



INDUSTRIAL
S E R I E S

Model PST-900X BATTERY TESTER WITH PRINTER



OWNER'S MANUAL

**READ ENTIRE MANUAL BEFORE
USING THIS PRODUCT**

00-99-000948/0110

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1. FEATURES

1.1 IMPORTANT:

1. For testing 6 and 12 volt batteries and 12 and 24 volt charging systems.
2. Suggested operation range 32°F (0°C) to 122°F (50°C).



1. Clear Cover
2. Printer Paper
3. LCD Display
4. FORWARD Button
5. BACK Button
6. ENTER: function selection
7. Negative clamp (BLACK, -)
8. Positive clamp (RED, +)

2. PERSONAL SAFETY PRECAUTIONS

- 2.1 Consider having someone close enough by to come to your aid when you work near a lead-acid battery.
- 2.2 Have plenty of fresh water and soap nearby in case battery acid contacts your skin, clothing or eyes.
- 2.3 Wear complete eye and body protection, including safety goggles and protective clothing. Avoid touching your eyes while working near the battery.
- 2.4 If battery acid contacts your skin or clothing, immediately wash the area with soap and water. If acid enters your eye, immediately flood the eye with cold running water for at least 10 minutes and get medical attention right away.
- 2.5 NEVER smoke or allow a spark or flame in the vicinity of a battery or engine.
- 2.6 Be extra cautious to reduce the risk of dropping a metal tool onto the battery. It might spark or short-circuit the battery or other electrical part that may cause an explosion.
- 2.7 Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
- 2.8 **WARNING:** Pursuant to California Proposition 65, this product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- 2.9 WARNING:** Working in the vicinity of a lead acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason, it is of utmost importance, if you have any doubt, that each time before using your tester, you read these instructions very carefully.
- 2.10** To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in the vicinity of the battery. Observe cautionary markings on these items.
- 2.11** Do not expose the tester to rain or snow.

3. PREPARING TO TEST

1. Be sure the area around the battery is well ventilated while the battery is being tested.
2. Clean the battery terminals. Be careful to keep corrosion from coming in contact with your eyes.
3. Inspect the battery for a cracked or broken case or cover. If the battery is damaged, do not use the tester.
4. If the battery is not a sealed maintenance free battery, check the level of each cell and if necessary, add distilled water until the battery acid reaches the level specified by the manufacturer. This helps purge excessive gas from the cells. Do not overfill.
5. If it is necessary to remove the battery from the vehicle to test it, always remove the ground terminal from the battery first. Make sure all accessories in the vehicle are off to ensure you do not cause any arcing.

4. OPERATING INSTRUCTIONS

PAPER LOADING

1. Hook the tester up to a vehicle battery.
2. Open the clear cover on the top of the tester.
3. Place the roll of paper in the cover with the paper lead on the bottom.
4. Insert the paper into the paper slot until it automatically starts feeding.
5. Make sure the paper comes through the slot in the clear cover before closing it.

NOTE: This is a thermal printer. If the printer does not print, remove the paper roll, turn it over and re-insert it.

NOTE: If you have a paper jam, pull the paper out slowly and carefully from the roll side of the tester and re-insert it properly.

CONNECTING THE TESTER

1. Before you test a battery in a vehicle, turn off the ignition, all accessories and loads. Close all of the vehicle's doors and trunk lid.
2. Make sure you have put the six 1.5V AA batteries into the battery compartment. If the 1.5V AA batteries run out of power, the screen will show POWER LOW. Replace the six 1.5V AA batteries before starting the test.

NOTE: Nothing will be seen on the display screen until the tester is connected to a battery.

3. Make sure the battery terminals are clean. Use a wire brush to clean them if necessary. NOTE: This tester works best if the battery connectors have been removed and the battery posts have been cleaned. Any corrosion between the tester clamps and the battery connectors, or between the battery connectors and the battery posts, will degrade the tester's efficiency.

4. Clamp the positive (red) clamp to the positive (POS, P, +) battery post. Clamp the negative (black) clamp to the negative (NEG, N, -) battery post.

