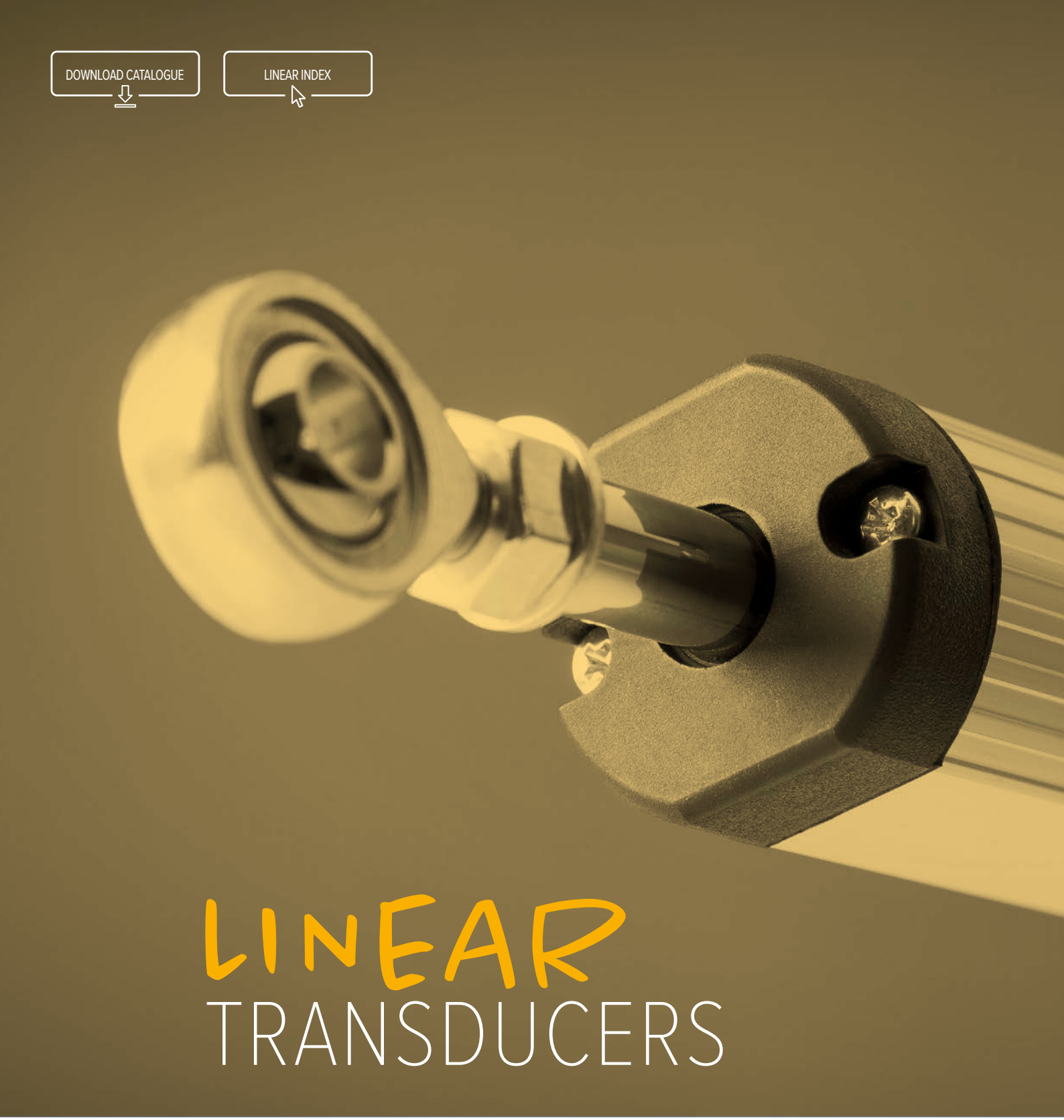
DOWNLOAD CATALOGUE

LINEAR INDEX



LINEAR TRANSDUCERS

High reliability even in the heavy environments

The potentiometers are an ideal solution for commonly used machines in material production, such as injection presses for plastics and rubber, thanks to the presence of a groove in the housing that makes them easy to install. ELTRA's linear transducers are engineered for high accuracy, high cycle-life and easy installation with standard strokes ranging from 10 mm (4/10") to 1250 mm (4 ft). They provide accurate sensing in a wide range of configurations.
ELTRA offers linear sensors with a rod style for fitting into hydraulic cylinders or profile housings for convenient mounting. These sensors provide absolute positioning, greater reliability, easy control, noise reduction, robustness, increased productivity, reduced shock and stress on mechanical parts, and high precision for optimal performance. Our cost-effective solutions ensure that you get the best value for your investment.

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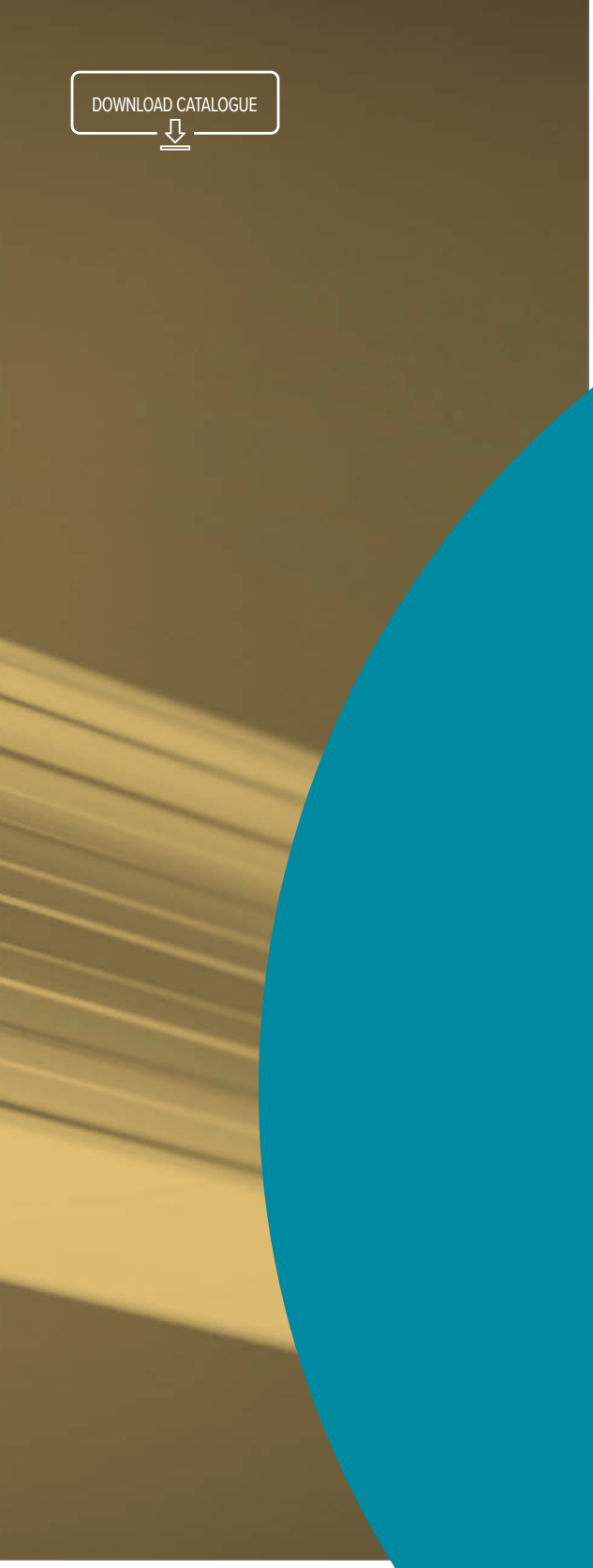
DOWNLOAD CATALOGUE



ER A / B / C / D / E / F
INCREMENTAL LINEAR ENCODER

MAIN FEATURES

Incremental linear system based on optical or magnetic principle.
Easy mounting with two joint heads.

- 0,01 mm max resolution (after quad evaluation)
- Available with or without zero mark on left, right or central position
- Up to 1 m/s travel speed
- Working stroke up to 500 mm
- Cable output, connectors available at cable end
- Mounting by joint heads

ORDERING CODE

ER A 100 S 8/24 P 6 P . XXX

SERIES
incremental linear encoder ER

RESOLUTION
0,2 mm A
0,1 mm B
0,04 mm C
1 mm D
0,5 mm E
0,2 mm F

WORKING STROKE
working stroke (mm) from 100 to 500

ZERO PULSE
without zero pulse S
(mod. A) central zero index C
(mod. A) right zero index (closed position) D
(mod. A) left zero index (open position) Z

POWER SUPPLY
5 V DC 5
8 ... 24 V DC 8/24

ELECTRICAL INTERFACE
(mod. A) NPN open collector C
push-pull P
line driver L

BALL JOINTS FIXING HOLE DIAMETER
mm 6

OUTPUT TYPE
radial cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after output type

VARIANT
custom version XXX

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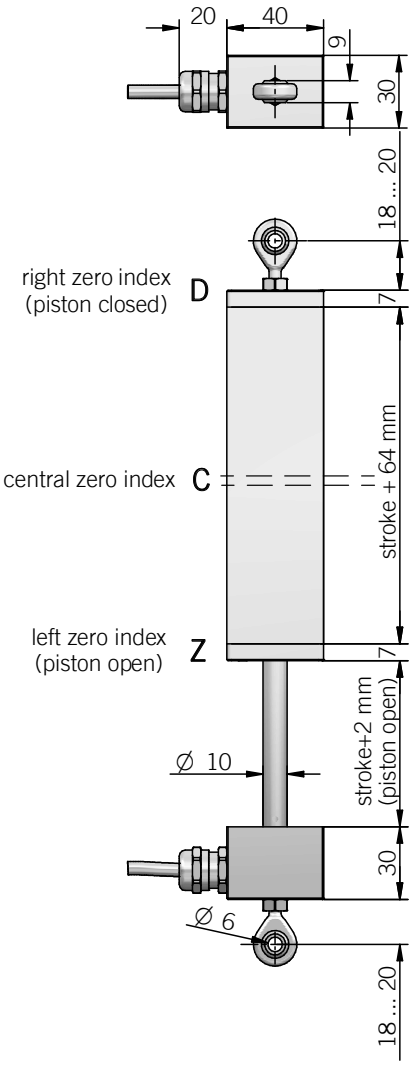
A / B / C / D / E / F

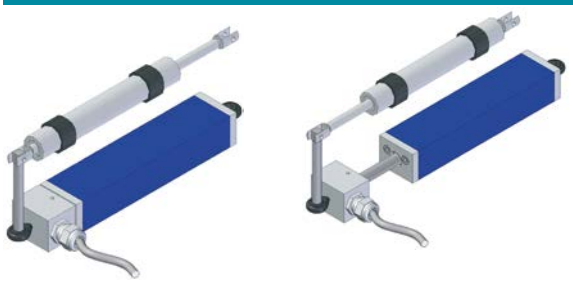


dimensions in mm

CONNECTIONS

Function	Cable C / P	Cable L
+V DC	red or brown	red
0 V	black or grey	black
A+	green	green
A-	/	brown or grey
B+	yellow	yellow
B-	/	orange
Z+	blue or white	blue
Z-	/	white
⏚	shield	shield

APPLICATION EXAMPLE



ELECTRICAL SPECIFICATIONS

Technology	optical mod. A magnetic mod. B / C / D / E / F
Resolution	A / F = 0,2 mm (0,05 mm after quad eval) B = 0,1 mm (0,025 mm after quad eval) C = 0,04 mm (0,01 mm after quad eval) D = 1 mm (0,25 mm after quad eval) E = 0,5 mm (0,125 mm after quad eval)
Linearity error	± 1/4 pulse
Power supply[1]	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC mod. A 8/24 = 4,5 ... 30 V DC (reverse polarity protection) mod. B / C / D / E / F
Current consumption without load	< 100 mA max
Max load current	50 mA / channel (NPN open) 20 mA / channel (push pull / line driver)
Electrical interface[2]	NPN open collector (pull-up max +30 V DC) push-pull / line driver HTL (AEIC-7272 or similar)
Max output frequency	100 kHz
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	431 years mod. A 318 years mod. B / C / D / E / F
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Counting direction	A leads B (piston opening) mod. A B leads A (piston opening) mod. B / C / D / E / F
Cable type	shielded - fixed or flexible installation conductors section 0,14 mm² / AWG 26 min bending radius min 60 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

MECHANICAL SPECIFICATIONS

Working stroke	100 - 150 - 200 - 250 - 300 - 350* - 400* - 500* mm * vertical mounting only (mod.A)
Enclosure rating	IP 64 (IEC 60529)
Travel speed	1 m/s max
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)
Rod material	stainless steel
Housing material	painted aluminum
Fixing	n.2 ball joints with ø 6 mm hole
Operating temperature[3, 4]	-10° ... +60°C (+14° ... +140°F)
Storage temperature[4]	-25° ... +70°C (-13° ... +158°F)
Weight	400 ... 1000 g (14,11 ... 35,27 oz)

[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] measured on transducer housing
[4] condensation not allowed

ETMA 1 / 2 / 4 / 5 / 6

MAGNETIC INCREMENTAL LINEAR SENSOR

MAIN FEATURES

Incremental linear system based on the magnetic principle with no wear thanks to non-contact technology. Thanks to its high IP rating, ETMA is suitable for applications in harsh environments such as marble and glass processing machines, washing machines.

