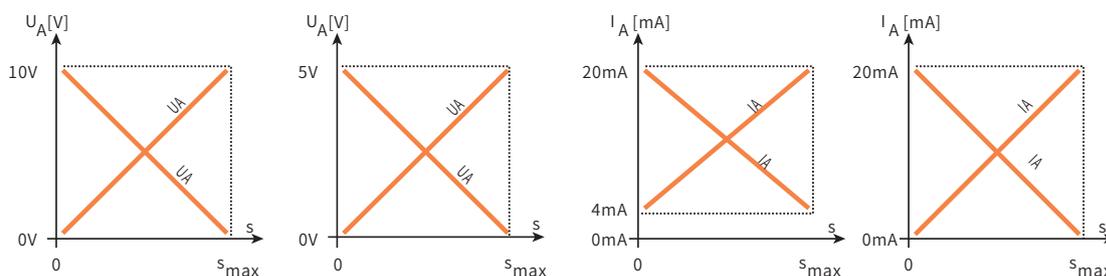




ES-Analog

ES pressure resistant outer tube



- + Non-contact measurement, no attrition
- + High reliability, absolute output, linear measurement
- + Compact structure: placed in the hydraulic cylinder, suitable for small installation space
- + Robust and durable, fully enclosed design, highest IP68 protection level
- + Completely replaceable with potentiometers and inductive displacement sensors
- + Easy to use, standard signal output, maintenance-free



MAGNETOSTRICTIVE SENSOR

Document Number:

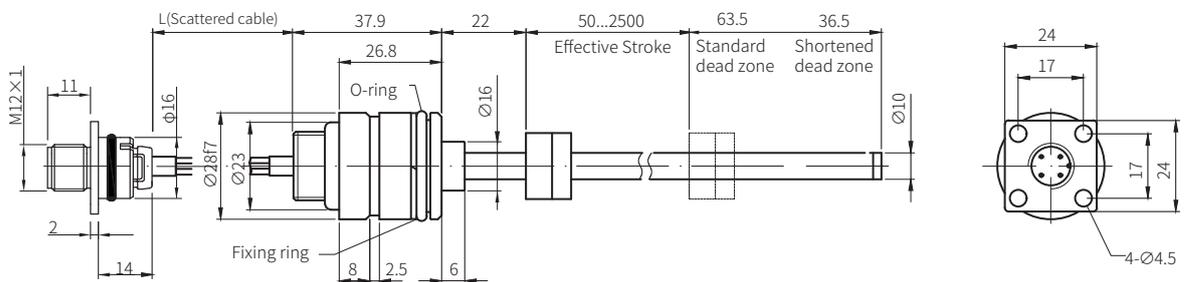
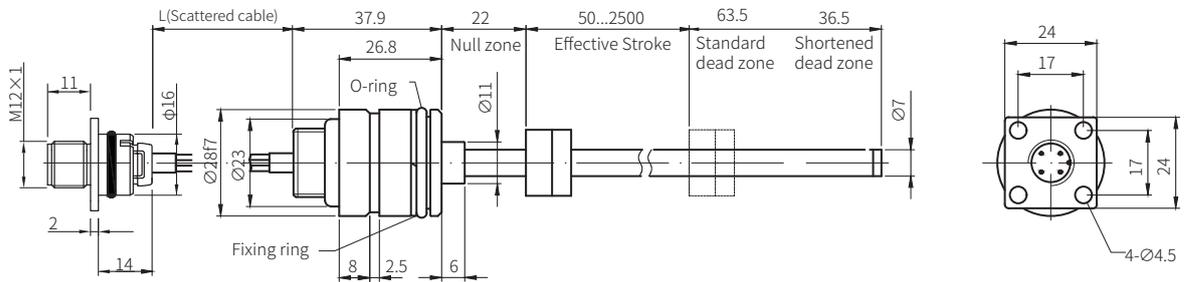
ES-A(V1.3)-EN

