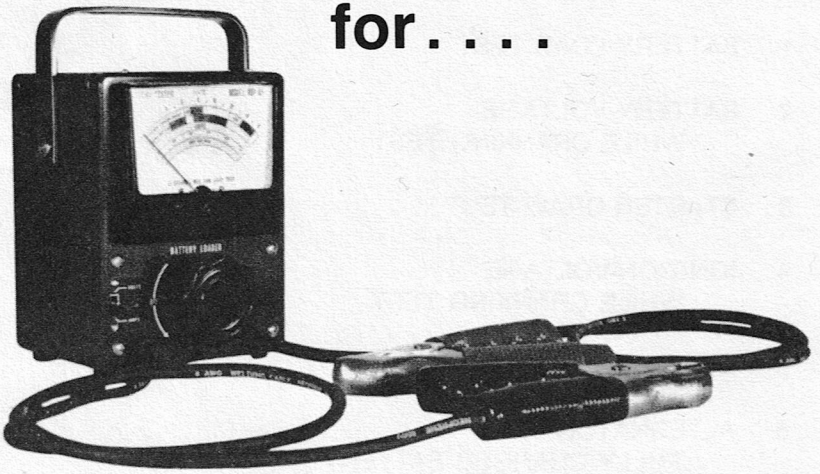
instruction
manual
for. . . .



MODEL BSG•5/463 BST TESTER

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INTRODUCTION

TESTER MODEL *BSG-5*/ 463 BST

is designed to simplify accurate electrical testing of Batteries - Starters - Generators - Alternators - Regulators and Electrical Circuits. 6 or 12 Volts.

IMPORTANT

Do not use this instrument before reading Operating Instructions. Proper use will give better and faster evaluation.

Each instrument is carefully tested and adjusted at the factory before shipment and, with proper care will give you many years of satisfactory service.

GENERAL INFORMATION

The purpose of any good test equipment is to eliminate guesswork by actually proving by means of the process of elimination, all electrical components suspected of being faulty.

For your guidance, **some** of the main causes of hard starting and/or battery failure problems are listed.

1. Short circuits in wiring systems.
2. Corroded, dirty or loose cable terminals.
3. Starter drawing excessive overload.
4. Battery subjected to undercharging.
5. Battery subjected to excessive overcharging.
6. Generator and/or Regulator failure.
7. Battery undersized for the job.
8. Battery worn out and/or defective.
9. Battery discharged.

The Battery Load Test will allow both you and your customer to determine if the Battery is at fault or otherwise. The main purpose of the load **test is to prove the Battery is capable of doing its job of cranking the engine, and under a properly controlled load test, the meter will show "low" or "OK". IT MUST BE REMEMBERED,** HOWEVER, THAT A DISCHARGED BATTERY WILL NATURALLY SHOW "LOW" ON THE METER AND YOU MUST ALWAYS ATTEMPT TO RECHARGE THE BATTERY FIRST, then test **again,** before reaching your final conclusion. The load test should always be applied after all recharges and prior to installations of all new batteries.

BATTERY MUST BE FULLY CHARGED FOR ACCURATE TESTS

BATTERY LOAD TEST.. . TEST NO. 1

1. Do not test battery with a specific gravity reading below 1.230 at 21℃/70℉. or open circuit terminal voltage of 12.4 volts for 12 volt battery (6.2 volts for 6 volt battery.) Recharge first then proceed with load test.
2. Control knob should be in OFF position (turn fully left) to avoid potentially dangerous arcing.
3. Connect large tester clips to battery posts. Red clip to positive post. Black clip to negative post.
4. Connect small voltmeter clips to large tester clips. Red clip to red clip. Black clip to black clip.

5. Set slide switch to VOLTS position. Read terminal voltage on top scale.

Minimum reading for 6 volt battery - 6.2 volts. Minimum reading for 12 volt battery - 12.4 volts.

6. Set slide switch to AMPS position.

7. Turn load control to the right until the reading on the AMPS TEST RATE scale is 1/2 the cold cranking amps (CCA) rating of the battery. If the CCA rating is unknown use a test load of 150 amps for a 12 volt battery and 300 amps for a 6 volt battery. HOLD LOAD FOR 15 SECONDS MAXIMUM.

