

# XT SERIES USER GUIDE

Version 2.0 - May 2022



# PROBEWELL CONNECT 2.0

DANGER

UNAUTHORIZED SERVICING MAY  
RESULT IN SERIOUS DAMAGES  
AND/OR INJURIES

READ USER'S GUIDE CAREFULLY  
BEFORE USING THIS EQUIPMENT

ALWAYS WEAR CERTIFIED SAFETY  
GLASSES & RUBBER GLOVES

MODEL NO: ST-3/XT3  
FORM: 3S/4S/6S/8S/9S  
SERIAL NO: 12345678  
LINE: 100-600V, 58-62 hZ  
SSID: PW-XT3-12345678-AP  
MAC: 00 B2 B8 19 22 05



PROBES



# **Probewell Connect**

## **User Guide for WT Series**

Version 2.1 – April 2021





**PROBEWELL LAB INC.**

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### End-User License Agreement (“Agreement”)

Please read this End-User License Agreement (“Agreement”) carefully before downloading or using Probewell Connect (“Application”).

By downloading or using the Application, you are agreeing to be bound by the terms and conditions of this Agreement.

If you do not agree to the terms of this Agreement, do not download or use the Application.

### License

Probewell Lab Inc. grants you a revocable, non-exclusive, non-transferable, limited license to download, install and use the Application solely for your purposes strictly in accordance with the terms of this Agreement.

### Restrictions

You agree not to, and you will not permit others to:

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### Modifications to Application

Probewell Lab Inc. reserves the right to modify, suspend or discontinue, temporarily or permanently, the Application or any service to which it connects, with or without notice and without liability to you.

### Term and Termination

This Agreement shall remain in effect until terminated by you or Probewell Lab Inc.

Probewell Lab Inc. may, in its sole discretion, at any time and for any or no reason, suspend or terminate this Agreement with or without prior notice.

This Agreement will terminate immediately, without prior notice from Probewell Lab Inc., in the event that you fail to comply with any provision of this Agreement. You may also terminate this Agreement by deleting the Application and all copies thereof from your mobile device or from your desktop.

Upon termination of this Agreement, you shall cease all use of the Application and delete all copies of the Application from your mobile device or from your desktop.

### Severability

If any provision of this Agreement is held to be unenforceable or invalid, such provision will be changed and interpreted to accomplish the objectives of such provision to the greatest extent possible under applicable law and the remaining provisions will continue in full force and effect.

### Amendments to this Agreement

Probewell Lab Inc. reserves the right, at its sole discretion, to modify or replace this Agreement at any time. If a revision is material, we will provide at least 30 days notice prior to any new terms taking effect. What constitutes a material change will be determined at our sole discretion.

### Contact Information

If you have any questions about this Agreement, please contact us.

Last updated: 2019-11-06

Probewell Lab Inc  
4500 rue Michelet  
Quebec, QC G1P 0B5 Canada

1-866-626-1126

## Limited Warranty

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Your WT Series meter tester comes with a two-year hardware warranty. Probewell Lab Inc. (Probewell) warrants WT Series meter tester against defects in material and workmanship for a period of two (2) years from the date of purchase from Probewell. This warranty applies only to the original purchaser of the WT Series meter tester and is not transferable.

For additional information regarding your tester warranty, please refer to the related WT Series meter tester user guide.

## Disclaimer

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Probewell Lab Inc., (Probewell) reserves the right to make changes to this document and the products which it describes without notice. Probewell shall not be liable for technical or editorial errors or omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

Features and specifications are subject to change without notice.

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## List of Abbreviations

Abbreviation	Complete Term	Abbreviation	Complete Term
A	Ampere	PPI	Pore per inch
Amp	Ampere	Rev	Revolution, number of revolutions
AC	Alternating current	RMS	Root mean square
AP	Access point	TA	Test ampere
ATK	Accuracy Testing Kit	THD	Total harmonic distortion
CFM	Cubic feet per minute	V	Volt
CL	Class	VA	Volt-ampere
CSV	Comma-separated values	VAC	Volt(s) of alternating current
CT	Current transformer	VARh	VARhour (Volt-ampere reactive hour)
DSP	Digital signal processor	Vdc	Voltage direct current
HL	High load (full load)	VT	Voltage transformer
Kh	Watthour constant. The number of watthours represented by one revolution of the disk. Also, called disk constant.	W	Watt(s)
Kt	Test constant. For electronic (no disk) meter, the amount of energy represented by each calibrated pulse of the LED.	Wh	Watt hour
kW	Kilowatt	Wi-Fi	Wireless network protocols
Lb	Pound	WLAN	Wireless local area network
LL	Light load	WWW	World Wide Web
NIST	National Institute of Standard and Technology	μWh	Micro-watthour
PF	Power factor	μVARh	Micro-VARhour

## Introduction

---

Probewell Connect 2.0 is the official companion application for MT-1/WT3 and MT-1/WT1 wireless watt hour meter testers. It allows the user to perform various types of meter tests, review test report data and change the WT Series testers' operation parameters. The application is available free of charge for iOS and Android.

The following document outlines the scope of the application, its capabilities and how it enables complete control over the WT Series testers.

## Getting the app

---

The Probewell Connect application is available on all major platforms as stated above and is continually updated to ensure the best user experience. To download the application, follow the instructions for your mobile device operating system:



### iOS

On your iOS device, launch the App Store and search for the Probewell Connect application.

The application supports all devices running iOS 11 and above.



### Android

On your Android device, launch the Google Play Store and search for the Probewell Connect application.

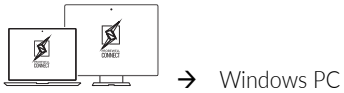
The application supports all devices running Android 7.0 and above\*.





## Features

### Operating system

The Probewell Connect application has a different feature set depending on the mobile device operating system (OS). Throughout this document, the following icons help identify which features are available for a specific operating system:



A quick rundown of the available features per operating system is given below.

	 iOS/Android	 Windows
GPS coordinates	Yes	No
E-mail reports	Yes	No
Barcode scanner	Yes	No
Export CSV / PDF	Yes	Yes
Offline mode	Yes	Yes
Settings Profiles	Yes	Yes
Accuracy Test Report	Yes	Yes

### Online/Offline mode

Some features are also only accessible when the Probewell Connect application is in online mode (connected to a WT Series tester). The icons for indicating these are:



## Operation

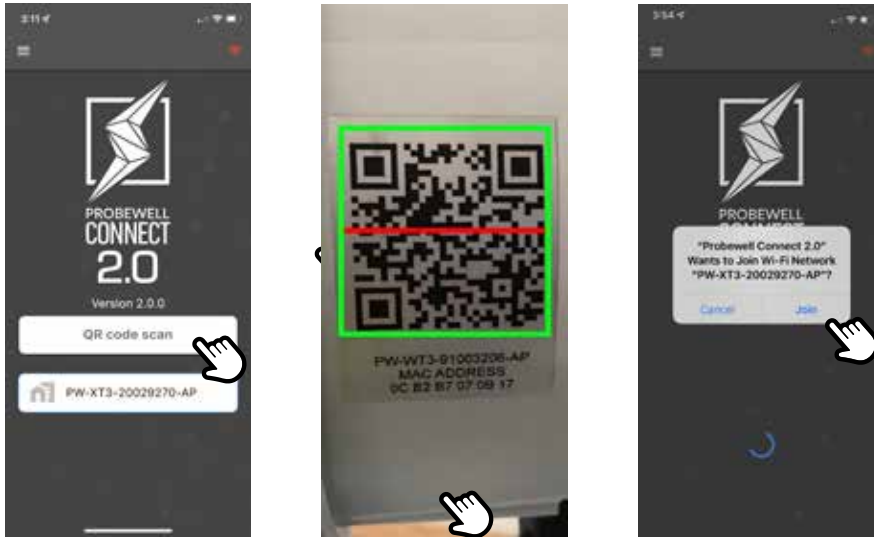


### Connecting to the WT Series tester

In the order to use the WT Series tester, the user must first connect their mobile device to the socket.



#### iOS and Android



The connection process is done from within the Probewell Connect application itself. Follow these steps to connect to the WT Series tester:

1. Connect the WT tester to a meter base.
2. Power up the WT tester by setting the Power switch to the ON position.
3. Launch the Probewell Connect application on your mobile device.
4. Press on the "SCAN QR CODE" button. If prompted, allow the app to use the device camera.
5. Point the camera at the QR code located on the side of the WT tester unit.
6. Once connected, the unit emits a beeping sound.

If the WT Series has already been connected to the mobile device, it may also be selected from the known devices list, identified by their SSID, below the QR Code Scan button.



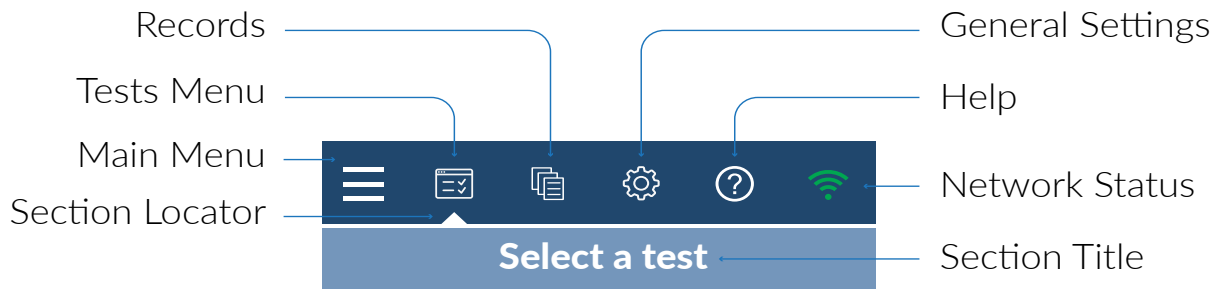
## Main View

The Main View of the application is always available to the user. It provides shortcut access to basic control within the application.

### Header

The header is located at the top of the window. It allows basic navigation within the application.

#### Mobile header



### Main Menu

The Main Menu icon expand and collapse the menu containing direct links to Network Status, Setup, Tests, Records, Settings, WT Series Settings and XT Series Settings as well as an info and help section. (See details on page 10.)

### Tests Menu

The Test view lists all available test modes. Some test modes are only available for certain meter categories and system operation modes. A summary of available test modes and their minimal conditions is available in the Tests section of this document.

### Records

The Records view lists all test reports.

### General Settings

The Settings view shows all available tests and device settings.

### Help

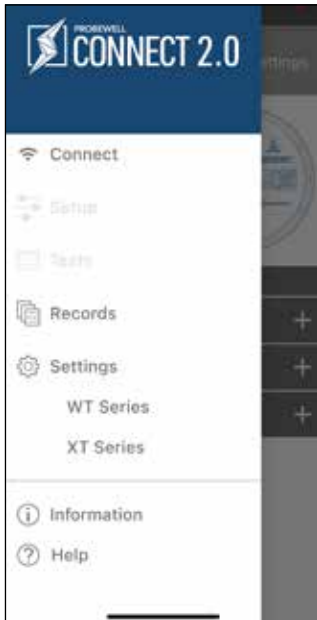
Open the help page which provide contact information for support.

### Network Status

Manage your connection to the tester, the user can click on the green icon to disconnect the device, the icon turns red when the device is disconnected.

## ☰ Main Menu

The header is located at the top of the screen.



Clicking on this button displays all system information, including:



**Connect:**

Take you back to the home screen to connect to a device by scanning the QR Code or selecting it from the list.



**Setup:**

Allow access to the device Setup Screen when the device is connected. (See page 12 for details)



**Tests:**

Access to the test menu Screen when the device is connected.



**Records:**

Browse saved reports is accessible whether online or offline.



**General Settings:**

- Application Parameters
- Utility profile
- User profile

WT Series Settings

- System
- Meter
- Calibration
- Custom Questions

XT Series Settings

- Power Quality
- Primary Secondary
- Secondary Burden
- Custom Questions



**Information**

Clicking on this button displays all system information. (See details below)



**Help:**

Provide contact information for support



**Information button**

Clicking on this button displays all system information, including:

**1. Socket information** (When connected):

- Tester model
- DSP number
- Optical (Metercam or Pulse pickup)

**2. System information** (When connected):

- User Calibration Date
- Factory calibration date

**3. Site** (When connected):

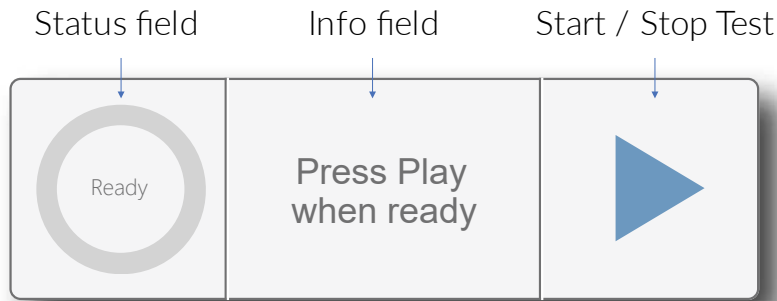
- TA
- FORM
- Kh

**4. App:**

- Firmware version (When connected)
- Software version



## ▶ Test Control Pan



### The Control Pan

Located just below the main navigation, the control pan is only available in test mode.

