HYDROGUARD
Turbidity Module

Installation and Operation Manual

February 2011

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1 Preface

1.1 Intended Use

This manual is for qualified and trained service technicians who will install and service HydroGuard Water Quality Analyzers.

Safety Precautions

Warning

Only properly trained and licensed electricians should attempt to wire or service the electronic components of the analyzer. There is an Electrical Shock Hazard when servicing this system. Always verify that all electrical power source(s) are off before opening the analyzer unit or attempting to service electronic components or wiring.

Caution

- Extreme caution should be used when installing, operating, and maintaining the HydroGuard Water Quality Analyzer and Controller.
- Only properly trained technicians are authorized to install and maintain the analyzer.
- Only properly trained and licensed electricians should attempt any change to the system's electrical components.
- Only properly trained and licensed operators should attempt to make any changes to chemical dosing levels.
- Always follow local health and safety regulations when performing any service on the HydroGuard unit or changing chemical dosing settings.

1.2 Manual Overview

This manual is intended to provide information on installation, operation and maintenance of Turbidity measurements of HydroGuard analyzers and controllers. The information provided is not specific to a single HydroGuard analyzer or controller so refer to the HydroGuard base manual for information related to the analyzer you are operating.

1.3 Installation

If the HydroGuard system was ordered with the Turbidity pre-installed, some of these steps will be completed in the factory.

1.4 Supplied Components

1. Turbidity Input Module (electronics card)
2. 150 mm flat cable
3. Turbidity Sensor (wiper optional)
4. Turbidity Flow Cell (bubble remover optional)
5. Flow Cell Mounting Bracket
6. 1 PG9 (connector)

7. Four mounting screws

Figure 1: *Turbidity Module Components*

Caution

Prior to opening the analyzer or installing any electrical components, turn off all power supplies to the analyzer

There are five (5) wires, contained in a single cord, from the sensor that must be connected to the analyzer. The standard wire length is 22 ft (7m), and may be cut or extended up to 650 ft (200m) as needed. The turbidity flow cell and sensor must be securely mounted using appropriate hardware for the mounting location. Unfiltered water will need to be supplied to the turbidity flow cell at a flow between 0.25 to 1 GPM and less than 30 psi (2 bar).

1.5 Turbidity unit without Gas Bubble Elimination

Figure 2: *Turbidity Module without gas bubble elimination*

1.6 Turbidity unit with Gas Bubble Elimination

Conventional turbidity measurements are carried out in an unpressurised sample. When the pressure on a sample (which was pressurized beforehand) is released, fine bubbles are produced which distort the turbidity measurement.

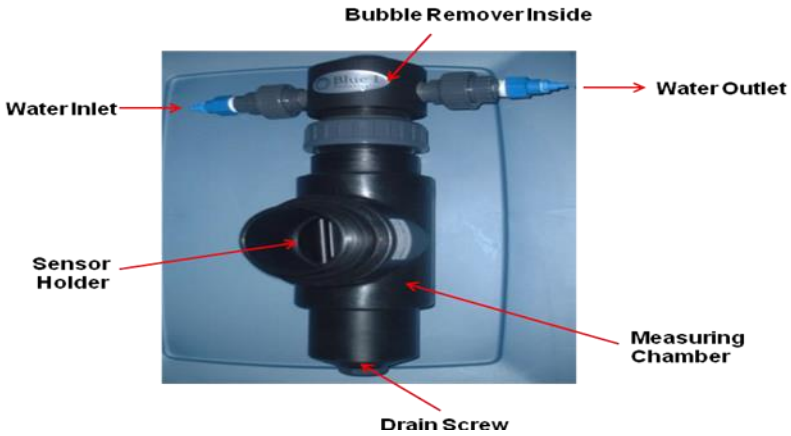


Figure 3: *Turbidity Module with gas bubble elimination*

How does the gas bubble trap works?

Most of the gas bubbles are sent directly to the assembly outlet in the upper half of the separated inlet.

