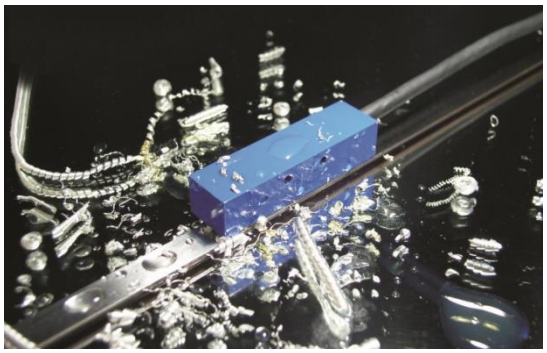
Datasheet

- magnetic sensor with slimline and super flat scanning unit with 1Volt/pp output
- easy and quick mounting with large alignment tolerances
- high system accuracy
- extremely low-noise sensors
- resistant against dust, humidity and shavings
- protection class IP67



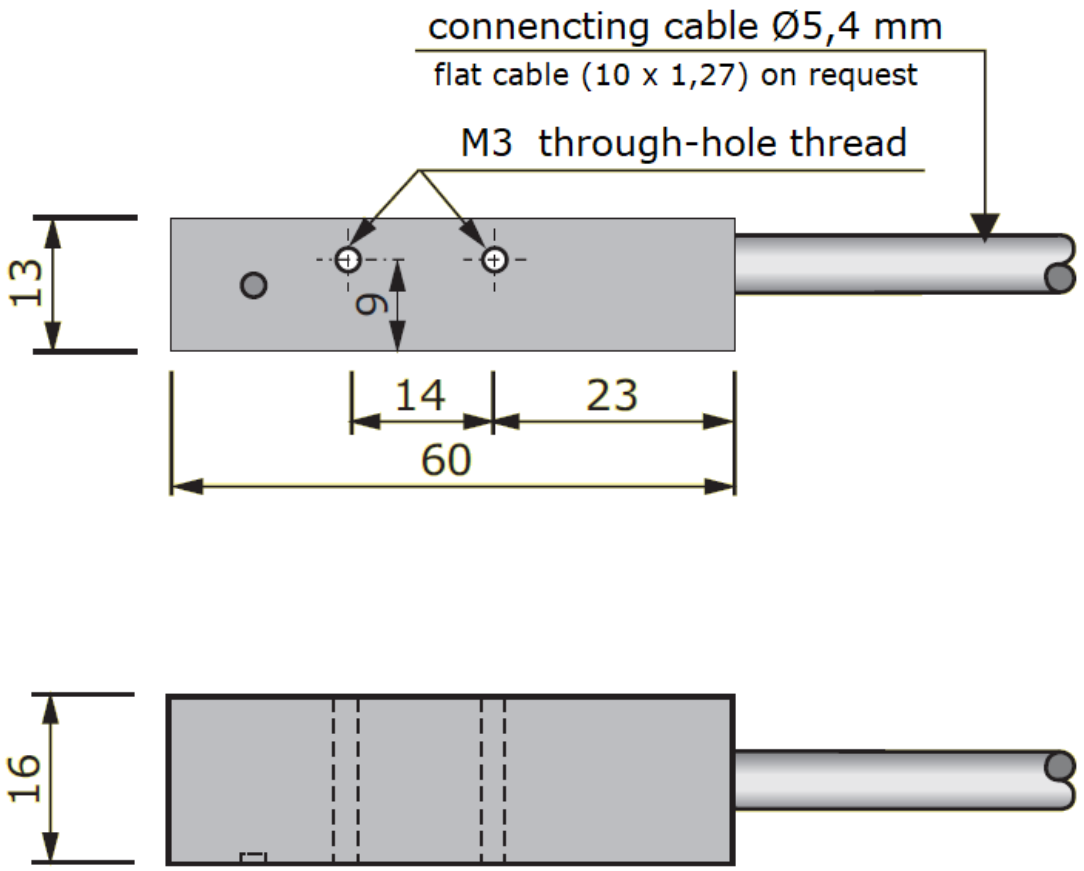
Mechanical Data

Material Housing Sensor Base Cable Connector	 aluminium; pressure die-casting stainless steel 8 wires, respectively twisted pair and screened SUBD9; 9-pin (optional)
Dimensions Sensor Cable Cable Length Bending Radius	 60 x 13 x 16 mm Ø4,5 mm <50 m >60 mm
Weight	40 g
Pole pitch	1+1 mm
Reference signal TTL	every 1 mm possible
Resolution VPP TTL	 1000 µm 100; 10; 5; 2; 1 µm
Distance Sensor Magnetic Tape	0 … 0,35 mm (without magnetic tape) 0 … 0,20 mm (with magnetic tape)
