

VEHICLE ELECTRICAL POWER ANALYZER

VEPAC-III-S & VEPAC-III-T

User Operation guides

1. Safety

- 1.1. Read the operating instructions before using the VEPAC Analyzer.
- 1.2. Check for any damages of battery casing. Replace battery or stop the test if necessary.
- 1.3. Avoid direct contact with acid.
- 1.4. Do not short the battery terminal because it will create spark and cause hazard.
- 1.5. Keep the test probes (PV3K-120, cable & clips) away from moving engine parts.
- 1.6. VEPAC-III-T is to be used on 12V and 24V system and VEPAC-III-S is used for 12V only. Over voltage may damage the analyzer.
- 1.7. Operating temperature should be kept within -10°C to $+50^{\circ}\text{C}$.
- 1.8. Do not alter the test probe PV3K-120 because it may affect the accuracy and cause hazard. Do not use unknown test probe plug to the VEPAC Analyzer, it may permanently damage the device.

2. Set up for testing

- 2.1. If battery electrolyte level is low, add battery water to cover the battery plate. Charge the battery and clean the electrodes before testing.
- 2.2. After charging, allow the battery to cool down before testing for better results.
- 2.3. Turn off all the loads of the battery for better accuracy of results.
- 2.4. Connect the positive (+) red clamp of the analyzer to battery's positive terminal before connect the negative (-) black clamp of the analyzer to battery's negative terminal. The analyzer is ready to test your battery.
- 2.5. Poor connection of clamps and terminals will directly affect the accuracy of results.

3. Function keys and System Usage

Battery Static Test (Battery alone):

- 3.1. Select the CCA of battery.

For VEPAC-III-T

- Push & hold '>' key to increase CCA by 5A,
Push & hold '<' key to decrease CCA by 5A.

For VEPAC-III-S

- Push & hold 'Next' key <0.5sec to increase CCA by 5A,
Push & hold 'Next' key >0.5sec to increase CCA by 5A.

- 3.2. Push 'ENTER' to confirm the CCA and begin battery static test.
- 3.3. Push '>' or '<' or 'Next' to scroll and read the test results.
- 3.4. Push 'ENTER' to view quick report.
- 3.5. Push 'ENTER' and hold for 2 sec to view test reporting.

Battery Cranking Test (Battery in vehicle): The system is ready for battery cranking test after static test.

- 3.6. Crank the engine to start the vehicle.
 - 3.7. Push '>' or '<' or 'Next' to scroll and read the cranking test results.
 - 3.8. Push 'ENTER' and hold for 2 sec to view test reporting. (At reporting, the system will not accept cranking test)
- To repeat Battery Static Test or Battery Cranking Test, just disconnect and reconnect the two probes/clamps. The system is able to store the last used CCA value for next usage. Repeat step 3.1 to 3.8 accordingly.

4. Testing route and data output

Battery Static Test (Battery alone):

The batter test and result output are displayed in the following sequence:

- 4.1. Battery terminal voltage: 6.00 to 40.00 volts.(6.00 to 20.00 volts for VEPAC-III-S). Update every 100 mSec.
- 4.2. State of charge (SOC): 0 to 100 % (if <80% charge & re-test)
- 4.3. Internal Impedance (IMP) 1.00 to 100.00 m-Ohm (VEPAC-III-T only, the lower Ohm the better).
- 4.4. Resave Cranking Capacity (RCC): 0~100%, Ratio of actual and rated cranking capacity of the battery.
4 Results: 1) Normal, 2) Marginal, 3) Weak, and 4) Extremely weak
- 4.5. Cranking Capacity: 100 to 2000Amp (SAE), 90 to 1800Amp (EN) for VEPAC-III-T.
100 to 1200Amp (ASE), 90 to 1000Amp (EN) for VEPAC-III-S.

4.6. Other data display are as follows:

Faulty Areas	Data Display	User Actions
Over voltage range	Over voltage may damage device, this is for 12V/24V (T) system only	Wrong model used
Surface charge	Please Wait..... Surface Charged. NN.NN volts	Test Later
Faulty Probe	PLS check, connector, and clamps. NN.NN volts	Re-clamp & re-test
Faulty Sources	DUT (Device Under Test, Battery). NN.NN volts	Faulty/uncharged cell
Low battery voltage	Device under test, extremely weak, unable to test. NN.NN volts	Faulty/uncharged cell
Cell Faulty	Bad cell found! Faulty battery. NN.NN volts.	Condemned battery
Low Amp battery	Device under test, extremely weak, unable to test, NN.NN volts	Faulty/uncharged cell
Over Amp range	Device under test, out of range, unable to test, NN.NN volts	Battery out of range

Battery Cranking Test (Battery in vehicle):

- 4.7. Cranking power index (CPI): 0~500%, (Ratio of battery maximum output power and actual load power by starter.)
5 Results: 1) Excellence, 2) Normal, 3) Marginal, 4) Weak, and 5) Extremely weak
- 4.8. Starter maximum crank current (Ip): 100Amp to 2000Amp (1200A for VEPAC-III-S)
- 4.9. Starter average crank current (Ia): 100Amp to 2000Amp (1200A for VEPAC-III-S)
- 4.10. Ripple voltage of alternator (Vr): 2.0mV to 200.0mV (VEPAC-III-T only)
- 4.11. Alternator charging status: 6.00volts to 40.00volts (6.0 to 20v for VEPAC-III-S)
(Note: With headlamp loaded and engine running at 1500rpm and above for one minute to confirm the test results.)
4 Results: 1) Weak Charging, 2) Marginal, 3) Normal, and 4) Over Charging

5. Overall Grading of Battery Test Results

- 5.1. Normal: Battery or device in good condition.
- 5.2. Marginal: Acceptable condition, charge battery & re-test.
- 5.3. Weak: Charge battery & re-test, battery may not recover.
- 5.4. Extremely Weak: Faulty battery, end of battery service life.
- 5.5. Other overall data display are as follows:

Highlighted Areas	Data Display
SOC	Battery, weak charging, Charge & re-test (If SOC<80%)
RCC	Batt performance, Marginal
	Batt performance, Weak
	Batt performance, extremely weak, battery end of service life
CPI	Batt performance, undersize. (If CPI below Marginal but battery Normal)
	Batt performance, Marginal
	Batt performance, Weak, Unfit for Use.
	Batt performance, extremely weak, battery end of service life
Charging Status	Weak Charging, PLS ram engine (if testing mode) or PLS check Alternator
	Marginal, PLS ram engine (if testing mode) or PLS check Alternator
	Over Charging, PLS check alternator
All Spec Normal	Normal (Battery static test)
	System Normal (Battery cranking test)

6. Storage and Memory Data (VEPAC-III-T only)

- 6.1 VEPAC-III-T has data storage capability. After reporting, VEPAC-III-T will prompt user whether to store or replace test data or not. One full set of data can be kept for retrieval any time later.
- 6.2 The ripple voltage must be displayed before ripple data can be stored.
- 6.3 The test sequence is to test 12V system first, and then follow by 24V system, otherwise, user needs to wait for 30 sec for the system to stabilize(capacitor fully discharge) after testing a 24V system before moving to the 12V system.
- 6.4 To read the memory data, just push and hold 'ENTER' before connecting the test probes to the battery, after test probes are connected, release and follow instructions on screen to view stored data.