TESCO METERING

# OPERATIONS MANUAL

# TURBO METER TESTER

# CATALOG NO. T3

# TURBO METER TESTER OPERATIONS MANUAL

## CATALOG NO. T3

TESCO METERING

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**Revision: 3.0.0**

**TESCO – The Eastern Specialty Company**

925 Canal Street Bristol, PA, 19007

**Phone**: 215.228.0500

support@tescometering.com

tescometering.com

# LIMITED WARRANTY & LIMITATION OF LIABILITY

**TESCO** warrants to the original purchaser that it will correct all defects in material and/or workmanship in the Instrument, test equipment or software covered by this warranty (herein called **"PRODUCT"**), provided that TESCO is notified of such defect within the warranty period (set forth below) in accordance with paragraph four of this warranty.

**WARRANTY PERIOD.** The warranty period shall begin on the date of shipment of the PRODUCT or the date of the issuance of this warranty certificate, whichever is later. If no warranty period is specified below and signed by an authorized DISTRIBUTOR of TESCO, the warranty period shall be one (1) year. In no event shall this warranty remain in effect for more than the stated warranty period plus two (2) months after the date of shipment. TESCO's sole obligation and the purchaser's sole remedy under this warranty is limited to repair or replacement, at TESCO's option, free of charge, F.O.B. TESCO's factory at Bristol, PA of any workmanship and/or part which in TESCO's sole judgment displays evidence of defect. On-site warranty repairs will be made when in TESCO's judgment the PRODUCT cannot practically be shipped to TESCO's factory. Any modifications, additions or upgrades made to the PRODUCT or control software after this warranty becomes effective shall not extend the term of this warranty.

**COVERAGE.** The warranty set forth above shall be applicable only if the PRODUCT:

1. Is used for the specific purpose for which it was intended;
2. Is operated in accordance with instructions, if any, supplied by TESCO;
3. Has not been modified, neglected, altered, tampered with, vandalized, abused or misused, or subjected to accident, fire, flood or other casualties;
4. Has not been repaired by unauthorized persons;
5. Has not had its serial number altered, defaced or removed;
6. Has not been connected, installed or adjusted other than in accordance with the instructions, if any, furnished by TESCO.

The warranty set forth herein DOES NOT APPLY to defects resulting from ordinary wear, tear and usage, or any cause, similar or dissimilar, not resulting solely from defective material and/or workmanship.

The warranty set forth herein shall NOT be effective unless:

1. Notice of defect is given to TESCO by phone, fax, email, or mail as soon as the defect is discovered.
2. Notice of defect contains the following information: PRODUCT serial number, PRODUCT model number, date of original installation, and an accurate and complete description of the defect including the exact circumstances leading to the defect.
3. The defective PRODUCT or part is returned only upon authorization from TESCO as evidenced by the issuing of a Return Merchandise Authorization (RMA) number, and that the transportation charges are prepaid (except that TESCO may, at its option, appoint a qualified DISTRIBUTOR to make field inspections of the PRODUCT for which purpose the purchaser shall permit such DISTRIBUTOR to enter upon its premises and examine the PRODUCT).
4. The Return Merchandise Authorization (RMA) number is written on the shipping label and all paperwork defective PRODUCT or part.
5. The defective PRODUCT or part is returned in the original packing or packing approved by TESCO

TESCO is not responsible for drayage charges, damages, or labor costs incurred in conjunction with failure, removal, or reinstallation of any PRODUCT, all of which shall be at the purchaser's expense. TESCO is not responsible for special, incidental, or consequential damages, whether resulting from breach of warranty, negligence, or any other reason.

TESCO manufactured parts will be available for a minimum period of at least two years after the manufacture of a PRODUCT has been discontinued.

TESCO will provide original purchaser during the warranty period, unlimited telephone consulting time for the purpose of PRODUCT trouble shooting/servicing and for the first thirty (30) days of the warranty period, unlimited telephone consulting time for the purpose of PRODUCT/software application.

**THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES AND TESCO MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OR CONDITION, DESIGN, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER.**

No other warranty, express or implied, is authorized by TESCO, and no DISTRIBUTOR of TESCO or any other person has any authority to amend, extend, modify, enlarge, or otherwise alter the foregoing warranty and disclaimers in any way whatsoever, except as provided for in an Extended Limited PRODUCT warranty agreement.


+1 215 228 0500
support@tescometering.com

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# 1.0 INTRODUCTION

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# 1.1 Introduction

***Precise and Portable Field Meter Testing for Self-Contained Meters***

The TESCO T3 Turbo Meter Tester is a field-ready solution designed for accurate, efficient testing of self-contained electric meters. Built for technicians who demand reliability and precision, the T3 combines advanced metrology, rugged construction, and intuitive operation in a lightweight, portable instrument suitable for daily field use.

The T3 supports fast, repeatable meter testing for applications such as new meter verification, routine audits, troubleshooting questionable readings, and compliance testing. Its circular form factor allows it to fit directly into standard self-contained meter bases, providing real-time results without the need for bulky external equipment.

Weighing approximately 5.4 lbs., the T3 is engineered for portability while maintaining lab-grade measurement performance in the field. The integrated three-phase watt-hour standard enables phantom load testing from 0.1A to 50A, delivering high accuracy across a wide range of operating conditions. The instrument is designed to perform reliably in demanding utility environments.

Advanced connectivity options allow technicians to operate the T3 using a handheld interface device, Ethernet connection, or Wi-Fi Access Point with mobile application support. Test results can be stored onboard and managed through TESCO Device Manager (TDM), streamlining data review and reporting from field to office.

For more than 120 years customers have trusted TESCO for accuracy and reliability. When you think metering, think TESCO.

T3 will be referred as “Instrument” all throughout the operational manual.

# 1.2 Contacting TESCO

For Technical Support or Calibration/Repair, please call 215.228.0500.

You can also send an email to **support@tescometering.com** with any questions.

To view, print, or download the latest manual supplement, visit **tescometering.com**

# 1.3 General Safety Summary

This manual contains information and warnings that must be observed to ensure safe operation and keep the Instrument in a safe condition. Operation or service in conditions or in a manner other than specified could compromise safety. For the correct and safe use of this device, it is essential that both operating and service personnel follow accepted safety procedures in addition to the safety precautions specified.

In this manual, a **WARNING** identifies conditions and actions that pose hazard(s) to the user, while a **CAUTION** identifies conditions and actions that may damage the Instrument or the test equipment.

**WARNING**

**To avoid electrical shock, personal injury, or fire hazard:**

- **The device must not be switched ON if it is damaged or suspected to be faulty.**
- **Do not operate the device in wet, condensing, dusty, or explosive gas conditions.**
- **If the equipment is used in a manner not specified in this manual, the protection provided by the Instrument may be impaired.**
- **Whenever it is likely that safety protection has been impaired, the device must be made inoperative and be secured against any unintended operation. Inform qualified maintenance or repair personnel.**
- **Safety protection is likely to be impaired if, for example, the Instrument displays visible damage or fails to operate normally.**
- **Use of any fuse other than specified may cause damage.**
- **Defeating any safety devices may result in electric shock and potential death.**

# 1.4 Description of Safety-related Icons

| ICONS | DESCRIPTION |
|---|---|
| | Risk of danger. Important information. See manual. |
| | Hazardous voltage. Risk of electrical shock. |

# 1.5 Product Features

## 1.5.1 Key Features

- **Capable of testing self-contained single-phase and three-phase meters**
- **Compatible with multiple self-contained meter forms for flexible field use**
- **Operable using a handheld interface device, mobile application, or Ethernet connection, enabling easy monitoring and test result management**
- **Circular form factor fits directly into standard self-contained meter bases, supporting installation in a wide range of socket configurations**
- **Integrated three-phase watt-hour standard supporting phantom load testing from 0.1A to 50A without the need for external load equipment**
- **Rugged construction designed for reliable operation during transport, storage, and use in demanding utility environments**
- **Equipped with 600V-rated fusing, surge suppression, and mechanical interlock systems for safe field operation**

## 1.5.2 Standard Features

- **HIGH-ACCURACY METROLOGY**
  An integrated three-phase watt-hour standard supports phantom load testing with precision normally reserved for laboratory environments.
- **ADVANCED CONNECTIVITY OPTIONS**
  Operate the T3 using the durable TESCO handheld remote, or control it wirelessly via the TESCO Mobile App. The unit also provides Ethernet connectivity and a Wi-Fi Access Point for remote access.
- **TESCO DEVICE MANAGER INTEGRATION**
  All tests, results, and field data can be synchronized, reviewed, and managed through TESCO Device Manager (TDM), enabling a streamlined workflow from field to office.
- **INTEGRATED POWER SYSTEM**
  The T3 draws power directly from the installation under test – eliminating the need for internal charging or battery management. USB-C DC power mode enables technicians to retrieve stored results even without an AC supply
- **FIELD-PROVEN DURABILITY**
  TESCO's hard-shell case withstands the demands of utility environments, protecting the tester and its accessories through daily transport and exposure to harsh field conditions.

### 1.5.3 Optional Features

- Tesco Handheld Device
  600 x 480 full-color LCD
  Capacitive touchscreen
  Integrated barcode scanner
  Includes 6-foot communication cable

# 1.6 General Specifications

## 1.6.1 Input Characteristics

| PARAMETERS | DATA |
|---|---|
| **Power Supply** | 120V Single Phase<br>480V Polyphase pass-through |
| **Supply Frequency** | 45Hz-65Hz |
| **HDMI Cable** | 72” (183 cm) |

## 1.6.2 Dimensions

| PARAMETERS | DATA |
|---|---|
| **Diameter** | 6.9” (17.5 cm) |
| **Length** | 7.2” (18.3 cm) |
| **Weight** | 5.4 lbs (2.45 kg) |

| PARAMETERS | DATA |
|---|---|
| **Height** | 10.8” |
| **Width** | 4.8” |
| **Depth** | 1.6” |
| **Weight** | 1.6 lbs |

## 1.6.3 Measurements Accuracy

*Valid for 0.01A Resolution and Current of 0.1A to 50A.*

| PARAMETERS | DATA |
|---|---|
| Power Measurements Accuracy (Watts / VA / VAR) | ±0.04% |
| Energy Measurements Accuracy (WHrs / VAHrs / VARHrs) | ±0.04% |

# 1.7 About this Operations Manual

This manual provides complete information for installing and operating the Instrument. This document instructs the user on the following operations of the T3:

- Installation
- Front Panel Features
- Graphical User Interface (GUI)
- How to set up the machine for remote operation using PC Application
- Instrument Maintenance

# 2.0 INSTALLATION

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**2.4 Meter Site Installation**
**2.5 Airflow and Cooling Considerations**

# 2.1 Introduction

This chapter provides instructions for unpacking and installing the Instrument. Read this chapter before you operate the Instrument. Instructions for cable connections can be found in this section.

# 2.2 Unpacking and Inspection

The Instrument is shipped in a container designed to prevent damage during shipping. Inspect the Instrument carefully for damage and immediately report any damage to the shipper. A packing list is included in the packaging. When you unpack the Instrument, check for all the equipment listed and check the shipping order for any additional items ordered. Report any shortage to the place of purchase, your distributor, or directly to TESCO.

**Figure 2.2a**

Inside of the (1) carrying case, you will find (2) the Turbo Tester (T3) Instrument, (3) the Optical Pickup (1037-DIN), (4) the clearance adapter, two ring clamps, and spare fuses. Optionally, you will also find the (5) Handheld Device (THD) with HDMI cable.

# 2.3 Powering the Instrument

The T3 can be powered either by an AC or a DC power supply.

## 2.3.1 AC Power Mode

The T3 will power automatically when a potential between 120-480 VAC is applied between the first and third stabs (see Section 3.xx for Installation facing diagram). At a meter installation, this is derived from the customer's service. In the lab, this can be supplied by any desktop universal socket configured for self-contained meters (such as CAT-2100, DTS-2990, or MTS-3050).

## 2.3.2 DC Power Mode

The T3 is equipped with a USB-C port that can be used with a USB power supply or computer to supply 5VDC to the instrument. In this mode of operation, the instrument can be accessed remotely, but all testing functionality is disabled.

# 2.4 Meter Site Installation

Proper installation of the T3 device is essential for safe operation and optimal performance.

**WARNING**

**Always ensure proper PPE is worn when removing/installing any meter at an installation.**

**The Instrument should only be used in installations supplying between 120 and 480 VAC line-to-line to avoid damaging the Instrument.**

**Only intended for self-contained meters! Damage and injury may result if used in a transformer rated installation, especially involving form 5S.**

Remove the meter from the socket, place the Instrument on a flat surface, and insert the meter directly downwards into the Instrument. If desired, install the included meter locking ring for added security. Next, install the assembly into the meter socket as you would any meter – the Instrument will power on automatically. When testing is complete, remove the assembly from the socket, separate the meter from the Instrument, and reinstall the meter into the socket.

## 2.4.1 Clearance Adapter Installation

For certain four position installations with clearance constraints, an adapter is included. Before installing the Instrument into the meter socket, first insert the Instrument into the adapter. If desired, install the included meter locking ring for added security. To remove the adapter, insert a flat head screwdriver into the notch of the adapter, and pry the two pieces apart.

Figure 2.4.1a shows the full installation of the Instrument.

Figure 2.4.1b shows the Instrument installed in the clearance adapter and how the Instrument should look once you are taking the clearance adapter off.

## 2.5 Airflow and Cooling Considerations

The device features a cooling fan with designated intake and exhaust areas that operate continuously once powered on. Ensure both intake and exhaust areas remain unobstructed to maintain proper airflow and prevent overheating. Clean the non-removable air filters regularly using a vacuum to remove dust and debris.

**CAUTION**

**Damage caused by overheating may occur if the area around the air intake is restricted, the intake air is too warm, is interfered, or the air filter becomes clogged.**

# 3.0 T3 FUNCTIONALITIES


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# 3.1 Introduction

This chapter is a reference for the functions and locations of the Instrument's front panel features and provides brief descriptions of each feature for quick access. **Please read this information before operating the Instrument.** Front panel operating instructions for the Instrument are provided in this chapter and Remote Operating instructions are in **Chapter 4**.

# 3.2 Panel Features

All panel features (including all controls, displays, indicators, and terminals) are shown in Figures 3.2.1a – 3.2.1e. Each front panel feature is briefly described below.

## 3.2.1 Panel Sections

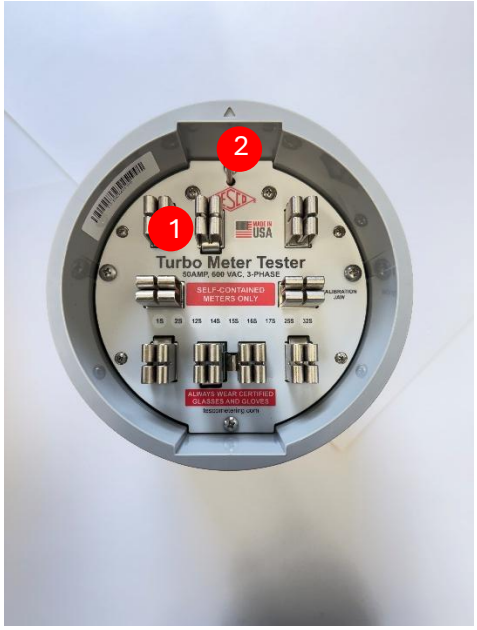



Figure 3.2.1a

The (1) jaws on the meter facing side of the instrument connect to the meter once it's plugged in, bringing voltage and current to power the meter during testing. This side houses the (2) safety switch (plunger) that must be engaged for voltage to be present at the jaws.

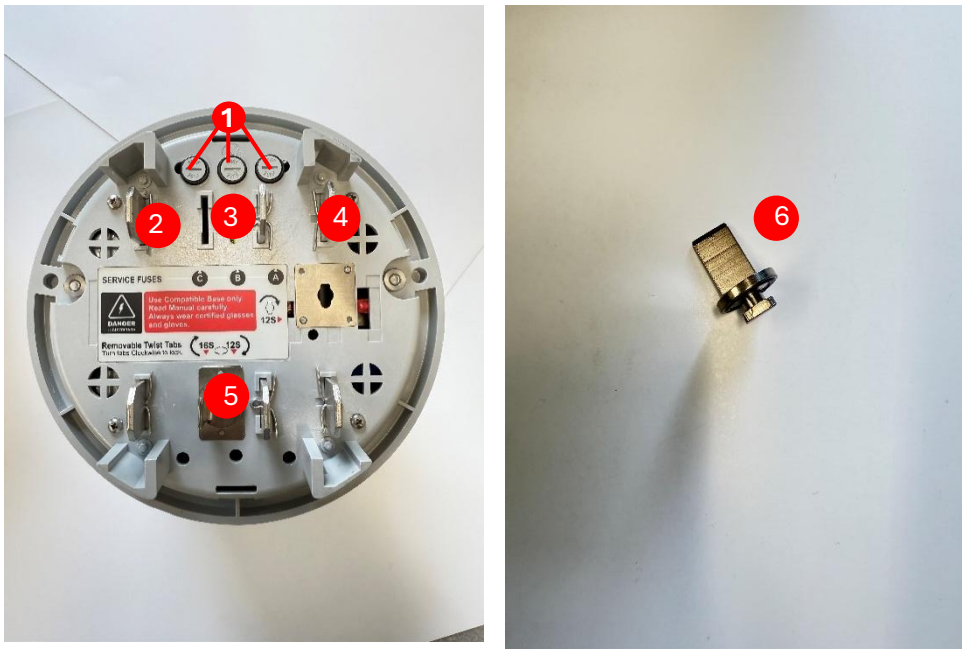



Figure 3.2.1b

The back of the instrument features the three fuses (1), the installation side with (2, 3, and 4) stabs that plug into the meter socket, along with the configurable (5 and 6) neutral tab that can be positioned for different meter forms (12S and 16S configurations). This side contains the fuses 3.2.1b (5A 600V Ceramic 3AB type) that protect against power surges, and relays that bring voltage to the required levels. The device can handle currents up to 50 amps and generates current while taking voltage from the customer's service.