Angular Tolerance	±1°
Interpolation Error system error arises from the interpolation error plus measuring tape error	±2 µm
Traverse Speed VPP	< 10 m/s (32 ft/sec)
Operating Temperature	-40 °C … +80 °C

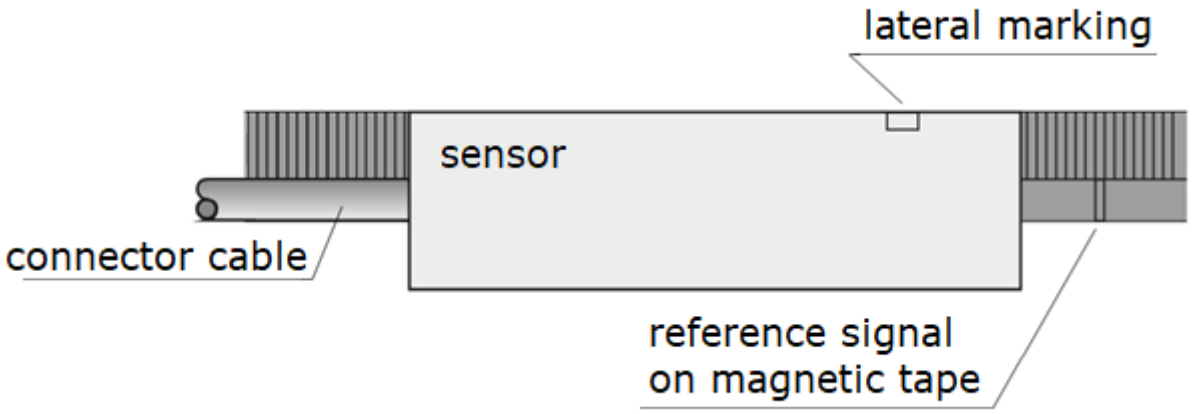
Electrical Data

Power Supply	5 VDC ±5% 10 - 30 VDC (optional with TTL)
Power Consumption VPP TTL	 35 mA < 70 mA 70 mA < 120 mA
Output	TTL RS422, square signals (digital) VPP 1 Volt/PP, sinus signals (analog)
Vibration EN 60068-2-6	300 m/s2 [55 … 2.000 Hz]
Interference protection class IEC 801	3
IP-Rating	IP67

Dimensions



Reference Single Signal

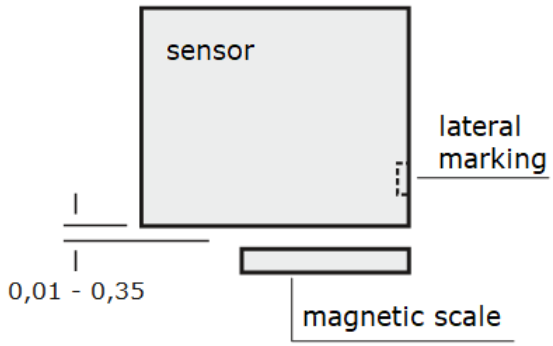


The reference single signal is triggered as soon as the lateral marking is at the same level as the reference single signal.

