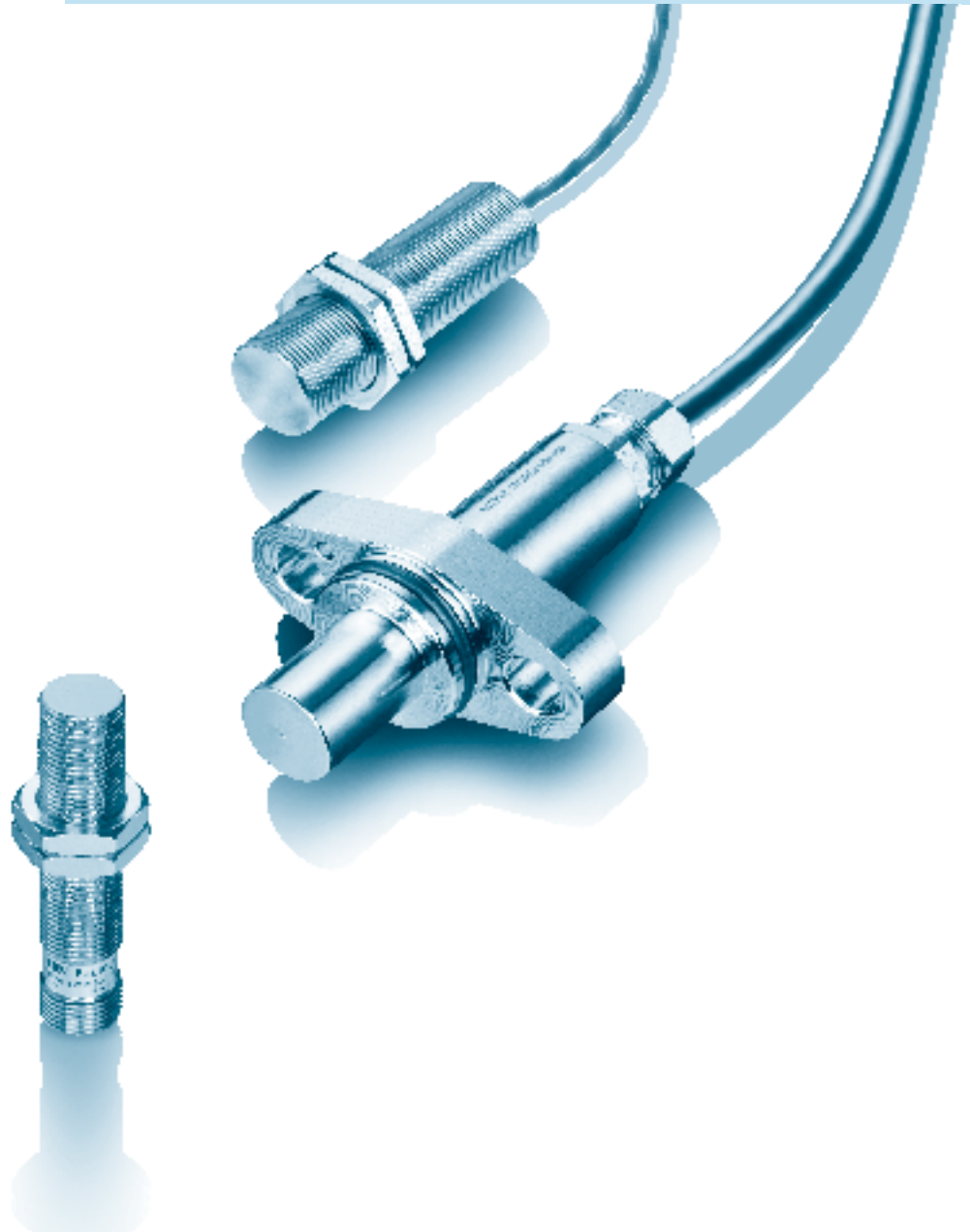









Hall sensors



Overview
Functional principle and installation
Cylindrical designs

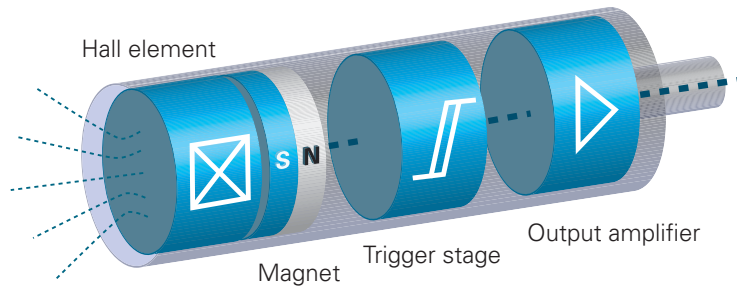
Page 28
Page 29
Page 31

product family	MHRM 12	MHRM 12	IHRM 12	MHRM 18	MTRM 16
					
dimension	12 mm	12 mm	12 mm	18 mm	16 mm
housing length	50 mm 60 mm	60 mm	60 mm	60 mm	93 mm
switching frequency range	0 ... 15 kHz	0 ... 15 kHz	1 ... 20 kHz	1 ... 20 kHz	2 ... 20 kHz
min. gear size	> module 1	> module 1	> module 1	> module 1	module 1 module 1,5 module 2 module 2,5 module 3
gear width	> 6 mm	> 6 mm	> 6 mm	> 6 mm	> 10 mm
output A	push-pull	push-pull	PNP	PNP	push-pull
