ACX135 (6-8M)

KEY-FEATURES:

- Measurement ranges 6, 7 or 8 meters
- Analog output: potentiometer, voltage, current
- Linearity up to ±0.02% of full scale
- Protection class up to IP67
- Temperature range: -20 to +85 °C
- (optional -40 °C or +120 °C)
- High dynamics and interference immunity factor
- Customized versions available
- Optional with TEDS connector

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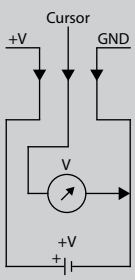
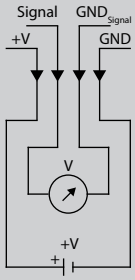
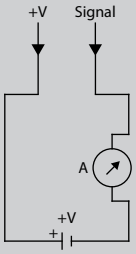
TECHNICAL DATA ANALOG OUTPUT

Measurement range MR [1]	[m]	6	7	8
Linearity [2]	[%]	±0.1		
Improved linearity (optional) [2]	[%]	±0.05		
Resolution		see output types below		
Sensor element		Hybrid Potentiometer		
Connection		connector output M12 or cable output axial (TPE cable)		
Protection class		IP65, optional IP67		
Humidity		max. 90 % relative, no condensation		
Temperature		see output types below		
Mechanical data		extraction force, max. velocity and max. acceleration see "Mechanical Data"		
Housing		aluminum, anodized, spring case PA6		
Draw wire		stainless steel V2A Ø 0.5 mm		
Weight	[g]	approx. 1700, depending on the measurement range		

[1] others on request
[2] linearity max. ±0.15 % in combination with outputs 5R and 10R

ELECTRICAL DATA ANALOG OUTPUT

Output type	**Potentiometer**			**Voltage** [1]				**Current**
Order Code	1R	5R	10R	4,5V	5V	55V	10V	420A
Output	1 kΩ	5 kΩ	10 kΩ	0.5 to 4.5 V	0 to 5 V	-5 to +5 V	0 to 10 V	4 to 20 mA
Supply	max. 30 V			8 to 30 VDC			12 to 30 VDC	12 to 30 VDC [2]
Recommended cursor current	<1 µA			-				
Current consumption max.	-			max. 25 mA (no load)				-
Power consumption max.	-							
Output current	-			max. 10 mA, min. load 10 kΩ				max. 50 mA in case of error [3]
Dynamics	-			<3 ms from 0 to 100 % and 100 to 0 %				<1 ms from 0 to 100 % and 100 to 0 %
Resolution	theoretically unlimited, limited by the noise							
Noise	depends on the quality of the power supply			0.5 mV_{eff}				1.6 μA_{eff}
Inverse-polarity protection	-			yes				
Short-circuit proof	-			yes				-
Operating temperature	-20 to +85 °C / optional: -40 to +85 °C or -20 to +120 °C			-20 to +85 °C / optional: -40 to +85 °C				
Temperature coefficient	±0.0025 %/K			0.0037 %/K				0.0079 %/K
EMC	-			according to EN 61326-1:2013				
Circuit								

[1] Galvanically isolated
[2] Load: 250 Ω (max. 500 Ω)
[3] Load max. 0.5 kΩ

MFL = multi-functional line

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TECHNICAL DATA DIGITAL OUTPUT ABSOLUTE CANopen (WCAN)

Measurement range	[m]	6	7	8
Linearity	[%]	±0.1		
Improved linearity (optional)	[%]	±0.05		
Resolution		0.002 % of the measurement range		
Sensor element		Potentiometer		
Connection		connector output M12 axial/radial or cable output axial (TPE cable)		
Protection class		IP65, optional IP67		
Humidity		max. 90 % relative, no condensation		
Operating temperature	[°C]	-20 to +85 / optional: -40 to +85		
Mechanical data		extraction force, max. velocity and max. acceleration see “Mechanical Data“		
Housing		aluminum, anodized, spring case PA6		
Draw wire		stainless steel V2A Ø 0.5 mm		
Weight	[g]	approx. 1700, depending on the measurement range		

ELECTRICAL DATA DIGITAL OUTPUT ABSOLUTE CANopen (WCAN)

