Dosing System MANUAL

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Table of Contents

1. Specifications

Specification	Details
Component description	Microcontroller-controlled and menu-driven controller that operates the sensor and displays measured values.
Operating temperature	0 to 60 ºC (32 to 140 ºF); 95% relative humidity, non-condensing with sensor load <7 W; 0 to 60 ºC (32 to104 ºF) with sensor load <28 W
Storage temperature	-20 to 70 ºC (-4 to 158 ºF); 95% relative humidity, non-condensing
Enclosure[1]	IP-54 protected enclosure
Power requirements	**AC powered controller:** 100-240 VAC ±10%, 50/60 Hz
	24 VDC powered controller: 24 VDC—15%, + 20%
Altitude requirements	Standard 2000 m (6562 ft.) ASL (Above Sea Level)
Pollution degree/Installation category	Pollution Degree 2; Installation Category II
Relays	Two SPDT, user-configured contacts, rated 250 VAC, 5 Amp resistive maximum for the AC powered controller and 24 VDC, 5A resistive maximum for the DC powered controller. Relays are designed for connection to AC Mains circuits (i.e., whenever the controller is operated with 115 - 240 VAC power) or DC circuits (i.e., whenever the controller is operated with 24 VDC power).
Dimensions	170x67x125 (LxBxH) in mm
Weight	600 gm (1.32lb)
Digital communication	Optional Modbus, RS485
Accuracy	±0.1%Full scale
Repeatability	±0.1%Full scale
Linearity	±0.05%Full scale
Response Time	T90<1s
Power consumption	1.5 mA@ 3.3V DC
Display	LED Display
Storage	4 GB (Optional)
Dosing Pump Specification	
Supply Voltage	230V AC 50/60Hz
Current consumption	0.08A
Max. pressure	4 Bar
Max. pumping capacity	6.0 Lph
Ip Rating	IP 65

Specifications are subject to change without notice.

2. General Information

The manufacturer disclaims any responsibility for direct, indirect, special, incidental, or consequential damages arising from any defects or omissions in this manual. The manufacturer retains the right to modify this manual and the products it references at its discretion and without prior notification or obligation.

Safety information

NOTICE
The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements.
Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

Use of Hazard information

⚠ DANGER
Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING
Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION
Indicates a potentially hazardous situation that may result in minor or moderate injury.

NOTICE
Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

Precautionary Labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	This symbol indicates that a risk of electrical shock and/or electrocution exists.
	This symbol indicates the presence of devices sensitive to Electro-static Discharge (ESD) and indicates that care must be taken to prevent damage with the equipment.
	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive2002/96/EC), European electrical equipment users must now return old or end-of-life equipment to the Producer for disposal at no charge to the user.

Operation is subject to the following conditions:

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Warning Guidelines

1. *Avoid touching the terminals while the equipment is operational, and ensure the power supply is switched off during the wiring process.*
2. *To prevent electromagnetic interference, use wires with appropriate ratings.*
3. *Utilize wires with a cross-section of at least 1mm and adequate insulation for a minimum of 1.5 kV.*
4. *Always employ a standard power supply cable for the instrument to minimize the impact of noise.*
5. *When extending thermocouple lead wires, use thermocouple compensation wires. For RTD types, select wiring materials with minimal lead resistance (maximum 5 ohms per line) and ensure there are no resistance variations among the three wires.*

Mechanical Installation Guidelines

1. *Create a precise cut-out on the panel following the provided dimensions.*
2. *Securely install the equipment within the panel using an appropriate clamp.*
3. *Utilize an M3.5 Screw crimp terminal of specified size to connect the terminal block, and employ a torque instrument within the 1.2N.m range to tighten the screw.*
4. *Ensure that the equipment maintains a safe distance from any heat sources, surfaces, or potentially hazardous vapors.*
5. *Avoid making connections to unused terminals.*

Maintenance

1. *Regularly clean the equipment.*
2. *Operators should refrain from replacing the fusible resistor.*
3. *When cleaning, use a clean, soft cloth and avoid the use of acetone or any other cleaning agents.*

3. Product Overview

Description:

The Smart Controller Series transmitters are versatile single and multi-channel devices designed for the precise measurement and control of various parameters such as pH, ORP, conductivity, turbidity, and chlorine in safe area applications. These applications span a wide range of industries, including chemical, pharmaceutical, pulp & paper, mining, and water treatment plants.

What sets the Smart Controller apart is its adaptable design, allowing it to work seamlessly with any of the available sensor and communication modules. This flexibility makes it a reliable and durable choice even in the most demanding process conditions.

Encased in a sturdy IP54 enclosure, the Smart Controller can be effortlessly mounted on walls, pipes, or panels. Its hinged door, equipped with anti-tamper indication, provides unhindered access to the communication and sensor modules, streamlining the commissioning and maintenance processes.

(Figure: 01)

Advantages:

- Transmitter Overview:
  This transmitter is specifically designed for safe area applications.
  It is a low-power, high-performance device.

- Plug-and-Play Sensors:
  The plug-and-play sensor functionality minimizes the need for extensive stockholding.
  This ensures maximum operational uptime and flexibility.

- Security Access:
  Robust security access mechanisms are in place to prevent unauthorized modifications.
  These measures safeguard the transmitter's configuration and calibration settings.

- One-Button Sensor Calibration:
  The transmitter simplifies routine maintenance with a convenient one-button sensor calibration feature.
  This not only saves time but also reduces the expenses associated with maintenance.

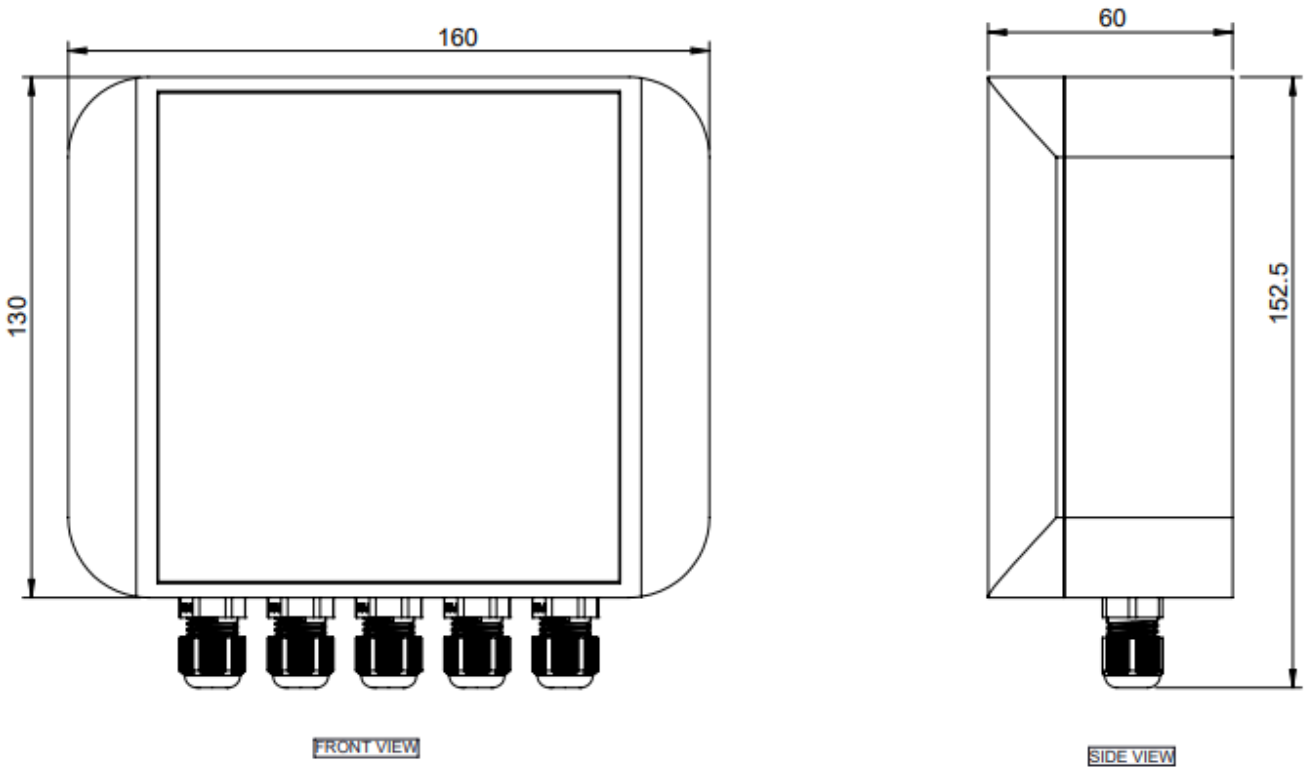
- Hazardous Area Installation:
  The transmitter is intrinsically safe and designed to be non-incendive.
  This makes it suitable for installation in hazardous areas.

- Storage Options:
  As an added feature, the transmitter is available with an SD card slot.
  It can support storage of up to 4 GB, providing data storage capabilities.

