

## TRUCK BRAKE TESTER

PFB100 –PFB150 – PFB200 SERIES  
PFB201 /L - PFB202

**TRUCK/CAR BRAKE TESTER**  
PFB100 1V00/3V00 - PFB150 1V00/3V00  
PFB715 1000/3000 – PFB716 3000

### INSTRUCTION OPERATION AND MAINTENANCE MANUAL



#### COMPOSIZIONE

79 pagine (copertine  
comprese)

77 pagine numerate

#### COMPOSITION

79 pages (including  
cover pages)

77 numbered pages

#### ZUSAMMENSETZUNG

79 Seiten (inkl.  
Deckblätter)

77 numerierte Seiten

#### COMPOSITION

79 pages (pages de la  
couverture incluses)

77 pages numérotées










#### COMPOSICIÓN

79 páginas (incluidas  
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**SIMBOLOGIA UTILIZZATA NEL MANUALE**  
**SYMBOLS USED IN THE MANUAL**  
**IN DER BETRIEBSANLEITUNG VERWENDETE ZEICHEN**  
**SYMBOLES UTILISES DANS LA NOTICE**  
**SIMBOLOGÍA UTILIZADA EN EL MANUAL**

	<b>SIMBOLI</b>	<b>SYMBOLS</b>	<b>ZEICHEN</b>	<b>SYMBOLES</b>	<b>SÍMBOLOS</b>
	<b>VIETATO!</b>	<b>FORBIDDEN!</b>	<b>VERBOTEN</b>	<b>INTERDIT!</b>	<b>PROHIBIDO!</b>
	<b>Obbligo!</b> Operazioni o interventi da eseguire obbligatoriamente	<b>Mandatory!</b> Operations or jobs to be performed compulsorily	<b>Vorschrift Obligatorisch</b> auszuführende Arbeitsvorgänge oder Eingriffe	<b>Obligation.</b> Opérations ou interventions obligatoires	<b>Obigación.</b> Operaciones o intervenciones que hay que realizar obligatoriamente
	<b>Pericolo!</b> Prestare particolare attenzione	<b>Hazard!</b> Be especially careful	<b>Gefahr!</b> Äusserste Vorsicht ist geboten	<b>Dager!</b> Faire très attention	<b>Peligro!</b> Prestar especial atención
	Movimentazione con carrello elevatore o transpallet	Handle using fork-lift or pallet transfer unit	Transport mit Dabelstapler oder Handgabelhubwagen	Déplacement avec chariot élévateur ou traspalette	Desplazamiento con carretilla elevadora o estibadora
	Attenzione: carichi sospesi	Caution: hanging loads	Achtung: hängende Lasten	Attention: charge suspendue	Atección: cargas suspendidas
	Pericolo: scariche elettriche	Shock hazard	Gefahr! elektrische Entladungen	Danger d'électrocution	Peligro de descargas eléctricas
	Indossare guanti da lavoro	Wear work gloves	Der Arbeit angemessene Handschuhe tragen	Porter des gants de travail	Colocarse guantes de trabajo
	Calzare scarpe da lavoro	Wear work shoes	Der Arbeit angemessene Schuhe tragen	Mettre des chaussures de travail	Usar zapatos de trabajo
	Indossare occhiali di sicurezza	Wear safety goggles	Schutzbrille tragen	Porter des lunettes de sécurité	Usar gafas de seguridad

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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 do not engage the measurement devices (for example, putting something on the weighting frame) 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 20000 Kg when fully loaded.

The max acceptable roller assembly and suspension test load per axle is 20000 Kg



**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.



- Evitare che il personale non autorizzato si avvicini al provafreni durante il ciclo. Un 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. 3.2.1 at page 20) 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 (see Figure 12 at page 20- point 8 and Figure 13 at page 21) or on the front of the panel of the PFC603D (see Figure 15, page 22).

## 2.4. Safety devices



- Safety button: stops and prevents roller start (Button on the front of the cab shown at Figure 12 at page 20 and Figure 13 at page 21). Note: not for PFC603D.
- 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 (see Figure 12, Figure 13 and Figure 15).

## 2.5. Emergency situations

### ATTENTION!:



In the event of emergency situations, the special device behind the console will have to be operated (see Figure 12, Figure 13 and Figure 15), 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 (see Figure 12 at page 20 and Figure 13 at page 21- NOT for console PFC603D); 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.

### ATTENTION!:



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.

### ATTENTION!:



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

### 3. EQUIPMENT COMPOSITION

In the following table are listed the possible combination of CONSOLE + ROLLER ASSEMBLY of the various models of Brake Tester for Truck and Double Speed, all certified in Italy in 2016, following the Technical Directives about brake testers for vehicle with total mass > 3.5 t of the Italian Ministry of Transport and Navigation.

<b>EQUIPMENT CODE ITALY CERTIFIED Car / Truck</b>	<b>CONSOLE</b>	<b>ROLLER ASSEMBLY</b>
<b>PFK563</b>	PFC603E	PFB716
<b>PFK563DL</b>	PFC603D	PFB201L

<b>EQUIPMENT CODE ITALY CERTIFIED Truck</b>	<b>CONSOLE</b>	<b>ROLLER ASSEMBLY</b>
<b>PFK561</b>	PFC501E or PFC601E	PFB201
<b>PFK562</b>	PFC501E or PFC601E	PFB202
<b>PFK561L</b>	PFC601K	PFB201L

### 3.1. Roller assembly

The roller assemblies of the 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 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.

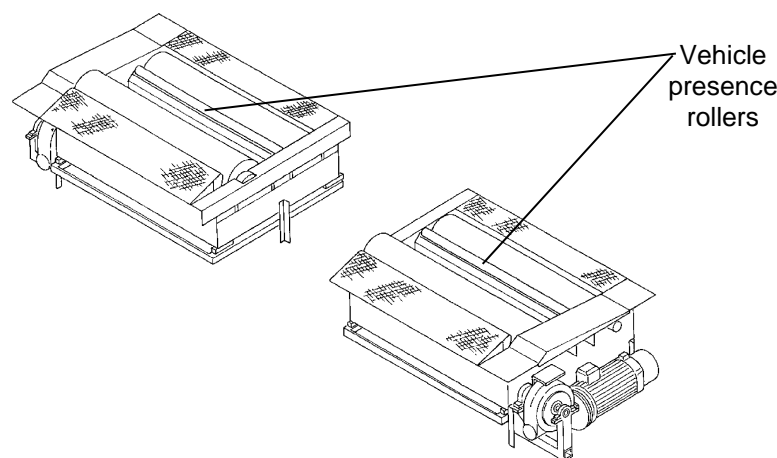
Each pair of rollers also features a proximity switch (called TACHO sensor) that detects roller speed and consequently vehicle wheel speed. This quantity, which is continuously measured, when compared with the initial wheel speed, determines the slip condition that causes test stop.

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.

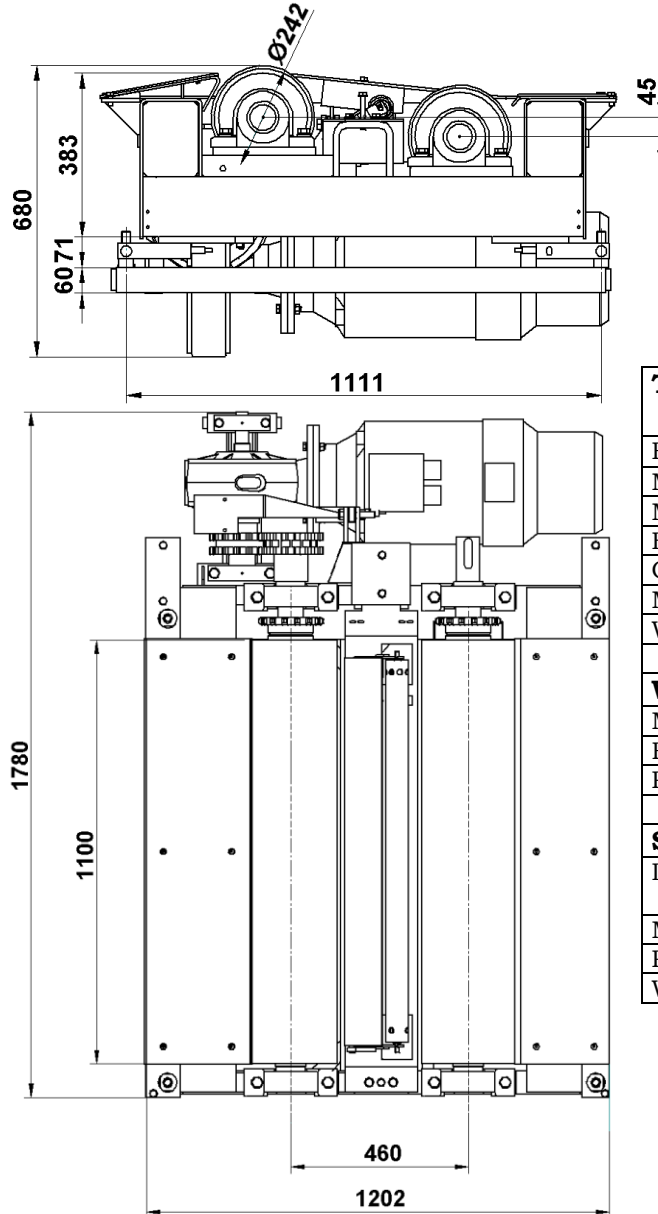
The axle-weighing frame consists of two cell retention metal crosspieces on which the roller tester frame rests.

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.



### 3.1.1. Roller Brake Tester PFB100 series

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).



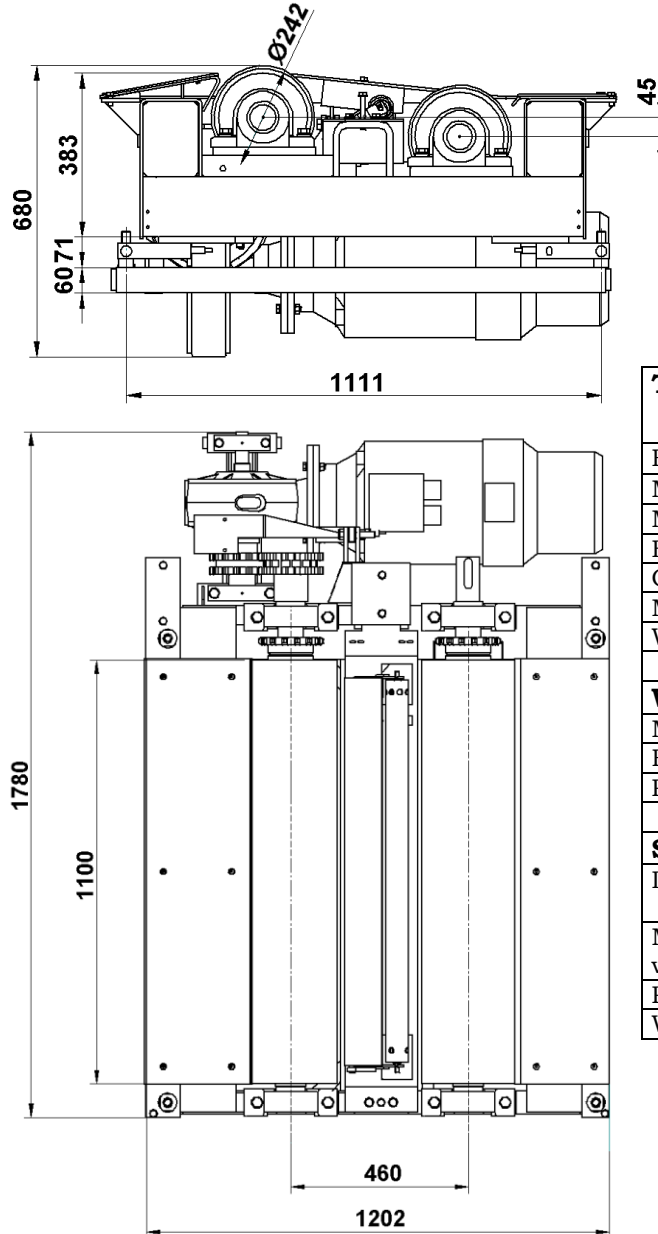
TECHNICAL SPECIFICATIONS	
□ PFB100 Series	
Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x10 kW
Empty roller tip speed	2,2 km/h
Grip coefficient	>0,75
Max braking effort shown	3000 daN
Weight	2x800Kg
WEIGHING FRAME	
Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$
SIDE SLIP TESTER (APF151)	
Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

Figure 1



### 3.1.2. Roller Brake Tester PFB150 series

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).



#### TECHNICAL SPECIFICATIONS

##### □ PFB150 Series

Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x15 kW
Empty roller tip speed	2,2 km/h
Grip coefficient	>0,75
Max braking effort shown	4000 daN
Weight	2x800Kg

#### WEIGHING FRAME

Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$

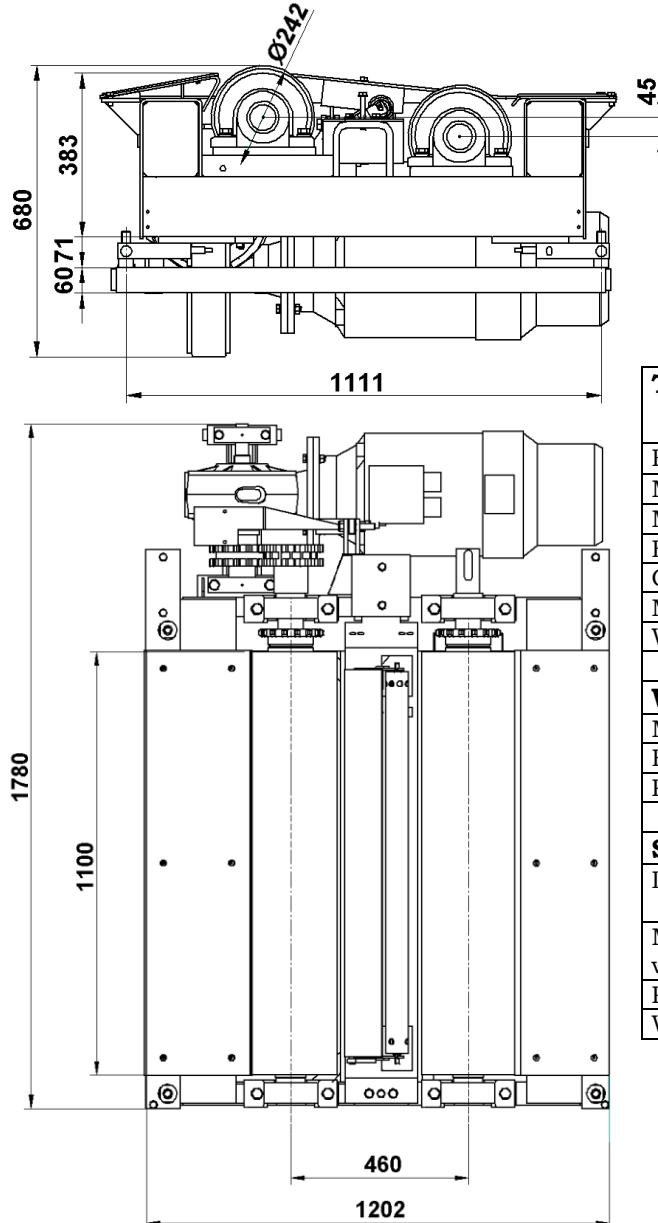
#### SIDE SLIP TESTER (APF151)

Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

Figure 2

### 3.1.3. Roller Brake tester PFB200 series

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).



#### TECHNICAL SPECIFICATIONS

##### □ PFB200 Series

Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x20 kW
Empty roller tip speed	2,2 km/h
Grip coefficient	>0,75
Max braking effort shown	5000 daN
Weight	2x800Kg

#### WEIGHING FRAME

Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$

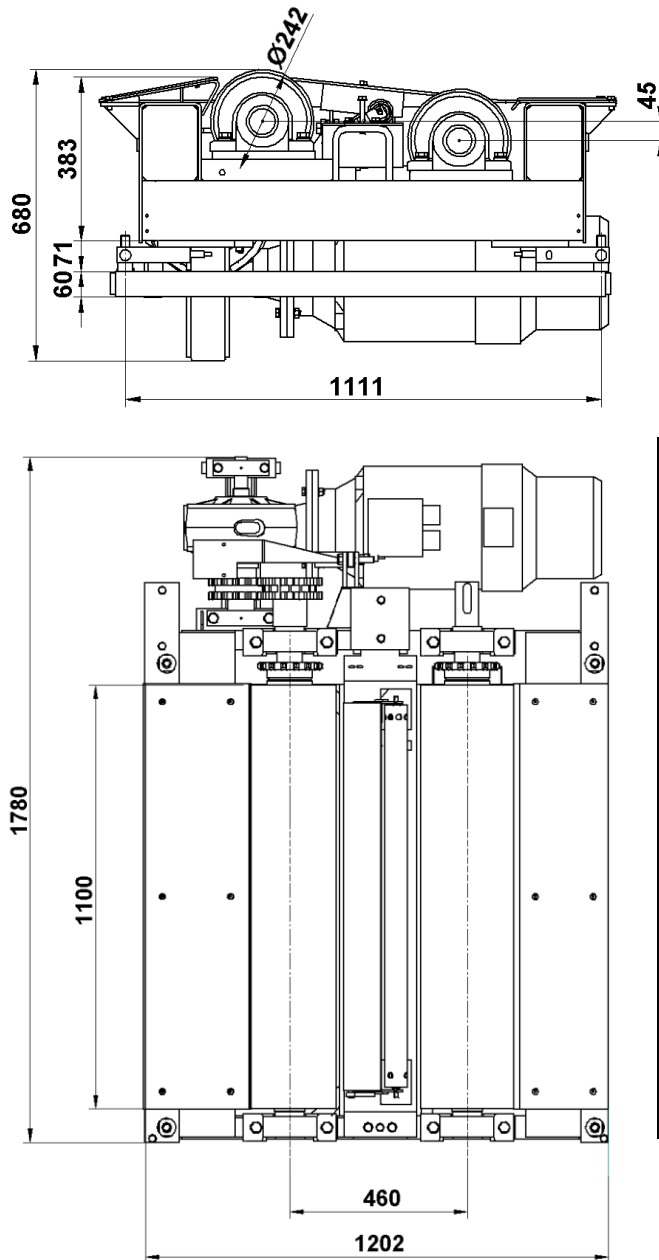
#### SIDE SLIP TESTER (APF151)

Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

Figure 3

### 3.1.4. Roller Brake tester PFB100 1V00/3V00

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).

