PowerLogic ION8600 and ION8650 accuracy verification

All PowerLogic™ ION8600 and ION8650 meters are tested and verified at the factory according to International Electrotechnical Commission (IEC) and American National Standards Institute (ANSI) standards; however, before a new revenue meter is installed, it is important to perform a final accuracy verification.

ION™ meters are digital and do not require calibration, only verification of their accuracy. This technical note outlines a procedure for verifying the accuracy of ION8600 and ION8650 meters.

In this document

Additional information

- your meter's *Installation guide*
- your meter's *User guide*
- *ION reference*
- *ION Setup online help*

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Schneider Electric

Hazard categories and special symbols

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

NOTE

Provides additional information to clarify or simplify a procedure.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

Safety precautions

Meter accuracy verification must be performed in accordance with all local and national electrical codes.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA or applicable local standards.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- Connect protective ground (earth) before turning on any power supplying this device.
- Verify the meter's power source meets the specifications for your meter's power supply option.

Failure to follow these instructions will result in death or serious injury.

Introduction

Digital meters require accuracy verification to help ensure the meter meets required accuracy specifications. If you know your meter is within required accuracy specifications before installation, errors observed in the field could be attributed to incorrect connections or instrument transformer ratio settings.

Testing overview

The most common method for testing meter accuracy is to apply test voltages and currents from a stable power source and compare the meter energy readings with readings from a reference meter or energy standard. Although meter shops use different methods for testing revenue meters, most test equipment requirements are similar.

The sections below provide an overview and some guidelines for testing the accuracy of your meter.

Test socket

A test socket is a convenient mounting device that is designed to fit socket-type meters. Ensure that the meter's test socket or mounting device is properly connected to the source of the test signal and the reference meter or energy standard.

NOTE

Do not use PTs (voltage transformers) or CTs (current transformers) when performing accuracy testing on the meter as they may introduce inaccuracies.

Power source

The meter will maintain its accuracy during signal source variations but its energy pulsing output needs a stable test signal to produce accurate test pulses. The meter energy pulsing mechanism needs approximately three to four seconds to stabilize after every source adjustment; the meter measurements are accurate during the signal source transitions, but the pulse output needs to be allowed to stabilize before the start of every test to help ensure accuracy.

In order to conduct verification testing of meters powered from the voltage inputs, the source of the test signal must be capable of supplying sufficient power to the meter under test. Please refer to the meter's *Installation guide* for power consumption specifications.

In order to conduct verification testing of auxiliary powered meters, the meter must be connected to an additional power source. Refer to the meter's *Installation guide* for power supply specifications.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Verify the meter's power source meets the specifications for your meter's power supply option.

Failure to follow these instructions will result in death or serious injury.

Control equipment

Control equipment is required for counting and timing the pulse outputs (revolutions) from the front panel pulser LED. Most standard test benches have an arm with optical sensors used for this purpose. Make sure the optical sensor can detect red LED or infrared signals.

NOTE

The optical sensors on the test bench can be disrupted by strong sources of ambient light (such as camera flashes, fluorescent tubes, sunlight reflections, floodlights, etc.) and cause test errors. Use a hood, if necessary, to block out ambient light.

Environment

The meter must be tested at the same ambient temperature as the testing equipment. The ideal reference ambient temperature is typically 23° C (73° F). Ensure the meter is warmed up sufficiently before testing. The meter's internal temperature is shown on the meter's front panel display (refer to "Meter internal temperature" on page 18), and can be monitored to help ensure the meter has warmed-up sufficiently. For best results, the meter's internal temperature should be within 31 to 43 degrees Celsius (88 to 109 degrees Fahrenheit).

During the warmup period, the meter can be powered from any source (e.g. mains).

Meter	Accuracy level	Warm-up period
ION8600	Class 0.2	30 minutes
ION8650	Class 0.2	no warm-up required
ION8650	0.1% accuracy	60 minutes

At the factory, the meters are warmed up to their typical operating temperature to help ensure that the meters will reach their optimal accuracy at operating temperature.

Most high precision electronic equipment requires a warm up time before it reaches its specified performance levels. Energy meter standards allow the manufacturers to specify meter accuracy de-rating due to ambient temperature changes and self-heating, and the meters comply with and exceed the requirements of these energy metering standards.

For a complete listing of accuracy standards that your meter complies to, please contact your Schneider Electric local representative or refer to the meter brochure on www.schneider-electric.com.

Grounding

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Connect protective ground (earth) before turning on any power supplying this device.

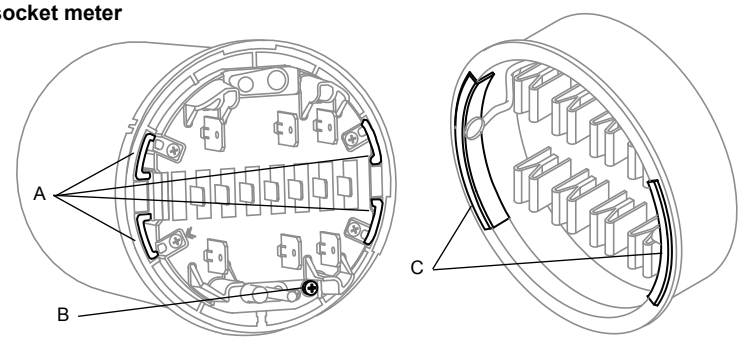
Failure to follow these instructions will result in death or serious injury.

