INTRODUCTION

The ***g-meter+*** is designed for statutory MOT brake performance testing of Class I, II, III, IV, V, VI & VII vehicles in accordance with the Motor Vehicle (Tests) Regulations 1981, as amended. It can also be used for statutory MOT brake performance testing of Heavy Goods Vehicles in accordance with the Goods Vehicles (Plating and Testing) Regulations 1988, as amended.

The test reading is shown on a bright LED display as **Brake Efficiency** in percent or the deceleration in metres per second per second.

The electronic deceleration sensor used in ***g-meter+*** gives it a number of advantages over older electronic devices and mechanical pendulums, namely:

- It is self-aligning and will automatically sense the direction of travel. Precise alignment of the instrument with the direction is, therefore, not necessary.
- Its memory can record 3 sets of test results; for example, for main, secondary and parking brake tests. These are retained even if the instrument is switched off.
- It has an internal clock to accurately record the time and date of each test.
- It measures the peak deceleration, mean deceleration and stopping time and then calculates speed and stopping distance.
- It determines any left-right pull sensed during the brake test
- It has a built in interface for a printer or to download results to a PC
- Warnings are automatically given if the battery needs replacing or a calibration is due.
- It has UKAS traceable calibration.

SPECIFICATION

Sensing principle	Multi-axis electronic decelerometer.
Measurement range	0 to 2.0 g g=9.81 metre/sec/sec
Accuracy	Better than ±3% g
LED Resolution	1% g 0.1 metre/sec/sec
Display	2 digit, 7 segment LED Readable in sunlight
Peak reading time constant	0.2 seconds
Start window	0.5 seconds
Brake threshold	10% g
Tilt compensation	2.5 degrees per g
Battery	9V PP3 alkaline MN1604 or 6LR61 CR2032 Lithium cell
Battery life	PP3: 20 hours approx. CR2032: 10 years
Interface	RS232C via 4-pole 2.5mm jack
Printer	Turnkey AP1300
Memory	3 tests
Size	122 mm octagon 24 mm deep
Weight	300 grams
Calibration	Multipoint calibration, UKAS traceable.
Environmental	Operating and storage temperature range -10ºC to +50ºC, RH <95% non-condensing. **Do not use in flammable or explosive atmospheres.**

INSTRUCTIONS

SWITCHING ON

Press and release the large yellow button. The display will show **--** while the instrument does a self-check and recovers its settings from memory. Any error conditions will cause E1, E2 or E3 to flash on the display, consult the factory if this happens.

If the printer is connected at switch-on, a summary of the instrument settings and status will be printed.

LOW BATTERY

The display will flash **Lo** if the battery is exhausted. If this occurs replace the battery with a 9V, PP3 alkaline type (MN1604, 6LR61 or equivalent). A new battery will give about 20 hours of use.

Do not use the instrument for statutory brake testing if the low battery warning is on.

TEST RESULTS

The ***g-meter+*** stores the results of the last 3 brake tests. Except when armed for a new test, the display always shows the last test results. Press and release the button to select Test 1, 2 or 3 as indicated by the numbered LED. These could represent main, secondary and parking brake tests. Results are cleared if the battery or settings are changed.

PRINTING

Connect the ***Turnkey AP1300*** printer; making sure the jack is pushed in properly. Double-Click the button to print the results of the selected test. The printer will switch-on and off automatically.

SWITCHING OFF

The ***g-meter+*** will automatically switch itself off if the button is not pressed for more than 4 minutes. The instrument **will not** switch off while it is armed ready for a brake test. Double-Double click the button to switch-off manually, but disconnect the printer first.

SETTING THE CLOCK

The ***g-meter+*** clock can be set by means of the **g-meterPC** program. Alternatively, hold the button at switch-on for at least 1 second and then release. The Test 1 (***d***) LED will flash, adjust the ***d***ay of the month by tilting forwards or backwards. Press and release and the (***h***) LED will flash, adjust the ***h***ours by tilting. Repeat for the minutes (***m***) LED. Double click when finished.

CALIBRATION

g-meter+ must be calibrated at least every 24 months by the manufacturer or other UKAS approved organisation. The display will flash **cd** when ***c***alibration is ***d***ue. The calibration expiry date is shown on the underside of the instrument, on the printout, or via the ***g-meterPC*** program.

Do not use the instrument for statutory testing when the cd warning is on.

BRAKE TESTING

When carrying out a statutory MOT test, the brake test procedure detailed in the latest version of the relevant MOT Inspection Manual must be followed.

