

# DRAPER®

## INSTRUCTIONS FOR Battery Diagnostic Tool & Printer

Stock No.64583 Part No.BDT/B

**IMPORTANT:** PLEASE READ THESE INSTRUCTIONS CAREFULLY TO ENSURE THE SAFE AND EFFECTIVE USE OF THIS PRODUCT.



DRAPER®

### GENERAL INFORMATION

These instructions accompanying the product are the original instructions. This document is part of the product, keep it for the life of the product passing it on to any subsequent holder of the product. Read all these instructions before assembling, operating or maintaining this product.

This manual has been compiled by Draper Tools describing the purpose for which the product has been designed, and contains all the necessary information to ensure its correct and safe use. By following all the general safety instructions contained in this manual, it will ensure both product and operator safety, together with longer life of the product itself.

All photographs and drawings in this manual are supplied by Draper Tools to help illustrate the operation of the product.

Whilst every effort has been made to ensure the accuracy of information contained in this manual, the Draper Tools policy of continuous improvement determines the right to make modifications without prior warning.

# 1. TITLE PAGE

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## **1.1 INTRODUCTION:**

USER MANUAL FOR:

## **BATTERY DIAGNOSTIC TOOL & PRINTER**

Stock no. 64583.

Part no. BDT/B.

## **1.2 REVISIONS:**

Date first published November 2014

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As our user manuals are continually updated, users should make sure that they use the very latest version.

Downloads are available from: <http://www.drapertools.com/b2c/b2cmanuals.pgm>

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## **1.3 UNDERSTANDING THIS MANUALS SAFETY CONTENT:**

**WARNING!** Information that draws attention to the risk of injury or death.

**CAUTION!** Information that draws attention to the risk of damage to the product or surroundings.

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## 3. GUARANTEE

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### **3.1 GUARANTEE**

Draper tools have been carefully tested and inspected before shipment and are guaranteed to be free from defective materials and workmanship.

Should the tool develop a fault, please return the complete tool to your nearest distributor or contact Draper Tools Limited, Chandler's Ford, Eastleigh, Hampshire, SO53 1YF. England. Telephone Sales Desk: (023) 8049 4333 or Product Helpline (023) 8049 4344.

A proof of purchase must be provided with the tool.

If upon inspection it is found that the fault occurring is due to defective materials or workmanship, repairs will be carried out free of charge. This guarantee period covering parts/labour is 12 months from the date of purchase except where tools are hired out when the guarantee period is ninety days from the date of purchase. This guarantee does not apply to normal wear and tear, nor does it cover any damage caused by misuse, careless or unsafe handling, alterations, accidents, or repairs attempted or made by any personnel other than the authorised Draper warranty repair agent.

Note: If the tool is found not to be within the terms of warranty, repairs and carriage charges will be quoted and made accordingly.

This guarantee applies in lieu of any other guarantee expressed or implied and variations of its terms are not authorised.

Your Draper guarantee is not effective unless you can produce upon request a dated receipt or invoice to verify your proof of purchase within the guarantee period.

Please note that this guarantee is an additional benefit and does not affect your statutory rights. Draper Tools Limited.

# 4. INTRODUCTION

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## 4.1 SCOPE

Battery diagnostic tool and printer is designed to analyse battery status and also enable quick and reliable analysis of the charging system. To calculate the actual cold cranking capability of the battery, which provides reliable analysis evidence for the maintenance of lead acid, AGM flat plate, AGM spiral, gel and EFB batteries.

Through testing the actual required cranking current and cranking voltage, the battery diagnostic tool and printer is able to diagnose the condition of the starter motor.

## 4.2 SPECIFICATION

Stock no .....	64583
Part no .....	BDT/B
Cold cranking amps measurement range:	
CCA.....	100 - 2000
BCI.....	100 - 2000
CA.....	100 - 2000
MCA .....	100 - 2000
JIS .....	26A17--245H52
DIN .....	100 - 1400
IEC .....	100 - 1400
EN .....	100 - 1400
SAE .....	100 - 2000
GB.....	100 - 1400
Voltage Measure Range .....	1.0 - 30VDC
Current Measure Range.....	0-900A DC
Working Environment Temp.....	-20°C - 60°C
Weight.....	500g

## 5. HEALTH & SAFETY INFORMATION

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### **5.1 GENERAL SAFETY INSTRUCTIONS FOR BATTERY DIAGNOSTIC TOOL USE**

For your safety, read this manual thoroughly before operating your Battery Diagnostic Tool. Always refer to and follow safety messages and test procedures provided by the manufacturer of the vehicle or equipment being tested.

