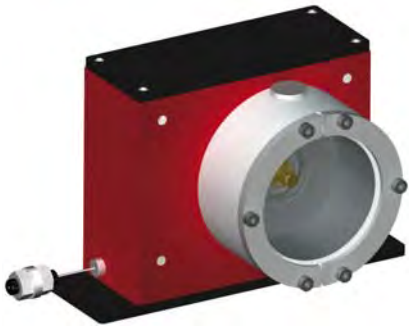


■ Magnetic linear measuring

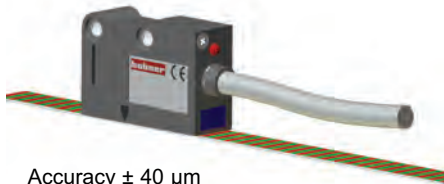


High accuracy
contactless

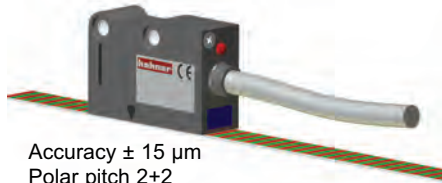
■ Draw wire (enco-meter)



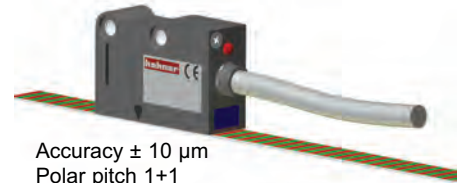
Easy mounting
Good for telescope
system

MSL

Accuracy $\pm 40 \mu\text{m}$
 Polar pitch 5+5
 Resolution up to $5 \mu\text{m}$
 IP67

MSM

Accuracy $\pm 15 \mu\text{m}$
 Polar pitch 2+2
 Resolution up to $1 \mu\text{m}$
 IP67

MSH

Accuracy $\pm 10 \mu\text{m}$
 Polar pitch 1+1
 Resolution up to $0,5 \mu\text{m}$
 IP67

General Information

Incremental magnetic sensors for linear measurement of the MS series allow non-contact, highly precise and real-time measurements. The measuring group is made up of two parts: a sensor that incorporates the electronic capture/an output driver and a polarized magnetic strip in a constant period.

Use is very simple. It consists in moving the sensor without making contact along the strip allowing lengths over 50 metres.

Series of MS magnetic sensors is made up of 3 models, depending on the precision required, with the possibility to incorporate reference signals externally or to the magnetic strip.

Sensor's high IP allows installation in most industrial applications and is ideal for outdoor use.

Range of MS sensors offers an economic and robust alternative to other lineal measurement systems.

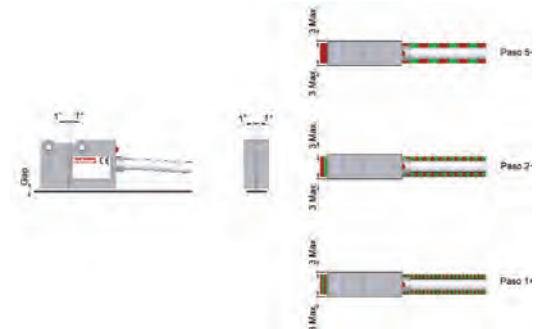
Sensor assembly

The sensor can be mounted in any position, keeping the active side, marked by arrows, toward the surface of magnetic strip. Once mounting is carried, place cables and move manually the sensor in the entire run, in order to ensure it can freely slide without any obstacle.

Check that aligning tolerances between sensor and magnetic strip are respected along the whole run. Each positioning error must be corrected.

Dimension of any brackets or supporting arms have to be conveniently calculated; it must be avoided any kind of their bending.

- Proceed to fix magnetic sensor using the M4 threaded holes.
- As an alternative you can use them as passing holes for TCEI M3x18 screws.



Fixing of magnetic band

Magnetic band can be fixed on any kind of non-magnetic surface.

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the metal sheet cover PS, already equipped with a double-sided adhesive tape or the aluminium support AP.

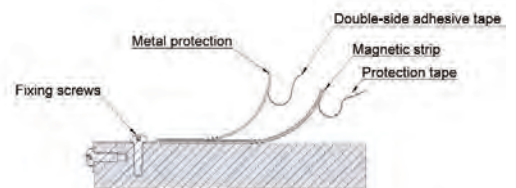
The best gluing temperature is between 20 and 30 °C; avoid making it when temperature is below 10°C.

In case of stocking magnetic strip MP200 at a lower temperature than the machine, it is advisable to wait for some hours before gluing. The adhesion of glued parts is completed after at least 48 hours.

Make the gluing of magnetic strip as follows:

- Clean carefully the fixing surface from oil, fat or any kind of dirt, using trace-free solvents.
- Raise up few centimetre of adhesive protection and place magnetic strip, lightly pushing on the initial adhesive zone.
- Proceed with the placing of the strip, removing progressively the adhesive protection and making a uniform pressure. If possible, use a small manual roller.
- Proceed as above to glue the stainless steel cover tape on the magnetic strip, after an accurate cleaning of the surface.
- Use the exceeding part of cover tape for mechanical fixing and "earth" connection of the structure by means of screws TC M3x8.

In order for the system to be more precise, the magnetic strip should be 80 mm (40 mm on each side) longer than the maximum travel of the machine: $L = \text{effective travel} + 80 \text{ mm}$. The tape should be centred along the limit switch.



LINEAR MEASURING MAGNETIG SYSTEM

Electrical connections

Sensor is set up with a Line-Driver output. If the reading device cannot read complementary signals, it is necessary to isolate the unused wires one by one. It is important to note that the connection of the unused wires can damage the sensor and it does not guarantee its immunity from interferences.

Make connection when power supply is switched off, and also batteries (when present) are excluded.

Avoid allocating the cable next to any devices which may cause electromagnetic interferences (motors, solenoid valves, inverters).

If some interferences are detected, act on the source of disturb using EMC filters.

If cable extensions are needed, it is necessary to use shielded cables with a section at least 0.35 mm² for power supply and 0.14 mm² for signals.

Verify the correct connection and the continuity of the shield which has to be connected to an earthing node with very low impedance.

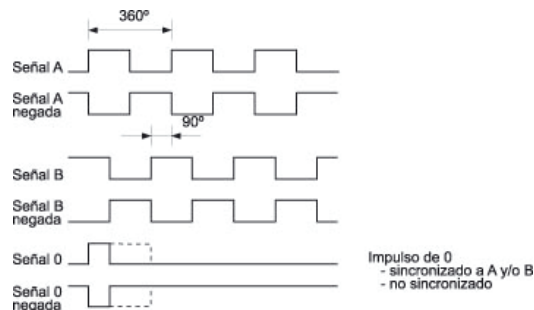
Sensor is supplied with a standard cable 2m long. longer lengths can be required.

To balance Line-Driver output, you have to use the following resistance:

- 5V RL=120Ω
- 12V RL=350Ω
- 24V RL=1000Ω

Respect the minimum cable's winding radius of 60mm.

For applications where the max speed reaches more than 1m/sec, the use of a "special cable", suitable to continuous movements, is indispensable.



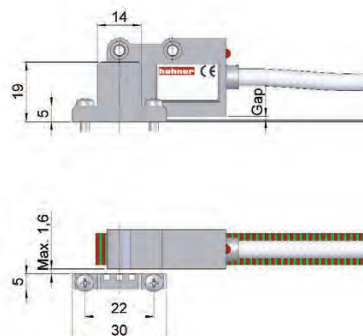
Mounting external zero

The sensor allows the detection of external reference points as well as those included on the magnetic strip (special order). This gives the measurement system the position references necessary for most applications.

The external reference signal is received by installing a magnet (EC) or magnetizing the strip at the desired position(s).

For the installation of the external zero reference (magnet) proceed as follows:

- Both sensor and magnetic strip have to be previously fixed to the machine, in their final position.
- Place the magnet where you need the zero position and move it around 4 mm, until the index red led turns on.
- Place the base of the magnet parallelly to the magnetic strip, at a distance of about 1mm from the sensor. Make the notch, located on the upper part of the magnet, roughly correspond with the vertical one on the body of the sensor.
- Mark on the machine the position of M3 fixing holes of magnet.
- Drill the fixing holes and tighten the magnet by 2 TC M3x12 screws, keeping the active part (magnets) toward the sensor. The slots permit a displacement, parallelly to the magnetic strip, in order to get an accurate positioning of magnet.
- Make a working test in both ways of moving.



Resistance to chemical agents and maintenance

LOW-IMPACT AGENTS

Formic acid, lactic acid, formaldehyde 40%, glycerine 93°C, hexane, iso-octane, linseed oil, cotton oil, soybean oil, mineral oil.

MEDIUM-IMPACT AGENTS

Acetylene, acetone, acetic acid, oleic acid, stearic acid 70°C, seawater, ammonia, gasoline, ether isopropilic, petroleum, vapor.

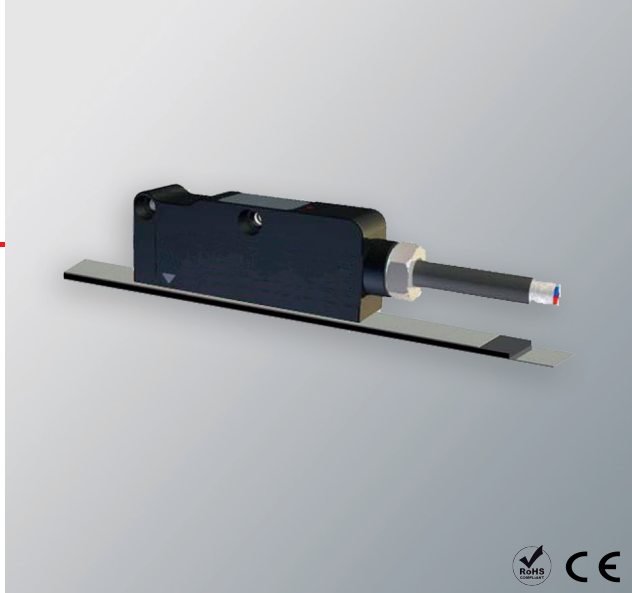
STRONG-IMPACT AGENTS

Nitric acid, benzene, dimethylbenzene, tetraethyl furan, nitrobenzene, solvent, toluene, carbon tetrachloride, turpentine, trichlorethylene.

The band and sensor do not need any particular maintenance. An accurate installation, conforming to mounting instructions, and a correct use are sufficient to get a qualitative stability.

In case of malfunctioning please contact the manufacturer for repairing or changing of faulty components. Verify again all mounting tolerances whenever it happens something which can modify the correct alignment of the system.

In order not to compromise the precision of the strip, do not stress it mechanically. Strip has to be rolled always in the same way (active part toward outside), with a diameter not less than 260 mm.

