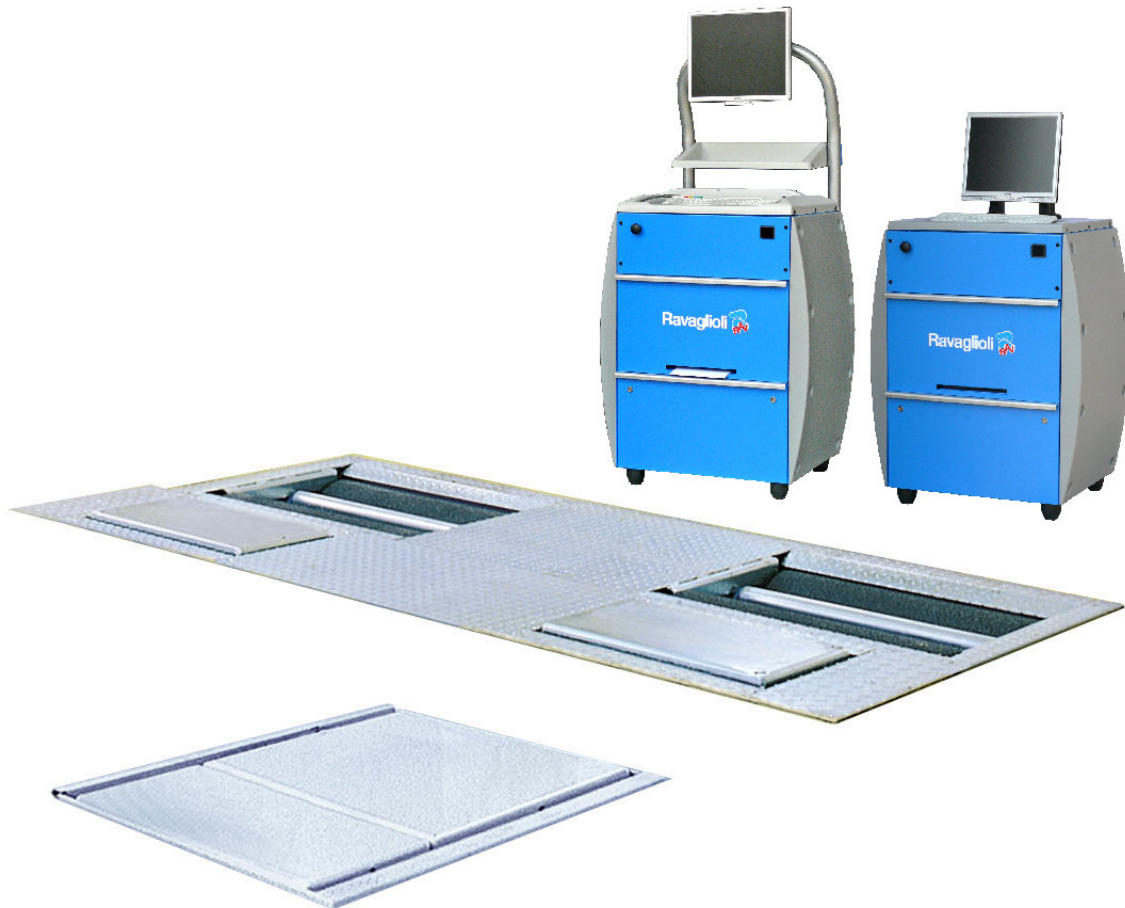


**BRAKE TESTER – TEST LANE****CONTROL UNIT
RAVRT009/4SE - RAVRT011/4SE
+
ROLLER BRAKE TESTERS
RAVRT095/ RAVRT102/ RAVRT105/
RAVRT152/RAVRT155/RAVRT175 series****INSTRUCTION OPERATION
AND MAINTENANCE MANUAL****COMPOSIZIONE**

67 pagine (copertine
comprese)
65 pagine numerate

COMPOSITION

67 pages (including
cover pages)
65 numbered pages

ZUSAMMENSETZUNG

67 Seiten (inkl.
Deckblätter)
65 nummerierte Seiten

COMPOSITION

67 pages (pages de la
couverture incluses)
65 pages numérotées





COMPOSICIÓN

67 páginas (incluidas
las portadas)
65 páginas numeradas

- Per eventuali chiarimenti interpellare il più vicino rivenditore oppure rivolgersi direttamente a:
- For any further information please contact your local dealer or call:
- Im Zweifelsfall oder bei Rückfragen wenden Sie sich bitte an den nächsten Wiederverkäufer oder direkt an:
- Pour tout renseignement complémentaire s'adresser au revendeur le plus proche ou directement à:
- En caso de dudas, para eventuales aclaraciones, póngase en contacto con el distribuidor más próximo ó diríjase directamente a:



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

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

**LIST OF CONTENTS**

0.	CAUTION	2
0.1.	Preliminary safety information	2
1.	INTENDED USE	3
2.	PERSONNEL TRAINING	3
2.1.	General preventive measures	3
2.2.	Indication of outstanding risks	4
2.3.	Emergency devices	4
2.4.	Safety devices	4
2.5.	Emergency situations	4
2.6.	Emergency situations	5
3.	EQUIPMENT COMPOSITION	6
3.1.	Roller assembly	7
3.1.1.	Roller Brake Tester RAVRT095 series	8
3.1.2.	Roller Brake Tester RAVRT102 series	9
3.1.3.	Roller Brake Tester RAVRT105 series	10
3.1.4.	Roller Brake Tester RAVRT155 series	11
3.1.5.	Roller Brake Tester RAVRT152 series	12
3.1.6.	Roller Brake Tester RAVRT175 series	13
3.2.	Console code RAV RT009/4SE.....	14
3.3.	Console code RAV RT011/4SE.....	15
3.4.	Remote control	16
3.5.	Control keyboard	16
3.6.	Pressure-meter pedal (optional).....	17
3.7.	Electronic weather device (optional).....	17
3.8.	Weighing frame (optional)	18
3.9.	Adherence test (optional)	18
3.10.	Side-slip test (optional).....	18
4.	OPERATING INSTRUCTIONS	19
4.1.	Starting and stopping the appliance	19
4.2.	Program configuration	20
4.2.1.	Inspections (Checks)	21
4.2.2.	Date, time, print personalisation	25
4.2.3.	Test line layout	26
4.2.4.	Environmental conditions (optional).....	27
4.3.	Selecting the language	28
4.4.	Selecting the type of test	28
4.5.	Choosing the vehicle category	29
4.6.	Side-slip procedure.....	31
4.7.	Measuring the weight of the axle or entering the vehicle weight.....	32
4.8.	Adherence test procedure	33
4.9.	Brake test procedure	35
5.	OTHER TESTS (OPTIONAL)	40
5.1.	Headlight test with Tec nolux 2800- MCTC instrument.....	40
5.2.	Headlight test with MCTC-Net compatible instrument.....	41
5.3.	Sound-level meter test.....	42
5.4.	Exhaust gas test.....	47
5.5.	Opacimeter test	51
5.6.	Entering the results of the sight checks.....	54
5.7.	Data printing	55
6.	CLIENT DATABANK	59
7.	BACK-UP and RESTORE	60
8.	TROUBLESHOOTING	61
9.	MAINTENANCE	63
10.	STORING AND SCRAPPING	63
11.	IDENTIFICATION PLATE	64

0. CAUTION

Any damage caused by failure to follow the instructions in this manual or improper machine use shall relieve Ravaglioli S.p.A. 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 (specialised technical staff) are contained in the specific manual code R0028. Masonry works and details on system specifications are shown on specific drawings available from your Ravaglioli S.p.A. dealer.
- Make sure the power supply is in conformity with the specifications shown on the plate.
- Make sure the machine is properly positioned on the floor.
- Suitably position the machine power cables.

On starting the machine:

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

In emergency conditions and before performing any maintenance:

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

Work environment and machine cleaning:

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

RAVAGLIOLI S.p.A. reserves the right to make any changes to the models described in this manual at any time for technical or market reasons.

1. INTENDED USE

The product is designed to perform braking tests on front and rear axles of vehicles weighing under 3500 kg when fully loaded.

The model featuring adherence test device is designed to perform tests on the front and rear axles of vehicles weighing under 3500 kg when fully loaded.

The max acceptable roller assembly and suspension test load per axle is 3000 daN.



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

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

2. PERSONNEL TRAINING

The machine must only be used by specially trained and authorised 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 authorised after-sales centre or the Ravaglioli S.p.A. 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 authorised persons.



- This machine must only be used for the purpose for which it was expressly intended. Ravaglioli S.p.A. 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 authorised by Ravaglioli S.p.A. 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 Ravaglioli S.p.A. technical assistance in order to obtain instructions suitable for performing operations in total safety.



- Do not allow unauthorised 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 and 3.3 on page 14 and 15) indicating hazard areas. In the event pictograms become illegible, please order them from a dealer or directly from Ravaglioli S.p.A. and replace them. Please refer to Spare Parts manuals.

2.3. Emergency devices

In case of an emergency, operate the special device on the rear of the cab as shown at Figure 7 and Figure 8 page 14 and 15 at ref. 8.

2.4. Safety devices



- Safety button: stops and prevents roller start (Button on the front of the cab shown at Figure 7 and Figure 8 on page 14 and 15 at ref. 3).
- Vehicle sensor rollers: these enable the start of the rollers only when they are both pressed.
- Slip/speed control sensor rollers: these stop roller rotation when an anomalous wheel speed is detected of the vehicle being tested.
- Stop/F1 key: on the functional keyboard and remote control. For stopping roller rotation and the test under way.
- Cab access doors: these prevent access to energised parts. These must only be opened by professional and authorised personnel (Figure 7 and Figure 8 at ref. 9).

2.5. Emergency situations

ATTENZIONE!: In the event of emergency situations, the special device behind the console will have to be operated (see Figure 7 and Figure 8 on page 14 and 15, at ref. 8), and consequently, the console should be installed so the emergency device is easily accessible. The user is responsible for inspecting and maintaining access to the emergency device free of obstacles or impediments and for periodically checking its efficiency.



ATTENZIONE!: Unauthorised 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.



ATTENZIONE!: The equipment also features a safety device on the front (Figure 7 and Figure 8 on page 14 and 15, at ref. 3; this prevents the rollers starting. This must be disengaged, by turning clockwise, only after checking that no risk situations exist. The disconnecting operation must be only executed after to have verified that the conditions of emergency inside of the test area are respected. The rollers are normally prevented from being started if the vehicle axle is not on the roller assembly. Press the STOP key on the remote control or the red key on the keyboard to stop the rollers; this is necessary if the vehicle brakes are not working properly and do not allow automatic roller stoppage.



2.6. Emergency situations

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



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



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

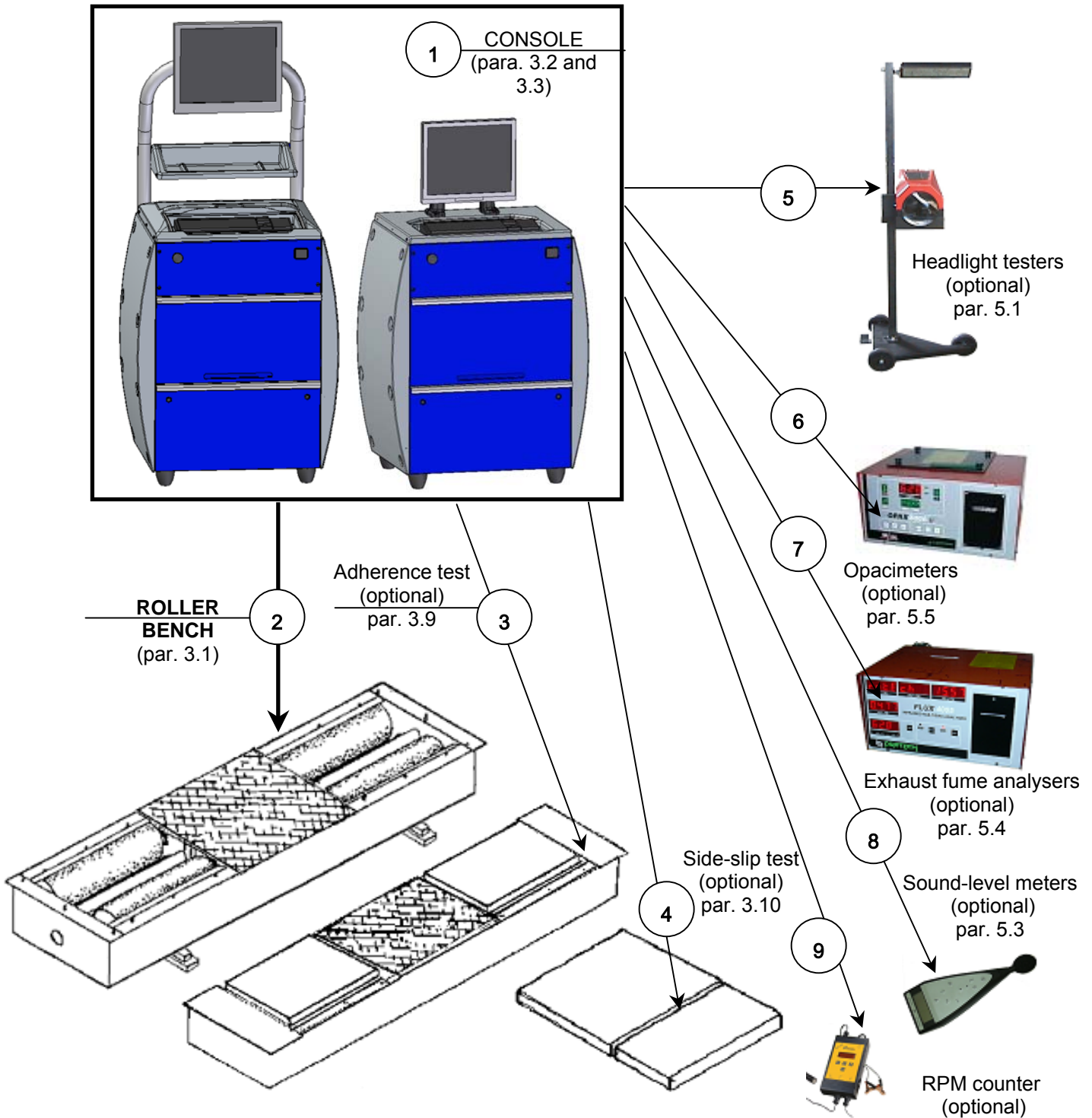
IMPORTANT!: Vehicles with permanent four-wheel drive can only be tested on the REVERSE version brake tester with 4WD program switched on. This enables the wheels to be turned in the opposite direction so as to uncouple the differential and prevent transmitting driving torque to the axle not being tested.



IMPORTANT!: Before performing a test, make sure the brakes are dry and that tyre pressure is correct.



3. EQUIPMENT COMPOSITION



IMPORTANT: Instruments such as: Exhaust fume analysers, Opacimeters, Sound-level meters, Headlight testers, can only be connected to the brake tester panel if they are in conformity with the MCTC-Net protocol (standard adopted by Italian legislation). The instruments that can be connected are listed on the following table.



EQUIPMENT	MODEL
5. HEADLIGHT TESTERS	- TECNOCOLOR 2800MCTC
6. OPACIMETERS	- PROTECH OPAX 2000
	- PROTECH Vsmoke
	- BRAINBEE Opa100
	- SAGEM 5040 Green
	- SAGEM Ultima 600
7. EXHAUST FUME ANALYSERS	- CAPELEC CAP3200
	- PROTECH FLUX 4005
	- PROTECH VGas
	- BRAINBEE Ags200
	- SAGEM 5040 Green
8. SOUND-LEVEL METERS	- SAGEM Ultima 600
	- CAPELEC CAP3200
	- BRÜEL&KJÆR 2237EH
9. RPM COUNTER	- DELTA OHM HD9020
	- 01DB SIP95 + converter GS0001
	- PROTECH RPM8500 cod. AAG 210
	- BRAINBEE MGT30
	- CAPELEC CAP3200

3.1. Roller assembly

The roller assemblies of the RAVAGLIOLI 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 gearmotor (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 gearmotor. In these conditions, the gearmotor would tend to turn around the roller rotation axis if it were not secured to the load cell.

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

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

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

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

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

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

3.1.1. Roller Brake Tester RAVRT095 series

The roller brake tester RAVRT095 series consists of:

- roller brake tester RAVRT095N (can be used together with suspension tester code RAVRT202) or with weigher RAVRT095P (2 sensor weighing equipment)
- tailored console with monitor SVGA 17" RAVRT009/4SE, (see para. 3.2 at page 14) or monitor SVGA 19" RAVRT011/4SE (see para. 3.3 on page 15)

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

**E.g. Roller brake tester with weigher:
 RAVRT095P**

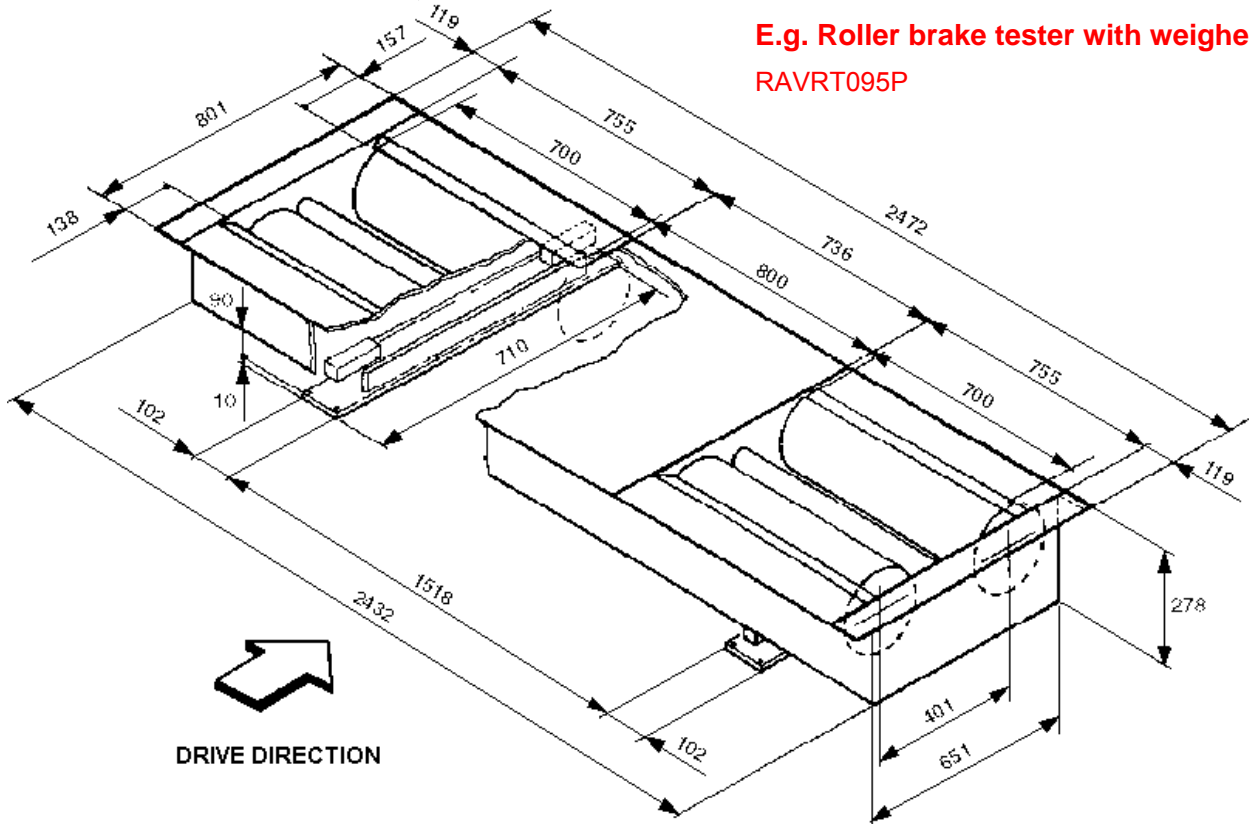


Figure 1

TECHNICAL SPECIFICATIONS RAVRT095N	
Roller dimensions	700 - φ 204
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max acceptable load per axle	3000 daN
Motors	M90 3,5kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,75
Precision measuring chain	≤ ±1%
Weight	382 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Maximum acceptable load per axle	3000 daN
Weight per axle measurement end of scale	2000 daN
Precision measuring chain (2 sensor)	≤ ±3%
Weight	30kg

