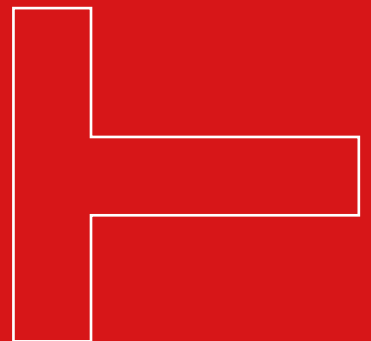
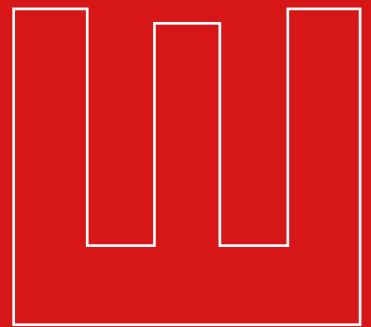


TEC[®]

Magnetostrictive Displacement Sensor

E Series Product manual

浙达精益
ZHEDA JINGYI



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**TEC CostEffective
Sensor**



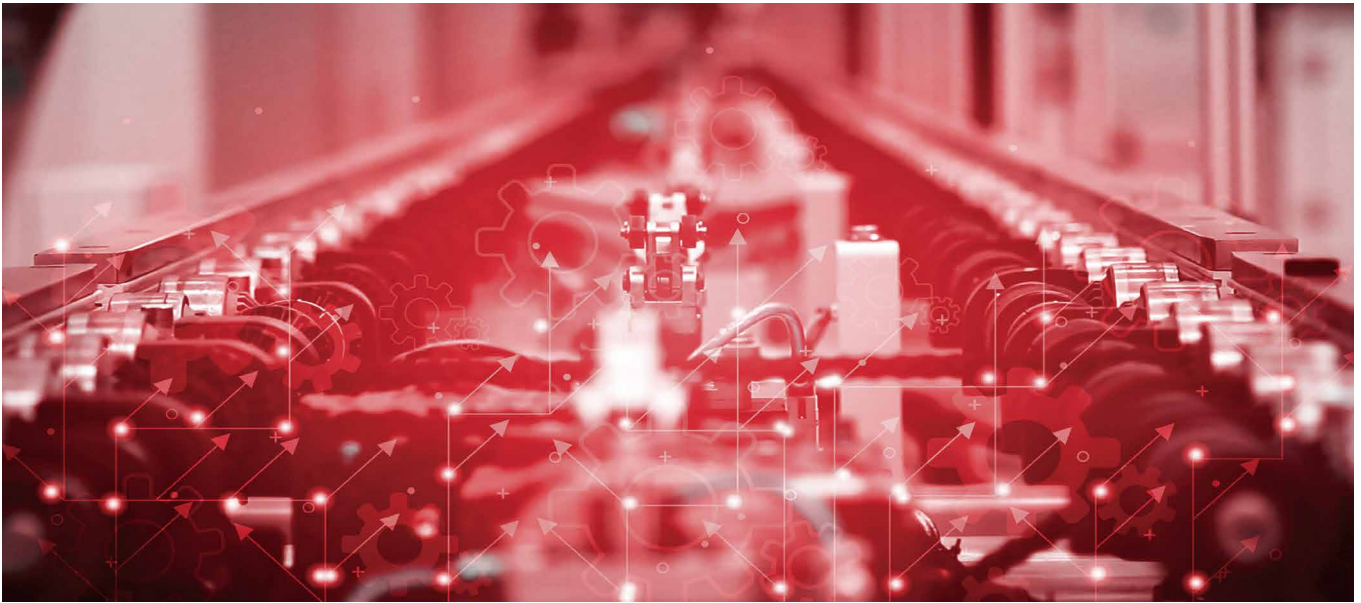
E Series

TEC CostEffective Sensor-E Series

Sensor classification	Structure and application	Interface	Parameter
 <p>EJ displacement sensor</p>	<p>Stell rod structure Most of them are used in hydraulic cylinder and cylinder</p>	<p>Analog SSI Modbus</p>	<p>Maximum stroke:5500mm Maximum resolution:5μm IP67 protection</p>
 <p>ES displacement sensor</p>	<p>Stell rod structure Most of them are used in hydraulic cylinder and liquid level measuring</p>	<p>Analog Modbus</p>	<p>Maximum stroke:3500mm Maximum resolution:10μm IP67 protection</p>
 <p>EP displacement sensor</p>	<p>Aluminum profile structure Can be installed in narrow spaces on machine surfaces</p>	<p>Analog</p>	<p>Maximum stroke:2500mm Maximum resolution:10μm IP65 protection</p>
 <p>HP displacement sensor</p>	<p>Aluminum profile structure Can be installed on the machine surface with guide mechanism</p>	<p>Analog</p>	<p>Maximum stroke:2500mm Maximum resolution:5μm IP65 protection</p>
 <p>ED displacement sensor</p>	<p>Aluminum profile structure It can be installed in a narrow space on the surface of the machine</p>	<p>Analog</p>	<p>Maximum stroke:3000mm Maximum resolution:10μm IP65 protection</p>
 <p>ESC structure</p>	<p>Anticorrosive outer tube structure Most of them are used for measuring corrosion liquid</p>	<p>Analog</p>	<p>Maximum stroke:2500mm Maximum resolution:10μm IP67 protection</p>

Company Profile

We are a science and technology innovative enterprise born from Zhejiang University, a national high-tech enterprise, the fourth batch of "small giant" enterprises of the Ministry of Industry and Information Technology, and a special enterprise of Zhejiang Province. Our company has more than 200 employees, including 4 overseas talents, 4 professors, and 2 associate professors. There are also 12 doctors, and more than 86% of employees with a bachelor degree or above.



We are committed to intelligent manufacturing, high-end equipment, intelligent sensing, intelligent detection, military industry and other fields. Most of our company's products are independently researched and developed, and the market share ranks in the forefront of the domestic industry. A variety of equipment is the first set in China, which breaks the long-term monopoly of foreign companies.

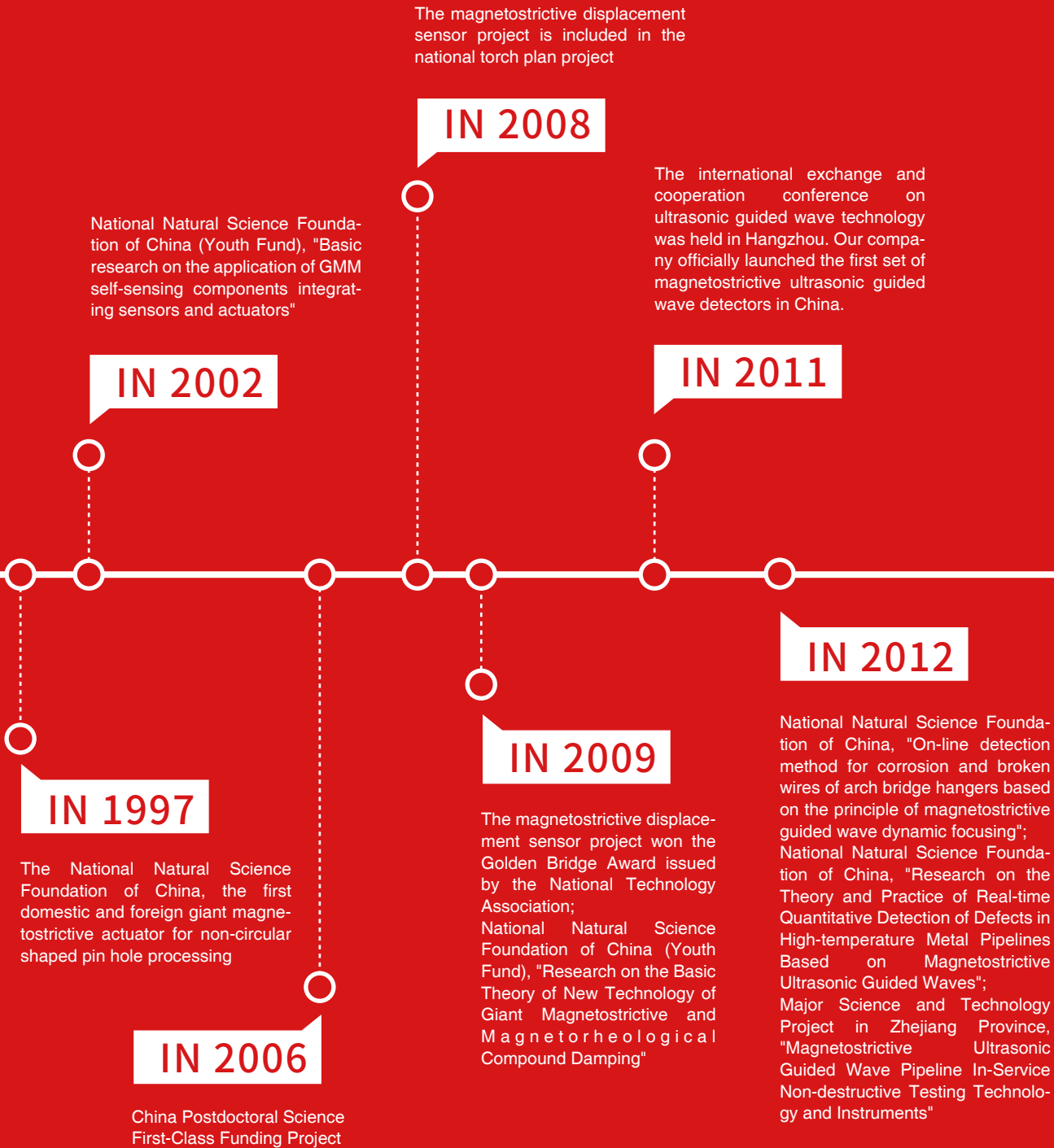
We are a national high-tech enterprise integrating scientific research, product development, engineering design, and technical consulting. Besides, the company has obtained 45 invention patents, 29 utility model patents, 10 software copyrights, and 4 registered trademarks.

Taking "Created in China, Create China" as our ideal, we are committed to building a century-old national brand. Our development goal is to become a well-known leading technology and strength-based enterprise in China's high-end equipment and intelligent inspection industries.

Honorary Qualification



TEC Magnetostriction Development



National Natural Science Foundation of China, "Research on Theory and Practice of Real-time Quantitative Detection of Defects in High-temperature Metal Pipelines Based on Magnetostrictive Guided Waves"

IN 2013

IN 2016

National Major Scientific Instrument and Equipment Development Project, "R&D of Rail Broken Monitoring Equipment and Testing Network in Key Sections"

National Key R&D Program, "On-line Monitoring and Inspection of Pressure Equipment and Dynamic Risk Management Technology Research"; Zhejiang Province Key R&D Program, "Usonic Guided Wave-based Track Turnout Structural Health Monitoring System"

IN 2017

IN 2018

National Natural Science Foundation of China, "Research on the Theory and Practice of On-line Monitoring of Turnout Point Rail Defects Based on Phased Array Guided Wave Sound Field Control"; National Key R&D Project, "Research on Magnetoacoustic Compound Monitoring and Detection Technology for Typical Pressure-bearing Special Equipment Damage"

Key R&D Program of Zhejiang Province, "Research and Demonstration Application of Safety Early Warning Technology for Nearshore High Tower Equipment"

IN 2019

IN 2021

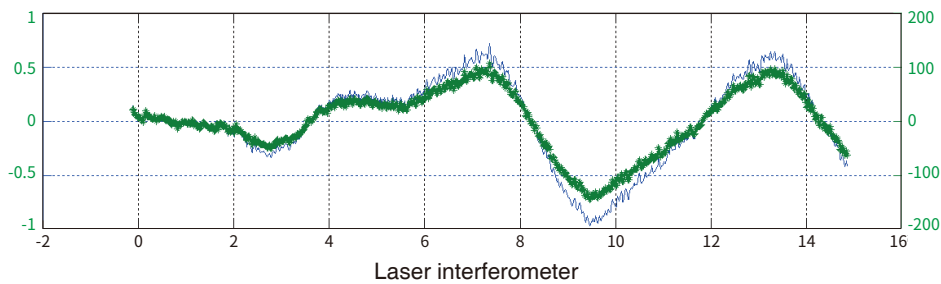
Science and Technology Progress Award of Zhejiang Province, "High-precision magnetoacoustic sensing technology and industrialization application of important components".

The fourth batch of "Small Giant" enterprises of the Ministry of Industry and Information Technology of the People's Republic of China, and the specialized and special new enterprises of Zhejiang Province

IN 2022

Quality Assurance

After years of experience and precipitation, TEC magnetostrictive displacement sensor has built a modern, automatic and standardized production line, which ensures the reliability, stability and consistency of products. Before the new series of products are put into the market, they must pass EMC, vibration, impact, high and low temperature tests. Sensors need to go through signal verification before and after each manufacturing process. After assembly, they are tested and screened one by one. Finally, they pass the calibration and linearity detection of laser interferometer, and the detection results are uploaded to the database for subsequent tracking of products.



Calibrated by laser interferometer can measure up to 1000 points per millimeter

Parts Test

Electro Magnetic Compatibility Test (EMC)

Electrostatic discharge immunity	(GB/T17626.2, IDT IEC61000-4-2)
Radiation immunity of radio frequency electromagnetic field	(GB/T17626.3, IDT IEC61000-4-3)
Immunity of electrical fast transient	(GB/T17626.4, IDT IEC61000-4-4)
Surge (shock) immunity	(GB/T17626.5, IDT IEC61000-4-5)
RF field induced conducted disturbance immunity	(GB/T17626.6, IDT IEC61000-4-6)
Power frequency magnetic field immunity	(GB/T17626.8, IDT IEC61000-4-8)

Temperature Test

Low temperature	(GB/T2423.1, IDT IEC60068-2-1)
High temperature	(GB/T2423.2, IDT IEC60068-2-2)
Constant damp heat	(GB/T2423.3, IDT IEC60068-2-78)
Alternating damp heat	(GB/T2423.4, IDT IEC60068-2-30)
Temperature change	(GB/T2423.22, IDT IEC60068-2-14)

Other Tests

Explosion-proof test	(GB3836.1, IDT IEC60079-0)
Explosion-proof test	(GB3836.2, IDT IEC60079-1)
Explosion-proof test	(GB3836.4, IDT IEC60079-11)
Insulation resistance, insulation strength	(GB/T15479)
Impact test	(GB/T2423.5, IDT IEC68-2-27)
Free drop test	(GB/T2423.8, IDT IEC68-2-32)
Vibration test	(GB/T2423.10, IDT IEC68-2-6)

Technical Characteristics

• Product introduction

TEC magnetostrictive displacement sensor is a new generation of linear displacement sensor independently developed by Zheda Jingyi. It can provide users with real-time, reliable, accurate and continuous linear displacement signals under harsh operating environment, and is widely used in metallurgical equipment, wind power equipment, construction machinery, rubber machinery, port machinery, energy and other industrial automation fields.

• Product characteristics

High precision

The highest resolution and repetition accuracy can reach 1 μ m

Strong adaptability

It can work in harsh environment such as high and low temperature, humidity, vibration, impact, corrosion, dust and so on.

Various signal output forms

Analog,SSI,Profibus-DP,PROFINET

Strong shell

The 304 stainless steel tube shell is precision welded, with pressure resistance, dust resistance, pollution resistance, and electrical protection grades up to IP65, IP67, and IP68.

Easy to use

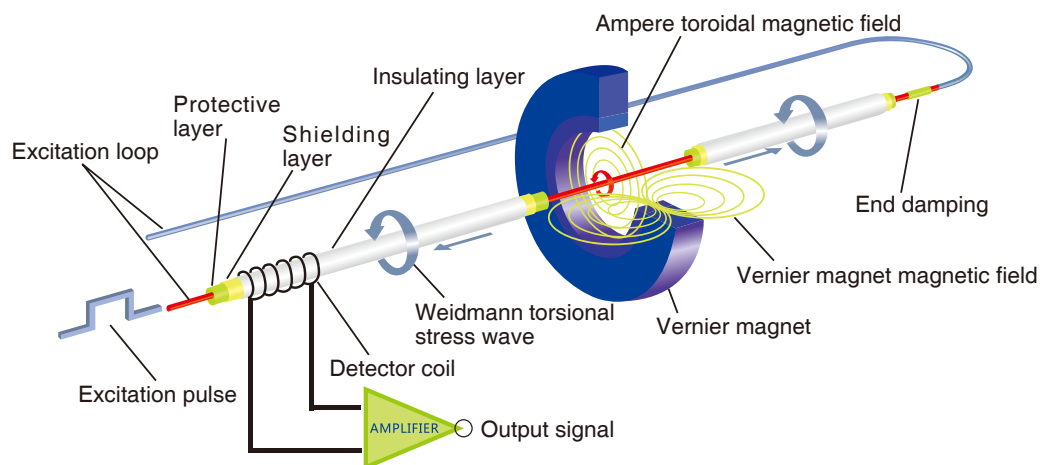
M18 \times 1.5、M20 \times 1.5、3/4"-16UNF-3A threaded installation

Reliable operation

The core components have undergone durability test, shock test, vibration test, temperature test, absolute displacement measuring, and are not affected by power failure

• Working Principle

The detection mechanism of the magnetostrictive displacement sensor is based on the "Weidmann effect" between the magnetostrictive waveguide wire and the vernier magnet which is the core detection element of the sensor. The excitation module in the sensor electronic bin will apply a query pulse at both ends of the loop where the sensitive detection element (magnetostrictive waveguide wire) is located, and the pulse forms a circumferential ampere annular magnetic field around the waveguide wire at speed of light. The magnetic field is coupled with the permanent magnet magnetic field at the position of the vernier magnet, and a "Weidmann effect" torsional stress wave is formed on the surface of the waveguide wire. The torsional wave transmitted to the end is absorbed by the damping device, and the signal transmitted to the excitation end is received by the detection device. The control module calculates the time difference between the inquiry pulse and the received signal, and multiplies it by the propagation speed of torsional stress wave in the waveguide material, so as to calculate the distance between the torsional wave occurrence position and the measurement reference point, and realize the real-time accurate measurement of the vernier magnet position.



