

АНАЛИЗ СОСТОЯНИЯ БАТАРЕИ

Проверьте результат через 10 секунд при включенном переключателе нагрузки.

ПРОВЕРКА ПОД НАГРУЗКОЙ	СОСТОЯНИЕ БАТАРЕИ
ОК (ЗЕЛЕНЫЙ СВЕТОДИОД)	Достаточный заряд батареи. Батарея может быть заряжена полностью или неполностью. Чтобы определить состояние заряда батареи, проверьте плотность электролита при помощи гидрометра. Если плотность электролита меньше плотности при полном заряде, убедитесь, что система зарядки не повреждена и отсутствует утечка электроэнергии. Перезарядите батарею до полного заряда.
СЛАБЫЙ (ЖЕЛТЫЙ СВЕТОДИОД)	Заряд батареи недостаточен. Батарея может быть неисправна или частично разряжена. Проверьте плотность электролита, чтобы определить причину. Если плотность больше 1,225, батарея неисправна. Если плотность менее 1,225, перезарядите батарею и повторите проверку. Плотность в ячейках батареи варьируется более, чем на 0,025 (25 делений), возможно повреждение ячеек. Если после зарядки батареи плотность электролита не достигла уровня плотности при полном заряде, замените батарею.
РАЗРЯЖЕНА (КРАСНЫЙ СВЕТОДИОД)	Батарея может быть неисправна или изношена. Для получения более точного результата проверьте плотность электролита и следуйте описанной выше процедуре.

ТЕМПЕРАТУРНАЯ КОМПЕНСАЦИЯ

ТЕМПЕРАТУРА БАТАРЕИ	+20°F (-7°C)	0°F (-18°C)	-20°F (-29°C)
УМЕНЬШЕНИЕ НОМИНАЛЬНОГО НАПРЯЖЕНИЯ БАТАРЕИ НА:	1 шаг	2 шага	3 шага

1 ШАГ = 50 АМПЕР ПРИ ЗАПУСКЕ

УРОВЕНЬ ЗАРЯДА БАТАРЕИ

Для определения состояния батареи заряд батареи должен составлять не менее 75% без нагрузки. Если батарея не прошла проверку под нагрузкой при данном 75% уровне заряда, ее необходимо заменить. Если заряд батареи менее 75%, следует ее зарядить, а затем проверить под нагрузкой. Если батарея снова не прошла проверку, ее следует заменить. В нижеследующей схеме приведены значения для 12-В батареи.

НАПРЯЖЕНИЕ В РАЗОМКНУТОЙ ЦЕПИ	ЗАРЯД В %
11,7 В и менее	0%
12,0	25%
12,2	50%
12,4	75%
12,6 В и более	100%

ПРОВЕРКА СИСТЕМЫ ЗАРЯДКИ

1. Подсоедините красный зажим к положительному контакту, а черный зажим к отрицательному контакту батареи.
2. Выключите все электрическое оборудование.
3. Запустите двигатель и дождитесь его прогрева до нормальной рабочей температуры.
4. Запустите двигатель на частоте оборотов от 1200 до 1500 об/мин (не нажимайте переключатель нагрузки).
5. Загоревшийся красный светодиод указывает на проблему системы зарядки и на то, что батарея заряжается не полностью. Если загорелся зеленый светодиод, система зарядки осуществляет зарядку батареи.

ВАЖНЫЕ ИНСТРУКЦИИ ПО ТЕХНИКЕ БЕЗОПАСНОСТИ

1. Работы рядом со свинцово-кислотной аккумуляторной батареей представляют опасность. При обычной эксплуатации батареи выделяют взрывоопасные газы. Поэтому, очень важно каждый раз перед использованием тестера читать данное руководство и внимательно следовать инструкциям.
2. С целью снижения риска взрыва батареи необходимо следовать данным инструкциям и инструкциям производителя батареи, инструкциям производителей другого оборудования, используемого при работе с батареями. Ознакомьтесь с предостережениями, промаркированными на этих изделиях и на двигателе.
3. Не подвергайте тестер воздействию дождя или снега.
4. Не эксплуатируйте тестер с поврежденными шнурами – немедленно замените их.
5. Не эксплуатируйте тестер, если он поврежден; в этом случае необходимо выполнить ремонт устройства у квалифицированного специалиста.

