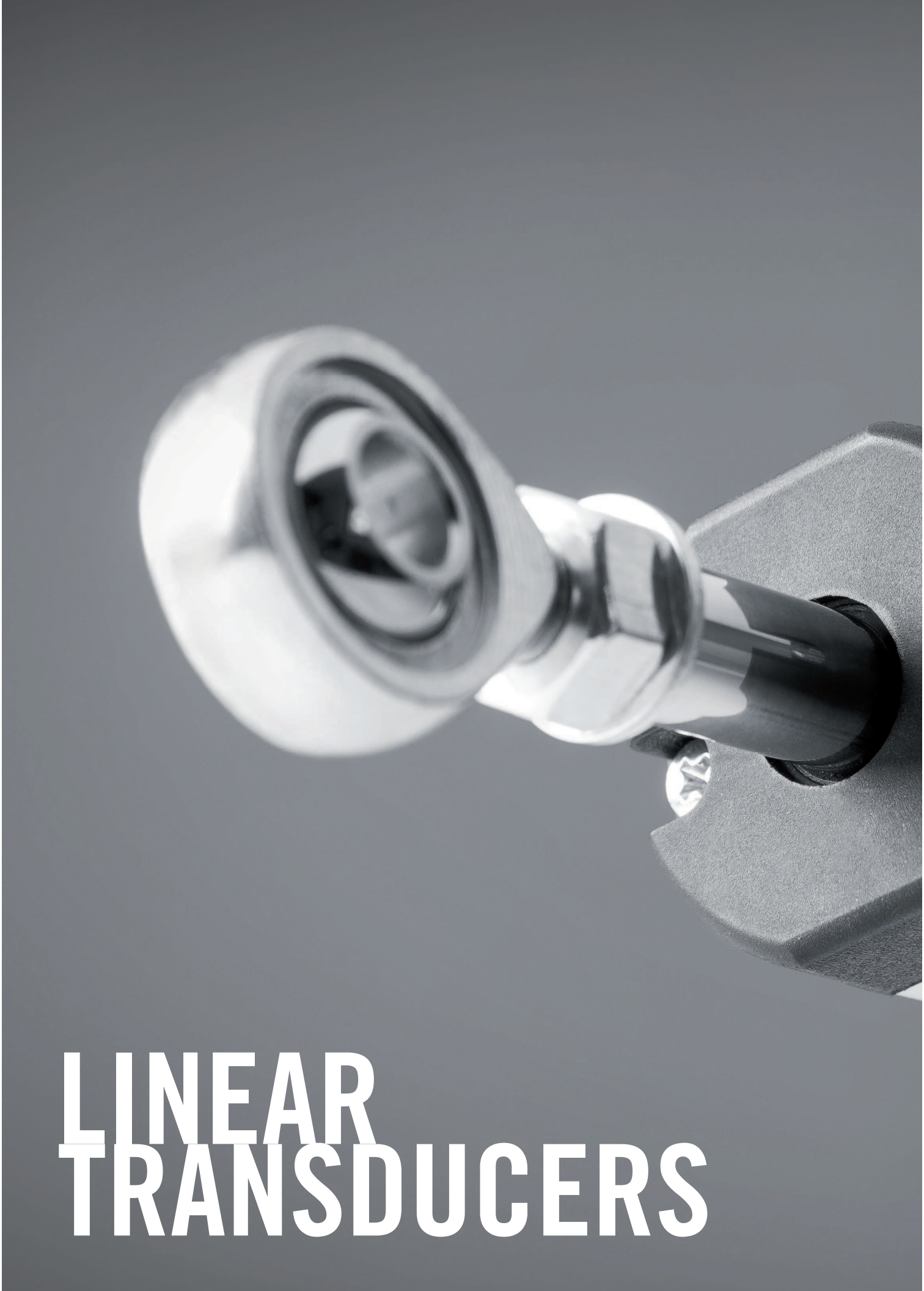


LINEAR TRANSDUCERS

HIGH RELIABILITY EVEN IN THE HEAVY ENVIRONMENTS.

Easy installation made easier for the presence of a groove in the housing potentiometer represent an ideal solution for the most used machine of material manufacture, for example injection press for plastic and gum.
ELTRA's linear transducers are engineered for high accuracy, high cycle-life and easy installation. Standard strokes are from 10 (4/10") mm to 1250 mm (4 ft).

ELTRA's linear transducers provide accurate sensing in a wide range of configurations. Rod style for fitting within hydraulic pistons or profile housing for a convenient mounting are available.
ELTRA's linear sensors feature absolute positioning, greater reliability, easy control, noise reduction, robustness, increased productivity, reduced shock and stress on mechanical parts, high precision for high performances, cost-effective solutions.

MAIN FEATURES

Incremental linear system based on optical or magnetic principle.
Easy mounting due to to joint heads.

- 0,01 mm max resolution (after quad eval)
- 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, connector available on 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

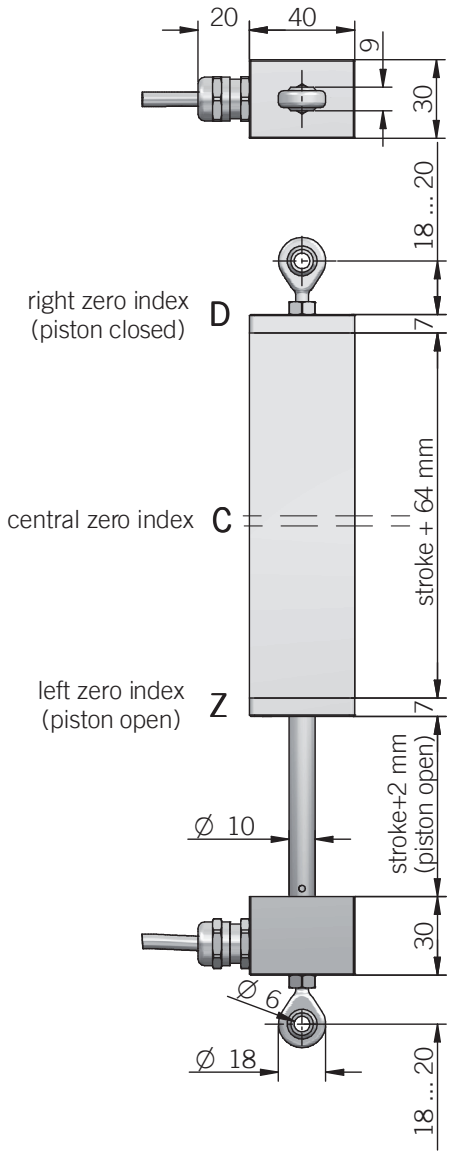
ELECTRICAL INTERFACE
(mod. A) NPN open collector C
push-pull P
line driver L

FIXING HOLE DIAMETER
mm 6

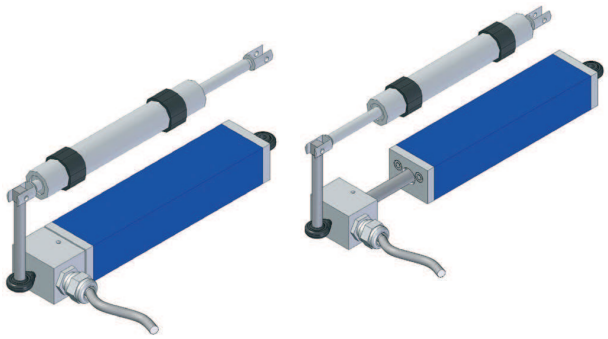
OUTPUT TYPE
radial cable (standard length 1,5 m) P
preferred cable lengths 2 / 3 / 5 / 10 m, to be added after output type

VARIANT
custom version XXX

A / B / C / D / E / F



dimensions in mm



ELECTRICAL SPECIFICATIONS

Technology	optical mod. A magnetic mod. B / C / D / E / F
Resolution	1 mm (0,25 mm after quad eval) 0,5 mm (0,125 mm after quad eval) 0,2 mm (0,05 mm after quad eval) 0,1 mm (0,025 mm after quad eval) 0,04 mm (0,01 mm after quad eval)
Linearity error	± 0,05 mm max (mod. A / F) ± 0,025 mm max (mod. B) ± 0,01 mm max (mod. C) ± 0,125 mm max (mod. E) ± 0,25 mm max (mod. D)
Power supply	5 = 4,5 ... 5,5 V DC 8/24 = 7,6 ... 25,2 V DC
Current consumption without load	< 100 mA max
Max load current	50 mA / channel (NPN open) 20 mA / channel (push pull / line driver)
Output type*	NPN open collector (pull-up max +30 V DC) push-pull line driver HTL (AEIC-7272)
Max output frequency	100 kHz
Counting direction	A leads B (piston opening) mod. A B leads A (piston opening) mod. B / C / D / E / F
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	certificate n. E212495

* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section

MECHANICAL SPECIFICATIONS

Working stroke	100 - 150 - 200 - 250 - 300 - 350 - 400 - 500 mm
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	1.4305 / AISI 303 stainless steel
Housing material	painted aluminum
Fixing	2 joint heads with ø 6 mm hole
Operating temperature	-10° ... +60°C (+14° ... +140°F)
Storage temperature	-25° ... +70°C (-13° ... +158°F)
Weight	400 ... 1000 g (14,11 ... 35,27 oz)

CONNECTIONS

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

ETMA 1 / 2

MAGNETIC INCREMENTAL LINEAR SENSOR

MAIN FEATURES

Incremental linear system based on magnetic principle without wear thanks to no-contact technology. Thanks to high IP rating ETMA is suitable for harsh environment applications such as marble and glass working machines, washing systems machines.

