

# **Bierer**

## **METERS**

*Safety is number one.*



Manufacturing & Service: Bierer & Associates Inc.

Patent No. 6,885,180

# **ST Series® Service Tester Phase Identifier Operating Instructions ST800**



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## Limitation of Warranty and Liability

Bierer & Associates Inc. warrants this product to be free from defects in workmanship and material, under normal use and service conditions for a period of one year from date of shipment.


Due to continuous product improvement and development, Bierer & Associates Inc. reserves the right to modify product designs and specifications without notice.


It is impossible to eliminate all risks associated with the use of high voltage electrical devices including this device. Risks of serious injury or death are inherent in working around energized electrical systems. Such risks include but are not limited to variations of electrical systems and equipment, manner of use or applications, weather and environmental conditions, operator mentality, and other unknown factors that are beyond the control of Bierer & Associates Inc.


Bierer & Associates Inc. do not express or imply to be an insurer of these risks, and by purchasing or using this product you **AGREE TO ACCEPT THESE RISKS**. IN NO EVENT SHALL Bierer & Associates Inc. BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT.


## SAFETY MESSAGE DEFINITIONS per ANSI Z535

These instructions contain important safety messages to alert the user to potentially hazardous situations, how to avoid the hazard, and the consequences of failure to follow the instruction.

The safety alert symbol  identifies a safety message. The signal word following the symbol indicates:

 **DANGER** A hazardous situation which, if not avoided, **will** result in death or serious injury and equipment damage.

 **WARNING** A hazardous situation which, if not avoided, **could** result in death or serious injury and equipment damage.

 **CAUTION** A hazardous situation which, if not avoided, **could** result in minor or moderate injury and equipment damage.

**NOTICE** Important safety message relating to equipment damage only.

## PRODUCT SAFETY INFORMATION



### WARNING

1. ST800, STRCV Meter, cable assembly, and tool adapters shall be considered **insulated for 600V or less**. Do not let copper end fittings come in contact with energized and/or grounded conductors at the same time. **The tool adapters, fittings, and handles shall not be used on any other devices.**
2. Use appropriate length live line tools for voltage being worked and maintain minimum approach distances as outlined in OSHA 1910.269, Table R-6.
3. Do not attach any part of this equipment to voltage exceeding 600 Volts Phase to Phase. The equipment shall be considered insulated for 600V or less and operational from 10V to 600V maximum.
4. This equipment should be used only by qualified employees, trained in and familiar with the safety-related work practices, safety rules and other safety requirements associated with the use of this type of equipment.
5. These instructions are not intended as a substitute for adequate training, nor do they cover all details or situations which could be encountered when operating this type of equipment.
6. Before operating this equipment, read, understand and follow all instructions contained in this manual. Keep instructions with equipment.



### WARNING

1. Prior to using any low/high voltage test equipment a careful inspection should be made to ensure the unit is free from any contaminants such as dirt, grease, etc. and that there are no apparent physical damages.
2. Always confirm internal battery voltage before and after use. ST800 incorporates a blinking alarm symbol when battery is low and a solid alarm symbol when battery must be replaced. STRCV will chirp and blink lights when voltage is low.
3. Unit shall be tested on known voltage prior to each use. If a fuse is blown or the battery alarm symbol is solid the unit will not measure voltage and display will remain 000 even if the conductor is energized.

## **DESIGN and FUNCTION**

The ST800 Digital All Purpose Service Tester & Phase Identifier is designed to replace numerous meters that incorporate single range or function. Each tester has only 2 buttons for ease of use on system voltages ranging from 10 volts to 600 volts (phase-to-phase). The digital meter is capable of reading AC voltages up to 600 and AC Current from 0 to 800. The ST800 kit consist of an ST800 large backlit LCD digital meter contained in plastic injection molded housing, a STRCV receiver probe for indicating signal strength and direction, cable assemblies, and a digital laser pyrometer for identifying poor service connectors. Improved voltage range and output signal creates an all purposed device that identifies the good and bad conductors without being fooled by parallel neutral paths. Patented methodology results in the most accurate and versatile secondary service tester available in the electric utility industry.

### ST800 Push Button Controls (Left to Right)

- V / I – displays voltage or current
- OFF / ON – Turns unit On or Off

### STRCV Switch Positions

- OFF position - Unit Off for storage and transit.
  - High - 300+ Amp position
  - Medium- 50 – 300 Amps position
  - Low- Less than 50 Amp position
- “T” position tests internal battery voltage by sounding buzzer and light indications.

## **BATTERY REPLACEMENT**

STRCV - The threaded live line tool fitting on the face of the meter probe is furnished with two flat edges for use with a wrench or slip joint pliers to remove and install the fitting from the meter housing. To remove, turn the live line tool fitting in a counterclockwise direction and install in a clockwise direction. Standard 9V battery is used.

