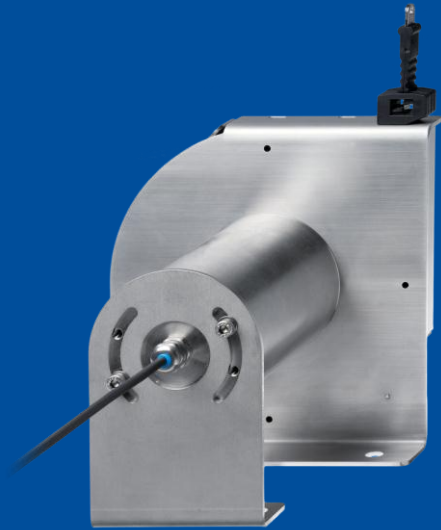


 **WB100M**

Displacement sensor with measurement length up to 10,000 mm for underwater applications



- Protection class up to IP68/IP69
- Robust stainless steel measurement tape
- Magnetic absolute encoder
- With magnetic absolute encoder
- Redundant version available

Product versions



Analog output



Analog output, programmable



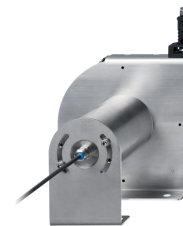
Analog output, redundant



Digital output SSI



Digital output CANopen, SAE J1939



WB100M - Tape Extension Position Sensor
Version with analog output

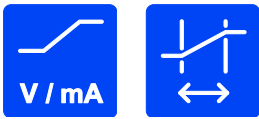
Specifications

		Order options	
Measurement range	2000 / 3500 / 7500 / 10000 mm	1	2000 / 3500 / 7500 / 10000
Resolution	<0.05 mm		
Output	Voltage 0.5 ... 10 V Voltage 0.5 ... 4.5 V Current 4 ... 20 mA, 3 wire	2	U2 U8 I1
Signal characteristics	Increasing (eg. 4 ... 20 mA) Decreasing (eg. 20 ... 4 mA)	3	A D
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4	L10 L05
Sensing device	Magnetic absolute encoder		
Material	Stainless steel, TPU Tape: stainless steel, 10 mm wide, 0,08 mm thick		
Protection class	IP68/IP69		
Connection	Cable output, standard length 2 m	5	KAB2M
Dust wiper		6	BAB1
Shock	DIN EN 60068-2-27:1993, 100 g/11 ms, 100 shocks		
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles		
Temperature range	-20 ... +85°C		
Weight	max. 12 kg		
EMC	DIN EN 61326-1:2013		

Order code

WB100M – **1** – **2** – **3** – **4** – **5** – **6**

Order example: WB100M – 10000 – U2 – A – L10 – KAB2M – BAB1



WB100M - Tape Extension Position Sensor
Version with analog output, programmable

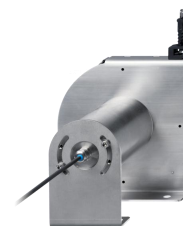
Specifications

		Order options
Measurement range	2000 / 3500 / 7500 / 10000 mm	1 2000 / 3500 / 7500 / 10000
Resolution	<0.05 mm	
Output	Voltage 0.5 ... 10 V, programmable Voltage 0.5 ... 4.5 V, programmable Current 4 ... 20 mA, 3 wire, programmable	2 U2/PMU U8/PMU I1/PMU
Signal characteristics	Increasing (eg. 4 ... 20 mA) Decreasing (eg. 20 ... 4 mA)	3 A D
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4 L10 L05
Sensing device	Magnetic absolute encoder	
Material	Stainless steel, TPU Tape: stainless steel, 10 mm wide, 0,08 mm thick	
Protection class	IP68/IP69	
Connection	Cable output, standard length 2 m	5 KAB2M
Dust wiper		6 BAB1
Shock	DIN EN 60068-2-27:1993, 100 g/11 ms, 100 shocks	
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles	
Temperature range	-20 ... +85°C	
Weight	max. 12 kg	
EMC	DIN EN 61326-1:2013	

Order code

WB100M	-	1	-	2	-	3	-	4	-	5	-	6
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Order example: WB100M – 10000 – U2/PMU – A – L10 – KAB2M – BAB1