TECHNICAL SPECIFICATIONS RAVRT320IN (OPTIONAL)	
Dimensions	800x600x50mm
Max capacity at transit	2000 daN
Precision measuring chain	≤ ±2%
Weight	50kg

3.1.2. Roller Brake Tester RAVRT102 series

The roller brake tester RAVRT102 series consists of:

- roller brake tester RAVRT102N without weighing equipment but can be used together with suspension tester code RAVRT202
 or with self-braking motors RAVRT102NF without weighing equipment but can be used with suspension tester code RAVRT202
 or with weigher RAVRT102P (2 sensor weighing equipment)
 or with self-braking motors and weigher RAVRT102PF (2 sensor weighing equipment)
 or with weigher RAVRT102P4 (4 sensor weighing equipment)
 or with self-braking motors and weigher RAVRT102P4F (4 sensor weighing equipment)
- tailored console with monitor SVGA 17" RAVRT009/4SE, (see para. 3.2 at page 14) or monitor SVGA 19" RAVRT011/4SE (see para. 3.3 on page 15)

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

E.g. Roller brake tester with weigher:
 RAVRT102P – RAVRT102PF
 RAVRT102P4 – RAVRT102P4F

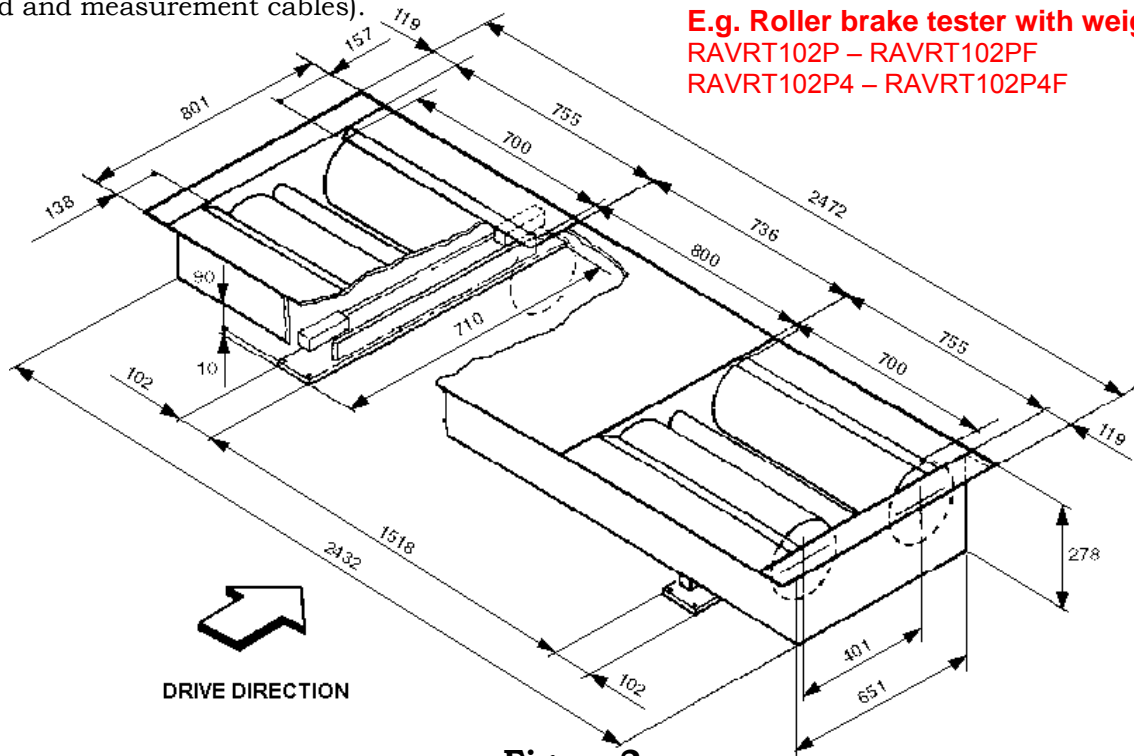


Figure 2

TECHNICAL SPECIFICATIONS RAVRT102N/NF	
Roller dimensions	700 - ϕ 204
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max acceptable load per axle	3000 daN
Motors	M100 4kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,75
Precision measuring chain	$\leq \pm 1\%$
Weight	385 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Maximum acceptable load per axle	3000 daN
Weight per axle measurement end of scale	2000 daN
Precision measuring chain (2 sensor)	$\leq \pm 3\%$
Precision measuring chain (4 sensor)	$\leq \pm 1\%$
Weight	30kg

TECHNICAL SPECIFICATIONS APF 150	
Dimensions	800x600x50mm
Max capacity at transit	2000 daN
Precision measuring chain	$\leq \pm 2\%$
Weight	50kg

3.1.3. Roller Brake Tester RAVRT105 series

The roller brake tester RAVRT105 series consists of:

- roller brake tester RAVRT105N without weighing equipment but can be used together with suspension tester code RAVRT202
 or with self-braking motors RAVRT105NF without weighing equipment but can be used with suspension tester code RAVRT202
 or with weigher RAVRT105P (2 sensor weighing equipment)
 or with self-braking motors and weigher RAVRT105PF (2 sensor weighing equipment)
 or with weigher RAVRT105P4 (4 sensor weighing equipment)
 or with self-braking motors and weigher RAVRT105P4F (4 sensor weighing equipment)
- tailored console with monitor SVGA 17" RAVRT009/4SE, (see para. 3.2 at page 14) or monitor SVGA 19" RAVRT011/4SE (see para. 3.3 on page 15)

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

E.g.: Roller brake tester without weigher, it can be used together with suspension tester code RAVRT202 (see par. 3.9): RAVRT105N - RAVRT105NF

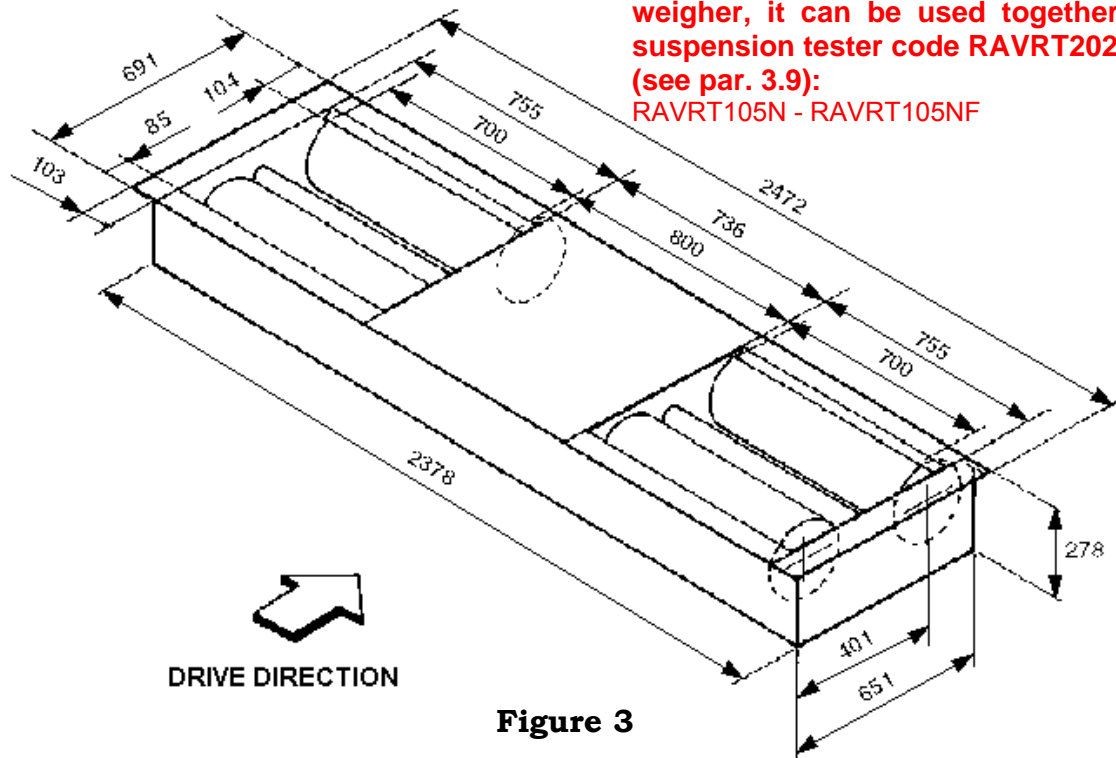


Figure 3

TECHNICAL SPECIFICATIONS RAVRT105N/NF	
Roller dimensions	700 - ϕ 204
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max acceptable load per axle	3000 daN
Motors	M100 5kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,75
Precision measuring chain	$\leq \pm 1\%$
Weight	389kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Maximum acceptable load per axle	3000 daN
Weight per axle measurement end of scale	2000 daN
Precision measuring chain (2 sensor)	$\leq \pm 3\%$
Precision measuring chain (4 sensor)	$\leq \pm 1\%$
Weight	30kg

TECHNICAL SPECIFICATIONS RAVRT320IN (OPTIONAL)	
Dimensions	800x600x50mm
Max capacity at transit	2000 daN
Precision measuring chain	$\leq \pm 2\%$
Weight	50kg

3.1.4. Roller Brake Tester RAVRT155 series

The roller brake tester RAVRT155 series consists of:

- roller brake tester RAVRT155N without weighing equipment but can be used together with suspension tester code RAVRT202
 or with self-braking motors RAVRT155NF without weighing equipment but can be used with suspension tester code RAVRT202
 or with weigher RAVRT155P (2 sensor weighing equipment)
 or with self-braking motors and weigher RAVRT155PF (2 sensor weighing equipment)
- tailored console with monitor SVGA 17" RAVRT009/4SE, (see para. 3.2 at page 14) or monitor SVGA 19" RAVRT011/4SE (see para. 3.3 on page 15)

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

E.g.: Roller brake tester without weigher, it can be used together with suspension tester code RAVRT202 (see par. 3.9): RAVRT155N - RAVRT155NF

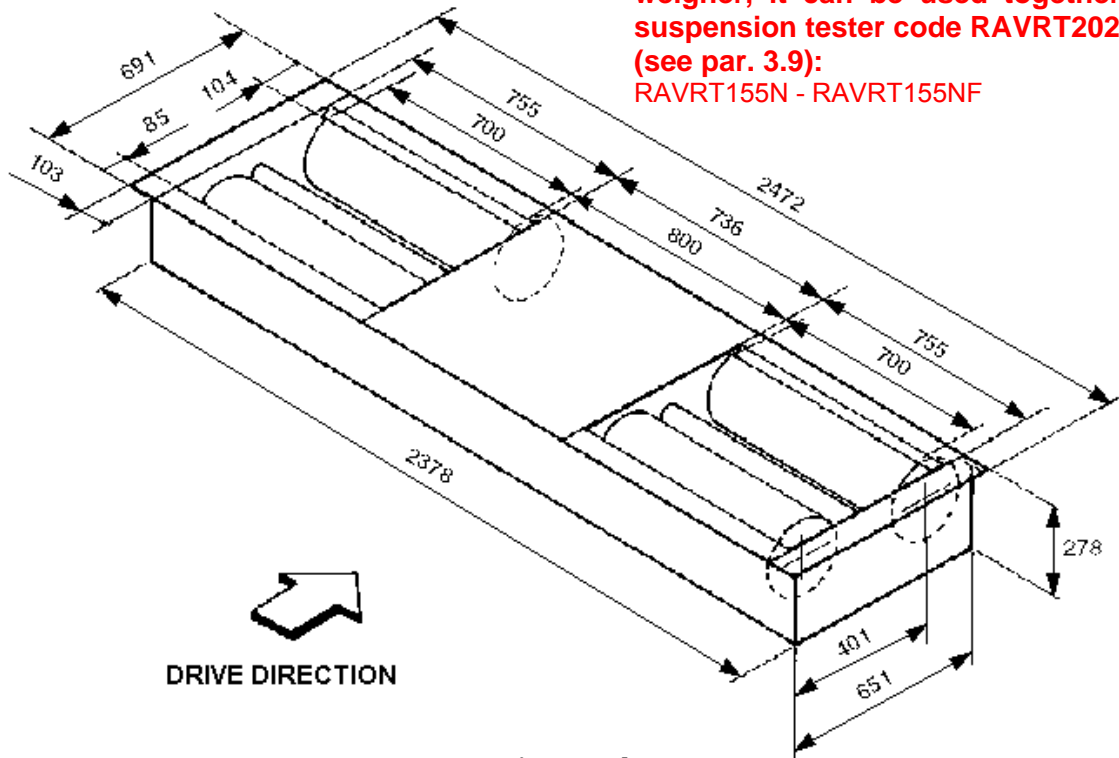


Figure 4

TECHNICAL SPECIFICATIONS RAVRT155N/NF	
Roller dimensions	700 - φ 204
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max acceptable load per axle	3000 daN
Motors	M112 5,5kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,75
Precision measuring chain	≤ ±1%
Weight	389kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Maximum acceptable load per axle	3000 daN
Weight per axle measurement end of scale	2000 daN
Precision measuring chain (2 sensor)	≤ ±3 %
Weight	30kg

TECHNICAL SPECIFICATIONS RAVRT320IN (OPTIONAL)	
Dimensions	800x600x50mm
Max capacity at transit	2000 daN
Precision measuring chain	≤ ±2%
Weight	50kg

3.1.5. Roller Brake Tester RAVRT152 series

The roller brake tester RAVRT152 series consists of:

- roller brake tester RAVRT152N without weighing equipment but can be used together with suspension tester code RAVRT202
 or with self-braking motors RAVRT152NF without weighing equipment but can be used with suspension tester code RAVRT202
 or with weigher RAVRT152P (2 sensor weighing equipment)
 or with self-braking motors and weigher RAVRT152PF (2 sensor weighing equipment)
- tailored console with monitor SVGA 17" RAVRT009/4SE, (see para. 3.2 at page 14) or monitor SVGA 19" RAVRT011/4SE (see para. 3.3 on page 15)

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

**E.g. Roller brake tester with weigher:
 RAVRT152P – RAVRT152PF**

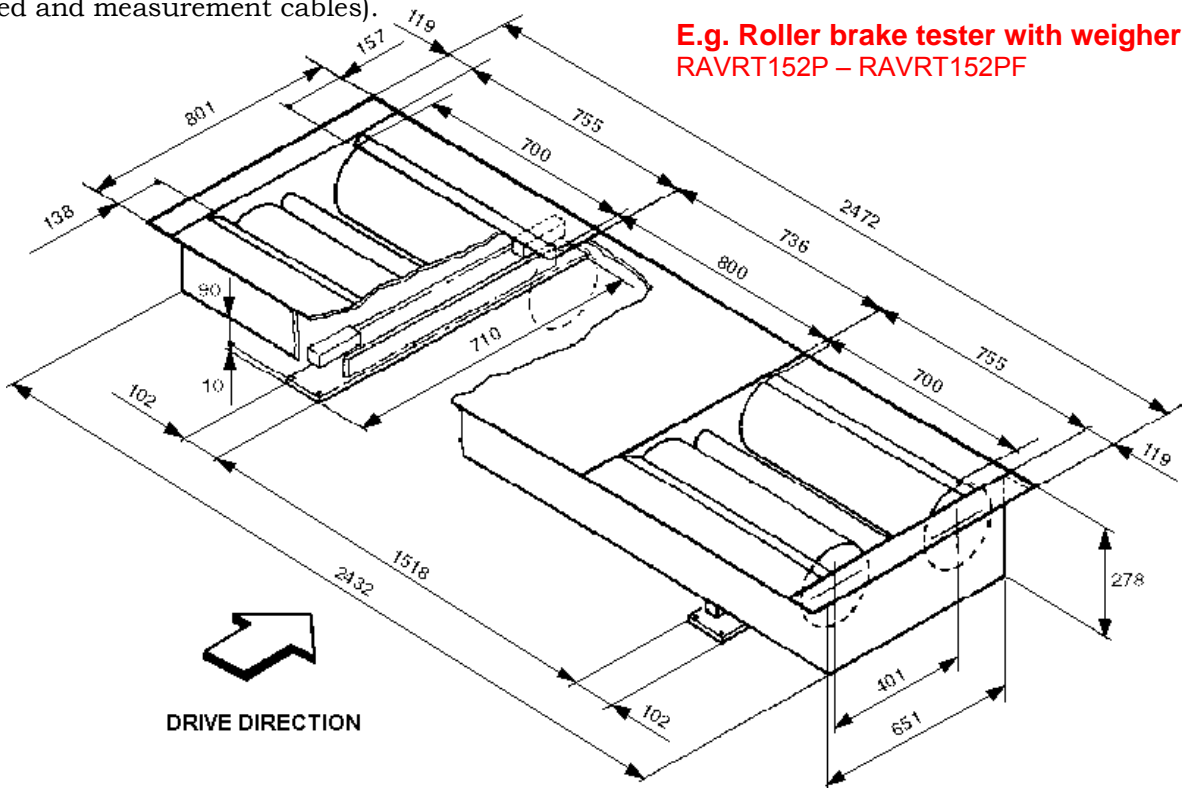


Figure 5

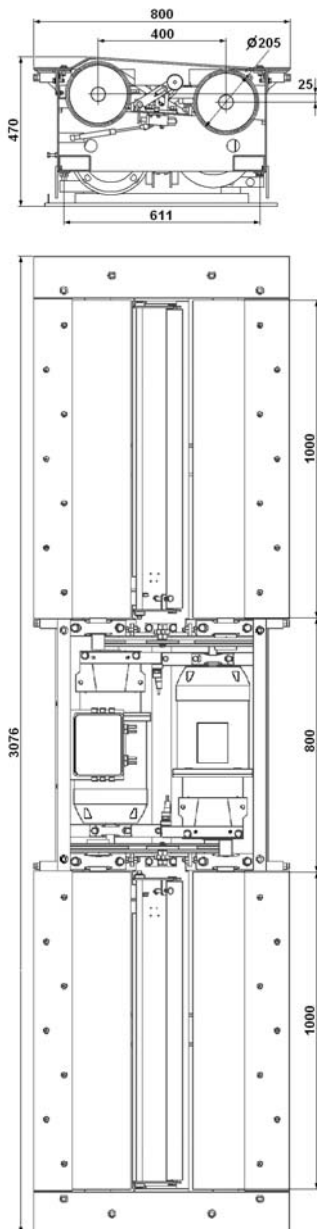
TECHNICAL SPECIFICATIONS RAVRT152N/NF	
Roller dimensions	700 - ϕ 204
Roller internal wire distance	800 mm
Roller external wire distance	2200 mm
Max acceptable load per axle	3000 daN
Motors	M112 5,5kW
Empty roller tip speed	5,2 km/h
Grip coefficient	>0,75
Precision measuring chain	$\leq \pm 1\%$
Weight	385 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Maximum acceptable load per axle	3000 daN
Weight per axle measurement end of scale	2000 daN
Precision measuring chain (2 sensor)	$\leq \pm 3\%$
Weight	30kg

TECHNICAL SPECIFICATIONS RAVRT320IN (OPTIONAL)	
Dimensions	800x600x50mm
Max capacity at transit	2000 daN
Precision measuring chain	$\leq \pm 2\%$
Weight	50kg

3.1.6. Roller Brake Tester RAVRT175 series

The roller brake tester RAVRT175 series consists of:

- roller brake tester RAVRT175N
 or with self-braking motors RAVRT175NF
 or with weigher RAVRT175P (2 sensor weighing equipment)
 or with self-braking motors and weigher RAVRT175PF (2 sensor weighing equipment)
- tailored console with monitor SVGA 17” RAVRT009/4SE, (see para. 3.2 at page 14) or
 monitor SVGA 19” RAVRT011/4SE (see para. 3.3 on page 15)



TECHNICAL SPECIFICATIONS RAVRT175N/NF	
Roller dimensions	1000 - ϕ 204
Roller internal wire distance	800 mm
Roller external wire distance	2800 mm
Max acceptable load per axle	5000 daN
Motors	M112 5,5kW
Empty roller tip speed	2,6 km/h
Grip coefficient	>0,75
Precision measuring chain (2 sensor)	$\leq \pm 3\%$
Weight	485 kg
WEIGHING FRAME TECHNICAL SPECIFICATIONS	
Maximum acceptable load per axle	5.000 daN
Weight per axle measurement end of scale	4.000 daN
Precision measuring chain	$\leq \pm 3\%$
Weight	30kg

Figure 6

3.2. Console code RAV RT009/4SE

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.

