QR series

QR40EMN-090HB-2V-CM-5V-UL

Absolute rotary encoder (contactless) Full Redundant

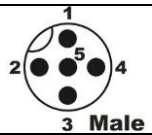
Output
0 - 5 V / 5 - 0 V

Supply voltage
5V dc

Measuring range
90° (±45°)



	General specifications v20230519
Housing	Reinforced plastic injection molded (Celanex 2300 GV3/30 - glass filled PBT, black)
Dimensions (indicative)	40x40x17 mm
Mounting	Included: 2x M4x25 stainless steel pozidrive pan head screws, self-tapping (PZ DIN7500CZ), Mounting on flat surface only. Screw with care
Ingress Protection (IEC 60529)	IP67, IP69K (with IP69K mating connector)
Relative Humidity	0 - 95% (non condensing, fully potted)
Weight	approx 50 gr.
Magnet type	11,2 x 5,5 x 8 mm Neodymium/N35/nickel coated/remanention 1,2 T
Magnet distance to sensor	0 to 10 mm, magnet at front side
Max. radial magnet misalignment	1 mm Radial Off Axis (< 0,3 mm for minimum non-linearity)
Direction of magnetization	Axial in 8 mm (Northpole marked)
Supply voltage	5V dc
Polarity protection	Yes
Current consumption	≤ 25 mA
Operating temperature	-40 to 85°C
Storage temperature	-40 to 85°C
Measuring range	90° (±45°)
Programmable center position	No
Accuracy	
Resolution	12 bit over 360° (min. step 0,09°)
Sensitivity error	±0.5% typ. (@20°C), ±1% typ. (full Temp. range)
Offset error	Magnet + Sensor: <3° typ. (with perfect external magnet positioning)
Non linearity	< ± 1,5° in magnet alignment range (both outputs individual)
Repeatability	0,13°
Response time	< 4 ms
Max speed	100 rpm
Output signal	0 - 5 V / 5 - 0 V (ratiometric to 5 V supply voltage)
Short circuit protection	Yes (T<55°C), Max 10 s (T>55°C)
Output load resistor	≥ 20 kΩ
Connection (length ±10%)	M12 5p male connector (Glass fibre reinforced grade, contacts CuZn pre-nickeled galv. Au)
Pinout M12 connector	Pin 1: + Supply voltage Pin 2: not connected Pin 3: Gnd Pin 4: Output 1 Pin 5: Output 2



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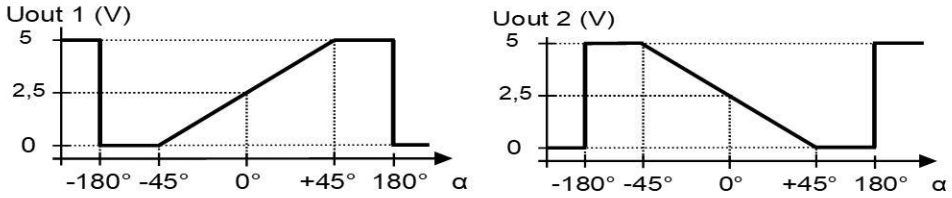
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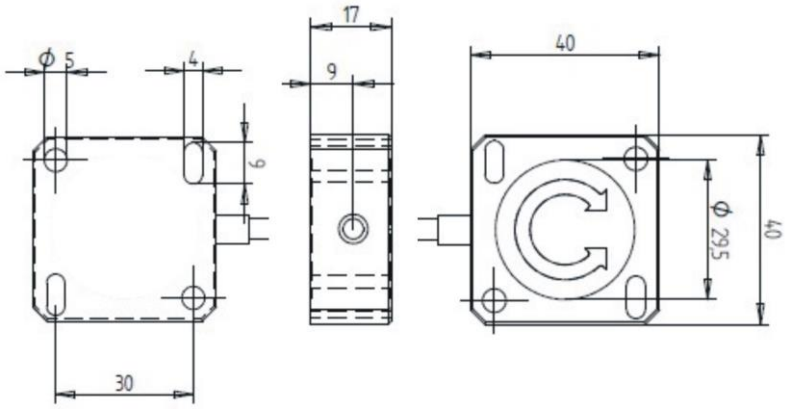
Output approx. 0V when magnetic field outside specifications

Differences between the outputs < 3°

Transfer characteristic



Dimensions (indicative only)



Intended use & UL

Intended use:
QR series sensors are intended to measure rotation after installing in machines, equipment and systems. Flawless function in accordance with the specifications is ensured only when the device is used within its specifications. Modifications or non-approved use are not permitted and will result in loss of warranty and void any claims against the manufacturer.

This device can be used as safety component according to the EU Machine Directive (ISO13849), if the cross-check function between both outputs is performed by the application. An algorithm should be implemented in the application that compares the two outputs of this sensor, and brings the application into safe state if the difference between the two outputs exceeds the limits that fits the application involved.

UL:
UL certificate: UL File number: E312057
UL & c-UL listed product (standards UL60947-5-2 & CSA-C22,2 No. 14)
Product Identity / Category Code Number (CCN): Industrial Control Equipment / NRKH & NRKH7
Enclosure / Temperature rating: Enclosure type 1 / Temperature -40° . .+85°C
Electrical rating: Intended to be used with a Class 2 power source in accordance with UL1310

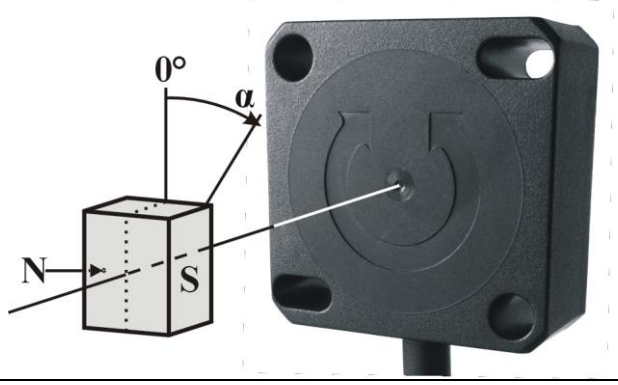
Magnet orientation

Front view

Magnet drawn in α=0° position
Magnet rotates clockwise: α increases

Magnet North pole is indicated

Magnet surface to sensor: 11,2 x 8mm
Magnet heigth: 5,5mm



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