

"ESA Control" Ltd



DIRECT CURRENT

INDUCTIVE

PROXIMITY SENSORS

with connector

DC, 3- and 4-wire



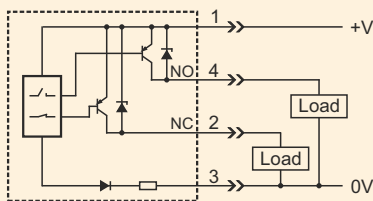
Bulgaria
5300 Gabrovo
3, Stancionna str.
Tel./fax: +359 66 860543
E-mail: office@esa-control.com
Site: <http://www.esa-control.com>

Inductive proximity sensors for direct current with connector /3-wire and 4-wire/

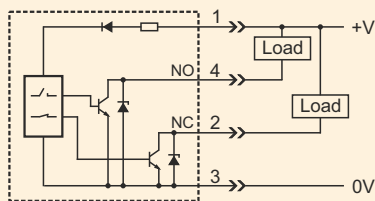
Purpose and areas of application

The presented proximity inductive sensors and switches ending with a connector are used in industrial systems as automation tools for switching 3- and 4-wire direct current circuits. The sensors are activated when metal objects approach their active part. Proximity inductive sensors and switches are moisture and dust resistant. They are used in many areas of human activity to automate production processes in the bottling, textile, packaging and many other industries. The sensors have a long service life due to the non-contact switching of the electrical circuits in which they are included.

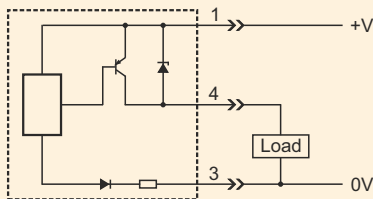
Electrical connection circuit of sensors of the direct current /DC/



Scheme 10 (PNP / NO+NC)

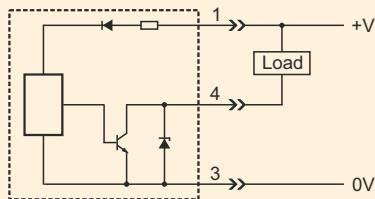


Scheme 20 (NPN / NO+NC)



Scheme 11 (PNP / NO)

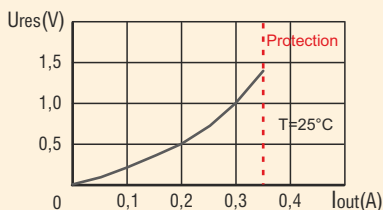
Scheme 12 (PNP / NC)



Scheme 21 (NPN / NO)

Scheme 22 (NPN / NC)

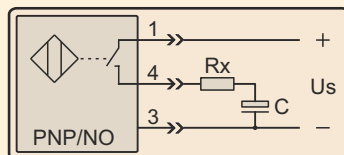
Output characteristic /residual voltage/



Features when working with capacitive load of sensors that have pulse protection against current overload and short circuit

When connecting a capacitive load to the output of the sensors that have pulse protection against short circuit, it is necessary to connected in series a resistor R_x , which limits the current when initially charging the load capacitor C . R_x is added if capacitor C is larger than 100nF.

$$R_x = U_s / 0,5 \quad (R_x = 20\Omega \dots 60\Omega)$$



M8 inductive proximity sensor with 3-pin connector for direct current, shielded type

M8/C



fig.1

Operating principle

The presented shielded type M8 inductive proximity sensor with connector serves to switch 3-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

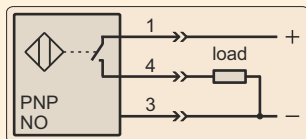
Operating distance, S_n	1,7 mm
Hysteresis, h	4...15%
Supply voltage, U_s	9...36 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	39 Vdc (open drain)
Residual voltage, U_{res}	0,8 V ($I = 250$ mA)
Load current (max), I_{out}	250 mA
Protection of output, I_{prot}	No
Current consumption, I_s	7 mA
Switching frequency (max), f_o	1200 Hz ($S_n=0,8$ mm)
Time of fall / rise, t_f / t_r	2 μ s / 2 μ s
Operating temperature range, T_{amb}	-25°...+70° C
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M8 connector, 3-pins
Overall dimensions	M8x1, L=55 mm
Housing - metallic	CuZn (Ni plated)

Protection from reverse inclusion of the supply voltage.
No protection of the output from overcurrent and short circuit.

