



**MODEL MBT400**

# **Wireless Electrical System Analyzer**

**For Testing 6V/8V/12V/24V Lead Acid Batteries individually & in Battery Packs. Also for testing 12V, 24V and 36V Charging & Starter Systems**

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## **User Manual**

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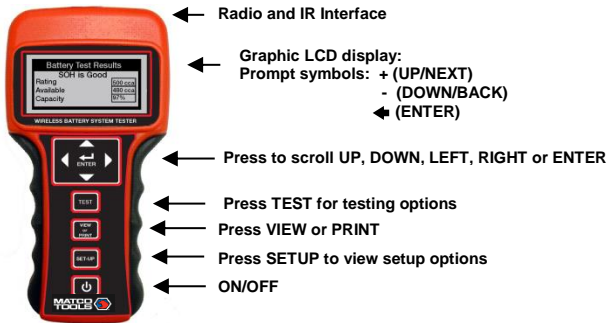
## INTRODUCTION

The MBT400 Wireless Micro LCD tests all 6V, 8V, 12V lead acid batteries individually or in parallel and 24V HD (series) battery packs. The tester will display the battery or battery pack condition as % available capacity, rated capacity (i.e. CCA's), state of charge voltage and good, marginal or replace status. The Wireless Micro LCD also tests 6V,12V, 24V and 36V starter and charging systems including starter draw, alternator output (loaded/unloaded), and diode ripple. The Wireless Micro LCD features both a Radio and an IR wireless printer output for remote printout of the test results. Test results can be sent to either an USB Adapter (included) or stand alone IR Printer. The test data for the last test performed is stored in the memory and can be reviewed either when connected to a battery, or when disconnected from the battery at a later time.

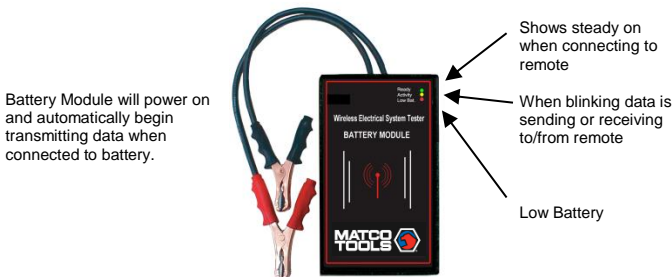
### Features:

- Patented conductance technology
- Displays % of capacity and CCA's.
- Tests 6V,8V,12V & 24V (series) lead acid batteries including AGM and Gel
- Includes Wireless Battery Module Transmitter
- Radio and IR printer interface for remote printing
- USB adapter for PC printing (included)
- No conversion tables needed
- Test batteries from 100 CCA to 3500 CCA (battery pack)
- Tests 6/12/24/36V Starting/Charging Systems
- Tests both series and parallel batteries
- Tests Alternator Ripple
- Bad cell is detected and displayed
- Displays Multiple International Units
- Tests 6V & 8V "golf cart" type batteries
- Custom Header with Company Name, Date and Time
- Loose lead detection
- Temperature Compensation
- RoHS compliant brass post adapters included
- Multiple language (English, Spanish, French, German, Italian & Dutch)
- Reverse polarity protection
- Auto shutoff feature
- Tests parasitic drain
- Made in USA

## MBT400 Controls



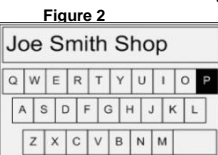
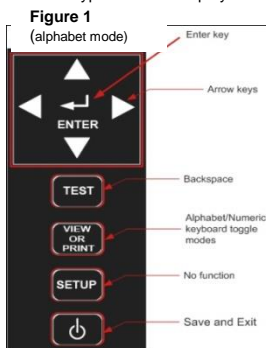
## Battery Module



## MENU OPTIONS

**SET UP:** Press SET-UP to select language, company info (shop name & address), HPIr-PRINTER or USB adapter (included), technician name and the date and time. Note: after setting date and time press SET-UP to save.

