

# RFV 2000™

## Operations Manual



**JohnBean™**





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### 1 Typographic style

This manual contains specific styles of text that suggest the relative operating modes:

**Note :**

Provides a suggestion or an explanation.

**WARNING: NON-OBSERVANCE CAN CAUSE DAMAGES TO THE UNIT OR TO OBJECTS CONNECTED TO IT.**

---

**WARNING: ABUSE CAN CAUSE INJURY TO THE OPERATOR OR BYSTANDERS**

---

Dotted list:

- Indicates an action or sequence of actions that the operator must carry out in the order listed.

#### 1.1 General safety rules

Only properly trained personnel shall be allowed to operate the balancer.

The machine must be used exclusively for the scope of application by following the operating indications contained in the manual.

Unauthorized changes and modifications to the machine relieve the manufacturer from any liability for damages and injuries that might result there from.

On no account should safety features be removed or made inoperative. In general any work on the electrical system, during installation or power supply modifications, must be carried out by a qualified electrician in line with relevant national standards and the regulations of the local power station.

It should be noted that working with technical equipment may always involve an unforeseeable acceptable risk. Therefore the operator should eliminate such dangers by operating the machine with care.

## Safety & function

The following points should be observed:

- Use the machine only as a technical work tool for its specified scope of application only;
- Always use original accessories, approved by the manufacturer, in perfect condition and suitable for the type of work to be carried out;
- Follow the instructions, notes and technical data of the machine manufacturer and the manufacturer of the wheels to be balanced;
- Wear suitable protective clothing and accessories (e.g. goggles, safety shoes, etc.);
- Avoid eye contact with the Laser Systems;
- Do not knock or tamper with the Laser Systems;
- Do not lean on the wheel guard while the balance run is in progress.

In case of calibration defects there is an internal diagnostic that prompts contacting service.

(figure 1-1)

**1** Pedal to operate the Power Clamp and the main shaft lock.

The low rotation speed of the wheel ensures that this balancer is very safe.

Always work in a clean area and with clean wheels.

**WARNING:**

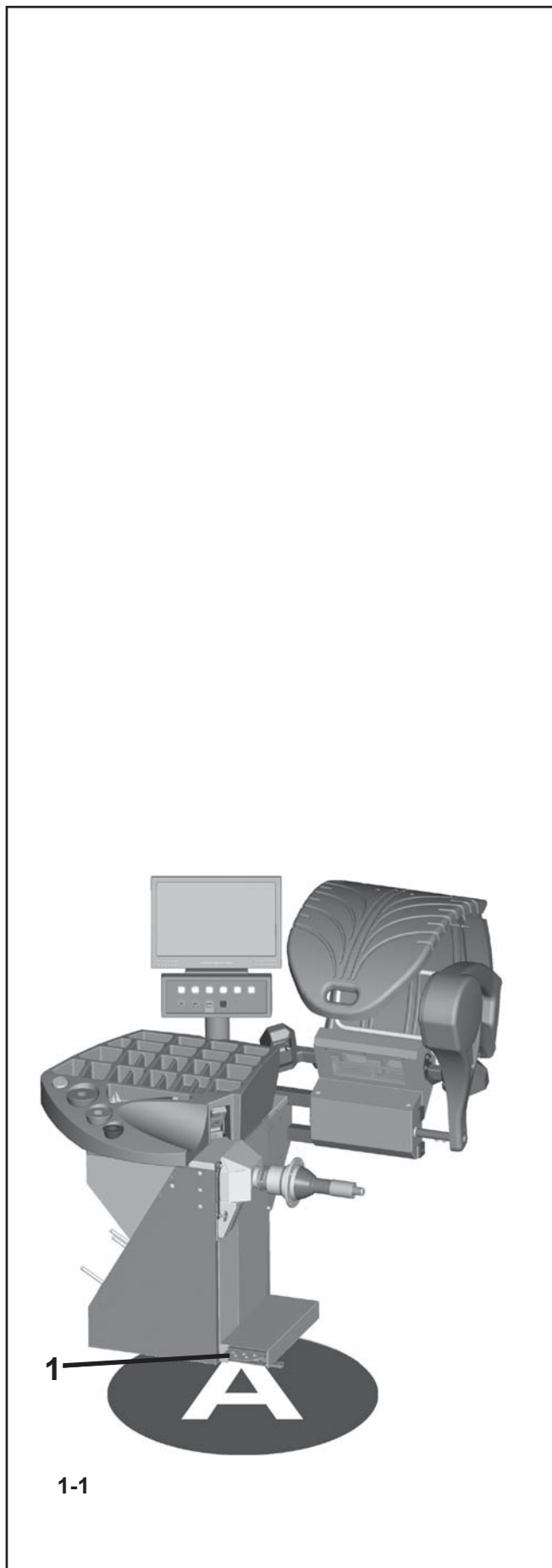
THIS MACHINE HAS A SINGLE OPERATING STATION (A). THE OPERATOR IS RESPONSIBLE FOR RESTRICTING ACCESS TO THE WORK AREA AND FOR ANY CONSEQUENCE ARISING FROM USING THE EQUIPMENT

**Note:**

THE USE OF THIS DEVICE IS ALLOWED ONLY TO PERSONNEL DULY TRAINED BY AN AUTHORIZED DEALER AND IN POSITION.

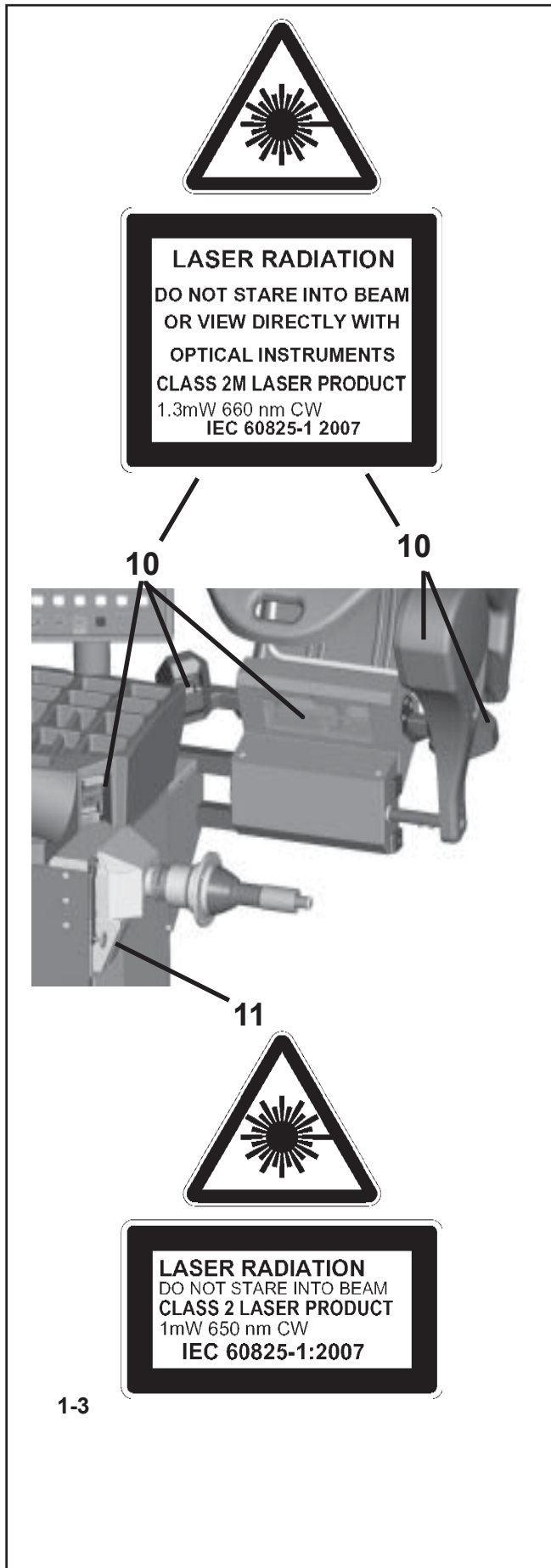
**Note:**

THE BALANCER SHOULD BE FIRMLY BOLTED DIRECTLY TO THE FLOOR. SEE PAGE 118 FOR INSTALLATION INSTRUCTIONS.



1-1





### 1.2.1 Laser Systems

The balancer is fitted with various types of laser measurement and pointer systems. These systems are protected by guards and are aimed precisely on the wheel. Even though of low intensity, they can be potentially dangerous for your eyes. Do not tamper with their aiming direction and the protection systems.

The operator must ensure that the projected rays do not reach directly or via reflection their own eyes or the eyes of anyone close to the machine.

There two types of Laser projectors on the machine:

- Class 2M with power 1.3 mW, 660 nm CW in position **10** of **figure 1-3**.

and

- Class 2 with power 1 mW, 650 nm CW in position **11** of **figure 1-3**.

### 1.3 Description of function

#### Application.

The balancer is designed to balance and accurately analyze in depth wheels of cars, SUVs, and vans, whose parameters are within the limits indicated in the machine's technical specifications.

This is a high accuracy measuring device. Handle with care.

The wheel data detection is carried out automatically and with no contact by 5 Cameras (**10, fig. 1-3**).

The balancer calculates the co-ordinates of the optimal positions for the application of balancing counter-weights.

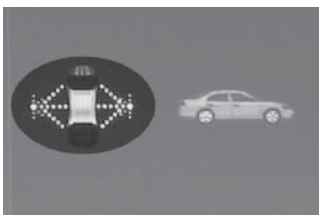
The balancer can be used to determine geometric information relative to rim and/or of the tire deformations (radial and/or lateral deviations of the axis in respect of its rotation axis, commonly referred to as RUNOUT); to determine geometric information relative to tire deformations (deviations of the axis in respect of its rotation axis). This information is useful for an accurate diagnosis of the wheel behavior as well as providing the operator with useful indications to minimize the effects of these deformations.

The balancer is able to automatically determine the unbalance of the rim or of the wheel in respect of its rotation center. At the end of the measuring run the control software carries out a matching, that consists in corresponding the top part of the tire with the bottom part of the rim. The balancer analyses the overall state of the wheel and prompts any possible corrections.

## Safety & function



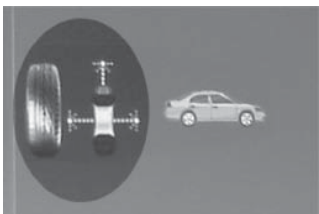
**MANUAL**



**PROFILING**



**OPTIMA**



**OPTIMA  
FULL DIAGNOSTIC**

1-6

The balancer carries out two types of **runout**:

- 1) radial (on the radius);
- 2) lateral (on the lateral shift).

The balancer also has the TDI (*Tread Depth Indication*) system, which provides a general indication of tread wear. This function is only active from OPTIMA mode.

The balancer can operate in four distinct modes, which can be selected by Operator. Two basic modes:

- MANUAL & PROFILING -  
and two advanced modes
- OPTIMA & OPTIMA FULL DIAGNOSTIC.

The Basic modes are:

### Figure 1-6

#### MANUAL Mode # 7

The machine guarantees the basic functions, suggesting the position and value of the weights to apply to the rim. The MANUAL mode is activated through the functions menu.

#### PROFILING Mode # 7.8

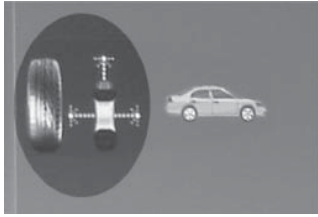
This mode is identifiable on the monitor with the symbol displayed in fig. 1-6 **PROFILING**. The control software automatically acquires the wheel dimensions during the measuring run. During the normal measurement cycle the Cameras automatically sample the rim shape (internal and external). The machine optically suggests the exact application point of the weight on the rim through the projection of a laser beam (*Laser Pointer*).

The Advanced modes are:

#### OPTIMA Mode # 7.10

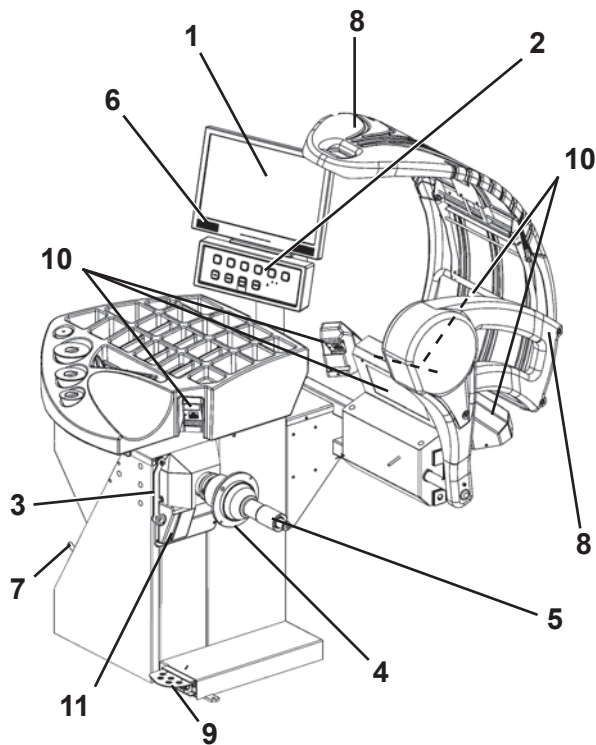
Identifiable on the monitor with the symbol displayed in fig. 1-6 **OPTIMA**. In this mode the balancer, as well as the **profiling**, carries out the automatic diagnosis of the **runout** and the reading for the TDI function.



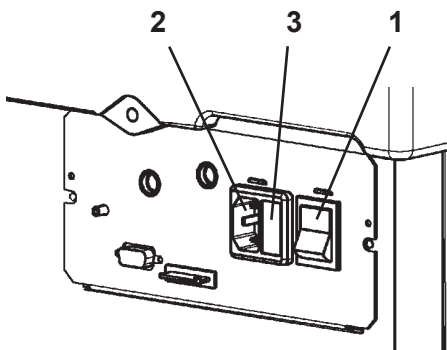


### OPTIMA FULL DIAGNOSTIC

1-6



1-7



1-8

**Control of the rim only:** in OPTIMA mode, clamping only the rim on the balancer, the laser scanner detects the absence of the tire. In this condition, the rear laser analyses the **runout** on the bead recess in the internal part of the rim and will prompt to automatically proceed with the **matching**.

### OPTIMA FULL DIAGNOSTIC Mode # 7.11

Identified by the symbol shown in figure 1-6. In this mode the balancer performs the detailed diagnosis of the tire, as well as the OPTIMA mode functions.

A three-dimensional reconstruction of the wheel on the screen and the use of specific colors, allow the operator to examine the uniformity and wear of the tire, the presence of any faults on the wheel, that are hard to detect with the naked eye.