The remaining flow's through the water inlet channel by means of the central pipe. The remaining bubbles rise here and are conveyed out of the measuring chamber by means of holes in the outlet located in the centre of the assembly. Bubble-free medium is pushed down into the measuring chamber. This also leads to a high flow which results in a quick response time. In addition, this almost completely prevents dirt particles settling.

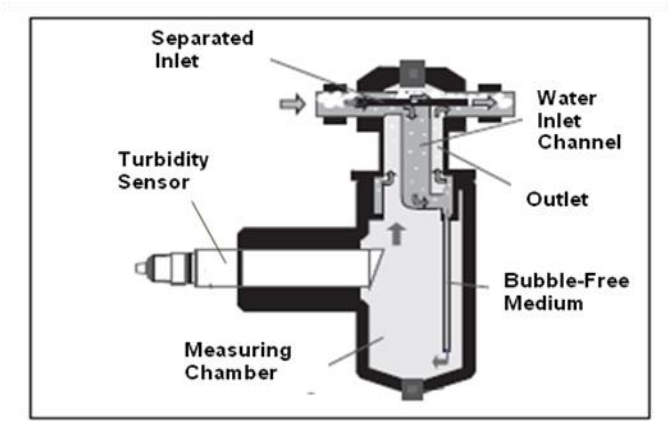


Figure 4: *Turbidity Module with gas bubble elimination - components*

1.6.1 Hardware and Plumbing Installation

1) Mount the Turbidity Flow Cell, using the supplied bracket (or other mounting hardware as appropriate) such as describe in the figure -1, figure -2 describes bubble removal installation
2) Insert the sensor into the opening of the flow tube, ensuring that the notch in the top of the opening matches the rod on the sensor.

3) Hand-tighten the connector to secure the sensor and seal the turbidity flow cell.

4) Connect the water supply to the turbidity flow cell. Follow the flow indicated by the arrow on the flow cell.

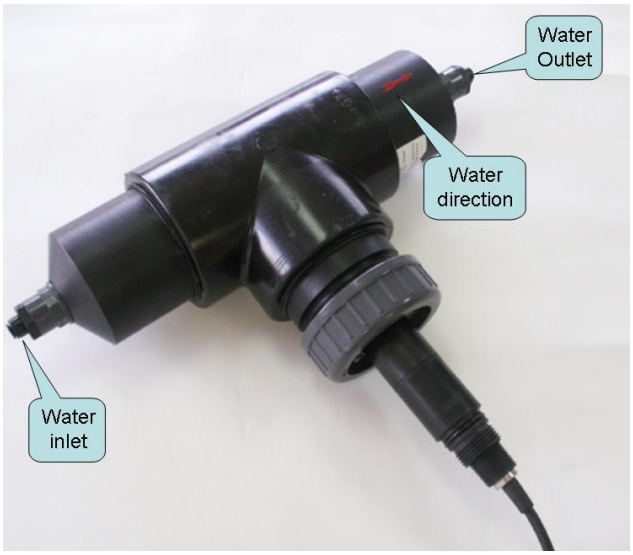


Figure 5: *Standard flow cell mounting orientation*

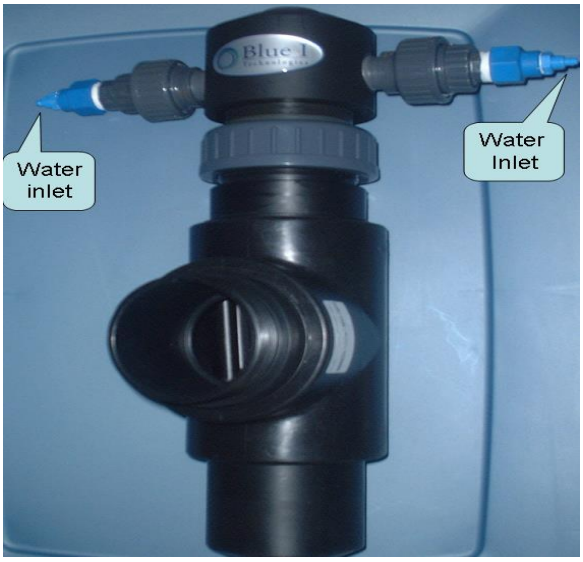


Figure 6: *Bubble removal mounting orientation*

Pressure should not exceed 30psi (2 bars). The inlet and outlet connections are ¼" FNPT.