TECHNICAL PAKAMETER

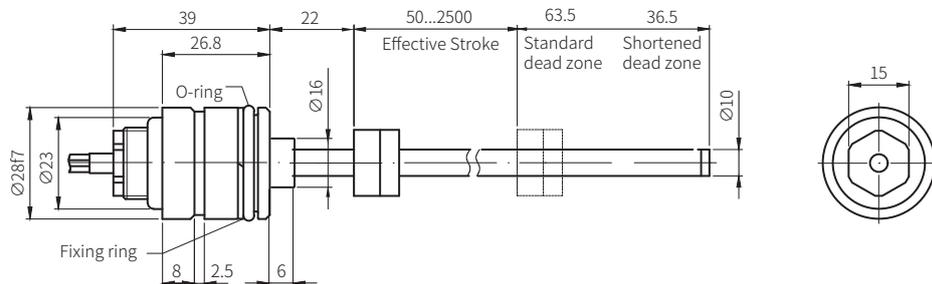
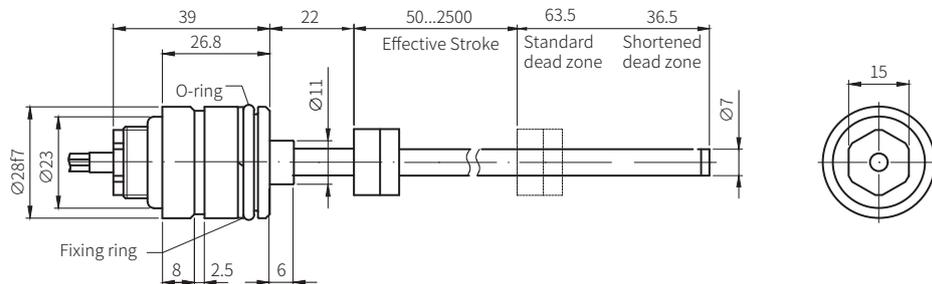
Input							
Measured data	Position						
Measurement range	50mm...2500mm						
Output							
Voltage	0...10VDC, 10...0VDC, 0...5VDC, 5...0VDC, 0.5...4.5VDC, 0.25...4.75VDC (Controller min. load impedance >5K Ω)						
Current	4...20mA, 20...4mA, 0...20mA, 20...0mA (min./max. load 0/750 Ω)						
Resolution							
Resolution	16 bit D/A						
None-Linearity	< \pm 0.04%F.S.(min. 0.1mm)						
Repeatability	< \pm 0.005%F.S.						
Update time	<table border="1"> <tr> <td>Stroke length</td> <td>\leq 1200mm</td> <td>\leq 2500mm</td> </tr> <tr> <td>Update time</td> <td>0.5ms</td> <td>1ms</td> </tr> </table>	Stroke length	\leq 1200mm	\leq 2500mm	Update time	0.5ms	1ms
Stroke length	\leq 1200mm	\leq 2500mm					
Update time	0.5ms	1ms					
Temperature coefficient	<30ppm/ $^{\circ}$ C						
Mounting							
Mounting position	Any						
Mounting	Extrusion mounting						
Design/Material							
Electronics housing	Stainless steel 304						
Measuring rod	Stainless steel 304/316L						
Magnet	Standard magnet						
Electrical connection							
Wiring connection	Straight out cable, aviation plug						
Operating voltage	+24VDC(-15/+20%)						
Polarity protection	Up to -36VDC						
Overvoltage protection	Up to +36VDC						
Power consumption	<50mA (varies with range size)						
Dielectric strength	500 VDC (DC ground to machine ground)						
Operating conditions							
Loop velocity	Any						
Operating temperature	-40...105 $^{\circ}$ C (customizable)						
Humidity	90 % relative humidity, no condensation						
Operating pressure	30MPa (continuous), 45MPa (peak)						
Ingress protection	IP68 (Straight out cable)						
Shock	100 g/6 ms, IEC standard 60068-2-27						
Vibration	IEC standard 60068-2-64 Φ 10 rod: 20 g(root-mean-square value)10...2000 Hz (resonant frequencies excluded) Φ 7 rod: 15 g(root-mean-square value)10...2000 Hz (resonant frequencies excluded)						
EMC	ISO 14982 Agricultural and forest machines ISO 16750-2 Road vehicle Immunity: ISO 11452-2(200V/m Antenna), ISO 11452-4(200mA BCI) Transiente Impulses: ISO 7637-1/2 E.S.D.: ISO/TR 10605						

TECHNICAL DRAWING

Basic type with aviation plug



Straight-out cable



For selection of supporting magnetic rings and non-permeable gaskets, please refer to the attachment for details.

