

Tantalus Utility Network™

Procedure for Installing TUNet modules in Single-Phase Meters



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Procedure for Installing TUNet Modules in Single-Phase Meters

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Operation of the TUNet Module

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications to this device not expressly approved by Tantalus Systems Corp. could void the user’s authority to operate the equipment.

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1 Introduction

1.1 Scope

This document provides the instructions for the retrofit of the Tantalus TUNet meter modules into single-phase meters. The meters covered in this document include the GE I-70-S, ABB AB-1, GE I-210, and the Itron CENTRON.

1.2 Overview

The entire retrofit process should take approximately ten minutes per meter once a technician is familiar with all the steps involved. This procedure includes instructions for the following basic steps:

- Drill a hole in the meter base to mount the IR (infrared) serial interface for the meter module.
- Mark the disk for reading by the optical sensor on the module (electromechanical meters only).
- Mount the IR serial interface.
- Connect the power from the host meter to the TUNet module.
- Mount the TUNet module into the host meter.
- Program the TUNet module with the utility operating parameters.

1.3 Required parts

The following items are required for the TUNet meter module installation:

- GE I-70 and ABB AB-1 (240V)
 - One (1) TC-1205 meter module for 200 class service or one (1) TC-1207 for 320 class service
 - One (1) infrared LED serial interface
 - Two (2) mounting screws: UNF 4-48 x 1/2" required for the GE I-70S meter
 - Two (2) power clips to attach to bus bars. The part number is dependant on the meter bus bar diameter.

Part Number	Bus Bar Diameter
13811300003A	0.20" – 0.22"
13811300003B	0.18" – 0.20"
13811300003C	0.26" – 0.28"
13811300003D	0.32" – 0.36"

- GE I-210 (240V)
 - One (1) TC-1210 module
 - One (1) infrared LED serial interface
 - Two (2) Y-clips are required for the TC-1210 module.
- Itron CENTRON
 - One (1) TC-1216 meter module for 240V or one (1) TC-1116 meter module for 120V
 - One (1) infrared LED serial interface

1.4 Required tools and materials

The following Tantalus tools are required:

- DJ-100, Tantalus drill alignment jig and 3/8" drill bit with stop
- DT-150, Tantalus meter programming software
- DT-100, Tantalus optical programming fixture including DC power adapter 6 – 8 VDC
- DT-116, Tantalus programming key (for use with the TC-1216/TC-1116 meter only)
- Disk marking template (electromechanical meters only)
- Disk marking paint pen (electromechanical meters only)

The following generic hand tools and materials are required:

- Electric hand drill
- Needle nose pliers
- Diagonal cutters
- #2 Phillips screwdriver
- Rubbing alcohol
- Soft cloth or paper towels
- Anti-static wrist strap
- Windows[™] compatible computer for programming meter module
- 240VAC meter socket for powering the meter and module during programming

Caution!

The Tantalus meter modules contain electrostatic sensitive devices. Working with the modules should be done at a protected workstation. Persons handling the modules should be grounded with an ESD wrist strap. When removed from the packaging the modules should be placed on antistatic foam. When handling the modules hold the module only by the edges of the plastic holder.



2 Detailed Procedure

2.1 Open the meter

It will be necessary to remove the meter cover to proceed with the meter module retrofit. If the meter cover is sealed to the meter base, remove the seal by cutting it with a diagonal cutter and pull the seal pieces from the base and the cover. Leave the cover on until the meter base has been drilled.

2.2 Drill the meter base

2.2.1 Drill the GE and Itron Meters (I-70, I-210, CENTRON)

1. Place the meter glass face down on the work surface.
2. Place the drill alignment jig with the pins of the jig straddling the load side terminals of the meter. The drilling hole of the alignment jig should be at the six o'clock position as shown in Figure 1.
3. With a 3/8" electric hand drill, and 3/8" bit, drill a hole in the meter base as shown in Figure 1.
4. After drilling the meter, clear the meter of any debris by removing the meter cover and clearing any loose particles.

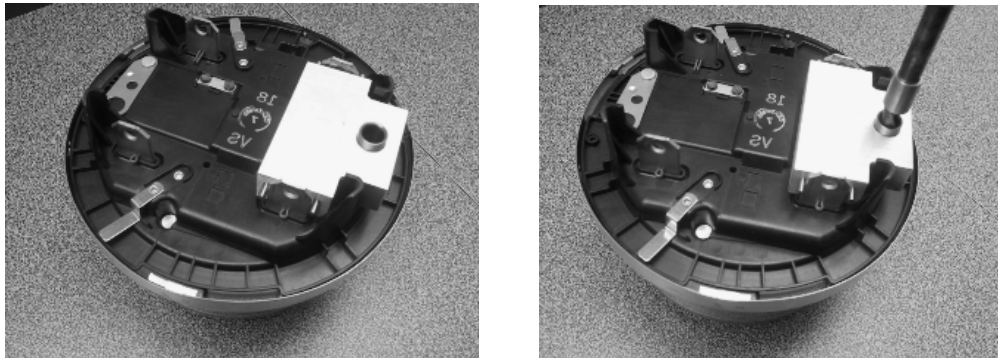


Figure 1: Drill Alignment Jig

2.2.2 Drill the ABB AB-1

Note: ABB meters usually have venting holes at the bottom centre of the meter base. These holes must not be used as a guide for drilling a 3/8" hole in the meter base because the vent hole does not provide the optimum alignment of the IR interface.

