



Description

- ▶ Application-proven speed sensors with
 - Magnetic scanning of a ferromagnetic measuring scale
 - Scanning of an electrically conductive measuring scale based on the eddy current principle
- ▶ Detection of direction by means of the evaluation of two channels with 90° phase offset or directional signal
- ▶ Robust, compact housing for usage in harsh applications with little space
- ▶ Straightforward flange mounting
- ▶ Cable fabrication with cable protection and connectors to suit customer requirements

Features

- ▶ 1 to 4 channels, also as electrically isolated systems
- ▶ Output signals
 - Square-wave signals with current or voltage output
 - Inverted output signals (optional)
 - Output of a standstill voltage (optional)
- ▶ Housing with protection class IP 68
- ▶ Type test according to EN 50155

Advantages

- ▶ Maintenance and wear-free operation due to contactless measurement of rotational movements
- ▶ Safe acquisition of creeping movements without loss of pulses as well as fast rotational movements
- ▶ Current output signals immune to electromagnetic interference fields
- ▶ Output with inverted signals possible for decoupling interference signals
- ▶ Cable break monitoring by means of current output or voltage output with standstill voltage

Field of application

- ▶ Rail vehicle industry
 - Rotational speed acquisition for traction monitoring
 - Rotational speed acquisition for wheel slide protection
 - Rotational speed acquisition for bogie monitoring
 - Speed acquisition for automatic train protection

Subject to technical modifications and typographical errors.

Selection aid

Sensors	Series GEL...							Multi-channel
	247	2471	2474	2475	2476	2477	2478	
General data								
Operating voltage ⁽¹⁾	10 to 30 V DC or 10 to 20 V DC							
Measuring technique	mag.	EC	mag.	mag.	mag.	mag.	mag.	mag.
Output signals	Square-wave signals (short-circuit-proof)							
Target wheel material	ferrom.	Al / steel	ferrom.	ferrom.	ferrom.	ferrom.	ferrom.	ferrom.
Sensor systems ⁽²⁾	1 - 2	1	1	1 - 2	1 - 2	1	1	2 - 4
Module of target wheel ⁽¹⁾	1 - 3.5	2 - 3	1 - 3.5	1 - 3.5	1 - 3.5	1	1 - 3.5	1 - 3.5
Degree of protection	IP 68							
Housing material	VA	VA	VA	VA	VA	VA	VA	VA
Cable ⁽¹⁾	Halogen-free and screened							
Screen connection can be selected	•	•	•	•	•	•		•
Flange using index pin ⁽³⁾	•	•		•		•	•	•
Minimum phase offset ⁽⁴⁾			•	•				•
Type test according to EN 50155	•	•	•	•	•	•	•	•
Special approvals			UIC	UIC	UIC		ATEX	
Possible signal outputs								
Voltage output (HTL)	•	•	•	•	•	•	•	•
Current output ⁽⁵⁾			•	•	•			•
Output of a standstill voltage ⁽⁶⁾			•	•	•			•
Inverted signals ⁽⁷⁾	•	•	•	•	•	•	•	•
Detection of direction ⁽⁸⁾	•	•	•	•	•	•	•	•
Electrical isolation of the channels	•			•	•			•
Integrated interpolation						•		•

Key to the table

Al Aluminium

ATEX For the EEx area

ferrom. Ferromagnetic material

mag. Magnetic measuring technique

UIC For some signal patterns approval as per UIC certificate B-004/2011-04

VA Stainless steel

EC Eddy current technique

Depending on the number of systems, various standard series housings can be used for multichannel sensors.

(1) Depending on the signal pattern

(2) Independent systems in one housing

(3) Ensures the correct assignment of the channels to the direction of rotation

(4) Tighter mounting tolerances for the index pin minimise the phase offset


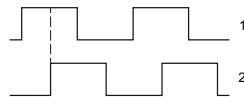
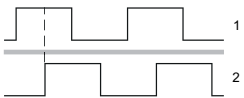

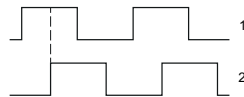
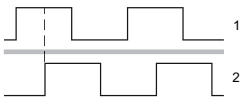
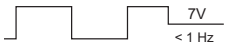
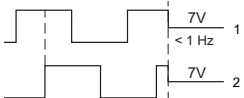
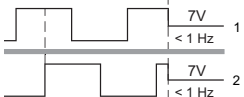
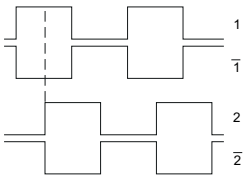
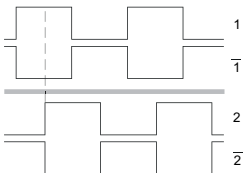
(5) Immune to electromagnetic interference

