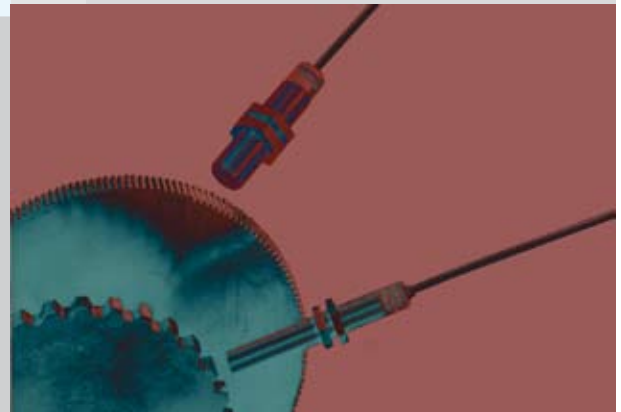


CATALOGUE

***MAGNETO-
RESISTIVE
SENSORS
MRS***





Registration No.: 1327-01



Testing laboratory accredited according to
DIN EN 45001 Reg.-No. DAT-P-048/95-00

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With publication of this catalogue all former printed catalogues about RECHNER magneto-resistive sensors are invalid.

Irrtümer und Änderungen ohne vorherige Anündigung vorbehalten. (10/2010)

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Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)

TECHNOLOGY • MOUNTING • APPLICATION

The magnetoresistive sensors (MRS) detect the movement of ferromagnetic materials, by means of the change of the magnetic flow. They are suitable for rotary speed sensing, for detection of gearwheels and for standstill control. Areas of use can be heavy construction engines, rail vehicles, large diesel engines and turbines.

The magnetoresistive sensors (MRS) work like a magnetic Wheatstone bridge. They react to all ferromagnetic materials. The tooth or gap of a gearwheel, which passed the active area of the sensor, have a different influence on the magnetic field. This results in a change of the magnet-field dependent resistor. This change of the magnetic field is transformed to an electrical voltage-bridge, which then is filtered and prepared. The output signal is a voltage, which corresponds to the magnetfield change.

We have two different series:

⇒Series 300	...-S	3-wire PNP or NPN
	...-N	2-wire
⇒Series 350	...-S	4-wire PNP or NPN
	...-Z	4-wire PNP with dephased output signal with detection of direction of rotation

The components of the MRS are mounted in plastic or metal casings and encapsulated with epoxy casting resin.

The plastics used for the housings are:

- ⇒ PA (polyamide) 6.6 glass-fibre reinforced
- ⇒ PEEK (polyetheretherketone) (FDA 21 CFR 177.2415)

And the metal housings are

- ⇒ VA stainless-steel, material No. 1.4305 or No. 1.4404 (FDA conform).
- ⇒ MS brass / chrome or nickel-plated

Since the active area is made from a block material the degree of protection IP 68 is achieved on the front end.

Only pre-tested electronic components, proven integrated circuits and hybrid circuits are used and produced with SMT. The standard constant ambient temperature permitted is dependent on the model from -40 up to +125 °C (see data sheet).

