

**Operating Instructions  
for  
Optical Level Sensor**

**Model: OPT**



## 1. Contents

---

1. Contents.....	2
2. Note .....	2
3. Instrument Inspection.....	3
4. Regulation Use.....	3
5. Operating Principle.....	3
6. Mechanical Connection.....	4
6.1. Process Connection M14 with Nut (OPT-..10).....	4
6.2. Process Connection G ½ (OPT-..22).....	4
7. Electrical Connection .....	5
7.1. General Information .....	5
7.2. Terminal Connection Diagrams .....	5
8. Technical Information.....	6
9. Order Codes .....	7
10. Dimensions .....	7
11. Declaration of Conformance .....	8

### Manufactured and sold by:

Kobold Messring GmbH  
Nordring 22-24  
D-65719 Hofheim, Germany  
Tel.: +49 (0)6192-2990  
Fax: +49(0)6192-23398  
E-mail: info.de@kobold.com  
Internet: www.kobold.com

## 2. Note

---

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EWG-machine guidelines.

When using the OEM designs (OPT - 0), the electromagnetic compatibility in the plant must be demonstrated. The sensors themselves are not subjected to any testing of this type.

### 3. Instrument Inspection

---

All Instruments are inspected before shipping and sent out in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

**Scope of delivery:**

The standard delivery includes:

- Optical Level Sensor      model: OPT
- Operating instructions

### 4. Regulation Use

---

Any use of the Optical Level Sensor, model: OPT, which exceeds the manufacturers specification may invalidate its warranty. Therefore any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

### 5. Operating Principle

---

The optical level sensors of model OPT have been developed for monitoring **transparent** liquids. Due to the very small dimensions, very slight switching hysteresis and high repeatability, the instruments are also suited for service in small vessels. The optical sensor is situated in a robust housing. It comprises a plastic hollow hemisphere, in which the infrared diode is fitted as a transmitter and a semiconductor as a receiver. When the sensor is not wetted by liquid, the infrared light is reflected fully from the surface of the hemisphere to the receiver. As soon as the sensor is covered with liquid, the refractive index on the boundary layer changes and most of the light escapes into the liquid. Less light then reaches the receiver, which allows switching to take place. The level probe should not be fitted with the sensor pointing downwards, as errors can occur due to drops of liquid sticking to it.

## 6. Mechanical Connection

### Before installation:

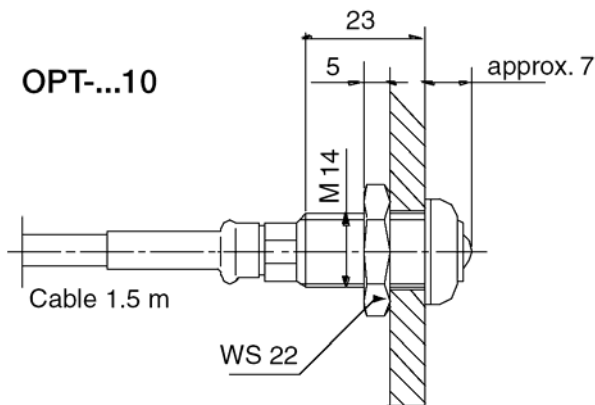
Make sure that the maximum operating pressures and temperatures allowed for this device are not exceeded (see 8. Technical Information).

Avoid mounting the Optical Level Sensor vertically downward from the top of the container cover. In this position, drops accumulating on the optical sensor can cause the sensor to report an apparent, false, simulated level (switching point reached).

Recommended mounting positions:

- On the side wall of the tank
- Vertically upward on the bottom of the tank

### 6.1. Process Connection M14 with Nut (OPT-..10)

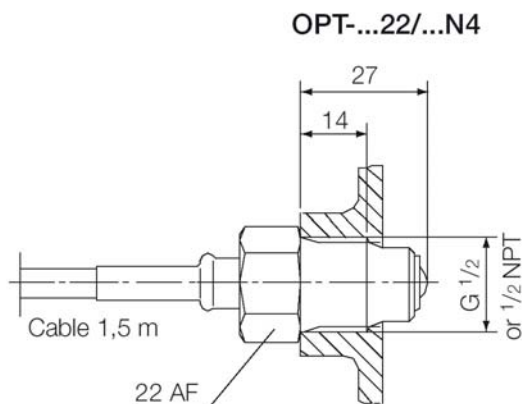


Hole in the bottom of the tank:  
Ø 15 mm

The device is sealed with the supplied O-ring.

