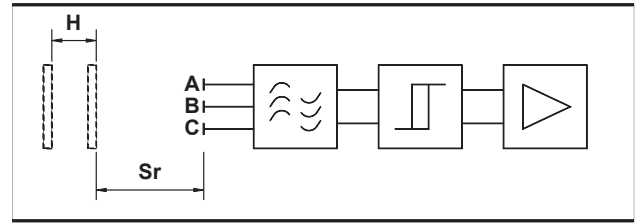


Capacitive Proximity Switches

Capacitive proximity switches consist of an RC-oscillator with a special multi-part sensing electrode. The electrode and the oscillator circuit have a tube connected with earth potential for lateral shielding. This enables flush mounting of the sensor in metal, since the electrical field is only present in front of the sensing electrode. This field is the active zone of the sensor. When the conductive material is removed from the active zone, the oscillator is undamped and the oscillation amplitude decreases. The amplifier of the oscillator voltage and the sensitivity of the sensor can be altered by the built-in potentiometer.

The middle electrode together with the built-in re-coupling gives very effective compensation under conditions of humidity, dust or icing. Special circuitry automatically compensates for these influences. The preset sensing distance remains nearly constant. The electrode design, along with the compensating circuitry of capacitive sensors, is a unique design, and provides performance advantages far superior to other capacitive sensors.



**A indicates SENSOR ELECTRODE
B AND C indicates COMPENSATION ELECTRODES**

Applications

The capacitive switches may be used to limit the level in tanks and containers. The contents may be fluids, pulverized or granulated materials such as PVC powder, dyes, flour, sugar, powdered milk etc. Further applications are as end and limit switches for checking and regulating machinery setting, (even if the materials are non-metallic as in conveyor belt positioning and material stacking); checking drive belts and paper reels for sag and tear. Additionally they may be used as detectors for counting metal and non-metal components.

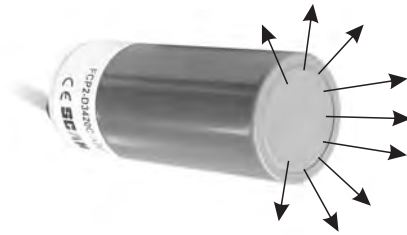
Shielded Configuration

Sensors with a straight-line electrical field. These units scan solids (e.g. wafers, components, PCB's, hybrids, cartons, paper piles, bottles, plastic blocks and stacks of paper) at a distance, or liquids through a separating wall (glass or plastic up to a max. of 4 mm thick).



Non-shielded Configuration

Sensors with a spherical electrical field. These units are designed to touch the product, bulk goods or liquids (e.g. granulate, sugar, flour, corn, sand or oil and water) with their active surface.



Sensing Distance

The data was obtained using a 1 mm thick square steel plate (st37) as an actuator, with a side length equal to $3 \times S_n$. The steel plate was grounded. Ambient temperature was 25°C . The largest possible sensing distance is defined as the nominal sensing distance with a Tolerance $\pm 10\% S_n$.

The sensing distance depends upon shape, size and nature of the object concerned. If the plate is made from a different material or has a smaller diameter, the sensing distance will be reduced.

Size Correction Factor

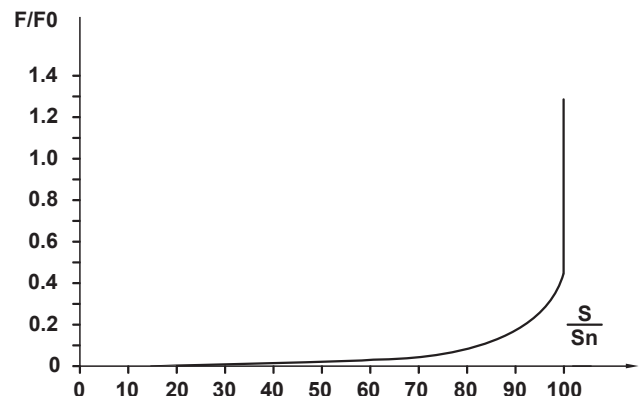
For objects which are not flat and are smaller in relation to the active sensor surface, the following sensing distances are obtained depending on the scaled object surface F/F_0 , where:

F = sensor front surface (active surface), and F_0 = front surface of the object being scanned. The figures in the table below refer to flush sensors, and objects in the form of long thin

Notes:

The three right-hand columns of the table reflect the application example for a C1NF18A08A sensor; The diagram below shows in graphic form the data from the table.

Scaled Object Surface (F/F_0)	Sensing Distance (S_n : mm)	C of Object (mm)	F (mm^2)	S (mm)
1.50	100	22.0	380.0	8.0
1.24	100	20.0	314.0	8.0
0.80	100	16.0	201.0	8.0
0.61	100	10.0	154.0	8.0
0.31	94.0	14.0	79.0	7.5
0.20	85.0	8.0	50.0	6.8
0.15	82.5	7.0	38.0	6.6
0.05	67.5	4.0	13.0	5.4
0.03	57.5	3.0	7.0	4.6





Material Correction Factor

If the material of the object in question is not metal or water, the sensing distance is reduced.
 The reduction factors for the different materials are shown in the table below.

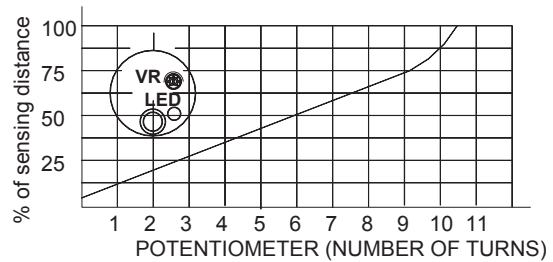
Actuating Material	Sensing Distance (compared to a surface of water)			
	20mm	10mm	15mm	10mm
Hand	20	10	15	10
Square steel plate (100x100x1)	20	10	15	10
Round Steel Plate (Ø30 x1)	11	6	4	2
Stone (marble)	18	8.5	8	5
Wood	13	5	5	3
Glass	12	4	6	2.5
Carbon	19	9	12	9
PVC-block (30x30x5)	8	4	1.5	/
Lupulin granulate 1800H	8	3	2.5	Head approx. 2mm immersed
Polystyrene 454 H	9.5	3	4	1
Hostalen GC 8960H	8.2	1.5	2	Head approx. 1mm immersed
Vestron 719-50	7.9	1.2	2	Head approx. 3mm immersed
Hostyren	8.2	3	3	Head approx. 1mm immersed
BM scrap material (Z)	6.7	1.4	1	Head surrounded
Hostalen GC coarse powder	8	2	1.5	Head approx. 3mm immersed
Lupulin fine granulate	7.7	1.5	1	Head approx. 3mm immersed
Hostaform C	9.8	3.5	4	1
Hostyren (polystyrene)	7.4	2	2.5	Head approx. 2mm immersed
Hostalit S	7.5	2	2.5	Head surrounded
Hostalen PP	5	1.5	1.5	Head surrounded
Hostalit E	7.2	1	1	Head approx. 4mm immersed
Styropor unfoamed	8.1	3	3	0.5
Styropor (Ø1.5)	/	/	/	/
Antimony-trioxide	6.2	0.9	2.5	Direct contact
Oil	9	3	5	3
Maximum sensing-distance Critical point	55	55	110	/

Conditions:

- Tu=25°C; Va=24 VDC
- In each case, the measurements were made from a level surface.

