Agricultural Water Quality Program

WS Cercospora Sensor Building Instructions

By the Colorado State University Agricultural Water Quality Program

Step 1: Prepare Enclosure

Materials

- Waterproof Enclosure
- Drill and cone drill bit
- PG-7 gland w/ nut

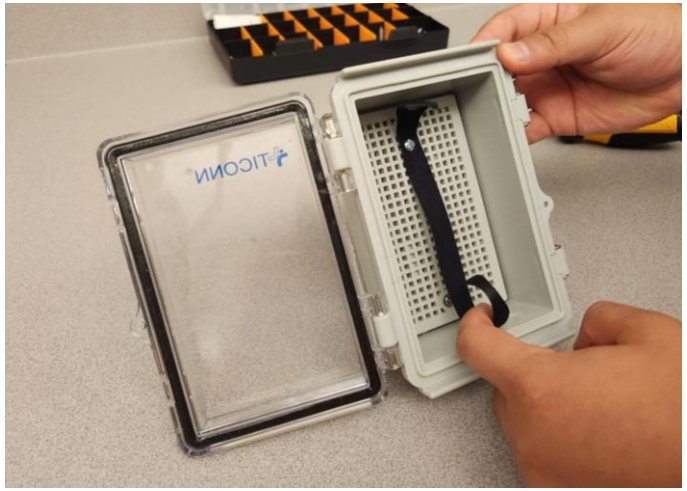
- Using a cone drill bit we will make a ½” hole into the Waterproof Enclosure for the PG-7 gland
- Drill hole 1” from the right of the bottom of the enclosure
- Insert PG-7 gland and secure inside enclosure with nut

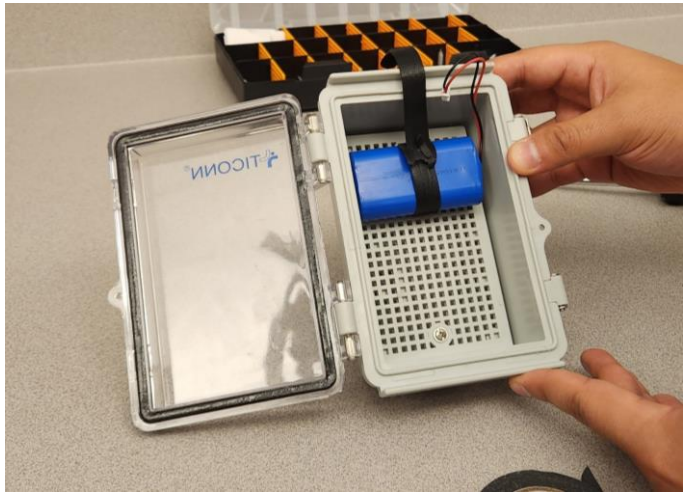
Step 2: Velcro Mount for Battery

Materials

- 1 Sheet Metal Screw (#6 x ½”)
- Fastening Cable Ties Reusable

- Using a #6 x 1/2" Sheet Metal screw, secure the Velcro strap to the top of the inner mesh.
- Secure battery with Velcro strap with battery wire on the top right side

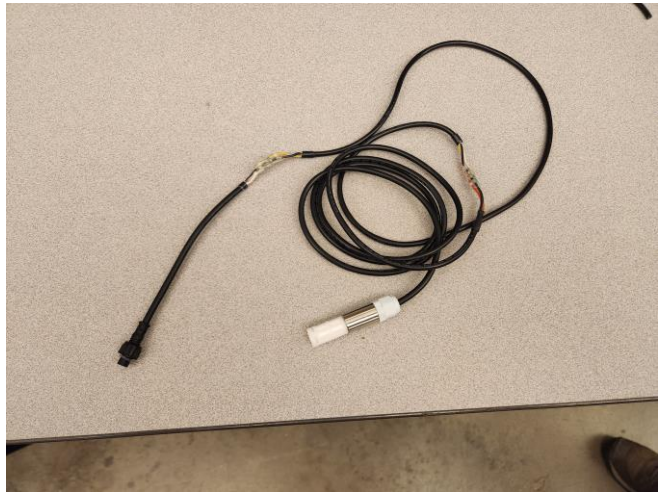




Step 3: Wiring the SHT-31 Sensor

Materials

- SHT-31 sensor
- Gauge 4 Conductor (4C) Wire
- Solder Seal Wire Connectors AWG26-24
- 4C Waterproof connector
- ¼” Heat Shrink
- Heat gun or lighter