output B	none	push-pull	none	none	push-pull
cable PUR, 2 m	■				
cable Radox, 2 m					■
cable FEP, 2 m		■	■	■	
flylead connector PUR M12, L=200 mm			■		
connector	■				
housing material	brass nickel plated	stainless steel	stainless steel	stainless steel	brass nickel plated
version		Full metal	Full metal	Full metal	Full metal
Page	31	32	33	34	35



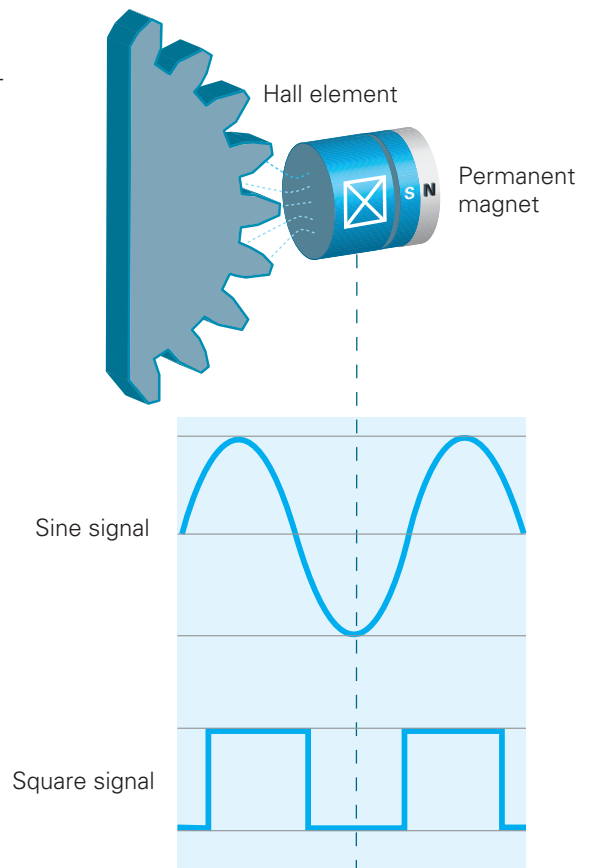
General information

Hall sensors identify ferromagnetic objects by the non-contact sensing principle. Achieving very high switching frequencies, they are ideal for gear applications where rotating speeds and directions of rapidly turning toothed wheels must be reliably detected.



