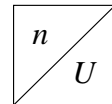


Inductive rotational-speed sensors

Incremental* measurement of angles and rotational speeds



- Non-contacting (proximity) and thus wear-free, rotational-speed measurement.
- Sturdy design for exacting demands.
- Powerful output signal.
- Measurement dependent on direction of rotation.

Application

Inductive rotational-speed sensors of this type are suitable for numerous applications involving the registration of rotational speeds. Depending on design, they measure engine speeds and wheel speeds for ABS systems, and convert these speeds into electric signals.

Design and function

The soft-iron core of the sensor is surrounded by a winding, and located directly opposite a rotating toothed pulse ring with only a narrow air gap separating the two. The soft-iron core is connected to a permanent magnet, the magnetic field of which extends into the ferromagnetic pulse ring and is influenced by it. A tooth located directly opposite the sensor concentrates the magnetic field and amplifies the magnetic flux in the coil, whereas the magnetic flux is attenuated by a tooth space. These two conditions constantly follow on from one another due to the pulse ring rotating with the wheel. Changes in magnetic flux are generated at the transitions between the tooth space and tooth (leading tooth edge) and at the transitions between tooth and tooth space (trailing tooth edge). In line with Faraday's Law, these changes in magnetic flux induce an AC voltage in the coil, the frequency of which is suitable for determining the rotational speed.



Wheel-speed sensor (principle).

- 1 Shielded cable, 2 Permanent magnet, 3 Sensor housing, 4 Housing block, 5 Soft-iron core, 6 Coil, 7 Air gap, 8 Toothed pulse ring with reference mark.

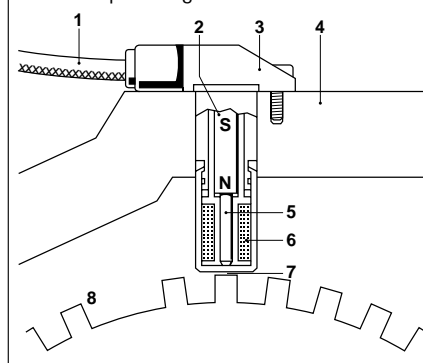
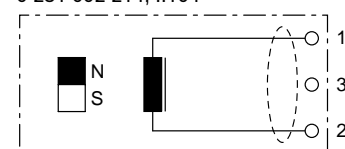


Diagram.

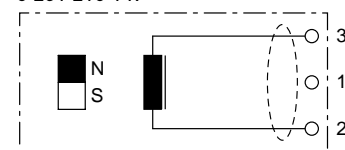
Connections:

- 1 Output voltage,
2 Ground, 3 Shield.

0 281 002 214, ..104



0 261 210 147



Range

Cable length with plug	Fig./ Dimension drawing	Order No.
360 ± 15	1	0 261 210 104
553 ± 10	2	0 261 210 147
450 ± 15	3	0 281 002 214

Technical Data

Rotational-speed range n ¹⁾	min ⁻¹	≈ 20...7000
Permanent ambient temperature in the cable area		
For 0 261 210 104, 0 281 002 214	°C	-40...+120
For 0 261 210 147	°C	-40...+130
Permanent ambient temperature in the coil area	°C	-40...+150
Vibration stress max.	m · s ⁻²	1200
Number of turns		4300 ± 10
Winding resistance at 20 °C ²⁾	Ω	860 ± 10 %
Inductance at 1 kHz	mH	370 ± 15 %
Degree of protection		IP 67
Output voltage U_A ¹⁾	V	0...200