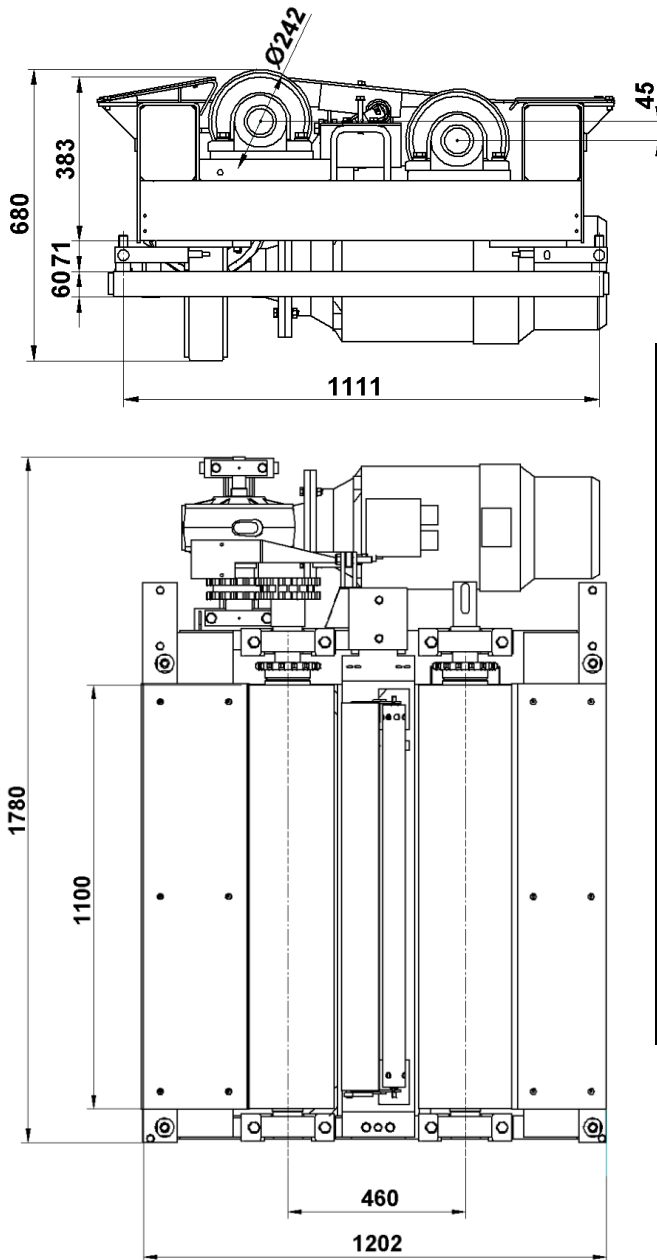


<b>TECHNICAL SPECIFICATIONS</b>	
<b>□ PFB100 1V00 / PFB100 3V00</b>	
Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x5 kW 2x10 kW
Empty roller tip speed	2,5/5 km/h
Grip coefficient	>0,7
Max braking effort shown	3000 daN
Weight	2x700Kg
<b>WEIGHING FRAME</b>	
Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$
<b>SIDE SLIP TESTER (APF151)</b>	
Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

**Figure 4**

### 3.1.5. Roller Brake tester PFB150 1V00 /3V00

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).

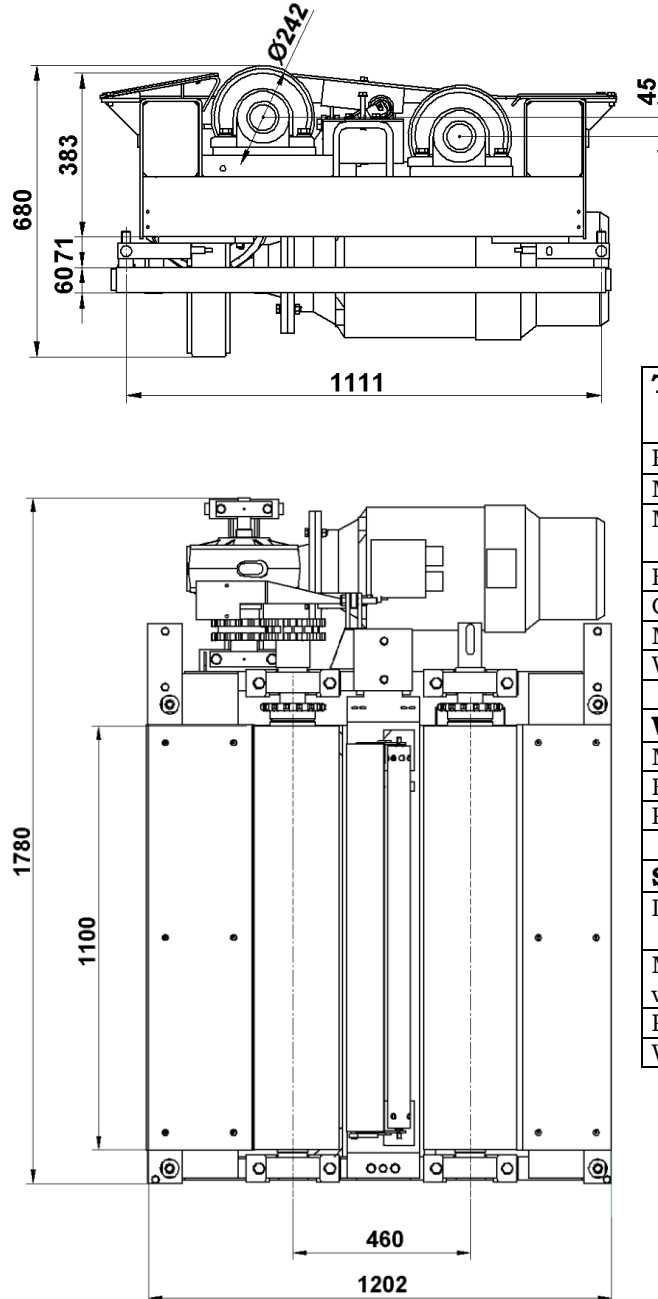


<b>TECHNICAL SPECIFICATIONS</b>	
<b>□ PFB150 1V00 / PFB150 3V00</b>	
Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x7 kW 2x15 kW
Empty roller tip speed	2,5/5 km/h
Grip coefficient	>0,7
Max braking effort shown	4000 daN
Weight	2x740Kg
<b>WEIGHING FRAME</b>	
Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$
<b>SIDE SLIP TESTER (APF151)</b>	
Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

**Figure 5**

### 3.1.6. Roller Brake tester PFB715 1000/3000

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).

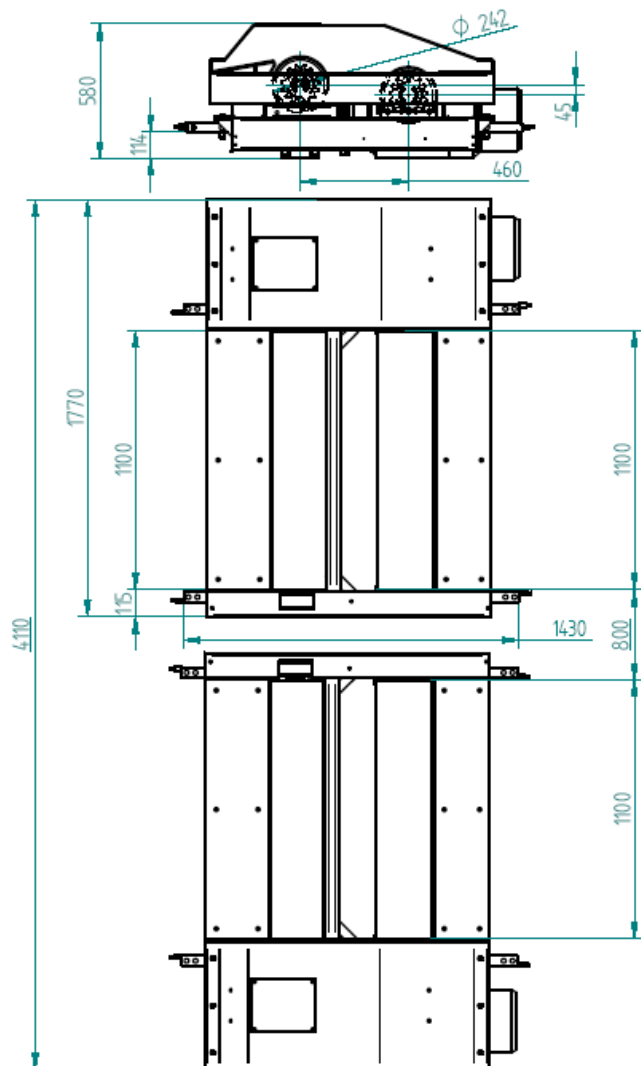


<b>TECHNICAL SPECIFICATIONS</b>	
<b>□ PFB7151000 / PFB7153000</b>	
Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x7kW 2x15 kW
Empty roller tip speed	2,5/5 km/h
Grip coefficient	>0,7
Max braking effort shown	4200 daN
Weight	2x800Kg
<b>WEIGHING FRAME</b>	
Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$
<b>SIDE SLIP TESTER (APF151)</b>	
Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

**Figure 6**

### 3.1.7. Roller Brake tester PFB200L

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).



#### TECHNICAL SPECIFICATIONS

##### □ PFB200L

Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x20 kW
Empty roller tip speed	2,35/5,35 km/h
Grip coefficient	>0,75
Max braking effort shown	5000 daN
Weight	2x800Kg

##### WEIGHING FRAME

Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$

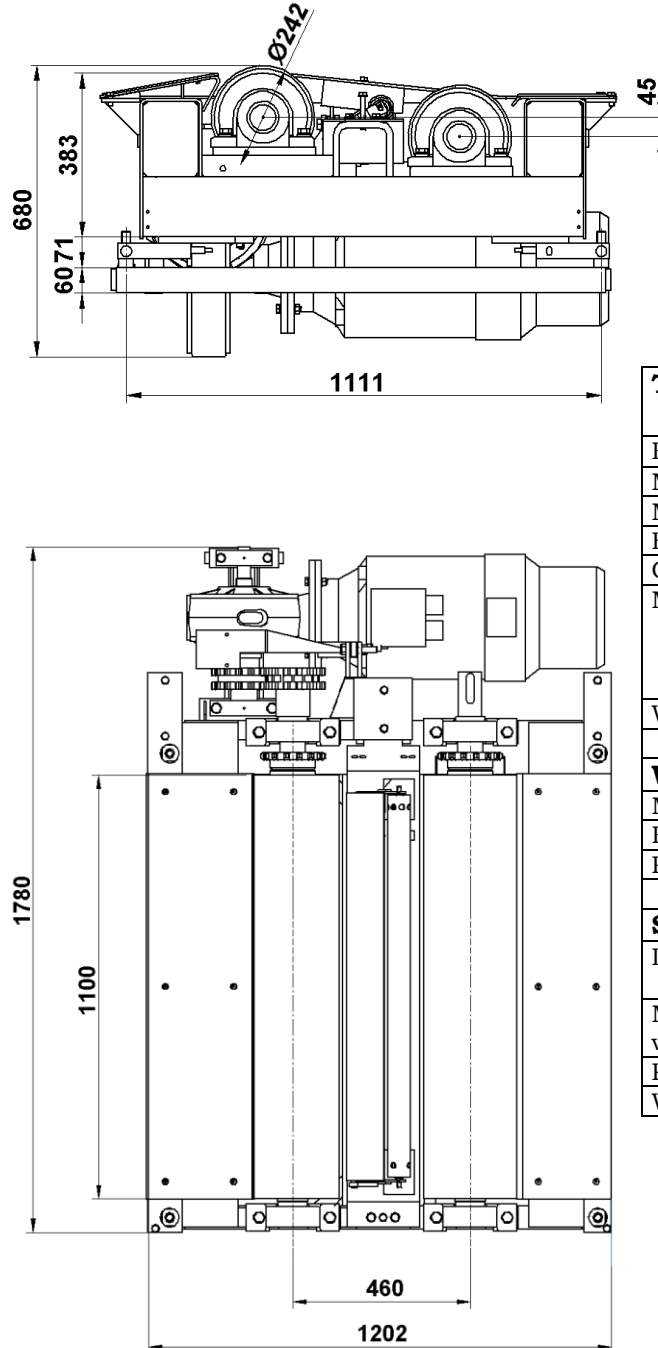
##### SIDE SLIP TESTER (APF151)

Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

Figure 7

### 3.1.8. Roller brake tester PFB201 (truck class 1)

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).



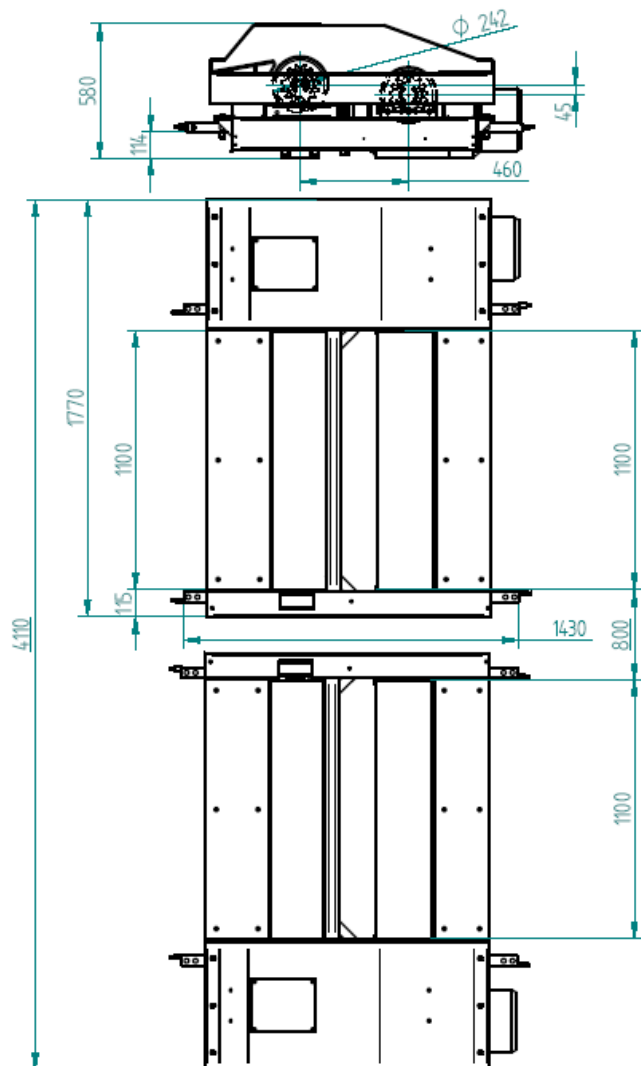
TECHNICAL SPECIFICATIONS	
□ PFB201	
Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x15 Kw
Empty roller tip speed	2,2 km/h
Grip coefficient	>0,75
Max braking effort shown	3500 daN 3500 daN (con extra coppia)
Weight	2x800Kg
WEIGHING FRAME	
Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$
SIDE SLIP TESTER (APF151)	
Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

Figure 8



### 3.1.9. Roller Brake Tester PFB201L (truck class 1 - lowered)

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).



