

NOVOTURN
Multi-turn Sensor
Non-contacting

MZ1-2200
Ratiometric
Industrial



Special Features

- Non-contacting, magnetic
- Long life
- Housing diameter only 22 mm
- Measuring range 15840° (44 turns)
- True-Power-On system: counts turns even when not powered. Patented non-volatile technology does not require gears or batteries
- Easy mounting via bushing mount
- Protection class IP50 and IP65, electronics encapsulated
- Resolution 16 bits
- Other configurations see separate data sheets

Applications

- Mechanical engineering
- Mobile machinery
- Driveline or steering systems
- Wire-actuated encoders
- Gate drives
- Motor sports

Multi-turn sensors that use the GMR technology (giant magneto resistance), provide absolute position values, do not require any reference signals and need no power supply or buffer battery for detecting the revolutions. The fact that rotations are detected even unpowered and the sensor does not lose its position information during a power failure, makes the MZ1-2200 with its diameter of only 22 mm an extremely compact real True-Power-On rotary sensor.

The sensor operates magnetically and thus contactless allowing an extremely long life.

The sensor is able to detect angular positions over up to 44 revolutions with a high resolution up to 16 bits.

Description

Material	Housing: high grade, temperature resistant plastic PPS
	Bushing: CuZn21Si3P
	Shaft: stainless steel, X8CrNiS18-9 1.4305
Mounting	Central mounting M10 x 0.75 with lock nut (included in delivery)
Fastening torque of mounting	max. 200 Ncm
Bearing	Slide bearing
Electrical connection	Cable 4x 0.5 mm ² (AWG 20), TPE, shielded / Connector M12x1, A-coded with cable L = 0.15 m

Mechanical Data

Dimensions	See dimension drawing
Mechanical travel	Continuous
Permitted shaft load static or dynamic	1 N (axial / radial)
Torque	Typ. ≤ 3 Ncm
	Depending on the environmental temperature and standstill time, the necessary force for the initial operating of the shaft may increase
Weight (w/o connection)	approx. 30 g

Ordering Specifications

Ordering Specifications

Preferred types printed in bold

- Delivery time up to 25 pcs. within 10 working days EXW
- Best low-volume pricing

Supply voltage U_b

2: $U_b = 5 \text{ VDC}$

Interface parameters

1: 5 ... 95% ratiometric to supply voltage U_b (0.25 ... 4.75 VDC)

2: 10 ... 90% ratiometric to supply voltage U_b (0.5 ... 4.5 VDC)

Output characteristic

1: Rising output characteristic cw

2: Rising output characteristic ccw

Other output characteristics on request

Electrical connection

202: Cable, 4-pole, shielded, $L = 1$ m

501: Connector M12x1, 4-pin, with cable, shielded, L = 0.15 m

Cable versions and assembled connectors on request

M Z 1 - 2 2 1 1 - 0 1 0 - 2 1 1 - 2 0 2

Series

Number of turns for output characteristic

001 ... 044: 1 up to 44 turns

Increment 1 turn, X turns correspond to a measuring angle of $X \cdot 360^\circ$

001, 003, 006, 010, 016, 025, 044: 1, 3, 6, 10, 16, 25, 44 turns

Other measuring angles on request

Mechanical version

2201: Bushing, M10 x 0.75 thread, 6 mm shaft, IP50

2211: Bushing, M10 x 0.75 thread, 6 mm shaft, IP65

2221: Bushing, M10 x 0.75 thread, 6 mm shaft, IP50, with index pin

2231: Bushing, M10 x 0.75 thread, 6 mm shaft, IP65, with index pin

Other shaft configurations on request

Accessories included in delivery

- Fastening material (toothed washer, lock nut)