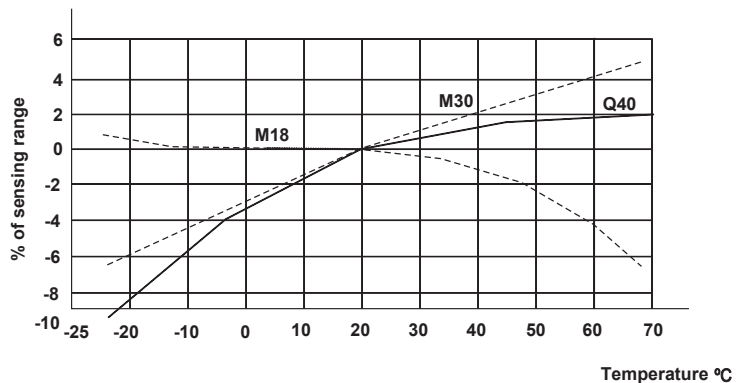
Sensitivity Adjustment

Capacitive proximity sensors have a fourteen turn potentiometer. The potentiometer must be adjusted to suit most applications. Turn clockwise to increase sensitivity. From the original setting of 0.7-0.8xSn (Sn=nominal range), the nominal sensing range is reached after 2-3 clockwise turns. This, however, leads to nonlinearity of the curve and oversensitivity, which may lock on the sensor. If this occurs, decrease sensitivity by turning the potentiometer 2-3 turns counter clockwise.



Temperature

Capacitive proximity switches will function within a temperature range of -25°C to +70°C. The switching distance deviation is 20% provided that the switching distance is not greater than the nominal switching distance (taking into consideration the reduction factors of the material).



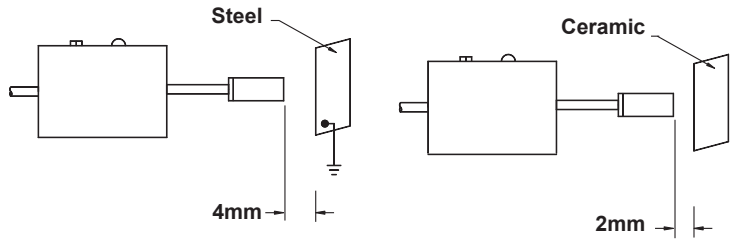
Sensors For Shielded Mounting

Normally, the linear field of shielded sensors scans block materials for distance. In order to obtain faultless switching of sensors, check the maximum switching gap as described below before putting the device into operation:

Example:

To be scanned by a DC capacitive mini C1AE12A04A and its' amplifier CP-700N-ACU. Set the sensor to the maximum switching gap S_n of 4mm over steel or hand using its amplifier. After setting a gap of 4mm, move the sensor over the ceramic plate. approximately 2mm.

The distance of 2mm is now the maximum switching gap on the ceramic plate. Optimum switching ensured if the sensor scans the ceramic plate under 2mm and the calibration is not exceeded.



Note:

The sensors are set to a greater switching gap than the rated switching gaps S_n specified in the catalog to ensure operation within the technical specifications. If the operator increases the switching gap to 4 mm over the ceramic plate as described above, the sensor will be operating outside its range. This may lead to faulty switching in the sensor due to temperature effects and voltage transients in the power source.

Example:

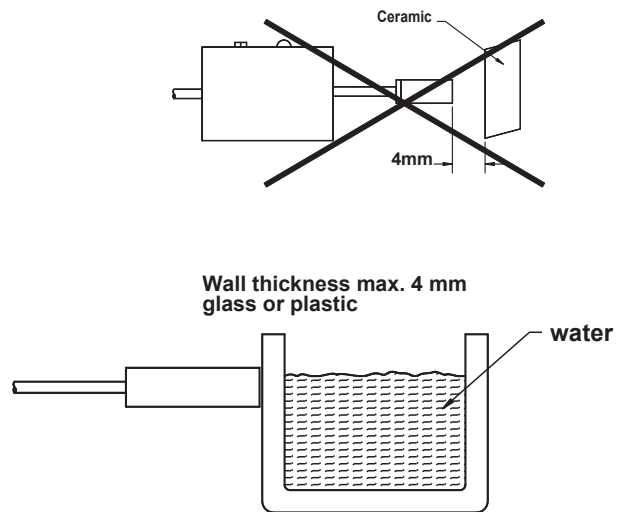
A liquid e.g. water, is to be scanned through a partition wall by a flush sensor type C1NF34A25A. The partition wall made of glass or plastic with a max. thickness of 4 mm. To calculate the wall thickness, the thickness in mm will be 10...20% of the switching gap of the sensor but a max. of 4 mm.

The face (active surface) of the sensor is bonded to the glass or plastic wall. The vessel is filled with water until approx. 75% of the active surface of the sensor is covered. Turn the potentiometer of the sensor counterclockwise (reduce sensitivity) until the LED and the output signal turn off.

Turn the potentiometer clockwise (increase sensitivity) until the LED and the output signal switch on.

Using the calibration process described ensures that the sensor does not detect the wall or the water residue on the wall.

It only switches when the liquid has reached the 75% level described above.



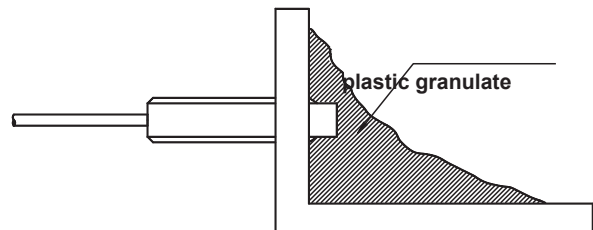
Sensors For Non-shielded Mounting

Due to their spherical fields, capacitive sensors are suitable for applications such as filling level indicators and plastic granulate or powder.

Example:

A granulate in a vessel is to be scanned by a non-shielded mounted sensor type C1ME30A10A. The sensor is mounted so its active surface (free zone at head) projects into the product in the vessel, as shown below, the sensor must be completely covered by the product before calibration.

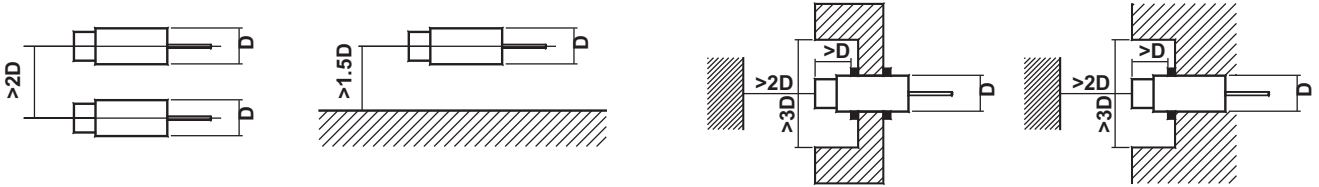
Turn the potentiometer of the sensor counterclockwise (reduce sensitivity) until the LED and the output signal turn off. Turn the potentiometer clockwise (increase sensitivity) until the LED and the output signal switch on. Make an additional 14 turn (90 turn) in the clockwise direction. This is to compensate for temperature fluctuations or changes in the humidity of the product scanned.



