

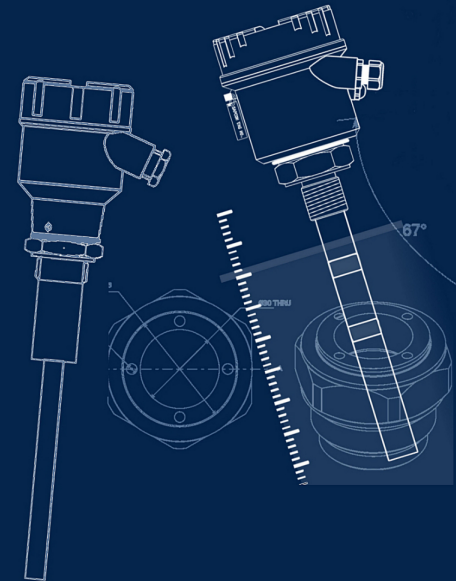
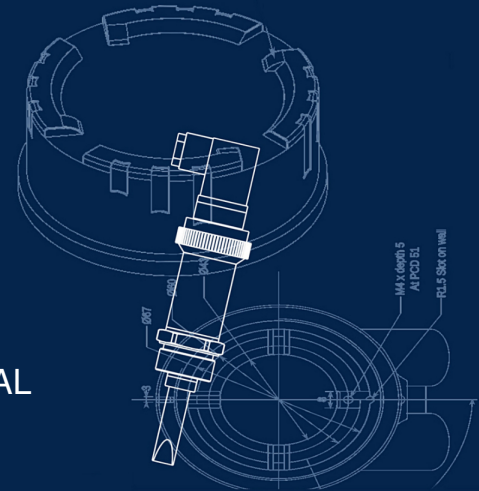
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INSTRUCTION MANUAL

ELIXIR

Compact Vibrating Fork

Version 2.8



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Contents

Revision History	6
1 Introduction	7
2 Operating Principle	7
3 Features	7
4 System Description	7
5 Applications	7
6 Applications Specifications	7
7 Model Identification	8
8 Application Specifications	9
9 Switching Indication	9
10 Temperature Class for Intrinsic Safety	9
11 Electrical Specifications	10
12 Mechanical Specifications	10
13 Influences on Switching Point	11
14 Installation Guidelines	14
15 Electrical Connections	14
16 Calibration	14
17 Cover Delay	15
18 Uncover Delay	16
19 Failsafe Settings	16
20 For AS-Interface Module	17
20.1 AS-Interface Topology	17
20.2 Electrical Specifications	17
20.3 AS-i Configuration	17
20.4 Electrical Connections	17
20.5 Programming Instructions	17
20.6 Setting Up AS-Interface	18
20.7 Installation & Calibration	18
21 For Namur Module	19
21.1 Electrical Specifications	19
21.2 Mechanical Specifications	19
21.3 Switching Indication	19
21.4 Namur Isolation Barrier Specifications	20
21.5 Temperature Class for Intrinsic Safety	20
22 Applications Specifications	21
23 Electrical Connections	21
23.1 Calibration	21
23.2 Installation Guidelines	21

24 Troubleshooting & Fault Indication	21
24.1 Output Indications	21
24.2 Error Indications	21
25 Certification	22
26 Maintenance	22
27 Customer Support	22
28 Product Selection Order Code	23
29 Namur Selection Order Code	26
30 AS-Interface Order Code	28

List of Figures

1	Elixir Product Image	7
2	Description of Parts	7
3	Temperature Conditions	8
4	Temperature Specifications	8
5	Top Panel for SPDT Relay & PNP	8
6	Top Panel for DPDT Relay	8
7	Top Panel for NAMUR	8
8	Top Panel for 8/16 mA	8
9	Top Panel for AS-Interface	8
10	Influence of Process Pressure on Switching Point	11
11	Influence of Process Temperature on Switching Point	12
12	Influence of Liquid Density on Switching Point	13
13	Provision of Baffle	14
14	Instrument Handling	14
15	Cable Gland Position	14
16	Electrical Connections	14
17	Test Tank	15
18	Calibration Point	15
19	Cover Delay Switch Position	15
20	Cover Delay Switch Position	15
21	Setting Cover Delay	15
22	Saving Cover Delay	15
23	Uncover Delay Switch Position	16
24	Setting Uncover Delay	16
25	Saving Uncover Delay	16
26	Failsafe High	16
27	Failsafe Low	16
28	AS-Interface	17
29	Electrical Connection	17
30	Connection of Elixir via AS-Interface	17
31	Output of AS-Interface	18
32	Temperature Conditions	21
33	Temperature Specifications	21
34	Electrical Connection during installation	21
35	Electrical Connections during Calibration	21
36	Calibration at safe zone	21

List of Tables

1	Application Specifications	9
2	Switching Indication	9
3	Temperature Class for Intrinsic Safety	9
4	Electrical Specifications	10
5	Mechanical Specifications	10
6	Electrical Specifications	17
7	AS-i Configuration	17
8	Electrical Specifications	19
9	Mechanical Specifications	19
10	Switching Indication	19
11	Namur Isolation Barrier Specifications	20
12	Temperature Class for Intrinsic Safety	20
13	Certifications	22

Revision History

Revision	Date	Author(s)	Description
1.0	26 Mar 2014	RND	First Version Editing
1.1	15 Sep 2014	MRK	Applications Revision
1.2	09 Apr 2015	RND	Features Revision
1.3	20 Nov 2015	RND	Specs Revision
1.4	19 Oct 2016	RND	Specs Revision
2.0	08 Jan 2017	BRND	Revised Format
2.1	17 Sep 2017	BRND	Branding Revisions
2.2	20 Jan 2018	MRK	Marketing Revisions
2.3	19 Oct 2018	RND	Specs Revision
2.4	17 Aug 2020	RND	Certificate Addition
2.5	17 Apr 2021	RND	Namur Section Added
2.6	4 Jun 2021	RND	AS-i Section Added
2.7	4 Mar 2022	RND	Temperature Class Table Added
2.8	31 Aug 2023	RND	Order Coding Chart Updated

1

1

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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 is a Vibrating Fork Liquid Level Limit Switch. It is suitable for level detection in storage tanks, mixing containers and pipelines, for liquids that do not react with stainless steel (SS) whose viscosity does not exceed 10000 cP. It is suitable for most of the applications where float switches were previously employed, as well as in such places where float switches were not appropriate (due to deposit formation, turbulence, stresses and air bubbles).



Figure 1: Elixir Product Image

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.

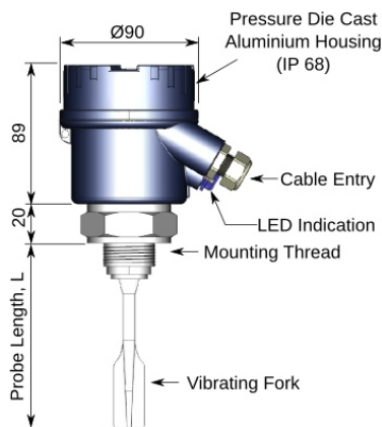


Figure 2: Description of Parts

3 Features

- Universal Power Supply: 18 - 55V DC, 90 - 265V AC
- 8.5 ± 0.2 V DC via Namur Isolator should contain 1K Ω Internal Resistor (e.g.Ex ia IIC T6...T3* Ga (Zone 0, gas group 2))
- Low Power Consumption: less heat, long life
- High temperature durability (H1 up to 200°C)

- Immunity to spurious external vibrations, material turbulence and flow
- Suitable for liquids with viscosity up to 10,000 cP
- Fast switching
- Self-diagnosis
- Independent of material's electrical properties

4 System Description

The Elixir level detecting system consists of a micro-controller based electronic insert with fork probe. The instrument comprises of an electronics SS 316 tuning fork housed in a cast aluminum housing provided with 2 suitable cable entries. The fork is of a special shape suitable for operating in liquids of specified range of viscosities. This is provided with either screwed mounting or flanged mounting suitable for installation on to a container or pipeline. Piezo ceramic elements are mounted inside the fork capsule and potted with epoxy compound for rendering them immune to dust, moisture and inflammable gases.

