

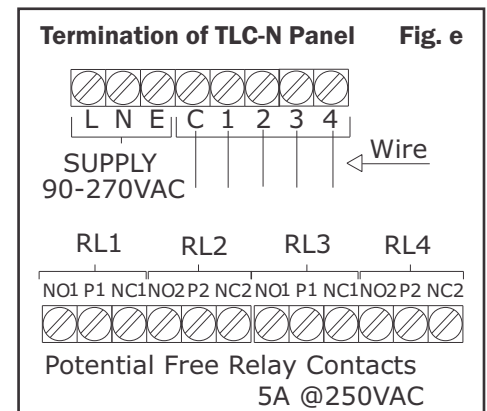
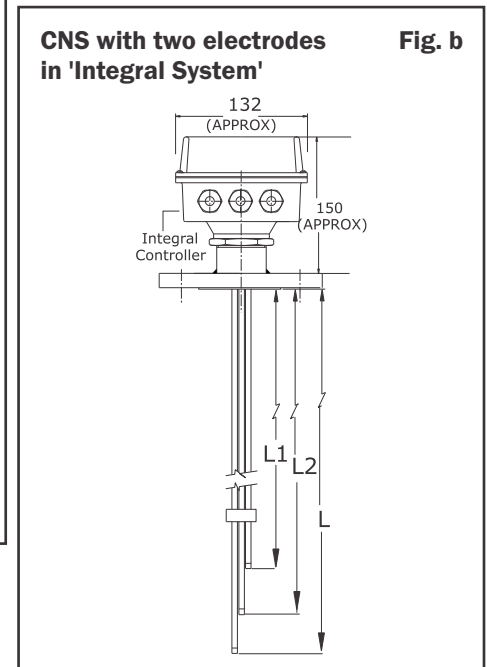
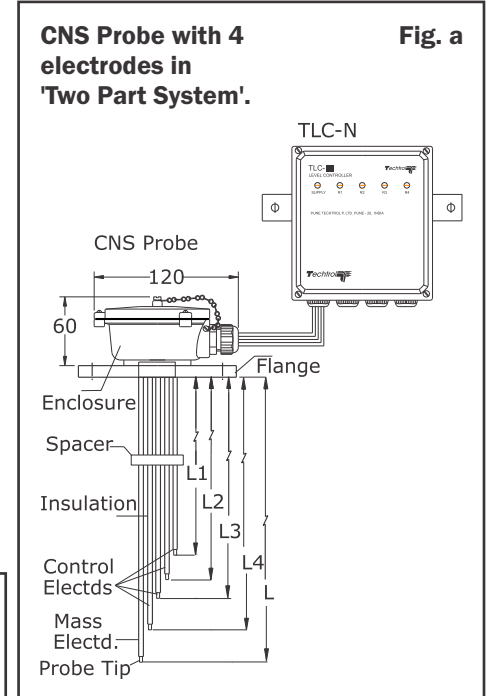
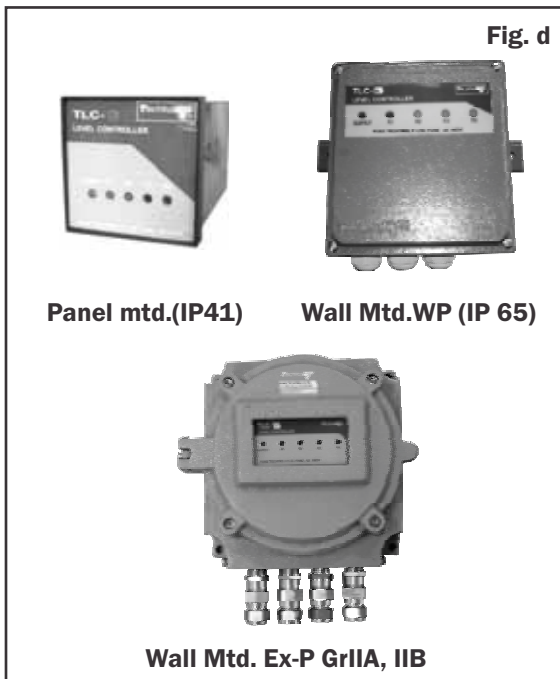
Conductivity Type Level Switch 'CNS' & TLC-N

'CNS' switch is used in conjunction with 'TLC-N' controller for level detection of conductive liquid as well as for interface level detection between conductive and non conductive liquid. The 'CNS' is available in two constructions **1) Two Part System (fig a)** **2) Integral System (fig. b)** In 'Two Part System', probe is separate from controller & in 'Integral System' probe is integral with controller.

'CNS' consists of solid or suspended probe (**fig c**) & controller 'TLC-N' (**fig d**) to activate potential free contacts at preset levels to operate auxiliary devices viz. pumps, solenoid valves and DCS.

