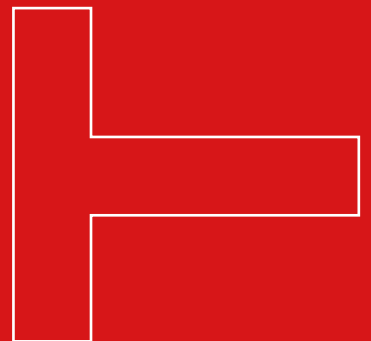
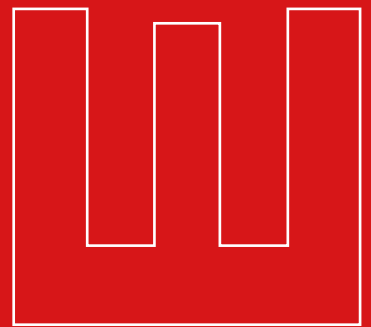


浙达精益
ZHEDA JINGYI

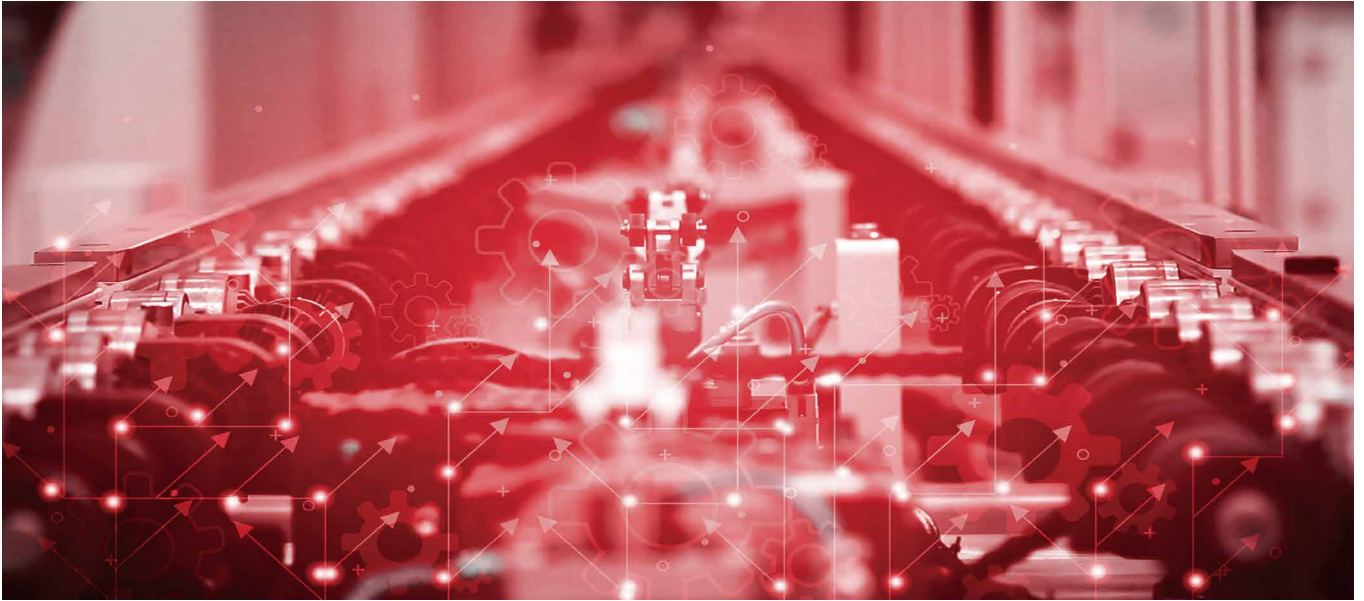


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Company Profile

As a technological innovation enterprise born out of Zhejiang University, our company has more than 180 employees, including 4 overseas talents, 4 professors, and 2 associate professors. There are also 12 doctors, and more than 86% of employees with a bachelor degree or above.



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

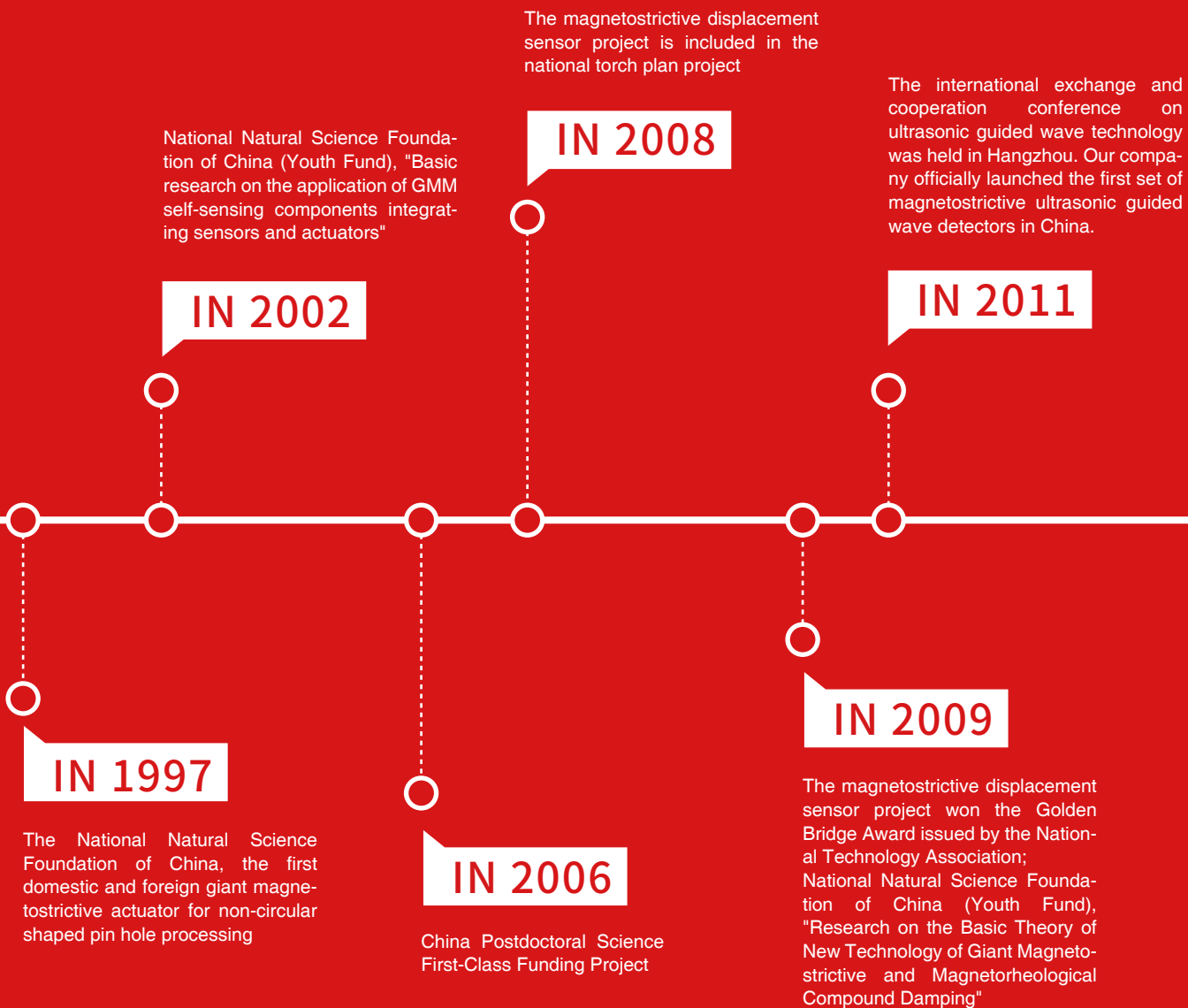
We are a national high-tech enterprise integrating scientific research, product development, engineering design, and technical consulting. Besides, the company has obtained 45 invention patents, 29 utility model patents, 10 software copyrights, and 4 registered trademarks.

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

Honorary Qualification



TEC Magnetostriction Development



National 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"

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 2017

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

IN 2013

IN 2019

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"

IN 2016

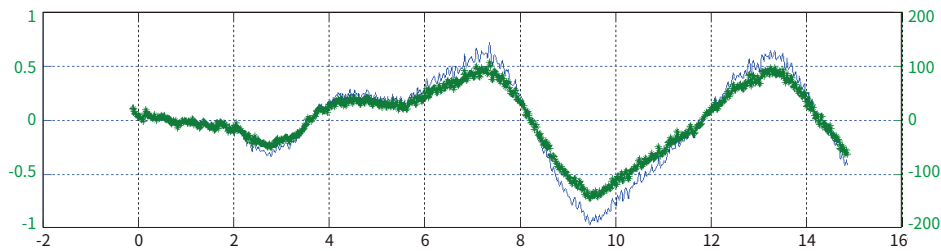
National Major Scientific Instrument and Equipment Development Project, "R&D of Rail Broken Monitoring Equipment and Testing Network in Key Sections"

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"

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 $1\mu\text{m}$

Extra long stroke

Up to 23 meters

Never wear

Non-contact measurement, maintenance-free and calibration-free, and the detection accuracy is always as new.

Various signal output forms

Analog (voltage, current), SSI, Start/Stop, Profibus-DP

Strong adaptability

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

Strong shell

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

Easy to use

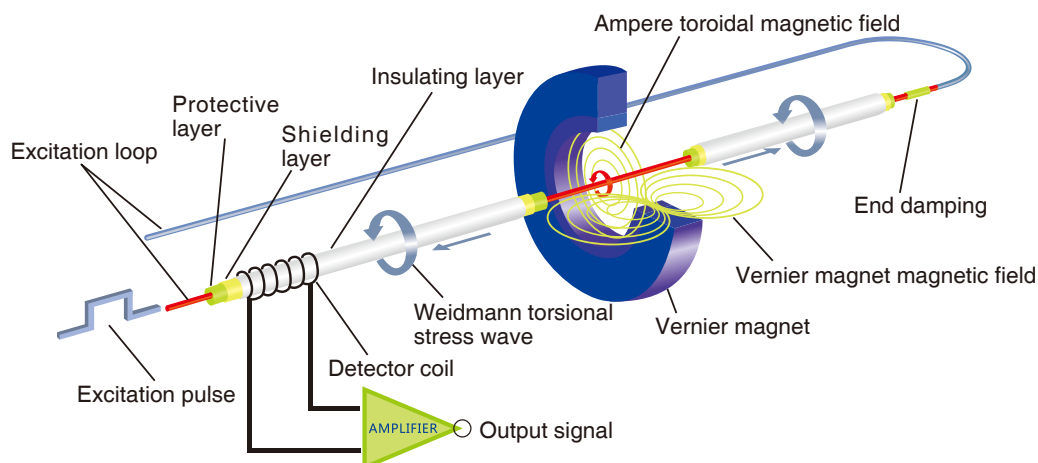
M18 \times 1.5、M20 \times 1.5、3/4"-16UNF-3A threaded installation is optional. When replacing the sensor, only the electronic compartment can be replaced without removing the pressure measuring rod.

Reliable operation

The core components have been tested for durability, impact, vibration, temperature and absolute displacement, and are not affected by power failure.