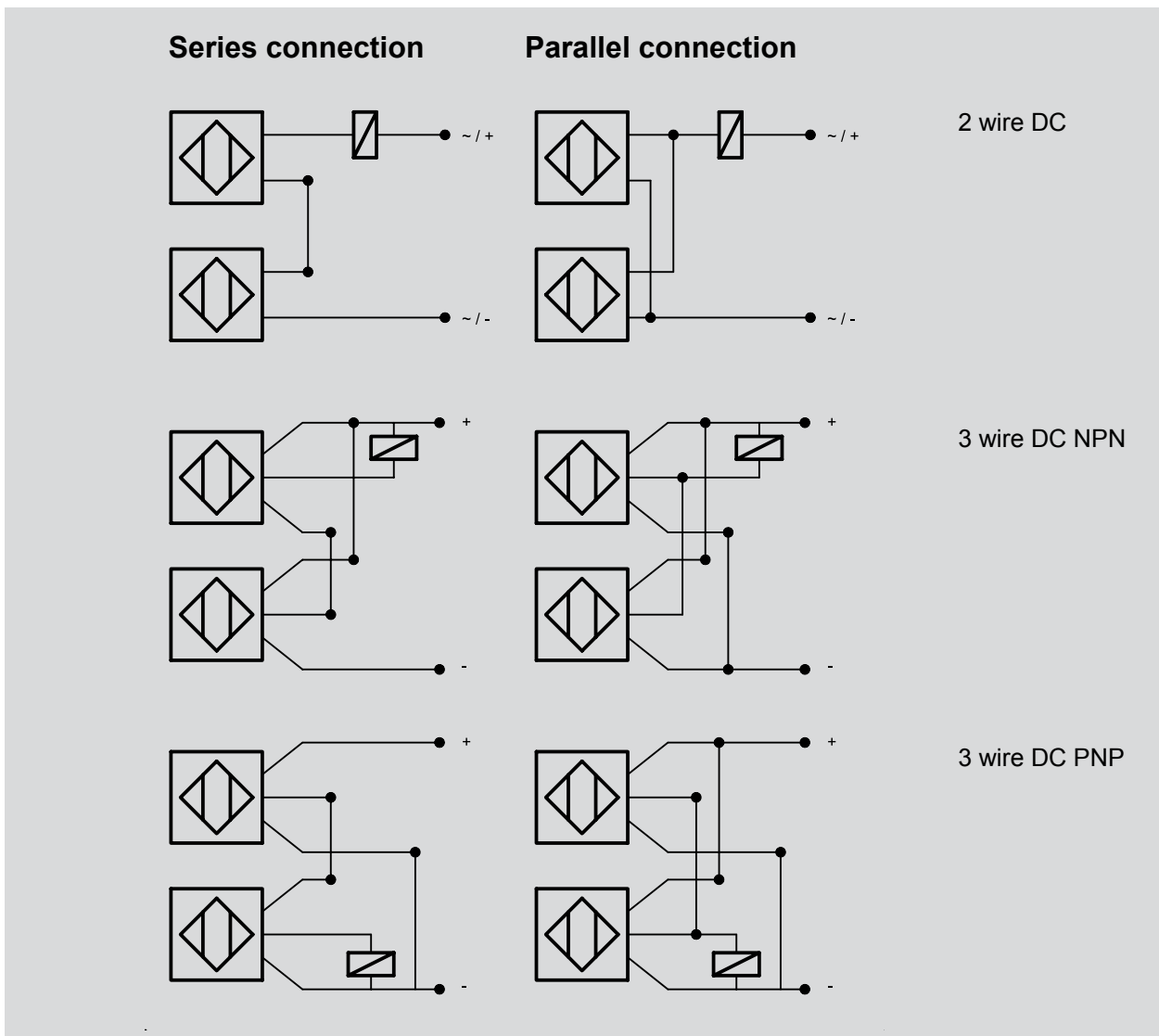
With contactless detection no physical actuating force is required for operation. There is no contact bounce, no sensor wear, no maintenance and the service life is independent of the switching frequency.

MRS can be used in machines, systems and vehicles for contactless detection, for monitoring and positioning, as a pulse generator for counting tasks and speed measurements, and for many other applications (for application examples see page 8).

Wiring of the MRS should be routed separately or screened from heavy conductor lines, as in extreme cases inductive peak voltages can destroy the sensors despite the integrated protective circuit. Screened cable or twisted lines are recommended, especially for longer cable runs > 5 m. Direct control of electric light bulbs is to be avoided, because during the switch-on moment cold current is many times the rated current and can destroy the output stage of the sensor.

Units with strong local field power, e. g. high power walkie-talkies, or noise sources in the lower frequency range, e.g. long, middle or short wave transmitters should not be operated close to the sensors or additional measures have to be taken in order to eliminate the maloperation.

2- and 3-wire sensors with binary output can be used in series or parallel connection, similar to mechanical contacts. It is important to note the type-typical voltage drop and the residual voltage U_d , that must be multiplied, for series connection, in accordance with the number of sensors.



Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)

The material and version-dependent **maximum torque** should be taken into consideration when mounting, in order to prevent damage to the threaded sleeves. The values listed in the table are based on the use of the nuts supplied with the sensors.

