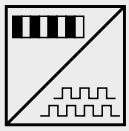
# POSIROT®
# PMIS4, PMIR7
# Incremental magnetic encoder rings

## Magnetic rings for rotative applications with POSIROT® position sensor PMIS4

- **All metal housing (sensor head PMIS4)**
- **Protection class IP67**
- **Highest EMC protection**
- **Large guiding distance of ±1 mm**
- **Suitable for harsh environments**
- **Up to 184,320 pulses/360°**
- **For shaft diameters of 27, 35 and 50 mm**
- **Magnet rings with index mark**



### Order Code PMIR7
(magnetic ring)

PMIR7 – □ – □

**Model name**

**Magnetic period**
20 = 2 mm

**Number of poles and inner diameter [in mm]**
50 - M - 27
64 - M - 35
90 - M - 50

### Order Code PMIS4
(sensor head)

PMIS4 – □ – □ – □ KHZ – □ – □ – □ M – □

**Model name**

**Magnetic period**
20 = 2 mm

**Scaling factor**
See table page 35

**Maximum pulse frequency (in kHz, standard 50 kHz)**
50 / 20 / 10 (other frequencies on request, max. 480 kHz)

**Output**
HTL = HTL output with excitation 24 V DC, output 24 V
TTL = TTL output with excitation 5 V DC, output TTL/RS-422
TTL24V = TTL output with excitation 24 V DC, output TTL/10 mA

**Signal Z / status signal**
Z0 = A/B w/o signal Z
Z1 = A/B with signal Z
Z3 = A/B with signal Z and status signal, only for non-differential (single-ended) outputs

**Cable length (in m, standard 2 m)**

**Connection**
S = Open cable end

**Order example magnet ring: PMIR7 - 20 - 64 - M - 35**

**Order example sensor head: PMIS4 - 20 - 100 - 50KHZ - HTL - Z0 - 2M - S**

| | | |
|---|---|---|
| **Specifications** | Output | Incremental encoder output A/B with differential push-pull output, TTL/24 V-, TTL/RS-422- or HTL-compatible |
| | Excitation voltage | 10 ... 30 V DC or 5 V DC ±5 % |
| | Excitation current | 50 mA to 300 mA, depending on pulse frequency, cable length and load |
| | Magnetic period of the sensor | 2 mm |
| | Guided spacing between sensor and wheel $x_Z$ | 0.1 ... 0.8 mm |
| | Side tracking tolerance of the sensor | ±1 mm |
| | Linearity (sensor with magnetic wheel PMIR4) | ±0.1° |
| | Repeatability | ±1 digit |
| | Maximum pulse frequency $f_P$ | 50, 20, 10 kHz (standard 50 kHz, max. 480 kHz) |
| | Output signals | A, $\overline{A}$, B, $\overline{B}$, signal Z, $\overline{Z}$, status signal $\overline{ERR}$ |
| | Material of housing | Zinc diecast |
| | Connection | Cable 8 wire, dia. 5 mm, open cable end. Max. length of the integrated sensor cable: output TTL: 3 m; HTL/TTL24V: 20 m |
| | Weight (w/o cable and connector) | 30 ±5 g |
| | Protection class (EN 60529) | IP67 |
| | Environmental | |
| | Shock | EN 60068-2-27:1993, 50 g 6 ms, 100 shocks |
| | Vibration | EN 60068-2-6:1995, 20 g, 10-2000 Hz, 10 cycles |
| | EMC | DIN EN 61326 |
| | Temperature | -40 ... +85 °C |

The subsequent counting device must be able to process the specified maximum pulse frequency of the sensor.

| | | | |
|---|---|---|---|
| **Output signals** | Saturation voltage | UH, UL = 0.2 V<br>UH, UL = 0.4 V<br>$C_{last}$ < 10 nF | $I_{out}$ = ±10 mA (UH = UB - $U_{out}$)<br>$I_{out}$ = ±30 mA |
| | Short circuit current | ISL, ISH < 800 mA<br>ISL, ISH < 90 mA | (UH, UL = 0 V)<br>(UH, UL = 1.5 V) |
| | Rise time | $t_r$, $t_f$ < 200 ns | with cable length 1 m, 10 % … 90 % |

