INSTRUCTIONS FOR

Diagnostic Probe

Stock No.30647 Part No.DP

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

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

1.1 INTRODUCTION:

USER MANUAL FOR:

DIAGNOSTIC PROBE

Stock no. 30647
Part no. DP

1.2 REVISIONS:

Date first published February 2013.

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

DRAPER TOOLS LIMITED
HURSLEY ROAD
CHANDLER'S FORD
EASTLEIGH
HAMPSHIRE
SO53 1YF
UK

WEBSITE: www.drapertools.com
PRODUCT HELPLINE: +44 (0) 23 8049 4344
GENERAL FAX: +44 (0) 23 8026 0784

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.

NOTE! Important information.

1.4 COPYRIGHT © NOTICE:

2. CONTENTS

2.1 CONTENTS

PAGE CONTENT ***PAGE***

3. GUARANTEE

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. 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

4.1 SCOPE

1. STARTING & CHARGING SYSTEM

- Starter Motor
- Test Battery Load
- Alternator Capacitor
- Test Charging Signal

2. ELECTRIC RELAY & ACTUATOR

- Window Motor
- Stepping Motor
- ISA (Idle Speed Actuator)
- TR (Power Transistor)
- Fuel Injector
- Wind Shield Wiper Motor
- C/D/L (Central Door Locking)
- Fuel Pump Motor
- Main Control Relay

3. SENSORS

- Power & Ground of Sensors
- MAP Sensors
- O2 Sensors
- RPM Sensors
- Air Flow Sensors
- ABS-Wheel Speed Sensor
- Throttle Position Sensor
- Cam Position Sensor
- Noise Filter
- Air Temperature Sensor
- Barometric Pressure Sensor
- Inhibitor Switch (A/T)
- Water Temperature Sensor
- Solenoid Valve (A/T)
- Electric Horn
- Electric Fan Switch
- Tachometer
- Crank Angle Sensors
- Vehicle Speed Sensors
- NO. 1 TDC Sensor
- Water Temperature Switch
- Pulse Generator (A/T)
- Idle Switch

WARNING

1. Do not use the tester where explosive gas, vapour, or dust is present.
2. Always follow the instructions and procedures indicated in the vehicle's users manual and service manual.
3. Never touch any moving object of the vehicle for safety. Don't touch any dangerous live conductor with hand or skin.
4. Use caution when working with voltage above 30V ac rms, 42V peak, or 60V dc. as these voltages pose a shock hazard

4.2 SPECIFICATION

Stock no	30647
Part no	DP
Voltage measurement range	DC-45V ~ +50V
Frequency measurement range	0Hz ~ 20kHz
Duty cycle measurement range	1% ~ 99%
Max. allowable input voltage	-70V ~ +80V
Input impedance	220kΩ
Operating temperature	0°C ~ 50°C
Battery	2x AAA 1.5V not included
Size (probe only)	Approx. 218 x 36 x 28mm
Weight (probe only)	Approx. 99g

A minimum of 8.0 V is required for most control modules to operate properly in a vehicle.

5. HEALTH & SAFETY INFORMATION

5.1 GENERAL SAFETY INSTRUCTIONS FOR DIAGNOSTIC PROBE USE

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

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.

Follow service manual warnings when working around air bag components or wiring.

– If service manual instructions are not followed, an air bag may deploy unexpectedly, resulting in injury. Note: an air bag can still deploy several minutes after ignition key is off (or even if vehicle battery is disconnected) because of a special energy reserve module.
– The Diagnostic Probe should be operated by qualified personnel only.
– Use the Diagnostic Probe only as described in the user's manual.
– Use only manufacturer's recommended attachments.
– Do not operate the Diagnostic Probe with damaged cables.
– Do not operate the Diagnostic Probe if it has been dropped or damaged, until examined by a qualified service representative.

Risk of electric shock

Do not exceed voltage limits between inputs indicated in the Specifications. Use extreme caution when working with circuits that have voltage greater than 60 volts DC or 24 volts AC.

Avoid making an accidental connection between the battery terminals. Do not place uninsulated metal tools on the battery.

When removing battery cables, remove the earth/ground cable first.

Make sure ignition is off, headlights and other accessories are off and vehicle doors are closed before disconnecting the battery cables. – This also helps prevent damage to on-board computer systems.

Always disconnect the battery ground connections before servicing electrical system components.

5. HEALTH & SAFETY INFORMATION

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 Diagnostic Probe 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 Diagnostic Probe 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.