The keypad and the display are used to enter text with the following key assignment:

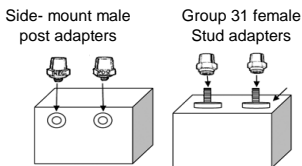


As seen in Fig. 1, the key functions in this mode have different functions used to enter the text required. Use the Arrow keys to navigate the keys on the keyboard layout as shown in Fig. 2 or Fig. 3. Press ENTER key to add the character selected. Press Backspace to erase the last character. Press Backslash key (/) to start a new line. Press the Alphabet/Numeric keyboard toggle modes key to switch between Fig. 2 and Fig. 3 layouts. Press Save and Exit key to save and exit.

**TEST:** Press TEST to test battery, starter, and charging system. Follow prompts on display. Scroll up/down and then press enter when desired option is selected.

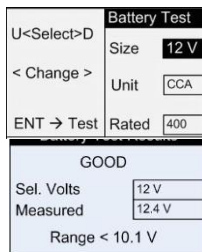
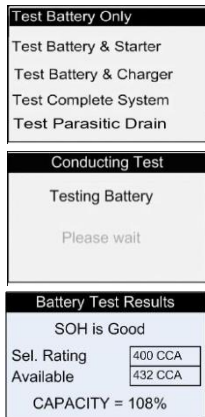
## PRIOR TO TESTING

**Important:** Use stud or post adapters (provided with the MBT400) when connecting to side mount or Group 31 batteries outside of the vehicle. Or connect battery clips on the base of threaded stud when testing (see Fig. below). Make sure adapters are properly tightened. Connecting the tester directly to threaded studs or bolts will result in false readings. When connecting to batteries inside or outside of the vehicle, rock the clips back and forth to ensure a good connection. **CHECK CONNECTION** may show on the display if a poor connection is detected. Reset clips if necessary.



## Out of Vehicle Test BATTERY TEST:

- Connect the MBT400 Battery Module to the battery to be tested. The green **Ready** LED and the yellow **Activity** LED will blink. **Note: make sure battery clips make contact with the lead battery post.**
- Press the ON/OFF button to turn on the remote. "MATCO MBT400" will appear momentarily on the display. Press TEST. The display will show the following screens. Select TEST BATTERY ONLY if testing just the battery. Follow the screen sequence as below. See the next sections for the starter and charging systems screen sequences.



**In Vehicle Tests**  
**BATTERY TEST:**

Connect the MBT400 Battery Module to the battery to be tested. The green **Ready** LED and the yellow **Activity** LED will blink. Press the MENU ON/OFF button to turn on the remote. "MATCO MBT400" will appear momentarily on the display and then the display will show **WAITING TO CONNECT**. When connected the green LED will stop blinking and the display will show **IN VEHICLE TEST? PRESS YES (→)**. The display will then prompt the user to **SELECT BATTERY/SYSTEM VOLTAGE**. Press the **+ UP** or **- Down** buttons to select the battery or battery pack voltage i.e. 6V, 8V, 12V, 24V, 36V to be tested.

**NOTE:** When testing the battery in the vehicle, make sure vehicle engine is **not** running and all accessory loads are **off**. If **SURFACE CHARGE (SOC)** is displayed, turn on accessory loads (lights, AC or heater) for 15 seconds with engine off.

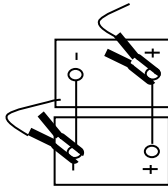
**Testing Battery Packs:**

The MBT400 tests battery packs when they are connected to the vehicle as though it is testing a single battery. When testing a battery pack, enter the battery voltage and rating of the pack as a single battery.

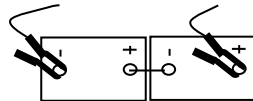
**Batteries in parallel:** For batteries connected in parallel, add the rated capacity of each single battery to determine the rated capacity of the pack. For example two 500 CCA batteries in parallel would have a rating 1,000 CCA (see figure below). The voltage of the pack remains the same regardless of the number of batteries in the pack. The MBT400 can test batteries in parallel up to 3500 CCA.

**Batteries in series:** A pack consisting of 2 single 12V batteries in series would have 24V. The rated capacity of the two 12V batteries in series is 1/2 the rating of the single battery. For example two 500 CCA 12V batteries in series would have a rating of only 250 CCA. The MBT400 can test two 12V batteries in series

**IMPORTANT:** The MBT400 determines the condition of the pack as whole but does not determine the condition of the individual battery in the pack. If the condition of the parallel pack is determined to be bad, disconnect the batteries from the pack and check each battery individually.