NOTE: Do not use excessive force when adjusting the control knob to produce the required test load. Generally, if difficulty is experienced in achieving a high amps load reading, this may be due to a poor connection.

First turn the control knob to OFF (fully left) and check that the large tester clips are making a good connection to the battery post. Then try again to produce the required test load. If the problem persists the battery is discharged or defective.

8. With the load at the required value, set the slide switch to the VOLTS position and read the VOLTS scale. Minimum required voltage will be governed by electrolyte temperature as shown in the following chart:

Electrolyte	℉ +	70	60	50	40	30	20	10	0
Temperature	℃ +	21	16	10	4	-1	-7	-12	-18

Minimum Test

Volts*	9.6	9.5	9.4	9.3	9.1	8.9	8.7	8.5

*For 12 volt battery. For 6 volt batteries use 1/2 the above values.

8. (a) If the test reading is in the “OK” (green) section of the VOLTAGE UNDER LOAD scale the battery is in good condition.

   (b) If the test reading is in the “LOW” (red) section, check the electrolyte temperature and compare voltage reading with chart. If the voltage is equal to or greater than that shown on the chart, the battery is in good condition. If voltage is less than the minimum shown the battery is wearing out and should be replaced.

   (C) If the test reading falls off and one or more cells bubble or smoke the battery is unserviceable and should be replaced.

9. DO NOT CONTINUE THE TEST BEYOND 15 SECONDS. After the test make sure that the control knob has been turned to the OFF position (fully left) before proceeding to another test, or before removing the large test clips.

BATTERY VOLTAGE WHILE CRANKING.. TEST #2

1. Connect Voltmeter Leads to Battery Posts (Red to Positive, Black to Negative).

2. Set Slide Switch to Volts position.

3. Remove Coil Wire from center socket of Distributor Cap and Ground it. (This prevents engine firing and avoids damage to Coil.)

4. Operate Starter Motor and check reading. Should read in GREEN, OK band of Volt-under-load scale (4.8V for 6V batt?ry or 9.6V for 12V battery). Release Starter. (N.B. Do not operate Starter for more than approx. 30 sec. or overheating may occur.) Restore Coil Wire and remove Ground.

TEST RESULTS

If reading is in GREEN block, Battery-voltage-while –cranking may be passed as OK. If reading is in RED (Low) band, this indicates too low a voltage-while-cranking, which may be due to either a faulty or a discharged Battery or an excessive Starter Current Draw. Make Test #1 to check Battery or, if OK, make Test #3, to check Starter Draw.

STARTER DRAW TEST, TEST #3

1. Set Slide Switch to Volts position.

2. Connect Voltmeter Leads to Battery Posts (not to Cable Lugs,) but to a clean area of the actual Battery Post - touching Terminal Post.

3. Operate Starter Motor - either with an extension Starter Switch or an assistant and CAREFULLY note exact meter reading on Voltmeter scale while Starter is cranking. (N.B. It may be necessary to ground out Ignition to prevent engine firing. See Step 3, Test #2.) Do not operate Starter for more than 30 sec. or Starter may overheat.

4. Release Starter. Connect Heavy Amps Clips to Battery (Red to Positive, etc.) and turn Control Knob until Voltmeter again reads exactly the same as it did for Step 3.

5. Move Slide Switch to Amps position and read off WHITE Amps scale. This is Starter Current Draw reading. Compare with specs for vehicle if available. Should be about 150-250 Amps for 6V or 80-1 50 for 12V vehicle. Exact reading will be dependent on Battery and Engine Temp., Oil viscosity, etc.

TEST RESULTS

Providing Voltmeter Clips are actually connected to the Battery Post and not merely attached to, or touching the Cable Clamps, a low reading of Voltage indicates either a discharged or a defective Battery. Recharge and retest the battery to determine its condition.

With normal voltage, a low current reading will be due to either excessive resistance in the cables between Battery and Solenoid, or Solenoid and Starter, or in the various connections - including both Battery and Engine Block Ground Straps (where used) - or a defective Solenoid. Remove, clean and then re-install suspicious connections and then re-check. If defect is stilt present, check connections and then re-check. If defect is still present, check voltage drop of each connection in turn with an AVR Tester. Don't overlook possibility of undersized cables having been installed previously.

