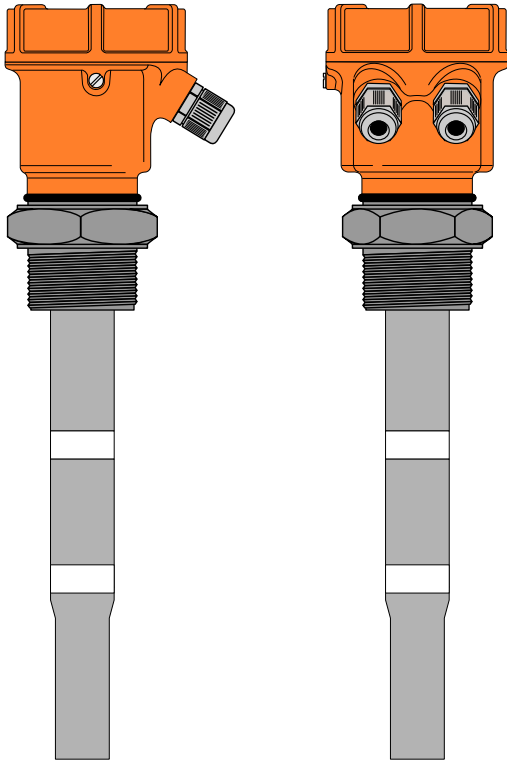


LSY: RF Admittance Type Level Limit Switch

Instruction Manual



Operating Principle

Introduction

- controls & indicators
- connection terminals
- configuration switches

Calibration

- single point (No-material calibration)
- two point (high-precision calibration)

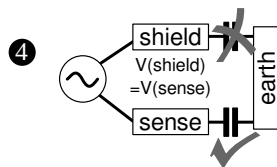
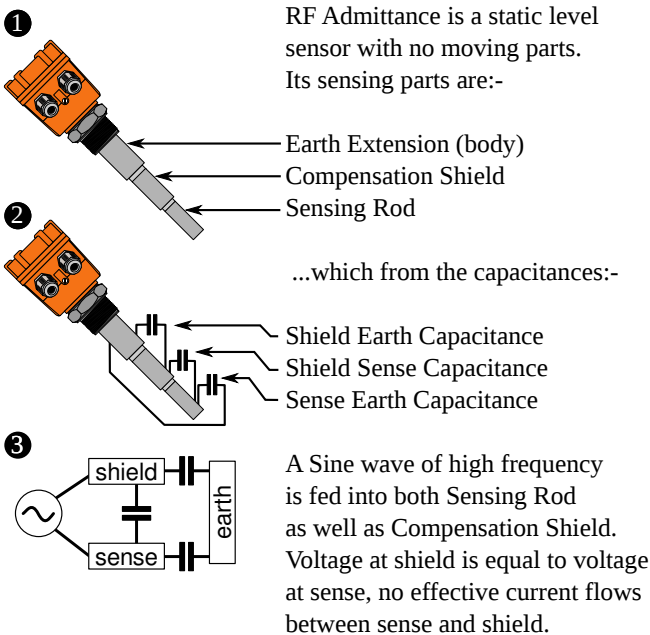
Failsafe Installation

- failsafe selection
- electrical connections (AC)
- electrical connections (DC)

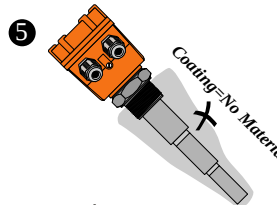
Troubleshooting

Maintenance & Spares

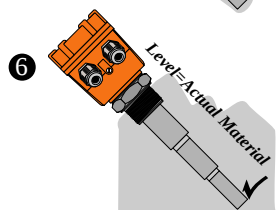
Operating Principle



This same voltage or equi-potential drive to sense and shield removes shield-sense capacitance from the measurement. shield-earth capacitance is ignored by circuit.



Which makes the probe selectively sensitive and by virtue of electrostatic loading of shield, it actually makes admittance device reverse sensitive in the shield-earth region.



Since, level is detected by measuring sense-earth capacitance only, level is not sensed until sufficient amount of material covers sense & earth combined.