5 Applications

Elixir is suitable for the following industries:

- FMCG
- Paint
- Textile
- Breweries
- Cosmetics
- Chemicals
- Pesticides
- Edible Oil
- Confectionery
- Food Industry
- Dairy Industry
- Packaging Industry
- Pharmaceutical Industry

6 Applications Specifications

For hazardous areas, the environmental temperature conditions at the installation site should be within the specified limit as per Table 1. The acceptable ambient temperature depends upon the Gas Group and Process Temperature. Additionally, maintain the surface temperature ($T_{surface}$) up to 75°C. Exceed the $T_{surface}$ value over the permitted limit may lead to disaster conditions.

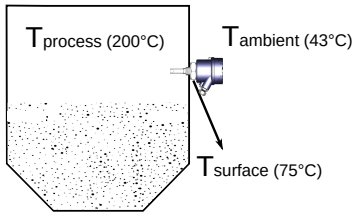


Figure 3: Temperature Conditions

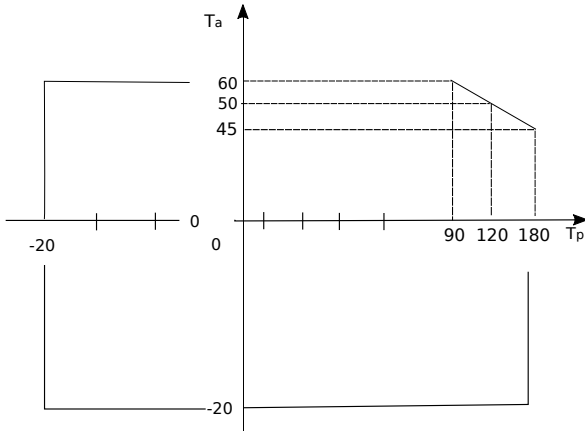


Figure 4: Temperature Specifications

7 Model Identification

Elixir has 4 variant models based on array of features and functionalities. Select the model based on electronic insert:

1. **SPN:** Selection of SPN(SPDT Relay PNP Output) model avail the benefit of following functionalities-

- Cover Delay
- Uncover Delay
- Calibration
- Failsafe

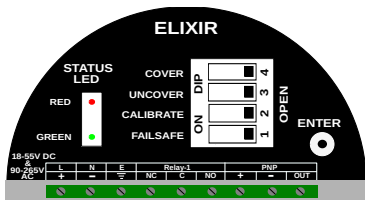


Figure 5: Top Panel for SPDT Relay & PNP

2. **D:** Selection of D(DPDT Relay) model avail the benefit of following functionalities-

- Cover Delay
- Uncover Delay
- Calibration
- Failsafe

3. **NMR:** Selection of NMR(Namur Current) model avail the benefit of following functionalities-

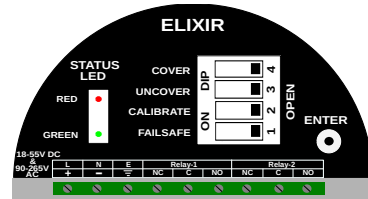


Figure 6: Top Panel for DPDT Relay

- Calibration
- Failsafe

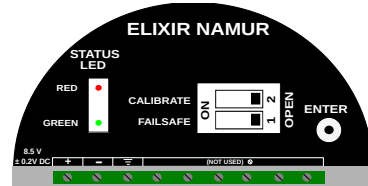


Figure 7: Top Panel for NAMUR

4. **MA1:** Selection of MA1(8/16mA Current 2-wire loop current) model avail the benefit of following functionalities-

- Cover Delay
- Uncover Delay
- Calibration
- Failsafe

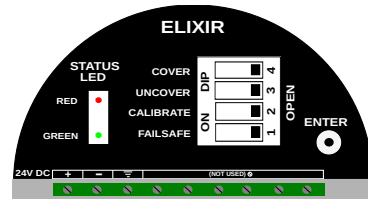


Figure 8: Top Panel for 8/16 mA

5. **AS-i:** Selection of AS-i(Actuator Sensor Interface) model avail the benefit of following functionalities-

- Cover Delay
- Uncover Delay
- Calibration
- Failsafe

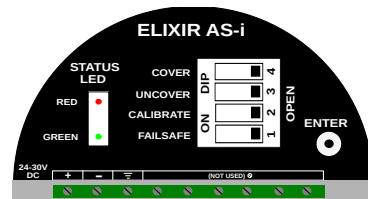


Figure 9: Top Panel for AS-Interface

8 Application Specifications

Please refer to Table 1 for Application Specifications.

Parameter	Value
Response Time	<ul style="list-style-type: none"> Cover Delay - 0.8 seconds Uncover Delay - 1 seconds
Hysteresis	3 - 4 mm
Density	Above 0.7gm/cm^3
Viscosity	Suitable for liquids with viscosity up to 10,000 cP

Table 1: Application Specifications

9 Switching Indication

Please refer to Table 2 for Switching Indication.

Parameter	Value
Internal Indication	Two LEDs <ul style="list-style-type: none"> Green: Normal Red: Alarm
External Indication	Available only in SCUTE Enclosure

Table 2: Switching Indication

10 Temperature Class for Intrinsic Safety

Temperature Class	Ambient Temperature	Max. process Temperature
T3	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	180°C
T4	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	125°C
T5	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	90°C
T6	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	75°C

Table 3: Temperature Class for Intrinsic Safety

11 Electrical Specifications

Please refer to Table 4 for Electrical Specifications.

Parameter	Value
Input Power Supply and Outputs	<ul style="list-style-type: none"> • D: Universal Power Supply 18 - 55V DC, 90 - 265V AC, Single-point two potential free relay outputs rated at 6A • SPN: Universal Power Supply 18 - 55V DC, 90 - 265V AC <ul style="list-style-type: none"> - Single-point Single relay (Rated 6A) - Open-collector PNP output, max 100mA non-inductive load • MA1: 24V DC 8/16mA 2-wire Loop powered current output • AS-i: ASi-3, Actuator Sensor Interface, 4-bit bus • NMR: 8.5 ± 0.2 V DC. Namur type current output ($I_{ON} \geq 2.1$ mA, $I_{OFF} \leq 1.2$ mA) Namur compliance can be attained with a Namur certified isolator.
Power Consumption	4W at 24V DC with 90 mA load
Fail-safe Settings	User selectable (Field selectable through toggle switch) <ul style="list-style-type: none"> • Open: Fail-safe High • Close: Fail-safe Low
Time Delay Settings	Cover and Uncover Delay: 0.8s / 1s to 20s, through toggle switches
Sensitivity Setting	Field Selectable (through toggle switches)
Protection	If required, additional over-current and short-circuit protections can be provided with the use of an external fuse rated for 500mA.

Table 4: Electrical Specifications

12 Mechanical Specifications

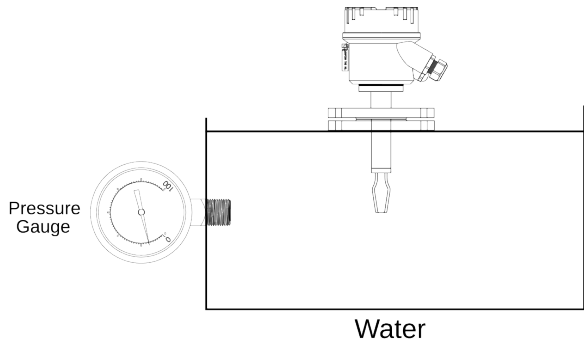
Please refer to Table 9 for Mechanical Specifications.

