novotechnik
Siedle Group

NOVOTURN
Multi-turn Sensor
Non-contacting

MC1-2800
CANopen
Mobile Applications

Special Features
- Non-contacting, magnetic
- Long life
- 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
- Available with push-on coupling or marked shaft
- Easy mounting
- Protection class IP54 up to IP67
- Resolution 16 bits per revolution
- Exceeds European E1 requirements
- 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 MC1-2800 with its diameter of only 30 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 per revolution.

Description	
Material	Housing: high grade, temperature resistant plastic PPS-GF Shaft: stainless steel, X8CrNiS18-9 1.4305
Mounting	With 2 screws M4 and washers
Fastening torque of mounting	140 ± 40 Ncm
Bearing	Sintered bronze bushing
Electrical connection	Cable 2x 2x 0.34 mm² (AWG 22), 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	20 N (axial / radial)
Torque	Typ. ≤ 3 Ncm Depending on the environmental temperature and standstill time, the necessary force for the inital operating of the shaft may increase
Weight (w/o connection)	approx. 50 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

Interface
6: CANopen

Interface parameters
1: 1x position, 1x speed

Baud rate
1: 1000 kBaud
2: 800 kBaud
3: 500 kBaud
4: 250 kBaud
5: 125 kBaud
7: 50 kBaud

Electrical connection
232: Cable, 4-pole, shielded, L = 1 m
236: Cable, 4-pole, shielded, L = 3 m
240: Cable, 4-pole, shielded, L = 5 m
511: Connector M12x1, 5-pin, with cable, shielded, L = 0.15 m
Cable versions and assembled connectors on request

M	C	1	–	2	8	3	2	–	A	7	F	–	6	1	4	–	2	3	2

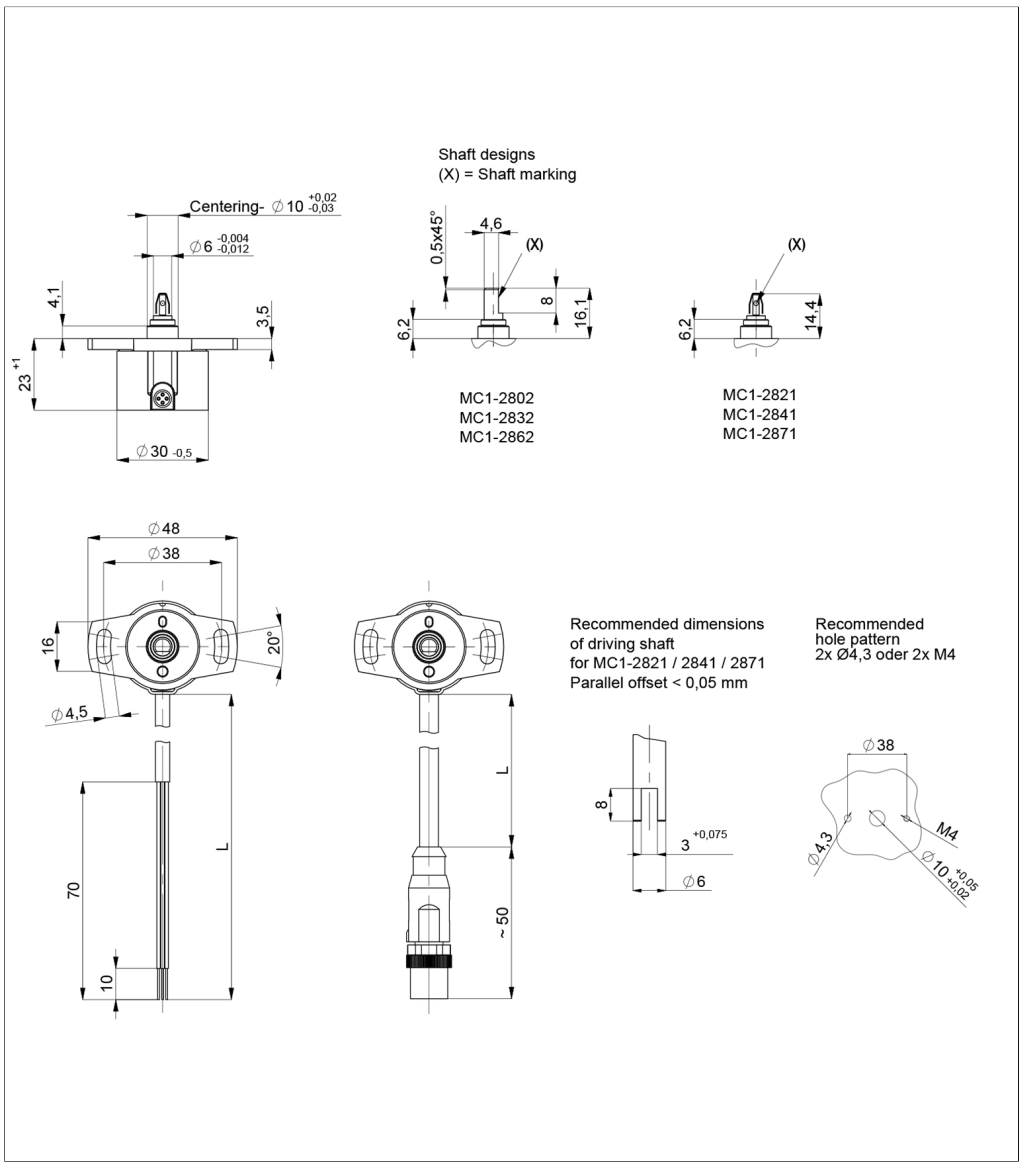
Parameterization
A7F: Start in Pre-Operational Mode, Event-Timer 0 ms, Node ID 127
Other parameterizations (e.g. Node ID) on request

