

Installation of the 941B0466 AIM Environmental Protection Enclosure Kits

NOTE AIM modules installed outside the vehicle will not be warranted unless installed in the 941B0466 AIM Environmental Protection Enclosure Kit. This does not apply to AIM HD, which is designed for installation outside the vehicle.

AIM modules use RF to communicate with FuelMaster® Fuel Management Unit (FMU) transceivers. Installations in most automobiles will support RF communications. In trucks, buses, or heavy equipment with heavy steel cabs, RF may not penetrate. If the AIM and FMU can't RF connect, communications will be inconsistent. The 941B0466 AIM Environmental Protection Enclosure Kits provide installation options that facilitate good RF reception.

Because the 941B0410 RFID AIM Extension Cables have connectors on both ends, and the connectors will not fit through the strain reliefs into the enclosure, a 941B0468 RFID AIM Extension Cable was designed with the connector removed from one end. The 941B0468 cables are available in 5, 10, 15, 20, 30, 50, and 80-foot lengths. A length must be specified in the equipment order. Any excess can be coiled and concealed.

The 941B0466 AIM Environmental Protection Enclosure Kits are designed to provide environmental protection for AIM2 and AIM2.4 modules so they may be mounted externally to a vehicle or cab of a truck. The 941B0466 AIM Environmental Protection Enclosure Kits can only be utilized with analog installations; No-OBD installations, due to the length of the OBD cable. This product bulletin will cover both the parts supplied with the various kits and suggested mounting options.

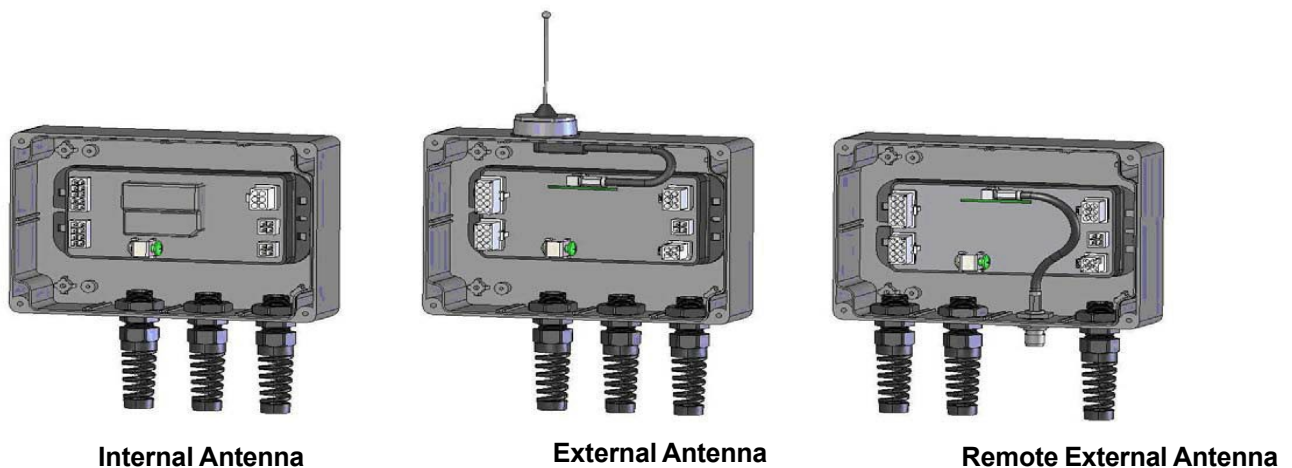


Figure 1. 941B0466 AIM Environmental Protection Enclosure Kit Options

Kit Selection

There are three 941B0466 AIM Environmental Protection Enclosure kits (see Figure 1): internal antenna, external antenna, and remote external antenna. If the AIM module must be mounted outside a truck cab or outside a vehicle passenger compartment, one of the three kits is required. Kit selection will be most dependent upon where the antenna needs to be mounted to effect line-of-sight RF communications. Since fueling scenarios, physical layouts and vehicles vary, it is difficult to define hard and fast rules for antenna location and kit selection. The physical layout of the vehicle and fueling facility, and how the vehicle approaches the fueling point(s) will determine which kit is needed.