- 0,01 mm max resolution (after quad eval)
- Power supply up to +28 V DC with several electrical interfaces available
- Up to 4 m/s travel speed
- IP 67 as protection grade
- Cable output, connector available on 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

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 - 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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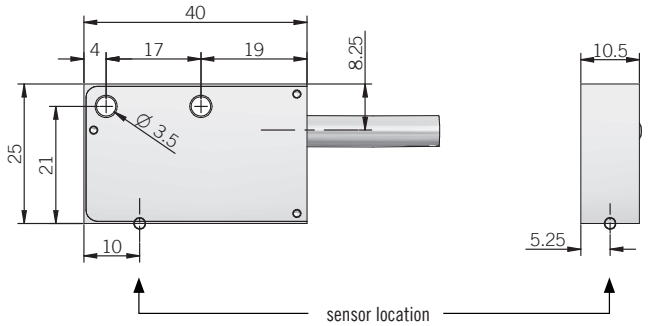
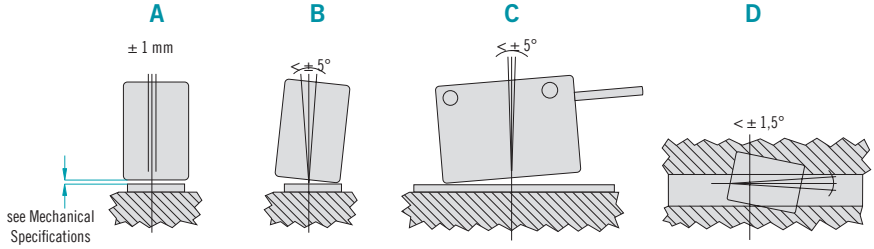
ETMA 1 / 2



Mechanical tolerances

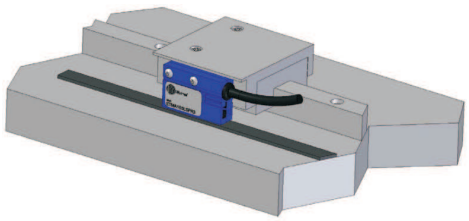


dimensions in mm

ELECTRICAL SPECIFICATIONS

Resolution	ETMA1 = 0,1 mm (0,025 mm after quad eval) ETMA2 = 0,04 mm (0,01 mm after quad eval)
Zero pulse	ETMA1 = every 5 mm ETMA2 = every 2 mm
Power supply	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
Output type *	push-pull / line driver HTL (AEIC-7272) line driver RS-422 (AELT-5000 or equivalent)
Linearity error	± 0,025 mm (ETMA 1) ± 0,01 mm (ETMA 2)
Travel speed	4 m/s
Electromagnetic compatibility	according to 2014/30/EU directive
RoHS	according to 2011/65/EU directive
UL / CSA	certificate n. E212495

* for further details please see OUTPUT LEVELS under TECHNICAL BASICS section



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 3,5 mm
Operating temperature	-20° ... +85°C (-4° ... +185°F)
Storage temperature	-25° ... +70°C (-13° ... +158°F)
Working distance from magnetic tape	ETMA 1 < 1,5mm with magnetic tape protection ETMA 1 < 2mm without cover ETMA 2 < 0,5mm with magnetic tape protection ETMA 2 < 1mm without cover
Weight	150 g (5,29 oz)

CONNECTIONS

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

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EBMA
INCREMENTAL MAGNETIC TAPE

MAIN FEATURES

- Magnetic tape to be used with ETMA
- Easy mounting due to premounted double side adhesive
- 2 mm or 5 mm pole pitch
- High pole accuracy
- Available in reels up to 50 m

ORDERING CODE

EBM A 1 - 10 . XXX

SERIES
magnetic tape EBM

TAPE TYPE
10 mm width magnetic tape A

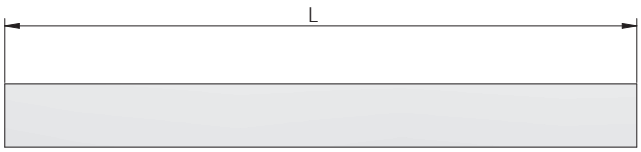
PITCH
5mm pitch for ETMA 1 1
2mm pitch for ETMA 2 2

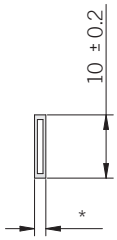
separate the code with a dash -

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

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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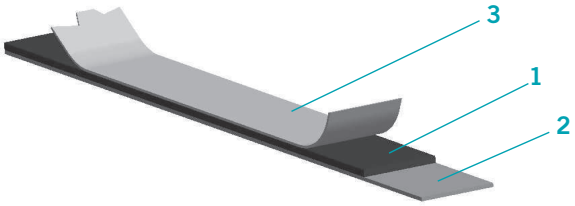
CONSTRUCTION

As shown in the figure below, Eltra magnetic tape is composed by three layers:

1 - a flexible magnetic tape made of elastomer filled with ferrite
2 - a stainless steel tape used to create a shield against any external magnetic fluxes and other external agents. Furthermore it's glued to the upper layer in order to give the correct mechanical rigidity to the magnetic tape. The stainless steel tape is supplied with an acrylic double side adhesive (thickness 0,13 mm) not shown in the figure
3 - a steel tape, magnetically transparent and with the function to protect mechanically the magnetic layer; it is the most rigid part and therefore is supplied separately due to transport and application needs. It must be sticked on the magnetic tape by the user
The steel tape is supplied with an acrylic double side adhesive (thickness 0,13 mm) not shown in the figure



To prevent damage from possible internal stresses in the magnetic tape rolled up with magnetic layer facing outwards, with a minimum internal diameter of 200 mm; keep of least 5 mm between the layers. If supplied in single strip keep at least 10 mm between the strips.

TIPS TO STICK THE MAGNETIC TAPE ON

Fixing pressure
The magnetic tape is adhesive. Therefore it is important an optimum contact between surfaces for right use.
A good pressure must be uniformly applied to guarantee a perfect result.

Applying temperature
In order to guarantee optimal sticking it is recommended a surface temperature between +20°C and +37°C (+68°F to +98,6°F). Maximum adhesion is obtained after 72 hours at temperature of +21°C (+69,8°F). Please do not apply magnetic tape when surface temperature is lower than +10°C (+50°F).

Application materials
Magnetic tape must be placed on dry, smooth and clean surfaces. Surfaces must be cleaned with aqueous solution (like water and alcohol 50% or heptane).
Metallic surfaces like 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 could be incremental or absolute.
Perfectly suitable also for harsh enviroments, thanks to its high mechanical strength.
It can be used in wide range of applications such as: vertical storehouses, presses, extruders, etc.

ORDERING CODE

FE 1500 A .XXX

SERIES
rope encoder for linear measures FE

WORKING STROKE
1,5 m 1500
4 m 4000

TYPE OF ROPE END
eyelet A

VARIANT
custom version XXX

The encoder you wish to apply to the FE model needs to be ordered separately. The F letter will be placed before the standard ordering code.

