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Messtechnik GmbH

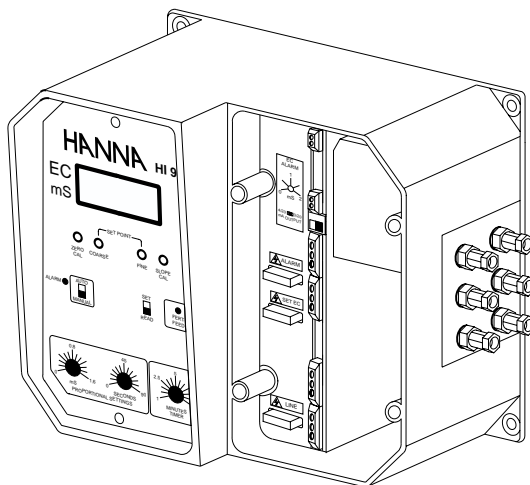
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Instruction Manual

HI 9931 - HI 9934

Wall Mounted Conductivity & TDS Controllers



 **HANNA**
instruments
<http://www.hannainst.com>


These Instruments are in
Compliance with the CE Directives





Dear Customer,

Thank you for choosing a Hanna Product.

Please read this instruction manual carefully before using the instrument. This manual will provide you with the necessary information for a correct use of the instrument, as well as a more precise idea of its versatility. If you need more technical information, do not hesitate to e-mail us at tech@hannainst.com.

These instruments are in compliance with the **CE** directives EN 50081-1, 50082-1 and 61010-1.

TABLE OF CONTENTS

PRELIMINARY EXAMINATION	3
GENERAL DESCRIPTION	3
MECHANICAL LAYOUTS	4
FUNCTIONAL DIAGRAM HI 9931	6
FUNCTIONAL DIAGRAM HI 9934	9
CONNECTIONS & WIRING	12
NORMAL OPERATION & MEASUREMENT	15
CALIBRATION	16
ADJUSTMENT OF SETPOINT	17
PROPORTIONAL CONTROL	18
OVERDOSAGE TIMER	20
PROBE CLEANING & MAINTENANCE	20
SUGGESTED INSTALLATIONS FOR EC/TDS PROBES	21
ACCESSORIES	23
WARRANTY	25
OTHER PRODUCTS FROM HANNA	26
CE DECLARATION OF CONFORMITY	27



HANNA
instruments

*ISO 9000 Certified
Company since 1992*





PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipping. If there is any noticeable damage, notify your Dealer.

Note: Save all packing materials until you are sure that the instrument functions correctly. Any defective item must be returned in the original packaging together with the supplied accessories.

IMPORTANT:

1. Read the instructions before using the instrument.
2. The instrument should be connected to a mains socket.
3. Never install the controller outdoors, in a wet or humid area or under direct sun light. Nor install the controller where liquids may be sprayed or poured on it.
4. The instrument's main power line as well as the dosage and alarm terminals are protected by separate 2A fuses. Use only 2A fuses for replacement.



GENERAL DESCRIPTION

Hanna's wall-mounted conductivity and TDS controllers with proportional control are designed to meet a variety of process control requirements, especially those in horticultural, hydroponics and agricultural applications.

The controllers operate with the optional Hanna 4-ring probes to provide a linear and repeatable measurement. The conductivity/TDS probes can be installed quickly and easily. Simply plug the DIN connector into the socket and tighten the retainer ring.

The probes incorporate a temperature sensor and the controller will automatically compensate for the temperature effect. Accurate measurements are displayed on a large LCD.

The controllers come equipped with relays operating at a maximum of 2A (240V).

The controllers incorporate a triple contact alarm system. When activated, the alarm contacts will open or close, triggering the mechanism of your choice, whether a buzzer, light or any other electrical device.





The recorder output terminals are isolated from the controller circuitry to avoid any interference and are user-switchable between 0 to 20 mA or 4 to 20 mA.

The controller is housed in a rugged, modular, fiber-reinforced ABS housing.

All models can be wired to work with 110/115V or 220/240V at 50/60 Hz power supplies.

MECHANICAL LAYOUTS

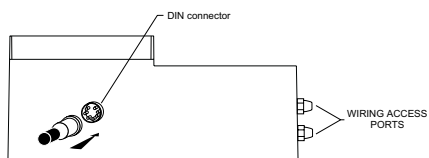


Fig. 1

Figure 1 illustrates the connector for probe and the wiring access ports.

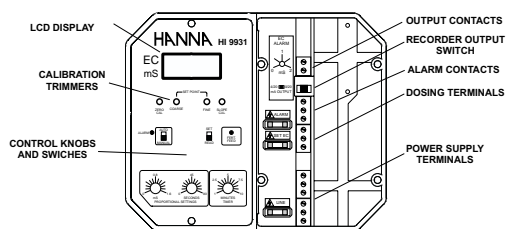


Fig. 2

Figure 2 illustrates the controls and terminals.