#### TECHNICAL SPECIFICATIONS

##### □ PFB201L

Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x15 kW
Empty roller tip speed	2,35/5,35 km/h
Grip coefficient	>0,75
Max braking effort shown	3500 daN 4200 daN (con extra coppia)
Weight	2x800Kg

#### WEIGHING FRAME

Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$

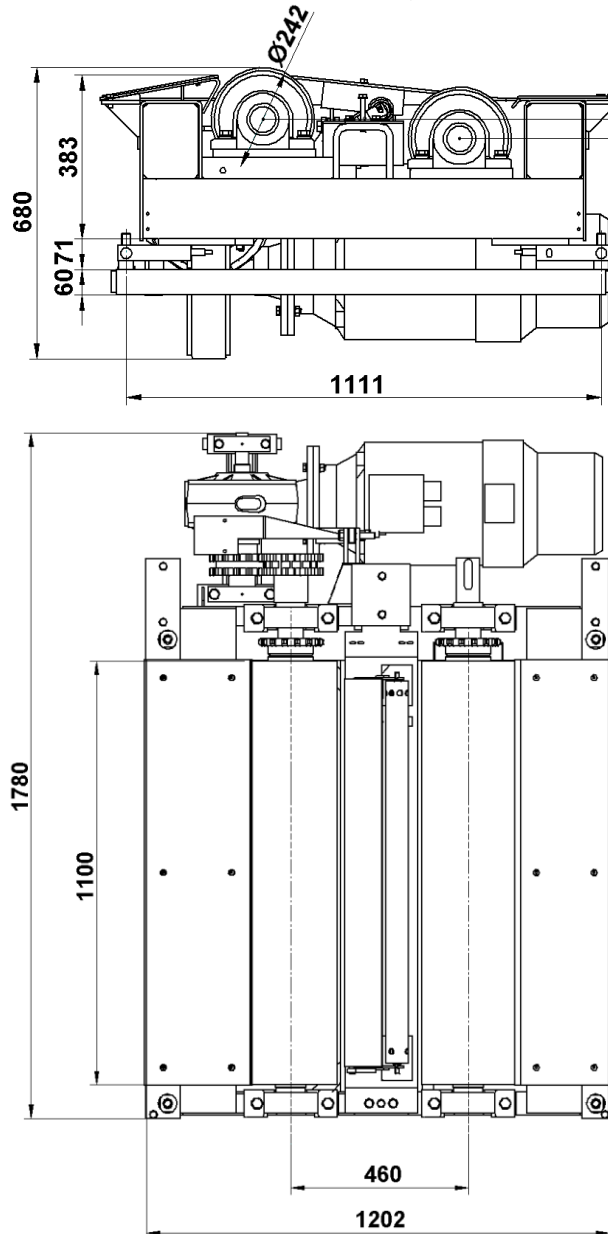
#### SIDE SLIP TESTER (APF151)

Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

Figure 9

### 3.1.10. Roller Brake Tester PFB716 (truck class 1)

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).



#### TECHNICAL SPECIFICATIONS

##### □ PFB716

Roller dimensions	1100 - $\varnothing$ 242
Max acceptable load per axle	20000 daN
Motors	2x7 kW 2x15 kW
Empty roller tip speed	2,5/5 km/h
Grip coefficient	>0,75
Max braking effort shown	3500 daN
Weight	2x800Kg

#### WEIGHING FRAME

Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$

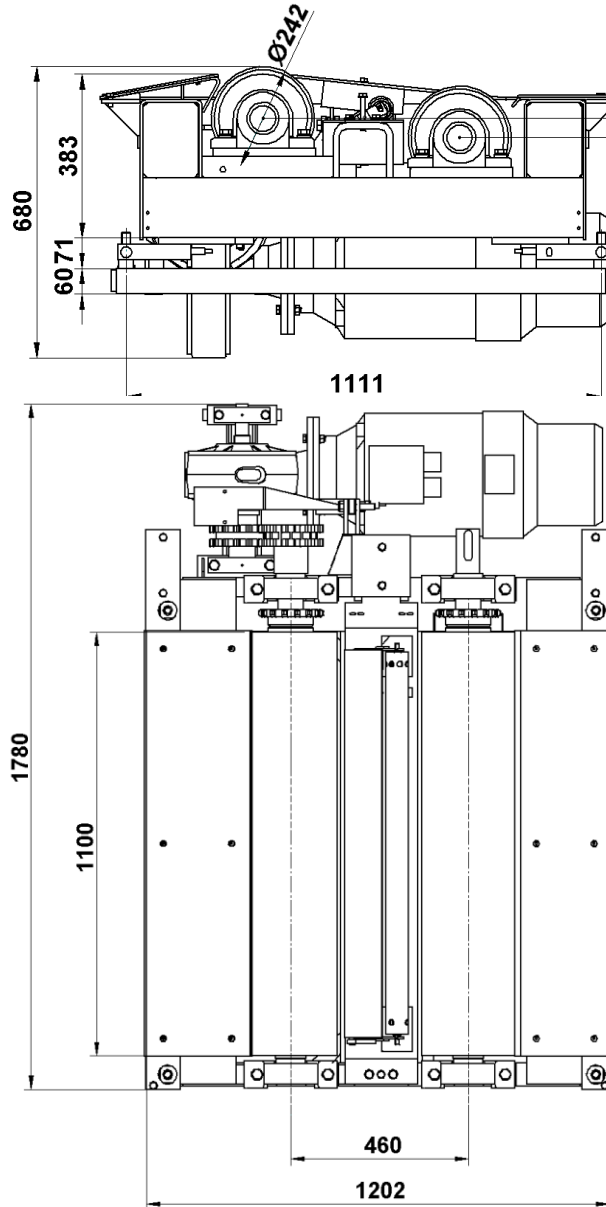
#### SIDE SLIP TESTER (APF151)

Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

**Figure 10**

### 3.1.11. Roller brake tester PFB202 (truck class 2)

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).



#### TECHNICAL SPECIFICATIONS

##### □ PFB202

Roller dimensions	1100 - $\phi$ 242
Max acceptable load per axle	20000 daN
Motors	2x18.5 kW
Empty roller tip speed	2,2 km/h
Grip coefficient	>0,75
Max braking effort shown	4550 daN
Weight	2x800Kg

##### WEIGHING FRAME

Max acceptable load per axle	20000 daN
Full scale weight value per axle	16000 daN
Precision	$\pm 1\%$

##### SIDE SLIP TESTER (APF151)

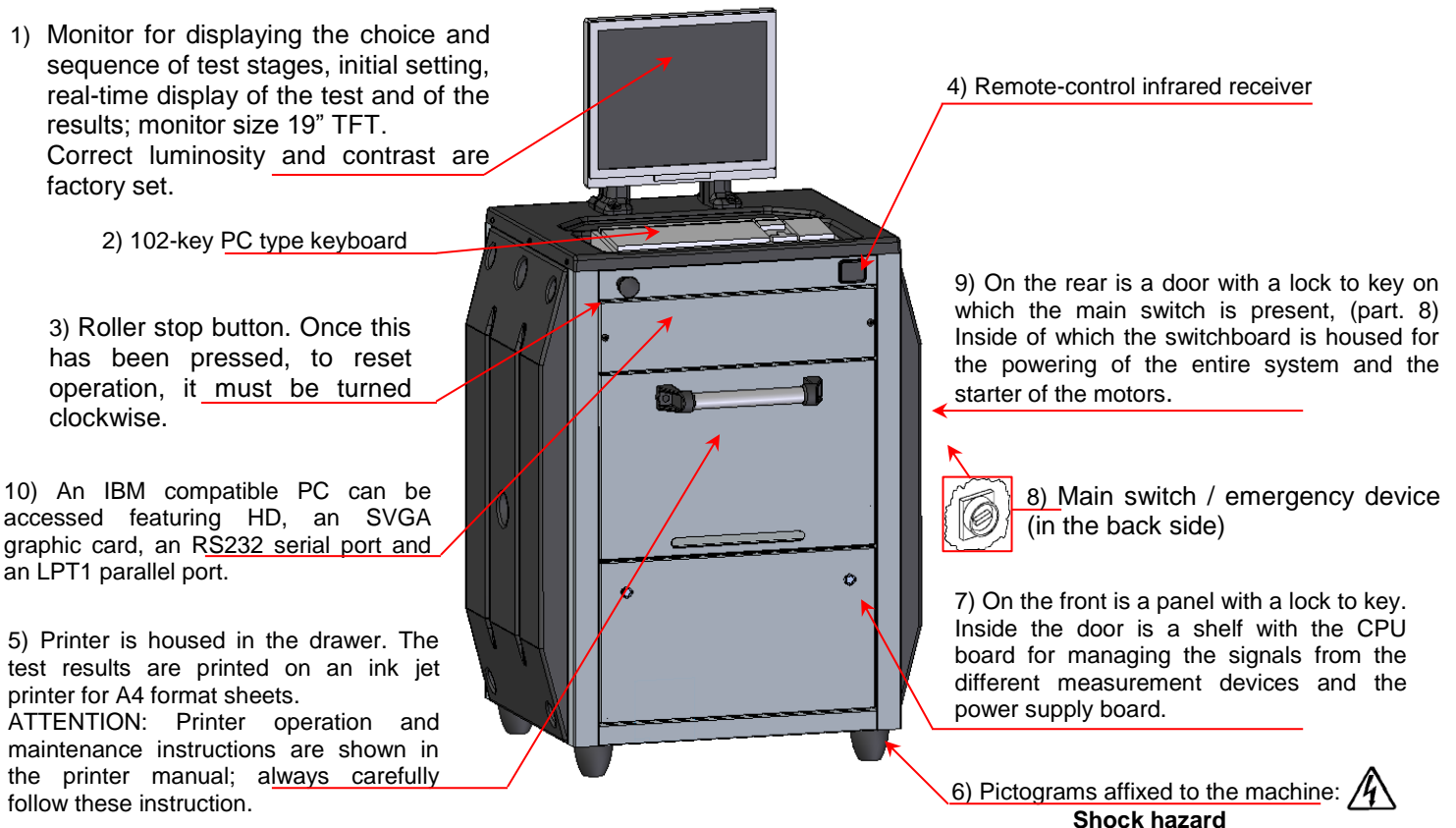
Dimensions	840x855 x50mm
Max carrying capacity per single wheel	10000 daN
Precision	$\pm 1\%$
Weight	60kg

**Figure 11**

## 3.2. Console

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

### 3.2.1. Console PFC451E, PFC501E, PFC602E, PFC400V

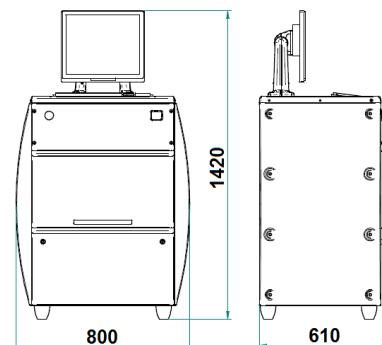


**Figure 12**

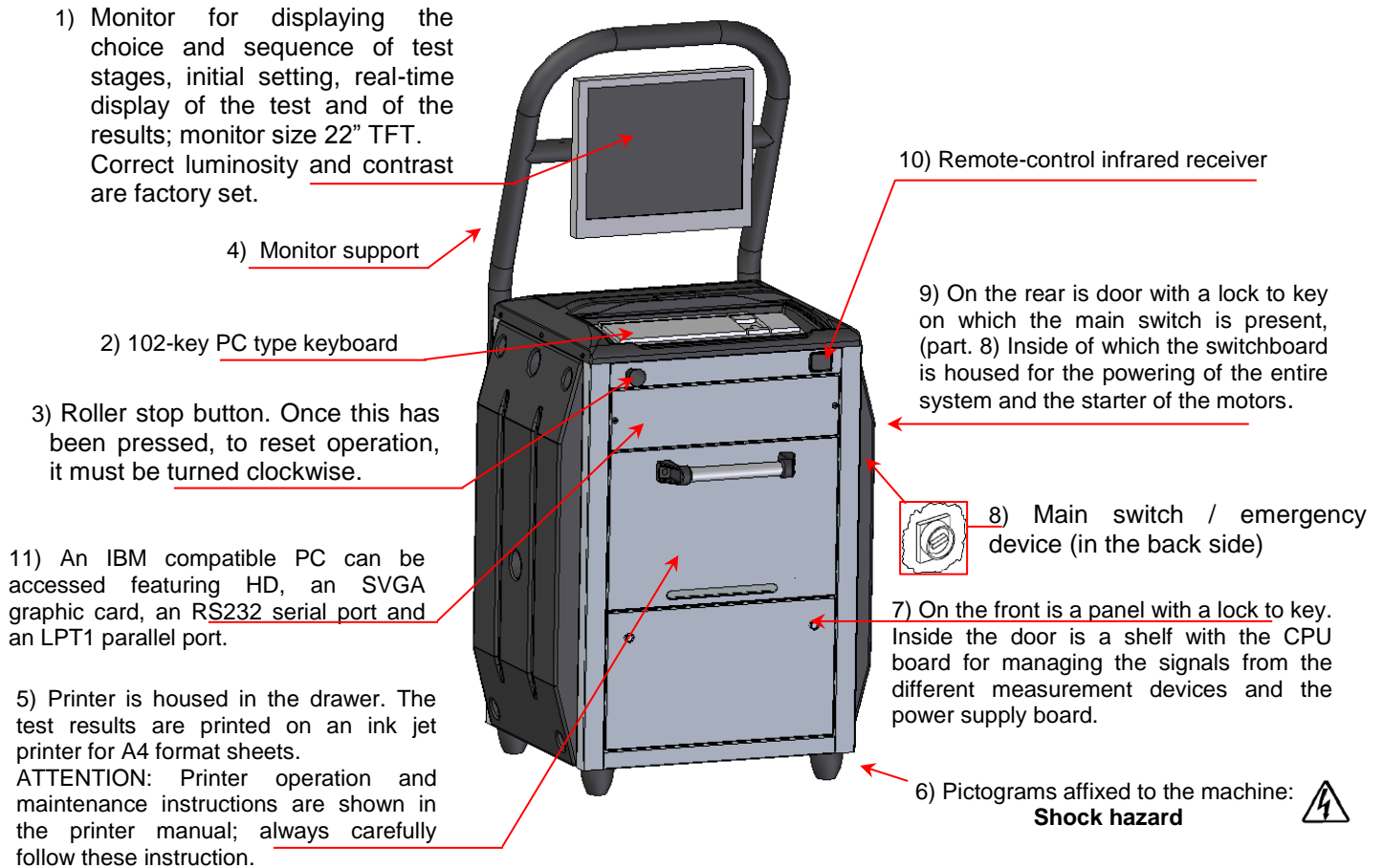
**IMPORTANT!:** The rear door leading to the switchboard and the front panel leading to the CPU board and power board can only be opened by authorised personnel; these compartments contain high-voltage components which can prove hazardous to unskilled operators.



TECHNICAL DETAILS	
Power supply	400V 3ph + N
Weight console	145kg



### 3.2.1. Console PFC452, PFC601E, PFC603E

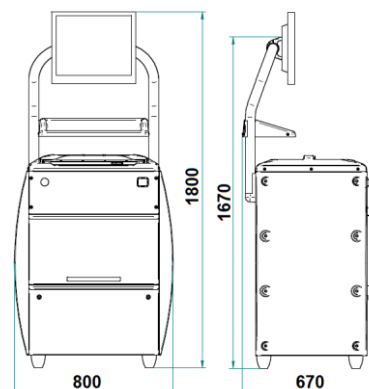


**Figure 13**

**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 authorised personnel; these compartments contain high-voltage components which can prove hazardous to unskilled operators.



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



### 3.2.2. Console PFC603D

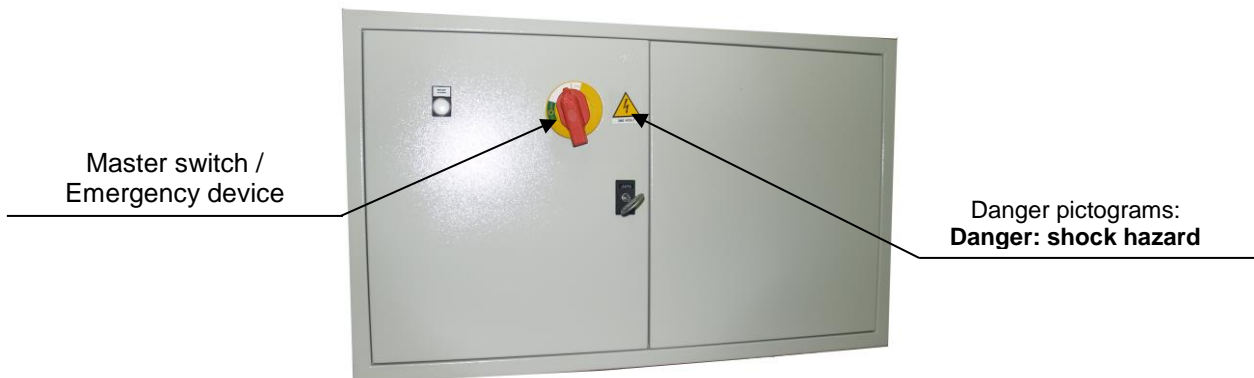
The console PFC603D is composed as follow:

- PC, Monitor and printer (see Figure 14 as example)



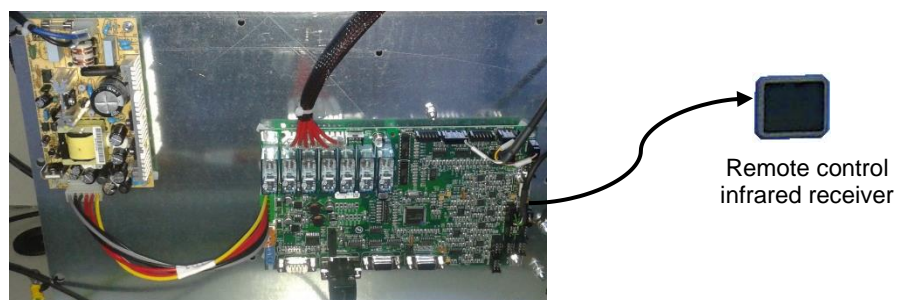
**Figure 14**

- Electric panel (see Figure 15). The electric panel to start the rollers in inside a metallic cabinet with a key lock and on it there is a master switch for the emergency stop.