Product image:-

Indicator Panel:-

Dimensions:



(Figure: 02)

Dimensions:	Length	160 mm (6.29 inch)
	Width	130 mm (5.11 inch)
	Height	60 mm (2.36 inch)

4. Installation

Shipping

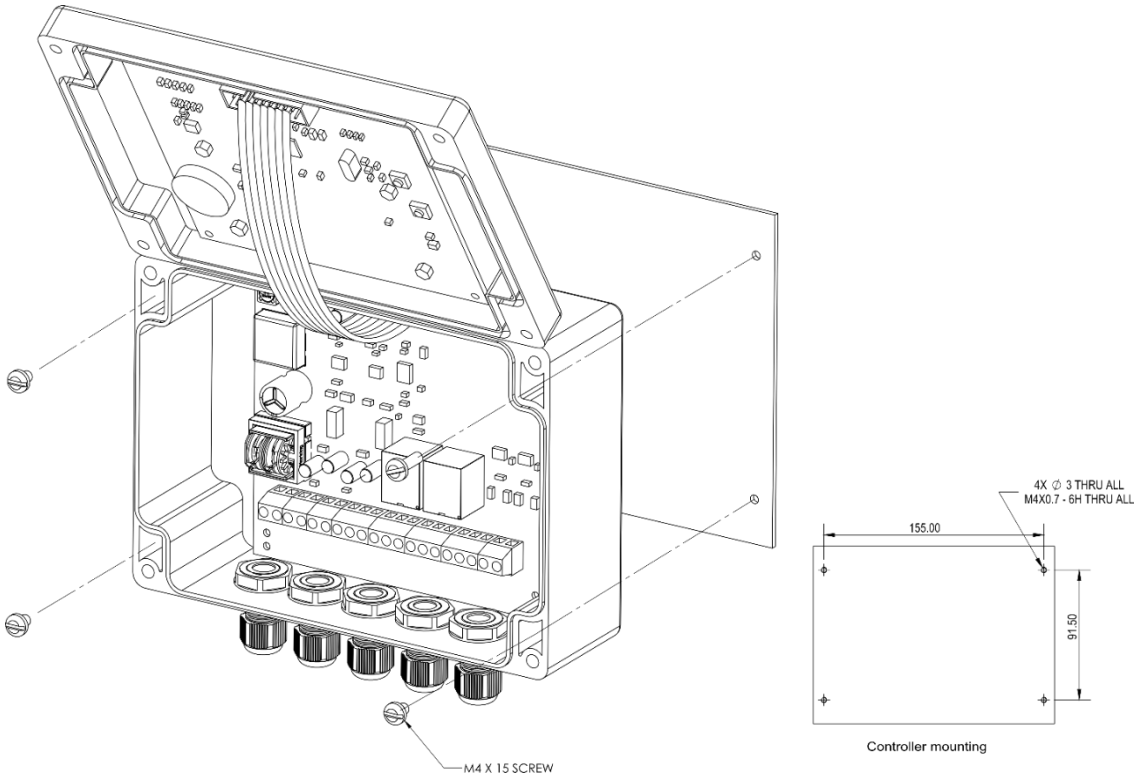
This water quality Analyzer is shipped in a double-wall, corrugated carton suitable for protecting the analyzer from damage during normal shipping and handling. We recommend retaining this carton to provide optimum protection for return shipping if needed.

Unpacking

When unpacking the analyzer, inspect the equipment for any damage that may have occurred in the shipping process.

Mounting

The analyzer should be mounted securely to an indoor wall using appropriate fasteners.



(Figure: 03)

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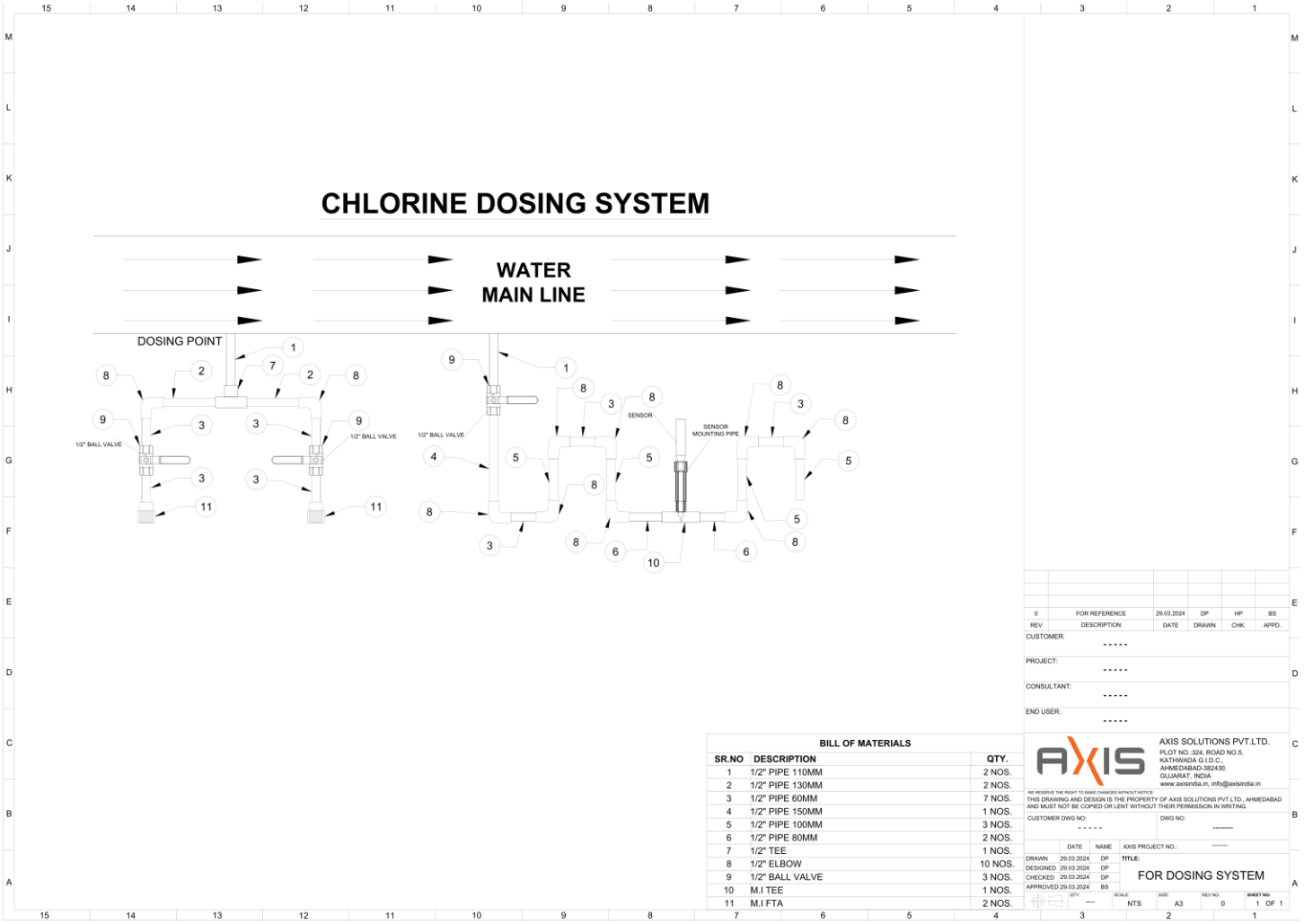
Dosing system tubing:-



BILL OF MATERIALS

SR.NO	DESCRIPTION	QTY.
1	1/2" PIPE 110MM	2 NOS.
2	1/2" PIPE 130MM	2 NOS.
3	1/2" PIPE 60MM	7 NOS.
4	1/2" PIPE 150MM	1 NOS.
5	1/2" PIPE 100MM	3 NOS.
6	1/2" PIPE 80MM	2 NOS.
7	1/2" TEE	1 NOS.
8	1/2" ELBOW	10 NOS.
9	1/2" BALL VALVE	3 NOS.
10	M.I TEE	1 NOS.
11	M.I FTA	2 NOS.

REV	DESCRIPTION	DATE	DRAWN	CHK.	APPD.
0	FOR REFERENCE	29.03.2024	DP	HP	BS

CUSTOMER: -----
PROJECT: -----
CONSULTANT: -----
END USER: -----

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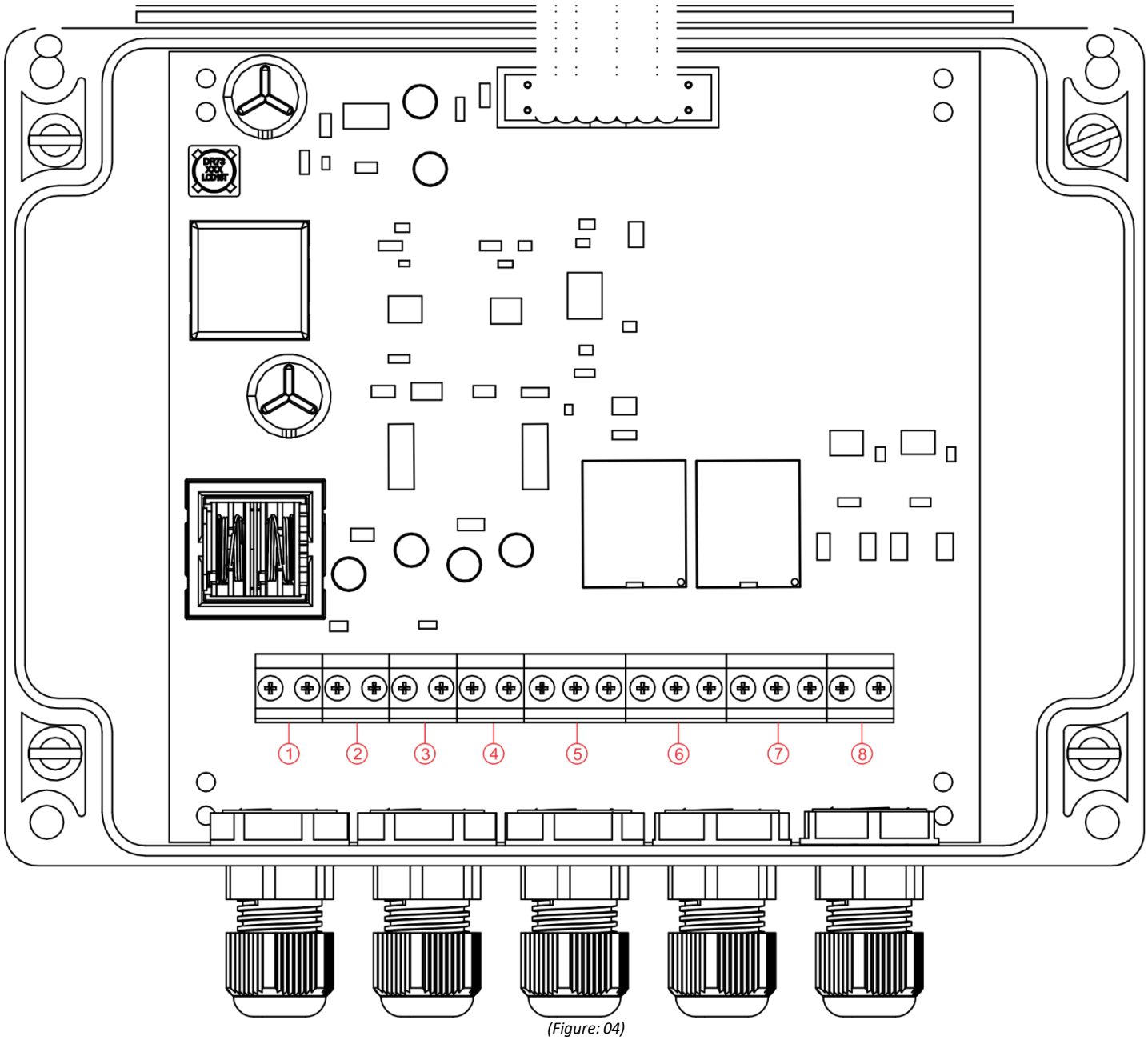
CUSTOMER DWG NO: - - - - -
DWG NO: --------

