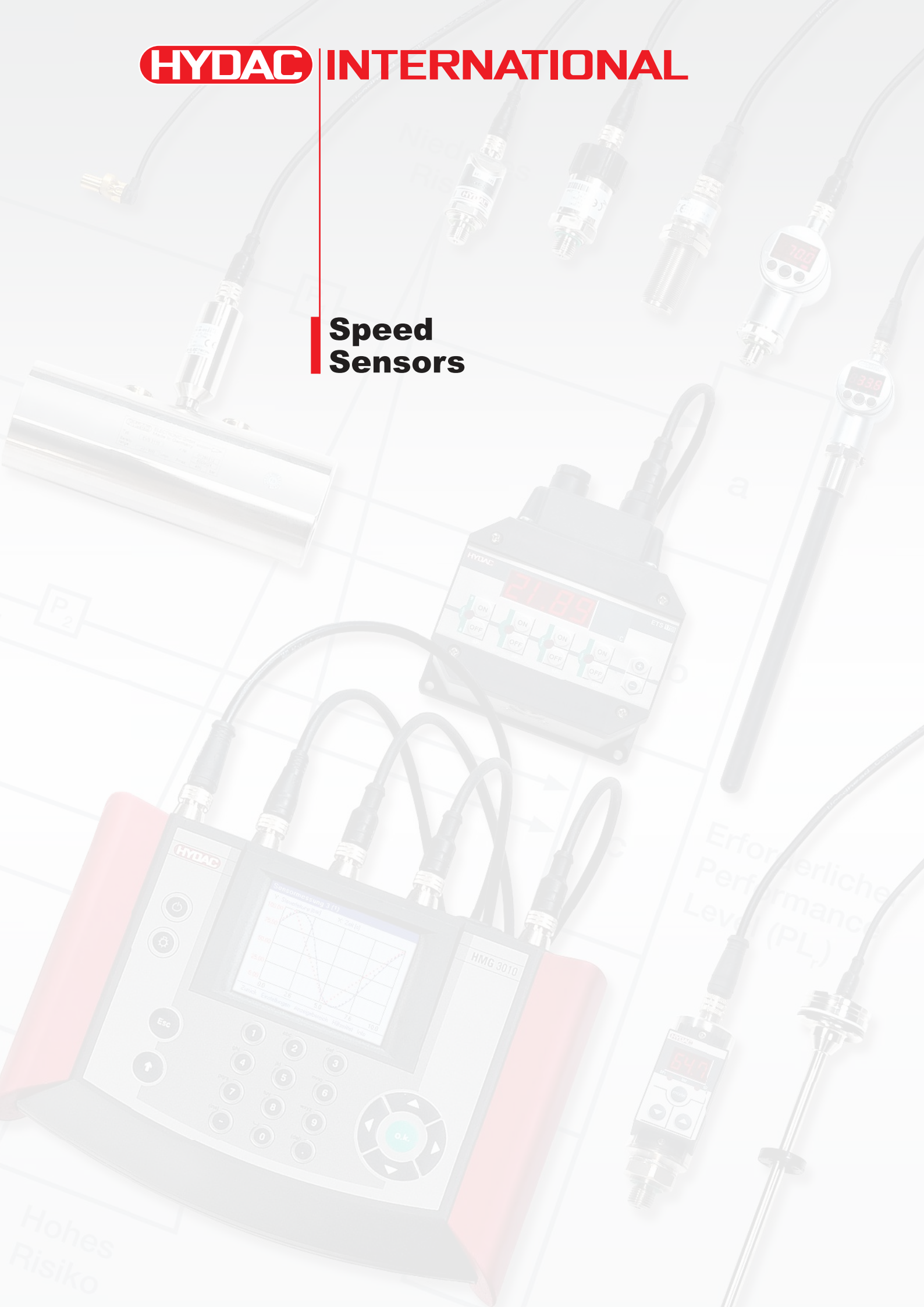
HYDAC INTERNATIONAL

Speed Sensors



SPEED SENSORS

The contact-free speed sensors of the HSS series detect the movement of ferromagnetic structures, such as gear wheels, gear rims or perforated discs, using the changes in magnetic flux.

Speed sensors for general applications:

Electronic Speed Sensor HSS 110

Electronic Speed Sensor HSS 120

Electronic Speed Sensor HSS 130

Electronic Speed Sensor HSS 210

Electronic Speed Sensor HSS 220

Electronic Speed Sensor HSS 110

Description:

The contact-free speed sensors of the HSS 110 series detect the movement of ferromagnetic structures, such as gear wheels, gear rims or perforated discs, using the changes in magnetic flux.

So each sensor has two Hall elements and the differential between the two signals is detected, evaluated and then converted into an output signal suitable for processing.