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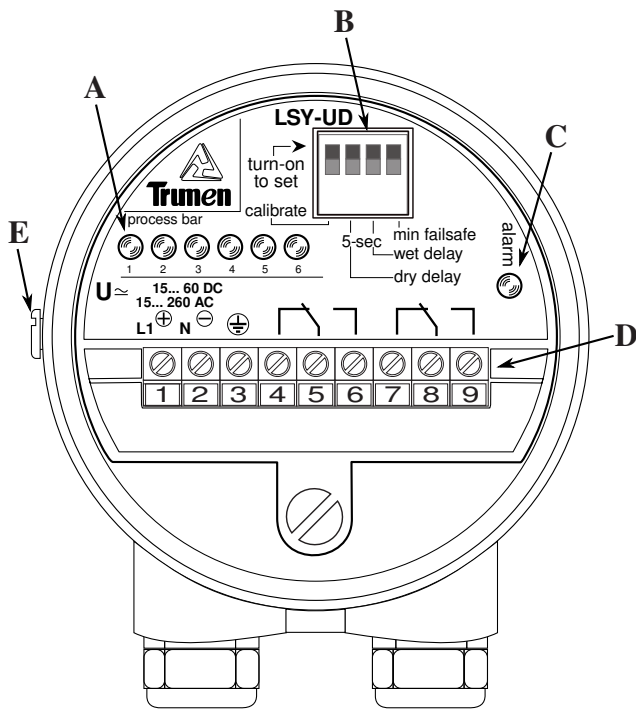
86 Tilak-Path Rambag, Indore, MP, 452 007, India

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email: sales@trumen.in

web:www.trumen.in

Introduction



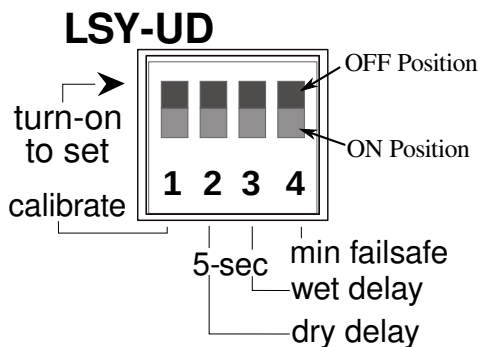
controls & indicators

- A Process indicating LED bar.
- B Configuration switches.
- C Alarm indication.
- D Connecting terminals
- E External earthing terminal

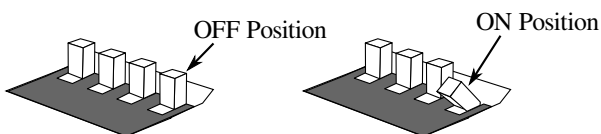
connection terminals

- 1 + of DC or Live of AC Supply input
 - 2 - of DC or Neutral of AC Supply input
- Supply:
15 to 60VDC or 15 to 260VAC 50/60Hz
- 3 Supply earth terminal for safety
 - 4 Normally connected terminal of contact 1
 - 5 Common terminal of contact 1
 - 6 Normally open terminal of contact 1
 - 7 Normally connected terminal of contact 2
 - 8 Common terminal of contact 2
 - 9 Normally open terminal of contact 2

configuration switches

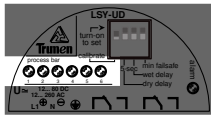
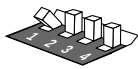
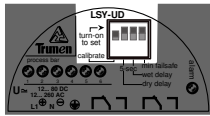
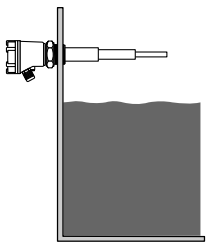


- 1 “calibrate” switch: This switch allows calibration in two calibration modes:
 - 1.1 Single Point (switches 2 & 3 must be open)
 - 1.2 Pump Control (requires switches 2 & 3)
 Please refer next page for calibration process.
- 2 “dry” (or uncovered) delay switch. During normal operation, this switch is turned ON if 5 second uncover delay is required. During 'pump-control' calibration this switch is turned ON to set low switching point.
- 2 “wet” (or covered) delay switch. During normal operation, this switch is turned ON if 5 second covered delay is required. During 'pump-control' calibration this switch is turned ON to set high switching point.
- 4 “minimum” failsafe select
Failsafe means alarm is same as power failure.
Failsafe=high (maximum) for overflow detection (device will give alarm in covered condition)
Failsafe=low (minimum) for underflow detection (device will give alarm in uncovered condition)

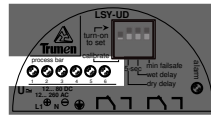


Example of Switch in On and Off Positions

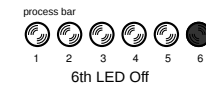
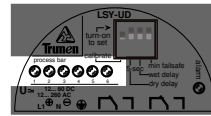
Calibration (No-Material)



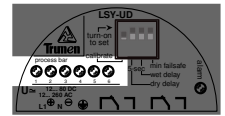
All LEDs On



6th LED Blinking



6th LED Off



4th, 5th & 6th LED Off

Make sure material is not touching the probe and it is away from the probe

Turn "calibrate" switch ON
Make sure that switch 2 & 3 are OFF (as shown above)

All LEDs of process bar will turn ON. This indicates that current level is recognized as switching level.

