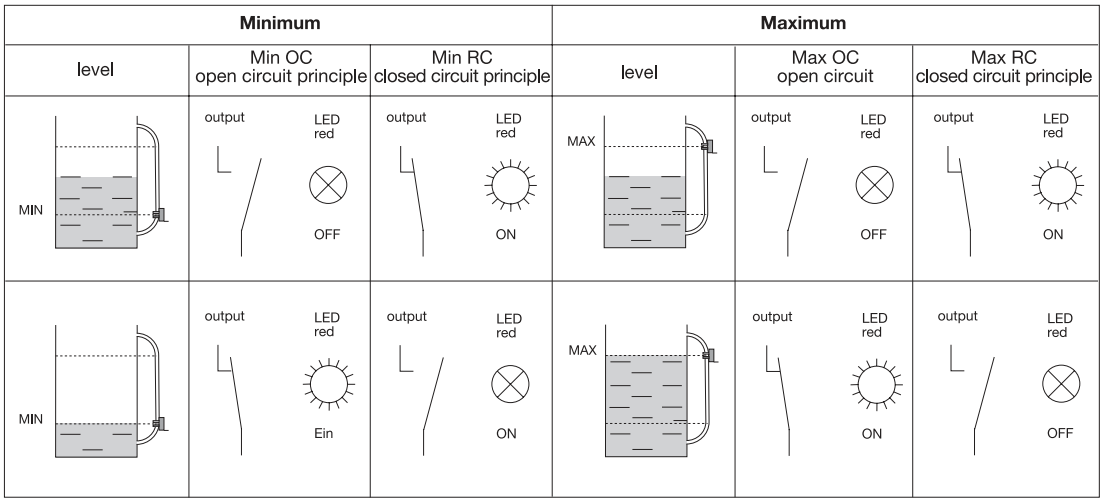
» Tube Sensor TLS100

Technical data (TU = 25°C, UB = DC 24 V)

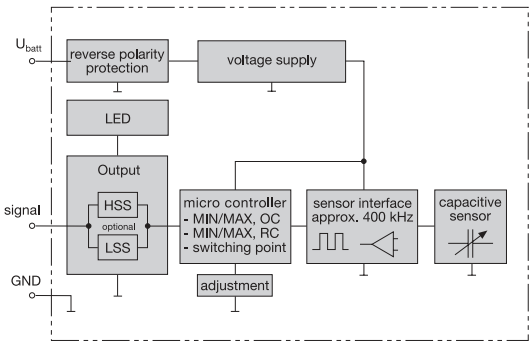
Operation voltage U_B:	DC 12/24 V (DC 9...36 V)
Power consumption:	typ. 8 mA
Output current:	max. 1 A, LSS minus switching (or HSS plus switching) short-circuit-proof and overload protected over the entire temperature range, with free-wheeling diode.
Voltage drop at output transistor:	< 200 mV at 1 A
Response delay of output signal:	typ. 500 ms (red LED lightedwhen output is switched)
Reverse polaritiy protection:	fitted between plus and minus pole
Short circuit and overload protection:	reset of output and autoreset after remedy of short circuit
Switch point with vertical mounting position:	adjustable via potentiometer; switch point must lie between the two mounting clips. .
Visual indication:	red LED lighted when output is switched
Switching point hysteresis:	vertically mounted: typically < 3 mm
Mdium temperature:	-20 °C...+90 °C
Ambient temperature:	-20 °C...+80 °C
Storage temperature:	-20 °C...+80 °C
Protection class:	IP65 (Standard)
Materials:	sensors: aluminium AlMg 3, coated housing: ultramid epoxy: polyurethane
Connection:	Cable: LVCC, AWG 24, 3 x 0,25 mm², length min. 0,1 m Connector: M8 IEC 60947-5-2 3-pole
Mounting:	mounting lug (ø 3,4 mm)
Marking:	laser marking/label
EMC requirements:	CE-logo in accordance with EMC directive 89/336/EWG In the event of extreme conducted interferences we recommend the negative signal to be grounded via a 100 nF capacitor.
Dimensions:	59 x 39,5 x 20 mm
Mass:	approx. 50 g (without cable)

» Tube Sensor TLS100

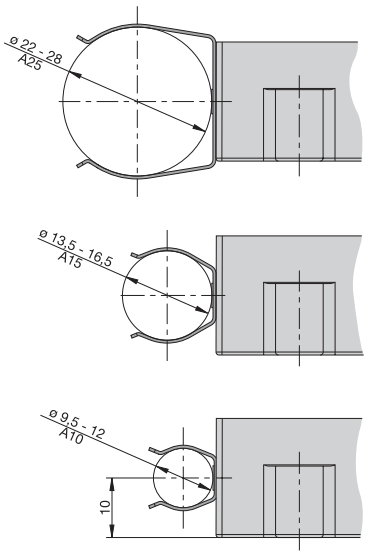
Status indication: MIN or MAX function factory pre-set



Schematic diagram



Mounting clips (dimensions)



Temperature drift [1)]

Temperature range	tolerance
0 °C...20 °C	± 2 mm
20 °C...60 °C	± 1 mm
60 °C...80 °C	± 2 mm

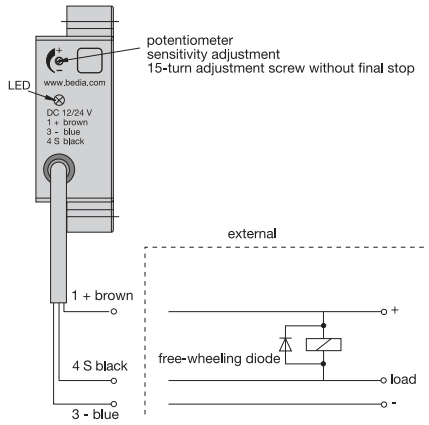
1) reference medium: tap water 300 µS/cm tube diameter 10 mm, wall thickness 2 mm, material PVC Switch point lies between mounting clips.

- We recommend adjusting the switch point at operating temperature of the medium. Should the medium temperature change significantly later, a re-adjustment of the switch point may be required.

