**PAQUiN**
**SENSORS**
A Division of The Paquin Company™

# Ultrasonic Level Sensor

- Non-contact measurement that avoids contamination and wear

- For liquids and dry bulk

- Maintains accuracy regardless of media density or dielectric properties

- 4...20mA output with or without RS232/RS485 communication

- Up to 4 programmable alarm relays

CE

## About

The P41 Ultrasonic level sensor is a non-contact level measuring device designed for reliability, easy installation, and minimal maintenance. It uses ultrasonic pulses to measure the height of liquid or solid materials without physical contact, making it suitable for sensitive or hard-to-access applications. It features integrated temperature compensation and intelligent signal processing to deliver accurate results in variable environmental conditions. Supporting different measuring ranges and output configurations, it provides a flexible solution for a wide range of level monitoring needs.

## Applications

- ✓ Food & Beverage
- ✓ Chemical Refining & Manufacturing
- ✓ Pharmaceuticals
- ✓ Water Treatment & Wastewater
- ✓ Agriculture
- ✓ Mining
- ✓ Bulk Materials
- ✓ Liquids
- ✓ Solids

# Build Your Part Number

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| Series P41 | Example: **P41M2AS22S** |
| --- | --- |

| Series |
| --- |
| P41 |

| Measurement Range Zero to Full Scale - *select one; see pages 4 & 5 for dimensions and process connection thread sizes* | |
| --- | --- |
| M1 | 0 ... 16'    (5 meters) |
| M2 | 0 ... 32'   (10 meters) |
| M3 | 0 ... 49'   (15 meters) |
| M4 | 0 ... 65'   (20 meters) |
| M5 | 0 ... 98'   (30 meters ) |
| M6 | 0 ... 131'   (40 meters) |
| M7 | 0 ... 164'  (50 meters) |
| XX | Custom range request in feet (Ex: 0...9') please indicate below part number |

| Medium Facing Sensor Material - *select one* | |
| --- | --- |
| A | ABS |
| P | PTFW |

| Output - *select one; see instruction manual for wiring diagrams* | |
| --- | --- |
| AA | 4...20mA |
| S2 | 4...20mA with RS232 |
| S4 | 4...20mA with RS485 |

| Relays - *select one , see page 3 for technical parameters* | |
| --- | --- |
| X | No relays |
| 2 | 2 relays |
| 4 | 4 relays (available only as remote version) |

| Type - *select one; see page 3 for technical parameters; see page 4 & 5 for pictorials and dimensions* | |
| --- | --- |
| S | Standard (transmitter & receiver all in one unit with visual display) |
| R | Remote (transmitter separate from receiver; wall mount receiver with visual display) |

# Technical Parameters

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## Technical Parameters

| | | Standard | Remote |
|---|---|---|---|
| **Electrical** | Analog output | Four-wire: 4 ... 20mA / 510 Ω load<br>Two-wire: 4 ∼ 20mA / 250 Ω load | 4 ... 20mA / 510 Ω load |
| | Relay output | Two groups: Max 30VDC / 5A<br>Status can be programmed | Two groups for single channel. Four groups for double channels<br>Max 30VDC / 5A<br>Status can be programmed |
| | Power Supply & Amperage Ratings for switching relays | 24VDC (Max 30VDC / 5 Amps) | 24VDC (Max 30VDC / 5 Amps) |
| | Power consumption | **Four-wire system**<br>Power supply: 24VDC<br>No relay: 80mA<br>Channel 1 of Relay: 105mA<br>Channel 2 of Relay: 130mA<br><br>The specific power is as follows:<br>No relay: 24×80mA=1.9W<br>Channel 1 of Relay: 24×105mA=2.5W<br>Channel 2 of Relay: 24×130mA=3.1W<br>**Two-wire system**<br>Power supply: 24V<br>No relay: 30mA<br><br>The specific power is as follows:<br>No relay: 24×30mA=0.72W | Power supply: 24VDC<br>No relay: 100mA<br>Channel 1 of Relay: 120mA<br>Channel 2 of Relay: 145mA<br>Channel 3 of Relay: 170mA<br>Channel 4 of Relay: 190mA<br><br>The specific power is as follows:<br>No relay: 24×100mA=2.4W<br>Channel 1 of Relay: 24×120mA=2.9W<br>Channel 2 of Relay: 24×145mA=3.5W<br>Channel 3 of Relay: 24×170mA=4.1W<br>Channel 4 of Relay: 24×190mA=4.6W |
| | Connection method | Cable gland and with internal terminal strip | |
| | Communication | 4...20mA, 4...20mA with RS232, 4...20mA with RS485 | |
| **Materials** | Housing | ABS | |
| | Medium facing sensor material | ABS<br>PTFW | |
| | Display | LED | |
| **Environmental** | Temperature range | Housing: -4°F ... 140°F (-20°C ... +60°C)<br>Probe: -4°F ... 176°F (-20°C ... +80°C) | |
| | Protection class | LED: IP65<br>Probe: IP68 | |
| **Measuring** | Measuring range (meters) | 0 ...5m, 10m, 15m, 20m, 30m, 40m, 50m | 0 ...5m, 10m, 15m, 20m, 30m, 40m, 50m |
| | Accuracy | 0.5% | |
| | Resolution | 3mm or 0.1% | |

