PA0022 Technical User Manual

1 Introduction

The Device Solutions PA0022 SensorII LoRa Board is based on a Semtech SX1276 Low Power Long Range Multiband RF Transceiver.   The PA0022 card has Limited Modular approval under FCC 15C and applicable Industry Canada RSSs. This document summarizes the requirements for integrating the PA0022 into additional products.

2 Regulatory Requirements

The Limited Modular FCC and IC approvals for the PA0022 SensorII LoRa Board only authorizes integration into Device Solutions host products; specifically the Gateway and Sensor products.

To conform to the limited modular approval, the integration must conform to the following:
1. There must be no changes to the antenna system.
2. There must be no changes to the remainder of the module.
3. The product shall be labeled "Contains FCC ID: OXW-PA0022" per FCC requirements.
4. The product shall be labeled "Contains IC ID: 10572A-PA0022" per IC requirements.
5. All integrations must conform to applicable RF exposure limits and associated usage conditions for installation type (fixed, portable, mobile).
6. The user manual shall include the following text:

This device complies with Part 15 of the FCC Rules. This device complies with Industry Canada's license-exempt RSSs. Operation of the device is subject to the following two conditions: (1) The device may not cause harmful interference, and (2) The device must accept any interference that may cause undesired operation.

This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

•   Reorient or relocate the receiving antenna

•   Increase the separation between the equipment or devices

•   Connect the equipment to an outlet other than the receiver's

•   Consult a dealer or an experienced radio/TV technician for assistance

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3 Other Recommendations

1. The PA0022 Sensor II LoRa board shall be installed in such a way as to maximize clearance around the antenna.

4 Example Host Product Assembly Instructions

1. Insert the rubber O-ring into the groove in the enclosure base.

2. Insert the wire gland in the bulkhead as shown and fasten in place with the wire grommet nut on the inside of the enclosure bulkhead to a torque of 15-20 inch lbs.
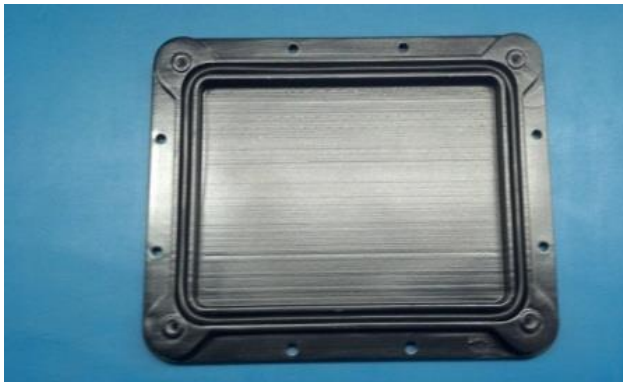
3. Fasten the Sensor PCB assembly to the enclosure top using four 3/8" #4 screws as shown. The screws should be tight such that the PCB is not free to move.

4. Install the battery retention device.

5. Insert four 3/8" #4 screws into the corners of the enclosure top to fasten it to the enclosure base. Tighten screws to a torque of 8.2 +/-0.5 kgf-cm.

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6. Place the FCC label on the bottom of the enclosure as shown. The top of the label should be pointing in the same direction as the sensor antenna.

7. Apply the label as shown to the enclosure. The top of the label should be pointing in the same direction as the sensor antenna.


5 Example Host Product Installation Instructions

1. Use a Torx T10 driver to remove the screws that hold the top of the Sensor's enclosure to the baseplate.
2. Verify the signal strength at the Sensor. Note: This signal strength monitoring process may only be executed on one Sensor at a time.
   a. Open the Gateway by using a Torx T10 bit to remove the four screws which hold the enclosure top to the base plate.
   b. Press the button on the Gateway to enter "Range Check Mode".
   c. Wait for the internal green LED to illuminate.
   d. Place the Sensor within 50 feet line of sight of the Gateway
   e. Reboot the Sensor by removing and re-installing the 9 volt battery
   f. Wait for the Sensor's internal LED to illuminate (up to 10 seconds)