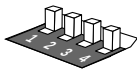
6th LED will then start blinking. This means that the device is setting itself 1/2 pF insensitive to current material level.

6th LED will then turn OFF. This means that the device is setting itself 1 pF insensitive to current material level.

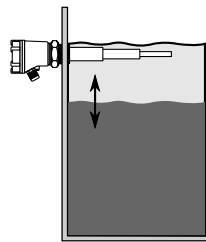
This sequence will repeat itself. When 4th,5th,6th LEDs are off, the device has set itself 3 pF insensitive to current material level.



4th, 5th & 6th LED Off



When required insensitivity is reached
Turn "calibrate" switch OFF.
(3pF setting shown above)
(3pF is most common setting)



device is now ready for use as single point level switch.

!

4pF 2pF 2pF 1pF 1pF 1pF

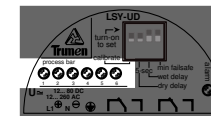
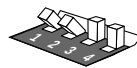
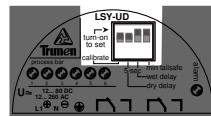
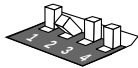
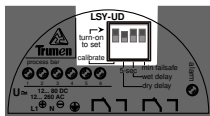
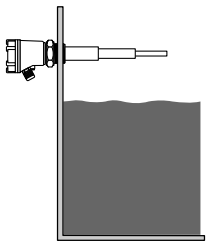
For conductive materials setting of at least 7pF is recommended.

!

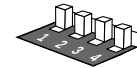
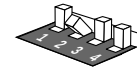
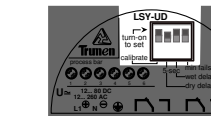
4pF 2pF 2pF 1pF 1pF 1pF

Total 11pF insensitivity can be set for single point switching

Calibration (With and Without Material - High Precision Calibration)



LED 1 blinking, other LEDs Off



Empty the material so that it is away from probe.

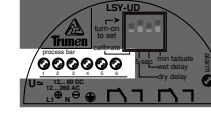
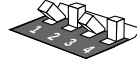
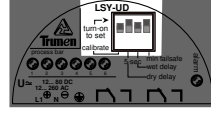
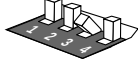
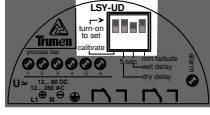
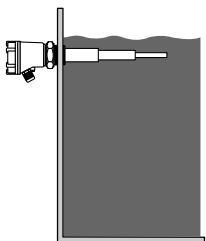
Turn dry delay switch ON
Make sure that switch 1 & 3 are OFF (as shown above)

Turn calibrate switch ON
Make sure that switch 3 is OFF (as shown above)

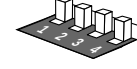
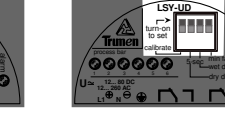
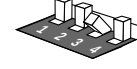
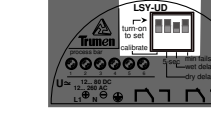
LEDs will turn off, only LED 1 will blink. This shows that level is read as low level by device. wait for 3-4 seconds here.

Turn calibrate switch OFF. This sequence of turning off the switches is important

Turn dry delay switch OFF.
Low level for two-point (pump control) has been calibrated.)



LED 6 blinking, other LEDs ON



Fill the material up-to the required level where material sensing is required.

Turn wet delay switch ON
Make sure that switch 1 & 2 are OFF (as shown above)

Turn calibrate switch ON
Make sure that switch 2 is OFF (as shown above)

LEDs will turn on, only LED 6 will blink. This shows that level is read as high level by device. wait for 3-4 seconds here.

Turn calibrate switch OFF. This sequence of turning off the switches is important

Turn wet delay switch OFF.
High level for two-point (pump control) has been calibrated.)
Device is ready for use.

! When device is calibrated in two-point (high-precision cal) process bar LEDs will follow material level while in use.

