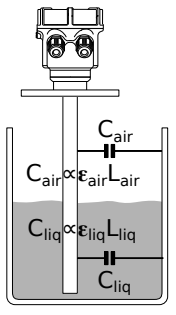


# Capacitance type Liquid Level Transmitter



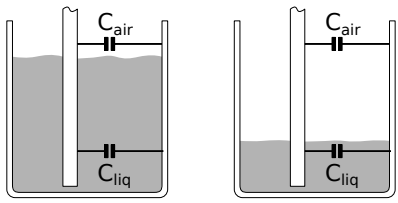
## Operating Principle



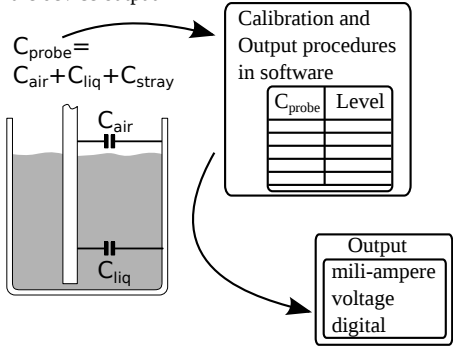
TLC probe surface forms a capacitance with the walls of tank containing the liquid

Level sensing probe gets divided into three parts:-  
Stray capacitance  $C_{stray}$   
Air part forming  $C_{air}$   
Liquid part forming  $C_{liq}$

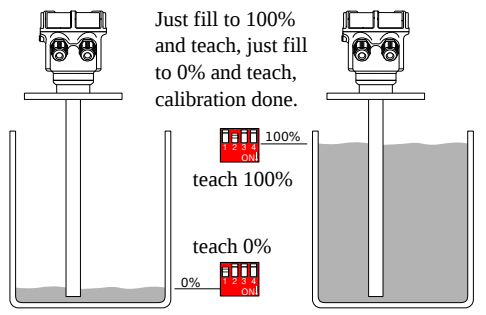
When level increases,  $C_{liq}$  increase,  $C_{air}$  falls while  $C_{stray}$  stays constant as probe/device is held at fixed location with respect to the tank.



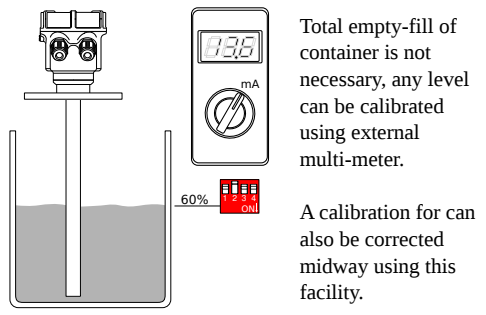
while, with level decreasing,  $C_{air}$  increases while  $C_{liq}$  falls, so in effect measuring capacitance provides information about liquid level in the tank. Software inside the device holds the higher and lower calibration values, and provides level information on the device output



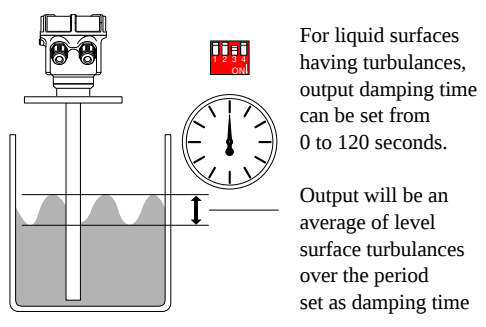
## Easy Calibration



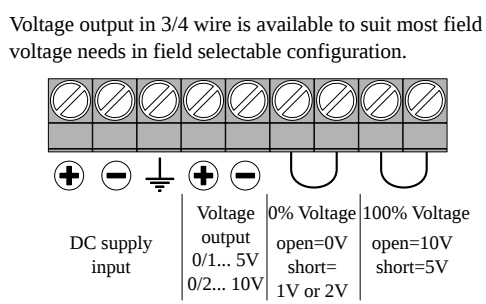
## Calibrate/Correct Any Level



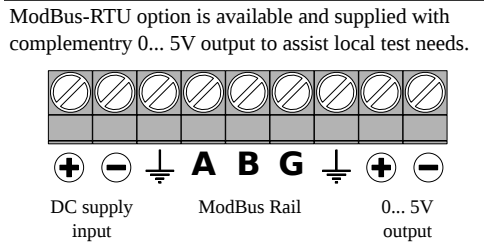
## Ajustable Damping



## Voltage Output, All in One



## ModBus with 0... 5V output



ModBus-RTU address can be forced to default using onboard DIP switches.

