浙达精益
ZHEDA JINGYI



# Magnetostrictive Displacement Sensor

## E Series Product manual

杭州浙达精益机电技术股份有限公司
Hangzhou Zheda Jingyi Electromechanical Technology Corporation Limited

浙达精益

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# 2021

# CONTENT


Company Profile 01

Honorary & Qualification 02

TEC Magnetostriction Development 03

EJ Displacement Sensor 08

Analog Output

SSI Output

Modbus Output

ES Displacement Sensor 22

Analog Output

Modbus Output

EP Displacement Sensor 32

Analog Output

HP Displacement Sensor 38

Analog Output

ED Displacement Sensor 44

Analog Output

ESC Displacement Sensor 49

Analog Output

General Option 53

Programming Tool

Magnet ring floating ball

Connector

Cable

Industrial Application 61

# TEC CostEffective Sensor

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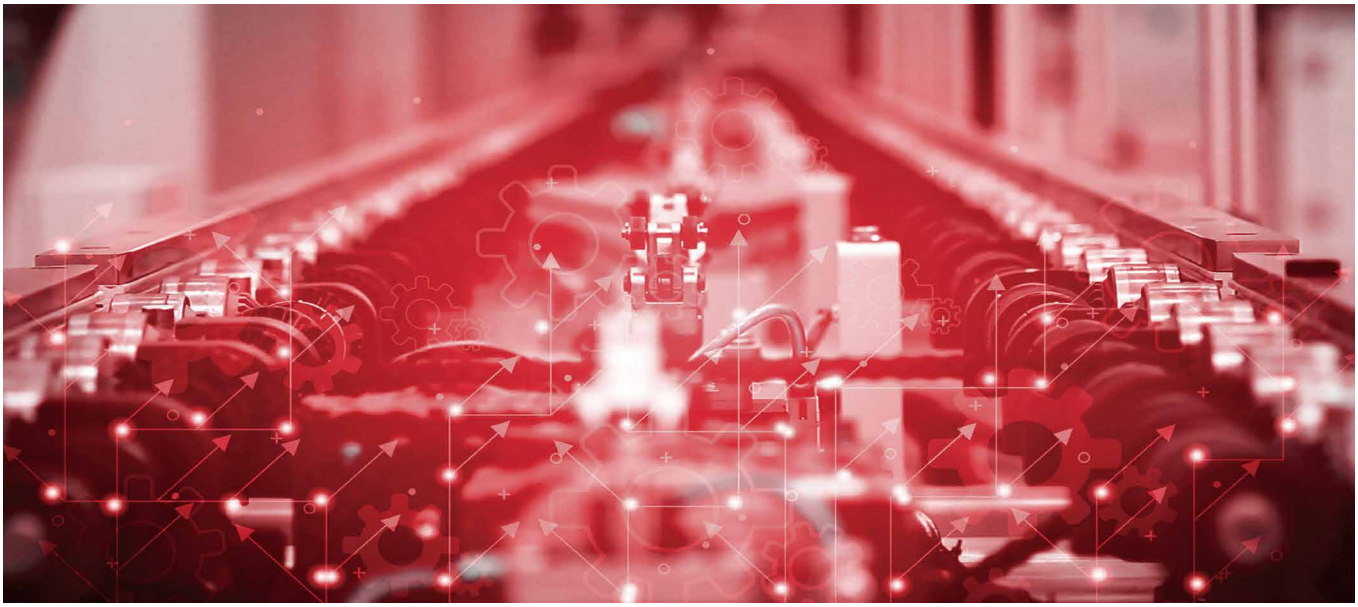
# E Series

# TEC CostEffective Sensor-E Series

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

# 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

## IN 1997

The National Natural Science Foundation of China, the first domestic and foreign giant magnetostrictive actuator for non-circular shaped pin hole processing

## IN 2002

National Natural Science Foundation of China (Youth Fund), "Basic research on the application of GMM self-sensing components integrating sensors and actuators"

## IN 2006

China Postdoctoral Science First-Class Funding Project

## IN 2008

The magnetostrictive displacement sensor project is included in the national torch plan project

## IN 2009

The magnetostrictive displacement sensor project won the Golden Bridge Award issued by the National Technology Association;
National Natural Science Foundation of China (Youth Fund), "Research on the Basic Theory of New Technology of Giant Magnetostrictive and Magnetorheological Compound Damping"

## IN 2011

The international exchange and cooperation conference on ultrasonic guided wave technology was held in Hangzhou. Our company officially launched the first set of magnetostrictive ultrasonic guided wave detectors in China.

## IN 2012

National Natural Science Foundation of China, "On-line detection method for corrosion and broken wires of arch bridge hangers based on the principle of magnetostrictive guided wave dynamic focusing";
National Natural Science Foundation of China, "Research on the Theory and Practice of Real-time Quantitative Detection of Defects in High-temperature Metal Pipelines Based on Magnetostrictive Ultrasonic Guided Waves";
Major Science and Technology Project in Zhejiang Province, "Magnetostrictive Ultrasonic Guided Wave Pipeline In-Service Non-destructive Testing Technology and Instruments"

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## IN 2013

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 2016

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

## IN 2017

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 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"

## IN 2019

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

## IN 2021

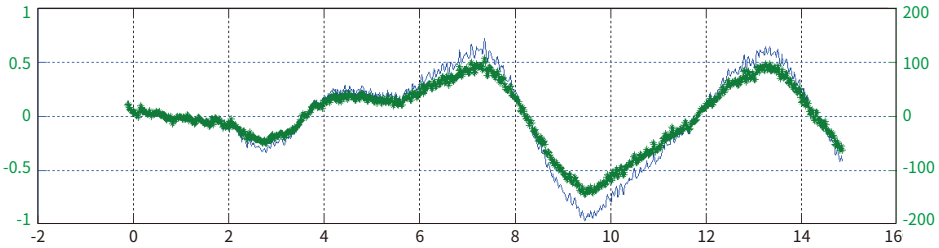
Science and Technology Progress Award of Zhejiang Province, "High-precision magnetoacoustic sensing technology and industrialization application of important components".

## IN 2022

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

# 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.




Laser interferometer

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 1μm

**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**

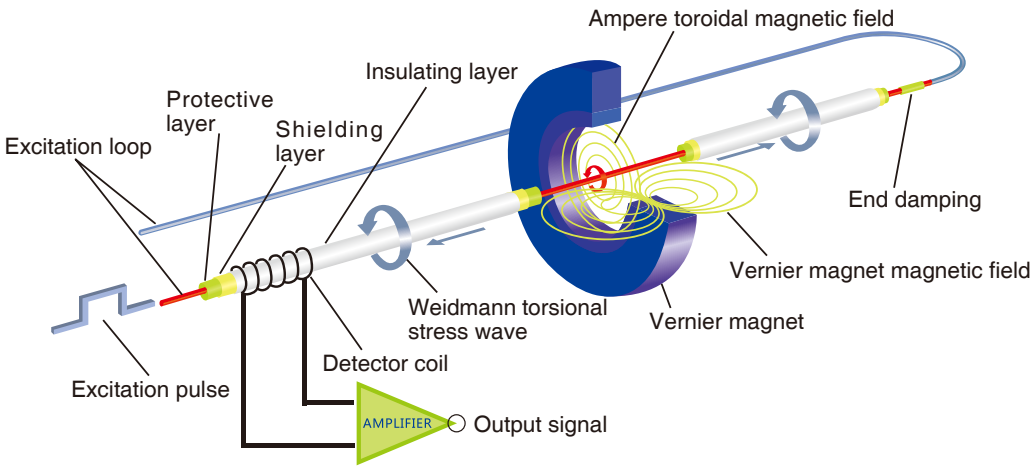
M18×1.5、M20×1.5、3/4"-16UNF-3A threaded installation

**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.

## 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.

## 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.

## Environmental conditions

For normal Operating conditionsof displacement sensors, the industry has the following standards:
a） Temperature:25℃（±10℃）
b） Relative humidity: 90%or less
Generally, the environment for calibrating and testing sensors is more stringent than the standard requirements.

## Temperature coefficient

The temperature coefficient unit is ppm/°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.

## Shell protection class

The IP (Ingress Prection) 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.

## 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.

## 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.

## 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.

## Full scale

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

## Multiple position measurement

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

## Load impedance

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

## Resolution

Refers to the minimum amount of sensor output that can be distinguished. The highest resolution of TEC magnetostrictive displacement sensor can reach1μm.