(6) For standstill detection and cable break monitoring

(7) Evaluation of the voltage difference between both signals reduces the effect of coupled interference signals

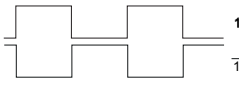
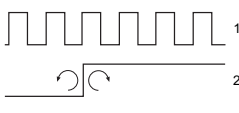
(8) By means of evaluation of two channels with 90° phase offset or directional signal

Overview of the signal patterns

Output signals		Pulse diagram	Series GEL...						
			247	2471	2474	2475	2476	2477	2478
Voltage output – standard signal pattern									
E	1 channel		•	•	•	•	•		•
V	2 channels, 90° phase offset		•	•	•	•	•	•	•
D	2 channels, electrically isolated, 90° phase offset		•			•(1)		•(1)	
Current output									
EI	1 channel				•	•	•		
VI	2 channels, 90° phase offset				•	•	•		
DI	2 channels, electrically isolated, 90° phase offset					•		•	
Voltage output with standstill voltage									
EM	1 channel with standstill voltage				•	•	•		
VM	2 channels, 90° phase offset, with standstill voltage				•	•	•		
DM	2 channels, electrically isolated, 90° phase offset, with standstill voltage				•	•	•		
Voltage output with inverse signals									
X	2 channels, 90° phase offset, with inverse signals		•	•		•	•	•	•
H	2 channels, electrically isolated, 90° phase offset, with inverse signals		•			•(1)		•(1)	

(1) Available as signal pattern \underline{L} with lower current consumption

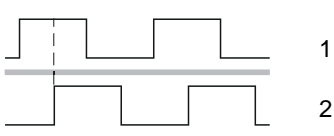
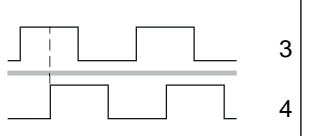
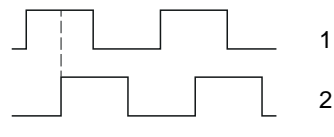
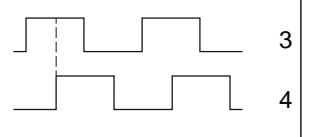
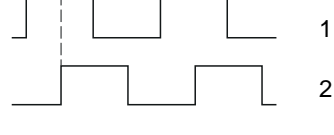
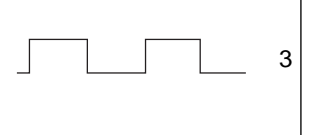
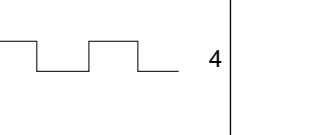
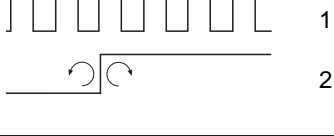
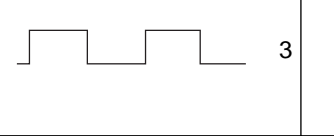
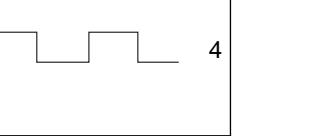
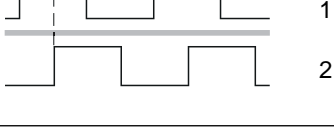
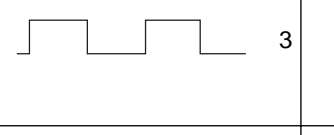
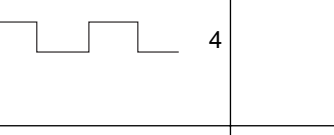

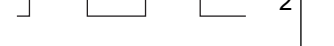
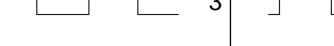

Overview of the signal patterns

Output signals		Pulse diagram	Series GEL...						
			247	2471	2474	2475	2476	2477	2478
F	1 channel with inverse signals		•	•					•
Voltage output with directional signal									
S	1 channel with directional signal ↻ forward ↻ backward		•	•		•	•		