**Figure 15**

Inside the panel there is the power supply with the mother board (see Figure 16) on which it is connected the infrared receiver that must stay outside, so that the operator who is working with the remote control can see it.

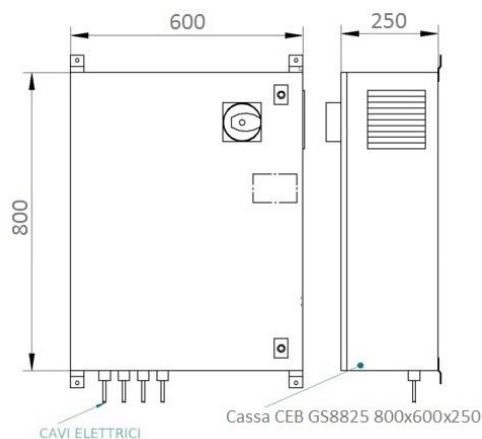


**Figure 16**

### 3.2.1. Console PFC602E/WALL

Space saver control unit wall mounted.

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



**Figura 17**

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



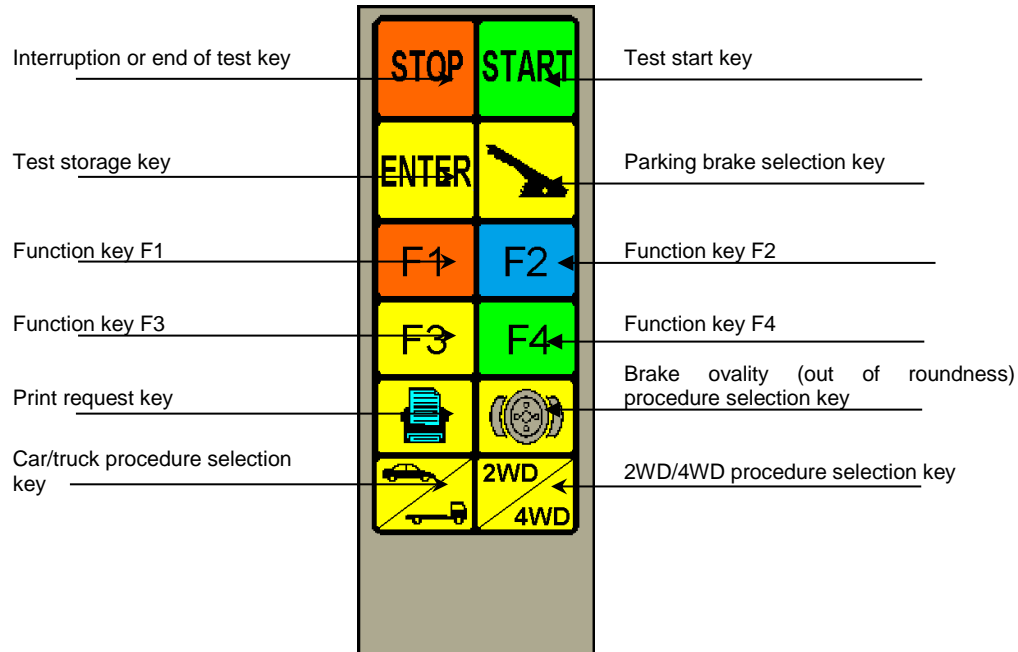
□ TECHNICAL DETAILS	
Power supply	400V 3ph + neutral
Precision	±0,5%
Weight	40 kg



### 3.3. 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 18**

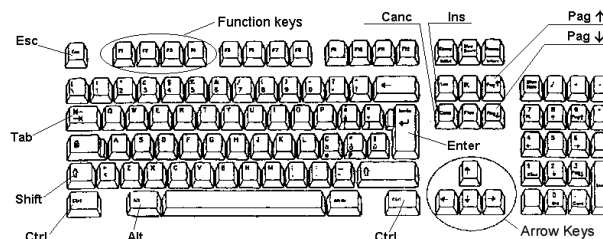
### 3.4. Control keyboard

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 19**

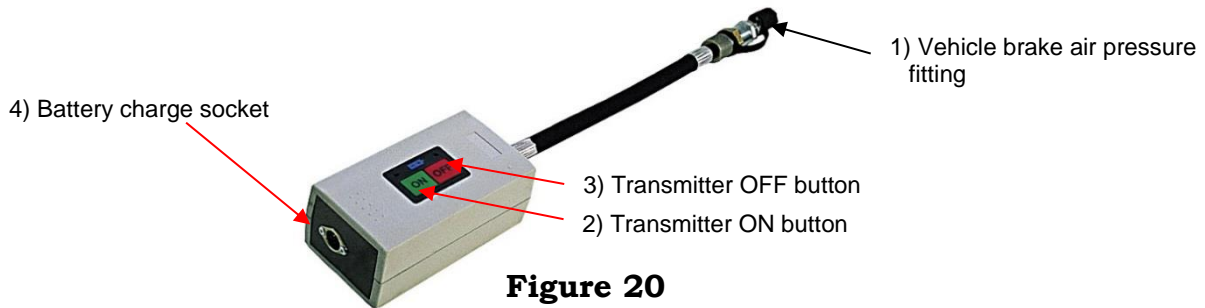
### 3.5. Air pressure meter P1 and P2

An optional Primary Air pressure transducer code SRT051BTH (**P1**) and an optional secondary SRT052BTH (**P2**) are available with Bluetooth 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 20**

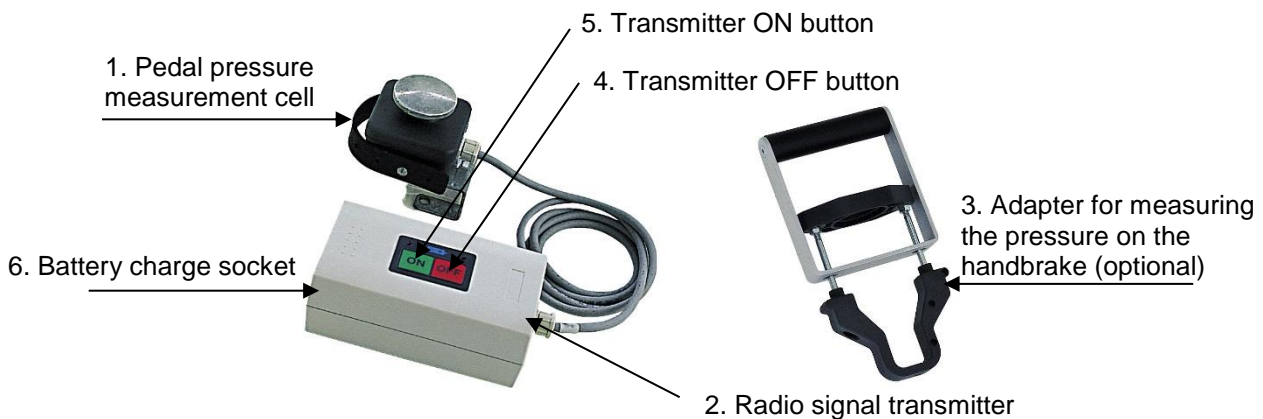
### 3.1. Pressure-meter pedal SRT047BTH

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 21**

### 3.2. Side slip tester (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.

## 4. INSTALLATION OF THE BTS2 SOFTWARE

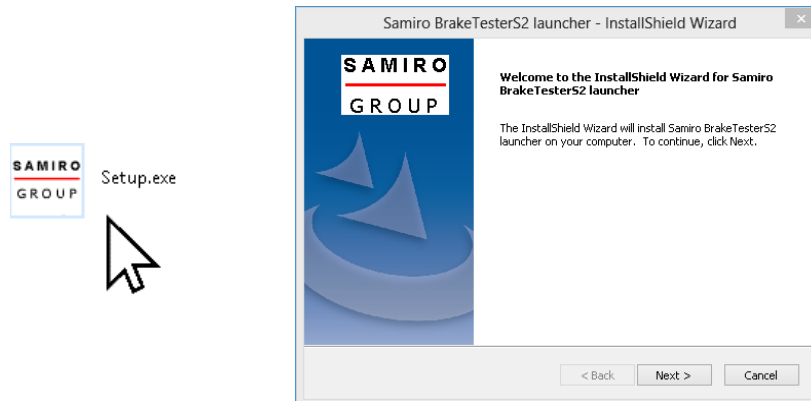
The BTS2 software can be installed on any PC that satisfies the minimum requirements described below:

- 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 Pixel 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.



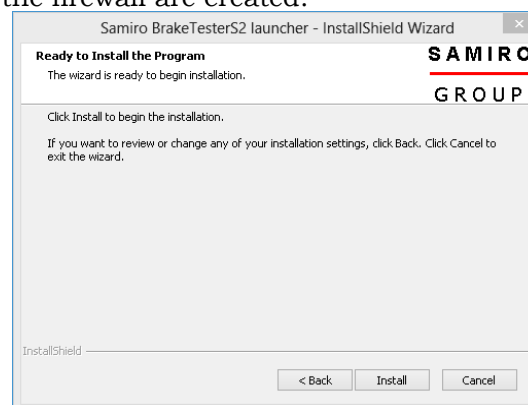
**Figure 22**

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.exe, 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.

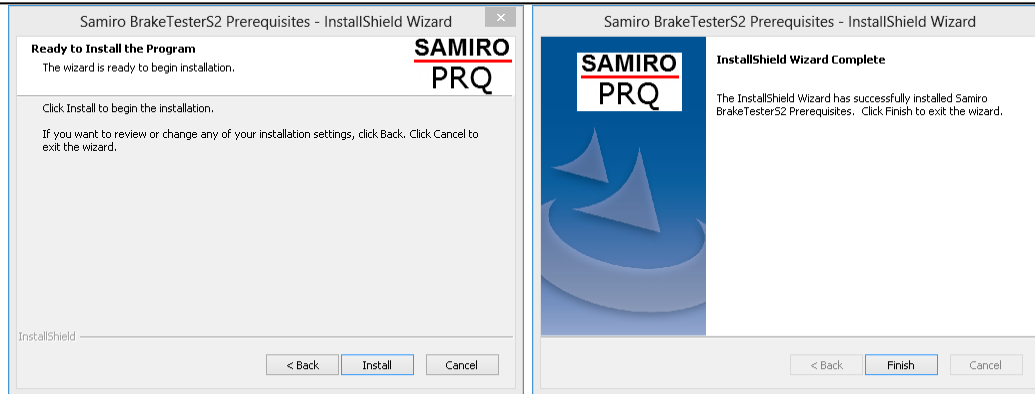


**Figure 23**

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.



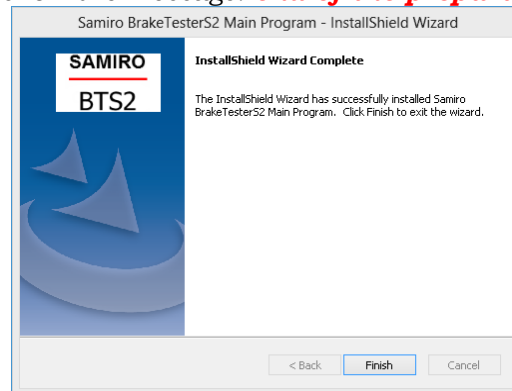
**Figure 24**

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

### 4.3. Part 3: installation of the main software

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

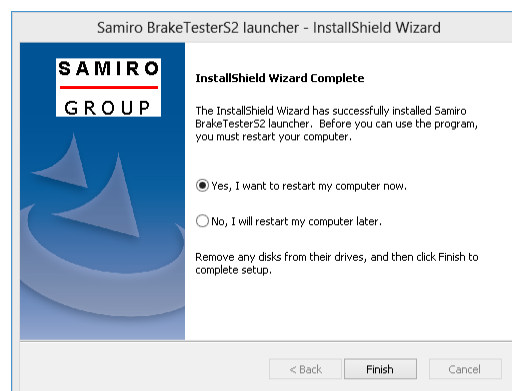
Attention: now the installer show the message: **end of the preparation procedure.**



**Figure 25**

Clicking on “Finish”, the installer starts to copy on the hard disk the primary and secondary files of the software. In the next window the installation mode DIR or RETE (network), see chap. 6 for more details, and the type of roller installed (truck, cars, motorcycle, cars + speed tester and/or suspension tester). *N.B. 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.



**Figure 26**

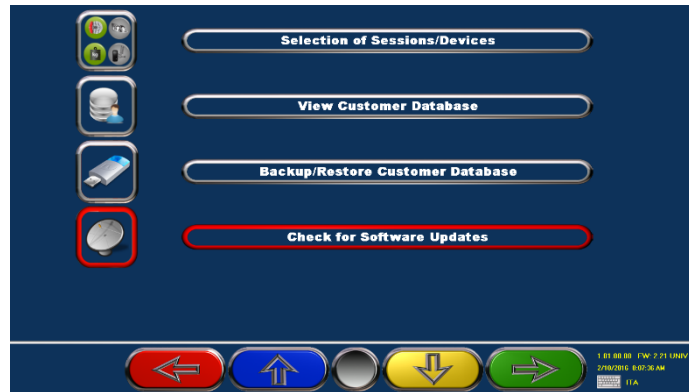
Select “Yes, I will restart my computer now”; the installation is complete and the PC will reboot. The software is modifiable with the option allowed by the Smart Card (see chapter 5.2 for further details).

#### 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:

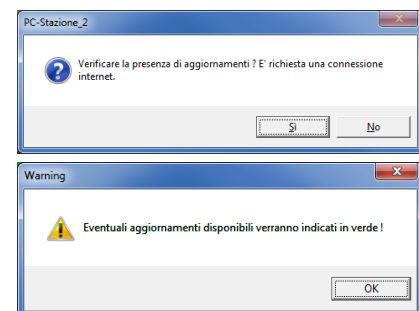
From the main page (logo) as seen in Figure 34 use the key "F3", the menu in Figure 27 will be shown.

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



**Figure 27**

After the confirmation. The software will show the message in Figure 28.



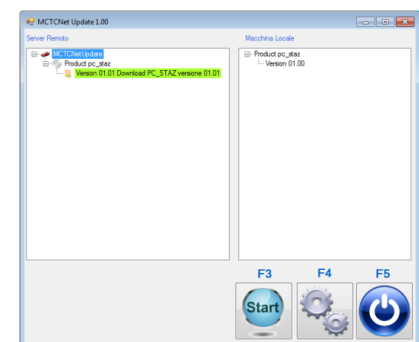
**Figure 28**

At the end of the check, the software will show Figure 29.

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

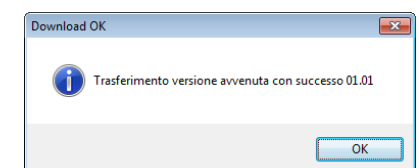
If no update is found, a not highlighted line will be shown.

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



**Figure 29**

At the end of the download, if it's been successful, the software will show the message as Figure 30



**Figure 30**

Pressing the key F4 from the screen in Figure 29, the page in Figure 31, is shown and it is possible to enter the workshop data, the type of connection and save with F2.

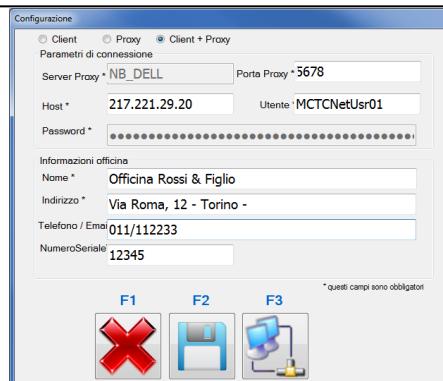
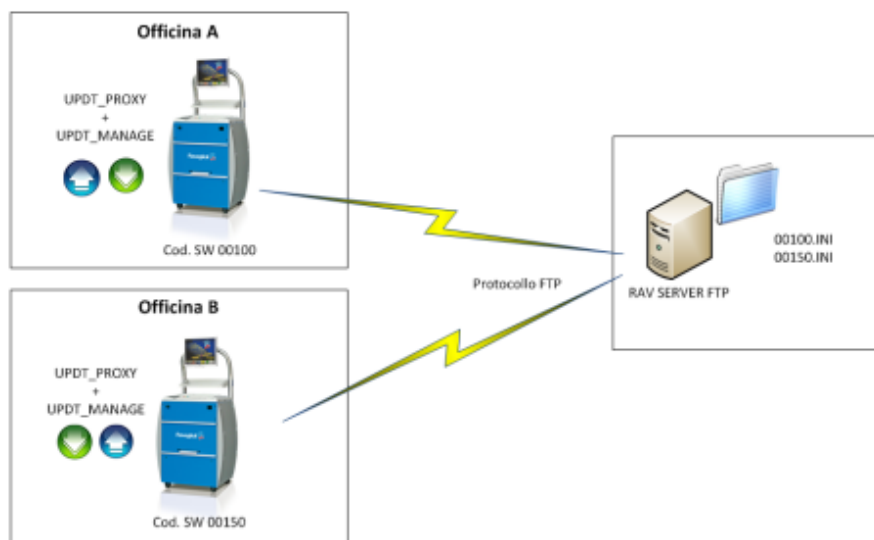


Figure 31

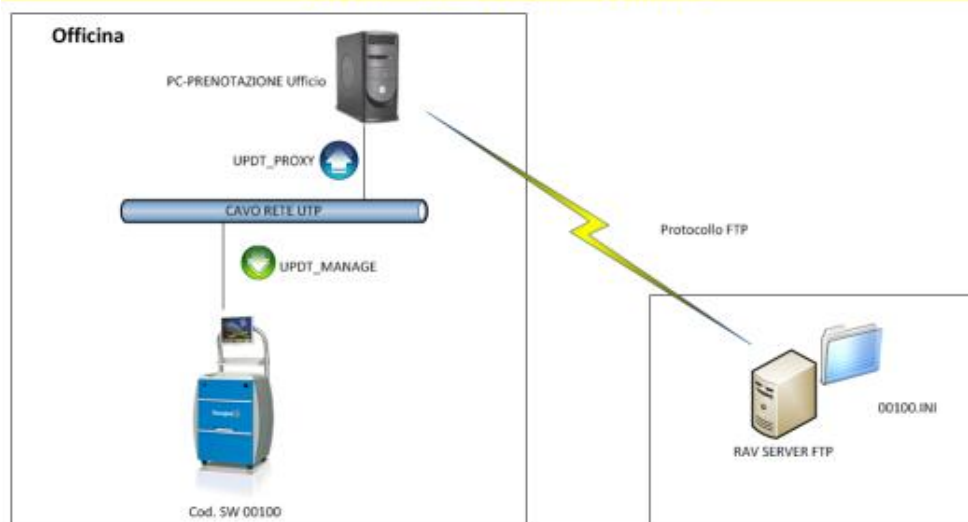
Below are described the two possible connections:

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




15/10/2012

### 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 34 press the key **F5** , it appears the menu in Figure 32.

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**.

