



The GSH-S is a **compact** and **robust draw wire sensor** designed for **linear position measurement** in mobile machines.

Its optimized mechanical design allows **easy integration** even in space-constrained installations.

Based on **non-contact Hall-effect technology**, it ensures **stable measurement** performance, **high repeatability** and **long-term reliability** without wear of the sensing element.

With measurement **ranges up to 12500 mm**, it is suitable for applications such as stabilizers, telescopic booms, lifting systems and articulated machine structures.

The sensor is engineered to withstand **harsh operating conditions**, including **shock**, **vibration** and **demanding EMC** environments typical of **off-highway equipment**.

Multiple output options are available, including **voltage**, **current**, **ratiometric** and **CANopen / CANopen Safety** interfaces, enabling **flexible system integration**.

PLd/SIL2 certified variants are available, designed according to Category 2 and HFT = 0 (Category 3 and HFT = 1 for electronic subsystem) in compliance with **EN ISO 13849-1** and **EN IEC 62061** (See information for use for further details).

Detailed installation instructions, safety related informations and CAN communications details are provided in the detailed user documentation.

TECHNICAL SPECIFICATIONS

Measurement range (FS)

10000 mm, 12500 mm

Supply voltage (Us)

8...32 V DC (overvoltage 36 V DC continuous)
4.5...5.5 V DC (for ratiometric output only); 13...32 V DC (for 0...10 V output only)

Supply current

< 50 mA (excluding output current / terminated CAN-bus line)

Reverse polarity protection

Yes

Short circuit protection

Yes

Output signal

Ratiometric output: 10...90% Us
Analog output (voltage): 0.5...4.5 V; 0...10 V
Analog output (current): 4...20 mA
Digital output: CANopen; CANopen Safety

Load conditions

Voltage output: Min. 10 kΩ.
Current output:
Max. 200 Ω for supply voltage < 15 V DC;
Max. 500 Ω for supply voltage > 15 V DC
Digital output: internal 120 Ω terminating resistor not included

Power-on start-up time

< 1s

Response time

Analog output: Typ. 2ms; Digital output: Typ. 200ms

Electrical connections

M12 connector; Electrical cable

Resolution

Analog output: 12 bit; Digital output: 14 bit

Linearity factory verification@ 25 °C

< ±1%FS

Repeatability

Typ. ±0.5 % FS

Accuracy

< ±1.4 % FS (-40...+85 °C)

Working temperature

-40...+85 °C

Sinusoidal vibrations

20g, 10-2000 Hz, 3 axes (IEC 60068-2-6)

Mechanical shock

50g, 11 ms, 3 axes (IEC 60068-2-27)

Electromagnetic compatibility

2014/30/EU Electromagnetic Compatibility (EMC); Reference standards: EN ISO 13766-1:2018; EN ISO 13766-2:2018

Safety

SIL 2 according to EN IEC 62061 and IEC/EN 61508; Performance Level d (PL d) according to EN ISO 13849-1 Category 2

Life cycles

50000 cycles @ $v \leq 2$ m/s, $a \leq 1$ g
(v = linear cable velocity; a = linear cable acceleration)

Measuring cable pull-in/out force

> 7 N at start of stroke (retracted); > 13 N at end of stroke (extended)

Measuring cable speed/acceleration

Max. 2 m/s @ 1g, Typ. 1m/s @ 0.5g

IP Protection level

IP67, IP69k (with mating connector)