(1) Available as signal pattern \underline{L} with lower current consumption

Signal pattern combinations for multichannel sensors

Examples for the combination of the signal patterns for sensor systems with 4 channels

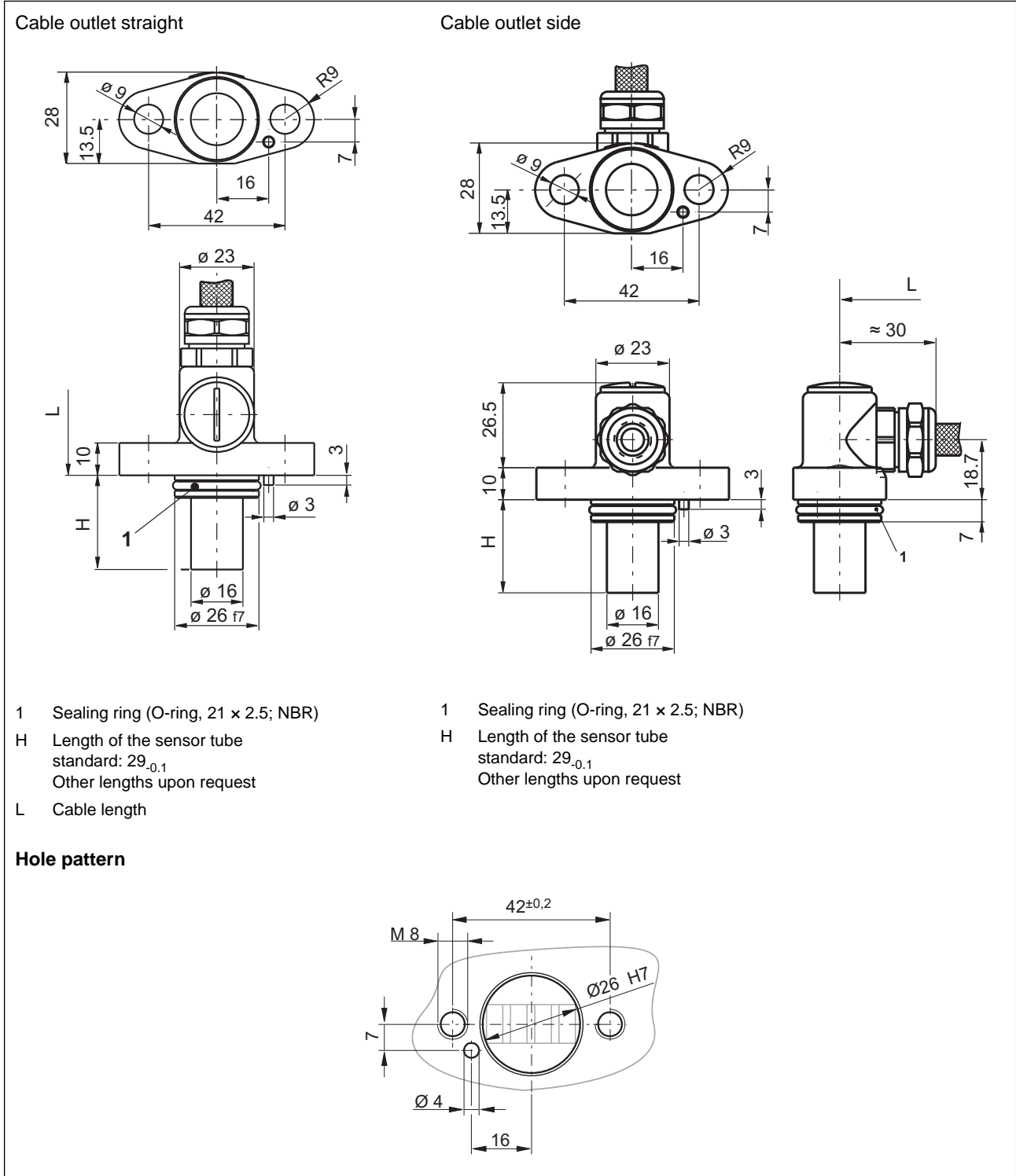
System 1	System 2	System 3	System 4
 1 2	 3 4		
 1 2	 3 4		
 1 2	 3 4	 3 4	
 1 2	 3 4	 3 4	
 1 2	 3 4	 3 4	
 1 2	 3 4	 3 4	 3 4

Maximum 4 electrically isolated systems, with either current or voltage output
Output of a standstill voltage possible

