

Magnetostrictive Displacement Sensor

M Series Product manual

Honorary Qualification





MHA Displacement Sensor

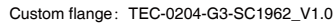


Technical characteristics

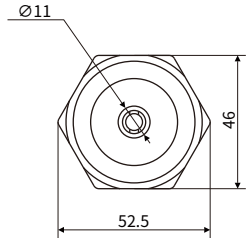
- Non-contact measurement
- Linear measurement, absolute position output
- Adapt to harsh environment, IP67 protection level
- Multiple signal (analog and digital signal) output modes
- Specially designed for construction machinery
- High vibration resistance and impact resistance
- Low power consumption design effectively reduces system heating
- Quick assembly through external threads

Structural Shape

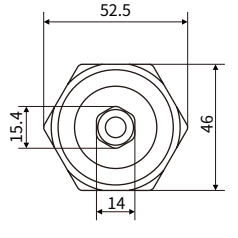
External dimensions of cable outlet (fastening mode DE)



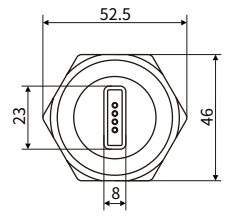
External dimensions of cable outlet (fastening method QM)



External dimensions of cable outlet (fastening mode DM)

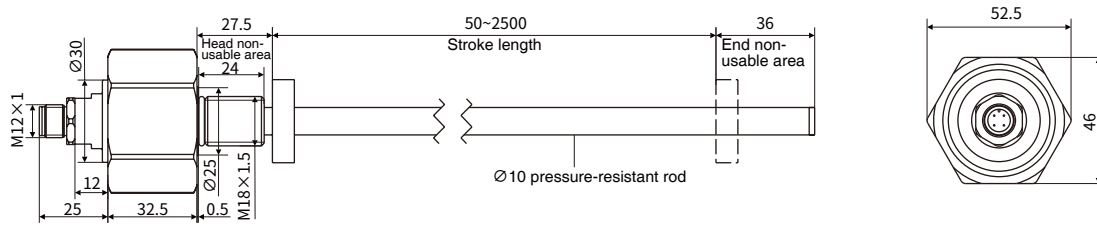


Connector external dimensions (standard type)



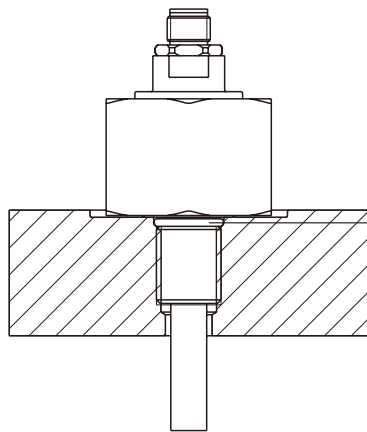
Structural Shape

Connector external dimensions (customized type)



Assembly mode

To seal the flange contact surface by assembling 15.4x2.1 mmO rings in the cut, threaded holes conforming to ISO6149-1 standard must be provided.



• Seal by O-ring in flange cut

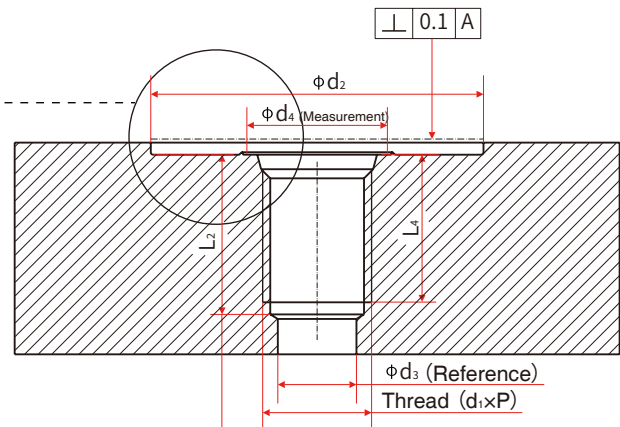
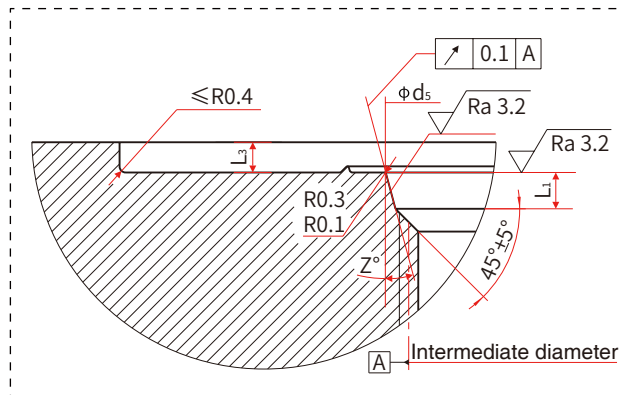
Note::