The Internal Antenna kit mounts the AIM module in the enclosure. There are no provisions for connection to an external antenna. This kit must use an AIM module with an internal antenna: AIM2 part number 941B0420A, or AIM2.4 part number 941B0720. RF can penetrate the plastic enclosure. The internal antenna and external antenna enclosure kits are nearly identical in function and installation. The internal antenna kit should be used if you have AIM modules with an internal antenna.

The External Antenna kit mounts the AIM module in the enclosure, and an external antenna on the outside of the enclosure. This kit must use an AIM module with an external antenna connector: AIM2 part number 941B0420B, or AIM2.4 part number 941B0720A. These AIM modules do not have an internal antenna. They must have an external antenna. The external antenna and internal antenna enclosure kits are nearly identical in function and installation. The external antenna kit should be used if you have AIM modules without an internal antenna.

The Remote External Antenna kit mounts the AIM module in the enclosure, and an external antenna somewhere remote from the enclosure. The external antenna and antenna bracket are not included with the 941B0466 kit, and must be purchased separately. When considering Remote External Antenna kits, consideration should be given to using longer RFID cables over longer antenna cables. This kit must also use an AIM module with an external antenna connector: AIM2 part number 941B0420B, or AIM2.4 part number 941B0720A. These AIM modules do not have an internal antenna. They must have an external antenna. Following are external antenna options. For AIM2 two different antennas are available. 1/4 wave antennas are approximately 3 inches long; 5/8 wave antennas provide greater range and are approximately 9 inches long. The length specified below is the length of the antenna cable. The AIM2.4 modules have only one antenna option; differences occur only with the antenna cable length. In addition to the various antennas and antenna cable combinations, there are also two different antenna mount brackets: 981A0201 short, and 981A0201A long. See Figure 2. Both brackets attach to a vertical surface. The long bracket extends the antenna 6 inches higher than the short bracket.

Part	Antenna	
Number	Antenna	Cable
941G0309	1/4 wave	13 ft
941G0309A	1/4 wave	20 ft
941G0309B	5/8 wave	20 ft
941G0309C	5/8 wave	12 in
981A0207		13 ft
981A0207A		3 ft

Kit Components

See the examples in Figure 1. All kits have common components as shown below. The 3M Dual Lock Fasteners fit and function like Velcro, but have a different brand name. In addition to the parts listed below, the external antenna kit also has a 941B0477 antenna and cable, and the remote external antenna kit also has a 255637-antenna cable with bulkhead fitting. The 256196 and 254401 strain relief domes are shorter (less than 1 inch) than the strain reliefs and may be used if the strain reliefs are too long. The 252387 and 252395 are 22-inches long.

Description	Qty	Part Number
Enclosure Base and Cover	1	252379
3M Dual Lock Fasteners	4	243973
Large Cable Strain Relief	2	252387
(Large Cable Strain Relief Dome	As Required	256196)
Small Cable Strain Relief	1	252395
(Small Cable Strain Relief Dome	As Required	254401)
Nylon Lock Nut	3	252409
O-Ring	3	252417
RF/ID AIM Extension Cable	1	941B0468
8-32 x 1 inch Screws	4	252476
8-32 Locknuts	4	228524

