

OEM pressure sensor

For mobile working machines, model MH-3

For mobile hydrogen applications, model MH-3-HY

WIKA data sheet PE 81.59



Applications

- Load monitoring
- Load moment limitation
- Hydraulic drive control
- Pressure monitoring of hydrogen (model MH-3-HY)

Special features

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



OEM pressure sensor model MH-3

Description

Durable and robust

Shock and vibration resistance, resistance against 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.

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

A metal 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 and load cycle stability.

State-of-the-art manufacturing

Our manufacturing concept is ideally designed for the production of OEM requirements. Customer-specific adaptations are also 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.

For hydrogen applications

The model MH-3-HY is designed for hydrogen applications and has a corresponding approval in accordance with EC79/2009.

Specifications

Accuracy specifications		
Non-linearity per IEC 61298-2		
Measuring ranges ≥ 40 bar [≥ 500 psi]	$\leq \pm 0.25$ % of span	
Measuring ranges < 40 bar [< 500 psi]	$\leq \pm 0.4$ % of span	
Accuracy	→ See "Max. measured error per IEC 61298-2"	
Max. measured error per IEC 61298-2		
Measuring ranges ≥ 40 bar [≥ 500 psi]	$\leq \pm 1$ % of span	
Measuring ranges < 40 bar [< 500 psi]	$\leq \pm 2$ % of span	
Medium temperature coefficient at $-40 \dots +100$ °C [$-40 \dots +212$ °F]		
Zero point	Measuring ranges ≥ 40 bar [≥ 500 psi]	$\leq \pm 0.15$ % of span/10 K
	Measuring ranges < 40 bar [< 500 psi]	On request
Span	$\leq \pm 0.08$ % of span/10 K	
Long-term stability per DIN 16086		
Model MH-3	Measuring ranges ≥ 40 bar [≥ 500 psi]	$\leq \pm 0.2$ % of span/year
	Measuring ranges < 40 bar [< 500 psi]	$\leq \pm 0.3$ % of span/year
Model MH-3-HY ¹⁾	Medium temperature range $-40 \dots +30$ °C [$-40 \dots +86$ °F]	$\leq \pm 1$ % of span/year (typical)
		$\leq \pm 3$ % of span/year (maximum)
Reference conditions	Per IEC 61298-1	

1) It is explicitly recommended for the user to test the selected product version for suitability in the intended application(s) with the specified ambient conditions.

Measuring ranges, gauge pressure

bar	Model MH-3	Model MH-3-HY
0 ... 6	x	-
0 ... 10	x	-
0 ... 16	x	-
0 ... 20	-	x
0 ... 25	x	x
0 ... 40	x	x
0 ... 60	x	x
0 ... 100	x	x
0 ... 160	x	x
0 ... 250	x	x
0 ... 400	x	x
0 ... 600	x	x ¹⁾

psi	Model MH-3	Model MH-3-HY
0 ... 100	x	-
0 ... 160	x	-
0 ... 200	x	-
0 ... 300	x	x
0 ... 500	x	x
0 ... 1,000	x	x
0 ... 1,500	x	x
0 ... 2,000	x	x
0 ... 3,000	x	x
0 ... 5,000	x	x
0 ... 8,000	x	x ¹⁾

1) Helium leak test for 400 bar [5,800 psi]

1) Helium leak test for 400 bar [5,800 psi]

Other measuring ranges on request.

Further details on: Measuring range	
Units	<input type="checkbox"/> bar <input type="checkbox"/> psi <input type="checkbox"/> MPa (1 bar = 0.1 MPa)
Overpressure limit	2 times (deviating for individual psi measuring ranges of model MH-3-HY)
Vacuum resistance	Yes

Process connection						
Standard	Thread size	Max. measuring range ¹⁾	Overpressure limit	Model MH-3	Model MH-3-HY	Sealing (model MH-3) ²⁾
EN 837	G ¼ B	600 bar [8,000 psi]	1,480 bar [21,466 psi]	x	x	■ Copper ■ Stainless steel
DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ¼ A	600 bar [8,000 psi]	858 bar [12,444 psi]	x	-	■ NBR ■ FPM/FKM
DIN EN ISO 9974-2 (formerly DIN 3852-E)	M14 x 1.5	600 bar [8,000 psi]	858 bar [12,444 psi]	x	-	
ISO 6149-2	M14 x 1.5	600 bar [8,000 psi]	858 bar [12,444 psi]	x	-	-
SAE J514 Fig.34B	7/16-20 UNF-2A	600 bar [8,000 psi]	1,144 bar [16,592 psi]	x	x	-
ANSI/ASME B1.20.1	¼ NPT	600 bar [8,000 psi]	1,480 bar [21,466 psi]	x	x	-

- 1) Details must be tested separately in the respective application. The specified values for the max. nominal pressure serve only as a rough orientation. The values depend on the temperature, the seals used, the selected torque, the type and the material of the mating thread and the prevailing operating conditions.
- 2) The sealings listed under "Standard" are included in the delivery (only for model MH-3). Model MH-3-HY is delivered without sealing. Depending on the process connection and measuring range, including overpressure limit, an appropriate sealing has to be selected.