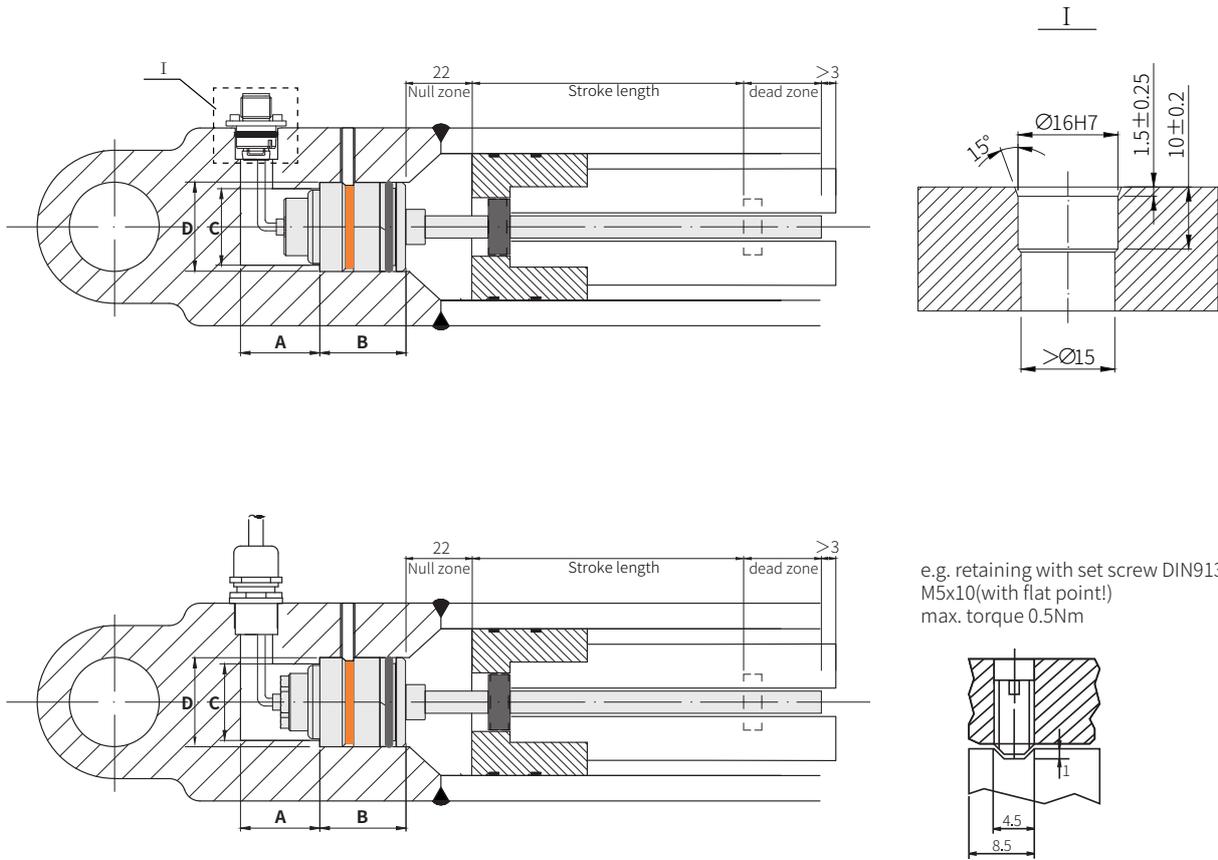


Magnetic ring



Non-permeable gasket

MECHANICAL MOUNTING DIAGRAM



Type	A depth (mm)		B depth (mm)	C Φ (mm)	D Φ (mm)
	straight-out cable	connector			
Thimble type	≥ 25	≥ 25	$26.8^{+0.2}$	> 24	28H8

Surface Ra < 0.8mm

- ! + The size of hole in the piston rod depends on factors such as hydraulic pressure and piston speed. The minimum hole size is $\Phi 10$ ($\Phi 7$ measuring rods) or $\Phi 13.5$ ($\Phi 10$ measuring rods).
- + Thimble type, thimble adopts flat head wire, torque $0.5N \cdot m$.
- + The borehole depth $>$ Stroke length + Dead zone + 3mm.

