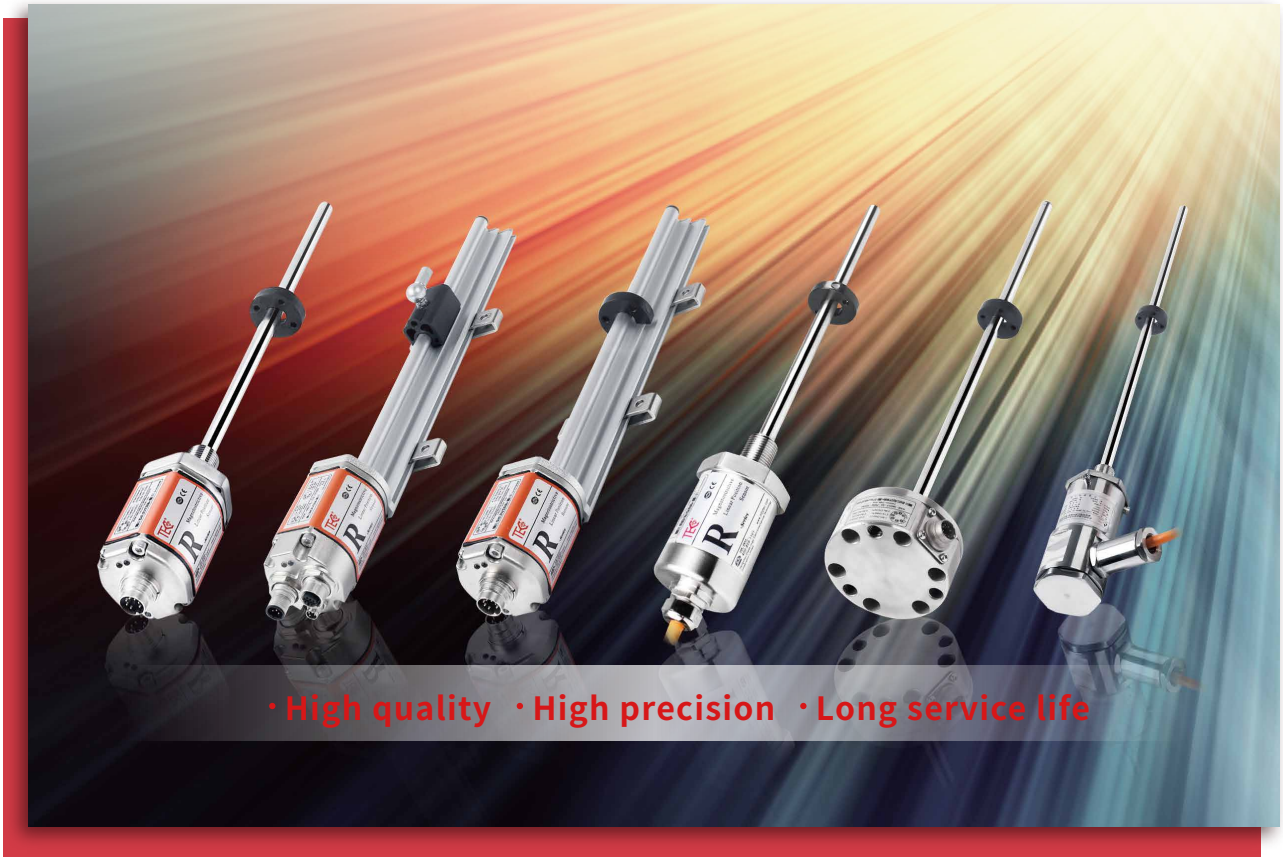
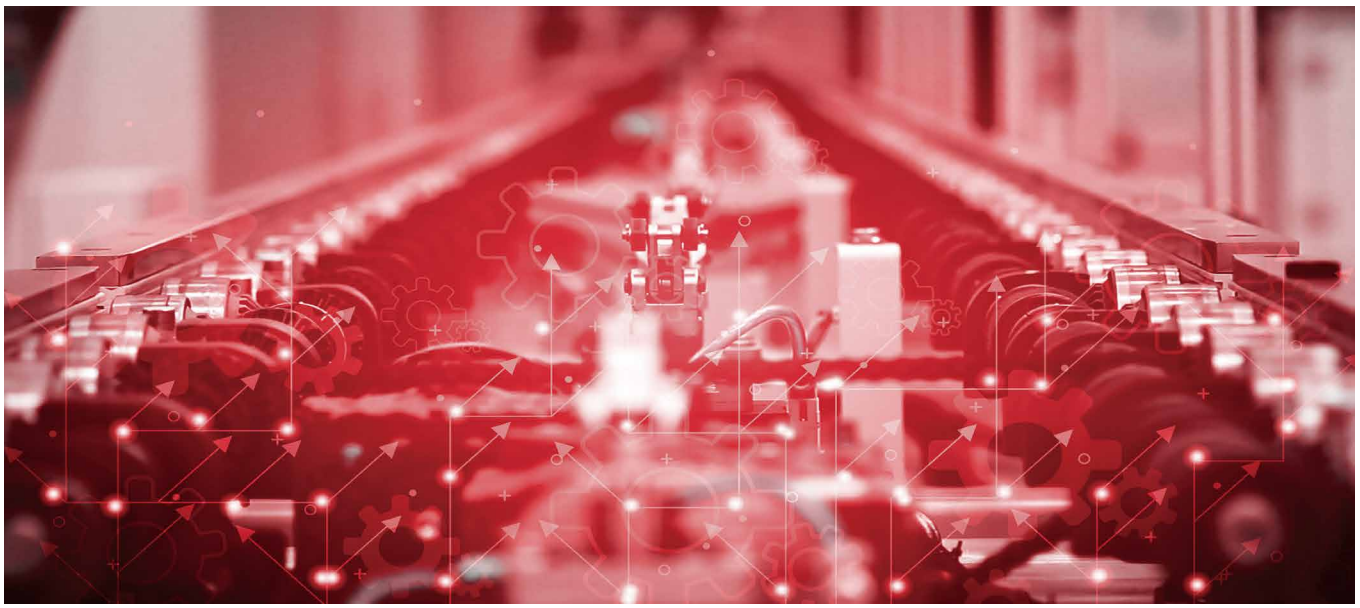
Magnetostrictive Displacement Sensor