ПЕРЕД ПРОВЕРКОЙ

1. Работает только с 12-ти вольтовыми батареями.
2. При проверке батареи убедитесь, что пространство вокруг нее хорошо проветривается.
3. Очистите клеммы аккумулятора. Следите за тем, чтобы едкая жидкость не попала в глаза.
4. Убедитесь, что корпус или крышка батареи не треснули и не разбиты.
5. Добавьте дистиллированную воду в каждую ячейку, пока электролит не достигнет уровня, указанного изготовителем аккумулятора. Это позволит удалить излишки газа из ячеек. Не переливайте.
6. Проводите проверку батареи под нагрузкой при температуре выше 60°F (16°C).
7. Если для проверки необходимо снять аккумулятор с автомобиля, обязательно сначала отсоедините от аккумулятора клемму заземления. Отключите все оборудование автомобиля.

МЕРЫ ПРЕДОСТОРОЖНОСТИ ПРИ ПОДКЛЮЧЕНИИ

1. Не подключайте зажимы с включенным переключателем нагрузки.

ЛИЧНЫЕ МЕРЫ ПРЕДОСТОРОЖНОСТИ

1. Работы рядом со свинцово-кислотной батареей следует выполнять в присутствии другого лица.
2. Позаботьтесь о том, чтобы рядом была пресная вода и мыло на случай, если аккумуляторная кислота попадет на кожу, одежду или глаза.
3. Используйте средства защиты глаз и одежды. Не дотрагивайтесь до глаз во время работы рядом с батареей.
4. При попадании аккумуляторной кислоты на кожу или одежду немедленно смойте мылом и водой. При попадании кислоты в глаза немедленно промойте глаза холодной водой, как минимум, в течение 10 минут и немедленно обратитесь к врачу.
5. НИКОГДА не курите и не допускайте возникновения искр или пламени рядом с батареей или двигателем.
6. Будьте особенно внимательны с целью снижения риска попадания металлических инструментов на батарею.
7. Снимите с себя металлические предметы, например, кольца, браслеты, ожерелья и часы, при работе со свинцово-кислотной аккумуляторной батареей.

2. Проверьте полярность контактов аккумулятора ПОЛОЖИТЕЛЬНЫЙ (POS, P, +) контакт обычно имеет больший диаметр, чем ОТРИЦАТЕЛЬНЫЙ (NEG, N, -) контакт.
3. При подключении зажимов к контактам аккумулятора поверните или подвигайте их вперед и назад несколько раз, чтобы проверить надежность подключения.
4. Расположите кабели так, чтобы уменьшить риск их повреждения деталями двигателя.
5. Не приближайтесь к лопастям вентиляторов, ремням, шкивам и другим деталям, которые могут причинить травмы.

ПРОВЕРКА БАТАРЕИ

1. Подсоедините красный зажим к положительному контакту, а черный зажим к отрицательному контакту.
2. Установите переключатель нагрузки в положение «ON» (ВКЛ.) и удерживайте не более 15 секунд.
3. Оцените состояние батареи согласно показаниям светодиода и дисплея измерителя.