1.6.2 Electrical Installation

1) Install the Turbidity Module (electronics card) on the inside, bottom of the control panel door using the supplied screws.

2) Connect the turbidity module to the I/O module using the supplied ribbon cable and any open connector (the connectors on both boards operate in parallel).

3) Pass the sensor cable through an open glad on the bottom of the analyzer.

4) Connect the wires from the sensor cable to the terminal block on the lower left corner of the Turbidity Module, following the color order indicated on the module.

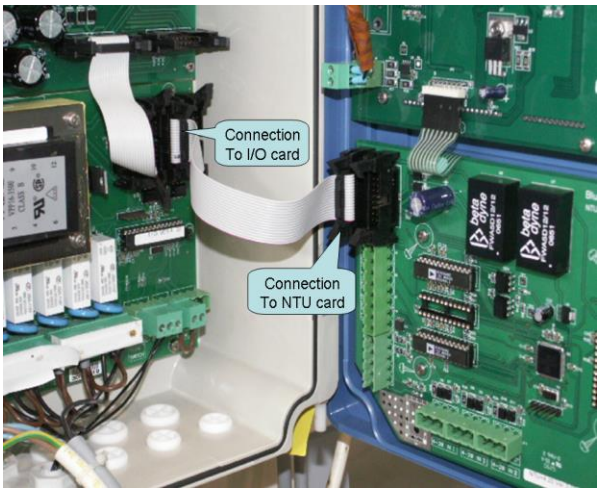


Figure 7: *Connecting Turbidity Module to I/O Module*

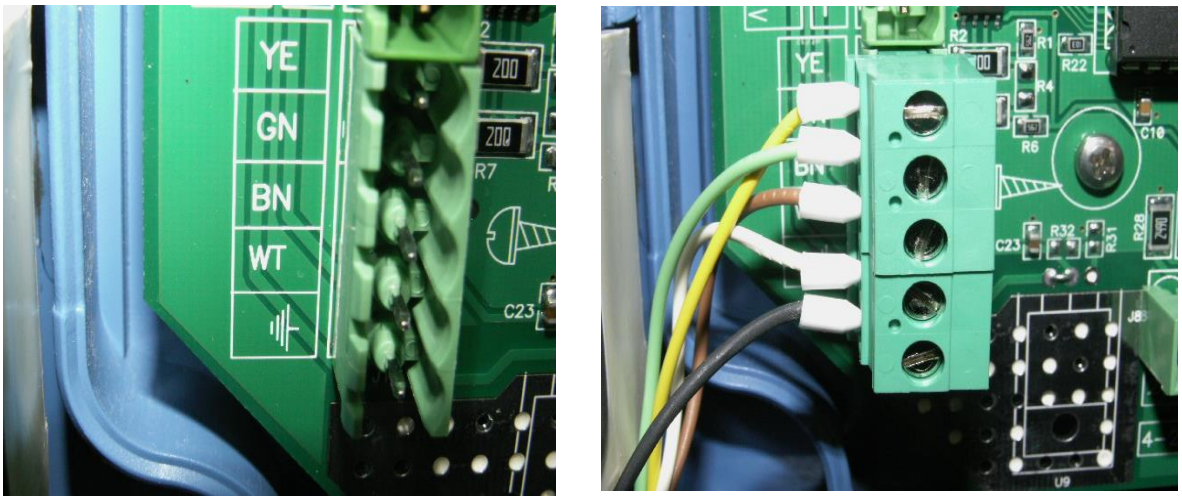


Figure 8: *Connecting Turbidity Sensor to Turbidity Module*

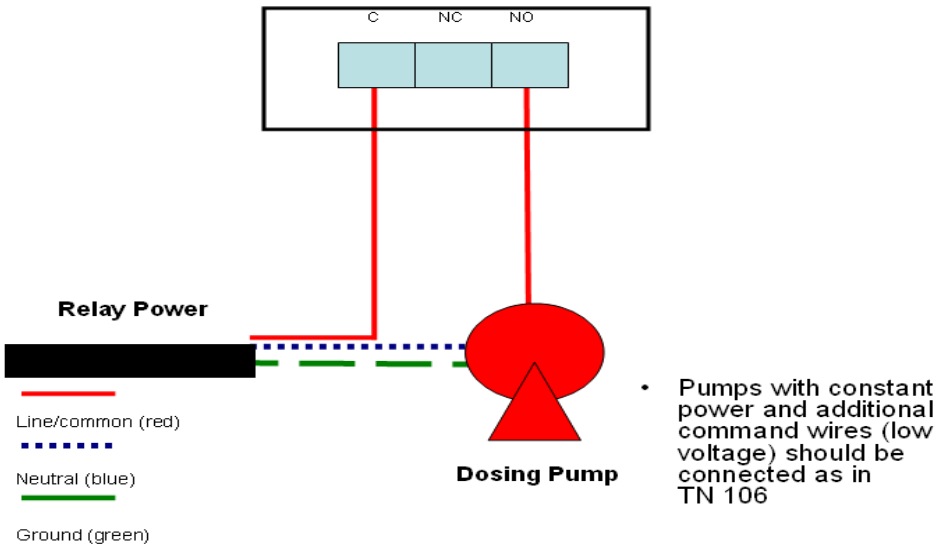
The sensor cable may be cut or extended up to a maximum distance of 650 feet (200m) as needed.

If the turbidity relay is not going to be connected to any external equipment, the installation is complete. If the relay will be used to operate equipment based on the turbidity set point, the following steps will need to be followed:

1.6.3 Relay Wiring and Use

Wiring of the Turbidity Relay (NTU relay) is identical to wiring of all other relays and should be connected to a dependent (interlocked) power supply to prevent operation of equipment when the water supply is not active. Likewise, it operates based on closed-loop control.

The line (live) wire of the pump-dependent power source connects to the connection labeled Common (C) on the NTU relay. The line wire of the controlled external turbidity equipment (such as flocculants dosing pump) is connected to the normally open (NO) or normally closed (NC) connection of each relay as appropriate. Normally Open means that the relay will be open (i.e. no power from the relay) until the analyzer calls for power; Normally Closed means that the relay will be closed (i.e. power from the relay) until the analyzer calls to stop power.



1. Turn OFF all power sources to the analyzer.
2. Connect the earth ground wire of the power supply to the ground return wire from the controlled external turbidity equipment.
3. Connect the neutral wire of the power supply to the neutral wire from the controlled external turbidity equipment.
4. Connect the line (live) wire of the power supply to the connector marked ‘C’ (common) on the NTU terminal block.
5. Connect the line (live) wire of the controlled external turbidity equipment to the normally open (NO) or normally closed (NC) connection on the NTU terminal block.

Caution

Each relay connection is limited to 4 amps, to prevent overheating. The relays may show a higher rating but do not connect equipment exceeding 4 amps.

1.6.3.1 Relay and External Equipment Operation

The relay will operate in an ON/OFF mode. Whenever the measured turbidity is below the set point, the relay will remain open (no power to normally open connection). Whenever the measured turbidity is above the turbidity set point, the relay will close (power will be supplied to the normally open connection).

If the measured turbidity is above the turbidity high alarm, the alarm on the analyzer will be activated. The NTU relay will remain closed (power to the normally open connection) even during alarm.

1.7 First Time Set-up and General Operation

Although the turbidity unit is connected, it will not operate until it is set-up in the analyzer menu.

