

# Temposonics®

Magnetostrictive Linear Position Sensors

## DATA SHEET MXR Analog

- External mounting for new or retrofit designs
- Rugged, up to 100 g shock and 15 g vibration levels
- Flexible, capability to measure a range from 100 to 600 mm



## Product overview

The MH-Series Model MXR sensor is available in two versions. The MXRC and the MXRS. Although the two versions are similar in both appearance and performance, there are unique features distinguishing the two sensors from one another. The MXRC is available in four discrete stroke lengths up to 250 mm, while the MXRS is available in stroke lengths up to 600 mm (50 mm ordering increments). The MXRC works with a 5 VDC operating voltage, and provides a voltage output that is ratiometric to the operating voltage. The MXRS can work with an operating voltage of either 12 or 24 VDC, and has multiple analog output options available.

## Technical data

	MXRS	MXRC
<b>Input</b>		
Measured value	Linear Position measurement	Linear Position measurement
Stroke length	100...500 mm	109.5 mm, 148.0 mm, 217.3 mm, and 250.1 mm
<b>Output</b>		
Voltage	0.25...4.75 VDC, 0.5...4.5 VDC	0.1...4.9 VDC at +5 VDC supply, ratiometric with V supply
Current	4...20 mA	–
<b>Accuracy</b>		
Resolution	±0.10 mm	±0.10 mm
Linearity	< ±0.04 % F.S.	±0.3 mm
Repeatability	< ±0.1 mm	< ±0.1 mm
Hysteresis	±0.1 mm	±0.1 mm
<b>Operating conditions</b>		
Operating temperature	–40...+105 °C	–40...+75 °C
Storage temperature	–30...+105 °C	–20...+85 °C
Humidity	90% relative humidity, no condensation	90% relative humidity, no condensation
Ingress protection	IP69K with M12 approved connector	IP69K with M12 approved connector
Shock test*	100 g (single hit) / IEC standard 68-2-27 (survivability)	5 g (single hit) / IEC standard 68-2-27 (survivability)
Vibration test*	15 g / 10...2000 Hz / IEC standard 68-2-6	1 g / 10...150 Hz / IEC standard 68-2-6
EMC test	ISO 14982 100 V/m (radiated immunity)	Emmissions: EN61000-6-4 Immunity: EN61000-6-2
<b>Design/Material</b>		
Sensor electronics housing	Stainless steel 1.4305 / AISI 303	Stainless steel 1.4305 / AISI 303
Sensor rod with flange	Stainless steel 1.4306 / AISI 304L	Stainless steel 1.4306 / AISI 304L
<b>Installation</b>		
Mounting	Threaded M10×1.5 stud Optional Ball Joint or Spherical Rod End	Threaded M10×1.5 stud Optional Ball Joint or Spherical Rod End
<b>Electrical connection</b>		
Connection type	M12 connector (male)	M12 connector (male)
Electrical isolation	500 VDC (DC ground to machine ground)	500 VDC (DC ground to machine ground)
Operating voltage	12/24 VDC (8...32 VDC)	5 VDC (4.75...5.5 VDC)
Current consumption	Typical ≤ 80 mA (12 VDC); Typical ≤ 40 mA (24 VDC)	Typical ≤ 40 mA (5 VDC)
Polarity protection	Up to –36 VDC	VDC to GND
Overvoltage protection	Up to 36 VDC	Up to 20 VDC

\* The vibration and shock rating is stated for a fully retracted sensor.  
The rating for full or partially extended sensor depends on the application

## Model MXR sensor dimension references

### Model MXR (rod retracted)

Drawing is for reference only, contact applications engineering for tolerance specific information.

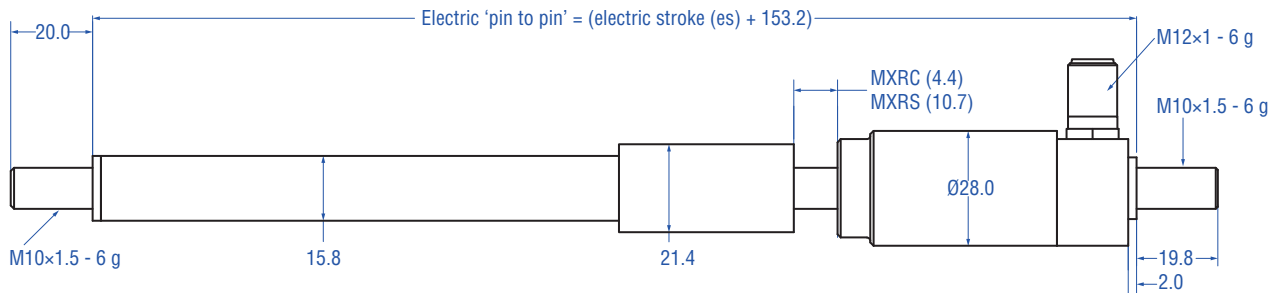


Figure 1. MH-Series Model MXR sensor dimension reference (Model MXRS shown)

### Model MXR (rod extended)

Drawing is for reference only, contact applications engineering for tolerance specific information.