(OPT-..22)

### 6.2. Process Connection G 1/2



Seal the device in the side of the container with PTFE tape or similar sealant.

## 7. Electrical Connection

### 7.1. General Information



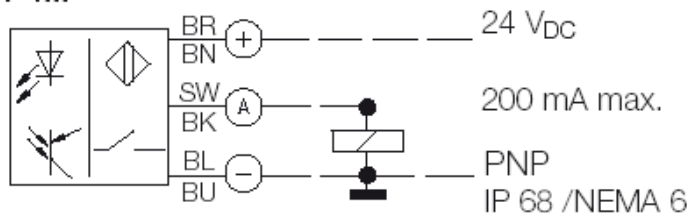
**Attention! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit.**



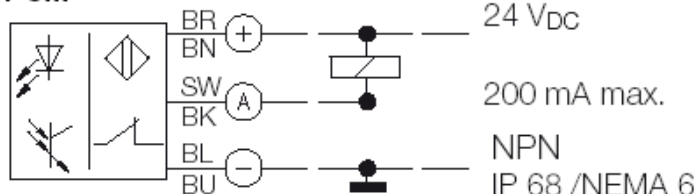
**Make sure that the supply wires are de-energised.**

### 7.2. Terminal Connection Diagrams

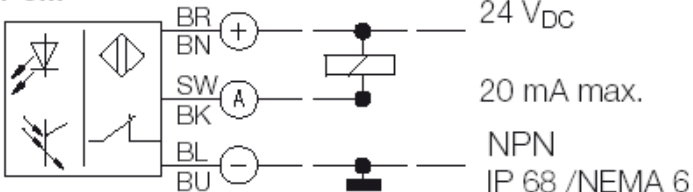
OPT-4...



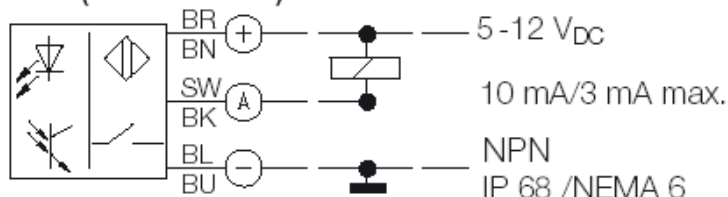
OPT-5...



OPT-6...



OPT-0... (OEM version)



## 8. Technical Information

---

Operating temperature: -20 to +80 °C  
Operating pressure: max. 10 bar  
Protection: IP 68

### Material:

Housing: OPT-\_\_1\_\_ : Polypropylene  
OPT-\_\_2\_\_ : St. steel (1.4301)  
Sensor: Polysulfone  
Cable: Polyurethane 1.5 m, Ø 4.5 mm  
O-ring: OPT-\_\_2\_\_ : FPM  
Hexagon nut: OPT-\_\_10 : Polyamide  
Flat gasket: OPT-\_\_10 : FPM

### Electrical data

Repeatability: ±1 mm  
Hysteresis: ±1 mm  
Response time: 50 µsec (with rising level)  
1 sec (with falling level)  
depending on viscosity

### OPT-0 (OEM-version, without CE-marking)

Power supply: 5-12 VDC ± 5 %  
Current input: 15 mA typ. at  $V_{DC}$  (without load)  
Output: NPN, open collector,  
function N/O contact (WET on)  
Current output: 10 mA max. at 25 °C  
3 mA max. at 80 °C

### OPT-4

Power supply: 24 VDC ± 15 %  
Current input: 17 mA typ. at 24  $V_{DC}$  (without load)  
Output: PNP, Open Collector,  
function N/O contact (WET on)  
Current output: 200 mA, short-circuit-proof

### OPT-5

Power supply: 24 VDC ± 15 %  
Current input: 17 mA typ. at 24  $V_{DC}$  (without load)  
Output: NPN, Open Collector,  
function N/C contact (DRY on)  
Current output: 200 mA, short-circuit-proof