Example:
1) encoder model EH 30 M ordering code: FEH30M300S8/24P6X6PR
2) encoder model EL 53 B ordering code: FEL53B1100S5/28P6X3MR
3) encoder model EAM 53 B ordering code: FEAM53B16/4096G8/28PPX6X3MER

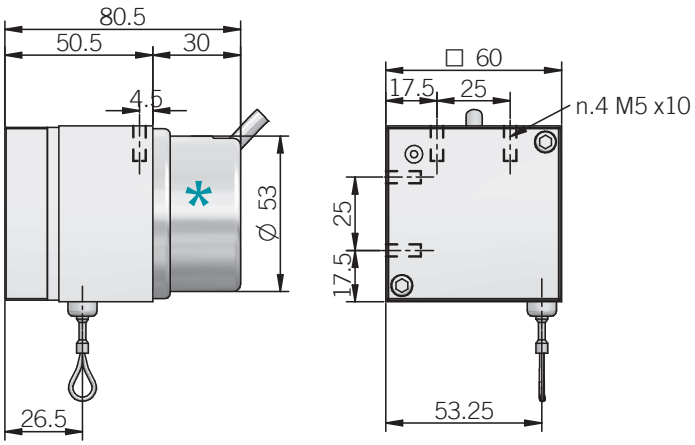
Complete ordering code example:
FE1500A-FEH30M300S8/24P6X6PR
For encoder specifications, refer to single product datasheet :
- EH 30 M see EH 30 M - EH 30 MH encoder
- EL 53 B see EL - ER 53 encoder
- EAM 53 B see EAM 58 - 63 solid shaft encoder

MECHANICAL 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	
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	

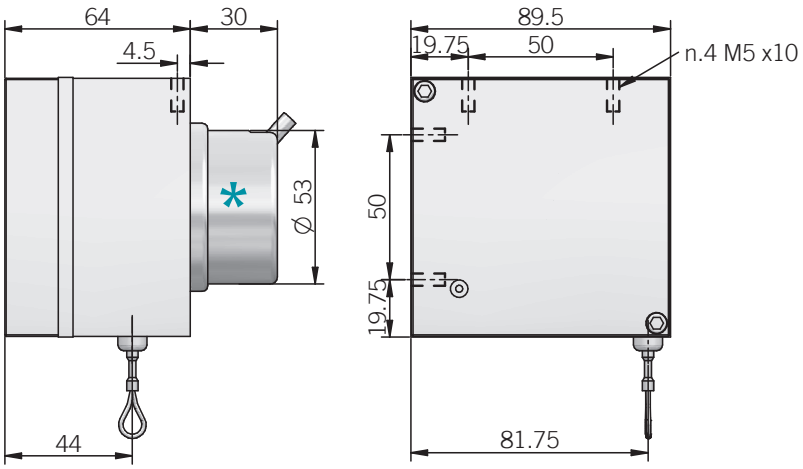
Mechanical resolution [mm] = Drum circumference [mm] / Encoder pulses [ppr o singleturn resolution]

FE 1500



* dimensions with EH30M encoder

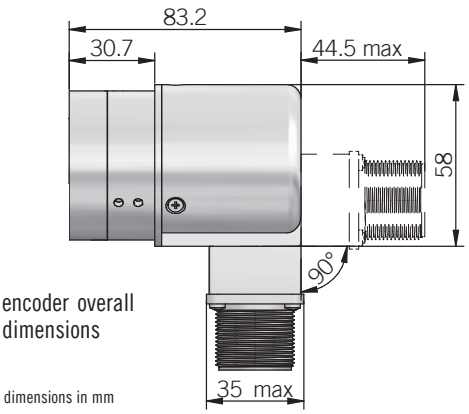
FE 4000



* dimensions with EH30M encoder

FEL 53 B

✻ incremental encoder application

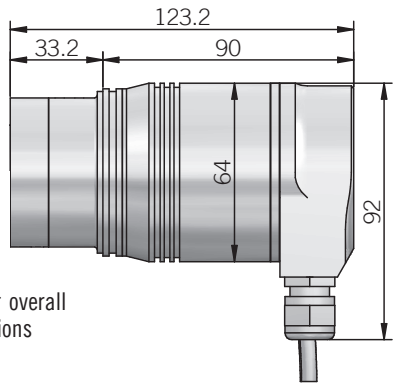


encoder overall dimensions

dimensions in mm

FEAM 53 B

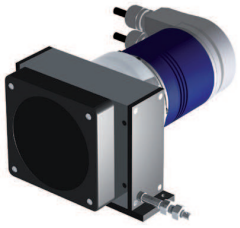
✻ multiturn absolute encoder application



encoder overall dimensions

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 strength.
It can be used in wide range of applications such as: vertical warehouses, presses, extruders, etc.



ORDERING CODE

FES 3000 A . XXX

SERIES
rope encoder for linear measures FES

WORKING STROKE
3 m 3000
6 m 6000
15 m 15000

OUTPUT TYPE
horizontal output A

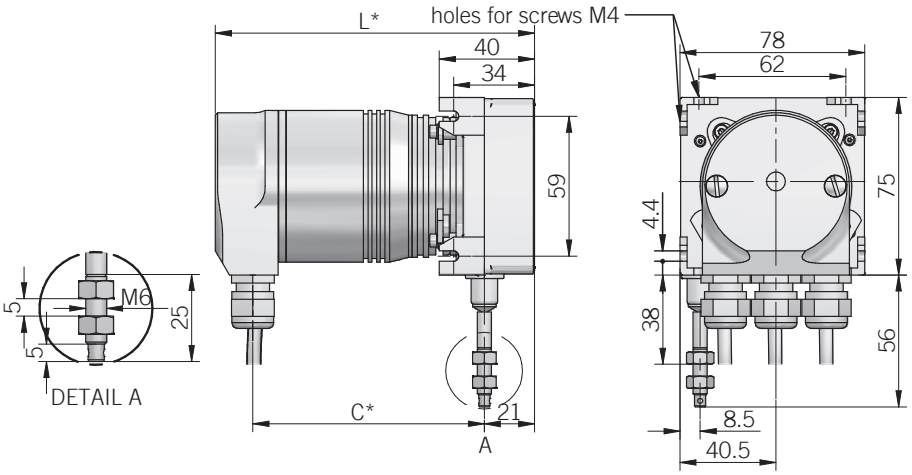
VARIANT
custom version XXX

Incremental or absolute (model 58B) must be ordered together. Please add letter F before standard encoder ordering code.

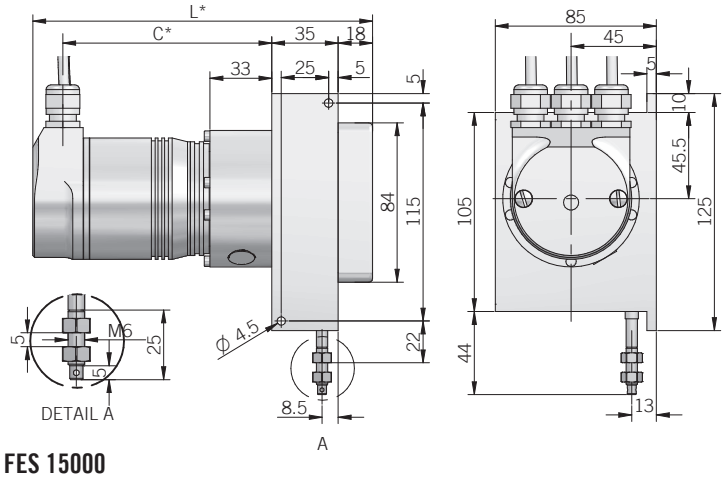
Example:
1) with incremental encoder ordering code will be : FER58B ...
2) with absolute multiturn encoder ordering code will be : FEAM58BR ...
3) with absolute Profinet multiturn encoder ordering code will be : FAAM58B ...

Complete ordering code example:
FES3000A-FER58B ...

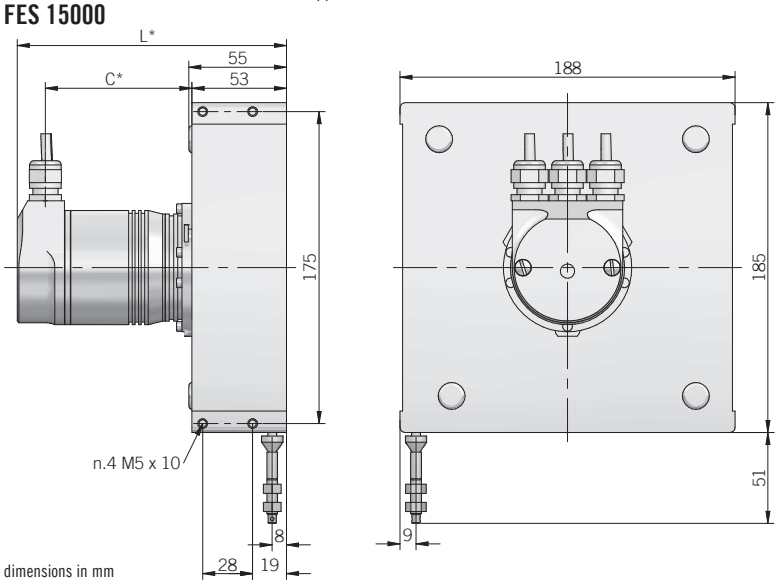
FES 3000



FES 6000



FES 15000



dimensions in mm

Installation notes

A 5 mm wire extension is recommended before the measurement starting point.
This prevents the wire snapping back to the stop on rewinding.
Wire should be pulled out straight in line with wire outlet.