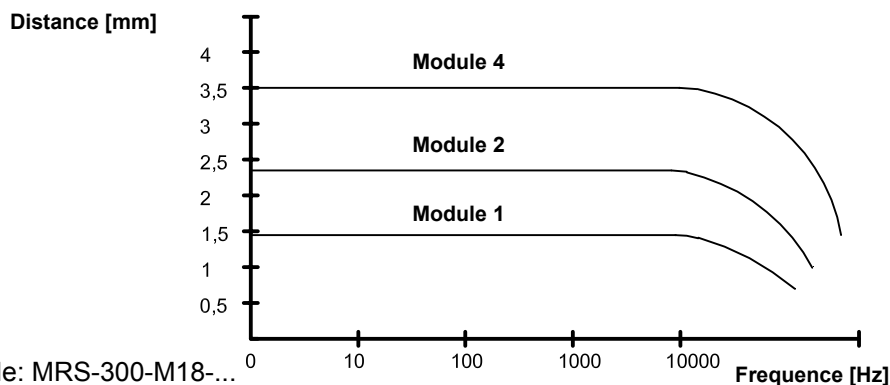
Thread	Housing material					
	PVC	PA 6.6	PPO	PTFE	Brass	Stainless steel
M 5 x 0,5	-	-		-	-	1,5 Nm
M 8 x 1	-	-		-	-	4,5 Nm
M 12 x 1	1,5 Nm	1 Nm	1 Nm	0,2 Nm	15 Nm	15 Nm
M 18 x 1	-	1,7 Nm	1,7 Nm	0,5 Nm	28 Nm	40 Nm
M 22 x 1,5	12 Nm	6 Nm	6 Nm	1,4 Nm	32 Nm	50 Nm
M 30 x 1,5	-	8 Nm	8 Nm	2,5 Nm	82 Nm	150 Nm
M 32 x 1,5	-	13 Nm	13 Nm	3 Nm	110 Nm	180 Nm

Due to the permitted thread tolerances specified in German standard DIN 13, the **maximum screw-in length** for threaded sensors should be taken into consideration. Depending on that the length of the threaded block for screwing in proximity sensors should not exceed the following dimensions. In the case of larger threaded blocks we recommend drilling a blind hole in order to adhere to the maximum screw-in length.

Thread:	M 5 x 0,5	M 8 x 1	M 12 x 1	M 18 x 1	M 22 x 1,5	M 30 x 1,5	M 32 x 1,5
Screw-in length	3 mm	6 mm	8 mm	12 mm	12 mm	12 mm	12 mm

ADJUSTMENT

Speed sensing is possible with gearwheels down to **module 1** at a maximum switching frequency of 15 kHz. For detecting rotary speed / direction of rotation magnetoresistive sensors (MRS) must be mounted radially with respect to the direction of motion and with their marking set vertically to it. The dependence of the modul of the detected gearwheel on the mounting distance and the maximum detecting frequency is as follows:



Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)

TECHNICAL TERMS

Unless otherwise specified technical data is as follows: +24 °C, $U_B = 24$ V DC.

Operating sensing distance / S_a

Within the operating sensing distance the sensor operates reliably taking into account all the possible tolerances. It lies between 0 and $0.81 \times S_n$.

Power up time delay

The time the sensor needs to be ready for operation after connecting the operating voltage. It is in the milliseconds range.

Housing materials

The application of the housing materials used is based on the technical specifications of the material and of the manufacturer. The customer is responsible for checking in each case that the housing material is suitable for the application, even though RECHNER Sensors have far-reaching application experience concerning the use of different housing materials.

Cable

For the standard models PVC- or PUR-cable are used. One has to take into consideration that the cable should not be moved with ambient temperatures below -5 °C. PVC is not suitable for use in applications with oil-based liquids or with UV-radiation. PUR is not suitable for continuous contact with water. For special application areas silicone or PTFE cables are available.

Nominal sensing distance / S_n

The characteristic value of a sensor, without consideration of production tolerances and variations due to temperature and voltages. Reference gearwheel module 4, 1000 Hz.

Real sensing distance / S_r

The sensing distance determined at +20 °C and rated voltage. Here the series variance is taken into consideration. Variation max. ± 10 %.

Series- and parallel connection

It is possible to connect the sensors in series or parallel. When considering this it must be taken into account that the voltage drops are added for series connection and the residual voltages for parallel connection. Under these circumstances it is advisable to operate a maximum of three sensors in a corresponding circuit.

Frequency of operating cycles

The maximum damping and un-damping cycles of the proximity sensor within one second. To ascertain the frequency of operating cycles a pulse / break ratio of 1 : 2 is used as a basis.

Enclosure rating

IP 65: Protection against contact with voltage-carrying parts, protection against ingress of dust and water jet.

IP 67: Protection against contact with voltage-carrying parts, protection against ingress of dust and protection against ingress of water when the equipment is immersed in water, up to 1 m depths and for a period of 30 minutes.