### OPT-6

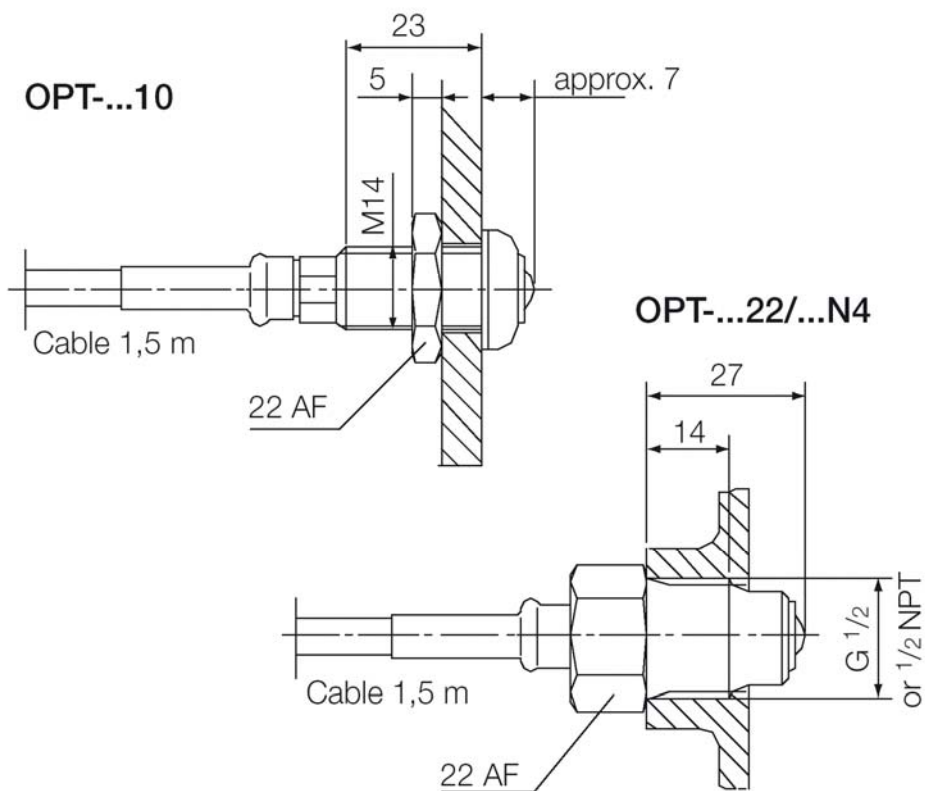
Power supply: 24 VDC ± 15 %  
Current input: 17 mA typ. at 24  $V_{DC}$  (without load)  
Output: NPN, Open Collector,  
function N/O contact (WET on)  
Current output: 20 mA max., not short-circuit-proof

## 9. Order Codes

Example: **OPT-0 1 10**

Model	Version	Housing material	Connection female thread
<b>OPT-</b>	<b>0</b> = 5-12 V <sub>DC</sub> , NPN, OEM (without CE) <b>4</b> = 24 V <sub>DC</sub> ± 15 %, PNP <b>5</b> = 24 V <sub>DC</sub> ± 15 %, NPN <b>6</b> = 24 V <sub>DC</sub> ± 15 %, NPN	<b>1</b> = Polypropylene <b>2</b> = Stainless steel	<b>10</b> = M14 with nut <b>22</b> = G 1/2 <b>N4</b> = 1/2 NPT
<b>MSR-010</b>	Contact protection relay for OPT-4 and OPT-5, 230 V <sub>AC</sub>		

## 10. Dimensions



## 11. Declaration of Conformance

---

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Optical Level Sensor      model: OPT -4..., OPT -5... and OPT-6**

to which this declaration relates is in conformity with the standards noted below:

**EN 61000-6-2 (2002-08)**

Electromagnetic compatibility (EMC) - Basic specification: Noise immunity

- a.) **EN 61000-4-4** (2002-07) Susceptibility to fast transients (IEC 1000-4, BURST)
- b.) **EN 61000-4-2** (2001-12) Susceptibility to the discharge of electrostatic electricity

**EN 61000-6-3 (2002-08)**

Electromagnetic compatibility (EMC) – Basic specification: Emitted interference for living quarters

**EN 61010-1 (2002-08)**

Safety assurance for electrical measuring, control- and laboratory instruments

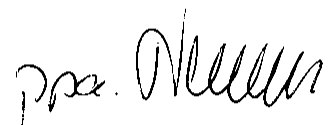
Also in conformance with the specifications in the following EEC directives:

**2004/108/EC      Electromagnetic compatibility (EMC)**

Hofheim, 14. March 2006



H. Peters  
General Manager



M. Wenzel  
Proxy Holder