• Working Principle

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



Working principle of magnetostrictive linear displacement sensor

Technical Terminology

● Absolute position

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

● Environmental conditions

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

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

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

● Measuring range

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

● Full scale

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

● Resolution

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

● Nonlinearity

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

● Non-contact

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

● Temperature coefficient

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

● Update time

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

● Multiple position measurement

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

● Precision

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

● Hysteresis

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

● Drift

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

● Shell protection class

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

● Preheating period

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

● Load impedance

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

● Repetition accuracy

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

MH Displacement Sensor

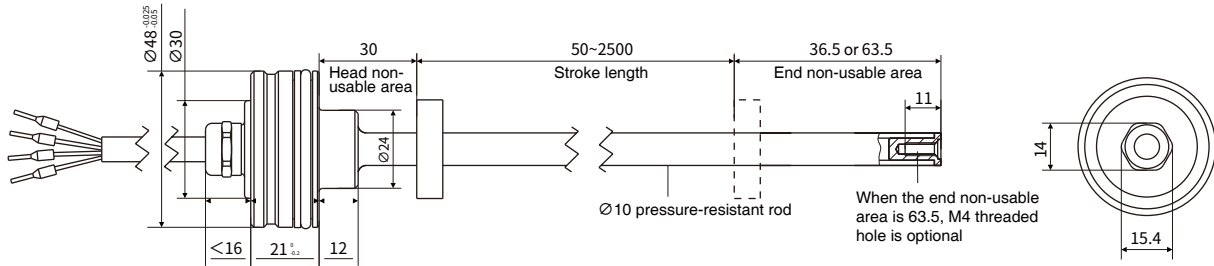


Technical characteristics

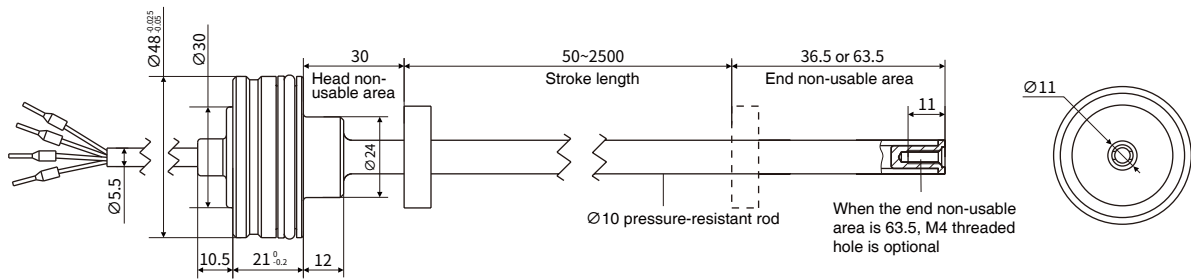
- Specially designed for construction machinery
- High vibration resistance and impact resistance
- Low power consumption design effectively reduces system heating
- Multiple outgoing modes, suitable for different sizes of cylinder
- Linear measurement, absolute position output
- Adapt to harsh environment, IP67 protection level
- Multiple signal (analog and digital signal) output modes
- Assembled in cylinder, free from environmental and electromagnetic interference, non-contact measurement

Structural Shape

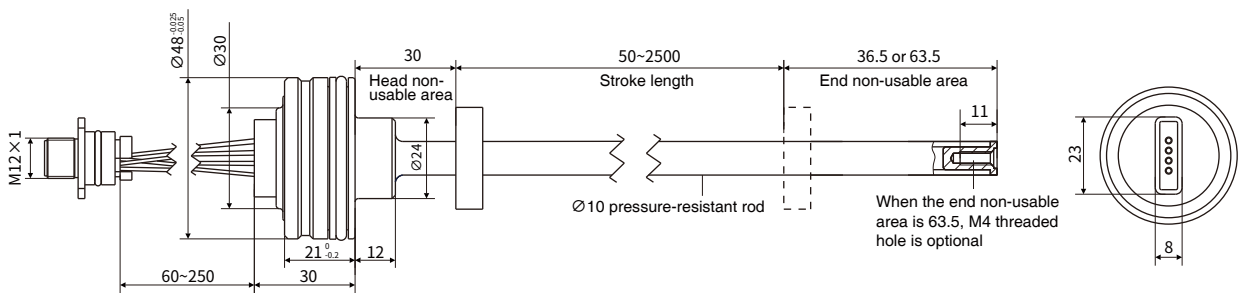
External dimensions of cable outlet (fastening mode DM)



External dimensions of cable outlet (fastening method QM)

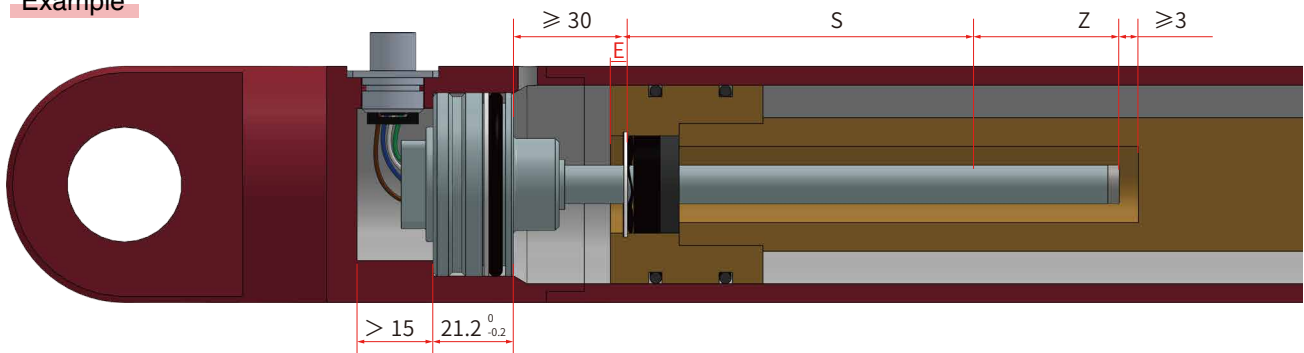


Head non-usable area



▶ Assembly mode

Example

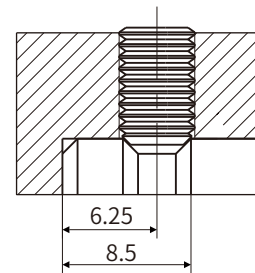
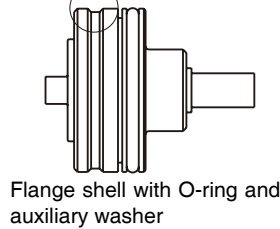
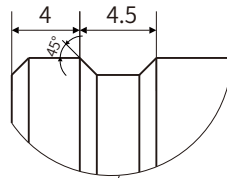


The assembly method depends on the design of the hydraulic cylinder. The commonly used assembly method is to assembly from the rod end of the hydraulic cylinder, or to assembly from the cylinder head end of the hydraulic cylinder. In both assembly methods, O-ring and auxiliary gasket are used for air sealing.

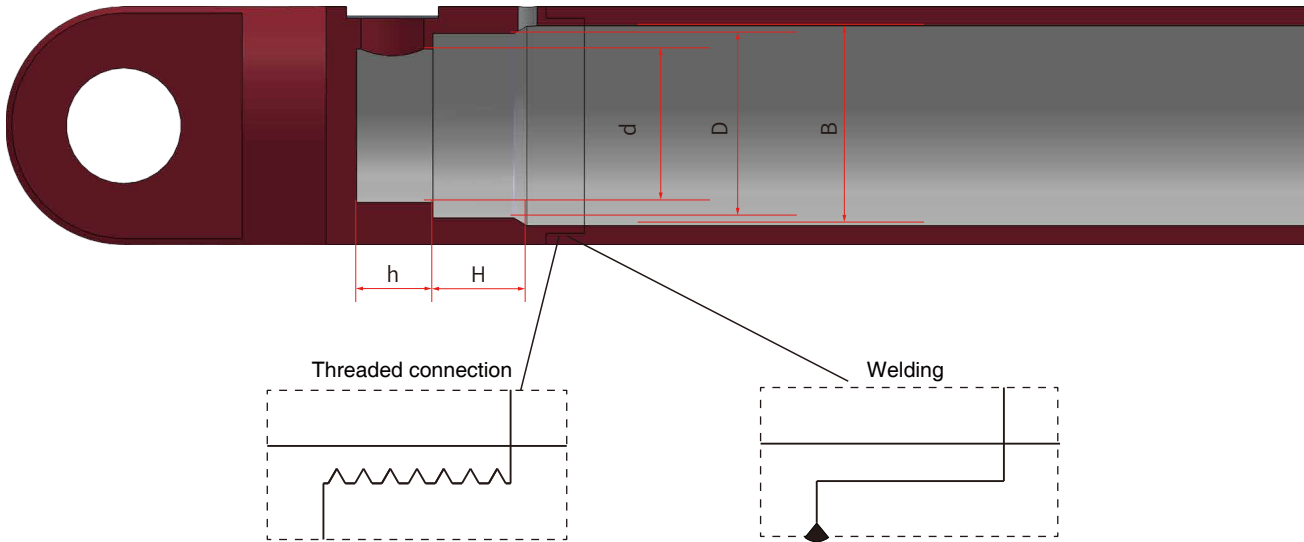
- Note: 1. The position magnet should not contact the stell rod;
 2. Drilling depth of piston rod $\geq E+Z+3$ mm;
 3. Piston rod hole diameter

Pressure-resistant rod	$\varnothing 10$
Aperture size	$\geq \varnothing 13$

4. Do not exceed the operating pressure during use.



Use M5 internal hexagon flat-end set screws for fixation with a maximum torque of 0.5 N/m

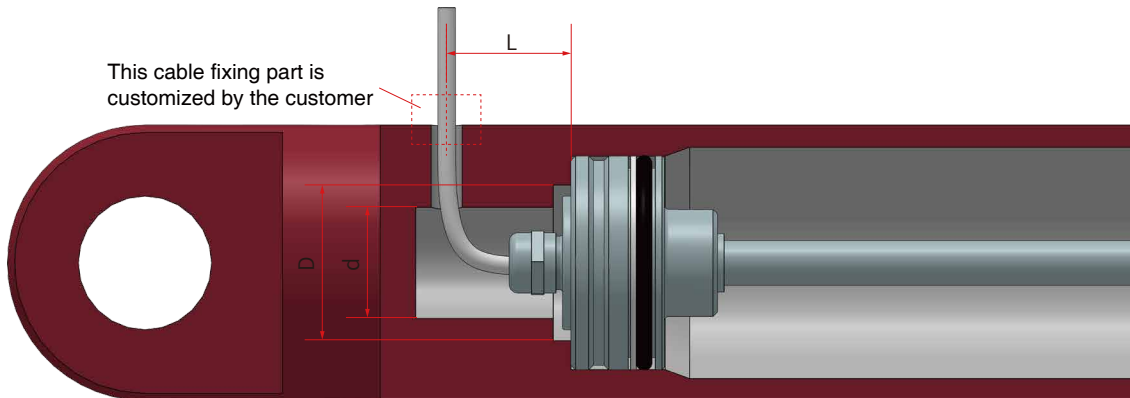


Unit: mm

Model	B Minimum diameter of hydraulic cylinder	D Minimum diameter	H Depth	d Minimum diameter	h Depth
MH	52	48H8 (thread) 48G7 (welding)	$21.2^{+0.2}$	$> 32.5 < 40$	> 15