Parameter	Value
Active Fork Length	44 mm and 100 mm
Housing	<ul style="list-style-type: none"> • SCUTE: Pressure die-cast aluminium weatherproof (Rating IP-68) • FP2C: Cast aluminium, weatherproof & flameproof, powder coated, suitable for Gas Groups IIA, IIB & IIC as per IS-2148
Electrical Connector	PG-13.5, 1/2" BSP DC Glands, 1/2" NPT DC Glands
Mounting	<ul style="list-style-type: none"> • Screwed - 1"/1 1/2" BSP/NTP(M) • Flanged - As per your specifications • Material - SS
Extension Pipe	SS-304 / SS -316
Wetted Parts	<ul style="list-style-type: none"> • S4: SS 304 • S6: SS 316 • S6L: SS 316L • HA: Hastelloy C • CHLR: Halar Coated • PTFE: Teflon Coated
Process Temperature	<ul style="list-style-type: none"> • A (Ambient): Below 100°C • H (High temperature): 100°C - 200°C
Resonant Frequency	Value
<ul style="list-style-type: none"> • Active Fork length of 100mm • Active Fork length of 44mm 	<ul style="list-style-type: none"> • Approx. 1.1KHz • Approx. 1.5KHz

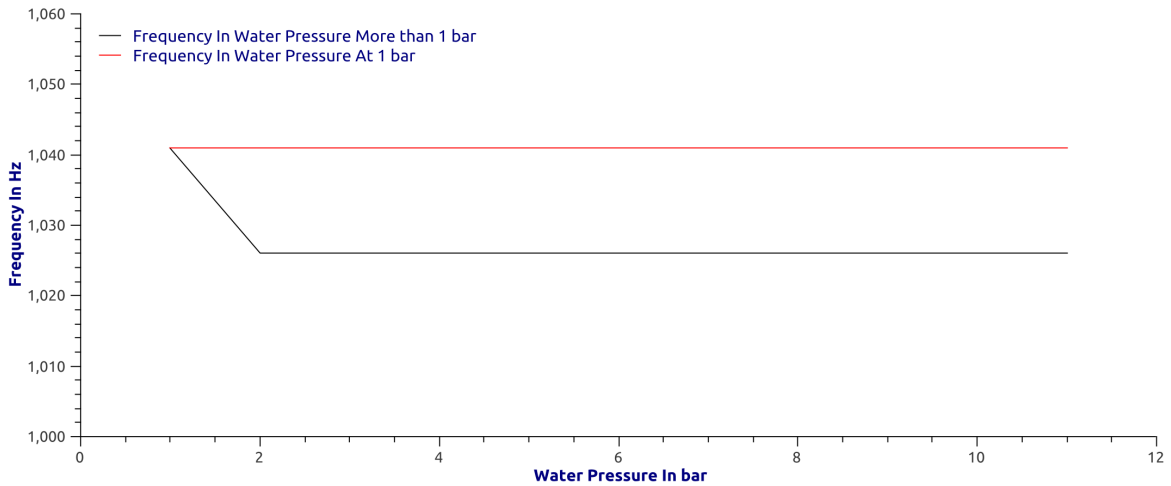
Table 5: Mechanical Specifications

13 Influences on Switching Point

1. **Process Pressure** - It has no significant effect on the switching point of the device as can be observed from the Figure 10.



Change In Frequency With Respect To Change In Water Pressure More Than 1 bar



Change In Covered Switching Point With Respect To Change In Water Pressure More Than 1 bar

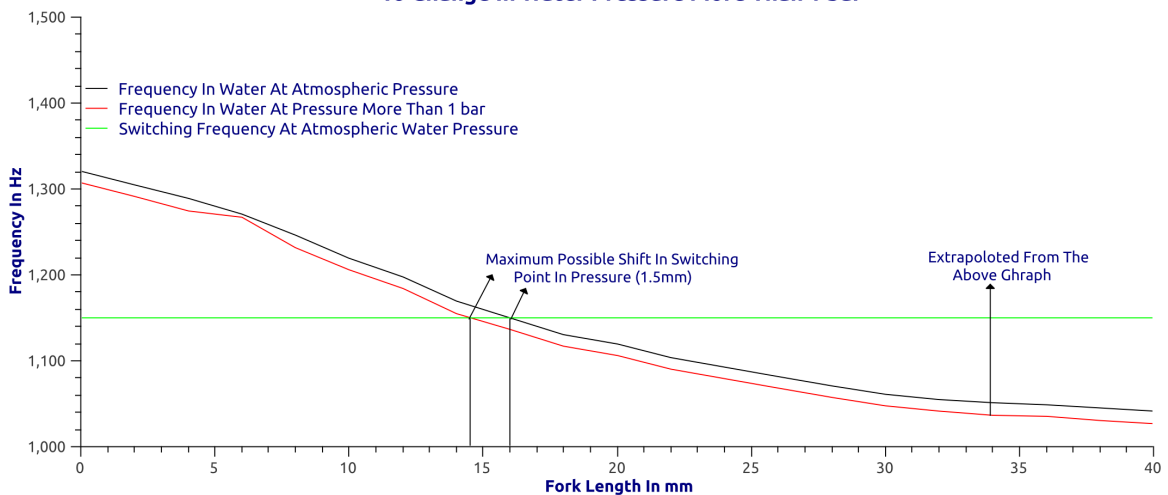
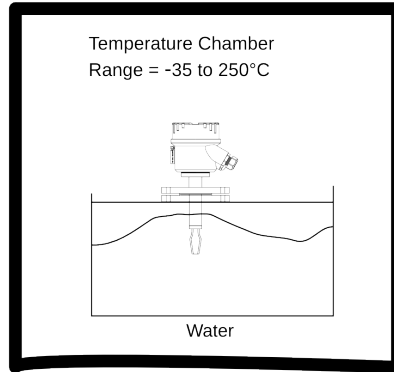
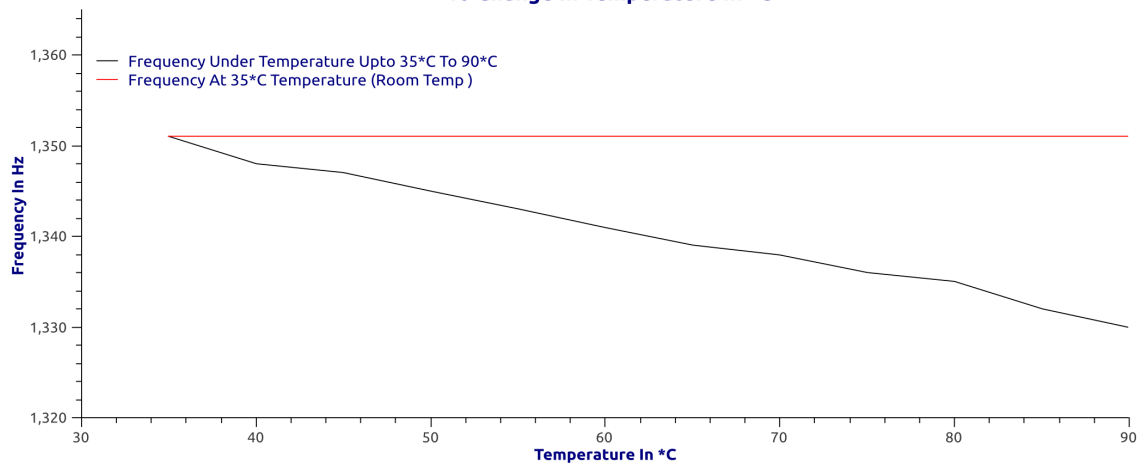


Figure 10: Influence of Process Pressure on Switching Point

2. **Process Temperature** - The influence of temperature on switching point of the device is described in Figure 11.



Change In Frequency With Respect To Change In Temperature In °C



Change In Covered Switching Point with Respect To Change In Temperature In °C

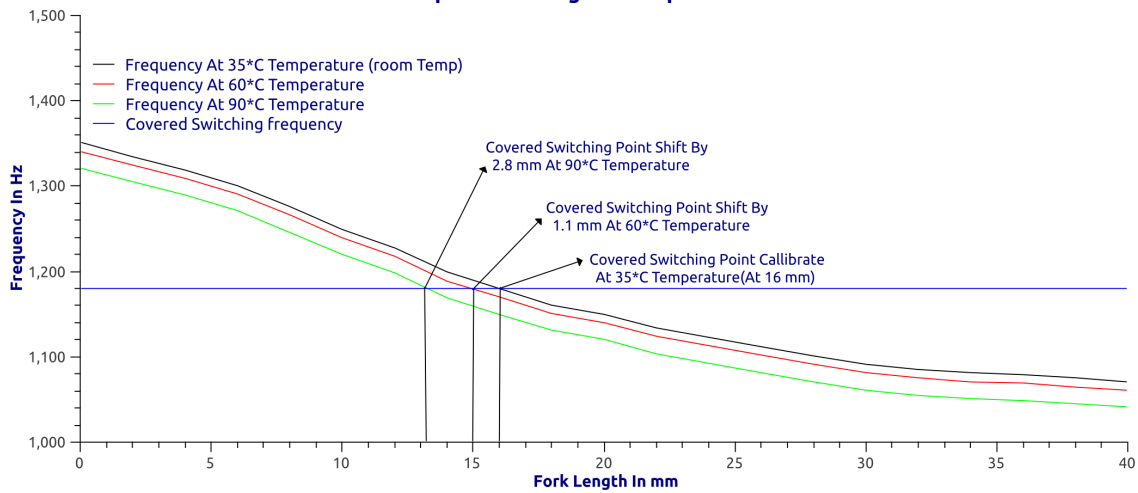


Figure 11: Influence of Process Temperature on Switching Point

3. **Liquid Density** - The influence of liquid density on switching point of the device can be seen in the graph in Figure 12.