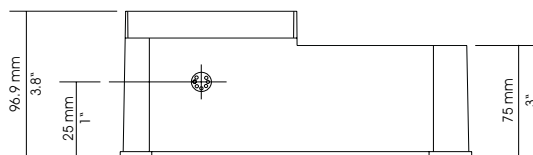
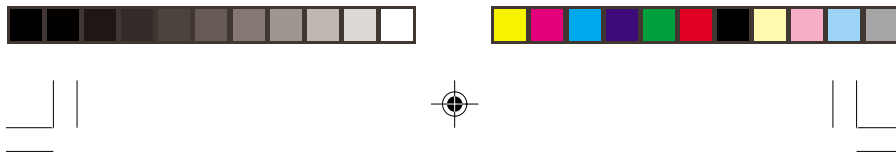


Fig. 3

Figure 3 is a dimensioned, bottom view of the wall mounted controller. The modular design isolates the control circuitry from the contacts making it possible to make the connections and then close the compartment. Adjustments can then be made only in the control area, without having to open the contacts compartment.

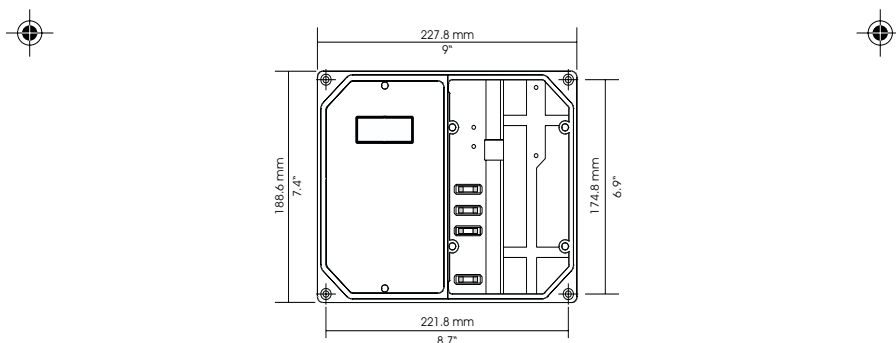


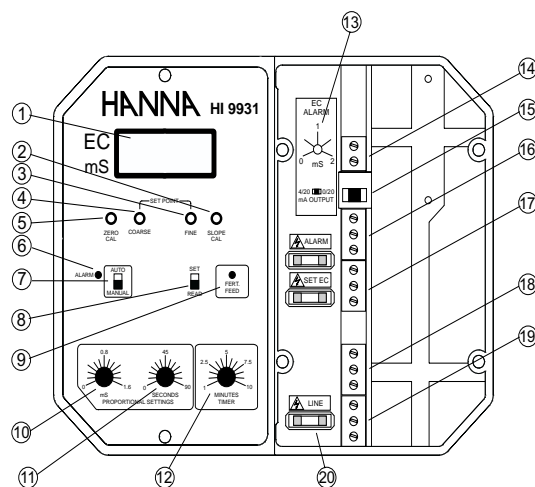
Fig. 4

Figure 4 is a dimensioned front view of the wall mounted controller. The molded, mounting holes in the corners provide for quick and secure installation. No additional hardware is needed for mounting. All electrical connections and controls are located on the front of the instrument so that adjustment can be made without having to remove the unit.



FUNCTIONAL DIAGRAM HI 9931

FRONT PANEL



Left panel

1. Liquid Crystal Display
2. Slope calibration trimmer
3. Fine setpoint trimmer
4. Coarse setpoint trimmer
5. Zero calibration trimmer
6. Alarm LED warning signal
7. Alarm disable switch
8. READ for actual measurement and SET for setpoint adjustment
9. Dosing LED signal
10. Proportional conductivity band setting
11. Proportional time cycle setting
12. Overdosage timer

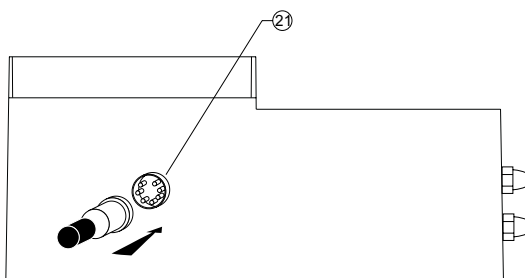
Right panel

13. Conductivity alarm setting from 0 to 2.0 mS/cm (EC)
14. Recorder output contacts
15. 0 to 20 or 4 to 20 mA output selector
16. Triple contact alarm in a Normally Closed (NC) or a Normally Open (NO) position.