Further details on: Process connection	
Max. measuring range	→ See above
Overpressure limit	→ See above
Pressure port diameter	→ See "CDS system"
Possible limitations	Depending on the choice of sealing on the process connection, there may be limitations in the permissible temperature range
Copper	40 ... +125 °C [-40 ... +257 °F]
Stainless steel	-40 ... +125 °C [-40 ... +257 °F]
NBR	-30 ... 100 °C [-22 ... +212 °F]
FPM/FKM	-40 ... +125 °C [-40 ... 257 °F]

CDS system (Cavitation/Damping system)

All process connections are available with the CDS system.

The diameter of the pressure port is reduced in order to counteract pressure spikes and cavitation (see fig. 1).

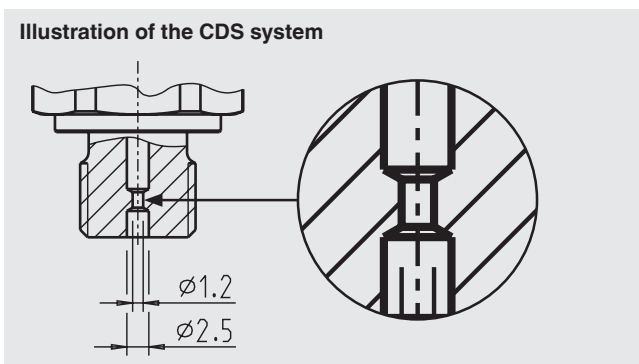


Fig. 1: Reduced diameter of the pressure port

Output signal		
Signal type		
Model MH-3 ¹⁾	Current (2-wire)	4 ... 20 mA
	Voltage (3-wire)	<ul style="list-style-type: none"> ■ DC 0 ... 10 V ■ DC 1 ... 5 V ■ DC 1 ... 6 V
	Ratiometric (3-wire)	DC 0.5 ... 4.5 V
Model MH-3-HY	Current (2-wire)	4 ... 20 mA
	Ratiometric (3-wire)	DC 0.5 ... 4.5 V
Load in Ω		
Output signal 4 ... 20 mA	$\leq (\text{supply voltage} - 10 \text{ V}) / 0.02 \text{ A}$	
Output signal DC 0 ... 10 V	> 5 kΩ	
Output signal DC 1 ... 5 V	> 2.5 kΩ	
Output signal DC 1 ... 6 V	> 5 kΩ	
Output signal DC 0.5 ... 4.5 V, ratiometric	> 4.5 kΩ	
Signal clamping	Yes	
Diagnostic function	Yes	
Voltage supply		
Supply voltage	Output signal 4 ... 20 mA	DC 10 ... 36 V
	Output signal DC 0 ... 10 V	DC 14 ... 36 V
	Output signal DC 1 ... 5 V	DC 8 ... 36 V
	Output signal DC 1 ... 6 V	DC 9 ... 36 V
	Output signal DC 0.5 ... 4.5 V, ratiometric	DC 4.5 ... 5.5 V
Current supply	Output signal 4 ... 20 mA	< 30 mA
	Output signal DC 0 ... 10 V	< 10 mA
	Output signal DC 1 ... 5 V	< 10 mA
	Output signal DC 1 ... 6 V	< 10 mA
	Output signal DC 0.5 ... 4.5 V, ratiometric	< 10 mA
Dynamic behaviour		
Settling time per IEC 61298-2	$\leq 2 \text{ ms}$	

