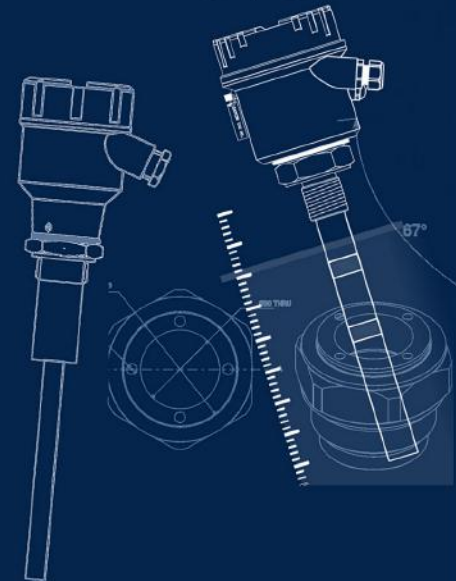# INSTRUCTION MANUAL

ELIXIR-T-UNI

Compact Vibrating Fork

Version 2.1

SAPCON INSTRUMENTS PVT. LTD.

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Revision History

Revision	Date	Author(s)	Description
1.0	23 Feb 2014	RND	First Version Editing
1.1	10 Aug 2014	MRK	Applications Revision
1.2	15 Jul 2015	RND	Features Revision
1.3	28 Dec 2015	RND	Specs Revision
1.4	04 Sep 2016	RND	Specs Revision
2.0	08 Jan 2017	BRND	Revised Format
2.1	17 Sep 2017	BRND	Branding Revisions

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- The images shown in this manual may differ from the actual instrument / housing in terms of dimensions, color and design. Please refer to GA drawings for dimensional details.

- Values (of performance) described in this manual were obtained under ideal testing conditions. Hence, they may differ under industrial environment and settings.

General Instructions

- Instrument shouldn't block the material filling inlet.

- Secure the cover of housing tightly. Tighten the cable glands. For side mounting, the cable glands should point downwards.

- For side mounting, provide a baffle to prevent the material from falling on the probe.

- When handling forks, do not lift them using their tines. While using them with solids, ensure that material size is less than 10mm.

- Deforming the shape of the tines may interfere with the fork's operating frequency.

- Make all electrical connections as instructed in the manual. Don't power on the device before verifying the connections.

1 Introduction

Elixir-T-Uni is a Vibrating Fork Level Limit Switch for liquids. It is suitable for level detection in storage tanks, mixing container and pipelines, for all kinds of liquid which do not react with SS 316, viscosity does not exceed 10,000 cP and temperature lies within $0°C$ to $80°C$. It is suitable for most of the applications where float switches were previously employed, as well as in places where float switches were not appropriate (due to deposition, turbulence, stresses and air bubbles). Elixir-T-Uni ignores foam deposition on its fork tines.

Figure 1: Elixir-T-Uni

2 Operating Principle

Elixir-T-Uni works on the principle of continuous vibration of the fork at its natural frequency. A specially shaped Tuning Fork is kept vibrating by piezo electric element. The resonance frequency changes when the tines are immersed in any fluid.The change in frequency is detected and used is for switching.
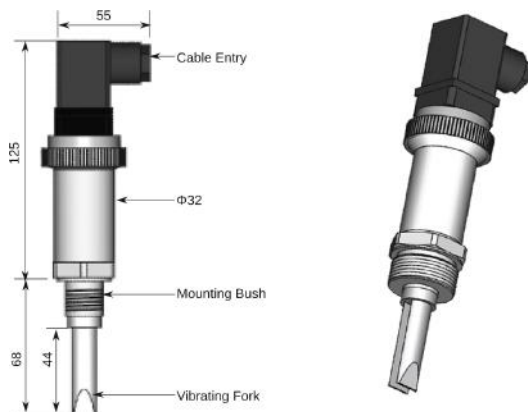

Figure 2: Part Diagram

3 System Description

Elixir-T-Uni vibrating fork level switch detects the resonant frequency change and changes the output signal according to fail-safe mode selection. Typically, the output is fed to a PLC which then uses it to control the process.

