

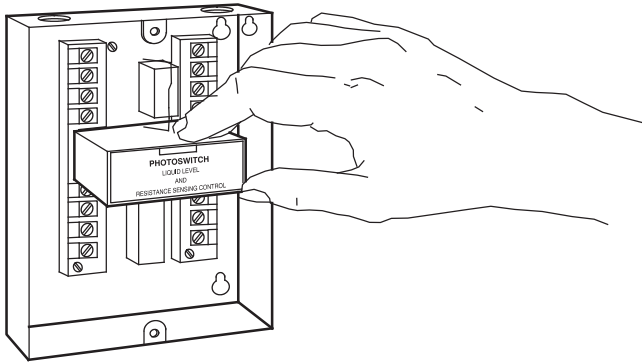
Installation Instructions

PHOTOSWITCH® Liquid Level and Resistance Sensing Control

Bulletin 13DJ3-3000

IMPORTANT: SAVE THESE INSTRUCTIONS FOR FUTURE USE.

Product Data



Description

The PHOTOSWITCH Bulletin 13DJ3 Series 3000 is a high sensitivity Liquid Level Control designed to detect the level of conductive liquids or solids with a moisture content as low as 5%.

Features

- Very high sensitivity—up to 60 megohms cm liquid resistivity
- Compact, all solid state, plug-in, modular design for reliability with flexibility
- DPDT EM relay and 12V DC solid state outputs. Optional solid state logic outputs
- Low probe voltage isolated from line voltage
- Fast response time
- Wide selection of probe assemblies
- All molded parts of rugged, impact resistant polyphenylene oxide (PPO) and polystyrene (PS)
- Heavy-duty easy to wire terminals
- High voltage connections isolated from low voltage
- Ambient temperature range: -40 to 135°F (-40 to 57°C)

General

The Bulletin 13DJ3 Series 3000 Conductive Liquid Level Control is designed to provide a reliable level detection of conductive liquids or solids. No moving parts or floats are required. Metal probe rods are placed in the conductive liquid at the desired levels. The liquid or solid conductive material completes the circuit between the probe rod or rods to the metal material container. If the container is non-conductive (fiberglass, cement, etc.), an additional probe rod is used as a grounding probe to complete the electrical circuit. Completion of the circuit will cause the output relay to operate. The relay contacts may be used for pump, valve, or motor control; audible and/or visual level indication.

The controls will operate over a resistivity range of 0 to 60 MegOhms cm. This permits the sensing of liquids or solids with very

low conductivity such as antibiotics, refrigerants, or sand with a moisture content as low as 5%.

In addition to high sensitivity, the control has a fast response time and can be wired for electronic control latching on certain applications, allowing the use of both sets of relay contacts for external loads.

A solid-state output signal can be obtained from the control simultaneously with a relay output. This signal can be used for electronic counting, data logging, or feeding information to a computer.

The control has protection against false operation due to line voltage transients, line voltage dropouts of 1/2 second or less, or during initial power up. These features allow the 13DJ3 Series 3000 Control to be used in solving the more difficult industrial level applications.

Resistance Sensing Control

PHOTOSWITCH Bulletin 13DJ3 is also designed to be used as a resistance sensing control. In this application the control operates as an electronic switch which converts the minute current flow through delicate mechanisms or extremely light contacts into a switching output capable of handling relatively heavy electrical loads. The maximum sensitivity of the control when used for resistance sensing is 15 megohms.