## 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.

## Repetition accuracy

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

## 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.

## 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).

# EJ Displacement Sensor



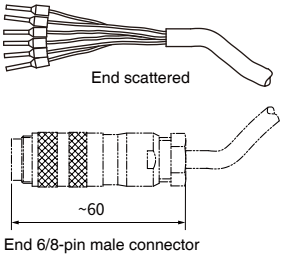

## *Technical Characteristics*

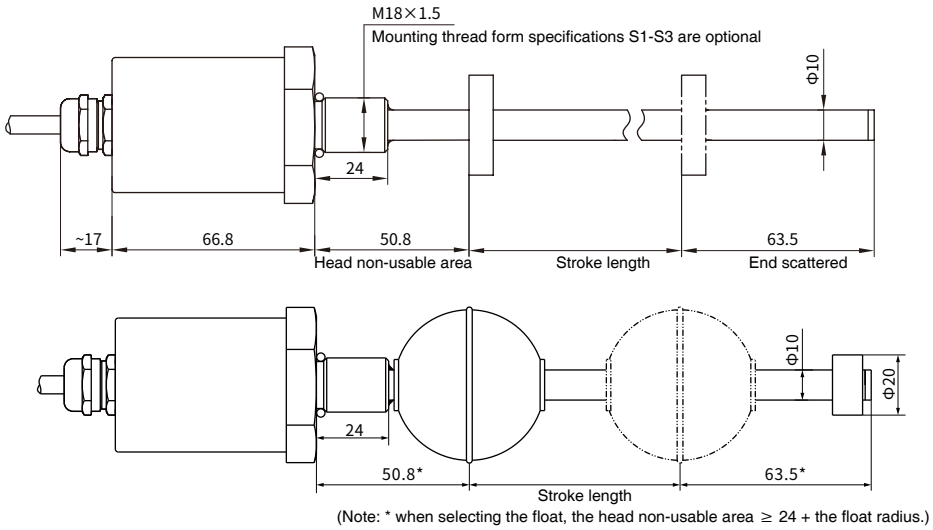
- Rugged and fully enclosed design
- Non-wear, non-contact measuring method
- Low power consumption design effectively reduces system heating
- Absolute position output, not affected by power failure
- Adapt to harsh environment, IP68 protection class
- Multiple interfaces are available: Analog, SSI,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

# EJ-Analog Output

## Structural shape

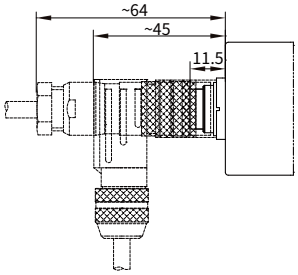
- Dimensions of cable outlet

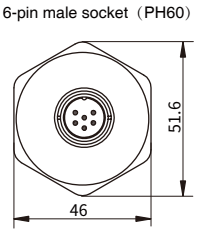


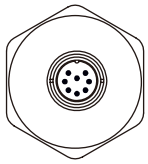




(Note: * when selecting the float, the head non-usable area ≥ 24 + the float radius.)

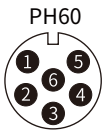
- Dimensions of connector outlet

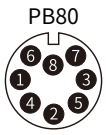



## Wiring and pin definition




- 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℃
* Cable color 2/3: cable PVC sheath orange,-20~105℃

# 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<br>GB/T17626.3 Radiation Immunity of Radio Frequency Electromagnetic Fields, Grade 3, Class A<br>GB/T17626.4 Electrical Fast Transient Immunity, Grade 3, Class B<br>GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Immunity, Grade 2, Class A<br>GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A<br>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

| E | J | – | M | | | | | – | S | | – | | | | | – | | | 1 | | – | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | | 03 | 04 | 05 | 06 | 07 | | 08 | 09 | | 10 | 11 | 12 | 13 | | 14 | 15 | 16 | 17 | | 18 | 19 |

| 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 diamete 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 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) |
| 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 |
|---|---|
| 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 |
|---|---|
| 1 | Single magnet ring |
| 2 | Single floating ball |

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

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

## ● Selection example

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

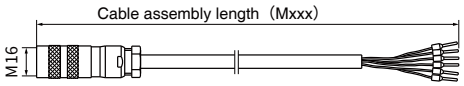
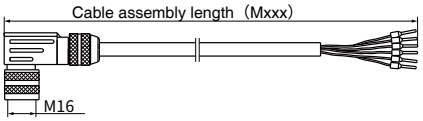
Indicates: E series EJ structure, Stroke length is 300mm, mounting thread form is M18×1.5, diameter 10, material 304 measuring rod, cable outlet PVC orange cable 2 meters (PVC orange sheath, -20~105°C, end scattered), 0-10V output, single magnet ring output (magnet ring needs to be purchased separately), the output value of no magnet ring is 10V, and the head and end non-usable area is 50.8mm+63.5mm.

## ● Supply list

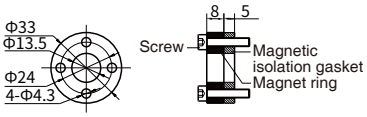
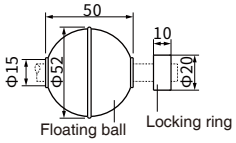
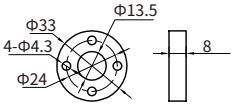
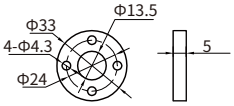
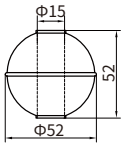
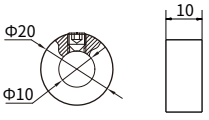
Sensor, certificate, manual, optional accessories (sold separately)

# EJ Analog Output-Common Options

## • Plug assembly cable

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

## • Magnet ring/floating ball

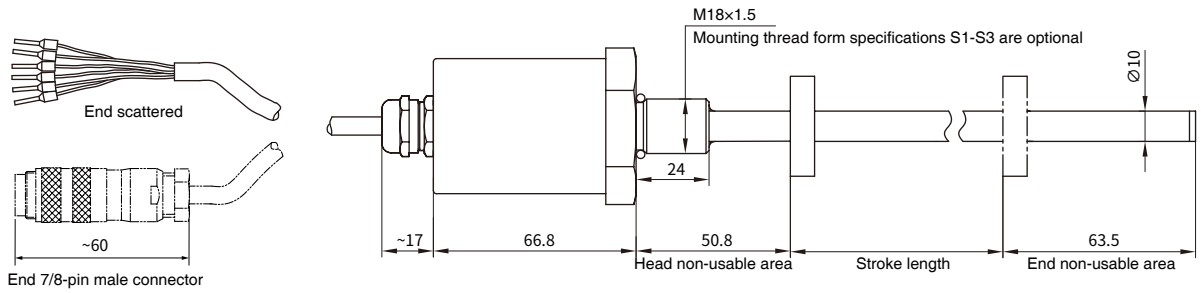
| Accessory name/model | Dimensions | Description |
|---|---|---|
| Standard magnet ring kit<br>Order No.:288501 |  | One magnet ring 211501, one gasket 211521 (thickness 5mm)、four M4X20 socket screws with spring wgreyer. |
| Floating ball kit<br>Order No.:266001 |  | One floating ball 211546, a set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

Note: For other accessories, please refer to general options

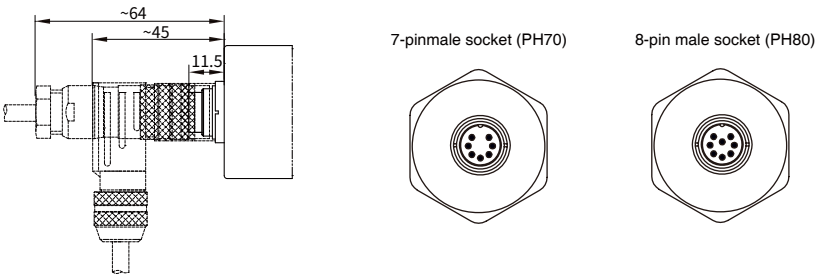
# EJ-SSI Output

## Structural shape

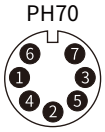
- Dimensions of cable outlet

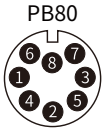



- Outline dimensions of connector outlet




## 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 |

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

- 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 |

# 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<br>Line length <3 <50 <100 <200 <400 (m)<br>Rate 1000 <400 <300 <200 <100 (KBD) |
| Update time | Stroke 300 750 1000 2000 5000 mm<br>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

| E | J | – | M | | | | | – | S | | – | | | | | – | S | | | | | | – | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | | 03 | 04 | 05 | 06 | 07 | | 08 | 09 | | 10 | 11 | 12 | 13 | | 14 | 15 | 16 | 17 | 18 | 19 | | 20 | 21 |

| 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 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* |
| | * 26-bit are parity bits, 25-bit are status bits | | | | |
| 16 | Data format | | | | |
| B | Binary | G | Gray code | | |
| 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 |

## • Selection example

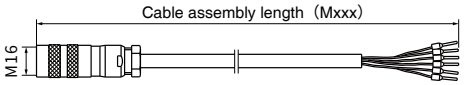
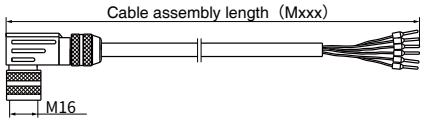
For example：EJ-M0300-S1-DU02-S2B300-S0
Indicates: E series EJ structure, Stroke length is 300mm, mounting thread form is M18 × 1.5, diameter is 10, material is 304 measuring rod, straight orange cable is 2 meters (PVC orange sheath, -20~105°C, end scattered), SSI interface 25-bit data binary format is 0.02 mm, resolution is forward asynchronous output, and head and end non-usable area is 50.8 mm+63.