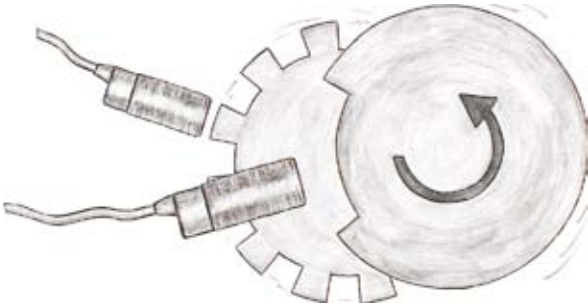
Temperature variation

The displacement of the switching point if the ambient temperature changes. This is with MRS less than ± 10 %.

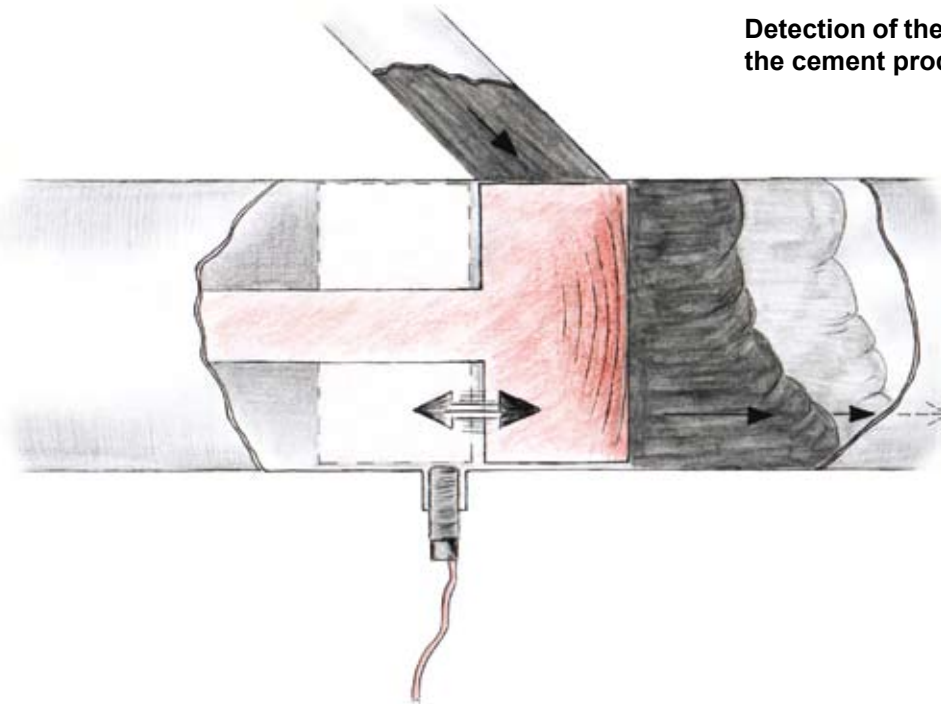
Modul

Diameter of a gearwheel in relation to the number of teeth. $M = D : T$

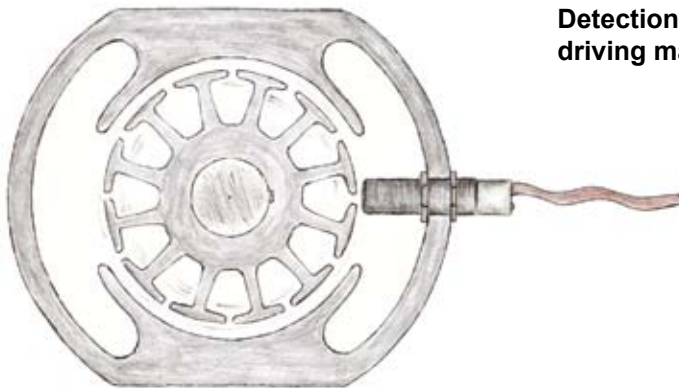
APPLICATION EXAMPLES



Detection of a gear wheel or cam wheel.



Detection of the motion of a bolt during the cement production.



Detection of the rotation of an electric driving machine.

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)

TYPE CODE

MRS-.....

if existing
Y... = with flange connector

if existing
OC = open collector

if existing
K... = special housing material

with 3 or 4-wire
S = NO
Ö = NC
Z = dephased output signal

N = 2-wire DC
10 = 3 or 4-wire DC PNP
20 = 3 or 4-wire DC NPN

10, 16, M ... = Version / thread size

300 = Speed control
350 = Speed control / with detection of direction of rotation