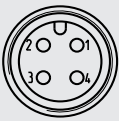
1) Other output signals on request

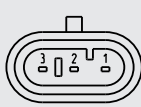
Electrical connection				
Connection type	IP code ¹⁾	Wire cross-section	Cable diameter	Cable length
Model MH-3				
Deutsch DT04-3P, 3-pin	IP67	-	-	-
Delphi connector Metri-Pack series 150, 3-pin	IP67	-	-	-
Circular connector M12 x 1, 4-pin	IP67	-	-	-
AMP Superseal connector 1.5 series, 3-pin	IP67	-	-	-
Cable outlet, 2-pin	IP69K	0.75 mm ² (with end splices)	6.6 mm	<ul style="list-style-type: none"> ■ 0.5 m ■ 2 m ■ 5 m
Cable outlet, 3-pin	IP69K	0.75 mm ² (with end splices)	6.6 mm	<ul style="list-style-type: none"> ■ 0.5 m ■ 2 m ■ 5 m
Model MH-3-HY				
Delphi connector Metri-Pack series 150, 3-pin	IP67	-	-	-
AMP Superseal connector 1.5 series, 3-pin	IP67	-	-	-

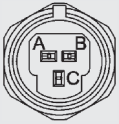
1) The stated IP codes only apply when plugged in using mating connectors that have the appropriate IP code.

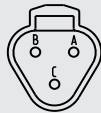
Further details on: Electrical connection	
Connection type	→ See above
Wire cross-section	→ See above
Cable diameter	→ See above
Pin assignment	→ See below
Ingress protection (IP code) per IEC 60529	→ See above
Short-circuit resistance	S+ vs. U-
Reverse polarity protection	U+ vs. U- (no reverse polarity protection with ratiometric output signal)
Insulation voltage	DC 500 V

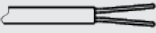
Pin assignment

Circular connector M12 x 1 (4-pin)			
		2-wire	3-wire
	U+	1	1
	U-	3	3
	S+	-	4

AMP Superseal 1.5 (3-pin)			
		2-wire	3-wire
	U+	3	3
	U-	1	1
	S+	-	2

Metri-Pack series 150 (3-pin)			
		2-wire	3-wire
	U+	B	B
	U-	A	A
	S+	-	C

Deutsch DT04-3P (3-pin)			
		2-wire	3-wire
	U+	A	A
	U-	B	B
	S+	-	C

Cable outlet			
		2-wire	3-wire
	U+	Brown	Brown
	U-	Green	Green
	S+	-	White





Legend

- U+ Positive power supply terminal
- U- Negative power supply terminal
- S+ Analogue output

Material	
Material (wetted)	
Model MH-3	Stainless steel
Model MH-3-HY	Stainless steel, 2.4711
Material (in contact with the environment)	Highly resistant glass-fibre reinforced plastic (PBT)

Operating conditions	
Medium temperature range	
Model MH-3	-40 ... +100 °C [-40 ... +212 °F]
Model MH-3-HY	-40 ... + 85 °C [-40 ... +185 °F]
Ambient temperature range	
Model MH-3	-40 ... +100 °C [-40 ... +212 °F]
Model MH-3-HY	-40 ... + 85 °C [-40 ... +185 °F]
Storage temperature range	
Model MH-3	-40 ... +100 °C [-40 ... +212 °F]
Model MH-3-HY	-40 ... + 85 °C [-40 ... +185 °F]
Vibration resistance per IEC 60068-2-6	20 g
Shock resistance per IEC 60068-2-27	500 g

Approvals

Logo	Description	Country	Model MH-3	Model MH-3-HY
	EU declaration of conformity	European Union	x	x
	EMC directive, EN 61326 emission (group 1, class B) and immunity (industrial application)			
	Pressure equipment directive			
	RoHS directive			
	EAC EMC directive	Eurasian Economic Community	x	-
	GOST Metrology, measurement technology	Russia	x	-
-	MTSCHS Permission for commissioning	Kazakhstan	x	-
	MazInMetr Metrology, measurement technology	Kazakhstan	x	-
-	EC79/2009 Type approval for hydrogen-powered vehicles	European Union	-	x

Manufacturer's information

Logo	Description
-	China RoHS directive

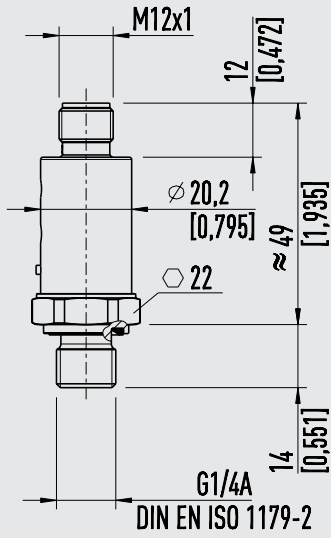
Safety-related characteristic values

Safety-related characteristic values	
MTTF	> 100 years

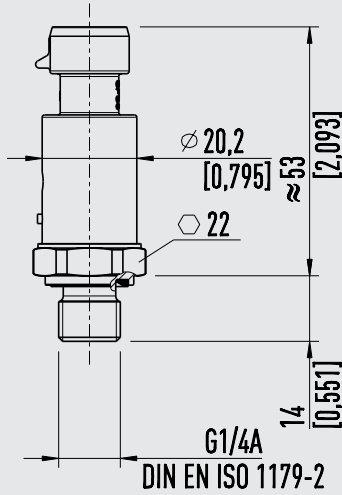
→ Approvals and certificates, see website