Dimension and hole patterns for the series

All dimensions stated in mm, general tolerance DIN ISO 2768 mK

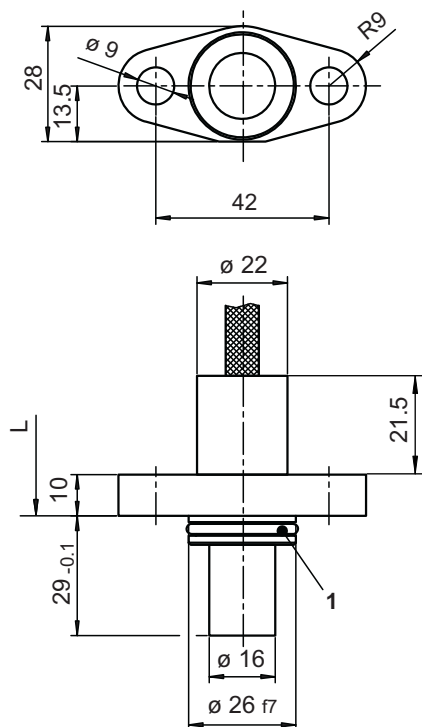
GEL 247 and GEL 2471



Dimension and hole patterns for the series

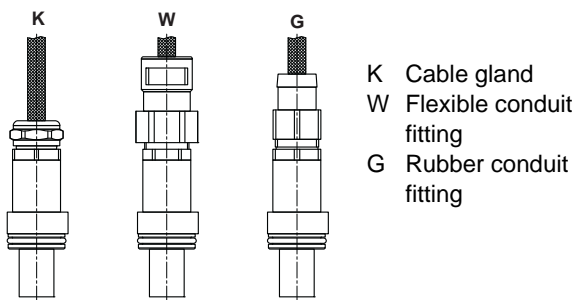
All dimensions stated in mm, general tolerance DIN ISO 2768 mK

GEL 2474

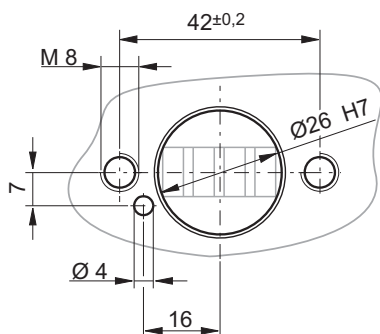


- 1 Sealing ring (O-ring, 21 × 2.5; NBR)
L Cable length

Cable outlets

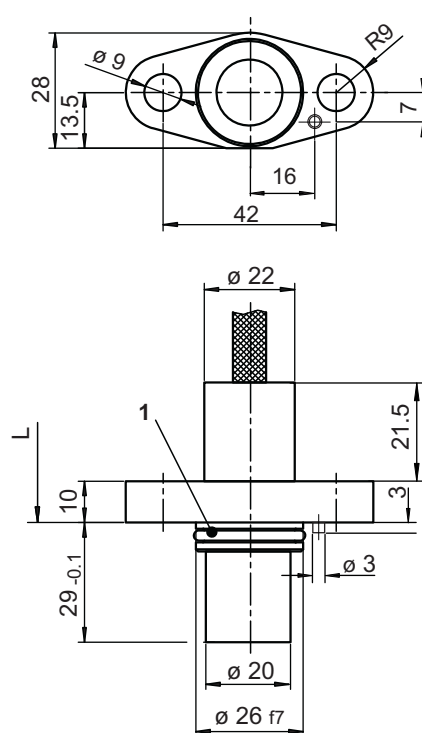


Hole pattern



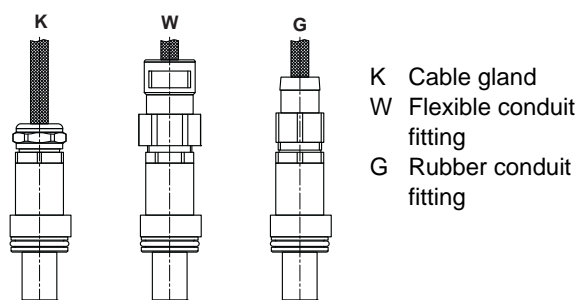
Hole pattern for minimum phase offset → [page 10](#)