For integration into standard controls, standard output signals are available.

Due to their extremely compact design, the robust housing and protection class IP 6K9K, the devices can be used in almost any application and any mounting position.

The main fields of application are detection of speed and rotation direction on gear wheels with small module and high resolution, especially in vehicles and mobile machines with electrical and hydraulic drives.

Special features:

- 1-channel Hall differential sensor
- Different signal outputs available
- Extremely compact design
- Wide frequency range
- Alignment required on installation
- Large air gap

Technical data:

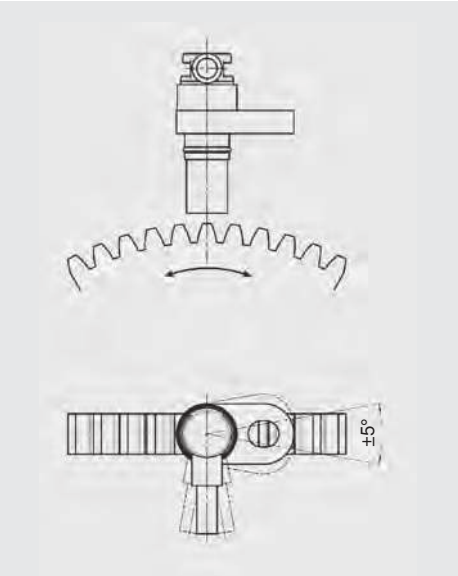
Input data	
Frequency range	NPN: 0.1 .. 20,000 Hz PWM: 1.0 .. 5,000 Hz
Probe length Probe diameter	18.4 mm 10.2 / 9.4 mm
Max. pressure on sensing surface	362.59 psi, static
Air gap / installation distance	Module 1: 0.2 .. 0.8 mm Module 1.25: 0.2 .. 1.4 mm Module 1.5: 0.2 .. 1.8 mm Module 2: 0.2 .. 2.4 mm Module 3: 0.2 .. 2.9 mm
Mechanical connection	Flange, single, asymmetrical, cable outlet 90°
Type of installation	Dependent on direction (with asymmetrical flange)
Torque value	max. 8 Nm
Housing material Seal	Brass FPM
Output data	
Variants	1-channel frequency or 1-channel frequency / direction of rotation (PWM)
Types	1 NPN frequency output or 1 PWM output, 4 .. 20 mA
Switching capacity / current rating	NPN: ≤ 40 mA PWM: ≤ 200 mA
Direction of rotation	Flange on left, gear turns to right, for duration of PWM signal pulse
Signal level	LOW: ≤ 0.6 V / 4 .. 9 mA PWM HIGH: $+U_B$ / 12 ..17 mA PWM
Environmental conditions	
Operating temperature range	-40 .. +284 °F
Media resistance of housing	Salt water; various hydraulic oils; diesel oils; cleaning agent; salt spray
CE mark	DIN EN 60947-5-2
Vibration resistance to EN 60068-2-64	0.05 g^2 / Hz, 20 .. 2,000 Hz
Shock resistance to EN 60068-2-27	100 g, 6 ms, 3x in each direction
Protection class to IEC 60529 to ISO 20653	IP 67 IP 6K9K
Other data	
Electrical connection	Flying leads, 3-core, cable length 1 m
Supply voltage	NPN: 12.5 .. 32 V DC PWM: 4.5 .. 20 V DC
Residual ripple of supply voltage	≤ 5 %
Current consumption	< 30 mA at 30 V DC
Average life expectancy	200,000 h (MTTF)
Weight	~ 50 g

Note: Reverse polarity protection of the supply voltage and short circuit protection (max. 50 mA) are provided.

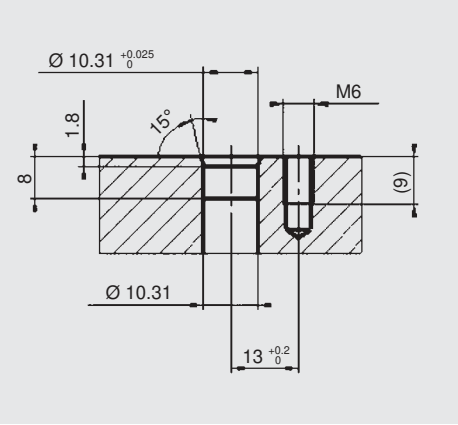
Pin connections:

Core	HSS 110-1	HSS 110-4
red	$+U_B$	$+U_B$
black	0 V	PWM
blue	Frequency	

Mounting position tolerance:



Specification for installation cavity:



Model code:

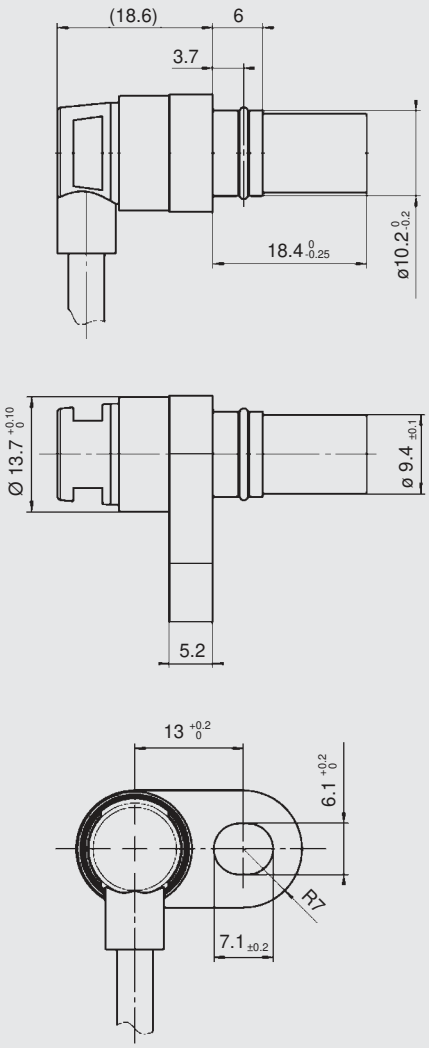
HSS 1 1 0 – X – 018 – 000

Signal type
1 = Output 1: Frequency
4 = Output 1: Frequency and direction of rotation PWM

Probe length
018 = 18.4 mm

Modification number
000 = Standard

Dimensions:



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Electronic Speed Sensor HSS 120

Description:

The contact-free speed sensors of the HSS 120 series detect the movement of ferromagnetic structures, such as gear wheels, gear rims or perforated discs, using the changes in magnetic flux.

So each sensor has two Hall elements and the differential between the two signals is detected, evaluated and then converted into an output signal suitable for processing.

The instruments are available for different insertion depths. For integration into standard controls, standard output signals are available.

Due to their extremely compact design, the robust housing and protection class IP 69K, the instruments can be used in almost any application and any mounting position.

The main fields of application are detection of speed and rotation direction on gear wheels with a small module and high resolution, especially in vehicles and mobile machines with hydraulic drives.

Special features:

- 2-channel Hall differential sensor
- Wide frequency range
- Alignment required when installing
- Large air gap

Technical data:

Input data			
Frequency range	0.1 .. 20,000 Hz		
Probe length probe diameter	30; 35; 45 mm 15 / 12 mm		
Max. pressure on sensing surface	217.55 psi, dynamic		
Air gap / installation distance	**Probe length:**	**30 mm**	**35 / 45 mm**
	Module 1:	0.2 .. 1.0 mm	0.2 .. 1.3 mm
	Module 1.25:	0.2 .. 1.5 mm	0.2 .. 1.8 mm
	Module 1.5:	0.2 .. 1.7 mm	0.2 .. 2.0 mm
	Module 2:	0.2 .. 2.2 mm	0.2 .. 2.5 mm
	Module 2.5:	0.2 .. 3.2 mm	0.2 .. 3.5 mm
Mechanical connection	Flange, single, asymmetrical, cable outlet 90° (30 mm) / axial (35, 45 mm)		
Type of installation	Dependent on direction (with asymmetrical flange)		
Torque value	10 Nm		
Housing material Seal	Brass FPM		
Output data			
Variant	2-channel speed (90° / 270° phase shift for module 2)		
Type	2 NPN frequency outputs		
Switching capacity	≤ 50 mA ≥ 10 kΩ ohmic load ≤ 2.2 nF capacitive load		
Direction of rotation	Flange on left, gear turns to right: channel A lagging; channel B leading		
Signal level	LOW: ≤ 0.5 V HIGH: $+U_B$		
Environmental conditions			
Operating temperature range	-40 .. +284 °F (-40 .. +320 °F for max. 500 operating hours)		
Media resistance of housing	Salt water; various hydraulic oils; diesel oils; cleaning agent; salt spray		
CE mark	DIN EN 60947-5-2		
Vibration resistance to EN 60068-2-64	30 g, 10 .. 500 Hz, 100 min in each direction		
Shock resistance to EN 60068-2-27 / -29	50 g, 11 ms, 3x in each direction 100 g, 6 ms, 3x in each direction		
Protection class to IEC 60529 to ISO 20653	IP 67 IP 69K		
Other data			
Electrical connection	Flying leads, 4-core, cable length 1 m		
Supply voltage	7 .. 30 V DC		
Residual ripple of supply voltage	≤ 5 %		
Current consumption	< 30 mA at 30 V DC		
Average life expectancy	200,000 h (MTTF)		
Weight	~ 80 g		