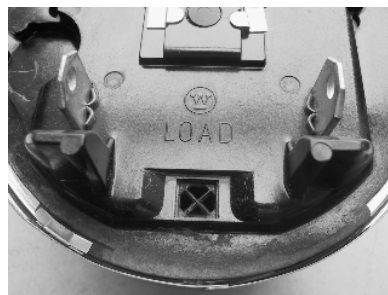


Figure 2: ABB AB-1 Vent hole with "crosshairs"

1. Place the meter glass face down on the work surface.
2. The vent hole is typically covered with a metal screen and a fibre filter. Remove the filter with needle nose pliers.
3. Place the drill alignment jig with the pins of the jig straddling the load side terminals of the meter. The drilling hole of the alignment jig should be at the six o'clock position as shown in Figure 1.
4. With a 3/8" electric drill and a 3/8" bit, drill a hole in the meter base as shown in Figure 1.
5. After drilling the meter, clear the meter of any debris by removing the meter glass and clearing any loose particles.

2.3 Mark the disk (electromechanical meters only)

Complete the following steps if the disk is not already marked with a factory or other $\frac{1}{2}$ " W x $\frac{3}{4}$ " H mark.

1. Remove the meter nameplate and set the original nameplate mounting screws aside. Note: New, longer screws will be required to remount the module under the nameplate for the GE I-70 meters.
2. Align the disk marking template on the disk with the upper left corner of the template opening aligned with the left side of the index mark on the disk as shown in Figure 3.
3. Fill in the $\frac{1}{2}$ " W x $\frac{3}{4}$ " H gap formed by the template with the disk marking paint pen. Be careful to avoid smearing the wet paint mark when removing the template from the disk.

Note: Do not substitute the paint pen with any other type of marker as this may cause the mark to not be correctly detected.

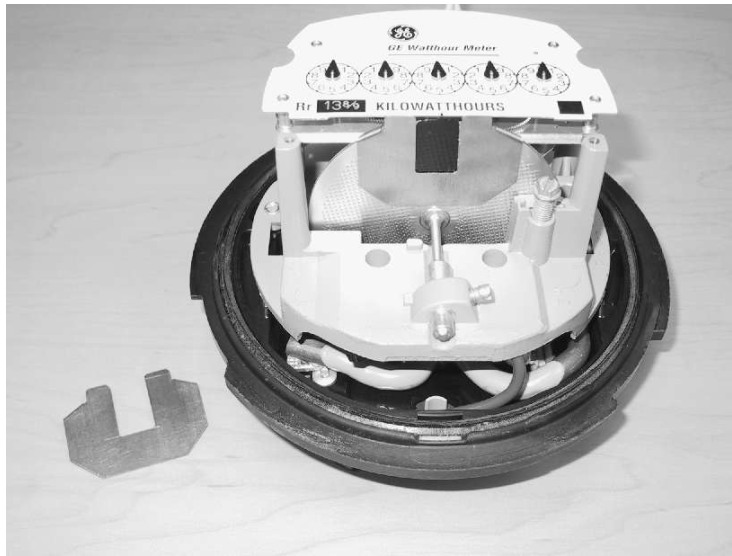


Figure 3: Disk Marking Template Aligned on Disk

2.4 Mount the IR serial interface adapter (all meter types)

1. Clean the external area of the meter base between the load side terminals with rubbing (isopropyl) alcohol.
2. Dry the area thoroughly with clean cloth or paper towel.
3. Peel the liner from the adhesive tape on the IR interface adapter (Figure 4).



Figure 4: IR Serial Interface Adapter

4. Insert the IR interface cable through the drilled hole from outside to inside the meter.
5. Arrange the IR interface such that the flat side of the sensor is toward the centre of the meter (Figure 4). The legs of the meter will guide the sensor positioning.
6. Apply pressure over the flat side of the interface adapter. Note: Care must be applied to position the sensor in place as straight as possible. The split cylindrical protrusion on the adhesive side of the sensor will fit into the 3/8" hole.