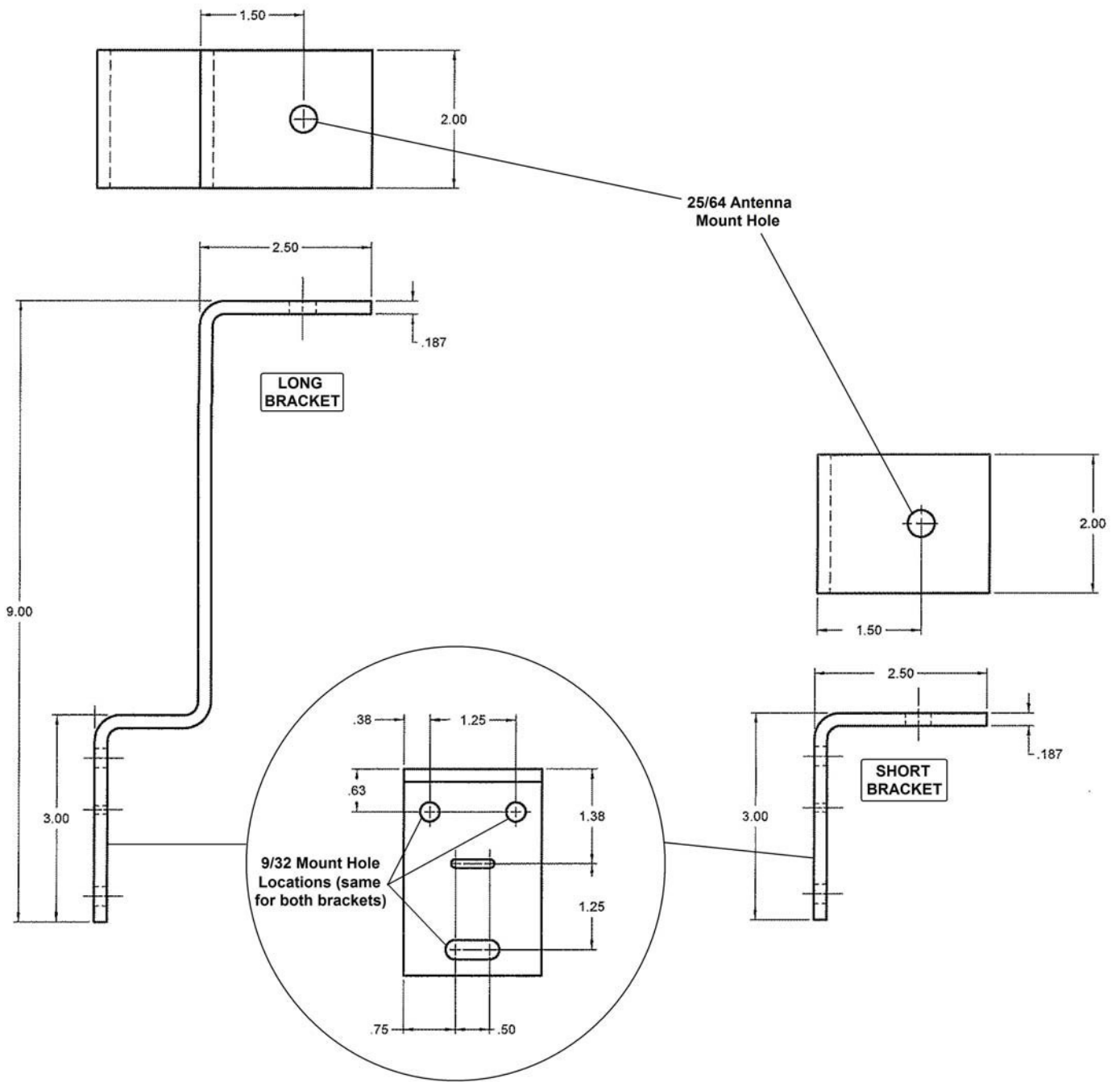


Figure 2. Remote External Antenna Brackets

Selecting a Mounting Location

Several points must be considered when selecting the mounting location for the enclosure and, if used, remote antenna. The enclosure (or remote antenna) must have RF line-of-sight with the antennas on the FMU when the vehicle is fueling. The orientation of the vehicle when it is fueling will impact line-of-sight. The AIM module will require connections to the analog speed sensor cable, the RFID extension cable, and a ground. In some cases, it may also require a connection to an analog chronometer. Wherever the enclosure is mounted must support routing of these cables to the enclosure. When a remote antenna is used, the enclosure need not be line-of-sight, but must support connections to the same cables and the remote antenna.

For troubleshooting, it will be good to have visibility of the LEDs on the AIM module, and accessibility to update the firmware.

Installation

The appropriate kit must be installed as follows:

1. Unpack and inspect all parts. Verify all parts are included, and nothing was damaged in shipment.
2. As required, locate connections for power and analog speed/chronometer inputs. Plan and layout routes for the 941B0411 Analog Speed Sensor Cable and 941B0421 Analog Chronometer Cable, as required.

NOTE There are two designs of the RFID AIM Extension Cable. The 941B0410 is not used with this application. It has connectors installed on both ends of the cable. The 941B0468 has one connector removed to permit the cable to be routed through the strain reliefs and holes in the enclosure. Verify the cable being used is a 941B0468.

