# Liquid Level Controller




Operating Instruction

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# OVERVIEW




**DIN 70mm**

## Salient features

- **Used for two tank & single tank conductive liquid level monitoring**
- **Pump protection from dry run and overflow condition**
- **Specially designed sensors**
- **Adjustable trip & recovery time delay settings**
- **6A SPDT output relay (resistive)**
- **Manual start switch facility**
- **Liquid levels & Trip indication LED's**
- **Selectable suction & delivery mode in single tank operation**

## Ordering information

| Product code | Supply voltage | Certification |
|---|---|---|
| **LLCA-2M-1-U-CE** | 85 - 270V AC/DC | CE |

# SAFETY RECOMMENDATION

All safety related modifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.
If the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment. If there is physical damage to the unit then do not use it.
Read complete instructions prior to installation and operation of the unit.

- **Caution**
- Ensure the connection as per terminal diagram.
- To be handled only by authorized and technical person.
- Do not install any heat sources like burner, electric arc, etc near unit.
- Install as near to the starter as possible.
- The sensor prods are suspended from the top opening of the water tank in a suitable PVC conduct piping. Metal pipes should not be used.
- The sensor prods should not be wall mounted on metallic water tank.

# SPECIFICATION

| Technical specifications | |
|---|---|
| Auxiliary supply | 85 - 270V AC/DC |
| Frequency | 50Hz/60Hz |
| Power comsumption | 4VA max. |
| Input sensor | Stainless steel prods |
| Trip setting | According to the levels of sensor placed in the tank. |
| Trip time delay | 0.5-10 sec |
| Recovery time | 0.5-10 sec |
| Reset | Automatic |
| Time accuracy | ±5% of set value |
| Output specification | Relay rating: 1 N/O (Resistive)<br>NO: 10A@277V AC / 28V DC<br>NC: 6A@277V AC |
| Mechanical specifications | Dimension: 35x90x60mm<br>Mounting: 35mm DIN Rail mount<br>Screw tightening torque: 0.5N.m<br>Length of insulation to be removed before insertion of conductor into the terminal: 6-7mm |
| Environmental specifications | - Indoor use<br>- Altitude of up to 2000 meters<br>- Pollution degree 2<br>- Over voltage category II<br>- Impulse withstand voltage: 4kV<br>- Degree of protection: IP20 for terminal<br>IP40 for casing<br>IP50 for faceplate |
| Storage temperature | -20 to 70 °C |
| Humidity | Up to 95% RH, non-condensing |
| Weight | Sensor: 50 gm each<br>Unit: 100 gm |
| Certification | IEC60947-5-1 |

## APPLICATIONS

- This product protects the motor from dry run condition; thus ensures durability
- The automatic sensing of levels and controlling algorithm ensures 24 hours liquid level supply without any kind of interruption, which fortunately saves liquid & human efforts.
- This device operates with sensors which are specially designed to monitor the conductive liquid level in tanks. These sensors are safe, electrically isolated from mains, plastic moulded & non-corrosive so it lasts longer.

### Mode selection & Operation

This product operates in following modes:

- Single tank mode:
  - Suction logic - Single level, Two level
  - Delivery logic - Single level, Two level
- Dual tank mode

### Function of single tank mode (suction or delivery logic)

When product is to be used with Single Tank Mode with Suction/Delivery Logic,

- Sensors P4, P5 & P6 are not connected/kept open.
- Lower & upper liquid level measurement is done with sensor P2 & P3 respectively, considering P1 as reference.

