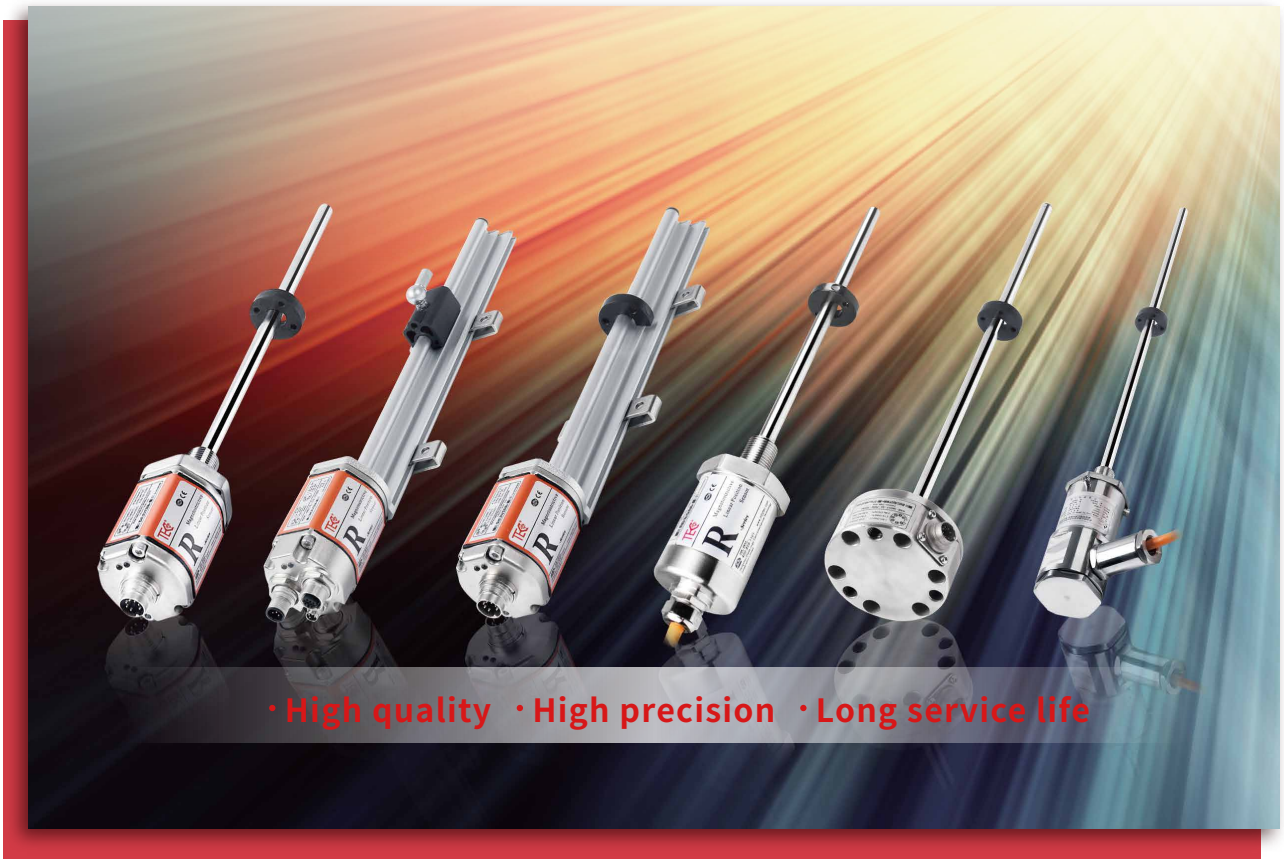
浙达精益
ZHEDA JINGYI

Magnetostrictive Displacement Sensor

R Series Product manual

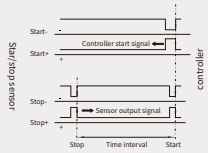
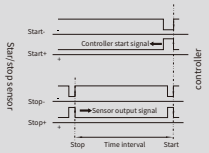
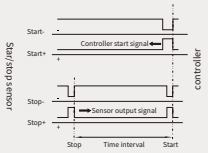
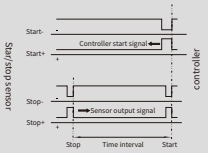


浙达精益——科技先行 以人为本
ZHEDAJINGYI
TECHNOLOGY FIRST PEOPLE-ORIENTED

中 国 创 造 · 创 造 中 国

CONTENT

TEC Product List

Appearance / interface	RH	RP	RS	RF
				
Analog Current	0~20mA (or reverse) 4~20mA (or reverse)	0~20mA (or reverse) 4~20mA (or reverse)	0~20mA (or reverse) 4~20mA (or reverse)	0~20mA (or reverse) 4~20mA (or reverse)
Analog voltage	0~10V (or reverse) 0~5V (or reverse) -10~10V (or reverse) -5~5V (or reverse)	0~10V (or reverse) 0~5V (or reverse) -10~10V (or reverse) -5~5V (or reverse)	0~10V (or reverse) 0~5V (or reverse) -10~10V (or reverse) -5~5V (or reverse)	0~10V (or reverse) 0~5V (or reverse) -10~10V (or reverse) -5~5V (or reverse)
SSI	24/25/26bit/Gray code/ Binary	24/25/26bit/Gray code/ Binary	24/25/26bit/Gray code/ Binary	24/25/26bit/Gray code/ Binary
Profibus-DP	PROFIBUS	PROFIBUS		PROFIBUS
PROFINET	PROFINET	PROFINET		PROFINET
CANopen	CANopen	CANopen	CANopen	CANopen
Start/Stop				
EtherCAT	EtherCAT	EtherCAT		EtherCAT

CHARACTERISTICS

installation form	internal	external	internal	
measuring range	25~5500mm	25~5500mm	25~5500mm	500~23000mm
Protection level	IP67	IP65	IP68	IP65
magnet	various ring magnets	Slider magnet/Square magnet/Sector magnet	various ring magnets	various ring magnets
LED Diagnosis	√	√	-	√
Diagnosis Software	√	√	√	√
Outer tube pressure	35MPa	-	35MPa	-
Outgoing mode	Cable outlet or Connector	Cable outlet or Connector	Cable outlet	Cable outlet or Connector

TEC Product List

Appear-ance / interface	 RB	 FBGB	 RD
Analog Current	0~20mA (or reverse) 4~20mA (or reverse)	0~20mA (or reverse) 4~20mA (or reverse)	0~20mA (or reverse) 4~20mA (or reverse)
Analog voltage	0~10V (or reverse) 0~5V (or reverse)	0~10V (or reverse) 0~5V (or reverse) -10~10V (or reverse) -5~5V (or reverse)	0~10V (or reverse) 0~5V (or reverse) -10~10V (or reverse) -5~5V (or reverse)
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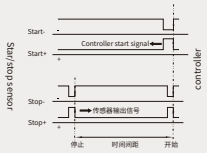
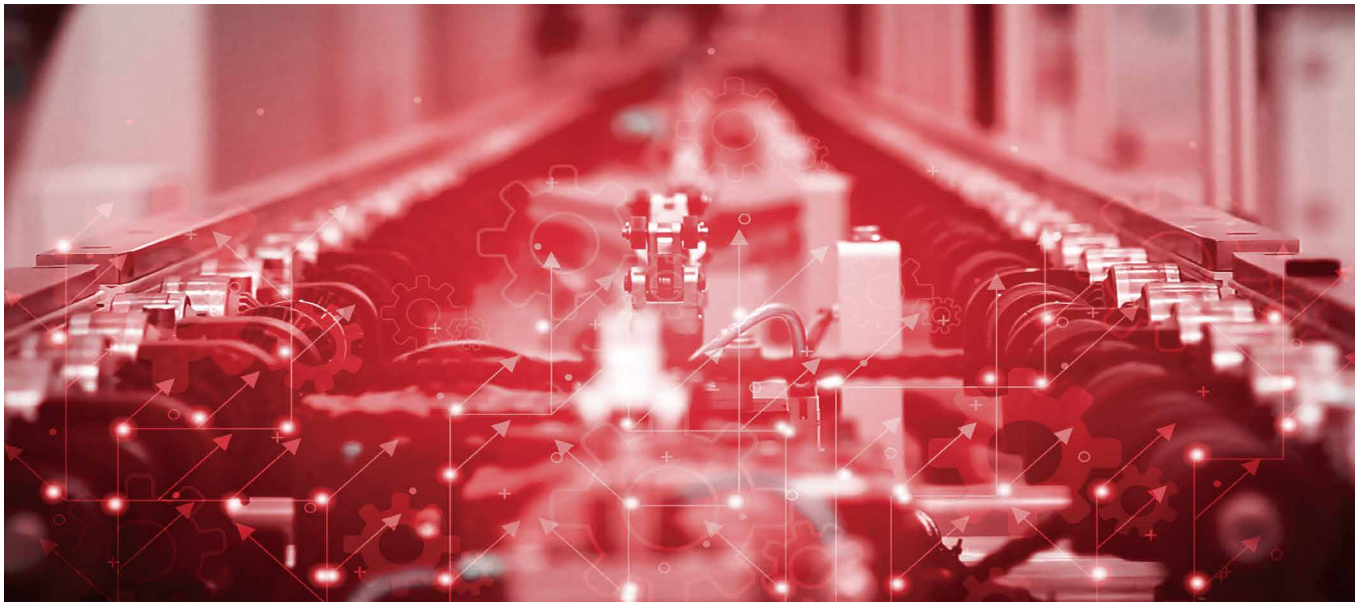
PROFINET			PROFINET
CANopen	CANopen	CANopen	CANopen
Start/Stop			
EtherCAT			EtherCAT

CHARACTERISTICS

installation form	internal	internal	internal
measuring range	25~5500mm	25~5500mm	25~5500mm
Protection level	IP67	IP67	IP68
magnet	various ring magnets	various ring magnets	various ring magnets
LED Diagnosis	-	-	√
Diagnosis Software	√	√	√
Outer tube pressure	35MPa	35MPa	35MPa
Outgoing mode	Cable outlet or Connector	Cable outlet	Cable outlet or Connector

Company Profile

We are a technological innovation enterprise born out of Zhejiang University. It is 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 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

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"

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

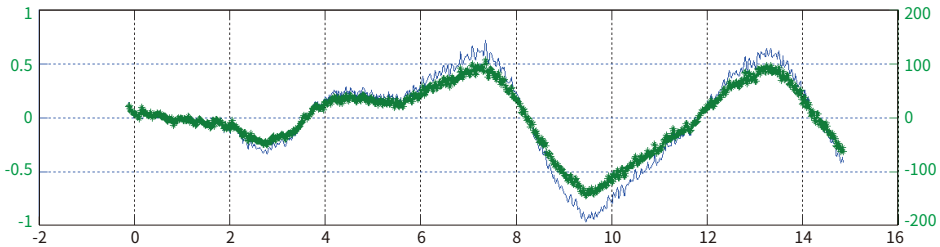
Science and Technology Progress Award of Zhejiang Province, "High-precision magnetoacoustic sensing technology and industrialization application of important components".

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 (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)
Highly accelerated life test	(HALT)
Enclosure protection test	(GB/T4208-2017)

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).

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 working 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 0.1μm

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、CANopen、Profinet、EtherCAT

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

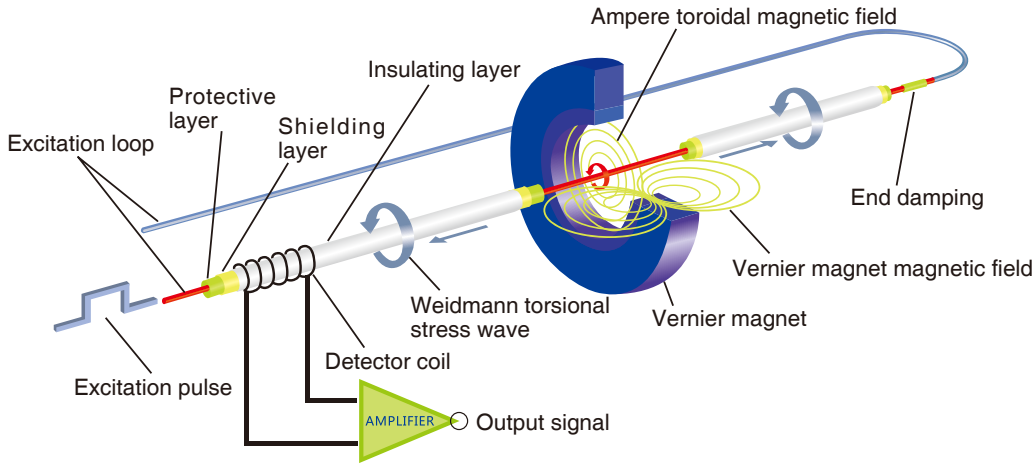
M18×1.5、M20×1.5、3/4"-16UNF-3Athreaded installation is optional. When replacing the sensor, only the electronic compartment can be replaced without removing the pressure measuring rod.

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

RH/RP Displacement Sensor-Analog Output

Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Easy to use, standard analog signal output
- No need to return to zero, absolute position output
- Easy diagnosis, LED real-time condition monitoring
- Low power consumption design effectively reduces system heating
- Stable and reliable, using digital analog technology
- The start and end position of the measurement can be adjusted in full scale

Product Parameters-Analog Output

• Input

Measurement data	Position magnet ring
Stroke length	25~5500 mm，customized according to customer needs
Number of measurements	1

• Output

Current	4 ~ 20mA or 20 ~ 4mA(min/max load 0/5002)
Voltage	0 ~ 10Vdc or 0~5Vdc（min load resistance ≥10K）
Resolution	16-bit D/A or 0.0015% of full scale (min 1um)
Nonlinearity	<±0.01% of full scale, min±50um
Repetition accuracy	<±0.001% of full scale, min ±1um
Hysteresis	＜10um
Update time	1KHz (range ≤ 1m), 500Hz (1m < range ≤ 2m), 333Hz (2m < range ≤ 3m), customizable
Temperature coefficient	＜30ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67 RH Stainless Stell Rod /IP65 RP Aluminum profile
Operating temperature	-40℃ ~ +85℃
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3， Class A，CE Certification

• Structure and Materials

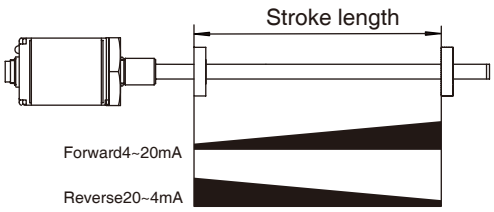
Failure indication		Displayed by the LEDs on the rear cover of the electronic compartment
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa（continuous）/70MPa（peak）or 350bar（continuous）/ 700bar（peak）
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic bin	Aluminum alloy
	Measuring rod	Aluminum alloy
	Position magnet	Slider magnet, square magnet, sector magnet
Mounting thread form		M18×1.5、M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction		Any direction
Outgoing mode		Cable outlet or Connector

• Electrical Connections

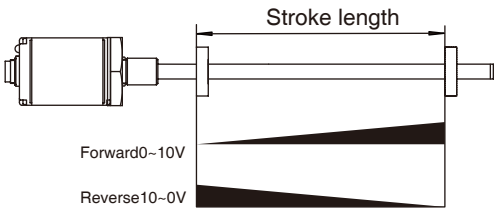
Input voltage	+24Vdc±20%
Operating current	<80mA (varying with range)
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

S s Output Characteristics-Analog Output

- The measurement accuracy of analog output magnetostrictive displacement sensor depends on the number of bits of built-in D/A module. Displacement signals can be directly output to external controllers, such as analog input of PLC.
- The sensor transforms the absolute position of the vernier magnet into a standard analog signal in real time, that is, 0~20A (or reverse), 4~20mA (or reverse) DC current or 0~5V (or reverse),-5~+5V (or reverse), 0~10V (or reverse),-10~+10 (or reverse) DC voltage, etc. The change trend of the output value is linear with the movement direction of the magnet ring, which can be set as forward and reverse output according to needs. As shown in the following figure:



Current output includes: 0~20mA (or reverse) 、4~20mA (or reverse)



Voltage output includes: 0~5V (or reverse) 、-5~+5V (or reverse) 、0~10V (or reverse) 、-10~+10V (or reverse)

L l LED Real-time State Monitoring and Diagnosis

- Red and green LED indicator built into the sensor head cover provide sensor working condition and diagnostic function.

Green light	ON	ON	ON	Flash
Red light	OFF	Flash	ON	ON
Function	Normal work	Magnet leaves Stroke length range	Magnet not detected	Programming status

B b Programming

- TEC sensors are field programmable using a USB converter. No need to open the electronic bin, USB port power supply, standard cable connection, fully meet customer needs. The following parameters of the sensor can be modified through the configuration software on the PC side: set the measurement direction of the sensor; set the zero point and full scale point of the sensor; graphically display the magnet ring position value; diagnose the sensor online through the error code.

USB converter
(Order No. TEC612811)

Sensor programming window

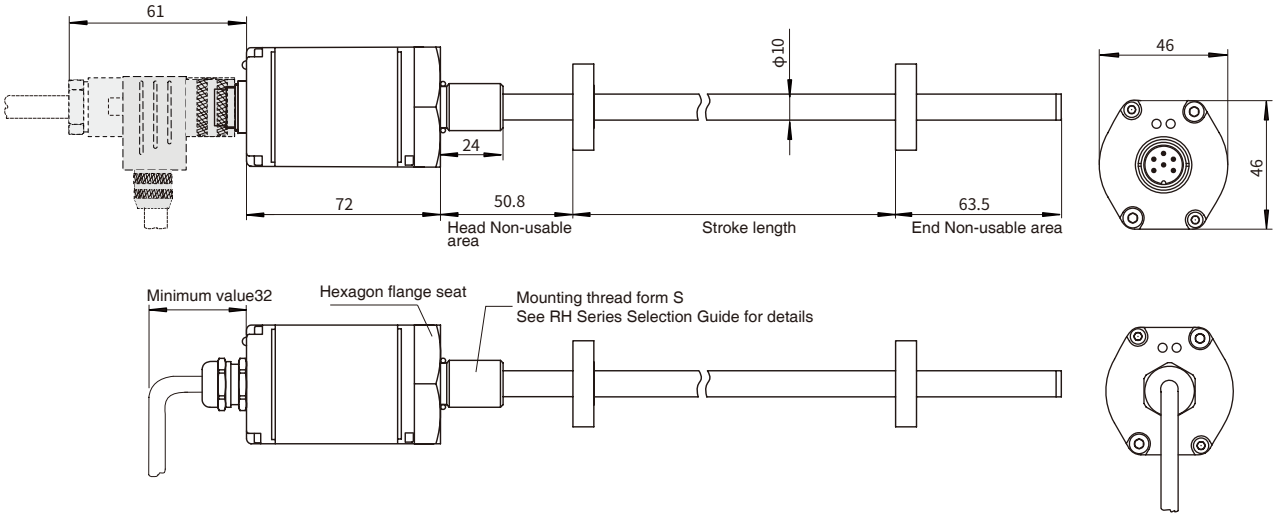
Aa Installation Instructions-Analog Output

Analog output magnetostrictive displacement sensor, suitable for real-time and precise measurement of moving parts stroke, it can measure the absolute displacement or stroke of vernier magnet, expressed in the form of standard analog quantity, including: 0~20MA (or reverse), 420MA (or reverse) DC current or 0~5V (or reverse),-5~+5V (or reverse), 0~10V (or reverse),-10~+10V (or reverse) DC voltage, etc. Sensors have built-in and external two different installation methods, built-in type is suitable for the built-in installation of hydraulic cylinders, compact structure; the external type adopts aluminum profile, which is installed outside the moving parts and convenient to use.

• Dimensions and installation guidance of RH pressure-resistant rod sensor

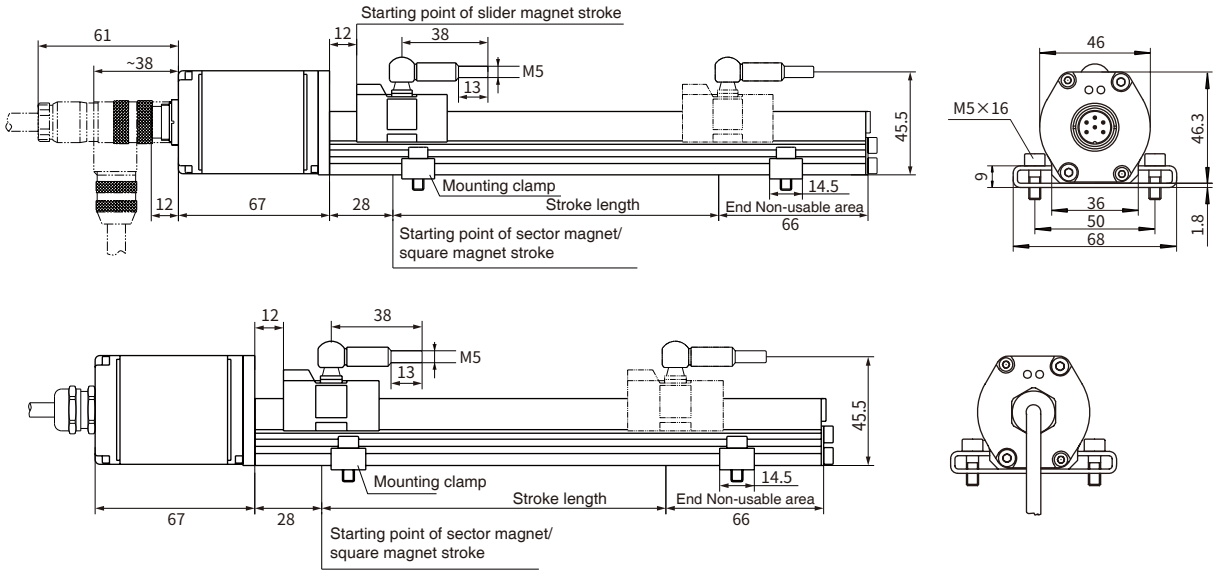
RH series pressure-resistant rodshell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode.Mounting thread form M18×1.5 or M20×1.5 or 3/4"-16UNF-3A.

Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The default values of the first and last measurement Non-usable areas of this product are 50.8mm and 63.5mm respectively. The value of the measurement Non-usable area can be appropriately modified according to the needs of customers, please pointed out when ordering.

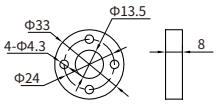
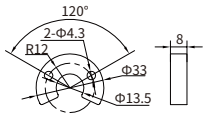
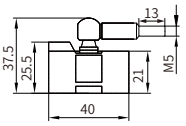


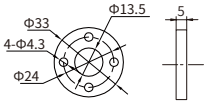
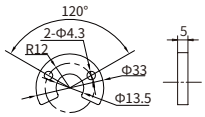
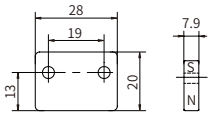
• Dimensions and installation guidance of RP aluminum profile sensor

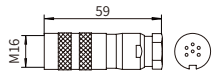
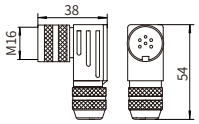
RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.



C C Common Accessories - Analog Output

Accessory name/ model	Dimensions
Standard magnet ring Order No.: 211501	
Sector magnet Order No.: 211502	
Slider magnet Order No.: 211503	

Accessory name/ model	Dimensions
Magnetic isolation gasket	
Sector magnetic isolation gasket	
Square magnet Order No.: 211508	

Accessory name/ model	Dimensions
6-pin Female Connector Order No.: 312701	
6-pin 90 Female Connector Order No.: 312702	

Note: Please refer to "Magnet ring Selection" for details of magnet ring kit and other models.

• Wiring mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet output, refer to the line color definition in the following table for connection mode

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

Pin	Line color 1*	Line color 2*	Pin/wire function definition
1	Blue	Grey	No. 1 magnet ring position signal(+)
2	Green	Pink	No. 1 magnet ring position signal(-)
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc (power supply circuit)

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

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

Pin	Line color 3*	Pin/wire function definition
1	Yellow	Current output
2	Grey	0Vdc(Current/Voltage Loop)
3	Pink	Reservation
4	-	Reservation
5	Green	0...10V
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Selection Guide - Analog Output

R		–	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

RH	Pressure-resistant rod (internal or external)
RP	Aluminum profile (external only)

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09 Magnet ring type / mounting thread form

Only for RH series	S1	M18×1.5, measuring rod diameter 10mm, 304 material
	S2	M20×1.5, measuring rod diameter 10mm, 304 material
	S3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material
Only for RP series	C1	Sector magnet
	C2	Slider magnet
	C3	Square magnet

10 - 13 Connection form

10 - 11 Cable outlet mode

DH	PUR sheath, orange,-20~90℃, end scattered, line color 1
DU	PVCsheath, orange, -20~105℃, end scattered, line color 2
DB	PVC sheath, orange,-20~105℃, end scattered, line color 3
DI	PUR sheath, orange,-20~90℃, end with 6-pin connector
DV	PVC sheath, orange,-20~105℃, end with 6-pin connector
DC	PVC sheath, orange,-20~105℃, end with 8-pin connector

12 - 13 Cable outlet mode: cable length, 01~99 meters

Note: For supporting cables, please refer to Analog/Start-Stop Cable Accessories Selection

10 - 13 Connector mode

PH60	M16 male connector (6-pin)
PB80	M16 male connector (8-pin)

14 - 17 Signal output mode

14 - 15 Output form and direction

A0	Current output，4 ~ 20mA
A1	Current output，20 ~ 4mA
A2	Current output，0 ~ 20mA
A3	Current output，20 ~ 0mA
V0	Voltage output，0 ~ 10V
V1	Voltage output，10 ~ 0V
V2	Voltage output，-10 ~ +10V
V3	Voltage output，+10 ~ -10V
V4	Voltage output，0 ~ 5V
V5	Voltage output，5 ~ 0V
V6	Voltage output，-5 ~ +5V
V7	Voltage output，+5 ~ -5V

16 Number of magnet rings

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, customizable

S0	50.8mm+63.5mm
B0	30mm+60mm
S1	28mm+66mm（used in RP series）

20-21 Country

Refer to the country list，page 130.

Note:The forward output of the sensor means that when the magnet ring moves away from the electronic bin, the output value increases and decreases when the magnet ring moves in the reverse direction.

Selection example : RH-M0800-S1-DH02-A01C-S0-CN

Indicates: the ordered product model is RH structural displacement sensor, the measuring range is 800mm, and the mounting thread form is M18×1.5; the diameter of the measuring rod is 10mm, and the material is 304; cable ouelet connection, 2m long PUR orange cable end scattered; 4~20mA current output; no magnet ring display value is the minimum value; single magnet ring; the non-usable area of the first end is 50.8mm, and the non-usable area of the end is 63.5mm.

Selection of Analog/Start-Stop Cable Fittings

A	S	T	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
A S T	Analog/Start-Stop interface

04 - 07	Cable length
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m

08 - 10	Cable type and outlet mode
H 0 1	One end of 6-pin (M16) female connector, and one end scattered
H 0 3	One end of 6-pin (M16) right angle female connector, and one end scattered
U 0 1	One end of 6-pin (M16) female connector, and one end scattered
U 0 2	One end of 8-pin (M16) female connector, and one end scattered
U 0 3	One end of 6-pin (M16) right angle female connector, and one end scattered
U 0 4	One end of 8-pin (M16) right angle female connector, and one end scattered
Note	H: cable type, PURsheath, orange, -20~90℃
	U: Cable type, PVCsheath, orange, -20~105℃

- Selection example: AST-M005-H01

  Indicates: Analog or Start-Stop interface cable, cable length 5 meters, PURsheath, orange, -20~90°C, one end of the cable is 6-pin (M16) vcvfemale connector, and one end scattered.

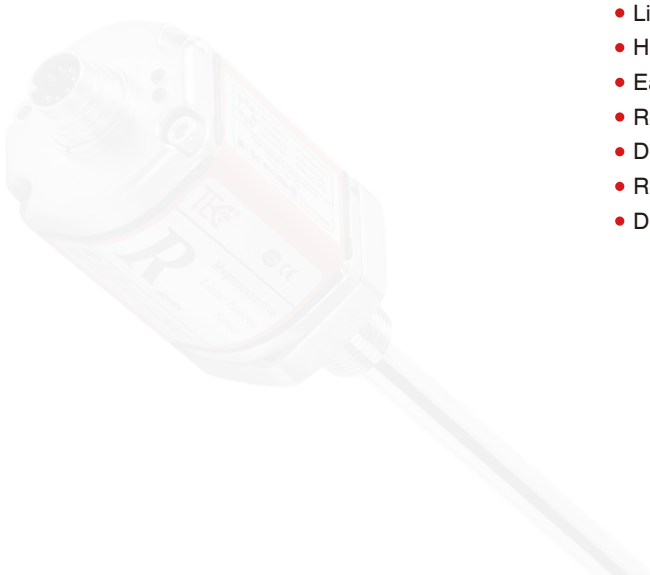
- Selection example:AST-M010-U04

  Indicates: Analog or Start-.Stop interface cable, cable length 10 meters, PVC sheath, orange, -20~105C, one end of the cable is an 8-pin (M16) right angle female connector, and one end scattered.

RH/RP Displacement Sensor - SSI Output

Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Linear measurement, absolute output
- High resolution, up to 0.1μm
- Easy diagnosis, LEDs real-time condition monitoring
- Repeatability is less than 0.001%FS
- Digital technology, stable and reliable
- Real-time induction and synchronous measurement
- Direct SSI signal output can directly replace encoder



Product Parameters - SSI Output

• Input

Measurement data	Position magnet ring
Stroke length	25~5500 mm， customized according to customer needs
Number of measurements	1

• Output

Interface	SSI Synchronous Serial Interface
Data Format	Binary or Gray code
Data length	24/25/26bit
Resolution	0.1/0.5 / 1 / 2 / 5 / 10 / 20 / 40/ 50 / 100 μm
Nonlinearity	<±0.01% of full scale, minimum ±50μm
Repetition accuracy	<±0.001% of full scale, minimum ±1μm
Transmission rate	50KBD~1MBD line length <3 <50 <100 <200 <400（m） Rate 1000 <400 <300 <200 <100（KBD）
Update time (High update rate)	Stroke: 300 750 1000 2000 5000 mm Frequency: 3.7 3.0 2.3 1.2 0.5 kHz
Update time (general)	1KHz (range ≤ 1m) 500Hz (1m < range ≤ 2m) 250Hz (2m < range ≤ 3m), customizable
Hysteresis	<10μm
Temperature coefficient	<15ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67RH Stainless Stell Rod/IP65RP Aluminum profile
Operating temperature	-40℃ ~ +85℃
Humidity/ dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC Test	GB/T17626.2/3/4/6/8，Grade4/3/4/3/3，Class A，CE Certification

• Structure and Materials

Failure indication		Electronic bin coverwith LEDs display
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350bar continuous)/700bar (peak)
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic bin	Aluminum alloy
	Measuring rod	Aluminum alloy
	Position magnet	Slider magnet, square magnet, sector magnet
Mounting thread form		M18×1.5、 M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction		Any direction
Outgoing mode		Cable outlet or Connector

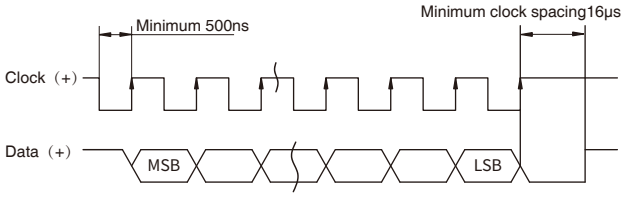
• Electrical Connections

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

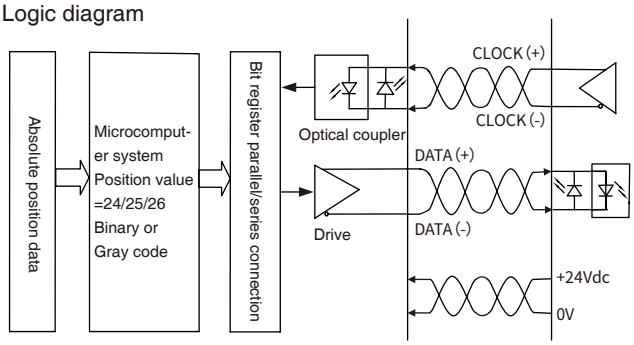
S s Output Characteristics-SSI Output

- SSI output magnetostrictive displacement sensor can provide Synchronized Serial Interface (SSI), which can convert the real-time position of vernier magnet into 24-bit, 25-bit or 26-bit (binary or Gray code) serial data format, and transmit the data to the controller by serial communication after receiving the clock signal provided by the controller. The format of SSI output data is identical to absolute output encoder, and it can be directly connected with PLC function modules (such as SM338 or SM138 of Siemens), which can be conveniently used to replace absolute encoder.

Timing diagram



Logic diagram



L l LED Real-time State Monitoring and Diagnosis

- Red and green LEDs built into the sensor head cover provide sensor working condition and diagnostic function.

Green light	ON	ON	Flash
Red light	OFF	ON	ON
Function	Normal work	The magnet leaves the Stroke length range or the magnet cannot be detected	Programming state

B b Programming

- The TEC sensor can be programmed in the field using a USB converter. No needs to open the electronic bin, USB port power supply, standard cable connection, fully meet the needs of customers. The following parameters of the sensor can be modified by the configuration software of PC; Set sensor parameters (data length, data format, measurement direction); Graphical display of magnet position value; The user arbitrarily sets the sensor zero point and the measurement display value; Diagnose the sensor online by error code.

USB Converter
（Order No. TEC612812）

Sensor Programming Window

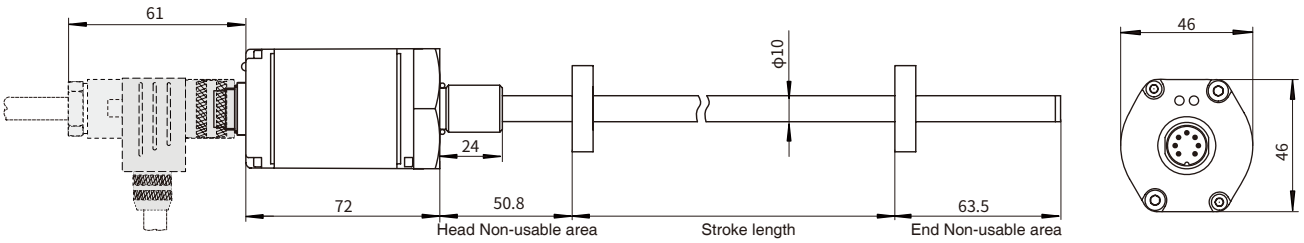
Installation Instructions SSI Output

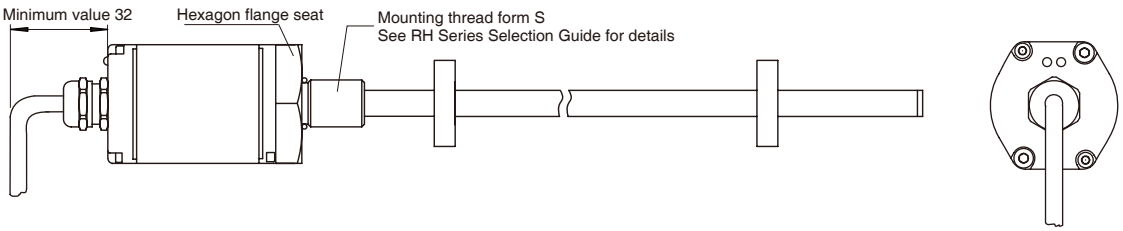
SSI output magnetostrictive linear displacement sensor provides synchronous serial signal output, which can convert the real-time position of vernier magnet into 24, 25 or 26-bit (binary or Gray code) data form, and transmit the data to the controller by serial communication after receiving the clock signal provided by the controller. The data format of SSI output is identical with absolute output encoder, and it can be connected directly with the function module of PLC, so it can be conveniently used to replace absolute encoder.

