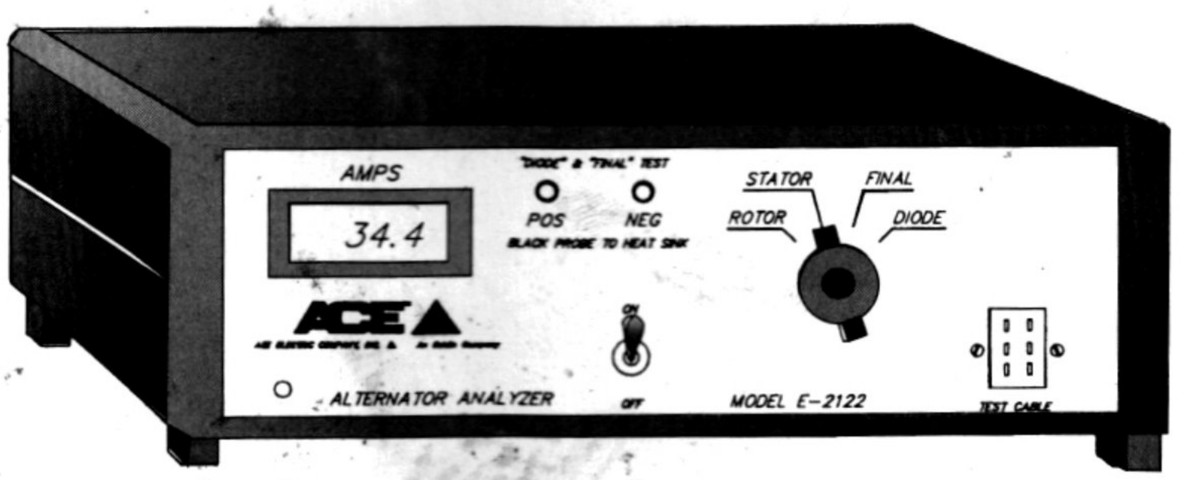
E-2122 Alternator Analyzer General Instruction Manual



ACE™

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ACE ELECTRIC
Columbus, Kansas

MODEL E-2122 ALTERNATOR ANALYZER

This manual should be read completley before attempting to operate the tester.

I. SPECIFICATIONS

A. Physical

Size 9 3/4 deep X 11 3/8 wide X 4 3/8 high
Weight 9 pounds

B. Electrical

115 VAC, 4 amp 60 Hz. Single phase

II. CONTROLS AND INDICATORS

A. Front Panel

1. Amp meter
   3 1/2 digit that shows the amount of current for the test being performed.
   Readings will repeat within 1/10 amp.
2. Power switch
   When in the "on" position, the amp meter should display.
3. Circuit breaker
   This is located on the back panel. Excessive testing or overloading the tester will cause this to open turning off the tester.
4. Function Switch
   The test function must be selected before the test leads are used for any test.
5. Diode lights
   These lights are used in two tests.
   a. Will determine negative or positive diodes in the "Diode Test.
   b. Will aid in finding a defective diode in a partial alternator assembly in the "Final Test".
6. Test lead socket
   This 6 pin receptacle is polarized. Two pins are spaced differently from the other 4 pins. DO NOT FORCE THE PLUG INTO THE SOCKET.

A. Test Lead Assembly

The 6 prong plug attaches to the front panel. (OBSERVE PLUG POLARITY.) The red and black probes are used to apply the test power to the item being tested. The clip leads are used only for the Final Test function. Leads should not be left touching each other, or touching a common metal surface, when the unit is turned on.

CAUTIONS

1. Do not spill any liquids in or on the tester.
2. Do not allow any test leads to touch each other while the unit is turned on.
   Leads touching each other will cause excessive heating in the tester and may reduce life of the tester.
3. Each stator test should be limited to 5 seconds. Allow at least 10 seconds between tests.
4. Continuous testing will cause the unit to overheat and reduce the life of the tester.
5. Turn off the power switch when not in use.

