

# Optical Liquid Level Sensors D101 Series

# DURAKOOL

- Features:
- \* M12 Screw-in Body
  - \* Low cost
  - \* Compact size
  - \* Wide range of commercial and industrial applications.



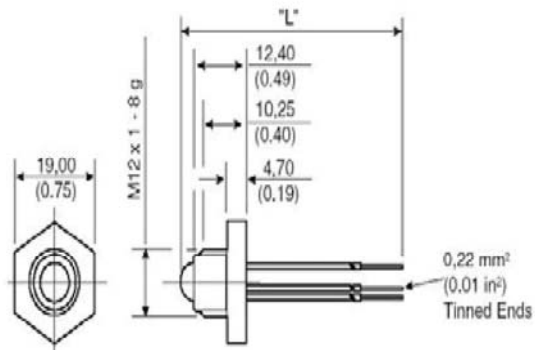
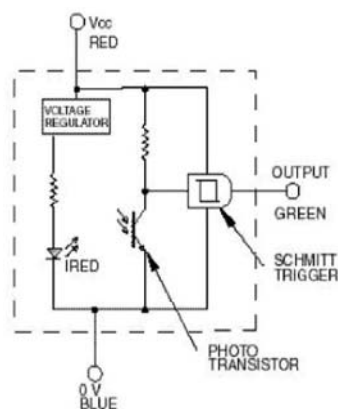
|  | Standard Temperature            | High Temperature                  |
|--|---------------------------------|-----------------------------------|
| Output Function                        | Digital - High in Air           |                                   |
| Repeatability                          | ± 1 mm                          |                                   |
| Hysteresis                             | 2 mm depending on liquid        |                                   |
| Housing Type                           | M12 Threaded Probe              |                                   |
| Response time rising liquid            | 50 µS                           |                                   |
| Response time falling liquid (ethanol) | < 1 second                      |                                   |
| Supply Voltage                         | + 5 to 12Vdc                    |                                   |
| Supply Current                         | 15mA                            |                                   |
| Temperature range operating (storage)  | -25°C to +80°C (-30°C to +85°C) | -40°C to +125°C (-40°C to +125°C) |
| Housing material                       | Polysulphone                    |                                   |
| Output Current (@25°C & @ 5Vdc)        | Sinks 10mA                      | Sinks 40mA                        |
| Leadwire Length                        | 250mm PTFE                      |                                   |

### Order Codes:

- D101000 Standard Temperature Range (1)  
D101101 Extended Temperature Range (2)

(1) Supplied with Nitrile washer and nut, unassembled. (2) Supplied with VAMAC washer and nut, unassembled. Contact factory for custom terminations and other lead lengths available to special order.

Drawing dimensions in millimetres



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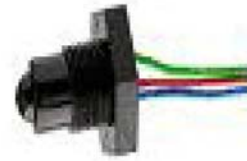
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# Optical Liquid Level Sensors D102 Series

# DURAKOOL

- Features:
- \* M12 Screw-in Body
  - \* Low cost
  - \* Compact size
  - \* Wide range of commercial and industrial applications.

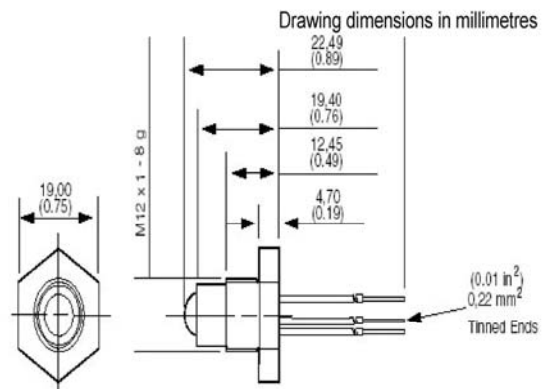
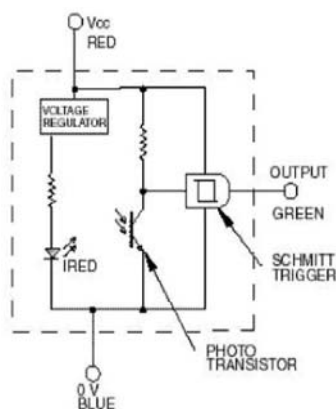