Sensors For Non-shielded Mounting

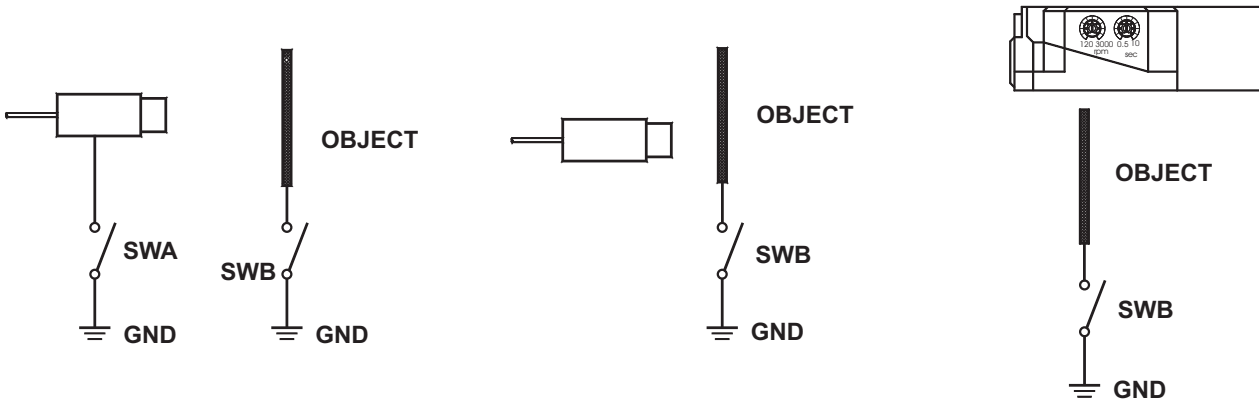
Installation Requirements

Surrounding objects will affect capacitive proximity switches by affecting switch capacitance or sensing the object. It is necessary to maintain a standard distance between a capacitive proximity switches and the surrounding objects when installing the capacitive proximity switch.



Connection Ground

Connected to ground, both the standard sensing object(60x60x1t iron) and capacitive proximity switch, affects the change of operating distance.



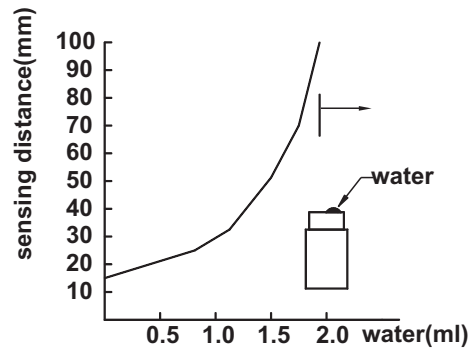
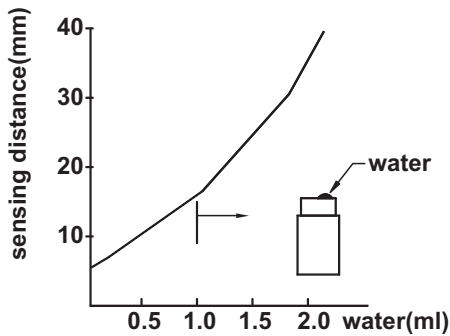
GND	switch a	ON	OFF	ON	OFF
	switch b	ON	ON	OFF	OFF
sensing distance		20	20	12	12

GND	switch b	ON	OFF
sensing distance		15	8

GND	switch b	ON	OFF
sensing distance		30	17

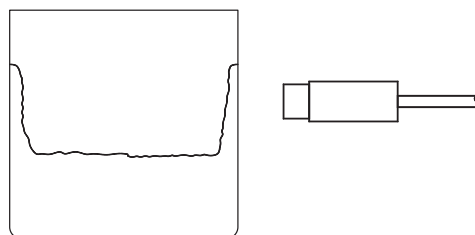
Influence to sensing face covered with drops of water

The following figures show the changes to operating distance caused by drops of water on the sensing face of capacitive proximity switches. If the water drops are 0.2 ml (about 2-3 drops), the operating distance will be increased about 20%, as the attached water drops on the sensing face cover the surface and is flowing operating distance is increased over 300%.



Caution

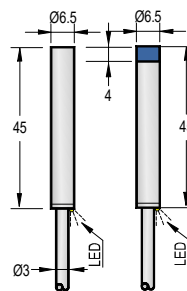
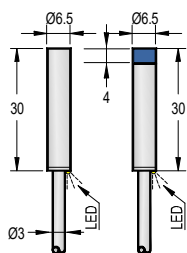
If ice, frost, moisture, oil or dust is on the active surface, it will cause faulty operation. The detecting of liquid or powder on non-metallic tanks, if the liquids or powders are attached to tank wall, it will cause faulty operation. The application of a DC capacitive proximity switch, connected to a heavy load current (current over 200 mA, (electric motor, electrical-magnetic contact) the output transistor will break down. It should be connected through a relay.





Features

- Ø6.5mm diameter
- Sn=1mm, shielded
2mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- Cable version
- IP67 protection



		(Unit: mm)		(Unit: mm)	
		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1BC6.5C01A	C1BD6.5C02A	C1BE6.5C01A	C1BF6.5C02A
	NPN-NC	C1BC6.5D01A	C1BD6.5D02A	C1BE6.5D01A	C1BF6.5D02A
	PNP-NO	C1BC6.5A01A	C1BD6.5A02A	C1BE6.5A01A	C1BF6.5A02A
	PNP-NC	C1BC6.5B01A	C1BD6.5B02A	C1BE6.5B01A	C1BF6.5B02A
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1NC6.5C01A	C1ND6.5C02A	C1NE6.5C01A	C1NF6.5C02A
	NPN-NC	C1NC6.5D01A	C1ND6.5D02A	C1NE6.5D01A	C1NF6.5D02A
	PNP-NO	C1NC6.5A01A	C1ND6.5A02A	C1NE6.5A01A	C1NF6.5A02A
	PNP-NC	C1NC6.5B01A	C1ND6.5B02A	C1NE6.5B01A	C1NF6.5B02A
	NPN-NO+NC				
	PNP-NO+NC				

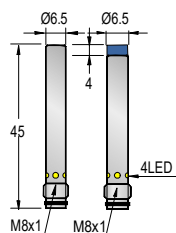
General Data					
Housing size	Ø6.5mm		Ø6.5mm		
Installation type	Shielded	Non-shielded	Shielded	Non-shielded	
Sensing distance(Sn: mm)	1mm	2mm	1mm	2mm	
Standard sensing object	Steel 6.5x6.5x1mm	Steel 6.5x6.5x1mm	Steel 6.5x6.5x1mm	Steel 6.5x6.5x1mm	
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn		
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn		
Hysteresis	<15%		<15%		
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin		
Operating voltage	10 ... 30VDC		10 ... 30VDC		