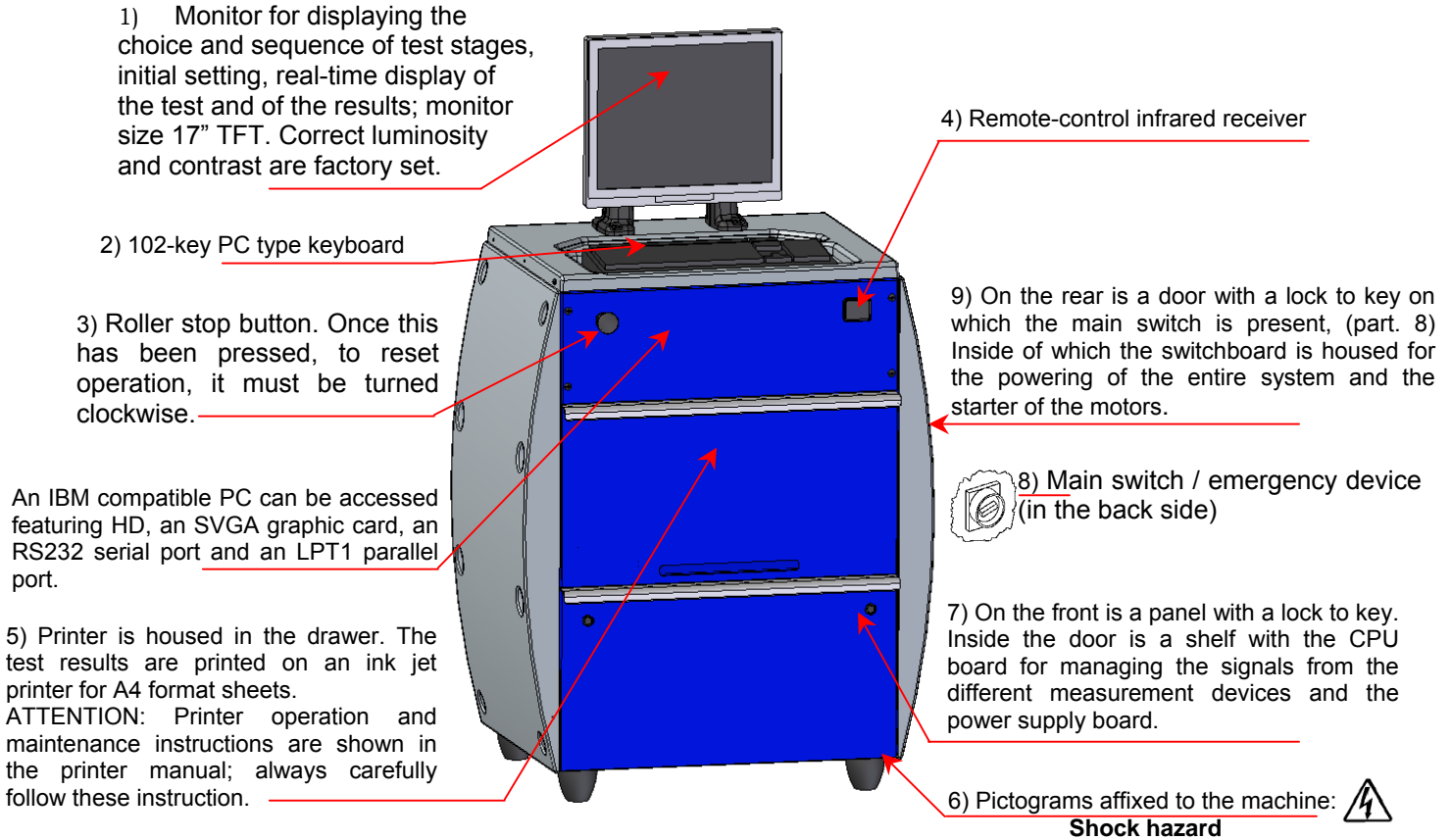


Figure 7

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

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

3.3. Console code RAV RT011/4SE

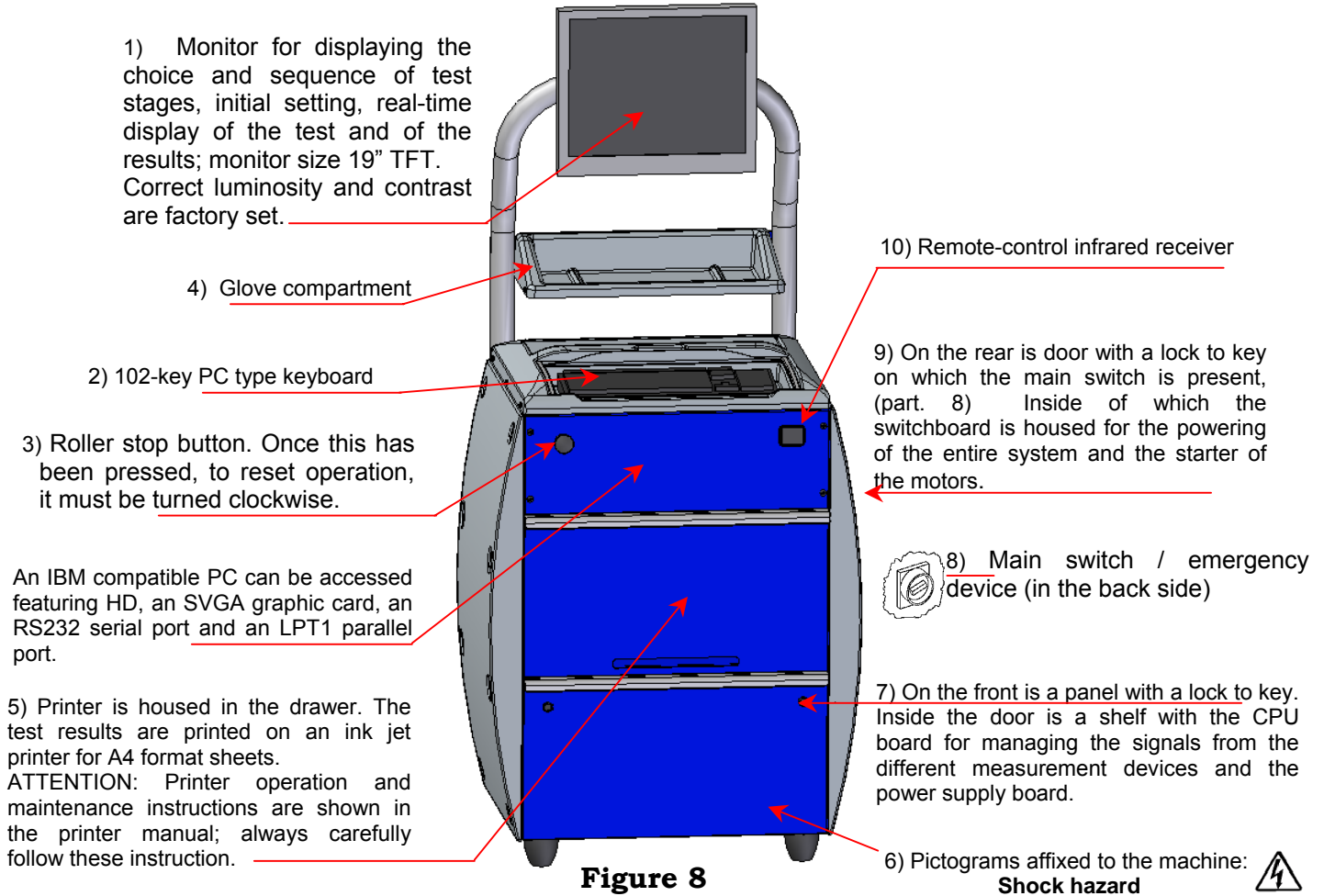


Figure 8

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



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

3.4. 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.

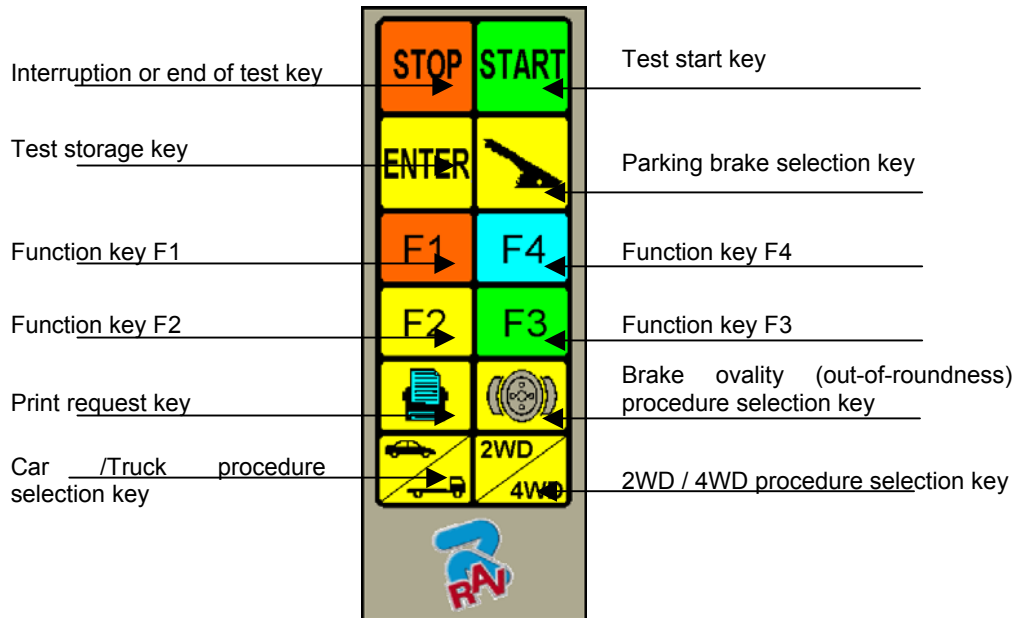


Figure 9

3.5. 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.

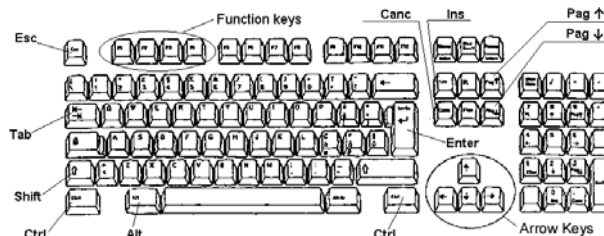


Figure 10

3.6. Pressure-meter pedal SRT047BTH (optional)

An optional 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.

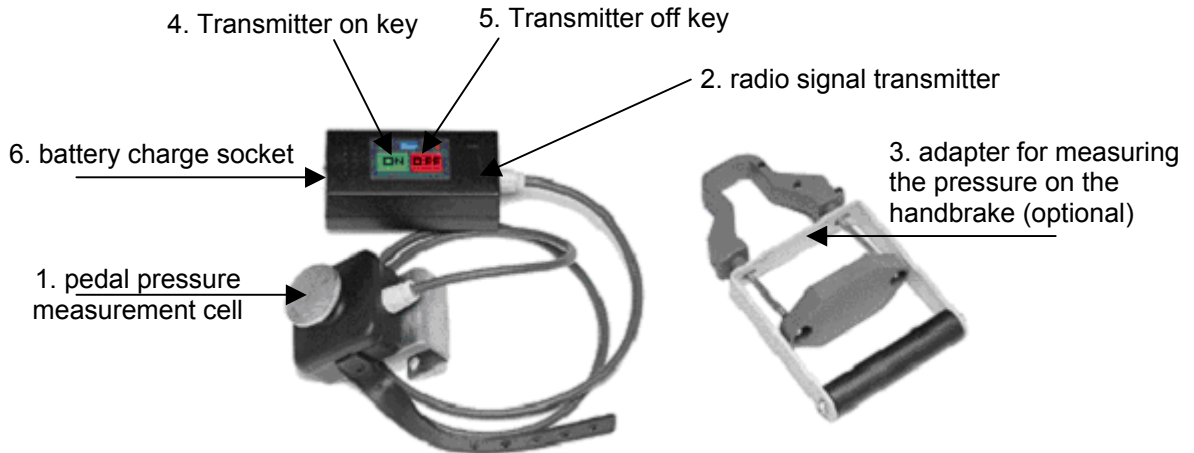


Figure 11

3.7. Electronic weather device (optional)

An optional electronic weather device is available with the equipment.

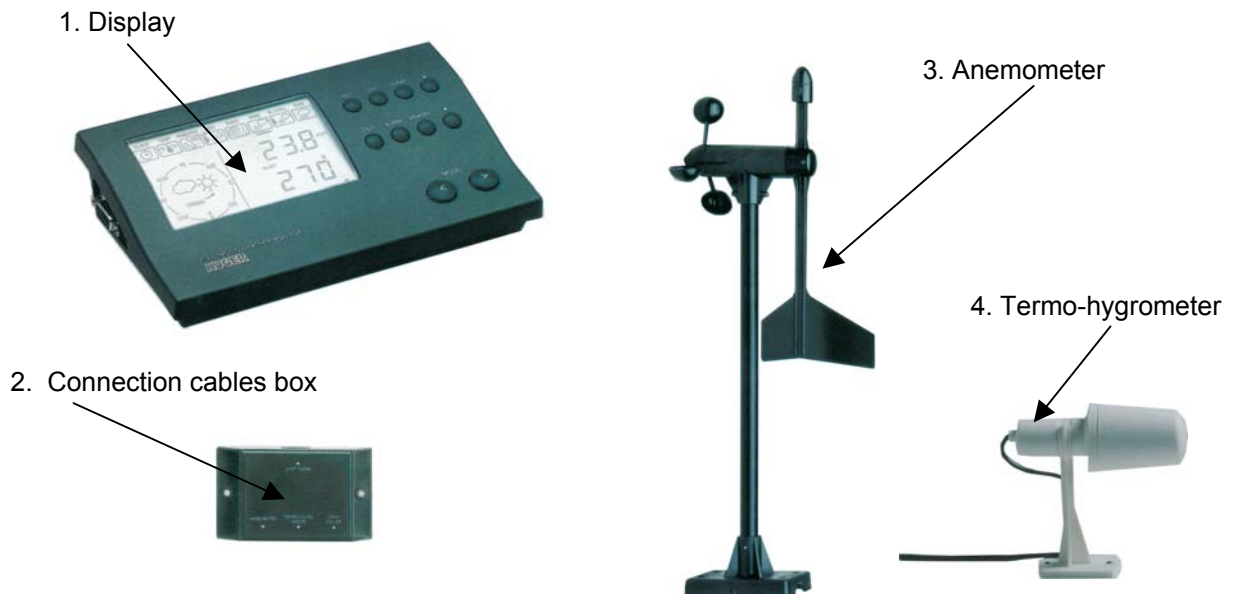


Figure 12

3.8. Weighing frame (optional)

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

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

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

3.9. Adherence test (optional)

The adherence tester RAV RT202 checks the condition of the vehicle suspensions.

Each platform features 3 shear beam load cells that also measure static weight. The adherence tester is thus able to replace the axle weighing frame.

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

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

TECHNICAL SPECIFICATIONS RAV RT202	
Maximum acceptable load per axle	3000 daN
Weight per axle measurement end of scale	2000 daN
Motors	2 x M100 3kW
Weight precision	±0,5%
Min/max track	915 /2015 mm
Weight	400kg

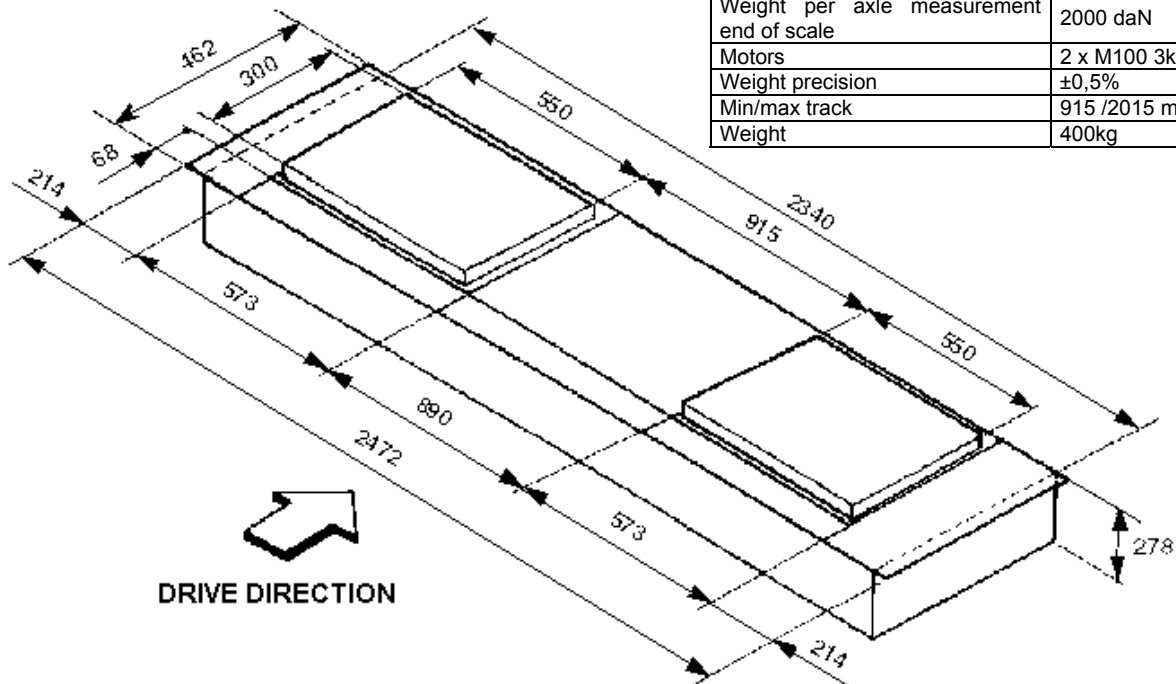


Figure 13

3.10. Side-slip test (optional)

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

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

4. OPERATING INSTRUCTIONS

4.1. 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 14 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 14

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 15

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

4.2. Program configuration

To configure the program, select key **F1** on the presentation page, as explained in Figure 14 on page 19.

A configuration menu is accessed that permits changing the characteristics of the program according to individual needs.