### Function of two tank mode (suction and delivery logic)

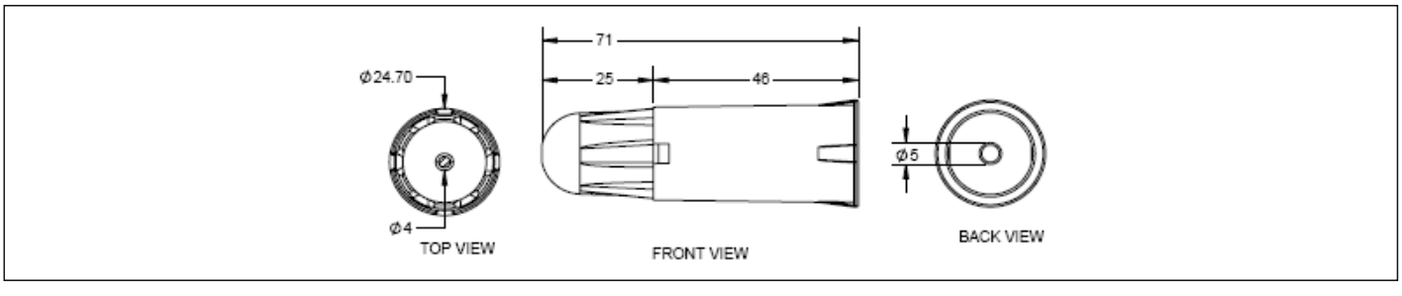
When product is to be used in two tank logic,

- The system starts up whenever liquid is to be supplied to delivery tank and suction tank has sufficient level to supply it & it stops when the liquid reaches its maximum level in the delivery tank or if the suction tank reaches its minimum level.
- P1 is considered reference for suction tank & measurement is done with sensor P2 & P3 for two level and with sensor P2 for single level.
- Similarly for delivery tank, P4 is considered as reference & measurement is done with sensor P5 & P6 for two level and sensor P5 for single level.

### • Input sensor

- This product is to be used with Selec sensor prod only.
- The Selec sensor prod has a bolting arrangement for connecting a suitable cable and it is to be suspended from top opening of the liquid tank.
- Sensor material: Stainless steel

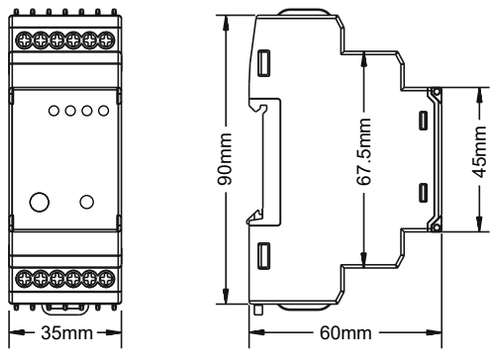
### Input sensor dimensions



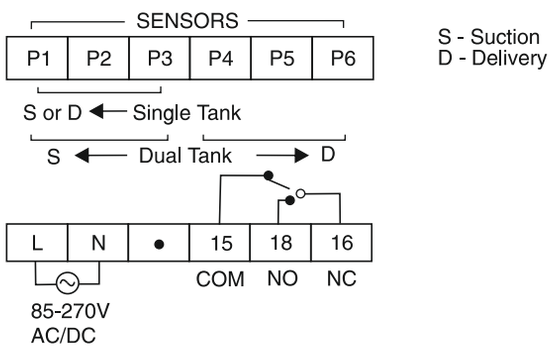

### LED indication chart

| LED color | Notation | Indication |
|---|---|---|
| Green | ON | Power ON |
| Yellow1 | S | Suction tank level indication |
| Yellow2 | D | Delivery tank level indication |
| Red | R | Relay indication |