▶ Assembly mode

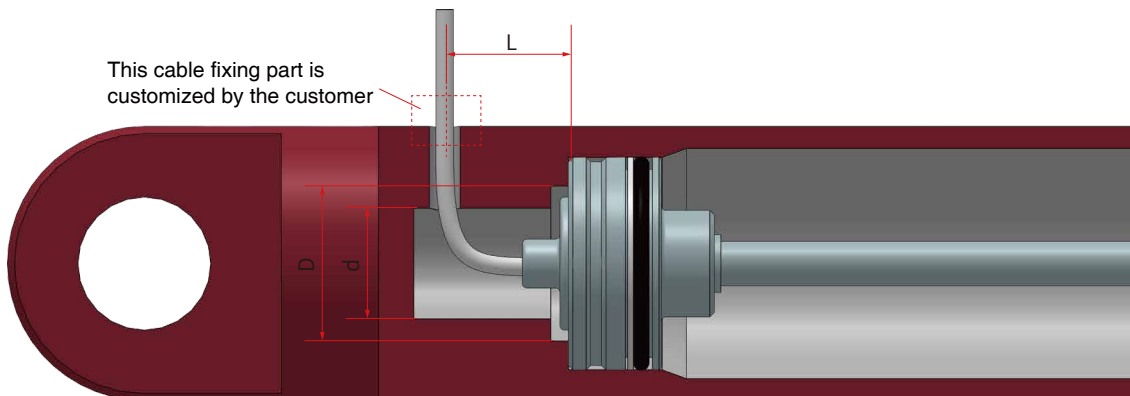
Assembly dimensions of outgoing mode-cable outlet (DM)



D	d	L
> 32 < 40	> 18	> 28

Note: Other dimensions are the same as those of connector cable outlet

Assembly dimensions of outgoing mode-cable outlet (QM)

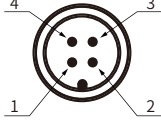


D	d	L
> 32 < 40	> 18	> 20

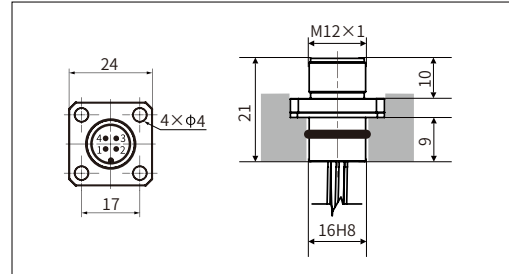
Note: Other dimensions are the same as those of connector outlet

Electrical connections

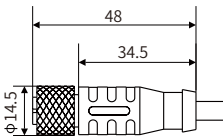
• Analog (connector)

M12-4Pin Definition	No.	PA	PB	PC
	1	Power supply	Do not connect	Power supply
	2	Signal	Power supply	Do not connect
	3	Ground	Ground	Ground
	4	Do not connect	Signal	Signal

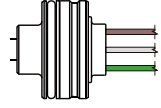
• M12-4 pin socket



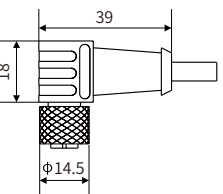
• Analog output (line color definition of female connector)

M12-5 pin female connector		Line color		
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black


• Analog output (scattered output)

Scattered output	PT	
	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green

• Analog output (line color definition of right angle female connector)

M12-5 pin right angle female connector		Line color		
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black

• Analog output (cable outlet)

Cable code: 511806	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green

▶ Product Parameters-Analog Output

• Input

Measurement data	Position (vernier magnet)
Stroke length	50~2500 mm

• Output

Current	4 ~ 20mA (load resistance $\leq 250\Omega$)
Voltage	0.5 ~ 4.5Vdc or 0.25~4.75Vdc (load resistance $\geq 10K\Omega$)
Resolution	$\pm 0.1\text{mm}$ (range $< 500\text{mm}$) range $\div 4096$ (range $> 500\text{mm}$)
Nonlinearity	$\pm 0.1\text{mm}$ ($\leq 250\text{mm}$) or 0.04%F.S ($> 250\text{mm}$)
Repetition accuracy	$\pm 0.1\text{mm}$
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40 C ~ +105 C
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	$< 30\text{ppm}/\text{C}$
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 25g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference, Grade 3, Class A
	GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference, Grade 3, Class A
	GB/T17626.4 Electric Fast Transient Pulse Group Anti-interference, Grade 3, Class B
	GB/T17626.5 Surge (Impact) Anti-interference, Grade 3, Class B
	GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference, Grade 3, Class A
	GB/T17626.8 Power Frequency Magnetic Field Anti-interference, Grade 4, Class A

• Electrical connections

Input voltage	9~ 32Vdc
Power consumption	$< 1\text{W}$
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum36Vdc
Insulation resistance	$> 10M\Omega$
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304Lstainless steel
Measuring rod	304Lstainless steel
Operating pressure grade	Rated pressure Pn: 35MPa maximum pressure Pmax: 45MPa for stell rod with diameter of 10mm
Assembly	Any direction
Position magnet	Various ring magnets

▶ Selection Guide-Analog Output

MH - M - S - M - - M R

01 - 02	Sensor shell form
M H	Flange shell Φ48mm
03 - 07	Measuring range
	0050~2500 mm, step length 1mm
08 - 09	Mounting thread form
S 1	Pressure-resistant rod, diameter 10mm
S 4	Pressure-resistant rod, 10mm diameter; M4 thread at the end
S 7	Pressure-resistant rod, diameter 7mm
10 - 13	Connection form
P A 	3 wires, M12 IP69K, 4 pins (1-3-2)
P A 0 6	60mm, minimum length of wiring harness
P A 2 5	250mm, maximum length of wiring harness
P B 	3 wires, M12 IP69K, 4 pins (2-3-4)
P B 0 6	60mm, minimum length of wiring harness
P B 2 5	250mm, maximum length of wiring harness
P C 	3 wires, M12 IP69K, 4 pins (1-3-4)
P C 0 6	60mm, minimum length of wiring harness
P C 2 5	250mm, maximum length of wiring harness
P T 	3 scattered, brown-white-green
P T 0 6	60mm, minimum length of wiring harness
P T 2 5	250mm, maximum length of wiring harness

D M 	3-pin cable outlet
D M 0 1	1m cable
D M R 1	0.1m cable, ordering method within 1 m
Q M 	3-pin cable outlet (internal thread fastening)
Q M 0 1	1m cable
Q M R 1	0.1m cable, ordering method within 1 m

15 - 17	Signal output mode
A 0 1	Current output, 20~4mA
A 1 1	Current output, 4~20mA
V 0 1	Voltage output, 4.5~0.5V
V 1 1	Voltage output, 0.5~4.5V
V 0 2	Voltage output, 4.75~0.25V
V 1 2	Voltage output, 0.25~4.75V
V 0 3	Voltage output, 10~0V
V 1 3	Voltage output, 0~10V

18 - 19	Non-usable area at head and end, customizable
M 0	30mm+36.5mm
M 1	30mm+63.5mm
20	RUSSIA

● Selection example

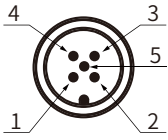
For example: MH-M0300-S1-PA08-A11-M0R

Indicates: MH series flange diameter 48mm, stroke length of 300mm, pressure-resistant rod with diameter of 10mm, M12 4-pin male connector, current output of 4~20mA, non-usable area at head and end of 30mm + 36.5 mm.

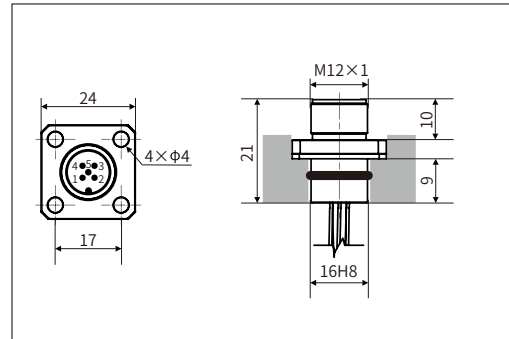
MH-CANopen Output

Electrical connections

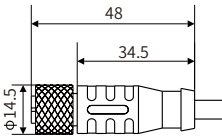
• CAN (connector)

M12-5 Pin Definition	No.	PC
	1	Do not connect
	2	Power supply
	3	Ground
	4	CAN High
	5	CAN Low

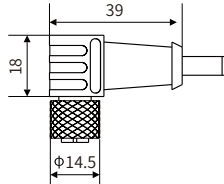
• M12-5 pin socket




• CANopen (line color definition of female connector)

M12-5 pin female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

• CANopen (line color definition of right angle female connector)

M12-5pin right angle female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

• CAN (cable outlet)

Cable code: 511816	Definition	Line color
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

▶ Product Parameters-CANopen Output

• Input

Measurement data	Position (vernier magnet)
Stroke length	50~2500 mm

• Output

Interface	CAN bus ISODIS11898, CANopen conforms to CIA DS-301V3.0, sensor specification DS-406V3.1
Transmission speed	maximum 1Mbit/s
Resolution	±0.1mm
Nonlinearity	±0.1mm (≤250mm) or 0.04%F.S (>250mm)
Repetition accuracy	±0.1mm
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40℃ ~ +105℃
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	<30ppm/℃
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 25g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference, Grade 3, Class A
	GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference, Grade 3, Class A
	GB/T17626.4 Electric Fast Transient Group Anti-interference, Grade 3, Class B
	GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference, Grade 3, Class A
	GB/T17626.8 Power Frequency Magnetic Field Anti-interference, Grade 4, Class A

• Electrical connections

Input voltage	9~ 32Vdc
Power consumption	<1W
Polarity protection	maximum-30Vdc
Overvoltage protection	maximum36Vdc
Insulation resistance	>10MΩ
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304Lstainless steel
Measuring rod	304Lstainless steel
Operating pressure grade	Rated pressure Pn: 35MPa maximum pressure Pmax: 45MPa for stell rod with diameter of 10mm
Assembly	Any direction
Position magnet	Various ring magnets

▶ Selection Guide-CANopen Output

M H - M - S - M - C 1 - M R

01 - 02	Sensor shell form	
M H	Flange shell Φ48mm	
03 - 07	Measuring range	
	0050~2500mm, step length 1mm	
08 - 09	Mounting thread form	
S 1	Pressure-resistant rod, diameter 10mm	
S 4	Pressure-resistant rod, diameter 10mm; Thread with M4 at end	
S 7	Pressure-resistant rod, diameter 7mm	
10 - 13	Connection form	
P C 	4 wiring harness, M12 IP69K, 5 pins (2-3-4-5)	
P C 0 6	60mm, minimum length of wiring harness	
P C 2 5	250mm, maximum length of wiring harness	
D M 	CAN special cable outlet	
D M 0 1	1m cable	
D M R 1	0.1m cable, ordering method within 1 m	
15 - 16	Signal output mode	
15 - 16	Output form	
C 1	CANopen	
17	Baud	
1	20Kbit/s	2 50Kbit/s
3	100Kbit/s	4 125Kbit/s
5	250Kbit/s	6 500Kbit/s
7	800Kbit/s	8 1000Kbit/s
18	Resolution	
1	0.1mm	
19	Number of magnet rings	
1	Single magnet ring	
20 - 21	Non-usable area at head and end, customizable	
M 0	30mm+36.5mm	
M 1	30mm+63.5mm	
22	RUSSIA	

