

BRAKE TESTER – TEST LANE

CONTROL UNIT:

PFC750
PFC800
PFC750/WALL

ROLLER BRAKE TESTERS:

PFB035 SERIES – PFB040 SERIES
PFB045 SERIES – PFB060 SERIES
SPRT102/4 SERIES – SPRT102/5 SERIES
SPRT102/6 SERIES – SPRT102/7 SERIES

INSTRUCTION OPERATION AND MAINTENANCE MANUAL



COMPOSIZIONE

70 pagine (copertine
comprese)
68 pagine numerate

COMPOSITION

70 pages (including
cover pages)
68 numbered pages

ZUSAMMENSETZUNG

70 Seiten (inkl.
Deckblätter)
68 nummerierte Seiten

COMPOSITION

70 pages (pages de la
couverture incluses)
68 pages numérotées

COMPOSICIÓN

70 páginas (incluidas
las portadas)
68 páginas numeradas

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SIMBOLOGIA UTILIZZATA NEL MANUALE
SYMBOLS USED IN THE MANUAL
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SYMBOLES UTILISES DANS LA NOTICE
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	SIMBOLI	SYMBOLS	ZEICHEN	SYMBOLES	SÍMBOLOS
	VIETATO!	FORBIDDEN!	VERBOTEN	INTERDIT!	PROHIBIDO!
	Obbligo! Operazioni o interventi da eseguire obbligatoriamente	Mandatory! Operations or jobs to be performed compulsorily	Vorschrift Obligatorisch auszuführende Arbeitsvorgänge oder Eingriffe	Obligation. Opérations ou interventions obligatoires	Obigación. Operaciones o intervenciones que hay que realizar obligatoriamente
	Pericolo! Prestare particolare attenzione	Hazard! Be especially careful	Gefahr! Äusserste Vorsicht ist geboten	Dager! Faire très attention	Peligro! Prestar especial atención
	Pericolo: scariche elettriche	Shock hazard	Gefahr! elektrische Entladungen	Danger d'électrocution	Peligro de descargas eléctricas



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0. CAUTION

Any damage caused by failure to follow the instructions in this manual or improper machine use shall relieve SPACE S.R.L. of all liability.

0.1. Preliminary safety information



Before starting the machine:

- Read this manual carefully before using the brake tester. This manual forms an integral part of the product, its purpose is to provide the user with instructions on how to operate the brake tester.
Keep it throughout the working life of the machine in a well-known and easily-accessible place where it can be referred to every time doubts arise. All product operators must be in a position to read this manual.
- Assembly and setting instructions, reserved for the fitter (specialized technical staff) are contained in the specific manual. Masonry works and details on system specifications are shown on specific drawings available from your SPACE S.R.L. dealer.
- Make sure the power supply is in conformity with the specifications shown on the plate.
- Make sure the machine is properly positioned on the floor.
- Suitably position the machine power cables.

On starting the machine:

- During operating program loading, position the vehicle close to the line but not move the front axle onto the roller, as the system is busy checking the correct operation of these devices.

In emergency conditions and before performing any maintenance:

- Isolate the machine from any power sources by means of the machine master switch.

Work environment and machine cleaning:

- The work environment must be kept clean and dry and must not be exposed to atmospheric agents. It must also be well lighted.
- Do not clean the machine using strong jets of water and compressed air.
To clean plastic panels or tops, use alcohol (always avoid liquids containing solvents).

SPACE S.R.L. can modify in any moment the models described in this manual for technical or commercial reasons.

1. INTENDED USE

The product is designed to perform braking tests on front and rear axles of vehicles weighing under 4000 kg when fully loaded.

The model featuring adherence test device is designed to perform tests on the front and rear axles of vehicles weighing under 4000 kg when fully loaded.

The max acceptable roller assembly and suspension test load per axle is 2500 daN.



Important! Failure to comply with the weight restrictions indicated above could permanently damage system parts.

Any damage ensuing from failure to comply with the instructions given in this manual or incorrect machine use shall relieve SPACE S.R.L. of all liability.

2. PERSONNEL TRAINING

The machine must only be used by specially trained and authorized persons. To ensure the machine is operated in the best possible manner and measurements are properly made, operators must be correctly trained and be in possession of all necessary information in order to achieve operating standards in line with the indications provided by the manufacturer. In case of any doubt concerning use and maintenance of the machine, refer to the instruction manual; if doubts still remain, contact an authorized after-sales center or the SPACE S.R.L. technical department.

2.1. General preventive measures



- During operation and maintenance of this machine, always abide by the safety and accident-prevention regulations in force.



- The machine must only be used by adequately trained and authorized persons.



- This machine must only be used for the purpose for which it was expressly intended. SPACE S.R.L. declines all liability for injury or damage to persons, animals and things caused by improper machine use.



- Accessories and spare parts must be fitted by persons authorized by SPACE S.R.L. and only original spare parts and accessories must be used



- The machine must only be operated in places where there is no danger of explosions or fire.



- Removal or changes made to safety devices, or warning signals on the machine can cause serious hazards and represents a violation of European safety regulations.



- Before doing any maintenance jobs on the system, always disconnect the power supply. In case of doubt, do not interpret, but contact SPACE S.R.L. technical assistance in order to obtain instructions suitable for performing operations in total safety.



- Do not allow unauthorized personnel to come near the brake tester during the cycle. Only one operator must work inside the test area and must not exit from the vehicle near the roller tester. In the event of the operator, for any reason, not being able to exit from the vehicle, he should ask for the assistance of a second operator who may access the test area only after operating the emergency device



- The workspace must be clean and dry with particular reference to substances made up of that oil can cause danger; the atmosphere must sufficiently be illuminated.

2.2. Indication of outstanding risks

The machine was designed and manufactured in compliance with applicable regulations. The risks connected to the use of the machine have been eliminated as far as possible. Other outstanding risks are described in this manual; the machine also features self-adhesive pictograms (chap 0 and 0 on page 15 and 16) indicating hazard areas. In the event pictograms become illegible, please order them from a dealer or directly from SPACE S.R.L. and replace them. Please refer to Spare Parts manuals.

2.3. Emergency devices

In case of an emergency, operate the special device on the rear of the cab as shown at Figure 7 and Figure 6 page 15 and 16 at ref. 8.

2.4. Safety devices

- Safety button: stops and prevents roller start (Button on the front of the cab shown at Figure 7 and Figure 6 on page 15 and 16 at ref. 3).
- Vehicle sensor rollers: these enable the start of the rollers only when they are both pressed.
- Slip/speed control sensor rollers: these stop roller rotation when an anomalous wheel speed is detected of the vehicle being tested.
- Stop/F1 key: on the functional keyboard and remote control. For stopping roller rotation and the test under way.
- Cab access doors: these prevent access to energized parts. These must only be opened by professional and authorized personnel (Figure 7 and Figure 6 at ref. 9).

2.5. Emergency situations

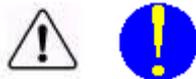
ATTENTION!  In the event of emergency situations, the special device behind the console will have to be operated (see Figure 7 and Figure 6 on page 15 and 16, at ref. 8), and consequently, the console should be installed so the emergency device is easily accessible. The user is responsible for inspecting and maintaining access to the emergency device free of obstacles or impediments and for periodically checking its efficiency.

ATTENTION!     Unauthorized persons must not be allowed to enter the test area. Only one operator must work inside the test area and must not exit from the vehicle near the roller tester. In the event of the operator, for any reason, not being able to exit from the vehicle, he should ask for the assistance of a second operator who may access the test area only after operating the emergency device.

ATTENTION!   The equipment also features a safety device on the front (Figure 7 and Figure 6 on page 15 and 16, at ref. 3); this prevents the rollers starting. This must be disengaged, by turning clockwise, only after checking that no risk situations exist. The disconnecting operation must be only executed after to have verified that the conditions of emergency inside of the test area are respected. The rollers are normally prevented from being started if the vehicle axle is not on the roller assembly. Press the STOP key on the remote control or the red key on the keyboard to stop the rollers; this is necessary if the vehicle brakes are not working properly and do not allow automatic roller stoppage.

2.6. Operating precautions

IMPORTANT!:



During brake testing, the vehicle is sometimes reactively pushed off the rollers. To prevent this occurring, pull the handbrake, when this does not affect the axle being tested.

IMPORTANT!:



The vehicle must be tested with the motor running so the servo brake expansion box is loaded. It is important to have the motor running especially when a vehicle is being tested with hydropneumatic compensation type suspensions.

The steering lock of the vehicle being tested must not be engaged.

IMPORTANT!:



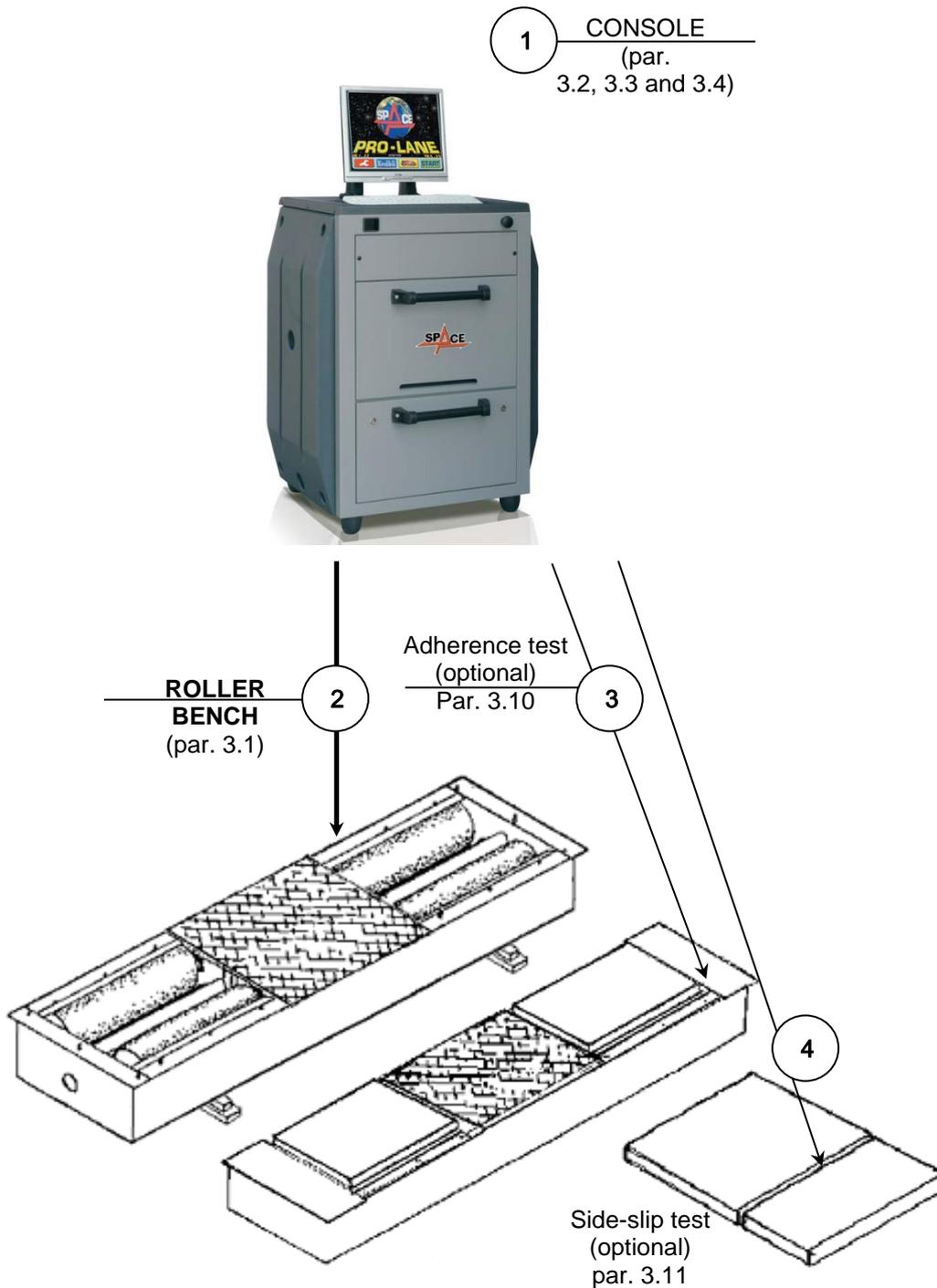
Vehicles with permanent four-wheel drive can only be tested on the REVERSE version brake tester with 4WD program switched on. This enables the wheels to be turned in the opposite direction so as to uncouple the differential and prevent transmitting driving torque to the axle not being tested.

IMPORTANT!:



Before performing a test, make sure the brakes are dry and that tire pressure is correct.

3. EQUIPMENT COMPOSITION





3.1. Roller assembly

The roller assemblies of the SPACE brake tester consist of a folded metal (plate) frame with reinforcements and “C” sections for supporting and housing the operation and measurement devices.

The roller drive system consists of a gear motor (one for each pair of rollers) constrained to a load cell secured to the frame.

During braking, a tangential force is applied on the rollers which creates a torque resistant to the action of the gear motor. In these conditions, the gear motor would tend to turn around the roller rotation axis if it were not secured to the load cell.

In actual fact, the resistant torque generated by braking is unloaded on the cell.

The load cell sends a signal to the console which is used to manage result calculation and display.

Each pair of rollers features a proximity switch (called CAR-ON sensor) which indicates the presence of a vehicle. If the support on which this is mounted is lowered, the sensor no longer detects the support, the contact closes and an electric signal is sent to the console; this is the signal for the motors to start.

In the event of even only one of the proximity switches not closing the contact, the console fails to receive the signal and consequently the test is interrupted. It follows that testing is only possible with both “rollers” lowered by the axle of the vehicle being tested.

Each pair of rollers also features a proximity switch (called TACHO sensor) that detects roller speed and consequently vehicle wheel speed. This quantity, which is continuously measured, when compared with the initial wheel speed, determines the slip condition that causes test stop. Roller stoppage at the end of the test is therefore determined by the set slide threshold having been reached. This normally coincides with detection of maximum braking force of the axle being measured.

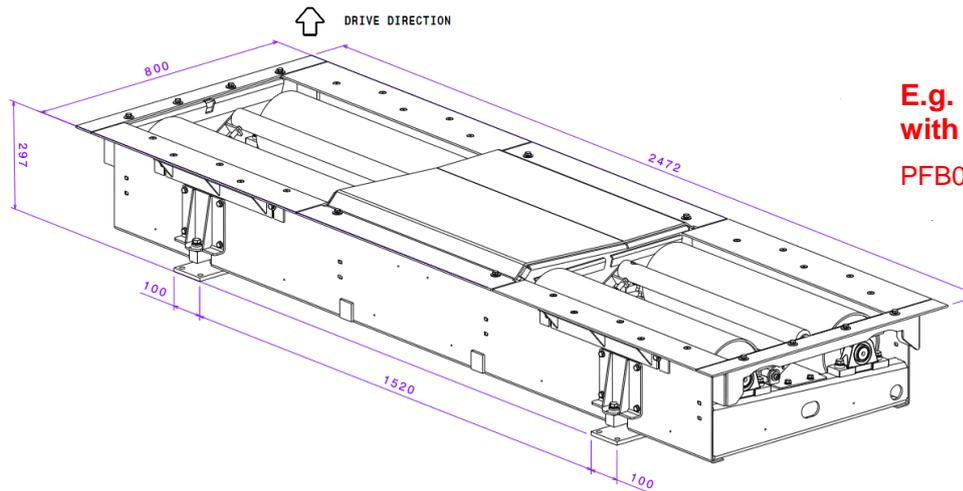
In the case of emergencies or special needs, the test can also be stopped by the operator, by the remote control or keyboard.

3.1.1. Roller brake tester PFB035 series

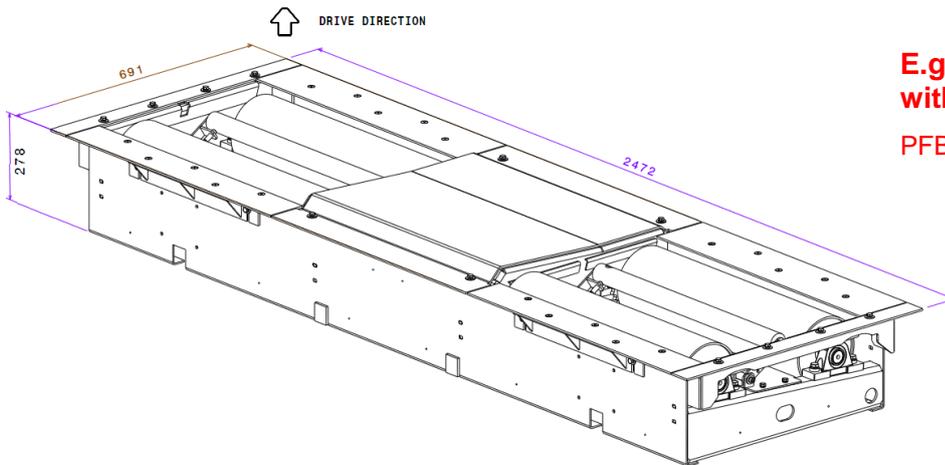
The roller brake tester PFB035 series consists of:

- roller brake tester PFB035 0000 (can be used together with suspension tester code APF110);
- roller brake tester with weighing equipment PFB035 2000 (2 sensor weighing equipment)

The tester is physically separate from the console; the only connections are power connections (to power the motors) and electronic connections (signaling cables, vehicle presence, rolling speed and measurement cables).



E.g. Roller brake tester with weighing equipment:
PFB035 2000



E.g. Roller brake tester without weighing equipment:
PFB035 0000

Figure 1

TECHNICAL SPECIFICATIONS PFB035	
Roller dimensions	700 - ϕ 205
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max. transit weight per axle	4000 daN
Max measurable braking force	5000 N
Motors	M90 4kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,7
Precision measuring chain	$\leq \pm 1\%$
Weight	382 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Max. transit weight per axle	4000 daN
Max. test weight per axle	2500 daN
Precision measuring chain (2 sensor)	$\leq \pm 3\%$
Weight	30kg

3.1.2. Roller brake testers SPRT102/4, SPRT102/5, SPRT102/6 and SPRT102/6 series with weighing equipment:

The roller brake tester SPRT102/4, SPRT102/5, SPRT102/6 and SPRT102/6 series with weighing equipment consists of:

- roller brake testers SPRT102/4P, SPRT102/5P, SPRT102/6P or SPRT102/7P with weighing equipment;
- roller brake testers SPRT102/4P4, SPRT102/5P4, SPRT102/6P4 or SPRT102/7P4 with 4 sensors weighing equipment;
- roller brake testers SPRT102/4PF, SPRT102/5PF, SPRT102/6PF or SPRT102/7PF with weighing equipment and self-braking motors;
- roller brake testers SPRT102/4P4F, SPRT102/5P4F, SPRT102/6P4F or SPRT102/7P4F with 4 sensors weighing equipment and self-braking motors.