**Status field:** The Status field displays three different types of information (Idle, Ready or a Timer), all contain within a wheel which is spinning when then application is processing data.

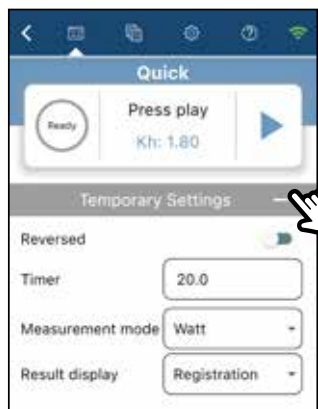
**Idle:** The application is waiting for user input or setup

**Ready:** The setup phase is finished, the user can start the test

**Timer:** The application displays a count down when a test is under way

**Info field:** The Info field displays the Kh, tips on what to do next or what operation the application is currently performing (i.e. Setup, Press Play when ready, Waiting for pulse or in progress)

**Start / Stop:** Allow user to start or stop the test



### Temporary Settings

This tab is located below the Control Pan and is only available when a test mode is selected.

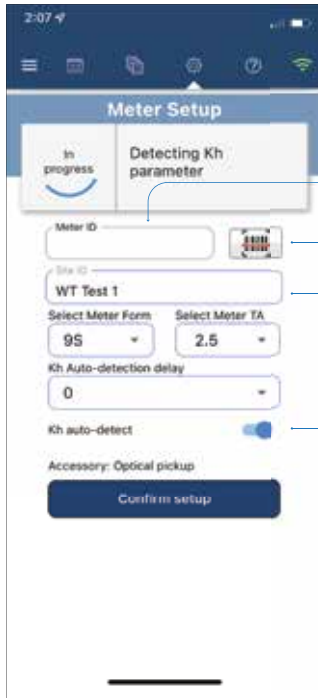
Clicking on the Temporary Settings tab expand the temporary test settings option window. These settings can be changed to match the required test parameters. **Such modifications are reset to the default settings as soon as you select a new test from the test menu.**

The number and type of available parameters in this test view varies with the selected test.

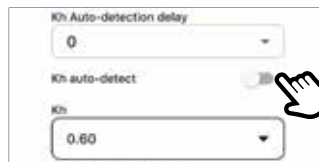
## Meter Setup



The Meter Setup view lets the user set basic parameters for the meter to be tested. These parameters are used by the WT Series tester to properly energize the meter and calculate test results.



1. **Meter ID:** Required fields  
Can be entered manually or by scanning the device barcode
2. **Barcode Scanner**  
Users have the option of scanning the device barcode
3. **Site ID field:** Optional  
Tip: When performing Meter and Site testing at the same location, it is recommended to use the same Site ID and Meter ID for both fields. Doing so make it easier to find Report when needed.
4. **Kh auto-detect**  
Users can turn off the Kh auto-detect and enter a value manually



Meter Setup parameters are:

**Meter ID:** required

**Site ID:** Optional

**Form:** The meter form (already populated with detected meter form).

**TA:** the meter test amps.

**Kh Auto-detection:** Allows or disables auto-detection of the meter Kh value with the optical pickup or metercam.

**Kh Auto-detection delay:** Time delay to start registering pulses after the meter is first energized.

**Accessory:** Type of accessory detected

**Kh Dropdown:** To manually select the Kh value

## Barcode Scanner

On a mobile device (iOS and Android), the meter settings may be automatically imported by scanning a barcode located on the meter itself. The barcode must be in the AEP or one of the predefined formats ([Read system settings barcode note on page 48](#)) and contains information on the meter form, TA, Kh and serial number. The serial number is then entered in the Meter ID field and is kept in memory to be automatically filled in when saving test results.

Once all meter parameters are correctly entered, press Confirm Setup to complete the meter setup.

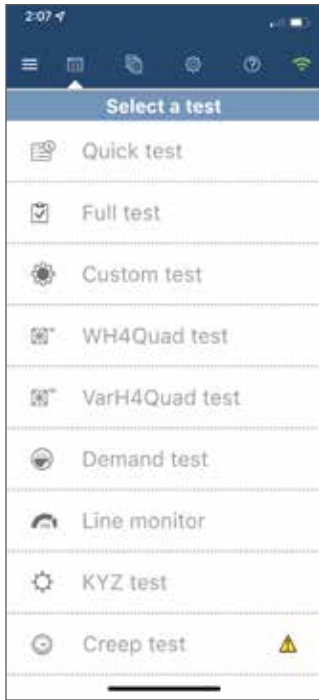


If the meter is equipped with a communication module (AMI/AMR) that emits from the same port as the test pulse, a delay can be added before registering the first pulse by modifying the **Kh Auto-detection delay** setting. For example, use a 10 second delay for a KV2C Form 9S, TA 2.5A.

# Tests



The Tests View shows a list of all available test modes for the meter. A short and full description of all test modes follows.



**i** The test modes available in the Tests View is dependent on both the type of meter (single phase or polyphase) and the accessories.

## Summary of test modes and availability

Test mode	Meter type	Pickup
Quick Test	Any	Optical/Metercam
Full Test	Polyphase	Optical/Metercam
Custom Test	Any	Optical/Metercam
Line Monitor	Any or None	Any or None
Demand Test	Any	Any or None
Creep Test	Any	Any or None
KYZ Test	Any	Any
Manual/Tracking	Mechanical	None
4 Quad Test	Solid-state	Optical

## Test Description

- Quick Test:** The quick test is the most common type of test. It can be used to quickly assess the accuracy of a meter. The Quick Test runs a predetermined sequence of sub-tests, all in one operation, during which all phases are energized simultaneously.
- Full Test:** This is the most thorough type of test. It is used to fully assess the quality of a meter, as it runs a complete sequence of sub-tests. The Full Test runs an equivalent of the Quick Test followed by additional single-element tests. It is the most thorough type of test. It is used to fully assess the quality of a meter, as it runs a complete sequence of sub-tests. The Full
- Custom Test:** Custom Test consists of choosing one of the three loads to apply to the meter: HL, PF or LL. The disk revolutions or pulses are counted automatically by the pickup. No critical timing is required to start a test. The test ends automatically.
- Line Monitor:** It is used to observe the input voltage and obtain the THD measurement.
- Demand Test:** It is used to test meters that have a demand register. The meter must first be configured to be in kW demand test mode (check meter manual for device specific procedure).
- Creep Test:** It is used to check the effect of a 0 A current and nominal voltage on the energy registration of a meter.
- KYZ Test:** It is used to assess the ability of some solid-state meters to transmit energy use information to another piece of equipment via a physical wire interface.
- Manual/Tracking:** It is used to assess the quality of a mechanical meter without using external accessories. To do this, the meter is energized with a low or high load while the test operator counts the number of disk revolutions.
- 4 Quad:** Test: is an automatic test sequence that can be used to assess the meter's ability to register energy in all four quadrants of the power vector diagram.

## Quick Test

### Prerequisites

An optical pickup or a metercam must be installed on the WT Series tester.

### Description

The Quick Test is the most common type of test. It can be used to quickly assess the accuracy of a meter. The Quick Test performs a predetermined sequence of sub-tests, all in one operation, during which all phases are energized simultaneously. The sub-tests are:

- a) All phases, High Load (HL)
- b) All phases, Power Factor (PF)
- c) All Phase, Low Load (LL)

Once the test is completed, the user may save the test data.


### Operation

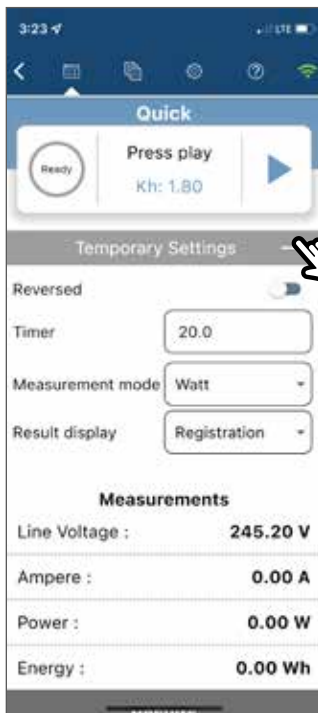
#### Step 1: Temporary test settings

If necessary, modify the test settings by clicking on the Temporary Settings bar, below the control pan.


Test settings for the quick test are:

- **Timer:** minimum test time in seconds
- **Reverse:** enables or disables reverse flow testing
- **Result display:** Result display type
- **Measurement mode:** Watt or VAR

The Temporary Settings return to their default values as soon as the user return to the main test menu .



#### Step 2: Start Test

Press the **Play Test** button  to initiate the test sequence. The load current increases to its HL value, the meter sends pulses and the WT Series internal electronic standard registers the energy that flows through the meter.





**Step 3: Test Execution**

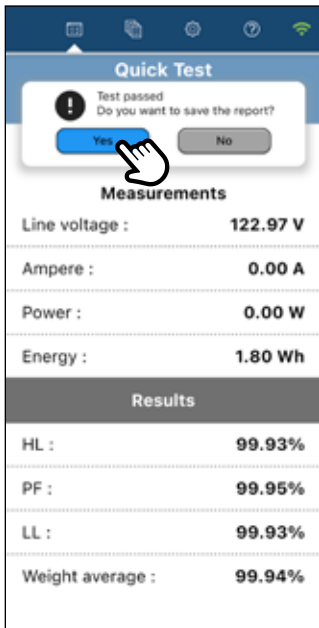
In addition to the test results, the user can see the line voltage and current applied to the meter, the power and cumulated energy.

At the top, within the status field of the control pan, a timer displays the remaining time for the sub-test.

The sub-test is currently running is highlighted.

An audio tone is heard when a sub-test is completed

The test may be aborted at any time by pressing the **Stop Test** button.



**Step 4: Test End**

When all sub-tests have been completed, the test ends automatically. The load is then removed, and the test results are displayed.

The last test result, Weight, is the weighted average of the three other test results. The Weight result formula depends on the meter type and the Weight factor configuration in the settings. Please refer to the System Settings section for a complete description of the Weight result calculation.

To save the test results, click on the **Yes** button within the control pan at the top of the screen.



**Step 6: User Questions**

Up to 8 user defined questions can be programmed in the **Settings** tab.

Answer each question and click on the **Submit** button to save the test report.

## Full Test

### Prerequisites

An optical pickup or a metercam must be installed on the WT Series tester.

### Description

The Full Test is the most thorough type of test. It is used to fully assess the quality of a meter, as it runs a complete sequence of sub-tests. The Full Test runs an equivalent of the Quick Test followed by additional single-element tests. The sub-tests are:

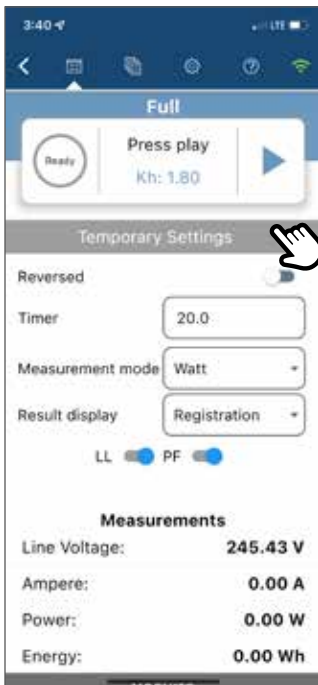
- a) All phases, High Load (HL)
- b) All phases, Power Factor (PF)
- c) All Phase, Low Load (LL)
- d) Phase A, High Load (HL)
- e) Phase A, Power Factor (PF)
- f) Phase A, Low Load (LL)
- g) Phase C, High Load (HL)
- h) Phase C, Power Factor (PF)
- i) Phase C, Low Load (LL)

If applicable phase B is done between phase A and phase C,

- j) Phase B, High Load (HL)
- k) Phase B, Power Factor (PF)
- l) Phase B, Low Load (LL)

Once the test is completed, the user may save the test data.