Figure 3.2.1c

The instrument features a cooling fan (left) and exhaust area (right). The fan operated continuously once the unit is powered on to maintain proper operating temperature. Ensure the intake and exhaust areas remain unobstructed for adequate airflow and cooling performance.

Figure 3.2.1d

The IO (Input/Output) Panel features multiple connection parts, including the handheld port for the THD instrument, Ethernet port for network communication, optical pickup connection for the 1037-DIN pickup, and USB-C port for power and communication. The panel also includes a green indicator light that shows when the unit is powered on and operating.

Figure 3.2.1e

The TESCO Handheld Device (THD) provides the graphical user interface (GUI) for operating the T3. It features both touchscreen and keypad navigation, allows meter form selection, barcode scanning capability for automatic meter identification, test configuration options, and displays real-time testing results including phase angles, watt hours, and pass/fail status. The THD is powered via the T3 connection using an HDMI cable (provided).

You can learn more about this instrument in the Navigation Keys for THD in section 3.2.2

## 3.2.2 Navigation Keys for THD

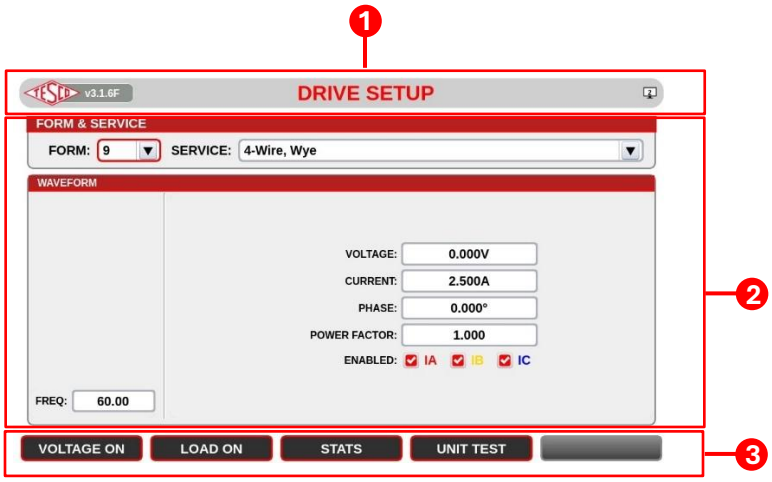
| Symbol | Description |
|---|---|
| ▲ or ▼ | Functions any of the following:<br>• Selects the NEXT or PREVIOUS **MENU** item.<br>• Moves the **SELECTED LINE** UP or DOWN<br>• Select an Item from a dropdown menu |
| ◀ or ▶ | Functions any of the following:<br>• Moves the cursor left/right of the current character in text boxes.<br>• Moves the selection left/right of the current selected cell in tables. |
| ⇤ or ⇥ | Selects the NEXT or PREVIOUS **TAB** item. |
| SCAN | When the meter barcode is scanned, the Instrument will load information from the database associated with the meter serial number. If the meter uses AEP codes, the Instrument will load any information contained within the code. |
| | The touchscreen for the THD works alongside the traditional keypad navigation. It allows users to interact directly with the GUI by touching screen elements, providing an alternative to using the physical function keys for menu selection and test configuration. |
| | The number keypad for the THD uses multi-top input functionality. Single press selects the primary character; multiple cycle through secondary characters (letter/symbols) assigned to each key. The 0 is the Space Key. |
| ← | Deletes the previous character |
| ↑ | Returns to the previous screen |
| F1 F2 F3 F4 | Function Keys |
| ▣ | Home Key cycles through sections within a window |
| ▼ | Enter selects a response |

# 3.3 The Graphical User Interface (GUI)

The GUI (graphical user interface) is similar to other Next Gen units with slight difference in keypad layout and testing functions. It features both touchscreen and keypad navigation, allows meter form selection, barcode scanning capability, test configuration options, and displays real-time testing results including phase angles, watt-hours, and pass/fail status.

## 3.3.1 Graphical User Interface (GUI) Screens

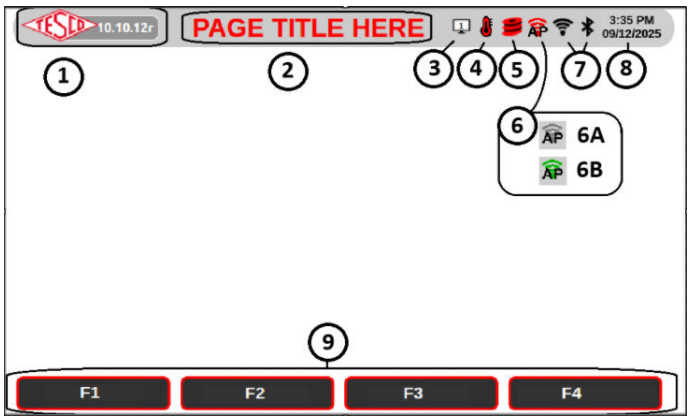
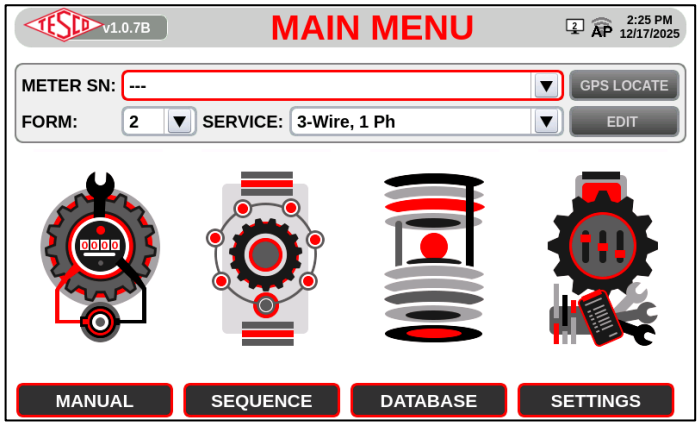
The user interface is divided into three sections. In the screen, any field that is grayed out cannot be changed or accessed by the user.



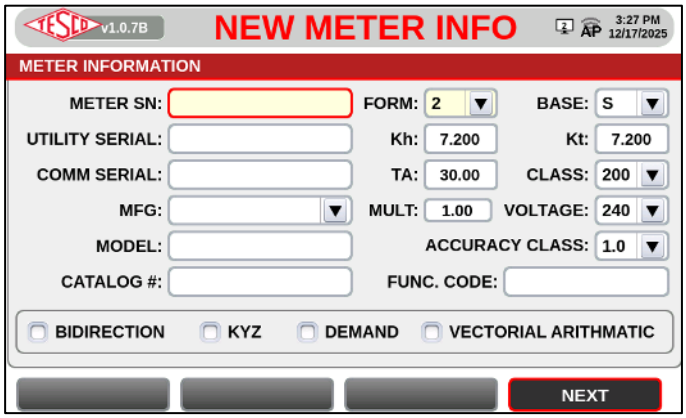
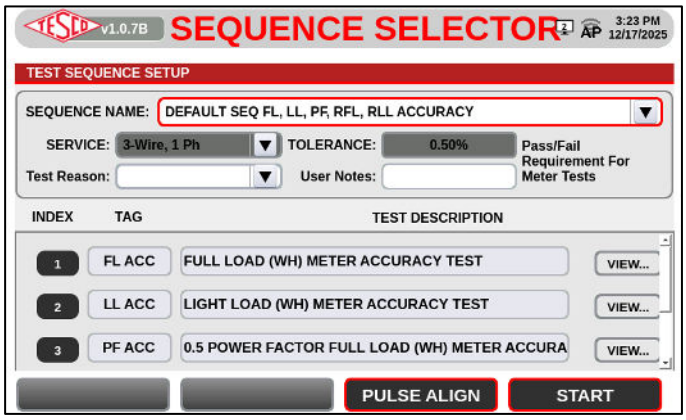

| NUMBER | DESCRIPTION |
|---|---|
| 1 | Screen Title |
| 2 | Screen Data |
| 3 | Function Buttons |

Table 3.3.1. T3 GUI Sections

# 3.3.2 MAIN MENU

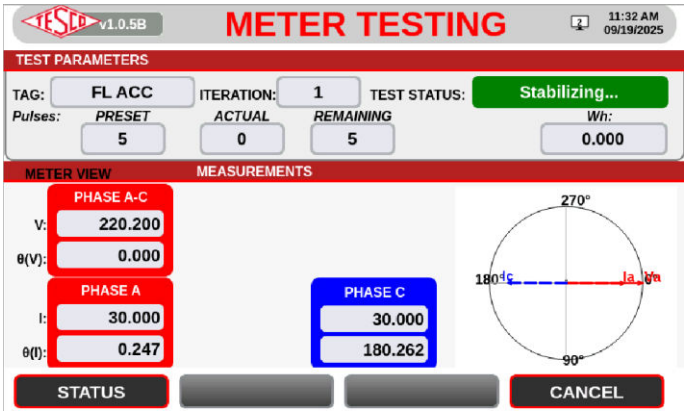
| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Function Keys (Bottom):** | **3.3.2.1 MAIN MENU SCREEN ICON AND BAR OVERVIEW**<br>**(1) Left Panel:** Software version.<br>**(2) Page Title:** Displays the title of the current screen<br>**(3) Connection Status Icon:** Indicates connected devices or system connection status.<br>**(4) Temperature Indicator:** Shows the device's temperature or alerts if thresholds are exceeded.<br>**(5) Database Status Icon:** Displays database is full state.<br>**(6) Access Points (AP):** Lists available Wi-Fi or AP connections.<br>(A) Grayed-out icon: AP not connected/available.<br>(B) Green icon: Active/connected AP.<br>**(7) Wi-Fi Indicator:** Shows Wi-Fi connectivity strength or status.<br>**Bluetooth Indicator:** Displays Bluetooth connection status<br>**(8) Time and Date Info**<br>**(9) Function Keys (F1 – F4):** Soft keys for user actions. Their functions vary depending on the screen context and are labeled dynamically on the display. |
|  <br>**Action Buttons:**<br>If you select **MANUAL** button see Section 3.3.10.<br>If you select **SEQUENCE** button see Section 3.3.3.<br>If you select **DATABASE** button see Section 3.3.8.<br>If you select **SETTINGS** button see Section 3.3.5. | **3.3.2.2 MAIN MENU SCREEN OVERVIEW**<br>• **METER SN**: Displays the meter identifier for the current session (can be blank or filled depending on the context).<br>• **FORM**: Allows the selection of different test forms.<br>• **SERVICE**: Indicates the current service type (e.g., 4-Wire, Wye). Only services associated with the current form are available.<br>**Main Buttons:**<br>• **Manual**: Navigates to manual testing options.<br>• **Sequence**: Opens the sequence testing section.<br>• **Database**: Provides access to the database for managing stored data.<br>• **Settings**: Opens the settings for system preferences and configuration.<br>Navigation between these options is done by selecting the respective icons or buttons at the bottom. |

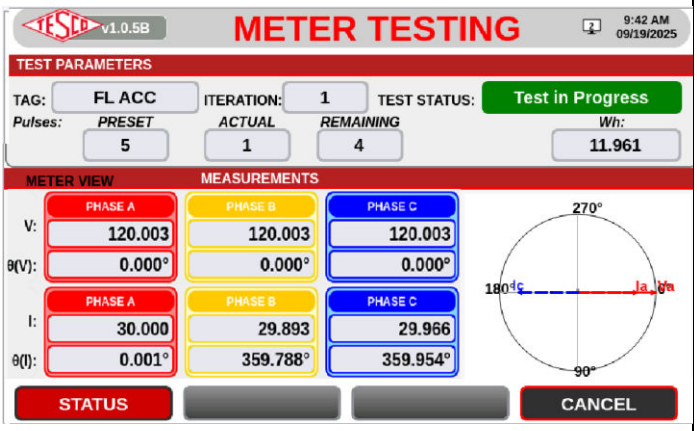
# 3.3.3 METER INFORMATION AND SEQUENCE SETUP

| SCREEN | DESCRIPTION |
|---|---|
|  <br>When you are done with the meter info click **NEXT**. See next page<br>For more information on setting up a Database, see Section 3.3.8 | **3.3.3.1 METER INFO SCREEN: METER INFORMATION**<br>If a meter was not selected in the Main Menu, selecting Sequence will navigate to the New Meter Info screen. This set of screens requires users to input the meter and station information before selecting a sequence. For setting up meter stations, see Section 3.3.8.<br>• **Identification:** Meter SN, Utility S/N, Comm S/N, Site, Loc. ID, Loc. Code, Description, Notes<br>• **Manufacturer:** MFG, Model, Catalog #<br>• **Specifications:** Form/Base, Kh, Kt, TA, Class, Voltage, Multiplier, Accuracy Class, Service<br>• **Options:** Bidirection, KYZ, Demand, Vectorial Arithmetic<br>Once the meter info is entered, click **Next** to proceed.<br>To return to the **Main Menu**, press the **Return** key. |
|  <br>Select the sequence name to see more options. See next page | **3.3.3.2 SEQUENCE SELECTOR SCREEN**<br>On the **Sequence Selector** screen, you can select a test sequence to run on the meter. For setting up sequence tests, see Section 3.3.9<br>• **Sequence Name:** Choose a predefined sequence from the dropdown menu<br>• **Service:** Service associated with the Sequence. Only services available for the selected meter form are available.<br>• **Tolerance:** Pass/Fail tolerance for meter tests**.**<br>• **Test Reason/User Notes:** Add reasons for the test and any relevant notes.<br>• **Test List:** Displays the tests in the sequence<br>  ○ **Index:** Test number in the sequence<br>  ○ **Tag:** Identifier for the test<br>  ○ **Test Description:** Brief details of test parameters<br>  ○ **View:** View full details of test parameters<br>Additional controls:<br>• **Pulse Align**: Enables power to the meter to ensure pulse pickup before running the tests.<br>Click **Start** to begin the test sequence |

# 3.3.4 RUNNING AND MONITORING TESTS

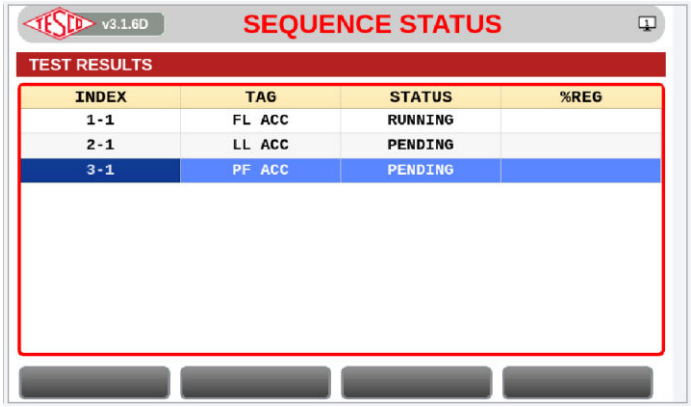
| SCREEN | DESCRIPTION |
|---|---|




**Action Buttons:**

- **STATUS:** Provides detailed overall test status.
- **CANCEL:** Stops the current test in progress.




### 3.3.4.1 TESTING SCREEN

This screen provides real-time monitoring of a test while it is running, including electrical measurements, pulse counts, and a visual phasor diagram.

**Test Parameters (Top Section):**

- **Tag:** Identifier for the test (e.g., *FL ACC* for Full Load Accuracy Test).
- **Iteration:** The current iteration number of the test.
- **Test Status:** Indicates the current state of the test (e.g., *Test in Progress*).
- **Pulses:**
  - **Preset:** Number of pulses required to complete the test.
  - **Actual:** Pulses already measured.
  - **Remaining:** Pulses still needed.
- **Wh:** Accumulated watt-hour measurement during the test.

**Meter View & Measurements (Single Phase):**

- **Phase A-C:** Displays voltage (V) and phase angle θ(V) between phases A and C.
- **Phase A:** Displays current (I) and phase angle θ(I) for Phase A.
- **Phase C:** Displays current (I) and phase angle θ(I) for Phase C.

**Meter View & Measurements (Polyphase):**

- **Phase A:** Displays voltage, current, and phase angles (θ).
- **Phase B:** Displays voltage, current, and phase angles (θ).
- **Phase C:** Displays voltage, current, and phase angles (θ).

**Phasor Diagram (Right Side):**

- A circular chart showing the angular relationships between phases.
- Each vector (e.g., *Ia*, *Va*, *Vc*) represents phase magnitude and angle.