The tester is physically separate from the console; the only connections are power connections (to power the motors) and electronic connections (signaling cables, vehicle presence, rolling speed and measurement cables).

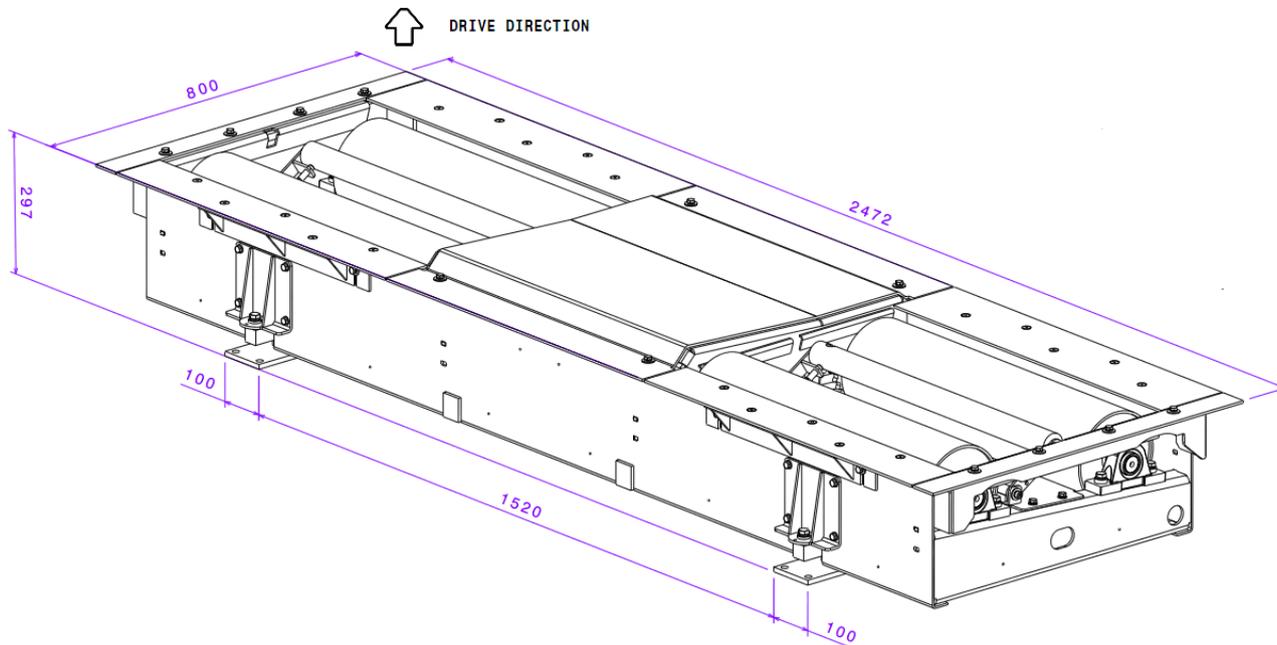


Figure 2

TECHNICAL SPECIFICATIONS	
Roller dimensions	700 - ϕ 205
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max. transit weight per axle	4000 daN
Max measurable braking force RT102/4 series	4000 N
Max measurable braking force RT102/5 series	5000 N
Max measurable braking force RT102/6 series	6000 N
Max measurable braking force RT102/7 series	7500 N
Empty roller tip speed	5,4 km/h
Grip coefficient a	>0,7
Weight	385 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Max. transit weight per axle	4000 daN
Max. test weight per axle	2500 Kg
Precision	± 2 %
Weight	30kg

3.1.3. Roller brake testers SPRT102/4, SPRT102/5, SPRT102/6 and SPRT102/7 series without weighing equipment:

The roller brake tester SPRT102/4, SPRT102/5, SPRT102/6 and SPRT102/7 series without weighing equipment consists of:

- roller brake testers SPRT102/4, SPRT102/5, SPRT102/6 or SPRT102/7 without weighing equipment;
- roller brake testers SPRT102/4F, SPRT102/5F, SPRT102/6F or SPRT102/7F with self-braking motors and without weighing equipment;

The tester is physically separate from the console; the only connections are power connections (to power the motors) and electronic connections (signaling cables, vehicle presence, rolling speed and measurement cables).

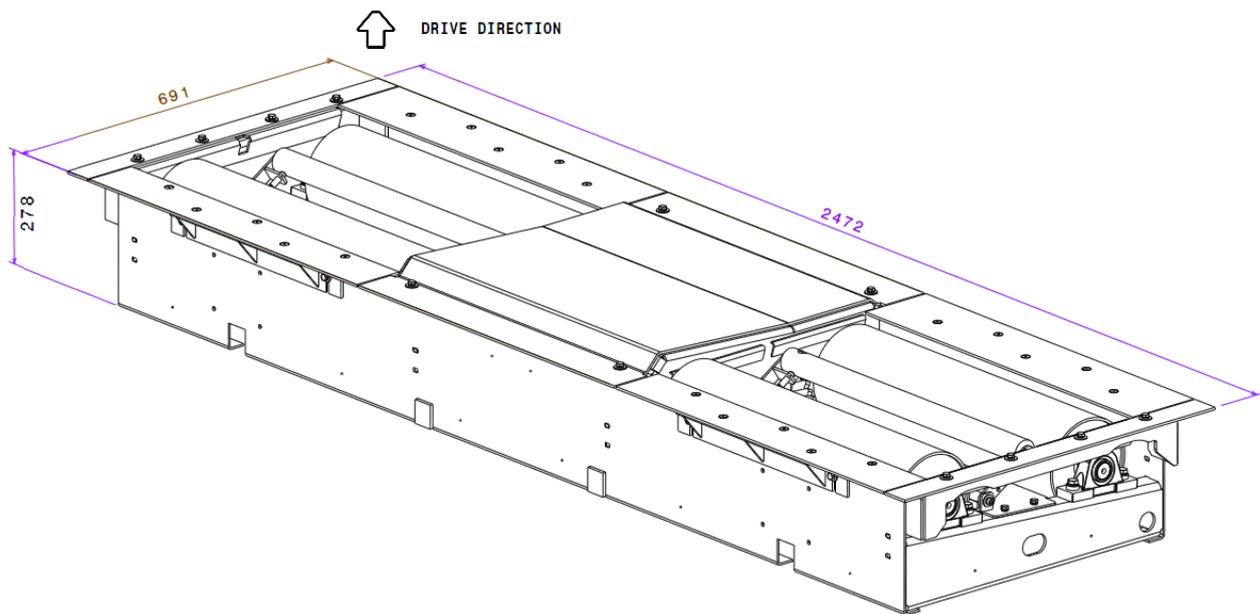


Figure 3

TECHNICAL SPECIFICATIONS	
Roller dimensions	700 - ϕ 205
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max. transit weight per axle	4000 daN
Max measurable braking force RT102/4 series	4000 N
Max measurable braking force RT102/5 series	5000 N
Max measurable braking force RT102/6 series	6000 N
Max measurable braking force RT102/7 series	7500 N
Empty roller tip speed	5,4 km/h
Grip coefficient a	>0,7
Weight	385 kg

3.1.4. Roller brake testers PFB040 series:

The roller brake tester PFB040 series consists of:

- roller brake testers PFB040 0000 without weighing equipment;
- roller brake testers PFB040 2000 with four sensors weighing equipment;
- roller brake testers PFB040 1000 with self-braking motors and without weighing equipment;
- roller brake testers PFB040 3000 with self-braking motors and four sensors weighing equipment;

The tester is physically separate from the console; the only connections are power connections (to power the motors) and electronic connections (signaling cables, vehicle presence, rolling speed and measurement cables).

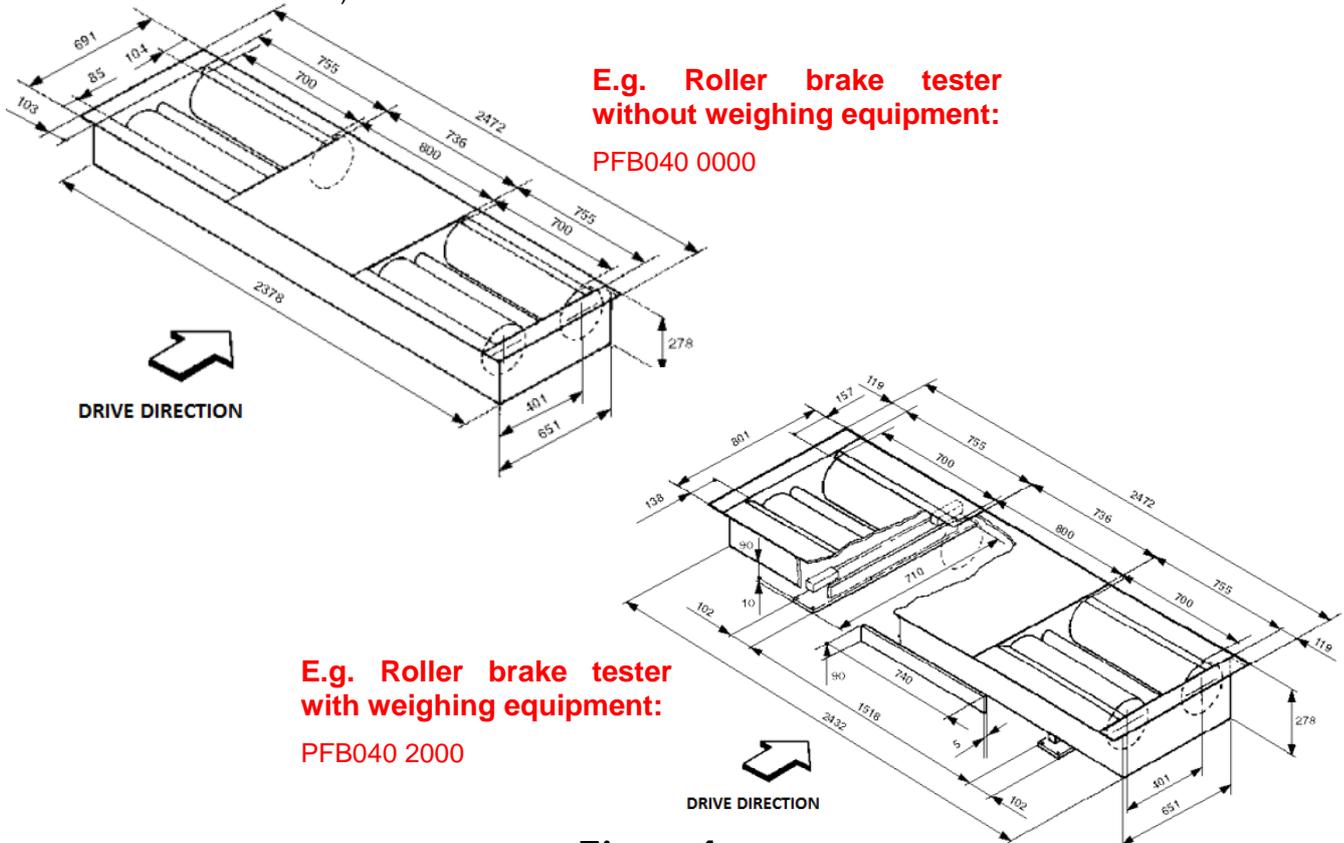


Figure 4

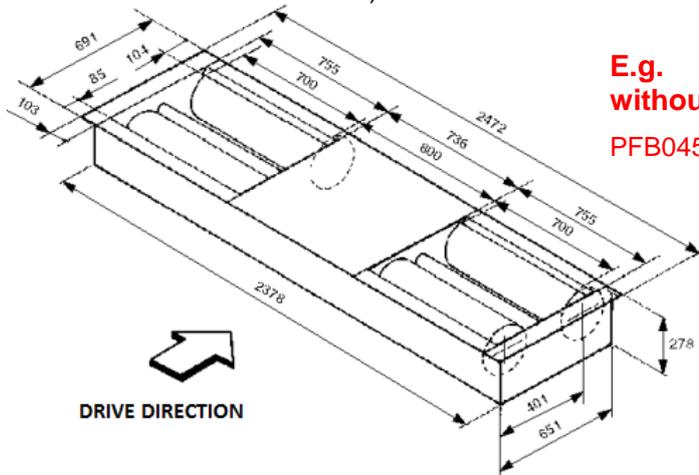
TECHNICAL SPECIFICATIONS PFB040 SERIES	
Roller dimensions	700 - ϕ 205
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max. transit weight per axle	4000 daN
Max measurable braking force	6000 N
Motors	M100 4,7kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,7
Weight PFB040 2000	415 kg
Weight PFB040 0000	385 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Max. transit weight per axle	4000 daN
Max. test weight per axle	2500 Kg
Precision	± 2 %
Weight	30kg

3.1.5. Roller Brake Testers PFB045 series

The roller brake testers PFB045 series consist of:

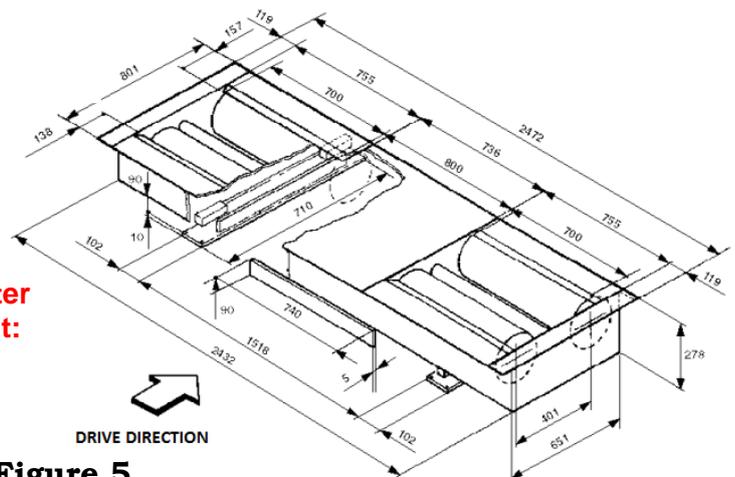
- roller brake testers PFB045 0000 without weighing equipment;
- roller brake testers PFB045 2000 with four sensors weighing equipment;
- roller brake testers PFB045 1000 with self-braking motors and without weighing equipment;
- roller brake testers PFB045 3000 with self-braking motors and four sensors weighing equipment;

The tester is physically separate from the console; the only connections are power connections (to power the motors) and electronic connections (signaling cables, vehicle presence, rolling speed and measurement cables).



**E.g. Roller brake tester
without weighing equipment:**

PFB045 0000



**E.g. Roller brake tester
with weighing equipment:**

PFB045 2000

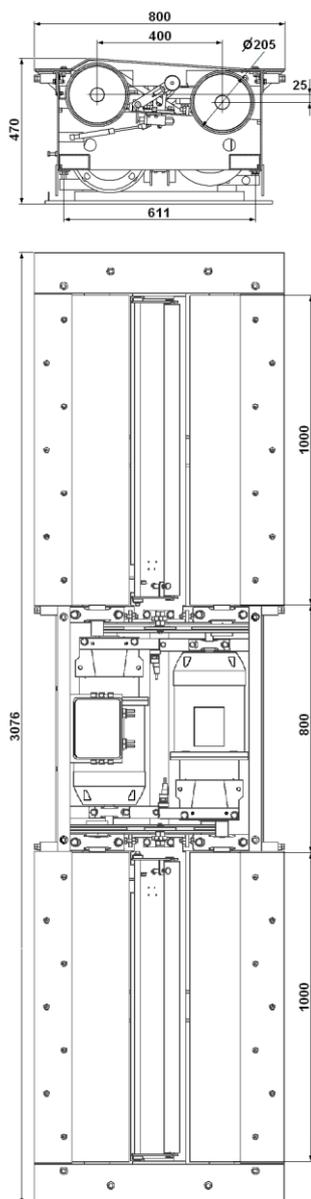
Figure 5

TECHNICAL SPECIFICATIONS PFB045	
Roller dimensions	700 - ϕ 205
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max. transit weight per axle	4000 daN
Motors	M112 5kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,7
Weight PFB045 0000	385kg
Weight PFB045 2000	415 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Max. transit weight per axle	4000 daN
Max. test weight per axle	2500 Kg
Precision	± 2 %
Weight	30kg

3.1.6. Roller brake testers PFB060 series:

The roller brake tester PFB060 series consists of:

- roller brake tester PFB060 0000 without weighing equipment;
- roller brake tester PFB060 1000 with self-braking motors and without weighing equipment;
- roller brake tester PFB060 2000 with two sensors weighing equipment;
- roller brake tester PFB060 3000 with self-braking motors and two sensors weighing equipment.



TECHNICAL SPECIFICATIONS PFB060	
Roller dimensions	1000 - ϕ 205
Roller internal wire distance	800 mm
Roller external wire distance	2800 mm
Max. transit weight per axle	5000 daN
Motors	M112 5,5kW
Empty roller tip speed	2,5 km/h
Grip coefficient	>0,7
Precision measuring chain (2 sensor)	$\leq \pm 3\%$
Weight	485 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Max. transit weight per axle	5.000 daN
Max. test weight per axle	4.000 daN
Precision measuring chain	$\leq \pm 3\%$
Weight	30kg

Figure 6

3.2. Console PFC750E000

All brake tester and suspension tester operations expect the use of a console, featuring electronic and electric components for the processing and management of signals from the tester sensors.