Link to the manual		CANopen (WCAN)
CAN specification		Full CAN 2.0B (ISO11898)
Communication profile		CANopen CiA 301 V 4.2.0
Device profile		Encoder, absolute linear; CiA 406 V 3.2.0
Error control		Producer Heartbeat, Emergency Message, Node Guarding
Node ID		Default: 7, configurable via SDO
PDO		1 x TPDO, static mapping
PDO Modes		Event-triggered, Time-triggered, Sync-cyclic, Sync-acyclic
Transmission rate		1 Mbps, 800, 500, 250, 125, 50, 20 kbps configurable via SDO
Integrated Bus termination resistor		120 Ω, connectible via SDO
Bus, galvanic separation		No
Supply	[VDC]	8 to 30
Current consumption		10 mA typical at 24 V, 20 mA typical at 12 V
Measurement rate		1 kHz with 16-bit resolution
Electrical protection		inverse polarity protection
Temperature coefficient	[%/K]	0.0014
EMC		DIN EN61326-1:2013, conformity with directive 2014/30/EU

MECHANICAL DATA

Measurement range [m]	Extraction force F_{min} [N]	Extraction force F_{max} [N]	Velocity V_{max} [m/s] [1)]	Acceleration a_{max} [m/s^2] [1)]
6	7.8	13.6	10	140
7	8.2	15	10	140
8	8.2	15.2	10	140

[1)] reduced to 80 % with option IP67

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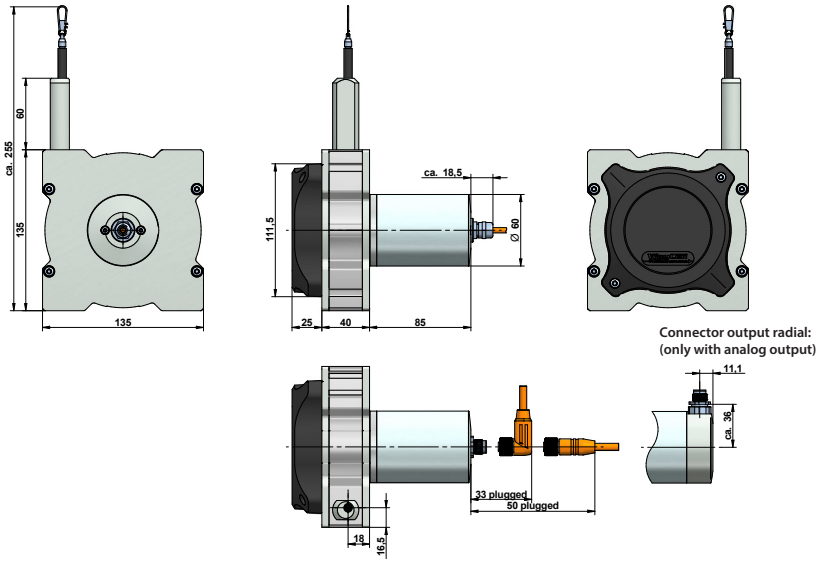
TECHNICAL DRAWING ANALOG OUTPUT AND DIGITAL OUTPUT WCAN



MOUNTING OPTIONS

1. Using the grooves in the sensor housing

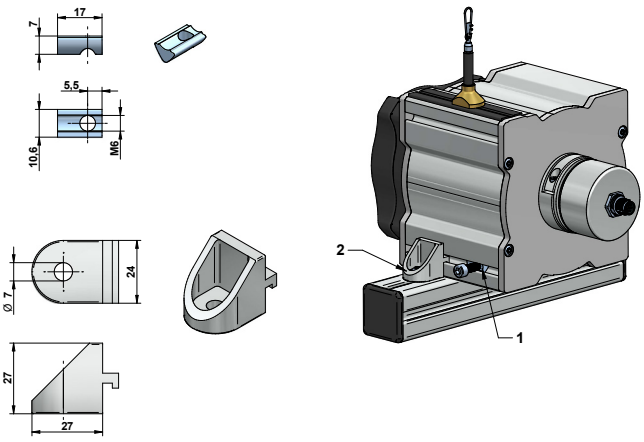
The included slot nuts can be easily inserted into the grooves of the sensor housing. The slot nuts have a metric M6 thread.
Each sensor with a measurement range of 20 m or lower is delivered with two slot nuts. Each sensor with a measurement range of 25 m or greater is delivered with four slot nuts.

