Stator Tester
Model STA-AS

Operating Instructions
(*6F)

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INTRODUCTION - This Tester is designed to check automotive alternator stators up to 200 amp capacity. It uses standard 120 volt A.C. power. The on-off switch also serves as a circuit breaker which will trip if the test leads are shorted.

TESTING - A good stator test answers three questions...

1- Is the winding GROUNDED (connected to the frame) ?

2 - (most important) are the 3 phases of the winding BALANCED ?

3 - What is the expected OUTPUT of the stator ?

Stators should be tested on a NON-CONDUCTING surface. Stator winding terminals must be clean. Dirty or corroded terminals will result in erroneous readings.

Turn tester on by placing the circuit breaker located on the left of the lower panel to its ON (up) position. Pilot light next to breaker will come on. Test clips at this point are NOT energized.

GROUND TEST - Connect the RED test clip and the BLACK test clip to any two stator leads. Touch the GREEN test clip to the stator steel frame. The red GROUND indicator light (located directly above the meter) will glow dimly for lightly grounded windings and brightly for heavy grounds. If no ground is detected, connect GREEN test clip to third stator leg. Ground indicator light will now come on. This is O.K.

BALANCE TEST - Begin automatic test cycle by depressing the cycle start (press-to-test) switch loacted at center of lower panel and holding switch down for 1 second. Cycle pilot light (next to switch) will come on indicating that cycle timer is running. After 1 second, switch can be released and cycle will continue automatically. Total test cycle time is 10-12 seconds. Cycle will re-set (cycle light will go out) after 15 seconds. Each stator phase receives power for 2-3 seconds.

As each phase is energized, the meter will indicate approximate output amps. Each line on the meter scale equals 5 amps. After a few minutes of working with the tester, you should become familiar with the scale and be able to make readings quickly. As the automatic test cycle begins, phase #1 is energized and the small green light marked "1" will come on. Phase 1 is that part of the winding located between the black and red test clips. Phase 2 (between black & green) and phase 3 (between red & green) are each tested in succession as shown by green lights marked "2" and "3".

The most important part of the test is determining the BALANCE of the 3 stator phases. All three readings should be within 5% of each other. For a 60 amp stator, the tolerance would be .05 x 60 or 3 amps. For a 100 amp stator, the tolerance would be .05 x 100 or 5 amps.

A word about HEATING. This tester is not just a resistance measuring instrument. It puts a heavy A.C. current through the windings being tested in order to heat the windings to expose bad connections. This heating effect has several consequences.....

1 - Coils get HOT! Be careful not to burn your fingers. Don't test on or near paper or other flammable material.

2 - Repeated tests could damage the winding. Without forced air cooling, the windings may be damaged by excessive heat. Limit testing to 2 consecutive cycles. Allow stator to cool (2-3 minutes) before re-testing.

3 - As a winding heats up, its resistance will increase and the meter reading will drift lower. During the 2-3 second (per phase) test sequence, this will cause a 100 amp initial reading to drop to abot 98 amps. This is normal and still well within the 5 amp tolerance range. On DELTA wound stators, this cycle (100 amp reading dropping to 98 amps) will repeat for phase #2 and #3 as each phase is being energized from a cold start. Immediately repeating the cycle (for a second run-through) will produce lower initial readings because the windings are already hot. In this case, the initial readings might be 98 dropping to 96. This is all normal!

In WYE wound stators, each phase is made up of 2 segments. Calling the three stators leads BLACK, RED and GREEN (corresponding to the three test clips) and referring to the delta-wye diagram on the tester,.....

Phase 1 - consists of two segments; the "black-to-wye connection" segment and the "red-to-wye connection" segment.

Phase 2 - consists of the black and green segments.

Phase 3 - consists of the red and green segments.

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During part 1 of the test cycle, both the red and black elements start cold so you might expect (on a 100 amp stator) a reading of 100 dropping perhaps to 98 as the windings heat up. Part 2 of the test cycle, however, tests the black and green segments. But,... the black segment is already hot from part 1 of the cycle so the initial reading will be somewhat lower, perhaps 99 (dropping to 97).

Finally, in part 3 of the test cycle, the red and green segments are tested. Both of these winding segments are already hot (from test parts 1 & 2) so the initial reading should be lower still - perhaps starting at 98 and dropping to 96.

These numbers are just for illustration. The principle here is that,...

... in a WYE wound stator, the readings will be slightly lower as the test cycle proceeds from phase 1 through phase 3. Again, this is the normal pattern and it's simply due to coil heating.

NOTE - Some re-builders rub a common wax crayon or "china marker" on the stator wye connection before testing. If the wye connection is faulty, the wax will "smoke". Touching the wye connection after testing will give the same result but also produce BURNED FINGERS!.

ESTIMATING OUTPUT - Now comes the tricky part - determining stator OUTPUT. This part is tricky because it requires keeping records. It is simply impossible for us to calibrate this tester to read 100% accurate stator output directly because of many factors beyond our control, such as...

* Your AC line voltage may be higher or lower than average.

* A 60 amp Ford stator is not wound exactly like a 60 amp Chrysler, etc. stator.

* Your Test Bench (your final indicator of alternator output) might be reading higher or lower than your neighbor's.

Therefore, your road to being able to tell, with some degree of accuracy, what the output of the stator under test will be - begins with record keeping. Make copies of the Data Sheet included with these instructions and use them to record...

* Stator manufacturer
* Nominal (supposed) output
* Tester reading (average of 3 legs)
* Actual output - measured at your alternator test bench

After a while, you or your operator will be able to predict output with a reasonable degree of accuracy.

Turn off tester when not in use. Problems? Questions? Call us!

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