|  | Standard Temperature            | High Temperature                  |
|--|---------------------------------|-----------------------------------|
| Output Function                        | Digital - High in Air           |                                   |
| Repeatability                          | ± 1 mm                          |                                   |
| Hysteresis                             | 2 mm depending on liquid        |                                   |
| Housing Type                           | M12 Threaded Probe              |                                   |
| Response time rising liquid            | 50 µS                           |                                   |
| Response time falling liquid (ethanol) | < 1 second                      |                                   |
| Supply Voltage                         | + 5 to 12Vdc                    |                                   |
| Supply Current                         | 15mA                            |                                   |
| Temperature range operating (storage)  | -25°C to +80°C (-30°C to +85°C) | -40°C to +125°C (-40°C to +125°C) |
| Housing material                       | Polysulphone                    |                                   |
| Output Current (@25°C & @ 5Vdc)        | Sinks 10mA                      | Sinks 40mA                        |
| Leadwire Length                        | 250mm PTFE                      |                                   |

### Order Codes:

- D102000 Standard Temperature Range (1)  
D102101 Extended Temperature Range (2)

(1) Supplied with Nitrile washer and nut, unassembled. (2) Supplied with VAMAC washer and nut, unassembled. Contact factory for custom terminations and other lead lengths available to special order.



Recommended panel hole size is 12.5mm +/- 0.3mm. (0.49 +/- in)

  
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# Optical Liquid Level Sensors D103 Series

# DURAKOOL

- Features:
- \* M12 Screw-in Body
  - \* Low cost
  - \* Compact size
  - \* Wide range of commercial and industrial applications.

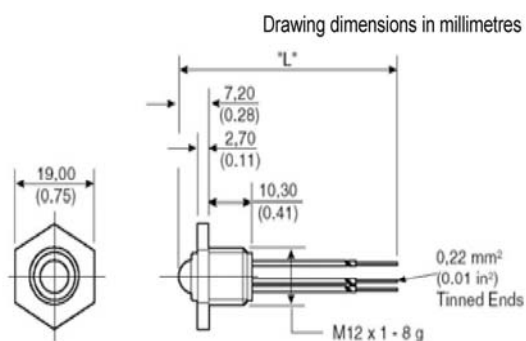
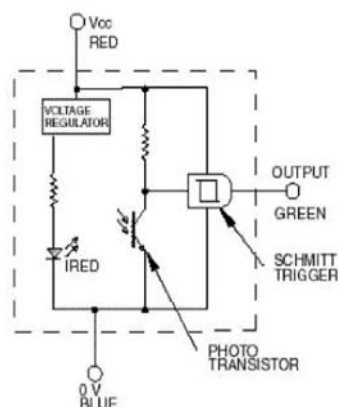


|  | Standard Temperature            | High Temperature                  |
|--|---------------------------------|-----------------------------------|
| Output Function                        | Digital - High in Air           |                                   |
| Repeatability                          | ± 1 mm                          |                                   |
| Hysteresis                             | 2 mm depending on liquid        |                                   |
| Housing Type                           | M12 Threaded Probe              |                                   |
| Response time rising liquid            | 50 µS                           |                                   |
| Response time falling liquid (ethanol) | < 1 second                      |                                   |
| Supply Voltage                         | + 5 to 12Vdc                    |                                   |
| Supply Current                         | 15mA                            |                                   |
| Temperature range operating (storage)  | -25°C to +80°C (-30°C to +85°C) | -40°C to +125°C (-40°C to +125°C) |
| Housing material                       | Polysulphone                    |                                   |
| Output Current (@25°C & @ 5Vdc)        | Sinks 10mA                      | Sinks 40mA                        |
| Leadwire Length                        | 250mm PTFE                      |                                   |

### Order Codes:

- D103000 Standard Temperature Range (1)  
D103101 Extended Temperature Range (2)

(1) Supplied with Nitrile washer and nut, unassembled. (2) Supplied with VAMAC washer and nut, unassembled. Contact factory for custom terminations and other lead lengths available to special order.