Note: Reverse polarity protection of the supply voltage and short circuit protection (max. 50 mA) are provided

Pin connections:

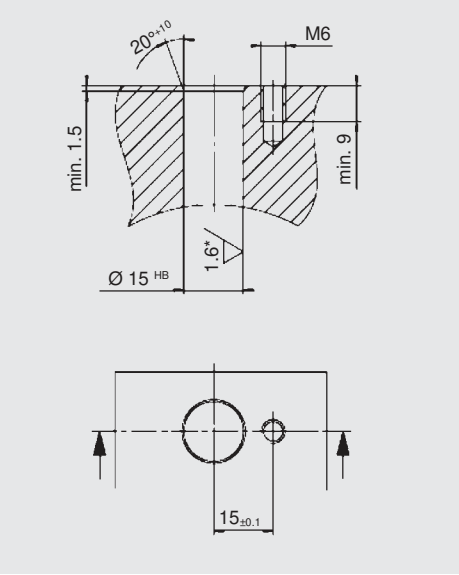
Core	HSS 120-2
brown	$+U_B$
blue	Frequency 1 (A)
black	0 V
white	Frequency 2 (B)

Adjustment angle for other modules:

It is possible to achieve a 90° phase shift of the two frequency signals by turning the sensor through the angle indicated in the table below.

-20°	Module 1	
-15°	Module 1.25	
-10°	Module 1.5	
± 0°	Module 2	± 0°
	Module 2.5	+15°

Specification for installation cavity:



* For sealing function RA 1.6, otherwise 3.2

Model code:

HSS 1 2 0 – 2 – XXX – 000

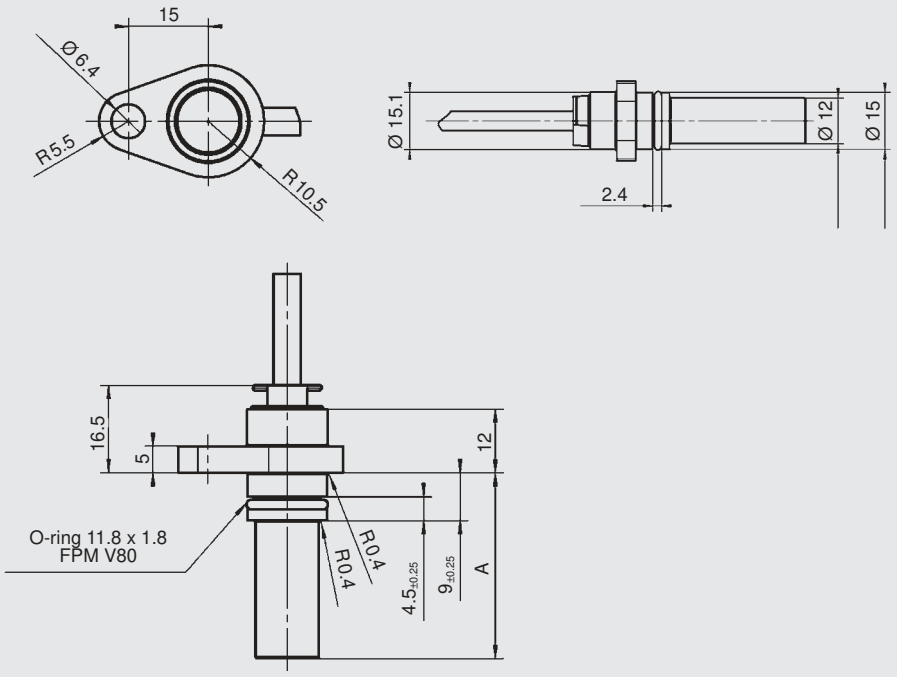
Signal technology
2 = Outputs 1 and 2: Frequency (90° phase shift)