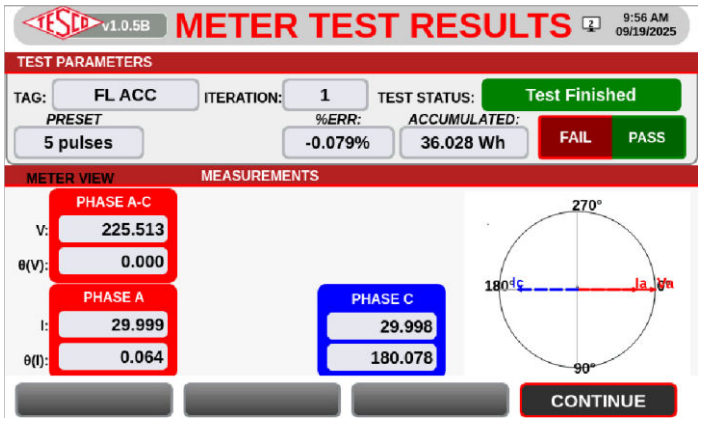
### 3.3.4.2 STATUS SCREEN

The **Sequence Status** screen displays the progress of tests in the current sequence. Here's what you can see:

- **Index**: The position of the test in the sequence.
- **Tag**: The name of the test (e.g., FL ACC for Full Load Accuracy, LL ACC for Light Load Accuracy, PF ACC for Power Factor Accuracy).
- **Status**: Shows if the test is running, pending, or completed.
- **%REG**: The percentage registration, indicating how accurate the meter is based on the test results.

This screen helps you track the completion and results of each test within the selected sequence.

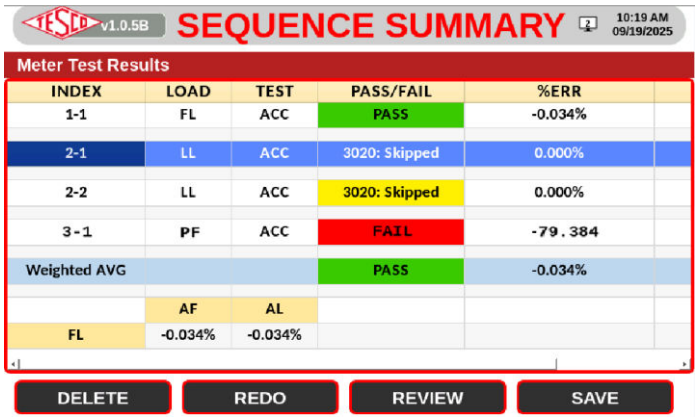
| SCREEN | DESCRIPTION |
|---|---|




Select the continue see next page.

Action Button:

- **CONTINUE:** Advances to the next step, allowing the operator to review detailed results or proceed to the DB or back to testing.




Select the **Done** button, return to Sequence Selector screen

Action Buttons:

- **DELETE:** Removes the highlighted test entry.
- **REDO:** Allows rerunning of a failed or skipped test.
- **REVIEW:** Opens the detailed review screen for in-depth analysis of the selected test.
- **SAVE:** Saves the sequence results for later reference or reporting

### 3.3.4.5 TEST FINISHED

This screen displays the final outcome of a meter test once it has completed.

**Test Parameters (Top Section):**

- **Tag:** Identifier for the test (e.g., *FL ACC*).
- **Iteration:** Shows which test iteration was completed.
- **Test Status:** Displays *Test Finished* when the run is complete.
- **Pulses:** Number of pulses that were preset for the test (e.g., *5 pulses*).
- **%Error:** Final percent error calculated at the end of the test (e.g., *-0.079%*).
- **Accumulated (Wh):** Total watt-hours measured during the test (e.g., *36.028 Wh*).

**Pass/Fail Result:**

- At completion, the result is clearly displayed as either **PASS** or **FAIL**.
- Only one of these two states will be active at any time, based on whether the test met tolerance requirements.

**Meter View & Measurements:**

- Displays the same measurement details as during the test, but now frozen to represent the final state.
- Includes voltages, currents, and phase angles (θ) for each measured phase (A, B, and C).

The phasor diagram remains visible for quick verification of angular alignment.

### 3.3.4.4 SUMMARY SCREEN

This screen provides an overview of all tests executed within a sequence, showing results, errors, and overall performance.

**Displayed Results:**

- **Index:** Identifies the test order in the sequence (e.g., *1-1, 2-1, 3-1*).
- **Load:** Indicates the test condition (e.g., *FL – Full Load, LL – Light Load, PF – Power Factor*).
- **Test:** The type of test performed (e.g., *ACC – Accuracy*).
- **Pass/Fail:** Displays the outcome of each test. Possible states include:
  - **PASS** – Test completed successfully.
  - **FAIL** – Test did not meet required standards.
  - **3020: Skipped** – Indicates the test was bypassed.
- **%Err/Reg:** Error expressed as percent error or percent registration.

**Additional Data:**

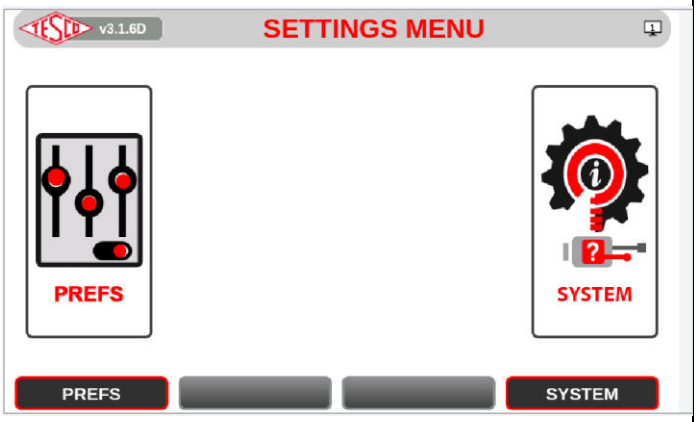
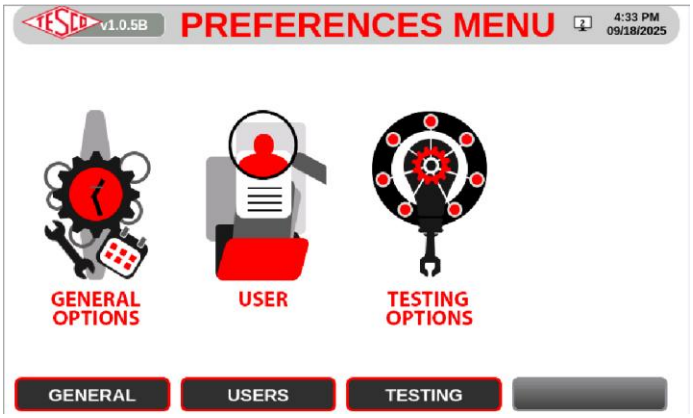
- **Weighted AVG:** Provides the overall result of the sequence, calculated from a weighted average of the test results.
- **AF / AL Rows:** Show alignment of Average Forward (AF) and Average Lagging (AL) results by load type (e.g., FL).

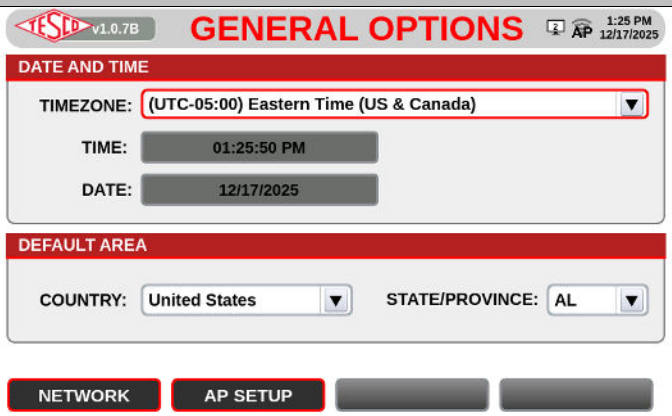
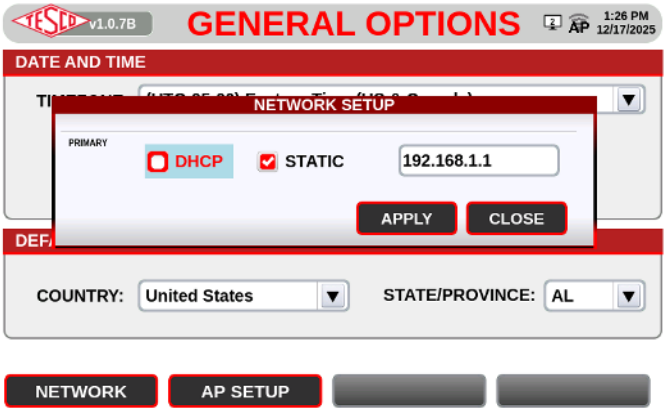
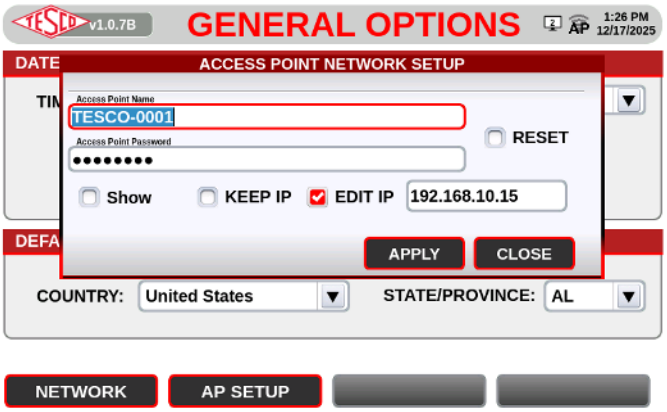
**Notes:**

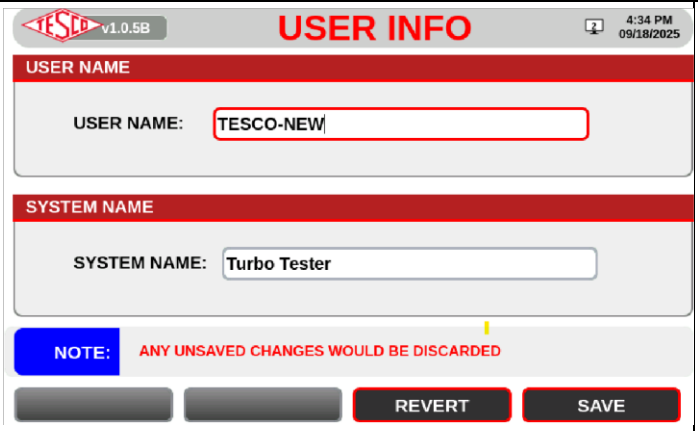
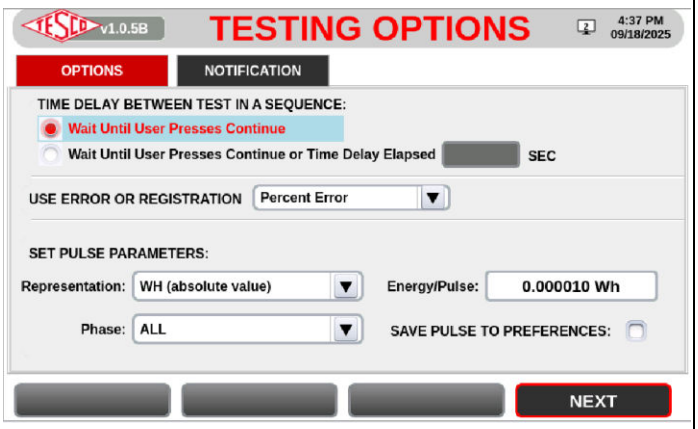
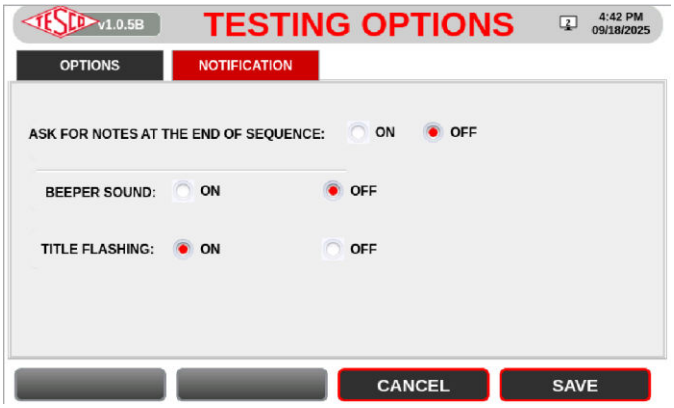
The system supports explicit *Skipped Test* reporting, providing clearer visibility into sequences where not all tests were executed.

Weighted averages are emphasized as the final measure of whether the sequence passed or failed overall.

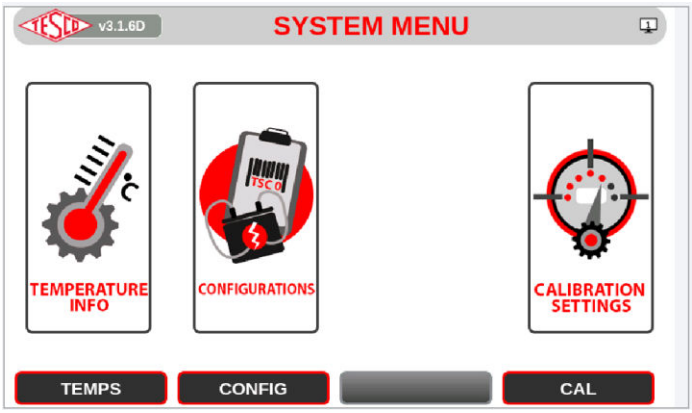
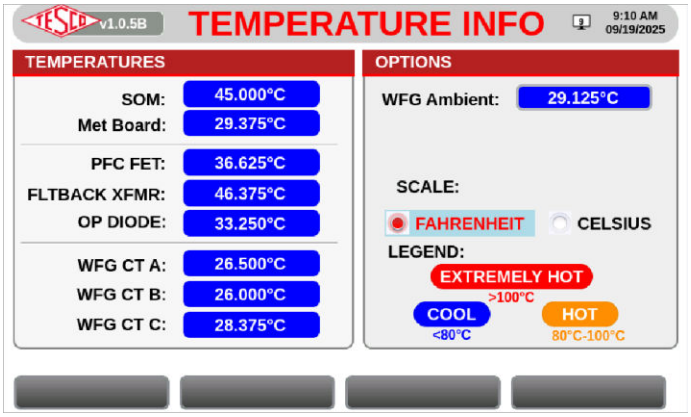
# 3.3.5 SETTINGS AND PREFERENCES

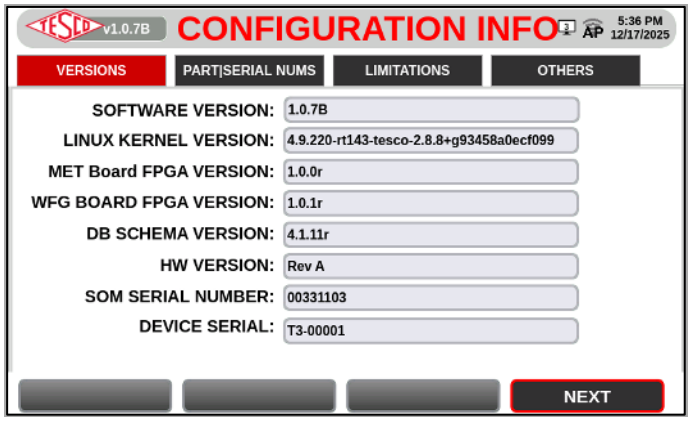
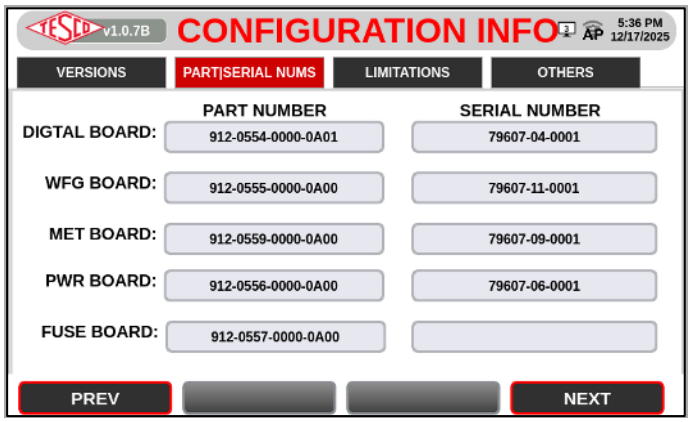
| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>If you select **PREFS** button see next page.<br>If you select **SYSTEM** button see Section 3.3.6. | **3.3.5.1 SETTINGS MENU**<br>This is the **Settings Menu** screen. Here, you can adjust system preferences or access system information.<br>• **PREFS**: Takes you to the preferences settings where you can adjust the user interface, test configurations, and other system preferences.<br>• **SYSTEM**: Provides access to system-level settings, including device information, version details, and system diagnostics.<br>You can switch between the two options by selecting either **PREFS** or **SYSTEM**, depending on what you need to configure.<br>To return to the **Main Menu**, press the **Return** key. |
|  <br>**Action Buttons:**<br>If you select **GENERAL** button see next page.<br>If you select **USERS** button see 3.3.5.6.<br>If you select **TESTING** button see 3.3.5.7. | **3.3.5.2 PREFERENCES MENU**<br>This is the **Preferences Menu** screen. From here, you can adjust various settings that control how the system operates:<br>• **GENERAL OPTIONS**: Accesses general configuration settings that impact overall system behavior.<br>• **USER**: Manages user profiles and permissions.<br>• **TESTING OPTIONS**: Allows you to configure settings specific to the tests being conducted, such as timing and accuracy thresholds.<br>Each button navigates to its respective submenu for further adjustments. |

