



MODEL K-5720

POINT LEVEL SWITCH
FOR LIQUID LEVEL CONTROL

OPERATION

AND

INSTRUCTION MANUAL



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INTRODUCTION

SWITZER Model K-5720 Point Level Switch has been developed for monitoring and control of a wide range of non-corrosive, non-hazardous and non-flammable liquids. It is particularly suitable for detecting the presence of a liquid and an effective instrument for liquid level control and alarm.

The simple electronic device replaces conventional sight glasses and float Level switch effectively by providing excellent repeatability and accuracy of operation. Since this is completely solid state and no moving parts are involved, the life of the instrument is practically unlimited.

The primary level sensing element for the detection is a positive temperature coefficient thermistor element encapsulated within solid glass. Hence this can be used for any conductive and non-conductive liquid applications.

One of the specific applications for which the instrument can be used is for monitoring lubricating oil in lube oil sumps in gear boxes. There are various other unlimited applications for which this level switch can be put into use.

PRINCIPLE OF OPERATION

When the sensor is electrically excited with a supply voltage, it self-heats to a temperature well above ambient and stabilizes at a particular power dissipation and circuit current.

When the sensing medium changes, due to which the thermal conductivity changes, the sensor restabilizes to a new operating current and temperature.

Changing from a low to high thermally conductive medium or vice-versa, causes the sensor circuit current to change. This current change is sensed and a voltage is generated, which activates an on-off control relay to generate an alarm or trip signal.

The sensor should be located in the vessel or tank at which the liquid level is maintained for safe operation of the equipment. When the level is normal, the sensor is in contact with the liquid exhibiting low resistance so that the relay is in OFF condition. If the liquid level goes down, the sensor is exposed to air and its resistance increases, switching the relay ON.

When the liquid level is restored back to the required normal level, it touches the sensor, whose resistance once again reduces. For Auto reset option, the relay returns back to OFF state automatically and no manual intervention is required.

For Manual reset option, the relay remains in the ON state, till the Reset switch is pressed to manually clear the unsafe condition. This Auto/Manual Reset feature is enabled by a jumper located on the PCB inside the enclosure. Refer to details provided elsewhere in this manual.

Indicating lamps are provided to indicate Power On and Relay On status.

The maximum allowable liquid temperature for the sensor to detect the presence of liquid is 90°C.

INSTALLATION INSTRUCTIONS

The instrument contains 2 parts – sensor assembly and electronics assembly. Refer to **Fig-1a & b**, **Fig-2** for details.

Sensor assembly:

The sensor should be located at a point where the material is to be sensed for presence. It is housed in a brass adaptor which can be directly screwed on to the vessel/container in which the level is to be monitored. The standard thread provided on the brass sensor adaptor is 1/2" BSP(M). Consult factory for any other non-standard thread.

A lock nut is also provided with the sensor assembly to be used in applications where the vessel wall is thin and without any suitable mating thread. The wall thickness of vessel should not exceed 10mm when the lock nut is to be used. Use suitable gasket to prevent leaks.

Use a 25mm A/F wrench at the hexagonal portion of the sensor adaptor to fix it on the vessel. The lock nut also uses the same A/F size.

The sensor assembly also contains a 2-core cable of 2 mtr length standard. Other lengths are offered upon specific requests during ordering. The maximum allowed cable length is only 5 mtrs. The sensor can be used for both horizontal and vertical mounting applications. It is recommended to maintain the sensor at an angle of 15 to 30° from the horizontal, to enable clean draining of the liquid for quick response.

CAUTION

The sensor tip will be hot when powered up and the sensor is exposed to air. DO NOT TOUCH SENSOR TIP WITH BARE FINGERS.

Electronics assembly:

The electronics is housed in a DIN rail mount plastic enclosure. Suitable DIN rail to be used is of width 35mm. The plastic enclosure is also suitable for surface mount applications and necessary mounting holes are provided. Recommended screw size for surface mounting is 2 pcs of M4x12mm. Electrical connection terminals, status indicating lamps and manual reset switch are provided in this electronic assembly. Refer to **Fig-1b** for suitable DIN rail.

