

OEM pressure sensor For mobile working machines Model MH-4

WIK A data sheet PE 81.63



For further approvals,
see Seite 9

Applications

Operating and control pressure measurement in:

- Construction machinery
- Agricultural and forestry machinery
- Mobile cranes and mobile elevating work platforms (MEWP)
- Material handling and municipal vehicles

Special features

- Developed for the extreme operating conditions in mobile working machines
- Reliability and highest accuracy over the entire life cycle
- Customer-specific adaptations and individualisation
- High production capacities

Description

The model MH-4 is a powerful, reliable and extremely resilient pressure sensor for mobile working machines. Even under demanding conditions, the maintenance-free sensor consistently delivers precise measured data and ensures high operational safety. Thus it is the ideal choice for OEM use. The MH-4 (E1) model is ECE type-approved, confirming its suitability for use in vehicles.

Developed for the specific requirements in mobile working machines

The model MH-4 meets high demands and measures with high precision at temperatures of -40 ... +125 °C [-40 ... +257 °F]. With its up to 3 times overpressure limit, the sensor withstands hydraulic pressure spikes – and is optionally available with a restrictor. Thanks to metal shielding, the model MH-4 works interference-free at field strengths up to 100 V/m. In addition, vibrations up to 40g and shocks up to 100g have no influence on the measurement quality.



OEM pressure sensor, model MH-4

Highest reliability over the entire life cycle

Whether dust, humidity, heat or mechanical stress: The model MH-4 pressure sensor is optimised for mobile use, particularly safe in operation and thus continuously dependable. The maintenance-free instrument design ensures a particularly low total cost of ownership. The MH-4 is designed for over 100 million load cycles and features a long-term drift of less than 0.1 % FS.

Think big – with WIK A as an OEM supplier

Secure supply chains, high quality standards and a comprehensive range of services worldwide make WIK A a reliable OEM supplier – especially for large volume orders. Model MH-4 pressure sensors are available directly, in high quantities, with commonly used electrical connections and pressure connections. Customer-specific interfaces and adaptations can be realised together – including an option for brand labelling.