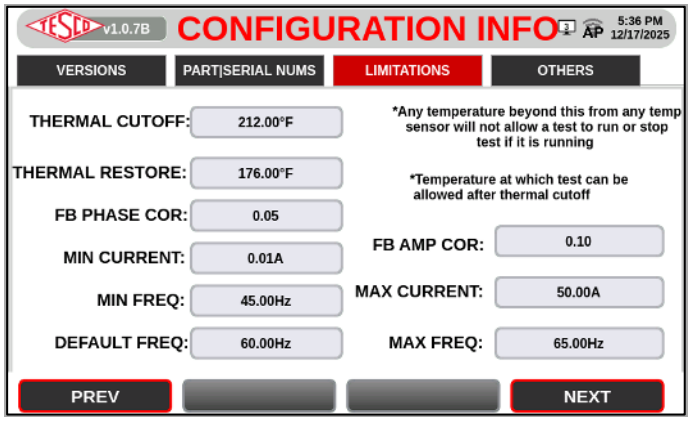
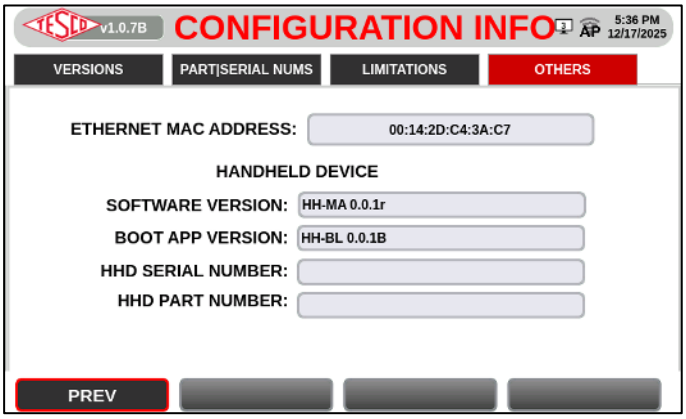
| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>If you select **NETWORK** button see next page.<br>If you select **AP SETUP** button see 3.3.5.5. | **3.3.5.3 GENERAL OPTIONS**<br>This is the **General Options** screen where you can configure basic settings related to the system's date, time, location, and network settings.<br>• **Timezone:** Allows you to select the appropriate time zone from the dropdown menu.<br>• **Time and Date:** Displays the current system time and date.<br>• **Default Area:** Lets you select the Country and State/Province that will default when entering Station information.<br>• **Network Button:** Opens the network settings to configure DHCP or static IP addresses.<br>• **AP Setup Button:** Opens the wireless access point settings to configure name, password, and IP address. |
|  | **3.3.5.4 NETWORK SETUP**<br>This window, accessed from the General Options menu, allows configuration of network settings for the device.<br>• **DHCP:** When selected, the device automatically obtains an IP address from the network.<br>• **Static:** Allows manual entry of a static IP address (e.g., *192.168.1.1*). |
|  | **3.3.5.5 ACCESS POINT NETWORK SETUP**<br>This window, accessed from the General Options menu, allows configuration of the wireless Access Point network settings for the device.<br>• **Access Point Name:** Identifies the device on the network (e.g., *TESCO-0001*).<br>• **Access Point Password:** The password required to connect to the device's access point.<br>• **Reset:** Resets the access point credentials to their default values.<br>• **Show:** Reveals or hides the access point password field for easier entry verification.<br>• **Keep IP:** Retains the currently assigned IP address when switching modes.<br>• **Edit IP:** Allows manual editing of the device's IP address (e.g., *172.168.10.15*). |

| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **REVERT:** Cancels changes and restores the previous saved values.<br>• **SAVE:** Saves the updated user and system information. | **3.3.5.6 USER INFO**<br>This screen allows the user to input or update key information related to the device configuration.<br>1. **User Name:** Identifies the user of the device. This field can be updated to match the current operator or account.<br>2. **System Name:** Represents the system or setup in use. This field is typically used to identify the device or environment (e.g., *Turbo Tester*).<br>**Note Section:**<br>Displays a reminder that *any unsaved changes will be discarded* if not saved. |
|  <br>**Action Buttons:**<br>• **NEXT:** advances to the next configuration Tab<br>• **IF something is different:** Save and cancel will appear | **3.3.5.7 TESTING OPTIONS – OPTIONS TAB**<br>This screen allows configuration of test behavior and pulse parameters during a test sequence.<br>**Time Delay Between Tests in a Sequence:**<br>• **Wait Until User Presses Continue:** Requires manual confirmation to proceed to the next test.<br>• **Wait Until User Presses Continue or Time Delay Elapsed:** Allows automatic continuation after a set time delay (in seconds).<br>**Use Error or Registration:**<br>• Dropdown option to define how results are displayed:<br>○ *Percent Error*<br>○ *Percent Registration*<br>**Set Pulse Parameters:**<br>• **Representation:** Defines how the pulse values are displayed (e.g., *Wh (absolute value)*).<br>• **Energy/Pulse:** Sets the energy value per pulse (e.g., *0.000010 Wh*).<br>• **Phase:** Allows selection of the test phase (e.g., *ALL, A, B, C*).<br>• **Save Pulse to Preferences:** Option to save the current pulse configuration as a preference for future tests. |
|  <br>**Action Buttons:**<br>If anything is Different, it will show the buttons else will have PREV button<br>• **CANCEL:** Discards any unsaved changes and restores the previous settings.<br>• **SAVE:** Saves the current notification settings. | **3.3.5.8 TESTING OPTIONS – NOTIFICATION TAB**<br>This tab allows configuration of user notifications and prompts during testing.<br>**Notification Settings:**<br>• **Ask for Notes at the End of Sequence:** Toggles whether the user is prompted to enter notes after a test sequence is completed (*ON/OFF*).<br>• **Beeper Sound:** Enables or disables the beeper that provides audible feedback during tests (*ON/OFF*).<br>• **Title Flashing:** Toggles the flashing of the screen title bar to visually indicate test events or alerts (*ON/OFF*). |

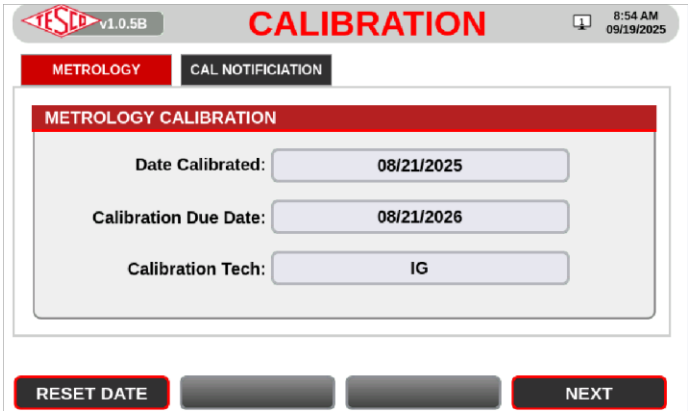
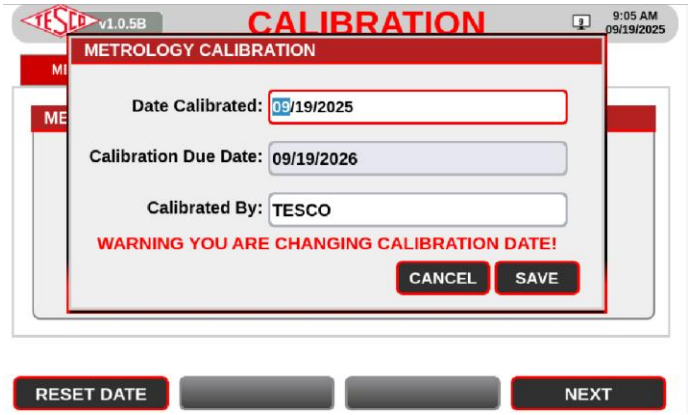
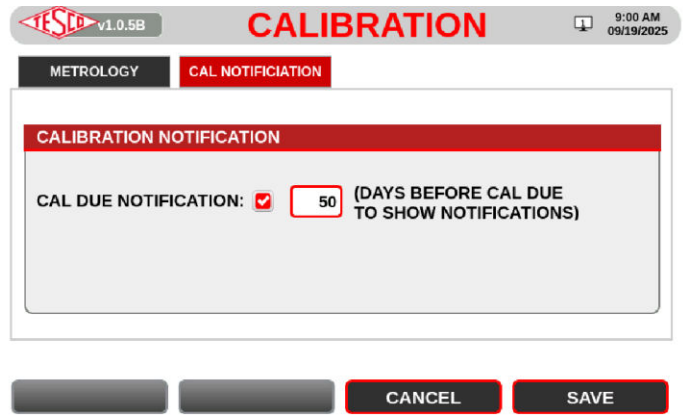
# 3.3.6 SYSTEM INFORMATION AND CONFIGURATION

| SCREEN | DESCRIPTION |
|---|---|
|  <br><br>**Action Buttons:**<br>If you select **TEMPS** button see next page.<br>If you select **CONFIG** button see 3.3.6.3.<br>If you select **CAL** button see Section 3.3.7.<br><br>  <br> | **3.3.6.1 SYSTEM MENU**<br>This screen allows you to access various system-level options:<br>• **Temperature Info**: View temperature-related data for different components.<br>• **Configurations**: Access configuration information about the system, including model and hardware details.<br>• **Calibration Settings**: Review and adjust settings related to the calibration of the system.<br>At the bottom of the screen:<br>• **TEMPS**: Shortcut to the Temperature Info section.<br>• **CONFIG**: Shortcut to the Configurations section.<br>• **CAL**: Shortcut to the Calibration Settings section.<br>To return to the **Main Menu**, press the **Return** key twice.<br><br>**3.3.6.2 TEMPERATURE INFO SCREEN**<br>This screen displays real-time temperature readings for multiple system components and provides configuration options for how the data is presented.<br>**Temperature Readings (Left Panel):**<br>• **SOM:** System-on-Module temperature.<br>• **Met Board:** Temperature of the metrology board.<br>• **PFC FET/FLTBACK XFMR/OP DIODE:** Monitors temperatures of the integrated power supply<br>• **WFG CT A / B / C:** Monitors temperatures of the waveform generator circuits<br>**Options (Right Panel):**<br>• **WFG Ambient:** Temperature of the waveform generator<br>• **Scale:** Allows switching between Fahrenheit and Celsius for temperature display.<br>• **Legend:** Color-coded guide to indicate operating ranges:<br>  ○ **COOL** (<80°C): Blue<br>  ○ **HOT** (80°C–100°C): Orange<br>  ○ **EXTREMELY HOT** (>100°C): Red |

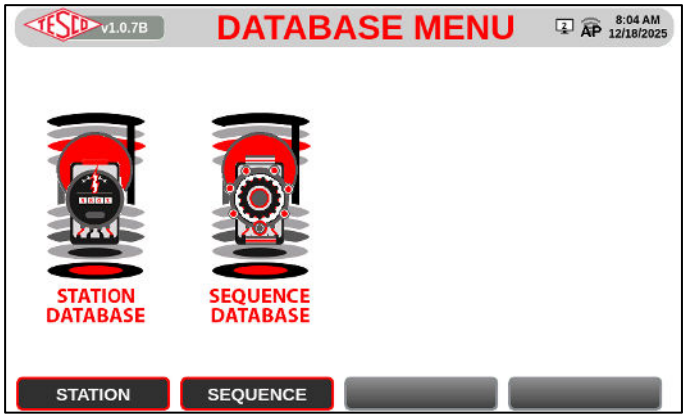
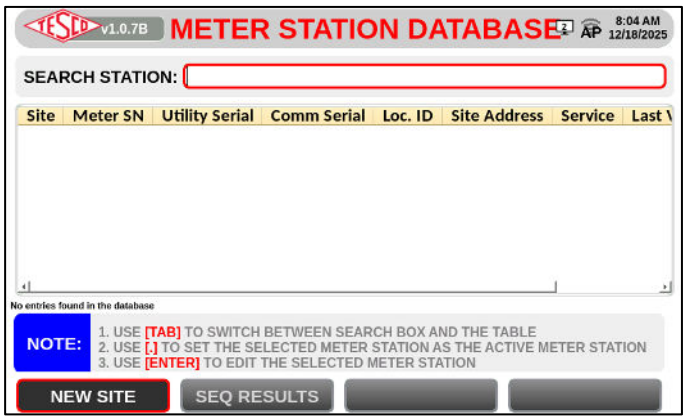
| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **NEXT:** Advances to the Part/Serial Nums tab | **3.3.6.3 CONFIGURATION INFO: VERSIONS TAB**<br>This screen displays detailed configuration information for the device, including software, hardware, FPGA, and database versions.<br>• **Software Version:** Indicates the version of the device software.<br>• **Linux Kernel Version:** Displays the kernel build and version running on the system.<br>• **MET Board FPGA Version:** Version of the FPGA on the metrology board.<br>• **WFG Board FPGA Version:** Version of the FPGA on the waveform generator board.<br>• **DB Schema Version:** Indicates the database schema version used by the system.<br>• **HW Version:** Hardware revision of the device.<br>• **SOM Serial Number:** Serial number of the System-on-Module.<br>• **Device Serial:** Serial identifier for the device (e.g., *ENG-01*). |
|  <br>**Action Buttons:**<br>• **PREV:** Returns to Versions tab<br>• **NEXT:** Advances to the Limitations tab | **3.3.6.4 CONFIGURATION INFO: MAIN BOARD TAB**<br>This tab displays part numbers and serial numbers for the major boards inside the device.<br>**Listed Components:**<br>• **Digital Board**<br>• **WFG Board**<br>• **MET Board**<br>• **PWR Board** |

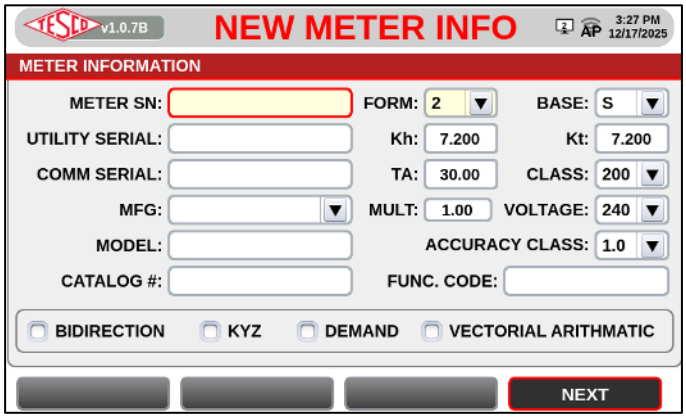
| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **PREV:** Returns to Part/Serial Nums tab<br>• **NEXT:** Advances to the Others tab | **3.3.6.5 CONFIGURATION INFO: LIMITATIONS TAB**<br>This tab defines the system's operational limitations and cutoff thresholds.<br>**Parameters:**<br>• **Thermal Cutoff:** *100.00°C*<br>  ○ Any temperature beyond this from any sensor will prevent a test from starting or stop a running test.<br>• **Thermal Restore:** *80.00°C*<br>  ○ Temperature threshold at which testing can resume after a thermal cutoff.<br>• **FB Phase Cor.:** *0.05*<br>• **FB Amp Cor.:** *0.10*<br>• **Min Current:** *0.01A* (minimum current the system can measure).<br>• **Max Current:** *50.00A* (maximum current the system supports).<br>• **Min Freq:** *45.00Hz* (minimum frequency supported).<br>• **Max Freq:** *65.00Hz* (maximum frequency supported).<br>• **Default Freq:** *60.00Hz* (default operating frequency). |
|  <br>**Action Buttons:**<br>• **PREV:** Returns to Limitations | **3.3.6.6 CONFIGURATION INFO: OTHERS TAB**<br>This tab provides additional configuration details, including network and handheld device information.<br>**Parameters:**<br>• **Ethernet MAC Address:** Displays the device's unique hardware MAC addres.<br><br>**Handheld Device (Plug-in Module):**<br>• **Software Version:** Version of the handheld device software.<br>• **Boot App Version:** Version of the boot application running on the handheld device.<br>• **HHD Serial Number:** Serial number of the handheld device.<br>• **HHD Part Number:** Part number of the handheld device.<br><br>**Notes:**<br>• The handheld device is a plug-in module.<br>• If the handheld is **not plugged in**, the fields will display default placeholder values (e.g., Software Version: *0.0.0A*). |

