

Remote Water Level Monitoring Technical Note

Product: HOBO® RX3000 Station

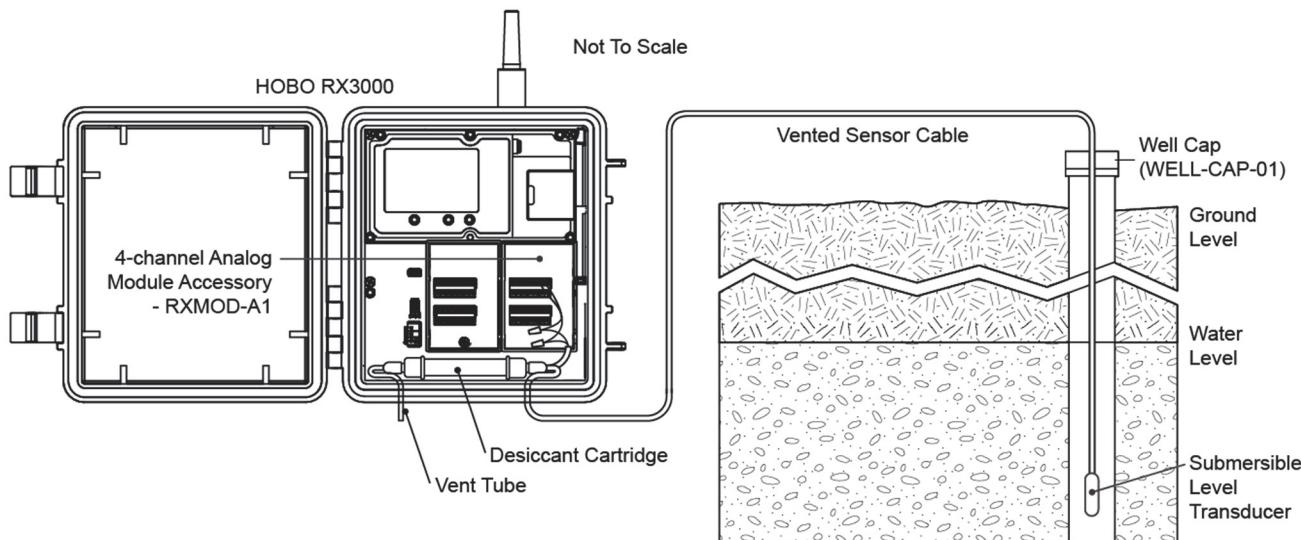
Summary: This technical note provides details on configuring the HOBO RX3000 Remote Monitoring Station with water level sensors with a 4-20mA output.

The combination of the RX3000 station and one or more third-party water level sensors with 4-20mA analog outputs provides a solution to remotely monitor water level and to access data via the internet. This system can also send notifications when critical levels are reached. Typical applications include monitoring wells, groundwater, surface water, storm water and storm surges.