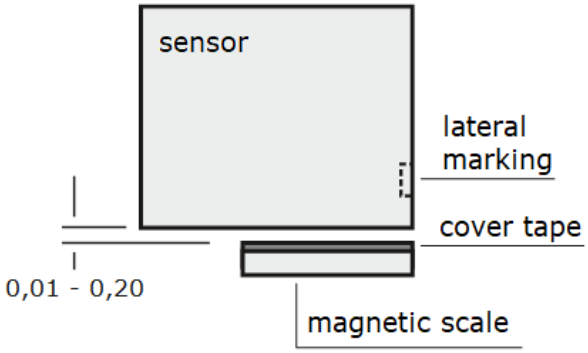
Mounting Tolerances

vertical tolerances

without DB01

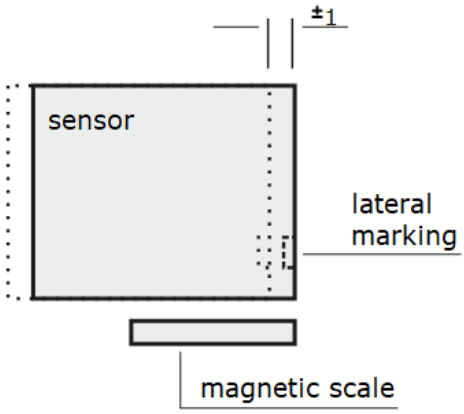


with DB01

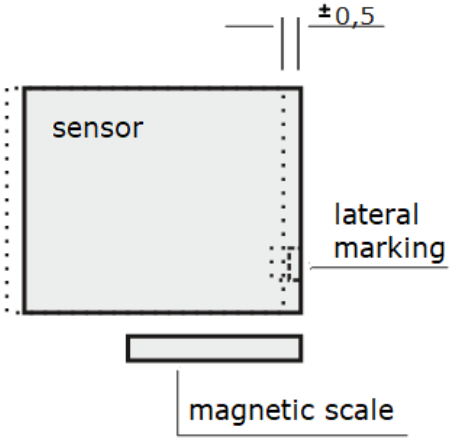


horizontal tolerances

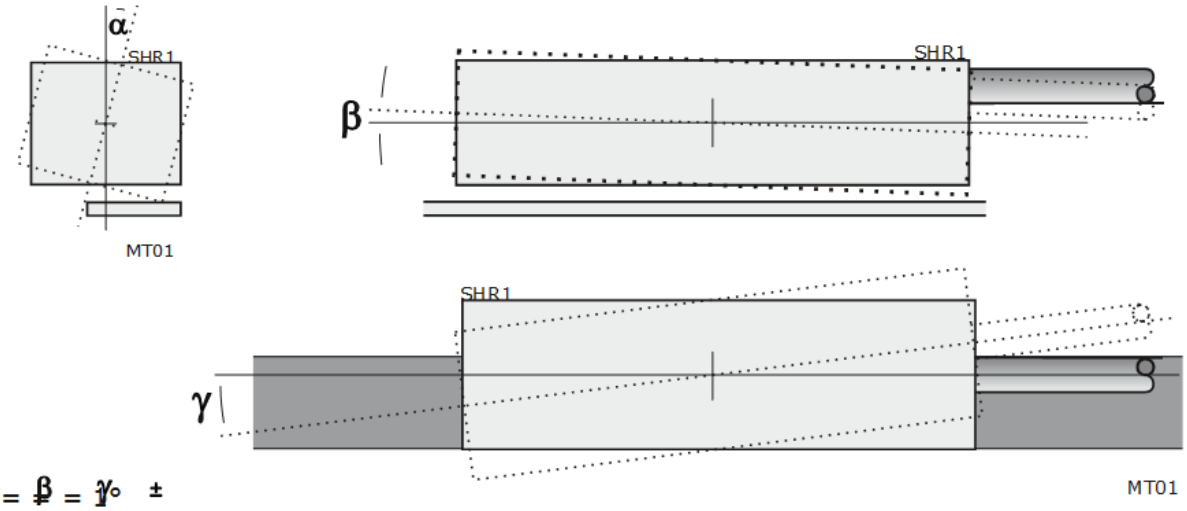
without reference signal



with reference signal



angular tolerances

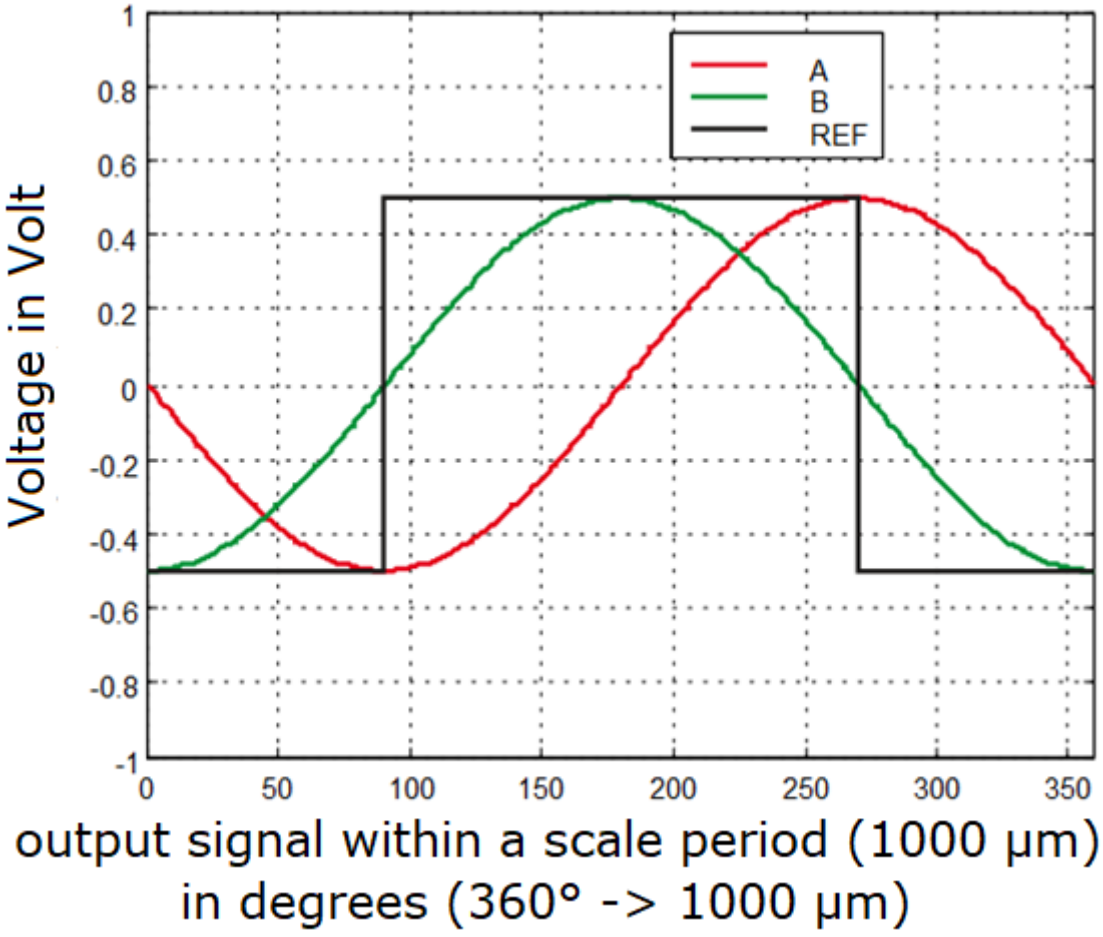


α = β = γ° ±

Interface

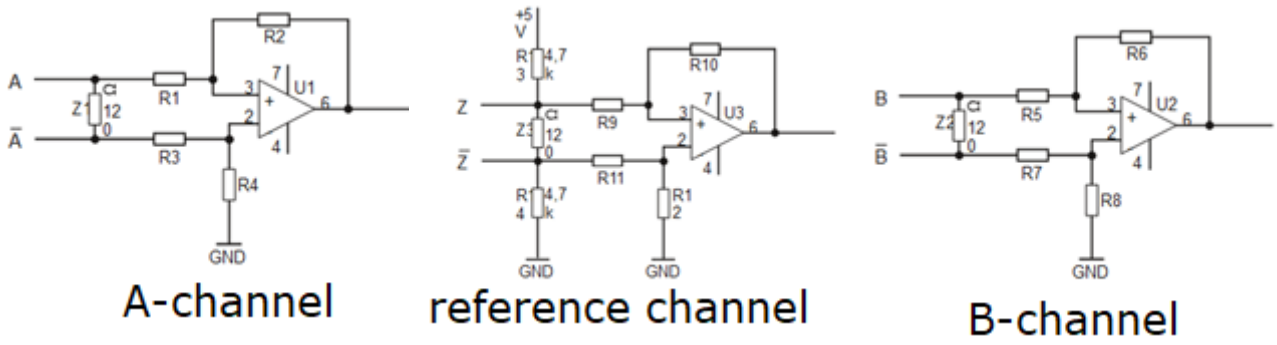
VPP - analog

Electric signals after the difference input of the subsequent electronic