## • Supply list

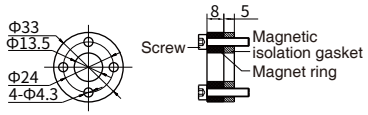
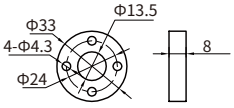
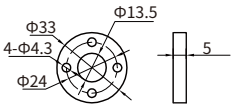
Sensor, certificate, manual, optional accessories (sold separately)

# EJ SSI Output-Common Options

## • Plug assembly cable

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

## • Magnet ring

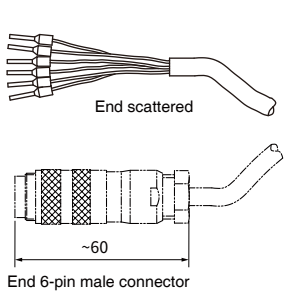
| Accessory name/model | Dimensions | Description |
|---|---|---|
| Standard magnet ring kit<br>Order No.:288501 |  | One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreyers. |
| Standard magnet ring<br>Order No.:211501 |  | |
| Magnetic isolation gasket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

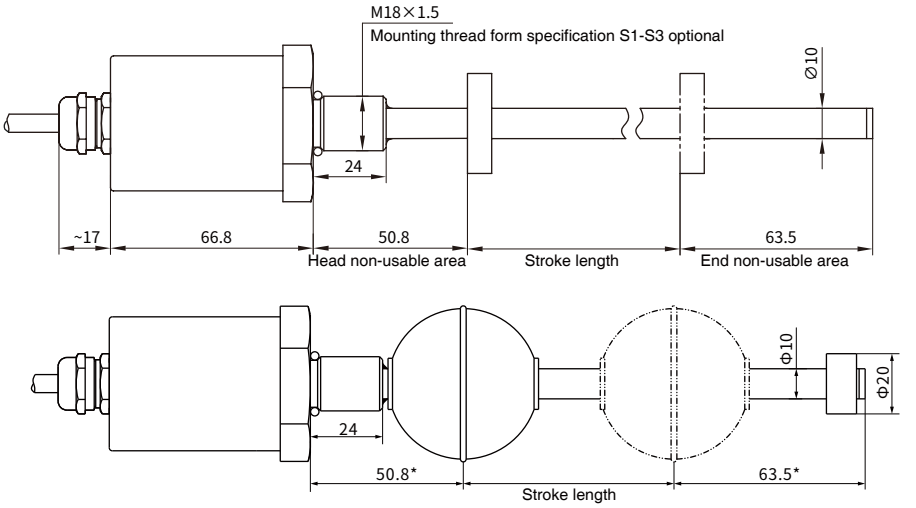
Note:See general options for other accessories

# EJ-Modbus Output

## Structural shape

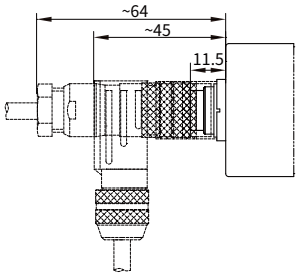
- Dimensions of cable outlet

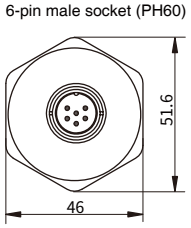


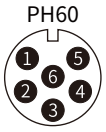

(Note: * when selecting the float, the head non-usable area ≥ 24 + the float radius.)

- 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<br>GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Immunity, Grade 3, Class A<br>GB/T17626.4 Electrical Fast Transient Burst Immunity, Grade 3, Class B<br>GB/T17626.6 Conducted Disturbance Degree Induced by Radio Frequency Field, Grade 2, Class A<br>GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A<br>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

| E | J | – | M | | | | | – | S | | – | | | | | – | | | | | | | – | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | | 03 | 04 | 05 | 06 | 07 | | 08 | 09 | | 10 | 11 | 12 | 13 | | 14 | 15 | 16 | 17 | 18 | 19 | | 20 | 21 |

| 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 |
| 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 | | |
| 15 | communication rate | | |
| 1 | 19200 bps | 5 | 38400 bps |
| 4 | 4800 bps | 6 | 57600 bps |
| 9 | 9600 bps | 7 | 115200 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 away from the direction of the electronic compartment, the output value decreases) | | |
| 17 | Reserved bit | | |
| 1 | Single magnet ring | | |
| 2 | Single floating ball | | |
| 18 | No magnet ring state | | |
| C | Minimum value | | |
| 19 | Check method | | |
| 2 | Even parity | | |

| 20 - 21 | Front and end non-usable area |
|---|---|
| S 0 | 50.8mm+63.5mm |

## ● Selection example

For example：EJ-M0300-S1-DU02-R912-S0

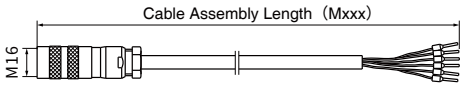
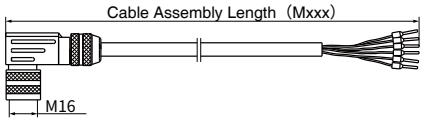
Indicates: E series EJ structure, Stroke length is 300mm, mounting thread form is M18 × 1. 5, diameter is 10, material is 304 measuring rod, straight orange cable is 2 meters (PVC orange sheath,-20~105°C, end scattered), 24Vdc power supply RTU protocol output, baud rate is 9600bps, reverse output, single position magnet ring, standard head and end non-usable area is 50.8 mm + 63.5 mm.（Note: Factory default address 1)

## ● Supply list

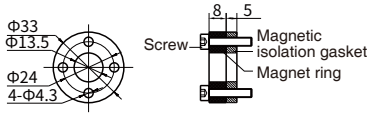
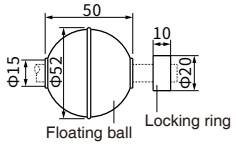
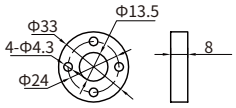
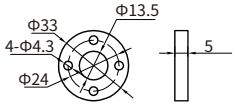
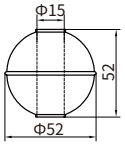
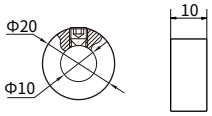
Sensor, certificate, manual, optional accessories (sold separately)

# EJ Modbus Output-Common Options

## • Plug assembly cable

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

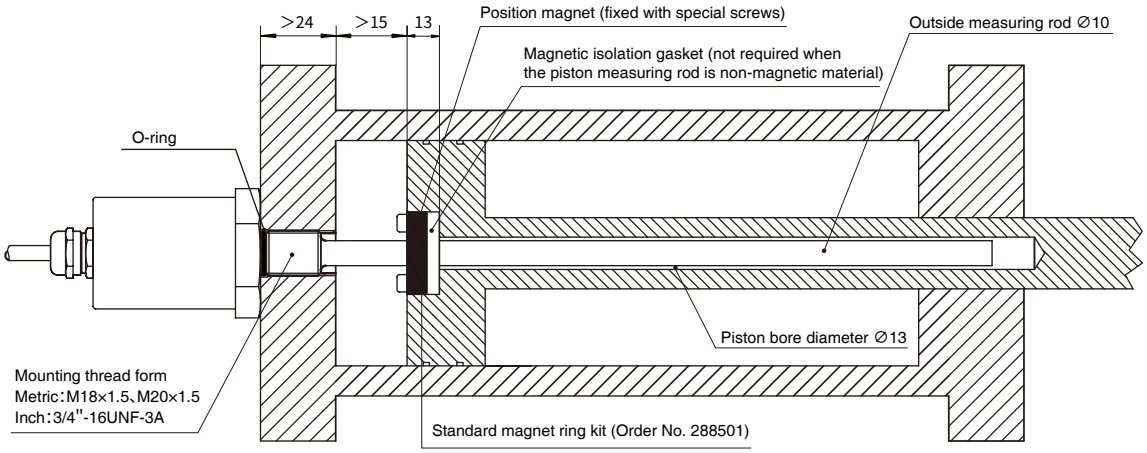
## • Magnet ring/float

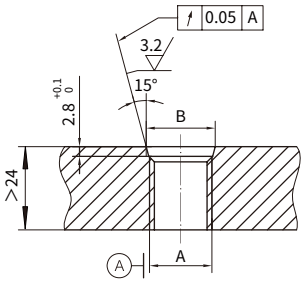
| Accessory name/model | Dimensions | Description |
|---|---|---|
| Standard magnet ring kit<br>Order No.:288501 |  | One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreyers. |
| Floating ball kit<br>Order No.:266001 |  | One floating ball211546, a set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

Note:For other accessories, please refer to general options

# EJ-Hydraulic cylinder Application

## Built-in installation

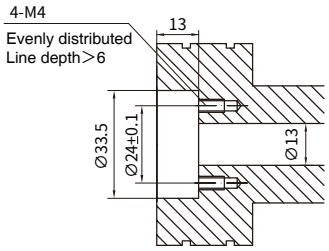



Installation accessories size list:

| Code \ Size | A | B | O-ring |
|---|---|---|---|
| S1 | M18×1.5 | ∅19.9±0.1 | 15.3×2.4 |
| S2 | M20×1.5 | ∅21.8±0.1 | 16×2.4 |
| S3 | 3/4"-16UNF-3A | ∅20.8±0.1 | 17×2.4 |

Installation and sealing surface processing requirements
Note: Recommended matching lineed hole structure size




Structural dimensions and center dimensions of accessories installed on the piston measuring rod