### Compact Size

### Durable Construction

### Fluid Turbulation Stability

### Simple Calibration

### Easy Installation

### Order Code

TLC	Capacitance Liquid Level Transmitter
Hxx	Enclosure: HAN: Aluminum Non-Hazardous IP-66/68, HAX: Aluminum Flameproof IIa, IIb and IIc, HSN: Stainless steel, HES: Specially designed enclosure as per customer requirement
Tx	Material Temperature (T1: max 80°C, T2: max 200°C, TS: Customer specified - Special designed )
Rx	Sensor rigid/flexible type, RD : Rigid Rod Sensor, RP : Flexible Rope Sensor for Solids (2/4mm), RL: FlexibleRope Sensor for Liquids (2mm), RS : Specially designed sensor )
Sx	Sensing Surface Material (S6:SS-316, SL:SS-316L, ST: PTFE coated, SF: PFA coated, SS: Special surface)
Ix	Insulation type : I0: None, IP: Partly PTFE insulated, IT: Full PTFE insulated, IC: Partly ceramic insulated,
Gx	Inactive Length or Sensor Extension Material (G0: None, G4: SS-304, G6: SS-316, GL: SS-316-L, GS: special material)
Wx	Stilling Well Material (W0: None, W4: SS-304, W6: SS-316, WL: SS-316-L, WS: special material)
Px	Process Connection Type : (PB1: BSP 1", PB2: BSP 1 1/2", PB4: BSP 1 1/4", PB5: BSP 2") (PN1: NPT 1", PN2: NPT 1 1/2", PN4: NPT 1 1/4", PN5: NPT 2") (PT1: Triclover/Triclamp 1 1/2", PT2: Triclover/Triclamp 2")(PCS: Special Process Connection) (PFL: Flanged Type - description of flange - FL -at the end of order code)
Cx	Process Connection Material (C4: SS-304, C6: SS-316, CL: SS-316L, CS: Special material)
EIL	Integral Electronics 4-20mA output, loop powered
EIV	Integral Electronics 0-10V/2-10V/0-5V/1-5V field selectable outputs, three wire system
EIM	Integral Electronics with ModBus interface and complementary 0-5V output, supports both local (DIP switch) and remote (ModBus) calibrations.
EIR	Blind Integral Electronics suitable for Trumen ICT series Remote Indicator-Controller-re-Transmitter units using ordinary 2-core shielded inter-connection cable with 1...1.5 sq mm conductors.
Lxxxx	Insertion length (125mm to 3000mm)
FLxx	Flange type and bore size specified for ASA/ANSI/JIS/DIN/Custom
ICT	Remote Indicator, Controller and re-Transmitter suitable for remote applications using EIR/EIL electronic inserts
Sx	SA : 80-260V AC 50/60Hz, SD : 16-32V DC
Rxx	RS3: 3 SPDT Relays (Cast Aluminum IP-65 Enclosure), RK2: 2NO/2NC Contactors (MS Sheet IP10 Enclosure) RS4/RS5/RS6: 4/5/6 SPDT Relays (MS Sheet IP10 Enclosure)