2- 12V batteries in parallel: add rated capacities of single battery. Pack is still 12V.

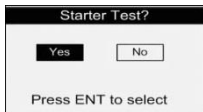


2- 12V batteries in series: add 1/2 rated capacities of single battery. Pack is 24V.

**STARTER TEST:**

Note: Before the starter can be properly tested, make sure the battery or battery-pack SOC (state of charge) and battery condition tests GOOD and the engine is OFF.

To test the Starter, press the ON/OFF button to turn on the remote. "MATCO MBT400" will appear momentarily on the display. Press TEST. The display will show the following screens. Select TEST BATTERY & STARTER. Follow the screen sequence as below. See the next section for the charging system screen sequences.

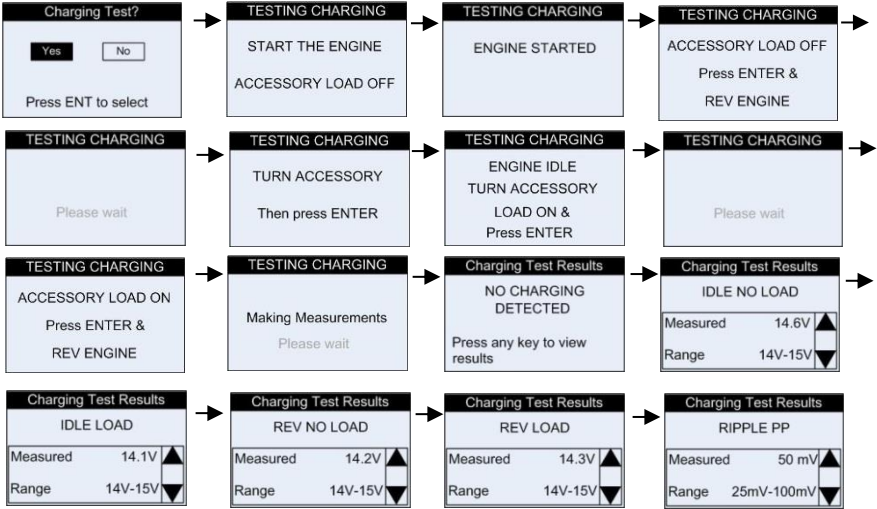


<b>STARTER IS GOOD</b>	
Initial Start Volts =	12.6V
Cranking Volts =	10.3V
Range > 9V	

## CHARGING SYSTEM TEST:

**IMPORTANT: Engine must be off before testing charging system.**  
**Charging system can also be road tested while driving vehicle\*.**

To test the Charging system, press the ON/OFF button to turn on the remote. "MATCO MBT400" will appear momentarily on the display. Press TEST. The display will show the following screens. Select TEST BATTERY & CHARGER. Follow the screen sequence as below.



### \*ROAD TESTING THE CHARGING SYSTEM

Connect the local unit to the battery making sure it is properly secured. Turn on the Remote and wait for the connection to sync. Set the vehicle charging voltage and press Enter. The display will show the battery SOC (state of charge). Start engine and begin road testing at various speeds with and without accessory loads. The display will show the real time alternator output. Check manufacturer's specifications for proper charging voltage during road test.



**Warning! Risk of accident.**

Two people should be in the vehicle when driving on the road, one to drive and the other to attend to the equipment. Accidents can occur when attention is not solely given to driving.



**Road test:** Extra precautions are required to keep the local unit away from hot or moving parts while a vehicle is driven on the road. It may be necessary to secure the local unit to frame or body parts with wire or nylon ties to insure that the local unit does not change position while the vehicle is being driven.

### VIEW OR PRINT TEST RESULTS

The following data can be viewed or printed for the last test stored in the tester's memory:

Technician Name	Cranking Voltage
Date	Starting System Condition (Normal)
Battery Voltage	Idle No Load
CCA Rating	Rev No Load
CCA Available	Idle Load
% Available	Rev Load
State of Health Battery	Ripple Peak to Peak
Initial Battery Voltage	Charging System Condition (Normal)

### USING THE IR PRINTER INTERFACE

The MBT400 will download test data to any stand-alone IR Printers utilizing either IrDA or HPIr protocol. The user can print both when connected and when not connected to a battery. To print out the last test results:

1. Turn on the MBT400 by pressing the ON/OFF button.
2. Press SET-UP button. Select either model IrDA or HPIr-PRINTER.
3. Press the VIEW or PRINT button. The display will show the message **ALIGN THE PRINTER**. Align the MBT400 transceiver located at the top of the tester with the printer's IR receiver. Note: The HPIr printer must be within 12-18 in. from the tester and remain aligned during entire printout. The last data stored in the memory will begin to printout on the IR printer.