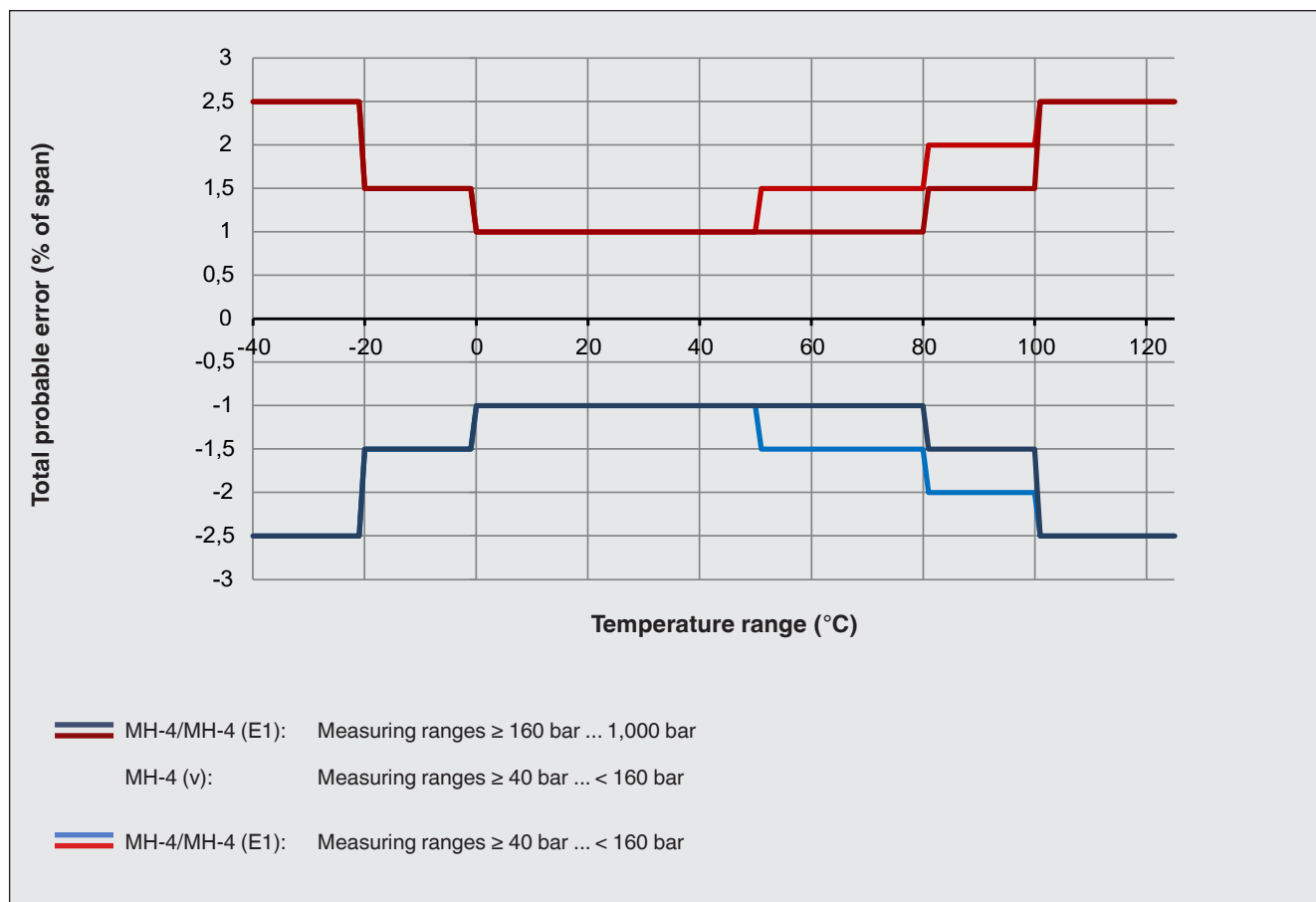
Specifications

Overview of versions	
Version	Description
MH-4	OEM pressure sensor
MH-4 (E1)	OEM pressure sensor with type approval per UN Regulation No. 10
MH-4 (v)	OEM pressure sensor with pressure compensation element (v = vented) → The pressure compensation element ensures increased accuracy for measuring ranges < 160 bar [< 2,000 psi]. → The pressure compensation element is available for selected electrical connections. → Not suited to applications involving diesel fuels and ambient conditions involving extreme temperature fluctuations.

Accuracy specifications	
Non-linearity per IEC 62828-1	$\leq \pm 0.25$ % of span (BFSL) ^{1) 2)}
Accuracy	→ See " Max. measured error per IEC 62828-1 "
Max. measured error per IEC 62828-1	$\leq \pm 1.0$ % of span → For measuring ranges < 40 bar, see " Total probable error for measuring ranges ≥ 6 bar ... < 40 bar ."
Total probable error per IEC 62828-2	→ See chart " Total probable error "
Max. measured error for temperature per IEC 62828-3	$\leq \pm 2$ K ³⁾
Long-term drift per IEC 62828-1	$\leq \pm 0.1$ % of span
Reference conditions	Per IEC 62828-1

- 1) $\leq \pm 0.35$ % of span (BFSL) with 0 ... 5 V and 0 ... 10 V output signals
2) For measuring ranges < 40 bar: $\frac{1}{2} \times$ ("[Total probable error per IEC 62828-2](#)")
3) With a difference of 85 K between start and end of measuring range

Total probable error



Total probable error for measuring ranges ≥ 6 bar ... < 40 bar:			
Measuring range	Temperature limit		
	20 °C [68 °F] ¹⁾	50 °C [122 °F]	80 °C [176 °F]
MH-4/MH-4 (E1)			
0 ... 6 bar	$\leq \pm 1.7 \%$	$\leq \pm 3.4 \%$	$\leq \pm 5.8 \%$
0 ... 10 bar	$\leq \pm 1.3 \%$	$\leq \pm 2.3 \%$	$\leq \pm 3.8 \%$
0 ... 16 bar	$\leq \pm 1.0 \%$	$\leq \pm 1.6 \%$	$\leq \pm 2.7 \%$
0 ... 25 bar	$\leq \pm 1.0 \%$	$\leq \pm 1.3 \%$	$\leq \pm 2.1 \%$
MH-4 (v)			
0 ... 6 bar	$\leq \pm 1.3 \%$	$\leq \pm 1.6 \%$	$\leq \pm 2.2 \%$
0 ... 10 bar	$\leq \pm 1.0 \%$	$\leq \pm 1.2 \%$	$\leq \pm 1.5 \%$
0 ... 16 bar	$\leq \pm 1.0 \%$	$\leq \pm 1.0 \%$	$\leq \pm 1.0 \%$
0 ... 25 bar	$\leq \pm 1.0 \%$	$\leq \pm 1.0 \%$	$\leq \pm 1.0 \%$