# TLC: Capacitance Level Transmitter for Liquids

## Features

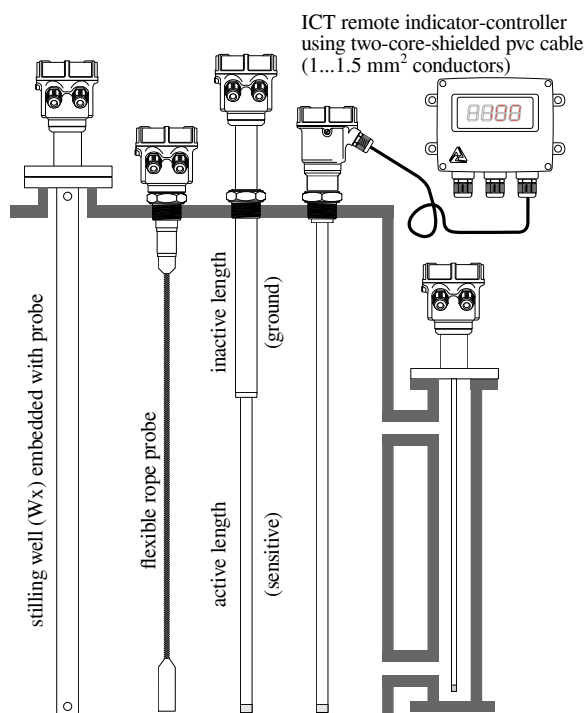
1. Fast Switching Response
2. High temperature endurable probes
3. Single sensor allows pump-control & multi-point switching
4. Easy calibration with or without material
5. Remote electronics with std 10 meters cable length
6. External indication LED available
7. Threaded & Flanged Mountings
8. Electronic Inserts support all requirements
9. Ingress protection : IP 68/65 (as per IS-13947)
10. Ex-proof (Ex d T6 IP-66 IIC )
  - Flameproof as per IS/IEC 60079-1:2007
  - Weatherproof (IP-66) as per IS/IEC 60529:2001
  - Suitable for Gas Group : IIC
  - Suitable for Zone 1 & 2 atmospheres

## Applications

Capacitance type level limit switch used as a full, empty and demand alarm in containers, hoppers, silos containing bulks and powders of various types.

Typical applications: water, waste water, cereals, beans, edible oil process, animal feed, rice plants, soya plants, dye powder, chalk, gypsum, fly-ash, cement, sand, plastic granules, spices, milk powder,

## Typical Mountings



## Specifications

EIL Supply	Integral Electronics Two-wire Loop Powered 14-60 VDC
Output	4-20mA Loop powered, Error output 21mA
Loop Resistance	maximum 475 Ohm @ 24DC supply
EIV Supply	Integral Electronics Three/Four wire (negative common) 14-60 VDC
Output	Field Configurable : 0% => 0V/1V (2V for 100%=>10V), 100% => 5V/10V
Load Resistance	minimum 10K Ohm
EIM Supply	Integral Electronics Three/Four wire (negative common) 14-60 VDC
Interface/Output	ModBus-RTU / complementry 0-5V output suitable for > 20K Ohm Calibration/configuration available through ModBus as well as without using DIP switches
EIR Supply	Blind Integral Electronics Two-wire suitable for Remote ICT units.
Output	From ICT "sensor +, -" terminals Loop current to ICT "sensor +, -" terminals
ICT specifications	ICT provides numerical LED indicator, control logic with relay outputs and re-transmission over galvanically isolated 4-20mA output
ICT Power Supply	SA : 80-260VAC, 50/60Hz for AC version SD : 16 to 32VDC for DC version
ICT RSx Relay Rating	SPDT 5 A each @ 24VDC or 220VAC (3 SPDT relays in IP65, max 6 SPDT relays in IP40 metal sheet enclosure)
ICT RKx Relay Rating	Contactors with 2NO/2NC rated at (1, 2 or 3 contactors, only in IP40 metal sheet enclosure)
ICT Isolated Loop Supply	24V +/- 4V Suitable for maximum 25mA load
ICT re-Transmission	4-20mA, Error@21mA, galvanically isolated loop powered section for use with either integrated ICT Isolated Loop Supply or any external DC supply within range 16 to 50VDC
ICT to TLC cable	Shielded 2 Core PVC cable with 1 to 1.5 mm <sup>2</sup> conductors cross section
Min. Dielectric Constant	1.8 (non-hygroscopic)
Ambient Temp.	-20°C ... 60°C (-4°F ... 140 °F)
Process Temp.	-20°C ... 100°C (-4°F ... 212 °F)
Extended Process Temperature	PTFE Insulation: -30 °C ... 250 °C (-22 °F ... 482 °F) Ceramic Insulation: -30 °C ... 600 °C (-22°F ... 1,112 °F) (extensions & heat sinks required)
Process Pressure	absolute / max. 15 bar (for ceramic insulation : 1 atm)
Wetted Parts	SS-304, SS-316, SS-316L, PTFE, part ceramic
Process Connection	NPT / BSP 1", 1¼", 1½", 2" etc Flanged : ANSI/JIS/DIN/ASA/custom
Probe Insertion Length:	Rigid Rod : 50mm to 3,000mm Flexible Rope : 100mm to 20,000mm

Specifications are subject to change without prior notice