## 1.4 Layout

### Figure 1-7

Nomenclature of the unit's parts:

1. Display  
Refer to Chapter 4.1.
2. Input panel  
Refer to Chapter 4.2.
3. Internal gauge arm
4. Flange
5. Stub shaft with hub nut
6. Weight compartments
7. Storage areas for cones and hub nuts
8. Wheel guard
9. Brake Pedal and *Power Clamp* Operation
10. Camera (5 Acquisition camera)
11. Laser Pointer

### Figure 1-8

1. Mains switch (ON/OFF)
2. Power inlet
3. Main fuse

## Safety & function

### 1.4.1 Manuals for the unit

The unit includes the following documentation:

- Safety Booklet (European supplement only)
- Operator's Manual  
The operator must learn in detail the instructions contained in the manual and meticulously observe the **WARNING** notes.

#### **Installation instructions**

The installation instructions are in the Appendix of the Operator Manual.

## Technical Data

### 2. Technical data

Power supply (v):  
230V 1Ph 50/60hz

Shaft length:  
7.5 " 190 mm

Shaft diameter:  
1.57 " 40 mm

Measuring speed:  
rpm 200

Balancing precision:  
0.035 oz 1 gr

Camera device precision:  
(Wheel Data) 0,5" 12.7 mm  
(Runout) 0,039" 0.1 mm

Rim width (dynamic balancing):  
3" - 20"

Rim diameter:  
(Manual) 8 " - 30"  
(Automatic) 15 " - 30"

Overall wheel width:  
20" 508 mm

Overall wheel diameter:  
37" 950 mm

Maximum wheel weight:  
154 lbs 70 kg

Maximum cycle time (Full Diag Mode):  
65 s ~

Type of data input for the DISTANCE:  
Automatic, no contact with the wheel

Type of data input for the DIAMETER:  
Automatic, no contact with the wheel

Type of data input for the WIDTH:  
Automatic, no contact with the wheel

Dimensions (mm) H x L x D with wheel guard raised:  
1630 x 1540 x 1220

Dimensions of the package (mm) H x L x D:  
1850 x 1520 x 1200

Weight of machine:  
190kg

Shipment weight:  
235 kg

## Accessories

### 3. Accessories

Refer to Figure 3-7/3-12.  
Standard accessories:

**Fig. 3.1**

Power Clamp Nut  
Plastic Sleeve  
Spacer Ring

**Fig. 3.2**

User Calibration weight

**Fig. 3.3**

Weight pliers

**Fig. 3.4**

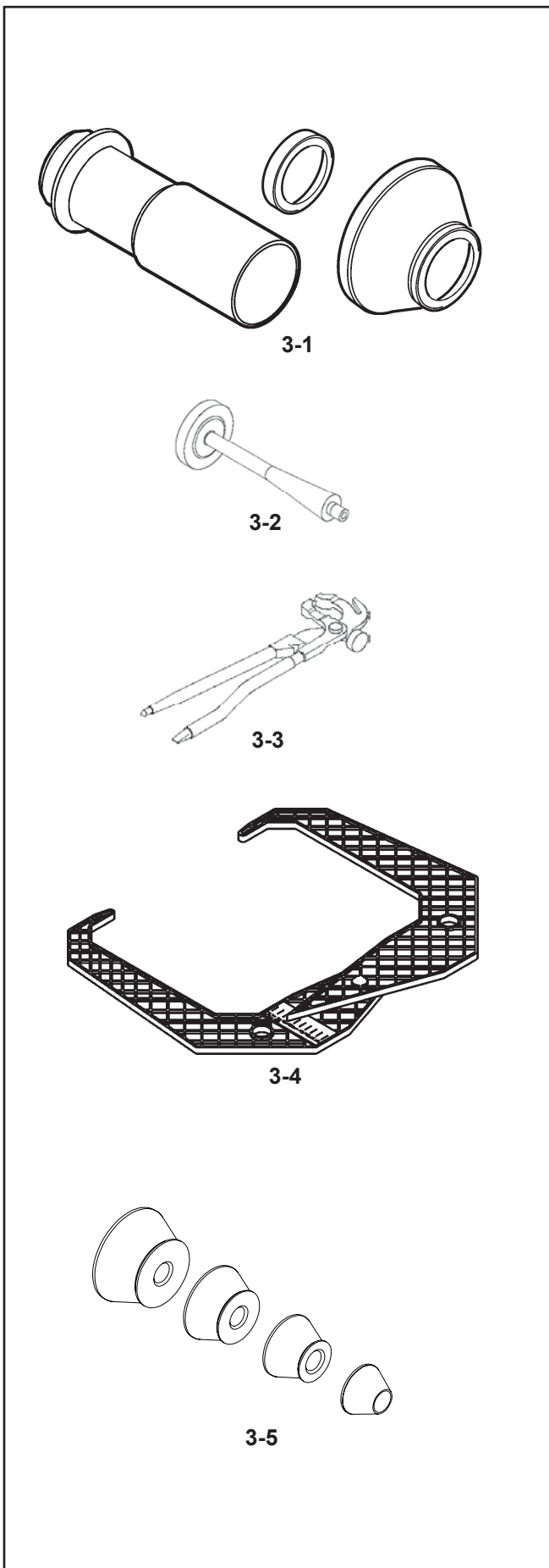
Caliper

**3.1 Optional Accessories - depends on Model**

**Fig. 3.5**

Lt truck cone  
Large cone  
Medium cone  
Small cone

**NOTE: An optional 7 cone set is available as well**



## Accessories

### 3.1 Optional Accessories continued

#### 3.7 Wheel lift

It can operate with a balancer, a tire changer or placed between a balancer and a tire changer. Lifting capacity up to 90 kg.

#### 3.8 Trolley for Flanges

Designed for the complete range of universal and special perforated flanges (17.4). This accessory guarantees maximum safety in stocking.

#### 3.9 Perforated flanges for screw stud

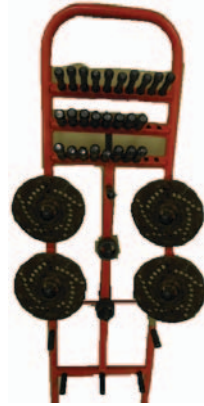
A complete range of 6 universal flanges for all European vehicles. Four flanges designed for North American vehicles. Including bolts. Special flanges for BMW and OPEL available. Special flange for custom-built vehicles.

#### 3.10 Printer

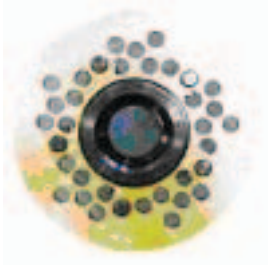
The color printer produces a professional report that can be delivered to the client as the balancing certificate. This certificate can function as an extended guarantee of performance.



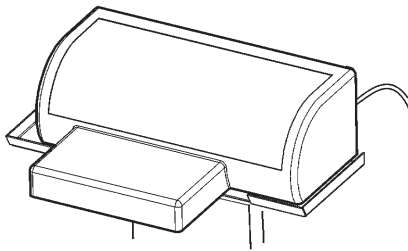
3-7



3-8



3-9



3-10

## 4. Controls and displays

### 4.1 Key pad

Fig. 4-1 Key pad

- 1 Menu keys (associated with a menu field)
- 2 ESC key
- 3 HELP key
- 4 START key
- 5 STOP key (emergency stop)
- 6 Loudspeaker outlet
- 7 Pilot light, Scroll or OK Key active
- 8 Pilot light, power supply ON
- 9 OK key (touch control)
- 10 Cursor, SCROLL (touch control)

#### 4.1.1 Description of keys

##### 1 Menu keys

###### Figure 4-1a Keys

- The Menu Keys open the list of functions to perform or continue the operating cycle

All function keys are toggle switch type keys so they have triple commands plus two functions:

##### Command a

Pressing the center

Opens the Menus

Activates the Menu item when selected.

##### Command b

Pressing the upper part

Opens the Menu and selects the first item on the bottom directly.

With the Menu open, it moves the selection on the upper function on the list.

##### Command c

Pressing the lower part

With the Menu open, it moves the selection on the lower function on the list.

Depending on how they are used by the program, each key can have other functions too, e.g.:

##### Hold down function

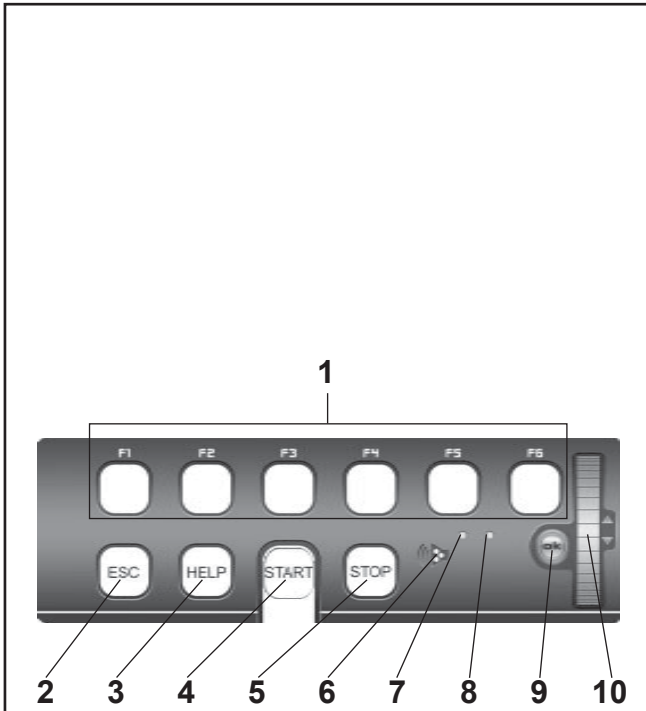
If the key is used in "keep pressed" mode it will scroll a series of values or data.

##### Release function

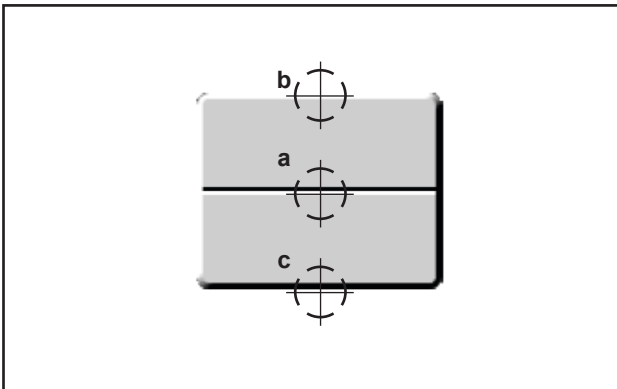
After the key has been used in "hold down" mode, when you let go of it the data selected is inserted automatically

##### 2 ESC key

- Exits any Menu.
- Exits the C codes procedures
- Deletes the help information and error messages.



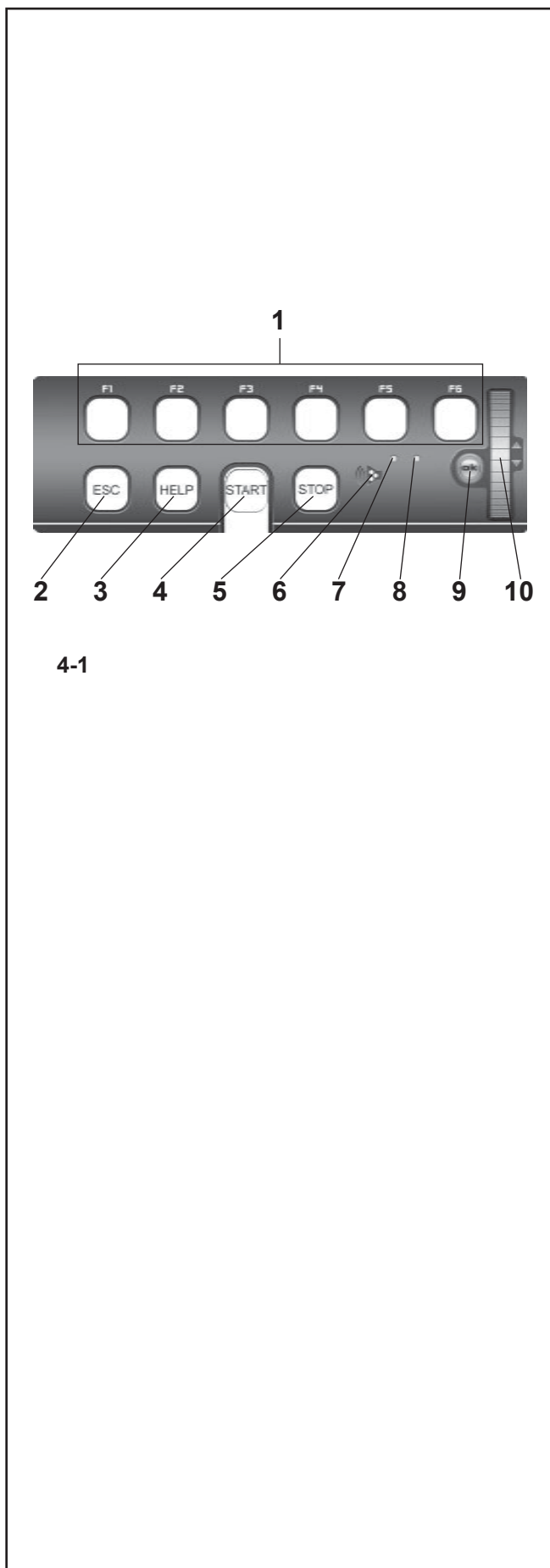
4-1



4-1a



## Controls and displays



### 3 HELP key

- Display useful information to explain a situation and – in case of error codes – provide hints for remedy.

### 4 START key

- Start the measuring run.

By setting the relative mode of operation accordingly it is possible to start measurement by closing the wheel guard (see Chapter 10. Changing modes of operation).

### 5 STOP key (Emergency Stop)

- Stop a measuring run that has just been initiated and brake the wheel.

### Note

The STOP key also has an emergency stop function.

### 6 Loudspeaker Outlet

- Loudspeaker for acoustic signals.

### 7 Pilot light, Scroll or OK Key active

- When the touch control scroll selector or the OK key are in use, the pilot light switches on to inform the operator that they are operational.

### 8 Pilot light, power supply ON

- The LED lights up when the mains switch is turned on and the operating voltage is available.

### 9 OK key

- Inserts the Menu options selected previously. Touch control key.

### 10 Touch control cursor, SCROLL

- Scrolls the items in the Menu. Touch control key.

## 4.2 The screen

**Fig. 4-2** Screen with display fields

- 1 Status Bar field
- 2 Display field of screen
- 3 Menu fields of screen

The screen displays the function Menus, the data set, the operator information, all the measured data and the error messages.

### Description of display fields

The screen is subdivided into various display fields, each of which is associated with a certain type of information.