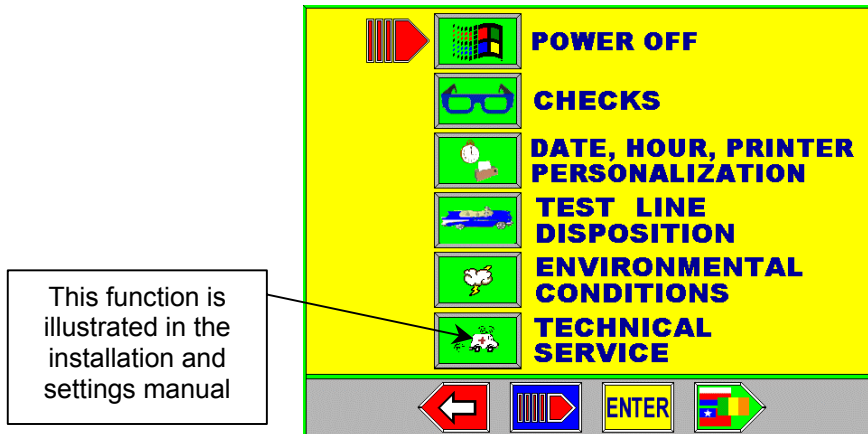


Figure 16

SWITCH-OFF: Activates or deactivates appliance switch-off request.

CHECKS: The efficiency and alarm unbalance thresholds and the calibration zero (OFFSET) ARE NOT changeable except by the skilled Ravaglioli S.p.A. after-sales department personnel. For this reason access is subject to a password.

The operator can in any case refer to the thresholds or the calibration offset as explained in (para. 4.2.1 on page 21).

DATE, TIME, PRINT PERSONALISATION: The date and time of the system can be changed to correctly record the chronology of the operations performed.

Enter the data relating to the workshop. These will be printed with the printout of the measurements made.

TEST ORDER : The order of the tests to be performed can be established by moving the cursor on the different icons.

ENVIRONMENTAL CONDITIONS : Enter the environmental condition values as required by Italian law.

TECHNICAL ASSISTANCE: This function is illustrated in the installation and settings manual.

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Return to presentation page (para. 4.1 at page 195)
			Move selection down.
			Confirm selection.
			Select language (para. 4.3 at page 21)

4.2.1. Inspections (Checks)

□ BRAKE LIMITS

The efficiency and alarm unbalance thresholds and the zero (OFFSET) of the calibrations CANNOT be changed except by skilled Ravaglioli S.p.A. 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 **F1** from the initial page (Figure 14).

The system will display the configuration page (Figure 16).

Select the “CHECKS” icon using key “F2” and then the “BRAKE LIMITS” icon, by pressing the “ENTER/F3” key: a chart will appear showing the efficiency and unbalance thresholds (see Figure 17).

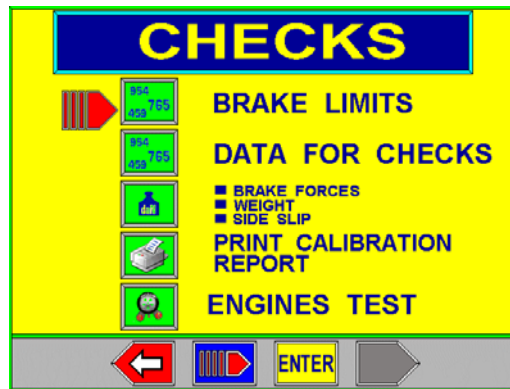


Figure 17

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Return to the configuration page (Figure 16)
			Move selection down
			Confirm selection

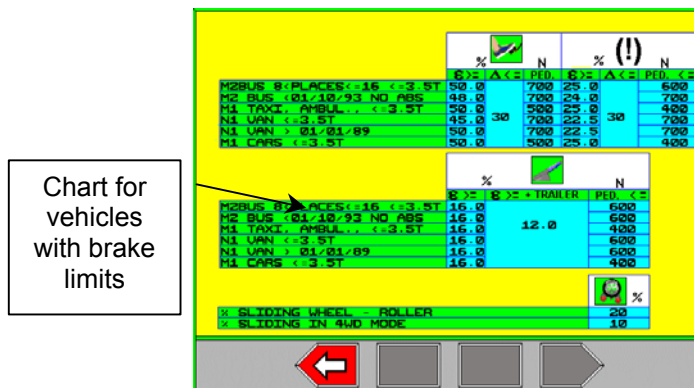


Figure 18

Press key “F1” to return to previous page.

□ **DATA FOR CHECKS**

From the presentation page (Figure 14) press key **“F1”**.
 The configuration menu will appear (Figure 16).

Using key **“F2”** select **“CHECKS”** and press key **“ENTER/F3”** to confirm and continue.

Select the **“DATA FOR CHECKS”** icon (Figure 17) using key **“F2”**, press key **“ENTER/F3”** to confirm and continue.

Introduce the password: **“F4-F4-F2-F2-F3-F2”**

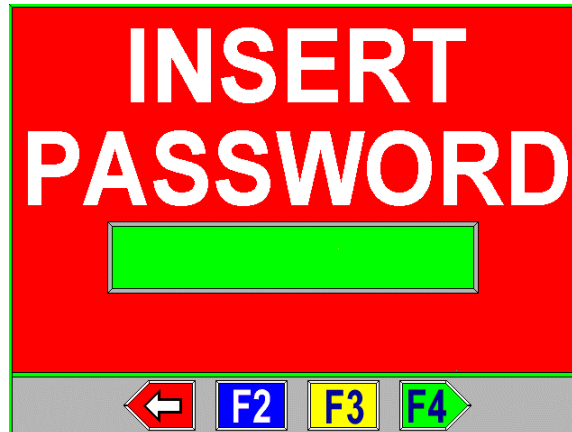


Figure 19

The following table appears; where it is possible to change the values of the check points and all tolerances for the Offset values, Full Scale and intermediate check points. Instead the Full Scale values can be set up in the “Parameters” configuration reserved to the attendance authorizes centers.

Parametro	Valore	Presente
N. Omologazione + Data scadenza in certificato taratura		Presente
Freno Sx: tolleranza offset(+/-) (daN)	2	
Freno Sx: tolleranza gain(+/-) (daN)	6	
Freno Sx: verifica punto 1 (daN)	50	
Freno Sx: tolleranza punto 1(+/-) (daN)	2	
Freno Sx: verifica punto 2 (daN)	100	
Freno Sx: tolleranza punto 2(+/-) (daN)	2	
Freno Sx: verifica punto 3 (daN)	200	
Freno Sx: tolleranza punto 3(+/-) (daN)	4	
Freno Dx: tolleranza offset(+/-) (daN)	2	
Freno Dx: tolleranza gain(+/-) (daN)	6	
Freno Dx: verifica punto 1 (daN)	50	
Freno Dx: tolleranza punto 1(+/-) (daN)	2	
Freno Dx: verifica punto 2 (daN)	100	
Freno Dx: tolleranza punto 2(+/-) (daN)	2	
Freno Dx: verifica punto 3 (daN)	200	
Freno Dx: tolleranza punto 3(+/-) (daN)	4	
Pesa sotto rulli unica: tolleranza offset(+/-) (daN)	3	
Pesa sotto rulli unica: tolleranza gain(+/-) (daN)	4	
Pesa sotto rulli unica: verifica punto 1 (daN)	100	
Pesa sotto rulli unica: tolleranza punto 1(+/-) (daN)	3	
Pesa sotto rulli unica: verifica punto 2 (daN)	200	

Figure 20

Select, by using key **“F2”** and/or key **“F4”**, the parameters of the ckeck points, press key ENTER/F3 for introduce the value and confirming.

□ BRAKE FORCES, WEIGHT, SIDE SLIP

From the presentation page (Figure 14) press key **“F1”**.

Using key **“F2”** select **“CHECKS”** (Figure 16) and press key **“ENTER/F3”** to confirm and continue.

Select the **“BRAKE FORCES, WEIGHT, SIDE SLIP”** icon (Figure 18) using key **“F2”**, press key **“ENTER/F3”** to confirm and continue.

Calibrations are exclusively reserved to the attendance authorize Ravaglioli S.p.A. centers, the operator can however to control the calibrations introducing the following password **“F4-F4-F2-F2-F3-F2”** (Figure 19).

Introduce the name of the technical manager (it will be printed in the calibration report) then press key **“ENTER/F3”** in order to confirm the selection.

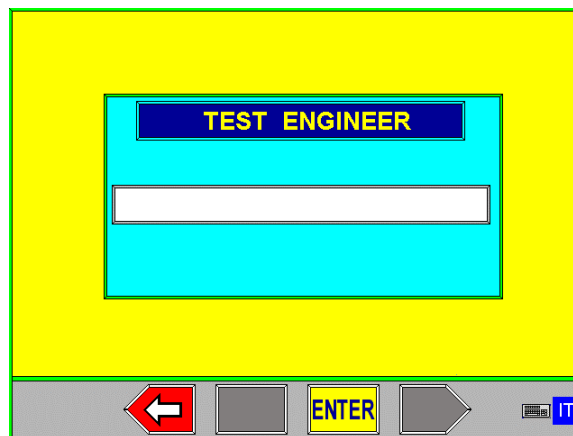


Figure 21

Operating in this modality the Calibration CHECKS can be executed (operations explained in the service manual for the attendance authorize centers); **“CONTROLS”** will be only carry out. The calibrations saved in the system **DO NOT CHANGE**.

□ PRINT CALIBRATION REPORT

From the presentation page (Figure 14) press key **“F1”**.

Using key **“F2”** select **“CHECKS”** (Figure 16) and press key **“ENTER/F3”** to confirm and continue.

Select the **“PRINT CALIBRATION REPORT”** icon (Figure 18) using key **“F2”**, press key **“ENTER/F3”** to confirm and continue.

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



RAVAGLIOLI S.p.A.
40044 Pontecchio Marconi (Bologna)
Via 1° Maggio, 38

Calibration report						
Brake tester data						
Manufacturer.....: RAVAGLIOLI S.p.A.						
Model.....: RAV RT009/5P4X						
Serial number.....: 00422						
Homologation number.....: OM003221						
Date of expiry calibration.....: 31/12/2007						
Brake Force Lh						
Calibration						
(daN)	Before calibration	After calibration	Limits	Date	Ok	Test engineer
0	0	0	-2 - 2	13/06/2007	√	Rossi Mario
300	328	300	294 - 306	13/06/2007	√	Rossi Mario
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	0	-2 - 2	13/06/2007	√	Rossi Mario	
.....
.....
Brake Force Rh						
Calibration						
(daN)	Before calibration	After calibration	Limits	Date	Ok	Test engineer
0	4	0	-2 - 2	13/06/2007	√	Rossi Mario
300	332	300	294 - 306	13/06/2007	√	Rossi Mario
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	0	-2 - 2	13/06/2007	√	Rossi Mario	
.....
.....
Weight Lh						
Calibration						
(daN)	Before calibration	After calibration	Limits	Date	Ok	Test engineer
0	-76	0	-3 - 3	13/06/2007	√	Rossi Mario
200	265	200	194 - 206	13/06/2007	√	Rossi Mario
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	0	-3 - 3	13/06/2007	√	Rossi Mario	
.....
200	200	196 - 204	13/06/2007	√	Rossi Mario	
.....
Weight Rh						
Calibration						
(daN)	Before calibration	After calibration	Limits	Date	Ok	Test engineer
0	-78	0	-3 - 3	13/06/2007	√	Rossi Mario
200	273	200	194 - 206	13/06/2007	√	Rossi Mario
Checks						
(daN)	Values	Limits	Date	Ok	Test engineer	
0	0	-3 - 3	13/06/2007	√	Rossi Mario	
.....
200	200	196 - 204	13/06/2007	√	Rossi Mario	
.....
Side slip						
Calibration						
(dm/km)	Before calibration	After calibration	Limits	Date	Ok	Test engineer
.....
.....
Checks						
(dm/km)	Values	Limits	Date	Ok	Test engineer	
.....
.....

□ **ENGINES TEST**

From the presentation page (Figure 14) press key **“F1”**.

Using key **“F2”** select **“CHECKS”** (Figure 16) and press key **“ENTER/F3”** to confirm and continue.

Select the **“ENGINES TEST”** icon (Figure 18) using key **“F2”**, press key **“ENTER/F3”** to confirm and continue.

The engines test is used in order to verify the rollers speed with the vehicle presence and under effort.

4.2.2. Date, time, print personalisation

From the presentation page (Figure 14) press key “**F1**”. The configuration menu will appear (Figure 16).

Using key “**F2**” select “ **DATE, TIME, PRINT PERSONALISATION** ” and press key “**ENTER/F3**” to confirm and continue. A window is accessed to introduce the date and time changed so as to correctly record the time sequences of the performed operations. This page permits changing the data concerning the manufacturer which will afterwards be shown at the top on the final printout.

Now, using key “**F2**” the different sectors can be highlighted, the current date and time can be introduced and the workshop data can be personalised.

Press the “**ENTER/F3**” key to store the data. After changing the data, press the **ENTER/F3** key again. At the end of the operation, press key F1 to exit from this page.

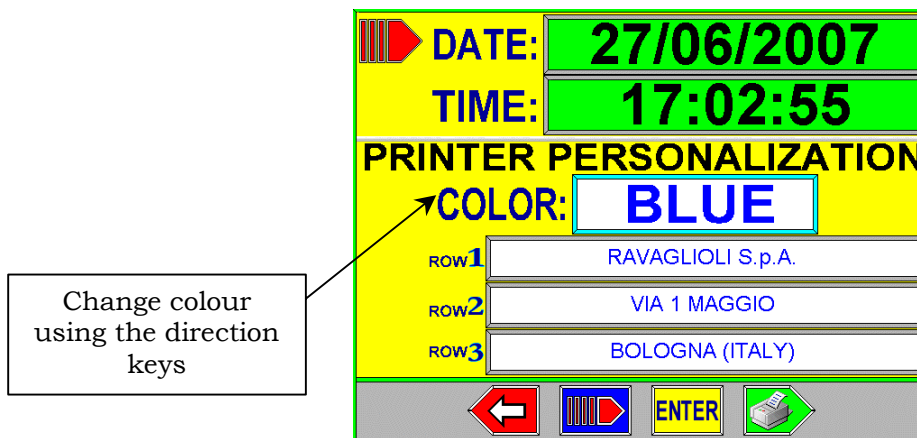


Figure 22

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Return to the initial configuration page. (Figure 16)
			Move the selection down.
			Introduce and confirm data.
			Print the report personalisation logo

4.2.3. Test line layout

Press key **F1** from the initial page (para. 4.1, page 19). The system will display Figure 16. Using key **F2** move to the «**TEST LINE LAYOUT**» icon and press **ENTER/F3** to display Figure 23.

Line tests are shown in green.

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.

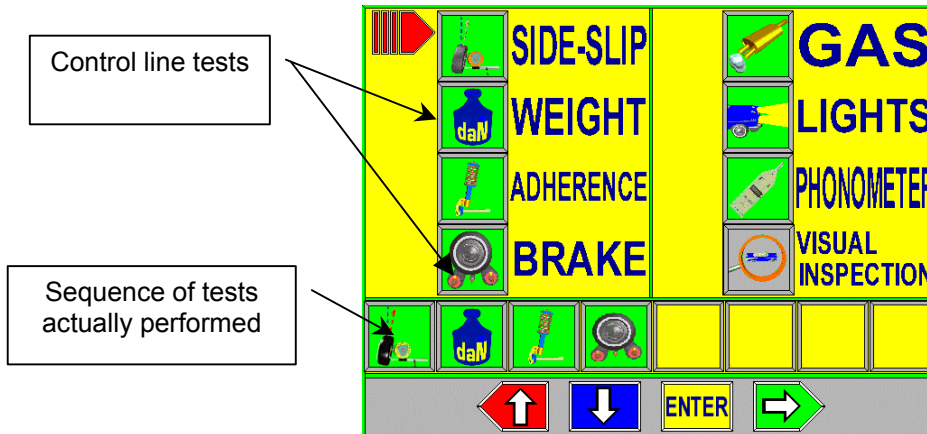


Figure 23

	REMOTE CONTROL	PC KEYBOARD	DESCRIPTION
			Move the selection up
			Move the selection down
			Start or stop the selected test
			Confirm the order and return to the configuration page (Figure 16)

Press key **F4** to confirm the introduced sequence and return to the “program configuration” menu (Figure 16).

4.2.4. Environmental conditions (optional)

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 (see para. 3.7 on page. 17).

To introduce the environmental condition data, press key F1, from the initial page, to display the configuration page (Figure 24), move to the environmental condition icon using key “F2” and press ENTER/F3 to confirm.

POSSIBLE SELECTIONS:

- Press key “F1” to return to the previous page.
- Press key “F4” to change language. The program language can be selected from among the 20 available.

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 pressing “F3/ENTER” to change the previously entered data.

POSSIBLE SELECTIONS:

- Press key “F1” to return to the previous page.

The environmental values will show in YELLOW if they refer to a previously entered measurement or in WHITE if they have just been entered or changed.

- 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 at least once before starting the measurement cycle. The system can also be set at pre-established time intervals or before each test cycle.

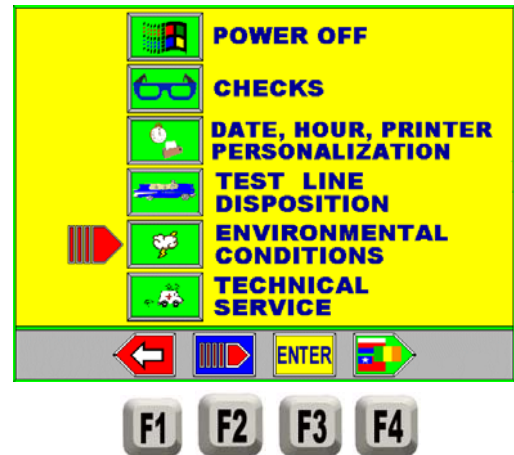


Figure 24

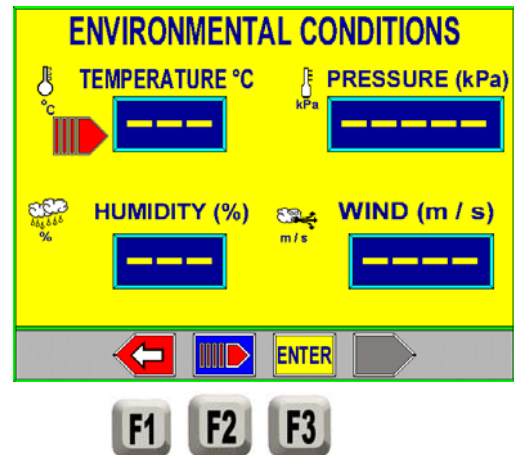


Figure 25

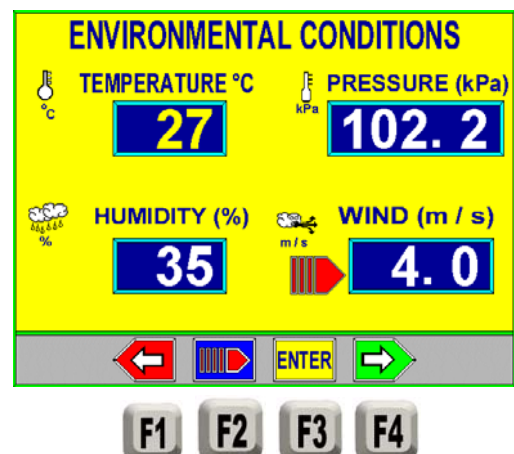


Figure 26

4.3. Selecting the language

From the presentation page (Figure 14) press key “**F1**”. The configuration menu will appear (Figure 16).

Press key F4. The program will display a page where a language can be selected from among the 20 available.



Figure 27

Use key F2 to select the required language. Press key **F3/ENTER** to confirm. The program returns to the configuration page (Figure 16).

4.4. 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 14) appears, press **ENTER/F3**: the list of available tests will appear (see example Figure 28).

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).