Functional principle

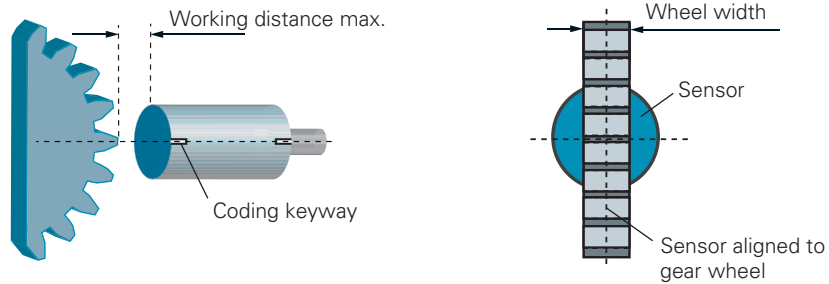
Hall sensors host a current-carrying semiconductor element which is exposed to permanent magnetic prestress built by a stationary permanent magnet. Any change in the magnetic field intensity caused by a ferromagnetic object penetrating the field will be identified by the semiconductor element as voltage change. The sensor's integrated electronics will evaluate the generated sine voltage in an amplified square wave signal.





Installation

When installing a Hall sensor, make sure that the measured object (gear wheel) is within the maximum working distance. Furthermore, the sensor should be centrically aligned to the gear wheel. Observe the minimum wheel width to ensure sufficient signal reserves. Working distance and installation instructions refer to gear wheels with involute toothing (DIN 867).



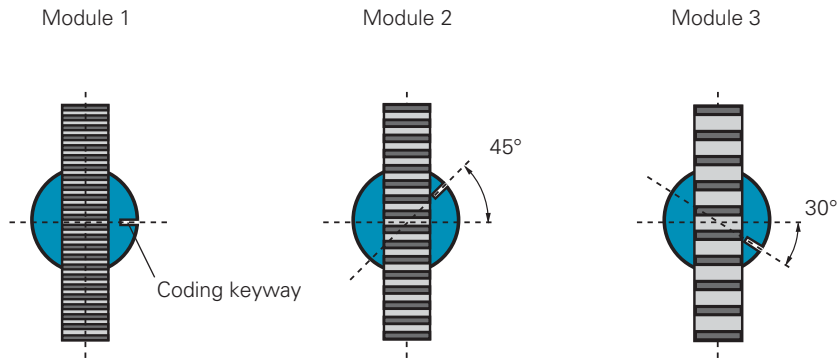
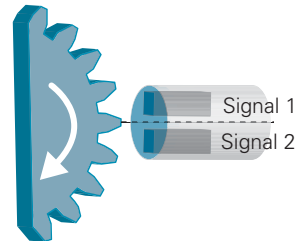
Rotating direction of multichannel sensors

Two Hall semiconductor elements output two differentiated signals shifted by 90° per tooth and thus allow for picking up both rotating speed and direction of a gear wheel. A clockwise turning gear wheel will result in channel A being in lead to channel B.



Adjustment

To ensure proper two-channel output functionality, the Hall elements of multichannel Hall sensors must be arranged in alignment to the wheel's tooth module. The sensor must be aligned to the teeth of the gear by aid of the coding keyway and under consideration of the gear module.





Cylindrical M12, 1 channel

- 1-channel push-pull output
- High switching frequencies
- High temperature range



general data

sensor type	hall sensor
working distance max.	<0,7 mm (module 1), <2,4 mm (module 3)
min. gear size	> module 1
gear width	> 6 mm
gear material	ferromagnetic

electrical data

switching frequency range	0 ... 15 kHz
voltage supply range +Vs	8 ... 28 VDC
current consumption max.	20 mA
output A	push-pull
output B	none
output current	< 30 mA
voltage drop Vd	< 5 VDC
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

type	cylindrical threaded
housing material	brass nickel plated
dimension	12 mm
material (sensing face)	PBTP

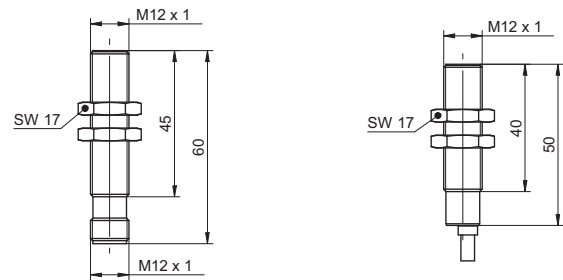
ambient conditions

operating temperature	-40 ... +85 °C
protection class (sensing face)	IP 67
protection class (sensor)	IP 67

