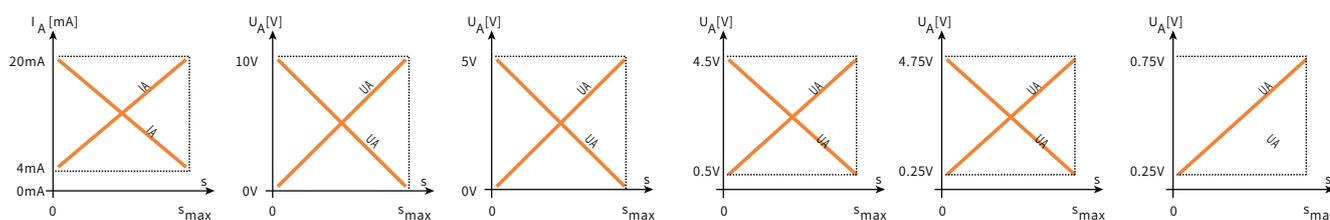




# MH- Analog

## MH-pressure resistant outer tube



- + High resistance to vibration and shock.
- + Compact design: suitable for applications with strict space requirements for the installation of electronics housing, extensive applications in construction machinery.
- + Robust: fully enclosed design with maximum IP69K protection.
- + Linear measurement: absolute value output without zeroing.
- + Easy to use: standard signal output, maintenance-free.
- + Maximum durability: continuous non-contact measurement.
- + Fully adjustable: 100% adjustable zero point and full scale.



**MAGNETOSTRICTIVE SENSOR**

Document Number:

MH-A(V1.7)-EN

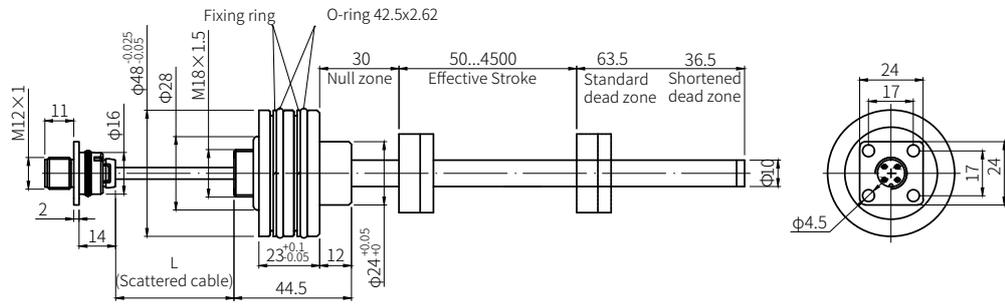
## TECHNICAL PARAMETER

<b>Input</b>									
Measured data	Position								
Measurement range	50...4500mm								
<b>Output</b>									
Voltage	0...10VDC, 10...0VDC, 0...5VDC, 5...0VDC, 0.25...0.75VDC, 0.5...4.5VDC, 0.25...4.75VDC, 4.75...0.25VDC, 4.5...0.5VDC (Controller min. load impedance >5KΩ)								
Current	4...20mA, 20...4mA (min./max. load: 0/750Ω)								
<b>Resolution</b>									
Position resolution	16 bit D/A								
None-Linearity	<±0.04%F.S. (min. 0.1mm)								
Repeatability	< ±0.005%F.S								
Update time	<table border="1"> <tr> <td>Stroke length</td> <td>≤ 1200mm</td> <td>≤ 2400mm</td> <td>≤ 4500mm</td> </tr> <tr> <td>Update time</td> <td>0.5ms</td> <td>1ms</td> <td>2ms</td> </tr> </table>	Stroke length	≤ 1200mm	≤ 2400mm	≤ 4500mm	Update time	0.5ms	1ms	2ms
Stroke length	≤ 1200mm	≤ 2400mm	≤ 4500mm						
Update time	0.5ms	1ms	2ms						
Temperature coefficient	< 30ppm/°C								
<b>Mounting</b>									
Mounting position	Any								
Mounting	Extrusion mounting								
<b>Design/Material</b>									
Electronics housing	Stainless steel 304								
Measuring rod	Stainless steel 304、 316L								
Magnet	Standard magnet								
<b>Electrical connection</b>									
Wiring connection	Straight out cable, aviation plug								
Operating voltage	12/24VDC (tolerance range 10...36VDC)								
Polarity protection	Up to -36VDC								
Overvoltage protection	Up to +36VDC								
Power consumption	< 50mA (varies with range size)								
Dielectric strength	500 VDC (DC ground to machine ground)								
<b>Operating conditions</b>									
Magnet velocity	Any								
Operating temperature	-40... 105°C (customizable)								
Humidity	90 % relative humidity, no condensation								
Operating pressure ratings	Φ10 measuring rod : 35MPa (continuous) , 70MPa (peak) Φ7 measuring rod : 30MPa (continuous) , 45MPa (peak)								
Ingress protection	IP68 / IP69K (Straight out cable )								
Shock	100 g/6 ms, IEC standard 60068-2-27								
Vibration	IEC standerd 60068-2-64 Φ10 rod: 20 g ( root-mean-square value)10...2000 Hz (resonant frequencies excluded) Φ7 rod: 15 g ( root-mean-square value)10...2000 Hz (resonant frequencies excluded)								
EMC	Compliant with: ISO 14982: Agricultural and Forestry Machinery ISO 16750-2: Road vehicles								
	<table border="1"> <tr> <td>Anti-interference</td> <td>ISO 11452-2 (200V/m Antenna) ISO 11452-4 (200mA BCI)</td> </tr> <tr> <td>Transient pulse</td> <td>ISO 7637-1/2</td> </tr> <tr> <td>E.S.D.</td> <td>ISO/TR 10605</td> </tr> </table>	Anti-interference	ISO 11452-2 (200V/m Antenna) ISO 11452-4 (200mA BCI)	Transient pulse	ISO 7637-1/2	E.S.D.	ISO/TR 10605		
Anti-interference	ISO 11452-2 (200V/m Antenna) ISO 11452-4 (200mA BCI)								
Transient pulse	ISO 7637-1/2								
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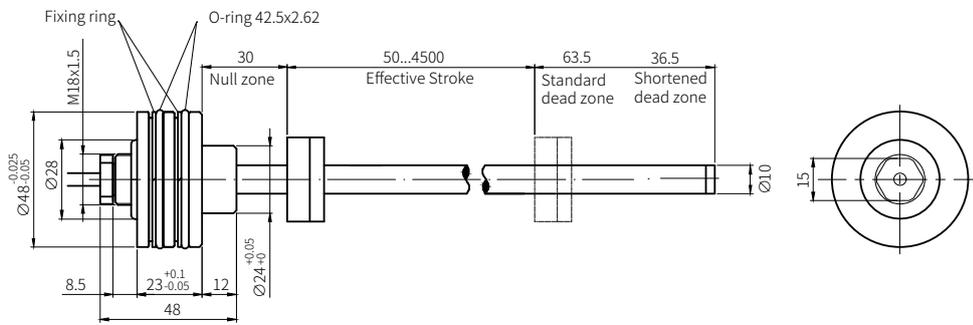
# TECHNICAL DRAWING