## 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



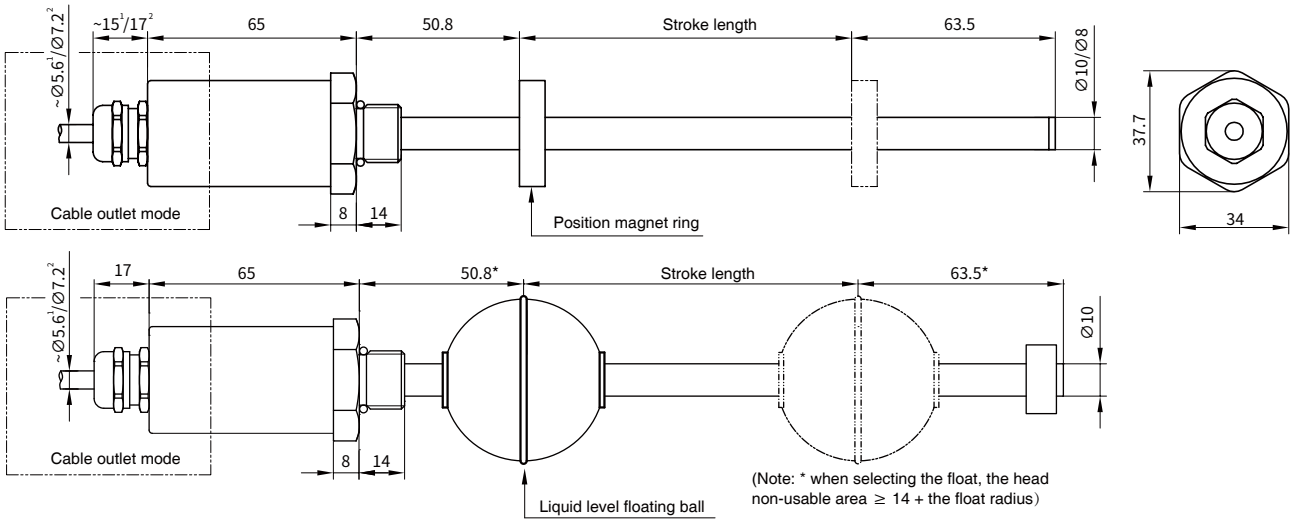

## *Technical Characteristics*

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

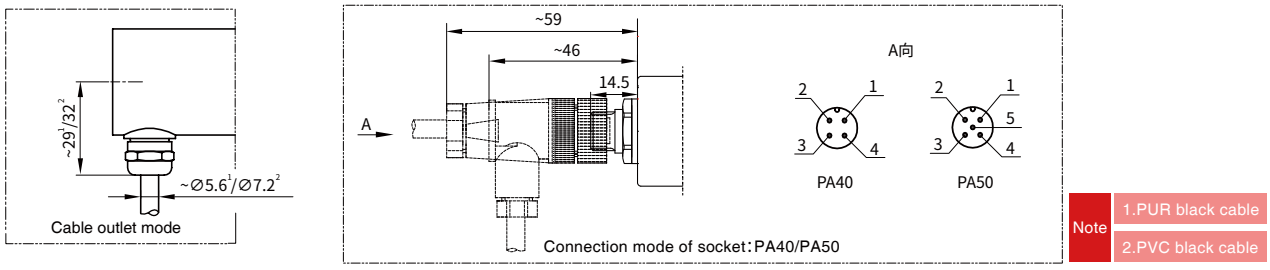
# ES-Analog Output

## 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 ≥10KΩ) |
| Resolution | ±0.01mm, 16bit DA, 4-wire system current<br>±0.1mm, 16bit DA, 4-wire system voltage<br>±0.1mm, 12bit DA, 2-wire system current |
| Nonlinearity | 0.05% F.S |
| Repeatability | Same resolution |
| Update time | 2-wire system 100 ms<br>4-wire system 1ms (range≤1m) 、2ms (1m＜range≤2m) 、3ms (range＞2m) |
| Temperature coefficient | ＜50ppm/°C |

## • Operating conditions

| | |
|---|---|
| Magnet velocity | Arbitrary |
| Protection class | IP67 |
| Operating temperature | -40°C ~ +75°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<br>GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A<br>GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class B<br>GB/T17626.6 Conducted Disturbance Degree Induced by Radio Frequency Field, Grade 2, Class A<br>GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A<br>CE certification |

## • Electrical Connections

| | |
|---|---|
| Input voltage | +24Vdc power supply (-20%~+20%): 4-wire system<br>+24/12Vdc power supply (-20%~+20%): 2-wire system |
| Power consumption | <80mA |
| Polarity protection | Maximum-30Vdc |
| Overvoltage protection | Maximum36Vdc |
| 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)<br>rod diameter ϕ 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

| E | S | – | M | | | | | – | | | – | | | | | – | | | | – | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | | 03 | 04 | 05 | 06 | 07 | | 08 | 09 | | 10 | 11 | 12 | 13 | | 14 | 15 | 16 | 17 | | 18 | 19 |

| 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 |

## • Selection example

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

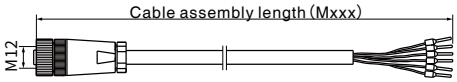
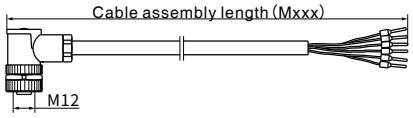
Indicates: ES rod structure series, 300mm Stroke length, M18X1.5 installation thread, 10mm diameter, 304 material measuring rod, M12 5-pin socket form, current output of 4~20mA, single position magnet ring (magnet ring needs to be selected separately), non-magnet ring status display > 20mA value, head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

## • Supply list

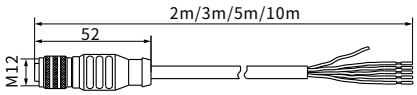
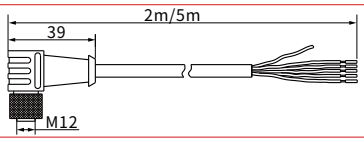
Sensor, certificate, instruction manual, optional parts (optional separately)

# ES Analog Output-Common Options

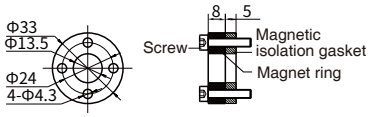
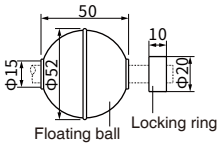
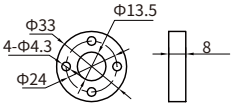
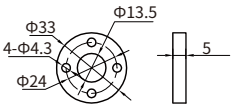
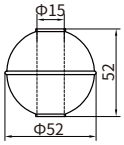
## • Plug assembly cable

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

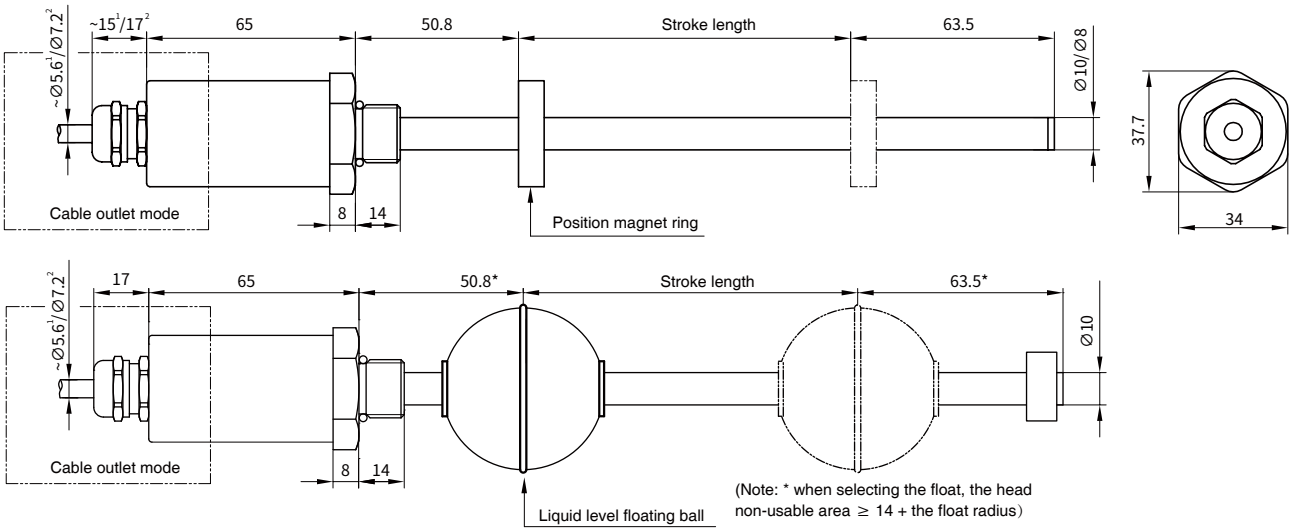
| Accessory name/model | Dimensions | Description |
|---|---|---|
| Standard magnet ring kit<br>Order No.:288501 |  | One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreyers |
| Floating ball kit<br>Order No.:266001 |  | One floating ball211546, a set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

Note:For other accessories, please refer to general options

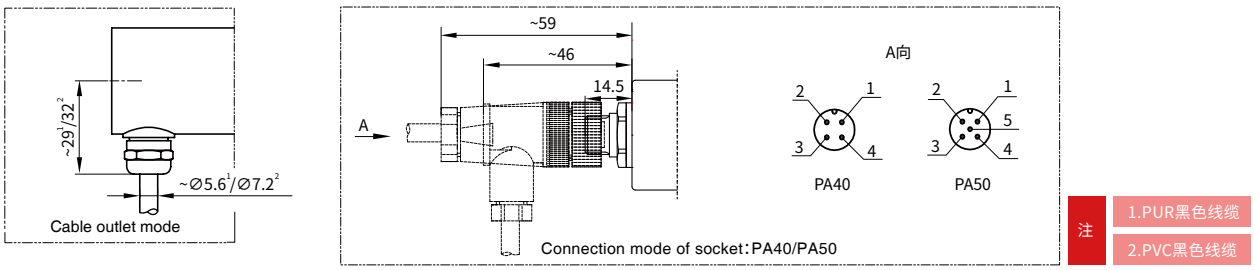
# ES-Modbus Output

## Structural shape

- Dimensions of cable outlet




- Outline dimensions of connector outlet

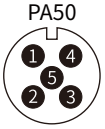



## Wiring and pin definition

PA40




PA50




- 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 ± 50um or <0.01%.F.S |
| Repeatability | Minimum ± 10um or <0.001%.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 | <10ppm/℃(temperature compensation required) |
| Temperature functional parameters | The operating temperature resolution is 0.25℃ |
| Temperature measuring position | Electronic compartment |
| Operating temperature accuracy | ≤1℃ |

