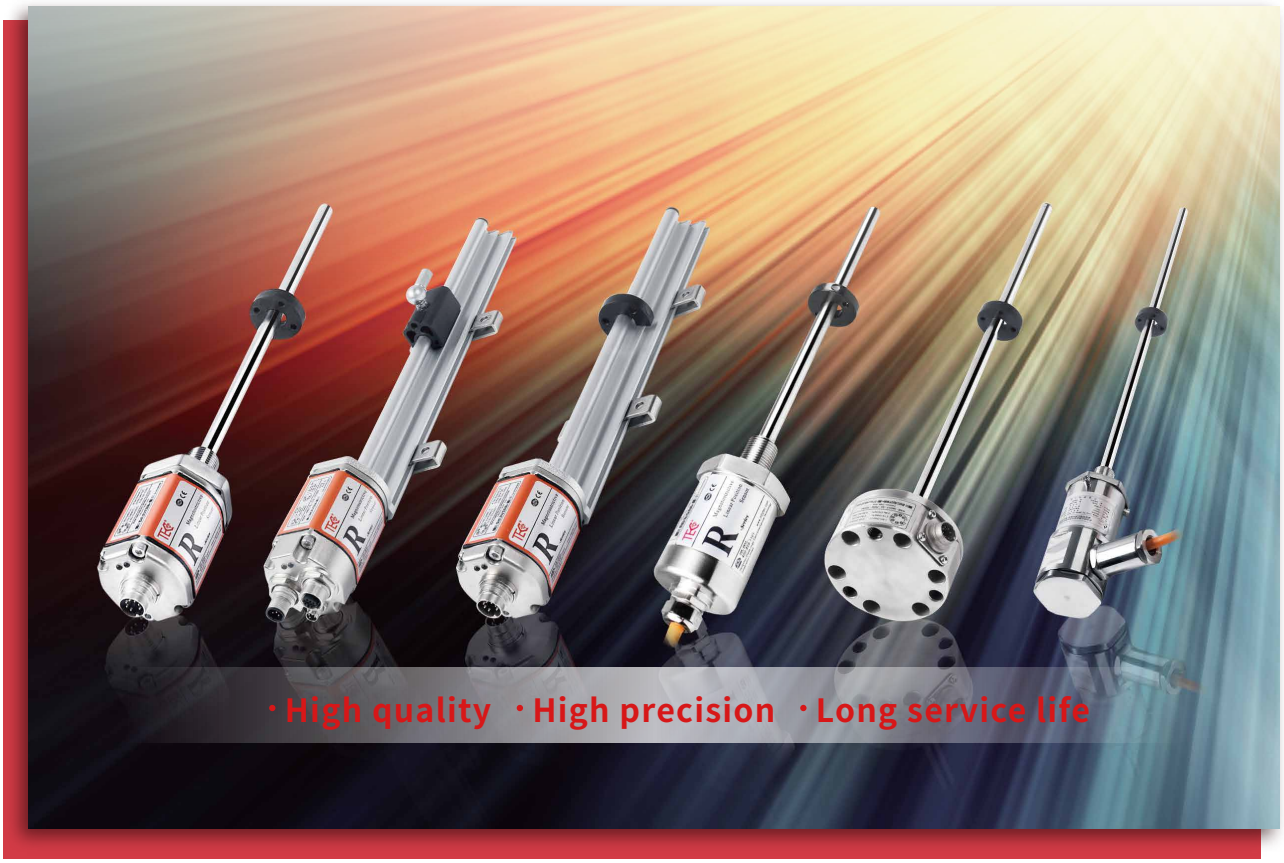
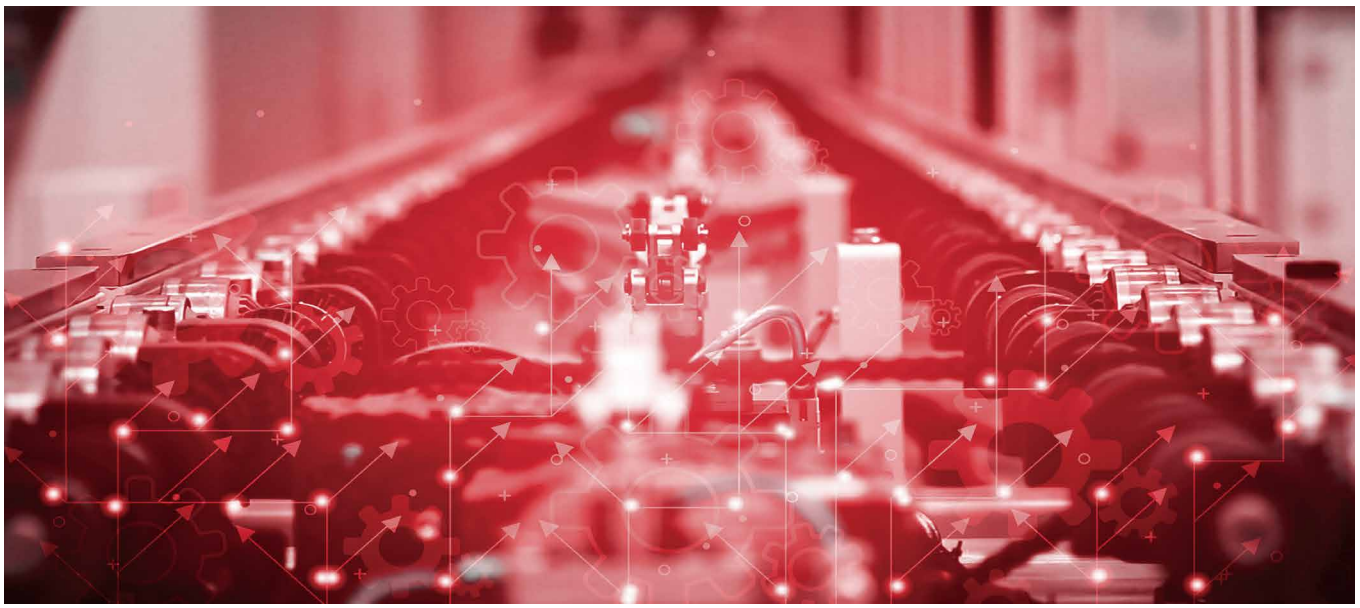
Magnetostrictive Displacement Sensor