• Dimensions and installation guidance of RH pressure-resistant rod sensor

RH series pressure-resistant rod shell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode, mounting thread form M18×1.5 or M20×1.5 or 3/4" -16UNF-3A.

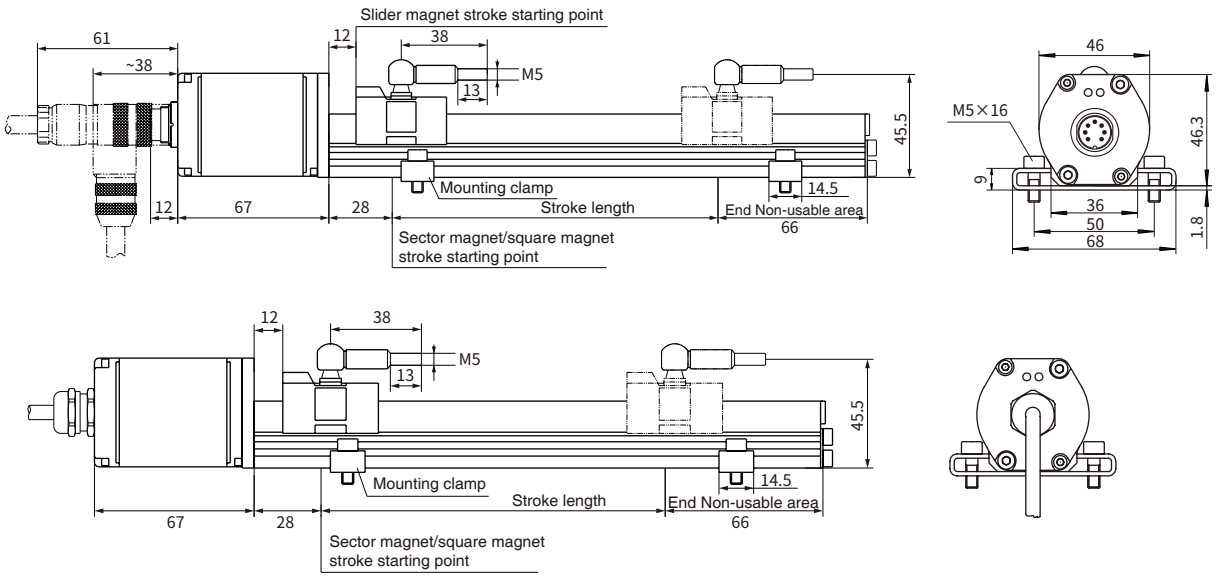
Note: The measurement non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The default values of the first and last measurement non-usable areas of this product are 50.8mm and 63.5mm respectively. The value of the measurement non-usable area can be appropriately modified according to the needs of customers, please pointed out when ordering.



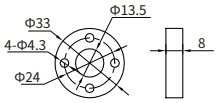
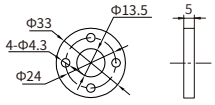
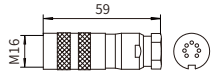
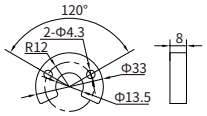
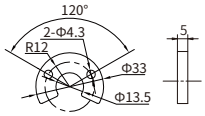
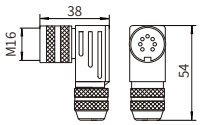
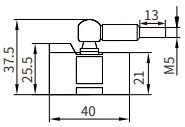
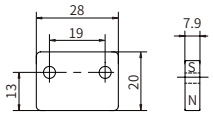


• Dimensions and installation guidance of RP aluminum profile sensor

RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.



Common Accessories - SSI Output

Accessory name/ model	Dimensions	Accessory name/ model	Dimensions	Accessory name/ model	Dimensions
Standard Magnet ring Order No.: 211501		Magnetic isolation gasket		7-pinFemale Connector Order No.: 312703	
Sector magnet Order No.: 211502		Sector magnetic isolation gasket		7-pin 90 Female Connector Order No.: 312704	
Slider magnet Order No.: 211503		Square magnet Order No.: 211508			

Note: Please refer to "Magnet ring Selection" for details of magnet ring kit and other models.

Wiring mode

When the sensor is connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet output, refer to the line color definition in the following table for connection mode

7-pin male connector arrangement (facing the sensor head)

Pin	Line color 1*	Line color 2*	Pin/wire 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	0 Vdc
7	-	-	Do not connect

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

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

Pin	Line color 3*	Pin/wire function definition
1	Yellow	Clock （+）
2	Grey	Data （+）
3	Pink	Clock （-）
4	-	Reservation
5	Green	Data （-）
6	Blue	0 Vdc（power supply circuit）
7	Brown	+24Vdc power supply （-20%~+20%）
8	White	Reservation

Selection Guide-SSI Output

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

01 - 02 Sensor shell form

RH	Pressure-resistant rod (internal or external)
RP	Aluminum profile (external only)

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09 Magnet ring Type / Mounting Thread Form

Only for RH series	S1	M 18×1.5, measuring rod diameter 10mm, 304 material
	S2	M20×1.5, measuring rod diameter 10mm, 304 material
	S3	3/4 "-16UNF-3A, measuring rod diameter 10mm, 304 material
Only for RP series	C1	Sector magnet
	C2	Slider magnet
	C3	Square magnet

10 - 13 Connection form

10- 11 Cable outlet mode

DH	PUR sheath, orange,-20~90℃, end scattered, line color 1
DU	PVC sheath, orange,-20~105℃, and one end scattered, line color 2
DB	PVC sheath, orange,-20~105℃, and one end scattered, line color 3
DI	PUR sheath, orange,-20~90℃, end with 6-pin connector
DV	PVC sheath, orange,-20~105℃, end with 6-pin connector
DC	PVC sheath, orange,-20~105℃, end with 8-pin connector

Note: See SSI cable accessories selection for supporting cables

12 - 13 Cable outlet mode: cable length, 01~99 meters

10 - 13 Connector mode

PH70	M16 male connector (7-pin)
PB80	M16 male connector (8-pin)

14 - 19 Signal output mode

15 Data length

1	24-bit	2	25-bit	3	26-bit*

* 26-bitis parity bits and 25-bitis 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	6	0.002mm
7	0.001mm	8	0.04mm
9	0.0005mm	0	0.0001mm

18 Direction

0	Forward	1	Reverse

19 Mode

0	Regular	1	Synchronization	2	High update rate

20 - 21 Non-usable area at head and end, customizable

S0	50.8mm+63.5mm
B0	30mm+60mm
S1	28mm+66mm（used in RP series）

22 - 23 Country

Refer to the country list, page 130.

- Note: The forward output of the sensor means that when the magnet ring moves away from the electronic bin, the output value increases and decreases when the magnet ring moves in the reverse direction.
- Selection example: RH-M0500-S1-PH70-S2B700-S0-CN

  Indicates: The ordered product model is RH series displacement sensor, the measuring range is 500mm, the mounting thread form is M18×1.5, the measuring rod diameter is 10mm, 304 material, 7-pin M16 connector connection, no cable, SSI output (data bit length is 25-bit, output format is binary, resolution is 0.001mm, forward output, asynchronous mode), and the head non-usable area is 50.8mm and the end non-usable area is 63.5mm.

SSI Cable accessories selection Guide

S	S	I	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
S S I	SSI interface

04 - 07	Cable length
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m

08 - 10	Cable type, outlet mode
H 0 1	One end of 7-pin (M16) is female connector, and one end scattered
H 0 3	One end of 7-pin (M16) right angle female connector, and one end scattered
U 0 1	One end of 7-pin (M16) is female connector, and one end scattered
U 0 2	One end of 8-pin (M16) is female connector,and one end scattered
U 0 3	One end of 7-pin (M16) right angle female connector, and one end scattered
U 0 4	One end of 8-pin (M16) right angle female connector, and one end scattered

Note	
	H: Cable type, PURsheath, orange, -20~90℃
	U: Cable type, PVC sheath, orange,-20~105℃

- Selection example: SSI-M005-H01

  Indicates: SSI interface cable, cable length 5 meters, PURsheath, orange, -20~90℃, one end of the cable is 7-pin (M16) female connector, and one end scattered.

- Selection example: SSI-M010-U04

  Indicates: SSI interface cable, cable length 10 meters, PVC sheath, orange, -20~105℃, one end of the cable is an 8-pin (M16) right angle female connector, and one end scattered.

RH/RPDisplacement Sensor-Profibus-DP Bus Output

Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Linear measurement, absolute output
- High resolution, up to 5μm
- Easy diagnosis, LEDs real-time condition monitoring
- Repetition accuracy is less than 0.001% F.S
- Digital technology, stable and reliable
- Direct Profibus-DP signal output
- Supports simultaneous measurement of multiple magnet ring positions

Product parameters-Profibus-DP bus output

• Input

Measurement data	Position magnet ring
Stroke length	25~5500 mm，customized according to customer needs
Number of measurements	1~9

• Output

Interface	Profibus-DP System，ISO74498
Data format	Profibus-DP（EN-50170)
Transmission speed	Maximum 12Mbit/s
Resolution	1 / 5 / 10 / 20 / 50 / 100 μm
Nonlinearity	<±0.01% of full scale, minimum ±50μm
Repetition accuracy	<±0.001% of full scale, minimum ±1μm
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m），customizable
Hysteresis	<10μm
Temperature coefficient	<15ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67RH Stainless Stell Rod/IP65RP Aluminum profile
Operating temperature	-40℃ ~ +85℃
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A，CE Certification

• Structure and Material

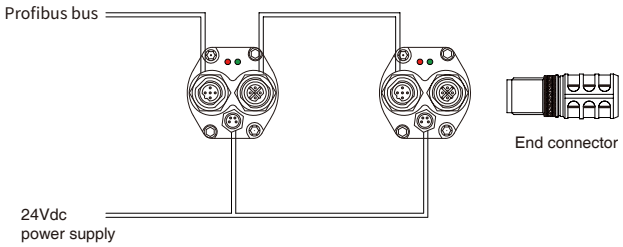
Failure indication		Electronic bin coverwith LEDs display
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa(continuous)/70MPa(peak)or 350bar(continuous)/700bar (peak)
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic bin	Aluminum alloy
	Measuring rod	Aluminum alloy
	Position magnet	Slider magnet, square magnet, sector magnet
Mounting thread form		M18×1.5、 M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction		Any direction
Outgoing mode		Cable outlet or Connector

• Electrical connection

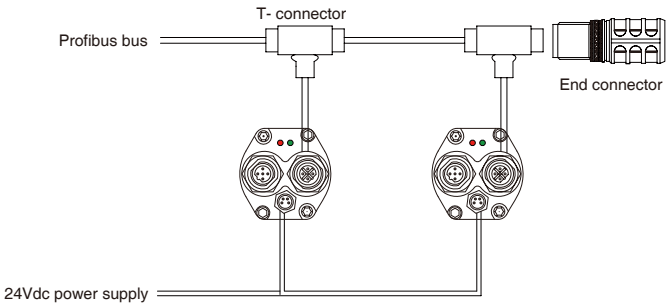
Input voltage	+24Vdc±20%
operating current	＜80mA（varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

S s Output Characteristics-Profibus-DP Bus Output

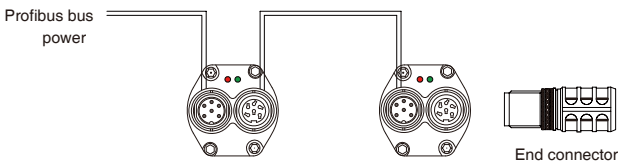
- Connection by 5-pin connector (series connection): The power supply cable is separate from the bus connection.



- Connection by 5-pin connector (parallel connection): a standard T connector with cable for bus connection, the power supply cable is separate. When any sensor on the line is disconnected, the sensors on other lines keep working.



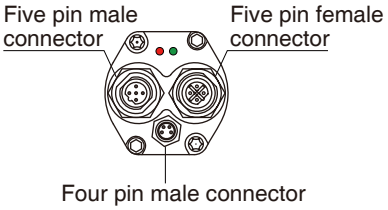
- Connection with a 6-pin connector (series connection)



L l LED Real-time State Monitoring and Diagnosis

- The integrated LEDs (red or green) provide the basic status feedback and troubleshooting function of the sensor.

Green light	ON	ON	Flash	Flash
Red light	OFF	ON	OFF	ON
Function	Normal work	Magnets not detected or incorrect number	Waiting for host parameters	Programming state



B b Programming

- The TEC sensor can be programmed in the field using a USB converter. No need to open the electronic bin, USB port power supply, standard cable connection, fully meets the needs of customers. The following parameters of the sensor can be modified by the configuration software of PC: setting the slave station address; Graphical display of magnet ring position value; Diagnose the sensor online by error code.

USB Converter
（Order No.TEC612814）

Sensor Programming Window

Aa Installation and Use Instructions - Profibus-DP Bus Output

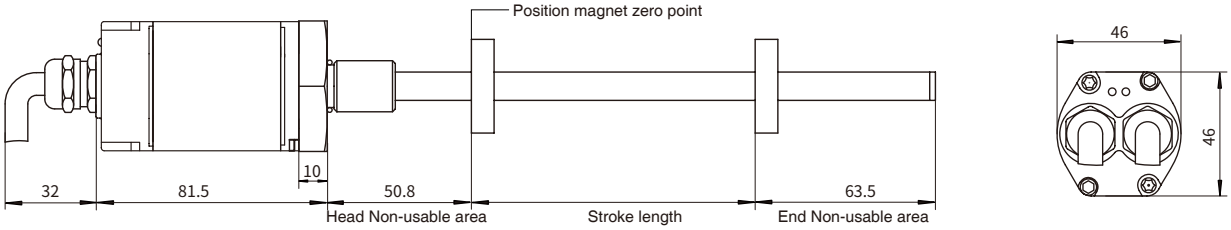
The DP output magnetostrictive sensor meets the Profibus-DP (EN 50 170) protocol. The sensor transmits the absolute position data of the magnet ring to the controller in the form of RS-485 standard serial asynchronous, and the maximum transmit rate can reach 12Mbps. The Profibus-DP interface provides powerful diagnostic and setting functions in the form of GSD data sheets.

• Dimensions and installation guidance of RH pressure-resistant rod sensor

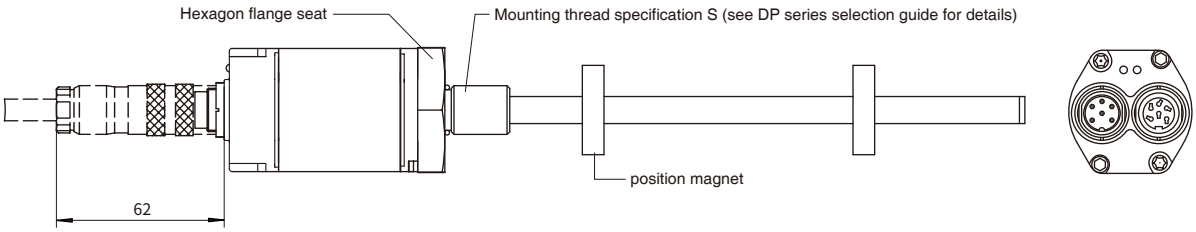
RH series pressure-resistant rodshell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode, mounting thread form M18×1.5 or M20×1.5 or 3/4"-16UNF-3A.

Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The default values of the first and last measurement Non-usable areas of this product are 50.8mm and 63.5mm respectively. The value of the measurement Non-usable area can be appropriately modified according to the needs of customers, please pointed out when ordering.

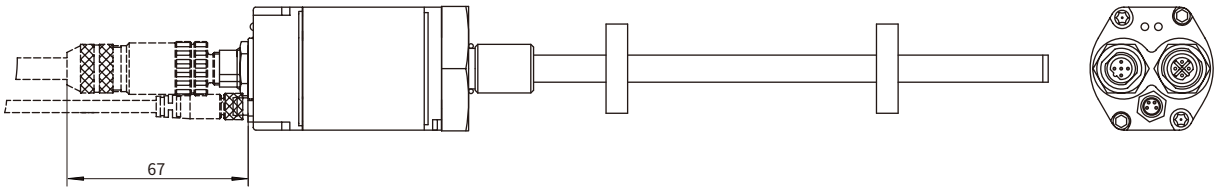
Cable outlet



Six pin Connector



Five pin Connector



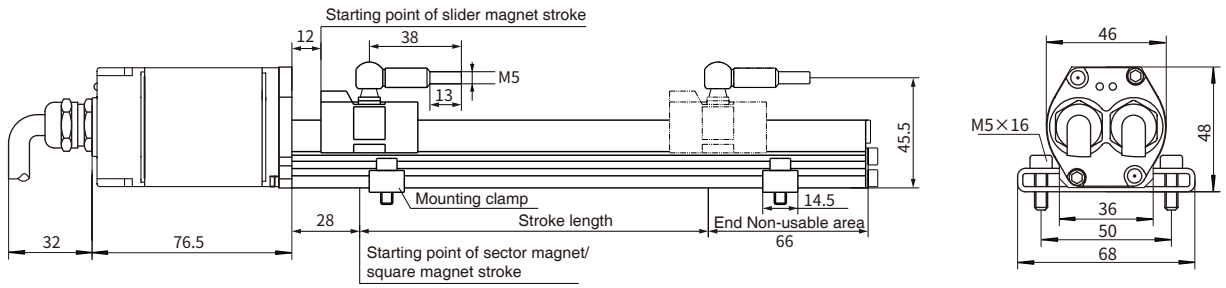
Installation Instructions-Profibus-DP Bus Output

• Dimensions and installation guidance of RP aluminum profile sensor

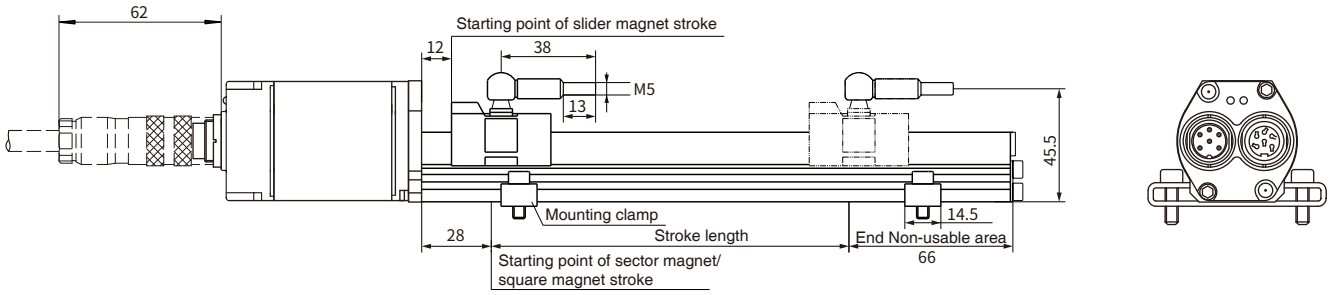
RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.

Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The default value of the measurement Non-usable area at the head and end is 28mm and 66mm respectively. The value of the measurement Non-usable area can be modified appropriately according to the customer's needs, please pointed out when ordering.

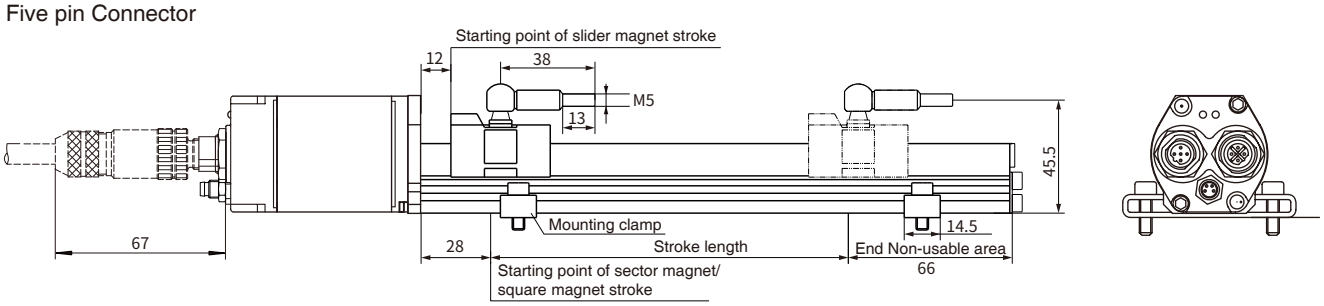
Cable outlet



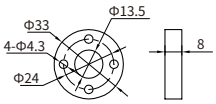
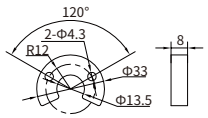
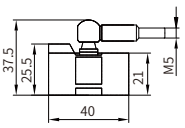
Six pin Connector

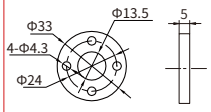
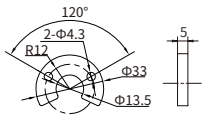
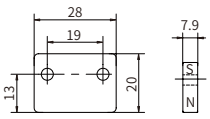


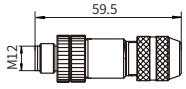
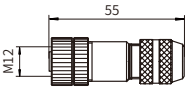
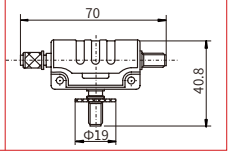
Five pin Connector

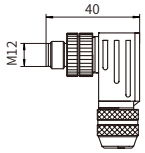
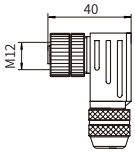
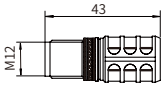


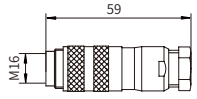
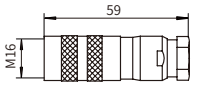
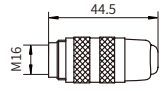
C Common Accessories-Profibus-DP Bus Output

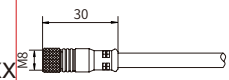
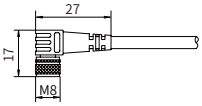
Accessory name/ model	Dimensions
Standard Magnet ring Order No.: 211501	
Sector magnet Order No.: 211502	
Slider magnet Order No.: 211503	

Accessory name/ model	Dimensions
Magnetic isolation gasket	
Sector magnetic isolation gasket	
Square magnet Order No.: 211508	

Accessory name/ model	Dimensions
5-pin connector male head（B code） Order No.: 312706	
5-pin female connector （B code） Order No.: 312707	
5-pin T-shaped male connector Order No.: 312708	

Accessory name/ model	Dimensions
5-pin 90° Connector male Order No.: 312709	
5-pin 90° female connector Order No.: 312710	
5-pin end connector Order No.: 312705	

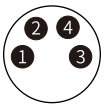
Accessory name/ model	Dimensions
6-pin Connector male Order No.: 312714	
6-pin female connector Order No.: 312701	
6-pin end male c onnector Order No.: 312715	

Accessory name/ model	Dimensions
4-pin Female Connector （For power supply） Order No.: 522000-XX xx-cable length in m	
4-pin 90° female connector （For power supply） Order No.: 522001-XX xx-cable length in m	

Note: Please refer to "Magnet ring Selection" for details of magnet ring kit and other models.

• Wiring mode

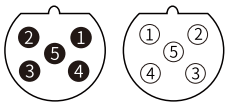
When the sensor is connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet output, refer to the line color definition in the following table for connection mode



4-pin connector socket (for power supply)

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

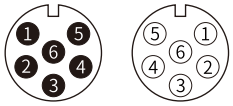
Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc power supply (-20%+20%)
2	White	Do not connect
3	Blue	0Vdc(power supply circuit)
4	Black	Do not connect



• 5-pin male connector, female connector pin arrangement (facing the direction of the sensor head)

Pin	Line color	Pin/wire function definition
1	-	VP+5N(applicable to end wiring only) *
2	Green	RxD/TxD-N(Bus)
3	-	DGnd(end connection only) *
4	Red	RxD/TxD-P(Bus)
5	Shielded wire	Ground the cable shield

Note: * Only applicable to signal connection of sensor female connector



• 6-pin male connector, female connector pin arrangement (facing the direction of the sensor head)

Pin	Line color	Pin/wire function definition
1	Green	RxD/TxD-N(bus)
2	Red	RxD/TxD-P(bus)
3	-	DGnd(for end wiring only) *
4	-	VP+5N(for end wiring only) *
5	Black	+24Vdc power supply (-20%+20%)
6	Blue	0 Vdc (power supply circuit)

Note: * Only applicable to signal connection of sensor female connector

Selection Guide-Profibus-DP Bus Output

R □ – M □ □ □ □ – S □ – □ □ □ □ – D □ □ – □ □ – □ □

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
RH	Pressure-resistant rod (internal or external)
RP	Aluminum profile (external only)

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09	Magnet ring type/mounting thread form	
Only for RH series	S1	M18×1.5, measuring rod diameter 10mm, 304 material
	S2	M20×1.5, measuring rod diameter 10mm, 304 material
	S3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material
Only for RP Series	C1	Sector magnet
	C2	Slider magnet
	C3	Square magnet

10 - 13	Connection form
10 - 11	Cable outlet mode
DA	Single cable outlet, PUR sheath, cyan,-20~80C, end scattered
DB	Double cable outlet, PUR sheath, cyan,-20~80°C, end scattered
DC	Double cable outlet, PUR sheath, cyan, -20-～80°C, M16, 6-pin, end with a male connector and a female connector
12 - 13	Cable outlet: cable length, 01 to 99 meters
10 - 13	Connector mode
PD53	One set of 5-pin male connector (M12), one set of 5-pin female connector (M12), One set of 4-pin male connectors (M8)
PD63	One set of 6-pin male connectors (M16), one set of 6-pin female connectors (M16)

Note: See SSI cable accessories selection for supporting cables

14 - 16	Signal output mode
14	Profibus Protocol
15	Number of magnet rings (1~9 optional)
16	0-single magnet B-single/multiple magnet rings

17 - 18	Non-usable area at head and end, customizable
S0	50.8mm+63.5mm
B0	30mm+60mm
S1	28mm+66mm（used in RP series）

19 - 20	Country
□□	Refer to the country list，page 130.

- Note: The forward output of the sensor means that when the magnet ring moves away from the electronic bin, the output value increases and decreases when the magnet ring moves in the reverse direction.
- Selection example:RH-M0300-S1-PD53-D10-S0-CN
  Indicates:The ordered product model is RH structure displacement sensor, with a measuring range of 300mm, mounting thread form of M18×1.5 (metric system), measuring rod diameter of 10mm, 304 material, 5-pin Connector connection, Profibus signal output, single magnet ring, head end Non-usable area of 50.8mm and end Non-usable area of 63.5mm.

Pp Profibus-DP Cable Accessories Selection

D	P	–	M				–			
01	02		03	04	05	06		07	08	09

01 - 02	Type
D P	Profibus-DP interface

03 - 06	Cable length
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m

07 - 09	Cable type、utlet mode
H 0 1	One end of 5-pin (M12) female connector, and one end scattered
H 0 2	One end of 5-pin (M12) female connector, and one end scattered
H 0 3	One end of 5-pin (M12) right angle female connector, and one end scattered
H 0 4	One end of 5-pin (M12) right angle maleconnector, and one end scattered
Z 0 5	One end of 6-pin (M16) female connector, and one end scattered
Z 0 6	One end of 6-pin (M16) female connector, and one end scattered
Z 0 7	One end of 6-pin (M16) right angle female connector, and one end scattered
H 1 2	One end of 5-pin (M12) female connector; One end of 5-pin (M12) female connector
H 3 4	One end of 5-pin (M12) right angle male connector; One end of 5-pin (M12) right angle female connector
Z 5 6	One end of 6-pin (M16) male connector and one end of 6-pin (M16) is female connector
Note	H：Cable type, PUR sheath, purple, 2 cores,-20~80℃
	Z：Cable type, PUR sheath, cyan, 5-pin,-20~80C℃

- Selection example：DP-M020-H01

  Indicates: Profibus-DP interface cable, 20 meters long, PUR sheath, purple, 2 cores,-20~80℃, 5-pin (M12) at one end of the cable are female connector, and the other end is scattered.

- Selection example： DP-M015-Z56

  Indicates: Profibus-DP interface cable, with a length of 15m, PUR sheath, cyan, 5 cores,-20~80℃, with 6-pin (M16) at one end male connector and 6-pin (M16) at the other end female connector.

RH/RP Displacement Sensor-CANBus Output

Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Linear measurement, absolute output
- High resolution, up to 1μm
- Easy diagnosis, LEDs real-time condition monitoring
- The repetition accuracy is 0.001% F.S
- Digital technology, stable and reliable
- CANopen signal output
- Support simultaneous measurement of multiple magnet ring positions

Product Parameters-CAN Bus Output

• Input

Measurement data	Position magnet ring
Stroke length	25~5500 mm，customized according to customer needs
Number of measurements	1~9

• Output

Interface	CANBus System Protocol, IS0DIS11898
CANopen	CIA Standard DS-301V3.0 Encoder Profile DS-406V3.1
Transmission speed	Maximum 1Mbit/s
Resolution	1 / 2 / 5 / 10 / 20 / 50 / 100 μm
Nonlinearity	< 0.01% full-scale taxi, minimum 50μm
Repetition accuracy	<±0.001% of full scale, minimum ±1μm
Update time	1KHz（range ≤1m）500Hz（1m< range ≤2m） 250Hz（2m< range ≤3m），customizable
Hysteresis	<10μm
Temperature coefficient	<15ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67RH Stainless Stell Rod/IP65RP Aluminum profile
Operating temperature	-40℃ ~ +85℃
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC Test	GB/T17626.2/3/4/6/8，Grade4/3/4/3/3，Class A, CE Certification

• Structure and Material

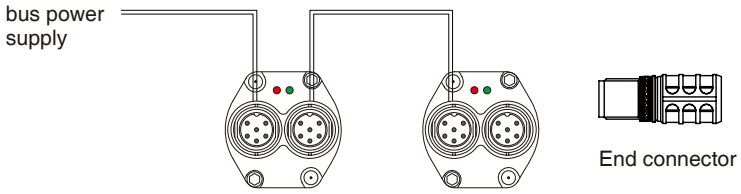
Failure indication		Electronic bin coverwith LEDs display
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350bar (continuous)/700bar (peak)
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic bin	Aluminum alloy
	Measuring rod	Aluminum alloy
	Position magnet	Slider magnet, square magnet, sector magnet
Mounting thread form		M18×1.5、 M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction		Any direction
Outgoing mode		Cable outlet or Connector

• Electrical Connection

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

Ss Output Characteristics-CAN Bus Output

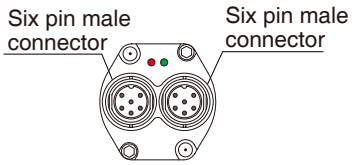
- Connect by 6-pinconnector (series connection)



Ll LED Real-time State Monitoring and Diagnosis

- As a slave station, CAN output magnetostrictive displacement sensor can upload the displacement information and velocity information of the vernier magnet to the controller in real time through bus. It conforms to CAN (ISO 11898) protocol standard, and the maximum transmission rate is 1Mbit/s.
- The integrated LEDs (red or green) provide the basic status feedback and troubleshooting function of the sensor.

Green light	ON	ON	ON	Flash
Red light	OFF	Flash	ON	ON
Function	Normal work	The magnet leaves the Stroke length range	Magnet not detected	Programming state

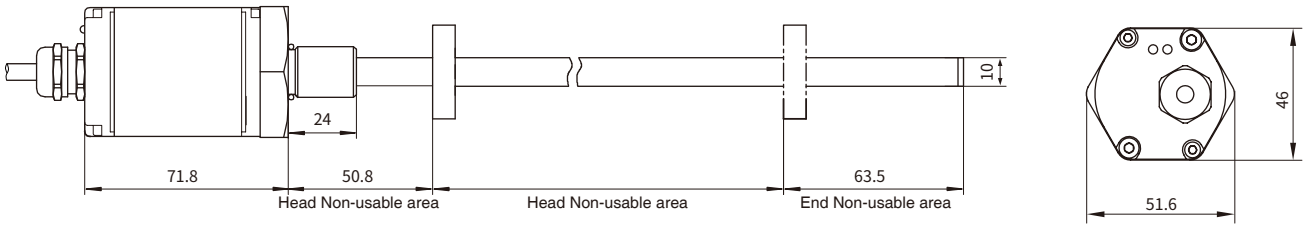


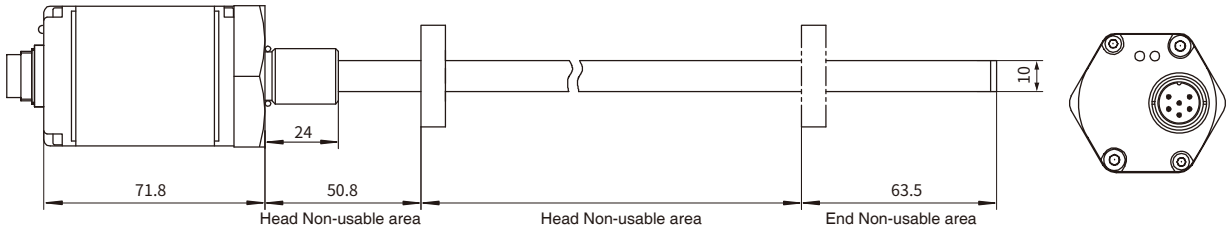
Aa Installation Instructions-CAN Bus Output

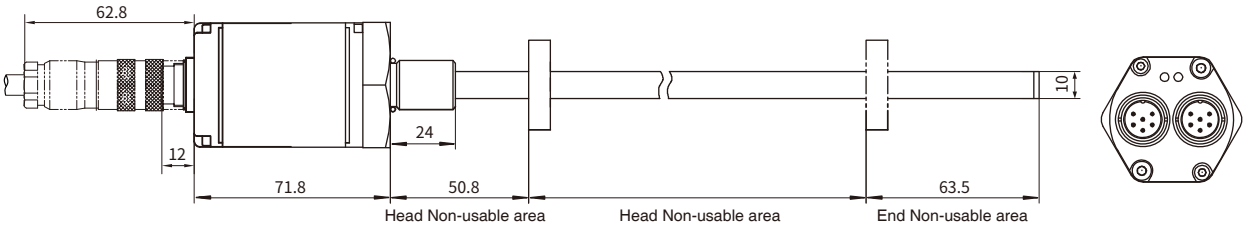
- Dimensions and installation guidance of RH pressure-resistant rod sensor

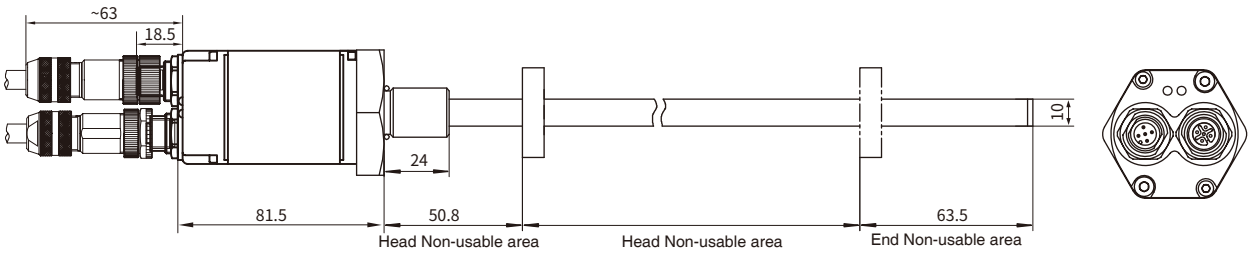
RH series pressure-resistant rodshell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode, mounting thread form M18×1.5 or M20×1.5 or 3/4"-16UNF-3A.

Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The values of the head and end non-usable areas of this product are 50.8mm and 63.5mm respectively. The value of the measurement non-usable area can be appropriately modified according to the needs of customers, please pointed out when ordering.







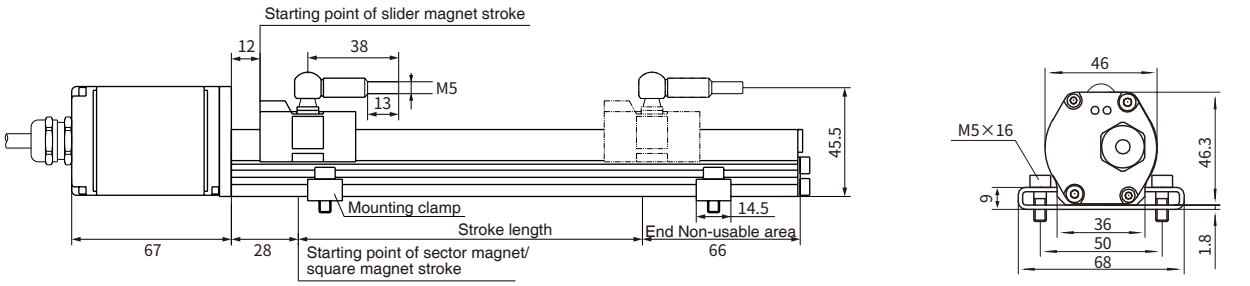


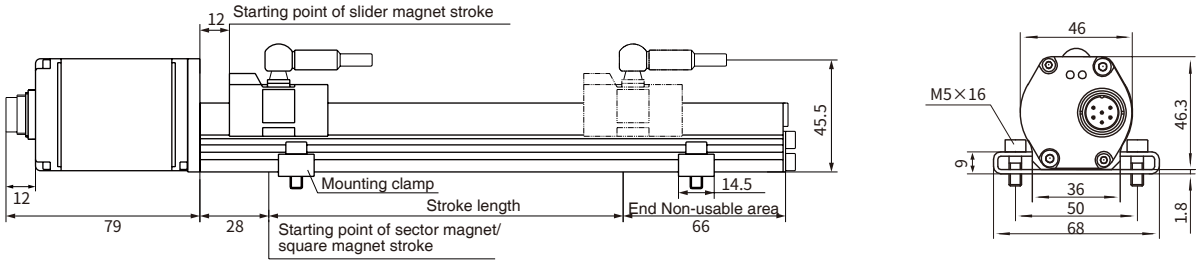
Installation Instructions-CAN Bus Output

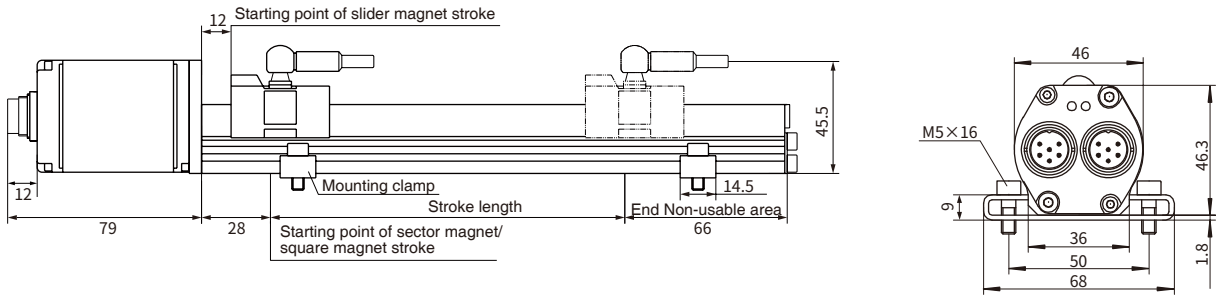
- Dimensions and installation guidance of RP aluminum profile sensor

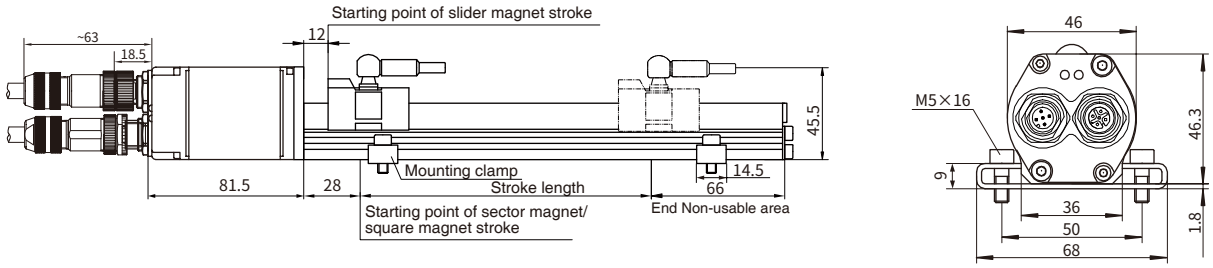
RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.

Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The default value of the measurement Non-usable area at the head and end of this product is 28mm and 66mm respectively. The value of the measurement Non-usable area can be modified appropriately according to the customer's needs, please pointed out when ordering.

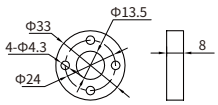
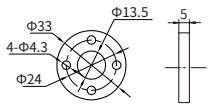
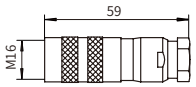
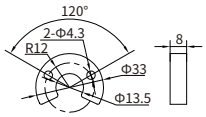
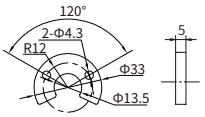
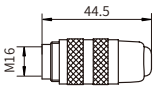
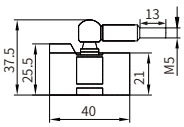
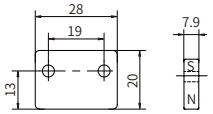








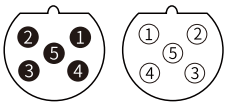
C Common Accessories - CAN Bus Output

Accessory name/ model	Dimensions	Accessory name/ model	Dimensions	Accessory name/ model	Dimensions
Standard Magnet ring Order No.: 211501		Magnetic isolation gasket		6-pin female connector Order No.: 312701	
Sector magnet Order No.: 211502		Sector magnetic isolation gasket		6-pin end female connector Order No.: 312722	
Slider magnet Order No.: 211503		Square magnet Order No.: 211508			

Note: Please refer to "Magnet ring Selection" for details of magnet ring kit and other models.

• Wiring mode

When the sensor is connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet output, refer to the line color definition in the following table for connection mode



• 5-pin male connector and female connector pin arrangement (facing the sensor head direction)

Pin	Line color	Pin/wire function definition
1	-	Do not connect
2	Brown	+24 Vdc power supply（-20%~+20%）
3	White	0Vdc （power supply loop）
4	Yellow	CAN（+）
5	Green	CAN （-）

4-pin connector socket (for power supply)

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

Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc power supply (-20%+20%)
2	White	Do not connect
3	Blue	0Vdc(power supply circuit)
4	Black	Do not connect

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

Pin	Line color	Pin/wire function definition
1	Green	CAN （-）
2	Yellow	CAN （+）
3	-	Do not connect
4	-	Do not connect
5	Brown	+24Vdc power supply（-20%~+20%）
6	White	0 Vdc（power supply loop）

Selection Guide-CAN Bus Output

R □ – M □ □ □ □ – □ □ – □ □ □ □ – C □ □ □ □ – □ □ – □ □

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

01 - 02 Sensor shell form

RH	Pressure-resistant rod (internal or external)
RP	Aluminum profile (external only)

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09 Magnet ring type/mounting thread form

Only for RH series	S1	M 18×1.5, measuring rod diameter 10mm, 304 material
	S2	M20×1.5, measuring rod diameter 10mm, 304 material
	S3	3/4 "-16UNF-3A, measuring rod diameter 10mm, 304 material
Only for RP Series	C1	Sector magnet
	C2	Slider magnet
	C3	Square magnet

10 - 13 Connection form

10 - 11 Cable outlet mode

DA	Single cable outlet, PUR sheath, cyan,-20~80C, end scattered

12 - 13 Cable outlet mode: cable length, 0199 meters

0DR1	PVC sheath, length 150mm, end 5 pin male connector

10 - 13 Connector mode

PD60	6-pin male connector (M16)
PD62	Two sets of 6-pin male connectors (M16)
PD50	5-pin male connector (M12)
PD52	5-pin male connector (M12) and 5-pin female connector (M12)
PD54	5-pin male connectors (M12), 5-pin female connectors (M12), 4-pin male connectors (M8)

Note: For supporting cables, please refer to CAN bus cable accessories selection

14 - 18 Signal output mode

14 Interface

C	CAN bus

15 Protocol type

1	CANopen	2	CANBasic

16 Baud

1	1000kBit/s	2	800kBit/s
3	500kBit/s	4	250kBit/s
5	125kBit/s	6	100kBit/s
7	50kBit/s	8	20kBit/s

17 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	6	0.002mm
7	0.001mm		

18 Number of magnet rings (1~9 optional)

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

S0	50.8mm+63.5mm
B0	30mm+60mm
S1	28mm+66mm（used in RP series）

21 - 22 Country

Refer to the country list，page 130.

- Note: The forward output of the sensor means that when the magnet ring moves away from the electronic bin, the output value increases and decreases when the magnet ring moves in the reverse direction.
- Selection example: RH-M0300-S1-PD60-C1171-S0-CN

  Indicates: The ordered product model is RH structure displacement sensor, the measuring range is 300mm, the mounting thread form is M18×1.5 (metric system), the measuring rod diameter is 10mm, the material is 304, One set of 6-pin male connector, the baud is 1000kbit/s, the resolution is 0.001mm, single magnet ring, the Non-usable area at the head is 50.8mm, and the Non-usable area at the end is 63.5mm.

C Selection of CAN Bus Cable Accessories

C	A	N	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
C A N	CAN bus
04 - 07	**Cable length**
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m
08 - 10	**Cable type, outlet mode**
08	Cable type
C	PVC sheath, purple, 4 cores,-40~75C
09 - 10	Connection
0 1	One end of 6-pin (M16) female connector, and one end scattered
0 2	One end of 5-pin (M12) female connector, and one end scattered
0 3	One end of 5-pin (M12) male connector, and one end scattered
0 4	One end of 5-pin (M12) right angle female connector, and one end scattered
0 5	One end of 6-pin (M16) right angle female connector, and one end scattered
1 1	6-pin (M16) female connector at both ends
2 3	One end 5-pin (M12) female connector and one end 5-pin (M12) male connector

- Selection example: CAN-M015-C01

  Indicates: CAN bus interface cable, 15m long, PVC sheath, purple, 4-pin,-40~75C, 6-pin (M16) at one end of the cable are female connector, and one end scattered.

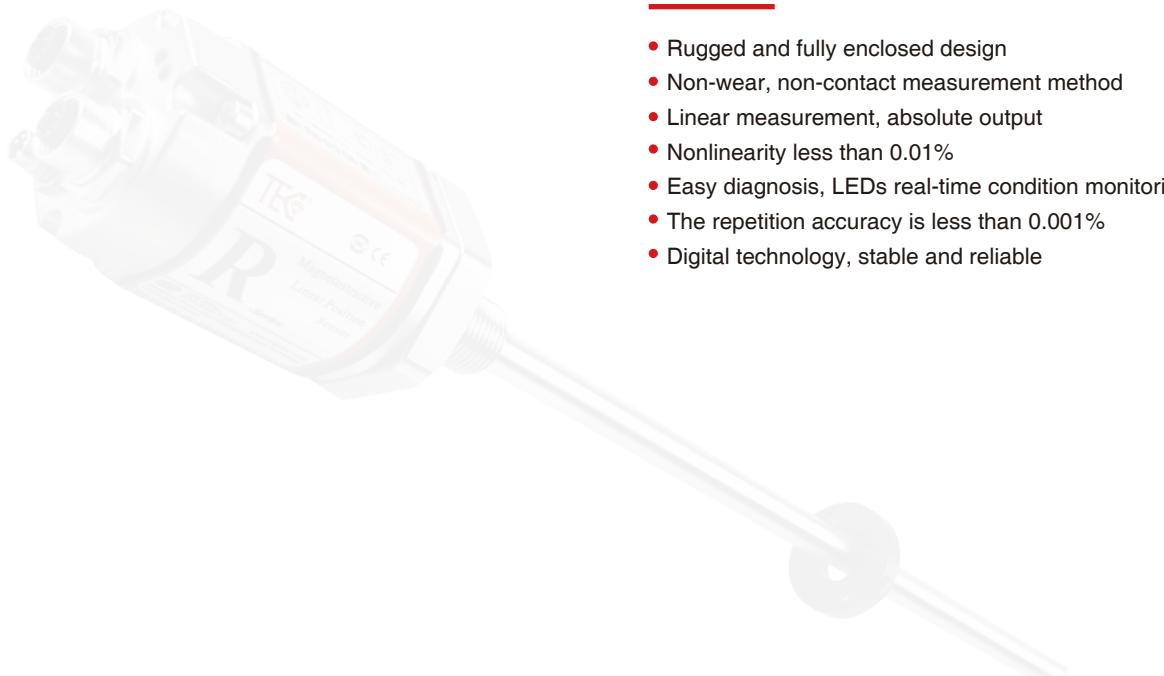
- Selection example: CAN-M020-C23

  Indicates: CAN bus interface cable, 20 meters long, PVC sheath, purple, 4 cores,-40~75C, with 5-pin (M12) at one end female connector and 5-pin (M12) at the other end male connector.

RH/RP Displacement Sensor - Profinet Output

Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Linear measurement, absolute output
- Nonlinearity less than 0.01%
- Easy diagnosis, LEDs real-time condition monitoring
- The repetition accuracy is less than 0.001%
- Digital technology, stable and reliable



Product Parameters-Profinet Output

• Input

Measurement data	Position magnet ring
Stroke length	25~5500 mm，customized according to customer needs
Number of measurements	1~9

• Output

Interface	Profinet IO RT
Data protocol	TEC Profile and Encoder Profile 4.1
Transmission speed	Maximum 100Mbit/s
Resolution	1 / 2 / 5 / 10 / 20 / 50 / 100 μm
Nonlinearity	<±0.01% of full scale, minimum ±50μm
Repetition accuracy	< 0.001% for full-scale taxis, minimum ±1μm
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m），customizable
Hysteresis	<10μm
Temperature coefficient	<15ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67RH Stainless Stell Rod/IP65RP Aluminum profile
Operating temperature	-40℃ ~ +85℃
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC Test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A, CE Certification

• Structure and Material

Failure indication		Electronic bin cover with LEDs display
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350bar (continuous)/700bar (peak)
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic bin	Aluminum alloy
	Measuring rod	Aluminum alloy
	Position magnet	Slider magnet, square magnet, sector magnet
Mounting thread form		M18×1.5、 M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction		Any direction
Outgoing mode		Cable outlet or Connector

• Electrical Connection

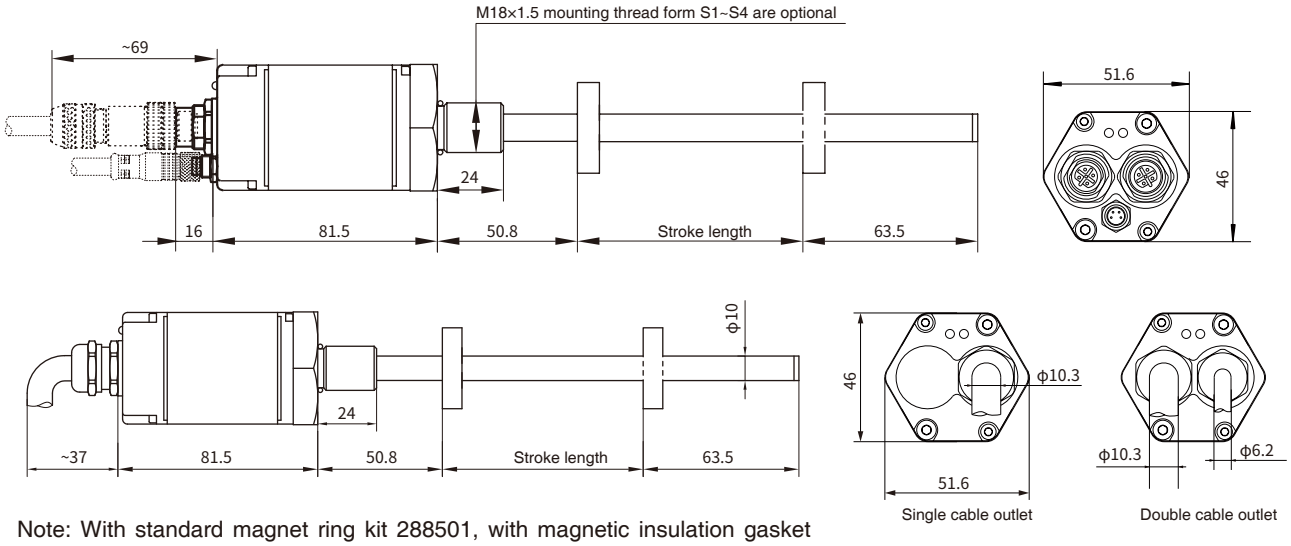
Input voltage	+24Vdc±20%
operating current	＜90mA（varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

Aa Installation Instructions-Profinet Output

• RH pressure-resistant rod mounting dimensions

RH series pressure-resistant rodshell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode, mounting thread form M18×1.5 or M20×1.5 or 3/4"-16UNF-3A.

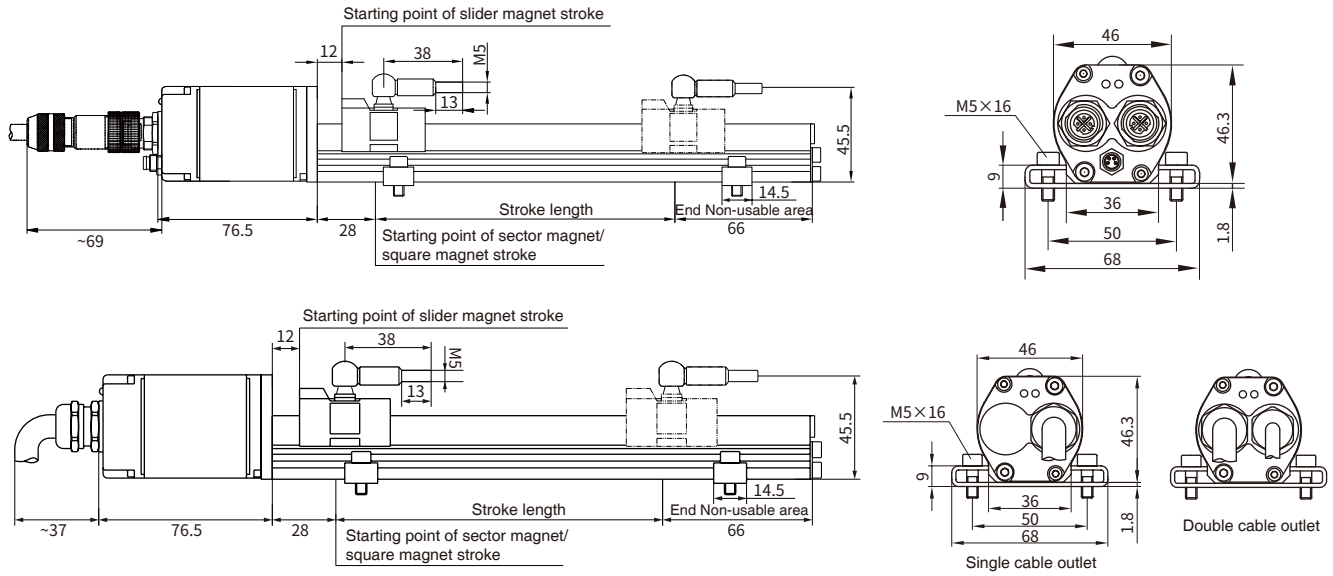
Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The values of the head and end Non-usable areas of this product are 50.8 m and 63.5 m respectively. The value of the measurement Non-usable area can be appropriately modified according to the needs of customers, please pointed out when ordering.



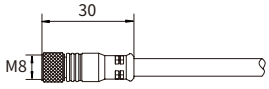
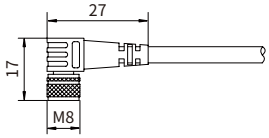
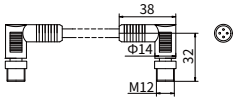
Note: With standard magnet ring kit 288501, with magnetic insulation gasket and fixing screw; Plug 321723 when Connector is equipped with cable plug

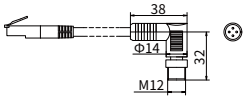
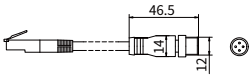
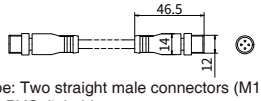
• Dimensions and installation guidance of RP aluminum profile sensor

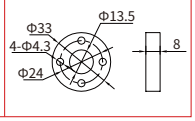
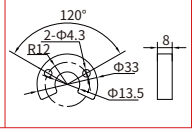
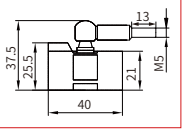
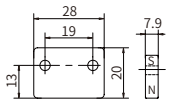
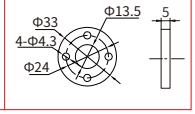
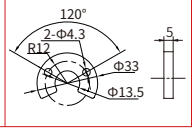
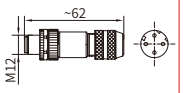
RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.



C C Common Accessories-Profinet Output

Accessory name/ model	Dimensions
4-pin female connector (For power supply) Order No.: 522000-xx (xx- cable length, unit m)	
4-pin90° female connector (For power supply) Order No.: 522001-xx (xx- cable length, unit m)	
For power supply (Cat 5e) d-coded Order No.: 522004-xx (xx- cable length, unit m)	 Connector type: two 4-pin 90° male connectors (M12) Cable sheath: PVC, light blue operating temperature:-40℃~80℃

Accessory name/ model	Dimensions
For power supply (Cat 5e) d-coded Order No.: 522005-xx (xx- cable length, unit m)	 Connector type: RJ45, 4-pin 90° male connector (M12) Cable sheath: PVC, light blue working temperature:-40℃~80℃
For power supply (Cat 5e) d-coded Order No.: 522006-xx (xx- cable length, unit m)	 Connector Type: RJ45, 4-pin straight male connector(M12) Cable sheath: PVC, light blue Working temperature:-40℃~80℃
For power supply (Cat 5e) d-coded Order No.: 522008-xx (xx-cable length, unit m)	 Connector type: Two straight male connectors (M12) Cable sheath: PVC, light blue Working temperature:-40℃~80℃

Accessory name/ model	Dimensions
Standard magnet ring Order No.: 211501	
Sector magnet Order No.: 211502	
Slider magnet Order No.: 211503	
Square magnet Order No.: 211508	
Magnetic isolation gasket	
Sector magnetic isolation gasket	
4-pin male connector Order No.: 312723	

Note: Please refer to "Magnet ring Selection" and "Cable Selection" for details of cables, magnet rings and other models.

• Wiring mode

4-pin connector socket (for power supply)

• Connector Connection Mode (Interface 1, 2)

Pin	Line color	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -

• Single cable outlet connection mode

Pin	Line color 1*	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -
5	Red	24Vdc
6	Black	COM

Note: * Line color 1: light green, PUR sheath, 6 cores,-40C~85℃

• Connector Connection Mode (Interface 3)

Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc(-20%~+20%)
2	White	Do not connect
3	Blue	COM
4	Black	Do not connect

• Double cable outlet connection mode

Pin	Line color1*	Line color2*	Pin/wire function definition
1	Yellow	Yellow	Tx +
2	White	White	Rx +
3	Orange	Orange	Tx -
4	Blue	Blue	Rx -
5	Red	-	24Vdc
6	Black	-	COM

Note: * Line color 2: light green, PUR sheath, 4 cores,-40C~70℃

Selection Guide-Profinet Output

R		–	M					–			–					–	N			–			–		
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

RH	Pressure-resistant rod (internal or external)
RP	Aluminum profile (external only)

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit: mm

08 - 09 Magnet ring type/mounting thread form

Only for RP Series	S1	M18×1.5, measuring rod diameter 10mm, 304 material
	S2	M20×1.5, measuring rod diameter 10mm, 304 material
	S3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material
Only for RP Series	C1	Sector magnet
	C2	Slider magnet
	C3	Square magnet

10 - 13 Connection form

DA**	Single cable outlet, light green, PUR sheath (6 cores),-40C~85℃ (**denotes cable length in meters)
DB**	Double cable outlet, light green, PUR sheath (one set of 6 cores,-40C~85C; one set of 4 cores,-40 C~70C) (**denotes cable length in meters)
PD56	two sets of 4-pin M12 female connectors, one set of 4-pin M8 male connector

Note: For supporting cables, please refer to the Selection Guide of Industrial Ethernet Cable Accessories

14 - 16 Communication interface

14 N	Profinet communication interface
15	Number of magnet rings (1~9 optional)
16	0-General, customizable

17 - 18 Non-usable area at head and end, customizable

S0	50.8mm+63.5mm
B0	30mm+60mm
S1	28mm+66mm（used in RP series）

19 - 20 Country

Refer to the country list, page 130.

- Selection example: RH-M0300-S1 -PD56-N10-S0

Indicates: RH structure series, 300mm Stroke length, M18X1.5 mounting thread, measuring rod diameter 10mm, 304 material, 2 sets of 4-pin female connectors, M12, 1 set of 4-pin male connector, M8, Profinet protocol, single magnet ring, head Non-usable area 50.8mm, end Non-usable area 63.5mm.

G g Selection of Cable Accessories for Industrial Ethernet

N	E	T	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
N E T	Industrial Ethernet

04 - 07	Cable length
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m

08 - 10	Cable type, outlet mode
08	Cable type
D	PVC sheath, blue, 8-pin, shielded, CAT-5e,-40~85°C
A	PUR sheath, green, 4-pin, shielded, CAT-5eES,-40~70C
09 10	Connection
1 1	Two 4-pin connector, M12, d-code
2 2	Two 4-pin right angle male connectors, M12, d-code
1 3	One end 4-pin connector, M12, d-code, one end shielded RJ45 connector
2 3	One end 4-pin right angle male connector, M12, d-code, one end shielded RJ45 connector

- Selection example: NET-M010-D11

  Indicates: Ethernet cable, 10m long, PVC sheath, blue, 8-pin, CAT-5e standard, shielded,-40~85C, 4-pin connector at both ends, M12, d-code.

- Selection example: NET-M020-A23

  Indicates: Ethernet cable, 20 meters long, PUR sheath, green, 4-pin, shielded, CAT-5eES,-40~70°C, 4-pin right angle male connector at one end of the cable, M12, d-code, and shielded RJ45 connector at one end.

L l LED real-time state monitoring and diagnosis

Green light	ON	ON	ON	Flash
Red light	OFF	ON	Flash	×
Function	Normal work	The network cable is not connected	Configuring	Fault

RH/RP Displacement Sensor-Start/Stop Output

Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Easy diagnosis, LEDs real-time condition monitoring
- No need to return to zero, absolute displacement output
- Stable and reliable, using digital analog technology
- Low power consumption design effectively reduces system heating

Product Parameters-Start/Stop Output

• Input

Measurement data	Position magnet ring
Stroke length	25~5500 mm， customized according to customer needs
Number of measurements	Multiple

• Output

Digital quantity	Start/Stop Signal (Start/End)
Resolution	Controller dependent (minimum accuracy 5μm)
Nonlinearity	< 0.01% full-scale taxi, minimum 50μm
Pulse width	Start pulse: 2~5μs, stop pulse: 1.5~2μs
Repetition accuracy	< 0.001% of full-scale taxis, min. 1μm
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m），customizable
Hysteresis	<10μm
Temperature coefficient	<30ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67RH Stainless Stell Rod/IP65RP Aluminum profile
Operating temperature	-40℃ ~ +105℃
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC Test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A, CE Certification

• Structure and Material

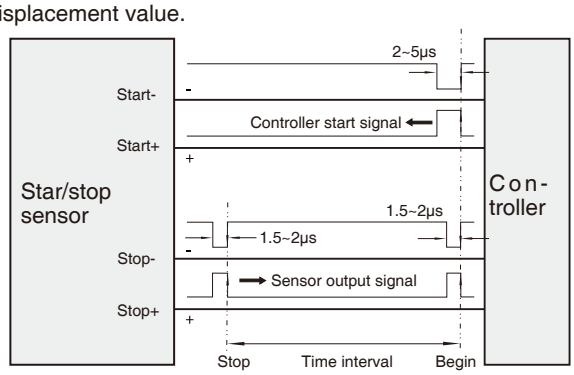
Failure indication		Electronic bin cover with LEDs display
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350bar (continuous)/700bar (peak)
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic bin	Aluminum alloy
	Measuring rod	Aluminum alloy
	Position magnet	Slider magnet, square magnet, sector magnet
Mounting thread form		M18×1.5、 M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction		Any direction
Outgoing mode		Cable outlet or Connector

• Electrical Connection

Input voltage	+24Vdc±20%
operating current	＜90mA（varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

S s Output Characteristics-Start/Stop Output

- The sensor outputs the controller start signal and the position magnet signal, and the time interval between them is proportional to the displacement of the position magnet. The measurement and control of time is calculated by the controller and converted into displacement value.



L l LED Real-time State Monitoring and Diagnosis

- Red and green LED indicator built into the sensor head cover provides sensor working condition and diagnostic function.

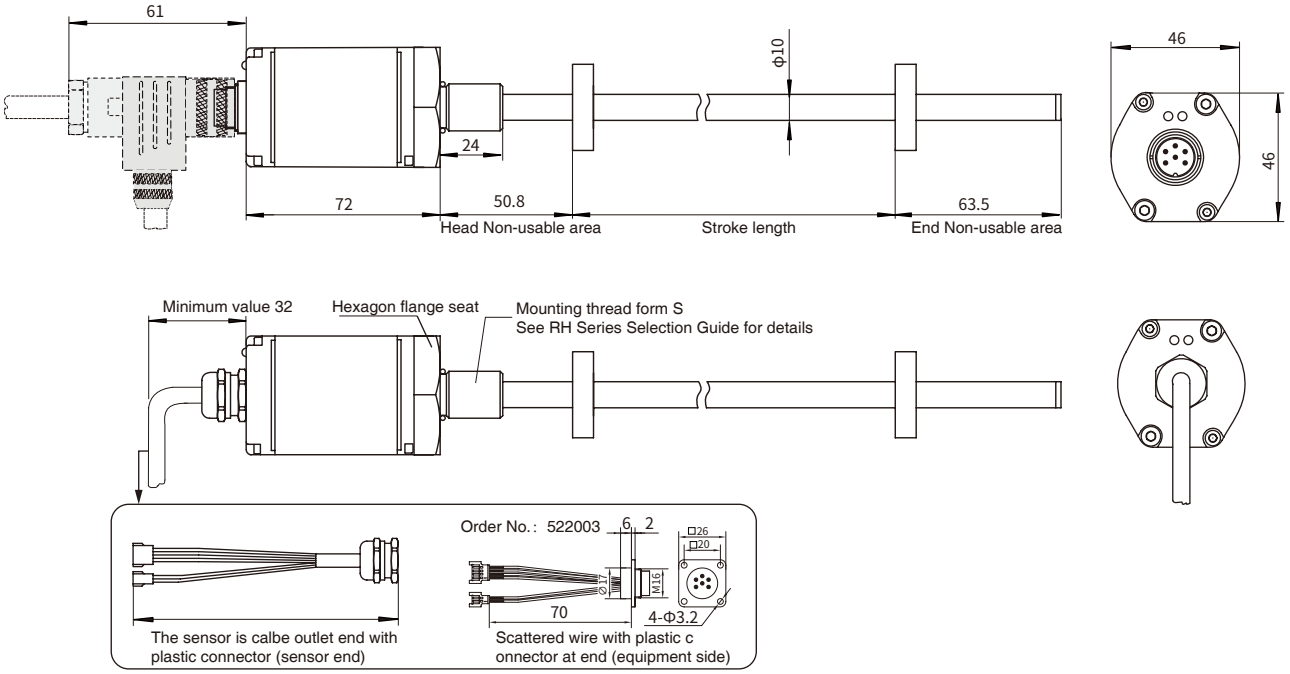
Green light	ON	ON	ON	Flash
Red light	OFF	Flash	ON	OFF
Function	Normal work	The sensor has no interrogation signal	Magnet not detected	Programming state

Aa Installation Instructions-Start/Stop Output

• Dimensions and installation guidance of RH pressure-resistant rod sensor

RH series pressure-resistant rodshell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode, mounting thread form M18×1.5 or M20×1.5 or 3/4"-16UNF-3A.