The meter's safety ground terminal or ground screw must be connected to a low impedance grounding system to help ensure measurement accuracy. For socket meters, make sure that the socket ground surfaces and the meter ground tabs are free of rust, paint or other contamination, and the socket grounded surfaces are connected to the protective earth ground. The signal source and the reference meter (or energy standard) must also be grounded as recommended by their respective manufacturers.

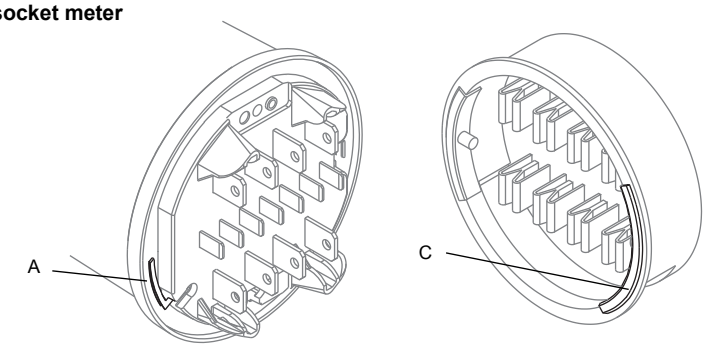
NOTE

Refer to the meter's *Installation guide* for more information about grounding your meter.

ION8650 socket meter



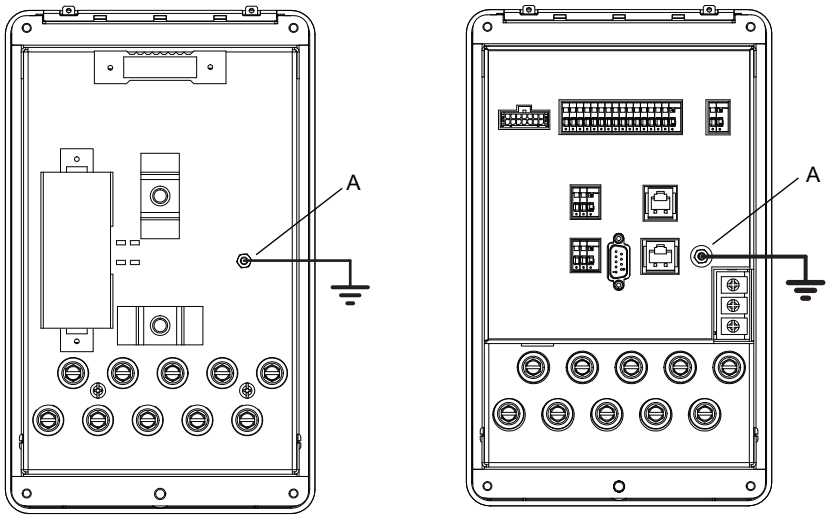
ION8600 socket meter



Back of meter Front of socket

A	Meter ground contacts
B	Meter ground lug
C	Socket base ground contacts

ION8600 and ION8650 switchboard meter



A	Chassis ground lug

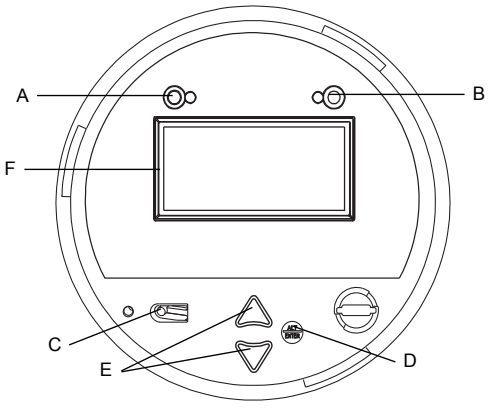
Reference meter or energy standard

To ensure accuracy of the meter accuracy test, it is recommended that a reference meter or a reference energy standard, with specified accuracy of ±0.01% or better, be used. Before you start testing, the reference meter or energy standard should be warmed up as recommended by its manufacturer.

NOTE

Verify the accuracy and precision of all measurement equipment used in accuracy testing (i.e. voltmeters, ammeters, power factor meters).

ION8600 and ION8650 meter front panel



A	Watt pulser: A set of LEDs (infrared, red) used for real energy pulsing
B	VAR pulser: A set of LEDs (infrared, red) used for reactive energy pulsing.
C	Test mode button: Located under the front label, this places the meter into Test mode, ceasing accumulation of billable quantities.
D	Round button (Alt/Enter): Press to select a highlighted option. Also used to toggle between Norm and Alt display modes. Press and hold for 3 seconds to access Setup menu.
E	Navigation buttons: Press the up or down buttons to scroll and highlight a different menu item or to increase/decrease the value of a highlighted number. Press and hold the up button for 3 seconds to move the cursor to the left. Press and hold the down button for 3 seconds to move the cursor to the right.
F	Meter LCD screen

Test procedure

The following are guidelines for testing the meter; your meter shop may have specific testing methods.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA or applicable local standards.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Verify the meter's power source meets the specifications for your meter's power supply option.
- Replace all devices, doors and covers before turning on power to this equipment.
- Connect protective ground (earth) before turning on any power supplying this device.

Failure to follow these instructions will result in death or serious injury.