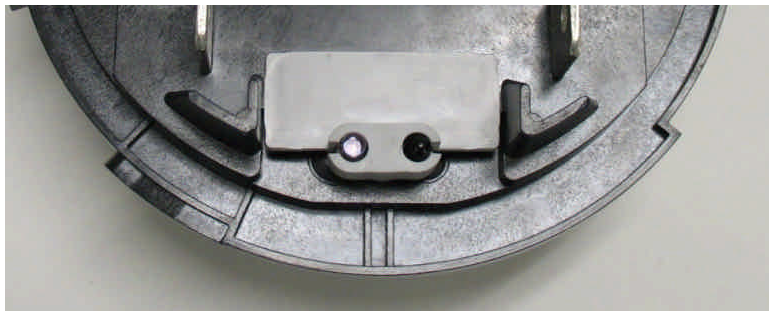


Figure 5: IR Serial Interface Adapter Alignment

2.5 Mount the meter module

2.5.1 TC-1205/TC-1207 Meter Module (electromechanical meters)

1. Attach the connector of the IR serial interface to the mating connector on the meter module. Take care to align the keys on the connector to the slots on the socket.
2. The connector should snap into place. Do not force the connector into place. If force is necessary then the keys are likely not aligned with the slots in the socket.
3. Position the module over the mounting posts on the meter.
4. Position the nameplate over the module. Use the ½” mounting screws for GE I-70, or the original nameplate mounting screws for the ABB AB-1, and secure the module to the mounting posts.



Figure 6: Connect the IR Serial Interface

5. Select the appropriate power clips for the size of the bus bars in the meters which are being retrofitted.
6. Use needle nose pliers to attach a pair of power clips to the Fast-on tabs on the meter module power leads.
7. Crossover the power leads to put three twists in the leads and arrange the leads together around the right side of the meter
8. Attach the power clips to the bus bars at the top side of the meter as shown in the figure below.
9. Use a flat screwdriver to press the clips onto the bus bars.
10. Replace the glass or polycarbonate cover for the meter.



Figure 7: Connect the Power Leads to the Meter Power Bus Bars

2.5.2 TC-1210 Meter Module (GE I-210)

1. Remove the GE I-210 meter from its base.
2. There are two power leads that connect the circuit board to the meter base. Depress the release levers in order to disconnect the leads as shown in the figure below.

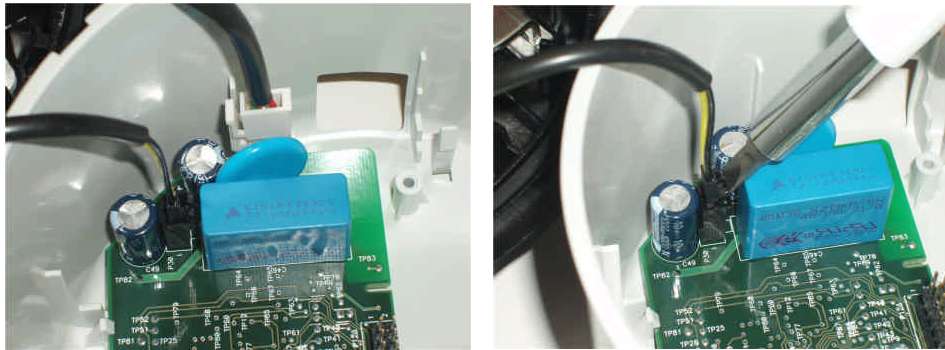


Figure 8: Disconnect the GE I-210 Power Leads

3. With the cover of the GE I-210 removed from the meter base, insert the TC-1210 module into the GE I-210 cover.
4. There are alignment holes on the I-210 cover which correspond to alignment pins on the TC-1210 module.
5. With the alignment pins mated to the holes, a slight amount of pressure will engage the plastic latches that hold the TC-1210 firmly in place.

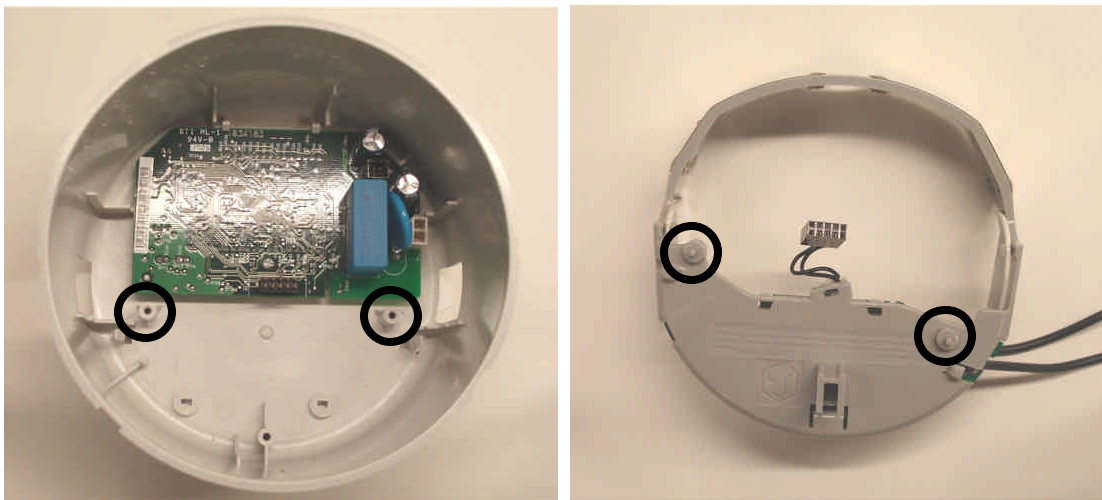


Figure 9: GE I-210 and TC-1210 Alignment Points

6. The TC-1210 will appear slightly rotated in relation to the GE I-210 circuit board which is the correct configuration
7. Connect the small 10-pin connector from the TC-1210 module to the GE I-210 board.