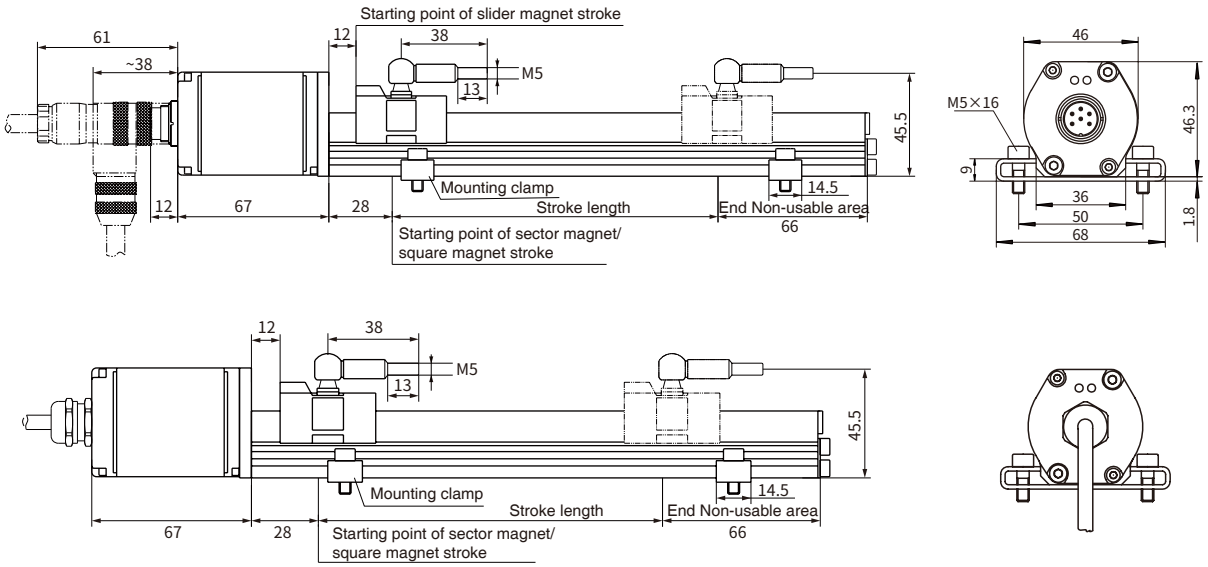
Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The values of the head and end Non-usable areas of this product are 50.8 m and 63.5 m respectively. The value of the measurement Non-usable area can be appropriately modified according to the needs of customers, please pointed out when ordering.



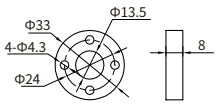
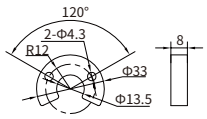
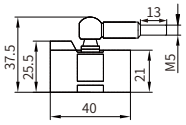
Schematic diagram of connecting outgoing line

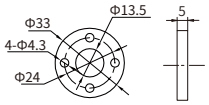
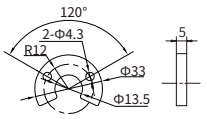
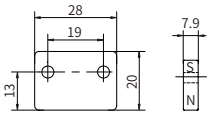
• Dimensions and installation guidance of RP aluminum profile sensor

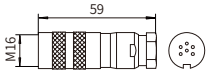
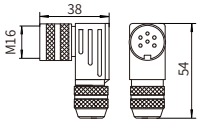
RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.



C C Common Accessories-Start/Stop Output

Accessory name/ model	Dimensions
Standard magnet ring Order No.: 211501	
Sector magnet Order No.: 211502	
Slider magnet Order No.: 211503	

Accessory name/ model	Dimensions
Magnetic isolation gasket	
Sector magnetic isolation gasket	
Square magnet Order No.: 211508	

Accessory name/ model	Dimensions
6-pin female connector Order No.: 312701	
6-pin 90° female connector Order No.: 312702	

Note: Please refer to "Magnet ring Selection" for details of magnet ring kit and other models.

• Wiring mode

When the sensor is connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet output, refer to the line color definition in the following table for connection mode

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

Pin	Line color 1*	Line color 2*	Pin/wire function definition
1	Blue	Grey	Stop (-)
2	Green	Pink	Stop (+)
3	Yellow	Yellow	Start (+)
4	White	Green	Start (-)
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc

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

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

Pin	Line color 3*	Pin/wire function definition
1	Yellow	Start (+)
2	Grey	Stop (+)
3	Pink	Start (-)
4	-	Reservation
5	Green	Stop (-)
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Selection Guide -Start/Stop Output

R		–	M					–			–					–	R				–			–		
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
RH	Pressure-resistant rod (internal or external)
RP	Aluminum profile (external only)

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09	Magnet ring type/mounting thread form	
Only for RH series	S1	M18×1.5, measuring rod diameter 10mm, 304 material
	S2	M20×1.5, measuring rod diameter 10mm, 304 material
	S3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material
Only for RP Series	C1	Sector magnet
	C2	Slider magnet
	C3	Square magnet

10 - 13	Connection form
10 - 11	Cable outlet mode
DH	PUR sheath, orange,-20~90° C, end scattered, line color 1
DU	PVC sheath, orange,-20~105°C, end scattered, line color 2
DB	PVC sheath, orange,-20~105°C, end scattered, line color 3
DI	PUR sheath, orange,-20~90° C, end with 6-pin connector
DV	PVC sheath, orange,-20~105°C, end with 6-pin connector
DC	PVC sheath, orange,-20~105°C, end with 8-pin connector
12 - 13	Cable length, 01~99 units: m (Cable outlet mode)

10 - 13	Cable outlet mode
10 - 13	0DR Cable outlet first and end with plastic connector
0DR2	Scattered wire with plastic connector 65mm
0DR3	Scattered wire with plastic connector 170mm
0DR4	Scattered wire with plastic connector 230mm
0DR5	Scattered wire with plastic connector 350mm

10 - 13	Connector mode
PH60	M16 male connector (6-pin)

Note: For supporting cables, please refer to Analog/Start-Stop Cable Accessories Selection

14 - 17	Signal output mode
15	Input voltage
1	+ 24Vdc（ - 20% ~ + 20% ）
2	+ 9 ~ 28.8Vdc
16 - 17	Output signal
01	Start/Stop，multi-magnet ring

18 - 19	Non-usable area at head and end, customizable
S0	50.8mm+63.5mm
B0	30mm+60mm
S1	28mm+66mm（used in RP series）

0 1	Country
	Refer to the country list，page 130.

- Note: The forward output of the sensor means that when the magnet ring moves away from the electronic bin, the output value increases and decreases when the magnet ring moves in the reverse direction.
- Selection example: RH-M0300-S1-PH60-R101-S0

  Indicates: the ordered product model is RH series displacement sensor, the measuring range is 300mm, the mounting thread form is M18×1.5, the measuring rod diameter is 10mm, the material is 304, the 6-pin Connector connection, the power supply voltage is + 24Vdc, start/stop output, the head Non-usable area is 50.8mm, and the end Non-usable area is 63.5mm.

Mm Selection Guide of Analog/Start-Stop Cable Fittings

A	S	T	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
A S T	Analog/Start-Stop interface

04 - 07	Cable length
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m

08 - 10	Cable type, outlet mode
H 0 1	One 6-pin (M16) female connector, and one end scattered
H 0 3	One 6-pin (M16) right angle female connector, and one end scattered
U 0 1	One end 6-pin (M16) female connector, and one end scattered
U 0 2	One end 8-pin (M16) inserted into female connector,and one end scattered
U 0 3	One end 6-pin (M16) right angle female connector, and one end scattered
U 0 4	One end 8-pin (M16) right angle female connector, and one end scattered
Note	H: Cable type, PUR sheath, orange,-20~90℃
	U: Cable type, PVC sheath, orange,-20~105℃

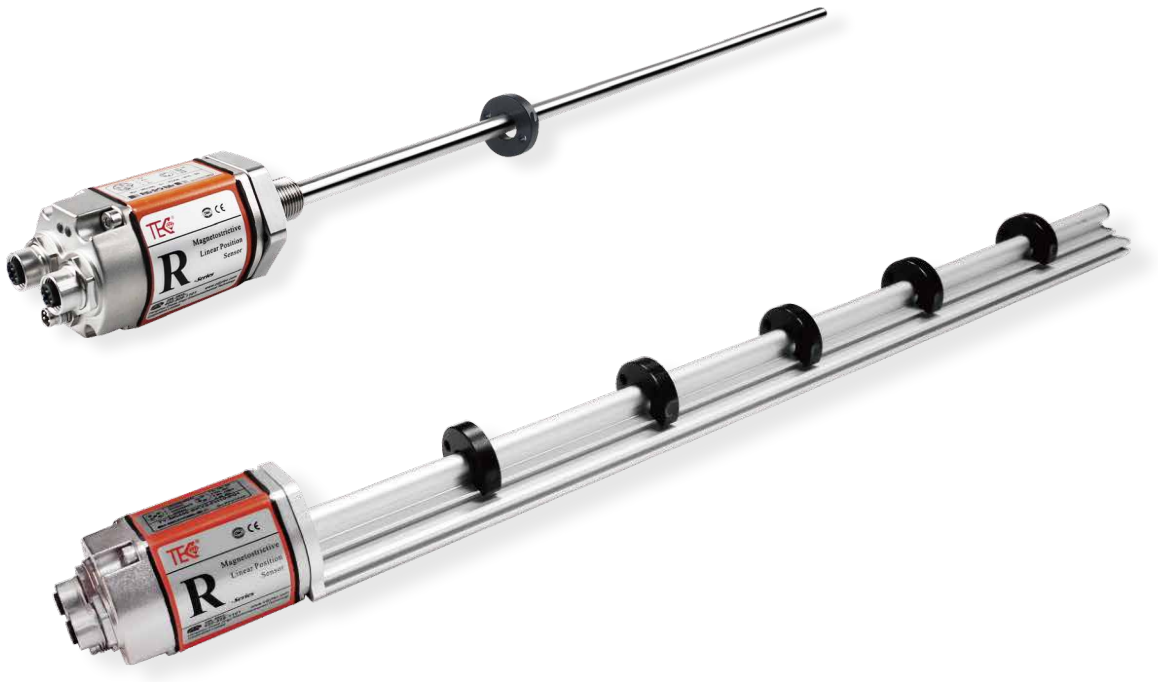
- Selection example: AST-M005-H01

  Indicates: analog or start-stop interface cable, 5 meters long, PUR sheath, orange,-20~90° C, with 6-pin (M16) at one end female connector and scattered at one end.

- Selection example: AST-M010-U04

  Indicates: Analog or Start-Stop interface cable, 10 meters long, PVC sheath, orange,-20~105°C;One end 8-pin (M16) right angle female connector, and one end scattered.

RH/RP Displacement Sensor-EtherCAT Output



Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Linear measurement, absolute position output
- Easy diagnosis, LEDs real-time condition monitoring
- Nonlinearity less than 0.01%
- The repetition accuracy is less than 0.001%
- Up to 9 magnet position, speed, status information output

Product parameters-EtherCAT output

• Input

Measurement data	Position magnet ring
Stroke length	25~5500mm
Number of measurements	1~9

• Output

Interface	EhterCAT Ethernet Control Automation Technology
Data protocol	EtherCAT 100 Base-TX
Transmission speed	Maximum 100Mbit/s
Resolution	1 ~ 100 μm，adjustable
Nonlinearity	<±0.01% of full scale, minimum 50μm
Repetition accuracy	<±0.001% of full scale, minimum ±1μm
Update time	≥0.25ms，depending on the measuring stroke
Hysteresis	<10μm
Temperature coefficient	<15ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67RH Stainless Stell Rod/IP65RP Aluminum profile
Operating temperature	-40℃ ~ +85℃
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC Test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A, CE Certification

• Structure and Material

Failure indication		Electronic bin cover with LEDs display
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350bar (continuous)/700bar (peak)
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic bin	Aluminum alloy
	Measuring rod	Aluminum alloy
	Position magnet	Slider magnet, square magnet, sector magnet
Mounting thread form		M18×1.5、 M20×1.5、3/4"-16UNF-3A （customizable）
Installation direction		Any direction
Outgoing mode		Cable outlet or Connector

• Electrical Connection

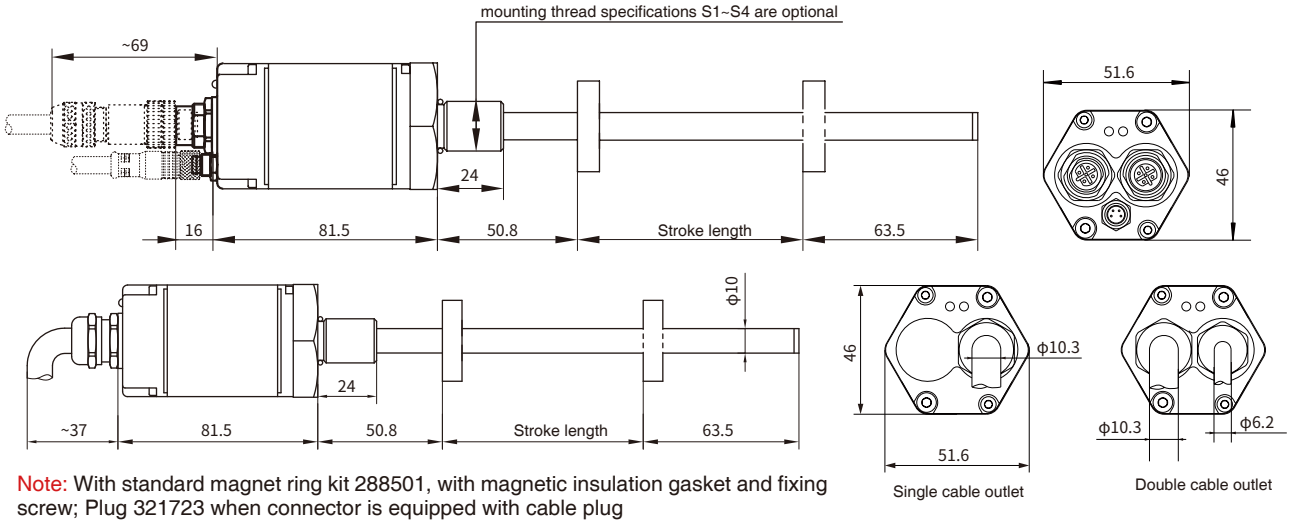
Input voltage	+24Vdc±20%
operating current	＜90mA（varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

Aa Installation Instructions-EtherCAT Output

• Dimensions and installation guidance of RH pressure-resistant rod sensor

RH series pressure-resistant rodshell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode.Mounting thread form M18×1.5 or M20×1.5 or 3/4"-16UNF-3A.

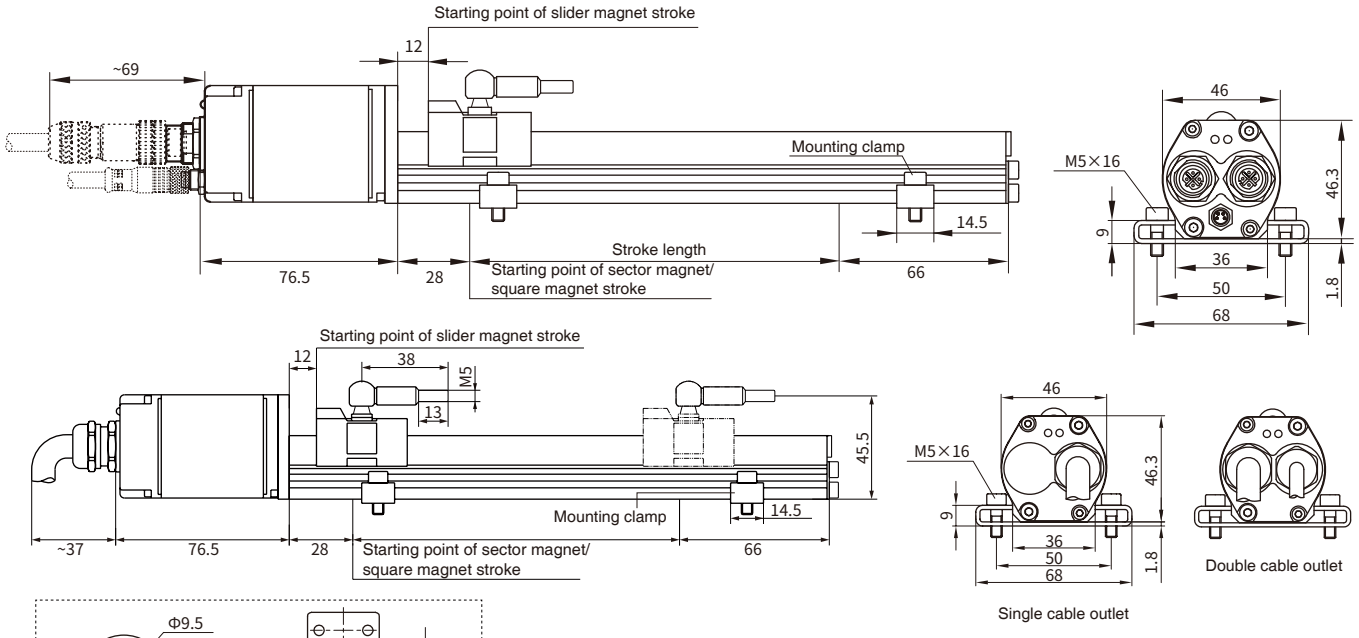
Note: The measurement Non-usable area shown in the figure indicates that the output value of the sensor in this area is zero or unreliable. The default values of the first and last measurement Non-usable areas of this product are 50.8mm and 63.5mm respectively. The value of the measurement Non-usable area can be appropriately modified according to the needs of customers, please pointed out when ordering.

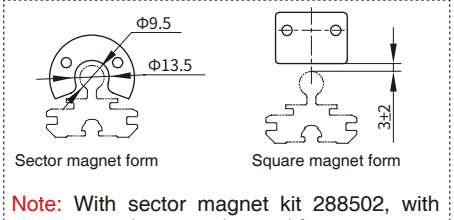


Note: With standard magnet ring kit 288501, with magnetic insulation gasket and fixing screw; Plug 321723 when connector is equipped with cable plug

• Dimensions and installation guidance of RP aluminum profile sensor

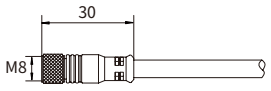
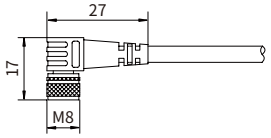
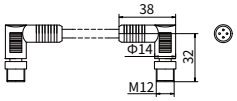
RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.

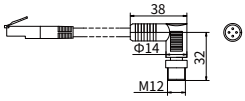
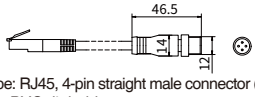
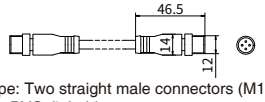


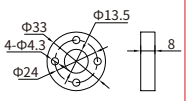
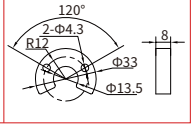
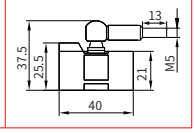
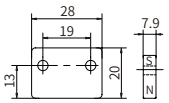
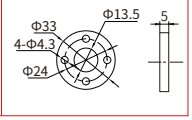
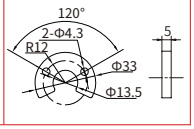
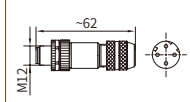


Note: With sector magnet kit 288502, with magnetic isolation gasket and fixing screw

Common Accessories-EtherCAT Output

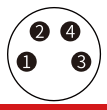
Accessory name/ model	Dimensions
Female Connector (for power supply) Order No.: 522000-xx (xx- cable length, unit m)	
4-pin90° female connector (for power supply) Order No.: 522001-xx (xx- cable length, unit m)	
Industrial Ethernet Cable (Cat 5e) d-coded Order No.: 522004-xx (xx- cable length, unit m)	 Connector type: two 4-pin 90° male connectors (M12) Cable sheath: PVC, light blue operating temperature:-40℃~80℃

Accessory name/ model	Dimensions
Industrial Ethernet Cable (Cat 5e) d-coded Order No.: 522005-xx (xx- cable length, unit m)	 Connector type: RJ45, 4-pin 90° male connector (M12) Cable sheath: PVC, light blue working temperature:-40℃~80℃
Industrial Ethernet Cable (Cat 5e) d-coded Order No.: 522006-xx (xx- cable length, unit m)	 Connector Type: RJ45, 4-pin straight male connector (M12) Cable sheath: PVC, light blue Working temperature:-40℃~80℃
Industrial Ethernet Cable (Cat 5e) d-coded Order No.: 522008-xx (xx- cable length, unit m)	 Connector type: Two straight male connectors (M12) Cable sheath: PVC, light blue Working temperature:-40℃~80℃

Accessory name/ model	Dimensions
Standard magnet ring Order No.: 211501	
Sector magnet Order No.: 211502	
Slider magnet Order No.: 211503	
Square magnet Order No.: 211508	
Magnetic isolation gasket	
Sector magnetic isolation gasket	
4-pin male connector Order No.: 312723	

Note: Please refer to "Magnet ring Selection" and "Cable Selection" for details of cables, magnet rings and other models.

Wiring mode



4-pin connector socket (for power supply)

Connector Connection Mode (Interface 1, 2)

Pin	Line color	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -

Single cable outlet connection mode

Pin	Line color 1*	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -
5	Red	24Vdc
6	Black	COM

Note: * Line color 1: light green, PUR sheath, 6 cores,-40C~85℃

Connector Connection Mode (Interface 3)

Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc (-20%~+20%)
2	White	Do not connect
3	Blue	COM
4	Black	Do not connect

Double cable outlet connection mode

Pin	Line color1*	Line color2*	Pin/wire function definition
1	Yellow	Yellow	Tx +
2	White	White	Rx +
3	Orange	Orange	Tx -
4	Blue	Blue	Rx -
5	Red	-	24Vdc
6	Black	-	COM

Note: * Line color 2: light green, PUR sheath, 4 cores,-40C~70℃

Selection Guide-EtherCAT Output

R		–	M					–			–					–	E				–			–		
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

RH	Pressure-resistant rod (internal or external)
RP	Aluminum profile (external only)

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09 Magnet ring type/mounting thread form

Only for RH series	S1	M18×1.5, measuring rod diameter 10mm, 304 material
	S2	M20×1.5, measuring rod diameter 10mm, 304 material
	S3	3/4"-16UNF-3A, measuring rod diameter 10mm, 304 material
	T1	M18×1.5, measuring rod diameter 8mm, 304 material
	T2	M20×1.5, measuring rod diameter 8mm, 304 material
	T3	3/4"-16UNF-3A, measuring rod diameter 8mm, 304 material
Only for RP Series	C1	Sector magnet
	C2	Slider magnet
	C3	Square magnet

10 - 13 Connection form

DA**	Single cable outlet, light green, PUR sheath (6 cores)
DB**	Double cable outlet, light green, PUR sheath (one set of 6 cores, one set of 4 cores)
PD56	2 sets of 4-pin M12 female connectors, 1 set of 4-pin M8 male connector

Note: ** Indicates the length of cable in meters

14 - 17 Communication interface

14 - 15 Sensor form

E1	EtherCAT, position and speed, distributed clock optional

16 - 17 Number of magnet rings

	01~09 optional

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

S0	50.8mm+63.5mm
B0	30mm+60mm
S1	28mm+66mm（used in RP series）

20-21 Country

Refer to the country list, page 130.

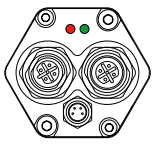
- Selection example: RH-M0300-S1 -PD56-E101-S0

  Indicates: RH structure series, 300mm Stroke length, M18X1.5 mounting thread, measuring rod diameter 10mm, 304 material, 2 sets of 4-pin female connectors, M12, 1 set of 4-pin male connector, M8, Profinet protocol, single magnet ring, head Non-usable area 50.8mm, end Non-usable area 63.5mm.

LED real-time state monitoring and diagnosis

- Red and green LEDs built into the sensor head cover provide sensor working condition and diagnostic function.

Green light	Flash	×
Red light	OFF	ON
Function	Normal work	Magnets not detected or incorrect number



RF Flexible Outer Tube Displacement Sensor

Technical Characteristics

- Suitable for long-stroke cylinder applications
- Easy to diagnose, LED indicator status indication
- Not limited by installation space
- Non-wear, non-contact measurement method
- Rugged and fully enclosed design
- Linear measurement, absolute value output
- Curly packaging saves space, packaging and transportation costs
- Direct displacement output: Analog, SSI, Profibus-DP, CANopen, Start/Stop, Profinet, EtherCAT

Product Parameters

• Input

Measurement data	Position magnet ring
Stroke length	500~7620mm，customized according to customer needs，Up to 23 meters
Number of measurements	Multiple, depending on the output interface

• Output

Interface	Analog、SSI、Profibus-DP、CANopen、Start/Stop、Profinet、EtherCAT
Resolution	Depending on the output
Nonlinearity	<±0.01% of full scale, minimum ±50μm
Repetition accuracy	<±0.001% of full scale, min. 1μm
Hysteresis	＜10μm
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m），customizable
Temperature coefficient	＜30ppm/℃

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP65（When combined with pressure-resistant outer tube，the protection level can reach IP67）
Operating temperature	-40℃ ~ +85℃（up to105℃）
Humidity/dew point	Humidity 90%, no condensation
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC Test	GB/T17626.2/3/4/6/8， Grade 4/3/4/3/3，Class A, CE Certification

• Electrical connection

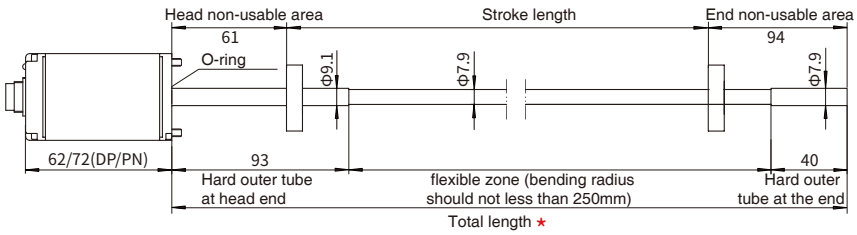
Input voltage	+24Vdc±20%
operating current	＜90mA（ varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

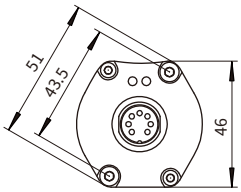
• Structure and materials

Failure indication	Electronic bin cover with LEDs display
Electronic bin	Aluminum alloy
Measuring rod	Stainless steel hose, minimum bending radius 250mm, shipping radius 400mm
Position magnet	Standard magnet ring and various ring magnets
Installation direction	Any direction
Outgoing mode	Cable outlet or Connector

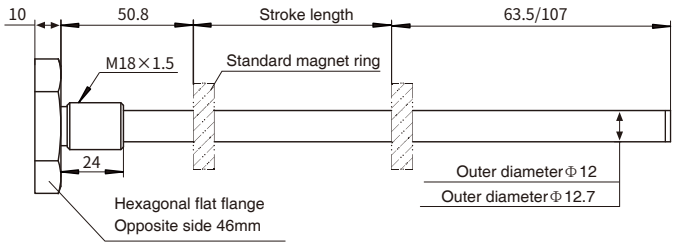
Aa Installation and Use Instructions

• Dimensions of RF flexible outer tube sensor





★ <7620mm，deviation0~+8mm； >7620mm，deviation-5~+15mm。（Total length deviation has no effect on Stroke length）



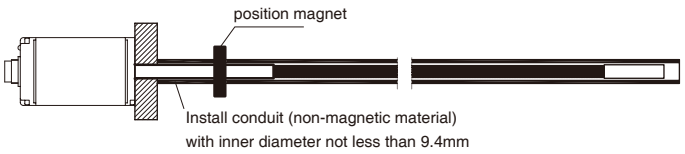
Option: Pressure-resistant outer pipe with flange, outer diameter 12mm/12.7mm

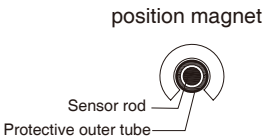
The flanged pressure-resistant outer pipe is used to cooperate with RF flexible sensor, which can withstand 35MPa pressure for hydraulic cylinder and provide protection for RF sensor. For large Cylinder, it is necessary to drill a ϕ18mm deep hole in the piston rod when selecting the pressure pipe with 12mm outer diameter, which can match our magnet ring with large inner diameter.

• Installation instruction of RF flexible outer tube sensor

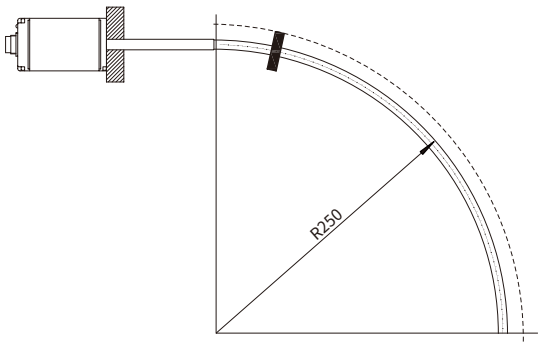
Two non-magnetic bolts are required for the installation of the sensor electronic bin. Long-stroke sensors need non-magnetic tube support (inner diameter ≥ 9.4), or bend into the desired shape. Sensors with hexagonal flanges can be easily mounted using non-magnetic bolts. Or you can choose a flanged pressure-resistant outer pipe with an outer diameter of 12mm, with a maximum stroke of 7620mm.

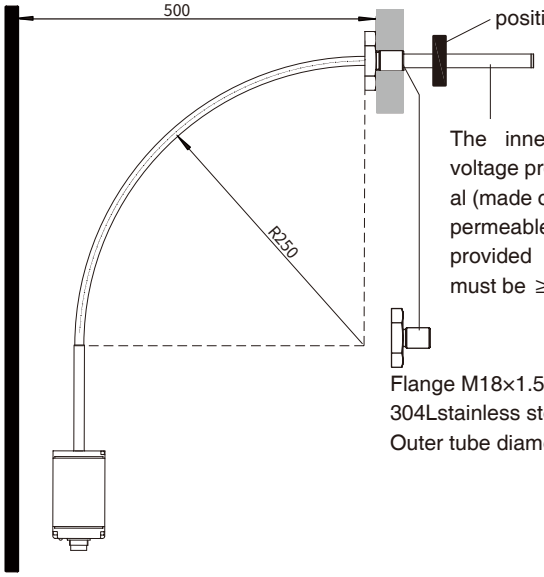
Linear measurement (external installation)





Arc measurement (external installation)





Selection Guide-Analog Quantity

R	F	–	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
R F	Hose shell

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09	Magnet ring type/mounting thread form
C 1	Without flange
C 2	With flange M18×1.5
C 3	With flange M20×1.5
C 4	With flange 3/4"-16UNF-3A

10 - 13	Connection form
10 - 11	Cable outlet mode
D H	PUR sheath, orange,-20~90℃, end scattered, line color 1
D U	PVC sheath, orange,-20-105℃, end scattered, line color 2
D B	PVC sheath, orange,-20~105C, end scattered, line color 3
D I	PUR sheath, orange,-20~90℃, end with 6-pin connector
D V	PVC sheath, orange,-20~105℃, end with 6-pin connector
D C	PVC sheath, orange,-20~105℃, end with 8-pin connector
12 - 13	Cable length，01~99 units: meters （Cable outlet mode）
10 - 13	Connector mode
P H 6 0	M16 male connector (6-pin)
P B 8 0	M16 male connector (8-pin)

Note: For supporting cables, please refer to Analog/Start-Stop Cable Accessories Selection Guide

14 - 17	Signal output mode
14 - 15	Output form and direction
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	Number of magnet rings
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, customizable
S 0	50.8mm+63.5mm
S 9	50.8mm+107mm
S B	61mm+94mm
20-21	Country
	Refer to the country list，page 130.

- Description: RF regular stroke is 500~7620mm, if you need longer stroke, please call our company to customize.
- Selection example:RF-M6000-C1-PH60-A01C-S0
  Indicates: the installation mode of the ordered product is built-in RF flexible structure, the stroke length is 6000m, six pin connector, 4-20A output, the output value of non-magnet ring is the minimum value, the single magnet ring, without connecting flange, the non-usable area at the head is 50.8mm, and the non-usable area at the end is 63.5mm.

Selection Guide-SSI

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

01 - 02 Sensor shell form

R F	Hose shell

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unitmm

08 - 09 Magnet ring type/mounting thread form

C 1	Without flanges
C 2	With flange M18×1.5
C 3	With flange M20×1.5
C 4	With flange 3/4"-16UNF-3A

10 - 13 Connection form

10 - 11 Cable outlet mode

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

12 - 13 Cable outlet mode: cable length, 01~99 meters

10 - 13 Connector mode

P H 7 0	M16 male connector (7 pins)
P B 8 0	M16 male connector (8-pin)

Note: For supporting cables, please refer to SS Cable Accessories Selection Guide

14 - 19 Signal output mode

15 Data length

1	24bit	2	25bit	3	26bit*

* 26-bit are parity bits and 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	6	0.002mm
7	0.001mm	8	0.04mm
9	0.0005mm	0	0.0001mm

18 Direction

0	Forward	1	Reverse

19 Mode

0	Regular	1	Synchronization	2	High update rate

20 - 21 Non-usable area at head and end, customizable

S 0	50.8mm+63.5mm
S 9	50.8mm+107mm

22-23 Country

Refer to the country list, page 130.

Selection Guide-Profibus-DP

R	F	–	M					–	C		–					–	D			–			–		
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
R F	Hose shell

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09	Magnet ring type/mounting thread form
C 1	Without flange
C 2	With flange M18×1.5
C 3	With flange M20×1.5
C 4	With flange 3/4"-16UNF-3A

10 - 13	Connection form
10 - 11	Cable outlet mode
D A	Single cable outlet, PUR sheath, cyan,-20~80℃, end scattered
D B	Double cable outlet, PUR sheath, cyan,-20~80C, end scattered
D C	Double cable outlet, PUR sheath, cyan,-20~80℃, end M16, 6-core, one male connector, one female connector
12 - 13	Cable outlet mode: cable length, 01~99 meters
10 - 13	Connector mode
P D 5 3	One set of 5-pin male connector (M12), one set of 5-pin female connector (M12), one set of 4-pin male connector (M8)
P D 6 3	A set of 6-pin male connector (M16), a set of 6-pin female connector (M16)

Note: For supporting cables, please refer to Profibus-DP Cable Accessories Selection Guide

14 - 16	Signal output mode
14	Profibus Protocol
15	Number of Magnet rings (1~9 optional)
16	0-single magnet B-single/multiple Magnet rings

17 - 18	Non-usable area at head and end, customizable
S 0	50.8mm+63.5mm
S 9	50.8mm+107mm

19-20	Country
	Refer to the country list, page 130.

Selection Guide-CAN Bus

R	F	–	M					–			–					–	C					–		–		
01	02		03	04	05	06	07		08	09		10	11	12	13		14	15	16	17	18		19	20		21	22

01 - 02 Sensor shell form

R F	Hose shell

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09 Magnet ring type/mounting thread form

C 1	Without flange
C 2	With flange M18×1.5
C 3	With flange M20×1.5
C 4	With flange 3/4"-16UNF-3A

10 - 13 Connection form

10 - 11 Cable outlet mode

D A	PVC sheath, purple, 4 cores,-40℃~75℃, end scattered

12 - 13 Cable outlet mode: cable length, 01~99meters

0 D R 1	PVC sheath, length 150mm, end 5-pin male connector

10 - 13 Connector mode

P D 6 0	6-pin male connector (M16)
P D 6 2	Two sets of 6-pin male connector (M16)
P D 5 0	5-pin male connector (M12)
P D 5 2	5-pin male connector (M12), one set of 5-pin female connector (M12)
P D 5 4	5-pin male connector (M12), 5-pin female connector (M12), 4-pin male connector (M8)

Note: For supporting cables, please refer to CAN bus cable Accessories selection

14 - 18 Signal output mode

14 Interface

C	CAN bus

15 Protocol type

1	CANopen	2	CANBasic

16 Baud

1	1000kBit/s	2	800kBit/s
3	500kBit/s	4	250kBit/s
5	125kBit/s	6	100kBit/s
7	50kBit/s	8	20kBit/s

17 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	6	0.002mm
7	0.001mm		

18 Number of Magnet rings（1~9 optional）

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

S 0	50.8mm+63.5mm
S 9	50.8mm+107mm

21-22 Country

Refer to the country list, page 130.