	DATE	NAME
DRAWN	29.03.2024	DP
DESIGNED	29.03.2024	DP
CHECKED	29.03.2024	DP
APPROVED	29.03.2024	BS

AXIS PROJECT NO.: --------
TITLE: FOR DOSING SYSTEM
QTY: ----
SCALE: NTS
SIZE: A3
REV NO.: 0
SHEET NO: 1 OF 1

5. Wiring Overview



(Figure: 04)

Table 1 wiring overview (Number with connection)

1 AC and DC power connector	**5** Relay connections
2 4-20 mA output (ORP)	**6** Communication module connector (e.g., Modbus)
3 4-20 mA output (Pump-1)	**7** Digital sensor connectors
4 4-20 mA output (Pump-2)	**8** Digital sensor connectors (Power Supply)

⚠ WARNING

Potential Electrocution Hazard. Always disconnect power to the instrument when making electrical connections.

⚠ WARNING

Potential Electrocution Hazard. If this equipment is used outdoors or in potentially wet locations, a **Ground Fault Interrupt** device must be used for connecting the equipment to its mains power source.

DANGER

Electrocution Hazard. Do not connect AC power to a 24 VDC powered model.

⚠ WARNING

Potential Electrocution Hazard. A protective earth (PE) ground connection is required for both 100-240 VAC and 24 VDC wiring applications. Failure to connect a good PE ground connection can result in shock hazards and poor performance due to electromagnetic interferences. ALWAYS connect a good PE ground to the controller terminal.

NOTICE

Install the device in a location and position that gives easy access to the disconnect device and its operation.

The controller can be purchased as either a 240 VAC powered model or a 24 VDC powered model. Follow the appropriate wiring instructions for the purchased model.

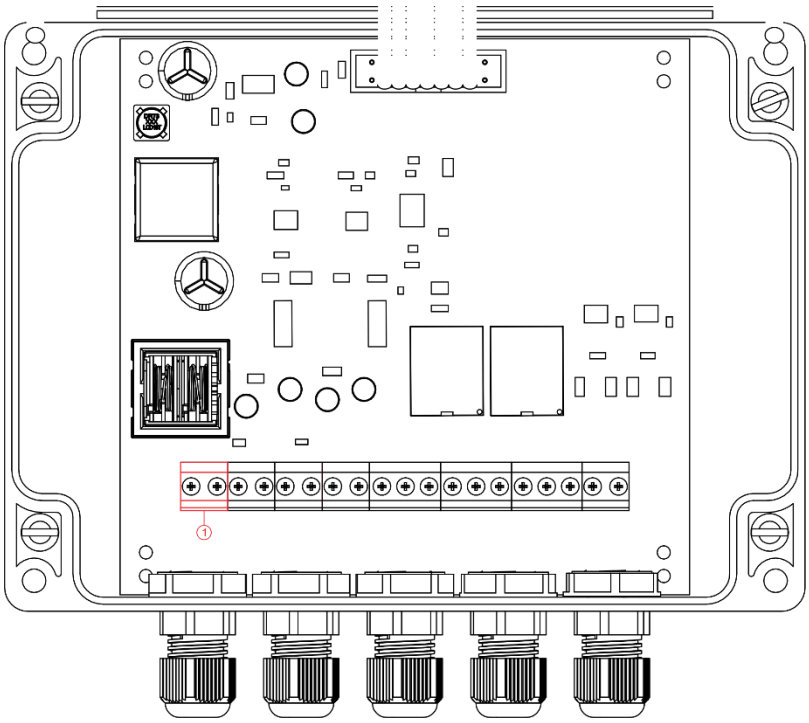
The controller can be wired for line power by hard-wiring in conduit or wiring to a power cord. Regardless of the wire used, the connections are made at the same terminals. A local disconnect designed to meet local electrical code is required and must be identified for all types of installation. In hard-wired applications, the power and safety ground service drops for the instrument must be 18 to 12 AWG.

Notes:

- Connector 1- Provided to give input power supply.
- Connector 2&3&4- Provides three isolated 4-20mA outputs
- Connector 5- Provides configurable potential free relay contact for customer use.
- Connector 6- Provides the RS485 Digital output from controller
- Connector7&8- Provides for connections of sensor

Wiring for Power Supply

Refer to the illustrated steps that follow and Table 2 or Table 3 to wire the controller for power. Insert each wire into the appropriate terminal until the insulation is seated against the connector with no bare wire exposed. Tug gently after insertion to make sure that there is a secure connection. Seal any unused openings in the controller box with conduit opening sealing plugs.



(Figure: 05)

Table 2 AC power wiring information (AC powered models only)

Terminal	Description	Color
1	Hot (L1)	Red
2	Neutral (N)	Black

Table 3 DC power wiring information (DC powered models only)

Terminal	Description	Color
1	+24 VDC	Red
2	Ground	Black

⚠ WARNING
 Potential Electrocution Hazard. Always disconnect power to the instrument when making electrical connections.

⚠ WARNING
 Potential fire hazard. Do not daisy-chain the common relay connections or jumper wire from the mains power connection inside the instrument?

⚠ WARNING
 Potential electrocution hazard. In order to maintain the IP environmental ratings of the enclosure, use only conduit fittings and cable glands rated for at least IP54 to route cables in to the instrument.

AC line (100—250 V) powered controllers

The wiring compartment is not designed for voltage connections in excess of 250 VAC.

⚠ WARNING
 Potential Electrocution Hazard. Always disconnect power to the instrument when making electrical connections.

WARNING
 Potential electrocution hazard. AC mains powered controllers (115 V–230 V) are designed for relay connections to AC mains circuits (i.e., voltages greater than 16 V-RMS, 22.6 V-PEAK or 35 VDC).

24 VDC powered controllers

The wiring compartment is not designed for voltage connections in excess of 24 VDC.

⚠ WARNING
 Potential Electrocution Hazard. Always disconnect power to the instrument when making electrical connections.

WARNING
 Potential electrocution hazard. 24 V powered controllers are designed for relay connections to low voltage circuits (i.e., voltages less than 16 V-RMS, 22.6 V-PEAK or 35 VDC).

Relays

The controller is equipped with two unpowered, single pole relays rated 100-250 VAC, 50/60 Hz, 5-amp resistive maximum. Contacts are rated 250 VAC, 5-amp resistive maximum for the AC powered controller and 24 VDC, 5A resistive maximum for the DC powered controller. The relays are not rated for inductive loads.

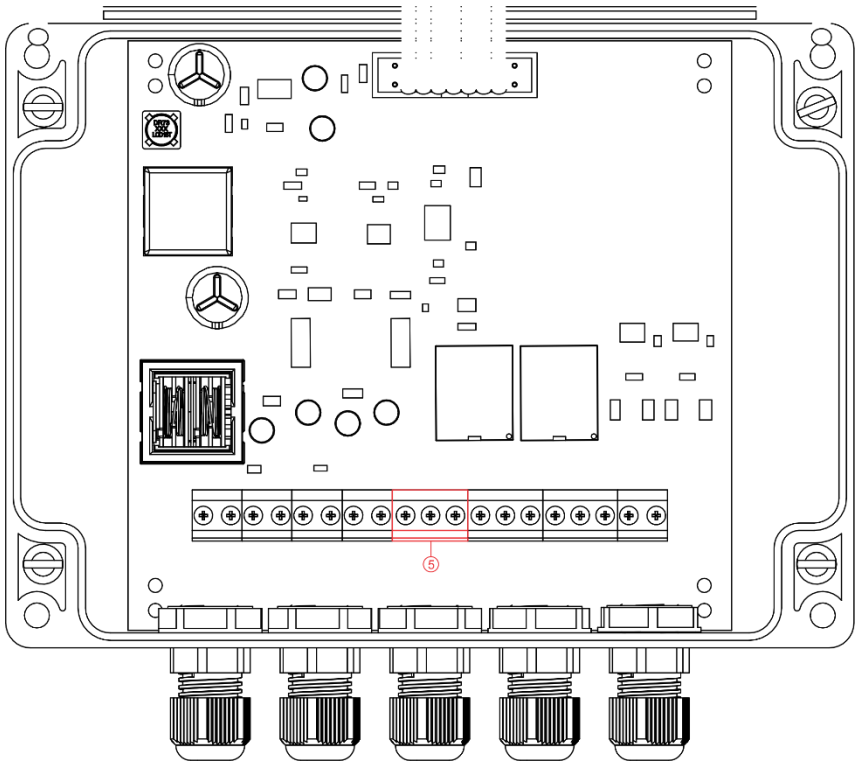
Most relay connections use either the NO and COM terminals or the NC and COM terminals.