The safety information presented below and throughout this user's manual are reminders to the operator to exercise extreme care when using this test instrument.

#### **READ ALL INSTRUCTIONS**

Read, understand and follow all safety messages and instructions in this manual and on the test equipment.

#### **Misdiagnosis may lead to incorrect or improper repair and/or adjustment.**

Do not rely on erratic, questionable, or obviously erroneous test information or results.

- If test information or results are erratic, questionable, or obviously erroneous, make sure all connections and data entry information are correct and test procedures were performed correctly.
- If test information or results are still suspicious, do not use them for diagnosis. Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.
- The Battery Diagnostic Tool should be operated by qualified personnel only.
- Use the Battery Diagnostic Tool only as described in the user's manual.
- Use only manufacturer's recommended attachments.
- Do not operate the Battery Diagnostic Tool with damaged cables.
- Do not operate the Battery Diagnostic Tool if it has been dropped or damaged, until examined by a qualified service representative.

## 5. HEALTH & SAFETY INFORMATION

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### **Risk of explosion**

Safety goggles and protective clothing must be worn by the operator and any bystanders. - Even if everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

Flammable fuel and vapours can ignite. Do not smoke, strike a match, or cause a spark in the vicinity of the battery. Battery gases can ignite.

Avoid sparks when connecting or disconnecting power leads to the battery.

Do not use this Battery Diagnostic Tool in environments where explosive vapours may collect. These areas include:

- below-ground pits.
- confined areas.
- areas that are less than 18 inches above floor.

### **Risk of poisoning**

Use this Battery Diagnostic Tool in locations with mechanical ventilation providing at least 4 air changes per hour. Engine exhaust contains odourless gas which can be lethal. Route the exhaust outside while testing with the engine running.

### **Risk of Burns**

Battery acid is a highly corrosive sulphuric acid.

Safety goggles and protective gloves must be worn by the operator and any bystanders. - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

Make sure someone can hear you or is close enough to provide aid when working near a battery.

Have plenty of fresh water and soap nearby. - If battery acid contacts skin, clothing, or eyes, flush exposed area with soap and water for 10 minutes. Seek medical help.

Do not touch eyes while working near battery.

Risk of unexpected vehicle movement.

Block drive wheels before performing a test with engine running.

Unless instructed otherwise:

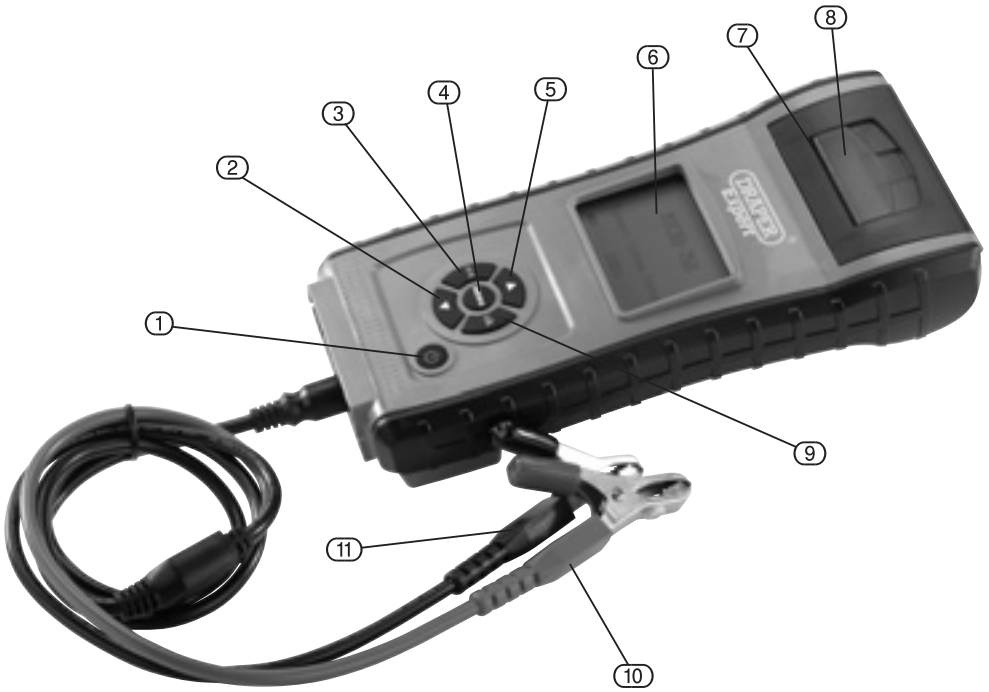
- set parking brake
- put gear selector in neutral for manual transmissions
- put gear selector in park for automatic transmissions
- disconnect release mechanism on the automatic parking brake release for testing and reconnect when testing is completed.

