

Inductive Sensors with Special Properties

NAMUR, high pressure rated sensors, EX protected M12x1

NAMUR

High Pressure Rated

EX

Ignition protection type
"intrinsically safe" used with
switching amplifier outside
the Ex area

Inductive sensors to NAMUR specification consist essentially of an oscillator with a dampable oscillator coil and a demodulator.

These high pressure sensors are used, for example, in end-of-travel monitoring on hydraulic cylinders or position detection on valves.

They can be used in conjunction with suitable isolating amplifiers, such as from STAHL (see page 603), in potentially explosive systems or spaces classified as Zone 1 or 2. The isolating amplifier must be installed only outside the explosive area.

Note

Before design, installation and startup, please read the user's guide found at www.balluff.com. You must also observe the requirements for the EC Type Examination Certificate.

Ignition protection type
"intrinsically safe"



Size	M12x1	M12x1
Installation type (pay attention to the note in the Basic Information chapter)	Flush	Flush
Rated switching distance s_n	1.5 mm	1.5 mm
Assured switching distance s_a	0...1.2 mm	0...1.2 mm
NAMUR	Ordering code	BHS004L
	Part number	BES 516-300-S318-S4-N
	Part number	BES 516-300-S315-S4-N
Rated operating voltage U_e	8.2 V DC	8.2 V DC
Supply voltage U_s	7.7...9 V DC	7.7...9 V DC
Rated insulation voltage U_i	75 V DC	75 V DC
Current consumption at $s_r = 0$	≤ 1 mA	≤ 1 mA
consumption at $s_r = \infty$	≥ 4 mA	≥ 4 mA
Rated series resistance R_V	1000 Ω	1000 Ω
Permissible series resistance R_V	550...1100 Ω	550...1100 Ω
Output signal:	Current change (no trigger response)	Current change (no trigger response)
Fully undamped	≥ 4 mA	≥ 4 mA
Fully damped	≤ 1 mA	≤ 1 mA
Polarity reversal protected < 9 V	Yes	Yes
Ambient temperature T_a	-25...+70 °C	-25...+70 °C
Switching frequency f	1 kHz	1 kHz
Degree of protection as per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Material	Housing: Stainless steel	Housing: Stainless steel
	Sensing surface: POM	Sensing surface: POM
Connection	M12 connector, 4-pin	M12 connector, 4-pin
O-ring/spare part number	5.85x2.4/636594	5.85x2.4/636594
Support ring/spare part number	10x5.9x1/705918	10x5.9x1/705918
Pressure rated (hydraulic) up to	500 bar	500 bar

Ex area		
Conformity to standards	EN 60079-0:2004 EN 50020:2002	EN 60079-0:2004 EN 50020:2002
For additional data see -EC Type Examination Certificate.	PTB 01 ATEX 2207 X	PTB 01 ATEX 2207 X
Designation	EX II 2 G EX ia IIC T6	EX II 2 G EX ia IIC T6
Effective internal capacitance	≤ 30 nF	≤ 30 nF
Effective internal inductance	≤ 0.5 mH	≤ 0.5 mH
Maximum input power P_i	200 mW	200 mW

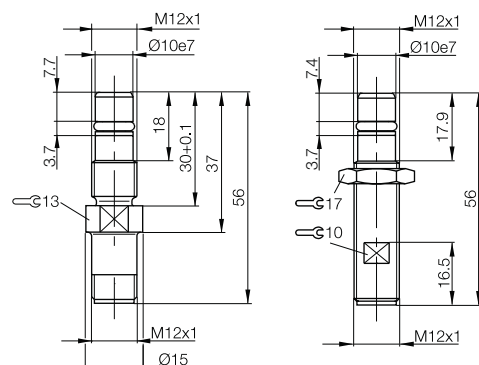
For additional data see
EC Type Examination Certificate.



Sensors with ATEX approval Category 2G

Devices in this category are designed for use in areas where explosive atmospheres occur for short periods (Zone 1).

Before design, installation and startup, please read the user's guide found at www.balluff.com.