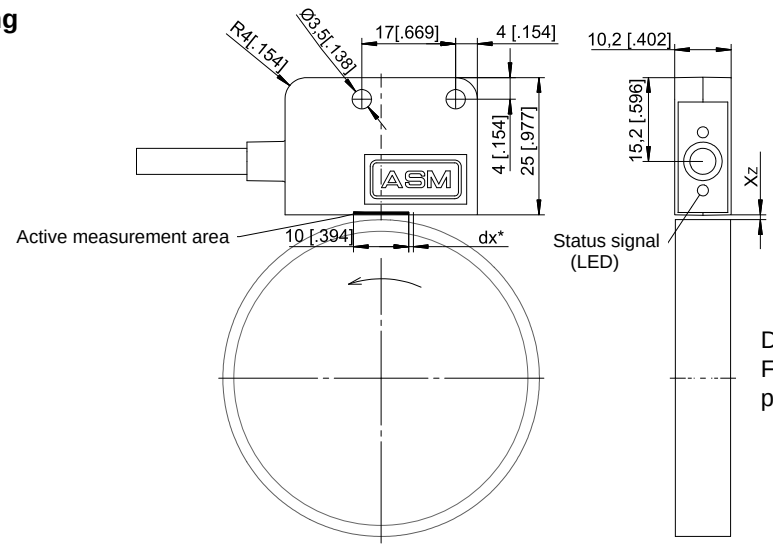
**Pulse frequency** in dependence on the cable length

| **Load/cable length** | **Load/pulse frequency fp** | | |
|---|---|---|---|
| | **HTL single ended**<br>UB = 24 V | **TTL/RS422 differential**<br>UB = 5 V * | **TTL/24 V**<br>UB = 24 V |
| Max. output current | 50 mA | 50 mA | 10 mA |
| $R_{last}$ min. | 500 Ω | 100 Ω | 500 Ω |
| $C_{last}$ max. | 10 nF | 10 nF | 1 nF |
| 200 m | 15 kHz | — | — |
| 100 m | 25 kHz | 100 kHz | — |
| 50 m | 50 kHz | 200 kHz | 50 kHz |
| 10 m | 100 kHz | 300 kHz | 100 kHz |

* = consider the voltage loss of the cable; the excitation voltage 5 V ± 5% of the sensor must be guaranteed.
Note: For longer distances (see specification above) you must use min. 0.5 mm² wire for „Excitation+“ and „Excitation GND“ (see signal wiring next page), all signal wires must be min. 0.14 mm²!

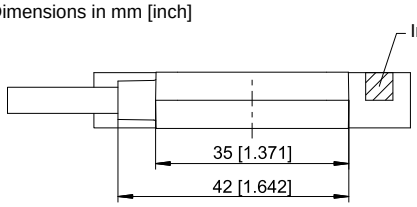
# POSIROT®
# PMIS4
# Incremental encoder

## Outline drawing




Dimensions informative only.
For guaranteed dimensions
please consult factory.

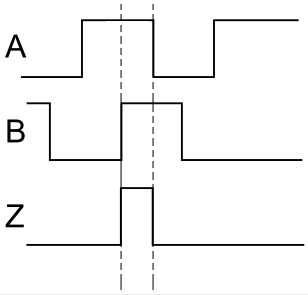
Dimensions in mm [inch]




* = position tolerance of the active measurement area:
dx = ±1 mm

## Output signals

### Option Z1 (signal Z)

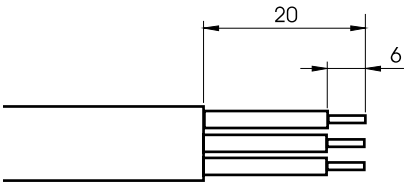



## Signal wiring

| Signal name | | | | Cable with open end, cable color |
|---|---|---|---|---|
| **Option** | **Z0** | **Z1** | **Z3 *** | |
| Excitation + | | | | White |
| Excitation GND (0 V) | | | | Brown |
| | B | B | B | Green |
| | A | A | A | Yellow |
| | $\overline{B}$ | $\overline{B}$ | $\overline{ERR}$ | Grey |
| | $\overline{A}$ | $\overline{A}$ | – | Pink |
| | – | Z | Z | Blue |
| | – | $\overline{Z}$ | – | Red |
| Shield | | | | Black |