1. Turn off power to the test socket, test harness or other standard measuring device to prevent hazardous voltages on meter terminals and connected equipment. Use a properly rated voltage sensing device to confirm power is off.
2. Place the meter into the test socket or other standard measuring device. Connect the meter ground to earth ground and connect the meter terminals to the test source, test load and reference meter or energy standard as shown in the appropriate test configuration.
   Ensure the test source is grounded. Refer to "Test configurations" on page 11 for test configurations.

NOTE

Ensure that your meter is in the correct volts mode for the test configuration.

3. Connect the control equipment used for switching the voltage to the reference meter or energy standard device.
4. Connect the control equipment used for counting the standard output pulses from the meter's front panel pulser LEDs.
5. Apply the nominal current and voltage to the terminals of the meter.
6. Before performing the accuracy test, let the test equipment power up the meter and apply voltage for at least 30 seconds. This allows the internal circuitry of the meter to stabilize.

7. Place the meter into Test mode to prevent test data from being incorrectly incorporated into revenue data and causing incorrect customer billing.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA or applicable local standards.
- Do not touch the meter's lever contact switches if accessing the front panel buttons of a switchboard meter.
- Do not touch the metallic wraparound shield if accessing the front panel buttons of a socket meter.

Failure to follow these instructions will result in death or serious injury.

   - For ION8600 meters, Instrument Transformer Correction (ITC) and Transformer Loss Correction (TLC) must be manually disabled so that the corrections will not be applied to the test values. When testing is completed, you must manually enable ITC and TLC. "Enabling/disabling ITC/TLC (ION8600)" on page 19.
   - When the ION8650 is in Test mode, Instrument Transformer Correction (ITC) and Transformer Loss Correction (TLC) are automatically disabled unless forced on by user settings. Refer to "Using Test mode" on page 16.

NOTE

You must disable Demand Forgiveness in order for test values to accumulate when the meter is power cycled. Refer to your meter's *User Guide* for more information on Demand Forgiveness.

8. Align the optical sensor on the standard test bench armature over the appropriate front panel LED pulser.

TIP

If the outer cover is still on the meter, align the meter sensor slightly off-perpendicular to the LEDs. This reduces reflections from the outer cover.
Flashing lights in the test area may reflect and register as pulses, affecting test results.

9. Perform testing on all test points described in "Test points" on page 21.

   You must run each test point for at least 30 seconds (time from start pulse to end pulse). Before each test point, allow 10 seconds of rest time before starting on the next test point.

   If your test equipment requires you to specify the number of pulses, the number of pulses required for a test duration of **"t"** seconds can be determined using the following formula:

   Number_of_pulses = [Ne * V * I * |PF | * t] / [3600 * Kt]

   Where:

   Ne = number of metering elements used

   V = test point voltage in volts [V] per phase

   I = test point current in amps [A] per phase

PF = power factor

Kt = pulse constant programmed in the meter under test in Wh/pulse

NOTE

Refer to “Changing LED pulser settings” on page 17 for information on how to configure your Kt value.

t = test duration in seconds [s] — this must be longer than 30 seconds

Round up the result of the calculation to the nearest integer number of pulses.

Example:

Calculate the number of pulses required for an inductive load 3-phase test point with test duration of 60s; the source is configured to use V=120V, I=5A, PF=-0.5; the pulse constant of the tested ION8650 is Kt = 1.8 Wh/pulse

Number_of_pulses = [3 * 120V * 5A *0.5 *60s] / [3600s * 1.8 Wh/pulse] = $8.\overline{3}$

Round the number up to the nearest integer: Number of pulses = 9

10. Calculate error.

    For every test point:

    Energy Error = [(Em - Es)/Es] x 100%

    Where:

    Em = energy measured by the meter under test

    Es = energy measured by the reference meter or the energy standard

NOTE

If accuracy verification indicates that there may be inaccuracies with your meter, please refer to “Appendix A: Typical sources of test errors” on page 22. If there are no sources of test errors present, please contact your local Schneider Electric representative.

11. Enable ITC and TLC on your ION8600 meter if you disabled those corrections in step 7. See “Enabling/disabling ITC/TLC (ION8600)” on page 19.

Test configurations

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

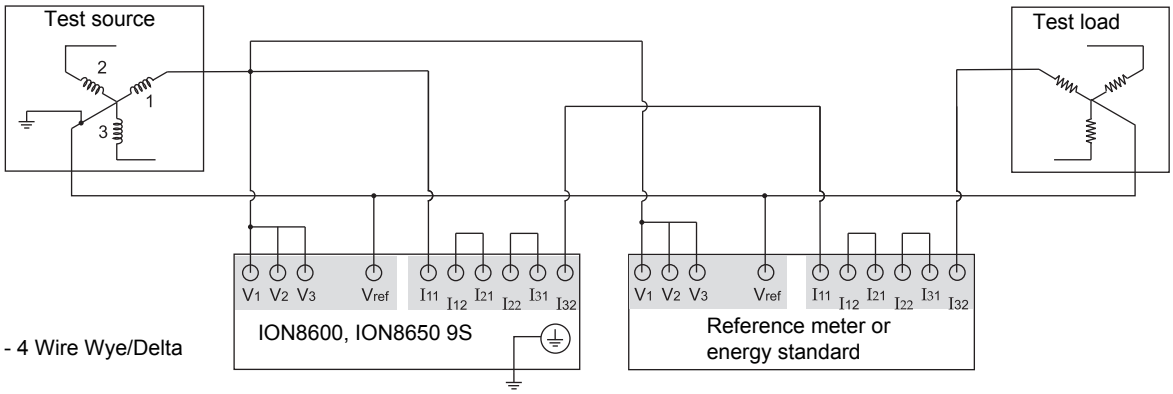
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA or applicable local standards.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Verify the meter's power source meets the specifications for your meter's power supply option.
- Replace all devices, doors and covers before turning on power to this equipment.
- Connect protective ground (earth) before turning on any power supplying this device.