- Resolution up to 0,01 mm
- Power supply up to +30 V DC with various electrical interfaces available
- Up to 4 m/s travel speed
- IP 67 as protection grade
- Cable output, connectors available at cable end

ORDERING CODE

ETMA	1	Z	5	L	S	PR3	. XXX

SERIES
magnetic incremental linear sensor ETMA

RESOLUTION
0,1 mm 1
0,04 mm 2
0,2 mm 4
0,5 mm 5
1 mm 6

ZERO PULSE
without zero pulse S
with zero pulse Z

POWER SUPPLY
(with L electrical interface) 5 V DC 5
5 ... 28 V DC 5/28

ELECTRICAL INTERFACE
push-pull P
line driver L
power supply 5/28 V DC - output RS-422 RS

ENCLOSURE RATING
IP 67 S

OUTPUT TYPE
cable length 3m PR3
preferred cable lengths 6 / 10 / 20 m, to be added after output type

VARIANT
custom version XXX

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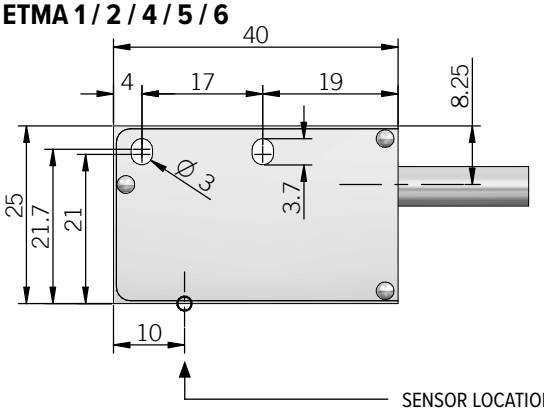
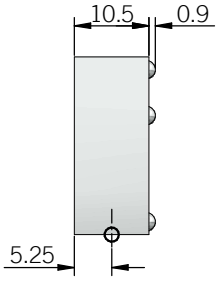
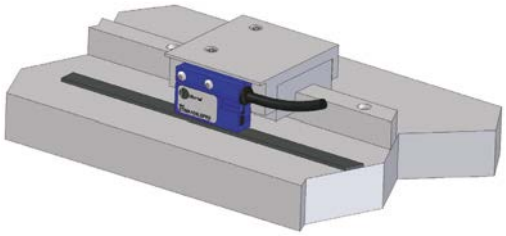
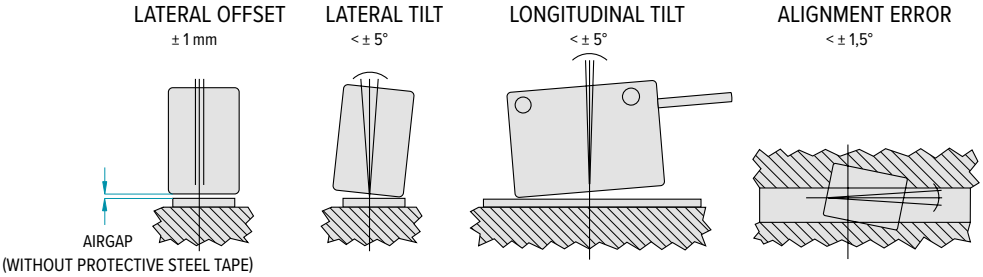
ETMA 1 / 2 / 4 / 5 / 6







MECHANICAL TOLERANCES



dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	1 = 0,1 mm (0,025 mm after quad eval) 2 = 0,04 mm (0,01 mm after quad eval) 4 = 0,2 mm (0,05 mm after quad eval) 5 = 0,5 mm (0,125 mm after quad eval) 6 = 1 mm (0,25 mm after quad eval)
Zero pulse	ETMA 1 / 4 / 5 = every 5 mm ETMA 2 / 6 = every 2 mm
Power supply[1]	5 = 4,5 ... 5,5 V DC 5/28 = 4,5 ... 30 V DC (reverse polarity protection)
Current consumption without load	30 mA max
Max load current	20 mA / channel
Electrical interface[2]	push-pull / line driver HTL (AEIC-7272 or similar) line driver RS-422 (AELT-5000 or similar)
Accuracy (at +20°C / +68°F)	± 1/4 pulse with recommended airgap
Travel speed	4 m/s
Cable type	shielded - fixed or flexible installation conductors section 0,14 mm² / AWG 26 min bending radius min 60 mm
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	318 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	file n. E212495

[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] measured on the transducer flange
[5] condensation allowed

MECHANICAL SPECIFICATIONS

Enclosure rating	IP 67 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Housing material	anodized aluminium
Fixing	n.2 holes ø 3 mm
Operating temperature[4,5]	-20° ... +85°C (-4° ... +185°F)
Storage temperature[5]	-25° ... +70°C (-13° ... +158°F)
Air gap	ETMA 1 / 4 / 5 1 ... 2 mm (1,5 mm recommended) ETMA 2 / 6 0,1 ... 1 mm (0,3 mm recommended)
Weight	150 g (5,29 oz)

CONNECTIONS

Function	Cable P	Cable L / RS
+V DC	red or brown	red
0 V	black or grey	black
A+	green	green
A-	/	brown or grey
B+	yellow	yellow
B-	/	orange
Z+	blue or white	blue
Z-	/	white
⏚	shield	shield

EBMA

INCREMENTAL MAGNETIC TAPE

MAIN FEATURES

- Magnetic tape for use with ETMA
- Easy to install with premounted double-sided adhesive
- 2 mm or 5 mm pole pitch
- High pole accuracy
- Available in rolls up to 50 m

ORDERING CODE

EBM A 1 - 10 . XXX

SERIES
magnetic tape EBM

TAPE TYPE
10 mm width magnetic tape A

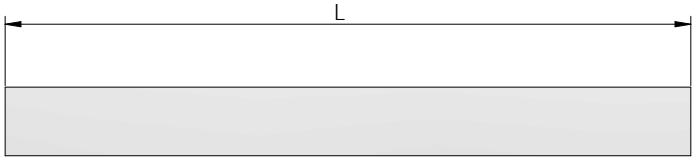
PITCH
5mm pitch for ETMA 1 / 4 / 5 1
2mm pitch for ETMA 2 / 6 2

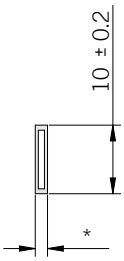
separate the code with a dash -

TAPE LENGTH
from 0,5 m to 50 m 10

VARIANT
custom version XXX

EBMA





1,43 ± 0,13 mm WITHOUT STEEL COVER TAPE
1,66 ± 0,15 mm WITH STEEL COVER TAPE

dimensions in mm

for fixing clips please refer to Accessories

GENERAL SPECIFICATIONS

Operating temperature	-20° ... +100°C (-4° ... +212°F)
Accuracy	± 40 µm/m
Linear expansion coefficient	17 x 10^{-6} m/K
Bending radius	> 65 mm without steel cover tape > 100 mm with steel cover tape

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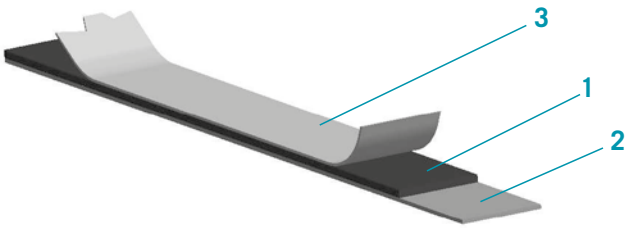
CONSTRUCTION

As shown in the figure below, Eltra magnetic tape is made up of three layers:

1 - a flexible elastomer magnetic tape filled with ferrite
2 - a stainless steel tape used to create a shield against any external magnetic flux and other external agents. It's also glued to the top layer to give the magnetic tape the
mechanical rigidity. The stainless steel tape is supplied with a double-sided acrylic adhesive (thickness 0.13 mm), not shown in the illustration.
3 - a steel tape, magnetically transparent, with the function of mechanically protecting the magnetic layer; it is the most rigid part and is therefore supplied separately
for transport and application purposes. It must be stuck on the magnetic tape by the user. The steel tape is supplied with a double-sided acrylic adhesive (thickness
0.13 mm) not shown in the illustration.



To prevent damage from possible internal stresses in the magnetic tape, the tape should be wound with the magnetic layer facing outwards, with a minimum internal diameter of 200 mm and a minimum of 5 mm between layers. If supplied in single strips, leave at least 10 mm between strips.

TIPS FOR APPLYING THE MAGNETIC TAPE

Fixing pressure
Magnetic tape is adhesive. It is therefore important that there is optimum contact between the surfaces for correct use.
Good pressure must be applied evenly to ensure a perfect result.

Applying temperature
To ensure optimum adhesion, a surface temperature between +20°C and +37°C (+68°F to +98.6°F) is recommended. Maximum adhesion is achieved after 72 hours at a temperature of +21°C (+69.8°F). Do not apply magnetic tape if the surface temperature is below +10°C (+50°F).

Application materials
Magnetic tape must be applied to dry, smooth and clean surfaces. The surfaces must be cleaned with an aqueous solution (such as water and 50% alcohol or heptane). Metallic surfaces such as brass, copper, etc. must be protected to prevent possible oxidation.

CHEMICAL AGENTS AND MAGNETIC TAPE BEHAVIOUR

Null effect	Medium effect	Strong effect
motor oil	JP-4 fuel	aromatic hydrocarbons (benzene, toluene, xylene, trichloroethylene, freon 10)
transmission oil	gasoline	ketones (acetone)
ATF (automatic transmission fluid)	heptane	mineral acids (hydrochloric, sulphuric, nitric, phosphoric, boric)
hydraulic oil	alcohols	
kerosene		
antifreeze		
detergents, disinfectants (Clorox®)		
turpentine		
water		
salt spray		

TMAA

MAGNETIC ABSOLUTE LINEAR SENSOR

MAIN FEATURES

Absolute linear system based on the magnetic principle with no wear thanks to non-contact technology. Thanks to its high IP rating, TMAA is suitable for applications in harsh environments
such as marble and glass processing machines or washing machines.

- 5 µm max absolute resolution / 1 µm incremental resolution
- Power supply up to +30 V DC with SSI electrical interface
- Up to 5 m/s travel speed
- IP 67 as protection grade
- M12 radial connector
- For use with BMAA magnetic tape

ORDERING CODE	TMAA	5	G	5/30	S	1	L	G	S	M12R	.162

SERIES
magnetic absolute linear sensor TMAA

ABSOLUTE RESOLUTION
5 µm 5
10 µm 10

CODE TYPE
gray G

POWER SUPPLY
5 ... 30V DC 5/30

ELECTRICAL ABSOLUTE INTERFACE
Serial Synchronous Interface - SSI S

INCREMENTAL RESOLUTION
without incremental signals X
1 µm 1
5 µm 5
10 µm 10

ELECTRICAL INCREMENTAL INTERFACE
to be reported if not used X
RS-422 L

MAX INCREMENTAL SIGNALS FREQUENCY
to be reported if not used X
1250 kHz A
100 kHz D
15 kHz G
refer to the table for travel speed limits

ENCLOSURE RATING
IP 67 S

OUTPUT TYPE
12 pin M12 radial plug connector M12R

SOCKET
socket not included .162
for socket see Accessories

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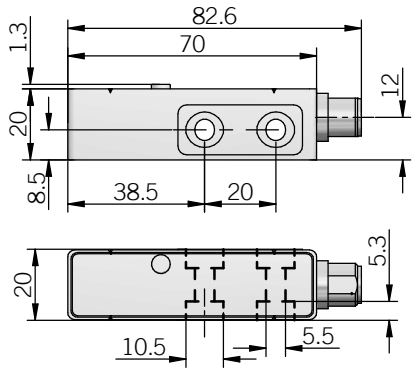
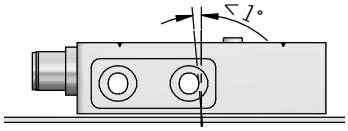
TMAA

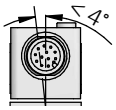


MOUNTING TOLERANCES

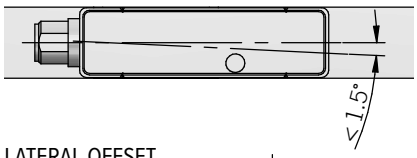
LONGITUDINAL TILT



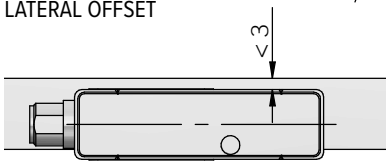
LATERAL TILT



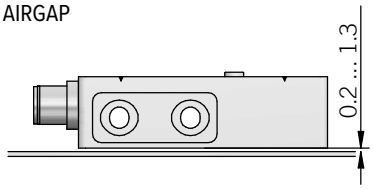
ALIGNMENT ERROR



LATERAL OFFSET



AIRGAP



dimensions in mm
for connector please refer to Accessories

CONNECTIONS

Function	M12 connector 12 pin
+ V DC	5
0 V	12
A+	7
A-	6
B+	9
B-	8
DATA +	2
DATA -	3
CLOCK +	11
CLOCK -	4
PROG	10

M12 connector (12 pin)
M12 A coded
front view

ELECTRICAL SPECIFICATIONS

Absolute resolution	5 - 10 µm
Incremental resolution	1 - 5 µm
Stroke	≤ 10240 mm
Power supply[1]	4,5 ... 30 V DC (reverse polarity protection)
Power draw without load	< 1,5 W
Electrical interface for absolute signals[2]	RS-422
Electrical interface for incremental signals[2]	RS-422
Clock frequency	50 ... 750 kHz
Pause time (Tc)	> 25 µs
SSI frame	MSB ... LSB 27 bit data lenght 24 bit data + 3 bit status
Code type	gray
Accuracy (sensor+tape)	± (0,02 + 0,03 x lenght) mm lenght in meter
Repeatability	± 5 µm, ± 1 increment
Max travel speed	≤ 5 m/s for absolute output refer to the table for incremental output
Mean time to dangerous failure ($MTTF_d$)[3] **according to EN ISO 13849-1**	106 years
Mission time (Tm)[3]	20 years
Diagnostic coverage (DC)[3]	0%
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

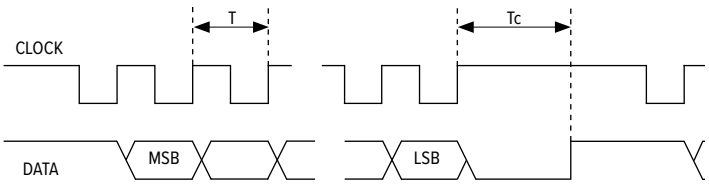
Enclosure rating	IP 67 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 10 ... 2000 Hz (IEC 60068-2-6)
Housing material	zinc die-cast
Operating temperature[3, 4]	-30° ... +85°C (-22° ... +185°F)
Storage temperature[4]	-40° ... +85°C (-40° ... +185°F)
Working distance from magnetic tape **without steel cover tape**	0,2 ... 1,3 mm
Weight	80 g (2,82 oz)

[1] as measured at the transducer without cable influences
[2] for further details refer to OUTPUT LEVELS on TECHNICAL BASICS section
[3] this product is not a safety component, for further details refer to TECHNICAL BASICS section
[4] measured on the transducer flange
[5] condensation allowed

INCREMENTAL FREQUENCY - TRAVEL SPEED

Resolution (µm)	Travel speed (m/s)		
1	4	0,32	0,05
5	20	1,60	0,25
10	25	3,20	0,50
Max frequency (Khz)	1250	100	15,63

SSI INTERFACE



CLOCK Input from controller
T Clock signal period
Tc Pause time

DOWNLOAD CATALOGUE

LINEAR INDEX

BMAA

ABSOLUTE MAGNETIC TAPE

MAIN FEATURES

- Magnetic tape for use with TMAA
- Easy to install with premounted double-sided adhesive
- High pole accuracy
- Available in rolls up to 75 m

ORDERING CODE

BMA A 50 - 1 . XXX

SERIES
magnetic tape BMA

TAPE TYPE
20 mm width magnetic tape A

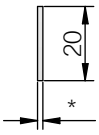
ACCURACY CLASS
± 50 µm 50

separate the code with a dash -

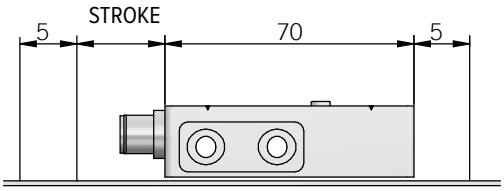
TAPE LENGTH
0,2 ... 75 m 1
in intervals of 0,1 m

VARIANT
custom version XXX

BMAA



1,4 mm without steel cover tape
1,58 mm with steel cover tape



Minimum tape lenght (mm) = 70 + 10 + STROKE

dimensions in mm

for fixing clips please refer to Accessories

SPECIFICATIONS

Operating temperature	-20° ... +70°C (-4° ... +158°F)
Storage temperature	-40° ... +70°C (-40° ... +158°F)
Relative humidity	100%
Accuracy	± 50 µm
Linear expansion coefficient	(11 ± 1) x 10^{-6} m/K
Bending radius	> 350 mm

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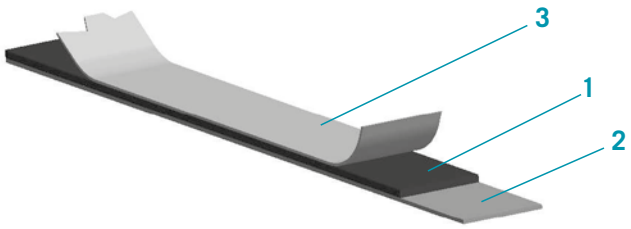
CONSTRUCTION

As shown in the figure below, Eltra magnetic tape is made up of three layers:

1 - a flexible elastomer magnetic tape filled with ferrite
2 - a stainless steel tape used to create a shield against any external magnetic flux and other external agents. It's also glued to the top layer to give the magnetic tape the
mechanical rigidity. The stainless steel tape is supplied with a double-sided acrylic adhesive (thickness 0.13 mm), not shown in the illustration.
3 - a steel tape, magnetically transparent, with the function of mechanically protecting the magnetic layer; it is the most rigid part and is therefore supplied separately
for transport and application purposes. It must be stuck on the magnetic tape by the user. The steel tape is supplied with a double-sided acrylic adhesive (thickness
0.13 mm) not shown in the illustration.