The 941B0468 cable is available in the following lengths and associated part numbers: 941B0468 (5 ft), 941B0468A (10 ft), 941B0468B (15 ft), 941B0468C (20 ft), 941B0468D (30 ft), 941B0468E (50 ft), and 941B0468F (80 ft). One R/ID cable is provided with each enclosure kit. The correct part number must be requested for the length needed.

3. Plan and layout a route for the 941B0468 RFID AIM Extension Cable from the fuel tank filler neck to the enclosure mount location.

NOTE The enclosures are not predrilled for cable entry or antenna installation. Where the cables enter the enclosure, and the number of entry holes, may not be the same for every installation. Illustrations in these instructions show some mounting examples. Depending upon the desired mounting method, holes for the strain reliefs or antenna installation may be drilled anywhere in the enclosure base.

A step drill is a good choice for cutting holes in the enclosure. The step drill needs to include steps for 7/16 inch, 1/2 inch and 9/16-inch hole cuts.

- See Figure 3. The figure illustrates the strain reliefs installed on the bottom edge of the enclosure. The strain reliefs and antenna connections may be placed anywhere that still permits cable connection and installation of the module. Using the 1" x 2" Dual Lock Reclosable Fasteners (like Velcro), mount the AIM inside the enclosure allowing room for cable entry and, where required, installation of an external or remote external antenna. Adhesive on one side of the fasteners must adhere to the AIM module, and the other side to the enclosure. Do not place the fasteners over the AIM serial number.

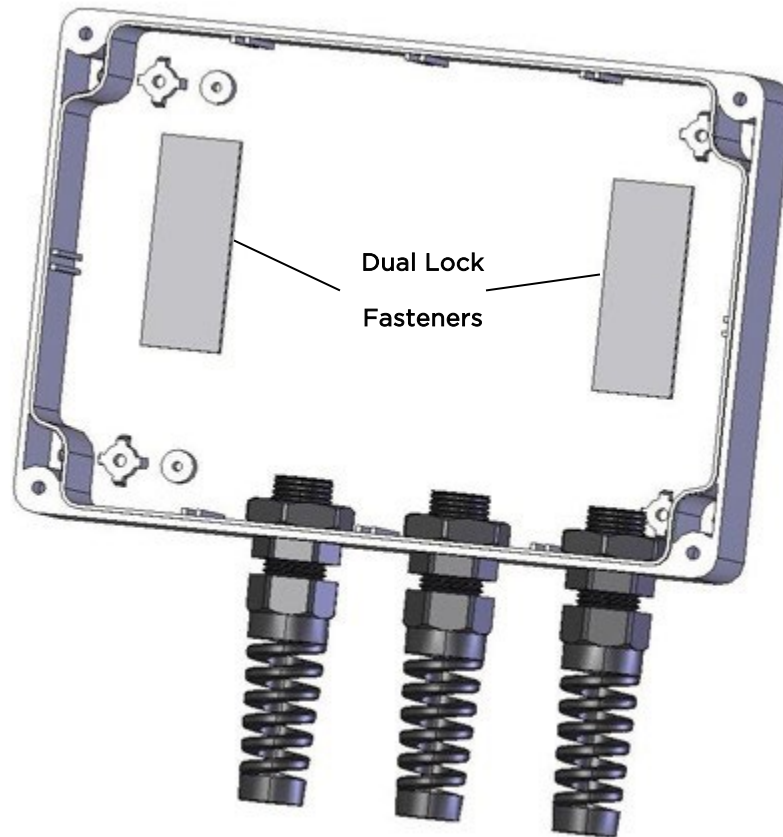


Figure 3.Placement of Dual Lock Fasteners to Mount AIM Module

NOTE If the enclosure with the external antenna is used, the external antenna must be vertical mounted. It cannot be horizontal.

5. Mark locations to cut holes for the strain reliefs and external (or remote external) antenna/antenna cable.
6. Remove the AIM module.
7. Use a step drill (Figure 4) to drill the appropriate holes; 9/16 inch for the strain reliefs, 7/16 inch for the external antenna, and ½ inch for the remote external antenna cable. Remove the plastic shavings.