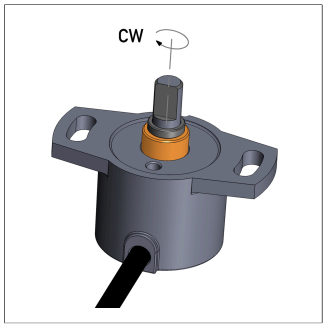
Mechanical version
2802: 6 mm shaft with flattening, IP54
2832: 6 mm shaft with flattening, IP65
2862: 6 mm shaft with flattening, IP67
2821: push-on coupling, IP54
2841: push-on coupling, IP65
2871: push-on coupling, IP67
Other shaft configurations on request

Series

Drawing

CAD data see
www.novotechnik.de/en/download/cad-data/





When the marking of the shaft is pointing towards the electrical outlet, the sensor output is located on an integer turn position.

Technical Data

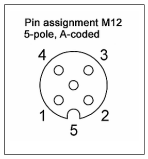
CANopen

Type	**MC1-28_ _-_ _ _-6_ _-_ _ _** **CANopen**
Measured variables	Position, speed, temperature and supply voltage
Measuring range	44 turns = 15840°
Measuring range speed	0 ... 546 rpm
Number of channels	1
Protocol	CANopen protocol to CiA DS-301 V4.2.0, Device profile DS-406 V4.1.0 Encoder Class C3, LSS services to CiA DS-305 V3.0.0
Programmable parameters	e.g. cams, working area, preset, rotating direction, node ID, baud rate, resolution
Condition monitoring functions	Statistical data on temperature, operating time, supply voltage, running performance
Start-up time	≤ 70 ms
Diagnosis	activated (in case of error, position signal is outside of the plausible signal range)
Node ID	1 ... 127 (default 127)
Transfer rate	50 ... 1000 kBaud
Update rate	1 kHz
Signal propagation delay	< 0.3 ms
Resolution position (across 360°)	16 bits
Resolution speed	0.1°/s
Linearity *	≤ ±1°
Repeatability *	≤ ±0.1°
Hysteresis *	≤ ±0.5°
Temperature error	±0.36°
Supply voltage Ub	12/24 VDC (8 ... 32 VDC)
Current consumption w/o load	≤ 60 mA
Overvoltage protection	45 VDC (permanent)
Polarity protection	yes (supply lines and outputs)
Short circuit protection	yes (all outputs vs. GND and supply voltage)
Insulation resistance (500 VDC)	≥ 10 MΩ
Bus termination internal	w/o (internal load resistance 120 Ω on request)
	*) For the MC1-2821/2841/2871 models with push-on coupling, the values may change (up to a factor of 2) due to the plastic deformation of the coupling spring.
Environmental Data	
Max. operational speed	800 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	IP54 / IP65 / IP67
Operating temperature	-40 ... +85°C -25 ... +85°C (connector M12)
Insensitivity to magnetic DC fields	< 15 mT
Life	> 50 Mio. movements (mechanically)
Functional safety	If you need assistance in using our products in safety-related systems, please contact us
MTTF (IEC 60050)	440 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	
ISO 13766-1 Construction machinery	
ISO 14982 Agricult./forestry machines	
Emission/Immunity E1	E1 compliant
EN 61000-4-2 ESD (contact/air discharge)	4 kV, 8 kV
EN 61000-4-3 Electromagnetic fields (RFI)	30 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

