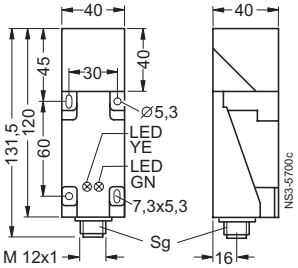
Selection and ordering data

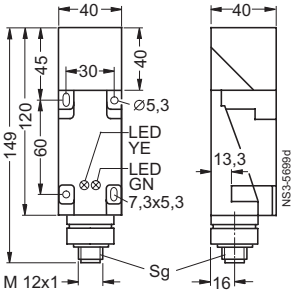
Rated operating distance s_n	**40/25 mm** (adjustable)
Form	**40 mm × 40 mm block**
Installation in metal	**Non-embeddable**

Dimensions

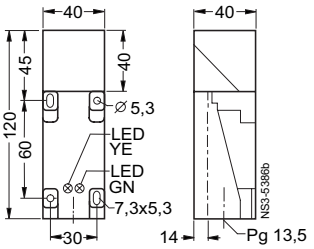
Type 1 The sensing face may be set to 5 different planes.



Type 2 The sensing face may be set to 5 different planes.



Type 3 The sensing face may be set to 5 different planes.



Delivered with
Pg 13.5 = Pg 13.5 thread for moulded-plastic joint, 3SX6 274 connector plug or 3RX1 566 adapter
Sg = plug thread

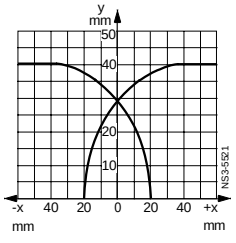
Number of cores		**3 cores**
Group		Increased operating distance
Housing material		Moulded plastic
Operational voltage	DC V	10 to 65
Indicator		2 LED
Current input (no load)	mA	≤ 8
Loading capacity	mA	500
Operating frequency	Hz	20
Repeat accuracy	mm	1.5
Response time	ms	4
Build-up time	ms	25
Availability delay	ms	300
Protective measures		1 2 3 4 5 6

		Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/89 No.
With M 12 plug-in connection Type E, F	NO function, pnp	1	**3RG41 41–3AB02**		0.265	2
With M 12 plug-in connection Type E, F adjustable in 30° steps	NO function, pnp	2	**3RG41 41–3AB01**		0.265	2
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function, pnp 40 mm (not adjustable)	3	**3RG41 41–6AB03**		0.265	19

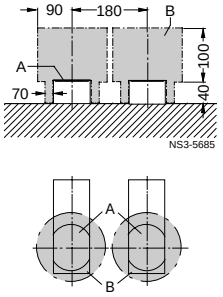
Protective measures
Response characteristics
Mounting instructions

Protective measures
☐ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection

Operating distance 40 mm

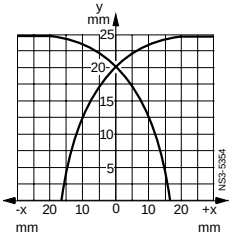


Ascertained with standard target

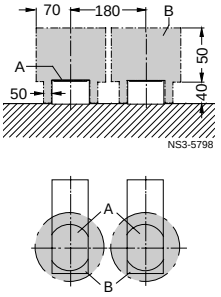


A = sensing face
B = metal-free space

Operating distance 25 mm



Ascertained with standard target

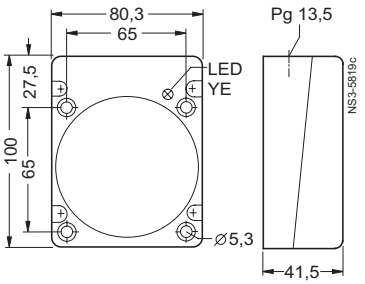


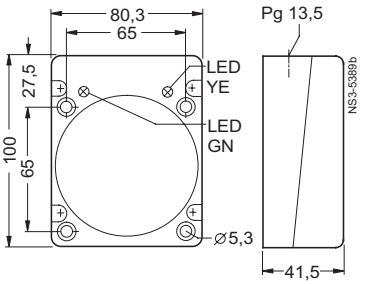
A = sensing face
B = metal-free space

Rated Operating Distance 40 mm

Selection and ordering data

Rated operating distance s_n	**40 mm (embeddable installation)/ 30 mm (non-embeddable installation)**	**40 mm (embeddable installation)/ 30 mm (non-embeddable installation)**
Form	**80 mm × 100 mm block**	**80 mm × 100 mm block**
Installation in metal	**Embeddable/non-embeddable**	**Embeddable/non-embeddable**
Dimensions	Type 1	Type 2





Delivered with
Pg 13.5 = Pg 13.5 thread for moulded-plastic joint, 3SX6 274 connector plug or 3RX1 566 adapter

Number of cores		**2 cores**	**3 cores**
Group		High electrical requirements (AC/DC)	Automotive industry (Ford)
Housing material		Moulded plastic	Moulded plastic
Operational voltage	AC/DC V	20 to 265/20 to 320	–/10 to 65
Indicator		LED	2 LED
Current input (no load)			
AC 230 V/DC 24 V	mA	1.5/1.0	–/20
Loading capacity continuous	mA	300	300
20 ms	mA	1800[1])	–
Minimum load current	mA	5	–
Operating frequency	AC/DC Hz	25/60	–/10
Repeat accuracy	mm	2	2
Response time	ms	4	10
Build-up time	ms	11	80
Availability delay	ms	100	200
Protective measures		1 ☐ 3 4 5 6	1 2 3 4 5 6

		Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/89 No.
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function or NC function, programmable	1	**3RG40 33–6KD01**		0.47	24
		2 ▶	**3RG40 33–6AD01**		0.47	23
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function or NC function, pnp programmable		–			
			–			

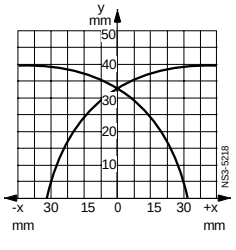
1) Siemens 3TF contactors up to size 4 (AC 230 V; max. operating frequency 0.25 Hz)

Protective measures
Response characteristics
Mounting instructions

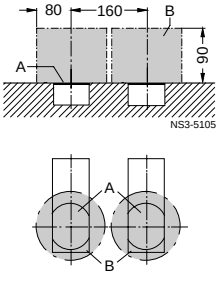
Delivery
▶ Preferred type.