Figure 4. Step Drill

8. The enclosure with the hinged cover has four mount bracket ears that must be installed for mounting the enclosure. If using this enclosure, open the cover and install the four mount bracket ears using the four screws and nuts provided.

NOTE When using the internal or external antenna enclosure, the enclosure must have line-of-sight with the FMU antennas when the vehicle is fueling. The remote external antenna enclosure need not have line-of-sight, but the mounting location for the remote external antenna must have line-of-sight with the FMU antennas when the vehicle is fueling.

9. At the selected mounting location, use the enclosure, or dimensions from the drawing shown in Figure TBD, and mark four mount holes for the enclosure base.
10. Drill four 3/16" mount holes to mount the enclosure.

NOTE In some applications it may be necessary to replace the 8-32 x 1" screws and nuts with self-tapping screws.

11. Using the supplied 8-32 x 1" screws and nuts, mount the enclosure to the 3/16" mount holes.
12. The 252387 large strain reliefs are used with the 941B0411 Analog Speed Sensor Cable, and 941B0468 RFID Extension Cable. The 252395 small strain relief is used with the 941B0421 Analog Chronometer Cable. Insert the strain reliefs in the enclosure. Install an o-ring over the threaded end of the strain relief, then install a nylon locknut tight against the o-ring.
13. Reinstall the AIM module on the Dual Lock Fasteners.
14. Install the 941B0468 RFID AIM Extension Cable (see Figure 5):

NOTE The connectors on the ends of the 941B0468 RFID AIM Extension Cable will not fit through the large strain relief or 9/16" holes in the enclosure. The 941B0468 cable is supplied with one connector removed. The connector is installed after the cable is threaded through the strain relief into the enclosure. The other end of the cable with the installed connector has shrink tubing, and is better sealed for outdoor connection to the RFID Interface Module. The loose wire end of the cable is routed into the enclosure.

- a. Thread the loose wire end of the cable through a large strain relief into the enclosure.
- b. The three loose wires are color coded red, black, and white. The loose connector has pin holes marked with red, black, and white paint. Match the color code and insert the wires into the connector. The pins on the ends of the loose wires have a latch to lock the pins in the connector. Check the three wires lock in the connector.
- c. Plug the connector into one of the four pin Tank Ring Ports in the AIM module.
- d. Extend the other end of the cable to the RFID Interface Module in accordance with AIM2 Installation Manual instructions for the 941B0410 RFID AIM Extension Cable.