Z = reference pulse
ERR = status signal, periodical approx. 16 Hz, for side tracking and velocity errors
* = status signal ERR available only with HTL (single ended) output

## Connection




Cable output dimensions

# POSIROT®
# PMIR7
# Incremental magnetic encoder rings

| | | |
|---|---|---|
| **Specification** | Material | Elastomer bonded hard ferrite |
| | Base material | Stainless steel |
| | Signal periods per revolution | From 50 poles/revolution (see table below) |
| | Magnetic period | 2 mm |
| | Temperature range | -40 ...+85°C |
| | Linearity with sensor PMIS4 | Approx. ± 0.1° |

Data valid in connection with the sensor PMIS4.

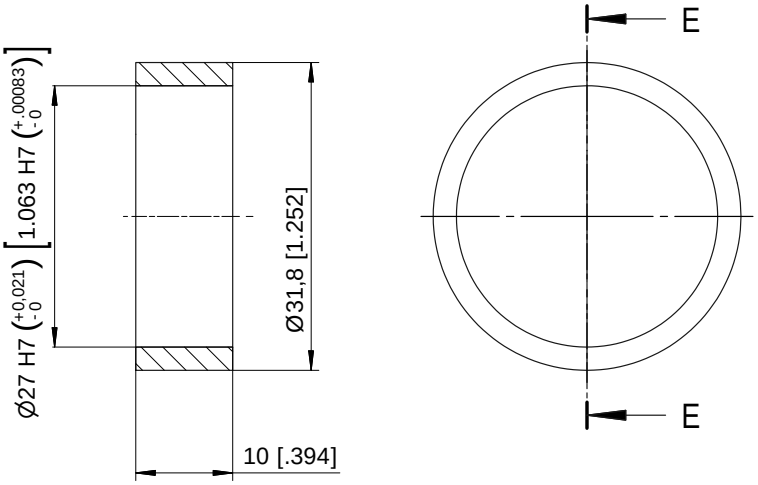
**Standard magnetic wheels**

| Type | Poles | ∅ | Width | Signal periods/rotation | Inside diameter |
|---|---|---|---|---|---|
| PMIR7-20-50-27 | 50 | 31.8 | 10 | decade division (refer to the table below) | 27H7 |
| PMIR7-20-64-35 | 64 | 40.7 | 10 | binary division (refer to the table below) | 35H7 |
| PMIR7-20-90-50 | 90 | 57.3 | 10 | vernier (refer to the table below) | 50H7 |