» Tube Sensor TLS100

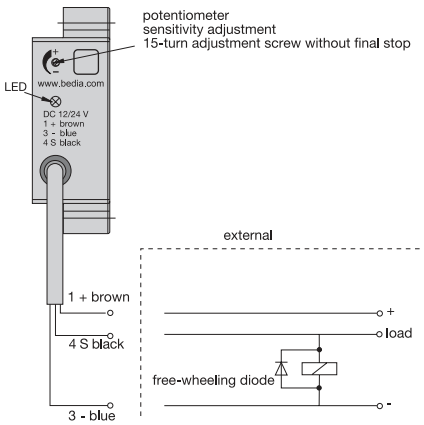
Connection diagram LSS

TLS100 minus switching [1)]



Connection diagram HSS

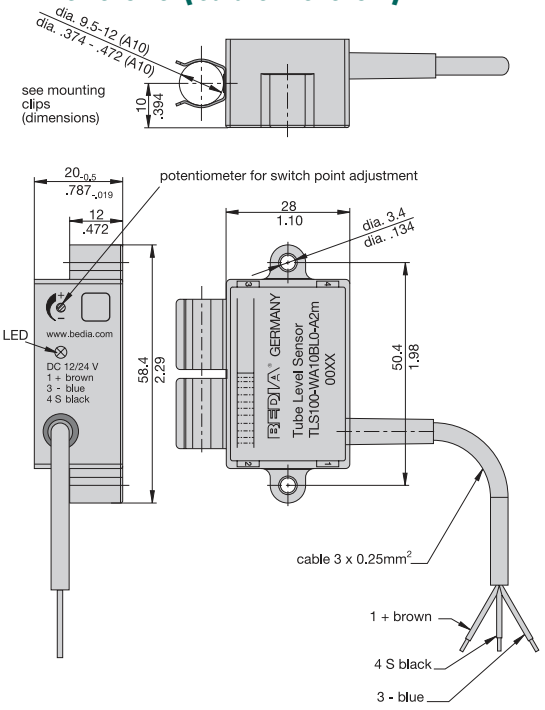
TLS100 plus switching [1)]



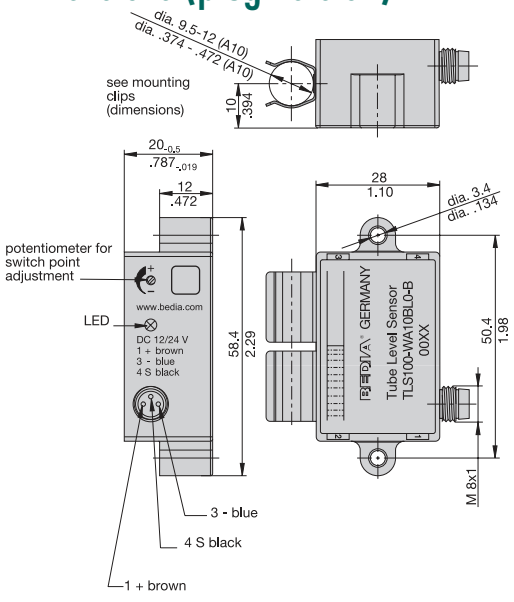
[1)] Electrostatic shielding

We recommend shielding on both sides for protection against EMC interferences with the ground connection as close as possible to the sensor. A long ground connection cable (e.g. in a remotely installed control cabinet) would NOT provide the required shielding and ought to be avoided.

Dimensions (cable version)



Dimensions (plug version)



» TLS100 - Accessories: Cable types

Cable type 25 with connectors

Description

Connecting cable M8 for tube sensor TLS100 (plug version) for connection of supply voltage and switching output.

Technichal data (Cable type 25)

Features:	protection class IP67 (only when plugged in with the corresponding connector), sheathing PUR halogen-fee; high resistance against chemical substances and oil.
Temperature range:	-25 °C...90 °C
Contact resistance:	< 5 mΩ
Current carrying capacity:	3 A
Insulation resistance:	> 10^9 Ω
Withstand voltage:	1,5 kV_{eff}/60 s

Ordering information	
Do + Ka type 25 - 2 m	with connector to IEC 60947-5-2, 3-pole M8 and PUR insulated cable 3x0.25 mm^2
Type	
Do + Ka type 25 - 2 m	ordering example (standard)

» NR80

Description

Level Sensor NR80 is designed to monitor a preset medium level in electrically non-conductive containers with a wall thickness up to approx. 5 mm. It is fitted outside the container. Suitable for water and other electrically conductive liquids with a high relative dielectric constant ε_r 35...85. Available as MIN or MAX sensor.

NR80-...

Ordering information

Type	Voltage rating	Housing	Output	Function (factory preset)	Cable	
NR80						level sensor for liquids
	DC 6 - 36 V					water (other liquids upon request)
		1				moulded housing (54,5 x 36 x 18 mm)
			1			NPN transistor, low side switching
			2			PNP transistor, high side switching
				MIN		minimum sensor
				MAX		maximum sensor
					2 m	Cable (type: LVCC, AWG 24, 3 x 0,2 mm², Ø 4 mm), 2 m (standard), 10m max. [1]
NR80	DC6-36V	1	1	MIN	2 m	ordering example

[1] Available cable lengths: 2 m, 3 m, 5 m, 8 m, 10 m.

» NR80

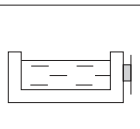
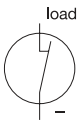
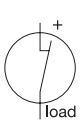
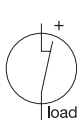
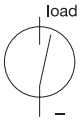
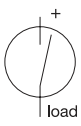
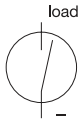
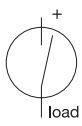
Technical data

Input voltage:	DC 6...36 V
Power consumption:	typ. 8 mA
Output, max. load:	max. 1 A, LSS minus switching (or HSS plus switching) short-circuit-proof and overload protected over the entire temperature range, with free-wheeling diode.
Voltage drop:	< 200 mV
Ambient temperature:	0 °C...70 °C
Medium temperature:	sensor not in contact with medium
Response delay:	approx. 60 ms
Switch point hysteresis (depending on medium viscosity):	vertically mounted: 12.5 mm max. (probe dia. = dia. of active surface)
Reverse polarity protection:	fitted between plus and minus pole
Degree of protection (DIN 40050):	IP54 housing
Medium:	water and similar media
Connection:	3-wire AWG 24 cable
Material housing:	ABS = acrylonitrile butadine styrene
Mounting method:	outside container (see dimension diagram)
Mounting attitude:	optional
Cable length:	2 m standard, max. 10 m
Mass:	approx. 90 g