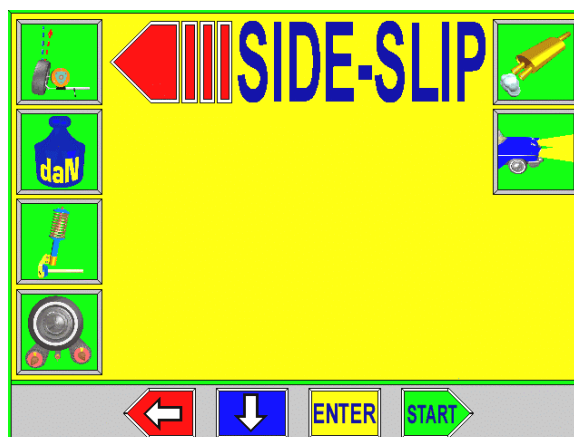


Figure 28

4.5. Choosing the vehicle category

After selecting the type of test to be performed (para. 4.4) or pressing **START/F4** from the initial page (Figure 14) the vehicle category will be requested (Figure 29).

By means of the blue key on the remote control (or **F2**) position the index on the vehicle type and press **ENTER/F3**.

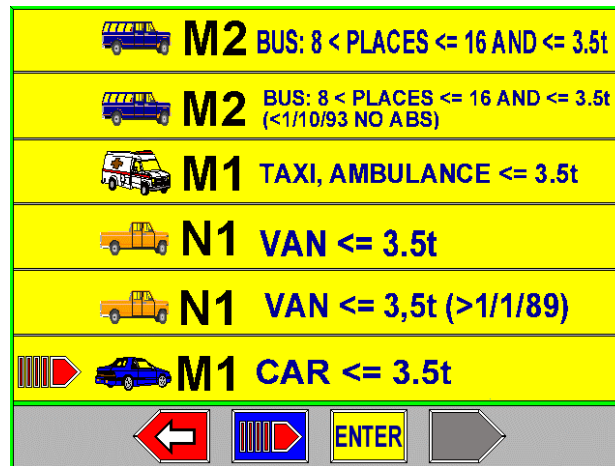


Figure 29

Key to Figure 29:

VEHICLE CATEGORY	DESCRIPTION
M2 BUS: 8 < PLACES <= 16 AND <= 3.5t	Bus seating from 8 to 16 with overall weight of 3500 kg or LESS
M2 BUS: 8 < PLACES <= 16 AND <= 3.5t (<1/10/93 NO ABS)	Bus seating between 8 and 16 with overall weight of 3500 kg or LESS, homologated before October 1 1993 without ABS
M1 TAXI, AMBULANCE <= 3.5t	Taxis and Ambulances with overall weight of 3500 kg or LESS
N1 VAN <= 3.5t	Vehicles used to transport goods having an overall weight of 3500 kg or LESS
N1 VAN <= 3,5t (>1/1/89)	Vehicles used to transport goods having an overall weight of 3500 kg or LESS, homologated after January 1 1989
M1 CAR <= 3.5t	Cars having an overall weight of 3500 kg or LESS

Once the vehicle category has been selected, the system will show the following display page:



Figure 30

Using key F2 move the icon and confirm selection with the **ENTER/F3** key. If the vehicle features a tow hook, the towable weight will have to be entered (see Figure 30 on page 30) so the system can correctly calculate the braking efficiency value of the parking brake. To enter the tow weight, press key **ENTER/F3**. Key in the weight and confirm by pressing **ENTER/F3** again (see Figure 31 on page 30).

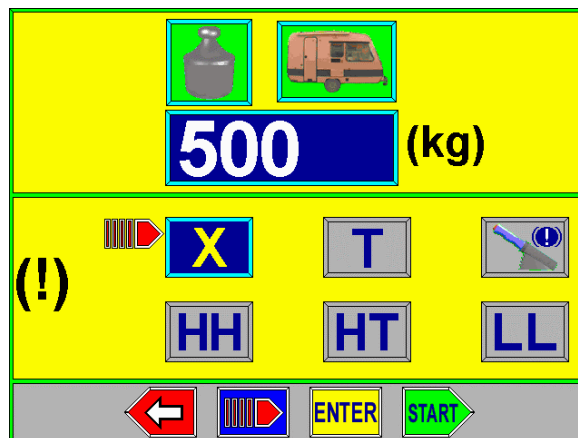


Figure 31

After entering the towable weight (if necessary), select the type of auxiliary brake (X, TT, LL, HH, HT or coinciding with the parking brake). Using the F2 key, move the cursor onto the selected icon, press key **ENTER/F3** to confirm. The icon will change colour, press key **START/F4** to start the measurement cycle.

NOTE: The type of auxiliary brake can also be changed during display of final summary (Figure 43 on page 37).

4.6. Side-slip procedure

The side-slip test indicates vehicle side slip expressed in metres over a distance of one kilometre.

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 32) 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.

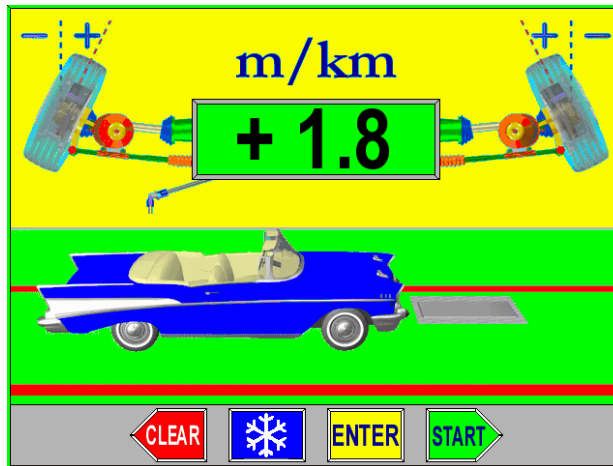


Figure 32

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

4.7. 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 33.

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.

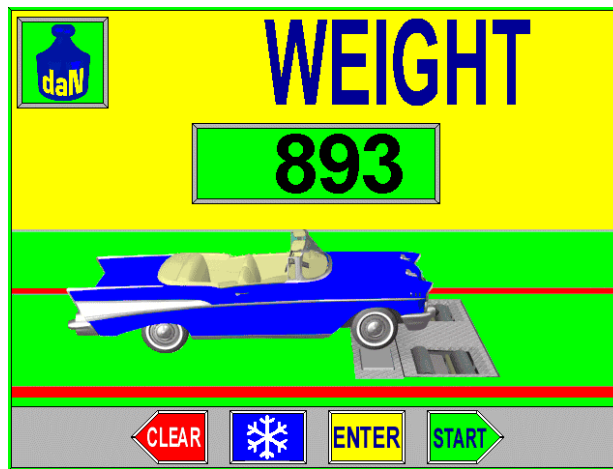


Figure 33

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

4.8. Adherence test procedure

□ Preparing for the test

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

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

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

Reading are normally assessed as follows:

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

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

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

□ Performing the test

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

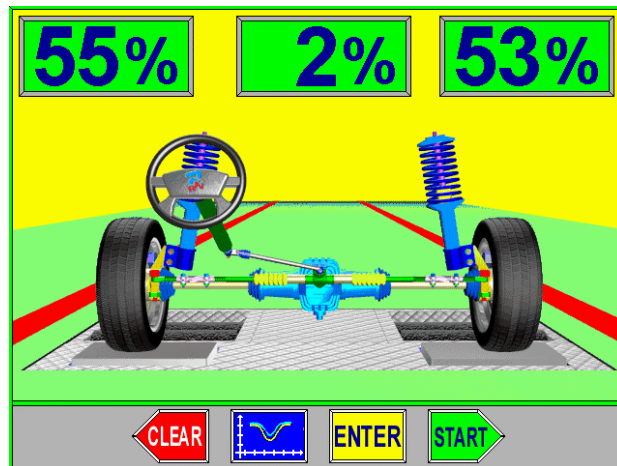


Figure 34

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

The displayed readings are automatically stored after a few seconds. Within this time, the operator can nevertheless press the F2 key to display the test graph.

□ **Displaying the graph**

The adherence graph shows: the evolution of the percentage measurements detected on the left and right wheels depending on the frequency of platform movement. The lowest point of the curve shows the frequency at which minimum weight on the wheel is detected; this frequency, called resonance frequency, is normally 12 ÷ 18 Hz.

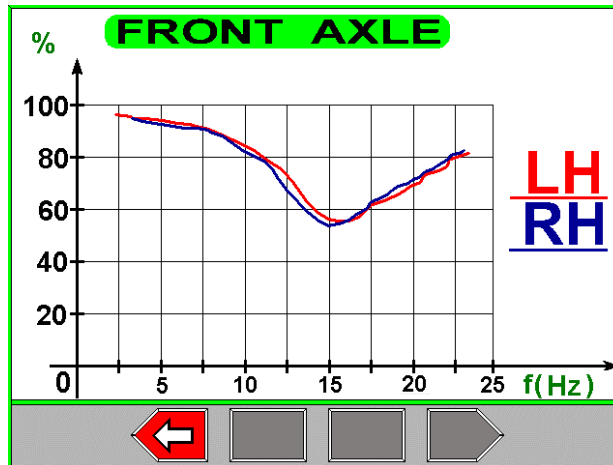


Figure 35

To exit from graph display, press the STOP/F1 key on the remote control. The monitor will once again show the page with the numeric results of the suspension test. At this point, the operator can store the test just performed by pressing ENTER/F3 or repeat it by pressing START/F4.

4.9. 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 36 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 (eg. 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.

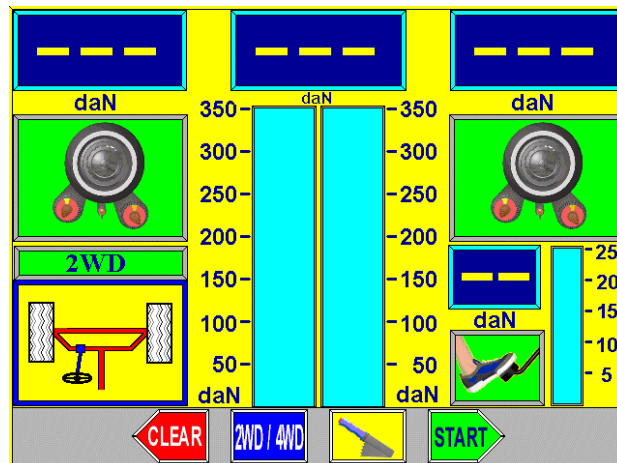


Figure 36

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

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

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

- Slipping of one of the two wheels.
- Stop by the remote control or keyboard from the user, by selecting the keys STOP or F1.
- Reaching of threshold difference in 4WD mode.
- Reaching of the maximum threshold of effort on the pressure pedal meter, on the service brake control device or on the hand brake control device.

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

□ **Wheel drag, brake heating**

After starting the rollers, wait for the braking pressure readings to appear on the digital indicators; at this stage, DO NOT BRAKE. The readings that appear on the outer upper indicators, referring to the left and right wheels (see Figure 37) indicate the pressure needed to drag the unbraked 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.

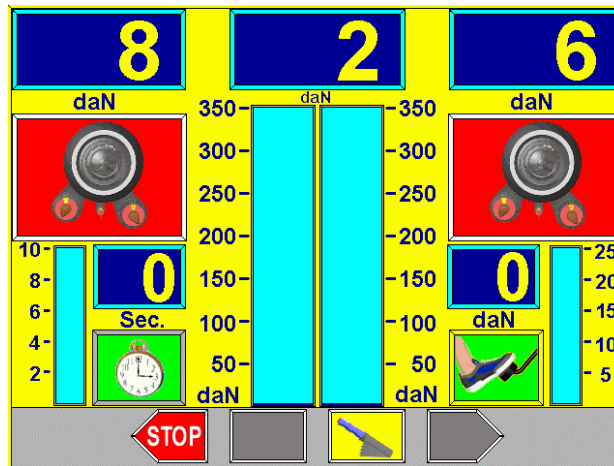


Figure 37

□ **Brake ovality or out-of-roundness**

Operate the brake pedal until a pressure reading of 80-100 daN is shown on the indicators; press the key with the ovality symbol; on the left side of the screen, the ovality procedure symbol will appear (see Figure 38), maintain the same pressure on the brake pedal throughout.

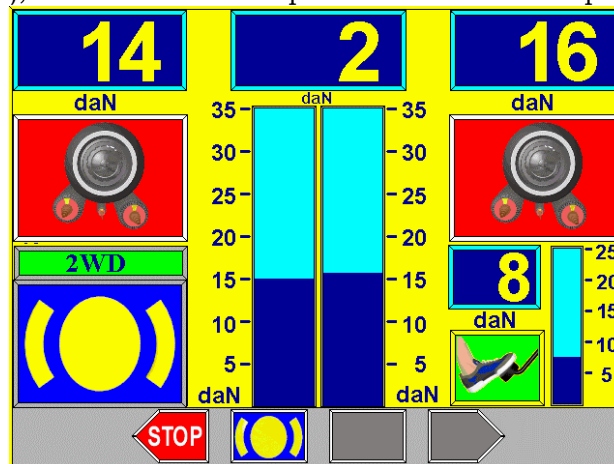


Figure 38

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 analyse a braking progression.

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

Slowly and gradually operate the brake pedal, observe the braking pressure and pedal pressure readings on the analog and digital indicators and assess their simultaneous progression. See Figure 39.

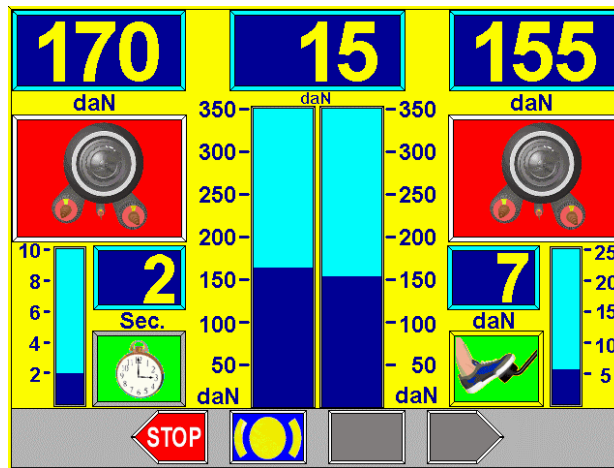


Figure 39

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

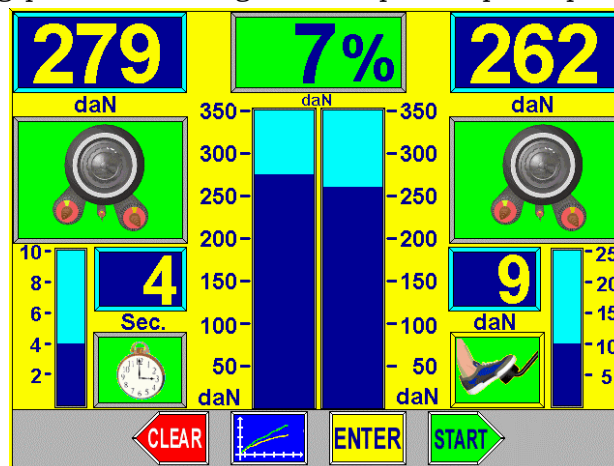


Figure 40

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 41.

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.

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

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 41. 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.

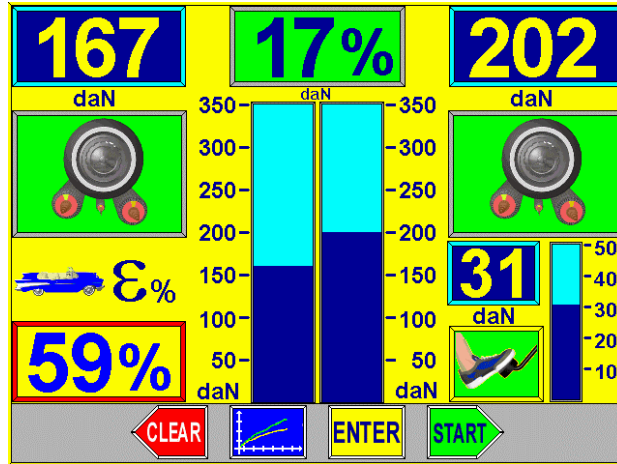


Figure 41

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.

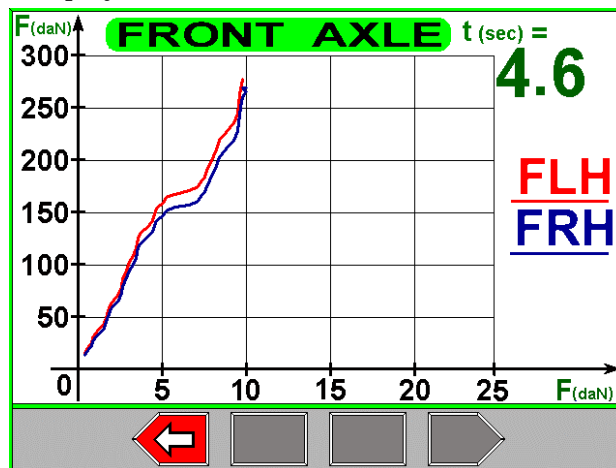


Figure 42

The axis of ordinates shows the left and right braking forces, while the axis of the abscissa shows the time that has passed (see Figure 42) 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 43).

The % unbalance values between the wheels (symbol $\Delta\%$) and the % braking efficiency values (symbol $\epsilon\%$) are shown in very large figures, which can be seen from a distance and distinguished by colours 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.

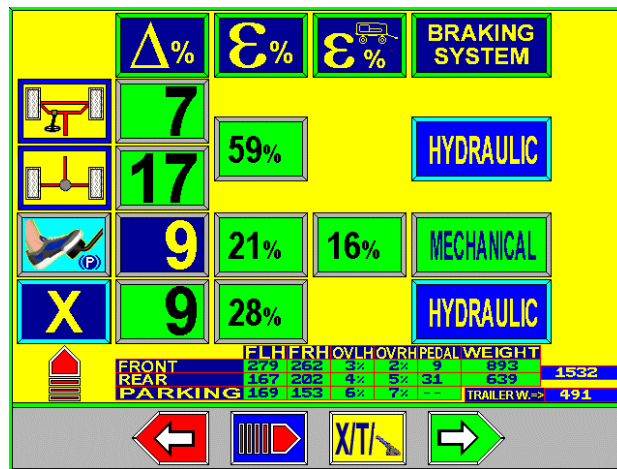


Figure 43

5. OTHER TESTS (OPTIONAL)

5.1. Headlight test with Tec nolux 2800- MCTC instrument

□ Making connection

To perform the headlight test, the program shows the display page in Figure 44.
 Start the instrument, make sure the appliance is connected up properly and select the “**F4/START**” key.

POSSIBLE SELECTIONS:

- Press key “**F1**” to return to the previous page.



Figure 44

□ Checking headlights

Wait a few moments for instrument connection.
 Now check the headlights of the vehicle being tested. The program will display Figure 45 for the entire headlight test!
 Press key “**F4**” to start the headlight test on the instrument (as per manual supplied with the appliance).



Figure 45

Important!

If the headlight tester is not properly connected or is switched off, the monitor will show an error signal on red background.
 Make sure the connection is correct and press key “**F1**” to exit from the error display page. Make the connection again (see para. Figure 44 on page 40 “Making connection”)



Figure 46

□ **Data display**

At the end of the complete procedure, the final headlight test summary will appear. (Figure 47)
 Press key “**ENTER/F3**” to confirm.

The test values are shown in: **RED** if outside tolerance and **GREEN** if within tolerance.

The height and headlight type values are shown below in **BLUE**, as these have to be checked with tolerance thresholds.

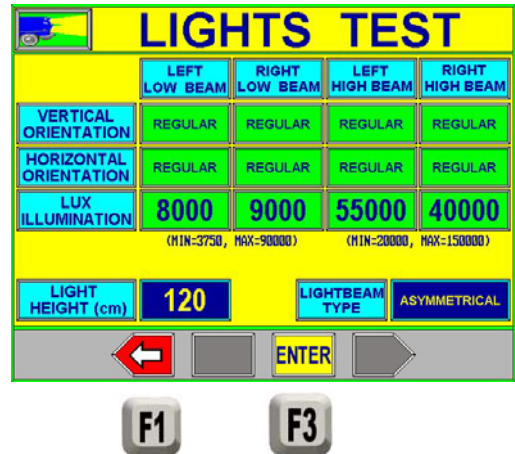


Figure 47

If the headlight test is considered over, press key “**F4/YES**” on the PC to confirm and terminate the test.



