OEM pressure sensor
For mobile working machines, CANopen®/SAE J1939
Model MH-4-CAN

For further approvals, see page 6

Applications

Working and control pressure measurement in:
- Construction equipment
- Agricultural and forestry machines
- Mobile cranes and mobile elevating work platforms (MEWP)
- Material handling equipment and municipal vehicles

Special features

- Developed for the extreme operating conditions in mobile working machines
- Highest signal stability and integrity thanks to CANopen®
- Reliability and highest accuracy over the entire life cycle
- Customer-specific adaptations and individualisation
- High production capacities

OEM pressure sensor, model MH-4-CAN

Description

The MH-4-CAN, based on the MH-4, is a powerful, reliable and extremely resilient pressure sensor for mobile working machines. Even under demanding conditions, the sensor delivers constant, precise measured data and ensures high operational safety. The special feature of the MH-4-CAN is, as the name suggests, the CANopen® or SAE J1939 serial interface. This enables use in complex machines and offers the advantage of simple and cost-effective system expansion with the bridging of large distances while simultaneously ensuring signal stability and signal integrity.

Developed for the specific requirements in mobile working machines
The MH-4-CAN meets high demands and measures with high precision at temperatures between -40 and +100 °C [-40 ...+212 °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 MH-4-CAN works interference-free at field strengths of up to 60 V/m. In addition, vibrations up to 40 g and shocks up to 100 g have no influence on the measurement quality.

Highest reliability over the entire life cycle
Whether dust, humidity, heat or mechanical stress: The MH-4-CAN 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.
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

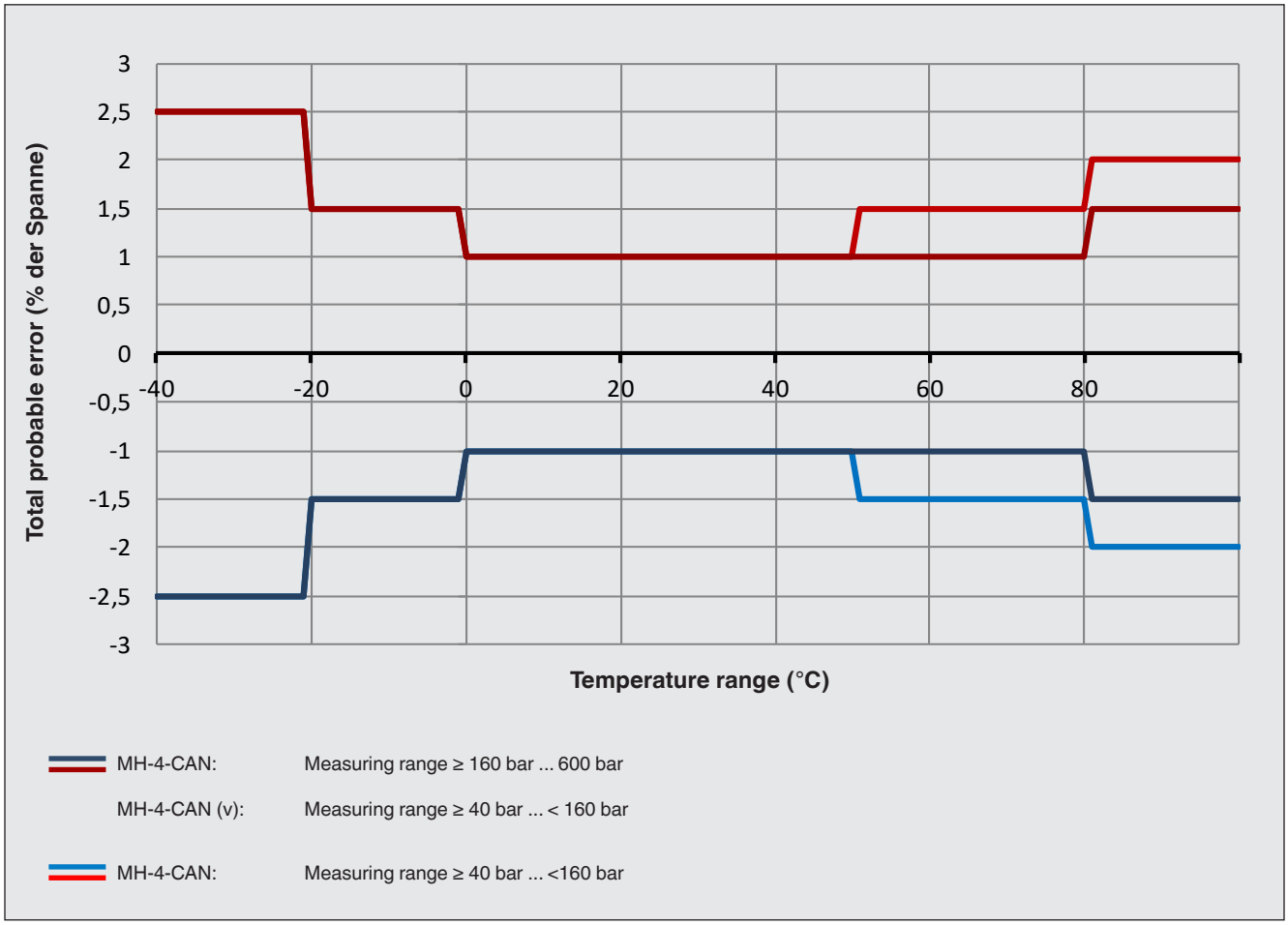
Overview of versions	
Model	**Description**
MH-4-CAN	OEM pressure sensor
MH-4-CAN (v)	OEM pressure sensor with vented electrical connection → By means of ventilation of the electrical connection, the pressure sensor achieves a higher accuracy in measuring ranges < 160 bar [2,000 psi], see diagram “Total probable error” below. → Not suited to applications involving diesel fuels, ambient conditions involving salt mist and extreme temperature fluctuations.