To prevent damage from possible internal stresses in the magnetic tape, the tape should be wound with the magnetic layer facing outwards, with a minimum internal diameter of 200 mm and a minimum of 5 mm between layers. If supplied in single strips, leave at least 10 mm between strips.

TIPS FOR APPLYING THE MAGNETIC TAPE

Fixing pressure
Magnetic tape is adhesive. It is therefore important that there is optimum contact between the surfaces for correct use.
Good pressure must be applied evenly to ensure a perfect result.

Applying temperature
To ensure optimum adhesion, a surface temperature between +20°C and +37°C (+68°F to +98.6°F) is recommended. Maximum adhesion is achieved after 72 hours at a temperature of +21°C (+69.8°F). Do not apply magnetic tape if the surface temperature is below +10°C (+50°F).

Application materials
Magnetic tape must be applied to dry, smooth and clean surfaces. The surfaces must be cleaned with an aqueous solution (such as water and 50% alcohol or heptane). Metallic surfaces such as brass, copper, etc. must be protected to prevent possible oxidation.

CHEMICAL AGENTS AND MAGNETIC TAPE BEHAVIOUR

Null effect	Medium effect	Strong effect
motor oil	JP-4 fuel	aromatic hydrocarbons (benzene, toluene, xylene, trichloroethylene, freon 10)
transmission oil	gasoline	ketones (acetone)
ATF (automatic transmission fluid)	heptane	mineral acids (hydrochloric, sulphuric, nitric, phosphoric, boric)
hydraulic oil	alcohols	
kerosene		
antifreeze		
detergents, disinfectants (Clorox®)		
turpentine		
water		
salt spray		

FE
ROPE ENCODER FOR LINEAR MEASURES

MAIN FEATURES

Rope encoder series with Dyneema rope available for lengths up to 4 m.
The applied encoder can be incremental or absolute. Perfectly suitable for harsh environments thanks to its high mechanical resistance. It can be used in a wide range of applications such as: vertical warehouses, presses, extruders, etc.

ORDERING CODE

FE 1500 A - EH30

SERIES
rope encoder for linear measures FE

WORKING STROKE
1,5 m 1500
4 m 4000

TYPE OF ROPE END
eyelet A

ENCODER FLANGE MODEL
EAM53
EL/ER53
EH/EMI30M

The encoder used with the FE model must be ordered separately. The letter F must be placed in front of the ordering code.
Example:
1) encoder model EH 30 M ordering code: FEH30M300S5/28P6X6PR
2) encoder model EL 53 B ordering code: FEL53B1100S5/28P6X3MR
3) encoder model EAMR 53 B ordering code: FEAMR53B12/13G8/30SX6XM12R
4) encoder model EAML 53 B ordering code: FEAML53B16B12/30V010X6M12R

Complete ordering code example:
FE1500A-EH30
FEH30M1024S5/28P6X6PR

SPECIFICATIONS

Model	FE 1500	FE 4000
Linearity error	± 0,75 mm	± 2 mm
Drum circumference	120 mm	220 mm
Max speed	0,85 m/s	
Pull-out force required	≥ 9 N (2,02 lbs)	
Enclosure rating	depends on encoder IP	
Shock	50 G, 11 ms (IEC 60068-2-27)	
Vibration	10 G, 10 ... 2000 Hz (IEC 60068-2-6)	
Housing material	painted aluminum	
Rope material	Dyneema®	
Operating temperature	-10° ... +60°C (+14° ... +140°F)	
Storage temperature	-25° ... +70°C (-13° ... +158°F)	
Weight	500 g (17,64 oz) mod. 1500 1100 g (38,80 oz) mod. 4000	
Electromagnetic compatibility	see encoder	
RoHS	see encoder	

Mechanical resolution [mm] = Drum circumference [mm] / Encoder pulses [ppr o singleturn resolution]

For encoder specifications, refer to single product datasheet :
- FEH 30 M see EH 30 M - EH 30 MH encoder
- FEL 53 B see EL - ER 53 encoder
- FEAMR 53 B see EAMR 58 - 63 solid shaft encoder
- FEAML 53 B see EAML 58 - 63 solid shaft encoder

FE installation notes

A 5 mm wire extension is recommended before the measurement start point.
This will prevent the wire from snapping back to the stop on when rewinding.
The wire should be pulled straight out in line with the wire outlet; the wire must not spring back loosely, it must be loaded by spring force in all situations and movements.
Do not twist or bend the wire seat or the wire.
Do not open the spring housing of the rope encoder.
Do not extend the wire beyond the specified maximum extension length.

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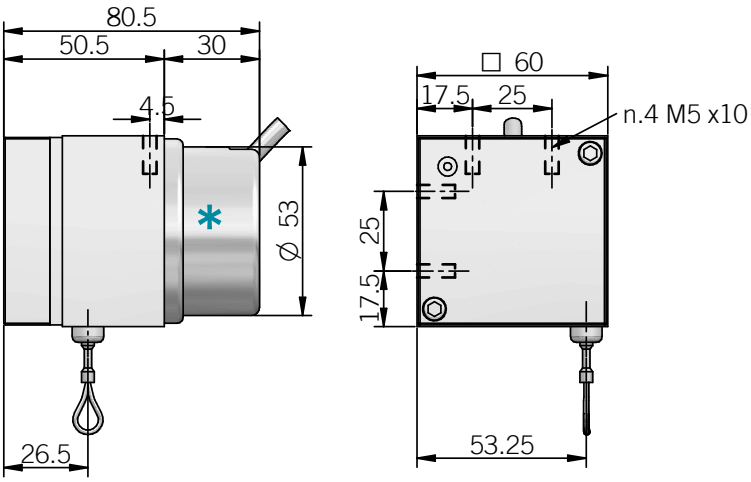
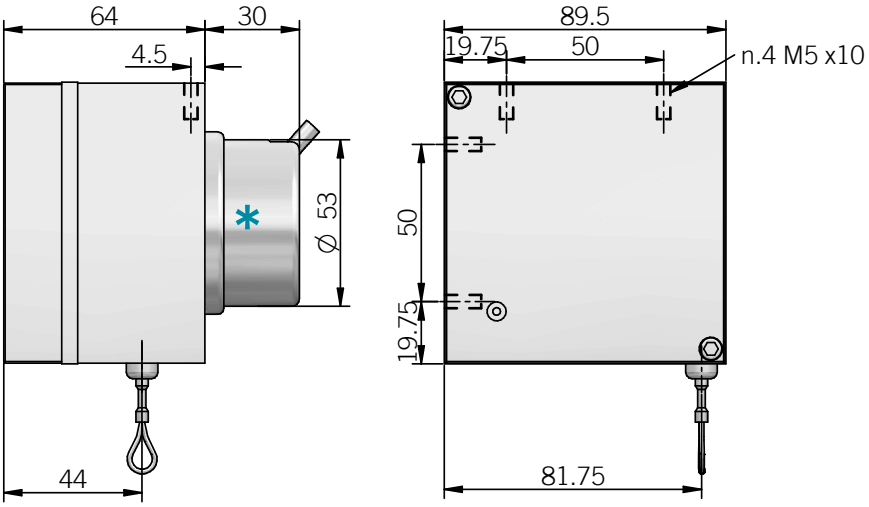
FE 1500



* dimensions with EH30M encoder

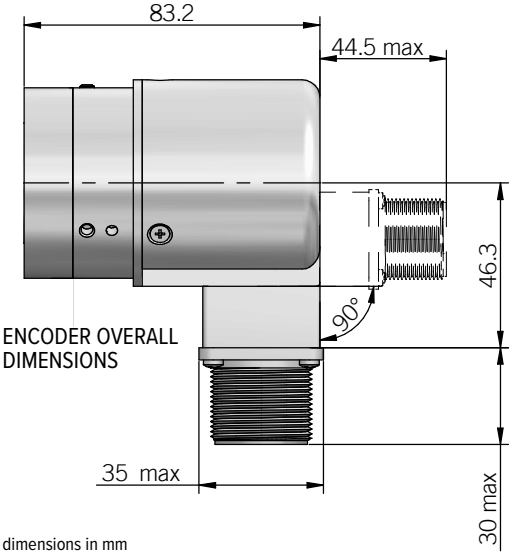
FE 4000



* dimensions with EH30M encoder

FEL 53 B

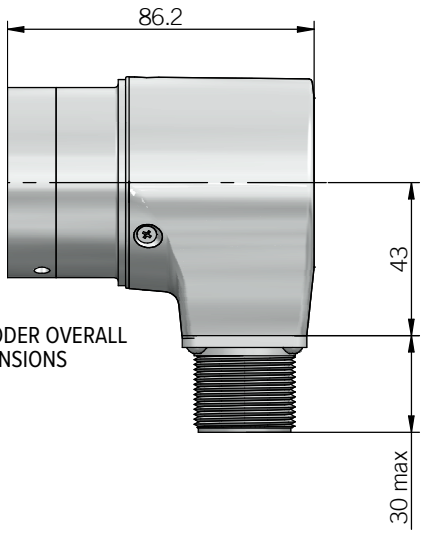
✱ INCREMENTAL ENCODER APPLICATION



ENCODER OVERALL DIMENSIONS

FEAMR 53 B

✱ MULTITURN ABSOLUTE ENCODER APPLICATION



ENCODER OVERALL DIMENSIONS

dimensions in mm

FES

ROPE ENCODER FOR LINEAR MEASURES

MAIN FEATURES

Rope encoder series with steel rope available for lengths up to 15 m.
The attached encoder can be incremental or absolute.
Perfectly suitable also for harsh environments, thanks to its excellent mechanical resistance.
It can be used in wide range of applications such as: vertical warehouses, presses, extruders, etc.

ORDERING CODE

FES 3000 A -58B

SERIES
rope encoder for linear measures FES

WORKING STROKE
3 m 3000
6 m 6000
15 m 15000

OUTPUT TYPE
horizontal output A

ENCODER FLANGE MODEL
58B

Incremental or absolute (model 58B) must be ordered together.
Please add the letter F in front of the standard encoder ordering code.
Example:
1) with incremental encoder ordering code will be : FER58B ...
2) with absolute multiturn encoder ordering code will be : FEAMR58B ...
3) with absolute Profinet multiturn encoder ordering code will be : FAAM58BR ...

Complete ordering code example:
FES3000A-58B
FER58B1024Z5/28L6X3PR

SPECIFICATIONS

Model	FES 3000	FES 6000	FES 15000
Max length measurement	3 m	6 m	15 m
Drum circumference	200 mm	200 mm	500 mm
Wire diameter	0,87 mm	0,6 mm	0,87 mm
System accuracy	/	± 0,1%	± 0,1%
Repeat accuracy	± 0,15 mm	± 0,15 mm	± 0,2 mm
Max speed	0,8 m/s	3 m/s	≤ 2,4 m/s
Max acceleration	/	≤ 23,5 m/s²	/
Pull-out force required	≥ 3 N (0,67 lbs)	≥ 8 N (1,8 lbs)	≥ 15,5 N (3,48 lbs)
Housing material	aluminum / plastic		aluminium die casting
Rope material	steel		steel rope, synthetically coated
Enclosure rating	depends on encoder IP		
Shock (IEC 60068-2-27)	/	50 G, 11 ms	/
Vibrations (IEC 60068-2-6)	/	10 G, 5 ... 150 Hz	/
Operating temperature	-40° ... +80°C (-40° ... +176°F)	-20° ... +80°C (-4° ... +176°F)	-40° ... +80°C (-40° ... +176°F)
Weight	350 g (12,35 oz) + encoder	600 g (24,69 oz) + encoder	2500 g (88,18 oz) + encoder
(EMI-EMIP-ER 58B) L*	95 mm	120 mm	112 mm
(EAMR 58B) L*	98 mm	123 mm	115 mm
(AAM 58BR PROFINET/ETHERCAT) L*	125,5 mm	151 mm	143 mm
(EMI-EMIP-ER 58B) C*	57 mm	51 mm	41 mm
(EAMR 58B) C*	57 mm	51 mm	41 mm
(AAM 58BR PROFINET/ETHERCAT) C*	90 mm	83,5 mm	73,5 mm
Electromagnetic compatibility	see encoder		
RoHS	see encoder		