- 17. Powered dosage terminals (Relay)
- 18. 110/115V or 220/240V power configuration
- 19. Incoming power terminals
- 20. Fuses

BOTTOM VIEW



- 21. Female DIN connector for conductivity probe



Unplug the instrument from the power supply before wiring or replacing the fuses.





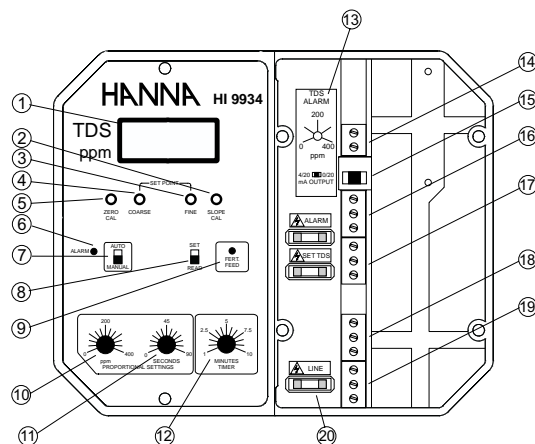
Specifications	HI 9931
RANGE	0.00 to 10.00 mS/cm (EC)
RESOLUTION	0.01 mS/cm
ACCURACY (@20 C/68 F)	±2% F. S.
TYPICAL EMC DEVIATION	±2% F. S.
CALIBRATION	Through "ZERO CAL" and "SLOPE CAL" trimmers
SETPOINT RANGE	From 0 to 10.00 mS/cm
PROPORTIONAL CONTROL	Conductivity from 0.0 to 1.6 mS/cm and time cycle from 0 to 90 seconds
ALARM CONTACTS	Terminal can be configured as normally open or normally closed (isolated output Max. 2A, Max. 240V, resistive load, 1,000,000 strokes). The alarm is activated if conductivity exceeds by more than the user- selectable interval (0 to 2.0 mS/cm) from the setpoint or due to overdosage
DOSING TERMINALS	Relay (115 to 240V, Max.2A, 1,000,000 strokes) is activated whenever conductivity falls below the setpoint
PROBE (optional)	4-ring potentiometric with built-in temperature sensor
POWER SUPPLY	220/240V or 110/115V at 50/60Hz
ENVIRONMENT	-10 to 50°C (14 to 122°F) max. 95% RH non-condensing
WEIGHT	1.6 Kg (3.5 lb.)
ENCLOSURE	181 x 221 x 142mm (7.1 x 8.7 x 5.6")
CASE MATERIAL	Fiber-reinforced, self-extinguishing ABS





FUNCTIONAL DIAGRAM HI 9934

FRONT PANEL



Left panel

1. Liquid Crystal Display
2. Slope calibration trimmer
3. Fine setpoint trimmer
4. Coarse setpoint trimmer
5. Zero calibration trimmer
6. Alarm LED warning signal
7. Alarm disable switch
8. READ for actual measurement and SET for setpoint adjustment
9. Dosing LED signal
10. Proportional TDS band setting
11. Proportional time cycle setting
12. Overdosage timer

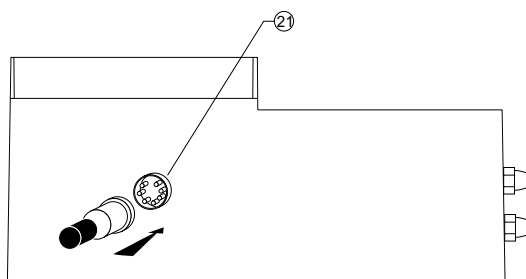
Right panel

13. TDS alarm setting from 0 to 400 ppm (mg/L)
14. Recorder output contacts
15. 0 to 20 or 4 to 20 mA output selector
16. Triple contact alarm in a Normally Closed (NC) or a Normally Open (NO) configuration



- Open (NO) position.
- 17. Powered dosage terminals (Relay)
 - 18. 110/115V or 220/240V power configuration
 - 19. Incoming power terminals
 - 20. Fuses