⚠ WARNING
Potential Electrocution Hazard. Always disconnect power to the instrument when making electrical connections.

WARNING
Potential electrocution hazard. AC mains powered controllers (115 V–230 V) are designed for relay connections to AC mains circuits (i.e., voltages greater than 16 V-RMS, 22.6 V-PEAK or 35 VDC).

WARNING
Potential electrocution hazard. 24 V powered controllers are designed for relay connections to low voltage circuits (i.e., voltages less than 16 V-RMS, 22.6 V-PEAK or 35 VDC).

⚠WARNING
Potential fire hazard. Do not daisy-chain the common relay connections or jumper wire from the mains power connection inside the Instrument.



(Figure: 06)

First pin of Relay- 1 (indicated as 5 in figure) is Normally Open, second pin is Common and Third pin is Normally Connected.

Output Connections

Three isolated 4-20 mA outputs (2 and 3) are provided (below figure). Such outputs are commonly used for analog signaling or to control other external devices.

Make wiring connections to the controller as shown table.

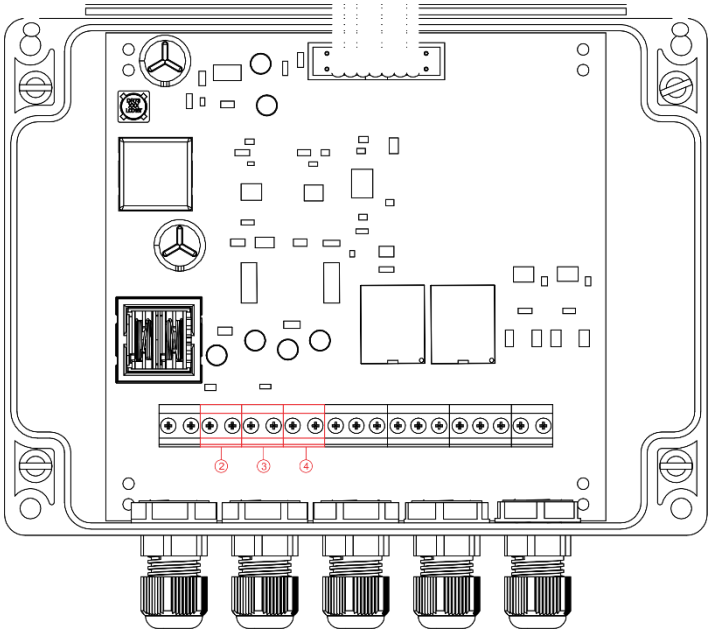
1. Open the controller cover.
2. Feed the wires through the strain relief.
3. Adjust the wire as necessary and tighten the strain relief.
4. Make connections with twisted-pair shielded wire and connect the shield at the controlled component end or at the control loop end.
   - Do not connect the shield at both ends of the cable.
   - Use of non-shielded cable may result in radio frequency emission or susceptibility levels higher than allowed. Maximum loop resistance is 500 ohms.
5. Close the controller cover and tighten the cover screws.
6. Configure outputs in the controller.

⚠ WARNING

Potential Electrocution Hazard. Always disconnect power to the instrument when making electrical connections.

⚠ WARNING

Potential electrocution hazard. In order to maintain the IP environmental ratings of the enclosure, use only conduit fittings and cable glands rated for at least IP54 to route cables in to the instrument.

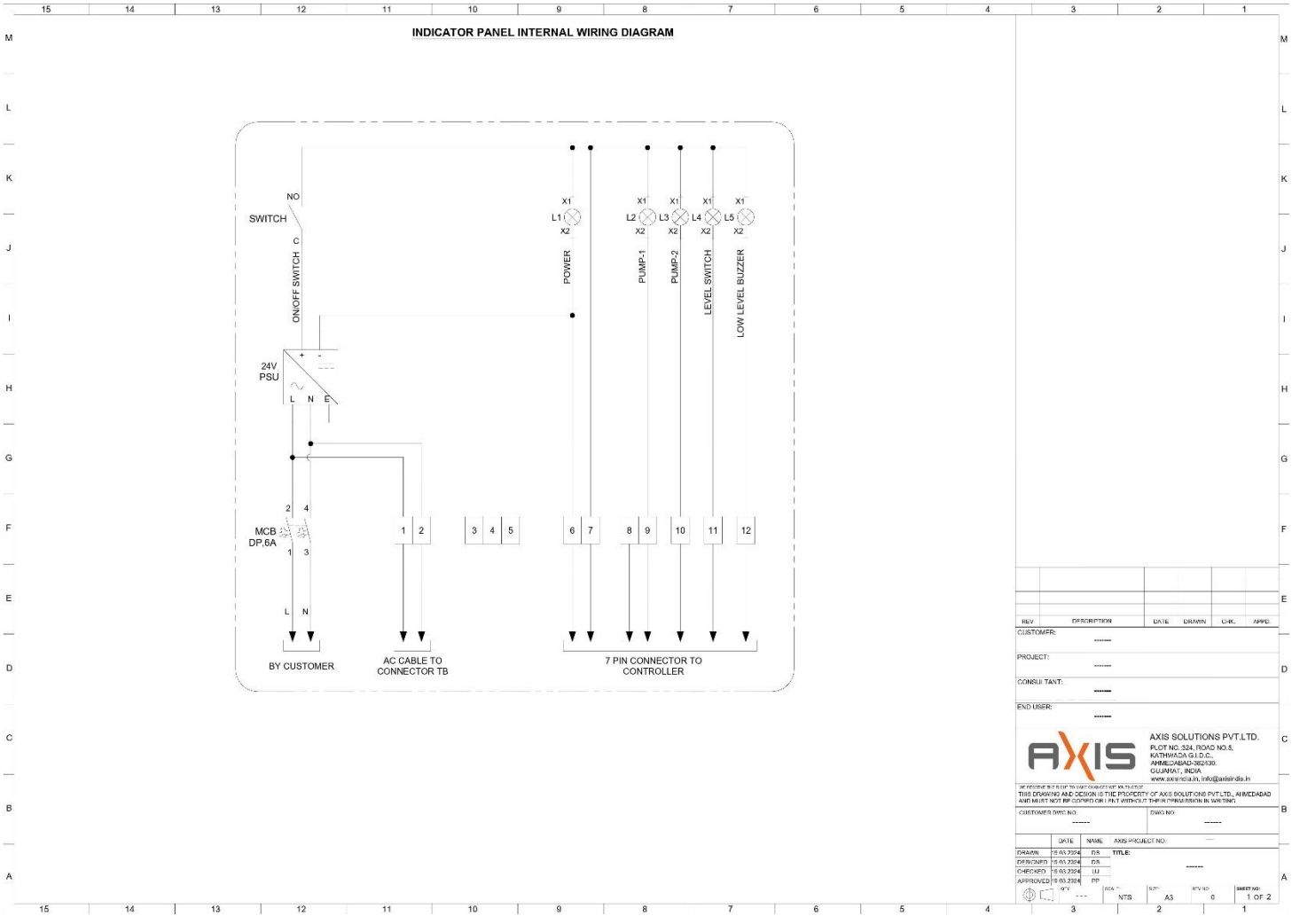


(Figure: 07)