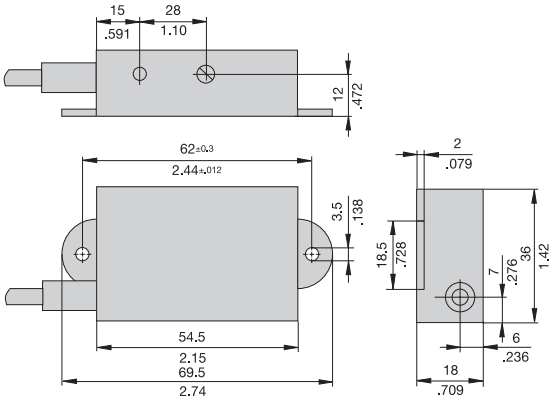
CE-mark to demonstrate compliance with applicable directive.

» NR80

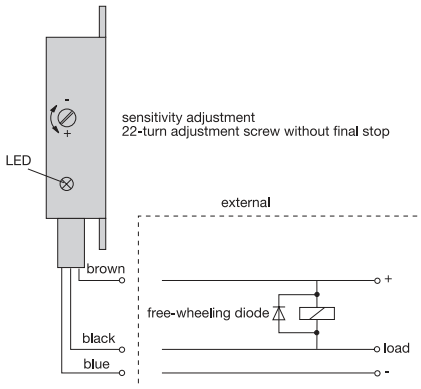
Status indication factory preset for MIN or MAX

Minimum				Maximum			
medium level	transistor output		LED green	medium level	transistor output		LED green
	NPN	PNP			NPN	PNP	
			 ON				 ON
			 OFF				 OFF

Dimensions

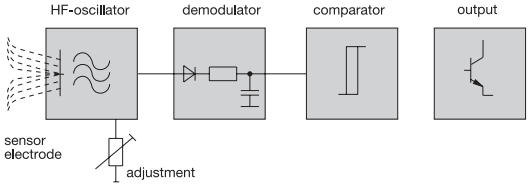


NR80-DC 6-36-11-... (NPN transistor) Connection diagram

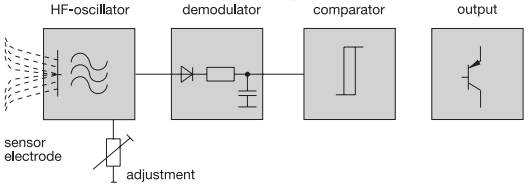


Schematic diagram

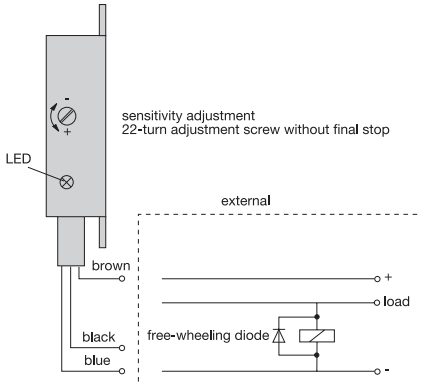
transistor output NPN, minus switching



transistor output PNP, plus switching



NR80-DC 6-36-12-... (PNP transistor)



» NR150

Description

NR150-...

Level Sensor NR150 is suitable for liquids with low relative dielectric constant ε_r 1,8...6 (ref. ε_r 2,1). With MIN/MAX selector switch. The functions for MIN or MAX monitoring as well as other properties (output signal LSS or HSS, response delay etc.) are factory pre-set.

The switch point is adjustable by means of a teach-in momentary switch.

Ordering information

Type No.	Voltage rating	Medium	Mounting method	Function	output signal	Self test function	Response delay	Fitting material	Connection	
NR150	level sensor for oils and media with low electrical conductivity									
	U2	DC 9...36 V								
		F	oil							
		S	special medium							
			02	G3/4A thread to DIN 13, part. 6, ISO 228/1						
			04	3/4" NPT thread to ANSI B1.20.1						
				A	Minimum OC (open circuit principle)					
				B	Maximum OC (open circuit principle)					
				C	Minimum RC (closed circuit principle)					
				D	Maximum RC (closed circuit principle)					
					L	LSS minus switching				
					H	HSS plus switching				
						0	without			
						1	1 second			
						2	2 seconds			
							00	without		
							02	2 seconds		
							03	3 seconds		
							07	7 seconds		
							17	17 seconds		
								2	stainless steel V4A-DIN 1.4571/AISI 316 Ti	
									A	with cable gland [1]
									E12	connector M12x1, 3-pole (standard) [2]
NR150	U2	F	02	A	H	0	00	2	A	ordering example

[1] cable type 20: see accessories, [2] suitable connecting cable: Do + Ka type 24: see accessories

» NR150

Technical data

Input voltage:	DC 9-36 V
Power consumption:	typ. 15 mA
Output, max. load:	transistor, plus switching (HSS) or minus switching (LSS) 1.0 A cont. duty at max. 125 °C and 24 V DC 1.0 A cont. duty at max. 105 °C and 32 V DC 1.5 A short-time overload, power LED blinking, short circuit and overload proof, with integral free-wheeling diode
Voltage drop:	< 200 mV
Ambient temperature:	-20 °C...125 °C
Medium temperature:	-20 °C...125 °C, for a short period (1 minute) up to 150 °C
Response delay:	typ. 500 ms
Switching point hysteresis, (depending on medium viscosity):	horizontally mounted: 5 mm max. (probe dia.)
Reverse polarity protection:	fitted between plus and minus pole
Degree of protection (DIN 40050):	IP68 housing (with mating connector)
Cable gland:	M16x1,5
Pressure resistance:	25 bar/367.5 PSI
Connection:	screw terminals max. 1,5 mm^2 (AWG 16)
Material:	probe: ETFE fitting adapter: V4A, DIN 1.4571 seal (O ring): EPDM70, black, interlaced peroxide housing cover: PA6-3-T = Trogamid transparent
Material spec.:	ETFE = Tefzel® 200
Vibration (sinusoidal, IEC 60068-2-6):	10 Hz...57 Hz (0,765 mm), 57 Hz...2 000 Hz (10 g)
Shock (IEC 60068-2-27):	50 g/11 ms
EMC requirements (EMC directive, CE logo):	interference: EN 61000-6-3/4 interference: EN 61000-6-2
Mounting method:	screw in
Mounting attitude:	optional
Cable lenght:	200 m max. (AWG 24) Observe voltage drop!
Mass:	approx. 215 g ... 300g