BOTTOM VIEW



21. Female DIN connector for TDS probe





Specifications	HI 9934
RANGE	0.00 to 1999 ppm (mg/L)
RESOLUTION	1 ppm (mg/L)
ACCURACY (@20 C/68 F)	± 2% F. S.
TYPICAL EMC DEVIATION	± 2% F. S.
CALIBRATION	Through "ZERO CAL" and "SLOPE CAL" trimmers
SETPOINT RANGE	From 0 to 1999 ppm (mg/L)
PROPORTIONAL CONTROL	TDS from 0 to 400 ppm and time cycle from 0 to 90 seconds
ALARM CONTACTS	Terminals can be configured as normally open or normally closed (isolated output Max. 2A, Max. 240V, resistive load, 1,000,000 strokes). The alarm is activated if TDS exceeds by more than the user- selectable interval (0 to 400 ppm) from the setpoint or due to overdosage.
DOSING TERMINALS	Relay (115 to 240V, Max.2A, 1,000,000 strokes) are activated whenever TDS falls below the setpoint
TDS RATIO	$0.65 \text{ ppm (mg/L)} = 1 \mu\text{S/cm}$
PROBE (optional)	4-ring potentiometric with built-in temperature sensor
POWER SUPPLY	220/240V or 110/115V at 50/60Hz
ENVIRONMENT	-10 to 50°C (14 to 122°F) max. 95% RH non-condensing
WEIGHT	1.6 Kg (3.5 lb.)
ENCLOSURE	181 x 221 x 142mm (7.1 x 8.7 x 5.6")
CASE MATERIAL	Fiber-reinforced, self-extinguishing ABS

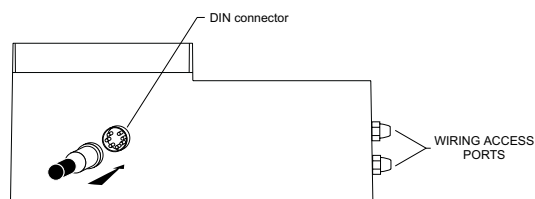


CONNECTIONS & WIRING

GENERAL POINTS

- The **relay terminals** of the controller are **powered**. This means that you can simply hook up your pump or electrovalve directly to the controller and do not need additional power supply.
- Unscrew the 4 screws on the right hand panel and remove the cover and the gasket. Thread the wires through the access ports on the right hand side of the controller.
- **Before connecting the controller to the mains, wire the controller completely** and make all the connections for pumps, alarm, probe, set the alarm threshold and adjust the settings. Upon completion **replace the cover**. *Only then* connect the controller to the power supply.

PROBE CONNECTION



- Attach the conductivity/TDS probe (HI 3002, HI 3001D or HI 7638) to the DIN socket located on the bottom of the casing. Align the guide on the connector with the socket, push the connector in and tighten the retainer ring. (HI 3002 is more suitable for direct immersion in the tank, vat or pipes. HI 3001D can be mounted directly into a pipe and HI 7638 is recommended for high temperature and pressure applications).
- The probes incorporate a temperature sensor and the controller's circuitry automatically compensates for the temperature effect.

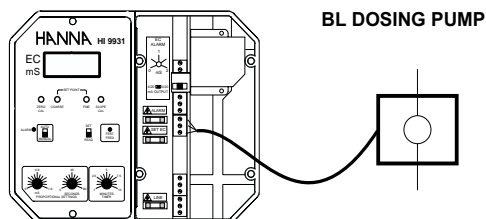
RELAY CONNECTIONS

- Wire the external devices (pumps or electrovalves) directly to the relay terminal strips of the controller (see 17 - Functional Dia-



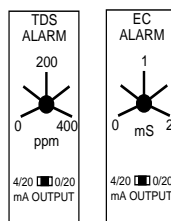


gram). The **terminals are powered** and hence you **do not need an external power supply** for the pumps or valves.

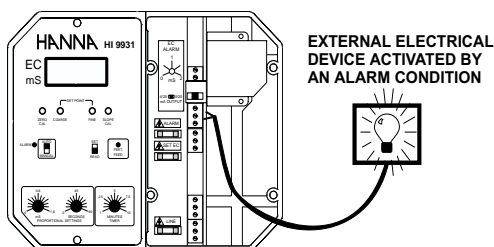


ALARM CONNECTIONS

- The operator can select an alarm threshold of 0.0 to 2.0 mS/cm for HI 9931 and 0 to 400 ppm for HI 9934 by turning the alarm knob (see 13 - Functional Diagram). If the actual measurements are above the setpoint by a margin greater than the user-selectable alarm threshold, the alarm terminal is activated.



The alarm can be selected as normally closed ("NC") by connecting the external device to the C and NC terminals or normally open ("NO") by connecting the external device to the C and NO terminals.

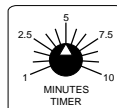


- When activated, the alarm contacts will open or close, triggering the mechanism of your choice. When the **alarm is activated all other terminals** (such as dosing relay etc.) **are deactivated**. The alarm LED light also comes on.
- The alarm AUTO/MANUAL switch (see 7 - Functional Diagram) is only to **disable the alarm terminal** (e.g. the buzzer will not sound). However, all other functions such as disactivation of the dosing relay remain unvaried, i.e. the pump ceases to dose until the alarm condition is alleviated.