## Basic type

Basic type with aviation plug

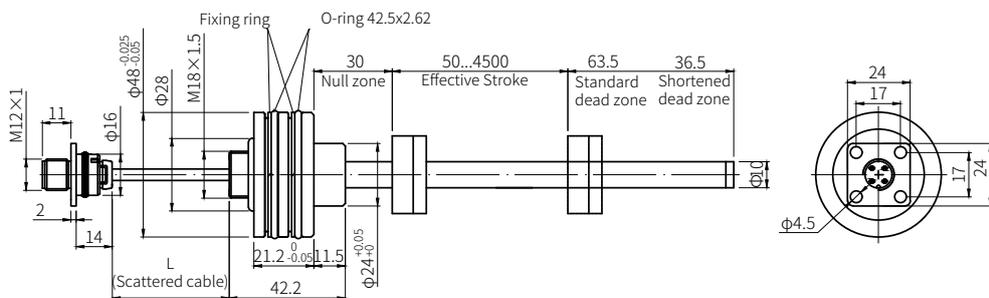


Basic type with straight-out cable

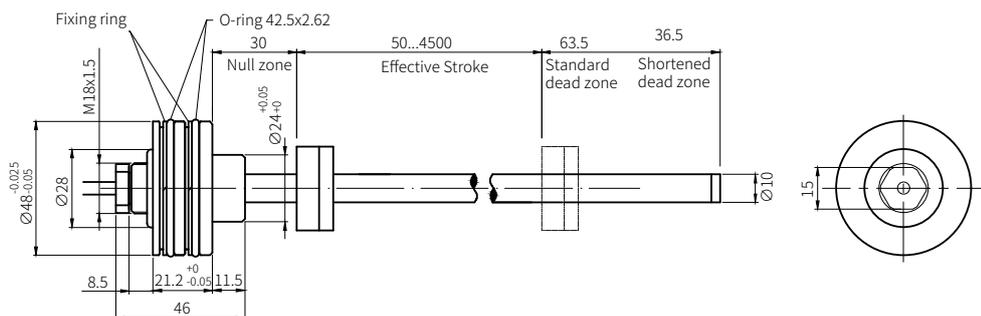


## Customized type

Customized type with aviation plug

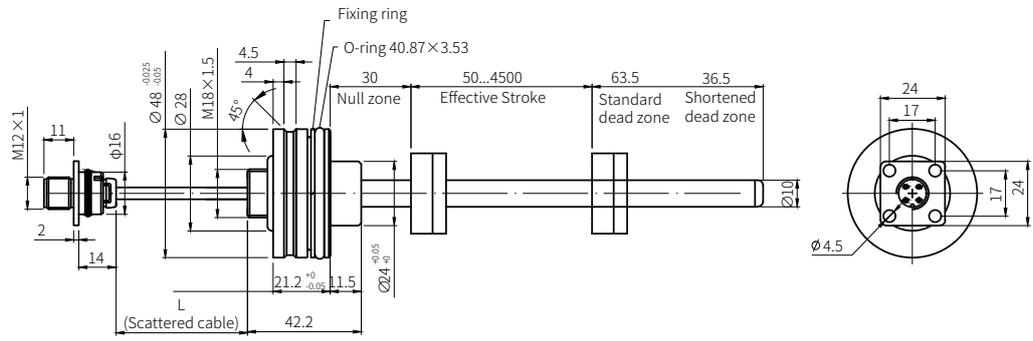


Customized type with straight-out cable

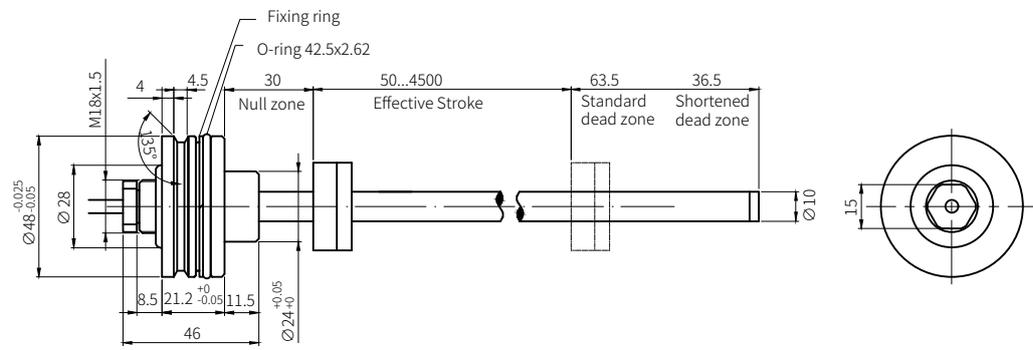


## Thimble type

Thimble type with aviation plug



Thimble type with straight-out cable



For selection of supporting magnetic rings and non-permeable gaskets, please refer to the attachment for details.