Selection Guide-Profinet Output

R	F	–	M					–			–					–	N			–			–		
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
RF	Hose shell

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09	Magnet ring type/mounting thread form
C1	Without flange
C2	With flange M18×1.5
C3	With flange M20×1.5
C4	With flange 3/4"-16UNF-3A

10 - 13	Connection form
DA**	Single cable outlet, light green, PUR sheath (6 cores),-40℃~85C (cable length, unit: meters)
DB**	Double cable outlet, light green, PUR sheath (one set of 6 cores, 40C~85C; one set of 4 cores,-40℃~70℃) (cable length, unit: meters)
PD56	2 sets of 4-pin female connector, M12, 1 set of 4-pin male connector, M8

Note: For supporting cables, please refer to the Guide for Selection of Industrial Ethernet Cable Accessories

14 - 16	Communication interface
14N	Profinet communication interface
15	Number of Magnet rings（1~9 optional）
16	0-General, customizable

17 - 18	Non-usable area at head and end, customizable
S0	50.8mm+63.5mm
S9	50.8mm+107mm

19-20	Country
	Refer to the country list, page 130.

Selection Guide-EtherCAT Output

R	F	–	M					–			–					–	E				–			–		
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
R F	Hose shell

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09	Magnet ring type/mounting thread form
C 1	Without flange
C 2	With flange M18×1.5
C 3	With flange M20×1.5
C 4	With flange 3/4"-16UNF-3A

10 - 13	Connection form
D A * *	Single cable outlet, light green, PUR sheath (6 cores),-40℃~85℃ (** means cable length, unit: meters)
D B * *	Double cable outlet, light green, PUR sheath (one set of 6 cores,-40℃~85℃; one set of 4 cores,-40℃~70℃) (** means cable length, unit: meters)
P D 5 6	2 sets of 4-pin M12 female connector, 1 set of 4-pin M8 male connector

14 - 17	Communication interface
14 - 15	Sensor form
E 1	EtherCAT, 1-9magnets, position and speed, distributed clock optional
16 - 17	Number of Magnet rings
	01~09 optional

18 - 19	Non-usable area at head and end, customizable
S 0	50.8mm+63.5mm
S 9	50.8mm+107mm

20-21	Country
	Refer to the country list, page 130.

Selection Guide-Start/Stop Output

R	F	–	M					–			–					–	R				–			–		
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
R F	Hose shell

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09	Magnet ring type/mounting thread form
C 1	Without flange
C 2	With flange M18×1.5
C 3	With flange M20×1.5
C 4	With flange 3/4"-16UNF-3A

10 - 13	Connection form
10 - 11	Cable outlet mode
D H	PUR sheath, orange,-20~90℃, end scattered, cable color 1
D U	PVC sheath, orange,-20~105℃, end scattered, cable color 2
D B	PVC sheath, orange,-20~105℃, end scattered, cable color 3
D I	PUR sheath, orange,-20~90℃, end 6-pin connector
D V	PVC sheath, orange,-20~105℃, end 6-pin connector
D C	PVC sheath, orange,-20~105℃, end 8-pin connector
12 - 13	Cable length，01~99 units: meters （Cable outlet mode）

10 - 13	Cable outlet mode
10 - 13	0 D R cable outlet first and end with plastic connector
0 D R 2	Scattered wire with plastic connector 65mm
0 D R 3	Scattered wire with plastic connector 170mm
0 D R 4	Scattered wire with plastic connector 230mm
0 D R 5	Scattered wire with plastic connector 350mm

10 - 13	Connector mode
P H 6 0	M16 male connector (6 pins)

Note: For supporting cables, please refer to the Guide for Selection of Cable Accessories

14 - 17	Signal output mode
15	Input voltage
1	+ 24Vdc（- 20% ~ + 20%）
2	+ 9 ~ 28.8Vdc
16 - 17	Output signal
0 1	Start/Stop， multi-Magnet ring

18 - 19	Non-usable area at head and end, customizable
S 0	50.8mm+63.5mm
S 9	50.8mm+107mm

20-21	Country
	Refer to the country list，page 130.

Selection Guide-Pressure Outer Tube

F		–	S		–	M					–		
01	02		03	04		05	06	07	08	09		10	11

01 - 02	RF flange measuring rod
F A	Flange measuring rod, measuring rod outer diameter 12mm
F B	Flange measuring rod, measuring rod outer diameter 12.7 mm
F C	Flange measuring rod, measuring rod outer diameter 10mm

03 - 04	Flange thread specification
S 1	M18×1.5
S 2	M20×1.5
S 3	3/4"-16UNF-3A

05 - 09	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

10 - 11	Non-usable area at head and end, customizable
S 0	50.8mm+63.5mm
S 9	50.8mm+107mm

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

Analog

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

Pin	Cable color 1*	Cable color 2*	Pin/wire function definition
1	Blue	Grey	No.1 Magnet position signal(+)
2	Green	Pink	Position signal of No.1 Magnet(-)
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc (power supply circuit)

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

Analog

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Current output
2	Grey	0Vdc(Current/Voltage Loop)
3	Pink	Reservation
4	-	Reservation
5	Green	0...10V
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

SSI

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

Pin	Cable color 1*	Cable color 2*	Pin/wire 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	0 Vdc
7	-	-	Do not connect

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

SSI

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Clock (+)
2	Grey	Data (+)
3	Pink	Clock (-)
4	-	Reservation
5	Green	Data (-)
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

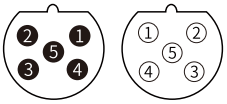
Profibus-DP bus output

Four-pin connector socket (for power supply)

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

Pin	Cable color	Pin/wire function definition
1	Brown	+24Vdc power supply (-20%~+20%)
2	White	Do not connect
3	Blue	0Vdc(power supply circuit)
4	Black	Do not connect

Profibus-DP bus output

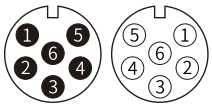


• Five-pin male connector and female connector pin arrangement (facing the sensor head direction)

Pin	Cable color	Pin/wire function definition
1	-	VP+5N (for end connections only) *
2	Green	RxD/TxD-N(bus)
3	-	DGnd (for end connections only) *
4	Red	RxD/TxD-P(bus)
5	Shielded wire	for end connections only

Note: * Only applicable to signal connection of sensor female connector

Profibus-DP bus output



• The pins of the six-pin male connector and female connector are arranged in the direction of the sensor head)

Pin	Cable color	Pin/wire function definition
1	Green	RxD/TxD-N(bus)
2	Red	RxD/TxD-P(bus)
3	-	DGnd (for end connections only) *
4	-	VP+5N (for end connections only) *
5	Black	+24Vdc power supply (-20%~+20%)
6	Blue	0 Vdc (power supply circuit)

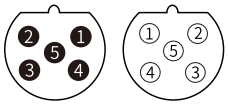
Note: * Only applicable to signal connection of sensor female connector

CAN bus output

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

Pin	Cable color	Pin/wire function definition
1	Green	CAN (-)
2	Yellow	CAN (+)
3	-	Do not connect
4	-	Do not connect
5	Brown	+24Vdc power supply (-20%~+20%)
6	White	0 Vdc (power supply circuit)

CAN bus output



• Five-pin male connector and female connector pin arrangement (facing the sensor head direction)

Pin	Cable color	Pin/wire function definition
1	-	Do not connect
2	Brown	+24 Vdc power supply (-20%~+20%)
3	White	0Vdc (power supply circuit)
4	Yellow	CAN (+)
5	Green	CAN (-)

CAN bus output

Four-pin connector socket (for power supply)

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

Pin	Cable color	Pin/wire function definition
1	Brown	+24 Vdc power supply(-20%~+20%)
2	White	Do not connect
3	Blue	0Vdc(power supply circuit)
4	Black	Do not connect

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

Profinet Output

• Connector Connection Mode (Interface 1, 2)

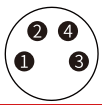
Pin	Line color	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -

• Single cable outlet connection mode

Pin	Line color 1*	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -
5	Red	24Vdc
6	Black	COM

Note: * Line color 1: light green, PUR sheath, 6 cores,-40C~85℃

Profinet Output



4-pin connector socket (for power supply)

• Connector Connection Mode (Interface 3)

Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc (-20%~+20%)
2	White	Do not connect
3	Blue	COM
4	Black	Do not connect

• Double cable outlet connection mode

Pin	Line color1*	Line color2*	Pin/wire function definition
1	Yellow	Yellow	Tx +
2	White	White	Rx +
3	Orange	Orange	Tx -
4	Blue	Blue	Rx -
5	Red	-	24Vdc
6	Black	-	COM

Note: * Line color 2: light green, PUR sheath, 4 cores,-40C~70℃

Start/Stop Output

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

Pin	Line color 1*	Line color 2*	Pin/wire function definition
1	Blue	Grey	Stop (-)
2	Green	Pink	Stop (+)
3	Yellow	Yellow	Start (+)
4	White	Green	Start (-)
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc

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

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

EtherCAT Output 

• Connector Connection Mode (Interface 1, 2)

Pin	Line color	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -

• Single cable outlet connection mode

Line color 1*	Pin/wire function definition
Yellow	Tx +
White	Rx +
Orange	Tx -
Blue	Rx -
Red	24Vdc
Black	COM

Note: * Line color 1: light green, PUR sheath, 6 cores,-40C~85℃

EtherCAT Output 

4-pin connector socket (for power supply)

• Connector Connection Mode (Interface 3)

Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc (-20%~+20%)
2	White	Do not connect
3	Blue	COM
4	Black	Do not connect

• Double cable outlet connection mode

Line color1*	Line color2*	Pin/wire function definition
Yellow	Yellow	Tx +
White	White	Rx +
Orange	Orange	Tx -
Blue	Blue	Rx -
Red	-	24Vdc
Black	-	COM

Note: * Line color 2: light green, PUR sheath, 4 cores,-40C~70℃

RD Split Displacement Sensor

Technical Characteristics

- Rugged and fully enclosed design
- Non-wear, non-contact measurement method
- Linear measurement, absolute output
- Sealing grade up to IP68
- Low power consumption design effectively reduces system heating
- Ultra-high temperature sensing rod (up to + 125℃)
- Multiple interfaces available: Analog、SSI、Profibus-DP、CANopen、Start-Stop、Profinet、EtherCAT

Product Parameters

• Input

Measurement data	Position Magnet ring
Stroke length	25mm~5500mm，customized according to customer needs

• Output

Interface	Analog、SSI、CANopen、Profibus-DP、Start-Stop、Profinet、EtherCAT
Resolution	Analog: 16-bit D/A or 0.0015% of full scale (min. 1μm) Bital: 0.5 / 1 / 2 / 5 / 10 / 20 / 40 / 50 / 100 μm
Nonlinearity	< ± 0.01% of full scale, Min. ± 50μm
Repetition accuracy	< 0.001% for full-scale taxis, Min. ± 1μm
Hysteresis	＜10μm
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m）， customizable
Temperature coefficient	＜30ppm/℃

• Working conditions

Magnet ring velocity	Arbitrary
Protection level	IP68（Sensor Lever）
Operating temperature	Sensor rod -40℃ ~ +125℃，electronic bin-40℃ ~ +85℃
Humidity/dew point	100%， relative humidity
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A, CE Certification

• Electrical connection

Input voltage	+24Vdc±20%
operating current	＜100mA（varying with range）
Polarity protection	Max.-30Vdc
Overpressure protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

• Structure and materials

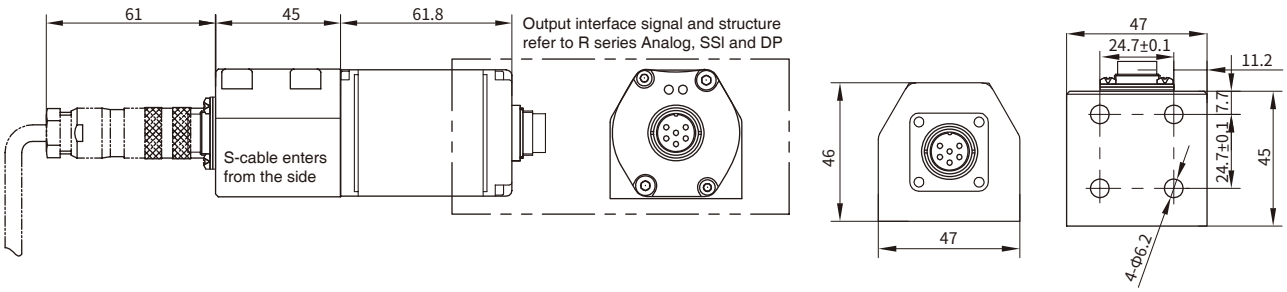
Fault indication	Electronic bin cover with LEDs display
Electronic bin	Aluminum alloy
Measuring rod	304 stainless steel
Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350bar (continuous)/700bar (peak)
Position magnet	Standard Magnet ring and various magnet rings
Mounting thread form	M18×1.5（customizable）
Installation direction	Any direction
Cable outlet mode	Cable outlet cable or connector

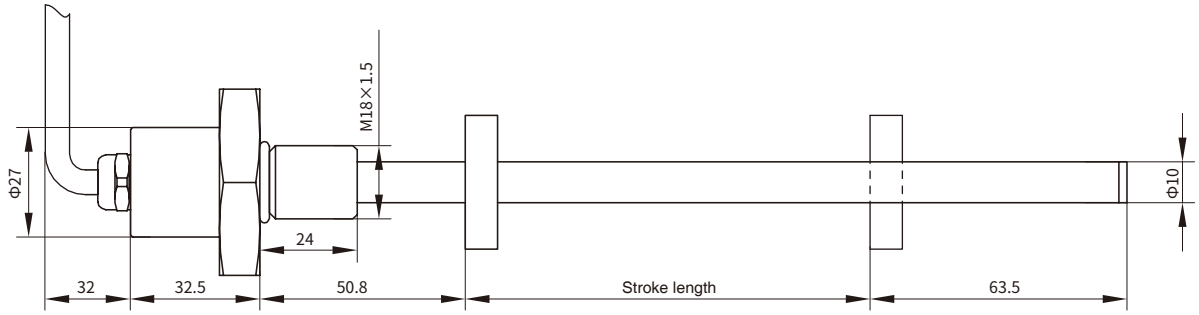
Installation and Use Instructions

Output characteristic

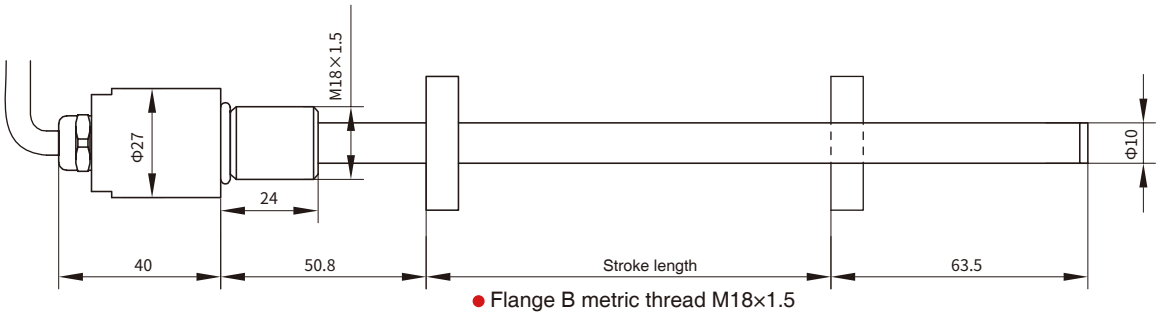
RD Series sensors are designed in a split form and are suitable for installation in cylinder, especially for cylinder applications in confined spaces. The sensor consists of two parts: a sensing rod and an electronic bin. The sensor rod is a pressure-resistant stainless round pipe with threads or flanges to provide protection for the sensing elements, and the whole sensor rod is installed in the cylinder through pistons. The temperature resistance of the sensing rod up to + 125℃, and the protection level reaches IP68, which is very suitable for harsh occasions such as high temperature, high humidity and water vapor; The electronic bin encapsulates the sensor signal processing part and the external interface together, reaching IP67 protection level, and can be connected with the sensor rod through the side or bottom of the connector plate.

RD Split Sensor Installing Dimensions

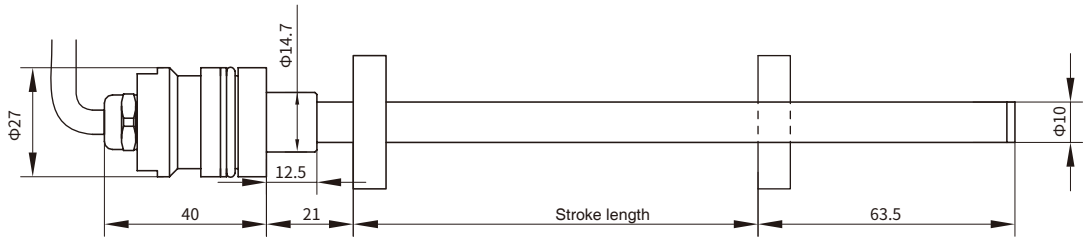




● Flange A metric thread M18×1.5 hexagon flange 46



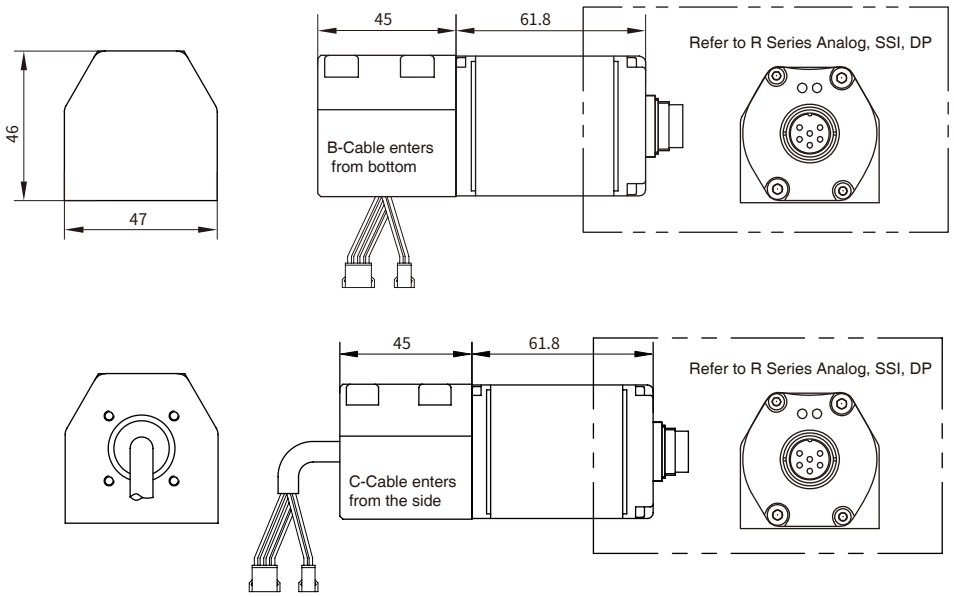
● Flange B metric thread M18×1.5



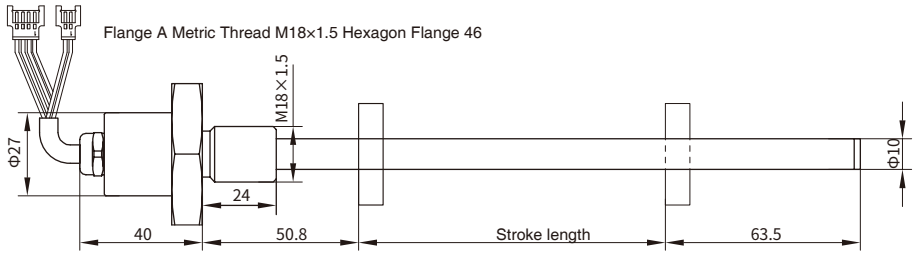
● Flange C connecting flange

Aa Installation and Use Instructions

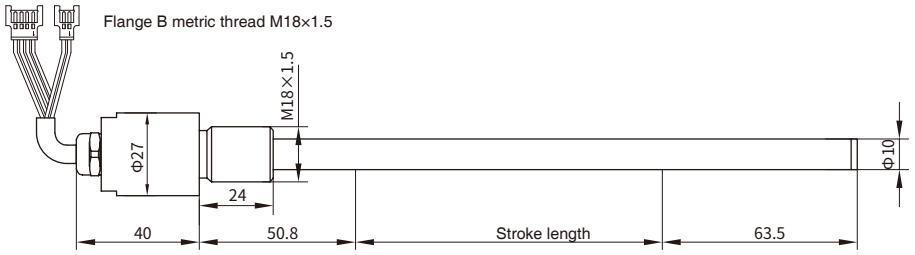
- RDSplit Sensor Installing Dimensions



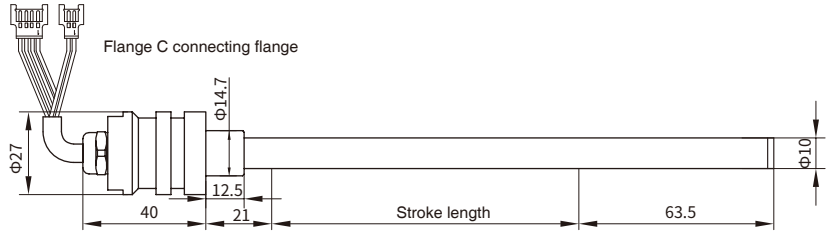
Scattered wire
with plastic plug



Scattered wire
with plastic plug



Scattered wire
with plastic plug



Selection Guide-Analog

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

01 - 02	Sensor shell form
RD	Split structure

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08	Outer tube flange
A	M18X1.5 SW46
B	M18X1.5 SW24
C	Connecting flange

09 - 11	Connection mode of outer tube
09	Cable outlet mode
S	Cable enters from the side, PUR cable
B	Cable entry from bottom, independent cable with flat plastic connector
C	Cable entry from side, independent cable with flat plastic connector

10 - 11	Cable length				
M1	1m	M2	2m	M3	3m
M4	1.5m	D1	250mm	D2	400mm
D3	600mm	R2	65mm	R4	170mm
R5	230mm	R6	350mm		

12 - 15	Connection form
12 - 13	Cable outlet mode
DH	PUR sheath, orange,-20~90℃, end scattered, cable color 1
DU	PVC sheath, orange,-20~105℃, end scattered, cable color 2
DB	PVC sheath, orange,-20~105℃, end scattered, cable color 3
DI	PUR sheath, orange,-20~90℃, end 6-pin connector
DV	PVC sheath, orange,-20~105℃, end 6-pin connector
DC	PVC sheath, orange,-20~105℃, end 8-pin connector
14 - 15	PVC sheath, orange,-20~105℃, end 8-pin connector

Note: For supporting cables, please refer to Analog/Start-Stop cable accessories selection

12 - 15	Connector mode
PH60	M16 male connector (6 pins)
PB80	M16 male connector (8 pins)

16 - 19	Signal output mode
16 - 17	Output form and direction
A0	Current output，4 ~ 20mA
A1	Current output，20 ~ 4mA
A2	Current output，0 ~ 20mA
A3	Current output，20 ~ 0mA
V0	Voltage output，0 ~ 10V
V1	Voltage output，10 ~ 0V
V2	Voltage output，-10 ~ +10V
V3	Voltage output，+10 ~ -10V
V4	Voltage output，0 ~ 5V
V5	Voltage output，5 ~ 0V
V6	Voltage output，-5 ~ +5V
V7	Voltage output，+5 ~ -5V

18	Number of Magnet rings
1	Single Magnet ring

19	No Magnet ring state
A	Keep the original value
B	Max. value
C	Min. value

20 - 21	Non-usable area at head and end, customizable
S0	50.8mm+63.5mm
B0	30mm+60mm

22-23	Country
	Refer to the country list，page 130.

- Note: The forward output of the sensor means that when the magnet ring moves away from the electronic bin, the output value increases and decreases when the magnet ring moves in the reverse direction.
- Selection examples:RD-M0500-A-SM1-PH60-A01C-S0

  Indicates: the ordered product is split-mounted RD structure, stroke length is 500m, outer tube flange M18X1.5, SW46 electronic bin and sensor rod connecting side cable outlet, cable length is 1m. Six-pin connector, 4-20mA output, No Magnet ring output value is the Min., single magnet ring, head non-usable area 50.8 mm, end non-usable area 63.5 mm.

Selection Guide-SSI

R	D	-	M					-		-				-					-	S						-			-		
01	02		03	04	05	06	07		08		09	10	11		12	13	14	15		16	17	18	19	20	21		22	23		24	25

01 - 02	Sensor shell form
R D	Split structure

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08	Outer tube flange
A	M18X1.5 SW46
B	M18X1.5 SW24
C	Connecting flange

09 - 11	Connection mode of outer tube
09	Cable outlet mode
S	Cable enters from the side, PUR cable
B	Cable entry from bottom, independent cable with flat plastic connector
C	Cable entry from side, independent cable with flat plastic connector

10 - 11	Cable length							
M	1	1m	M	2	2m	M	3	3m
M	4	1.5m	D	1	250mm	D	2	400mm
D	3	600mm	R	2	65mm	R	4	170mm
R	5	230mm	R	6	350mm			

12 - 15	Connection form
12 - 13	Cable outlet mode
D H	PUR sheath, orange,-20~90℃, end scattered, cable color 1
D U	PVC sheath, orange,-20~105℃, end scattered, cable color 2
D B	PVC sheath, orange,-20~105℃, end scattered, cable color 3
D I	PUR sheath, orange,-20~90℃, end 7-pin connector
D V	PVC sheath, orange,-20~105℃, end 7-pin connector
D C	PVC sheath, orange,-20~105℃, end 8-pin connector

14 - 15	Cable outlet mode: cable length, 01~99 meters
12 - 15	Connector mode
P H 7 0	M16 male connector (7 pins)
P B 8 0	M16 male connector (8 pins)

Note: For supporting cables, please refer to SSI cable accessories selection guide

16 - 21	Signal output mode				
17	Data length				
1	24bit	2	25bit	3	26bit*
	* 26-bit are parity bits and 25-bit are status bits				
18	Data format				
B	Binary	G	Gray code		
19	Resolution				
1	0.1mm	2	0.05mm		
3	0.02mm	4	0.01mm		
5	0.005mm	6	0.002mm		
7	0.001mm	8	0.04mm		
9	0.0005mm	0	0.0001mm		
20	Direction				
0	Forward	1	Reverse		
21	Mode				
0	Regular	1	Synchronization	2	High update rate

22 - 23	Non-usable area at head and end, customizable
S 0	50.8mm+63.5mm
B 0	30mm+60mm

24-25	Country
	Refer to the country list，page 130.

Selection Guide-Profibus-DP Bus

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

01 - 02 Sensor shell form

RD	Split structure

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 Outer tube flange

A	M18X1.5 SW46
B	M18X1.5 SW24
C	Connecting flange

09 - 11 Connection mode of outer tube

09 Cable outlet mode

S	Cable enters from the side, PUR cable
B	Cable entry from bottom, independent cable with flat plastic connector
C	Cable entry from side, independent cable with flat plastic connector

10 - 11 Cable length

M1	1m	M2	2m	M3	3m
M4	1.5m	D1	250mm	D2	400mm
D3	600mm	R2	65mm	R4	170mm
R5	230mm	R6	350mm		

12 - 15 Connection form

12 - 13 Cable outlet mode

DA	Single cable outlet, PUR sheath, cyan,-20-80℃, end scattered
DB	Double cable outlet, PUR sheath, cyan,-20~80℃, end scattered
DC	Double cable outlet, PUR sheath, cyan,-20~80℃, end M16, 6-pin, one male connector, one female connector

14 - 15 Cable outlet mode: cable length, 01-99m

12 - 15 Connector mode

PD53	One set of 5-pin male connector (M12), one set of 5-pin female connector (M12), one set of 4-pin male connector (M8)
PD63	A set of 6-pin male connector M16 and a set of 6-pin female connector M16

Note: Please refer to Profibus-DP cable fitting selection for supporting cables

16 - 18 Signal output mode

16	Profibus Protocol
17	Number of Magnet rings (1~9 optional)
18	0-single magnet B-single/multiple Magnet rings

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

S0	50.8mm+63.5mm
B0	30mm+60mm

21-22 Country

Refer to the country list, page 130.

XX Selection Guide-Start/Stop Output

R	D	–	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 - 02 Sensor shell form

RD	Split structure

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 Outer tube flange

A	M18X1.5 SW46
B	M18X1.5 SW24
C	Connecting flange

09 - 11 Connection mode of outer tube

09 Cable outlet mode

S	Cable enters from the side, PUR cable
B	Cable entry from bottom, independent cable with flat plastic connector
C	Cable entry from side, independent cable with flat plastic connector

10 - 11 Cable length

M1	1m	M2	2m	M3	3m
M4	1.5m	D1	250mm	D2	400mm
D3	600mm	R2	65mm	R4	170mm
R5	230mm	R6	350mm		

12 - 15 Connection form

12 - 13 Cable outlet mode

DH	PUR sheath, orange,-20~90℃, end scattered, cable color 1
DU	PVC sheath, orange,-20~105℃, end scattered, cable color 2
DB	PVC sheath, orange,-20~105℃, end scattered, cable color 3
DI	PUR sheath, orange,-20~90℃, end 6-pin connector
DV	PVC sheath, orange,-20~105℃, end 6-pin connector
DC	PVC sheath, orange,-20~105℃, end 8-pin connector

14 - 15 Cable length, 0199 units: meters (Cable outlet mode)

12 - 15 Cable outlet mode

12 - 15 0DR cable outlet first and end with plastic connector

0DR2	Scattered wire with plastic connector 65mm
0DR3	Scattered wire with plastic connector 170mm
0DR4	Scattered wire with plastic connector 230mm
0DR5	Scattered wire with plastic connector 350mm

12 - 15 Connector mode

PH60	M16 male connector (6 pins)

Note: For supporting cables, please refer to the Guide for Selection of Cable Accessories

16 - 19 Signal output mode

17 Input voltage

1	+ 24Vdc（- 20% ~ + 20%）
2	+ 9 ~ 28.8Vdc

18 - 19 Output signal

01	Start/Stop， multi-Magnet ring

20 - 21 Non-usable area at head and end, customizable

S0	50.8mm+63.5mm
S9	50.8mm+107mm

22-23 Country

Refer to the country list，page 130.

Selection Guide-CAN Bus

R	D	–	M					–		–				–					–					–			–		
01	02		03	04	05	06	07		08		09	10	11		12	13	14	15		16	17	18	19	20		21	22		23	24

01 - 02 Sensor shell form

R D	Split structure

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 Outer tube flange

A	M18X1.5 SW46
B	M18X1.5 SW24
C	Connecting flange

09 - 11 Connection mode of outer tube

09 Cable outlet mode

S	Cable enters from the side, PUR cable
B	Cable entry from bottom, independent cable with flat plastic connector
C	Cable entry from side, independent cable with flat plastic connector

10 - 11 Cable length

M 1	1m	M 2	2m	M 3	3m
M 4	1.5m	D 1	250mm	D 2	400mm
D 3	600mm	R 2	65mm	R 4	170mm
R 5	230mm	R 6	350mm		

12 - 15 Connection form

12 - 13 Cable outlet mode

D A	PVC sheath, purple, 4 cores,-40℃~75℃, end scattered

14 - 15 Cable outlet mode: cable length, 01-99m

0 D R 1	PVC sheath, length 150mm, end 5-pin male connector

12 - 15 Connector mode

P D 6 0	6-pin male connector (M16)
P D 6 2	Two sets of 6-pin male connector (M16)
P D 5 0	5-pin male connector (M12)
P D 5 2	5-pin male connector (M12) and 5-pin female connector (M12)
P D 5 4	5-pin male connector (M12), 5-pin female connector (M12), 4-pin male connector (M8)

Note: For supporting cables, please refer to CAN bus cable Accessories selection

16 - 20 Signal output mode

16 Interface

C	CAN bus

17 Protocol type

1	CANopen	2	CANBasic

18 Baud

1	1000kBit/s	2	800kBit/s
3	500kBit/s	4	250kBit/s
5	125kBit/s	6	100kBit/s
7	50kBit/s	8	20kBit/s

19 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	6	0.002mm
7	0.001mm		

20 Number of Magnet rings (1~9 optional)

21 - 22 Non-usable area at head and end, customizable

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

23-24 Country

Refer to the country list, page 130.

Selection Guide-Profinet Output

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

01 - 02	Sensor shell form
RD	Split structure

03 - 07	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08	Outer tube flange
A	M18X1.5 SW46
B	M18X1.5 SW24
C	Connecting flange

09 - 11	Connection mode of outer tube
09	Cable outlet mode
S	Cable enters from the side, PUR cable
B	Cable entry from bottom, independent cable with flat plastic connector
C	Cable entry from side, independent cable with flat plastic connector
10 - 11	Cable length

M1	1m	M2	2m	M3	3m
M4	1.5m	D1	250mm	D2	400mm
D3	600mm	R2	65mm	R4	170mm
R5	230mm	R6	350mm		

12 - 15	Connection form
DA**	Single cable outlet, light green, PUR sheath (6 cores),-40℃~85℃ (**indicating cable length, unit: meter)
DB**	Double cable outlet, light green, PUR sheath (one set of 6 cores,-40℃~85℃; one set of 4 cores,-40℃~70℃) (** denotes cable length, unit: meters)
PD56	2 sets of 4-pin M12 female connector, 1 set of 4-pin M8 male connector

Note: For supporting cables, please refer to the Guide for Selection of Industrial Ethernet Cable Accessories

16 - 18	Communication interface
16 N	Profinet communication interface
17	Number of Magnet rings (1~9 optional)
18	0-General, customizable

19 - 20	Non-usable area at head and end, customizable
S0	50.8mm+63.5mm
S9	50.8mm+107mm

21-22	Country
	Refer to the country list, page 130.