2. Using the angle clamp brackets

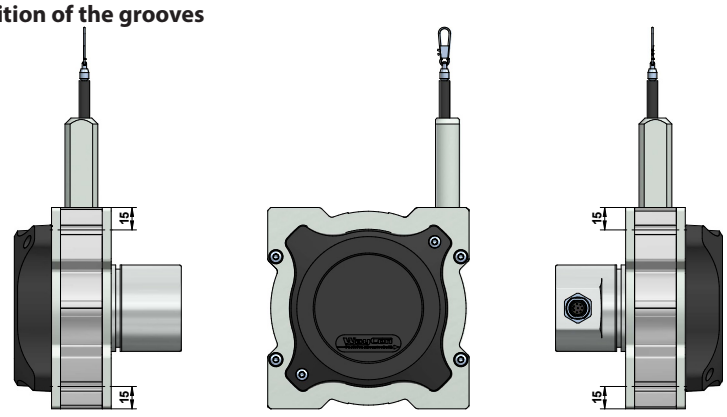
The angle clamp brackets feature a bore for M6 screws to fix it on a plate / slab or a profile.
Each sensor with a measurement range of 20 m or lower is delivered with two brackets. Each sensor with a measurement range of 25 m or greater is delivered with four brackets.

Note:

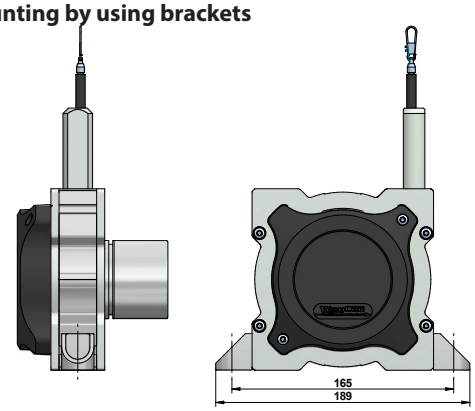
The required number of angle clamp brackets and slot nuts/screws ship with each unit. If additional brackets are required, or replacement parts are needed, please contact EPC Customer Service and order Part Number: 097262



Position of the grooves



Mounting by using brackets



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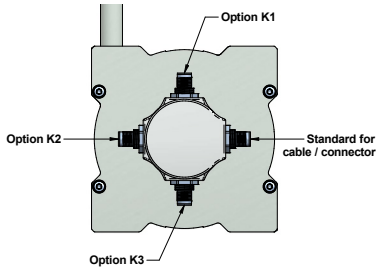
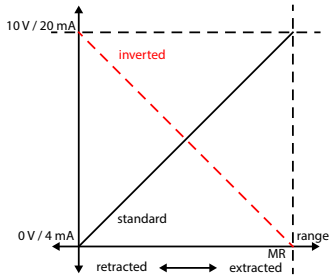
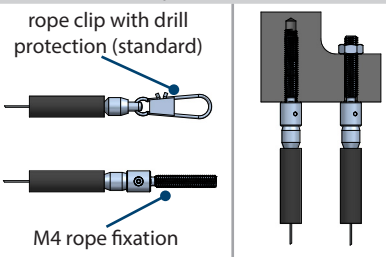
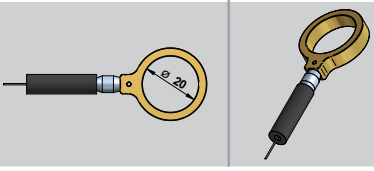
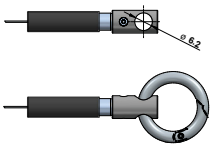
OPTIONS

Option	Order code	Description	
Cable or connector orientation	-	Standard: sideways, opposite to the rope outlet	
Improved linearity	L02, L05	Improved linearity 0.02 % (L02) or 0.05 % (L05)	
Inverted output signal (analog output only)	IN	The analog signal of the sensor is increasing by extracting the rope (standard). Option IN inverts the signal, i.e. the signal of the sensor declines by extracting the rope.	
Synthetic wire rope	COR	Synthetic wire rope, made out of abrasion resistant and enhanced Coramid. We recommend COR at stable temperatures due to the coefficient of expansion.	
Rope fixation by M4 thread	M4	Optional, pivoted rope fixation with screw thread M4, length 22 mm. Ideal for attachment to through holes or thread holes M4.	
Rope fixation by eyelet	RI	The end of the wire rope is equipped with a eyelet instead of a rope clip. Inside diameter 20 mm	
Rope fixation with cylindrical pin and M6 through bore	ZH, ZR	ZH: cylindrical pin with M6 through bore ZR: cylindrical pin with M6 through bore and carbine ring	
Protection class IP67	IP67	Use option IP67, if the sensor will operate in a humid environment. Note that with this option there may occur a light hysteresis in the output signal due to the special sealing. The max. acceleration and displacement speed are reduced to 80 % of the specified value.	
Corrosion protection	CP	Includes a V4A wire rope, stainless steel bearings and option M4. The sensors rope drum gets HARTCOAT® coated. This coating is a hard-anodic oxidation that protects the sensor from corrosion by aggressive media (e. g. sea water) with a hard ceramics-like layer.	
Increased corrosion protection (analog output only)	ICP	Components of the housing and the rope drum get HARTCOAT® coated. Includes the options CP, IP67 and M4.	
Increased temperature range High (potentiometer output only)	H120	Sensors with potentiometer output and cable output can be operated from -20 to +120 °C when this option is used.	
Increased temperature range Low (analog output only)	T40	Special components and a low temperature grease make a working temperature down to -40 °C (up to +85 °C) possible.	
TEDS connector (in combination with analog and cable output only; more information about TEDS)	TD, TDP, TDPS	TD: Assembling TDP: Assembling + programming TDPS: Assembling + programming + 35 measurement points	