M12 connector

3 single wires, $0.5mm^2$



Wiring

DG (1-3-4)wiring

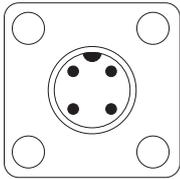
4 pin M12 connector



PIN	Color	Function
1	Brown	+24VDC (-15/+20%)
2	-	NC
3	White	GND
4	Gray	Signal output

DH (1-2-3)wiring

4 pin M12 connector



PIN	Color	Function
1	Brown	+24VDC (-15/+20%)
2	Green	Signal output
3	White	GND
4	-	NC

DE (2-3-4)wiring

4 pin M12 connector

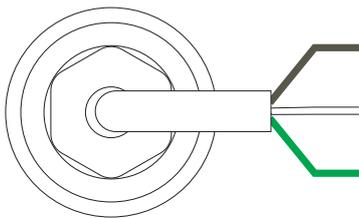


PIN	Color	Function
1	-	NC
2	Green	+24VDC (-15/+20%)
3	White	GND
4	Gray	Signal output

Straight out cable

Color

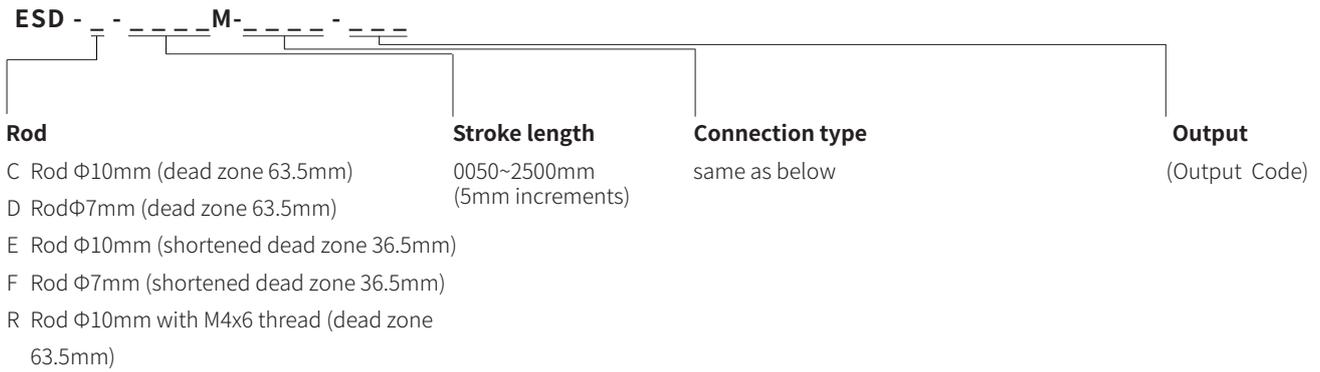
Function



Brown	+24VDC (-15/+20%)
White	GND
Green	Signal output

ORDER CODE

Basic type, aviation plug



Connection type

Fill: [1] [2] [3] [4] [5]

[1] and [2]: Cable connection

- DG** 4 pin aviation plug, M12 (Pin definition 1-3-4)
- DH** 4 pin aviation plug, M12 (Pin definition 1-2-3)
- DE** 4 pin aviation plug, M12 (Pin definition 2-3-4)

(Unit: 10mm(mm) 01=10mm, 02=20mm...99=990mm)