## • Operating conditions

| | |
|---|---|
| Magnet velocity | Arbitrary |
| Protection class | IP67 |
| Operating temperature | -40℃ ~ +75℃ |
| 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<br>GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A<br>GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class B<br>GB/T17626.6 RF Field Induced Conducted Disturbance Immunity, Grade 2, Class A<br>GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A<br>CE certification |

## • Electrical Connections

| | |
|---|---|
| Input voltage | 9~ 30Vdc |
| Power consumption | <80mA |
| Polarity protection | Maximum-30Vdc |
| Overvoltage protection | Maximum36Vdc |
| Insulation resistance | ＞10MΩ |
| Insulation strength | 500V |

## • Construction and Materials

| | |
|---|---|
| Electronic compartment | 304Lstainless steel |
| Measuring rod | 304L/316L stainless steel |
| Outer tube pressure | 35Mpa (continuous)/70Mpa (peak)<br>rod diameter Φ10 |
| Installation | Any direction, threaded installation<br>(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

| E | S | – | M | | | | | – | | | – | | | | | – | | | | | | – | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | | 03 | 04 | 05 | 06 | 07 | | 08 | 09 | | 10 | 11 | 12 | 13 | | 14 | 15 | 16 | 17 | 18 | 19 | | 20 | 21 |

**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**

**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 |

## ● Selection example

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

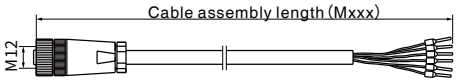
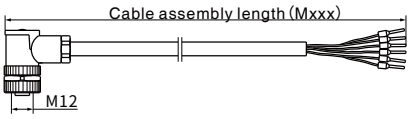
Indicates: ES voltage-resistant round pipe structure, 300mm Stroke length, M18X1.5 installation thread, 10mm diameter, 304 material measuring rod, M12 5-pin socket connection mode, 24Vdc power supply RTU protocol output, baud rate 19200bps, reverse output, single position magnet ring, output 0 without magnet ring, standard head and end non-usable area 50.8 mm+63. 5mm.(Note: Factory default address 1)

## ● Supply list

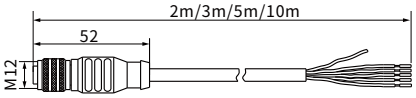
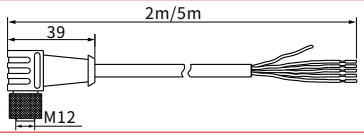
Sensor, certificate, instruction manual, optional parts (optional separately)

# ES Modbus Output-Common Options

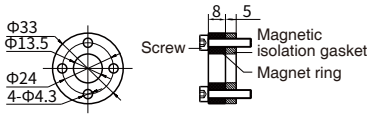
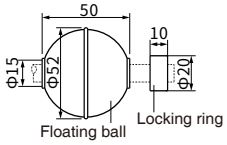
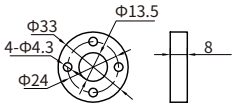
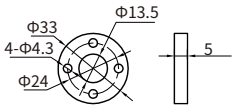
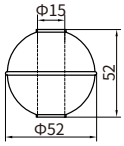
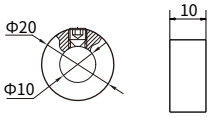
- Plug assembly cable

| Accessory name/model | Dimensions | Description |
|---|---|---|
| Modbus interface cable assembly<br>Order No.:AST-Mxxx-W06 |  | Mxxx denotes cable length in meters;<br>W06-5-pin PUR black sheath, temperature resistance of-40~80°C Cable assembly. |
| Modbus interface right angled cable assembly<br>Order No.:AST-Mxxx-W05 |  | Mxxx denotes cable length in meters;<br>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<br>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<br>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<br>Order No.:288501 |  | One magnet ring 211501, one gasket 211521 (thickness 5mm), four M4X20 socket screws with spring wgreyers. |
| Floating ball kit<br>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<br>Order No.:211501 |  | |
| Magnetic isolation gasket<br>Order No.:211521 |  | |
| Floating ball<br>Order No.:211546 |  | Material 304, pressure resistance 2.5 MPa, density 0.6 |
| Locking ring<br>Order No.:211589 |  | Material 304 |

Note: For other accessories, please refer to general options

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# EP Displacement Sensor



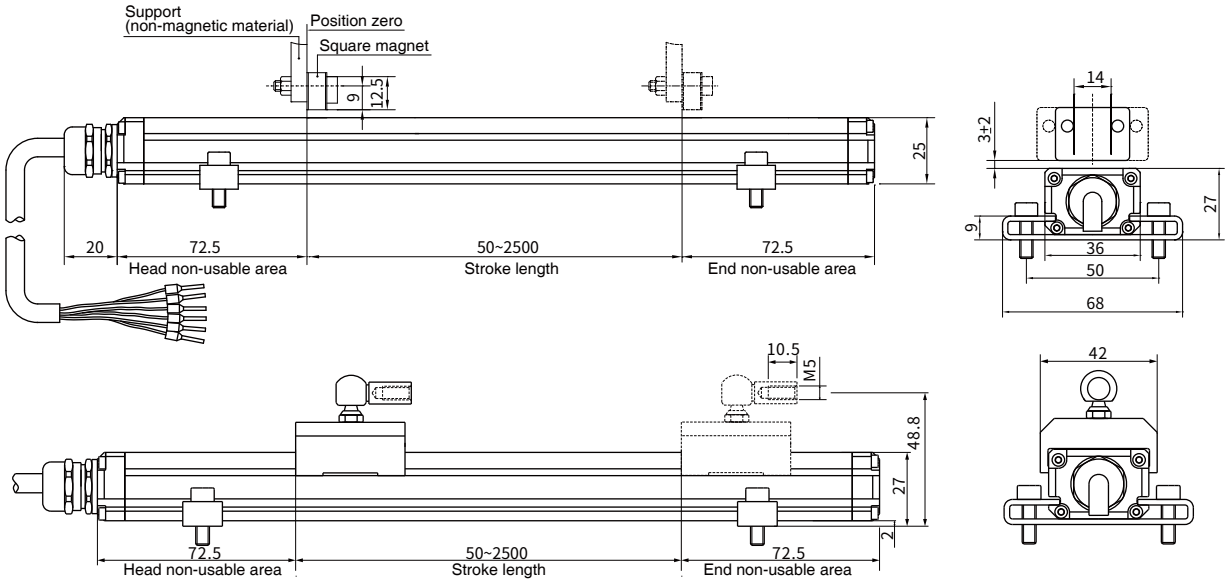
## *Technical characteristics*

- 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.

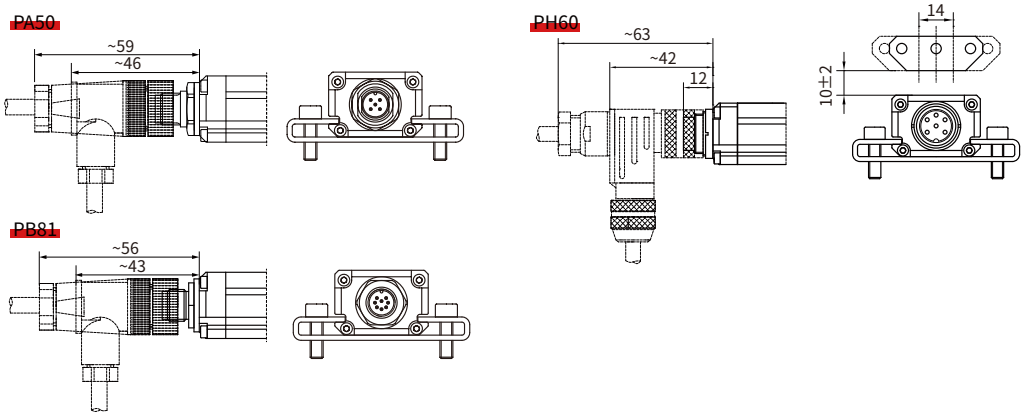
# EP-Analog Output

## Structural shape

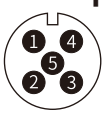
- Cable outlet DHXX/DUXX/DWXX




- Connector PA50/PB81/PH60




## Wiring and pin definition




**• PA50 pin arrangement (Sensor Oriented)**

| Pin | Cable color3* | 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 |

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




**• PH60 pin arrangement - 2-wire system (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 | 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 |

# 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℃ ~ +85℃ |
| Temperature coefficient | ＜30ppm/℃ |
| 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<br>GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A<br>GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 4, Class A<br>GB/T17626.6 RF Field Induced Conducted Disturbance Immunity, Grade 2, Class A<br>GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A<br>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 connector) |

# EP Analog Output-Selection Guide

| E | P | – | M | | | | | – | C | | – | | | | | – | | | 1 | | – | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | | 03 | 04 | 05 | 06 | 07 | | 08 | 09 | | 10 | 11 | 12 | 13 | | 14 | 15 | 16 | 17 | | 18 | 19 |

| 01 - 02 | Sensor shell form |
|---|---|
| E P | Overall profile structure series |

| 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 |

## ● Selection example

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

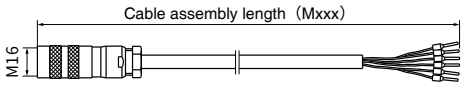
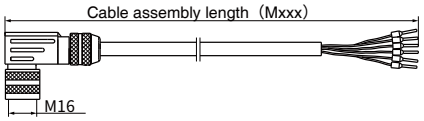
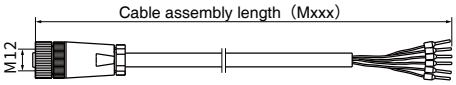
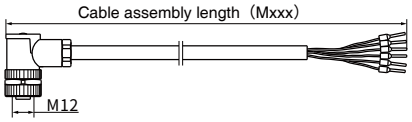
Indicates: EP integral profile structure, mounting clamp installation, 300mm Stroke length, no magnet block, M12 connector outlet form, current output of 4~20mA, output value of non-magnet ring less than 4mA, non-usable area at head and end of 72.5 mm+72.5mm.