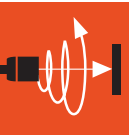


Inductive Sensors with Special Properties

NAMUR, isolating amplifiers



Size	99x17.6x114.5 mm	99x17.6x114.5 mm
Ordering code	FHW004P	FHW004R
Part number	STAHL 9170/20-12-11S	STAHL 9170/20-12-21S
Input	NAMUR-specification	NAMUR-specification
Output relay	2-channel, 1 converter Switching voltage 250 V AC Switching current 4 A AC Switching capacity 50 W/1000 VA	2-channel, 1 converter Switching voltage 250 V AC Switching current 4 A AC Switching capacity 50 W/1000 VA
Function change	via switch	via switch
Supply voltage U_S	24 V DC	120...230 V AC
Ambient temperature T_a	-20...+60 °C	-20...+60 °C
Relative humidity	≤ 95 %, no condensation	≤ 95 %, no condensation
EX area		
Designation	EX II (1) GD [EEx ia] IIC/IIB and EX II 3 G EEx nAC II T4	
EC Type Examination Certificate	DMT 02 ATEX E 195 X	



Inductive Sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special Properties

High-pressure Resistant Sensors

Ex Sensors

Steelface Sensors

High Temperature Rated Sensors

Full PTFE Sensor

Sensors for the Food Industry

Factor 1 Sensors

Weld and Magnetic Field Immune Sensors

Diagnostics Sensors

Large Designs

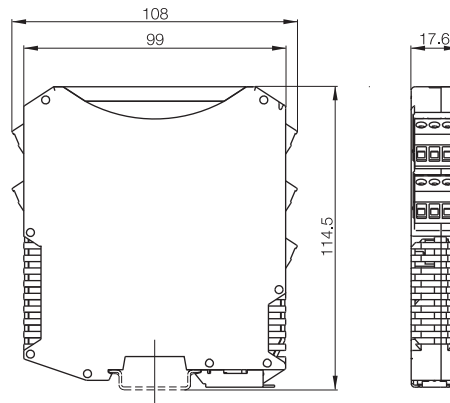
Ring Sensors

Hose Sensors

Analogue Distance Measurement

Accessories

For safety and other data see EC- Type Examination Certificate.



The switch amplifier with relay output serves as the interface between electrical signals from the hazardous area (EX- zone) and the non-hazardous area (safe zone).

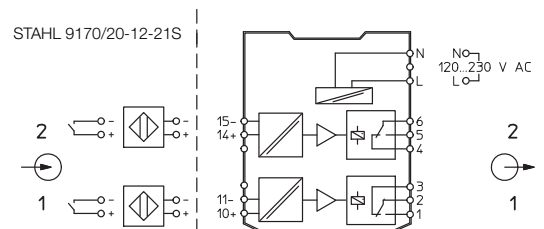
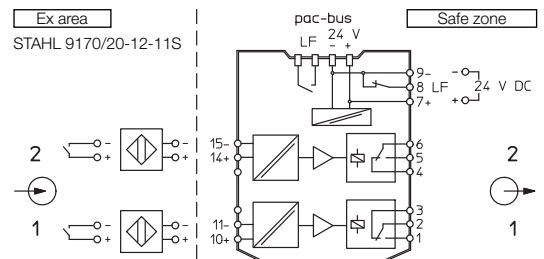
The input signals from NAMUR-sensors are converted using relay switching contacts-at the outputs. Input, output and auxiliary power circuits are galvanically isolated.

Important!

Before design, installation and startup, please read the operating manual found at www.stahl.de.

You must also observe the requirements for the EC- Type Examination Certificate.

Wiring diagrams



Inductive Sensors with Special Properties

NAMUR, EX-protected

Ø 6.5 mm, M8x1

NAMUR EX

Ignition protection type "intrinsically safe" used with isolating amplifier outside the Ex area



Inductive sensors to NAMUR specification consist essentially of an oscillator with a dampable oscillator coil and a de-modulator.

These sensors can be used in conjunction with suitable isolating amplifiers such as from STAHL (see page 603) in explosive systems or zones (see ATEX-marking). The isolating amplifier must be installed only outside the explosive area.

Note

Before design, installation and startup, please read the user's guide found at www.balluff.com.