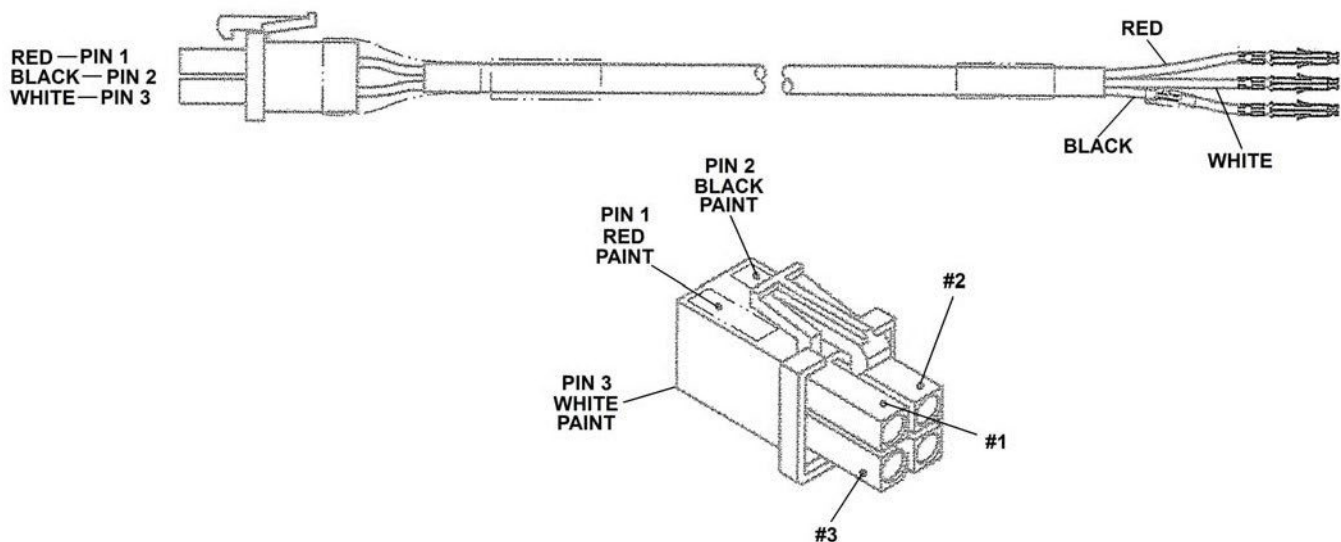


Figure 5. 941B0468 RF/ID AIM Extension Cable

15. Plug the 941B0411 Analog Speed Sensor Cable into the 8 pin AIM Power/Speed Sensor Port and thread the loose wire ends out the remaining large strain relief. Then connect the loose wire ends in accordance with the AIM2 Installation Manual.
16. If applicable, plug the 941B0421 Analog Chronometer Cable connector into the 6 pin AIM Chronometer Port and thread the loose wire ends out the small cable strain relief. Then connect the loose wire ends in accordance with the AIM2 Installation Manual.
17. (External Antenna Kit) See Figure 6. If applicable, install the external antenna. There should be a 7/16-inch hole cut in the enclosure (from step 7) to mount the external antenna:
 - a. Disassemble the external antenna assembly.
 - b. Insert the antenna mount through the 7/16-inch enclosure hole from inside the enclosure.

NOTE Some antennas have a white plastic washer (shown as OPTIONAL in Figure 6) on the underside of the brass nut; some don't. The antenna will perform as needed with or without the washer.

- c. Install the O-ring and, if provided, the plastic washer in the recesses under the brass nut.

- d. Install the rubber gasket over the antenna mount, then thread the brass nut onto the antenna mount.
- e. Tighten the brass nut so the rubber gasket is providing a seal between the brass nut and enclosure.
- f. Install the antenna on the brass nut, and tighten. The rubber gasket should also seal the space between the antenna and enclosure.
- g. Attach the connector on the end of the antenna cable to the AIM module external antenna connector.