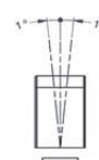
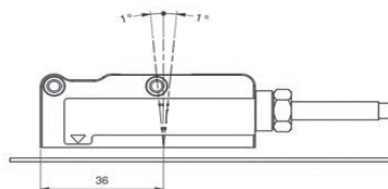
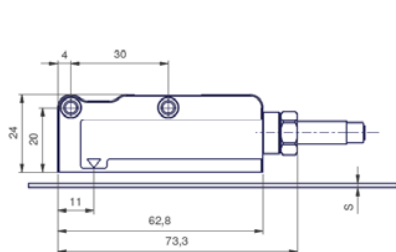
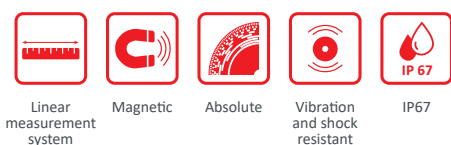


SERIE MSA

ABSOLUTE LINEAR MEASURING MAGNETIC SENSOR



- Linear magnetic sensor, with direct reading of the absolute position
- Magnetic detection without contact
- High speed serial interface
- Easy assembly; Wide alignment tolerances
- Resolution 10 μm
- Accuracy $\pm 15 \mu\text{m}$
- Pole pitch 2+2
- Protection class IP67
- Warning indication through LED
- Connection by cable (other cable length available)



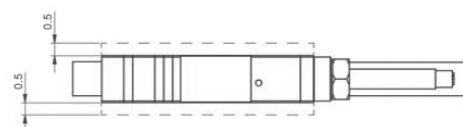
Magnetic band CSMA

	CSMA	CSM + PS*	CSM + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.3 ÷ 1	0.7 MAX	0.2 MAX

(*) PS and AP see accessories section

Drawing MSA sensor dimensions

Sensor alignment tolerances



SENSOR REFERENCE

Reference example: MSA-M10528S7M02

Serie	Pole pitch	Resolution	Power supply	Interface	Connection	Special Customer
MSA -	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	M. 2+2 mm	10. 10 μm (*)	528. 5...28 VDC	S7. SSI Gray	M02. 2 meters cable	

(*) Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (1, 100 μm).

BAND REFERENCE

Serie

CSMA

Band length: ☐☐☐☐ m (*)

(*) 1 unit = 1 meter.

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).

SERIE MSA

ABSOLUTE LINEAR MEASURING MAGNETIC SENSOR



SENSOR SPECIFICATIONS

Absolute resolution	10 μm
Accuracy	$\pm 15 \mu\text{m}$
Repeatability	± 1 increment
Signal period	2 mm
GAP, distance sensor/band (d) see previous table	0,3 to 1 mm
Measuring length	up to 30 m
Max. traversing speed	300 m/min
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +70°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	200 m/s^2 (55...2000 Hz)
Weight	80g
Axial connection	2 meters cable (other cable length or radial output available, upon request)

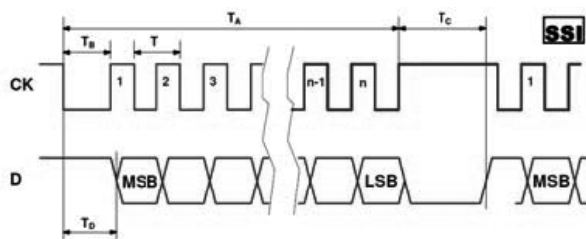
OUTPUT SIGNALS



Interface	SSI Gray
Clock frequency	0,1...1,2 MHz
n	Position bit* = 24 bit
T _c	12...45 μs
Power supply	5...28 VDC $\pm 5\%$
Current consumption	150 mA max (Z=120 Ω)
Length of cable allowed	20 m
Short circuit protection	Yes
Protection polarity inversion	Yes

Reading through positioning sensor based on magneto resistance, with AMR effect (Magnetic Anisotropy).

(*) The number of bit transmitted is different for other resolutions. See values table in MSA reference manual, section 8.

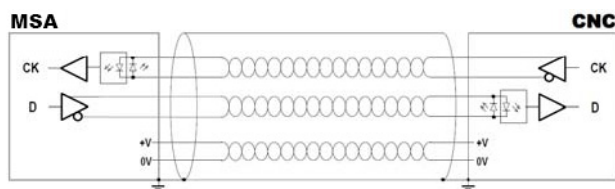


CONNECTION



	Cable
	2x2x0,25+2x0,25 mm ²
GND	White
VCC	Brown
D+	Pink
D-	Grey
CK+	Green
CK-	Yellow
Shield	Shield

The cable is suitable for continuous movements.
The cable's bending radius should not be lower than 70 mm.



In case of cable extension, it is necessary to guarantee

- > The electrical connection between the body of the connectors and the cables shield.
- > Ensuring a minimum power supply of 5 V to the sensor, the maximum cable length can be extended to 50 m.

SERIE MSA

ABSOLUTE LINEAR MEASURING MAGNETIC SENSOR

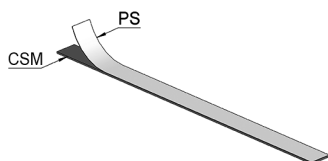


BAND SPECIFICATIONS

Pole pitch	Incremental track 2+2 mm + absolute track
Accuracy at 20°C	±20 µm/m (high accuracy) ±80 µm/m (low accuracy)
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	30 m
Thermal expansion	$10,5 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$ Tref: 20°C ± 0,1°C
Bending radius	≥ 130 mm
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C

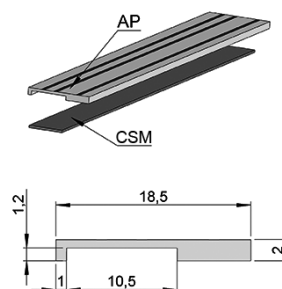
ACCESSORIES

PS: Cover for band protection



Stainless steel cover for protection.
To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).

AP: Aluminium support



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

INSTALLATION AND HANDLING

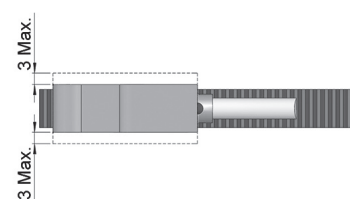
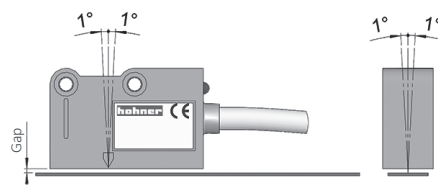
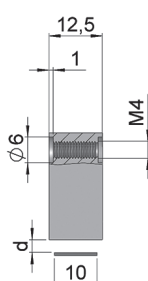
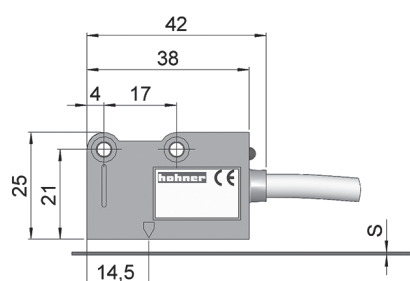
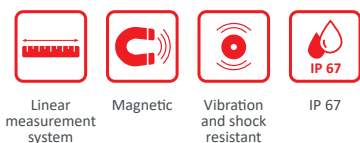
1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.



SERIE MSH

LINEAR MEASURING MAGNETIC SENSOR

- Magnetic detection without contact
- Easy assembly
- Resolution 5 μm
- Accuracy $\pm 6 \mu\text{m}$
- Pole pitch 1+1
- Protection class IP67
- Metallic cover
- Connection by cable (other cable length available)



Magnetic band CSH

	CSH	CSH + PS*	CSH + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.1 \div 0.4	-	-

Drawing MSH sensor dimensions

Sensor alignment tolerances

SENSOR REFERENCE

Reference example: MSH-5528

Serie	Resolution	Power supply	Special Customer
MSH -	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Pole pitch 1+1	5. 5 μm (*)	528. 5...28 VDC	

(*) Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (0.5, 1, 10 μm).

BAND REFERENCE

Serie

CSH

Band length: ☐☐☐ , ☐☐☐ m (*)

(*) 1 unit = 1 meter.

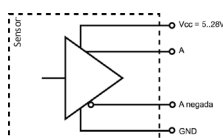
SERIE MSH

LINEAR MEASURING MAGNETIC SENSOR

SENSOR SPECIFICATIONS

Resolution	5 μm
Accuracy	$\pm 6 \mu\text{m}$
Repeatability	± 1 increment
GAP, distance sensor/band (d) see previous table	0,1 to 0,4 mm
Speed	6 m/s (10 μm)
Housing	Metallic
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +80°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	300 m/s ² (55...2000 Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11ms)
Weight	40g
Connection	2 meters cable

OUTPUT SIGNALS



OUTPUT CIRCUIT	Line Driver
Power supply	5...28 VDC $\pm 5\%$
Load without charge	Max: 60 mA
Load with charge	140 mA max (VDC=5V and Z= 120 Ω) 90 mA max (VDC=28V and Z= 1,2k Ω)
Frequency	300 kHz
Short circuit protection	Yes
Protection polarity inversion	Yes

Channel A leads 90° electrics channel B

CONNECTION



	Cable
	3x2x0,14+2x0,35 mm ²
GND	Blue
VCC	Red
A	Green
B	White
\tilde{A}	Orange
\tilde{B}	Sky blue
0 (reference)	Brown
$\tilde{0}$	Yellow

The cable's bending radius should not be lower than 60 mm.

BAND SPECIFICATIONS

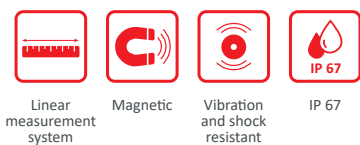
Pole pitch	1+1 mm
Accuracy at 20°C	$\pm 30 \mu\text{m}/\text{meter}$
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	50 m
Thermal expansion	$10,5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ Tref: 20°C $\pm 0,1^\circ\text{C}$
Bending radius	$\geq 130 \text{ mm}$
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C



SERIE MSM

LINEAR MEASURING MAGNETIC SENSOR

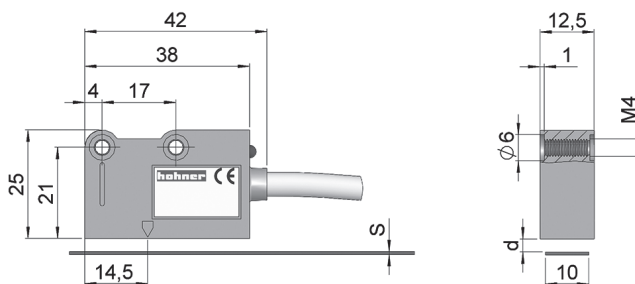
- Magnetic detection without contact
- Easy assembly
- Resolution 10 µm
- Accuracy ±8 µm
- Pole pitch 2+2
- Protection class IP67
- Metallic cover
- External or integrated reference signal
- Connection by cable (other cable length available)



Magnetic band CSM

	CSM	CSM + PS*	CSM + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.2 ÷ 1.4	1.1 MAX	0.6 MAX

(*) PS and AP see accessories section



SENSOR REFERENCE

Reference example: MSM-10E528

Serie	Resolution	Zero	Power supply	Special Customer
MSM -	<input type="text"/> <input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
Pole pitch 2+2	10. 10 µm (*)	E. External (**)	528. 5...28 VDC	

(*) Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (1, 5, 25, 50, 100, 500, 1000 µm).

(**) Integrated zero available, upon request.

BAND REFERENCE

Serie

CSM

Band length: , m (*)

(*) 1 unit = 1 meter.

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).

Integrated zero available, upon request.

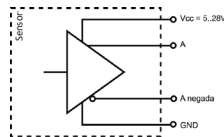
SERIE MSM

LINEAR MEASURING MAGNETIC SENSOR

SENSOR SPECIFICATIONS

Resolution	10 µm
Accuracy	±8 µm
Repeatability	±1 increment
GAP, distance sensor/band (d) see previous table	0,2 to 1,4 mm
Speed	12 m/s (10 µm)
Housing	Metallic
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +80°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	300 m/s ² (55...2000 Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11ms)
Weight	40g
Connection	2 meters cable

OUTPUT SIGNALS



OUTPUT CIRCUIT	Line Driver
Power supply	5...28 VDC ±5%
Load without charge	Max: 60 mA
Load with charge	140 mA max (VDC=5V and Z= 120Ω) 90 mA max (VDC=28V and Z= 1,2kΩ)
Frequency	300 kHz
Short circuit protection	Yes
Protection polarity inversion	Yes

Channel A leads 90° electrics channel B

CONNECTION



	Cable
	3x2x0,14+2x0,35 mm ²
GND	Blue
VCC	Red
A	Green
B	White
~A	Orange
~B	Sky blue
0 (reference)	Brown
~0	Yellow

The cable's bending radius should not be lower than 60 mm.