III. OPERATING INSTRUCTIONS

A. ROTOR TEST

NOTE: This tester is designed to test the actual rotor current. Arcing may occur while making probe contact. Touch the probes to the slip ring area but not in the path where the brushes make contact.

1. Turn the test select switch to the rotor position.
2. Place the black test probe to one slip ring.
3. Place the red test probe to the other slip ring.
4. Read the amperage.
   a. If the meter reads higher than anticipated, the coil is possibly shorted.
   b. If there is no display of amperage, the coil is open, or there is a poor connection to either slip ring.
      Rotors that look alike may have different designed amperage draw. This test may be used for sorting these different field coils. Amperage ranges, for the field coil is to be determined by other specifications.
5. Check for shorting from coil to shaft.
   a. Touch one probe to the rotor shaft.
   b. Touch the other probe to each slip ring.
   c. No amperage should be observed.

NOTE - (This tester will not check for extreme low current shorts from the coil winding to the shaft.) An Ohm meter or a hi-pot tester should be used if more critical testing is required.

B. STATOR TEST

1. Turn the test select switch to the Stator position.
2. Disconnect all stator wires or terminals.
3. Measure the current of all three phases

NOTE. - aa. Measurement is taken from the three stator leads that connect to the diodes. The common connection of a "Y" connected stator is not used as a terminal in this test. This common "Y" terminal will usually have three wires at its junction.

ab. "Y" connected stators may vary. Some common "Y" connections connect to a fourth set of diodes. This connection will have three wires and is not normally used in this test.

ac. Some stators may have 6 leads to the connection points. Each lead (or winding) may even have two wires (double wound). These are to be tested differently than other stators. See step 6.

a. Mentally mark the three leads as 1, 2, and 3.

b. Touch the black probe to lead #1 and touch the red probe to lead #2 & #3.
Amperage readings should be within 3 amps.

c. Touch the black probe to lead #2 and the red probe to lead #3.
Amperage reading should be within 3 amps of step b.

4. Test for shorts to lamination stack.

a. Touch one probe to a stator terminal and the other to a clear metal point of the lamination stack.
No amperage reading should be observed.

5. Sorting stators of varied amperage ratings may be accomplished if standard amperage readings are established by the operator for each type of stator. Stator readings may vary slightly from one tester to another due to component tolerances in the tester.

NOTE: - Amperage readings from a tester, of this generic type, will not determine the amperage output of the stator. Wire size, turns in each slot, type of termination and air gap to the rotor are only some of the variables of alternator output relative to the stator.

6. Testing stators with 6 leads

NOTE: - The beginning and ending of each coil has a lead protruding.

a. Touch the black probe to one lead and touch the red probe to another lead which produces amperage.

b. Touch the black probe to one of the other 4 leads and touch the red probe to another lead that produces amperage.

STATOR TEST instructions continued...

c. Touch the back probe to one remaining lead and touch the red probe to the other remaining lead and read amperage.
All three tests should be in balance within 3 amps.

NOTE:- Observe the color of the wires in the stator for any overheating. The quality of the stator should be questioned if the stator wires have a variance in color. There may be shorted turns even if there is a balance in the amperage test.

C. Final test.

This test is performed with a stator seated in the housing with stator leads attached to the diode assemblies.

1. Turn the select switch to the "Final" Position.
2. Place the red clip lead to the battery output post.
3. Place the black clip lead to the frame or the negative output of the alternator.
4. Mentally number the three stator output terminals. The "Y" stator terminal (even if connected to diodes) is not used in this test.
5. Touch the black probe to #1 stator terminal.
6. With black probe at #1, touch the red probe to #2 stator terminal and observe the amperage.
7. With black probe at #1, touch the red probe to #3 terminal and observe the amperage.
8. Move the black probe to terminal #2.
9. With the black at #2, touch the red probe to #3 terminal and observe the amperage.
The 3 amperage readings should be in balance within 3 amps.
10. Test for shorted diodes.
   a. Proceed to identify the defective diode if either diode light is on during tests 6, 7, or 9.
   b. Touch the black probe to one stator lead.
   c. With the black probe touching one lead, touch the red probe to the 2nd and then to 3rd stator lead.
   b. If either diode light turns on only when the red probe is on 2nd or the 3rd stator lead, move the black probe to another stator lead and test with the red probe on each of the other 2 stator leads.
   c. If one diode light remains on in both tests (while moving the red probe to two positions) a diode at the black probe is defective.
   The Negative or Positive diode light will disclose a defective negative or positive diode.
   A shorted stator lead, to the lamination or housing, will read the same as a bad negative diode.
   If the "Y" terminal connects to diodes, The black probe may be placed at that point and the red probe moved to determine which diode at the black probe is defective.