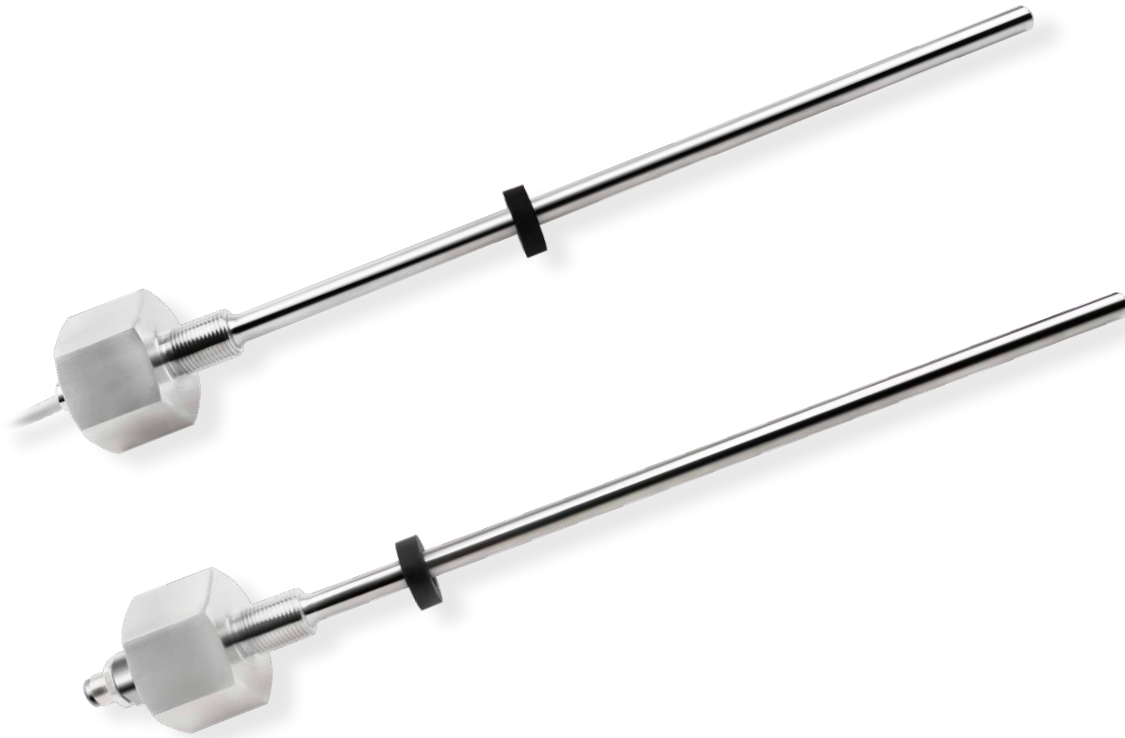
● Selection example

For example: MH-M0300-S1-DM50M-C1511-M1R

Indicates: MH rod series flange diameter 48mm, stroke length 300mm, pressure-resistant rod with diameter 10mm, straight cable form, CANopen output, baud 250kbit/s, resolution 0.1 mm, single magnet ring, head and end non-usable area 30 +63.5.



MHA Displacement Sensor

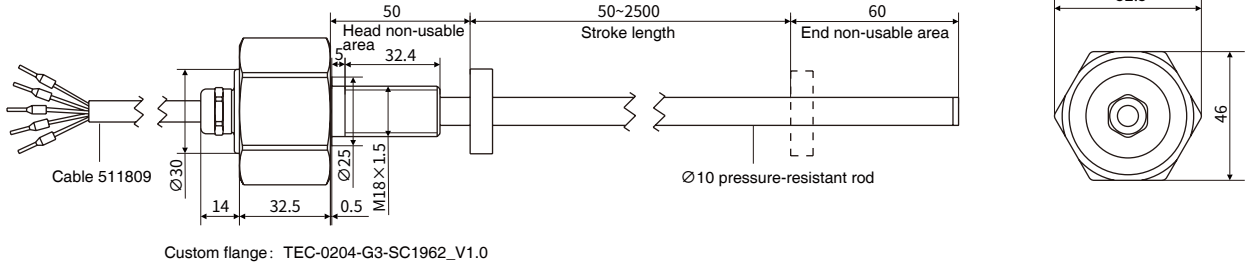


Technical characteristics

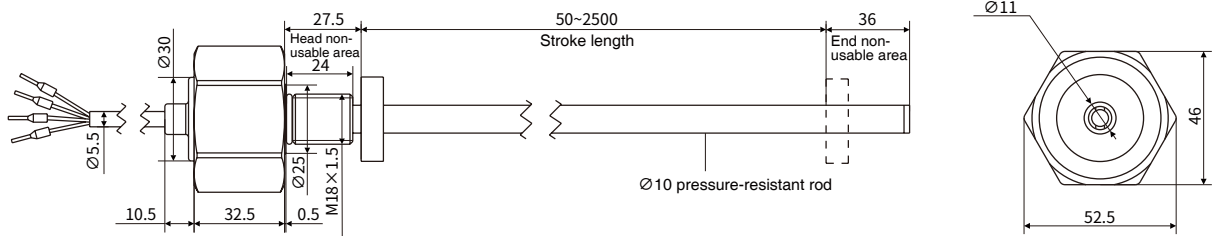
- Non-contact measurement
- Linear measurement, absolute position output
- Adapt to harsh environment, IP67 protection level
- Multiple signal (analog and digital signal) output modes
- Specially designed for construction machinery
- High vibration resistance and impact resistance
- Low power consumption design effectively reduces system heating
- Quick assembly through external threads

Structural Shape

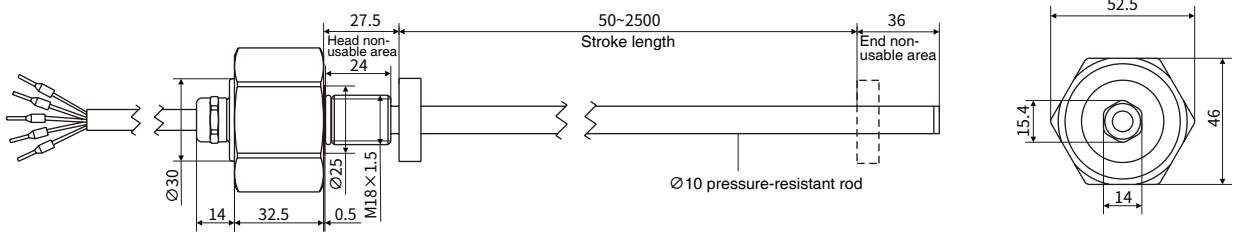
External dimensions of cable outlet (fastening mode DE)



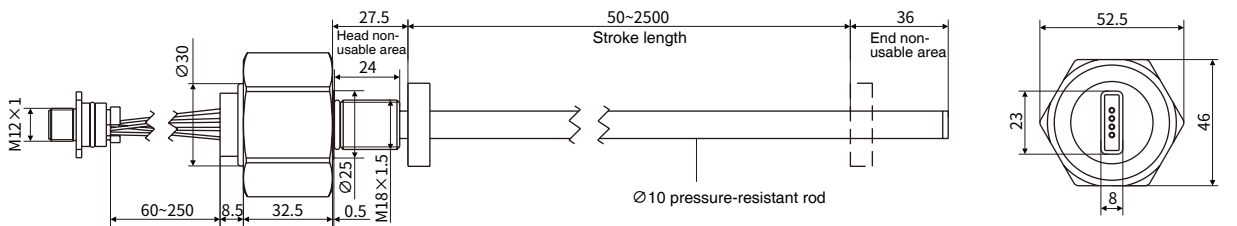
External dimensions of cable outlet (fastening method QM)



External dimensions of cable outlet (fastening mode DM)

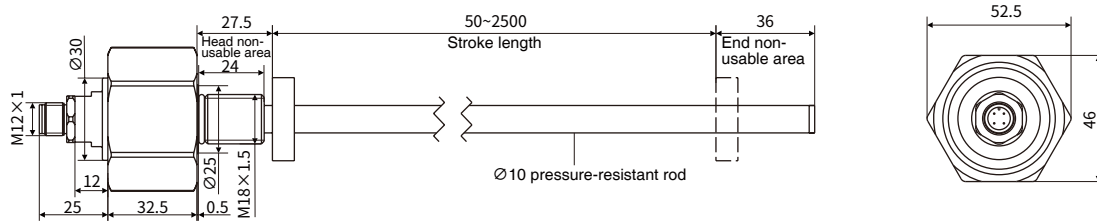


Connector external dimensions (standard type)



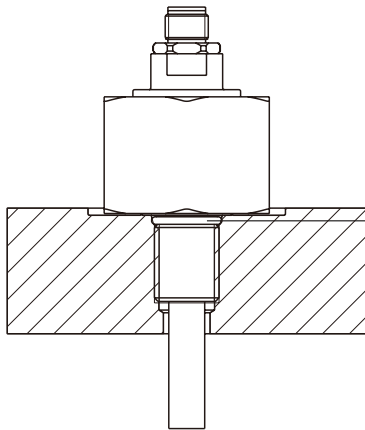
Structural Shape

Connector external dimensions (customized type)



▶ Assembly mode

To seal the flange contact surface by assembling 15.4x2.1 mmO rings in the cut, threaded holes conforming to ISO6149-1 standard must be provided.



• Seal by O-ring in flange cut

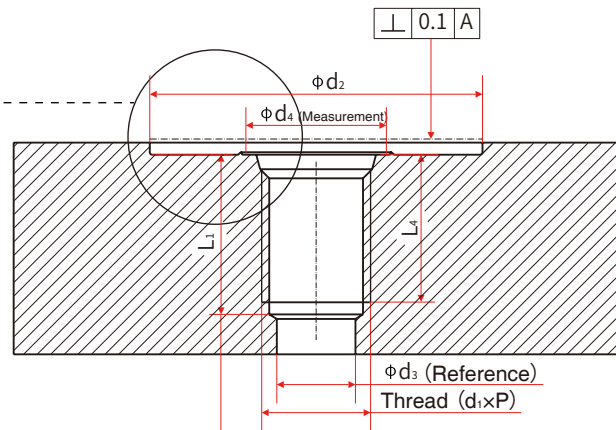
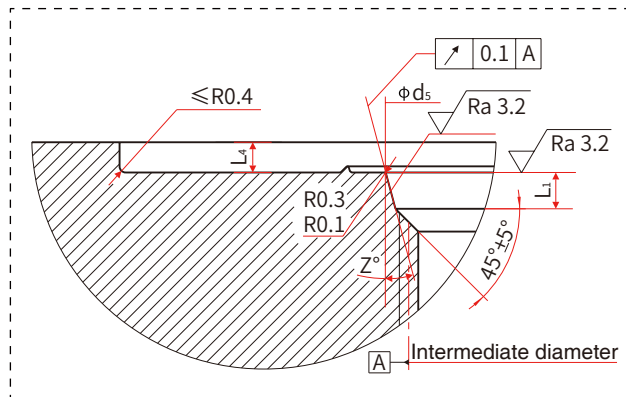
Note: :

- 1.The fastening torque is 50Nm;
- 2.The flange contact surface must be located on the Cylinder assembly surface as a whole;
- 3.The positioning magnet should not contact with the sensor measuring rod;
- 4.Do not exceed the peak pressure of equipment;
- 5.Protect the steel rod from wear.