BAND SPECIFICATIONS

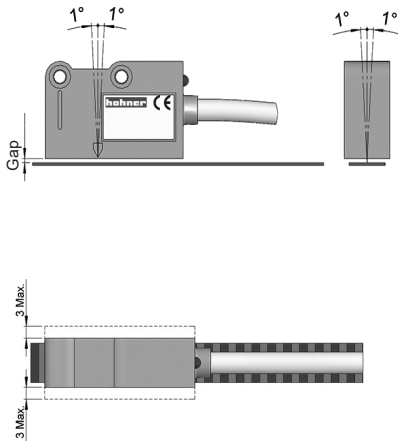
Pole pitch	2+2 mm
Accuracy at 20°C	±30 µm/meter
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	50 m
Thermal expansion	10,5 x 10 ⁻⁶ °C ⁻¹ Tref: 20°C ± 0,1°C
Bending radius	≥ 130 mm
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C

SERIE MSM

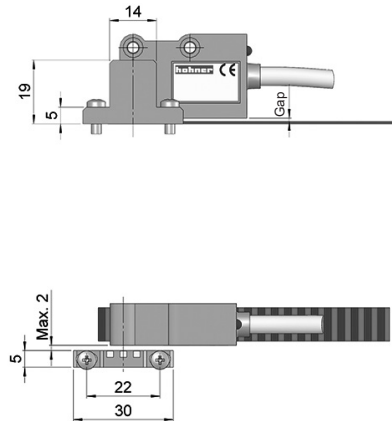
LINEAR MEASURING MAGNETIC SENSOR

ALIGNMENT AND SENSOR MOUNTING

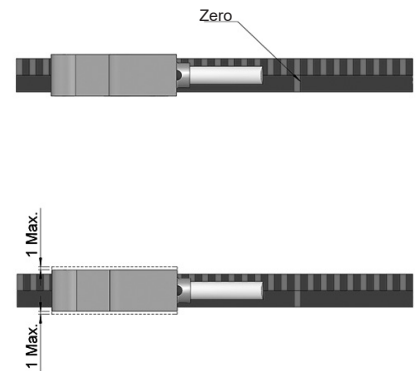
Sensor - Band



Sensor with external zero - Band

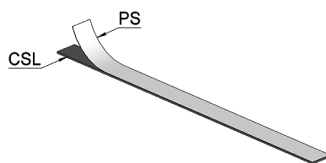


Sensor with integrated zero

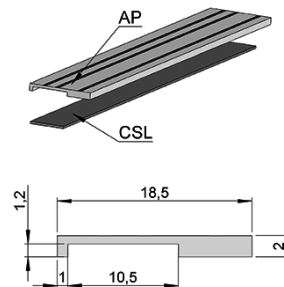


ACCESSORIES

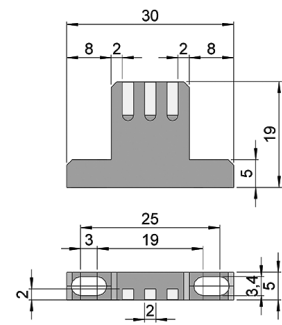
PS: Cover for band protection



AP: Aluminium support



EC: External zero



Stainless steel cover for protection. To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

INSTALLATION AND HANDLING

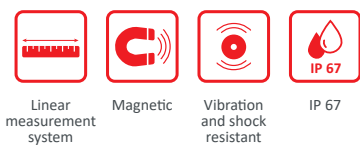
1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.



SERIE MSL

LINEAR MEASURING MAGNETIC SENSOR

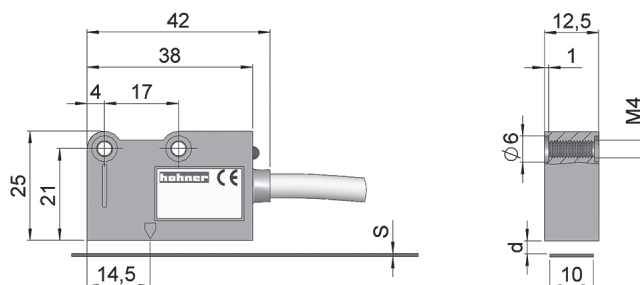
- Magnetic detection without contact
- Easy assembly
- Resolution 100 μm
- Accuracy $\pm 50 \mu\text{m}$
- Pole pitch 5+5
- Protection class IP67
- Metallic cover
- External or integrated reference signal
- Connection by cable (other cable length available)



Magnetic band CSL

	CSL	CSL + PS*	CSL + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.3 ÷ 4	3.7 MAX	3.2 MAX

(*) PS and AP see accessories section



SENSOR REFERENCE

Reference example: MSL-100E528

Serie	Resolution	Zero	Power supply	Special Customer
MSL -	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
Pole pitch 5+5	100. 100 μm (*)	E. External (**)	528. 5...28 VDC	

(*) Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (5, 10, 25, 50 μm).

(**) Integrated zero available, upon request.

BAND REFERENCE

Serie

CSL

Band length: m (*)

(*) 1 unit = 1 meter.

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).

Integrated zero available, upon request.

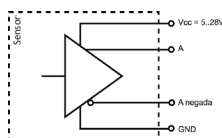
SERIE MSL

LINEAR MEASURING MAGNETIC SENSOR

SENSOR SPECIFICATIONS

Resolution	100 μm
Accuracy	$\pm 50 \mu\text{m}$
Repeatability	± 1 increment
GAP, distance sensor/band (d) see previous table	0,3 to 4 mm
Speed	30 m/s (25 μm)
Housing	Metallic
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +80°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	300 m/s ² (55...2000 Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11ms)
Weight	40g
Connection	2 meters cable

OUTPUT SIGNALS



OUTPUT CIRCUIT	Line Driver
Power supply	5..28 VDC $\pm 5\%$
Load without charge	Max: 60 mA
Load with charge	140 mA max (Vdc=5v and Z= 120 Ω) 90 mA max (Vdc=28v and Z= 1,2k Ω)
Frequency	300kHz
Short circuit protection	Yes
Protection polarity inversion	Yes

Channel A leads 90° electric channel B

CONNECTION



	Cable
	3x2x0,14+2x0,35 mm ²
GND	Blue
VCC	Red
A	Green
B	White
\tilde{A}	Orange
\tilde{B}	Sky blue
0 (reference)	Brown
$\tilde{0}$	Yellow

The cable's bending radius should not be lower than 60 mm.

BAND SPECIFICATIONS

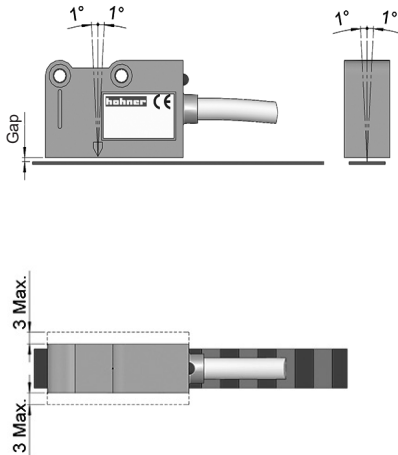
Pole pitch	5+5 mm
Accuracy at 20°C	$\pm 30 \mu\text{m}/\text{meter}$
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	25 m
Thermal expansion	$10,5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ Tref: 20°C $\pm 0,1^\circ\text{C}$
Bending radius	$\geq 130 \text{ mm}$
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C

SERIE MSL

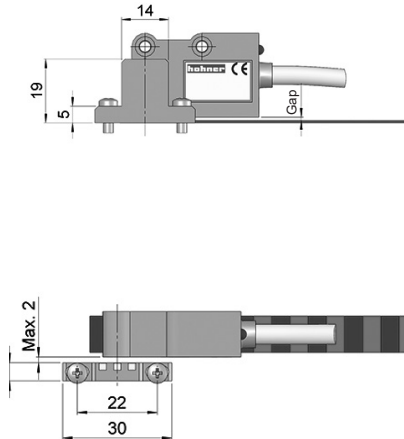
LINEAR MEASURING MAGNETIC SENSOR

ALIGNMENT AND SENSOR MOUNTING

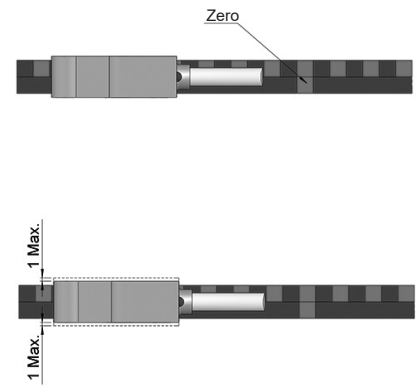
Sensor - Band



Sensor with external zero - Band

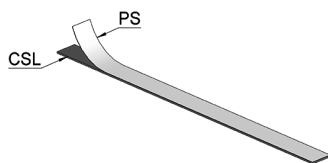


Sensor with integrated zero

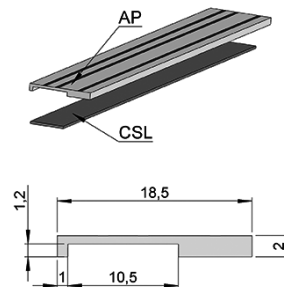


ACCESSORIES

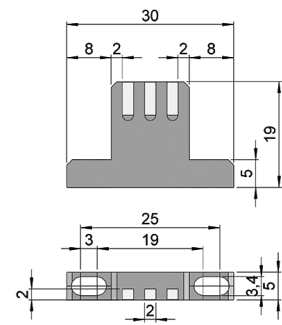
PS: Cover for band protection



AP: Aluminium support



EC: External zero



Stainless steel cover for protection. To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

INSTALLATION AND HANDLING

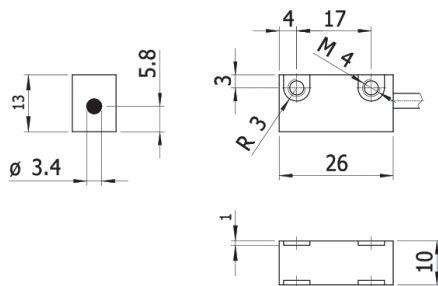
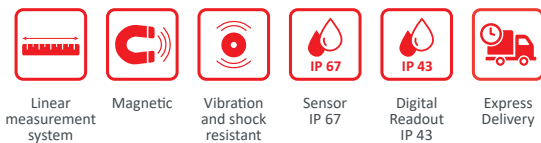
1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.



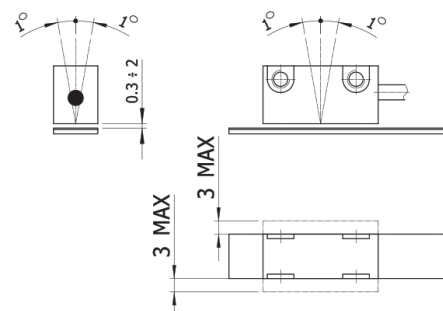
SERIE VIMS

DIGITAL READOUT WITH MAGNETIC SENSOR

- Magnetic detection without contact
- Easy assembly
- One axis Digital Readout with 6 ½ digit LCD and negative sign
- Programmable resolution
- Accuracy $\pm 20 \mu\text{m}$
- Pole pitch 2+2
- Wide alignment tolerances
- Magnetic Sensor of small overall dimensions
- Connection by cable (other cable length available)



Drawing VIMS sensor dimensions



REFERENCE

Reference example: VIMS-2BM02

Serie	Pole pitch	Power supply	Connection	Special Customer
VIMS -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	2. 2+2 mm	B. Batteries E. External power supply (1,5...5 V)	M02. 2 meters cable	

Configurable settings instructions in VIMS reference manual, section 9.