#### Status Bar Field

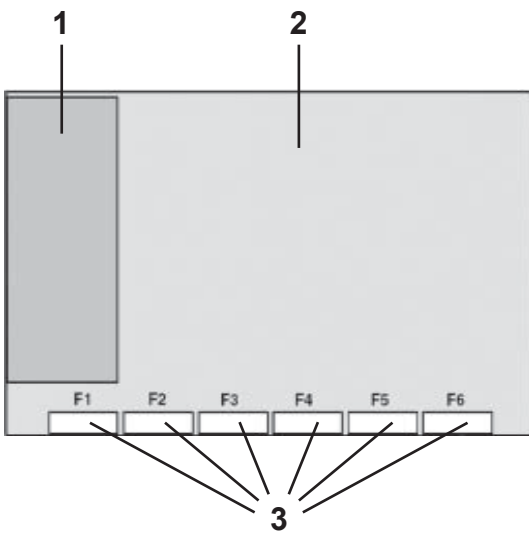
- 1 Active Function Icons
  - Type of Vehicle
  - Type of Alu
  - Operating Mode
  - Error messages
  - Online Help

#### 2 Display field

- Number of the installed program version
- Machine name
- Date and time
- Rim dimensions
- Balancing modes
- Direction of orientation and correction position (location of unbalance)
- Amount of unbalance
- Selected wheel profile

#### 3 Menu fields

The symbols for each operating menu are displayed in the six menu fields. Under each Menu icon there is a pull-down menu and other Function or Submenu options.

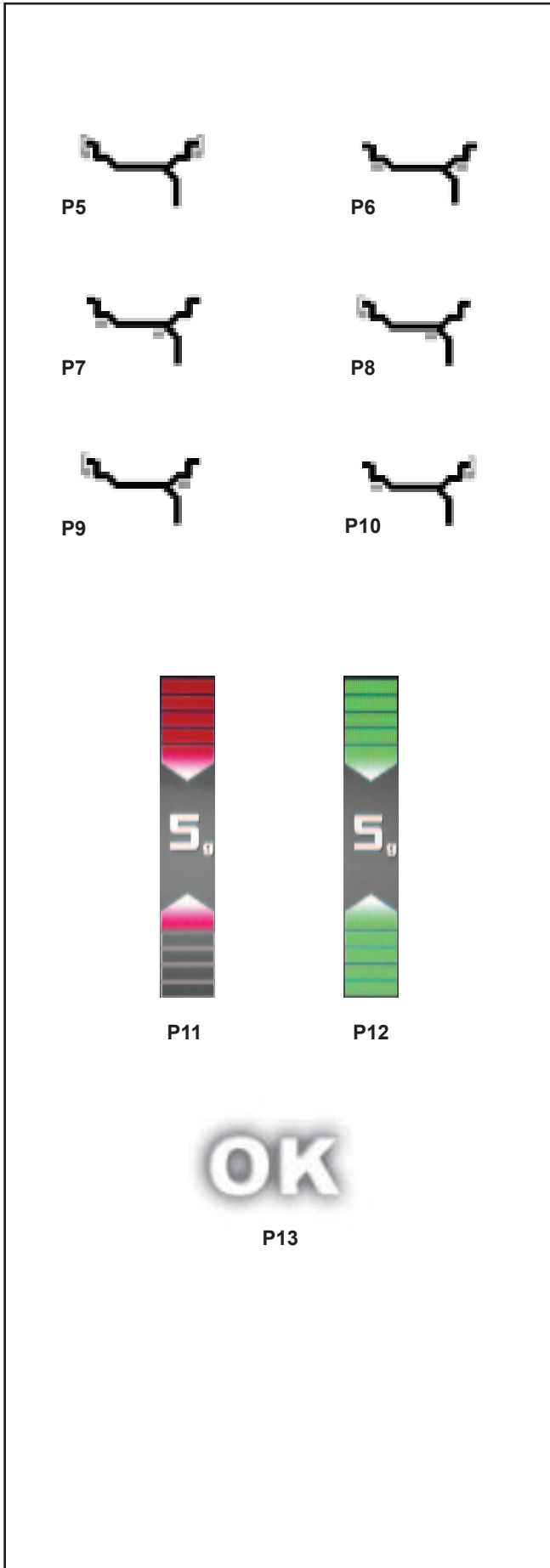


4-2



4-3

**Fig. 4-3** Initial screen/Main menu



## Balancing modes

**P5** Alu 0 - normal - Standard balancing mode

**P6** Alu 1

**P7** Alu 2, Alu 2P

**P8** Alu 3, Alu 3P

**P9** Alu 4

**P10** Alu 5

**P11** Display of unbalance measured and direction indicator (red arrows or arrow heads)

**P12** Correction position reached (green arrows)

**P13** Correction position for both correction planes reached

### 4.4 The Menu

The machine function menus are always on the bottom part of the screen. The active menu can be opened by pressing the relative function key inside the various screens.

The active menus are marked by the icon of the menu contents.

The balancer setting and reading functions can be selected with the menu items in the menus.

The Menu Keys operating mode is the same for all the menus and in all the machine screens

For example:  
(Figure 4-1a)

#### To access a Menu:

- Press the Menu Key in the middle (a).

The Menu opens and no option is highlighted in the items available.

Or,

Press the Menu Key in the upper part (b).

The Menu opens and the first item of the list is highlighted.

#### To select a different item:

- Press the high (b) or low (c) part of the Menu Key

Or,

- Pass your finger on the keypad Scroll Cursor.

Or,

- Keep the Menu Key pressed in the middle (a) and rotate the wheel-holder shaft.

#### To enter the selection:

- Press the Menu Key in the middle (a)

Or,

- touch OK.

Or, alternatively,

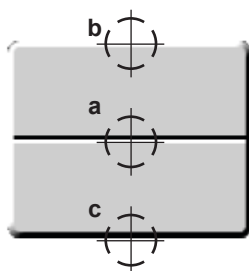
#### To cancel the selection:

- Press **ESC**; the menu list disappears.

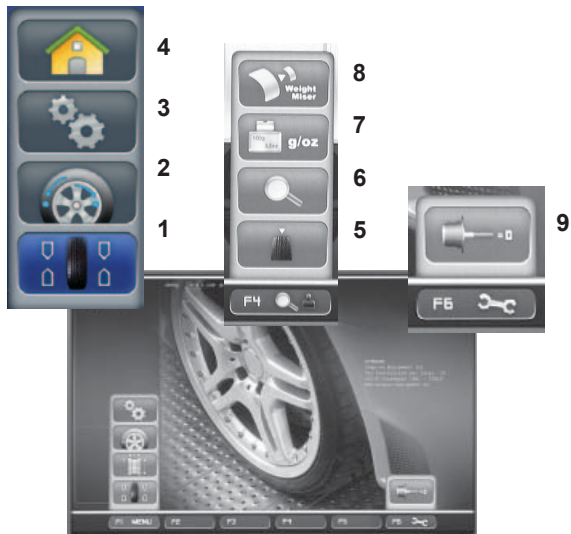
- Press a different Menu key; the new Menu opens and what has been selected up to now is deleted.

#### Types of Menu

The Menus assigned to the same Key position can vary according to the operational screen in the different program phases.



4-1a



4-4

## MAIN MENU

The Main menu **F1** in the Start Screen (**Fig.4-4**), contains the access items to the most common operational screens:

- 1 Access to BALANCING
- 2 Access to RIM DATA INPUT
- 3 Access to SETTINGS
- 4 Access to OPTIMIZATION/MINIMISATION

The entire machine operational cycle and the user pre-settings can be managed from these screens.

The **F4** menu contains the following setting items:

- 5 Static unbalance Selection
- 6 Weights Fine Reading Selection
- 7 Grams / Ounces Selection
- 8 Weight Miser Selection (if present)

Menu **F6**

- 9 Access to COMPENSATION RUN



4-5

## BALANCING

The **F1** Menu in the Balancing screen (**Fig. 4-5**), contains the access items to the following screens:

- 1 Access to RIM DATA INPUT
- 2 Access to OPTIMIZATION
- 3 Access to SETTINGS
- 4 Go back to the START SCREEN (HOME)

The **F2** Menu contains the various ALU selection items:

- 5 ALU 0 Selection
- 6 ALU 1 Selection
- 7 ALU 2 Selection
- 8 ALU 3 Selection
- 9 ALU 4 Selection
- 10 ALU 5 Selection

None of the Menu items can enable ALU P selections.

The **F3** menu contains the following items to select the Type of Vehicle settings:

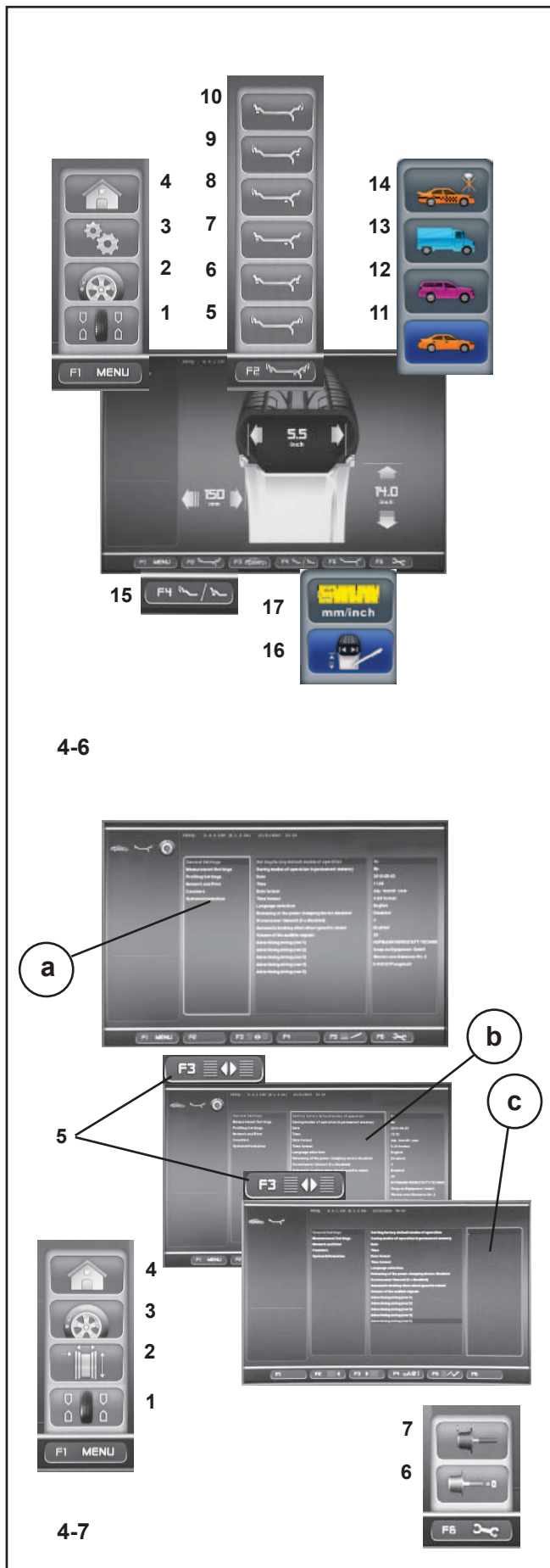
- 11 CAR Selection
- 12 SUV Selection
- 13 VAN Selection
- 14 RUNFLAT vehicle

The **F4** menu contains the following setting items:

- 15 Static unbalance Selection
- 16 Weights Fine Reading Selection
- 17 Grams / Ounces Selection
- 18 Weight Miser Selection (if present)

Menu **F6**

- 19 Access to COMPENSATION RUN



## RIM DATA INPUT

The **F1** Menu in the Rim Data Input screen (**Fig. 4-6**), contains the following items:

- 1 Access to BALANCING
- 2 Access to OPTIMIZATION
- 3 Access to SETTINGS
- 4 Go back to the START SCREEN (HOME)

The **F2** menu contains the different ALU selection items (enabled if in manual mode or after the measurement run):

- 5 ALU 0 Selection
- 6 ALU 1 Selection
- 7 ALU 2 Selection
- 8 ALU 3 Selection
- 9 ALU 4 Selection
- 10 ALU 5 Selection

Each Menu Item enables the selection for ALU and ALU P.

The **F3** menu contains the following items to select the Type of Vehicle settings:

- 11 CAR Selection
- 12 SUV Selection
- 13 VAN Selection
- 14 Runflat Selection

The **F4** Menu contains the following items:

- 15 *Easy Alu Toggle* Selection

The **F5** Menu contains the following items:

- 16 WHEEL PROFILE Input
- 17 MILLIMETERS / INCHES Selection

## FUNCTIONS

The **F1** Menu in the Functions screen (**Fig. 4-7**), contains the following items:

- 1 Access to BALANCING
- 2 Access to RIM DATA INPUT
- 3 Access to OPTIMIZATION
- 4 Go back to the START SCREEN (HOME)

The **F3** (**5**) key in the Functions screen, is used to access the “**b**” and “**c**” panels used to select and change the options shown in the basic list “**a**”.

- 5 Alternate selection of panels “**b**” and “**c**”.

The **F6** Menu of the Functions Screen contains the Items to access the following procedures:

- 6 Access to COMPENSATION RUN
- 7 Access to USER CALIBRATION





## 4.5 Help information

Help information explains the current action and, in the case of an error code, provides hints for remedy.

The information displayed relates to the current action.

The complete help guide is available from the MAIN MENU screen (**Fig. 4-1**).

### Display help information

- Press the HELP key (1, **Fig. 4-1**).

The first screen with help information appears, e. g. to the screen RIM DATA INPUT (**Fig. 4-11**).

- Press the HELP key once more to display the next screen with help information.

The second screen with help information to the screen RIM DATA INPUT (**Fig. 4-12**) appears. Continue to scroll through all the help screens until you return to the first page.

The help screens can be scrolled in both directions.

### Scrolling backwards

- Press the upper part of the HELP key.

#### Note

You can only perform progressive movements in the help screens, in both directions, once screen at the time

On pressing the HELP key in the last screen with help information the display jumps to the first screen again.

### Quit help information

- Press the ESC key (2, **Fig. 4-1**).