A probe consists of one 'Mass electrode' (longest) & one or more 'Control electrodes' depending on preset levels. However in case of metallic tank, its wall acts as mass electrode and as such the probe need not be provided with mass electrode.

Solid probes are supplied up to 4mtr range, beyond which you have to use suspended probes up to 10 mtrs. Control unit 'TLC-N' is available in three types of enclosure **Panel mtd , Wall mtd (WP) or Wall mtd (Ex-P).** (**fig d**)



Pre-Installation Check

- ☑ Ensure CNS & TLC-N are not physically damaged in transit and probe insulation is intact.
- ☑ Ensure supplied goods are in accordance to required specification.

'TLC-N' is supplied from factory in 'Unlatch' or 'Latch' mode as required.

Unlatched Mode : When liquid reaches preset level (control electrode), the relay is actuated (LED On) & gets de-actuated (LED Off) only when the liquid falls below preset level. This mode is generally required for level indication or control through PLC/DCS.

Latched Mode : Two preset levels are actuated such that at one preset level, a relay is actuated (LED On) and remains actuated till the next preset level is reached. At this point the corresponding relay gets actuated & the previous one gets de-actuated (LED Off)

TESTING OF 'TLC- N' :



- ☑ Connect **Supply** wire to **L N E** terminals of controller
- ☑ Connect short lengths of individual wires at each terminal **C, 1, - - 4** resp. depending on no. of preset levels. (refer fig e)

Step	Step (Unlatched mode)	Observation
1	Switch on supply	'Supply' LED is on.
2	Short 'C' & '1'	LED 'R1' is on & 'RL1' actuated.
3	Short 'C' & remaining of terminals individually	Corresponding LEDs are on & relays actuated.

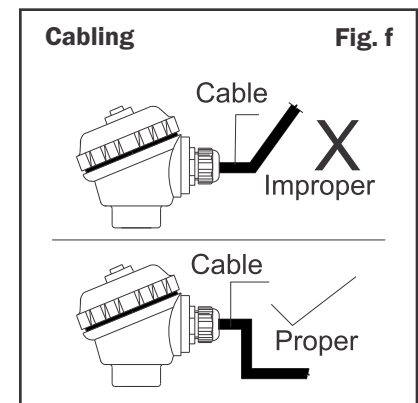
Step	Step (Latched mode) Latching is provided between (L1, L2) & (L3, L4)	Observation
1	Switch on supply	'Supply' & low level LED is on (LED 'R2' in case of latching between 'L1', 'L2') & RL2 is actuated.
2	Short 'C' & '2'	LED 'R2' remains on and relay RL2 is still actuated.
3	Short 'C' & '1' in addition to step '2' (i.e. C, 1 & 2 are shorted)	LED 'R1' on & 'RL1' actuated while LED 'R2' off & 'RL2' de-actuated.
4	Open '1' from 'C' while 'C' & '2' remain shorted.	Still LED 'R1' on and 'RL1' actuated.
5	Open 'C' & '2'	LED 'R2' on, & 'RL2' is actuated while LED 'R1' off, 'RL1' de-actuated.
6	Adopt similar steps to check latching between 'L3', 'L4'	

'TLC-N' is ready for installation.

Installation

CNS PROBE MOUNTING :

- ☑ Ensure that process connection of CNS match with counter connection of the tank.
- ☑ Provide suitable gasket between process connection before bolting to ensure zero leakage.
- ☑ For outdoor mounting, cable termination is routed downwards before cable gland to prevent water seepage in the enclosure (fig f).
- ☑ '**Shortening of Probe electrodes**' to adjust them to required preset level at site. In case of suspended electrodes, remove counter weight before cutting. Mass electrode is the longest and should generally match tank depth. Cut other control electrodes to required length depending on your preset level (refer fig. a) with reference to bottom of flange. Electrodes should be cut by using appropriate cutter without damaging its insulation. Electrodes should be gripped in vice while cutting.
- ☑ **Solid electrodes** - Remove 10/15 mm insulation from electrode tip to ensure conductivity.
- ☑ **Suspended electrodes** - Remove 5/10 mm of insulation & fix counter weight on the wire rope with given screw.