1) Corresponds to the max. measured error per IEC 62828-1

Measuring ranges, gauge pressure

bar		psi	
MH-4/MH-4 (E1)	MH-4 (v)	MH-4/MH-4 (E1)	MH-4 (v)
0 ... 6	0 ... 6	0 ... 100	0 ... 100
0 ... 10	0 ... 10	0 ... 200	0 ... 200
0 ... 16	0 ... 16	0 ... 300	0 ... 300
0 ... 25	0 ... 25	0 ... 400	0 ... 400
0 ... 40	0 ... 40	0 ... 500	0 ... 500
0 ... 60	0 ... 60	0 ... 1,500	0 ... 1,500
0 ... 100	0 ... 100	0 ... 2,000	-
0 ... 160	-	0 ... 3,000	-
0 ... 250	-	0 ... 5,000	-
0 ... 400	-	0 ... 8,000	-
0 ... 600	-	0 ... 10,000	-
0 ... 1,000	-		

Measuring ranges, temperature

Temperature	°C	°F	Temperature steps
Measuring range	-40 ... +125	-40 ... +257	-
Start of measuring range	-40 ... +0	-40 ... +32	In 5 K steps
End of measuring range	+85 ... +125	+185 ... +257	In 5 K steps

Since the temperature is measured on the thin-film element, the real response time to the medium temperature depends on the installation details. The difference between the start and end of the measuring range must be at least 85 °C [185 °F].

→ Other measuring ranges on request.

Further details on: measuring range	
Units	bar psi MPa

Further details on: measuring range	
Maximum working pressure per IEC 62828-2	→ Corresponds to the upper measuring range value / end value of the measuring range → Any permanent operation above the maximum working pressure is not permissible
Overpressure limit per IEC 62828-2	The overpressure limit is based on the measuring range. Depending on the selected process connection and the seal, restrictions in overpressure limit can result.
Measuring ranges ≤ 400 bar [≤ 5,000 psi]	3 times
Measuring ranges > 400 bar and ≤ 600 bar [> 5,000 psi and ≤ 8,000 psi]	2 times
Measuring ranges > 600 bar and ≤ 1,000 bar [> 8,000 psi and ≤ 10,000 psi]	1.5 times
Vacuum resistance	Yes

Process connection				
Standard	Thread size	Max. measuring range	Overpressure limit	Seal
DIN EN ISO 1179-2	G ¼ A	600 bar [8,000 psi]	858 bar [12,400 psi]	■ NBR ■ FPM/FKM
DIN EN ISO 9974-2	M14 x 1.5	600 bar [8,000 psi]	858 bar [12,400 psi]	
ISO 6149-2	M14 x 1.5	600 bar [8,000 psi]	858 bar [12,400 psi]	
JIS B 2351-1	G ¼ B x 10, form O with collar	600 bar [8,000 psi]	858 bar [12,400 psi]	
	G ¾ A, form O with collar	600 bar [8,000 psi]	858 bar [12,400 psi]	
SAE J514 (compatible with SAE J1926 tapped holes)	7/16-20 UNF, O-ring BOSS	600 bar [8,000 psi]	858 bar [12,400 psi]	
	9/16-18 UNF-2A, O-ring BOSS	600 bar [8,000 psi]	858 bar [12,400 psi]	
	¾-16 UNF-2A, O-ring BOSS	600 bar [8,000 psi]	858 bar [12,400 psi]	
	7/16-20 UNF-2A, sealing cone 74°	800 bar [10,000 psi]	1,144 bar [16,500 psi]	-
ANSI/ASME B1.20.1	⅙ NPT	400 bar [5,000 psi]	572 bar [8,200 psi]	
	¼ NPT	1,000 bar [13,000 psi]	1,480 bar [21,400 psi]	
KS	PT ¼	1,000 bar [13,000 psi]	1,480 bar [21,400 psi]	
	PT ¾	1,000 bar [13,000 psi]	1,480 bar [21,400 psi]	
ISO 7	R ¼	1,000 bar [13,000 psi]	1,480 bar [21,400 psi]	
	R ¾	1,000 bar [13,000 psi]	1,480 bar [21,400 psi]	
EN 837	G ⅙ B	400 bar [5,000 psi]	572 bar [8,200 psi]	■ Copper ■ Stainless steel
	G ¼ B	1,000 bar [13,000 psi]	1,480 bar [21,400 psi]	
	G ¾ B	1,000 bar [13,000 psi]	1,480 bar [21,400 psi]	

