# Compact Horizontal Float Switch

**Gentech – LCS-01 Specification No. FLCS39/96**

LCS-01 Compact Liquid Level Sensor

Design Features

- High or low sensing
- Normally open or normally closed operation by rotation through 180º
- Acetal copolymer housing with polypropylene float
- External fit
- Rapid push fit installation
- Sealing washers and materials suitable for a wide range of chemicals
- Reed switch reliability
- Temperature range up to 60ºC
- Minimum SG 0.80

Operational Characteristics

| | |
|---|---|
| Contact Configuration: | SPST |
| Contact Ratings maximum: | 100 VDC |
| (resistive loads) | 250 VAC |
| | 1.0 A |
| | 15 Watts |
| Minimum Withstand Voltage | 600 V |
| (across open contacts) | |
| Initial Contact Resistance | 0.25 Ω |

Enviromental Specification

| | |
|---|---|
| Housing & Float Material: | Glass Filled Polypropylene |
| Sealing Grommet: | EPDM |
| Operating Temperature: | -30ºC to +60ºC |

Mechanical Specification

| | |
|---|---|
| Mounting Position: | ±15º from vertical |
| Operate Window: | within 5mm from float stop |
| Release Angle: | When float is at full travel |
| Shock: | 50g for 11ms duration (reed switch only) |
| Vibration: | 35g up to 500Hz (reed switch only) |

Electrical Connections

Fitted with 2 x 0.1 meters of 22 AWG, 16/0.2mm stranded, with PVC insulation

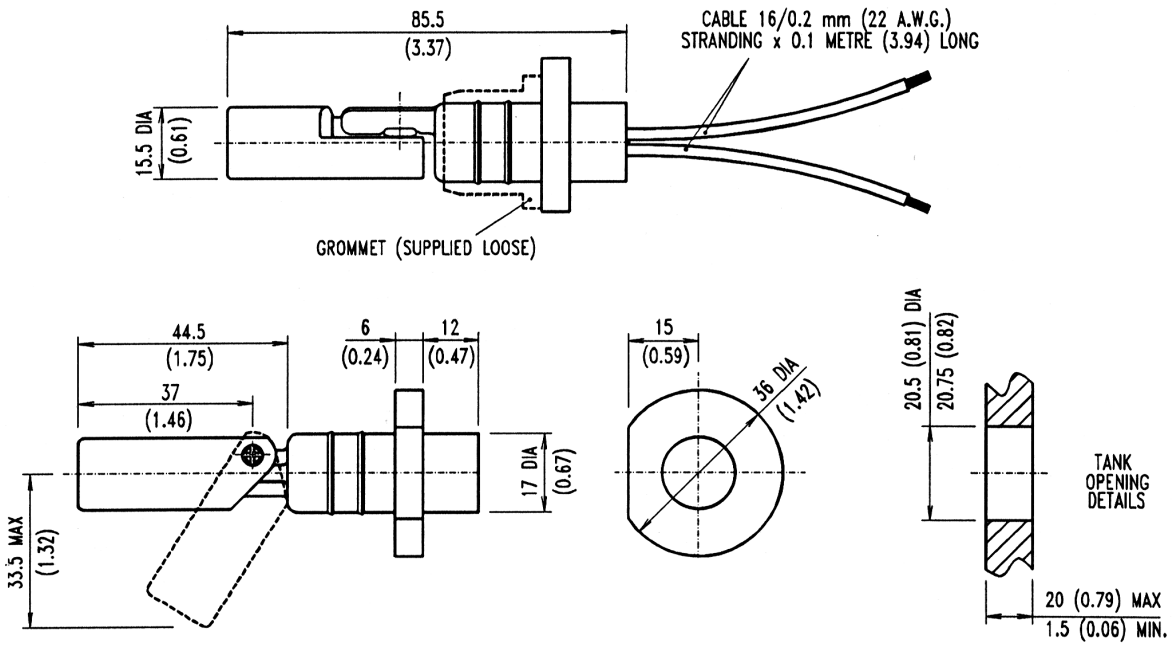
Notes:

1. The switching performance can be drastically affected if switch ratings are exceeded. For inductive, capacitance and tungsten filament loads, derate by 50%. All switch ratings are at DC resistive loads.

