

# D400

## MOT Class 4 roller brake tester

# USER MANUAL

**Please read the user manual before starting the test procedure!**

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## **1 Introduction**

This manual describes how to safely use the *D400 roller brake tester* (further to be called RBT) for statutory Vehicle Inspection test class 3 and 4 vehicles (further to be called MOT class 3&4). The manual is intended for users of this equipment. Another manual for installation, service and calibration is available.

The RBT is designed for testing commercially available class 3 & 4 vehicles for road use (including 3-wheel vehicles and 4-wheel driven vehicles). The maximum axle load during the test is 3000 kg. The test speed is 2.9 km/h. The RBT can be operated by one person.

This manual describes how to carry out a brake test according to the GB Department of Transport compulsory schemes. The manual provides the MOT braking measurement requirements and describes a complete test procedure.

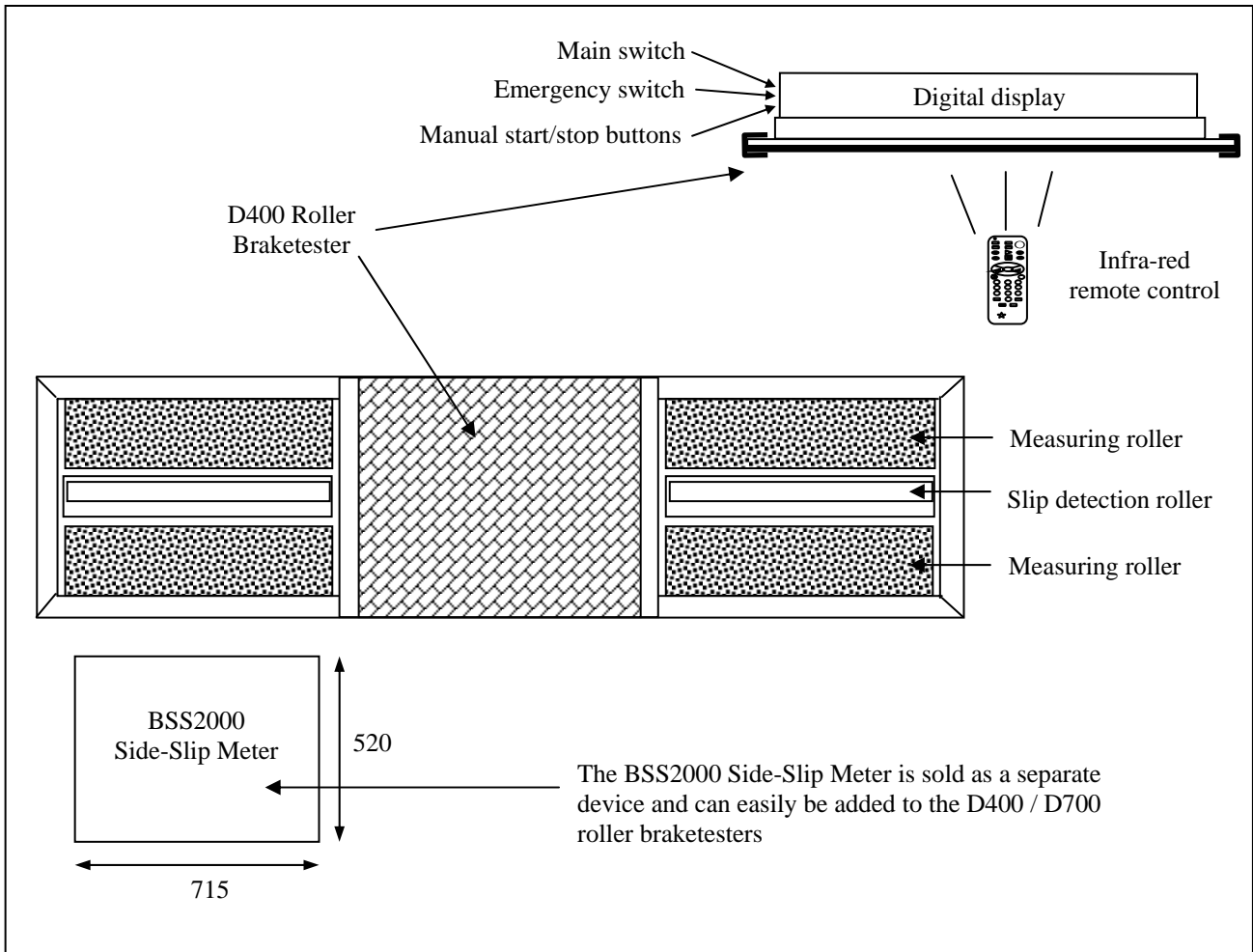
The customer should ensure that the installation for testing vehicles under any of the Department of Transport compulsory schemes, is according to the details mentioned in the Department of Transport's requirements.

The motor and control gear of the RBT are not flameproof and it is the responsibility of the operator to make sure that the proposed site and the aspects of the installation comply with the Petroleum Regulations and that they satisfy the local Petroleum Officer's requirements.

