

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 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.

For the case, a highly resistant glass-fibre reinforced plastic (PBT) is used. 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 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.

Measuring ranges

Gauge pressure		MH-3	MH-3-HY
bar	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	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 at 400 bar/5,800 psi

MPa available (1 bar = 0.1 MPa)

Other measuring ranges on request

Overload safety

2 times (deviating for individual psi measuring ranges of model MH-3-HY)

Vacuum tightness

Yes

Output signals

Signal type	Signal	MH-3 ¹⁾	MH-3-HY
Current (2-wire)	4 ... 20 mA	x	x
Voltage (3-wire)	DC 0 ... 10 V	x	-
	DC 1 ... 5 V	x	-
	DC 1 ... 6 V	x	-
Ratiometric	DC 0.5 ... 4.5 V	x	x

1) Other output signals on request

Load

- 4 ... 20 mA: $\leq (\text{power supply} - 10 \text{ V}) / 0.02 \text{ A}$
- DC 0 ... 10 V: $> 5 \text{ k}\Omega$
- DC 1 ... 5 V: $> 2.5 \text{ k}\Omega$
- DC 1 ... 6 V: $> 5 \text{ k}\Omega$
- DC 0.5 ... 4.5 V: $> 4.5 \text{ k}\Omega$

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 supply

The current supply depends on the selected output signal.

- 4 ... 20 mA $< 30 \text{ mA}$
- DC 0 ... 10 V $< 10 \text{ mA}$
- DC 1 ... 5 V $< 10 \text{ mA}$
- DC 1 ... 6 V $< 10 \text{ mA}$
- DC 0.5 ... 4.5 V $< 10 \text{ mA}$

Reference conditions (per IEC 61298-1)

Temperature

15 ... 25 °C [59 ... 77°F]

Atmospheric pressure

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

Air humidity

45 ... 75 % r. h.

Power supply

DC 24 V

Mounting position

Calibrated in vertical mounting position with process connection facing downwards.

Accuracy specifications

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/10 K

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]

Model MH-3-HY:

Medium temperature range -40 ... +30 °C [-40 ... +86 °F]:
 typ. ±1 % / max. ±3 %

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.

Operating conditions

Ingress protection (per IEC 60529)

The ingress protection depends on the type of electrical connection.

Electrical connection	Ingress protection ¹⁾	MH-3	MH-3-HY
Deutsch DT04-3P (3-pin)	IP67	x	
Delphi connector Metri-Pack series 150, 3-pin	IP67	x	x
Circular connector M12 x 1 (4-pin)	IP67	x	
AMP Superseal connector 1.5 series, 3-pin	IP67	x	x
Cable outlet (0.5 / 1 / 2.5 m), 2-pin	IP6K9K	x	
Cable outlet (0.5 / 1 / 2.5 m), 3-pin	IP6K9K	x	

1) 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

	MH-3	MH-3-HY
Ambient	-40 ... +100 °C [-40 ... +212 °F]	-40 ... +85 °C [-40 ... +185 °F]
Medium	-40 ... +125 °C [-40 ... +257 °F]	-40 ... +85 °C [-40 ... +185 °F]
Storage	-40 ... +100 °C [-40 ... +212 °F]	-40 ... +85 °C [-40 ... +185 °F]

Electrical connections

Short-circuit resistance

S+ vs. U-

Reverse polarity protection

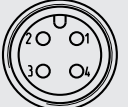
U+ vs. U-


(no reverse polarity protection with ratiometric output signal)


Insulation voltage


DC 500 V

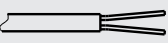
Connection diagrams

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

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

Process connection per	Thread size	Max. nominal pressure ¹⁾	MH-3	MH-3-HY	Sealing and temperature range ²⁾	
					Standard (MH-3)	Option (MH-3)
EN 837	G ¼ B	600 bar [8,000 psi]	x	x	Copper -40 ... +125 °C [-40 ... +257 °F]	Stainless steel -40 ... +125 °C [-40 ... +257 °F]
DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ¼ A	600 bar [8,000 psi]	x	-	NBR -40 ... +100 °C [-40 ... +212 °F]	FPM/FKM -40 ... +125 °C [-40 ... 257 °F]
DIN EN ISO 974-2 (formerly DIN 3852-E)	M14 x 1.5	600 bar [8,000 psi]	x	-	-	-
ISO 6149-2	M14 x 1.5	600 bar [8,000 psi]	x	-	-	-
SAE J514 Fig.34B	7/16-20 UNF-2A	600 bar [8,000 psi]	x	x	-	-
ANSI/ASME B1.20.1	¼ NPT	600 bar [8,000 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) Model MH-3-HY is delivered without sealing. Depending on the process connection and measuring range, including overload safety, an appropriate sealing has to be selected.

The sealings listed under “Standard” are included in the delivery (only for model MH-3).

CDS 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).