## Principle

Measuring principle Short ultrasonic pulses in the range of 35 kHz to 70 kHz are emitted by the transducer to the product surface, reflected there and received by the transducer. The pulses travel at the speed of sound - the elapsed time from emission to reception of the signals depends on the level in the vessel. The latest microcomputer technology and the proven processing software select the level echo from among any number of false echoes and calculate the exact distance to the product surface. An integrated temperature sensor detects the temperature in the vessel and compensates the influence of temperature on the signal running time. By simply entering the vessel dimensions, a level-proportional signal is generated from the distance. It is not necessary to fill the vessel for adjustment.
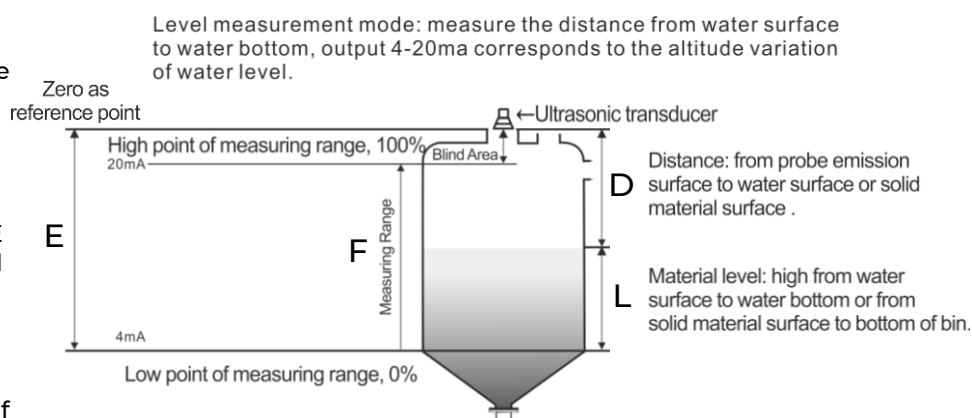
The instrument uses the time t (and the velocity of sound c) to calculate the distance D between the sensor membrane and the product surface:

$$D = \frac{c \times t}{2}$$

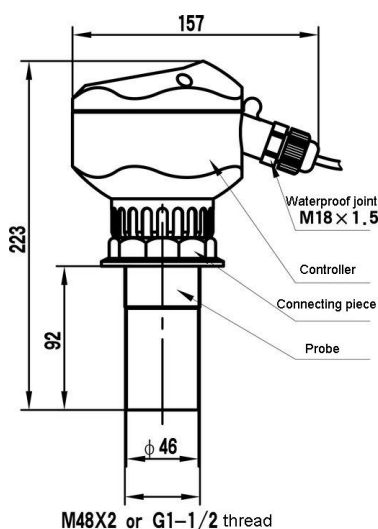As the device knows the empty distance E from a user entry, it can calculate the level as follows:

$$L = E - D$$

An integrated temperature sensor (NTC) compensates for changes in the velocity of sound caused by temperature changes.
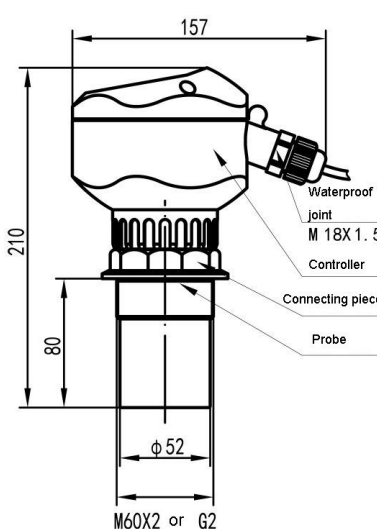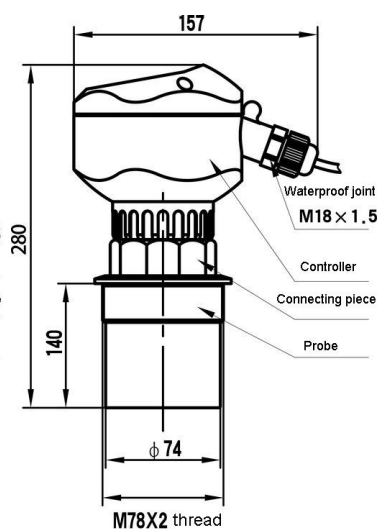
Level measurement mode: measure the distance from water surface to water bottom, output 4-20ma corresponds to the altitude variation of water level.