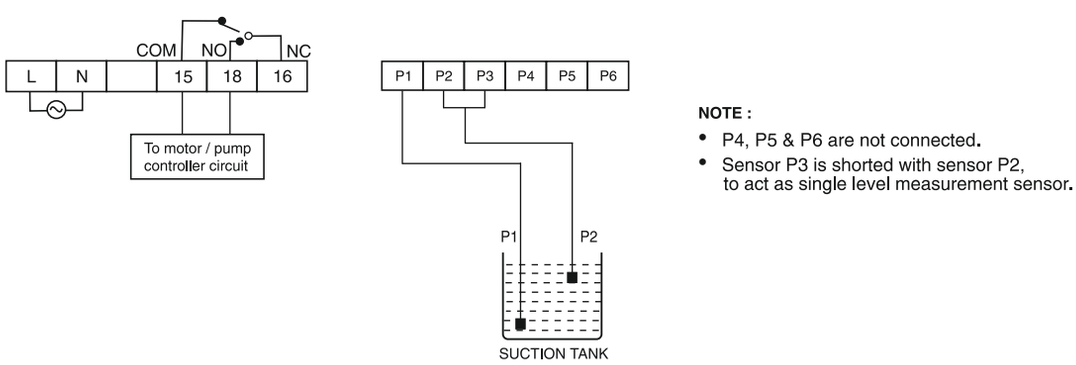
## Mechanical installation / Dimensions




## Terminal connection



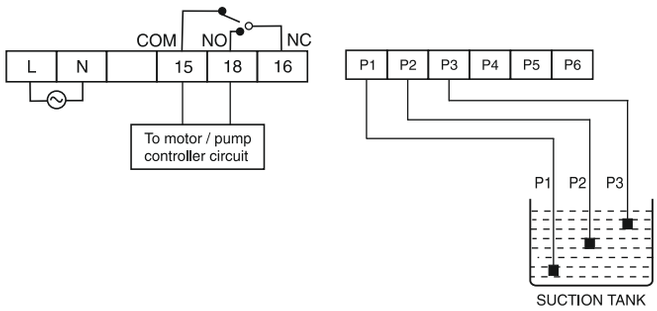

## Single tank single level_suction logic




## Testing chart

| Sr. No. | P1 | P2= P2+P3 | Trip Status | LED1 | LED2 | LED3 | LED4 |
|---|---|---|---|---|---|---|---|
| | | | | Power ON | Suction | Delivery | Relay |
| 1 | IN | OUT | OFF | ON | Fast Blinking | OFF | OFF |
| 2 | IN | IN | ON | ON | ON | OFF | ON |

## Single tank two level_suction logic



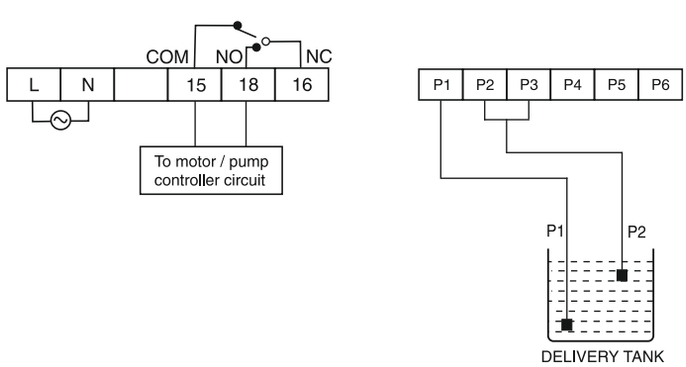

**NOTE :**

- P4, P5 & P6 are not connected.
- Measurement is done with sensor P2 & P3 for different liquid levels, considering P1 as reference.

## Testing chart

| Sr.No. | P1 | Sensor condition | | Trip Status | LED1 | LED2 | LED3 | LED4 |
|---|---|---|---|---|---|---|---|---|
| | | P2 | P3 | | Power ON | Suction | Delivery | Relay |
| 1 | IN | OUT | OUT | OFF | ON | Fast Blinking | OFF | OFF |
| 2 | IN | IN | OUT | OFF | ON | Slow Blinking | OFF | OFF |
| 3 | IN | IN | IN | ON | ON | ON | OFF | ON |
| 4 | IN | IN | OUT | ON | ON | Slow Blinking | OFF | ON |
| 5 | IN | OUT | OUT | OFF | ON | Fast Blinking | OFF | OFF |

## Single tank single level_delivery logic



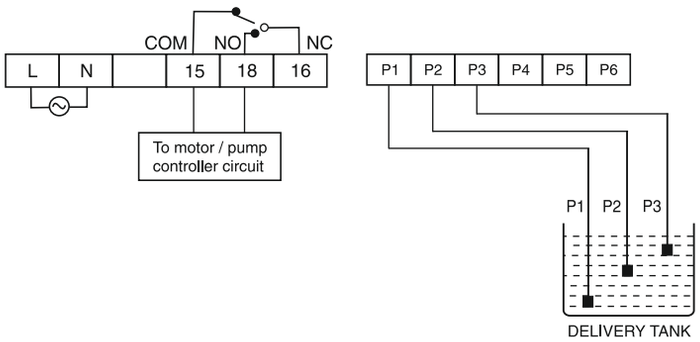

**NOTE :**

- Sensor P4, P5 & P6 are not connected.
- Sensor P3 is shorted with sensor P2, to act as single level measurement sensor.