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# Optical Liquid Level Sensors D105 Series

# DURAKOOL

- Features:
- \* 10mm Push fit Body
  - \* Low cost
  - \* Compact size
  - \* Wide range of commercial and industrial applications.

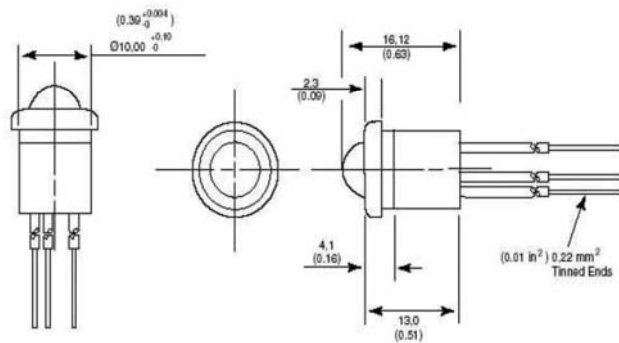
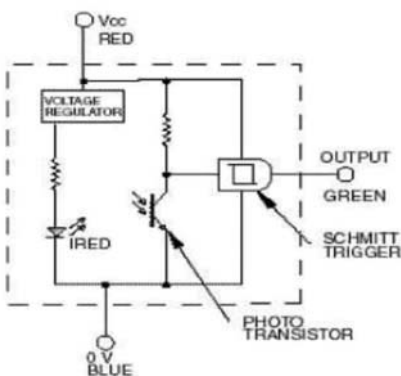


|  | Standard Temperature           | High Temperature                  |
|--|--------------------------------|-----------------------------------|
| Housing                                  | D105 M10 Push Fit Probe        |                                   |
| Output Function                          | Digital - High in Air          |                                   |
| Repeatability                            | ± 1 mm                         |                                   |
| Hysteresis                               | 2mm (depending on liquid)      |                                   |
| Response Time: Rising Liquid             | 50 µS                          |                                   |
| Response Time: Falling Liquid (Ethanol)  | < 1 second                     |                                   |
| Supply Voltage                           | +5V to 12VDC                   |                                   |
| Supply Current                           | 15 mA                          |                                   |
| Temperature Range: Operating / (Storage) | -25°C to +80°C (-30°C to +85°) | -40°C to +125°C (-40°C to +125°C) |
| Housing Material                         | Polysulphone                   |                                   |
| Output Current (@25°C & 5VDC)            | Sinks 10 mA                    | Sinks 40 mA                       |
| Lead wire Length                         | 250mm PTFE                     |                                   |

### Order Codes:

Drawing dimensions in millimetres

- D105000 Standard Temperature Range  
D105100 Extended Temperature Range



Contact factory for custom terminations and other lead lengths available to special order.



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# Optical Liquid Level Sensors D200D Series

# DURAKOOL

- Features:
- \* M12 Threaded Body
  - \* Low cost
  - \* Compact size
  - \* High reliability
  - \* Wide range of commercial and industrial applications.



