

ULTRASONIC LEVEL SENSOR



1052 DISPLAY

Type: **MEUS**

- RANGE 30 mm ... 3.5 m
- 4 ... 20 mA WITH HART
- 4-DIGIT LED, HEAD TURNS 300°
- 2 SWITCHING CONTACTS



ORDER CODE

Code	Field	Meaning
FUMA	series	ultrasonic level sensor with HART
0 · 2	input and connection	ultrasonic echo · M12 x 1 connector, 8-pin
1 · 2	configuration	factory setting · customer-specific
0 · 1 · 2	measuring range	30 ... 400 mm (M18x1) · 80 ... 1600 mm (M18x1) · 300 ... 3500 mm (M30x1,5)
1 · 2 · 3 · 4	wetted material	1.4571 · PA6 · PVC · POM
0 ... 8	switching contacts	0 two and 1 one PNP contact, 200 mA · 2 none · 3 two and 4 one NPN contact, 200 mA · 5 to 8 the same four with 1000 mA
0 · 1	special version	no · yes, please state

Factory setting: maximum measuring range, filter 0.1 s, limit 1 switching at 40 % and resetting at 20 %, limit 2 switching at 80 % and resetting at 60 %.



OVERVIEW

The sensor sends an ultrasonic pulse at the surface, waits for the echo and reads the distance from the time between the two — nothing touches the medium, and nothing in the vessel wears. A temperature compensation in the sensor head corrects the speed of sound, so the reading holds while the air above the liquid warms up. Three types cover 30 to 400 mm, 80 to 1600 mm and 300 to 3500 mm with a beam of 8°; the current output carries 4 ... 20 mA with a HART signal on top, and two electronic contacts switch at any point of the range. The four-digit red LED shows the reading, the display can be mirrored through 180° and the whole head turns through about 300°, so it faces the walkway whatever the thread does. Set points, hysteresis, delays and damping are entered over three keys or over HART.

MEASUREMENT	DEVICE AND MOUNTING
• Ultrasonic transit time — no part touches the medium • Three types: 30 ... 400, 80 ... 1600 and 300 ... 3500 mm • Beam angle 8°, temperature compensation built in • Linearity from 0.3 %, repeatability from ± 1 mm • 4 ... 20 mA with HART on top, three-wire • Two electronic contacts, PNP or NPN, 200 mA or 1000 mA • Fault signal 3.6 mA and 21 mA, failsafe behaviour settable • Measuring rate 10 per second, filter 0 ... 99 s	• Process connection M18x1 or M30x1,5, any mounting position • Wetted part of stainless steel 1.4571, or PA6, PVC or POM • System pressure up to 10 bar, IP65 electronics and IP67 process connection • Four-digit red LED, 8.5 mm high, display mirrorable through 180° • The display head turns through about 300° after mounting • Three keys, or configuration over HART from a PC • Switching contacts are separated from the amplifier • Functions and operation to VDMA 24574-1 to -4



TECHNICAL DATA

MEASUREMENT

Principle	ultrasonic echo, transit time
Type 49-40	30 ... 400 mm, min. span 30 mm
Type 49-160	80 ... 1600 mm, min. span 80 mm
Type 49-350	300 ... 3500 mm, min. span 300 mm
Beam angle	8°
Temp. compensation	built into the sensor
Measuring rate	10 measurements per second
Reference temperature	25 °C

PROCESS AND MATERIALS

Process connection	M18x1 · M30x1,5 (49-350)
Wetted part	1.4571 · PA6 · PVC · POM
Housing	PBT GF30
Display top	polycarbonate
System pressure	max. 10 bar
Protection rating	IP65 electronics · IP67 process
Weight, type 49-350	approx. 240 g steel · 180 g plastic
Mounting position	any

OUTPUT AND SUPPLY

Current output	4 ... 20 mA with HART, three-wire
Current range	3.8 ... 20.5 mA
Fault signal	3.6 mA short circuit · 21 mA open
Switching contacts	2 x PNP or NPN, 30 V DC, 200 mA
Switching contacts, option	2 x PNP or NPN, 30 V DC, 1000 mA
Voltage drop	< 1 V
Supply voltage	24 V DC $\pm$ 10 %
Current consumption	< 70 mA without contacts
HART communication	communication resistor 250 Ω