Electrical Data					
Rated operating voltage	24VDC		24VDC		
Repeated accuracy	±10%		±10%		
Ripple	<10%		<10%		
No load current	10mA		10mA		
Max. Load current	200mA		200mA		
Leakage current	0.01mA		0.01mA		
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC	
Switching frequency	100Hz	100Hz	100Hz	100Hz	
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	
Rated insulation voltage	75VDC		75VDC		
Operating temperature	-25°C ... +70°C		-25°C ... +70°C		
Storage temperature	-40°C ... +80°C		-40°C ... +80°C		
Temperature drift	<10%		<10%		
Power indicator	No		No		
Function indicator	Yellow LED		Yellow LED		
Reverse polarity protection	Yes		Yes		
Short-circuit protection	Yes		Yes		
Overload trip point	220mA		220mA		
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		

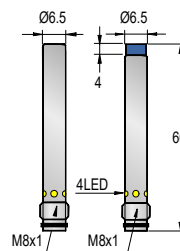
Mechanical Data					
Sensing surface material	POB		POB		
Protection	IP67		IP67		
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms		
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.		
EMC	IEC 60947-5-2		IEC 60947-5-2		
Accessory	/		/		
Connection	2m PVC cable (Ø3 3x0.15mm ²)		2m PVC cable (Ø3 3x0.15mm ²)		
Weight	Approx. 36g/35g		Approx. 40g/38g		

Features

- Ø6.5mm diameter
- Sn=1mm, shielded
2mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- M8 connector version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1BC6.5C01F	C1BD6.5C02F	C1BE6.5C01F	C1BF6.5C02F
	NPN-NC	C1BC6.5D01F	C1BD6.5D02F	C1BE6.5D01F	C1BF6.5D02F
	PNP-NO	C1BC6.5A01F	C1BD6.5A02F	C1BE6.5A01F	C1BF6.5A02F
	PNP-NC	C1BC6.5B01F	C1BD6.5B02F	C1BE6.5B01F	C1BF6.5B02F
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1NC6.5C01F	C1ND6.5C02F	C1NE6.5C01F	C1NF6.5C02F
	NPN-NC	C1NC6.5D01F	C1ND6.5D02F	C1NE6.5D01F	C1NF6.5D02F
	PNP-NO	C1NC6.5A01F	C1ND6.5A02F	C1NE6.5A01F	C1NF6.5A02F
	PNP-NC	C1NC6.5B01F	C1ND6.5B02F	C1NE6.5B01F	C1NF6.5B02F
	NPN-NO+NC				
	PNP-NO+NC				

General Data

Housing size	Ø6.5mm		Ø6.5mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	1mm	2mm	1mm	2mm
Standard sensing object	Steel 6.5x6.5x1mm		Steel 6.5x6.5x1mm	
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC		10 ... 30VDC	

Electrical Data

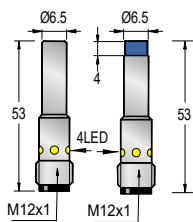
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	10mA		10mA	
Max. Load current	200mA		200mA	
Leakage current	0.01mA		0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz		100Hz	
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

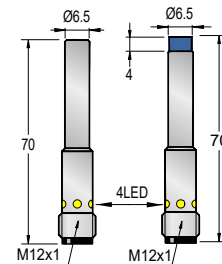
Sensing surface material	POB		POB	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	/		/	
Connection	Pico-style 3 Pin M8 Connector		Pico-style 3 Pin M8 Connector	
Weight	Approx. 14g		Approx. 15g	

Features

- Ø6.5mm diameter
- Sn=1mm, shielded
2mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- M12 connector version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1BC6.5C01H	C1BD6.5C02H	C1BE6.5C01H	C1BF6.5C02H
	NPN-NC	C1BC6.5D01H	C1BD6.5D02H	C1BE6.5D01H	C1BF6.5D02H
	PNP-NO	C1BC6.5A01H	C1BD6.5A02H	C1BE6.5A01H	C1BF6.5A02H
	PNP-NC	C1BC6.5B01H	C1BD6.5B02H	C1BE6.5B01H	C1BF6.5B02H
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1NC6.5C01H	C1ND6.5C02H	C1NE6.5C01H	C1NF6.5C02H
	NPN-NC	C1NC6.5D01H	C1ND6.5D02H	C1NE6.5D01H	C1NF6.5D02H
	PNP-NO	C1NC6.5A01H	C1ND6.5A02H	C1NE6.5A01H	C1NF6.5A02H
	PNP-NC	C1NC6.5B01H	C1ND6.5B02H	C1NE6.5B01H	C1NF6.5B02H
	NPN-NO+NC				
	PNP-NO+NC				

General Data		Ø6.5mm		Ø6.5mm	
Housing size		Ø6.5mm		Ø6.5mm	
Installation type		Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)		1mm	2mm	1mm	2mm
Standard sensing object		Steel 6.5x6.5x1mm	Steel 6.5x6.5x1mm	Steel 6.5x6.5x1mm	Steel 6.5x6.5x1mm
Effective sensing distance (Sr: mm)		90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)		0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis		<15%		<15%	
Housing material		Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage		10 ... 30VDC		10 ... 30VDC	

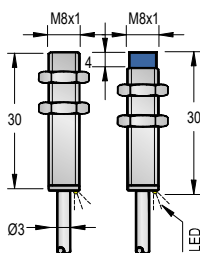
Electrical Data					
Rated operating voltage		24VDC		24VDC	
Repeated accuracy		±10%		±10%	
Ripple		<10%		<10%	
No load current		10mA		10mA	
Max. Load current		200mA		200mA	
Leakage current		0.01mA		0.01mA	
Voltage drop		<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency		100Hz	100Hz	100Hz	100Hz
Response time		1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage		75VDC		75VDC	
Operating temperature		-25°C ... +70°C		-25°C ... +70°C	
Storage temperature		-40°C ... +80°C		-40°C ... +80°C	
Temperature drift		<10%		<10%	
Power indicator		No		No	
Function indicator		Yellow LED		Yellow LED	
Reverse polarity protection		Yes		Yes	
Short-circuit protection		Yes		Yes	
Overload trip point		220mA		220mA	
Correction factors		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data					
Sensing surface material		POB		POB	
Protection		IP67		IP67	
Shock rating		Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating		55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC		IEC 60947-5-2		IEC 60947-5-2	
Accessory		/		/	
Connection		Euro-style 4 Pin M12 Connector		Euro-style 4 Pin M12 Connector	
Weight		Approx. 20g		Approx. 25g	

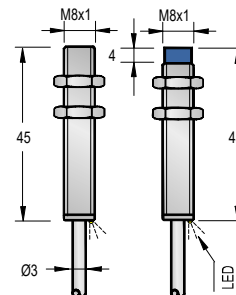


Features

- M8mm diameter
- Sn=1mm, shielded
2mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- Cable version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC08C01A	C1AD08C02A	C1AE08C01A	C1AF08C02A
	NPN-NC	C1AC08D01A	C1AD08D02A	C1AE08D01A	C1AF08D02A
	PNP-NO	C1AC08A01A	C1AD08A02A	C1AE08A01A	C1AF08A02A
	PNP-NC	C1AC08B01A	C1AD08B02A	C1AE08B01A	C1AF08B02A
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC08C01A	C1MD08C02A	C1ME08C01A	C1MF08C02A
	NPN-NC	C1MC08D01A	C1MD08D02A	C1ME08D01A	C1MF08D02A
	PNP-NO	C1MC08A01A	C1MD08A02A	C1ME08A01A	C1MF08A02A
	PNP-NC	C1MC08B01A	C1MD08B02A	C1ME08B01A	C1MF08B02A
	NPN-NO+NC				
	PNP-NO+NC				