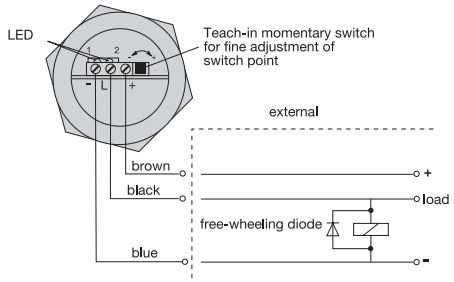
CE-mark to demonstrate compliance with applicable directive.

Status indication: MIN or MAX

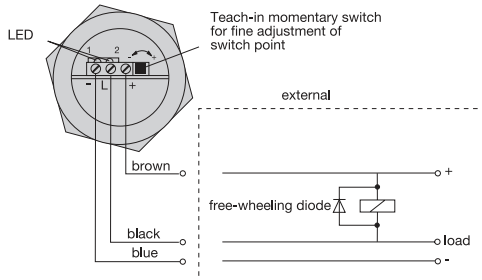
Minimum			Maximum		
level	Min OC open circuit principle (N/O)	Min RC closed circuit principle (N/C)	level	Max OC open circuit principle (N/O)	Max RC closed circuit principle (N/C)
normal level	output transistor; signal LED green: OFF; power LED red: ON	output transistor; signal LED green: ON; power LED red: ON	normal level	output transistor; signal LED green: OFF; power LED red: ON	output transistor; signal LED green: ON; power LED red: ON
switching level	output transistor; signal LED green: ON; power LED red: ON	output transistor; signal LED green: OFF; power LED red: ON	switching level	output transistor; signal LED green: ON; power LED red: ON	output transistor; signal LED green: OFF; power LED red: ON
short circuit/overload at switching output (output transistor)	OFF; flashing		short circuit/overload at switching output (output transistor)	OFF; flashing	

Connection diagram

cable version
transistor output HSS (plus switching)

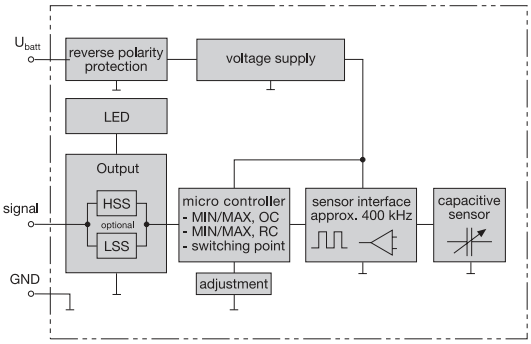


transistor output LSS (minus switching)

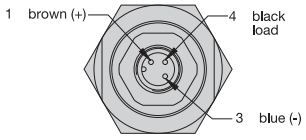


In the event of extreme conducted interferences we recommend grounding the minus signal via a 100 nF capacitor.