BAND REFERENCE

Serie

CSM

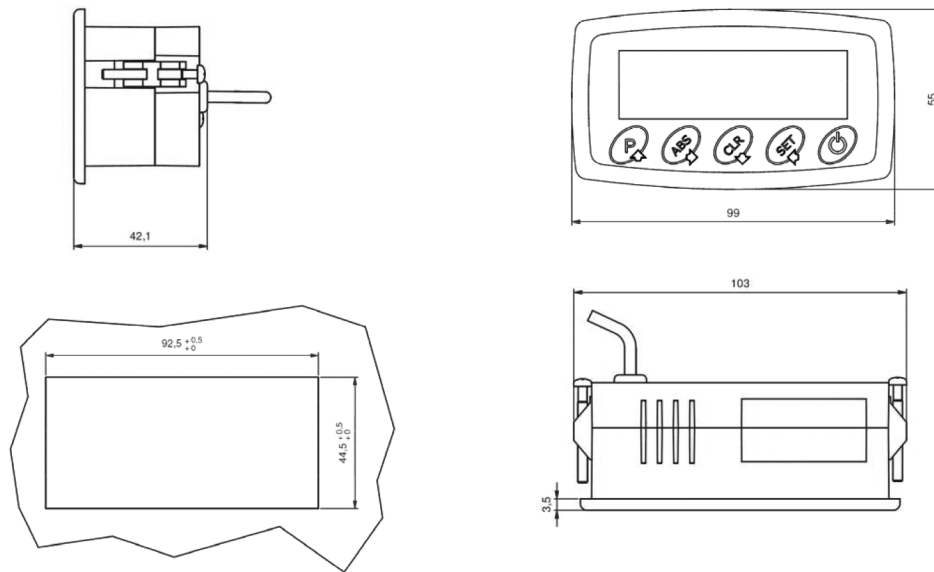
Band length: , m (*)

(*) 1 unit = 1 meter.

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).

SERIE VIMS

DIGITAL READOUT WITH MAGNETIC SENSOR



Drawing VIMS digital readout dimensions

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Display	6 ½ digits LCD h = 13 mm and negative sign
Programmable resolution	1.0 - 0.1 - 0.05 - 0.01 mm 0.01 - 0.001 - 1/16 - 1/32 - 1/64 inch 1° - 0.1° - 0.01° - 0.001° angular
Repeatability	± 1/2 digit
Power supply	Batteries x2 LR6 AA External (1,5...5 V)
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +70°C
Humidity	95% (not condensed)

READOUT

Weight	100 g
Vibration (EN 60068-2-6)	25 m/s ² (55Hz...2000Hz)
Protection class (EN 60529)	IP 43

CABLE - 6 cores Ø 3,4 mm

Minimum bending radius	25 mm
Length	2 m

SENSOR SPECIFICATIONS

Maximum speed	4 m/s
Sensor - magnetic band gap	0,3...2 mm
Accuracy	± 20 µm
Magnetic band to be used with – pole pitch	CSM (2+2mm)
Vibration (EN 60068-2-6)	300 m/s ² (55Hz...2000Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11 ms)
Protection class (EN 60529)	IP 67

SERIE VIMS

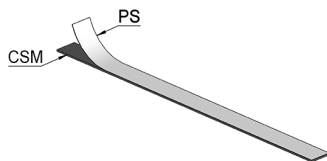
DIGITAL READOUT WITH MAGNETIC SENSOR

BAND SPECIFICATIONS

Pole pitch	2+2 mm
Accuracy at 20°C	±30 µm/m
Width band	10 mm
Thickness band	1,3 mm
Maximum length	50 m
Thermal expansion	$10,5 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$ T ref = 20°C ± 0,1°C
Bending radius	≥ 130 mm
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C

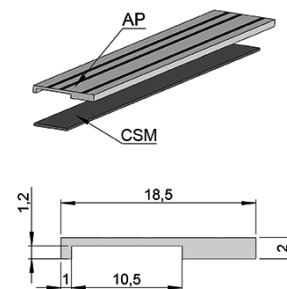
ACCESSORIES

PS: Cover for band protection



Stainless steel cover for protection.
To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).

AP: Aluminium support



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

INSTALLATION AND HANDLING

1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.

WARNING

WHAT TO AVOID

1. All mechanical reworks (Cutting, drilling, face milling a.s.o.).
2. All mishandling.
3. Impacts and external stress.
4. Avoid other magnetic fields.



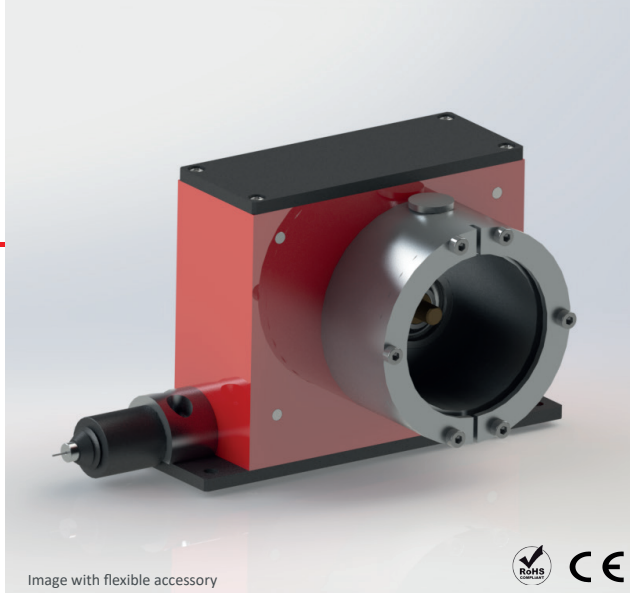


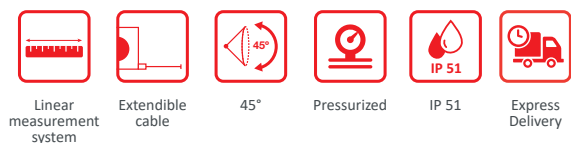
Image with flexible accessory



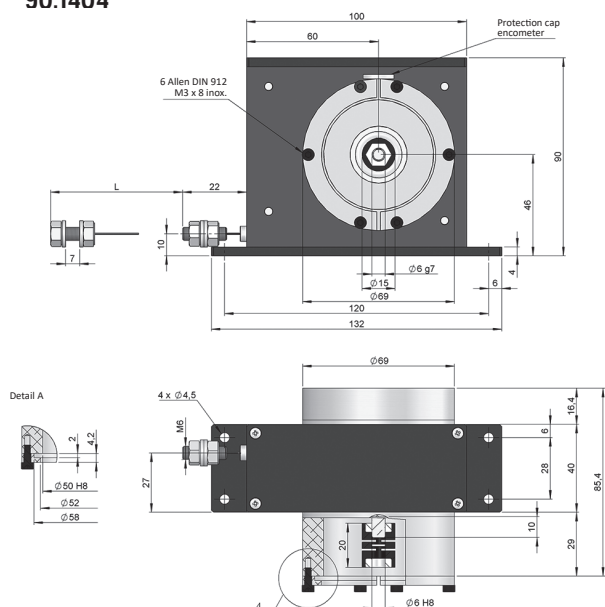
ENCO-METER EM4

EXTENDIBLE CABLE MEASUREMENT SYSTEM

- Measuring linear distances up to 4 meters
- Any mounting position possible
- Protection class IP51 according to DIN EN 60529
- Anodised and pressurized options available
- The drum shaft can drive any kind of rotary encoder (encoder, potentiometer, ...)
- Stainless steel extendible cable $\varnothing 0,61$ AISI316

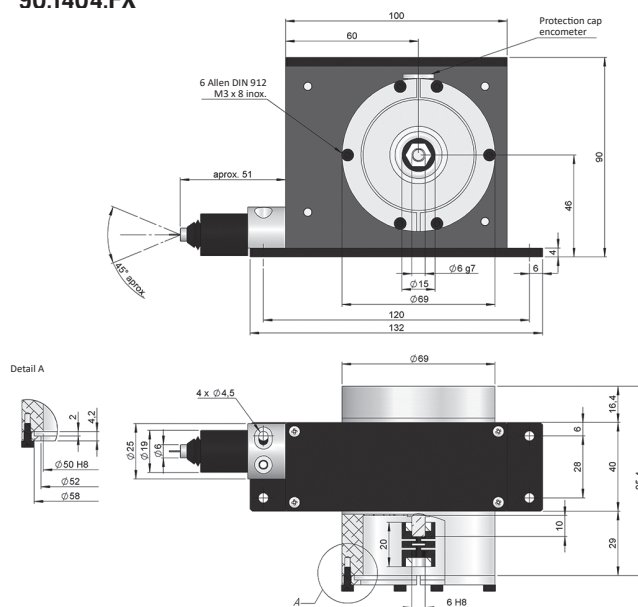


90.1404



Drawing 90.1404 with standard bell synchro and coupling type 1

90.1404.FX



Drawing 90.1404.FX with flexible accessory, standard bell synchro and coupling type 1

REFERENCE

Reference example: 90.1404.SY1

Serie	Fixing system to sensor	Coupling	Special Customer
90.1404 / 90.1404.FX	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
90.1404. Standard	SY. Standard bell synchro	1. PFP 1520 06/06	AW. Inverted caps
90.1404.FX. Flexible accessory	CL. Clamping bell	2. PFP 1520 06/6.35	AV. Double restoring force
		3. PFP 2224 06/10	BF. Outdoor (Anodised 5µm)
			BL. Saline environment (Anodised 20µm)
			BD. Pressurized

Request the ENCO-METER already coupled to an electronic output device that could be an Incremental Optical Encoder, Multiturn Absolute Optical Encoder, Potentiometer or Multiturn Absolute Magnetic Encoder.

ENCO-METER EM4

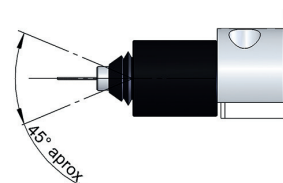
EXTENDIBLE CABLE MEASUREMENT SYSTEM

TECHNICAL SPECIFICATIONS

MODEL	EM4
Reference	90.1404 / 90.1404.FX
Travel	200 mm $\pm 0,06$ / per turn
Cable (*)	$\varnothing 0,61$ stainless steel AISI316 (structure 19 x 7 + 0)
Measurement range, up to (mm)	4000
Maximum cable extension (mm)	4010
Minimum cable static tension	3 N - Standard 6 N - Special customer AV
Maximum cable static tension	8,9 N - Standard 18 N - Special customer AV
Maximum extension acceleration	35 m/s ² - Standard 30 m/s ² - Special customer AV
Maximum recovery acceleration	10 m/s ² - Standard 20 m/s ² - Special customer AV
Maximum speed	1 m/s
Protection against dust and splashes according to DIN EN 60529	IP51

(*) Other types of cables are possible on special order.