Threaded holes conforming to ISO6149-1 (for pressure-resistant rods with a diameter of 10mm)

unit: mm

Thread (d1 xP)	d ₂	d ₃	d ₄	d ₅	L ₁	L ₂	L ₃	L ₄	Z°
M18x1.5	55	13	24.5	19.8	2.4	28.5	2	14.5	15°

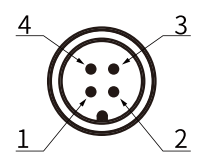


This size is suitable for blind holes

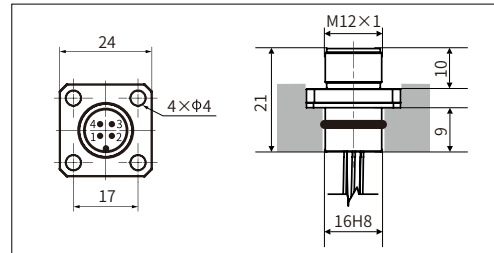
MHA-Analog Output

Electrical connections

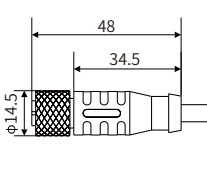
Analog (connector)

M12-4Pin Definition	No.	PA	PB	PC
	1	Power supply	Do not connect	Power supply
	2	Signal	Power supply	Do not connect
	3	Ground	Ground	Ground
	4	Do not connect	Signal	Signal

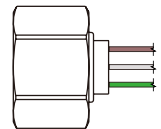
M12-4 pin socket



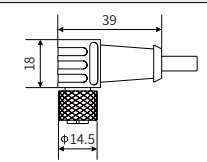
Analog output (line color definition of female connector)

M12-5 pin female connector	Line color			
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black



Analog output (scattered output)

Scattered output	PT	
	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green

Analog output (line color definition of right angle female connector)

M12-5pin right angle female connector	Line color			
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black

Analog output (cable outlet)

Cable code: 511806	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green
Cable code: 511809	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Blue

▶ Product Parameters-Analog Output

• Input

Measurement data	Position (Vernier magnet)
Stroke length	50~2500 mm

• Output

Current	4 ~ 20mA (load resistance $\leq 250\Omega$)
Voltage	0.5 ~ 4.5Vdc or 0.25~4.75Vdc (load resistance $\geq 10K\Omega$)
Resolution	$\pm 0.1\text{mm}$ (range $< 500\text{mm}$) range $\div 4096$ (range $> 500\text{mm}$)
Nonlinearity	$\pm 0.1\text{mm}$ ($\leq 250\text{mm}$) or 0.04%F.S ($> 250\text{mm}$)
Repetition accuracy	$\pm 0.1\text{mm}$
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40℃ ~ +105℃
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	$< 30\text{ppm}/\text{C}$
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 25g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference, Grade 3, Class A GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference, Grade 3, Class A GB/T17626.4 Electric Fast Transient Pulse Group Anti-interference, Grade 3, Class B GB/T17626.5 Surge (Impact) Anti-interference, Grade 3, Class B GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference, Grade 3, Class A GB/T17626.8 Power Frequency Magnetic Field Anti-interference, Grade 4, Class A

• Electrical connections

Input voltage	9~ 32Vdc
Power consumption	$< 1\text{W}$
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum36Vdc
Insulation resistance	$> 10M\Omega$
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304Lstainless steel
Measuring rod	304Lstainless steel
Operating pressure grade	Rated pressure Pn: 35MPa maximum pressure Pmax: 45MPa for stell rod with diameter of 10mm
Assembly	Any direction
Position magnet	Various ring magnets

▶ Selection Guide-Analog Output

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

01 - 03 Sensor shell form

M	H	A	Hexagon flange shell
---	---	---	----------------------

04 - 08 Measuring range

0050~2500 mm, step length 1mm

09 - 10 Mounting thread form

S	1	Standard flange, pressure-resistant rod, diameter 10mm
S	2	Custom flange: TEC-0204-G3-SC1962_V1.0, pressure-resistant rod, diameter 10mm

11 - 14 Connection form

P	A	0	0	Custom, M12 IP69K, 4 pins (1-3-2)
P	A			3 wires, M12 IP69K, 4 pins (1-3-2)
P	A	0	6	60mm, minimum length of wiring harness
P	A	2	5	250mm, maximum length of wiring harness
P	B	0	0	Custom, M12 IP69K, 4 pins (2-3-4)
P	B			3 wires, M12 IP69K, 4 pins (2-3-4)
P	B	0	6	60mm, minimum length of wiring harness
P	B	2	5	250mm, maximum length of wiring harness
P	C	0	0	Custom, M12 IP69K, 4 pins (1-3-4)
P	C			3 wires, M12 IP69K, 4 pins (1-3-4)
P	C	0	6	60mm, minimum length of wiring harness
P	C	2	5	250mm, maximum length of wiring harness
P	T			3 scattered, brown-white-green
P	T	0	6	60mm, minimum length of wiring harness
P	T	2	5	250mm, maximum length of wiring harness

Q	M			3-pin cable outlet (internal thread fastening)
---	---	--	--	--

Q	M	0	1	1m cable
---	---	---	---	----------

Q	M	R	1	0.1m cable, ordering method within 1 m
---	---	---	---	--

D	E			3-pin cable outlet (511809 cable is used)
---	---	--	--	---

D	E	0	1	1m cable
---	---	---	---	----------

D	E	R	1	0.1m cable, ordering method within 1 m
---	---	---	---	--

D	M			3-pin cable outlet
---	---	--	--	--------------------

D	M	0	6	1m cable
---	---	---	---	----------

D	M	2	5	0.1m cable, ordering method within 1 m
---	---	---	---	--

16 - 18 Signal output mode

A	0	1	Current output, 20~4mA
---	---	---	------------------------

A	1	1	Current output, 4~20mA
---	---	---	------------------------

V	0	1	Voltage output, 4.5~0.5V
---	---	---	--------------------------

V	1	1	Voltage output, 0.5~4.5V
---	---	---	--------------------------

V	0	2	Voltage output, 4.75~0.25V
---	---	---	----------------------------

V	1	2	Voltage output, 0.25~4.75V
---	---	---	----------------------------

V	0	3	Voltage output, 10~0V
---	---	---	-----------------------

V	1	3	Voltage output, 0~10V
---	---	---	-----------------------

19- 20 Non-usable area at head and end, customizable

M	2	27.5mm+36mm
---	---	-------------

M	3	50mm+60mm
---	---	-----------

21 RUSSIA


● Selection example

For example: MHA-M0300-S1-PA08M-A11-M2R

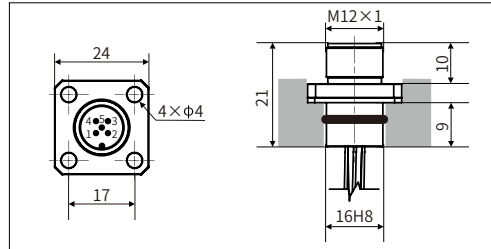
Indicates: MHA structure hexagonal flange shell, 300mm stroke length, 10mm diameter pressure-resistant rod, M12 connector 4-pin male connector, current output of 4~20mA, non-usable area at head and end of 27.5 +36.

Electrical connections

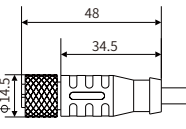
CAN (connector)

M12-5 Pin Definition	No.	PC
	1	Do not connect
	2	Power supply
	3	Ground
	4	CAN High
	5	CAN Low

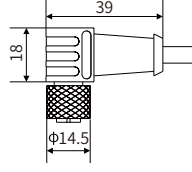
M12-5 pin socket




CAN (line color definition of female connector)

M12-5 pin female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

CAN (line color definition of right angle female connector)

M12-5pin right angle female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

CAN (cable outlet)

Cable code:511816	Definition	Line color
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

🕒 Product Parameters-CANopen Output

• Input

Measurement data	Position (vernier magnet)
Stroke length	50~2500 mm

• Output

Interface	CANbus ISO DIS 11898, CANopen complies with CIA DS-301V3.0, Sensor Specification DS-406V3.1
Transmission speed	maximum 1Mbit/s
Resolution	±0.1mm
Nonlinearity	±0.1mm (≤250mm) or 0.04%F.S (>250mm)
Repetition accuracy	±0.1mm
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40°C ~ +105°C
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	<30ppm/°C
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 25g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference, Grade 3, Class A
	GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference, Grade 3, Class A
	GB/T17626.4 Electric Fast Transient Group Anti-interference, Grade 3, Class B
	GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference, Grade 3, Class A
	GB/T17626.8 Power Frequency Magnetic Field Anti-interference, Grade 4, Class A

• Electrical connections

Input voltage	9~ 32Vdc
Power consumption	<1W
Polarity protection	maximum-30Vdc
Overvoltage protection	maximum36Vdc
Insulation resistance	>10MΩ
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304Lstainless steel
Measuring rod	304Lstainless steel
Operating pressure grade	Rated pressure Pn: 35MPa maximum pressure Pmax: 45MPa for stell rod with diameter of 10mm
Assembly	Any direction
Position magnet	Various ring magnets

🔍 Selection Guide-CANopen Output

M H A - M - S - M - C 1 - M R

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23

01 - 03	Sensor shell form				
M H A	Hexagon flange shell				
04 - 08	Measuring range				
	0050~2500mm, step length 1mm				
09 - 10	Mounting thread form				
S 1	Pressure-resistant rod, diameter 10mm				
11 - 14	Connection form				
P C 0 0	Custom, M12 IP69K, 5 pins (2-3-4-5)				
P C	4 wiring harness, M12 IP69K, 5 pins (2-3-4-5)				
P C 0 6	60mm, minimum length of wiring harness				
P C 2 5	250mm, maximum length of wiring harness				
D M	CAN special cable outlet				
D M 0 1	1m cable				
D M R 1	0.1m cable, ordering method within 1 m				
16 - 20	Signal output mode				
16 - 17	Output form				
C 1	CANopen				
18	Baud				
1	20Kbit/s	2	50Kbit/s	3	100Kbit/s
4	125Kbit/s	5	250Kbit/s	6	500Kbit/s
7	800Kbit/s	8	1000Kbit/s		
19	Resolution				
1	0.1mm				
20	Number of magnet rings				
1	Single magnet ring				
21 - 22	Non-usable area at head and end, customizable				
M 2	27.5mm+36mm				
23	RUSSIA				

● Selection example

For example: MHA-M0300-S1-DM50M-C1511-M2R

Indicates: MHA structure hexagonal flange shell, 300mm stroke length, 10mm diameter withstand voltage round pipe, cable outlet form, CANopen output, baud 250kbit/s, resolution 0.1 mm, single magnet ring, head and end non-usable area 27.5 +36.