Protective measures
☐ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection

Operating distance 40 mm

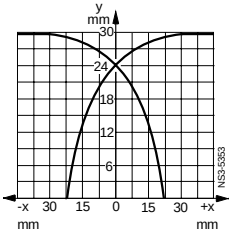


Ascertained with standard target

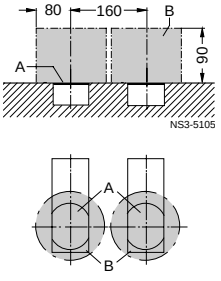


A = sensing face
B = metal-free space

Operating distance 30 mm



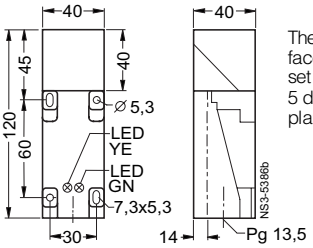
Ascertained with standard target

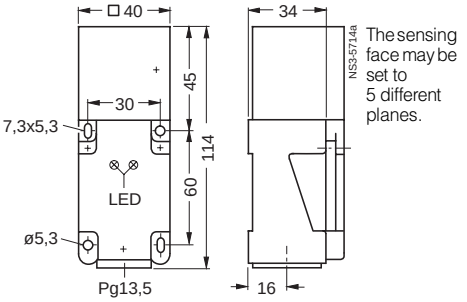


A = sensing face
B = metal-free space

Selection and ordering data

Rated operating distance s_n	**40 mm**	**40 mm**
Form	**40 mm × 40 mm block**	**40 mm × 40 mm block**
Installation in metal	**Non-embeddable**	**Non-embeddable**
Dimensions	Type 1	Type 2





Delivered with
Pg 13.5 = Pg 13.5 thread for moulded-plastic joint, 3SX6 274 connector plug or 3RX1 566 adapter

Number of cores		**3 cores**	**4 cores**
Group		Increased operating distance	U BERO (without reduction factor)[1]
Housing material		Moulded plastic	Moulded plastic
Operational voltage	DC V	10 to 65	10 to 30
Indicator		2 LED	2 LED
Current input (no load)	mA	≤ 8	≤ 15
Loading capacity	mA	500	≤ 200
Operating frequency	Hz	20	250
Repeat accuracy	mm	1.5	0.2
Response time	ms	4	0.13
Build-up time	ms	25	0.1
Availability delay	ms	300	≤ 8
Protective measures		1 2 3 4 5 6	1 2 3 4 5 6 7

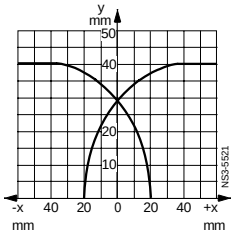
		Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/89 No.
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function or NC function, pnp programmable	1 ▶	**3RG41 41–6AD00**		0.23	23
			–			
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function, pnp NO function, npn		–			
		2	**3RG46 44–6AN01**		0.22	19
		2	**3RG46 44–6GN01**		0.22	21
			Automotive industry (Opel) Extremely high EMC			
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function or NC function, pnp programmable	1	**3RG41 41–6AD04**		0.23	23

1) These BERO switches are resistant to magnetic fields up to 160 mT eff.

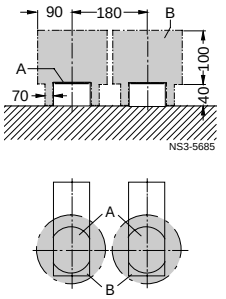
Protective measures
Response characteristics
Mounting instructions

Delivery
▶ Preferred type.

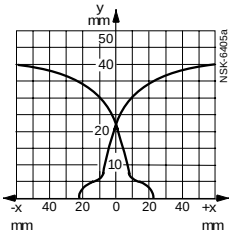
Protective measures
☐ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection
7 Totally isolated



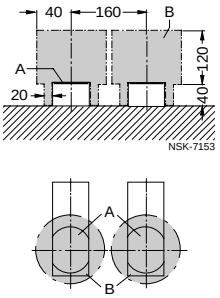
Ascertained with standard target



A = sensing face
B = metal-free space



Ascertained with standard target

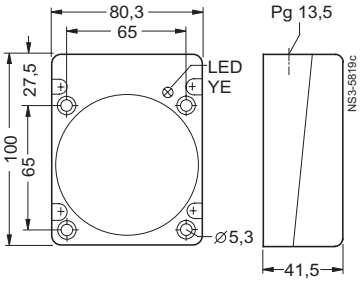


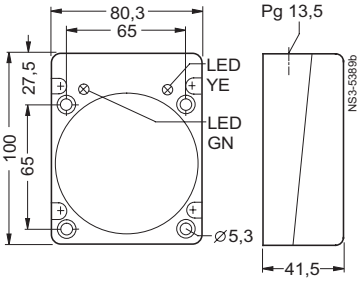
A = sensing face
B = metal-free space

Rated Operating Distance 40 mm

Selection and ordering data

Rated operating distance s_n	**40 mm**	**40 mm**
Form	**80 mm × 100 mm block**	**80 mm × 100 mm block**
Installation in metal	**Non-embeddable**	**Non-embeddable**
Dimensions	Type 1	Type 2





Delivered with
Pg 13.5 = Pg 13.5 thread for moulded-plastic joint, 3SX6 274 connector plug or 3RX1 566 adapter

Number of cores		**2 cores**	**3 cores**
Group		High electrical requirements (AC/DC)	High electrical requirements
Housing material		Moulded plastic	Moulded plastic
Operational voltage	AC/DC V	20 to 265/20 to 320	–/10 to 65
Indicator		LED	2 LED
Current input (no load)			
AC 230 V/DC 24 V	mA	1.5/1.0	–/20
Loading capacity continuous	mA	300	300
20 ms	mA	1800[1])	–
Minimum load current	mA	5	–
Operating frequency	AC/DC Hz	25/60	–/10
Repeat accuracy	mm	1	1
Response time	ms	4	10
Build-up time	ms	11	80
Availability delay	ms	100	200
Protective measures		1 ☐ 3 4 5 6	1 2 3 4 5 6

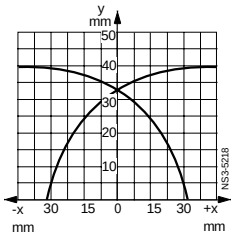
		Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/89 No.
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function or NC function, pnp programmable	1 ▶	**3RG40 43–6KD00**		0.47	24
		2 ▶	**3RG40 43–6AD00**		0.47	23

1) Siemens 3TF contactors up to size 4 (AC 230 V; max. operating frequency 0.25 Hz)

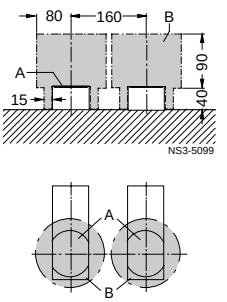
Protective measures
Response characteristics
Mounting instructions

Delivery
▶ Preferred type.

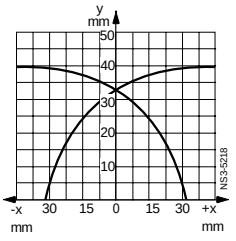
Protective measures
☐ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection



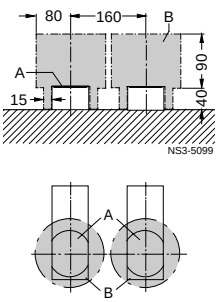
Ascertained with standard target



A = sensing face
B = metal-free space



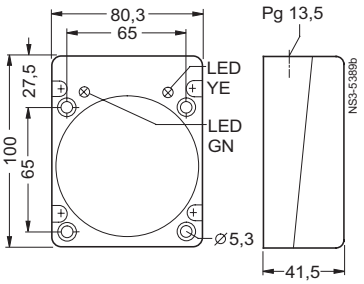
Ascertained with standard target

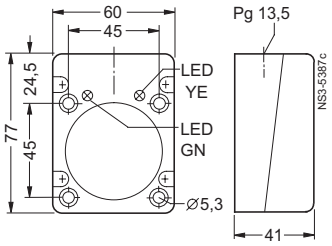


A = sensing face
B = metal-free space

Selection and ordering data

Rated operating distance s_n	**40 mm**	**50 mm**
Form	**80 mm × 100 mm block**	**60 mm × 80 mm block**
Installation in metal	**Non-embeddable**	**Non-embeddable**
Dimensions	Type 1	Type 2





