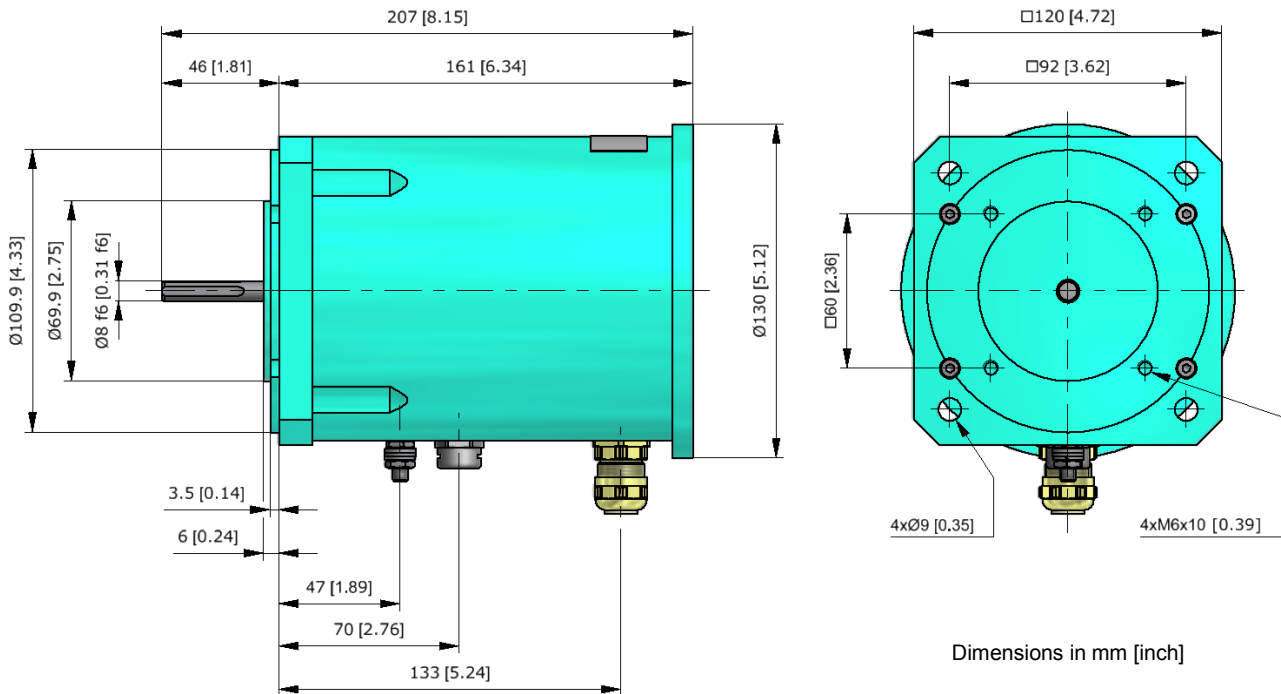


## Dimensional drawing



## Application

The RIPOS absolute transmitter accurately measures shaft positions (Angle of rotation, stroke, way) i.e. the total number of rotations (0...4096 rotations) including the precise angle (0...360°). The compact and robust construction as well as the simple installation enable a wide number of applications, for example for the position measurement of flaps, slides, valves, turbines, travelling and slewing cranes, winches, sluices, rudders, etc.