Note: The alignment between the tester and the IR printer must be proper for data to print out.

**\*Important: Make sure the printer you are using is selected in the Set Up Menu.**

## Using the USB Adapter

The USB adapter allows the user to download the stored test data in the MBT400 into your computer. Once the CD program is installed, the test data is stored in a Windows based program for immediate printing or saved in a file for future reference.



**NOTE:** Depending on the environment, the remote should be within 20 feet of the USB adapter.

Figure 1

## Installing the USB CD

### System Requirements:

Windows XP Service Pack 2 Minimum (Home or Pro), Vista (Home or Pro), Windows 7\* (Home or Pro) 32 & 64 Bit System

1. Insert the CD into your CD-Rom
2. Follow the simple onscreen instructions. The software will prompt you through each step of the installation.
3. If the software does not start automatically:
  - ❖ Click START on the Windows Taskbar
  - ❖ Chose RUN
  - ❖ Type D:\setup.exe (where D is your CD-ROM drive)
  - ❖ Click OK.

**Note:** The software installation requires Microsoft Framework 3.5. This will be automatically installed if required. In this case installation may take about 10 to 12 minutes to install although older systems may take longer.

4. When the installation finishes, connect the USB adapter to one of the USB ports on your computer. The computer will show the prompt "Found New Hardware". Follow the directions in the new hardware Wizard to complete the driver installation.
5. When the new hardware installation is complete, double click on the USB Software icon to open the USB Adapter program.

### \* WINDOWS 7 USERS:

If error messages occur when printing you may need to set the UAC (User Account Control) slider is set to "Never Notify".

To set:

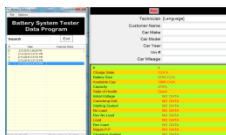
1. In control panel select user account (family safety).
2. Under "Make changes to your account", select "Change user account control settings."
3. Adjust slider down to "Never Notify".
4. Restart computer.

This allows users to save and reopen battery tester data files (files with .btd extensions.)

## Downloading Data Using the USB Adapter

**Note:** Select WIRELESS in Set Up Menu under PRINTER- for radio transmission to the USB Adapter

1. Click on the USB Adapter icon to open the USB Adapter program.
2. Select OPTIONS> SETUP to enter shop name, address, phone number and language. This information will show at the top of the print out page each time the data is printed and only needs to be entered once.
3. Turn on the MBT400 and press VIEW or PRINT button. Select Print and the stored data will appear on computer monitor. See following example:



**NOTE:** Enter the customer, technician name, car make/model, etc.

The data will automatically display in the appropriate columns. Note: If it is not necessary to track the customer, technician, or other information on this screen, leave blank and click OK without entering their names.

To save the data, click on **Save As**. The data will be saved as a .btd file. To view the file at a later date, click on **Load** and select the file name desired. Note: to save and view **all** test data stored, keep all test data in the **same** file. Each new data downloaded will always be added to the next row. **Note:** To delete any row of data- Click mouse to highlight and press delete key on keyboard. Otherwise, individual data can be saved as a separate file as long as no new data is added and saved to that file.

### Printing the Data on your PC Printer

To print the data using your PC printer, click on print button. The last entry will print. To print a different entry, click on the row to highlight. The data will print out on standard 8 1/2 x 11 size computer paper.