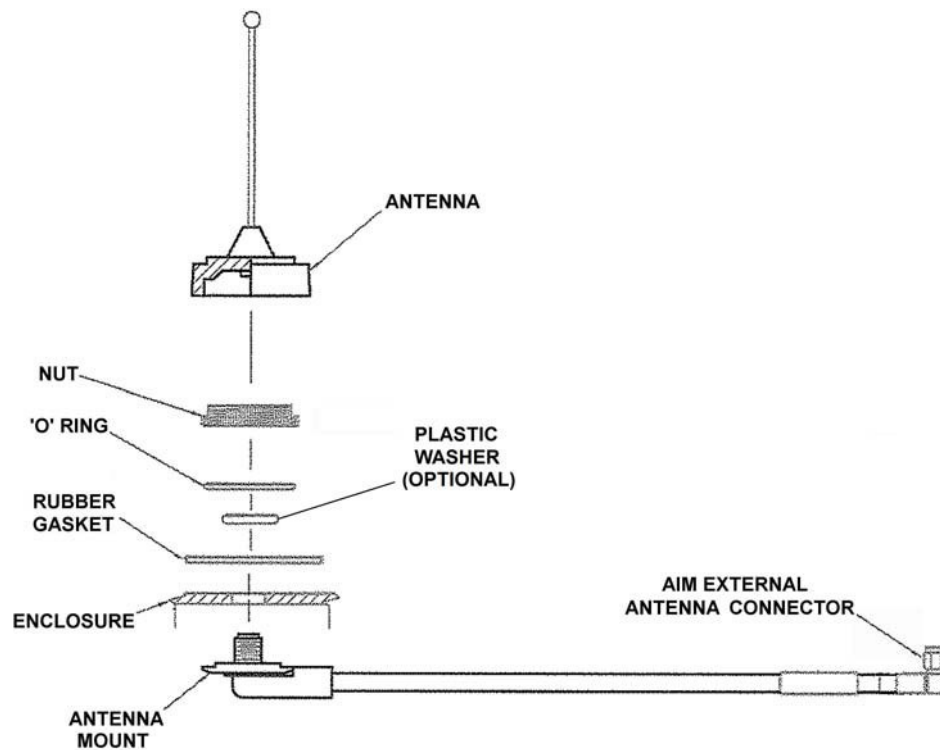


Figure 6. External Antenna Assembly

18. (Remote External Antenna) Install the remote external antenna:
 - a. Remove the locknut, star washer, and o-ring from the bulkhead connector of the 255637-antenna cable.
 - b. Insert the bulkhead connector through the ½ inch hole in the enclosure from the inside to the outside.
 - c. Re-install the o-ring, star washer, and locknut on the bulkhead connector. Tighten the locknut.
 - d. Connect the SMA antenna connector to the AIM external antenna receptacle.
 - e. The remote external antenna will be mounted vertical on an antenna bracket as shown in Figure 2. A suitable mounting location must be found to give the antenna line-of-sight with the FMU antenna when the vehicle is being fueled. Consider the length of the remote antenna cable, and find a suitable mount location for the antenna bracket. Using the bracket as a template, mark three mount holes.
 - f. Drill three 9/32-inch mount holes for the antenna mount bracket.

- g. Attach the antenna mount bracket to the mount holes with three ¼ inch mount screws (not supplied).
- h. All remote antennas have antenna mounts similar to the mount shown in Figure 6. Insert the antenna mount up through the antenna mount hole in the bracket.

NOTE Some antennas have a white plastic washer (shown as OPTIONAL in Figure 6) on the underside of the brass nut; some don't. The antenna will perform as needed with or without the washer.

- i. Install the O-ring and, if provided, the plastic washer in the recesses under the brass nut.
- j. Install the rubber gasket over the antenna mount, then thread the brass nut unto the antenna mount.
- k. Tighten the brass nut so the rubber gasket is providing a seal between the brass nut and enclosure.
- l. The different antennas supplied with the remote external antenna kits are illustrated in Figure 7. Verify the needed antenna matches one of the illustrations in Figure 7. Install the antenna on the brass nut, and tighten. The rubber gasket should seal the space between the antenna and enclosure.
- m. Attach the connector on the end of the antenna cable to the bulkhead connector on the enclosure.