Fig-1a: Overall Dimension Drawing

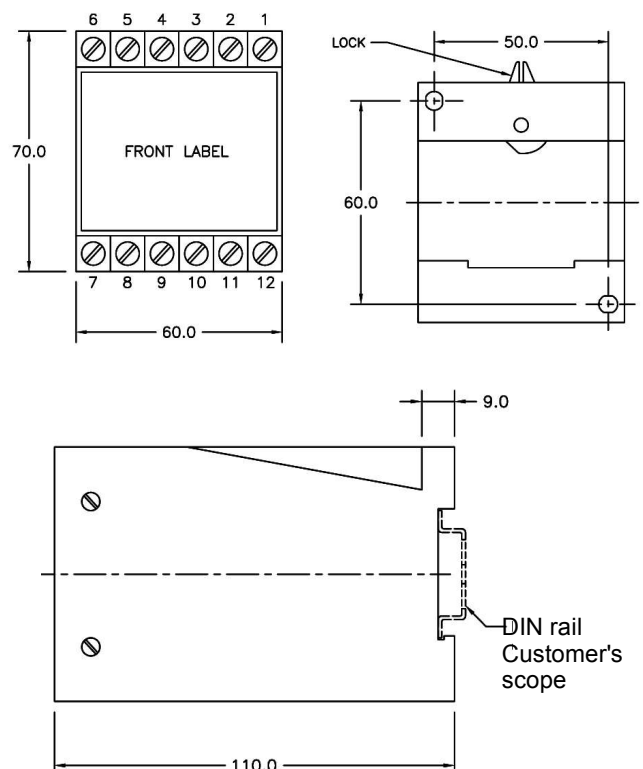


Fig-1b: Suitable DIN rail

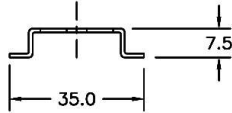
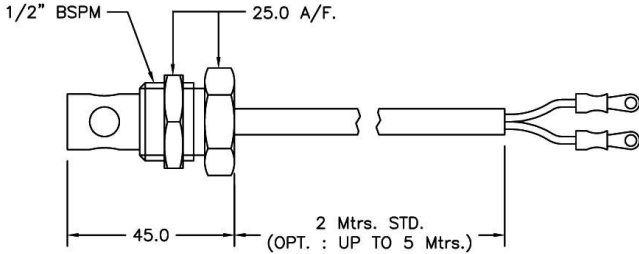


Fig-2: Sensor assembly dimensional drawing



CAUTION

Ensure adequate care is taken during handling the sensor assembly to avoid any mechanical shock and knock-off. The sensor is a glass type and can be damaged when there is excessive mechanical shock.

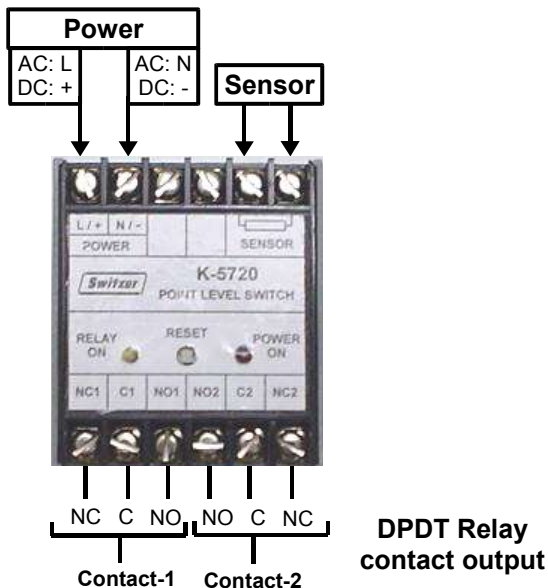
WIRING INSTRUCTION

The external connection terminals are located on the top of the DIN rail instrument enclosure. The terminals are of screw clamp type. Refer to Fig-3

Terminal # and its connections

1. Sensor
2. Sensor
3. N/C
4. N/C
5. Power – Neutral for AC or (-) for DC
6. Power – Live for AC or (+) for DC
7. Normally Closed – 1
8. Common – 1
9. Normally Open – 1
10. Normally Open – 2
11. Common – 2
12. Normally Closed – 2

Fig-3: Wiring diagram



AUTO / MANUAL RESET SELECTION

Auto and Manual reset option is selected through Jumper J1, located on the signal conditioner board. Refer Fig-4, 5 below.

For AUTO Reset, insert jumper between A-C.
For MANUAL Reset, insert jumper between M-C.

The reset switch is not functional when Auto reset option is selected.

Fig-4: Auto / Manual reset jumper location in instrument

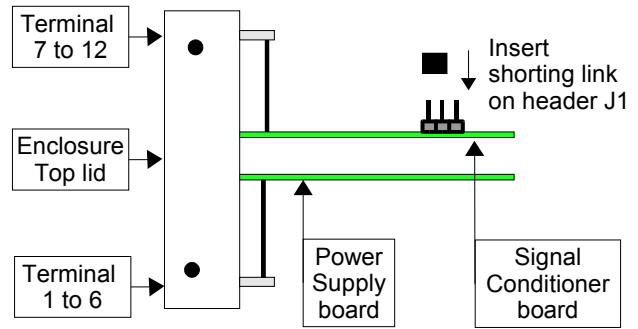
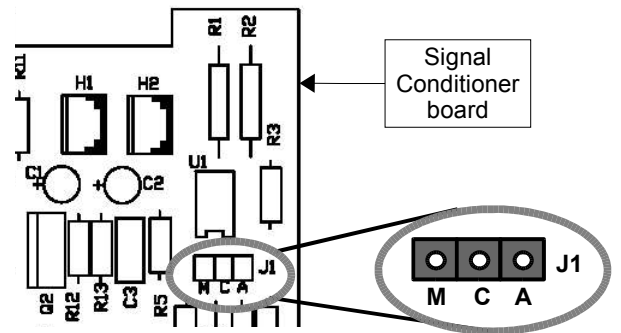