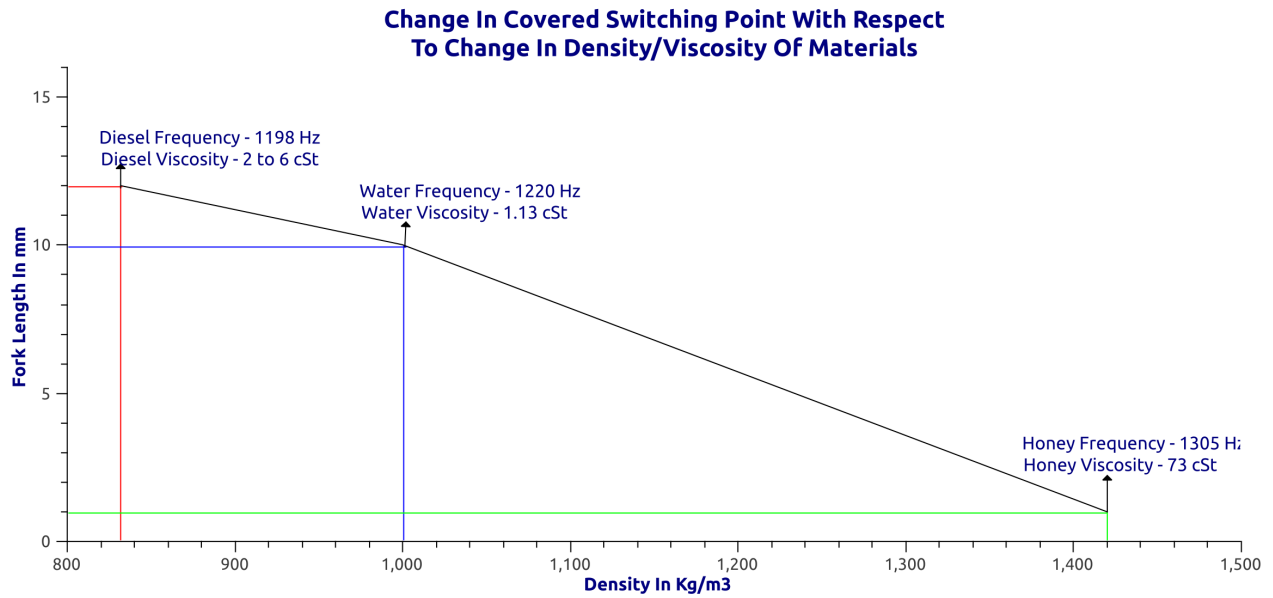
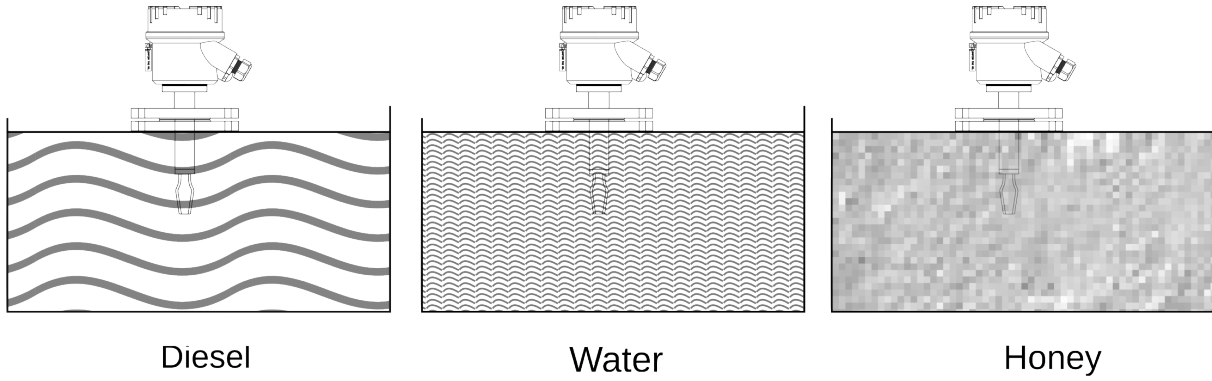


Figure 12: Influence of Liquid Density on Switching Point

14 Installation Guidelines

The Elixir can be installed in the vessel in almost any position. For liquids with higher viscosities, top mounting or side mounting with tines slanting downwards is preferred as then the viscous liquid can drip off faster when the level goes below the set point. While installation of Elixir fork, please take care of the following points:

- The instrument shouldn't block the material filling inlet.
- Secure the cover of housing tightly. Tighten the cable glands.
- For side-mounting, provide a baffle to prevent the material from falling on the fork. Please refer to Figure 13.

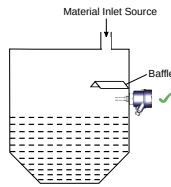


Figure 13: Provision of Baffle

- When handling forks, do not lift them using their tines. Please see Figure 14.

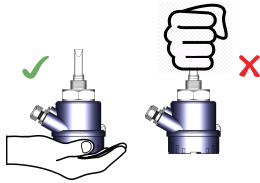


Figure 14: Instrument Handling

- The tines should not be bent nor should their dimensions be altered. 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 connections.
- To prevent the ingress of moisture and water seepage in side mounting position, the cable entries should always point downwards as shown in Figure 15.

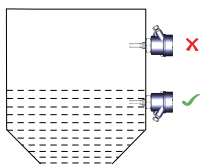
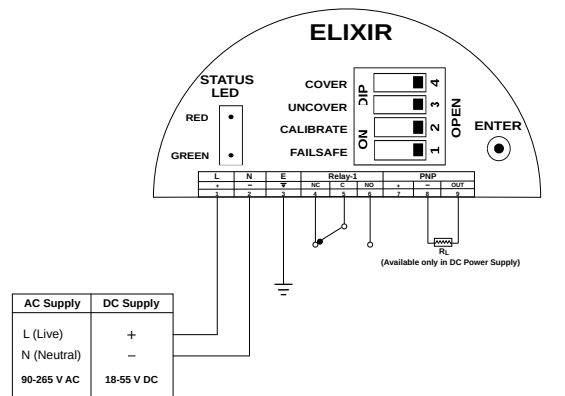


Figure 15: Cable Gland Position

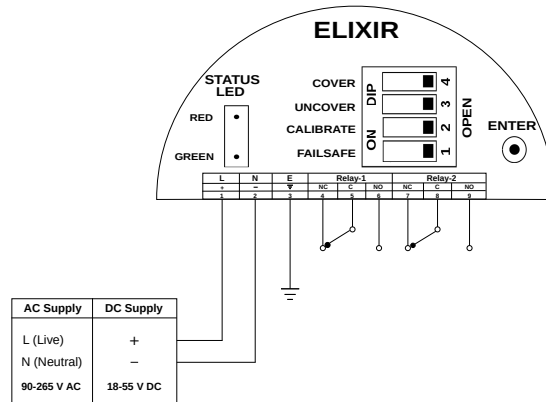
- Weatherproofness of enclosure is guaranteed only if the cover is in place glands adequately tightened. Damage due to accidental entry of water can be avoided if the instrument is installed in a rain shade.
- If the ambient temperature is high, the instrument should not be installed to receive direct 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.
- While screwing the Elixir instrument, the hexagonal mounting bush should be turned and not the housing.