TO TEST THE BATTERY

1. Once you connect the tester to a battery, the screen will come on and display BATTERY TEST and the voltage of the battery the tester is connected to. Press the ENTER button.
2. The screen will show BATTERY TYPE and STANDARD SLI type of battery. To change the battery type to VRLA/GEL/AGM/SLA, press the FORWARD or BACK button. Once the correct battery type has been selected, press ENTER. (See GLOSSARY for battery definition.)
3. The screen will show SELECT RATING and either CCA (SAE), IEC, DIN, JIS or EN battery rating. To change the battery rating, press the FORWARD or BACK button. Once the correct battery rating has been selected, press ENTER.
4. The screen will show SET CAPACITY and a number with the rating you previously chose. To change the capacity to a different number, press the FORWARD or BACK button. Once the correct battery capacity has been selected, press ENTER. The following chart shows the capacity ranges available for each battery rating.
 - CCA (SAE): 40 – 2000
 - EN: 40 – 2100
 - IEC: 30 – 1500
 - DIN: 25 – 1300
 - JIS: By Battery Type Number
5. The screen will show TESTING. After several seconds, the screen will change to show the results of the test. After the results are displayed, press ENTER.

NOTE: If the tester determines that the battery voltage is low (based on the type, rating and capacity that was previously input), it will ask IS BATTERY CHARGED? This means, has the battery been charged without any drain placed on it within the last 24 hours. Press the FORWARD or BACK button to switch between YES and NO. Once the correct option has been selected, press ENTER.

6. When the test is complete, the display shows the volts and CCA or percent of charge. Press the FORWARD or BACK button to select: SOH (STATE OF HEALTH) or SOC (STATE OF CHARGE). One of five results will be displayed:
 - GOOD AND PASS: The battery is good and capable of holding a charge.
 - RECHARGE AND RETEST: The battery is discharged, and the battery condition cannot be determined until it is fully charged. Recharge and retest the battery.
 - BAD AND REPLACE: The battery will not hold a charge and should be replaced.
 - BAD CELL AND REPLACE: The battery has at least one cell short circuit and should be replaced.
 - LOAD ERROR: The tested battery is bigger than 2000 CCA or 200 Ah, or the clamps are not connected properly. Diagnose and correct the problem, then fully charge the battery and retest it. If the reading is the same, replace the battery. NOTE: Are there any accessories still turned on? If yes, turn them off, charge the battery and retest it. If no, replace the battery since the charging system is working and a good battery should have accepted a charge.

7. The screen will show CODE and a computer generated code number. After the code is displayed, press ENTER.
8. The screen will show PRINT RESULTS and a NO or YES option. To change the print results choice, press the FORWARD or BACK button. Once the correct option has been selected, press ENTER and the tester will print the results of the test or it will go back to the first screen, depending on which option was chosen. NOTE: if you select YES to print; after you've printed the number of copies you need, you must select NO to return to the BATTERY TEST screen.
9. Remove the clamps from the battery posts after the completion to end the test.

TO TEST THE CHARGING SYSTEM

1. Connect the tester as specified in CONNECTING THE TESTER.
2. Once you connect the tester to a battery, the screen will come on and display BATTERY TEST and the voltage of the battery the tester is connected to. Press the FORWARD button to get to the SYSTEM TEST, and then press ENTER.
3. Turn off all accessories and loads, such as lights, air conditioning, radio, etc., and close all of the vehicle's doors and trunk lid before starting the engine.
4. When the engine is started, one of the three following results will be displayed along with the actual reading measured.
 - CRANKING VOLTS NORMAL: The system is showing normal draw. Press ENTER to perform the charging system test.
 - CRANKING VOLTS LOW: The cranking voltage is below normal limits; troubleshoot the starter with the manufacturer's recommended procedure.
 - CRANKING VOLTS NOT DETECTED: The cranking voltage is not detected.
5. If cranking voltage is normal, press ENTER to begin the charging system test.
6. The display will show PRESS ENTER FOR CHARGING TEST. Press ENTER to continue.
7. The display will show MAKE SURE ALL LOADS ARE OFF. Confirm that all accessories are off and the doors and trunk are closed. Press ENTER to continue.
8. One of the three following results will be displayed along with the actual reading measured.
 - LOW CHARGING VOLTS WHEN AT IDLE: The alternator is not providing sufficient current to the battery. Check the belts to ensure the alternator is rotating with the engine running. If the belts are slipping or broken, replace the belts and retest. Check the connections from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. If the belts and connections are in good condition, the alternator may need to be replaced, have it checked.
 - CHARGING SYSTEM NORMAL WHEN AT IDLE: The system is showing normal output from the alternator. No problem is detected.