D. Diode Test

NOTE: - This test does not check for the following:
Extremely low specified leakage, avalanche tests or forward voltage drop.
This test will determine the general usable function and the polarity (+ or -) type of the diode.

1. The diodes must be disconnected from the stator or any other wires. The test clips must not be connected. Only test probes are used. (Reference from FINAL TEST).
2. Place the Test Select switch in the "Diode" position.
3. Touch the black probe on the heat sink.
This is the large common portion of the assembly
This may also be the housing for some press type diodes.
4. Touch the red probe to the other lead or stator contact of the diode.
Observe the diode lights.
Negative diode light - negative diode.
Positive diode light - positive diode.
Both lights are out - open diode.
Both lights are on - shorted diode.

SUMMARY OF TEST PROCEDURES

ROTOR TEST

1. Touch one probe to each slip ring.
2. Read amperage.
3. Touch one probe to shaft and one probe to a slip ring.
   No amperage should be read.

STATOR TEST

1. Touch probes to stator leads.
   1 & 2, 1 & 3, 2 & 3
3. Read amperage.
   Variations should be less than 3 amps.
4. Place one lead to a stator terminal and the other to the lamination stack.
   No amperage should be read.

FINAL TEST

1. Connect clip leads.
   Red clip to battery terminal.
   Black clip to ground or frame.
2. Touch probes to stator leads.
   1 & 2, 1 & 3, 2 & 3
3. Read amps.
   Variations should be less than 3 amps.
4. Observe diode lights.
   If either diode light turns on, test to identify which diode.

DIODE TEST

1. Touch black probe to heat sink.
2. Touch red probe to other connection of one diode.
   Negative diode light - negative diode.
   Positive diode light - positive diode.
   Both lights are out - open diode.
   Both lights are on - shorted diode.

NOTE: The tester test clips are only used for the final test. For all other tests, these clips must be free from touching any metal or current carrying object.

SERVICE

Only qualified personnel should pursue trouble shooting the internal parts of the tester. ELECTRICAL SHOCK CAN OCCUR WHILE TESTING THE COMPONENTS INSIDE THE UNIT.

TROUBLE SHOOTING.

1. Digital does not display.
   a. Make sure there is power at the line plug outlet.
      A breaker may have turned off on the back panel.
   b. Power is found at the test probes when in the Stator test.
      Check for fuse on the electronics board.
      DO NOT OVER FUSE!
      Check that the plugs are attached to the electronics board and to the digital display.
2. Diode lights do not function.
   a. Place the Test Select switch in diode position.
   b. Touch the test probes together
      Both lights should be on.
   c. One light stays on.
      Balance calibration is required.
      Call Technical Service for help.
3. Test Amp meter.
   a. Place the Test Select switch in the Rotor position.
   b. Momentarily touch the probes together.
      Amp meter should read between 115 and 125.
4. Digital is not on zero.
   a. Allow the unit to warm up for a minimum of 15 minutes.
   b. With a very small screwdriver turn the adjusting screw through the left side of the front panel.
      Use extreme care so as not to damage the adjustment or a component on the electronics board.
      If using a metal driver, use extreme care not to touch anything but the adjustment screw slot.

Note: This unit should settle at a zero reading within 0.2 amps.
Due to the electronic circuits, the meter has some delay in returning to zero.

FOR ADDITIONAL AID IN SERVICE
Call Ace Technical Service Department 1-800-835-0350

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