## 2 General product description D400

The RBT is a well-known method to analyse and judge the efficiency of the braking system of a vehicle.

The *D400* consists of a mechanical floor unit and a digital display.



The mechanical unit contains two electrical motors, two independent sets of three measuring rollers, two brake force transducer and additional safety sensors.

The brake forces induce reaction forces on the electric motor. An electric transducer with strain gauges measures these reaction forces. The roller diameter is sufficiently large to keep the tyre flexing to a minimum. The special coating of the rollers is very wear resistant and provides good friction values, both wet and dry. The third smaller roller on each side between the wheel supporting rollers has two functions: The first is to detect if a vehicle is present in the roller bed (a built in safety device to prevent the motor to start up without a vehicle in place). For safety purposes, the motors will **not start** if the left and right small rollers are not pushed down within **one second** after each other (except when 3-wheel mode is selected). The second function is to detect if tyre slippage on the rollers does not exceed the maximum value.

If the tester is not being used, it must be closed with the (optional) roller bed cover plates.

The *D400* is equipped with a **digital display** containing a horizontal LED digital display, seven lamps, a computerised processing system, three manual start/stop buttons, an emergency stop button, a main switch and an infra red remote control handset.

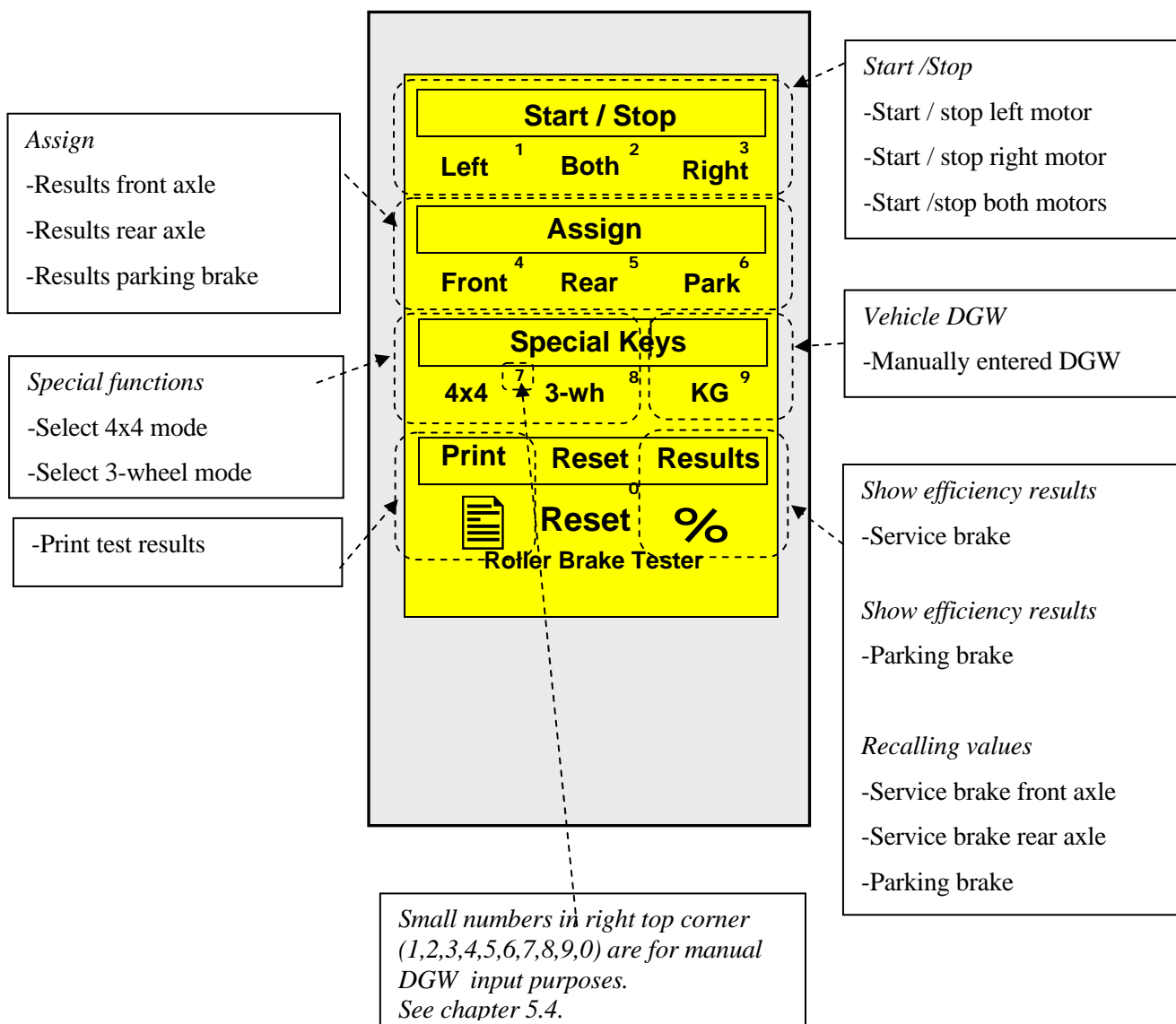
During the test, the computer measures the brake force values. The system will calculate the imbalance between left brake forces and right brake forces of an axle, as well as the brake efficiency of the service brake and the parking brake. An optional printer can be connected to generate a full test report.