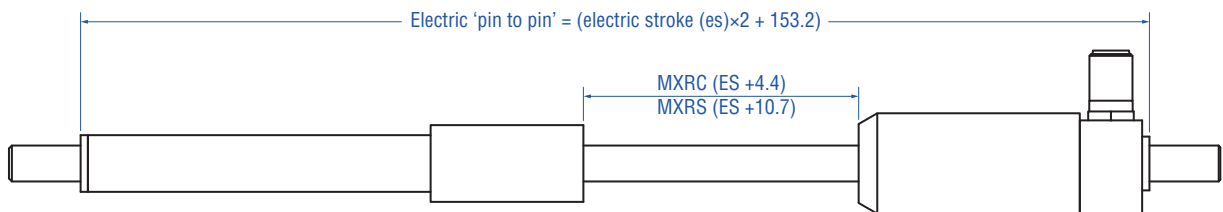


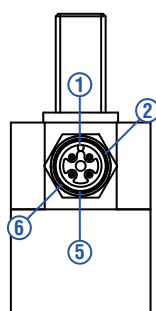
Figure 2. MH-Series Model MXR sensor dimension reference (Model MXRC shown)

## Connections and wiring

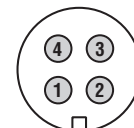
### Connection Type

The Temposonics® M12 integrated connector (shown in Figure 3), meets the most stringent protection requirements important for the difficult environmental conditions of mobile hydraulics applications. Protection type IP69K makes the robust metal housing not only completely dust and waterproof, even the harshest cleaning measures cannot damage the sensor.

#### M12x1 key orientation



#### Connector PIN Assignment Reference



Integrated connector (male) as viewed when looking at the sensor

Standard	Integrated connector	Pin assignment and function
N_E	4-pin M12x1	2-3-4; Power, ground, output
N_G	4-pin M12x1	1-3-4; Power, ground, output
N_H	4-pin M12x1	1-3-2; Power, ground, output

Figure 3. M12x1 connector key orientation

Table 1. PIN assignments

## Model MXRS ordering information

Use the table below to configure your sensor part number.



<b>SENSOR MODEL</b>	_____	=	<b>M</b> <b>X</b> <b>R</b>	<b>1-3</b>
<b>MXR</b>	= Externally mounted sensor with self-contained housing			
<b>SENSOR STYLES</b>	_____	=	<b>S</b>	<b>4</b>
<b>S</b>	= Version S Electronics			
<b>STROKE LENGTH (ORDER LENGTH)</b>	_____	=	<b>M</b>	<b>5-8</b>
<b>M</b>	= Millimeters 100...500 mm in 50 mm increments			
<b>CONNECTION TYPE</b>	_____	=	<b>N</b>	<b>9-11</b>
<b>N</b>	= <b>Integrated:</b> N = Integrated M12×1 connector			
	<b>Key orientations (See Figure 3) (90° M12 connector plugged):</b>			
<b>1</b>	= Connector key at 0°	<b>5</b>	= Connector key at 180°	
<b>2</b>	= Connector key at 45°	<b>6</b>	= Connector key at 225°	
	<b>Termination type and pin assignment (See Table 1):</b>			
<b>N_E</b>	= M12×1, IP69K, 4 pin (pin assignment 2-3-4)			
<b>N_G</b>	= M12×1, IP69K, 4 pin (pin assignment 1-3-4)			
<b>N_H</b>	= M12×1, IP69K, 4 pin (pin assignment 1-3-2)			
<b>MOUNTING HARDWARE</b>	_____	=		<b>12</b>
<b>A</b>	= No Additional Hardware			
<b>B</b>	= 2 × Ball Joint Ends with 2 × M10 Hex Nuts			
<b>C</b>	= 2 × Spherical Ball Ends with 2 × M10 Hex Nuts			
<b>INPUT VOLTAGE</b>	_____	=	<b>3</b>	<b>13</b>
<b>3</b>	= +12/24 VDC			
<b>OUTPUT</b>	_____	=		<b>14-16</b>
	<b>Voltage:</b>			
<b>V11</b>	= 0.25...4.75 VDC			
<b>V12</b>	= 0.5...4.5 VDC			
	<b>Current:</b>			
<b>A01</b>	= 4...20 mA			

## Model MXRC ordering information

Use the table below to configure your sensor part number.

M	X	R	C				M	N				5	V	C	1
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

**SENSOR MODEL** \_\_\_\_\_ = 

M	X	R
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**1-3**  
**MXR** = Externally mounted sensor with self-contained housing

**SENSOR STYLES** \_\_\_\_\_ = 

C
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**4**  
**C** = Version C Electronics

**STROKE LENGTH (ORDER LENGTH)** \_\_\_\_\_ = 

			M
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**5-8**  
 \_\_\_\_\_ **M** = Millimeters  
**109** = 109.5 mm stroke      **217** = 217.3 mm stroke  
**148** = 148.0 mm stroke      **250** = 250.1 mm stroke

**CONNECTION TYPE** \_\_\_\_\_ = 

N		
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**9-11**  
**N\_ \_** = **Integrated:**  
**N** = Integrated M12×1 connector

