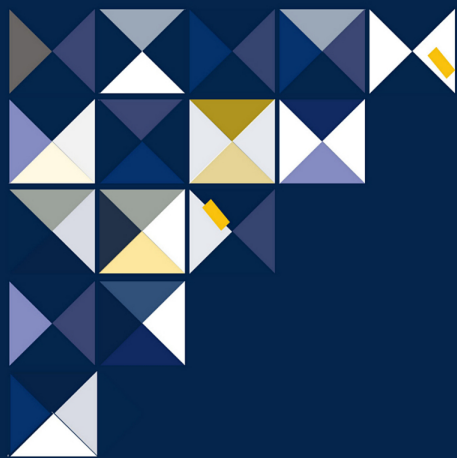




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INSTRUCTION MANUAL

ELIXIR-T-UNI

Compact Vibrating Fork

Version 2.4



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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
2.2	25 Jul 2019	BRND	Addition of Order Code
2.3	24 Apr 2021	BRND	Text Updation
2.4	23 May 2023	BRND	AS-i Section Added

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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 switch used for level detection in storage tanks, mixing container and pipelines in all kinds of liquid which do not react with SS 316 whose viscosity does not exceed 10,000 cP. 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

A specially shaped tuning fork is kept vibrating using piezo-electric elements. Typically, the fork vibrates at its natural frequency. The frequency of oscillation for the tuning fork changes when immersed in liquids. The change in frequency is detected by the microprocessor leading to a switching decision.

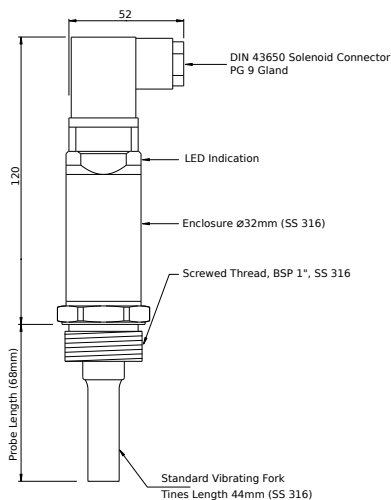


Figure 2: Description of Parts

3 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
- IP Rating-IP65,IP68

4 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

5 EHEDG Certification

Elixir-T-UNI with hygienic mounting for dairy and pharmaceutical applications has been certified by EHEDG.

6 Application Specifications

Please refer to Table 1 for Application Specifications.

PARAMETER	VALUE
Response Time	Value
• Covered	• 0.5 second
• Uncovered	• 1 second
Repeatability	± 0.5mm
Switching Hysteresis*	3mm ± 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	Value
• Ambient	• 0°C to 60°C
• Process	• 0°C to 150°C

Table 1: Application Specifications

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

7 Electrical Specifications

Please refer to Table 2 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 2: Electrical Specifications

8 Mechanical Specifications

Please refer to Table 3 for Mechanical Specifications.

PARAMETER	VALUE
Mounting	• Thread Mounting: 1/2", 3/4", 1" BSP / NPT • Tri-Clamp: As per user specification • Hygienic Flash Mounted Socket, SS 316 with 1" BSP
Electrical Connector	Valve Connector
Cable Gland	PG 11, PG 9, M12
Active Fork Length	44 mm
Probe Length	68 mm, 105 mm, 125 to 1000 mm
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

9 Installation Guidelines

While installing the instrument, please take care of the following points:

1. The instrument should be installed in horizontal or vertical position only.
2. Observe that when installed directly under the material inlet source, a canopy called baffle of appropriate strength and size should be welded right above the instrument as shown.

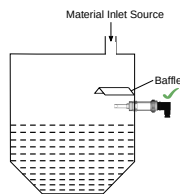


Figure 3: Provision of Baffle

3. To prevent the ingress of moisture and water seepage in side mounting position, the cable entries should always point downwards.

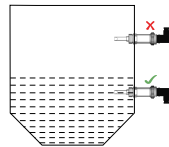


Figure 4: Cable Gland Arrangement

4. Secure the cover of housing tightly. Tighten the cable glands.
5. Make all electrical connections as instructed in the manual. Don't power on the device before verifying the connections.
6. Weatherproofness of enclosure is guaranteed only if the cover is in place glands adequately tightened. Damage due to accidental entry of water can be avoided if the instrument is installed in a rain shade.
7. If the ambient temperature is high, the instrument should not be installed to receive direct sunlight. In case such a position of shade is not available, a heat shield should be fitted above the instrument especially if the operating temperature lies between 60°C and 80°C.