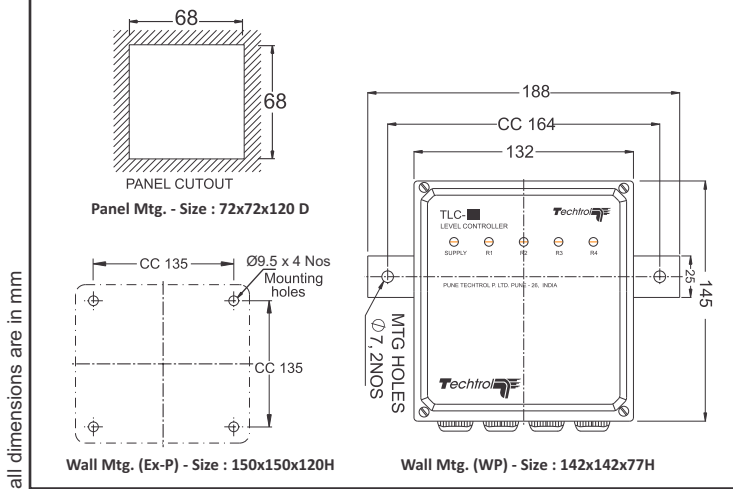
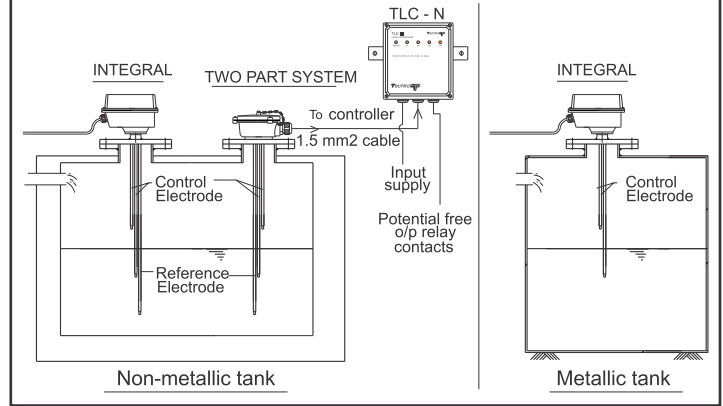


TLC-N' MOUNTING :

- ☑ **Panel Mounted** : Prepare a **68 x 68mm 'cut out'**. Mount '**TLC-N'** from front & secure it in place through fixing clamps
- ☑ **Wall Mounted (WP)** : Mount '**TLC-N'** on identified position & secure it via two holes on mounting bracket.
- ☑ **Wall Mounted (Ex-P)**: Mount '**TLC-N'** on identified position & secure it via four holes.

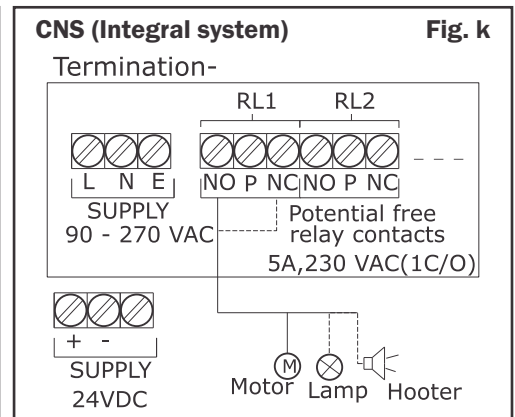
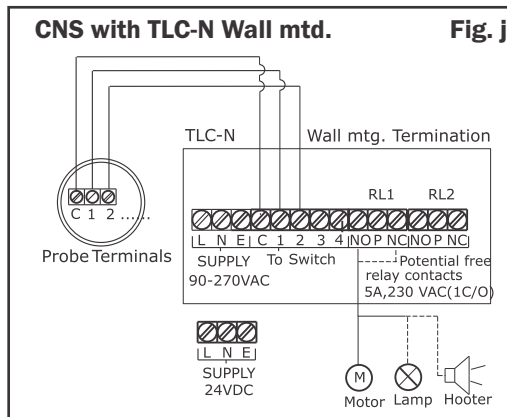
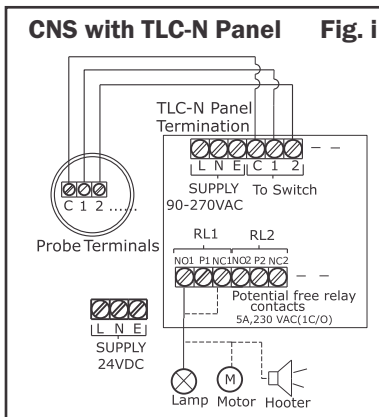
Please ensure following -

1. Mounting surface is flat & not subjected to vibrations
2. Mounting location should be away from '**high voltage cables**'/ '**contactors or drive controls**'.
3. '**TLC-N'** should be located where ambient temp. does not exceed rated temp (50°C).
4. For outdoor location '**TLC-N'** should be protected from '**severe weather conditions**' by using canopy.