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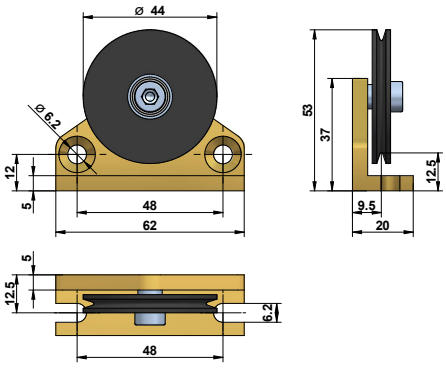
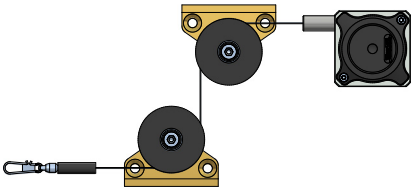
ACCESSORIES

Deflection pulley - UR2

The rope must be extracted from the sensor vertically. The maximum variation from the vertical is 3°. A deflection pulley allows a change in the direction of the wire rope. Several pulleys may be used. The rope clip must not be guided over the deflection pulley.
Suitable for standard wire rope diameter 0.5 mm.

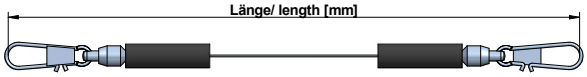


Material foot:	anodized aluminum
Material rope wheel:	POM-C
Mounting:	by 2 hexagon socket or countersunk screws M6, vertical or horizontal mounting possible. Ball bearings: with special low temperature grease and RS-sealing.
Temperature:	-40 to +80 °C



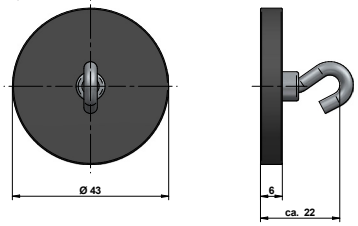
Rope extension - SV

For bridging a greater distance between the measuring target and the sensor a rope extension can be applied. The rope clip must not be guided over the deflection pulley.
Please specify the length needed in your order (XXXX). The minimum length is 150 mm:
SV1-XXXX: rope extension (150 to 4995 mm)
SV2-XXXX: rope extension (5000 to 19995 mm)
SV3-XXXX: rope extension (20000 to 40000 mm)



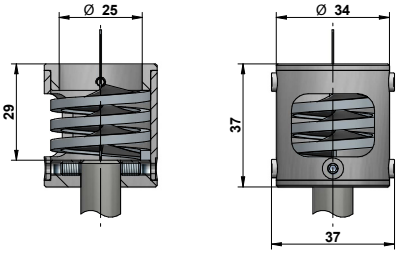
Magnetic clamp - MGG2

Use the magnetic clamp to quickly attach the rope to metallic objects without any assembly time. A rubber coating provides gentle contact (e. g. on varnished surfaces) and prevents from slipping due to vibration.
The magnet consists of a neodymium core for an increased adhesive force of 100 N. The hook makes it easy to attach the rope clip.



Rope cleaner - RCS

Use the RCS rope cleaner to remove dirt from the measuring rope of the sensor. Please note that the maximum measuring range of the sensor is reduced by 29 mm and that the RCS is not compatible with the option RI.