8. The 10-pin connector has a small arrow on it. Orient the connector such that the arrow is on the left side and is facing towards the top of the TC-1210 module or towards the GE circuit board.

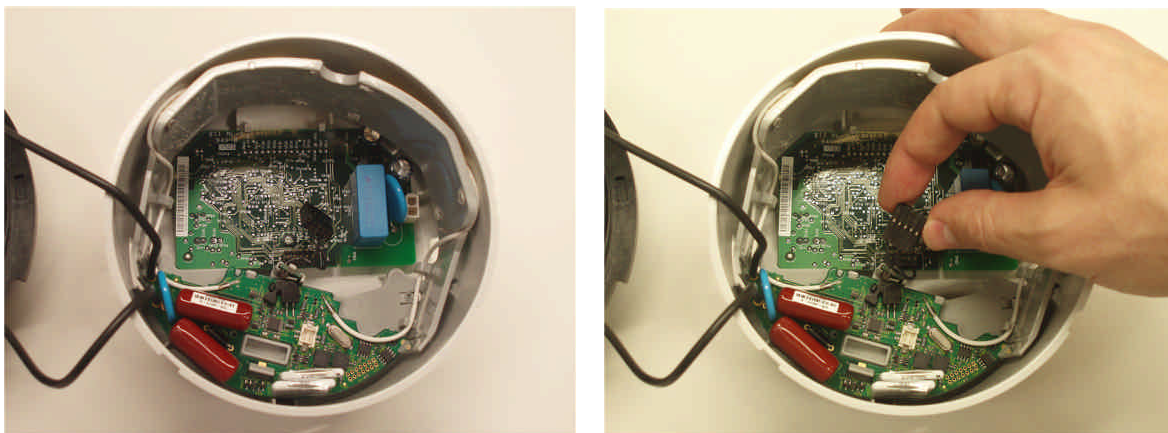


Figure 10: GE I-210 with Tantalus TC-1210 Module Installed

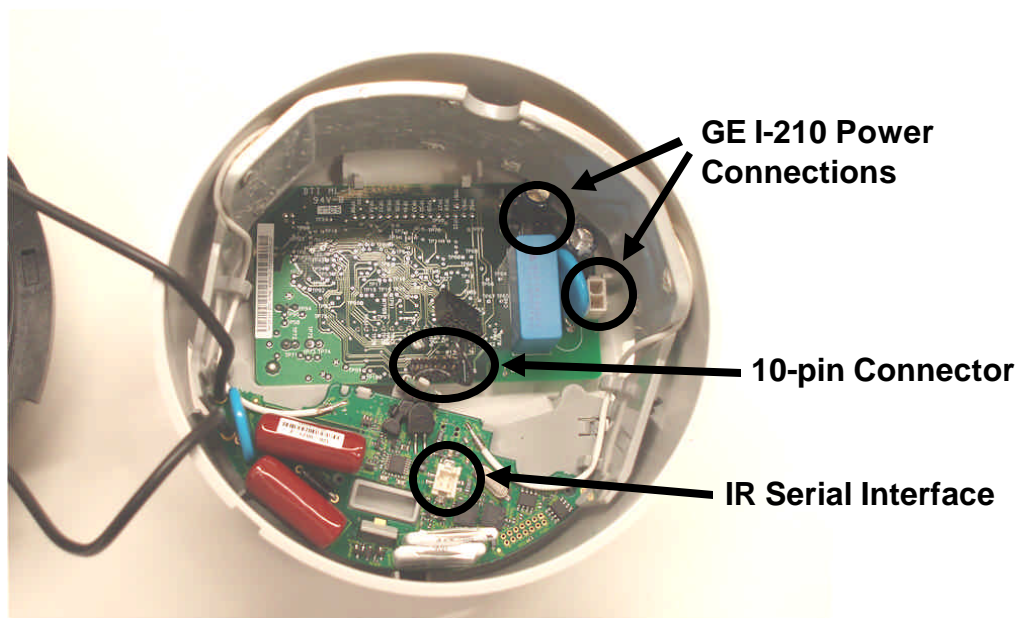


Figure 11: GE I-210 and TC-1210 Connection Points

9. Reconnect the power leads that were disconnected in steps 1 and 2 to the GE I-210.
10. Leave the IR serial interface connection until after the power connections to the meter base have been made.