Accuracy specifications	
Non-linearity per IEC 62828-1	≤ ±0.25 % of span (BFSL) [1]
Accuracy	→ See “Total probable error” below
Max. measured error per IEC 62828-1	→ See “Total probable error” below
Total probable error per IEC 62828-2	→ See diagram “Total probable error” below
Long-term drift per IEC 62828-1	≤ ±0.1 % of span
Reference conditions	Per IEC 62828-1

1) Applies to SAE J1939 at a zero point of +0.5 % ... full scale value of -0.5 %

Total probable error

Accuracy including non-linearity, hysteresis, non-repeatability, zero and span tolerance, temperature effects and long-term stability.



Measuring ranges, gauge pressure

bar	
MH-4-CAN	**MH-4-CAN (v)**
0 … 40	0 … 40
0 … 60	0 … 60
0 … 100	0 … 100
0 … 160	-
0 … 250	-
0 … 400	-
0 … 600	-

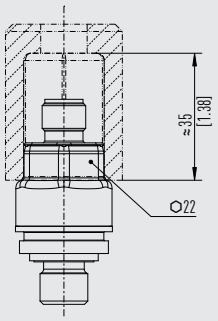
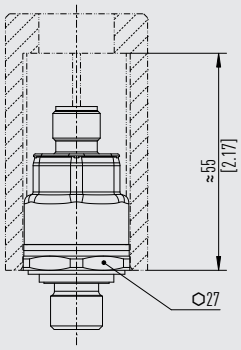
psi	
MH-4-CAN	**MH-4-CAN (v)**
0 … 500	0 … 500
0 … 1.000	0 … 1.000
0 … 1.500	0 … 1.500
0 … 2.000	-
0 … 3.000	-
0 … 5.000	-
0 … 8.000	-

Other measuring ranges on request.