You must also observe the requirements for the EC-Type Examination Certificate.

Ignition protection type "intrinsically safe"  



Size	Ø 6.5 mm	M8x1
Installation type (pay attention to the note in the Basic Information chapter)	Flush	Flush
Rated switching distance s_n	1 mm	1 mm
Assured switching distance s_a	0.8 mm	0...0.8 mm
NAMUR	Ordering code	BES02ZR
	Part number	BES G06MD-GNX10B-EV02-EEX
		BES M08MD-GNX10B-EV02-EEX
Rated operating voltage U_e	8.2 V DC	8.2 V DC
Supply voltage U_s	7.7...9 V DC	7.7...9 V DC
Rated insulation voltage U_i	75 V DC	75 V DC
Current consumption	Current change (no trigger response)	Current change (no trigger response)
	self-locking (undamped)	self-locking (undamped)
	conductive (damped)	conductive (damped)
Rated series resistance R_v	1 kΩ	1 kΩ
Polarity reversal protected	no*	no*
Ambient temperature T_a	-20...+70 °C	-20...+70 °C
Switching frequency f	2 kHz	2 kHz
Function indicator	No	No
Degree of protection as per IEC 60529	IP 67	IP 67
Material	Housing: Brass-coated	Brass-coated
	Sensing surface: PBT	PBT
Possible installation variations		
Connection	2 m PVC cable, 2x0.14 mm ²	2 m PVC cable, 2x0.14 mm ²

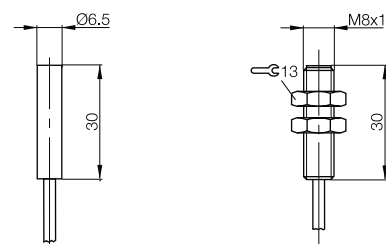
Ex area	Ø 6.5 mm	M8x1
Conformity to standards	EN 50014:1997+A1+A2 EN 50020	EN 50014:1997+A1+A2 EN 50020
For additional data see -EC Type Examination Certificate.	BVS 05 ATEX E 163 PTB 05 ATEX 2075	BVS 05 ATEX E 163 PTB 05 ATEX 2075
Designation	Ex II 2G EEx ia IIC T6 Ex II 1D Ex iaD 20 T90°C	Ex II 2G EEx ia IIC T6 Ex II 1D Ex iaD 20 T90°C
Maximum internal capacitance	80 nF	80 nF
Maximum internal inductance	0.07 mH	0.07 mH
Connected to approved intrinsically safe circuits with the highest values	U = 15 V I = 50 mA P = 120 mW	U = 15 V I = 50 mA P = 120 mW

*Power restriction when using an approved intrinsically safe isolating amplifier

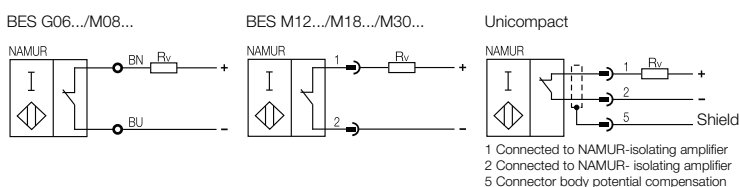


Sensors in accordance with marking

For use in Zone 1 or Zone 20.



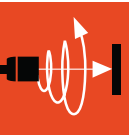
Wiring diagrams



Inductive Sensors with Special Properties

NAMUR, EX-protected

M12×1, M18×1, M30×1.5, 40×40 mm

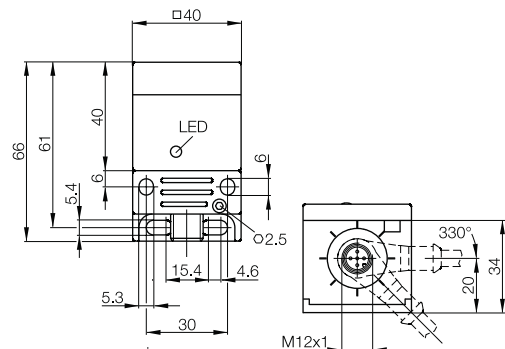
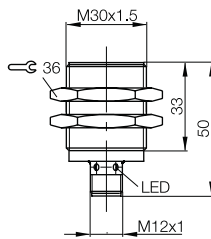
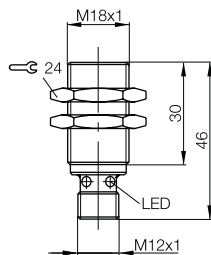
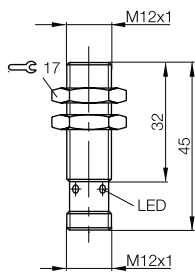