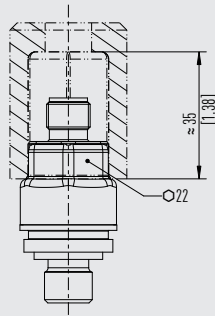
Details must be tested separately in the respective application. The specified values for the overpressure limit serve only as a rough orientation. The values depend on the temperature, the seal used, the selected torque, the type and the material of the mating thread and the prevailing operating conditions.

Further details on: process connection	
Max. measuring range	→ See table "Process connection"
Overpressure limit	→ See table "Process connection"
Seal	→ See table "Process connection"
Pressure port diameter	For applications that can lead to pressure spikes, a restrictor with a pressure port of 0.3 mm is available.
	■ 2.5 mm ■ 0.3 mm with mounted restrictor

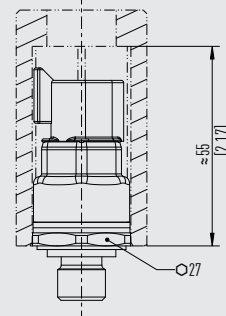
Further details on: process connection

Socket wrench suitability

Hexagon (SW 22) integrated in the case



Additional hexagon (SW 27) above the process connection
Suitable for mounting with socket wrench



Possible restrictions, seal

Depending on the choice of seal on the process connection, there may be restrictions in the permissible temperature limit.

NBR	-40 ... +100 °C [-40 ... +212 °F]
FPM/FKM	-20 ... +125 °C [-4 ... +257 °F]
Copper	-40 ... +125 °C [-40 ... +257 °F]
Stainless steel	-40 ... +125 °C [-40 ... +257 °F]

→ Other process connections and seals on request.

→ For further information on process connections, see technical information IN 00.14.

Output signal

Signal type

Current (2-wire)	4 ... 20 mA → Not available with temperature output
Voltage (3-wire)	■ DC 0 ... 5 V ■ DC 0 ... 10 V ■ DC 0.5 ... 4.5 V ■ DC 1 ... 5 V ■ DC 1 ... 10 V
Ratiometric (3-wire)	DC 0.5 ... 4.5 V

Load Ω

Current (2-wire)	$\leq (\text{auxiliary power } -7.8 \text{ V}) / 0.022 \text{ A}$
Voltage (3-wire)	$\geq \text{Max. output voltage} / 1 \text{ mA}$
Ratiometric (3-wire)	$\geq 4.5 \text{ k}\Omega$

Signal damping

	■ Without ■ 2 ms ■ 4 ms ■ 9 ms ■ 18 ms ■ 37 ms ■ 75 ms ■ 150 ms
--	--

Signal clamping

	The range of the output signal can be limited. For this purpose, a lower and an upper signal threshold are defined in the sensor electronics. If the output signal reaches these threshold values, the sensor outputs a defined, constant signal value. Therefore, in operation, unwanted pressure or signal ranges are filtered out. ■ Without ■ With
--	--

Output signal		
Diagnostic function	Permanent errors in the sensor electronics and temporary system overpressures can be output through defined constant output signals. A permanent error signal signifies a sensor defect and cannot be reset. The temporary error signal is reset as soon as the system pressure once again lies under the error threshold. In the application, one can therefore realise an efficient system diagnosis.	
	Without With	
Voltage supply		
Auxiliary power	Current output (2-wire), 4 ... 20 mA	DC 8 ... 36 V
	Voltage output (3-wire), DC 0 ... 5 V	DC 8 ... 36 V
	Voltage output (3-wire), DC 0 ... 10 V	DC 12 ... 36 V
	Voltage output (3-wire), DC 1 ... 5 V	DC 8 ... 36 V
	Voltage output (3-wire), DC 1 ... 10 V	DC 12 ... 36 V
	Voltage output (3-wire), DC 0.5 ... 4.5 V	DC 8 ... 36 V
	Voltage output (3-wire), DC 0.5 ... 4.5 V, ratiometric	DC 5 V ±10 %
	→ Max. auxiliary power with UL approval	DC 35 V
Current supply	Current output (2-wire)	≤ 25 mA
	Voltage output (3-wire)	≤ 10 mA
	Ratiometric output (3-wire)	≤ 10 mA
Overvoltage resistance	Current output (2-wire)	DC 48 V
	Voltage output (3-wire)	DC 48 V
	Ratiometric output (3-wire)	DC 30 V
Dynamic behaviour		
Settling time per IEC 62828-1	Pressure	≤ 1 ms
	Temperature	≤ 10 min
Switch-on time	< 200 ms	-