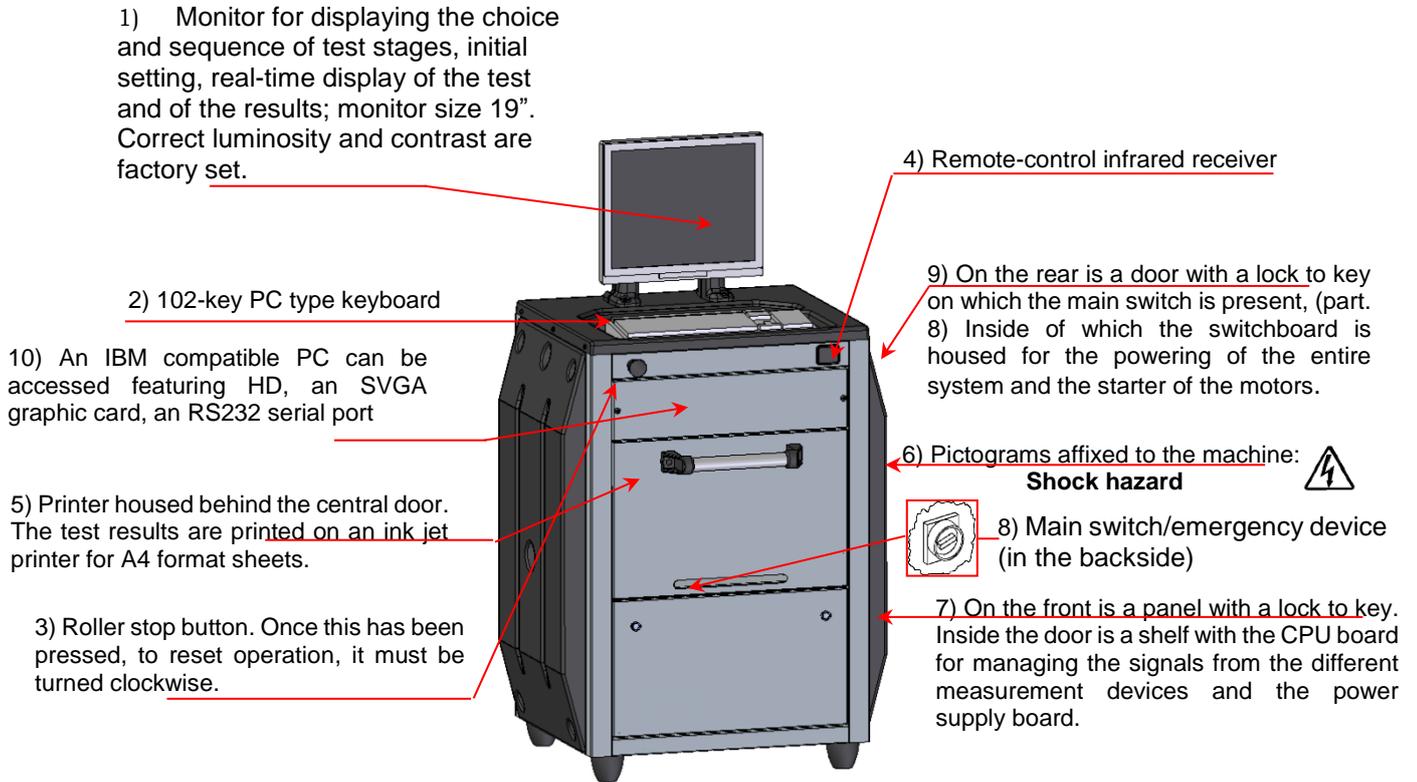


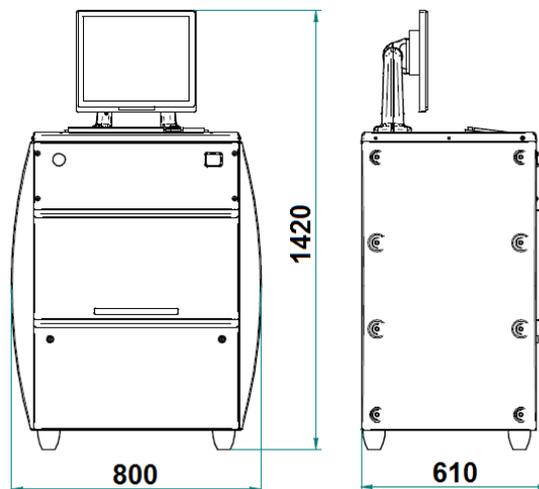
Figure 7

IMPORTANT!:



The rear door leading to the switchboard and the front panel leading to the CPU board and power board can only be opened by authorized personnel; these compartments contain high-voltage components which can prove hazardous to unskilled operators.

TECHNICAL DETAILS	
Power supply	400V 3ph + neutral
Weight	110kg



3.3. Console PFC800E000

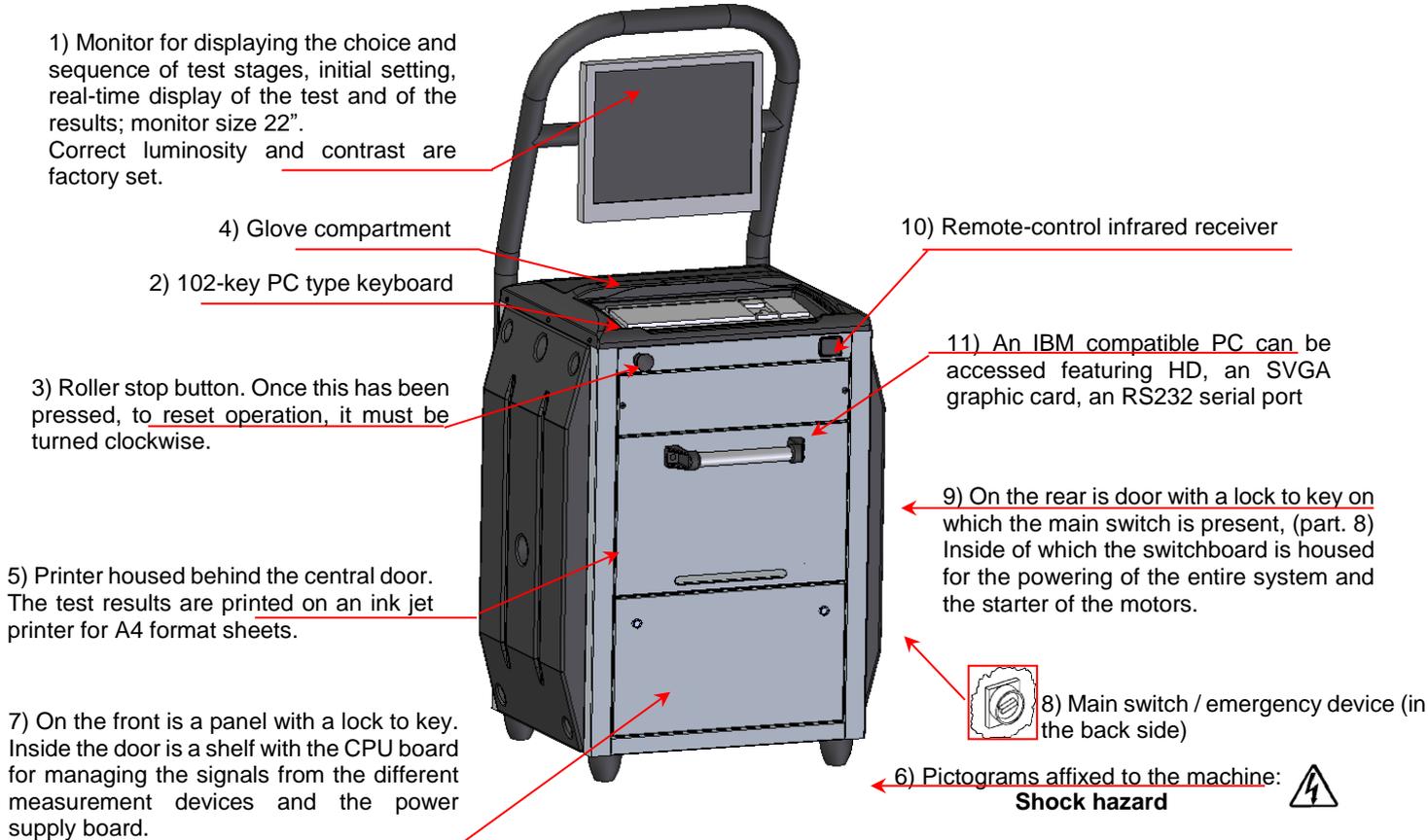
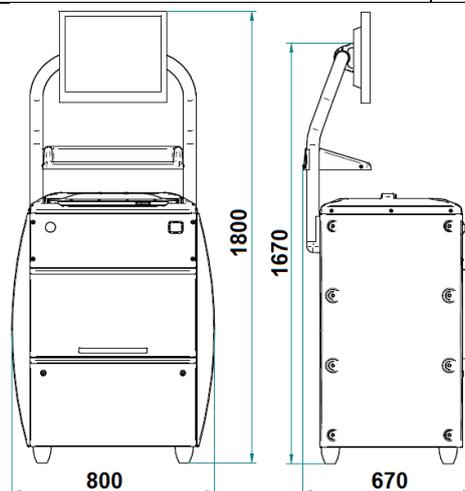


Figure 8

IMPORTANT!: The rear door leading to the switchboard and the front panel leading to the CPU board and power board can only be opened by authorized personnel these compartments contain high-voltage components which can prove hazardous to unskilled operators.



TECHNICAL DETAILS	
Power supply	400V 3ph + neutral
Weight	155kg



3.4. Console PFC750/WALL

Space saver control unit wall mounted.

It is available with PC, keyboard, 19 SVGA monitor and printer included or not.

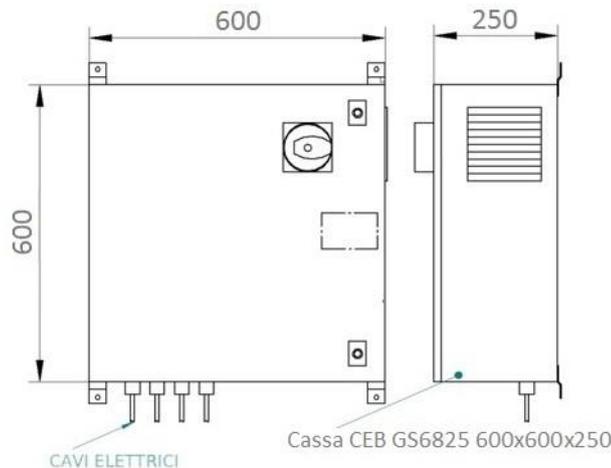


Figure 9

IMPORTANT!: The door leading to the switchboard, the CPU board and power board can only be opened by authorized personnel; these compartments contain high-voltage components which can prove hazardous to unskilled operators.



□ TECHNICAL DETAILS	
Power supply	400V 3ph + neutral
Precision	±0,5%
Weight	40 kg

3.5. Remote control

The control interface with the console consists mainly of the 12-key infrared beam remote control. The entire test procedure can be conducted from the remote control. Thanks to the icons, the keys are easy to distinguish during the test.

The function keys (F1, F2, F3 and F4) take on different meanings from time to time. Reference must be made to the graphic representation of such keys on the lower part of the monitor.

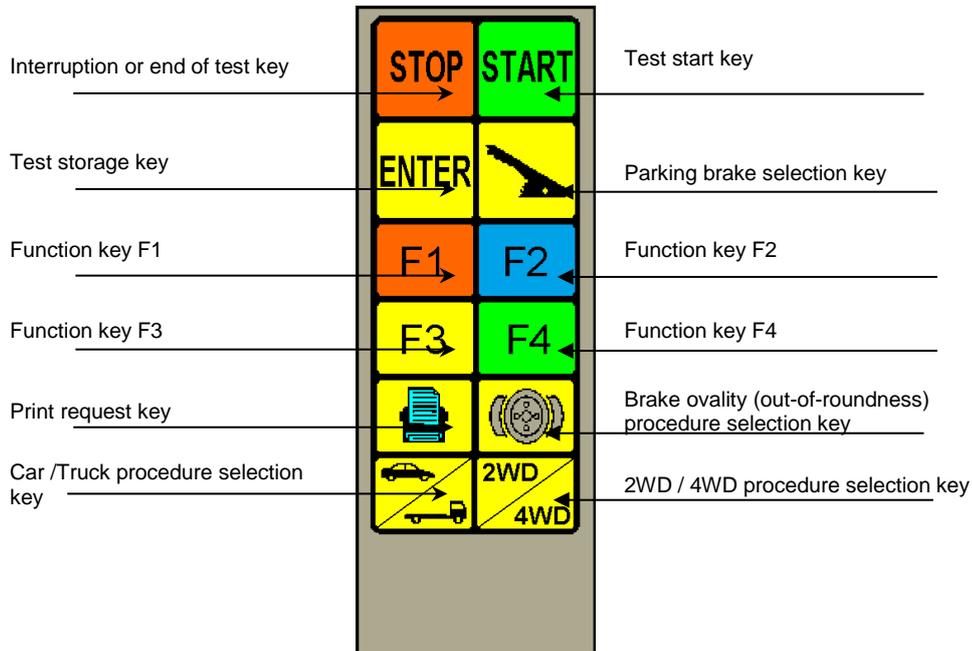


Figure 10

3.6. Control keyboard

All models feature a standard 102-key keyboard connected to the PC.

The PC keyboard acts as an interface for entering details of the car, for headings, for first configuration setting and for entering the maximum parameters acceptable for the measured quantities.

These parameters can only be changed by qualified users according to acceptability criteria which can change according to reference norms, specific analyses and studies, etc.

In case of faulty operation of the remote control, the test can be fully performed through the PC keyboard on the function keys.

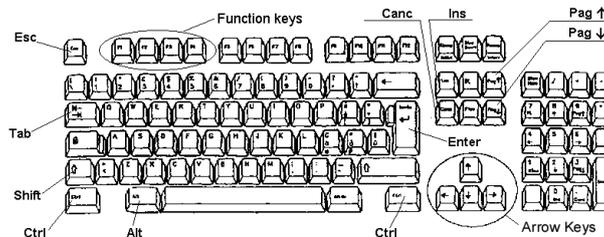


Figure 11

3.7. Pressure-meter pedal SRT047BTH

A brake pedal pressure meter is available with radio transmission.

The meter transmitter features a rechargeable battery; to keep this battery charged, this must be switched off when not in use. When the red LED is on, this means the meter is operative; when the LED is off, the meter is switched off.

During the night or during work intervals, the meter should be placed on charge using the battery connector provided. When the green LED is on, this means the meter is on charge.

The battery has a duration of 16 hours; complete battery charging takes about 8 hours.

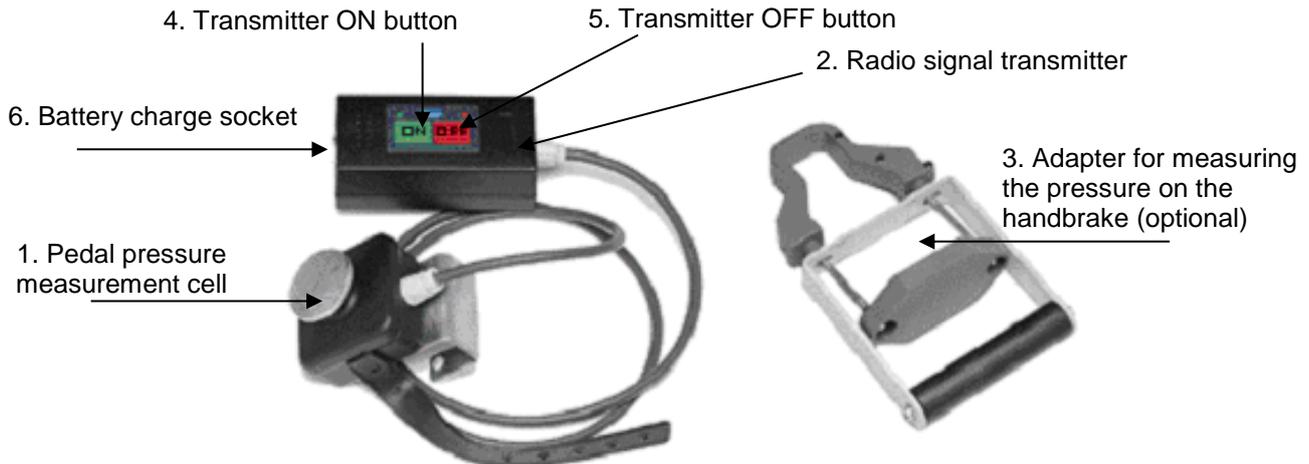


Figure 12

3.8. Brake lever pressure meter with remote control (optional) only for 3 wheels vehicle and quadricycles

A brake lever pressure meter with radio transmission is supplied for the brake test of tricycles, quadricycles and light quadricycles.

START and STOP buttons are fitted on the handgrip and can be used to control the test procedure. The meter transmitter is fitted with a rechargeable battery; in order to keep this battery charged it must be switched off when not in use, even if after approx. 5 minutes of inactivity the transmitter will automatically switch itself off.

When the red LED is on, the meter is on; when the LED is off, the meter is off.

At night or during work breaks, the meter should be charged using the battery connector provided.

When the green LED is on, the meter is charging.

The battery lasts approximately 16 hours; complete battery charging takes about 8 hours (see Figure 13)

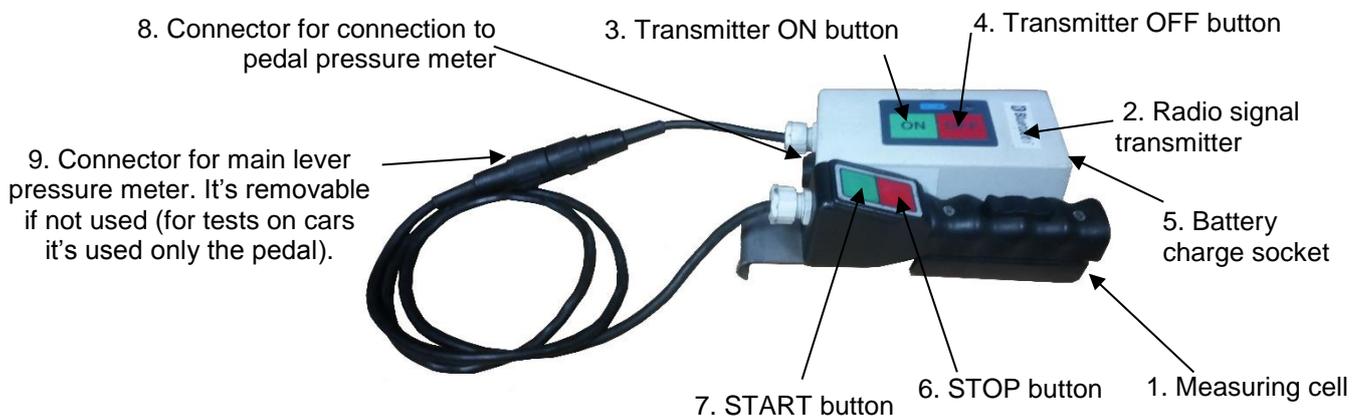


Figure 13

3.9. Set of carriageable covers (optional) only for the test with 3 wheels vehicles



Figure 14

3.9. Weighing frame

The axle-weighing frame consists of two cell retention metal crosspieces on which the roller tester frame rests.