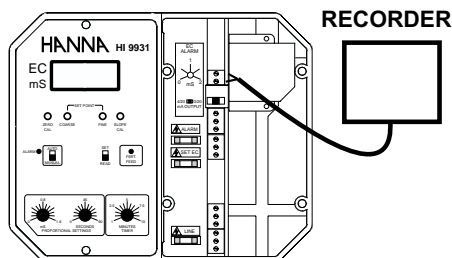
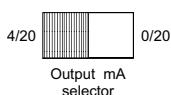


- The controller provides for **automatic fail-safe security** by activating the alarm if there is a power failure, regardless of whether the NC or NO configurations were chosen.
- The alarm is also activated if the overdosage time is exceeded. The maximum time that the relay contacts remain active continuously can be set from 1 to 10 minutes.
- Once in an alarm condition, the alarm contact remains activated until the switch is put in the manual position or the measurements return to normal values.



RECORDER OUTPUT CONNECTIONS

- The recorder output contacts are isolated from the controller circuitry to avoid interference. Select 0 to 20 mA or 4 to 20 mA with the switch (see 15 - Functional Diagram) before wiring the recorder to the terminals. The output mA value is proportional and is the measured conductivity or TDS over the entire range. For example, when HI 9931 measures 2.00 mS/cm (EC), the output values are 4 mA or 7.2 mA based on whether the 0-20 or 4-20 output was respectively selected. Likewise, when HI 9934 measures 1500 ppm (mg/L), the output values are 15 mA or 16 mA based on whether the 0-20 or 4-20 output was selected.



TEMPERATURE COMPENSATION

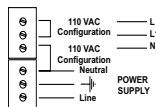
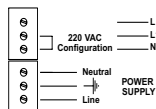
Temperature affects conductivity and TDS measurements considerably (approx. 2% per °C). You however do not need to worry about having to compensate for this or go through complicated calculations since all three probes recommended in this manual (HI 7638, HI 3002 and HI 3001D) compensate for temperature automatically.





MAIN POWER SUPPLY CONNECTION

- **Before connecting the unit to the mains**, make sure that the **controller is completely wired** and that all connections for pump, alarm, probe, etc. have been made.
- For 220-240V, short the L1 and N1 terminals. Then wire the external power supply to the three terminals as shown.
- For 110-115V, short the L and L1 terminals *and* the N1 and Neutral. Then wire the external power supply to the three terminals as shown.
- Replace the cover with the gasket and screw it tight with the 4 screws provided. *Only then* connect the controller to the mains.



NORMAL OPERATION & MEASUREMENT

Make sure that the controller has been properly calibrated before commencing and that the conductivity/TDS setpoint has been adjusted (see following pages).

The conductivity/TDS probe must be properly connected and wired to the controller (see preceding pages).

The protective sleeve must not be removed and the holes on the sleeve should be near the top (the cable end). The probe must be immersed in the solution above the air-vent holes on the external sleeve. The probe must be installed in such a way as to minimize presence of air bubbles (see probe installation tips at the end of the manual).

Ensure that the selector (see 8 - Functional Diagram) is in the "READ" mode.



The controller provides for a visual dosing status through the "FERT FEED" LED (see 9 - Functional Diagram).

The actual conductivity (EC) or TDS value will be displayed on the LCD in mS/cm or ppm, respectively.



EC
mS **1.20**

TDS
ppm **1240**





CALIBRATION

Make sure that the probe has been properly connected and wired to the controller (see preceding pages) and that the meter is plugged to the mains.

Calibration should be ideally performed at a temperature similar to that of the liquid to be monitored.

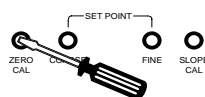


Ensure that the controller is in the "READ" position.



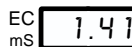
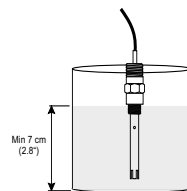
ZERO ADJUSTMENT:

- Leave the probe in the air and make sure that it is dry.
- The LCD should show 0. If necessary adjust the "ZERO CAL" trimmer to display zero.



SLOPE ADJUSTMENT:

- Pour sufficient amount of a known conductivity or TDS solution in a beaker. The solution should be close to the sample stream to be monitored. For example, when using the HI 9931, choose HI 7031L with a 1.41 mS/cm value at 25 °C if the measurements are in the 1.2 to 2.5 EC range. Similarly, utilize HI 70442L with a value of 1500 ppm at 25 °C if controlling your process with HI 9934.
- Immerse the probe in the beaker ensuring that the holes on the sleeve of the probe are completely covered.
- Stir the probe and gently tap it on the bottom of the beaker to ensure that any air bubbles trapped inside the sleeve escape. Best results are obtained when the probe is not too close to the walls of the beaker nor lying on the bottom.
- Wait for the reading to stabilize. Adjust the "SLOPE CAL" trimmer to display the same value as the calibration solution at 25 °C. For example, with HI 7031L, you should adjust the display to 1.41 mS/cm and with HI 70442 to 1500 ppm.