Low Level

Mid Level

High Level

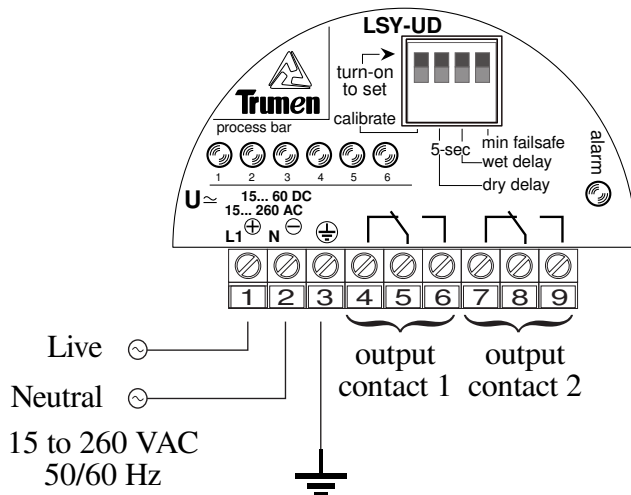
Failsafe Installation

failsafe selection

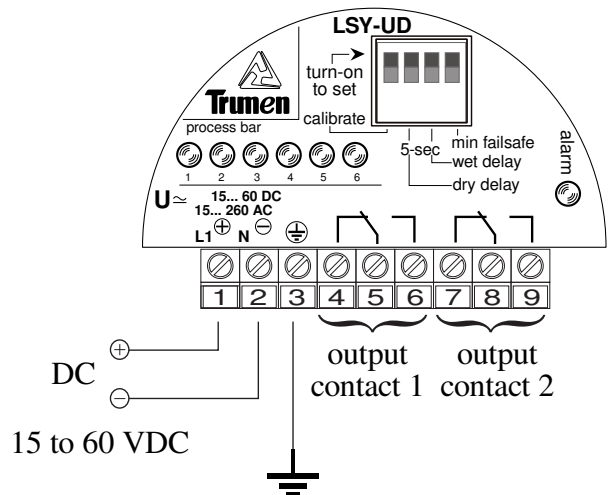
Failsafe defines that the alarm and power failure / device failure conditions are same to the external system. Failsafe operation is best understood with the type of installation.

Material & installation	failsafe setting	alarm LED	Alarm	DPDT relay contacts
		○ Off	Normal	
		☀ On	Alarm	
		☀ On	Alarm	
		○ Off	Normal	

electrical connections (AC)



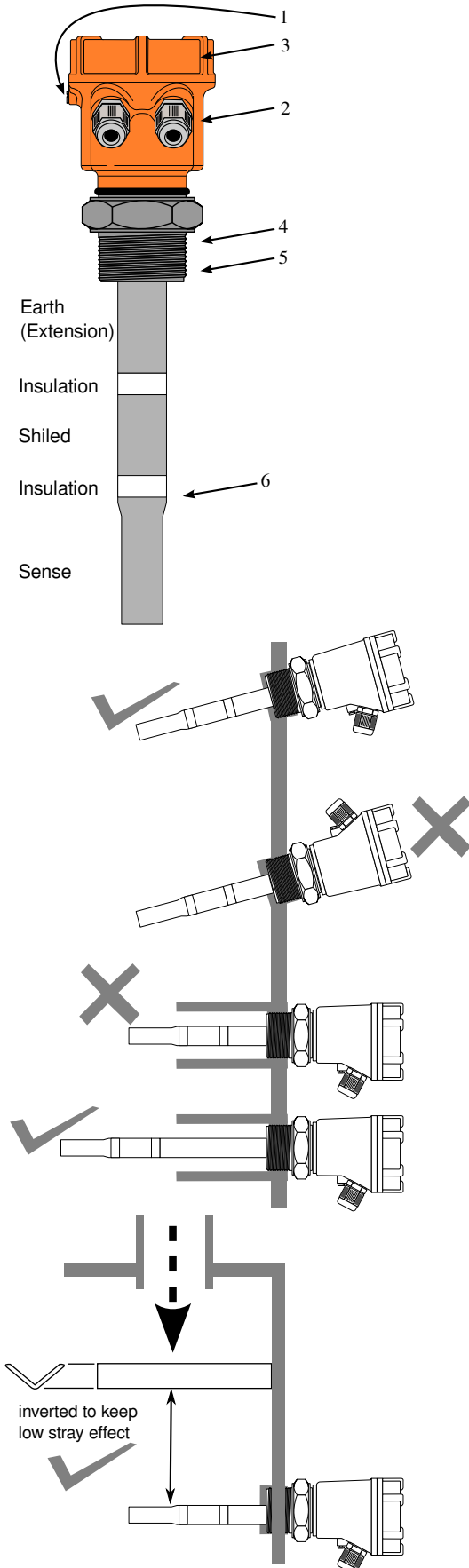
electrical connections (DC)



Proper connection to supply earth terminal (3) and the external earth terminal (screw) is must.