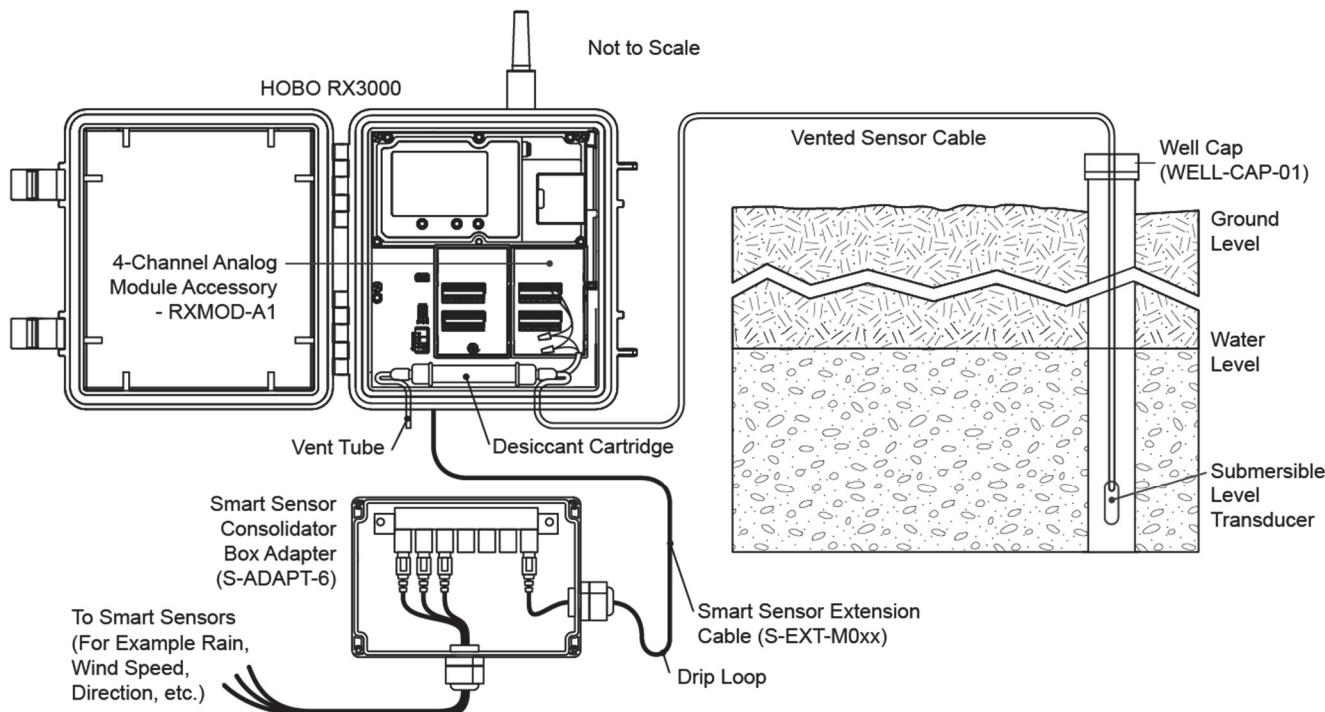
Deployment/Mounting Tips

Follow these guidelines for deploying and mounting a water level sensor for use with an RX3000 Station.

- When mounting the sensor in a well, use the Onset well cap (WELL-CAP-01). Drill a hole through the top of the cap for inserting the sensor cable. Use a hose clamp around the cable as a stopper to suspend the cable.
- Be sure the well with the water level sensor has a vent hole to the atmosphere.
- A desiccant cartridge is recommended for keeping moisture out of the vent tube for accurate measurements. The desiccant cartridge should be located inside a vented, weatherproof enclosure. Install the weatherproof cable channels in both channel openings in the bottom of the RX3000 station. The vent tube to the atmosphere should be routed through one of the weatherproof sensor cable openings.
- The desiccant cartridge can fit inside the RX3000 enclosure as shown in the following diagram, as long as the desiccant is no more than 11 cm (4.5 in.) long.



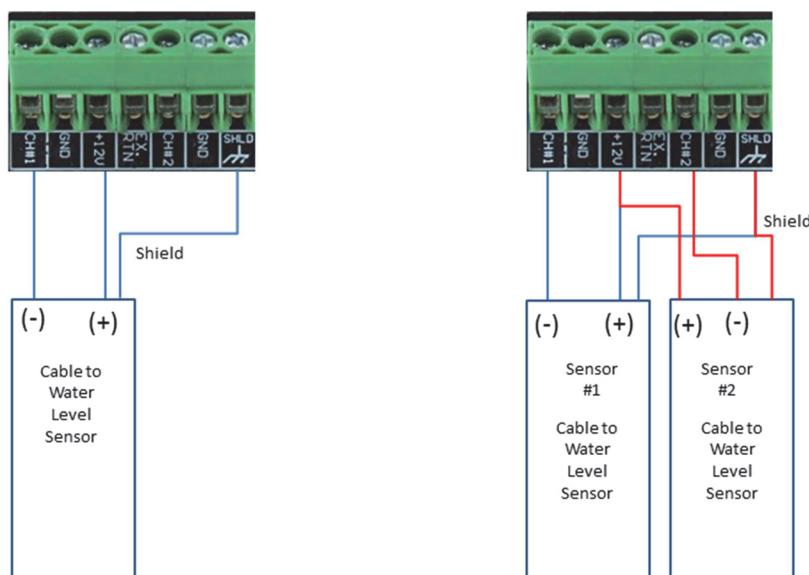
- If you are using other smart sensors (rain gauge, wind speed/directions, barometric pressure, etc.) in addition to the water level sensor, you may need to use a smart sensor consolidator box adapter (S-ADAPT-6) and a smart sensor extension cable (S-EXT-M0xx).