MECHANICAL 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	0,54 mm	0,87 mm
Repeat accuracy	± 0,15 mm		± 0,25 mm
Max speed	0,8 m/s	3 m/s	2,4 m/s
Pull-out force required	≥ 3 N	≥ 8 N	≥ 15,5 N
Housing material	aluminum / plastic		aluminium die casting
Rope material	steel		steel rope, synthetically coated
Enclosure rating	depends on encoder IP		
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	700 g (24,69 oz) + encoder	2500 g (88,18 oz) + encoder
(EL-ER 58B) L*	95 mm	140 mm	114 mm
(EAM 58BR) L*	109 mm	154 mm	128 mm
(EAM 58B PROFIBUS) L*	135 mm	180 mm	154 mm
(EL-ER 58B) C*	58 mm	70 mm	99,5 mm
(EAM 58BR) C*	70 mm	82 mm	100,5 mm
(EAM 58B PROFIBUS) C*	98 mm	110 mm	127,2 mm

EPLA
LINEAR POTENTIOMETER

MAIN FEATURES

EPLA is an absolute linear potentiometer assuring great reliability even in tough applications with heavy vibrations and shocks.
The groove on the enclosure of the transducer represents an excellent alternative to the usual system of fastening with brackets.
Installation is also made simpler by the absence of variations on the electrical output signal outside of the theoretical electrical stroke.
EPLA is the right solution in machinery for material processing such as injection presses for plastic, rubber and so on.

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
DIN 43650-A 4 pin connector C4
DIN 43322 5 pin connector C5

OUTPUT DIRECTION
axial A

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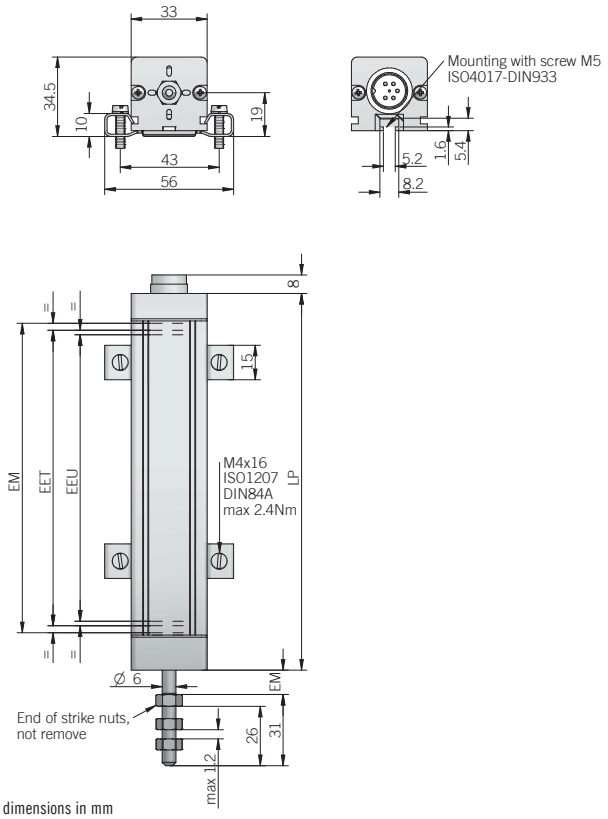
EPLA

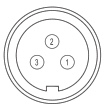


dimensions in mm

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	/	/	/	/
nc	/	/	/	/
⏚	shield	/	⏚	/

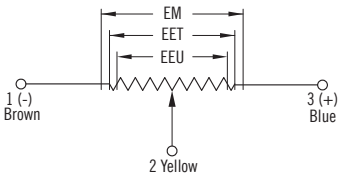
C3 connector (3 pin)
solder side view FV



C4 connector (4 pin)
DIN 43650-A
solder side view FV

C5 connector (5 pin)
DIN 45322
solder side view FV

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



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
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 model (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	3,5 N typical (IP 60) / 15 N typical (IP 65)
Housing material	anodized aluminium / Nylon 66 G
Pull shaft material	1.4305 / AISI 303 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	-30° ... +100°C (-22° ... +212°F)
Storage temperature	-50° ... +120°C (-58° ... +248°F)

Installation warning instructions:

- connect the transducer according to the reported connections
- DO NOT use it as a variable resistance
- the transducer calibration has to be done setting the stroke in order to have an output signal between 1 % and 99 % of the voltage level

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EPLB
CYLINDRICAL LINEAR POTENTIOMETER

MAIN FEATURES

EPLB is an absolute linear potentiometer transducer.
Mechanical mounting is made simpler by the presence of two spherical joints on the two sides and by the enclosure's cylindrical shape.
The main characteristic is the absence of variations on the electrical output signal outside of the theoretical electrical stroke.
Thanks to its robustness and precision EPLB represents a great solution in most mechanical application for automation.

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
DIN 43650-C 4 pin connector C4
M16 DIN 45322 5 pin connector C5

OUTPUT DIRECTION
radial R

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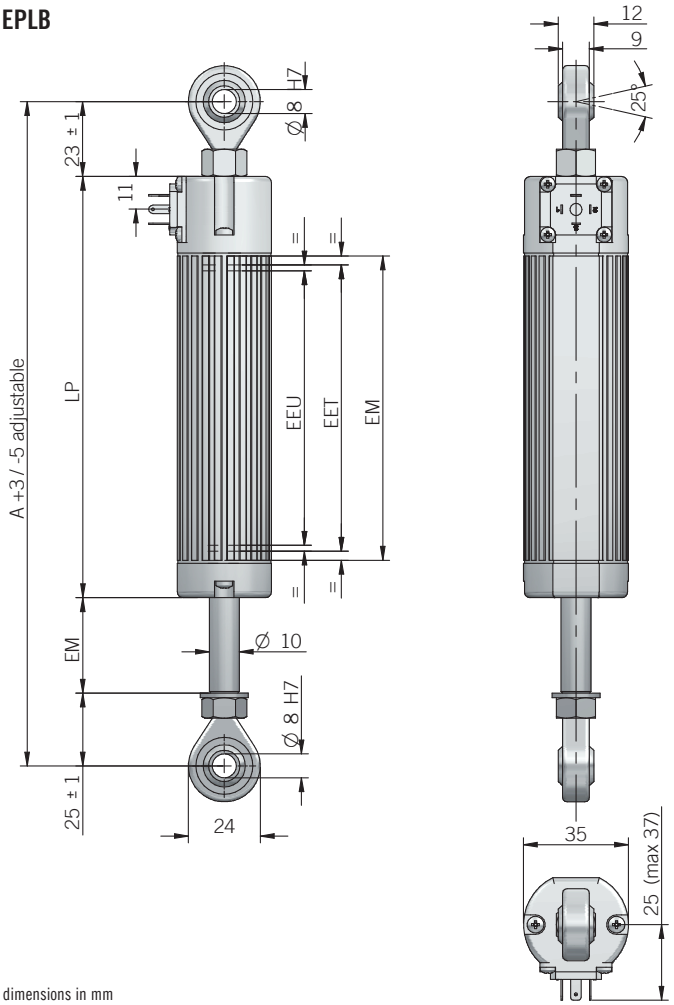
EPLB



dimensions in mm

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
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 model (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
Moving angle	± 25° max
Housing material	anodized aluminium / Nylon 66 G
Rod material	1.4305 / AISI 303 stainless steel
Mounting	n° 2 selfloading and selfaligning ball-joints
Life	> 25 x 10^6 m strokes or > 100 x 10^6 manoeuvres
Operating temperature	-30° ... +100°C (-22° ... +212°F)
Storage temperature	-50° ... +120°C (-58° ... +248°F)

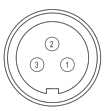
Installation warning instructions:

- connect the transducer according to the reported connections
- DO NOT use it as a variable resistance
- the transducer calibration has to be done setting the stroke in order to have an output signal between 1 % and 99 % of the voltage level

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	/	/	/	/
nc	/	/	/	/
⏚	shield	/	⏚	/

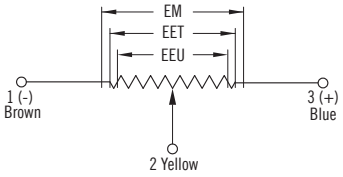
C3 connector (3 pin) solder side view FV



C4 connector (4 pin) DIN 43650-C solder side view FV

C5 connector (5 pin) DIN 45322 solder side view FV

· female connector not included, please refer to Accessories section



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MAIN CHARACTERISTICS

EPLC is an absolute linear potentiometer transducer without internal rod.
This transducer is characterized by a cursor with integrated coupling sliding on the axis.
The main characteristic is the absence of variations on the electrical output signal outside of the theoretical electrical stroke.