Mounting Details for controller
Fig. g

Installation of Conductivity switch CNS
Fig. h


Termination and Wiring :

- ✓ During wiring, 'Supply' should be strictly 'Off' for human safety and prevention of accidents.
- ✓ Connect 'Supply' terminals of 'TLC-N' to 230VAC (Supply 90 to 270VAC) or 24VDC as required. In case of '24VDC', ensure correct polarity.
- ✓ 'CNS' with 'Two Part System' is wired to 'TLC-N' Panel or Wall mtd. (refer fig. i & j)
- ✓ In case of 'CNS' with 'Integral system', probe electrodes are internally wired to controller.
- ✓ Terminals/connectors are suitable for 1.5mm² cable. Ensure that cable is of correct size, oversize cable may damage connectors.



- ✓ Controller is provided with DIP switch. Various combinations of switch can be used for 'FSH', 'FSL' & 'Latching' operation between level set points. Follow the table below for the same.

DIP switch setting and logic combinations :

Cond	Set. Pt.	DIP Switch setting	Relay / LED Status
FSL	1 & 2	DIP1 ON (switch 7&2 for set pt. 1&2 resp.)	Relay/LED 1 & 2 are initially OFF
	3 & 4	DIP2 ON (switch 7&2 for set pt. 3&4 resp.)	Relay/LED 3 & 4 are initially OFF
Latch	1 & 2	DIP1 ON	Relay/LED 2 is initially ON
	3 & 4	DIP2 ON	Relay/LED 4 is initially ON
FSH	1 & 2	DIP1 ON (switch 8&1 for set pt. 1&2 resp.)	Relay/LED 1 & 2 are initially ON
	3 & 4	DIP2 ON (switch 8&1 for set pt. 3&4 resp.)	Relay/LED 3 & 4 are initially ON

LED ON = RELAY ENERGISED

Fail safe low (FSL) - When level reaches at & below set point, relay will be de-actuated and LED is 'Off'.
Fail safe high (FSH) - When level reaches at & above set point, relay will be de-actuated and LED is 'Off'.

Precautions : (please ensure the following)



- ☑ Ensure controller is duly earthed.
- ☑ Ensure supply used is '**rated**' and '**without fluctuation**'.
- ☑ Ensure wiring should run away from '**high voltage cable**', '**contactor**' or '**drive control**'.
- ☑ Before switching on power supply, ensure all the wiring is correct and completed.
- ☑ For outdoor mounting, ensure that cable termination is routed downwards before cable gland to prevent water seepage in the enclosure(fig f).
- ☑ Ensure weather proofness (Probe Encl -IP66, Controller Encl -IP65) by closing the enclosure cover with its gasket and, cable should be full tight in cable gland ensuring no gap.
- ☑ Ensure that operating temperature and pressure does not exceed the limits.

Periodic Maintenance

- ☑ Clean electrode tip to remove deposits of scaling formed on it. In case, the liquid is highly viscous & contains suspended material, cleaning is required periodically.
- ☑ Ensure that all terminal screws are kept properly tightened.
- ☑ Visually examine '**CNS**' probe for sleeving breakage, probe rod bent.
- ☑ In case of wall mtd Controller, clean it from inside for removal of dust or foreign particles.
- ☑ After maintenance, ensure weather proofness by closing enclosure with its cover and gasket.
- ☑ In '**hazardous locations**' do not open the enclosure cover before disconnecting switch from supply and carry out maintenance then after to prevent ignition / explosion.

Troubleshooting

SL	Faults/Defects	Cause	Solution
1	Controller dead	<ol style="list-style-type: none"> 1. Loose Terminal wiring 2. Fuse blown 3. Incorrect power supply. 	<ol style="list-style-type: none"> 1. Check & tighten loose connections properly. 2. Replace Fuse. 500mA (230VAC), 250 mA (24VDC) 3. Check & ensure correct supply.
2	Repeated fuse blowing	<ol style="list-style-type: none"> 1. Improper power supply & fluctuations or spikes in supply. 	<ol style="list-style-type: none"> 1. Ensure supply is correct and rated.
3	Improper relay operation	<ol style="list-style-type: none"> 1. Incorrect wiring from CNS probe to Controller 2. Wrong Dip switch setting 3. Scaling formed on electrode tip due to acidic liquid 4. Level does not sense due to low conductive liquid 	<ol style="list-style-type: none"> 1. Ensure CNS probe is wired correctly to Controller Refer fig. g/h/i 2. Ensure Dip switch settings are correct. Refer DIP switch setting 3. Clean probe tip periodically 4. Ensure liquid conductivity is > 25 uS
4	LED/ Relay continuously on	<p>Probe short due to</p> <ol style="list-style-type: none"> 1. Electrode insulation damaged & suspended material between electrode. 2. Ingress of water in probe enclosure 	<ol style="list-style-type: none"> 1. Remove suspended material & contact factory 2. Remove water and dry it. Close encl. cover properly 3. In addition prevent ingress of water by using canopy 4. For cabling refer fig. f

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