Four shear beam load cells send a signal to the console proportionate to the force applied by the axle of the vehicle being tested, thus permitting weight measurement.

This features four parts for regulating the level of the overlying roller tester.

3.10. Adherence tester (optional)

The adherence tester APF110 checks the condition of the vehicle suspensions.

Each platform features three shear beam load cells that also measure static weight. The adherence tester is thus able to replace the axle-weighing frame.

A motor turns the pair of cam shafts on which the platforms rest at a frequency of around 25 Hz; during the test, the left platform is first of all started and, after measuring the applied force, the right platform is started.

The adherence test consists in measuring the dynamic weight bearing on the each wheel during 6 mm overall shaking and subsequent platform deceleration.

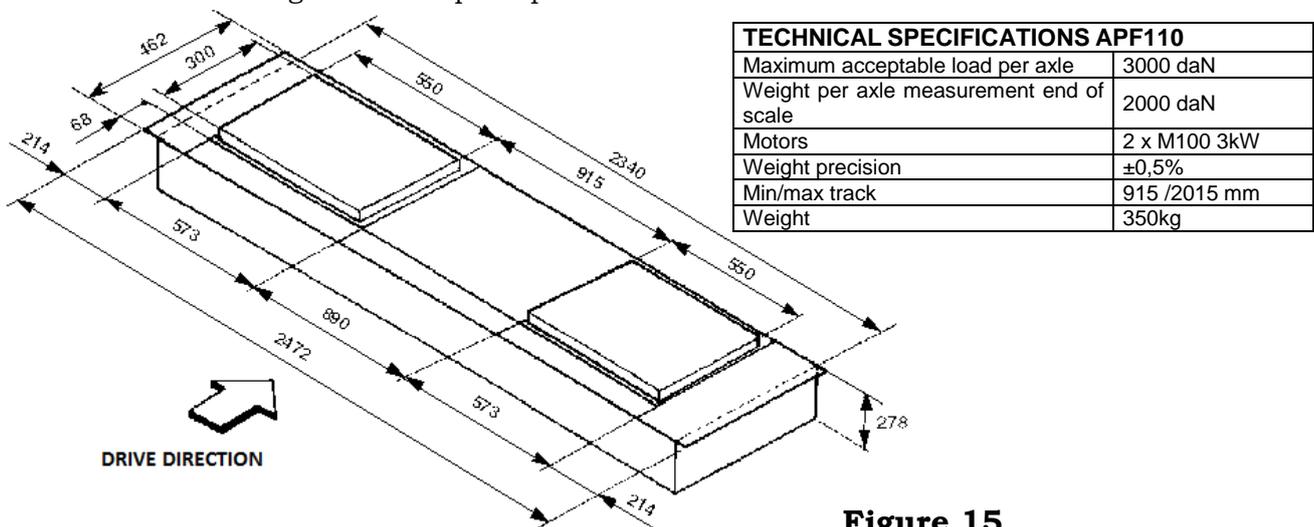


Figure 15

3.11. Side-slip test (optional)

The side-slip test device consists of a slip plate which, when transited over by the left vehicle wheel, moves in the opposite direction to the sum of wheel side-slips (the right wheel is in contact with the ground) and gives a side-slip reading in m/km.

Performance of the side-slip test simply consists in the front wheel of the vehicle transiting over the slip plate at a moderate speed (~ 2 km/h) with a direction as far as possible at right angles to the plate itself.

TECHNICAL SPECIFICATIONS APF115 (OPTIONAL)	
Dimensions	800x600x50mm
Max. transit weight per axle	2000 daN
Precision	±1%
Weight	50kg

4. INSTALLATION OF THE BTS2 SOFTWARE

The BTS2 software can be installed on any PC that satisfies the minimum requirements described below:

- Processor 1,5 GHz / RAM 2Gb/ Hard Disk 80 GB
- 4 USB; 1 COM; 1 LAN Ethernet 10/100/1000Mb;
- Operative system WIN XP sp3 , WIN 7 or WIN 8
- Video output 1366x768 Pixels HD Ready

This procedure will take several minutes, it could ask for several restarts.

A series of pre-required software will be installed and then the main BTS2 software.

To install the BTS2 software the batch file Setup.exe (double click) must be executed.



Figure 16

The installation is composed by three parts:

- Launcher (the software that prepare and control the installation),
- Pre-required software installation,
- Main software

4.1. Part 1: Launcher installation

The software will start with a double click on the batch file setup.bat; then it will prepare all that is needed to correctly complete the installation. The UAC is automatically set to the lower level and all the needed rules in the firewall are created.

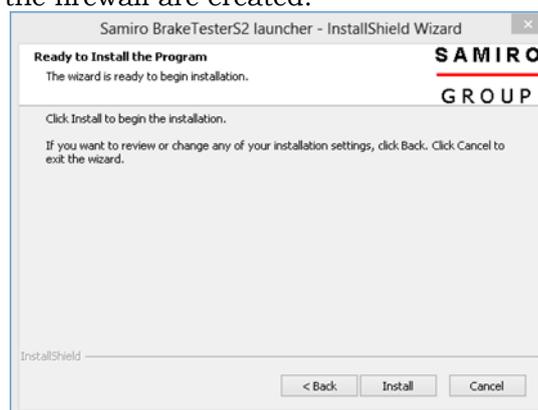


Figure 17

Click on Finish to end the preparation part and start the installation (attention: the main installation has not started yet).

4.2. Part 2: Pre-required software installation

The installer is able to automatically recognize the operative system and the software already installed. Based on what it can find, it will decide which software it has to install.

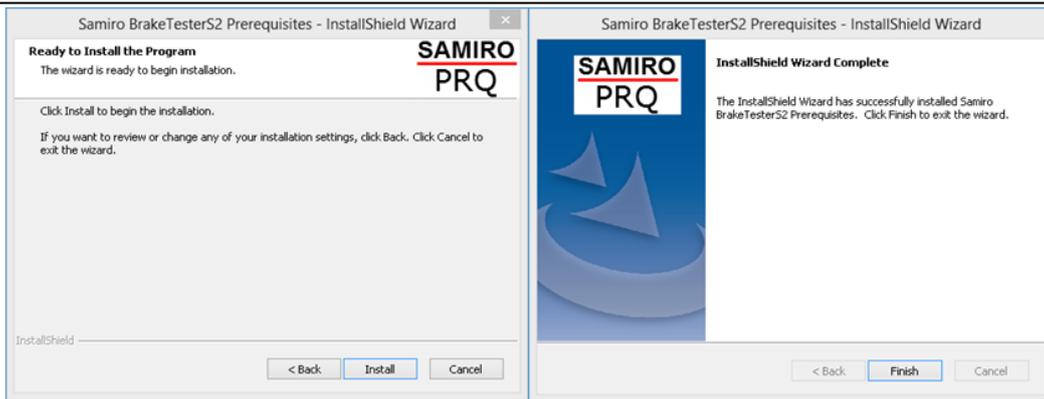


Figure 18

Click on Install and at the end on Finish to end this part and start the following.

4.3. Parts 3: Installation of the main software

It's not necessary to manually disable the firewall, because the necessary rules are automatically created.

Attention: now the installer show the message: ***end of the preparation procedure.***

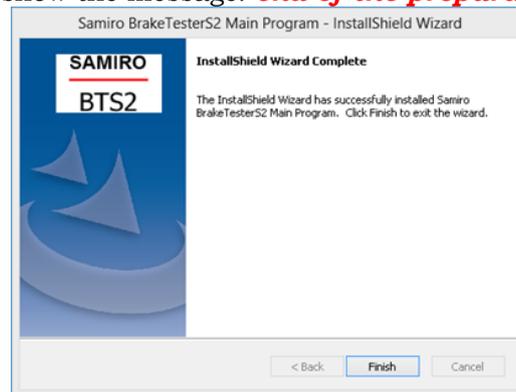


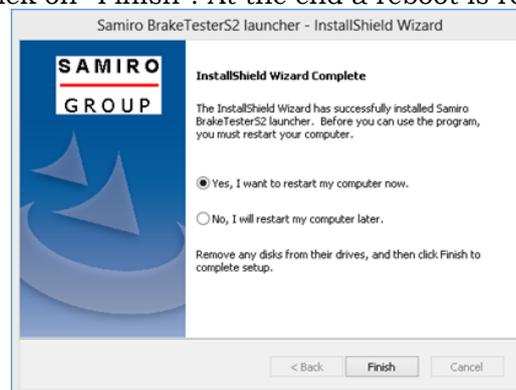
Figure 19

Clicking on “Finish”, the installer starts to copy on the hard disk the primary and secondary files of the software.

Select in the next window the installation mode DIR or RETE (network), see chap. 6 for more details, and the type of roller installed (cars, motorcycle, cars + speed tester and/or suspension tester).

NB: for a universal installation, select cars and then in the parameters configuration select also the motorcycle mode).

Follow the procedure and click on “Finish”. At the end a reboot is recommended.



Select “Yes, I will restart my computer now”; the installation is complete and the PC will reboot. The software is modifiable with the option allowed by the Smart Card (see chapter 5.1 for further details).

4.4. Update the SW (ONLY for MCTC-Net2 in Italy)

The software will automatically check before starting (at least once a day) if there are updates, inclusive of new keys to sign the .PFR files, or it's possible to manually check as follow:

From the main page (logo) as seen in Figure 27 use the key “**F3**”, the menu in Figure 20 will be shown.

With **F2** select the icon  “**UPDATE SW**” and press **ENTER/F4** to confirm.

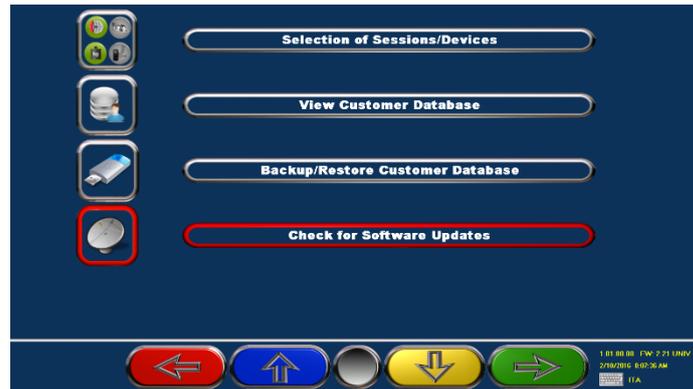


Figure 20

After the confirmation. The software will show the message in Figure 21.

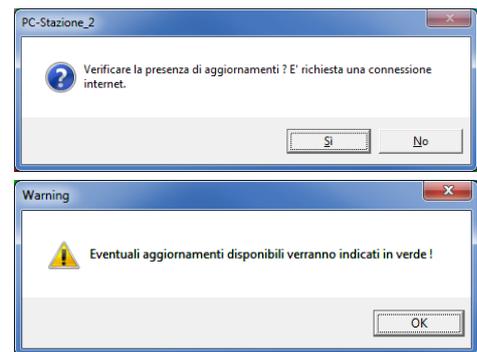


Figure 21

At the end of the check, the software will show Figure 22.

If any new version of the software is found, the software will show the update on green line (as in the example).

If no update is found, a not highlighted line will be shown.

Press the key **START/F3** to download the updates and wait.



Figure 22

At the end of the download, if it's been successful, the software will show the message as Figure 20.

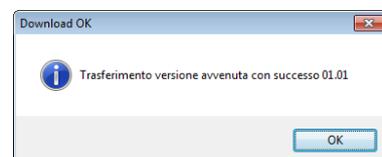


Figure 23

Pressing the key F4 from the screen in Figure 22, the page in Figure 24 is shown and it is possible to enter the workshop data, the type of connection and save with F2.

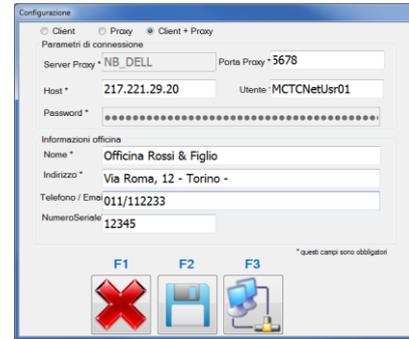
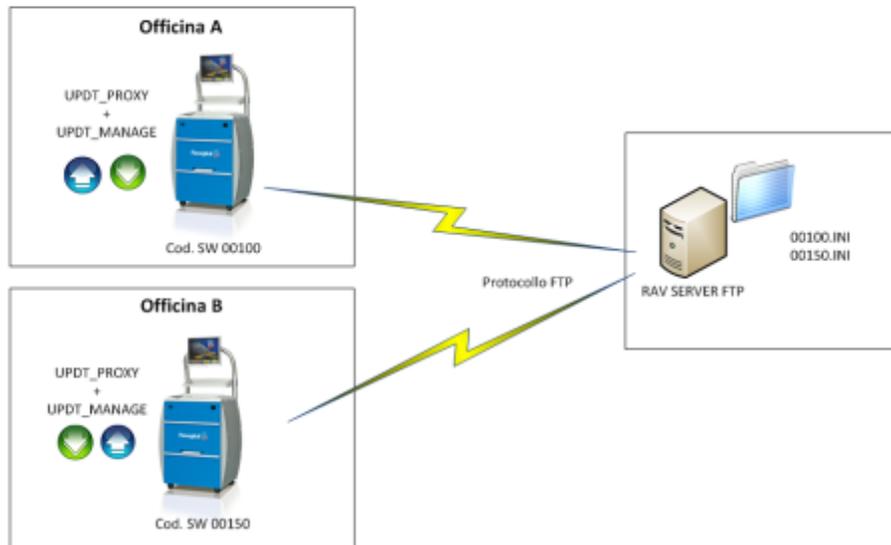


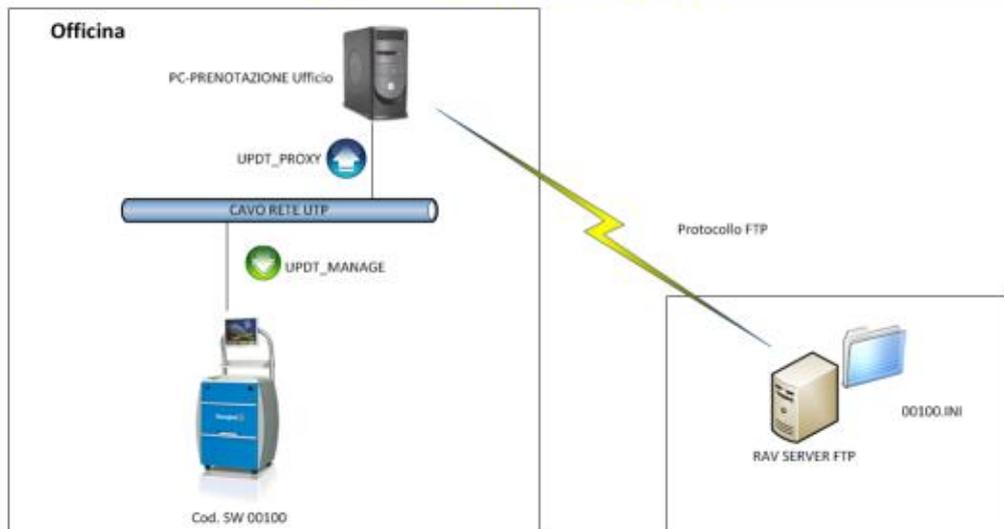
Figure 24

Below are described the two possible connections:

Aggiornamento SW MCTCNet 2 Soluzione A (cabinato raggiunge direttamente SERVER)



Aggiornamento SW MCTCNet 2 Soluzione B (cabinato non raggiunge direttamente SERVER)



15/10/2012

4.5. System Info view

From the main page (logo) shown in Figure 27 press the key **F5** , it appears the menu in Figure 25.

Move with the key **F2** on the icon “**Information**” and press **ENTER/F4** to confirm.

In the next menu, select the option “**Information**”  and confirm with **ENTER/F4**.



Figure 25

A page appears as in the example in Figure 26 that shows all the system info: certification number, serial number, sw version and expiring date for the periodic control, for every module (brake tester 2, 3/4 wheels and cars) present.



The software version is indicated with a 4 numbers series separated by “.”
In the example, 1 . 0 . 0 . 0
The first number (1) can change just if there is a change in the Regulations, so the device could need a new certification.

Figure 26

5. OPERATING INSTRUCTIONS

5.1. Starting and stopping the appliance

To start the appliance and the program, turn the master switch (on the rear of the console) to position I.

Wait for the operating program to load, until the logo shown in Figure 27 appears.

NOTE: During operating program loading, do not engage the measurement devices (for example by climbing on the weighing frame), because during this time lapse, the system checks their correct operation.



Figure 27

Starting with the first page of the program, press key **F1**. The machine can be switched off by selecting the icon corresponding to this function.

Select the «**POWER OFF**» icon and confirm with the **ENTER/F3** key. The system displays the following page:

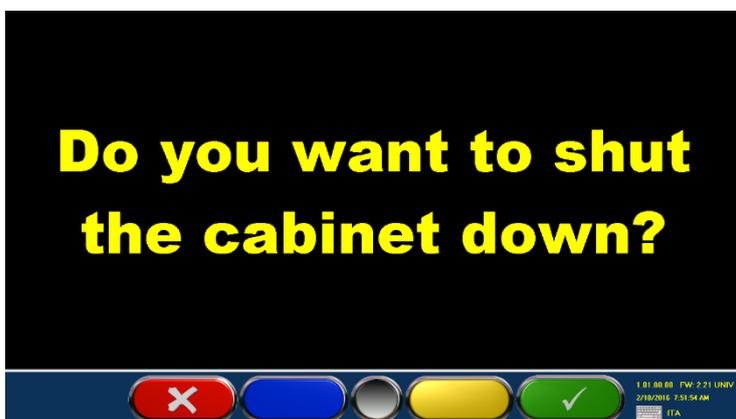


Figure 28

Switch off the appliance by means of the master switch on the rear of the console.