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ORDER GUIDE ANALOG OUTPUT

ACX135 – □ – □ – □ – □

Measurement range MR [m]	
6 / 7 / 8	

Output signal		
Potentiometer	1 kΩ	**1R**
Potentiometer	5 kΩ	5R
Potentiometer	10 kΩ	10R
Voltage	0.5 to 4.5 V	4,5V
Voltage	0 to 5 V	5V
Voltage	-5 to +5 V	55V
Voltage	0 to 10 V	**10V**
Current	4 to 20 mA	**420A**

Connection	
Connector output M12, axial, 4 poles	**SA12**
Connector output M12, radial, 4 poles	SR12
Cable output, axial, 2 m, 4 poles	KA02
Cable output, axial, 5 m, 4 poles	KA05
Cable output, axial, 10 m, 4 poles [1]	KA10

Version	
Standard	-
Sensor with options	O

[1] larger lengths on request
[2] for more information about TEDS connectors see here
Bold text: standard with shorter lead time

Option	**Description (see page 5)**
L05	Improved linearity ±0.05 %
IN	Inverted output signal
COR	Synthetic wire rope (Coramid)
M4	Rope fixation M4
RI	Rope fixation eyelet
ZH	Cylindrical pin
ZR	Cylindrical pin with carbine ring
IP67	Protection class IP67
CP	Corrosion protection
ICP	Increased corrosion protection
H120	Increased temperature range -20 to +120 °C
T40	Increased temperature range -40 to +85 °C
TD	TEDS: assembling [2]
TDP	TEDS: assembling + programming [2]
TDPS	TEDS: assembling + programming + 35 measurement points [2]

Option	**Not combinable with**
L05	5R, 10R
COR	MR 8, H120
M4	CP, ICP
RI	CP, ICP
ZH	CP, ICP
ZR	CP, ICP
IP67	H120, ICP
CP	M4, RI, ZH, ZR, ICP
ICP	M4, RI, ZH, ZR, IP67, CP
H120	4,5V, 5V, 55V, 10V, 5VT, 10VT, 420A, SA12, SR12, COR, IP67, CP, ICP, T40, TD, TDP, TDPS
T40	H120
TD	1R, 5R, 10R, SA12, SR12, H120, TDP, TDPS
TDP	1R, 5R, 10R, SA12, SR12, H120, TD, TDPS
TDPS	1R, 5R, 10R, SA12, SR12, H120, TD, TDP

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ORDER GUIDE DIGITAL OUTPUT ABSOLUTE CANopen (WCAN)

ACX135 – □ – □ – □ – □

Measurement range MR [m]	
6 / 7 / 8	

Output signal	
CANopen	WCAN

Connection	
Connector output M12, axial, 5 poles	SA12
Connector output M12, radial, 5 poles	SR12
Cable output, axial, 2 m, 5 poles	KA02
Cable output, axial, 5 m, 5 poles	KA05
Cable output, axial, 10 m, 5 poles [1)]	KA10

Version	
Standard	-
Sensor with options	O

[3)] larger lengths on request

Option	**Description (see page 5)**
L05	Improved linearity ±0.05 %
COR	Synthetic wire rope (Coramid)
M4	Rope fixation M4
RI	Rope fixation eyelet
ZH	Cylindrical pin
ZR	Cylindrical pin with carbine ring
IP67	Protection class IP67
CP	Corrosion protection
ICP	Increased corrosion protection
T40	Increased temperature range -40 to +85 °C

Option	**Not combinable with**
COR	MR 8
M4	CP, ICP
RI	CP, ICP
ZH	CP, ICP
ZR	CP, ICP
IP67	ICP
CP	M4, RI, ZH, ZR, ICP
ICP	M4, RI, ZH, ZR, IP67, CP

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GENERAL ACCESSORIES

UR2	deflection pulley (for rope diameter 0.5 mm)
MGG2	magnetic clamp
RCS-ACX135-8 [1)]	rope cleaner

SV1-XXXX	rope extension (150 mm up to 4995 mm)
SV2-XXXX	rope extension (5000 mm up to 19995 mm)
SV3-XXXX	rope extension (20000 mm up to 40000 mm)

[1)] please note that the maximum measuring range is reduced by 29 mm when using the rope cleaner. The RCS is not compatible with the option RI.

ANALOG OUTPUT ACCESSORIES

Cable with connector (female) M12, 4 poles, shielded, IP67	
K4P2M-S-M12	2 m, straight connector
K4P5M-S-M12	5 m, straight connector
K4P10M-S-M12	10 m, straight connector
K4P2M-SW-M12	2 m, angular connector
K4P5M-SW-M12	5 m, angular connector
K4P10M-SW-M12	10 m, angular connector

Mating connector (female) M12, 4 poles, for self assembly	
D4-G-M12-S	straight connector
D4-W-M12-S	angular connector

DIGITAL OUTPUT ABSOLUTE CANopen (WCAN) ACCESSORIES

Cable with connector (female) M12, 5 poles, shielded, IP67	
K5P2M-S-M12	2 m, straight connector
K5P2M-SW-M12	2 m, angular connector

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