## 4.6 Main shaft lock

**Fig. 4-13** Pedal of main shaft lock

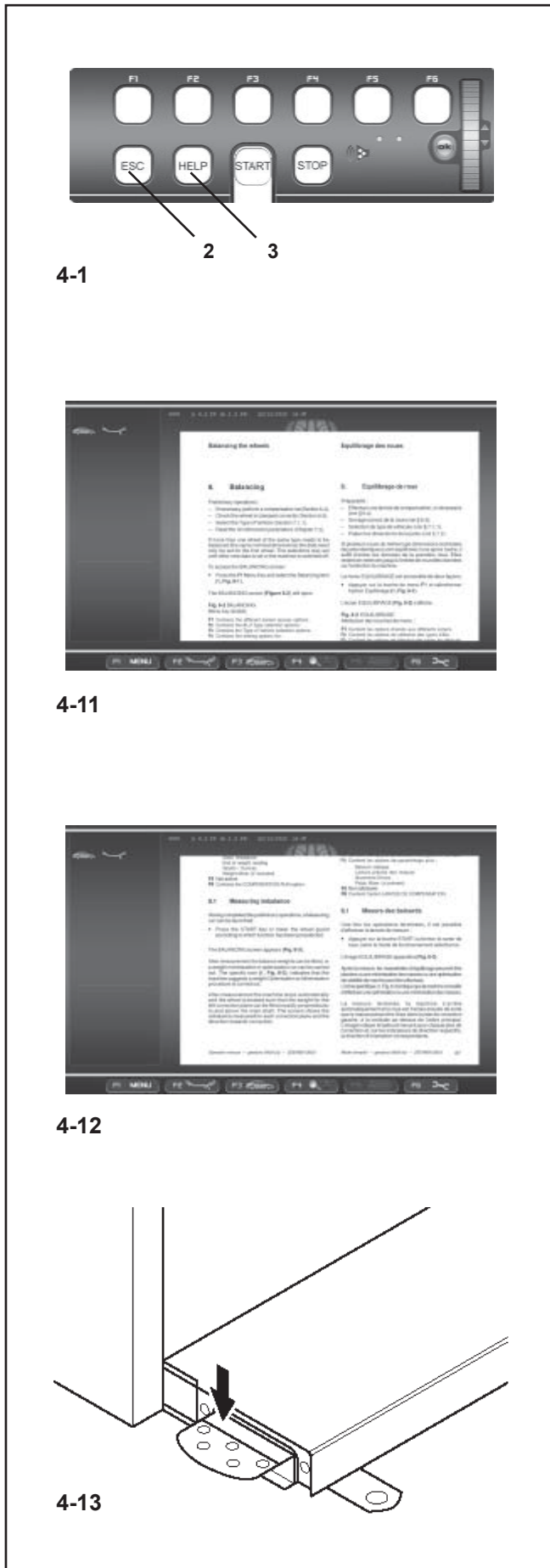
The main shaft is locked when the pedal is depressed. This facilitates tightening or untightening of the clamping nut and retains the wheel in the correction position for correct fitting of the balance weights.

#### Note:

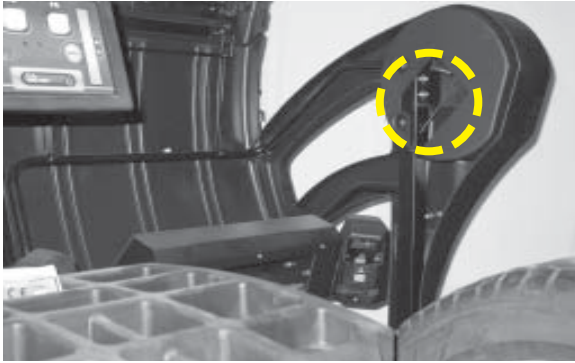
This lock is designed only to facilitate orientation of the wheel and must not be used for braking the main shaft.

#### Note:

On wheel balancers equipped with the quick-acting *Power Clamp* system: The pedal also controls the *Power Clamp*, for clamping the wheel on the balancer.



### 4.7 Cameras and Laser Pointers



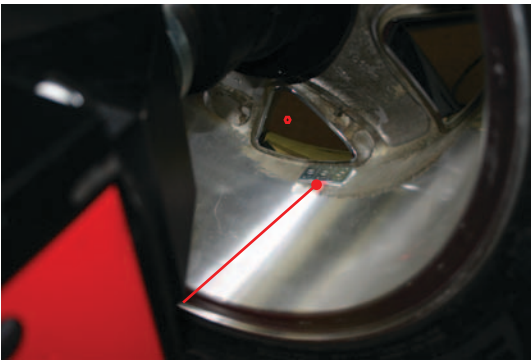
4-14

**Figure 4-14**

The various Cameras aimed at the wheel are used for the automatic acquisition of the Distance, Diameter and Width, as well as to perform the three-dimensional scan of the entire surface of the tire and rim.

**Figure 4-15**

The machine uses the *Laser Pointer* to indicate the precise point for fitting the adhesive weights on the rim.



4-15

## Switching on the machine

### 5. Switching on the machine

Please read through the operation manual and follow the instructions, especially when operating the wheel balancer for the first time.

- Always make sure the wheel guard is fully raised.
- Plug the power cable plug into the power outlet (1, Fig. 5-1).
- Switch on the machine by the power switch (2, Fig. 5-1).

The electronic unit now performs a number of self-tests.

In this phase this message is displayed on the screen "WAIT: LOADING..." (Fig. 5-2).

As long as the machine is carrying out the self-tests, no inputs and no other operations whatsoever must be made. During this starting phase the machine must not be subjected to even the slightest vibrations.

Upon completion of the self-tests a melodious signal is heard, the screen shows the main menu (Fig. 5-3) and the machine is ready for operation.

Fig. 5-3 Main menu

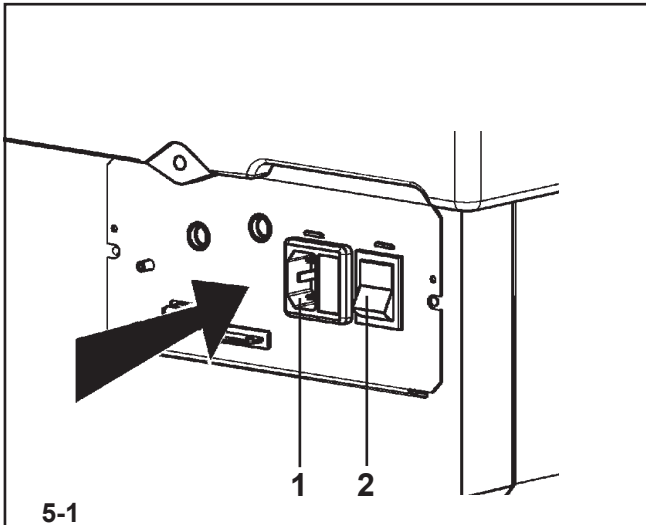
The menu fields of the function keys F1 to F6 show:

- F1** Access to BALANCING  
Access to ENTERING RIM DATA  
Access to OPTIMIZATION  
Access to SETTINGS
- F2** Not assigned
- F3** Not assigned
- F4** Selection of: Static unbalance, Weights Fine Reading, Grams / Ounces, Weight Miser
- F5** Not assigned
- F6** Access to COMPENSATION RUN

### 5.1 Status at switching on

The electronic unit is factory-adjusted to the following operating modes, available immediately after switch on:

- Weight mode 1 (car wheel with nominal dimensions in inches, width 6.5" and diameter 15.0").
- Acquisition of rim data, unit of measurement: inches.
- Display of unbalance value with 5 gram increments.
- Suppression of minor unbalance readings (tolerance limit set at 3.5 g).
- Automatic wheel braking when guard is opened during the measuring run.
- Compensation of adaptor unbalance switched off.
- Start of measuring run by START key only.



5-1



5-2



5-3

## Clamping the wheel

### 6. Clamping the wheel

**Fig. 6-1 A**

The main shaft lock pedal has two functions

**PEDAL DOWN: Stopping rotation**

The shaft angle is locked when the pedal is depressed. This lock is designed only to facilitate orientation of the wheel and must not be used for braking the main shaft.

**PEDAL UP: POWER CLAMP lock**

The pedal also controls the POWER CLAMP, for clamping the wheel on the balancer.

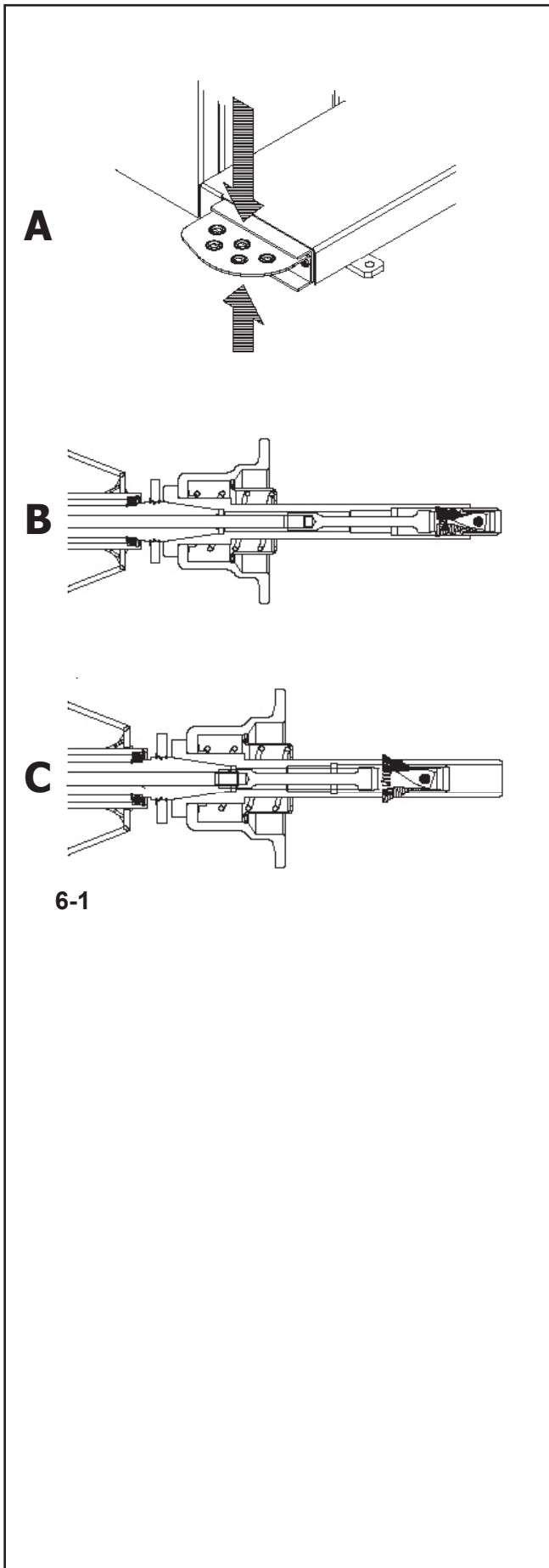
**Fig. 6-1 B**

**Power Clamp with jaws fully open.**

**Fig. 6-1 C**

**Power Clamp with jaws fully closed.**

By changing the mode of operation it is possible to reverse the direction of actuation of the pedal.



## Clamping the wheel

### 6.2 Clamping / unclamping the wheel

The electric controller is so designed that after turning on the power switch the clamping jaws remain in their instantaneous position and any change must be effected intentionally by actuating the pedal.

#### 6.2.1 Clamping the wheel

**Note:**

Before clamping the wheel make sure the contact surfaces on wheel adaptor and rim are free from dirt and grease.

- Move the clamping jaws to **unclamped** position (**Fig. 6-3**).
- Slide the centering cone or centring ring (chosen function of center bore diameter of the wheel) on the main shaft (**Fig. 6-4**).
- Position the wheel to be clamped on the centring cone or ring, hold approximately in vertical position and slide the clamping sleeve and clamping means (clamping head, pressure ring, or flange plate) on the chuck (**Fig. 6-5**).
- Press the clamping sleeve and clamping means firmly against the wheel and lift the pedal (**Fig. 6-6**).
- Check for proper clamping prior to the measuring run.

**Notes**

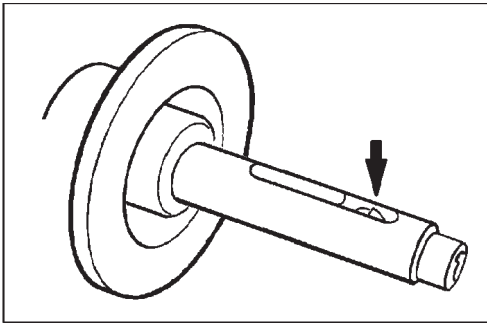
If the pedal is actuated once again during the clamping process, clamping is interrupted and the clamping jaws return to unclamped position. Clamping can also be interrupted by operation of the STOP or the ESC key.

#### 6.2.2 Unclamping the wheel

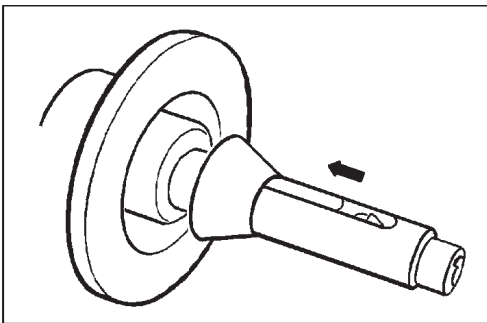
**Note:**

While the jaws unclamp, hold the wheel so that it will not tilt when unclamped.

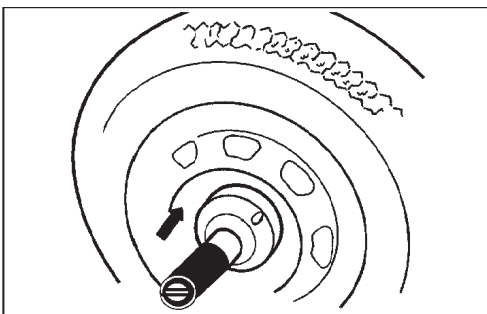
- Lift the pedal (**Fig. 6**).
- Remove the clamping sleeve from the chuck.
- Remove the wheel.



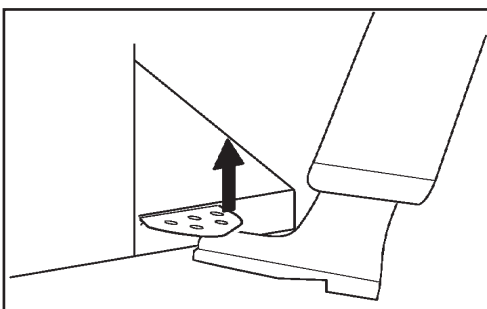
6-3



6-4



6-5



6-6



## Clamping the wheel

### 6.3 Preparing for calibration

For calibration compensation, the clamping device must be clamped without wheel.

- Fit the small centering cone, the middle centering cone and the clamping sleeve without clamping head (**Fig. 6-7**) on the chuck.
- Start the clamping process.

The device should be calibrated exactly as described in the relevant chapters.

### 6.4 Compensation Run

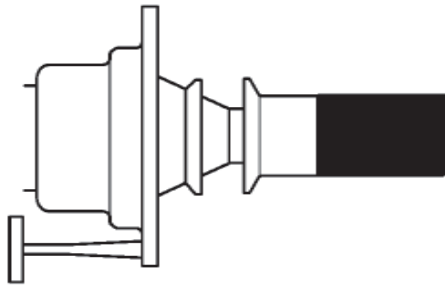
All clamping and centering means are balanced in our works to within a certain tolerance.