Material

Housing: PBT; Measuring cable: AISI316 stainless steel, Ø 0.85 mm nylon coating

Measuring cable break load

Typ. 300 N

Drum circumference

308 mm

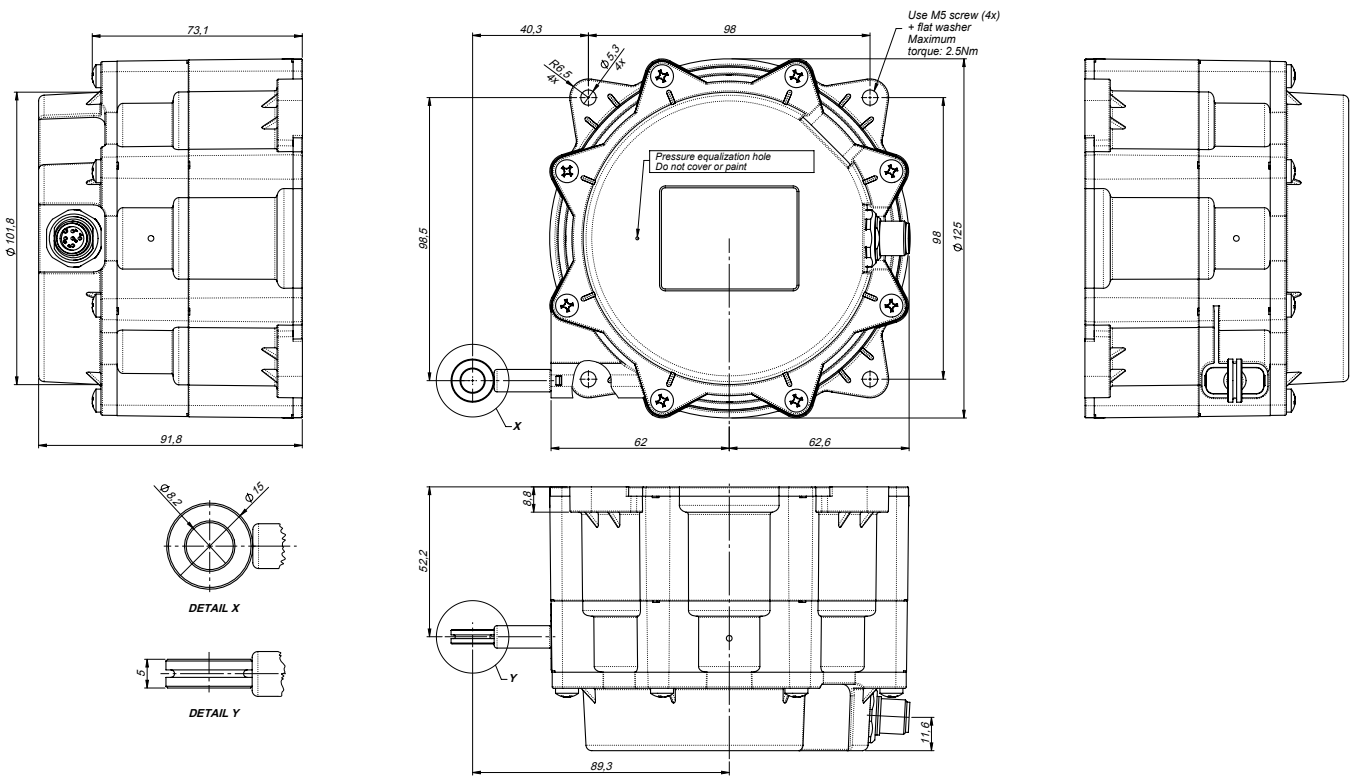
Weight

< 1.5 kg

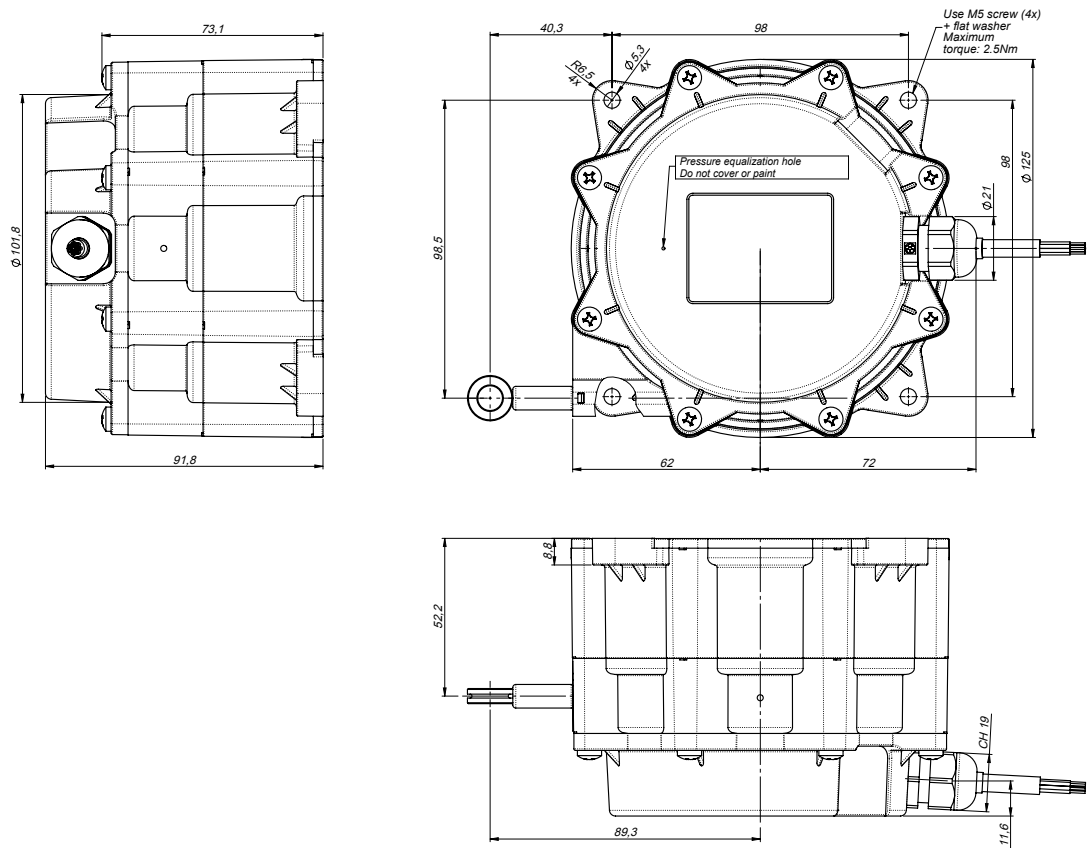
MECHANICAL DIMENSIONS

All dimensions are in mm. Decimal separator in drawings is comma.

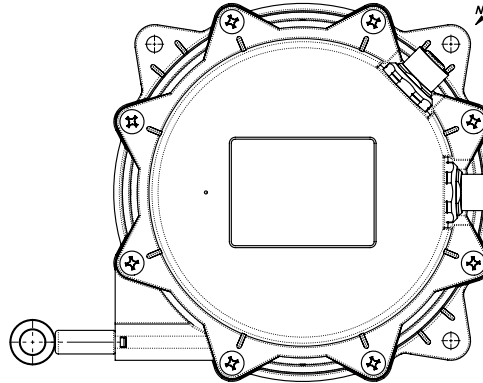
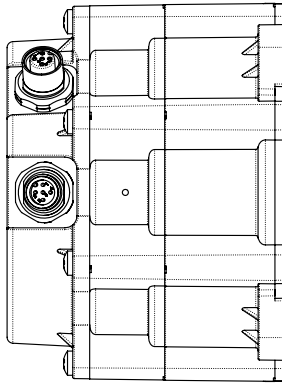
M12 1x Version



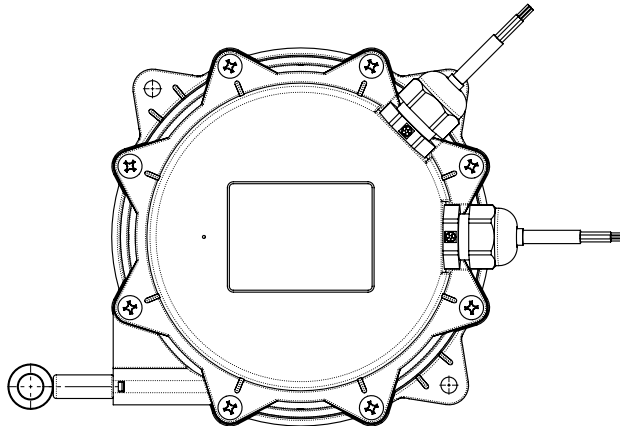
