OEM pressure sensor
For mobile working machines
Model MH-3

Applications
- Load monitoring
- Load moment limitation
- Hydraulic drive control

Special features
- For extreme operating conditions
- Compact and robust design
- Diagnostic function (option)
- Signal clamping (option)
- Customer-specific modifications possible

Description

Durable and robust
Shock and vibration resistance, resistance to pressure spikes (CDS system) and an ingress protection of up to IP69K make the model MH-3 pressure sensor especially qualified for the harsh operating conditions of mobile working machines. Even extreme temperature shocks do not affect its performance.

The case is made of a highly resistant glass-fibre reinforced plastic (PBT). This material is successfully used within the automotive industry.

A metallic shield inside the instrument provides excellent EMC characteristics in accordance with EN 61326, thus ensuring reliable operation, even under high exposures of up to 100 V/m.

The hermetically-welded thin-film measuring cell ensures long-term leak-tightness, without the need for additional sealing materials. Especially in applications with high dynamic load cycles, the thin-film measuring cell features high long-term stability and load-cycling resistance.

State-of-the-art manufacturing
Our manufacturing concept is optimally designed for the production of OEM needs. Also customer-specific modifications of the instruments are possible.

Diagnostic function
As a measuring instrument of the latest generation, the MH-3 features a diagnostic function. By means of the output signal, fault conditions can be detected and evaluated via software. Thus it is possible to differentiate between permanent and temporary faults.
Measuring ranges

<table>
<thead>
<tr>
<th>Gauge pressure</th>
<th>0 ... 6</th>
<th>0 ... 10</th>
<th>0 ... 16</th>
<th>0 ... 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>0 ... 40</td>
<td>0 ... 60</td>
<td>0 ... 100</td>
<td>0 ... 160</td>
</tr>
<tr>
<td></td>
<td>0 ... 250</td>
<td>0 ... 400</td>
<td>0 ... 600</td>
<td></td>
</tr>
<tr>
<td>psi</td>
<td>0 ... 100</td>
<td>0 ... 160</td>
<td>0 ... 200</td>
<td>0 ... 300</td>
</tr>
<tr>
<td></td>
<td>0 ... 500</td>
<td>0 ... 1,000</td>
<td>0 ... 1,500</td>
<td>0 ... 2,000</td>
</tr>
<tr>
<td></td>
<td>0 ... 3,000</td>
<td>0 ... 5,000</td>
<td>0 ... 8,000</td>
<td></td>
</tr>
</tbody>
</table>

Overload safety
2 times

Vacuum tightness
Yes

Output signals

<table>
<thead>
<tr>
<th>Signal type</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (2-wire)</td>
<td>4 ... 20 mA</td>
</tr>
<tr>
<td>Voltage (3-wire)</td>
<td>DC 0 ... 10 V</td>
</tr>
<tr>
<td></td>
<td>DC 1 ... 5 V</td>
</tr>
<tr>
<td></td>
<td>DC 1 ... 6 V</td>
</tr>
<tr>
<td>Ratiometric</td>
<td>DC 0.5 ... 4.5 V</td>
</tr>
</tbody>
</table>

Other output signals available on request

Load
- 4 ... 20 mA: ≤ (power supply - 10 V) / 0.02 A
- DC 0 ... 10 V: > 5 kΩ
- DC 1 ... 5 V: > 2.5 kΩ
- DC 1 ... 6 V: > 5 kΩ
- DC 0.5 ... 4.5 V: > 4.5 kΩ

Voltage supply

Power supply
The power supply depends on the selected output signal.
- 4 ... 20 mA: DC 10 ... 36 V
- DC 0 ... 10 V: DC 14 ... 36 V
- DC 1 ... 5 V: DC 8 ... 36 V
- DC 1 ... 6 V: DC 9 ... 36 V
- DC 0.5 ... 4.5 V: DC 4.5 ... 5.5 V

Current consumption
The current consumption depends on the selected output signal.
- 4 ... 20 mA: < 30 mA
- DC 0 ... 10 V: < 10 mA
- DC 1 ... 5 V: < 10 mA
- DC 1 ... 6 V: < 10 mA
- DC 0.5 ... 4.5 V: < 10 mA

Reference conditions (per IEC 61298-1)

Temperature
15 ... 25 °C [59 ... 77°F]

Atmospheric pressure
860 ... 1,060 mbar [12.5 ... 15.4 psi]

Humidity
45 ... 75 % r. h.