To compensate for any residual unbalance that might be left in the clamping means, it is recommended that an electrical compensation run be performed after switching on the machine or after changing the wheel adaptor, (also see ch 6. Changing modes of operation). This mode cannot be transferred into the permanent memory.

- Fit the clamping device properly on the balancer shaft. Do not fit the wheel.
- Starting from the screen main menu (**Fig. 6-8**) press the menu key **F6** for electrical compensation of unbalance in clamping means (**1, Fig. 6-8**).
- Start the compensation run with the **START** key.

The compensation run takes longer than a regular measuring run. After the Compensation Run, an icon in the status Bar indicates the Compensation Active status.

This mode of operation is retained until deleted by pressing menu key **F6** (**1, Fig. 6-8a**) again, by starting readjustment or an optimization run, or by switching off the machine.



6-7



6-8

1



6-8a

1

## Wheel data Reading

### 6.5 Gauge head application on various Wheel types

In order to be able to determine unbalance in a single measuring run, the rim dimensions have to be entered correctly. Therefore proceed with utmost care and as is shown in the Figures when applying the gauge head on the rim in the desired weight fitting position. Incorrect application will result in deviations of measured values and consequently inaccurate results of the measuring run.

#### Fig. 6-11, a to f

show correct application (with and without adhesive weight) of the gauge head on various rims and for various weight fitting positions.

**Fig. 6-11 a** Standard wheel – Steel rim

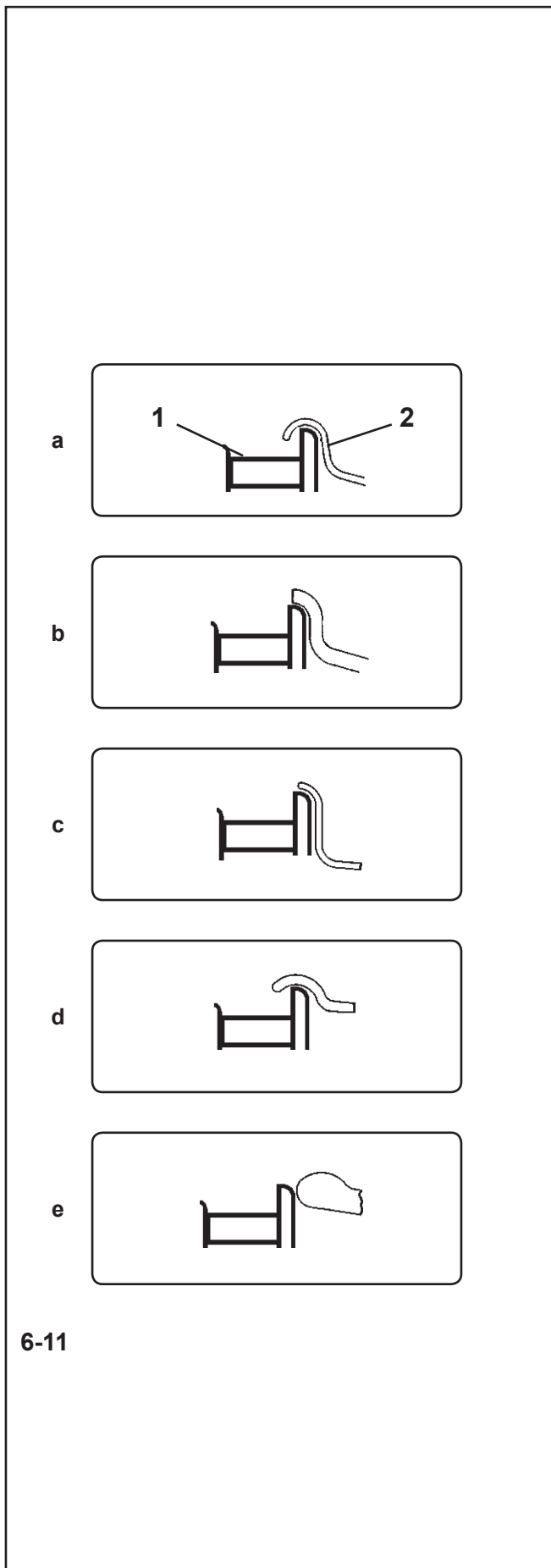
1 Gauge head  
2 Rim

**Fig. 6-11 b** Standard wheel – Alloy rim

**Fig. 6-11 c** Light-truck wheel – Steel rim

**Fig. 6-11 d** Light-truck wheel – 15° taper steel rim

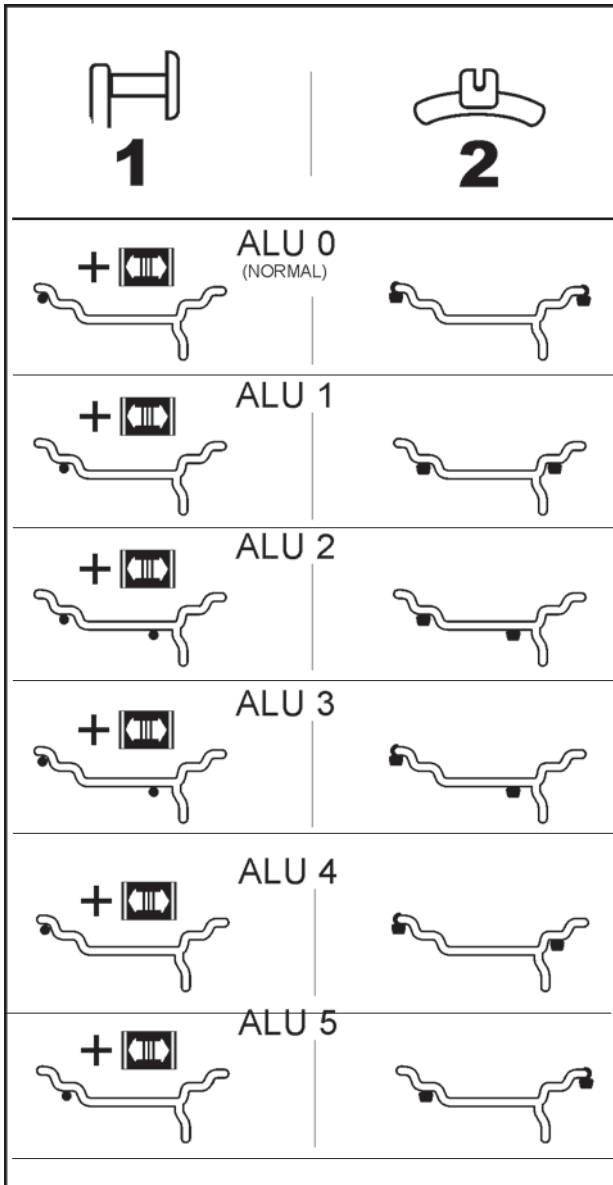
**Fig. 6-11 e** Alloy wheel - Rim without a housing for clip-on weights



## Wheel data Reading

### 6.5.1 Reading positions for various Alu types

The Gauge should be used to select the various Alu only in MANUAL Mode



6-12

Fig. 6-12 shows the corrected reading positions of the measurement gauge on different types of rim (1), depending on the required weight application positions (2); adhesive and clip-on weights.

\* Select the menu key:  
F4 to recall the required ALU P weight positions.

Fig. 6-12

• = Point of application of gauge arm (1)  
■/□ = Given weight position (2)

normal Normal weight positioning. Clip-on weight positions on the rim flange - this mode is presented immediately by the Easyalu function.

Alu 1 Adhesive weights applied symmetrically to the rim flanges with NOMINAL weight positioning. Function not included in Easyalu mode. After reading, set mode from Menu F2.

Alu 2 Adhesive weights - Adhesive weight on rim flange, adhesive weight hidden in rim disc with NOMINAL positioning. Function not included in Easyalu mode. After reading, use internal calibration to set mode from Menu F2

Alu 3 Clip-on weight on left rim flange, adhesive weight hidden in rim disc. Function not included in Easyalu mode. Weight positioning is NOMINAL. After reading, set mode from Menu F2.

Alu 4 Balance clip fitted on left rim flange, adhesive weight attached to right bead seat.

Alu 5 Balance clip fitted on right rim flange, adhesive weight attached to left bead seat.



### 7.1 MANUAL Mode - Settings

To establish the imbalance value the machine must have been given the following basic information:

- **Vehicle type** (depending on rim type)
- **balancing mode** (weight fitting position on rim)
- **Rim width** and **diameter** (nominal or effective)
- **Distance** between machine and left correction plane

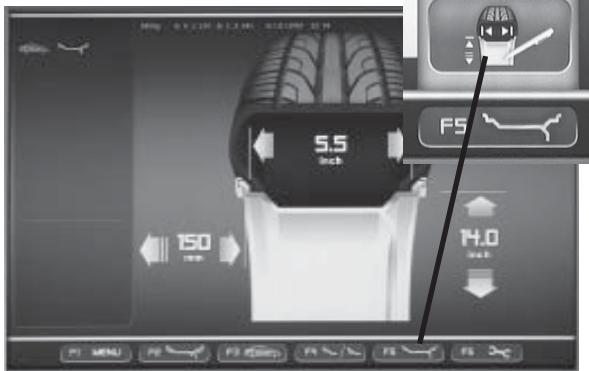
This data can be entered one at a time by recalling the various options in the respective menus. This allows the machine to calculate imbalances on the basis of NOMINAL (theoretical) data.

## 7.2 Rim dimension reading and setting and Alu Mode

### **Important**

Apart from Alu 2P and 3P that only the internal gauge is used for the remaining Alu0, Alu1, Alu4 and Alu5 modes the width of the rim must always be entered manually on the keyboard.

The OK indication and recommendation for optimization, as well as the optimisation procedure itself, will only be accurate if the rim width has been correctly entered.



7-5



7-5.a

ALU 0



ALU 1



ALU 4



ALU 5



7-6

### Rim distance and diameter reading

- Move the internal gauge arm gauge into position on the rim to select the initial weight application position (internal rim side). Keep it in this position until an audible signal is heard.

For Alu2P and Alu3P:

- Position and hold the internal gauge in the second position on the rim to select the application position on the right side of the rim.

Shortly afterwards the machine emits an audible signal to indicate that the machine automatically saves the weight application coordinates.

- Move the gauge to the idle position.
- For Alu2P and Alu3P you can proceed with a measuring run (Chapter 8.1).

### Rim width detection

To set rim width:

- Access the ENTERING RIM DATA screen and select the EDIT MEASUREMENTS item (**Fig. 7-5**) by selecting the Menu key **F5**.
- Measure the width with the appropriate gauge or read the data stamped on the wheel.
- Press the menu key **F3** (**2, Figure 7-5a**) and scroll until the required value is reached.
- Press the menu key **F3** to set the value.

An ALU Type in use identification icon will be displayed in the Status Bar at top left; in the example, Alu 2P (**Fig. 7-6a**).

**Note:**

After the run, the Alu selection can be changed and the values re-calculated as required. The machine automatically recalculates the results. Another measuring run is not required.

- On the BALANCING screen press the **F2** Menu.



### 7.3 Menu settings

The wheel dimensions to be entered are usually given on the rim (in inches or mm on standard wheels, in mm on TD or TRX wheels). Rim diameter is also given on the tire. Read the rim dimensions before clamping the wheel on the balancer

To make a setting using the Menu, access the BALANCING screen (**Fig. 7-9**), or the RIM DATA ENTRY screen (**Fig. 7-9**):

- On the main Menu (**Fig. 7-8**) press the **F1 MENU** key and select the RIM DATA ENTRY.

The RIM DATA ENTRY screen (**Fig. 7-9**) will open.

**Note:**

All the basic selections can be made in the same way from the BALANCING and RIM DATA ENTRY menus.



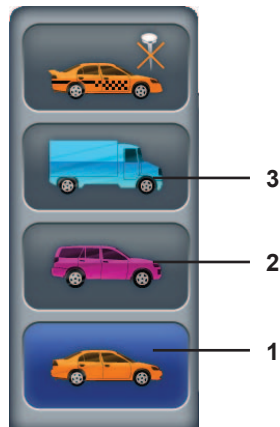
7-8



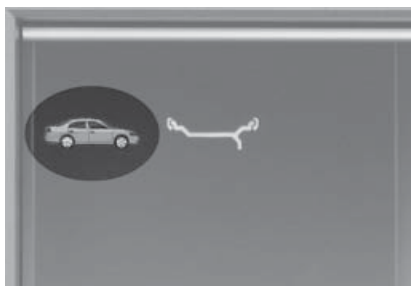
7-9



7-10



7-11



7-12

### 7.3.1 Selecting the Type of Vehicle

When the unit is started it shows the “Vehicle” selection 1.

In MANUAL mode the vehicle must always be selected by the operator.

- On the BALANCING and RIM DATA ENTRY screen **Fig. 7-10** press the menu key **F3 Fig. 7-11** to select the Type of Vehicle.
- Select the TYPE OF VEHICLE item according to the rim on the machine.

**Fig. 7-11** Types of Vehicle

Assigned Menu items:

- 1 Standard vehicle wheel (car)- nominal dimensions in inches. The unit of measure (**inches**) is displayed. Normal and Alu 1 to Alu 5 weight positioning can be selected. To select a standard wheel with nominal dimensions in mm - TD or TRX wheel, you should select the **mm/inch** option from Menu **F5** in the RIM DATA ENTRY screen **Fig. 7-10**.
- 2 SUV vehicle wheel - nominal dimensions in **inches**.
- 3 Light industry vehicle wheel (Van) - nominal dimensions in **inches**. The threshold value for suppression of minor unbalances is automatically doubled when this type is chosen and the resolution of the amount reading set to 10 g and 5 g respectively. Thresholds for WeightMiser correspond to 1.5 times this value (see specific Weight Miser™ user’s handbook).

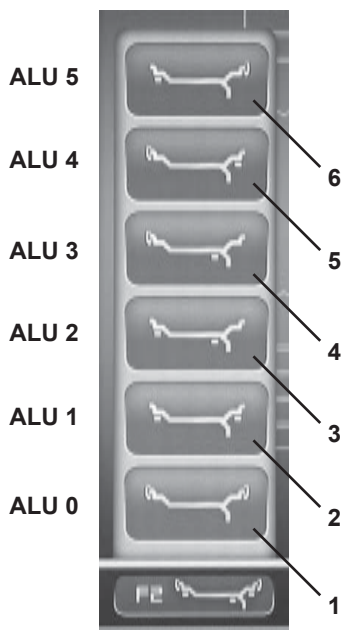
When the selection has been made, a Type of Vehicle in use identification icon will be displayed in the Status Bar at top left **Fig. 7-12**.



7-10



7-13



7-14

### 7.3.2 Manual ALU selection

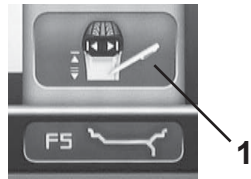
- On the BALANCING and ENTERING RIM DATA screen (Fig. 7-10) press the F2 MENU key (Fig. 7-14) to select a specific ALU mode.
- Select the ALU item corresponding to the required weight location.