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

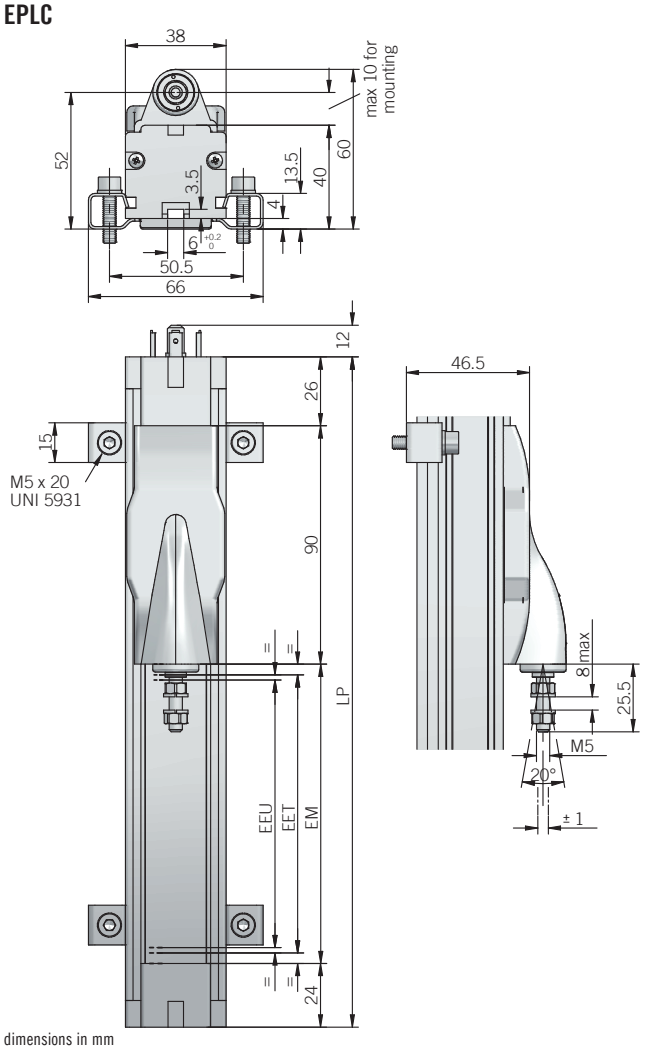
ENCLOSURE RATING
IP 40 X

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

OUTPUT TYPE
DIN 43650-A 4 pin connector C4
M16 DIN 43322 5 pin connector C5

OUTPUT DIRECTION
axial A

EPLC



dimensions in mm

CONNECTIONS

Function	4 pin C4	5 pin C5
+	3	3
-	1	1
output	2	2
nc	/	/
nc	/	/
⏚	⏚	/

C4 connector (4 pin)
DIN 43650-C
solder side view FV

C5 connector (5 pin)
DIN 45322
solder side view FV

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

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

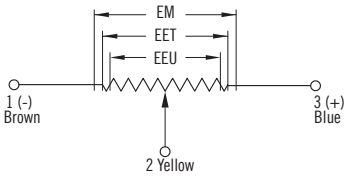
Important: data are valid if the transducer is used as a ratiometric device with a maximum applicable current ≤ 0,1 µA

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 model (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 max
Housing material	anodized aluminium / Nylon 66 G 25
Mounting	brackets with variable center-to-center distance with M6 screw ISO4017 - DIN933
Operating temperature	-30° ... +100°C (-22° ... +212°F)
Storage temperature	-50° ... +120°C (-58° ... +248°F)

Installation warning instructions:

- connect the transducer according to the reported connections
- DO NOT use it as a variable resistance
- the transducer calibration has to be done setting the stroke in order to have an output signal between 1 % and 99 % of the voltage level

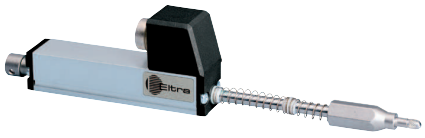


EPLT
LINEAR POTENTIOMETER WITH BALL TIP

MAIN CHARACTERISTICS

EPLT is an absolute linear potentiometer transducer.
This model is characterized by the absence of cursor and the presence of a sensing system, composed by a moving rod, stainless steel sphere mounted on a threaded tip with a spring.
This transducer is suitable for applications where short strokes are requested.
The presence of the spring assures an automatic head positioning making this device suitable for being used in precise applications on cams or to control products coming from automatic production line.
EPLT is also characterized by the absence of variations on the electrical output signal outside of the theoretical electrical stroke.

UNI EN ISO 9001:2008



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 DIN 43322 5 pin connector C5

OUTPUT DIRECTION
axial A

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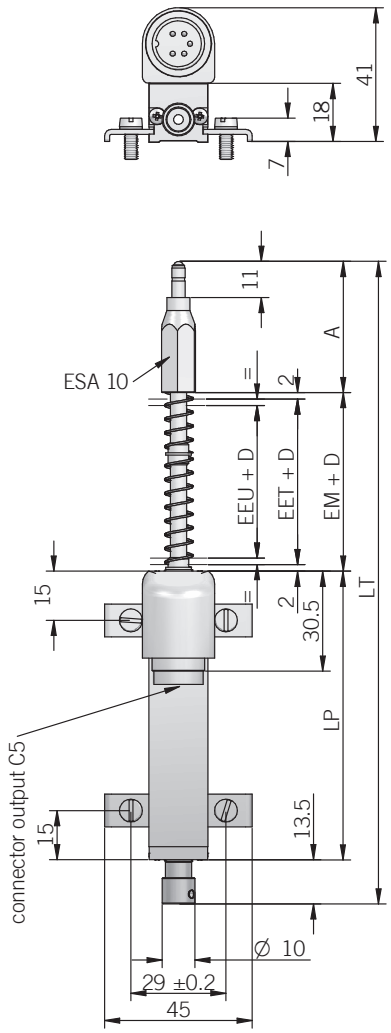
EPLT



dimensions in mm

CONNECTIONS

Function	Cable P	5 pin C5
+	blue	3
-	brown	1
output	yellow	2
nc	/	/
nc	/	/
⏚	shield	/

C5 connector (5 pin)
DIN 45322
solder side view FV

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

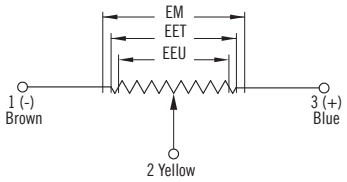
ELECTRICAL SPECIFICATIONS

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					
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					
Housing material	anodized aluminium / Nylon 66 G 25					
Rod material	1.4305 / AISI 303 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	-30° ... +100°C (-22° ... +212°F)					
Storage temperature	-50° ... +120°C (-58° ... +248°F)					



Installation warning instructions:

- connect the transducer according to the reported connections
- DO NOT use it as a variable resistance
- the transducer calibration has to be done setting the stroke in order to have an output signal between 1 % and 99 % of the voltage level

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EMSPA

LINEAR MAGNETOSTRICTIVE TRANSDUCER WITH ANALOGUE OUTPUT

MAIN CHARACTERISTICS

EMSPA is an absolute linear magnetostrictive transducer with analog interface.
Thanks to the absence of electrical contact on the enclosure there is no issue of wear and deterioration during working life.
Magnetostrictive technology guaranties great performances of speed and accuracy.
High reliability and simple installation even for applications with mechanical stresses, shocks or high contamination are assured by the compact size and the rugged enclosure.