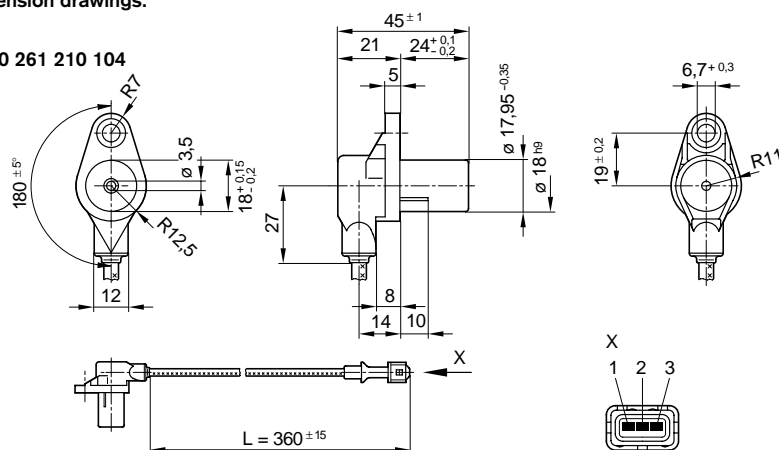
* A continuously changing variable is replaced by a frequency proportional to it.

¹⁾ Referred to the associated pulse ring.

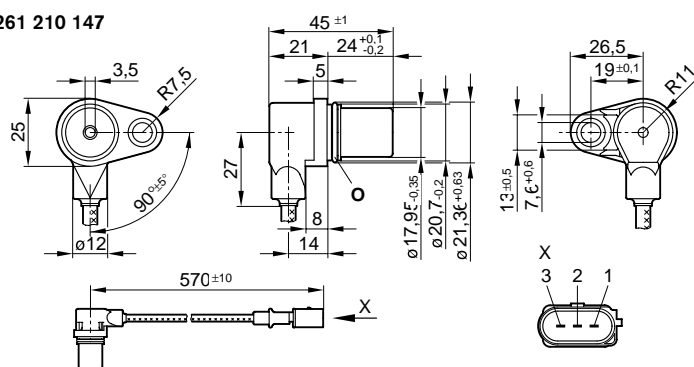
²⁾ Change factor $k = 1 + 0.004 (\vartheta_W - 20 \text{ °C})$; ϑ_W winding temperature

Dimension drawings.

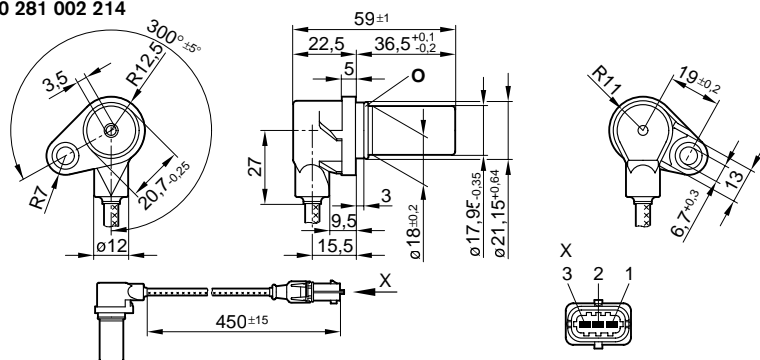
① 0 261 210 104



② 0 261 210 147



③ 0 281 002 214



The sensor generates one output pulse per tooth. The pulse amplitude is a function of the air gap, together with the toothed ring's rotational speed, the shape of its teeth, and the materials used in its manufacture. Not only the output-signal amplitude increases with speed, but also its frequency. This means that a minimum rotational speed is required for reliable evaluation of even the smallest voltages.

A reference mark on the pulse ring in the form of a large "tooth space" makes it possible not only to perform rotational-speed measurement, but also to determine the pulse ring's position. Since the toothed pulse ring is an important component of the rotational-speed measuring system, exacting technical demands are made upon it to ensure that reliable, precise information is obtained. Pulse-ring specifications are available on request.

Explanation of symbols

U_A Output voltage
 n Rotational speed
 s Air gap

Accessories

For rot-speed sensor	From offer drawing	Plug part number
0 261 210 104	A 928 000 019	1 928 402 412
0 261 210 147	A 928 000 012	1 928 402 579
0 281 002 214	A 928 000 453	1 928 402 966