WB100M - Tape Extension Position Sensor
Version with analog output, redundant

Specifications

		Order options
Measurement range	2000 / 3500 / 7500 / 10000 mm	1 2000 / 3500 / 7500 / 10000
Resolution	<0.05 mm	
Output	Voltage 0.5 ... 10 V, redundant Voltage 0.5 ... 4.5 V, redundant Current 4 ... 20 mA, 3 wire, redundant	2 U2R U8R I1R
Signal characteristics	Output 1 increasing, output 2 increasing Output 1 increasing, output 2 decreasing Output 1 decreasing, output 2 decreasing	3 A/A A/D D/D
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4 L10 L05
Sensing device	Magnetic absolute encoder	
Material	Stainless steel, TPU Tape: stainless steel, 10 mm wide, 0,08 mm thick	
Protection class	IP68/IP69	
Connection	Cable output, standard length 2 m	5 KAB2M
Dust wiper		6 BAB1
Shock	DIN EN 60068-2-27:1993, 100 g/11 ms, 100 shocks	
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles	
Temperature range	-20 ... +85°C	
Weight	max. 12 kg	
EMC	DIN EN 61326-1:2013	

Order code

WB100M	-	1	-	2	-	3	-	4	-	5	-	6
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Order example: WB100M – 10000 – I1R – A/D – L10 – KAB2M – BAB1



WB100M - Tape Extension Position Sensor
Version with digital output SSI

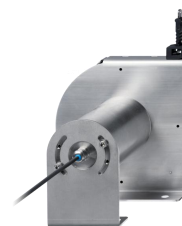
Specifications

			Order options
Measurement range	2000 / 3500 / 7500 / 10000 mm	1	2000 / 3500 / 7500 / 10000
Resolution	50 µm (other resolutions on demand)	2	50
Output	Digital output SSI	3	MSSI
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4	L10 L05
Sensing device	Magnetic absolute encoder		
Material	Stainless steel, TPU Tape: stainless steel, 10 mm wide, 0,08 mm thick		
Protection class	IP68/IP69		
Connection	Cable output, standard length 2 m	5	KAB2M
Dust wiper		6	BAB1
Shock	DIN EN 60068-2-27:1993, 100 g/11 ms, 100 shocks		
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles		
Temperature range	-20 ... +85°C		
Weight	max. 12 kg		
EMC	DIN EN 61326-1:2013		

Order code

WB100M	-	1	-	2	-	3	-	4	-	5	-	6
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Order example: WB100M – 10000 – 50 – MSSI – L10 – KAB2M – BAB1



WB100M - Tape Extension Position Sensor
Version with digital output CANopen, SAE J1939

Specifications

		Order options
Measurement range	2000 / 3500 / 7500 / 10000 mm	1 2000 / 3500 / 7500 / 10000
Resolution	Setting via CAN Bus	
Output	CANopen SAE J1939	2 MCANOP MCANJ1939
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	3 L10 L05
Sensing device	Magnetic absolute encoder	
Material	Stainless steel, TPU Tape: stainless steel, 10 mm wide, 0,08 mm thick	
Protection class	IP68/IP69	
Connection	Cable output, standard length 2 m	4 KAB2M
Dust wiper		5 BAB1
Shock	DIN EN 60068-2-27:1993, 100 g/11 ms, 100 shocks	
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles	
Temperature range	-20 ... +85°C	
Weight	max. 12 kg	
EMC	DIN EN 61326-1:2013	