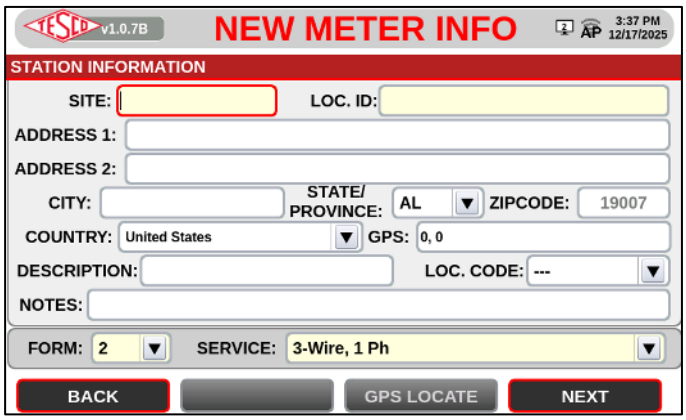
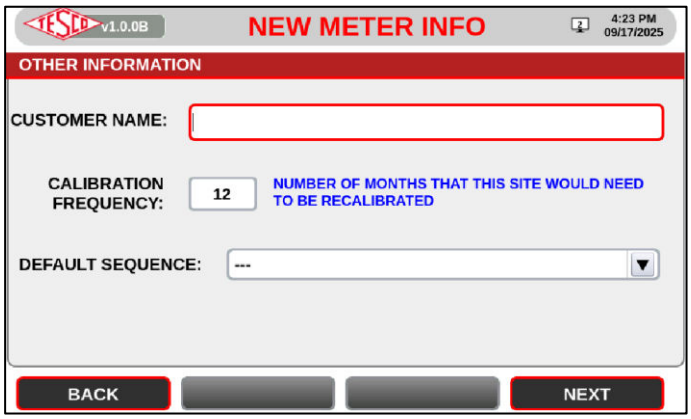
# 3.3.7 CALIBRATION FUNCTIONS

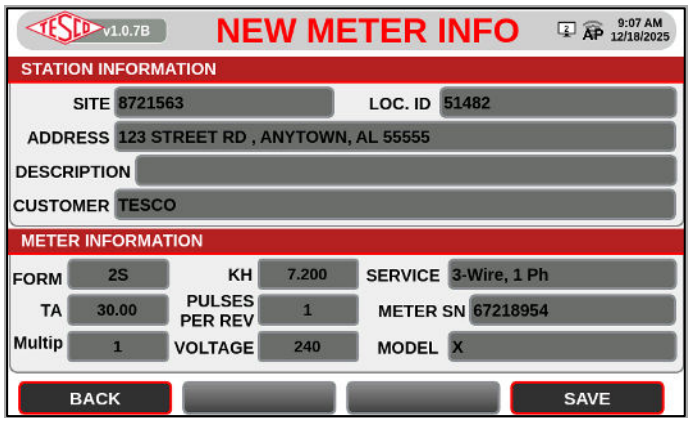
| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **RESET DATE:** Allows the user to reset calibration dates.<br>• **NEXT:** Proceeds to the next calibration tab (Cal Notification). | **3.3.7.1 CALIBRATION SCREEN: METROLOGY TAB**<br>This screen provides calibration information for the system and allows management of calibration records.<br>• **Date Calibrated:** Displays the date when the system was last calibrated.<br>• **Calibration Due Date:** Shows the next scheduled calibration date.<br>• **Calibration Tech:** Identifies the technician who performed the calibration. |
|  | **3.3.7.2 CALIBRATION SCREEN: RESET POPUP**<br>This popup window allows the user to adjust and update calibration details.<br>• **Date Calibrated:** Editable field showing the most recent calibration date.<br>• **Calibration Due Date:** Editable field showing the next scheduled calibration date.<br>• **Calibrated By:** Field identifying the entity or technician who performed the calibration (e.g., *TESCO*).<br>**Warnings:**<br>• A red message is displayed: *"WARNING YOU ARE CHANGING CALIBRATION DATE!"*<br>• If **Save** is clicked, an additional confirmation warning appears:<br>  ○ *"ARE YOU SURE YOU WANT TO CHANGE CALIBRATION DATE!"*<br>  ○ The user must select **YES** to confirm or **NO** to cancel.<br>• This ensures users understand that changing calibration dates without an actual calibration event will result in **incorrect or misleading records**. |
|  <br>**Action Buttons:**<br>• **PREV:** Returns to Metrology tab.<br>• **SAVE:** Saves updated notification settings.<br>• **CANCEL:** Discards changes and restores previous settings. | **3.3.7.3 CALIBRATION SCREEN: CAL NOTIFICATION TAB**<br>• **Cal Due Notification:** Checkbox to enable or disable calibration reminders.<br>• **Days Before Calibration Due:** Field to set the number of days before the calibration due date when notifications should appear.<br>  ○ Example: *30 days* or *50 days.*<br>This screen ensures that calibration reminders are issued in advance, helping maintain proper calibration schedules. |

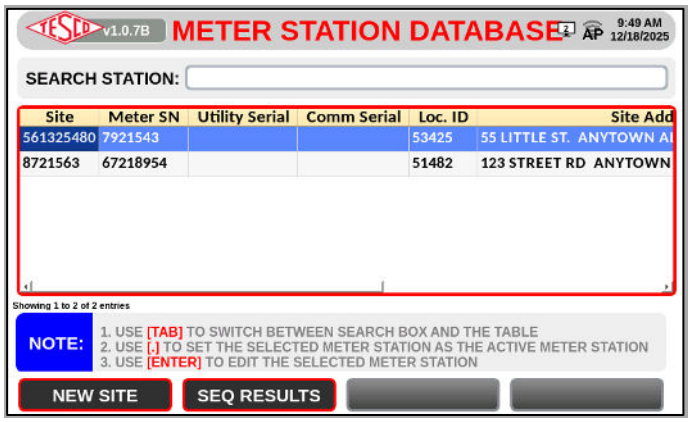
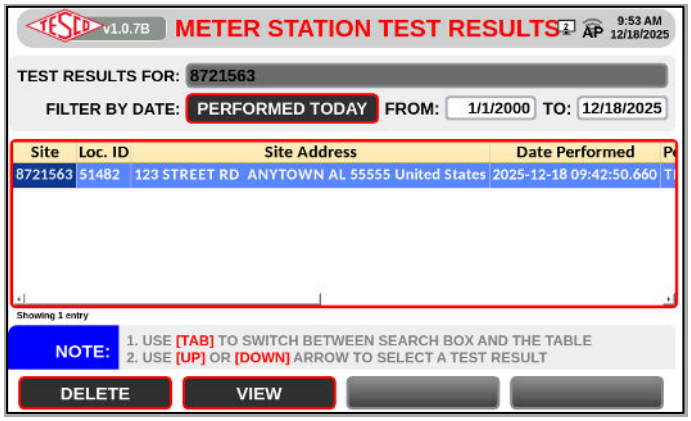
# 3.3.8 DATABASE MANAGEMENT

| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>If you select **STATION** button see next page.<br>If you select **SEQUENCE** button see Section 3.3.9. | **3.3.8.1 DATABASE MENU**<br>The Database Menu screen allows you to access and manage stored databases:<br>• **Station Database:** View and manage stored station records, including site and meter information.<br>• **Sequence Database:** View and manage stored test sequences for automated workflows<br>To return to the **Main Menu**, press the **Return** key. |
|  <br>**Action Buttons:**<br>If you select **NEW SITE** button see next page.<br>If you select **SEQ RESULTS** button see 3.3.8.10. | **3.3.8.2 METER STATION DATABSE**<br>This screen represents the **Meter Station Database**. It lists the saved meter stations along with their relevant details.<br>**Key Elements:**<br>• **Search Station**: A search box at the top allows users to search for a specific station.<br>• **Table Columns**:<br>○ **Site ID**: Identifier for the station.<br>○ **Meter SN**: Serial number of the meter.<br>○ **Utility Serial**: Serial number assigned by the utility.<br>○ **Comm Serial**: Communication serial number.<br>○ **Loc. ID**: Location ID of the station.<br>○ **Site Address**: The address of the meter station. Ext.<br>○ **Service**: The type of service provided.<br>○ **Last Visit**: Date of last result for this station.<br>○ **Customer**: Customer associate with the station.<br>• **New Site Button:** Creates a new meter station<br>• **Seq Results Button:** Displays sequence results for the selected station.<br>The table provides an overview of all the meter stations saved in the system, allowing users to interact with the entries for further actions. |

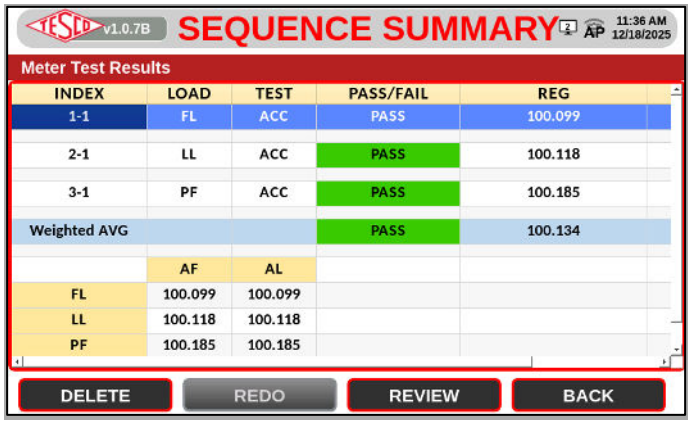
| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **NEXT:** Proceeds to the Station Information screen. | **3.3.8.3 NEW METER INFO: METER INFORMATION**<br>This screen collects detailed **Meter Information** for setting up a new meter station. The fields include:<br>**Meter Information:**<br>• **Meter SN**: The serial number of the meter.<br>• **Form**: The meter form (default is 2).<br>• **Base**: Specifies the base type of the meter (default is S).<br>• **Utility Serial**: Serial number assigned by the utility company.<br>• **Comm Serial**: Communication serial number for the meter.<br>• **MFG**: Manufacturer of the meter.<br>• **Model**: Model number of the meter.<br>• **Catalog #**: Catalog number of the meter.<br>**Specifications:**<br>• **Kh**: The meter's constant for energy consumption (default based on meter form).<br>• **Kt**: A constant related to the meter's test. Pulses per revolution are determined by Kh/Kt.<br>• **TA**: Test amps for the meter, determined by class.<br>• **Class**: The class rating of the meter (default is 200).<br>• **Mult**: Multiplier for reading (default is 1.00).<br>• **Voltage**: Operating voltage of the meter (default is 240V).<br>• **Accuracy Class**: Accuracy class of the meter (default is 1.0).<br>• **Func. Code**: Functional code related to meter configuration.<br>**Features:**<br>• **Bidirectional**: Checkbox to indicate if the meter can measure both directions of current flow.<br>• **KYZ**: Checkbox for the KYZ pulse output feature.<br>• **Demand**: Checkbox to indicate demand feature is available.<br>• **Vectorial Arithmetic**: Checkbox for vector arithmetic capability.<br>This screen is crucial for entering all technical details related to the meter being added to the station. |

| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **NEXT:** Proceeds to the Other Information screen.<br>• **BACK:** Returns to the Meter Information screen. | **3.3.8.5 NEW METER INFO: STATION INFORMATION**<br>This screen collects detailed **Station Information** for setting up a new meter station. The fields include:<br>• **Site ID**: Unique identifier for the new station.<br>• **Loc. ID**: Location identification number for the site.<br>• **Address 1/2**: Physical address of the meter station (two lines for flexibility).<br>• **City**: The city where the station is located.<br>• **State/Province**: Dropdown to select the state or province. This can be set in Preferences.<br>• **Zip code**: Postal code for the location.<br>• **Country**: Dropdown to select the country. This can be set in Preferences.<br>• **Description**: Any additional description of the station.<br>• **Notes**: Any extra notes or information that the user wants to include.<br>• **Loc. Code**: Additional code related to the station location.<br>• **Form**: Dropdown to select the form type. This is set in the previous Meter Information screen.<br>• **Service**: The service of the site. The dropdown options are limited based upon the Form.<br><br>This screen is essential for setting up and configuring new meter stations within the system. |
|  <br>**Action Buttons:**<br>• **NEXT:** Proceeds to the Overview screen.<br>• **BACK:** Returns to the Station Information screen. | **3.3.8.6 NEW METER INFO: OTHER INFORMATION**<br>This screen gathers **Other Information** necessary for setting up a new meter station, including:<br>• **Customer Name**: Field to input the name of the customer associated with the meter station.<br>• **Calibration Frequency**: Specifies how often the meter station needs recalibration, in months. Here, it is set to 12 months.<br>• **Default Sequence**: Dropdown menu to select the default sequence for this meter station, if any are available.<br><br>This screen ensures that important customer and recalibration details are captured when configuring the new meter station. |

| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **SAVE:** Saves the new meter station information to the database.<br>• **BACK:** Returns to Other Information screen. | **3.3.8.7 NEW METER INFO: OVERVIEW**<br>This screen provides an **Overview** of the information entered before the user saves the new meter station. It includes both **Station Information** and **Meter Information**, displayed for review.<br>**Station Information:**<br>• **Site**: Displays the site identifier.<br>• **Loc. ID**: Displays the location identifier.<br>• **Address**: Displays the address of the station.<br>• **Description**: Displays any further details entered.<br>• **Customer**: Displays the customer's name.<br>**Meter Information:**<br>• **Form**: Displays the meter form.<br>• **KH**: Displays the Kh value.<br>• **Service**: Displays the service type.<br>• **TA**: Displays the Test Amps value.<br>• **Pulses per Rev**: Displays the pulses per revolution (Kh/Kt).<br>• **Meter SN**: Displays the meter serial number.<br>• **Multiplier**: Displays the multiplier.<br>• **Voltage**: Displays the voltage.<br>• **Model**: Displays the meter model.<br><br>This screen serves as a final check before committing the details entered for a new meter station. |
| | **3.3.8.8 NEW METER INFO: SUCCESS**<br>Once the user presses **Save**, a success popup will indicate the information was added to the database. The popup will automatically close after 5 seconds and return to the **Meter Station Database** screen. |

| SCREEN | DESCRIPTION |
|---|---|
|  | **3.3.8.9 METER STATION DATABASE: EDITING**<br>To edit a station entry, select it by using the arrow keys, and then press the **Enter** key. This navigates to the **New Meter Info** screen.<br><br>To return to the **Main Menu**, press the **Return** key twice. |
|  <br>**Action Buttons:**<br>• **DELETE:** Deletes the highlighted entry from the database.<br>• **VIEW:** Proceeds to the **Sequence Summary** screen of the highlighted test result. See next page. | **3.3.8.10 METER STATION TEST RESULTS**<br>This screen displays the **Meter Station Test Results** for a selected meter station, showing the outcome of any tests performed on that station.<br>**Key Elements:**<br>• **Test Results For**: Displays the meter station ID for which the test results are shown.<br>• **Filter By Date**: Allows users to filter test results by date.<br>  ○ **Performed Today Button:** Automatically filters the results to show tests performed on the current date.<br>  ○ **From/To Date Range**: Users can also set a custom date range by entering specific start and end dates.<br>**Table Columns:**<br>• **Site ID**: The identifier for the site where the test was performed.<br>• **Loc. ID**: Location ID of the test site.<br>• **Site Address**: The physical address of the test site.<br>• **Date Performed**: The date when the test was conducted.<br>• **Performed By**: The name of the individual or system that performed the test.<br>• **Service**: The type of service used during the test.<br>• **Test Device**: The Instrument type and serial number used to perform the test.<br>• **Meter**: The meter involved in the test.<br>This screen allows users to filter and view test results for a specific meter station, either by the current day or a custom date range.<br><br>To return to the **Main Menu**, press the **Return** key three times. |

| SCREEN | DESCRIPTION |
|---|---|




**Action Buttons:**

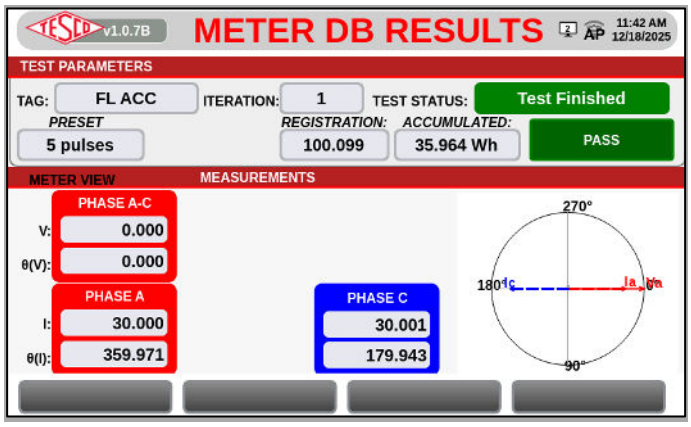
- **DELETE:** Removes the selected test result from the summary.
- **REVIEW:** Opens a detailed review of the selected test result. See next page.
- **BACK:** Returns to **Meter Station Test Results** screen.

### 3.3.8.11 SEQUENCE SUMMARY

This screen displays the results of a completed meter test sequence. It provides a summary of test conditions, results, and error values for quick evaluation.

**Meter Test Results:**

- **Index:** The sequence number of the test (e.g., 1-1).
- **Load:** Indicates the load applied during the test (e.g., FL, LL, PF).
- **Test:** Specifies the test performed (e.g., ACC).
- **Pass/Fail:** Displays the outcome of the test based on defined tolerances.
- **%Err/Reg:** Shows the percentage error or registration calculated for the test result. This can be selected in Preferences.




### 3.3.8.12 METER DB RESULTS

This screen provides a detailed review of the results from an individual meter test. It displays test parameters, measurements, and outcome status.

**Test Parameters:**

- **Tag:** Identifier for the test.
- **Iteration:** Indicates which iteration of the test is being reviewed.
- **Preset:** Displays the number of pulses measured for the test.
- **%Err/Registration:** Shows the measured percentage error or registration. This can be selected in Preferences.
- **Accumulated:** Displays the accumulated measurement data.
- **Test Status:** Shows test finished.
- **Result:** Test outcome is displayed with associated color.
  - **GREEN** indicates PASS
  - **RED** indicates FAIL
  - **GRAY** indicates an error condition or skipped test.