Working principle of magnetostrictive linear displacement sensor

Technical Terminology

● Absolute position

The output of the sensor is relative to a fixed reference point, which does not need to be reset when power supply is restored after power failure; this position is an absolute position. However the general incremental sensor, such as incremental encoder and incremental grating ruler, which needs to find the reference point again.

● Environmental conditions

For normal Operating conditions of displacement sensors, the industry has the following standards:

- a) Temperature: 25°C ($\pm 10^\circ\text{C}$)
- b) Relative humidity: 90% or less

Generally, the environment for calibrating and testing sensors is more stringent than the standard requirements.

● Measuring range

For the sensor, the physical quantity to be measured is indicated by upper and lower limits. The measurement range is the full scale of motion.

● Full scale

Full scale (abbreviated as "F.S") (see measuring range).

● Resolution

Refers to the minimum amount of sensor output that can be distinguished. The highest resolution of TEC magnetostrictive displacement sensor can reach 1 μm .

● Nonlinearity

Nonlinearity is the absolute deviation as a percentage of the Stroke length length. In a magnetostrictive sensor, this change is caused by the difference in the propagation velocity of the return signal propagating in the waveguide medium.

● Non-contact

Magnetostrictive displacement sensor uses non-contact magnetic induction technology to measure position. Non-contact measurement does not exist mechanical wear and mechanical vibration, which improves the reliability and service life of the sensor.

● Temperature coefficient

The temperature coefficient unit is ppm/ $^\circ\text{C}$ (one millionth per degree Celsius). It refers that the ambient temperature changes by 1 degree Celsius, the amount of change in the position value output by the sensor.

● Update time

The time interval between two measurements made by the sensor. The larger the range of the sensor, the longer the update time required.

● Multiple position measurement

Measure the position of multiple magnet rings on the sensor stroke shaft or guide rail at the same time.

● Precision

The difference between the indicated measured value and the true value can be calculated from the root mean square of the nonlinear deviation, repeatability, and hysteresis.

● Hysteresis

The difference in displayed position when reaching the same point from opposite directions along the length of stroke (Note: Magnetostrictive displacement sensors have very little hysteresis and are therefore negligible in most applications).

● Drift

Drift refers to the change of output signal or output value under the influence of surrounding environment, such as time or temperature. Please refer to "preheating period" and "temperature coefficient" at the same time.

● Shell protection class

The IP (Ingress Protection) standard for shell intrusion protection issued by the International Electrotechnical Commission. For specific IP standard instructions, please refer to the official website of IEC. The optional protection levels of sensors are IP65, IP67 and IP68.

● Preheating period

The time required for the sensor to be energized until the output is stable, this deviation can be seen from the calibration curve of the sensor.

● Load impedance

The impedance when the external circuit is connected to the output end of the sensor.

● Repetition accuracy

The difference in sensor output when the magnet repeatedly reaches the same position from the same direction when measured along the stroke.

EJ Displacement Sensor



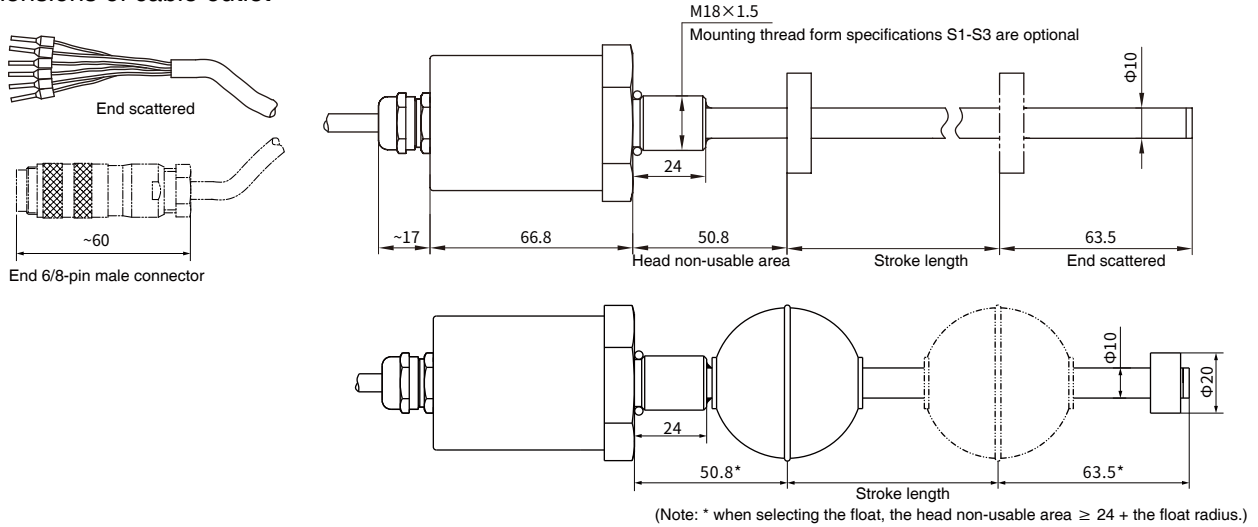
Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measuring method
- Low power consumption design effectively reduces system heating
- Absolute position output, not affected by power failure
- Adapt to harsh environment, IP68 protection class
- Multiple interfaces are available: Analog, SSI, Modbus, etc

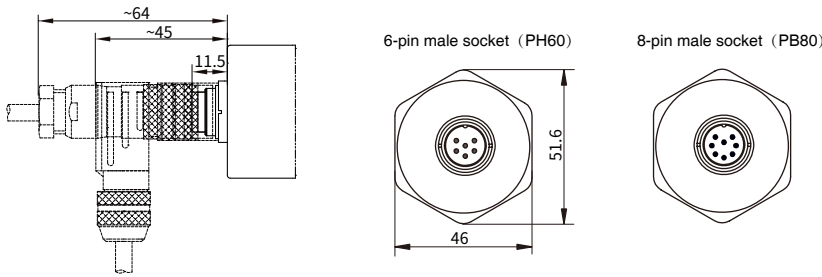
EJ-Analog Output

▶ Structural shape

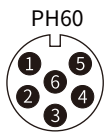
• Dimensions of cable outlet



• Dimensions of connector outlet



▶ Wiring and pin definition



• 6-pin male connector arrangement (facing the sensor head)

Pin	Cable color 1*	Cable color 2*	Function definition
1	Blue	Grey	magnet ring position signal(+)
2	Green	Pink	magnet ring position signal(-)
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	GND (power supply circuit)

• 8-pin male connector arrangement (facing the sensor head)

Pin	Cable color 3*	Function definition
1	Yellow	Current output
2	Grey	Current/Voltage circuit
3	Pink	Reservation
4	-	Reservation
5	Green	Voltage output
6	Blue	GND (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Note: * Cable color 1: cable PUR sheath, orange, -20~90 C
* Cable color 2/3: cable PVC sheath orange, -20~105 C

▶ EJ Analog Output-Product Parameters

• Input

Measuring data	Position magnet ring
Stroke length	25~5500 mm (customized according to customer's needs)

• Output

Current	4 ~ 20mA or 0~20mA(min/max load 0/500Ω)
Voltage	-5 ~ 5Vdc or -10~10Vdc (minimum load resistance ≥ 10KΩ)
resolution	16-bit D/A , minimum 5 μm
Nonlinearity	<±0.02% of full scale, Minimum±50 μm
Repeatability	<±0.001% of full scale or the same as the resolution
Update time	1ms(range ≤ 1m)、2ms(1m<range ≤ 2m)、3ms(2m<range ≤ 3m)

• Operating conditions

Magnet ring speed	Arbitrary
Protection class	Cable outlet mode IP68; socket mode IP67
Operating temperature	-40°C ~ +75°C
Humidity/dew point	Humidity 90%, no condensation
Impact Indicator	GB/T2423.5 50g(6ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Anti-interference Degree of Electrostatic Discharge, Grade 3, Class A GB/T17626.3 Radiation Immunity of Radio Frequency Electromagnetic Fields, Grade 3, Class A GB/T17626.4 Electrical Fast Transient Immunity, Grade 3, Class B GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Immunity, Grade 2, Class A GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A CE certification

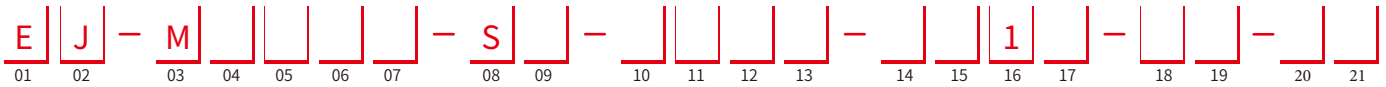
• Electrical Connections

Input voltage	+24Vdc±20% / +12Vdc±20%
Power consumption	<100mA
Polarity protection	Maximum -30Vdc
Overvoltage protection	Maximum 36Vdc
Insulation resistance	>10MΩ
Insulation strength	500V

• Construction and Materials

Electronic compartment	304L stainless steel
Measuring rod	304L stainless steel /316L stainless steel
Outer measuring rod withstand pressure	35Mpa (continuous) / 70Mpa (peak) measuring rod diameter (Φ10)
Installation	Any direction, mounting thread form (line specification is optional)
Position magnet	Various ring magnets
Outgoing mode	Cable outlet or connector (M16 connector)

▶ EJ Analog Output-Selection Guide



01 - 02		Sensor shell form
E	J	Pressure-resistant pipe

03 - 07		Range (0025~5500mm, others can be customized as needed)
		0025~0500mm step length 5mm
		0500~0750mm step length 10mm
		0750~1000mm step length 25mm
		1000~5500mm step length 50mm

08 - 09		Mounting thread form
S	1	M18X1.5, measuring rod diameter 10mm, 304 material
S	2	M20X1.5, measuring rod diameter 10mm, 304 material
S	3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material

10 - 13		Connection form
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10 - 11		Cable outlet mode
D	H	PUR sheath, orange, -20~90°C, end scattered, Cable color 1
D	U	PVC sheath, orange, -20~105°C, end scattered, Cable color 2
D	B	PVC sheath, orange, -20~105°C, end scattered, Cable color 3
D	I	PUR sheath, orange, -20~90°C, end 6-pin male connector
D	C	PVC sheath, orange, -20~105°C, end 8-pin male connector

12 - 13		Cable length, 01~99 unit: meter (cable outlet)
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10 - 13		Connector form		
P	H	6	0	M16 6-pin male socket, plug cable needs to be selected separately
P	B	8	0	M16 8-pin male socket, plug cable needs to be selected separately

14 - 17		Signal output mode
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14 - 15		Communication interface
A	0	Current output, 4 ~ 20mA
A	1	Current output, 20 ~ 4mA
A	2	Current output, 0 ~ 20mA
A	3	Current output, 20 ~ 0mA
V	0	Voltage output, 0 ~ 10V
V	1	Voltage output, 10 ~ 0V
V	2	Voltage output, -10 ~ +10V
V	3	Voltage output, +10 ~ -10V
V	4	Voltage output, 0 ~ 5V
V	5	Voltage output, 5 ~ 0V
V	6	Voltage output, -5 ~ +5V
V	7	Voltage output, +5 ~ -5V

16		Reserved bit
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1	Single magnet ring
2	Single floating ball

17		No magnet ring state
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A	Keep the original value
B	Maximum value
C	Minimum value

18 - 19		Head and end non-usable area
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S	0	50.8mm+63.5mm
B	0	30mm+60mm

20-21		Country
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		Refer to the country list, page 61.
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● Selection example

For example: EJ-M0300-S1-DU02-V01B-S0-CN

Indicates: E series EJ structure, Stroke length is 300mm, mounting thread form is M18x1.5, diameter 10, material 304 measuring rod, cable outlet PVC orange cable 2 meters (PVC orange sheath, -20~105°C, end scattered), 0-10V output, single magnet ring output (magnet ring needs to be purchased separately), the output value of no magnet ring is 10V, and the head and end non-usable area is 50.8mm+63.5mm.

● Supply list

Sensor, certificate, manual, optional accessories (sold separately)

Ⓜ EJ Analog Output-Common Options

• Plug assembly cable

Accessory name/model	Dimensions	Description
Analog wiring cable assembly Order No.:AST-Mxxx-H01 (U01/U02)		Mxxx denotes cable length in meters; H01-6-pin PUR orange sheath, temperature-resistant -20~90°C cable assembly; U01-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly; U02-8-pin PVC orange sheath, temperature -20~105°C cable assembly.
Analog wiring right angled cable assembly Order No.:AST-Mxxx-H03 (U03/U04)		Mxxxdenotes cable length in meters; H03-6-pin PUR orange sheath, temperature-resistant -20~90°C cable assembly; U03-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly; U04-8-pin PVC orange sheath, temperature -20~105°C cable assembly.

• Magnet ring/floating ball

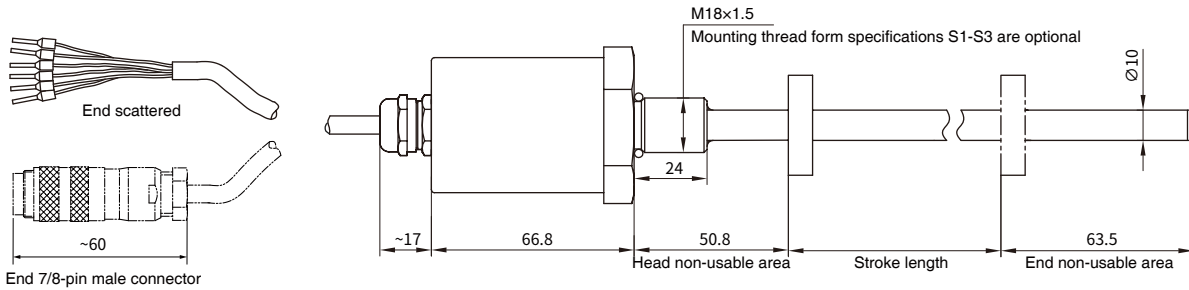
Accessory name/model	Dimensions	Description
Standard magnet ring kit Order No.:288501		One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreyer.
Floating ball kit Order No.:266001		One floating ball 211546, a set of locking rings 211589. Floating ball material 304, pressure resistance 2.5MPa, density 0.6; locking ring material 304.
Standard magnet ring Order No.:211501		
Magnetic isolation gasket Order No.:211521		
Floating ball Order No.:211546		Material 304, pressure resistance 2.5 MPa, density 0.6
Locking ring Order No.:211589		Material 304

Note: For other accessories, please refer to general options

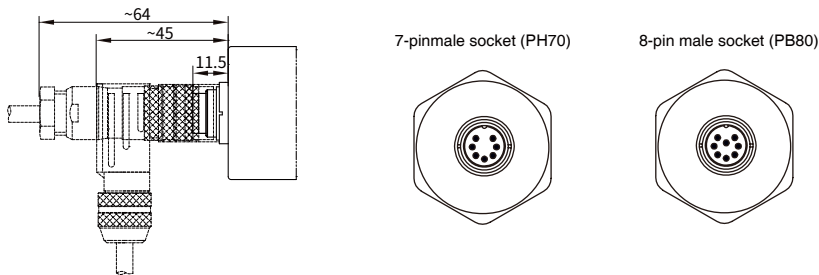
EJ-SSI Output

▶ Structural shape

• Dimensions of cable outlet



• Outline dimensions of connector outlet



▶ Wiring and pin definition



• Pin arrangement of seven-pin male connector (facing the sensor head)

Pin	Cable color 1*	Cable color 2*	Function definition
1	White	Grey	Data (-)
2	Yellow	Pink	Data (+)
3	Blue	Yellow	Clock (+)
4	Green	Green	Clock (-)
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	GND (power supply circuit)
7	-	-	Do not connect



• Pin arrangement of eight-pin male connector (facing the sensor head direction)

Pin	Cable color3*	Function definition
1	Yellow	Clock (+)
2	Grey	Data (+)
3	Pink	Clock (-)
4	-	Reservation
5	Green	Data (-)
6	Blue	GND (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Note: * Cable color 1: Cable PUR sheath, orange,-20-90 C
 * Cable color 2/3: Cable PVC sheath, orange,-20-105 C

▶ EJ SSI Output-Product Parameters

• Input

Measuring data	Position magnet ring
Stroke length	25~5500mm, customized according to customer's needs
Number of measurings	1