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Cancel operation. Return to initial page.
			Definitive confirmation of appliance switch-off.

5.2. Smart Card to protect the software



The SPACE brake testers are equipped with a PC with a SMARTCARD reader. The SMARTCARD allows the software functioning and enables the possibility (or not) to activate the various tests.

Every console is provided with its own SMARTCARD that absolutely cannot be changed with another one from another console. If a SMARTCARD need to be removed or changed, a program will show an error message and it will not authorize the start of the software.

After the software installation, at the first start of the program the page in Figure 26 is shown: in here is requested to copy the “Token” file in the PC to allow the execution of the program. Simply press F3  to copy the file from the equipment USB memory key, where the Token file is stored.

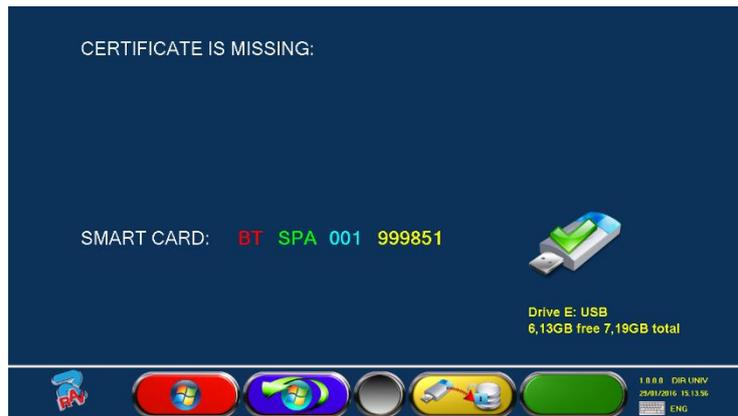


Figure 29

5.3. Program configuration

To configure the program, select key **F2**  on the presentation page, as explained in Figure 27 at page 26.

It appears a configuration menu that permits changing the characteristics of the program according to individual needs.

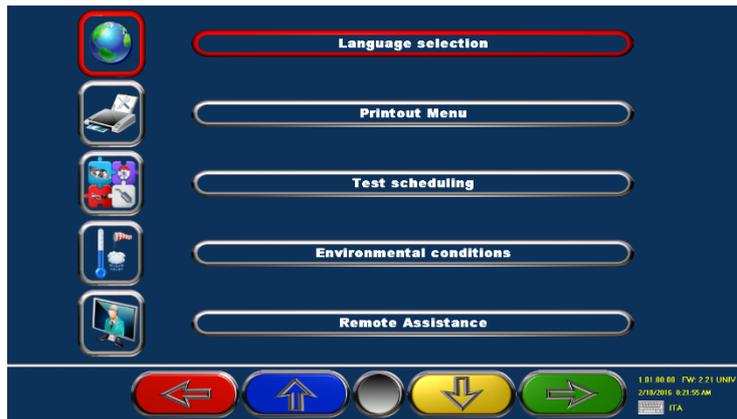


Figure 30

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Back to the presentation page (par. 5.1 at page 26)
			Move up the selection.
			Move down the selection.
			Confirm the selection.

5.3.1. Inspections (Checks)

□ BRAKE LIMITS

The efficiency and alarm unbalance thresholds and the zero (OFFSET) of the calibrations CANNOT be changed except by skilled SPACE S.R.L. engineers. For this reason, access requires a password. The operator can in any case see the thresholds and the calibration offset as follows:

Press key **F5** from the initial page (Figure 27). Select with the keys “**F2/F3**” the menu “**Information**” and confirm with **ENTER/F4**. Select in the next menu the “**Brake Limits**” and confirm with **ENTER/F4**.



Figure 31

If the program is set to work with both cars and 2, 3 and 4 wheels, the page in Figure 32 will be shown.

Select with “**F2**” the type of vehicle that need to be checked and press “**ENTER/F4**”: a chart appears with the efficiency and unbalance thresholds (see Figure 33).



Figure 32

CAR chart
Press F4 to see the charts for service, emergency and parking brakes.

Chart for 3-4 wheels
Press F4 to see the charts for service and parking brakes.



Figure 33

Press “**F1**”, to come back to the previous page.

❑ **OPERATOR NAME**

Press **F5**  from the main page (Figure 27).

Select with “**F2/F3**” the menu “**User name**” (see Figure 31) and confirm with **ENTER/F4**.



Figure 34

Insert the name of the technical manager that will be print in the report, the press **F4** to confirm the selection.

❑ **CALIBRATION CHECK**

Press **F5**  from the main page (Figure 27).

Select with “**F2/F3**” the menu “**Calibration check**” (see Figure 31) and confirm with **ENTER/F4**.

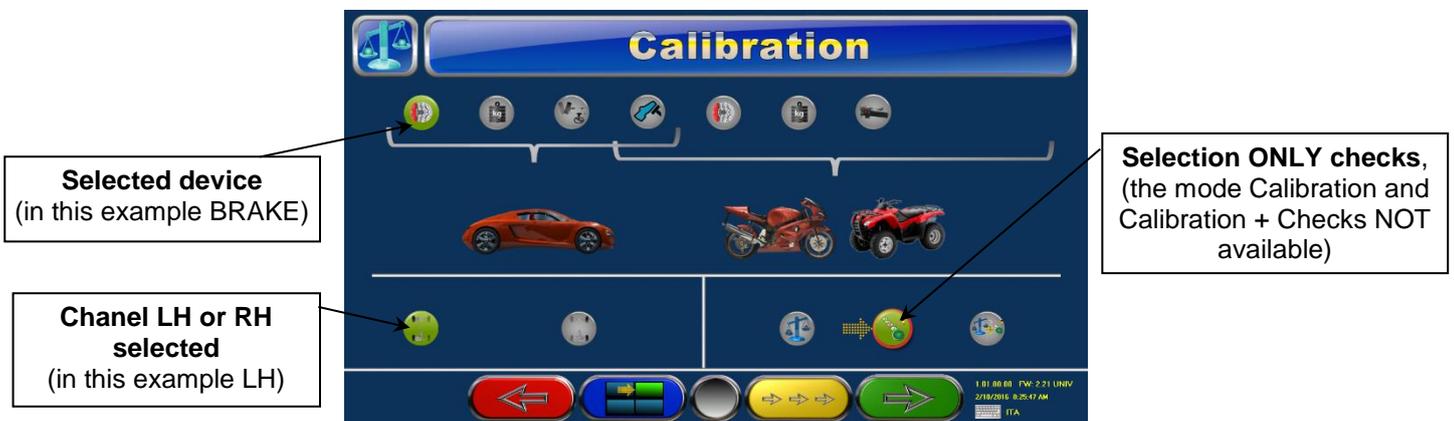


Figure 35

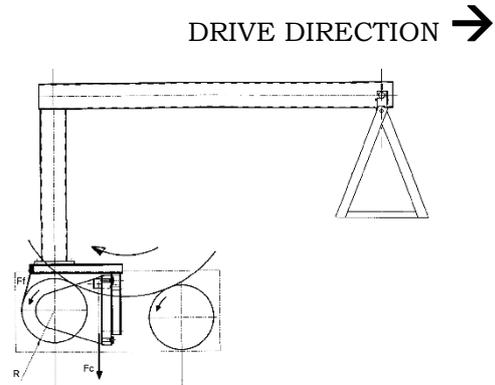
The calibration is reserved to authorized SPACE S.R.L. personnel, the operator can only check the calibration, in this session only checks are made; the calibration saved in the program WILL NOT CHANGE.

Select the device on which the calibration check is needed. Confirm **F5**  , then press **F4**  to go on.

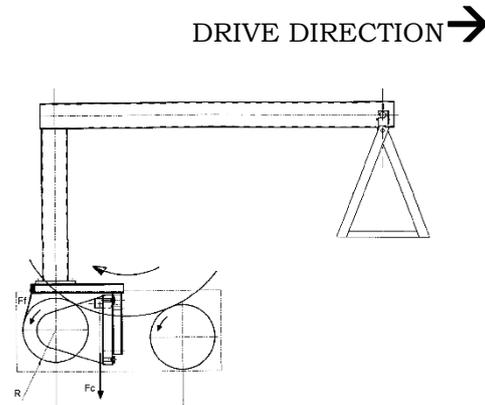
Below is shown the example of a check on the calibration on the LH braking force.

LH Braking effort

1/5) - Fit the calibration tool as indicated in Figure, without putting weight into the basket.
Press F4 to proceed.

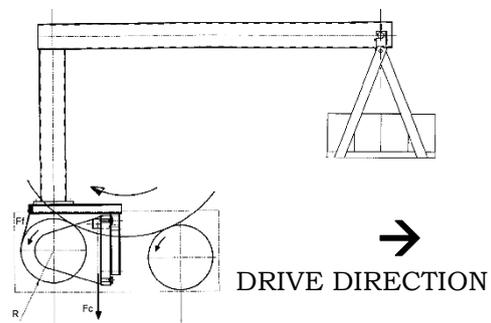


2/5) - Press ENTER/F3 to store the OFFSET. Press F4 to proceed.



3/5) Put the 10Kg weights in the basket (every weight correspond to 100daN of effort).

Only authorized personnel can set the check points for the calibration.
Press ENTER/F3 to store the check point and F4 to proceed.



4/5) - Remove the calibration tool from the roller block. Then press F4 to proceed to the next step.



5/5) The final calibration summary is shown as in figure; press F4 to end





□ **PRINT CALIBRATION REPORT**

Press **F5**  from the main page (Figure 27).

Select with “**F2/F3**” the menu “**Calibration Check**” (see Figure 31) and confirm with **ENTER/F4**.

Select the icon “**PRINT CALIBRATION REPORT**” and confirm the selection.

One report regarding the last CALIBRATION and/or CHECKS will be printed.
See the following example.

 SPACE s.r.l. Via Sangano, 48 Trana (TO) ITALY						
Software ver. 9.60W Firmware ver. 0.99 Pag. 1/1						
Calibration Certificate						
Brake tester data						
Manufacturer						
Model						
Serial Number: 00422						
Homologation number: OM003221						
Date of expiry calibration: 31/12/2015						
LH Brake effort			Calibration			
(daN)	Before Calibration	After Calibration	Limits	Date	Ok	Test engineer
0	3	0	-5 + 5	26/07/2015	√	ROSSI MARIO
300	303	300	295 + 305	26/07/2015	√	ROSSI MARIO
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	1	-5 + 5	26/07/2015	√	ROSSI MARIO	
100	100	95 + 105	26/07/2015	√	ROSSI MARIO	
300	301	295 + 305	26/07/2015	√	ROSSI MARIO	
500	503	492 + 508	26/07/2015	√	ROSSI MARIO	
RH Brake effort			Calibration			
(daN)	Before Calibration	After Calibration	Limits	Date	Ok	Test engineer
0	2	0	-5 + 5	26/07/2015	√	ROSSI MARIO
300	302	300	295 + 305	26/07/2015	√	ROSSI MARIO
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	1	-5 + 5	26/07/2015	√	ROSSI MARIO	
100	100	95 + 105	26/07/2015	√	ROSSI MARIO	
300	302	295 + 305	26/07/2015	√	ROSSI MARIO	
500	505	492 + 508	26/07/2015	√	ROSSI MARIO	
LH Weight			Calibration			
(daN)	Before Calibration	After Calibration	Limits	Date	Ok	Test engineer
0	2	0	-5 + 5	26/07/2015	√	ROSSI MARIO
200	202	200	195 + 205	26/07/2015	√	ROSSI MARIO
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	1	-5 + 5	26/07/2015	√	ROSSI MARIO	
200	203	195 + 205	26/07/2015	√	ROSSI MARIO	
400	398	392 + 408	26/07/2015	√	ROSSI MARIO	
800	805	790 + 810	26/07/2015	√	ROSSI MARIO	
RH Weight			Calibration			
(N)	Before Calibration	After Calibration	Limits	Date	Ok	Test engineer
0	2	0	-5 + 5	26/07/2015	√	ROSSI MARIO
200	202	200	195 + 205	26/07/2015	√	ROSSI MARIO
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	1	-5 + 5	26/07/2015	√	ROSSI MARIO	
200	202	195 + 205	26/07/2015	√	ROSSI MARIO	
400	399	392 + 408	26/07/2015	√	ROSSI MARIO	
800	803	790 + 810	26/07/2015	√	ROSSI MARIO	
Side Slip			Calibration			
(dm/km)	Before Calibration	After Calibration	Limits	Date	Ok	Test engineer
0	-1	0	-5 + 5	26/07/2015	√	ROSSI MARIO
100	74	100	195 + 105	26/07/2015	√	ROSSI MARIO
Checks						
(dm/km)	Values	Limits	Date	Ok	Test engineer	
0	-1	-5 + 5	26/07/2015	√	BIANCHI ANTONIO	
100	97	195 + 105	26/07/2015	√	BIANCHI ANTONIO	

5.3.2. Test line layout

Press **F2** from the initial page (par. 5.1, page 26). The system will display Figure 30. With the key

F2 move on the icon  «**TEST SCHEDULING**» and press **ENTER/F4** to display Figure 36.

Set the test sequence as required, moving the cursor onto the different icons.
Line tests are shown in green.

NOTE: Only the test available in the Smart Card are achievable (see chapter 5.2).
The not achievable tests are marked with a red cross. 

Set the test sequence as required, moving the cursor onto the different icons and then switch off the test by means of the “**ENTER/F3**” key.
The tests, in order sequence, are shown below.

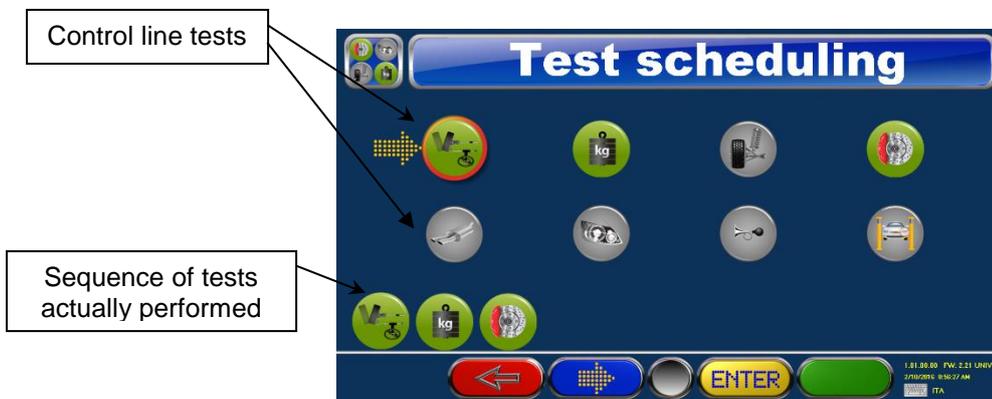


Figure 36

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Confirm the order and return to the configuration page
			Move the selection
	 	 	Start or stop the selected test

Press **F1** to confirm the introduced sequence and return to the “program configuration” menu (Figure 30).

5.3.3. Environmental conditions

Before starting to proceed with the normal line measuring cycle, the environmental condition values must be entered as required by Italian law.

These values can be entered manually or by means of the device for the automatic detection of environmental conditions.

To introduce the environmental condition data, press “F2”, from the initial page, to display the configuration page (Figure 37), move to the environmental condition icon using key “F2” and press ENTER/F4 to confirm.



Figure 37

The data must be entered manually or else they are detected automatically by means of the device for detecting environmental conditions.

If the data are entered manually:

- Press key “F2” to move the cursor onto the relevant data to be entered.
- The entered values can be changed by positioning with key “F2” on the desired box and entering the digit to modify the previous data.



Figure 38

POSSIBLE SELECTIONS:

- Press key “F1” to return to the previous page.
- Once the correct values have been entered, press “START/F4” to start performing the test. The entered data will be displayed on the data printout.

NOTE: The environmental condition values must be entered every prearranged time rage.



Figure 39

6. MCTCNet 2 PROGRAM (ONLY for MCTC-Net2 in Italy).

Referring to D.D. 3986 of the 11/8/2009 and S.M.I. for vehicle with total weight $\leq 3,5t$ it is possible to choose:

- The connection configuration type **“RETE”** to share the files, between the Personal Computer of the workshop and the Personal Computer of the brake tester.
In this case must set the directory where is possible to find the file MCTC.INI on the Reservation PC (par. 1000005 – see the Service Manual reserved to the authorized assistance center to access the parameters).
- The configuration **“DIR”** where the software module to manage the brake cycle is installed directly on the PC Station.
In this case must set the local directory where reside the executable programs, usually C:/MCTC – main folder, C:/MCTC/DIR_PFR – brake folder (par. 1000008, 1000009 - see the Service Manual reserved to the authorized assistance center to access the parameters).

It's necessary, for both the RETE and DIR configurations, to set the input and output directory for the WEBCAM file and also the directory for the environmental files METEO.MET (par. 1000006, 1000007, 1000018).

In both cases, the tests that can be executed, coming from the PC Station, must respond to NET2 and so be files with the extension “.AC2”.

6.1. RETE mode

To start the appliance and the program, turn the master switch (on the rear of the console) to position I.

Wait for the operating program to load, until the logo shown in Figure 40 appears.



Figure 40

Press START/F4, appears the list of the reservations approved by the PC Station. See Figure 41. Move the pointer on the requested vehicle with F2/F3.



Figure 41



Now the program is ready to start the tests.

Depending on the devices connected to the consoles, the test can carry:

Side slip - Adherence (only cars) - Weight – Brake test

See the chapters below for more information.

At the end the page in Figure 78 appears, so it's possible to print a report.

6.2. DIR mode

This kind of connection requires that the PC Station decides which test has to be made, executing the program:

BTS2_DIR.EXE: weight + brake test (+ possible side slip test and/or suspension test for cars)

Executing the modules above mentioned will show the list of the reservation as in

Figure 41; the operator must select the reservation of the vehicle and proceed with the tests.

See the next chapters for more information about how the tests are made.

At the end, the module will write a file with the values of the test, so that can be processed by the PC Station.

7. CARS MEASUREMENTS CYCLE

7.1. Enter data

ATTENTION: If the software is set to work in MCTC Net, the test mode and all the vehicle data, as shown hereunder, are not editable. Just confirm the selection with F4.

