

**Chapter 1 : Full text of "SUN Electric Corp. VAT Operators Manual"**

*SUN Electric Corporation Volt Ampere Tester SUN VAT Operator's Manual.*

The ampere range is used to measure ignition and accessory current loads up to amperes, and to measure charging system outputs up to amperes. The ampere range is used to measure battery loads 6 or 12 volt batteries, starter current draw up to amperes and charging system output over amperes. These marks can be used if desired to determine whether the battery is being charged or discharged as explained under Clamp-On Ammeter Pickup. This scale can also be used with the Red and Black external voltmeter leads. See voltmeter in Figure 1. In this position, the voltmeter is internally connected to the load cables and then to the battery through special wires within the load leads. This eliminates two test connections. It has a spring loaded off position. Loads should only be applied to 6 or 12 volt batteries. This scale can also be used to measure current draw of any accessory and to measure battery drain. Tester provides the circuits required to test diode and stator operating condition. This lead is equipped with the three commonly used connector types for convenient connections to alternator and generator field terminals. Since the ammeter has a zero in the center of the scale, polarity need not be observed. For example, if the clamp-on Pickup is placed around either battery cable to the starter and the engine is cranked, the ammeter will indicate starter current draw. To use the arrow on the probe to indicate proper polarity, clamp the Green Amp Pickup around the negative battery cable with the arrow pointing away from the battery. A special circuit in the tester uses the clamp-on Ammeter Pickup to sense diode stator conditions, provided that at least 15 amps of current is flowing. To load test a six or a twelve volt battery. To provide power to operate the tester ammeter circuit. The Load Leads are color coded Red for positive and Black for negative. Should the applied voltage fall below 4. Tests can be made under other conditions, but standard specifications will not apply. The general specifications shown here are for 12 volt systems. Ammeter readings will be accurate as long as the vehicle battery voltage is 4. If the test load cannot be reached and the battery voltage is below 9. Maintain load for 15 seconds and note Green Voltmeter scale reading. Voltage with load applied is 9. However, battery needs further testing. Perform Sun 3 Minute Battery Test. Voltage with load applied is below 9. Battery is either discharged or defective and further testing is needed. Test load cannot be reached. Starting System This test should be made only with a serviceable battery. Turn off all lights and accessories and close all doors. If more than one cable is connected to battery post, place clamp around all cables. Prevent the engine from starting during the cranking test. Restore engine to starting condition. Gasoline engines with externally mounted coil: A. Remove the coil high tension lead at the distributor center tower and connect the disconnected lead to engine ground. Gasoline engines with integral mounted ignition coil: Disconnect the ignition coil lead to touch ground. Crank engine while observing Green Voltmeter reading and Red ammeter reading. Ammeter reading should not exceed maximum specified. Voltage should be at or above minimum specified. Cranking speed should be normal. If no specification is available, a normal cranking speed is 1000 rpm. Starter current draw Large 8 cyl. Turn the ignition switch to the run position and read rate of discharge on the Ammeter. Do not drop voltage lower than 12 volts. Proceed to Test 3. This test is to determine if alternator or voltage regulator is bad and is only required if system fails Charging Test 2. The test is for alternator charging systems only. Stop engine and disconnect the vehicle lead from the alternator field terminal or disconnect the regulator connector plug if field terminal is inaccessible. Field lead connections for testing the alternator. Select proper lead terminal and connect the Blue tester field lead to the alternator field terminal or to the field lead in the regulator connector plug. Never use Blue field lead with voltage regulator connected. Positions reverse on positive ground systems. However, no damage will occur if the wrong position is used. Observe the reading on the proper ammeter scale. Check vehicle wiring, replace voltage regulator and retest system. Operate engine at approximately 1000 rpm, or at the test speed specified by the manufacturer. Note reading on Green Voltmeter scale after voltmeter reading ceases to rise, usually when current drops to 10 amps or less. BAD Voltage above or below specified voltage range. Replace voltage regulator and retest. If at least 15 amps was not obtained in Test 2A, alternator is defective and should be replaced or repaired. Diode test is not valid. Turn lead control OFF, return engine

speed to idle, and stop engine. Note reading on ammeter. This ammeter reading is the total accessory load. Compare this reading to the total alternator output reading obtained in Test 2, Step G. Total alternator output reading should exceed accessory load reading by 5 amps or more. With a known good battery, the starter motor, cables and starter solenoid can be checked by performing the Starting System Test. Batteries need to be capable of cranking engines under all load conditions while maintaining enough voltage to supply ignition current for starting. The generally accepted theory of battery testing is that a battery should maintain a voltage of 9. Since starter loads vary and battery sizes vary, the Battery Performance Test is based on battery ratings provided by the manufacturer. There are now two methods of rating batteries. While some battery manufacturers are supplying both ratings, many are not. Therefore, the method of determining how much load to apply to test a battery depends on which rating is known. If the Ampere Hour rating is known, multiply this rating by 3 to obtain the load. For example, a 60 ampere battery multiplied by 3 equals a 180 ampere load. When using this rating, divide it by 2 to obtain the load. For example, a battery with a Cold Cranking Current rating of 360 divided by 2 equals a 180 ampere load. A GOOD battery will maintain a voltage of 10 volts or more for at least 15 seconds 5 volts for 6 volt batteries. A FAIR battery will read 9. Batteries that test in this range can be used to perform starting system tests. In this way, many batteries that are marginal will be detected and replaced, preventing a road failure. A load voltage of less than 9. This battery should also be completely tested to determine if it is defective and needs replacing or is merely in need of a recharge. The engine is cranked with the ignition system disabled so that the engine will not start. The test procedure consists of cranking the engine for 10 seconds while observing the tester Red ammeter scale for starter current draw and the tester Green voltmeter scale for cranking voltage. Good starting systems will read: Starter current is not to exceed the maximum specified for the vehicle being tested. Cranking voltage on 12 volt systems, some vehicles are rated at 9. On 6 volt systems, 4. Vehicles failing the Starting System Area Test need a pinpoint test of the cables and starter solenoid to determine whether the problem is in the cables, the solenoid, or the starter. The testing sequence is the normal one, demonstrating movement from the area testing of systems to the detailed testing of components. In normal testing situations, failures indicated in area testing point to the detailed tests that should be performed. Check mechanical zero of meters.

### Chapter 2 : TPC \* VAT 40 Operating Guide

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