Probe length
030 = 30 mm
035 = 35 mm
045 = 45 mm

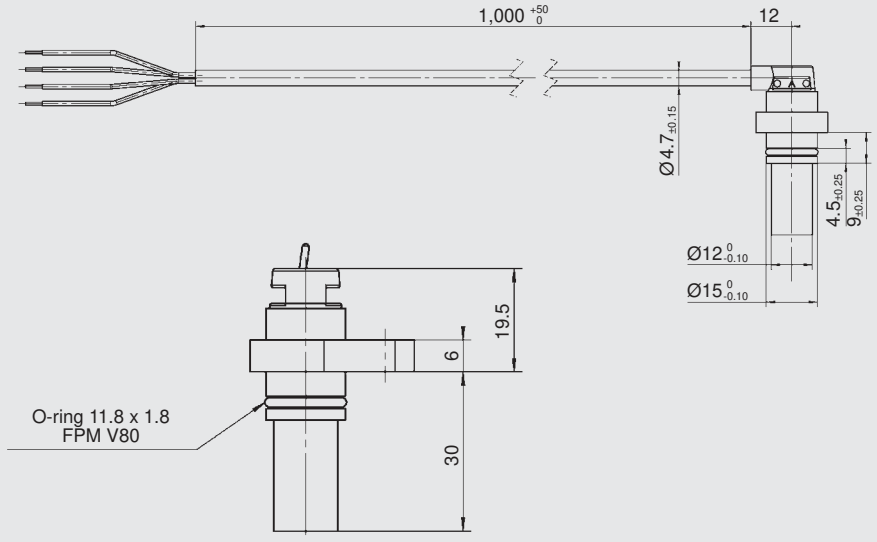
Modification number
000 = Standard

Dimensions:

Probe length (A): 35 mm, 45 mm



Probe length: 30 mm



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Electronic Speed Sensor HSS 130

Description:

The contact-free speed sensors of the HSS 130 series detect the movement of ferromagnetic structures, such as gear wheels, gear rims or perforated discs, using the changes in magnetic flux.

So each sensor has two Hall elements and the differential between the two signals is detected, evaluated and then converted into an output signal suitable for processing.

The instruments are available in different insertion depths. For integration into standard controls, standard output signals are available.

Due to their extremely compact design, the robust housing and protection class IP 69K, the devices can be used in almost any application and any mounting position.

These devices are mainly used for detection of speed and rotation direction on rotary sensors, also under extreme environmental conditions.

Special features:

- 2-channel Hall differential sensor
- Single-core seal
- Very high EMC resistance
- Large air gap

Technical data:

Input data	
Frequency range	0.1 .. 20,000 Hz
Probe length probe diameter	16; 32 mm 18 mm
Max. pressure on sensing surface	145.04 psi, dynamic
Air gap / installation distance	Module 1: 0.2 .. 1.3 mm Module 1.25: 0.2 .. 1.8 mm Module 1.5: 0.2 .. 2.0 mm Module 2: 0.2 .. 2.5 mm Module 2.5: 0.2 .. 3.5 mm
Mechanical connection	Double flange, asymmetrical, cable outlet at 90°
Type of installation	Dependent on direction (with asymmetrical flange)
Torque value	10 Nm
Housing material Seal	Brass / plastic (PA6 GF30) FPM
Output data	
Variants	2-channel speed (90° phase shift) or 2-channel speed / direction of rotation
Types	2 NPN frequency outputs or 1 NPN frequency output + 1 NPN direction of rotation output
Switching capacity	≤ 500 mA
Direction of rotation	Cable outlet at 90°, gear rotation to right: channel A leading; channel B lagging or rotational direction signal (right: HIGH / left: LOW)
Signal level	LOW: ≤ 2 V HIGH: ≥ U_B - 2 V
Environmental conditions	
Operating temperature range	-40 .. +257 °F
Media resistance of housing	Saltwater, various hydraulic oils
CE mark	DIN EN 60947-5-2
Vibration resistance to EN 60068-2-36	5 .. 57 Hz (1.5 mm p-p) 57 .. 2000 Hz (10 g)
Shock resistance to EN 60068-2-27	15 g, 11 ms, in each direction 25 g, 6 ms, in each direction
Protection class to IEC 60529 to ISO 20653	IP 67 IP 6K9K
Other data	
Electrical connection	Flying leads, 4-core, 43 cm cable length
Supply voltage	8 .. 32 V DC
Residual ripple of supply voltage	≤ 5 %
Current consumption	< 33 mA at 24 V, both outputs LOW < 23 mA at 24 V, both outputs HIGH
Average life expectancy	120,000 h (MTTF)
Weight	~ 110 g

Note: Reverse polarity protection of the supply voltage and short circuit protection are provided.

