

OEM pressure sensor For mobile working machines Model MH-4

WIKA data sheet PE 81.63



For further approvals,
see page Seite 9

Applications

Working 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.

Developed for the specific requirements in mobile working machines

The model MH-4 meets high demands and measures with high precision at temperatures of $-40 \dots +125 \text{ }^{\circ}\text{C}$ [$-40 \dots +257 \text{ }^{\circ}\text{F}$]. With its up to 3 times overpressure limit, the sensor withstands hydraulic pressure spikes – and is optionally available with a restrictor. Thanks to metallic shielding, the model MH-4 works interference-free at field strengths up to 100 V/m. In addition, vibrations up to 40 g and shocks up to 100 g 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. Even after more than 100 million load cycles, the long-term drift is still less than 0.1 % FS.

Think big – with WIKA as an OEM supplier

Secure supply chains, high quality standards and a comprehensive range of services worldwide make WIKA 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.

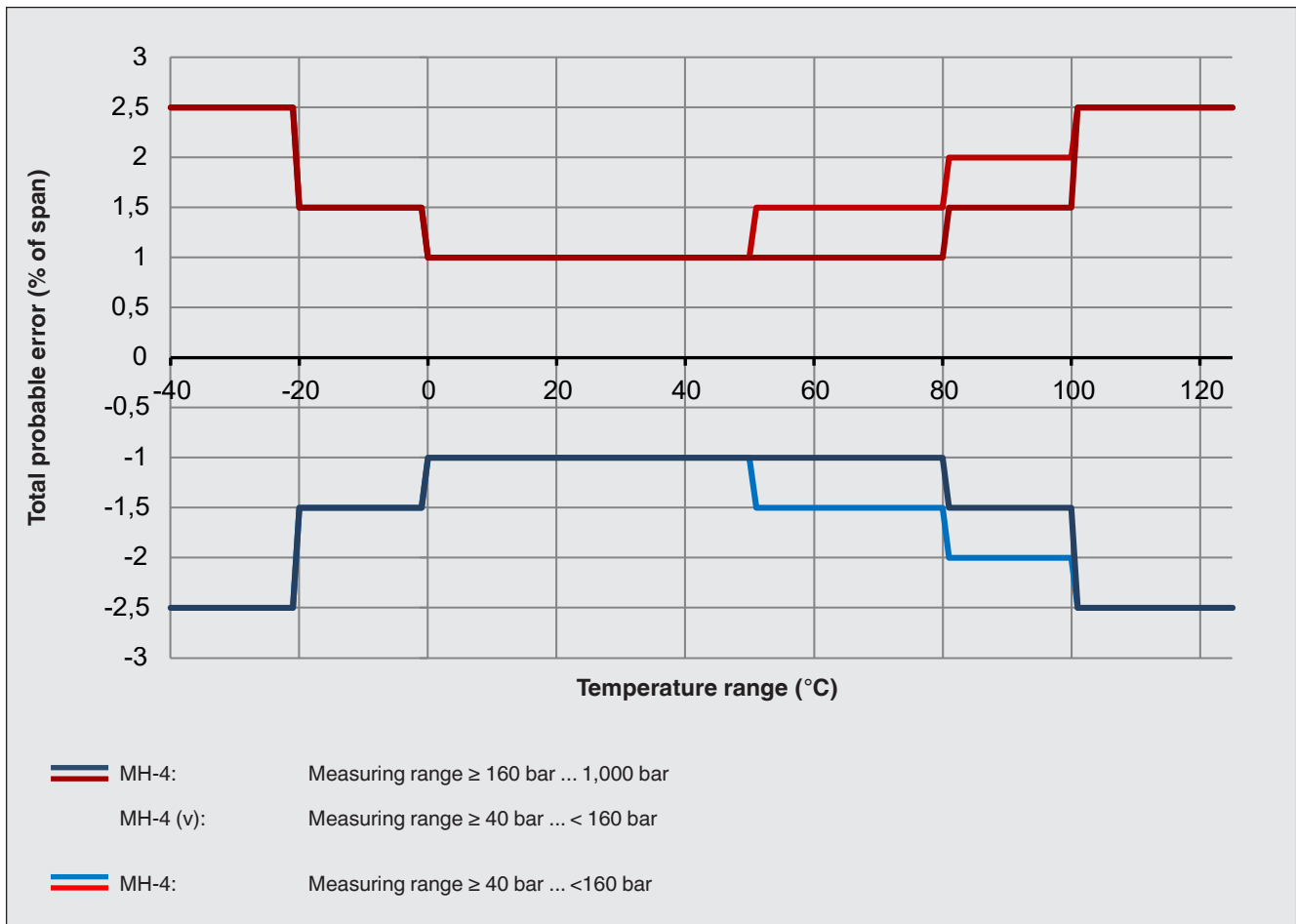
Specifications

Overview of versions	
Model	Description
MH-4	OEM pressure sensor
MH-4 (v)	OEM pressure sensor with pressure compensation element (v = vented) → The pressure compensation element ensures higher 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⁾
Accuracy	→ See „Total probable error per IEC 62828-2“ below
Max. measured error per IEC 62828-1	→ See „Total probable error per IEC 62828-2“ below
Total probable error per IEC 62828-2	→ See diagram „Total probable error“ below
Max. measured error for temperature per IEC 62828-3	$\leq \pm 2\text{ K}$ ²⁾
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) 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]	50 °C [122 °F]	80 °C [176 °F]
MH-4			
0 ... 6 bar	≤ ±1.7 %	≤ ±3.4 %	≤ ±5.8 %
0 ... 10 bar	≤ ±1.3 %	≤ ±2.3 %	≤ ±3.8 %
0 ... 16 bar	≤ ±1.0 %	≤ ±1.6 %	≤ ±2.7 %
0 ... 25 bar	≤ ±1.0 %	≤ ±1.3 %	≤ ±2.1 %
MH-4 (v)			
0 ... 6 bar	≤ ±1.3 %	≤ ±1.6 %	≤ ±2.2 %
0 ... 10 bar	≤ ±1.0 %	≤ ±1.2 %	≤ ±1.5 %
0 ... 16 bar	≤ ±1.0 %	≤ ±1.0 %	≤ ±1.0 %
0 ... 25 bar	≤ ±1.0 %	≤ ±1.0 %	≤ ±1.0 %

Measuring ranges, gauge pressure

bar	
MH-4	MH-4 (v)
0 ... 6	0 ... 6