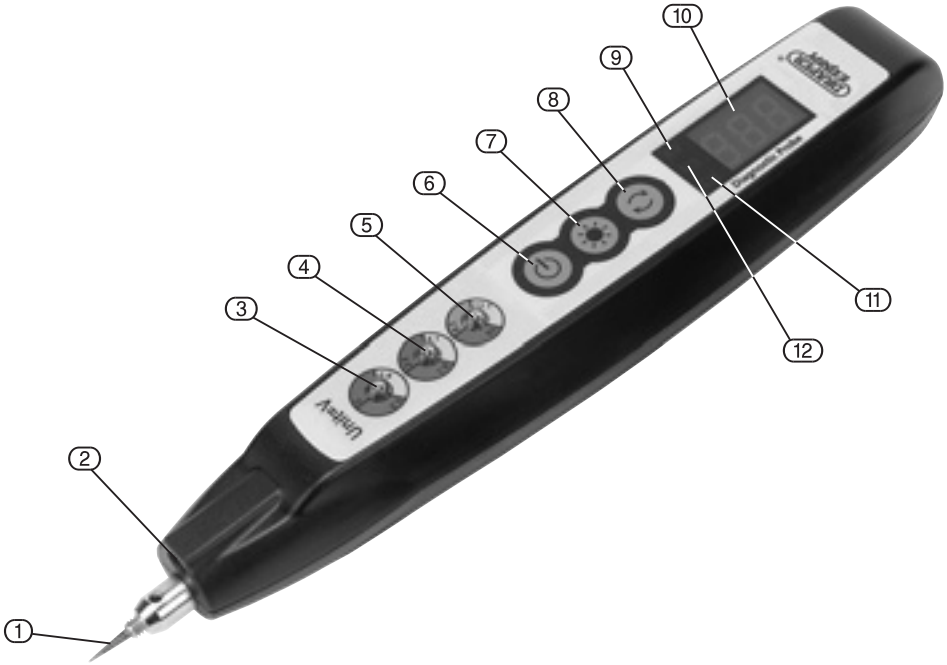
Unless instructed otherwise:

– 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

6.1 IDENTIFICATION



① Test probe and probe holder
② Illumination light
③ Bottom LED indicator
④ Middle LED indicator
⑤ Top LED indicator
⑥ Power switch
⑦ Illumination switch
⑧ Function switch
⑨ Voltage indicator lamp
⑩ Numeric display
⑪ Duty cycle lamp
⑫ Frequency lamp

7. UNPACKING & CHECKING

7.1 PACKAGING

Carefully remove the diagnosic probe from the packaging and examine it for any sign of damage that may have happened during shipping. Lay the contents out and check them against the parts shown below. If any part is damaged or missing; please contact the Draper Helpline (the telephone number appears on the Title page) and do not attempt to use the product.

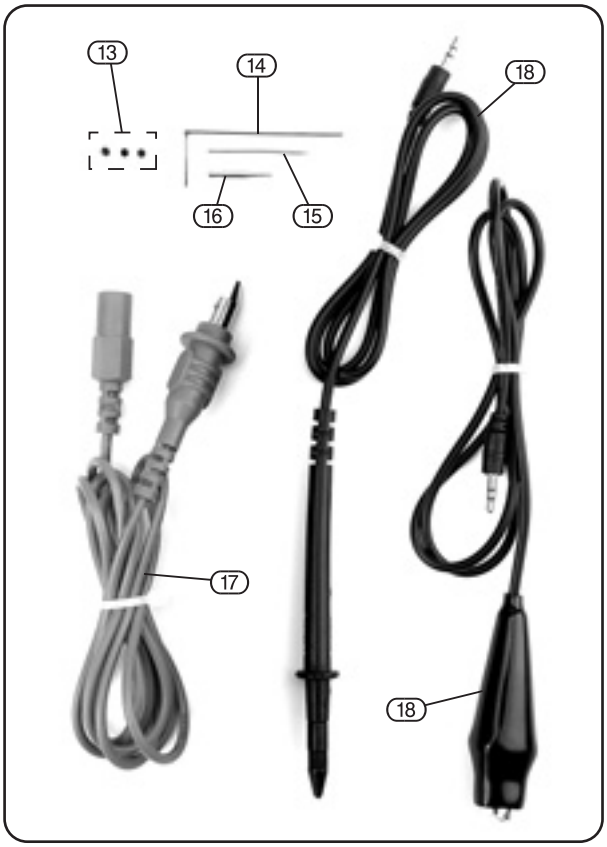
The packaging material should be retained at least during the guarantee period: in case the machine needs to be returned for repair.