MI Displacement Sensor

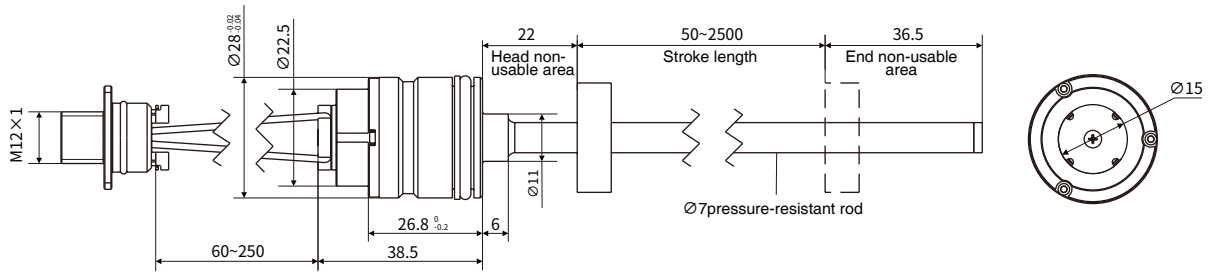


Technical characteristics

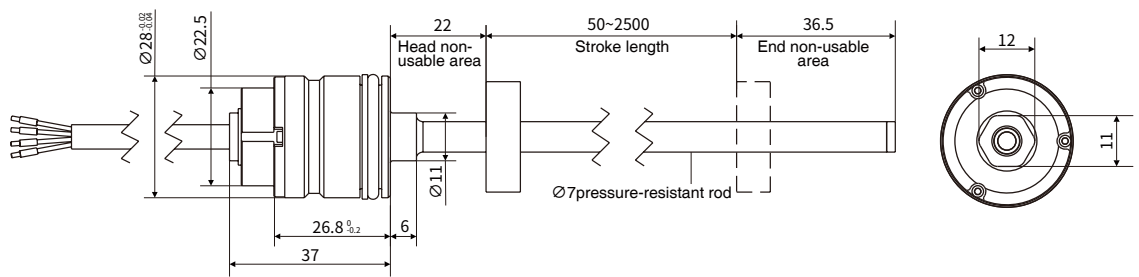
- Specially designed for construction machinery
- High vibration resistance and impact resistance
- Low power consumption design effectively reduces system heating
- Multiple signal (analog and digital signal) output modes
- Linear measurement, absolute position output
- Compact structure, suitable for small Cylinder
- Adapt to harsh environment, IP67 protection level
- Assembled in cylinder, free from environmental and electromagnetic interference, non-contact measurement

Structural Shape

Connector external dimensions

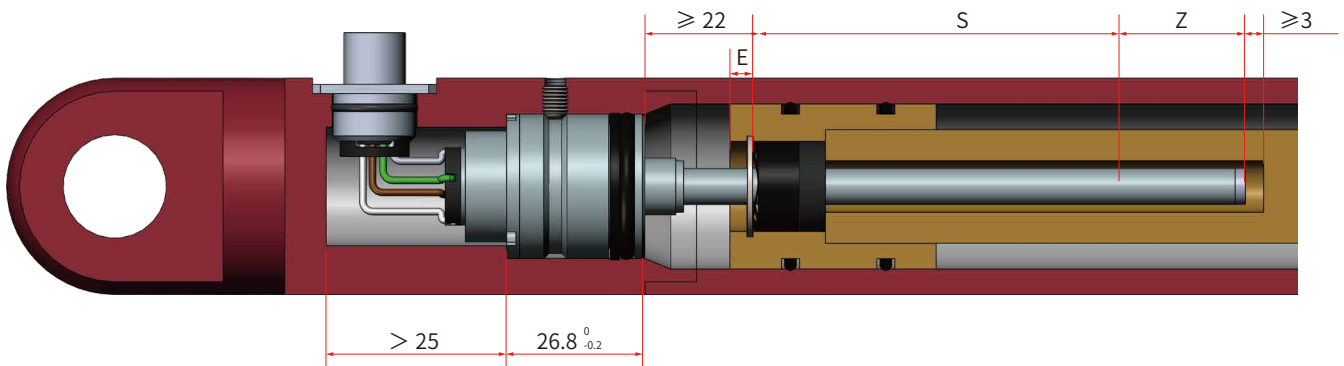


External dimensions of cable outlet



▶ Assembly mode

Example

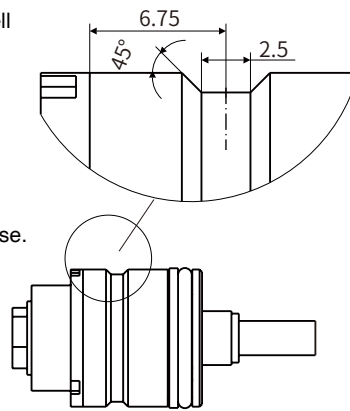


The assembly method depends entirely on the design of the hydraulic cylinder. The commonly used assembly method is to install from the rod end of the hydraulic cylinder, or to install from the cylinder head end of the hydraulic cylinder. In both assembly methods, O-ring and auxiliary gasket are used for air sealing.

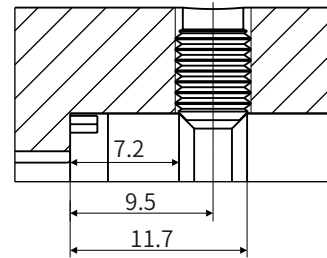
- Note: 1. The position magnet should not contact the steel rod;
 2. Drilling depth of piston rod $\geq E+Z+3$ mm;
 3. Piston rod hole diameter

Stell rod	$\varnothing 7$
Aperture size	$\geq \varnothing 10$

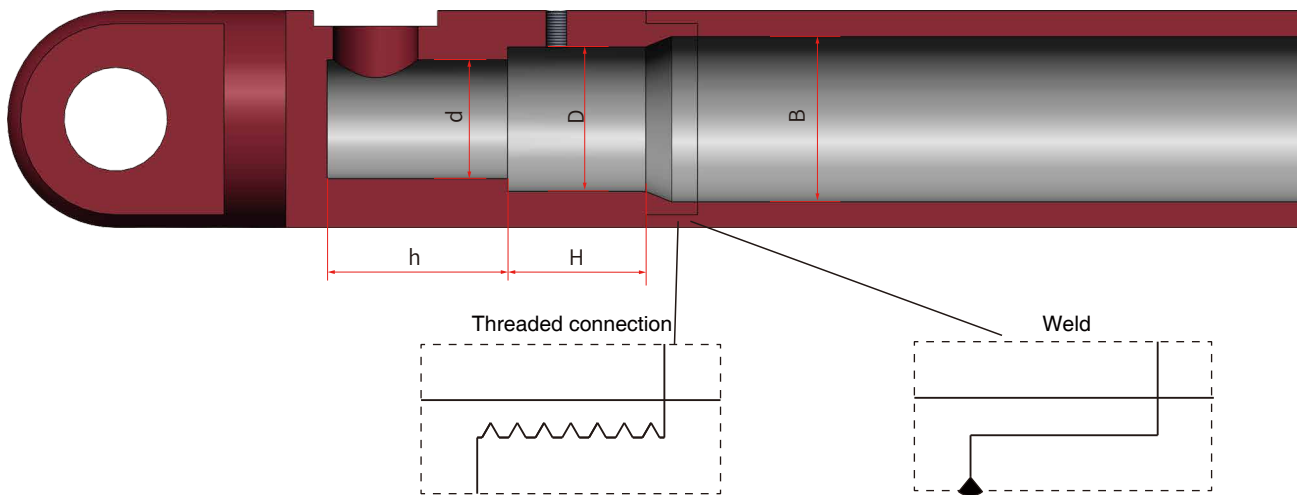
4. Do not exceed the operating pressure during use.



Flange shell with O-ring and auxiliary washer



Use M5 internal hexagon flat-end setting screws for fixation with a maximum torque of 0.5 N/m

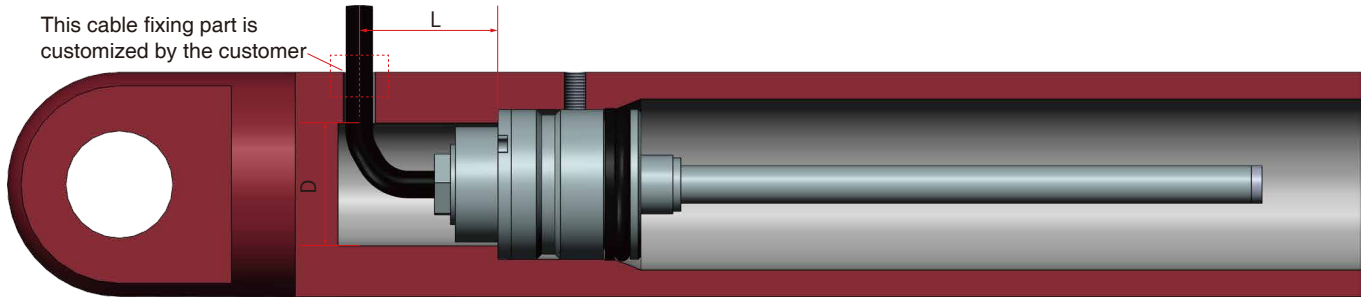


Unit: mm

Model	B Minimum diameter of hydraulic cylinder	D Minimum diameter	H Depth	d Minimum diameter	h Depth
MI	≥ 32	28H8 (Thread) 28G7 (Welding)	$26.8^{+0.2}$	23.5	< 25

▶ Assembly mode

Assembly dimensions of outgoing mode



D	L
>23.5 <20	> 20

Note: Other dimensions are the same as those of connector cable outlet

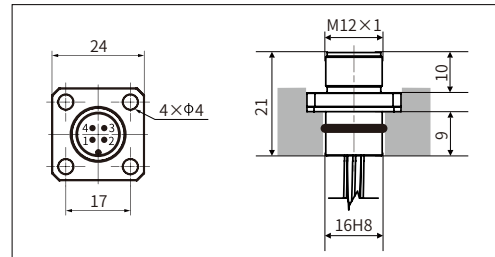
MI-Analog Output

▶ Electrical connections

• Analog (connector)

M12-4Pin Definition	No.	PA	PB	PC
	1	Power supply	Do not connect	Power supply
	2	Signal	Power supply	Do not connect
	3	Ground	Ground	Ground
	4	Do not connect	Signal	Signal

• M12-4 pin socket



• Analog output (line color definition of female connector)

M12-5pin female connector		Line color		
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black

• Scattered output

Scattered output	PT	
	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green

• Analog output (line color definition of right angle female connector)

M12-5pin right angle female connector		Line color		
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black

• Special cable

Cable code:511815	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green

▶ Product Parameters-Analog Output

• Input

Measurement data	Position (vernier magnet)
Stroke length	50~2500 mm

• Output

Current	4 ~ 20mA (load resistance $\leq 250\Omega$)
Voltage	0.5 ~ 4.5Vdc or 0.25~4.75Vdc (load resistance $\geq 10K\Omega$)
Resolution	$\pm 0.1\text{mm}$ (range $< 500\text{mm}$) range ± 4096 (range $> 500\text{mm}$)
Nonlinearity	$\pm 0.1\text{mm}$ ($\leq 250\text{mm}$) or 0.04%F.S ($> 250\text{mm}$)
Repetition accuracy	$\pm 0.1\text{mm}$
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40°C ~ +105°C
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	$< 30\text{ppm}/^\circ\text{C}$
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference Degree, Grade 3, Class A
	GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference Degree, Grade 3, Class A
	GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference Degree, Grade 3, Class A
	GB/T17626.8 Power Frequency Magnetic Field Anti-interference Degree, Grade 4, Class A