TRISCO®



***Battery Analyzer IBA-300
with Mini Printer***

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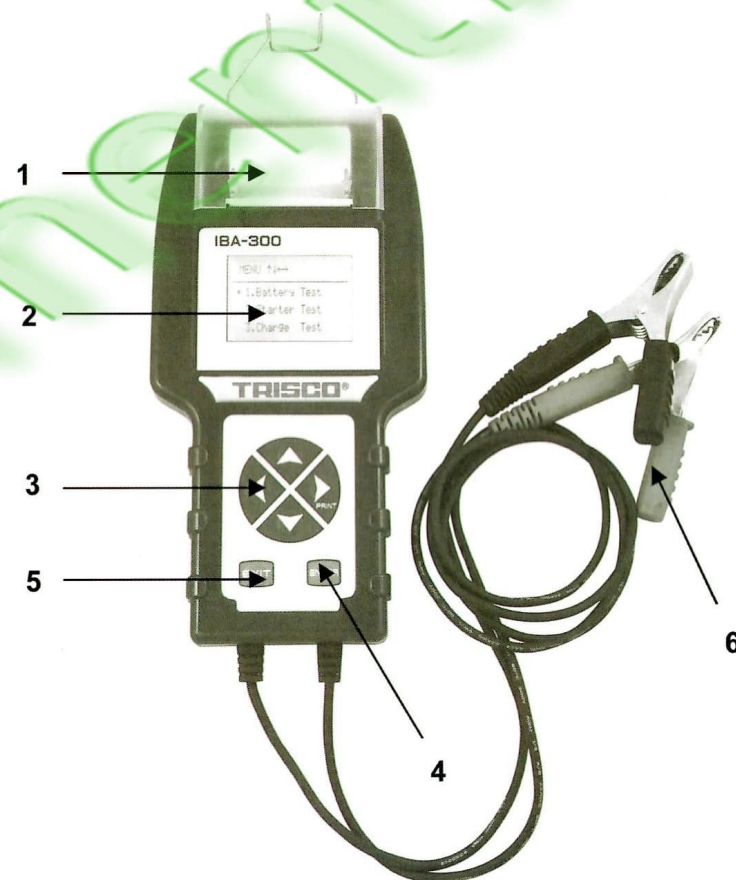
LIMITED WARRANTY

INTRODUCTION



This IBA-300 Battery Analyzer works only on single 12 Volt batteries. DO NOT test batteries in series; it could damage the batteries and this analyzer.

DESCRIPTION OF THE IBA-300 BATTERY ANALYZER



1. Mini Printer
2. Large backlit screen
3. UP/DOWN/LEFT/RIGHT ARROW keys to scroll function menu or key in numbers
4. ENTER key to confirm the selected function or number
5. EXIT key to confirm the selected function or exit the test or number
6. 10 ft cable with dual conductor clamp

SPECIFICATIONS

Battery Applications	12-Volt WET, AGM, AGM Spiral, Gel batteries.
Rating System Range	CCA 100-1700
	DIN 100-1000
	IEN 100-1000
	EN 100-1700
	JIS By JIS number
DC Voltage	9-18V, $\pm 2\%$
Display	64 x 128 backlit display
Printer Paper Size	75 x 30 mm
Test Leads	100 cm with durable clips
Operating Temperature	0-50°C

SAFETY PRECAUTIONS



BE AWARE, VEHICLE BATTERIES GENERATE EXPLOSIVE MIX OF HYDROGEN GAS AND OXYGEN DURING OPERATION OR EVEN WHEN THEY ARE NOT IN OPERATION. FOR THIS REASON, IT IS IMPORTANT TO READ THIS MANUAL AND FOLLOW MANUFACTURERS' INSTRUCTIONS CAREFULLY.

PERSONAL PRECAUTIONS

- Always wear safety glasses and proper protective clothing. Do not wear loose clothing; loose clothing can get caught in fan, pulleys, belts, etc.
- Remove personal metallic items, any jewelry or watches before start servicing on a battery.
- Have fresh water and soap nearby. If battery acid enters your eyes, immediately flush eyes with cool, clean running water for at least 15 minutes. If battery acid contacts skin or clothing, wash immediately with soap and water.

GENERAL SAFETY INSTRUCTIONS

- Always operate the vehicle in a well ventilated area. When the engine is running, it produces carbon monoxide, a toxic and poisonous gas. Do not breathe exhaust gases – they are hazardous that can lead to death.
- DO NOT smoke near the vehicle during testing. Fuel and battery vapors are highly flammable.
- When engine is running, many parts (such as pulleys, coolant fan belts, etc) turn at high speed. To avoid serious injury, always be alert and keep a safe distance from these parts.
- Before starting the engine for testing or trouble shooting, always make sure the parking brakes are firmly engaged. Put the transmission in Park (automatic transmission) and Neutral (manual transmission).
- Engine parts become very hot when engine is running. To prevent severe burns, avoid contact with hot engine parts.
- Never lay tools on vehicle battery. You may short the terminals together causing harm to yourself, the tools or the battery.
- Always keep a fire extinguisher readily available and easily accessible in the workshop.
- Avoid keeping this analyzer under sunshine or in wet, damp or high temperature conditions. These could damage the analyzer.