### Operation




#### Step 1: Temporary test settings

If necessary, modify the test settings by clicking on the Temporary Settings bar below the Control pan.

Test settings for the full test are:

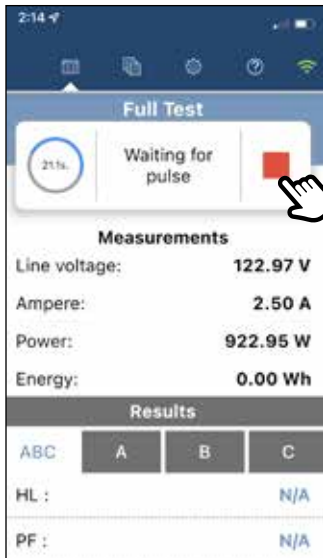
- **Timer:** minimum test time in seconds
- **Reverse:** enables or disables reverse flow testing
- **Power factor testing:** enables or disables power factor testing on single element
- **Low Load Testing:** enables or disables the low load testing on single element
- **Result display:** Result display type
- **Measurement mode:** Watt or VAR

The Temporary Settings return to their default values as soon as the user return to the main test menu .



**Step 2: Start Test**

Press the **Play Test** ► button to initiate the test sequence. The load current increases to its HL value, the meter sends pulses and the WT Series internal electronic standard registers the energy that flows through the meter.



**Step 3: Test Execution**

In addition to the test results, the user can see the line voltage and current applied to the meter, the power and cumulated energy.

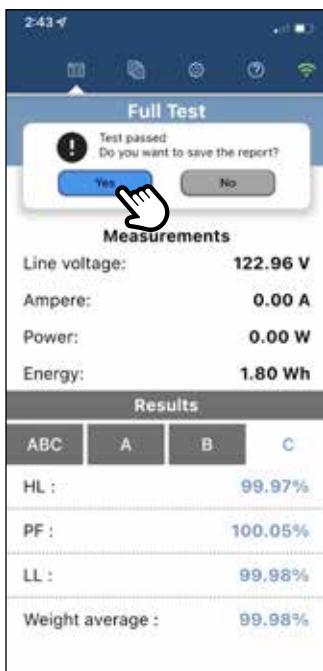
At the top, within the status field of the control pan, a test timer displays the remaining time for the sub-test.

The sub-test is currently running is highlighted

At any time during the test, the user can navigate the test results for multiphase and single-element by using the left and right arrows on each side of the results table.

Use the Tab to navigate and preview results fields ABC, A, B or C

The test may be aborted at any time by pressing the **Stop Test** button.



**Step 4: Test End**

When all sub-tests have been completed, the test ends automatically. The load is then removed, and the test results are displayed.

The last test result, Weight, is the weighted average of the three other test results according to the following formula:

$$\frac{(4HL+2LL+PF)}{7}$$

To save the test results, click on the **Yes** button within the control pan at the top of the screen.

2:38 4G LTE

Custom questions

Question 1  
Reason for test  
Answer 1


Question 2  
Work order number  
Answer 2

Submit

### Step 6: User Questions

Up to 8 user defined questions can be programmed in the **Settings** tab.

Answer each question and click on the **Submit** button to save the test report.

 In the Reports tab, a Full Test report is split into multiple entries: one entry for the multiphase test and one entry for each single-phase test.

## Custom Test

### Prerequisites

An optical pickup or a metercam must be installed on the WT Series tester.

### Description

The Custom Test is used to test a specific combination of loads and active phase.

Once the test is completed, the user may save the test data.

### Operation



#### Step 1: Test Setup

Select the load and the active phase.

#### Active Phase:

A+B+C or A+C: multiphase test on polyphase meter

A, B or C: Single-element test on phase A, B or C

The Start Test button is only available when a load is selected.



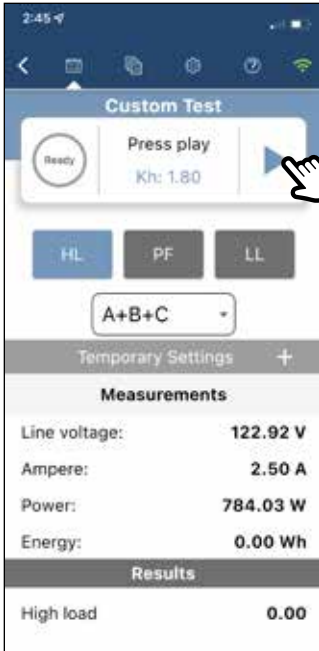
#### Step 2: Temporary test settings

If necessary, modify the test settings by clicking on the Temporary Settings bar below the control pan.

Test settings for the custom test are:

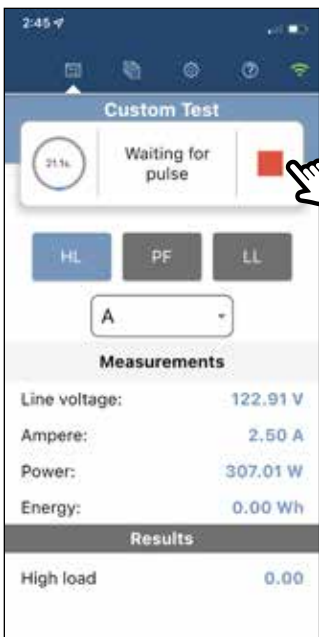
- **Timer:** minimum test time in seconds
- **Reverse:** enables or disables reverse flow testing
- **Result display:** Result display type
- **Measurement mode:** Watt or VAR

The Temporary Settings return to their default values as soon as the user return to the main test menu 



**Step 3: Start Test**

Press the **Start Test** button to initiate the test sequence. The load current increases to its selected load value, the meter sends pulses and the WT Series internal electronic standard registers the energy that flows through the meter.



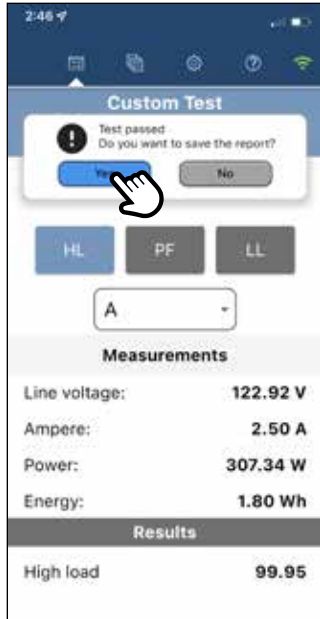
**Step 4: Test Execution**

In addition to the test results, the user can see the line voltage and current applied to the meter, the power and cumulated energy.

At the top, within the status field of the control pan, a test timer displays the remaining time for the test.

The test may be aborted at any time by pressing the **Stop Test** button.





### Step 5: Test End

When enough test pulses have been registered, the test ends automatically. The load is then removed, and the test result is displayed.

To save the test result, click on the **Yes** button at the bottom of the screen.



### Step 7: User Questions

Up to 8 user defined questions can be programmed in the **Settings** tab.

Answer each question and click on the **Save** button to save the test report.



The Custom Test runs a specific subset of the Full Test. If a meter has already been tested with the Full Test mode, running a Custom Test is redundant.

## Line Monitor

### Prerequisites

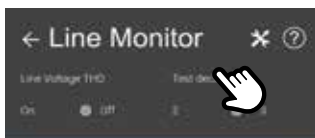
There are no prerequisites for running the Line Monitor test.

### Description

The Line Monitor Test is used to observe the input voltage and obtain the THD measurement.

This test does not save data to the device memory.

### Operation




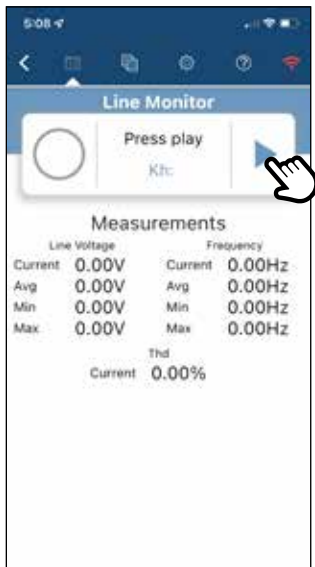
#### Step 1: Temporary test settings

If necessary, modify the test settings by clicking on the Temporary Settings bar below the control pan.

Test settings for the line monitor test are:

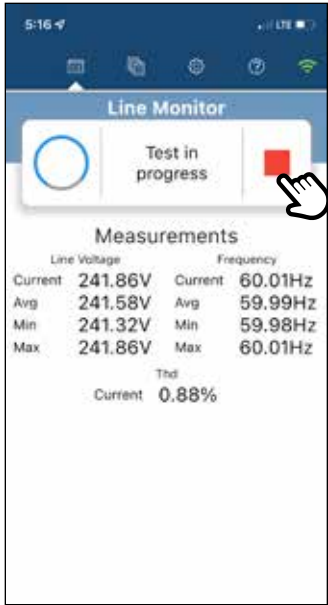
- **Line Voltage THD:** enables or disables the display of the THD

The Temporary Settings return to their default values as soon as the user return to the main test menu .



#### Step 2: Start Test

Press the **Start Test** button to initiate the test sequence. This test only monitors the line voltage and does not involve the meter.



### Step 3: Test Execution

The voltage, frequency and THD (if selected) values are continuously updated. Minimum and maximum values are also displayed for each parameter.

The harmonic content (THD) considers harmonics up to the 32<sup>nd</sup> order.

To stop the test, click on the **Stop Test** button.

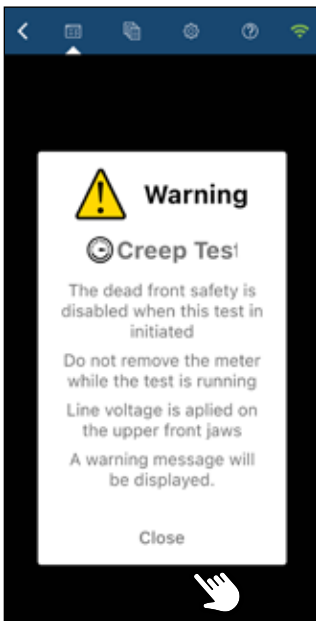
## Creep

### Description

The Creep Test is used to check the effect of a 0 A current and nominal voltage on the energy registration of a meter. Under a 0 A load, a mechanical meter should do no more than one disk revolution in a 10-minute time window. Under the same conditions, a solid-state meter should emit no more than 1 pulse in a 10-minute time window. If these conditions are not met, the meter is considered to creep.

This test does not save data to the device memory.

### Operation



#### Test Execution



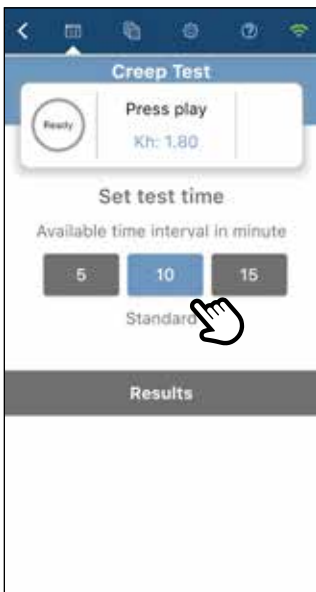
**WARNING:** The dead front safety is disabled when this test is initiated. Do not remove the meter while the test is running. Line voltage is applied on the upper front jaws. A warning message is displayed.

The test may be aborted at any time by pressing the **Stop Test** button.

At the top, within the status field of the control pan, a test timer displays the remaining time for the test.



The WT Series testers use a closed-link arrangement on the meter's load terminals and cannot be opened. However, in the Creep Test, the internal current synthesizers are set to 0.00 A (no current), thus simulating an open circuit..

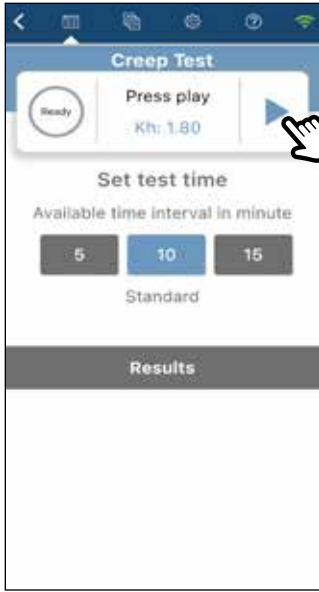


#### Step 1: Test Setup

Select the test time.