## **2.1 The infra-red remote control and digital display**

The equipment can be switched on by means of the mains switch on the side of the display cabinet. Usually the unit is operated through the infra-red remote control. The system however can also be operated manually (see chapter 5.8). The system can be switched off at any time by pressing the emergency stop button, located on the side of display cabinet. The functions of the remote control and the display cabinet are explained in the two following paragraphs 2.1.1 and 2.1.2. There is a separate user manual for an optional printer.

### **2.1.1 Infra-red remote control**

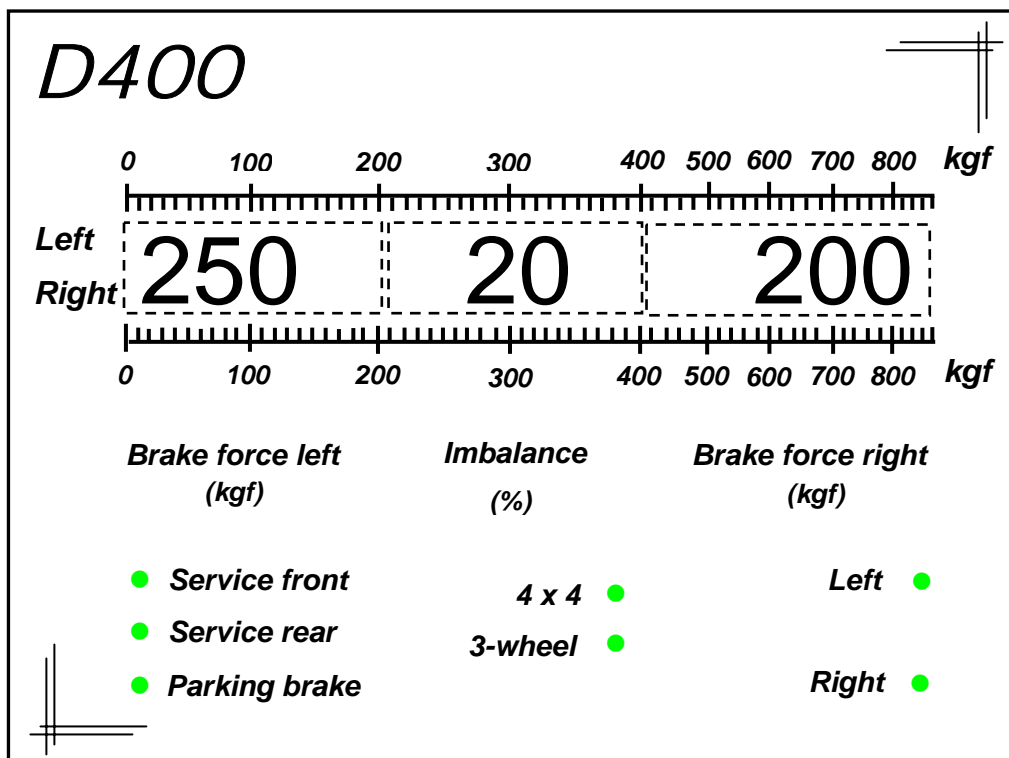
The system is controlled by means of an infra-red remote control.



## 2.1.2 Digital display

The display cabinet contains a horizontal LED digital display (for showing measurements both in bar graph as well as in numerical values), seven indication lamps, a main switch, three manual start/stop buttons and an emergency stop switch.

Digital LED display	Displays the brake force in a bar diagram in <i>kgf</i> for: -The left wheel of an axle. Displays the brake force in a bar diagram in <i>kgf</i> for: -The right wheel of an axle.  -The manual weight input. -The brake efficiency in % for the service brake. -The brake efficiency in % for the parking brake.
Digital LED display left	Displays the brake force in numerical values in <i>kgf</i> for: -The left wheel of an axle.
Digital LED display right	Displays the brake force in numerical values in <i>kgf</i> for: -The right wheel of an axle.
Digital LED display centre	Displays in numerical values: -The imbalance left/right of an axle.
Seven lamps	-3x to indicate the assigned axle: front, rear, parking brake. -2x to indicate wheel lock (slip) left and right wheel. -1x to indicate when the 3-wheel mode is selected. -1x to indicate when the 4 x 4 mode is selected.
Emergency switch	-To be used to stop the rollers in case of an emergency.
Manual start buttons	-For testing without the infra red remote control.