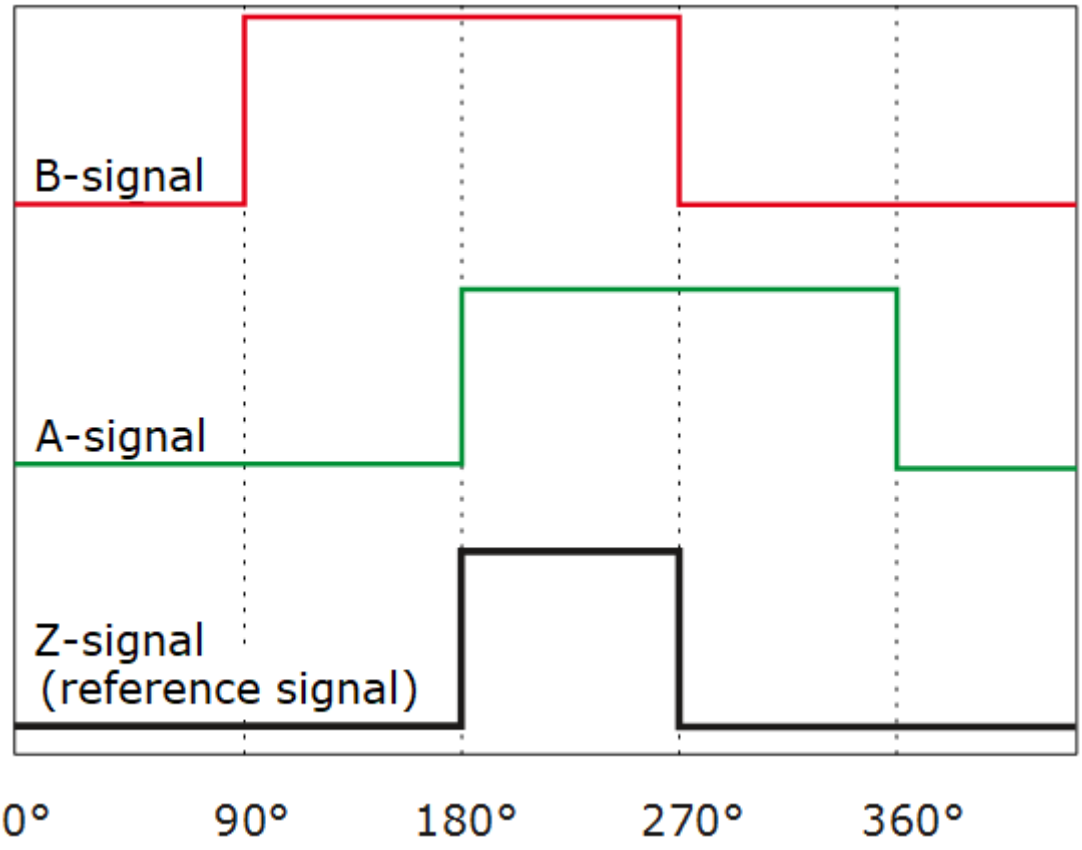


- The SHR1-interface Sinus 1volts/pp is strictly based on the Siemens specifications.
- The period length of the Sinus output signal is 1000 micrometer.

Recommended circuit of the subsequent electronic:

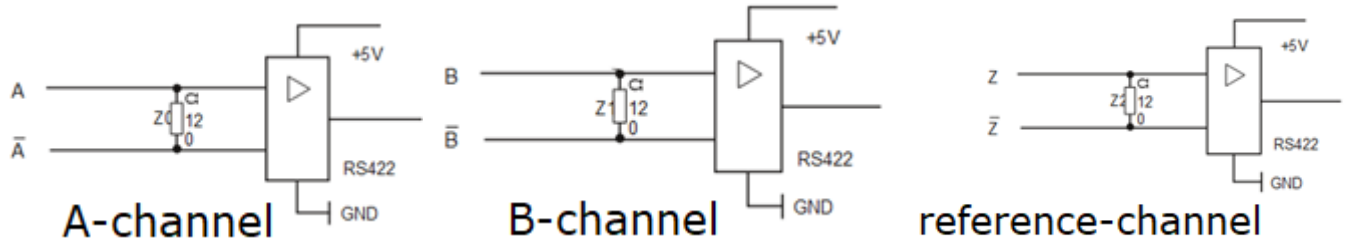


TTL - digital



- 90° phase-shifted quadrature signals in accordance with DIN 66259 – RS 422 specification
  Recommended ferrule resistor Z = 120 Ohm
- Output is made differentially as A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
  Optionally, the reference impulse can be shifted and/or extended.
  Optionally, the minimum impulse width can be limited.

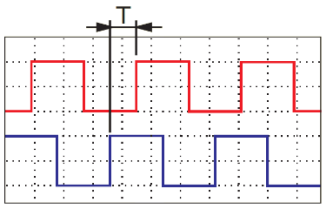
Recommended circuit of the subsequent electronic:



Relationship between edge distance and travel speed

On the basis of two possible methods to explain the tables:

- The determination of a suitable SHR system with an existing control.
  - ➔ **edge spacing:** min. 1 µs (=1000 ns)
  - ➔ *speed:* max. 2 m/s
  - ➔ **pole pitch**: 1 mm (=SHR1)
    - ⇒ A glance at the table SHR1 enough and you read out of the line at **1000 ns**, the resolution 5 µm as the best possible resolution for this constellation.
- the determination of the required counter frequency, required for the future control.
  - ➔ **resolution**: 1 µm
  - ➔ *speed*: max. 5 m/s
  - ➔ **pole pich**: 1 mm (=SHR1)
    - ⇒ A glance at the table SHR1 enough and you will see that the control of a min. edge separation of 120 ns should (about 8.3 MHz) are safe.



T is the time interval between a signal transition to the next.