Further details on: Measuring range	
Units	bar, psi, MPa
Maximum working pressure	→ Corresponds to the upper measuring range value / measuring range full scale value
Overpressure limit per IEC 62828-1	The overpressure limit is based on the measuring range. Depending on the selected process connection and sealing, restrictions in overpressure limit can result.
Measuring range ≤ 400 bar [≤ 5,000 psi]	3 times
Measuring range 600 bar [8,000 psi]	2 times
Vacuum resistance	Yes

Process connection				
Standard	**Thread size**	**Max. measuring range**	**Overpressure limit**	**Sealing**
DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ¼ A	600 bar [8,700 psi]	858 bar [12,440 psi]	■ NBR ■ FPM/FKM
DIN EN ISO 9974-2 (formerly DIN 3852-E)	M14 x 1.5	600 bar [8,700 psi]	858 bar [12,440 psi]	
ISO 6149-2	M14 x 1.5	600 bar [8,700 psi]	858 bar [12,440 psi]	
JIS B 2351-1	G ¼ B x 10, form O with collar	600 bar [8,700 psi]	858 bar [12,440 psi]	
	G ⅜ A, form O with collar	600 bar [8,700 psi]	858 bar [12,440 psi]	
SAE J514 (Compatible for threaded holes SAE J1926)	7/16-20 UNF, O-ring BOSS	600 bar [8,700 psi]	858 bar [12,440 psi]	
	9/16-18 UNF-2A, O-ring BOSS	600 bar [8,700 psi]	858 bar [12,440 psi]	
	3/4-16 UNF-2A, O-ring BOSS	600 bar [8,700 psi]	858 bar [12,440 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	⅛ NPT	400 bar [5,800 psi]	572 bar [8,290 psi]	-
	¼ NPT	1,000 bar [14,500 psi]	1,480 bar [21,400 psi]	
KS	PT ¼	1,000 bar [14,500 psi]	1,480 bar [21,400 psi]	
	PT ⅜	1,000 bar [14,500 psi]	1,480 bar [21,400 psi]	
ISO 7	R ¼	1,000 bar [14,500 psi]	1,480 bar [21,400 psi]	
	R ⅜	1,000 bar [14,500 psi]	1,480 bar [21,400 psi]	
EN 837	G ⅛ B	400 bar [5,800 psi]	572 bar [8,290 psi]	■ Copper ■ Stainless steel
	G ¼ B	1,000 bar [15,000 psi]	1,480 bar [21,400 psi]	
	G ⅜ B	1,000 bar [15,000 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 sealing 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 “Process connection” table above	
Overpressure limit	→ See “Process connection” table above	
Sealing	→ See “Process connection” table above	
Pressure port diameter	As an option, for applications that can lead to pressure spikes, a restrictor with a pressure port of 0.3 mm is available. ■ 2.5 mm (standard for all process connections) ■ Restrictor 0.3 mm possible (for all process connections)	
Socket wrench suitability	Hexagon (SW 22) integrated into case 	Additional hexagon (SW 27) above the process connection 
Possible restrictions	Depending on the choice of sealing on the process connection, there may be restrictions in the permissible temperature range	
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 sealings on request.

Output signal		
Signal type		
CANopen®	Communication profile	CiA 301
	Device profile	CiA 404
	Layer-setting services and protocol	CiA 305
	Automatic bit-rate detection	CiA 801
	→ See “Special documentation for CANopen®”	
Communication		
Configuration of the CANopen® interface	It is possible to order the model MH-4-CAN already preconfigured.	
	→ See “Special documentation for CANopen®”	
Baud rate	0	1000 kbit/s
	1	800 kbit/s
	2	500 kbit/s
	3	250 kbit/s (standard)
	4	125 kbit/s
	5	100 kbit/s
	6	50 kbit/s
	7	20 kbit/s