0 ... 10	0 ... 10
0 ... 16	0 ... 16
0 ... 25	0 ... 25
0 ... 40	0 ... 40
0 ... 60	0 ... 60
0 ... 100	0 ... 100
0 ... 160	-
0 ... 250	-
0 ... 400	-
0 ... 600	-
0 ... 1,000	-

psi	
MH-4	MH-4 (v)
0 ... 100	0 ... 100
0 ... 200	0 ... 200
0 ... 300	0 ... 300
0 ... 400	0 ... 400
0 ... 500	0 ... 500
0 ... 1,500	0 ... 1,500
0 ... 2,000	-
0 ... 3,000	-
0 ... 5,000	-
0 ... 8,000	-
0 ... 10,000	-

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	<ul style="list-style-type: none"> ■ bar ■ psi ■ MPa
Maximum working pressure	Corresponds to the upper measuring range value / measuring range full scale value

Further details on: Measuring range	
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 range 600 bar [8,000 psi, 10,000 psi]	2 times
Measuring range 1,000 bar	1.5 times
Vacuum resistance	Yes

Process connection					
Standard	Thread size	Max. measuring range	Overpressure limit	Seal	
DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ¼ A	600 bar [8,700 psi]	858 bar [12,400 psi]	<ul style="list-style-type: none"> ■ NBR ■ FPM/FKM 	
DIN EN ISO 9974-2 (formerly DIN 3852-E)	M14 x 1.5	600 bar [8,700 psi]	858 bar [12,400 psi]		
ISO 6149-2	M14 x 1.5	600 bar [8,700 psi]	858 bar [12,400 psi]		
JIS B2351-1	G ¼ B x 10, form O with collar	600 bar [8,700 psi]	858 bar [12,400 psi]		
	G ¾ A, form O with collar	600 bar [8,700 psi]	858 bar [12,400 psi]		
SAE J514 (Compatible with SAE J1926 tapped holes)	7/16-20 UNF, O-ring BOSS	600 bar [8,700 psi]	858 bar [12,400 psi]		
	9/16-18 UNF-2A, O-ring BOSS	600 bar [8,700 psi]	858 bar [12,400 psi]		
	3/4-16 UNF-2A, O-ring BOSS	600 bar [8,700 psi]	858 bar [12,400 psi]		
	7/16-20 UNF-2A, sealing cone 74°	800 bar [11,600 psi]	1,144 bar [16,500 psi]		
ANSI/ASME B1.20.1	½ NPT	400 bar [5,800 psi]	572 bar [8,200 psi]		-
	¼ NPT	1,000 bar [14,500 psi]	1,430 bar [20,700 psi]		
KS	PT ¼	1,000 bar [14,500 psi]	1,430 bar [20,700 psi]		
	PT ¾	1,000 bar [14,500 psi]	1,430 bar [20,700 psi]		
ISO 7	R ¼	1,000 bar [14,500 psi]	1,430 bar [20,700 psi]		
	R ¾	1,000 bar [14,500 psi]	1,430 bar [20,700 psi]		
EN 837	G ½ B	400 bar [5,800 psi]	572 bar [8,200 psi]	<ul style="list-style-type: none"> ■ Copper ■ Stainless steel 	
	G ¼ B	1,000 bar [14,500 psi]	1,430 bar [20,700 psi]		
	G ¾ B	1,000 bar [14,500 psi]	1,430 bar [20,700 psi]		