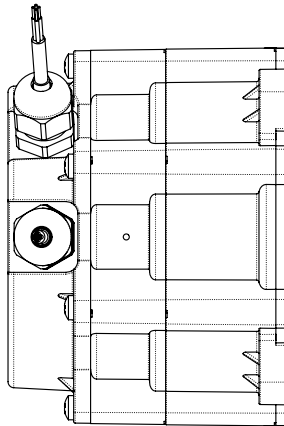
Cable Version



IN-OUT - M12 5P VERSION - CANopen

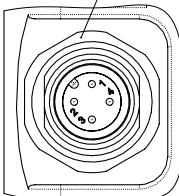
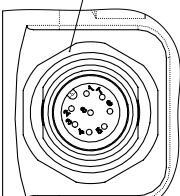
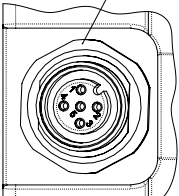
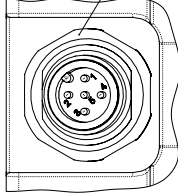
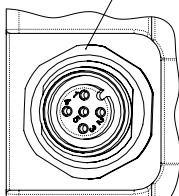
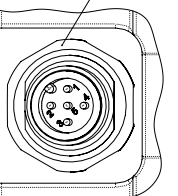


IN-OUT - CABLE VERSION - CANopen

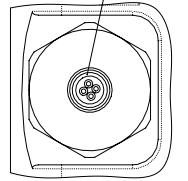


All dimensions are in mm. Decimal separator in drawings is comma.