General Data

	M8mm		M8mm	
	Shielded	Non-shielded	Shielded	Non-shielded
Housing size	M8mm		M8mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	1mm	2mm	1mm	2mm
Standard sensing object	Steel 8x8x1mm	Steel 8x8x1mm	Steel 8x8x1mm	Steel 8x8x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC		10 ... 30VDC	

Electrical Data

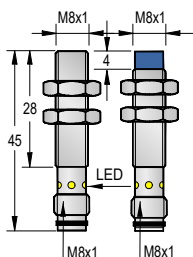
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	10mA		10mA	
Max. Load current	200mA		200mA	
Leakage current	0.01mA		0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

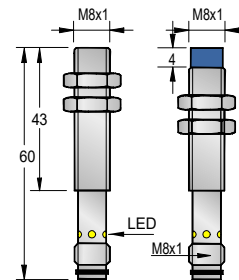
Sensing surface material	POB		POB	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	2m PVC cable (Ø3 3x0.15mm ²)		2m PVC cable (Ø3 3x0.15mm ²)	
Weight	Approx. 36g/35g		Approx. 40g/38g	

Features

- M8mm diameter
- Sn=1mm, shielded
2mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
- Overload protection
- Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- M8 connector version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC08C01F	C1AD08C02F	C1AE08C01F	C1AF08C02F
	NPN-NC	C1AC08D01F	C1AD08D02F	C1AE08D01F	C1AF08D02F
	PNP-NO	C1AC08A01F	C1AD08A02F	C1AE08A01F	C1AF08A02F
	PNP-NC	C1AC08B01F	C1AD08B02F	C1AE08B01F	C1AF08B02F
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC08C01F	C1MD08C02F	C1ME08C01F	C1MF08C02F
	NPN-NC	C1MC08D01F	C1MD08D02F	C1ME08D01F	C1MF08D02F
	PNP-NO	C1MC08A01F	C1MD08A02F	C1ME08A01F	C1MF08A02F
	PNP-NC	C1MC08B01F	C1MD08B02F	C1ME08B01F	C1MF08B02F
	NPN-NO+NC				
	PNP-NO+NC				

General Data

Housing size	M8mm		M8mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	1mm	2mm	1mm	2mm
Standard sensing object	Steel 8x8x1mm	Steel 8x8x1mm	Steel 8x8x1mm	Steel 8x8x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC		10 ... 30VDC	

Electrical Data

Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	10mA		10mA	
Max. Load current	200mA		200mA	
Leakage current	0.01mA		0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

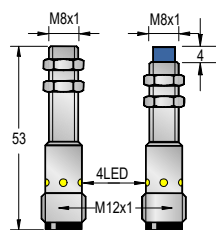
Mechanical Data

Sensing surface material	POB		POB	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	Pico-style 3 Pin M8 connector		Pico-style 3 Pin M8 connector	
Weight	Approx. 13g/11g		Approx. 15g/12g	

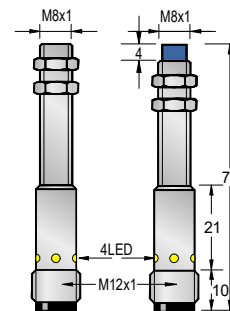


Features

- M8mm diameter
- Sn=1mm, shielded
2mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
- Overload protection
- Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- M8 connector version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC08C01H	C1AD08C02H	C1AE08C01H	C1AF08C02H
	NPN-NC	C1AC08D01H	C1AD08D02H	C1AE08D01H	C1AF08D02H
	PNP-NO	C1AC08A01H	C1AD08A02H	C1AE08A01H	C1AF08A02H
	PNP-NC	C1AC08B01H	C1AD08B02H	C1AE08B01H	C1AF08B02H
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC08C01H	C1MD08C02H	C1ME08C01H	C1MF08C02H
	NPN-NC	C1MC08D01H	C1MD08D02H	C1ME08D01H	C1MF08D02H
	PNP-NO	C1MC08A01H	C1MD08A02H	C1ME08A01H	C1MF08A02H
	PNP-NC	C1MC08B01H	C1MD08B02H	C1ME08B01H	C1MF08B02H
	NPN-NO+NC				
	PNP-NO+NC				

General Data

	M8mm		M8mm	
	Shielded	Non-shielded	Shielded	Non-shielded
Housing size	M8mm		M8mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	1mm	2mm	1mm	2mm
Standard sensing object	Steel 8x8x1mm	Steel 8x8x1mm	Steel 8x8x1mm	Steel 8x8x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC		10 ... 30VDC	

Electrical Data

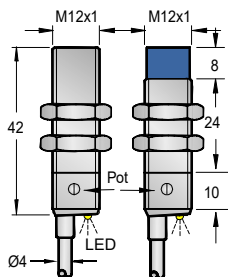
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	10mA		10mA	
Max. Load current	200mA		200mA	
Leakage current	0.01mA		0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

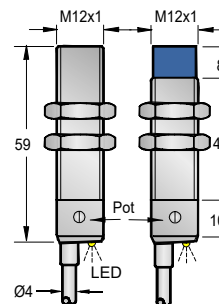
Sensing surface material	POB		POB	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	Euro-style 4 Pin M12 connector		Euro-style 4 Pin M12 connector	
Weight	Approx. 18g/17g		Approx. 23g/22g	

Features

- M12mm diameter
- Sn=1 ... 3mm, shielded
2 ... 6mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- Cable version
- IP67 protection



(Unit: mm)



(Unit: mm)

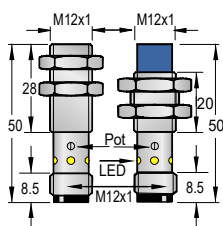
		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC12C03A	C1AD12C06A	C1AE12C03A	C1AF12C06A
	NPN-NC	C1AC12D03A	C1AD12D06A	C1AE12D03A	C1AF12D06A
	PNP-NO	C1AC12A03A	C1AD12A06A	C1AE12A03A	C1AF12A06A
	PNP-NC	C1AC12B03A	C1AD12B06A	C1AE12B03A	C1AF12B06A
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC12C03A	C1MD12C06A	C1ME12C03A	C1MF12C06A
	NPN-NC	C1MC12D03A	C1MD12D06A	C1ME12D03A	C1MF12D06A
	PNP-NO	C1MC12A03A	C1MD12A06A	C1ME12A03A	C1MF12A06A
	PNP-NC	C1MC12B03A	C1MD12B06A	C1ME12B03A	C1MF12B06A
	NPN-NO+NC				
	PNP-NO+NC				