- 1.The fastening torque is50Nm;
- 2.The flange contact surface must be located on the Cylinder assembly surface as a whole;
- 3.The positioning magnet should not contact with the sensor measuring rod;
- 4.Do not exceed the peak pressure of equipment;
- 5.Protect the stell rod from wear.

Threaded holes conforming to ISO6149-1 (for pressure-resistant rods with a diameter of 10mm)

unit: mm

Thread (d1 xP)	d ₂	d ₃	d ₄	d ₅	L ₁	L ₂	L ₃	L ₄	Z°
M18x1.5	55	13	24.5	19.8	2.4	28.5	2	14.5	15°

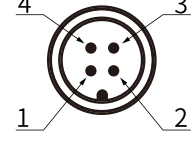


This size is suitable for blind holes

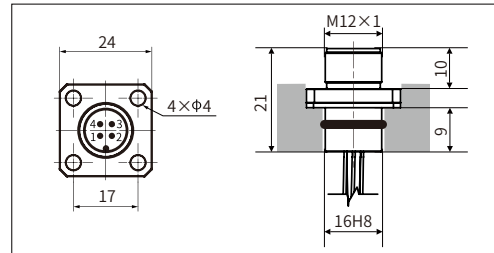
MHA-Analog Output

Electrical connections

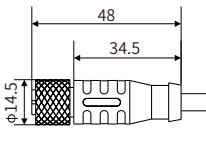
• Analog (connector)

M12-4Pin Definition	No.	PA	PB	PC
	1	Power supply	Do not connect	Power supply
	2	Signal	Power supply	Do not connect
	3	Ground	Ground	Ground
	4	Do not connect	Signal	Signal

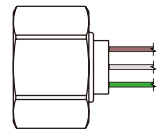
• M12-4 pin socket



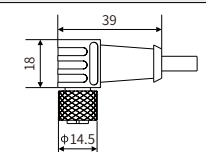
• Analog output (line color definition of female connector)

M12-5 pin female connector		Line color		
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black

• Analog output (scattered output)

Scattered output	PT	
	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green

• Analog output (line color definition of right angle female connector)

M12-5pin right angle female connector		Line color		
	Definition	PA	PB	PC
	Power supply	Brown	White	Brown
	Ground	Blue	Blue	Blue
	Signal	White	Black	Black

• Analog output (cable outlet)

Cable code:511806	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Green
Cable code:511809	Definition	Line color
	Power supply	Brown
	Ground	White
	Signal	Blue

▶ Product Parameters-Analog Output

• Input

Measurement data	Position (Vernier magnet)
Stroke length	50~2500 mm

• Output

Current	4 ~ 20mA (load resistance $\leq 250\Omega$)
Voltage	0.5 ~ 4.5Vdc or 0.25~4.75Vdc (load resistance $\geq 10K\Omega$)
Resolution	$\pm 0.1\text{mm}$ (range $< 500\text{mm}$) $\text{range} \div 4096$ (range $> 500\text{mm}$)
Nonlinearity	$\pm 0.1\text{mm}$ ($\leq 250\text{mm}$) or 0.04%F.S ($> 250\text{mm}$)
Repetition accuracy	$\pm 0.1\text{mm}$
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40℃ ~ +105℃
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	$< 30\text{ppm}/^\circ\text{C}$
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 25g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference, Grade 3, Class A GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference, Grade 3, Class A GB/T17626.4 Electric Fast Transient Pulse Group Anti-interference, Grade 3, Class B GB/T17626.5 Surge (Impact) Anti-interference, Grade 3, Class B GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference, Grade 3, Class A GB/T17626.8 Power Frequency Magnetic Field Anti-interference, Grade 4, Class A