Warning! Some of the packaging materials used may be harmful to children. Do not leave any of these materials in the reach of children.

If any of the packaging is to be thrown away, make sure they are disposed of correctly; according to local regulations.

7.2 WHAT´S IN THE BOX?

As well as the diagnostic probe; there are several parts not fitted or attached to it.



(13) Locking screw
(14) Hex. key
(15) Long probe
(16) Standard probe
(17) Extension lead
(18) Ground lead

8. PREPARING THE PROBE

8.1 HOW TO CONNECT THE GROUND LEAD - FIGS. 1 - 2

Insert the plug of the ground lead into the jack at the end of the tester.

FIG.1

FIG.2

8.2 HOW TO CHECK THE TEST PROBE AND THE GROUND LEAD - FIGS. 3 - 4

1. Insert the plug of the ground lead into the jack at the end of the tester.
2. Press the power switch (6) to turn on the tester.
3. Press the (8) key until the voltage lamp (9) lights up.
4. Connect the clip of the ground lead to the test probe.

   The bottom LED indicator should light blue and the other two LED Indicators should be off, and the display screen will change from (A) to (B) (Fig.4).
5. Disconnect the clip from the test probe, all the three LED indicators should be off and the display screen should indicate (A) (Fig.4).
6. In the above steps, if one or more LED indicators did not act as described above, you must replace the test probe and the ground lead.

FIG.3

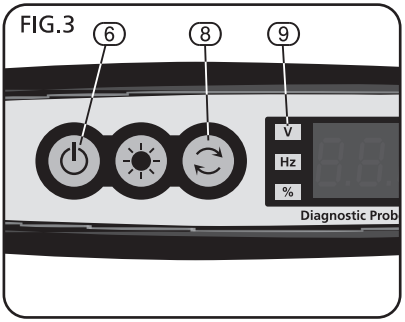
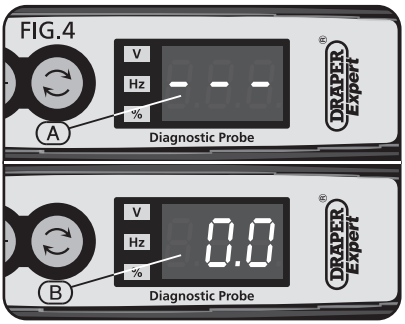


FIG.4



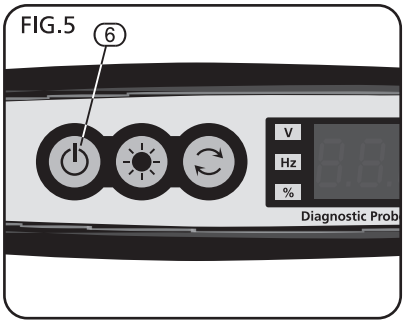
8. PREPARING THE PROBE

8.3 HOW TO USE THE KEYS - FIGS. 5 - 8

1. Turning on/off the Tester

Press the (6) key to turn on the tester, press again to turn it off.

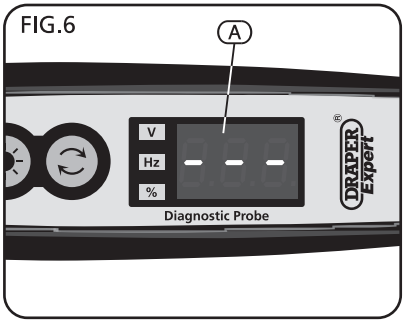
FIG.5



2. Stand-by Mode

When the display screen shows three short lines (A), the tester is in stand-by mode (Fig.6).

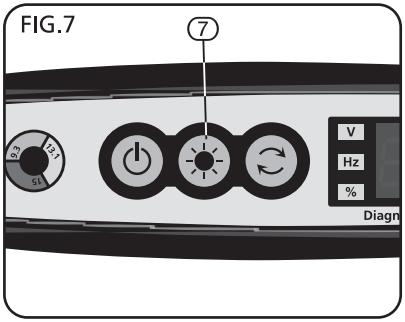
FIG.6



3. Using Illumination

Press and hold the (7) key to turn on the illumination light, release the (7) key to turn off the light.

FIG.7



4. Selecting the Desired Measurement Function

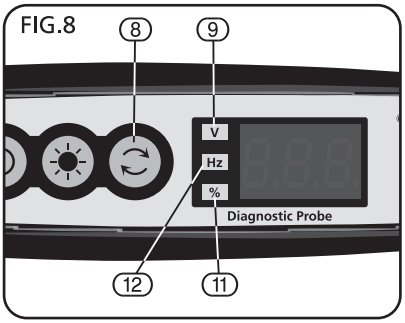
Press the (8) key to select the desired measurement function.

