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

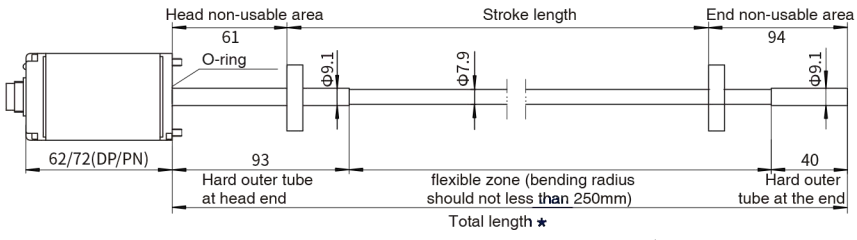
Input voltage	+24Vdc±20%
operating current	＜90mA（ varying with range）
Polarity protection	Max.-30Vdc
Overvoltage protection	Max.36Vdc
Insulation resistance	＞10MΩ
Insulation strength	500V

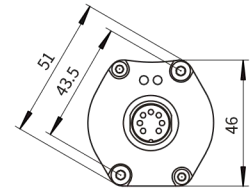
◦ Structure and materials

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

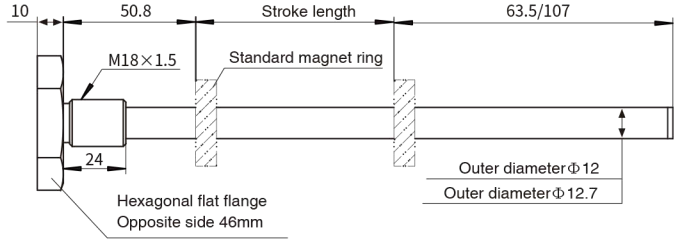
Aa Installation and Use Instructions

● Dimensions of RF flexible outer tube sensor





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



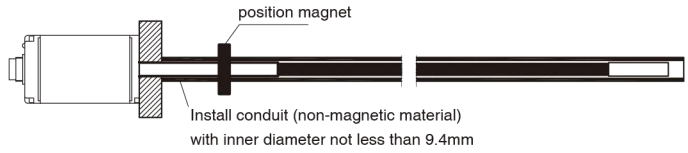
Option: Pressure-resistant outer pipe with flange, outer diameter 12mm/12.7mm

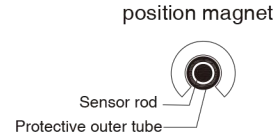
The flanged pressure-resistant outer pipe is used to cooperate with RF flexible sensor, which can withstand 35MPa pressure for hydraulic cylinder and provide protection for RF sensor. For large Cylinder, it is necessary to drill a ϕ18mm deep hole in the piston rod when selecting the pressure pipe with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

● Installation instruction of RF flexible outer tube sensor

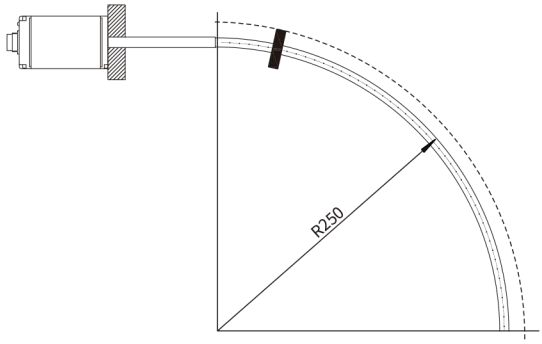
Two non-magnetic bolts are required for the installation of the sensor electronic bin. Long-stroke sensors need non-magnetic tube support (inner diameter ≥ 9.4), or bend into the desired shape. Sensors with hexagonal flanges can be easily mounted using non-magnetic bolts. Or you can choose a flanged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

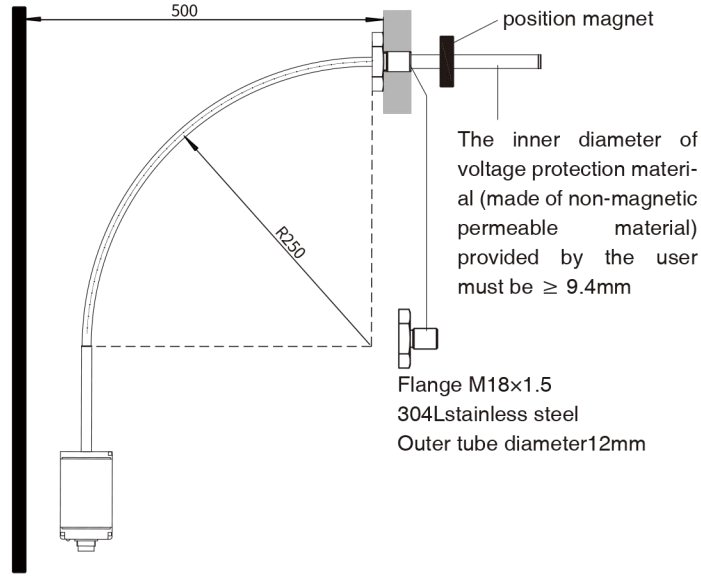
Linear measurement (external installation)





Arc measurement (external installation)





X x 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			

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

● 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

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
S B	61mm+94mm

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

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
S B	61mm+94mm

X x 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

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
S B	61mm+94mm

X x 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

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℃~85C (cable length, unit: meters)
D B * *	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)
P D 5 6	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

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

S 0	50.8mm+63.5mm
S 9	**50.8mm+107mm**
S B	**61mm+94mm**

X x 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

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
S B	61mm+94mm

X x 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

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)
P B 8 0	M16 male connector (8-pin)

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
S B	61mm+94mm

X x 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

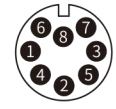
SSI

• 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



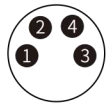
• Pin arrangement of eight-pin male connector (facing the sensor head direction)

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

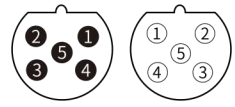


Four-pin connector socket (for power supply)

• 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

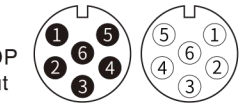


• Five-pin male connector and female connector pin arrangement (facing the sensor head direction)

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)

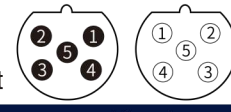
* Only applicable to signal connection of sensor female connector

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)

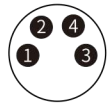
CAN bus output



• 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)

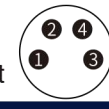
Pin	Line color	Pin/wire function definition
1	Yellow	Tx +
2	White	Rx +
3	Orange	Tx -
4	Blue	Rx -

- 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 

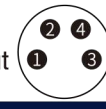
• Connector Connection Mode (Interface 1, 2)

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℃