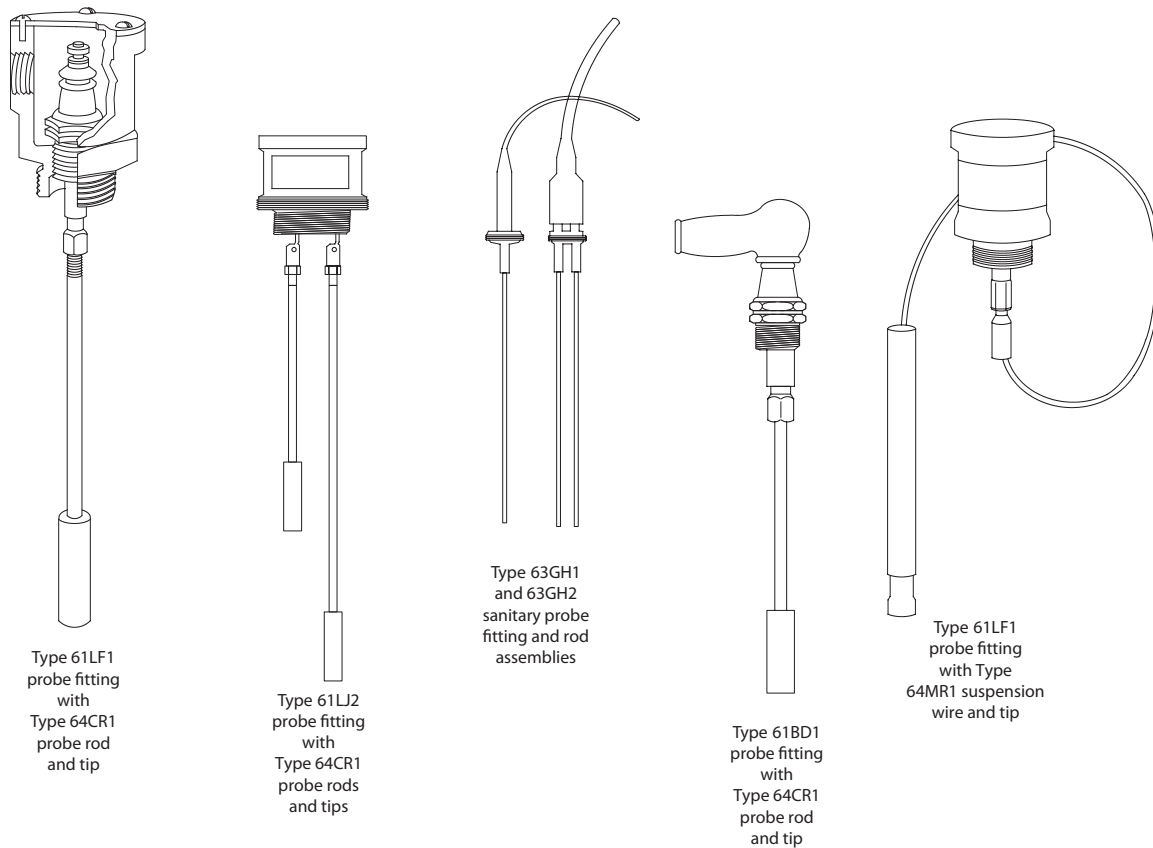


Figure 1: Probes for Level Controls Series 61, 63, 64

Probe Assemblies

A selection of probe assemblies is available for a wide variety of applications. The probe assembly consists of a probe fitting threaded for convenient installation into a tank, vat, or other container; a stainless steel probe rod or insulated suspension wire which may be cut to the desired length for the particular installation; and a probe tip designed to provide the required surface area at a point of contact with the liquid. Figure 1 shows typical probe assemblies.

Series 61 probe fittings are ceramic insulated with stainless steel trim which may be used either alone or in one of a variety of metal enclosures. Single and double probe fittings are available. Series 63 sanitary probe fittings are available for dairy and other food processing installations. Sanitary probes do not require probe tips for satisfactory operation.

Series 64 probe tip assemblies are combinations of a probe rod or suspension wire of the desired length with a suitable probe tip and are used with all Series 61 probe fittings.

Table 1: Level and Resistance Control

Bulletin Number	Control Base	Output	Voltage Supply	Output Characteristics			Response Time	Resistivity Range
				Type	Rating	Leakage		
13DJ3-3000				—	—	—	Refer to Table 7	Refer to Table 6
	60-1600B		120V AC 50/60 Hz	—	—	—		
	60-1601B		240V AC 50/60 Hz	—	—	—		
		8-670 supplied with control base		DPDT EM Relay	5A, 120V AC 2.5A, 240V AC 1A, 120V DC	—		
		8-651		SPNO TRIAC AC	1A, 265V AC 20mA min.	1mA		
		8-652		SPNO FET AC/DC	30mA, 120V AC/DC	10µA		
		63-116		Voltage DC Output	30mA, 24V DC	—		
		63-115		NPN Open Collector	250mA, 24V DC	1mA		

