



# VAT-700

## USER GUIDE



## MASHIN ELECTRIC CORP.

Established in 1996 in Madou District, Tainan City, Mashin Electric Corp. begins as a manufacturer of car chargers. Over the years, Mashin becomes a professional battery charger manufacturer for Automotive, Motorcycle, Industry, Jump Starter and functional battery chargers. Especially the car chargers stand the first selling position in domestic market. Recently, we have committed into more and more product lines for battery chargers.

We specialized in Battery Charger, Adaptor, Transformer, Switching Power, DC to AC Inverter, LiFePO4 Lithium Battery Pack, Battery Analyzer, Booster Cable, Jump Starter and related electronic products. With more than 20 years' factory experiences, we received customers' reliance for automotive market around the world. Mashin can do OEM services and also has the capability for ODM. Our products are followed by high SOP standards throughout the whole production process. Besides, we put into the newest equipment and focus on employees training in order to provide the best service and products to our customers.

Creativity and experiences are our advantages to receive customers' trust. Besides, our engineers have decades of experiences and contributed in developing our own battery chargers. Every year, we will have more than 5% R&D developing fees for our new products. What we want is to provide our customers a more convenient life. We take the four policies, "Total Quality Assurance, Quality First, Service First, Customer Satisfy" as our company goals. From R&D, purchasing, production to the sales and delivery, we all have completely Quality Management System. In addition, most of our products obtained UL, CE, CB, FCC, PSE, SAA, RoHs, and CEC certifications and safety regulations. Strict company policy and management obtain the certification of French (ANFOR) ISO-9001 and be the Japan PSE and U.S. UL certified factory.

Since the factory established, Mashin has actively built up our own brand and strives to develop the best products on a daily basis. It wasn't easy to keep the faith after several decades, but we did.

In the future, we will maintain our creativity, keep developing new types of chargers and extend the international market. It's our responsibility to feed back to the world.

# NOTES

---

- ◆ Please read the user manual carefully before using.
- ◆ There will be no further notice for the product upgrade or changes.  
Please take the device as standard.
- ◆ Declaration : Any product names mentioned in this manual are used for explaining the using methods. The trademarks still belong to the original company.
- ◆ Only available for 12V lead-acid batteries.

Mashin will have no responsibility for the followings:

- ◆ This manual is designed for Mashin's Analyzer only. Any consequence caused by using this manual to other products.
- ◆ Any damages or problems that caused by using other accessories or consumables instead of Mashin's original products.
- ◆ Any fees or expenses from the damages or losses of the analyzer caused by private accidents or misused and unused without following Mashin's standard.

# CONTENT

---

◆ PRODUCT SUMMARY	1.
■ Product Profile	
■ Function	
■ Technical Parameters	2.
■ Environmental Requirement	
◆ OPERATION	3.
■ Pre-Test	
■ Connect Analyzer	
■ Button Indicator	4.
■ How to use	
■ Battery System Standard and Rating	5.
◆ BATTERY TEST	6.
◆ CRANKING TEST	7.
◆ CHARGING TEST	8.
◆ SETTING	9.
◆ TEST RESULT	10.
■ Battery Test	
■ Chanking Test	12.
■ Charging Test	
◆ SPECIFICATION	13.
◆ TROUBLESHOOTING	14.

# PRODUCT SUMMARY

---

## ■ Product Profile

VAT-700 Lead-acid Battery Analyzer adopts the world's most advanced conductance testing technology which can easily, quickly and accurately measure the actual cold cranking amps capability of the vehicle starting battery, state of battery health, and common faults of the vehicle starting and charging system. This Battery Analyzer helps maintenance personnel to find out the problem quickly and accurately to increase the efficiency for repairing the vehicle.

- 1 、 Available for all automotive lead-acid batteries, eg. Regular Flooded, AGM , GEL and EFB...etc.
- 2 、 Battery condition detection.
- 3 、 Reverse polarity protection which will not cause the damage when connecting reversely either for analyzer or battery.
- 4 、 Low battery testing.
- 5 、 Multiple rating system selection, eg. CCA, DIN, JIS, EN, IEC, AH, SAE, MCA, BCI and CA.

## ■ Function

VAT-700 Lead-acid Battery Analyzer includes Battery Test, Cranking Test, Charging Test and other additional functions.