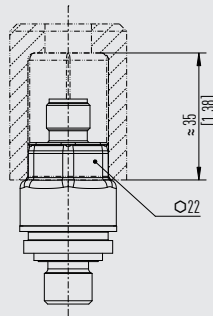
Details must be tested separately in the respective application. The specified values for the overpressure limit serve only as a rough orientation. The values depend on the temperature, the seal used, the selected torque, the type and material of the mating thread and the prevailing operating conditions.

Further details on: Process connection	
Max. measuring range	→ See "Process connection" table above
Overpressure limit	→ See "Process connection" table above
Seal	→ See "Process connection" table above
Pressure port diameter	For applications that can lead to pressure spikes, a restrictor with a pressure port of 0.3 mm is available. <ul style="list-style-type: none"> ■ 2.5 mm ■ 0.3 mm with mounted restrictor

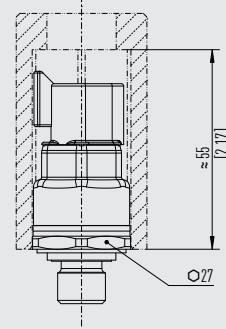
Further details on: Process connection

Socket wrench suitability

Hexagon (SW 22) integrated into case



Additional hexagon (SW 27) above the process connection



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)	<ul style="list-style-type: none"> ■ DC 0 ... 5 V ■ DC 0 ... 10 V ■ DC 1 ... 5 V ■ DC 1 ... 10 V
	<ul style="list-style-type: none"> ■ DC 0.5 ... 4.5 V → Not available with temperature output
Ratiometric (3-wire)	DC 0.5 ... 4.5 V

Load

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
- Selectable range: 2 ... 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

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

Output signal		
Voltage supply		
Auxiliary power	Current output (2-wire), 4 ... 20 mA	DC 8 ... 36 V
	<ul style="list-style-type: none"> ■ Voltage output (3-wire), DC 0 ... 5 V ■ Voltage output (3-wire), DC 0 ... 10 V ■ Voltage output (3-wire), DC 1 ... 5 V ■ Voltage output (3-wire), DC 1 ... 10 V ■ Voltage output (3-wire), DC 0.5 ... 4.5 V 	<ul style="list-style-type: none"> ■ DC 8 ... 36 V ■ DC 12 ... 36 V ■ DC 8 ... 36 V ■ DC 12 ... 36 V ■ DC 8 ... 36 V
	Ratiometric output (3-wire), DC 0.5 ... 4.5 V	DC 5 V ±10 %
	Max. auxiliary power with UL approval	DC 35 V
	Current supply	
Current supply	Current output (2-wire)	≤ 25 mA
	Voltage output (3-wire)	≤ 10 mA
	Ratiometric output (3-wire)	≤ 10 mA
Overvoltage resistance	DC 48 V (DC 30 V with ratiometric output signal)	
Dynamic behaviour	Pressure	Temperature
Settling time per IEC 62828-1	≤ 1 ms	≤ 10 min
Switch-on time	< 200 ms	-

→ Other output signals on request

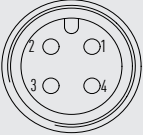
Electrical connection		
Connection type	IP code ¹⁾	Permissible temperature range
MH-4		
Circular connector M12 x 1, code A, 4-pin ²⁾	IP67 per IEC 60529	-40 ... +125 °C [-40 ... +257 °F]
Deutsch connector DT04-2P, 2-pin		
Deutsch connector DT04-3P, 3-pin		
Deutsch connector DT04-4P, 4-pin ²⁾		
Delphi 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 series, 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 4-pin	IP67 per IEC 60529	-40 ... +125 °C [-40 ... +257 °F]
Deutsch connector DT04-3P, 3-pin		

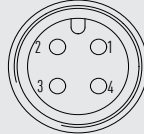
1) The stated IP codes only apply when plugged in using mating connectors that have the appropriate IP code.