= Magneto-resistive sensor

CYLINDRICAL HOUSINGS

Item	Sensing distance [mm]		Diameter [mm] or with thread	Housing material	Electrical version		Connection	Pages
					DC	DC		
	Flush	Non-flush		Stainless steel [VA] Nr. 1.4305 Nr. 1.4404 Polyamide [PA]	NPN [20] PNP [10] Selection Normally open (NO) Normally closed (NC) See data sheet	10...35 V 7,5...20 V 2- wire [N]	Cable Connector [Y...]	
MRS-300-...								
1	1,5	-	M 12	VA, PA	10, 20, N		Cable	12-14
2	3	-	M 18	VA	10, 20		Cable, Connector	15-16
MRS-350-... with detection of direction of rotation								
3	1	-	M 12	VA	10, 20		Cable	17
4	2,5	-	M 18	VA	10, 20		Cable	18
MRS-350-...-Z detection of direction of rotation with dephased output signal								
5	1	-	M 12	VA	10		Cable	19
6	2,5	-	M 18	A	10		Cable	20

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)



Magneto-resistive Sensors

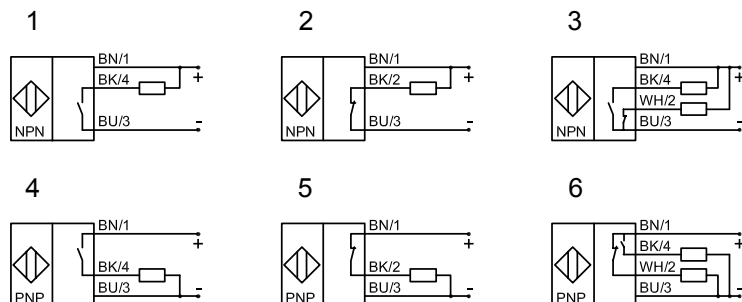
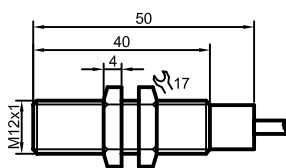
Series 300 • 20 - NPN
Series 300 • 10 - PNP

- Housing M 12 x 1
- Housing material: Stainless steel VA
- Sensing distance S_n 1.5 mm

Certificate:



Technical data	Flush mountable
Operating distance S_n	1.5 mm
Electrical version	3-wire DC
Output	NO
Type NPN	MRS-300-M12-20-S
Art.-No.	360 300
Connection diagram No.	1
Type PNP	MRS-300-M12-10-S
Art.-No.	360 100
Connection diagram No.	4
Operating voltage (U_B)	10...35 V DC
Output current max. (I_o)	250 mA
Voltage drop max. (U_d)	≤ 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 15 mA
Frequency of operating cycles min. / max.	0.5 Hz / 10 kHz
Permitted ambient temperature	-40...+125 °C
LED-display	Yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, silicone, 3 x 0.34 mm ²
Housing material	VA No. 1.4305
Active surface	VA No. 1.4305
Lid	PEEK (FDA 21 CFR 177.2415)



Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)



Magneto-resistive Sensors

Series 300 • 20 - NPN
Series 300 • 10 - PNP

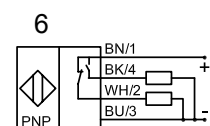
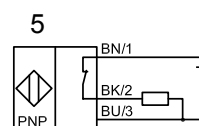
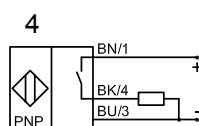
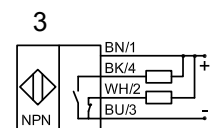
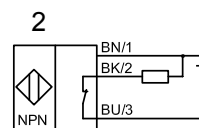
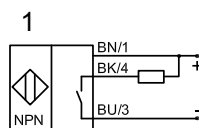
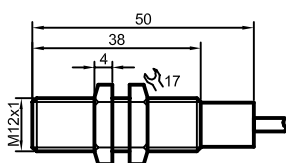
- Housing M 12 x 1
- Housing material: PA
- Sensing distance S_n 1.5 mm

Certificate:



Technical data	Flush mountable
Operating distance S_n	1.5 mm
Electrical version	3-wire DC
Output	NO
Type NPN	MRS-300-M12-20-S-K
Art.-No.	360 350
Connection diagram No.	1
Type PNP	MRS-300-M12-10-S-K
Art.-No.	360 150
Connection diagram No.	4
Operating voltage (U_B)	10...35 V DC
Output current max. (I_o)	250 mA
Voltage drop max. (U_d)	≤ 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 15 mA
Frequency of operating cycles min. / max.	0.5 Hz / 10 kHz
Permitted ambient temperature	-25...+70 °C
LED-display	Yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, PUR, 3 x 0.14 mm ²
Housing material	PA
Active surface	PA
Lid	PA