- **HIGH CHARGING VOLTS WHEN AT IDLE:** The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator. Check to ensure there is no loose connection and the ground connection is good. If there are no connection problems, the regulator may need to be replaced, have it checked. Since most alternators have the regulator built-in, this may require you to replace the alternator, have it checked. The normal high limit of a typical automotive regulator is 14.6+0.05 volts. Check the manufacturer's specifications for the correct limit, as it will vary by vehicle type and manufacturer.
9. After you are through with testing the charging system at idle, press ENTER to test the charging system with accessory loads. The display screen will show TURN ON LOADS AND PRESS ENTER. Turn on the blower to high (heat), high beam headlights and rear defogger. Do not use cyclical loads, such as air conditioning or windshield wipers. Press ENTER to continue.

NOTE: When testing older model diesel engines, the users need to run the engine at 2500 rpm for 15 seconds. The display screen will show RUN THE ENGINE UP TO 2500 RPM 15 SEC.

10. The tester will test the amount of ripple from the charging system to the battery. One of the three following results will be displayed along with the actual reading measured.
 - **RIPPLE DETECTED NORMAL:** The diodes are functioning properly in the alternator/stator.
 - **NO RIPPLE DETECT:** The diodes are functioning properly in the alternator/stator.
 - **RIPPLE DETECTED HIGH:** One or more of the diodes in the alternator are not functioning properly or there is stator damage. Check to ensure the alternator mounting is sturdy and that the belts are in good shape and functioning properly. If the mounting and belts are good, the alternator may need to be replaced, have it checked.
11. Press ENTER to continue testing the charging system with accessory loads. One of the three following results will be displayed along with the actual reading measured.
 - **ALT. LOAD VOLTS HIGH:** The output voltage from the alternator to the battery exceeds the normal limits of a functioning regulator. Check to ensure there are no loose connections and that the ground connection is good. If there are no connection problems, the regulator may need to be replaced, have it checked. Since most alternators have the regulator built-in, this may require you to replace the alternator, have it checked.
 - **ALT. LOAD VOLTS LOW:** The alternator is not providing sufficient current for the system's electrical loads and the charging current for the battery. Check the belts to ensure that the alternator is rotating with the engine running. If the belts are slipping or broken, replace the belts and retest. Check the connection from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. If the belts and connections are in good working condition, the alternator may need to be replaced, have it checked.
 - **ALT. LOAD VOLTS NORMAL:** The system is showing normal output from the alternator. No problem detected.
12. Press ENTER and the display will show TEST OVER, TURN OFF LOADS AND ENGINE. Press ENTER to continue.
13. Turn off all accessory loads and the engine. Press ENTER to continue.

14. The screen will show PRINT RESULTS and a NO or YES option. To change the print results choice, press the FORWARD or BACK button. Once the correct option has been selected, press ENTER and the tester will print the results of the test or it will go back to the first screen, depending on which option was chosen. NOTE: If you select the YES to print; after you've printed the number of copies you need, you select NO to return to the first screen.
15. Remove the clamps from the battery posts after the completion to end the test.

5. SETTINGS AND INFORMATION RETRIEVAL

LANGUAGE SELECT

1. Hook the tester up to a vehicle battery.
2. The tester defaults to the BATTERY TEST display. Press the FORWARD button twice to get to the LANGUAGE SELECT display.
3. Press ENTER and the display will show the language options. Press the FORWARD or BACK buttons to select the language you want the tester to display.
4. Press ENTER and the display returns to BATTERY TEST.

TEST COUNTER (Displays total number of times tests are performed)

