**DATA SHEET**

Miniature PBT Float Switch

**M7000 Series**

The M7000 miniature liquid level float switch has a PBT stem and a Buna-N float and is a superior choice to basic nylon float switches. The Buna-N float provides better buoyancy and is typically suitable for use in oils, water, aromatic hydrocarbons, diluted acids, and bases. This float switch is ideal for single point float switch level detection when needing to sense a high or low fluid level. The M7000 is not recommended for use in hot water or soap water applications above 149°F / 65°C.

## Applicable Industries

- Oil tanks
- Hydraulic oil level detection
- Low or high alarms or shut-off switches

## Features

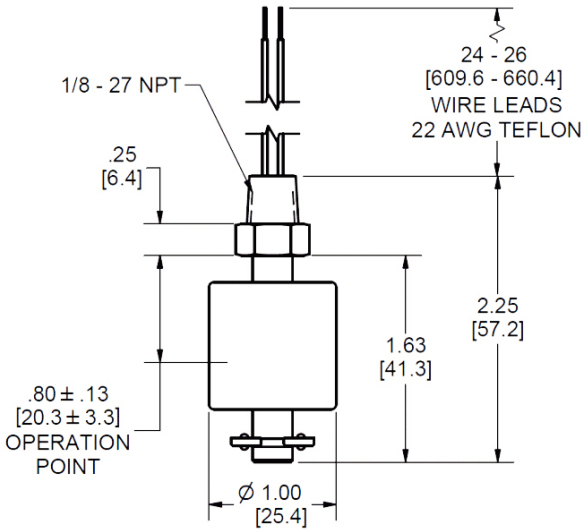
- Single point float switch level detection when needing to sense a high or low fluid level

## Material

- Stem: PBT
- Float: Buna-N

## Specifications

- Mounting: 1/8” NPT
- Max. temperature: 221°F / 105°C
- Max. pressure: 150 psi
- Switch rating: 30 watt, 240V max. (AC/DC), SPST




| Part Number | Minimum Media SG | Lead Wires | Approvals |
|---|---|---|---|
| M7000 | 0.56 | 24”, 22 AWG, Teflon Insulated (standard) | CE, UL, CSA, FLORIDA DEP EQ682 |

NOTE: Other fittings and voltages are available. Contact us to discuss your application.

- Electrical ratings
  Switches are rated for resistive loads. The table below represents the UL guidelines for current (amperes resistive) at different voltages.

| AC Voltage | | DC Voltage | |
|---|---|---|---|
| 30 VA nominal at 120V AC | 0.28 amps max | 30 watt nominal at 24V DC | 0.28 amps max |
| 30 VA nominal at 240V AC | 0.14 amps max | 30 watt nominal at 120V DC | 0.07 amps max |

**Custom Configurations**

Contact us directly for custom solutions.
Email: info@madisonco.com

## Electrical Considerations

When using Madison level switches, it is important to consider the application's electrical parameters. Our level switches utilize reed switch technology, which are glass encapsulated, magnetically actuated switches. Madison generally provides electrical ratings for resistive loads; however, where the maximum current of the load permits, the switches are capable of controlling devices such as motors, solenoids or coils that produce capacitive or inductive electrical loads. Where possible, Madison recommends the use of general-purpose/isolation relays or controllers to protect the switch.

## Protection Techniques and Common Failure Modes

Reed Switch protection is the most successful method of increasing the performance and life of your level sensor. Since every application varies, it is important to understand your protection options. The life of the reed switch is typically 1 million cycles, within rated load conditions. The table below is a guide to suggested protection techniques and common failure modes associated with each load type.

| Load | Load Example | Protection | Diagram | Common Failure Modes | Failure Mode Description |
|---|---|---|---|---|---|
| Resistive (DC) | Indicator Lamp, Heaters | Current Limiting Resistor | A | In-rush Current (Switching) | In-rush current exceeds rating and welds switch closed |
| | | | | Over-Current (Carry) | Carry-current exceeds rating and switch welds or burns open like a fuse |
| Inductive & Capacitative (DC) | Relay Coil, Solenoids, Motor | Reversing Diode | B | Over-Voltage (Arcing) | Voltage arcing during switching welds contacts closed |
| Inductive & Capacitive (AC or DC) | | Resistor & Capacitor Network | C | | |
| Resistive, Inductive & Capacitive (AC or DC) | Indicator Lamp, Heaters, Relay Coil, Solenoids, Motor | Varistor or MOV | D | Over-Voltage (Arcing) | Transients voltage spikes exceed breakdown voltage and weld switch closed |

### Capacitive Load

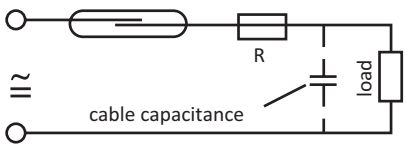



Diagram A: Current Limiting Resistor

### Inductive Load

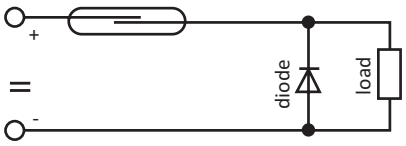



Diagram B: Reversing Diode

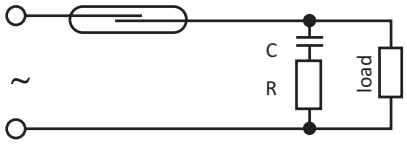



Diagram C: RC Network

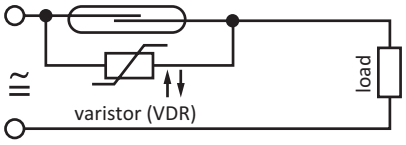



Diagram D: Varistor or MOV

For DC circuits: Insert a 1N4004 diode across the load (i.e.: relay coil) with the cathode end (marked with circular line) connected toward the positive side. This way the diode conducts only when the field collapses. General rule is to use a diode with a voltage rating at least three times the circuit voltage. A 1N4004 has a rating of 1 amp continuous, 30 amp surge, 400V max. Refer to diagram B.

For typical 120V AC circuits: Insert a 50 to 100 ohm, 1/2 watt Resistor in series with a .1 micro farad 400 to 600 volt capacitor across the switch. The capacitor is a high impedance to 60 hertz, but is essentially a short circuit to high frequencies of generated voltages. Alternately, a varistor V130LA10A by itself across the switch will also work for 120V AC. Refer to diagram D.

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