Selection Guide-EtherCAT Output

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

01 - 02 Sensor shell form

RD	Split structure

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 Outer tube flange

A	M18X1.5 SW46
B	M18X1.5 SW24
C	Connecting flange

09 - 11 Connection mode of outer tube

09 Cable outlet mode

S	Cable enters from the side, PUR cable
B	Cable entry from bottom, independent cable with flat plastic connector
C	Cable entry from side, independent cable with flat plastic connector

10 - 11 Cable length

M1	1m	M2	2m	M3	3m
M4	1.5m	D1	250mm	D2	400mm
D3	600mm	R2	65mm	R4	170mm
R5	230mm	R6	350mm		

12 - 15 Connection form

DA**	Single cable outlet, light green, PUR sheath (6 cores),-40°C~85°C (** indicating cable length, unit: meter)
DB**	Double cable outlet, light green, PUR sheath (one set of 6 cores,-40℃~85℃; one set of 4 cores,-40℃~70℃) (** denotes cable length, unit: meters)
PD56	2 sets of 4-pin M12 female connector, 1 set of 4-pin M8 male connector

16 - 19 Communication interface

16 - 17 Sensor form

E1	EtherCAT, 1-9 magnets, position and speed, distributed clock optional

18 - 19 Number of Magnet rings

	01~09 optional

20 - 21 Non-usable area at head and end, customizable

S0	50.8mm+63.5mm
B0	30mm+60mm

22-23 Country

	Refer to the country list, page 130.

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

Analog

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

Pin	Cable color 1*	Cable color 2*	Pin/wire function definition
1	Blue	Grey	No.1 Magnet position signal(+)
2	Green	Pink	Position signal of No.1 Magnet(-)
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc (power supply circuit)

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

Analog

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Current output
2	Grey	0Vdc(Current/Voltage Loop)
3	Pink	Reservation
4	-	Reservation
5	Green	0...10V
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

SSI

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

Pin	Cable color 1*	Cable color 2*	Pin/wire 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	0 Vdc
7	-	-	Do not connect

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

SSI

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Clock (+)
2	Grey	Data (+)
3	Pink	Clock (-)
4	-	Reservation
5	Green	Data (-)
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Start/Stop Output

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

Pin	Line color 1*	Line color 2*	Pin/wire function definition
1	Blue	Grey	Stop (-)
2	Green	Pink	Stop (+)
3	Yellow	Yellow	Start (+)
4	White	Green	Start (-)
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc(power supply circuit)

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

Start/Stop Output

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

Pin	Line color 1*	Pin/wire function definition
1	Yellow	Start (+)
2	Grey	Stop (+)
3	Pink	Start (-)
4	-	Reservation
5	Green	Stop (-)
6	Blue	0 Vdc(power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

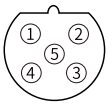
Profibus-DP bus output

Four-pin connector socket (for power supply)

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

Pin	Cable color	Pin/wire function definition
1	Brown	+24Vdc power supply (-20%~+20%)
2	White	Do not connect
3	Blue	0Vdc(power supply circuit)
4	Black	Do not connect

Profibus-DP bus output

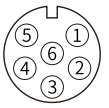


• Five-pin male connector and female connector pin arrangement (facing the sensor head direction)

Pin	Cable color	Pin/wire function definition
1	-	VP+5N (for end connections only) *
2	Green	RxD/TxD-N(bus)
3	-	DGnd (for end connections only) *
4	Red	RxD/TxD-P(bus)
5	Shielded wire	for end connections only

Note: * Only applicable to signal connection of sensor female connector

Profibus-DP bus output



• The pins of the six-pin male connector and female connector are arranged in the direction of the sensor head)

Pin	Cable color	Pin/wire function definition
1	Green	RxD/TxD-N(bus)
2	Red	RxD/TxD-P(bus)
3	-	DGnd (for end connections only) *
4	-	VP+5N (for end connections only) *
5	Black	+24Vdc power supply (-20%~+20%)
6	Blue	0 Vdc (power supply circuit)

Note: * Only applicable to signal connection of sensor female connector

Profinet Output

• Connector Connection Mode (Interface 1, 2)

Pin	Line color	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -

• Single cable outlet connection mode

Pin	Line color 1*	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -
5	Red	24Vdc
6	Black	COM

Note: * Line color 1: light green, PUR sheath, 6 cores,-40C~85℃

Profinet Output

4-pin connector socket (for power supply)

• Connector Connection Mode (Interface 3)

Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc (-20%~+20%)
2	White	Do not connect
3	Blue	COM
4	Black	Do not connect

• Double cable outlet connection mode

Pin	Line color1*	Line color2*	Pin/wire function definition
1	Yellow	Yellow	Tx +
2	White	White	Rx +
3	Orange	Orange	Tx -
4	Blue	Blue	Rx -
5	Red	-	24Vdc
6	Black	-	COM

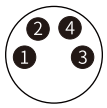
Note: * Line color 2: light green, PUR sheath, 4 cores,-40C~70℃

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

CAN bus output

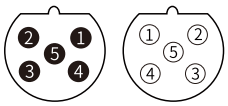
Four-pin connector socket (for power supply)



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

Pin	Cable color	Pin/wire function definition
1	Brown	+24Vdc power supply (-20%~+20%)
2	White	Do not connect
3	Blue	0Vdc(power supply circuit)
4	Black	Do not connect

CAN bus output



- Five-pin male connector and female connector pin arrangement (facing the sensor head direction)

Pin	Cable color	Pin/wire function definition
1	-	Do not connect
2	Brown	+24Vdc power supply (-20%~+20%)
3	White	0Vdc (power supply circuit)
4	Yellow	CAN (+)
5	Green	CAN (-)

CAN bus output

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

Pin	Cable color	Pin/wire function definition
1	Green	CAN (-)
2	Yellow	CAN (+)
3	-	Do not connect
4	-	Do not connect
5	Brown	+24Vdc power supply (-20%~+20%)
6	White	0 Vdc (power supply circuit)

EtherCAT Output

- Connector Connection Mode (Interface 1, 2)

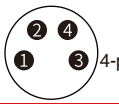
Pin	Line color	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -

- Single cable outlet connection mode

Line color 1*	Pin/wire function definition
Yellow	Tx +
White	Rx +
Orange	Tx -
Blue	Rx -
Red	24Vdc
Black	COM

Note: * Line color 1: light green, PUR sheath, 6 cores,-40C~85℃

EtherCAT Output



4-pin connector socket (for power supply)

- Connector Connection Mode (Interface 3)

Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc (-20%~+20%)
2	White	Do not connect
3	Blue	COM
4	Black	Do not connect

- Double cable outlet connection mode

Line color1*	Line color2*	Pin/wire function definition
Yellow	Yellow	Tx +
White	White	Rx +
Orange	Orange	Tx -
Blue	Blue	Rx -
Red	-	24Vdc
Black	-	COM

Note: * Line color 2: light green, PUR sheath, 4 cores,-40C~70℃

RS Waterproof Displacement Sensor

Technical Characteristics

- Non-wear, non-contact measurement method Rugged and
- fully enclosed design
- Linear measurement, absolute position output Low power
- consumption design effectively reduces system heating
- Sealing grade up to IP67
- Multiple signal type optional：Analog、SSI、CANopen、Start/Stop

Product Parameters

• Input

Measurement data	Position Magnet ring
Stroke length	50mm~5500mm，customized according to customer's needs
Number of measurements	1

• Output

Interface	Analog、SSI、CANopen、Start/Stop
Resolution	Analog: 16-bit D/A or 0.0015% of full scale (min. 1μm) Bital quantity:0.5 / 1 / 2 / 5 / 10 / 20 / 40 / 50 / 100 μm
Nonlinearity	< ± 0.01% of full scale, Min. ±50μm
Repetition accuracy	< ± 0.001% of full scale, Min. ± 1μm
Hysteresis	＜10um
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m），customizable
Temperature coefficient	＜30ppm/℃

• Working conditions

Magnet ring velocity	Arbitrary
Protection level	IP68
Operating temperature	-40℃ ~ +105℃
Humidity/dew point	Humidity100%，relative humidity
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A, CE Certification

• Electrical connection

Input voltage	Normal:+24Vdc±20% Wide voltage: 9Vdc~28.8Vdc
operating current	＜90mA（varying with range）
Polarity protection	Max.-30Vdc
Overpressure protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

• Structure and materials

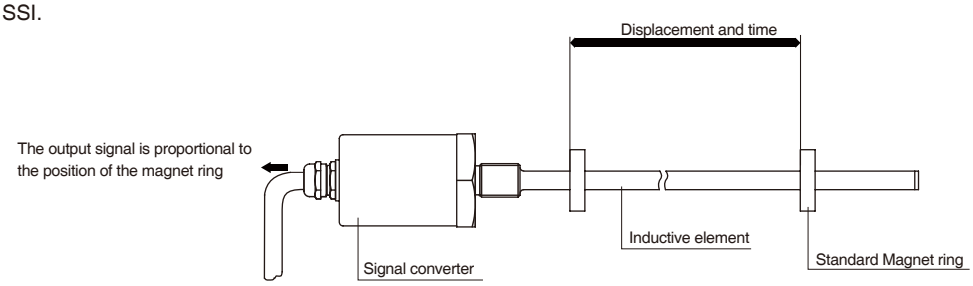
Electronic bin	304 stainless steel, or 316L according to customer requirements
Measuring rod	304 stainless steel, or 316L according to customer requirements
Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350bar (continuous)/700bar (peak)
Position magnet	Standard Magnet ring and various magnet rings
Mounting thread form	M18×1.5、M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction	Any direction
Cable outlet mode	Cable outlet

Aa Installation and Use Instructions

Output characteristic

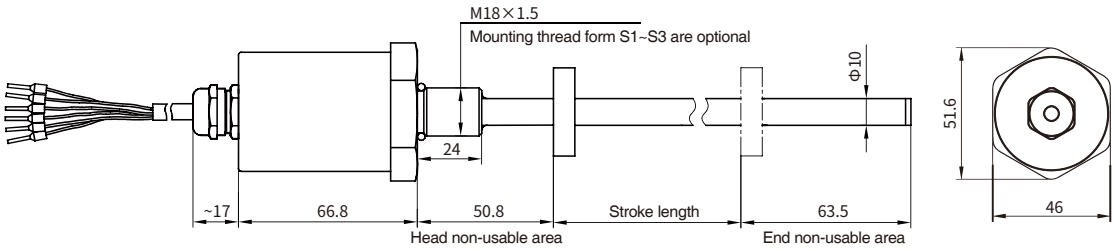
RS series sensors have strong protective shell, which is durable and can provide users with continuous, reliable and real-time displacement signals in harsh environment. The sensor is completely sealed with stainless steel shell, which fully meets the protection level IP68. Note: The electronic compartment is not detachable.

Because of the non-contact measurement technology, the sensor can be integrated in an isolated and sealed shell. The position magnet moves along the measuring rod, and the position can be measured without mechanical contact. For liquid level measurement, an alternative float can be used. The sensor with high protection level shell is easy to install and use, so as to better meet the application requirements. The measurement accuracy and all technical parameters depend on the output characteristics of the selected sensor, and the interface form can be selected: analog or SSI.



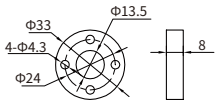
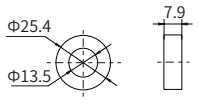
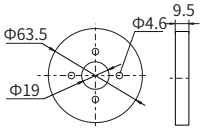
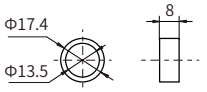
Installation dimensions of RS waterproof sensor

RS Series super protective Sensor, designed for cylinder built-in installation in harsh environment, withstands pressure of 35MPa for continuous, flexible and simple installation mode, and mounting thread form M18×1.5 or M20×1.5 or 3/4”-16UNF-3A.



Note: It is equipped with standard Magnet ring kit 288501, with magnetic isolation gasket and fixing screw.

Cc Commonly Used Accessories

Accessory name/ model	Dimensions	Accessory name/ model	Dimensions	Accessory name/ model	Dimensions
Standard Magnet ring Order No.: 211501		Magnet ring Order No.: 211506		Enlarge magnet ring Order No.: 211504	
Magnet ring Order No.: 211507					

Note: Please refer to "Magnet ring Selection" for details of Magnet ring kit and other models

Selection Guide-Analog

R	S	–	M					–	S		–	D				–					–			–		
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
R S	Pressure-resistant pipe
03 - 07	**Measuring range**
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm
08 - 09	**Magnet ring type/mounting thread form**
S 1	M 18×1.5, measuring rod diameter 10mm, 304 material
S 2	M20×1.5, 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℃, end scattered, cable color 1
D U	PVC sheath, orange,-20~105℃, end scattered, cable color 2
D B	PVC sheath, orange,-20~105℃, end scattered, c able color 3
D I	PUR sheath, orange,-20~90℃, end 6-pin connector
D V	PVC sheath, orange,-20~105℃, end 6-pin connector
D C	PVC sheath, orange,-20~105℃, end 8-pin connector
12 - 13	**Cable outlet mode: cable length, 01~99 meters**
10 - 13	**Connector mode**
P H 6 0	M16 male connector (6 pins)
P B 8 0	M16 male connector (8 pins)

Note: For supporting cables, please refer to Analog/Start-Stop Cable Accessories Selection

14 - 17	Signal output mode
14 - 15	**Output form and direction**
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	**Number of magnet ring**
1	Single magnet ring
17	**No magnet ring state**
A	Keep the original value
B	Max. value
C	Min. value
18 - 19	**Non-usable area at head and end, customizable**
S 0	50.8mm+63.5mm
B 0	30mm+60mm
20-21	**Country**
	Refer to the country list，page 130.

- Note: The forward output of the sensor means that when the Magnet ring moves away from the electronic bin, the output value increases and decreases when the Magnet ring moves in the reverse direction.

- Selection examples: RS-M0300-S1-DU02-V01B-S0

  Indicates: the installation mode of the ordered product is built-in waterproof steel structure, the stroke length is 300mm, the thread is M18×1.5, the measuring rod diameter is 10mm, the material is 304, cable outlet, cable length is 2 meters (PVC sheath, orange,-20~105℃, the end is scattered), the output is 0-10V, the output value of No Magnet ring is the Max., and the single Magnet ring is forward

Selection Guide-SSI

R S – M □ □ □ □ – □ □ – □ □ □ □ – S □ □ □ □ □ – □ □ – □ □

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

01 - 02 Sensor shell form

R S	Pressure-resistant pipe

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09 Magnet ring type/mounting thread form

S 1	M 18×1.5, measuring rod diameter 10mm, 304 material
S 2	M20×1.5, 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℃, end scattered, cable color 1
D U	PVC sheath, orange,-20~105℃, end scattered, cable color 2
D B	PVC sheath, orange,-20~105℃, end scattered, cable color 3
D I	PUR sheath, orange,-20~90℃, end 6-pin connector
D V	PVC sheath, orange,-20~105℃, end 6-pin connector
D C	PVC sheath, orange,-20~105℃, end 8-pin connector

12 - 13 Cable outlet mode: cable length, 01~99 meters

10 - 13 Connector mode

P H 7 0	M16 male connector (7 pins)
P B 8 0	M16 male connector (8 pins)

Note: For supporting cables, please refer to the Guide for Selection of Cable Accessories

14 - 19 Signal output mode

15 Data length

1	24bit	2	25bit	3	26bit *

* 26-bit are parity bits and 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	6	0.002mm
7	0.001mm	8	0.04mm
9	0.0005mm	0	0.0001mm

18 Direction

0	Forward	1	Reverse

19 Mode

0	Regular	1	Synchronization	2	High update rate

20 - 21 Non-usable area at head and end, customizable

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

22-23 Country

□ □ Refer to the country list， page 130.

Selection Guide-CAN Bus

R	S	–	M					–			–					–	C					–			–		
01	02		03	04	05	06	07		08	09		10	11	12	13		14	15	16	17	18		19	20		21	22

01 - 02 Sensor shell form

R S	Pressure-resistant pipe

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09 Magnet ring type/mounting thread form

S 1	M18×1.5，measuring rod diameter 10mm, 304 material
S 2	M20×1.5，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 A	PVC sheath, purple, 4 cores,-40℃~75℃, end scattered

12 - 13 Cable outlet mode: cable length, 01~99 meters

0 D R 1	PVC sheath, length 150mm, end 5-pin male connector

10 - 13 Connector mode

P D 6 0	Set of 6-pin male connector (M16)

Note: For supporting cables, please refer to CAN bus cable Accessories selection

14 - 18 Signal output mode

14 Interface

C	CAN bus

15 Protocol type

1	CANopen	2	CANBasic

16 Baud

1	1000kBit/s	2	800kBit/s
3	500kBit/s	4	250kBit/s
5	125kBit/s	6	100kBit/s
7	50kBit/s	8	20kBit/s

17 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	6	0.002mm
7	0.001mm		

18 Number of Magnet rings (1~9 optional)

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

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

21-22 Country

Refer to the country list，page 130.

Selection Guide-Start/Stop Output

R	S	–	M					–			–					–	R				–			–		
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

R S	Pressure-resistant pipe

03 - 07 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09 Magnet ring type/mounting thread form

S 1	M18×1.5，measuring rod diameter 10mm, 304 material
S 2	M20×1.5，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℃, end scattered, cable color 1
D U	PVC sheath, orange,-20~105℃, end scattered, cable color 2
D B	PVC sheath, orange,-20~105℃, end scattered, cable color 3
D I	PUR sheath, orange,-20~90℃, end 6-pin connector
D V	PVC sheath, orange,-20~105℃, end 6-pin connector
D C	PVC sheath, orange,-20~105℃, end 8-pin connector

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

10 - 13 Cable outlet mode

10 - 13 0 D R _ cable outlet first and end with plastic connector

0 D R 2	Scattered wire with plastic connector 65 mm
0 D R 3	Scattered wire with plastic connector 170 mm
0 D R 4	Scattered wire with plastic connector 230 mm
0 D R 5	Scattered wire with plastic connector 350 mm

10 - 13 Connector mode

P H 6 0	M16 male connector (6 pins)

Note: For supporting cables, please refer to Analog/Start-stop Cable Accessories Selection

14 - 17 Signal output mode

15 Input voltage

1	+ 24Vdc（- 20% ~ + 20%）
2	+ 9 ~ 28.8Vdc

16 - 17 Output signal

0 1	Start/Stop，multi-Magnet

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

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

20-21 Country

_ _	Refer to the country list，page 130.

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

Analog

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

Pin	Cable color 1*	Cable color 2*	Pin/wire function definition
1	Blue	Grey	No.1 Magnet position signal(+)
2	Green	Pink	Position signal of No.1 Magnet(-)
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc (power supply circuit)

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

Analog

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Current output
2	Grey	0Vdc(Current/Voltage Loop)
3	Pink	Reservation
4	-	Reservation
5	Green	0...10V
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

SSI

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

Pin	Cable color 1*	Cable color 2*	Pin/wire 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	0 Vdc
7	-	-	Do not connect

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

SSI

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Clock (+)
2	Grey	Data (+)
3	Pink	Clock (-)
4	-	Reservation
5	Green	Data (-)
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

Start/Stop Output

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

Pin	Line color 1*	Line color 2*	Pin/wire function definition
1	Blue	Grey	Stop (-)
2	Green	Pink	Stop (+)
3	Yellow	Yellow	Start (+)
4	White	Green	Start (-)
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc(power supply circuit)

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

Start/Stop Output

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

Pin	Line color 1*	Pin/wire function definition
1	Yellow	Start (+)
2	Grey	Stop (+)
3	Pink	Start (-)
4	-	Reservation
5	Green	Stop (-)
6	Blue	0 Vdc(power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

CAN bus output

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

Pin	Cable color	Pin/wire function definition
1	Green	CAN (-)
2	Yellow	CAN (+)
3	-	Do not connect
4	-	Do not connect
5	Brown	+24Vdc power supply (-20%~+20%)
6	White	0 Vdc (power supply circuit)

RB Flat Displacement Sensor

Technical Characteristics

- Non-wear, non-contact measurement method
- Rugged and fully enclosed design
- Linear measurement, absolute position output
- Low power consumption design effectively reduces system heating
- Sealing grade up to IP67
- Multiple signal type optional：Analog、SSI、CANopen

Product Parameters

• Input

Measurement data	Position Magnet ring
Stroke length	50mm~5500mm， customized according to customer's needs
Number of measurements	1

• Output

Interface	Analog、SSI、CANopen
Resolution	Analog： 16-bit D/A or 0.0015% of full scale (min. 1μm) Digital quantity： 1 / 2 / 5 / 10 / 20 / 40 / 50 / 100 μm
Nonlinearity	< ± 0.01% of full scale, Min. ± 50μm
Repetition accuracy	< ± 0.001% of full scale, Min. ± 1μm
Hysteresis	＜10μm
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m），customizable
Temperature coefficient	＜30ppm/℃

• Operating conditions

Magnet ring velocity	Arbitrary
Protection level	IP67
Operating temperature	-40℃ ~ +85℃
Humidity/dew point	100%，relative humidity
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A, CE Certification

• Electrical connection

Input voltage	+24Vdc±20%
operating current	＜100mA（ varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

• Structure and materials

Electronic bin	304 stainless steel
Measuring rod	304 stainless steel
Outer tube pressure resistance	35MPa (continuous)/70MPa (peak) or 350ba (continuous)/700ba (peak)
Position magnet	Standard magnetic ring and various ring magnets
Mounting thread	6 M6X16 screws，M18×1.5、 M20×1.5（Customizable）
Installation direction	Any direction
Connection type	Cable outlet or connector

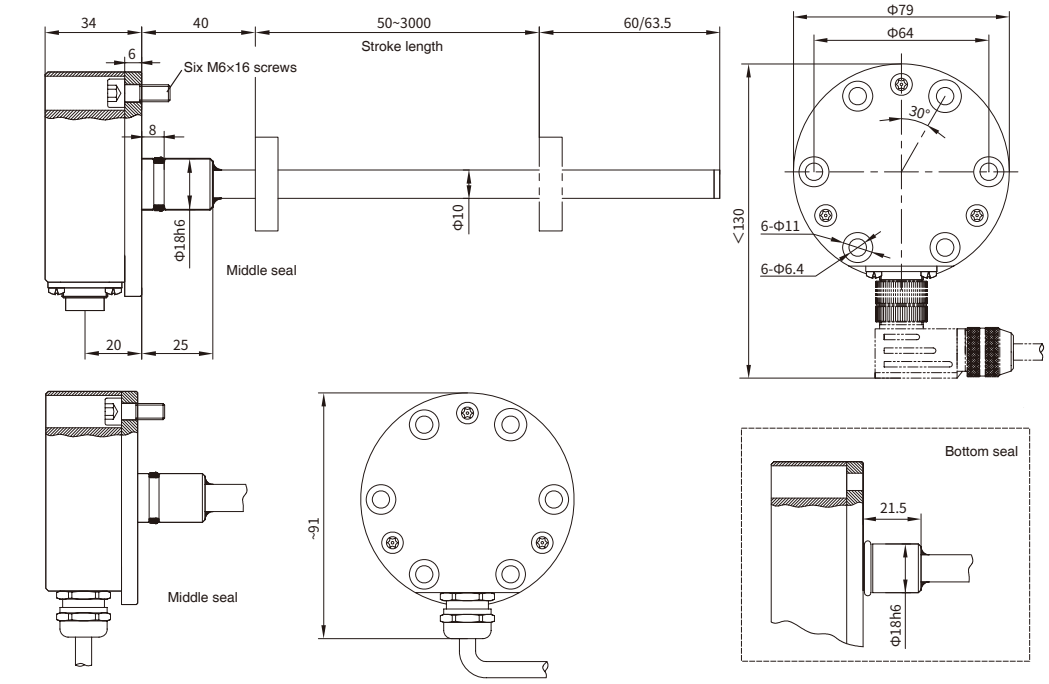
Aa Installation and Instructions for use

• Output characteristic

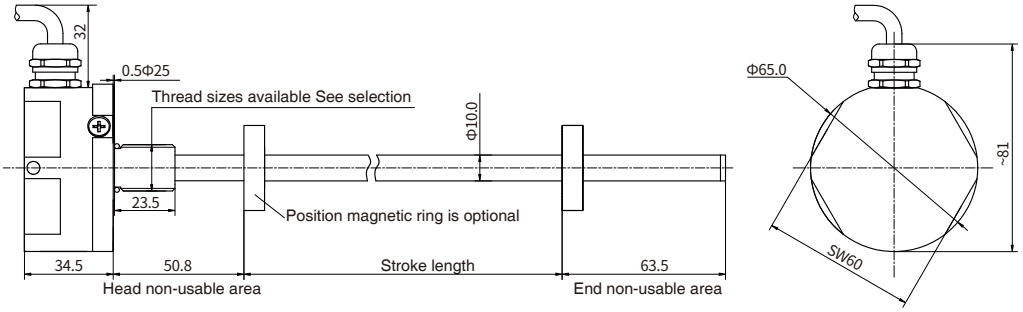
RB series sensors have high-strength protective shell and high working temperature, and are durable, which can provide users with continuous, reliable and real-time displacement signals in harsh environment. The sensor has a completely stainless steel shell. It is suitable for installing in hydraulic cylinder and measuring the stroke of piston, and is widely used in energy and mining industries. Thanks to its flat and compact design, the sensor is very suitable for cylinder installation in narrow space.

• Installation dimensions

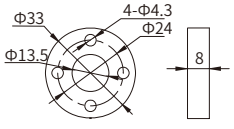
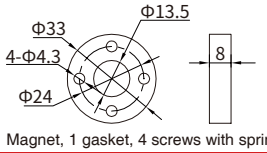
Tight pressure seal type



External thread type



Cc Commonly used accessories

Accessory name/ model	Dimensions	Accessory name/ model	Dimensions
Standard magnetic ring Order No.: 211501		Standard Magnet ring Kit Order No.: 288501	 Includes: 1 Magnet, 1 gasket, 4 screws with spring washer

● Note: Please refer to "Magnet Ring Selection" for details of magnet ring kit and other models

Selection Guide-Analog Quantity

R	B	–	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
R B	Compact sealing installation

03 - 07	Stroke length
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09	Installation form
S 1	Bottom seal
S 2	Middle seal
S A	M18X1.5 measuring rod diameter 10mm, 304 material
S B	M20X1.5 measuring rod diameter 10mm, 304 material

10 - 13	Connection form
10 - 11	For cable outlet
D H	PUR sheath, orange,-20~90℃, end scattered, cable color 1
D U	PVC sheath, orange,-20~105℃, end scattered, cable color 2
D B	PVC sheath, orange,-20~105℃, end scattered, cable color 3
D I	PUR sheath, orange,-20~90℃, end with 6-pin connector
D V	PVC sheath, orange,-20~105℃, end with 6-pin connector
D C	PVC sheath, orange,-20~105℃, end with 8-pin connector
12 - 13	For cable outlet: cable length, 01~99 meters
10 - 13	For connector
P H 6 0	M16 male connector (6 pins)
P B 8 0	M16 male connector (8 pins)

Note: For supporting cables, please refer to Analog/Start-Stop Cable Accessories Selection

14 - 17	Signal output mode
14 - 15	Output form and direction
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	Number of magnet ring
1	Single magnet ring
17	No magnet ring state
A	Keep the original value
B	Max. value
C	Min. value
18 - 19	Non-usable area at head and end, customizable
S 4	40mm+60mm
20-21	Country
	Refer to the country list，page 130.

- Note: The forward output of the sensor means that when the magnet ring moves away from the electronic bin, the output value increases and decreases when the magnet ring moves in the reverse direction.

- Examples of selection： RB-M3600-S1-PH60-A01C-S4

  Indication: The product is a compact sealed RB structure, with an effective stroke of 3600 mm, a bottom sealed M18×1.5, six-pin connector, output of 4-20 mA, Min. output value of no magnet ring state, single magnet ring, non-usable area of 40mm at the head and 60mm at the end.

Selection Guide-SSI

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

01 - 02	Sensor shell form
R B	Compact sealing installation

03 - 07	Stroke length
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09	Installation form
S 1	Bottom seal
S 2	Middle seal
S A	M18X1.5 measuring rod diameter 10mm, 304 material
S B	M20X1.5 measuring rod diameter 10mm, 304 material

10 - 13	Connection form
10 - 11	For cable outlet
D H	PUR sheath, orange,-20~90℃, end scattered, cable color 1
D U	PVC sheath, orange,-20~105℃, end scattered, cable color 2
D B	PVC sheath, orange,-20~105℃, end scattered, cable color 3
D I	PUR sheath, orange,-20~90℃, end with 7-pin connector
D V	PVC sheath, orange,-20~105℃, end with 7-pin connector
D C	PVC sheath, orange,-20~105℃, end with 8-pin connector
12 - 13	For cable outlet: cable length, 01~99 meters
10 - 13	For connector
P H 7 0	M16 male connector (7 pins)
P B 8 0	M16 male connector (8 pins)

Note: See SSI cable fittings selection for supporting cables

14 - 19	Signal output mode
15	Data length
1	24bit
2	25bit
3	26bit*
	* 26-bit are parity bits and 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
6	0.002mm
7	0.001mm
8	0.04mm
18	Direction
0	Forward
1	Reverse
19	Mode
0	Regular

20 - 21	Non-uasble area at head and end, customizable
S 4	40mm+60mm

22-23	Country
	Refer to the country list, page 130.

Selection Guide-CAN Bus

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

01 - 02 Sensor shell form

R B	Compact sealing installation

03 - 07 Stroke length

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

08 - 09 Installation form

S 1	Bottom seal
S 2	Middle seal
S A	M18X1.5 measuring rod diameter 10mm, 304 material
S B	M20X1.5 measuring rod diameter 10mm, 304 material

10 - 13 Connection form

10 - 11 For cable outlet

D A	PVC sheath, purple, 4 cores,-40℃~75℃, end scattered

12 - 13 Straight-out cable mode: cable length, 01~99 meters

0 D R 1	PVC sheath, length 150mm, end with 5-pin connector

10 - 13 For connector

P D 6 0	Set of 6-pin male connectors (M16)

Note: For supporting cables, please refer to CAN bus cable fittings selection

14 - 18 Signal output mode

14 Interface

C	CAN bus

15 Protocol type

1	CANopen	2	CANBasic

16 Baud

1	1000kBit/s	2	800kBit/s
3	500kBit/s	4	250kBit/s
5	125kBit/s	6	100kBit/s
7	50kBit/s	8	20kBit/s

17 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	6	0.002mm
7	0.001mm		

18 Number of magnet rings (1~9 optional)

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

S 4	40mm+60mm

21-22 Country

Refer to the country list, page 130.

JJ Wiring Mode

When the sensor is a connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

Analog

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

Pin	Cable color 1*	Cable color 2*	Pin/wire function definition
1	Blue	Grey	No.1 Magnet position signal(+)
2	Green	Pink	Position signal of No.1 Magnet(-)
3	Yellow	Yellow	Reservation
4	White	Green	Reservation
5	Red	Brown	+24Vdc power supply (-20%~+20%)
6	Black	White	0 Vdc (power supply circuit)

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

Analog

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Current output
2	Grey	0Vdc(Current/Voltage Loop)
3	Pink	Reservation
4	-	Reservation
5	Green	0...10V
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

SSI

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

Pin	Cable color 1*	Cable color 2*	Pin/wire 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	0 Vdc
7	-	-	Do not connect

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

SSI

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

Pin	Cable color3*	Pin/wire function definition
1	Yellow	Clock (+)
2	Grey	Data (+)
3	Pink	Clock (-)
4	-	Reservation
5	Green	Data (-)
6	Blue	0 Vdc (power supply circuit)
7	Brown	+24Vdc power supply (-20%~+20%)
8	White	Reservation

CAN bus output

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

Pin	Cable color	Pin/wire function definition
1	Green	CAN (-)
2	Yellow	CAN (+)
3	-	Do not connect
4	-	Do not connect
5	Brown	+24Vdc power supply (-20%~+20%)
6	White	0 Vdc (power supply circuit)

FBGB Explosion-Proof Displacement Sensor

Technical Characteristics

- Non-wear, non-contact measurement method
- Rugged and fully enclosed design
- Linear measurement, absolute position output
- Low power consumption design effectively reduces system heating
- Sealing grade up to IP67
- Pressure resistance and explosion-proof, high explosion-proof grade
- Strong anti-interference performance and high reliability
- Multiple interfaces are available：Analog、SSI、CANopen

Product Parameters

• Input

Measurement data	Position Magnet ring
Stroke length	25mm~5500mm，customized according to customer needs
Number of measurements	1

• Output

Interface	Analog、SSI、CANopen
Resolution	Analog：16-bit D/A or 0.0015% of full scale (min. 1μm) Bital quantity：0.5 / 1 / 2 / 5 / 10 / 20 / 40 / 50 / 100 μm
Nonlinearity	< ± 0.01% of full scale, Min. ± 50μm
Repetition accuracy	< ± 0.001% of full scale, Min. ± 1μm
Hysteresis	＜10μm
Update time	1KHz（range≤1m） 500Hz（1m＜range≤2m） 250Hz（2m＜range≤3m），customizable
Temperature coefficient	＜30ppm/℃

• Working conditions

Magnet ring velocity	Arbitrary
Protection level	IP67
Operating temperature	-40℃ ~ +85℃
Humidity/dew point	The humidity is 90, and dew cannot be condensed
Shock index	GB/T2423.5 100g(6ms)
Vibration index	GB/T2423.10 20g/10~2000Hz
EMC test	GB/T17626.2/3/4/6/8，Grade 4/3/4/3/3，Class A, CE Certification
Certified Exd Ⅱ BT6	Comply with GB3836.1-2010 and GB3836.2-2010 standards Temperature range: T6 (85℃ surface)

• Electrical Connection

Input voltage	+24Vdc±20%
operating current	＜90mA（ varying with range）
Polarity protection	Max.-30Vdc
Overpressure protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

• Structure and materials

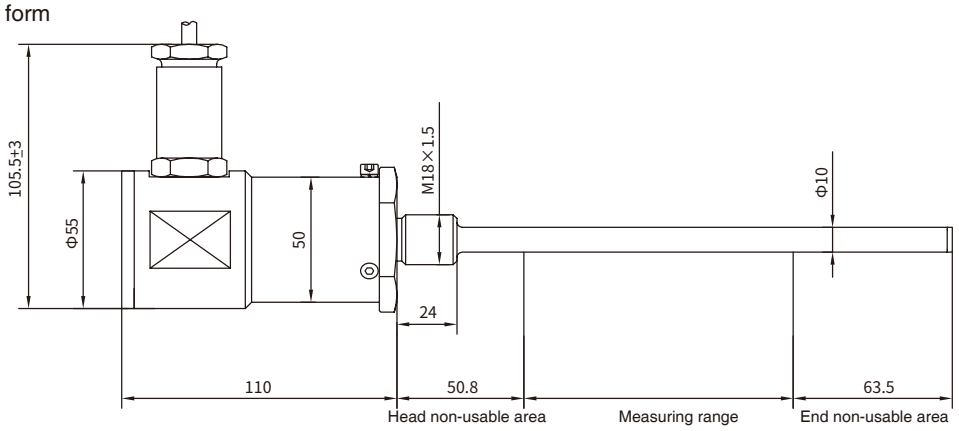
Electronic bin	304 stainless steel
Measuring rod	304/316 L stainless steel
Outer tube pressure	35MPa (continuous)/70MPa (peak) or 350ba (continuous)/700ba (peak)
Position magnet	Standard Magnet ring and various magnet rings
Mounting thread form	M18×1.5、 M20×1.5、3/4"-16UNF-3A（customizable）
Installation direction	Any direction
Cable outlet mode	Special cable outlet(flameproof cable lead-in device)

Installation and Use Instructions

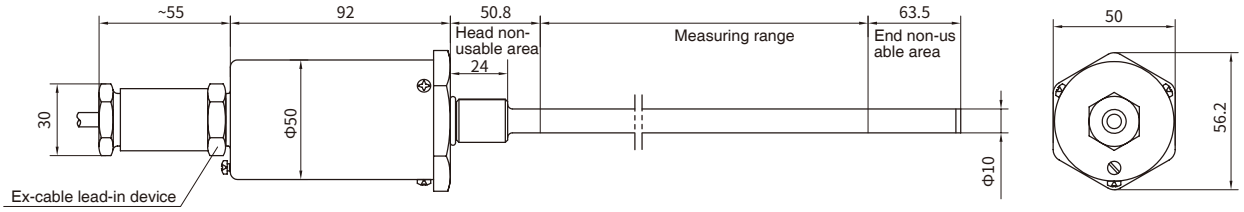
• Dimensions of FBGB explosion-proof sensors

FBGB series explosion-proof shell sensor is an explosion-proof structure composed of shell, electronic bin, sensor and lead-in device. It is designed for cylinder built-in installation under harsh environment. The working pressure is 35MPa continuous, flexible and simple installation mode. The Mounting thread form M18×1.5 or M20×1.5 or inch 3/4”-16UNF-3A.