Available time intervals are:

- 5 minutes
- 10 minutes (standard)
- 15 minutes



**Step 2: Start Test**

Press the **Start Test** button to initiate the test sequence.



**Step 3: Test End**

When the test timer runs out, the test ends automatically. The dead front safety is re-enabled. If the disk has not completed a full revolution or no more than one pulse was received during this time, the meter does not creep.



## Prerequisites

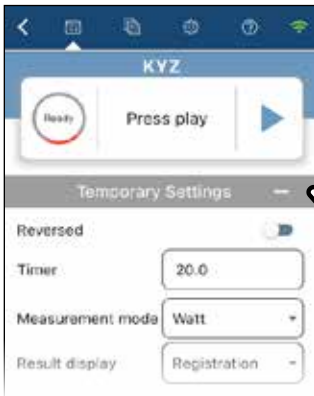
An optical pickup must be connected to the WT Series testers.

## Description

The KYZ Test is used to assess the ability of some solid-state meters to transmit energy use information to another piece of equipment via a physical wire interface. This test mode requires the KYZ Device accessory (model PW-0767) and an optical pickup with suction cup (model PW-9073). The KYZ device accessory transforms the electrical pulses generated by the meter into optical pulses to be picked up with the optical device. The optical pickup is connected to the IO port of the WT Series tester and transmits pulses to the device. By using the total energy registered by the internal standard of the WT Series tester and the number of registered KYZ pulses, a Watt hour/Pulse value can be obtained.

This test does not save data to the device memory.

## Operation




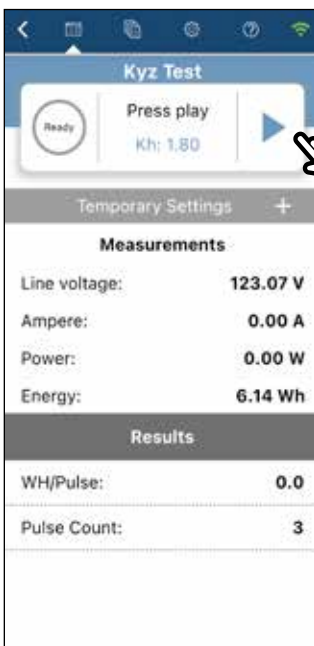
### Step 1: Temporary test settings

If necessary, modify the test settings by clicking on the Temporary Settings bar below the control pan.

Test settings for the KYZ test are:

- Reverse
- Timer
- Measurement Moder
- Result display

The Temporary Settings return to their default values as soon as the user return to the main test menu .



### Step 2: Start Test

To initiate the test sequence, press the **Start Test** button.



### Step 3: Test Execution

During the test, the WT Series tester's internal standard registers the accumulated energy and the number of pulses obtained from the KYZ interface. The average Watthour/Pulse value and the number of pulses is displayed.

The test may be stopped at any time by pressing the **Stop Test** button.



### Step 4: Test End

Once enough KYZ pulses have been registered, the user may stop the test by pressing the **Stop** button. The test will not stop by itself.

The average WH/Pulse value is displayed. Depending on how the solid-state meter is programmed, this value may be different from the Kh value.



### Step 5: User Questions

Up to 8 user defined questions can be programmed in the Settings tab. Answer each question and click on the Save button to save the test report

## Demand

### Prerequisites

No accessories must be connected to the WT Series testers

### Description

The Demand Test is used to test meters that have a demand register. The meter must first be configured to be in kW demand test mode (check meter manual for device specific procedure). The Demand Test applies a load on the meter for a given subinterval time. When the subinterval time is reached, the energy reading of the internal standard of the WT Series tester is compared to the energy reading given by the meter.

This test does not save data to the device memory.

### Operation



#### Step 1: Test Setup

The available parameters for this test are:

**Amp:** load to apply to the meter

**Interval Time (min):** the demand interval time of the meter in minutes (between 1 and 99)

**Timer:** duration of the demand test in minutes (must be less or equal to the demand interval of the meter under test)

Fill in the appropriate values for the meter in the input fields.



#### Step 2: Start Test

To initiate the test sequence, reset the demand register of the meter and press the **Start Test** button on the mobile device simultaneously.



To know how to reset the demand register of the meter under test, please refer to the meter manufacturer's specific instructions..



### Step 3: Test Execution

During the test, the WT Series tester's internal standard registers the accumulated energy and displays it on screen.

The test may be aborted at any time by pressing the **Stop Test** button.

At the top, within the status field of the control pan, a test timer displays the remaining time for the test.




### Step 4: Save Test

When the test timer runs out, the test ends automatically, and the load is removed.

Type the value of the demand meter register (read on the meter display) in the *kW Max Meter* field. Press on the **Get Results** button to calculate the final test results as a percentage error.

A result higher than 100% indicates that the meter records a higher kW demand compared to the reference. Conversely, a result lower than 100% means that the meter records less kW demand compared to the reference.

 There may be a slight delay between pressing the Start button on-screen and resetting the meter demand register. This may affect the precision of the test. Please ensure that both actions are performed simultaneously..

## Four Quadrant Watthour (4 Quad)

### Prerequisites

An optical pickup must be installed on the WT Series tester.

### Description

The Four Quadrant test in Wh is an automatic test sequence that can be used to assess the meter's ability to register energy in all four quadrants of the power vector diagram. The Four Quadrant Test runs four sub-tests, first two are an equivalent of a Quick Test in Active Power **and the an** Reactive Power, followed by Custom Tests for PF in remaining angles. The four sub-tests are:

**a. Subtest 1: Watthour (Quadrant 1)**

HL angle: 0°

Power factor angle: 60°

LL angle: 0°

**b. Subtest 2: Watthour (Quadrant 3)**

HL angle: 180°

Power factor angle: 240°

LL angle: 180°

**c. Subtest 3: Watthour (Quadrant 2)**

Power factor angle: 120°

**d. Subtest 4: Watthour (Quadrant 4)**

Power factor angle: 300°

## Four Quadrant VARhour (4 Quad)

### Prerequisites

An optical pickup must be installed on the WT Series tester.

### Description

The Four Quadrant test in VARh is an automatic test sequence that can be used to assess the meter's ability to register energy in all four quadrants of the power vector diagram. The Four Quadrant Test runs four sub-tests, first two are an equivalent of a Quick Test in Active Power **and the an** Reactive Power, followed by Custom Tests for PF in remaining angles. The four sub-tests are:

**a. Subtest 1: VARhour (Quadrant 1)**

Power factor angle: 30°

**b. Subtest 2: VARhour (Quadrant 3)**

Power factor angle: 210°

**c. Subtest 3: VARhour (Quadrant 2)**

Power factor angle: 150°

**d. Subtest 4: VARhour (Quadrant 4)**

Power factor angle: 330°

## Operation




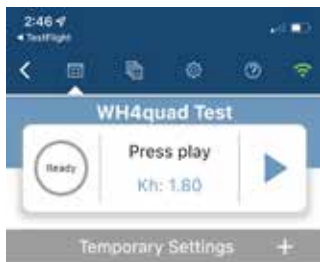
### Step 1 : Temporary test settings

If necessary, modify the test settings by **clicking on the Temporary Settings bar** below the control pan.

Test settings for the four quadrant test are:

- Timer: minimum test time in seconds
- Low Load Testing: enables or disables the low load testing
- Result display: Result display type

The Temporary Settings return to their default values as soon as the user return to the main test menu .

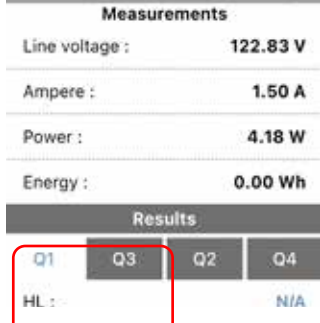


### Step 2: Start Test



If the meter has separate optical outputs for Wh and VARh, install the optical pickup on the output depending on the test you are performing.

Press the **Start Test button** to initiate the test sequence. The load current increases to its HL value, the meter sends pulses and the WT Series internal electronic standard registers the energy that flows through the meter.



### Step 3: Test execution

In addition to the test results, the user can see the line voltage and current applied to the meter, the power and cumulated energy.

At the top, within the status field of the control pan, a test timer displays the remaining time for the sub-test.

A spinning wheel indicates which sub-test is currently running.

At any time during the test, the user can navigate the test results each sub-test by using the left and right arrows on each side of the results table.

The test may be aborted at any time by pressing the **Stop Test button**.





#### Step 4 : Test End

When all sub-tests have been completed, the test ends automatically. The load is then removed and the test results are displayed.

To save the test results, click on the Yes button at the bottom of the screen.

To save the test results, click on the **Yes** button at the bottom of the screen.



#### Step 6: User Questions

Up to 8 user defined questions can be programmed in the Settings tab.

Answer each question and click on the Save button to save the test report. 1




In the Reports tab, a Four Quadrant Test report will be split into multiple entries: one entry for each sub-test of the sequence (for a total of four sub-tests). An algorithm allows to generate one PDF integration the 4 sub-test into one report. although four identical will be generated. The report will merge all four sub-test and displayed from quadrant 1 to 4. In CSV format, the will be one line for each sub-test. DO NOT erase a sub-test, this action will disrupt the algorithm.


## Accuracy

### Description

The accuracy of MT-1/WT1 and MT-1/WT3 can be checked against a **NIST** traceable standard using the following test procedure. The accuracy is tested on 6 different current test points: 1.5, 3.0, 5.0, 15.0, 30.0 and 50.0 A at both 1 (0°) and 0.5 lag (60°) power factors in Wh. Additionally the MT-1/WT3 does VARh at 30° and 90°. The accuracy test can be done using a stabilized and isolated AC power source at either 120 or 240 volts.

### Equipment Required

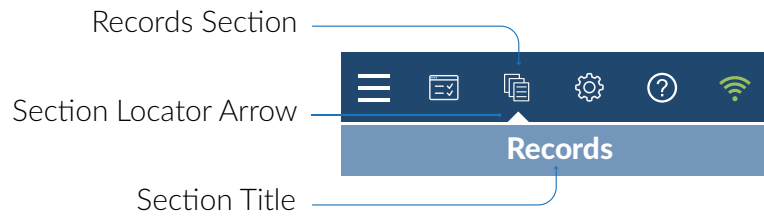
- A primary or secondary electronic watt hour standard traceable to NIST, with an output BNC port of **10μWh or 20μWh** per pulse. The standard must have at least 1 isolated current input port of a minimum capacity of 50 A with autoranging capability. We recommend a standard with an accuracy of 0.02% or better.
- The Probewell Accuracy Test Kit (single-phase or three-phase). The Kit includes the following items:
  - An Accuracy Test Interface (PW-8967), a BNC coaxial cable and a Probewell extension cable RJ12 type connection.
  - An Accuracy Test Jack.
    - Three-phase (ATK-3) for MT-1/WT3
    - Single-phase (ATK-4) for MT-1/WT1
- A laboratory stabilized and isolated AC power source with fundamental waveform selectable at 120V or 240V ±5%, 58~62 Hz, rated at least 150VA.
- A Windows PC, an Android device or iOS device with the latest Probewell Connect application installed. 

 A laboratory stabilized, and isolated AC power source is preferred rather than a small isolated line transformer or autotransformer. Such small transformers could generate severe harmonics and voltage fluctuations which could cause small additional measuring errors. **Always fuse** the power leads going to the rear tabs 1 & 3 of the unit with a quick action 1A fuse. The power leads and fuses are not provided with the Accuracy Test Kit (ATK).



















For further information and a complete calibration procedure for WT Series testers, please refer to the *Accuracy Test Kit User's Guide* which can be downloaded from the Probewell website at the following link: <https://probewell.com/atk3-atk4/>



# Records



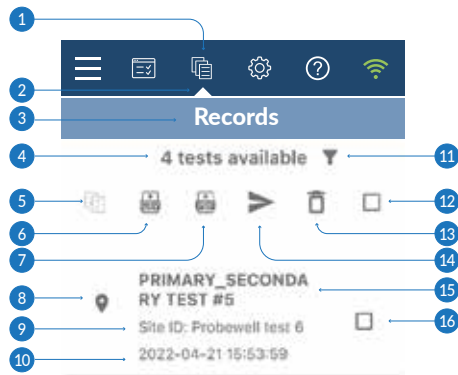
A test record is created when the operator opts to save the data of a test conducted with either an optical pickup or a metercam. Test modes that support data logging are:

-  Quick Test
-  Full Test
-  Custom Test
-  Line Monitor
-  Demand Test
-  Creep Test
-  KYZ Test
-  Manual / Tracking
-  4 Quad Test (VARh)
-  4 Quad Test (Wh)
-  Power Quality (PQ)
-  Real-Time Waveform
-  Phasors
-  Total Harmonic Distortion
-  CT & PT Ratios
-  CT Burden
-  Admittance
-  Accuracy

A Full Test and a Four Quadrant Test take up to four test record slots. In Full Test, one one for the polyphase subtest and one for each single element subtest. In Four Quadrant, one for each subtest.

