Figure 7-14 ALU types

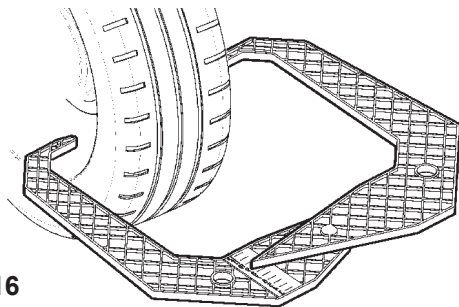
Assigned F2 Menu items:

- 1 ALU 0 (normal) - Using clip-on weights on the internal and external sides of the rim.
- 2 ALU 1 - Using adhesive weights on the internal and external rim flange.
- 3 ALU 2 - Using an adhesive weight on the internal rim flange and an adhesive weight on the rim disc. Both weights will be invisible from the outer wheel.
- 4 ALU 3 - Using a clip-on weight on the inside and an adhesive weight on the rim disc. Both weights will be invisible from the outer wheel.
- 5 ALU 4 - Using a clip-on weight on the inside and an adhesive weight on the external rim flange.
- 6 ALU 5 - Using an adhesive weight on the internal rim flange and a clip-on weight on the outside of the rim.

A Type of ALU in use identification icon Fig. 7-13 will be displayed in the Status Bar at top left.



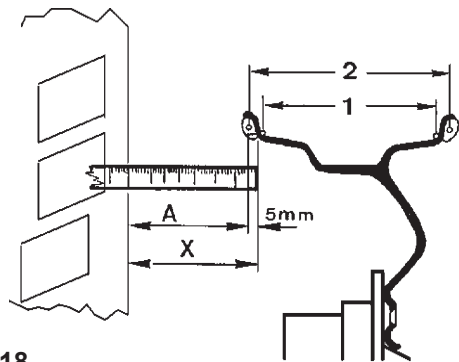
7-15



7-16



7-17



7-18

### 7.3.3 Entering rim measurements manually

Entering rim measurements manually results in balancing cycles based on nominal data

If data is changed manually, before or after a run, the system immediately exits the automatic function and inhibits real data based measurements.

- Access the ENTERING RIM DATA screen and select the EDIT MEASUREMENTS item (1, Fig. 7-15) by selecting the Menu key F5.

#### 7.3.3.1 Entering the rim width

If the width of the rim cannot be measured, if a standard rim is present it can be measured using the width gauge (Figure 7-16 - reg. no. EAA0247G21A).

To set rim width:

- Measure the width with the appropriate gauge or read the data stamped on the wheel.
- Press the menu key F3 (2, Figure 7-17) and scroll until the required value is reached.
- Press the menu key F3 to set the value.

#### 7.3.3.2 Entering the rim/machine distance

If automatic determination of the distance rim/machine is not possible (error code E 92), the distance can be determined manually.

**Fig. 7-18** Determining distance by measurement

- X** Distance between cabinet cover edge and rim
- A** Value X (as measured) less 5 mm = Value A to be entered.

- Measure the distance X (Fig. 7-18) between cabinet cover edge and rim.

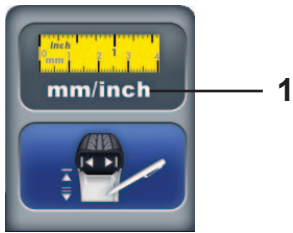
The value A to be inserted corresponds to X less 5mm.

- Press the menu key F2 (1, Figure 7-17) and scroll until the required value is reached.
- Press the menu key F2 to set the value.

#### 7.3.3.3 Entering the rim diameter

If automatic determination is not possible (error code E92), the rim diameter can be determined manually .

- Read the nominal diameter on the rim or tire and note it down.
- Press the menu key F4 (3, Fig. 7-17) and scroll until the required value is reached.
- Press the menu key F4 to set the value.



7-15

### 7.4 Special Dimensions mode

- In the ENTERING RIM DATA screen press the menu key **F5**, then select the Special Dimensions item (**1**, Fig. 7-15).

The ENTERING RIM DATA screen appears where the weights highlighted on two planes appear in a square shape (Fig. 7-20).

**Note:**

The Special Modes function is not used for the normal balancing procedures but only if it is not possible to use a programmable weight position (e.g. in the case of special wheels), with complex dimension parameters beyond the automated mechanisms on the machine.

The ALU 0 mode is automatically recalled when selected.

The dimensions are always displayed in millimeters.

- Measure directly on the wheel to be balanced the distance **X** and the effective compensation measurements (weight barycentre) using a flexible tape measure (Figure 7-21).
- Press key **F2**, **F3** or **F4**, according to the dimension you wish to alter.

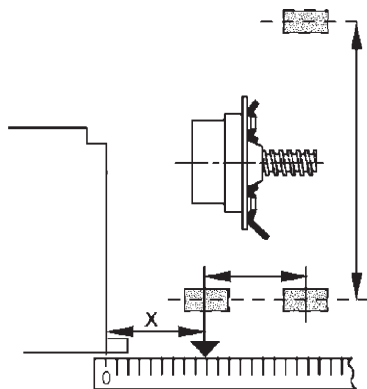
The value involved in the alteration takes on a colored identification frame.

- Using the scroll cursor change the value, until the value displayed corresponds to the value measured.
- When this value is reached press the same key again.

The rim dimensions are now entered completely. The input is retained until a new input is made or until the machine is turned off.



7-20



7-21

### 7.5 Wheel Profiles function

To balance more than one wheel of the same type and with the same nominal dimensions, simply set the data for the first wheel only. The data set then remains until other new data is set or the machine is switched off. Manual measurement inputs are available ONLY in the manual mode.

To make the wheel parameters available permanently use the WHEEL PROFILES function.

The wheel profiles function enables you to memorize the values of certain wheel types that are often balanced in the garage. Naturally this bypasses the task of repeatedly setting wheel data. This function is particularly useful for workshops that carry out series fitting of tyre/rim assemblies or frequently handle the same wheel types (e.g. workshops that offer rims for retrofitting).

The once-only storage of the rim data in the profiles guarantees that the same correction planes are always used, in particular for alloy wheels, thus providing consistent balance quality.

The function can be used to save the following data:

- Nominal wheel dimensions
- Values measured with gauge (Alu P)
- Position of weights (Modo Alu)
- Type of Vehicle
- Traceability positions (list from 1 to 9)
- Number of spokes (if loaded previously)

**Fig. 7-22 PROFILE**

Assignment of menu fields:

**F1** Access to Basic Menu

**F2** Not assigned

**F3** Saves current profile in permanent memory

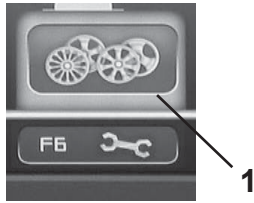
**F4** Not assigned

**F5** Applies a wheel profile selected from the memory

**F6** Not assigned



**7-22**



7-23

### 7.5.1 Saving a Wheel Profile

Up to 9 wheel profiles can be saved.

- Clamp the wheel you wish to save the profile of.
- Set and acquire all the wheel data including the number of spokes.
- Press the menu key **F6** in the ENTERING RIM DATA screen and select the Wheel Profiles item (**1**, **Fig. 7-23**).

The WHEEL PROFILES screen (**Fig. 7-24**) will open.

The current wheel profile data is highlighted in a line on its own at the bottom of the page.



7-24

- In the 9 position list, use the Scroll command to choose the current profile registration position.
- Press the **F3** key to save data.

The data is now saved permanently in the chosen position and can be recalled when required.

**Note:**

If the profile is overwritten with other data it is no longer shown in the list.



7-25

### 7.5.2 Recalling a Wheel Profile from the memory

- Clamp the wheel to the balancer.
- Press the Menu key **F6** in the ENTERING RIM DATA screen and then select and press the WHEEL PROFILES key (**1**, **Fig. 7-23**).

The WHEEL PROFILES screen (**Fig. 7-24**) will open.

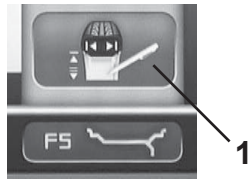
- Use the Scroll command to select the profile indicated for the wheel on the machine.
- Press the **F5** key to apply the data selected.

The ENTERING RIM DATA screen (**Fig. 7-25**) will open and show the data recalled.

- Check that the settings in the Indications Field and Status Bar panel are correct.

The machine is now ready to proceed with the measuring run (Chapter 8.1).





7-15

## 7.6 Correction of inputs after measurement

If incorrect data and/or incorrect wheel type or balancing mode were entered for a measuring run (Type of Vehicle, Alu Mode):

To reset the corrected rim dimensions and/or the corrected measurement methods

- Return to the ENTERING RIM DATA screen (Menu **F1**).
- Press the **F5** Menu key to select the item (**1**, **Fig. 7-15**).

The EDIT MEASUREMENTS function screen opens so proceed as described in Chapter 7.3.3.

At the end of the process the electronic control unit acquires the new settings, processes and displays the corrected measurement values in the BALANCING screen without having to launch another run.

## Operation - AUTOMATIC “PROFILING”

### 7.8 “PROFILING” Mode

The following instructions describe the specific functions of the wheel balancer in PROFILING mode.

The icon shown in fig. 7-20 indicates the PROFILING mode is active. The unit operates in Automatic Mode.

When the “PROFILING” mode is set with the set up panel, the machine performs the automatic wheel data reading procedure and the user does not have to perform any setting before the measuring run.

This section sets out the specific functions of the “PROFILING” mode and only the Menu items that refer to this mode.

For information about the other items and icons, refer to the basic chapter “4. Control Elements”.

The balancer displays the start screen at power-on. The screen in fig. 7-20 appears automatically on the monitor after clamping the wheel.

During the wheel measuring run the screen in fig. 7-22 appears and at the end the weights shown can be:

- suggested (yellow)

or

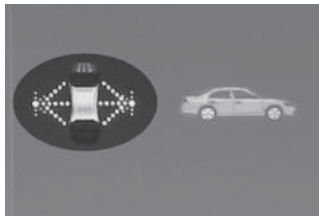
- possible alternatives (grey) in the 6 o'clock zone, precisely where the laser beam indicates they should be applied (1, Fig. 7-23).

If the Spokes Count is active, the icon in fig. (Fig. 7-22a) is displayed during the measuring run.

The possible application of the weights in ways other than that suggested by the machine is indicated by the grey weights in the positions compatible with the rim configuration detected.

#### Note:

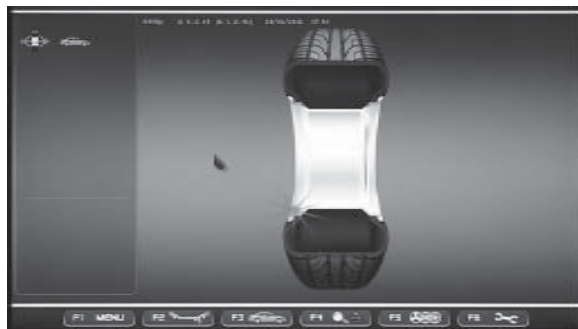
The change in the position of the weight is saved by the machine, then automatically suggested for all subsequent wheels with the same dimensions. The selection is deleted when the machine is switched off.



7-20



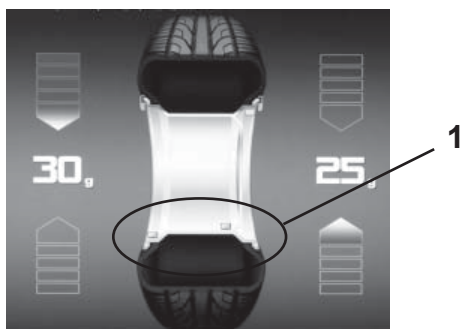
7-21



7-22



7-22a



7-23

## Operation - AUTOMATIC “PROFILING”



7-24



7-25

### F2 - POSITION CHANGE:

With the *Laser Pointer* mode active (Fig. 7-24), the **F2** key opens the Menu with the Item used to change the weight position during the application phase.

Once you have reached the adhesive weight application position (green arrows), change the weight position as follows:

- Press the **F2** key in the Menu and select *Laser Pointer* (1, Fig. 7-25)..
- Manually rotate the wheel to change the position of the weight indicated by the pointer.
- Press the **F2** key in the Menu and select *Laser Pointer* to enter the position reached.

### Note:

The relocation causes a variation of the position and value of both weights. As the change can be performed on both planes, the right weight (close to the rim flange) is usually applied first, due to the fact that it needs to be moved more often.

### Note:

The change in the position of the weight is saved by the machine, then automatically suggested for all subsequent wheels with the same dimensions. The selection is deleted when the machine is switched off.

### 7.8.1 Wheel Data Freezing “Rim Data Freeze”

The “Rim Data Freeze” function allows you to save the data detected on a first rim, of a group of identical wheels (usually four) to be balanced.

This function enhances machine performance since it reduces the data acquisition time for the subsequent identical wheels after the first

**Note:**

This feature is only available in AUTOMATIC Mode: (PROFILING - OPTIMA - OPTIMA ADVANCED).

#### How the function works

- Clamp the first wheel.
- Perform a run.

During the run, all wheel data is defined by the unit by means of the laser scanners; if necessary the operator can change the values suggested by the machine

After the first wheel has been balanced, before clamping another wheel from the set on the machine, you can freeze the rim data by selecting *Rim Data Freeze* (1, Fig. 7-27) in the F2 Menu. The (2, Fig. 7-27a) icon is immediately displayed.

The subsequent wheels will be balanced without running the wheel profile detection.

The use of the previously “frozen” data, reduces the cycle time considerably.