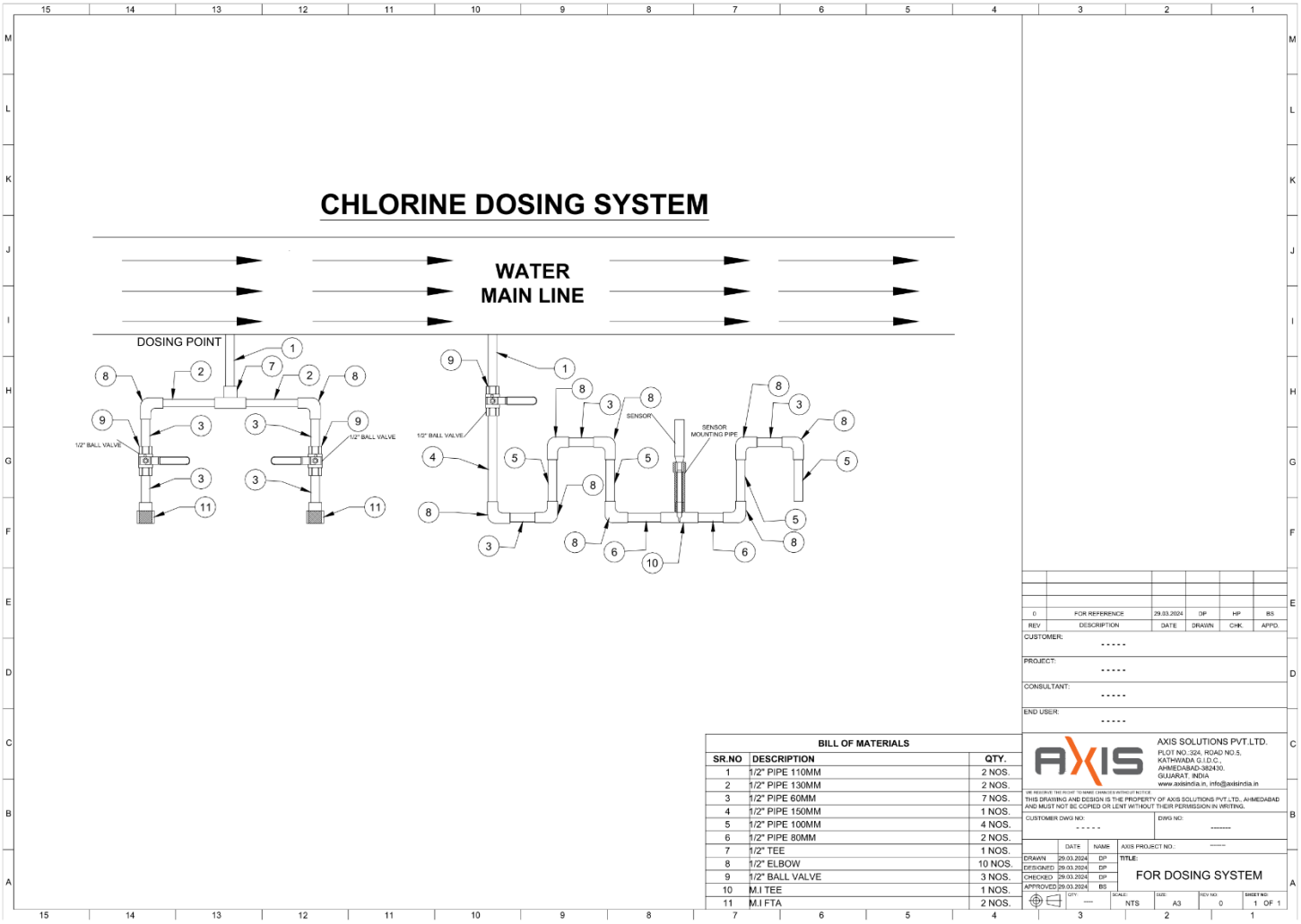
Table 4 Output connections

Recorder wires	Circuit board position
Output 3+	Pin 2 of connector 3
Output 3-	Pin 1 of connector 3
Output 2+	Pin 2 of connector 3
Output 2–	Pin 1 of connector 3
Output 1+	Pin 2 of connector 2
Output 1–	Pin 1 of connector 2

Indicator Panel Internal Wiring diagram



Controller side Wiring diagram



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5	1/2" PIPE 100MM	4 NOS.
6	1/2" PIPE 80MM	2 NOS.
7	1/2" TEE	1 NOS.
8	1/2" ELBOW	10 NOS.
9	1/2" BALL VALVE	3 NOS.
10	M.I TEE	1 NOS.
11	M.I FTA	2 NOS.

REV	DESCRIPTION	DATE	DRAWN	CHK.	APPD.
0	FOR REFERENCE	29.03.2024	DP	HP	BS

CUSTOMER: - - - - -
PROJECT: - - - - -
CONSULTANT: - - - - -
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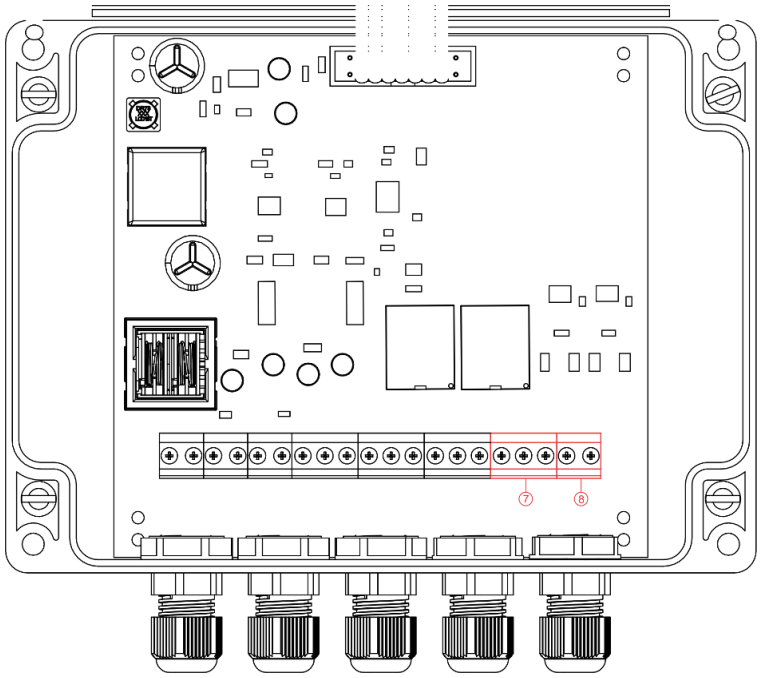
	DATE	NAME
DRAWN	29.03.2024	DP
DESIGNED	29.03.2024	DP
CHECKED	29.03.2024	DP
APPROVED	29.03.2024	BS

TITLE: FOR DOSING SYSTEM

QTY: ---
SCALE: NTS
SIZE: A3
REV NO: 0
SHEET NO: 1 OF 1

Connect a Digital Sensor



(Figure: 08)

Note: ***To connect an analog sensor, refer to the instructions supplied in the module or sensor manual.***

Pin1 of connector 7 provided for ground.

Pin 2 of connector 7 provided for RS485 (+) of sensor.

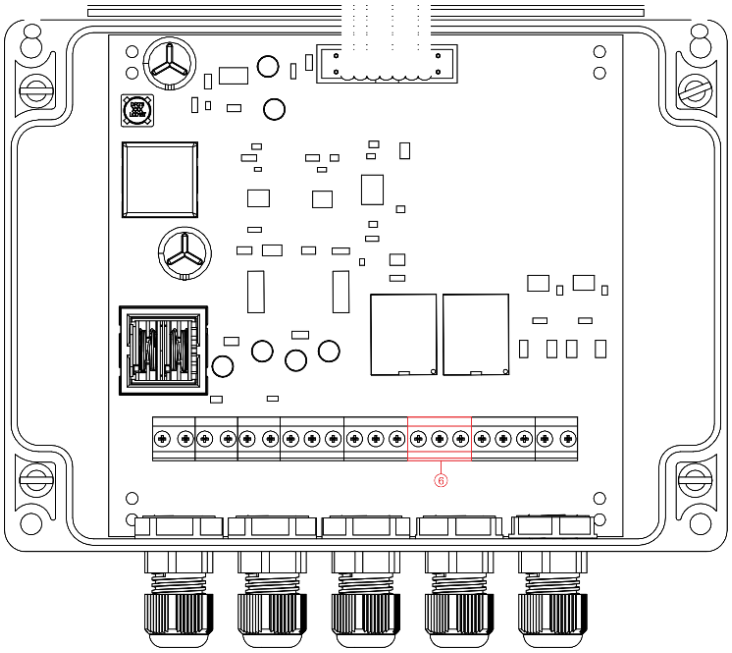
Pin 3 of connector 7 provided for RS485 (-) of sensor.

1. Open the controller cover.
2. Feed the wires through the strain relief.
3. Adjust the wire as necessary and tighten the strain relief.
4. Make connections with sensor.

Errors can be occurring with the connection of sensor.

1. The screen becomes red and the membrane's error LED begins to blink when the sensor is not connected to the power card. When both sensor wires are properly connected, the screen turns blue.
2. When a sensor is removed the membrane LED does not start to blink but the screen for that sensor becomes red.

Connect the Optional Digital Communication Output



(Figure: 09)

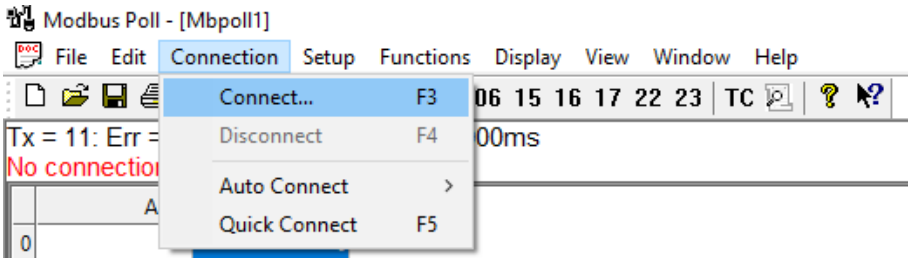
The controller provided Modbus RS485 communication protocols.

Note: *To connect an analog sensor, refer to the instructions supplied in the module or sensor manual.*

1. Open the controller cover.
2. Feed the wires through the strain relief.
3. Adjust the wire as necessary and tighten the strain relief.
4. Make connections with Modbus RS485.