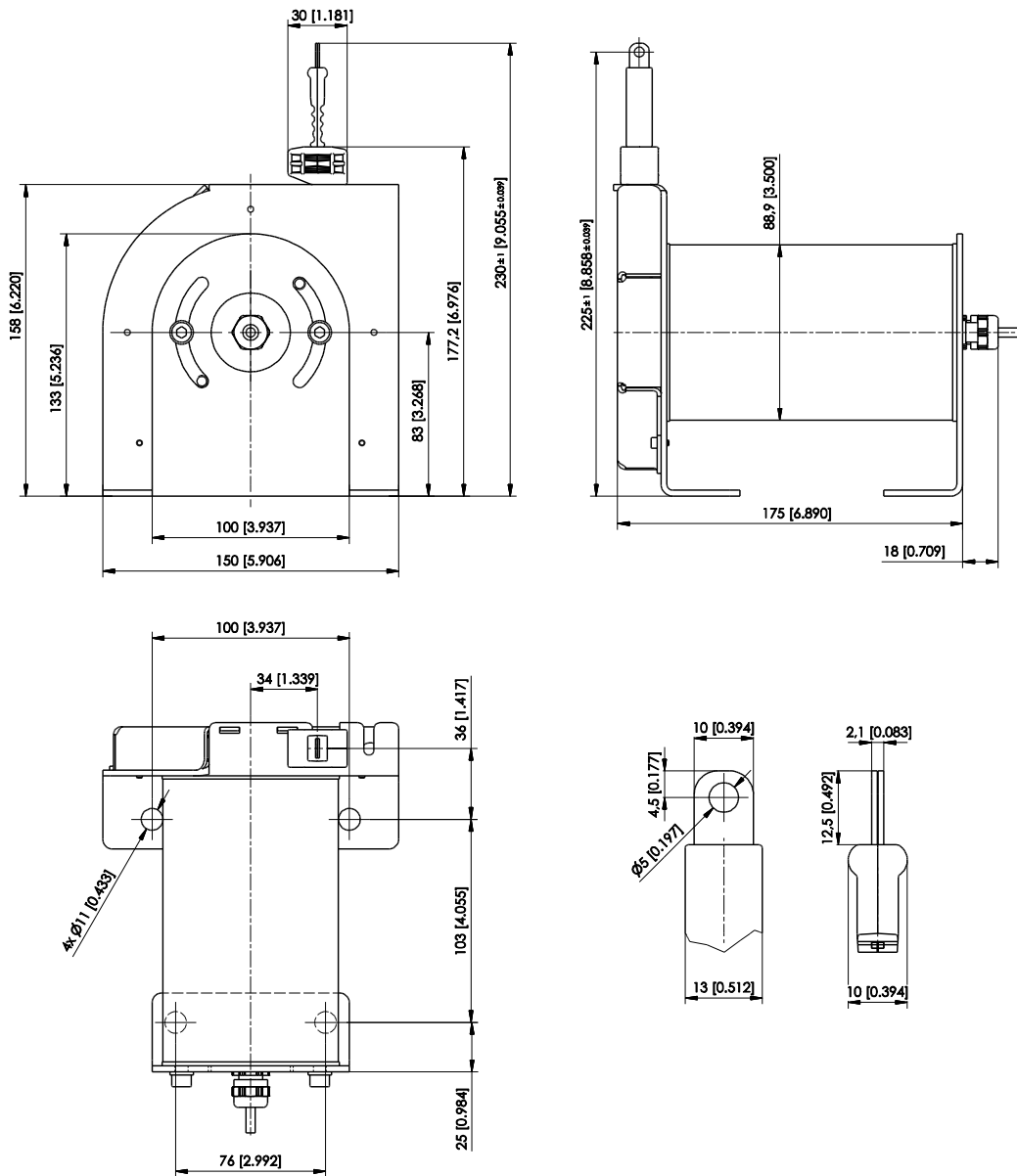
Order code

WB100M – **1** – **2** – **3** – **4** – **5**

Order example: WB100M – 