Power supply
DC 24 V

Mounting position
Calibrated in vertical mounting position with pressure connection facing downwards.
Accuracy data

Accuracy at reference conditions
≤ ±1 % of span for measuring ranges ≥ 40 bar [≥ 500 psi]
≤ ±2 % of span for measuring ranges < 40 bar [< 500 psi]

Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2).

Non-linearity (per IEC 61298-2)
≤ ±0.25 % of span for measuring ranges ≥ 40 bar [≥ 500 psi]
≤ ±0.40 % of span for measuring ranges < 40 bar [< 500 psi]

Temperature error at -40 ... +100 °C [-40 ... +212 °F]
Mean temperature coefficient of zero point:
≤ ±0.15 % of span/10 K for measuring ranges ≥ 40 bar [≥ 500 psi]
For measuring ranges < 40 bar [< 500 psi]: on request
Mean temperature coefficient of span:
≤ ±0.08 % of span/10K

Settling time
≤ 2 ms

Long-term stability
≤ ±0.2% of span/year for measuring ranges ≥ 40 bar [≥ 500 psi]
≤ ±0.3% of span/year for measuring ranges < 40 bar [< 500 psi]

Electrical connections

Short-circuit resistance
S+ vs. U-

Reverse polarity protection
U+ vs. U-
(no reverse polarity protection with ratiometric output signal)

Insulation voltage
DC 500 V

Operating conditions

Ingress protection (per IEC 60529)
The ingress protection depends on the type of electrical connection.

■ Circular connector M12 x 1 (4-pin): IP67
■ Metri-Pack series 150 (3-pin): IP67
■ AMP Superseal 1.5 (3-pin): IP67
■ Deutsch DT04-3P (3-pin): IP67
■ Cable outlet: IP69K

The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

Vibration resistance
20 g (per IEC 60068-2-6, under resonance)

Shock resistance
500 g (per IEC 60068-2-27, mechanical)

Permissible temperature ranges
■ Ambient: -40 ... +100 °C [-40 ... +212 °F]
■ Medium: -40 ... +125 °C [-40 ... +257 °F]
■ Storage: -40 ... +100 °C [-40 ... +212 °F]

Connection diagrams

Circular connector M12 x 1 (4-pin)

<table>
<thead>
<tr>
<th>2-wire</th>
<th>3-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>1</td>
</tr>
<tr>
<td>U-</td>
<td>3</td>
</tr>
<tr>
<td>S+</td>
<td>-</td>
</tr>
</tbody>
</table>

AMP Superseal 1.5 (3-pin)

<table>
<thead>
<tr>
<th>2-wire</th>
<th>3-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>3</td>
</tr>
<tr>
<td>U-</td>
<td>1</td>
</tr>
<tr>
<td>S+</td>
<td>-</td>
</tr>
</tbody>
</table>

Metri-Pack series 150 (3-pin)

<table>
<thead>
<tr>
<th>2-wire</th>
<th>3-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>B</td>
</tr>
<tr>
<td>U-</td>
<td>A</td>
</tr>
<tr>
<td>S+</td>
<td>-</td>
</tr>
</tbody>
</table>

Deutsch DT04-3P (3-pin)

<table>
<thead>
<tr>
<th>2-wire</th>
<th>3-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>A</td>
</tr>
<tr>
<td>U-</td>
<td>B</td>
</tr>
<tr>
<td>S+</td>
<td>-</td>
</tr>
</tbody>
</table>