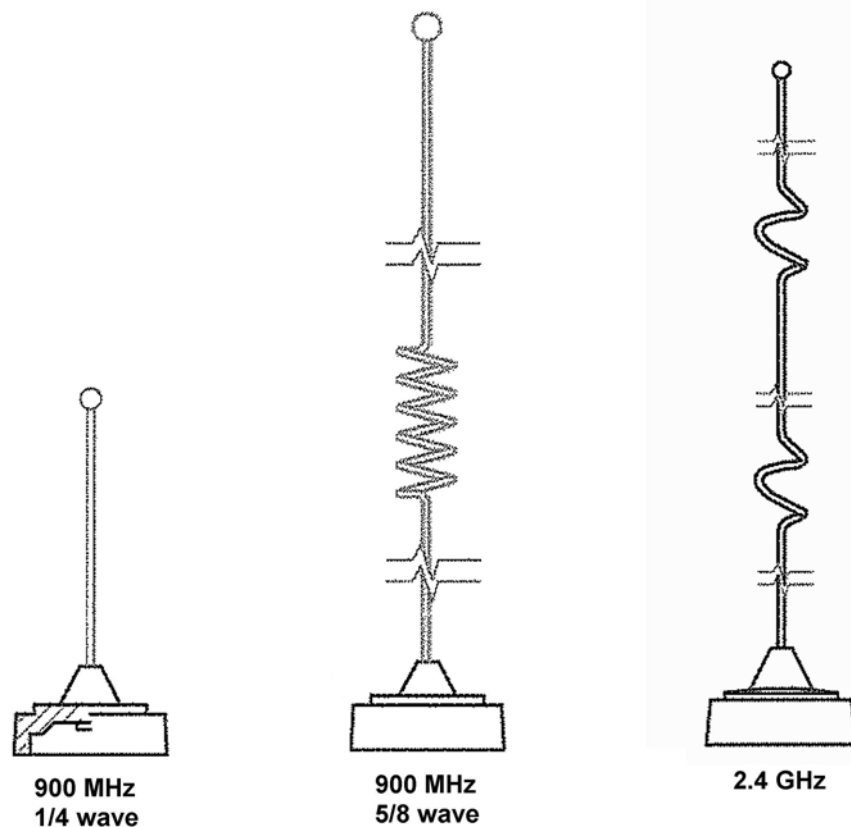


Figure 7. Remote External Antennas

19. As required, install/close the enclosure cover.

20. Perform Post Installation Tests in accordance with the AIM2 Installation Manual.

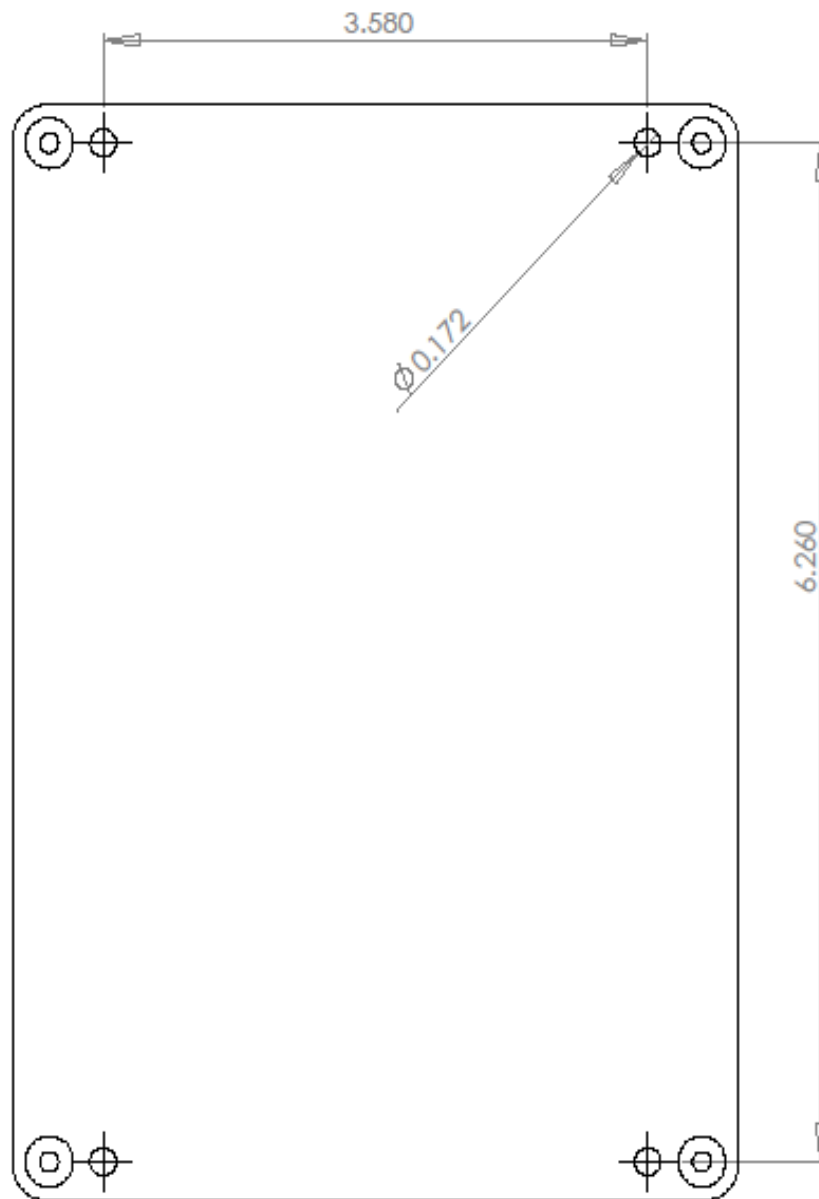


Figure 8. Enclosure Dimensions (Do not use as a template.)

TIP

If any questions arise, contact Syntech Systems, Inc.'s Customer Satisfaction Center (CSC) at 1-800-888-9136, ext. 2, or email support@myfuelmaster.com.