If previously enabled, the laser pointer function can be used for weight placement. - enabled in setup

This function is directly available at the end of the wheel measuring run and can be activated:

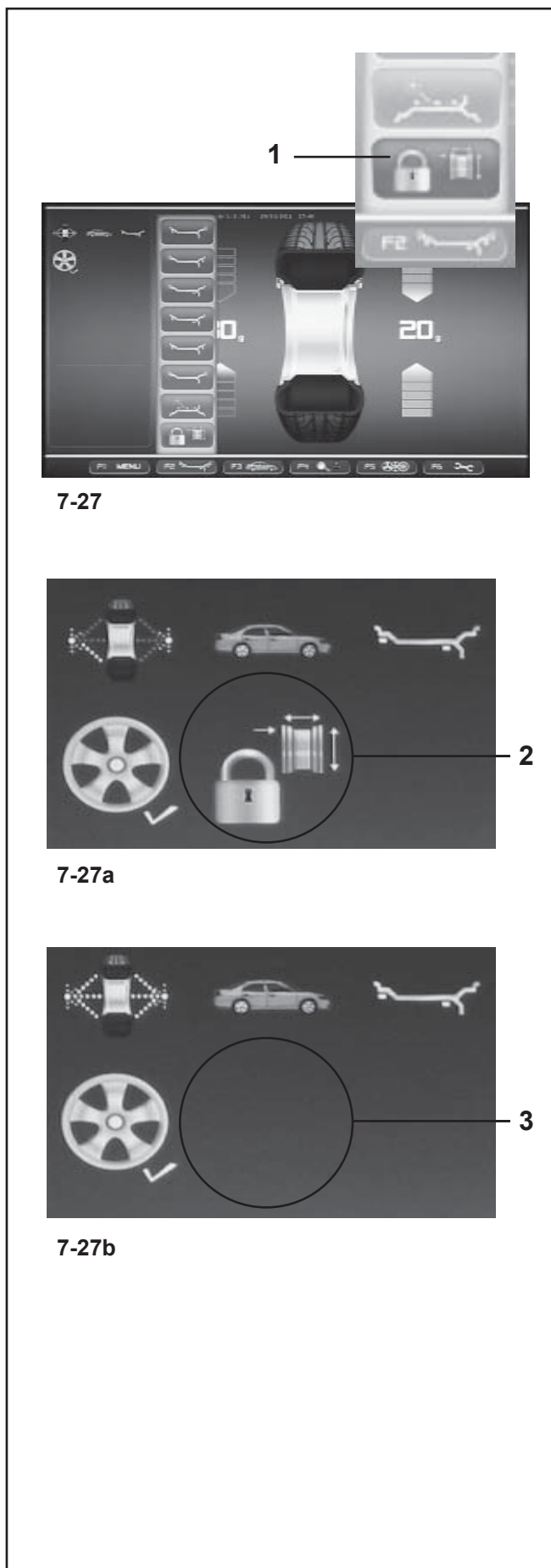
from the BALANCING screen page or from the RIM DATA INPUT screen page

- press F2 and select *Rim Data Freeze* (1, Fig. 7-27).

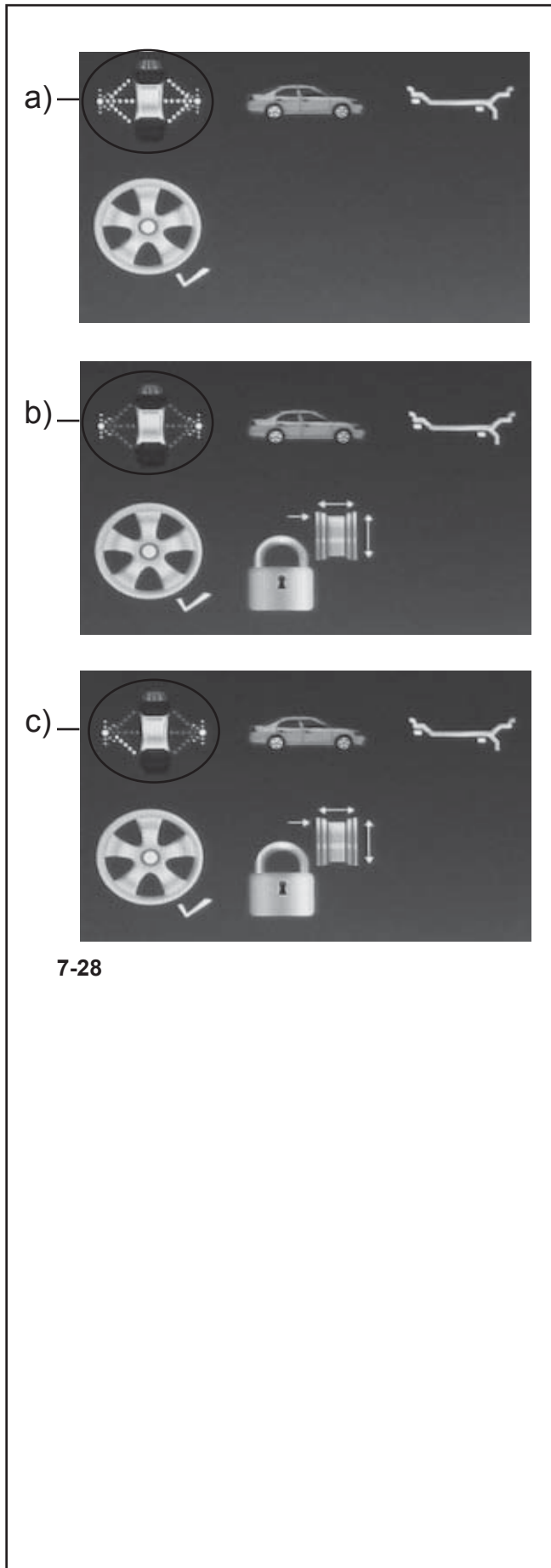
#### To cancel the function:

The frozen rim data can be deleted at any time, by pressing the F2 key again and selecting *Rim Data Freeze* (1, Fig. 7-27).

In this way the padlock icon disappears (3, Fig. 7-27b), to indicate that the rim scan is allowed and it will be necessary for the wheel data acquisition at the next wheel run.



## Operation - AUTOMATIC "PROFILING"



The *Rim data freeze* condition set is also identified by the icon shown on the right of the monitor, with the following meaning:

(Fig. 7-28)

**a)** Yellow hatching for external and internal detectors, indicating that the Wheel Data Freezing function is not activated. For every measuring run after clamping the wheel the machine will perform the complete wheel scan.

**b)** Grey hatching for external and internal detectors, indicating that the Wheel Data Freezing function is activated. The subsequent wheels will be balanced without the wheel profile scan and the machine will use the data previously detected and saved.

**c)** Grey hatching for the detector on the outside of the wheel and grey hatching with yellow only for the lower part of the detector on the inside of the wheel, indicate that the Wheel Data Freezing function is activated and the Laser Pointer mode (previously activated) is ON. The machine will not scan the wheel and will use the data previously detected and saved. The internal laser will still be available for pointing to the areas where stick-on weights must be fixed.

### Special conditions of the function

Spoked rims:

To divide the weight on a set of wheels with spoked rims, in the Wheel Data Freezing function, after clamping the second wheel (the first following Freezing activation) you must:

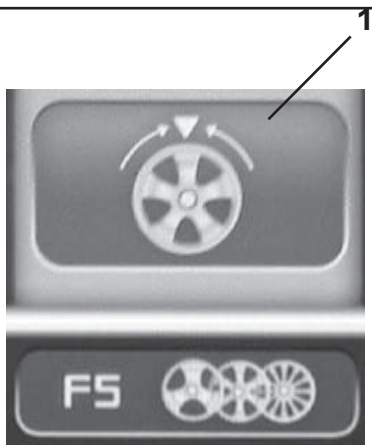
- Press **F5 (1, Fig. 7-29)** to activate the function.

**Note:**

The position and the number of spokes is automatically identified at every run.

### Manually changing a wheel data item:

If you change a data item in the RIM DATA INPUT screen page, after selecting Wheel Data Freezing, the freezing setting will be cancelled automatically and the machine will proceed in MANUAL mode, considering the data just entered. When the next wheel is clamped on the balancer, the machine will perform the complete scan of the profiles.



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### Spoked rims:

To divide the weight on a set of wheels with spoked rims, in the Wheel Data Freezing function, after clamping the second wheel (the first following Freezing activation) you must:

- Press **F5** (1, Fig. 7-29) to activate the function.

### Note:

The position and the number of spokes is automatically identified at every run.

### Manually changing a wheel data item:

If you change a data item in the RIM DATA INPUT screen page, after selecting Wheel Data Freezing, the freezing setting will be cancelled automatically and the machine will proceed in MANUAL mode, considering the data just entered. When the next wheel is clamped on the balancer, the machine will perform the complete scan of the profiles.

### 7.8.2 Wheel measuring run (PROFILING mode)

- Lower the wheel guard.
  - With the **PROFILING MEASURING RUN NOT ACTIVATED**,

no signal appears on the screen, therefore to proceed with the run

- press the START button.

The balancer performs the measuring run with the unbalance measuring cycle and rim profile detection (to find the type, steel/aluminium and count the spokes, if present).

- With **PROFILING MEASURING RUN ACTIVATED**, the machine proceeds directly to the measuring run.

At the end of the run, the unbalance values and the points where the balancing weights should be applied are displayed.

Press **F1** and select RIM DATA INPUT to check the rim nominal dimensions.

Press **F2** to alternate the type of ALU by selecting it from those suggested. The Menu contains only the ALU that the machine retains possible, based on the type of rim detected. At every ALU change the balancer automatically recalculates the value and position of the weights.

The wheel measuring run may have detected the number of spokes: in this case press **F5** to activate the hidden weight mode.

Only if it is impossible to read one or more wheel widths (e.g.: rim without a tire) the wheel data input screen page appears automatically, with the values not detected shown in red.





7-31



7-32

### 7.9 Advanced Spoke Detection

This mode, which can be activated when required, allows absolute precision when detecting the position and dimensions of the rim spokes, to allow more precise behind the spokes placement. If the Cameras can't recognize the spokes or the operator decides he is dealing with a rim with a particularly complex shape, enable the Advanced Spoke Detection function which recognizes any type of spokes, even those with unusual shapes, for example: paired, oblique, with holes or of different sizes to one another (**fig. 7-31**).

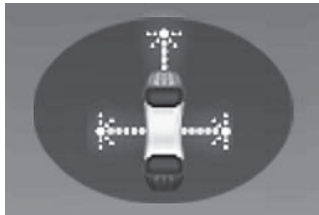
Before performing the measuring run, in the Settings menu:

- Access the “Measurements Setting” topic.
- Access the “Spokes Detection” parameter and select the “**Advanced**” value.
- Perform the normal procedures for the run.

**Note:** This function increases the time for the total measuring cycle by max.4 seconds.

During the Detection the icon in (**Fig. 7-32**) is displayed.

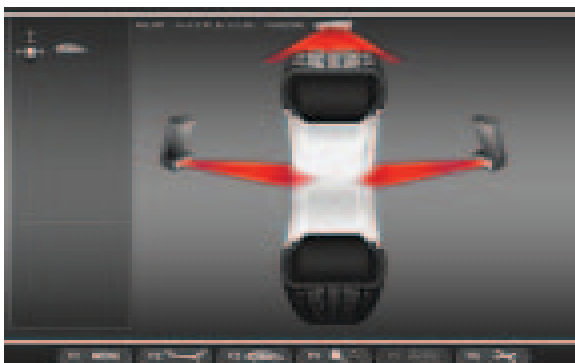




7-33



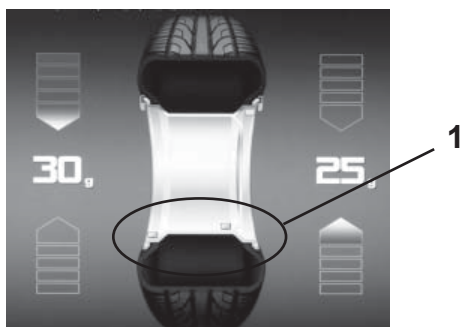
7-34



7-35



7-35a



7-36

### 7.10 “OPTIMA” Mode

The following instructions describe the specific functions of the wheel balancer in *OPTIMA* mode.

The icon shown in fig. 7-33 indicates the *OPTIMA* mode is active. The unit operates in Automatic Mode.

When the “*OPTIMA*” mode is set with the set up panel, the machine performs the automatic wheel data reading procedure and the user does not have to perform any setting before the measuring run.

This section sets out the specific functions of the “*OPTIMA*” mode and only the Menu items that refer to this mode.

For information about the other items and icons, refer to the basic chapter “4. Control Elements”.

The balancer displays the start screen at power-on. The screen in fig. 7-34 appears automatically on the monitor after clamping the wheel.

During the wheel measuring run the screen in fig. 7-35 appears and at the end the weights shown can be:

- Suggested (yellow)

Or

- Possible alternatives (grey) in the 6 o’clock zone, precisely where the laser beam indicates they should be applied (1, Fig. 7-36).

If the Spokes Count is active, the icon in figure (Fig. 7-35a) is displayed during the measuring run.

The possible application of the weights in ways other than that suggested by the machine is indicated by the grey weights in the positions compatible with the rim configuration detected.

**Note:**

The change in the position of the weight is saved by the machine, then automatically suggested for all subsequent wheels with the same dimensions. The selection is deleted when the machine is switched off.

**Note:**

As far all the Automatic Modes, the previously described functions can also be used in the “*OPTIMA*” Mode:

“RELOCATION “ (section 7.8)

“*Rim Data Freeze*” (section 7.8.1).

“Advanced Spokes Detection” (section 7.9).

Further Menu Items and specifications of this mode are described below.

“OPTIMA” MAIN MENU

The following additional items can be found in the *Entry Screen* (Fig. 7-37) in Optima mode:

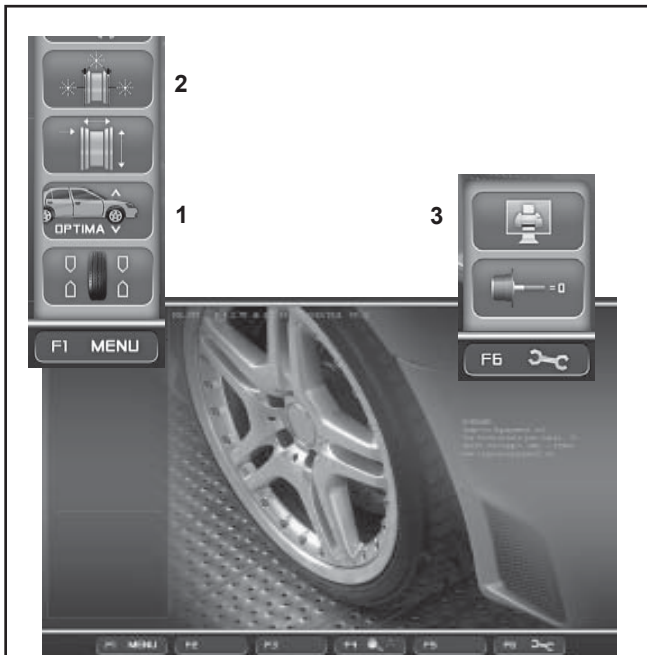
F1 Menu

- 1 Access to the Optima Diagnostics screen
- 2 Access to the *Matching* screen

F6 Menu

- 3 Select Print of the current Screen.

For information about the other items and icons, refer to the basic chapter “Control Elements”.