Cable outlet

<table>
<thead>
<tr>
<th>2-wire</th>
<th>3-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>brown</td>
</tr>
<tr>
<td>U-</td>
<td>green</td>
</tr>
<tr>
<td>S+</td>
<td>white</td>
</tr>
</tbody>
</table>

Wire cross-section 0.75 mm² (with end splices)
Cable diameter 6.6 mm
Cable length 0.5 m, 2 m or 5 m [1.64 ft, 6.56 ft, 16.4 ft]

Legend
U_ Positive power supply terminal
U_ Negative power supply terminal
S_ Analogue output
### Process connections

<table>
<thead>
<tr>
<th>Process connection per</th>
<th>Thread size</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 837</td>
<td>G ¼ B</td>
</tr>
<tr>
<td>DIN EN ISO 1179-2 (formerly DIN 3852-E)</td>
<td>G ¼ A</td>
</tr>
<tr>
<td>DIN EN ISO 974-2 (formerly DIN 3852-E)</td>
<td>M14 x 1.5</td>
</tr>
<tr>
<td>ANSI/ASME B1.20.1</td>
<td>¼ NPT</td>
</tr>
<tr>
<td>ISO 6149-2</td>
<td>M14 x 1.5</td>
</tr>
<tr>
<td>SAE J514 Fig.34B</td>
<td>7/16-20 UNF-2A</td>
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</tbody>
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### Sealings and temperature ranges

<table>
<thead>
<tr>
<th>Thread size</th>
<th>Standard FKM/FPM</th>
<th>Option 1 NBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>G ¼ A</td>
<td>-40 ... +125 °C [-40 ... +257 °F]</td>
<td>-30 ... +100 °C [-22 ... +212 °F]</td>
</tr>
<tr>
<td>M14 x 1.5</td>
<td>-20 ... +125 °C [-4 ... +257 °F]</td>
<td>-30 ... +120 °C [-22 ... +248 °F]</td>
</tr>
<tr>
<td>7/16-20 UNF-2A (O-ring BOSS)</td>
<td>-20 ... +125 °C [-4 ... +257 °F]</td>
<td>-40 ... +100 °C [-40 ... +212 °F]</td>
</tr>
</tbody>
</table>

The sealings listed under “Standard” are included in the delivery.

**CDS system**

All process connections are available with the CDS system. The diameter of the pressure channel is reduced in order to counteract pressure spikes and cavitation (see fig.1).

![Illustration of the CDS system](image)

**Fig. 1: Reduced diameter of the pressure channel**

### Materials

**Wetted parts**

Stainless steel

**Non-wetted parts**

Highly resistant glass-fibre reinforced plastic (PBT)
Dimensions in mm

with circular connector M12 x 1

with Metri-Pack series 150

with Deutsch DT04-3P

with AMP Superseal 1.5

with cable outlet
Process connections

For information on tapped holes and welding sockets, see Technical information IN 00.14 at www.wika.com.

Approvals

<table>
<thead>
<tr>
<th>Logo</th>
<th>Description</th>
<th>Country</th>
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<tbody>
<tr>
<td>EU</td>
<td>EU declaration of conformity</td>
<td>European union</td>
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<tr>
<td>EAC</td>
<td>EMC directive</td>
<td>Eurasian Economic Community</td>
</tr>
<tr>
<td>GOST</td>
<td>Metrology, measurement technology</td>
<td>Russia</td>
</tr>
<tr>
<td></td>
<td>MTSCHS</td>
<td>Kazakhstan</td>
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Manufacturer's information and certifications

<table>
<thead>
<tr>
<th>Logo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MTTF: &gt; 100 years</td>
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</table>

Approvals and certificates, see website
Ordering information
Model / Measuring range / Output signal / Process connection / Sealing / Electrical connection