• Electrical connections

Input voltage	9~ 32Vdc
Power consumption	$< 1\text{W}$
Polarity protection	Maximum-30Vdc
Overvoltage protection	Maximum36Vdc
Insulation resistance	$> 10M\Omega$
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304Lstainless steel
Measuring rod	304Lstainless steel
Operating pressure grade	Rated pressure Pn: 35MPa maximum pressure Pmax: 45MPa for stell rod with diameter of 10mm
Assembly	Any direction
Position magnet	Various ring magnets

▶ Selection Guide-Analog Output

M	H	A	-	M					-	S									-									-	M	
01	02	03		04	05	06	07	08		09	10		11	12	13	14		15	16	17		18	19							

01 - 03 Sensor shell form

M	H	A
---	---	---

Hexagon flange shell

04 - 08 Measuring range

0050~2500 mm, step length 1mm

09 - 10 Mounting thread form

S	A
---	---

Standard flange, pressure-resistant rod, diameter 10mm

S	B
---	---

Custom flange: TEC-0204-G3-SC1962_V1.0, pressure-resistant rod, diameter 10mm

11 - 14 Connection form

P	A	0	0
---	---	---	---

Custom, M12 IP69K, 4 pins (1-3-2)

P	A		
---	---	--	--

3 wires, M12 IP69K, 4 pins (1-3-2)

P	A	0	6
---	---	---	---

60mm, minimum length of wiring harness

P	A	2	5
---	---	---	---

250mm, maximum length of wiring harness

P	B	0	0
---	---	---	---

Custom, M12 IP69K, 4 pins (2-3-4)

P	B		
---	---	--	--

3 wires, M12 IP69K, 4 pins (2-3-4)

P	B	0	6
---	---	---	---

60mm, minimum length of wiring harness

P	B	2	5
---	---	---	---

250mm, maximum length of wiring harness

P	C	0	0
---	---	---	---

Custom, M12 IP69K, 4 pins (1-3-4)

P	C		
---	---	--	--

3 wires, M12 IP69K, 4 pins (1-3-4)

P	C	0	6
---	---	---	---

60mm, minimum length of wiring harness

P	C	2	5
---	---	---	---

250mm, maximum length of wiring harness

P	T		
---	---	--	--

3 scattered, brown-white-green

P	T	0	6
---	---	---	---

60mm, minimum length of wiring harness

P	T	2	5
---	---	---	---

250mm, maximum length of wiring harness

Q	M		
---	---	--	--

3-pin cable outlet (internal thread fastening)

Q	M	0	1
---	---	---	---

1m cable

Q	M	R	1
---	---	---	---

0.1m cable, ordering method within 1 m

D	E		
---	---	--	--

3-pin cable outlet (511809 cable is used)