General Data					
Housing size	M12mm		M12mm		
Installation type	Shielded	Non-shielded	Shielded	Non-shielded	
Sensing distance(Sn: mm)	1...3mm adjustable	2...6mm adjustable	1...3mm adjustable	2...6mm adjustable	
Standard sensing object	Steel 12x12x1mm	Steel 18x18x1mm	Steel 12x12x1mm	Steel 18x18x1mm	
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn		
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn		
Hysteresis	<15%		<15%		
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin		
Operating voltage	10 ... 30VDC		10 ... 30VDC		
Electrical Data					
Rated operating voltage	24VDC		24VDC		
Repeated accuracy	±10%		±10%		
Ripple	<10%		<10%		
No load current	10mA		10mA		
Max. Load current	200mA		200mA		
Leakage current	0.01mA		0.01mA		
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC	
Switching frequency	100Hz	100Hz	100Hz	100Hz	
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	
Rated insulation voltage	75VDC		75VDC		
Operating temperature	-25°C ... +70°C		-25°C ... +70°C		
Storage temperature	-40°C ... +80°C		-40°C ... +80°C		
Temperature drift	<10%		<10%		
Power indicator	No		No		
Function indicator	Yellow LED		Yellow LED		
Reverse polarity protection	Yes		Yes		
Short-circuit protection	Yes		Yes		
Overload trip point	220mA		220mA		
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		
Mechanical Data					
Sensing surface material	PBT		PBT		
Protection	IP67		IP67		
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms		
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.		
EMC	IEC 60947-5-2		IEC 60947-5-2		
Accessory	2 nuts		2 nuts		
Connection	2m PVC cable (Ø4 3x0.34mm ²)		2m PVC cable (Ø4 3x0.34mm ²)		
Weight	Approx. 60g/58g		Approx. 66g/65g		

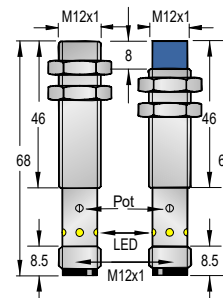


Features

- M12mm diameter
- Sn=1 ... 3mm, shielded
2 ... 6mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- M12 Connector version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC12C03H	C1AD12C06H	C1AE12C03H	C1AF12C06H
	NPN-NC	C1AC12D03H	C1AD12D06H	C1AE12D03H	C1AF12D06H
	PNP-NO	C1AC12A03H	C1AD12A06H	C1AE12A03H	C1AF12A06H
	PNP-NC	C1AC12B03H	C1AD12B06H	C1AE12B03H	C1AF12B06H
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC12C03H	C1MD12C06H	C1ME12C03H	C1MF12C06H
	NPN-NC	C1MC12D03H	C1MD12D06H	C1ME12D03H	C1MF12D06H
	PNP-NO	C1MC12A03H	C1MD12A06H	C1ME12A03H	C1MF12A06H
	PNP-NC	C1MC12B03H	C1MD12B06H	C1ME12B03H	C1MF12B06H
	NPN-NO+NC				
	PNP-NO+NC				

General Data

	M12mm		M18mm	
	Shielded	Non-shielded	Shielded	Non-shielded
Housing size	M12mm		M18mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	1...3mm adjustable	2...6mm adjustable	1...3mm adjustable	2...6mm adjustable
Standard sensing object	Steel 12x12x1mm	Steel 18x18x1mm	Steel 12x12x1mm	Steel 18x18x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC		10 ... 30VDC	

Electrical Data

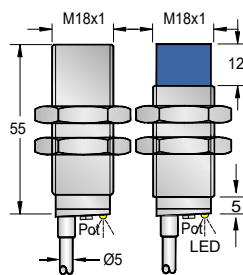
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	10mA		10mA	
Max. Load current	200mA		200mA	
Leakage current	0.01mA		0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

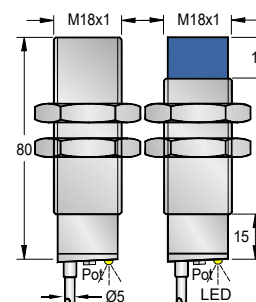
Sensing surface material	PBT		PBT	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	Euro-style 4 Pin M12 Connector		Euro-style 4 Pin M12 Connector	
Weight	Approx. 25g/523g		Approx. 31g/30g	

Features

- M18mm diameter
- Sn=2 ... 8mm, shielded
2 ... 15mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- Cable version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC18C08A	C1AD18C15A	C1AE18C08A	C1AF18C15A
	NPN-NC	C1AC18D08A	C1AD18D15A	C1AE18D08A	C1AF18D15A
	PNP-NO	C1AC18A08A	C1AD18A15A	C1AE18A08A	C1AF18A15A
	PNP-NC	C1AC18B08A	C1AD18B15A	C1AE18B08A	C1AF18B15A
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC18C08A	C1MD18C15A	C1ME18C08A	C1MF18C15A
	NPN-NC	C1MC18D08A	C1MD18D15A	C1ME18D08A	C1MF18D15A
	PNP-NO	C1MC18A08A	C1MD18A15A	C1ME18A08A	C1MF18A15A
	PNP-NC	C1MC18B08A	C1MD18B15A	C1ME18B08A	C1MF18B15A
	NPN-NO+NC				
	PNP-NO+NC				

General Data

	M18mm		M18mm	
	Shielded	Non-shielded	Shielded	Non-shielded
Housing size	M18mm		M18mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	2...8mm adjustable	2...15mm adjustable	2...8mm adjustable	2...15mm adjustable
Standard sensing object	Steel 24x24x1mm	Steel 45x45x1mm	Steel 24x24x1mm	Steel 45x45x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC(55Vdc can also be customized)		10 ... 30VDC(55Vdc can also be customized)	

Electrical Data

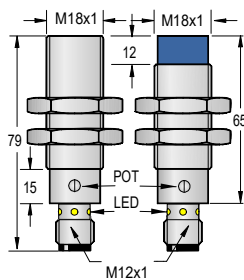
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	10mA		10mA	
Max. Load current	200mA		200mA	
Leakage current	0.01mA		0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

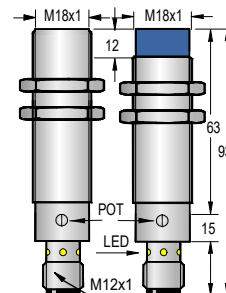
Sensing surface material	PBT		PBT	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	2m PVC cable (Ø5 3x0.5mm ² /4x0.5mm ²)		2m PVC cable (Ø5 3x0.5mm ² /4x0.5mm ²)	
Weight	Approx. 110g/115g		Approx. 153g/144g	

Features

- M18mm diameter
- Sn=2 ... 8mm, shielded
2 ... 15mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- M12 connector version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC18C08H	C1AD18C15H	C1AE18C08H	C1AF18C15H
	NPN-NC	C1AC18D08H	C1AD18D15H	C1AE18D08H	C1AF18D15H
	PNP-NO	C1AC18A08H	C1AD18A15H	C1AE18A08H	C1AF18A15H
	PNP-NC	C1AC18B08H	C1AD18B15H	C1AE18B08H	C1AF18B15H
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC18C08H	C1MD18C15H	C1ME18C08H	C1MF18C15H
	NPN-NC	C1MC18D08H	C1MD18D15H	C1ME18D08H	C1MF18D15H
	PNP-NO	C1MC18A08H	C1MD18A15H	C1ME18A08H	C1MF18A15H
	PNP-NC	C1MC18B08H	C1MD18B15H	C1ME18B08H	C1MF18B15H
	NPN-NO+NC				
	PNP-NO+NC				