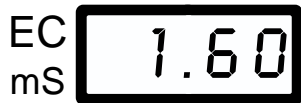
- Once the controller is calibrated to a solution by referring to its value at 25 °C, all subsequent measurements are temperature compensated to 25 °C. You can also obtain temperature compensation to a different temperature reference point by calibrating the meter to that value. For example, the conductivity and TDS value of HI 7031L and HI 70442L at 20 °C are 1.28 mS/cm and 1358 ppm, respectively. By adjusting the display to these two values, all subsequent measurements are compensated to a base temperature of 20 °C.

Calibration is now complete.

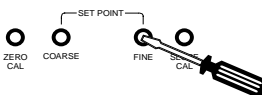
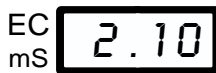
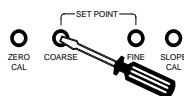
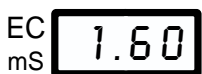
ADJUSTEMENT OF SETPOINT

Make sure that the probe is properly installed and calibrated (see the preceding pages).

Turn the switch to the "SET" position (see 8 - Functional Diagram). The display will show the previously adjusted (e.g. 1.60 mS/cm or 1400 ppm).



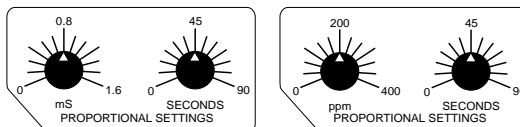
Using a small screwdriver, first adjust the setpoint through the COARSE trimmer and then fine tune it to your required level with the FINE trimmer (see 4 and 3 - Functional Diagram) until the desired value is displayed (e.g. 2.1 mS/cm or 1700 ppm).





PROPORTIONAL CONTROL

In order to optimize the controlling process and reduce the amount of chemicals and fertilizers used, it is recommended to use a proportional dosage appropriate for the system.



HI 9931 and HI 9934 allow for a proportional band (delta) of 0 to 1.6 mS/cm and 0 to 400 ppm for conductivity (EC) and TDS, respectively. Each controller also provides for a time cycle from 0 to 90 seconds. The proportional dosage is obtained by personalizing a current pulse whose height equals the EC or TDS proportional delta and the length corresponds to the selected time cycle.

The controller will enter proportional dosage at the setpoint minus the preselected delta. It will then keep the dosing relay activated for a period proportional to the difference between the actual measurement less the setpoint over the cycle.

If the setting is left at 0 mS/cm or 0 ppm, the controller will operate as an ON/OFF control with no proportional dosage. The hysteresis of such an ON/OFF control will be 0.1 mS/cm or 15 ppm, respectively.

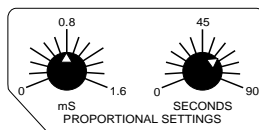
e.g. HI 9931 proportional control

Setpoint = 2.2 mS/cm (EC)

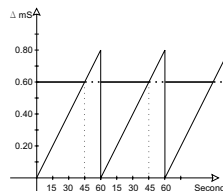
Measured value = 1.6 mS/cm

Delta = $2.2 - 1.6 = 0.6$ mS/cm

Proportional settings = EC set to 0.8 and time cycle to 60 seconds



The controller will be dosing fertilizers to increase the EC to the desired limit. Since it is $0.6/0.8 = 75\%$ away from the ideal setting, it will keep the dosing relay activated for 75% of the time over the preselected 60 seconds. The terminals are hence theoretically activated for 45 seconds

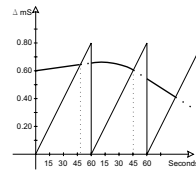
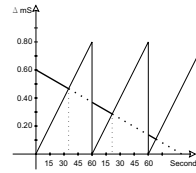




and off for 15 seconds.

In order to avoid over dosage of highly concentrated chemicals or fertilizers, the controller provides even a more accurate control.

As the graphs show, it does that by stopping the dosage as soon as the current pulse curve intersects the dosage curve. This means shortening the dosage period if the chemicals have reacted quickly or lengthening it if the measured conductivity continues to drift from the ideal setpoint as can be seen from the graphs.



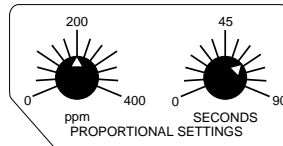
e.g. HI 9934 proportional control

Setpoint = 1600 ppm TDS)

Measured value = 1550 ppm

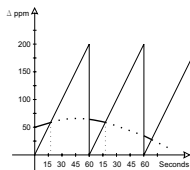
Delta = 1600 - 1550 = 50 ppm

Proportional settings = ppm set to 200 and time cycle to 60 seconds



The controller will be dosing fertilizers to reach the desired value.