Connection diagram



plug version
connector pins DIN EN 50044 or IEC 947
M12x1 3-pole

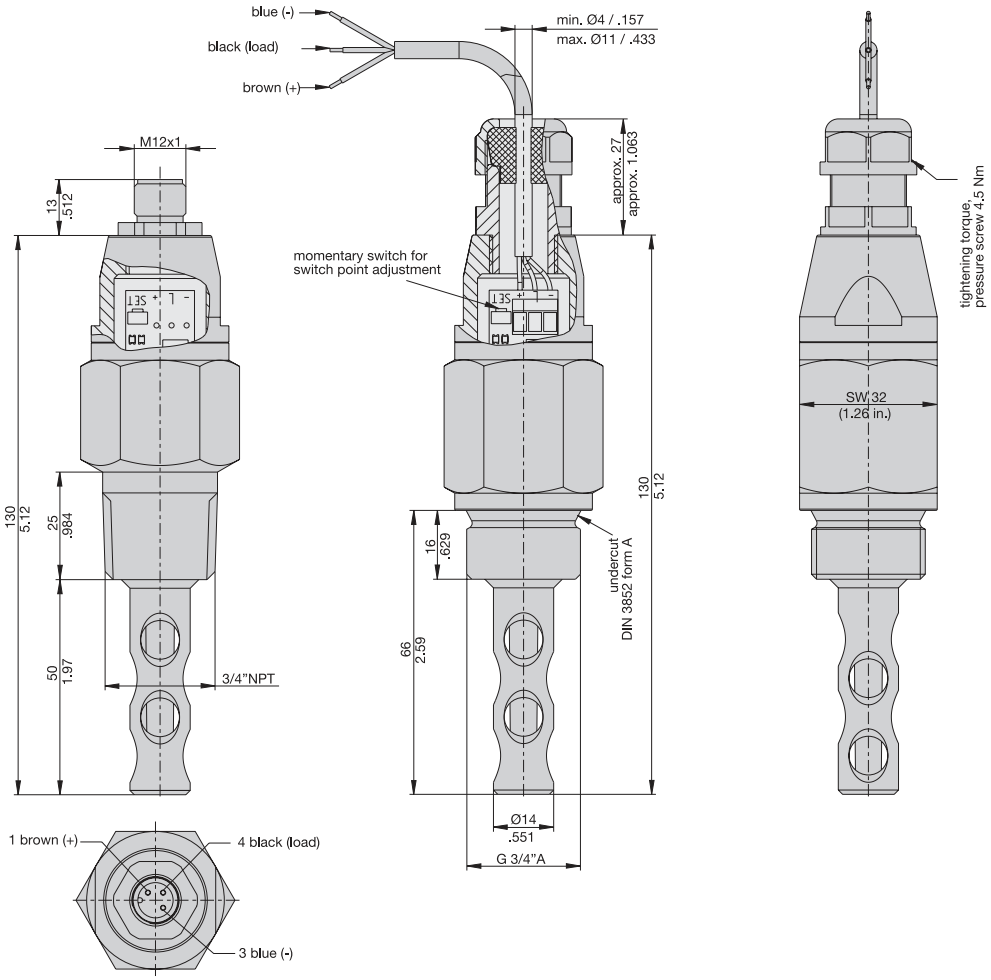


» NR150

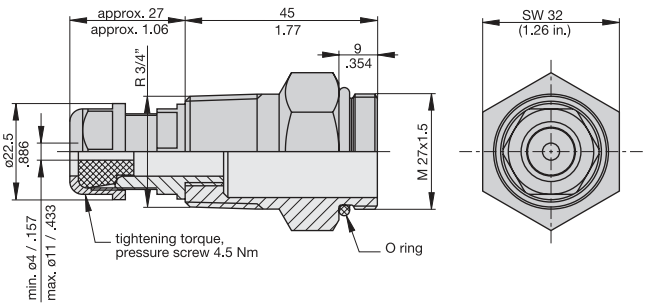
Dimensions

plug version

cable version



adapter for extension
X 222 789 01



» NR150 - Cable types

Cable type 24 with connectors

Description

M12 plug-in electrical connection for supply voltage and transistor output for supply voltage and transistor output.

Technical data (cable type 24)

Features:	Protection degree IP67 (only with connector fitted) Resistant to chemicals and oils
Temperature range:	-25 °C...80 °C
Contact resistance:	5 mΩ
Current carrying capacity:	4 A
Insulation resistance:	> 10⁹ Ω
Withstand voltage:	2,0 kV_{eff} / 60 s

Bestellnummernschlüssel	
Do + Ka Typ 24 - 5 m	with connector to IEC60947-5-2, 3-pole, M12 and PUR insulated cable 3x0,34 mm² (AWG 22) halogen-free
Type	
Do + Ka Typ 24 - 5 m	ordering example

Orderin information for cable type 20		
Ka Typ 20	PVC control cable, AWG 24, 3x0,25 mm², RAL 9005	
Type No.	. . . m	2 m, 3 m, 5 m, 8 m, 10 m, 15 m, 20 m, 25 m, 30 m ... 200 m, in 10 m steps
	Available cable lengths	
Ka Typ 20	2 m	ordering example

» NR160

Description

NR160-...

Capacitive Level Sensor NR160 is designed to monitor liquids and powders with high relative dielectric constant ε_r 35...85.

The functions for MIN or MAX monitoring as well as other properties (output signal LSS or HSS, response delay etc.) are factory pre-set. The switch point is adjustable by means of a teach-in momentary switch.

Orderin information

Type	Voltage rating	Medium	Mounting method	Function	Output signal	Self test function	Response delay	Fitting material	Connection	
NR160	level sensor for water and media with low electrical conductivity									
	U2	DC 9...36 V								
		W	water							
		S	special medium							
			02	G3/4A						
			04	3/4" NPT						
				A	Minimum OC (open circuit principle)					
				B	Maximum OC (open circuit principle)					
				C	Minimum RC (closed circuit principle)					
				D	Maximum RC (closed circuit principle					
					L	LSS minus switching				
					H	HSS plus switching				
						0	without			
						1	1 second			
						2	2 seconds			
							00	without		
							02	2 seconds		
							03	3 seconds		
							07	7 seconds		
							17	17 seconds		
								2	stainless steel V4A-DIN 1.4571	
									A	with cable gland [1]
									E12	connector M12x1, 3-pole (standard) [2]
NR160	U2	W	02	A	H	0	00	2	A	ordering example

[1] cable type 20: see accessories, [2] suitable connecting cable: Do + Ka type 24: see accessories

» NR160

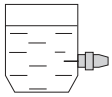
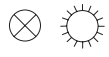
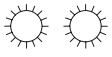
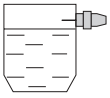
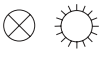
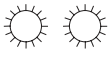
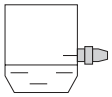
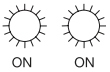
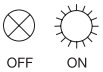
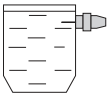
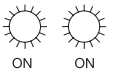
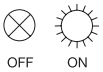
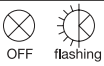
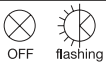
Technical data

Input voltage:	DC 9...36 V
Power consumption:	typ. 17 mA
Output, max. load:	Transistor, plus switching (HSS) or minus switching (LSS) 1,0 A cont. duty at max. 125 °C and 24 V DC 1,0 A cont. duty at max. 105 °C and 32 V DC 1,5 A a short-time overload, power LED blinking, short circuit and overload proof, with integral free-wheeling diode
Voltage drop:	< 200 mV
Ambient temperature:	-20 °C...125 °C
Medium temperature:	-20 °C...125 °C, for a short period (1 minute) up to 150°C
Response delay:	typ. 500 ms
Switching point hysteresis, (depending on medium viscosity):	horizontally mounted: 21.8 mm max. (probe dia.)
Reverse polarity protection:	fitted between plus and minus pole
Degree of protection (DIN 40050):	IP68 housing
Cable gland:	M16x1.5
Pressure resistance:	25 bar/367.5 PSI
Connection:	screw terminals max. 1 mm² (AWG 18)
Material:	probe: PA12-Gf 30 fitting, Adapter: V4A, DIN 1.4571/AISI 316 Ti sealing (O ring): EPDM70, black, interlaced peroxide housing cover: PA6-3-T
Material spec.:	PA12-Gf30 = Polyamide with glass fibre 30% PA6-3-T = Trogamide, transparent
Vibration (sinusoidal, IEC 60068-2-6):	10 Hz...57 Hz (0.765 mm), 57 Hz...2 000 Hz (10 g)
Shock (IEC 60068-2-27):	50 g/11 ms
EMC requirements (EMC directive, CE logo):	interference: EN 61000-6-3/4, interference: EN 61000-6-2
Mounting method:	screw in
Mounting attitude:	optional
Cable length:	200 m max. (AWG 24), observe voltage drop!
Mass:	approx. 190 g ... 270 g

CE-mark to demonstrate compliance with applicable directive.