ELECTRICAL CONNECTIONS - M12 VERSION

1xM12 4 poles connector		M-1	1xM12 8 poles connector		O-1
M12x1 4-pin male connector 		ANALOG OUTPUT CONNECTOR PINOUT 1. V+ 2. 0V 3. OUT CH1 4. OUT CH2		DIGITAL OUTPUT CONNECTOR PINOUT 1. V+ 2. 0V 3. CAN_H 4. CAN_L	
				M12x1 8-pin male connector 	
				ANALOG OUTPUT CONNECTOR PINOUT 1. V+ 2. 0V 3. OUT CH1 4. N.C. 5. V+ 6. 0V 7. OUT CH2 8. N.C.	
IN-OUT with M12 5 poles connector		P-3	1xM12 5 poles connector		P-1
(CAN pin 1 0V)			(CAN pin 1 0V)		
M12x1 5-pin female connector 		DIGITAL OUTPUT CONNECTOR PINOUT 1. 0V 2. V+ 3. 0V 4. CAN_H 5. CAN_L		M12x1 5-pin male connector 	
				DIGITAL OUTPUT CONNECTOR PINOUT 1. 0V 2. V+ 3. 0V 4. CAN_H 5. CAN_L	
VIEW FROM N					
IN-OUT with M12 5 poles connector		N-3	1xM12 5 poles connector		N-1
(CAN pin 1 FLOATING)			(CAN pin 1 FLOATING)		
M12x1 5-pin female connector 		DIGITAL OUTPUT CONNECTOR PINOUT 1. FLOATING 2. V+ 3. 0V 4. CAN_H 5. CAN_L		M12x1 5-pin male connector 	
				DIGITAL OUTPUT CONNECTOR PINOUT 1. N.C. 2. V+ 3. 0V 4. CAN_H 5. CAN_L	
VIEW FROM N					
The male and female M12 connectors are internally wired in pass-through configuration. Corresponding pins, including Pin 1 (floating), are directly connected between connectors.					
PINS MARKED "N.C." MUST NOT BE CONNECTED					

ELECTRICAL CONNECTION - CABLE VERSION

IN-OUT with cable connection F-0 F-3	
IEC 60228 Cable 4 pole 0.34mm2 PUR OD 4.4mm  ANALOG OUTPUT CONNECTIONS RED 1. V+ BLACK 2. 0V BLUE 3. OUT CH1 WHITE 4. OUT CH2 DIGITAL OUTPUT CONNECTOR PINOUT RED 1. V+ BLACK 2. 0V BLUE 3. CAN_H WHITE 4. CAN_L	

ORDERING CODE

GSH S M 1 H 100C S C3 - XXX 0 000 X 00

TRANSDUCER TYPE

Wire position sensor S

ELECTRICAL CONNECTIONS

M12 4P connector	M
M12 5P connector (CAN pin 1 FLOATING)*	N
M12 8P connector**	O
M12 5P connector (CAN pin 1 0V)*	P
Cable	F

* Available for digital output only

** Available for analog output only

CONNECTOR OPTIONS

Cable output	0
1 connector	1
1 Male & 1 Female connectors* or 2 cables**	3

* Only for electrical connections: "N", "P"

** Only for electrical connection: "F"

MEASUREMENT RANGE

10000 mm	100C
12500 mm	125C

ARCHITECTURE

Standard	H
PLd / SIL2	S

OUTPUT SIGNAL

CH1=CH2 : 10...90 % Us	A0
CH1=CH2 : 0.5...4.5 V	A1
CH1=CH2 : 0...10 V *	A2
CH1=CH2 : 4...20 mA	A3
CANopen	C1
CANopen Safety **	C3

* Not available with architecture "S"

** Available only with architecture "S"

Special execution XXX

CABLE LENGTH

00	No cable
01	100 mm
02	200 mm
05	500 mm
10	1 m
20	2 m
30	3 m
40	4 m
50	5 m
A0	10 m
....	Other lengths on request

ACCESSORIES

X	No accessories
C	4-pin female mating connector M12x1; IP67-rated (CON293)
D	8-pin female mating connector M12x1; IP67-rated (CON469)
E	5-pin female mating connector M12x1; IP67-rated (CON031)
F	Protective cap kit for M12x1 female connector (PKIT811)
G	Protective cap kit for M12x1 male connector (PKIT812)
H	4-pin female connector, 90°, M12x1; IP67-rated (CON050)
I	5-pin female connector, 90°, M12x1; IP67-rated (CON041)

000 Special configuration

LINEARITY REPORT

0	Individual linearity report not included
L	Individual linearity report included

EXAMPLE OF DESCRIPTION:

GSH S M 1 H 100C S A3 0 000 X 00

GSH - S - M12 4P connector - 1 connector - stroke 10000 mm - PLd/SIL2 certified architecture - 4...20 mA output - individual linearity report not included - no special execution - no accessories

GEFRAN spa reserves the right to make any kind of design or functional modification at any moment without prior notice.