Battery Test : Analyze the battery status to calculate the actual cold cranking capability and aging.

Cranking Test : Test and analyze the condition of starting motor.

Charging Test : Check and analyze the condition of charging system.

---

## ■ Technical Parameters

◎ Cold Cranking Amps Measure Range:

Measure Standard	Measure Rate
CCA	40 - 2000
DIN	40 - 1400
JIS	26A17 - 245H52
EN	40 - 2000
IEC	40 - 1400
AH	3 - 240
SAE	40 - 2000
MCA	40 - 2000
BCI	40 - 2000
CA	40 - 2000

## ■ Environmental Requirement

◎ Temperature : -20°C ~ 60°C ( Non-waterproof )

◎ Storage : -30°C ~ 70°C

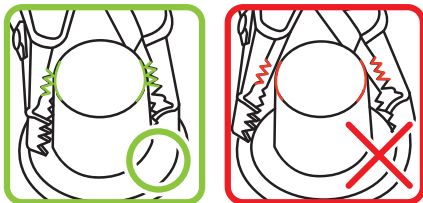
# OPERATION

## ■ Pre-Test

- Please clean battery terminal before using.
- Please make sure clamps and battery are well-connected.
- Before testing, please make sure the engine stopped and the door closed.

## ■ Connect Analyzer

- Please connect the clamps with the battery terminal, positive to positive and negative to negative.



Please make sure clamps are well-connected. If they are not connected well, the test will be unavailable. If screen shows “CHECK CONNECTION”, before getting into the testing program, please clean the terminals and connect again.

CHECK CONNECTION

- VAT-700 has reverse polarity protection, If clamps are connecting reversely, the screen will not light on. But it will not cause any damages either on analyzer or car load.

- ※ For parallel batteries, must break off the cathode connection first, then do the individual test to each battery. If you do not break off the cathode connection, there might come out with an error testing result.
- ※ For series batteries, if it is 24V, please test by each battery.

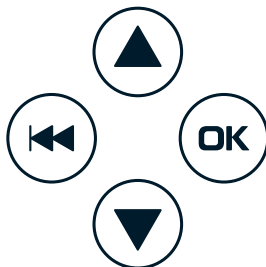
---

## ■ Button Indicator

●   ( UP & DOWN )

●  ( BACK )

●  ( OK )




## ■ How to use

VAT-700 will turn on automatically when the clamps are well-connected.



The battery voltage will show at the bottom of screen which can be used as DC Voltmeter. The measuring range is 6 - 30VDC, out of this range will cause the damage of the analyzer.

Press  to get into the MAIN MENU and select Testing Function.



---

## ■ Battery System Standard and Rating

Please select the SYSTEM STANDARD and RATING according to the information showed on the battery, as the arrow indicated below:



CCA : Cold Cranking Amps, specified by SAE & BCI

DIN : German Institute for Standardisation

JIS : Japanese Industrial Standard, displayed on the battery as combination of the numbers and letters, e.g. 55D23, 80D26

EN : European Standard

IEC : International Electrotechnical Commission

AH : Battery Capacity

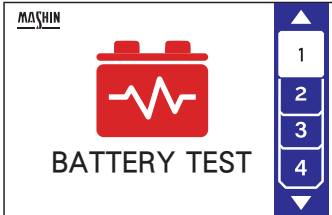
SAE : Society of Automotive Engineers (USA)

MCA : Marine Cranking Amps standard, effective starting current value at 0°C

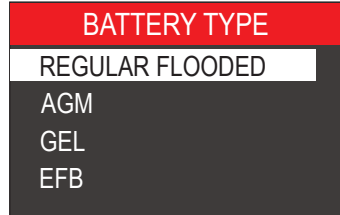
BCI : Battery Council International (Publishes Automotive Battery Standards)