Figure 48

5.2. Headlight test with MCTC-Net compatible instrument

If a headlight tester of the “RS senza esito” type is used, the program will display the following display Figure 49. Select the test to be performed by means of the “**F2**” key.

Start the instrument, make sure the entire appliance is properly connected and select the “**F4/START**” key. At the end of the procedure, the program will display the final summary.

POSSIBLE SELECTIONS:

- Press key “**F1**” to return to the previous page.
- Press key “**F3**” to display the test summary.

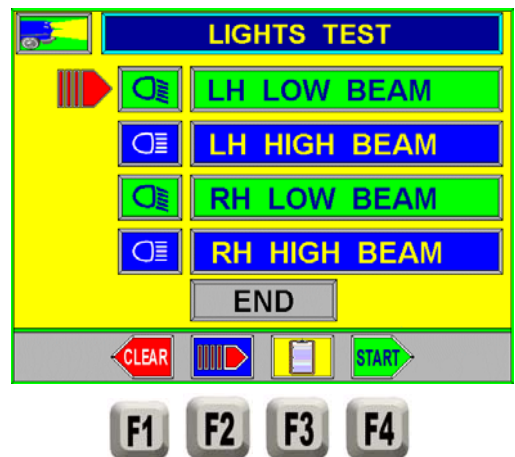


Figure 49

5.3. Sound-level meter test

□ Entering data

Make sure the sound-level meter is connected and start the instrument.

By means of the “F2” key, move the cursor along the directive with which the test has to be performed. The program shows Figure 50. Press key “F4” to confirm the chosen directive.

POSSIBLE SELECTIONS:

- Press key “F1” to abolish the procedure.



Figure 50

Once the directive has been selected, the program shows a display page with the data relating to the sound-level meter test, with indication of limit values relating to the vehicle being tested.

Such values were entered during the acceptance phase:

- Noise limit value
- Number of rpm at which the noise test is performed
- Minimum rpm value

Press key “F4” to continue.

POSSIBLE SELECTIONS:

- Press key F1 to return to previous page.
- Press key “F2” to select the required field
- Press key “F3” to manually change the entered data

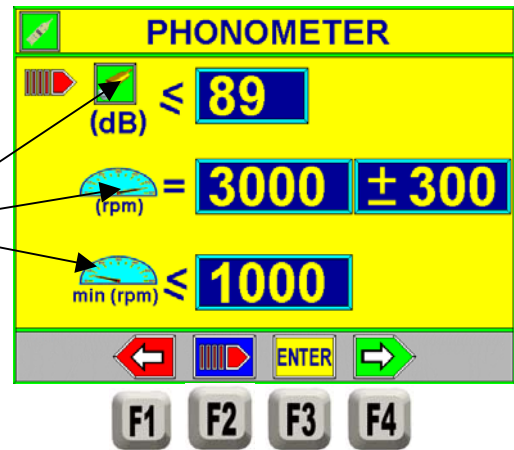


Figure 51

Enter the type of rpm governor if this is fitted. Press key “F2” to select the desired field and confirm using the “F4” key to continue.

POSSIBLE SELECTIONS:

- Press key F1 to return to previous page.

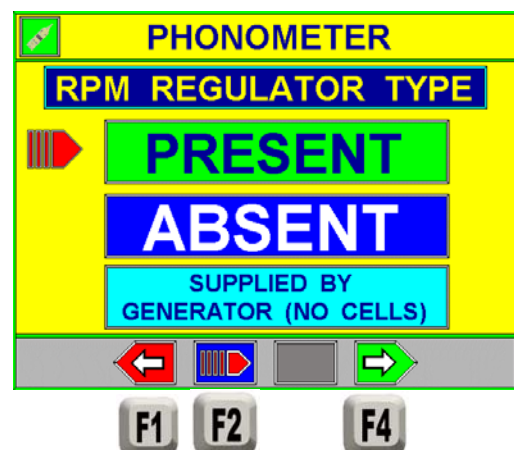


Figure 52

At this point, the program shows the silencer technical data page. These data are shown in the vehicle registration book. Check and if necessary change the previously-entered data. Press key **F4** to confirm and continue.

POSSIBLE SELECTIONS:

- Press key **F1** to display the previous page.
- Press key **F2** to position on the desired item.
- Press key **F3/ENTER** to change the entered values.

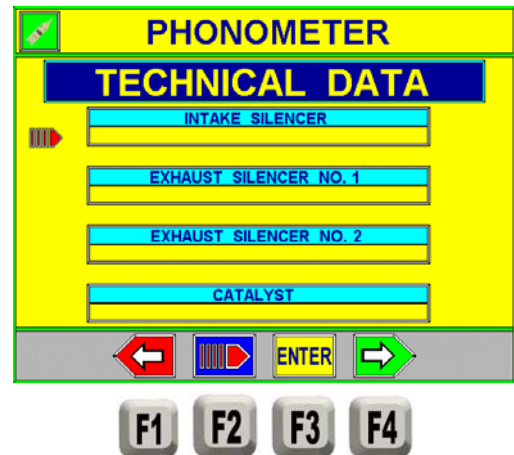


Figure 53

Select the exhaust distance if the vehicle features 2 exhausts or select a single exhaust: Press key “**F4**” to continue.

POSSIBLE SELECTIONS:

- Press key **F1** to return to previous page
- Press key **F2** to select the desired field.

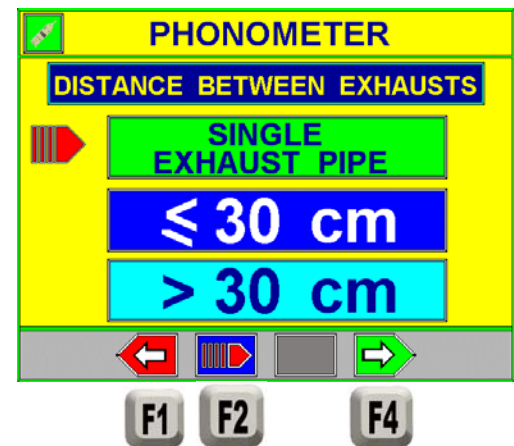


Figure 54

□ **Performing the test. Background noise**

Wait for the instrument to start up completely (about 8 seconds).

Press key “**F4**” to confirm and continue.

The program shows the Background Noise test preparation page. Position the sound-level meter according to the selected directive and according to Ministry of Transport instructions – Circular 88/95 dated 6 September 1999.

Press key **F4/START** to continue test.

POSSIBLE SELECTIONS:

- Press key **F1** to return to the previous page.

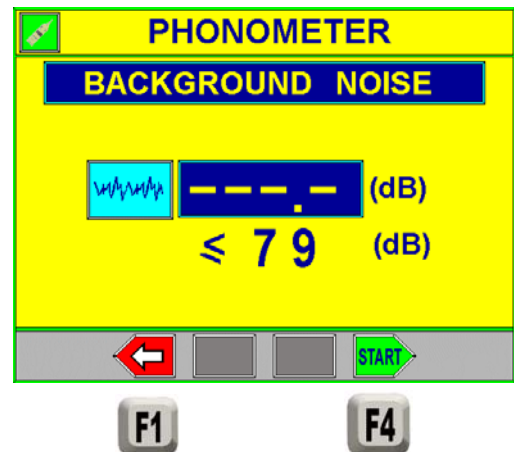


Figure 55

In Figure 56, the program displays background noise maximum peak acquisition.

Press key **F1** on the PC to interrupt and repeat the test (**NOTE** The program will show Figure 54 again).

If the test is satisfactory, press key "**F3/ENTER**" to confirm and continue to test the acoustic indicator.

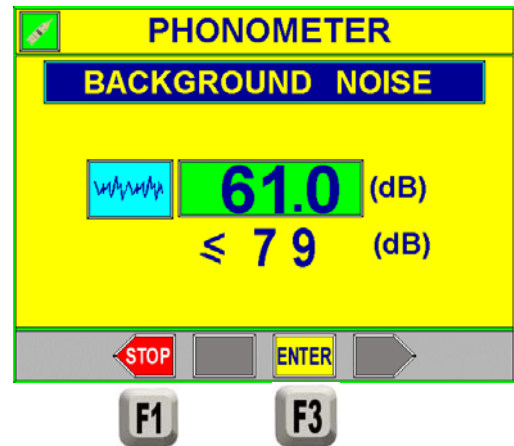


Figure 56

□ **Acoustic indicator**

Upon confirmation of the background noise, the program displays the acoustic indicator test preparation page.

The example in Figure 57 shows that the instrument must be placed at a distance of 7 m in front of the vehicle because the item relating to motor vehicles that comply with directives 70/157/EEC; 73/350/EEC; 77/212 EEC regulation number 9 ECE-ONU has been previously selected (see Figure 50).

For motor vehicles approved according to C.A. 393/59, measurement is taken in front of the vehicle, at 30 m from this and the sound intensity must be above or the same as 80 dB.

Position the sound-level meter according to the selected directive pursuant to Ministry of Transport provisions - Circular 88/95 dated 6 September 1999. Press key **F4/START** to follow the test.

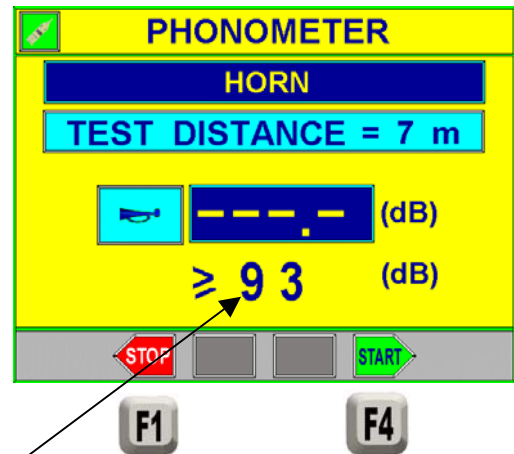


Figure 57

Limit value of sound intensity

POSSIBLE SELECTIONS:

- Press key **F1** to return to the previous page.

Figure 58 shows the acquisition of the maximum sound intensity of the acoustic indicator.

Press key **F1** on the PC to interrupt and repeat the test (**NOTE:** The program will display Figure 57 again).

If the test is satisfactory, press key **F3/ENTER** to confirm and continue with the noise test.

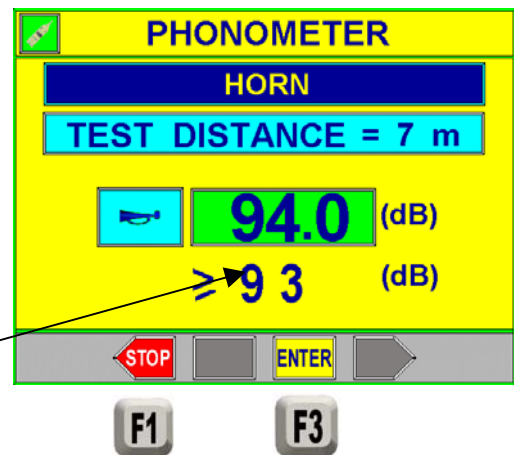


Figure 58

Maximum sound intensity of the acoustic indicator

□ **Noise test**

Connect the external revolution counter. The engine should be running at the speed indicated on the registration booklet, to be determined using the revolution counter.

Prepare for the test and press key **START/F4** to start accelerating.

POSSIBLE SELECTIONS:

- Press key **F1** to display the previous page and interrupt the noise test.
- Press key **F2/RPM** to enter the number of engine revs manually.

IMPORTANT: The number of revs can be entered manually but at the end of the sound-level meter test the program will show a page dedicated to notes as justification of the manually introduced datum.

Start accelerating until running speed is achieved. The program will take at most 8 measurements.

On reaching the running threshold, keep the number of engine revs constant.

Release the accelerator slowly as suggested by the program. The program is now storing the measurement taken.

Press key **F3/ENTER** to store the measurement, press key **F4/START** to continue with subsequent measurement.

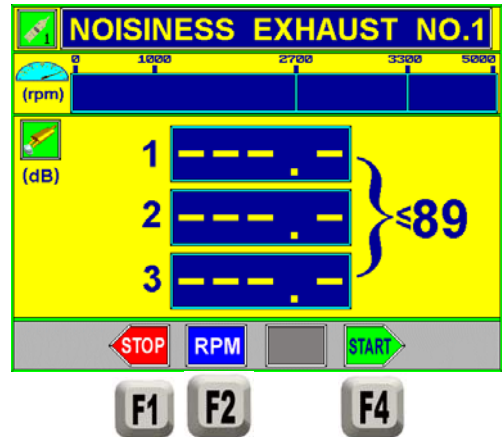


Figure 59

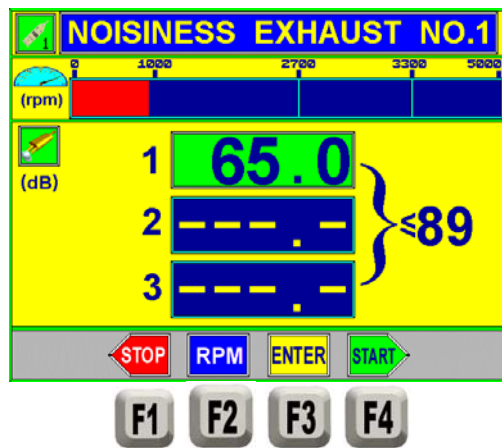


Figure 60

Important: If the difference of two consecutive measurements is more than 2 dB, at the end of each measurement, ONLY the last measurement taken can be repeated by pressing the F4/START key.

After all the tests have been made, the screen shows the page of Figure 61.

The results are valid if, between two consecutive measurements, the difference is not more than 2 dB.

The highest value read must not exceed the maximum level shown on the registration book of the motor vehicle being checked.

To repeat the test press.

Nr. of engine revs

Alarm signal.
 Displayed on red background in white letters.
 The difference between 2 consecutive measurements is above 2 dB.



Figure 61

□ **Final summary of the sound-level meter test**

At the end of the entire procedure, press the “**F3/ENTER**” key from Figure 62; the PROGRAM will show a final summary page of the sound-level meter test.

The test values are also shown in colour:
RED – outside tolerance,
GREEN – within tolerance.

If the sound-level meter test is considered over, press the **ENTER/F3** key on the PC to pass onto the next stage.

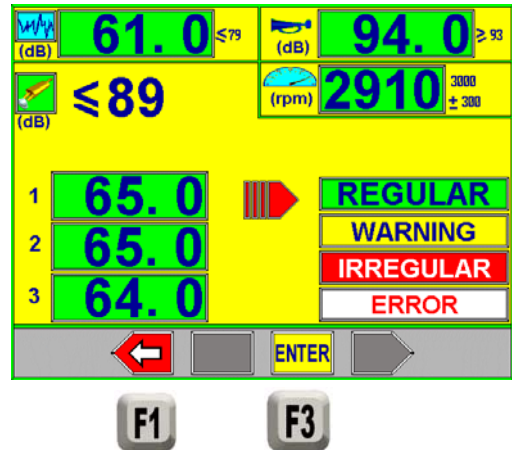


Figure 62

POSSIBLE SELECTIONS:

- Press key **F1** to perform the sound-level meter test again.
- Press key **F2** to move to the test result.

In the event of the results between the two consecutive measurements showing a difference of over 2 dB, the program shows the following indications on the final summary page.

The example of Figure 63 also indicates that the background noise value is excessive. This is shown on a red background because it is outside tolerance.

Alarm signal

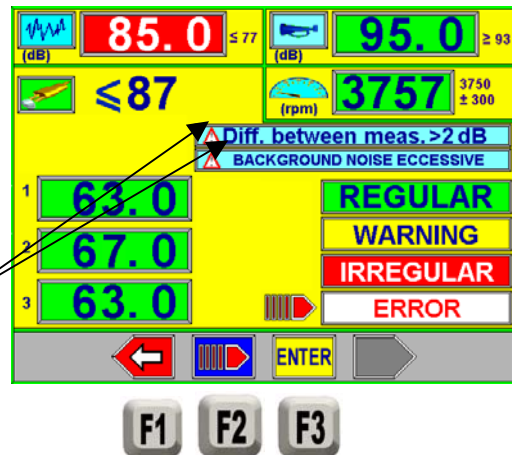


Figure 63

Once the test result has been entered, the program asks to confirm the entered data: Press the “**F4/YES**” key to terminate the sound-level meter test.



Figure 64

Important! If the sound-level meter is not properly connected or is off, the screen will show system error nr. 302 on red background:



Figure 65

Check the connection and press key **F2/REPEAT** to make the connection again
 Press key **F1** to exit from the error page and start the test again.

5.4. Exhaust gas test

As initial page of the exhaust fume test, the screen shows the type of vehicle chosen and the test to be performed. See example of Figure 66.
 Press key **F4** to continue

POSSIBLE SELECTIONS:

- Press key **F1** to abolish the test

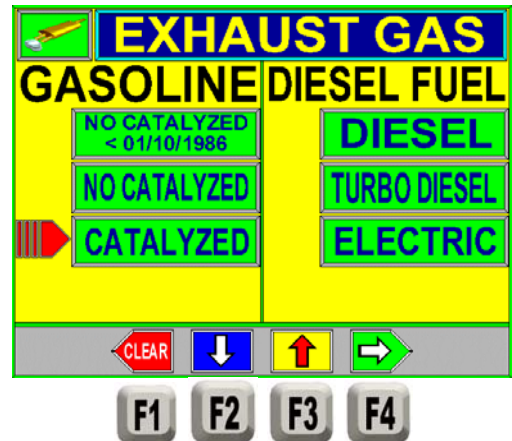


Figure 66

□ **Entering the vehicle registration data**

When key “**F4**” is pressed on the exhaust fume test display page, the screen shows the following display page (Figure 67). Press key **F2** to position the cursor on the required field. Press key **F4** to continue

POSSIBLE SELECTIONS:

- Press key **F1** to abolish the test

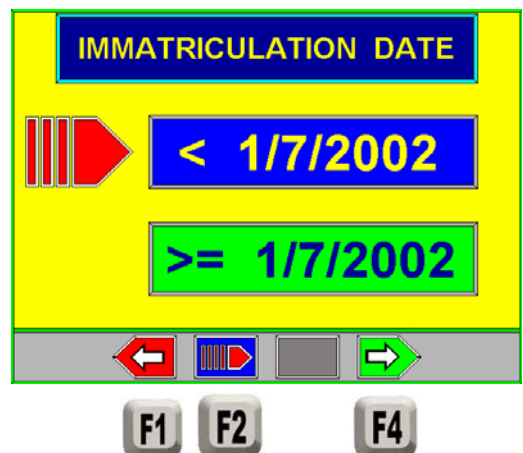


Figure 67

□ **Entering nominal vehicle data**

When key “F4” is pressed on the exhaust fume test display page, the following display page appears on the screen. To manually enter the nominal vehicle data, press key F2 to position the cursor on the required field. Press key “ENTER/F3” to manually enter the value.

- Max rpm during test at minimum.
- Rpm from MINIMUM to MAX during accelerated minimum test. **CATALYTIC VEHICLES ONLY**
- Minimum oil Temperature Degree

Press key F4 to continue displaying the page in Figure 69.

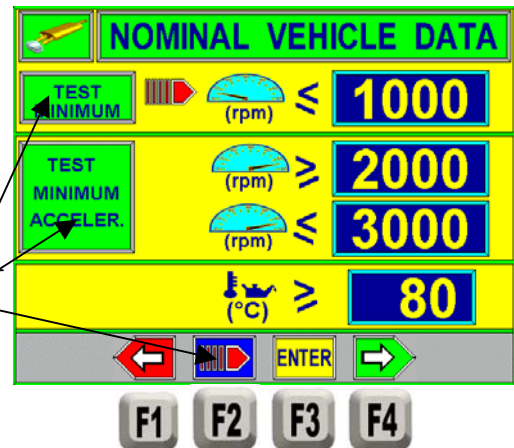


Figure 68

POSSIBLE SELECTIONS:

- Press key F1 to display previous page
- Press key F2 to select the required field.