### **3 Safety**

In order to comply with your responsibilities under the Health and Safety at Work Act 1974, it is essential that this brake tester and any optional accessories are sited, installed, operated, and maintained by:

- ◆ A competent person with a minimum of 18 years of age and have a minimum qualification of NVQ 3 (or an equivalent qualification) and / or experience within their own field of responsibility, E.g. installation engineering, automobile engineering etc.

#### **3.1 Important safety rules**

- ◆ All persons installing, operating or maintaining this brake tester and any optional accessories must be familiar with the layout of the equipment, the safety precautions, the emergency shutdown procedures and vehicle braking systems.
  - ◆ Appropriate training is required, prior to installing, using or maintaining this roller brake tester.
  - ◆ In case of an emergency, all electric power can be disconnected by pushing the emergency button on the side of the display, or turn the main power switch off.
  - ◆ The instructions in this manual have to be strictly adhered to, to avoid injuries to personnel and damage to machine and vehicle.
  - ◆ The equipment may be operated only within its rated capacity. The equipment is designed for MOT class 3 & 4 vehicles.
  - ◆ During the test nobody is to stand close to the mechanical units.
  - ◆ The danger zone should be clear of personnel, tools and equipment before starting each stage of the test.
  - ◆ Do not stand on, or walk over the rollers at any time.
  - ◆ The unit should be placed inside a rigid, flat and clean surface, protected against water, humidity and weather influences.
  - ◆ Only a qualified technician should carry out any work on the electrical system, if necessary.
  - ◆ He should follow procedures pre-described by national standards and the regulations of the local Power Company.
  - ◆ It is not allowed to make the safety features inoperative or to remove them.
  - ◆ Do not park a vehicle on any part of the tester.
  - ◆ It should only be used where the operator has a good view of the whole machine.
  - ◆ Don't leave the RBT switched on and unattended.
  - ◆ Keep the operating environment clean and free of oil; don't leave loose objects around the RBT.
  - ◆ When the RBT is not working correctly, switch off the RBT immediately and refer to the user manual or contact Analyze UK.
  - ◆ Isolate the RBT from the power supply before starting a reparation or maintenance, by switching off the main power and to secure it with a lock.
  - ◆ Make sure the remote control is stored safely when not in use.
  - ◆ Always use the original tools to adjust the RBT.
  - ◆ Follow the maintenance specifications accurately.
  - ◆ Avoid the entangling from clothes (e.g. ties) and/or limbs between the rollers or chains.
  - ◆ Avoid any direct- or indirect electrical contact.
  - ◆ Avoid any electrostatic influences.
  - ◆ Do not test a vehicle when there is insufficient light.
  - ◆ Take precautions to extract exhaust in the workplace properly while testing.
- ◆ **Special attention is required for testing 3-wheel and 4WD-vehicles!**

## **3.2 Safety devices**

With the design of the RBT the following safety devices have been installed, to reduce risks as much as possible.

- ◆ The RBT is provided with an emergency stop button, by which the machine can be stopped immediately in case of an emergency.  
The RBT can only be switched on if the centre rotating measuring rollers are pressed down, i.e. when there is a vehicle axle in the roller brake tester (except when 3-wheel mode is selected).
- ◆ By applying the brake force and locking any wheels under test, the rollers will stop immediately.
- ◆ Closed covers for the chain and electrical components.
- ◆ The electrical circuits are built in the display cabinet, to reduce any direct danger.
- ◆ The RBT is ground wired to earth.
- ◆ Optional roller cover plates can be provided to close the mechanical unit when the brake tester is not in use.
- ◆ The controlling software has been tested extensively.
- ◆ A list of safety rules is included in this user manual.

## **3.3 Misuse**

The RBT is designed for use as a brake tester for statutory testing of MOT class 3 & 4 vehicles and for brake diagnostic purposes only.

It must **NOT** be used for any other purpose e.g.

- ◆ 'Running in' of brake linings.
- ◆ Brake adjustments.
- ◆ Diagnosis of vehicle faults e.g., tyre examination etc.
- ◆ Any purpose requiring the operator to be in the danger zone, other than to conduct a brake test and/or maintenance and calibration purposes (authorised personnel only).



## 4 MOT regulations

### 4.1 Brake efficiency

- ◆ The brake efficiency of each system is calculated from the total brake force and expressed as a percentage of the vehicle weight.
- ◆ Total up the braking effort from all wheels of the vehicle when the service brake is applied.
- ◆ Total up the braking effort recorded from the appropriate wheels when the parking brake is applied.
- ◆ The weight of the vehicle can be determined from the *Brake Data Chart*.
- ◆ This total weight on the *Brake Data Chart* includes 140 kg for the weight of the driver.
- ◆ On the *D400* display, the vehicle weight can also be inputted manually by means of the infra red remote control (see chapter 5.4).
- ◆ It is required to test the service brake individually, wheel by wheel.
- ◆ *Efficiency calculation*

$$\text{Efficiency \%} = \frac{\text{Total brake effort all wheels}}{\text{Vehicle weight}} \times 100$$

- ◆ The Department of Transport allows the use of an electronic calculator to perform the calculation of brake efficiency.
- ◆ If the separate brake measurements are assigned properly with the remote control, the display is able to show the efficiency for both the service brake as well as the parking brake.
- ◆ If an optional printer is connected, the brake efficiencies will be shown on the print out (only if the separate brake measurements are assigned properly).