Output signal		
Node ID	001 ... 127	001 (standard) [1)]
PDO mapping	A	Object 0x9130.01 (pressure value int32) and 0x6150.01 (status)
	B	Object 0x6130.01 (pressure value float) and 0x6150.01 (status) (standard)
	C	Object 0x7130.01 (pressure value int16) and 0x6150.01 (status)
PDO cycle	00001 ... 65535	Period in milliseconds (default: 100)
Decimal points	A	Optimum (standard)
	0 ... 5	Number of decimal points [1)]
Transmission type	001 ... 240	Synchronous transmission 001 (standard) [1)]
	254	Asynchronous cyclic transmission (event-timer-driven)
	255	Asynchronous transmission (event-timer-driven and/or PV change, PV limit exceeded)
Event timer	0	Automatic (standard)
	00001 ... 65535	Event timer in milliseconds [1)]
Auto-operational	Z	Off via object 1F80 (standard)
	A	On via object 1F80
Heartbeat	0	Without (standard)
	00001 ... 65535	Heartbeat in milliseconds [1)]
Signal type		
J1939	SAE J1939	
Communication		
Baud rate	2	500 kbit/s
	3	250 kbit/s (standard)
TR-JPRIO	0	0
	1	1
	2	2
	3	3
	4	4
	5	5
	6	6 (standard)
	7	7
Parameter Group Number (PGN)	→ See “Special documentation J1939, 14547349”	
Suspect Parameter Number (SPN)	→ See “Special documentation J1939, 14547349”	
Source address (SA)	128	128 (standard)
	000 ... 253	Source address
Arbitrary Address Capable	0	0
	1	1 (standard)
Industry Group	0	Global (standard)
	1	On-highway equipment
	2	Agricultural and forestry equipment
	3	Construction equipment
	4	Marine
	5	Stationary industrial process control
	6	Reserved
	7	Reserved
Vehicle System Instance	0 ... 15	00 (standard)

Output signal		
Vehicle System	0 ... 127	000 (standard)
Function	0 ... 255	000 (standard)
Function Instance	0 ... 31	0 (standard)
ECU Instance	0	0 (standard)
	1	1
	2	2
	3	3
	4	4
	5	5
	6	6
	7	7
TRR rate var.	0 ... 65535	TRR rate var.
	100	100 ms (standard)
Voltage supply		
Supply voltage	■ CANopen: DC 9 ... 35 V ■ SAE J1939: DC 9 … 35 V	
Current supply	■ CANopen: < 50 mA ■ SAE J1939: < 50 mA	
Overvoltage protection	DC 36 V	
Dynamic behaviour		
Settling time per IEC 62828-1	≤ 3 ms	
Switch-on time	< 500 ms	

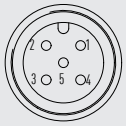
1) Select a numerical value

Electrical connection		
Connection type	**IP code [1)]**	**Permissible temperature range**
MH-4-CAN		
Circular connector M12 x 1 5-pin	IP67 per IEC 60529	-40 ... +125 °C [-40 ... +257 °F]
MH-4-CAN (v)		
Circular connector M12 x 1 5-pin, ventilated	IP67 per IEC 60529	-40 ... +125 °C [-40 ... +257 °F]

1) The stated IP codes (per IEC 60529) only apply when plugged in using mating connectors that have the appropriate IP code.

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	CAN-High/CAN-Low vs. U+/U- (U+: ≤ DC 24 V)
Reverse polarity protection	U+ vs. U-
Insulation voltage	DC 500 V
CAN bus impedance	A CAN bus impedance of 120 ohm is strictly required to reach a wide range and high number of involved persons with all transmission rates. In order to avoid gradients in potential, the shield must be connected along the entire bus with the lowest possible impedance.

Pin assignment

Circular connector M12 x 1 (5-pin)		
	1	Shield
	2	U+
	3	U-
	4	CAN-High
	5	CAN-Low

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 ... +100 °C [-40 ... +212 °F]
Ambient temperature limit [1]	-40 ... +85 °C [-40 ... +185 °F]
Storage temperature limit	-40 ... +70 °C [-40 ... +158 °F]
Relative humidity per EN 60068-2-78	93 % at 55°C [131 °F]
Vibration resistance per IEC 60068-2-6	40 g, 10 ... 2,000 Hz
Permanent vibration resistance per IEC 60068-2-6	10 g, 10 ... 2,000 Hz
Shock resistance per IEC 60068-2-27	100 g, 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 table “Electrical connection” 6
Service life	> 100 million load cycles
EMC (HF field)	
80 ... 1,500 MHz	60 V/m
1,500 ... 2,000 MHz	30 V/m
2,000 ... 6,000 MHz	60 V/m

1) Depending on the choice of sealing on the process connection, the electrical connection and the UL approval, there may be restrictions in the medium and ambient temperature (→ for restrictions, see “Process connection” and “Electrical connection”).