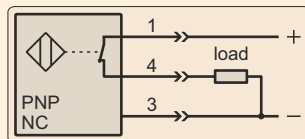
Type parameters

Type	Output function	Scheme of connection
M1-08.11.C	PNP / NO	11C
M1-08.12.C	PNP / NC	12C
M1-08.21.C	NPN / NO	21C
M1-08.22.C	NPN / NC	22C

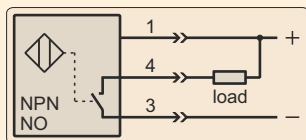
Schemes of connection



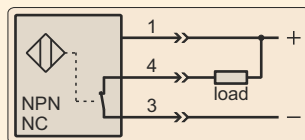
Scheme 11C



Scheme 12C



Scheme 21C



Scheme 22C



fig.1

Operating principle

The presented shielded type M8 inductive proximity sensor with connector serves to switch 3- and 4-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

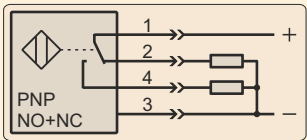
Operating distance, S_n	1,7 mm
Hysteresis, h	4...15%
Supply voltage, U_s	9...36 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	39 Vdc (open drain)
Residual voltage, U_{res}	0,8 V ($I = 250\text{ mA}$)
Load current (max), I_{out}	250 mA
Protection of output, I_{prot}	No
Current consumption, I_s	7 mA
Switching frequency (max), f_o	1200 Hz ($S_n=0,8\text{ mm}$)
Time of fall / rise, t_f/t_r	2 μs / 2 μs
Operating temperature range, T_{amb}	-25°...+70° C
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M12 connector, 4-pins
Overall dimensions	M8x1, L=60 mm
Housing - metallic	CuZn (Ni plated)

Protection from reverse inclusion of the supply voltage.
No protection of the output from overcurrent and short circuit.

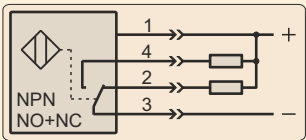
Type parameters

Type	Output function	Scheme of connection
M1-08.10.CA	PNP / NO+NC	10C
M1-08.20.CA	NPN / NO+NC	20C

Schemes of connection



Scheme 10C



Scheme 20C

**M12 inductive proximity sensor
with 4-pin connector for direct current, shielded type**

M12/C



fig.1

Operating principle

The presented shielded type M12 inductive proximity sensor with connector serves to switch 3- and 4-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

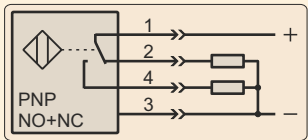
Operating distance, S_n	3,5 mm
Hysteresis, h	4...15%
Supply voltage, U_s	10...30 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	35 Vdc (open collector)
Residual voltage, U_{res}	0,8 V ($I = 250\text{ mA}$)
Load current (max), I_{out}	250 mA
Protection of output (scanning), I_{prot}	350 mA (25°C)
Current consumption, I_s	9 mA
Switching frequency (max), f_o	1000 Hz
Time of fall / rise, t_f / t_r	0,6/0,2 μs PNP (0,2/0,6 μs NPN)
Operating temperature range, T_{amb}	$-25^\circ \dots +70^\circ\text{C}$
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M12 connector, 4-pins
Overall dimensions	M12x1, L=60 mm
Housing - metallic	CuZn (Ni plated)

Protection from reverse inclusion of the supply voltage.
Protection of the outputs from overcurrent and short circuit.

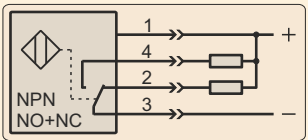
Type parameters

Type	Output function	Scheme of connection
M1-12.10.KC	PNP / NO+NC	10C
M1-12.20.KC	NPN / NO+NC	20C

Schemes of connection



Scheme 10C



Scheme 20C

**M18 inductive proximity sensor
with 4-pin connector for direct current, shielded type**

M18/C



fig.1

Operating principle

The presented shielded type M18 inductive proximity sensor with connector serves to switch 3- and 4-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

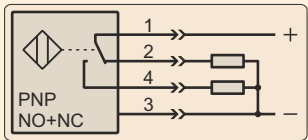
Operating distance, S_n	5,0 mm
Hysteresis, h	4...15%
Supply voltage, U_s	10...30 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	35 Vdc (open collector)
Residual voltage, U_{res}	0,8 V ($I = 250$ mA)
Load current (max), I_{out}	250 mA
Protection of output (scanning), I_{prot}	350 mA (25°C)
Current consumption, I_s	9 mA
Switching frequency (max), f_o	600 Hz
Time of fall / rise, t_f / t_r	0,6/0,2 μs PNP (0,2/0,6 μs NPN)
Operating temperature range, T_{amb}	$-25^\circ \dots +70^\circ\text{C}$
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M12 connector, 4-pins
Overall dimensions	M18x1, L=60 mm
Housing - metallic	CuZn (Ni plated)

Protection from reverse inclusion of the supply voltage.
Protection of the outputs from overcurrent and short circuit.