The test results can be accessed by clicking on the Records tab  at the top of the screen.

## Explore Records



- |                    |                   |
|--------------------|-------------------|
| 1. Records Section | 9. Custom Site ID |
| 2. Section ID      | 10. Timestamp     |
| 3. Section Title   | 11. Filter Icon   |
| 4. Number of test  | 12. Select All    |
| 5. Merge Reports   | 13. Delete        |
| 6. CSV Format      | 14. Send          |
| 7. PDF Format      | 15. Test Type     |
| 8. Localisation    | 16. Select Test   |

Not Available  
 Available Option

- |   |                        |   |
|---|------------------------|---|
| 1.     | Records Section Icon:  | Record Icon   |
| 2.     | Section Locator arrow: | Let you know in what section you are at a glance  |
| 3.     | Section Title:         | The app has 4 main sections Test, Records, Settings and Help                                      |
| 4.     | Number of test:        | Number of test saved in the device  |
| 5.     | Merge Reports:         | Available as soon as 2 or more reports are selected and allow to merge several reports together   |
| 6.     | CSV Format:            | Select the CSV format for your report exportation   |
| 7.    | PDF Format:            | Select the PDF format for your report exportation   |
| 8.   | Localisation:          | Display the test site localisation on a map   |
| 9.   | Custom Site ID:        | Site or Meter name as designated by the user  |
| 10.  | Timestamp:             | Date and time of the test   |
| 11.  | Filter Option:         | To help finding specific records, filter can be applied by Site ID, Meter ID, Test Types and Date |
| 12.  | Select All:            | Select all the test by clicking the menu check box  |
| 13.  | Trash can Icon:        | Delete any selected item  |
| 14.  | Paper plane Icon:      | Send the report by email  |
| 15.  | Test Type:             | Type of the test that has been perform  |
| 16.  | Select Test:           | Individual test selection checkbox  |

** WARNING**

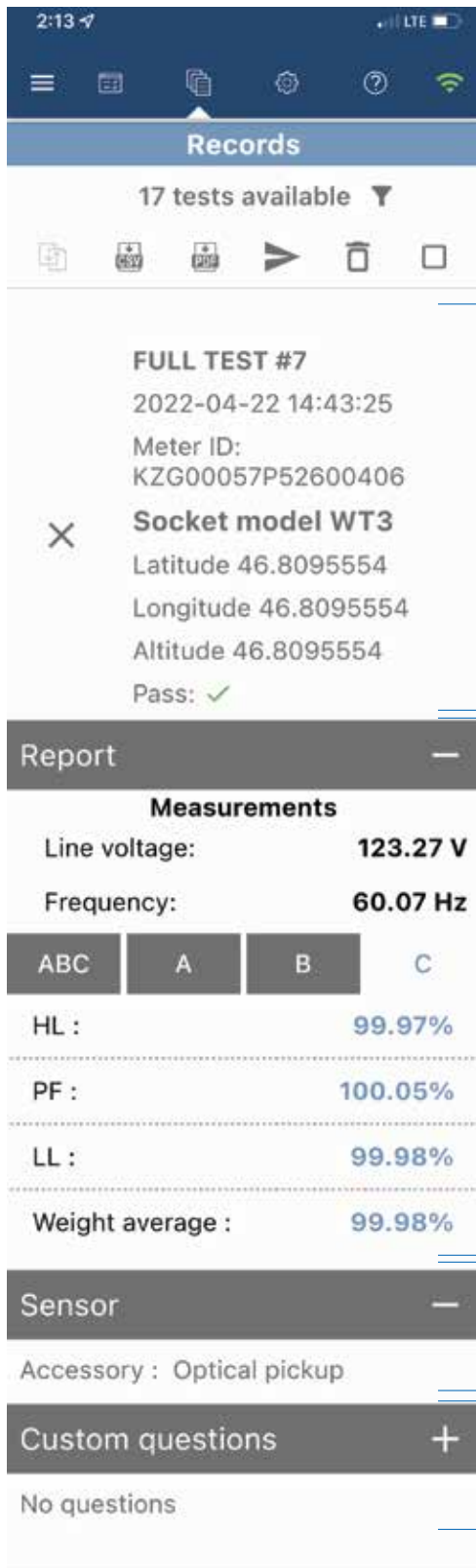
The Delete button  deletes all test reports selected. Please ensure that test data has been properly exported to a Windows computer before deleting all test data from the device. This procedure is defined in the Export section of this document.

The test list screen lists all available test results that are currently stored **on the WT Series tester**. Test records are sorted by date; newer tests being the first in the list. The test record list shows the following basic information for each test result:

- Test ID: numerical identifier for the test
- Date and time
- Meter or Site ID: meter serial number or unique identifier
- Phase: phases that were energized for the test

The operator can scroll the record list to reach older test results. Clicking the name of an element in the list display the test report details.

The test report details screen is composed of 4 distinct sections:



**1. Test ID Section**

Includes: Test Type, Site ID, GPS coordinates (when available)  
Pass or Failed status

If the test has associated GPS data, the See on Map button is available. Clicking on this button launched Google Map (if installed on device) and shows the test location on a 2D map. This functionality requires that the mobile device have internet access.

**2. Report Section**

Includes: Full test data, including meter specifications and error percentage readings

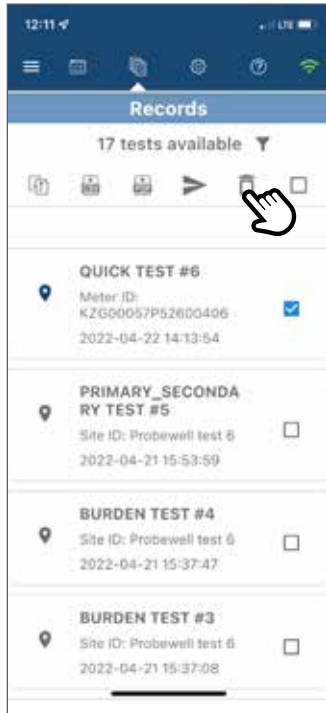
**3. Sensor Section**


Includes: Information on the type of sensor (optical pickup or metercam) and the number of pulses or revolutions that were recorded at each step of the test

**4. Questions Section**

Includes: User defined questions and their corresponding answers filled in at the end of the test

## Individual record deletion



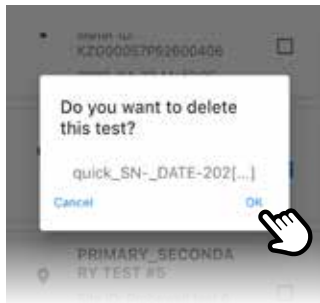
On iOS and Android, an individual report can be deleted by selecting the checkbox on the targeted report entry in the list and pressing on the trash can icon .

On Windows, the trash can icon is always visible for each report entry.

The application requires additional validation to complete the deletion process. Once a report has been deleted, it is completely removed from the device memory and is no longer accessible.

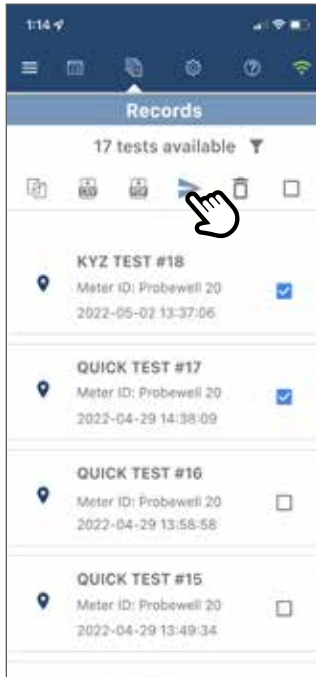





Please ensure that test data has been properly exported to a Windows computer before deleting any test data from the device. This procedure is defined in the Export section of this document.




When there are no more vacant test report slots on the system (i.e., when all 100 report slots are occupied), the device will display a system error when trying to save new test data. The device does NOT automatically overwrite test data. At this point, the user must transfer test reports to a computer and delete data from the tester before running additional tests.

## E-mail Selected Report(s)

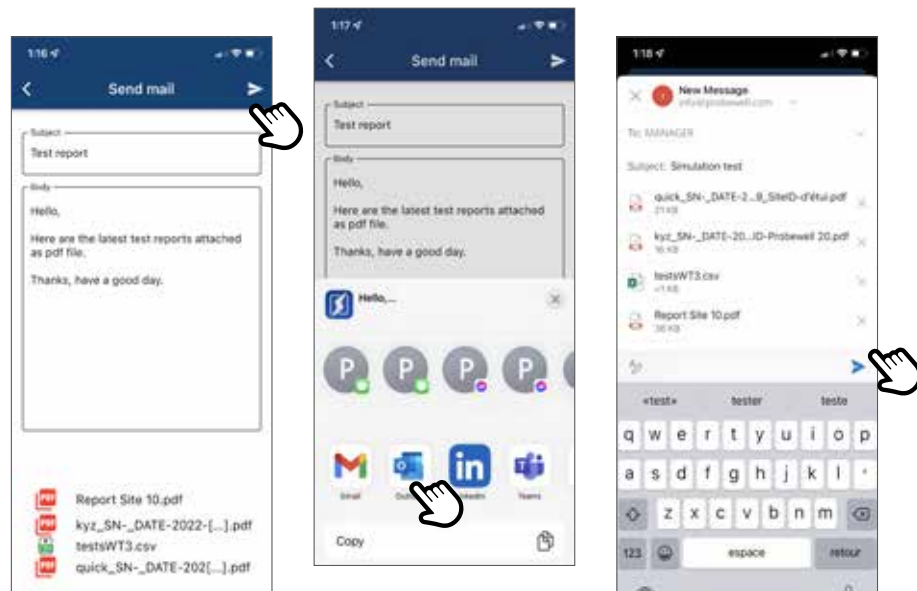


As soon as a single test report is selected, the format options buttons for CSV  or PDF  are activated allowing the user to generate a report in one or both of the formats. The **Send Mail** button  in the test report view also becomes available,

Select a format and press the Send Mail button to begin sending an email. This automatically opens an e-mail and populates the subject and content of the message.

 If the mobile device cannot reach the internet when the e-mail is sent, the message will go to the Outbox and will automatically be sent when the mobile device is connected to the internet again (either via WiFi or cellular data).

iOS

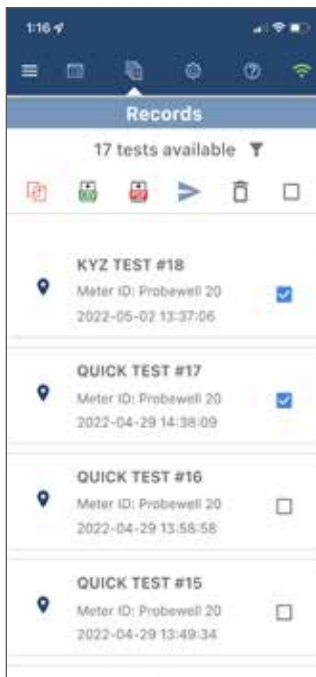


Edit the subject and the content of the email and press send to continue.

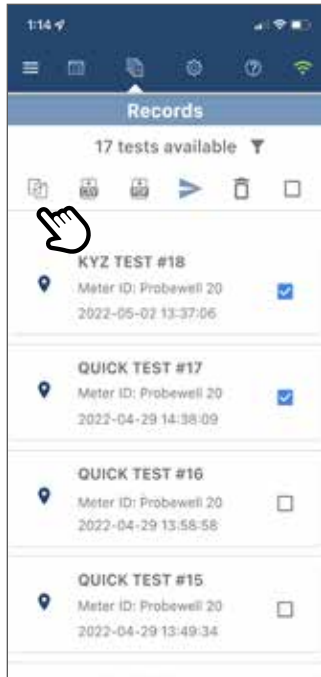
Select the mail application


Enter the recipient's email then the subject and click send

Android?