10000 – MCANJ1939 – L10 – KAB2M – BAB1

Dimensions

WB100M-2000

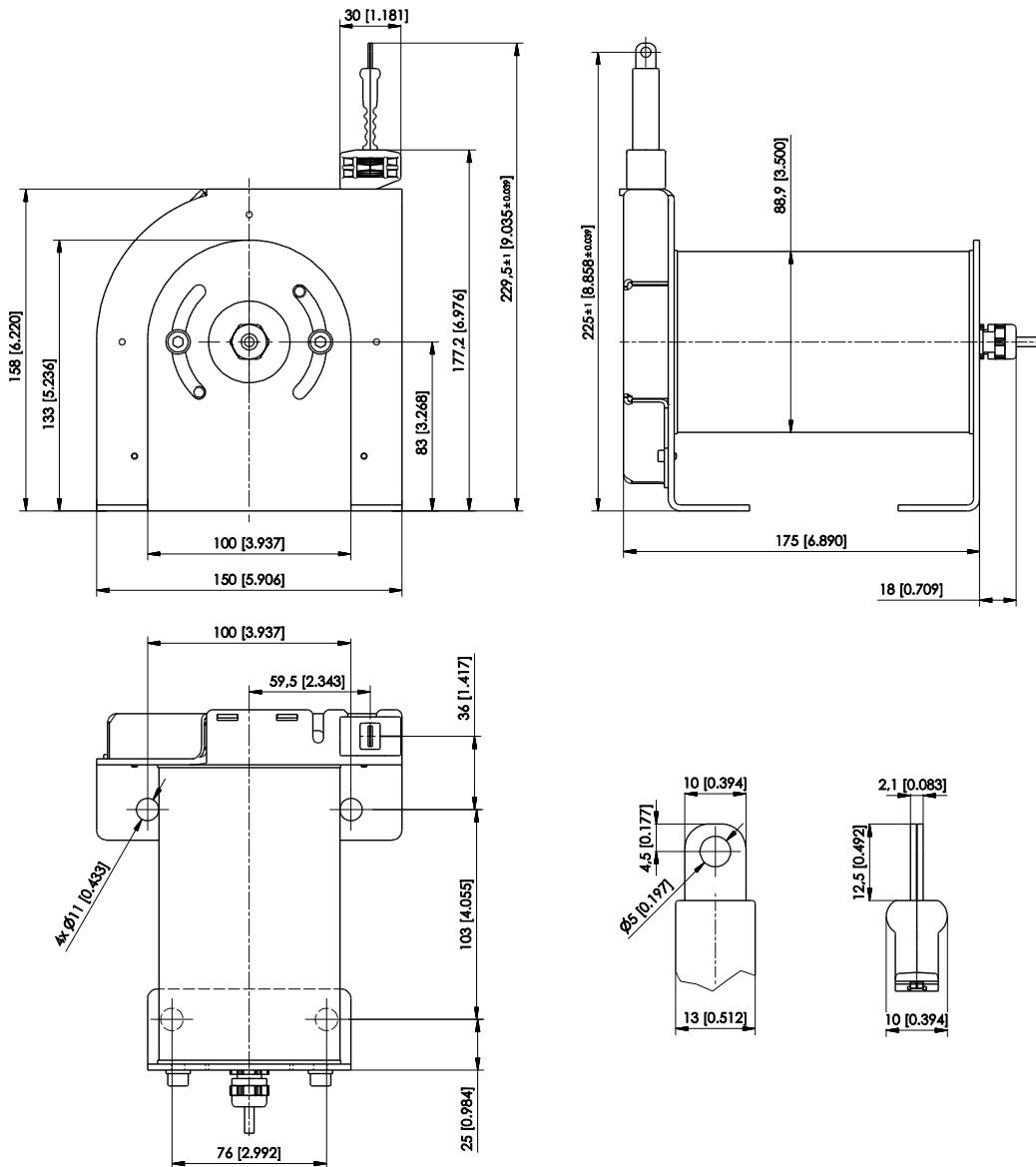


Dimensions in mm [inch]