→ Other output signals on request

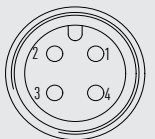
Electrical connection		
Connection type	IP code ¹⁾	Permissible temperature range
MH-4/MH-4 (E1)		
Circular connector M12 x 1, code A, 4-pin ²⁾	IP67 per IEC 60529	-40 ... +125 °C [-40 ... +257 °F]
Deutsch connector DT04-2P, 2-pin		
Deutsch connector DT04-3P, 3-pin		
Deutsch connector DT04-4P, 4-pin ²⁾		
Delphi connector Metri-Pack series 150, 3-pin		
Cable outlet, IP6K9K, 2- or 3-wire	IP6K9K per ISO 20653	-40 ... +85 °C [-40 ... +185 °F]
AMP Micro Quadlok System connector, code A, 3-pin	IP67 per IEC 60529	-40 ... +125 °C [-40 ... +257 °F]
AMP Superseal connector 1.5, 3-pin		
AMP Seal 16 connector, cone, code A, 3-pin		
AMP Econoseal J Mark II series connector, 3-pin		
VW connector, code I, 4-pin, 2 rows ²⁾		
MH-4 (v)		
Circular connector M12 x 1, code A, 4-pin ²⁾	IP67 per IEC 60529	-40 ... +125 °C [-40 ... +257 °F]
Deutsch connector DT04-3P, 3-pin		

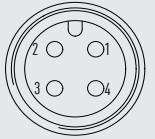
1) The stated IP codes only apply when plugged in using mating connectors that have the appropriate IP code.

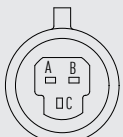
2) Usable for MH-4 with additional temperature output signal

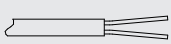
Further details on: electrical connection	
Connection type	→ See table "Electrical connection"
Pin assignment	→ See table "Pin assignment"
Ingress protection (IP code)	→ See table "Electrical connection"
Short-circuit resistance	S+ vs. U- (P vs. U-, T vs. U- for model MH-4 with additional temperature output signal)
Reverse polarity protection	U+ vs. U-
Insulation voltage	DC 500 V (DC 850 V optional)

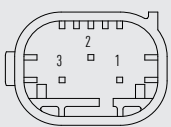
Pin assignment

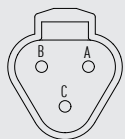
Circular connector M12 x 1, code A, 4-pin			
		2-wire	3-wire
	U+	1	1
	U-	3	3
	S+	-	4

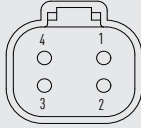
Circular connector M12 x 1, code A, 4-pin			
		4-wire	
	U+	1	
	U-	3	
	P	4	
	T	2	

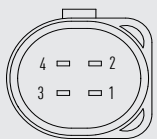
Delphi connector Metri-Pack series 150, 3-pin			
		2-wire	3-wire
	U+	B	B
	U-	A	A
	S+	-	C

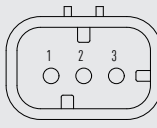
Cable outlet, IP6K9K, 2- or 3-wire			
		2-wire	3-wire
	U+	Red (RD)	Red (RD)
	U-	Black (BK)	Black (BK)
	S+	-	White (WH)

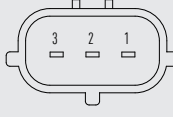
AMP Micro Quadlok System connector, code A, 3-pin			
		2-wire	3-wire
	U+	3	3
	U-	1	1
	S+	-	2

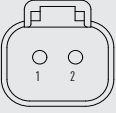
Deutsch connector DT04-3P, 3-pin			
		2-wire	3-wire
	U+	A	A
	U-	B	B
	S+	-	C