D	E	0	1
---	---	---	---

1m cable

D	E	R	1
---	---	---	---

0.1m cable, ordering method within 1 m

D	M		
---	---	--	--

3-pin cable outlet

D	M	0	1
---	---	---	---

1m cable

D	M	R	1
---	---	---	---

0.1m cable, ordering method within 1 m

15 - 17 Signal output mode

A	0	1
---	---	---

Current output, 4~20mA

A	1	1
---	---	---

Current output, 20~4mA

V	0	1
---	---	---

Voltage output, 0.5~4.5V

V	1	1
---	---	---

Voltage output, 4.5~0.5V

V	0	2
---	---	---

Voltage output, 0.25~4.75V

V	1	2
---	---	---

Voltage output, 4.75~0.25V

V	0	3
---	---	---

Voltage output, 0~10V

V	1	3
---	---	---

Voltage output, 10~0V

18 - 19 Non-usable area at head and end, customizable

M	2
---	---

27.5mm+36mm

M	3
---	---

50mm+60mm

● Selection example

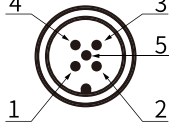
For example: MHA-M0300-SA-PA08-A01-M2

Indicates: MHA structure hexagonal flange shell, 300mm stroke length, 10mm diameter pressure-resistant rod, M12 connector 4-pin male connector, current output of 4~20mA, non-usable area at head and end of 27.5mm +36mm.

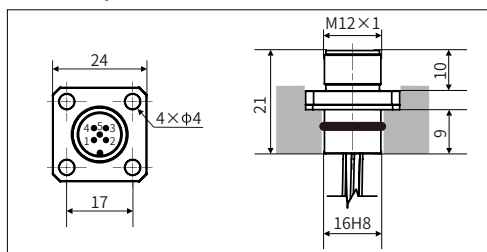
MHA-CANopen Output

Electrical connections

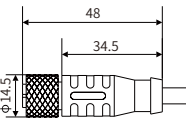
• CAN (connector)

M12-5 Pin Definition	No.	PC
	1	Do not connect
	2	Power supply
	3	Ground
	4	CAN High
	5	CAN Low

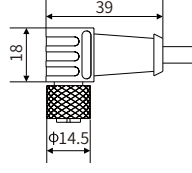
• M12-5 pin socket



• CAN (line color definition of female connector)

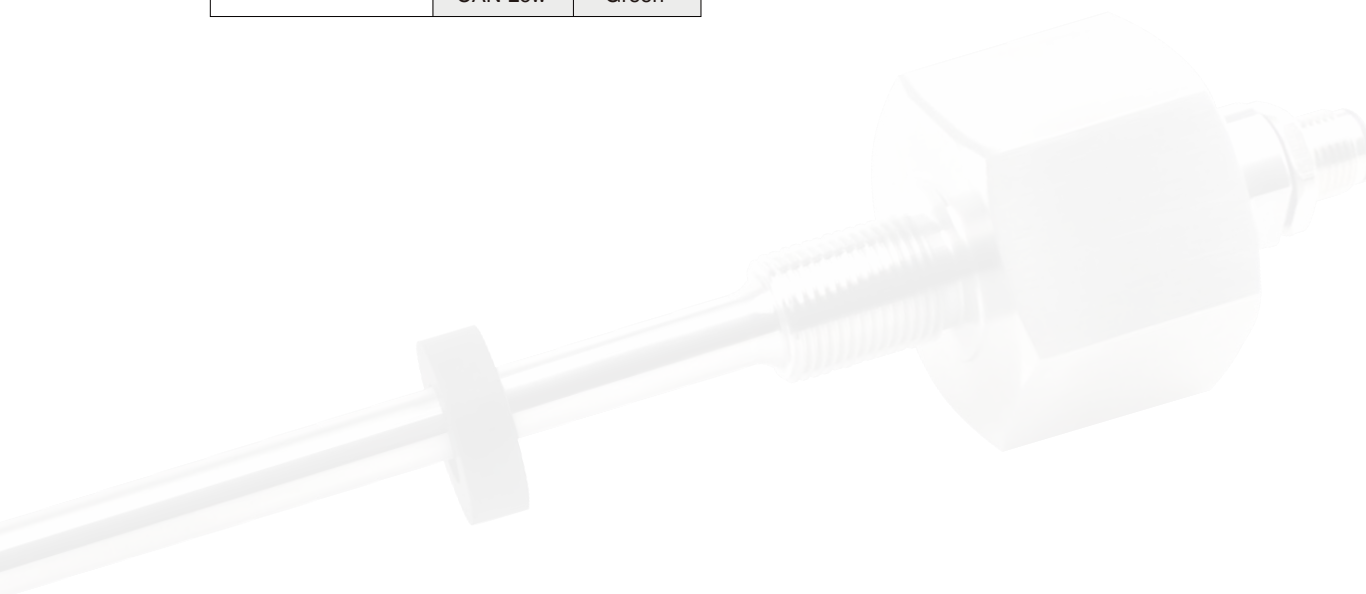
M12-5 pin female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