Do not leave a running engine unattended.

## 6. TECHNICAL DESCRIPTION

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### 6.1 IDENTIFICATION



- ① Power button
- ② "Down" key
- ③ "Return" key
- ④ "MENU" key
- ⑤ "Up" key
- ⑥ LED screen
- ⑦ Serrated cut off point for print out
- ⑧ Roll replacement door
- ⑨ "OK" key
- ⑩ Red "+" crocodile clip
- ⑪ Black "-" crocodile clip



## 7. PREPARING THE BATTERY DIAGNOSTIC TOOL

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### 7.1 CONNECT TESTER - FIGS. 1 - 2

- Before test, clean battery poles with metal wire brush and alkaline cleaner to avoid the tolerance caused by oil and dust to the test result.
- While testing, ensure none of the in-vehicle electrical appliances are is on, doors are closed and the ignition is OFF.
- Connect the red test clamp with battery anode and the black test clamp with cathode. Ensure there is a good connection.

NOTE: For parallel connected batteries, remove the cathode connection first, then test each battery.

- If the above is not followed either figure 1 or figure 2 will be displayed.

FIG.1

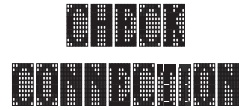


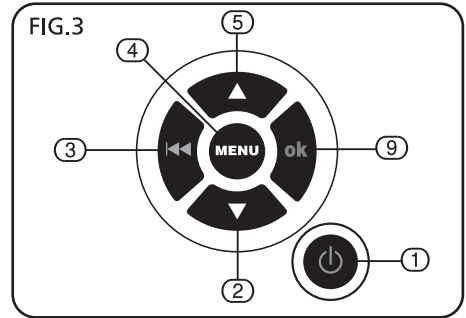
FIG.2



## 7. PREPARING THE BATTERY DIAGNOSTIC TOOL

### 7.2 KEY DESCRIPTION - FIG. 3

- Up (5) and Down (2) keys:  
Select upwards or downwards via white UP and DOWN keys.
- Return (3) key:  
Return to previous menu via blue RETURN key.
- OK (9) key:  
Confirm the selection via green OK key
- MENU (4) key:  
Enter additional function program via MENU key.
- Power (1) key:  
Turn on/off the tester.



## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 8.1 TESTER STARTUP - FIGS. 4 - 5

Tester will start up after pressing the power key, and display.

At the bottom left of the startup interface, "██████" the real time capacity of the internal 9V battery. When the capacity of the 9V battery is not sufficient, replace before any work is carried out.

By default, at the bottom of the startup interface, DC voltmeter value is displayed, measure range is 1.0-30VDC.

(Caution: Use of this tester over this measure range, will damage the tester.)

Voltmeter function can be set as "ON/OFF" under Additional Functions.

When OK key is pressed, tester enters the battery test program. When pressing the MENU key enters additional functions.

When Voltmeter is OFF, screen shows the startup interface and after 2 seconds, it will automatically enter the battery test program. Press MENU key within 2 seconds, to enter the additional functions.