• Output

Interface	SSI Synchronous Serial Interface					
Data format	Binary or gray code					
Data length	24/25/26 bit					
Resolution	5 / 10 / 20 / 40/ 50 / 100 μm					
Nonlinearity	<±0.01% of full scale, minimum±50μm					
Repeatability	< ± 0.001% of full scale, minimum ± 5μm					
Transmission rate	50KBD~1MBD					
	Line length	<3	<50	<100	<200	<400 (m)
	Rate	1000	<400	<300	<200	<100 (KBD)
Update time	Stroke	300	750	1000	2000	5000 mm
	Frequency	3.7	3.0	2.3	1.2	0.5 kHz
Operating mode	Asynchronous					
Temperature coefficient	<30ppm/°C					

• Operating conditions

Magnet ring speed	Arbitrary
Protection class	Cable outlet mode IP68; socket way IP67
Operating temperature	-40°C ~ +85°C
Humidity/dew point	Humidity 90%, no condensation
Impact Indicator	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2/3/4/6/8, Grade 4/3/4/3/3, Class A

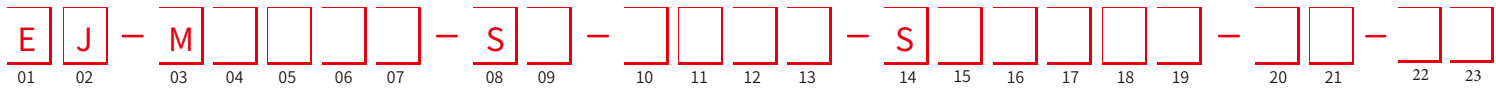
• Electrical Connections

Input voltage	+24Vdc±20%
Power consumption	<80mA (varying with range)
Polarity protection	Maximum -30Vdc
Overvoltage protection	Maximum 36Vdc
Insulation resistance	>10MΩ
Insulation strength	500V

• Construction and Materials

Electronic compartment	304L
Measuring rod	304L stainless steel
Outer tube pressure	35MPa (continuous) /70MPa (peak)
Position magnet	Standard magnet ring and various ring magnets
Thread form	M18×1.5、M20×1.5、3/4"-16UNF-3A (customizable)
Installation direction	Any direction
Outgoing mode	Cable outlet or connector

EJ SSI Output-Selection Guide



01 - 02 Sensor shell form

E	J	Pressure-resistant pipe
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03 - 07 Range (0025~5500mm, others can be customized as needed)

0025~0500mm	step length 5mm
0500~0750mm	step length 10mm
0750~1000mm	step length 25mm
1000~5500mm	step length 50mm

08 - 09 Mounting thread form

S	1	M18X1.5, measuring rod diameter 10mm, 304 material
S	2	M20X1.5, measuring rod diameter 10mm, 304 material
S	3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material

10 - 13 Connection form

10 - 11 Cable outlet mode

D	H	PUR sheath, orange, -20~90°C, end scattered, Cable color 1
D	U	PVC sheath, orange, -20~105°C, end scattered, Cable color 2
D	B	PVC sheath, orange, -20~105°C, end scattered, Cable color 3
D	I	PUR sheath, orange, -20~90°C, end 7-pin male connector
D	V	PVC sheath, orange, -20~105°C, end 7-pin male connector
D	C	PVC sheath, orange, -20~105°C, end 8-pin male connector

12 - 13 Cable length, 01~99 unit: meter (cable outlet)

10 - 13 Connector form

P	H	7	0	M16 7-pin male socket, plug cable needs to be selected separately
P	B	8	0	M16 8-pin male socket, plug cable needs to be selected separately

14 - 19 Signal output mode

15 Data length

1	24-bit	2	25-bit	3	26-bit*
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* 26-bit are parity bits, 25-bit are status bits

16 Data format

B	Binary	G	Gray code
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17 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	8	0.04mm

18 Direction

0	Forward (when the magnet ring or floating ball is far away from the electronic compartment, the output value increases)
1	Reverse (when the magnet ring or floating ball is far away from the electronic compartment, the output value decreases)

19 Mode

0	Asynchronous
---	--------------

20 - 21 Front and end non-usable area

S	0	50.8mm+63.5mm
B	0	30mm+60mm

22 - 23 Country

		Refer to the country list, page 61.
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● Selection example

For example: EJ-M0300-S1-DU02-S2B300-S0-CN

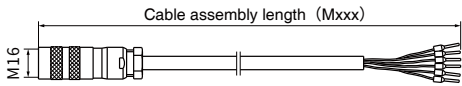
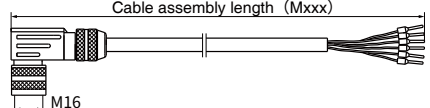
Indicates: E series EJ structure, Stroke length is 300mm, mounting thread form is M18 × 1.5, diameter is 10, material is 304 measuring rod, straight orange cable is 2 meters (PVC orange sheath, -20~105°C, end scattered), SSI interface 25-bit data binary format is 0.02 mm, resolution is forward asynchronous output, and head and end non-usable area is 50.8 mm+63.

● Supply list

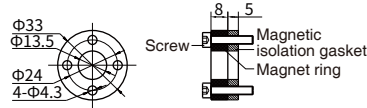
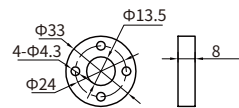
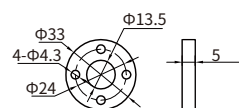
Sensor, certificate, manual, optional accessories (sold separately)

▶ EJ SSI Output-Common Options

• Plug assembly cable

Accessory name/model	Dimensions	Description
SSI Interface Cable assembly Order No.: SSI-Mxxx-H01 (U01/U02)		Mxxx represents the cable length in meters; H01-7-pin PUR orange sheath, temperature -20~90°C cable assembly; U01-7-pin PVC orange sheath, temperature -20~105°C cable assembly; U02-8-pin PVC orange sheath, temperature -20~105°C cable assembly.
SSI Interface Right angled cable assembly Order No.: SSI-Mxxx-H03 (U03/U04)		Mxxx represents the cable length in meters; H03-7-pin PUR orange sheath, temperature -20~90°C cable assembly; U03-7-pin PVC orange sheath, temperature -20~105°C cable assembly; U04-8-pin PVC orange sheath, temperature -20~105°C cable assembly.

• Magnet ring

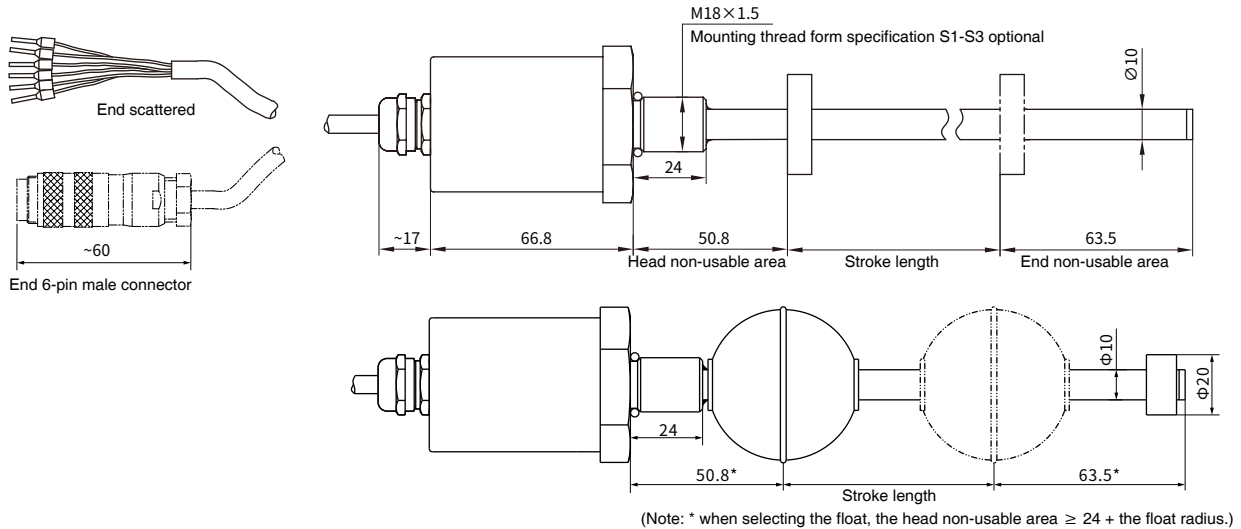
Accessory name/model	Dimensions	Description
Standard magnet ring kit Order No.: 288501		One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring washers.
Standard magnet ring Order No.: 211501		
Magnetic isolation gasket Order No.: 211521		

Note: See general options for other accessories

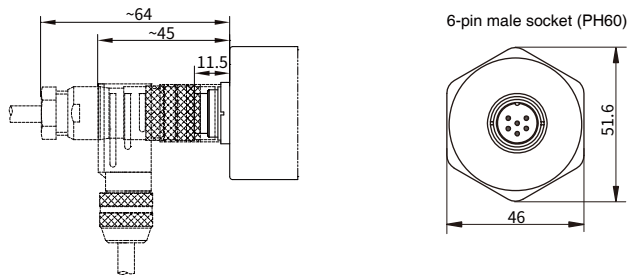
EJ-Modbus Output

▶ Structural shape

- Dimensions of cable outlet



- Outline dimensions of connector outlet



▶ Wiring and pin definition



- 6-pin connector pin arrangement (Sensor Oriented)

Pin	Cable color1*	Cable color2*	Function definition
1	Blue	Grey	Magnet ring position signal+
2	Green	Pink	Magnet ring position signal-
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	brown	+24Vdc power supply (-20%~+20%)
6	Black	White	GND (supply and return circuit)

Note:* Cable color 1: Cable PUR sheath, orange,-20~90°C

* Cable color 2: Cable PVC sheath, orange,-20~105°C

▶ EJ Modbus Output-Product Parameters

• Input

Measuring data	Position magnet ring or position floating ball
Stroke length	25~5500 mm, others can be customized according to needs

• Output

Interface	Modbus RTU protocol
Resolution	≤10um
Nonlinearity	Minimum ±50um(or <±0.01%F.S.)
Repeatability	Minimum ±10um(or <±0.001%F.S.)
Update time	10ms
Communication rate	4800/9600/19200/38400/57600/115200 bps
Check method	Even check

• Operating conditions

Magnet velocity	Arbitrary
Protection class	IP67
Operating temperature	-40°C ~ +75°C
Humidity/dew point	Humidity 90%, no condensation
Impact Indicator	GB/T2423.5 50g(6ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Immunity, Grade 3, Class A GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Immunity, Grade 3, Class A GB/T17626.4 Electrical Fast Transient Burst Immunity, Grade 3, Class B GB/T17626.6 Conducted Disturbance Degree Induced by Radio Frequency Field, Grade 2, Class A GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A CE certification

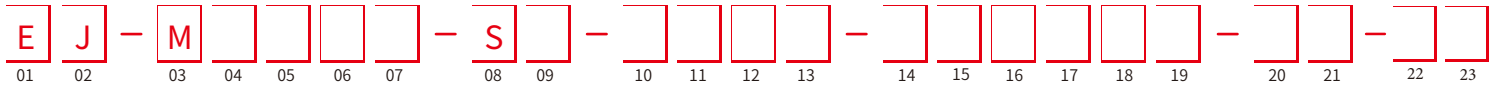
• Electrical Connections

Input voltage	24Vdc
Power consumption	<80mA
Polarity protection	Maximum -30Vdc
Overvoltage protection	Maximum 36Vdc
Insulation resistance	>10MΩ
Insulation strength	500V

• Construction and Materials

Electronic compartment	304Lstainless steel
Measuring rod	304L/316Lstainless steel
Outer tube pressure	35Mpa (continuous)/70Mpa (peak) measuring rod diameter φ 10
Installation	Any direction, mounting thread form (thread form specification is optional)
Position magnet	Various annular magnets or floating balls
Outgoing mode	Cable outlet (scattered connection) or connector (M12 connector)

EJ Modbus Output-Selection Guide



01 - 02	Sensor shell form
E J	Pressure-resistant pipe

03 - 07	Range (0025~5500mm, others can be customized as needed)
	0025~0500mm step length 5mm
	0500~0750mm step length 10mm
	0750~1000mm step length 25mm
	1000~5500mm step length 50mm

08 - 09	Mounting thread form
S 1	M18X1.5, measuring rod diameter 10mm, 304 material
S 2	M20X1.5, measuring rod diameter 10mm, 304 material
S 3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material

10 - 13	Connection form
10 - 11	Cable outlet mode
D H	PUR sheath, orange,-20~90°C, end scattered, Cable color 1
D U	PVC sheath, orange,-20~105°C, end scattered, Cable color 2
D I	PUR sheath, orange,-20~90°C, end 6-pin male connector
D V	PVC sheath, orange,-20~105°C, end 6-pin male connector

12 - 13	Cable length, 01~99
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10 - 13	Connector form
P H 6 0	M16 6-pin male socket, plug cable needs to be selected separately

14 - 19	Signal output mode
14	Communication protocol and power supply

R	RTU, 24Vdc power supply
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15	communication rate
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1	19200 bps	5	38400 bps
4	4800 bps	6	57600 bps
9	9600 bps	7	115200 bps

16	Output forward and reverse
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0	Forward (when the magnet ring or floating ball is far away from the electronic compartment, the output value increases)
1	Reverse (when the magnet ring or floating ball is away from the direction of the electronic compartment, the output value decreases)

17	Reserved bit
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1	Single magnet ring
2	Single floating ball

18	No magnet ring state
-----------	-----------------------------

C	Minimum value
---	---------------

19	Check method
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2	Even parity
---	-------------

20 - 21	Front and end non-usable area
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S 0	50.8mm+63.5mm
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22 - 23	Country
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	Refer to the country list, page 61.
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● Selection example

For example: EJ-M0300-S1-DU02-R912-S0

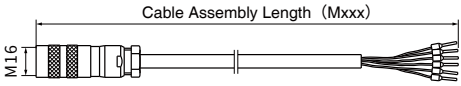
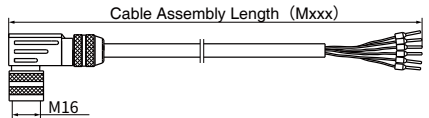
Indicates: E series EJ structure, Stroke length is 300mm, mounting thread form is M18 × 1.5, diameter is 10, material is 304 measuring rod, straight orange cable is 2 meters (PVC orange sheath,-20~105°C, end scattered), 24Vdc power supply RTU protocol output, baud rate is 9600bps, reverse output, single position magnet ring, standard head and end non-usable area is 50.8 mm + 63.5 mm. (Note: Factory default address 1)

● Supply list

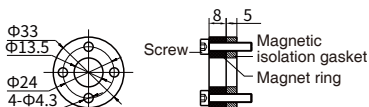
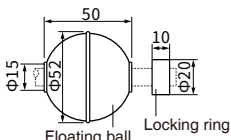
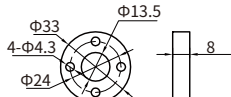
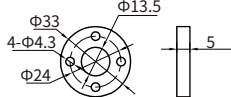
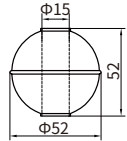
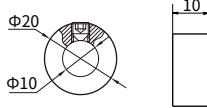
Sensor, certificate, manual, optional accessories (sold separately)

Ⓜ EJ Modbus Output-Common Options

• Plug assembly cable

Accessory name/model	Dimensions	Description
Modbus Interface Cable assembly Order No.:AST-Mxxx-H01 (U01)		Mxxx represents the cable length in meters; H01-6-pin PUR orange sheath, temperature -20~90°C cable assembly; U01-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly.
Modbus Interface right angled Cable Assembly Order No.:AST-Mxxx-H03 (U03)		Mxxx represents the cable length in meters; H03-6-pin PUR orange sheath, temperature resistance -20~90°C cable assembly; U03-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly.