The MOT brake efficiency requirements are specified in the MOT inspection manual as:

- ◆ Minimum brake efficiency service brake 50%.
- ◆ Minimum brake efficiency parking brake single line braking system 25%.
- ◆ Minimum brake efficiency parking brake split (dual) braking system 16%.

*3-Wheel vehicles with a service brake operating on all wheels and a parking brake operating on at least one wheel.*

- ◆ Minimum brake efficiency service brake 40% for vehicles registered before January 1<sup>st</sup>, 1968.
- ◆ Minimum brake efficiency service brake 50% for vehicles registered on or after January 1<sup>st</sup>, 1968.
- ◆ Minimum brake efficiency parking brake single line braking system 25%.
- ◆ Minimum brake efficiency parking brake split (dual) braking system 16%.

## **4.2 Brake imbalance**

- ◆ The imbalance of brake force between the left and right wheels of an axle, expressed as a percentage of the higher brake force.
- ◆ The imbalance of the braking effort on an axle is obtained by comparing the brake efforts at each wheel when they are tested simultaneously.

◆ Imbalance calculation:

◆

$$\text{Imbalance \%} = \frac{\text{Higher brake effort} - \text{Lower brake effort}}{\text{Higher brake effort}} \times 100$$

- ◆ The MOT minimum brake balance requirement as specified in the MOT inspection manual is 25%.

## **5 Manual MOT testing procedure**

Chapter 5 describes the testing procedure on the *D400* roller brake tester according to the MOT method of inspection. See *latest MOT Inspection Manual* to check for any recent changes.

- ◆ Brake forces are indicated in *kgf*.
- ◆ Weight input is indicated in *kg*.
- ◆ Imbalance is indicated in *%*.
- ◆ Brake efficiency is indicated in *%*.

### **5.1 Preparations before starting a brake test**

- A. Examine the tyres to ensure they are not under-inflated, if the tyre pattern is in good condition and if the tyres are free from mud and stones.
- B. Determine whether the vehicle has a single brake control system or a split (dual) brake control system. This is important for the operator to check a PASS or FAIL on the brake efficiency.
- C. Remove the (optional) covers of the roller tester and switch the power on.

**NO VEHICLE SHOULD BE IN THE BRAKE TESTER WHEN THE MACHINE IS SWITCHED ON !**

**The machine will go through its self-test and through its warm-up stage. When the horizontal bar diagram is going back slowly from right to left, by pressing MENU, the tester will be in its test mode. *D400* will appear in the display. The *D400* is now ready for testing.**

- D. Drive the front axle in the roller beds and select neutral gear.  
Start both rollers by pressing **Key “BOTH”** on the remote control to position the wheels and align the vehicle. Make sure the tyres do not touch the sides of the chassis.
  - E. Press **Key “BOTH”** to stop the roller set. The machine is now ready to test the front wheels.
- ◆ **Pressing any KEY on the remote control can always stop the motors and abort a test.**
  - ◆ **In the event of an emergency, these procedures must be followed:**
    - (1) Press any **KEY** on the remote control. This will stop the rollers *or*
    - (2) Press the manual start/stop buttons on the side of the cabinet *or*
    - (3) Push the **red emergency stop switch**, to isolate the electrical supply to the roller bed and stop the rollers.

<p><b>The described KEYS correspond with the KEYS on the infra-red remote control. To ensure accurate storage of test results, always start with the LEFT wheel of an axle.</b></p>
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**Press “RESET” to reset the system and clear the memory from any previous results!**

## **5.2 Testing the front wheels**

1. Press **Key “LEFT”** to start the left roller. The “**Left**” lamp flashes as an indication that the left rollers are running.  
Slowly increase the brake force on the brake pedal until maximum effort is achieved, or until the wheel locks and slips on the rollers. The real time brake force is displayed on the LED display in a horizontal bar diagram.  
At the slip limit the motor will be cut out immediately (to avoid unnecessary wear of the tyre) and the “**Left**” lamp will light to indicate this wheel lock. If slip does not occur while the maximum brake force is achieved, the left rollers can be stopped by pressing **Key “LEFT”**.  
The “**Left**” lamp will not light or flash.

### **For an accurate measurement, the brake force has to be built up slowly!**

After the rollers have stopped, on the LED display, the bar diagram for the brake force will switch into a numerical brake force value and will remain displayed.

The operator should note the achieved brake force for the left wheel.

Press **Key “FRONT”** to assign the service brake left wheel for the front axle and the computer will automatically hold the test result in its memory (only relevant for automatic brake efficiency calculation by the computer and recalling of results per axle). The “**Service front**” lamp will light to confirm this assignment.