General Data

	M18mm		M18mm	
	Shielded	Non-shielded	Shielded	Non-shielded
Housing size	M18mm		M18mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	2...8mm adjustable	2...15mm adjustable	2...8mm adjustable	2...15mm adjustable
Standard sensing object	Steel 24x24x1mm	Steel 45x45x1mm	Steel 24x24x1mm	Steel 45x45x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC(55Vdc can also be customized)		10 ... 30VDC(55Vdc can also be customized)	

Electrical Data

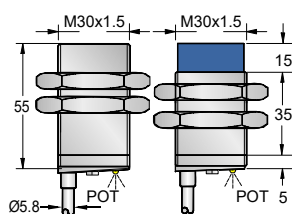
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	10mA		10mA	
Max. Load current	200mA		200mA	
Leakage current	0.01mA		0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

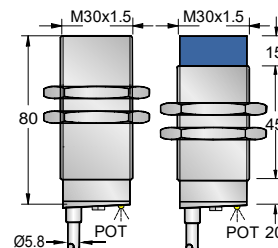
Sensing surface material	PBT		PBT	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	Euro-style 4 Pin M12 Connector		Euro-style 4 Pin M12 Connector	
Weight	Approx. 62g/60g		Approx. 69g/68g	

Features

- M30mm diameter
- Sn=2 ... 20mm, shielded
2 ... 30mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- Cable version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC30C20A	C1AD30C30A	C1AE30C20A	C1AF30C30A
	NPN-NC	C1AC30D20A	C1AD30D30A	C1AE30D20A	C1AF30D30A
	PNP-NO	C1AC30A20A	C1AD30A30A	C1AE30A20A	C1AF30A30A
	PNP-NC	C1AC30B20A	C1AD30B30A	C1AE30B20A	C1AF30B30A
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC30C20A	C1MD30C30A	C1ME30C20A	C1MF30C30A
	NPN-NC	C1MC30D20A	C1MD30D30A	C1ME30D20A	C1MF30D30A
	PNP-NO	C1MC30A20A	C1MD30A30A	C1ME30A20A	C1MF30A30A
	PNP-NC	C1MC30B20A	C1MD30B30A	C1ME30B20A	C1MF30B30A
	NPN-NO+NC				
	PNP-NO+NC				

General Data

Housing size	M30mm		M30mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	2...20mm adjustable	2...30mm adjustable	2...20mm adjustable	2...30mm adjustable
Standard sensing object	Steel 60x60x1mm	Steel 90x90x1mm	Steel 60x60x1mm	Steel 90x90x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC(55Vdc can also be customized)		10 ... 30VDC(55Vdc can also be customized)	

Electrical Data

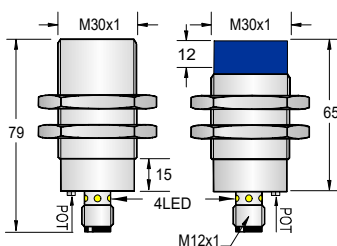
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	<10mA		<10mA	
Max. Load current	200mA		200mA	
Leakage current	<0.01mA		<0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

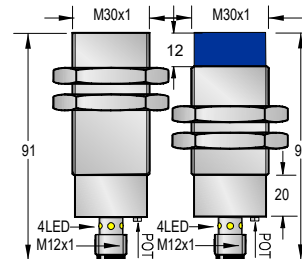
Sensing surface material	PBT		PBT	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	2m PVC cable (Ø5.8 3x0.5mm ² /4x0.5mm ²)		2m PVC cable (Ø5.8 3x0.5mm ² /4x0.5mm ²)	
Weight	Approx. 217g/207g		Approx. 231g/219g	

Features

- M30mm diameter
- Sn=2 ... 20mm, shielded
2 ... 30mm, non-shielded
- Brass housing case
PBT housing case
- Short circuit protection
Overload protection
Reverse-polarity protection
- NPN, PNP Output
- NO, NC, NO+NC Function
- M12 Connector version
- IP67 protection



(Unit: mm)



(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO	C1AC30C20H	C1AD30C30H	C1AE30C20H	C1AF30C30H
	NPN-NC	C1AC30D20H	C1AD30D30H	C1AE30D20H	C1AF30D30H
	PNP-NO	C1AC30A20H	C1AD30A30H	C1AE30A20H	C1AF30A30H
	PNP-NC	C1AC30B20H	C1AD30B30H	C1AE30B20H	C1AF30B30H
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1MC30C20H	C1MD30C30H	C1ME30C20H	C1MF30C30H
	NPN-NC	C1MC30D20H	C1MD30D30H	C1ME30D20H	C1MF30D30H
	PNP-NO	C1MC30A20H	C1MD30A30H	C1ME30A20H	C1MF30A30H
	PNP-NC	C1MC30B20H	C1MD30B30H	C1ME30B20H	C1MF30B30H
	NPN-NO+NC				
	PNP-NO+NC				

General Data

	M30mm		M30mm	
	Shielded	Non-shielded	Shielded	Non-shielded
Housing size	M30mm		M30mm	
Installation type	Shielded	Non-shielded	Shielded	Non-shielded
Sensing distance(Sn: mm)	2...20mm adjustable	2...30mm adjustable	2...20mm adjustable	2...30mm adjustable
Standard sensing object	Steel 60x60x1mm	Steel 90x90x1mm	Steel 60x60x1mm	Steel 90x90x1mm
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn	
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn	
Hysteresis	<15%		<15%	
Housing material	Nickel plated brass/PBT Resin		Nickel plated brass/PBT Resin	
Operating voltage	10 ... 30VDC(55Vdc can also be customized)		10 ... 30VDC(55Vdc can also be customized)	

Electrical Data

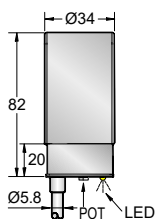
Rated operating voltage	24VDC		24VDC	
Repeated accuracy	±10%		±10%	
Ripple	<10%		<10%	
No load current	<10mA		<10mA	
Max. Load current	200mA		200mA	
Leakage current	<0.01mA		<0.01mA	
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC
Switching frequency	100Hz	100Hz	100Hz	100Hz
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms
Rated insulation voltage	75VDC		75VDC	
Operating temperature	-25°C ... +70°C		-25°C ... +70°C	
Storage temperature	-40°C ... +80°C		-40°C ... +80°C	
Temperature drift	<10%		<10%	
Power indicator	No		No	
Function indicator	Yellow LED		Yellow LED	
Reverse polarity protection	Yes		Yes	
Short-circuit protection	Yes		Yes	
Overload trip point	220mA		220mA	
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4	