FIG.4

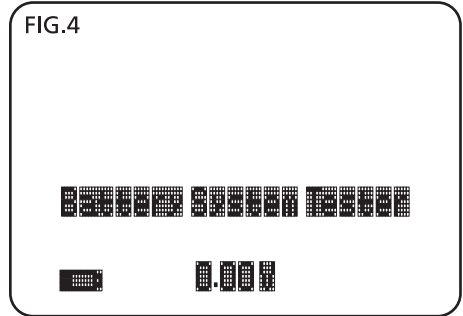
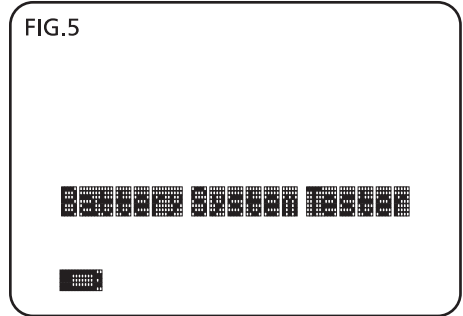


FIG.5

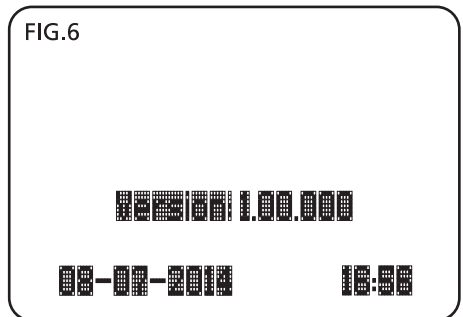


### 8.2 BATTERY TEST - FIG. 6

After entering the battery test program, the tester will display model version, date and time.

NOTE: Date and time can be adjusted in additional functions..

FIG.6



## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 8.3 IN-VEHICLE OR OUT-OF-VEHICLE - FIGS. 9 - 11

Press UP/DOWN key to select the battery location, in vehicle or out of vehicle, then press OK key to confirm.

1. **IN-VEHICLE** means battery is connected with the vehicle.

FIG.7

SURFACE CHARGE  
IN-VEHICLE

When surface charge detected by the tester, it prompts "SURFACE CHARGE, TURN LIGHTS ON".

FIG.8

SURFACE CHARGE  
TURN LIGHTS ON

Turn lights on as prompted to eliminate battery surface charge, tester will then display the following messages in a sequence:

FIG.9

HEADLIGHTS ON

When the tester detects the surface charge has been eliminated, turn lights off as prompted, then press OK key. The tester will recover automatic test.

FIG.10

TURN LIGHTS OFF

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

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2. **OUT-OF-VEHICLE** means battery is not connected with any of the vehicle loaded, i.e. battery connection is cut off.

### 8.4 SELECT BATTERY CHARGE STATE - FIGS. 12 - 13

After selecting the battery location, the tester will prompt to select the battery charge status, i.e. Before Charge or After Charge.

Press UP/DOWN key to select battery charge status, then press OK key to confirm. In this way, it ensures a more accurate test result.

NOTE: In Vehicle, select Before Charge for Cold Vehicle and After Charge for Hot Vehicle.

FIG.11

SELECT BATTERY LOCATION  
OUT-OF-VEHICLE

FIG.12

SELECT CHARGE STATE  
BEFORE CHARGING

FIG.13

SELECT CHARGE STATE  
AFTER CHARGING

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 8.5 SELECT BATTERY TYPE - FIGS. 14 - 21

After the battery charge status is selected, the tester will prompt to select battery type, i.e. Regular Flooded, AGM Flat Plate or AGM Spiral, Gel or EFB battery. Press UP/DOWN key to select battery type, and press OK key to confirm.

FIG.14

SELECT BATT  
REGULAR FLOODED

FIG.15

SELECT BATT  
AGM FLAT PLATE

FIG.16

SELECT BATT  
AGM SPIRAL

FIG.17

SELECT BATT  
GEL

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

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When the IN-VEHICLE test is selected, battery installation position must be selected, e.g. TOP, SIDE or REMOTE (This is not required for OUT-OF-VEHICLE), then press OK key to confirm. REMOTE is used for some vehicle batteries when the access to the battery poles are restricted.

FIG.18

SOURCE TYPE  
TOP

FIG.19

SOURCE TYPE  
TOP POSN

FIG.20

SOURCE TYPE  
SIDE POSN

NOTE: In REMOTE test results may vary, if in any doubt, remove battery and carry out OUT-OF-VEHICLE test.