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 DIN 45322 6 pin connector C6
M16 DIN 45326 8 pin connector C8

OUTPUT DIRECTION
axial A

1985 - 2015
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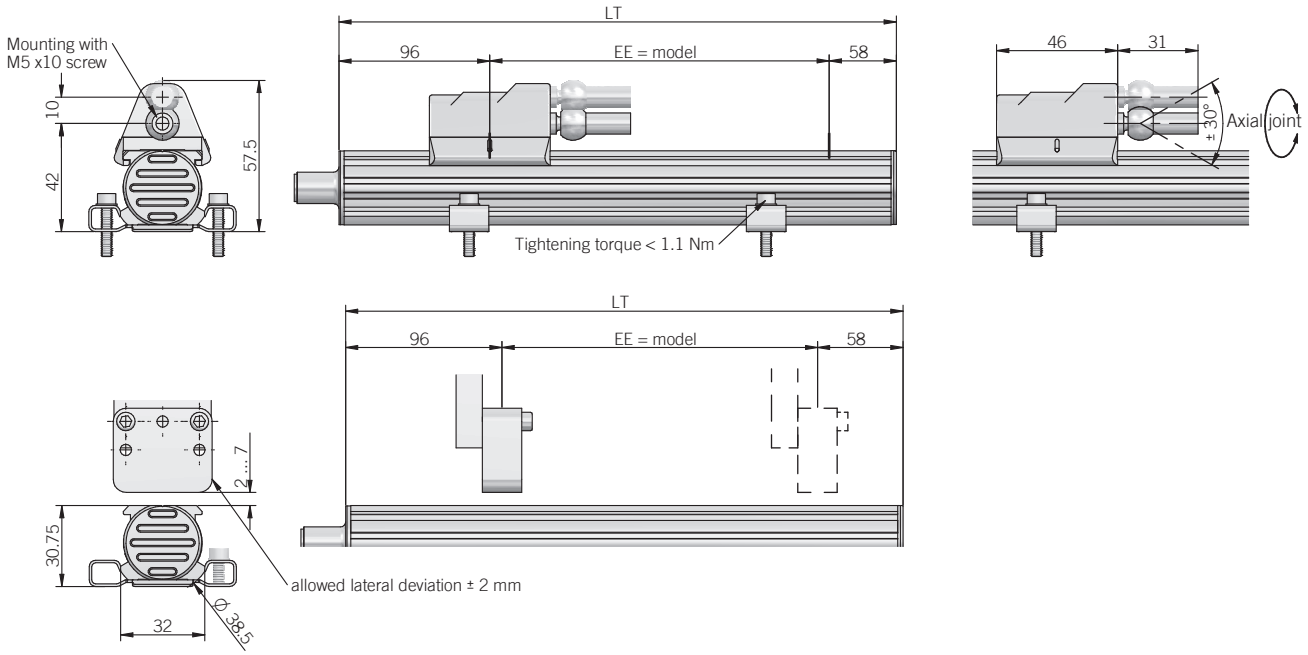
EMSPA



dimensions in mm

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

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	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	
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 model (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	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)
Housing material	anodized aluminium / Nylon 66 G 25
Cursor type	sliding or floating cursor
Temperature coefficient	0,005 % FS / °C
Operating temperature	-30° ... +75°C (-22° ... +167°F)
Storage temperature	-40° ... +100°C (-40° ... +212°F)

CONNECTIONS

Function	Cable P	5 pin M12 S5	8 pin M12 S8	6 pin M16 C6	8 pin M16 C8
+ V DC	brown	5	7	5	7
0V	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
0V **Output cursor 1** **Output cursor 2** **Output speed**	pink	2	2	4	6

S5 connector (5 pin)
M12 A coded
solder side view FV

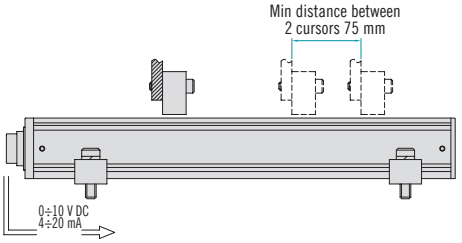
S8 connector (8 pin)
M12 A coded
solder side view FV

C6 connector (6 pin)
DIN 45322
solder side view FV

C8 connector (8 pin)
DIN 45326
solder side view FV

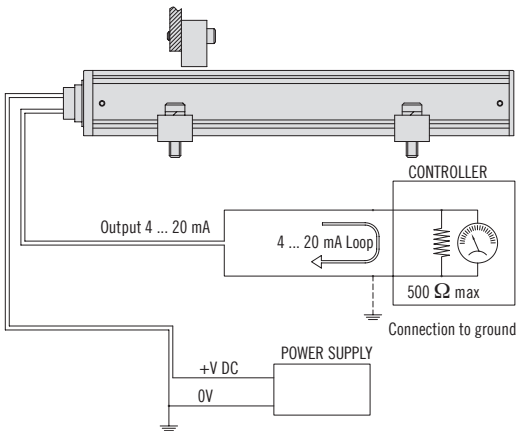
The transducer enclosure has to be connected to ground only on the control system side by the cable shield.
To guarantee the correct electrical insulation of the transducer from the machine, always assemble the brackets using the plastic washers included.

Installation example with two cursors



For multi-cursor model, the cursors have to work in the same conditions of distance and temperature. Cursors must be installed on a support made of non-magnetic material (like brass, aluminium or AISI316 stainless steel).
The installation kit provides two screws, two nuts and two washers (all made of brass).
The cursor must be installed with maximum attention to horizontal alignment with the transducer axis (maximum tolerance is ± 2 mm), distance from the transducer surface has to be within the range from 2 to 7 mm.

Current output application example

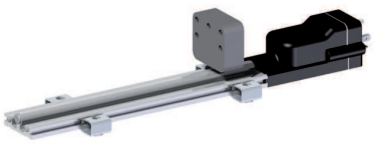


EMSPB

LINEAR MAGNETOSTRICTIVE TRANSDUCER WITH ANALOGUE OUTPUT

MAIN CHARACTERISTICS

EMSPB is an absolute linear magnetostrictive transducer with analogue interface.
Thanks to the absence of electrical contact on the enclosure there is no issue of wear and deterioration during working life.
Magnetostrictive technology guaranties great performances of speed and precision.
High reliability and simple installation even for applications with mechanical stresses, shocks or high contamination are assured by the compact size and the rugged enclosure.



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
DIN 43650-A 4 pin connector C4
M12 5 pin connector S5

OUTPUT DIRECTION
axial A

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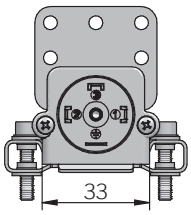
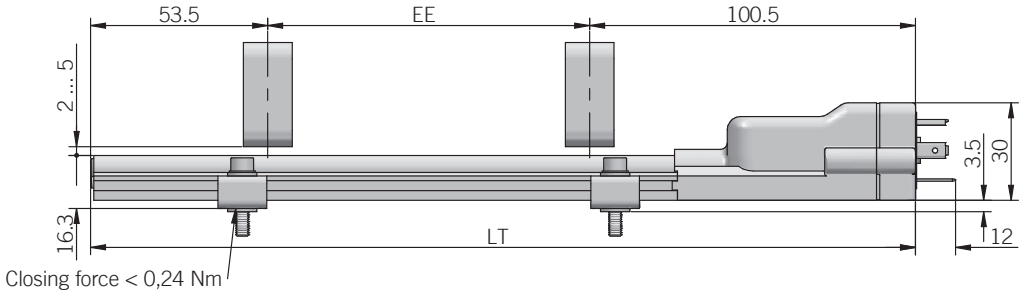
EMSPB





dimensions in mm

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

MECHANICAL SPECIFICATIONS

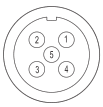
Stroke	50 - 100 - 150 - 200 - 225 - 300 - 350 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 - 1100 - 1200 - 1300 - 1400 - 1500 mm
Electric stroke (EE)	see model (mm)
Overall dimension (LT)	EE + 154 mm
Enclosure rating	IP 65 (IEC 60529)
Detected measurement	displacement
Travel speed	10 m/s max
Acceleration	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	-20° ... +75°C (-4° ... +167°F)
Storage temperature	-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
OV output	/	2
⏚	shield	/

C4 connector (4 pin)
DIN 43650-A
solder side view FV

M12 connector (5 pin)
M12 A coded
solder side view FV



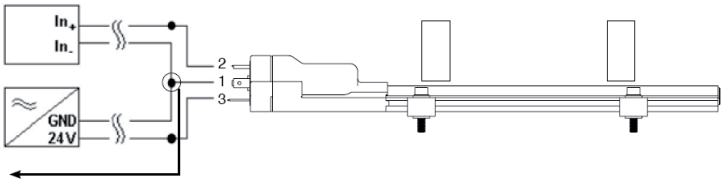
ELECTRICAL SPECIFICATIONS

Resolution	virtually infinite	
Output signal	0,1 ... 10,1 V DC	4 ... 20 mA
Output alarm value	10,5 V DC	21 mA
Output value max	12 V DC	30 mA
Power supply	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	
Hysteresis	≤ 0,02 mm	
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	50 V DC	
Electromagnetic compatibility	according to 2014/30/EU directive	
RoHS	according to 2011/65/EU directive	

Installation notes

For multi-cursor model, the cursors have to work in the same conditions of distance and temperature. Cursors must be installed on a support made of non-magnetic material (like brass, aluminium or AISI316 stainless steel).
The installation kit provides two screws, two nuts and two washers (all made of brass).
The cursor must be installed with maximum attention to horizontal alignment with the transducer axis (maximum tolerance is ± 2 mm), distance from the transducer surface has to be within the range from 2 to 5 mm.

