# Photoelectrics
# Level Sensors
# Types VP, Modulated, Metal Housing

CARLO GAVAZZI



- Modulated light
- Built-in amplifier
- Output: NPN or PNP, 4-wire (NO & NC)
- Housing: Stainless steel or nickel plated brass
- Tip: Polysulphone or glass
- High chemical resistance to most acids and bases
- Liquid and electrical circuit completely isolated
- Power supply: DC models 10 to 40 VDC

CE

## Product Description

Optical level probe with modulated infrared light for detection of liquids. Self-contained unit has built-in amplifier. Separate transmitting and receiving elements sealed behind the tip. Designed for direct mounting through the wall of a tank. The polysulphone tip is especially resistant to most acids and bases.

## Ordering Key

**VPB1 M NA-1**

- **Type: Refraction principle**
- **Housing material**
- **Tip material**
- **Light source**
- **Output type**
- **Connection**

## Type Selection

| Housing material | Tip material | Ordering no. NPN, Make & Break switching Cable | Ordering no. NPN, Make & Break switching M12 Plug | Ordering no. PNP, Make & Break switching Cable | Ordering no. PNP, Make & Break switching M12 Plug |
|---|---|---|---|---|---|
| Stainless steel | Polysulphone | **VPA1MNA** | **VPA1MNA-1** | **VPA1MPA** | **VPA1MPA-1** |
| Stainless steel | Glass | **VPA2MNA** | **VPA2MNA-1** | **VPA2MPA** | **VPA2MPA-1** |
| Nickel plated brass | Polysulphone | **VPB1MNA** | **VPB1MNA-1** | **VPB1MPA** | **VPB1MPA-1** |
| Nickel plated brass | Glass | **VPB2MNA** | **VPB2MNA-1** | **VPB2MPA** | **VPB2MPA-1** |

## Specifications

| | |
|---|---|
| **Rated operational voltage** | 10 - 40 VDC |
| **Ripple** | ≤ 10% |
| **Output current** | |
| Continuous | ≤ 200 mA |
| **No-load supply current** | ≤ 7 mA |
| **Voltage drop** | ≤ 2.5 VDC |
| **Protection** | Reverse polarity, short circuit, transients |
| **Ambient light** | ≤ 50.000 lux |
| **Transient voltage** | 1 kV |
| **Delay after power-on** | 20 ms |
| **Operating frequency** | ≤ 30 Hz |
| **Indication for** | |
| Output ON | LED, yellow |
| | No LED indication on plug types |
| **Sensing accuracy** | |
| Liquid level difference | Horizontal mounting: ± 5 mm |
| LED indication on plug types | Vertical mounting: ± 2.5 mm |

| | |
|---|---|
| **Pressure** | ≤ 10 bar at +60°C (+ 140°F) |
| **Environment** | |
| Degree of protection | IP 67 |
| Operating temperature | -20° to +70°C (-4° to +158°F) |
| Storage temperature | -40° to +100°C (-40° to +212°F) |
| **Liquid temperature** | +100°C (+212°F) for ≤ 60 s |
| **Housing material** | Stainless steel AISI 303 or nickel plated brass |
| **Cable** | 2 m, 4 x 0.3 mm², grey, Ø 5.2 oil resistant PVC |
| Resistance | ≤ 100 Ω, extension possible |
| **Weight** | 90 g |
| **Tightening torque** | |
| Stainless steel | 30 Nm |
| Nickel plated brass | 30 Nm |
| **External thread** | 3/8" (ISO 228/1) |
| **CE-marking** | Yes |



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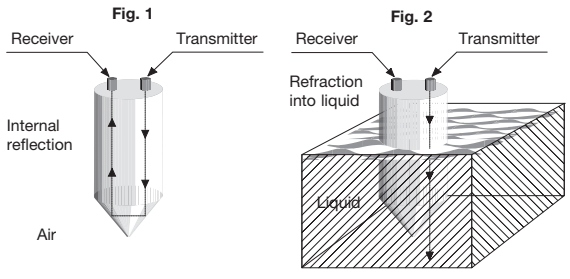
## Mode of Operation

The probe contains IR transmitter, receiver and amplifier with open collector NPN or PNP output. The light source is a Ga-As diode emitting modulated, infrared light in short pulses.

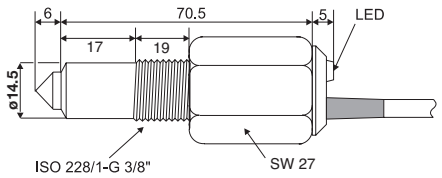
This level probe is thus insensitive to ambient light (up to 50,000 lux) and suitable even for adhesive liquids.

The conical tip of the sensor forms an angle of 90°. This angle acts as a prism, i.e. the beam, emitted from the Ga-As diode placed in one side of the sensor head, is reflected internally to the phototransistor placed in the other side of the sensor head (fig. 1), provided that the tip of the sensor is situated in free air. If the sensor tip is immersed in a liquid, always having a refractive index different from air (fig. 2), the beam will be refracted into the liquid.

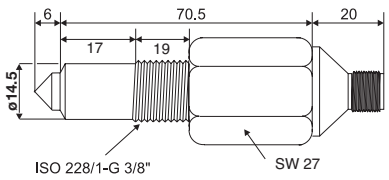
All types of sensors can operate in oil, waste water, aqueous solutions such as beer, wine, alcohol etc. without any kind of accessory.




## Dimensions

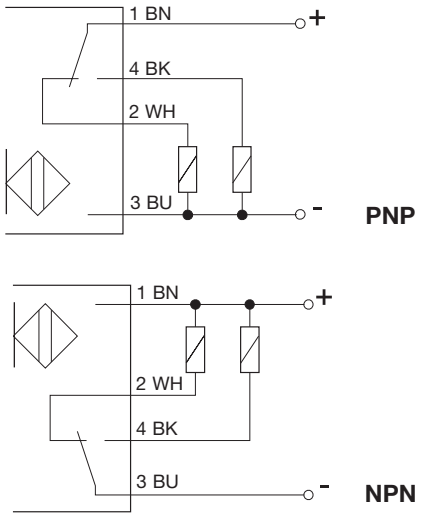



**VP..M.A**



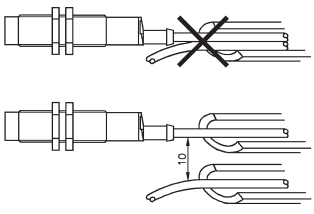

**VP..M.A-1**

## Wiring Diagrams

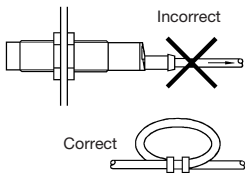



## Installation Hints

*To avoid interference from inductive voltage/ current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables*

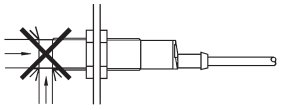



*Relief of cable strain*



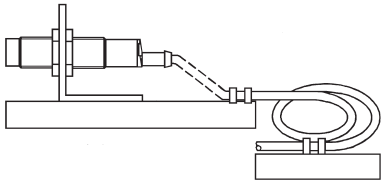

The cable should not be pulled

*Protection of the sensing face*



A proximity switch should not serve as mechanical stop

*Switch mounted on mobile carrier*



Any repetitive flexing of the cable should be avoided

## Accessories

- Connector type CON.14NF.. series.



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