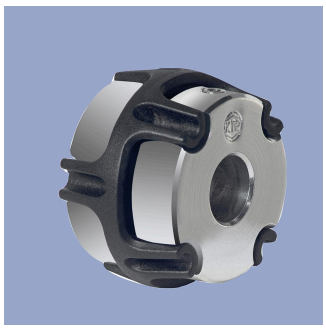
Important:
While operation, care should be taken not to rotate the sensor shaft below 0° or above 5760°. Refer to users manual.

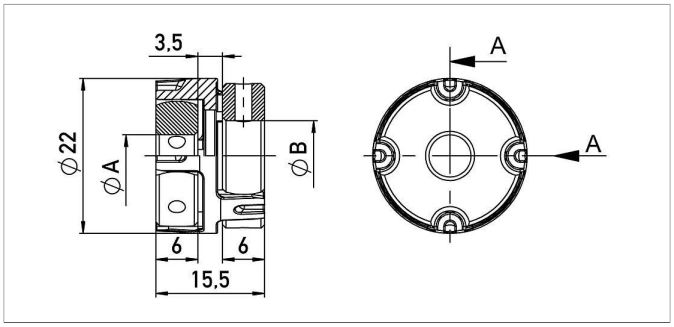
Connection Assignment

Signal	Cable code 2_ _	Connector code 5_ _
Supply voltage Ub	WH	Pin 2
GND	BN	Pin 3
CAN_H	YE	Pin 4
CAN_L	GN	Pin 5
CAN_SHLD	Shield	Pin 1
	Connect cable shielding to protection earth (Industrial/CE) or GND (mobile applications)	



Sensor Mounting



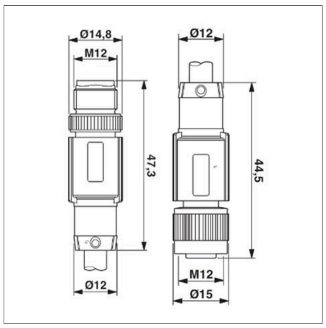


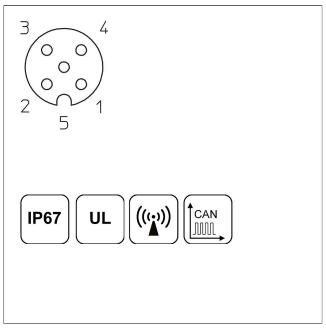
Z-106-G-_
Backlash-free, double cardanic shaft coupling for Ø6 mm to Ø6 mm, Ø6.35 mm or Ø10 mm, mounting via 2 threaded pins with internal hexagon

Material	Aluminium, PEEK
Operating temp.	-40 ... +160°C
Transferable torque	≤ 1 Nm
Displacement	rad. ≤ 0.1 mm, angl. ≤ 0.45°

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

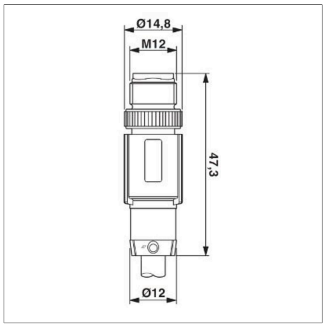


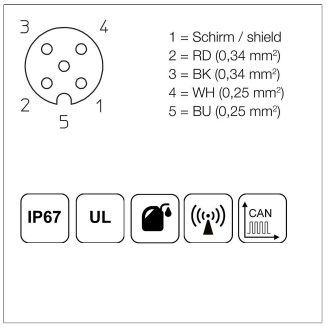


EEM-33-52
M12x1 Mating female/male connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), CAN-Bus

Plug housing	PUR
Cable sheath	PUR, Ø = 6.7 mm, -25 ... +90°C (plug/socket) -20 ... +80°C (cable)
Lead wires	PE, 2x0.25 mm²+2x0.34 mm²