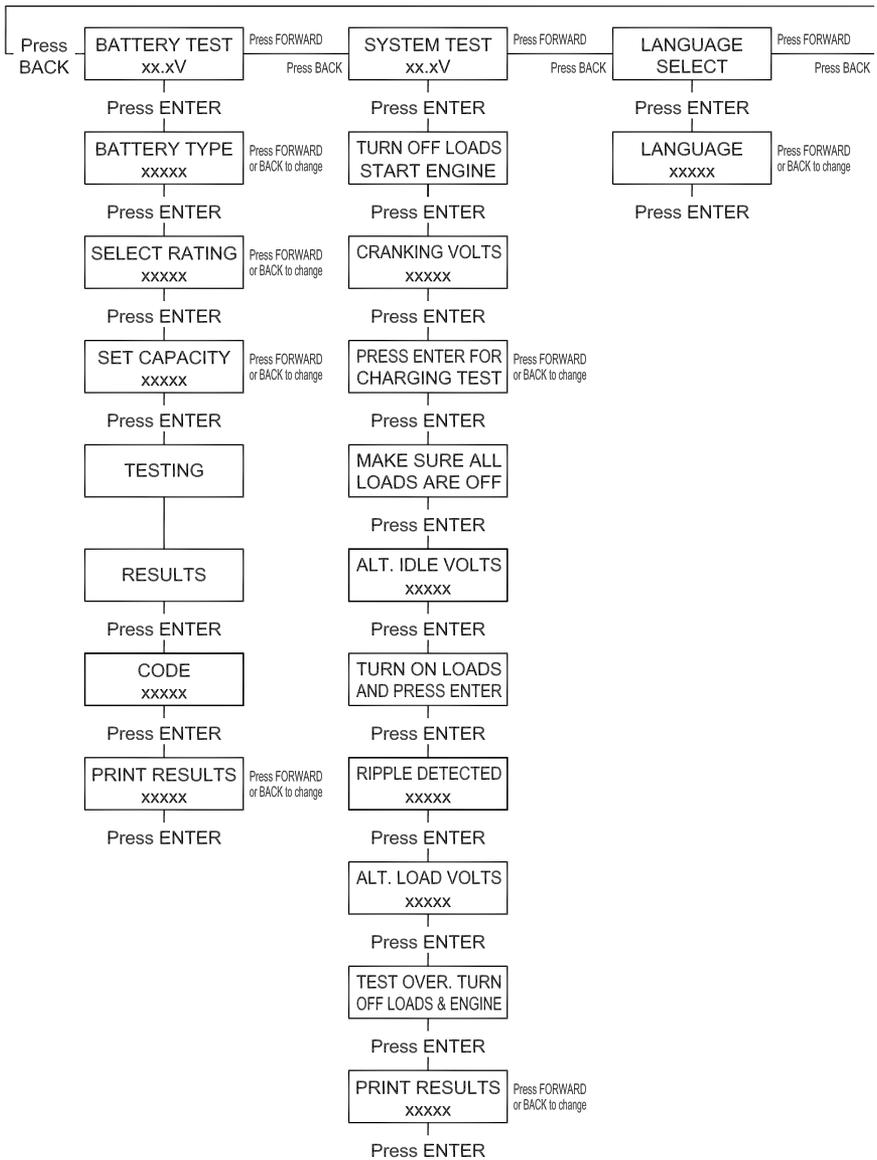
1. Hook the tester up to a vehicle battery.
2. The tester defaults to the BATTERY TEST display. Press the FORWARD button three times to get to the TEST COUNTER display.
3. Press ENTER and the display will show the NUMBER OF TIMES THE BATTERY TEST HAS BEEN RUN AND THE NUMBER OF TIMES THE SYSTEM TEST HAS BEEN RUN.
4. Press ENTER and the display shows RETURN TO BATTERY TEST. If you press the FORWARD or BACK button you will get the options of resetting the counter, printing the counter totals or returning to battery test mode.

SETTING THE DATE AND TIME

1. Hook the tester up to a vehicle battery.
2. The tester defaults to the BATTERY TEST display. Press the FORWARD button four times to get to the CURRENT DATE/TIME display.
3. Press ENTER and the display will show the ADJUST YEAR. Press the FORWARD or BACK buttons to change the setting.
4. Press ENTER and the display will show the ADJUST MONTH. Press the FORWARD or BACK buttons to change the setting.
5. Press ENTER and the display will show the ADJUST DAY. Press the FORWARD or BACK buttons to change the setting.
6. Press ENTER and the display will show the ADJUST HOUR. Press the FORWARD or BACK buttons to change the setting.
7. Press ENTER and the display will show the ADJUST MINUTE. Press the FORWARD or BACK buttons to change the setting.
8. Press ENTER and the display will show the ADJUST SECOND. Press the FORWARD or BACK buttons to change the setting.
9. Press ENTER and the display returns to BATTERY TEST.

ADJUST THE DISPLAY BRIGHTNESS

1. Hook the tester up to a vehicle battery.
2. The tester defaults to the BATTERY TEST display. Press the FORWARD button five times to get to the BRIGHTNESS display.
3. Press ENTER and the display will show BRIGHTNESS ADJUST. Press the FORWARD or BACK buttons to adjust the brightness of the display.
4. Press ENTER and the display returns to BATTERY TEST.



6. GLOSSARY

What is a SLI battery?

These initials stand for Starting, Lighting and Ignition, which are the three basic functions which a battery has to perform on all normal vehicles. Batteries given this description, will have been specifically designed for service on cars and trucks within a voltage controlled electrical system. Most Maintenance Free Batteries are SLI, otherwise known as Flooded, Regular or Standard Batteries.

What is a GEL battery?