Enter the tolerance values of the minimum test and of the minimum accelerated test.

VALUES TO BE ENTERED
CATALYTIC VEHICLES ONLY

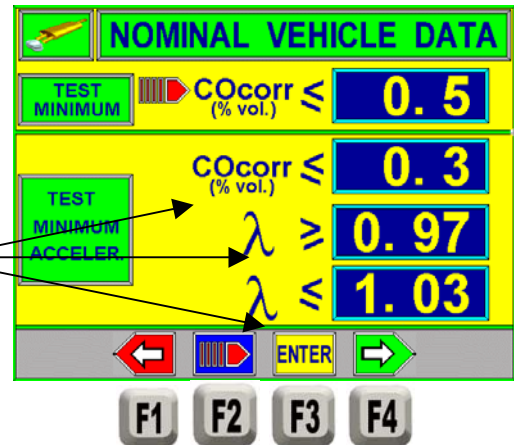


Figure 69

Press key “F4” to continue the exhaust fume test

POSSIBLE SELECTIONS:

- Press key “F1” to return to previous page
- Press key “F2” to select required field.
- Press key “F3” to manually enter the tolerance value.

□ **Selection of number of exhausts**

By selecting key “F4” from the page of Figure 69, the monitor shows the exhaust fume selection page relating to the number of exhausts on the vehicle. Press key F2 to position the cursor on the required number of exhausts and press key F4 to confirm and continue.

POSSIBLE SELECTIONS:

- Press key F1 to return to the previous page

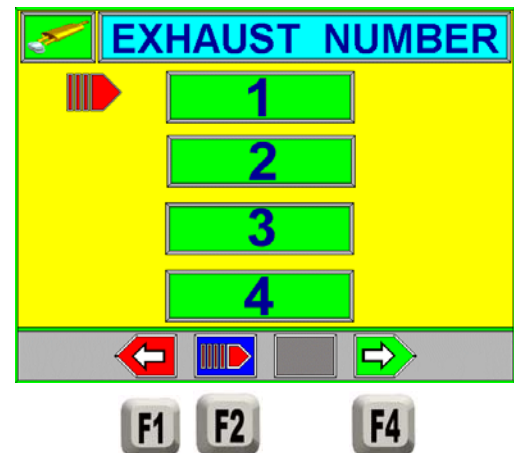


Figure 70

When key **F4** is pressed, the monitor shows a preparation page indicating the exhaust being tested. Press key **START/F4** to start the exhaust test.

POSSIBLE SELECTIONS:

- Press key “**CLEAR/F1**” to abolish the test.



Figure 71

□ **Performing the test. Preliminary operations**

Wait for the execution of AUTO ZERO, keeping the probe outside the exhaust.
 Wait for TEST HC to be performed, keeping the probe outside the exhaust.

Fit the probe in the exhaust. Connect the device for reading the number of rpm and the probe for reading the oil temperature. Press key **START/F4** to start the test.

Refer to the instrument manual to interpret the various polluting agents for the test procedures.

□ **First exhaust fume phase**

Maintain the minimum and wait for the values to stabilise. For 30 sec., the program will not display any operating keys.

After 30 sec., when the displayed data are acceptable, press key **ENTER/F3** to store them and go on to stage 2 of the test.

POSSIBLE SELECTIONS:

- Press key **F1/T°** to manually enter the oil temperature.
- Press key **F2/RPM** to manually enter the number of rpm.
- Press key **F4/START** to repeat the test.

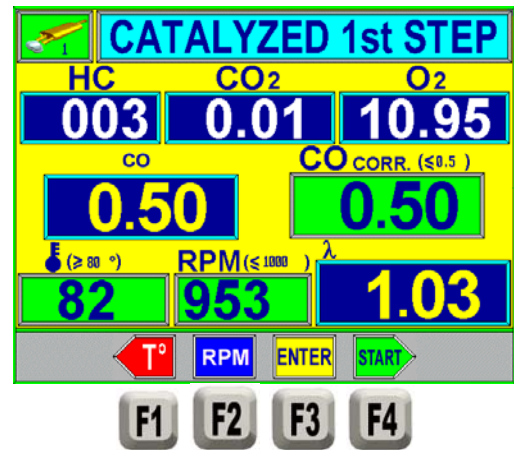


Figure 72

□ **Second exhaust fume phase (catalysed vehicles only)**

Accelerate to 2000 - 2500 rpm and keep the number of rpm constant until the indicated values are stable. For 30 sec. the program will not display any operating key. After 30 sec. have passed, press key **ENTER/F3** to store the values and end the test.

When key **ENTER/F3** is pressed, remove the probe from the exhaust and wait for the circuit to be drained.

POSSIBLE SELECTIONS:

- Press key **F1/T°** to manually enter the oil temperature.
- Press key **F2/RPM** to manually enter the number of rpm.
- Press key **F4/START** to repeat the test.

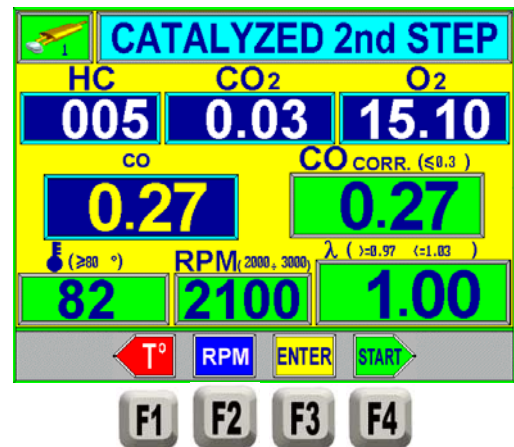


Figure 73

5.5. Opacimeter test

The program will show the type of vehicle chosen and indicate the test to be performed. See example in Figure 74.

Press key **F4** to continue

POSSIBLE SELECTIONS:

- Press key **F1** to abolish test

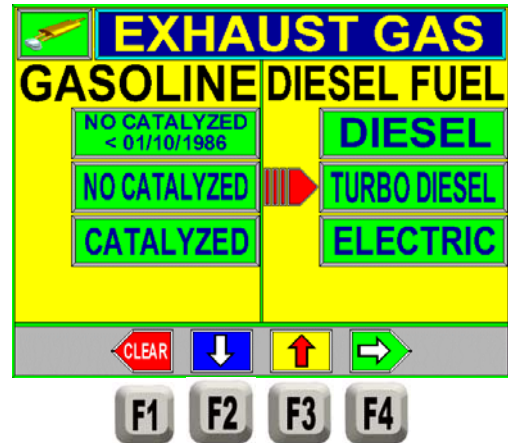


Figure 74

❑ Entering vehicles in conformity with the various directives

By means of “**F2**” select the type of directive corresponding to the vehicle being tested.

Press key “**F4**” to confirm and continue the opacity test.

POSSIBLE SELECTIONS:

- Press key “**F1**” to return to the previous page.
- Press key “**F2**” to move the cursor to the required field.
- Press key “**F4**” to confirm and continue the opacity test

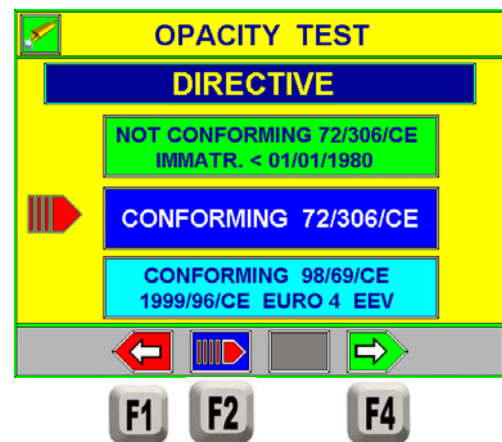


Figure 75

❑ Entering the nominal data of the vehicle

On pressing key F4 on the exhaust fume test display page.

Press key “**F4**” to continue the opacity test.

POSSIBLE SELECTIONS:

- Press key “**F1**” to return to the previous page.
- Press key “**F2**” to move the cursor to the required field.
- Press key “**F3**” to manually enter the nominal data of the vehicle being tested.

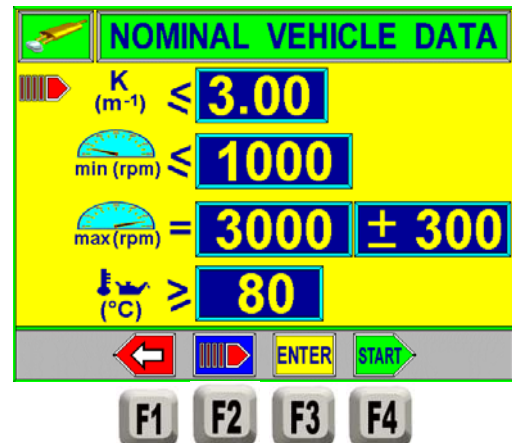


Figure 76

□ **Preliminary operations**

Wait for the execution of AUTO ZERO keeping the probe outside the exhaust.

Connect the device for reading the number of rpm and the probe for reading the oil temperature.

At this point read the number of engine rpm while maintaining the minimum as indicated in Figure 77.

Press key **F3/ENTER** to confirm and continue

POSSIBLE SELECTIONS:

- Press key **F2/RPM** to manually enter the number of engine rpm.
- Press key **F1** to return to the previous phase.

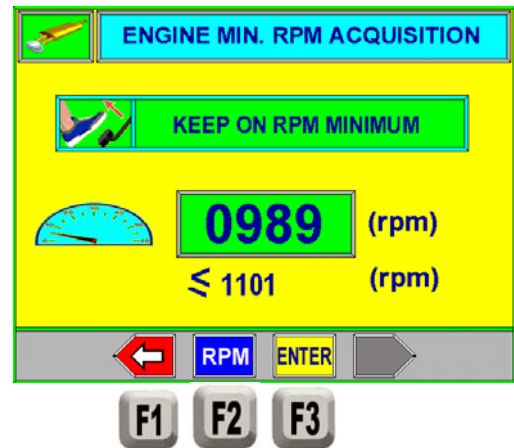


Figure 77

Quickly, but not violently, operate the accelerator until 3000 +/- 100 rpm as indicated in Figure 78. Press key **F3/ENTER** to confirm and continue.

POSSIBLE SELECTIONS:

- Press key **F2/RPM** to manually enter the maximum engine rpm.
- Press key **F1** to return to the previous phase.

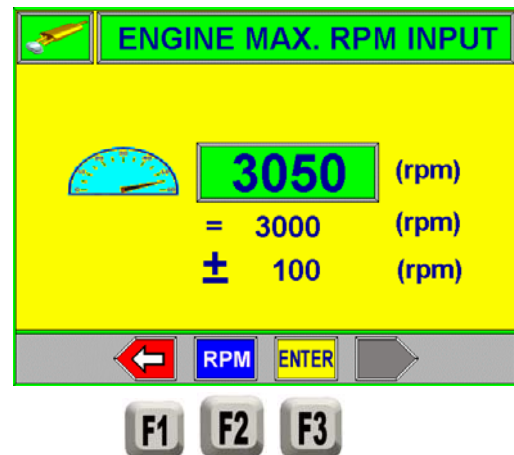


Figure 78

Read the engine oil temperature. This must be over 80° as shown in the Figure alongside.

POSSIBLE SELECTIONS:

- Press key **F2/T°** to manually enter the temperature
- Press key **F1** to return to the previous phase.

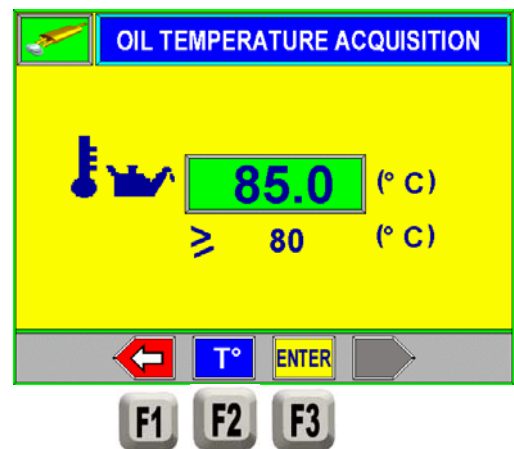


Figure 79

□ Performing the test

Fit the probe in the exhaust. Press key **ENTER/F3** to start the test.

The operator should prepare to accelerate.

IMPORTANT: For supercharged engines registered before 1/10/1980 and not in conformity with directive 72/306/EC ONLY, the program displays Figure 80, Now proceed as follows:

Start accelerating for at least 3 sec. Maintain the engine revs constant at 50% of the max power rpm (Value between 1200 and 1800 rpm).

After 3 seconds, the program shows Figure 81.

Constant number of engine rpm
 Value between 1200 and 1800 rpm
 Wait 3 sec. before starting to accelerate

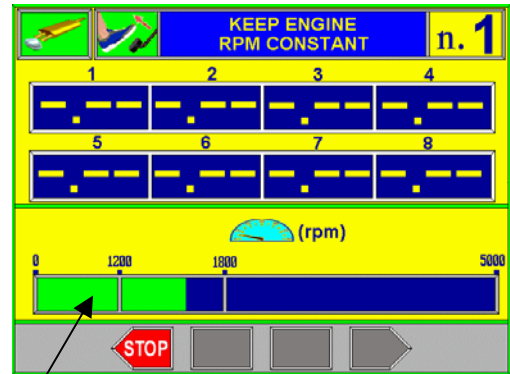


Figure 80

Refer to the instrument manual for the specific interpretation of the data and test procedures.

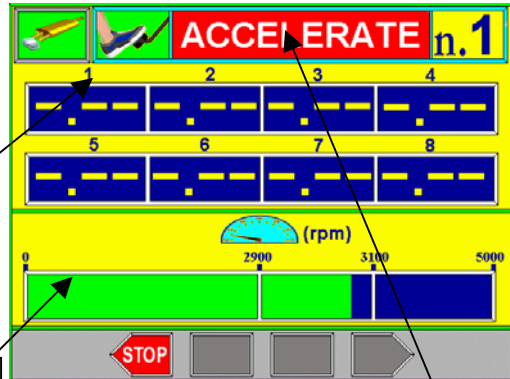
Perform accelerations in sequence. At the top of the screen, the operations to be performed will be shown.

The number of accelerations to be made is between 3 and 8.

The result is calculated out of 3 consecutive accelerations.

Start accelerating until the set value is achieved (in the example 2900 ÷ 3100 rpm).

Accelerate until the opacity value is shown.



Number of rpm read.
 Value between 2900 and 3100 rpm

Acceleration in progress

Figure 81

Release the accelerator pedal and repeat the same procedure for the subsequent accelerations.

“RELEASE” indication

First opacity value read

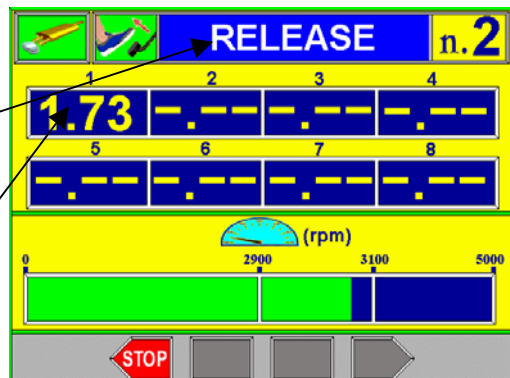


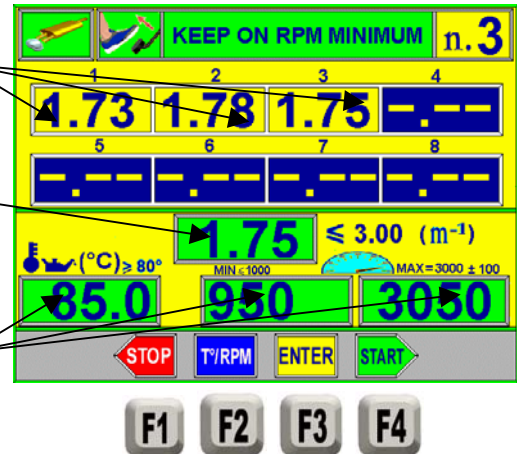
Figure 82

Once accelerations are over, the screen shows the average opacity reading.

Opacity read during the various accelerations

Average opacity read

Temperature and rpm found in previous phases



Press key **F3/ENTER** to confirm and continue.

POSSIBLE SELECTIONS:

- Press key **F1/STOP** to abolish the opacity procedure.
- Press key **F2/T°-RPM** to manually enter the temperature and/or the number of engine rpm.
- Press key **F4/START** to repeat the opacity test.

Figure 83

5.6. Entering the results of the sight checks

By entering the results of the sight checks, the operator is able to notify any irregularities as regards the devices which are subject to verification during periodical vehicle testing.

Simply move the cursor onto the chapter involved and press **ENTER/F3** (see Figure 84).

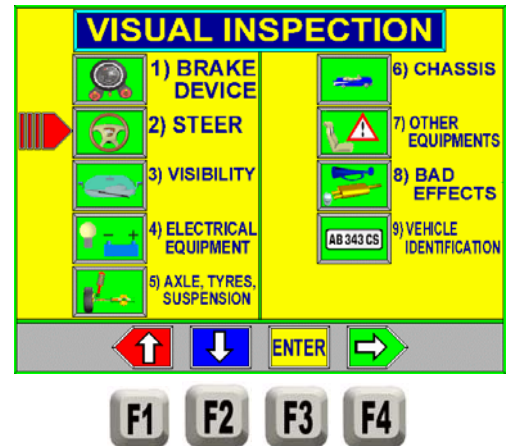


Figure 84

Now move the cursor on any indication of the irregularity found and press **ENTER/F3** to change the state (see example Figure 85).

The indication shown in RED means IRREGULAR STATE; the indication in GREEN means REGULAR STATE

Press key **START/F4** to return to the main page of the 9 chapters (Figure 84) and to go on to the next step (data printing); press **START/F4** again.

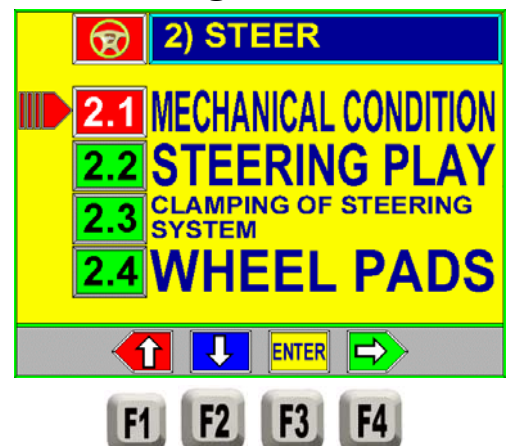


Figure 85

5.7. Data printing

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.

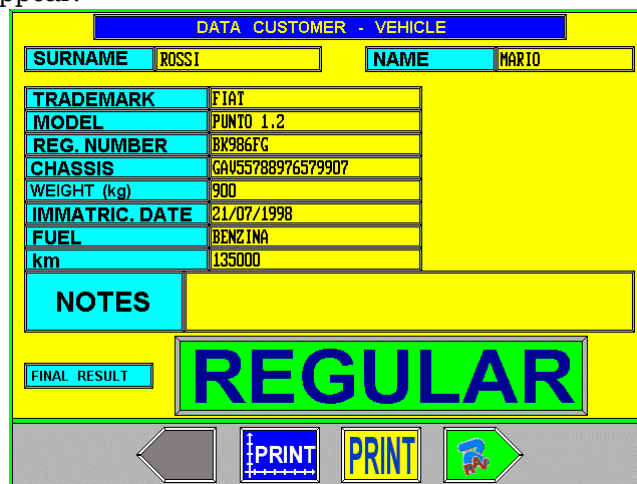
Press key F2 to print the test graphs.

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 14 will appear.



