novotechnik
Siedle Group

NOVOTURN
Multi-turn Sensor
Non-contacting

MB1-3600
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
- Solid shaft or hollow shaft
- Resolution 16 bits per revolution
- Protection class IP67, IP69K
- 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

Non-contacting Rotary Sensor in very robust design including a double bearing system in a compact OD 36 mm full metal housing. The magnetic True-Power-On Multi-Turn utilizes the GMR technology (Giant Magneto Resistance) for measurements of 44 revolutions. The heavy-duty version in IP69K ingression protection version is well suited for extreme environment applications including high bearing loads. The semi-hollow shaft version with its integrated stator coupling obsoletes a costly separate shaft coupling.

Description

Type	Ø6 mm shaft MB1-3601-_ _ _-_ _ _-_ _ _	Ø10 mm shaft Heavy Duty MB1-3624-_ _ _-_ _ _-_ _ _	Ø6 mm hollow shaft MB1-3607-_ _ _-_ _ _-_ _ _
Material	Flange: aluminium AlSiMgBi, anodized Cover: Stahl, verzinkt, ST 12 1.0330 Shaft: SS X10CrNiS18-9 1.4305		Flange: aluminium AlSiMgBi, anodized Cover: steel, galvanized ST 12 1.0330 Shaft: SS X10CrNiS18-9 1.4305 Coupling: SS X10CrNiS18-8 1.4310
Mounting	With 3 mounting clamps Z1-15 (included in delivery) or via frontal thread 4 x M3		Stator coupling
Bearing	Ball bearings		
Electrical connection	Connector M12x1, A-coded		