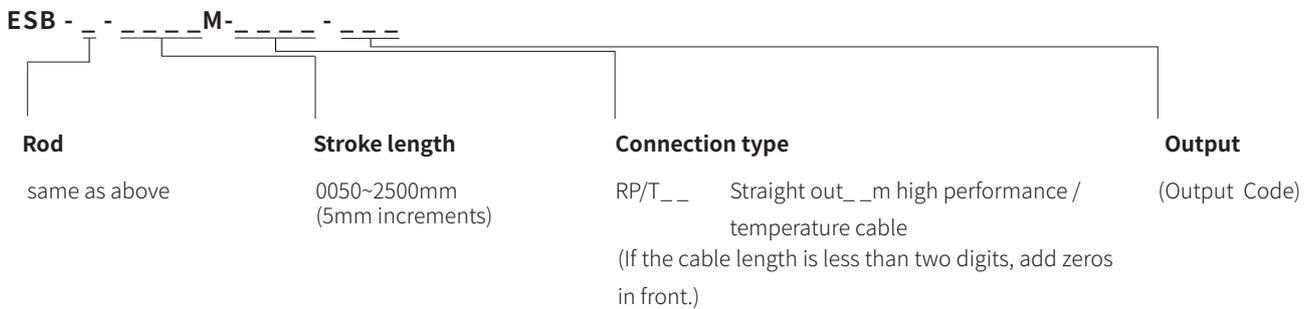
[3]: Cable performance

- P** high performance cable
- T** high temperature cable

[4] and [5]: Cable length

- unit: meter
Fill in zero if less than 2 places
- unit: 10millimetre

Basic type, straight-out cable



Analog Output Code [1][2][3]

[1][2] Output type and direction

- | | |
|--------------------|------------------------|
| A0 4~20mA(forward) | V0 0.25~4.75V(forward) |
| A1 20~4mA(reverse) | V1 0.5~4.5V(forward) |
| A2 0~20mA(forward) | V2 0~5V(forward) |
| A3 20~0mA(reverse) | V3 5~0V(reverse) |
| | V4 0~10V(forward) |
| | V5 10~0V(reverse) |

[3] Ring number

- 1 one magnet ring
- 2 two magnet rings

K=Anti-vibration program (If there are special needs, please fill in the end of the model number.)

Note: forward, data grows larger when the magnet is distant from the electronics housing;
reverse, data grows larger when the magnet approaches the electronics housing.

Model selection

Model: ESD-C-0600M-DGP05-A01

Explanation: ES series aviation plug, measuring rod diameter 10mm, range 600mm, 50mm high performance cable with 4 pin M12 connector (Pin definition 1-3-4), 4...20mA (forward), single magnetic ring.

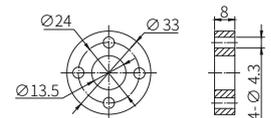
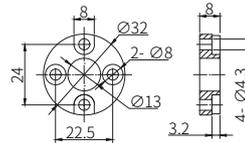
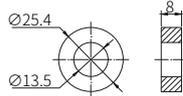
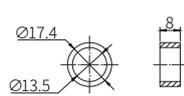
Please contact us for more customized products.



ACCESSORIES

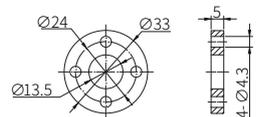
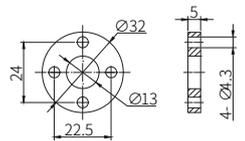
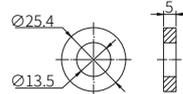
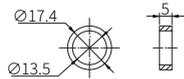
Analog

ES



Name	Ring magnet	Ring magnet	Ring magnet	Ring magnet
Operating temperature	-40~125°C			
Order code	12-1032	12-1019	12-1024	12-1001

Non-permeable gasket



Name	Non-permeable gasket	Non-permeable gasket	Non-permeable gasket	Non-permeable gasket
Operating temperature	-40~125°C			
Order code	12-1037	12-1021	12-1025	12-1008

Integral cables



Connector	5 pin M12 female connector	5 pin M12 female connector (90 degree angle)
Name	Integral cable	Integral cable
Cable	5 wire 0.25mm ² shielded cable	5 wire 0.25mm ² shielded cable
Color/Diameter	Orange/ Ø 6	Orange/ Ø 6
Plug surface	 <ul style="list-style-type: none"> 1-Brown 2-Green 3-White 4-Gray 5-Yellow 	 <ul style="list-style-type: none"> 1-Brown 2-Green 3-White 4-Gray 5-Yellow
Length	5~30M	5/10/15/20/30M
Order code	16-1035	16-1040

Building 6, Dazu Enterprise Bay,
8th yard of Liangshuihe 2nd street, BDA Beijing P.R.China

Tel: +86 10-67948976 67948916
Fax: +86 10-67948979
Technical support: +86 (0)13370126657

■ For more customizable products,
please contact us.

Beijing Tebeifu Electronic Technology Co., Ltd.