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)





Magneto-resistive Sensors

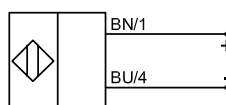
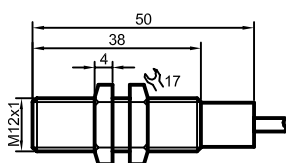
Series 300 • 2-wire

- Housing M 12 x 1
- Housing material: PA
- Sensing distance S_n 1.5 mm

Certificate:



Technical data	Flush mountable
Operating distance S_n	1.5 mm
Electrical version	2-wire DC
Output	NO
Type	MRS-300-M12-N-K
Art.-No.	362 100
Operating voltage (U_B)	7.5...20 V DC
Output current active surface free	Typ. 7 mA
Output current active surface covered	Typ. 14 mA
Self-inductance (L)	100 μ H
Self-capacitance (C)	500 pF
Voltage drop max. (U_d)	\leq 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 7 mA
Frequency of operating cycles min. / max.	0.5 Hz / 10 kHz
Permitted ambient temperature	-25...+70 °C
LED-display	-
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, PVC, 2 x 0.14 mm ²
Housing material	PA
Active surface	PA
Lid	PA



Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)



Magneto-resistive Sensors

Series 300 • 20 - NPN
Series 300 • 10 - PNP

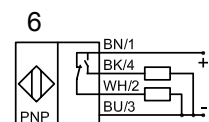
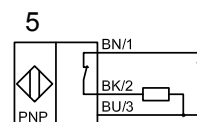
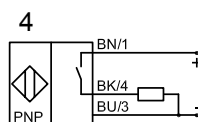
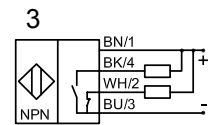
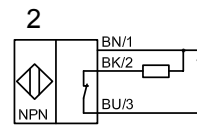
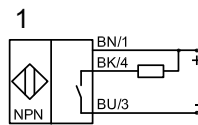
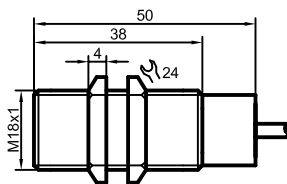
- Housing M 18 x 1
- Housing material: Stainless steel VA
- Sensing distance S_n 3 mm

Certificate:



Technical data	Flush mountable
Operating distance S_n	3 mm
Electrical version	3-wire DC
Output	NO
Type NPN	MRS-300-M18-20-S
Art.-No.	360 700
Connection diagram No.	1
Type PNP	MRS-300-M18-10-S
Art.-No.	360 500
Connection diagram No.	4
Operating voltage (U_B)	10...35 V DC
Output current max. (I_o)	250 mA
Voltage drop max. (U_d)	≤ 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 15 mA
Frequency of operating cycles min. / max.	0.5 Hz / 15 kHz
Permitted ambient temperature	-40...+125 °C
LED-display	Yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, silicone, 3 x 0.34 mm ²
Housing material	VA No. 1.4404
Active surface	VA No. 1.4404
Lid	PEEK (FDA 21 CFR 177.2415)

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)





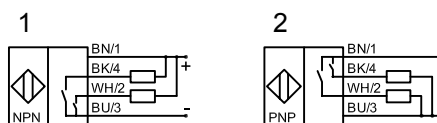
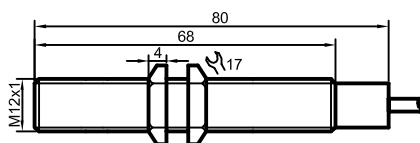
**Magneto-resistive Sensors
with detection of direction of rotation**
Series 350 • 20 - NPN
Series 350 • 10 - PNP

- Housing M 12 x 1
 • Housing material: Stainless steel VA
 • Sensing distance S_n 1 mm



Certificate:

Technical data	Flush mountable
Operating distance S_n	1 mm
Electrical version	4-wire DC
Output	NO
Type NPN	MRS-350-M12-20-S
Art.-No.	361 100
Connection diagram No.	1
Type PNP	MRS-350-M12-10-S
Art.-No.	360 900
Connection diagram No.	2
Operating voltage (U_B)	10...35 V DC
Output current max. (I_o)	2 x 250 mA
Voltage drop max. (U_d)	≤ 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 15 mA
Frequency of operating cycles min. / max.	0.5 Hz / 10 kHz
Permitted ambient temperature	-40...+125 °C
LED-display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, silicone, 4 x 0.14 mm ²
Housing material	VA No. 1.4305
Active surface	VA No. 1.4305
Lid	PEEK (FDA 21 CFR 177.2415)