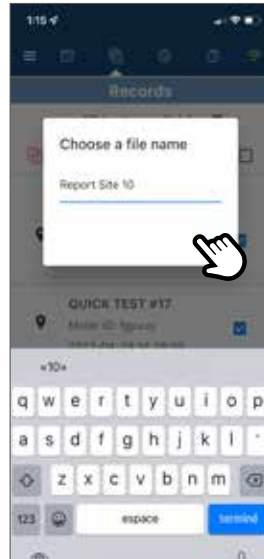
## Merge and Send Reports



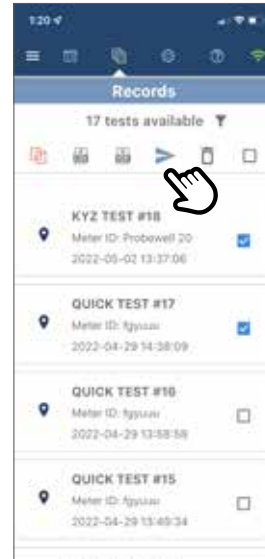
You have the option of merging two or more reports into a single one. As soon as more than one report is selected, the Merge Reports button  becomes available. Press the Merge Reports button and follow the steps below.




Click on the text field to start editing the merged report name.



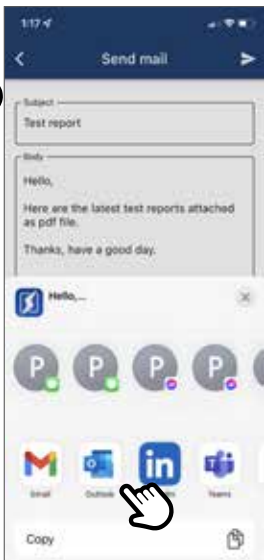
Edit the name of the merged report and press done to continue.



The Merge Report icon is highlighted in red, meaning that a PDF format of the report has been created. The Send Email button  is now available, press Send email.



Edit the subject and the content of the email and press send to continue.



Select the mail application

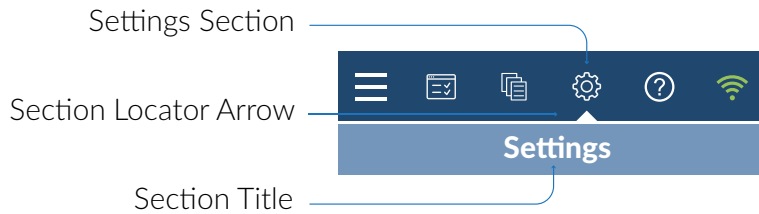


enter the recipient's email then the subject and click send



## Settings

### Settings Mobile Header



## General Settings



The WT Series tester's come with factory default settings that are suitable for most operations. The device settings can be easily changed to suit the operator's needs by using the Settings tab in the app. These settings can then be save to a profile and reused as needed.

The Settings comprise 3 main sections, General Settings, WT Series Settings and XT Series Settings which are described here.

- **General Settings**      App. parameters      Adjust parameters specific to the app, such as language and dark mode.

Language selection.

  - English (default)
  - French
  - Spanish
- Utility profile      Brand reports by adding the company logo, address and contact info.
- User profile      Add field tech user ID and email here.

**i** Users can now access some function of the app while offline, such as "Settings" and "Records" for both the WT and XT Series device. This allows user to setup their device before hands and access Records at any time.

As a rules of thumb, the color code for the WT Series header is generally blue ● and for the XT Series header is Black ●.

## WT Series Settings

System Settings are used to configure how the WT Series tester performs tests and contains various basic usability settings.



### – WT Series Settings Profile

The WT Series tester's come with factory default settings that are suitable for most operations.

The device settings can be easily changed to suit the operator's needs by using the Settings tab in the app.

These settings can then be save to a profile and reused as needed.

**System** Personalize the system technical specifications as required, these settings will remain active until they are modified by the user.

**Meter** Change the pass/fail parameters or other meter parameters

**Calibration** Tester calibration parameters

**Custom Questions** Add up to 8 predefined questions relating to the WT test, these will be included in the report

**Factory default** The WT Series tester's come with factory default settings that are suitable for most operations.

**Reset socket** Press reset socket will disconnect the device and take the user back to the network screen where he can either scan the QR Code again or select the device from the available device list



Add a setting profile for both the WT or the XT Series Settings, Use the dropdown menu to add a profile or activate one by selecting its name in the list.



## Profile

The WT Series tester's come with factory default settings that are suitable for most operations.

The device settings can be easily changed to suit the operator's needs by expanding the Settings tab in the app.

These settings can then be save to a profile and reused as needed.

**Default:** The default factory settings are suitable for most operations.

**Create a profile:** Click the dropdown menu and select "Add a setting profile", input a relevant name and click done, the profile will be created with all the fields current values (Figure 1).

**Select a profile:** Click the dropdown menu and select the name of the needed profile (Figure 2).

**Modify a profile:** To modify a profile, start by selecting the profile, make the required changes in the settings and click the green checkmark ✓ to save the changes, that's it (Figure 3).

**Delete a profile:** To delete a profile, click the dropdown menu and click the name of the profile and click the garbage can 🗑️ to delete it (Figure 4).

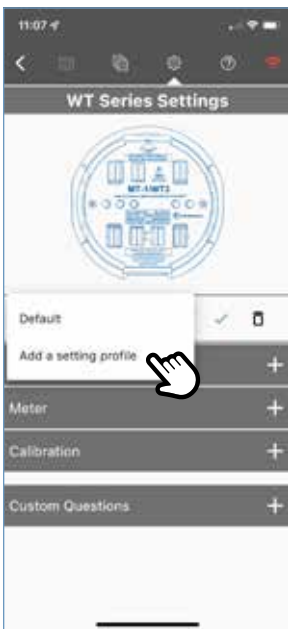


Figure 1

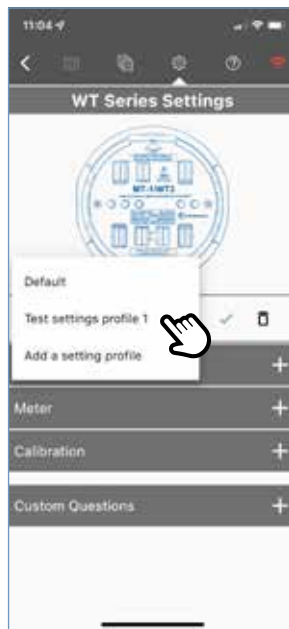


Figure 2

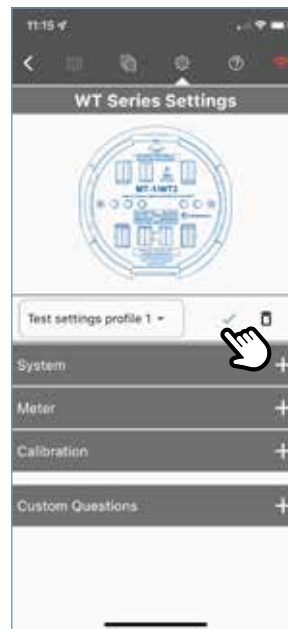


Figure 3



Figure 4

## System Settings



### Result display

Display type of the error percentage result.

- **Error percentage:** error on the meter readout compared to the reference. Positive values indicate a leading meter and negative values indicate a lagging meter.
- **Registration (default):** readout of the meter as a percentage of the reference standard measurement. Values over 100% indicate a leading meter and values under 100% indicate a lagging meter. Settings can be accessed directly by clicking the Cog Icon shortcut or within the main colapsable menu.

### Measurement mode

- **Wh (Default):** tests the meter in watthour
- **VARh:** tests the meter in VARh

### Minimum test time

Minimum test duration time per load type for solid-state meters. Minimum time is 10 seconds and maximum time is 120 seconds. Default is 20 seconds.

### Weight ratio

High Load specific weight in the weighted average calculation. Default value is 4.

With WR as the weight ratio parameter, the weighted average formulas are :

### Test Decimal

Number of test decimals used to display the error percentage result. Default value is 2.

### Power Factor Test Enable

Enabled by default.

For polyphase meters:

- Enables or disables PF Load in Full Test sequence.

### Low Load Testing in Full Test

Enables or disables the Low Load single element subtest in the Full Test mode.

Disabled by default.

### Reverse

Enables or disables the reverse flow testing when doing Net Metering. Disabled by default.

use meters

$$\frac{(WR \cdot HL + 2 \cdot LL + PF)}{(WR + 2 + 1)}$$

$$\frac{(4 \cdot HL + 2 \cdot LL + PF)}{7}$$

default WR value of 4, the formula is:

$$\frac{(4 \cdot HL + PF)}{5}$$

WR value of 4 and with the Low Load Test option disabled, the formula is:

## Meter Settings

The screenshot shows the 'Meter' settings screen with the following sections:

- Kh auto detection:** A toggle switch set to 'On'.
- Kh auto-detection delay:** A numeric input field with '0'.
- Electronic precision (%):** A numeric input field with '0.20'.
- Electromechanical precision:** A numeric input field with '2.00'.
- Sensus 3S meter:** A toggle switch set to 'On'.
- KH default table:** A grid of input fields for different meter forms:
 

1S	3.6	2S	7.2
3S	0.3	4S	0.6
9S	1.8	12S	14.4
14S	21.6	15S	21.6
16S	21.6	6S	1.8
8S	1.8	5S	1.2
45S	1.2		
- TA default table:** A grid of input fields for different meter forms:
 

1S	15.0	2S	30.0
3S	2.5	4S	2.5
9S	2.5	12S	30.0
14S	30.0	15S	30.0
16S	30.0	6S	2.5
8S	2.5	5S	2.5
45S	2.5		
- Load:** Input fields for LL (10.0), PF (100.0), and HL (100.0).
- Revolution per load:** Input fields for LL (1) and PF (5), with an HL field containing '10'.

### Kh Autodetection

Enables or disables the automatic detection of the meter Kh value when an Optical Pickup or Metercam is connected. Enabled by default.

### Kh autodetection delay

Adds a delay (in seconds) before registering the first pulse for the Kh automatic detection. This option is useful for meters that have an AMI/AMR module that emits from the same port as the test pulse.

Available values are (in seconds):

- 0 (default)
- 1
- 2
- 5
- 10

### Electronic precision (%)

Solid-state meter accuracy class (e.g. 0.2%). This value is used to evaluate the Pass/Fail status of a test when an Optical Pickup is used. When the error percentage is greater than the accuracy class of the meter, the numerical result is surrounded by square brackets [ ].\*

### Electromechanical precision (%)

Electromechanical meter accuracy class (e.g. 2%). This value is used to evaluate the Pass/Fail status of a test when a Metercam is used. When the error percentage is greater than the accuracy class of the meter, the numerical result is surrounded by square brackets [ ].\*

\*The RESULTS window, should read something like this, LL exceeding the accuracy: HL 99.95% PF 99.97% LL [99.97]%

### KH default table\*

Default Kh value per specific meter form. This value is populated in the Meter Setup view depending on the automatically suggested meter form.

### TA default table\*

Default TA value per specific meter form. This value is populated in the Meter Setup view depending on the automatically suggested meter form.

### Load\*

Percentage of the test amperage (TA) that defines which current value to use for each subtest. By default, LL is set as 10% of TA, PF and HL are set as 100% of TA.

As an example, with a TA of 25 amperes:

- LL:  $0.1 * 25 = 2.5$  A
- PF and HL:  $1 * 25 = 25$  A

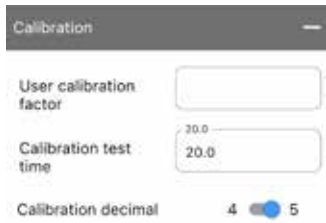
### Revolution per load\*

Number of revolutions registered when using the Manual/Tracking mode or any automatic test using the Metercam. Default values are:

- LL: 1 revolution
- PF: 5 revolutions
- HL: 10 revolutions

\*Default values can be modified

## Calibration Settings



### User calibration factor

Custom user calibration factor (affects all error percentage results)

### User calibration date

User calibration factor last update

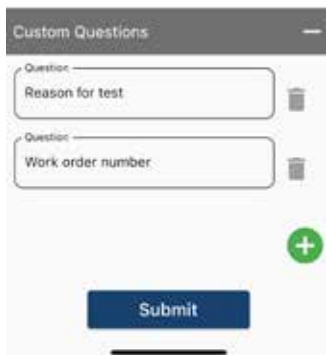
### Factory calibration date

WT unit calibration date at the Probewell factory

### Calibration decimal

Number of test decimals used to display the error percentage result in the accuracy test. Default value is 4.