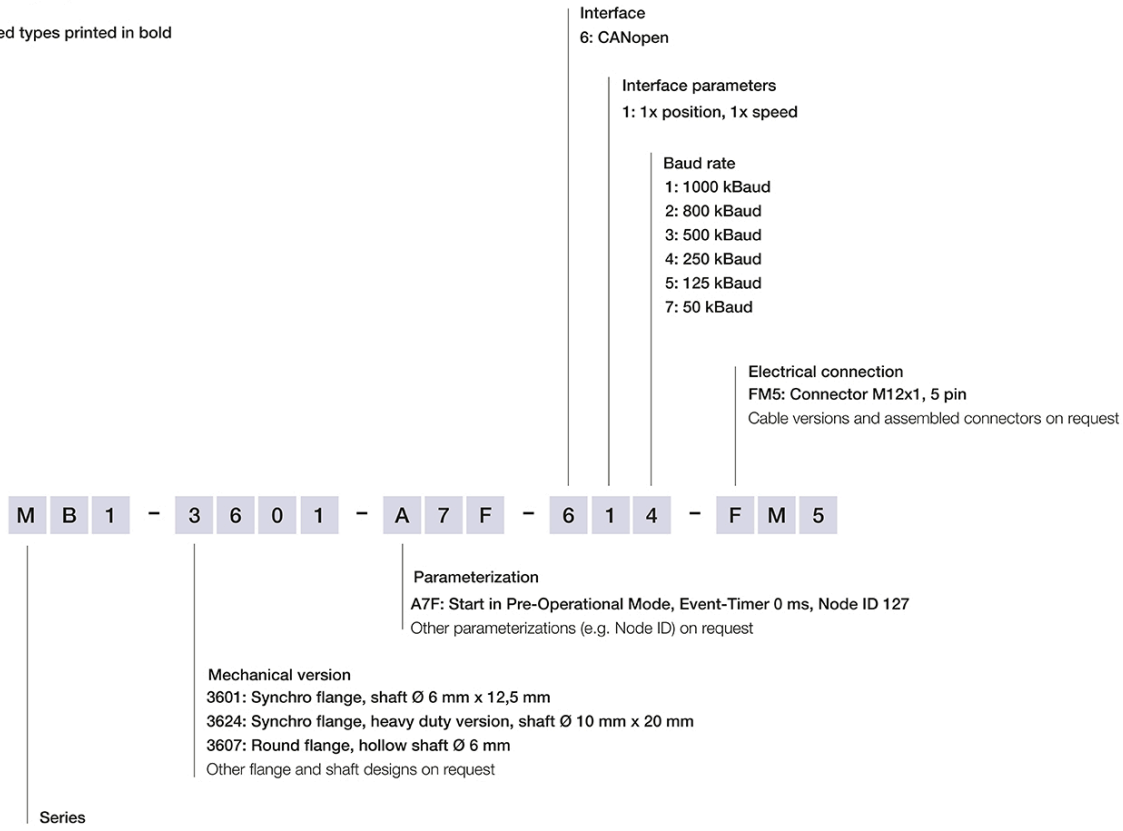
Mechanical Data

Type	**Ø6 mm shaft** **MB1-3601-_ _ _-_ _ _-_ _ _**	**Ø10 mm shaft Heavy Duty** **MB1-3624-_ _ _-_ _ _-_ _ _**	**Ø6 mm hollow shaft** **MB1-3607-_ _ _-_ _ _-_ _ _**
Dimensions	See dimension drawing		
Mechanical travel	Continuous		
Weight (w/o connection)	approx. 100 g		
Torque*	Typ. 0.3 Ncm	Typ. 3 Ncm	Typ. 0.5 Ncm
Permitted shaft load static or dynamic	40 N (axial) / 50 N (radial)	100 N (axial / radial)	40 N (axial) / 50 N (radial)
	*) Depending on the environmental temperature and standstill time, the necessary force for the inital operating of the shaft may increase.		