## Testing chart

| Sr. No. | P1 | P2= P2+P3 | Trip Status | LED1 | LED2 | LED3 | LED4 |
|---|---|---|---|---|---|---|---|
| | | | | Power ON | Suction | Delivery | Relay |
| 1 | IN | OUT | ON | ON | OFF | Fast Blinking | ON |
| 2 | IN | IN | OFF | ON | OFF | ON | OFF |

## Single tank two level_delivery logic

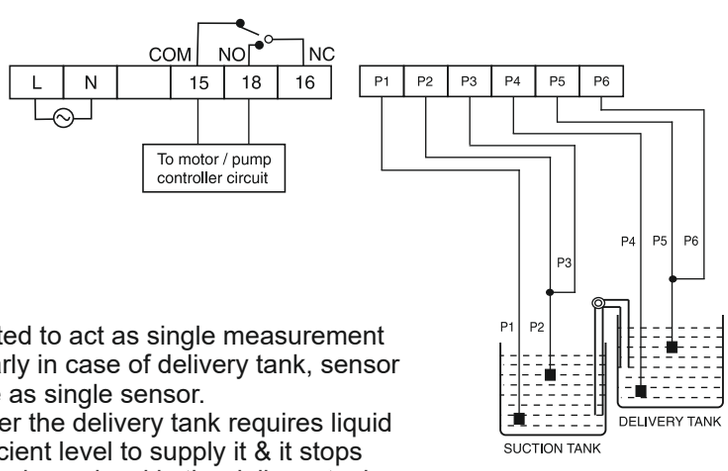



**NOTE :**
- P4, P5 & P6 are not connected.
- Measurement is done with sensor P2 & P3 for different liquid levels, considering P1 as reference.

## Testing chart

| Sr.No. | P1 | Sensor condition | | Trip Status | LED1 | LED2 | LED3 | LED4 |
|---|---|---|---|---|---|---|---|---|
| | | P2 | P3 | | Power ON | Suction | Delivery | Relay |
| 1 | IN | OUT | OUT | ON | ON | OFF | Fast Blinking | ON |
| 2 | IN | IN | OUT | ON | ON | OFF | Slow Blinking | ON |
| 3 | IN | IN | IN | OFF | ON | OFF | ON | OFF |
| 4 | IN | IN | OUT | OFF | ON | OFF | Slow Blinking | OFF |
| 5 | IN | OUT | OUT | ON | ON | OFF | Fast Blinking | ON |

## Two tank single level

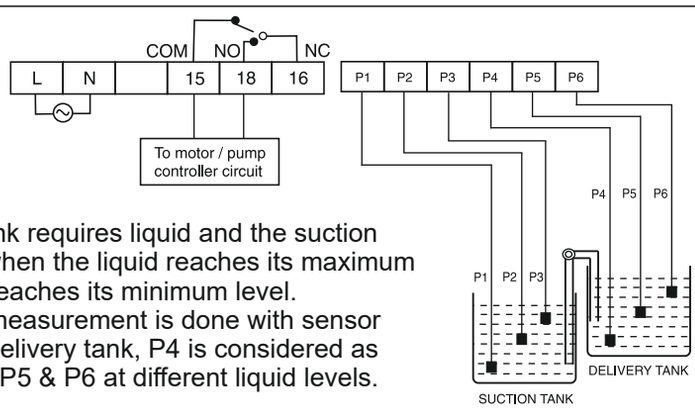



**NOTE :**
- Sensor P2+P3 are to be shorted to act as single measurement sensor for suction tank, similarly in case of delivery tank, sensor P5+P6 are shorted to operate as single sensor.
- The system starts up whenever the delivery tank requires liquid and the suction tank has sufficient level to supply it & it stops when the liquid reaches its maximum level in the delivery tank or if the suction tank reaches its minimum level.

