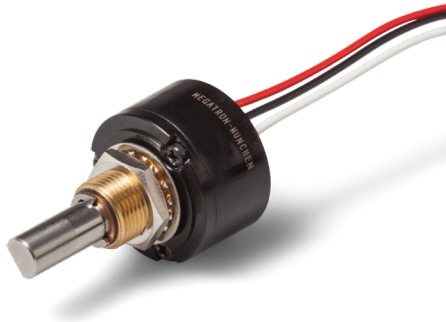


Data Sheet for Angle Sensors

Hall-Effect Single-Turn Rotary Encoder

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Series HSM22S



- Wide operating temperature range -40..105°C
- Also available with redundant electronics
- Only 13.1 mm housing depth
- Compact Ø22.5 mm housing
- Ø6 mm shaft
- 5 V, 12 V or 24 V supply voltage
- IP65
- Sleeve bearing

One application field of the HSM22S rotary encoder series is the replacement of potentiometers with the widely used 22.5 mm housing diameter and the overall compact housing dimensions. For increased operational safety requirements, the HSM22S is also available with redundant electronics if desired. The large operating temperature range as well as the increased IP protection grade makes the encoder also interesting in applications with increased environmental requirements.

Electrical Data

Effective electrical angle of rotation 1.)	360°
Independent linearity (bet straight line) 1.)	±0.5 %
Output signal	@VSUP 5 V Output voltage: 10 % ±3 %..90 % ±3 % from VSUP (ratiometric) @VSUP 24 V or 12 V Output voltage 10 % ±3 %..90 % ±3 % from 24 V or 12 V
Resolution 1.)	12 Bit (4096 steps)
Update rate	800 µs
Supply voltage	5 VDC ±0,5 V 12 VDC ±0,5 V 24VDC ±0,5 V
Power consumption (no load)	< 16 mA (single) < 32 mA (redundant)
Output load	≥ 10 kΩ
Insulation voltage	±8 kV contact discharge, ±16 kV aerial discharge (IEC 61000-4-2)
Insulation resistance 1.)	>1000 MΩ @ 500 VDC

Mechanical and Environmental Data

Mechanical angle of rotation 1.)	360° without stop
Lifetime 2.)	50 mio. shaft revolutions
Bearing	Sleeve bearing
Max. operational speed	400 rev./min
Operational torque @ RT 1.)2.)	≤ 5 Nmm
Operating temperature range	-40..+105 °C
Storage temperature range	-40..+105 °C
Protection grade (IEC 60529)	IP65
Vibration (IEC 68-2-6, Test Fc)	10..2000 Hz 196 m/s ² 12 hours
Shock (IEC 68-2-27, Test Ea)	980 m/s ² 6 ms (18 times)
Housing diameter	22.5 mm
Housing depth	13.9 mm
Shaft diameter	6 mm
Shaft type	Solid shaft

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Mechanical and Environmental Data, Miscellaneous

Max. allowed radial load	≤1 N
Max. allowed axial load	≤1 N
Connection type	Single strands 180 mm ±20 mm
Connection position	Axial
Sensor mounting	Bushing
Mass	app. 20 g
Fastening parts included in delivery	Hex nut, tooth washer
Fastening torque mounting nut	< 100 Ncm
Material shaft	Stainless steel
Material housing	Plastic

1.) According IEC 60393

2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

Data Sheet for Angle Sensors

Hall-Effect Single-Turn Rotary Encoder

Series HSM22S

Order code (non redundant version)

Description		Selection: Standard=black/bold, possible options=grey/cursive				
Series:	HSM22S					
Shaft diameter / shaft length: Ø 6.00 mm x 23.1 mm <i>Option: user defined shaft [mm]</i> <i>(Shaft diameters > 6.00 mm are designed as two part shaft)</i>		6x23,1 <i>XxXX</i>				
Supply voltage / output signal: VSUP=5 V ±10 % / output voltage: 10 % ±3%..90 % ±3 % from VSUP (ratiometric) <i>Option: VSUP 12 V ±0.5 V</i> <i>Output voltage: 1,2 V ±0.36 V..10,8 V ±0.36 V</i> <i>Option: VSUP 24 V ±0.5 V</i> <i>Output voltage: 2.4 V ±0.72 V..21.6 V ±0.72 V</i>			0505 1212 2424			
Sense of rotation output signal: Signal increases by turning the shaft clockwise <i>Option: signal increases by turning the shaft counter clockwise</i>				CW CCW		
Effective electrical angle: Effective electrical angle 360° <i>Option: user defined effective electrical angle xxx°</i>					360 <i>xxx</i>	
Electrical connection: Single strands length 0.18 m <i>Option: single strands length in x.xx [m]</i>						L0,18 <i>Lx,xx</i>

Order example HSM22S (non redundant version):

Requirement:

Shaft Ø 6.00 mm, shaft length 23.1 mm, VSUP = 5 V / OUT = 10 % ±3 %..90 % ±3 % from VSUP (ratiometric), output increases by turning the shaft clockwise CW, effective electrical angle 360°, signal cable length 18 cm