Do's & Dont's

installation precautions

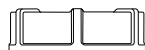


1. Always connect the "Earth" to the external "Earthing" screw
2. Tighten the cable entries & glands properly
3. Secure the top aluminum cover at its place properly once the electrical connections and other settings are completed
4. Always tighten the process connection using proper wrench never try to tight by rotating the aluminum housing
5. Make sure process connection is same as that in hooper/tank
6. Sensing probe should never be:-
 - 6.1 Bent
 - 6.2 Cut or machined in any way
 - 6.3 Extended by welding or machining
7. Cable entries must face downwards only
8. Nozzles should never be longer than the sensor earth extension.
8. If mounted directly under the material entry, always install a canopy of suitable strength at proper height from the sensor
9. Never climb either by gripping or stepping over either the sensor probe or its aluminum housing
10. Observe other safety precautions as required at the place of application

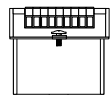
Troubleshooting

Indication	Probable cause	Work-around	Solution
No switching output or Sensor is permanently in alarm	Power is not available	See if 'power' LED is ON If power LED is OFF check voltage on terminal 1 and 2	Sensor electronic insert is needed to be replaced.
Proper voltage is available but 'power' LED is still OFF	Sensor electronic insert internal power section is failed		
After calibrating no switching output when sense part of probe is touched	Sense and earth part of probe are shorted	Remove electronic insert and calibrate without probe, test calibration by touching and releasing rightmost pin of 4-pin male connector, with your finger	Admittance probe is needed to be replaced, check for any visible damages on probe and inside LSY enclosure
No sensing even while testing without any probe	Sensor electronic insert admittance or evaluation section failed		Sensor electronic insert is needed to be replaced.
Abrupt switching	Material is agitated	Set time delay to 5 second in both dry and wet condition (turn switch 3, 4 ON)	Time delay solves switching issues in agitated materials
Device shows material present even when material is well below the probe	Sticky material or calibration was done at too sensitive setting	Recalibrate and choose higher hysteresis by turning off more LED's at calibration	Recalibration at insensitive setting reduces effect of sticky material
Device shows material absent even when probe is fully covered with material	Very low dielectric material not causing enough change of capacitance	Recalibrate at sensitive setting or consider ordering probe with longer and wider sense part	If recalibration doesn't seem to solve then probe with bigger sense surface has to be ordered
Calibration and settings are all OK but device switches abruptly or chatters continuously	Power supply carrying extra noise and admittance amplifier picking the noise	Make necessary arrangements to filter the noise in power-line before being fed to the device. Provide an exclusive earthing to terminal# 3, for enclosure earthing screw and fork process connection (device mounting screw or flange)	Device contains sufficient filtering of power supply noise inside, but sometimes external earth is needed to make filters sink the extra power supply noise back to earth.
Device worked for few months/ years but now shows material present permanently	Material deposition sensor Not enough thermal extension spacer used in material with high temperature	Clean up deposited materials on probe as a part of maintenance schedule Order device of proper thermal grade for proper service life of device.	Scheduled cleaning of sense probe in sticky material application is recommended . Care is needed to be taken while ordering for high temperature

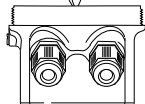
Maintenance and Spares



Top Cover



Electronic Insert
connection terminals
electronic insert fixing screw
4-way male connector for sensor (probe)
4-way female connector from sensor (probe)



Device enclosure
Cable glands

Thermal spacer (where needed)

Process connection

Earth extension (longer for low level) may fuse into process connection for shorter probes

Shield

Sense

Admittance sensing probe

Shown on the right are various parts of LSY level switch. separable parts are

1. Electronic insert in short called 'electronics'
2. Probe + Enclosure + Cover + Glands collectively called 'mechanical'

For maintenance issues involving replacement of 'electronics', just a single fixing screw is needed to be released.

Lift the electronics slowly by holding electronics with one hand and mechanical with other, as wires are connected using rigid 4-way connectors to it.

Disconnect 4-way connector by holding electronics with one hand and female of connector by other hand, while the rest of the device is at rest.

Connect the new replaced sensor. 4-way connector is unidirectional and only connects in proper direction.

Set the electronics properly to its position.

Match the mounting screw hole of electronics with that of enclosure and fix the screw.

For mechanical issues please send the entire device back to Trumen.