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

Approvals

Logo	Description	Region
CE	**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	**UKCA**	United Kingdom
	Electromagnetic compatibility regulations	
	Pressure equipment (safety) regulations	
	Restriction of hazardous substances (RoHS) regulations	

Optional approvals

Logo	Description	Region
c UL us	**UL** Component approval	USA and Canada

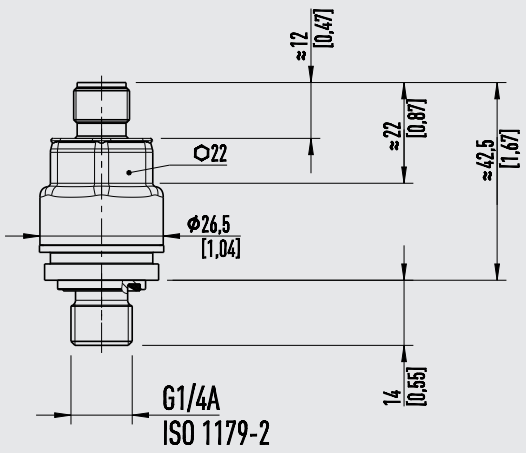
Manufacturer's information and certificates

Logo	Description
-	MTTF: > 100 years
-	China RoHS directive

→ For approvals and certificates, see website

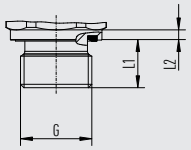
Dimensions in mm [in]

Circular connector M12 x 1, 5-pin



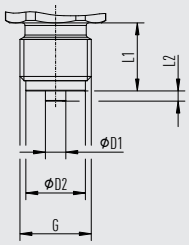
Weight: 80 g [0.18 lbs]

Process connections



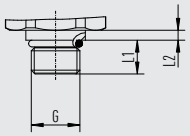
G	L1
G ¼ A DIN EN ISO 1179-2	14 [0,55]
M14 x 1,5 DIN EN ISO 9974-2	14 [0,55]

EN 837



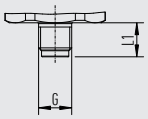
G	L1
G ¼ B	13 [0,51]
G ⅜ B	16 [0,63]

SAE J514

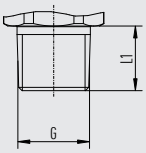


G	L1
3/4-16 UNF-2A	11,13 [0,44]
7/16-20 UNF-2A	12,06 [0,48]
9/16-18 UNF-2A	12,85 [0,51]

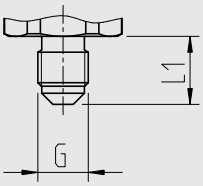
EN 837



G	L1
G ⅛ B	10 [0,39]

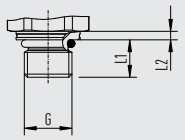


G	L1
⅛ NPT ANSI/ASME B1.20.1	10 [0,39]
¼ NPT ANSI/ASME B1.20.1	13 [0,51]
R ¼ ISO 7	13 [0,51]
R ⅜ ISO 7	15 [0,59]
PT ¼ KS	13 [0,51]
PT ⅜ KS	15 [0,59]



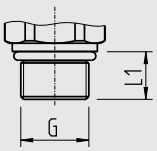
G	L1
7/16-20 UNF-2A, sealing cone 74°	15 [0,59]

ISO 6149-2



G	L1
M14 x 1,5	13,5 [0,53]

JIS B2351-1



G	L1
G ¼ B	10 [0,39]
G ⅜ A	12 [0,47]

Accessories and spare parts

Description	Order number
PCAN-USB adapter, cable set and power supply unit for configuration of CANopen®/J1939 design (for Windows® 98, ME, 2000, XP, Vista, Windows 7)	7483167

Windows® is a registered trademark of Microsoft Corporation in the United States and other countries.

Ordering information

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

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