FIG.21

SOURCE TYPE  
REMOTE

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

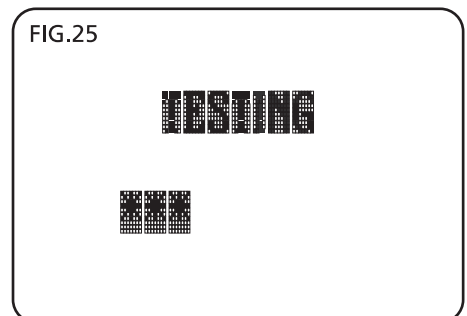
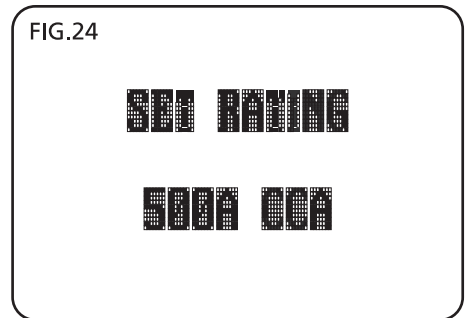
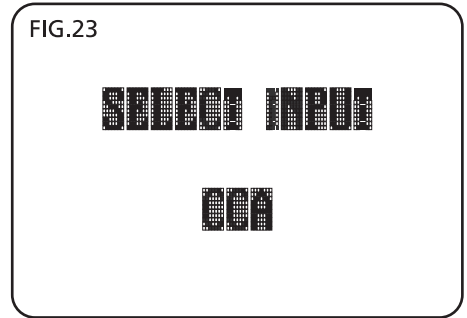
### 8.6 BATTERY SYSTEM STANDARD AND RATING - FIGS. 22 - 25

Battery Diagnostic Tool & Printer will test each battery according to the selected system and rating.

Use UP/DOWN key to select the correct system standard and rating marked on the battery.

To begin test, press OK.

It takes around 3 seconds to display the battery test result.





# 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

## 8.7 BATTERY TEST RESULT - FIGS. 26 - 33

Battery test result includes 5 types as following:

### 1. Good Battery

No action required.

NOTE:

SOH means State of Health.

SOC means State of Charge.

FIG.26

SOH 88% SOC 88%  
12.60V 400A  
RATED 500A  
GOOD BATTERY

### 2. Good, Recharge

Good battery but low current, recharge before using.

FIG.27

SOH 88% SOC 88%  
12.20V 400A  
RATED 500A  
GOOD RECHARGE

### 3. Replace

The battery is near or already reached the end of using life, replace battery.

FIG.28

SOH 26% SOC 88%  
12.60V 400A  
RATED 500A  
REPLACE

### 4. Bad Cell, Replace

Battery interior damaged, broken cell or short circuit, replace battery.

FIG.29

SOH 0% SOC 20%  
10.60V 0A  
RATED 500A  
BAD CELL REPLACE

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 5. Charge, Retest

Unstable battery, recharge and retest. If the same result appears after a recharging and retesting, the battery is regarded as damaged, replace the battery.

After battery test:

If it is "OUT-OF-VEHICLE" test state, press OK key and the results will be printed.

If it is "IN-VEHICLE" test state, press OK key to move onto Cranking Test.

FIG.30

FIG.30 shows a battery diagnostic tool display with the following text: SOH 88% SOH 20%, 12180V 610A, 88000 500A, and CHARGE! REUSE!

### 6. Cranking Test

Starting the engine as prompted, tester will automatically complete the cranking test and display the result.

FIG.31

FIG.31 shows a battery diagnostic tool display with the following text: CRANKING TEST and START ENGINE.

Normally cranking voltage value lower than 9.6V is regarded as abnormal, higher than 9.6V is OK.

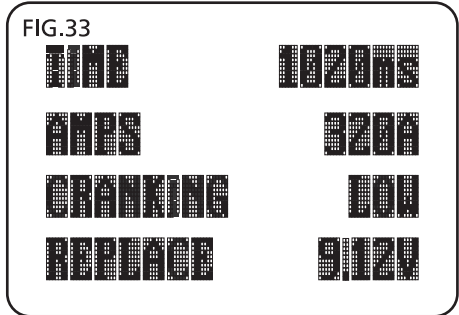
Test result of the tester includes actual cranking voltage, actual cranking amps, and actual cranking time.

