

Bierer

METERS

Safety is number one.



Manufacturing & Service: Bierer & Associates Inc.

Patent No. 6,885,180

ST Series® Service Tester Phase Identifier

Operating Instructions

ST500PGN



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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. ST500, 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. ST500 tester and STRCV meter probe assemblies shall be wiped clean periodically with a silicone impregnated cloth and kept clean and free of contaminants. This will prevent tracking on the outside of the assembly and meter error.
3. Always confirm internal battery voltage before and after use.
4. Unit shall be tested on known voltage prior to each use. If a fuse is blown the unit will not measure voltage and display will remain 000 even if the conductor is energized.

DESIGN and FUNCTION

The ST500PGN Digital All Purpose Service Tester & Phase Identifier is designed to replace numerous meters that incorporate single range or function. Each tester has three buttons for ease of use on system voltages ranging from 10 volts to 500 volts (phase-to-phase). The digital meter is capable of reading AC voltages as well as AC Current from 10 to 500 Volts/Amps. The ST500PGN kit consist of an ST500 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.

ST500 Push Button Controls (Left to Right)

- V / I – displays voltage or current
- OFF / SPAN – Helps troubleshoot suspect connectors
- OFF / ON – Turns unit on

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.

ST500 – 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.

ST500 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 ST500. 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 ST500 unit off. Neither unit features automatic off.

TESTING ON KNOWN VOLTAGE

3a. Testing the ST500 on known voltage:

- Attach standard wall socket plug cable to unit.
- Insert the plug into a 120V wall outlet rated at 30A.
- 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 blue light flashing and the numbers steadily increasing on the display.

3b. Testing the STRCV while the ST500 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 ST500.

NOTICE A current limiter device (PN: CL120) can be used to minimize the breaker requirement for testing the ST500 in a standard wall socket. If the current limiter is not used it could result in tripping the breaker the unit is attached to unless it is rated for 30A or greater.

Testing URD / Overhead Service Conductors



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

1. Pull Meter or open cabinet.
2. Make sure ST500 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 blue 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 ST500 will give a red or green pass/fail light in conjunction with the maximum voltage and ampacity of the circuit.
8. With only 3 possible connections, the user can quickly determine the bad conductor in the circuit.



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



CAUTION - Before attaching the ST500 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 ST500 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 blue 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 ST500 will give a red or green pass/fail light in conjunction with the maximum voltage and ampacity of the circuit.
8. With only 3 possible connections, the user can quickly determine the bad conductor in the circuit.
9. After the test has failed a red light will come on and the ampacity displayed will be less than 500. Push the “SPAN” button down and wait 5 minutes before performing the next step.
10. 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 ST500 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 blue 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 ST500 will give a red or green pass/fail light in conjunction with the maximum voltage and ampacity of the circuit.
8. Turn the STRCV meter to the respective current setting that matches the displayed current reading on the ST500.
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 as the ST500.
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 as the ST500.



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

Identify Pedestal / Transformer Conductors from Electrical Outlet



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

1. Locate outside electrical outlet to be used.
2. Make sure ST500 is in the “OFF” position (button is up).
3. Plug in current limiter device to electrical outlet so that the house breaker doesn’t trip during the test. Use standard cable with ST500.
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a blue 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 ST500 will give a red or green pass/fail light in conjunction with the maximum voltage and ampacity of the circuit.
8. Turn the STRCV meter to the respective current setting that matches the displayed current reading on the ST500.
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 as the ST500.
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 as the ST500.



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 ST500 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 blue 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 ST500 will give a red or green pass/fail light in conjunction with the maximum voltage and ampacity of the circuit.
8. Turn the STRCV meter to the high current setting that matches the displayed current reading on the ST500.
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 ST500. 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 ST500 is in the “OFF” position (button is up).
3. Attach brown lead to X1 hot leg bushing and blue lead to X3 hot leg bushing.
4. Turn unit on by pressing down the “OFF/ON” button on the right.
5. The unit will begin to blink a blue light indicating it is working.
6. The LCD screen will display the voltage or applied current depending on the far left button position.
7. After 1 minute, the ST500 will give a green pass light in conjunction with an approximate 500A or 240V reading.
8. Turn the STRCV meter to the low current setting.
9. If the concentric neutral is good, the audible tone and directional light will be on the concentric neutral twisted off the same cable.
10. If the concentric neutral is bad, place the probe tip on each primary cable just below the elbow such that the cable rests in the curved section of the tip but not on the concentric neutral. An audible tone and a directional light will come on when the tip of the probe is on the cable being fed from the source. If the primary to secondary turns ratio exceeds 60:1, the receiver may not be sensitive enough to pick up the signal.



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

PARTS & ACCESSORIES

PART NO.	DESCRIPTION
CL120	Current limiter for electrical outlet use
SCABLE	Standard wall outlet cable
ST500	Service Tester
STRCV	Cable Identifier meter probe
10009CHM	10” handle for use with STRCV
STLASER	Infrared Pyrometer for OH connector testing
YCABLE	Alligator clip cable
PA50AB	Nylon bag for kit
GB215 / GB225	Grounding Bushings for URD cable ends
PBKIT	Probe Kit for accessing center conductor

NOTES _____



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