Pin connections:

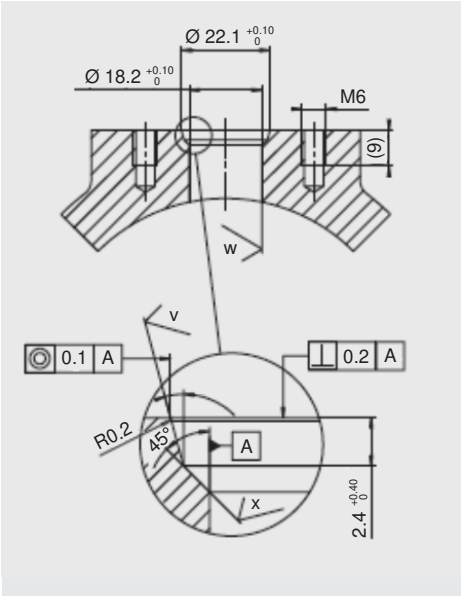
Core	HSS 130-2	HSS 130-3
brown	$+U_B$	$+U_B$
blue	0 V	0 V
black	Frequency 1	Frequency
white	Frequency 2	Direction of rotation

Adjustment angle for other modules:

It is possible to achieve a 90° phase shift of the two frequency signals by turning the sensor through the angle indicated in the table below.

-12°	Module 1	
- 9°	Module 1.25	
- 7°	Module 1.5	
- 3°	Module 1.75	
± 0°	Module 2	± 0°
	Module 2.25	+ 4°
	Module 2.5	+ 8°
	Module 2.75	+13°
	Module 3	+17°

Specification for installation cavity:



- General tolerances for chipping processes: ISO 2768-mH
- Tolerance: ISO 8015
- Surface quality: ISO 1302

Model code:

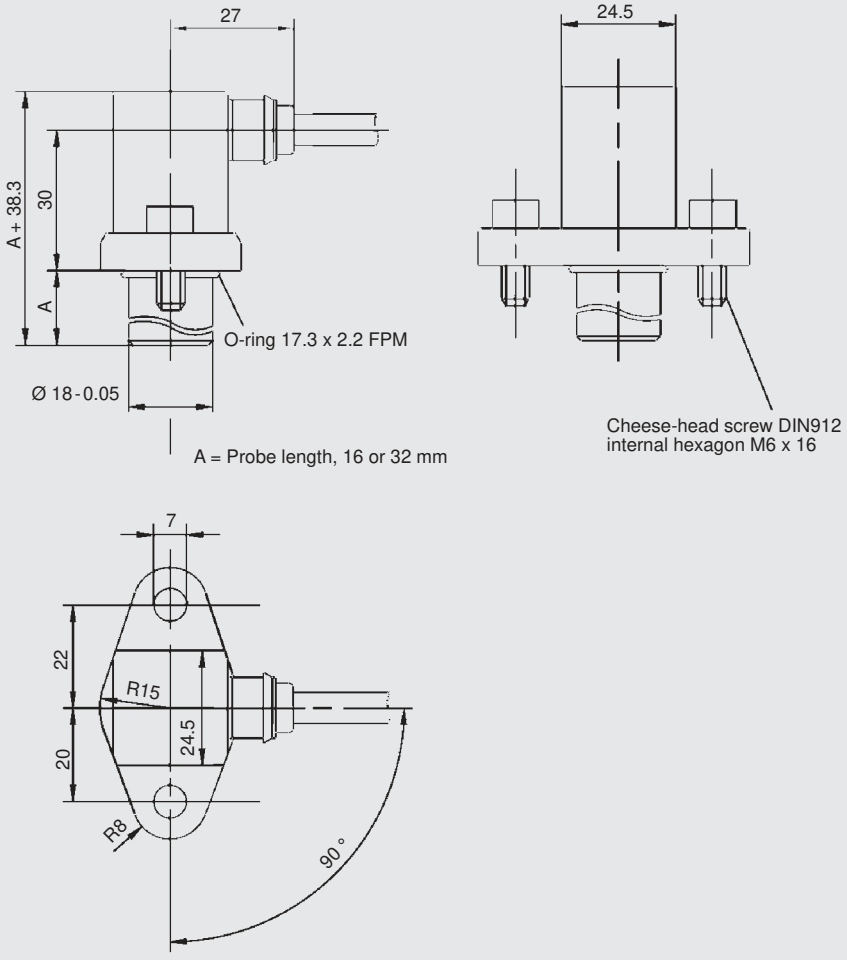
HSS 1 3 0 – X – XXX – 000

Signal technology
2 = Outputs 1 and 2: Frequency (90° phase shift)
3 = Output 1: Frequency
Output 2: Direction of rotation

Probe length
016 = 16 mm
032 = 32 mm

Modification number
000 = Standard

Dimensions:



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Electronic Speed Sensor HSS 210

Description:

The contact-free speed sensors of the HSS 210 series detect the movement of ferromagnetic structures, such as gear wheels, gear rims or perforated discs, using the changes in magnetic flux.

So each sensor has two Hall elements and the differential between the two signals is detected, evaluated and then converted into an output signal suitable for processing.

For integration into standard controls, standard output signals are available.

Due to their extremely compact design, the robust housing and protection class IP 67, the instruments can be used in almost any application and any mounting position.