DATA CUSTOMER - VEHICLE	
SURNAME	ROSSI
NAME	MARIO
TRADEMARK	FIAT
MODEL	PUNTO 1.2
REG. NUMBER	BK986FG
CHASSIS	GAV55788976579907
WEIGHT (kg)	900
IMMATRIC. DATE	21/07/1998
FUEL	BENZINA
km	135000
NOTES	
FINAL RESULT	REGULAR

Figure 86

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

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

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

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

2 types of printouts are available:

- Complete printout
- Short printout



□ **COMPLETE PRINTOUT**



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

RAVAGLIOLI S.p.A.
VIA 1 MAGGIO
BOLOGNA (ITALY)

1

Brake tester data

Manufacturer: RAVAGLIOLI S.p.A.
Model.....: _____
Homologation number: _____
Serial number: _____
Date of expiry calibration.....: 31/12/2007

2

3

Owner and vehicle data

Surname: ROSSI
Manufacturer: FIAT
R.number: BK523AF
Immatriculat. date: 21/07/1999
Vehicle w. under test(kg) : 1562
Trailer weight (kg).....: 500
Category: M1 cars <=3.5t
Name: MARIO
Model.....: PUNTO
Chassis: 11254564364562122
Km: 95000
1 Fuel.....: DIESEL
Tare (kg).....: 900
Result of exam.....: REGULAR

4

5

6

Temperature (°C)...: 27 Pressure (kPa).....: 102.2 Humidity (%).....: 35
Date: 29/06/2007 Start time: 15:14 End time.....: 15:15

7

8

Braking system

Service brake.....: HYDRAULIC Emergency brake: HYDRAULIC
Parking brake: MECHANICAL Emergency brake system.....: XX

9

Brakes

	Front			Rear			Parking		
	Lh	Rh	Limits/Tot.	Lh	Rh	Limits/Tot.	Lh	Rh	Limits
Weight (N)	4500	4430	8930	3200	3190	6390	---	---	---
Total weight (N)	15320						---	---	---
Brake force (N)	2790	2620	---	1670	2020	---	1690	1530	---
Brake difference (%)	7 ≤ 30			17 ≤ 30			9 --		
Ovalization (%)	3	2	---	4	5	---	6	7	---
Pedal (N)	90 ≤ 500			310 ≤ 500			--- ≤ 400		
Emergency brake diff. (even if coincid. with parking brake)	---						≤ 30		

10

11

Brake efficiency (%)

	Measures		Limits		Measures		Limits	
	Service	Emergency	Parking isolated vehicle	Parking vehicle + trailer	Service	Emergency	Parking isolated vehicle	Parking vehicle + trailer
	59	---	≥ 50	≥ 25	24	18	≥ 16	≥ 12

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

13

Side slip

Front (m/Km)		Rear (m/Km)	
Measure: 6.3	Limit: -6.0 ÷ +6.0	Measure: ---	Limit: -6.0 ÷ +6.0

14

15

Notes

Test engineer

16



Example of COMPLETE PRINT- OUT:

1. Space reserved for personalisation of customer details (²)
2. Brake meter type-homologation details (these are printed on vehicle periodical testing machines)
3. Identification details of the owner being tested
4. Identification details of the vehicle being tested
5. Final result
6. Electronic weather values
7. Start and end of test automatically processed
8. Identification details of the type of braking system and emergency brake (defined by operator during final summary display - Figure 43)
9. With system featuring separate wheel weigher (adherence test) – vehicle weight split up on each single wheel.
With system featuring axle weigher (system below rollers) – weight of vehicle split up on each axle
10. MAX braking force on wheels in N (service and parking brake) and pedal
11. Ovality of left and right wheels (if performed during braking procedure) for each axle being tested
12. Service brake, emergency brake and parking brake braking efficiency Dynamic unbalance of front and rear axles of service brake, parking brake and emergency brake (if coinciding with that of parking)
13. Adherence test value (optional) - vehicle weight subdivided in every single wheel for rear and front axle
14. Side-slip test (optional) for rear and front axle
15. Space reserved for notes that can be entered manually during data entering (Figure 86)
16. Space reserved for operator approval in case of periodical vehicle testing


Example of SHORT PRINTOUT:

1. Space reserved for personalisation of customer details (³)
2. Identification details of the owner and vehicle being tested
3. Final result
4. MAX braking force on wheels in N (service and parking brake) and pedal; ovality of left and right wheels (if performed during braking procedure) for each axle being tested
5. Service brake, emergency brake and parking brake braking efficiency
6. Adherence test value (optional) - vehicle weight subdivided in every single wheel for rear and front axle
7. Side-slip test (optional) for rear and front axle
8. Space reserved for notes that can be entered manually during data entering (Figure 86)
9. Space reserved for operator approval in case of periodical vehicle testing

² From the presentation page (Figure 14) press key “F1”. The configuration menu will appear (Figure 16). Using key “F2” select “**DATE, TIME, PRINT PERSONALISATION**” and press key “ENTER/F3” to confirm and continue. This page permits changing the data concerning the manufacturer which will afterwards be shown at the top on the final printout.



□ **SHORT PRINTOUT**



Software ver. 9.60W
Firmware ver. 0.99

RAVAGLIOLI S.p.A.
VIA 1 MAGGIO
BOLOGNA (ITALY)

1

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			310			≤ 400		

Brake efficiency (%)

	Measures		Limits	Measures		Limits
	Service	Emergency		Parking isolated vehicle	Parking vehicle + trailer	
Service	59		≥ 50	21		≥ 16
Emergency	28		≥ 25	16		≥ 12

Adherence

Front (%)					Rear (%)				
Lh	Rh	Limits	Diff.	Limits	Lh	Rh	Limits	Diff.	Limits
55	53	≥ 20	2	≤ 10	42	43	≥ 20	1	≤ 10

Side slip

Front (m/Km)		Rear (m/Km)					
Measure	6.3	Limits.....	-6.0 ÷ +6.0	Measure	---	Limits.....	-6.0 ÷ +6.0

Notes

Test engineer

2

3

4

5

6

7

8

9

6. CLIENT DATABANK

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

Press key **F2** from page 1 of the program (Figure 14). The program shows a page with search functions and various keys:

- Search by licence plate
- Search by surname
- Search by performed test date
- Search by chassis
- Search by tests to be repeated

Press key **F2** to select the required function.

Press key **F3/ENTER** to confirm the selection and introduce the desired datum and then press the ENTER key on the keyboard.

To see all the stored clients, select a function, press **F3/ENTER**, release “*” and press the ENTER key on the keyboard.

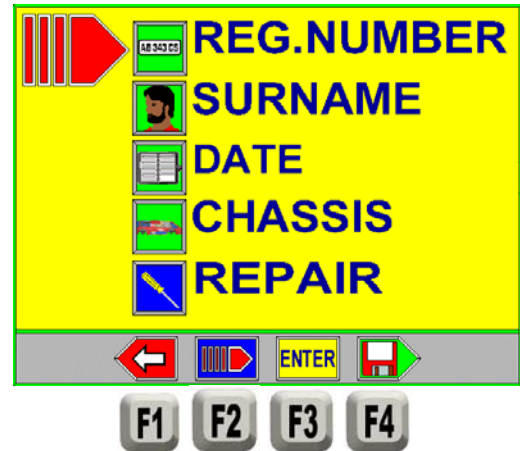


Figure 87

POSSIBLE SELECTIONS:

- Press **F1** to return to the presentation page
- Press **F4** to BACK-UP/RESTORE the databank

The program displays the list of stored clients.

Using **F2/F3** select the desired client.

Press **F4** to display the tests performed.

POSSIBLE SELECTIONS:

- Press **F1** to return to the previous page

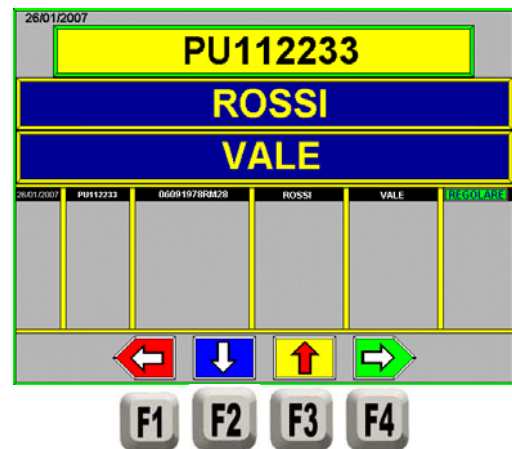


Figure 88

The client databank is used to:

- search for the desired vehicle after some time
- print the report of the test performed;
- print the graphs;
- complete the tests not yet performed
- repeat the desired tests.

Press F2 to select the required function.

The tests that can be repeated are shown in green. The others are shown in grey.

To repeat a grey test, select it with **F2** and press **F3/ENTER**.

The icon will turn green.

Press **F4/START** to continue.

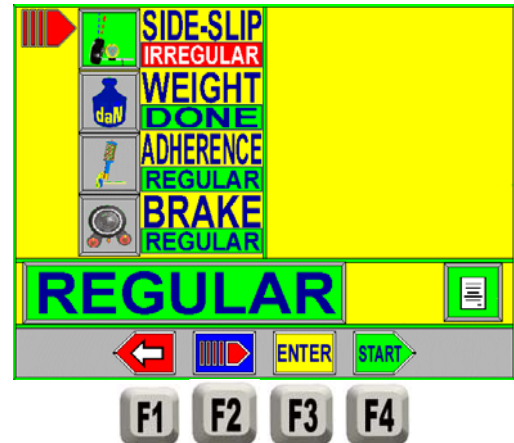


Figure 89

POSSIBLE SELECTIONS:

Press **F1** to return to the previous page

7. BACK-UP and RESTORE

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

Press **F4** from Figure 87.

Select **“RESTORE CUSTOMERS DATA BANK”** icon if you want to be restored the data on the PC.

Select **“SAVE CUSTOMERS DATA BANK”** icon if you want to save on a mass storage device (USB key).

Press **F3/ENTER** in order to perform the operation.

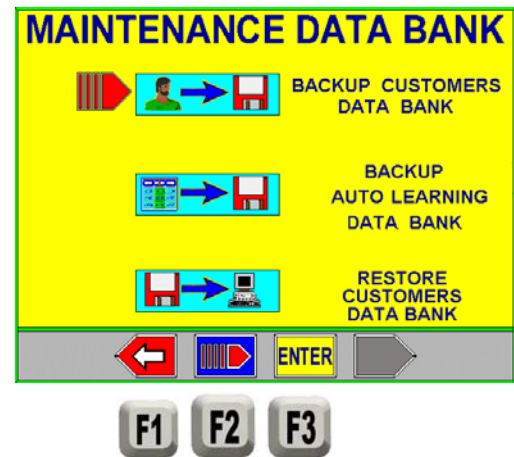


Figure 90

POSSIBLE SELECTIONS:

- Press **F1** to return to the previous page.
- Press **F2** to select the required function

At this point insert the mass storage device provided with the equipment and select, using the **“F2”** key, the unit wished for the BACKUP/RESTORE (D:).

Press key **F3/ENTER** in order to confirm the unit.

Choose the folder on which you desire to carry out the BACKUP/RESTORE and press the **F4/START** key in order to execute the operation.

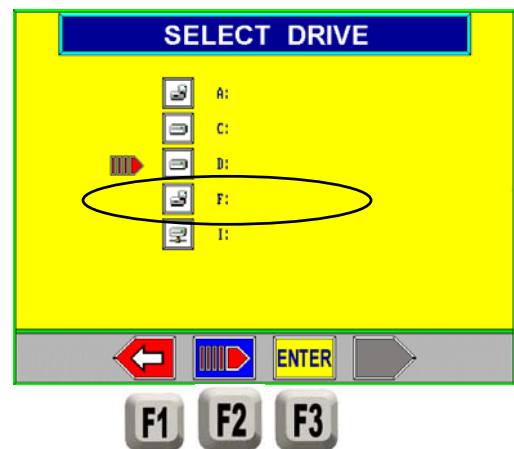


Figure 91

POSSIBLE SELECTIONS:

- Press **F1** to exit.







8. TROUBLESHOOTING

The following are a list of possible problems that could affect the TEST LANE. Ravaglioli S.p.A. cannot accept any liability for injury to persons and animals or damage to things resulting from machine maintenance performed by unauthorised 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 Ravaglioli S.p.A. after-sales service which will be pleased to provide information suitable for performing operations in total safety.



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

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

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 Ravaglioli S.p.A. 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	Roller stopped during oval stage
39 – Trouble during adherence test, non-reliable data	Adherence test has not detected min. values or non-reliable min. values

9. MAINTENANCE

IMPORTANT!: Routine maintenance operations must be performed annually by skilled personnel authorised by Ravaglioli S.p.A.



The only maintenance operations the user of the appliance is allowed to perform are simple ones that nevertheless require the authorisation 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 unauthorised persons accidentally accessing it. A notice should also be placed on the control console indicating that maintenance work is in progress, with the wording “Machine being serviced; DO NOT TOUCH” .

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

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

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

IMPORTANT!: Any other maintenance operation not described above (such as, for instance, routine yearly maintenance or checking settings) is described in the installation and settings manual Code R0028; these operations can only be performed by skilled personnel authorised by Ravaglioli S.p.A.



10. 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:

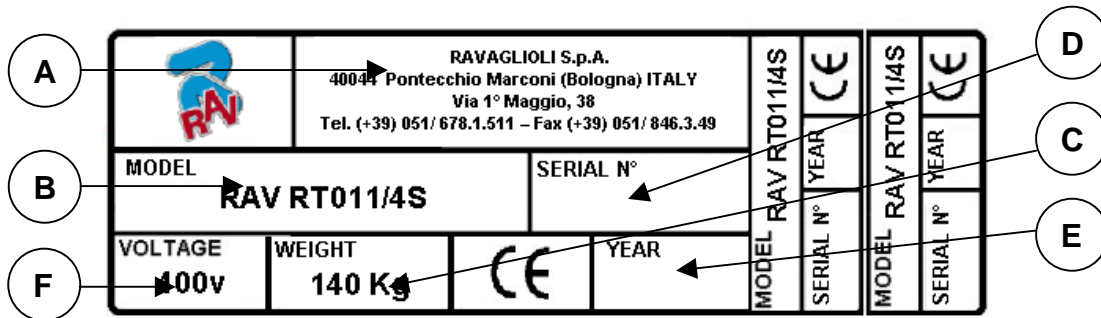
- Those parts that could represent hazard sources should be made harmless.
- Assess the part according to the degree of disposal
- Scrap as scrap iron through authorised channels.
- If considered special waste, this must be removed and split into uniform types before disposing according to applicable regulations.

11. IDENTIFICATION PLATE

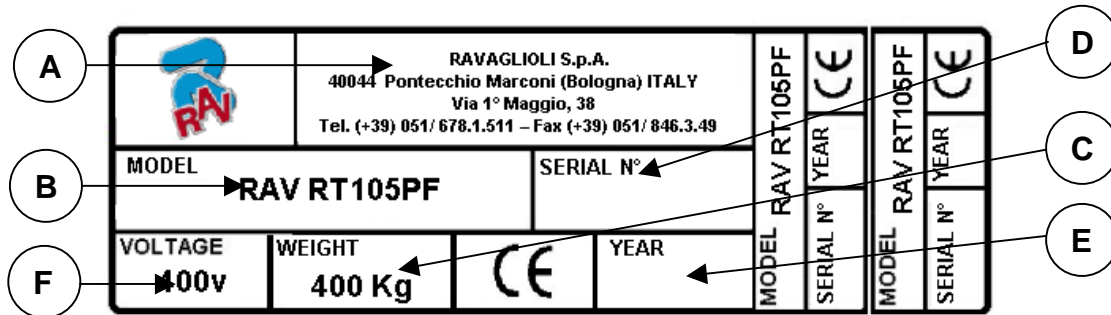
The various parts of the identification plates are following indicated as an example.

- A) Manufacteur
- B) Model code
- C) Weight
- D) Serial number
- E) Year of construction
- F) Powering (Voltage)

CONSOLE IDENTIFICATION PLATE



ROLLER TESTER IDENTIFICATION PLATE



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

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

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

POSITIONING THE IDENTIFICATION PLATES

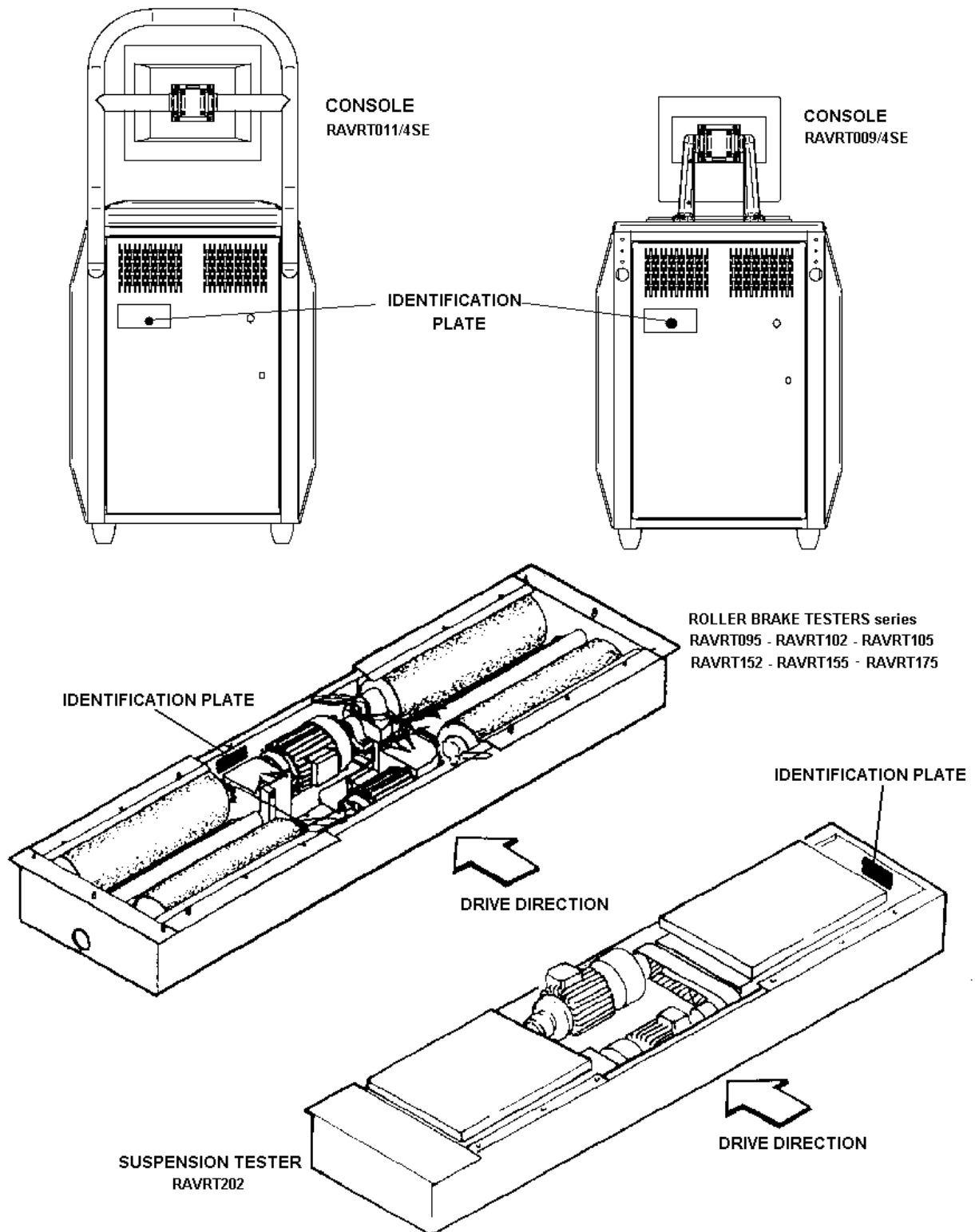


Figure 92