Failure to follow these instructions will result in death or serious injury.

NOTE

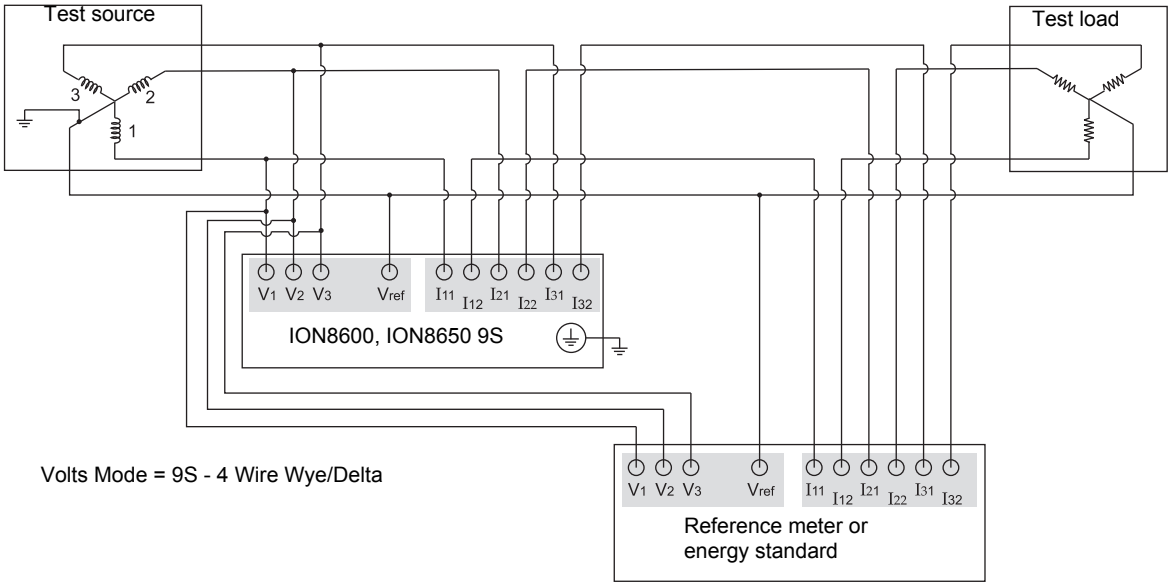
All phases of the source used in a test must be connected to both the meter and the reference meter.

Three-element single-phase test configuration - 9S meters - example

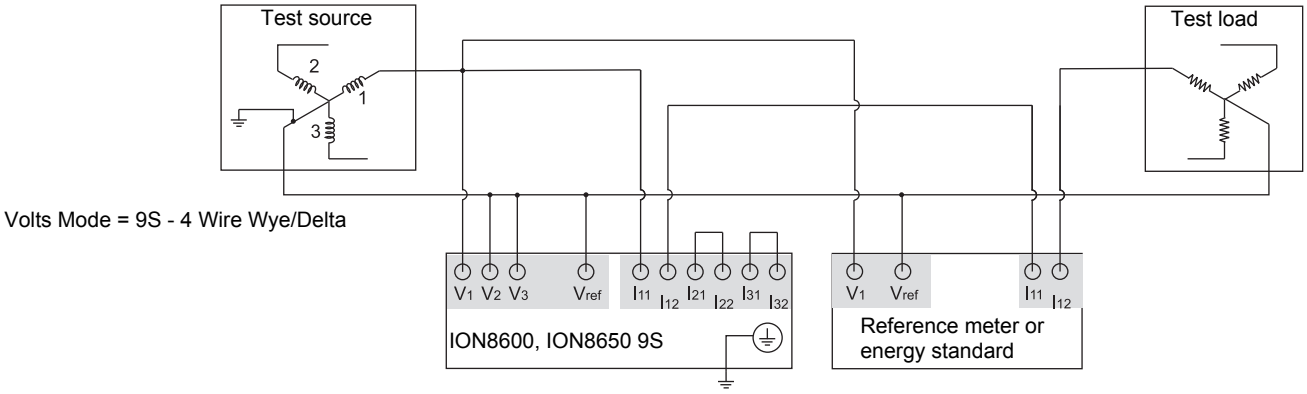


Volts Mode = 9S - 4 Wire Wye/Delta

Three-element three-phase test configuration - 9S meters - example



Single-element single-phase test configuration - 9S - example



The V1 element test configuration is shown in this example. Follow these steps if you need to test V2 or V3:

1. Turn off power to the test socket, test harness or other standard device to prevent hazardous voltages on meter terminals and connected equipment. Use a properly rated voltage sensing device to confirm power is off.