FLEXIBLE ACCESSORY (FX)



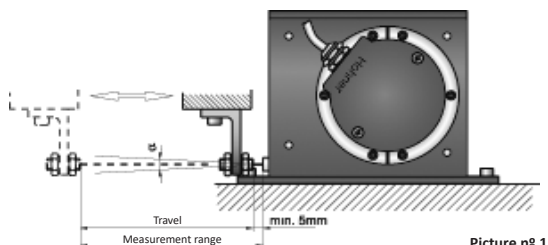
ENCO-METERS with flexible accessory FX (90.1404.FX, 90.1808.FX, 90.1810.FX) allow a misalignment of the extendable cable up to 45°.

ANODISED OPTIONS

+ **Special Customer BF**: 5 microns anodised housing for using in outdoor environments.

+ **Special Customer BD**: 20 microns anodised housing protected against the aggressive effect of the saltwater air.

INSTALLATION



Picture n° 1

ENCO-METER units are secured to a flat machine surface by means of three or four M4 screws. The cable must be correctly aligned and under no circumstances must it exceed the measurement range.

Special customer AW for inverted caps.

EM 90.1404: $\alpha < 2^\circ$ | EM 90.1404.FX: $\alpha < 45^\circ$

OUTPUT DEVICES

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

+ ABSOLUTE OR INCREMENTAL ENCODER

If it is required to obtain a determined resolution "r" (mm per pulse) in the case of using an absolute or incremental encoder, the number of encoder pulses (n) will be:

$$n = \frac{D}{r} \quad (D \text{ is ENCO-METER travel in mm})$$

+ POTENTIOMETER

Using a potentiometer, an output "r" ratio (in Ω per mm) is obtained in accordance with:

$$r = \frac{R}{D \cdot n} \quad (R \text{ is the rated resistance and } n \text{ is the maximum number of turns})$$

As standard, we have potentiometers of $R = 10K\Omega$ and $n = 10$ turns. It must be taken into consideration that the mechanical travel of the potentiometer may limit the ENCO-METER measurement range.

i Electronic output devices that are delivered coupled to an ENCO-METER have an orientation of 45°. See Installation picture n° 1.

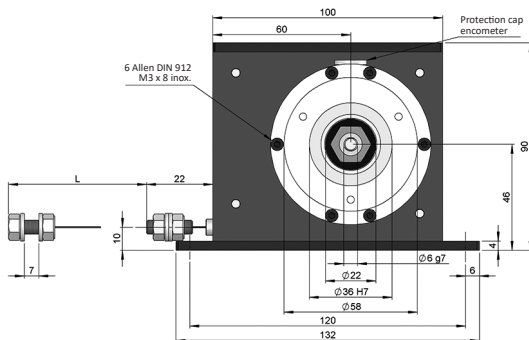
i If devices are not supplied assembled, we recommend mounting the sensor on the ENCO-METER without the seal.

ENCO-METER EM4

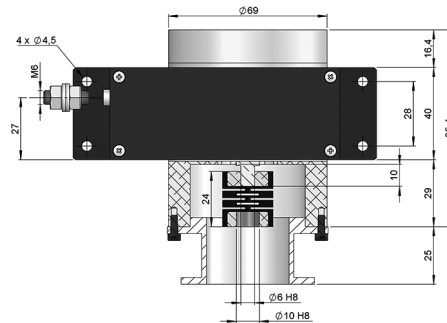
EXTENDIBLE CABLE MEASUREMENT SYSTEM

FIXING SENSOR SYSTEM DIMENSIONS

**Fixing system to
sensor type CL**
Clamping bell

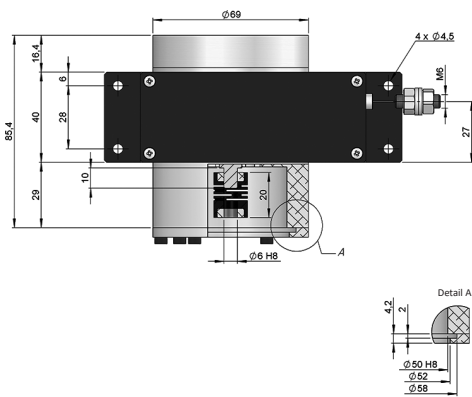
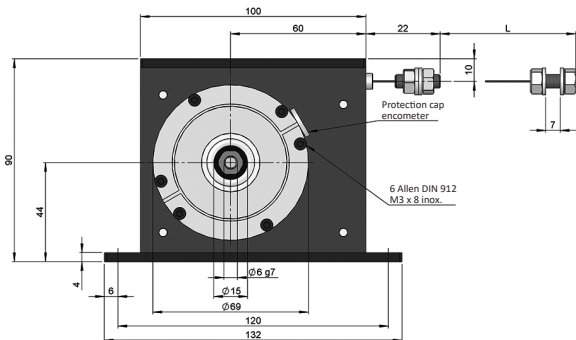


Coupling type 3
PFP 2224 06/10



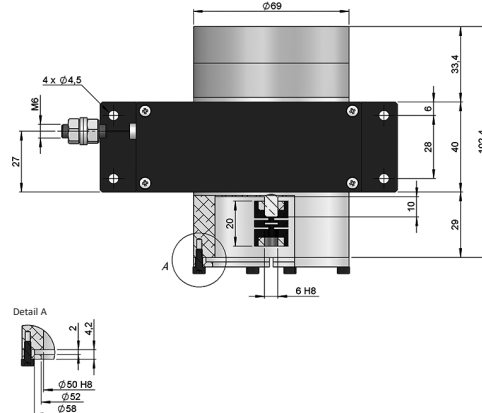
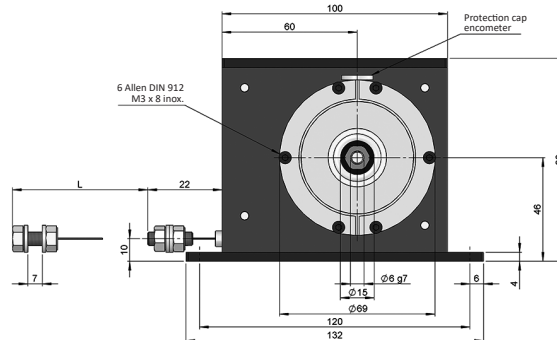
SPECIAL CUSTOMER OPTIONS

AW - Inverted caps



Drawing 90.1404, Special Customer AW

AV - Double restoring force

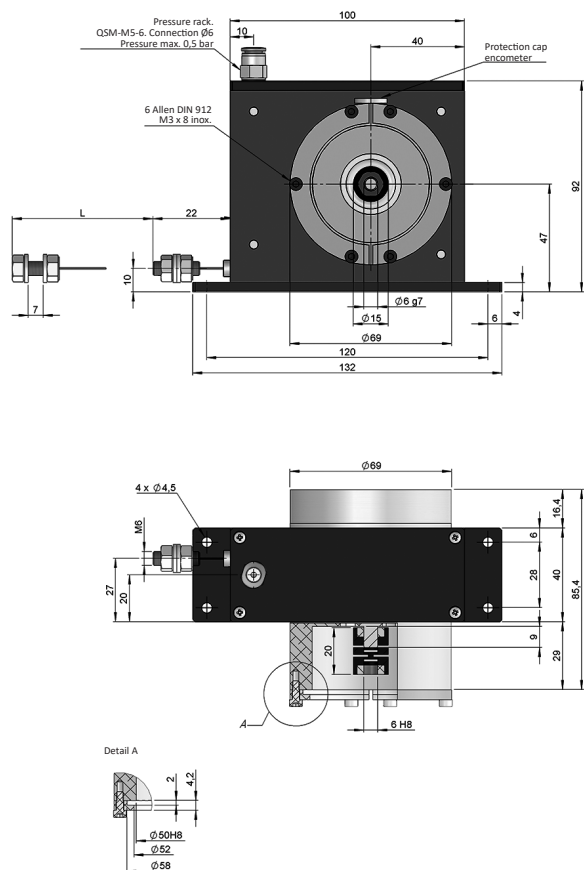


Drawing 90.1404, Special Customer AV

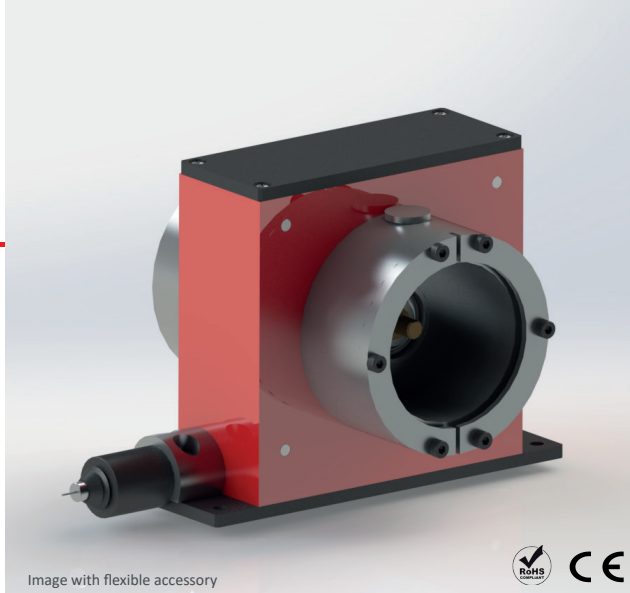
ENCO-METER EM4

EXTENDIBLE CABLE MEASUREMENT SYSTEM

BD - Pressurized option



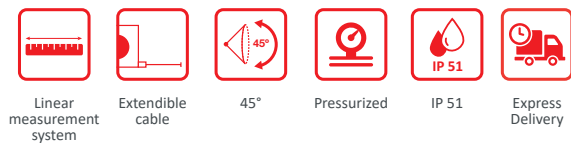
Drawing 90.1404, Special Customer BD



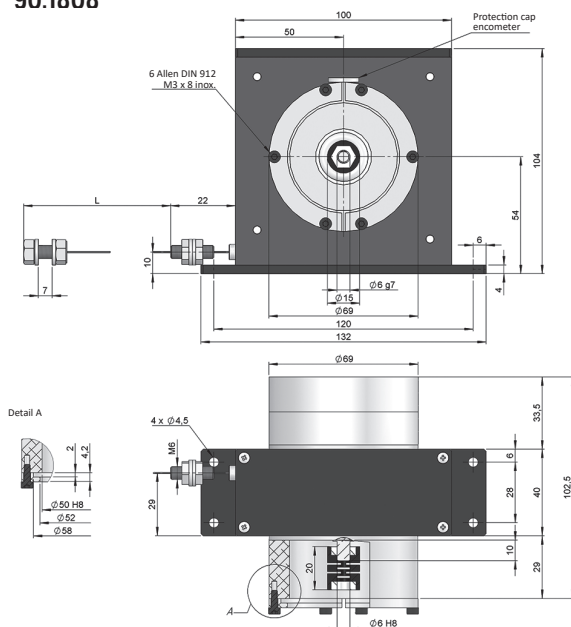
ENCO-METER EM8

EXTENDIBLE CABLE MEASUREMENT SYSTEM

- Measuring linear distances up to 8 meters
- Any mounting position possible
- Protection class IP51 according to DIN EN 60529
- Anodised and pressurized options available
- The drum shaft can drive any kind of rotary encoder (encoder, potentiometer, ...)
- Stainless steel extendible cable \varnothing 0,61 AISI316