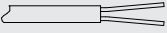
2) Usable for MH-4 with additional temperature output signal

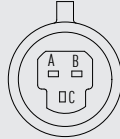
Further details on: Electrical connection	
Connection type	→ See "Electrical connection" table above
Pin assignment	→ See "Pin assignment" table below
Ingress protection (IP code) per IEC 60529	→ See "Electrical connection" table above
Short-circuit resistance	S+ vs. U-
Reverse polarity protection	U+ vs. U-
Insulation voltage	DC 500 V (DC 850 V optional)

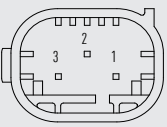
Pin assignment

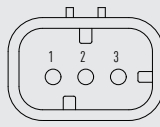
Circular connector M12 x 1, code A, 4-pin			
		2-wire	3-wire
	U+	1	1
	U-	3	3
	S+	-	4

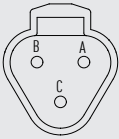
Circular connector M12 x 1, code A, 4-pin			
		4-wire	
	U+	1	
	U-	3	
	P	4	
	T	2	

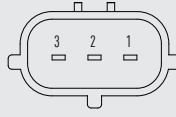
Cable outlet, IP6K9K, 2- or 3-wire			
		2-wire	3-wire
	U+	Red (RD)	Red (RD)
	U-	Black (BK)	Black (BK)
	S+	-	White (WH)

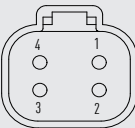
Delphi connector Metri-Pack series 150, 3-pin			
		2-wire	3-wire
	U+	B	B
	U-	A	A
	S+	-	C

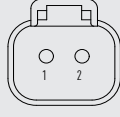
AMP Micro Quadlok System connector, code A, 3-pin			
		2-wire	3-wire
	U+	3	3
	U-	1	1
	S+	-	2

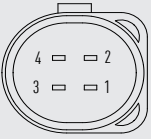
AMP Seal 16 connector, cone, code A, 3-pin			
		2-wire	3-wire
	U+	3	3
	U-	1	1
	S+	-	2

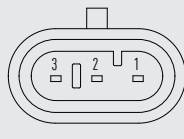
Deutsch connector DT04-3P, 3-pin			
		2-wire	3-wire
	U+	A	A
	U-	B	B
	S+	-	C

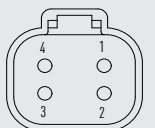
AMP Econoseal J Mark II series connector, 3-pin			
		2-wire	3-wire
	U+	1	1
	U-	3	3
	S+	-	2

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

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

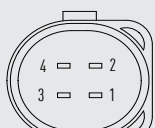
VW connector, code I, 4-pin, 2 rows			
		2-wire	3-wire
	U+	2	2
	U-	1	1
	S+	-	4

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

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

Legend

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

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

Material	
Material (wetted)	Stainless steel 304L, PH grade steel
Material (in contact with the environment)	Stainless steel 304L, 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]
Relative humidity per EN 60068-2-78	93 % at 55 °C [131 °F]
Pollution degree	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) per IEC 60529	→ See "Electrical connection"
Service life	> 100 million load cycles
EMC	
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
Puls 1 per ISO 7637-2 ²⁾	Level III
Puls 2a per ISO 7637-2 ²⁾	Level III
Puls 2b per ISO 7637-2 ²⁾	Level III
Puls 3a per ISO 7637-2 ²⁾	Level III
Puls 3b per ISO 7637-2 ²⁾	Level III
Fast Transient Pulses per ISO 7637-3	Level IV
Radiation 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) Not valid for ratiometric output signal

Packaging and instrument labelling	
Packaging	Multiple packaging (up to 25 pieces)
Instrument labelling	<ul style="list-style-type: none"> ■ WIKA product label, lasered ■ Customer-specific 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	
	UKCA	United Kingdom
	Electromagnetic compatibility regulations	
	Pressure equipment (safety) regulations	
	Restriction of hazardous substances (RoHS) regulations	