Technical Data

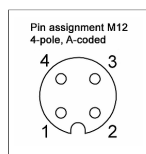
Type	MZ1- - - - -2- - - - Ratiometric
Output signal	ratiometric to supply voltage Ub 5 ... 95% (0.25 ... 4.75 V) 10 ... 90% (0.5 ... 4.5 V)
Load	≥ 10 kΩ (for cable break detection pull-down is recommended)
Diagnosis	activated (in case of error, output signal is outside of the plausible signal range)
Update rate	10 kHz
Measuring range	0 ... 360° up to 0 ... 15840° in 360°-steps (1 to 44 turns)
Linearity	1 turn: ≤ ±0.4 %FS 2 turns: ≤ ±0.26 %FS 3...6 turns: ≤ ±0.22 %FS 7...9 turns: ≤ ±0.16 %FS 10...13 turns: ≤ ±0.15 %FS 14...27 turns: ≤ ±0.14 %FS 28...44 turns: ≤ ±0.13 %FS
Resolution (related to Ub)	16 bits over the entire measuring range
Repeatability	≤ ±0.5°
Hysteresis	≤ ±0.5°
Temperature error	±0.25 %FS
Supply voltage Ub	5 VDC (4.5 ... 5.5 VDC)
Current consumption w/o load	≤ 60 mA
Overvoltage protection	max. 28 VDC (10 min.)
Polarity protection	yes (supply lines)
Short circuit protection	yes (output vs. GND and supply voltage)
Insulation resistance (500 VDC)	≥ 10 MΩ
Environmental Data	
Max. operational speed	500 rpm
Vibration IEC 60068-2-6	20 g, 5 ... 2000 Hz, Amax = 0.75 mm
Shock IEC 60068-2-27	50 g, 6 ms
Protection class DIN EN 60529	IP50 / IP65 resp. IP67 (housing side)
Operating temperature	-40 ... +85°C -25 ... +85°C (connector M12)
Insensitivity to magnetic DC fields	< 15 mT
Life	typ. > 10 Mio. movements
Functional safety	If you need assistance in using our products in safety-related systems, please contact us
MTTF (IEC 60050)	484 years
Traceability	Serial number on type labeling: production batch of the sensor assembly and relevant sensor components
Conformity/Approval	CE, UKCA see https://www.novotechnik.de/en/downloads/certificates/declarations-of-conformity-eu/uk WEEE see https://www.novotechnik.de/en/downloads/certificates/eu-directive-wEEE/
EMC Compatibility	
EN 61000-4-2 ESD (contact/air discharge)	4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields (RFI)	10 V/m
EN 61000-4-4 Fast transients (burst)	1 kV
EN 61000-4-6 Cond. disturbances (HF fields)	10 V eff.
EN 55016-2-3 Radiated disturbances	Industrial and residential area

Important:

While operation, care should be taken not to rotate the sensor shaft below 0° or above 15840°. Refer to users manual.
FS = Full scale: Signal span according to electrical measuring range

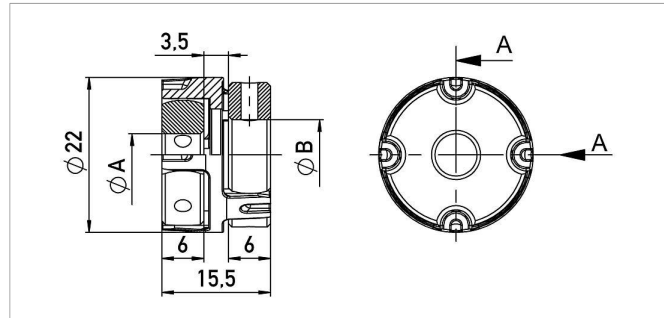
Connection Assignment

Connection Assignment		
Signal	Cable code 2_ _	Connector code 5_ _
Supply voltage Ub	GN	Pin 1
GND	BN	Pin 3
Signal output	WH	Pin 2
n.c. (Position Error Reset)	YE	Pin 4
Connect cable shielding to protection earth		



The graph shows the relationship between the signal and the upper error value over a range of 44 turns. The signal is represented by a line that starts at a minimum value (min) and increases linearly to a maximum value (max) over the measurement range. The upper error value is constant at max throughout the measurement range. The lower and upper overtravel ranges are indicated by horizontal arrows at the top of the graph. The measurement range is 44 turns, and the upper error value is U = turns.