- 1a. During the test, the pedal force can be held at a constant value to visually check any fluctuations on that wheel. The operator should note and interpret the irregularities in the brake force behaviour.
2. For the right wheel press **Key “RIGHT”** to start the right rollers. Repeat the test procedure as described for the left wheel in **STEP 1** and note the highest brake force.  
The maximum brake force value will remain displayed until the next measurement is started.

When starting the right rollers, the left wheel brake force value (and possible lock indication) will return on the display (when correctly stored under key FRONT in step 1). After the right wheel test, both brake force values for left and right are displayed at the same time.

The operator should note the achieved brake force for the right wheel.

Press **Key “FRONT”** to assign the service brake right wheel for the front axle.

The “**Service front**” lamp will light to confirm this assignment.

The computer has already stored the brake force measurement of the left wheel in its memory.

3. Press **Key “BOTH”** to start both sides and note whether a significant brake effort is recorded from any wheel without applying the brake pedal (rolling resistance test).
4. Slowly increase the pressure on the brake pedal and aim to stop just short of the value on which maximum brake force is achieved during the individual left and right wheel brake force measurement (the brake forces are already noted by the operator in **STEP 1 & 2**).
5. Gradually release the service brake and observe how the braking effort at each wheel reduces.
6. During **STEP 4**, the lower reading of the two brake forces should not be less than 75% of the higher reading.

Remark: Disregard any service brake imbalance when the brake effort from each front wheel is less than 40 kgf.

7. Press **Key “BOTH”** to stop both rollers. After the rollers have stopped, on the LED display, the bar diagrams for brake forces left and right will switch into numerical brake force values.  
The maximum imbalance in brake forces for the left and right wheel is also displayed numerically.

The operator should note the imbalance and determine a PASS or FAIL according to the MOT regulations (see chapter 4.2 Brake imbalance). The operator can also store the results in the computer’s memory.

Press **Key “FRONT”** to assign the service brake imbalance result for the front axle.

The **“Service front”** lamp will light to confirm this assignment (*the assignments of the independent left and right wheel brake force measurements will also be displayed numerically*).

8. If the vehicle has a parking brake on the front wheels, press **Key “LEFT”** to start the left roller and apply the parking brake. Follow the procedure as described in **STEP 1**.  
Keep the hold on button or trigger in the disengaged position at all time.

Press **Key “PARK”** to assign the parking brake measurement for the left wheel.

The **“Parking Brake”** lamp will light to confirm this assignment.

Repeat the test of the parking brake for the right wheel as described in **STEP 2**.

Press **Key “PARK”** to assign the parking brake measurement for the right wheel.

The **“Parking Brake”** lamp will light to confirm this assignment.

Repeat the imbalance test for the parking brake as described in **STEP 3-7**.

Press **Key “PARK”** to assign the parking brake imbalance result.

The **“Parking Brake”** lamp will light to confirm this assignment. (*the assignments of the independent left and right wheel brake force measurements will also be displayed numerically*).

Remove the vehicle from the roller bed.

It can be helpful to start both roller sides of the brake tester when driving out of the rollers.

### **5.3 Testing the rear wheels**

9. Release the brakes and drive the rear wheel in the rollers.  
Follow instructions A, D, E as described in paragraph 5.1 to prepare the vehicle for testing the rear wheels.
10. Repeat **STEPS 1-7** for testing the rear wheels of the service brake individually and for the imbalance as described for the front wheels.

The operator should note the maximum brake forces as well as the imbalance.

*The only differences is the storage of the measurements:*

Press **Key “REAR”** to assign the service brake left wheel for the rear axle.

Press **Key “REAR”** to assign the service brake right wheel for the rear axle.

Press **Key “REAR”** to assign the service brake imbalance result for the rear axle. (*the assignments of the Independent left and right wheel brake force measurements will also be displayed numerically*).

The **“Service rear”** lamp will light to confirm all three assignments.

11. If the parking brake is operated by the rear wheels, follow the procedure described in **STEP 8**.
12. Remove the vehicle from the roller bed.  
It can be helpful to start both roller sides of the brake tester when driving out of the rollers.

## **5.4 Vehicle weight**

- 12a. Enter vehicle weight. With the remote control, the operator can input the vehicle weight for the automatic calculation of the brake efficiency.

The *DGW* of the vehicle can be obtained from the *Department of Transport Plate* (commonly called “*Ministry*” Plate) fitted to the vehicle. If a *Ministry* plate is not fitted to the vehicle then obtain the *DGW* from the manufacturer’s plate fitted to the vehicle.

*Weight input procedure:*

Press **Key “KG”** on the remote control. The digital display will mention “**KG:**”. The operator should always enter 4 digits (if the vehicle weighs under 1,000 kg, the first digit should be a 0 (zero)). Each key on the remote control mentions a number, which can be used for vehicle weight input. The display will present each digit (*example: KG: 0985*). The computer will use the last entered weight until a new weight is entered or “**RESET**” is pressed. After entering the 4 digits, the total weight is displayed for a few seconds.