## Testing chart

| Sr.No. | Sensor condition | | | | Trip Status | LED1 | LED2 | LED3 | LED4 |
|---|---|---|---|---|---|---|---|---|---|
| | P1 (Ref1) | P2 = P2+P3 | P4 (Ref2) | P5 = P5+P6 | | Power ON | Suction | Delivery | Relay |
| 1 | IN | OUT | IN | OUT | OFF | ON | Fast Blinking | Fast Blinking | OFF |
| 2 | IN | IN | IN | OUT | ON | ON | ON | Fast Blinking | ON |
| 3 | IN | IN | IN | IN | OFF | ON | ON | ON | OFF |
| 4 | IN | OUT | IN | IN | OFF | ON | Fast Blinking | ON | OFF |

## Two tank two level




**NOTE :**

- The system starts up whenever the delivery tank requires liquid and the suction tank has sufficient level to supply it & it stops when the liquid reaches its maximum level in the delivery tank or if the suction tank reaches its minimum level.
- P1 is considered reference for suction tank & measurement is done with sensor P2 & P3 at different liquid levels. Similarly for delivery tank, P4 is considered as reference & measurement is done with sensor P5 & P6 at different liquid levels.

| Sr.No. | Suction | | | Delivery | | | Trip Status | LED1 | LED2 | LED3 | LED4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sensor condition | | | | | | | | | | |
| | P1(Ref1) | P2 | P3 | P4(Ref1) | P5 | P6 | | Power ON | Suction | Delivery | Relay |
| 1 | IN | OUT | OUT | IN | OUT | OUT | OFF | ON | Fast Blinking | Fast Blinking | OFF |
| 2 | IN | IN | OUT | IN | OUT | OUT | OFF | ON | Slow Blinking | Fast Blinking | OFF |
| 3 | IN | IN | IN | IN | OUT | OUT | ON | ON | ON | Fast Blinking | ON |
| 4 | IN | IN | OUT | IN | IN | OUT | ON | ON | Slow Blinking | Slow Blinking | ON |
| 5 | IN | IN | IN | IN | IN | OUT | ON | ON | ON | Slow Blinking | ON |
| 6 | IN | IN | IN | IN | IN | IN | OFF | ON | ON | ON | OFF |
| 7 | IN | IN | OUT | IN | IN | IN | OFF | ON | Slow Blinking | ON | OFF |
| 8 | IN | OUT | OUT | IN | IN | IN | OFF | ON | Fast Blinking | ON | OFF |
| 9 | IN | OUT | OUT | IN | IN | OUT | OFF | ON | Fast Blinking | Slow Blinking | OFF |

**Manual start switch:** If liquid level in lower tank is greater than low level & liquid level in upper tank is below high level then by pressing a switch, relay can be switched ON manually. Trip & recovery time delay is not applicable with manual start switch operation

## WARRANTY / LIMITATIONS OF LIABILITY

Selec warrants the products to be free from defects in the materials and workmanship for a period of one year (or other period specified, if any) from the date of sale by Selec.

The warranty does not apply to defects resulting from any action of the buyer, including but not limited to improper handling, operating the product outside the specification limits or unauthorized disassembling / altering of the product. The warranty shall be VOID if the product shows evidence of having been tampered or being damaged due to usage in corrosive environment; or current, heat, moisture or vibration; improper specification; wrong usage in an application; misuse or other operating conditions outside of Selec's control.

Selec shall not be responsible for special, indirect or consequential damages, loss of profits or commercial loss in any way connected with the products, whether such claim is based on contract, warranty, negligence or strict liability.

In no event shall the responsibility of Selec for any act exceed the individual price of the product on which liability is asserted.

In no event shall Selec be responsible for warranty or other claims regarding the products unless Selec's analysis confirms that the products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification or repair.

## CONFIGURATION SETTING

To enter configuration mode, all the sensors should be disconnected from unit or should be out of water. Either of the three modes i.e Single Tank (Suction), Single Tank (Delivery), Two Tank (Suction & Delivery) can be selected. Default mode is Two Tank (S&D).

| Step | Condition | START Key | LED INDICATION (Once entered config mode) | | | | Duration |
|---|---|---|---|---|---|---|---|
| | | | ON | S | D | R | |
| 1 | Enter Configuration | Press for 5sec | ON | Blink | Blink | Blink | 3 sec |
| 2 | Mode Selection | Press key to switch between modes | | | | | 10 sec |
| | | 1. Two Tank (S&D) | ON | ON | ON | OFF | |
| | | 2. Single tank (S) | ON | ON | OFF | OFF | |
| | | 3. Single tank (D) | ON | OFF | ON | OFF | |
| 3 | Exit Configuration | - | ON | Blink | Blink | Blink | 3 sec |
| 4 | After 10secs unit will auto exit configuration mode, considering mode present during the time of exit for further operation | | | | | | |

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