11. Power for the TC-1210 is taken directly off the GE I-210 meter base. Remove the red wire from the fast tab connector on the meter base.
12. Install a 'Y' connector on the fast tab mount as depicted in the sequence below.

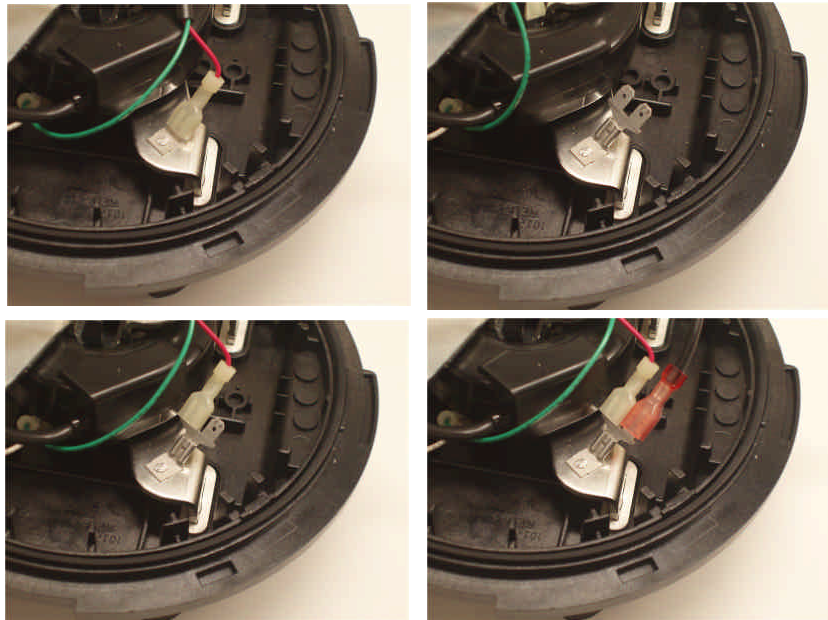


Figure 12: Example 'Y' Fast Tab Connector

13. Reconnect the power lead from the I-210 module to one of the leads on the 'Y' connector.
14. Connect the power lead from the TC-1210 module to the other lead on the 'Y' connector.
15. Repeat steps 2-4 for the fast tab with the green wire connected to it.
16. The final configuration will have two new 'Y' connectors installed on the meter base. Figure 13 depicts the final configuration for the power leads.

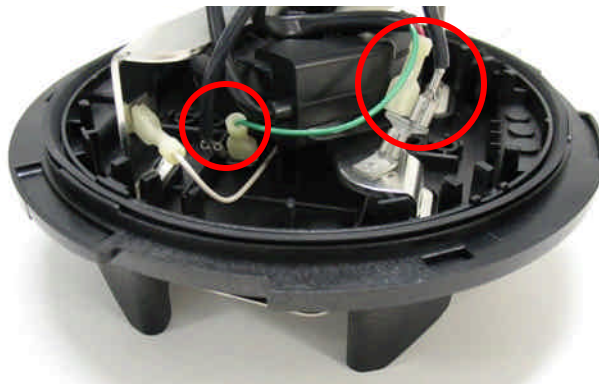


Figure 13: Final Power Lead Configuration

17. With the power connections complete, connect the IR serial interface to the mating connector on the TC-1210 meter module. Take care to align the mating keys on the connector to the slots on the socket.
18. The base and the display portion will need to be tilted towards each other in order to allow the IR serial interface connection to be made.
19. The display portion can now be mated to the base. Install the clear polycarbonate or glass cover.

2.5.3 TC-1216/TC-1116 Meter Module (Itron CENTRON)

Note: The TC-1216 meter module is used for 240 volt service and the TC-1116 meter module is used for 120 volt service. The installation and retrofit procedure is the same for each of these meter types.

1. Remove the glass or polycarbonate lid from the CENTRON meter.
2. Remove the grey cover from the base of the CENTRON meter.
3. Connect the IR serial interface adapter sticking through the base of the CENTRON meter to the Tantalus module. Take care to align the mating keys on the connector to the slots on the socket.