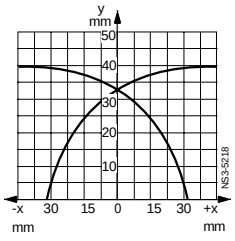
Delivered with
Pg 13.5 = Pg 13.5 thread for moulded-plastic joint, 3SX6 274 connector plug or 3RX1 566 adapter

Number of cores	**4 cores**	**3 cores**
Group	Normal requirements	Increased operating distance
Housing material	Moulded plastic	Moulded plastic
Operational voltage DC V	15 to 34	10 to 65
Indicator	2 LED	2 LED
Current input (no load) mA	≤ 30 (24 V); ≤ 50 (34 V)	≤ 8
Loading capacity mA	200 (≤ 50 °C); 150 (≤ 85 °C)	500
Operating frequency Hz	10	20
Repeat accuracy mm	1.0	1.5
Response time ms	10	4
Build-up time ms	80	25
Availability delay ms	200	300
Protective measures	1 2 3 ☐ 5 6	1 2 3 4 5 6

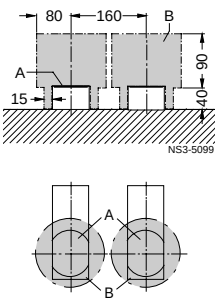
		Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/89 No.
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function and NC function, pnp	1	**3RG40 43–6CD00**		0.047	18
		2	–			
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function or NC function, pnp programmable		–			
		2	**3RG41 42–6AD00**		0.27	23

Protective measures
Response characteristics
Mounting instructions

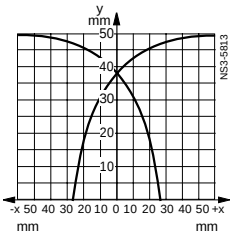
Protective measures
☐ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection



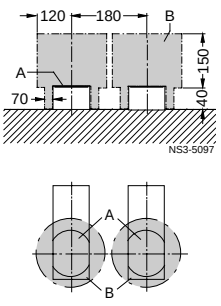
Ascertained with standard target



A = sensing face
B = metal-free space



Ascertained with standard target

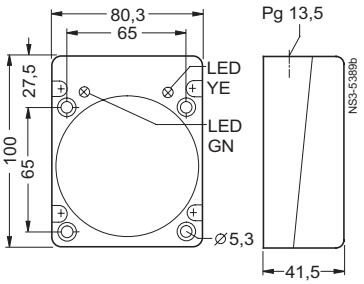


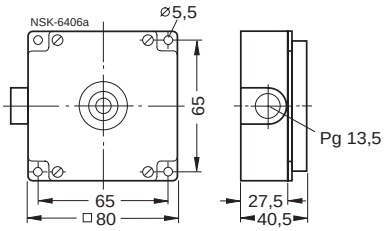
A = sensing face
B = metal-free space

Rated Operating Distance 65 mm and 75 mm

Selection and ordering data

Rated operating distance s_n	**65 mm**	**75 mm**
Form	**80 mm × 100 mm block**	**80 mm × 80 mm block**
Installation in metal	**Non-embeddable**	**Non-embeddable**
Dimensions	Type 1	Type 2





Delivered with
Pg 13.5 = Pg 13.5 thread for moulded-plastic joint, 3SX6 274 connector plug or 3RX1 566 adapter

Number of cores		**3 cores**	**4 cores**
Group		Increased operating distance	U BERO (without reduction factor)[1]
Housing material		Moulded plastic	Moulded plastic
Operational voltage	DC V	10 to 65	10 to 13
Indicator		2 LED	LED
Current input (no load)	mA	≤ 8	≤ 15
Loading capacity	mA	500	≤ 200
Operating frequency	Hz	10	250
Repeat accuracy	mm	2	1.5
Response time	ms	5	2.5
Build-up time	ms	30	2.5
Availability delay	ms	300	≤ 8
Protective measures		1 2 3 4 5 6 □	1 2 3 4 5 6 7

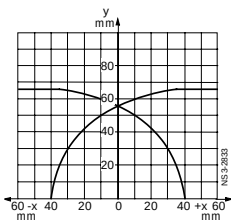
		Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/89 No.
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function or NC function, pnp programmable	1	**3RG41 43–6AD00**		0.48	23
			–			
With terminal compartment for cables of 0.5 to 2.5 mm²	NO function, pnp	2 ▶	**3RG46 43–6AN01**		0.24	19
	NO function, npn		**3RG46 43–6GN01**		0.24	21
			–			

1) These BERO switches are resistant to magnetic fields up to 60 mT eff.

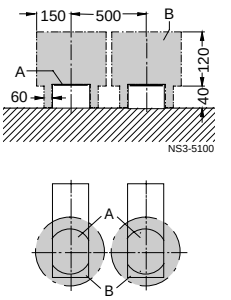
Protective measures
Response characteristics
Mounting instructions

Delivery
▶ Preferred type.

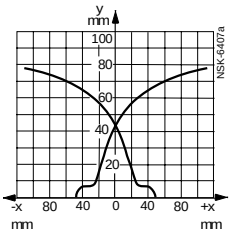
Protective measures
□ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection
7 Totally isolated



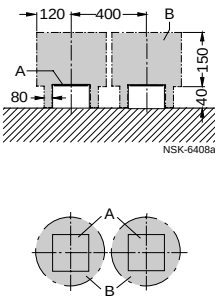
Ascertained with standard target



A = sensing face
B = metal-free space



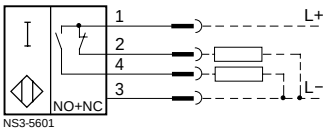
Ascertained with standard target



A = sensing face
B = metal-free space

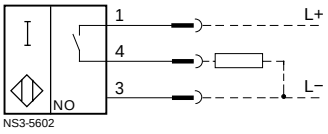
Wiring diagrams

No. 1



NS3-5601

No. 2



NS3-5602

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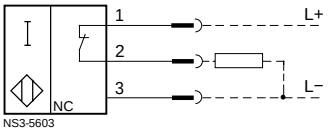

NS3-5603

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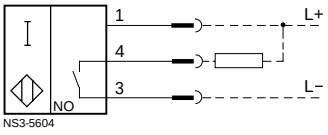

NS3-5604

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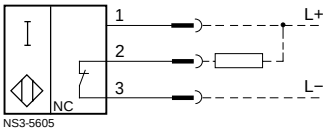

NS3-5605

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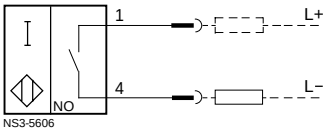

NS3-5606

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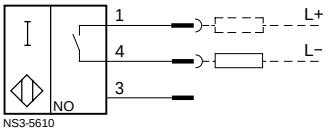
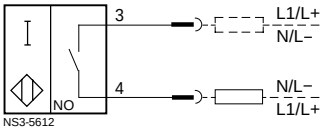


