**DATA SHEET**

**Liquid Level Switches**

**Optomax Basic Series**

**FEATURES**
- Liquid level switches that can detect almost any liquid type; oil or water based
- Choice of material: Polysulfone (standard) or Trogamid®
- Choice of threads and terminal connections

**Housing/ Mounting**
- M10x1
- M12x1
- 1/4" NPT
- 1/2" SAE

**Output Type / Logic**
- Customer provides
- Photo-transistor

**Supply Voltage**
- Customer provides
- 3.3 - 24 V

**Output Current**
- Customer provides
- 4mA

**Temp**
- -25°C to +80°C

**BENEFITS**
- OEM optics only solution
- Low cost
- Compact design

**OUTPUT VALUES**
Refer to Circuit Diagram section on page 3 for details.

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage (Vs)</td>
<td>Any with suitable LED current limiting resistor</td>
</tr>
<tr>
<td>LED forward current (If)</td>
<td>10mA recommended</td>
</tr>
<tr>
<td>Output signal</td>
<td>Phototransistor open collector.</td>
</tr>
<tr>
<td>Operating temperatures</td>
<td>Standard: -25°C to +80°C</td>
</tr>
<tr>
<td>Storage temperatures</td>
<td>Standard: -30°C to +85°C</td>
</tr>
<tr>
<td>Housing material²</td>
<td>Polysulfone or Trogamid®</td>
</tr>
<tr>
<td>Sensor termination</td>
<td>24AWG, 250mm PTFE wires, 8mm tinned</td>
</tr>
</tbody>
</table>

**NOTES**
1) Minimum order quantity of 500 applies.
2) Before use check that the fluid in which you wish to use these devices is compatible either with Polysulfone or Trogamid®.
OUTLINE DRAWING

All dimensions shown in mm. Tolerances = ±1mm.

HOUSING SPECIFICATIONS

<table>
<thead>
<tr>
<th>Housing Series</th>
<th>500</th>
<th>200</th>
<th>600</th>
<th>700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread</td>
<td>M10x1</td>
<td>M12x1x8g with hex nut¹</td>
<td>1/2&quot; SAE with O-ring¹</td>
<td>1/4&quot; NPT²</td>
</tr>
<tr>
<td>Pressure</td>
<td>20 bar / 209 psi max.</td>
<td>7 bar / 101 psi maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightening Torque</td>
<td>1.5 Nm / 13.26 in-lbs maximum</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ELECTRICAL INTERFACE

Flying Leads—3-wire option

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>LED_ANODE</td>
</tr>
<tr>
<td>Green</td>
<td>Output</td>
</tr>
<tr>
<td>Blue</td>
<td>0V</td>
</tr>
</tbody>
</table>

Flying Leads—4-wire option

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>LED_ANODE</td>
</tr>
<tr>
<td>Green</td>
<td>Output</td>
</tr>
<tr>
<td>Blue</td>
<td>0V LED</td>
</tr>
<tr>
<td>Black</td>
<td>0V Phototransistor</td>
</tr>
</tbody>
</table>
Flying Leads—3-wire option

Flying Leads—4-wire option

Note: The 4-wire version provides galvanic isolation between input (IR-LED) and output (Phototransistor).

| Pre-selected $R_{\text{LED}}$ and $R_{\text{PULL-UP}}$ Value for Different Supply Voltages |
|-----------------------------------------------|-------------|----------------|----------------|
| $V_s$                  | $R_{\text{LED}}$ | $R_{\text{PULL-UP}}$ | $V_{\text{OUTPUT in Air}}$ | $V_{\text{OUTPUT in Water}}$ |
| 3.3V                   | 200Ω         | 2kΩ             | < 0.75V         | > 2.5V          |
| 5V                     | 360Ω         | 2kΩ             | < 1V            | > 4.25V         |
| 8V                     | 680Ω         | 2.5kΩ           | < 1.5V          | > 7.25V         |
| 12V                    | 1kΩ          | 3kΩ             | < 3V            | > 11.25V        |
| 15V                    | 1.3kΩ        | 3.5kΩ           | < 3.25V         | > 14.25V        |
| 24V                    | 2.2kΩ        | 4kΩ             | < 10.5V         | > 22.5V         |

Typical installation: You must select suitable resistors for your chosen supply voltage. Forward voltage of LED is 1.3V and LED current should be 10mA (depending on application liquid). Therefore, for a supply of $V_s = 5V$ for example:

$$R_{\text{LED}} = \frac{(V_s - 1.3) V}{10mA} = \frac{5 - 1.3}{0.01} = 370\Omega \approx 360\Omega$$ (standard value)

CAUTION: Failure to select the correct resistor values may result in damage to the sensor.
The minimum value of $R_{\text{PULL-UP}}$ should not exceed $V_s$/max output current.

Note: Shorting the output to $V_s$ will result in irreparable damage to the sensor.
ORDER INFORMATION

Generate your specific part number using the convention shown opposite. Use only those letters and numbers that correspond to the sensor and output options you require — omit those you do not.

Sensor mounted from inside vessel

921 X 5 0 0 A X

Housing Material
C Polysulfone
T Trogamid®

Housing Type
5 500 series M10x1

Termination
3 3-wire output
4 4-wire

Sensor mounted from outside vessel

921 XX 0 0 A X SH

Housing Material
C Polysulfone
T Trogamid®

Housing Type
2 200 SH series M12x1
6 600 SH series 1/2" SAE
7 700 SH series

Termination
3 3-wire output
4 4-wire output

Notes:
- 500 series sensors are mounted internally
- 200, 600 & 700 series sensors are mounted externally
- SH suffix applicable to 200, 600 & 700 series sensors only; omit from 500 series sensor part number

CAUTION
Do not exceed maximum ratings and ensure sensor(s) are operated in accordance with their requirements.

Carefully follow all wiring instructions. Incorrect wiring can cause permanent damage to the device.

IBA-Sensorik recommend using alcohol based cleaning agents. Do NOT use chlorinated solvents such as trichloroethylene as these are likely to attack the sensor material.

Failure to comply with these instructions may result in product damage.

INFORMATION
As customer applications are outside of IBA-Sensorik control, the information provided is given without legal responsibility. Customers should test under their own conditions to ensure that the equipment is suitable for their intended application. Before use, check that the fluid in which you wish to use these devices is compatible with Polysulfone or Trogamid®.