

## LLE Series

### Liquid level sensors



#### DESCRIPTION

The enhanced series of liquid level sensors incorporates a photo-transistor trigger which provides a digital output that denotes the presence or absence of liquid.

The mode of operation is derived from the principle of total internal reflection. An LED and photo-transistor are housed within a plastic dome at the head of the device. When no liquid is present, light from the LED is internally reflected from

the dome to the photo-transistor. When liquid covers the dome, the effective refractive index at the dome-liquid boundary changes, allowing some light from the LED to escape. Thus the amount of light received by the photo-transistor is reduced and the output switches, indicating the presence of liquid. This method of liquid level sensing is very fast, and almost instantaneous for water.

#### FEATURES

- Solid state technology
- Small size
- Digital output
- Pre-wired
- Electrically robust

#### BENEFITS

- Accurate, repeatable switching point
- Can be mounted in applications where space is limited
- Microprocessor compatible
- Easy to install, saving assembly time
- Reverse polarity, over voltage, short circuit and transient protection

#### TYPICAL APPLICATIONS

- Home appliances
- Spa baths
- Vending machines
- Food and beverage
- Medical
- Compressors
- Machine tools
- Automotive

#### ORDER GUIDE

| Catalogue Listing             |                     |                      |                  |
|-------------------------------|---------------------|----------------------|------------------|
| Description                   |                     | Standard temperature | High temperature |
| Screw In, M12 Thread, Plastic | (Type 1)            | LLE101000            | LLE101101        |
|                               | (Type 2)            | LLE102000            | LLE102101        |
|                               | (Type 3)            | LLE103000            | LLE103101        |
| Push In, Plastic              | (Type 5)            | LLE105000            | LLE105100        |
| Screw In, ½ in, Metal         | Nickel plated brass | LLE205000            | LLE205100        |
|                               | Stainless steel     | LLE305000            | LLE305100        |

# LLE Series

## TECHNICAL INFORMATION

| Specifications                             |                                                                                                                                |                                                  |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Operation mode                             | User defined single point on/off switch (Output is high in air)                                                                |                                                  |
| Repeatability (mm)                         | ± 1                                                                                                                            |                                                  |
| Hysteresis (mm)                            | 2 (dependent on liquid)                                                                                                        |                                                  |
| Response time                              | Rising liquid level - 50 µs<br>Falling liquid level - 1 s max (in ethanol)<br>Response in other liquids dependent on viscosity |                                                  |
| Mechanical                                 |                                                                                                                                |                                                  |
| Mounting                                   | Type 1 and 2 - mounted from outside; Type 3 and 5 - mounted from inside                                                        |                                                  |
| Termination                                | 250 mm flying leads (180 mm for metal versions)                                                                                |                                                  |
|                                            | Blue                                                                                                                           | 0 V                                              |
|                                            | Red                                                                                                                            | +5 V to +12 V supply                             |
|                                            | Green                                                                                                                          | Output                                           |
| Material [Note 1]                          | Polysulphone                                                                                                                   |                                                  |
| Dimensions                                 | <b>Plastic</b><br><b>LLE101/102/103 Series</b>                                                                                 | <b>Metal</b><br><b>LLE205/305 Series</b>         |
|                                            | 3,5 mm radius (includes LLE105 Series)                                                                                         |                                                  |
|                                            | Dome<br>Thread                                                                                                                 | M12x1<br>½ in BSPT                               |
|                                            | Hex                                                                                                                            | 19 mm<br>24 mm (See mounting drawings on page 3) |
| Environmental                              |                                                                                                                                |                                                  |
| <b>Standard temperature</b>                |                                                                                                                                | <b>High temperature</b>                          |
| Operating temperature (°C)                 | -25 to 80 (-13 °F to 176 °F)                                                                                                   | -40 to 125 (-40 °F to 257 °F)                    |
| Storage temperature (°C)                   | -30 to 85 (-22 °F to 185 °F)                                                                                                   | -40 to 125 (-40 °F to 257 °F)                    |
| 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                                                                                         |                                                  |
| Pressure range (bar)                       | 0 to 5 (plastic housing) [Note 2]<br>0 to 25 (metal housing)                                                                   |                                                  |
| Ambient IR light limit (@ 940 nm) [Note 3] | 10 mW/cm² in operation                                                                                                         |                                                  |
| Electrical                                 |                                                                                                                                |                                                  |
| <b>Standard temperature</b>                |                                                                                                                                | <b>High temperature</b>                          |
| Supply voltage (Vcc)                       | +5 Vdc to +12 Vdc ± 5 %                                                                                                        |                                                  |
| Supply current (mA)                        | 15 mA nominal @ +5 Vdc                                                                                                         | 5 mA nominal @ +5 Vdc                            |
| Output sink current [Note 4]               | @ 25 °C 10 mA max.                                                                                                             | @ 25 °C 40 mA max.                               |
| @ 5 Vdc supply                             | @ 80 °C 3 mA max.                                                                                                              | @ 125 °C 7 mA max.                               |

### Notes:

[Note 1] Material compatibility information available on request.