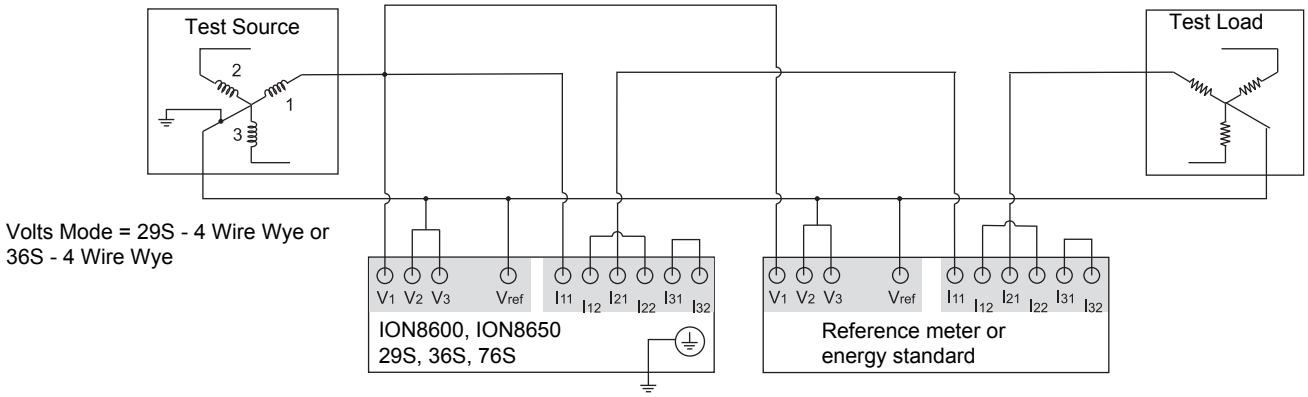
2. Configure the meter connections according to the table below:

Meter connections	V2 Test	V3 Test
V1	Vref	Vref
V2	Test source	Vref
V3	Vref	Test source
I11	Short to I12	Short to I12
I12	Short to I11	Short to I11
I21	Test source	Short to I22
I22	Test load through Reference	Short to I21
I31	Short to I32	Test source
I32	Short to I31	Test load through Reference

Two-element single-phase test configuration - 29S, 36S and 76S meters - example

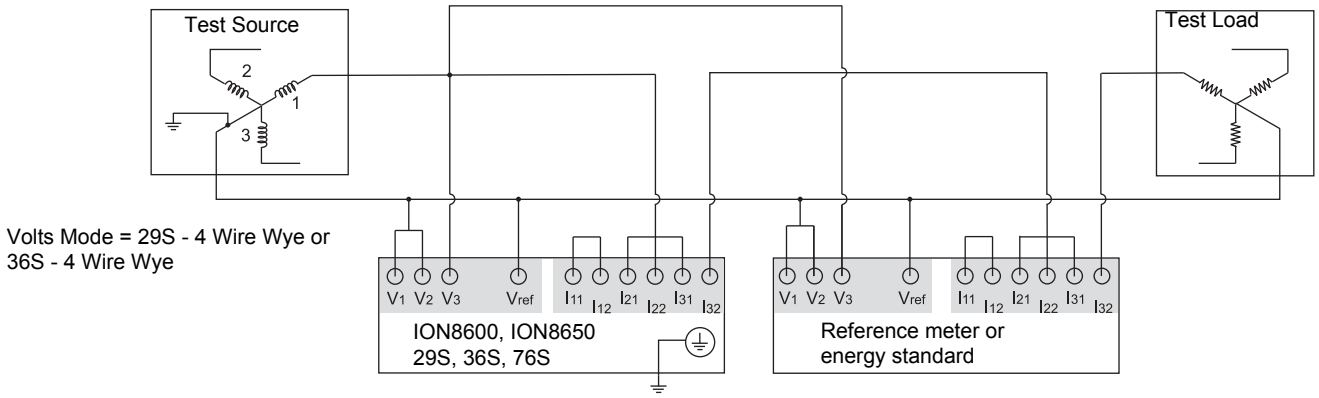
Single-Phase Source Test part 1 of 2

Your meter will read two times the value of the test source. The meter's accuracy provides the accumulated accuracy for V1, I1 and I2.

