

GroLine

HI981413

Nutrient Dosing System



INSTRUCTION MANUAL

Dear
Customer,

Thank you for choosing a Hanna Instruments product.

Please read this instruction manual carefully before using this instrument.

This manual will provide you with the necessary information for correct use of this instrument, as well as a precise idea of its versatility.

If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com or view our contact list at www.hannainst.com.

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1. PRELIMINARY EXAMINATION

Remove the instrument and accessories from the packaging and examine it carefully. For further assistance, please contact your local Hanna Instruments office or email us at tech@hannainst.com. Each **HI981413** is available in multiple configurations: controller and probe - **HI981413-00**, kit for in-line mounting - **HI981413-10**, kit for flow cell mounting - **HI981413-20**.

Each instrument is supplied with:

HI981413-00, without mounting kit

- **HI30033** EC / TDS / temperature probe
 - **HI7031-012** Conductivity calibration solution 1413 $\mu\text{S}/\text{cm}$, 120 mL
 - Plastic beaker
 - Power connection cable
 - Instrument & electrode quality certificates
 - Instruction manual
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HI981413-10, with in-line mounting kit

- **HI30033** EC / TDS / temperature probe
 - **HI7031-012** Conductivity calibration solution 1413 $\mu\text{S}/\text{cm}$, 120 mL
 - Controller aspiration filter
 - Controller injector, 1/2" NPT thread
 - Saddle for Ø 50 mm pipe (2 pcs.)
 - Plastic beaker
 - Power connection cable
 - Instrument & electrode quality certificates
 - Instruction manual
 - PVC aspiration tubing (flexible)
length: 5 m
OD: Ø 6.0 mm; ID: Ø 4.0 mm
 - PE rigid dispensing tubing (pump to injector)
length: 5 m
OD: Ø 6.0 mm; ID: Ø 4.0 mm
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HI981413-20, with flow cell mounting kit

- **HI30033** EC / TDS / temperature probe
 - **HI7031-012** Conductivity calibration solution 1413 $\mu\text{S}/\text{cm}$, 120 mL
 - Flow cell for **HI981413**
 - Mounting panel assembly for **HI981413**
 - Controller aspiration filter
 - Controller injector, 1/2" NPT thread
 - Saddle for Ø 50 mm pipe (3 pcs.)
 - Plastic beaker
 - Power connection cable
 - Instrument & electrode quality certificates
 - Instruction manual
 - Rapid coupling 1/2" to 12.0 mm (2 pcs.)
 - Flow cell valve (2 pcs.)
 - PVC aspiration tubing (flexible)
length: 5 m
OD: Ø 6.0 mm; ID: Ø 4.0 mm
 - PE rigid dispensing tubing (pump to injector)
length: 5 m
OD: Ø 6.0 mm; ID: Ø 4.0 mm
 - PE rigid tubing (flow cell)
length: 10 m
OD: Ø 12.0 mm; ID: Ø 10.0 mm
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OD: Outer Diameter; ID: Inner Diameter

Note: Save all packing material until you are sure that the instrument works correctly. Any damaged or defective item must be returned in its original packing material with the supplied accessories.

2. SAFETY MEASURES



- Always disconnect the EC pump controller from power when making electrical connections.



- Do not run other cables with the power cabling.
- Do not touch the metallic part. Hot surface.

3. ABBREVIATIONS & CONVERSION CHARTS

LED	Light Emitting Diode
NPT	American National Standard Taper Pipe Thread
ID	Inner Diameter
OD	Outer Diameter
PE	Polyethylene
PVC	Polyvinyl Chloride
SPDT	Single Pole Double Throw

METRIC vs INCHES

Metric (mm)	Inches - Decimal	Inches - Fractional
4.0 mm	0.16"	$\frac{5}{32}$ "
6.0 mm	0.24"	$\frac{15}{64}$ "
10.0 mm	0.39"	$\frac{25}{64}$ "
12.0 mm	0.47"	$\frac{15}{32}$ "
20.0 mm	0.79"	$\frac{25}{32}$ "
25.4 mm	1.00"	1"
50.0 mm	1.97"	1 $\frac{31}{32}$ "
63.0 mm	2.48"	2 $\frac{31}{64}$ "
75.0 mm	2.95"	2 $\frac{61}{64}$ "

METRIC vs FEET & INCHES

Metric (m)	Feet (') Inches (")	Feet (')	Inches (")
2 m	6' 7"	6.56'	78.74"
5 m	16' 4"	16.40'	196.85"
10 m	32' 9"	32.80'	393.70"