When the "(9)" lamp is on, the tester is in voltage measurement mode.

When the "(12)" lamp is on, the tester is in frequency measurement mode.

When the "(11)" lamp is on, the tester is in duty cycle measurement mode.

FIG.8



9. OPERATION AND USE

9.1 MEASURING DC VOLTAGE - FIGS. 9 -10

1. Press the (8) key until the (9) lamp lights up. Now the tester is in voltage measurement mode.
2. Connect the clip of the ground lead to the negative terminal of the circuit to be tested, and connect the test probe to the positive terminal of this circuit.
3. The display screen shows the measured voltage.

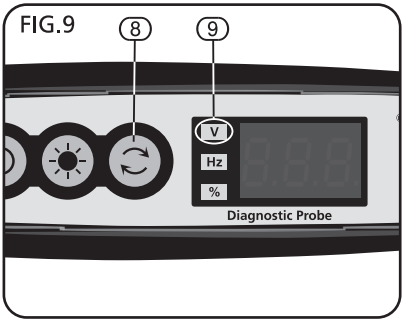
   The measuring range is : -45V ~ +50.0V.

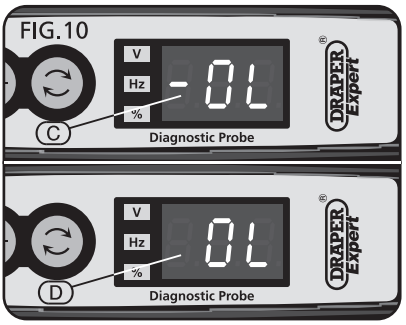
   For voltage below -45V, the display screen shows (C) (Fig.10);

   for voltage above +50.0V, the display screen shows (D) (Fig.10).

   If the voltage is between -9.9V and +50.0V, the display screen will show a number containing a decimal point. If the voltage is lower than -9.9V, it will be rounded to the nearest whole number.
4. LED indicator will also indicate the voltage value, as described as follows:

   Each LED indicator can emit 3 different colours of light, the 3 different colours represent 3 different voltage levels, respectively; thus the three LED indicators can indicates 9 different voltage levels.



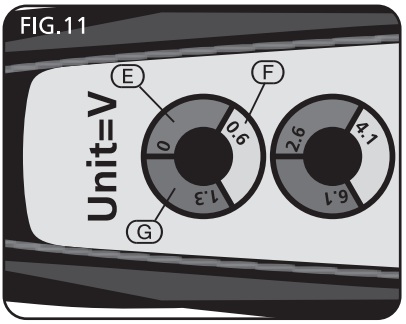


9.2 BOTTOM LED INDICATOR (VOLTAGE RANGE: 0.0V - 2.5V) - FIG. 11

When the measured value is between 0.0V and 0.5V (E), the bottom LED indicator will light blue.

When the measured value is between 0.6V and 1.2V (F), the bottom LED indicator will light yellow.

When the measured value is between 1.3V and 2.5V (G), the bottom LED indicator will light red.

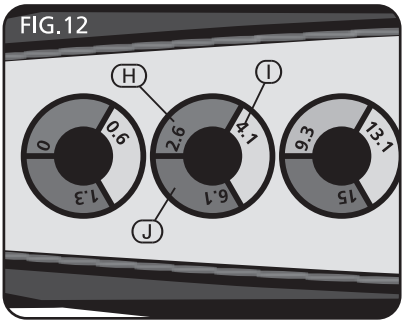


9.3 MIDDLE LED INDICATOR (VOLTAGE RANGE: 2.6V - 9.2V) - FIG. 12

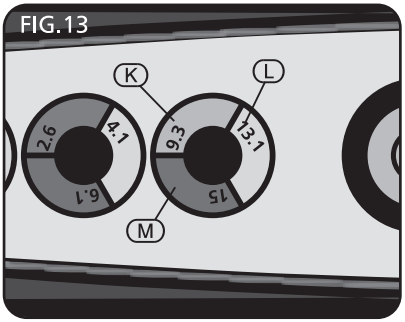
When the measured value is between 2.6V and 4.0V (H), the middle LED indicator will light blue.

When the measured value is between 4.1V and 6.0V (I), the middle LED indicator will light yellow.

When the measured value is between 6.1V and 9.2 (J), the middle LED indicator will light red.