Optional approvals

Logo	Description	Region
	UL	USA and Canada
	Component approval	
	EAC	Eurasian Economic Community
	EMC directive	

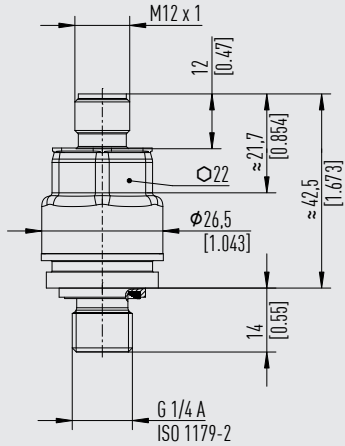
Manufacturer's information and certificates

Logo	Description
-	China RoHS directive
MTTF	> 100 years

→ For approvals and certificates, see website

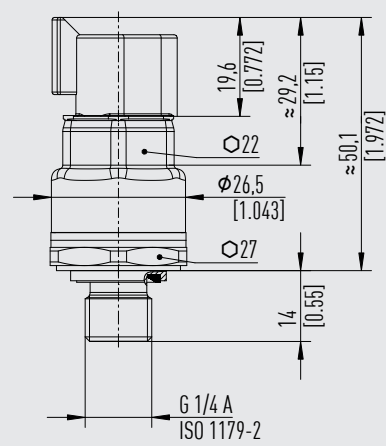
Dimensions in mm [in]

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



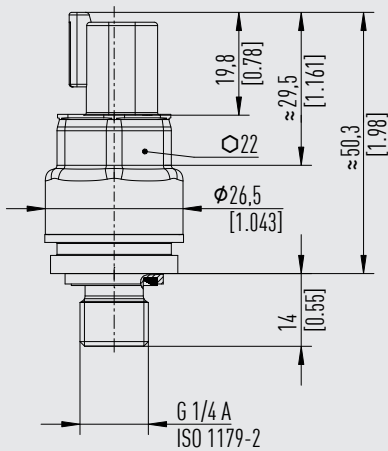
Weight: approx. 80 g [0.18 lbs]

Deutsch connector DT04-3P, 3-pin



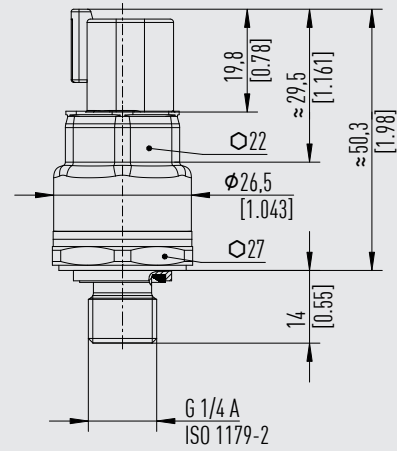
Weight: approx. 80 g [0.18 lbs]

Deutsch connector DT04-2P, 2-pin



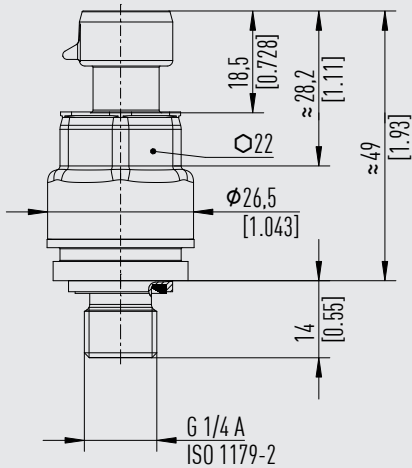
Weight: approx. 80 g [0.18 lbs]

Deutsch connector DT04-4P, 4-pin



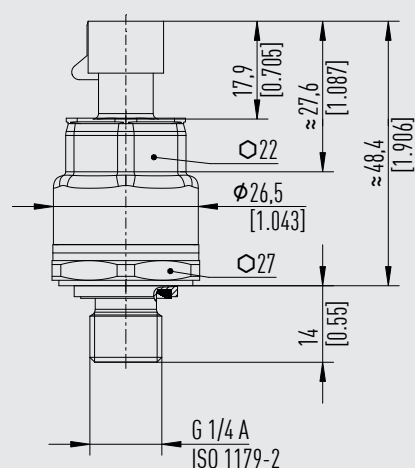
Weight: approx. 80 g [0.18 lbs]