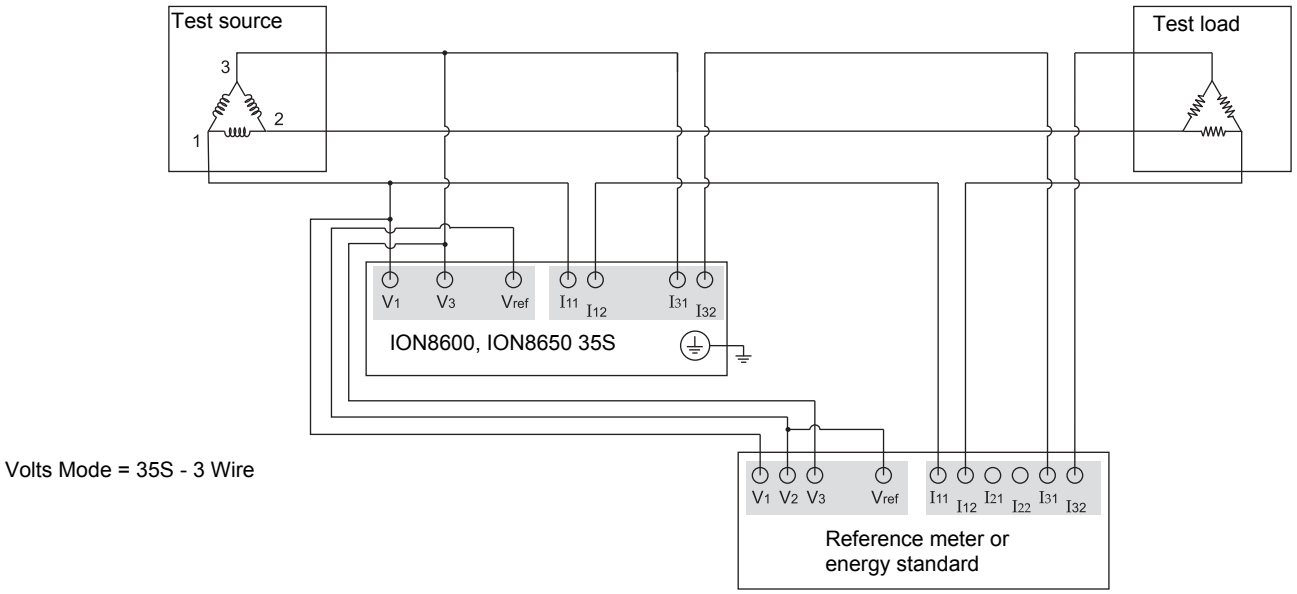


Single-phase source test part 2 of 2

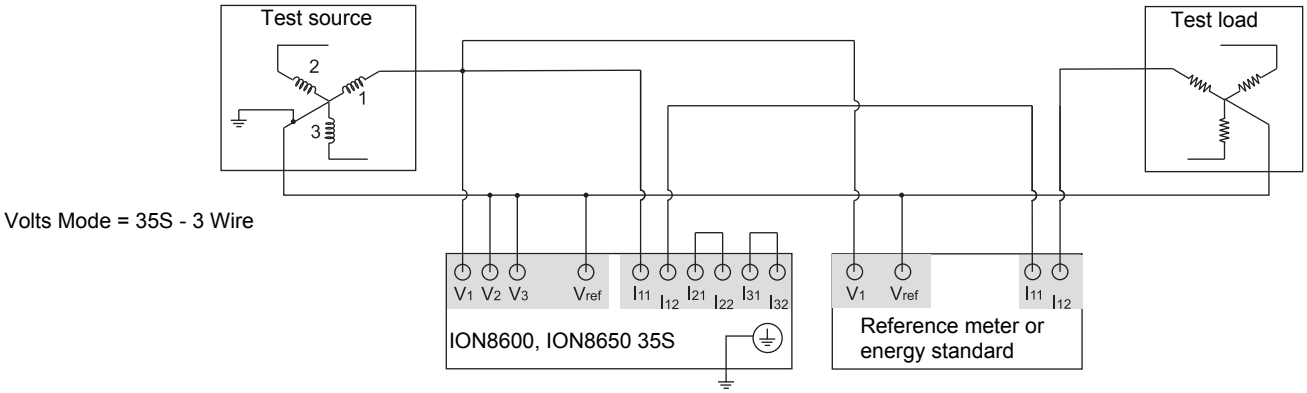
Your meter will read two times the value of the test source. The meter's accuracy provides the accumulated accuracy for V3, I2 and I3.



Two-element three-phase test configuration - 35S meters - example



Single-element single-phase test configuration - 35S - example



The V1 element test configuration is shown in this example. Follow these steps if you need to test V3:

1. Turn off power to the test socket, test harness or other standard device to prevent hazardous voltages on meter terminals and connected equipment. Use a properly rated voltage sensing device to confirm power is off.
2. Configure the meter connections according to the table below:

Meter connections	V3 Test
V1	Vref
V3	Test source
I11	Short to I12
I12	Short to I11
I31	Test source
I32	Test load through Reference

Using Test mode

⚠ DANGER

HAZARD OF ELECTRIC SHOCK

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA or applicable local standards.
- Do not touch the meter's lever contact switches if accessing the front panel buttons of a switchboard meter.
- Do not touch the metallic wraparound shield if access the front panel buttons of a socket meter.

Failure to follow these instructions will result in death or serious injury.

If you have a hardware-locked meter, you must remove the cover and manually press the **Test mode** button to enter Test mode. If your meter is not hardware-locked, you can use ION Setup to place the meter in Test mode. Refer to the meter's *User Guide* for more information on Test mode.

When the meter is in Test mode, separate test mode registers are used for test measurement accumulations so that the billing registers are not changed. When the ION8650 meter is in Test mode, Instrument Transformer Correction (ITC) and Transformer Loss Correction (TLC) are automatically disabled (unless forced on by user settings), and the ITC and TLC settings are saved. When the ION8650 exits Test mode, ITC and TLC are automatically enabled and the saved settings reapplied. The ITC and TLC corrections must be manually disabled and enabled on the ION8600 meter. Refer to "Enabling/disabling ITC/TLC (ION8600)" on page 19.

The meter must be warmed up before proceeding with testing (refer to "Environment" on page 5). The meter can be powered by mains power during the warmup period.