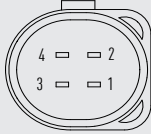
Deutsch connector DT04-4P, 4-pin			
		2-wire	3-wire
	U+	2	2
	U-	1	1
	S+	-	4

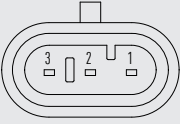
VW connector, code I, 4-pin, 2 rows			
		2-wire	3-wire
	U+	2	2
	U-	1	1
	S+	-	4

AMP Seal 16 connector, cone, code A, 3-pin			
		2-wire	3-wire
	U+	3	3
	U-	1	1
	S+	-	2

AMP Econoseal J Mark II series connector, 3-pin			
		2-wire	3-wire
	U+	1	1
	U-	3	3
	S+	-	2

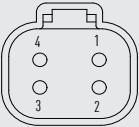
Deutsch connector DT04-2P, 2-pin			
		2-wire	
	U+	1	
	U-	2	
	S+	-	

VW connector, code I, 4-pin, 2 rows			
		4-wire	
	U+	2	
	U-	1	
	P	4	
	T	3	

AMP Superseal connector 1.5, 3-pin			
		2-wire	3-wire
	U+	3	3
	U-	1	1
	S+	-	2

Legend

- U+ Positive power supply terminal
- U- Negative power supply terminal
- S+ Analogue output
- P Analogue output, pressure
- T Analogue output, temperature

Deutsch connector DT04-4P, 4-pin			
		4-wire	
	U+	2	
	U-	1	
	P	4	
	T	3	

Material	
Material (wetted)	Stainless steel 304L (1.4307), PH grade steel
Material (in contact with the environment)	Stainless steel 304L (1.4307), electrical connection made of highly resistant glass-fibre reinforced plastic (PBT)

Operating conditions	
Medium temperature limit ¹⁾	-40 ... +125 °C [-40 ... +257 °F]
Ambient temperature limit ¹⁾	-40 ... +125 °C [-40 ... +257 °F]
Storage temperature limit	-40 ... +70 °C [-40 ... +158 °F]
Humidity per EN 60068-2-78	93 % at 55 °C [131 °F] relative humidity
Condensation	Non-condensing
Pollution degree per IEC 61010-1	2
Vibration resistance per IEC 60068-2-6	40g, 10 ... 2,000 Hz
Permanent vibration resistance per IEC 60068-2-6	10g, 10 ... 2,000 Hz
Shock resistance per IEC 60068-2-27	100g, 11 ms
Free fall in line with IEC 60068-2-31	
Single instrument	1 m [3.28 ft]
Multiple packaging	0.5 m [1.64 ft]
Ingress protection (IP code)	→ See "Electrical connection"
Service life	100 million load cycles
EMC ²⁾	
ESD per ISO 10605	±8 kV contact discharge, ±15 kV air discharge
HF field per ISO 11452-2	100 V/m
BCI per ISO 11452-4	200 mA
Pulse 1 per ISO 7637-2 ³⁾	Level III

Operating conditions	
Pulse 2a per ISO 7637-2 ³⁾	Level III
Pulse 2b per ISO 7637-2 ³⁾	Level III
Pulse 3a per ISO 7637-2 ³⁾	Level III
Pulse 3b per ISO 7637-2 ³⁾	Level III
Fast transient pulses per ISO 7637-3	Level IV
Radio disturbance per CISPR 25	30 ... 1,000 MHz

- 1) Depending on the choice of seal on the process connection, the electrical connection and the UL approval, there may be restrictions in the medium and ambient temperatures.
→ For restrictions, see "[Process connection](#)" and "[Electrical connection](#)".
- 2) The specifications listed are the manufacturer's information and have been verified by internal tests.
- 2) Does not apply for ratiometric output signal

Packaging and instrument labelling	
Packaging	Multiple packaging (up to 25 pieces)
Instrument labelling	■ WIKA product label, lasered ■ Customised product label on request

Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	EMC Directive	
	EN 61326 emission (group 1, class B) and immunity (industrial environments)	
	Pressure Equipment Directive	
	RoHS directive	

Optional approvals

Logo	Description	Region
	UL	USA and Canada
	Component approval	
	Type approval by the German Kraftfahrt-Bundesamt (KBA – Federal Motor Transport Authority)	International
	EMC UN Regulation No. 10	