Current output application example



Note: connect as close as possible to transducer

eltra@eltra.it | www.eltra.it

EMSPS

LINEAR MAGNETOSTRICTIVE TRANSDUCER WITH SSI OUTPUT

MAIN CHARACTERISTICS

EMSPS is an absolute linear magnetostrictive transducer featuring a digital RS-422 SSI compliant output.
The main characteristic of magnetostrictive transducers is the absence of electric contact on the enclosure there is no issue of wear and deterioration during working life guaranteeing high displacement speed and precision.
High reliability and simple installation even for applications with mechanical stresses, shocks or high contamination are assured by the compact size and the rugged enclosure.

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

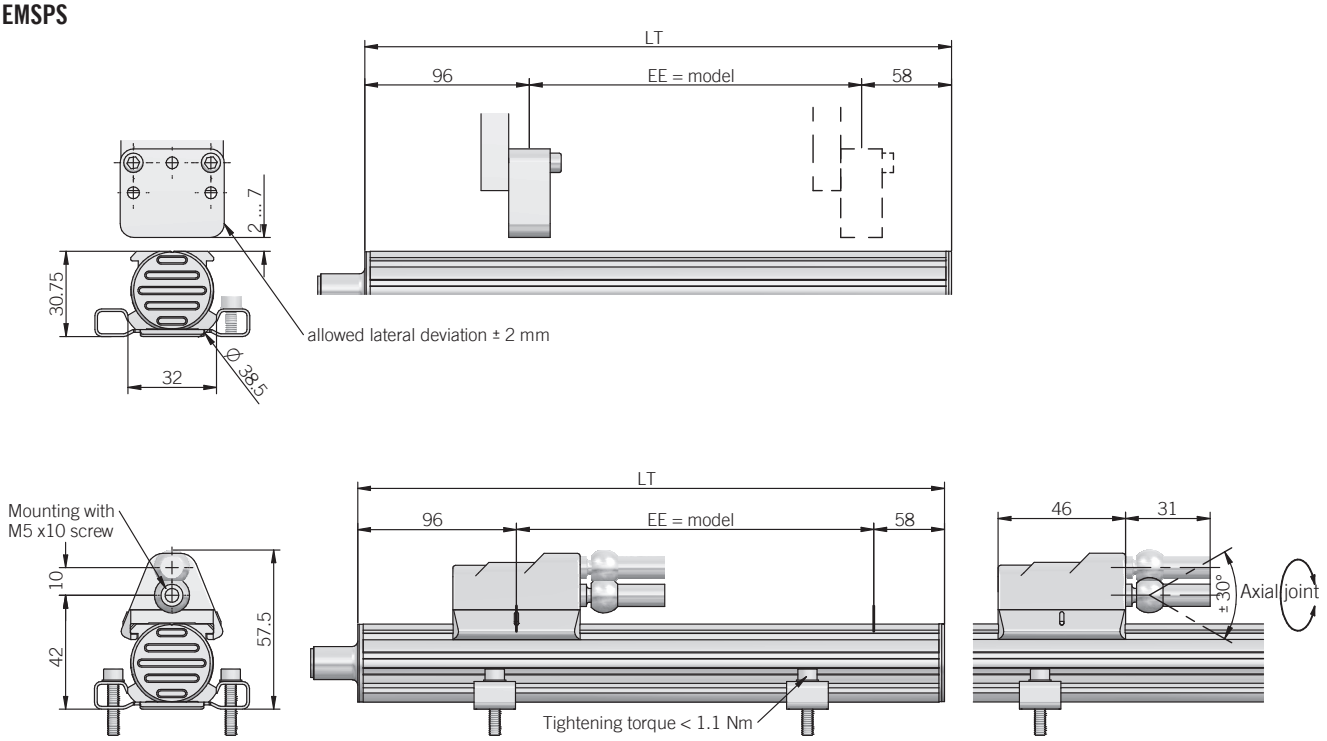
TRAVEL SPEED
max 10 m/s 10

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 6 pin connector C6
DIN 45326 M16 8 pin connector C8
M12 8 pin connector S8

OUTPUT DIRECTION
axial A

EMSPS



dimensions in mm

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

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	10 ... 32 V DC
Power ripple	1 Vpp max
Max load current	50 mA max
Output type	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)
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 model (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	-30° ... +90°C (-22° ... +194°F)
Storage temperature	-40° ... +100°C (-40° ... +212°F)

CONNECTIONS

Function	Cable P	8 pin M12 S8	6 pin M16 C6	8 pin M16 C8
+ V DC	blue / white	7	5	7
0V	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

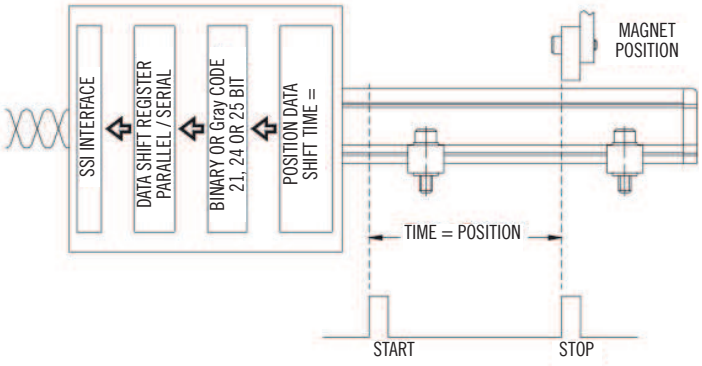
S8 connector (8 pin)
M12 A coded
solder side view FV

C6 connector (6 pin)
DIN 45322
solder side view FV

C8 connector (8 pin)
DIN 45326
solder side view FV

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

SSI BLOCK DIAGRAM

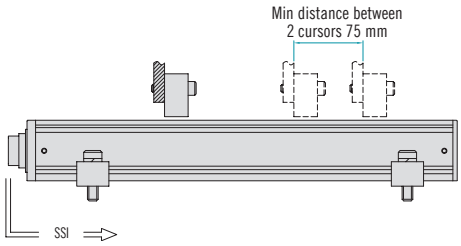


SSI output goes to 0 if the echo is absent (magnet out of measurement range or internal device error)

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 with two cursors



For multi-cursor model, the cursors have to work in the same conditions of distance and temperature. Cursors must be installed on a support made of non-magnetic material (like brass, aluminium or AISI316 stainless steel).
The installation kit provides two screws, two nuts and two washers (all made of brass).
The cursor must be installed with maximum attention to horizontal alignment with the transducer axis (maximum tolerance is ± 2 mm), distance from the transducer surface has to be within the range from 2 to 7 mm.

MAIN CHARACTERISTICS

EMSSA is an absolute linear magnetostrictive transducer featuring an analogue interface.
Main characteristics of magnetostrictive transducers is the absence of electric contact on the enclosure there is no issue of wear and deterioration during working life guaranteeing high displacement speed and precision.
High reliability and simple installation even for applications with mechanical stresses, shocks or high contamination are assured by the compact size and the rugged enclosure. This series has been designed for being mounted internally to high 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

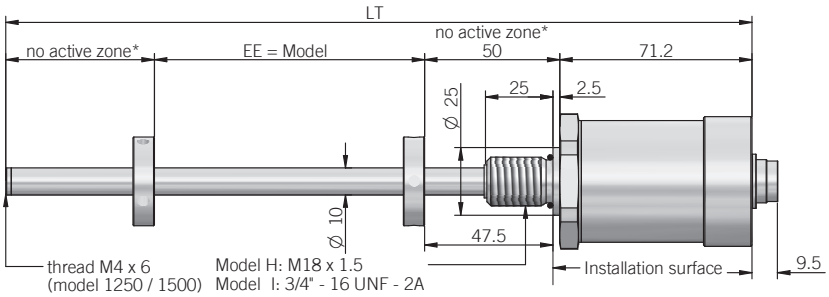
THREAD TYPE
M18 x 1,5 H
3/4" - 16 UNF I

DISPLACEMENT SPEED
max 10 m/s 10

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

OUTPUT DIRECTION
axial A

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 female connector not included, please refer to Accessories section