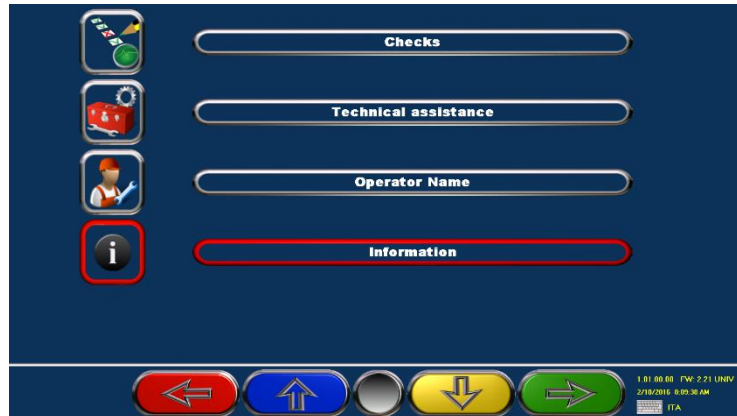
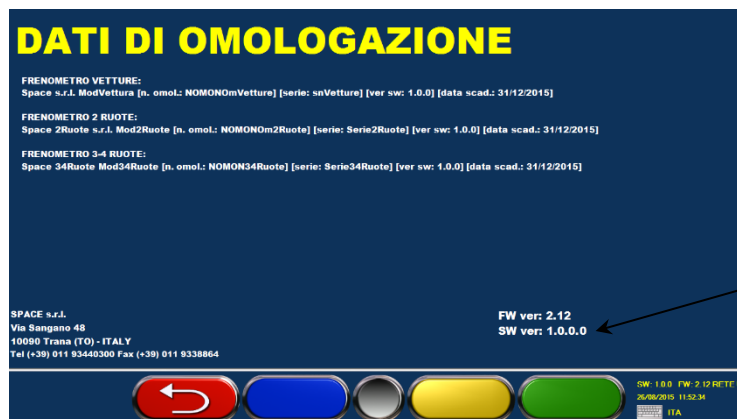


Figure 32

A page appears as in the example in Figure 33 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 33



## 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 34 appears.

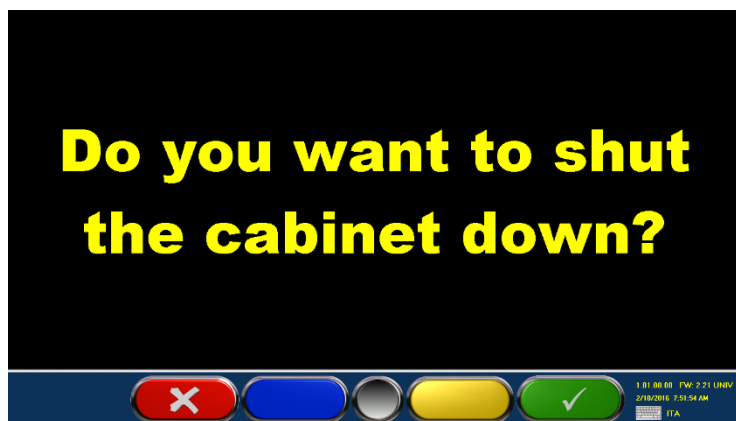
**NOTE:** During operating program loading, do not engage the measurement devices (for example by climbing on the weighing frame), because during this time lapse, the system checks their correct operation.



**Figure 34**







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:

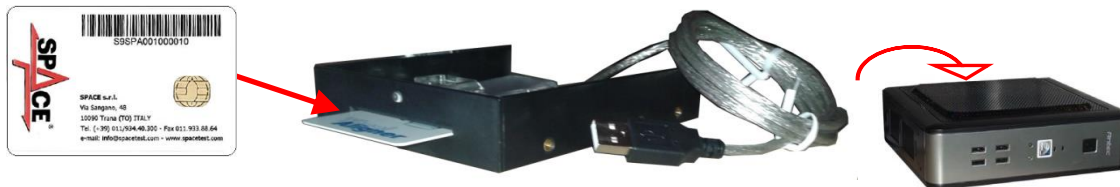


**Figure 35**

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




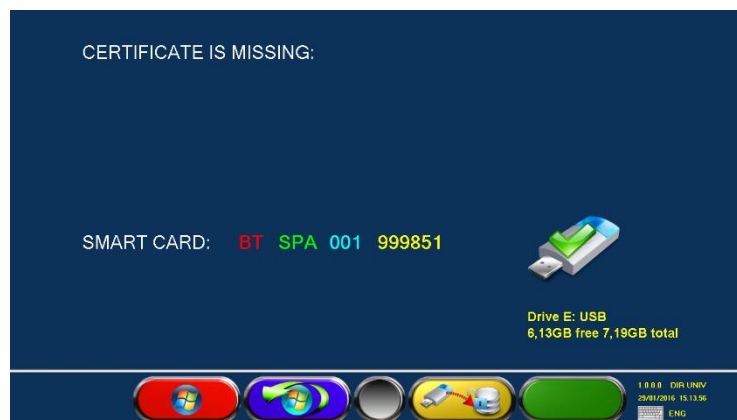
The SPACE brake testers are equipped with a PC with a SMARTCARD reader. The SMARTCARD allows the software functioning and enables the possibility (or not) to activate the various tests (see par 5.3.2).

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 36 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 36**

### 5.3. Program configuration

To configure the program, select key **F2**  on the presentation page, as explained in Figure 34 at page 31.

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

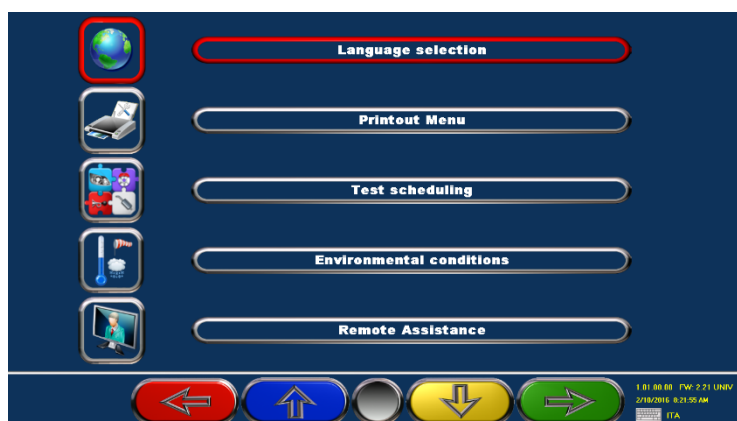















Figure 37

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Back to the presentation page (par. 5.1 at page 31)
			Move up the selection.
			Move down the selection.
			Confirm the selection.

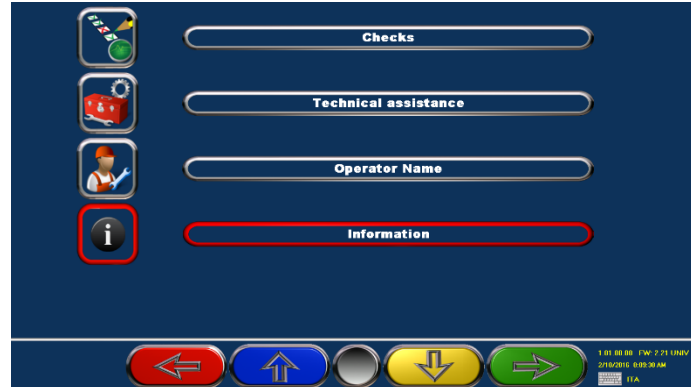
### 5.3.1. Inspections (Checks)

#### □ 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 34).  
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**.

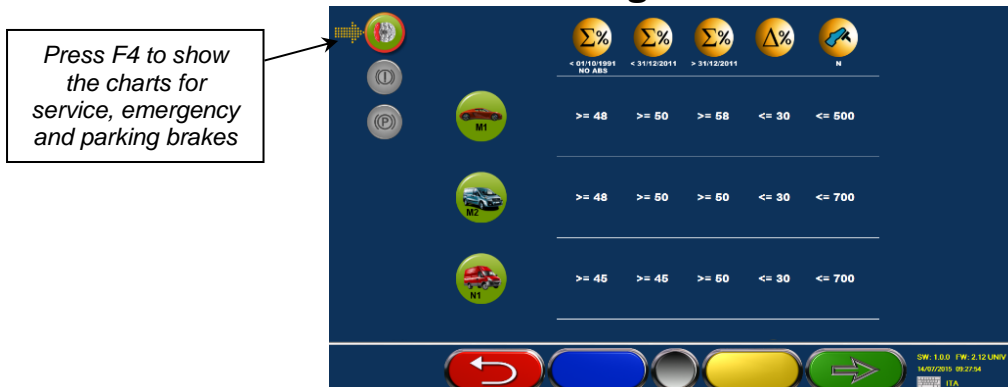


**Figure 38**

If the program is set to work with both cars and trucks, it is necessary to select with the keys **F2/F3** the correct chart, then confirm with **F4**: a chart appears with the efficiency and unbalance thresholds (see Figure 40).




**Figure 39**



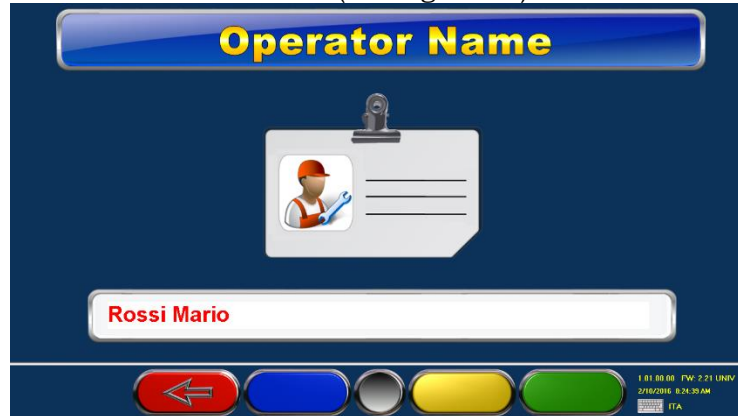
**Figure 40**

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

## ❑ OPERATOR NAME

Press **F5**  from the main page (Figure 34).


Select with “**F2/F3**” the menu “**User name**” (see Figure 38) and confirm with **ENTER/F4**.



**Figure 41**

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 34).

Select with “**F2/F3**” the menu “**Calibration check**” (see Figure 38) and confirm with **ENTER/F4**.



**Figure 42**

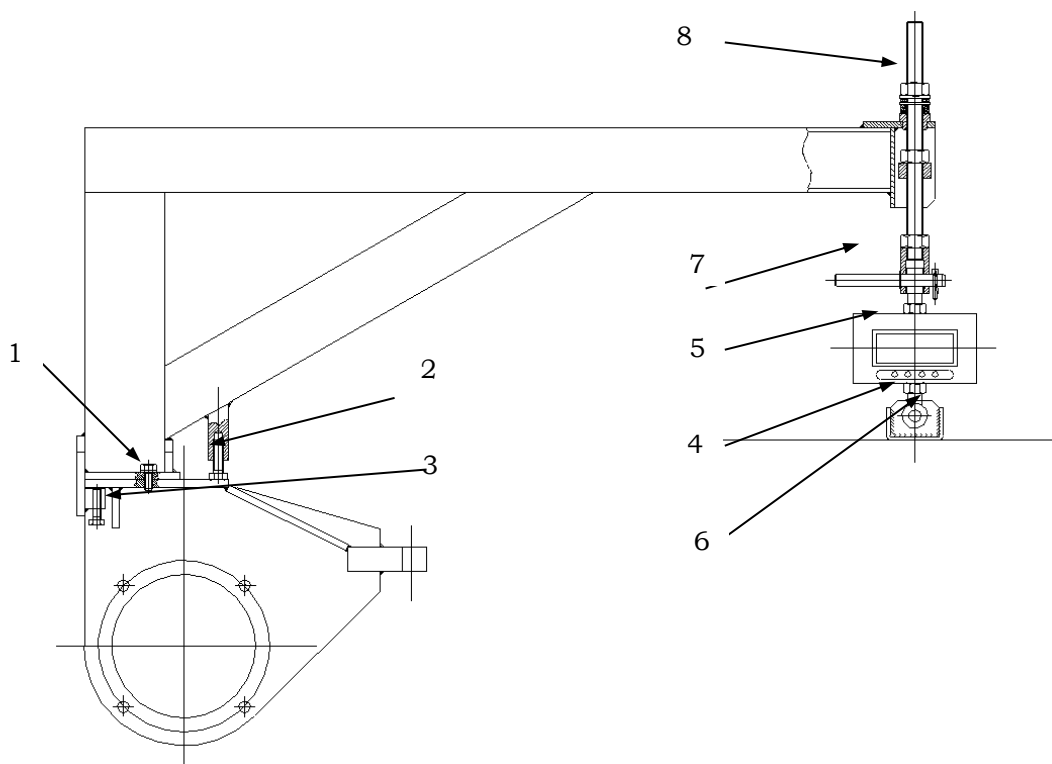
The calibration is reserved to authorized SPACE S.R.L. personnel, the operator can only check the calibration, in this session only checks are made; the calibration saved in the program WILL NOT CHANGE.

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

Below is shown how to mount the calibration devices.

## How to mount the calibration bar for braking effort TRUCK mode

1. Mount the calibration bar as show in the figure, putting the screw ref. 1 without tighten.
2. Put the screws ref. 2 and 3, until they touch the stirrup of the gearmotor.
3. Mount the U-shaped iron ref. 4 on the frame putting two screws M10.
4. Mount the dynamometer ref. 5 (full scale 600 Kg), fixing it between the frame and the bar with the special pins ref. 6 and 7.
5. Turn the dynamometer on and adjust the bar tightening the nut on the threaded rod ref. 8 with a 30 spanner. The dynamometer will show the value in Kg of the force that strain it: loosen the tension until the dynamometer will show 0Kg.