## Custom Questions



Add up to 8 predefined questions relating to the WT test, these will be included in the report

- Press on the Plus icon **+** to add a Custom Question
- Press the Submit button to save the questions
- Delete any question by pressing the trash can icon **🗑** beside it

## Factory default & Reset socket



### Factory default

The WT Series tester's come with factory default settings that are suitable for most operations.

### Reset socket

Press reset socket will disconnect the device and take the user back to the network screen where he can either scan the QR Code again or select the device from the available device list



### Barcode type

By default the app barcode scanner is setup for AEP barcode format. You can find a break down of the pre-defined barcode setup below:

AEP: Position 1 & 2 = Meter Setup / Position 3 = Meter Manufacturer (skipped) / Position 4 to 12 = Meter ID  
 Custom 1: Position 1 & 2 = Meter Setup / Position 3 to 8 = Meter ID  
 Custom 2: Position 1- to 6 = Meter ID

\*only above mentioned barcode position digits are taking into consideration for Meter setup and Meter ID

### Result display

Display type of the error percentage result.

- **Error percentage:** error on the meter readout compared to the reference. Positive values indicate a leading meter and negative values indicate a lagging meter.
- **Registration (default):** readout of the meter as a percentage of the reference standard measurement. Values over 100% indicate a leading meter and values under 100 % indicate a lagging meter.

### Weight ratio

High Load specific weight in the weighted average calculation. Default value is 4.

With WR as the weight ratio parameter, the weighted average formulas are :

### Minimum test time

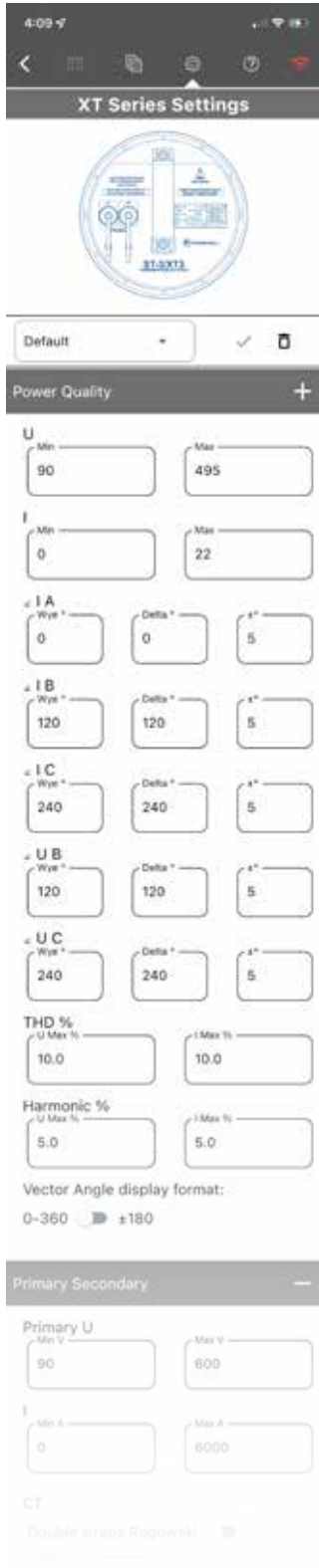
Minimum test duration time per load type for solid-state meters. Minimum time is 10 seconds and maximum time is 120 seconds. Default is 20 seconds.

### Measurement mode

- **Wh (Default):** tests the meter in watthour
- **VARh:** tests the meter in VARh
- 

### Line Voltage THD

Enables or disables to display of the THD value in the Line Monitor test.



– XT Series Settings


- Power Quality Change the pass/fail parameters or other meter parameters
- Primary Secondary Change the pass/fail parameters or other meter parameters
- Secondary Burden Change the pass/fail parameters or other meter parameters
- Custom Questions Add up to 8 predefined questions relating to the WT test, these will be included in the report

Press on the “+” icon to add a Custom Question

Press Submit to save the questions

Delete any question by pressing the trash can icon 



 Add a setting profile for both the WT or the XT Series Settings, Use the dropdown menu to add a profile or activate one by selecting its name in the list.




# Firmware Update

In order to benefit from all the latest features and bug fixes, Probewell Lab suggests that firmware updates on WT series testers be done periodically. The latest firmware for WT Series testers is always available on the Probewell website at the following link: [www.probewell.com/services](http://www.probewell.com/services) (password protected)

## Setup and material required

The required material for a firmware update for the WT series testers is:

- A proprietary USB update Cable included with the socket (if you need a replacement USB cable, contact [sales@probewell.com](mailto:sales@probewell.com))
- A computer running on Windows 10
- The Probewell Connect App for Windows.
- The MT-1/WT3 or MT-1/WT1 meter tester. The tester must be energized and powered on. A meter base, desktop solution or test board providing 120 or 240 V on the two upper jaws with a capacity of at least 150 VA can be used to energize the tester. Be sure to properly configure the twist tabs and form switch selector.

 The Windows computer does not need to be connected to the wireless network of the WT series tester to perform the firmware update. The update process is done over a physical connection with the USB Update Cable..

### Instructions

1. Download the firmware update .ucf file in a Windows 10 computer.

Click on the link <https://probewell.com/services> to access the secured client page containing all the firmware files.  
 Password: jb17549

### Firmware downloads available

WT Series Testers Firmware 1.7.0 (UCF file):

[WTProd\\_1.7.0.zip](#) (Right click to save)

[WATCH THE WT SERIES TUTORIAL](#)

XT Series Site tester Firmware 1.6.2 (UCF file):

[XT3Prod\\_1.6.2.zip](#) (Right click to save)

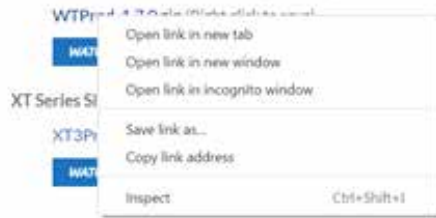
[WATCH THE XT SERIES TUTORIAL](#)



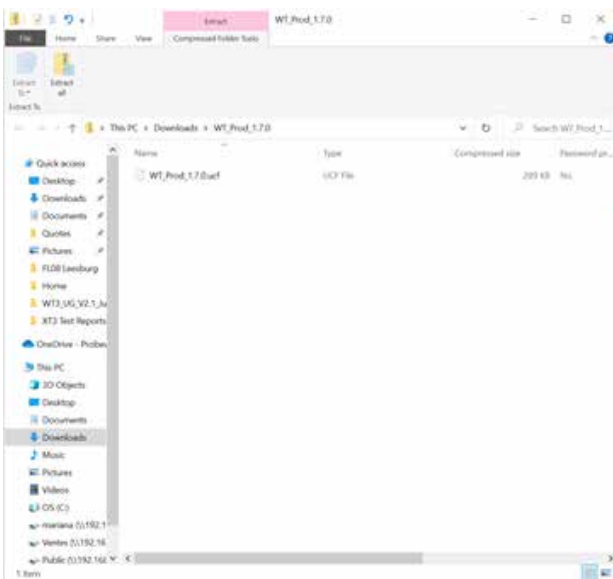
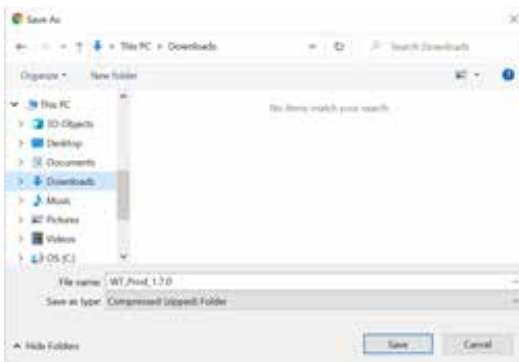


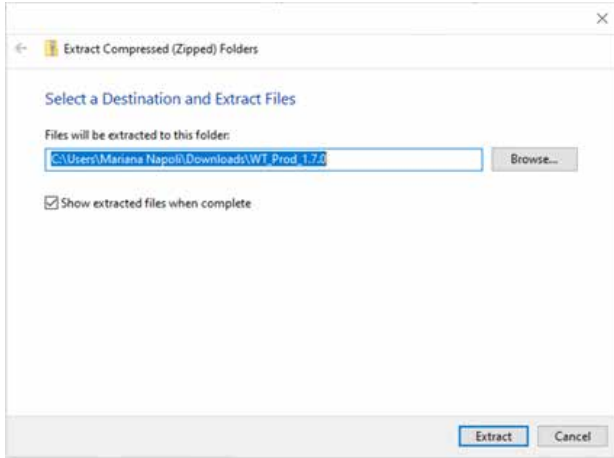
Firmware downloads available

WT Series Testers Firmware 1.7.0 (UCF file):



This will open a window prompting you to choose where to save the zip file.





2. Place your Probewell tester into a socket for energization and turn your tester on
3. Locate your Probewell Update cable (usually placed inside Probewell tester carrying case). Use the Probewell Update cable and plug it into a USB port of your computer. Plug the other end (RJ connector/telephone jack) of the cable into the I/O port of your tester.

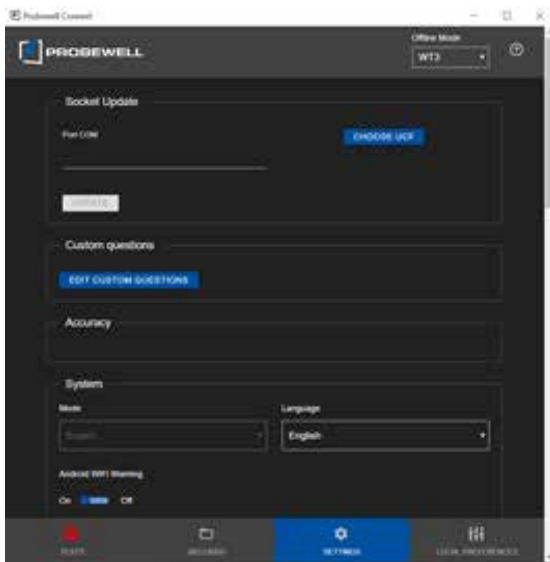
4. Launch the Probewell Connect App on your computer (if it was not installed) from the Probewell website, at the software section and download Probewell Connect

**IMPORTANT:**

BE sure to download the appropriate file depending on the product you are updating.

File names start with the product family  
WTProd\_(version).zip for the wireless meter tester  
or  
XT3Prod\_(version).zip for the wireless site tester.

5. Select the “Settings” tab at the bottom of your Probewell Connect Application. After clicking the appropriate firmware file, chose “Save link as...”



- Choose a location where you will save the file in your computer.
- Locate the file in your Windows Explorer

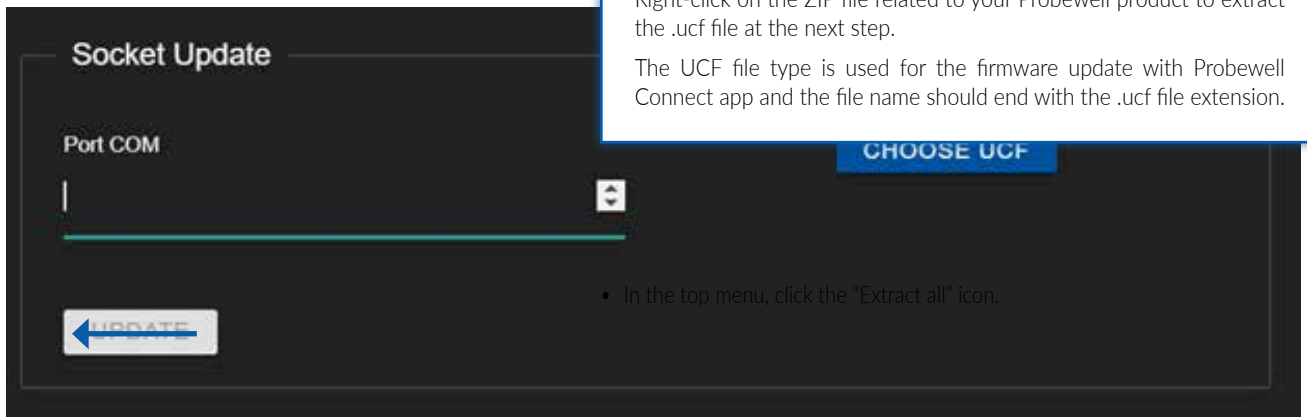
**FILE FORMAT**

The UCF file has been compressed and will appear as a zip file (.zip) on the page.

Right-click on the ZIP file related to your Probewell product to extract the .ucf file at the next step.

The UCF file type is used for the firmware update with Probewell Connect app and the file name should end with the .ucf file extension.