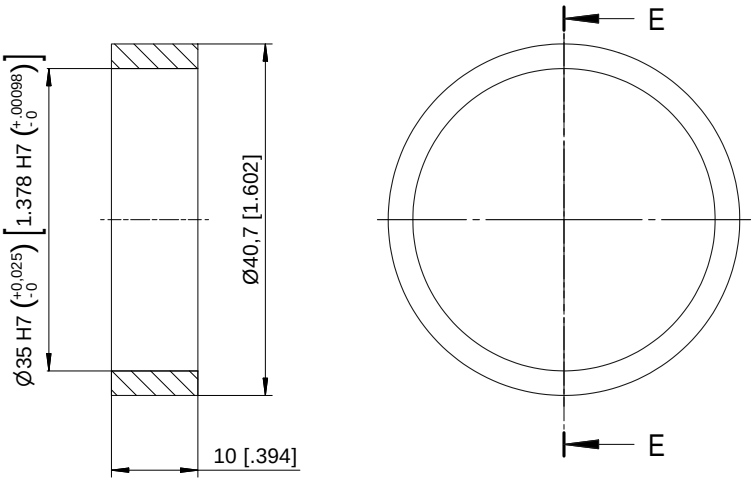
| Scaling factor Sensor PMIS4-20- ... | PMIR7-20-50-27 | | PMIR7-20-64-35 | | PMIR7-20-90-50 | |
|---|---|---|---|---|---|---|
| | Signal periods | R.p.m. )* (at 480 kHz) | Signal periods | R.p.m. )* (at 480 kHz) | Signal periods | R.p.m. )* (at 480 kHz) |
| 1 | 50 | 6000 | 64 | 6000 | 90 | 6000 |
| 2 | 100 | 6000 | 128 | 6000 | 180 | 6000 |
| 4 | 200 | 6000 | 256 | 6000 | 360 | 6000 |
| 8 | 400 | 6000 | 512 | 6000 | 720 | 6000 |
| 10 | 500 | 5760 | 640 | 4500 | 900 | 3200 |
| 16 | 800 | 6000 | 1024 | 6000 | 1440 | 6000 |
| 20 | 1000 | 5760 | 1280 | 4500 | 1800 | 3200 |
| 25 | 1250 | 6000 | 1600 | 6000 | 2250 | 5120 |
| 32 | 1600 | 6000 | 2048 | 6000 | 2880 | 6000 |
| 40 | 2000 | 5760 | 2560 | 4500 | 3600 | 3200 |
| 50 | 2500 | 6000 | 3200 | 6000 | 4500 | 5120 |
| 64 | 3200 | 6000 | 4096 | 5625 | 5760 | 4000 |
| 80 | 4000 | 5760 | 5120 | 4500 | 7200 | 3200 |
| 100 | 5000 | 4608 | 6400 | 3600 | 9000 | 2560 |
| 125 | 6250 | 3686 | 8000 | 2880 | 11 250 | 2048 |
| 128 | 6400 | 3600 | 8192 | 2813 | 11 520 | 2000 |
| 200 | 10 000 | 2304 | 12 800 | 1800 | 18 000 | 1280 |
| 250 | 12 500 | 1843 | 16 000 | 1440 | 22 500 | 1024 |
| 256 | 12 800 | 1800 | 16 384 | 1406 | 23 040 | 1000 |
| 400 | 20 000 | 1152 | 25 600 | 900 | 36 000 | 640 |
| 500 | 25 000 | 922 | 32 000 | 720 | 45 000 | 512 |
| 512 | 25 600 | 900 | 32 768 | 703 | 46 080 | 500 |
| 1024 | 51 200 | 450 | 65 536 | 352 | 92 160 | 250 |
| 2048 | 102 400 | 225 | 131 072 | 176 | 184 320 | 125 |

)* Maximum revolution per minute mechanically 6.000 R.p.m.