FUNCTION TESTS

Before start the IBA-300 function tests, do the following Test Preparation first.

- Inspect the battery before start the tests if there are any damages on surface, terminals and case. If you see any defects, replace or repair it before do the tests.
- Clean the corrosion on the battery terminals, and dirt or acid on the case by a wire brush and a mixture of water and baking soda.
- Ensure the vehicle or the battery for testing is in a well ventilated area, and the parking brakes are firmly engages. Put the transmission in Park (automatic transmission)-and Neutral (manual transmission).
- The battery for testing is preferred in-the-vehicle.
- Connect the IBA-300 Battery Analyzer, BLACK clip to the NEGATIVE terminal of the battery and RED clip to the POSITIVE terminal.

The IBA-300 Battery Analyzer can perform the following Battery Test, Starter Test, Charging Test and Peak Load Test.

BATTERY TEST

- Turn Ignition OFF and keep key on OFF.
- If the testing vehicle has been running for a while and the vehicle battery is under fully charged condition, the voltage can be higher than the normal value. Then, turn on the vehicle lights for 3 minutes to return to normal voltage value, before do the Battery Test.
- Follow the steps shown on the screen step by step.

MENU ↑↓↔
▪ 1.Battery Test
2.Starter Test
3.Charge Test

MENU ↑↓↔
2.Starter Test
3.Charge Test
▪ 4.Peak Load Test

In the Battery Test function, the IBA-300 provides the test results of battery's voltage, CCA, Resistance and the status Life and Result.

Select "Battery Test" then press ENTER key to perform the test.

Select Type ↑↓

- 1.CCA (SAE)
- 2.IEC
- 3.AH (AMP HR)

Select one Rating System Range, then press ENTER key.

Use UP/DOWN ARROW keys to move the cursor to select the Type, and LEFT/RIGHT ARROW keys to scroll pages.

Select Type ↑↓

- 4.EN
- 5.DIN
- 6.JIS

Select Type ↑↓

- 5.DIN
- 6.JIS
- 7.Unknown Type

Standard Input ↑↓↔

SET 500 CCA

<Enter>START Test

Select "1. CCA" then press ENTER key.

Edit the battery data by UP/DOWN ARROW keys to obtain an increase or decrease every 100 units, and LEFT/RIGHT ARROW keys every 5 units.

Press ENTER key to start the test.

```

12.89V  523 CCA
Resistance  04.87 mΩ
LIFE  89 %
RESULT:  GOOD Pass

```

The test result of these information will be shown on display.

Voltage 12.89V

The following datum are set in the program of this IBA-300 Analyzer.

Fully charged 100% – 12.78V
 75% – 12.54V
 50% – 12.30V
 25% – 12.12V
 Discharged – 11.94V

Value of CCA 523CCA

Resistance 4.87 mΩ

Note: The resistance value can be variable by different materials of the batteries. However, the resistance values for the batteries in one manufacturer-made model series are usually similar.

Status of the Life and Result

Life 89%
 Result Good Pass

This is showing the status of the battery. Suggest change a new battery while the Life-span is less than 45%.

Recommendations for the test results:

Life-Span	Test Result	Recommendation
> 80%	GOOD Pass	Battery in good condition
> 60%	FAIR Pass	Battery in fair condition
> 45%	Warning! Marginal Pass	Life-span is close to the end
< 44%	Replace Battery	Immediately replace a new one

STARTER TEST

Steps to perform the Starter Test:

1. Turn ignition OFF. Connect the Analyzer's BLACK clip to the NEGATIVE terminal of the battery and RED clip to the POSITIVE terminal.
2. Select the "2. Starter Test" on Menu then press ENTER key.
3. Start engine.
4. Read the voltage at starting and the variable voltage range.

```

MENU ↑↓↔
1. Battery Test
2. Starter Test
3. Charge Test

```

Entering "Starter Test" function then press ENTER key to perform the test.

```

Starter Test
Initial 13.02 V
Min 13.02 V
Normal:
More than 9.6V

```

The test result of these information will be shown on display.