A gel battery is a lead-acid electric storage battery that:

- is sealed using special pressure valves and should never be opened.
- is completely maintenance-free.*
- uses thixotropic gelled electrolyte.
- uses a recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead-acid battery (particularly in deep cycle applications).
- is non-spillable, and therefore can be operated in virtually any position. However, upside-down installation is not recommended.

*Connections must be retorqued and the batteries should be cleaned periodically.

What is an AGM battery?

An AGM battery is an absorbed glass mat lead-acid electric storage battery that:

- is sealed using special pressure valves and should never be opened.
- is completely maintenance-free.*
- has all of its electrolyte absorbed in separators consisting of a sponge-like mass of matted glass fibers.
- uses a recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead-acid battery (particularly in deep cycle applications).
- is non-spillable, and therefore can be operated in virtually any position. However, upside-down installation is not recommended.

*Connections must be retorqued and the batteries should be cleaned periodically.

What is a VRLA battery?

Valve Regulated Lead Acid Battery – This type of battery is sealed Maintenance Free with a “Bunce” Valve or Valves in the top of them that opens when a preset pressure is realized inside the battery and let’s the excess gas pressure out. Then the valve resets itself.

What is STATE OF HEALTH?

It means how much battery capacity is left (%) compared with the marked original battery capacity.

What is STATE OF CHARGE?

It means to what percent the battery is actually charged.

What is CCA (COLD CRANKING AMPS)?

The current in amperes which a new fully charged battery can deliver for 30 seconds continuously without the terminal voltage falling below 7.2 volts (1.2 volts per cell), after it has been cooled to 0°F and held at that temperature. This rating reflects the ability of the battery to deliver engine starting currents under winter conditions.

What is AMPERE-HOUR?

The unit of measurement of electrical capacity. A current of one ampere for one hour implies the delivery or receipt of one ampere-hour of electricity. Current multiplied by time in hours equals ampere-hours.

7. REPLACEMENT PARTS

Output Leads -	22-99-001824
Battery Cover -	37-99-006010
Paper Cover -	37-99-006020
Carrying Case -	22-99-001986
Paper Roll (1) -	49-99-000106
Cable Cover -	37-99-006724

REPLACING THE OUTPUT LEADS

1. Remove the screw in the backside bottom cover of the battery tester, and then remove the cover.
2. Disconnect the old cable connectors and insert the connectors of the new cable into the corresponding same color sockets. (Yellow Connector into Yellow Socket; Red Connector into Red Socket; White Connector into White Socket; Black Connector into Black Socket)
3. **IMPORTANT:** There is a small rib on the tester case, place the first slot of the rubber strain relief attached to the cable over this rib. There is also a rib on the cover you removed, make sure that the rib is in the first slot of the strain relief when you replace the cover. Replace the cover and tighten the screw. Do not over tighten.

8. LIMITED WARRANTY

SCHUMACHER ELECTRIC CORPORATION, 801 BUSINESS CENTER DRIVE, MOUNT PROSPECT, IL 60056-2179, MAKES THIS LIMITED WARRANTY TO THE ORIGINAL RETAIL PURCHASER OF THIS PRODUCT. THIS LIMITED WARRANTY IS NOT TRANSFERABLE OR ASSIGNABLE.

Schumacher Electric Corporation (the "Manufacturer") warrants this battery tester for 1 year from the date of purchase at retail against defective material or workmanship that may occur under normal use and care. If your unit is not free from defective material or workmanship, Manufacturer's obligation under this warranty is solely to repair or replace your product with a new or reconditioned unit at the option of the Manufacturer. It is the obligation of the purchaser to forward the unit, along with mailing charges prepaid to the Manufacturer or its authorized representatives in order for repair or replacement to occur.

Manufacturer does not provide any warranty for any accessories used with this product that are not manufactured by Schumacher Electric Corporation and approved for use with this product. This Limited Warranty is void if the product is misused, subjected to careless handling, repaired, or modified by anyone other than Manufacturer or if this unit is resold through an unauthorized retailer.

Manufacturer makes no other warranties, including, but not limited to, express, implied or statutory warranties, including without limitation, any implied warranty of merchantability or implied warranty of fitness for a particular purpose. Further, Manufacturer shall not be liable for any incidental, special or consequential damage claims incurred by purchasers, users or others associated with this product, including, but not limited to, lost profits, revenues, anticipated sales, business opportunities, goodwill, business interruption and any other injury or damage. Any and all such warranties, other than the limited warranty included herein, are hereby expressly disclaimed and excluded. Some states do not allow the exclusion or limitation of incidental or consequential damages or length of implied warranty, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and it is possible you may have other rights which vary from this warranty.

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1-800-621-5485

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