| Housing Style                            | D200<br>M12 Thread <sup>(1)</sup>      |
|--|--|
| Output Function                          | Digital (High or Low in Air) outputs   |
| Repeatability                            | ± 1mm                                  |
| Hysteresis                               | 1mm depending on liquid                |
| Response time rising liquid              | 50µS                                   |
| Response time falling liquid (ethanol)   | < 1 second                             |
| Supply Voltage (V <sub>s</sub> )         | 5 to 12Vdc                             |
| Supply Current                           | 15mA nominal                           |
| Sink / Source Current                    | 10mA max                               |
| Temperature range: operating / (storage) | -25°C to +80°C (-30°C to +85°C)        |
| Housing Material                         | Polysulphone UDEL 1700                 |
| Cable Length                             | 200mm PTFE wires                       |
| Environmental                            | IP67 Rated                             |
| Thermal Testing                          | As per BS EN60068-2-33                 |
| Humidity                                 | As per BS EN60068-2-30                 |
| Vibration                                | As per BS EN60068 Part S3: 1996        |
| Mechanical Shock                         | As per BS EN60068-2-27 Part 2 Ea: 1987 |
| Max. Pressure                            | 7 bar                                  |

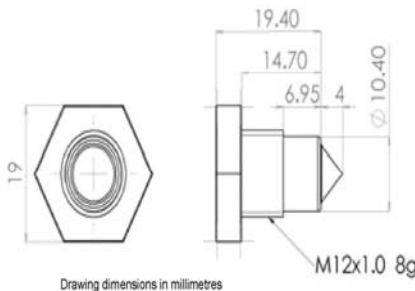
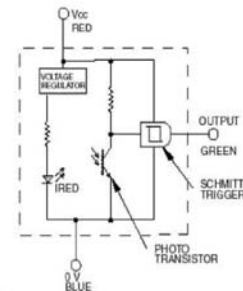
### Order Codes:

High in Air Sensors: Output Voltage in Liquid < 1Vdc; Output Voltage in Air is within V<sub>s</sub> - 0.5Vdc

3 Wire D200D3SH  
4 Wire <sup>(2)</sup> D200D4SH

Low in Air Sensors: Output Voltage in Liquid is within V<sub>s</sub> - 0.5VDC; Output Voltage in Air < 1Vdc

3 Wire D200D3LSH  
4 Wire <sup>(2)</sup> D200D4LSH



- (1) Stainless Steel nut and Nitrile washer LLPK1 must be ordered separately.  
(2) In certain applications (when used in certain liquids or emulsions and in heavily condensing applications), it may be necessary to "tune" the sensor's operation using a 4th wire connected directly to the LED. This requires the installer to select a suitable current limiting resistor—contact factory for details.



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# Optical Liquid Level Sensors D200HD Series

# DURAKOOL

- Features:
- \* M12 Threaded Body
  - \* Heavy Duty Style
  - \* Wider range of options
  - \* Wide range of Commercial, Industrial & Automotive applications.



| Housing Style                          | HD200<br>M12 Thread <sup>(1)</sup>     |
|--|--|
| Output Function                        | Digital (High or Low in Air) outputs   |
| Repeatability                          | ± 1mm                                  |
| Hysteresis                             | 1mm depending on liquid                |
| Response time rising liquid            | 50µS                                   |
| Response time falling liquid (ethanol) | < 1 second                             |
| Supply Voltage (V <sub>s</sub> )       | 5 to 12Vdc or 10 to 28Vdc (see below)  |
| Supply Current                         | 15mA nominal                           |
| Sink / Source Current                  | 250mA or 500mA max (see below)         |
| Temperature range: operating           | -25°C to +80°C or -40° to +125°C       |
| Housing Material                       | Polysulphone UDEL 1700                 |
| Cable Length                           | 200mm PTFE wires                       |
| Environmental                          | IP67 Rated                             |
| Thermal Testing                        | As per BS EN60068-2-33                 |
| Humidity                               | As per BS EN60068-2-30                 |
| Vibration                              | As per BS EN60068 Part S3: 1996        |
| Mechanical Shock                       | As per BS EN60068-2-27 Part 2 Ea: 1987 |
| Max. Pressure                          | 7 bar                                  |

## Order Codes:

1) Stainless steel nut & nitrile washer available separately (order LLPK1)