Dimensions informative only.

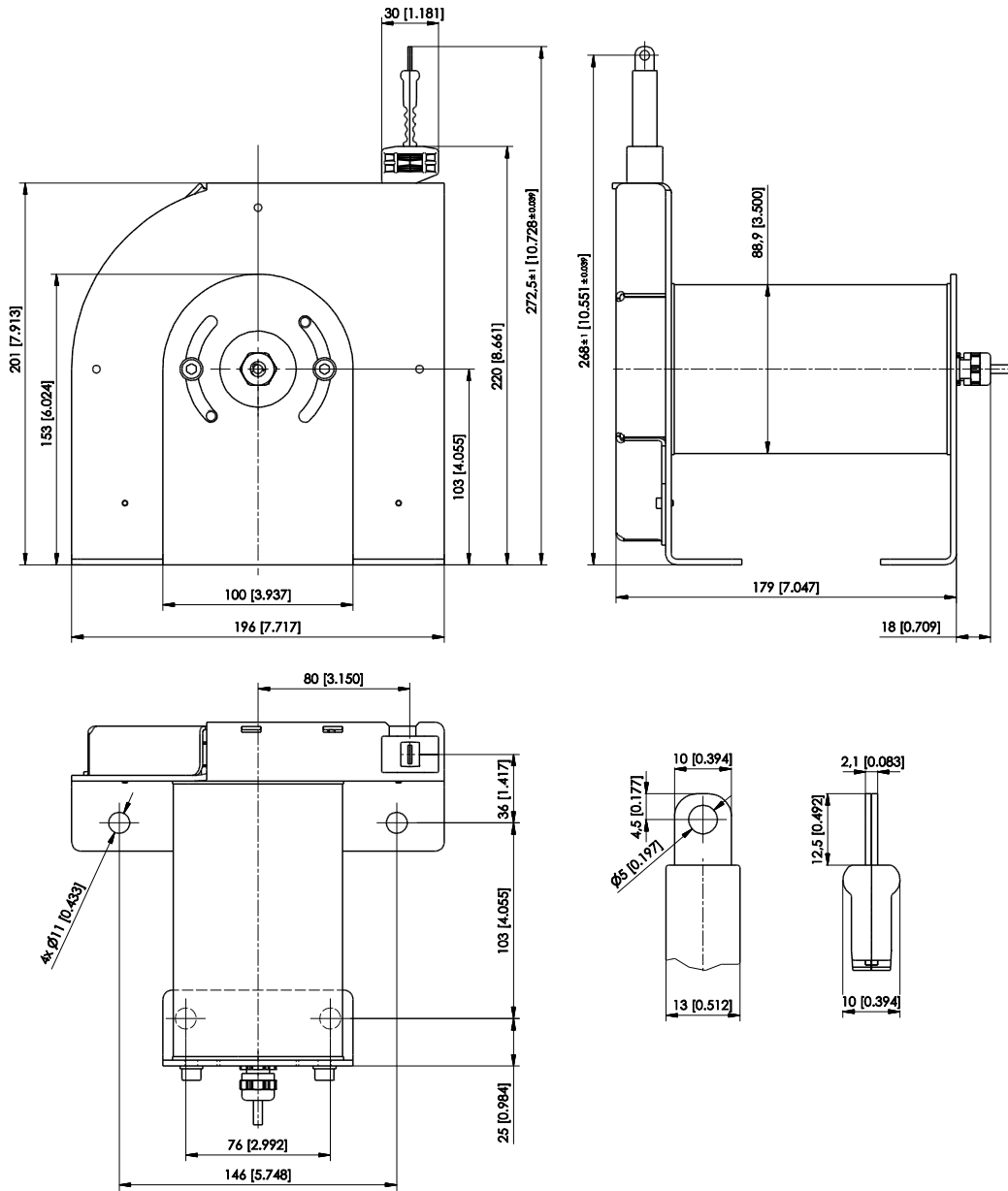
For guaranteed dimensions consult factory.