- Before connecting your water level sensor to the RX3000 station, make sure that the cable has been routed through openings as needed. Specifically, if the cable needs to go through a well cap, do that before connecting the wires. Also make sure that the cable is coming through one of the cable openings in the bottom of the RX3000.

Connecting a Water Level Sensor that Can Operate from 12V Power

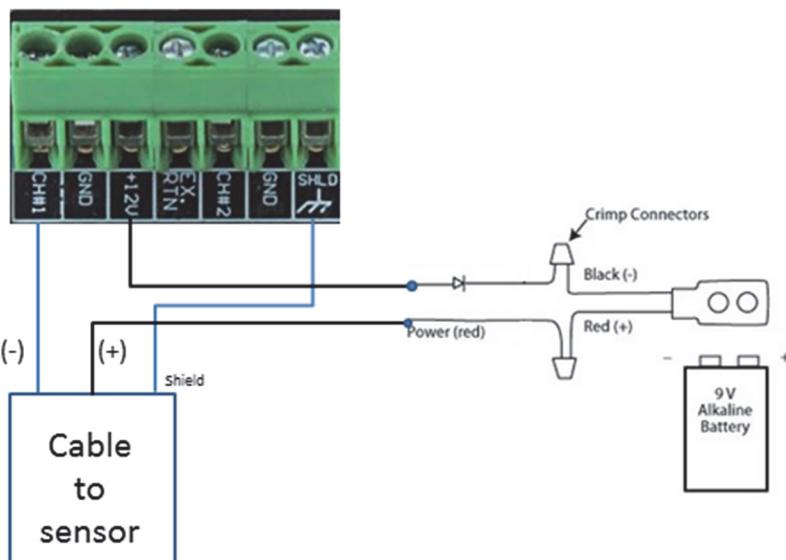
Connect as shown below.



Configuration with Sensors that work with a 12V Power Supply

Connecting a Sensor that Requires More than 12 Volts

Some water level sensors need excitation power higher than the 12 volts the RX3000 provides. The diagram below shows how to use a 9V battery to boost the 12V excitation of the RX3000. This configuration requires a 9V battery connector such as Radio Shack Model 270-325, and a diode rated for at least 50mA and 20V, such as a 4148 diode or a 5817 Schottky diode. With a 1 minute logging rate and 30ms warm-up time, a good 9V battery should last for over a year in this configuration. Onset recommends replacing the battery annually to be safe.



Analog Sensor Module Connections using a 9V Battery to Boost the Output Voltage

Configuring Analog Sensors in HOBOlink

1. In HOBOlink, select Devices from the left menu and click List and find your station in the list. From icon, select Module/Sensor Configuration as shown below.

The screenshot shows the HOBOlink software interface. The left sidebar includes 'Dashboards', 'Devices' (with 'List' and 'Map' options), 'Data', and 'User Settings'. The main area is titled 'Remote Monitoring Devices' and displays a table with columns: Nickname, Serial #, Last Connection, Communications, Relay, Alarms, and Configuration. A row for 'RX3000 Station' is shown with a connection status of 'Today at 13:15 UTC'. Below the table is a 'Register a Device' button and a note 'Displaying 1'. A dropdown menu is open over the 'Configuration' column, listing 'General Configuration', 'Readout Configuration', 'Module/Sensor Configuration' (which is highlighted in orange), 'Start/Stop', and 'Alarm Configuration'. At the bottom, there's a section for 'Standalone Device Deployments' with a checkbox for 'Show latest deployment only'.

2. Select the Analog Sensor Module from the menu on the left (Module 1 in this example). On the Module Configuration page, set your desired module logging interval.
 - Check “Use excitation power.”
 - Select Warmup and set the warmup time to 500 milliseconds (0.5 seconds). To save power, some water level sensors can be used with a shorter warm-up time. Check with the sensor manufacturer for the minimum warm-up time.
 - Click Next.

Configuration

- General
- Readout
- Smart Sensors Logging
 - Temperature
 - Module 1: Analog Sensors Logging
 - Channel 1 - Voltage
 - Channel 2 - Voltage
 - Channel 3 - Voltage
 - Channel 4 - Voltage
- Module 2: Relays
 - Relay 1
 - Relay 2
 - Relay 3
- Battery
- Start/Stop
- Alarms

Module Configuration

Logging Interval:
0 hours 10 minutes 0 seconds

Actual usage to date
5% of plan
This Month

Estimated usage with this configuration
80% of plan
This Month

*Data usage estimation assumes no tripped alarms or logger launches.