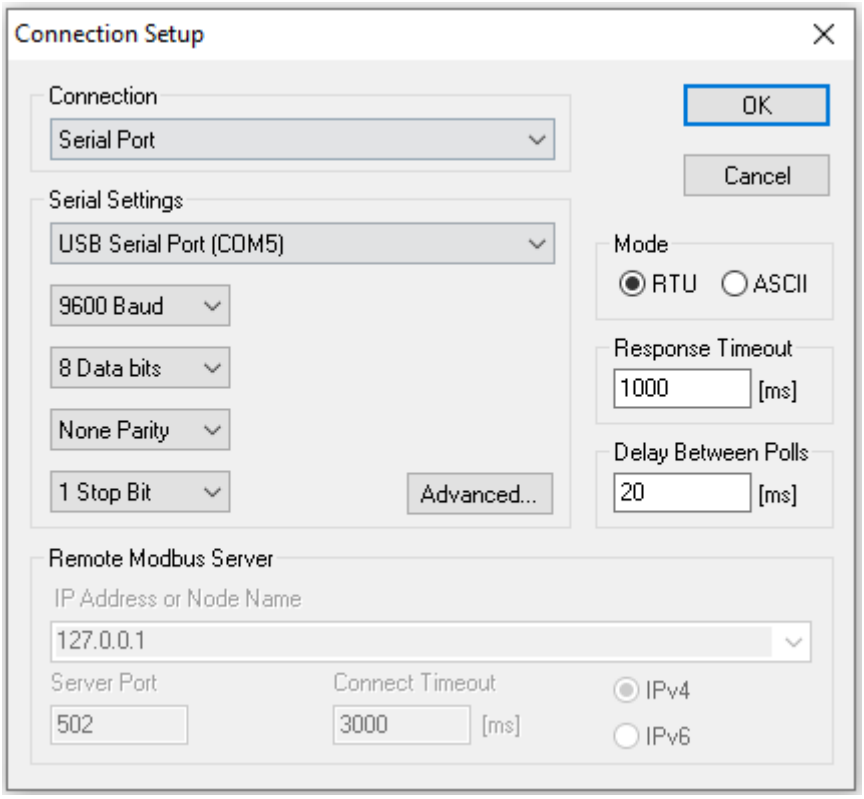
Connection with MODBUS POLL:

- Select connection as shown in figure.



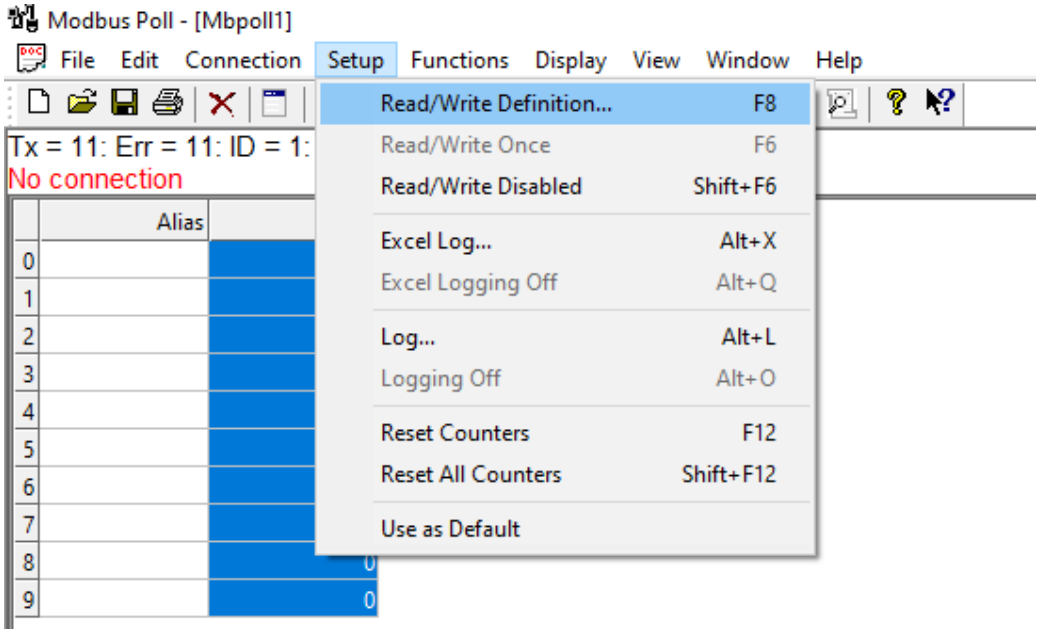
(Figure: 10)

- Check the parameters on this screen as shown in figure.



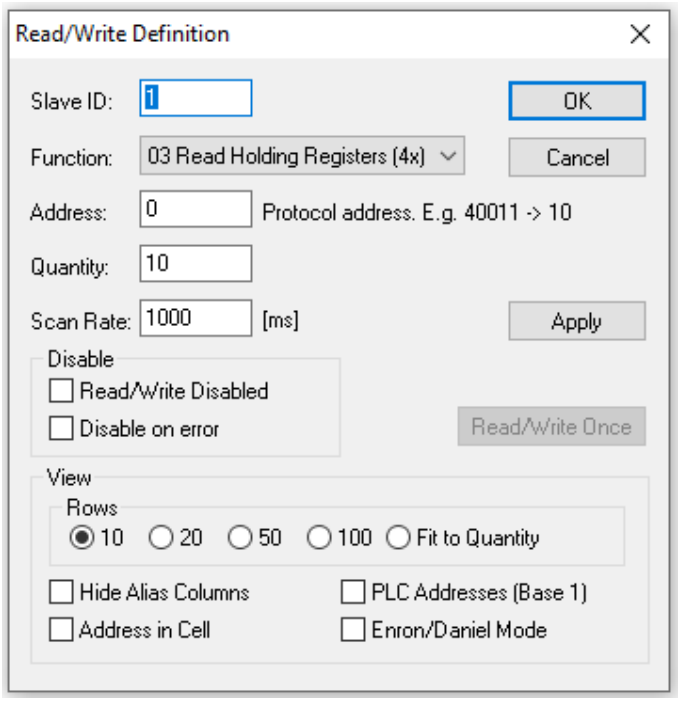
(Figure: 11)

- Select Read/Write Definition as shown in figure.



(Figure: 12)

- Check the parameters on this screen as shown in figure.

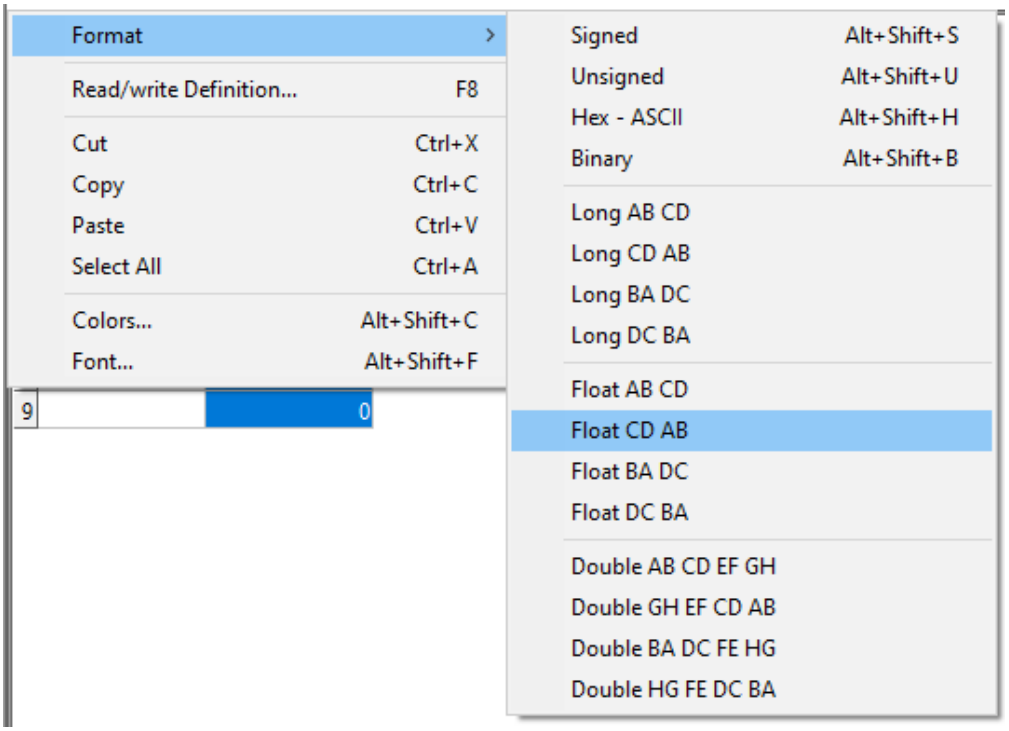


(Figure: 13)

- Select all the cell of column 2 and right click on that, then select format to change into **Float CD AB.**

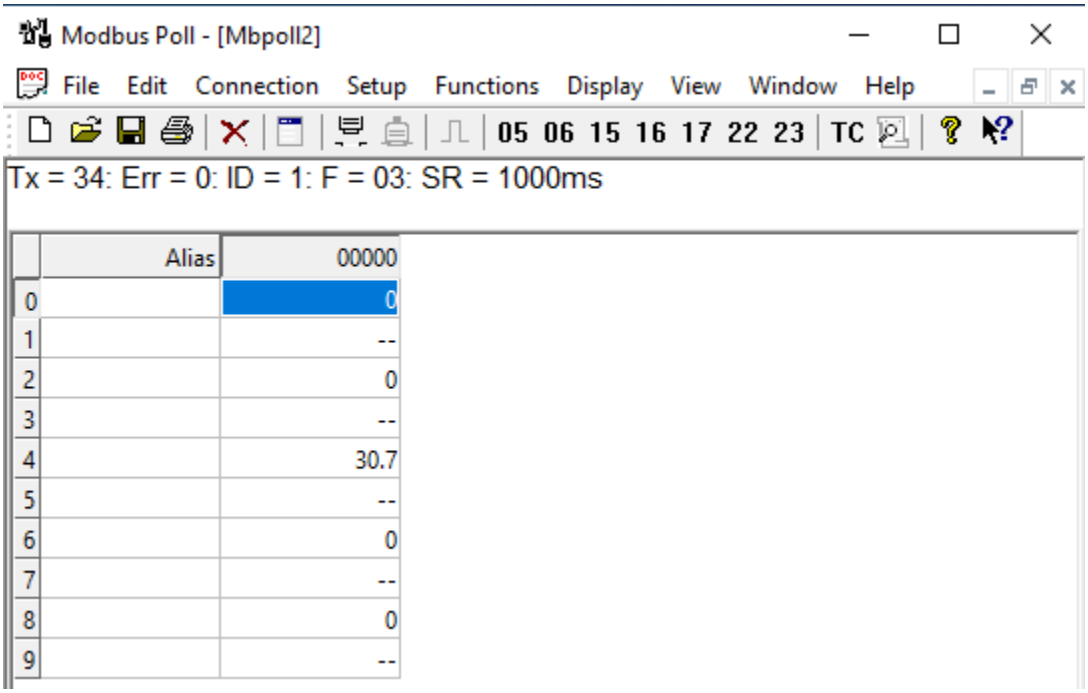
	Alias	00000
0		0
1		0
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

(Figure: 14)



(Figure: 15)

- Example of ORP and dosing pump.