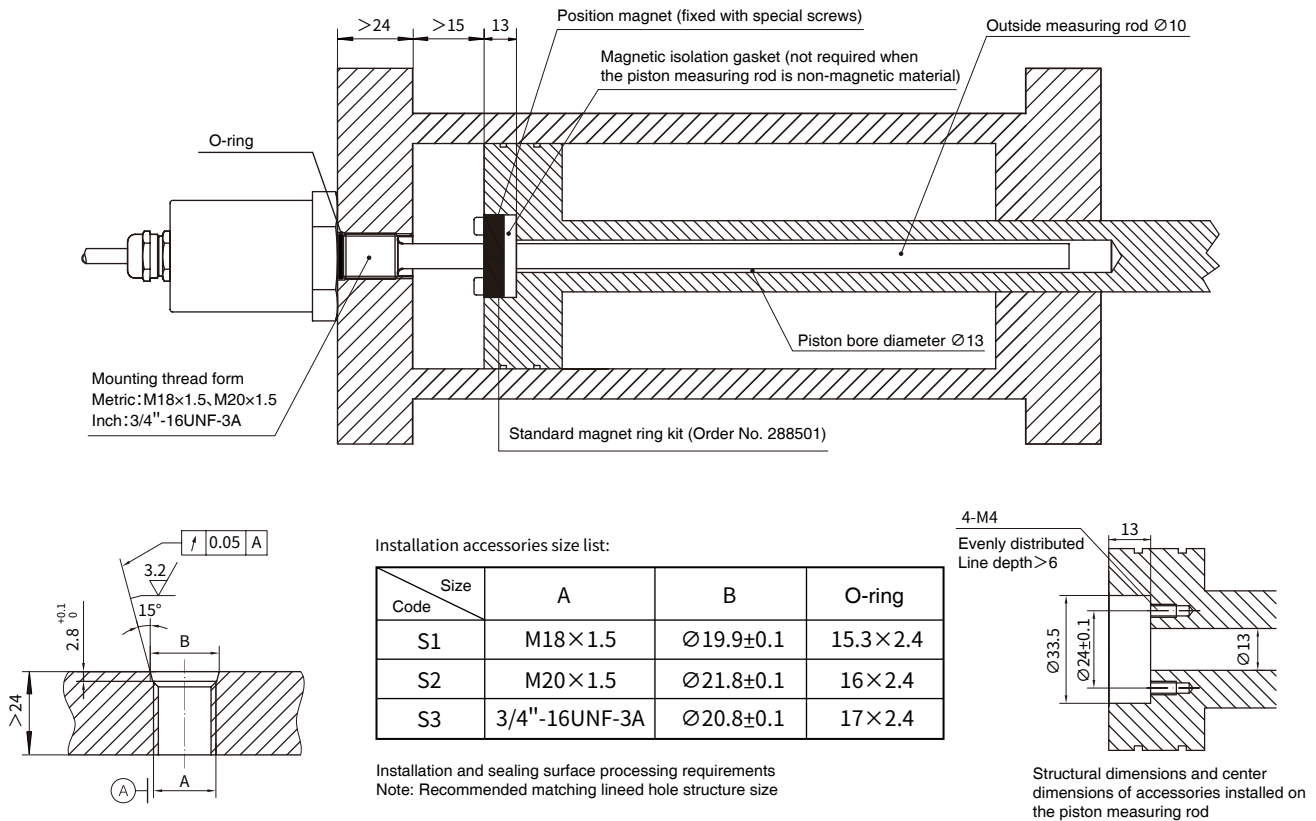
• Magnet ring/float

Accessory name/model	Dimensions	Description
Standard magnet ring kit Order No.:288501		One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreysers.
Floating ball kit Order No.:266001		One floating ball211546, a set of locking rings 211589. Floating ball material 304, pressure resistance 2.5MPa, density 0.6; locking ring material 304.
Standard magnet ring Order No.:211501		
Magnetic isolation gasket Order No.:211521		
Floating ball Order No.:211546		Material 304, pressure resistance 2.5MPa, density 0.6
Locking ring Order No.:211589		Material 304

Note: For other accessories, please refer to general options

EJ-Hydraulic cylinder Application

► Built-in installation



► How to choose the sensor range according to the hydraulic cylinder

When selecting the sensor range for the existing hydraulic cylinder, ensure that the sensor range covers the cylinder piston measuring rod stroke, that is, the sensor range 0 point is before the piston measuring rod stroke starting point, and the sensor range end point is after the piston measuring rod stroke ends.

► Precautions

- Hydraulic cylinder installation—the sensor of the pressure-resistant round tube casing is usually installed with a built-in hydraulic cylinder. The mounting thread form specifications Includes: M18×1.5, M20×1.5, 3/4"-16UNF-3A. Before installation, make sure that the hydraulic cylinder is as given in the picture book. Finished to the correct size.
- Mechanical installation - The sensor has no requirements on the installation position and direction, but must ensure that the installation is firm and reliable. The position magnet should be installed on the moving part under test and maintains a proper distance from the measuring rod. Position magnet - To ensure the accuracy of measuring, the installing parts of the position magnet must be made of non-magnetic materials, such as screws, magnetic isolation gaskets, etc.
- Notes: The sensor is a magnetic sensitive device and must be kept away from the interference of strong external magnetic fields. The stability and accuracy of the power supply should also be considered when measuring with high precision. During use, it is also necessary to prevent the electronic compartment from being hit by foreign objects.

ES Displacement Sensor



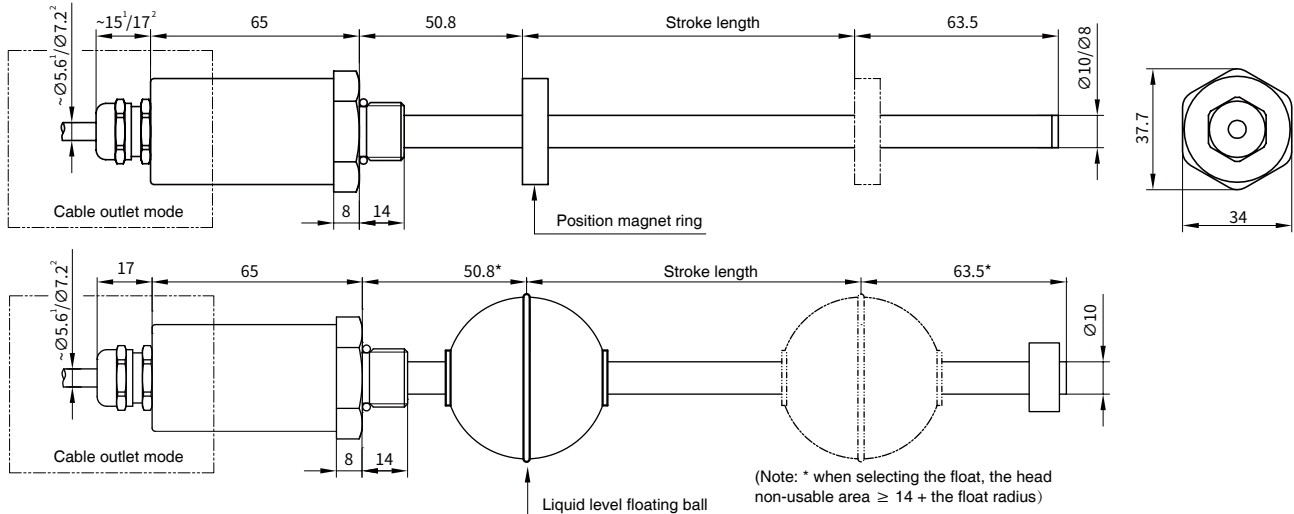
Technical Characteristics

- Compact structure, convenient disassembly and assembly
- Linear measuring, absolute position output
- Multiple interfaces are optional. Modbus etc
- Rugged and fully enclosed design
- Non-wear, non-contact measuring method
- Adapt to harsh environment and resist high pressure sensor measuring rod

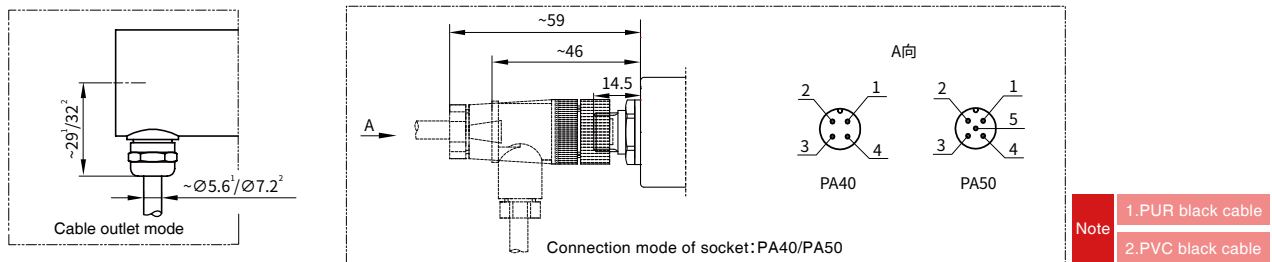
ES-Analog Output

▶ Structural shape

- Dimensions of cable outlet



- Outline dimensions of connector outlet



▶ Wiring and pin definition



- PA40/PA50 pin arrangement - 2-wire system (Sensor Oriented)

Pin	Cable color1*	Cable color2*/3*	Function definition
1	Brown	Red	+24/12Vdc power supply (-20%~+20%)
2	White	Black	GND (power supply circuit)
3	Blue	-	Do not connect
4	Black	-	Do not connect
5	Grey	-	Do not connect

- PA40/PA50 Pin Arrangement-Four Wire (Sensor Oriented)

Pin	Cable color1*	Cable color2*	Cable color3*	Function definition
1	Brown	Red	Red	+24Vdc power supply (-20%~+20%)
2	White	Black	Black	GND (power supply circuit)
3	Blue	Blue	Brown	Magnet ring position signal +
4	Black	Green	Green	Magnet ring position signal -
5	-	-	-	Do not connect

Note: * Cable color 1: Cable PUR sheath, black, -40~80°C, end scattered

* Cable color 2: Cable PUR sheath, orange, -20~90°C, end scattered

* Cable color 3: Cable PVC sheath, black, -40~80°C, end scattered

▶ ES Analog Output - Product Parameters

• Input

Measuring data	Position magnet ring
Stroke length	25~3500 mm, others can be customized according to needs

• Output

Current	4 ~ 20mA or 0 ~ 20mA (min/max load 0/500Ω)
Voltage	0 ~ 10Vdc or 0~5Vdc (minimum load resistanc $\geq 10K\Omega$)
Resolution	$\pm 0.01\text{mm}$, 16bit DA, 4-wire system current $\pm 0.1\text{mm}$, 16bit DA, 4-wire system voltage $\pm 0.1\text{mm}$, 12bit DA, 2-wire system current
Nonlinearity	0.05% F.S
Repeatability	Same resolution
Update time	2-wire system 100 ms 4-wire system 1ms (range $\leq 1\text{m}$) 、 2ms (1m < range $\leq 2\text{m}$) 、 3ms (range $> 2\text{m}$)
Temperature coefficient	$< 50\text{ppm}/^\circ\text{C}$

• Operating conditions

Magnet velocity	Arbitrary
Protection class	IP67
Operating temperature	$-40^\circ\text{C} \sim +75^\circ\text{C}$
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 50g(6ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Anti-interference Degree of Electrostatic Discharge, Grade 3, class A GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class B GB/T17626.6 Conducted Disturbance Degree Induced by Radio Frequency Field, Grade 2, Class A GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A CE certification

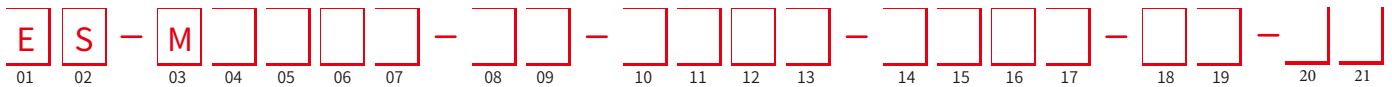
• Electrical Connections

Input voltage	+24Vdc power supply (-20%~+20%): 4-wire system +24/12Vdc power supply (-20%~+20%): 2-wire system
Power consumption	$< 80\text{mA}$
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum36Vdc
Insulation resistance	$> 10M\Omega$
Insulation strength	500V

• Construction and Materials

Electronic compartment	304Lstainless steel
Measuring rod	304L/316Lstainless steel
Outer tube pressure	35Mpa (continuous)/70Mpa (peak) rod diameter $\phi 10$
Installation	Any direction, threaded installation (thread specification is optional)
Position magnet	Various ring magnets
Outgoing mode	Cable outlet or connector (M12 connector)

ES Analog Output-Selection Guide



01 - 02	Sensor shell form
E S	Pressure-resistant pipe
03 - 07	Measuring range (0025~5500mm, others can be customized as needed)
	0025~0500mm step length 5mm
	0500~0750mm step length 10mm
	0750~1000mm step length 25mm
	1000~3500mm step length 50mm
08 - 09	Mounting thread form
S 1	M18X1.5, measuring rod diameter 10mm, 304 material
S 2	M20X1.5, measuring rod diameter 10mm, 304 material
S 3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material
T 1	M18X1.5 mounting thread, measuring rod diameter 8mm, 316 material
T 2	M20X1.5 mounting thread, measuring rod diameter 8mm, 316 material
T 3	3/4"-16UNF-3A mounting thread, measuring rod diameter 8mm, 316 material
10 - 13	Connection form
10 - 11	Connection
D E	Cable outlet, PVC sheathed, black,-40~80°C, end scattered,Cable color 3
D W	Cable outlet, PUR sheath, black,-40~80°C, end scattered,Cable color 1
D H	Cable outlet, PUR sheath, orange,-20~90°C, end scattered,Cable color 2
C W	Side outlet, PUR sheath, black,-40~80°C, end scattered,Cable color 1
C H	Side outlet, PUR sheath, orange, -20~90°C, end scattered,Cable color 2
12 - 13	Cable length, 01~99 unit: meter
10 - 13	Connector form
P A 4 0	M12 4-pin socket, plug cable needs to be selected separately
P A 5 0	M12 5-pin socket, plug cable needs to be selected separately

14 - 17	Signal output mode
14 - 15	Communication interface
A 0	Current output, 4 ~ 20mA
A 1	Current output, 20 ~ 4mA
A 2	Current output, 0 ~ 20mA
A 3	Current output, 20 ~ 0mA
A 4	2-wire current, 4~20mA
A 5	2-wire current, 20~4mA
V 0	Voltage output, 0 ~ 10V
V 1	Voltage output, 10 ~ 0V
V 4	Voltage output, 0 ~ 5V
V 5	Voltage output, 5 ~ 0V
16	Reserved bit
1	Magnet ring
2	Floating ball
17	No magnet ring state
A	Keep the original value
B	Maximum (default)
C	Minimum value
18 - 19	Non-usable area at head and end
S 0	50.8mm+63.5mm
20-21	Country
	Refer to the country list, page 61.

• Selection example

For example: ES-M0300-S1-PA50-A01B-S0

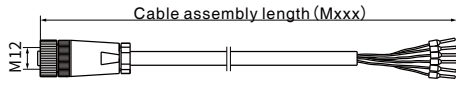
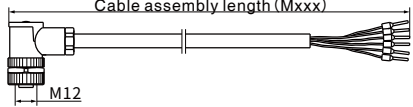
Indicates: ES rod structure series, 300mm Stroke length, M18X1.5 installation thread, 10mm diameter, 304 material measuring rod, M12 5-pin socket form, current output of 4~20mA, single position magnet ring (magnet ring needs to be selected separately), non-magnet ring status display > 20mA value, head and end non-usable area of 50.8 mm+63.5mm.

• Supply list

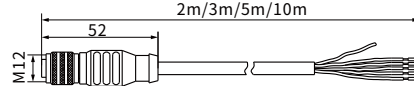
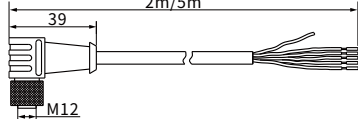
Sensor, certificate, instruction manual, optional parts (optional separately)

ES Analog Output-Common Options

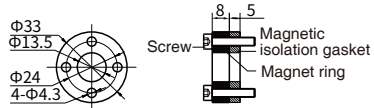
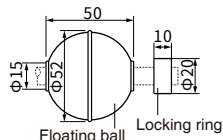
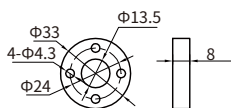
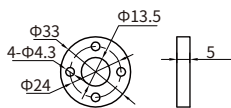
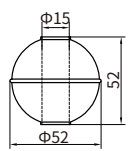

• Plug assembly cable

Accessory name/model	Dimensions	Description
Analog Output Cable assembly Order No.:AST-Mxxx-W06		Mxxx denotes cable length in meters; W06-5-pin PUR black sheath, temperature resistance of -40~80°C Cable assembly.
Analog output right angled cable assembly Order No.:AST-Mxxx-W05		Mxxx denotes cable length in meters; W05-5-pin PUR black sheath, temperature resistance of -40~80°C Cable assembly.

• Finished plug cable

Accessory name/model	Dimensions	Description
M12 female connector Order No.:521801-2 (3/5/10)		PUR black sheath, line core 1 brown, 2 white, 3 blue, 4 black, 5 gray, temperature resistance -40°C~80°C.
M12 right angle female connector Order No.:521804-2 (5)		PUR black sheath, line core 1 brown, 2 white, 3 blue, 4 black, 5 gray, temperature resistance -40°C~80°C.