   g. The color of the LED indicates the following (red – poor signal quality, yellow – marginal signal quality, green – good signal quality)
   h. Move the Gateway and/or Sensor until the Sensor displays a good signal condition for at least 5 consecutive seconds.
   i. Repeat c through g for each sensor.
   j. Disable "Range Check Mode" for the Gateway by pressing the button on the Gateway again (if this step is forgotten the Gateway will exit Range Check Mode in one hour)
   k. Turn off each Sensor by removing the 9 volt battery (if this step is forgotten the sensor will exit install mode in five minutes)
3. Strip the insulation from the end of transducer wires.

4. Tin the ends of the transducer cable with a soldering iron.
5. Trim the transducer wire such that only 0.25 inches remains uninsulated.
6. Inspect the transducer cable for loose solder and wire strands. Repeat steps 3 through 6 if found. Loose solder or wire strands can cause permanent damage to the Sensor and/or transducer.
7. Remove the battery from the Sensor. Performing the following steps with the battery installed can lead to permanent damage of the device.
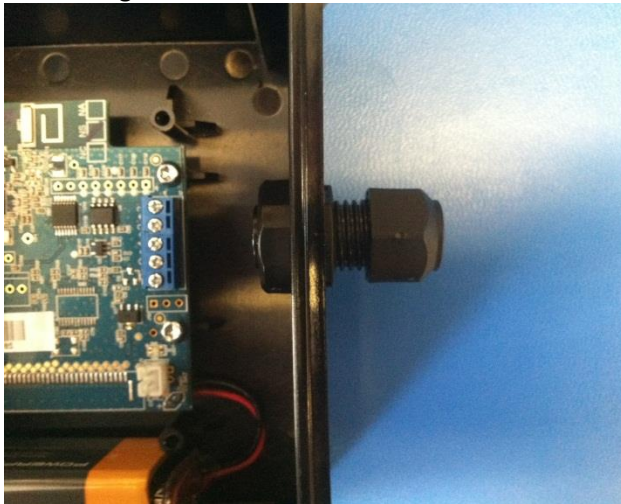
8. Loosen the nut from the outside of the cable restraint shown above.
9. Pass the transducer wires through the cable restraint.
10. Tighten the cable restraint nut to the cable restraint. Note: The transducer cable must be between 2.9 and 6.4 mm in diameter and must be tighten to a torque of 25-30 inch lbs to avoid water infiltration.
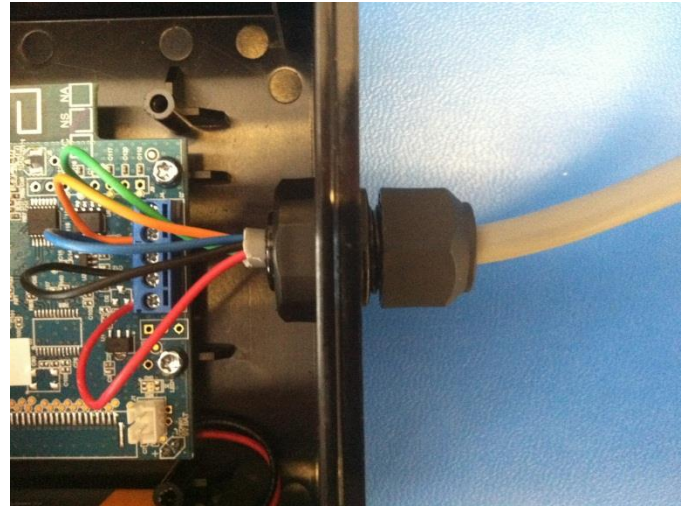
11. Attach the transducer wires to the terminal blocks. This connection depends on the type of transducer used.
12. Install the 9 volt battery in the sensor
13. Re-install the screws that hold the top of the enclosure to the baseplate.
14. Attach the enclosure to a surface. The best RF performance is obtained by mounting the Sensor vertically. This is achieved with the power connector coming out the left side of the gateway.