7.1.1. Selecting the type of test

If you do not wish to perform the complete line measuring cycle, but want to proceed with a specific measurement, after the initial logo (Figure 27) appears, press F3: the list of available tests will appear (see example Figure 42).

Select the measurements to be made by pressing ENTER/F3; the logo representing the tests will appear in green. Press the START/F4 key to begin tests. During the course of the cycle, to eliminate a selected test, press STOP/F1 (and then START/F4 to confirm).

To cancel the entire measuring cycle and return to the initial logo, press ESC on the keyboard (and then START/F4 to confirm).

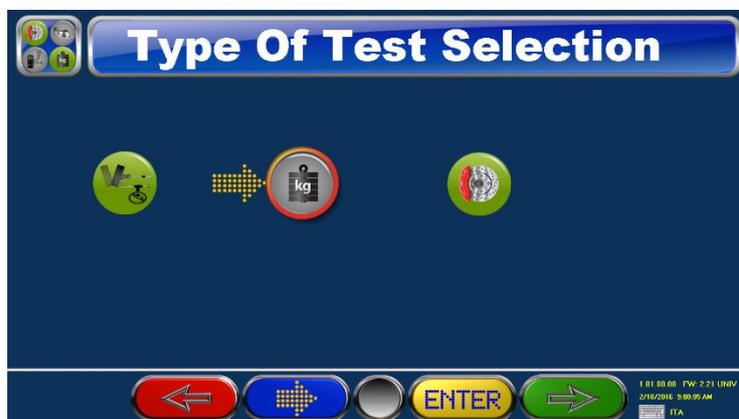


Figure 42

7.1.2. Choosing the vehicle category

Press F4 to start the cycle, a page appears with the choice of the category and the vehicle data.



Figure 43

Select the category, M1, M2 or N1, moving the pointer with the key F3 on the desired category and press Enter : the chosen category is highlighted in green.

Move the pointer on the others panel with F2 , select the manufacture year and the type of emergency brake (at X, at TT, at LL, at HH, at HT or the same as the parking brake).

If the vehicle has a tow hook it's required to enter the towing weight, so the system can correctly calculate the braking efficiency on the parking brake.

To enter the weight of the trailer, move the pointer on the trailer icon and press Enter / : the icon becomes green, then enter the weight.

At the end proceed with F4 / 



Figure 44

Select 2WD/4WD moving the pointer with F3 on the icon 2WD or 4WD and press Enter / ; the icon becomes green.

Move the pointer on the others panel with F2  and select the axle on which the parking brake insists (front, rear or on the differential); select how the brake operates (lever, pedal or electric).

At the end proceed with the next step with F4 /  .

7.2. Side slip procedure

The side-slip test indicates vehicle side slip expressed in meters over a distance of one kilometer.

Cross the side-slip test plate very slowly (max 2 km/h), at right angles to the plate without holding the driving wheel.

The slip plate, crossed over by the left wheel, moves in a direction opposite to the sum of wheel slip (the right wheel touches the ground and is added to that of the left wheel).

Once the plate has been crossed over, the side-slip reading (see Figure 45) is automatically displayed after the vehicle axle has reached the next device (adherence test or brake test).

The crossing of the plate can also be manually confirmed by means of the **ENTER/F3** key.

The result of the side-slip test is displayed for a few seconds. The operator can press the F2 key to prevent automatic storage of the test and then store this manually by means of the **ENTER/F3** key.

To repeat the side-slip test, the vehicle must be reversed, the **START/F4** key must be pressed and then the slip plate must be crossed again.



Figure 45

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Abolishes test
			Prevents automatic storage of test
			Stores test manually
			Repeats test

7.3. Measuring the weight of the axle or entering the vehicle weight

Before starting the brake test procedure, if the weighing device is not operative, the vehicle weight will have to be entered so the system can calculate vehicle braking efficiency. Other vehicle or client data that appear on the print-out are entered later on, immediately before printing.

If, on the other hand, a weighing device is operative, when the operating program gives the OK (displayed by a vehicle moving onto the weighing system), drive the vehicle onto the device and wait for the axle weight to appear. See Figure 46.

Storage of the displayed axle weight is automatic after a few seconds from the system having read a stable weight. The operator can nonetheless press key **F2** to prevent automatic test storage and then store this manually by pressing the **ENTER/F3** key.

To repeat the axle weight test, press **START/F4** and then once again move onto and off the weighing system.



Figure 46

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Abolishes test
			Prevents automatic storage of test
	 	 	Stores test manually
			Repeats test

7.4. Adherence test procedure

□ Preparing for the test

The adherence test consists in measuring the weight bearing on each wheel during swinging of the platforms on which these are resting.

The results of the adherence test indicate the minimum weight determined during such shaking in relation to the static weight of the wheel. The greater the adherence, the better the road-holding of the vehicle.

It should nevertheless be remembered that wheel adherence does not only depend on suspensions, but also on a series of other factors, like tire pressure, load distribution, any play on the arms. Consequently, before performing the test, check to make sure that the vehicle is roadworthy.

Reading are normally assessed as follows:

Adherence $\geq 60\%$	good
Adherence $20 \div 60\%$	acceptable
Adherence $< 20\%$	below standard

Difference $> 15\%$	excessive
Difference $\leq 15\%$	acceptable

If below standard adherence or excessive differences are shown, the shock absorber should not be immediately replaced. It is first best to check whether the out-of-tolerance result might be due to the other factors mentioned previously (tire pressure, load distribution, etc.).

□ Performing the test

Move the vehicle axle onto the adherence-test platforms, visibly at right angles to the platform axis. The test starts automatically once the system detects a weight of at least 60-80 daN on both platforms. The left platform is first started and then the right platform.



Figure 47

At the end of the test, the outer indicators on the screen display the percentage adherence readings of the left and right wheels and the percentage difference between these.

The displayed readings are automatically stored after a few seconds. Within this time, the operator

can nevertheless press the F2 key /  to display the test graph.

□ Displaying the graph

The adherence graph shows: the evolution of the percentage measurements detected on the left and right wheels depending on the frequency of platform movement.

The lowest point of the curve shows the frequency at which minimum weight on the wheel is detected; this frequency, called resonance frequency, is normally $12 \div 18$ Hz.

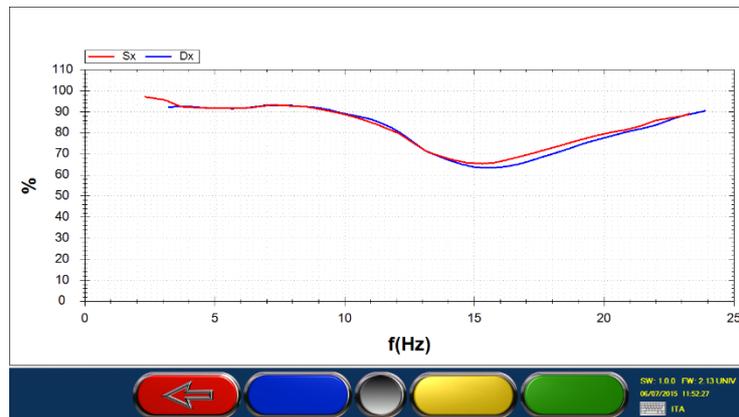


Figure 48

To exit from graph display, press the STOP/F1 key on the remote control. The monitor will once again show the page with the numeric results of the suspension test.

At this point, the operator can store the test just performed by pressing ENTER/F3 or repeat it by pressing START/F4.

7.5. Brake test procedure

As suggested by the operating program (represented on the screen by a vehicle moving onto the roller assembly), drive the vehicle onto the rollers with the remote control inside the vehicle and the pedal pressure measuring device fitted on the brake pedal. The display page in Figure 49 will appear.

The brake test performs the following measurements:

- Single wheel drag
- Brake ovality (out-of-roundness)
- Maximum brake force on wheels
- Braking unbalance between wheels of the same axle
- Braking efficiency of service, emergency and parking brakes
- Pressures applied to brake pedal and handbrake lever

The **parking brake test** is normally performed after testing the service brake of the rear axle and is therefore automatically required by the system after this stage. The operator can however manually select the parking brake test on the front axle as well before starting the rollers, by means of the special key with the handbrake symbol. By means of the same key, the type of parking brake can be selected: with hand-operated lever mechanism (normal setting) or pedal operation (e.g. Mercedes).

NOTE: The parking brake test with hand-operated lever mechanism, which must be performed with pedal pressure measuring device closed in the special sling, is automatically interrupted when 40 daN is reached on the lever, while the parking brake test with pedal operation and service brake test are interrupted at 50daN.

The brake tester can also be used for permanent four-wheel drive vehicles. In this case the **4WD program** must be selected by pressing the specific key.

The braking procedure is split into two stages for each axle being tested. During the first stage, the left roller turns in the direction of vehicle movement and the right roller turns in the opposite direction. During the second stage, the right roller turns in the direction of vehicle movement and the left roller turns in the opposite direction; this uncouples the vehicle differential and prevents transmitting torque to the axle off the rollers.

The results of the braking procedure are only available in the 4WD program when both stages have terminated.



Figure 49

After engaging the roller assembly, the system is enabled to start the rollers and begin the braking procedure; press START/F4 to start the rollers.

When the rollers are stopped the wheel symbols are green; when the rollers are started these switch to red.

The end of test with consequently detection of braking effort at the roller stop it is caused by:

- Slipping of one of the two wheels.
- Stop by the remote control or keyboard from the user, by selecting the keys STOP or F1.
- Reaching of threshold difference in 4WD mode.

- Reaching of the maximum threshold of effort on the pressure pedal meter, on the service brake control device or on the hand brake control device.

In this last case the final value of effort visualized correspond at the maximum braking effort reached, and the value is pointed out by a red square.

□ Wheel drag, brake heating

After starting the rollers, wait for the braking pressure readings to appear on the digital indicators; at this stage, DO NOT BRAKE. The readings that appear on the outer upper indicators, referring to the left and right wheels (see Figure 50) indicate the pressure needed to drag the un-braked wheels (rolling resistance only).

Slowly press the brake pedal until a pressure reading of at least 60-80 daN is displayed on the indicators and maintain this pressure for a few seconds to heat the brake friction elements. Release the brake pedal and observe the pressure readings on the digital and analog indicators, assessing whether there is an immediate return to minimum readings corresponding to rolling force.



Figure 50

□ Brake ovality or out-of-roundness

Operate the brake pedal until a pressure reading of 80-100 daN is shown on the indicators; press the key with the ovality symbol; on the left side of the screen, the ovality procedure symbol will appear (see Figure 51), maintain the same pressure on the brake pedal throughout.



Figure 51

During this stage, the screen shows the absolute reading of the braking pressure swing due to disc ovality or drum out-of-roundness. This swing will only return to the percentage relating to maximum braking pressure at the end of the braking action (on final summary and printout).

Press the ovality key again and release the brake pedal, as suggested by the icon that appears on the left. On the left side, the symbol of the axle being tested appears; the system is now ready to analyze a braking progression.

□ **Braking progression, unbalance calculation and braking efficiency**

Slowly and gradually operate the brake pedal, observe the braking force and pedal pressure readings on the analog and digital indicators and assess their simultaneous progression. See Figure 52.

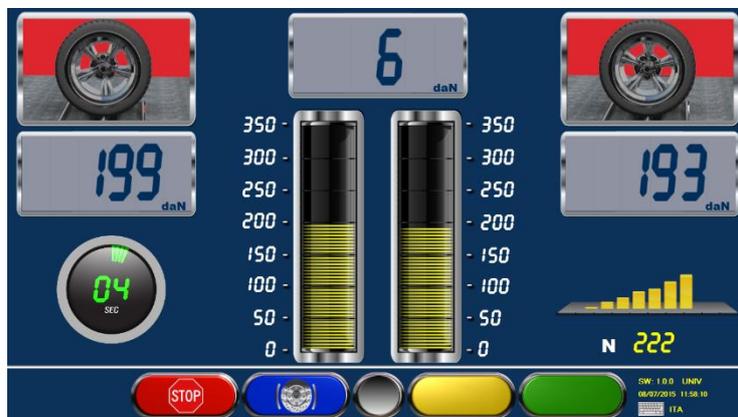


Figure 52

Continue to slowly and gradually operate the brake pedal until the wheels stop moving ⁽¹⁾, observe the max braking pressure readings and respective pedal pressure on the analog and digital indicators.



Figure 53

The mid upper indicator also shows the braking dynamic unbalance reading; at this stage, assess whether this is within tolerance; if it is outside tolerance, the reading is displayed in RED. See Figure 54.

At the end of the rear axle and handbrake braking procedure (if the latter operates on the rear axle), the system is already able to assess the % braking efficiency of the service brakes and parking brake.

The left indicator shows the above braking efficiency reading; at this stage, assess whether this is within tolerance; if it is outside tolerance, the reading is displayed in RED. See Figure 54. After assessing the final result of braking, if the operator wishes, this can be stored by means of the ENTER/F3 key; alternatively, to repeat the test, the rollers can be started again by pressing the START/F4 key.

¹ If wheel movement cannot be stopped (this often occurs on the rear axle) press the STOP/F1 key on the remote control to stop the rollers manually.



Figure 54

IMPORTANT!: To pass onto the next stage, after completing axle test, the vehicle axle must be moved off the rollers. If the axle on the rollers is the driving axle and the brake tester motors are not self-braking, the rollers will have to be started by means of the **START/F4** key to facilitate exit.

□ **Display of test graph**

At the end of the axle braking procedure, by pressing key **F2** on the remote control, a braking force pattern graph can be displayed.

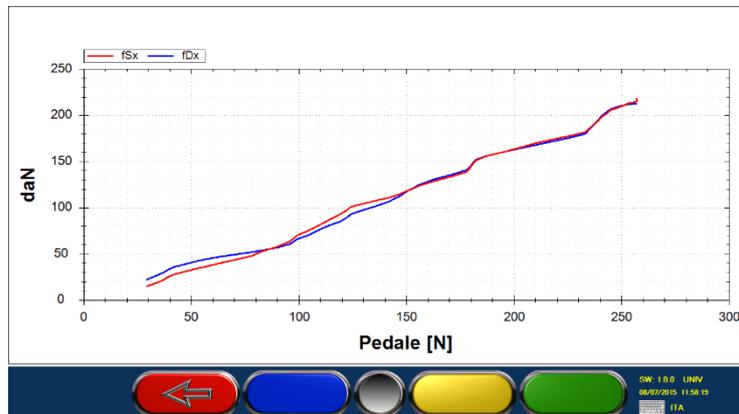


Figure 55

The x - axis shows the left and right braking forces, while the y – axis shows the time that has passed (see Figure 55) or the pressure applied on the brake pedal if the system features a measuring unit.

Press **STOP/F1** to exit from graph display and return to numerical test display.

NOTE. The graph shows up to 15 seconds of test from when the minimum braking threshold is passed (normally about 20 daN).

□ Display of final brake test summary

After storing the front and rear axle and parking brake tests, and after disengaging the rollers, the screen shows a summary page with all brake tester procedure results (see Figure 56).

The % unbalance values between the wheels (symbol $\Delta\%$) and the % braking efficiency values (symbol $\varepsilon\%$) are shown in very large figures, which can be seen from a distance and distinguished by colors referring to test results: RED for out of tolerance, GREEN for within tolerance.

The maximum left and right braking force, left and right ovality, pedal / handbrake lever pressure and front and rear axle weight values are always shown down below in BLUE (such results are not subject to confirmation with tolerance thresholds).

At this stage, the type of emergency brake can be changed (X, T or coinciding with parking brake) by moving the cursor (flashing index) onto the emergency brake icon and pressing ENTER/F3. The braking efficiency and unbalance values change automatically when a different type of emergency brake is selected.

The operator can also change the definition of the braking system type for the service brake, parking brake and emergency brake. This is indicated on the print-out by moving the cursor (flashing index) onto the relevant wording and pressing ENTER/F3.

If necessary (for instance if a result is out of tolerance), the operating program can be returned to the previous stage and the test repeated on one or both axles; press the STOP/F1 key.

If, at this stage, the brake test is terminated, press the START/F4 key to pass on to the next program stage.



Figure 56

8. THREE AND FOUR WHEELS VEHICLES AND LIGHT QUADRICYCLE MEASUREMENT CYCLE

8.1. Data enter

ATTENTION: If the software is set to work in MCTC Net, the test mode and all the vehicle data, as shown hereunder, are not editable. Just confirm the selection with F4.

8.1.1. Select the vehicle

From the initial page (Figure 27) press F4 on the keyboard or on the remote control, the program shows Figure 57.



Figure 57

- Select with “F2” or “F3” the kind of the vehicle, in this case “**MOTOCYCLE / TRICYCLE and LIGHT QUADRICYCLE**”
- Press “**START/F4**” to confirm and start the cycle of measurements.

8.1.2. Select the category for a tricycle



Figure 58

- Select with “F2” or “F3” the category of the vehicle, confirm with F4 and then enter the registration date.
- Press “**START/F4**” to confirm and proceed.

Legend of Figure 58 :

CAT	DESCRIPTION	CAT	DESCRIPTION
	L1e: 2 wheels vehicle with cubic capacity <= 50 cc or max speed <= 45 km/h		L5e: 3 symmetrical wheels vehicles with cubic capacity > 50 cc or max speed > 45 km/h
	L2e: 3 wheels vehicle with cubic capacity <= 50 cc or max speed <= 45 km/h		L6e: light quadricycles <= 350 kg <= 50 cc or max speed <= 45 km/h , maximum nominal power <= 4 kW
	L3e: 2 wheels vehicle with cubic capacity > 50 cc or max speed > 45 km/h		L7e: light quadricycles <= 400 kg (550 kg for freight transport) <= 15 kW
	L4e: vehicle with 3 asymmetrical wheels with cubic capacity > 50 cc or max speed > 45 km/h		

Select the category and press “**START/F4**” to confirm and proceed.