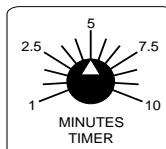
Since it is $50/200 = 25\%$ away from the ideal setting, it will keep the dosing relay activated for 25% of the time over the 60 second period. The terminals are hence activated for 15 seconds and off for 45 seconds until the next cycle.





OVERDOSAGE TIMER

HI 9931 and HI 9934 provide for an overdosage alarm system. The operator can set the maximum amount of time that the dosage terminals should continuously remain activated from 1 to 10 minutes. Should this period elapse, the alarm terminals are activated (and dosage disactivated to ensure that fertilizers or chemicals have not run out or pumps or electrovalves have not ceased to function properly).



PROBE CLEANING & MAINTENANCE

PREPARATION

Make sure that the protective sleeve is on the probe shaft and that the air-vent holes are on the top (nearer to the cable).

STORAGE

The conductivity/TDS probes should be stored dry. If the probes are not to be used for a while, clean and dry them thoroughly (see below) before storing them in a dry store room.

PERIODIC MAINTENANCE

Inspect the probe and the cable. The cable used for the connection to the controller must be intact and there must be no points of broken insulation on the cable or cracks on the probe sleeve.

Connector must be clean and dry. If any cracks are present, replace the probe and cable.

CLEANING PROCEDURE

Remove the sleeve and soak the probe in a Hanna HI7061 General Cleaning Solution for 1 hour. Wash the sleeve with plenty of water and remove any dirt.

If the probe has been left in highly concentrated fertilizer solution and does not seem to become clean, repeat the cleaning procedure.

The rings can also be cleaned with a cloth. Make sure that the cloth is made of a soft and non-abrasive material and does not scratch the rings.



IMPORTANT: After performing the cleaning procedures rinse the probe thoroughly with distilled or tap water. Dry it and replace the sleeve ensuring that the air-vents are nearer to the cable end and recalibrate the controller.

TROUBLESHOOTING

If the controller does not respond properly or constantly reads zero or a value close to it, or is in over range, check the probe and cable for cracks. The cable may be shorted or the probe broken, in which case they need to be replaced. If the response seems sluggish, follow the cleaning procedure above.

If there are anomalies such as numbers fluctuating, ensure that the probe has been properly mounted and that it is in a pipe or well continuously filled with the solution. Air bubbles also disturb the measurements (especially with HI 3001D) and the probe should be installed in such a way as to minimize their presence (see Suggested Installations below).

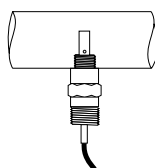
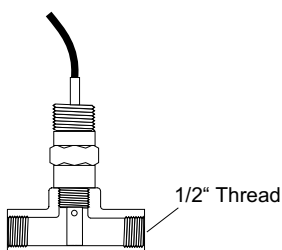
Note: With industrial applications, it is always recommended to keep a spare probe handy. When anomalies are not resolved with a simple cleaning or maintenance, change the probe (and recalibrate the controller) to see if the problem is alleviated.

SUGGESTED INSTALLATIONS for EC/TDS PROBES

As with any other liquid contact measurement, ensure that the probe is installed in such a way that it permanently lies in the solution, whether in the tank or the discharge pipe.

HI 3001D FOR IN-LINE INSTALLATION

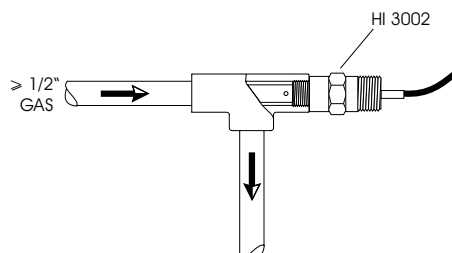
HI 3001D is suitable for this purpose due to its external 1/2" NPT thread, 6 Bar (87 psi) pressure rating and the short immersion depth of 20 mm (0.8"). It can be installed in 1/2" pipes (with the aid of a "T"). For larger pipe sizes, HI 3001D can be mounted upside down or vertically.





HI 3002 FOR IN-LINE INSTALLATION

The drawing illustrates the ideal installation system since the stream pressure in the pipe forces the air bubbles out automatically. HI 3001D illustrated previously can also be mounted in this fashion. However the longer stem of HI 3002 facilitates an easier escape route for any air bubbles. HI 3002 comes with external 1/2" NPT and thread 60 mm (2.4") immersion level.