## Brief description

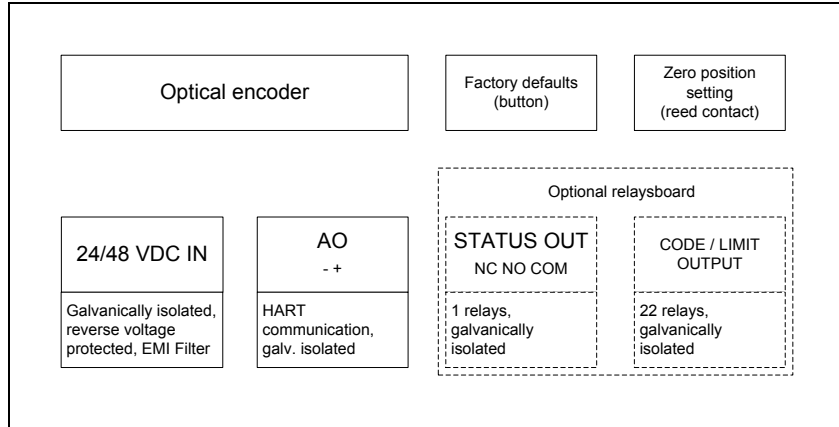
The rotation and angle to be measured is transferred to the input shaft by means of toothed wheel, transfer chain, lever, universal joint, etc. and converted into a digital electrical signal by a high resolution optical encoder.

The signal processing in the unit takes place digitally by a microcontroller. The device is parameterized with a HART® capable interface/software. With the aid of a linearization curve (max. 30 X-/Y-pair of values), the possibility of position linearization exists. Up to four limit values as well as the measured value as a digital code (binary, Gray, BCD) and the device status can be output (for doing this an optional relays board is needed). Flawless functioning of the transmitter is guaranteed with an internal watchdog function.

The power supply and analog output connections are protected against overvoltage.

# Specifications

## Overview



## Product version / ordering information

Type	Description	Article-no.
MGRH	RIPOS Rotary Transmitter 4096 rotations	00 67125.001
MGRH.DO	RIPOS Rotary Transmitter 4096 rotations, with pre-mounted relays board	00 67125.002

Table 1: Product version / ordering information

## Resolution and accuracy

Specification	Accuracy
Measurement range (FS)	1474560° / 4096 rotations
Resolution	0.044°
Nonlinearity, hysteresis and repeatability	≤ ±0.044°
Temperature influence	0 ppm/°C

Table 2: Resolution and accuracy

**Mechanical**

- Housing: Aluminum (EN AW AlSi1MgMn), varnished with blue green (NCS-S-2555 B60G) powder coating, thickness app. 60 µm / 2.36 mils
- Protection class: IP67 (guaranteed with supplied cable glands and accessory cables)
- Dimensions: Total height: 210 mm / 8.27", baseplate: 120 x 120 mm / 4.72 x 4.72", height without shaft: 165mm / 6.50"
- Weight (without cable): approx. 2.9 kg / 6.4 lb.
- Installation position: As required / no limitation
- Radial load on drive shaft: ≤ 120 N / 27 lbf
- Axial load on drive shaft: ≤ 10 N / 2.25 lbf  
**Attention:** avoid excessive vibrations and/or shock!  
With direct axis-axis coupling preferably use flexible shaft couplings, refer to accessories!
- Driving torque: ≤ 1 Ncm / 1.42 oz. in
- Shaft speed: ≤ 6000 min<sup>-1</sup>

**Power supply**

- Supply voltage ranges: 19.2 ... 60 VDC.  
The device shall be supplied with a power supply with double or reinforced insulation, SELV, in line with an UL Listed fuse of 1.5 A.
- Polarity: Internally protected against inverse polarity
- Tightening torque of connectors: 5 mm / 0.20" grid dimension: 0.56 – 0.79 Nm / 4.96 – 7.00 lbf in  
3.5 / 3.81 mm / 0.14 / 0.15" grid dimension: 0.22 – 0.25 Nm / 1.95 – 2.21 lbf in
- Power consumption: < 7 W, typically 3 W (measuring mode without optionally relays board)
- Galvanic isolation: 500 VAC
- Overvoltage protection: Protected by overvoltage arrester diodes (TVS, 90 VDC)
- Installation category: IV, used at the origin of installation (i.e. outside of buildings)