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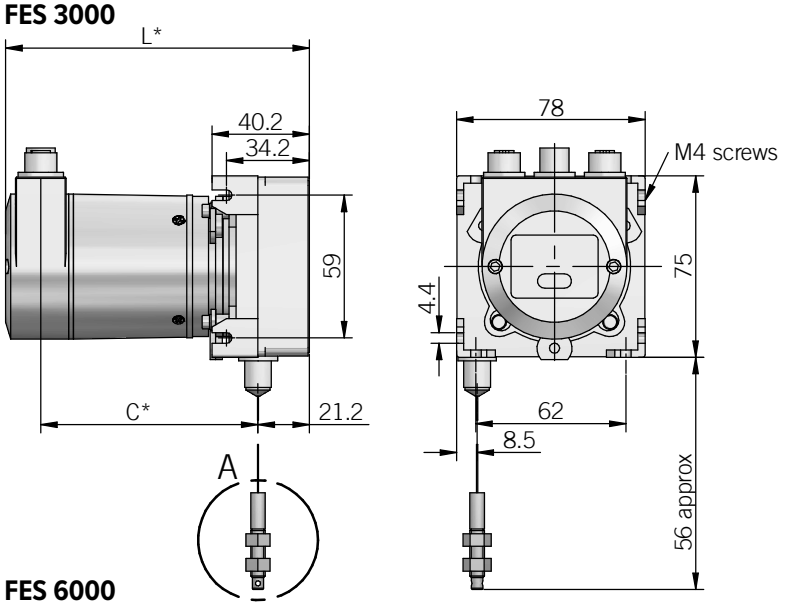
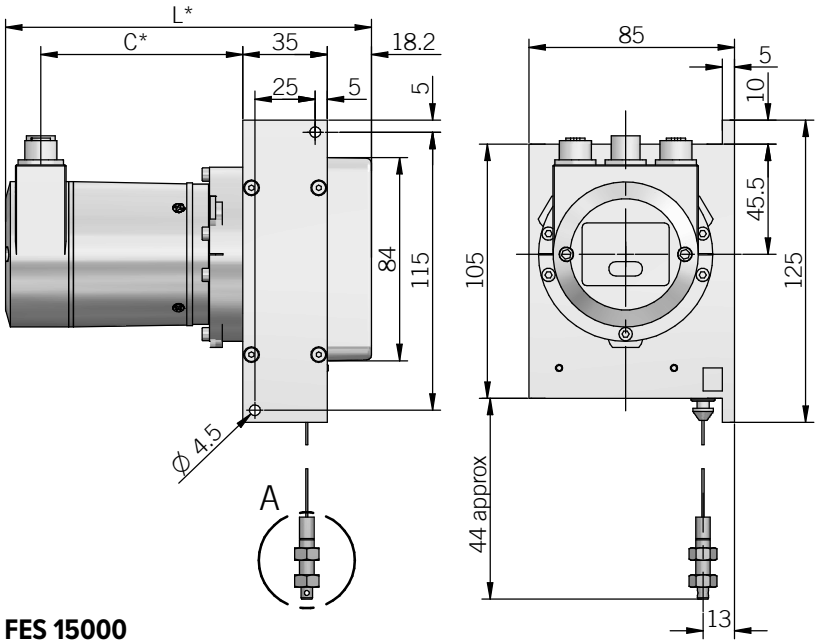
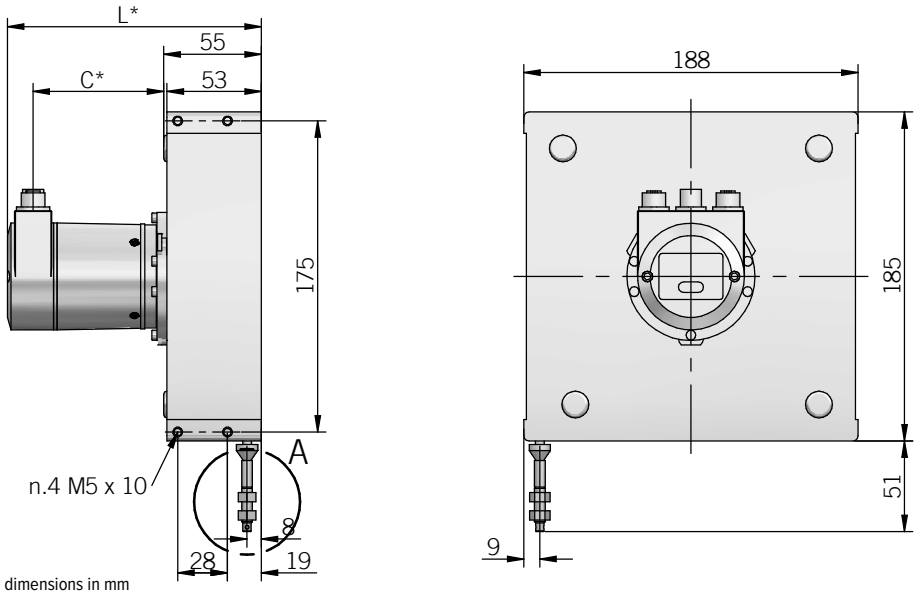
FES 3000



FES 6000



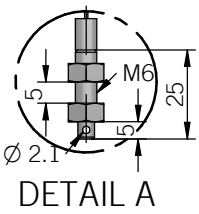
FES 15000



dimensions in mm

FES installation notes

A 5 mm wire extension is recommended before the measurement start point. This will prevent the wire from snapping back to the stop on when rewinding.
The wire should be pulled straight out in line with the wire outlet; the wire must not spring back loosely, it must be loaded by spring force in all situations and movements.
Do not twist or bend the wire seat or the wire.
Do not open the spring housing of the rope encoder.
Do not extend the wire beyond the specified maximum extension length



EPLA
LINEAR POTENTIOMETER

MAIN FEATURES

EPLA is an absolute linear potentiometer that guarantees high reliability even in harsh applications with strong vibrations and shocks. The groove on the housing of the transducer is an excellent alternative to the usual system of mounting with brackets.
Installation is also simplified by the absence of variations in the electrical output signal outside the theoretical electrical stroke. EPLA is the right solution for material processing machines such as injection presses for plastics, rubber, etc.

ORDERING CODE

EPLA	200	X	10	C5	A

SERIES
linear potentiometer model EPLA

STROKE
mm from 50 to 900
see table for stroke availability

ENCLOSURE RATING
IP 60 X
IP 65 S

TRAVEL SPEED
max 10 m/s 10

OUTPUT TYPE
cable (standard length 1 m) P
3 pin connector C3
EN 175301-803 form A (DIN 43650-A) 4 pin connector C4
DIN 43322 5 pin connector C5

OUTPUT DIRECTION
axial A

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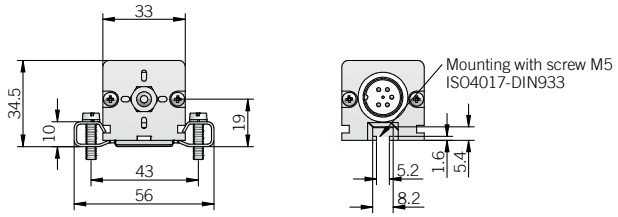
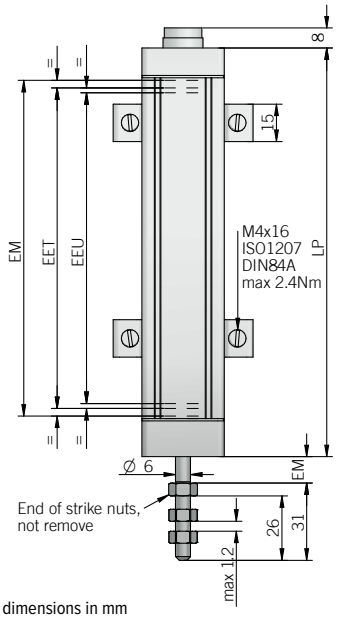
EPLA



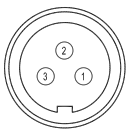


dimensions in mm

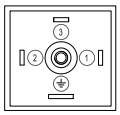
CONNECTIONS

Function	Cable	3 pin C3	4 pin C4	5 pin C5
+	blue	3	3	3
-	brown	1	1	1
OUTPUT	yellow	2	2	2
NC	/	/	4	4
NC	/	/	/	5

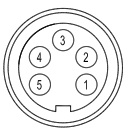
C3 connector (3 pin)
front view



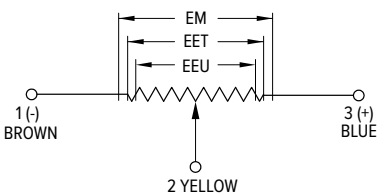
C4 connector (4 pin)
EN 175301-803 form A
front view



C5 connector (5 pin)
DIN 45322
front view



- fixing kit (brackets, screws) included
- socket connector not included, please refer to Accessories



ELECTRICAL SPECIFICATIONS

Resolution	virtually infinite
Independent linearity	± 0,05 %
Repeatability	0,01 mm
Resistance tolerance	± 20 %
Recommended cursor current	< 0,1 µA
Resistence thermal coefficient	-200 ... 200 ppm / °C typical
Output voltage temperature coefficient	≤ 5 ppm / °C
Power dissipation	3 W at 40 °C / 0 W at 120 °C
Max cursor current	10 mA
Applicable voltage	60 V DC max
Electrical insulation	> 100 MΩ, 500 V DC, 1 bar, 2 s
Dielectric strenght	< 100 µA, 500 V AC, 50 Hz, 1 bar, 2 s
Cable type	shielded - fixed installation conductors section 0,20 mm² / AWG 24 bending radius min 40 mm
RoHS	according to 2011/65/EU directive

Important: data are valid if the transducer is used as a ratiometric device with a maximum applicable current ≤ 0,1 µA

MECHANICAL SPECIFICATIONS

Stroke	50 - 100 - 150 - 200 - 300 - 350 - 400 - 450 - 500 - 600 - 750 - 900 mm
Useful electric stroke (EEU) (+ 3 / - 0 mm)	see stroke (mm)
Theoretical electric stroke (EET) (±1 mm)	EEU + 3 mm (50 ... 150),EEU + 4 mm (200 ... 300), 355 mm (350), 406 mm (400), 457 mm (450), 508 mm (500), 609 mm (600), 762 mm (750), 914 mm (900)
Mechanical stroke (EM)	EEU + 9 mm (50 ... 150),EEU + 10 mm (200 ... 300), 361 mm (350), 412 mm (400), 463 mm (450), 518 mm (500), 619 mm (600), 772 mm (750), 924 mm (900)
Resistance (on the EET)	5 kΩ (50 ... 600) 10 kΩ (750 ... 900)
Case length (LP)	EEU + 63 mm (50 ... 150), EEU + 64 mm (200 ... 300), 415 mm (350), 466 mm (400), 517 mm (450), 572 mm (500), 673 mm (600), 826 mm (750), 978 mm (900)
Travel speed	10 m/s max
Acceleration	200 m/s² max
Enclosure rating	X = IP 60 (IEC 60529) S = IP 65 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 5 ... 2000 Hz (IEC 60068-2-6)
Displacement force typical	3,5 N (0,79 lbs) with X enclosure rating 15 N (3,37 lbs) with S enclosure rating
Housing material	anodized aluminium / Nylon 66 G
Pull shaft material	stainless steel
Mounting	brackets with variable center-to-center distance or M5 ISO4017 - DIN933 screw
Life	> 25 x 10⁶ m strokes or > 100 x 10⁶ manoeuvres
Operating temperature[1, 2]	-30° ... +100°C (-22° ... +212°F)
Storage temperature[2]	-50° ... +120°C (-58° ... +248°F)

[1] measured on transducer
[2] condensation not allowed

Installation warnings:
- connect the transducer according to the specified connections
- DO NOT use it as a variable resistor
- the transducer must be calibrated by adjusting the stroke so that the output signal is between 1% and 99% of the voltage level

DOWNLOAD CATALOGUE

LINEAR INDEX

EPLB

CYLINDRICAL LINEAR POTENTIOMETER

MAIN FEATURES

EPLB is an absolute linear potentiometer transducer.
Mechanical mounting is facilitated by the presence of sferical joints on both sides and by the cylindrical shape of the housing.
The main feature is the absence of variations in the electrical output signal outside the theoretical electrical travel. Thanks to its robustness and precision, the EPLB is an excellent solution for most mechanical automation applications.

ORDERING CODE

EPLB	300	S	5	P	R

SERIES
cylindrical linear potentiometer model EPLB

STROKE
mm from 50 to 750
see table for stroke availability

ENCLOSURE RATING
IP 65 S

TRAVEL SPEED
max 5 m/s 5

OUTPUT TYPE
cable (standard length 1 m) P
3 pin connector C3
EN 175301-803 form C (DIN 43650-C) 4 pin connector C4
M16 IP40 DIN 43322 5 pin connector C5

OUTPUT DIRECTION
radial R

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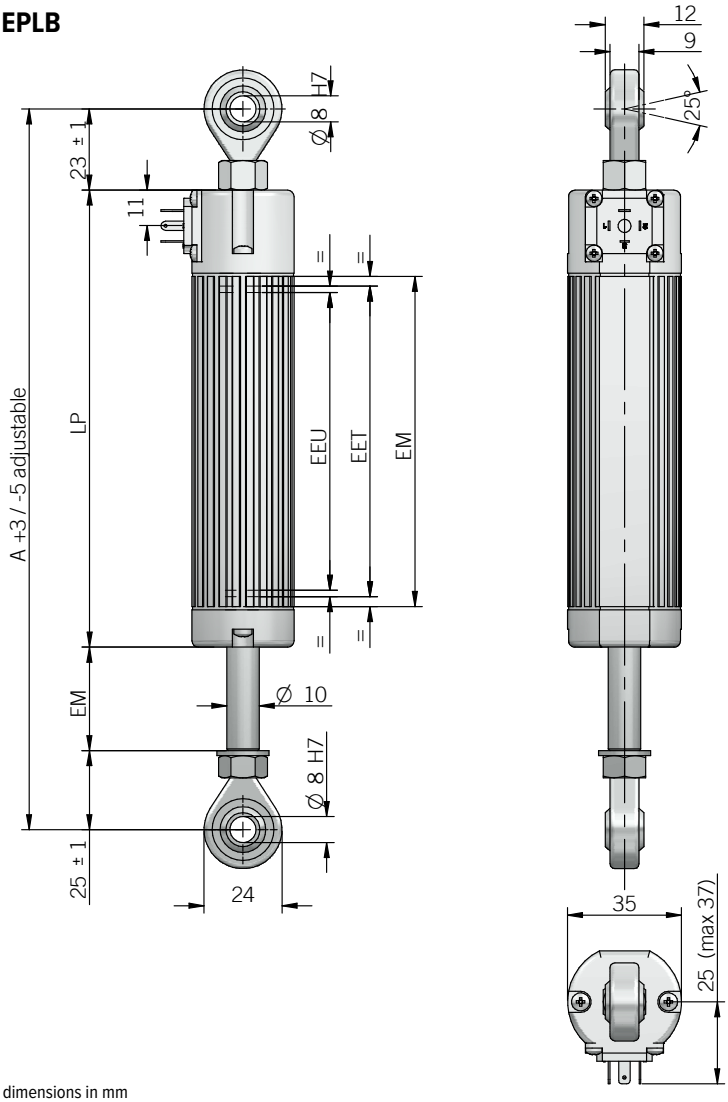
EPLB