15 Electrical Connections

Please refer to the Figures 16a and 16b for the same.



(a) Electronics option SPDT Relay and PNP Output (SPN)



(b) Electronics option DPDT Relay (D)

Figure 16: Electrical Connections

16 Calibration

It is recommended to first calibrate the Elixir in a more convenient setup before installing it in the application tank. To carry out calibration process, please follow the steps mentioned below.

- Prepare a narrow transparent test tank & fill the application media as shown in the following Figure 17.

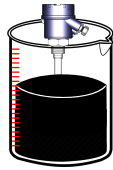


Figure 17: Test Tank

- Refer to given Figure 16 for Electrical Connections to power up and connect the device.
- Dip the Elixir into test tank upto the notch (calibration point) as shown in Figure 18.

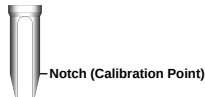


Figure 18: Calibration Point

- Ensure that all DIP switches are in OPEN position as shown in Figure 19. Make sure that STATUS LED is not blinking for Error.
- To start with Calibration process, set the CALIBRATE switch to CLOSE position and press ENTER. (CLOSE is the opposite of OPEN for a DIP switch.)
- The Status RED LED will glow. Blinking indicates that Elixir is registering the switching point position.
- Keep ENTER key pressed for 4 to 5 blinks. Release the ENTER key.
- On Release, the status LED should :
 - Turn RED for Maximum Failsafe Selection.
 - Turn Green for Minimum Failsafe Selection.
 This indicates that calibration is correct.
- Test the calibration by dipping and removing the Elixir tines from liquid.
- During calibration, delays are automatically by-passed.
- If calibration is correct, put the calibration switch back to the OPEN position.
- Else, Elixir will indicate error after 2 minutes of pressing the ENTER key for the last time.
- If calibration is incorrect, repeat the above stated steps once again.

17 Cover Delay

Note: Set the value of COVER DELAY between 1-25 secs.

When the application material covers the fork tines, the changeover of the output can be delayed by a pre-determined time. This time is called COVER Delay. For a different value of Cover Delay, the number of blinks can be adjusted as per requirement. Follow the below procedure for setting Cover Delay:

1. Ensure that all DIP switches are in OPEN position as shown in Figure 19. Make sure that STATUS LED is not blinking for Error.

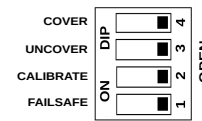


Figure 19: Cover Delay Switch Position

2. Set the COVER switch to CLOSE (Opposite of OPEN in a DIP switch) position as shown in Figure 20.

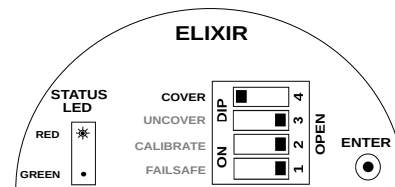


Figure 20: Cover Delay Switch Position

3. Press ENTER. The STATUS LED starts blinking. Blink the STATUS LED according to value of cover delay as shown 21.

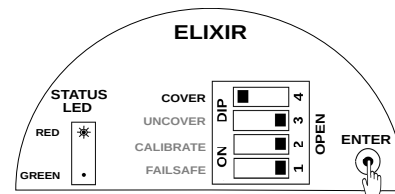


Figure 21: Setting Cover Delay

4. Cover delay is entered, but not saved. To save and test the cover delay, set the COVER switch back to OPEN position as shown in Figure 22.

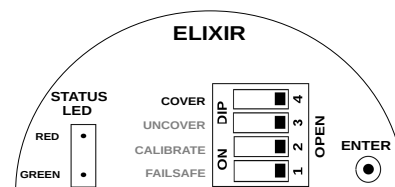


Figure 22: Saving Cover Delay

5. To test, dip Elixir into the application material until the switching point is reached.
6. The STATUS LED will start blinking RED if the switch point is reached. It will blink for the number of seconds for which the cover delay is set. 1 blink is equal to 1 second during switching.

18 Uncover Delay

Note: Set the value of UNCOVER DELAY between 1-25 secs.

When the application material uncovers Elixir's fork tines, the changeover of the output can be delayed by a pre-determined time. This time is called UNCOVER Delay. For a different value of Uncover Delay, the number of blinks can be adjusted as per requirement. Follow the below procedure for setting Uncover Delay:

1. Ensure that all DIP switches are in OPEN position as shown in Figure 19. Make sure that STATUS LED is not blinking for Error.
2. Set the UNCOVER switch to CLOSE (Opposite of OPEN in a DIP switch) position as shown in Figure 23.

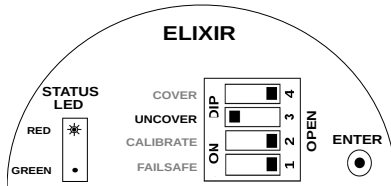


Figure 23: Uncover Delay Switch Position

3. Press ENTER. The STATUS LED starts blinking. Blink the STATUS LED according to value of uncover delay as shown in Figure 24.

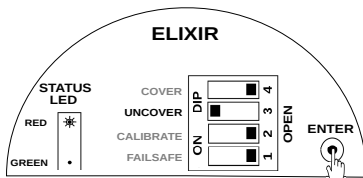


Figure 24: Setting Uncover Delay

4. Uncover Delay is entered, but not saved. To save and test the uncover delay, set the UNCOVER switch back to OPEN position as shown in Figure 25.

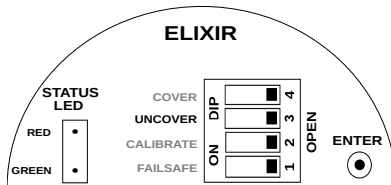


Figure 25: Saving Uncover Delay

5. To test, dip Elixir into the application material until the switching point is achieved.
6. The STATUS LED will start blinking GREEN if the switch point is achieved. It will blink for the number of seconds for which the Uncover Delay is set.

19 Failsafe Settings

In a condition of device failure, known errors and input power failure the outputs of the device resemble the ALARM condition. This is meant to prevent overflow or dry run conditions in case of failures.

Prevent Overflow - High Level Switch Failsafe High (default) is set by moving the Failsafe switch to OPEN position.

1. When not in contact with the material, LED turns GREEN.
2. When in contact with the material, LED turns RED.

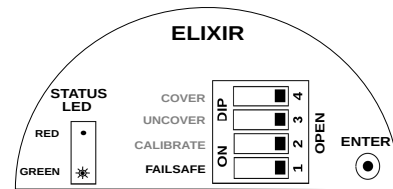


Figure 26: Failsafe High

Prevent Dry run - Low Level Switch Failsafe Low is set by moving the Failsafe switch to CLOSE position

1. When in contact with the material, LED turns GREEN.
2. When not in contact with the material, LED turns RED.

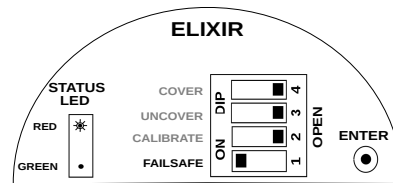


Figure 27: Failsafe Low

20 For AS-Interface Module

20.1 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 28. ASi-3 is based

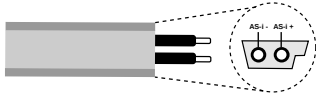


Figure 28: AS-Interface

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

20.2 Electrical Specifications

Please refer to Table 6 for Electrical Specifications.

PARAMETER	VALUE
Input Power Supply	24-30V DC
Electrical Connector	PG-13.5, 1/2" BSP DC Glands, 1/2" NPT DC Glands
Current Consumption	60mA @24V DC
Fail-safe Settings	User selectable (Field selectable through toggle switch) <ul style="list-style-type: none"> • Open: Fail-safe High • Close: Fail-safe Low

Table 6: Electrical Specifications

20.3 AS-i Configuration

Please refer to Table 7 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 7: AS-i Configuration

20.4 Electrical Connections

Please refer to the Figure 29 for electrical connections of AS-Interface Module.