**Indicators / controls (internal)**

- LEDs on the mainboard: CPU status (C): Green flashes at 1 Hz = measurement running  
System status (S): Green flashes at 0.5 Hz = measurement OK  
Orange flashes at 0.5 Hz = measurement warning  
Red flashes at 0.5 Hz = measurement error
- LEDs on the opt. relays board: Status output (S): Green = OK (relay energized)  
Digital outputs (DO18 ... DO21, sign): green = relay energized
- Reset button (R): Restart of the device.
- Factory defaults button (F): Reset to the factory default settings (activate for at least 5 seconds, refer to the user manual).
- Zero setting reed contact (Z): Store installation offset (activate for at least 10 seconds, refer to the user manual).
- Rotary switch (MODE): Position 0: Normal operating mode (refer to the user manual)  
1: Normal operating mode with parameters write protected (refer to user manual)

- Buzzer:
  - 2: HART® armed mode (refer to the user manual)
  - F: Software (Firmware) update (refer to the user manual)
- Feedbacks: 1 x beep = position 0  
3 x beep = invalid position (refer to the user manual)

## Outputs

- AO: Analog output 4 ... 20 mA (3.5...24mA for error currents), load  $\leq 800 \text{ Ohm}^1$ , resolution 16 bits, accuracy @ 25 °C  $\pm 0.05 \%$  FS, linearity 0.01 % FS, temperature coefficient max. 50 ppm/°C  
Protected by overvoltage arrester diodes (TVS, 90 VDC), galvanic isolation 500 VAC, HART® communication

On the optional relays board:

- STATUS OUT: Status relay, switch-over contact, contact load 1 A at 125 VDC or 150 VAC nominal  
UL contact ratings: 30 VDC / 1 A  
65 VDC / 0.46 A  
150 VAC / 0.46 A  
galvanic isolation 500 VAC  
Expected life, mech.: typ.  $10^9$  switching operations  
Expected life, electr. at 12 V/10 mA: typ.  $50 \times 10^6$  switching operations  
at 6 V/100 mA: typ.  $10 \times 10^6$  switching operations  
at 30 V/1 A: typ.  $10 \times 10^3$  switching operations
- CODE OUTPUT: 22 relay outputs, closing contact, common root, contact load 1 A at 125 VDC or 150 VAC nominal  
UL contact ratings: 30 VDC / 1 A  
65 VDC / 0.46 A  
150 VAC / 0.46 A  
galvanic isolation 500 VAC,  
Expected life: refer to STATUS OUT  
Max. allowed current on common root contact: 2 A

## Data interfaces

- HART®: via analog output (AO)
- USB: only for software update (refer to the user manual)

## Environmental conditions

- Operating temperature range: -40 ... +60 °C / -40 ... +140 °F
- Storage temperature range: -40 ... +85 °C / -40 ... +185 °F
- Relative humidity (internal): 5-95 % @ 25 °C, non-condensing, decreasing linearly to 40 % relative humidity at 40 °C
- Installation site: Protected from direct sunlight, excessive vibrations and mechanical shock; max. altitude 5000 m
- Vibration immunity (IEC 68-2-6):  $20 \text{ ms}^{-2}$  (10...500 Hz)
- Shock immunity (IEC 68-2-27):  $200 \text{ ms}^{-2}$  (12 ms)
- Pollution degree: class III (device may only be opened in a controlled environment)

<sup>1</sup> Up to 24 mA output current possible if load  $\leq 500 \text{ Ohm}$

## Quality tests

The device meets the requirements for CE certification according to:

- EN 61000-6-2:2005                      Generic standards - Immunity for industrial environments
- EN 61000-6-3:2007                      Generic standards - Emission standard for residential and commercial environments
- EN 61010-1:2010                      Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements
- EN 60068-2-14:2009                      Climatic environmental conditions, change of temperature  
(see also EN 60068-2-33)
- EN 60068-2-30:2005, variant 1                      Climatic environmental conditions, damp heat, cyclic
- EN 60068-2-6:2008                      Immunity against vibration (sinusoidal)
- EN 60068-2-27:2009                      Immunity against shock
- EN 60529:1991 +A1:2000 +A2:2013                      Degrees of protection provided by enclosures (IP code)  
IEC 60529:1989 +A1:1999 +A2:2013
- RoHS                      Restriction of the use of certain hazardous substances in electrical and electronic equipment
- WEEE                      Directive on electronic waste