8.1.3. Type of three wheels vehicle

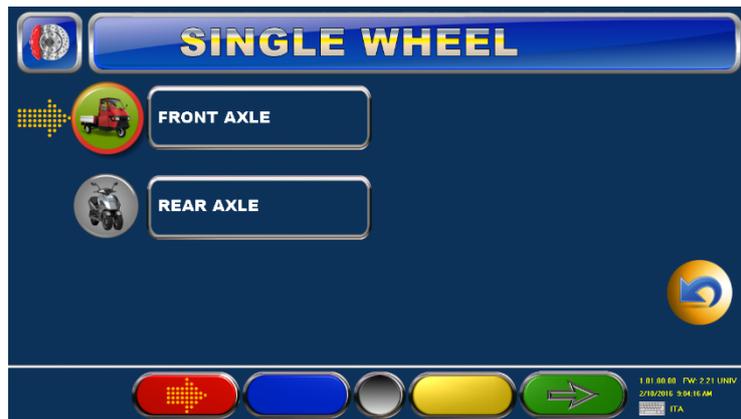


Figure 59

➤ Select with “**F1** the **TYPE of THREE WHEELS VEHICLE**:

- **One front wheel and two rear wheels**
- **Two front wheels and one rear wheel.**

Press “**F4**” to confirm and proceed.

8.1.4. Service commands for the front and the rear axle



Figure 60

- Select with “**F1**” the **service commands** for the front and rear axle of the vehicle, LEVER or PEDAL

Press “**F4**” to confirm and proceed.

8.1.5. Type of braking system: SERVICE and PARKING

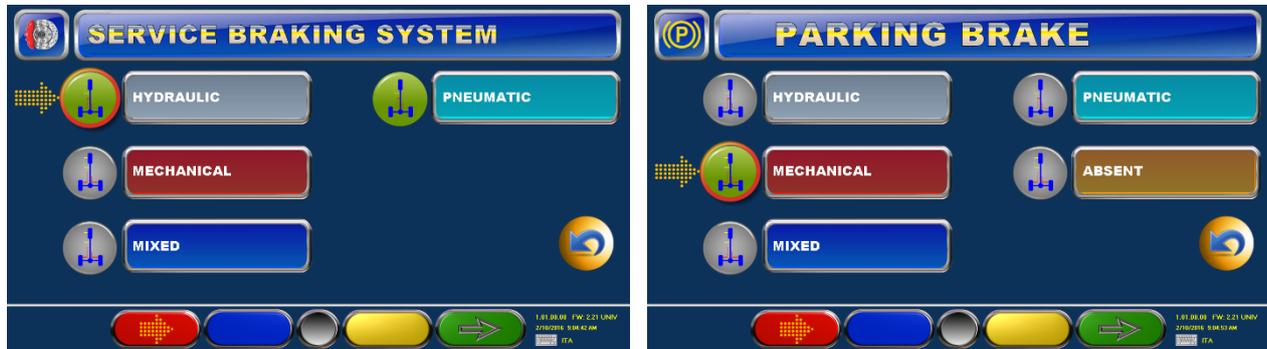


Figure 61

- Select with “**F1**” the **TYPE OF BRAKING SYSTEM** for the **SERVICE** brake. Press “**F4**” to confirm and then select the **TYPE OF BRAKING SYSTEM** for the **PARKING** brake.

Press “**F4**” to confirm and proceed.

8.1.6. Action of the PARKING brake



Figure 62

- Select with “**F1**” the axel on which the parking brake works: **front** or **rear**, press “**F4**” to confirm, then select the **service command** for the parking axel for the vehicle, LEVER or PEDAL.

8.1.7. Type of vehicle and entry of the weight of the vehicle for freight transport.



Figure 63

- Select with “**F1**” the **TYPE of VEHICLE**. Choose if it is for freight or people transport.
- Press “**F4**” to confirm and proceed.

Note: For a tricycle, a quadricycle and a light quadricycle for **people transport** the program goes directly to the procedure about the front axle brakes (Figure 64 at page 53); for a tricycle, quadricycle and a light quadricycle for **freight transport** it is possible to enter the total mass of the vehicle, as it’s written on the registration certificate.

Once entered the data, the program will ask to confirm them. Press “**F4**” to confirm.

8.2. Brake test on the front axel

• Weighting the front axel

Cover the roller not used in the test of the single wheel, drive the vehicle on the roller, as shown by the program.

NOTE: It's possible to set the system so that it's used the left or the right roller for this test.

- Press **"F1"** to abort the test



F1

Figure 64

Wait for the axel weight to be shown. After few seconds of stable weight, the system will automatically store the axel weight.

POSSIBLE SELECTIONS:

- The operator can press **"F2"** to stop the automatic continuation of the test and proceed manually.
- Press **"F1"** to abort the test.
- Press **"START/F4"** to proceed.



F1

F2

F4

Figure 65

□ Start brake test

The icon of the right roller is green because the roller is still.

- Press **"START"** to start the rollers. The roller icon becomes red when it start to move.

The test stops and the forces at the locking are stored when:

- Roller locking for the slipping of the wheel.
- Reaching of the maximum effort on the pedal or at the lever.
- Manual stop with the keyboard on the effort lever measurer, remote control or keyboard with F1 or STOP.



F1

F4

Figure 66

POSSIBLE SELECTION:

The operator can see the summary page pressing **"F1"**.

❑ Wheel drag, brake heating

After starting the rollers, wait for the braking pressure readings to appear on the digital indicators: at this stage, DO NOT BRAKE.

The value that appears is referred to the front wheel and it shows the force needed to drag the wheel not braked (wheel drag).

If the brake needs to be heated, slowly press the brake until a value is shown on the display without locking the wheel. Release the brake and look at the values of the force on the digital and analogical display; decide if they immediately come back to the minimum values of the drag force.



F1

Figure 67

POSSIBLE SELECTION:

- Press **"F1"** to lock the roller
- Press **"F4"** to start the ovality procedure.

❑ Brake ovality or out-of-roundness

➤ Operate the brake until the braking effort value shown on the left panel is enough to use at least 50% of its possibility on the braking circuit; press the icon for **"Ovality/F4"**. On the left side on the screen it will appear an icon for the ovality procedure.

➤ Keep the force on the pedal and/or lever of the brake steady during this period. On screen is shown the absolute value of the fluctuation of the braking force due to the ovality of the disk or the off centered drum. Only in the summary and in the print this fluctuation is reported in percentage relative to the maximum braking forces.

➤ Press again the key **"OVALITY/F4"** and released the brake pedal, as suggested by the program. On the left side it's shown the time. The system is now ready to process a brake progression.



F1

F4

Figure 68

POSSIBLE SELECTION:

- Press **"STOP/F1"** if it's needed to stop the roller.

❑ **Brake progression, unbalance calculation and braking efficiency**

- Slowly and gradually operate the brake pedal, observe the braking effort and the pedal pressure readings on the analog and digital indicators and assess their simultaneous progression.

POSSIBLE SELECTION:

- Press **“STOP/F1”** if it’s needed to stop the roller
- Press **“F4”** to select the ovality test again.



F1

F4

Figure 69

- Continue to slowly and gradually operate the brake pedal until the lock. At the locking, the program will show the summary page (see Figure 77).
- Value the test and press **“ENTER/F4”** to save it and proceed.

POSSIBLE SELECTION:

- Press **“STOP/F1”** to come back to Figure 66 and in case abort the test or repeat it.



F1

F4

Figure 70

8.3. Brake test on the rear axel

- **Weighting the rear axel**

Cover the roller not used in the test of the single wheel, drive the vehicle on the roller, as shown by the program.

Wait for the axel weight to be shown.
After few seconds of stable weight, the system will automatically store the axel weight.

POSSIBLE SELECTIONS:

- The operator can press **"F2"** to stop the automatic continuation of the test and proceed manually.
- Press **"F1"** to abort the test.
- Press **"START/F4"** to proceed



Figure 71

When the roller block is committed, the system can start the rollers and start the braking procedure.

- Press **"START"** to start the rollers.

When the rollers are still the icons of the wheels are green; when the rollers start moving the icons are red.

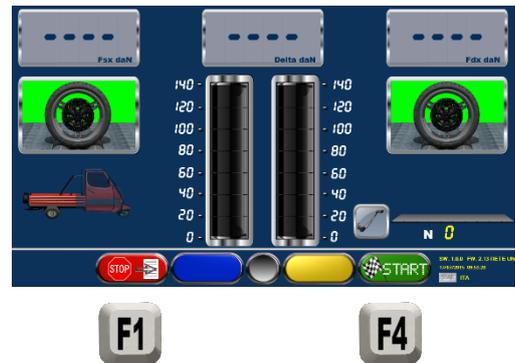


Figure 72

Slowly and gradually operate the brake pedal, observe the braking effort and the pedal pressure readings on the analog and digital indicators and assess their simultaneous progression.

POSSIBLE SELECTIONS:

- Press **"F1"** to stop the rollers
- Press **"F4"** to start the ovality procedure.



Figure 73

Continue to slowly and gradually operate the brake pedal until the wheels stop moving, observe the max braking pressure readings and respective pedal pressure on the analog and digital indicators.

The mid upper indicator also shows the braking dynamic unbalance reading; at this stage, assess whether this is within tolerance; if it is outside tolerance, the reading is displayed in RED.

At the end of the rear axle and handbrake braking procedure and the parking brake the system is already able to assess the % braking efficiency of the service brakes and parking brake.



Figure 74

8.4. Parking brake test

If the operator choose to make the parking brake test on the rear axle at the end of the procedure of the service brake on the rear axle, the system will automatically make the parking brake test.

- Press **“START”** to start the rollers.
- Slowly and gradually operate the parking brake, until the wheels lock.
- Press **“F1”** to come back to the summary page.



Figure 75

8.5. Test graph and final summary

□ Test graph

At the end of the braking procedures on front axle, rear axle and parking brake press **“F2”** (see as example par. 8.4 at page 57) to see a graph with the braking force pattern.

The x – axis shows the left and right braking forces, while the y – axis shows the time that has passed or the force applied to the brake lever and / or to the brake pedal if the system features a measuring unit.

NOTE. The graph shows up to 15 seconds of test from when the minimum braking threshold is passed.

- Press **“STOP/F1”** to exit from the graph display and come back in the numerical display of the test.

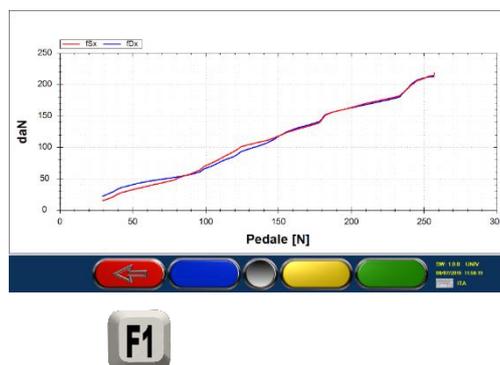


Figure 76

Final brake test summary

After storing the front and rear axle and parking brake tests, and after disengaging the rollers, the screen shows a summary page with all brake tester procedure results. It's possible to see this page also during the test.



Figure 77

The first line contains the data of the front axle, from left to right:

- Unbalance value % (in this case with the front axle with a single wheel) (symbol $\Delta\%$)
- Braking efficiency value of the service brake (symbol $\varepsilon\%$),
- Maximum front brake force value.
- Front axle weight
- Ovality value in percentage and maximum pressure value of lever/pedal in N

The second line contains the data of the rear axle, from left to right:

- Unbalance value % (symbol $\Delta\%$)
- Braking efficiency value of the service brake, referred to the total weight of the vehicle (symbol $\varepsilon\%$)
- Maximum rear brake force value
- Rear axle weight
- Ovality value in percentage and maximum pressure value of lever/pedal in N

The third line near the symbol of the vehicle with both the axel means:

- Braking efficiency of the total service brake value (symbol $\varepsilon\%$),
- Maximum total braking force of service value.
- Total weight value

The fourth line near the symbol of the parking brake, from left to right:

- Unbalance value % (symbol $\Delta\%$)
- Braking efficiency value of the service brake (symbol $\varepsilon\%$),
- Maximum parking brake force value
- Maximum value of lever/pedal effort in N

If the vehicle is for freight transport, near the weight icon is shown the load percentage; if this value pass the 65% of the weight, the display is green, otherwise it's red, to show that the limit has not been passed.

The unbalance in % between the wheels (symbol $\Delta\%$) and the braking efficiency in % (symbol $\varepsilon\%$) are represented with big numbers and the background the same color as the outcome of the test: RED if out of tolerance, GREEN if inside.

The other values (maximum braking force, ovality, pressure on lever and pedal, weight on the axels) are reported with GREY background (their outcome is not subject to comparison with tolerance thresholds).

Press **ENTER/F4**, if the brake test is complete, to go to the program next phase.

9. DATA PRINT

At the end of all the tests, a page is presented where the vehicle and client data can be entered to be shown on the printout.

Press key **F2** to print the test graphs.

Press key **F3/PRINT** to print a copy.

Press key **F4** if you do not wish to print or to start the test on a new vehicle.

If several copies are required, simply press the **F2** or the **F3** key several times

It only takes a few moments to send the data to the printer. During this time, the screen shows the wording “wait please”. When the sending of the data to the printer is complete and no more printing operations are required, press F4 to start the test on a new vehicle; the initial display page of Figure 27 will appear.



Figure 78

This page also shows the result of the test (in this example it is OK).

If the performed test had been unsuccessful, before this page appeared, the user would have been asked to enter the test result – REPEAT or SUSPENDED.

NOTE: The values of the out-of-tolerance tests will be shown on the printout in characters:

- bold black if the printer features B/W cartridge
- red if the printer features color cartridge

Two types of printouts are available:

- Complete printout
- Short printout (only for the cars – it must be set in the parameters configuration reserved to authorized personnel).



□ **COMPLETE PRINTOUT**



Software ver. 9.60W
Firmware ver. 0.99
Pag. 1/1

SPACE s.r.l.
Via Sangano, 48
Trana (TO) ITALY

Brake tester data										
Manufacturer										
Model										
Homologation number										
Serial number										
Date of expiry calibration					31/12/2007					
Owner and vehicle data										
Surname: ROSSI					Name: MARIO					
Manufacturer: FIAT					Model.....: PUNTO					
R.number: BK523AF					Chassis: 11254564364562122					
Immatriculat. date: 21/07/1999					Km: 95000					
Vehicle w. under test(kg) : 1562					1 Fuel.....: DIESEL					
Trailer weight (kg).....: 500					Tare (kg).....: 900					
Category: M1 cars <=3.5t					Result of exame: REGULAR					
Temperature (°C).....: 27			Pressure (kPa).....: 102.2			Humidity (%).....: 35				
Date: 29/06/2007			Start time: 15:14			End time.....: 15:15				
Braking system										
Service brake.....: HYDRAULIC					Emergency brake: HYDRAULIC					
Parking brake: MECHANICAL					Emergency brake system.....: XX					
Brakes										
	Front			Rear			Parking			
	Lh	Rh	Limits/Tot.	Lh	Rh	Limits/Tot.	Lh	Rh	Limits	
Weight (N)	4500	4430	8930	3200	3190	6390	---	---	---	
Total weight (N)	15320									
Brake force (N)	2790	2620	---	1670	2020	---	1690	1530	---	
Brake difference (%)	7		≤ 30	17		≤ 30	9		--	
Ovalization (%)	3	2	---	4	5	---	6	7	---	
Pedal (N)	90		≤ 500	310		≤ 500	---		≤ 400	
Emergency brake diff. (even if coincid. with parking brake)						---		≤ 30		
Brake efficiency (%)										
	Measures		Limits		Measures		Limits			
Service	59		≥ 50	Parking isolated vehicle	24		≥ 16			
Emergency	---		≥ 25	Parking vehicle + trailer	18		≥ 12			
Adherence data										
	Front (%)				Rear (%)					
	Lh	Rh	Limit	Diff.	Limit	Lh	Rh	Limit	Diff.	Limit
	55	53	≥ 20	2	≤ 10	42	43	≥ 20	1	≤ 10
Side slip										
	Front (m/Km)				Rear (m/Km)					
Measure	6.3		Limit: -6.0 ÷ +6.0		Measure	---		Limit: -6.0 ÷ +6.0		
Notes					Test engineer					



Example of COMPLETE PRINTOUT:

1. Space reserved for personalization of customer details ⁽²⁾
2. Brake meter type-homologation details (these are printed on vehicle periodical testing machines)
3. Identification details of the owner being tested
4. Identification details of the vehicle being tested
5. Final result
6. Electronic weather values
7. Start and end of test automatically processed
8. Identification details of the type of braking system and emergency brake (defined by operator during final summary display - Figure 56)
9. With system featuring separate wheel weigher (adherence test) – vehicle weight split up on each single wheel. With system featuring axle weigher (system below rollers) – weight of vehicle split up on each axle
10. MAX braking force on wheels in N (service and parking brake) and pedal
11. Ovality of left and right wheels (if performed during braking procedure) for each axle being tested
12. Service brake, emergency brake and parking brake braking efficiency Dynamic unbalance of front and rear axles of service brake, parking brake and emergency brake (if coinciding with that of parking)
13. Adherence test value (optional) - vehicle weight subdivided in every single wheel for rear and front axle
14. Side-slip test (optional) for rear and front axle
15. Space reserved for notes that can be entered manually during data entering (Figure 78)
16. Space reserved for operator approval in case of periodical vehicle testing

Example of SHORT PRINTOUT:

1. Space reserved for personalization of customer details ⁽³⁾
2. Identification details of the owner and vehicle being tested
3. Final result
4. MAX braking force on wheels in N (service and parking brake) and pedal; ovality of left and right wheels (if performed during braking procedure) for each axle being tested
5. Service brake, emergency brake and parking brake braking efficiency
6. Adherence test value (optional) - vehicle weight subdivided in every single wheel for rear and front axle
7. Side-slip test (optional) for rear and front axle
8. Space reserved for notes that can be entered manually during data entering (Figure 78)
9. Space reserved for operator approval in case of periodical vehicle testing

²The personalization of the customer details and of time and date can be done by the operator following the proper procedure.