The main fields of application are detection of speed and rotation direction on gear wheels with a small module and high resolution, especially in vehicles and mobile machines with hydraulic drives.

Special features:

- 2-channel Hall differential sensor
- Wide frequency range
- Alignment required when installing
- Large air gap
- Simple installation

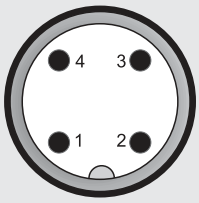
Technical data:

Input data	
Frequency range	0.1 .. 20,000 Hz
Installation depth	0 .. 50 mm adjustable
Max. pressure on sensing surface	72.52 psi, static / dynamic
Air gap / installation distance	Module 1: 0.2 .. 1.0 mm Module 1.25: 0.2 .. 1.5 mm Module 1.5: 0.2 .. 1.7 mm Module 2: 0.2 .. 2.2 mm Module 2.5: 0.2 .. 3.2 mm
Mechanical connection	Screw-in thread M12x1
Type of installation	Dependent on direction
Torque value	13 Nm
Housing material	Brass
Output data	
Variants	2-channel speed (90° phase shift) or 2-channel speed / direction of rotation
Types	2 push-pull frequency outputs or 1 push-pull frequency output + 1 push-pull direction of rotation output
Switching capacity	≤ 50 mA
Direction of rotation	Marking on housing in direction of rotation, gear rotation to right: channel A leading; channel B lagging or direction of rotation signal (right: HIGH / left: LOW)
Signal level	LOW: ≤ 2 V HIGH: ≥ U_B - 2 V
Environmental conditions	
Operating temperature range	-40 .. +257 °F
Media resistance of housing	Oils: HETG; HEES, HFD; HVLP; HLP
CE mark	DIN EN 60947-5-2
Vibration resistance to EN 60068-2-64	0.05 g^2/Hz, 20 .. 2,000 Hz
Shock resistance to EN 60068-2-27	30 g, 11 ms
Protection class to IEC 60529	IP 67 (when an IP 67 female connector is used)
Other data	
Electrical connection	Male M12x1, 4 pole
Supply voltage	8 .. 30 V DC
Residual ripple of supply voltage	≤ 5 %
Current consumption	< 30 mA at 30 V DC
Average life expectancy	200,000 h (MTTF)
Weight	~ 40 g

Note: Reverse polarity protection of the supply voltage and short circuit protection are provided.

Pin connections:

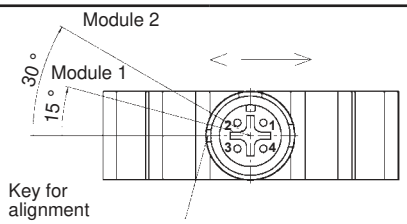
M12x1, 4 pole



Pin	HSS 210-2	HSS 210-3
1	$+U_B$	$+U_B$
2	Frequency 1 (A)	Frequency
3	0 V	0 V
4	Frequency 2 (B)	Direction of rotation

Adjustment angle for other modules:

It is possible to achieve a 90° phase shift of the two frequency signals by turning the sensor through the angle indicated in the table below.



Module 1	+15°
Module 1.25	+18°
Module 1.5	+23°
Module 2	+30°
Module 2.5	+38°

Model code:

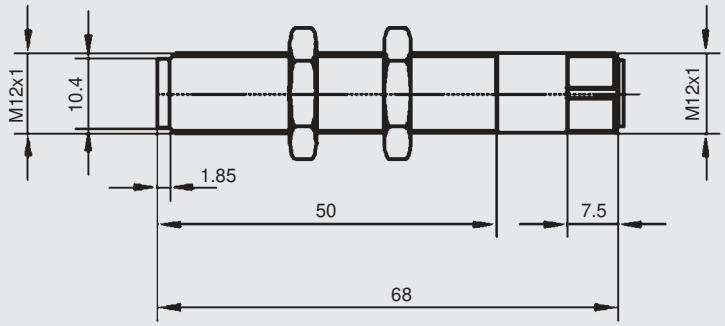
HSS 2 1 0 – X – 050 – 000

Signal technology
2 = Outputs 1 and 2: Frequency (90° phase shift)
3 = Output 1: Frequency
Output 2: Direction of rotation

Installation depth
050 = 50 mm max.

Modification number
000 = Standard

Dimensions:



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Electronic Speed Sensor HSS 220

Description:

The contact-free speed sensors of the HSS 220 series detect the movement of ferromagnetic structures, such as gear wheels, gear rims or perforated discs, using the changes in magnetic flux.

So each sensor has two Hall elements and the differential between the two signals is detected, evaluated and then converted into an output signal suitable for processing.

For integration into standard controls, standard output signals are available.