• Electrical connections

Input voltage	8 ~ 32Vdc
Power consumption	$< 1\text{W}$
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum36Vdc
Insulation resistance	$> 10M\Omega$
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304L stainless steel
Measuring rod	304L stainless steel
Operating pressure grade	Rated pressure Pn: 30MPa maximum pressure Pmax: 40MPa for stell rod with diameter of 7mm
Assembly	Any direction
Position magnet	Various ring magnets

▶ Selection Guide-Analog Output

M I - M - S - M - - M R

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

01 - 02 Sensor shell form

M	I	Flange shell Φ 28mm
---	---	--------------------------

03 - 07 Measuring range

0050~2500 mm, step length 1mm

08 - 09 Mounting thread form

S	7	Pressure-resistant rod, diameter 7mm
---	---	--------------------------------------

10 - 13 Connection form

P	A			3 wires, M12 IP69K, 4 pins (1-3-2)
P	A	0	6	60mm, minimum length of wiring harness
P	A	2	5	250mm, maximum length of wiring harness
P	B			3wires, M12 IP69K, 4 pins (2-3-4)
P	B	0	6	60mm, minimum length of wiring harness
P	B	2	5	250mm, maximum length of wiring harness
P	C			3 wires, M12 IP69K, 4 pins (1-3-4)
P	C	0	6	60mm, minimum length of wiring harness
P	C	2	5	250mm, maximum length of wiring harness
P	T			3 scattered, brown-white-green
P	T	0	6	60mm, minimum length of wiring harness
P	T	2	5	250mm, maximum length of wiring harness
T	I			3-pin cable outlet
T	I	0	1	1m cable
T	I	R	1	0.1m cable, ordering method within 1 m

15 - 17 Signal output mode

A	0	1	Current output, 20~4mA
A	1	1	Current output, 4~20mA
V	0	1	Voltage output, 4.5~0.5V
V	1	1	Voltage output, 0.5~4.5V
V	0	2	Voltage output, 4.75~0.25V
V	1	2	Voltage output, 0.25~4.75V

18- 19 Non-usable area at head and end, customizable

M	6	22mm+36.5mm
M	7	22mm+63.5mm

20 RUSSIA

● Selection example

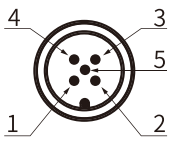
For example: MI-M0300-S7-PA06M-A11-M6R

Indicates: MI series flange diameter 28mm, 300mm stroke length, 7mm diameter pressure-resistant rod, 60mm, minimum length of wiring harness, current output of 4~20mA, non-usable area at head and end of 22 +36.5.

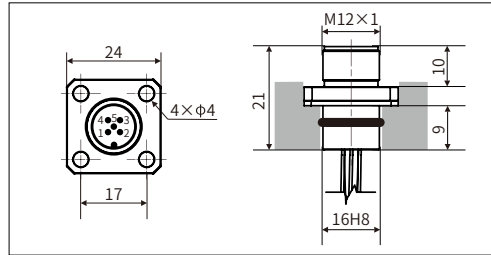
MI-CANopen Output

Electrical connections

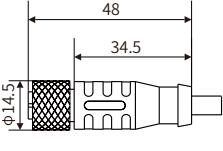
• CAN (connector)

M12-5Pin Definition	No.	PC
	1	Do not connect
	2	Power supply
	3	Ground
	4	CAN High
	5	CAN Low

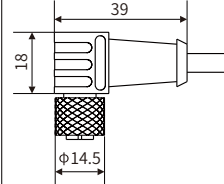
• M12-5 pin socket




• CAN (line color definition of female connector)

M12-5pin female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

• CAN (line color definition of right angle female connector)

M12-5pin right angle female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

• CAN (cable outlet)

Cable code:511816	Definition	Line color
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

▶ Product parameters-CANopen Output

• Input

Measurement data	Position (Vernier magnet)
Stroke length	50~2500 mm

• Output

Interface	CAN bus ISO DIS 11898, CANopen complies with CIA DS-301V3.0, Sensor Specification DS-406V3.1
Transmission speed	maximum 1Mbit/s
Resolution	±0.1mm
Nonlinearity	±0.1mm (≤250mm) or 0.04%F.S (>250mm)
Repetition accuracy	±0.1mm
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40℃ ~ +105℃
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	<30ppm/℃
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference Degree, Grade 3, Class A
	GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference Degree, Grade 3, Class A
	GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference Degree, Grade 3, Class A
	GB/T17626.8 Power Frequency Magnetic Field Anti-interference Degree, Grade 4, Class A

• Electrical connections

Input voltage	8~ 32Vdc
Power consumption	<1W
Polarity protection	maximum -30Vdc
Oversvoltage protection	maximum 36Vdc
Insulation resistance	> 10MΩ
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304L stainless steel
Measuring rod	304L stainless steel
Operating pressure grade	Rated pressure P _n : 30MPa maximum pressure P _{max} : 40MPa for stell rod with diameter of 7mm
Assembly	Any direction
Position magnet	Various ring magnets

▶ Selection Guide-CANopen Output

M I - M - S - - M - C 1 - M R

01 - 02	Sensor shell form		
M I	Flange shell Φ 28mm		
03 - 07	Measuring range		
	0050~2500 mm, step length 1mm		
08 - 09	Mounting thread form		
S 7	Pressure-resistant rod, diameter 7mm		
10 - 13	Connection form		
P C 	4 wiring harness, M12 IP69K, 5 pins (2-3-4-5)		
P C 0 6	60mm, minimum length of wiring harness		
P C 2 5	250mm, maximum length of wiring harness		
T M 	CAN special cable outlet		
T M 0 1	1m cable		
T M R 1	0.1m cable, ordering method within 1 m		
15 - 19	Signal output mode		
15 - 16	Output form		
C 1	CANopen		
17	Baud		
1	20Kbit/s	2	50Kbit/s
3	100Kbit/s	4	125Kbit/s
5	250Kbit/s	6	500Kbit/s
7	800Kbit/s	8	1000Kbit/s
18	Resolution		
1	0.1mm		
19	Number of magnet rings		
1	Single magnet ring		
20- 21	Non-usable area at head and end, customizable		
M 6	22mm+36.5mm		
M 7	22mm+63.5mm		
22	RUSSIA		

● Selection example

For example: MI-M0300-S7-TI50M-C1511-M6R

Indicates: MI rod series flange diameter 28mm, stroke length 300mm, pressure-resistant rod with diameter 7mm, cable outlet form, CANopen output, baud 250kbit/s, resolution 0.1 mm, single magnet ring, non-usable area at head and end 22 +36.5.

MT Displacement Sensor

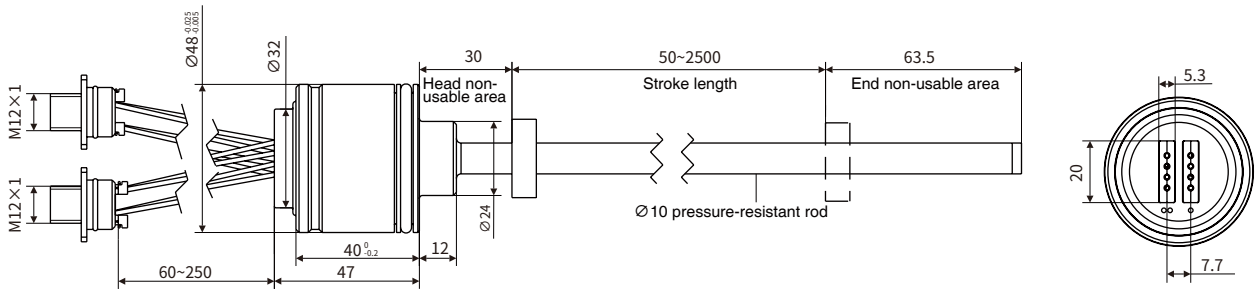


Technical characteristics

- Specially designed for construction machinery
- High vibration resistance and impact resistance
- Low power consumption design effectively reduces system heating
- Multiple signal (analog and digital signal) output modes
- Linear measurement, absolute position output
- Adapt to harsh environment, IP67 protection level
- Assembled in Cylinder, free from environmental and electromagnetic interference, non-contact measurement
- Redundant sensor system to improve the safety and stability of construction machinery

Structural shape

Connector external dimensions



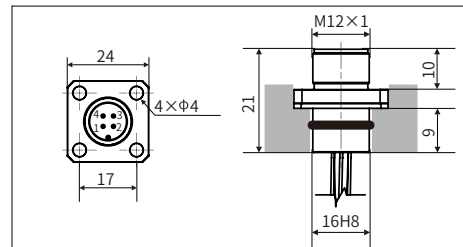
MT-Analog Output

Electrical connections

• Channel 1 analog (connector)

M12-4 Pin Definition	No.	PD
	1	Power supply
	2	Do not connect
	3	Ground
	4	Signal

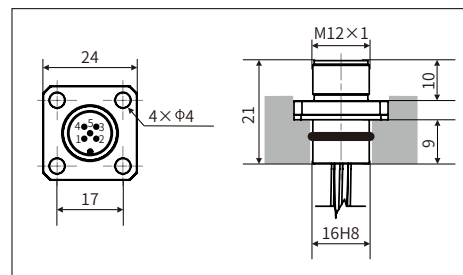
• M12-4pin socket



• Channel 2 analog (connector)

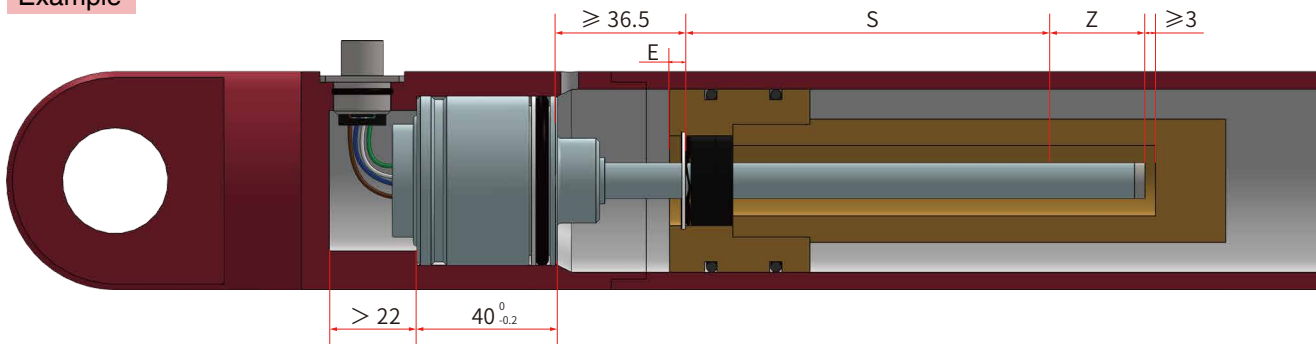
M12-5 Pin Definition	No.	PD
	1	Power supply
	2	Signal
	3	Ground
	4	Do not connect
	5	Do not connect

• M12-5pin socket



▶ Assembly mode

Example

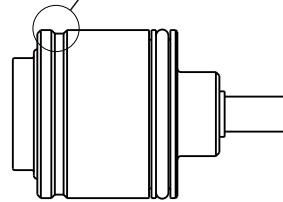
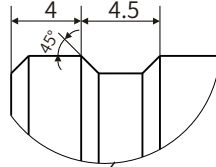


The assembly method depends entirely on the design of the hydraulic cylinder. The commonly used assembly method is to install from the rod end of the hydraulic cylinder, or to install from the cylinder head end of the hydraulic cylinder. In both assembly methods, O-ring and auxiliary gasket are used for air sealing.