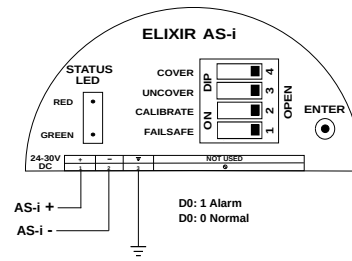


Figure 29: Electrical Connection

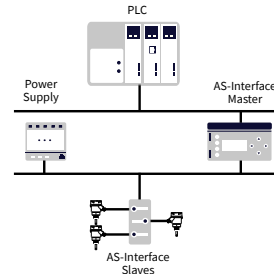


Figure 30: Connection of Elixir via AS-Interface

20.5 Programming Instructions

Here D0 for Alarm status and D1 for system health. D2 & D3 are not engaged.

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

20.6 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:

- **Set Unique Bus ID:** Assign and set a unique bus identification for the slave device. This can be done by using an AS-I master device. 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 failsafe switch to toggle the output and observe the change in the D0 bit for the assigned address. The output change can observed via a PLC or a SCADA system connected to the PLC.

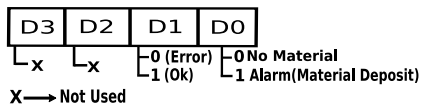


Figure 31: Output of AS-Interface

20.7 Installation & Calibration

Proceed to Section [Installation Guidelines](#) for installing the product in an application tank and then refer to given Figure 29 for connecting Elixir AS-i and power up to follow the calibration procedure given in [Calibration](#) Section to calibrate the Elixir AS-i.

21 For Namur Module

21.1 Electrical Specifications

Please refer to Table 8 for Electrical Specifications.

Parameter	Value
Input Loop Power Supply	NMR: 8.5 ± 0.2 V DC. Namur type current output (I ON \geq 2.1 mA, I OFF \leq 1.2 mA) Namur compliance can be attained with a Namur certified isolator.
Ambient Temperature	0°C to 60°C
Fail-safe Settings	User selectable (Field selectable through toggle switch) <ul style="list-style-type: none"> • Open: Fail-safe High • Close: Fail-safe Low

Table 8: Electrical Specifications

21.2 Mechanical Specifications

Please refer to Table 9 for Mechanical Specifications.

Parameter	Value
Active Fork Length	44 mm
Housing	<ul style="list-style-type: none"> • SCUTE: Pressure die-cast aluminium weatherproof (Rating IP-68) • FP2C: Cast aluminium, weatherproof & flameproof, powder coated, suitable for Gas Groups IIA, IIB & IIC as per IS-2148 (Rating IP-66)
Powder Coating	<ul style="list-style-type: none"> • SCUTE: Pure Polyester (Thickness: 50-70 μm) • FP2C: Epoxy Polyester (Thickness: 50-70 μm)
Cable Gland	PG-13.5, 1/2" BSP DC Glands, 1/2" NPT DC Glands
Mounting	<ul style="list-style-type: none"> • Screwed - 1 1/2" BSP/NTP(M) • Flanged - As per your specifications • Material - SS
Extension Pipe	SS-304 / SS -316
Wetted Parts	<ul style="list-style-type: none"> • S4: SS 304 • S6: SS 316 • S6L: SS 316L • HA: Hastelloy C • CHLR: ECTFE Coated
Process Temperature	Upto 150°C
Resonant Frequency	Value
<ul style="list-style-type: none"> • Active Fork length of 44mm 	<ul style="list-style-type: none"> • Approx. 1.5KHz

Table 9: Mechanical Specifications

21.3 Switching Indication

Please refer to Table 10 for Switching Indication.

Parameter	Value
Internal Indication	Two LEDs <ul style="list-style-type: none"> • Green: Normal • Red: Alarm

Table 10: Switching Indication

21.4 Namur Isolation Barrier Specifications

The 'NMR' electronics of the vibrating fork requires the following specifications to be functional:

Parameter	Value
Functional Operating Voltage	8.5 ± 0.2 V DC
Internal Source Resistance	1K Ω
Absolute Maximum Voltage	UI & UO = 13 V
Current Consumption	II & IO = 16 mA
Power Consumption	PI & PO = 65 mW
Input Capacitance	0 μ F
Input Inductance	0 μ H
Certification	Ex ia IIC T3 Ga ($0^{\circ}\text{C} \leq T_{amb} \leq 60^{\circ}\text{C}$)

Table 11: Namur Isolation Barrier Specifications

21.5 Temperature Class for Intrinsic Safety

Temperature Class	Ambient Temperature	Max. process Temperature
T3	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	180 $^{\circ}\text{C}$
T4	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	125 $^{\circ}\text{C}$
T5	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	90 $^{\circ}\text{C}$
T6	$-20^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$	75 $^{\circ}\text{C}$

Table 12: Temperature Class for Intrinsic Safety

22 Applications Specifications

For hazardous areas, the environmental temperature conditions at the installation site should be within the specified limit as per Table 1. The acceptable ambient temperature depends upon the Gas Group and Process Temperature. Additionally, maintain the surface temperature ($T_{surface}$) up to 75°C . Exceed the $T_{surface}$ value over the permitted limit may lead to disaster conditions.

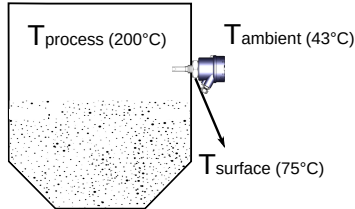


Figure 32: Temperature Conditions

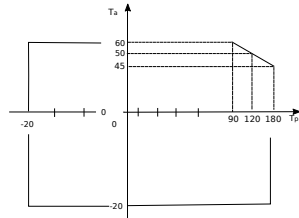


Figure 33: Temperature Specifications

23 Electrical Connections

Please refer to the Figure 34 for electrical connections while connecting the Elixir Namur in an application tank.

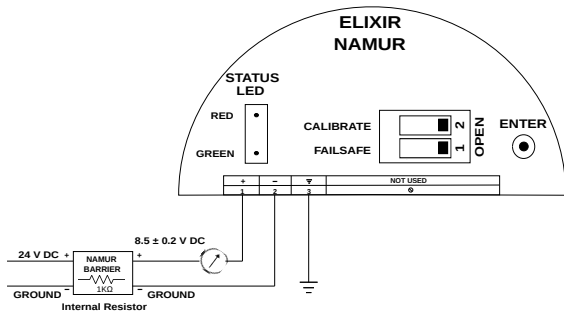


Figure 34: Electrical Connection during installation

23.1 Calibration

Note: Calibrator device must be used to power the instrument only when the level instrument is in a Safe Zone (Zone 2).

It is recommended to first calibrate the Elixir Namur in a more convenient setup in Safe Zone (Zone 2) before installing it in the application tank.

Refer to given Figure 35 for connecting Elixir Namur

and power up then follow the calibration procedure given in [Calibration](#) Section to calibrate the Elixir Namur in safe zone and proceed to [Section Installation Guidelines](#) for installing the product in an application tank

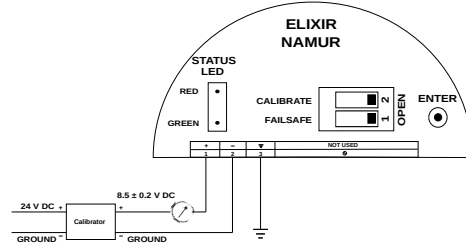


Figure 35: Electrical Connections during Calibration

23.2 Installation Guidelines

The Elixir Namur can be installed in the vessel in almost any position but before installing the device, ensure that the calibration process has been already carried out in safe area (Zone 2). After calibration procedure install the instrument in hazardous area as shown in Figure 36

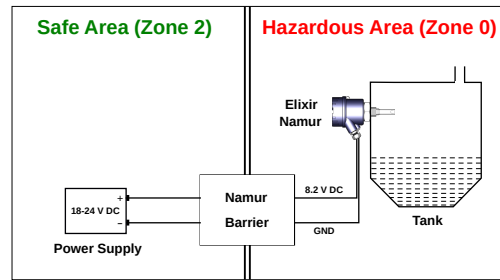


Figure 36: Calibration at safe zone

For other installation handling procedure, refer to [Section Installation Guidelines](#)

24 Troubleshooting & Fault Indication

24.1 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

24.2 Error Indications

1. Loss of Vibration

- 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.**

2. No LED Glows

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

3. Line Break to Piezo Drive/Oscillator

- In fail-safe 'High' mode, instrument will switch to alarm condition if the connectivity between vibrating fork and electronics is lost.