When you exit Test mode, all test-mode accumulated values are reset to zero. The values shown on the Test mode display screens include:

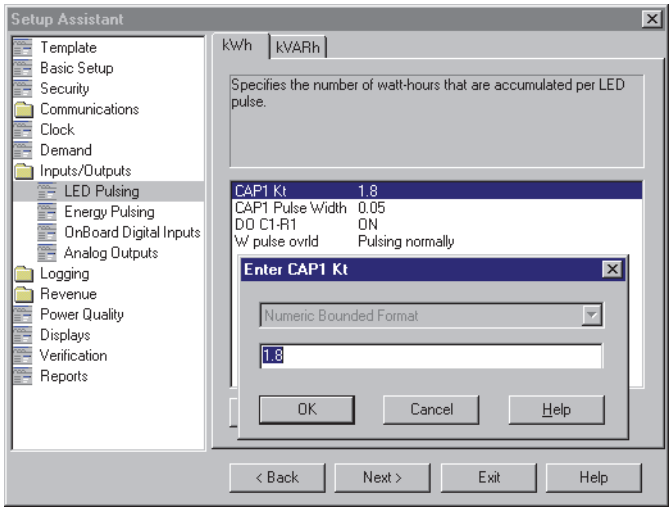
Values	Description
kWh del T, kWh rec T	Test values of kWh delivered and kWh received
kVAR del T, kVARh rec T	Test values of kVARh delivered and kVARh received
kVAh del T, kVAh rec T	Test values of kVAh delivered and kVAh received
kW SD del T, kW SD rec T	Test values of Rolling Block (Sliding Window) Demand delivered and received

Changing LED pulser settings

The WATT and VAR LEDs on the front panel are preconfigured for energy pulsing. The adjacent smaller infrared outputs are connected to the LEDs and pulse at the same rate. If the WATT or VAR LEDs are not capable of pulsing quickly enough, they remain on (not blink), and the pulse overload registers (shown on the LED Pulsing screen in ION Setup) indicate that LED pulsing has been suspended. You can reduce the LED pulse rate by modifying the pulse weight (Kt value).

Changing the LED pulse rate in ION Setup

1. Open the Setup Assistant for your meter. See the ION Setup Help for instructions.
2. Select **Inputs/Outputs > LED Pulsing** (ION8600) or **LED Pulsing** (ION8650).



3. Select the **kWh** or **kVARh** tab.
4. Select Kt (pulse weight) and click **Edit.** Configure the pulse weight as required to ensure the LED can pulse normally.

   The value entered defines how much energy the module accumulates before a pulse is sent to the LED. The front panel WATT and VAR LEDs are factory set to the same pulse weight. The default Kt value is shown on the front panel label and depends on the meter's form factor.

The default pulse weights are summarized below:

Form Factor	Default pulse weight for WATT LED (Kt)	Default pulse weight for VAR LED (Kt)
9S, 29S, 36S, 39S, 76S meters	1.8 Watt-hours per pulse	1.8 VAR-hours per pulse
35S meters	1.2 Watt-hours per pulse	1.2 VAR-hours per pulse

NOTE

Whether primary or secondary accumulated energy values are used is determined by Scaled Rev Param, located in the Basic Setup, PT/CT Ratios tab: if Scaled Rev Param is on (default), the energy measurements include the PT/CT multiplier, and if Scaled Rev Param is off, the energy measurements do not include PT/CT correction.

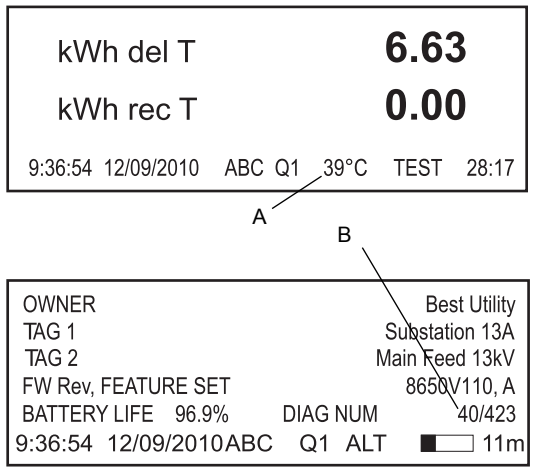
Meter internal temperature

The ION8650's internal temperature is displayed on meter's front panel Test mode display screens. The Test mode display screens are shown whenever the meter is in Test mode.

The ION8600's internal temperature is displayed on the meter's front panel Alt mode Name Plate 1 display screen. The Alt mode display screens are shown whenever the meter is in Alt mode.

NOTE

Refer to your meter's *Installation guide* for instructions on how to put your meter into Test mode and Alt mode, and how to access the display screens.



A	ION8650 internal temperature, in degrees Celsius
B	ION8600 internal temperature, in degrees Celsius

Enabling/disabling ITC/TLC (ION8600)

Instrument Transformer Correction (ITC) and Transformer Loss Correction (TLC) must be manually disabled on the ION8600 before gathering accuracy test data.

If ITC and TLC are not disabled, the correction values will be incorrectly applied to the test data, because the meter is not connected to the transformer during the test. After accuracy testing, you must enable ITC and TLC on your meter. If ITC and TLC corrections have not been applied to your meter, you do not have to disable them for accuracy testing.

For more information on ITC and TLC, refer to the *Transformer / Line loss calculations* technical note, available from www.schneider-electric.com.