CA : Cranking Amps standard, effective starting current value at 0°C

# BATTERY TEST



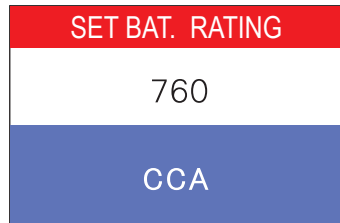
①



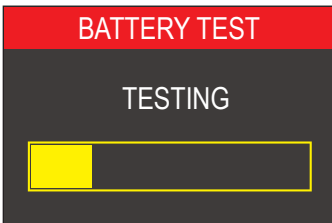
②

SELECT STANDARD	
CCA	EN
SAE	IEC
JIS	AH
DIN	MCA
BCI	CA

③



④



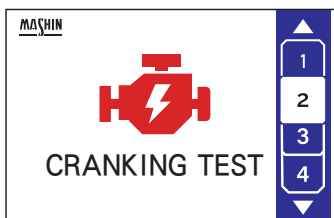
⑤

BATTERY TEST	
GOOD BATTERY	
SOH : 100%	655 CCA
SOC : 100%	12.58V
INTERNAL R :	4.55mΩ
RATED	550 CCA

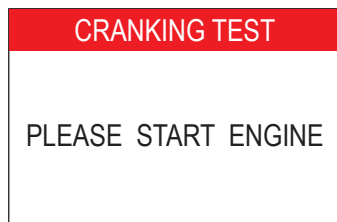
⑥

# CRANKING TEST

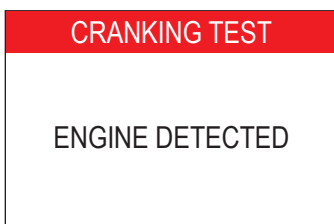
---



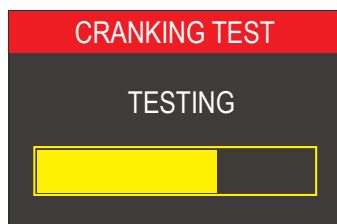
①



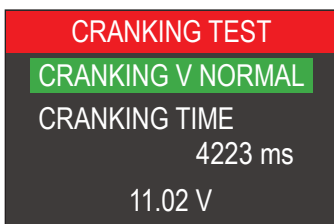
②



③

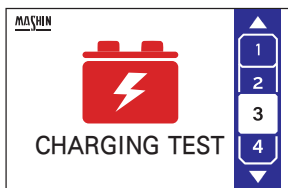


④

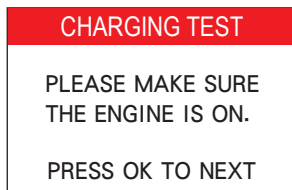


⑤

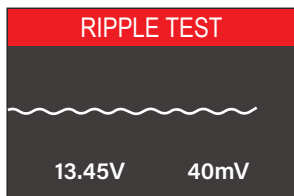
# CHARGING TEST



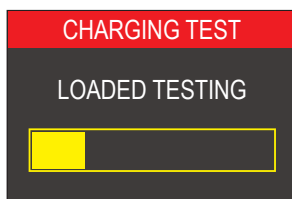
①



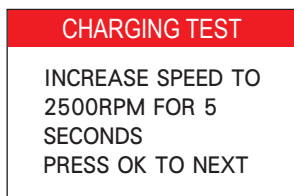
②



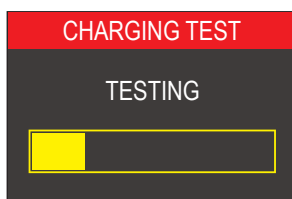
③



④



⑤

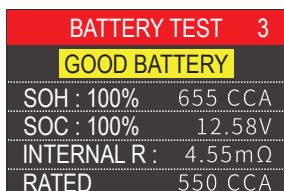
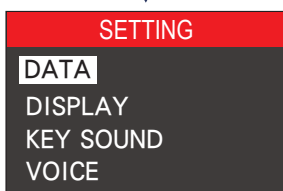
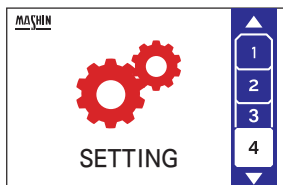