NS3-5610

No. 8



NS3-5612

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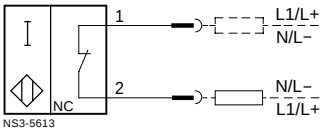
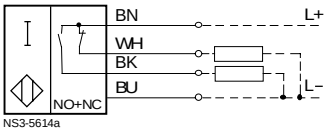


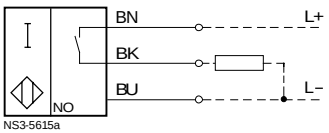
NS3-5613

No. 10



NS3-5614a

No. 11



NS3-5615a

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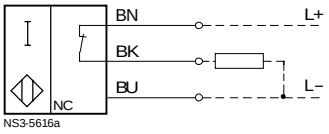

NS3-5616a

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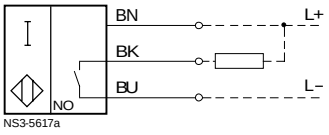

NS3-5617a

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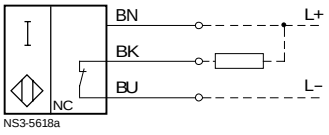
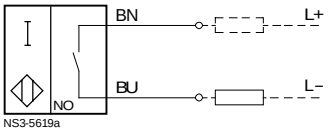


NS3-5618a

No. 15



NS3-5619a

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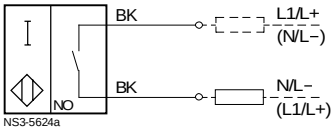

NS3-5624a

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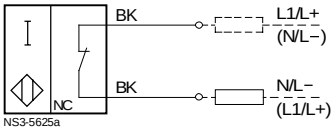

NS3-5625a

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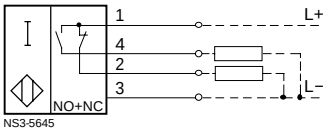
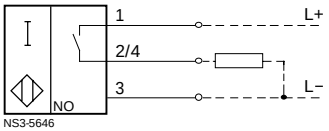


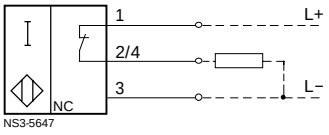
NS3-5645

No. 19



NS3-5646

No. 20



NS3-5647

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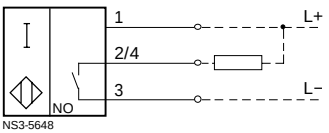

NS3-5648

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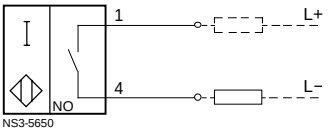

NS3-5650

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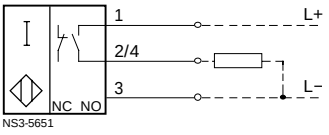
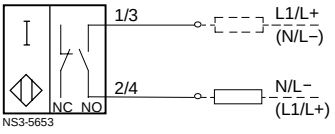


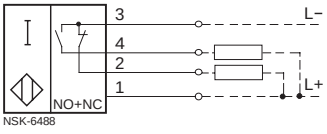
NS3-5651

No. 24



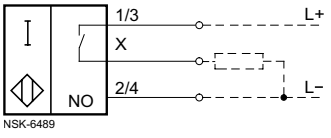
NS3-5653

No. 25



NSK-6488

No. 26



NSK-6489

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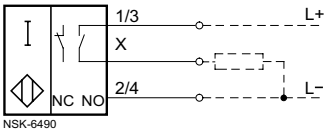
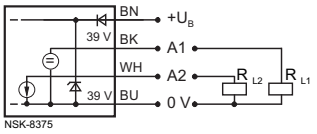


NSK-6490

No. 28



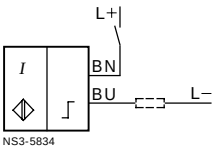
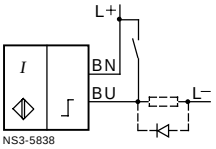
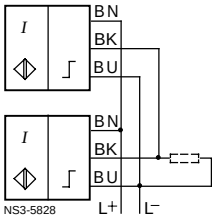
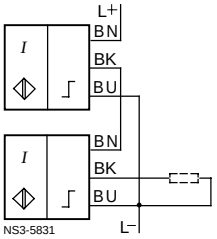
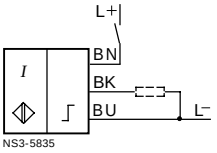
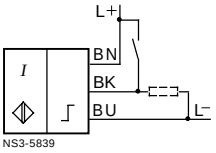
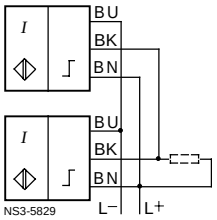
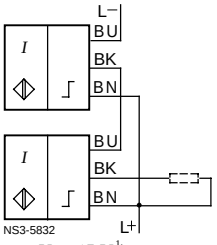
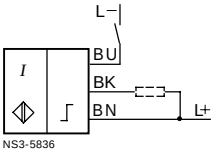
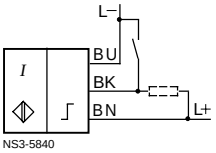
NSK-8375

Abbreviations for the colour identification of the connection cables according to IEC 60 757:

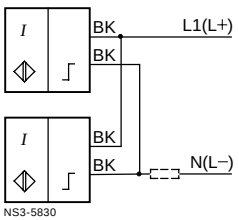
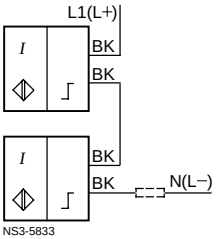
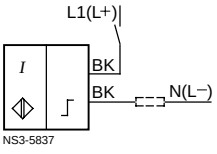
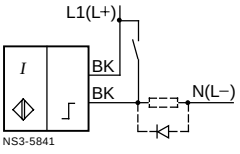
BK = Black	GN = Green
BN = Brown	WH = White
BU = Blue	YE = Yellow

Wiring examples

DC designs

	Parallel connection	Series connection	Series connection with a contact (NO or NC)	Parallel connection with a contact (NO or NC)
BERO with 2 cores for PLC	Not possible The sum of all the BERO residual currents must be less than the holding current of the load	not possible, because $n \leq \frac{U_b - 15\ V}{8\ V}$ U_b SPS: 24 V		
BERO with 3 cores, pnp		 $n \leq \frac{U_b - 15\ V^{1)}}{,5\ V} + 1$ $U_c = U_b - (n \cdot 2.5\ V)$	 Other connections are not permitted	
BERO with 3 cores, npn		 $n \leq \frac{U_b - 15\ V^{1)}}{,5\ V} + 1$ $U_c = U_b - (n \cdot 2.5\ V)$	 Important! Pay attention to availability delay.	 Important! Pay attention to availability delay.
BERO with 4 cores	Not possible	Not possible		

AC/DC designs

	Parallel connection	Series connection	Series connection with a contact (NO or NC)	Parallel connection with a contact (NO or NC)
BERO with 2 cores	 The sum of all the BERO residual currents must be less than the holding current of the load	 $n \leq \frac{U_b}{20\ V}$ $U_c = U_b - (n \cdot 8\ V)$	 Important! Pay attention to availability delay.	 For DC connection a diode must be connected in parallel with a mainly inductive load. Important! Pay attention to availability delay.