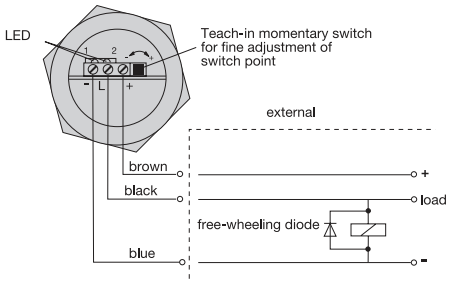
» NR160

Status indication: MIN or MAX

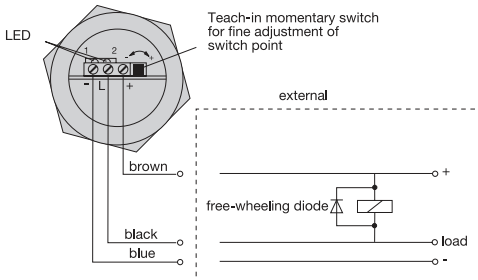
Minimum			Maximum		
level	Min OC open circuit principle (N/O)	Min RC closed circuit principle (N/C)	level	Max OC open circuit principle (N/O)	Max RC closed circuit principle (N/C)
normal level 	output transistor signal LED green power LED red  OFF ON	output transistor signal LED green power LED red  ON ON	normal level 	output transistor signal LED green power LED red  OFF ON	output transistor signal LED green power LED red  ON ON
switching level 	output transistor signal LED green power LED red  ON ON	output transistor signal LED green power LED red  OFF ON	switching level 	output transistor signal LED green power LED red  ON ON	output transistor signal LED green power LED red  OFF ON
short circuit/overload at switching output (output transistor)  OFF flashing			short circuit/overload at switching output (output transistor)  OFF flashing		

Connection diagram

cable version
transistor output HSS (plus switching)

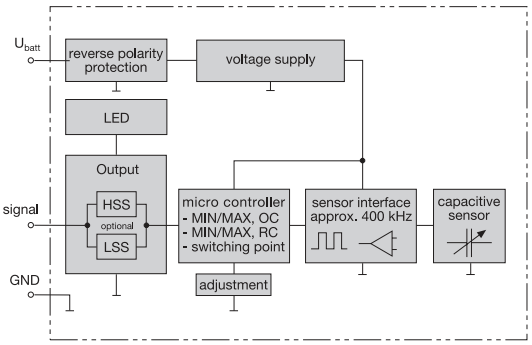


transistor output LSS (minus switching)

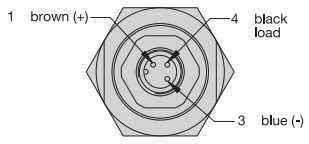


In the event of extreme conducted interferences we recommend grounding the minus signal via a 100 nF capacitor.

Connection diagram

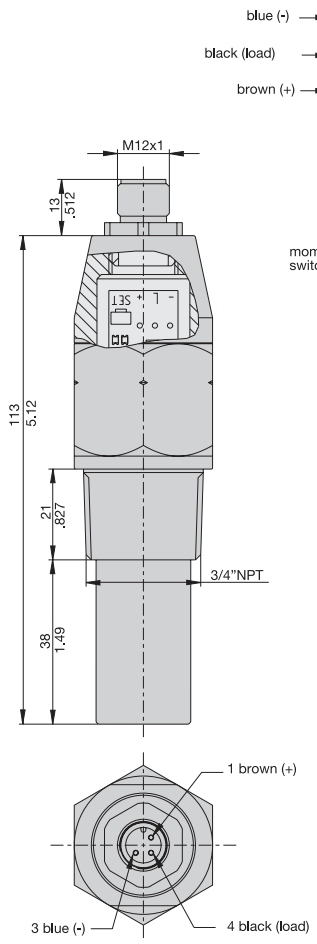


plug version
connector pins DIN EN 50044 or IEC 947
M12x1 3-pole

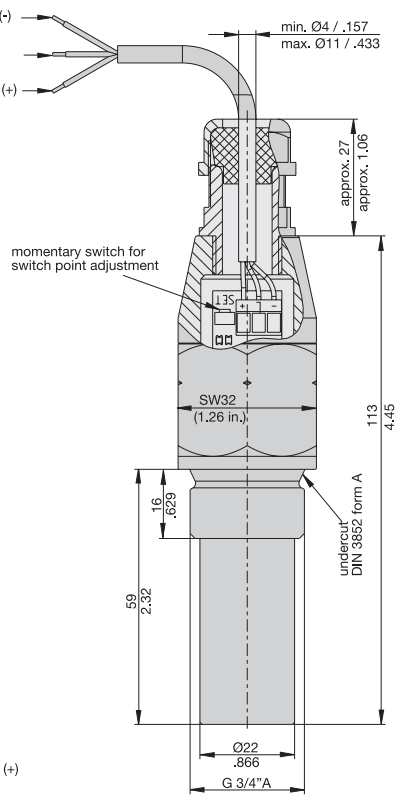


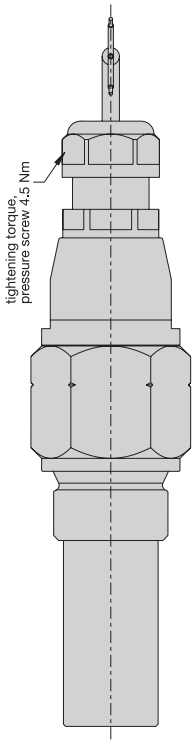
Dimensions

plug version

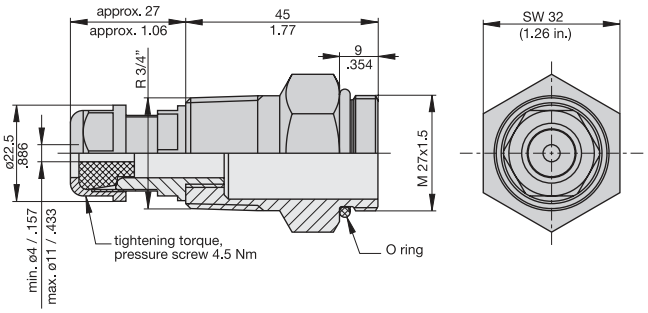


cable version





adapter for extension
X 222 789 01



» NR160 - Cable types

Cable type 24 with connectors

Description

M12 plug-in electrical connection for supply voltage and transistor output.