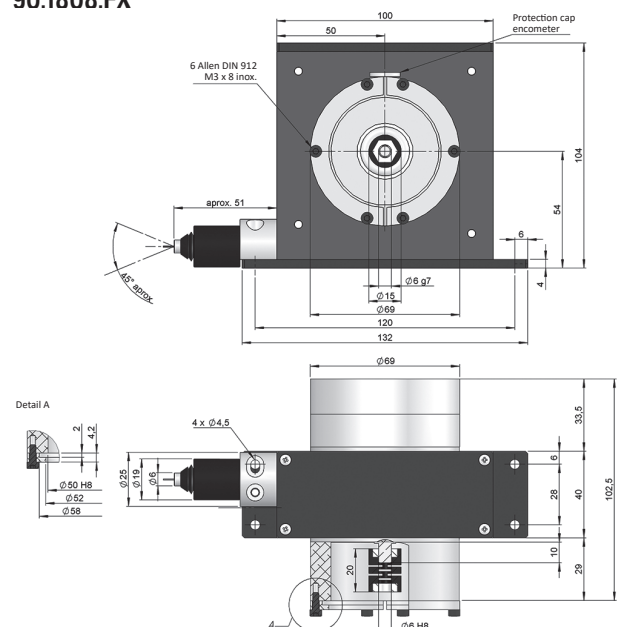


90.1808



Drawing 90.1808 with standard bell synchro and coupling type 1

90.1808.FX



Drawing 90.1808.FX with flexible accessory, standard bell synchro and coupling type 1

REFERENCE

Reference example: 90.1808.SY1

Serie	Fixing system to sensor	Coupling	Special Customer
90.1808 / 90.1808.FX	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
90.1808. Standard	SY. Standard bell synchro	1. PFP 1520 06/06	AW. Inverted caps
90.1808.FX. Flexible accessory	CL. Clamping bell	2. PFP 1520 06/6.35	BF. Outdoor (Anodised 5µm)
		3. PFP 2224 06/10	BL. Saline environment (Anodised 20µm)
			BD. Pressurized

Request the ENCO-METER already coupled to an electronic output device that could be an Incremental Optical Encoder, Multiturn Absolute Optical Encoder, Potentiometer or Multiturn Absolute Magnetic Encoder.

ENCO-METER EM8

EXTENDIBLE CABLE MEASUREMENT SYSTEM

TECHNICAL SPECIFICATIONS

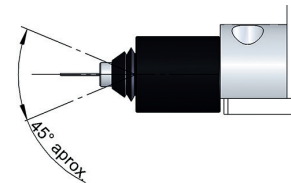
MODEL	EM8
Reference	90.1808 / 90.1808.FX
Travel	250 mm $\pm 0,06$ / per turn
Cable (*)	\varnothing 0,61 stainless steel AISI316 (structure 19 x 7 + 0)
Measurement range, up to (mm)	8000
Maximum cable extension (mm)	8010
Minimum cable static tension	6 N
Maximum cable static tension	13 N
Maximum extension acceleration	30 m/s ²
Maximum recovery acceleration	12 m/s ²
Maximum speed	0,75 m/s

Protection against dust and splashes according to DIN EN 60529

IP51

(*) Other types of cables are possible on special order.

FLEXIBLE ACCESSORY (FX)



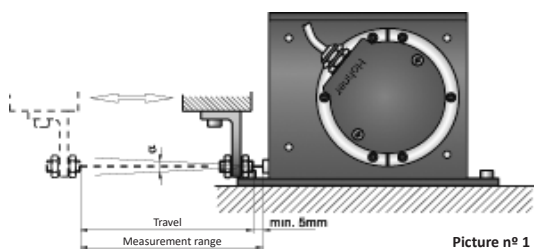
ENCO-METERS with flexible accessory FX (90.1404.FX, 90.1808.FX, 90.1810.FX) allow a misalignment of the extendable cable up to 45°.

ANODISED OPTIONS

+ **Special Customer BF:** 5 microns anodised housing for using in outdoor environments.

+ **Special Customer BD:** 20 microns anodised housing protected against the aggressive effect of the saltwater air.

INSTALLATION



Picture n° 1

ENCO-METER units are secured to a flat machine surface by means of three or four M4 screws. The cable must be correctly aligned and under no circumstances must it exceed the measurement range.

Special customer AW for inverted caps.

EM 90.1808: $\alpha < 2^\circ$ | EM 90.1808.FX: $\alpha < 45^\circ$

OUTPUT DEVICES

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

+ ABSOLUTE OR INCREMENTAL ENCODER

If it is required to obtain a determined resolution "r" (mm per pulse) in the case of using an absolute or incremental encoder, the number of encoder pulses (n) will be:

$$n = \frac{D}{r} \quad (D \text{ is ENCO-METER travel in mm})$$

+ POTENTIOMETER

Using a potentiometer, an output "r" ratio (in Ω per mm) is obtained in accordance with:

$$r = \frac{R}{D \cdot n} \quad (R \text{ is the rated resistance and } n \text{ is the maximum number of turns})$$

As standard, we have potentiometers of $R = 10K\Omega$ and $n = 10$ turns. It must be taken into consideration that the mechanical travel of the potentiometer may limit the ENCO-METER measurement range.

i Electronic output devices that are delivered coupled to an ENCO-METER have an orientation of 45°. See Installation picture n° 1.

i If devices are not supplied assembled, we recommend mounting the sensor on the ENCO-METER without the seal.

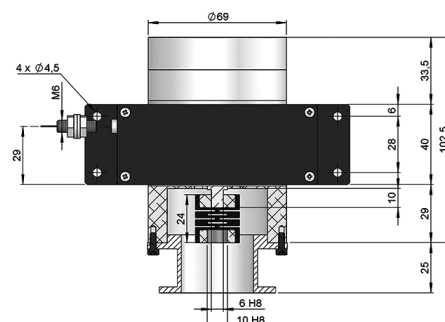
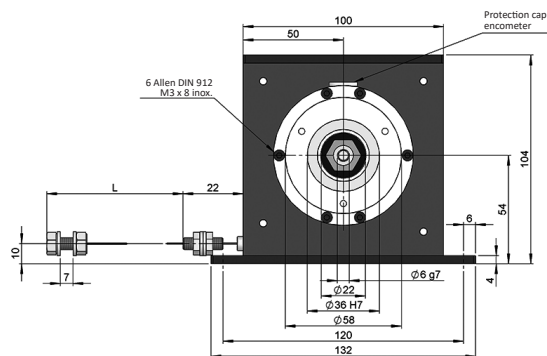
ENCO-METER EM8

EXTENDIBLE CABLE MEASUREMENT SYSTEM

FIXING SENSOR SYSTEM DIMENSIONS

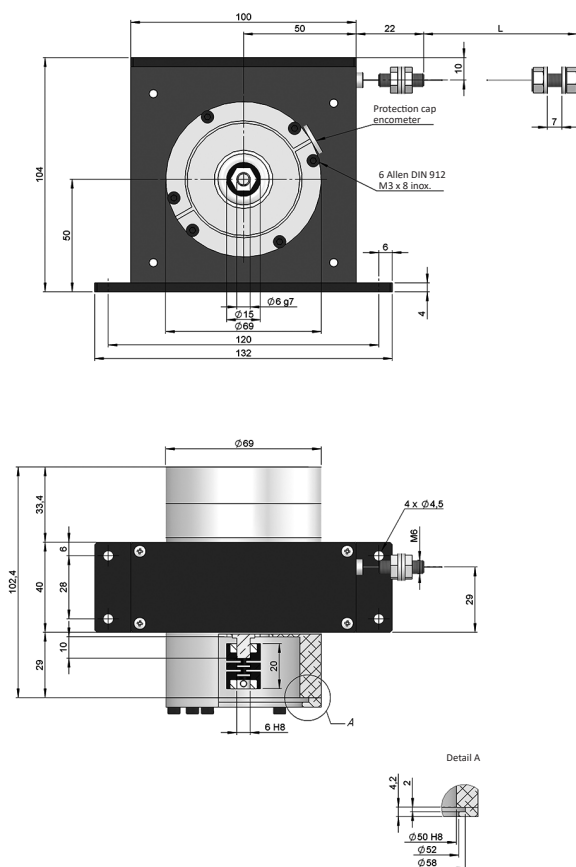
Fixing system to
sensor type CL
Clamping bell

Coupling type 3
PFP 2224 06/10



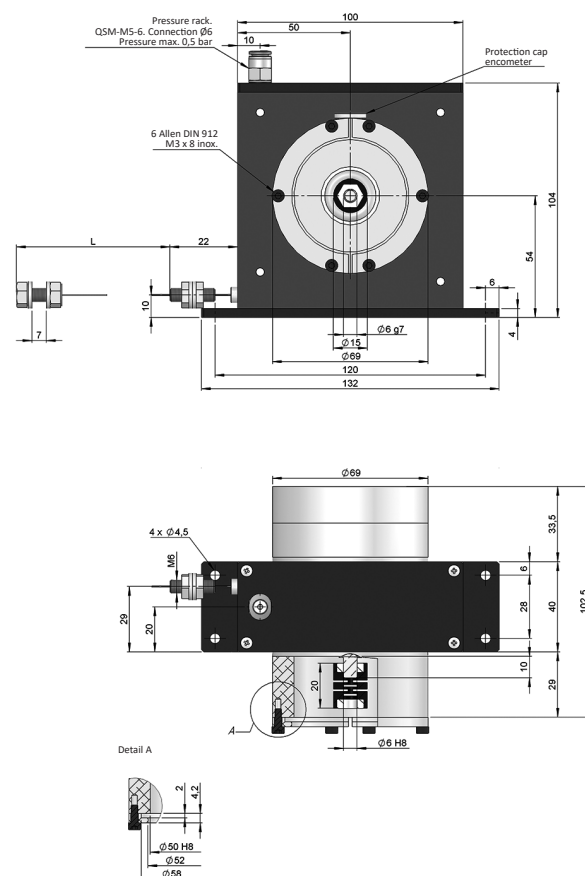
SPECIAL CUSTOMER OPTIONS

AW - Inverted caps

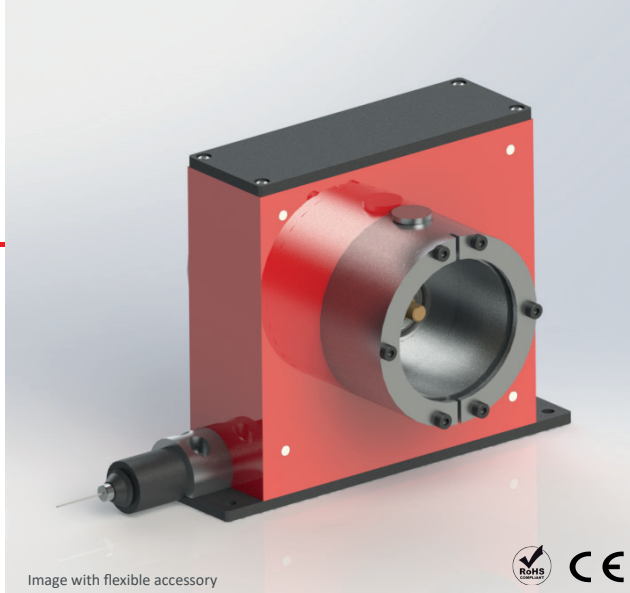


Drawing 90.1808, Special Customer AW

BD - Pressurized option



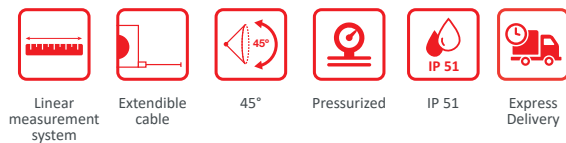
Drawing 90.1808, Special Customer BD



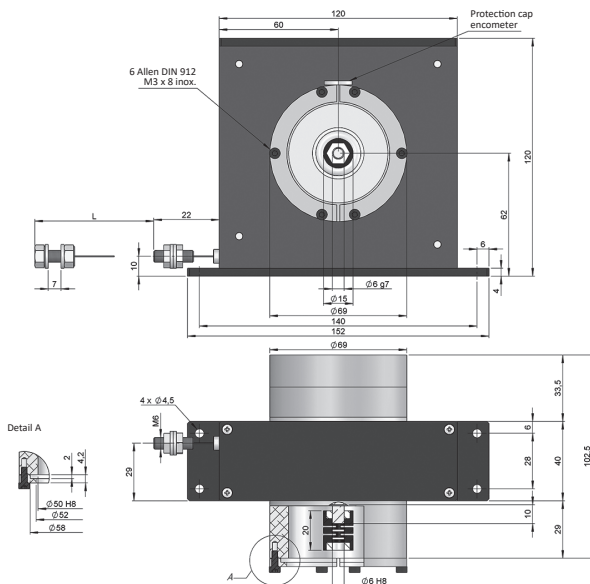
ENCO-METER EM10

EXTENDIBLE CABLE MEASUREMENT SYSTEM

- Measuring linear distances up to 10 meters
- Any mounting position possible
- Protection class IP51 according to DIN EN 60529
- Anodised and pressurized options available
- The drum shaft can drive any kind of rotary encoder (encoder, potentiometer, ...)
- Stainless steel extendible cable $\varnothing 0,61$ AISI316