• Magnet ring/floating ball

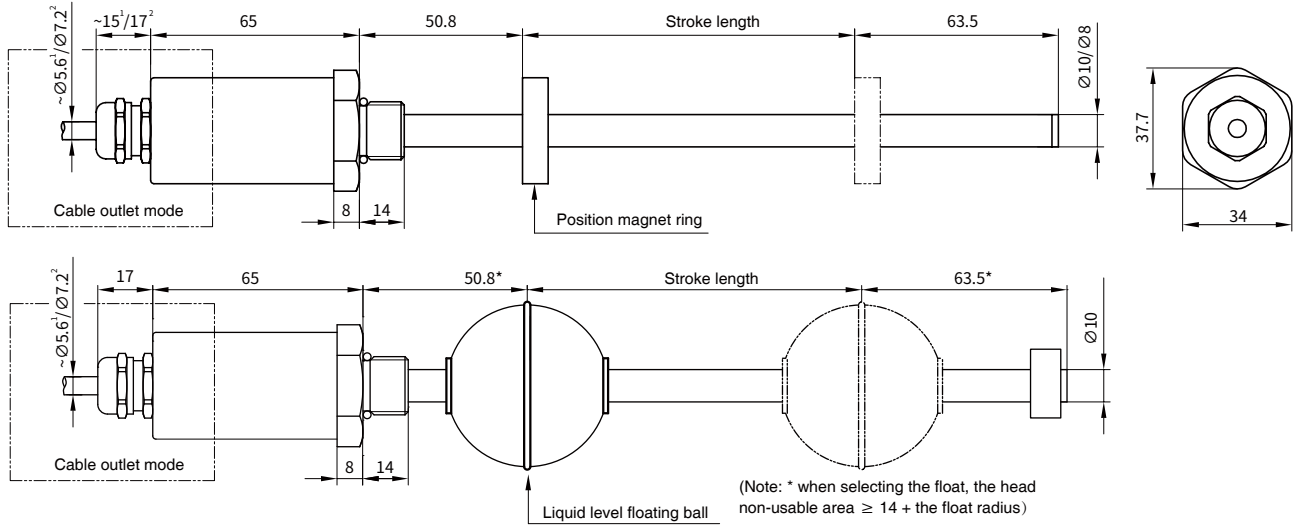
Accessory name/model	Dimensions	Description
Standard magnet ring kit Order No.:288501		One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreys
Floating ball kit Order No.:266001		One floating ball 211546, a set of locking rings 211589. Floating ball material 304, pressure resistance 2.5MPa; density 0.6; locking ring material 304.
Standard magnet ring Order No.:211501		
Magnetic isolation gasket Order No.:211521		
Floating ball Order No.:211546		Material 304, pressure resistance 2.5 MPa, density 0.6
Locking ring Order No.:211589		Material 304

Note: For other accessories, please refer to general options

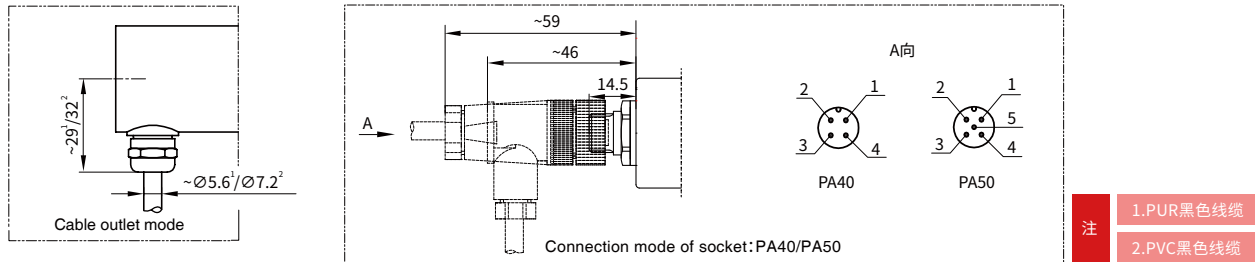
ES-Modbus Output

▶ Structural shape

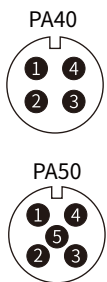
• Dimensions of cable outlet



• Outline dimensions of connector outlet



▶ Wiring and pin definition



• PA40/PA50 pin arrangement (Sensor Oriented)				
Pin	Cable color1*	Cable color2*	Cable color3*	Function definition
1	Brown	Red	Red	24Vdc power supply (-20%~+20%)
2	White	Black	Black	GND (power supply circuit)
3	Blue	Yellow	Brown	T+ (A)
4	Black	White	Green	T- (B)
5	-	-	-	Do not connect

Note: * Cable color1: Cable PUR sheath, black, -40~80°C, end scattered
 * Cable color2: Cable PUR sheath, orange, -20~90°C, end scattered
 * Cable color 3: Cable PVC sheath, black, -40~80°C, end scattered

▶ ES Modbus Output-Product Parameters

• Input

Measuring data	Position magnet ring or position floating ball
Stroke length	25~3500 mm, others can be customized according to needs

• Output

Interface	Modbus RTU protocol
Resolution	Minimum 10um
Nonlinearity	Minimum $\pm 50\mu\text{m}$ or $<0.01\%.\text{F.S}$
Repeatability	Minimum $\pm 10\mu\text{m}$ or $<0.001\%.\text{F.S}$
Update time	Default 20ms Adjustable according to range 1~50ms
Communication rate	1200/2400/4800/9600/19200/38400/57600/115200 bps
Check method	No/odd/even check (default no check)
Temperature coefficient	$<10\text{ppm}/^\circ\text{C}$ (temperature compensation required)
Temperature functional parameters	The operating temperature resolution is 0.25°C
Temperature measuring position	Electronic compartment
Operating temperature accuracy	$\leq 1^\circ\text{C}$

• Operating conditions

Magnet velocity	Arbitrary
Protection class	IP67
Operating temperature	$-40^\circ\text{C} \sim +75^\circ\text{C}$
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 50g(6ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Anti-interference Degree of Electrostatic Discharge, Grade 3, Class A GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class B GB/T17626.6 RF Field Induced Conducted Disturbance Immunity, Grade 2, Class A GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A CE certification

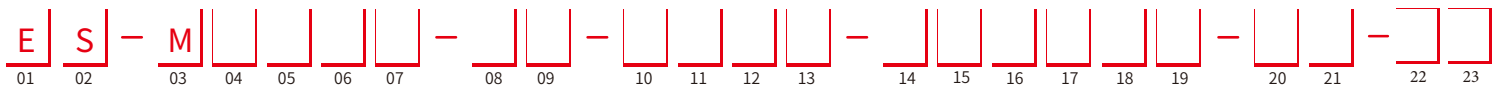
• Electrical Connections

Input voltage	9~ 30Vdc
Power consumption	$<80\text{mA}$
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum36Vdc
Insulation resistance	$>10\text{M}\Omega$
Insulation strength	500V

• Construction and Materials

Electronic compartment	304Lstainless steel
Measuring rod	304L/316L stainless steel
Outer tube pressure	35Mpa (continuous)/70Mpa (peak) rod diameter $\Phi 10$
Installation	Any direction, threaded installation (thread specification is optional)
Position magnet	Various annular magnets or floating balls
Outgoing mode	Cable outlet (scattered connection), connector (M12 connector)

ES Modbus Output-Selection Guide



01 - 02		Sensor shell form
E	S	Pressure-resistant pipe

03 - 07		Range (0025~5500mm, others can be customized as needed)
		0025~0500mm step length 5mm
		0500~0750mm step length 10mm
		0750~1000mm step length 25mm
		1000~3500mm step length 50mm

08 - 09		Mounting thread form
S	1	M18X1.5, measuring rod diameter 10mm, 304 material
S	2	M20X1.5, measuring rod diameter 10mm, 304 material
S	3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material
T	1	M18X1.5 mounting thread, measuring rod diameter 8mm, 316 material
T	2	M20X1.5 mounting thread, measuring rod diameter 8mm, 316 material
T	3	3/4"-16UNF-3A mounting thread, measuring rod diameter 8mm, 316 material

10 - 13		Connection form
---------	--	-----------------

10 - 11		Outlet type
D	E	Cable outlet, PVC sheath, black, -40~80°C, end scattered, Cable color 3
D	W	Cable outlet, PUR sheath, black, -40~80°C, end scattered, Cable color 1
D	H	Cable outlet, PUR sheath, orange, -20~90°C, end scattered, Cable color 2
C	W	Side outlet, PUR sheath, black, -40~80°C, end scattered, Cable color 1
C	H	Side outlet, PUR sheath, orange, -20~90°C, end scattered, Cable color 2

12 - 13		Cable length, 01~99 meters
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10 - 13		Connector form
---------	--	----------------

P	A	4	0	M12 4-pin socket, plug cable needs to be selected separately
P	A	5	0	M12 5-pin socket, plug cable needs to be selected separately

14 - 19		Signal output mode
14		Communication protocol and power supply

R	RTU protocol, 24Vdc power supply, resolution 0.1mm
K	RTU protocol 1, 9~30Vdc power supply, resolution 0.1mm
B	RTU protocol 2, 24Vdc power supply, resolution 0.01mm, with temperature measuring

15		Communication rate			
1	19200 bps	2	1200 bps	3	2400 bps
4	4800 bps	5	38400 bps	6	57600 bps
7	115200 bps	9	9600 bps		

16		Output forward and reverse
0	Forward (when the magnet ring or floating ball is far away from the electronic compartment, the output value increases)	
1	Reverse (when the magnet ring or floating ball is far away from the electronic compartment, the output value decreases)	

17		Reserved bit	
1	Single magnet ring	2	Single floating ball
3	Double floating ball	4	Double magnet ring
5	Tri-magnet ring		

18		No magnet ring state
A	keep the original value	
B	Maximum (Output forward default value)	
C	Minimum value (output reverse default value)	

19		Check method			
0	No check (default)	1	Odd check	2	Even check

20 - 21		Non-usable area at head and end
S	0	50.8mm+63.5mm

22 - 23		Country
		Refer to the country list, page 61.

• Selection example

For example: ES-M0300-S1-PA50-R111C-S0-CN

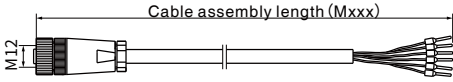
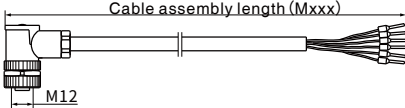
Indicates: ES voltage-resistant round pipe structure, 300mm Stroke length, M18X1.5 installation thread, 10mm diameter, 304 material measuring rod, M12 5-pin socket connection mode, 24Vdc power supply RTU protocol output, baud rate 19200bps, reverse output, single position magnet ring, output 0 without magnet ring, standard head and end non-usable area 50.8 mm+63.5mm.(Note: Factory default address 1)

• Supply list

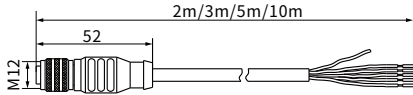
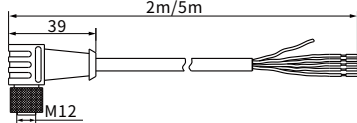
Sensor, certificate, instruction manual, optional parts (optional separately)

ES Modbus Output-Common Options

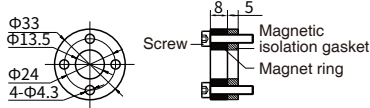
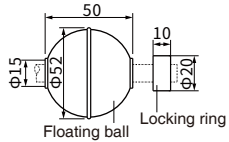
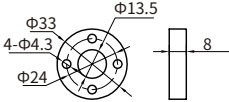
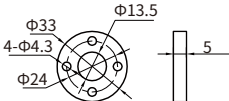
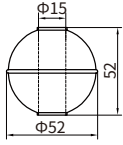
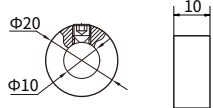
• Plug assembly cable

Accessory name/model	Dimensions	Description
Modbus interface cable assembly Order No.:AST-Mxxx-W06		Mxxx denotes cable length in meters; W06-5-pin PUR black sheath, temperature resistance of-40~80°C Cable assembly.
Modbus interface right angled cable assembly Order No.:AST-Mxxx-W05		Mxxx denotes cable length in meters; W05-5-pin PUR black sheath, temperature resistance of-40~80°C Cable assembly.

• Finished plug cable

Accessory name/model	Dimensions	Description
M12 female connector Order No.:521801-2 (3/5/10)		PUR black sheath, line core 1 brown, 2 white, 3 blue, 4 black, 5 gray, temperature resistance-40°C~80°C.
M12 Right angle female connector Order No.:521804-2 (5)		PUR black sheath, line core 1 brown, 2 white, 3 blue, 4 black, 5 gray, temperature resistance-40°C~80°C.

• Magnet ring/floating ball

Accessory name/model	Dimensions	Description
Standard magnet ring kit Order No.:288501		One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreys.
Floating ball kit Order No.:266001		One floating ball211546, a set of locking rings 211589. Floating ball material 304, pressure resistance 2.5MPa, density 0.6; locking ring material 304.
Standard magnet ring Order No.:211501		
Magnetic isolation gasket Order No.:211521		
Floating ball Order No.:211546		Material 304, pressure resistance 2.5 MPa, density 0.6
Locking ring Order No.:211589		Material 304

Note: For other accessories, please refer to general options

EP Displacement Sensor



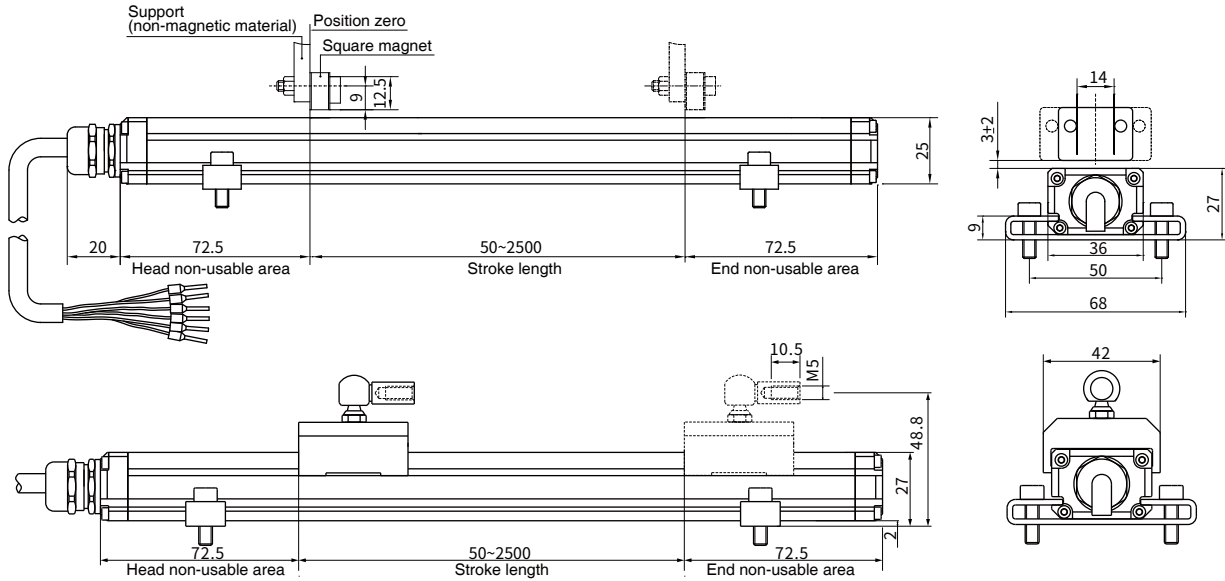
Technical characteristics

- Compact structure, convenient disassembly and assembly
- Linear measuring, absolute position output
- Never wear and tear, not affected by power failure
- Replaceable: LVDT, electronic ruler, encoder, etc.