U_b = operational voltage
U_c = minimum load actuating voltage
n = number of BEROs

Abbreviations for the colour identification of the connection cables according to IEC 60 757:
BK = Black
BN = Brown
BU = Blue

1) Minimum operational voltage of BERO.

Description

Function

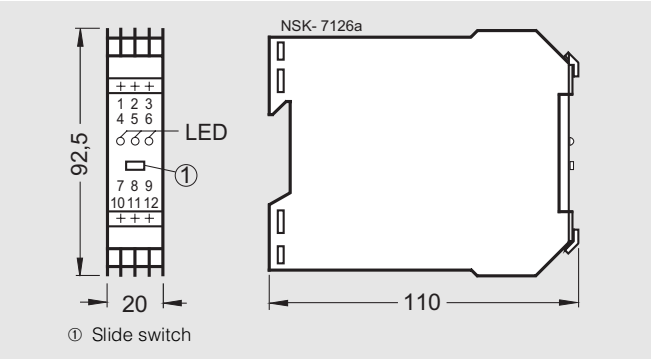
BERO according to NAMUR and DIN 19 234 are DC proximity switches with 2 cores. They only comprise the oscillator.

Due to the low-resistance termination they are insensitive to inductive and capacitive interferences acting on the BERO supply leads.

In connection with the series-connection switching devices, the BERO can be used in intrinsically safe circuits.

3RX1 73 series-connection switching device

Series-connection switching device, dimension drawing



Series-connection switching devices

The 3RX1 730 and 3RX1 731 series-connection switching devices are connected to the 3RG46..-. N... BERO via a 2-core lead (acc. to DIN 19 234 and NAMUR). They evaluate the level of the BERO current input (damped: <1 mA; undamped: >3 mA) and produce a corresponding switching signal. The switching function of the outputs (NC/NO) is selectable.

The devices are designed as isolating switching amplifiers, i.e. they isolate the input circuit (control circuit) from the output circuit and the power supply. Equalizing or earthing is not necessary. Due to their intrinsically safe circuits, the series-connection switching devices are approved for use in hazardous areas of [EEx ib] type of protection, explosion groups IIB and IIC.

LED function

Green LED: Operational voltage
Yellow LED: Output indication
Red LED: Open-circuit and short-circuit monitoring

Identification mark of the NAMUR-BERO

[EEx ib] IIC T6

- T6: Max. permissible surface temperature, here: 85 °C
- IIC: For the hazardous area minimum ignition current ratio <0.45
- [EEx ib]: Intrinsic safety of category "b" (1 failure)
- [EEx ib]: General identification mark Standard device

Intrinsically safe electrical equipment

Type of protection EEx ib IIC T6

BERO in accordance with NAMUR and DIN 19 234 constitute intrinsically safe electrical equipment for hazardous areas.
Conformity with the harmonized European standards:

EN 50 014 – 1977/
DIN VDE 0171 Part 1/5.78
and the general standards:
EN 50 020 – 1977/
DIN VDE 0171 Part 7/5.78

Intrinsic safety "i"
is certified in the PTB certificate of conformity No. Ex-88.B.2145 (sensors) and No. Ex-89.C.2074 (series-connection switching devices). The connections are made on intrinsically safe supply and control circuits with the following maximum values:

$U_o \leq 5.5$ V
$I \leq 52$ mA
$P \leq 169$ mW

The proximity switches can be used with supply and control circuits which are certified in type of protection [EEx ib] IIB or IIC. The type of protection for the proximity switches depends on the type of protection for the supply and control circuits. Considering the stated maximum values, the inherent heating should be ≤ 20 K (20 °C). The ambient temperature classes as well as the effective internal inductances and capacitances are stated in the certificate of conformity.

For using in danger Zone 0 in Germany

The proximity switches BERO in accordance with NAMUR with the PTB certificate of conformity are not permitted for use in danger Zone O.

3RG4 BERO Inductive Proximity Switches
according to NAMUR and DIN 19 234

Description

Line of action, open-circuit and short-circuit monitoring

By means of a sliding switch on the front of the series-connection switching device, the line of action from input to output may be selected.

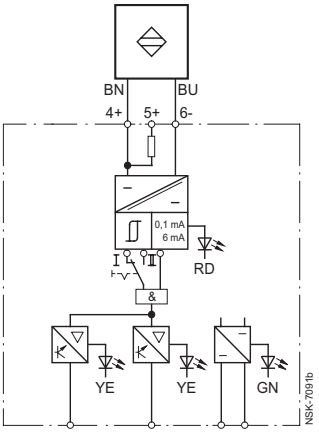
BERO	Slide switch in position	Output 3RX1 730	3RX1 731
undamped	I	conductive	closed
damped		blocked	open
undamped	II	blocked	open
damped		conductive	closed

Input modules for SIMATIC

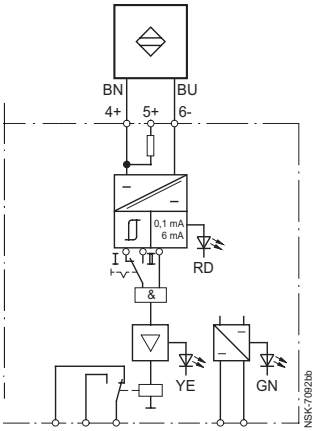
Input modules acc. to NAMUR are available for SIMATIC controllers. The NAMUR BERO switches are connected directly to these input modules (see Catalog ST 50 or ST 70).

SIMATIC	EEx i digital input
S5–100U, ET 100U, ET 200U	6ES5 437–8EA12
S5–115U/H S5–135 U, S5–155U/H	6ES5 434–4UA12
S7–300, ET 200M	6ES7 321–7RD00–0AB0

3RX1 730 series-connected switching device

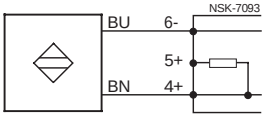


3RX1 731 series-connected switching device



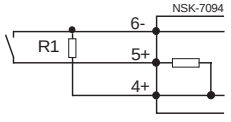
Application of series-connection switching devices

With NAMUR BERO

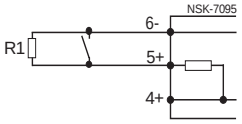


Open-circuit and short-circuit monitoring

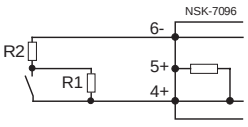
With mechanical contacts



Without monitoring



Open-circuit monitoring



Open-circuit and short-circuit monitoring

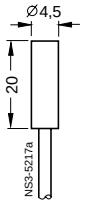
R1 = 10 kΩ
R2 = 400 Ω to 2 kΩ

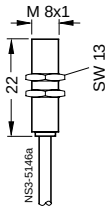
Abbreviations for the colour identification of the connection cables and luminous diodes acc. to IEC 60 757:

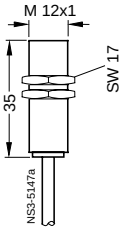
BN = Brown
BU = blue
GN = Green
RD = Red
YE = Yellow