Sensor Mounting



Z-106-G-__

Backlash-free, double cardanic shaft coupling
for Ø6 mm to Ø6 mm, Ø6.35 mm or Ø10 mm,
mounting via 2 threaded pins with internal
hexagon

Material	Aluminium, PEEK
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Operating temp. -40 ... +160°C

Transferable ≤ 1 Nm

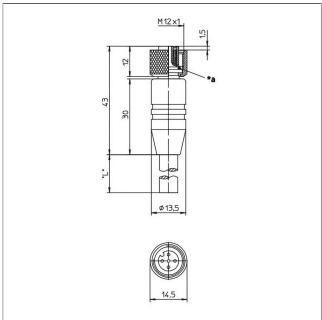
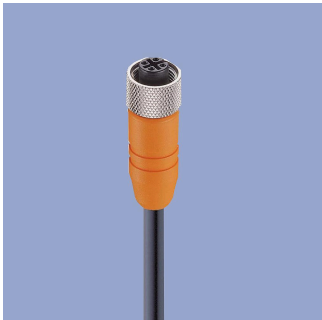
torque

Displacement rad. ≤ 0.1 mm, angl. $\leq 0.45^\circ$

P/N	Type	ØA / ØB [mm]
400103910	Z-106-G-6	6 / 6
400103912	Z-106-G-6,35	6 / 6.35
400103913	Z-106-G-10	6 / 10

Connector System

M12



3

4

2

1

1 = BN

2 = WH

3 = BU

4 = BK

IP67

UL

EEM-33-32/62/97

M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, shielded, IP67, open ended

Plug housing PA

Cable sheath PUR, Ø = max. 6 mm, -25 ... +80°C (moved) -50 ... +80°C (fixed)

Lead wires PP, 0.34 mm²

P/N	Type	Length
400005600	EEM-33-32	2 m
400005609	EEM-33-62	5 m
400005650	EEM-33-97	10 m

IP67

Protection class IP67 DIN EN 60529

IP68

Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibility (EMC) and shield systems

Very good resistance to oils, coolants and lubricants

Suited for applications in dragchains

UL

UL - approved

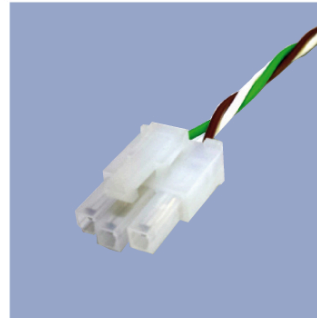
CAN-Bus

Connecting Options on request



M12 connector

- Customized lengths
- 3-, 4-, 6- and 8-pole versions
- Protection class IP68
- Ordering codes of standard versions see ordering specifications



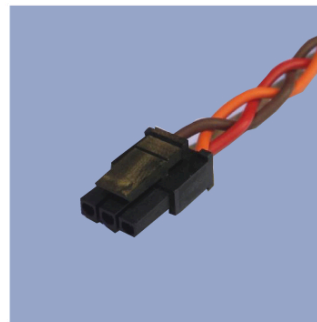
Molex Mini Fit jr.

- Customized length and lead wires
- 3-, 4- and 6-pole versions
- On request



Tyco AMP Super Seal

- Pin- and bushing housing
- Customized lengths
- 3-, 4- and 6-pole versions
- Protection class IP67
- On request



Molex Mini Fit jr.

- Customized length and lead wires
- 3-, 4- and 6-pole versions
- On request



Deutsch DTM 04

- Pin- and bushing housing
- Customized lengths
- 3-, 4- and 6-pole versions
- Protection class IP67
- On request



ITT Cannon Sure Seal connector

- Customized lengths
- 3-, 4- and 6-pole versions
- Protection class IP67
- On request

Novotechnik
Messwertaufnehmer OHG
P.O.Box 4220
73745 Ostfildern (Germany)
Horbstrasse 12
73760 Ostfildern (Germany)
Phone +49 711 4489-0
Fax +49 711 4489-118
info@novotechnik.de
www.novotechnik.de



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