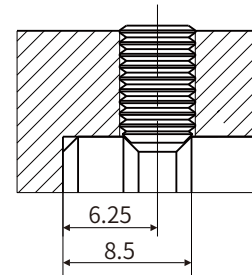
- Note:
1. The position magnet should not contact the steel rod;
 2. Drilling depth of piston rod $\geq E+Z+3\text{mm}$;
 3. Piston rod hole diameter

Stell rod	$\varnothing 10$
Aperture size	$\geq \varnothing 13$

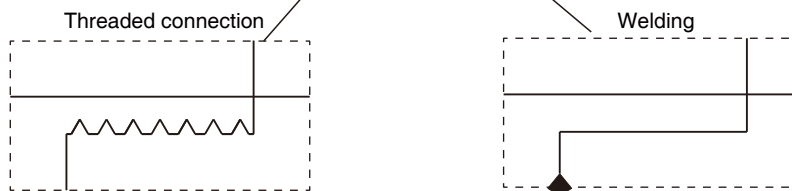
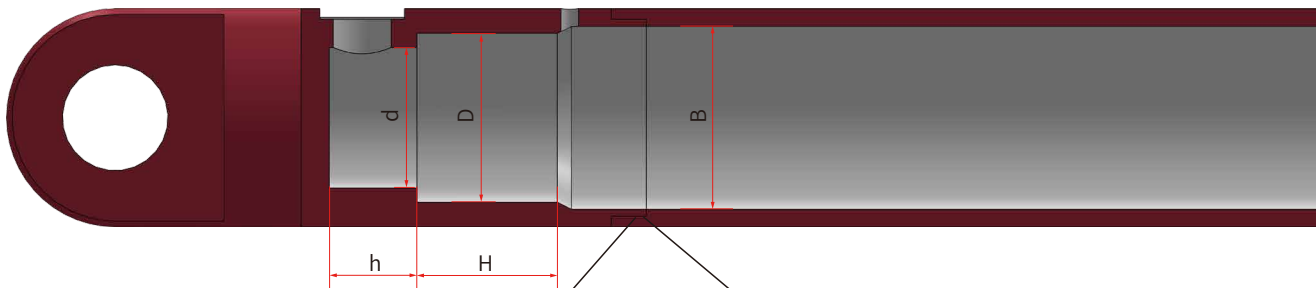
4. Do not exceed the operating pressure during use.



Flange shell with O-ring and auxiliary washer



Use M5 internal hexagon flat-end setting screws for fixation with a maximum torque of 0.5 N/m



Unit: mm

Model	B Minimum diameter of hydraulic cylinder	D Minimum diameter	H Depth	d Minimum diameter	h Depth
MT	52	48H8 (thread) 48G7 (welding)	40 ^{+0.2}	> 32.5 < 40	> 22

▶ Product parameters

• Input

Measurement data	Position (vernier magnet)
Stroke length	50~2500 mm

• Output

Current	4 ~ 20mA (load resistance $\leq 250\Omega$)
Voltage	0.5 ~ 4.5Vdc or 0.25~4.75Vdc (load resistance $\geq 10K\Omega$)
Resolution	$\pm 0.1\text{mm}$ (range $< 500\text{mm}$) range $\div 4096$ (range $> 500\text{mm}$)
Nonlinearity	$\pm 0.1\text{mm}$ ($\leq 250\text{mm}$) or 0.04%F.S ($> 250\text{mm}$)
Repetition accuracy	$\pm 0.1\text{mm}$
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	Sensor shell IP67; M12 Connector System IP69K
Operating temperature	-40℃ ~ +105℃
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	$< 30\text{ppm}/\text{C}$
Shock index	GB/T2423.5 100g (6ms)
Vibration index	GB/T2423.10 15g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference, Grade 3, Class B
	GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference, Grade 3, Class A
	GB/T17626.4 Electric Fast Transient Group Anti-interference, Grade 3, Class B
	GB/T17626.5 Surge (Impact) Anti-interference, Grade 3, Class B
	GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference, Grade 3, Class A
	GB/T17626.8 Power Frequency Magnetic Field Anti-interference, Grade 4, Class A


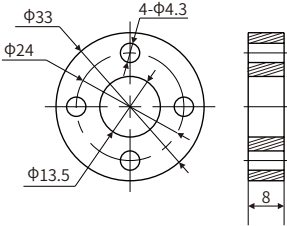

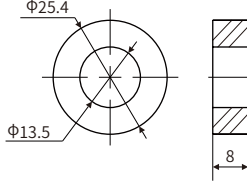

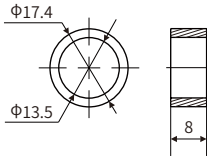

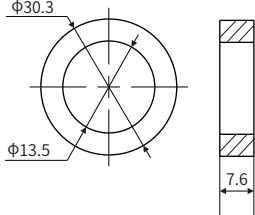
• Electrical connections

Input voltage	9~ 32Vdc
Power consumption	$< 1\text{W}$
Polarity protection	maximum -30Vdc
Overvoltage protection	maximum 36Vdc
Insulation resistance	$> 10\text{M}\Omega$
Insulation strength	500V
Outgoing mode	Cable outlet or connector






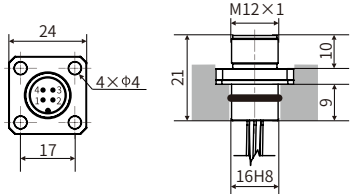

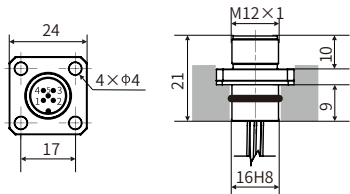
• Construction and materials

Electronic compartment	304L stainless steel
Measuring rod	304L stainless steel
Operating pressure grade	Rated pressure Pn: 35MPa maximum pressure Pmax: 45MPa for stell rod with diameter of 10mm
Assembly	Any direction
Position magnet	Various ring magnets


Magnet ring Selection

Accessory name/model	Dimensions	Description
 <p data-bbox="316 653 497 702">Magnet ring kit Order No.: 288501</p>		<p data-bbox="1066 500 1469 653">Magnetic isolation gasket: size same as magnet ring, thickness 5mm Screws: GB/T70.1, M4X18 , material304 Spring gasket: GB/T 93, φ 4, material304 Includes: 1 magnet ring, 1 gasket, 4 screws with elastic gasket</p>
 <p data-bbox="328 965 510 1015">Magnet ring kit Order No.: 288506</p>		<p data-bbox="1066 849 1406 976">Magnetic isolation gasket: size same as magnet ring, thickness 5mm Retaining ring: GB/T893,264 Includes: 1 magnet ring, 2 gaskets, 1 retaining ring</p>
 <p data-bbox="328 1300 510 1349">Magnet ring kit Order No.: 288507</p>		<p data-bbox="1066 1194 1406 1321">Magnetic isolation gasket: size same as magnet ring, thickness 5mm Retaining ring: GB/T 893 , 18 Includes: 1 magnet ring, 2 gaskets, 1 retaining ring</p>
 <p data-bbox="328 1645 510 1694">Magnet ring kit Order No.: 288509</p>		<p data-bbox="1066 1524 1406 1651">Magnetic isolation gasket: size same as magnet ring, thickness 5mm Retaining ring: GB/T893, 18 Includes: 1 magnet ring, 2 gaskets, 1 retaining ring</p>

Cable selection

Accessory name/model	Dimensions	Description
 MH Analog Special Cable (M) Order No.: 511806	$3C \times 0.5SQ$ $\phi 5.5 \pm 0.2mm$	Conductor: 3-pin, brown/white/green Sheath color: grey Shielding layer: tinned copper woven mesh Sheath material: 105°C polyvinyl chloride (PVC) Temperature: (-40~105°C)
 CAN StaticTPU Cable(C) Order No.: 511816	$2 \times 2 \times 24AWG$ $\phi 6.3 \pm 0.1mm$	Conductor: 4-pin, brown/white, yellow/green Sheath color: Purple Sheath Material: Polyurethane (TPU) characteristic impedance: $110 \pm 15\Omega$ Temperature: (-40~85°C)
 PUR Black Cable Order No.: 511809	$5 \times 0.25mm^2$ $\phi 5.6 \pm 0.2mm$	Conductor: 5-pin, brown/white/blue/black/gray Sheath color: Black Shielding layer: tinned copper woven mesh Sheath material: PUR Temperature: (-40~80°C)
 TPU three-pin black cable(M) Order No.: 511815	$3C \times 0.2SQ$ $\phi 5.1 \pm 0.2mm$	Conductor: 3-pin, brown/white/green Sheath color: Black Shielding layer: tinned copper woven mesh Sheath Material: Polyurethane (TPU) Temperature: (-40~80°C)
 MH 4-pin loose wire socket Order No.: 600000		
 MH 5-pin loose wire socket Order No.: 600001		

Cable selection

Accessory name/model	Dimensions	Description
 <p>5-pin M12 female connector Order No.: 521801-2/3/5/10/15</p>	 <p>5×0.25mm² φ 5.6±0.2mm</p>	<p>Conductor: 5-pin, brown/white/blue/black/gray Sheath color: Black Shielding layer: tinned copper woven mesh Sheath material: PUR Temperature: (-40~80°C) Line length: 2m/3m/5m/10m/15m</p>
 <p>5-pin M12 right angle female connector Order No.: 521804-2/3/5/10/15</p>	 <p>5×0.25mm² φ 5.6±0.2mm</p>	<p>Conductor: 5-pin, brown/white/blue/black/gray Sheath color: Black Shielding layer: tinned copper woven mesh Sheath material: PUR Temperature: (-40~80°C) Line length: 2m/3m/5m/10m/15m</p>
 <p>5-pin M12 female connector Order No.: 521806-3/5/10</p>	 <p>2×2×0.22mm² φ 7.6mm</p>	<p>Conductor: 4-pin, brown/white, yellow/green Sheath color: Purple Shielding layer: copper wire preparation Application characteristics: Impedance 120 Ω, special for CAN Temperature: (-30~80°C) Line length: 3m/5m/10m</p>
 <p>5-pin M12 right angle female connector Order No.: 521805-3/5/10</p>	 <p>2×2×0.22mm² φ 7.6mm</p>	<p>Conductor: 4-pin, brown/white, yellow/green Sheath color: Purple Shielding layer: copper wire preparation Application characteristics: Impedance 120 Ω, special for CAN Temperature: (-30~80°C) Line length: 3m/5m/10m</p>
 <p>MH adapter harness Order No.: 522007</p>		<p>When the Cylinder threading hole is less than 16H8, This harness switching can be used, Plastic shell thickness: 2.8 mm</p>

Industrial Application



Metallurgical industry



Port machinery



Hydraulic machinery



Wind power industry



Injection molding machinery



Vulcanizing machinery



Die casting machinery



Vertical mill machinery



Construction machinery



Papermaking machinery



Liquid level tank



Forming machinery

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