Selection and ordering data

Rated operating distance s_n	**0.8 mm**	**1.5 mm**	**2 mm**
Form	**Ø 4.5 mm**	**M 8**	**M 12**
Installation in metal	**Embeddable**	**Embeddable**	**Embeddable**
Dimensions	Type 1	Type 2	Type 3



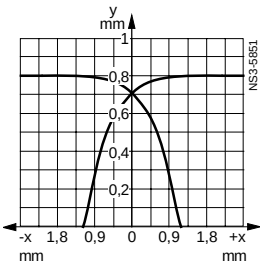




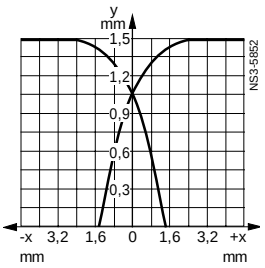
Number of cores		**2 cores**	**2 cores**	**2 cores**
Housing material		Stainless steel	Stainless steel	Stainless steel
Operational voltage[1]	DC V	5 to 25	5 to 25	5 to 25
Rated voltage	DC V	8 (R_i approx. 1 kΩ)	8 (R_i approx. 1 kΩ)	8 (R_i approx. 1 kΩ)
Power consumption				
BERO damped	mA	< 1.2	< 1.2	< 1.2
undamped	mA	> 2.1	> 2.1	> 2.1
Operating frequency	Hz	5000	5000	2000
Repeat accuracy	mm	0.01	0.01	0.01
Hysteresis	%	6	10	3
Self inductance[2]	µH	15	20	25
Inherent capacitance[2]	nF	15	16	32
Connection Design Designation		Cable: 2 m, LiYY 2 x 0.14 mm² BN = L+; BU = L–	Cable: 2 m, LiYY 2 x 0.14 mm² BN = L+; BU = L–	Cable: 2 m, LiYY 2 x 0.34 mm² BN = L+; BU = L–

Type	Order No.	Price 1 unit	Weight approx. kg
1	**3RG46 04–1NA00**		0.062
2 ▶	**3RG46 11–1NA00**		0.070
3 ▶	**3RG46 12–1NA00**		0.090

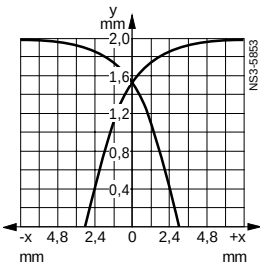
Response characteristics



Ascertained with standard target



Ascertained with standard target



Ascertained with standard target

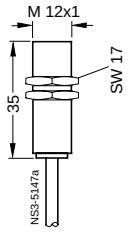
Delivery
▶ Preferred type.

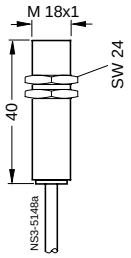
Abbreviations for the colour identification of the connection cables according to IEC 60 757:
BN = Brown
BU = Blue

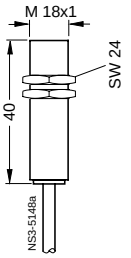
1) Including residual ripple of max. 5%.
2) To be noted when used in extreme areas only.

Selection and ordering data

Rated operating distance s_n	**4 mm**	**5 mm**	**8 mm**
Form	**M 12**	**M 18**	**M 18**
Installation in metal	**Non-embeddable**	**Embeddable**	**Non-embeddable**
Dimensions	Type ①	Type ②	Type ③



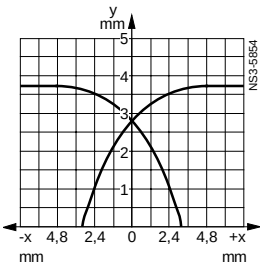




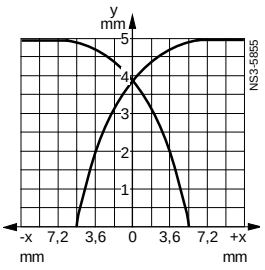
Number of cores		**2 cores**	**2 cores**	**2 cores**
Housing material		Moulded plastic	Stainless steel	Moulded plastic
Operational voltage[1])	DC V	5 to 25	5 to 25	5 to 25
Rated voltage	DC V	8 (R_i approx. 1 kΩ)	8 (R_i approx. 1 kΩ)	8 (R_i approx. 1 kΩ)
Power consumption				
BERO damped	mA	< 1	< 1	< 1
undamped	mA	≥ 3	≥ 3	≥ 3
Operating frequency	Hz	1500	500	200
Repeat accuracy	mm	0.01	0.01	0.01
Hysteresis	%	5	3	5
Self inductance[2])	µH	25	70	70
Inherent capacitance[2])	nF	40	30	30
Connection	Design	Cable: 2 m, LiYY 2 x 0.34 mm²	Cable: 2 m, LiYY 2 x 0.34 mm²	Cable: 2 m, LiYY 2 x 0.34 mm²
	Designation	BN = L+; BU = L–	BN = L+; BU = L–	BN = L+; BU = L–

Type	Order No.	Price 1 unit	Weight approx. kg
① ▶	**3RG46 22–1NA00**		0.082
② ▶	**3RG46 13–1NA00**		0.160
③ ▶	**3RG46 23–1NA00**		0.130

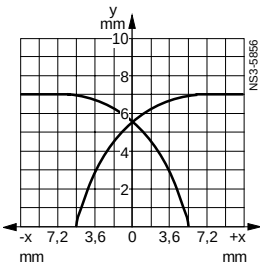
Response characteristics



Ascertained with standard target



Ascertained with standard target



Ascertained with standard target

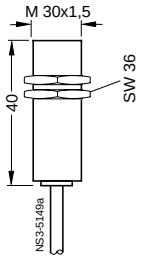
Delivery
▶ Preferred type.

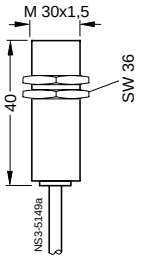
Abbreviations for the colour identification of the connection cables according to IEC 60 757:
BN = Brown
BU = Blue

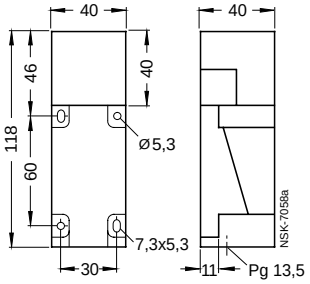
1) Including residual ripple of max. 5%.
2) To be noted when used in extreme areas only.