Side outlet form



Cable outlet form



Selection Guide-Analog Quantity

F	B	G	B	–	M					–	S		–				–				–			–		
01	02	03	04		05	06	07	08	09		10	11		12	13	14	15		16	17	18	19		20	21		22	23

01 - 04	Sensor shell form
F B G B	Explosion-proof flameproof sensor

05 - 09	Measuring range
	Four digits, less than four digits are preceded by zero, M means metric system, unit mm

10 - 11	Magnet ring type/mounting thread form
S 1	M18×1.5，measuring rod diameter 10mm, 304 material
S 2	M20×1.5，measuring rod diameter 10mm, 304 material
S 3	3/4"-16UNF-3A，measuring rod diameter 10mm, 304 material

12 - 15	Connection form
12 - 13	Cable outlet line type
D H	Cable outlet, PUR sheath, orange,-20~90℃, end scattered
D U	Cable outlet, PVC sheath, orange,-20~105℃, end scattered
S H	Side outlet, PUC sheath, orange,-20~90℃, end scattered
S U	Side outlet, PVR sheath, orange,-20~105℃, end scattered

14 - 15	Cable outlet mode: cable length, 01~99 meters

Note: For supporting cables, please refer to Analog/Start-Stop Cable Accessories Selection

16 - 19	Signal output mode
16 - 17	Output form and direction
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
18	Number of Magnet rings
1	Single Magnet ring
19	No Magnet ring state
A	Keep the original value
B	Max. value
C	Min. value

20 - 21	Non-usable area at head and end, customizable
S 0	50.8mm+63.5mm
B 0	30mm+60mm

22-23	Country
	Refer to the country list，page 130.

- Note: The forward output of the sensor means that when the Magnet ring moves away from the electronic bin, the output value increases and decreases when the Magnet ring moves in the reverse direction.

- Selection examples: FBGB-M0300-S2-DH02-A01B-B0

  Indicates: the installation mode of the ordered product is built-in explosion-proof steel structure, with an stroke length of 300mm, mounting thread is M20×1.5, cable outlet, cable length is 2m (PUR sheath, orange,-20~90℃, end scattered), a 4-20mA output, a Max. output value without magnet ring, a forward output of single magnet ring, a non-usable area of 30mm at the head and a non-usable area of 60mm at the end.

Selection Guide-SSI

F	B	G	B	–	M					–			–					–	S						–			–		
01	02	03	04		05	06	07	08	09		10	11		12	13	14	15		16	17	18	19	20	21		22	23				

01 - 04 Sensor shell form

F B G B	Explosion-proof flameproof sensor

05 - 09 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

10 - 11 Magnet ring type/mounting thread form

S 1	M18×1.5，measuring rod diameter 10mm, 304 material
S 2	M20×1.5，measuring rod diameter 10mm, 304 material
S 3	3/4"-16UNF-3A，measuring rod diameter 10mm, 304 material

12 - 15 Connection form

12 - 13 Cable outlet mode

D H	Cable outlet, PUR sheath, orange,-20~90℃, end scattered
D U	Cable outlet, PVC sheath, orange,-20~105℃, end scattered
S H	Side outlet, PUC sheath, orange,-20~90℃, end scattered
S U	Side outlet, PVR sheath, orange,-20~105℃, end scattered

14 - 15 Cable outlet mode: cable length, 01~99 meters

Note: See SSI cable Accessories selection for supporting cables

16 - 21 Signal output mode

17 Data length

1	24bit	2	25bit	3	26bit *

* 26-bit are parity bits and 25-bit are status bits

18 Data format

B	Binary	G	Gray code

19 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	6	0.002mm
7	0.001mm	8	0.04mm
9	0.0005mm	0	0.0001mm

20 Direction

0	Forward	1	Reverse

21 Mode

0	Regular	1	Synchronization	2	High update rate

22 - 23 Non-usable area at head and end, customizable

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

Country

Refer to the country list，page 130.

Selection Guide-CAN Output

F	B	G	B	–	M					–			–					–	C					–			–		
01	02	03	04		05	06	07	08	09		10	11		12	13	14	15		16	17	18	19	20		21	22		23	24

01 - 04 Sensor shell form

F B G B	Explosion-proof flameproof sensor

05 - 09 Measuring range

Four digits, less than four digits are preceded by zero, M means metric system, unit mm

10 - 11 Magnet ring type/mounting thread form

S 1	M18×1.5，measuring rod diameter 10mm, 304 material
S 2	M20×1.5，measuring rod diameter 10mm, 304 material
S 3	3/4"-16UNF-3A，measuring rod diameter 10mm, 304 material

12 - 15 Connection form

12 - 13 Cable outlet mode

D H	Cable outlet, PUR sheath, orange,-20~90℃, end scattered
D U	Cable outlet, PVC sheath, orange,-20~105℃, end scattered
S H	Side outlet, PUC sheath, orange,-20~90℃, end scattered
S U	Side outlet, PVR sheath, orange,-20~105℃, end scattered

14 - 15 Cable outlet mode: cable length, 01~99 meters

0 D R 1	PVC sheath, length 150mm, end 5-pin male connector

Note: For supporting cables, please refer to CAN bus cable Accessories selection

16 - 20 Signal output mode

16 Interface

C	CAN bus

17 Protocol type

1	CANopen	2	CANBasic

18 Baud

1	1000kBit/s	2	800kBit/s
3	500kBit/s	4	250kBit/s
5	125kBit/s	6	100kBit/s
7	50kBit/s	8	20kBit/s

19 Resolution

1	0.1mm	2	0.05mm
3	0.02mm	4	0.01mm
5	0.005mm	6	0.002mm
7	0.001mm		

20 Number of Magnet rings (1~9 optional)

21 - 22 Non-usable area at head and end, customizable

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

23-24 Country

Refer to the country list，page 130.

Wiring Mode

when the sensor is cable outlet cable output, refer to the cable color definition in the following table for connection mode

• Analog

Cable color 1*	Cable color 2*	Pin/wire function definition
Blue	Grey	No.1 Magnet position signal(+)
Green	Pink	Position signal of No.1 Magnet(-)
Yellow	Yellow	Reservation
White	Green	Reservation
Red	Brown	+24Vdc power supply (-20%~+20%)
Black	White	0 Vdc (power supply circuit)

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

• Analog

Cable color3*	Pin/wire function definition
Yellow	Current output
Grey	0Vdc(Current/Voltage Loop)
Pink	Reservation
-	Reservation
Green	0...10V
Blue	0 Vdc （power supply circuit）
Brown	+24Vdc power supply (-20%~+20%)
White	Reservation

• SSI

Cable color 1*	Cable color 2*	Pin/wire function definition
White	Grey	Data (-)
Yellow	Pink	Data (+)
Blue	Yellow	Clock (+)
Green	Green	Clock (-)
Red	Brown	+24Vdc power supply (-20%~+20%)
Black	White	0 Vdc
-	-	Do not connect

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

• SSI

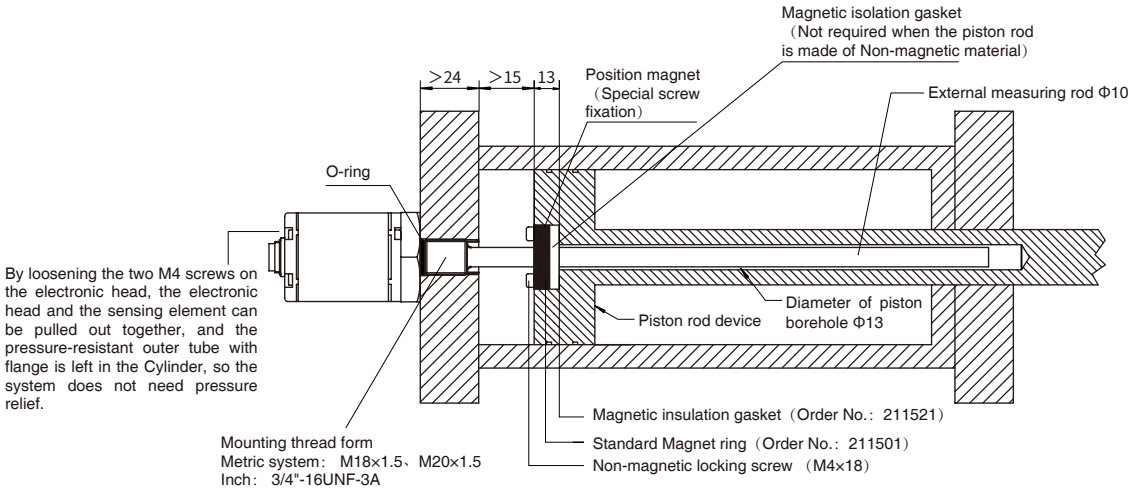
Cable color3*	Pin/wire function definition
Yellow	Clock (+)
Grey	Data (+)
Pink	Clock (-)
-	Reservation
Green	Data (-)
Blue	0 Vdc (power supply circuit)
Brown	+24Vdc power supply (-20%~+20%)
White	Reservation

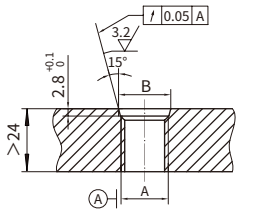
• CAN bus output

Cable color	Pin/wire function definition
Green	CAN (-)
Yellow	CAN (+)
-	Do not connect
-	Do not connect
Brown	+24Vdc power supply (-20%~+20%)
White	0 Vdc (power supply circuit)

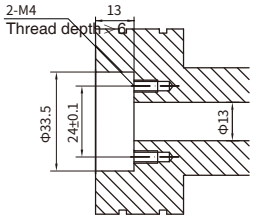
Installation Instruction

Built-in installation instruction of RH pressure-resistant rod sensor





Machining requirements for installation sealing surface
Note: Recommended structural dimensions of mating threaded holes



Structural dimensions and central dimensions of accessories installed on piston rods

Schedule of dimensions of installation accessories			
Code	A	B	O-ring
S1	M18 × 1.5	Φ19.9±0.1	15.3×2.4
S2	M20 × 1.5	Φ21.8±0.1	16×2.4
S3	3/4"-16UNF-3A	Φ20.8±0.1	17×2.4

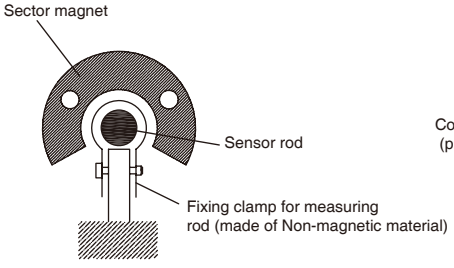
RH Pressure resistance rod sensor installation precautions

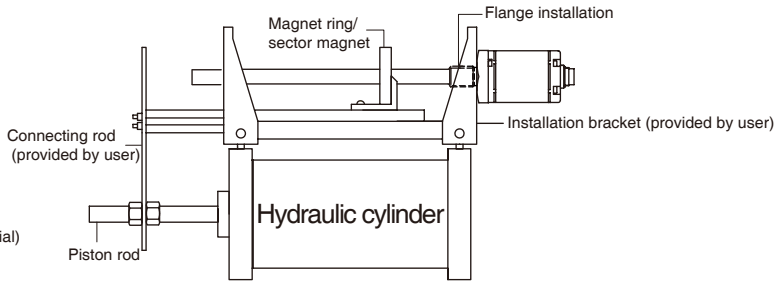
Cylinder installing — Pressure tube enclosed transducer (RH) usually has built-in cylinder installing, mounting thread form include: M18 x 1.5, M20 x 1.5, 3/4”-16UNF-3A. Before installation, make sure that the cylinder has been processed according to the correct size given in the atlas.
Mechanical installation — Sensor installation position and direction are not required, but must ensure that the installation is firm and reliable. The position magnet is installed on the moving part to be measured and keeps a proper distance from the measuring rod.
Outdoor use — when the sensor is used outdoors, it must be equipped with protective devices to prevent rainwater from immersing into the electronic compartment along cables or connectors in case of rain. The protective cover must consider the water outlet to prevent water accumulation.
Position magnet — In order to ensure the accuracy of measurement, the installing bracket of position magnet must be made of non-magnetic materials, such as screws, magnetic insulation gaskets, etc.

- Precautions: The sensor is magnetic sensitive equipment, which must keep away from the interference of external strong magnetic field. The stability and accuracy of power supply should also be considered when measuring with high precision. In use, it is also necessary to prevent the electronic bin from being impacted by foreign objects.

External installation guide of RH pressure-resistant rod sensor

When mounted horizontally, longer sensors (measuring ranges greater than 1m) must be mechanically supported (made of Non-magnetically permeable material).

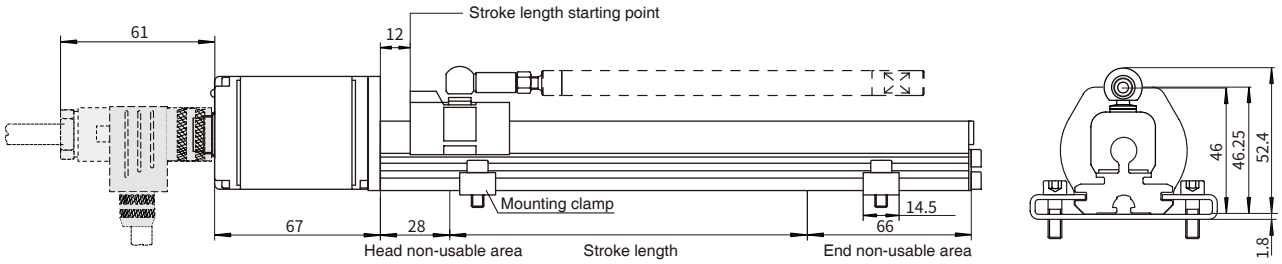


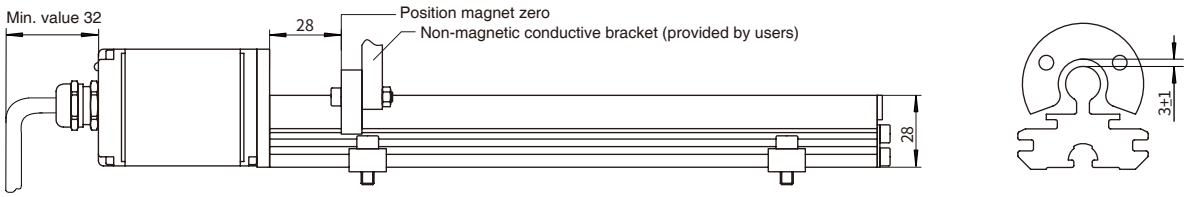


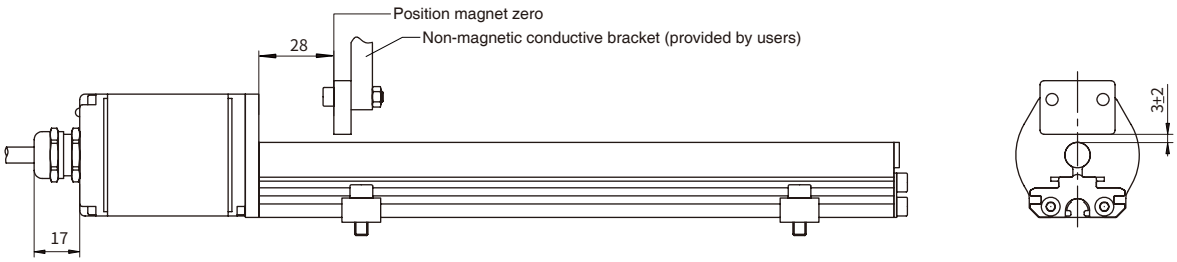
Installation Instruction

- Size and Installation Guidance of RP Aluminum profile Sensor

RP Series Aluminum profile provides a flexible and simple installation. In general, the sensor can be installed on the machine surface with mounting clamps.





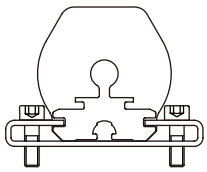


- Position measurements are achieved using two types of magnets:

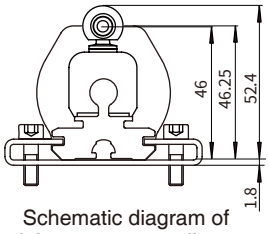
1、 The slider magnet moves along the guide rail of the aluminum profile shell, and the moving part is connected with the slider magnet through a connector bearing;

2、The sector magnet is directly installed on the moving part and moves near the surface of the profile, with a gap of 3mm (±1mm).

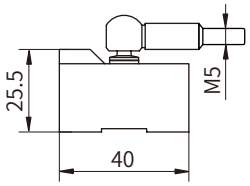
3、The square magnet is directly installed on the moving part and moves near the surface of the profile, with a gap of 3mm (±2mm).



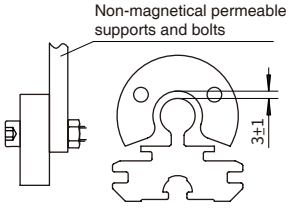
Mounting clamp installation



Schematic diagram of slider magnet installation



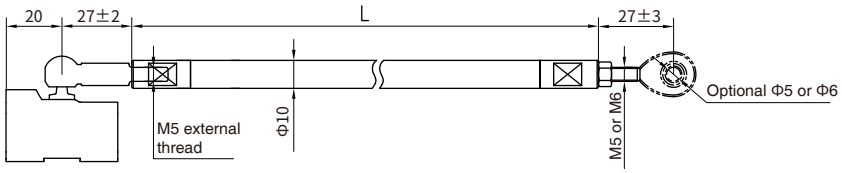
Slider magnet



Schematic diagram of installation of sector magnet

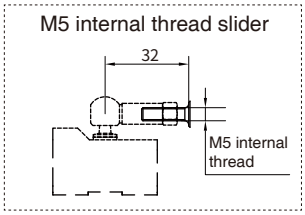
Installation Instruction

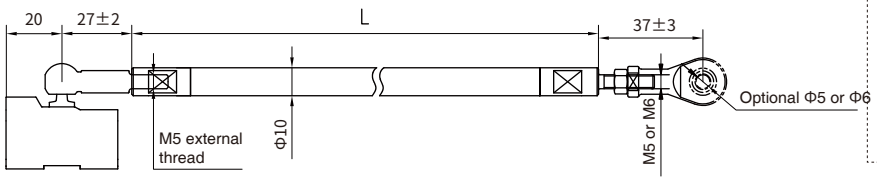
- Type selection of pull rod

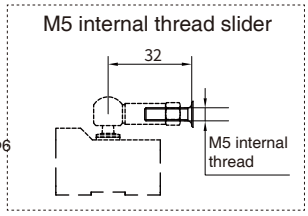


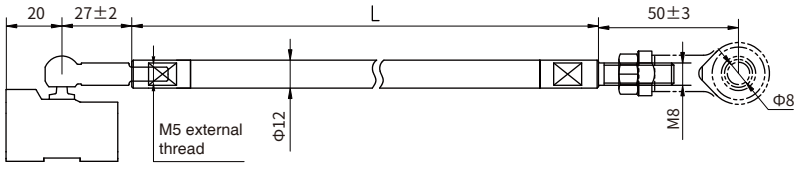
A magnet end

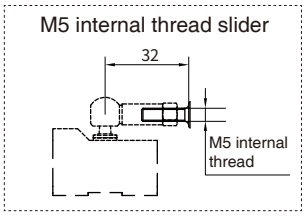
B installing end

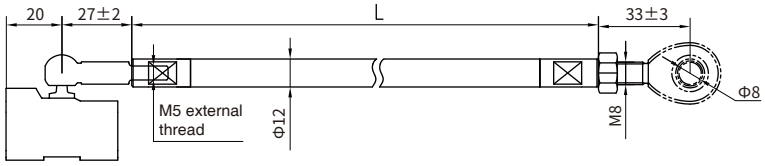


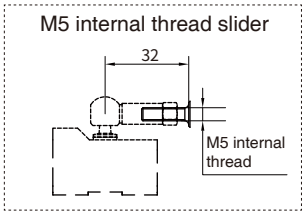












- Selection Guide

01	02	03	–	L	04	05	06	07	08	–	09	10	–	M	11	12	–	13

01	Connecting thread form: F : M 5 Internal thread/D : M 5 External thread
02 - 03	Diameter of pull rod: 10, 12
04 - 08	Length of pull rod (L): Four digits, less than four digits are preceded by zero, M means metric system, unitmm
09 - 10	Mounting thread form, two choices: C1: Internal thread/C2: External thread
11 - 12	Mounting thread specification: M 5 / M 6: Tie rod diameter 1 0 m m option; M 8: Tie rod diameter 1 2 m m option
13	Whether to equip plain bearings and their locking nuts: Y: Yes/N: No

- Selection examples:F10-L0200-C1-M5-N

Indicates: The diameter of pull rod is 10mm, the length of pull rod is 200mm, internal thread, thread specification is M5, without connector bearing.

Gg Selection of Cable Accessories for Industrial Ethernet

N	E	T	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
N E T	Industrial Ethernet
04 - 07	**Cable length**
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m
08 - 10	**Cable type, outlet mode**
08	**Cable type**
D	PVC sheath, blue, 8-core, shielded, CAT-5e,-40~85℃
A	PUR sheath, green, 4-core, shielded, CAT-5e ES,-40~70℃
09 10	**Cable type**
1 1	Two-end 4-pin male connector, M12, d-code
2 2	Two-end 4-pin right angle male connector, M12, d-code
1 3	One end 4 pin male connector, M12, d-code, one end shielded RJ 45 connector
2 3	One end 4-pin right angle male connector, M12, d-code, one end shielded RJ 45 connector

- Selection examples: NET-M010-D11
  Indicates: Ethernet cable, 10m long, PVC sheathed, blue, 8-core, CAT-5e standard, shielded,-40~85℃, 4-pin male connector at both ends, M12, d-code.

Cc Selection of SSI cable Accessories

S	S	I	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
S S I	SSI interface
04 - 07	**Cable length**
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m
08 - 10	**Cable type, outlet mode**
H 0 1	One end of 7 pins (M16) female connector, and one end scattered
H 0 3	One end of 7 pins (M16) right angle female connector, and one end scattered
U 0 1	One end of 7 pins (M16) female connector, and one end scattered
U 0 2	One end of 8-pin (M16) female connector,and one end scattered
U 0 3	One end of 7 pins (M16) right angle female connector, and one end scattered
U 0 4	One end of 8-pin (M16) right angle female connector, and one end scattered
Note	H: Cable type, PUR sheath, orange,-20~90℃
	U: Cable type, PVC sheath, orange,-20~105℃

- Selection example: SSI-M005-H01
  Indicates: SSI interface cable, 5m long, PUR sheath, orange,-20~90℃, 7 pins (M16) female connector at one end, and the other end is scattered.

Dd Selection of Analog/Start-Stop Cable Accessories

A	S	T	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
A S T	Analog/Start-Stop interface
04 - 07	**Cable length**
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m
08 - 10	**Cable type, outlet mode**
H 0 1	One end of 6 pins (M16) female connector, and one end scattered
H 0 3	One end of 6-pin (M16) right angle female connector, and one end scattered
U 0 1	One end of 6 pins (M16) female connector, and one end scattered
U 0 2	One end of 8-pin (M16) female connector,and one end scattered
U 0 3	One end of 6-pin (M16) right angle female connector, and one end scattered
U 0 4	One end of 8-pin (M16) right angle female connector, and one end scattered
Note	H：Cable type, PUR sheath, orange,-20~90°C
	U：Cable type, PVC sheath, orange,-20~105°C

- Selection example:AST-M005-H01

  Indicates: Analog or Start-Stop interface cable, 5m long, PUR sheath, orange,-20~90°C, 6 pins (M16) female connector at one end, and the other end is scattered.

Cc Selection of CAN Bus Cable Accessories

C	A	N	–	M				–			
01	02	03		04	05	06	07		08	09	10

01 - 03	Type
C A N	CAN bus
04 - 07	**Cable length**
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m
08 - 10	**Cable type, outlet mode**
08	Cable type
C	PVC sheath, purple, 4 cores,-40~75°C
09 - 10	Cable type
0 1	One end of 6 pins (M16) female connector, and one end scattered
0 2	One end of 5-pin (M12) female connector, and one end scattered
0 3	One end of5-pin (M12) female connector, and one end scattered
0 4	One end of 5-pin (M12) right angle female connector, and one end scattered
0 5	One end of 6-pin (M16) right angle female connector, and one end scattered
1 1	One end of 6-pin (M16) female connector
2 3	One end of5-pin (M12) female connector; One end 5-pin (M12) male connector

- Selection example: CAN-M015-C01

  Indicates: CAN bus interface cable, 15m long, PVC sheath, purple, 4 cores,-40~75°C, 6 pins (M16) female connector at one end, and the other end is scattered.

C C Selection of Profibus-DP Cable Accessories

D	P	–	M				–			
01	02		03	04	05	06		07	08	09

01 - 02	Type
D P	Profibus-DP interface

03 - 06	Cable length
M * * *	Less than 3 digits are preceded by zeros, and M means metric system, unit m

07 - 09	Cable type, outlet mode
H 0 1	One end of5-pin (M12) female connector, and one end scattered
H 0 2	One end of5-pin (M12) male connector, and one end scattered
H 0 3	One end of 5-pin (M12) right angle female connector, and one end scattered
H 0 4	One end of 5-pin (M12) right angle male connector, and one end scattered
Z 0 5	One end of 6-pin (M16) male connector, and one end scattered
Z 0 6	One end of 6-pin (M16) male connector, and one end scattered
Z 0 7	One end of 6-pin (M16) right angle female connector, and one end scattered
H 1 2	One end of 5-pin (M12) male connector, One-end 5-pin (M12) female connector
H 3 4	One end of 5-pin (M12) right angle male connector; One-end 5-pin (M12) right angle female connector
Z 5 6	One end of 6-pin (M16) male connector; One end of 6-pin (M16) female connector
Note	H:Cable type, PUR sheath, purple, 2 cores,-20~80°C
	Z:Cable type, PUR sheath, cyan, 5-core,-20~80°C

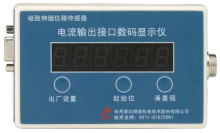
- Selection example: DP-M020-H01

  Indicates: Profibus-DP interface cable, 20 meters long, PUR sheath, purple, 2 cores,-20~80°C, 5-pins (M12) female connector at one end, and the other end is scattered.

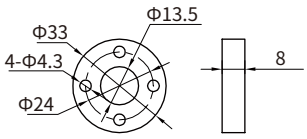
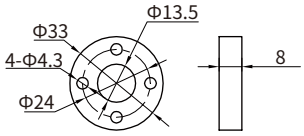
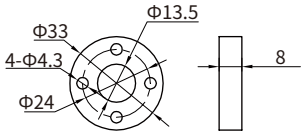
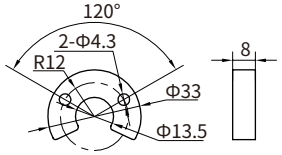
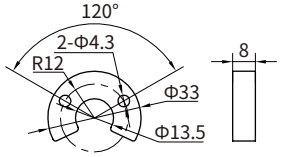
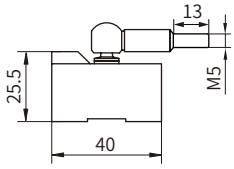
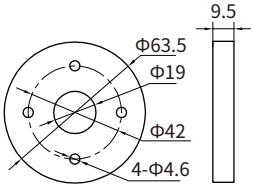
- Selection example:DP-M015-Z56

  Indicates: Profibus-DP interface cable, with a length of 15m, PUR sheath, cyan, 5 cores,-20~80°C, with 6 pins (M16) male connector at one end and 6 pins (M16) female connector at the other end.

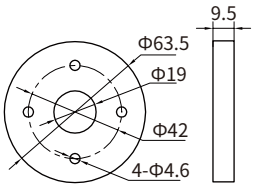
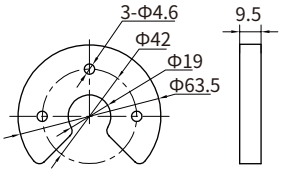
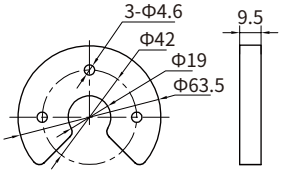
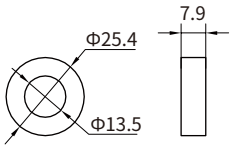
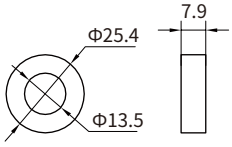
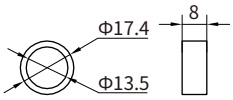
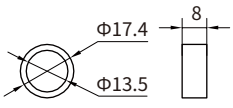
Programming Tools Selection

Accessory name/model	Dimensions	Description
Handheld programmer Order No.: TEC612801A/B (A: Current B: Voltage)		Applicable to analog signal output type sensor, can set the start position and full-scale point of analog signal output type displacement sensor Includes: handheld programmer, 220V power supply, sensor adapter×2
Interface converter Order No.: TEC612802		Applicable to SSI signal output type sensor, bital tube real-time display output vernier magnet ring displacement value. Includes: interface converter, 220V power supply, sensor adapter×2
Address programmer Order No.: TEC612803		Applicable to Profibus-DP signal output sensor, and provides the slave station address setting function of Profibus-DP signal output displacement sensor. Includes: address programmer, sensor adapter
Address programmer Order No.: TEC612804		Applicable to CANopen signal output sensor, and provides the slave station address setting function of CANopen signal output displacement sensor. Includes: address programmer, sensor adapter
USB converter Order No.: TEC612811		Applicable to analog signal output senor, connect PC and sensor via USB port, use TEC sensor configuration software for programming: 1) setting sensor measurement direction; 2) Setting sensor zero point and full-scale point; 3) Graphical display of Magnet ring position value; 4) Diagnose sensor online through error code. Includes: USB converter, USB data cable, sensor adapter×2, software
USB converter Order No.: TEC612812		Applicable to SSI signal output sensor, connect PC and sensor via USB port, using TEC sensor configuration software for programming: 1) Set sensor parameters (data length, data format, measurement direction); 2) Graphic display of Magnet ring position value; 3) Set sensor zero point and measurement display value; 4) Diagnosie sensor online through error code. Includes: USB converter, USB data cable, sensor adapter×2, software
USB converter Order No.: TEC612813		Applicable to start/stop signal output sensor, connect PC and sensor via USB port, use TEC sensor configuration software to program: 1) Graphic display of Magnet ring position value; 2) Diagnose sensor online through error code. Includes: USB converter, USB data cable, sensor adapter×2, software

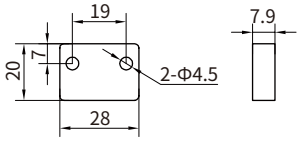
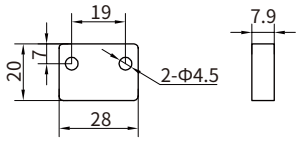
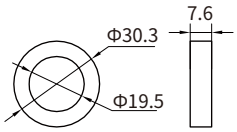
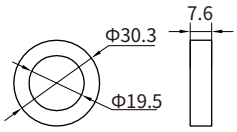
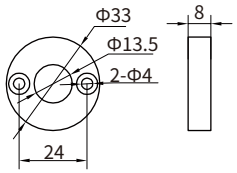
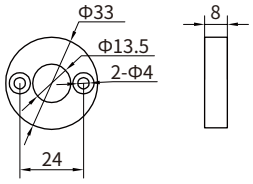
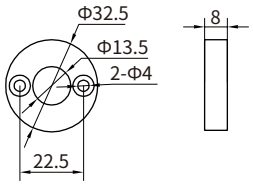
Magnet ring Selection

Accessory name/model	Dimensions	Description/application
 Standard magnet ring Order No.: 211501		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB
 Standard magnet ring Kit Order No.: 288501		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Screw: GB/T70.1, M4X18, Material 304 Spring gasket: GB/T 93, Φ 4, Material304 Includes: 1 Magnet, 1 gasket, 4 screws with spring washer Application: RH/RF/FBGB/RS/RD/RB
 Standard magnet ring Kit Order No.: 288501-2		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Screw: GB/T70.1, M4X18, Material 304 Spring gasket: GB/T 93, Φ 4, Material 304 Includes: 1 Magnet, 2 gaskets, 4 screws with spring washer Application: RH/RF/FBGB/RS/RD/RB
 Sector magnet Order No.: 211502		Includes: 1 Magnet Application: RP
 Sector magnet kit Order No.: 288502		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Screw: GB/T70.1, M4X18, Material 304 Spring gasket: GB/T 93, Φ4, Material 304 Includes: 1 Magnet, 1 gasket, 2 screws with spring washer Application: RP
 Slider Magnet Order No.: 211503		Screw: M5X25, Material 304 Nut: GB/T6170, M5, Material 304 Includes: 1 slider, 1 screw, 2 nuts Application: RP
 Enlarge magnet ring Order No.: 211504		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB

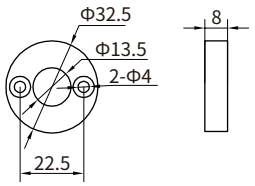
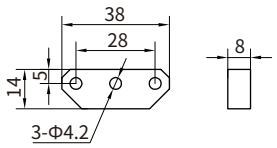
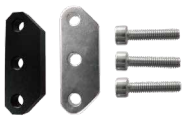
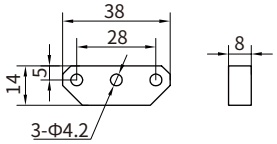
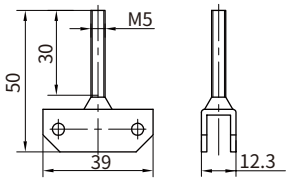
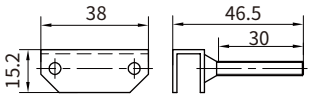
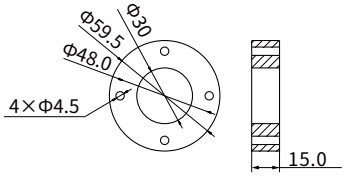
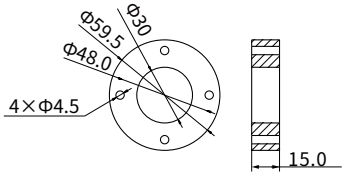
Magnet ring Selection