D 2 \* 0 \* H D \* \*\* - 0 0 \*

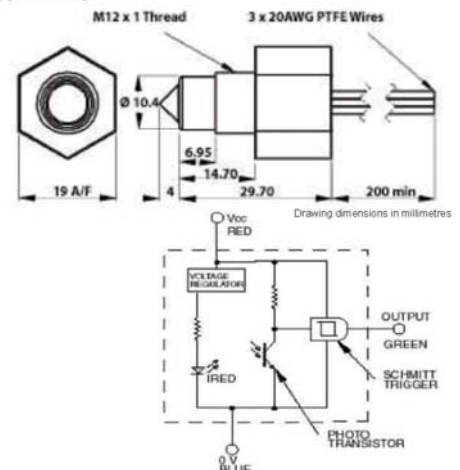
**Temp Range**  
0: -25°C to +80°C  
1: -40°C to +125°C

**Supply Voltage**  
12: 5 to 16VDC  
24: 10 to 28VDC

**Sink / Source Current**  
0: 250mA max  
5: 500mA max

**Output Circuit**  
1: N-Channel Open Drain with flyback diode\*  
2: Digital Output (Sink current only)  
3: N-Channel Open Drain  
4: P-Channel Open Drain  
5: N & P Channel Push-Pull Output  
\* For use with inductive loads

**Output Polarity**  
L: Output Low in Air  
H: Output High in Air



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# Optical Liquid Level Sensors D205 & D305 Series



- Features:
- \* 1/2" BSPT Screw-in Body
  - \* Low cost
  - \* Compact size
  - \* Wide range of commercial and industrial applications.

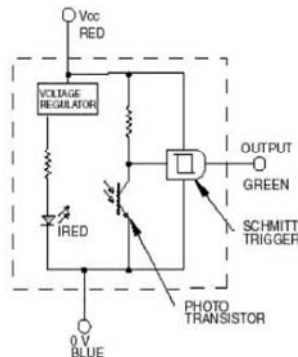


|  | Standard Temperature                                      | High Temperature                  |
|--|---|-----------------------------------|
| Output Function                        | Digital - High in Air                                     |                                   |
| Repeatability                          | ± 1 mm  |                                   |
| Hysteresis                             | 2 mm depending on liquid                                  |                                   |
| Housing Type                           | 1/2" BSPT Metal Body                                      |                                   |
| Response time rising liquid            | 50 µS   |                                   |
| Response time falling liquid (ethanol) | < 1 second  |                                   |
| Supply Voltage                         | + 5 to 12Vdc  |                                   |
| Supply Current                         | 15mA  |                                   |
| Temperature range operating (storage)  | -25°C to +80°C (-30°C to +85°C)                           | -40°C to +125°C (-40°C to +125°C) |
| Housing material                       | Stainless Steel or Nickel plated Brass, Polysulphone dome |                                   |
| Output Current (@25°C & @ 5Vdc)        | Sinks 10mA  | Sinks 40mA                        |
| Leadwire Length                        | 180mm PTFE  |                                   |

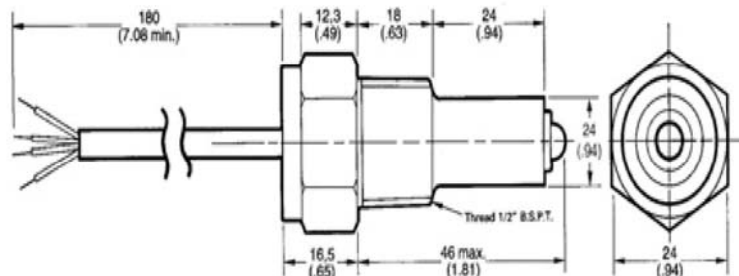
### Order Codes:

- D205000 Nickel Plated Brass Body, Standard Temperature Range (1)
- D205100 Nickel Plated Brass Body, Extended Temperature Range (2)
- D305000 Stainless Steel Body, Standard Temperature Range (1)
- D305100 Stainless Steel Body, Extended Temperature Range (2)

(1) Supplied with Nitrile washer and nut, unassembled. (2) Supplied with VAMAC washer and nut, unassembled. Contact factory for custom terminations and other lead lengths available to special order.



