



Data Sheet

Liquid level controllers

The range of liquid level controllers available from **RS**, is designed primarily for use with water and water based liquids. The resistivity of water varies in accordance with the following table:

Liquid	Specific resistance
City water	5 to 10k Ω /cm
Well water	2 to 5k Ω /cm
Industrial water	5 to 15k Ω /cm
Rain water	15 to 25k Ω /cm
Sea water	0.03k Ω /cm
Sewage	0.5 to 2k Ω /cm
Distilled water	100k Ω /cm or more

From the above it can be seen that the sensing relays would not be suitable for use with distilled water. Suitable liquids would include acids and alkalis. (See notes under 'Electrodes and Holders'.)

Relay operation

A low level ac current is passed through the liquid between the electrodes set at various levels. The electrode set in the lowest position forms the earth/return path. This return path can also be achieved by means of an electrically conductive tank. When the liquid falls below a set level electrode, the current ceases to flow and the relay operates. The relays may be used for either single or two-point level control (Figure 1).

It must be noted that the variable sensitivity relay operates in the reverse manner to the fixed sensitivity relay (see notes under the appropriate relay).

Features

- Two types of relay available covering most applications
- A range of stainless steel electrodes and holders available for mounting in limited space or wide separation applications
- Connectors and separators available for lengthening electrodes
- High pressure and high temperature applications catered for by using the single pole, high pressure electrode holders.

Liquid level control products

Relays	RS stock no.
Variable sensitivity 110Vac or 240Vac	346-609
Fixed sensitivity 240Vac	303-0414
Fixed sensitivity 110Vac	303-0391
Mounting sockets	
For RS stock no. 346-609	
panel mounting	402-721
base/rail mounting	402-153
For RS stock no. 303-0391/0414	353-657
Electrodes/Holders	
Electrode set 3-pole	354-290
Electrode holder 3-pole	354-307
Electrode holder 1-pole	354-313
Electrode holder 1-pole (high pressure)	354-329
Electrode stainless steel, 1 metre long	354-335
Electrode connector	354-341
Electrode separator	354-357

Controller types

Variable sensitivity relay

The relay is housed in a DIN 48 × 48 case and may be front panel mounted through a 45 × 45 cut-out (suitable hole punch available from **RS** stock no. 600-048). Suitable panel mounting hardware is supplied. Alternatively, the relay may be surface or DIN rail mounted using an 11-pin socket (**RS** stock no. 402-153).

Variable sensitivity allows operation in a wide variety of liquids including those with high viscosity. By reducing the sensitivity the relay will react more quickly when the electrode leaves the viscous fluid. Another advantage is its ability to ignore liquids that are not required to be detected (eg. froth on the surface of a liquid). Other applications requiring a variable sensitivity include control of soil moisture content and detection of degree of water pollution.

For single point level control the relay energises when the liquid level drops below the set level electrode. For two point level control the relay energises when the liquid level drops below the low level electrode and de-energises when the liquid level reaches the high level electrode.

This manner of operation is ideal for filling applications since power loss to the relay would cause it to revert to an 'off' condition, thus preventing over filling.

Technical specification

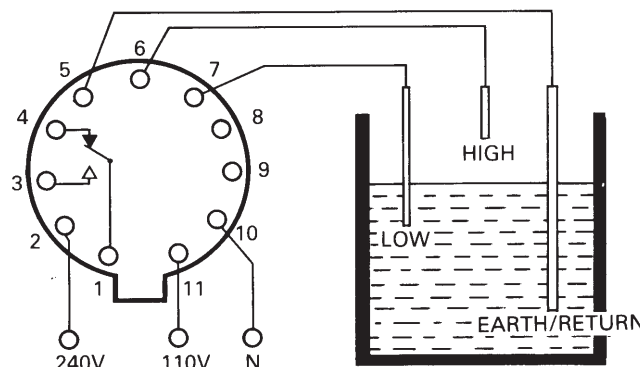
Supply voltage _____ 110V or 240Vac ± 10% 50 to 60Hz
 Supply power _____ 4VA max.
 Operating resistance _adjustable from 2kΩ on/5kΩ off,
 _____ to 20 kΩ on/50 kΩ off
 Operating time _____ 100 m sec typ.
 Delay to sense _____ 0.5 sec typ.
 Max. lead length to electrodes _____ 10m typ.
 Operating temperature range _____ -10°C to +60°C
 Control output _____ SPDT relay contacts rated at
 _____ 5A, 240Vac resistive
 Inter-electrode voltage _____ 8Vac max. dc component
 _____ less than 50µA

Features

- Supply voltage 110V/240Vac
- Sensitivity adjustable, 2kΩ on/5kΩ off to 20kΩ on/50kΩ off
- LED indicators and supply status via two front mounted indicators
- Single or two point level control
- Front panel or plug-in base mounting (via an 11-pin socket).



Figure 1 **Connections for variable sensitivity relay**



Fixed sensitivity relay

For single point level control the relay de-energises when the liquid level drops below the set level electrode. For two point level control the relay de-energises when the liquid level drops below the low level electrode and energises when the liquid level reaches the high level electrode.

This manner of operation is ideal for emptying applications.