-IGNITION - VOLTAGE - WHILE CRANKING. . . TEST #4

Hard-to-start problems are often due to insufficient voltage from the Coil, when the Starter is cranking. Make the following test whenever hard-to-start problems are encountered.

1. Ground Ignition, see Step 3, Test #2.

2. Set Control Knob fully left and Slide Switch to Volts.

3. Attach Voltmeter leads to a clean ground and the Battery Terminal of the Coil - not the Coil Terminal connected with a wire to the Distributor, but the Battery Terminal.

4. Turn on Ignition and operate Starter, (If meter attempts to deflect backwards, reverse Voltmeter connections.) Note meter reading on Voltage-under-load scale. Should read in GREEN OK Band. Do not operate Starter Motor for more than 30 sec. periods without allowing a pause for cooling.

TEST RESULTS

Low readings may be due to either a faulty or discharged Battery -see Test #1, or to excessive Starter Current Draw - See Test #2, or to excessive resistance in Ignition Primary circuits, Points, Ignition Switch, Solenoid, Ballast Resistor or wiring between, etc.

REGULATOR TEST. . . TEST #5

Whenever Battery tests show the possibility of a discharged Battery and always when a new Battery is installed, make a Regulator check.

1. Set Slide Switch to Volts position.

2. Connect Voltmeter Leads to the Battery Terminal of Regulator and a CLEAN ground. (if meter deflects backwards, reverse the voltmeter connections.)

3. Operate engine at a fast idle with all lights and other loads switched off. (1 200-1500 RPM)

4. Note meter reading on Regulator-charging-voltage scale. Reading should be in GREEN OK band (6.9V-7.5V for 6V vehicle, 1 3.8V-1 5.OV for 12V).

TEST RESULTS

High readings indicate a defective or high setting Regulator or sometimes defective wiring to Regulator. Low readings may be simply a slipping Fan Belt, or defective Generator and! or Regulator or low setting. If Regulator checks out OK, complaints of run-down Battery may be due to a wiring leak.

ALTERNATOR TESTING.. TEST #6

(Fully Charged Battery)

When checking the output of an Alternator with an AVR, a relatively low Amperage reading may be noted if the Battery is already fully charged and, consequently, not calling for a very large current from the Alternator. Under these conditions, the procedure is to connect the Heavy Amp Leads of the BSG-5 Tester across the vehicle Battery and adjust the Control until a reading equivalent to the rated current output of the Alternator, is being drawn from the Battery.

Then, rechecking with the AVR should show a normal output current from the Alternator. If reading is still low, fault lies in either the Regulator, Alternator or the wiring between.

ALTERNATOR TESTING.. TEST #7

(Discharged Battery)

If a large current (15 Amps or more) is read on the AVR when checking Alternator output voltage, this voltage reading may not be the true setting of the VA Relay in the Regulator, but merely the particular voltage produced by the Alternator, when it is being asked to deliver this large current.

With the Voltmeter leads ONLY connected across the Battery terminals and the engine operating at a fast idle, the reading should be within the GREEN OK band on the dial. A reading lower than this may be due to either a discharged Battery - calling for a large current - or a defective Regulator or Alternator. To remove the possibility of a heavy current affecting readings, connect a 1/4 ohm Resistor in Series with the Battery output lead of the Alternator, then recheck voltage reading of Tester across Battery. If reading is now in GREEN OK band, Regulator and Alternator are OK. If reading is still low, either Regulator or Alternator are defective.

WARRANTY

Every part and detail of this Tester is carefully engineered, constructed of the finest materials and thoroughly tested before being delivered to you. Extremely conservative ratings have been applied to all critical components, to ensure, as far as possible, complete freedom from breakdown under normal operating conditions.

Subsequently this tester is covered by a 12 month warranty from date of purchase by the original user, against failure due to defective materials or workmanship. This warranty does not cover accident, abuse, neglect or revision nor does it cover dirty or corroded test clips. Transportation to and from the following authorized service depots is the customer's responsibility.

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