Selection and ordering data

Rated operating distance s_n	**10 mm**	**15 mm**	**15 mm**
Form	**M 30**	**M 30**	**40 mm × 40 mm block**
Installation in metal	**Embeddable**	**Non-embeddable**	**Embeddable**
Dimensions	Type 1	Type 2	Type 3 The sensing face may be set to 5 different planes





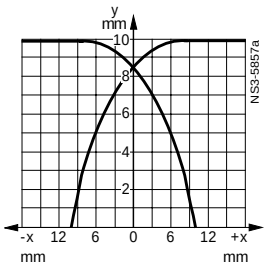


Number of cores	**2 cores**	**2 cores**	**2 cores**
Housing material	Stainless steel	Moulded plastic	Moulded plastic
Operational voltage[1])	DC V 5 to 25	5 to 25	5 to 25
Rated voltage	DC V 8 (R_i approx. 1 kΩ)	8 (R_i approx. 1 kΩ)	8 (R_i approx. 1 kΩ)
Power consumption			
BERO damped	mA < 1.2	< 1.2	< 1.2
undamped	mA > 2.1	> 2.1	> 2.1
Operating frequency	Hz 300	100	150
Repeat accuracy	mm 0.01	0.01	0.01
Hysteresis	% 3	5	3
Self inductance[2])	µH 70	65	100
Inherent capacitance[2])	nF 210	170	290
Connection Design Designation	Cable: 2 m, LiYY 2 x 0.75 mm² BN = L+; BU = L–	Cable: 2 m, LiYY 2 x 0.75 mm² BN = L+; BU = L–	Screw terminals max. 2.5 mm² 1 = L+; 2 = L–

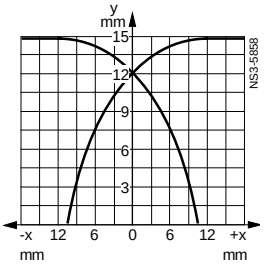
Type	Order No.	Price 1 unit	Weight approx. kg
1 ▶	**3RG46 14–1NA00**		0.215
2 ▶	**3RG46 24–1NA00**		0.150
3 ▶	**3RG46 31–6NA00**		0.261

Response characteristics

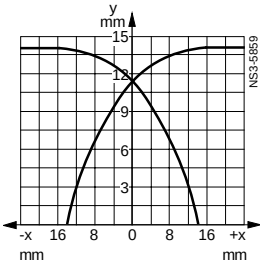
Delivery
▶ Preferred type.



Ascertained with standard target



Ascertained with standard target



Ascertained with standard target

Abbreviations for the colour identification of the connection cables according to IEC 60 757:
BN = Brown
BU = Blue

1) Including residual ripple of max. 5%.
2) To be noted when used in extreme areas only.

Selection and ordering data

	Type	Order No.	Price	Weight approx.	Type	Order No.	Price	Weight approx.
			1 unit	kg			1 unit	kg
Series-connection switching device								
with electronic output	▶	**3RX1 730**		0.150		–		
with relay output		–			▶	**3RX1 731**		0.150

Delivery
▶ Preferred type.

Technical data

Proximity switch

Residual ripple of operational voltage		≤ 5%
Reduction factors (embeddable and non-embeddable installation)	V2A-Steel	0.85
	Al	0.4
	Cu	0.3
Cable length	encapsulated	2 m
	max.	100 m
Degree of protection		IP 67
Ambient temperature	°C	–25 to +100
Shock resistance		30 × *g*, 11 ms duration
Resistance to vibration		55 Hz, 1 mm amplitude

Series-connection switching devices

Type		**3RX1 730**		**3RX1 731**
		Electronic output		Relay output
Operational voltage	DC V	10 to 30		20.4 to 27.6
Residual ripple		≤ 10%		≤ 10%
Power consumption/current input	mA	20		20
Inputs (intrinsically safe)		1 input		
Rated data		According to DIN 19 234 and NAMUR		
No-load voltage U_{A0}	DC V	Approx. 8		
Short circuit current I_{AK}	mA	Approx. 8		
Switching point I_S	mA	$1.2 \le I_S \le 2.1$		
Switching hysteresis I_H	mA	Approx. 0.2		
Input pulse length	ms	≥ 15		
Input interpulse period	ms	≥ 15		
Open-circuit monitoring	µA	≤ 100		
Short-circuit monitoring	mA	≥ 6		
Data in accordance with the certificate of conformity				
Voltage U_o max.	DC V	12.7		
Current I_K max.	mA	20		
Rated power $P_{max.}$ max.	mW	63.5		
Permissible connected load				
• Type protection, category		[EEx ib]		
• Explosion group		IIB/IIC		
• External capacity max.	nF	500/1200		
• External inductance max.	mH	330/90		
Outputs (not intrinsically safe)				
Relay outputs		–		1 changeover contact
• Contact load	AC	–		250 V/2 A/cos φ = 0.7
	DC	–		30 V/2 A
• Mechanical endurance		–		≥ 5 × 10^7 operating cycles
• Pickup delay	ms	–		approx. 20
• Dropout delay	ms	–		approx. 20
Electronic outputs (active)		2 electronic outputs		–
• Rated current (short-circuit-proof)	mA	10	200	–
• Signal level 1-signal		Supply voltage –3 V	Supply voltage –3.5 V	–
0-signal		Inhibited outputs		–
• Residual current	µA	≤ 10		–
Operating frequency	Hz	1000		10
Degree of protection		IP 20		IP 20
Ambient temperature	°C	–25 to +70		–25 to +70

Technical data

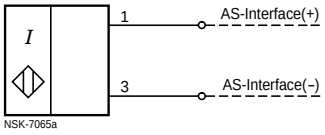
Polarity reversal protection	Available
Overvoltage protection	Available
Ambient temperature	–25 °C to 70 °C
I/O configuration (Hex)	1
ID code	1
Operating indicators	
• LED for switching state	Yellow/green
• LED for unsafe operating distance	Red
• Fault signalling	S_r: 0 . . . 10% S_n: 80 . . . 115% Wire-break of sensor coil Short-circuit in sensor coil

Allocation of data bits

Data bit	Type	Designation	State	Description
D0	Input	Switching signal	0	Damping medium is outside the usable operating distance Yellow LED is off
			1	Damping medium is inside the usable operating distance Yellow LED is on
D1	Input	Unsafe operating distance	0	Damping medium is inside the unsafe operating distance Red LED is on
			1	Damping medium is outside the unsafe operating distance Red LED is off
D2	Input	Ready for operation	0	Sensor is defective (not ready for operation) or medium has moved near to sensor (distance <10%). The signal is transmitted with a delay of approx. 1.3 s and reset without delay.
			1	Sensor is ready for operation
D3	Not used	–	–	–
			–	–

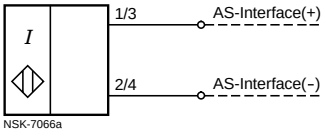
Wiring diagrams

No. 1



NSK-7065a

No. 2



NSK-7066a

Special design

Adapter module for BERO without connection to AS-Interface

Apart from the BERO for direct connection to the AS-Interface, all inductive 3RG40 and 3RG41's with Pg 13.5 thread can be connected to the AS-Interface with an adapter module.

In this case please add "**–Z**" and the code "C01" to the order number.