GEL 2475

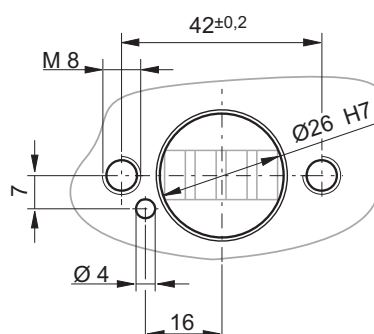


- 1 Sealing ring (O-ring, 21 × 2.5; NBR)
L Cable length

Cable outlets



Hole pattern

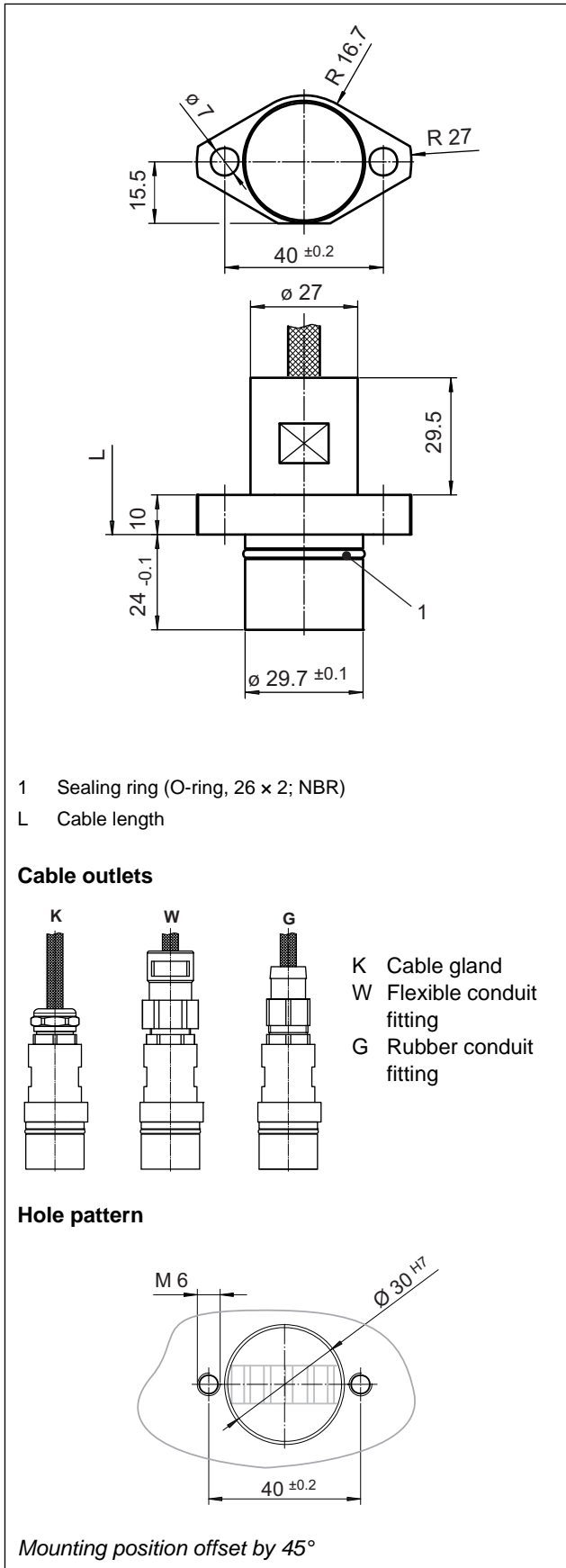


Hole pattern for minimum phase offset → [page 10](#)