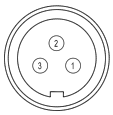


dimensions in mm

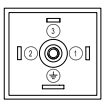
CONNECTIONS

Function	Cable	3 pin C3	4 pin C4	5 pin C5
+	blue	3	3	3
-	brown	1	1	1
OUTPUT	yellow	2	2	2
NC	/	/	4	4
NC	/	/	/	5

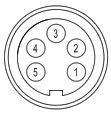
C3 connector (3 pin)
front view



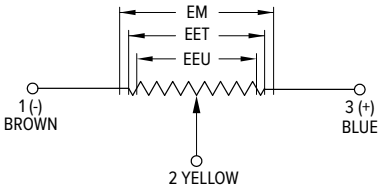
C4 connector (4 pin)
EN 175301-803 form C
front view



C5 connector (5 pin)
DIN 43322
front view



· socket connector not included, please refer to Accessories



ELECTRICAL SPECIFICATIONS

Resolution	virtually infinite
Independent linearity	± 0,05 %
Repeatability	0,01 mm
Resistance tolerance	± 20 %
Recommended cursor current	< 0,1 µA
Output voltage temperature coefficient	≤ 1,5 ppm / °C
Power dissipation	3 W at 40 °C / 0 W at 120 °C
Max cursor current	10 mA
Applicable voltage	60 V max
Electrical insulation	> 100 MΩ, 500 V DC, 1 bar, 2 s
Dielectric strenght	< 100 µA, 500 V AC, 50 Hz, 1 bar, 2 s
Cable type	shielded - fixed installation conductors section 0,20 mm² / AWG 24 bending radius min 40 mm
RoHS	according to 2011/65/EU directive

Important: data are valid if the transducer is used as a ratiometric device with a maximum applicable current ≤ 0,1 µA

MECHANICAL SPECIFICATIONS

Stroke	50 - 100 - 150 - 200 - 300 - 400 - 450 - 500 - 600 - 750 mm
Useful electric stroke (EEU) (+3/-0 mm)	see stroke (mm)
Theoretical electric stroke (EET) (±1 mm)	EEU + 3 mm (50 ... 150), EEU + 4 mm (200 ... 300), 406 mm (400), 457 mm (450), 508 mm (500), 609 mm (600), 762 mm (750)
Mechanical stroke (EM)	EEU + 9 mm (50 ... 150), EEU + 10 mm (200 ... 300), 412 mm (400), 463 mm (450), 518 mm (500), 619 mm (600), 772 mm (750)
Resistance (on the EET)	5 kΩ (50 ... 600) 10 kΩ (750)
Case length (LP)	EEU + 130,5 mm (50 ... 150), EEU + 131,5 mm (200 ... 300), 539,5 mm (400), 590,5 mm (450), 665,5 mm (500), 766,5 mm (600), 919,5 mm (750)
Minimum interaxis length (A)	EEU + 177 mm (50 ... 150), EEU + 178 mm (200 ... 300), 586 mm (400), 637 mm (450), 712 mm (500), 813 mm (600), 966 mm (750)
Travel speed	5 m/s max
Enclosure rating	IP 65 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 5 ... 2000 Hz (IEC 60068-2-6)
Displacement force	≤ 15 N (3,37 lbs)
Moving angle	± 25° max
Housing material	anodized aluminium / Nylon 66 G
Rod material	stainless steel
Mounting	2 selfloading and selfaligning ball-joints
Life	> 25 x 10^6 m strokes or > 100 x 10^6 manoeuvres
Operating temperature[1, 2]	-30° ... +100°C (-22° ... +212°F)
Storage temperature[2]	-50° ... +120°C (-58° ... +248°F)

[1] measured on transducer
[2] condensation not allowed

Installation warnings:
- connect the transducer according to the specified connections
- DO NOT use it as a variable resistor
- the transducer must be calibrated by adjusting the stroke so that the output signal is between 1% and 99% of the voltage level

EPLC
RODLESS LINEAR POTENTIOMETER

MAIN CHARACTERISTICS

EPLC is an absolute linear potentiometer transducer without an internal rod.
This transducer is characterised by a cursor with integrated coupling that slides along the axis.
The main characteristic is the absence of variations in the electrical output signal outside the theoretical electrical travel.

ORDERING CODE

EPLC	500	X	4	C4	A

SERIES
rodless linear potentiometer model EPLC

STROKE
mm from 100 to 1500
see table for stroke availability

ENCLOSURE RATING
IP 40 X

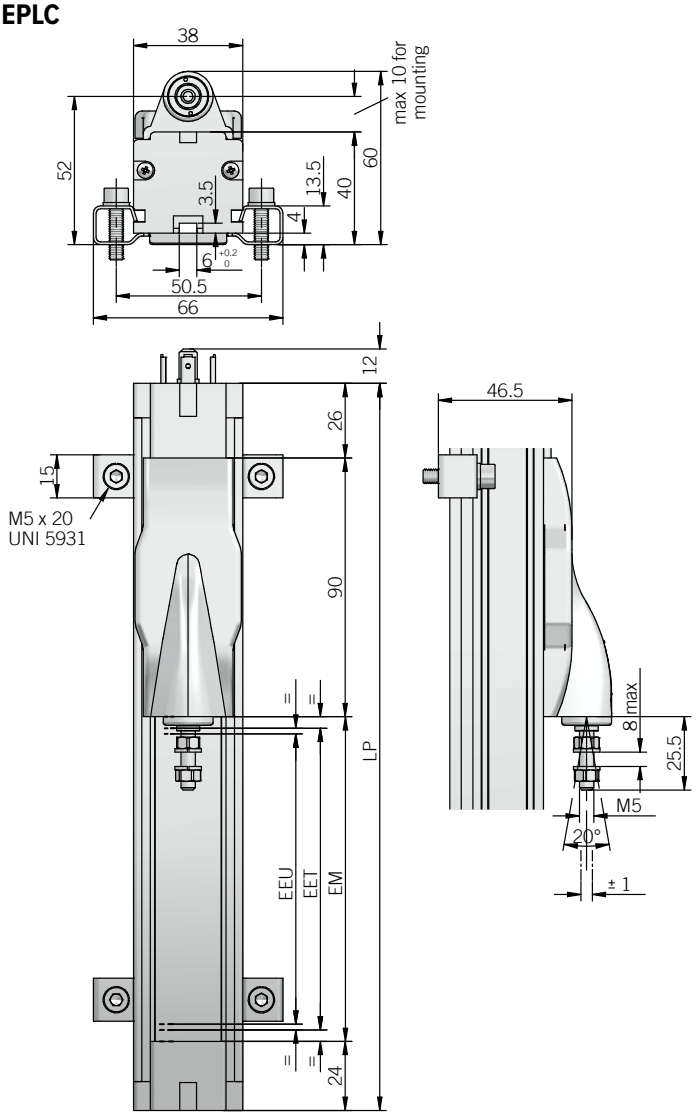
TRAVEL SPEED
max 4 m/s 4
max 10 m/s 10

OUTPUT TYPE
EN 175301-803 form A (DIN 43650-A) 4 pin connector C4
M16 IP40 DIN 43322 5 pin connector C5

OUTPUT DIRECTION
axial A

eltra.it@broadcom.com

EPLC

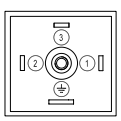


dimensions in mm

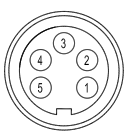
CONNECTIONS

Function	4 pin C4	5 pin C5
+	3	3
-	1	1
OUTPUT	2	2
NC	4	4
NC	/	5

C4 connector (4 pin)
EN 175301-803 form A
front view



C5 connector (5 pin)
DIN 45322
front view



- fixing kit (brackets, screws, grower) included
- socket connector not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	virtually infinite
Independent linearity	± 0,05 %
Repeatability	0,01 mm
Resistance tolerance	± 20 %
Recommended cursor current	< 0,1 µA
Resistance temperature coefficient	-200 ... 200 ppm / °C typical
Output voltage temperature coefficient	≤ 5 ppm / °C typical
Power dissipation	3 W at 40 °C / 0 W at 120 °C
Max cursor current	10 mA max
Applicable voltage	60 V max
Electrical insulation	> 100 MΩ, 500 V DC, 1 bar, 2 s
Dielectric strenght	< 100 µA, 500 V AC, 50 Hz, 1bar, 2 s
RoHS	according to 2011/65/EU directive

Important: data are valid if the transducer is used as a ratiometric device with a maximum applicable current ≤ 0,1 µA

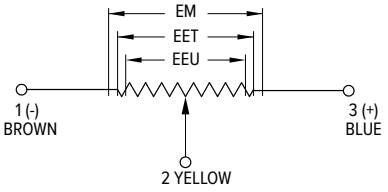
MECHANICAL SPECIFICATIONS

Stroke	100 - 150 - 200 - 300 - 400 - 500 - 600 - 700 - 850 - 900 - 1000 - 1250 - 1500 mm
Useful electric stroke (EEU) (+3/-0 mm)	see stroke (mm)
Theoretical electric stroke (EET) (±1 mm)	103 mm (100), 153 mm (150), 204 mm (200), 305 mm (300), 406 mm (400), 509 mm (500), 611 mm (600), 713 mm (700), 865 mm (850), 915 mm (900), 1017 mm (1000),1271 mm (1250), 1521 mm (1500)
Mechanical stroke (EM)	EET + 10mm (100 ... 1500)
Resistance (on the EET)	5 kΩ (100 ... 300) 10 kΩ (400 ... 1000) 20 kΩ (1250 ... 1500)
Case length (LP)	EET + 150mm (100 ... 1500)
Travel speed	4 = 4 m/s max 10 = 10 m/s max
Acceleration	200 m/s² max
Enclosure rating	IP 40 (IEC 60529)
Shock	50 G, 11 ms (IEC 60068-2-27)
Vibration	20 G, 5 ... 2000 Hz (IEC 60068-2-6)
Displacement force	≤ 1,2 N (0,27 lbs) max
Housing material	anodized aluminium / Nylon 66 G 25
Mounting	brackets with variable center-to-center distance with M6 screw ISO4017 - DIN933
Operating temperature[1, 2]	-30° ... +100°C (-22° ... +212°F)
Storage temperature[2]	-50° ... +120°C (-58° ... +248°F)

[1] measured on transducer
[2] condensation not allowed

Installation warnings:

- connect the transducer according to the specified connections
- DO NOT use it as a variable resistor
- the transducer must be calibrated by adjusting the stroke so that the output signal is between 1% and 99% of the voltage level



EPLT

LINEAR POTENTIOMETER WITH BALL TIP

MAIN CHARACTERISTICS

EPLT is an absolute linear potentiometer transducer.
This model is characterised by the absence of a cursor and the presence of a sensing system consisting of a moving stainless steel ball rod mounted on a threaded tip with a spring.
This transducer is suitable for applications where short strokes are required.
The presence of the spring ensures automatic positioning of the head, making it suitable for use in precision applications on cams or for checking products coming from automatic production lines. EPLT is also characterised by the absence of variations in the electrical output signal outside the theoretical electrical stroke.

ORDERING CODE

EPLT	100	X	10	P	A

SERIES
linear potentiometer with ball tip EPLT

STROKE
10 / 25 / 50 / 75 / 100
please contact our offices for other strokes

ENCLOSURE RATING
IP 40 X

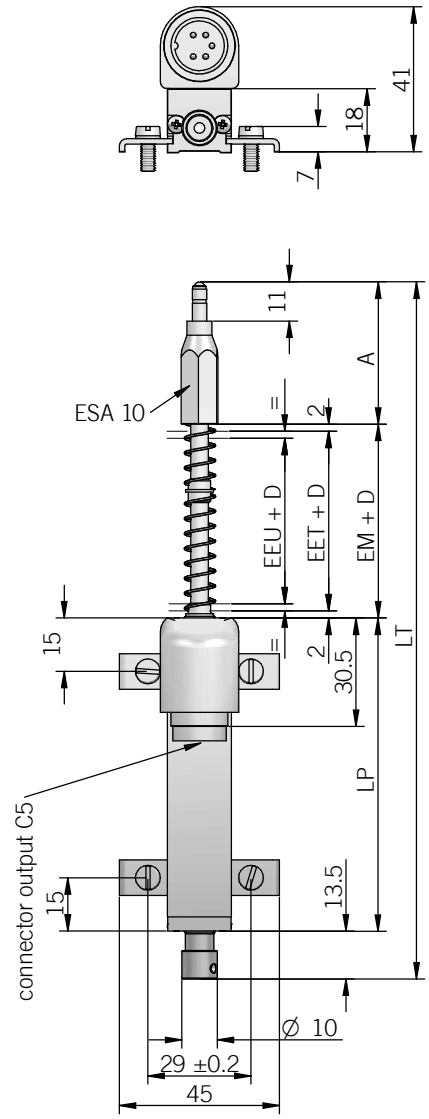
TRAVEL SPEED
max 10 m/s 10

OUTPUT TYPE
cable (standard length 1 m) P
M16 IP40 DIN 43322 5 pin connector C5

OUTPUT DIRECTION
axial A

eltra.it@broadcom.com

EPLT

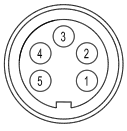


dimensions in mm

CONNECTIONS

Function	Cable P	5 pin C5
+	blue	3
-	brown	1
OUTPUT	yellow	2
NC	/	4
NC	/	5

C5 connector (5 pin)
DIN 45322
front view



- fixing kit (brackets, M4x10 screws, washer) and tip with ball included
- socket connector not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

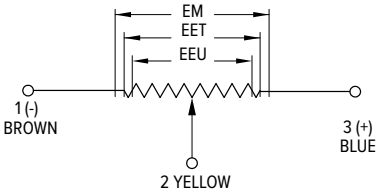
Resolution	virtually infinite					
Stroke	mm	10	25	50	75	100
Independent linearity	%	± 0,3	± 0,2	± 0,1	± 0,1	± 0,1
Resistance tolerance	± 20 %					
Recommended cursor current	< 0,1 µA					
Output voltage temperature coefficient	< 1,5 ppm / °C					
Power dissipation at 40 °C (0 W at +120 °C)	W	0,2	0,6	1,2	1,8	2,4
Max cursor current	10 mA max					
Max applicable voltage	V	14	25	60	60	60
Electrical insulation	> 100 MΩ, 500 V DC, 1 bar, 2 s					
Dielectric strenght	< 100 µA, 500 V AC, 50 Hz, 1bar, 2 s					
Cable type	shielded - fixed installation conductors section 0,20 mm² / AWG 24 bending radius min 40 mm					
RoHS	according to 2011/65/EU directive					

Important: data are valid if the transducer is used as a ratiometric device with a maximum applicable current ≤ 0,1 µA

MECHANICAL SPECIFICATIONS

Stroke	mm	10	25	50	75	100
Useful electric stroke (EEU) (+1/-0 mm)	mm	10	25	50	76	101
Theoretical electric stroke (EET) (±1 mm)	mm	11	26	51	76	101
Mechanical stroke (EM)	mm	15	30	55	81	106
Resistance (on EET)	kΩ	1	1	5	5	5
Case length (LP)	mm	48	63	88	114	139
Sensing probe length	mm	32	32	40	40	40
Additional length (D)	mm	-	-	-	5	11
Total length (LT)	mm	108	138	196	251	307
Travel speed	10 m/s max					
Enclosure rating	IP 40 (IEC 60529)					
Shock	50 G, 11 ms (IEC 60068-2-27)					
Vibration	20 G, 5 ... 2000 Hz (IEC 60068-2-6)					
Displacement force	≤ 4 N (0,9 lbs)					
Housing material	anodized aluminium / Nylon 66 G 25					
Rod material	stainless steel					
Mounting	brackets with variable center-to-center distance					
Life	> 25 x 10^6 m strokes or > 100 x 10^6 operations					
Operating temperature[1, 2]	-30° ... +100°C (-22° ... +212°F)					
Storage temperature[2]	-50° ... +120°C (-58° ... +248°F)					

[1] measured on transducer
[2] condensation not allowed



Installation warnings:

- connect the transducer according to the specified connections
- DO NOT use it as a variable resistor
- the transducer must be calibrated by adjusting the stroke so that the output signal is between 1% and 99% of the voltage level

EMSPA

LINEAR MAGNETOSTRICTIVE TRANSDUCER WITH ANALOGUE OUTPUT

MAIN CHARACTERISTICS

EMSPA is an absolute linear magnetostrictive transducer with analogue interface.
Thanks to the absence of electrical contact on the housing, there is no problem of wear and deterioration during its working life.
Magnetostrictive technology guarantees high performance in terms of speed and accuracy.
The compact size and robust housing ensure high reliability and ease of installation, even in applications with mechanical stresses, vibrations or high levels of contamination.