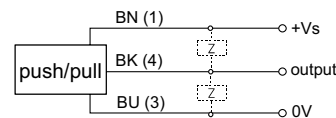
remarks

mounting rotationally symmetric

dimension drawings



connection diagram



connectors and mating connectors

ESG 34SH0200 Connector M12, 3 pin, straight, 2 m

ESW 33SH0200 Connector M12, 3 pin, angular, 2 m

additional cable connectors and field wireable connectors: see accessories

mounting accessories

10151720 Sensofix series 12 round

for details: see accessories section

order reference	housing length	connection types
MHRM 12G5501	50 mm	cable PUR, 2 m
MHRM 12G5501/S14	60 mm	connector



Cylindrical M12, 2 channels

- Detection of rpm speed and rotational direction
- High protection class and compressive strength
- High temperature range

general data

version	full metal
sensor type	hall sensor
working distance max.	<0,5 mm (module 1), <2,5 mm (module 3)
min. gear size	> module 1
gear width	> 6 mm
gear material	ferromagnetic

electrical data

switching frequency range	0 ... 15 kHz
voltage supply range +Vs	8 ... 28 VDC
current consumption max.	20 mA
output A	push-pull
output B	push-pull
voltage drop Vd	< 5 VDC
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

type	cylindrical threaded
housing material	stainless steel
dimension	12 mm
housing length	60 mm
installation aid	keyway
connection types	cable FEP, 2 m
front of sensor durable against pressure	20 bar

ambient conditions

operating temperature	-40 ... +120 °C
protection class (sensing face)	IP 68
protection class (sensor)	IP 67

remarks

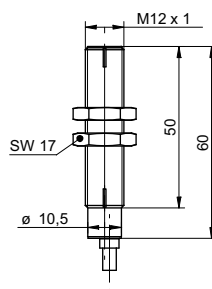
mounting rotationally symmetric

order reference

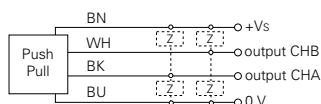
MHRM 12G2501



dimension drawing



connection diagram



mounting accessories

10151720 Sensofix series 12 round

for details: see accessories section



Cylindrical M12, 1 channel

- Robust full metal housing
- High protection class and compressive strength
- High temperature range



general data

version	full metal
sensor type	differential hall sensor
working distance max.	<1 mm (module 1), <2,5 mm (module 3)
min. gear size	> module 1
gear width	> 6 mm
gear material	ferromagnetic

electrical data

switching frequency range	1 ... 20 kHz
voltage supply range +Vs	8 ... 28 VDC
current consumption max.	20 mA
output A	PNP
output B	none
output current	< 30 mA
voltage drop Vd	< 3 VDC
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

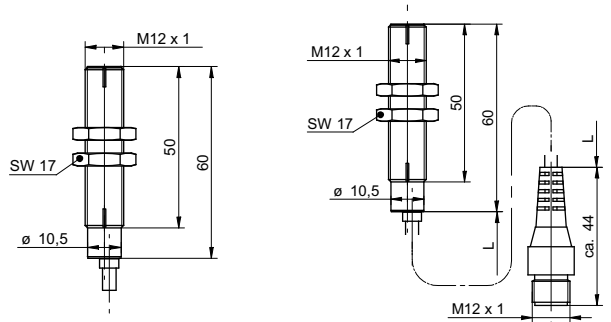
mechanical data

type	cylindrical threaded
housing material	stainless steel
dimension	12 mm
housing length	60 mm
installation aid	keyway
front of sensor durable against pressure	20 bar

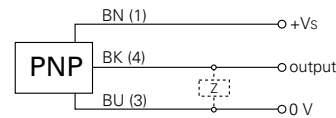
ambient conditions

protection class (sensing face)	IP 68
protection class (sensor)	IP 67

dimension drawings



connection diagram



connectors and mating connectors

ESG 34SH0200	Connector M12, 3 pin, straight, 2 m
ESW 33SH0200	Connector M12, 3 pin, angular, 2 m

additional cable connectors and field wireable connectors: see accessories

mounting accessories

10151720	Sensofix series 12 round
10161958	Converter PNP/NPN - M12 x 1

for details: see accessories section

order reference	operating temperature	connection types
-----------------	-----------------------	------------------