PFK561		PFK562	
Braking force (daN)	Corresponding value on the dynamometer (Kg)	Braking force (daN)	Corresponding value on the dynamometer (Kg)
0	0	0	0
800 $\pm 2\%$ (20% F.S)	100,5	910 $\pm 2\%$ (20% F.S)	114,3
2000 $\pm 2\%$ (50% F.S)	251,2	2275 $\pm 2\%$ (50% F.S)	285,7
3000 (calibration value)	376,7	3000 (calibration value)	376,7
3200 $\pm 2\%$ (80% F.S)	401,9	3640 $\pm 2\%$ (80% F.S)	457,1
4000 (F.S.)	502,3	4550 (F.S.)	571,4

PFK561L / PFK563DL		PFK563	
Braking force (daN)	Corresponding value on the dynamometer (Kg)	Braking force (daN)	Corresponding value on the dynamometer (Kg)
0	0	0	0
800 $\pm 2\%$ (20% F.S)	107,6	700 $\pm 2\%$ (20% F.S)	106,7
2000 $\pm 2\%$ (50% F.S)	269,0	1750 $\pm 2\%$ (50% F.S)	266,9
3000 (calibration value)	403,5	2800 $\pm 2\%$ (80% F.S)	427,0
3200 $\pm 2\%$ (80% F.S)	430,4	3000 (calibration value)	457,5
4000 (F.S.)	538,0	3500 (F.S.)	533,7

### PFB100 – PFB150 – PFB200

Braking force (daN)	Corresponding value on the dynamometer (Kg)
4000	502,3
3000	376,7
2000	251,2
1000	125,6

### PFB200L

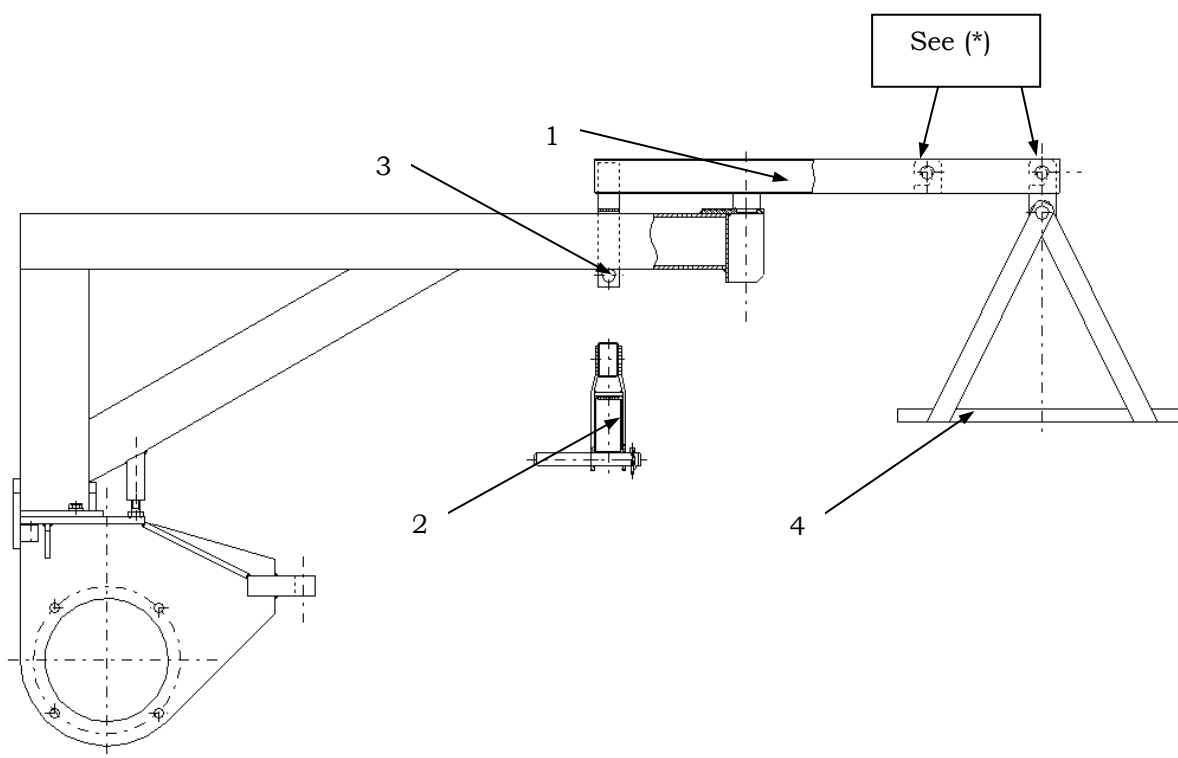
Braking force (daN)	Corresponding value on the dynamometer (Kg)
4000	538,0
3000	403,5
2000	269,0
1000	134,5

### PFB715

Braking force (daN)	Corresponding value on the dynamometer (Kg)
4000	610,0
3000	457,5
2000	305,0
1000	152,5

### How to mount the calibration bar for braking effort CAR mode

1. Mount the calibration bar as shown in the figure; the extension (ref. 1) must be fixed with the pin (ref. 2) in the special hole in the fork (ref. 3).
2. Hook the basket (ref. 4) on the bar without any weight.
3. Put the weight in the basket. Every weight is 10 Kg, meaning 100 daN of braking force.

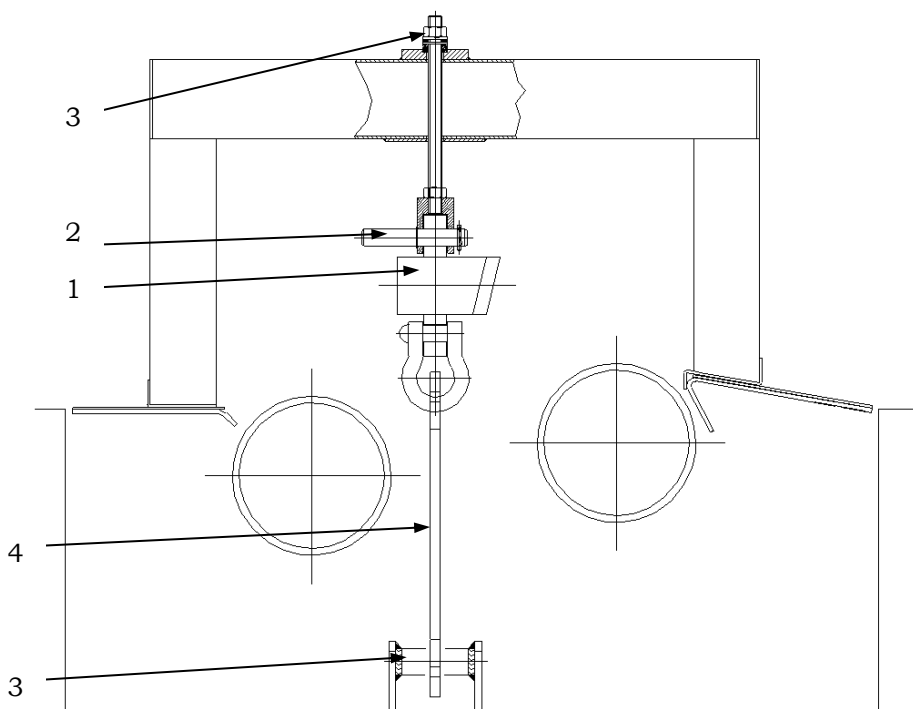


(\*) **models PFB200L - PFB201L** Hook the basket in the INNERMOST hole  
**models PFB715 - PFB716** Hook the basket in the OUTERMOST hole

## How to mount the calibration tool for the weight force


1. Remove the idle roller from the rollers frame.
2. Put the calibration tool on the roller bench, as shown in the figure below.
3. Mount the dynamometer ref. 1 (full scale 6300kg), using the special pin ref. 2.
4. Fix it on the pin sealed in concrete ref. 3, with the hooking bar ref. 4.
5. Turn the dynamometer on and adjust the bar tightening the nut on the threaded rod ref. 5, with a 30 spanner. The dynamometer will show the value in Kg of the force that strain it: loosen the tension until the dynamometer will show 0Kg.

N.B. Every Kg shown by the dynamometer means 9,81 N of weight force.





## PRINT CALIBRATION REPORT

Press **F5**  from the main page (Figure 34).

Select with “**F2/F3**” the menu “**Calibration Check**” (see Figure 38) 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.




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

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

Calibration Certificate						
Brake tester data						
Manufacturer ..... RAVAGLIOLI S.p.A.						
Model ..... RAV RT 102N						
Serial Number ..... 00422						
Homologation number ..... OM003221						
Date of expiry calibration ..... 31/12/2015						
<b>LH Brake effort</b>						
(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
<b>Checks</b>						
(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	
<b>RH Brake effort</b>						
(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
<b>Checks</b>						
(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	
<b>LH Weight</b>						
(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
<b>Checks</b>						
(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	
<b>RH Weight</b>						
(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
<b>Checks</b>						
(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	
<b>Side Slip</b>						
(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
<b>Checks</b>						
(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 31). The system will display Figure 37. With the key **F2** move on the icon  « **TEST SCHEDULING**» and press **ENTER/F4** to display Figure 43.

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 cap.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.

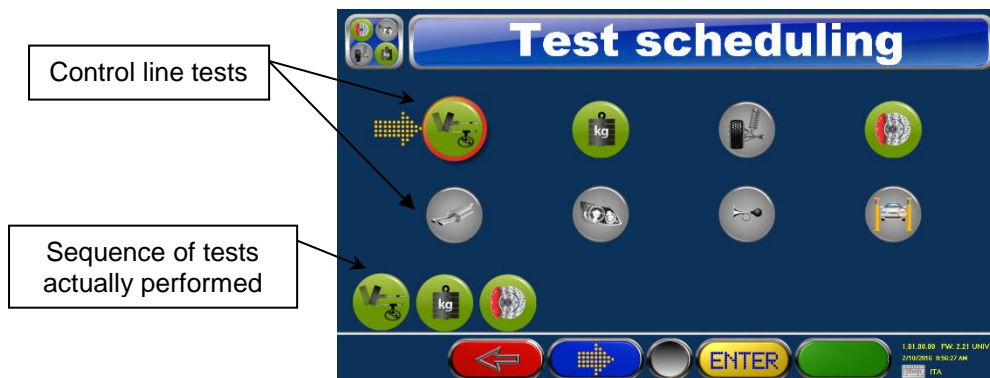













Figure 43

	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 37).

### 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 44), move to the environmental condition icon using key “F2” and press ENTER/F4 to confirm.



Figure 44

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.

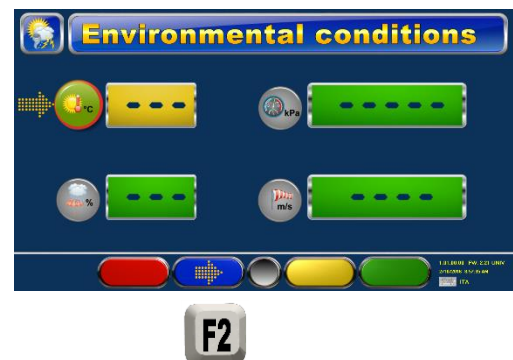


Figure 45

#### 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 range.**

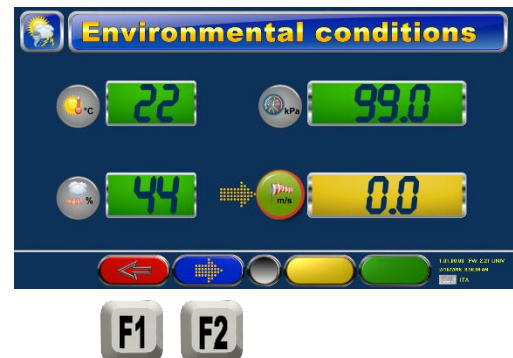


Figure 46

## 6. MCTCNet 2 PROGRAM

### (only for cars with compatible roller benches PFK563/PFK563DL)

Referring to “Ministerial Circular no. 6247/698/99 of the 16/11/1999, par. 2.1 “*Collegamenti tra le componenti del Sistema*” (T.N.: “System components connections”) and 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;
- The configuration “**DIR**” where the software module to manage the brake cycle is installed directly on the PC Station.

### 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 47 appears.



**Figure 47**

Press START/F4, appears the list of the reservations approved by the PC Station. See Figure 48. Move the pointer on the requested vehicle with F2/F3.



**Figure 48**

---

Now the program is ready to start the tests.

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

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

See the chapters below for more information.

At the end the page in Figure 89 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 48, 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. TRUCK MEASUREMENTS CYCLE

### 7.1. Data entry

#### 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 34), appears, press **F3**: the list of available tests will appear (see example Figure 76).

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.

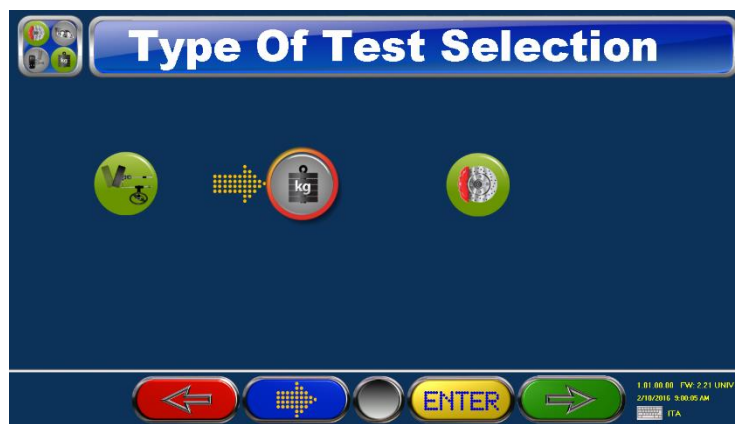


Figure 49

#### 7.1.2. Choosing the vehicle type

After the selection of the specific tests to be performed, if the roller bench is compatible for both cars and trucks, it is required to choose the type of vehicle in test.

With the remote control or with the keys **F2/F3** on the keyboard, select the type of vehicle to be tested and confirm with **F4**; press **F1** to come back to the previous page.

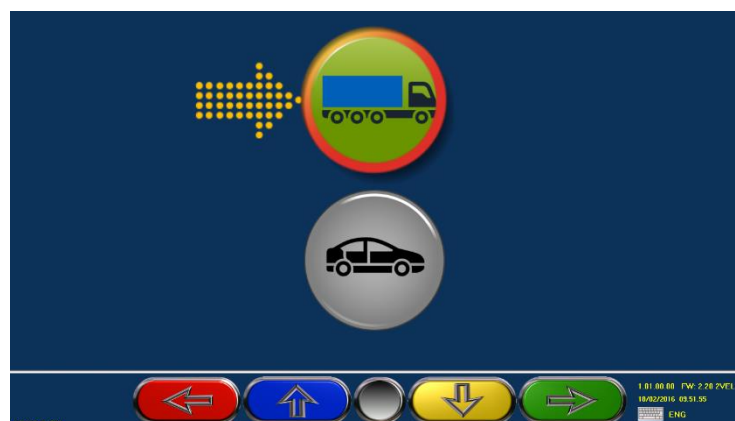


Figure 50



### 7.1.3. Choosing the vehicle category and entering the weight







After choosing the test to be executed (par. 7.1.1) and the type of vehicle (par. 7.1.2) the category of the vehicle is requested. Using the **F3** key, move the pointer on the category of the vehicle; using F5, select its sub-category.

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



**Figure 51**

Legend of Figure 51:

VEHICLE CATEGORY	DESCRIPTION
	Autobus with total mass FROM 35q TO 50q.
	Autobus with total mass GREATER THAN 50q.
	Truck for freight transport with total mass FROM 35q TO 12q
	Truck for freight transport with a total mass GREATER THAN 120q
	Trailers with total mass FROM 35q TO 100q
	Trailers with total mass GREATER THAN 100q

If the vehicle is equipped with a trailer, its category must be selected as well: with the **F3** key select the type of trailer and press **F5** to select the right sub-category (for example, previous or successive than 31/12/2011).

After the right category is selected, press F2 to go on the next window and enter the vehicle weight.

Enter the weight of the truck fully loaded to calculate the braking efficiency. If the vehicle is equipped for pulling trailers, enter also the total maximum mass authorized.

Enter the vehicle weight and press **F3** to go on the next panel and enter the trailer weight (if needed).

ATTENTION: the braking efficiency calculation with the “forces extrapolation” method is possible only if the brake tester is equipped with the air pressure meter model SRT051BTH.

To proceed with the normal measurement cycle press **START/F4**; instead, press **F1** to go back to the previous page.



Figure 52

#### 7.1.4. Type of braking system and air pressure reference (pneumatic system type)

After the vehicle full loaded weight and the trailer weight (if needed) have been entered, select the type of braking system:

- HYDRAULIC
- PNEUMATIC
- MIXED: PNEUMOHYDRAULIC

Move the pointer with the **F3** key on the selected icon, press **F5** to select the braking system type.

Enter the type of parking and emergency brake and the air pressure reference, only if the braking system is **PNEUMATIC**.

Press **F3** to select the box and enter the value.

Press **F2** to proceed with the next selections or press **F1** to go back to the previous page.



Figure 53



### 7.1.5. Enter the type of parking and emergency brake

After the type of braking system and, if needed, the air pressure reference have been confirmed, select the type of parking and emergency brake.

Move the pointer with the **F2** key on the upper right window and select the type of parking brake using the **ENTER/F3** key. The icon will change color.

Move on the next window with **F2** and select the emergency brake type with the **F3** key.

Press **F4** to start the measurement cycle. Press **F1** to go back to the previous page.

If the braking system is MIXED, see par. 7.1.6 at page 47.



Figure 54

### 7.1.6. Enter nominal data for the extrapolated braking forces calculation (MIXED braking system)

If the vehicle has a MIXED pneumohydraulic braking system, after the entering of the parking and emergency brake type, the nominal data for the extrapolated braking forces calculation must be entered, for both the tractor and the possible trailer.

Move the pointer with **F2** on the selected icon, press **ENTER/F3** to enter the values and confirm them. Press **START/F4** to proceed with the measurement cycle.



Figure 55

## 7.2. Automatic OFFSET check

When the START button is pressed, before the brake procedure starts, the program will show an ATTENTION message to signal the automatic setting of the offset.

The check of the zero of all the devices (weighing system and brake tester) is executed at the beginning and at the end of every vehicle test and it must be done **WITHOUT ANY VEHICLE ON THE ROLLERS**. The system shows the following page:



Figure 56

The program starts checking that the values from the channels weight and brake meet the threshold

$$\text{BRAKING FORCE} \leq 100\text{daN (daN)} - \text{WEIGHT (daN)} \leq 150\text{daN}$$

If the values are not correct a message is shown as the following example

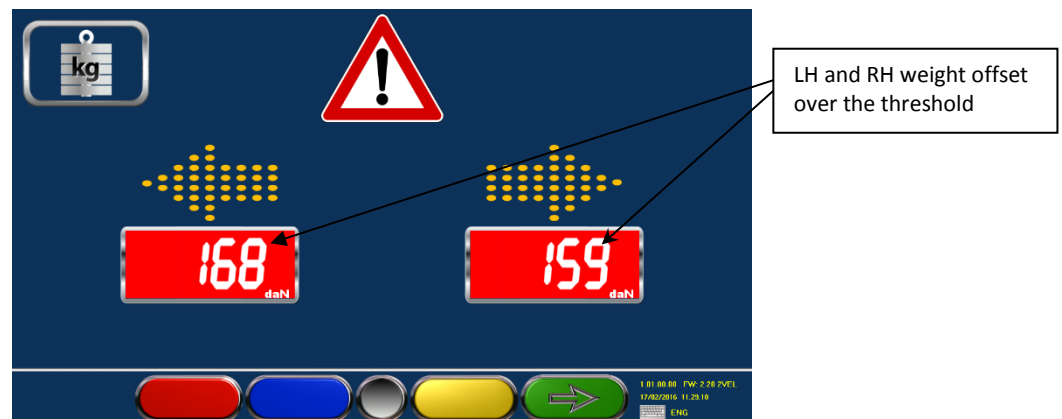


Figure 57

In this case, is advisable to try to remove the error cause (for example, remove the vehicle from above the rollers) and start the cycle again.