(Figure: 16)

Resistor 40000: Indicates value of ORP mV
Resistor 40002: Indicates Pump-1 status
Resistor 40004: Indicates Pump-2 status
Resistor 40006: Indicates Pump-1 speed
Resistor 40008: Indicates Pump-2 speed
Resistor 40010: Indicates level switch-1 status
Resistor 40012: Indicates level switch-2 status

6. User Interface and Navigation

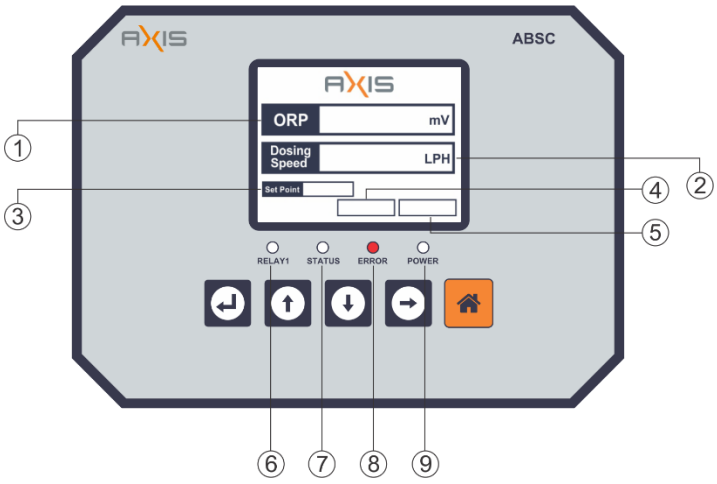
The Analyzer is configured using the five push buttons.

Table 5 Buttons and functions

Button	Action
	Enter. Select the menu
	Scroll up, Increment Numbers
	Scroll down, Decrement Numbers
	Shift. Scroll through different fields
	Home. Return to Home Screen and Abort

Display

Figure shows an example of the main measurement screen with ORP sensor connected to the controller. The front panel display screen shows sensor measurement data, errors, dosing speed, time, date, relay status indicator, status of sensor data, error indicator and power supply indicator.



(Figure: 17)

Table 6 Display Layout

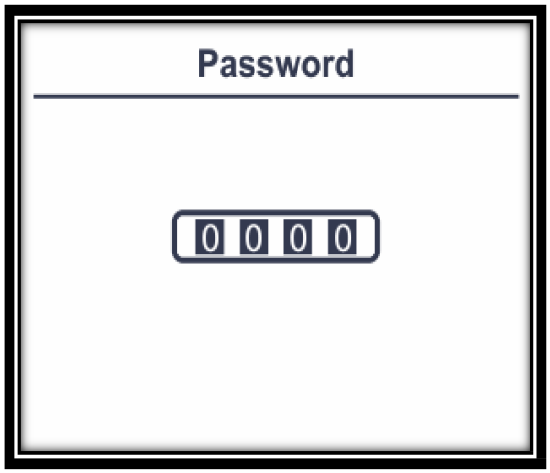
1 Measurement value and unit.	**6** Relay status indicator
2 Measurement value and unit.	**7** Status of sensor data
3 Set Point	**8** Error indicator
4 Time	**9** Power supply indicator
5 Date	

7. Configuration menu access.

The unit is configured through the MENU page which is password protected. From the Home Screen, press the button to access the PASSWORD page.

Use the and buttons to select the desired digit at each location and press button to select the next digit. If a digit is entered incorrectly press to return to the Home Screen.

The factory set password to access the configuration menu is '9558'.



(Figure: 18)

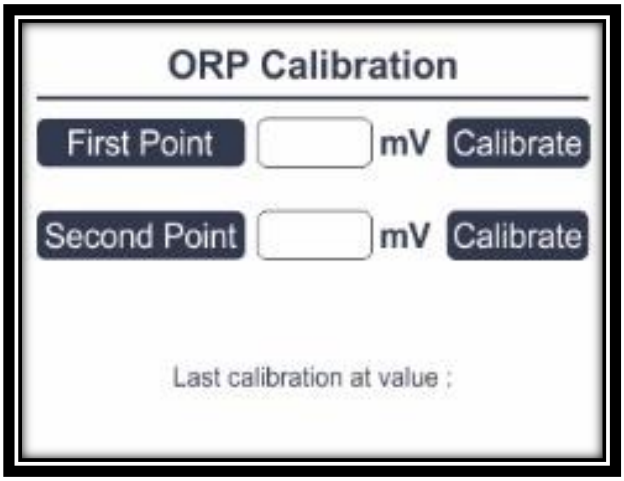
8. Configuration Menu

There are 9 sub-menus to the Configuration menu:

1. **ORP Calibration**
2. **ORP set point calibration**
3. **Pump cycle configuration**
4. **Relay Configuration**
5. **4-20mA Configuration**
6. **Communictaion Configuration**
7. **Time & Date**
8. **Self-diagnosis**
9. **Error code**

1. ORP Calibration

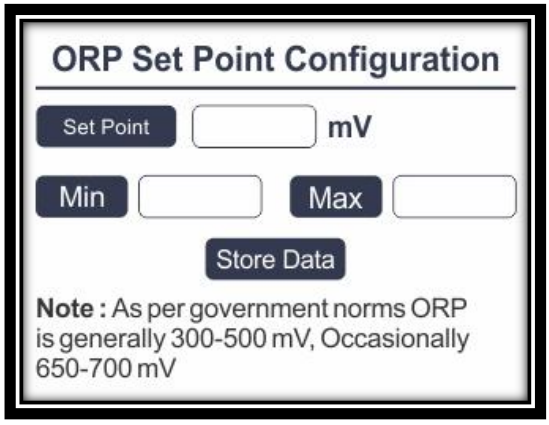
- Use the 'Shift' key to scroll across tabs
- Use the Arrow keys to increase or decrease the values.
- The sensor has to be dipped in the standard solution and calibration process should be done.
- The first point here is defined as the lowest point of the liquid and second point is defined as the highest point of the liquid.
- The calibration process has to be according to the order shown in the page (for ex- The first point has to be calibrated first and then second point has to be calibrated).



(Figure: 19)

2. ORP set point configuration

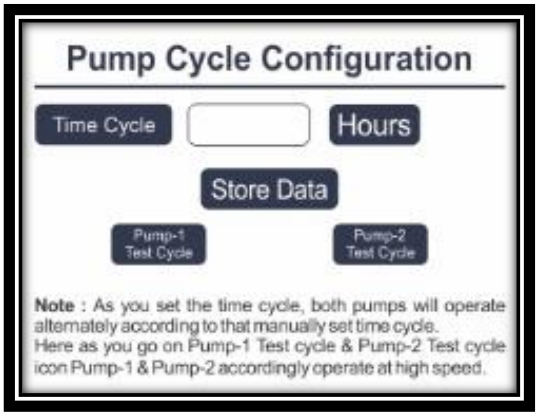
Here in this page ORP's value can be set according to need. If the value of ORP is less than the set value then, the dosing will start and will try to meet the value set value.



(Figure: 20)

3. Pump Cycle Configuration

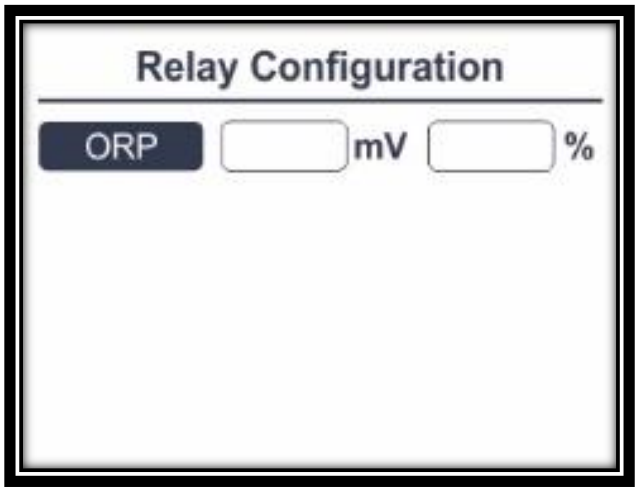
In this page the time cycle for pump can be set. If time cycle is to 1 hour the pump-1 will be working for 1 hour and then there will be change over will happen and pump-2 starts.



(Figure: 21)

4. Relay Configuration

Set the Value for which you want to turn the relay ON with the help of the Arrow key. Set bandwidth percentage for relay operation. If you have to set the value of ORP, the relay will turn ON when the value of ORP increases beyond the set limit. It will remain ON till the value goes down to the set value – bandwidth value.