SHORT PRINTOUT



Software ver. 9.60W
Firmware ver. 0.99
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SPACE s.r.l.
Via Sangano, 48
Trana (TO) ITALY

Owner and vehicle data										
Surname.....: ROSSI					Name.....: MARIO					
Manufacturer.....: FIAT					Model.....: PUNTO					
R.number.....: BK523AF					Chassis.....: 11254564364562122					
Tare (kg).....:					Trailing weight (kg).....: 500					
Fuel.....:					Immatriculat. date.....: 04/07/2007					
Km.....:					Date.....: 04/07/2007					
Result.....: Regular										
Brakes										
	Front			Rear			Parking			
	Lh	Rh	Limits	Lh	Rh	Limits	Lh	Rh	Limits	
Weight (N)	4500	4430	---	3200	3190	---	---	---	---	
Brake force (N)	2790	2620	---	1670	2020	---	1690	1530	---	
Brake difference (%)	7		≤ 30	17		≤ 30	9		--	
Ovalization (%)	3	2	---	4	5	---	6	7	---	
Pedal (N)	90		≤ 500	310		≤ 500	---		≤ 400	
Brake efficiency (%)										
	Measures		Limits		Measures		Limits			
Service	59		≥ 50	Parking isolated vehicle	21		≥ 16			
Emergency	28		≥ 25	Parking vehicle + trailer	16		≥ 12			
Adherence										
	Front (%)				Rear (%)					
	Lh	Rh	Limits	Diff.	Limits	Lh	Rh	Limits	Diff.	Limits
	55	53	≥ 20	2	≤ 10	42	43	≥ 20	1	≤ 10
Side slip										
	Front (m/Km)				Rear (m/Km)					
Measure	6.3		Limits.....: -6.0 + +6.0		Measure	---		Limits.....: -6.0 + +6.0		
Notes					Test engineer					

10.CUSTOMER DATABASE

By means of this function, the tests can be stored relating to a vehicle in an internal database.

It could be useful to:

- Look for a vehicle in a determined period
- Print the report of the tests;
- Complete the tests not yet performed.

Press **F3**  from the initial page (see Figure 27) then select “**Customer database**”.



Figure 79

The program displays the list of clients in a page where are the search functions, with different keys:

- Search for plate  / for surname  / for date  / for chassis 

Press **F2/F3** to select the desired test.

Press **F4/ENTER** to confirm the selection and display the tests performed.

To see the saved clients in another order (plate/name/date etc.). Press **F5**



Figure 80

Press **F1** to come back to the previous page.

11. BACK-UP and RESTORE

Using the BACK-UP/ RESTORE function, all the data of the client databank can be collected together on whichever mass storage device.

Press **F3**  from the initial page (see Figure 27) and select **“Backup/Restore Client Data Bank”**

POSSIBLE SELECTIONS:

- Press **F1** to return to the previous page.
- Press **F2/F3** to move upward or downward.
- Press **F4** to select the desired function.

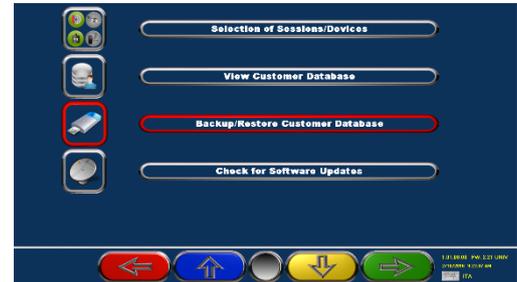


Figure 81

At this point, insert the USB mass storage device.

- Press **F2/F3** to move the selection upward or downward (Backup or Restore).
- Press **F4**  to confirm the copy of the data on the USB support (Backup) or the restore from the USB device to the PC (Restore).

Press **F1** to quit.



Figure 82

12. TROUBLESHOOTING

The following are a list of possible problems that could affect the TEST LANE. SPACE S.R.L. cannot accept any liability for injury to persons and animals or damage to things resulting from machine maintenance performed by unauthorized personnel or use of non-original spare parts.

Before doing any jobs on the machine, disconnect the power supply line at the main switchboard. In case of any doubts, always immediately contact the SPACE S.R.L. after-sales service which will be pleased to provide information suitable for performing operations in total safety.

-  The items marked by this symbol require the services of the after-sales department.
Do not perform operations on the machine

PROBLEM	CAUSE	REMEDY
NO OPERATION	- Power break - Protection fuses interrupted	<ul style="list-style-type: none"> • Check mains voltage • Check protection fuses
The monitor dos not work	- Power supply interrupted - No video signal	<ul style="list-style-type: none"> • Check power cable connection • Check video signal cable connection between PC and monitor
PC fails to switch on	- Power supply interrupted	<ul style="list-style-type: none"> • Check ON/OFF switch • Check power cable connection
Printer dos not work (see also printer operation manual)	- Power supply interrupted - No signal	<ul style="list-style-type: none"> • Check ON/OFF switch • Check power cable connection • Check signal cable connection between printer and PC
PC keyboard	- No signal	<ul style="list-style-type: none"> • Check cable connection with PC
Remote control	- Obstacles between transmitter and receiver - Battery low (red LED does not come on) - No signal	<ul style="list-style-type: none"> • Make sure there are no obstacles between the transmitter and the receiver • Replace the battery • Check cable connection between receiver and motherboard
Brake tester motors fail to start	- Protection fuses interrupted - STOP button pressed	<ul style="list-style-type: none"> • Check protection fuses • Disengage STOP button
Adherence test motors fail to start	- Protection fuses interrupted - STOP button pressed	<ul style="list-style-type: none"> • Check protection fuses • Disengage STOP button
Brake tester motor start signal failure	- CAR-ON vehicle sensor faulty	<ul style="list-style-type: none"> • Replace CAR-ON sensor

During TEST LANE operation, due to wrong operations by the operator or faulty devices, an error code could appear on the screen.

Press the **STOP/F1** key to return to previous program stage; if the error continues and is systematic even when regular procedure is followed, contact the SPACE S.R.L. technical dept.

ERROR CODE	CAUSE
1 – During starting stage, LH CAR-ON is Off	LH CAR-ON has become inactive during starting stage
2 – During starting stage, RH CAR-ON is Off	RH CAR-ON has become inactive during starting stage
4 – Starting stage blocked through STOP key	STOP pressed during starting stage
5 – LH roller speed too low during starting stage	LH TACHO has detected a speed which is too low during starting stage
6 – RH roller speed too low during starting stage	RH TACHO has detected a speed which is too low during starting stage
7 – LH roller speed too high during starting stage	LH TACHO has detected a speed which is too high during starting stage
8 – RH TACHO speed too high during starting stage	RH TACHO has detected a speed which is too high during starting stage
9 – LHBP > max. full scale threshold during starting stage	LH braking power > full scale threshold during starting stage
10 – RHBP > max. full scale threshold during starting stage	RH braking power > full scale threshold during starting stage
11 – LHBP > max. rolling threshold	LH braking power > rolling threshold during starting stage
12 – RHBP > max. rolling threshold	RH braking power > rolling threshold during starting stage
13 – LHBP > max. full scale threshold during braking stage	LH braking power > full scale threshold during braking stage
14 – RHBP > max. full scale threshold during braking stage	RH braking power > full scale threshold during braking stage
15 – Braking not valid because it does not exceed min. time	Braking stage shorter than set min. time. Braking threshold not exceeded (rolling value + 50%)
17 – Oval stage not ended	- Sono stati bloccati i rulli durante la fase di ovalizzazione
39 – Trouble during adherence test, non-reliable data	- La prove di aderenza non ha rilevato minimi oppure ha rilevato minimi inattendibili

13. MAINTENANCE

IMPORTANT!:



Routine maintenance operations must be performed annually by skilled personnel authorized by SPACE S.R.L.

The only maintenance operations the user of the appliance is allowed to perform are simple ones that nevertheless require the authorization of the plant manager. Before performing any maintenance jobs disconnect the appliance from the power mains and interrupt the main power supply.

Whenever maintenance jobs require removal of the brake tester covers, the work area must be fenced off and identified by suitable notices to prevent unauthorized persons accidentally accessing it. A notice should also be placed on the control console indicating that maintenance work is in progress, with the wording “Machine being serviced; DO NOT TOUCH”.

Maintenance operations must be performed at least every 6 months. If the appliance is used frequently, this schedule should be shortened to 2-3 months.

More specifically, after checking that all the above safety measures have been taken:

- grease the brake tester roller chains: use specific grease for chains and apply this with a brush
- clean the bottom of the brake tester and suspension tester pits with a vacuum cleaner; part movement must not be hindered and the air vents of the electric motors and the water drainage outlets must not be blocked.
- clean the monitor using a dry, soft and antistatic cloth; if it is very dirty, clean it with a well-wrung damp cloth and then dry.
- clean the keyboard by brushing with a brush; when this is not used, it is in any case best to always protect it with a suitable cover to prevent dust entering.
- cleaning and changing cartridges and other printer maintenance operations are described in the printer manual. Always refer to the latter before performing any maintenance operation on the printer.

IMPORTANT!:



Any other maintenance operation not described above (such as, for instance, routine yearly maintenance or checking settings) is described in the installation and settings manual; these operations can only be performed by skilled personnel authorized by SPACE S.R.L.

14. STORING AND SCRAPPING

Storing – If the machine is stored for a long period of time, all supplies must be disconnected and parts, such as printer and monitor, must be protected that could be damaged by excess dust deposits.

Grease the parts that could be damaged in case of drying.

Scrapping and disposal



- If the decision is taken to no longer use the machine, this must be made inoperative.
- Those parts that could represent hazard sources should be made harmless.
- Assess the part according to the degree of disposal.
- Scrap as scrap iron through authorized channels.
- If considered special waste, this must be removed and split into uniform types before disposing according to applicable regulations.



In order to inform the users regarding the correct disposal of batteries and accumulators, please take note of the following: the meaning of the symbol with the crossed-out wheeled bin marked on the accumulator is that the product cannot be disposed of in municipal solid waste (i.e. together with “mixed waste”).

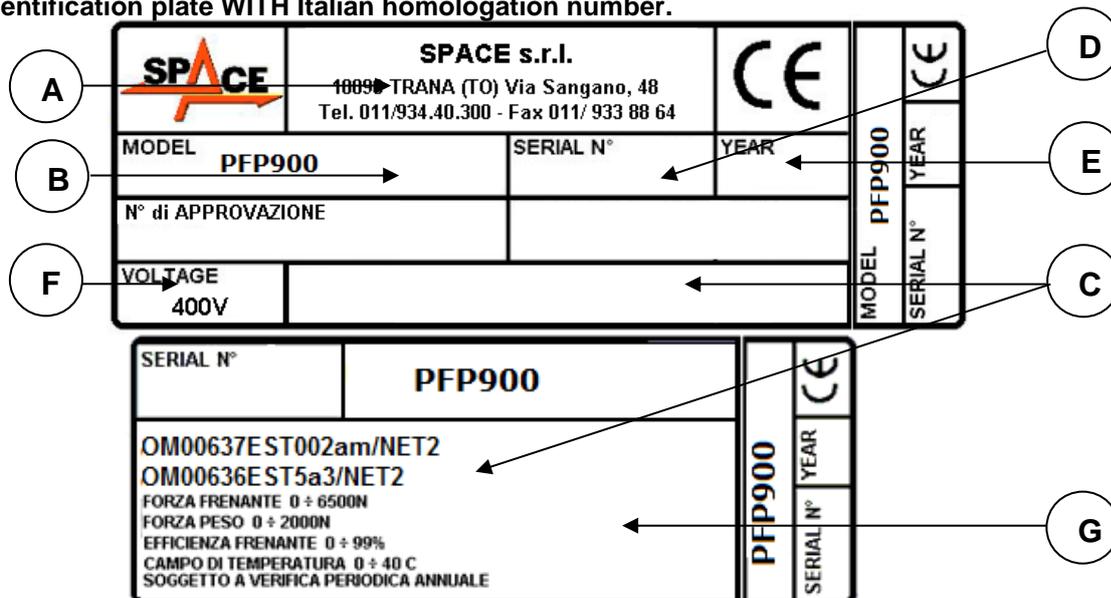
It must be handled separately with the purpose of performing specific operations for its reuse or treatments for eliminating and disposing safely of any substances that could be dangerous for the environment and extract and recycle the raw materials that may be reused. For further detailed information on the end-of-life treatment of batteries and accumulators, please contact the After-sales department of SPACE S.R.L.

15. IDENTIFICATION PLATE

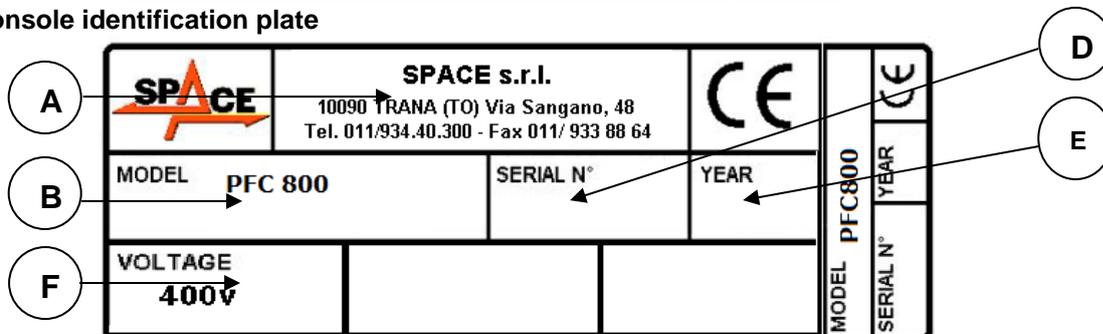
The various parts of the identification plates are following indicated as an example.

- A) Manufacture
- B) Model code
- C) Italian Homologation number
- D) Serial number
- E) Year of construction
- F) Powering (Voltage)
- G) Braking force and efficiency data, Brake weight and Temperature range

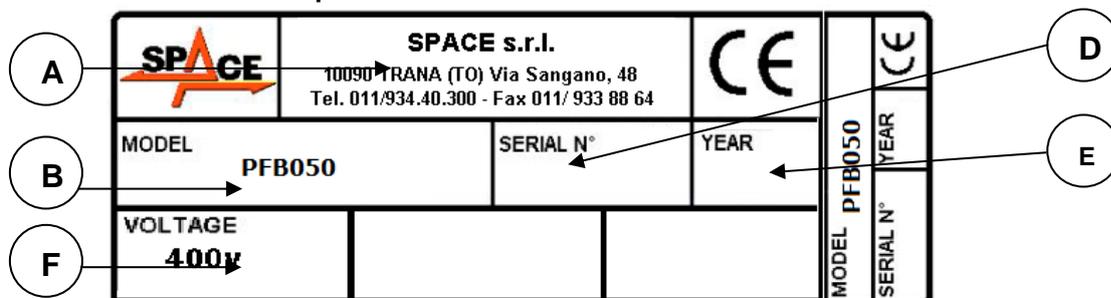
Identification plate WITH Italian homologation number.



Console identification plate



Roller tester identification plate



CAUTION: Do not tamper with, carve, change or remove the identification plate; do not cover it with panels, etc., since it must always be visible.

Always keep this plate clean of grease and dirt in general.

WARNING: Should the plate be accidentally damaged (removed from the machine, damaged or even partially illegible) inform immediately the manufacturer.

POSITIONING THE IDENTIFICATION PLATES

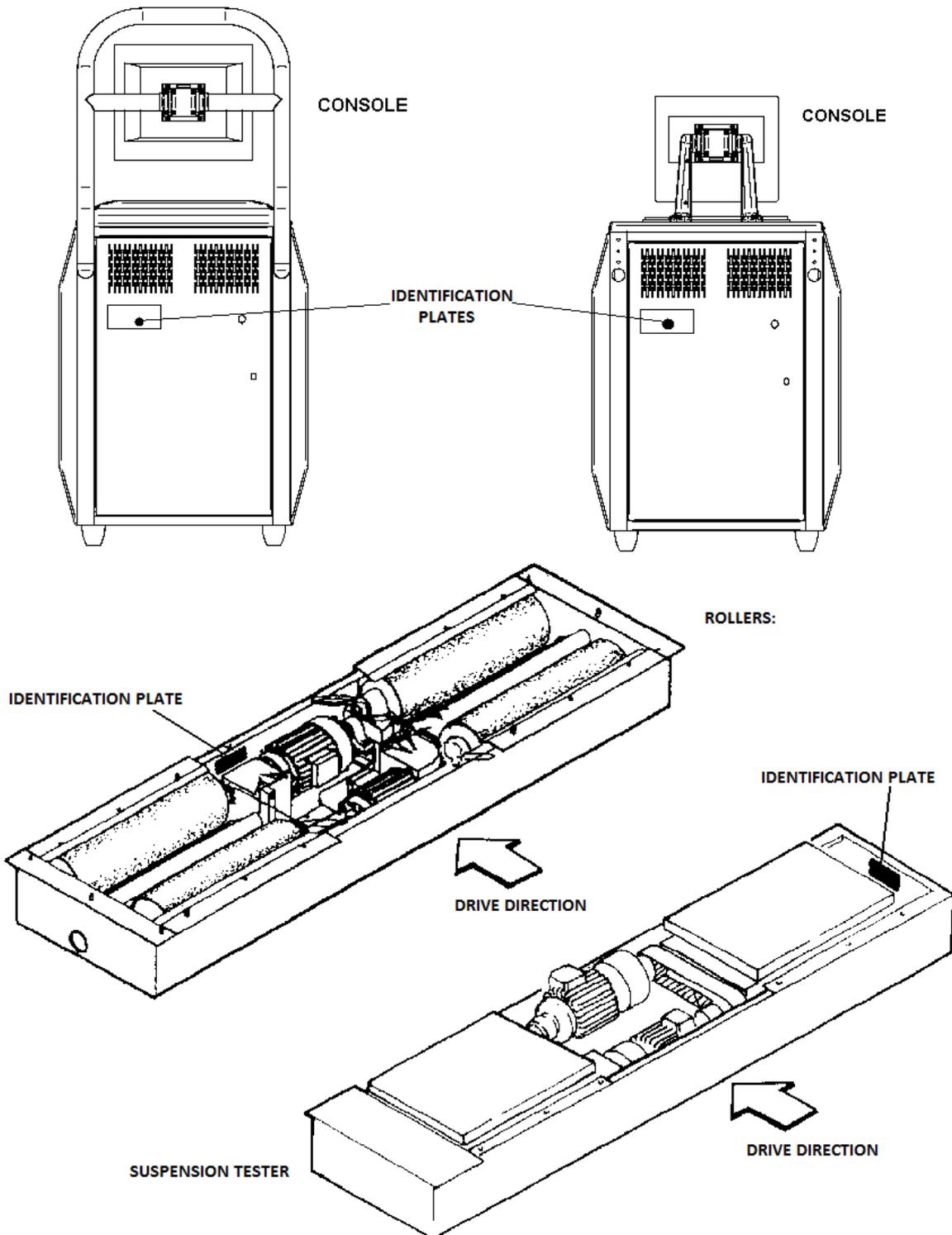


Figure 83