BK = Speed control
 WH = detection of direction of rotation

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)



**Magneto-resistive Sensors
with detection of direction of rotation**
Series 350 • 20 - NPN
Series 350 • 10 - PNP

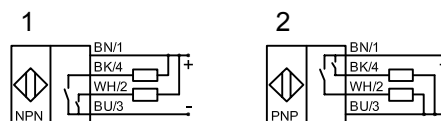
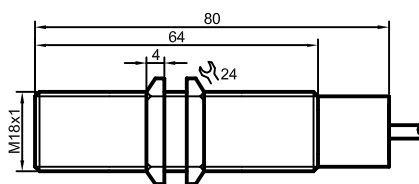
- Housing M 18 x 1
 • Housing material: Stainless steel VA
 • Sensing distance S_n 2.5 mm

Certificate:



Technical data	Flush mountable
Operating distance S_n	2.5 mm
Electrical version	4-wire DC
Output	NO
Type NPN	MRS-350-M18-20-S
Art.-No.	361 500
Connection diagram No.	1
Type PNP	MRS-350-M18-10-S
Art.-No.	361 300
Connection diagram No.	2
Operating voltage (U_B)	10...35 V DC
Output current max. (I_o)	2 x 250 mA
Voltage drop max. (U_d)	≤ 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 15 mA
Frequency of operating cycles min. / max.	0.5 Hz / 10 kHz
Permitted ambient temperature	-40...+125 °C
LED-display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, silicone, 4 x 0.34 mm ²
Housing material	VA No. 1.4404
Active surface	VA No. 1.4404
Lid	PEEK (FDA 21 CFR 177.2415)

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)



BK = Speed control
 WH = detection of direction of rotation



Magneto-resistive Sensors with detection of direction of rotation

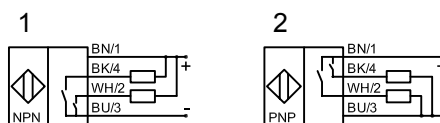
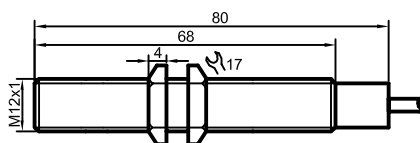
Series 350 • 10 - PNP

- Housing M 12 x 1
- Housing material: Stainless steel VA
- Sensing distance S_n 1 mm
- With dephased output signal

Certificate:



Technical data	Flush mountable
Operating distance S_n	1 mm
Electrical version	4-wire DC
Output	NO
Type PNP	MRS-350-M12-10-Z
Art.-No.	360 950
Connection diagram No.	2
Operating voltage (U_B)	10...35 V DC
Output current max. (I_o)	2 x 250 mA
Voltage drop max. (U_d)	≤ 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 15 mA
Frequency of operating cycles min. / max.	0.5 Hz / 10 kHz
Permitted ambient temperature	-40...+125 °C
LED-display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, silicone, 4 x 0.14 mm ²
Housing material	VA No. 1.4305
Active surface	VA No. 1.4305
Lid	PEEK (FDA 21 CFR 177.2415)



BK = Speed control
WH = detection of direction of rotation dephased

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)



**Magneto-resistive Sensors
with detection of direction of rotation**

Series 350 • 10 - PNP

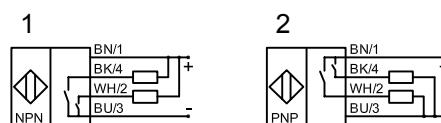
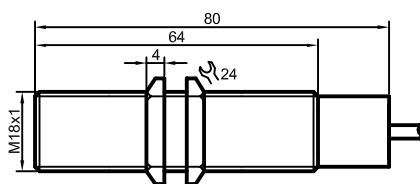
- Housing M 18 x 1
- Housing material: Stainless steel VA
- Sensing distance S_n 2.5 mm
- With dephased output signal

Certificate:



Technical data	Flush mountable
Operating distance S_n	2.5 mm
Electrical version	4-wire DC
Output	NO
Type PNP	MRS-350-M18-10-Z
Art.-No.	361 430
Connection diagram No.	2
Operating voltage (U_B)	10...35 V DC
Output current max. (I_o)	2 x 250 mA
Voltage drop max. (U_d)	≤ 2.5 V
Permitted residual ripple max.	10 %
No-load current (I_o)	Typ. 15 mA
Frequency of operating cycles min. / max.	0.5 Hz / 10 kHz
Permitted ambient temperature	-40...+125 °C
LED-display	Green / yellow
Protective circuit	Built-in
Degree of protection IEC 60529	IP 67
Norm	EN 60947-5-2
Connection cable	2 m, silicone, 4 x 0.34 mm ²
Housing material	VA No. 1.4404
Active surface	VA No. 1.4404
Lid	PEEK (FDA 21 CFR 177.2415)

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)



BK = Speed control
WH = detection of direction of rotation dephased

NORMS

The products of Rechner Industrie-Elektronik GmbH are designed and checked in accordance with the standards and specifications, DIN - VDE - IEC, for electric and electronic instruments. For new and revised products the newest standards are always used.