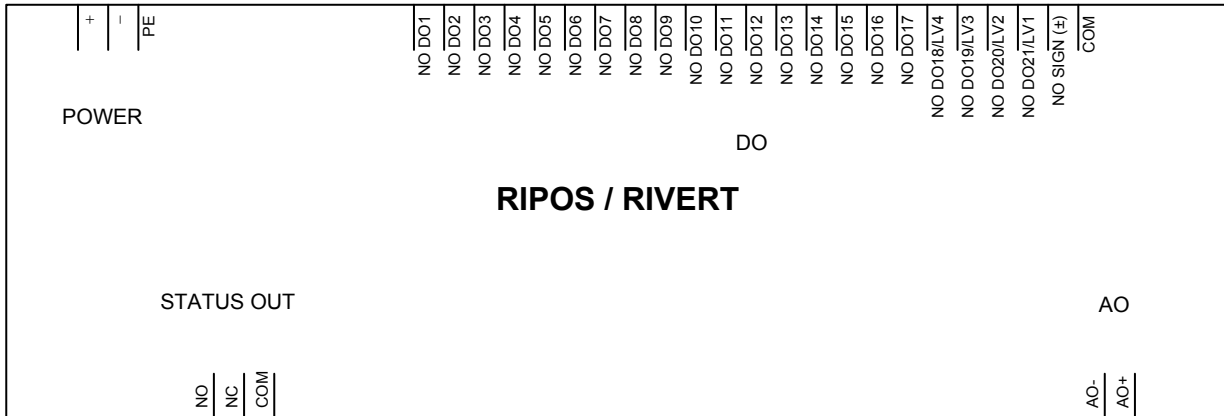
(See also Declaration of Conformity 24.281.0067122.001)

## Operation / configuration

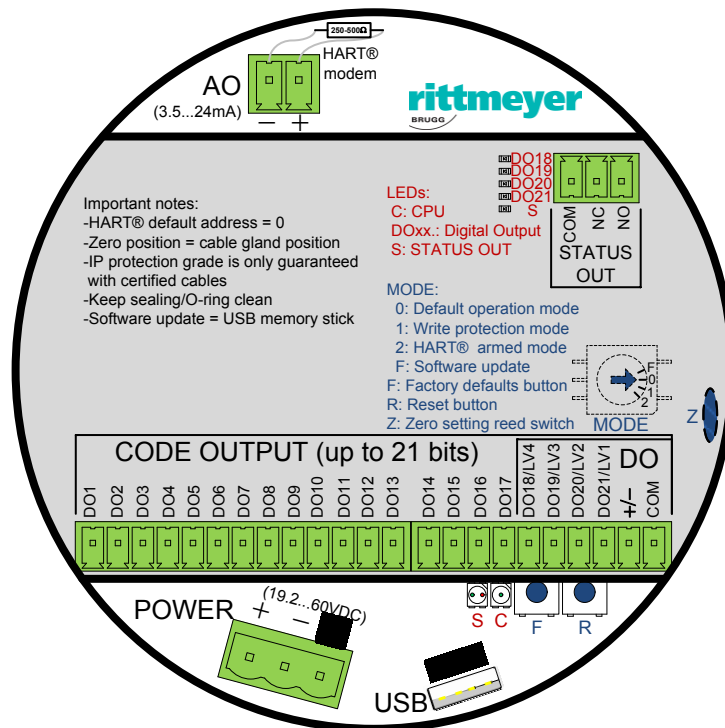
The device is configured over the HART® interface. For details refer to the Software Data Sheet 24.220.006712x.001.