## ● Supply list

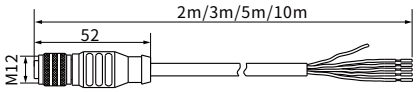
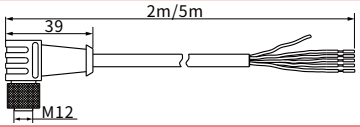
Sensor, certificate, instruction manual, optional parts (optional separately)

# EP Analog Output - Common Options

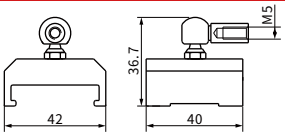
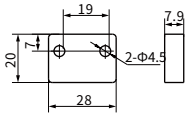
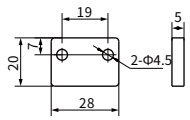
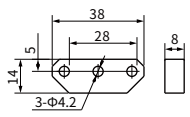
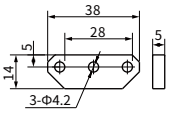
- Plug assembly cable

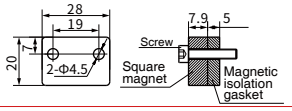
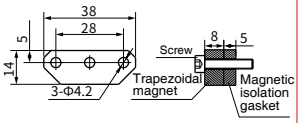
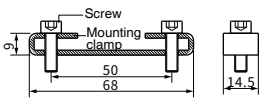
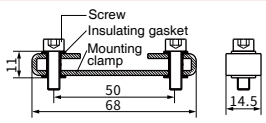
| Accessory name/model | Dimensions | Description |
|---|---|---|
| Analog wiring cable assembly<br>Order No.:AST-Mxxx-H01 (U01) |  | Mxxx denotes cable length in meters;<br>H01-6-pin PUR orange sheath, temperature-resistant-20~90°C cable assembly;<br>U01-6-pin PVC orange sheath, temperature resistance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

- Finished plug cable

| Accessory name/model | Dimensions | Description |
|---|---|---|
| M12 female connector<br>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<br>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 |
|---|---|
| Slider Magnet Kit<br>Order No.:211517 |  |
| Square magnet<br>Order No.:211508 |  |
| Square magnet gasket<br>Order No.:211529 |  |
| Trapezoidal magnet<br>Order No.:211514 |  |
| Trapezoidal magnet gasket<br>Order No.:211530 |  |

| Accessory name/ model | Dimensions | Description |
|---|---|---|
| Square Magnet Kit<br>Order No.:288508 |  | One square magnet 211508, one square magnet gasket 211529 (thickness 5mm), two M4X20 socket screws |
| Trapezoidal magnet kit<br>Order No.:288514 |  | One trapezoidal magnet 211514, one trapezoidal magnet gasket 211530 (thickness 5mm), three M4X20 socket screws |
| Mounting clamp kit<br>Order No.:211561 |  | One mounting clamp, two M5X16 socket screws |
| Mounting clamp kit (With insulation)<br>Order No.:211801 |  | One mounting clamp, two M6X16 socket head cap screws, four insulating washers |

Note:For other accessories, please refer to general options

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# HP Displacement Sensor



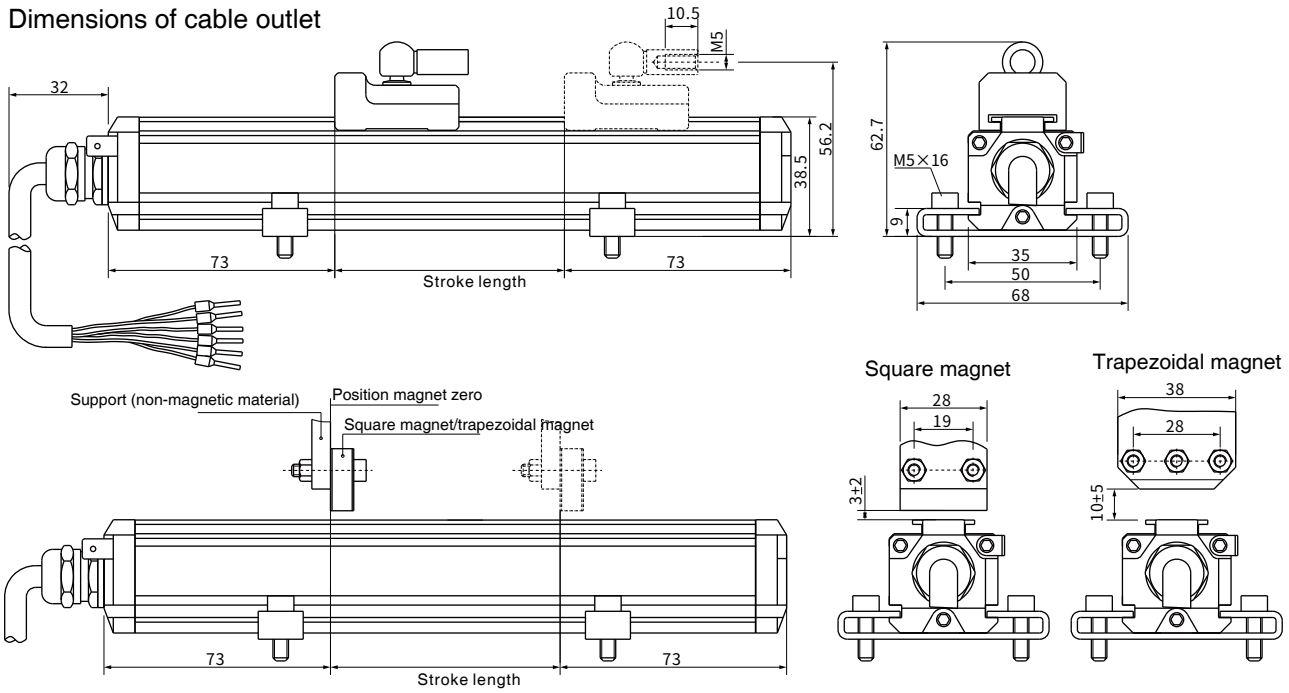
## *Technical characteristics*

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

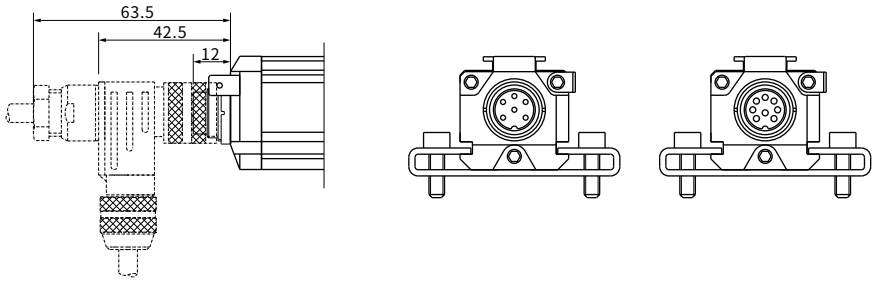
# HP-Analog Output

## Structural shape

- Dimensions of cable outlet




- Outline dimensions of connector outlet




## Wiring and pin definition

PH60 


PB80 


- 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<br>GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A<br>GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class A<br>GB/T17626.6 RF Field Induced Conducted Disturbance Immunity, Grade 2, Class A<br>GB/T17626.8 Power Frequency Magnetic Field Immunity, Grade 3, Class A<br>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

| H | P | – | M | | | | | – | C | | – | | | | | – | | | 1 | | – | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | | 03 | 04 | 05 | 06 | 07 | | 08 | 09 | | 10 | 11 | 12 | 13 | | 14 | 15 | 16 | 17 | | 18 | 19 |

| 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 |

## ● Selection example

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

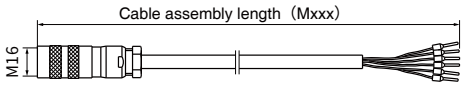
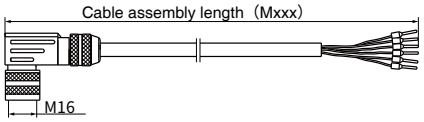
Indicates: HP structure, mounting clamp installation, 300mm Stroke length, C-type magnet, M16 male socket (without plug cable), current output of 0~20mA, output value larger than 20mA without magnet ring, non-usable area at head and end of 72.5 mm+72.5 mm.