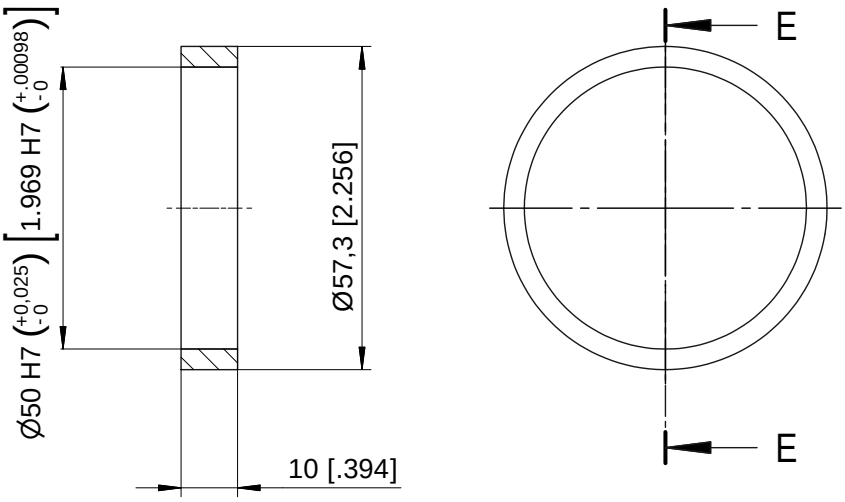
**Outline drawing**
**PMIR7-20-50**




**Outline drawing**
**PMIR7-20-64**




**Outline drawing**
**PMIR7-20-90**



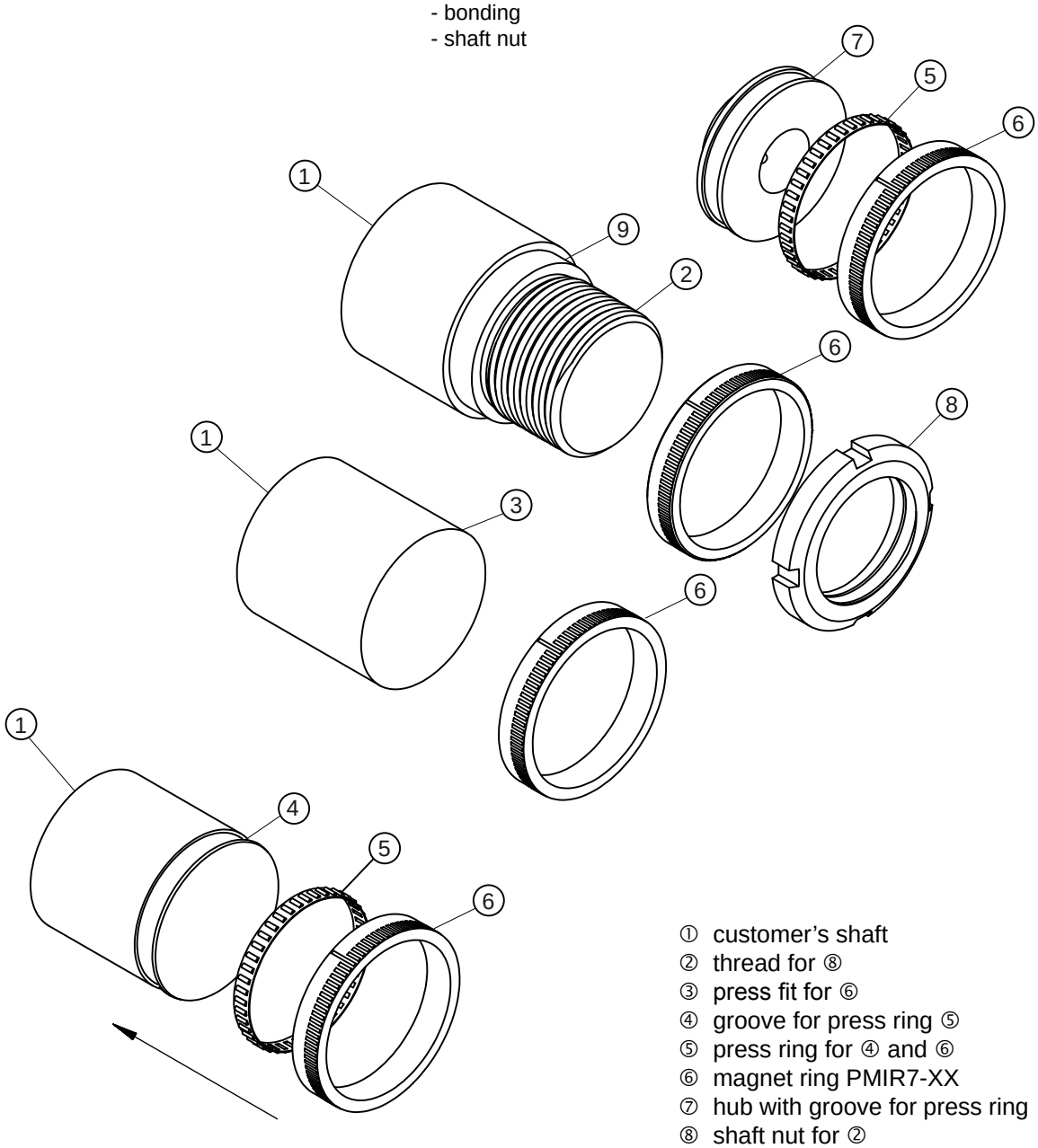

Dimensions in mm [inch]

Dimensions informative only.
For guaranteed dimensions consult factory.

**How to mount the PMIR7 magnet rings**

The PMIR7 magnet rings can be mounted in several ways on the customer's shaft resp. hub:

- press ring
- press fit
- bonding
- shaft nut




① customer's shaft
② thread for ⑧
③ press fit for ⑥
④ groove for press ring ⑤
⑤ press ring for ④ and ⑥
⑥ magnet ring PMIR7-XX
⑦ hub with groove for press ring
⑧ shaft nut for ②
⑨ force fit for ⑥