### Electrical connections

Power supply and signal connections are realized by means of plug-in terminals. Power and signals must be connected in a protected environment; no moisture may be fed in into the housing. A ground screw terminal M6 is placed near the device connection. The earth connection with low impedance must be with a strand wire of at least 4 mm<sup>2</sup>. Depending on the environment overvoltage protection solutions must be provided externally (see accessories).



### Mainboard overview with mounted relaysboard



### Connections mainboard

Pin order POWER (power supply):

Pin	Signal	Wire numbers for pre-installed cables		
		7-pole	12-pole	34-pole
1	Power+	1	1	1
2	Power-	2	2	2
3	PE	3	3	3

Pin order AO (analog output):

Pin	Signal	Wire numbers for pre-installed cables		
		7-pole	12-pole	34-pole
1	AO-	4	4	4
2	AO+	5	5	5

### Connections relaysboard

Pin order STATUS OUT:

Pin	Signal	Wire numbers for pre-installed cables		
		7-pole	12-pole	34-pole
1	STATUS NO (closing contact)	6	6	6
2	STATUS NC (opening contact)	7	-	7
3	STATUS COM (common contact)	8	7	8

Pin order CODE OUTPUT / DO:

Pin	Signal	used as	Wire numbers for pre-installed cables		
			7-pole	7-pole	7-pole
1	NO DO1	Code Output Bit 0	-	-	11
2	NO DO2	Code Output Bit 1	-	-	12
3	NO DO3	Code Output Bit 2	-	-	13
4	NO DO4	Code Output Bit 3	-	-	14
5	NO DO5	Code Output Bit 4	-	-	15
6	NO DO6	Code Output Bit 5	-	-	16
7	NO DO7	Code Output Bit 6	-	-	17
8	NO DO8	Code Output Bit 7	-	-	18
9	NO DO9	Code Output Bit 8	-	-	19
10	NO DO10	Code Output Bit 9	-	-	20
11	NO DO11	Code Output Bit 10	-	-	21
12	NO DO12	Code Output Bit 11	-	-	22
13	NO DO13	Code Output Bit 12	-	-	23
14	NO DO14	Code Output Bit 13	-	-	24
15	NO DO15	Code Output Bit 14	-	-	25
16	NO DO16	Code Output Bit 15	-	-	26
17	NO DO17	Code Output Bit 16	-	-	27
18	NO DO18	Code Output Bit 17, Limit Value LV4	-	12	28
19	NO DO19	Code Output Bit 18, Limit Value LV3	-	11	29
20	NO DO20	Code Output Bit 19, Limit Value LV2	-	10	30
21	NO DO21	Code Output Bit 20, Limit Value LV1	-	9	31
22	NO SIGN	Code Output sign (open: sign = positive)	-	-	32
23	COM	Common root contact of digital outputs	-	8	10

## Note:

- On pre-installed 7-pole cables the wires 6, 7 are not connected!
- On pre-installed 34-pole cables the wires 9, 33, 34 are not connected!

**Supplied accessories**

- 2 additional EMC cable glands (incl. reductions) for alternative cable diameters
- 1 resistor 470 ohms (for HART® configuration)
- 1 Documentation CDROM
- 1 Quick Start Guide
- 1 mounting guide for EMC cable glands



## Accessories

### Connector / cables

#### Ordering information

	<b>Order number</b>
• 7-core, shielded, cable Ø 6.7 mm, 0.5 mm <sup>2</sup> , 81 g/m, R=0.039 Ω/m	04 60 707
• 12-core, shielded, cable Ø 8.7 mm, 0.5 mm <sup>2</sup> , 150 g/m, R=0.039 Ω/m	04 60 712
• 34-core, shielded, cable Ø 13.2 mm, 0.5 mm <sup>2</sup> , 385 g/m, R=0.039 Ω/m	04 60 734