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	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	
Electromagnetic compatibility	according to 2014/30/EU directive	
RoHS	according to 2011/65/EU directive	

MECHANICAL SPECIFICATIONS

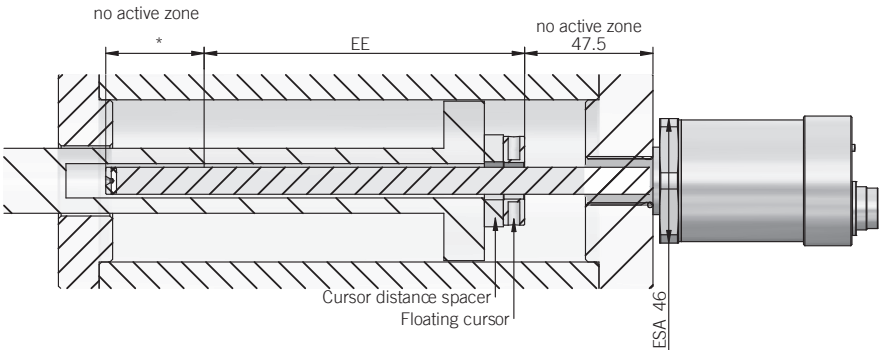
Stroke	50 - 100 - 150 - 200 - 250 - 300 - 350 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 - 1250 - 1500 mm
Electric stroke (EE)	see model (mm)
Overall dimensions (LT)	EE + 176,2 mm (mod. 50 ... 900) EE + 181,2 mm (mod. 1000 ... 1500)
Enclosure rating	IP 67 (IEC 60529)
Detected measurement	displacement
Travel speed	10 m/s max
Acceleration	100 m/s² max
Speed measurament range	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	350 bar (500 bar peak)
Cursor type	floating cursor
Temperature coefficient	≤ 0,01 % FS / °C
Operating temperature	-30° ... +75°C (-22° ... +167°F)
Storage temperature	-40° ... +100°C (-40° ... +212°F)

CONNECTIONS

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

C6 connector (6 pin)
DIN 45322
solder side view FV

Cylinder mounting example



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

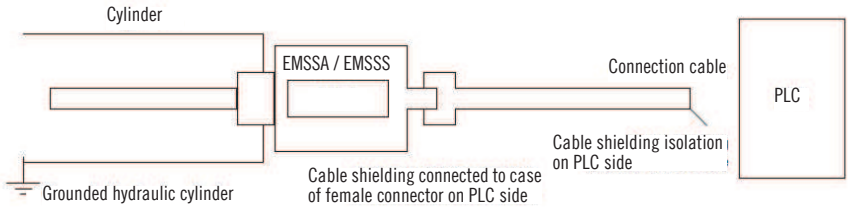
For correct installation of rod-type magnetostrictive transducers in hydraulic cylinders, remember that the cylinder head must be made of non-magnetic material where the threaded hole will be drilled to install the transducer. If not, the residual magnetisation caused by drilling the threaded hole must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

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.).

- with floating cursor assembly support must be made with nonmagnetic material
- the transducer connection cable must be wired separate from power cables and/or solenoid controls, drives, or remote switches
- power supply must be drawn from dedicated power supply and connected directly to power terminals as near as possible
- since 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, with consequent sliding problems
- if the transducer is installed in a cylinder isolated from the ground, the cable shielding on PLC side must be grounded
- with multiple cursors (two or more), cursors distance must be minimum 75 mm each

EMSSS

LINEAR MAGNETOSTRICTIVE ROD TRANSDUCER WITH SSI OUTPUT

MAIN CHARACTERISTICS

EMSSS is an absolute linear magnetostrictive transducer featuring a SSI output.
Main characteristics of magnetostrictive transducer is the absence of electric contact on the enclosure so there is no issue of wear and deterioration during working life guaranteeing high displacement speed and precision.
High reliability and simple installation even for applications with mechanical stresses, shocks or high contamination are assured by the compact size and the rugged enclosure.
This series has been designed for being mounted internally to high preassure (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

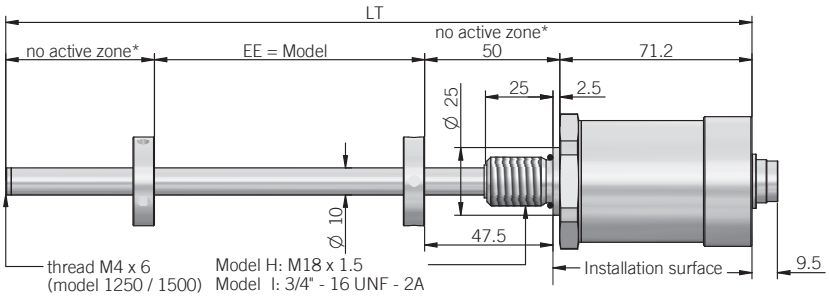
DISPLACEMENT SPEED
max speed 10 m/s 10

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 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 female connector not included, please refer to Accessories section

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	10 ... 32 V DC
Power ripple	1 Vpp max
Max load current	50 mA max
Output type	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)
Electromagnetic compatibility	according to 2014/30/EU directive
Electromagnetic	according to 2011/65/EU directive

MECHANICAL SPECIFICATIONS

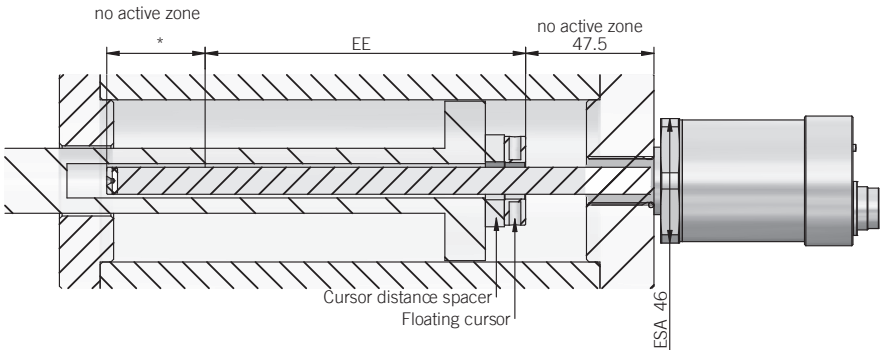
Stroke	100 - 150 - 200 - 300 - 400 - 450 - 500 - 600 - 700 - 800 - 900 - 1000 - 1250 - 1500 mm
Electric stroke (EE)	see model (mm)
Overall dimensions (LT)	EE + 176,2 mm (mod. 100 ... 1000) EE + 181,2 mm (mod. 1250 ... 1500)
Enclosure rating	IP 67 (IEC 60529)
Detected measurement	displacement
Travel speed	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	350 bar (500 bar peak)
Cursor type	floating cursor
Temperature coefficient	20 ppm FS / °C
Operating temperature	-30° ... +90°C (-22° ... +194°F)
Storage temperature	-40° ... +100°C (-40° ... +212°F)

CONNECTIONS

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

C6 connector (6 pin)
DIN 45322
solder side view FV

Cylinder mounting example



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

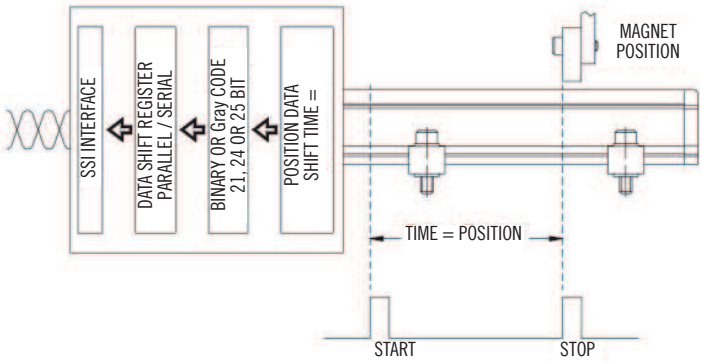
For the correct installation of rod-type magnetostrictive transducers in hydraulic cylinders, remember that the cylinder head must be made of non-magnetic material where the threaded hole will be drilled to install the transducer. If not, the residual magnetisation caused by drilling the threaded hole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

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

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.).

- with floating cursor assembly support must be made with nonmagnetic material
- the transducer connection cable must be wired separate from power cables and/or solenoid controls, drives, or remote switches
- power supply must be drawn from dedicated power supply and connected directly to power terminals as near as possible
- since 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, with consequent sliding problems
- cable shield must be connected on both sides (PLC and transducer)
- if the transducer is installed in a cylinder isolated from the ground, the cable shielding on PLC side must be grounded.