ACCURACY

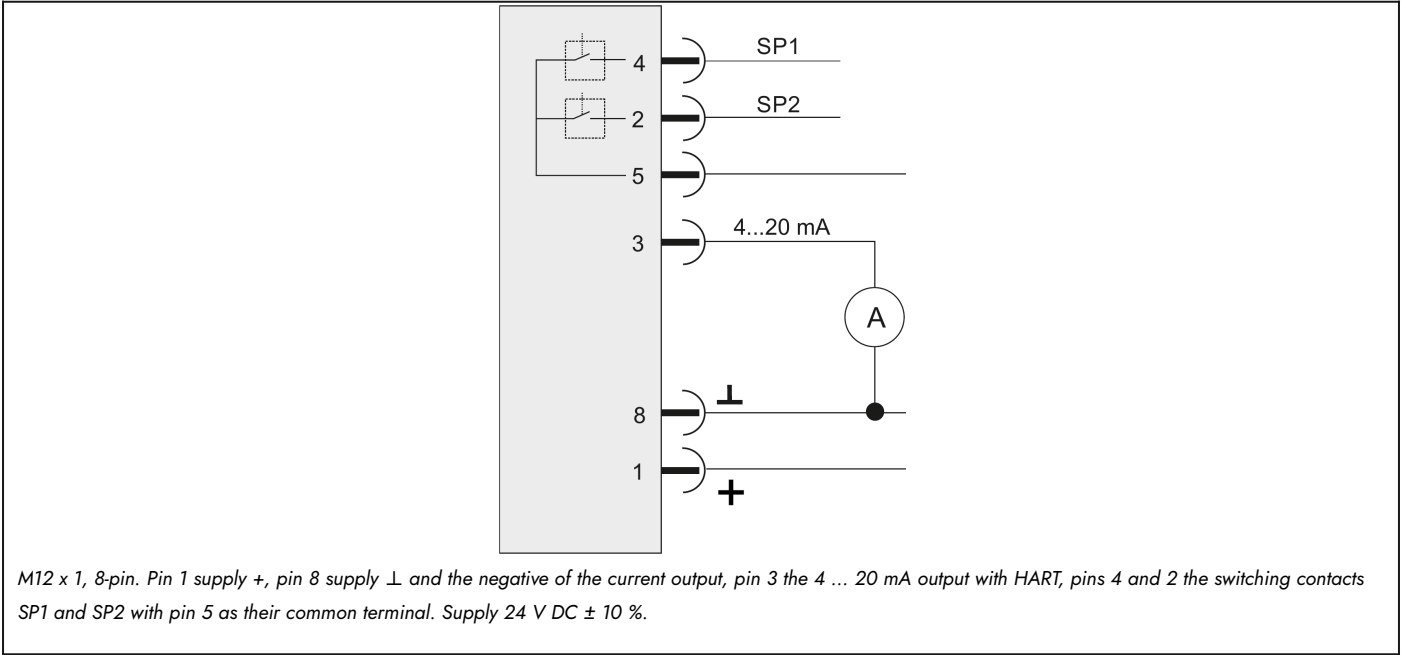
Linearity 49-40	< 0.3 %
Linearity 49-160 · -350	< 0.5 %
Repeatability 49-40	$\pm$ 1 mm, $\pm$ 0.2 %
Repeatability 49-160	$\pm$ 2 mm, $\pm$ 0.2 %
Repeatability 49-350	$\pm$ 2 mm, $\pm$ 0.4 %
Response time t_{90}	100 · 130 · 700 ms by type
Amplifier accuracy	0.3 % of the range
Response, amplifier	20 ms
Resolution	16 bit

DISPLAY, LIMITS AND ENVIRONMENT

Display	7-segment, 8.5 mm high, red, four digits, mirrorable through 180°; the head turns through about 300°; minimum and maximum are stored
Display accuracy	resolution -9999 ... 9999 digits · error $\pm$ 0.2 % of the range and $\pm$ 1 digit · temperature drift < 100 ppm/K
Limit contacts	set point and hysteresis anywhere in the range · switching delay 0.0 ... 999.9 s · failsafe behaviour settable · one red LED per limit · galvanically separated from the amplifier
Setting	three keys on the display, or over HART from a PC: range limits, trim, simulation, filter, linear output, HART address, two-point and ten-point calibration, unit, decimal point, TAG number