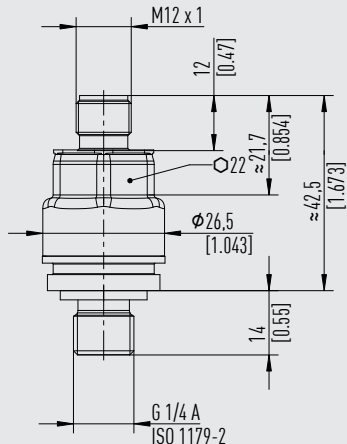
Manufacturer's declaration

Logo	Description
-	China RoHS directive
MTTF	> 100 years

→ For approvals and certificates, see website

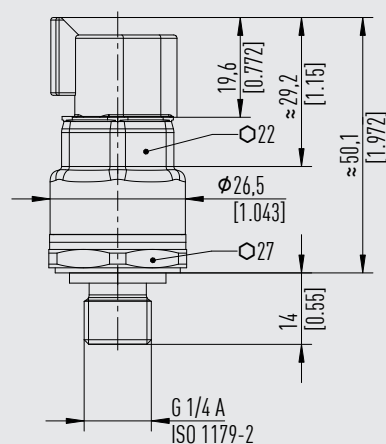
Dimensions in mm [in]

Circular connector M12 x 1, code A, 4-pin



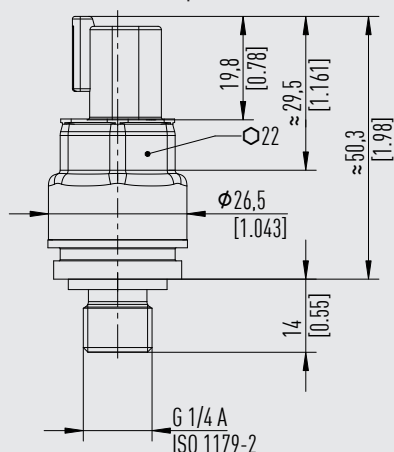
Weight: approx. 80 g [0.18 lb]

Deutsch connector DT04-3P, 3-pin



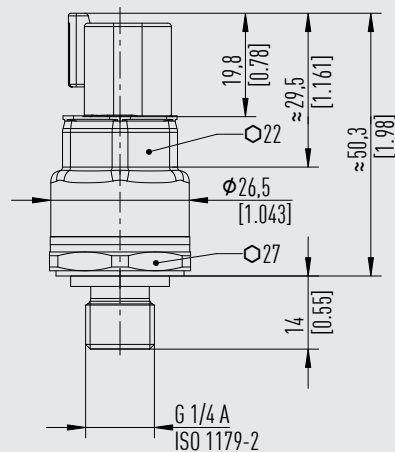
Weight: approx. 80 g [0.18 lb]

Deutsch connector DT04-2P, 2-pin



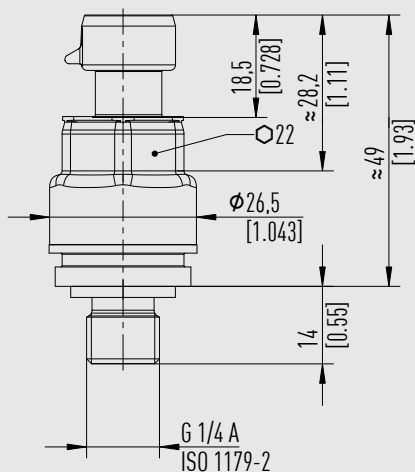
Weight: approx. 80 g [0.18 lb]

Deutsch connector DT04-4P, 4-pin



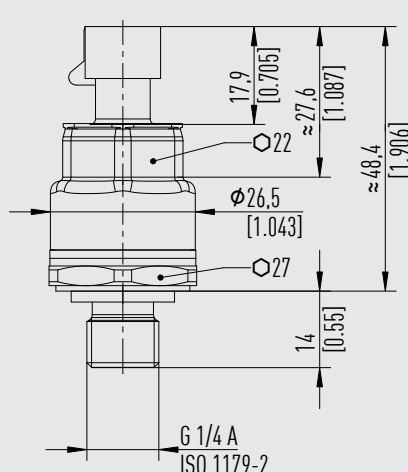
Weight: approx. 80 g [0.18 lb]

