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

C C 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.
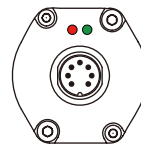
Timing diagram
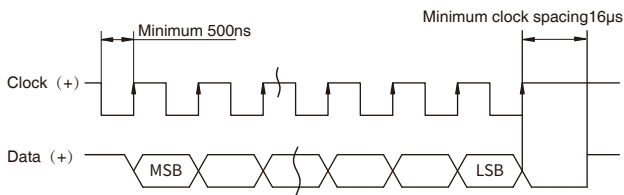
Logic diagram
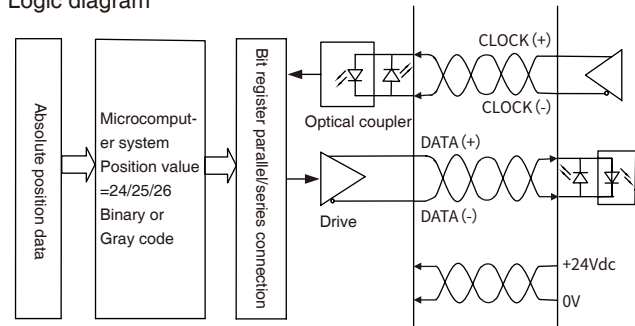
L l LED Real-time State Monitoring and Diagnosis

● 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

A a 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.
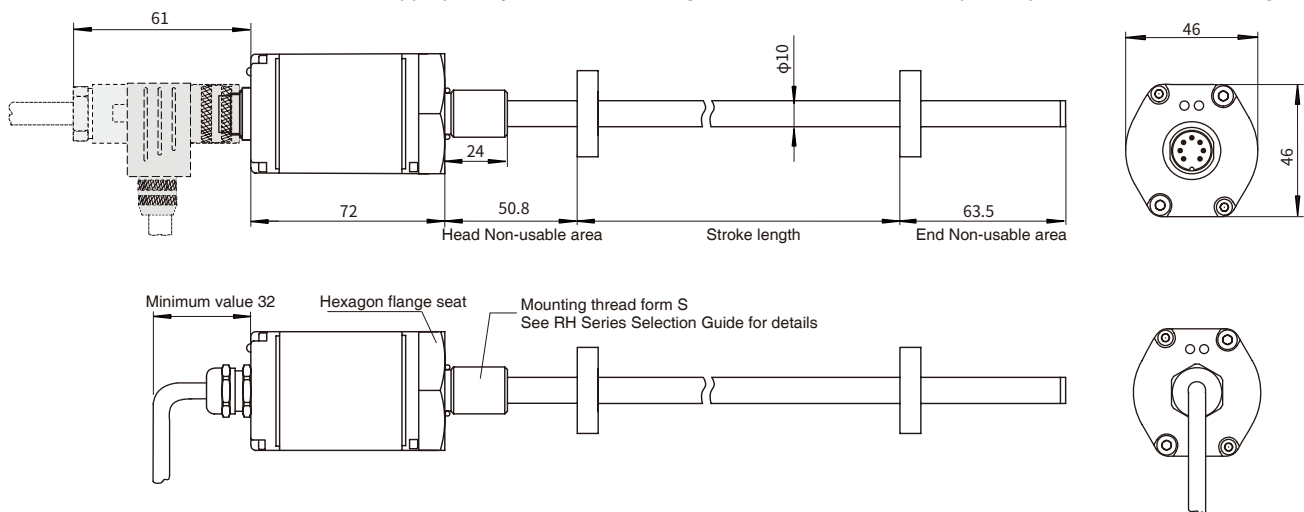
● Dimensions and installation guidance of RP aluminum profile sensor