ELECTRICAL CONNECTIONS



ACCESSORIES

HART interface	USB, with configuration software for Windows
Connecting cable	M12 x 1, 8-pin, socket with the matching protection rating
Weld-in socket, counter nut, mounting bracket, pipe socket, adapter flange	mounting variants shown in the manufacturer manual

The protection rating applies only with a mating socket of the same rating fitted. Accessories are ordered by description.

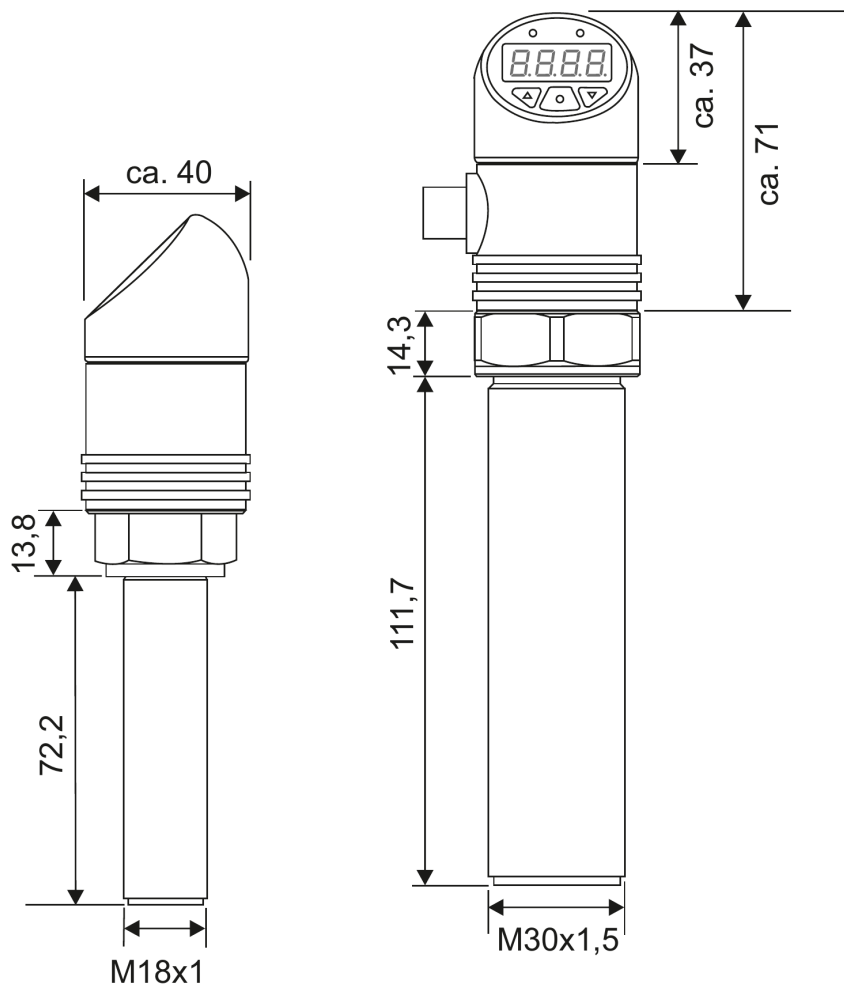
COMPLIANCE

 IP65	Protection rating	IP65 electronics · IP67 process connection
 Stainless Steel	Wetted material	stainless steel 1.4571 as standard; PA6, PVC and POM as options
 Display	Display and operation	functions and operation to VDMA 24574-1 to VDMA 24574-4
 M12	Electrical connection	M12 x 1, 8-pin, to IEC 61076-2-101

No approval beyond these is documented for this device. The manufacturer manual classes the sensor as electrical equipment to EN 50178.



DIMENSIONS (mm)



Left: types 49-40 and 49-160 with M18x1. Right: type 49-350 with M30x1,5. Tool for the process connection: A/F 27 and A/F 36.