Drawing dimensions in millimetres



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# Optical Liquid Level Sensors D500D Series

# DURAKOOL

- Features:
- \* M10 Threaded Body
  - \* Low cost
  - \* Compact size
  - \* High reliability
  - \* Wide range of commercial and industrial applications.



| Housing Style                             | D500<br>M10 Thread (1)                 |
|---|--|
| Output Function                           | Digital (High or Low in Air) outputs   |
| Repeatability                             | ± 1 mm                                 |
| Hysteresis                                | 1 mm depending on liquid               |
| Response time rising liquid               | 50 µS                                  |
| Response time falling liquid (ethanol)    | < 1 second                             |
| Supply Voltage (Vs)                       | 5 to 12Vdc                             |
| Supply Current                            | 15mA nominal                           |
| Sink/Source Current                       | 10mA max                               |
| Operating temp range: operating (storage) | -25°C to +80°C (-30°C to +85°C)        |
| Housing Material                          | Polysulphone UDEL 1700                 |
| Cable Length                              | 200mm PTFE wires                       |
| Environmental                             | IP 67 rated                            |
| Thermal Testing                           | As per BS EN60068-2-33                 |
| Humidity                                  | As per BS EN60068-2-30                 |
| Vibration                                 | As per BS EN60068-2-6 Part S3: 1996    |
| Mechanical Shock                          | As per BS EN60068-2-27 Part 2 Ea: 1987 |
| Max. Pressure                             | 20 bar                                 |

### Order Codes:

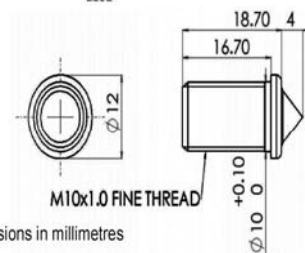
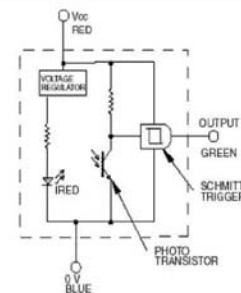
High in Air Sensors: Output Voltage in Liquid < 1Vdc; Output Voltage in Air is within Vs - 0.5Vdc

3 Wire D500D3  
4 Wire (2) D500D4

Low in Air Sensors: Output Voltage in Liquid is within Vs - 0.5VDC; Output Voltage in Air < 1Vdc

3 Wire D500D3L  
4 Wire (2) D500D4L

- (1) Plastic Nut LLPK3 must be ordered separately.  
 (2) In certain applications (when used in certain liquids or emulsions and in heavily condensing applications), it may be necessary to "tune" the sensor's operation using a 4th wire connected directly to the LED. This requires the installer to select a suitable current limiting resistor—contact factory for details.



Drawing dimensions in millimetres



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# Optical Liquid Level Sensors D600D Series

# DURAKOOL

- Features:
- \* 1/2" SAE Threaded Body
  - \* Low cost
  - \* Compact size
  - \* High reliability
  - \* Wide range of commercial and industrial applications.



| Housing Style                             | D600<br>1/2" SAE Thread <sup>(1)</sup> |
|---|--|
| Output Function                           | Digital (High or Low in Air) outputs   |
| Repeatability                             | ± 1 mm                                 |
| Hysteresis                                | 1 mm depending on liquid               |
| Response time rising liquid               | 50 µS                                  |
| Response time falling liquid (ethanol)    | < 1 second                             |
| Supply Voltage (Vs)                       | 5 to 12Vdc                             |
| Supply Current                            | 15mA nominal                           |
| Sink/Source Current                       | 10mA max                               |
| Operating temp range: operating (storage) | -25°C to +80°C (-30°C to +85°C)        |
| Housing Material                          | Polysulphone UDEL 1700                 |
| Cable Length                              | 200mm PTFEwires                        |
| Environmental                             | IP 67 rated                            |
| Thermal Testing                           | As per BS EN60068-2-33                 |
| Humidity                                  | As per BS EN60068-2-30                 |
| Vibration                                 | As per BS EN60068-2-6 Part S3: 1996    |
| Mechanical Shock                          | As per BS EN60068-2-27 Part 2 Ea: 1987 |
| Max. Pressure                             | 7 bar                                  |