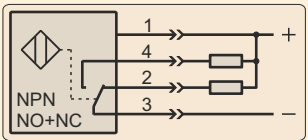
Type parameters

Type	Output function	Scheme of connection
M1-18.10.KC	PNP / NO+NC	10C
M1-18.20.KC	NPN / NO+NC	20C

Schemes of connection



Scheme 10C



Scheme 20C



fig.1

Operating principle

The presented unshielded type M18 inductive proximity sensor with connector serves to switch 3- and 4-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

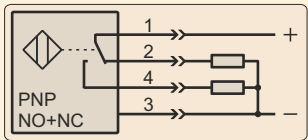
Operating distance, S_n	8,0 mm
Hysteresis, h	4...15%
Supply voltage, U_s	10...30 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	35 Vdc (open collector)
Residual voltage, U_{res}	0,8 V ($I = 250$ mA)
Load current (max), I_{out}	250 mA
Protection of output (scanning), I_{prot}	350 mA (25°C)
Current consumption, I_s	9 mA
Switching frequency (max), f_o	400 Hz
Time of fall / rise, t_f/t_r	0,6/0,2 μs PNP (0,2/0,6 μs NPN)
Operating temperature range, T_{amb}	$-25^\circ\text{...}+70^\circ\text{C}$
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M12 connector, 4-pins
Overall dimensions	M18x1, L=60 mm
Housing - plastic	PVC

Protection from reverse inclusion of the supply voltage.
Protection of the outputs from overcurrent and short circuit.

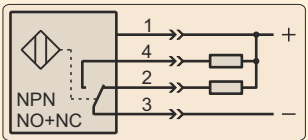
Type parameters

Type	Output function	Scheme of connection
P1-18.10.KC	PNP / NO+NC	10C
P1-18.20.KC	NPN / NO+NC	20C

Schemes of connection



Scheme 10C



Scheme 20C

M30 inductive proximity sensor
with 4-pin connector for direct current, shielded type

M30/C

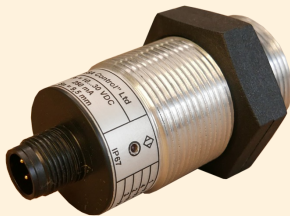


fig.1

Operating principle

The presented shielded type M30 inductive proximity sensor with connector serves to switch 3- and 4-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

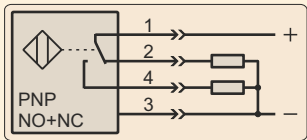
Operating distance, S_n	9,5 mm
Hysteresis, h	4...15%
Supply voltage, U_s	10...30 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	35 Vdc (open collector)
Residual voltage, U_{res}	0,8 V ($I = 250$ mA)
Load current (max), I_{out}	250 mA
Protection of output (scanning), I_{prot}	350 mA (25°C)
Current consumption, I_s	9 mA
Switching frequency (max), f_o	300 Hz
Time of fall / rise, t_f / t_r	0,6/0,2 μs PNP (0,2/0,6 μs NPN)
Operating temperature range, T_{amb}	$-25^\circ \dots +70^\circ\text{C}$
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M12 connector, 4-pins
Overall dimensions	M30x1.5, L=64 mm
Housing - metallic	Al (aluminum)

Protection from reverse inclusion of the supply voltage.
Protection of the outputs from overcurrent and short circuit.

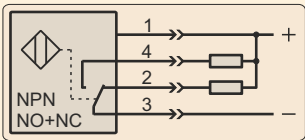
Type parameters

Type	Output function	Scheme of connection
M1-30.10.KC	PNP / NO+NC	10C
M1-30.20.KC	NPN / NO+NC	20C

Schemes of connection



Scheme 10C



Scheme 20C

**M30 inductive proximity sensor
with 4-pin connector for direct current, unshielded type**

M30/C



fig.1

Operating principle

The presented unshielded type M30 inductive proximity sensor with connector serves to switch 3- and 4-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

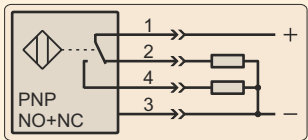
Operating distance, S_n	14,0 mm
Hysteresis, h	4...15%
Supply voltage, U_s	10...30 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	35 Vdc (open collector)
Residual voltage, U_{res}	0,8 V ($I = 250$ mA)
Load current (max), I_{out}	250 mA
Protection of output (scanning), I_{prot}	350 mA (25°C)
Current consumption, I_s	9 mA
Switching frequency (max), f_o	150 Hz
Time of fall / rise, t_f/t_r	0,6/0,2 μs PNP (0,2/0,6 μs NPN)
Operating temperature range, T_{amb}	$-25^\circ\text{...}+70^\circ\text{C}$
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M12 connector, 4-pins
Overall dimensions	M30x1.5, L=64 mm
Housing - plastic	PVC

Protection from reverse inclusion of the supply voltage.
Protection of the outputs from overcurrent and short circuit.