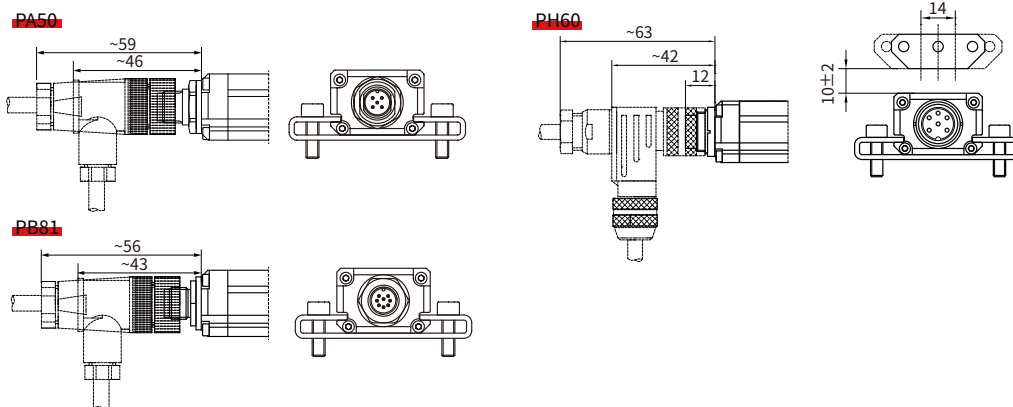
EP-Analog Output

▶ Structural shape

- Cable outlet DHXX/DUXX/DWXX



- Connector PA50/PB81/PH60



▶ Wiring and pin definition



• PA50 pin arrangement (Sensor Oriented)

Pin	Cable color ^{3*}	Function definition
1	Brown	+24Vdc±20% power supply
2	White	GND (power supply circuit)
3	Blue	Magnet ring position signal+
4	Black	Magnet ring position signal-
5	Grey	Sensor programming line

• PH60 pin arrangement (Sensor Oriented)

Pin	Cable color ^{1*}	Cable color ^{2*}	Function definition
1	Blue	Grey	Magnet ring position signal+
2	Green	Pink	Magnet ring position signal-
3	Yellow	Yellow	Sensor programming line
4	White	Green	Sensor programming line
5	Red	Brown	+24Vdc±20% power supply
6	Black	White	GND (power supply circuit)

• PB81 pin arrangement (Sensor Oriented)

Pin	Function definition
1	Do not connect
2	Magnet ring position signal-
3	Do not connect
4	Sensor programming line
5	Magnet ring position signal+
6	GND (power supply circuit)
7	+24Vdc power supply (-20%~+20%)
8	Sensor programming line

Note: * Cable color 1: Cable PUR sheath, black, -20~90°C
 * Cable color 2: Cable PVC sheath, orange, -20~105°C
 * Cable color 3: Cable PUR Sheath, Black, -40~85°C

Note: The shield wire of the shielded cable is grounded

▶ EP Analog Output-Product Parameters

• Input

Measuring data	Position magnet ring
Stroke length	50~2500 mm, others can be customized according to needs

• Output

Current	0 ~ 20mA or 4 ~ 20mA (min/max load 0/500Ω)
Voltage	0 ~ 10Vdc or 0~5Vdc (minimum load resistance ≥ 10KΩ)
Resolution	14-bit D/A or 0.0065% of full scale (minimum 10μm)
Nonlinearity	<±0.03% of full scale
Repeatability	<±0.005% of full scale
Update time	1ms(range ≤ 1m) 2ms(1m < range ≤ 2m) 3ms(2m < range ≤ 3m)
Hysteresis	<10μm

• Operating conditions

Magnet velocity	Arbitrary
Protection class	IP65
Operating temperature	-40 C ~ +85 C
Temperature coefficient	< 30ppm/ C
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 50g(11ms)
Vibration index	GB/T2423.10 10g/10~2000Hz
EMC test	GB/T17626.2 Anti-interference Degree of Electrostatic Discharge, Grade 4, Class A GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 4, Class A GB/T17626.6 RF Field Induced Conducted Disturbance Immunity, Grade 2, Class A GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A CE certification

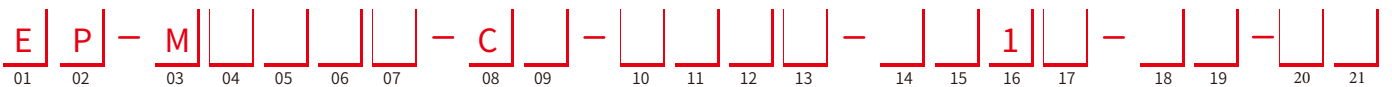
• Electrical Connections

Input voltage	+24Vdc±20%
Power consumption	<80mA
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum36Vdc
Insulation resistance	> 10MΩ
Insulation strength	500V

• Construction and Materials

Measuring rod	Aluminum profile
Installation	Any direction, clamp installation
Position magnet	Square magnet, trapezoidal magnet
Outgoing mode	Cable outlet (scattered connection), connector (M16 or M12 connector)

EP Analog Output-Selection Guide



01 - 02 Sensor shell form

E	P	Overall profile structure series
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03 - 07 Range (0050~2500mm, others can be customized as needed)

0050~0500mm	step length 5mm
0750~1000mm	step length 25mm
1000~2500mm	step length 50mm

08 - 09 Magnet form

C	2	Slider magnet (211517)
C	3	Square magnet (211508)
C	4	Trapezoidal magnet (211514)

10 - 13 Connection form

10 - 11 Cable outlet mode

D	H	PUR sheath, orange, -20~90°C, end scattered, Cable color 1
D	U	PVC sheath, orange, -20~105°C, end scattered, Cable color 2
D	W	PUR sheath, black, -40~85°C, end scattered, Cable color 3

12 - 13 Cable length, 01~99 units: m (cable outlet mode)

10 - 13 Connector form

P	A	5	0	M12 5-pin male socket, plug cable needs to be selected separately
P	H	6	0	M16 6-pin male socket, plug cable needs to be selected separately
P	B	8	1	M12 8-pin male socket

14 - 17 Signal output mode

14 - 15 Signal output mode

A	0	Current output, 4 ~ 20mA
A	1	Current output, 20 ~ 4mA
A	2	Current output, 0 ~ 20mA
A	3	Current output, 20 ~ 0mA
V	0	Voltage output, 0 ~ 10V
V	1	Voltage output, 10 ~ 0V
V	4	Voltage output, 0 ~ 5V
V	5	Voltage output, 5 ~ 0V

16 Reserved bit

1	Single magnet ring
---	--------------------

17 No magnet ring state

A	Keep the original value
B	Maximum value
C	Minimum value

18 - 19 Non-usable area at head and end

B	1	72.5mm+72.5mm
D	2	73mm+73mm

20-21 Country

		Refer to the country list, page 61.
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● Selection example

For example: EP-M0300-C0-PB81-A01B-B1-CN

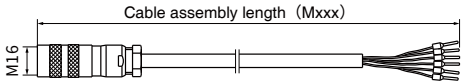
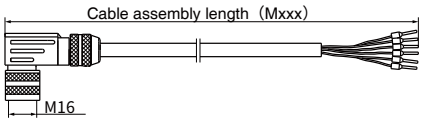
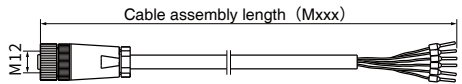
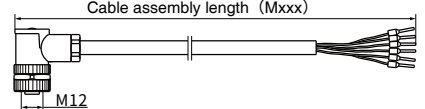
Indicates: EP integral profile structure, mounting clamp installation, 300mm Stroke length, no magnet block, M12 connector outlet form, current output of 4~20mA, output value of non-magnet ring less than 4mA, non-usable area at head and end of 72.5 mm+72.5mm.

● Supply list

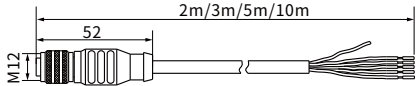
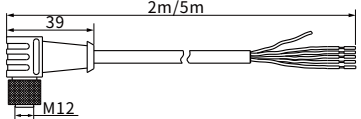
Sensor, certificate, instruction manual, optional parts (optional separately)

EP Analog Output - Common Options

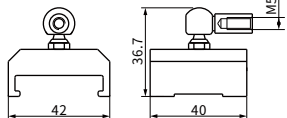
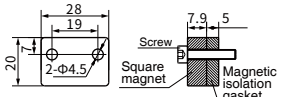
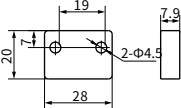
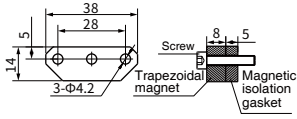
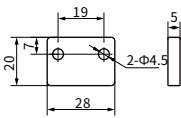
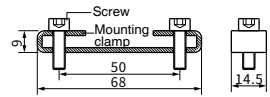
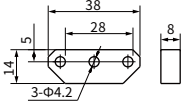
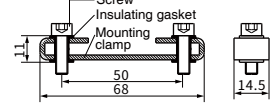
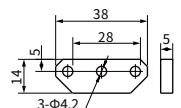
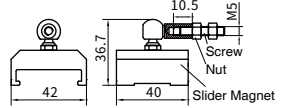
• Plug assembly cable

Accessory name/model	Dimensions	Description
Analog wiring cable assembly Order No.: AST-Mxxx-H01 (U01)		Mxxx denotes cable length in meters; H01-6-pin PUR orange sheath, temperature-resistant -20~90°C cable assembly; U01-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly.
Analog wiring right angled cable assembly Order No.: AST-Mxxx-H03 (U03)		Mxxx denotes cable length in meters; H03-6-pin PUR orange sheath, temperature-resistant -20~90°C cable assembly; U03-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly.
Analog output cable assembly Order No.: AST-Mxxx-W06		Mxxx denotes cable length in meters; W06-5-pin PUR black sheath, temperature -40~80°C cable assembly.
Analog output right angled cable assembly Order No.: AST-Mxxx-W05		Mxxx denotes cable length in meters; W05-5-pin PUR black sheath, temperature -40~80°C cable assembly.

• Finished plug cable

Accessory name/model	Dimensions	Description
M12 female connector Order No.: 521801-2 (3/5/10)		PUR black sheath, line core 1 brown, 2 white, 3 blue, 4 black, 5 gray, temperature resistance -40°C~80°C.
M12 Right angle female connector Order No.: 521804-2 (5)		PUR black sheath, line core 1 brown, 2 white, 3 blue, 4 black, 5 gray, temperature resistance -40°C~80°C.

• Magnet ring/floating ball

Accessory name/model	Dimensions	Accessory name/model	Dimensions	Description
Slider Magnet Order No.: 211517		Square Magnet Order No.: 288508		One square magnet 211508, one square magnet gasket 211529 (thickness 5mm), two M4X20 socket screws
Square magnet Order No.: 211508		Trapezoidal magnet kit Order No.: 288514		One trapezoidal magnet 211514, one trapezoidal magnet gasket 211530 (thickness 5mm), three M4X20 socket screws
Square magnet gasket Order No.: 211529		Mounting clamp kit Order No.: 211561		One mounting clamp, two M5X16 socket screws
Trapezoidal magnet Order No.: 211514		Mounting clamp kit (With insulation) Order No.: 211801		One mounting clamp, two M5X16 socket head cap screws, four insulating washers
Trapezoidal magnet gasket Order No.: 211530		Slider Magnet Kit Order No.: 288517		One slider Magnet 211517, one M5x25Screw, Two M5 Nuts

Note: For other accessories, please refer to general options

HP Displacement Sensor



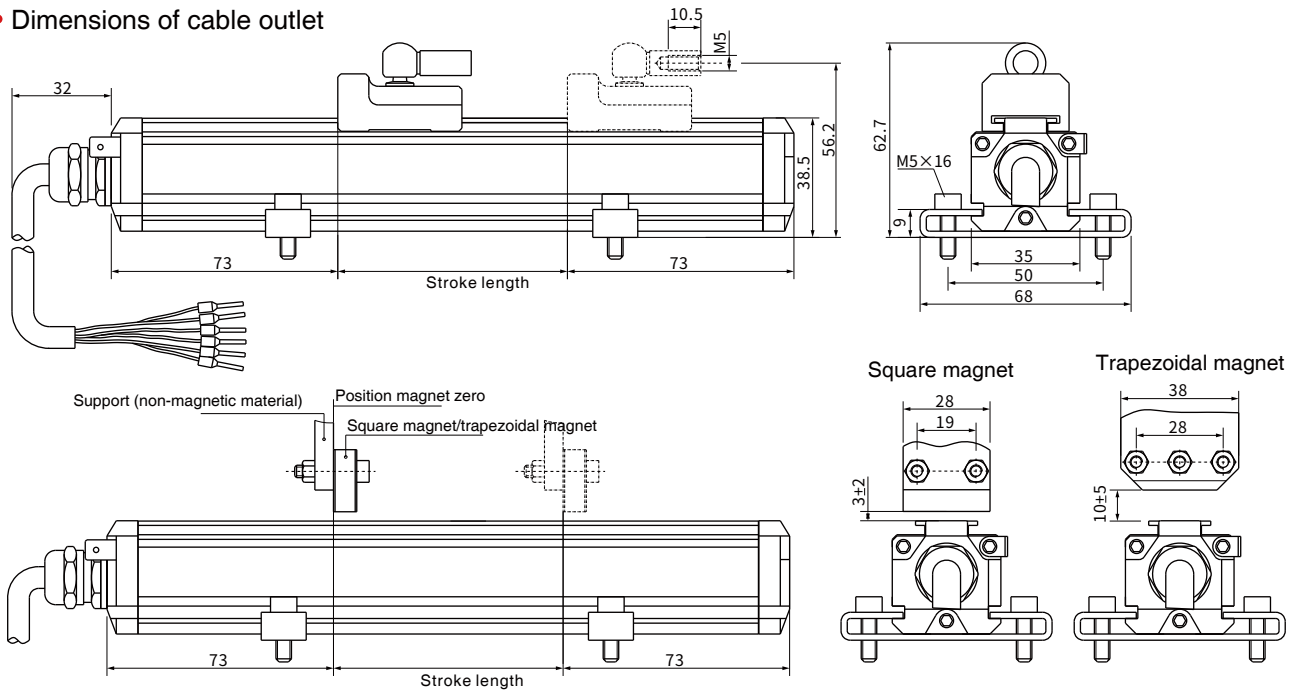
Technical characteristics

- Compact structure, convenient disassembly and assembly
- Linear measuring, absolute position output
- Rugged and fully enclosed design
- Digital technology, stable and reliable

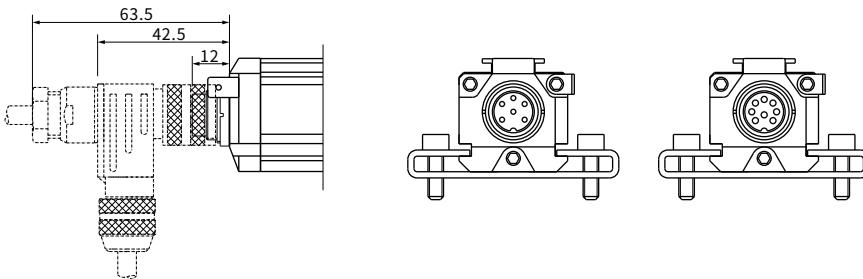
HP-Analog Output

▶ Structural shape

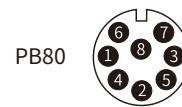
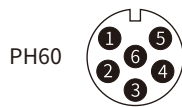
• Dimensions of cable outlet



• Outline dimensions of connector outlet



▶ Wiring and pin definition



• 6-pin male connector arrangement (Sensor Oriented)

Pin	Cable color 1*	Cable color 2*	Function definition
1	Blue	Grey	Magnet ring position signal+
2	Green	Pink	Magnet ring position signal-
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	GND (power supply circuit)

• 8-pin male connector arrangement (Sensor Oriented)

Pin	Cable color 3*	Function definition
1	Yellow	Current output
2	Grey	current/voltage circuit
3	Pink	Reservation
4	-	Reservation
5	Green	Voltage output
6	Blue	GND (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Note: * Cable color 1: Cable PUR sheath, orange, -20~90°C
* Cable color 2/3: Cable PUR sheath, orange, -20~90°C

▶ HP Analog Output-Product Parameters

• Input

Measuring data	Position magnet ring
Stroke length	50~2500 mm (customized according to customer's needs)

• Output

Current	4 ~ 20mA or 20~4mA(min/max load 0/500Ω)
Voltage	0 ~ 10Vdc or 0~5Vdc (minimum load resistance ≥ 10KΩ)
Resolution	16-bit D/A or 0.0015% of full scale (minimum 5μm)
Nonlinearity	< 0.02% of full scale
Repetition accuracy	< ± 0.005% of full scale
Update time	1ms(range ≤ 1m)、2ms(1m<range ≤ 2m)、3ms(2m<range ≤ 3m)
Hysteresis	<10μm

• Operating conditions

Magnet velocity	Arbitrary
Protection class	IP65
Operating temperature	-40°C ~ +85°C
Humidity/dew point	Humidity 90%, no condensation
Temperature coefficient	<30ppm/°C
Shock index	GB/T2423.5 50g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC test	GB/T17626.2 Anti-interference Degree of Electrostatic Discharge, Grade 3, Class A
	GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A
	GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class A
	GB/T17626.6 RF Field Induced Conducted Disturbance Immunity, Grade 2, Class A
	GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A
	CE certification

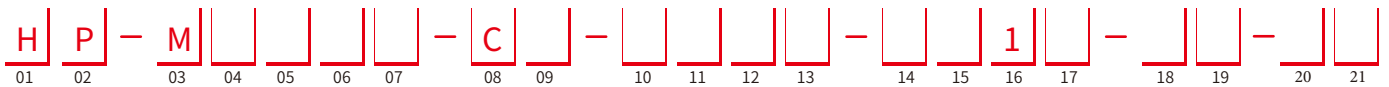
• Electrical Connections

Input voltage	+24Vdc±20%
Power consumption	<80mA
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum 36Vdc
Insulation resistance	>10MΩ
Insulation strength	500V

• Construction and Materials

Measuring rod	Aluminum profile
Installation	Movable mounting clamp
Position magnet	Slider magnet, trapezoidal magnet
Outgoing mode	Cable outlet or connector

HP Analog Output-Selection Guide



01 - 02	Sensor shell form
H P	Overall profile structure series
03 - 07	Range (0050~2500mm, others can be
	0050~0500mm step length 25mm
	0500~1000mm step length 50mm
	1000~2500mm step length 100mm
08 - 09	Magnet form
C 2	Slider magnet (211513)
C 3	Square magnet (211508)
C 4	Trapezoidal magnet (211514)
10 - 13	Connection form
10 - 11	Cable outlet mode
D H	PUR sheath, orange,-20~90°C, end scattered, Cable color 1
D U	PVC sheath, orange,-20~105°C, end scattered, Cable color 2
D B	PVC sheath, orange,-20~105°C, end scattered, Cable color 3
12 - 13	Cable length, 01~99 units: m (cable outlet mode)
10 - 13	Connector form
P H 6 0	M16 6-pin socket, plug cable needs to be selected separately
P B 8 0	M16 8-pin socket, plug cable needs to be selected separately

14 - 17	Signal output mode
14 - 15	Communication interface
A 0	Current output, 4 ~ 20mA
A 1	Current output, 20 ~ 4mA
A 2	Current output, 0 ~ 20mA
A 3	Current output, 20 ~ 0mA
V 0	Voltage output, 0 ~ 10V
V 1	Voltage output, 10 ~ 0V
V 4	Voltage output, 0 ~ 5V
V 5	Voltage output, 5 ~ 0V
16	Reserved bit
1	1 position magnet
17	No magnet ring state
A	Keep the original value
B	Maximum value
C	minimum
18 - 19	Non-usable area at head and end
B 1	72.5mm+72.5mm
D 2	73mm+73mm
20-21	Country
	Refer to the country list, page 61.