Delphi connector Metri-Pack series 150, 3-pin



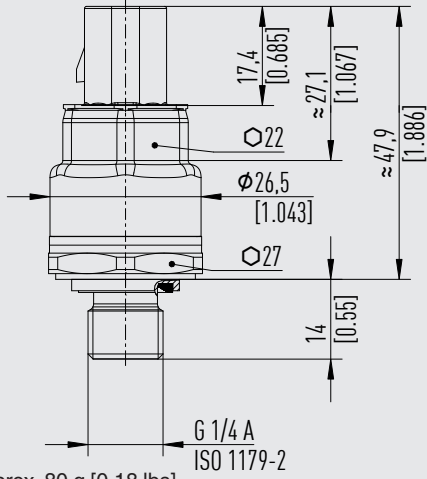
Weight: approx. 80 g [0.18 lbs]

AMP Superseal connector 1.5 series, 3-pin



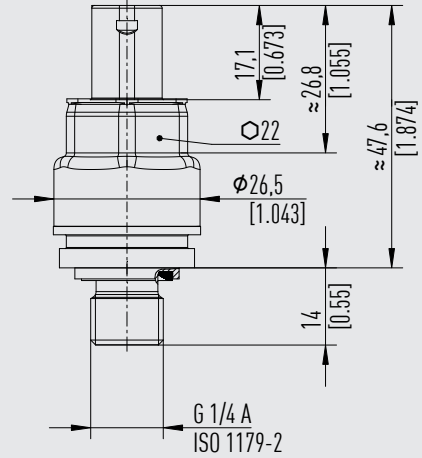
Weight: approx. 80 g [0.18 lbs]

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



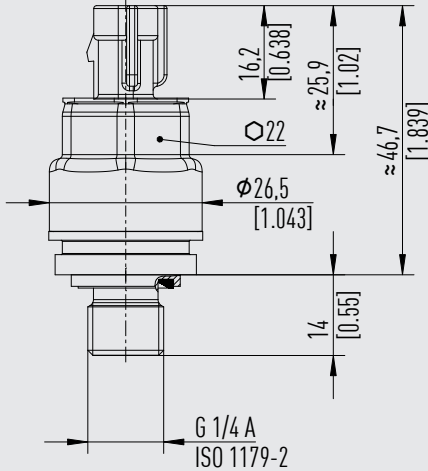
Weight: approx. 80 g [0.18 lbs]

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



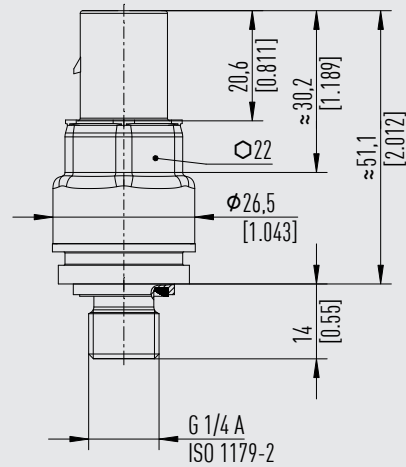
Weight: approx. 80 g [0.18 lbs]

AMP Econoseal J Mark II series connector, 3-pin



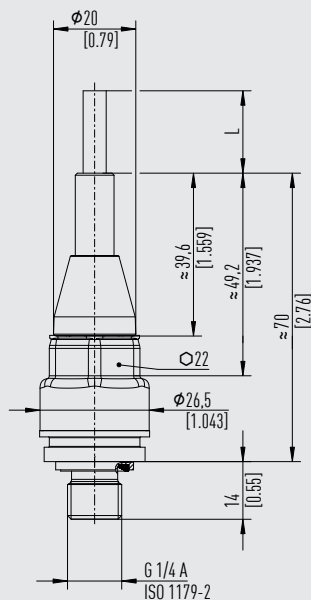
Weight: approx. 80 g [0.18 lbs]

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



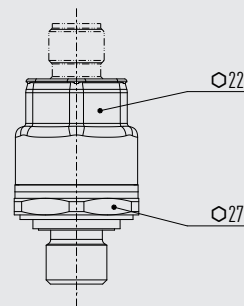
Weight: approx. 80 g [0.18 lbs]

Cable outlet, IP6K9K, 2- or 3-wire



Weight: approx. 80 g [0.18 lbs]

Additional hexagon at the process connection (SW 27)



Ordering information

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

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