During the test, the IBA-300 will record the minimum voltage. If you want to delete the data, press EXIT key to exit the test.

If the Minimum Voltage is greater than 9.6V, it means the starting system is in good condition. If less than 9.6V, there are some problems in the starting system, so you need to check all the wiring and connections with the starter, or there is any corrosion on battery terminals, and re-do the test again.

Read the test results and check the following recommendations to know what you should take further on the battery.

Voltage of Starter	Performance of Discharging	Recommendation
> 10.7 V	Good	In good condition
10.2 ~ 10.7V	Fair	Be caution and keep monitoring on it
9.6 ~ 10.2V	Poor	Need to replace a new one shortly
< 9.6V	Bad	Immediately replace a new one

CHARGING TEST

Steps to perform the Charging System Test:

1. Start Engine.
2. Connect the Analyzer's BLACK clip to the NEGATIVE terminal of the battery and RED clip to the POSITIVE terminal.
3. Select "3. Charge Test" on Menu then press ENTER key.
4. Accelerate to 2,000rpm for 15 seconds.
5. Read the maximum and minimum voltage readings.

MENU ↑↓↔

- 1. Battery Test
- 2. Starter Test
- 3. Charge Test

Charge test

Normal

Max 13.01 V ↓ 15.0V

Initial 12.99 V

Min 12.99 V ↑ 13.3V

From the test result, the charging system is in good condition if the voltage is between 13.3V-15.0V.

If the voltage is greater than 15V, you should check the regulator; and less than 13.3V, you should check all the connections, wiring and alternator.

During the test, the IBA-300 will record the minimum voltage. If you want to delete the data, press EXIT key to exit the test.

Read the test results and refer to the following recommendations:

Status	Voltage of the Battery	Condition of Alternator
Turn OFF vehicle lights and air-condition, but press acceleration pedal	> 13.5	In good condition
	13.2 ~ 13.5	Fair
	13.0 ~ 13.2	Be caution
	< 13.0	Immediately need a further inspection or repairing
Turn ON vehicle lights and air-condition, and also press acceleration pedal	13.4 ~ 14.6	In good condition
	13.2 ~ 13.4	Fair but be caution
	< 13.2	Immediately need a further inspection or repairing

Note: The above informations are only for reference. If the vehicle battery is not in good condition, it will affect the test result.

PEAK LOAD TEST

Steps to perform the Peak Load Test:

1. Start Engine.
2. Connect the Analyzer's BLACK clip to the NEGATIVE terminal of the battery and RED clip to the POSITIVE terminal.
3. Select "4. Peak Load Test" on Menu then press ENTER key.
6. Accelerate to 2,000rpm for 15 seconds.
7. Read the voltage readings.

MENU ↑↓↔

- 2. Starter Test
- 3. Charge Test
- 4. Peak Load Test

```
Peak load test
Initial13.44 V
Min 13.31V
Full Load on
12.8V above(Normal)
```

From the test result, if the minimum voltage is greater than 12.8V, it means the system is in good condition.

If the minimum voltage is less than 12.8V, you should check if the belt on alternator is damaged, and if wiring is shorted.

During the test, the IBA-300 will record the minimum voltage. If you want to delete the data, press EXIT key to exit the test.

PRINT OUT THE TEST RESULT

In each function test, when the test result is shown on screen you can print it out by pressing RIGHT ARROW key to obtain following screens to edit the testing vehicle data and test date before printing.

KEY-IN License Plate

00-0000

*

<ENTER>confirm
<EXIT>ignore

Press UP/DOWN ARROW keys to
select numbers 0-9 or letters A-Z

Press RIGHT/LEFT ARROW keys
to select the cursor for editing.

KEY-IN Date or Type

20130410

*

<ENTER>confirm
<EXIT>ignore

COMMON QUESTIONS

What's theory behind this tester?