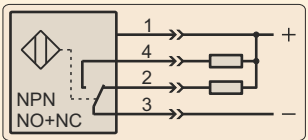
Type parameters

Type	Output function	Scheme of connection
P1-30.10.KC	PNP / NO+NC	10C
P1-30.20.KC	NPN / NO+NC	20C

Schemes of connection



Scheme 10C



Scheme 20C



fig.1

Operating principle

The presented unshielded type P3-60 inductive proximity sensor with connector serves to switch 3- and 4-wire direct current circuits. Its output is activated by approaching of metallic object to him active area. The inductive proximity sensor is resistant to moisture and dust. It has a long service life thanks to the non-contact switching of the electrical circuit in which it is connected.

Technical parameters

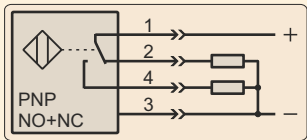
Operating distance, S_n	12,5 mm
Hysteresis, h	4...15%
Supply voltage, U_s	10...30 Vdc (Ripple $\pm 10\%$)
Output voltage (max), U_{out}	35 Vdc (open collector)
Residual voltage, U_{res}	0,8 V ($I = 250\text{ mA}$)
Load current (max), I_{out}	250 mA
Protection of output (scanning), I_{prot}	350 mA (25°C)
Current consumption, I_s	9 mA
Switching frequency (max), f_o	100 Hz
Time of fall / rise, t_f / t_r	0,6/0,2 μs PNP (0,2/0,6 μs NPN)
Operating temperature range, T_{amb}	$-25^\circ \dots +70^\circ\text{C}$
Degree of protection of the sensors	IP67 (IEC144)
Light output indicator	LED
Joining	M12 connector, 4-pins
Overall dimensions	72x30x15 mm
Housing - plastic	PA6 (polyamide)

Protection from reverse inclusion of the supply voltage.
Protection of the outputs from overcurrent and short circuit.

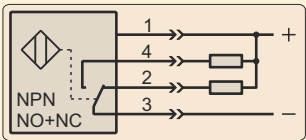
Type parameters

Type	Output function	Scheme of connection
P3-60.10.KC	PNP / NO+NC	10C
P3-60.20.KC	NPN / NO+NC	20C

Schemes of connection

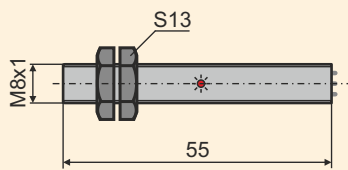


Scheme 10C

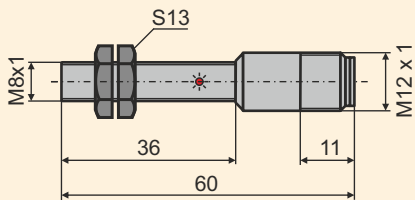


Scheme 20C

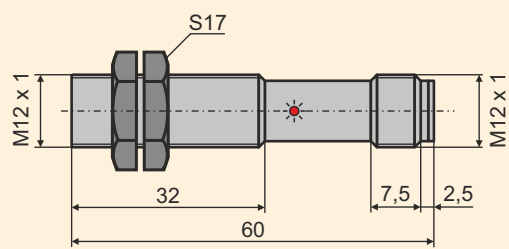
M8C



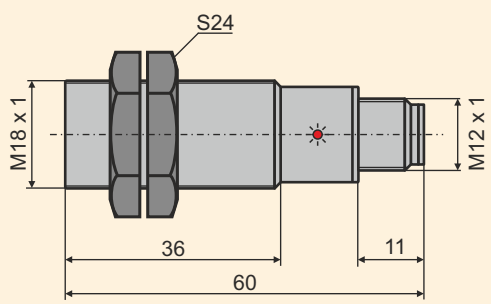
M8CA



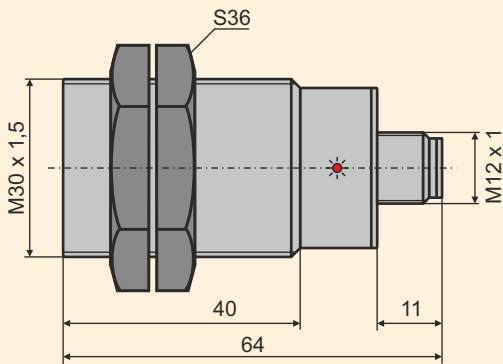
M12C



M18C



M30C



P3-60C