Position the ***g-meter+*** in a convenient location in the vehicle with the direction of travel arrow pointing roughly in the forward direction. The instrument must be placed as parallel as possible to the road surface, and located so that it cannot move under hard braking. The instrument is self-aligning, providing its **direction of travel arrow** roughly coincides with the actual direction of travel (within say ±60 degrees) no significant error will be introduced.

Press and release the button to select Test 1, 2, or 3, then press and hold the button to arm for a new test. The previous results for this number will be over-written only if the new test is completed.

When ***oo*** appears on the display release the button; after a sort pause, the instrument will determine its tilt within the vehicle and complete its arming. The display indicates ***go*** when it is ready to proceed. Do not move-off or disturb the instrument until ***go*** is displayed. To cancel the test, press the button again and the previous results will be retained.

The vehicle can now be accelerated to speed and the brake test carried out. The ***g-meter+*** will automatically sense the beginning and end of the deceleration and afterwards retain the results in its memory. During acceleration the display will indicate **Ac**, and when stopping it indicates **St**.

Brake test results can be displayed on the LED as either peak or mean deceleration and in units of either % g or metres/sec/sec (g=9.81metres/sec/sec). A %g reading is shown with no decimal point, metres/sec/sec with a decimal point.

Use the Turnkey AP1300 printer to print both the peak and mean readings, the time and date of the test, calculated speed, stopping distance and left-right pull under braking. The left-right pull is determined as the direction change in degrees from the initial acceleration direction. If the left-right pull feature is enabled, a minimum acceleration of 10% g is required.

Settings & Status Printout

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        g-meter+

09:31  18-Mar-05

 Peak to LED:   YES
 %g Readings:   YES
Metric Units:   YES
Measure pull:   YES

  Trigger at 10.0 %g
  Tilt Corr.  2.5 deg/g
 Start window 0.5 sec
Peak response 0.2 sec

      Battery 9.46 Volts

Calibrated by: TKI

Re-Calibrate before  8-Mar-07

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Brake Test Printout

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        g-meter+

Test 1 done at 09:32 18-Mar-05

Peak Decel:     64.5 %g
Mean Decel:     51.7 %g

Test Speed:     47 kph
 Stop Time:   2.60 secs
  Distance:   17.1 mtrs

 Pulled left by  7 degrees

Vehicle Reg ___________________

Examiner ______________________

Signature ____________________

 Re-Calibrate before  8-Mar-07

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g-meterPC

Use the ***g-meterPC*** Windows program to set up ***g-meter+*** to your requirements and adjust its clock. You can also use it to download, display and print results via your computer.

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Turnkey is a registered trademark.

Always test brakes in a safe area.

Turnkey Instruments Ltd accepts no responsibility for any misuse of the instrument or its use in any manner not intended by the manufacturer.

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VOSA approved for testing all vehicle classes

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Brake Performance (Decelerometer Test)

The following instructions are reproduced for your convenience from the MOT Inspection Manual, Issue Date: March 1992. When in any doubt always refer to the latest edition of this manual.

Information

Roads used for decelerometer brake testing

The requirement for a steady road speed during a brake test by decelerometer means that the vehicle must always be driven on a road which

- Has a good surface
- Is suitable for brake tests when wet or dry
- Has a minimum of traffic

A particular public road should not be used for tests so much that it would cause complaints from residents.

Testing transmission handbrakes

When using a decelerometer to test a transmission handbrake, keep the ratchet disengaged for as long as the brake is applied. Take the efficiency reading without the occurrence of transmission snatch or judder.

Vehicles which just pass

With some vehicles the required brake efficiency is just obtained or just exceeded, but the tester knows that a higher performance figure is normally obtained for the type of vehicle.

Although the vehicle has passed the brake performance test, the tester should advise the vehicle presenter that the braking system appears to need adjustment.

Method of Inspection

Decelerometer Test

If the vehicle is of a type which cannot be tested on a roller brake tester,

- Set up the decelerometer in the vehicle in accordance with the equipment manufacturer's instructions
- Drive the vehicle on a level road at a steady speed of approximately 20 mph (32 kph) and note the brake efficiency recorded when applying only
  a. the service brake
  b. the parking brake
  c. while the vehicle is decelerating under the action of the service brake, note if the steering wheel tends to pull or the vehicle tends to swerve.

Reasons for Rejection

a. the service brake efficiency recorded on the decelerometer does not meet the requirements specified in the Brake Efficiency Table

b. the parking brake efficiency recorded on the decelerometer does not meet the requirements specified in the Brake Efficiency Table

c. when the service brake is applied
   - there is severe grab or judder, or
   - there is severe pull one way on the steering wheel, and/or
   - the vehicle swerves appreciably