**Meter View & Measurements:**

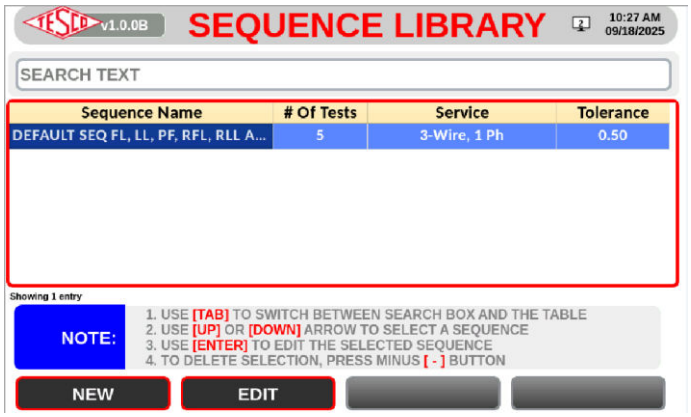
- **Phase A-C (line-to-line):** Displays voltage and phase angle values.
- **Phase A:** Current and phase angle values.
- **Phase B:** Current and phase angle values (shown if running a 3-phase test).
- **Phase C:** Current and phase angle values.
- **Phasor Diagram:** A circular chart illustrating the angular relationship and vector alignment of phases A, B, and C. This provides a visual confirmation of the phase balance and sequence.

This screen allows operators to verify detailed test data beyond the summary view. When running 3-phase tests, all three phases (A, B, and C) are shown alongside the phasor diagram for complete visualization of the electrical system under test.

To return to the **Sequence Summary**, press the **Return** key.

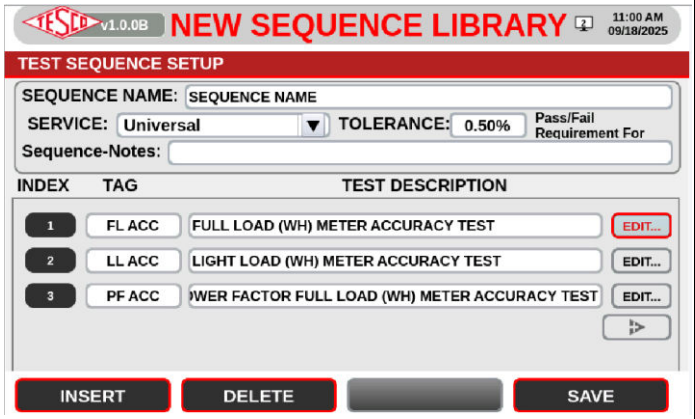
# 3.3.9 SEQUENCE LIBRARY

| SCREEN | DESCRIPTION |
|---|---|




**Action Buttons:**

- **NEW:** Create a new test sequence. See next page.
- **EDIT:** Modify the selected sequence. Same as on the next page.




**Action Buttons:**

- **INSERT:** Insert a new test. See next page.
- **DELETE:** Delete the selected test.
- **SAVE:** Save the sequence to the database.

### 3.3.9.1 SEQUENCE LIBRARY

This screen represents the **Sequence Library**, which contains pre-configured test sequences for meter stations.

**Key Elements:**

- **Search Text**: A search bar to look for specific sequences.
- **Table Columns**:
  - **Sequence Name**: The name or identifier of the test sequence.
  - **# of Tests**: The number of individual tests included in the sequence.
  - **Service**: Indicates the service type specific to the configuration. Universal can be used for any service.
  - **Tolerance**: The allowable tolerance for the overall sequence results.

This table provides a summary of the available sequences and offers users the functionality to search, edit, or create new test sequences for use in meter testing.

### 3.3.9.2 NEW SEQUENCE LIBRARY

This screen sets up a new sequence in the sequence library for meter testing. It allows the user to configure and save sequences that group together multiple tests with defined parameters.

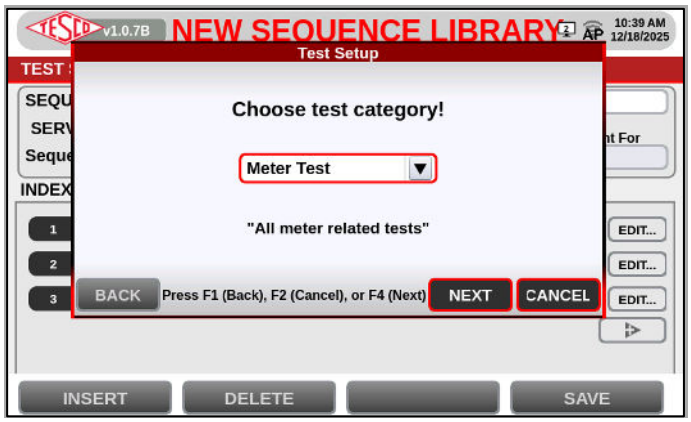
**Test Sequence Setup:**

- **Sequence Name:** Field to input the name of the sequence being created.
- **Service:** Dropdown menu to select the service type associated with the test sequence (Default is Universal).
- **Tolerance:** Specifies the pass/fail tolerance for meter tests, expressed as a percentage (Default is 0.050%).
- **Sequence-Notes:** Optional field for entering additional details or notes about the sequence.

**Test List Section:**

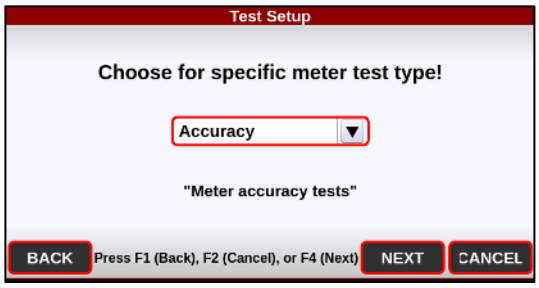
- **Index:** The order of each test in the sequence.
- **Tag:** A short label or identifier for each test.
- **Test Description:** A detailed description of each test.
- **Edit Buttons:** Opens configuration options to modify the parameters of the selected test. When selected, use the **Arrow** keys to move the test Index up or down.
- **Add Button:** Add a new test

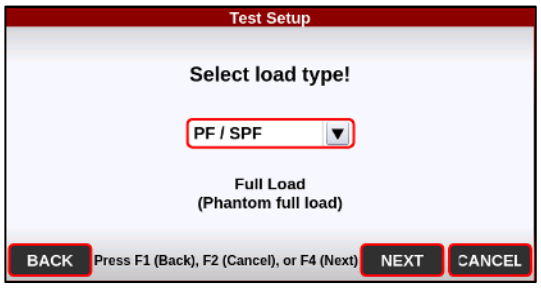
| SCREEN | DESCRIPTION |
|---|---|

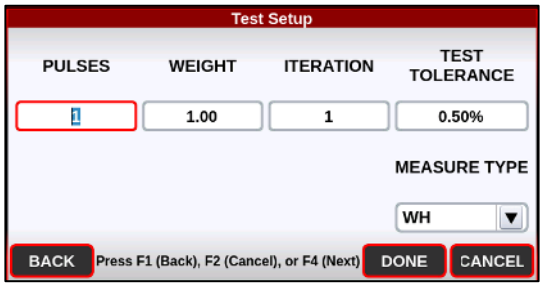



**Action Buttons:**

- **NEXT (F4):** Proceed to next step.
- **BACK (F1):** Return to previous step.
- **CANCEL (F2):** Exit without saving changes.




**Action Buttons:**

- **DONE (F4):** Save changes and exit.
- **BACK (F1):** Return to previous step.
- **CANCEL (F2):** Exit without saving changes.

### 3.3.9.3 NEW SEQUENCE LIBRARY: TEST SETUP

This popup appears when creating or editing a test sequence. It guides the user through selecting the test category, type, and configuration details.

Navigate through the steps using the **NEXT (F4)** and **BACK (F1)** buttons.

1. **Choose Test Category:** Dropdown menu to select a general category (default is Meter Test).

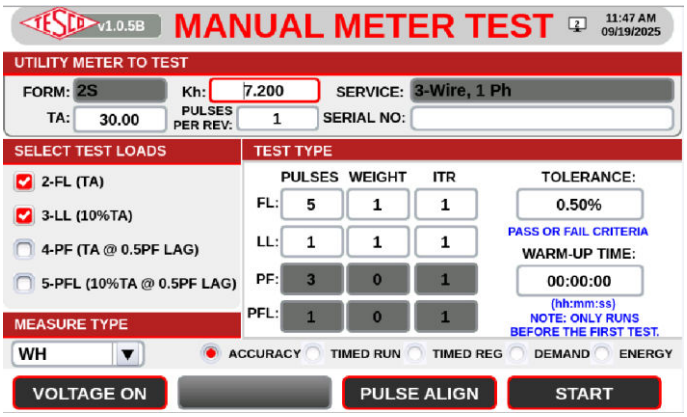
2. **Choose Specific Meter Test Type:** Provides a list of available meter test types.
   - Accuracy
   - Demand
   - Drive
   - Energy Delivery
   - Timed Register
   - Time Run

3. **Select Load Type:** Dropdown menu for selecting the type of load used during the test.
   - CL – Customer Load (use site load during testing)
   - FL – Full Load (phantom full load)
   - LL – Light Load (phantom light load 10% of TA)
   - PF – Power Factor Full Load (at Test Amps and 60 deg.)
   - PFL – Power Factor Light Load (Test Amps and 60 deg.)
   - RFL – Reverse Full Load (phantom full load)
   - RLL – Reverse Light Load (phantom light load 10% of TA)
   - ADV – Advance Load (user-defined phantom load)
   - CR – Creepage Test

4. **Set Test Parameters:** Input fields to define test settings.
   - Pulses
   - Weight
   - Iteration
   - Test Tolerance
   - Measure Type

# 3.3.10 MANUAL METER TESTING

| SCREEN | DESCRIPTION |
|---|---|




**Action Buttons:**

- **VOLTAGE ON:** Enables voltage to the meter.
- **PULSE ALIGN:** Enables power to the meter based on TA. Used to verify the pickup alignment
- **START:** Begins the test with the current configuration.

### 3.3.10.1 MANUAL METER TEST: OVERVIEW / ACCURACY

This is the **Manual Meter Test** screen, which allows customized utility meter testing. Selections from the **Main Menu** will be carried over and grayed out on the screen.

**Utility Meter To Test:**

- **FORM**: The meter form in use.
- **Kh**: The meter constant, indicating energy usage per revolution.
- **SERVICE**: The type of electrical service (e.g., 3-Wire, 1Phase).
- **TA**: The Test Amps for the meter.
- **PULSES PER REV**: Number of pulses per meter revolution This is determined by Kh/Kt.
- **SERIAL NO**: The serial number of the meter under test.

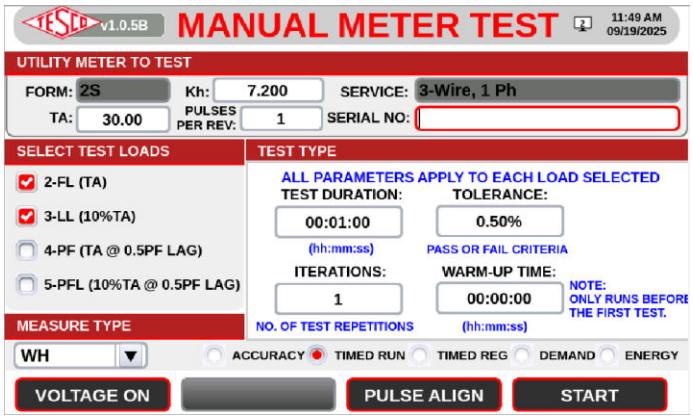
**Select Test Loads:**

- **2-FL (TA)**: Full Load, at Test Amps.
- **3-LL (10%TA)**: Light Load, at 10% Test Amps.
- **4-PF (TA @ 0.5PF)**: Power Factor, at Test Amps and 60 deg.
- **5-PFL (10%TA @0.5PF)**: Power Factor Light, at 10% Test Amps and 60 deg.

**Test Type - Accuracy:**

- **Pulses, Weight, ITR:** These fields allow you to configure the pulses, weight, and iterations for each load type (e.g., FL).
- **Measure Type:** Specifies the type of measurement. Selections include WH, VARH, and VAH.
- **Tolerance:** Sets the pass/fail criteria (Default is 0.50%).
- **Warm-Up Time:** Specifies the warm-up time before the first test is run.

To return to the **Main Menu**, press the **Return** key.

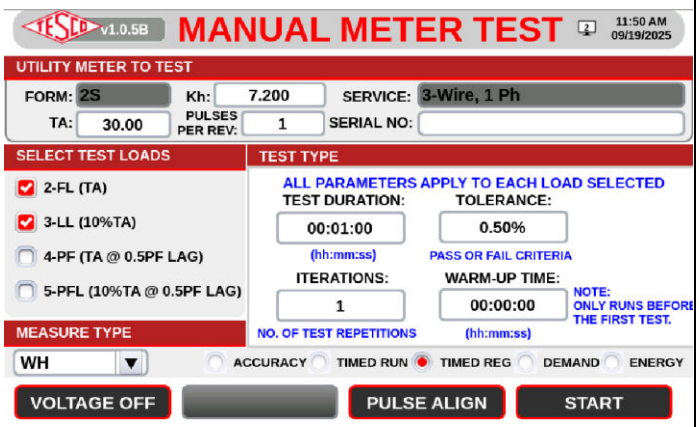
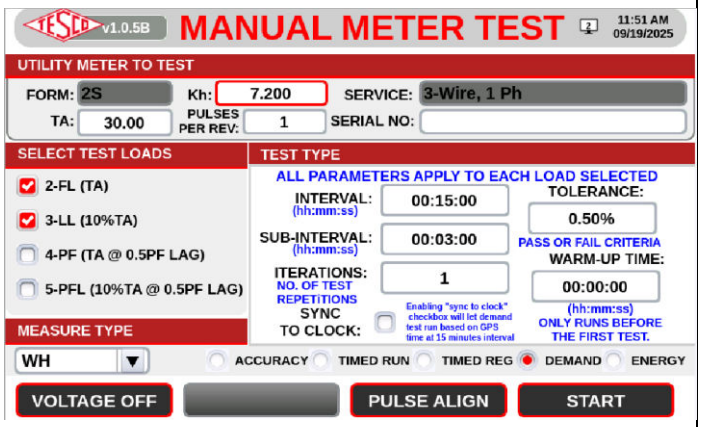


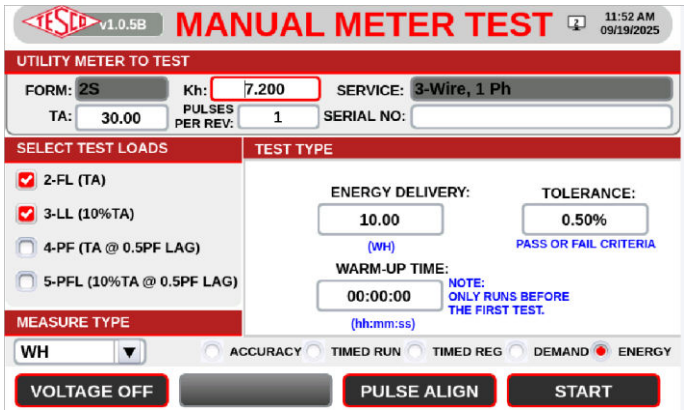
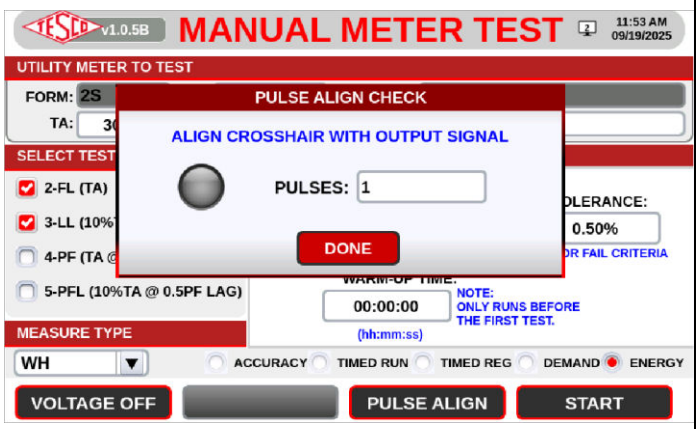

### 3.3.10.2 MANUAL METER TEST: TIMED RUN

The **Timed Run** test type is used to assess how much energy is consumed within a fixed period, allowing for precise performance evaluation of the utility meter under test.