25 Certification

CERTIFICATION	ITEM SELECTION
IS/IEC 60529: 2001 (IP68)	SCUTE
IS/IEC 60529: 2001 (IP66)	FP2C
IS/IEC 60079-1:2014 (Ex 'd')	FP2C
Ex ia IIC T3 Ga	NMR-DC6

Table 13: Certifications

26 Maintenance

The electronics of Elixir instrument needs no maintenance. When cleaning and checking the vessel, free the tuning fork from deposits. If the material has tendency to form a hard sticky deposit, the instrument must be checked more often. Make sure that the cable ducts and the lid are tightly sealed so that no moisture seeps into the instrument.

27 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:

- www.sapconinstruments.com
- sales@sapcon.in
- +91-731-4757575

28 Product Selection Order Code

Product

ELIXIR - Liquid Level Switch for Sticky, Corrosive, Agitated, Splashing, Foaming Liquids suitable for liquids with viscosity up to 10,000cp

Type

I : Integral (sensor in same unit)

Housing

SCUTE : Pressure Die Cast Aluminium, weatherproof, powder-coated, IP68

FP2C : Cast Aluminium, weather & flameproof, IEC 60079-1 Ex 'd', powder-coated suitable for gas group IIC, IP66

Indication

WL : With LED (SCUTE)

Probe Housing Cable Entry

PCPG13 : Threaded, PG 13.5 cable gland, Polyamide

PCB5D : Threaded, G 1/2" (BSP), DC gland, Brass (Ni plated)

PCN5D : Threaded, 1/2" NPT, DC gland, Brass (Ni plated)

Output (Depends on "Vibrating Fork" & "Power Supply")

SPN : One SPDT Relay (rated at 6A, 230V AC for non inductive load) and one PNP output (Only for 18 To 35V DC supply voltage)

D : DPDT Relay (rated at 6A, 230V AC for non inductive load)

NMR : Namur type current output at 8.2V (I ON 2.1 mA I OFF 1.2 mA) (Only with "VF44", "DC6", Temperature $\leq 180^\circ\text{C}$)

MA1 : 8/16 mA 2-wire Loop powered current output at 24V DC (Only with "VF44", "DC6", Temperature $\leq 180^\circ\text{C}$)

Power Supply (Depends on "Vibrating Fork" & "Output")

U : Universal (18 to 55V DC) and (90 to 265V at 50Hz AC)

DC6 : 8.5 ± 0.2 V DC supplied by NAMUR certified isolator should contain 1K Ω Internal Resistor (Only with "VF44", "NAMUR")

DC : 24V DC (Only with "VF44", "MA1")

Surface Coating (Depends on "Vibrating Fork" & "Mounting") (Optional)

CHLR : Ethylene chlorotrifluoroethylene (ECTFE) Coated (Only with "Flange" & $\leq 15\text{T}$)

CPFA : Perfluoroalkoxy alkanes (PFA) Coated (Only with "Flange")

Mounting (Depends on "Vibrating Fork")

MB5S6 : Threaded, G 1/2" (BSP), SS 316

MN5S6 : Threaded, NPT 1/2", SS 316

MB7S6 : Threaded, G 3/4" (BSP), SS 316

MN7S6 : Threaded, NPT 3/4", SS 316

MB10S4 : Threaded, G 1" (BSP), SS 304 (VF44)

MB10S6 : Threaded, G 1" (BSP), SS 316

MN10S4 : Threaded, NPT 1", SS 304 (Only with VF110)

MN10S6 : Threaded, NPT 1", SS 316

FA10S6 : 1" ANSI/ASME B16.5 150 Lbs Flange, SS 316

FA10S7 : 1" ANSI/ASME B16.5 150 Lbs Flange, SS 316L

FA15S4 : 1 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 304

FA15S6 : 1 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 316

Mounting

- FA15S7 : 1½" ANSI/ASME B16.5 150 Lbs Flange, SS 316L
- FA20S4 : 2" ANSI/ASME B16.5 150 Lbs Flange, SS 304
- FA20S6 : 2" ANSI/ASME B16.5 150 Lbs Flange, SS 316
- FA20S7 : 2" ANSI/ASME B16.5 150 Lbs Flange, SS 316L
- FA25S4 : 2½" ANSI/ASME B16.5 150 Lbs Flange, SS 304
- FA25S6 : 2½" ANSI/ASME B16.5 150 Lbs Flange, SS 316
- FA25S7 : 2½" ANSI/ASME B16.5 150 Lbs Flange, SS 316L
- FA30S4 : 3" ANSI/ASME B16.5 150 Lbs Flange, SS 304
- FA30S6 : 3" ANSI/ASME B16.5 150 Lbs Flange, SS 316
- FA30S7 : 3" ANSI/ASME B16.5 150 Lbs Flange, SS 316L
- FA10HA : 1" ANSI/ASME B16.5 150 Lbs Flange, Hastelloy C276
- FA15HA : 1½" ANSI/ASME B16.5 150 Lbs Flange, Hastelloy C276
- FA20HA : 2" ANSI/ASME B16.5 150 Lbs Flange, Hastelloy C276
- FA25HA : 2½" ANSI/ASME B16.5 150 Lbs Flange, Hastelloy C276
- FA30HA : 3" ANSI/ASME B16.5 150 Lbs Flange, Hastelloy C276
- F15S4 : 10 mm thick Flange conforming to 1½" ANSI/ASME B16.5 Flange, SS 304
- F20S4 : 10 mm thick Flange conforming to 2" ANSI/ASME B16.5 Flange, SS 304
- F25S4 : 10 mm thick Flange conforming to 2½" ANSI/ASME B16.5 Flange, SS 304
- F30S4 : 10 mm thick Flange conforming to 3" ANSI/ASME B16.5 Flange, SS 304
- F15S6 : 10 mm thick Flange conforming to 1½" ANSI/ASME B16.5 Flange, SS 316
- F20S6 : 10 mm thick Flange conforming to 2" ANSI/ASME B16.5 Flange, SS 316
- F25S6 : 10 mm thick Flange conforming to 2½" ANSI/ASME B16.5 Flange, SS 316
- F30S6 : 10 mm thick Flange conforming to 3" ANSI/ASME B16.5 Flange, SS 316
- TC10S6 : 1" Tri-Clamp ISO 2852/DIN 32676(DN25), SS 316
- TC15S6 : 1½" Tri-Clamp ISO2852/DIN32676(DN40), SS 316
- TC20S6 : 2" Tri-Clamp ISO2852/DIN32676(DN50), SS 316

Vibrating Fork (Depends on "Mounting" & "Probe Length")

- VF44 : Tines 44 mm, SS 316 (1.3H, 1.75H, 2H30H)
- VF44H : Tines 44 mm, Hastelloy C276
- VF44L : Tines 44 mm, SS 316L
- VF110 : Fluido Fork, 110 , Tines 100 mm, SS 316 (Only with 1.3H, 1.75H, 2H30H)

Finish

- HB : Standard
- HG : Hygienic (Only with "VF44" , Thread)

Extension Material (Depends on "Probe Length")

- ES4 : SS 304 (Only with "VF110")
- ES6 : SS 316
- ES7 : SS 316L
- EHA : Hastelloy C276

Operating Temperature

- 10T : Up to 100°C
- 15T : Up to 150°C (Only with "CHLR")
- 18T : Up to 180°C (Only with "NMR" , "MA1")
- 20T : Up to 200°C

Standoff Material (Depends on Operating Temperature, 10T)

STS4 : SS 304 (Only with "VF110")

STS6 : SS 316

STS7 : SS 316L

STHA : Hastelloy C276

Probe Length (Depends on Vibrating Fork)

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

1.05H : 105 mm (Only with "VF44", MN5S6)

1.3H : 130 mm (Only with "VF110")

1.75H : 175 mm (Only with "VF110")

1.25H5H : 125 to 500 mm (Only with "VF44", "MB5S6")

1.25H10H : 125 to 1000 mm (Only with "VF44", "NMR", "MA1", "Thread")