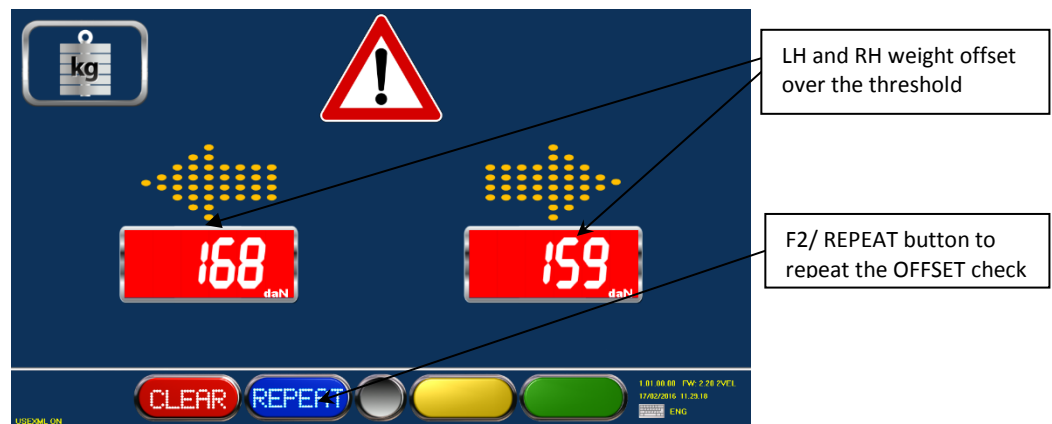
After the weighing system and the brake rollers OFFSET has been checked, the program shows the page of "Automatic check of the measurement chain"; see par. 7.3.

At the END OF THE TEST a new OFFSET check will be PERFORMED. The program will compare the difference between the values stored at the beginning and at the end of the test from the weight and brake channels, meets the threshold:

**BRAKING FORCE  $\leq 40$  (daN) and WEIGHT  $\leq 65$  (daN)** → No message is shown and the print page will appear (see par. 9 at page 68)

**BRAKING FORCE  $> 40\text{daN} < 100\text{daN}$  and WEIGHT  $> 65\text{daN} < 150\text{daN}$**  → an ATTENTION message is shown with the recognized changes; it is possible to continue by pressing START/F4.

**BRAKING FORCA  $\geq 100\text{daN}$  and WEIGHT  $\geq 150\text{daN}$ :** an ERROR message is shown as in Figure 58. IT IS NOT POSSIBLE TO GO ON AND PRODUCE A PRINTOUT REPORT!



**Figure 58**

NOTE: it is possible to repeat the offset trying to remove the cause of the error (for example the vehicle on the rollers) and pressing the F2/REPEAT button. If the error remain, the technical assistance intervention is required to remove the anomaly.  
Press F1/CLEAR to exit.

### 7.3. Automatic measurement chain check

Press the **START/F4** button; the program automatically executes the “AUTO-CHECK” procedure to check the braking forces channels; confirm with **ENTER/F3** and press **START/F4** to check the weight channels.

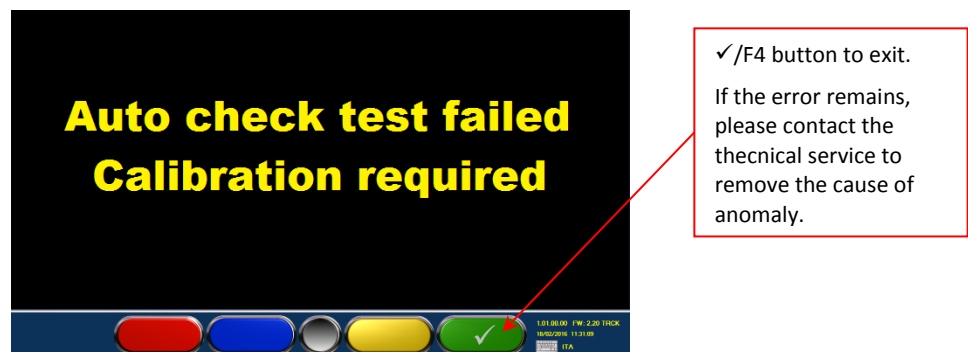
At the end of the AUTO-CHECK, if the test is passed, it is possible to press **ENTER/F3** to go on with the program and execute the braking test procedure, or to press **START/F4** to repeat the “AUTO-CHECK” procedure if the first time it gave a bad result (values shown in red).



**Figure 59**

If the AUTO-CHECK gives a bad result and the values are shown in red, pressing the **ENTER/F3** button the program shows an error message, as shown in Figure 60, that forbids to proceed with the next step.

NOTE: the AUTO-CHECK procedure is executed only once a day; if it is passed, it will be asked again the following day.



**Figure 60**

## 7.4. Side slip test

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 61) 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 pressing 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 pressing 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 61**

## 7.5. 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 62.

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 62**

## 7.6. Maximum air pressure for pneumatic braking system

Select the type of braking system (pneumatic or mixed), enter the nominal values of the vehicle and select the icon NOT FULLY LOADED, connect the P1 air pressure sensor to the braking element of the front axle (be sure that the air tank is loaded).

Press **Start/F4** and completely push in the pedal to notice the maximum pressure. The pressure must be greater than 650kPa.



**Figure 63**

Once the maximum pressure is reached, press the **ENTER/F3** key to confirm.



**Figure 64**

Press **START/F4** to execute the brake test procedure.



## 7.7. Brakes 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. The display page in Figure 63 will appear.

The brake test performs the following measurements:

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

**In the truck brake test** the operator must manually select the **parking brake test**. Before the rollers start, set this test using the button with a handbrake lever icon on the remote control.

The brake tester, if compatible, can also perform the test on permanent four-wheel vehicles: in this step, select the **4WD program** with the **F2** button.

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.



If the braking system is MECANIC, the program shows the following icon



**Figure 65**

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:

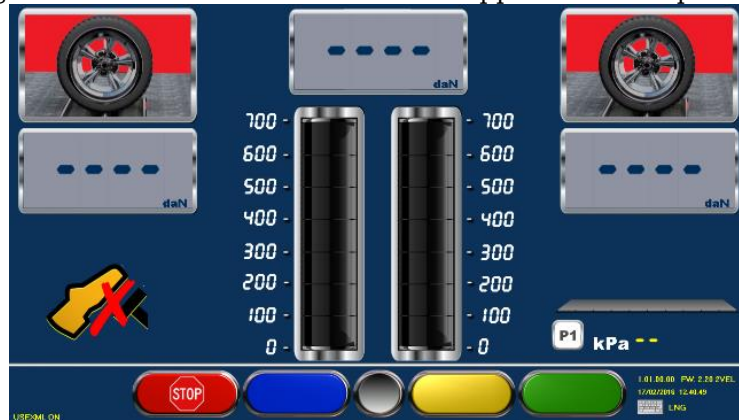
- Slipping of one of the two wheels;
- Stop by the remote control or keyboard from the user, by selecting the keys STOP or F1;
- Reaching of threshold difference in 4WD mode;
- Reaching of the maximum pressure on the pedal or on the handbrake lever.

In this case, the value of the pressure on the pedal is equal to the maximum braking force reached before and to the force value set. The value is highlighted in red.

## □ Wheel drag, brake heating

When the rollers start, **DO NOT BRAKE!** as shown in Figure 66.

Wait for the reading “PORCEED WITH THE BRAKE” to appear for a couple of seconds.



**Figure 66**

The upper outer panels show the values of the right and left wheels (see Figure 67) and show the force needed to drag the not braked wheels (drag resistance).



**Figure 67**

Maintain this value for a moment to let the brake friction elements heat. Release the brake pedal and observe the force values on the digital and analogical gauge: evaluated if there is an immediate return to the minimum values, corresponding to rolling force.



## □ Brake ovality or out of roundness

Operate the brake pedal until a pressure reading of 150-200 daN is shown on the indicators; then press the ovality button (**F2**); on the left side of the screen the ovality procedure symbol will appear (see Figure 68): maintain the same pressure on the brake pedal throughout (the ovality procedure must be at least 6 seconds).



**Figure 68**

During this stage, the screen shows the absolute value of the braking pressure swing due to disc ovality or drum out-of-roundness. Only at the end of the braking (on final summary and printout) this swing will be shown as the percentage related to the maximum braking pressure.

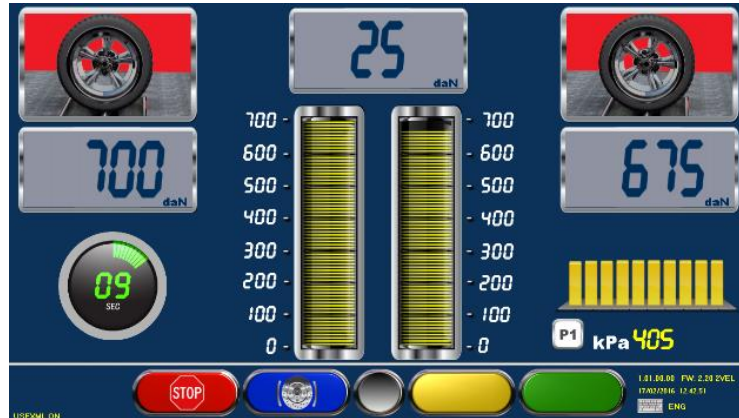
After 6 seconds, press again the ovality button (F2) and release the brake pedal, as suggested by the icon on the left of the screen (see Figure 69). When the icon disappear, the system is ready to analyze a braking progression.



**Figure 69**

## □ Braking progression, unbalance calculation and braking efficiency

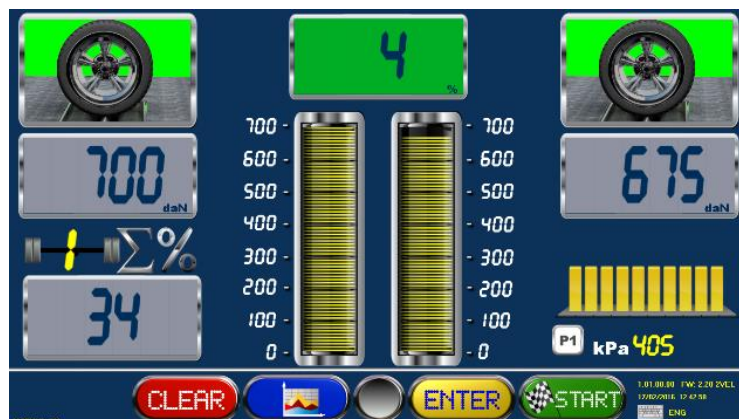
Slowly and gradually operate the brake pedal, observe the braking force and pedal pressure readings on the analog and digital indicators and assess their simultaneous progression. See Figure 70.



**Figure 70**

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.

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

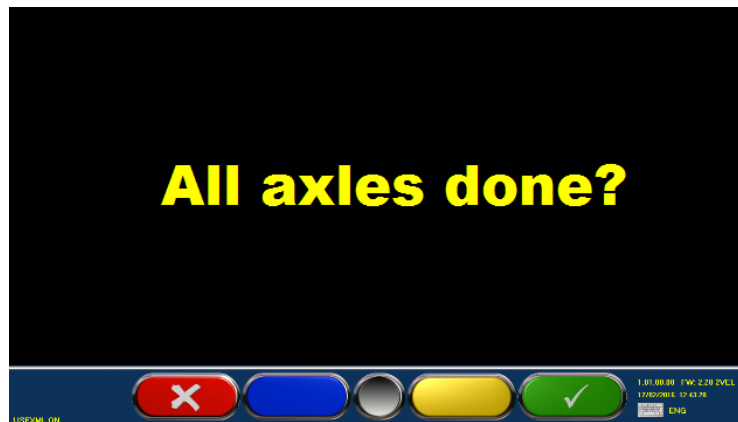


**Figure 71**

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 71. If the operator considers the braking acceptable, it is possible to store it with the key **ENTER/F3**, or pressing the key **START/F4** it is possible to restart the rollers and repeat the test.

In the truck program, when the brakes of all the axles have been tested and the vehicle is out of the rollers, press **F1**, the page in Figure 72 appears and then press **F4**.

At the end of the brakes procedure of all the axles, when the final summary is shown (see Figure 75), the system can evaluate the % of braking efficiency of the service brakes and of the parking brake.

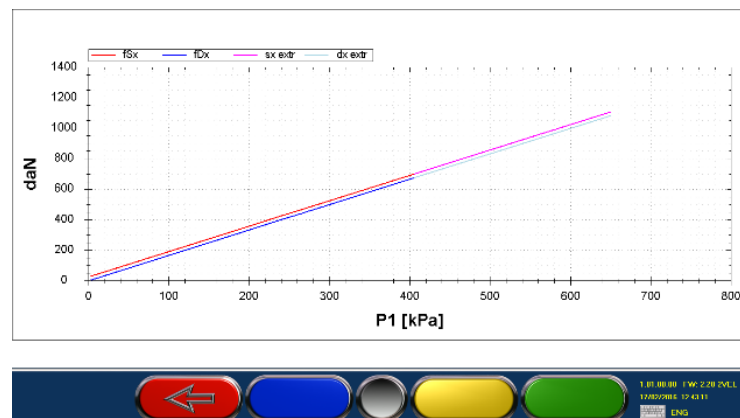


**Figure 72**

**ATTENTION!:** When the analysis of the axle in test is completed, to go on with the next move the axle out of the rollers. If the axle on the rollers is the drive axle and the brake tester motors are not self-braking, the exit can be aided by starting the rollers with the key **START/F4**.

#### □ 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 73**

The x - axis shows the left and right braking forces, while the y - axis shows the pressure applied (see Figure 73).

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 30 - 40daN).

#### □ Excessive rolling warning

At the end of the axle braking procedure, the program shows a warning of excessive rolling if the detected value is not less than the set threshold of 4% of the axle weight (see the example in Figure 74).



**Figure 74**

Press the **F1** key to exit the excessive rolling warning page.

Now it is possible to repeat the braking procedure or save the one just done remembering that the rolling value will be out of tolerance.

### □ Display of the final summary

After storing all the axle tests and after disengaging the rollers, press F1 to see the final summary page (see Figura 30) and the summary page for the tractor emergency brake and of the trailer (see Figura 31).

Confirm the selection with the key ENTER/F3.



**Figure 75**

**NOTE:** Press the key F8 on the PC keyboard to see the final summary page in every moment of the test.

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 % total braking efficiency values (symbol  $\varepsilon$ ) of the service, emergency and parking brakes 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 value of maximum left and right braking force, left and right ovality and the axles weight are always shown in BLUE (their result is not subject to confirmation with tolerance threshold).

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 more axles. Press the F4 key to show the axle summary display and to repeat the test.

Press the F1 button to exit and go back to the page in Figure 75.

## 8. CARS MEASUREMENT CYCLE

### 8.1. Data entry

ATTENTION: If the software is set to work in MCTC-Net, the type of test and all the identification data of the vehicle, shown below, are not changeable: it is only possible to confirm the selection pressing F4.

#### 8.1.1. Select the type of test

If a complete measurements cycle is not required, but a single test is needed, from the main page (Figure 34), press F3: a list of the available test appears (see for example Figure 76).

Select with **ENTER/F3** the test required; the icon became green. Press **START/F4** to start the test. During the cycle is always possible to press STOP/F1 (then START/F4 to confirm) to abort the test.

Press ESC on the keyboard (then START/F4 to confirm) to abort the entire measurement cycle and go back to the main page.

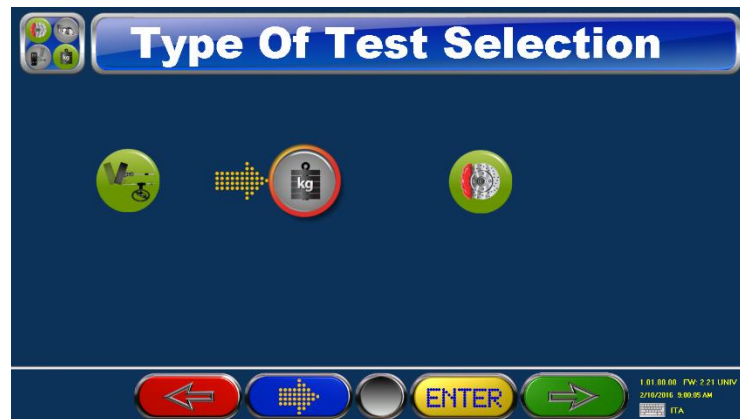



Figure 76

#### 8.1.2. Select the vehicle category


Press the F4 key to start a measurement cycle: it appears the page in which enter the vehicle category and its peculiar data.