### Order Codes:

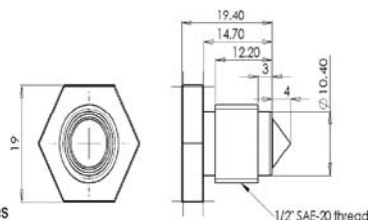
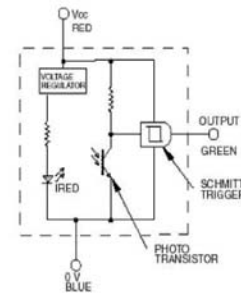
High in Air Sensors: Output Voltage in Liquid < 1Vdc; Output Voltage in Air is within Vs - 0.5Vdc

3 Wire     D600D3SH  
4 Wire <sup>(2)</sup>   D600D4SH

Low in Air Sensors: Output Voltage in Liquid is within Vs - 0.5VDC; Output Voltage in Air < 1Vdc

3 Wire     D600D3LSH  
4 Wire <sup>(2)</sup>   D600D4LSH

- (1) "O" Ring supplied, unassembled.  
(2) In certain applications (when used in certain liquids or emulsions and in heavily condensing applications), it may be necessary to "tune" the sensor's operation using a 4th wire connected directly to the LED. This requires the installer to select a suitable current limiting resistor—contact factory for details.



Drawing dimensions in millimetres



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# Optical Liquid Level Sensors D600HD Series

# DURAKOOL

- Features:
- \* 1/2" SAE Threaded Body
  - \* Heavy Duty Style
  - \* Wider range of options
  - \* Wide range of Commercial, Industrial & Automotive applications.



|  |  |
|--|--|
| Housing Style                          | HD600<br>1/2" SAE-20 Thread <sup>(1)</sup> |
| Output Function                        | Digital (High or Low in Air) outputs       |
| Repeatability                          | ± 1mm                                      |
| Hysteresis                             | 1mm depending on liquid                    |
| Response time rising liquid            | 50µS                                       |
| Response time falling liquid (ethanol) | < 1 second                                 |
| Supply Voltage (V <sub>s</sub> )       | 5 to 12Vdc or 10 to 28Vdc (see below)      |
| Supply Current                         | 15mA nominal                               |
| Sink / Source Current                  | 250mA or 500mA max (see below)             |
| Temperature range: operating           | -25°C to +80°C or -40° to +125°C           |
| Housing Material                       | Polysulphone UDEL 1700                     |
| Cable Length                           | 200mm PTFE wires                           |
| Environmental                          | IP67 Rated                                 |
| Thermal Testing                        | As per BS EN60068-2-33                     |
| Humidity                               | As per BS EN60068-2-30                     |
| Vibration                              | As per BS EN60068 Part S3: 1996            |
| Mechanical Shock                       | As per BS EN60068-2-27 Part 2 Ea: 1987     |
| Max. Pressure                          | 7 bar                                      |