**Key orientations (See Figure 3) (90° M12 connector plugged):**

**1** = Connector key at 0°      **5** = Connector key at 180°  
**2** = Connector key at 45°      **6** = Connector key at 225°

**Termination type and pin assignment (See Table 1):**

**N\_E** = M12×1, IP69K, 4 pin (pin assignment 2-3-4)  
**N\_G** = M12×1, IP69K, 4 pin (pin assignment 1-3-4)  
**N\_H** = M12×1, IP69K, 4 pin (pin assignment 1-3-2)

**MOUNTING HARDWARE** \_\_\_\_\_ = 

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**12**  
**A** = No Additional Hardware  
**B** = 2 × Ball Joint Ends with 2 × M10 Hex Nuts  
**C** = 2 × Spherical Ball Ends with 2 × M10 Hex Nuts

**INPUT VOLTAGE** \_\_\_\_\_ = 

5
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**13**  
**5** = +5 VDC


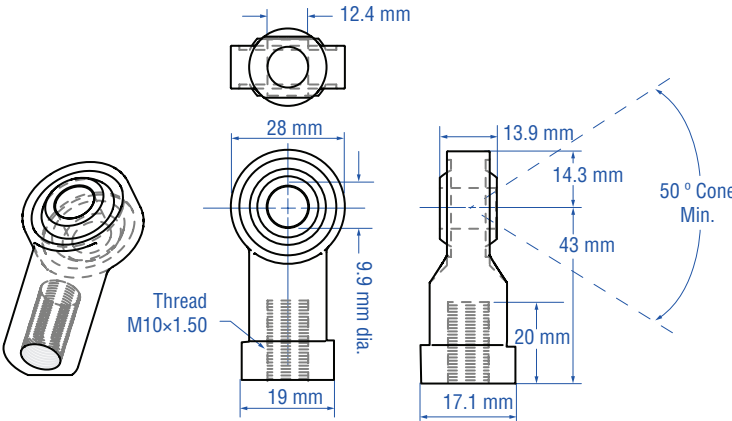

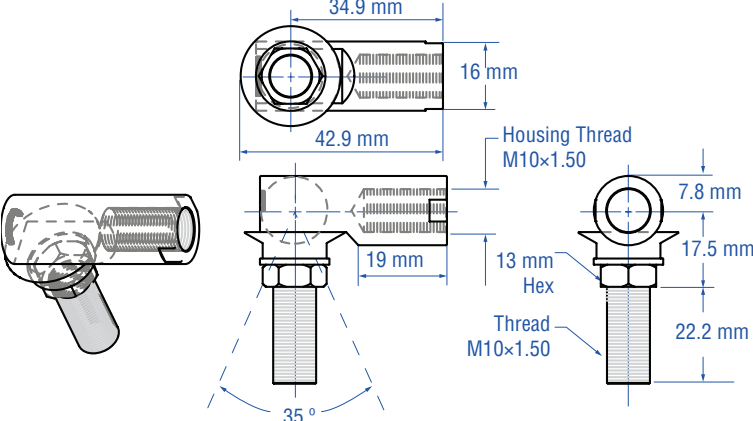

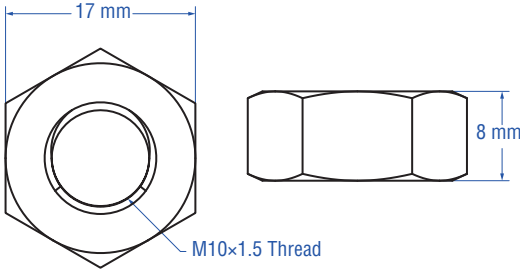
**OUTPUT** \_\_\_\_\_ = 

V	C	1
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**14-16**  
**Voltage:**  
**VC1** = 0.1...4.9 VDC at +5 VDC supply, output ratiometric with V supply

## Accessory selections

Mounting accessories available for the Model MXR sensor.

Spherical Rod End	Dimension reference	Part number
		<p><b>Spherical Rod End</b> 500035</p> <p><b>Spherical Rod End Kit</b> (includes 2 rod ends and 2 hex nuts) 201947</p>
Ball Joint End	Dimension reference	Part number
		<p><b>Ball Joint End</b> 500036</p> <p><b>Ball Joint End Kit</b> (includes 2 Ball Joints and 2 Hex Nuts) 201948</p>
M10 Hex Nut	Dimension reference	Part number
		<p>561788</p>

### Accessory selections (Cont.)

Optional accessories available for the Model MXR sensor.

MH-Series Analog/PWM Tester	Part number
<b>The MH-Series Tester includes:</b> <ul style="list-style-type: none"><li>• MH-Series analog / PWM Tester</li><li>• 12 VDC battery charger with (adapter main plug North America, adapter main plug EU or adapter main plug UK)</li><li>• Cable with M12×1 connector</li><li>• Cable with pigtailed wires</li><li>• Carrying case</li><li>• CD-Rom with user's guide</li></ul>	280 618



MH-Series Analog/PWM Tester, part no.: 280618

**Document Part Number:**

551601 Revision A (EN.EU) 04/2014

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