10 Electrical Connections

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

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

10.1 For Fail-safe High

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

10.2 For Standard Connector

- Connect positive terminal to Pin no. 3 of the device.
- Connect negative terminal to Pin no. 1 of the device.
- Connect fuse between positive terminal and Pin no. 3 of the device.
- Output can be taken between Pin no. 1 and 2.

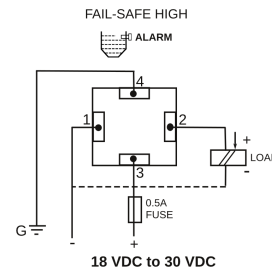


Figure 5: Fail-safe High

10.3 For M-12 Connector

- Connect positive terminal to Pin no. 1 of the device.
- Connect negative terminal to Pin no. 3 of the device.
- Output can be taken from Pin no. 4.

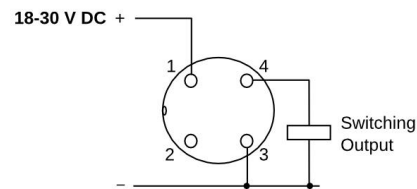


Figure 6: M-12 Connector Connection for Fail-safe High

10.4 For Fail-safe Low

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

10.5 For Standard Connector

- Connect positive terminal to Pin no. 2 of the device.
- Connect negative terminal to Pin no. 1 of the device.
- Connect fuse between positive terminal and Pin no. 2 of the device.
- Output can be taken between Pin no. 1 and 3.

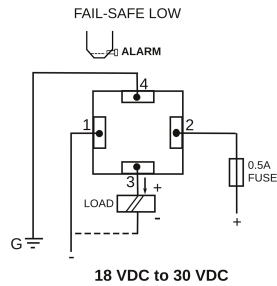


Figure 7: Fail-safe Low

10.6 For M-12 Connector

- Connect positive terminal to Pin no. 4 of the device.
- Connect negative terminal to Pin no. 3 of the device.
- Output can be taken from Pin no. 1.

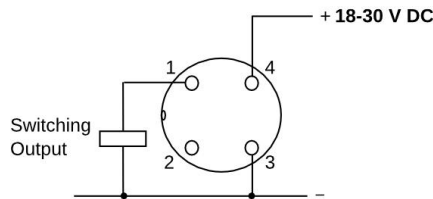


Figure 8: M-12 Connector Connections for Fail-safe Low

11 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.

11.1 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

12 Error Indications

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.
- 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.**

No LED Glows

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

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 MilliSeconds)	Temperature goes above 110 °C	
Blue LED Glows Permanently	Temperature goes above 120 °C	

Table 4: Error Indication

13 For AS-Interface Module

13.1 AS-Interface Topology

AS-Interface by design is a loop-powered digital bus. The 2-wire unshielded lines carry power as well as data on them. The single cabling system connects I/O devices with automation systems as shown in Figure 9. ASi-3 is based

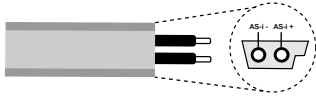


Figure 9: AS-Interface

on a master-slave system where single master can transfer input and output data with up to 62 slaves.

13.2 Electrical Specifications

Please refer to Table 5 for Electrical Specifications.

PARAMETER	VALUE
Input Power Supply	24-30V DC
Electrical Connector	M12 Connector(Male)
Current Consumption	60mA @24V DC
Fail-safe Settings	Field selectable • Fail-safe High • Fail-safe Low

Table 5: Electrical Specifications

13.3 AS-i Configuration

Please refer to Table 6 for AS-Interface Configuration.

PARAMETER	VALUE
AS-i Version	3
Max. Slaves	62 Slave
Max. Cable Length	100m
Communication Method	Master/Slave with cyclic polling
Communication Speed	167 kbits/sec
Max. Data Size	8 bits

Table 6: AS-i Configuration

13.4 Electrical Connections

Please refer to the Figure 10 & 11 for electrical connections of AS-Interface Module.