Magnetic ring

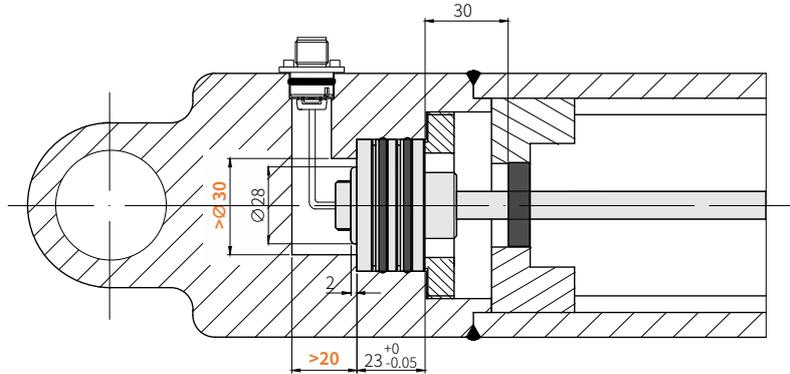


Non-permeable gasket

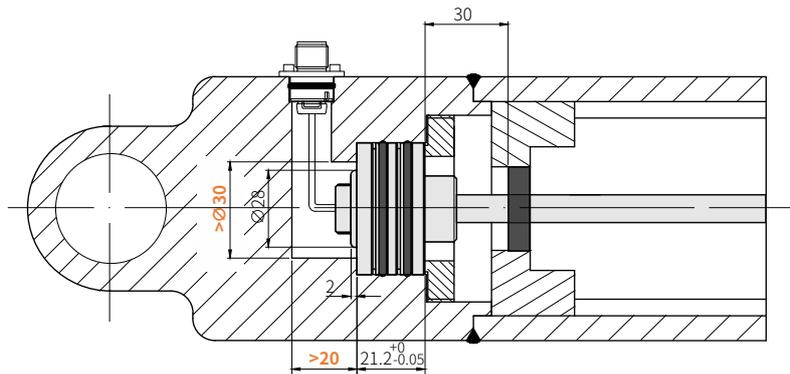
# MECHANICAL MOUNTING DIAGRAM

- + Secure the magnet with non-permeable gasket.
- + The size of hole in the piston rod depends on factors such as hydraulic pressure and piston speed. The minimum hole size is  $\Phi 10$  ( $\Phi 7$  measuring rods) or  $\Phi 13.5$  ( $\Phi 10$  measuring rods).
- + The top mounting hole of the cylinder is greater than 30mm in diameter and 20mm in depth.
- + The thimble is made of flat head top wire, and the force distance is  $< 0.5\text{N}\cdot\text{m}$ .

## Basic type

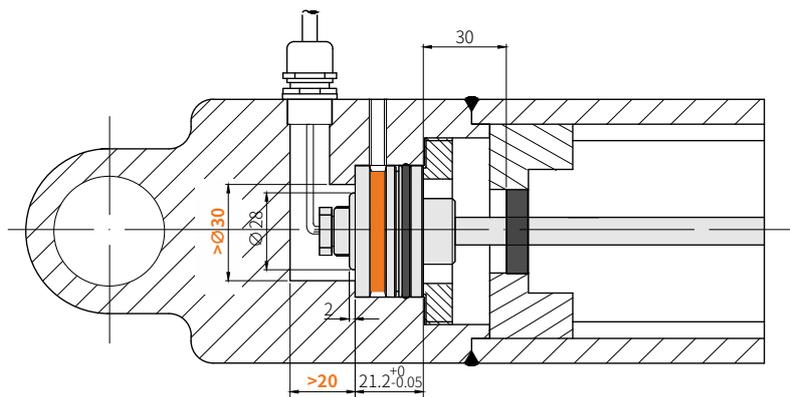
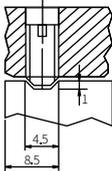


## Customized type



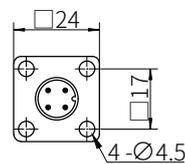
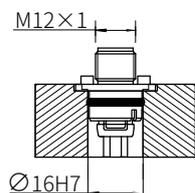
## Thimble type

e.g. retaining with set screw DIN913  
M5x10 (with flat point!)  
max. torque 0.5Nm



## M12 connector

3 single lines,  $0.5\text{mm}^2$



# Wiring

## DG (1-3-4)wiring

## 4 pin M12 connector

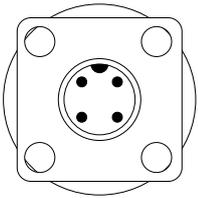


View on sensor

PIN	Color	Function
1	Brown	9...36VDC
2	-	NC
3	White	GND
4	Gray	Signal output

## DH (1-2-3)wiring

## 4 pin M12 connector



View on sensor

PIN	Color	Function
1	Brown	9...36VDC
2	Green	Signal output
3	White	GND
4	-	NC

## DE (2-3-4)wiring

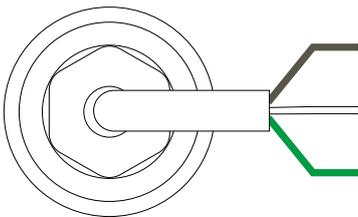
## 4 pin M12 connector



View on sensor

PIN	Color	Function
1	-	NC
2	Green	9...36VDC
3	White	GND
4	Gray	Signal output

## Straight out cable



Color	Function
Brown	9...36VDC
White	GND
Green	Signal output

# ORDER CODE

M H - - - M - - - - -

**MH pressure resistance exterior rod**

- D** Basic type, aviation plug
- B** Basic type, straight-out cable
- R** Customized type, straight-out cable
- G** Customized type, aviation plug
- N** Thimble type, straight-out cable
- K** Thimble type, aviation plug

**Rod**

- C** Rod Φ10mm (dead zone 63.5mm)
- D** Rod Φ7mm (dead zone 63.5mm)
- E** Rod Φ10mm (shortened dead zone 36.5mm)
- F** Rod Φ7mm (shortened dead zone 36.5mm)
- R** Rod Φ10mm with M4x6 thread (dead zone 63.5mm)