**Test Type - Timed Run:**

- **Test Duration**: Specifies time duration in hh:mm:ss.
- **Iterations**: Specifies number of test repetitions.
- **Tolerance**: Sets the pass/fail criteria (Default is 0.50%).
- **Warm-Up Time**: Specifies the warm-up time before the first test is run.

| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **VOLTAGE ON:** Enables voltage to the meter.<br>• **PULSE ALIGN:** Enables power to the meter based on TA. Used to verify the pickup alignment<br>• **START:** Begins the test with the current configuration. | **3.3.10.3 MANUAL METER TEST: TIMED REGISTRATION**<br>The **Timed Registration (Timed Reg)** test type measures the energy registration performance of the meter over a specific time interval.<br>**Timed Reg:**<br>• **Test Duration**: Specifies time duration in hh:mm:ss.<br>• **Iterations**: Specifies number of test repetitions.<br>• **Tolerance**: Sets the pass/fail criteria (Default is 0.50%).<br>• **Warm-Up Time**: Specifies the warm-up time before the first test is run.<br>At the beginning of the test, enter the Base Reading in kWh when prompted. |
|  | **3.3.10.4 MANUAL METER TEST: DEMAND**<br>The **Demand** test type measures energy consumption over a specific demand interval to simulate and verify the meter's demand registration capabilities.<br>**Demand:**<br>• **Interval**: Sets the primary test interval, which represents the total duration over which the meter's demand will be measured.<br>• **Sub-Interval**: Sets the test sub-intervals, breaking the overall interval into smaller sections for more granular data collection.<br>• **Iterations**: Specifies number of test repetitions.<br>• **Tolerance**: Sets the pass/fail criteria (Default is 0.50%).<br>• **Warm-Up Time**: Specifies the warm-up time before the first test is run.<br>At the beginning of the test, reset the meter's demand register when prompted.<br>After the test, enter the meter demand register, in kW, when prompted. |

| SCREEN | DESCRIPTION |
|---|---|
|  <br>**Action Buttons:**<br>• **VOLTAGE ON:** Enables voltage to the meter.<br>• **PULSE ALIGN:** Enables power to the meter based on TA. Used to verify the pickup alignment<br>• **START:** Begins the test with the current configuration. | **3.3.10.5 MANUAL METER TEST: ENERGY**<br>The **Energy** test measures how much energy the meter records over a specific amount of energy delivered, validating its ability to track energy usage correctly.<br><br>**Energy:**<br>• **Energy Delivery**: This field specifies the amount of energy, measured in Wh, to be delivered by the Instrument for the duration of the test.<br>• **Tolerance**: Sets the pass/fail criteria (Default is 0.50%).<br>• **Warm-Up Time**: Specifies the warm-up time before the first test is run.<br><br>At the beginning of the test, enter the Base Reading in kWh when prompted. |
|  | **3.3.10.6 MANUAL METER TEST: PULSE ALIGN POPUP**<br>This **Pulse Align Check** ensures that the pulse pickup is aligned with the meter's pulse output. Power is sent to the meter based on the selected Test Amps (TA).<br><br>**Pulse Align Check:**<br>• **Pulses**: The number of pulses received from the meter is displayed here. In this example, the system is currently aligned at 1 pulse.<br><br>• **Done button**: Exits the popup once pulses are verified. |

# 3.4 Optical Pickup Alignment

Plug the optical pickup into the OPTICAL PICKUP port. The arrow on the connector will point towards the green indicator light. Attach the magnetic optical pickup to the optical port of meter. For meter insertion and extraction, refer to section **§2.4 Meter Site Installation.**

To remove the optical pickup, hold it by the body and gently pull away from the meter. There is an indicator light showing that the pickup has power. If alignment is difficult to achieve, the PULSE ALIGN feature is available to assist with alignment.

If you have a meter that is difficult to align, TESCO offers a variety of solutions.

# 4.0 REMOTE OPERATIONS

**4.1 Introduction**
**4.2 Installation**
**4.3 Network Configuration**

# 4.1 Introduction

This chapter provides a brief introduction on how to remotely operate the Instrument using the Mobile Application and Tesco Device Manager (TDM). The Mobile Application can be used in place of the Handheld Device to access all the functionality of the instrument from an Android or iOS device. TDM can be used to manage information and push software updates to the instrument. Additional information can be found in the Mobile Application Operations Manual and the TDM Installation/Users Guide.

# 4.2 Installation

For TDM, please refer to Section **§3.1 Installation Steps** in the TDM Installation/Users Guide for instructions.

For the Mobile App, scan the QR code on the side of the Instrument, or visit the app store on your device and install Tesco Turbo Tester. After filling out your information, you will be sent an activation code.

# 4.3 Network Configuration

Remote access requires establishing the connection between the Instrument and TDM. Please refer to Section **§6.1 Setting up a device's network connection** in the TDM Installation/Users Guide instructions.

For setting the network connections on the Instrument, refer to 3.3.5

The wireless access point of the Instrument is set up by default. Scanning the barcode with your device will automatically populate this information. The network name, password, and IP address can all be manually updated under AP settings.

# 5.0 MAINTENANCE

5.1 Introduction
5.2 Calibration
5.3 Replacing the Fuses
5.4 Cleaning the Air Filters
5.5 Cleaning the Instrument External Surface

# 5.1 Introduction

This chapter explains how to perform the routine user maintenance required to keep the Instrument in optimal operating condition.

The topics covered in this chapter include:

- Calibration
- Replacing the Fuse
- Cleaning the Air Filter
- Cleaning the Instrument External Surface

# 5.2 Calibration

It is recommended that the instrument be calibrated at least yearly. More frequent calibrations will ensure that the instrument is functioning optimally. Calibration services are offered by TESCO. A self-calibration process is also available. Contact TESCO for details.

# 5.3 Replacing the Fuses

There are three (3) 5A 600V Ceramic 3AB type fuse (1/4” x 1-1/4”) installed in the instrument. These are accessed from the installation facing side (see section 3.2.1).

To remove a fuse, insert a flathead screwdriver into the fuseholder slot and rotate counterclockwise. Replace with an identical specification fuse to maintain proper equipment protection from power surges. Insert the new fuse, press the fuseholder back in, and twist the flathead clockwise to lock in place.

# 5.4 Cleaning the Air Filters

The air filters are non-removable. Clean using a vacuum to remove dust and debris from the intake and exhaust areas to maintain proper airflow and cooling.

**CAUTION**

**Damage caused by overheating may occur if the area around the fan is restricted, the intake air is too warm, or the air filter becomes clogged. The air filter must be removed and cleaned at least every 30 days or more frequently if the Instrument is operated in a dusty environment.**

## 5.5 Cleaning the Instrument External Surface

Clean the exterior of the Instrument using a soft cloth slightly dampened with either water or a non-abrasive mild cleaning solution that is not harmful to plastics.

**CAUTION**

**Do not use hydrocarbons or chlorinated solvents for cleaning. They can damage the plastic materials used in the Instrument.**


+1 215 228 0500
support@tescometering.com

# 6.0 FREQUENTLY ASKED QUESTIONS

**6.1 Introduction**

**6.2 Test**

**6.3 Software**

**6.4 Hardware**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support@tescometering.com

## 6.1 Introduction

This section aims to answer frequently asked questions when operating the Instrument. Some of these answers refer to certain sections in this manual to provide more information.

## 6.2 Test

1. **Is it possible to perform multiple types of test simultaneously?**
   Only one type of test can be executed at a time.
2. **How many repetitions can I set for a test?**
   The limit for test repetitions is 99.
3. **What meter forms can be tested?**
   The device can test only self-contained meter forms. 1S, 2S, 12S, 14S, 15S, 16S, and 17S.
4. **Can the T3 test transformer rated meters?**
   No, the T3 is designed for self-contained meter testing only. The CAT 6330 site tester performs complete testing for transformer rate installations.
5. **Can I use the T3 for a three-phase test?**
   Yes, the T3 can perform true three-phase testing on any self-contained three-phase installation.
6. **Can I perform a customer load test with the T3?**
   No, the T3 shunts the customer's service, and all current is derived from the unit.
7. **Can I change the voltage of a test?**
   No, all voltages are direct from the installation.

## 6.3 Software

1. **How can I obtain the firmware update file?**
   You can directly contact TESCO through phone or email. For the contact details, see Section **§1.2 Contacting TESCO**.
2. **When should I update the software?**
   Updates are managed by TESCO. For contact details, see section **§1.2 Contacting TESCO**.
3. **How frequent are the updates?**
   Updates are managed by TESCO. For contact details, see section **§1.2 Contacting TESCO**.

## 6.4 Hardware

1. **Where/Who can I ask for replacement parts?**
   For repair concerns, please contact TESCO. See section **§1.2 Contacting TESCO**.
2. **Are there any tests I can perform to check hardware performance?**

For maintenance concerns, please contact TESCO. See section **§1.2 Contacting TESCO**

# 7.0 TROUBLESHOOTING

**7.0 Troubleshooting**

## 7.1 Troubleshooting

1. **The instrument does not power up when installed.**
   Check the fuses and replace any that are open (see section 5). Verify that the site has voltage between Jaws 1 and 3.

2. **The meter will not energize after enabling voltage.**
   If you are at a 12S, 16S, or similar installation, verify that the neutral tab is installed in the correct locations.

3. **The meter is running, but no pulses are detected.**
   Check the power indicator on the optical pickup and verify that the connector is fully seated. Ensure proper alignment with the meter's IR port. If you are having difficulty with alignment, TESCO offers multiple products to suit your needs. Visit www.tescometering.com to learn more.

4. **"Open on Ix" error message (where x is A, B, or C).**
   The instrument could not produce the selected current. There may be an issue with the meter, or an internal fault for the T3. Please contact service for assistance.

5. **"Meter not installed" error message**
   Ensure that the meter is fully seated so that the safety plunger is actuated.

6. **Meter information is not loaded when meter scanned.**
   If the meter uses AEP codes, the Instrument will load any information contained within the code. Otherwise, the Instrument will load information from the database associated with the meter serial number.

For more information on troubleshooting, please contact TESCO. See section **§1.2 Contacting TESCO** for contact details.

# 8.0 T3 MOBILE APPLICATION

**8.1 Introduction**
**8.2 Setup**
- **8.2.1 Registration Enrollment**
- **8.2.2 User Identification**

**8.3 Connecting to the T3**
**8.4 Navigation**
**8.5 Meter Testing**
- **8.5.1 Test Setup**
- **8.5.2 Manual and Sequence Testing**
- **8.5.3 Test Execution**
- **8.5.4 Test Completion**

**8.6 Test Results**
- **8.6.1 Exporting Results**

**8.7 Sequences**
- **8.7.1 Sequence Details**

**8.8 Preferences**
**8.9 QR Codes for Mobile Application**

## 8.1 Introduction

The T3 Mobile Application provides a mobile interface for operating the T3 Turbo Meter Tester. It allows users to connect to a T3 unit, perform meter testing, manage test sequences, and review or export test results directly from a mobile device.

The application is designed to streamline testing workflows while maintaining accurate and traceable results.

## 8.2 Setup

Upon initial launch, the application requires registration enrollment before use. Users must enter the T3 board number and a valid email address. A verification code will be sent to the provided email and must be entered to complete setup.

Once verified, the application is ready for use.

### 8.2.1 Data collection notification

Upon initial launch, the application shows notification about data collection, we are informing user about collecting some type of data for purpose of improvements. At this point user can allow application do store usage data or reject it; later user can change his/her decision in application settings:

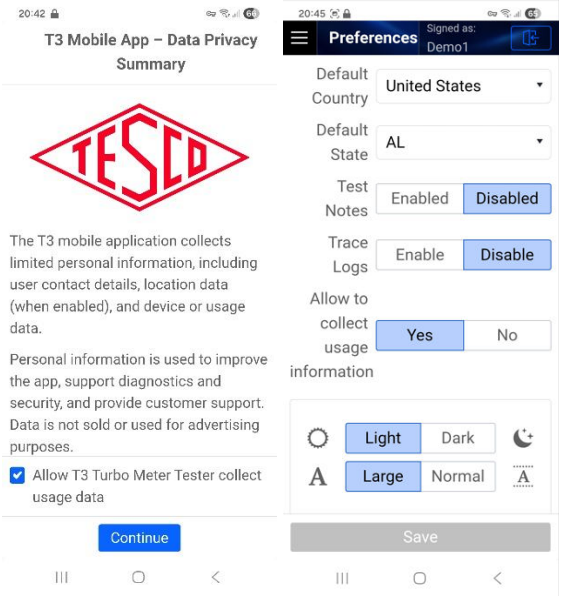


**Figure 8.2.1a T3 Mobile Application Data Privacy Summary**

## 8.2.2 Registration Enrollment

Upon initial launch, the application requires registration enrollment. Users must enter the T3 serial number (located on the barcode label on the unit) and a valid email address.

After submitting this information, a verification code will be sent to the email address provided. If the email is not received, users should check their spam or junk folder

Users must enter the verification code to complete the enrollment process. Once verified, the application stores the registration information and proceeds to the login stage.

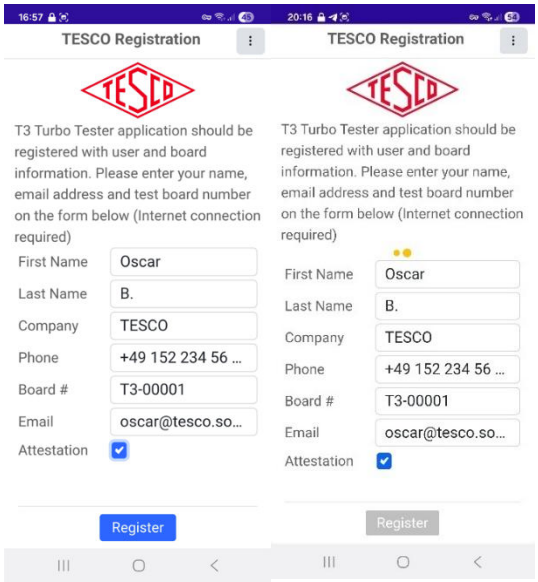


**Figure 8.2.2a T3 Mobile Application Registration Screen**

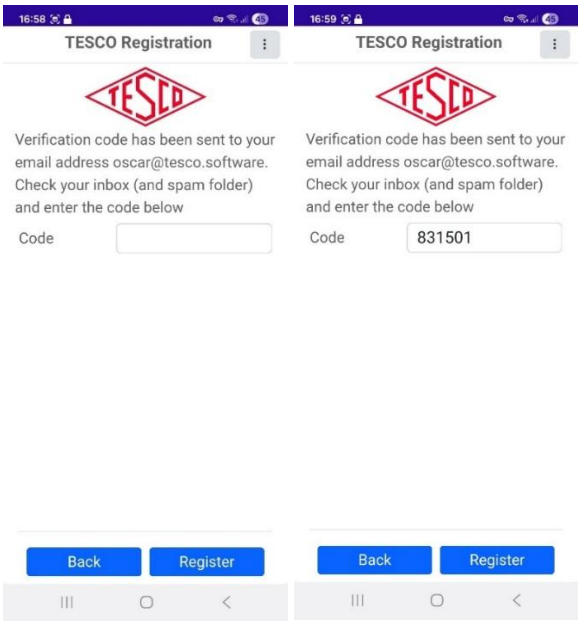


**Figure 8.2.2b T3 Mobile Application Registration Verification**

## 8.2.3 User Identification

After completing registration enrollment, users are required to log in to the application. A username is used to identify the technician performing tests and is associated with all recorded test results.

The user profile also stores connection parameters for future quick access

Once logged in, the user is granted access to the application's main functions.

**Figure 8.2.3a User Login Screen**

## 8.3 Connecting the T3

The T3 Mobile Application connects to the T3 Turbo Meter Tester using a Wi-Fi connection. Users can select a previously connected unit or manually enter connection details such as IP address and password.

Selecting the barcode icon allows the user to scan the barcode on the T3 to automatically populate default connection parameters. Connection parameters can also be configured using the Handheld Device (see Section 3.3.5.5 – Access Point Network Setup).

Depending on the mobile device, the user may need to manually select the T3 Wi-Fi access point from their device settings.

Once the connection is initiated, the application verifies communication with the tester. If the connection is successful, the application downloads the unit database and displays the connection status.

If the connection fails, an error message is displayed. Users should verify that the T3 unit is powered on, Wi-Fi is enabled, and the correct connection details have been entered.

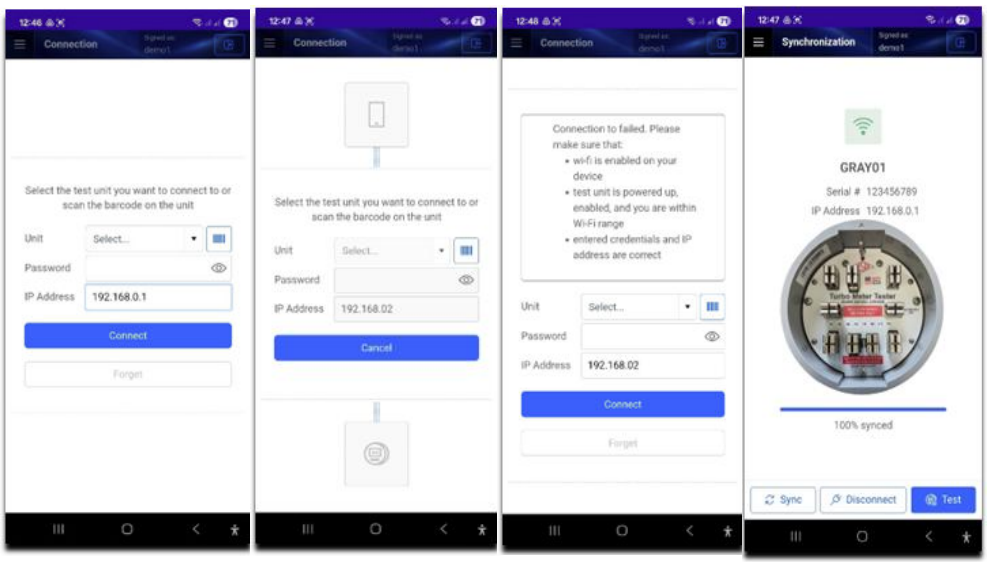


**Figure 8.3a T3 Mobile Application Connection and Synchronization**

## 8.4 Navigation

The application menu provides access to the primary functions of the T3 Mobile Application. From the main menu, users can navigate to the Tester Unit connection screen, Meter Testing screen, Test Results, Sequences and Preferences.