Zero as reference point

High point of measuring range, 100%
20mA
Blind Area
←Ultrasonic transducer
Measuring Range
E
F
D
L
4mA
Low point of measuring range, 0%

Distance: from probe emission surface to water surface or solid material surface .

Material level: high from water surface to water bottom or from solid material surface to bottom of bin.

# Dimensions and Pin-Out

## Standard Type (All-in one unit includes visual display)



157

223

92

φ46

**M48X2 or G1-1/2** thread

Waterproof joint
**M18×1.5**

Controller

Connecting piece

Probe

G1 ½" male thread

0...16' / 0....5 Meters

157

210

80

φ52

M60X2 or G2

Waterproof joint
M 18X1.5

Controller

Connecting piece

Probe

G2" male thread

0...32' / 0....10 Meters

157

280

140

φ74

**M78X2** thread

Waterproof joint
**M18×1.5**

Controller

Connecting piece

Probe

M78 x 2 male thread

0...98' / 0....30 Meters

157

248

115

φ104

**M108X2** thread

Waterproof joint
**M18×1.5**

Controller

Connecting piece

Probe
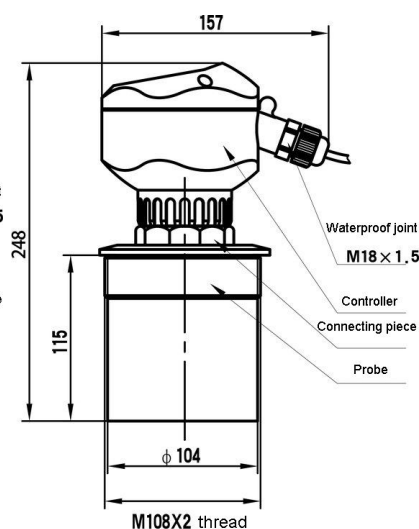
M108 x 2 male thread

0...164' / 0....50 Meters

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ |
| 24VDC+ | 24VDC− | mA− | mA+ | 485B | 485A | RL1+ | RL1− | RL2+ | RL2− |

connect 24V DC | current output | 485 output | Relay 1 | Relay 2

# Dimensions and Pin-Out

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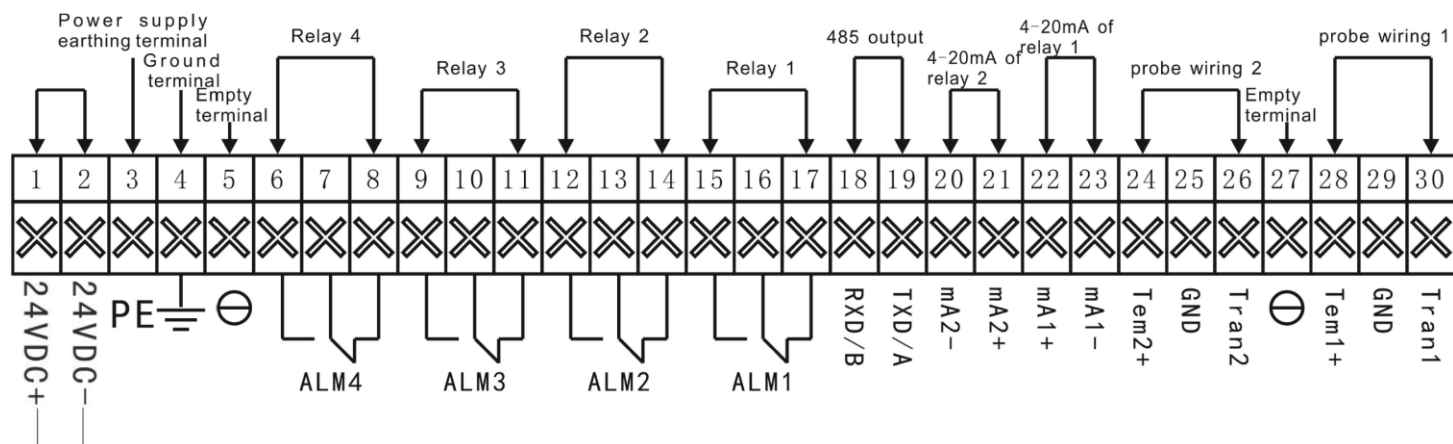A Division of The Paquin Company™