Technical data (Cable type 24)

Features:	Protection degree IP67 (only with connector fitted) Resistant to chemicals and oils
Temperature range:	-25 °C...80 °C
Contact resistance:	≤ 5 mΩ
Current carrying capacity:	4 A
Insulation resistance:	> 10⁹ Ω
Withstand voltage:	2,0 kV_{eff} / 60 s

Cable and cable connector for NR160 with connection type B	
Do + Ka Typ 24 - 5 m	with connector to IEC60947-5-2, 3-pole M12 and PUR insulated cable 3x0.34 mm² (AWG 22) halogen-free mm²
Type	
Do + Ka Typ 24 - 5 m	ordering example

Ordering information for cable type 20 for NR160 with cable gland type PG7		
Ka Typ 20	PVC control cable, AWG 24, 3x0,25 mm², RAL 9005	
Type	. . . m	2 m, 3 m, 5 m, 8 m, 10 m, 15 m, 20 m, 25 m, 30 m ... 200 m, in 10 m steps
	Available cable lengths	
Ka Typ 20	2 m	ordering example

» NR260

Description

NR260-...

Capacitive Level Sensor for monitoring liquids.

Designed for use in fuel cells. The material is also suited to applications in the chemical industry for monitoring aggressive media.

The functions for MIN or MAX monitoring as well as other properties (output signal LSS or HSS, response delay etc.) are factory pre-set.

Features

- high medium resistance of materials enamel, Hastelloy C4 2.4610 and stainless steel 1.4571
- high protection class IP67 with connector
- short-circuit proof switching output 1 A, high side or low side switch
- MAX sensor or MIN sensor
- switch point factory pre-set for the fellowing media:
  - de-ionised water (conductivity < 4,2 µS/cm): 28 mm ± 2 mm
  - tap water (conductivity ≈ 300 µS/cm): 22 mm ± 2 mm
  - other media upon request; switch point adjustment via programmable interface on request

» NR260

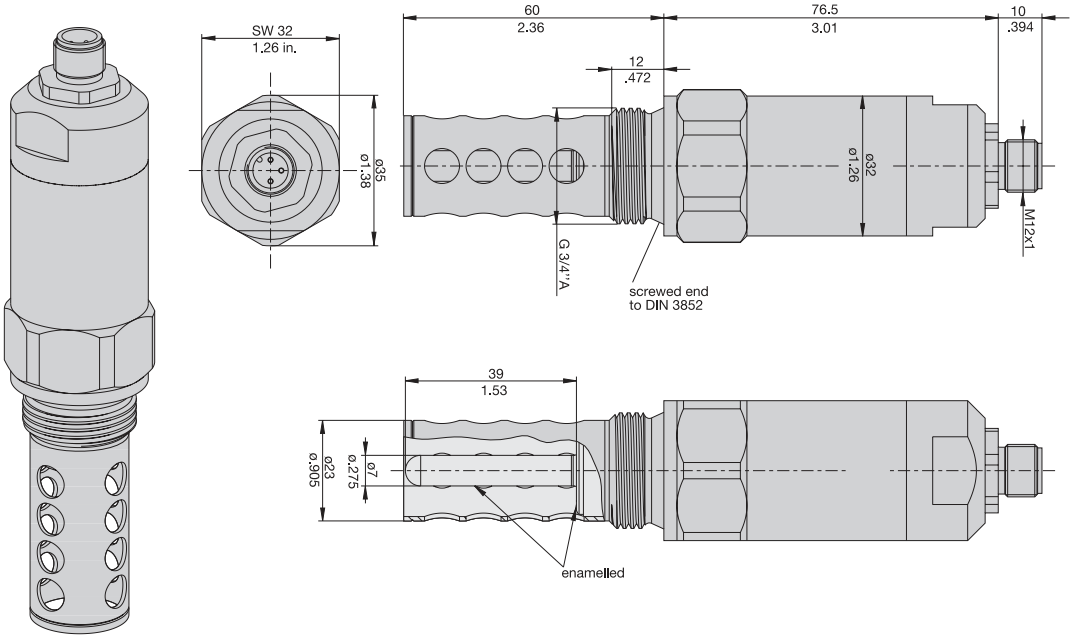
Technical data

Input voltage:	DC 9...36 V	
Power consumption:	typ. 17 mA	
Output, max. load:	transistor, high side switching or low side switching max. 1 A short-circuit and overload protected with free-wheeling diode	
Voltage drop:	< 300 mV at 1 A	
Ambient temperature:	-30 °C...125 °C	
Medium temperature:	-30 °C...125 °C, (max. +150 °C duration 1 minute)	
Response delay:	approx. 250 ms	
Mode of operation:	MAX or MAX monitoring	
Reverse polarity protection:	fitted between plus and minus pole	
Degree of protection (DIN 40050):	IP67 with connector	
Pressure resistance:	25 bar/367.5 PSI	
Connection:	Connector M12 3P	
Material:	probe:	Enamel
	fitting:	Hastelloy C4 2.4610
	sealing:	enamel air tight
Vibration (sinusoidal, IEC 60068-2-6, Fc):	10 Hz...57 Hz ± 1,6 mm, 57 Hz...2000 Hz 10 g frequency change: max. 1 octave/minute 3 directions: X, Y, Z (1 cycle each)	
Shock (IEC 60068-2-27, Ea):	22 g, 20 ms, half-sine, all-side	
Mounting method:	process connection G 3/4 A	
Mounting position:	user-defined	
Mass:	approx. 370 g	

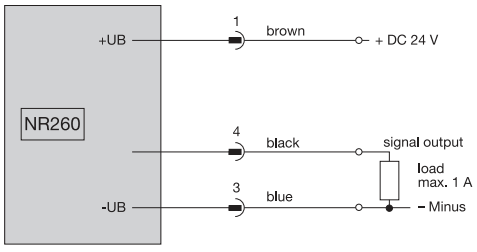
CE-mark to demonstrate compliance with applicable directive.