A Sign Out option is also available to return the user to login screen.

## 8.5 Meter Testing

The Meter Test screen is the primary interface used to configure and perform meter tests. Users can manually enter a meter serial number or scan a barcode using the device camera.

If the meter is not found in the database, the application prompts the user to create a new meter and site record. Once a meter is selected or created, the user can proceed with test setup and execution.

**Figure 8.5a Meter Test Screens**

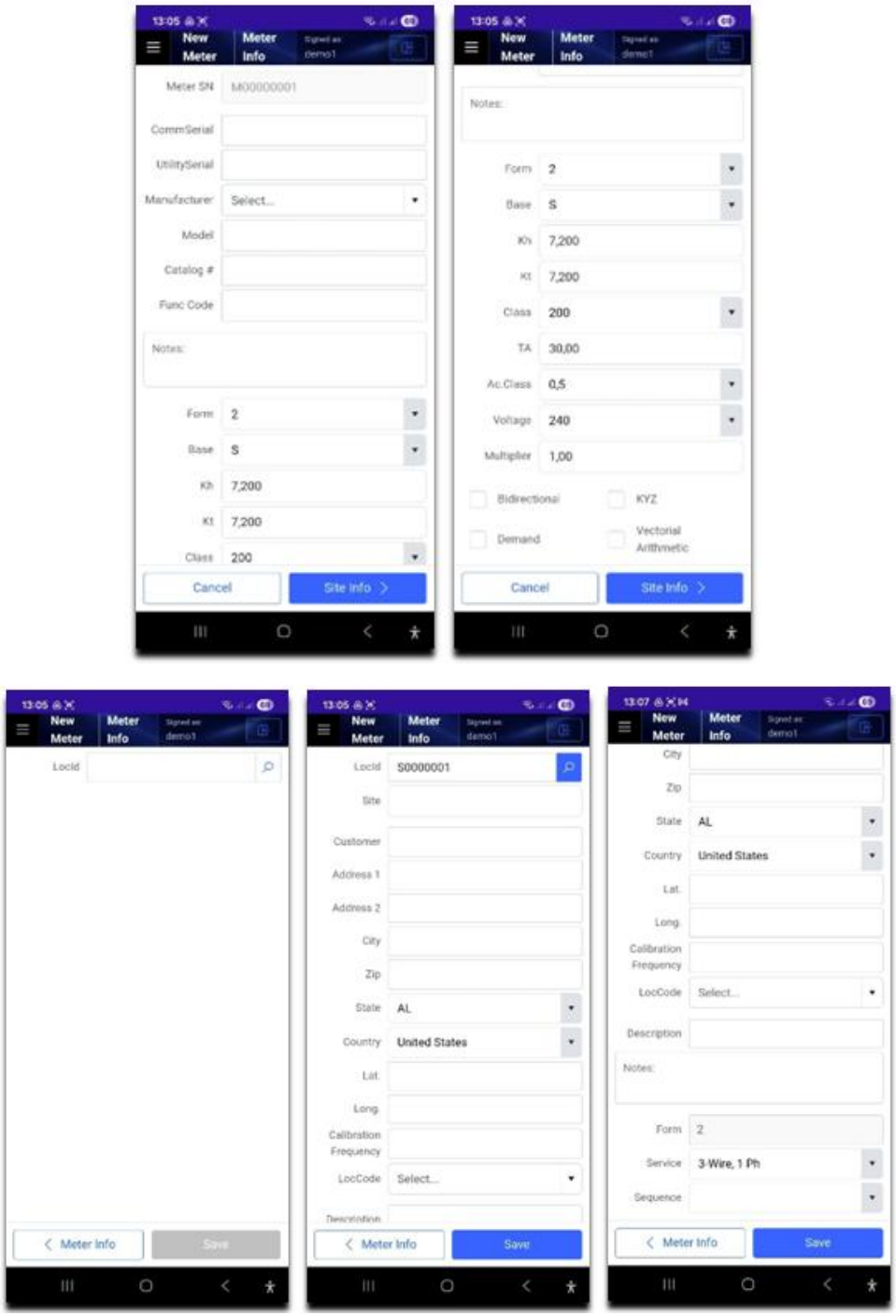


**Figure 8.5b Filling Out the Meter Test Screens**

## 8.5.1 Test Setup

The Test Setup screen allows users to prepare the meter for testing. Users can enable or disable voltage and load and verify the current state of the test unit prior to running a test.

**This screen also includes a pulse counter to verify proper optical pickup alignment.**

These controls allow the user to confirm proper setup and ensure accurate test conditions.

**Figure 8.5.1a Meter Setup Controls**

## 8.5.2 Manual and Sequence Testing

Manual testing allows the user to set up test parameters directly from the test screen, providing flexibility for ad-hoc testing.

This method provides consistent and repeatable testing and is commonly used for standard meter validation procedures.

Sequence testing allows users to run predefined test procedures automatically. Each sequence consists of a series of test steps configured in advance.

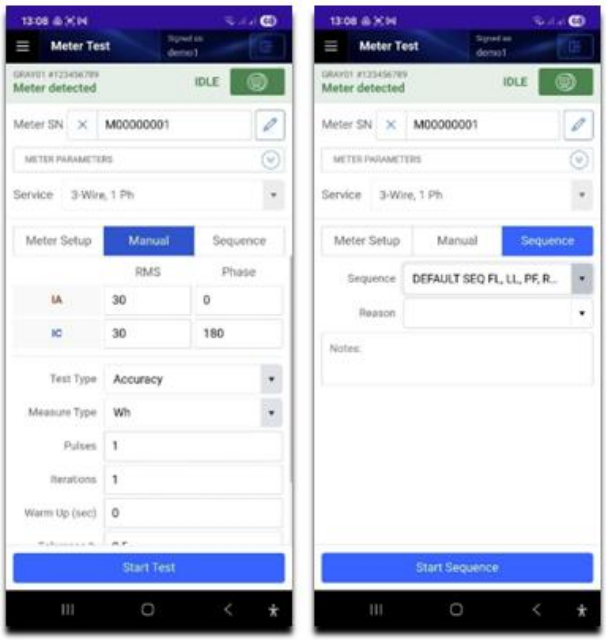


**Figure 8.5.2a Sequence Setup**

## 8.5.3 Test Execution

During test execution, the application displays real-time information including the active test step, elapsed time, pulse progress, and live measurement values.

Users can monitor the test as it progresses and have the option to stop or cancel the test if necessary.

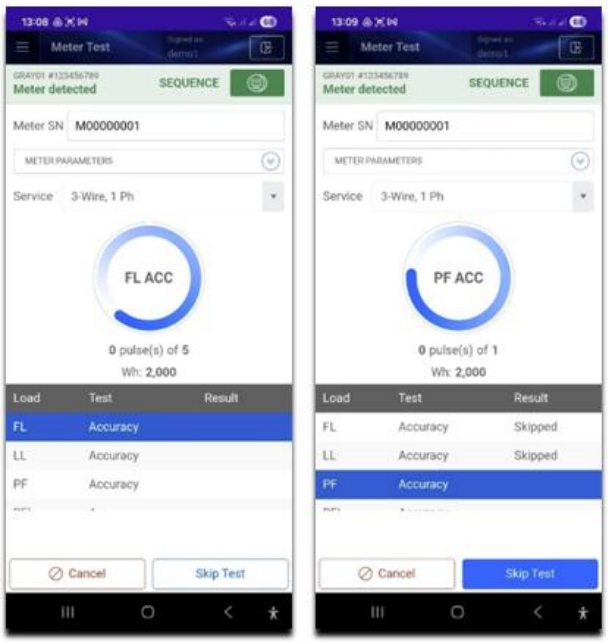


**Figure 8.5.3a Test in Progress**

## 8.5.4 Test Completion

Upon completion of a test or sequence, the application displays the results. The results indicate whether the test passed or failed and provide a summary of the test performance.

Users can choose to accept the results or discard and repeat the test if needed.

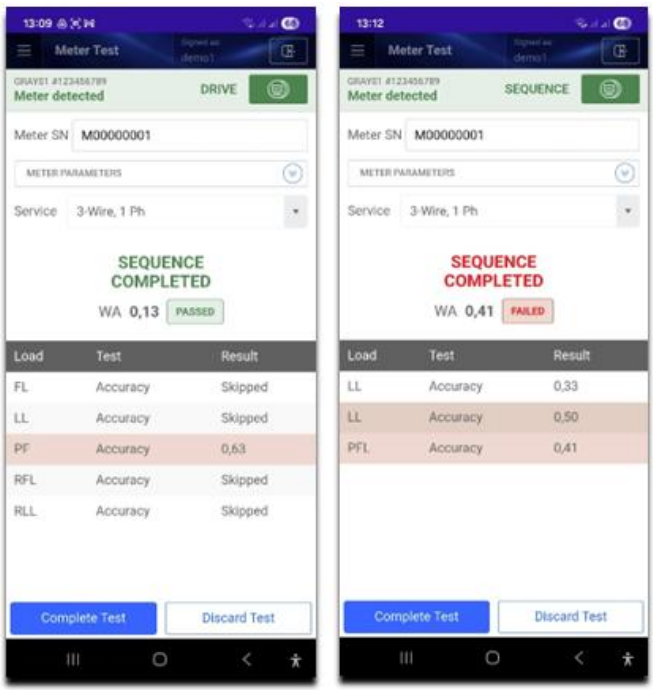


**Figure 8.5.4a Test Completion Results**

## 8.6 Test Results

The Test results screen allows users to view completed tests. Results are organized in a list format and can be searched by meter serial number or date range.

Each test record includes relevant test details and overall results for quick review.

Selecting a result record from the list opens a complete view of the test results.

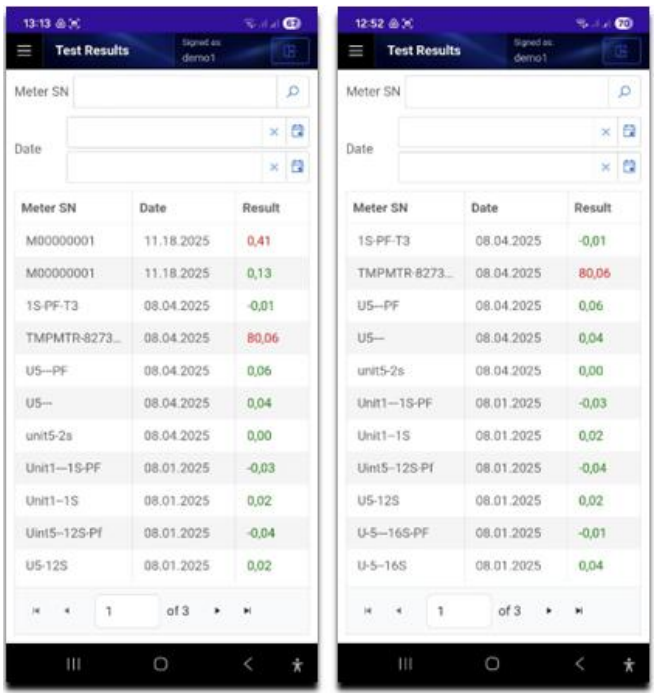


**Figure 8.6 Test Results**

### 8.6.1 Exporting Results

The application allows users to export individual test results for reporting and documentation purposes.

Results can be exported in either PDF or CSV format and saved directly to the mobile device or shared via text message or email.

Note: If an internet connection is required for sharing, it cannot be established through Wi-Fi while connected to the T3.

## 8.7 Sequences

The Sequences screen allows users to view available test sequences and review sequence details. Sequences define the steps and parameters used during automated testing.

Users can create, delete, or modify sequences from this screen. Selecting a sequence from the list opens the full details of that sequence.

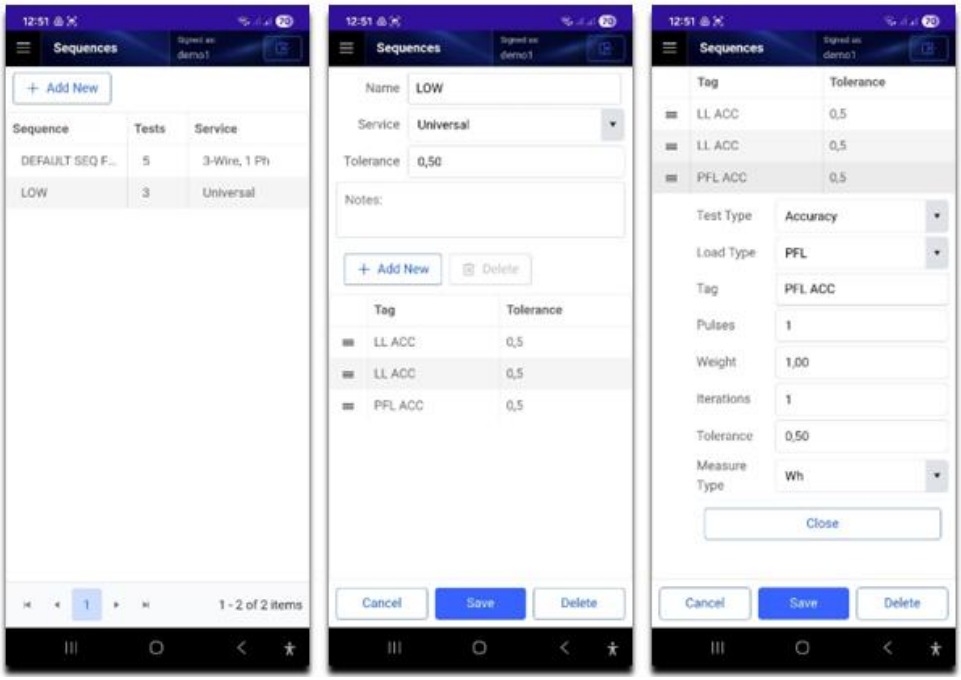


**Figure 8.7a Sequences Screen**

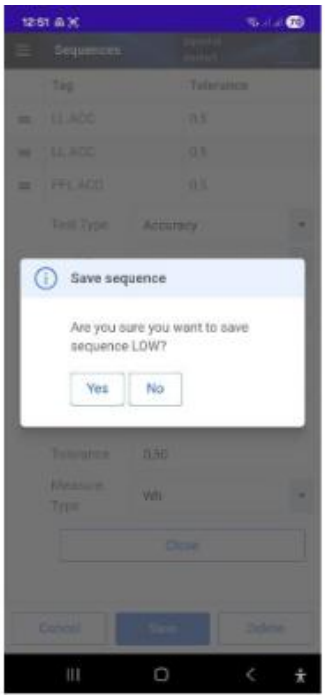


**Figure 8.7b Save Sequence Screen**

### 8.7.1 Sequence Details

Each sequence must have a Name and at least one Test.

A Service dropdown menu is provided, containing only services supported by the T3, along with a Universal option that applies to any meter installation. When running a sequence test, available sequences are filtered based on the selected service.

Test details are displayed in the lower portion of the screen. Selecting a tag name opens the full details of that test.

Tests can be added or deleted, and each test must include a tag name.

## 8.8 Preferences

The preferences screen allows users to configure application settings. Available options include selecting the test result format, enabling or disabling sound notifications, and adjusting default values used during testing.

The Nomenclature tab allows users to customize heading labels for certain fields in the results database.

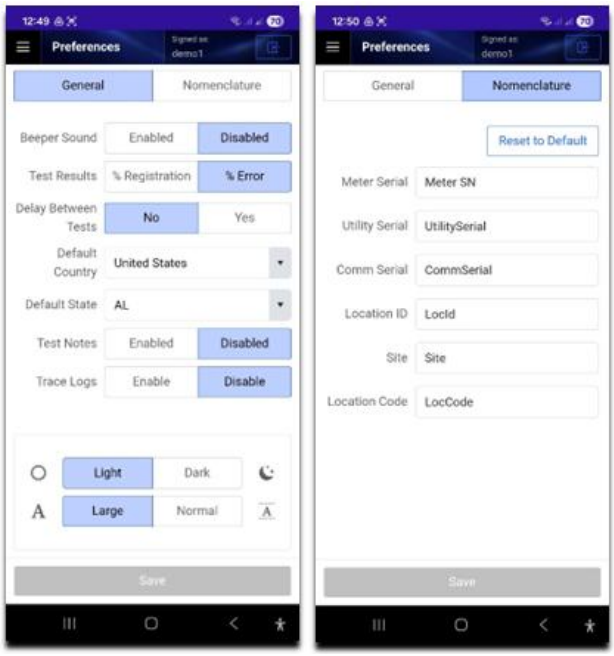


**Figure 8.8a Preferences Settings**

## 8.9 QR Codes for Mobile Application

T3 IOS App

**Figure 8.9.1 QR Code for IOS Mobile App**

T3 Android App

**Figure 8.9.2 QR Code for Android Mobile App**