⑥

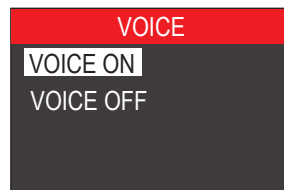
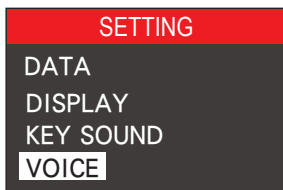
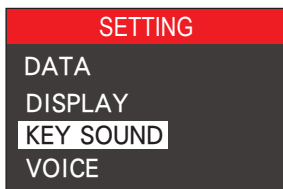
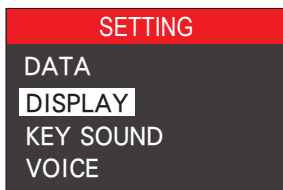
CHARGING TEST	
CHARGING V NORMAL	
LOADED V	13.43V
NO LOADED V	13.56V
RIPPLE V	35 mV
RIPPLE	NORMAL

⑦

# SETTING



▲ Check Testing History



# TEST RESULT

---

## ■ Battery Test

### ① GOOD BATTERY

BATTERY TEST	
GOOD BATTERY	
SOH : 100%	655 CCA
SOC : 100%	12.58V
INTERNAL R	4.55mΩ
RATED	550 CCA

NOTE : SOH : State Of Healthy  
SOC : State Of Charge

### ② GOOD RECHARGE

BATTERY TEST	
GOOD RECHARGE	
SOH : 100%	180CCA
SOC : 100%	12.36V
INTERNAL R	16.38mΩ
RATED	150 CCA

Battery is good but in low power, please  
charge before using.

### ③ CHARGE RETEST

BATTERY TEST	
CHARGE RETEST	
SOH : 30%	75CCA
SOC : 0%	10.06V
INTERNAL R	40.40mΩ
RATED	135 CCA

Unstable battery, please charge and re-test.  
If it still comes out the same result, the  
battery is damaged, replace it.

---

④ REPLACE

BATTERY TEST	
REPLACE	
SOH : 31%	180CCA
SOC : 60%	12.36V
INTERNAL R	16.38mΩ
RATED	320 CCA

Might be battery deterioration, please charge it and re-test. If it comes out the same result, replace the battery.

⑤ BAD CELL

BATTERY TEST	
BAD CELL	
SOH : 0%	75CCA
SOC : 0%	10.07V
INTERNAL R	40.40mΩ
RATED	1285 CCA

Replace the battery

※ Normally a good battery should be in low internal resistance unless it is short-circuit, this can be a determination when testing.

## ■ Cranking Test

CRANKING TEST	
CRANKING V	LOW
CRANKING TIME	
	1617 ms
9.14 V	

※ Normally the Cranking Voltage should higher than 9.6V, if it is lower, you need to check the starter motor.

## ■ Charging Test

CHARGING TEST	
CHARGING V	NORMAL
LOADED V	13.43V
NO LOADED V	13.56V
RIPPLE V	35 mV
RIPPLE	NORMAL

① Charging Voltage : Normal

No problems detected.

② Charging Voltage : Low

Please check if alternator system is well-connected. Otherwise, the alternator might be faulty.

③ Charging Voltage : High

Normally the highest voltage for stabilizer will not over  $14.7 \pm 0.5V$ , otherwise, please check if the alternator is faulty.

④ No Output :

Please check if alternator system is well-connected.

⑤ Ripple :

Through detecting the charging current wave to check if the ripple is in a normal condition. If the voltage is too high means the rectifier is damaged, please check and replace.



## SPECIFICATION

---

Test Voltage	DC 12V
Battery Test	Yes
Cranking Test	Yes
Charging Test	Yes
CCA Range	40~2000 CCA
Test Standard	CCA,DIN,JIS,EN,IEC,SAE,MCA,BCI,CA,AH
Battery Plate Test	Yes
Battery Voltage Test	Yes
Internal Resistance Test	Yes
Battery Health Test	Yes
Connection Error Test	Yes
Battery Types	WET / MF / AGM / EFB/ GEL

# TROUBLESHOOTING

---

## ■ The display does not turn on?

- Check if analyzer and battery are well-connected or reverse polarity.
- Check if testing cables are dropped off or broken.

## MASHIN ELECTRIC CORP.

- TEL : 06-5702066    ◦ FAX : 06-5702840
- E-MAIL : [mashin@mashin.com.tw](mailto:mashin@mashin.com.tw)
- ADDRESS : 10-33, Dashanjiao, Madou Dist., Tainan City 721, TAIWAN





**Keep Your Power.**

[www.mashin.com.tw](http://www.mashin.com.tw)

Ver.250214\_B