**Remote Type (Transmitter with separate wall mount remote receiver (visual display on receiver)**
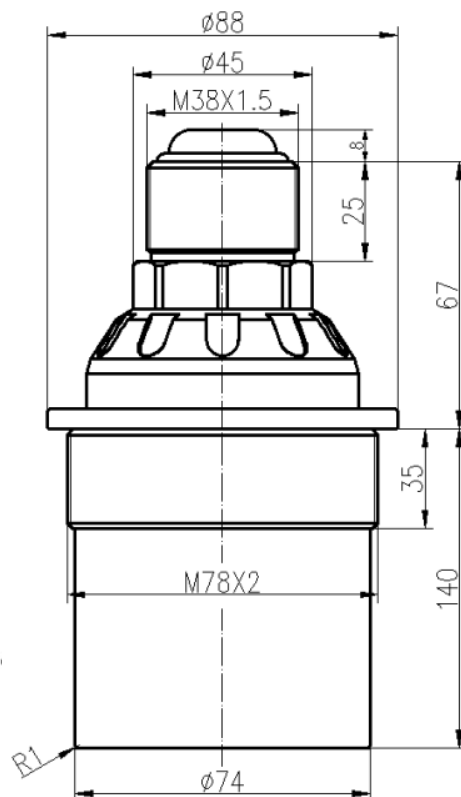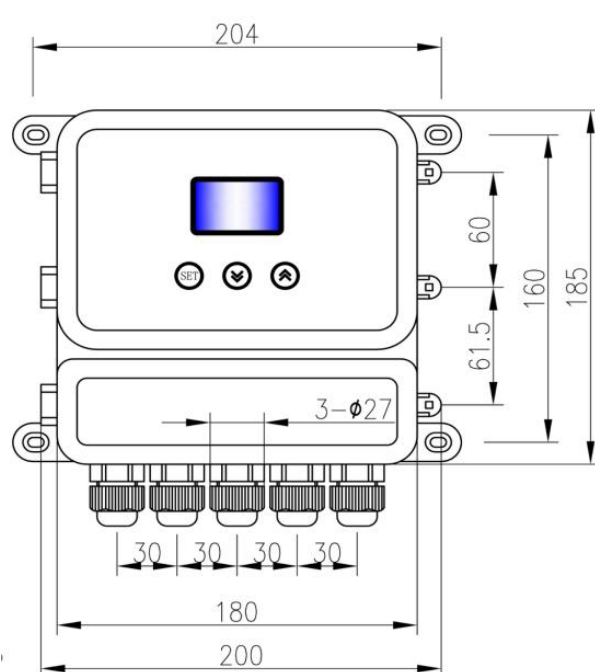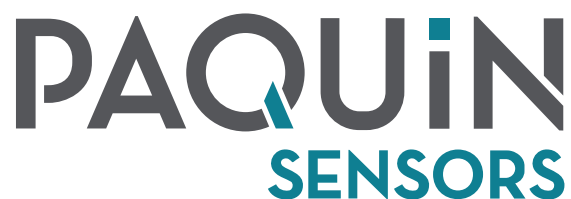


0...65' / 0....20 Meters

M78 x 2 male thread
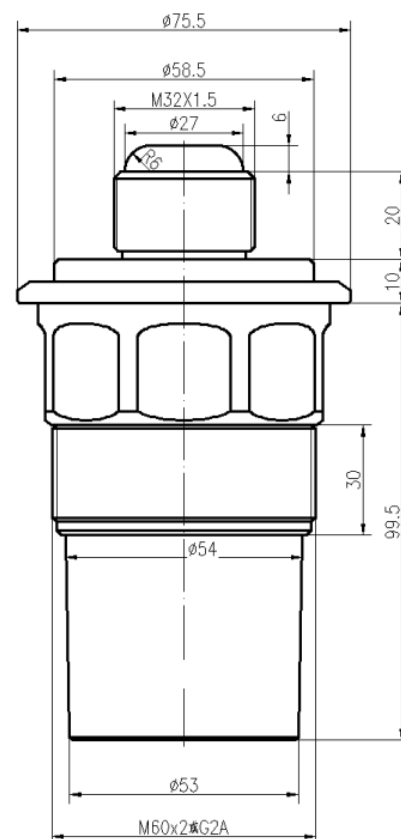
0...32' / 0....10 Meters

M60 x 2 male thread

# Additional Information



*Paquin Sensors' product portfolio is designed to provide options to fit the most diverse range of specifications.*

*We collaborate with our customers to match the best product technologies with your unique application requirements.*

*Please contact us or call +1 (800) 831-8217 anytime to discuss your needs!*