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	SSI
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, 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

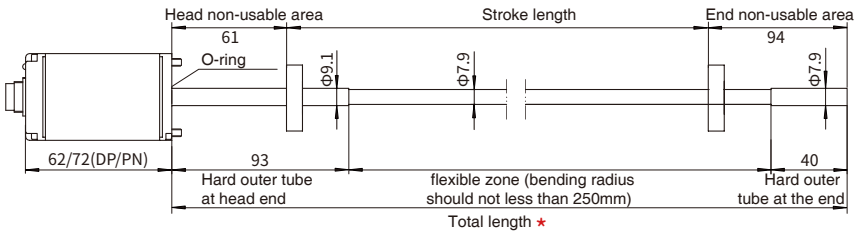
Input voltage	+24Vdc±20%
operating current	＜90mA（ varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

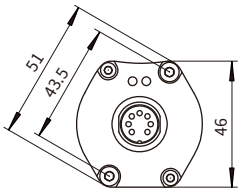
• Structure and materials

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

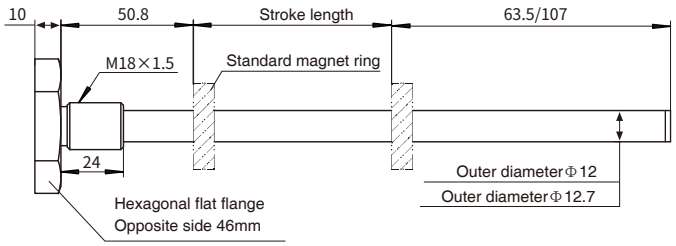
Aa Installation and Use Instructions

• Dimensions of RF flexible outer tube sensor





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



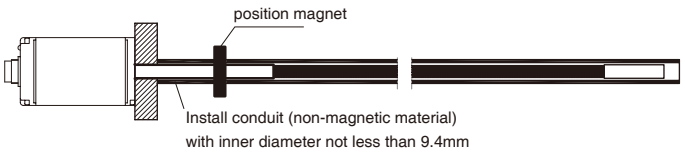
Option: Pressure-resistant outer pipe with flange, outer diameter 12mm/12.7mm

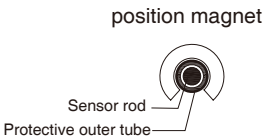
The flanged pressure-resistant outer pipe is used to cooperate with RF flexible sensor, which can withstand 35MPa pressure for hydraulic cylinder and provide protection for RF sensor. For large Cylinder, it is necessary to drill a ϕ18mm deep hole in the piston rod when selecting the pressure pipe with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

• Installation instruction of RF flexible outer tube sensor

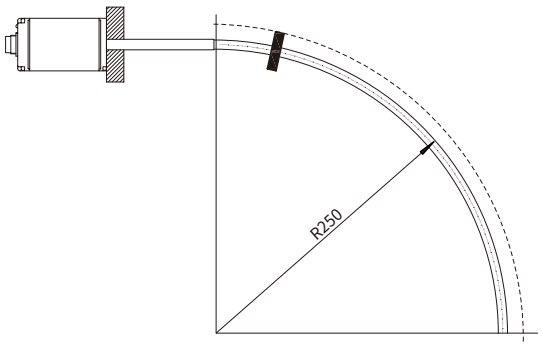
Two non-magnetic bolts are required for the installation of the sensor electronic bin. Long-stroke sensors need non-magnetic tube support (inner diameter ≥ 9.4), or bend into the desired shape. Sensors with hexagonal flanges can be easily mounted using non-magnetic bolts. Or you can choose a flanged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

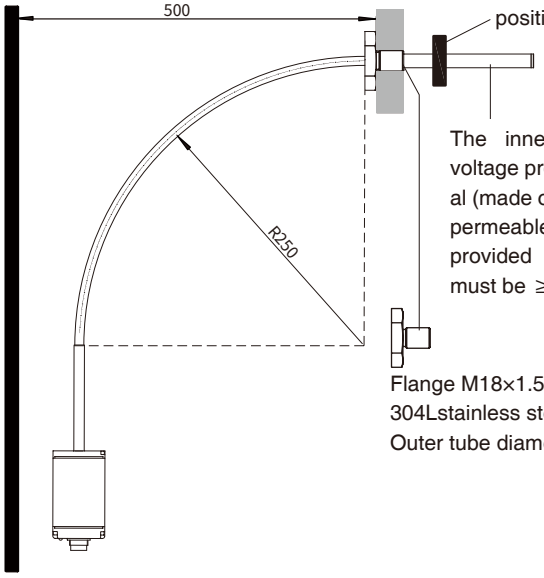
Linear measurement (external installation)



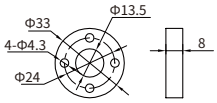
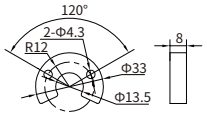
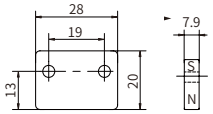


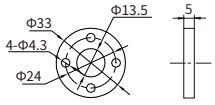
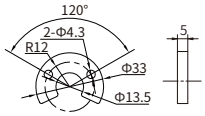
Arc measurement (external installation)

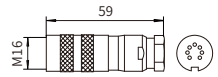
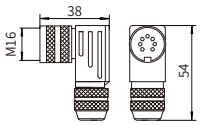




C Common Accessories - SSI Output

Accessory name/ model	Dimensions
Standard Magnet ring Order No.: 211501	
Sector magnet Order No.: 211502	
Square magnet Order No.: 211508	

Accessory name/ model	Dimensions
Magnetic isolation gasket	
Sector magnetic isolation gasket	

Accessory name/ model	Dimensions
7-pinFemale Connector Order No.: 312703	
7-pin 90 Female Connector Order No.: 312704	

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 wire 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

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

• 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

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, wire color 1
D U	PVC sheath, orange,-20~105℃, end scattered, wire color 2
D B	PVC sheath, orange,-20-105C, end scattered, wire 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 SSI 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

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.