9.4 TOP LED INDICATOR (VOLTAGE RANGE 9.3V - 50.0V) - FIG. 13

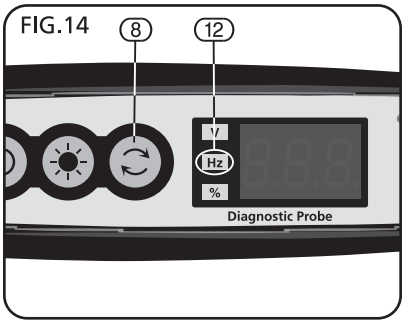


When the measured value is between 9.3V and 13.0V (K), the top LED indicator will light green.

When the measured value is between 13.1V and 14.9V (L), the top LED indicator will light yellow.

When the measured value is higher than 15.0V (M), the top LED indicator will light red.

9.5 MEASURING FREQUENCY - FIG. 14



The Frequency is the number of pulses per 1 second (Unit: Hz).

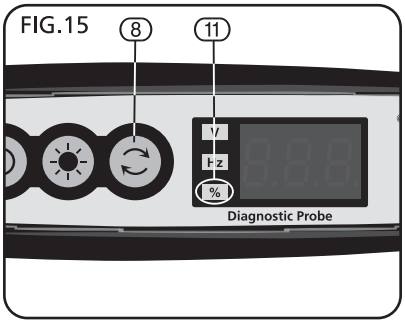
The tester can be used to the measure the frequency of a squarewave signal.

1. Press the (8) key until the (12) lamp lights up. Now the tester is in frequency measurement mode.
2. Connect the clip of the ground lead to the ground terminal of the circuit to be tested, and touch the test probe to the desired test point of the circuit.
3. a. The display screen shows the frequency value of the signal being measured.

   Tip: In frequency measurement mode, if the reading does not contain a decimal point, the reading's unit is Hz. If the reading contain's a decimal point, the reading's unit is kHz. For example, if the display screen shows "59", the frequency value is 59Hz. If the display screen shows "2.15", the frequency value is 2.15kHz.

   b. LED indicators indicate the high level and low level of the squarewave signal at the same time. (See the Step 4 of "Measuring DC Voltage").

9.6 MEASURING DUTY CYCLE - FIG. 15



The ratio of time at which the squarewave is on to the total time period of one cycle is called duty cycle. (Unit: %)

The tester's measuring range is: 1% - 99%.

1. Press the (8) key until the (11) lamp lights up. Now the tester is in duty cycle measurement mode.
2. Connect the clip of the ground lead to the ground terminal of the circuit to be tested, and touch the test probe to the desired test point of the circuit.
3. a. The display screen shows the duty cycle value of the signal being measured. (Unit: %).
   b. LED indicators indicate the high level and low level of the squarewave signal at the same time. (See the Step 4 of "Measuring DC Voltage").

9.7 OTHER FEATURES

1. **Auto Power off Feature**

   To save battery life, the tester will turn off automatically after about 3 minutes of non-use.

2. **Test Probe Replacement**

   Use the small hex. key supplied to loosen the screw and change the test probe.

   In order to use the extension lead, you should screw it clockwise onto the test probe.

10. MAINTENANCE

10.1 BATTERY REPLACEMENT

When the batteries are depleted, the display screen will show “LOB”; and about 5 seconds later, the tester will turn off automatically. You should replace the batteries immediately.

Before replacing battery, make sure that the tester has turned off and that the test probe and the ground lead are not connected.

Remove the battery cover, then replace the exhausted batteries with two new batteries of the same type (1.5V, AAA or equivalent, make sure that the polarity connections are correct. Reinstall the battery cover.

10.2 CLEANING

Periodically wipe the case with a clean cloth.

Do not use solvent or abrasive to clean the tester.

11. EXPLANATION OF SYMBOLS

Class II construction
(Double insulated).

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

12. DISPOSAL

12.1 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.

NOTES

NOTES

CONTACTS

- **DRAPER TOOLS LIMITED,**
  Hursley Road, Chandler's Ford,
  Eastleigh, Hampshire. SO53 1YF. U.K.

- **Helpline:** (023) 8049 4344
- **Sales Desk:** (023) 8049 4333
- **Internet:** www.drapertools.com
- **E-mail:** sales@drapertools.com
- **Sales Fax:** (023) 8049 4209
- **General Enquiries:** (023) 8026 6355

- **Service/Warranty Repair Agent**
  For aftersales servicing or warranty repairs, please contact the Draper Tools Helpline for details of an agent in your local area.

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