#### Cable specifications

• Conductor:	Cu-flex (cl. 5)
• Jacket:	PUR
• Jacket color:	Orange (~RAL 2004)
• Shielding:	Cu-braiding tinned, coverage approx. 90 %
• Special properties:	Halogen-free, flexible, weather resistance
• Temperature range (placed):	-40 °C to +80 °C / -40 °F to 176 °F
• Nominal voltage:	300/500 V / 50 Hz
• Test voltage:	1500 V / 50 Hz
• min. bending radius:	15 x cable Ø
• max. tensile strength:	20 N/mm <sup>2</sup> / 4.5 lbf/mm <sup>2</sup>

### Configuration

	<b>Type</b>	<b>Order number</b>
• HART® / USB PC-Interface	MGZMUSB	22 21 005
• HART® / Bluetooth PC-Interface	MGZMBT	22 21 006
• SIMATIC PDM, Software Media Package V8.2 SP1 (only available for Windows 7 Professional/Ultimate/Enterprise SP1 (32/64-bit) or Windows Server 2008 R2 SP1 Standard Edition (64 bit))		22 05 350
• SIMATIC PDM, Software Single Point Package V8.2		22 05 351

### Electrical

	<b>Type</b>	<b>Order number</b>
• Relays board for RIVERT/RIPOS	MGZH.RB	00 67 127.002
• Replacement connectors for RIVERT/RIPOS		00 67 129.001
• Junction box IP66 (~NEMA 6) with terminals	NLAD.KL8	00 65 190.100
• Junction box IP66 (~NEMA 6) with 1 OVP (supply 24 VDC) and 1 OVP (AO)	NLAD.MGX24	00 65 190.108
• Junction box IP66 (~NEMA 6) with 1 OVP (supply 48 VDC) and 1 OVP (AO)	NLAD.MGX48	00 65 190.109
• OVP complete for 24 VDC supply	PT2-PES-24AC-SET	22 50 203
• OVP complete for 48 VDC supply	PT2-PES-60AC-SET	22 50 202
• OVP complete for analog signal	PT1x2-24DC-SET	22 50 215

**Mechanical**

	<b>Type</b>	<b>Order number</b>
• Mounting bracket complete	MGZBW	00 65 966.001
• Chain wheel complete c = 300 mm [11.81 "], z = 12	MGZKR12	00 65 989.002
• Cross chain steel 1.4401, welded	MGZKK12	42 01 010
• Deflection pulley complete, c = 300 mm [11.81 "]	MGZUR12	00 65 990.002
• Console complete for pulley	MGZKO	00 65 983.001
• Floater, coated with zinc, D = 300 mm [11.81 "]	MGZS	00 65 976.001
• Floater, coated with zinc, D = 300 mm [11.81 "], with heating	MGZSH	00 65 982.001
• Floater leg 500 mm [19.7 "]	MGZSF.1	00 65 981.001
• Floater leg 1000 mm [39.4 "]	MGZSF.2	00 65 981.002
• Counter weight 3 kg [6.6 lbs.], D = 40 mm [1.57 "]	MGZGG	00 65 977.001

For details refer to the datasheet HW Level- and Position Measurement E24.210.0065976.001

- Cable connector NPT ½ " for conduits, with cable gland M12 00 66 590.003
- Cable connector NPT ½ " for conduits, with cable gland M16 00 66 590.004
- Cable connector NPT ½ " for conduits, with cable gland M20 00 66 590.005
  
- Flexible shaft couplings, for example from:
  - Wachendorff ([http://www.wachendorff-automation.de/drehgeber\\_zubehoer\\_kupplungen.html](http://www.wachendorff-automation.de/drehgeber_zubehoer_kupplungen.html))
  - Huco (<http://www.huco.com/products.asp?cat=59>)
  
- Rittmeyer 15 m cable drum with spring complete MGZFKT 00 67 050.001
  
- RIPOS with Rope Length Transmitter FSG: Refer to Projecting measuring site E24.260.0067110.xxx

For additional accessories please contact a Rittmeyer AG representative.