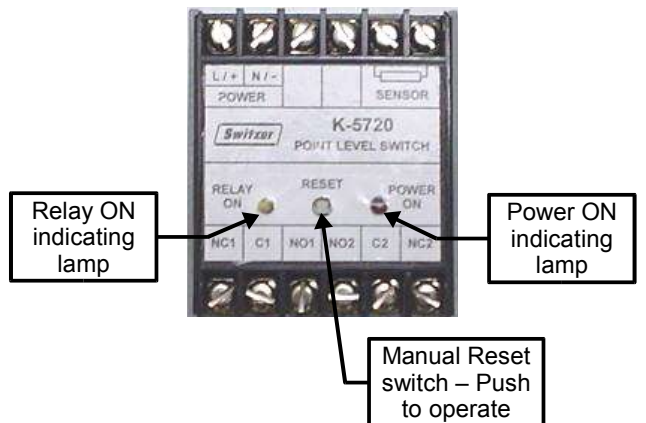
Fig-5: Auto / Manual reset jumper location on PCB



OUTPUT RELAY STATUS TABLE

Below are the status table for Auto and Manual reset option for relay and status indicating lamps. Refer Fig-6 for location.

Fig-6: Status and reset switch location



Auto Reset option

| Level | Sensor in | Relay | Relay status LED (Yellow) | Power status LED (Red) |
|--------|-----------|-------|---------------------------|------------------------|
| Normal | Fluid | OFF | OFF | ON |
| Low | Air | ON | ON | ON |

Manual Reset option

| Level | Sensor in | Relay | Relay status LED (Yellow) | Power status LED (Red) | Action Required |
|--------|-----------|-------|---------------------------|------------------------|--------------------|
| Normal | fluid | OFF | OFF | ON | None |
| Low | air | ON | ON | ON | None |
| Normal | fluid | ON | ON | ON | Press reset switch |
| Normal | fluid | OFF | OFF | ON | None |

Sensor and relay response time

The response time for the relay operation to occur, after a change in level is sensed by the sensor, varies from a typical value of about 2 to 15 secs. The earlier the draining of the liquid from the sensor tip, faster is the response. This response time also depends on the liquid temperature. If the liquid temperature is high, the response time will also decrease and the relay change over occurs earlier. If the liquid is cold, the response is comparatively little longer.

MAINTENANCE INSTRUCTIONS:

There are no user serviceable parts in this level switch and there is no calibration to be performed in this instrument. Keep the sensor port clean to enable proper sensing of the liquid level. Any clogging will prevent the liquid from draining from the sensor port which will keep the relay off continuously. If there is any clogging of the sensor port with any debris, remove it gently with a tweezer. Ensure that there is no damage caused to the sensor during any maintenance operation. Do not use any sharp tool that can damage the sensor. Non-corrosive solvents can be used for cleaning the sensor assembly such as iso-propyl alcohol.

TECHNICAL SPECIFICATIONS

| Characteristics | Specifications |
|-------------------|---|
| Model | K-5720 Point Level switch |
| Application media | Any non-corrosive liquid – non-conductive and conductive. |
| Input | PTC thermistor with 2 core cable of 2 mtr length (standard) |
| Output | 1 DPDT contact, 6A at 250V AC/ 28V DC |
| Power supply | 1. AC – 90 to 250V 2. DC – 18 to 32V |
| Status indication | By LEDs, Red – Power “ON” Yellow – Relay “ON” |
| Sensor Break | Relay Permanently “ON” |
| Response | 2 – 15 seconds typical. |

| Characteristics | Specifications |
|-----------------------------|---|
| Relay Reset option | Option – 1: Auto reset. <i>Default factory setting.</i> Option – 2: Manual reset through push switch on front cover These options are selectable by jumper located on the PCB |
| Max. Media Temp | 90°C |
| Process connection | ½” BSPM Brass adaptor with hexagon of 25 A/F. Provided with lock nut for mounting. Consult factory for other custom applications and options. |
| Wetted parts | Glass, Brass, epoxy potting material |
| Sensor to switch connection | 2 x 0.75mm ² , 7.0mm OD, cable 2 metre long standard. Maximum length of 5 metre can be offered. |
| Approximate weight | 700 gms max. inclusive of Instrument with 5 mtr. Cable and sensor assembly. Individual weight is provided below. <ul style="list-style-type: none"> • Sensor with 5 mtr. cable assembly – 500 gms max. • Instrument in DIN enclosure – 200 gms max. |
| Overall Dimension | DIN Enclosure: 60 x 70 x 110 mm |
| Enclosure type | DIN Enclosure suitable for DIN rail mount or surface mount |
| Enclosure material | ABS plastic |
| Ambient conditions | Temperature: 0 to 55°C Relative Humidity: 95% max. |