Sampling Interval:
 Enable 0 minutes 15 seconds

Statistics:
 Minimum Maximum Average Std Dev

Use excitation power
 Warmup
 Continuous
 0 seconds 500 milliseconds

Serial Number: 10524726

Back Save Next

3. On the Sensor Configuration page, check “Enable Graph” and “Enable this channel.”
4. Under Sensor/Input Type, select T-SDX-93720 with the appropriate range as shown in the example below.

Sensor Configuration

Latest Value: -12.500 feet

Current input maximum is 20.0 mA

Enable Graph
 Enable this channel

Label:

Sensor/Input Type:

Enable Scaling

Water Level

*Units:
 *Value 1:
 *Value 2:
 *Scaled Measurement:

Power

T-VER-8044-100, Veris 480 V, 100 Amp Kilowatt Transducer

Volatile Organic Compound

T-ION-TVOC, Ion Science VOC Monitor
 T-ION-TVOC, Range: (0 - 10 ppm)
 T-ION-TVOC, Range: (0 - 100 ppm)
 T-ION-TVOC, Range: (0 - 1000 ppm)

Water Level

T-SDX-93720, SDX Water Level Monitoring Sensor
 T-SDX-93720, Range: (0-5 ft)
T-SDX-93720, Range: (0-10 ft)
 T-SDX-93720, Range: (0-35 ft)
 T-SDX-93720, Range: (0-50 ft)

Back Save

5. Click Save. These changes will be transmitted to the station the next time it connects to HOBOlink. Press the Connect button on the station if you want it to connect to HOBOlink immediately.
6. Press the Start button on the station to begin logging when ready (if it isn't already logging).
 - If you will be using the sensor to monitor sensor depth, the steps are complete.

- If you will be using the sensor to monitor water level, continue with step 7.
7. Make sure the water level sensor is deployed in position and the station is logging. Make a reference level reading and note the time. For example, if you are using an on-site gauge as your reference, read the staff gauge to get your reference reading.
 8. In HOBOlink, create an export with data from this sensor.
 - a. From the main HOBOlink menu, select Data and then Exports.
 - b. Fill in the fields under export settings, making sure you select the time frame of over the past <x> number of minutes or hours to correspond with the time you took the reference level reading.
 - c. Select the Stevens T-SDX-93720 sensor.
 - d. Select Export Data.
 9. Open the file with the exported data. Find the logged data point in the exported file with the closest time to your reference level reading. Subtract this value from the reference level reading that you took in step 7.
 10. Return to the Sensor Configuration screen (in HOBOlink, click Devices, List, select Module/Sensor Configuration for your station and under Module <1 or 2>: Analog Sensors Logging, select the channel with the Stevens sensor).
 - a. Click Enable Scaling
 - b. Under Scaled Units, type Feet for the Units.
 - c. Add the offset value to the Scaled Units for both Value 1 and Value 2. For example, with an offset value of 2 and using the example in step 4, you would change Value 1 for Scaled Units to 2 and Value 2 for Scaled Units to 12 (it is ok to round to 12 instead of adding exactly 2 and entering 12.00000031914297).
 - d. Type the name of the data series in the Scaled Measurement Type field (for example, “Scaled Water Level”).

The screenshot shows the 'Sensor Configuration' screen with the following details:

- Latest Value:** 0.00 feet
- Current input maximum:** 20.0 mA
- Enable Graph:**
- Enable this channel:**
- Label:**
- Sensor/Input Type:** T-SDX-93720, Range: (0-10 ft)
- Enable Scaling:** [Help](#)
- Water Level** and **Scaled Units** sections are highlighted with a red box:

*Units: <input type="text" value="feet"/>	*Units: <input type="text" value="feet"/>
*Value 1: <input type="text" value="0.0"/>	= *Value 1: <input type="text" value="2"/>
*Value 2: <input type="text" value="10.00000031914297"/>	= *Value 2: <input type="text" value="12"/>
- Scaled Measurement Type:**
- Buttons:** Back, Save, Next

11. Click Save. These changes will be transmitted to the station the next time it connects to HOBOlink. Press the Connect button on the station if you want it to connect to HOBOlink immediately.