John Garage 1011 West 6th Street Hoboken, NJ 07030 Phone: 201-228-1028	← Header information is entered in Setup (see page 3)
Date: 10/10/09 8:25:14 AM	← Date and Technician (see page 4)
Technician:	
Customer: Car Make: Car Model: Car Year: Car Vins: Car Mileage:	← Car information entered (see page 4)
Charge State: 12.0 V Battery State: 0800 CCA Available Capacity: 9010 CCA Capacity: 0200 State of Health: 0200 WMA Voltage: 12.0 V Charging Voltage: 13.0 V	← Data from battery tester
Starting Voltage: Normal WMA No. Load: 14.0 V WMA Load: 14.0 V WMA Temp: 14.0 V WMA P. 2: 0000 mV Charging System: Normal	

**NOTE:** To properly test the Electrical System (Full Test) the test sequence should be Battery Test, Starter Test, and then Charging System Test. The battery must be in good condition to properly test the Starter and Charging system. Therefore, the Starter Test Data and/or Charging Test Data may not show on the printout if either test is skipped.

### AUTO SHUTOFF

If the tester is left on while in a user select mode (other than SOC) the MBT400 will automatically shutoff after 5 minutes from the last user entry. This will conserve battery life in case the tester is left on inadvertently.

### REPLACING THE INTERNAL 9V BATTERY

1. The MBT400 will alert the user when the voltage of the internal battery is low and needs to be replaced. When this occurs, the display shows **REPLACE INTERNAL BATTERY**. This message will also display if no battery is installed.
2. To replace battery: Remove screw at back of tester and lift up the battery cover. Insert the 9V battery into the battery compartment noting the polarity label inside. (See figure below).

MBT400 Battery Compartment



### PARASITIC DRAIN TEST

**Note:** Make sure all accessory loads are off before checking for parasitic drain.

1. In the TEST menu select PARASITIC DRAIN TEST.
2. Disconnect negative battery cable and connect the local unit in series to cable and battery as shown in Figure 1 below.
3. After connecting, the remote will display the battery current drain in mAmps. See Note 2.

**Note 1:** To avoid losing computer settings, turn on remote immediately after connecting and turning local unit on.

**Note 2:** Check manufacturer's specifications to determine acceptable current drain and how long it is necessary for the computer to go into sleep mode.

Figure 1





**REPLACEMENT PARTS**

Item	Part Number
Brass post adapters	B555
Carrying case	MBT400CC
Instruction Manual	MBT400IM

**PRODUCT SPECIFICATIONS**

<b>Model #</b>	<b>MBT400</b>
<b>Name</b>	<b>Electrical System Analyzer</b>
<b>Battery Size Range</b>	<b>100 CCA to 3500 CCA</b>
<b>DC Voltage: Range/Accuracy</b>	<b>3.0V to 49.9V/ +/- 2% reading</b>
<b>LCD Display</b>	<b>1.25" X 2.5" Graphic LCD with backlight</b>
<b>mA Range (Parasitic drain test)</b>	<b>5 mA to 1,000 mA</b>
<b>Power Supply</b>	<b>9V (Internal Battery)</b>
<b>Cable Length (battery module)</b>	<b>2 Ft.</b>
<b>Wireless Signal</b>	<b>900MHZ (Custom Protocol)</b>
<b>Weight, lbs</b>	<b>1.5 lbs</b>
<b>Warranty</b>	<b>2 years</b>
<b>Wireless Range</b>	<b>Approx. 50 Ft. (depending on the environment)</b>
<b>IR Printer Specifications</b>	
<b>Infra Red Protocol:</b>	<b>IrDA &amp; HPIr Capable</b>
<b>Normal dist. from Tester to Adapter:</b>	<b>18"</b>
<b>USB Cable:</b>	<b>Mini USB</b>
<b>USB cable length:</b>	<b>36"</b>
<b>Operating Temperature:</b>	<b>32°F to 120°F</b>
<b>Weight:</b>	<b>.25 LBS</b>

**RETURN FOR REPAIR POLICY**

Every effort has been made to provide reliable, superior quality products. However, in the event your instrument requires repair, forward unit to Service Center freight prepaid to the address below with return address, phone number and/or email address.

SERVICE CENTER  
2651 W 81st Street  
Hialeah, FL 33016

**WARRANTY POLICY**

The MBT400 Micro LCD Electrical System Analyzer is warranted to be free of defects in materials and workmanship for a period of two years from the date of purchase. This warranty applies to all repairable instruments that have not been tampered with or damaged through improper use including unauthorized opening of the unit. Please ship warranty units that require repair freight prepaid to Service Center along with proof of purchase, return address, phone number and/or email address.