Technical specifications

Supply voltage

RS stock no. 303-0414 _____ 240Vac (60/60Hz)

RS stock no. 303-0391 _____ 110Vac (60/60Hz)

Operating voltage range _____ 85-110% supply voltage

Power consumption _____ 3.2VA (approx.)

Operating resistance _____ 4k Ω on/15k Ω off

Operating times (max.) _____ 80ms on/60ms off

Inter-electrode voltage _____ 8Vac

Operating temperature range _____ -10°C to +55°C

Control output _____ SPDT relay contacts rated at

_____ 5A 240Vac resistive

Max. lead length to electrodes _____ 1km

Features

- Two versions available, 240V or 110Vac supply voltage
- Base mounting via an 8-pin socket with screw terminals and integral securing clips.
- Integral protection against voltage surges
- Single or two point level control.

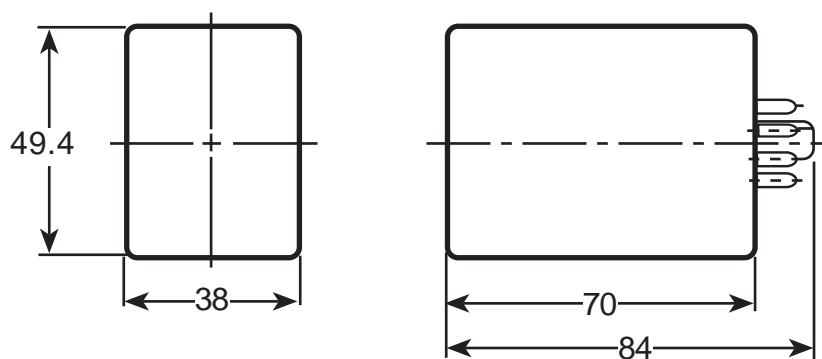
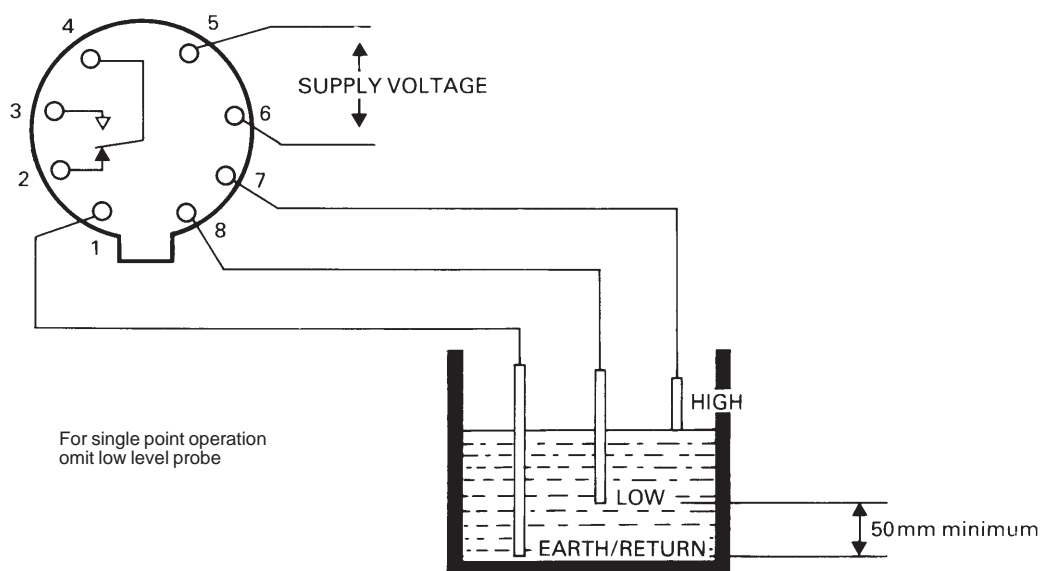


Figure 2 Connections for fixed sensitivity relay



Electrodes and holders



A range of stainless steel electrodes and holders is available to suit most applications. Stainless steel is suitable for use in purified water, sea water, sewage, acid (except strong acidic solutions) and alkaline liquids, although they may corrode in some applications depending upon the temperature and working conditions. When using electrodes in sea water, or sewage, a 1 metre spacing between electrodes is recommended. In the latter application this also prevents clogging. For this application, single pole electrode holders are available. If a 1 metre spacing cannot be achieved the variable sensitivity relay, set to a low position, may be used.

When cutting the electrodes, a minimum distance of 50mm between the 'low' set level and the 'earth/return electrode' set level must be observed (Figure 2).

If electrodes need to be extended, connectors (**RS** stock no. 354-341) and a separator (**RS** stock no. 354-357) must be used to prevent the electrodes from touching one another.

If tape is used on the electrodes, to prevent accidental contact other electrodes, at least 100mm must be left uncovered at the end.

Note that the relay may not operate immediately it reaches the end of the electrode. A certain amount of electrode material may need to be in contact with the liquid. This is dependent upon the sensitivity of the relay and the type of liquid used.

When measuring the resistance between electrodes disconnect the relay. For high pressure or high temperature applications use the single pole, high pressure electrode holder (**RS** stock no. 354-329).

Electrode installation

The electrodes must be used at, or within, the recommended distance from the relay. They should be installed vertically from above. If side access only is available, then the electrodes should be bent vertically downwards once they have entered the tank.