M12×1 mm	M18×1 mm	M30×1.5 mm	40×40×66 mm Unicomact	40×40×66 mm Unicomact
Flush	Flush	Flush	Flush	Not flush
4 mm	8 mm	15 mm	20 mm	35 mm
0...3.2 mm	0...6.5 mm	0...12.2 mm	0...16.2 mm	0...28.4 mm
BES02ZU	BES02ZW	BES02ZY	BES02ZZ	BES0300
BES M12ME-GNX40B-S04G-EEEX	BES M18ME1-GNX80B-S04G-EEEX	BES M30ME1-GNX15B-S04G-EEEX	BES Q40KFU-GNX20B-S92G-EEEX	BES Q40KFU-GNX35F-S92G-EEEX
8.2 V DC	8.2 V DC	8.2 V DC	8.2 V DC	8.2 V DC
7.7...9 V DC	7.7...9 V DC	7.7...9 V DC	7.7...9 V DC	7.7...9 V DC
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
Current change (no trigger response)	Current change (no trigger response)	Current change (no trigger response)	Current change (no trigger response)	Current change (no trigger response)
≤ 1 mA	≤ 1 mA	≤ 1 mA	≤ 1 mA	≤ 1 mA
≥ 2.1 mA	≥ 2.1 mA	≥ 2.1 mA	≥ 2.1 mA	≥ 2.1 mA
1 kΩ	1 kΩ	1 kΩ	1 kΩ	1 kΩ
no*	no*	no*	no*	no*
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
700 Hz	400 Hz	100 Hz	200 Hz	100 Hz
LED	No	No	No	No
IP 67	IP 67	IP 67	IP 67	IP 67
Brass-coated	Brass-coated	Brass-coated	PPE/PPS	PPE/PPS
PBT	PBT	PBT	PBT	PBT
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 5-pin	M12 connector, 5-pin

- Inductive Sensors
- Global DC 3-wire
- DC 3-/4-wire
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special Properties
- High-pressure Resistant Sensors
- Ex Sensors
- Steelface Sensors
- High Temperature Rated Sensors

EN 50014:1997+A1+A2	EN 50014:1997+A1+A2	EN 50014:1997+A1+A2	EN 50014:1997+A1+A2	EN 50014:1997+A1+A2
EN 50020	EN 50020	EN 50020	EN 50020	EN 50020
BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X
Ex II 2G EEx ia IIC T6	Ex II 2G EEx ia IIC T6	Ex II 2G EEx ia IIC T6	Ex II 2G EEx ia IIC T6	Ex II 2G EEx ia IIC T6
Ex II 1D Ex iaD 20 T90°C	Ex II 1D Ex iaD 20 T90°C	Ex II 1D Ex iaD 20 T90°C	Ex II 1D Ex iaD 20 T90°C	Ex II 1D Ex iaD 20 T90°C
210 nF	200 nF	230 nF	250 nF	220 nF
0.115 mH	0.19 mH	0.21 mH	0.45 mH	0.71 mH
U = 15 V	U = 15 V	U = 15 V	U = 15 V	U = 15 V
I = 50 mA	I = 50 mA	I = 50 mA	I = 50 mA	I = 50 mA
P = 120 mW	P = 120 mW	P = 120 mW	P = 120 mW	P = 120 mW

- Full PTFE Sensor
- Sensors for the Food Industry
- Factor 1 Sensors
- Weld and Magnetic Field Immune Sensors
- Diagnostics Sensors
- Large Designs
- Ring Sensors
- Hose Sensors



- Analog Distance Measurement
- Accessories

Permissible installation variations for Unicomact

