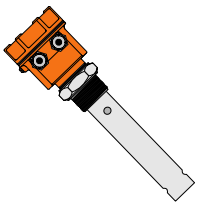


TLC2... Technical Specification Document

Capacitance Type Liquid Level Transmitter

Approvals & Certifications:

Trumen® sensing matters

Compact Size

Durable Construction

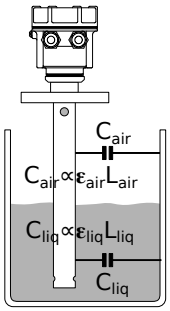
Fluid Turbulation Stability

Simple Calibration

Easy Installation

Order Code

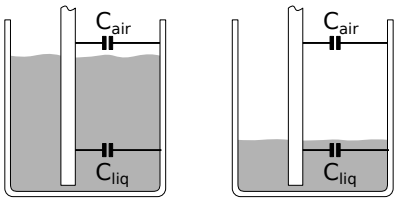
Operating Principle



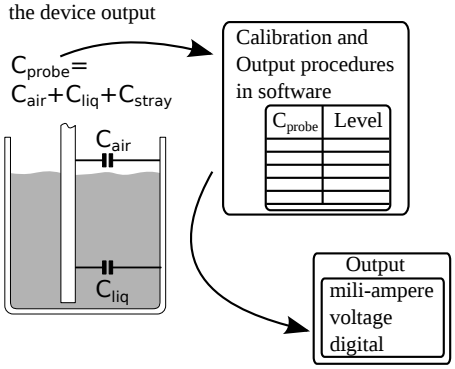
TLC2 probe surface forms a capacitance with the walls of tank containing the liquid

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

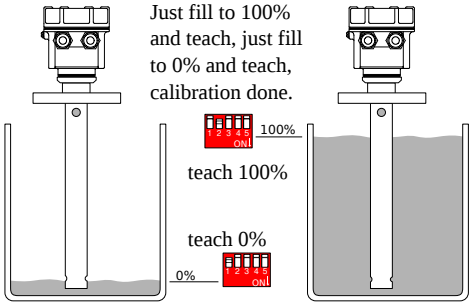
When level increases, C_{liq} increase, C_{air} falls while C_{stray} stays constant as probe/device is held at fixed location with respect to the tank.



while, with level decreasing, C_{air} increaeses 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

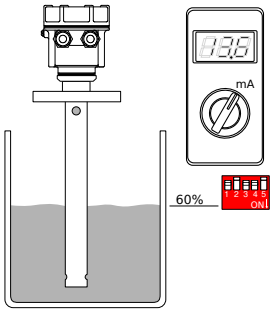


Easy Calibration



Just fill to 100% and teach, just fill to 0% and teach, calibration done.

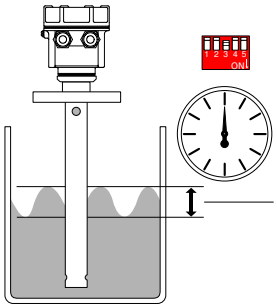
Calibrate/Correct Any Level



Total empty-fill of container is not necessary, any level can be calibrated using external multi-meter.

A calibration can also be corrected midway using this facility.

Adjustable Damping

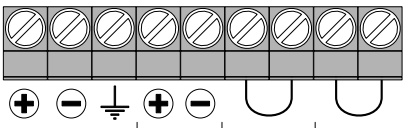


For liquid surfaces having turbulances, output damping time can be set from 0 to 120 seconds.

Output will be an average of level surface turbulances over the period set as damping time

Voltage Output, All in One

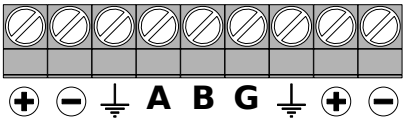
Voltage output in 3/4 wire is available to suit most field voltage needs in field selectable configuration.



DC supply input	Voltage output 0/1... 5V 0/2... 10V	0% Voltage open=0V short= 1V or 2V	100% Voltage open=10V short=5V

ModBus with 0... 5V output

ModBus-RTU option is available and supplied with complementry 0... 5V output to assist local test needs.



DC supply input | ModBus Rail | 0... 5V output

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

TLC2	Capacitance Type 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 ½", PB4: BSP 1 ¼", PB5: BSP 2") (PN1: NPT 1", PN2: NPT 1 ½", PN4: NPT 1 ¼", PN5: NPT 2") (PT1: Triclover/Triclamp 1½", 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 complementry 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)

Technical Specification

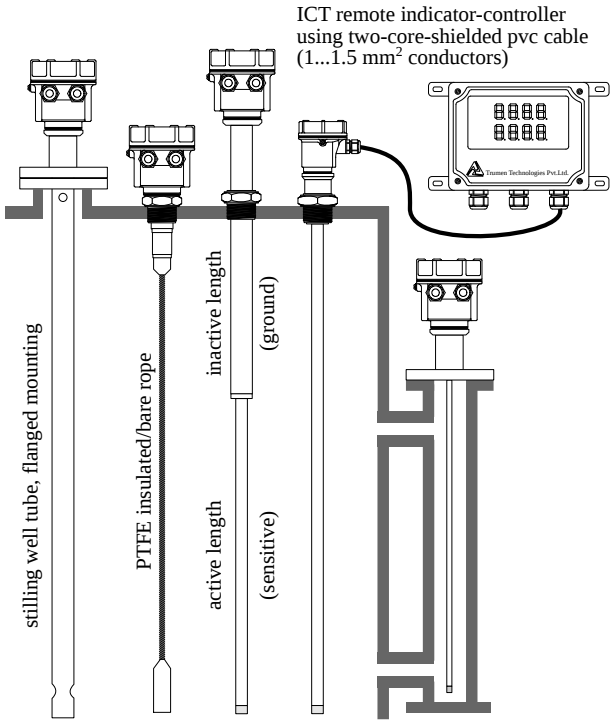
Features

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 & TC
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
12. Compact size
13. Rigid rod / flexible rope versions
14. No potentiometers - hassle free calibration compensation against material build-up

Applications

1. Free flowing homogeneous liquids like oil, raw water, WFI, DM/DI water etc
2. Suitable for top mounting
3. Process temperature max. 200°C
4. Process pressure max. 20 bar

Typical Mountings



Specifications

EIL	Integral Electronics Two-wire Loop Powered
Supply	15-60 VDC
Output	4-20mA Loop powered, Error output 21mA/1-5V/2-10V
Loop Resistance	maximum 475 Ohm @ 24VDC supply
EIM	Integral Electronics Three/Four wire (negative common)
Supply	15-60 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
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	Shileded 2 Core PVC cable with 1 to 1.5 mm² conductors cross section
Min. Dielectric Constant	1.8 (non-hygroscopic)
Ambient Temp.	-20°C ... 70°C (-4°F ... 158°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	TC / 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

Trumen®
sensing matters

Trumen Technologies Pvt. Ltd.

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