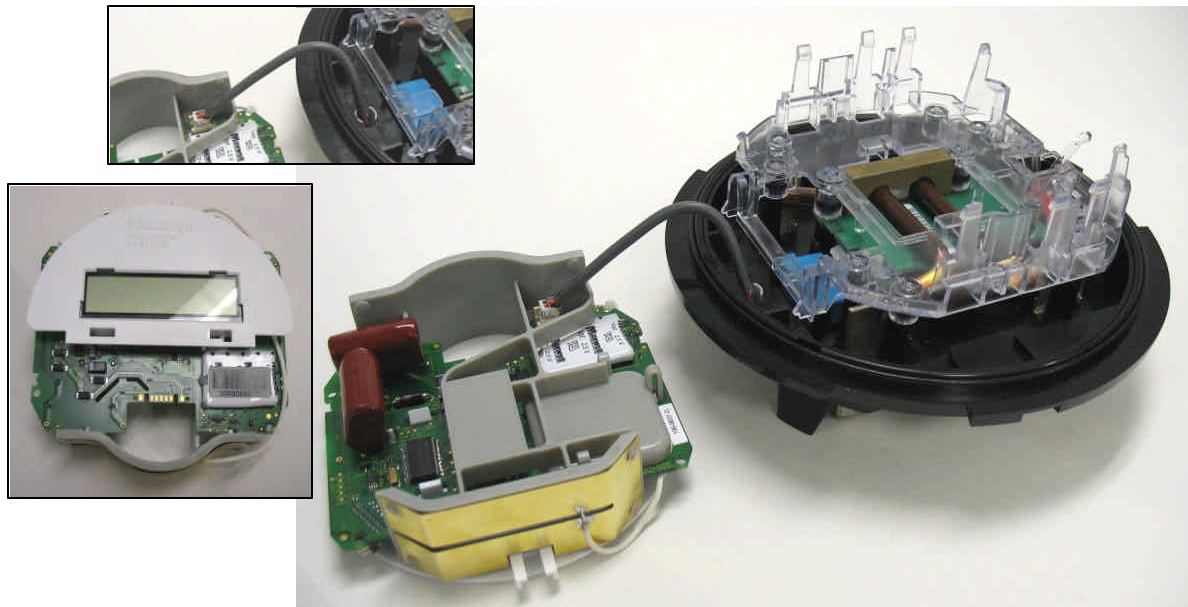


Figure 14: CENTRON Meter Base and TC-1216/TC-1116 module

4. Snap the TC-1216/TC-1116 module onto the base of the CENTRON meter. Ensure that the Tantalus module is held firmly in place by the plastic latches on the left and right side of the unit.



Figure 15: CENTRON Meter Base with TC-1216/TC-1116 Installed

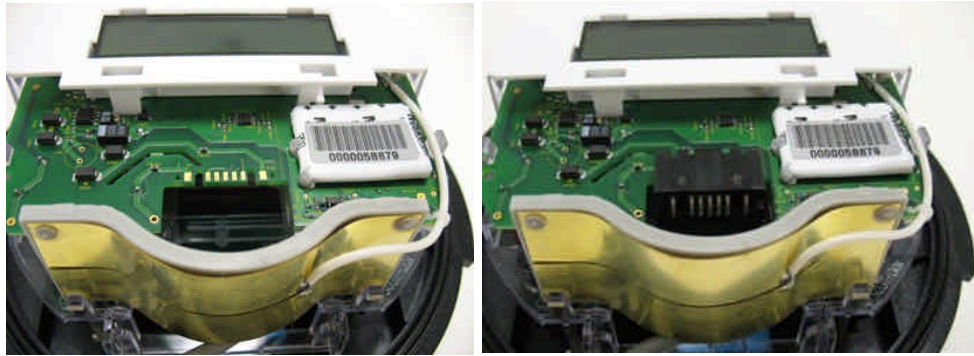


Figure 16: Board-to-Board Connector Installed

5. Snap the black Itron board-to-board connector in place. This piece connects the circuit board in the base of the CENTRON meter to the TC-1216/TC-1116 circuit board.
6. With the IR serial interface adapter connected, the TC-1216/TC-1116 secured, and the board-to-board connector installed, the grey Itron cover can be installed over the unit.

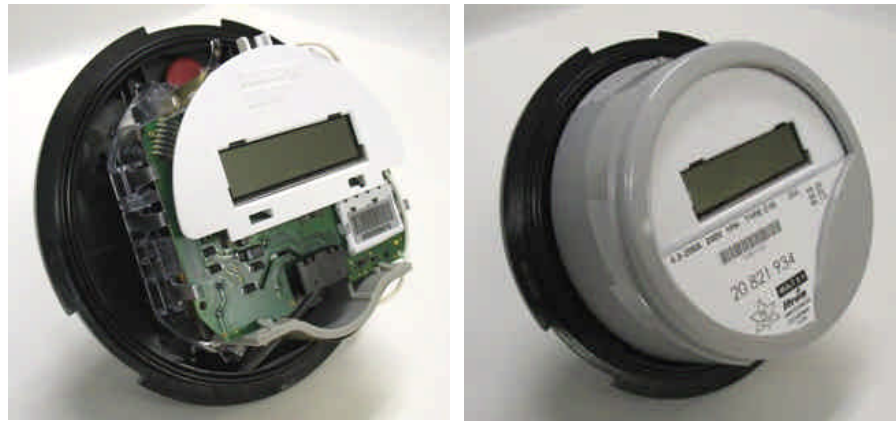


Figure 17: CENTRON meter with Tantalus Meter Module

7. Install the clear polycarbonate or glass cover. The retrofit process is complete and the meter can be programmed.

Note: To program the TC-1216 or TC-1116 module with an initial consumption reading other than zero, the DT-116 programming key must be inserted into the module as shown below.