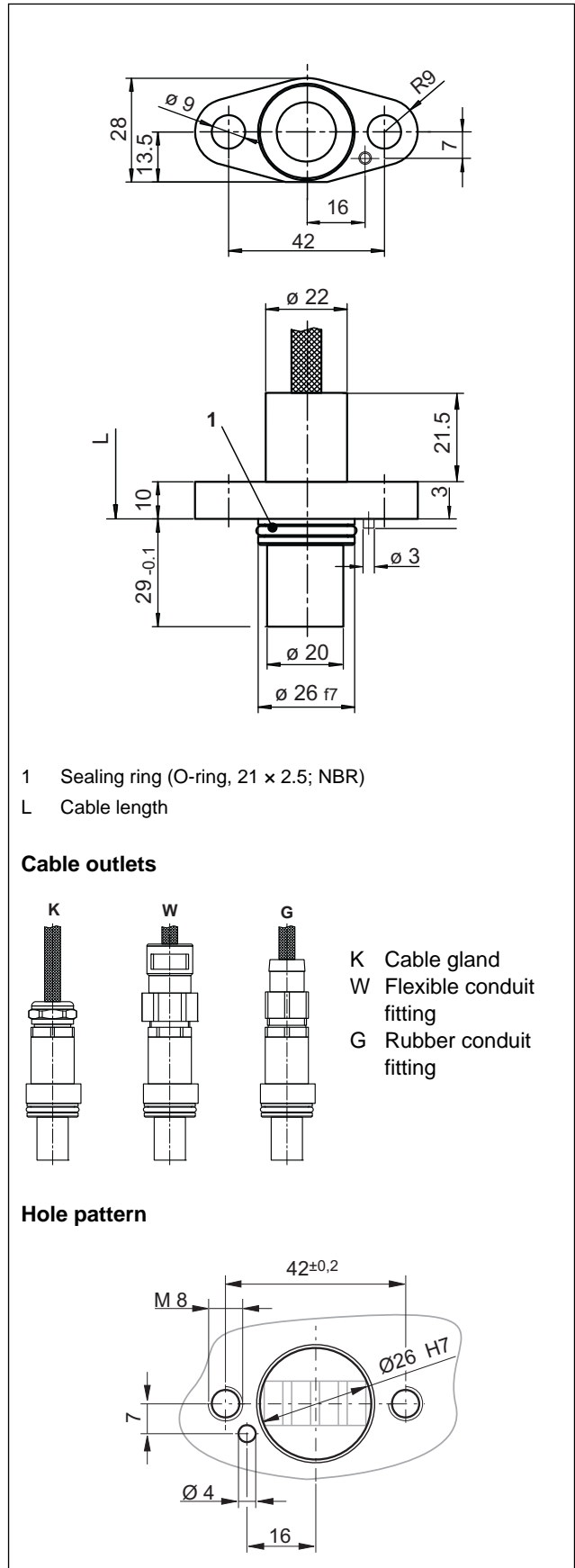
Dimension and hole patterns for the series

All dimensions stated in mm, general tolerance DIN ISO 2768 mK

GEL 2476



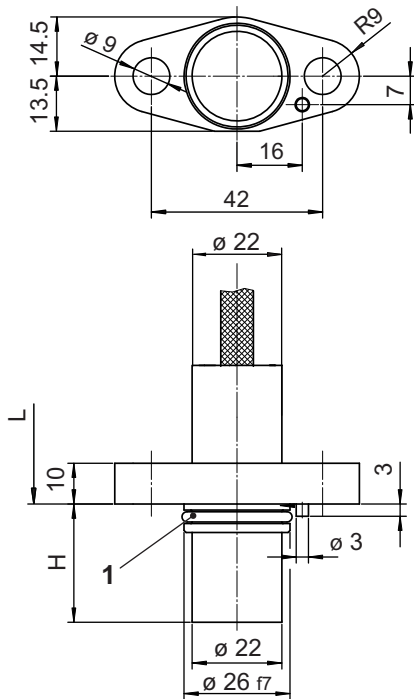
GEL 2477



Dimension and hole patterns for the series

All dimensions stated in mm, general tolerance DIN ISO 2768 mK

GEL 2478



1 Sealing ring (O-ring, 21 x 2.5; NBR)

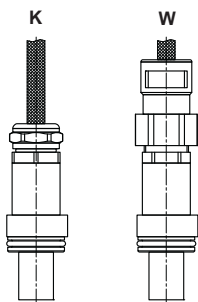
H Length of the sensor tube can be selected:

$H_K = 29_{-0.1}$ mm

$H_L = 45_{-0.1}$ mm

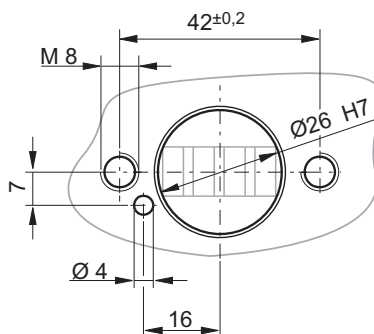
L Cable length

Cable outlets



K Cable gland
W Flexible conduit fitting

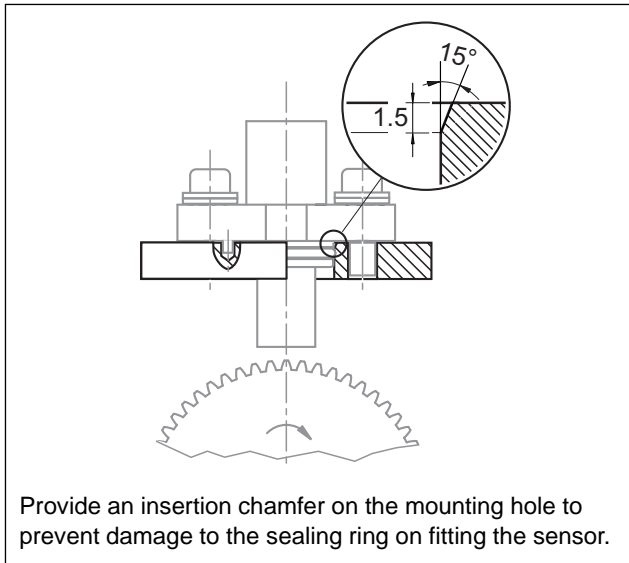
Hole pattern



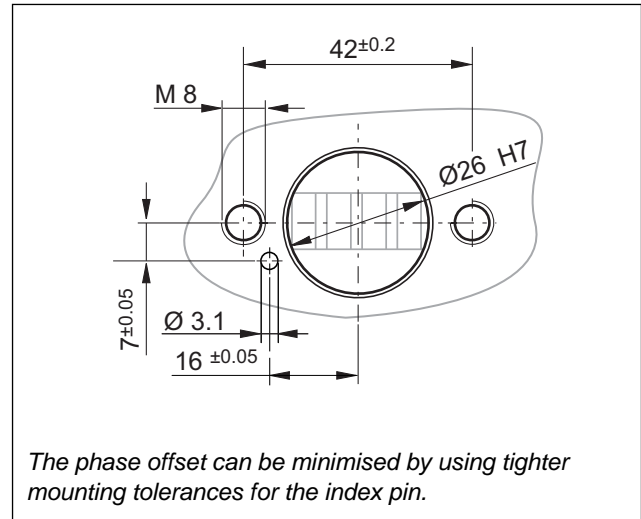
Notes on the preparation of the assembly