P/N	Type	Length
400106373	EEM-33-52	5 m

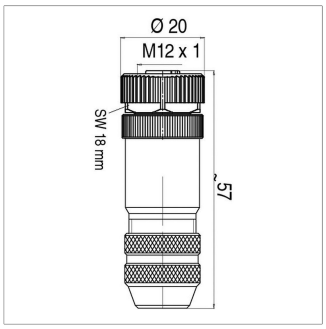


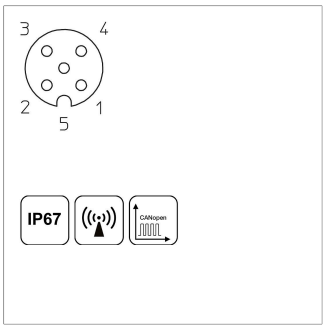


EEM-33-49/50/51
M12x1 Mating female connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), open ended

Plug housing	TPU
Cable sheath	PUR, Ø = 6.7 mm, -25 ... +90°C (socket) -20 ... +80°C (cable)
Lead wires	PE, 2x0.25 mm²+2x0.34 mm²

P/N	Type	Length
400106368	EEM-33-49	2 m
400106371	EEM-33-50	5 m
400106372	EEM-33-51	10 m

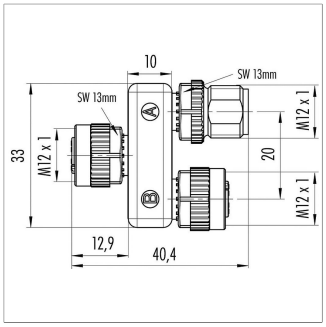


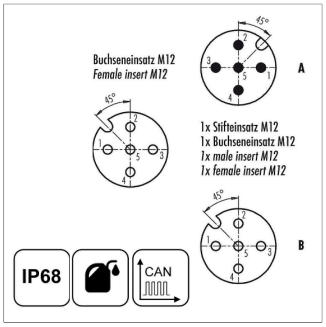


EEM-33-73
M12x1 Mating female connector, 5-pin, straight, A-coded, with coupling nut, screw termination, IP67, shieldable, CAN bus

Plug housing	Metal, -40 ... +85°C
For wire gauge	6 ... 8 mm, max. 0.75 mm²

P/N	Type
400005645	EEM-33-73



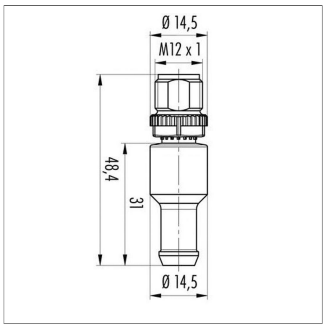


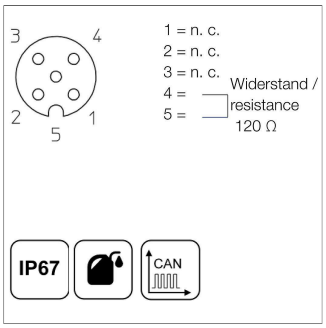
EEM-33-45
M12x1 splitter / T-connector, 5-pin, A-coded, IP68,1:1 connection, female - male - female, CAN-Bus

Plug housing	PUR, -25 ... +85°C

P/N	Type
400056145	EEM-33-45

Connector System M12





EEM-33-47

M12x1 terminating resistor, 5-pin, A-coded, IP67, 120 Ω resistance, CAN-Bus

Plug housing	PUR, -25 ... +85°C

P/N	Type
400056147	EEM-33-47

IP67 Protection class IP67 DIN EN 60529

IP68 Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibiliy (EMC) and shield systems

Very good resistance to oils, coolants and lubricants

Suited for applications in dragchains

UL UL - approved

CAN CAN-Bus

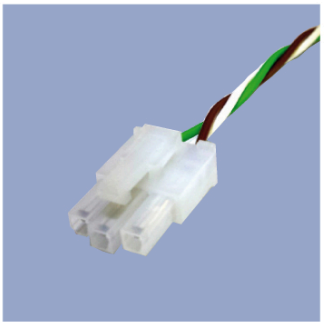
Connecting Options on request

M12 connector
- Customized lengths
- 3-, 4-, 6- and 8-pole versions
- Protection class IP68
- Ordering codes of standard versions see ordering specifications

Tyco AMP Super Seal
- Pin- and bushing housing
- Customized lengths
- 3-, 4- and 6-pole versions
- Protection class IP67
- 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



Molex Mini Fit jr.
- Customized length and lead wires
- 3-, 4- and 6-pole versions
- On request

Molex Mini Fit jr.
- Customized length and lead wires
- 3-, 4- and 6-pole versions
- On request

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