3 Programming the TUNet Modules

Before placing the meter and module into service the module must be programmed with initial operating parameters. Use the TUNet programming software, optical programming fixture, and an available computer to program the module with the following minimum parameters:

- Meter serial number or utility identification number
- Tantalus assigned Utility Business ID
- Initial kWh (meter face) reading
- Initial AMR reporting interval (Suggested: hourly)

Additional parameters which may be programmed include power outage reporting and PQM parameters:

- Power outage detection threshold
- Swell and Sag alarm voltage threshold and time threshold
- Initial PQM reporting interval (Suggested: every 6 hours)

3.1 TUNet Programmer

The following sections describe the operation of the TUNet Programmer application. These instructions are available in the TUNet Programmer Help:

3.1.1 Meter Settings

This section describes the parameters required from the host meter.

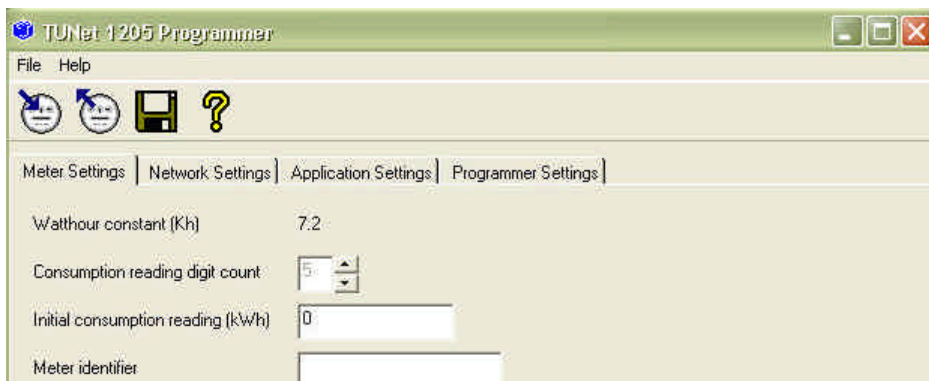


Figure 18: TUNet Programmer Meter Settings

The following table describes the settings taken from the screen shot above.

Consumption reading digit count	Select the number of digits or dials representing consumption on the meter face for electromechanical meters. This value should not include digits or dials that represent fractions of kilowatt hours. Valid values are 4 to 9. The default value is 5.
Initial consumption reading (kWh)	Enter the consumption reading (kWh) on the meter at the time the TUNet module is programmed. Valid values depend on the consumption reading digit count. The default value is 0. Note: The DT-116 key is required to change this value in the TC-1216/TC-1116.
Meter identifier	Enter the meter identifier on the meter face. Up to 17 characters can be entered.

3.1.2 Network Settings

This section describes the parameters which define the TUNet network the device will operate on.



Figure 19: TUNet Programmer Network Settings

The following table describes the settings taken from the screen shot above.

Utility business identifier	Enter the Tantalus assigned business identifier for the utility company network. If more than one utility company is using the same TUNet, each company must have their own unique business identifier. Valid values are 21 to 16382. The default value is 102.
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3.1.3 Application Settings

This section describes the settings for the automated meter reading and power quality monitoring applications supported by the Tantalus Utility Network (TUNet™).

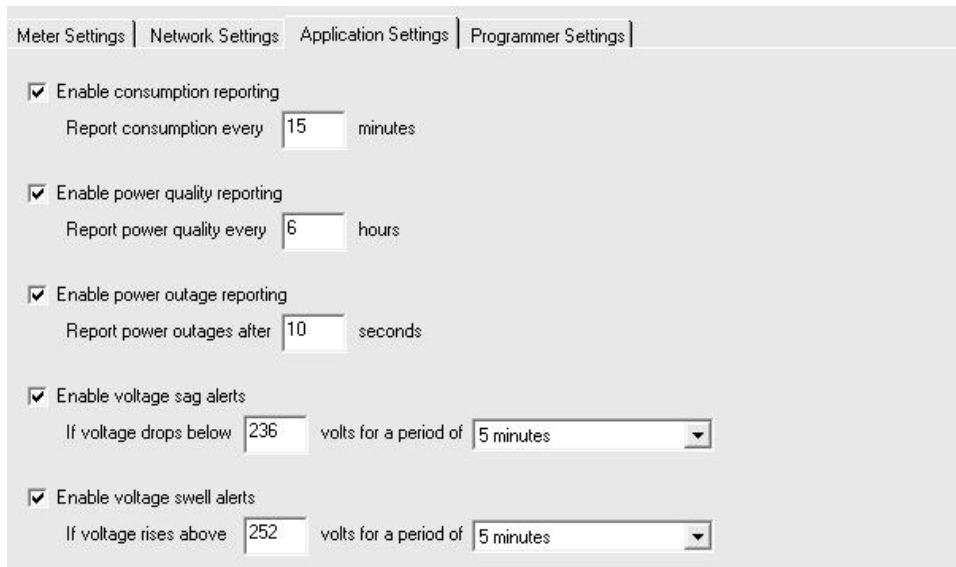


Figure 20: TUNet Programmer Application Settings

The following table describes the settings taken from the screen snapshot above.