Ordering Specifications

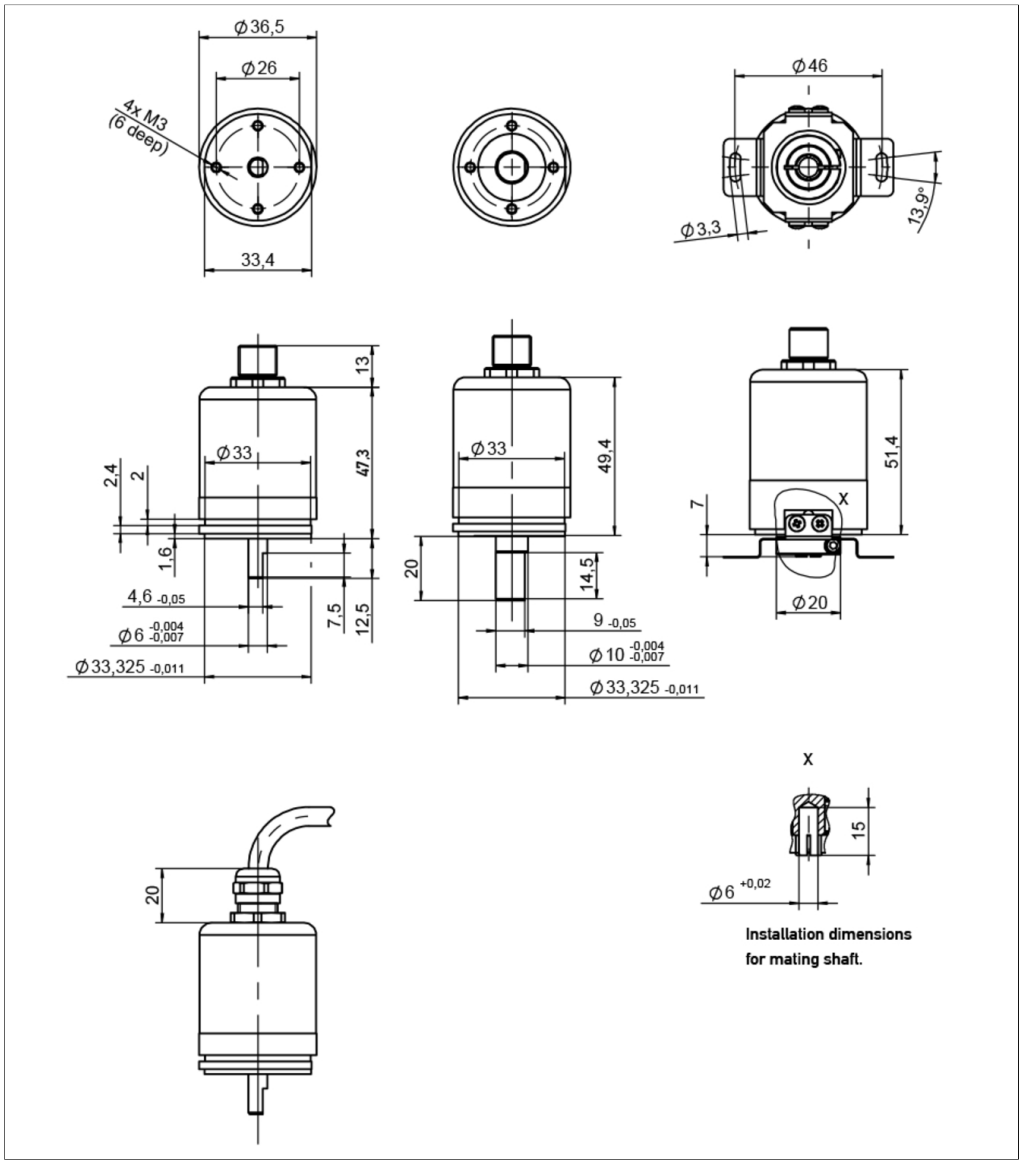
Ordering Specifications

Preferred types printed in bold



Accessories included in delivery
3x fixing clamp Z1-15

Drawing



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

When the marking of the shaft is pointing towards the flattening on the housing flange, the sensor output is located on an integer turn position.

Technical Data

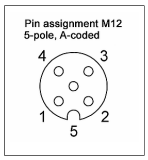
CANopen

Type	**MB1-36_ _-_ _ _-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		
Diagnosis	activated (in case of error, position signal is outside of the plausible signal range)		
Node ID	1 ... 127 (default 127)		
Baud 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)		
Environmental Data			
Type	Ø6 mm shaft MB1-3601-_ _ _-_ _ _-_ _ _	Ø10 mm shaft Heavy Duty MB1-3624-_ _ _-_ _ _-_ _ _	Ø6 mm hollow shaft MB1-3607-_ _ _-_ _ _-_ _ _
Max. operational speed	12,000 rpm	6,000 rpm	12,000 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 ISO 20653	IP65 (shaft side) IP67 (housing incl. electronics)	IP67 (shaft side) IP69K (housing incl. electronics)	IP65 (shaft side) IP67 (housing incl. electronics)
Operating temperature	-30 ... +85°C		
Insensitivity to magnetic DC fields	< 15 mT		
Bearing lifetime	typ. > 100 Mio. movements		
Functional safety	If you need assistance in using our products in safety-related systems, please contact us		
MTTF (IEC 60050)	441 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		

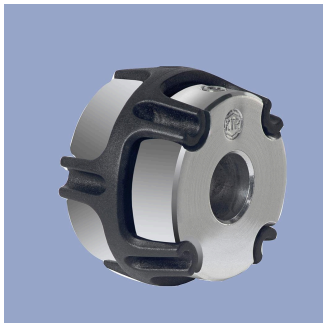
Important:
While operation, care should be taken not to rotate the sensor shaft below 0° or above 5760°. Refer to install guide.

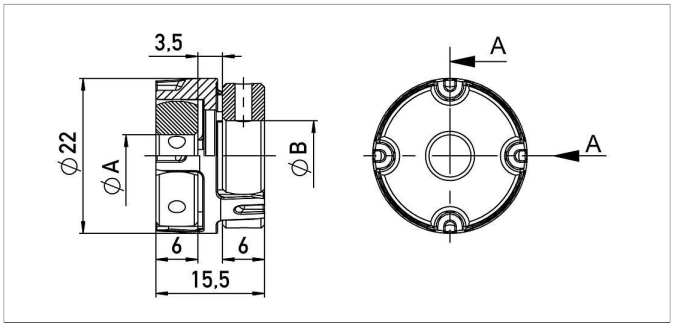
Connection Assignment

Signal	Connector
Supply voltage Ub	Pin 2
GND	Pin 3
CAN_H	Pin 4
CAN_L	Pin 5
CAN_SHLD	Pin 1
	Connect cable shielding to protection earth (Industrial/CE) or GND (mobile applications)



