



TROUBLESHOOTING GUIDE

Meter Transceiver Unit (MXU)

GENERAL

The following information is a guide to troubleshooting a suspected malfunctioning meter transceiver unit (MXU). Review these procedures prior to returning an MXU for evaluation.

This is a general guide for troubleshooting an MXU. For MXU installation procedures, please refer to installation bulletin AMR-970 as most recently revised.

NECESSARY TOOLS AND MATERIALS

The following should be available when troubleshooting an MXU:

- SR11® security screw socket with 1/4 inch nut driver or ratchet wrench
- 3M Scotchlok® UY or UY2 butt connector "gel-caps"
- 3M Scotchlok® E-9Y stepped jaw crimping tool with wire cutter
- MXU interrogation device (RFSSI with MXU Programmer application loaded, or VXU)
- A functioning Invensys absolute encoder ("test" encoder)
- Extra MXU battery pack(s)
- Extra MXU(s)
- Voltmeter (optional)

PROCEDURES

If you find an MXU to be inoperable after being installed, please follow the troubleshooting steps below. Perform these steps at the installation site.

First, ensure that the MXU is no closer than 4 feet to the next MXU. MXUs must be installed at least 4 feet apart to minimize the effects of RF interference between devices. Where such a configuration is needed, a model 505 (and MultiRead Module if necessary) is recommended. If the MXU is not within four feet of the next device proceed to Step 1.

1. If using STRIPES software with a VXU, change the reading **cycle** by selecting **RouteManager** and **Edit Class/Cycle**. The reading cycle is used to disable MXUs that have already been read during the current cycle from being interrogated a second time. A value of "0" is a "universal" cycle that forces all units to respond. The cycle range is from 0 to 255. MXUs are shipped with the following default: Cycle = "0". After changing the cycle attempt to read. If the MXU fails to respond proceed to Step 2.
2. Using an RFSSI or a VXU, reset the proper MXU **port** (Model 505 only), **class**, and **password** settings by reprogramming the MXU. If using an RFSSI, refer to **Invensys SSI Programming User's Manual** (AMR-986). If using a VXU, select **Configuration, VXU & MXU Parameters, Program MXU**.

Port options include: *Invensys ECR; Not Used; MultiRead; or ARB VI* (Schlumberger ProRead Encoder). MXUs are shipped with the following default settings: Port 1 - Invensys ECR and Port 2 - Not Used. Select the proper port settings.