IHRM 12P1501	-40 ... +120 °C	cable FEP, 2 m
IHRM 12P1501/KS34P	-25 ... +75 °C	flylead connector PUR M12, L=200 mm



Cylindrical M18, 1 channel

- Robust full metal housing
- 1-channel PNP output
- High temperature range

general data

version	full metal
sensor type	differential hall sensor
working distance max.	0,7 mm (module 1), 1,8 mm (module 2)
min. gear size	> module 1
gear width	> 6 mm
gear material	ferromagnetic

electrical data

switching frequency range	1 ... 20 kHz
voltage supply range +Vs	8 ... 28 VDC
current consumption max.	20 mA
output A	PNP
output B	none
output current	< 40 mA
voltage drop Vd	< 2 VDC
short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

type	cylindrical threaded
housing material	stainless steel
dimension	18 mm
housing length	60 mm
connection types	cable FEP, 2 m
front of sensor durable against pressure	20 bar

ambient conditions

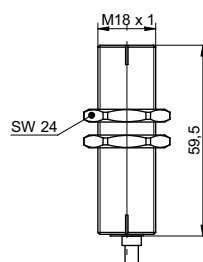
operating temperature	-40 ... +120 °C
protection class (sensing face)	IP 68
protection class (sensor)	IP 67

order reference

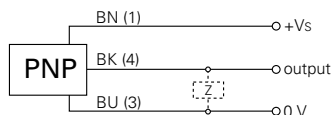
MHRM 18P5524



dimension drawing



connection diagram



mounting accessories

10151658 Sensofix series 18

for details: see accessories section



Railway standard, 2 channels

- Fullfills railway standards
- Detection of rpm speed and rotational direction
- High temperature range

general data

version	full metal
sensor type	differential hall sensor
gear width	> 10 mm
gear material	ferromagnetic
gear shape	involute gear (DIN867)

electrical data

switching frequency range	2 ... 20 kHz
voltage supply range +Vs	8 ... 28 VDC
current consumption max.	20 mA
output A	push-pull
output B	push-pull
voltage drop Vd	< 5 VDC

short circuit protection	yes
reverse polarity protection	yes, Vs to GND

mechanical data

type	cylindrical, with flange
housing material	brass nickel plated
dimension	16 mm
housing length	93 mm
installation aid	pin hole
connection types	cable Radox, 2 m
front of sensor durable against pressure	20 bar

ambient conditions

operating temperature	-40 ... +120 °C
protection class (sensing face)	IP 68
protection class (sensor)	IP 67

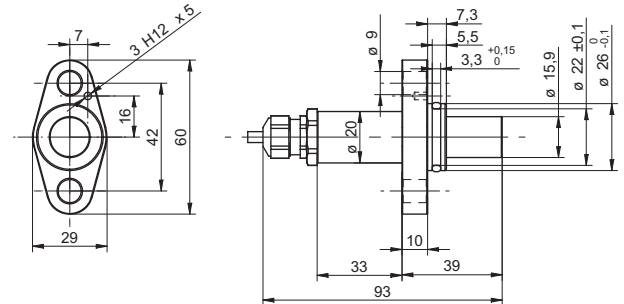
remarks

- fire protection (cable): CEN/TS 45545
- cable diameter 5,4 mm
- fulfilled standards: EN 50155:2007 (class S1), EN 50121-3-2:2006 tables 7, 8, 9, EN 61373:1999 (category 3)

order reference	working distance max.	min. gear size
MTRM 16G2524/M100	1,0 mm (module 1)	module 1
MTRM 16G2524/M150	1,6 mm (module 1,5)	module 1,5
MTRM 16G2524/M200	2 mm (module 2)	module 2
MTRM 16G2524/M250	2,2 mm (module 2,5)	module 2,5
MTRM 16G2524/M300	2,5 mm (module 3)	module 3



dimension drawing



connection diagram