WB100M-3500



Dimensions in mm [inch].
Dimensions informative only.
For guaranteed dimensions consult factory.

WB100M-7500

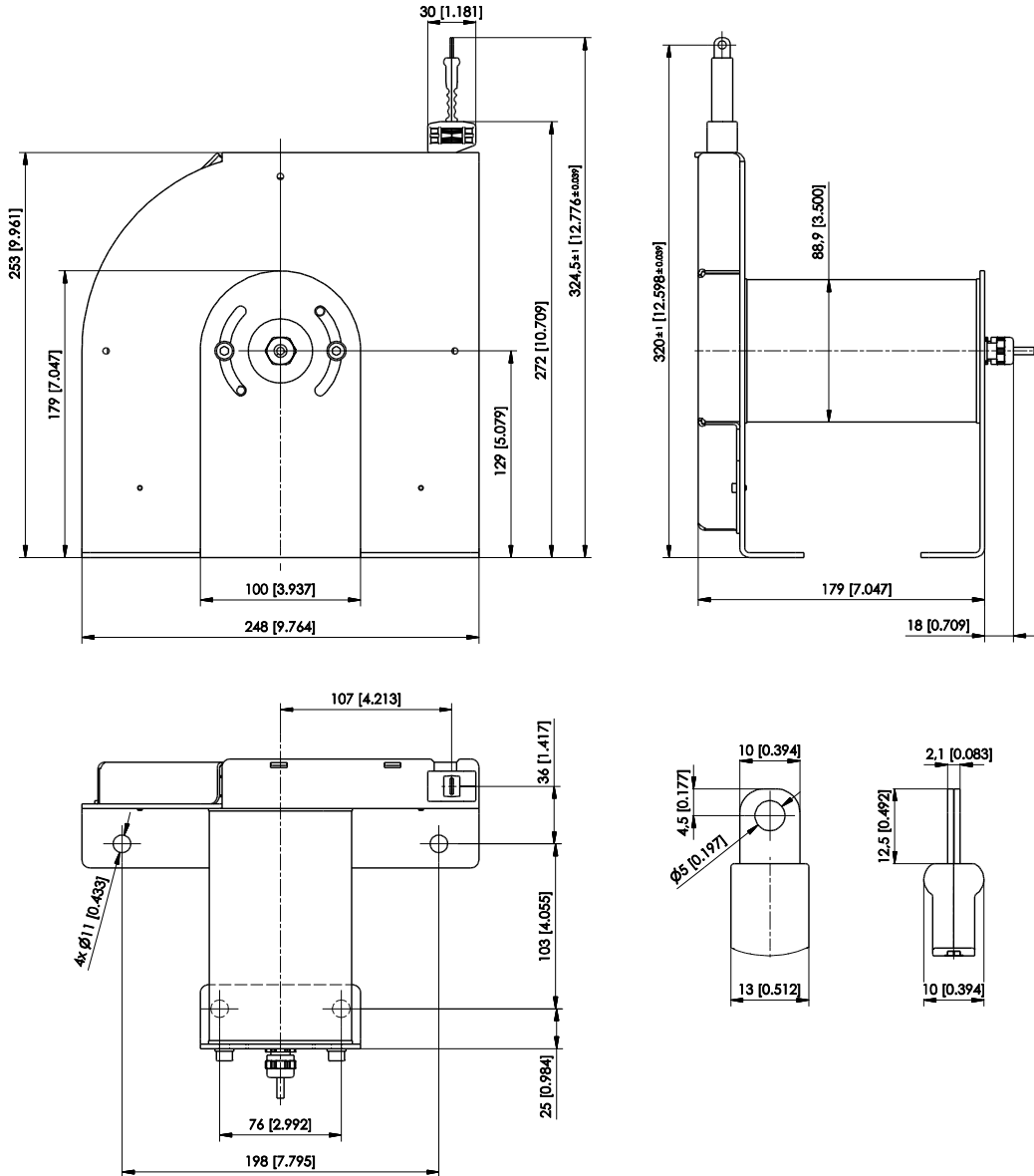


Dimensions in mm [inch]

Dimensions informative only.

For guaranteed dimensions consult factory.

WB100M-10000




Dimensions in mm [inch].


Dimensions informative only.


For guaranteed dimensions consult factory.

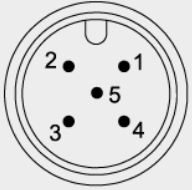
Output specification

Analog output


U2 Voltage output 0.5 ... 10 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 38 mA typical at 12 V DC max. 50 mA
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013


U8 Voltage output 0.5 ... 4.5 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	17 mA typical at 24 V DC 32 mA typical at 12 V DC 50 mA max.
	Output voltage	0.5 ... 4.5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013


I1 Current output 4 ... 20 mA, 3 wires 	Excitation voltage	8 ... 36 V DC
	Excitation current	typical 36 mA at 24 V DC typical 70 mA at 12 V DC 120 mA max.
	Load R _L	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 5 pin  View to the sensor connector	Excitation +	1	brown
	Signal	2	white
	GND	3	blue
	Do not connect!	4	black
	Do not connect!	5	(grey)

Analog output, programmable

U2/PMU Voltage output 0.5 ... 10 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 38 mA typical at 12 V DC max. 50 mA
	Output voltage	0,5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	EN 61326-1:2013

U8/PMU Voltage output 0.5 ... 4.5 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	17 mA typical at 24 V DC 32 mA typical at 12 V DC max. 50 mA
	Output voltage	0.5 ... 4.5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stabilität (Temperatur)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

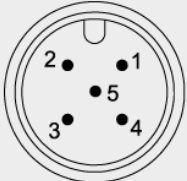
I1/PMU Current output 4 ... 20 mA, 3 wires 	Excitation voltage	8 ... 36 V DC
	Excitation current	typical 36 mA at 24 V DC typical 70 mA at 12 V DC max. 120 mA
	Load R _L	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

Output .../PMU


Programming of the start and end value by the customer (programmable)


Teach-In of start and end value for the analog outputs U2/PMU, U8/PMU, I1/PMU is provided by a binary signal SPAN/ZERO. At the start position connect signal SPAN/ZERO for a period of 2 ... 3 seconds to GND via push button. At the end position connect signal SPAN/ZERO for a period of 5 ... 6 seconds to GND via a push button. The scaling range will be stored non-volatile.


To reset the sensor to factory default ZERO/END must be connected to ground while powering up the sensor for 2 ... 3 seconds.

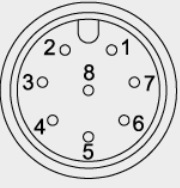
Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 5 pin  View to the sensor connector	Excitation +	1	brown
	Signal	2	white
	GND	3	blue
	Do not connect!	4	black
	SPAN/ZERO	5	grey

Analog output, redundant


U2R Voltage output 0.5 ... 10 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 38 mA typical at 12 V DC max. 50 mA per channel
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

U8R Voltage output 0.5 ... 4.5 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	17 mA typical at 24 V DC 32 mA typical at 12 V DC max. 50 mA per channel
	Output voltage	0.5 ... 4.5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

I1R Current output 4 ... 20 mA, 3 wires 	Excitation voltage	8 ... 36 V DC
	Excitation current	36 mA typical at 24 V DC 76 mA typical at 12 V DC max. 120 mA per channel
	Load R _L	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