● Selection example

For example: HP-M0300-C2-PH60-A01B-B1-CN

Indicates: HP structure, mounting clamp installation, 300mm Stroke length, C-type magnet, M16 male socket (without plug cable), current output of 4~20mA, output value larger than 20mA without magnet ring, non-usable area at head and end of 72.5 mm+72.5 mm.

● Supply list

Sensor, certificate, instruction manual, optional parts (optional separately)

▶ HP Analog Output - Common Options

• Plug assembly cable

Accessory name/model	Dimensions	Description
Analog wiring cable assembly Order No.:AST-Mxxx-H01 (U01/U02)		Mxxx denotes cable length in meters; H01-6-pin PUR orange sheath, temperature-resistant-20~90°C cable assembly; U01-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly; U02-8-pin PVC orange sheath, temperature -20~105°C cable assembly.
Analog wiring right angled cable assembly Order No.:AST-Mxxx-H03 (U03/U04)		Mxxx denotes cable length in meters; H03-6-pin PUR orange sheath, temperature-resistant -20~90°C cable assembly; U03-6-pin PVC orange sheath, temperature resistance -20~105°C cable assembly; U04-8-pin PVC orange sheath, temperature -20~105°C cable assembly.

• Magnet ring

Accessory name/ model	Dimensions	Description	Accessory name/ model	Dimensions	Description
Square magnet kit Order No.:288508		One square magnet 211508, one square magnet gasket 211529 (thickness 5mm), two M4X20 socket screws	Slider Magnet Order No.:211513		
Trapezoidal magnet kit Order No.:288514		One trapezoidal magnet 211514, one trapezoidal magnet gasket 211530 (thickness 5mm), three M4X20 socket screws	Square magnet Order No.:211508		
Mounting clamp kit Order No.:211561		One mounting clamp, two M5X16 socket screws	Square magnet gasket Order No.:211529		
Mounting clamp kit (With insulation) Order No.:211801		One mounting clamp, two M5X16 socket head cap screws, four insulating washers	Trapezoidal magnet Order No.:211514		
			Trapezoidal magnet gasket Order No.:211530		

Note:For other accessories, please refer to general options

ED Displacement Sensor



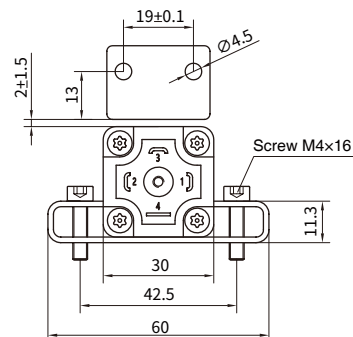
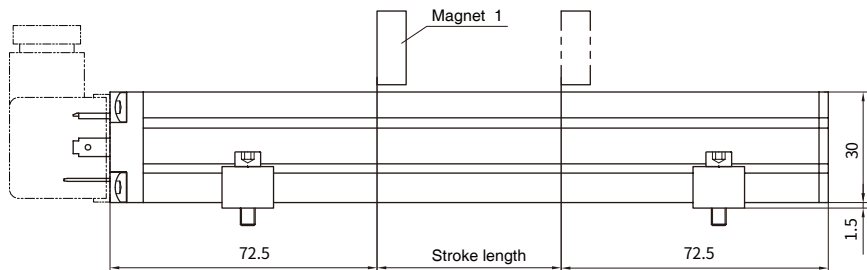
Technical characteristics

- Non-contact measuring, never wear
- Ultra-small profile, suitable for installation in compact occasions
- Up to two position signal outputs

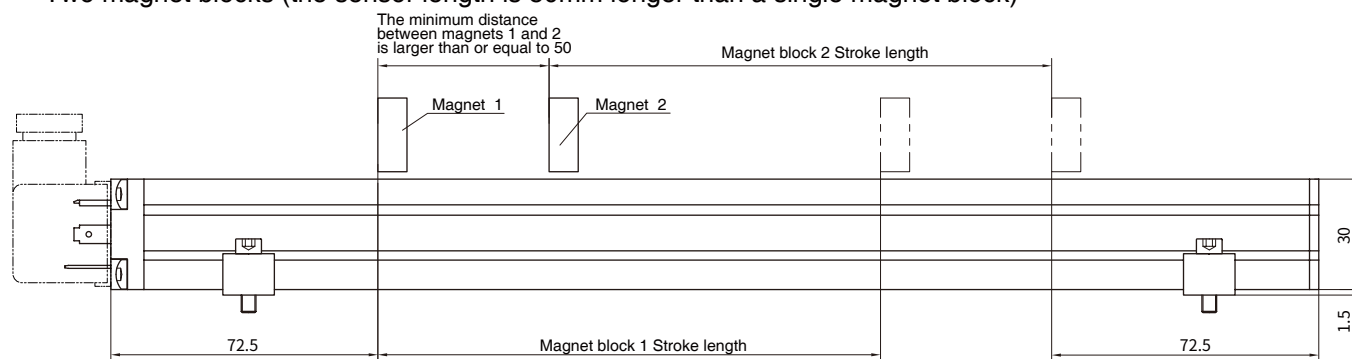
ED-Analog Output

▶ Structural shape

- Single magnet



- Two magnet blocks (the sensor length is 50mm longer than a single magnet block)



▶ Wiring and pin definition

No.	Single magnet block pin definition	Two magnet blocks pin definition
1	0~10VDC or 10~0VDC Magnet block1	0~10VDC or 10~0VDC Magnet block2
2	10~0VDC or 0~10VDC Magnet block1	10~0VDC or 0~10VDC Magnet block1
3	+24VDC	+24VDC
4	GND	GND

▶ ED Analog Output - Product Parameters

• Output

Measuring data	Position magnet ring
Stroke length	50~3000 mm,dual position output 50~3000
Voltage	0~10V/10~0V,single/dual
Resolution	0.025% of full scale (minimum 10um)
Nonlinearity	< ± 0.05% of full scale
Repetition accuracy	< ± 0.01% of full scale
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection class	IP65
Operating temperature	-40°C ~ +75°C
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 50g (11ms)
Vibration index	GB/T2423.10 5g/10~2000Hz
EMC test	GB/T17626.2 Anti-interference Degree of Electrostatic Discharge, Grade 4, Class A GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class B GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 4, Class B GB/T17626.6 RF Field Induced Conducted Disturbance, Grade 2, Class B GB/T17626.8 Power Frequency Magnetic Field Anti-interference Degree, Grade 3, Class A CE certification

• Electrical Connections

Input voltage	+24Vdc±20%
Power consumption	< 80mA
Polarity protection	Maximum -30Vdc
Overvoltage protection	Maximum 36Vdc
Insulation resistance	> 10MΩ
Insulation strength	500V

• Construction and Materials

Measuring rod	Aluminum alloy
Outgoing line connection	DIN46530(A)
Installation	Any direction, clamp installation
Position magnet	Suspension magnet

ED Analog Output-Selection Guide

E D - M - C 3 - P D 4 0 - - -

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20

01 - 02	Sensor shell form
E D	Integral profile structure series
03 - 07	Measuring range (0025~3000mm, others can be customized according to needs)
	0025~0750mm step length 5mm
	0750~1000mm step length 25mm
	1000~3000mm step length 50mm
08 - 09	Magnet form
	C3 square magnet
10 - 13	Outgoing mode/Cable length
P D 4 0	DIN46530, A-type socket and Connector
14 - 16	Communication interface
V A 1	Single magnet block, voltage 0~10V
V B 1	Single magnet block, voltage 10~0V
V A 2	Two magnet blocks, voltage 0~10V and voltage 0~10V
V B 2	Two magnet blocks, voltage 0~10V and voltage 10~0V
V C 2	Two magnet blocks, voltage 10~0V and voltage 10~0V
V D 2	Two magnet blocks, voltage 10~0V and voltage 0~10V
17 - 18	Non-usable area at head and end
B 1	72.5mm+72.5mm
19 - 20	Country
 	Refer to the country list, page 61.

• Selection example

For example: ED-M0300-C3-PD40-VA1-B1

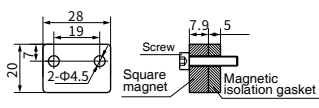
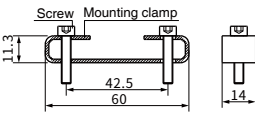
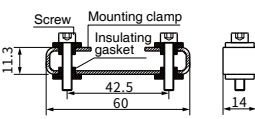
Indicates: ED structure, mounting clamp installation, 300mm Stroke length, standard DIN46530, A-type socket and Connector, single magnet block, output signal 0~10V, non-usable area at head and end 72.5mm+72.5mm.

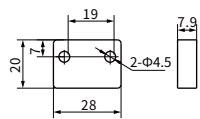
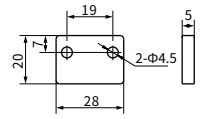
• Supply list

Sensor, certificate, instruction manual, optional parts (optional separately)

▶ ED Analog Output-Common Options

• Magnet ring

Accessory name/ model	Dimensions	Description
Square magnet kit Order No.:288508		One square magnet 211508, one square magnet spacer 211529 (thickness 5mm), two M4X20 socket head cap screws.
Mounting clamp kit Order No.:211584		One mounting clamp, two M4X20 socket screws.
Mounting clamp kit (With insulation) Order No.:211584A		One mounting clamp, two M4X20 socket screws, Four insulating washers.

Accessory name/ model	Dimensions
Square magnet Order No.:211508	
Square magnet gasket Order No.:211529	

Note: For other accessories, please refer to general options

ESC Displacement Sensor

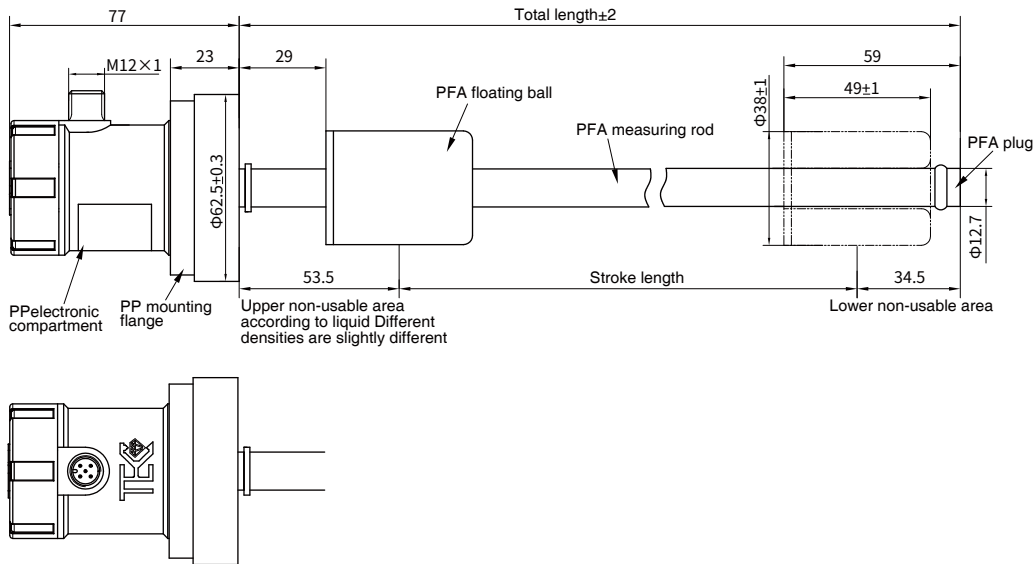


Technical characteristics

- Non-contact measuring, never wear
- PFA material shell, strong acid and alkali corrosion resistance
- Resolution 0.01, high precision liquid level detection
- The communication interface is rich and can be customized according to needs

ESC-Analog Output

▶ Structural shape



▶ Wiring and pin definition



Analog (four wires)

• PA50 pin arrangement (Sensor Oriented)

Pin	Cable color	Function definition
1	Brown	+24Vdc \pm 20% Power Supply
2	White	GND (power supply circuit)
3	Blue	Magnet ring position signal+
4	Black	Magnet ring position signal-
5	Grey	Shielded wire

ESC Analog Output-Product Parameters

• Input

Measuring data	Position magnet ring
Stroke length	25~2500 mm, others can be customized according to needs

• Output

Current	4 ~ 20mA or 20 ~ 4mA(min/max load 0/500Ω)
Voltage	0 ~ 10Vdc or 0~5Vdc (minimum load resistance ≥ 10KΩ)
Resolution	±0.01mm, 16bitDA, current ±0.1mm, 12bitDA, Voltage
Nonlinearity	0.05%F.S
Repetition accuracy	Same resolution
Update time	1ms (range ≤ 1m) 、2ms (1m < range ≤ 2m)、3ms (range > 2m)

• Operating conditions

Magnet velocity	Arbitrary
Protection class	IP67
Operating temperature	-40°C ~ +75°C
Humidity/Dew Point	Humidity 90%, no condensation
Impact Indicator	GB/T2423.5 50g(6ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Anti-interference Degree of Electrostatic Discharge, Grade 3, Class A GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class B GB/T17626.6 RF Field Induced Conducted Disturbance, Grade 2, Class A GB/T17626.8 Power Frequency Magnetic Field Anti-interference Degree, Grade 3, Class A CE certification

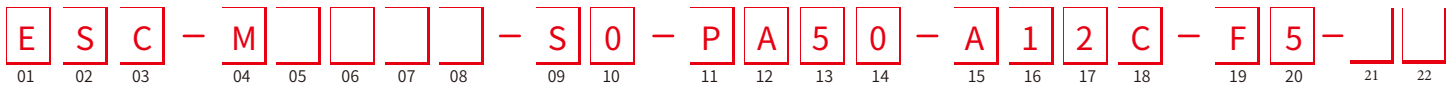
• Electrical Connections

Input voltage	+24Vdc±20% / +12Vdc±20%
Power consumption	<80mA
Polarity protection	Maximum -30Vdc
Overvoltage protection	Maximum 36Vdc
Insulation resistance	> 10MΩ
Insulation strength	500V

• Construction and Materials

Electronic compartment	PP
Measuring rod	PFA
Outgoing connection	Connector (M12 connector)
Installation	Any direction, threaded mounting (M50) or movable flange mounting
Position magnet	Built-in magnet in floating ball

ESC Analog Output-Selection Guide



01 - 03	Sensor shell form
E S C	Integral profile structure series
04 - 08	Measuring range (0025~2500mm, others can be customized according to needs)
	0025~0750mm step length 5mm
	0750~1000mm step length 25mm
	1000~2500mm step length 50mm
09 - 10	Installation mode
S 0	Unthreaded flange installation
11 - 14	Outgoing mode, cable length
P A 5 0	M12 5-pin male socket, plug cable needs to be selected separately
15 - 18	Communication interface
A 1 2 C	Single floating ball, 20~4mA output
19 - 20	Non-usable area at head and end
F 5	29mm+59mm
21 - 22	Country
	Refer to the country list, page 61.

• Selection example

For example: ESC-M0520-S0-PA50-A12C-F5-CN

Indicates: ESC structure, non-threaded flange installation, 520mm Stroke length, M12, 5-pin socket, single floating ball, 20~4mA output, head and end non-usable area 29mm + 59mm.

• Supply list

Sensor, certificate, instruction manual, optional parts (optional separately)





ESC Analog Output-Common Options

• Finished plug cable


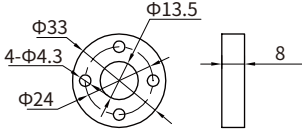

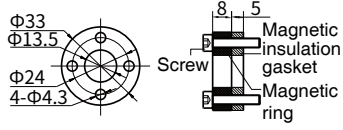

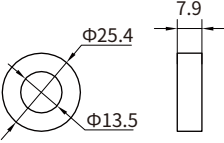

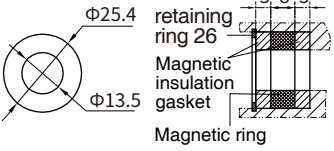

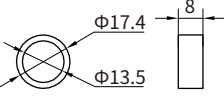

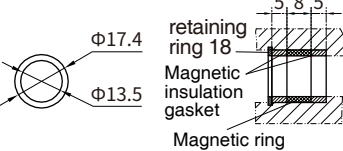

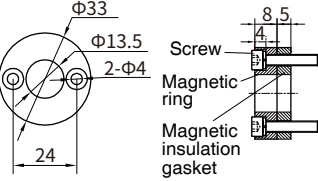
Accessory name/model	Dimensions	Description
M12 Right angle female connector Order No.:521816-5		Mxxx denotes cable length in meters; PP black sheath, -pin 1 brown, 2 white, 3 blue, 4 black, 5 gray, Temperature resistance-40°C~80°C.