Effective standards for proximity switches and sensors:

IEC 947-5-2 Low-voltage switchgear and controlgear

Control circuit devices and switching elements - proximity switches

EN 60947-5-6 Low-voltage switchgear and controlgear Part 5

Control circuit devices and switching elements, proximity sensors - DC interface for proximity sensors and switching amplifiers (NAMUR)

International Standards

IEC 947-5-2 Low-voltage switchgear and controlgear Part 5

Control circuit devices and switching elements - Section 2, proximity switches

Draft IEC 61934

Control circuit devices and switching elements DC interface for proximity sensors and switching amplifiers (NAMUR)

Standards On Explosion Protection

DIN EN 60079-0

Explosive atmospheres - Part 0: Equipment - General requirements

DIN EN 60079-10

Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres

DIN EN 60079-11

Explosive atmospheres - Part 11: Equipment protection by intrinsic safety „i“

DIN EN 60079-15

Electrical apparatus for potentially explosive gas atmospheres - Part 15: construction, test and marking of type of protection “n” electrical apparatus

DIN EN 60079-18

Electrical apparatus for potentially explosive gas atmospheres - Part 18: Construction, test and marking of type of protection encapsulation “m” electrical apparatus

EN 60079-14

Electrical apparatus for potentially explosive gas environments.
Classification of hazardous areas (mines excepted).

Norms for quality assurance (QS)

DIN ISO 9000-9004 (EN 29000-29 004)

Quality assurance (QA) for products and services

NORMS

DIN ISO 9001

Quality assurance in design/development, production, installation and servicing

DIN ISO 9002

Quality assurance in production

DIN ISO 9003

Quality assurance for final testing only

DIN ISO 9004

Quality management and elements of a quality management system

RECHNER Industrie-Elektronik-GmbH is certified according to DIN ISO 9001:2000.

CE - Marking

The CE marking represents the manufacturer's confirmation that the identified product conforms to applicable standards and directives throughout Europe.

The following regulations apply to the RECHNER products.

89/336/EWG

EMC Directive (EN 60 947-5-2)

73/23/EWG

Low-voltage Directive (compare with VDE 0160, product standard EN 60947-5-2)

Directive 94/9/EG

Equipment and Protection Systems designed for use in potentially explosive environments

RECHNER Industrie-Elektronik GmbH certifies the conformity of its products with each of the applicable directives in a Manufacturer's Declaration. In addition RECHNER has a laboratory accredited by DATech for testings according to IEC/EN 60947-5-2 and also an accredited EMC laboratory.

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)

TYPE SELECTION IN ARTICLE NUMBER ORDER			TYPE SELECTION IN DESCRIPTION ORDER		
Art.-No.	Type Description	Page	Type Description	Art.-No.	Page
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360150	MRS-300-M12-10-S-K	13	MRS-300-M12-10-S-K	360150	13
360300	MRS-300-M12-20-S	12	MRS-300-M12-20-S	360300	12
360350	MRS-300-M12-20-S-K	13	MRS-300-M12-20-S-K	360350	13
360500	MRS-300-M18-10-S	15	MRS-300-M12-N-K	362100	14
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360900	MRS-350-M12-10-S	16	MRS-300-M18-20-S	360700	15
360950	MRS-350-M12-10-Z	18	MRS-350-M12-10-S	360900	16
361100	MRS-350-M12-20-S	16	MRS-350-M12-10-Z	360950	18
361300	MRS-350-M18-10-S	17	MRS-350-M12-20-S	361100	16
361430	MRS-350-M18-10-Z	19	MRS-350-M18-10-S	361300	17
361500	MRS-350-M18-20-S	17	MRS-350-M18-10-Z	361430	19
362100	MRS-300-M12-N-K	14	MRS-350-M18-20-S	361500	17

Irrtümer und Änderungen ohne vorherige Ankündigung vorbehalten. (10/2010)

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