Accessory name/model	Dimensions	Description/application
 Enlarged magnet ring kit Order No.: 288504		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Screw: GB/T70.1, M4X20 Spring gasket: GB/T 93, Φ4, Material 304 Includes: 1 Magnet, 1 gasket, 2 screws with spring washer Application: RH/RF/FBGB/RS/RD/RB
 Enlarged sector magnet Order No.: 211505		Includes: 1 Magnet Application: RP
 Enlarged sector magnet Kit Order No.: 288505		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Screw: GB/T70.1, M4X20 , Material 304 Spring gasket: GB/T 93, Φ4, Material 304 Includes: 1 Magnet, 1 gasket, 2 screws with spring washer Application: RP
 Magnet ring Order No.: 211506		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB
 Magnet ring Kit Order No.: 288506		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Retaining ring: GB/T893 , 26 Includes: 1 Magnet, 2 gaskets and 1 retaining ring Application: RH/RF/FBGB/RS/RD/RB
 Magnet Order No.: 211507		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB
 Magnet ring Kit Order No.: 288507		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Retaining ring: GB/T893 , 18 Includes: 1 Magnet, 2 gaskets and 1 retaining ring Application: RH/RF/FBGB/RS/RD/RB

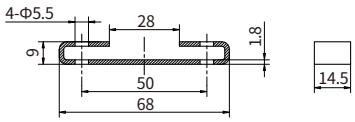
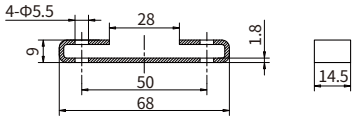
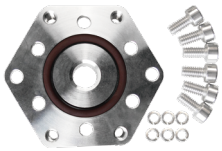
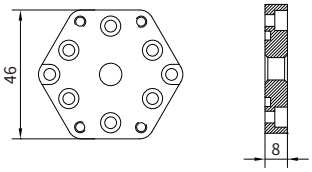
Magnet ring Selection

Accessory name/model	Dimensions	Description/application
 Square magnet Order No.: 211508		Includes: 1 Magnet Application: RP
 Square magnet kit Order No.: 288508		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Screw: GB/T70.1, M4X20, Material 304 Spring gasket: GB/T 93, Φ 4, Material 304 Includes: 1 Magnet, 1 gasket, 2 screws with spring washer Application: RP
 Magnet ring Order No.: 211509		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB
 Magnet ring Kit Order No.: 288509		Magnetic insulation gasket: size same as Magnet ring, thickness 5mm Retaining ring: GB/T893, 18 Includes: 1 Magnet, 2 gaskets and 1 retaining ring Application: RH/RF/FBGB/RS/RD/RB
 Magnet ring 33 Order No.: 211511		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB
 Magnet ring 33 Kit Order No.: 288511		Magnetic insulation gasket: size same as Magnet ring, thickness 5mm Screw: GB/T70.1, M4×20 Includes: 1 Magnet, 1 gasket, 2 screws with spring washer Application: RH/RF/FBGB/RS/RD/RB
 Weak magnet Magnet ring 32 Order No.: 211519		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB

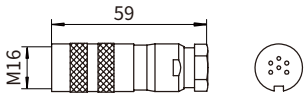
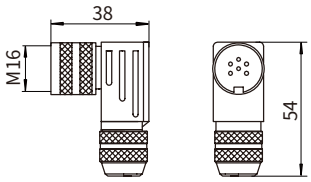
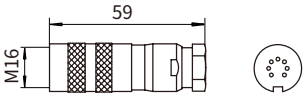
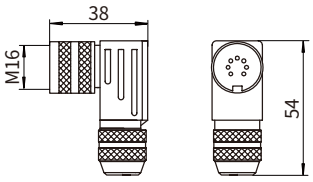
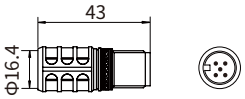
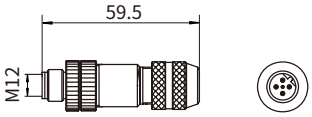
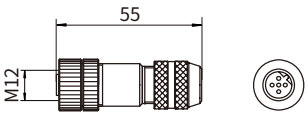
Magnet ring Selection

Accessory name/model	Dimensions	Description/application
 Weak magnet Magnet ring 32 kit Order No.: 288519		Magnetic insulation gasket: size same as magnet ring, thickness 5mm Screw: GB/T70.1, M4X20, Material 304 Spring gasket: GB/T93, Φ4, material 304 Includes: 1 Magnet, 1 gasket, 2 screws with spring washer Application: RH/RF/FBGB/RS/RD/RB
 Trapezoidal magnet Order No.: 211514		Includes: 1 Magnet Application: RP
 Trapezoidal magnet kit Order No.: 288514		Magnetic insulation gasket: size same as Magnet ring, thickness 5mm Screw: GB/T70.1, M4X20, Material 304 Spring gasket: GB/T93, Φ4, material 304 Includes: 1 Magnet, 1 gasket, 3 screws with spring washer Application: RP
 Trapezoidal Magnet (Straight) Kit Order No.: 288514A		Nut: GB/T6170, M5, Material 304 Includes: 1 Magnet, 1 Magnet holder, 2 screws Application: RP
 Trapezoidal Magnet (Bending) Kit Order No.: 288514B		Nut: GB/T6170, M5, Material 304 Includes: 1 Magnet, 1 Magnet holder, 2 screws Application: RP
 Magnet ring Order No.: 211573		Includes: 1 Magnet Application: RH/RF/FBGB/RS/RD/RB
 Magnet ring Kit Order No.: 288573		Nut: GB/T70.1, M4×25, Material 304 Includes: 1 Magnet, 4 screws Application: RH/RF/FBGB/RS/RD/RB

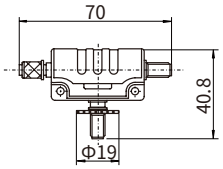
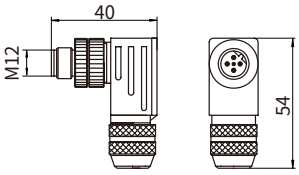
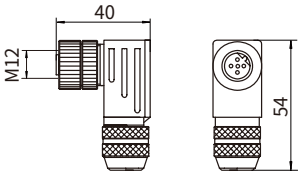
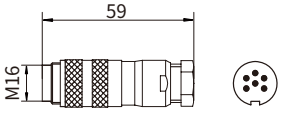
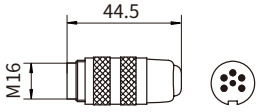
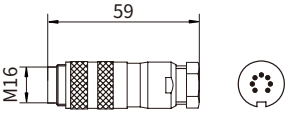
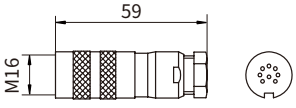
Other Accessories

Accessory name/model	Dimensions	Description/application
 Mounting clamp kit Order No.: 211561		Nut: GB/T70.1, M5×16, Material 304 Includes: 1 clip, 2 screws Application: RP
 Mounting clamp Kit (Including Insulation washer) Order No.: 211801		Nut: GB/T70.1, M5×16, Material 304 Includes: 1 clip, 2 screws, 2 Insulation washers Application: RP
 Transfer flange kit Order No.: 988003		Nut: GB/T70.1, M5×16, Material 304 Includes: 1 flange, 6 M4×8 screws with spring washer, 1 sealing ring Application: RF/RH

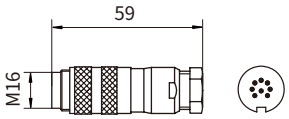
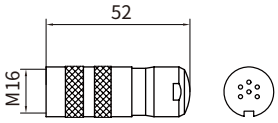
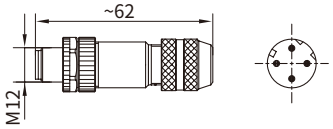
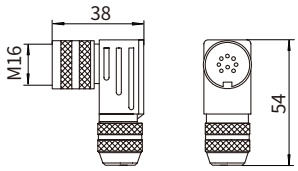
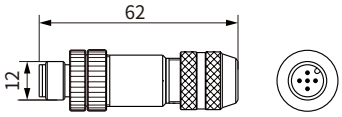
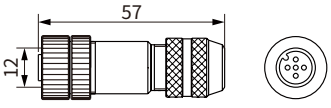
Connector Selection

Accessory name/model	Dimensions	Application
 Six-pin female connector female Order No.: 312701		Analog Profibus-DP CAN bus Start/Stop
 Six-pin 90°female connector Order No.: 312702		Analog Profibus-DP CAN bus Start/Stop
 Seven-pin female connector Order No.: 312703		SSI
 Seven-pin 90°female connector Order No.: 312704		SSI
 Five-pin male end connector Order No.: 312705		Profibus-DP(M12)-B code
 Five-pin male connector Order No.: 312706		Profibus-DP(M12)-B code
 Five-pin female connector Order No.: 312707		Profibus-DP(M12)-B code

Connector Selection

Accessory name/model	Dimensions	Application
 Five-pin T-shape connector Order No.: 312708		Profibus-DP(M12)
 Five-pin 90°connector male head Order No.: 312709		Profibus-DP(M12)-B code
 Five-pin 90° female connector Order No.: 312710		Profibus-DP(M12)-B code
 Six-pin male connector Order No.: 312714		Profibus-DP(M16)
 Six-pin end male connector Order No.: 312715		Profibus-DP(M16)
 Seven-pin male connector Order No.: 312718		SSI
 Eight-pin female connector Order No.: 312720		SSI/Analog/Start-Stop

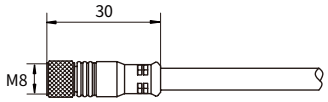
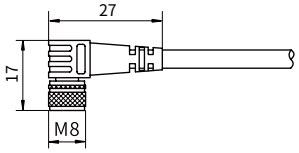
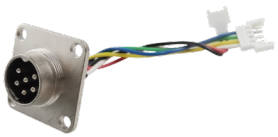
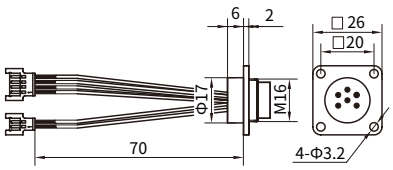
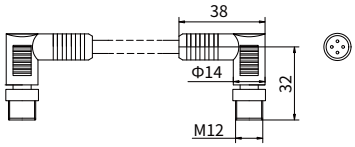
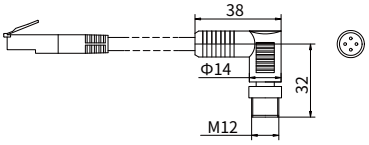
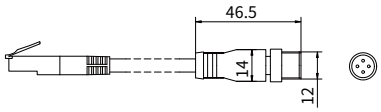
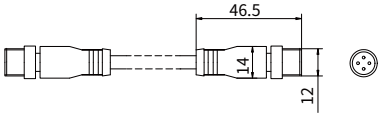
Connector Selection

Accessory name/model	Dimensions	Application
 Eight-pin male connector Order No.: 312721		SSI/Analog/Start-Stop
 Six-pin end female connector Order No.: 312722		CAN bus
 Four-pin male connector Order No.: 312723		Industrial Ethernet /M12-D code
 Eight-pin 90°female connector Order No.: 312724		Analog/SSI/Start-Stop
 Five-pin male connector Order No.: 312726		CAN（A code）
 Five-pin female connector Order No.: 312727		CAN（A code）

Cable Selection

Accessory name/model	Dimensions	Application
 Standard Cable (H) Order No.: 511802	3P×0.25mm²; Φ7.2mm Conductor: 6-core, red/black, blue/green, yellow/white Sheath: Orange, PUR Shielding layer: tinned copper wire mesh + aluminum foil Application characteristics: soft, oil resistance and bending resistance Temperature: (-20~90℃)	Interface: Analog/SSI Interface/Start/Stop Structure: RH/RP/RF/FBGB/RS/RB/RD
 Profibus 2-Core Special Cable (H) Order No.: 511803	2×0.2mm²; Φ8mm Conductor: 2 cores, red/green Sheath: Purple, PUR Shielding layer: tinned copper wire mesh + aluminum foil Application characteristics: Hard, special for DP Temperature: (-20~80℃)	Interface: DP interface Structure: Special for RH/RP/RF/5-pin connector
 Profibus 5-core Special Cable (Z) Order No.: 511804	1×2×0.65+3×0.75mm²; Φ8mm Conductor: 5-core, red/green/blue/black/yellow/green Sheath: Cyan, PUR Shielding layer: tinned copper wire mesh + aluminum foil Application characteristics: Linear and soft Temperature: (-20~80℃)	Interface: DP interface Structure: Special for RH/RP/RF/6-pin connector
 Orange European Standard Cable (U) Order No.: 511807	7×0.25mm²; Φ7mm Conductor:7-core,white/brown/green/yellow/gray/pink/blue Sheath: Orange, modified PVC Shielding layer: tinned copper wire mesh + aluminum foil Application characteristics: Extremely soft, oil resistance, bending resistance, high temperature resistance compliant with European colour code Temperature: (-20~105℃)	Interface: Analog/SSI Interface/Start/Stop Structure: RH/RP/RF/FBGB/RS/RB/RD
 CAN Special Cable (C) Order No.: 511808	2×2×0.22mm²; Φ7.6mm Conductor: 4-core, brown/white, yellow/green Sheath: Purple, PVC Shielding layer: braided with copper wire Application characteristics: Hard, impedance 120 Ω, special for CAN Temperature: (-40~75℃)	Interface: CAN interface Structure: RH/RP/RF/FBGB/RS/RB/RD
 Black European Standard Cable (U) Order No.: 511814	7×0.25mm²; Φ7mm Conductor: 7-core, white/brown/green/yellow/gray/pink/blue Sheath: Black, modified PVC Shielding layer: tinned copper wire mesh + aluminum foil Application characteristics: Extremely soft, oil resistance, bending resistance, high temperature resistance compliant with European colour code Temperature: (-20~105℃)	Interfaces: Analog, SSI, Start/Stop Structure: RH/RP/RF/FBGB/RS/RB/RD

Cable Selection

Accessory name/model	Dimensions	Application
 Four-pin female connector Order No.: 522000-XX		Profibus-DP/Profinet(M8) Optional:522000-02 — line length 2m 522000-05 — line length 5m 522000-10 — line length 10m 522000-15 — Line length 15m xx- cable length unit: m
 Four-pin90°female connector Order No.: 522001-XX		Profibus-DP/Profinet(M8) Optional:522001-10 — Line length 10m 522001-15 — Line length 15m xx- cable length unit: m
 Wire Harness Order No.: 522003		Start/Stop
 Industrial Ethernet Cable(Cat 5e) d-coded Order No.: 522004-XX		Industrial Ethernet interface Optional:522004-08 — Line length 8m xx- cable length unit: m Connector Type: Two 4-pin 90 ° male connectors (M12) Cable sheath: PVC, light blue Working temperature:-40°C ~80°C
 Industrial Ethernet Cable(Cat 5e) d-coded Order No.: 522005-XX		Industrial Ethernet interface Optional:522005-08 — Line length 8m xx- cable length unit: m Connector type: RJ45, 4-pin 90 ° male connector(M12) Cable sheath: PVC, light blue Working temperature:-40°C ~80°C
 Industrial Ethernet Cable(Cat 5e) d-coded Order No.: 522006-XX	 Connector Type: RJ45, 4-pin male connector (M12) Cable sheath: PVC, light blue Working temperature:-40°C ~80°C	Industrial Ethernet interface Optional:522006-03 — Line length 3m 522006-05 — Line length 5m 522006-08 — Line length 8m 522006-10 — Line length 10m 522006-15 — Line length 15m xx- cable length unit: m
 Industrial Ethernet Cable(Cat 5e) d-coded Order No.: 522008-XX	 Connector type: Two male connectors (M12) Cable sheath: PVC, light blue Working temperature:-40°C ~80°C	Industrial Ethernet interface Optional:522008-03 — Line length 3m 522008-05 — Line length 5m 522008-08 — Line length 8m 522008-10 — Line length 10m 522008-15 — Line length 15m xx- cable length unit: m

Troubleshooting Table

Analog

Fault	Reason	Checking method
RH.RP.RD .RF — LEDs off	No power supply	Check whether the power supply has power. Use a multimeter to measure whether the voltage value of the power supply is normal.
	Wiring error	Check whether the sensor power cord is connected correctly
	Sensor damaged	After investigation, if it is confirmed that the sensor is damaged or faulty and needs to be returned for repair, please contact the sales staff or after-sales staff to send it back
RH.RP.RD .RF — Red and green LED keep on	No magnet /magnet mismatch/mistakenly use gasket as magnet	Test after correctly installing the magnet
	Sensor damage	After investigation, if it is confirmed that the sensor is damaged or faulty and needs to be returned for repair, please contact the sales staff or after-sales staff to send it back
RH.RP.RD .RF — The green LED is on and the red LED is flashing	The magnet leaves the stroke length range	Check whether the magnet is in the non-usable area at the head and end. Test after move the magnet or piston rod into the stroke
RH.RP.RD .RF — Green LED flashing, red LED is off	Sensor data jumping	The sensor detects that the data jump at a certain point exceeds the set threshold (≥ 0. 5mm), and needs to be returned to the factory for inspection and maintenance, please contact the sales staff or after-sales staff to send it back
RH.RP.RD .RF — LED cannot be observed, no current/voltage tested	Magnet problem in Cylinder/broken current of multimeter for test	Step 1: If the sensor is not disassembled, measure the signal cable voltage with a multimeter. About 21.6 V indicates that the sensor output is normal, and the current file of the multimeter is damaged. It is necessary to replace a new multimeter test until the current is measured Step 2: Disassemble the sensor and put on a magnet on the rod. When the green LED is on and the multimeter current/voltage value is normal, it means that the sensor is normal. If there is a problem with the magnet in the cylinder, it is necessary to disassemble the cylinder to check whether the magnet is damaged or falls off Step 3: Disassemble the sensor and put on a magnet on the rod. Moving the magnet within the stroke,if the LED is abnormal and there is no current/voltage or abnormal current/voltage value (not in the corresponding output range), please returned to the factory for detection, please contact the sales staff or after-sales staff to send it back
RH.RP.RD .RF — Displacement value does not match with Cylinder action; the deviation between reference ruler and sensor actual value is large	Parameter setting in controller (PLC) program	The stroke length parameter of the sensor in PLC program should be set with the same value as the stroke of the sensor
RS.RB. FBGB — The data curve increasing is stepped	The customer uses the row grounding problem of the three-wire terminal / the signal (-) needs to be connected to the ground	Connect the power ground and the signal (-) cable to the power GND terminal block / after the signal (-) cable is connected to the ground, then check whether the data returns to normal
RS.RB. FBGB — Abnormal current value (current sensor) /abnormal voltage value (voltage sensor)	Problem with the magnet in the cylinder /communication module problem /The current gear of the multimeter for testing is broken /sensor damaged	Step 1: If the sensor is not disassembled, measure the signal cable voltage with a multimeter. About 21.6 V indicates that the sensor output is normal, and the current file of the multimeter is damaged. It is necessary to replace a new multimeter test until the current is measured Step 2: After disassembled, check the appearance of the sensor and whether the cable connector is damaged. After confirming that there is no abnormality, put on a magnet to power on the sensor. If the current/voltage value of the multimeter is normal, it means that the sensor is normal, indicating that there is a problem with the magnet in the cylinder, and the cylinder needs to be disassembled to check whether the magnet is damaged or fallen off. Step 3: Disassemble the sensor and put on a magnet on the rod. Moving the magnet within the stroke,if the LED is abnormal and there is no current/voltage or abnormal current/voltage value (not in the corresponding output range), please returned to the factory for detection, please contact the sales staff or after-sales staff to send it back

SSI

Fault	Reason	Checking method
RH.RP.RD .RF — LEDs are off	No power supply	After investigation, if it is confirmed that the sensor is damaged or faulty and needs to be returned for repair, please contact the sales staff or after-sales staff to send it back
	No magnet /magnet mismatch/mistakenly use gasket as magnet	Check whether the sensor power cord is connected correctly
	Sensor damage	After investigation, if it is confirmed that the sensor is damaged or faulty and needs to be returned for repair, please contact the sales staff or after-sales staff to send it back
RH.RP.RD .RF — Red and green LED keep on	No Magnet	Test after correctly installing the magnet
	Sensor damage	After investigation, if it is confirmed that the sensor is damaged or faulty and needs to be returned for repair, please contact the sales staff or after-sales staff to send it back
RH.RP.RS. RD.RF — Interface converter has data, but PLC shows no data	Internal fault of sensor	Needs to be returned for repair, please contact the sales staff or after-sales staff to send it back
	Poor wiring connection	Check whether the copper wire is full at the connection , re-plug the connector
	Interference	Check whether the two ends of the connecting cable are connected and whether the cable impedance is less than a few hundred Ω. Replace the channel test, install a power filter/isolator if necessary, replace the extension cable with a sensor-specific cable, or replace it with RHB, RHC sensors
RH.RP.RS. RD.RF — Abnormal output value or value jumping	Magnet mismatch or damage	Check whether the magnet in the cylinder is of another brand, whether the position of the built-in magnet and the gasket is correct, whether the magnet has fallen off, etc. Externally mounted sensors check for sliding magnets off track
	Wrong selection of mounting clamp	Use mounting clamp with insulation washer (for profile structure)
	Incorrect controller parameters	Check code system, baud , monostable time, etc. If necessary, contact after-sales technicians
	Sensor damage	Check the appearance to determine whether there is damage. If damaged, needs to be returned for repair, please contact the sales staff or after-sales staff to send it back; If there is no abnormality in the appearance and no abnormality is found after the above inspection, please contact the after-sales staff for solution

CAN

	Fault	Reason	Checking method
RH.RP. RF	Green LED is on, red LED is flashing	Magnet out of stroke length	Check the magnet, you need to move the magnet placed in the stroke test again, observe whether the light becomes green light, red light off
	Red and green LED keep on	Magnet not detected	Please check whether the Magnet ring is assembled correctly
	Green LED is on, red LED is off , no data	Wiring/program parameter setting error, etc	Check whether the wiring sequence is correct, whether the EDS file is correctly installed, whether the end resistance is connected, whether the baud is correctly set, whether the resistance value between CAN-H and CAN-L signal wire is about 27kΩ~50kΩ, whether there is current between the power supply and GND, whether the communication mode is asynchronous/synchronous, whether there is a start-up node instruction sent, please contact the technical or after-sales staff after the above inspection
	LEDs are off	power supply/sensor failure	Check whether the power supply, whether the sensor is damaged, and return to the factory for maintenance, please contact the sales staff or after-sales staff to send it back

Profinet

RH.RP	The green LED is on, and the data display is-1 or 0	Sensor communicating , cannot detect the magnet	The sensor output is normal, please check whether the magnet is assembled correctly and whether the measuring rod is damaged
	The green LED is on, and the data display is 0x7fffffff (hexadecimal)	Sensor communicating , cannot detect magnet	The sensor output is normal, please check whether the Magnet ring is assembled correctly and whether the measuring rod is damaged
	The green LED flashing and the red LED is on	Sensor internal fault	Sensor needs to be returned for repair, please contact the sales staff or after-sales staff to send it back
	LEDs are off	Abnormal power supply/sensor failure	Check whether the power supply, whether the sensor is damaged, and return to the factory for maintenance, please contact the sales staff or after-sales staff to send it back
	The green LED is on and the red LED is flashing	Communication failure	Check whether the GSD file matches or is correctly installed, whether the sensor name matches the configuration, modify the sensor name to simple characters such as A/a if necessary, and then configuration test

Start-Stop

RH.RP	Green LED is on, red LED is flashing, no data	The sensor has no interrogation signal	Check whether the connection is correct, whether the controller send the start signal, and whether the hardware such as the controller module is normal
	LEDs are on	Magnet or sensor failure	Check whether the magnet is assembled normally. Use frequency mode of an oscilloscope and multimeter to measure whether the waveform of start/stop signal line has amplitude or frequency value. After confirming that there is no amplitude or frequency, it must be returned to the factory for maintenance, please contact the sales staff or after-sales staff to send it back

Profibus-DP

RH.RP	Green LED flashing, no data	Communication failure, configuration setting error, etc.	Check the communication cable connection, whether the address set in the configuration is consistent with the sensor model label, and whether the sensor address jumps (TEC address programmer is required to read the actual sensor address)
	Green LED is on, no data	Abnormal configuration setting/ wrong number of magnets, etc.	Check state configuration, bus wiring, magnet number, etc.
	LEDs are off	Power/Sensor Failure	Check whether the power supply is normal, whether the sensor is damaged, and return to the factory for maintenance , please contact the sales staff or after-sales staff to send it back

Ether-CAT

RH.RP	The green LED flashing and the red LED is on	Magnet not detected/incorrect number of magnets	Check whether the magnet is assembled correctly; When there are multiple magnetic rings, check whether the actual number of magnets matches the number of set parameters

Industrial Application


Metallurgical industry

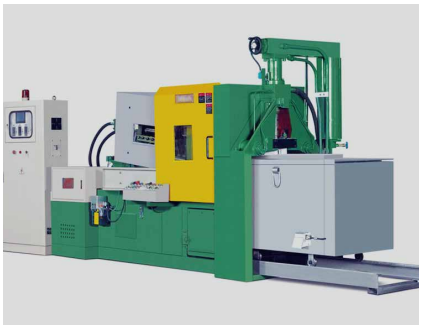

Port machinery


Hydraulic machinery


Wind power industry


Injection molding machinery

Vulcanizing machinery


Die casting machinery


Vertical mill machinery


Construction machinery


Papermaking machinery

Liquid level tank


Forming machinery

Country list

AF - Afghanistan 阿富汗
AL - Albania 阿尔巴尼亚
DZ - Algeria 阿尔及利亚
AS - American Samoa 东萨摩亚
AD - Andorra 安道尔
AO - Angola 安哥拉
Av - Anguilla 安圭拉岛
AQ - Antarctica 南极洲
AG - Antigua and Barbuda 安提瓜和巴布达
AR - Argentina 阿根廷
AM - Armenia 亚美尼亚
AA - Aruba 阿鲁巴
AU - Australia 澳大利亚
AT - Austria 奥地利
AZ - Azerbaijan 阿塞拜疆

BF - Bahamas 巴哈马
BH - Bahrain 巴林
BB - Barbados 巴巴多斯
BD - Bangladesh 孟加拉
BY - Belarus 白俄罗斯
BE - Belgium 比利时
BZ - Belize 伯里兹
BJ - Benin 贝宁
BM - Bermuda 百慕大
BS - Bahamas 巴哈马
BT - Bhutan 不丹
BW - Botswana 博茨瓦纳
BO - Bolivia 玻利维亚
BA - Bosnia and Herzegovina 波黑
BV - Bouvet Island 布韦岛
BR - Brazil 巴西
IO - British Indian Ocean Territory 英属印度洋领地
BN - Brunei Darussalam 文莱布鲁萨兰
BG - Bulgaria 保加利亚
BF - Burkina Faso 布基纳法索
BI - Burundi 布隆迪

KH - Cambodia (Internet) 柬埔寨
CB - Cambodia (CIA World Fact Book) 柬埔寨
CM - Cameroon 喀麦隆
CA - Canada 加拿大

CV - Cape Verde 佛得角
KY - Cayman Islands 开曼群岛
CF - Central African Republic 中非
TD - Chad 乍得
CL - Chile 智利
CN - China 中国
CX - Christmas Island 圣诞岛
CC - Cocos (Keeling) Islands 可可斯群岛
CO - Colombia 哥伦比亚
KM - Comoros 科摩罗
CG - Congo 刚果
CD - Congo, Democratic Republic 刚果
CK - Cook Islands 库克群岛
CR - Costa Rica 哥斯达黎加
CI - Cote DIvoire (Ivory Coast) 象牙海岸
HR - Croatia (Hrvatska) 克罗地亚
CU - Cuba 古巴
CY - Cyprus 塞普路斯
CZ - Czech Republic 捷克
CS - Czechoslovakia (former) 捷克斯洛伐克

DK - Denmark 丹麦
DJ - Djibouti 吉布提
DM - Dominica 多米尼加共和国
DO - Dominican Republic 多米尼加联邦

TP - East Timor 东帝汶
EC - Ecuador 厄瓜多尔
EG - Egypt 埃及
SV - El Salvador 萨尔瓦多
GQ - Equatorial Guinea 赤道几内亚
ER - Eritrea
EE - Estonia 爱沙尼亚
ET - Ethiopia 埃塞俄比亚

FK - Falkland Islands (Malvinas) 福兰克群岛
FO - Faroe Islands 法罗群岛
FJ - Fiji 斐济
FI - Finland 芬兰
FR - France 法国
FX - France, Metropolitan
GF - French Guiana 法属圭亚那
PF - French Polynesia 法属玻里尼西亚

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

GA - Gabon 加蓬
GM - Gambia 冈比亚
GE - Georgia 格鲁吉亚
DE - Germany 德国
GH - Ghana 加纳
GI - Gibraltar 直布罗陀
GB - Great Britain (UK) 英国
GR - Greece 希腊
GL - Greenland 格陵兰岛
GD - Grenada 格林纳达
GP - Guadeloupe 法属德洛普群岛
GU - Guam 关岛
GT - Guatemala 危地马拉
GN - Guinea 几内亚
GW - Guinea-Bissau 几内亚比绍
GY - Guyana 圭亚那

HT - Haiti 海地
HM - Heard and McDonald Islands 赫德和麦克唐纳群岛
HN - Honduras 洪都拉斯
HK - Hong Kong 中国香港特区
HU - Hungary 匈牙利

IS - Iceland 冰岛
IN - India 印度
ID - Indonesia 印度尼西亚
IR - Iran 伊朗
IQ - Iraq 伊拉克
IE - Ireland 爱尔兰
IL - Israel 以色列
IT - Italy 意大利

JM - Jamaica 牙买加
JP - Japan 日本
JO - Jordan 约旦

KZ - Kazakhstan 哈萨克斯坦
KE - Kenya 肯尼亚
KI - Kiribati 基里巴斯
KP - Korea (North) 朝鲜
KR - Korea (South) 韩国
KW - Kuwait 科威特
KG - Kyrgyzstan 吉尔吉斯斯坦

LA - Laos 老挝
LV - Latvia 拉托维亚
LB - Lebanon 黎巴嫩
LI - Liechtenstein 列支顿士登
LR - Liberia 利比里亚
LY - Libya 利比亚
LS - Lesotho 莱索托
LT - Lithuania 立陶宛
LU - Luxembourg 卢森堡

MO - Macau 中国澳门特区
MG - Madagascar 马达加斯加
MW - Malawi 马拉维
MY - Malaysia 马来西亚
MV - Maldives 马尔代夫
ML - Mali 马里
MT - Malta 马耳他
MH - Marshall Islands 马绍尔群岛
MQ - Martinique 法属马提尼克群岛
MR - Mauritania 毛里塔尼亚
MU - Mauritius 毛里求斯
YT - Mayotte
MX - Mexico 墨西哥
FM - Micronesia 米克罗尼西亚
MC - Monaco 摩纳哥
MD - Moldova 摩尔多瓦
MA - Morocco 摩洛哥
MN - Mongolia 蒙古
MS - Montserrat 蒙塞拉特岛
MZ - Mozambique 莫桑比克
MM - Myanmar 缅甸

NA - Namibia 纳米比亚
NR - Nauru 瑙鲁
NP - Nepal 尼泊尔
NL - Netherlands 荷兰
AN - Netherlands Antilles 荷属安德列斯
NT - Neutral Zone 中立区(沙特-伊拉克间)
NC - New Caledonia 新卡里多尼亚

NZ - New Zealand (Aotearoa) 新西兰
NI - Nicaragua 尼加拉瓜
NE - Niger 尼日尔
NG - Nigeria 尼日利亚
NU - Niue 纽爱
NF - Norfolk Island 诺福克岛
MP - Northern Mariana Islands 北马里亚纳群岛
NO - Norway 挪威

OM - Oman 阿曼

PK - Pakistan 巴基斯坦
PW - Palau 帕劳
PA - Panama 巴拿马
PG - Papua New Guinea 巴布亚新几内亚
PY - Paraguay 巴拉圭
PE - Peru 秘鲁
PH - Philippines 菲律宾
PN - Pitcairn 皮特克恩岛
PL - Poland 波兰
PT - Portugal 葡萄牙
PR - Puerto Rico 波多黎各

QA - Qatar 卡塔尔

RE - Reunion 法属尼留旺岛
RO - Romania 罗马尼亚
RU - Russian Federation 俄罗斯
RW - Rwanda 卢旺达

GS - S. Georgia and S. Sandwich Isls.
KN - Saint Kitts and Nevis 圣基茨和尼维斯
LC - Saint Lucia 圣卢西亚
VC - Saint Vincent and the Grenadines 圣文森特和格陵纳丁斯
WS - Samoa 西萨摩亚
SM - San Marino 圣马力诺
ST - Sao Tome and Principe 圣多美和普林西比
SA - Saudi Arabia 沙特阿拉伯
SN - Senegal 塞内加尔
SC - Seychelles 塞舌尔
SL - Sierra Leone 塞拉利昂
SG - Singapore 新加坡
SI - Slovenia 斯罗文尼亚
SK - Slovak Republic 斯洛伐克
Sb - Solomon Islands 所罗门群岛
SO - Somalia 索马里
ZA - South Africa 南非
ES - Spain 西班牙
LK - Sri Lanka 斯里兰卡
SH - St. Helena
PM - St. Pierre and Miquelon 圣皮艾尔和密克隆群岛
SD - Sudan 苏丹
SR - Suriname 苏里南
SJ - Svalbard and Jan Mayen Islands 斯瓦尔巴特和扬马延岛
SZ - Swaziland 斯威士兰
SE - Sweden 瑞典
CH - Switzerland 瑞士
SY - Syria 叙利亚

TW - Taiwan 中国台湾省
TJ - Tajikistan 塔吉克斯坦
TZ - Tanzania 坦桑尼亚
TH - Thailand 泰国
TG - Togo 多哥
TK - Tokelau 托克劳群岛
TO - Tonga 汤加
TT - Trinidad and Tobago 特立尼达和多巴哥
TN - Tunisia 突尼斯
TR - Turkey 土尔其
TM - Turkmenistan 土库曼斯坦
TC - Turks and Caicos Islands 特克斯和凯科斯群岛
TV - Tuvalu 图瓦卢

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

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

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

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

YE - Yemen 也门
YU - Yugoslavia 南斯拉夫

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

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