Disabling ITC and TLC in ION Setup

Use ION Setup to disable ITC and TLC in your ION8600 meter before gathering accuracy test data.

1. Open the Setup Assistant for your meter. See the ION Setup Help for instructions.
2. Select **Revenue > PT/CT Correction**.
3. Click the **ITC Correction** tab.
4. Select Active Correction and click **Edit**. The **Transformer Correction Setup** screen appears.

NOTE

If Active Correction is set to None, ITC has not been applied to your ION8600 meter and does not need to be disabled.

5. Record which options have been selected (Voltage Inputs, Current Inputs, or both Voltage Inputs and Current Inputs) for enabling ITC after accuracy testing has been completed.
6. Clear the selection boxes beside Voltage Inputs and Current Inputs. The individual voltage and current values become unavailable (grayed out), indicating that ITC correction is no longer enabled.

NOTE

The ITC values are retained, and will be applied when you re-enable ITC.

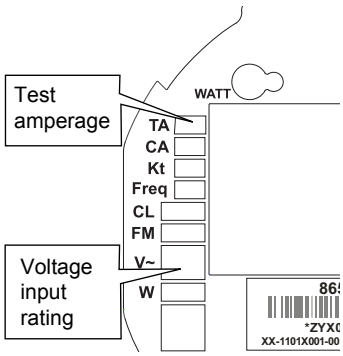
7. Click **Finish** to apply your changes to the meter.
8. Select **Revenue > Transformer Loss**.
9. Click the **Method Selection** tab.
10. Select Loss Comp Enble and click **Edit**. The **Select Loss Comp Enble** window appears.
11. Select Comp Disabled from the drop-down list. Click **OK** to apply your changes to the meter.

Enabling ITC and TLC in ION Setup

Use ION Setup to enable ITC and TLC on your ION8600 meter after you have finished gathering accuracy test data.

1. Open the Setup Assistant for your meter. See the ION Setup Help for instructions.
2. Select **Revenue > PT/CT Correction**.
3. Click the **ITC Correction** tab.
4. Select Active Correction and click **Edit**. The **Transformer Correction Setup** screen appears.
5. Refer to the recorded settings from step 5 of “Disabling ITC and TLC in ION Setup” on page 19. Select the Voltage Inputs and Current Inputs to match the recorded settings. Click **Next**.
6. Continue clicking **Next** to go through the configuration screens without altering your meter’s original settings. Click **Finish** to apply your changes to the meter.
7. Select **Revenue > Transformer Loss**.
8. Click the **Method Selection** tab.
9. Select Loss Comp Enble and click **Edit**. The **Select Loss Comp Enble** window appears.
10. Select Comp Enabled from the drop-down list and click **OK** to apply your changes to the meter.

Test points



The meter should be tested at full and light loads and at lagging (inductive) power factors to help ensure testing over the entire range of the meter. The test amperage and voltage input rating are shown on the meter's front panel label. Refer to your meter's *Installation guide* or data sheet for your meter's nominal current, voltage and frequency specifications.

Watt-hour test points - example

Watt-hour test point	Sample accuracy verification test point
Full Load	100% to 200% of the nominal current, 100% of the nominal voltage and nominal frequency at unity power factor, or one (1).
Light Load	10% of the nominal current, 100% of the nominal voltage and nominal frequency at unity power factor, or one (1).
Inductive Load (Lagging Power Factor)	100% of the nominal current, 100% of the nominal voltage and nominal frequency at 0.50 lagging power factor (current lagging voltage by 60^{o} phase angle).

VAR-hour points - example

VAR-hour test point	Specifications
Full Load	100% of the nominal current, 100% of the nominal voltage and nominal frequency at zero power factor (current lagging voltage by 90° phase angle).
Light Load	10% of the nominal current, 100% of the nominal voltage and nominal frequency at zero power factor (current lagging voltage by 90° phase angle).
Inductive Load (Lagging Power Factor)	100% of the nominal current, 100% of the nominal voltage and nominal frequency at 0.87 lagging power factor (current lagging voltage by 30^{o} phase angle).

Appendix A: Typical sources of test errors

If excessive errors are observed during accuracy testing, examine your test setup and test procedures to eliminate typical sources of measurement errors:

- Loose connections of voltage or current circuits; often caused by worn-out contacts or terminals. Inspect terminals of the test equipment, cables, test socket and the meter under test.
- Meter not completely warmed up.
- Meter or measurement equipment not adequately grounded to a low-impedance earth ground.
- Line-powered meter inadequately supplied with power, resulting in the meter resetting during the test procedure.
- Ambient temperature significantly different from 23^{o} C (73^{o} F). See “Environment” on page 5 for an explanation.
- Floating (ungrounded) neutral voltage terminal in single-phase test configuration or in any configuration with unbalanced phase voltages. See Test Configuration examples in “Three-element single-phase test configuration - 9S meters - example” on page 11.
- Operation of the optical sensor: sensitivity or ambient light problems.
- Unstable signal source. See “Power source” on page 4 for an explanation.
- Incorrect test setup: not all phases are connected to the reference meter or the energy standard in polyphase test configuration. All phases connected to the meter under test should be also connected to the reference meter/standard.
- Presence of moisture (condensing humidity) or pollution inside the meter under test.