Due to their extremely compact design, the robust housing and protection class IP 68, the instruments can be used in almost any application and any mounting position.

The main fields of application are detection of speed and rotation direction on gear wheels with a small module and high resolution, especially in rail vehicles and mobile machines.

Special features:

- 2-channel Hall differential sensor
- Wide frequency range
- Alignment required when installing
- Large air gap
- Simple installation

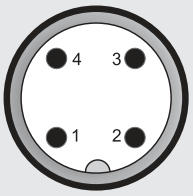
Technical data:

Input data	
Frequency range	0.1 .. 20,000 Hz
Installation depth	0 .. 46 mm adjustable
Max. pressure on sensing surface	145.04 psi, static
Air gap / installation distance	Module 1: 0.2 .. 1.3 mm Module 1.25: 0.2 .. 1.8 mm Module 1.5: 0.2 .. 2.0 mm Module 2: 0.2 .. 2.5 mm Module 2.5: 0.2 .. 3.5 mm
Mechanical connection	Screw-in thread M18x1
Type of installation	Dependent on direction
Torque value	12 Nm
Housing material	X12CrNiS18 8
Output data	
Variants	2-channel speed (90° phase shift) or 2-channel speed / direction of rotation
Types	2 NPN frequency outputs or 1 NPN frequency output + 1 NPN direction of rotation output
Switching capacity	≤ 50 mA (36 V, 257 °F, 50 % duty cycle) ≤ 500 mA (24 V, 77 °F, 50 % duty cycle)
Direction of rotation	Marking on housing at 90° to rotational direction, gear rotation to right: channel A leading, channel B lagging or direction of rotation signal (right: HIGH / left: LOW)
Signal level	LOW: ≤ 2 V HIGH: ≥ $+U_B$ - 2 V
Environmental conditions	
Operating temperature range	-40 .. +257 °F
Media resistance of housing	Saltwater, various hydraulic oils
CE mark	DIN EN 60947-5-2
Vibration resistance to EN 60068-2-6	15 g / 1 .. 2000 Hz
Shock resistance to EN 60068-2-27	30 g, 11 ms
Protection class to IEC 60529	IP 68 (when female connector is fitted)
Other data	
Electrical connection	Male M12x1, 4 pole
Supply voltage	8 .. 32 V DC
Residual ripple of supply voltage	≤ 5 %
Current consumption	< 33 mA at 24 V, both outputs LOW < 23 mA at 24 V, both outputs HIGH
Average life expectancy	200,000 h (MTTF)
Weight	~ 80 g

Note: Reverse polarity protection of the supply voltage and short circuit protection are provided.

Pin connections:

M12x1, 4 pole



Pin	HSS 220-2	HSS 220-3
1	$+U_B$	$+U_B$
2	Frequency 2	Direction of rotation
3	0 V	0 V
4	Frequency 1	Frequency

Adjustment angle for other modules:

It is possible to achieve a 90° phase shift of the two frequency signals by turning the sensor through the angle indicated in the table below.

-12°	Module 1	
- 9°	Module 1.25	
- 7°	Module 1.5	
- 3°	Module 1.75	
± 0°	Module 2	± 0°
	Module 2.25	+ 4°
	Module 2.5	+ 8°
	Module 2.75	+13°
	Module 3	+17°

Model code:

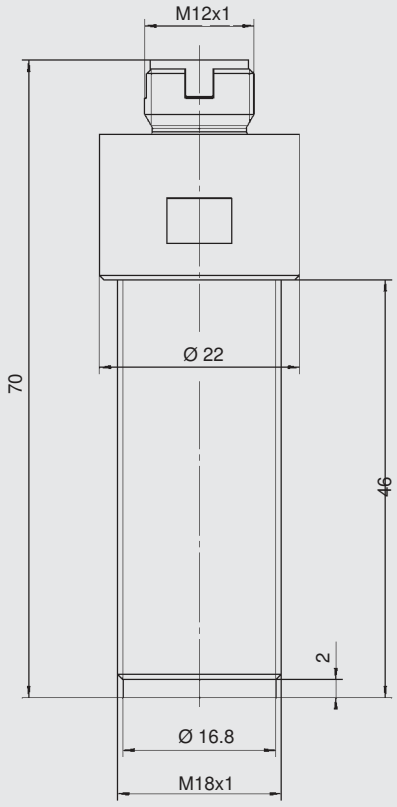
HSS 2 2 0 – X – 046 – 000

Signal technology
2 = Outputs 1 and 2: Frequency (90° phase shift)
3 = Output 1: Frequency
Output 2: Direction of rotation

Installation depth
046 = 46 mm max.

Modification number
000 = Standard

Dimensions:



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