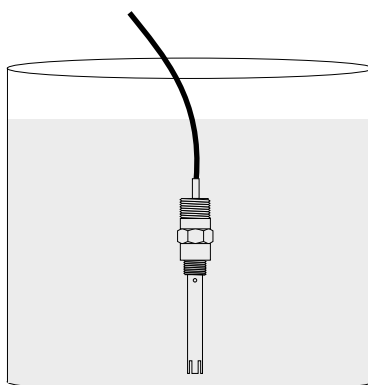
HI 7638 FOR IN-LINE INSTALLATION

HI 7638 comes with stainless steel 3/8" NPT external thread and 60 mm (2.4") immersion level. It can work at temperatures of up to 120°C and should be used in high temperature/pressure applications.



HI 3002 FOR TANK INSTALLATION

Due to its Ultem® and sealed body, HI 3002 can be installed directly in a tank or vat without requiring a probe holder.





ACCESSORIES

EC/TDS PROBE

- HI 3001D 1/2" NPT platinum 20 mm (0.8") long, 4-ring probe with temperature sensor and external threads for pipes
- HI 3002 1/2" NPT platinum 60 mm (2.4") 4-ring probe with temperature sensor and external threads for pipes and tanks
- HI 7638 3/8" NPT platinum 60 mm (2.4") 4-ring probe with temperature sensor and stainless steel external threads for high temperature and pressure

Hanna manufactures an extensive range of probes for process, water treatment and fertilizer applications. Consult the specific handbooks for process instrumentation, or simply call the Hanna Office nearest to you for a complete list.

EC CALIBRATION SOLUTIONS

- HI 7031L 1.41 mS/cm EC calibration solution, 460 mL
- HI 7039L 5.00 mS/cm EC calibration solution, 460 mL

TDS CALIBRATION SOLUTION

- HI 70442L 1500 ppm (mg/L) TDS calibration solution, 460 mL

PROBE CLEANING SOLUTION

- HI 7061L General purpose cleaning solution, 460 mL

PUMPS

- BL PUMPS Dosing pumps (several models are available with flow rates from 1.5 to 18.3 lph / 0.4 to 4.8 gph)





WARRANTY

All Hanna controllers are warranted for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions.

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered. This warranty is limited to free of charge repair or replacement of the meter only, if any malfunctioning is due to manufacturing defects.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

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Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.



OTHER PRODUCTS FROM HANNA

- CABLES AND CONNECTORS
- CALIBRATION AND MAINTENANCE SOLUTIONS
- CHEMICAL TEST KITS
- CHLORINE METERS
- CONDUCTIVITY/TDS METERS
- DISSOLVED OXYGEN METERS
- HYGROMETERS
- ION SPECIFIC METERS (Colorimeters)
- MAGNETIC STIRRERS
- Na/NaCl METERS
- pH/ORP/Na ELECTRODES
- pH METERS
- PROBES (DO, μ S/cm, RH, T, TDS)
- PUMPS
- REAGENTS
- SOFTWARE
- THERMOMETERS
- TITRATORS
- TRANSMITTERS
- TURBIDITY METERS
- Wide Range of ACCESSORIES

Most Hanna meters are available in the following formats:

- BENCH-TOP METERS
- POCKET-SIZED METERS
- PORTABLE METERS
- PRINTING/LOGGING METERS
- PROCESS METERS (Panel and Wall-mounted)
- WATERPROOF METERS
- METERS FOR FOOD INDUSTRY

For additional information, contact your dealer or the nearest Hanna Customer Service Center.

You can also e-mail us at tech@hannainst.com.



CE DECLARATION OF CONFORMITY



DECLARATION OF CONFORMITY

We

Hanna Instruments Srl
V.le delle industrie 12
35010 Ronchi di Villafranca (PD)
ITALY

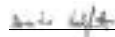
herewith certify that the wall-mounted instrument:

HI 9931 HI 9934

has been tested and found to be in compliance with the following regulations:

IEC 801-2	Electrostatic Discharge
IEC 801-3	RF Radiated
IEC 801-4	Fast Transient
EN 55022	Radiated, Class B
EN 61010-1	User Safety Requirement

Date of Issue: 07-06-1999


D. Volpato - Engineering Manager
On behalf of
Hanna Instruments S.r.l.

Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential areas could cause unacceptable interference to radio and TV equipment.

Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance.

Unplug the instruments from power supply before replacing the fuse or making any electrical connections.



HANNA LITERATURE

Hanna publishes a wide range of catalogs and handbooks for an equally wide range of applications. The reference literature currently covers areas such as:

- Water Treatment
- Process
- Swimming Pools
- Agriculture
- Food
- Laboratory
- Thermometry

and many others. New reference material is constantly being added to the library.

For these and other catalogs, handbooks and leaflets, contact your dealer or the Hanna Customer Service Center nearest to you. To find the Hanna Office in your vicinity, check our home page at www.hannainst.com.



<http://www.hannainst.com>