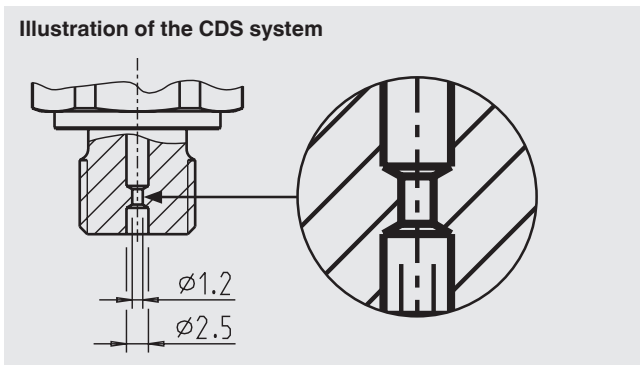


Fig. 1: Reduced diameter of the pressure port

Materials

Wetted parts

MH-3: Stainless steel

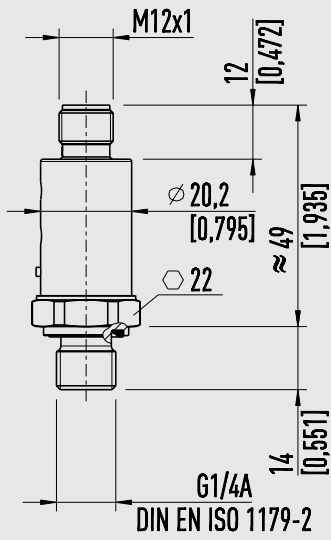
MH-3-HY: Stainless steel, 2.4711

Non-wetted parts

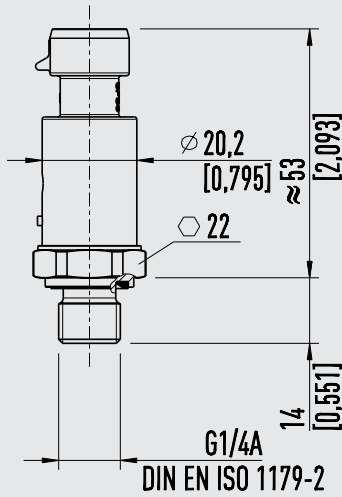
Highly resistant glass-fibre reinforced plastic (PBT)

Dimensions in mm

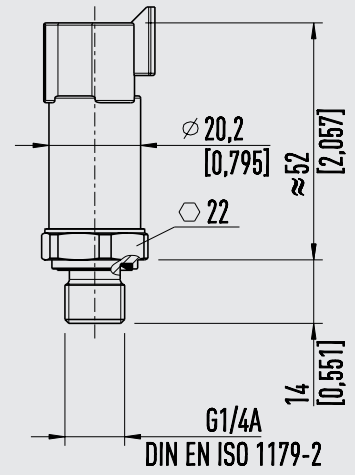
with M12 x 1 circular connector



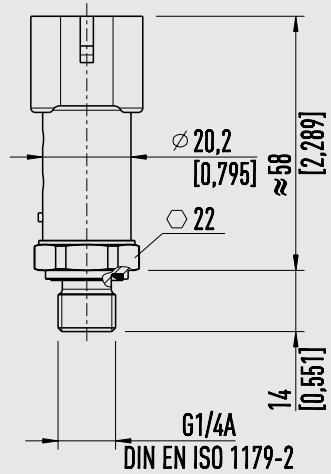
with Metri-Pack series 150



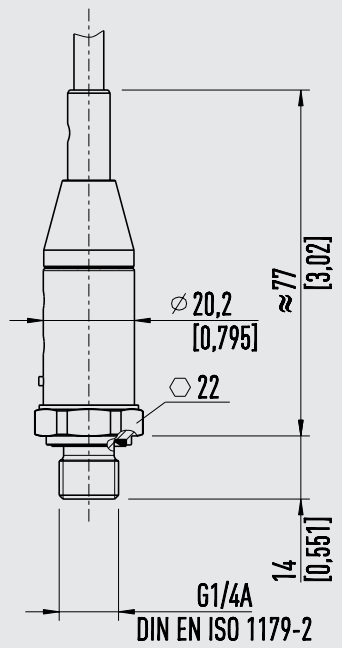
with Deutsch DT04-3P



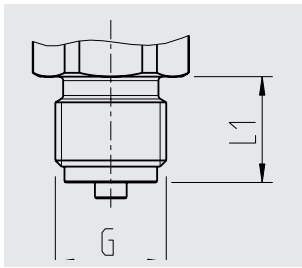
with AMP Superseal 1.5



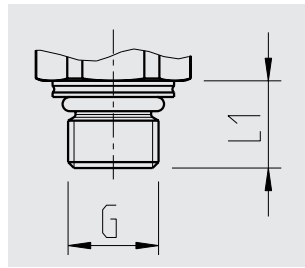
with cable outlet



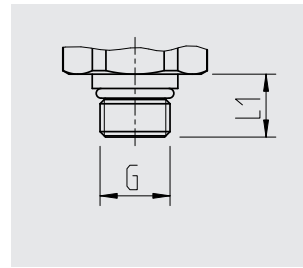
Process connections



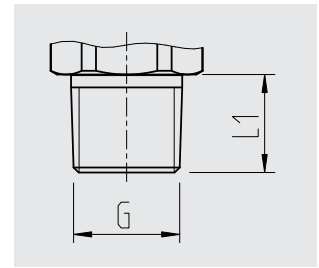
G	L1
G 1/4 B	13 [0.51]



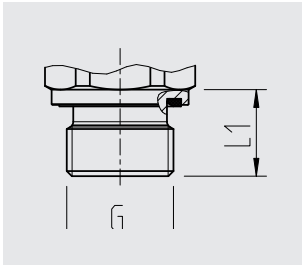
G	L1
M14 x 1.5	13.5 [0.53]



G	L1
7/16-20 UNF	12 [0.47]



G	L1
1/4 NPT	13 [0.51]



G	L1
G 1/4 A	14 [0.55]
M14 x 1.5	14 [0.55]

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

Approvals

Logo	Description	Country	MH-3	MH-3-HY
	EU declaration of conformity <ul style="list-style-type: none"> ■ EMC directive, EN 61326 emission (group 1, class B) and immunity (industrial application) ■ Pressure equipment directive ■ RoHS directive 	European Union	x	x
	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 and certificates

Logo	Description
-	MTTF: > 100 years (only applies to model MH-3)

Approvals and certificates, see website

Ordering information

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

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