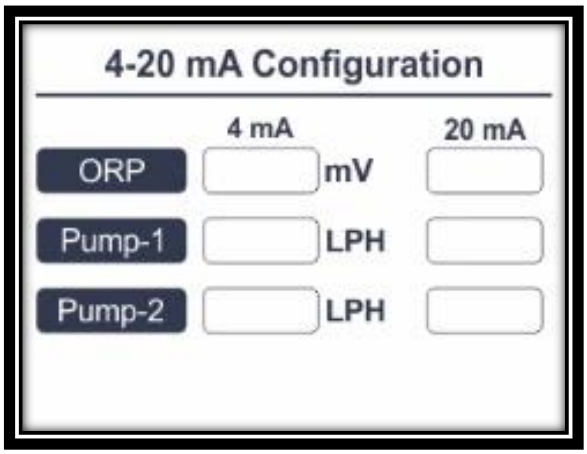


(Figure: 22)

5. 4-20 mA Configuration

You can set the value of parameters corresponding to 4 mA and 20 mA output. Use the Arrow keys for changing the values and the 'Shift' key to navigate.

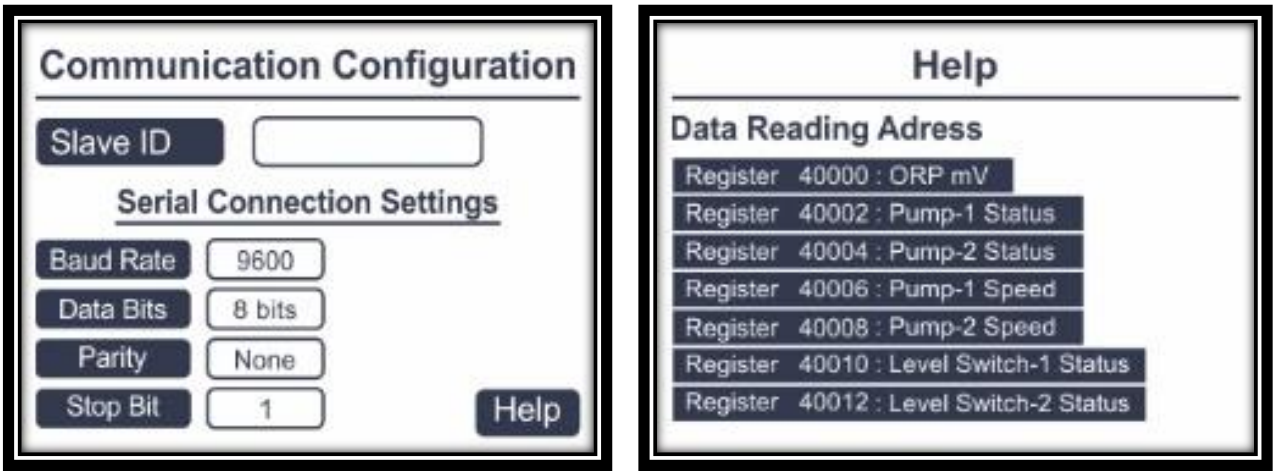
- The speed of pump will determine the value of 4-20mA



(Figure: 23)

6. Communication Configuration

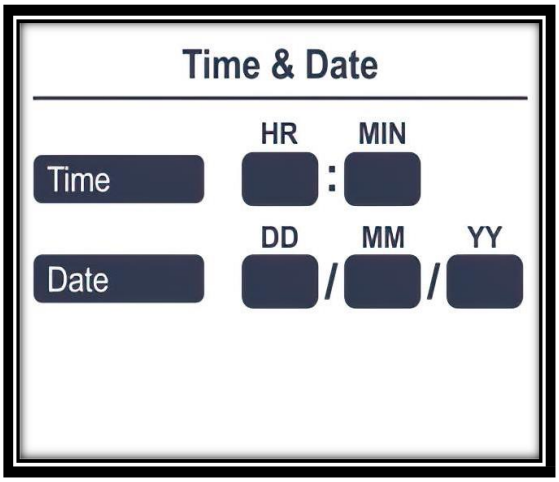
By visiting the help page the register address of different parameters can be known



(Figure: 24)

7. Time and Date

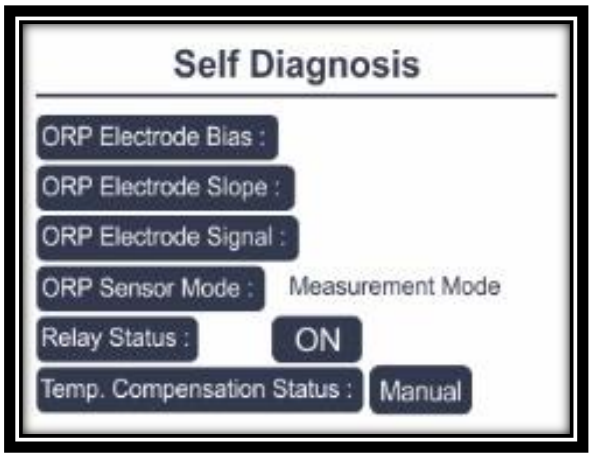
The analyzer has Real Time Clock which will maintain the time when Analyzer is turned ON. To set it manually, go to the Time and Date menu. Use the Arrow key to increase or decrease the values in the Date and Time fields.



(Figure: 25)

8. Self-diagnosis

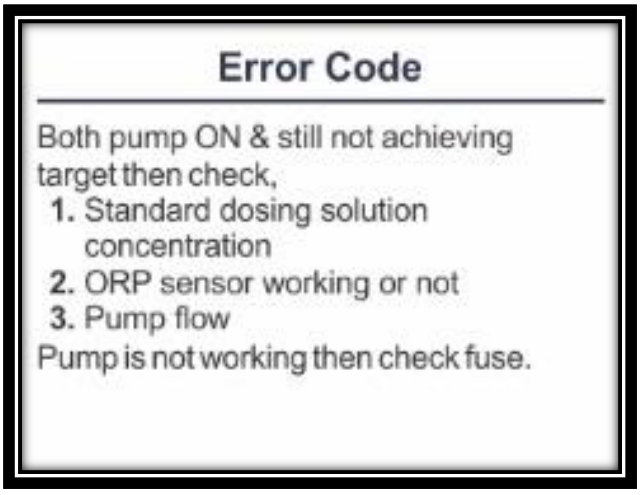
The analyzer has a self-diagnosis feature in which analyzer will perform self-diagnosis of full system and provide present condition information of the analyzer.



(Figure: 26)

9. Error Page

This page shows the meaning of error code that appears on the controller.



(Figure: 27)

9. Maintenance

1. *Regularly clean the equipment.*
2. *Operators should refrain from replacing the fusible resistor.*
3. *When cleaning, use a clean, soft cloth and avoid the use of acetone or any other cleaning agents.*

DANGER	
	Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

Cleaning the controller

DANGER	
	Always remove power from the controller before performing maintenance activities.

Note: *Never use flammable or corrosive solvents to clean any part of the controller. Use of these solvents may degrade the environmental protection of the unit and may void the warranty.*

1. Make sure the controller cover is securely closed.
2. Wipe the controller exterior with a cloth dampened with water, or with mixture of water and mild detergent

Fuse Replacement

Fuses are not user-serviceable items. The need for fuse replacement in controllers indicates severe technical failure and is therefore considered to be a service activity. If a blown fuse is suspected, contact Technical Support.

Note: Fuses are provided only with 230VAC / 50-60 Hz.

Battery Replacement

The lithium-ion backup battery (for RTC) is not user replaceable. Contact technical support for replacement.

10. Sticker Details

(Figure: 26)

Table 7 Sticker Details

1 Part No.	Product Part Number
2 Serial No.	Controller serial number
3 Input Supply	12V DC / 230V AC (any one from both)
4 Output	4-20 mA, RS 485
5 Product Serial No.	Product serial number with cabinet

11. Troubleshooting

Problem	Resolution
No current output	Verify current output configuration.
	Test current output signal using the Test/Maintenance sub menu. Input a current value and verify the output signal at the controller connections.
	Contact Technical Support.
Incorrect current output	Verify current output configuration.
	Test current output signal using the Test/Maintenance sub menu. Input a current value and verify the output signal at the controller connections. If the output is incorrect, perform an output calibration.
No relay activation	Make sure relay connections are secure.
	If using an external power source, make sure the relay wiring is correct.
	Make sure the relay configuration is correct.
	Test the relay activation through the Test/Maintenance menu. The relay should energize and de-energize as selected.
	Make sure the controller is not in calibration mode and that the relay is not being held.
Secure Digital Memory (SD) card not recognized by the controller	Make sure the SD card is properly oriented. The copper traces should face toward the controller display.
	Make sure the SD card is fully seated in the slot and the spring lock is engaged.
	Make sure the card is 4 GB.
	Make sure an SD card is being used. Other types of cards (such as SD, micro-SD, mini-SD) will not work properly.

Display is lit but shows no characters or characters are faint or blurry.	Adjust the display contrast
	Make sure protective film has been removed from display.
	Clean the outside of the controller, including the display screen.
Controller will not power up, or powers up intermittently	Make sure the AC power connections are properly terminated in the controller.
	Make sure the power strip, line power, wall plug are all properly plugged in.
	Contact Technical Support.
Error LED blinking	Check the RS485 connections of all the sensors with the controller.
	Check the supply connections of all the sensors with the controller.
	Contact Technical Support.
Red indications on display	Check the individual RS485 connections of particular sensor which is red on display.
	Check the individual power connections of particular sensor which is red on display.
	Contact Technical Support.
Error during calibration	The standard value was not received for a long time (about 180 seconds), or the standard solution was wrong.
	The sensor signal is not stable or out of measurement range.
	The sensor performance (slope or offset value) has exceeded the allowable range.

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