4. SPECIFICATIONS

4.1. HI981413 NUTRIENT DOSING SYSTEM

Range	EC	0.00 to 10.00 mS/cm
	TDS	0 to 9900 ppm, depends on TDS factor i.e. with TDS factor 0.5, range 50 to 5000 ppm with TDS factor 0.7, range 70 to 7000 ppm
	Temperature*	-5.0 to 105.0 °C (23.0 to 221.0 °F)
Resolution	EC	0.01 mS/cm
	TDS	1 ppm
	Temperature	0.1 °C (0.1 °F)
Accuracy @ 25 °C / 77 °F	EC	± 0.10 mS/cm (0.00 to 5.00 mS/cm) ± 0.20 mS/cm (5.00 to 10.00 mS/cm)
	TDS	± 2% F.S. ± 50 (0 to 2500 ppm) with TDS factor 0.5 ± 100 (2500 to 5000 ppm) with TDS factor 0.5
	Temperature	± 0.5 °C (± 0.9 °F)
	Calibration	• User calibration: automatic, one-point with standard solution (1.41 or 5.00 mS/cm) • Process calibration: single point, adjustable (± 0.50 mS/cm around measured value) • The corresponding value in TDS, depends on TDS factor
Temperature Compensation		Automatic
EC to TDS Conversion Factor		TDS factor selectable from 0.45 to 0.99
High or Low Mode Operation Pump Control		• On/Off control using adjustable set point (0.10 to 10.00 mS/cm; 45 to 9900 ppm, depends on TDS factor) with adjustable hysteresis (0.05 to 0.50 mS/cm; 23 to 495 ppm, depends on TDS factor) • Proportional control using adjustable set point (0.10 to 10.00 mS/cm; 45 to 9900 ppm, depends on TDS factor) with adjustable proportional band (0.05 to 1.00 mS/cm; 23 to 990 ppm, depends on TDS factor) • Startup delay timer at power-on (0 to 600 sec.) • Pump flow control 0.5 to 3.5 Liter/hour (0.13 to 0.92 Gallon/hour) and maximum output pressure 1 atm (14 psi) • Manual control for pump priming (defined in setup)

*The range may be limited by the probe's limits.

EC/TDS Alarms	• High & Low with enable or disable option • Triggered after 5 sec. if the controller records consecutive readings over or under threshold values • Level with enable or disable option • Overtime protection (1 to 180 min. or Off)
Controller Alarm System	• Intuitive alarm system, using red, yellow and green color coded backlight • User-selectable, alarm setup options
Alarm Relay Output	• SPDT 2.5A / 230 Vac • Activated by EC/TDS - selectable alarm conditions
Probe Input	• Quick connect DIN connector • Galvanic isolation
Level Sensor Input (Digital Input)	• External switches can be attached to stop the pump and activate the alarm (low reagent level) when the switch is open and level alarm is configured in Setup • Galvanic isolation
Power Supply	100 - 240 Vac, 50/60 Hz
Power Consumption	15 VA
Environment	0 to 50 °C (32 to 122 °F), max. 95% RH non-condensing
Dimensions	90 x 142 x 80 mm (3.5 x 5.6 x 1.8")
Weight	908 g (36 oz)
Casing	Wall mounted, built-in pump, IP65 rating

4.2. HI30033 PROBE

Range	0-10 mS/cm
Pin	Stainless steel
Temperature sensor	Yes
Temperature range	-5 to 60 °C (23 to 140 °F)
Body	PVDF (white)
Top thread	¾" NPT
In-line mounting thread	½" NPT
Cable length	2 m
Connector	Quick connect DIN connector
Maximum pressure @25 °C	3 bar (43.5 psi)

5. DESCRIPTION

5.1. GENERAL DESCRIPTION & INTENDED USE

The HI981413 Nutrient Dosing System is part of Hanna Instruments Groline family and features a durable EC controller with peristaltic dosing pump and a robust EC process sensor. The HI981413 has been designed to easily assimilate into a nutrient/fertilizer system to provide around the clock monitoring and adjustment of hydroponic nutrient solutions to ensure operational consistency.

Nutrient management requires monitoring and optimizing nutrient levels efficiently before applying to plants. In a freshly made solution, EC is the best way to verify that the resultant fertilizer agrees with the fertilizer manufacturer's recommendations.

Nutrients required for thriving plant growth are supplied through liquid nutrient solutions that contain dissolved salts which are conductive. Conductivity measurements detect the amount of salts that have been dissolved in the water. A higher EC indicates more salts have been dissolved and a lower EC indicates a lower total salt concentration.

The HI981413 Nutrient Dosing System precisely monitors and displays the conductivity measured by the HI30033 waterproof EC/Temperature probe and simultaneously controls the addition of nutrient fertilizer using On/Off or proportional control. Growers can define the ideal set point in conductivity (mS/cm) or TDS (ppm) units. The HI981413 is a small dosing controller and can be easily setup for a stand-alone nutrient reservoir or be part of a modular control scheme with the HI981412 Groline pH Dosing controller.

To obtain a representative conductivity measurement, the probe should be located at a spot that experiences good circulation but is free from bubbles. The probe can be used in a "sample pot" or reservoir or installed in a flow cell or recirculation line; perfect for drain-to waste or recirculating systems.

Main Features

- Easy to read LCD display with intuitive, color-coded backlight
- Automatic Temperature Compensation: all readings are compensated for variations in temperature. Temperature is displayed in °C or °F along with EC or TDS reading. The EC probe contains an integral temperature sensor to simplify installation.
- Configurable EC to TDS/ppm conversion factor. Most commonly a TDS factor of 0.5 is used for 0 to 5000 ppm (500 CF) or a TDS factor of 0.7 is used for 0 to 7000 ppm (700 CF).
- High and low alarms: warn the user when the nutrient solution is out of desired range by blinking the LCD backlight red, disabling the pump, and deactivating the alarm relay
- Built-in peristaltic pump with On/Off or Proportional control
- Manual control for pump priming
- Overfeed protection using the overtime safety timer
- Resumes dosing on restart in case of power failure
- IP65 rated enclosure designed to withstand harsh environments
- Level input to stop control when nutrient levels are low
- Wall-mounted design
- User selectable languages
- Extremely easy to calibrate and use (prepackaged calibration standards)

The **HI981413** Groline Nutrient Dosing System is designed to ensure smooth, safe and efficient nutrient use in growing operations and to grow healthy plants economically.