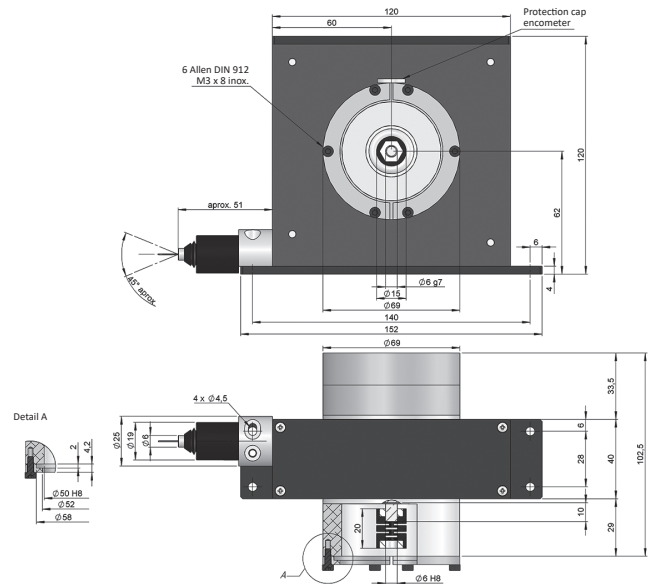


90.1810



Drawing 90.1810 with standard bell synchro and coupling type 1

90.1810.FX



Drawing 90.1810.FX with flexible accessory, standard bell synchro and coupling type 1

REFERENCE

Reference example: 90.1810.SY1

Serie	Fixing system to sensor	Coupling	Special Customer
90.1810 / 90.1810.FX	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
90.1810. Standard	SY. Standard bell synchro	1. PFP 1520 06/06	AW. Inverted caps
90.1810.FX. Flexible accessory	CL. Clamping bell	2. PFP 1520 06/6.35	BF. Outdoor (Anodised 5µm)
		3. PFP 2224 06/10	BL. Saline environment (Anodised 20µm)
			BD. Pressurized

Request the ENCO-METER already coupled to an electronic output device that could be an Incremental Optical Encoder, Multiturn Absolute Optical Encoder, Potentiometer or Multiturn Absolute Magnetic Encoder.

ENCO-METER EM10

EXTENDIBLE CABLE MEASUREMENT SYSTEM

TECHNICAL SPECIFICATIONS

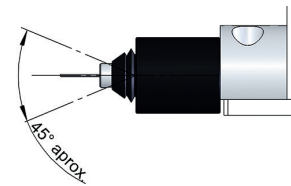
MODEL	EM10
Reference	90.1810 / 90.1810.FX
Travel	300 mm $\pm 0,06$ / per turn
Cable (*)	\varnothing 0,61 stainless steel AISI316 (structure 19 x 7 + 0)
Measurement range, up to (mm)	10000
Maximum cable extension (mm)	10010
Minimum cable static tension	6 N
Maximum cable static tension	13 N
Maximum extension acceleration	25 m/s ²
Maximum recovery acceleration	12 m/s ²
Maximum speed	0,75 m/s

Protection against dust and splashes according to DIN EN 60529

IP51

(*) Other types of cables are possible on special order.

FLEXIBLE ACCESSORY (FX)



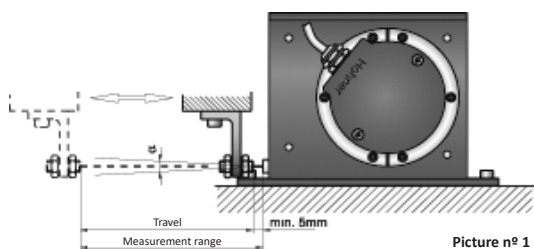
ENCO-METERS with flexible accessory FX (90.1404.FX, 90.1808.FX, 90.1810.FX) allow a misalignment of the extendable cable up to 45°.

ANODISED OPTIONS

+ **Special Customer BF:** 5 microns anodised housing for using in outdoor environments.

+ **Special Customer BD:** 20 microns anodised housing protected against the aggressive effect of the saltwater air.

INSTALLATION



Picture n° 1

ENCO-METER units are secured to a flat machine surface by means of three or four M4 screws. The cable must be correctly aligned and under no circumstances must it exceed the measurement range.

Special customer AW for inverted caps.

EM 90.1810: $\alpha < 2^\circ$ | EM 90.1810.FX: $\alpha < 45^\circ$

OUTPUT DEVICES

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

+ ABSOLUTE OR INCREMENTAL ENCODER

If it is required to obtain a determined resolution "r" (mm per pulse) in the case of using an absolute or incremental encoder, the number of encoder pulses (n) will be:

$$n = \frac{D}{r} \quad (D \text{ is ENCO-METER travel in mm})$$

+ POTENTIOMETER

Using a potentiometer, an output "r" ratio (in Ω per mm) is obtained in accordance with:

$$r = \frac{R}{D \cdot n} \quad (R \text{ is the rated resistance and } n \text{ is the maximum number of turns})$$

As standard, we have potentiometers of $R = 10K\Omega$ and $n = 10$ turns. It must be taken into consideration that the mechanical travel of the potentiometer may limit the ENCO-METER measurement range.

i Electronic output devices that are delivered coupled to an ENCO-METER have an orientation of 45°. See Installation picture n° 1.

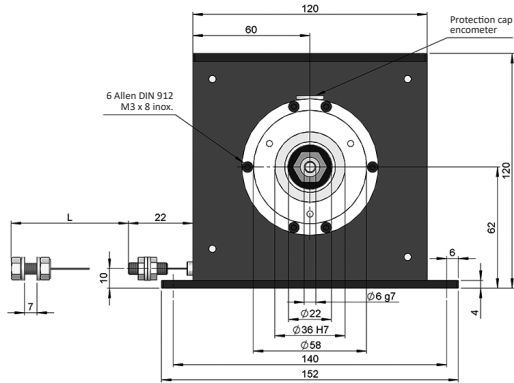
i If devices are not supplied assembled, we recommend mounting the sensor on the ENCO-METER without the seal.

ENCO-METER EM10

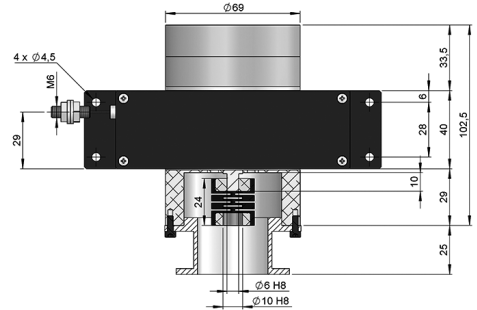
EXTENDIBLE CABLE MEASUREMENT SYSTEM

FIXING SENSOR SYSTEM DIMENSIONS

**Fixing system to
sensor type CL**
Clamping bell

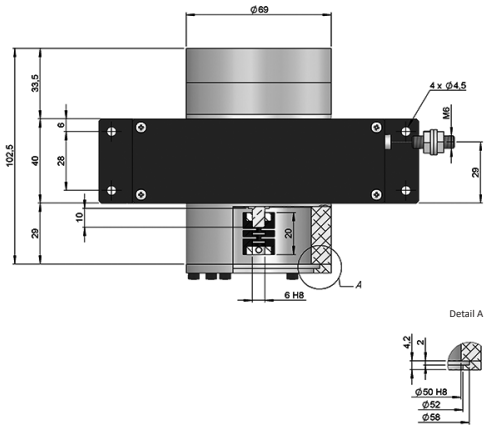
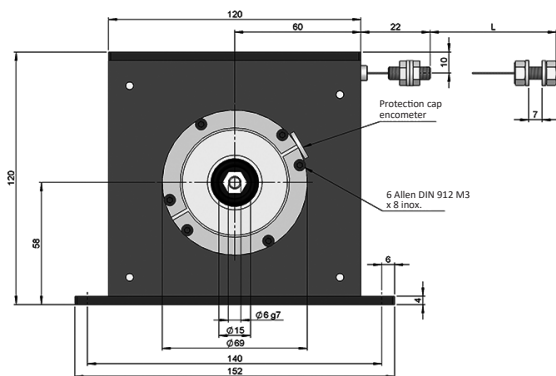


Coupling type 3
PFP 2224 06/10



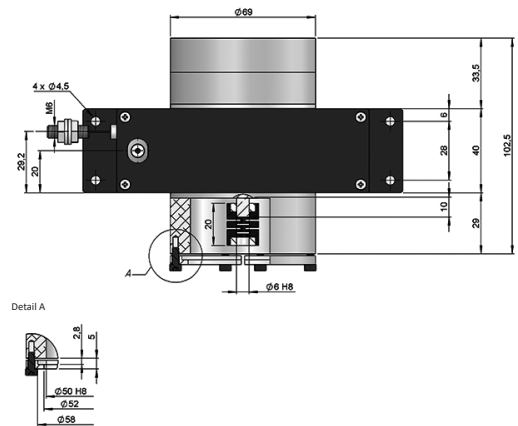
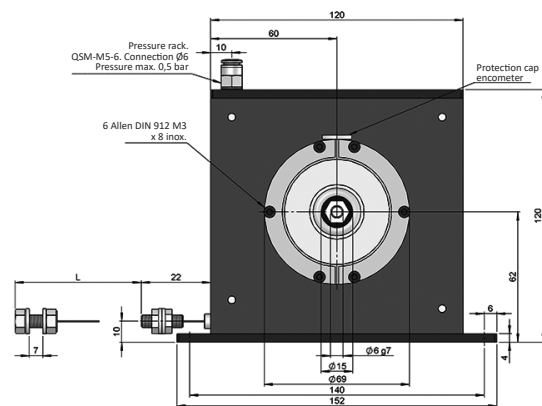
SPECIAL CUSTOMER OPTIONS