**Stroke \_ \_ \_ M**

M=mm (5mm increments)

**Connection type**

Fill: [1] [2] [3] [4] [5]

**[1] and [2]: Cable connection**

- R** straight-out cable
- DG** 4 pin aviation plug, M12 (Pin definition 1-3-4)
- DH** 4 pin aviation plug, M12 (Pin definition 1-2-3)
- DE** 4 pin aviation plug, M12 (Pin definition 2-3-4)

**[3]: Cable performance**

- P** high performance cable
- T** high temperature cable

**[4] and [5]: Cable length**

- unit: meter
- Fill in zero if less than 2 places
- unit: 10millimetre
- for DG/DH/DE

**Power**

- 1** +24VDC
- 2** +12VDC

**This item is not specified, and the default power supply is 24VDC**

**Output signal mode**

Fill: [1] [2] [3]

**[1] and [2] : Output type and direction**

- A0** 4...20mA (forward)
- A1** 20...4mA (reverse)
- V0** 0...10V (forward)
- V1** 10...0V (reverse)
- V2** 0...5V (forward)
- V3** 5...0V (reverse)
- V4** 0.25...0.75V (forward)
- V5** 0.5...4.5V (forward)
- V6** 0.25...4.75V (forward)
- V7** 4.75...0.25V (reverse)
- V8** 4.5~0.5V (reverse)

**[3] Ring number**

- 1** one magnet ring
- 2** two or more magnet rings

**K=Anti-vibration program (Note: for special request, fill in last digit)**

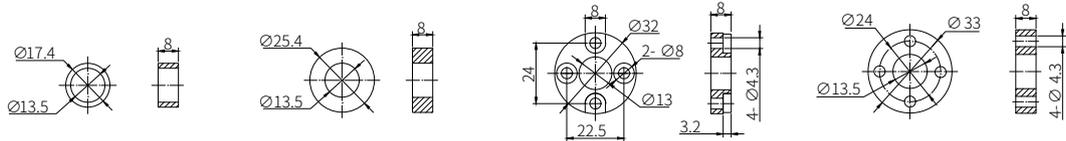
**Model** | Model: MHR-C-0600M-RP05-A01

Explanation: MH series straight out cable customized (electronics housing thickness 21.2mm) displacement transducer, measuring rod diameter 10mm, range 600mm, 5m high performance cable, 4 to 20mA current output (forward), single magnetic ring.

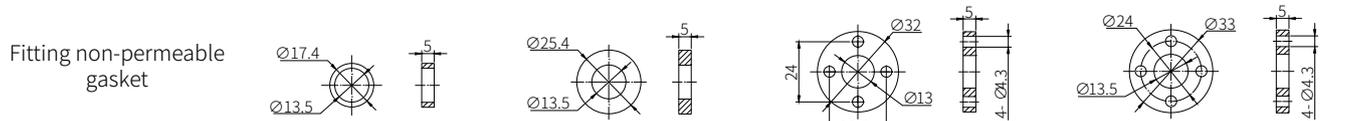


# ACCESSORIES

## Analog



Name	Ring magnet	Ring magnet	Ring magnet	Ring magnet
Operating temperature	-40...125°C			
<b>Order code</b>	<b>12-1032</b>	<b>12-1019</b>	<b>12-1024</b>	<b>12-1001</b>



Name	Non-permeable gasket	Non-permeable gasket	Non-permeable gasket	Non-permeable gasket
Operating temperature	-40...125°C			
<b>Order code</b>	<b>12-1037</b>	<b>12-1021</b>	<b>12-1025</b>	<b>12-1008</b>



Connector	5 pin M12 female connector	5 pin female connector (90 degree angle)
Name	Integral cable	Integral cable
Cable	5 wire 0.25mm <sup>2</sup> shielded cable	5 wire 0.25mm <sup>2</sup> shielded cable
Color/Diameter	Orange/ Ø 6	Orange/ Ø 6
Plug surface	 <ul style="list-style-type: none"> <li>1-Brown</li> <li>2-Green</li> <li>3-White</li> <li>4-Gray</li> <li>5-Yellow</li> </ul>	 <ul style="list-style-type: none"> <li>1-Brown</li> <li>2-Green</li> <li>3-White</li> <li>4-Gray</li> <li>5-Yellow</li> </ul>
Length	5...30M	5/10/15/20/30M
<b>Order code</b>	<b>16-1035</b>	<b>16-1040</b>

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