4 Features

- Power Supply: 18-30 V DC
- Output: Open collector PNP, LED Indication
- Operational temperature: $0°C$ to $150°C$ (Fork)
- Hygienic finish with 0.8 Ra available
- No calibration required at site, easy to install
- Compact in size
- Service friendly plug-in connection
- Rugged stainless steel housing
- Operational safety ensured
- Immune to foam build-up
- External circuit testing by test magnet

5 Applications

Elixir-T-Uni is suitable for the following applications and industries:

- Chemicals
- Pesticides
- Edible Oil
- Breweries
- Food Industry
- Dairy Industry
- Packaging Industry
- Pharmaceutical Industry

6 Dimensional Layout

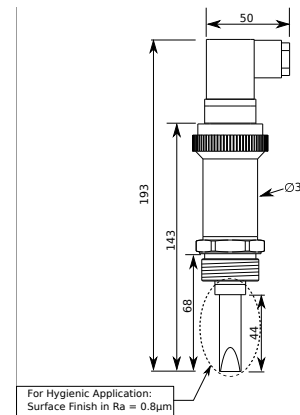Dimensional drawing for a fork length of 44 mm is shown in Figure 3

Figure 3: Dimensional Diagram
(All dimensions in mm)

7   Electrical Specifications

Please refer to Table 1 for Electrical Specifications.

PARAMETER	VALUE
Input Power Supply	18-30 V DC
Output	Open Collector - PNP Output (Load capacity upto 90 mA at 24 V DC)
Switching Indication	Red /Green LED ON/OFF
Switching Behavior	- ON - OFF
Fail-safe Feature	Field selectable - Fail-safe High (For Overflow Protection) - Fail-safe Low (For Dry Run Protection)
Power Consumption	Without Load 480 mW @ 24 V DC 168 mW @ 12 V DC With Load 3W @ 24 V DC

Table 1: Electrical Specifications

8   Application Specifications

Please refer to Table 2 for Application Specifications.

PARAMETER	VALUE
Response Time - Covered - Uncovered	Value 0.5 second 1 second
Repeatability	$\pm$ 0.5mm
Switching Hysteresis*	3mm $\pm$ 0.5mm
Fork Resonance Frequency*	1500Hz approx.
Minimum Liquid Density	0.7gm/cc
Maximum Viscosity of Liquid	10,000 cp
Solid Content Diameter	$<$ 5mm
Temperature - Ambient - Process	Value $0°C$ to $60°C$ $0°C$ to $150°C$

Table 2: Application Specifications

* The reported values have been found with water as application medium, at room temperature.

9   Mechanical Specifications

Please refer to Table 3 for Mechanical Specifications.

| PARAMETER	VALUE
Housing Pipe	SS 316 housing, Weatherproof with integral probe mounting (IP65)
Mounting	- Thread Mounting: 1/2", 3/4", 1" BSP / NPT - Flange Mounting: As per user specification - Tri-Clamp: As per user specification - Hygienic Flash Mounted Socket, SS 316 with 1" BSP
Electrical Connector	Valve Connector
Gland Type	PG 11, PG 9 cable gland
Dimension	Refer to Figure 3
Active Fork Length	44 mm and 100 mm
Probe Length	68 mm, 105 mm, 125 to 1000 mm {For 44 mm Fork Length} 126 mm {For 100 mm Fork Length}
Process Temperature	Up to $150°$C
Sensing Fork Material	SS 316
Fork Finish	- Hygienic Fork - Standard Fork
Pressure	Up to 10 Bar

Table 3: Mechanical Specifications

10   Installation Guidelines

Note: Elixir-T-Uni does not have any keys to operate.The Fail-safe feature has been implemented in accordance with connection.
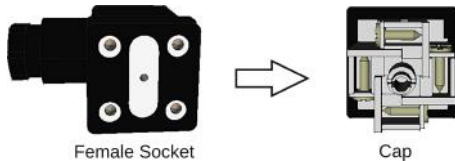
10.1   Procedure for Installation

For quick and easy installations, follow the steps in the order mentioned below -

- Remove the female socket from the top of Elixir-T-Uni (Use Screw Driver) and you can see that there are four pins of male socket on Elixir-T-Uni.
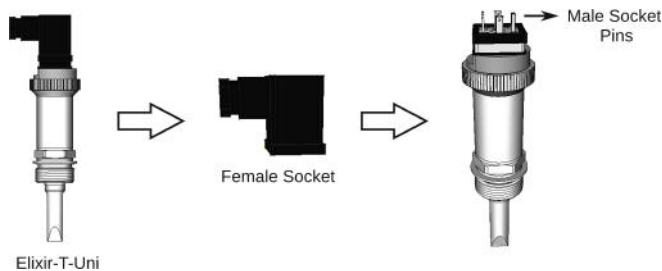
- Remove the cap from the female socket by using screw driver.