Specifications

- Power Consumption:** 3 watts (includes control base)
- Resistivity Range:** Typical liquid resistivity 0-60 MegOhms • centimeter (See Table 5)
- Resistance Sensing Sensitivity:** 0-15 MegOhms in six ranges. (See Table 6, Consult factory for higher ranges.)
- Maximum Probe Voltage:** 22.5VAC (Ranges 1, 2, & 3), 29 VAC (Ranges 4, 5, & 6) (See Table 6)
- Maximum Probe Current:** 65 mA to 0.001 mA. (See Table 6)
- Solid State Output Signal:** 12V DC open circuit limited to 30mA short circuit. Terminals #5 and #2 on Control Base.
- Speed of Response:** 0.003 sec. to 0.20 sec. (See Table 7)
- Permissible Lead Length:** Up to 2,000 ft (609.6 m) (See Table 8) Use #16 AWG wire minimum
- Ambient Temperature:** -40 to 135°F (-40 to 57°C)

Table 2: Probe Fittings

Bulletin Number	Description	Rods or Wires Used	Housing Material	Fitting Pipe Thread	Maximum Temperature	Maximum Pressure psi
61BD1-1000	Probe fitting with rubber cap	1	None	1/2 in.	300°F 149°C	250 (1,724 kPa)
61LF1-1000	Probe fitting in cast enclosure	2	Bronze	1 in.		200 (1,378 kPa)
61LF1-1000M			316 Stainless Steel			
61LJ2-1000	Two probe fittings in cast enclosure		Bronze	2 in.		250 (1,724 kPa)
61LJ2-1000			316 Stainless Steel			200 (1,378 kPa)
63GH1-1000	Special sanitary probe with 3 ft (0.91 m) probe rod(s) supplied with 10 ft (3 m) cable and separable connector	1	None	Fits 1 1/2 in. LAMD 13H nut for #15 Union Ferrule	212°F 100°C	—
63GH2-1000		2				
63GJ1-1000		1		Fits 2 in. LAMD 13H nut for #15 Union Ferrule		
63GJ2-1000		2				

Table 3: Probe Rod Assemblies

Bulletin Number	Description
64CR1-1000	316 Stainless Steel Probe Tip and 1/4 in. dia. x 12 in. (0.3 m) Probe Rod
64CR1-1001	316 Stainless Steel Probe Tip and 1/4 in. dia. x 24 in. (0.61 m) Probe Rod
64CR1-1002	316 Stainless Steel Probe Tip and 1/4 in. dia. x 36 in. (0.91m) Probe Rod
64CR1-1003	316 Stainless Steel Probe Tip and 1/4 in. dia. x 48 in. (1.22 m) Probe Rod
64CR1-1004	316 Stainless Steel Probe Tip and 1/4 in. dia. x 72 in. (1.83 m) Probe Rod
64CR1-1005	316 Stainless Steel Probe Tip and 1/4 in. dia. x 96 in. (2.44 m) Probe Rod
64CR1-1006	316 Stainless Steel Probe Tip and 1/4 in. dia. x 120 in. (3 m) Probe Rod

Table 4: Spare Parts

Part Number	Description	Application
3-170	Rubber Cap	For 61BD1
21-49-1	Connector and 10 ft (3 m) Cable Assembly	For 63GH2 – 63GJ2
21-50		For 63GH1 – 63GJ1
31-224	1 1/2 in. diameter Teflon Spacer	Separates double probes when the long probe exceeds 30 in. (76.2 cm)
33-287	1/4–20 UNC Hex Nut	Used with 64CR1 probe assemblies
58-66	Insulation Suspension Wire	Used when the required probe length exceeds 10 ft (3 m)
61-3284	316 SS 5/8" diameter Suspension Wire Probe Tip	Used when the required probe length exceeds 10 ft (3 m)
61-3285	316 SS Adaptor	Connects suspension wire to 61 Series probes
61-3288	316 SS 9/16 in. diameter Probe Tip	Required on all probe rods for rated sensitivity
61-3519	Resistor Package	For 13DJ3–3000