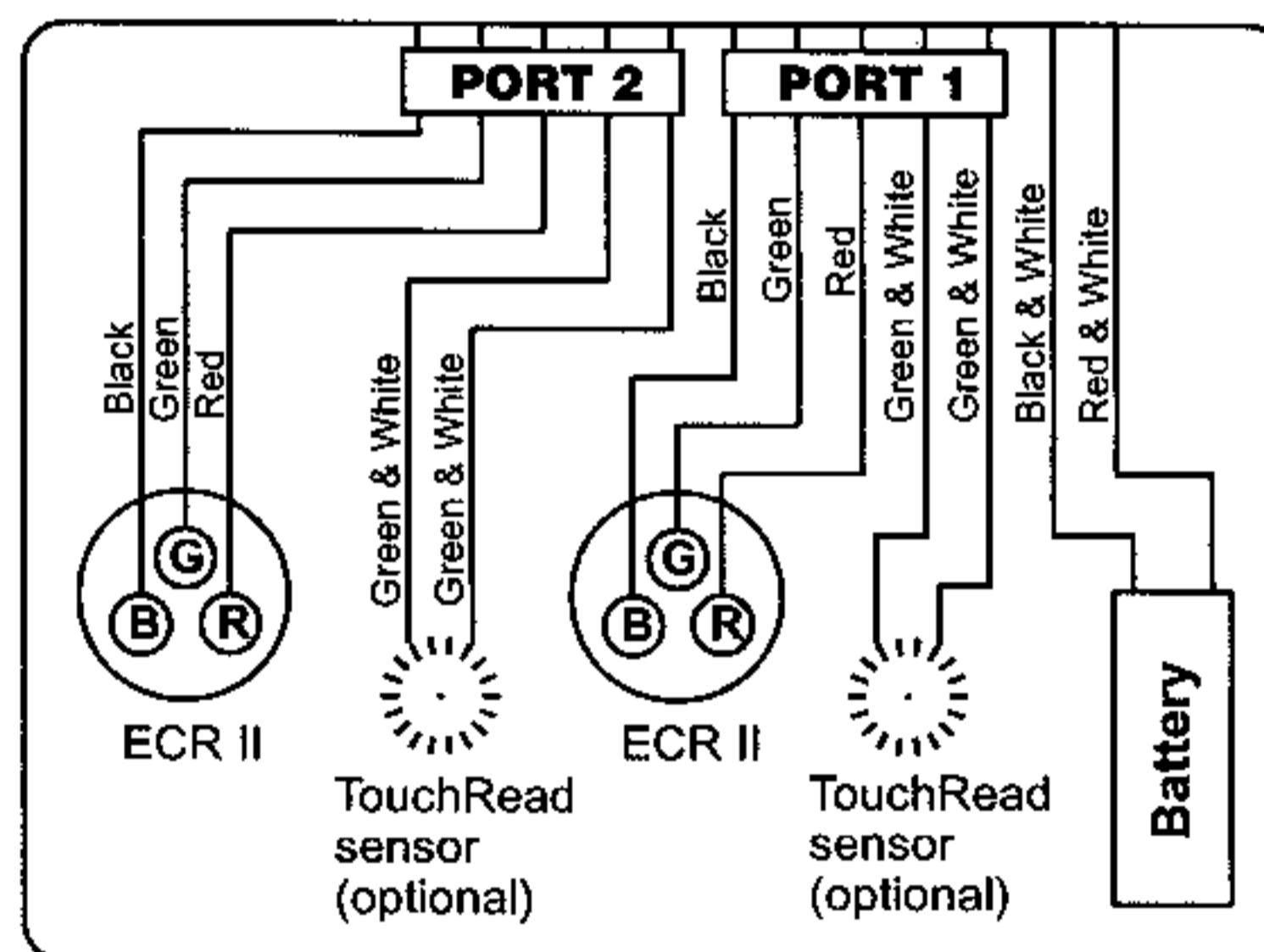
Class codes are used to identify a group of MXUs. By identifying a group of MXUs with a class code, the user can interrogate a specific group of devices. MXUs that have a different class code will not respond to the interrogation unit. The class code range is from 0 to 31. MXUs are shipped with the following default: Class code = "0". Select the proper class code.

Password codes are used to identify all of a utility's MXUs. Typically each utility assigns the same password to all its devices.

Other utilities in the same region would presumably have a different password to prevent the interrogation unit of one utility from reading the MXUs of another. The password range is from 1 to 1023. MXUs are shipped with a default password of "1". Select the proper password.

After verifying the proper settings by reprogramming the MXU, attempt a reading. If test fails, proceed to Step 3

3. Troubleshoot MXU by loosening the SR11® security screw. After opening MXU, verify that all wiring connections for each port (if using a MultiRead Module, check all connections), TouchRead connection, and battery pack are correct by "color code". Also verify the strength of the connections by lightly pulling on each gel-cap. Make sure no bare wires can be seen in or around the gel-cap. Wires should **not** be stripped prior to installing a gel-cap. If any wires are not connected properly to the encoder, disconnect the black-and-white stripe battery wire connection first by cutting the wire just below the gel-cap connection. Then cut off the gel-cap for the bad encoder connection and reconnect using the proper wire and new gel-cap. Reconnect the battery using a new gel-cap. After verifying all connections, attempt a reading while the device is still open. If test passes, close the MXU and tighten the SR11® security screw. If test fails proceed to Step 4.



MXU Wiring Diagram

4. Test or replace the MXU battery pack. If testing the battery, cut the black-and-white wire just below the gel-cap then repeat the procedure for the red-and-white wire. Strip off some of the wire jacket on each wire.

At the TouchPad connection, connect the same two wires to the terminal screws on the back of the TouchPad.

Caution: Be sure there is no bare wire-to-wire contact. (The TouchRead connection is non-polarity sensitive and will work as long as the same color wires are used at both ends of the connection. If three-conductor wire is used, be sure the third "dead" wire is not mistakenly connected at either end.)