All dimensions stated in mm, general tolerance DIN ISO 2768 mK

Insertion chamfer



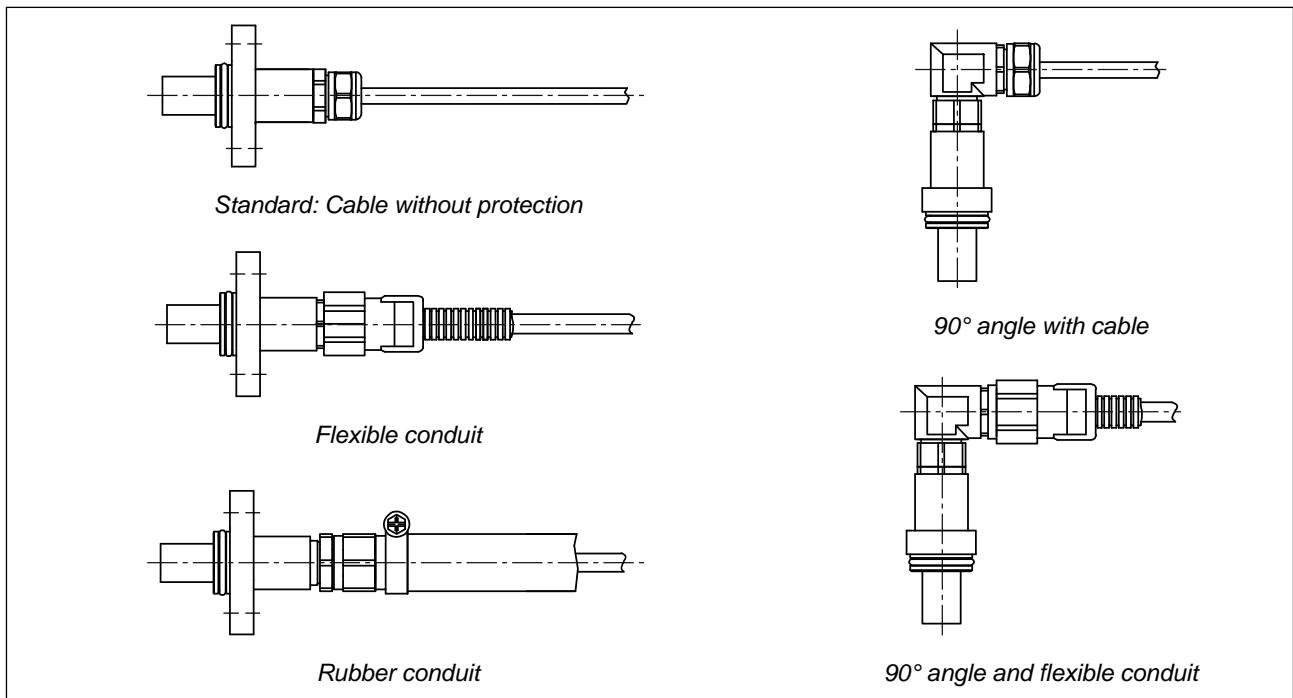
Hole pattern for minimum phase offset



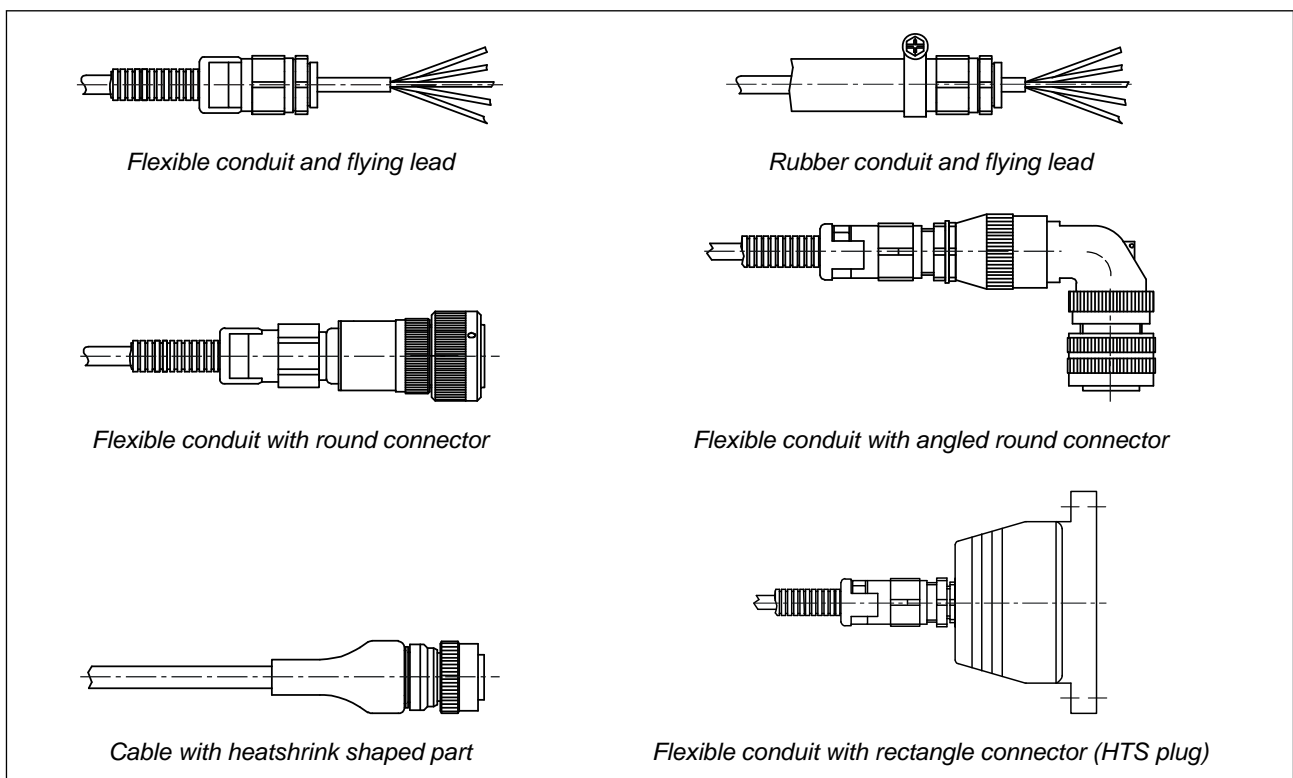
Cable fabrication

On request we manufacture the speed sensors with cable protection and ready-to-connect connectors.

Examples for the sensor end



Examples for the cable end





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Subject to technical modifications and typographical errors.