1.7.1 Operator Menu

If the NTU relay is connected to external equipment:

1) Press Menu until “Turbidity Set Point” appears on the display and press OK
2) Enter the operator or technician password and press OK
3) Enter the turbidity set point value and press OK

With or without the NTU relay connected to external equipment:

4) Press Menu until “Turbidity High Alarm” appears on the display and press OK
5) Enter the operator or technician password and press OK
6) Enter the turbidity high alarm value and press OK

1.7.2 Technical Menu

1) Press Menu to enter the Operator Menu and then Press up and down together to enter the technical menu
2) Press Menu until “Turbidity ON/OFF” appears in the display and press OK
3) Enter the technician password and press OK
4) Press up to turn the turbidity sensor "On" and press OK

5) Press Menu until “Turbidity Wiper Interval” appears in the display and press OK
6) Enter the technician password and press OK
7) Enter the wiper interval (2 minutes is recommended) and press OK

The turbidity unit should now be active. Confirm that the turbidity value appears on the LCD display. If it is not active, perform a system reset.

2 Routine Maintenance

2.1 Turbidity Calibration

1) Take a sample of water from the flow cell
2) Test the sample using an accurate digital turbidly meter
3) Press Menu until NTUl Calibrated to or NTUh Calibrated to appear in the LCD display.

   If calibrating below 1.0 NTU, use NTUl (low) if calibrating above 1.0 NTU use NTUh (high).
4) Press OK.
5) Enter the password. Press the up arrow or down arrow until the password is reached.
6) Press OK.
7) The value that appears is the last calibrated value.
8) Press OK again.
9) Press the up arrow or down arrow until the value is the same as the independent digital turbidity meter.
10) Press OK to save the new calibration or Esc to abort without saving.
11) Press Esc to return to the main display.

Note

Only 1 Turbidity calibration will be active. If the measured Turbidity is less than 1.0, only the NTUl calibration will be active; if the turbidity is greater than 1.0, only the NTUh calibration will be active.

2.2 Shut-down and Winterizing

1) Disable the Turbidity measurement in the technician menu
2) Shut off the flow of water to the turbidity flow cell
3) Open the drain at the bottom of the flow cell to drain all water
4) If temperatures will drop below freezing, remove the turbidity sensor and store in a safe location where temperatures will not drop below freezing.

2.3 Replacing Components

2.3.1 Replacing the Turbidity Meter

1) Turn off the inlet and outlet water to the flow cell and the power to the analyzer.
2) Open the door of the control module.
3) Remove the 5 wires from the bottom of the Turbidity input module
4) Remove the meter from the flow cell by unscrewing the cap and pulling gently

5) Install the new meter in the flow cell
6) Route the wires back to the turbidity module and reconnect the 5 wires following the color coding on the module.
7) Restart the flow and turn the power on
8) Confirm that proper operation has been restored

2.4 Replacing Turbidity Input Module

Disconnect the power supply to the unit before opening the control unit.

1) Disconnect the flat cable plug from the card.
2) Disconnect all terminal blocks
3) Unscrew the four (4) mounting screws.
4) Put in the new card and tighten the 4 mounting screws.
5) Connect the flat cable plug to the card
6) Reconnect the terminal blocks

3 Troubleshooting

1) Zero reading
   a. Make sure the comm. as in (1)
   b. Make sure the flow assembly filled with water
   c. Make sure calibration done correctly
   d. Replace flat cable
2) Communication test
   a. On the NTU card the lowest right side LED should flush.

      In case the LED is not flushing, check all wiring connection.
   b. Check the flat cable is well mounted
   c. Replace the flat cable to other available bus port
3) High NTU reading
   a. Make sure no bubbles in the flow assembly, remove the sensor→ open the water inlet and let water flow slowly through the assembly→ while water flowing tighten the sensor back to its housing
   b. Check calibration done correctly, to enter the sensor reading value→ enter calibration and accept the sensor reading.

For further troubleshooting, refer to the analyzer's technician manual and/or contact customer service at support@blueitechnologies.com.

Blue I Water Technologies Ltd.
www.blueitechnologies.com