ST800 – A 9V battery compartment is located on the back of the unit where the magnet is mounted. A Phillips head screwdriver is needed. A spare battery is furnished with every new unit in the same compartment.

# ST800 TESTER & STRCV METER SET-UP and TESTING



## **WARNING**

- see “Product Safety Information”, page 3.
- see “Inspection & Maintenance”, page 3.

1. Turn STRCV meter on and test basic meter functions by turning the function selector switch to the “T” position. If the battery voltage is good the unit will sound a buzzer and indicate all three lights in a sequence. If the battery voltage is not good, two yellow lights and the horn will continuously beep. Always test meter before and after each use.
2. Push the “OFF/ON” button down to turn on the ST800. If battery voltage is good the unit will display all zeros on a backlit LCD panel. If battery is low the unit will blink an alarm symbol but will work. If battery is too low the alarm will be solid and unit will not work at all.
3. Turn both the STRCV and ST800 unit off. Neither unit features automatic off.

## TESTING ON KNOWN VOLTAGE

### **3a.** Testing the ST800 on known voltage:

- Attach alligator clips to 120V source.
- Press down “OFF/ON” button to turn the unit on.
- Notice the voltage reading +/- 2 counts
- Press down “V/I” button to switch to current readings, notice the green light flashing and the numbers steadily increasing on the display.

### **3b.** Testing the STRCV while the ST800 is operating.

- Turn the unit to the “low” current position (most sensitive).
- Find the voltage/neutral wire using the probe end
- The unit should sound the buzzer and indicate the pulse direction when you’ve found the wire(s) attached to the ST800.

**NOTICE** Attaching the ST800 to a source with a breaker in the loop could result in tripping the breaker if it is not rated for 50A or greater.

## Testing URD / Overhead Service Conductors



**WARNING** – see “Meter Set-Up & Testing”, page 5.

1. Pull Meter or open cabinet.
2. Make sure ST800 is in the “OFF” position (button is up).
3. Attach alligator clips to either hot leg and neutral.
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a green light indicating it is performing the service conductor test.
6. The LCD screen will display the voltage or applied current depending on the button position and alternately display the number of times it has pulsed (0,1,2,3.....158 max)
7. After a few minutes, the ST800 will either have reached 800A or the maximum ampacity of the circuit. The pulse count indicates the strength of the service; the lower the number the stronger the service. Long spans of small wire (>175ft) will very likely not push 800A so the pulse count will go to 158.
8. With only 3 possible connections, the user can quickly determine the bad conductor in the circuit by seeing the difference between the pulse count and/or the maximum current potential.



**WARNING** – see “Meter Set-Up & Testing”, page 5.



**CAUTION** - Before attaching the ST800 to any voltage, make sure the unit is in the “OFF” position.

## Testing Overhead Service Connectors



**WARNING** – see “Meter Set-Up & Testing”, page 5.

1. Pull Meter or open cabinet.
2. Make sure ST800 is in the “OFF” position (button is up).
3. Attach alligator clips to either hot leg and neutral.
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a green light indicating it is performing the service conductor test
6. The LCD screen will display the voltage or applied current depending on the button position.
7. After 1 minute, the ST800 will either have reached 800A or the maximum ampacity of the circuit. The pulse count indicates the strength of the service; the lower the number the stronger the service. Long spans of small wire (>175ft) will very likely not push 800A so the pulse count will go to 158. If connections are bad, the current will not be able to steadily increase and you will start to see fluctuating current levels. When this occurs it is very likely that the connectors will begin to “pop” and the operator will be able to quickly identify the bad connection.
8. With only 3 possible connections, the user can quickly determine the bad conductor in the circuit.
9. Using the laser pyrometer (PN: STLASER) take a temperature measurement on the connectors in the circuit. A higher reading than normal indicates the bad connector in the circuit. If no abnormal reading is found visually inspect other areas.



**WARNING** – see “Meter Set-Up & Testing”, page 5.



## Identify Pedestal / Transformer Conductors from Meter Base



**WARNING** – see “Meter Set-Up & Testing”, page 5.

1. Pull Meter or open cabinet.
2. Make sure ST800 is in the “OFF” position (button is up).
3. Attach alligator clips to either hot leg and neutral.
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a green light indicating it is performing the service conductor test
6. The LCD screen will display the voltage or applied current depending on the button position.
7. After a few minutes, the ST800 will indicate the maximum ampacity of the circuit and the number of pulses it took to achieve the ampacity. The pulse count is not needed for identifying conductors.
8. Turn the STRCV meter to the respective current setting that matches the displayed current reading on the ST800.
9. At the meter base, place the probe tip on each conductor such that the cable rests in the curved section of the tip. An audible tone and a directional light will come on when the tip of the probe is on the same conductor(s) as the ST800.
10. At the pedestal/transformer, place the probe tip on each conductor such that the cable rests in the curved section of the tip. An audible tone and a directional light will come on when the tip of the probe is on the same conductor(s) as the ST800.