## ● Supply list

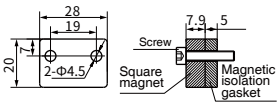
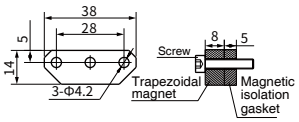
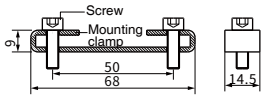
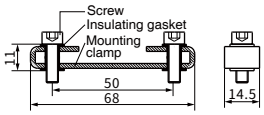
Sensor, certificate, instruction manual, optional parts (optional separately)

# HP Analog Output - Common Options

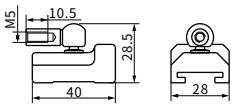
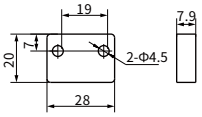
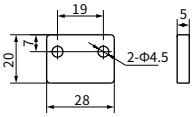
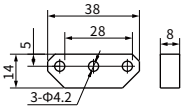
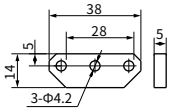
- Plug assembly cable

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

- Magnet ring

| Accessory name/ model | Dimensions | Description |
|---|---|---|
| Square magnet kit<br>Order No.:288508 |  | One square magnet 211508, one square magnet gasket 211529 (thickness 5mm), two M4X20 socket screws |
| Trapezoidal magnet kit<br>Order No.:288514 |  | One trapezoidal magnet 211514, one trapezoidal magnet gasket 211530 (thickness 5mm), three M4X20 socket screws |
| Mounting clamp kit<br>Order No.:211561 |  | One mounting clamp, two M5X16 socket screws |
| Mounting clamp kit (With insulation)<br>Order No.:211801 |  | One mounting clamp, two M6X16 socket head cap screws, four insulating washers |

Note: For other accessories, please refer to general options

| Accessory name/ model | Dimensions |
|---|---|
| Slider Magnet Kit<br>Order No.:211513 |  |
| Square magnet<br>Order No.:211508 |  |
| Square magnet gasket<br>Order No.:211529 |  |
| Trapezoidal magnet<br>Order No.:211514 |  |
| Trapezoidal magnet gasket<br>Order No.:211530 |  |

浙达精益
ZHEDA JINGYI

# ED Displacement Sensor



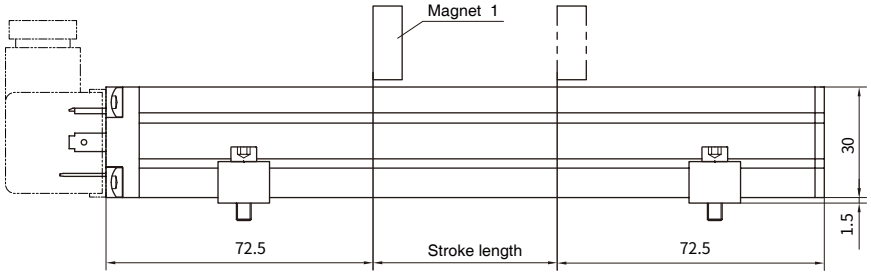

## *Technical characteristics*

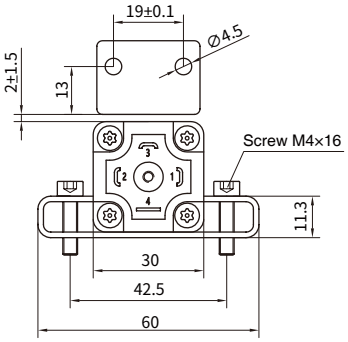
- Non-contact measuring, never wear
- Ultra-small profile, suitable for installation in compact occasions
- Up to two position signal outputs

# ED-Analog Output

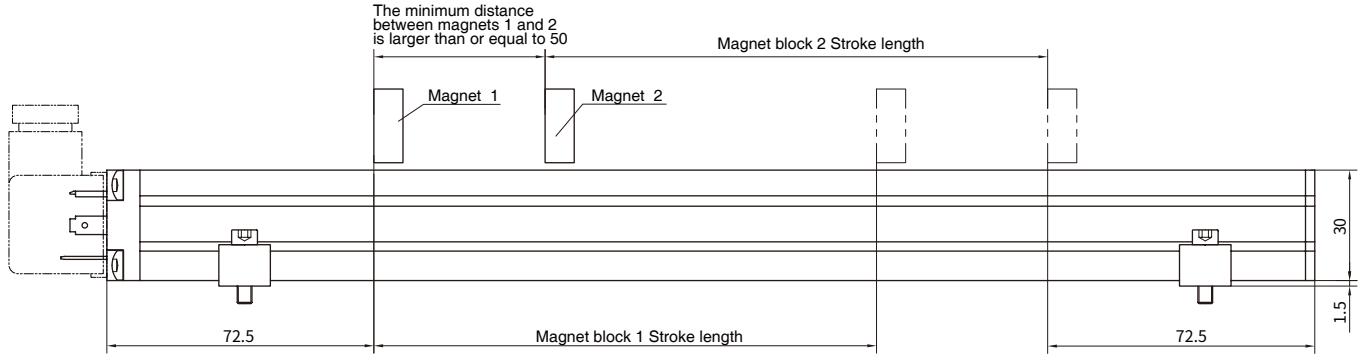
## Structural shape

- Single magnet

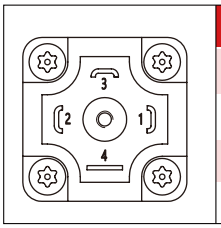



- Two magnet blocks (the sensor length is 50mm longer than a single magnet block)




## Wiring and pin definition



| No. | Single magnet block pin definition | Two magnet blocks pin definition |
|---|---|---|
| 1 | 0~10VDC or 10~0VDC<br>Magnet block1 | 0~10VDC or 10~0VDC<br>Magnet block2 |
| 2 | 10~0VDC or 0~10VDC<br>Magnet block1 | 10~0VDC or 0~10VDC<br>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<br>GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class B<br>GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 4, Class B<br>GB/T17626.6 RF Field Induced Conducted Disturbance, Grade 2, Class B<br>GB/T17626.8 Power Frequency Magnetic Field Anti-interference Degree, Grade 3, Class A<br>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 |

| 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 |

## • Selection example

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

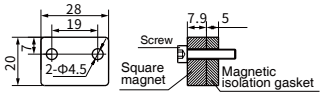
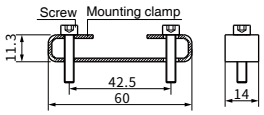
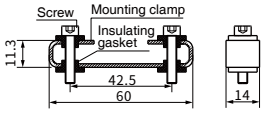
Indicates: ED structure, mounting clamp installation, 300mm Stroke length, standard DIN46530, A-type socket and Connector, single magnet block, output signal 0~10V, non-usable area at head and end 72.5mm+72.5mm.

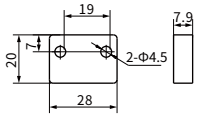
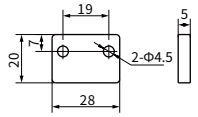
## • Supply list

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

# ED Analog Output-Common Options

- Magnet ring

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

| Accessory name/ model | Dimensions |
|---|---|
| Square magnet<br>Order No.:211508 |  |
| Square magnet gasket<br>Order No.:211529 |  |

Note: For other accessories, please refer to general options

# ESC Displacement Sensor

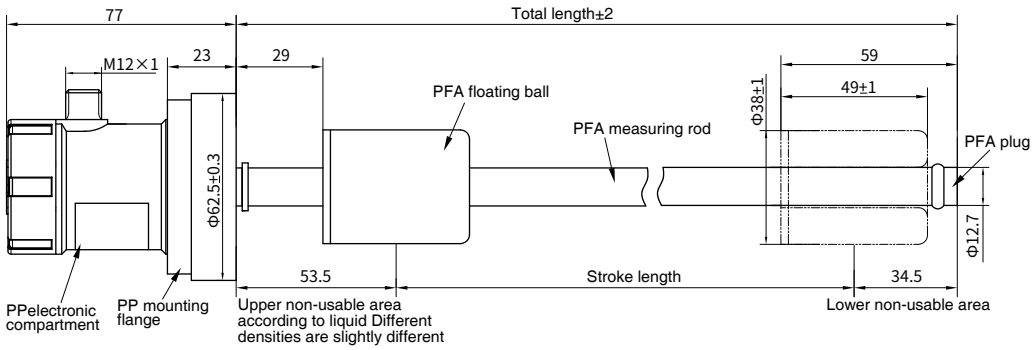


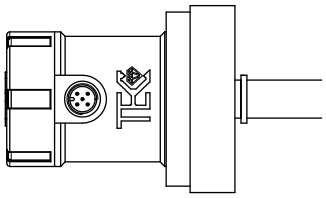
## *Technical characteristics*

- 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

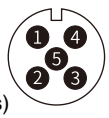
# ESC-Analog Output

## Structural shape



## Wiring and pin definition




Analog (four wires)

- PA50 pin arrangement (Sensor Oriented)

| Pin | Cable color | Function definition |
|---|---|---|
| 1 | Brown | +24Vdc+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<br>±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<br>GB/T17626.3 Radiation Anti-interference Degree of Radio Frequency Electromagnetic Field, Grade 3, Class A<br>GB/T17626.4 Anti-interference Degree of Electrical Fast Transient Train, Grade 3, Class B<br>GB/T17626.6 RF Field Induced Conducted Disturbance, Grade 2, Class A<br>GB/T17626.8 Power Frequency Magnetic Field Anti-interference Degree, Grade 3, Class A<br>CE certification |

| • Electrical Connections | |
|---|---|
| Input voltage | +24Vdc±20% / +12Vdc±20% |
| Power consumption | <80mA |
| Polarity protection | Maximum -30Vdc |
| Overvoltage protection | Maximum36Vdc |
| Insulation resistance | ＞10MΩ |
| Insulation strength | 500V |

| • Construction and Materials | |
|---|---|
| Electronic compartment | PFA |
| 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

| E | S | C | – | M | | | | | – | S | 0 | – | P | A | 5 | 0 | – | A | 1 | 2 | C | – | F | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 02 | 03 | | 04 | 05 | 06 | 07 | 08 | | 09 | 10 | | 11 | 12 | 13 | 14 | | 15 | 16 | 17 | 18 | | 19 | 20 |

| 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 |

- Selection example

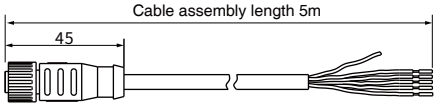
For example: ESC-M0520-S0-PA50-A12C-F5
Indicates: ESC structure, non-threaded flange installation, 520mm Stroke length, M12, 5-pin socket, single floating ball, 20~4mA output, head and end non-usable area 29mm + 59mm.