### Order Codes:

1) O-ring supplied unassembled

D 6 \* 0 \* HD \* \*\* - 0 0 \*

#### Temp Range

0: -25°C to +80°C  
1: -40°C to +125°C

#### Supply Voltage

12: 5 to 16VDC  
24: 10 to 28VDC

#### Sink / Source Current

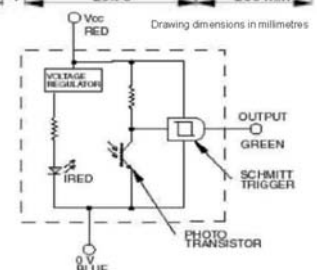
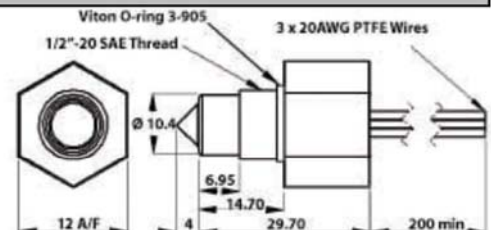
0: 250mA max  
5: 500mA max

#### Output Circuit

1: N-Channel Open Drain with flyback diode\*  
2: Digital Output (Sink Current only)  
3: N-Channel Open Drain  
4: P-Channel Open Drain  
5: N & P Channel Push-Pull Output  
\* For use with inductive loads

#### Output Polarity

L: Output Low in Air  
H: Output High in Air



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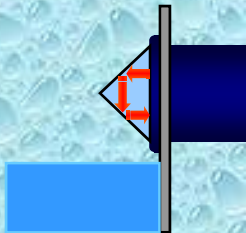
## Optical Liquid Level Sensors

**An extensive range of optical liquid level sensors used to accurately and repeatably detect the presence or absence of a wide range of fluids.**

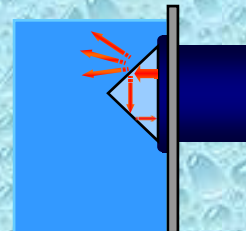
**Our products are used in many fluid detection and control applications.**

**Our range has been designed to outperform all other optical fluid sensors on the market and offers this high performance at reduced costs.**

**Sensor in Air: Infra Red light reflected back to detector.**



**Sensor in Liquid: Infra Red light refracted out of tip so less energy reaches detector.**



# Liquid Level Sensors

## Traditional Solid State

- **Expensive**
- **Provide limited power switching**
- **In some cases, proven unreliable.**

## Durakool Optical

- **Very Cost Competitive**
- **Extensive range of electronic supply & power output variation**
- **Robust & Reliable.**

# Product Range

All products are miniaturized, solid state, reliable and have been developed to a high specification while providing a very cost effective solution.

Product categories are as follows:

- **OEM Range**  
Small, very low cost basic sensor for large volume, cost sensitive applications. Priced to compete directly with electro-mechanical products.
- **Optomax**  
Comprehensive range of fully protected digital sensors, maintaining our low costs but with a wider range of capabilities and switching up to 500mA.
- **LLHP**  
Fully configurable range where customers select the exact product for their application, including ranges up to 50V supply and 3A output, added signal conditioning electronics, environmental protection, termination.

# Typical Applications

**Oil sump monitoring**

**Hydraulic reservoirs**

**Heating Ventilation & AC**

**Machine tools**

**Peristaltic pumps**

**Refrigeration**

**Hi - Lo fluid levels**

**Tank controls**

**Pump primed indication**

**Automotive**

**Spa Baths**

**Leak Detection**

**Drinks Vending Machines**

**Food & Beverage**

**Medical**

**Compressors**

**Printing**

**Pump Applications**

**Home Appliance**

# Advantages

- **The largest range of optical liquid level sensors, with in house technical support**
- **Miniaturized designs**
- **Cost effective solutions – Priced to compete with electromechanical products and lower cost than any other optical fluid sensor**
- **Wide variety of power output – Up to 3A, this can allow the sensor to switch lower power equipment directly, eliminating the need for costly interfaces**

# Advantages

- **Temperature ranges from -30°C to +140°C**
- **Housings, cabling and connectors to customer requirements**
- **Fully customizable range for added electronics, cabling, connectors, environmental protection, etc**
- **Basic version for high volume, cost sensitive OEM applications such as automotive and white goods**