» NR260

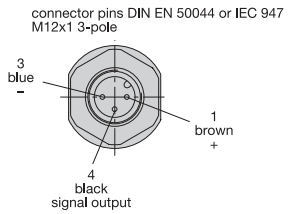
Dimensions



Connection diagram



Electrical connection



» NR260 - Cable types

Cable type 24 with connectors

Description

M12 plug-in electrical connection for supply voltage and switching output.

Technical data (Cable type 24)

Features:	Protection degree IP67 (only with connector fitted) Resistant to chemicals and oils
Temperature range:	-25 °C...80 °C
Contact resistance:	≤ 5 mΩ
Current carrying capacity:	4 A
Insulation resistance:	> 10⁹ Ω
Withstand voltage:	2,0 kV_{eff} / 60 s

Ordering information	
Do + Ka Typ 24 - 5 m	with connector to IEC60947-5-2, 3-pole M12 and PUR insulated cable 3x0.34 mm^2 (AWG 22), halogen-free
Type	
Do + Ka Typ 24 - 5 m	ordering example

» Power supply NG03

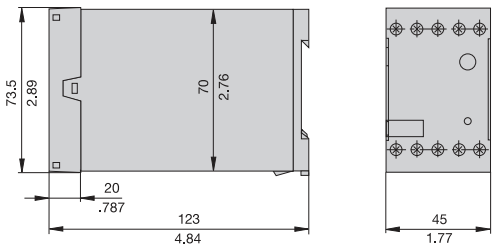
Description

NG03

The NG03 power supply is suitable for BEDIA Level Sensors TLS100, NR80, NR150, NR160 and NR260. It has a relay output with adjustable switching delay which is controlled by the signal output of the sensor. Status indication is by green LED. Power failure and wire break are indicated in the same way as incorrect medium level (closed circuit principle).

Ordering information		
NG03	Power Supply for mounting on DIN rail 50 022-35	
Type No. / Input voltage	AC 115 V	50/60 Hz
	AC 230 V	50/60 Hz
	AC 240 V	50/60 Hz
NG03	AC 230 V	ordering example

Dimensions



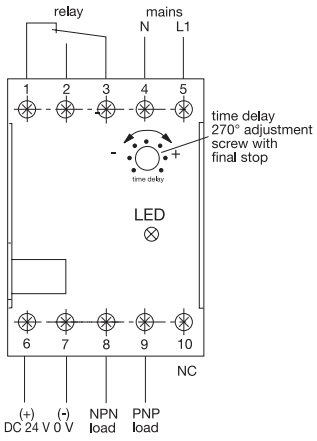
» Power supply NG03

Technical data

Input voltage:	AC 115/230 V/240 V 50/60 Hz + 10 %/-15 %
Power cosumption:	max. 4 VA
Output voltage:	DC 24 V
Output current:	50 mA
Ambient temperature:	0 °C...70 °C
Degree of protection:	IP20
Connection:	screw terminals, max. 2,5 mm²
Relay output:	potential-free change over contact: 1 20 W/1200 VA, DC 100 V/AC 250 V 5 A
Mass:	approx. 290 g
Switching delay:	1 - 60 sec, adjustable
Mounting method:	on DIN rail 50 022-35

CE-mark to demonstrate compliance with applicable directive.

Connection diagram



Contact position de-energized.
LED lights when relay is energized.

» Level Sensors

Applications

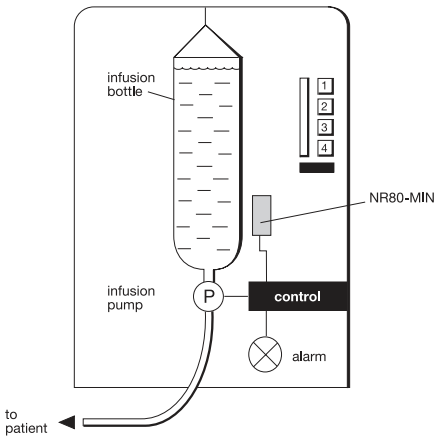
BEDIA Level Sensors are used wherever there is a need for a yes/no indication as to whether the medium is available or not, to supervise the filling level of containers, or to protect pipelines from liquid leakage.

BEDIA Level Sensors are suitable for use in harsh environments to monitor almost any liquid, powders and granules (please inquire for aggressive media). Small deposits on the sensors do not affect their performance. Level Sensor NR100 is suitable for sanitary applications. Steam cleaning does not harm this sensor.

Application examples

NR80 in medical equipment

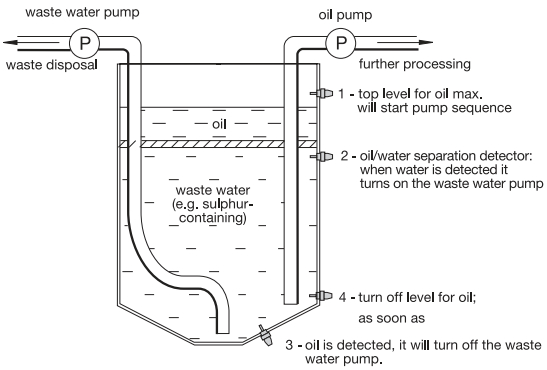
Indication that infusion bottles are empty: To overcome personnel shortages, level sensing of infusion bottles can be provided by Level Sensor NR80 which is able to sense the liquid value through the bottle wall.



Application examples

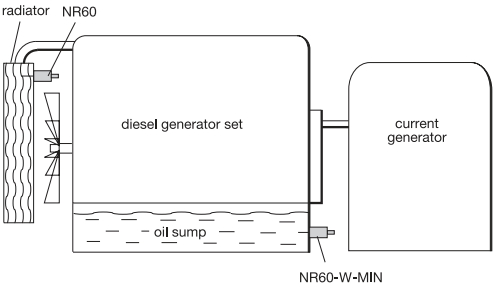
NR160 - Pump sequence for separation:

- When top level (1) of oil is detected, the waste water pump starts. The waste water pump stops when oil is detected (3). The oil pump starts and pumps until low level oil detector (4) reacts. This stops the action.
- If the water level reaches the oil/water separation detector (2) the waste water pump starts. This pumps until the low oil level is reached (3). This stops the waste water pump.



NR150 / NR160in process control systems

Low level sensing of oil and cooling water in emergency diesel generator sets.



» Notices

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