- Supply list

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

# ESC Analog Output-Common Options

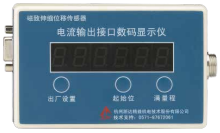
- Finished plug cable

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

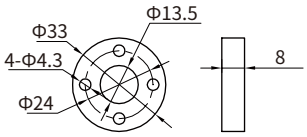
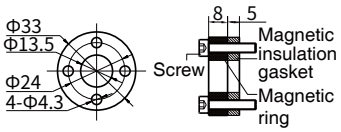
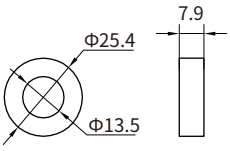
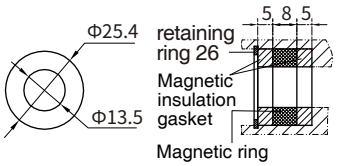
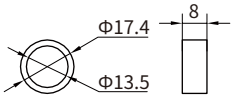
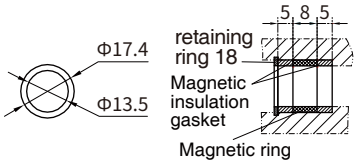
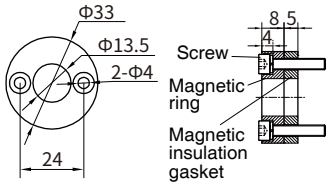
Note: For other accessories, please refer to general options

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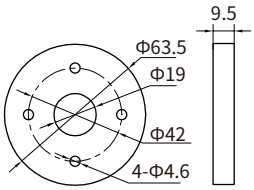
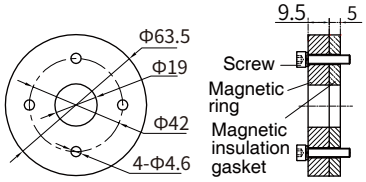
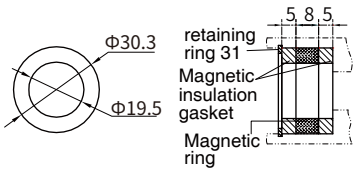
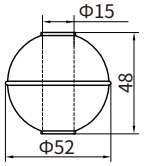
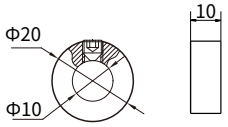
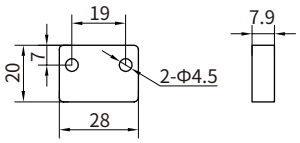
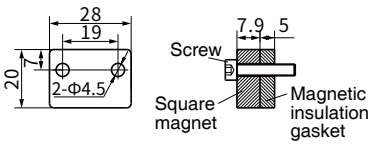
# General Options-Programming Tools

| Accessory name/model | Dimensions | Description |
|---|---|---|
| Handheld programmer<br>Order No.:TEC612801A/B<br>(A:Current B:Voltage) |  | It is suitable for analog output sensor, and can set the starting position and full range point of analog output displacement sensor<br>Includes: handheld programmer, 220V power supply, sensor adapter × 2 |
| Interface converter<br>Order No.:TEC612802 |  | Applicable to SSI output sensor, the digital tube displays the displacement value of the output vernier magnet ring in real time.<br>Includes: interface converter, 220V power supply, sensor adapter cable × 2 |
| USB dongle<br>Order No.:TEC612811 |  | 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.<br>Includes: USB converter, USB data cable, sensor adapter × 2, software |
| USB dongle<br>Order No.:TEC612812 |  | 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.<br>Includes: USB converter, USB data cable, sensor adapter × 2, software |

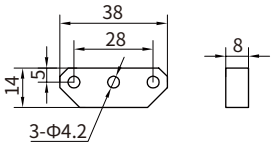
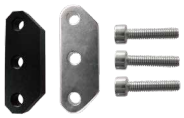
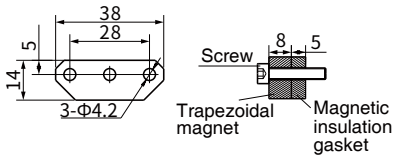
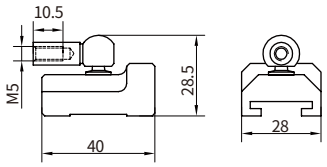
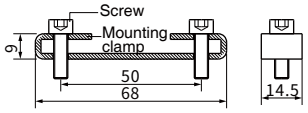
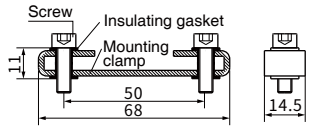
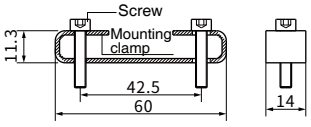
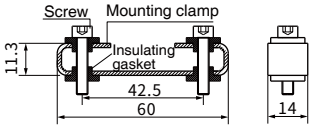
# General Option-Magnet Ring Floating Ball

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

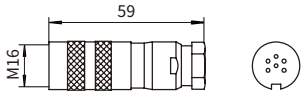
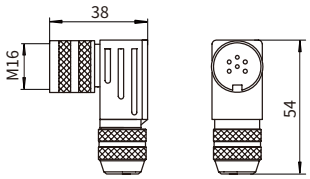
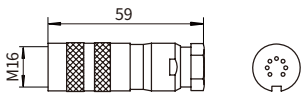
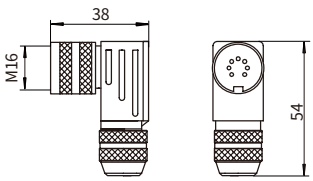
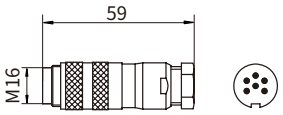
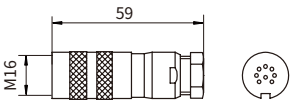
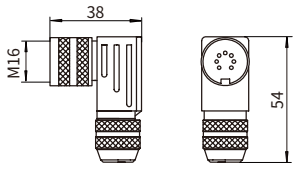
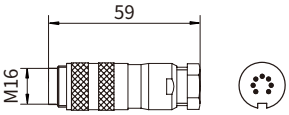
# General Option-Magnet Ring Floating Ball

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

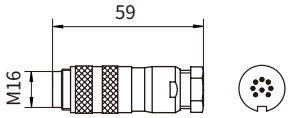
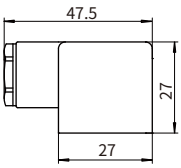
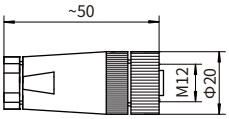
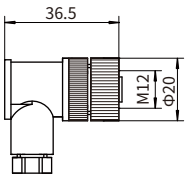
# General Options-Magnet Ring Floating Ball

| Accessory name/model | Dimensions | Description |
|---|---|---|
| <br>Trapezoidal magnet<br>Order No.:211514 |  | Includes:1 Magnet ring<br>Application:EP/HP/ED |
| <br>Trapezoidal magnet kit<br>Order No.:288514 |  | Magnetic isolation gasket: same size as magnet ring, thickness 5mm<br>Screw: GB/T70.1, M4X20 , Material 304<br>Spring gasket: GB/T93, φ 4, Material 304<br>Includes:1 Magnet ring、1 gasket、3 screws with elastic cushion<br>Application:EP/HP/ED |
| <br>Slider magnet<br>Order No.:211513 |  | Screw:M5X25 , Material 304<br>Nut: GB/T6170, M5 , Material 304<br>Includes:1 slider、1 screw、2 nuts<br>Application:HP |
| <br>Mounting clamp kit<br>Order No.:211561 |  | Screw: GB/T70.1, M5X16 , Material 304<br>Includes:1 clamp、2 screws<br>Application:EP/HP |
| <br>Mounting clamp kit<br>(including insulation washer)<br>Order No.:211801 |  | Screw: GB/T70.1, M5X16 , Material 304<br>Includes:1 clamp、2 screws、4insulating washers<br>Application:EP/HP |
| <br>Mounting clamp kit<br>Order No.:211584 |  | Screw: M4X20<br>Includes:1 mounting clamp、2 Screws<br>Application:ED |
| <br>Mounting clamp kit<br>(including insulation washer)<br>Order No.:211584A |  | Screw: M4X20<br>Includes:1 mounting clamp、2 Screws、4 insulating washers<br>Application:ED |

# General Option-Connector

| Accessory name/model | Dimensions | Application |
|---|---|---|
|  6-pin female connector Order No.:312701 |   | EJ/EP/HP-Analog |
|  6-pin90°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 |
| --- | --- | --- |
|  8-pin male connector Order No.:312721 |   | EJ-Analog/SSI |
|  Plug kit Order No.:312725 |   | ED-Analog |
|  M12 5-pin female Order No.:312301 |   | ES/EP-Analog<br>ES-Modbus |
|  M12 5-pin90°right angle Order No.:312302 |   | ES/EP-Analog<br>ES-Modbus |

# General Options-Cable

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

# Industrial Application



Metallurgical industry



Port machinery



Hydraulic machinery



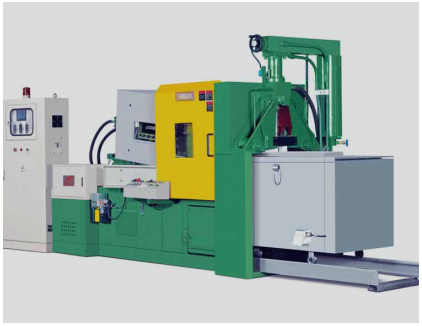
Wind power industry



Injection molding machinery



Vulcanizing machinery



Die casting machinery



Vertical mill machinery



Construction machinery



Papermaking machinery




Liquid level tank



Forming machinery

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