6. Use the top section “Socket Update”



- In the top menu, click the “Extract all” icon.

7. At the top of the settings page, enter the appropriate com port in which your USB Update cable is plugged in. To find the appropriate com port number, locate your device manager by searching for “Device Manager” in the bottom left corner of your computer screen (Detailed instructions on Appendix D of this guide).
8. Click on “Choose UCF” and locate UCF file previously saved in your computer. Once located, click on select.
9. The “Update” button will have changed from light grey to blue. Click the “Update” button.
10. Follow the instructions on your Probewell application to restart your device (tester) by turning the tester off then back on after waiting 3 seconds.
11. Probewell Connect application will now start programming the new firmware into your tester. The update process will take a few minutes. Do not interrupt the process.
12. When completed, restart your device (tester) by turning the tester off then back on after waiting 3 seconds.



## Specific operation modes

The WT Series tester supports operation modes that allow it to test additional functionalities of electrical meters.

- Choose the destination location on your local computer for the firmware file and click the "Extract" button.

### Wh/VARh

The Wh/VARh measurement mode lets the WT Series tester evaluate the resistive and the reactive operation of the electrical meter separately.

The measurement mode can be modified from the test specific settings in the Quick, Full and Custom test modes. This is a temporary setting that is reset to its default value (Wh) when the WT Series tester is power cycled.

#### Wh

In Wh operation mode, the **LL** and **HL** load subtests are done at 0° lag (current and voltage in phase) and the **PF** load subtest is done at 60° lag.

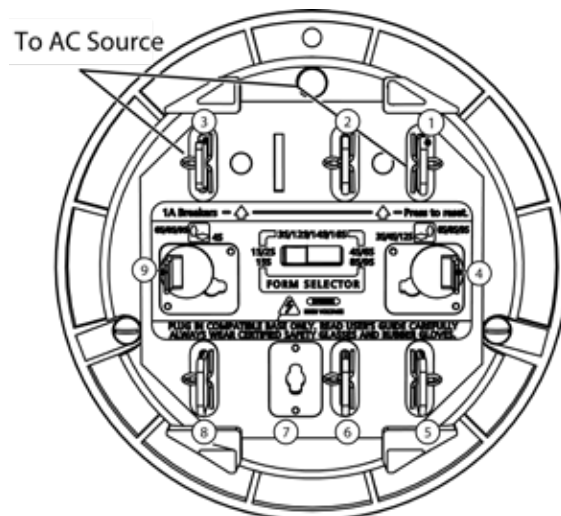
#### VARh

In VARh operation mode, the **LL** and **HL** load subtests are done at 90° lag and the **PF** load subtest is done at 30° lag (current lagging on voltage).

**i** Before conducting a test with a solid-state meter, please validate that the meter's output pulse settings are set to match the WT Series tester measurement mode. That is, if the WT Series tester is set to test the meter in Wh mode, the meter must be programmed to pulse in



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## Reverse Flow Testing

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In its typical operation mode, the meter measures the total energy being delivered to the customer by the grid. Some residential installations are equipped with renewable energy systems. In such cases, the renewable energy system may harvest more energy than is needed by the installation. The energy surplus may be delivered back to the power grid and the electric meter must be able to measure reverse energy flow to affect billing accordingly.

On the WT Series tester, the reverse flow testing is available in Wh and VARh measurement mode, with or without the optical pickup. Reverse flow testing is not available when a Metercam is connected. The WT Series tester's internal current generator can reverse the current flow and thus test the accuracy of a solid-state meter in received flow.

To configure Reverse flow testing, enable the Reverse option in the Settings tab under the System section. The option can also be set temporarily from within the test mode view. In the test report, the Power and Energy measurements are preceded by a backward arrow to indicate reverse flow.



Before conducting a test with a solid-state meter, please validate that the meter's output pulse settings are set to match the WT Series current flow mode. That is, if the WT Series tester is set to test the meter forward current flow, the meter must be programmed to pulse in increments of positive flow. If the WT Series tester is set to test the meter in backward current flow, the meter must be programmed to pulse in increments of negative flow. Please refer to the meter manufacturer's reference technical guide for instructions.

# Appendix A

## Troubleshooting

Under specific circumstances, the Probewell Connect app may display a warning or error message requiring further action from the user. A list of the most common troubleshooting topics is included below. If any problem persists, please contact Probewell Lab Inc. Technical Services.

FAULT	DESCRIPTION	• FIX
<b>CANNOT PAIR WITH SOCKET</b>	The application cannot connect to the WT Series tester wireless network.	<ul style="list-style-type: none"> <li>• Make sure the WT Series tester is turned on.</li> <li>• Check if the fan inside the socket is spinning.</li> <li>• Scan the QR code that is located on the directly on the tester. If using a QR code printed on the included plastic card, please validate that the serial number written on the card matches the serial number of the unit.</li> </ul>
<b>FIRMWARE VERSION WARNING</b>	The application gives a warning about the WT Series tester firmware version not matching the application version.	<ul style="list-style-type: none"> <li>• Follow the Firmware Update section of this document to update the firmware of the WT series tester</li> </ul>
<b>METER BARCODE NOT READABLE</b>	The application cannot get a proper reading on the meter barcode.	<ul style="list-style-type: none"> <li>• Make sure the meter barcode is readable and not damaged.</li> </ul>
<b>METER BARCODE NOT RECOGNIZED</b>	The application reads the meter barcode, but cannot recognize the structure of the barcode	<ul style="list-style-type: none"> <li>• Make sure that the meter barcode matches the AEP barcode standard.</li> </ul>

To find the exact meaning of an error code, please visit: <https://probewell.com/support/>

# Appendix B

## Parameters for Data Logging Option

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The following describes all the different data fields contained in the.CSV (Comma Separated Value) report file.

1- TEST#	This test # is given to each subsequent test conducted in the field. The unit can store up to 100 tests. Once the tests have been uploaded into your PC and deleted from the remote, the test # restarts at 1.
2- REC#	This is a permanent record number, it cannot be modified or deleted (already stored in remote). This number is incremented at each new logged test. It starts at 1 and increment by 1 up to 99999 then restarts at 1.
3- DATE/TIME	Stamp date and time of the test
4- REMOTE#	MT-1/WT Remote Serial Number (same as the SOCKET#)
5- SOCKET#	MT-1/WT Socket Serial Number (already stored in socket).
6- FORM	Meter form
7- PHASE	Phase tested
8- TA	Testing Amperage of meter tested
9- Kh	Kh of the meter tested
10- MODE	Mode in which test was conducted. Result can be full, quick or custom (single).
11- SENSOR	Indicates what type of sensor was used during test. Result can be <b>Optical Pickup</b> or <b>Metercam</b> .
12- METER ID:	Tested meter's serial number as entered by the technician in the field.
13- %HL	Result of HL test in registration percentage
14- %LL	Result of LL test in registration percentage
15- %WT	Weighted average in registration percentage as calculated with the configured ratio.
16- %PF	Result of PF test in registration percentage
17- CREEP	Status and result of creep test. There are 5 possible answers:
a) N/A	This will be returned when the %HL and %LL error difference falls within the acceptable error margin and no creep test needs to be run.
b) SKIP	This will be returned when the %HL and %LL error difference is outside the acceptable error margin, but the technician decided not to run a creep test.

**PROBEWELL LAB INC.**

c) YES	This will be returned when the %HL and %LL error difference is outside the acceptable error margin; a creep test has been run and the technician answers YES to the question: Does the meter creep?
d) NO	This will be returned when the %HL and %LL error difference is outside the acceptable error margin; a creep test has been run and the technician answers NO to the question: Does the meter creep?
e) N/S	Not supported
18- 33 Q & A	8 custom questions and answers
34- RevHL	Revolutions run during HL test
35- RevLL	Revolutions run during LL test
36- RevPF	Revolutions run during PF test
37-Weighting factor	Weighted error ratio as defined in configuration
38- AmpHL	Load in amps applied during HL test
39- AmpLL	Load in amps applied during LL test
40- AmpPF	Load in amps applied during PF test
41- WhHL	Watt hours recorded during HL test
42- WhLL	Watt hours recorded during LL test
43- WhPF	Watt hours recorded during PF test
44- VOLT	Line voltage recorded at end of all tests
45- FREQ	Line Frequency recorded at end of all tests
46- Latitude	GPS coordinates (latitude)
47- Longitude	GPS coordinates (longitude)
48- Altitude	GPS coordinates (altitude)

# Appendix C

## Customer Service

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### Warranty and repairs

If your MT-1/WT3 becomes defective while under warranty (two years after original date of purchase), Probewell Lab Inc. will repair or replace it. If the unit becomes defective after the warranty has expired, Probewell Lab. Inc. will repair it, charging the cost of labor and spare parts.

### Before returning a unit for repair

Please do not return your MT-1/WT3 without first contacting customer service at 1 866-626-1126 or sending an email to [info@probewell.com](mailto:info@probewell.com). You will be given detailed shipping instructions.

### Technical questions

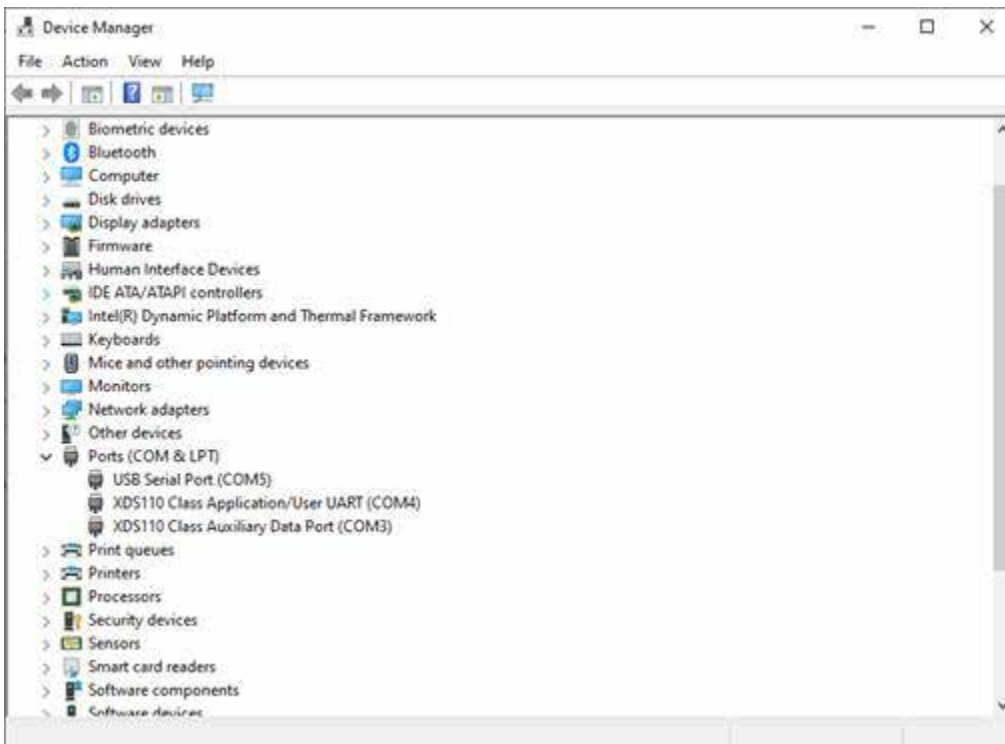
If you have any technical questions regarding the MT-1/WT3's operation, contact our technical support team at 1-866-626-1126 or send an email to [support@probewell.com](mailto:support@probewell.com).

# Appendix D

## USB Update cable COM port

In order to upgrade the firmware of the WT Series tester, the COM port number of the USB Update cable must first be determined. The following procedure outlines the required steps:

1. On the Windows PC, open the Device Manager. This can be done by searching for it in the Windows search bar or by going through Control Panel -> Hardware and Sound -> Devices and Printers -> Device Manager.
2. Expand the Ports (COM & LPT) section. The USB Update cable is identified as USB Serial Port (COMX), where X is a number. If many similar devices are already present in the list, try disconnecting the USB Update cable to see which one is removed from the list.











We believe that field testers should be easy to use, portable and safe.

Probewell generates added value for utilities companies and their customers by means of innovative metering solutions that provide accurate data-driven insight as well as flexibility and efficiency.

Through our expertise and constant innovation, we develop cutting-edge field testing technologies that deliver a premier solution for utility companies when it comes to quality, ease of use, sturdiness and customer satisfaction.

Leverage proven technologies to streamline your testing.

## Probewell Lab Inc.

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