ORDERING CODE

EMSPA 500 S 20D 10 P A

SERIES
linear magnetostrictive transducer with analogue output EMSPA

STROKE
mm from 50 to 1500
see table for stroke availability

ENCLOSURE RATING
IP 67 S

OUTPUT SIGNAL
0 ... 10 V DC / 1 cursor (standard) 10S
0 ... 10 V DC / 1 cursor position/speed 10P
0 ... 10 V DC / 2 cursors (min. stroke 400 mm) 10D
4 ... 20 mA / 1 cursor 20S
4 ... 20 mA / 1 cursor position/speed 20P
4 ... 20 mA / 2 cursors (min. stroke 400 mm) 20D

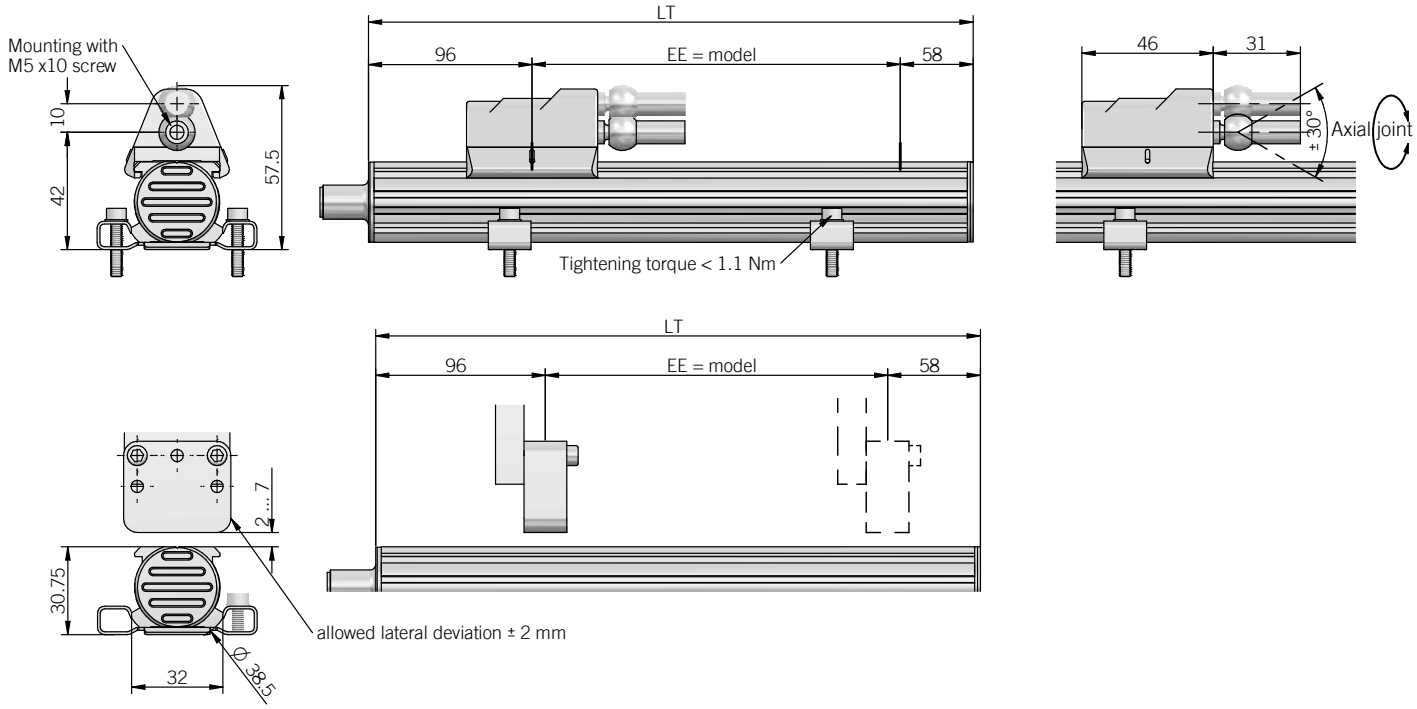
TRAVEL SPEED
max 10 m/s 10

OUTPUT TYPE
cable (standard length 1 m) P
M12 5 pin connector S5
M12 8 pin connector S8
M16 IP40 DIN 45322 6 pin connector C6
M16 IP40 DIN 45326 8 pin connector C8

OUTPUT DIRECTION
axial A

eltra.it@broadcom.com

EMSPA



dimensions in mm

· brackets, cursors and socket connector not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	16 bit (max electrical noise 5 mVpp)	
Output signal	0 ... 10 V DC	4 ... 20 mA
Output alarm value	10,5 V DC	21 mA
Output max value	12 V DC	30 mA
Power supply[1]	19,2 ... 28,8 V DC	
Power ripple	1 Vpp max	
Current consumption	70 mA max	90 mA max
Output load	5 kΩ	< 500 Ω
Output ripple	< 5 mVpp	
Indipendent linearity	≤ ± 0,01 % FS (min ± 0,060 mm) typical with sliding cursor ≤ ± 0,02 % FS with floating cursor (working distance 2 ... 5 mm) ≤ ± 0,04 % FS with floating cursor (working distance 5 ... 7 mm)	
Repeatability	< 0,01 mm	
Hysteresis	< 0,01 mm	
Sampling time	0,5 ms (50 ... 300) 1 ms (350 ... 1100) 1,5 ms (1200 ... 1500)	
Protection against overvoltage	yes	
Protection against polarity inversion	yes	
Protection against power supply on output	yes	
Electrical insulation	500 V DC	
Cable type	shielded - fixed installation conductors section 0,25 mm² / AWG 24 bending radius min 40 mm	
Electromagnetic compatibility	according to 2014/30/EU directive	
RoHS	according to 2011/65/EU directive	

MECHANICAL SPECIFICATIONS

Stroke	50 - 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 - 1200 - 1300 - 1400 - 1500 mm
Electric stroke (EE)	see stroke (mm)
Overall dimension (LT)	EE + 154 mm
Enclosure rating	IP 67 (IEC 60529)
Detected measurement	displacement / speed
Travel speed	10 m/s max
Acceleration	100 m/s² max
Speed measurament range	0 ... 10 m/s
Speed accuracy	< 2 %
Shock	100 G, 11 ms, single shock (IEC 60068-2-27)
Vibration	12 G, 10 ... 2000 Hz (IEC 680068-2-6)
Housing material	anodized aluminium / Nylon 66 G 25
Cursor type	sliding or floating cursor
Temperature coefficient	0,005 % FS / °C
Operating temperature[2, 3]	-30° ... +75°C (-22° ... +167°F)
Storage temperature[3]	-40° ... +100°C (-40° ... +212°F)

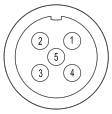
[1] as measured at the transducer without cable influences
[3] measured on transducer
[4] condensation not allowed

CONNECTIONS

Function	Cable P	5 pin M12 S5	8 pin M12 S8	6 pin M16 IP40 C6	8 pin M16 IP40 C8
+ V DC	brown	5	7	5	7
0 V	white	4	6	6	8
Output cursor 1 0 ... 10 V 4 ... 20 mA	grey	1	5	1	5 (1*)
0V cursor 1	pink	2	1	2	2
Inverse output cursor 1 **Output cursor 2** **Output speed** 10 ... 0 V 20 ... 4 mA	yellow	3	3	3	3
0 V **Output cursor 1** **Output cursor 2** **Output speed**	pink	2	2	4	6
NC	/	/	4	/	4
NC	/	/	8	/	/

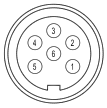
* only with 4 ...20 mA output

S5 connector (5 pin)
M12 A coded
front view

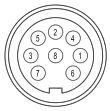


S8 connector (8 pin)
M12 A coded
front view

C6 connector (6 pin)
DIN 45322
front view

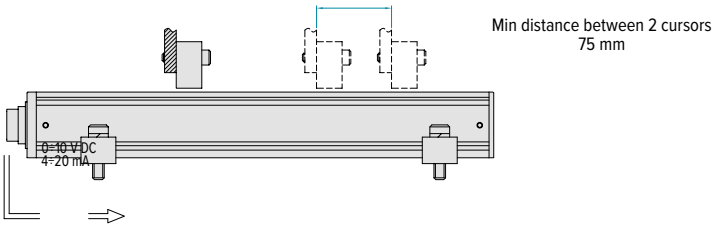


C8 connector (8 pin)
DIN 45326
front view



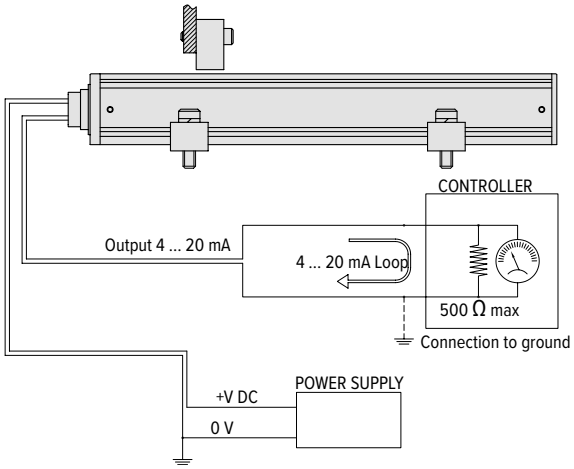
The transducer housing must only be earthed on the control system side through the cable shield.
To ensure correct electrical insulation of the transducer from the machine, always fit the brackets using the plastic washers supplied.

INSTALLATION EXAMPLE



For a multi-cursor model, the cursors must operate under the same conditions of distance and temperature. The cursors must be mounted on a non-magnetic material support (such as brass, aluminium or AISI316 stainless steel). The kit includes two screws, two nuts and two washers (all brass).
The cursor must be installed with maximum attention to horizontal alignment with the transducer axis (maximum tolerance ± 2 mm), the distance from the transducer surface must be within the range of 2 to 7 mm.

APPLICATION EXAMPLE (CURRENT OUTPUT)



EMSPB

LINEAR MAGNETOSTRICTIVE TRANSDUCER WITH ANALOGUE OUTPUT

MAIN CHARACTERISTICS

The EMSPB is an absolute linear magnetostrictive transducer with analogue interface.
Thanks to the absence of electrical contact on the housing, there is no problem of wear and deterioration during its working life.
Magnetostrictive technology guarantees high performance in terms of speed and accuracy.
The compact size and robust housing ensure high reliability and ease of installation, even in applications with mechanical stresses, shocks or high levels of contamination.

ORDERING CODE

EMSPB	1000	S	10S	10	C4	A

SERIES
linear magnetostrictive transducer with analogue output EMSPB

STROKE
mm from 50 to 1500
see table for stroke availability

ENCLOSURE RATING
IP 65 S

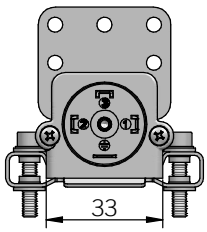
OUTPUT SIGNAL
0,1 ... 10,1 V DC / 1 cursor (standard) 10S
4 ... 20 mA / 1 cursor 20S

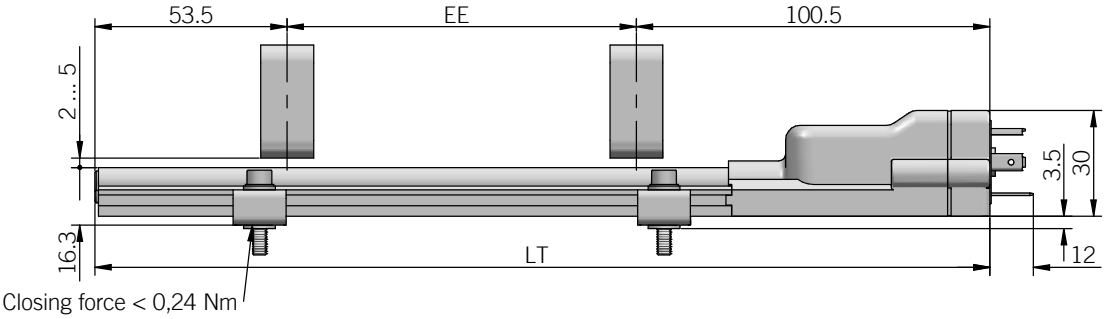
TRAVEL SPEED
max 10 m/s 10

OUTPUT TYPE
EN 175301-803 form A (DIN 43650-A) 4 pin connector C4
M12 5 pin connector S5

OUTPUT DIRECTION
axial A

EMSPB





dimensions in mm

· brackets, cursors and socket connector not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	virtually infinite limited only by electrical noise 5 mVpp	
Output signal	0,1 ... 10,1 V DC	4 ... 20 mA
Output alarm value in absense of cursor	10,5 V DC	21 mA
Output value max	12 V DC	30 mA
Power supply[1]	19,2 ... 28,8 V DC	
Power ripple	1 Vpp max	
Current consumption	35 mA max	60 mA max
Output load	≥ 10 kΩ	50 ... 500 Ω
Indipendent linearity	± 0,04 % FS max (min ± 0,09 mm)	
Repeatability	≤ 0,01 mm (typical)	
Hysteresis	≤ 0,02 mm (typical)	
Sampling time	1 ms (50 ... 600) 1,5 ms (650 ... 900) 2 ms (1000 ... 1300) 3 ms (1400 ... 1500)	
Protection against overvoltage	yes	
Protection against polarity inversion	yes	
Protection against power supply on output	yes	
Electrical insulation	500 V DC	
Electromagnetic compatibility	according to 2014/30/EU directive	
RoHS	according to 2011/65/EU directive	