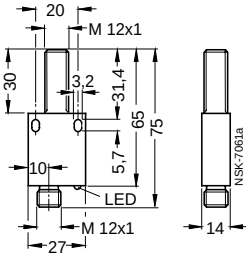
Example:

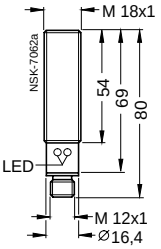
3RG41 41–6AB03–Z C01

Design	Code	Additional price
Direct connection to AS-Interface for inductive BERO with Pg 13.5	**C01**	

Selection and ordering data

Rated operating distance s_n	**2 mm**	**5 mm**
Form	**M 12**	**M 18**
Installation in metal	**Embeddable**	**Embeddable**
Dimensions	Type 1	Type 2



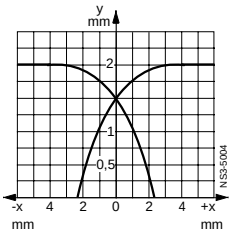


Number of cores	**2 cores**	**2 cores**
Housing material	Brass, nickel-plated/Moulded plastic	Brass, nickel-plated
Operational voltage DC V	20 to 32	20 to 32
Indicator	2 LED	2 LED
Current input (no load) mA	≤ 30	≤ 30
Protective measures	1 ☐ 3 ☐ 5 6	1 ☐ 3 ☐ 5 6

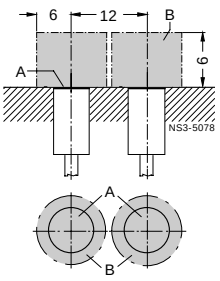
	Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/97 No.
With M 12 plug-in connection Type E, F	1	**3RG46 12–3WS00**		0.047	1
	2	**3RG46 13–3WS00**		0.067	1

Protective measures
Response characteristics
Mounting instructions

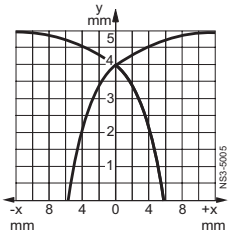
Protective measures
- ☐ Not available
- 1 Spurious switching signal suppression
- 2 Short-circuit and overload protection
- 3 Polarity reversal protection
- 4 Wire-break protection
- 5 Inductive interference protection
- 6 Radio interference protection



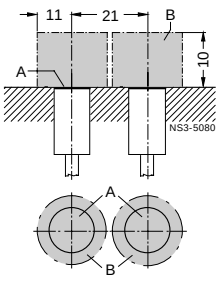
Ascertained with standard target



A = sensing face
B = metal-free space

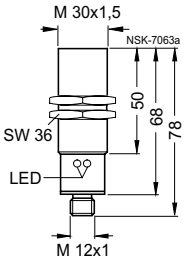


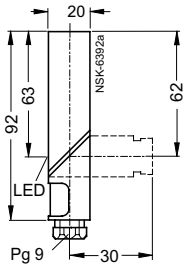
Ascertained with standard target



A = sensing face
B = metal-free space

Rated operating distance s_n	**10 mm**	**10 mm**
Form	**M 30**	**Ø 20 mm**
Installation in metal	**Embeddable**	**Non-embeddable**
Dimensions	Type 1	Type 2





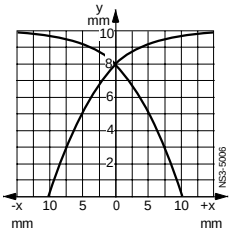
Delivered with
Pg 9 = Pg 9 thread for moulded plastic joint

Number of cores	**2 cores**	**2 cores**
Housing material	Brass, nickel-plated	Moulded plastic
Operational voltage DC V	20 to 32	20 to 32
Indicator	2 LED	2 LED
Current input (no load) mA	≤ 30	≤ 30
Protective measures	1 ☐ 3 ☐ 5 6	1 ☐ 3 ☐ 5 6

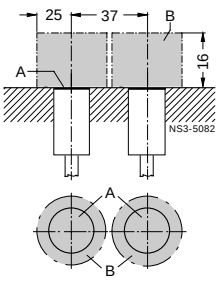
	Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/97 No.
With M 12 plug-in connection Type E, F	1	**3RG46 14–3WS00**		0.133	1
		–			
With terminal compartment for cables of 0.5 to 2.5 mm²	2	**3RG46 25–6WS00**	**57,30**	0.037	2
Connection to ribbon cable with cable adapter 3RX9 808–0AA00					
Fastening clamp included in the scope of supply.					

Protective measures
Response characteristics
Mounting instructions

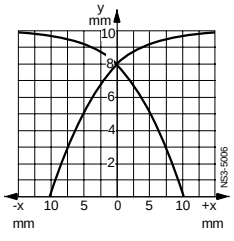
Protective measures
☐ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection



Ascertained with standard target



A = sensing face
B = metal-free space



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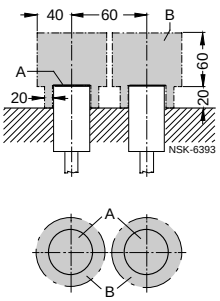
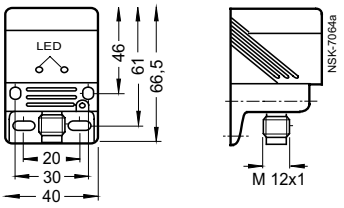
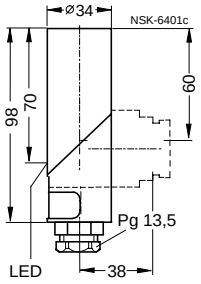


A = sensing face
B = metal-free space

Selection and ordering data

Rated operating distance s_n	**15 mm**	**20 mm**
Form	**40 mm × 40 mm block**	**Ø 34 mm**
Installation in metal	**Embeddable**	**Non-embeddable**
Dimensions	Type 1	Type 2





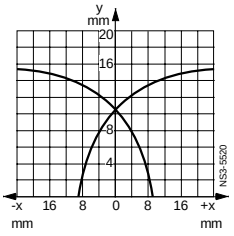
Delivered with
Pg 13.5 = Pg 13.5 thread for moulded-plastic joint, 3SX6 274 connector plug or 3RX1 566 adapter

Number of cores	**2 cores**	**2 cores**
Housing material	Moulded plastic	Moulded plastic
Operational voltage DC V Indicator Current input (no load) mA	20 to 32 2 LED ≤ 30	20 to 32 2 LED ≤ 30
Protective measures	1 ☐ 3 ☐ 5 6	1 ☐ 3 ☐ 5 6

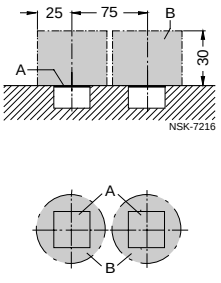
	Type	Order No.	Price 1 unit	Weight approx. kg	Wiring diagram p. 10/97 No.
With M 12 plug-in connection Type E, F	1	**3RG46 38–3WS00**		0.150	1
		–			
With terminal compartment for cables of 0.5 to 2.5 mm²	2	**3RG46 26–6WS00**		0.163	2
Connection to ribbon cable with cable adapter 3RX9 807–0AA00					
Fastening clamp included in the scope of supply.					

Protective measures
Response characteristics
Mounting instructions

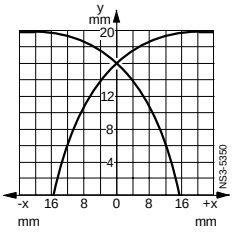
Protective measures
☐ Not available
1 Spurious switching signal suppression
2 Short-circuit and overload protection
3 Polarity reversal protection
4 Wire-break protection
5 Inductive interference protection
6 Radio interference protection



Ascertained with standard target



A = sensing face
B = metal-free space



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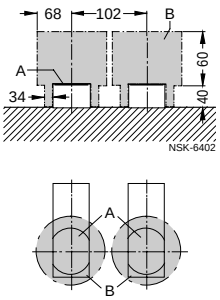

A = sensing face
B = metal-free space