FIG.32

FIG.32 shows a battery diagnostic tool display with the following text: RPM DETECTED, TIME 820MS, AMPS 500A, CRANKING NORMAL, and 1015V.

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

Press OK key to move onto changing test.  
Once the cranking test has finished, the results will be displayed. Example:



### 8.8 CHARGING SYSTEM TEST - FIGS. 34 - 38

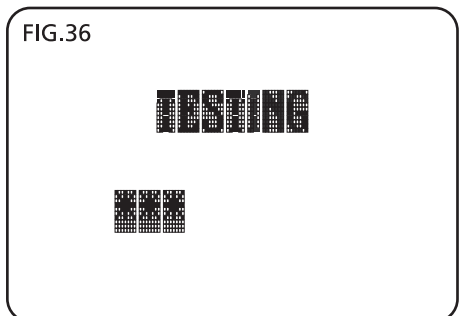
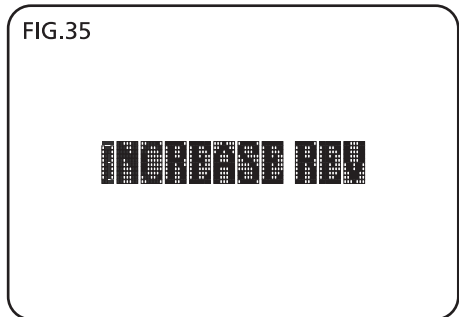
When entering the charging test, the tester will prompt "Charging Test?"

Press OK key again to start the charging test.

NOTE: Do not shut down the engine during the test. All electrical appliance and devices are removed or switch off



Increase REVs to around 3000rpm when prompted once test is complete allow vehicle to idle.



## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

Test results will be displayed, example:

FIG.37

CHARGING	NORMAL
LOADED	12.81V
NO LOADED	12.81V
BIPOLAR	NORMAL

NOTE: If no increase voltage is detected. The tester will try a further 3 times, if still failed, it will skip the increase rev and the test result will display "No Output".

FIG.38

NO OUTPUT	12.81V
LOADED	12.81V
NO LOADED	12.81V
BIPOLAR	NORMAL

### 8.9 ADDITIONAL FUNCTION

Press MENU key to enter Additional Functions (See 3.2 Tester Startup). Use the arrow keys to select any of the following functions.

#### 8.10 VIEW RESULTS - FIG. 39

View results from the last test by pressing OK key.

FIG.39

OPTION SCREEN
VIEW RESULTS

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 8.11 PRINT RESULTS - FIG. 40

The tester can view the latest 100 groups of test data, and print out any group for reference via the thermal printer. Press OK key to enter.

NOTE: You are able to search test results by date and time.

FIG.40

OPTION SEARCH  
PRINT RESULTS

### 8.12 VOLTMETER - FIG. 41

Battery Diagnostic Tool & Printer can also be used as DC voltmeter.

The working range is 1.0-30V DC.

CAUTION: The tester will be damaged if used above 30V.

FIG.41

OPTION SEARCH  
SEE VOLTMETER

### 8.13 QC MODE - FIG. 42

In QC mode, the tester will simplify the test input process, which makes the battery test much faster and easier.

This function is applicable for vehicle manufacturer and maintenance workshops to test and analyse the newly purchased battery, and also for the battery manufacturers to inspect and analyse the outgoing batteries.

NOTE: If QC function is turned on, all stored data will be erased and cannot be recovered.

FIG.42

OPTION SEARCH  
QC MODE

### 8.14 CLIENT CODE INPUT FUNCTION - FIG. 43

This option is to set client code input function ON or OFF.

After successful setup, it shows "OK" for 2 seconds, then return to the previous interface.

FIG.43

OPTION SEARCH  
CLIENT CODE  
SETTING

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 8.15 SET LANGUAGE - FIG. 44

This option is to let user select language. System contains multi-language package, including English, Spanish, German, French, Italian. After successful setup, it shows "OK" for 2 seconds, then return to the previous interface.

FIG.44

OPTION SCREEN  
SET LANGUAGE

### 8.16 SET DATE AND TIME FORMAT - FIG. 45

This option is to set date and time format, and time display in 12-hour or 24-hour. Default format is MM/DD/YY, 12-hour. After successful setup, it shows "OK" for 2 seconds, then return to the previous interface.