R Series Product manual



Company Profile

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



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

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

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

Honorary Qualification

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

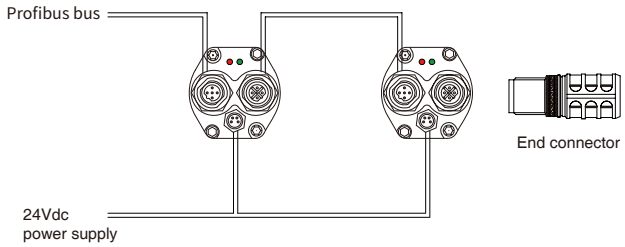
Failure indication		Electronic bin coverwith LEDs display
RH Series	Electronic bin	Aluminum alloy
	Measuring rod	304 stainless steel
	Outer tube pressure	35MPa(continuous)/70MPa(peak)or 350bar(continuous)/700bar (peak)
	Position magnet	Standard magnet ring and various ring magnets
RP Series	Electronic 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

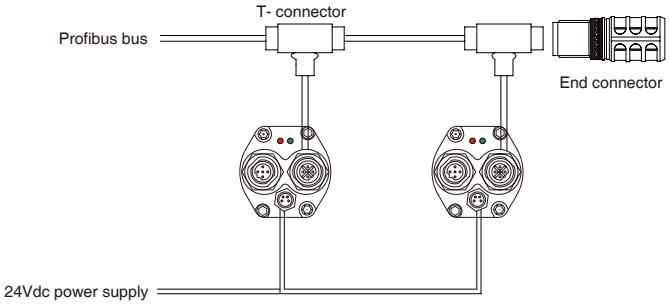
Input voltage	+24Vdc±20%
operating current	＜80mA（varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

S s Output Characteristics-Profibus-DP Bus Output

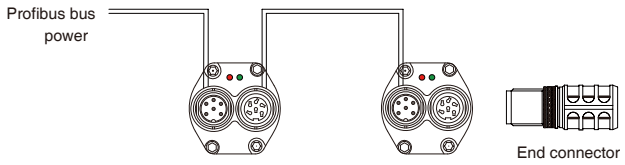
- Connection by 5-pin connector (series connection): The power supply cable is separate from the bus connection.



- 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.



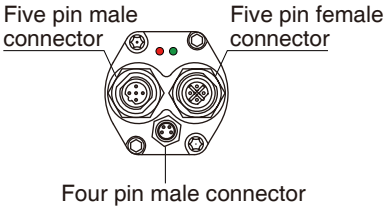
- Connection with a 6-pin connector (series connection)