1.25H20H : 125 to 2000 mm (Only with "VF44", "Thread")

1H10H : 100 to 1000 mm (Only with "NMR", "TC10S6", Thread)

1H20H : 100 to 2000 mm (Thread, TC10S6)

2H30H : 200 to 3000 mm (Only with "VF110")

Example - ELIXIR-I-SCUTE-PCPG13-SPN-U-MB10S6-VF110-HB-ES4-20T-STS4-2H30H

- Not Applicable

29 Namur Selection Order Code

Product

ELIXIR - Liquid Level Switch suitable for Sticky, Corrosive, Agitated, Splashing, Foaming Liquids with viscosity up to 10,000cp

Type

I : Integral (sensor in same unit)

Housing

SCUTE : Pressure Die Cast Aluminium, weatherproof, powder-coated, IP68

FP2C : Cast Aluminium, weather & flameproof, IEC 60079-1 Ex 'd', powder-coated suitable for gas group IIC, IP66

Probe Housing Cable Entry

PCPG13 : Threaded, PG 13.5 cable gland, Polyamide

PCB5D : Threaded, G 1/2" (BSP), DC gland, Brass (Ni plated)

PCN5D : Threaded, 1/2" NPT, DC gland, Brass (Ni plated)

Output

NMR : Namur type current output at 8.2V (I ON 2.1 mA I OFF 1.2 mA)(VF44, DC6 , Temperature $\leq 180^{\circ}\text{C}$)

Power Supply (Depends on "Vibrating Fork" & "Output")

DC6 : Intrinsically Safe, Ex-ia IIC T6..T3 as per IEC 60079-11:2011, 8.2V DC supplied by NAMUR certified isolator

Mounting (Depends on "Vibrating Fork")

MB5S6 : Threaded, G 1/2" (BSP), SS 316

MN5S6 : Threaded, NPT 1/2", SS 316

MB7S6 : Threaded, G 3/4" (BSP), SS 316

MN7S6 : Threaded, NPT 3/4", SS 316

MB10S6 : Threaded, G 1" (BSP), SS 316

MN10S6 : Threaded, NPT 1", SS 316

FA10S4 : 1" ANSI/ASME B16.5 150 Lbs Flange, SS 304

FA15S4 : 1 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 304

FA10S6 : 1" ANSI/ASME B16.5 150 Lbs Flange, SS 316

FA10S7 : 1" ANSI/ASME B16.5 150 Lbs Flange, SS 316L

FA15S6 : 1 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 316

FA15S7 : 1 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 316L

FA20S4 : 2" ANSI/ASME B16.5 150 Lbs Flange

FA20S6 : 2" ANSI/ASME B16.5 150 Lbs Flange

FA25S4 : 2 1/2" ANSI/ASME B16.5 150 Lbs Flange

FA25S6 : 2 1/2" ANSI/ASME B16.5 150 Lbs Flange

F10S4 : 10 mm thick Flange conforming to 1" ANSI/ASME B16.5 Flange

F15S4 : 10 mm thick Flange conforming to 1 1/2" ANSI/ASME B16.5 Flange

F10S6 : 10 mm thick Flange conforming to 1" ANSI/ASME B16.5 Flange

F15S6 : 10 mm thick Flange conforming to 1 1/2" ANSI/ASME B16.5 Flange

F20S4 : 10 mm thick Flange conforming to 2" ANSI/ASME B16.5 Flange, SS 304

F20S6 : 10 mm thick Flange conforming to 2" ANSI/ASME B16.5 Flange, SS 316

Mounting
F25S4 : 10 mm thick Flange conforming to 2½" ANSI/ASME B16.5 Flange, SS 304
F25S6 : 10 mm thick Flange conforming to 2½" ANSI/ASME B16.5 Flange, SS 316
Vibrating Fork (Depends on "Mounting" & "ProbeLength")
VF44 : Tines 44 mm, SS 316 (Only with "0.68H", "1.05H", "1.25H10H")
Finish
FB : Fully Buffed
Extension Material (Depends on "Probe Length", Only with "1.25H10H")
ES4 : SS 304
ES6 : SS 316
Operating Temperature
10T : Upto 100°C
15T : Upto 150°C (Only with "CHLR")
Standoff Material (Depends on "Operating Temperature")
STS4 : SS 304
STS6 : SS 316
Probe Length (Depends on "Vibrating Fork")
0.68H : 68 mm
1.05H : 105 mm
1.25H10H : 125 to 1000 mm

Example - ELIXIR-I-FP2C-PCN5D-NMR-DC6-MB10S6-VF44-FB-10T-0.68H

30 AS-Interface Order Code

Product

ELIXIR - Liquid Level Switch suitable for Sticky, Corrosive, Agitated, Splashing, Foaming Liquids with viscosity up to 10,000cp

Type

I : Integral (sensor in same unit)

Housing

SCUTE : Pressure Die Cast Aluminium, weatherproof, powder-coated, IP68

FP2C : Cast Aluminium, weather & flameproof, IEC 60079-1 Ex 'd', powder-coated suitable for gas group IIC, IP66

Probe Housing Cable Entry

PCPG13 : Threaded, PG 13.5 cable gland, Polyamide

PCB5D : Threaded, G 1/2" (BSP), DC gland, Brass (Ni plated)

PCN5D : Threaded, 1/2" NPT, DC gland, Brass (Ni plated)

Output

ASi-3 : ASi-3, Actuator Sensor Interface, 4-bit bus

Mounting (Depends on "Vibrating Fork")

MB5S6 : Threaded, G 1/2" (BSP), SS 316

MN5S6 : Threaded, NPT 1/2", SS 316

MB7S6 : Threaded, G 3/4" (BSP), SS 316

MN7S6 : Threaded, NPT 3/4", SS 316

MB10S6 : Threaded, G 1" (BSP), SS 316

MN10S6 : Threaded, NPT 1", SS 316

FA10S4 : 1" ANSI/ASME B16.5 150 Lbs Flange, SS 304

FA15S4 : 1 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 304

FA10S6 : 1" ANSI/ASME B16.5 150 Lbs Flange, SS 316

FA15S6 : 1 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 316

FA20S4 : 2" ANSI/ASME B16.5 150 Lbs Flange, SS 304

FA20S6 : 2" ANSI/ASME B16.5 150 Lbs Flange, SS 316

FA25S4 : 2 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 304

FA25S6 : 2 1/2" ANSI/ASME B16.5 150 Lbs Flange, SS 316

F10S4 : 10 mm thick Flange conforming to 1" ANSI/ASME B16.5 Flange, SS 304

F15S4 : 10 mm thick Flange conforming to 1 1/2" ANSI/ASME B16.5 Flange, SS 304

F10S6 : 10 mm thick Flange conforming to 1" ANSI/ASME B16.5 Flange, SS 316

F15S6 : 10 mm thick Flange conforming to 1 1/2" ANSI/ASME B16.5 Flange, SS 316

F20S4 : 10 mm thick Flange conforming to 2" ANSI/ASME B16.5 Flange, SS 304

F20S6 : 10 mm thick Flange conforming to 2" ANSI/ASME B16.5 Flange, SS 316

F25S4 : 10 mm thick Flange conforming to 2 1/2" ANSI/ASME B16.5 Flange, SS 304

F25S6 : 10 mm thick Flange conforming to 2 1/2" ANSI/ASME B16.5 Flange, SS 316

Vibrating Fork (Depends on "Mounting" & "Probe Length")

VF44 : Tines 44 mm, SS 316 (Only with "0.68H", "1.05H", "1.25H10H")

Finish
FB : Fully Buffed
Extension Material (Depends on "Probe Length", Only with "1.25H10H")
ES4 : SS 304
ES6 : SS 316
Operating Temperature
10T : Upto 100°C
15T : Upto 150°C (Only with "CHLR")
Standoff Material (Depends on "Operating Temperature")
STS4 : SS 304
STS6 : SS 316
Probe Length (Depends on "Vibrating Fork")
0.68H : 68 mm
1.05H : 105 mm
1.25H10H : 125 to 1000 mm

Example - ELIXIR-I-SCUTE-PCPG13-ASi-3-DC6-MB10S6-VF44-FB-ES6-15T-STS6-1.3H