Enable consumption reporting	Check this option to enable the TUNet module to report consumption on regular intervals. If consumption reporting is enabled, a reporting interval must be entered. Valid values are 1 to 127 minutes. The default value is 15 minutes.
Enable power quality reporting	Check this option to enable the TUNet module to report power quality on a regular basis. If power quality reporting is enabled, a reporting interval must be entered. Valid values are 1 to 24 hours. The default value is 6 hours.
Enable power outage reporting	Check this option to enable the TUNet module to report power outages. If power outage reporting is enabled, a minimum sustained outage period must be entered. Valid values are 1 to 10 seconds. The default value is 10 seconds.

Enable voltage sag alerts Check this option to enable the TUNet module to generate voltage sag alerts. If voltage sag alerts are enabled, a voltage sag level must be entered and a minimum sustained period must be selected.

Valid voltage sag levels are 170 to 279 volts, and must also be less than the voltage swell level. This value represents the threshold that the actual voltage must drop below for the device to be in a voltage sag state.

The device must be in a voltage sag state for at least the specified period before a voltage sag alert is generated. The default voltage sag level is 236 volts. The default period is 5 minutes.

Enable voltage swell alerts Check this option to enable the Tantalus module to generate voltage swell alerts. If voltage swell alerts are enabled, a voltage swell level must be entered and a minimum sustained period must be selected.

Valid voltage swell level values are 171 to 280 volts, and must also be greater than the voltage sag level. This value represents the threshold that the actual voltage must rise above for the device to be in a voltage swell state.

The device must be in a voltage swell state for at least the specified period before a voltage swell alert is generated. The default voltage swell level is 252 volts. The default period is 5 minutes.

3.1.4 Programmer Settings

This section describes the settings that control operation of the Tantalus Programmer application.

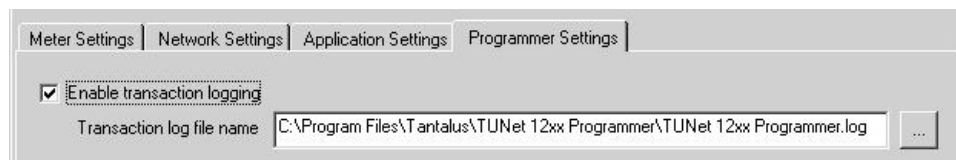


Figure 21: TUNet Programmer Settings

The following table describes the settings taken from the screen shot above.

Enable transaction logging Check this option to enable the Tantalus Programmer to keep a log of successfully programmed modules. If transaction logging is enabled, a transaction log file name must be entered.

3.1.5 How to Program a TUNet module

This section describes how to use the TUNet Programmer application to program a TUNet module.



Figure 22: TUNet Programming Instructions

Follow these steps when programming a series of TUNet modules:

1. Create a default program for each TUNet module.
2. Enter the initial consumption reading (kWh) and serial number.
3. Select the 'Program a TUNet module' item under the 'File' menu or click the 'Program a TUNet module' button on the toolbar as shown in the screen shot above.
4. The device will be programmed and then read to verify that all values are correct. During this time, the progress bar at the bottom of the application will be updated to indicate the progress of the operation.

When the programming operation has completed, a dialog will be displayed, indicating success or failure of the operation. If the operation failed, the dialog will indicate the failure. If the operation was successful, programming is complete. Proceed to program the next device.

3.1.6 How to Save the Current Settings As Defaults

This section describes how to save the current settings so that they become the default settings the next time the TUNet Programmer application is run.

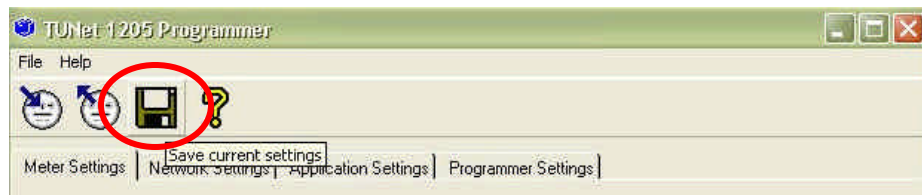


Figure 23: TUNet Programmer Save Default Settings

To save the current settings as the default settings, select the 'Save as default settings' item under the 'File' menu or click the 'Save as default settings' button on the toolbar as shown in the screen snapshot above. The settings are saved in a file called 'DefaultSettings.txt'.

4 Final Calibration

After the meter module is programmed replace the glass cover. The meter is ready for final calibration and service.

Prior to placing the meter into service, calibrate and seal the meter in accordance with normal operating practices.

5 Revision History

Version 0.2: Initial version

Version 0.4: Updated Tantalus contact information.

Version 0.5: Added support for the GE I-210.

Version 0.6: Added support for the Itron CENTRON.