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

Installation and Use Instructions - Profibus-DP Bus Output

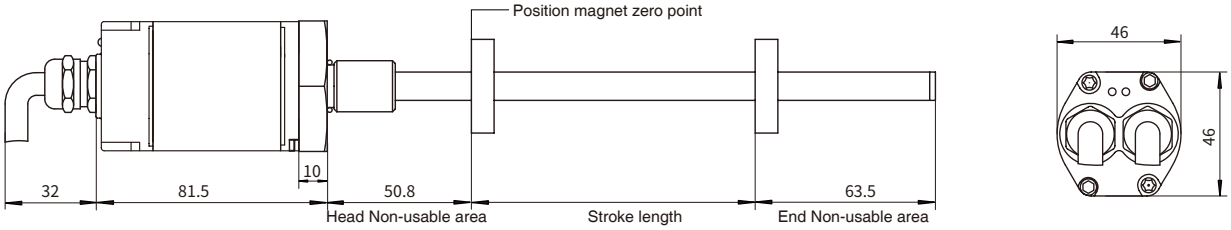
The DP output magnetostrictive sensor meets the Profibus-DP (EN 50 170) protocol. The sensor transmits the absolute position data of the magnet ring to the controller in the form of RS-485 standard serial asynchronous, and the maximum transmit rate can reach 12Mbps. The Profibus-DP interface provides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

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

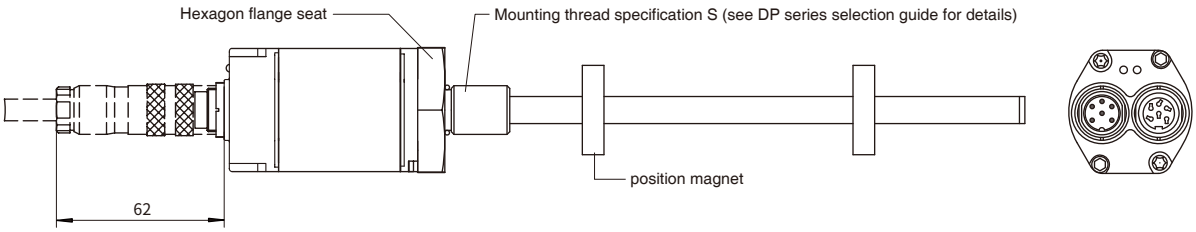
RH series pressure-resistant rodshell, built-in installation design for hydraulic system, pressure-resistant 35MPa continuous, flexible and simple installation mode, mounting thread form M18×1.5 or M20×1.5 or 3/4"-16UNF-3A.

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.

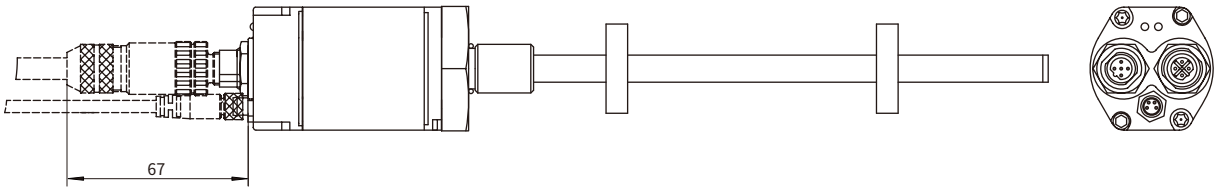
Cable outlet



Six pin Connector



Five pin Connector



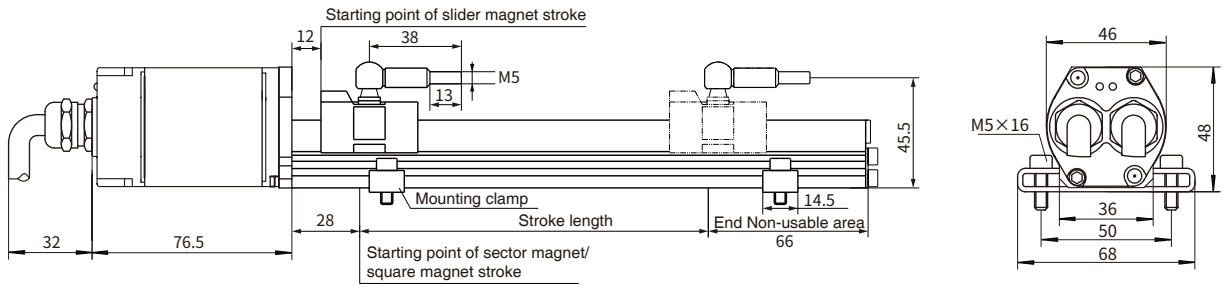
Installation Instructions-Profibus-DP Bus Output