## **5.5 Calculation of brake efficiency**

13. Manually calculate the brake efficiency for both the service brake and parking brake as described in chapter 4.1 by means of a calculator. Determine if the vehicle **PASSES** or **FAILS** on brake efficiency and imbalance. All brake force values are noted by the operator in the pre-described tests.

The *D700* is capable of displaying the efficiency for the service brake and the parking brake when all separate tests are assigned properly and the vehicle weight has been manually entered.

When pressing key **%** on the remote control once, the service brake efficiency is displayed.

The display will show “**EFF. SB ...%**” (SB = Service brake).

When pressing key **%** on the remote control again, the parking brake efficiency is displayed.

The display will show “**EFF. PB ...%**” (PB = Parking brake).

## **5.6 Recalling values**

14. When required by the operator, the test results of the service brake and the parking brake can be recalled on the display by means of the remote control. The results can all be recalled by pressing Key **%**.


**Press once** : Shows the last results of the *service brake front axle* and imbalance result left/right wheel, as well as possible wheel locks.

**Press again** : Shows the last results of the *service brake rear axle* and imbalance result left/right wheel as well as possible wheel locks.

**Press again** : Shows the last results of the *parking brake* and imbalance result left/right wheel, as well as possible wheel locks.

**REMARK:** Key % on the remote control is for the use of the brake efficiency and the recalling of values. All 5 requested values are displayed by pressing key % 5 times. It is a continues circle.

## **5.7 Printing test results (optional)**

15. When an optional printer is connected, the operator can print a summary of the measurements by pressing **KEY**  on the remote control.

## **5.8 Testing procedure without remote control**

It is possible to do a test without remote control. This test procedure requires two persons. One person to do a test, while the other person pushes the start/stop buttons on the display. The brake force will be displayed on the cabinet, however, these values can not be stored in the computer memory and therefore automatic calculation of the brake efficiency is not possible.

On the display cabinet three push buttons are mounted. If you want to start the left, right or both rollers, press the related button. Press the button again, to stop the rollers. The test starts up and the procedure is the same as described in paragraph 5.2 and 5.3. The manual buttons function as **Keys “LEFT”, “RIGHT”, “BOTH”** on the remote control.

## **6 Testing 3-wheel vehicles**

The *D400* is capable of testing 3-wheel vehicles, as classified under MOT class 3 and 4 vehicles. This mode allows the operator to start the left side of the roller bed, if the smaller middle roller of this one side only is pressed down.

When the 3-wheel mode is selected, as a safety precaution, the right rollers will not start when the middle roller of the right side is pressed down as well.

- ◆ **The motor can always be stopped by pressing any KEY and the test will be aborted.**
- ◆ **In the event of an emergency, these procedures must be followed:**
  - (1) Press any **KEY** on the remote control. This will stop the rollers *or*
  - (2) Press the manual start/stop buttons on the side of the cabinet *or*
  - (3) Push the **red emergency stop switch**, to isolate the electrical supply to the roller bed and stop the rollers.

### **Preparations**

- A. Examine the tyres to ensure they are not under-inflated, if the tyre pattern is in good condition and if the tyres are free from mud and stones.
- B. Remove only the left optional cover of the roller tester and switch the power of the tester on.
- C. Drive the front axle (front wheel) in the roller bed and select neutral gear.
- D. Start the left roller by pressing **Keys “3-WH” and “LEFT”** to position the wheel and align the vehicle. Make sure the tyre does not touch the side of the chassis. The **“3-wheel”** lamp on the display will constantly light as a warning and to confirm this function and will stay on during the test of the single wheel axle.
- E. Press **Key “LEFT”** to stop the roller set. The “3-wheel” lamp is still on.
- F. The machine is now ready to test the front wheel.

## Test procedure

1. While the 3-wheel mode is already selected (*see D,E*), press “LEFT” to start the left roller. This is for 3-wheel mode only and therefore not the same as Key “LEFT” as described in chapter 5.2. The “3-wheel” lamp on the display will constantly light as a warning. The “Left” lamp flashes as an indication that the left rollers are running.
2. Slowly increase the brake force on the brake pedal until maximum effort is achieved, or until the wheel locks and slips on the rollers. At the slip limit the motor will be cut out directly and the left lamp will light to indicate this wheel lock. If slip does not occur while the maximum brake force is achieved, the left roller can be stopped by pressing Key “LEFT”. The wheel lock lamp will not light or flash.

### **For an accurate measurement, the brake force has to be built up slowly!**

After the rollers have stopped, the maximum brake force is displayed in a numerical value and will remain displayed until the next measurement is started.

The operator should note the achieved brake force.

Press Key “FRONT” to assign the service brake of the single wheel for a single wheel-front axle.

The “Service front” lamp will light to confirm this assignment

Press Key REAR to assign the service brake of the single wheel for a single wheel-rear axle.