[Note 2] Threaded sensors only.

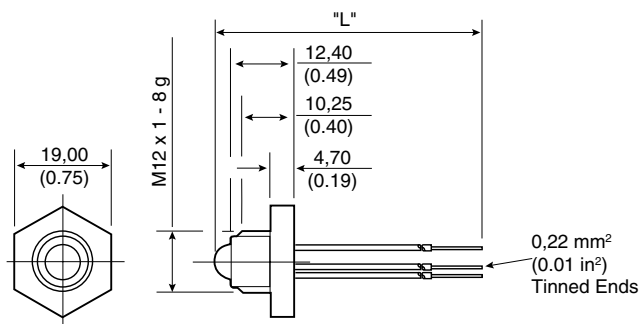
[Note 3] For other ambient light environments the user should test the sensor under application conditions to verify compatibility.

[Note 4] The output is intended as a TTL compatible output signal, for interfacing to logic systems. For interfacing with other types of circuitry an appropriate buffer circuit must be used.

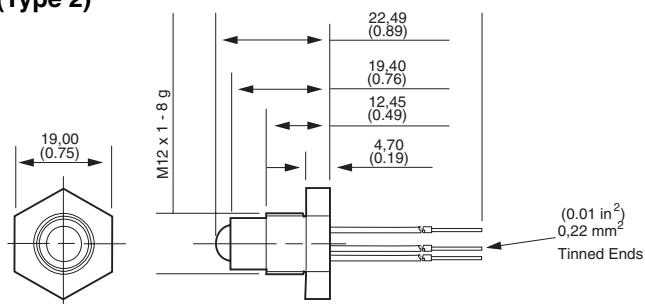
# Liquid level sensors

## MOUNTING DRAWING (IN MM AND INCHES)

### LLE101000/LLE101101 (Type 1)



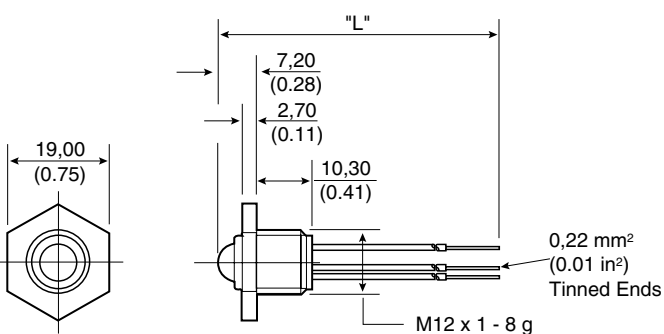
### LLE102000/LLE102101 (Type 2)



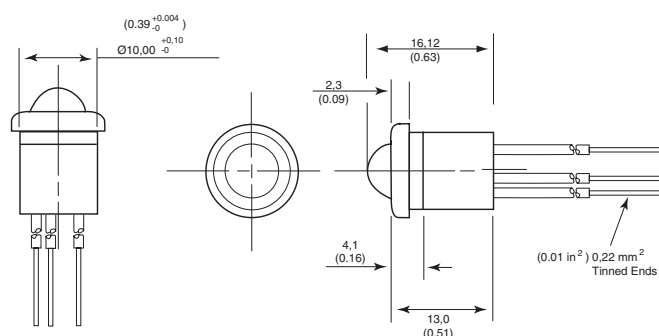
### Notes

- 1 Recommended panel hole size  $\varnothing$  12,5  
 $\pm 0.3$  mm (0.49  $\pm$  0.01 in)
- 2 'O' ring seal supplied Unassembled

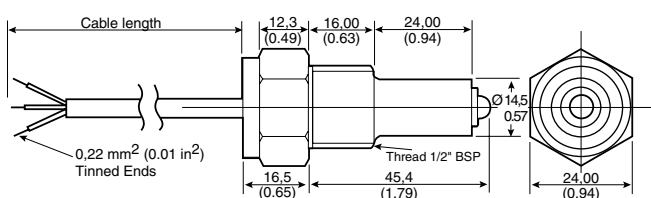
### LLE103000/LLE103101 (Type 3)



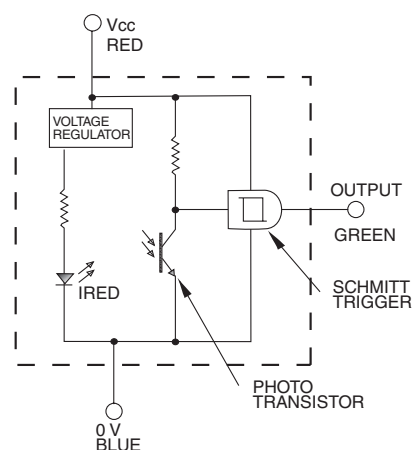
### LLE105000/LLE105100 (Type 5)



### LLE205000/LLE205100 LLE305000/LLE305100



## ELECTRICAL DIAGRAM



## **WARNING**

### **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

## **WARNING**

### **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

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