

HI981413

## Nutrient Dosing System

for Nutrient Solutions and Irrigation Water

HI981413 Nutrient Dosing System is engineered for maintaining the concentration of fertilizer in the nutrient solution used in hydroponics and irrigation water. The nutrient concentration in the water used for irrigation is critical for the successful propagation and growth of plants. The HI981413 uses an amperometric conductivity sensor for measuring the amount of fertilizer in the solution. The meter can be programmed to display results as EC (electrical conductivity) or as TDS (total dissolved solids). The EC results are displayed as mS/cm while TDS is displayed as ppm with a selectable conversion factor from 0.45 to 0.99. The HI981413 was developed to be an inexpensive solution for the horticulturist to maintain the ideal fertilizer concentrations at all times. Simply insert the probe and injection valve in-line with the recirculation pump and provide the chemical to be dosed.

*HI981413 is available in multiple configurations including a meter and probe option, a kit for in-line mounting, and a complete package that includes bypass loop and panel mounted flow cell. The kit for in-line and flow cell models include aspiration tubing with filter and dispensing tubing with injection valve.*



HI30033 EC/Temperature Probe



## Features



### Peristaltic Dosing Pump

The HI981413 has a powerful built-in peristaltic chemical feed pump that utilizes a stepper motor which does not have any gears or brushes to wear out. This design provides for a long life and little maintenance.



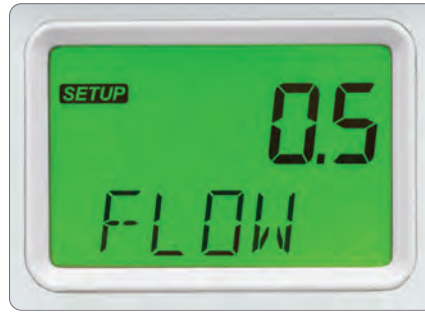
### Quick Connect Probe Input

The Quick Connect DIN connector creates a waterproof seal with the controller making it ideal for reducing electrical noise issues with the connection caused by humid environments.



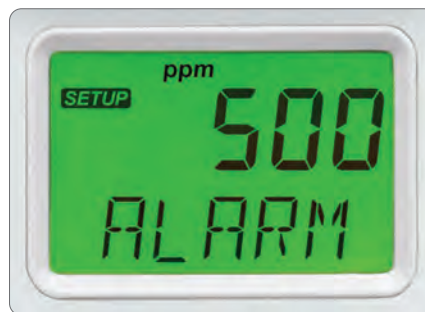
### Nutrient Level/Flow Switch Input

The HI981413 allows for a connection to an optional level controller or flow switch. This input can be used to disable the dosing pump when there is no chemical left in the reservoir tank or there is no flow due to the pump being turned off.



### Adjustable Flow Rate

The flow rate from the dosing pumps is adjustable from 0.5 to 3.5L/h. Larger bodies of water require more chemical to be dosed than smaller ones in per unit of time. The adjustable flow rate, like the proportional band, allows for better control in maintaining a desired set point.



### Programmable Alarm System

Enables or disables the low and high-level alarms. When an alarm is activated, all dosing will stop. For added safety, the alarm system also offers overdosing protection in that if the set point value is not corrected within a programmed time interval then the meter will go into alarm status.



### Multicolored LCD Display

The HI981413 features a multi-colored LCD that provides for a quick way to see the status of the controller. If in control mode and operating as intended the display will be green. If control is not enabled then the display will be yellow; while in an alarm state the display flashes red.



### Automatic Proportional Pump Control

The peristaltic dosing pump can be controlled by simple on/off or more advanced proportional control which helps prevent overshooting of the set point. When using proportional control the flow rate that is programmed, will be impacted by the proportional band used. The closer the reading is to the set point the longer it takes for the peristaltic pump to complete one revolution. If the reading is outside the proportional band then the amount of time it takes to complete one revolution is based on the flow rate programmed.



For example, a controller is programmed to have a set point of 1.50 mS/cm with a 0.30 mS/cm proportional band and the flow rate at 1 L/h. Any reading below 1.20 mS/cm will cause the dosing of stock fertilizer to be at 1 L/h. If the reading is at 1.35 mS/cm, which is 1/2 of the band, then the dosing pump will run at half speed or deliver 0.5 L/h of chemical. The closer the reading is to the set point the longer it takes for the pump to complete one rotation. This allows for very fine control of the EC/TDS value desired.