Battery cannot be used forever and the main reason is caused by the oxidation of the bipolar battery plate. As the bipolar battery plate ages, the affect and efficiency decreases, which indicates the battery will lose its ability to induce chemical reaction. Institute of Electrical and Electronics Engineers (IEEE) has officially listed conductivity test as one of the standard testing for lead acid battery, and this is clearly stated in IEEE standard 1118-1996: The conductance technology is that adding a constant frequency and amplitude A.C. to the battery terminals, the electric current is divided by the voltage is the conductance value. This product is designed according to the principle.

Would reverses current gear affect the tester's outcome?

All reverse current gear will affect the test's outcome, therefore please remove all reverses current gear before testing the battery to ensure the tester's accuracy.

Can this product be predicted when the battery cell is no longer functional?

A sealed lead acid battery has very complex resistant structure, which includes ohmic resistance, concentration polarization resistance, electrochemical reaction resistance, and electric double layer capacitor. The resistance measured using different type of tests or testing at two different times could have different proportion and resistance composition; therefore the resistance value will also be different. In a sealed lead acid battery, there aren't any mathematic equation that explain the relationship between resistance (or conductance) and the battery's capacitance, thus one can't predict battery life with resistance (or conductance). However, if the resistance or the battery increase or the current decrease significantly, it is a clear indication that the battery is coming to its end.

Is the measurement of the CCA value accurate?

CCA is a type of standard for battery production. From the accumulated experience to know, a new battery has a higher value (10~15%) than the standard, but when it has been used for some time period, the CCA vale will approach the standard, and then drops to a lower value.

What is the difference between, on-load test and IBA-300's test?

On-load Test

According to physics equation: $R = V/I$, to measure the voltage between two poles of a battery while it is forced under loading of a large and constant DC current (about 40A~80A) at a short time (2~3 seconds), then calculate the present resistance of the battery.

The shortages of this measured test:

- 1. This measurement can be done on large capacity batteries, but doesn't work on small capacity batteries to be loaded of such a large current at a short time period.
- 2. When a battery under a strong current, its inner electro will cause polarization phenomenon and create a polarization resistance. Therefore, the test has to be completed within a very short time period, otherwise the test result will be inaccurate.
- 3. Under such a large current loading, the battery's electrode could be damaged.

IBA-300's Test

In reality, a battery works as a powered resistance, therefore when we give the battery at a certain frequency and a small amount of constant current, then to take sampling from its voltage. Then after generated and filtered, we can get the battery's inner resistance.

The advantage of this measured test

- 1. This measurement can work on all size batteries.
- 2. This measurement won't hurt the batteries.

BASIC KNOWLEDGE OF VEHICLE BATTERIES

Resistant varies between different types of battery

Even in the same type of battery, the resistance can vary due to the characteristic, inconsistent distribution, of the chemical in the battery. Resistance in a battery is very small, and it is normally measured in milliohms. Resistance is a key indicator to the performance of a battery. Under normally condition, less resistance indicates higher current flow, and vice versa.

It is not possible to approximate battery's capacity by one's feelings.

One can measure the capacity of the battery by measuring the proportion between distilled water and ammonium sulfate in the battery acid. Standard battery acid is

made out of 1 : 1.260 distilled water to ammonium at 20°C. In a brand new battery, if

the battery acid is within range, the acidity will be constant, therefore a properly functional battery will not just have the ability to keep the acidity at a constant value, but it will also keep the proportion within range.

In a small size battery:

Voltage	Capacity (%)	Proportion
> 12.7V	100%	1.26~1.28
12.6V	90%	1.24
12.4V	70~80%	1.22
12.1V	50%	1.16
< 12V	25%	< 1.13

When a battery is fully charged, if the battery acid is unable to reach proportion of 1.26 ~ 1.28, and also unable to produce a voltage that's higher than 12.7V, that's an indication that the capacity of the battery is declining. At this time, if one tries to balances the proportion by adding more ammonium sulfate to the battery acid, it will actually decrease the battery life and capacity at a more significant rate then before due to the increase in acidity in the battery acid.