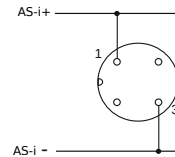


Figure 10: M12 connection for Fail-safe High with AS-Interface

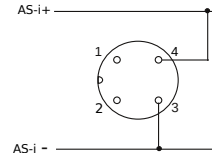


Figure 11: M12 connection for Fail-safe Low with AS-Interface

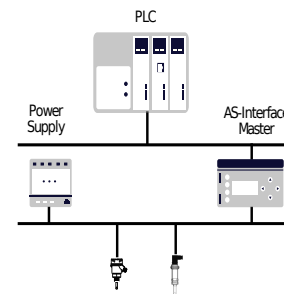


Figure 12: Connection of ETU via AS-Interface

13.5 Programming Instructions

Here D0 for Alarm Status and D1 for system health.

D0	0	No Material(Air)
	1	Alarm(Material Deposit)
D1	0	Error
	1	Normal(Ok)

D2 & D3 are not engaged.

13.6 Setting Up AS-Interface

Note: ASi-4 and ASi-5 are later versions of the AS-i protocol. However, ASi-3 version is the most prevalent. ASi-4 & ASi-5 are backwards compatible with ASi-3.

AS-Interface can set up easily using a PLC with AS-Interface bus input. Follow these steps for setting up the AS-Interface bus with Elixir-T-Uni:

- **Set Unique Bus ID:** Default set address(extended) is 1a (HEX) & can be change using ASi programming unit by selecting default address zero. Each device should have a unique bus identification. For setting the ID, there needs to be single device connected to the AS-Interface, other slaves need to be disconnected from the bus.
- **Check Configuration:** Use the magnet to observe the changes in D0 bit for the assigned address. When magnet placed at the target area of the instrument, current status of switching-LED and D0 bit will change and when the magnet is released; the status of the switching-LED and D0 bit will changed to the previous (original) state. The output change can observed via a PLC or a SCADA system connected to the PLC.

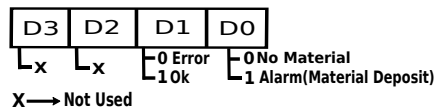


Figure 13: Output of AS-Interface

14 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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15 Order Code

Product

ETU: Elixir-T-Uni: Compact tubular vibrating fork level limit switch (suitable for all kinds of liquids having viscosity upto 10,000 cP and density greater than or equal to 0.7gm/cc)

Type

I : Integral (sensor in same unit)

Probe Housing Material

PHS6 : SS 316

Probe Housing Cable Entry

PCPG11 : PG 11, Polyamide

PCPG9 : PG 9, Polyamide

Output

PNP : PNP (Voltage upto 18 to 30V DC)

Power Supply

DC3 : 18 to 30V DC

Mounting

MB5S6 : Screwed Thread, BSP 1/2", SS 316

MN5S6 : Screwed Thread, NPT 1/2", SS 316

MB75S6: Screwed Thread, BSP 3/4", SS 316

MN75S6 : Screwed Thread, NPT 3/4", SS 316

MB10S6 : Screwed Thread, BSP 1", SS 316

MN10S6 : Screwed Thread, NPT 1", SS 316

TC10S6 : 1" or 1-1/2" Tri-Clamp, SS 316

TC20S6 : 2" or 2-1/2" Tri-Clamp, SS 316

Vibrating Fork

VF44 : Total Length 50mm, Tines 44mm, Material SS 316

Finish

HB : Standard

HG : Hygienic

Extension Material (Only with ("1.25H5H" , "1.25H10H"))

ES6 : SS 316

Operating Temperature

15T : Upto 150°C

Probe Length (Depend on "Mounting")

0.68H : 68 mm (Only with "VF44")

0.82H : 82 mm (For Socket Mounting, Only with "VF44")

1.05H : 105 mm (Only with "VF44")

1.25H5H : 125 to 500 mm (Only with 1/2" Mounting, "VF44")

1.25H10H : 125 to 1000 mm (Only with 3/4" & 1" Mounting, "VF44")

Example -

ETU-I-PHS6-PCPG11-PNP-DC3-MB5S6-VF44-HG-ES6-15T-0.68H