[1] as measured at the transducer without cable influences
[2,3] measured on transducer
[3] condensation not allowed

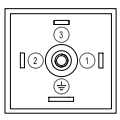
MECHANICAL SPECIFICATIONS

Stroke	50 - 100 - 150 - 200 - 225 - 300 - 350 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 - 1200 - 1300 - 1400 - 1500 mm
Electric stroke (EE)	see stroke (mm)
Overall dimension (LT)	EE + 154 mm
Enclosure rating	IP 67 (IEC 60529)
Detected measurement	displacement
Travel speed	10 m/s max
Acceleration	100 m/s² max
Shock	100 G, 11 ms, single shot (IEC 68000-2-27)
Vibration	12 G, 10 ... 2000 Hz (IEC 68000-2-6)
Housing material	anodized aluminium / Nylon 66 G 25
Cursor type	floating cursor
Temperature coefficient	≤ 0,01 % FS / °C (min. 0,015 mm / ° C)
Operating temperature[2, 3]	-20° ... +75°C (-4° ... +167°F)
Storage temperature[3]	-40° ... +100°C (-40° ... +212°F)

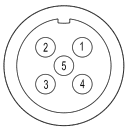
CONNECTIONS

Function	4 pin C4	M12 5 pin S5
+V DC	3	5
0 V	1	4
OUTPUT	2	1
0 V output	/	2
NC	/	3
⏚	4	housing

C4 connector (4 pin)
EN 175301-803 form A
front view



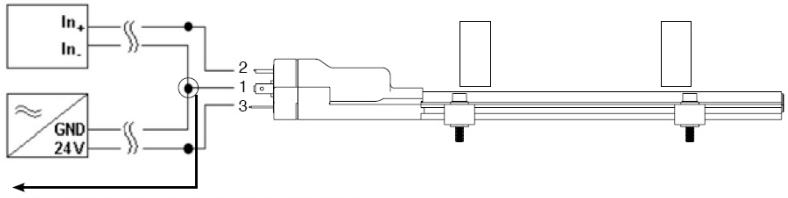
M12 connector (5 pin)
M12 A coded
front view



INSTALLATION NOTES

For a multi-cursor model, the cursors must operate under the same conditions of distance and temperature. The cursors must be mounted on a non-magnetic material support (such as brass, aluminium or AISI316 stainless steel).
The kit includes two screws, two nuts and two washers (all brass).
The cursor must be installed with maximum attention to horizontal alignment with the transducer axis (maximum tolerance ± 2 mm), the distance from the transducer surface must be within the range of 2 to 5 mm.

APPLICATION EXAMPLE (CURRENT OUTPUT)



Note: connect as close as possible to the transducer

EMSPS

LINEAR MAGNETOSTRICTIVE TRANSDUCER WITH SSI OUTPUT

MAIN CHARACTERISTICS

EMSPS is an absolute linear magnetostrictive transducer with SSI output.
The main characteristic of magnetostrictive transducers is the absence of electrical contact on the housing, there is no problem of wear and deterioration during the working life, guaranteeing high displacement speed and precision.
High reliability and ease of installation, even in applications with mechanical stresses, shocks or high levels of contamination, are ensured by the compact size and robust housing.

ORDERING CODE

ORDERING CODE	EMSPS	500	S	25	G	10	R5	P	A

SERIES
linear magnetostrictive transducer with SSI output EMSPS

STROKE
mm from 50 to 1500
see table for stroke availability

ENCLOSURE RATING
IP 67 S

DATA LENGTH
(FM357) 21+1 bit 21
24 bit 24
25 bit 25

CODE TYPE
binary B
gray G

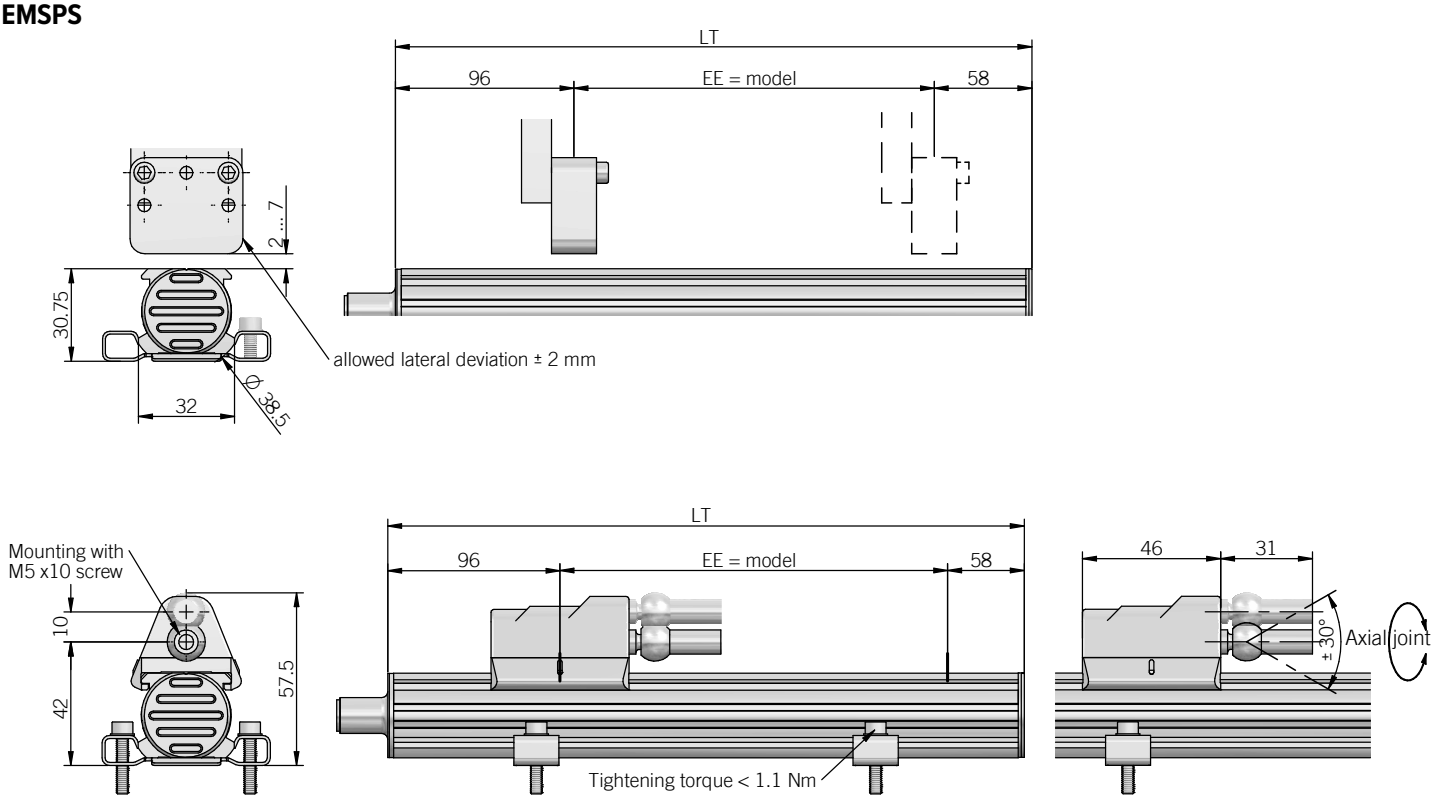
TRAVEL SPEED
max 10 m/s 10

RESOLUTION
0,002 mm R2
0,005 mm R5
0,010 mm R10
0,020 mm R20
0,040 mm R40

OUTPUT TYPE
cable (standard length 1 m) P
DIN 45322 M16 IP40 6 pin connector C6
DIN 45326 M16 IP40 8 pin connector C8
M12 8 pin connector S8

OUTPUT DIRECTION
axial A

EMSPS



dimensions in mm

· brackets, cursors and socket connector not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	2 - 5 - 10 - 20 - 40 µm
Indipendent linearity	≤ ± 0,01 % FS (min ± 0,060 mm) typical with sliding cursor ≤ ± 0,02 % FS typical with floating cursor
Repeatability	< 0,01 mm
Hysteresis	≤ ± 0,005 % FS (min 0,010 mm)
Power supply[1]	10 ... 32 V DC
Power ripple	1 Vpp max
Max load current	50 mA max
Electrical interface	RS-422
SSI output code	binary or gray
Clock frequency	50 kHz ... 1 MHz
SSI monostable time (Tm)	16 µs
SSI frame	21 / 24 / 25 bit data length
Counting direction	increase
Protection against overvoltage	yes
Protection against polarity inversion	yes
Self-resetting internal fuse	yes
Electrical insulation	500 V DC (+V DC / earth)
Cable type	twisted pair shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 75 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

Stroke	50 - 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 -1100 - 1200 - 1300 - 1400 - 1500 mm
Electric stroke (EE)	see stroke (mm)
Overall dimensions (LT)	EE + 154 mm
Enclosure rating	IP 67 (IEC 60529)
Detected measurement	displacement
Scale orientation	increasing
Travel speed	10 m/s max
Acceleration	100 m/s² max
Shock	100 G, 11 ms, single shot (IEC 68000-2-27)
Vibration	12 G, 10 ... 2000 Hz (IEC 68000-2-6)
Housing material	anodized aluminium / Nylon 66 G 25
Cursor type	sliding or floating cursor
Temperature coefficient	20 ppm FS / °C
Operating temperature[2, 3]	-30° ... +90°C (-22° ... +194°F)
Storage temperature[3]	-40° ... +100°C (-40° ... +212°F)

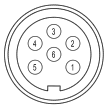
[1] as measured at the transducer without cable influences
[3] measured on transducer
[4] condensation not allowed

CONNECTIONS

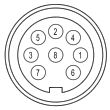
Function	Cable P	8 pin M12 S8	6 pin M16 IP40 C6	8 pin M16 IP40 C8
+ V DC	blue / white	7	5	7
0 V	blue	6	6	6
DATA +	orange / white	2	2	2
DATA -	orange	5	1	5
CLOCK +	green / white	3	3	1
CLOCK -	green	1	4	3
NC	/	4	/	4
NC	/	8	/	8

S8 connector (8 pin)
M12 A coded
front view

C6 connector (6 pin)
DIN 45322
front view

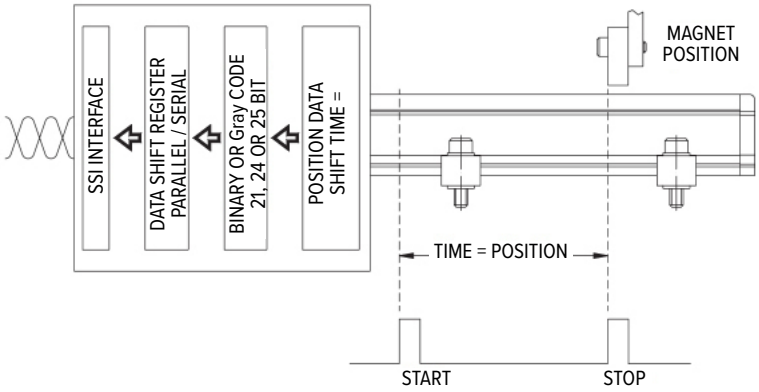


C8 connector (8 pin)
DIN 45326
front view



The transducer enclosure and cable shield have to be connected to ground on both sides.

SSI BLOCK DIAGRAM

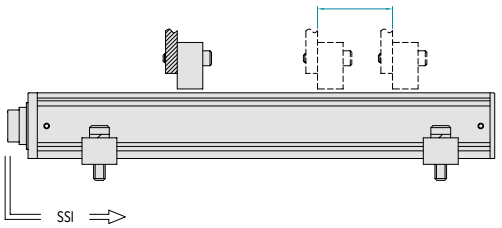


SSI output goes to 0 if the echo is absent (magnet out of measurement range or internal device error)

SSI CABLE LENGTH

Cable length	< 3 m	< 50 m	< 100 m	< 200 m	< 400 m
Baud rate	1 Mbaud	400 kbaud	300 kbaud	200 kbaud	100 kbaud

INSTALLATION EXAMPLE



For a multi-cursor model, the cursors must operate under the same conditions of distance and temperature. The cursors must be mounted on a non-magnetic material support (such as brass, aluminium or AISI316 stainless steel). The kit includes two screws, two nuts and two washers (all brass).
The cursor must be installed with maximum attention to horizontal alignment with the transducer axis (maximum tolerance ± 2 mm), the distance from the transducer surface must be within the range of 2 to 7 mm.

EMSSA

LINEAR MAGNETOSTRICTIVE ROD TRANSDUCER WITH ANALOGUE OUTPUT

MAIN CHARACTERISTICS

EMSSA is an absolute linear magnetostrictive transducer with analogue output.
The main characteristic of magnetostrictive transducers is the absence of electrical contact on the housing, there is no problem of wear and deterioration during working life, guaranteeing high displacement speed and precision.
High reliability and ease of installation, even in applications with mechanical stresses, shocks or high levels of contamination, are ensured by the compact size and robust housing. This series is designed for internal mounting in high pressure applications (350 bar, 500 bar peak) such as hydraulic or pneumatic cylinders.