Min Edge Separation T		accord counter frequency	SHR1			
			0,5 µm	1 µm	5 µm	10 µm
0,12 µs	**120 ns**	~ 8,30 MHz	*2,500 m/s*	*5,00 m/s*	*10,00 m/s*	*10,00 m/s*
0,29 µs	**290 ns**	~ 3,40 MHz	*1,000 m/s*	*2,00 m/s*	*10,00 m/s*	*10,00 m/s*
0,48 µs	**480 ns**	~ 2,10 MHz	*0,600 m/s*	*1,20 m/s*	*6,00 m/s*	*6,00 m/s*
0,68 µs	**680 ns**	~ 1,50 MHz	*0,400 m/s*	*0,90 m/s*	*4,50 m/s*	*4,50 m/s*
0,80 µs	**800 ns**	1,25 MHz	*0,400 m/s*	*0,80 m/s*	*4,00 m/s*	*4,00 m/s*
1,00 µs	**1000 ns**	1,00 MHz	*0,250 m/s*	*0,55 m/s*	*2,80 m/s*	*2,80 m/s*
1,50 µs	**1500 ns**	~ 670,00 KHz	*0,200 m/s*	*0,40 m/s*	*2,00 m/s*	*2,00 m/s*
2,00 µs	**2000 ns**	500,00 KHz	*0,150 m/s*	*0,30 m/s*	*1,50 m/s*	*1,50 m/s*
4,00 µs	**4000 ns**	250,00 KHz	*0,075 m/s*	*0,15 m/s*	*0,75 m/s*	*0,75 m/s*
10,00 µs	**10000 ns**	100,00 KHz	*0,030 m/s*	*0,06 m/s*	*0,30 m/s*	*0,30 m/s*

Min Edge Separation T		accord counter frequency	SHR1			
			1 µm	2 µm	5 µm	10 µm
0,12 µs	**120 ns**	~ 8,30 MHz	*5,00 m/s*	*10,00 m/s*	*10,00 m/s*	*10,0 m/s*
0,29 µs	**290 ns**	~ 3,40 MHz	*2,00 m/s*	*4,00 m/s*	*10,00 m/s*	*10,0 m/s*
0,48 µs	**480 ns**	~ 2,10 MHz	*1,20 m/s*	*2,40 m/s*	*6,00 m/s*	*10,0 m/s*
0,68 µs	**680 ns**	~ 1,50 MHz	*0,80 m/s*	*1,80 m/s*	*4,50 m/s*	*9,0 m/s*
0,80 µs	**800 ns**	1,25 MHz	*0,80 m/s*	*1,60 m/s*	*4,00 m/s*	*8,0 m/s*
1,00 µs	**1000 ns**	1,00 MHz	*0,50 m/s*	*1,20 m/s*	*2,80 m/s*	*5,8 m/s*
1,50 µs	**1500 ns**	~ 670,00 KHz	*0,40 m/s*	*0,80 m/s*	*2,00 m/s*	*4,0 m/s*
2,00 µs	**2000 ns**	500,00 KHz	*0,30 m/s*	*0,60 m/s*	*1,50 m/s*	*3,0 m/s*
4,00 µs	**4000 ns**	250,00 KHz	*0,15 m/s*	*0,30 m/s*	*0,75 m/s*	*1,5 m/s*
10,00 µs	**10000 ns**	100,00 KHz	*0,06 m/s*	*0,12 m/s*	*0,30 m/s*	*0,6 m/s*

For digital models more values are available on request

Pin Assignment

Signal	Colour	Pin
A	orange	6
$\overline{A}$	red	5
B	black	8
$\overline{B}$	brown	4
Z	green	9
$\overline{Z}$	yellow	1
Power Supply	white	7
GND	blue	2

Ordering Example

Type	**SHR1-HP**	-	**1**	-	**O**	-	**TTL**	-	**0.2**	-	**5V**	-	**XX**

Resolution [µm]
1 / 2 / 5 / 10 / 100 TTL
1000 µm VPP

Reference Signal
O = without reference signal
I = periodic reference signal (only TTL)
S = single reference signal

Output Signal
TTL = RS422, square signal (digital)
VPP = 1 Volt/PP, sinus signal (analog)

Cable Length [m]
0.2 = 0,2 m
1 = 1,0 m
5 = 5,0 m

Output Voltage
5V = 5 V
xV = 10-30 VDC (onnly TTL)

Frequency [kHz]
indications as optional