Mechanical Data

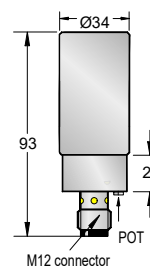
Sensing surface material	PBT		PBT	
Protection	IP67		IP67	
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms	
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.	
EMC	IEC 60947-5-2		IEC 60947-5-2	
Accessory	2 nuts		2 nuts	
Connection	Euro-style 4 Pin M12 Connector		Euro-style 4 Pin M12 Connector	
Weight	Approx. 187g/179g		Approx. 147g/137g	

Features

- Ø34mm diameter
- Sn=2 ... 25mm, shielded
2 ... 35mm, non-shielded
- PBT housing case
- Short circuit protection
- Overload protection
- Reverse-polarity protection
- NPN, PNP Output
- NO, NC Function, NO+NC Function
- Cable connector version
Connector version
- IP67 protection



(Unit: mm)



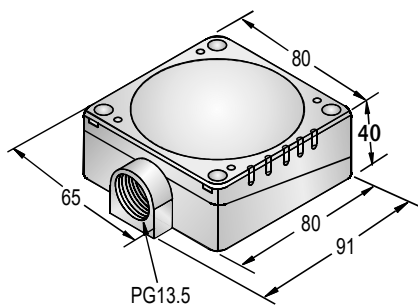
(Unit: mm)

		Shielded	Non-shielded	Shielded	Non-shielded
Brass Case	NPN-NO				
	NPN-NC				
	PNP-NO				
	PNP-NC				
	NPN-NO+NC				
	PNP-NO+NC				
PBT Case	NPN-NO	C1NC34C25A	C1ND34C35A	C1NE34C25H	C1NF34C35H
	NPN-NC	C1NC34D25A	C1ND34D35A	C1NE34D25H	C1NF34D35H
	PNP-NO	C1NC34A25A	C1ND34A35A	C1NE34A25H	C1NF34A35H
	PNP-NC	C1NC34B25A	C1ND34B35A	C1NE34B25H	C1NF34B35H
	NPN-NO+NC				
	PNP-NO+NC				

General Data					
Housing size	Ø34mm		Ø34mm		
Installation type	Shielded	Non-shielded	Shielded	Non-shielded	
Sensing distance(Sn: mm)	2 ... 25mm adjustable		2 ... 35mm adjustable		
Standard sensing object	Steel 75x75x1mm		Steel 105x105x1mm		
Effective sensing distance (Sr: mm)	90 ... 110% of Sn		90 ... 110% of Sn		
Assured operating distance(Sa: mm)	0 ... 80% of Sn		0 ... 80% of Sn		
Hysteresis	<15%		<15%		
Housing material	PBT Resin		PBT Resin		
Operating voltage	10 ... 30VDC(55Vdc can also be customized)		10 ... 30VDC(55Vdc can also be customized)		
Electrical Data					
Rated operating voltage	24VDC		24VDC		
Repeated accuracy	±10%		±10%		
Ripple	<10%		<10%		
No load current	<10mA/10 ... 30VDC, <20mA/10 ... 55VDC		<10mA/10 ... 30VDC, <20mA/10 ... 55VDC		
Max. Load current	200mA		200mA		
Leakage current	0.01mA		0.01mA		
Voltage drop	<2VDC	<2VDC	<2VDC	<2VDC	
Switching frequency	100Hz		100Hz		
Response time	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	1.5ms/1.5ms	
Rated insulation voltage	75VDC		75VDC		
Operating temperature	-25°C ... +70°C		-25°C ... +70°C		
Storage temperature	-40°C ... +80°C		-40°C ... +80°C		
Temperature drift	<10%		<10%		
Power indicator	No		No		
Function indicator	Yellow LED		Yellow LED		
Reverse polarity protection	Yes		Yes		
Short-circuit protection	Yes		Yes		
Overload trip point	220mA		220mA		
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4		
Mechanical Data					
Sensing surface material	PBT		PBT		
Protection	IP67		IP67		
Shock rating	Shock, half-sinus, 30gn, 11ms		Shock, half-sinus, 30gn, 11ms		
Vibration rating	55Hz, 1mm ampl., 3x30min.		55Hz, 1mm ampl., 3x30min.		
EMC	IEC 60947-5-2		IEC 60947-5-2		
Accessory	Brackets		Brackets		
Connection	2m PVC Cable(Ø5.8 3x0.5mm ² /4x0.5mm ²)		Euro-style 4 Pin M12 Connector		
Weight	Approx. 251g		Approx. 162g		

Features

- 80x80x40mm diameter
- Sn=2 ... 40mm, shielded
2 ... 50mm, non-shielded
- ABS housing case
- Short circuit protection
- Overload protection
- Reverse-polarity protection
- NPN, PNP Output
- NO, NC Function, NO+NC Function
- PG connector version
- IP67 protection



(Unit: mm)

		Shielded	Non-shielded		
Brass Case	NPN-NO				
	NPN-NC				
	PNP-NO				
	PNP-NC				
	NPN-NO+NC				
	PNP-NO+NC				
ABS Case	NPN-NO	C1EE80C40T	C1EF80C50T		
	NPN-NC	C1EE80D40T	C1EF80D50T		
	PNP-NO	C1EE80A40T	C1EF80A50T		
	PNP-NC	C1EE80B40T	C1EF80B50T		
	NPN-NO+NC				
	PNP-NO+NC				

General Data

Housing size	80x80x40mm			
Installation type	Shielded	Non-shielded		
Sensing distance(Sn: mm)	40mm	50mm		
Standard sensing object	Steel 120x120x1mm	Steel 150x150x1mm		
Effective sensing distance (Sr: mm)	90 ... 110% of Sn			
Assured operating distance(Sa: mm)	0 ... 80% of Sn			
Hysteresis	<15%			
Housing material	ABS Resin			
Operating voltage	10 ... 30VDC(55Vdc can also be customized)			

Electrical Data

Rated operating voltage	24VDC			
Repeated accuracy	±10%			
Ripple	<10%			
No load current	<10mA/10 ... 30VDC, <20mA/10 ... 55VDC			
Max. Load current	200mA			
Leakage current	0.8mA			
Voltage drop	<2VDC	<2VDC		
Switching frequency	100Hz	100Hz		
Response time	1.5ms/1.5ms	1.5ms/1.5ms		
Rated insulation voltage	75VDC			
Operating temperature	-25°C ... +70°C			
Storage temperature	-40°C ... +80°C			
Temperature drift	<10%			
Power indicator	No			
Function indicator	Yellow LED			
Reverse polarity protection	Yes			
Short-circuit protection	Yes			
Overload trip point	220mA			
Correction factors	Fe37 steel=1/stainless steel approx. 0.85/brass approx. 0.5/ Al. Approx. 0.45/ copper approx. 0.4			

Mechanical Data

Sensing surface material	ABS			
Protection	IP67			
Shock rating	Shock, half-sinus, 30gn, 11ms			
Vibration rating	55Hz, 1mm ampl., 3x30min.			
EMC	IEC 60947-5-2			
Accessory	/			
Connection	Cable Terminal with PG13.5 Connector			
Weight	Approx. 262g			