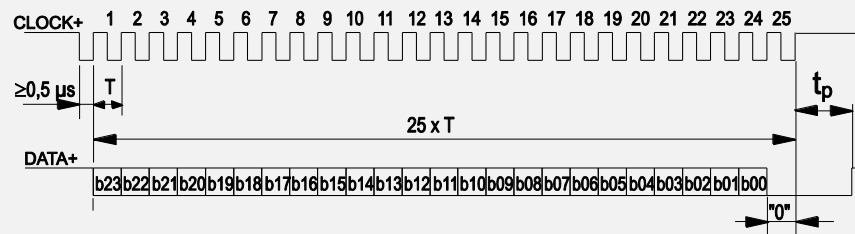
Signal wiring	Channel	Output signals	Connector pin no.	Cable color
Connector M12, 8 pin  View to the sensor connector	1	Excitation +	1	white
		Signal	2	brown
		GND	3	green
		Do not connect!	4	yellow
	2	Excitation +	5	grey
		Signal	6	pink
		GND	7	blue
		Do not connect!	8	red

Digital output

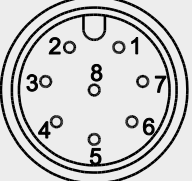
MSSI Synchronous serial SSI 	Interface	EIA RS-422
	Excitation voltage	8 ... 36 V DC
	Excitation current	19 mA typical at 24 V DC 35 mA typical at 12 V DC max. 80 mA
	Clock frequency	100 kHz ... 500 kHz
	Code	Gray-Code, continuous progression
	Delay between pulse trains (t_p)	30 μ s min.
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Operating temperature	See specification of the respective sensor
	Protection	Reverse polarity, short circuit
	EMC	DIN EN 61326-1:2013


Data format

(Train of 26 pulses)

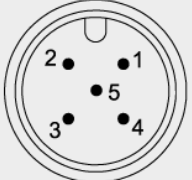



Transmission rate	Cable length	Baud rate	Note:
	50 m	100-400 kHz	Extension of the cable length will reduce the maximum transmission rate.
	100 m	100-300 kHz	

Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 8 pin  View to the sensor connector	Excitation +	1	white
	Excitation GND	2	brown
	CLOCK	3	green
	$\overline{\text{CLOCK}}$	4	yellow
	DATA	5	grey
	$\overline{\text{DATA}}$	6	pink
	-	7	blue
	-	8	red

MCANOP, CANOPR CANopen 	CAN specification	ISO 11898, Basic and Full CAN 2.0 B
	Communication profile	CANopen CiA 301 V 4.02, Slave
	Encoder profile	Encoder CiA 406 V 3.2
	Error Control	Node Guarding, Heartbeat, Emergency Message
	Node ID	Adjustable via LSS or SDO, default: 127
	PDO	3 TxPDO, 0 RxPDO, no linking, static mapping
	PDO Modes	Event-/Time triggered, Remote-request, Sync cyclic/acyclic
	SDO	1 Server, 0 Client
	CAM	8 cams
	Certified	Yes
	Transmission rate	50 kBit bis 1 Mbit, adjustable via LSS or SDO, default: 125 kBit
	Bus connection	M12 connector, 5 pin
	Integrated bus terminating resistor	120Ω adjustable by the customer
	Bus, galvanic isolated	no

Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 40 mA typical at 12 V DC 80 mA max.
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10 ⁻⁶ /°C f.s. (typical)
	Repeatability	1 LSB
	Operating temperature	See specification of the respective sensor
	Protection	Reverse polarity, short circuit
	Dielectric strength	1 kV (V AC, 50 Hz, 1 min.)
	EMC	EN 61326-1:2013

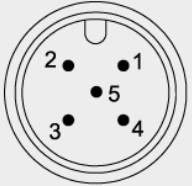
Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 5 pin  <p>View to the sensor connector</p>	Shield	1	brown
	Excitation +	2	white
	GND	3	blue
	CAN-H	4	black
	CAN-L	5	grey

MCANJ1939 SAE J1939 	CAN Specification	ISO 11898, Basic and Full CAN 2.0 B
	Transceiver	24V-compliant, not isolated
	Communication profile	SAE J1939
	Baud Rate	250 kbit/s
	Internal termination resistor	120 Ω adjustable by the customer
	Address	Default 247d, configurable

NAME Fields	Arbitrary address capable	1	Yes
	Industry group	0	Global
	Vehicle system	7Fh (127d)	Non specific
	Vehicle system instance	0	
	Function	FFh (255d)	Non specific
	Function instance	0	
	ECU instance	0	
	Manufacturer	145h (325d)	Manufacturer ID
	Identity number	0nnn	Serial number 21 bit