FIG.45

OPTION SCREEN  
SET DATE AND TIME FORMAT

### 8.17 DATE AND TIME ADJUSTMENT - FIG. 46

This option is to adjust and check the system date and time.

Adjustment is in the sequence of Year, Month, Date, Hour, Minute. This adjustment sequence does not affect the date and time format.

1. Press UP/DOWN key to modify the last two digits of the year. Press OK key to enter the month adjustment.
2. Press UP/DOWN key to modify the month. Press OK key to enter the date adjustment.
3. Press UP/DOWN key to modify the date. Press OK key to enter the hour adjustment.
4. Press UP/DOWN key to modify the hour. Press OK key to enter the minute adjustment.
5. Press UP/DOWN key to modify the minute. Press OK key till OK displayed.
6. After adjustment, tester will return to the startup interface.

FIG.46

OPTION SCREEN  
DATE AND TIME ADJUSTMENT

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 8.18 SET USER INFORMATION - FIGS. 47 - 48

This option is to set information on maintenance station code, telephone, address, website, etc. Presently, it supports only English letter and number input. Maximum 8 lines are allowed and each line 21 characters including Enter character. Using the arrow keys select digit the OK to move next.

FIG.47

OPTION SCREEN

SEE USER INFO

FIG.48

ENTER YOUR INFO

### 8.19 SCREEN LIGHT ADJUSTMENT - FIG.49

Brightness range is adjustable from 1-4. Default brightness value is 2. Press UP/DOWN key to set. After successful setup, it shows "OK" for 2 seconds, then return to the previous interface.

FIG.49

OPTION SCREEN

SCREEN LIGHT

ADJUSTMENT

### 8.20 SET PRINTER DEFINITION - FIG.50

This function is to adjust the clarity of the printed character to ensure a good printing effect under various environment and condition.

Definition range is adjustable from 1-9. Default clarity value is 4. Press UP/DOWN key to set. After successful setup, it shows "OK" for 2 seconds, then return to the previous interface.

#### NOTE:

The printer definition is inversely proportional to the printing speed and higher definition will shorten the life of the internal 9V battery.

FIG.50

OPTION SCREEN

SEE PRINTER

DEFINITION

## 8. OPERATING THE BATTERY DIAGNOSTIC TOOL

### 8.21 STANDBY POWER FUNCTION - FIG.51

This function is to set standby power, which is OFF by default.

For some vehicles, the ECU must be kept powered on while the battery is replaced.

Standby power function offers ECU power for short time while the vehicle battery is removed and replaced.

When standby power function is ON, the tester will use its internal 9V battery to supply power after its clamps are connected to the Red & Black battery cables.

**CAUTION:** when standby power function is ON, do not touch the Red & Black clamps as this will damage the tester.

After using, press Return key, the tester will automatically turn off the standby power.

**NOTE:** Due to its small capacity, the 9V battery can only supply power for short time. Before using the tester as standby power, make sure the internal 9V battery has sufficient capacity, and try to complete the battery replacement in a short time to avoid problems.

FIG.51





## 9. MAINTENANCE

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### 9.1 REPLACING THE INTERNAL BATTERY - FIGS. 52 - 54

Battery Diagnostic Tool & Printer uses one 9V battery (alkaline battery suggested) to test a battery with voltage lower than 1V and to perform the additional functions.

#### Step 1

use a screw driver to loosen the battery box cover screw and take off the battery cover.



FIG.52

#### Step 2

Insert a 9V battery. There are anode and cathode marks in the battery box and also a fixing tip.



FIG.53

#### Step 3

Cover the battery box, and fix the screw.



FIG.54

## 9. EXPLANATION OF SYMBOLS

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### 9.1 EXPLANATION OF SYMBOLS



WEEE  
Do not dispose of Waste Electrical  
& Electronic Equipment in with  
domestic rubbish



# 10. DISPOSAL

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## 10.1 DISPOSAL

- At the end of the machine's working life, or when it can no longer be repaired, ensure that it is disposed of according to national regulations.
- Contact your local authority for details of collection schemes in your area.

In all circumstances:

- Do not dispose of power tools with domestic waste.
- Do not incinerate.
- Do not abandon in the environment.
- Do not dispose of WEEE\* as unsorted municipal waste.



\* Waste Electrical & Electronic Equipment.

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