Installation and Application Notes

| | |
|---|---|
| Container Wall Thickness: | 2mm maximum, 1.5mm minimum |
| Hole Diameter: | 20.50 to 20.75mm clear of swarf |
| Pressure Seal: | Suitable for seal pressure up to 0.34 bar (5 psi) |
| Seal Materials: | E.P.D.M. |
| Installation: | Insert the grommet into the hole and push fit fully to achieve the seal |

External Fit




Dimensions are in mm (inches). Do not scale drawings

Gentech International

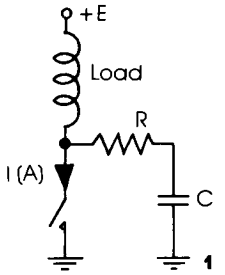
# TECHNICAL NOTEBOOK

# CONTACT PROTECTION CIRCUITS

**When a reed switch is connected to an inductive load or a load where surge current or in-rush current flows (such as capacitive lamp, long cable, etc) the following contact protection circuits are recommended.**

## Inductive Load

**When an electromagnetic relay, electromagnetic solenoid, or electromagnetic counter which has an inductive component as the circuit load; the energy stored in the inductance will cause an inverse voltage when the reed contacts break. The voltage, although dependent on the inductance value, sometimes reaches several hundred volts and becomes a major factor in contact deterioration. To prevent this, many protection circuits are available. typical examples of which are shown.**



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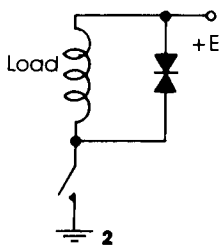
**CIRCUIT 1**
Contact protection with CR circuit.

$C = \frac{I^2}{10}\ (\mu F)$

$R = \frac{E}{10I(1+50/E)}\ (\Omega)$



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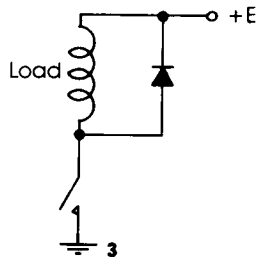
**CIRCUIT 2**
In circuits where reed contacts are open for long periods and there is a possibility of voltage spikes in excess of switch rating, a varister is recommended. This applies to A.C. applications.



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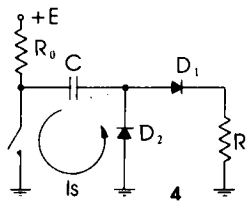
**CIRCUIT 3**
Contact protection with diode. The diode should have a withstand voltage of more than Ev and a forward current of:—

$\frac{5E}{\text{Load coil resistance}}$

## Capacitive Load

**When a capacitor is connected in series or in parallel with reed switch contacts in a closed circuit, the in-rush current which flows at the time of capacitor charge and discharge will cause deterioration of the reed contacts. Typical examples of the protection circuits to prevent high in-rush current are shown.**

**CIRCUIT 4**
Differential circuit without contact protection. The energy stored in C will cause in-rush current (Is) when the contacts close.



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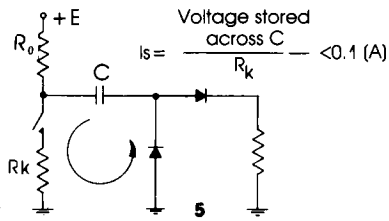
**CIRCUIT 5**
With a current limiting resistor (Rk) for contact protection.
The value of Rk (Ω) is calculated from the following:—

$Is = \frac{\text{Voltage stored across C}}{R_k} < 0.1\ (A)$



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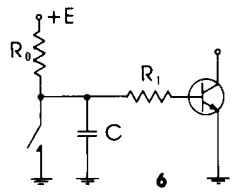
**CIRCUIT 6**
Circuit with C for chattering protection. In-rush current will be created similar to circuit 4.



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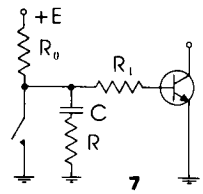
**CIRCUIT 7**
With R for contact protection

R=50~500 (Ω)



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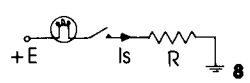
## Lamp Load

**If the reed switch is used for switching tungsten filament lamps, the in-rush current (5 to 10 times the steady-state current) at the contacts immediately the lamp is turned on, often causes excessive heating or sticking of the reed contacts. The lamp load is, therefore, considered similar to a capacitive load, thus requiring a contact protection circuit. Examples of protection circuits recommended are as shown.**

**CIRCUIT 8**
R=Current limiting resistor
R should be calculated on the basis of the Reed contact rating.



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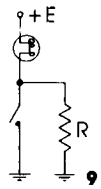

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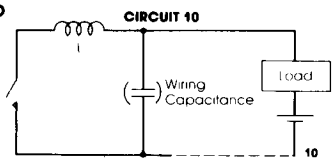
**CIRCUIT 9**
R—Parallel resistance
By connecting R, the filament is heated and its resistance (Ω) is increased.

$R < \frac{\text{Filament resistance}}{3}$

## Cable Capacitance

**When the reed switch is connected to the load by a cable over a long distance, static capacitance induced by the cable will affect the contact performance of the reed switch. It is recommended that the user provides a protection circuit as shown to extend operating life of the reed switch.**

**A surge suppressor ($L_s$) inserted close to the reed switch contacts causes the in-rush current flowing to the contacts to be delayed. The value of $L_s$ is 0.5 to 5mH depending on the load current. The $L_s$ can be replaced by a very small resistor (current-limiting) of 10 to 500 ohms.**



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