Sensor Mounting



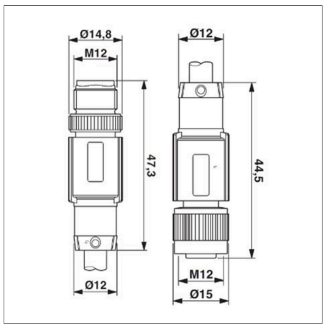


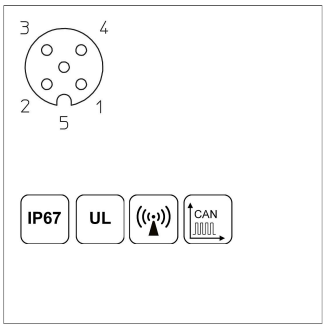
Z-106-G-_
Backlash-free, double cardanic shaft coupling for Ø6 mm to Ø6 mm, Ø6.35 mm or Ø10 mm, mounting via 2 threaded pins with internal hexagon

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

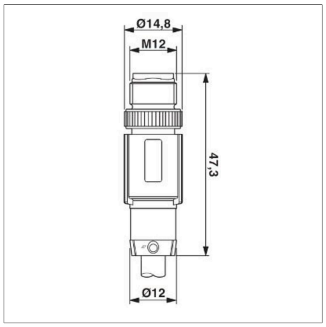


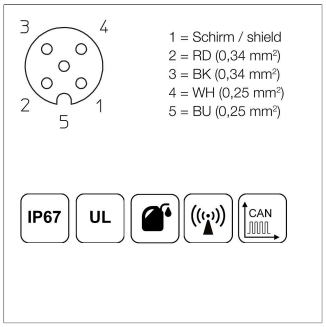


EEM-33-52
M12x1 Mating female/male connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), CAN-Bus

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

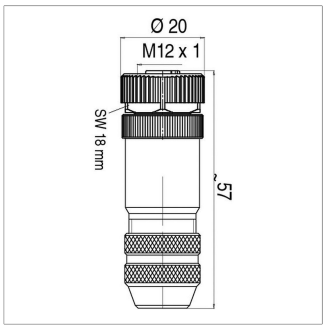


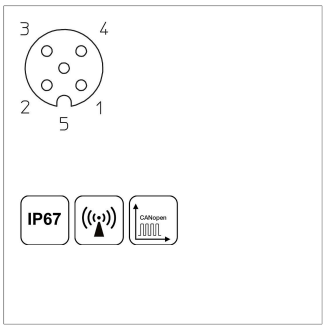


EEM-33-49/50/51
M12x1 Mating female connector, 5-pin, straight, A-coded, with molded cable, IP67, shielded (shield on knurl), open ended

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

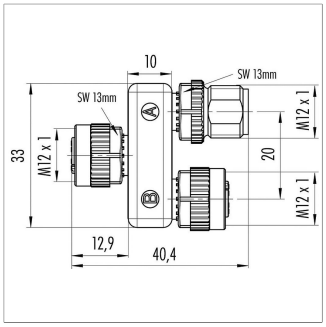


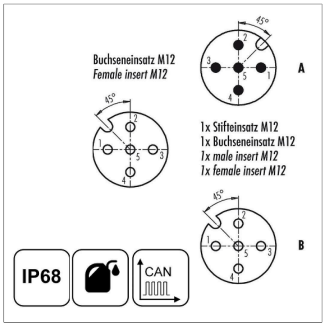


EEM-33-73
M12x1 Mating female connector, 5-pin, straight, A-coded, with coupling nut, screw termination, IP67, shieldable, CAN bus

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

P/N	Type
400005645	EEM-33-73



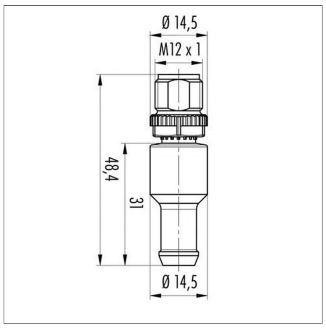


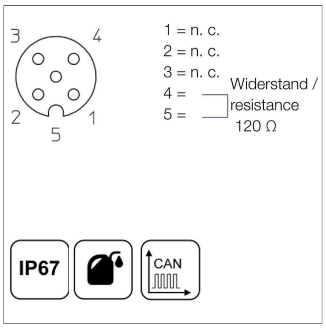
EEM-33-45
M12x1 splitter / T-connector, 5-pin, A-coded, IP68,1:1 connection, female - male - female, CAN-Bus

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

novotechnik
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