Example for order code:

HSM22S 6x23,1 0505 CW 360 L0,18

Data Sheet for Angle Sensors

Hall-Effect Single-Turn Rotary Encoder

Series HSM22S

Order example (redundant version)

Description	Selection: standard=black/bold, possible options=grey/cursive								
Series:	HSM22S								
Redundant electronic:									
Galvanically insulated electronic (2 separate supply voltages, 2 separate grounds, =6 electrical connection cables [VSUP1, VSUP2, Ground 1, Ground 2, Out 1, Out 2])			X1						
<i>Galvanically not insulated electronics</i> (one supply voltage, one ground, =4 electrical connection cables [1xVSUP, 1xGround, Out 1, Out2])			X2						
Shaft diameter / shaft length: Ø 6.00 mm x 23.1 mm									
<i>Option: user defined shaft [mm]</i> <i>(Shaft diameters > 6.00 mm are designed as two piece shaft)</i>				6x23,1					
				XxXX					
Supply voltage / output signal: VSUP=5 V ±10 % / output signal: 10 % ±3%..90 % ±3 % from VSUP (ratiometric)						0505			
<i>Option: VSUP 12 V ±0.5 V</i>						1212			
<i>Output voltage: 1.2 V ±0.36 V..10.8 V ±0.36 V</i>						2424			
<i>Option: VSUP 24 V ±0.5 V</i>									
<i>Output voltage: 2.4 V ±0.72 V..21.6 V ±0.72 V</i>									
Sense of rotation output signal 1: Signal 1 increases by turning the shaft clockwise							CW		
<i>Option: signal 1 decreases by turning the shaft clockwise</i>							CCW		
Sense of rotation output signal 2: Signal 2 increases by turning the shaft clockwise								CW	
<i>Option: signal 2 decreases by turning the shaft clockwise</i>								CCW	
Effective electrical angle: Effective electrical angle 360°								360	
<i>Option: user defined effective electrical angle</i>								xxx	
Electrical connection: Single strands length 0.18 m									L0,18
<i>Option: signal cable length in x.xx [m]</i>									Lx,xx

Order example HSM22SX (redundant version):

Requirement:
Redundant galvanically insulated electronic, shaft Ø 6.00 mm, shaft length 23.1 mm, VSUP = 5 V / Out = 10 % ±3 %..90 % ±3 % from VSUP (ratiometric), sense of rotation output signal 1: signal increase clockwise, sense of rotation output signal 2: signal increases clockwise, effective electrical angle for each signal output 360°, signal cable length 18 cm

Example order code:
HSM22S X1 6x23,1 0505 CW CW 360 L0,18

For higher quantities or on-going demand, additional options are available as described below

For example:

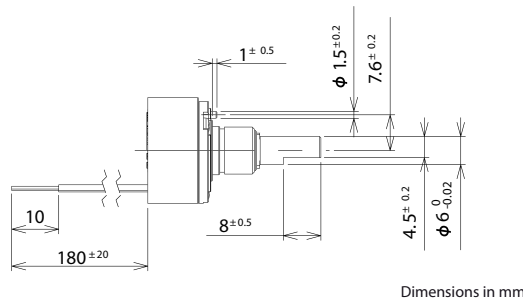
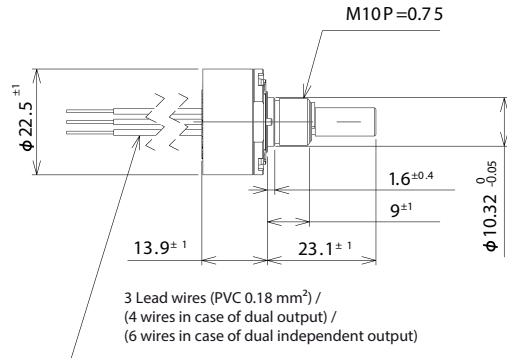
- PWM-output (pulse width modulation)
- Customized output signal, e.g.:
 - Signal plateaus
- Changed shaft design
 - Slot in the shaft
 - Special shaft flattening
- Special cable and connection design

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Series HSM22S

Technical Drawing

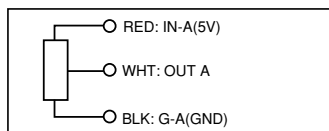


Note:

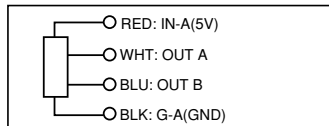
- 1) 1 pc. each of inner teeth washer and hex nut is attached.
- 2) Please duly note that inner construction may burn out when applying the voltage to the wrong terminals except input terminal.

Terminal Connection Diagrams:

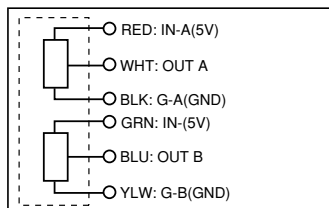
Single electronic:
1 electrical output



Redundant electronics X2:
2 electrical outputs
galvanically not insulated



Redundant electronics X1:
2 electrical outputs
galvanically insulated



Output Characteristics