**WARNING** – see “Meter Set-Up & Testing”, page 5.

## **Identify Pedestal / Transformer Conductors from Electrical Panel**



**WARNING** – see “Meter Set-Up & Testing”, page 5.

1. Locate outside/inside electrical panel to be used.
2. Make sure ST800 is in the “OFF” position (button is up).
3. Attach alligator clips to either hot let and neutral
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a green light indicating it is performing the service conductor test
6. The LCD screen will display the voltage or applied current depending on the button position.
7. After a few minutes, the ST800 will indicate the maximum ampacity of the circuit and the number of pulses it took to achieve the ampacity. The pulse count is not needed for identifying conductors.
8. Turn the STRCV meter to the respective current setting that matches the displayed current reading on the ST800.
9. At the meter base, place the probe tip on each conductor such that the cable rests in the curved section of the tip. An audible tone and a directional light will come on when the tip of the probe is on the same conductor(s) as the ST800.
10. At the pedestal/transformer, place the probe tip on each conductor such that the cable rests in the curved section of the tip. An audible tone and a directional light will come on when the tip of the probe is on the same conductor(s) as the ST800.



**WARNING** – see “Meter Set-Up & Testing”, page 5.

## Testing De-Energized URD Primary Cable for Dead



**WARNING** – see “Meter Set-Up & Testing”, page 5.

1. Isolate URD cable on transformer end and leave grounded on other end using bushing ground (PN: GB215 for 15kV or GB225 for 25kV)
2. Test isolated cable for dead using approved voltage detection device.
3. Make sure ST800 is in the “OFF” position (button is up).
3. Using alligator clip cable, attach one end to secondary voltage and the other to center conductor of isolated cable using optional probe kit (PN: PBKIT).
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a green light indicating it is performing the service conductor test
6. The LCD screen will display the voltage or applied current depending on the button position.
7. After a few minutes, the ST800 will indicate the maximum ampacity of the circuit and the number of pulses it took to achieve the ampacity. The pulse count is not needed for this function.
8. Turn the STRCV meter to the **LOW** current setting only.
9. At the transformer, place the probe tip on the outside jacket of the isolated cable such that the cable rests in the curved section of the tip. An audible tone and a directional light will come on, **note the direction of the light.**
10. At the midpoint, manhole, ditch, etc. place the probe tip on each outside jacket such that the cable rests in the curved section of the tip. An audible tone and the **same directional light** will come on when the tip of the probe is on the **same conductor** as the ST800. Other cables will have no light or the opposing directional light.



**WARNING** – see “Meter Set-Up & Testing”, page 5.

## Testing IN/OUT Feed on Energized URD Primary Cable



**WARNING** – see “Meter Set-Up & Testing”, page 5.

1. On a loop fed circuit, open the midpoint and go to the transformer where the feed needs to be identified.
2. Make sure ST800 is in the “OFF” position (button is up).
3. Attach one lead to X1 hot leg bushing and other lead to X3 hot leg bushing for single phase transformers. Attach neutral and hot leg for three phase transformers.
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a green light indicating it is performing the service conductor test
6. The LCD screen will display the voltage or applied current depending on the far left button position.
7. After a few minutes, the ST800 will indicate the maximum ampacity of the circuit and the number of pulses it took to achieve the ampacity. The pulse count is not needed for this function and the unit should always go to 800A unless the transformer is bad.
8. Turn the STRCV meter to the **LOW** current setting only.
9. At the transformer, place the probe tip on the twisted off concentric neutral of the cable so that it rests in the curved section of the tip. An audible tone and a directional light will come on (**note the direction of the light**) indicating the source cable that feeds that transformer
10. Every neutral cable upstream from that location with the same directional light indicates the source cable. The opposing directional light indicates the load cable at that location.

**Note:** When installing the ST800 on single phase transformers keep the unit and cables away from the primary or you will pick up a false signal on all cables due to the proximity of the leads emitting a high magnetic field.



**WARNING** – see “Meter Set-Up & Testing”, page 5.

**PARTS & ACCESSORIES**

<b>PART NO.</b>	<b>DESCRIPTION</b>
ST800	Service Tester
STRCV	Cable Identifier meter probe
10009CHM	10” handle for use with STRCV
STLASER	Infrared Pyrometer for OH connector testing
PA50AB	Nylon bag for kit
GB215 / GB225	Grounding Bushings for URD cable ends
PBKIT	Probe Kit for accessing center conductor

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