Note: For other accessories, please refer to general options


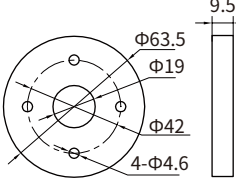

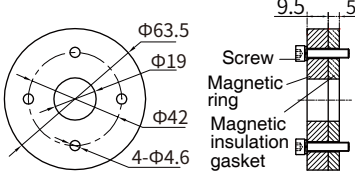

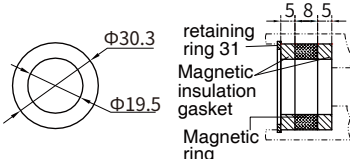

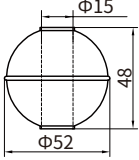

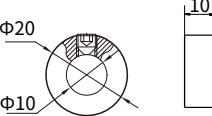

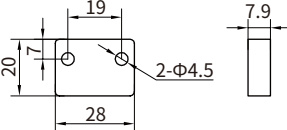

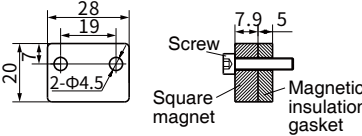
General Options-Programming Tools

Accessory name/model	Dimensions	Description
<p>Handheld programmer Order No.: TEC612801A/B (A:Current B:Voltage)</p>		<p>It is suitable for analog output sensor, and can set the starting position and full range point of analog output displacement sensor Includes: handheld programmer, 220V power supply, sensor adapter × 2</p>
<p>Interface converter Order No.: TEC612802</p>		<p>Applicable to SSI output sensor, the digital tube displays the displacement value of the output vernier magnet ring in real time. Includes: interface converter, 220V power supply, sensor adapter cable × 2</p>
<p>USB dongle Order No.: TEC612811</p>		<p>Applicable to analog output sensor, PC is connected with sensor through USB port, and TEC sensor configuration software is used for programming: 1) setting sensor measuring direction; 2) Setting sensor zero point and full-scale point; 3) Graphical display of magnet ring position value; 4) Diagnosing sensor online through error code. Includes: USB converter, USB data cable, sensor adapter × 2, software</p>
<p>USB dongle Order No.: TEC612812</p>		<p>Suitable for SSI output sensor, through USB port to connect PC and sensor, using TEC sensor configuration software for programming: 1) Set sensor parameters (data length, data format, measuring direction); 2) Graphic display of magnet ring position value; 3) Users arbitrarily set sensor zero point and measuring display value; 4) On-line diagnosis of sensor through error code. Includes: USB converter, USB data cable, sensor adapter × 2, software</p>


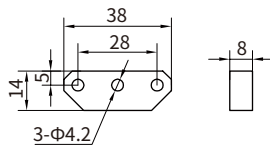
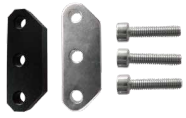
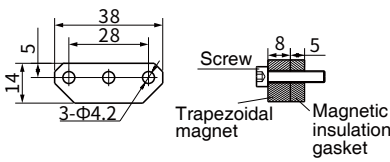

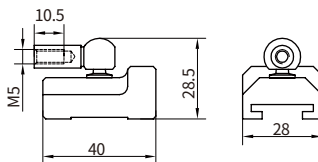

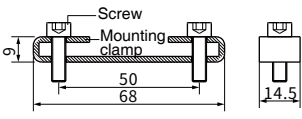

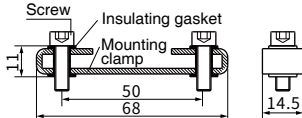

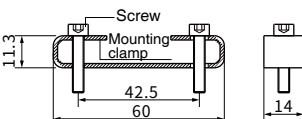

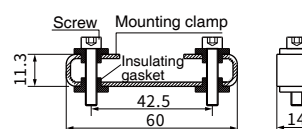
General Option-Magnet Ring Floating Ball

Accessory name/model	Dimensions	Description
 <p>Standard magnet ring Order No.:211501</p>		<p>Includes:1 magnet ring Application:EJ/ES</p>
 <p>Standard magnet ring kit Order No.:288501</p>		<p>Magnetic isolation gasket: same size as magnet ring, thickness 5mm Screw: GB/T70.1, M4X18 , Material 304 Spring gasket: GB/T93, φ 4, Material 304 Includes:1 magnet ring, 1 spacer, 4 screws with spring wgreysers Application:EJ/ES</p>
 <p>Magnet ring Order No.:211506</p>		<p>Includes:1 magnet ring Application:EJ/ES</p>
 <p>Magnet ring Kit Order No.:288506</p>		<p>Magnetic isolation gasket: same size as magnet ring, thickness 5mm Retaining ring: GB/T893 , 26 Includes:1 magnet ring, 2 spacer, 1 retaining ring Application:EJ/ES</p>
 <p>Magnet Order Order No.:211507</p>		<p>Includes:1 magnet ring Application:EJ/ES</p>
 <p>Ring Kit Order No.:288507</p>		<p>Magnetic isolation gasket: same size as magnet ring, thickness 5mm Retaining ring: GB/T893 , 18 Includes:1 magnet ring, 2 spacer, 1 retaining ring Application:EJ/ES</p>
 <p>Magnet ring 33 Kit Order No.:288511</p>		<p>Magnetic isolation gasket: same size as magnet ring, thickness 5mm Screw: GB/T70.1, M4×20 Includes:1 magnet ring, 1 spacer, 2 screws with elastic cushion Application:EJ/ES</p>


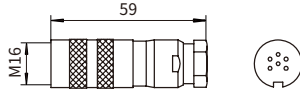

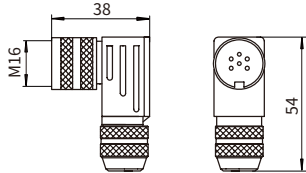

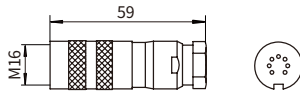

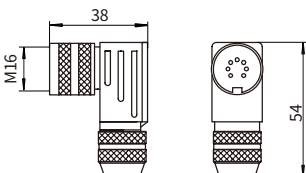



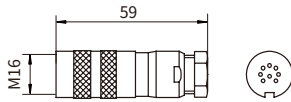

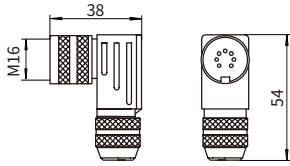

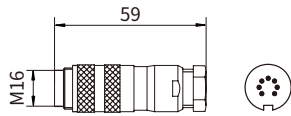
General Option-Magnet Ring Floating Ball

Accessory name/model	Dimensions	Description
 <p>Enlarge ring magnet ring Order No. :211504</p>		<p>Includes: 1 magnet ring Application: EJ/ES</p>
 <p>Enlarged ring magnet ring kit Order No. :288504</p>		<p>Magnetic isolation gasket: same size as magnet ring, thickness 5mm Screw: GB/T70.1, M4X20 Spring wgreyer: GB/T 93, φ 4, material304 Includes: 1 magnet ring, 1 spacer, 2 screws with spring wgreyer Application: EJ/ES</p>
 <p>Magnet ring Kit Order No. :288509</p>		<p>Magnetic isolation gasket: same size as magnet ring, thickness 5mm Retaining ring: GB/T893 , 31 Includes: 1 magnet ring, 2 spacer, 1 retaining ring Application: ES/EJ</p>
 <p>Floating ball Order No. :211546</p>		<p>Density: 0.6g/cm³ Surface material: 304 Pressure resistance: 2.5MPa Includes: 1 float Application: ES/EJ</p>
 <p>Locking ring Order No. :211589</p>		<p>material 304 Application: ES/EJ</p>
 <p>Square magnet Order No. :211508</p>		<p>Includes: 1 magnet Application: EP/HP/ED</p>
 <p>Square Magnet Kit Order No. :288508</p>		<p>Magnetic isolation gasket: same size as magnet, thickness 5mm Screw: GB/T70.1, M4X20 , material 304 Spring gasket: GB/T93, φ 4, material 304 Includes: 1 magnet ring, 1 gasket, 2 screws with elastic cushion Application: EP/HP/ED</p>


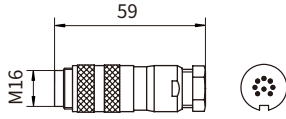

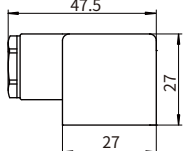

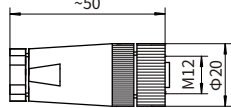

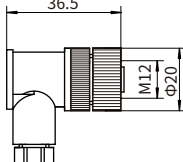
General Options-Magnet Ring Floating Ball

Accessory name/model	Dimensions	Description
 <p>Trapezoidal magnet Order No.:211514</p>		<p>Includes: 1 Magnet Application: EP/HP/ED</p>
 <p>Trapezoidal magnet kit Order No.:288514</p>		<p>Magnetic isolation gasket: same size as magnet , thickness 5mm Screw: GB/T70.1, M4X20 , Material 304 Spring gasket: GB/T93, ϕ 4, Material 304 Includes: 1 Magnet ring, 1 gasket, 3 screws with elastic cushion Application: EP/HP/ED</p>
 <p>Slider magnet Order No.:211513</p>		<p>Includes: 1 slider Application: HP</p>
 <p>Mounting clamp kit Order No.:211561</p>		<p>Screw: GB/T70.1, M5X16 , Material 304 Includes: 1 clamp, 2 screws Application: EP/HP</p>
 <p>Mounting clamp kit (including insulation washer) Order No.:211801</p>		<p>Screw: GB/T70.1, M5X16 , Material 304 Includes: 1 clamp, 2 screws, 4insulating washers Application: EP/HP</p>
 <p>Mounting clamp kit Order No.:211584</p>		<p>Screw: M4X20 Includes: 1 mounting clamp, 2 Screws Application: ED</p>
 <p>Mounting clamp kit (including insulation washer) Order No.:211584A</p>		<p>Screw: M4X20 Includes: 1 mounting clamp, 2 Screws, 4 insulating washers Application: ED</p>

General Option-Connector

Accessory name/model	Dimensions	Application
 6-pin female connector Order No.:312701		EJ/EP/HP-Analog
 6-pin 90° female connector Order No.:312702		EJ/EP/HP-Analog
 7-pin female connector Order No.:312703		EJ/HP-SSI
 7-pin 90° female connector Order No.:312704		EJ/HP-SSI
 6-pin male connector Order No.:312714		EJ/EP/HP-Analog
 8-pin female connector Order No.:312720		EJ-Analog/SSI HP-Analog
 8-pin 90° connector female Order No.:312724		EJ-Analog/SSI HP-Analog
 7-pin male connector Order No.:312718		EJ/HP-SSI

General Option-Connector

Accessory name/model	Dimensions	Application
 <p>8-pin male connector Order No.:312721</p>		EJ-Analog/SSI
 <p>Plug kit Order No.:312725</p>		ED-Analog
 <p>M12 5-pin female Order No.:312301</p>		ES/EP-Analog ES-Modbus
 <p>M12 5-pin 90°right angle Order No.:312302</p>		ES/EP-Analog ES-Modbus

General Options-Cable

Accessory name/model	Dimensions	Application
 <p>PUR Orange Cable Order No.:511802</p>	<p>3P×0.25mm²; φ 7.8±0.2mm Conductor: 6-pin, red/black, blue/green, yellow/white Sheath color: Orange Shielding layer: tinned copper wire mesh + aluminum foil Application characteristics: Linear softness, oil resistance and bending resistance Temperature: -20~90°C</p>	<p>EJ/EP/ES/HP-Analog ES-Modbus</p>
 <p>PVC Orange Cable Order No.:511807</p>	<p>7×24AWG; φ 6.7±0.3mm Conductor: 7-pin, brown/white/yellow/green/gray/pink/blue Sheath color: Orange Shielding layer: tinned copper wire mesh + aluminum foil Application characteristics: Linear extremely soft, oil resistance, bending resistance, resistance High temperature, in line with European color code Temperature: -20~105°C</p>	<p>EJ/EP/ES/HP-Analog</p>
 <p>PUR Black Cable Order No.: 511809</p>	<p>5×0.25mm²; φ 5.6±0.2mm Conductor: 5-pin, brown/white/blue/black/gray Application characteristics: cable sheath PUR black, with shielding Temperature: -40~80°C</p>	<p>EP/ES-Analog ES-Modbus</p>
 <p>PVC Black Cable Order No.: 511813</p>	<p>7×0.2mm²; φ 5.8±0.2mm Conductor: 7-pin, red/black/blue/green/yellow/white/brown Application characteristics: Cost performance, cable sheath P V C black, with shielding Temperature: -40~80°C</p>	<p>EP/ES-Analog ES-Modbus</p>
 <p>4-pin/5-pin M12 female connector Order No.:521801-2(3/5/10)</p>	<p>5×0.25mm²; φ 5.6±0.2mm Conductor: 5-pin, brown/white/blue/black/gray Application characteristics: Cable sheath PUR black, with shielding Temperature: -40~80°C Line length: 2m (optional 3m/5m/10m)</p>	<p>EP/ES-Analog ES-Modbus</p>
 <p>4-pin/5-pin M12 right angle female connector Order No.:521804-2(5)</p>	<p>5×0.25mm²; φ 5.6±0.2mm Conductor: 5-pin, brown/white/blue/black/gray Application characteristics: Cable sheath PUR black, with shielding Temperature: -40~80°C Line length: 2m (optional 5m)</p>	<p>EP/ES-Analog ES-Modbus</p>
 <p>M12 right angle female connector Order No.:521816-5</p>	<p>5×0.25mm²; φ 5.6±0.2mm Conductor: 5-pin, brown/white/blue/black/gray Application characteristics: Cable sheath PP black, with shielding Temperature: -40~80°C Line length: 5m</p>	<p>ESC-Analog</p>

Industrial Application



Metallurgical industry



Port machinery



Hydraulic machinery



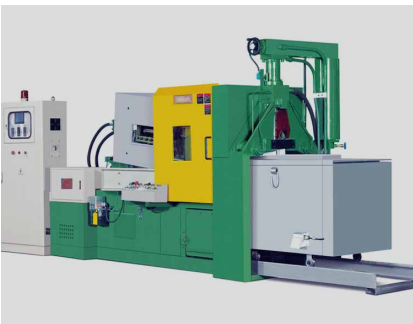
Wind power industry



Injection molding machinery



Vulcanizing machinery



Die casting machinery



Vertical mill machinery



Construction machinery



Papermaking machinery



Liquid level tank



Forming machinery

Country list

- AF - Afghanistan 阿富汗
AL - Albania 阿尔巴尼亚
DZ - Algeria 阿尔及利亚
AS - American Samoa 东萨摩亚
AD - Andorra 安道尔
AO - Angola 安哥拉
Av - Anguilla 安圭拉岛
AQ - Antarctica 南极洲
AG - Antigua and Barbuda 安提瓜和巴布达
AR - Argentina 阿根廷
AM - Armenia 亚美尼亚
AA - Aruba 阿鲁巴
AU - Australia 澳大利亚
AT - Austria 奥地利
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BM - Bermuda 百慕大
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BF - Burkina Faso 布基纳法索
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- KH - Cambodia (Internet) 柬埔寨
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- DK - Denmark 丹麦
DJ - Djibouti 吉布提
DM - Dominica 多米尼加共和国
DO - Dominican Republic 多米尼加联邦
- TP - East Timor 东帝汶
EC - Ecuador 厄瓜多尔
EG - Egypt 埃及
SV - El Salvador 萨尔瓦多
GQ - Equatorial Guinea 赤道几内亚
ER - Eritrea
EE - Estonia 爱沙尼亚
ET - Ethiopia 埃塞俄比亚
- FK - Falkland Islands (Malvinas) 福兰克群岛
FO - Faroe Islands 法罗群岛
FJ - Fiji 斐济
FI - Finland 芬兰
FR - France 法国
FX - France, Metropolitan
GF - French Guiana 法属圭亚那
PF - French Polynesia 法属玻里尼西亚

TF - French Southern Territories 法国南部
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MK - F.Y.R.O.M. (Macedonia)

GA - Gabon 加蓬
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DE - Germany 德国
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GL - Greenland 格陵兰岛
GD - Grenada 格林纳达
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GU - Guam 关岛
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GN - Guinea 几内亚
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KW - Kuwait 科威特
KG - Kyrgyzstan 吉尔吉斯斯坦

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LU - Luxembourg 卢森堡

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NG - Nigeria 尼日利亚
NU - Niue 纽爱
NF - Norfolk Island 诺福克岛
MP - Northern Mariana Islands 北马里亚纳群岛
NO - Norway 挪威

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TV - Tuvalu 图瓦卢

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UA - Ukraine 乌克兰
AE - United Arab Emirates 阿联酋
UK - United Kingdom 英国
US - United States 美国
UM - US Minor Outlying Islands 美国海外领地
UY - Uruguay 乌拉圭

SU - USSR (former) 前苏联
UZ - Uzbekistan 乌兹别克斯坦

VU - Vanuatu 瓦努阿鲁
VA - Vatican City State (Holy See) 梵蒂岗
VE - Venezuela 委内瑞拉
VN - Viet Nam 越南
VG - Virgin Islands (British) 英属维京群岛
VI - Virgin Islands (U.S.) 美属维京群岛

WF - Wallis and Futuna Islands 瓦里斯和福图纳群岛
EH - Western Sahara 西撒哈拉

YE - Yemen 也门
YU - Yugoslavia 南斯拉夫

ZM - Zambia 赞比亚
(ZR - Zaire) - See CD Congo, Democratic Republic 扎伊尔
ZW - Zimbabwe 津巴布韦

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