AW - Inverted caps



Drawing 90.1810, Special Customer AW

BD - Pressurized option



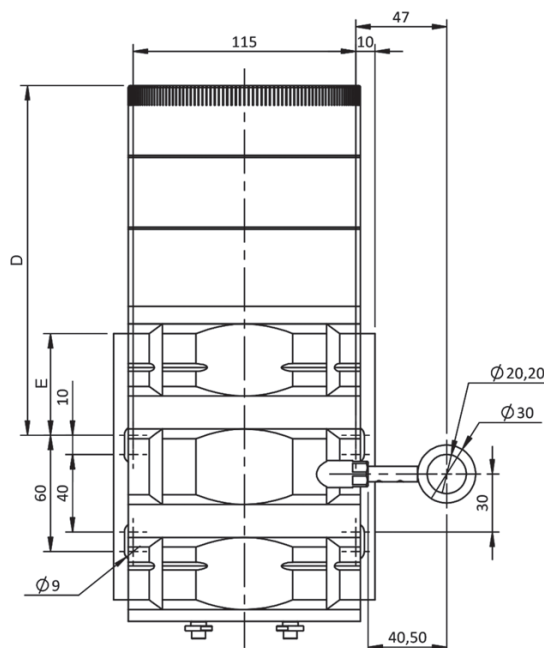
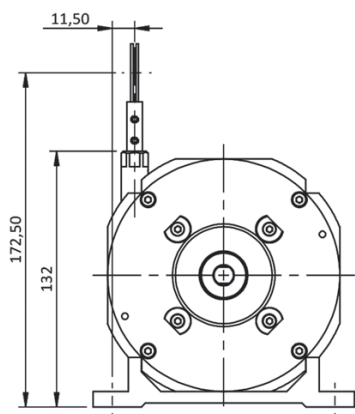
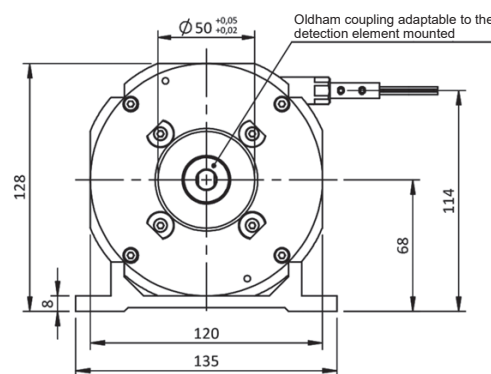
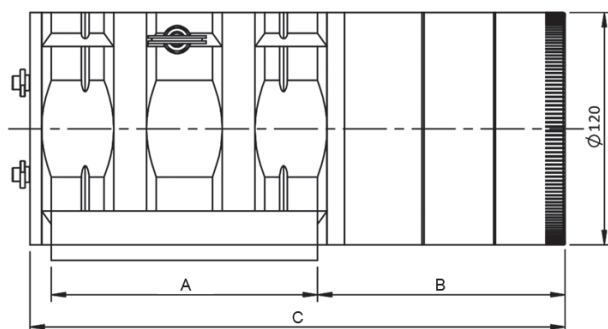
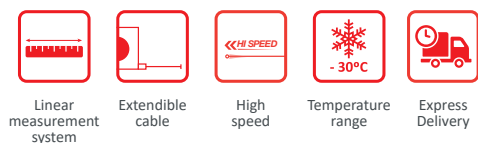
Drawing 90.1810 , Special Customer BD



SERIE XT12

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Measuring linear distances up to 15 meters
- Any mounting position possible
- High speed up to 10 m/s
- The drum shaft can drive any kind of rotary encoder or potentiometer
- Stainless steel measuring cable $\varnothing 0,90$ mm
- Different wire types and wire attachment options



SERIE	A	B	C	D	E
90.XT1210	102 mm	66 mm	181 mm	84,50 mm	18,50 mm
90.XT1215	137,50 mm	128 mm	276,50 mm	180,50 mm	52,50 mm

Drawing with a measuring cable attachment through eyelet

SERIE XT12

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

REFERENCE

Reference example: 90.XT1215

Serie	Measurement range	Special Customer
90.XT12	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
	10. up to 10000 mm 15. up to 15000 mm	BK. -30°C BL. Anodised BM. M6 threaded rod BN. Cleaning brush for the cable

The standard draw wire system includes a Ø10 coupling brace with adaptation flange.
Other coupling options and flanges available, upon request.

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

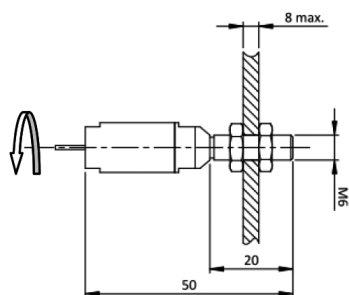
TECHNICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Measuring cable*: Ø 0,90 mm Stainless Steel
Travel	300 mm / per turn
Measurement range, up to (mm)	15000
Minimum cable static tension	10,5 N
Maximum cable static tension	15 N
Max. Acceleration	4 m/s ²
Max. Speed	10 m/s
Linearity	±0,05% f.s.
Weight aprox.	8 Kg
Operating temperature range	-20°C to +80°C - Standard -30°C to +80°C - Special Customer BK
Storage temperature range	-30°C to +80°C

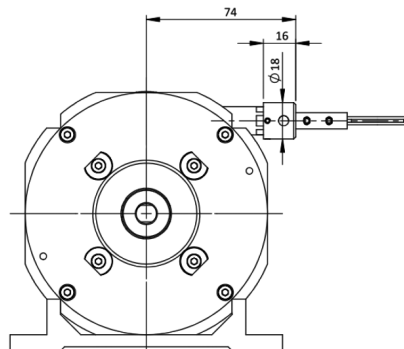
(*) Other types of cables are possible on special order.

SPECIAL CUSTOMER OPTIONS

BM - M6 threaded rod



BN - Cleaning brush for the cable

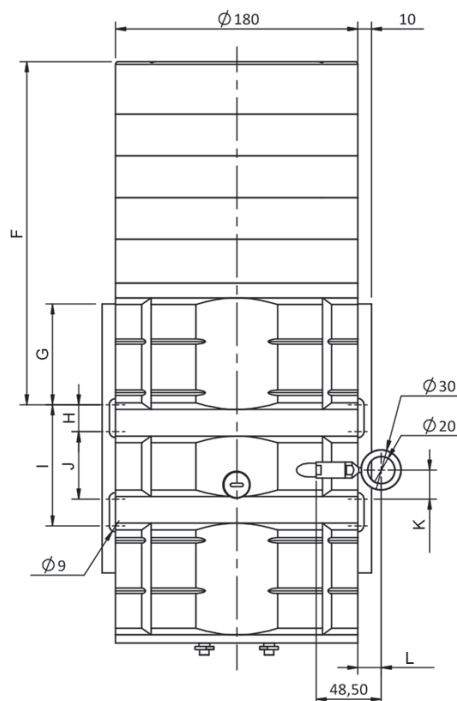
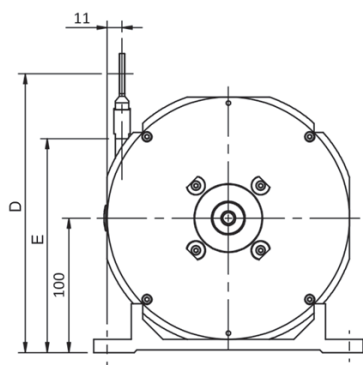
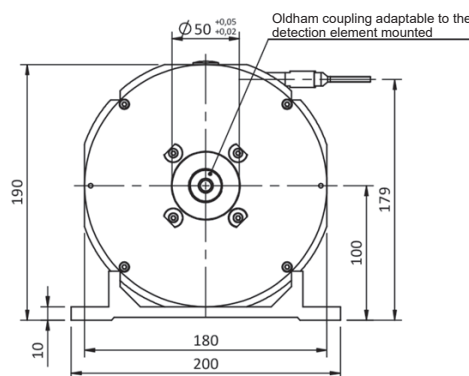
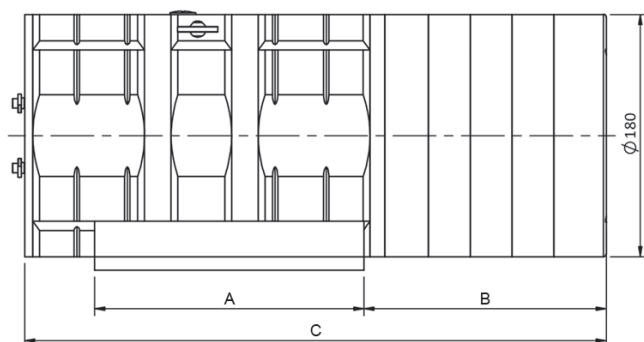
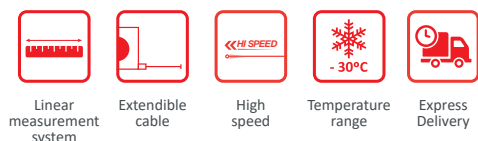




SERIE XT18

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Measuring linear distances up to 50 meters
- Any mounting position possible
- High speed up to 10 m/s
- The drum shaft can drive any kind of rotary encoder or potentiometer
- Stainless steel measuring cable $\varnothing 0,90$ mm
- Different wire types and wire attachment options



SERIE	90.XT1820	90.XT1830	90.XT1840	90.XT1850
A	110 mm	160 mm	180 mm	200 mm
B	154,50 mm	148 mm	180 mm	180 mm
C	282,50 mm	319 mm	392 mm	432 mm
D	218,50mm	218,50 mm	218,50 mm	207,37 mm
E	170 mm	170 mm	170 mm	159 mm
F	174,50 mm	183 mm	235 mm	255 mm
G	20 mm	35 mm	55 mm	75 mm
H	10 mm	20 mm	20 mm	20 mm
I	80 mm	90 mm	90 mm	90 mm
J	60 mm	50 mm	50 mm	50 mm
K	38 mm	21,50 mm	21,50 mm	21,50 mm
L	17,50 mm	28,50 mm	28,50 mm	17,50 mm

Drawing with a measuring cable attachment through eyelet

SERIE XT18

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

REFERENCE

Reference example: 90.XT1850

Serie	Measurement range	Special Customer
90.XT18	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
	20. up to 20000 mm 30. up to 30000 mm 40. up to 40000 mm 50. up to 50000 mm	BK. -30°C BL. Anodised BM. M6 threaded rod BN. Cleaning brush for the cable

The standard draw wire system includes a Ø10 coupling brace with adaptation flange.
Other coupling options and flanges available, upon request.

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

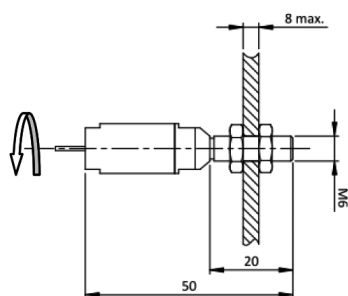
TECHNICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Measuring cable*: Ø 0,90 mm Stainless Steel
Travel	500 mm / per turn
Measurement range, up to (mm)	50000
Minimum cable static tension	15 N
Maximum cable static tension	30 N
Max. Acceleration	2 m/s ² (90.XT1820, 90.XT1830) 1 m/s ² (90.XT1840, 90.XT1850)
Max. Speed	10 m/s
Linearity	±0,05% f.s.
Weight aprox.	12 Kg (90.XT1820), 15 Kg (90.XT1830) 20 Kg (90.XT1840), 23 Kg (90.XT1850)
Operating temperature range	-20°C to +80°C - Standard -30°C to +80°C - Special Customer BK
Storage temperature range	-30°C to +80°C

(*) Other types of cables are possible on special order.

SPECIAL CUSTOMER OPTIONS

BM - M6 threaded rod



BN - Cleaning brush for the cable