• Dimensions and installation guidance of RP aluminum profile sensor

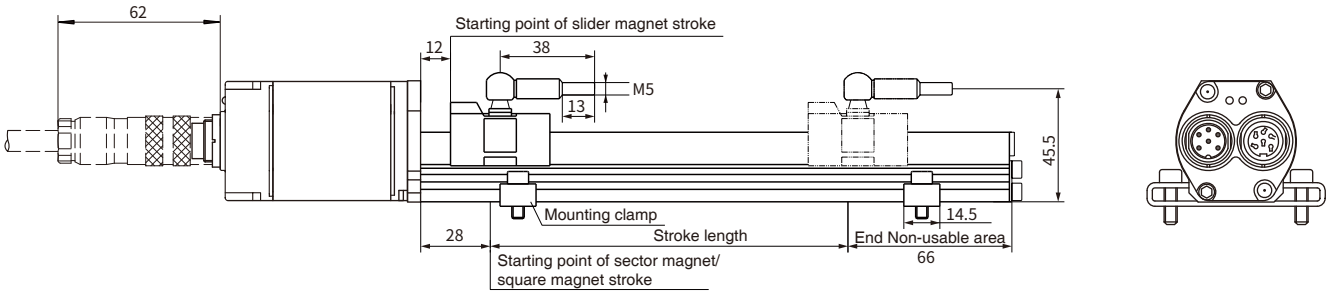
RP Series aluminum profile provides flexible and simple external installation mode, which is suitable for stroke or position detection of linear motion mechanism, and can also be used for external position detection of hydraulic cylinder.

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.

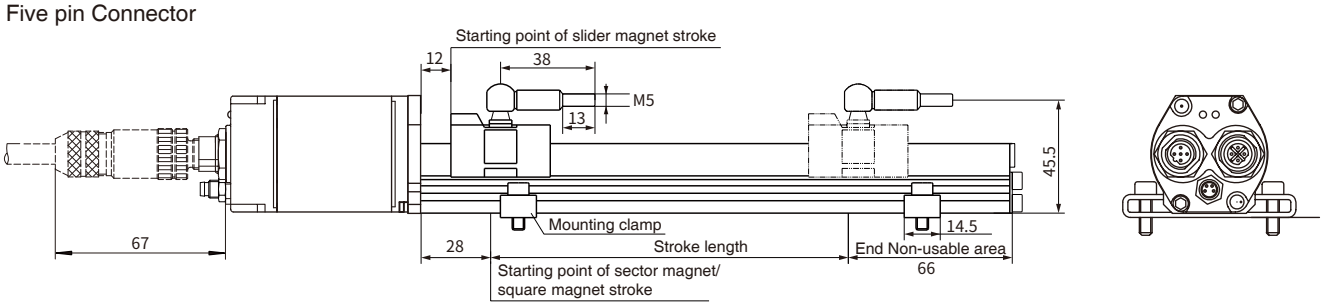
Cable outlet



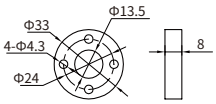
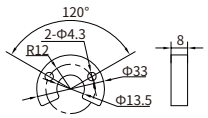
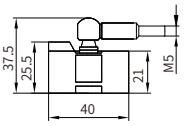
Six pin Connector

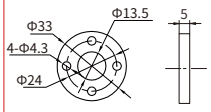
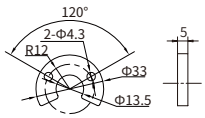
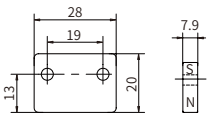


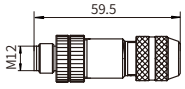
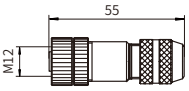
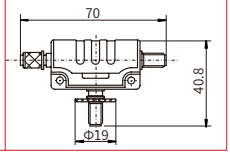
Five pin Connector

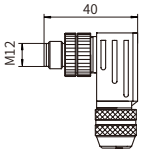
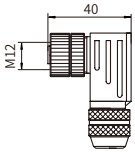
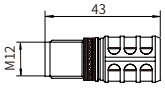


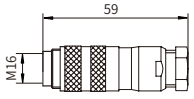
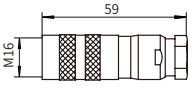
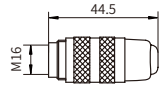
Common Accessories-Profibus-DP Bus Output

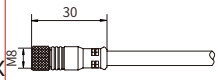
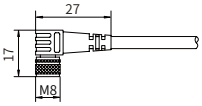
Accessory name/ model	Dimensions
Standard Magnet ring Order No.: 211501	
Sector magnet Order No.: 211502	
Slider magnet Order No.: 211503	

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	

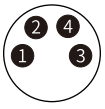
Accessory name/ model	Dimensions
6-pin Connector male Order No.: 312714	
6-pin female connector Order No.: 312701	
6-pin end male c onnector Order No.: 312715	

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

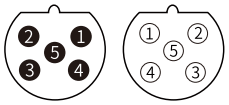
When the sensor is connector output, refer to the pin definition in the following table for wiring mode; when the sensor is cable outlet output, refer to the line color definition in the following table for connection mode



4-pin connector socket (for power supply)

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

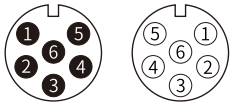
Pin	Line color	Pin/wire function definition
1	Brown	+24Vdc power supply (-20%+20%)
2	White	Do not connect
3	Blue	0Vdc(power supply circuit)
4	Black	Do not connect



• 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

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）

- 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

  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.

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.