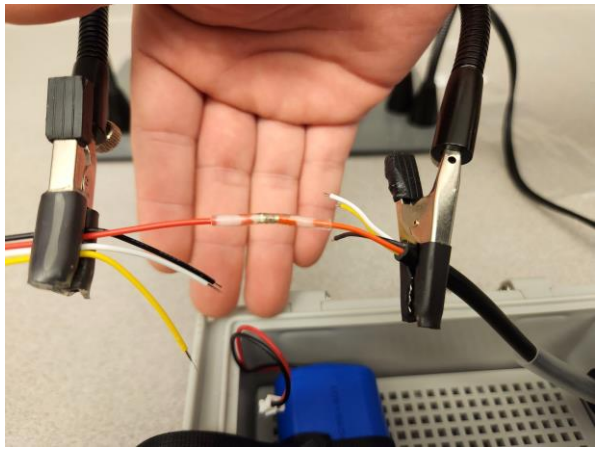


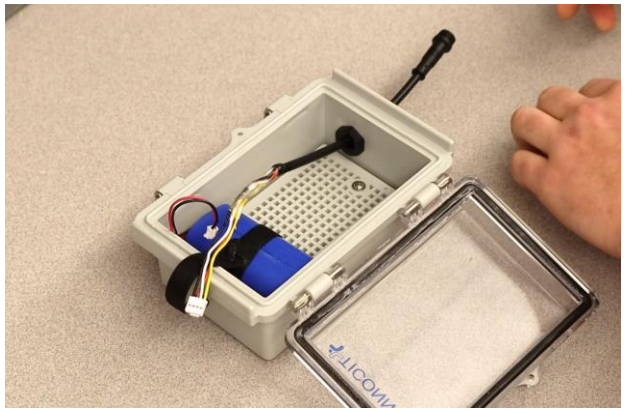
- Cut Gauge 4 Conductor Wire Extend the sensor cable by 3 ft
- Cut 2 Heat Shrink pieces (long enough to cover solder connections, roughly 2-3”) and slide both toward center of 4C wire BEFORE any soldering
- Use heat gun or lighter to connect wires using solder seal wire connectors
- Connect SHT-31 cable to the 4C wire matching the colors. (*Green = white)
- Connect 4C wire to waterproof connector (side with rubber gasket & screw cap) while matching colors
- Slide Heat Shrink over solder connections and use heat gun/lighter to secure
- Set aside until Step 7

Step 4: Wiring SHT-31 Sensor (cont.)

Materials

- Waterproof Enclosure
- Grove Connector
- 4C Waterproof Connector (other side)
- Solder Seal Wire Connectors AWG26-24 (x4)
- ¼” Heat Shrink
- Heat gun or lighter



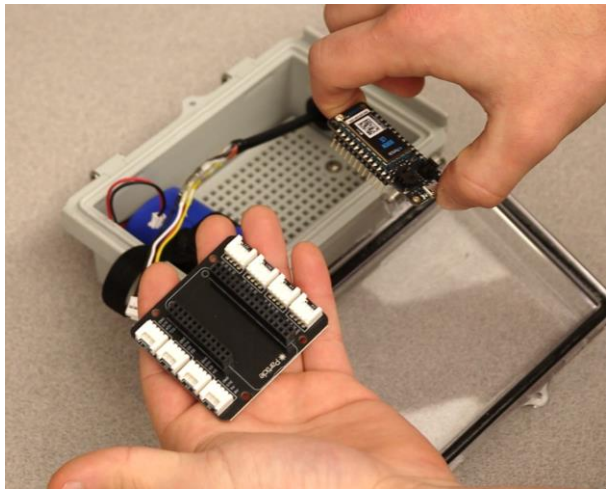


- Cut Grove connector in half
- Cut ¼” heat shrink about 2 to 3 in
- Slide the ¼” heat shrink onto the 4C Waterproof Connector
- Insert the waterproof connector into the PG7 gland on the waterproof enclosure
- **Make sure the waterproof connector is in the PG7 gland on the enclosure BEFORE soldering!**
- Use heat gun or lighter to connect grove connector to the 4C Waterproof connector using solder seal wire connectors matching all the colors.

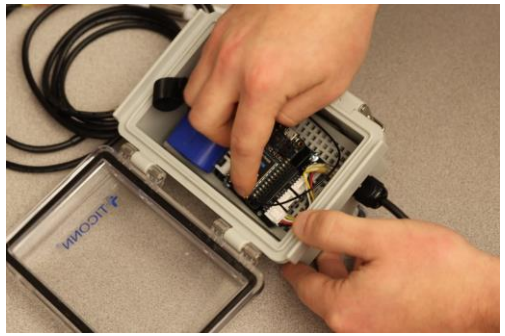
Step 5: Mounting Boron Cellular Device

Materials

- Boron w/ small antenna
- Grove Shield FeatherWing
- Waterproof Enclosure
- 2x Sheet Metal Screw (#6 x ½”)



- Match the 12 and 16 male pins on the bottom of the boron with the Grove shields 12 and 16 female pins
- Insert the boron onto the grove shield until all the pins a fully inserted
- (Optional but Recommended) Plug waterproof connector into the I2C_1 Port on grove shield before securing grove shield to enclosure
- Screw grove shield in below the battery using the sheet metal screws
- Attach small antenna to gold connector on top of boron and lay anywhere in enclosure