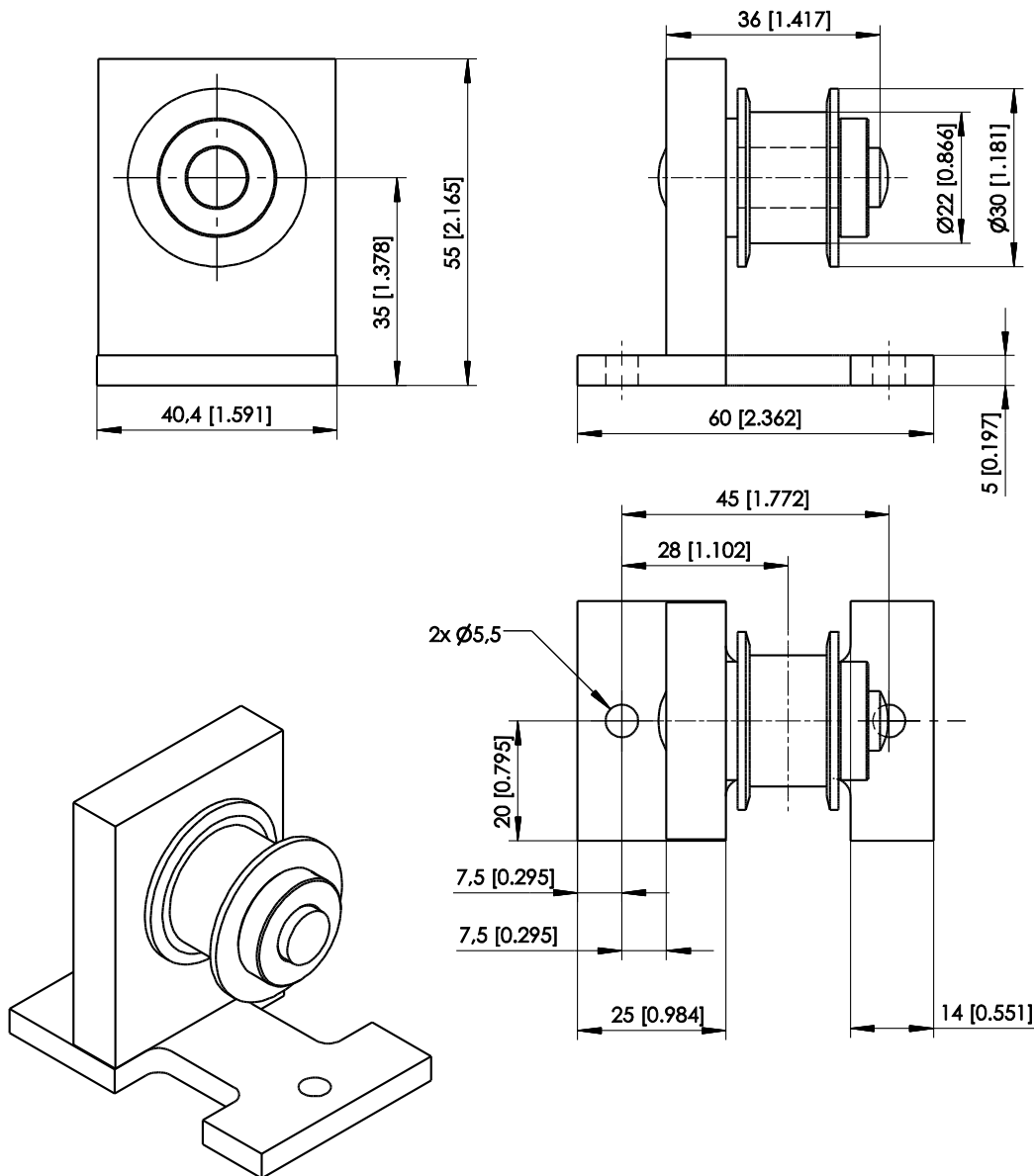
Parameter Group Numbers (PGN)	Configuration data	PGN EF00h	Proprietary-A (PDU1 peer-to-peer)
	Process data	PGN FFnnh	Proprietary-B (PDU2 broadcast); nn Group Extension (PS) configurable

Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 40 mA typical at 12 V DC max. 80 mA
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10 ⁻⁶ /°C f.s. (typical)
	Repeatability	1 LSB
	Operating temperature	See specification of the respective sensor
	Protection	Reverse polarity, short circuit
	Dielectric strength	1 kV (V AC, 50 Hz, 1 min.)
	EMV	EN 61326-1:2013

Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 5 pin  View to the sensor connector	Shield	1	brown
	Excitation +	2	white
	GND	3	blue
	CAN-H	4	black
	CAN-L	5	grey

Accessories
Tape pulley WBR1

Order code: WBR1



Dimensions in mm [inch]
Dimensions informative only.
For guaranteed dimensions consult factory.