- Connect all the wires from cable entry to male socket pin through cap.

- Plug-in Elixir-T-Uni to female socket.

- Mount the device with the help of Mounting Socket.

10.2   Electrical Connections

10.2.1   For Fail-safe High

If a device is mounted at top of the tank then follow the instructions given below for Electrical Connections -

- First of all connect the positive terminal to pin no. 3 of the device.
- Now connect the negative terminal to pin no. 1 of the device.
- Connect fuse between positive terminal and pin no. 3 of the device.
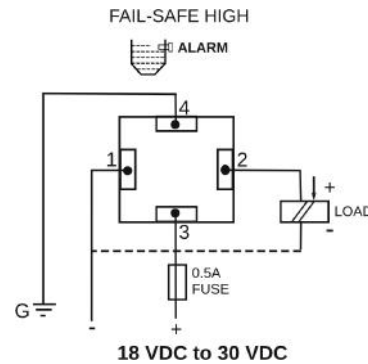- Between pin no. 1 and 2 the output can be taken.

Figure 4: Fail-safe High

10.2.2   For Fail-safe Low

If a device is mounted at bottom of the tank then follow the instructions given below for Electrical Connections -

- First of all connect the positive terminal to pin no. 2 of the device.
- Now connect the negative terminal to pin no. 1 of the device.
- Connect fuse between positive terminal and pin no. 2 of the device.
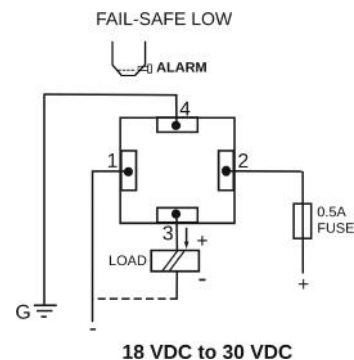- Between pin no. 1 and 3 the output can be taken.

Figure 5: Fail-safe Low

> *Note:* Elixir-T-Uni is compatible only with 24V DC power supply.

10.3 Output Check Test

Hold the magnet at the target place of the instrument, the current status of the switching LED and the PNP output will change and when the magnet is released from the target area the status of the switching LED and PNP output is switched to there previous (original) state.

10.4 Output Indications

Green LED Glows When:

- Fork is Uncovered and Fail-safe is High

- Fork is Covered and Fail-safe is Low

Red LED Glows When:

- Fork is Covered and Fail-safe is High

- Fork is Uncovered and Fail-safe is Low

10.5 Error Indications

1. **Temperature**

    - Blue LED glows when temperature of electronic insert goes above $120°$C.

LED ERROR INDICATION	DESCRIPTION	TROUBLESHOOTING
Red and Green LEDs Glows Permanently	No Calibration	
All LEDs OFF	Low Voltage (Below 10V)	Increase Voltage
Green LED Blinks (1 Second)	It is because of Serial Communication	Stop Serial Communication
Red LED Blinks (20 Seconds)	Oscillator Failed/Fork is not connected	
Blue LED Blinks Slowly (1 Second)	Temperature goes above $100°$C	
Blue LED Blinks Fast (300 MiliSeconds)	Temperature goes above $110°$C	
Blue LED Glows Permanently	Temperature goes above $120°$C	

Table 4: Error Indications

2. **Fork Stops Vibrating**

    - When Red LED blinks continuously and Fail-safe is High
    - When Green LED blinks continuously and Fail-safe is Low

    Troubleshooting: The following reasons may be responsible for the absence of vibrations in the fork:

    - The instrument is damaged.
    - The instrument is working but there may be solid particles in the application medium clogging the fork.
    - Heavy build-up of application medium can dampen the fork oscillations. In this case, the fork requires to be cleaned.
    - If material is very viscous, the fork vibrations will resume when the fork is uncovered. **In this case, the error indication should be ignored.**

3. **No LED Glows**

    - This would happen in absence of power supply to the instrument.

11   Customer Support

Thank you for going through the instructions given in this manual. To further ease the process of installation and use, we have developed special demo videos which are hosted on YouTube.

Sapcon's YouTube channel, SAPCON INSTRUMENTS, lists all these videos: https://goo.gl/dnxfcz

Should you require further information regarding installation, use or working of the instrument, please don't hesitate to contact us. Kindly provide the following information at the time of contacting:

- Instrument Model and Serial Number

- Purchase Order Number and Date of Purchase

- Description of the query

- Your contact details

In an attempt to serve you better, we are open seven days a week (9:30am to 7:30pm). We are available at:

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