## HI30033 EC/Temperature Probe

The HI981413 uses the HI30033 probe that incorporates both EC (TDS) and temperature sensors and connects to the controller with a single waterproof Quick Connect DIN connector. The PVDF body of the probe has a 1/2" threaded fitting for insertion to an in-line "T" fitting or the flow cell. The back end part of the probe has 3/4" NPT threads for submersion/tank mounting. The probe body has a hex fitting for tightening snugly with a wrench.



| Specifications                     | HI981413  |   |
|------------------------------------|---|---|
| EC                                 | Range   | 0.00 to 10.00 mS/cm   |
|                                    | Resolution  | 0.01 mS/cm  |
|                                    | Accuracy (@25°C/77°F)   | ±2% F.S.  |
|                                    | Calibration   | user calibration: automatic, one-point with standard solution (1.41 or 5.00 mS/cm)<br>Process calibration: single point, adjustable (±0.50 mS/cm around measured value)   |
| TDS                                | Range   | 0 to 9900 ppm (depends on factor selection)   |
|                                    | Resolution  | 1 ppm   |
|                                    | Accuracy (@25°C/77°F)   | ±2% F.S.  |
|                                    | Calibration   | through EC calibration  |
| EC to TDS Conversion Factor        | TDS conversion factor selectable from 0.45 to 0.99  |   |
|                                    |   |   |
| Temperature                        | Range   | -5.0 to 105.0°C (23.0 to 221.0°F)   |
|                                    | Resolution  | 0.1°C (0.1°F)   |
|                                    | Accuracy (@25°C/77°F)   | ±0.5°C (±0.9°F)   |
| Temperature Compensation           | automatic   |   |
| Temperature Correction Coefficient | $\beta$ can be set from 0%/°C to 2.4%/°C; default is 1.9%/°C  |   |
| Dosing Control Type                | On/Off control using adjustable set point (0.10 to 10.00 mS/cm; 45 to 9900 ppm) with adjustable hysteresis (0.05 to 0.50 mS/cm; 23 to 990 ppm)<br>proportional control using adjustable set point (0.10 to 10.00 mS/cm; 45 to 9900 ppm) with adjustable proportional band (0.05 to 1.00 mS/cm; 23 to 990 ppm) |   |
| Dosing Control Activation          | high or low mode operation<br>high set point dosing is activated when reading is higher than set point<br>low set point dosing is activated when reading is lower than set point (dose fertilizer)  |   |
| Delay Start for Dosing             | startup delay timer at power-on (0 to 600 sec.)   |   |
| Maximum Dosing Time                | overfeed protection using overtime safety timer (1 to 180 min. or Off)  |   |
| Pump Flow Control                  | selectable flow rate (0.5 to 3.5 L / hour; 0.13 to 0.92 G/hour)<br>manual control for pump priming  |   |
| Additional Specifications          | Alarms  | high and low with enable / disable option<br>triggered after 5 sec. if controller records a set of consecutive readings over / under threshold values<br>level with enable / disable option<br>Overtime protection (1 to 180 min. or off)<br>intuitive alarm system using red, light green, and green color-coded backlight |
|                                    | Alarm Relay Output (1)  | SPDT 2.5A / 230 VAC   |
|                                    | External Event Input  | input for level controller or flow switch to disable dosing pump in the event of no chemical when using a level controller or no flow when using a flow switch - galvanically isolated  |
| Probe Input (1)                    | HI30033 EC/TDS/Temperature probe with quick connect DIN connector - galvanically isolated   |   |
| Power Supply                       | 100-240 VAC, 50/60 Hz   |   |
| Power Consumption                  | 15 VA   |   |
| Environment                        | 0-50°C (32-122°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 rated   |   |

**HI981413-00** is supplied with HI981413 controller, HI30033 EC/TDS/temperature probe, 1413  $\mu$ S/cm conductivity calibration solution (120 mL), plastic beaker, power connection cable, instruction manual and quality certificates for instrument and probe.

**HI981413-10** (with in-line mounting kit) is supplied with HI981413 controller, HI30033 EC/TDS/temperature probe, 1413  $\mu$ S/cm conductivity calibration solution (120 mL), controller aspiration filter, controller injector with 1/2" thread, saddle for  $\varnothing$  50 mm pipe (2), PVC aspiration tubing (flexible) (5 m), PE rigid dispensing tubing (for pump to injector) (5 m), plastic beaker, power connection cable, instruction manual and quality certificates for instrument and probe.

**HI981413-20** (with flow-cell mounting kit) is supplied with HI981413 controller, HI30033 EC/TDS/temperature probe, 1413  $\mu$ S/cm conductivity calibration solution (120 mL), flow cell for HI981413, mounting panel assembly for HI981413, controller aspiration filter, controller injector with 1/2" thread, saddle for  $\varnothing$  50 mm pipe (3), PVC aspiration tubing (flexible) (5 m), PE rigid dispensing tubing (for pump to injector) (15 m), barbed tubing adapter (1/2" - 6 mm)(2), flow cell valve (2), plastic beaker, power connection cable, instruction manual and quality certificates for instrument and probe.

### Ordering Information