Figure 77


Select the vehicle category, M1, M2 or N1, moving the pointer with the F3 key on the required category and press Enter : the selected 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 78**

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 / .

## 8.2. 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 79) 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 79**

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

### 8.3. 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 80.

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 80

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



## 8.4. 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 81 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.

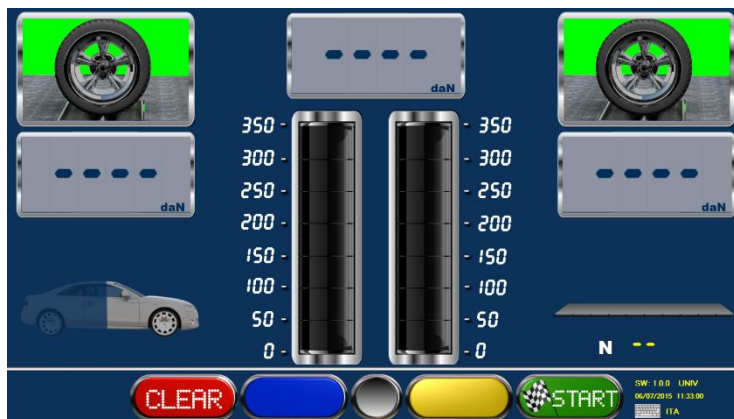
The **parking brake test** is normally performed after testing the service brake of the rear axle and is therefore automatically required by the system after this stage. The operator can however manually select the parking brake test on the front axle as well before starting the rollers, by means of 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 81**

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:

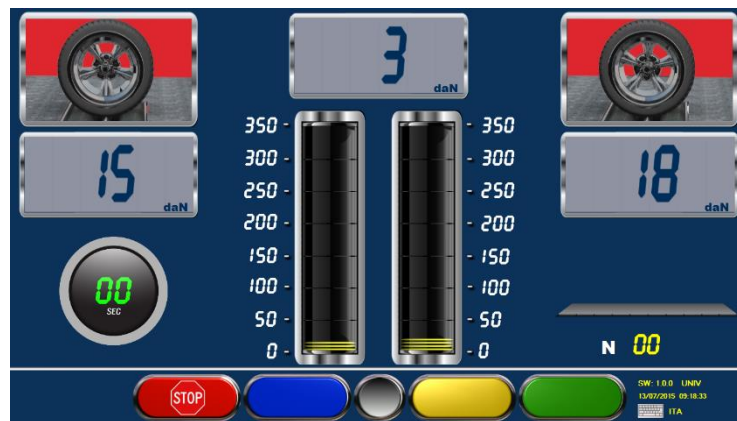
- Slipping of one of the two wheels;
- Stop by the remote control or keyboard from the user, by selecting the keys STOP or F1;
- In 4WD mode, the threshold of “relative slipping” is exceeded;
- Reaching of the maximum effort on the pedal or the handbrake.

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 82) indicate the pressure needed to drag the un-braked wheels (rolling resistance only).

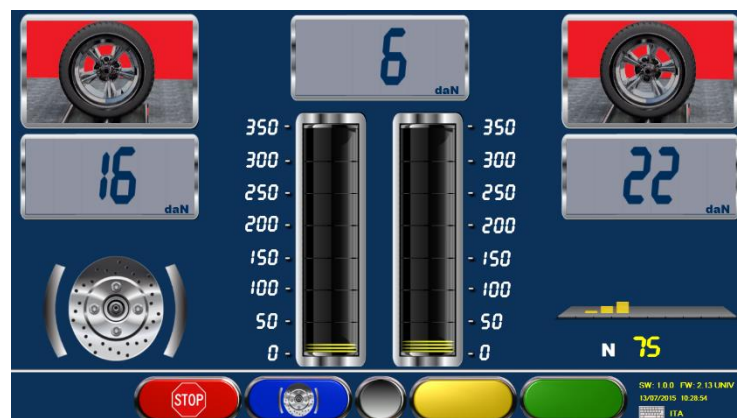
Slowly press the brake pedal until a pressure reading of at least 60-80 daN is displayed on the indicators and maintain this pressure for a few seconds to heat the brake friction elements. Release the brake pedal and observe the pressure readings on the digital and analog indicators, assessing whether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



**Figure 82**

### ❑ 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 83), maintain the same pressure on the brake pedal throughout.



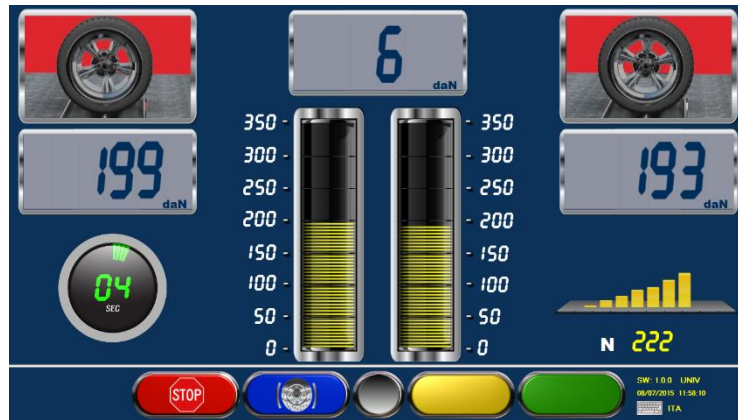
**Figure 83**

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 84.



**Figure 84**

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



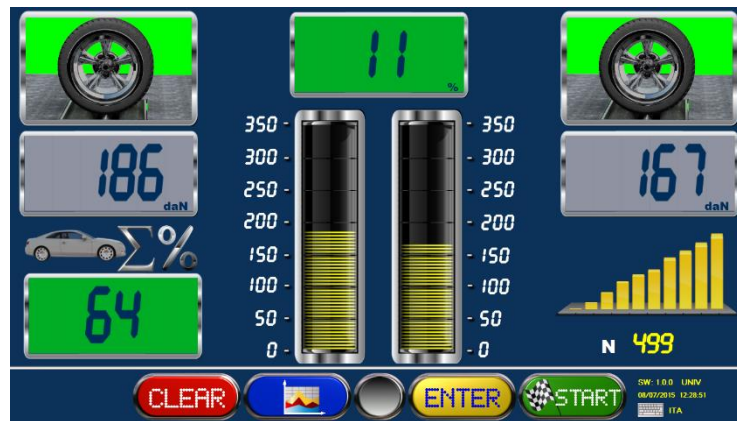
**Figure 85**

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 86.

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 86. 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.

<sup>1</sup> 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.

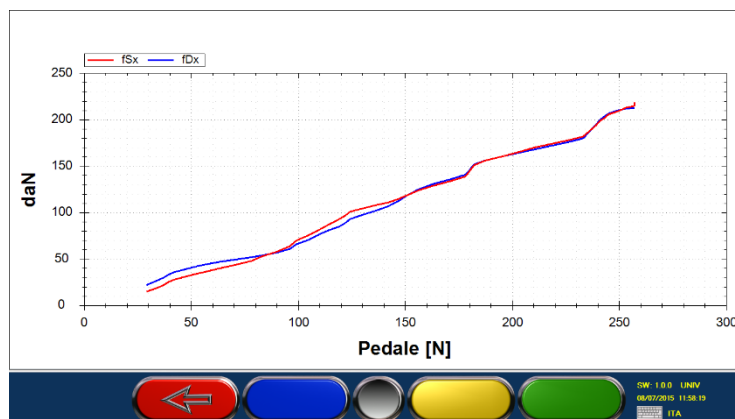


**Figure 86**

**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 87**

The x - axis shows the left and right braking forces, while the y - axis shows the time that has passed (see Figure 87) 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 88).

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 88**

## 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 34 will appear.



Customer - Vehicle Data	
Surname	
Name	
Reg.number	
Tare	
Km	
Note	
Result	PASSED

Vehicle make:   
Vehicle:   
Chassis:   
Matric. Date:

1 01 00 00 FW-221 UNIV  
2/10/2016 7:50:07 AM  
ITA

**Figure 89**

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

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 exam.....: 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 coincident with parking brake)						---				
Emergency brake diff. (even if coincident with parking brake) ≤ 30										
Brake efficiency (%)										
Measures			Limits			Measures			Limits	
Service			59			≥ 50			Parking isolated vehicle	
Emergency			---			≥ 25			Parking vehicle + trailer	
24			≥ 16			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 <sup>(2)</sup>;
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 88);
8. With system featuring separate wheel weight system (adherence test) – vehicle weight split up on each single wheel. With system featuring axle weight system (system below rollers) – weight of vehicle split up on each axle;
9. MAX braking force on wheels in N (service and parking brake) and pedal;
10. Ovality of left and right wheels (if performed during braking procedure) for each axle being tested;
11. 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);
12. Adherence test value (optional) - vehicle weight subdivided in every single wheel for rear and front axle;
13. Side-slip test (optional) for rear and front axle;
15. Space reserved for notes that can be entered manually during data entering (Figure 89);
16. Space reserved for operator approval in case of periodical vehicle testing.

### **Example of SHORT PRINTOUT:**

1. Space reserved for personalization of customer details <sup>(3)</sup>;
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 89);
9. Space reserved for operator approval in case of periodical vehicle testing.

---

<sup>2</sup>The 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  
Pag. 1/1

**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).....				Trailer 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.
	55	53	≥ 20	2	≤ 10	42	43	≥ 20	1
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. CLIENT 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 34) then select **"Customer database"**.

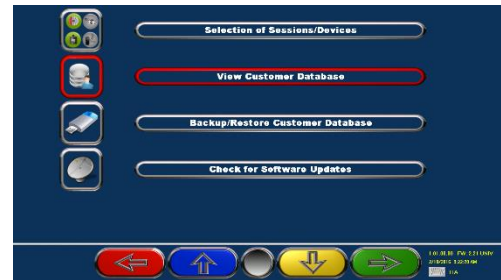






Figure 90

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**


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



Figure 91

## 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 34) 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.

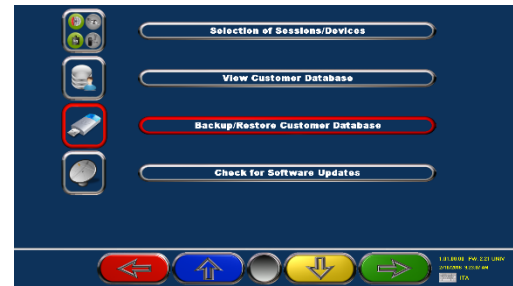



Figure 92

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 93






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

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	During ovality test, the rollers stop
39 – Trouble during adherence test, non-reliable data	Adherence test didn't detect the minimum or detected minimum not reliable

## 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.

**ATTENZIONE!:** 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.**

A			<b>SPACE s.r.l.</b> 10090 TRANA (TO) Via Sangano, 48 Tel. 011/934.40.300 - Fax 011/ 933 88 64			MODEL <b>PFK 602</b>	SERIAL N°	YEAR	
	MODEL		SERIAL N°						
B	N° di APPROVAZIONE								
F	VOLTAGE		400V						

SERIAL N°	<b>PFK 602</b>		<b>PFK 602</b>	
OM00637EST002am/NET2 OM00636EST5a3/NET2 FORZA FRENANTE 0 ÷ 6500N FORZA PESO 0 ÷ 2000N EFFICIENZA FRENANTE 0 ÷ 99% CAMPO DI TEMPERATURA 0 ÷ 40 C SOGGETTO A VERIFICA PERIODICA ANNUALE		YEAR		

**Console identification plate.**

The diagram shows a label with the following fields and callouts:

- A** points to the **SPACE** logo.
- B** points to the **MODEL** field, which contains **PFC 601**.
- F** points to the **VOLTAGE** field, which contains **400v**.
- D** points to the **CE** mark in the top right corner.
- E** points to the **YEAR** field in the bottom right section.

The label also contains the following text:

- SPACE s.r.l.**
- 10090 TRANA (TO) Via Sangano, 48**
- Tel. 011/934.40.300 - Fax 011/ 933 88 64**
- MODEL PFC 601**
- SERIAL N°**
- YEAR**
- VOLTAGE 400v**
- CE** (multiple instances)

**Roller tester identification plate.**

oller tester identification plate.

The diagram shows a rectangular identification plate divided into several sections. On the left, there are three circular labels: A, B, and F. On the right, there are two circular labels: D and E. Arrows point from these labels to specific parts of the plate. Label A points to the 'SPACE' logo. Label B points to the 'MODEL' field, which contains 'PFB 201'. Label F points to the 'VOLTAGE' field, which contains '400v'. Label D points to the 'CE' mark in the top right corner. Label E points to the 'YEAR' field, which is empty. The plate also contains the company name 'SPACE s.r.l.', its address '10090 TRANA (TO) Via Sangano, 48', and contact information 'Tel. 011/934.40.300 - Fax 011/ 933 88 64'. A vertical label 'MODEL' is on the right side, and a 'SERIAL N°' field is also present.

<b>SPACE</b>	<b>SPACE s.r.l.</b> 10090 TRANA (TO) Via Sangano, 48 Tel. 011/934.40.300 - Fax 011/ 933 88 64		<b>CE</b>
<b>MODEL</b>	<b>PFB 201</b>	<b>SERIAL N°</b>	<b>YEAR</b>
<b>VOLTAGE</b>	<b>400v</b>		

Labels and their corresponding fields:

- A: SPACE logo
- B: MODEL (PFB 201)
- F: VOLTAGE (400v)
- D: CE mark
- E: YEAR

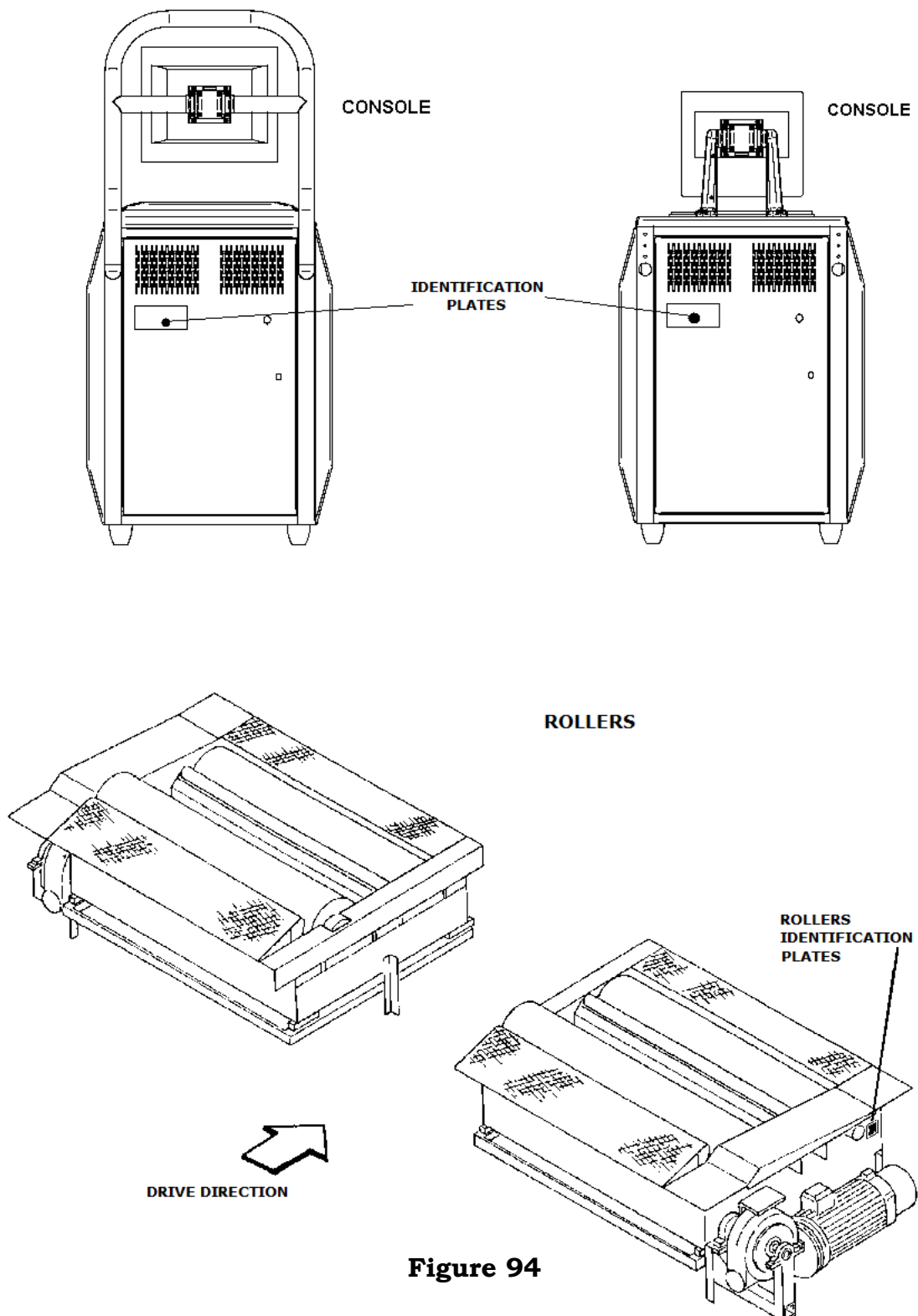
**CAUTION: Do not tamper with, carve, change or remove the identification plate; do not cover it with panels, etc., since it must always be visible.**

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 94**