Delphi connector Metri-Pack series 150, 3-pin



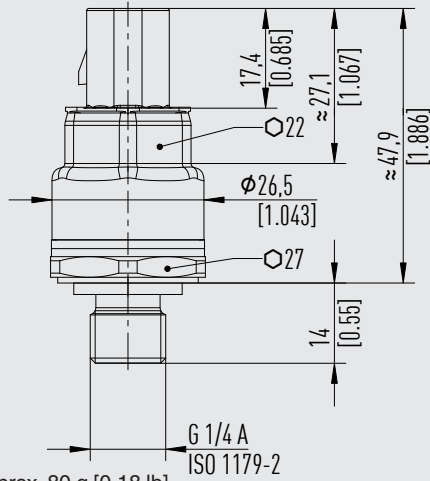
Weight: approx. 80 g [0.18 lb]

AMP Superseal connector 1.5, 3-pin



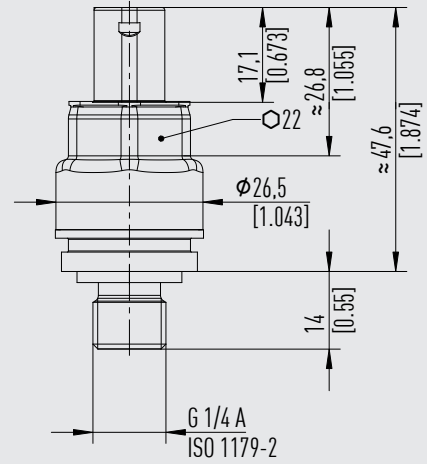
Weight: approx. 80 g [0.18 lb]

AMP Seal 16 connector, cone, code A, 3-pin



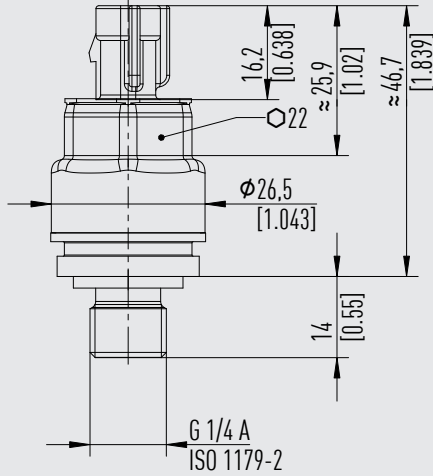
Weight: approx. 80 g [0.18 lb]

AMP Micro Quadlok System connector, code A, 3-pin



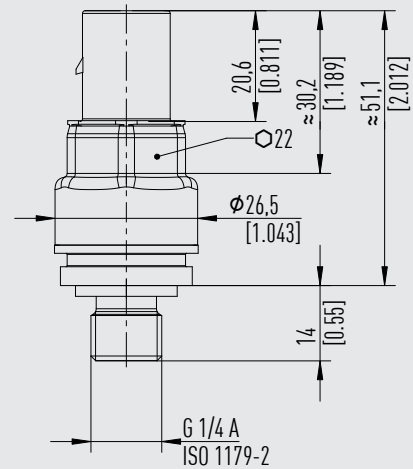
Weight: approx. 80 g [0.18 lb]

AMP Econoseal J Mark II series connector, 3-pin



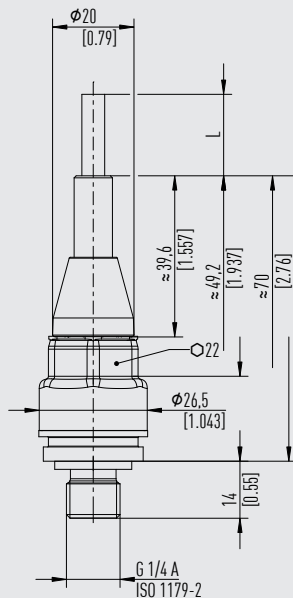
Weight: approx. 80 g [0.18 lb]

VW connector, code I, 4-pin, 2 rows



Weight: approx. 80 g [0.18 lb]

Cable outlet, IP6K9K, 2- or 3-wire



Weight: approx. 80 g [0.18 lb]

Ordering information

Model / Version / Output signal / Measuring range / Process connection / Seal / Electrical connection

© 08/2018 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.
The specifications given in this document represent the state of the art at the time of publishing.
We reserve the right to make modifications to the specifications and materials.



WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel. +49 9372 132-0
info@wika.de
www.wika.de