Pit-set Mount Sensor – The TouchRead pit-set sensor includes a factory-sealed three-conductor wire cable. Proper wire connections are therefore important. To activate the pit-set TouchRead sensor, use only the *red* and *black* wires from the sensor. Approximately 2" of cable's outer jacket must be stripped from its end to access these wires. Then, using gel-caps, connect the *black* wire from the sensor to one of the *green and white stripe* wires from the MXU. Next, connect the *red* wire from the sensor to the other *green and white stripe* wire from the MXU.

5. Verify MXU operation prior to final assembly:
 - To verify *RadioRead* reading, use Radio Frequency Solid State Interrogator (RFSSI) or Vehicle Transceiver (VXU) to display the register odometer reading, register ID number, and MXU ID number.
 - To verify *TouchRead* reading, use a TouchRead visual reader to display register odometer reading and register ID number. If MXU does not function, check all wire connections, re-do the connections or change battery pack. (For complete TouchRead installation and troubleshooting, see installation bulletins: TR-728, TR-997, and TR-998.)
6. After wiring connections are completed and MXU operation is verified, align guides of top and bottom parts of MXU and close, bringing the connection wire(s) out the front side using the wire pass-thru guides located on either side of the security screw. Secure the top and bottom parts of the MXU using the security screw.

Caution: DO NOT over-tighten security screw.

MXU MOUNTING INSTRUCTIONS

For Wall Mounting: (Indoors and Outdoors)

1. Using MXU mounting bracket, find a convenient location for the MXU mounting. It is recommended that the MXU be mounted in an upright position so the top part with the Invensys logo is facing up. The MXU mounting bracket can be mounted to a wall using screws or fasteners to an object using heavy duty wire ties. Grooves have been placed in the back of the bracket for mounting on either horizontal or vertical (existing) pipes.
2. After mounting MXU bracket, snap the MXU (which should already be wired as noted in the preceding wiring instructions) into the bracket. Be sure the locating tabs on either side of the MXU have snapped into position in the mounting bracket. The installation is now complete.
3. TouchPad Mounting (Optional) – If mounting the MXU outdoors and a TouchRead TouchPad connection is to be included, mounting holes can be drilled in the side of the MXU bracket. Using short screws or plastic rivets, mount the TouchPad to the side of the MXU bracket.

Caution: When using screws, be sure they do not penetrate the MXU enclosure when mounting the TouchPad. The TouchPad can also be mounted in a location away from the MXU. Be sure to use screws that are designed for and applicable to the mounting surface.

For Pit-Set Mounting:

1. Use 1/2" EMT. Select a location for the conduit where the MXU's installed position will not interfere with the meter and allow the MXU to be located as high as possible inside the meter box. The MXU should be kept approximately 1" from the sides of the meter box and positioned so the meter register odometer remains visible for visual confirmation readings. Conduit mounting method calls for driving a length of conduit into the ground at the bottom of the meter box. (If the bottom of the meter box does not have an opening sufficient for driving the conduit vertically into the ground below, a different mounting method may need to be developed.) Place driver on conduit and strike with hammer, driving conduit downward until it is at the desired height. The correct height should be at the point the driver is level with the top of the meter box in most cases. When completely installed, the top of the MXU should be about 1" below the meter box lid.
2. After installation of conduit, position the 1/2" opening located in the bottom of MXU over the conduit and press into place. Place meter box cover (lid) into position. Pit-set installation is now complete.
3. TouchRead Sensor Mounting (Optional) – If installing a TouchRead pit-set module follow the TR/PL mounting instructions on Invensys bulletin TR-997 for mounting in the meter box lid. Place meter box cover (lid) into position with the TR/PL sensor in place.

FCC COMPLIANCE

NOTE: This equipment has been tested and found to comply with the limits 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 in accordance with 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 can be determined 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 and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician

WARNING: No party shall make any modifications or changes to the MXU Model 505 (the equipment) without the express written consent of Invensys Metering Systems. Doing so could result in the equipment becoming non-compliant with the requirements of the Federal Communication Commission Rules CFR47 Part 15 and could void the user's authority to operate the equipment.

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