The “Service rear” lamp will light to confirm this assignment

3. During the test, the pedal force can be hold at a constant value to visually check any fluctuations on that wheel. The operator should note the irregularities in the brake force behaviour.
4. Follow the procedure described in chapter 5 for testing the service brake and parking brake on the dual wheel axle (can be front- or rear axle) for brake force as well as imbalance. Assigning results of the measurements is according to the same principle.

**To go out of the 3-wheel mode, press key “3-WH”. The 3-wheel lamp will go out as a confirmation that the 3-wheel mode is not operational anymore.**

## 7 Testing 4x4 vehicles

The D400 is capable of testing 4x4 vehicles, as classified under MOT class 3 and 4 vehicles. The brakes of each wheel of an axle are tested separately one after the other. **On one side the rollers turn in the normal direction, while on the other side the rollers turn in the reverse direction.**

**Always refer to the car manufacturer’s prescriptions before testing these types of vehicles!**

**Special attention is required that the correct buttons on the remote control are used!**

Press Key “4x4” to select the 4-wheel drive mode and Key “LEFT” on the remote control to start the left roller. The right rollers will turn in the reverse direction. This key is for the 4x4-mode only and is therefore not the same as Key “LEFT” as described in chapter 5.2. The “Left” and “Right” lamp will flash and the “4x4” lamp will light to indicate that the tester is in the 4x4 mode.

1. Slowly increase the brake force on the brake pedal until maximum effort is achieved, or until the wheel locks and slips on the rollers. At the slip limit the motor will be cut out directly and the “Left” lamp will light to indicate this wheel lock. If slip does not occur the left roller can be manually stopped by pressing Key “LEFT”. The lock lamp will not light or flash.  
*The tester is still in the 4x4 mode.*



## **For an accurate measurement, the brake force has to be built up slowly!**

After the rollers have stopped, on the LED display, the bar diagram for brake force will switch into a numerical brake force value and will remain displayed until the tester is manually reset.

The operator should note the achieved brake force for the left wheel or assign the results according to the same **KEYS** as described in chapter 5.2.

- 2a During the test, the pedal force can be hold at a constant value to visually check any fluctuations on that wheel. The operator should note and interpret the irregularities in the brake force behaviour.
- 3 Press **Key “RIGHT”** on the remote control to start the **right** roller.

**REMEMBER:** The tester is still in the 4x4 mode. The 4x4 lamp still lights.

**WARNING:** Do NOT press the LEFT key when the 4x4 mode is NOT selected.

The left rollers will turn in the reverse direction. Follow the procedure as described for the left wheel.

- 4 During **STEP 1 and 2** of a 4x4-vehicle, the lower reading of the two brake forces should not be less than 75% of the higher reading.

Both wheels can not run in the same direction at the same time. A measurement as described in **STEP 3** in chapter 5.2 is therefore not possible. The brake force for the left wheel and the brake force for the right wheel have to be compared by the operator and the imbalance should be calculated manually.

- 5 Repeat **STEP 1-4** in chapter 5 for the service brake of the rear axle.
- 6 Test the parking brake as described in chapter 5.2 and 5.3.

## **8 Trouble shooting & maintenance**

If the RBT does not function, as it should, the operator should only take action when the failure appears to be very simple to solve. For example changing the battery on the remote control or cleaning the front plate for better signal receiving of the remote control.

If for example the motors are not starting when a vehicle is placed in the rollers or the RBT makes uncommon noises, please contact Boston Garage Equipment for service and do not open the RBT for inspection yourself.

The RBT is designed and constructed so maintenance can be reduced to a minimum. Only the service technicians are allowed to perform adjustments. They are trained and have suitable calibration instruments at their disposal.

Although the RBT involves very little maintenance, it is important that the following instructions are carried out properly:

- ◆ Check the roller coating twice a year (visually by the operator).
- ◆ Check the tension of the chains every four months (recommended to be done by Analyze UK).
- ◆ Lubricate the chain every 3 months when used intensively (recommended to be done by Analyze UK).

For periodic maintenance, calibration and service contact Analyze UK.

**Warning: Do not use high pressure or steam cleaners on the RBT.** The brake tester should be kept clean and dust-free. Clean the sheet metal with a lukewarm soap solution. Do not use any aggressive or abrasive detergents. Do not spray the units with water.

## **9 Warranty**

Warranty conditions are available at request.

### **Appendix A: Product specifications**

Voltage	3 phase 400 V / 50 Hz / 32 A
Motor	2 x 3 kW
Electronics	Microprocessor controlled
Testing speed	2.9 km/h
Max. brake force (per wheel)	800 kgf
Max. axle load	3,000 kg
Weight roller tester	325 kg
Chassis dimensions	234 cm x 66 cm x 30 cm (L x W x H)
Diameter of the rollers	206 mm
Roller width	700 mm
Roller centres dimension	420 mm
Friction roller surface	0.9 $\mu$ dry, > 0.6 wet
Dimensions digital display	67 x 50 x 12 cm (L x W x H)