ORDERING CODE

EMSSA	500	S	10	H	10	P	A

SERIES
linear magnetostrictive transducer with analogue output EMSSA

STROKE
mm from 50 to 1500
see table for stroke availability

ENCLOSURE RATING
IP 67 S

OUTPUT SIGNAL
0 ... 10 V DC 10
4 ... 20 mA 20

THREAD TYPE
M18 x 1,5 H
3/4" - 16 UNF I

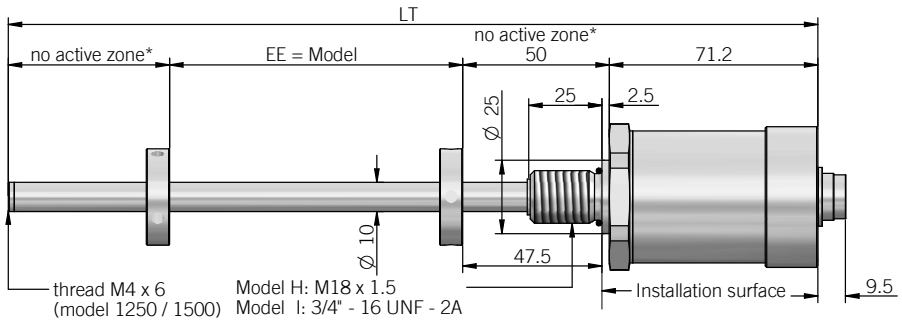
DISPLACEMENT SPEED
max 10 m/s 10

OUTPUT TYPE
cable (standard length 1 m) P
DIN 45322 M16 IP40 6 pin connector C6

OUTPUT DIRECTION
axial A

eltra.it@broadcom.com

EMSSA



* = 55 mm up to stroke 1000 mm, from 1250 mm consider 60 mm due to M4 threaded hole

dimensions in mm

- OR 15,4 x 2,1 (mod.H) / OR 16,36 x 2,21 (mod.I) included
- Cursors and socket connector not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	16 bit (max electrical noise 5 mVpp)	
Output signal	0 ... 10 V DC	4 ... 20 mA
Output alarm value	10,5 V DC	21 mA
Output value max	12 V DC	30 mA
Power supply[1]	19,2 ... 28,8 V DC	
Power ripple	1 Vpp max	
Current consumption	70 mA max	90 mA max
Output load	5 kΩ	< 500 Ω
Output ripple	< 5 mVpp	
Indipendent linearity	≤ ± 0,02 % FS (min ± 0,060 mm)	
Repeatability	< 0,01 mm	
Hysteresis	< 0,01 mm	
Sampling time	0,5 ms (mod. 50 ... 200) 1 ms (mod. 400 ... 1000) 1,5 ms (mod. 1250 ... 1500)	
Protection against overvoltage	yes	
Protection against polarity inversion	yes	
Protection against power supply on output	yes	
Electrical insulation	500 V DC	
Cable type	shielded - fixed installation conductors section 0,25 mm²/AWG 24 bending radius min 40 mm	
Electromagnetic compatibility	according to 2014/30/EU directive	
RoHS	according to 2011/65/EU directive	

MECHANICAL SPECIFICATIONS

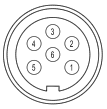
Stroke	50 - 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 - 1250 - 1500 mm
Electric stroke (EE)	see stroke (mm)
Overall dimensions (LT)	EE + 176,2 mm (mod. 50 ... 900) EE + 181,2 mm (mod. 1000 ... 1500)
Enclosure rating	IP 67 (IEC 60529)
Detected measurement	displacement
Travel speed	10 m/s max
Acceleration	100 m/s² max
Speed measurament range	0 ... 10 m/s
Speed accuracy	< 2 %
Shock	100 G, 11 ms, single shock (IEC 60068-2-27)
Vibration	12 G, 10 ... 2000 Hz (IEC 680068-2-6)
Rod / housing material	1.4401 / AISI 316 stainless steel
Operative pressure	350 bar (500 bar peak)
Cursor type	floating cursor
Temperature coefficient	≤ 0,01 % FS / °C
Operating temperature[2, 3]	-30° ... +75°C (-22° ... +167°F)
Storage temperature[3]	-40° ... +100°C (-40° ... +212°F)

[1] as measured at the transducer without cable influences
[3] measured on transducer
[4] condensation not allowed

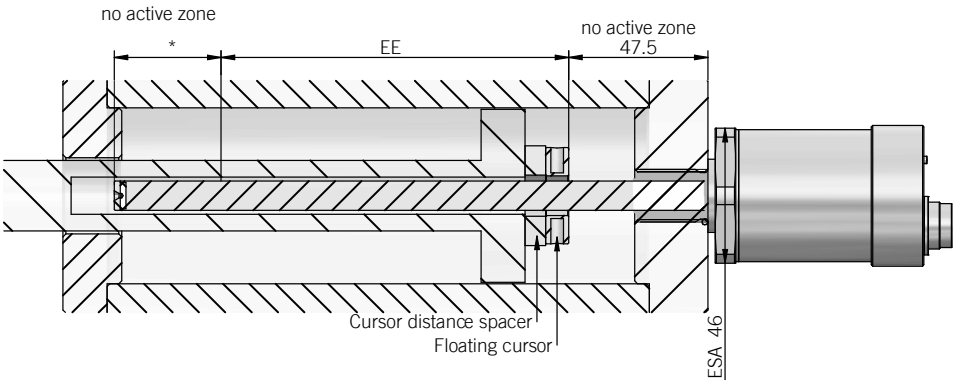
CONNECTIONS

Function	Cable P	6 pin M16 IP40 C6
+ V DC	brown	5
0 V	white	6
Output cursor 1 0 ... 10 V 4 ... 20 mA	grey	1
0 V cursor 1	pink	2
Inverse output cursor 1 10 ... 0 V 20 ... 4 mA	yellow	3
0 V inverse output cursor 1	pink	4

C6 connector (6 pin)
DIN 45322
front view



INSTALLATION EXAMPLE



* = 55 mm up to stroke 1000 mm, from 1250 mm consider 60 mm due to M4 threaded hole

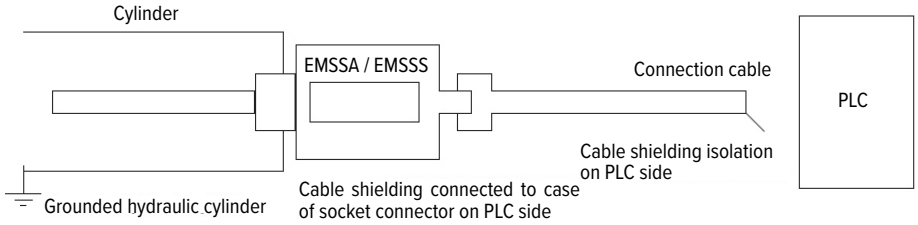
For correct installation of rod-type magnetostrictive transducers in hydraulic cylinders, remember that the cylinder head must be made of non-magnetic material where the threaded hole will be drilled to install the transducer. If not, the residual magnetisation caused by drilling the threaded hole must be less than 4 Gauss.
The sealing surface must be free of longitudinal or helical scratches.

Ro 1,6 µm for sealing with non pulsating pressure
Ro 0,8 µm for seals with pulsating pressure

Suggested o-ring (model H)
Parker 6-349 15,4 x 2,1
Material: Viton 90° Shore A
Mixes: Parker N552-90

Suggested o-ring (model I)
Parker 3-908 16,36 x 2,21
Material: Viton 90° Shore A
Mixes: Parker N552-90

ELECTRICAL CONNECTION EXAMPLE



The transducer must be installed away from sources of magnetic fields, both static and 50 Hz (electric motors, solenoids, etc.).

- in the case of a floating cursor, the support must be made of non-magnetic material.
- the transducer connection cable must be wired separatly from power cables and/or solenoid controls, drives, or remote switches
- power must be supplied from a dedicated power supply and connected directly to power terminals as close as possible
- as the transducer cursor is a magnet, make sure there are no iron filings or small fragments of magnetic metal near the transducer. This could produce an accumulation of material on the cursor, resulting in sliding problems
- if the transducer is installed in a cylinder that is isolated from the ground, the cable shield on PLC side must be grounded
- with multiple cursors (two or more), the cursors distance must be at least minimum 75 mm each

EMSSS

LINEAR MAGNETOSTRICTIVE ROD TRANSDUCER WITH SSI OUTPUT

MAIN CHARACTERISTICS

EMSSA is an absolute linear magnetostrictive transducer with SSI output.
The main characteristic of magnetostrictive transducers is the absence of electrical contact on the housing, there is no problem of wear and deterioration during working life, guaranteeing high displacement speed and precision.
High reliability and ease of installation, even in applications with mechanical stresses, shocks or high levels of contamination, are ensured by the compact size and robust housing. This series is designed for internal mounting in high pressure applications (350 bar, 500 bar peak) such as hydraulic or pneumatic cylinders.

ORDERING CODE	EMSSS	500	S	24	G	H	10	R5	P	A

SERIES
linear magnetostrictive transducer with SSI output EMSSS

STROKE
mm from 100 to 1500
see table for stroke availability

ENCLOSURE RATING
IP 67 S

DATA LENGTH
(FM357) 21+1 bit 21
24 bit 24
25 bit 25

CODE TYPE
binary B
gray G

THREAD TYPE
M18 x 1,5 H
3/4" - 16 UNF I

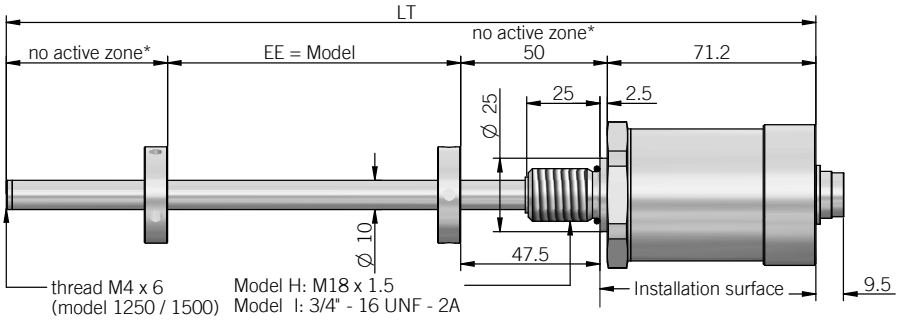
DISPLACEMENT SPEED
max speed 10 m/s 10

RESOLUTION
0,005 mm R5
0,010 mm R10
0,020 mm R20
0,040 mm R40

OUTPUT TYPE
cable (standard length 1 m) P
DIN 45322 M16 IP40 6 pin connector C6

OUTPUT DIRECTION
axial A

EMSSS



* = 55 mm up to stroke 1000 mm, from 1250 mm consider 60 mm due to M4 threaded hole

dimensions in mm

- OR 15,4 x 2,1 (mod.H) / OR 16,36 x 2,21 (mod.I) included
- Cursors and socket connector not included, please refer to Accessories

ELECTRICAL SPECIFICATIONS

Resolution	5 - 10 - 20 - 40 µm
Indipendent linearity	≤ ± 0,02 % FS (min ± 0,060 mm)
Repeatability	< 0,01 mm
Hysteresis	≤ ± 0,005 % FS (min 0,010 mm)
Sampling time	1 ms (mod. 100 ... 1000) 2 ms (mod. 1250 ... 1500)
Power supply[1]	10 ... 32 V DC
Power ripple	1 Vpp max
Max load current	50 mA max
Electrical interface	RS-422
SSI output code	binary or gray
Clock frequency	50 kHz ... 1 MHz
SSI monostable time (Tm)	16 µs
SSI frame	21 / 24 / 25 bit data length
Counting direction	increase
Protection against overvoltage	yes
Protection against polarity inversion	yes
Self-resetting internal fuse	yes
Electrical insulation	500 V DC (+V DC / earth)
Cable type	twisted pair shielded - fixed installation conductors section 0,22 mm² / AWG 24 bending radius min 75 mm
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

Stroke	100 - 150 - 200 - 300 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 - 1250 - 1500 mm
Electric stroke (EE)	see model (mm)
Overall dimensions (LT)	EE + 176,2 mm (mod. 100 ... 1000) EE + 181,2 mm (mod. 1250 ... 1500)
Enclosure rating	IP 67 (IEC 60529)
Detected measurement	displacement
Travel speed	10 m/s max
Acceleration	100 m/s² max
Speed measurament range	min 0 ... 0,1 m/s max 0 ... 10 m/s
Speed accuracy	< 2 %
Shock	100 G, 11 ms, single shock (IEC 60068-2-27)
Vibration	12 G, 10 ... 2000 Hz (IEC 680068-2-6)
Rod / housing material	1.4401 / AISI 316 stainless steel
Operative pressure	500 bar
Cursor type	floating cursor
Temperature coefficient	20 ppm FS / °C
Operating temperature[2, 3]	-30° ... +90°C (-22° ... +194°F)
Storage temperature[3]	-40° ... +100°C (-40° ... +212°F)

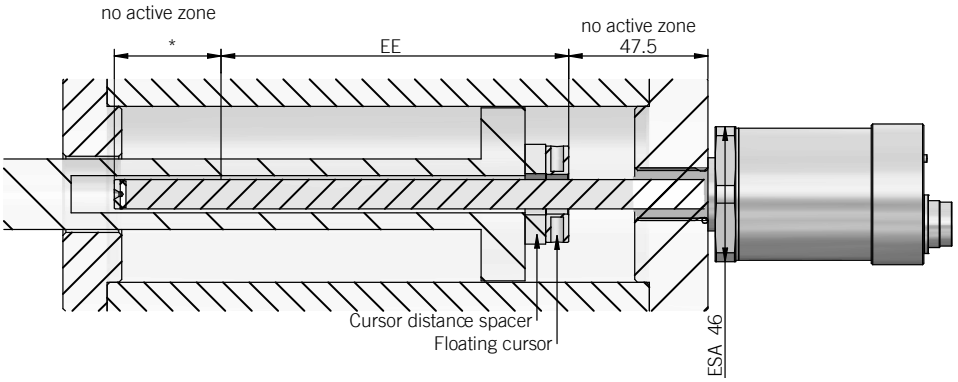
[1] as measured at the transducer without cable influences
[3] measured on transducer
[4] condensation not allowed

CONNECTIONS

Function	Cable P	6 pin M16 IP40 C6
+ V DC	blue / white	5
0 V	blue	6
DATA +	brown / white	2
DATA -	orange	1
CLOCK +	green / white	3
CLOCK -	green	4

C6 connector (6 pin)
DIN 45322
front view

INSTALLATION EXAMPLE



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Suggested o-ring (model I)
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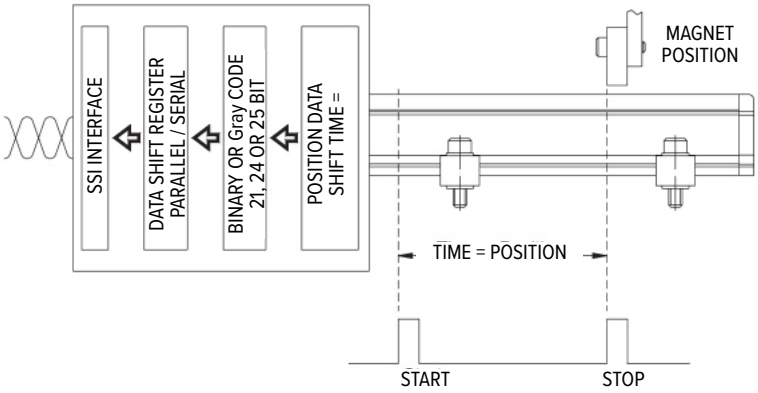
Mixes: Parker N552-90

SSI BLOCK DIAGRAM



SSI output goes to 0 if the echo is absent (magnet out of measurement range or internal device error)

SSI CABLE LENGTH

Cable length	< 3 m	< 50 m	< 100 m	< 200 m	< 400 m
Baud rate	1 Mbaud	400 kbaud	300 kbaud	200 kbaud	100 kbaud

INSTALLATION NOTES

The transducer must be installed away from sources of magnetic fields, both static and 50 Hz (electric motors, solenoids, etc.).

- in the case of a floating cursor, the support must be made of non-magnetic material.
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