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.
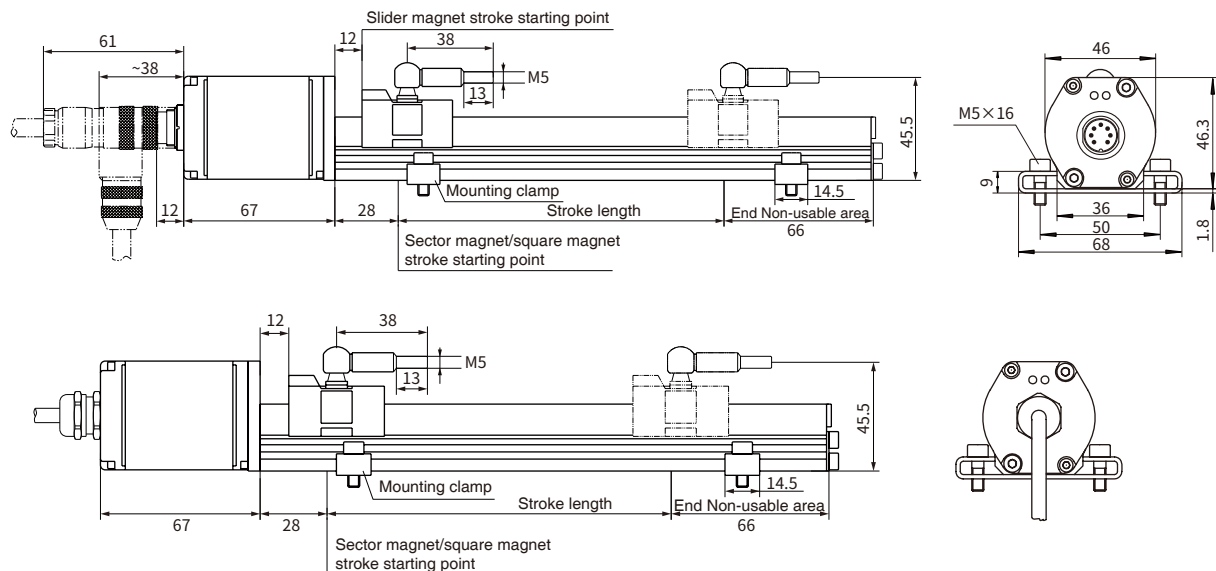
C C Common Accessories - SSI Output

Accessory name/model	Dimensions	Accessory name/model	Dimensions	Accessory name/model	Dimensions
Standard Magnet ring Order No.: 211501	Φ33 Φ13.5 4-Φ4.3 Φ24 8	Magnetic isolation gasket	Φ33 Φ13.5 5 4-Φ4.3 Φ24	7-pinFemale Connector Order No.: 312703	M16 59
Sector magnet Order No.: 211502	120° 2-Φ4.3 R12 Φ33 8 Φ13.5	Sector magnetic isolation gasket	120° 2-Φ4.3 R12 Φ33 5 Φ13.5	7-pin 90 Female Connector Order No.: 312704	M16 38 54
Slider magnet Order No.: 211503	13 37.5 25.5 21 M5 40	Square magnet Order No.: 211508	28 19 7.9 13 20 S N		

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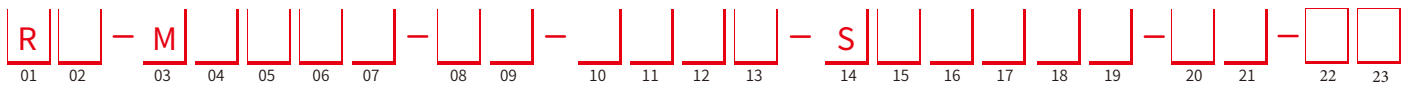
● Wiring mode

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	Wire color 1*	Wire 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

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

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

C C 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
R H	Pressure-resistant rod (internal or external)
R P	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 RH series	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
Only for RP series	C 1	Sector magnet
	C 2	Slider magnet
	C 3	Square magnet

10 - 13	Connection form
10 - 11	**Cable outlet mode**
D H	PUR sheath, orange,-20~90℃, and one end scattered, wire color 1
D U	PVC sheath, orange,-20~105℃, and one end scattered, wire color 2
D B	PVC sheath, orange,-20~105℃, and one end scattered, wire 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

Note: See SSI cable accessories selection for supporting cables

12 - 13	Cable outlet mode: cable length, 01~99 meters
10 - 13	**Connector mode**
P H 7 0	M16 male connector (7-pin)
P B 8 0	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
S 0	50.8mm+63.5mm
B 0	30mm+60mm
S 1	28mm+66mm（used in RP series）

| 22 - 23	Country
	Refer to the country list

● 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.

S S SSI Cable accessories selection Guide

S	S	I	—	M			—			
01	02	03		04	05	06	07	08	09	10
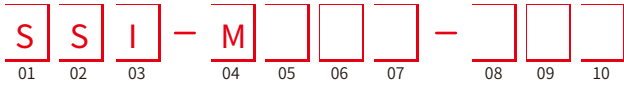
01 - 03	Type
S S I	SSI interface

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, wire color1
H 0 3	One end of 7-pin (M16) right angle female connector, and one end scattered, wire color 1
U 0 1	One end of 7-pin (M16) is female connector, and one end scattered, wire color 2
U 0 2	One end of 8-pin (M16) is female connector,and one end scattered, wire color 3
U 0 3	One end of 7-pin (M16) right angle female connector, and one end scattered, wire color 2
U 0 4	One end of 8-pin (M16) right angle female connector, and one end scattered,wire color 3

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.