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

RB Flat Pressure resistance 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

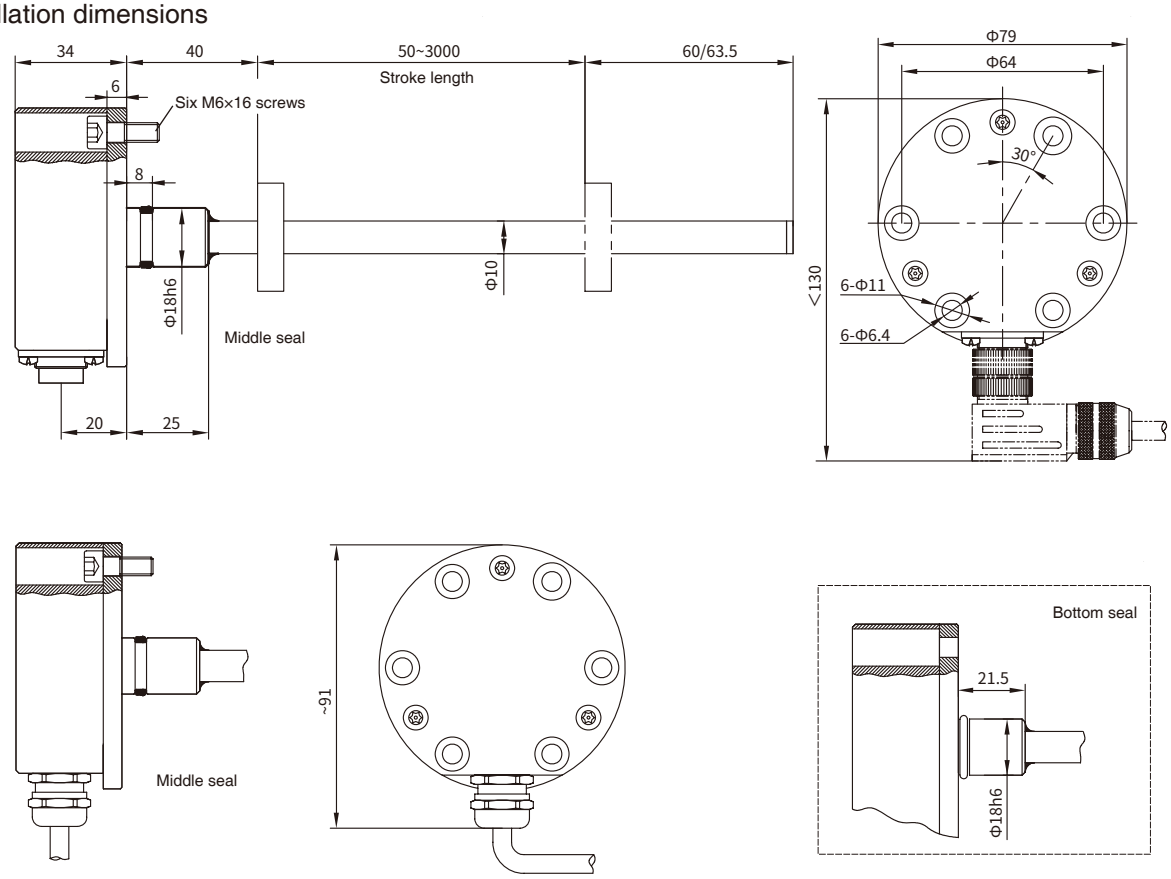
Electronic bin	304 stainless steel
Measuring rod	304 stainless steel
Outer tube pressure resistance	35MPa (continuous)/70MPa (peak) or 350ba (continuous)/700ba (peak)
Position magnet	Standard magnetic ring and various ring magnets
Mounting thread	6 M6X16 screws
Installation direction	Any direction
Connection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

A a Installation and Instructions for use

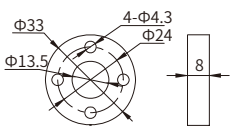
• Output characteristic

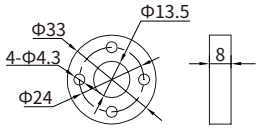
RB series sensors have high-strength protective shell and high working temperature, and are durable, which can provide users with continuous, reliable and real-time displacement signals in harsh environment. The sensor has a completely stainless steel shell. It is suitable for installing in hydraulic 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



C c Commonly used accessories

Accessory name/ model	Dimensions
Standard magnetic ring Order No.: 211501	

Accessory name/ model	Dimensions
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

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

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

- 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

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

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

Selection Guide-CAN Bus

R	B	–	M					–			–					–	C					–		
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 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

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

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)