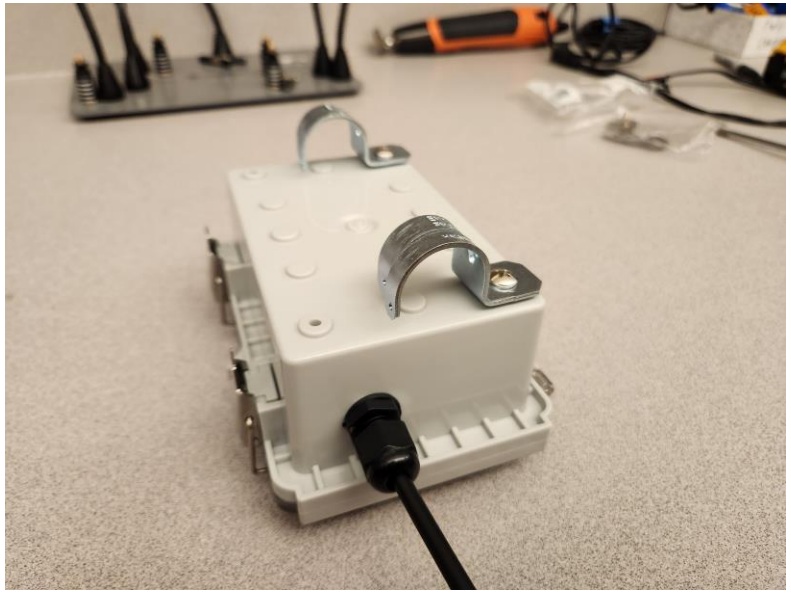


Step 6: Screw on Mounting Brackets

Materials

- 2x ¾”1-Hole Strap
- Waterproof Enclosure
- Mounting screws that came with the waterproof enclosure
- Screwdriver

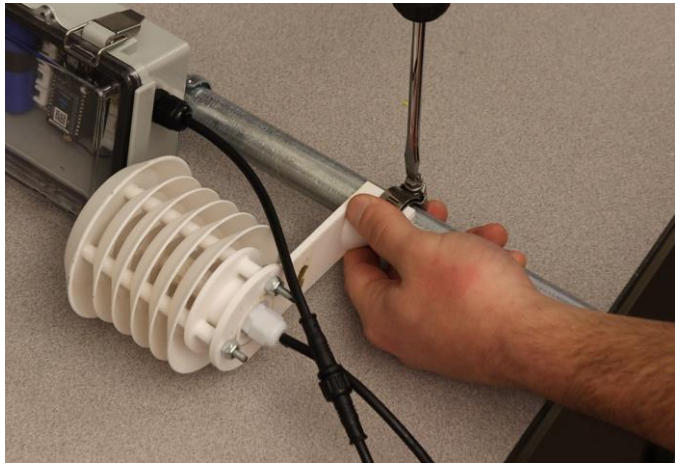
- Screw the ¾ “ 1 hole strap to the back of the waterproof enclosure with the screwdriver
- Make sure they are on the same side

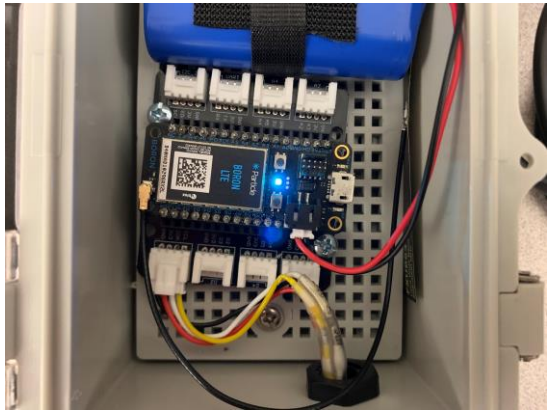


Step 7: Finishing/Deploying the Sensor

Materials

- ¾” EMT Pole
- Finished Enclosure
- Finished SHT-31 Sensor String
- (Optional) Radiation Shield
- (Optional) Pipe Clamp & Flathead Screwdriver





- Connect SHT-31 sensor string to other side of waterproof connector and secure using screw cap, and ensure grove connector is secured onto grove shield using the I2C_1 Port
- Secure enclosure to EMT pole using brackets on the back (will slide onto pole with a little resistance) and place EMT pole in desired location. Face sensor to the north for minimum sun exposure.
- (Optional) Mount SHT-31 sensor into radiation shield for cercospora sensing and mount radiation shield to EMT pole using pipe clamp and flathead screwdriver
- Plug battery into boron and wait until boron LED light is ‘breathing’ or ‘pulsing’ the color cyan (LED will cycle between flashing green and flashing cyan before ‘breathing’, may take up to two minutes)
- Sensor is now complete and is recording data!

All finished!

For any questions, please contact:

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