• CAN (line color definition of right angle female connector)

M12-5pin right angle female connector	Line color	
	Definition	PC
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green

• CAN (cable outlet)

Cable code:511816	Definition	Line color
	Power supply	Brown
	Ground	White
	CAN High	Yellow
	CAN Low	Green



🔍 Product Parameters-CANopen Output

• Input

Measurement data	Position (vernier magnet)
Stroke length	50~2500 mm

• Output

Interface	CANbus ISO DIS 11898, CANopen complies with CIA DS-301V3.0, Sensor Specification DS-406V3.1
Transmission speed	maximum 1Mbit/s
Resolution	±0.1mm
Nonlinearity	±0.1mm (≤250mm) or 0.04%F.S (>250mm)
Repetition accuracy	±0.1mm
Update time	2ms

• Operating conditions

Magnet velocity	Arbitrary
Protection level	IP67
Operating temperature	-40°C ~ +105°C
Humidity/dew point	Humidity 90%, no condensation
Temperature drift coefficient	<30ppm/°C
Shock index	GB/T2423.5 100g (11ms)
Vibration index	GB/T2423.10 25g/10~2000Hz
EMC test	GB/T17626.2 Electrostatic Discharge Anti-interference, Grade 3, Class A
	GB/T17626.3 Radio Frequency Electromagnetic Field Radiation Anti-interference, Grade 3, Class A
	GB/T17626.4 Electric Fast Transient Group Anti-interference, Grade 3, Class B
	GB/T17626.6 Radio Frequency Field Induced Conducted Disturbance Anti-interference, Grade 3, Class A
	GB/T17626.8 Power Frequency Magnetic Field Anti-interference, Grade 4, Class A

• Electrical connections

Input voltage	9~ 32Vdc
Power consumption	<1W
Polarity protection	maximum-30Vdc
Overvoltage protection	maximum36Vdc
Insulation resistance	>10MΩ
Insulation strength	500V
Outgoing mode	Cable outlet or connector

• Construction and materials

Electronic compartment	304Lstainless steel
Measuring rod	304Lstainless steel
Operating pressure grade	Rated pressure Pn: 35MPa maximum pressure Pmax: 45MPa for stell rod with diameter of 10mm
Assembly	Any direction
Position magnet	Various ring magnets

🔍 Selection Guide-CANopen Output

MHA - M - S - - C1 - M

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21

01 - 03				Sensor shell form							
M	H	A		Hexagon flange shell							
04 - 08				Measuring range							
				0050~2500mm , step length 1mm							
09 - 10				Mounting thread form							
S	A			Pressure-resistant rod, diameter 10mm							
11 - 14				Connection form							
P	C	0	0	Custom, M12 IP69K, 5 pins (2-3-4-5)							
P	C			4 wiring harness, M12 IP69K, 5 pins (2-3-4-5)							
P	C	0	6	60mm , minimum length of wiring harness							
P	C	2	5	250mm , maximum length of wiring harness							
D	M			CAN special cable outlet							
D	M	0	1	1m cable							
D	M	R	1	0.1m cable, ordering method within 1 m							
15 - 19				Signal output mode							
15 - 16				Output form							
C	1			CANopen							
17				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					
18				Resolution							
1		0.1mm									
19				Number of magnet rings							
1		Single magnet ring									
20 - 21				Non-usable area at head and end, customizable							
M	2			27.5mm+36mm							

● Selection example

For example: MHA-M0300-SA-DM50-C1411-M2

Indicates: MHA structure hexagonal flange shell, 300mm stroke length, 10mm diameter withstand voltage round pipe, cable outlet form, CANopen output, baud 250kbit/s, resolution 0.1 mm, single magnet ring, head and end non-usable area 27.5mm + 36mm.