

DATA SHEET

Miniature, Brass

M4400 Series



Typically suited for use with aromatic hydrocarbons, diluted acids, and bases, this miniature float switch works well in petroleum fluids, and mounts easily to an NPT pipe fitting to be extended into fluids with a standard pipe.

Applicable Industries

- Petroleum-based liquids, lubricating oils, gasoline and diesel fuels
- Storage tanks of vehicles, generators, transmissions, hydraulic systems
- Fluid recovery, refining and fuel processing

Features

- For high or low level float switch liquid control

Material

- Stem: 316 Stainless Steel
- Float: Buna-N

Specifications

- Fitting type: 1/8" NPT pipe thread
- Max. temperature: 221°F / 105°C
- Max. pressure: 150 psi
- Switch rating: 30 watt, 240V max. (AC/DC), Single Pole, Single Throw (SPST)

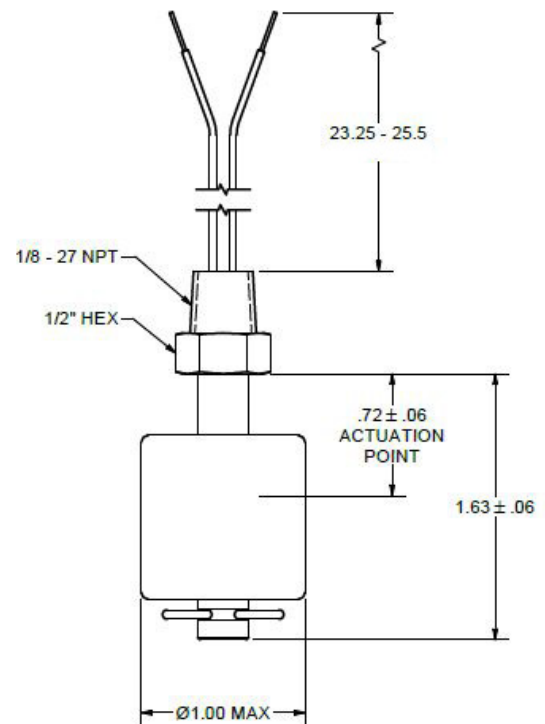
Part Number	Minimum Media SG	Lead Wires	Approval
M4400	0.56	24", 22 AWG, Teflon insulated (standard)	CE, UL, CSA

- 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



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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 & Capacitive (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

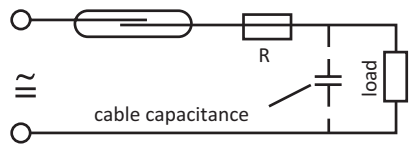


Diagram A: Current Limiting Resistor

Inductive Load

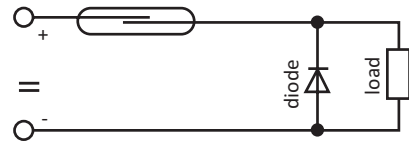


Diagram B: Reversing Diode

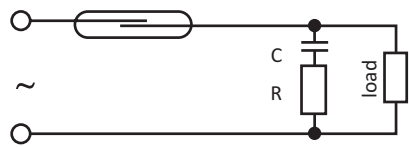


Diagram C: RC Network

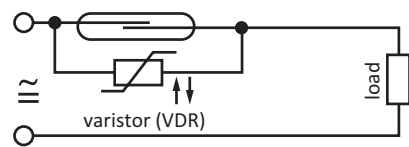


Diagram D: Varistor or MOV

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.



Madison Company | Sensing Solutions since 1959

27 Business Park Drive
Branford, CT 06405 USA

Toll-Free: 800.466.5383
Outside the USA: +1.203.488.4477

www.madisonsensors.com