Dimensions in mm [in]

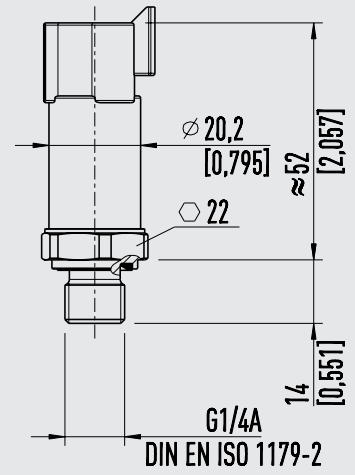
With circular connector M12 x 1



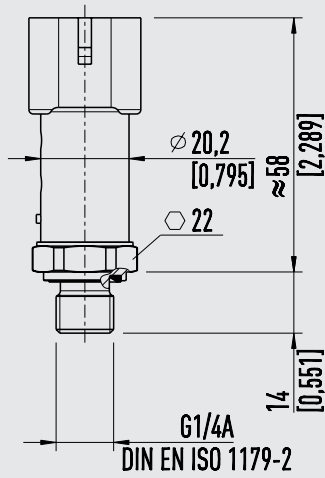
With Metri-Pack series 150



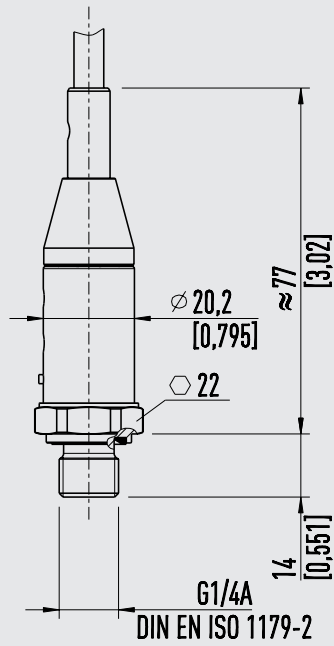
With Deutsch DT04-3P



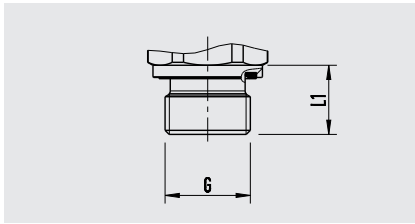
With AMP Superseal 1.5



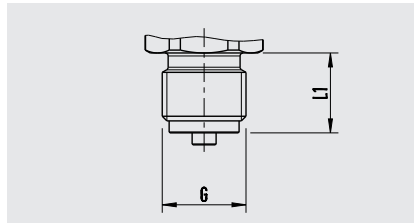
With cable outlet



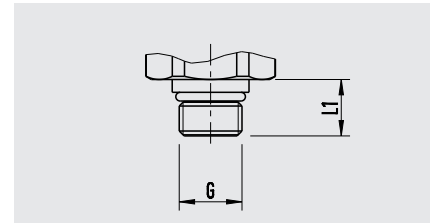
Process connections



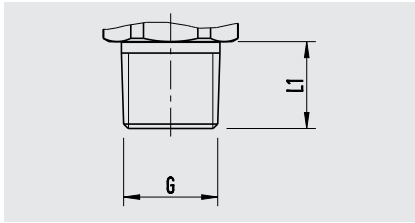
G	L1
G ¼ A DIN EN ISO 1179-2	14 [0.55]
M14 x 1.5 DIN EN ISO 9974-2	14 [0.55]



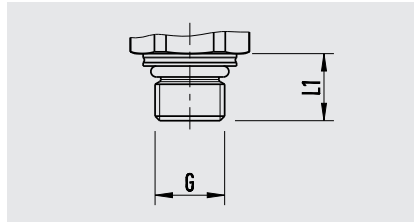
G	L1
G ¼ B EN 837	13 [0.51]



G	L1
7/16-20 UNF BOSS SAE J514 E	12.06 [0.48]



G	L1
¼ NPT ANSI/ASME B1.20.1	13 [0.51]



G	L1
M14 x 1.5 ISO 6149-2	13.5 [0.53]

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

Ordering information

Model / Measuring range / Output signal / Process connection / Sealing / Electrical connection

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