7-37

“OPTIMA” BALANCING

The following additional items can be found in the *Balancer Screen* (Fig. 7-38) in Optima mode:

F1 Menu

- 1 Access to the *OPTIMA ENTRY* Diagnostics screen
- 2 Access to the *Matching* screen

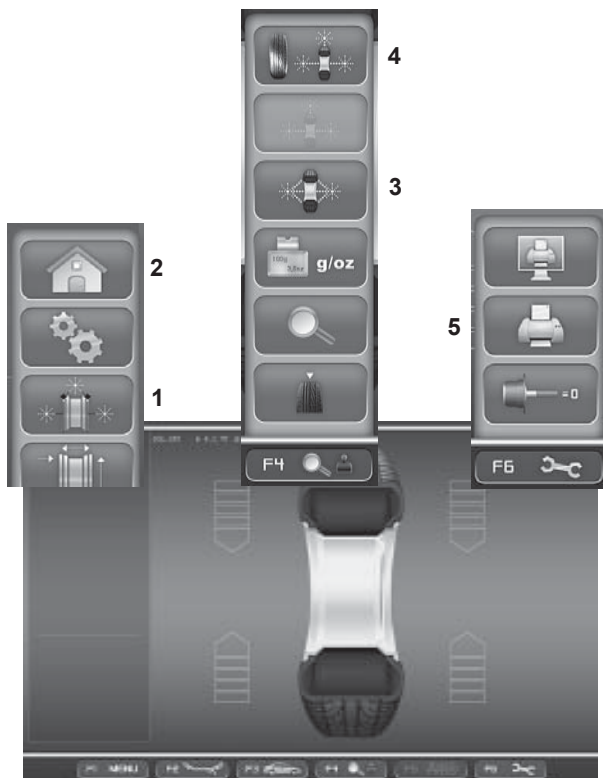
F4 Menu

- 3 Select the *PROFILING* Mode
- 4 Select the *OPTIMA FULL DIAGNOSTIC* Mode

F6 Menu

- 5 Print the Balancing results.

For information about the other items and icons, refer to the basic chapter “Control Elements”.



7-38

**RIM DATA INPUT “OPTIMA”**

The following additional items can be found in the *Rim Data Entry* screen (Fig. 7-39) in Optima mode:

(Fig. 7-39)

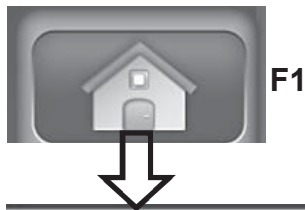
**F1 Menú**

- 1 Select *Rim Data Freeze*

For information about the other items and icons, refer to the basic chapter “Control Elements”.



7-39



F1



7-40

**“OPTIMIZATION ENTRY SCREEN”**

The key in the **F1** Menu in Optima mode, used to access the *Optimization Entry Screen*, takes you to the next screen (Fig. 7-40) which contains the following:

(Fig. 7-40)

**F5 Menu**

- 1 Access to the geometrical Matching of the complete wheel.
- 2 Access to the geometrical Matching of just the rim.

For information about the other items and icons, refer to the basic chapter “Control Elements”.

“ASSEMBLY RUNOUT INDICATION”

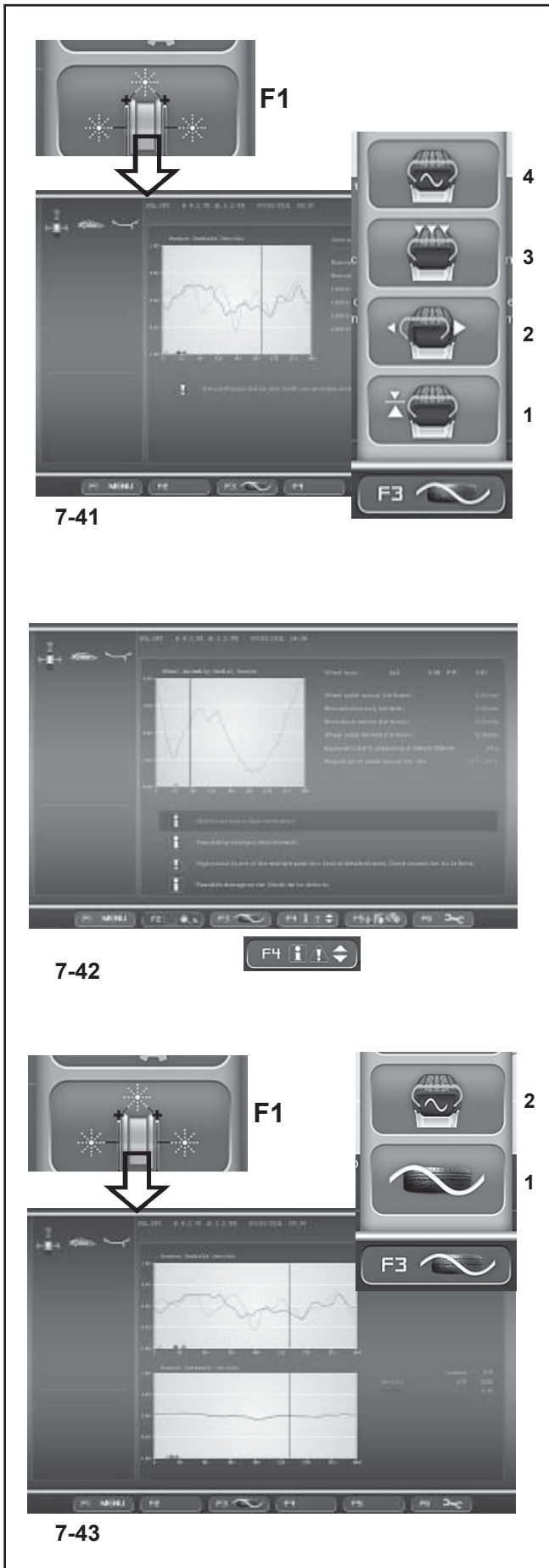
The *OPTIMA ENTRY* key in the **F1** Menu, after the measuring run of a wheel and tire, allows access to the Screen in **Fig. 7-41** which contains the following:

(**Fig. 7-41**)

**F3** Menu

- 1 Access the wheel/rim radial *Runout*.
- 2 Access the rim radial/lateral *Runout*.
- 3 Access the (data) multi position/harmonic *Runout*.
- 4 Access the harmonic 1st, 2nd, 3rd *Runout*.

For information about the other items and icons, refer to the basic chapter “Control Elements”.



**WARNING INDICATION**

The **F4** Menu key in the *Assembly Indication* screen, is used to scroll the messages present, when there are more than four messages:

(**Fig. 7-42**)

- Press the lower part of the **F4** key to scroll down the list of messages
- Press the **F4** key upwards to scroll up the list of messages.

“RIM RUNOUT INDICATION”

The *OPTIMA ENTRY* key in the **F1** Menu in Optima mode, after a bare rim measuring run, allows access to the Screen in **Fig. 7-43** which contains the following:

(**Fig. 7-43**)

**F5** Menu

- 1 Go back to the Assembly Indication screen.
- 2 Access the harmonic 1st, 2<sup>nd</sup> and 3rd *Runout*.
- 3 Access the 3D Plot and Sidewall Plot screen.

For information about the other items and icons, refer to the basic chapter “Control Elements”.

**START**

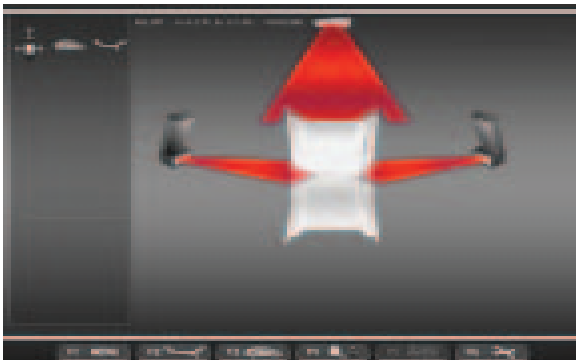


7-44

**"WHEEL SCANNING"**

In Optima mode, during the measuring run of a wheel and tire, the Screen in **Figure 7-44** is displayed.

**START**



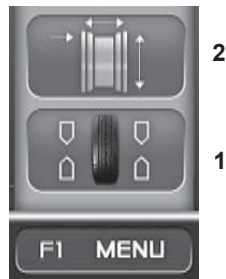
7-45

**"RIM ONLY SCANNING"**

In Optima mode, during a bare rim measuring, the Screen in **Figure 7-45** is displayed.



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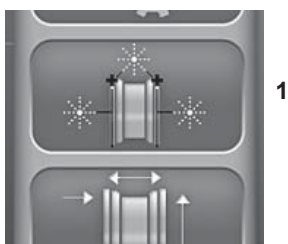
7-47



7-48



7-49



7-50

### 7.10.1 Wheel measuring run in OPTIMA Mode

- Lower the covering guard. If the automatic measuring run function has not been activated, press the **START** key: the balancer carries out the wheel measuring run piloted by the Cameras **Figure 7-46**. They detect the rim profile; measure the wheel runout; the internal rim lateral and radial and the external rim lateral and radial.

At the end of the wheel measuring run the balancer displays any unbalance on the wheel and signals the points to fit the weights, unless the RUNOUT limits have been exceeded, in this case the balancer automatically suggests the display of the Optima diagnostic results.

To go back to the basic balancing screens:

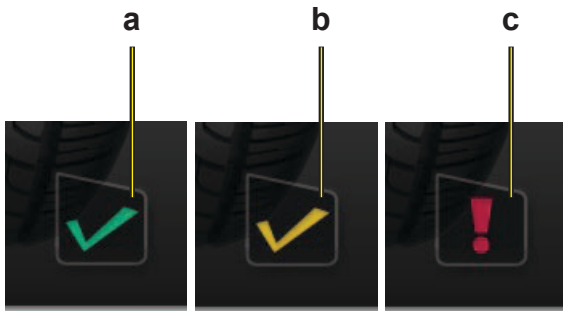
- Press **F1** and select Balancing (**1, Fig. 7-47**). The values will be displayed along with the weight application positions.
- Press **F1** and select Rim Data (**2, Fig. 7-47**). The wheel (rim + tire) size data detected with the wheel measuring run will be displayed.
- Press **F2** and select an Item (**Figure 7-48**). To change the weight application characteristic (ALU): the balancer will automatically recalculate the value and position of the corresponding weights.

The wheel measuring run may have detected the number of spokes:

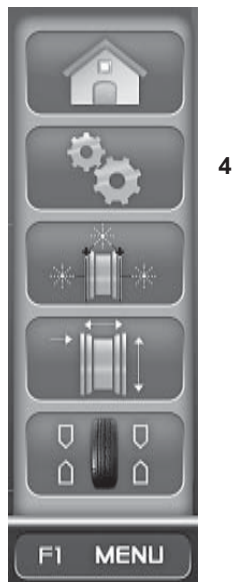
- Press **F5** to start the Weights behind the Spokes positioning procedure (**Fig. 7-49**).

To access the results of the OPTIMA diagnosis, from one of the basic screens:

- Select in the **F1** Menu the *OPTIMA ENTRY* item (**1, Fig. 7-50**).



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### 7.10.1.1 TDI Tread Depth Indication

When run in OPTIMA mode, the machine always automatically detects the depth of the tread groove at the center of the tire and over its whole circumference.

According to the mean value detected and the limit value set, the program displays one of the following Tread Groove indications on screen (**Fig. 7.51**):

- a) GREEN icon = higher than limit set.
- b) YELLOW icon = close to limit.
- c) RED icon = below limit set.

**Note:** The information provided for the operator is intended as a guideline only. The TDI function is designed to alert the operator to the need for a closer examination of wear on the tread.

You can set the tread depth limit value for which wear information will appear on screen. To change the limit value go to the "Settings" Screen (**4, Fig. 7.47**).

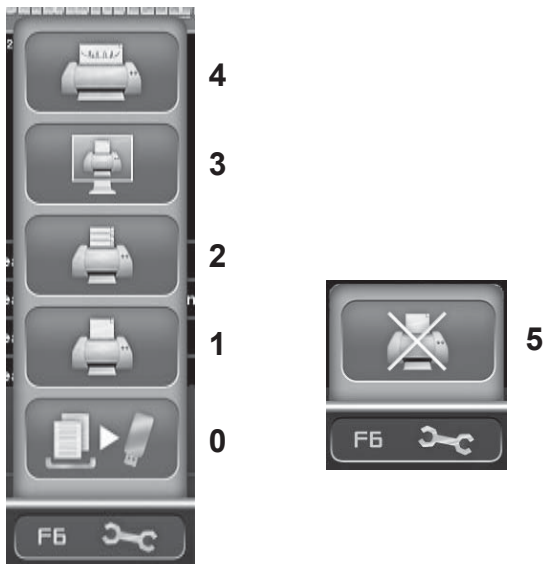
Access the following:

"**Optima Settings - Tread Depth Limit**", finally set the desired value, between **10mm** and **0mm** and press **OK**.





7-47



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### 7.10.1.2 Print functions

When a printer is connected, configured and enabled in the "Settings" menu of the balancer, the user can access the print management items in every screen (Fig. 7.52). In the F6 Menu, according to the Operating Mode and the Function currently active, the following can be selected:

- 0) Memorize on USB Drive. Export the acquired numerical data (Profiling, Plot 3D, etc.).
- 1) Print the Balancing results.
- 2) Print the current screen.
- 3) Print the results of the in-depth analysis.
- 4) Print the wear data for the Set of wheels (you must assign, in the vehicle screen, the single wheels examined in the set).
- 5) Aborts the print in progress.

To manage the printer access the "SETTINGS" Screen (4, Fig. 7.47).

Access the following:

**"SETTINGS / Network and Printing - Printer"**.

Field for switching the printer On/Off.

ISet **"Enabled"** to enable printing.

Set **"Disabled"** to disable printing; when the printer is not used for a long time.

**"SETTINGS / Network and Printing - Paper Size"**.

Field for selecting the print format. Activate the format which matches the paper size used, **A4** or **Letter**.

**"SETTINGS / Network and Printing – Printer type"**.

Field used for selecting the type of printer to connect to the machine pc.

The following can be selected in the Parameter:

- **GENERIC USB**: activates a general printer connection via a USB port.

- **NETWORK PDF**:

this print option produces a PDF file.

If the Networking "Snap-on Network" function is activated, the Pdf file will be sent to the remote.

When a USB key is inserted in a USB port on the machine, the Pdf file will be recorded on it.

- **XXX (Model List)**:

A list of printer models is available from which the model to be installed can be selected.

### 7.10.2 OPTIMA ENTRY Screen

Press **F1** in the balancing screen to access (1, fig. 7-50).

(fig. 7-53)

The control software automatically displays this screen whenever, at the end of the wheel measuring run, the measuring values exceed the preset limits.

The overall wheel (rim + tire) measuring run is displayed.

To move the cursor on the wheel graph, rotate the wheel by hand in both directions.

All of the OPTIMA ENTRY screens show the first harmonic Peak index (1, fig. 7-54), which facilitates advanced diagnosis of the rim or the wheel.

The unbalance data is shown under the graph (first runout harmonic).

The automatic Position Brake fitted on the machine will be activated when the peak position is manually brought to the 12 o'clock point.

The Position Brake function can be temporarily disabled in two ways:

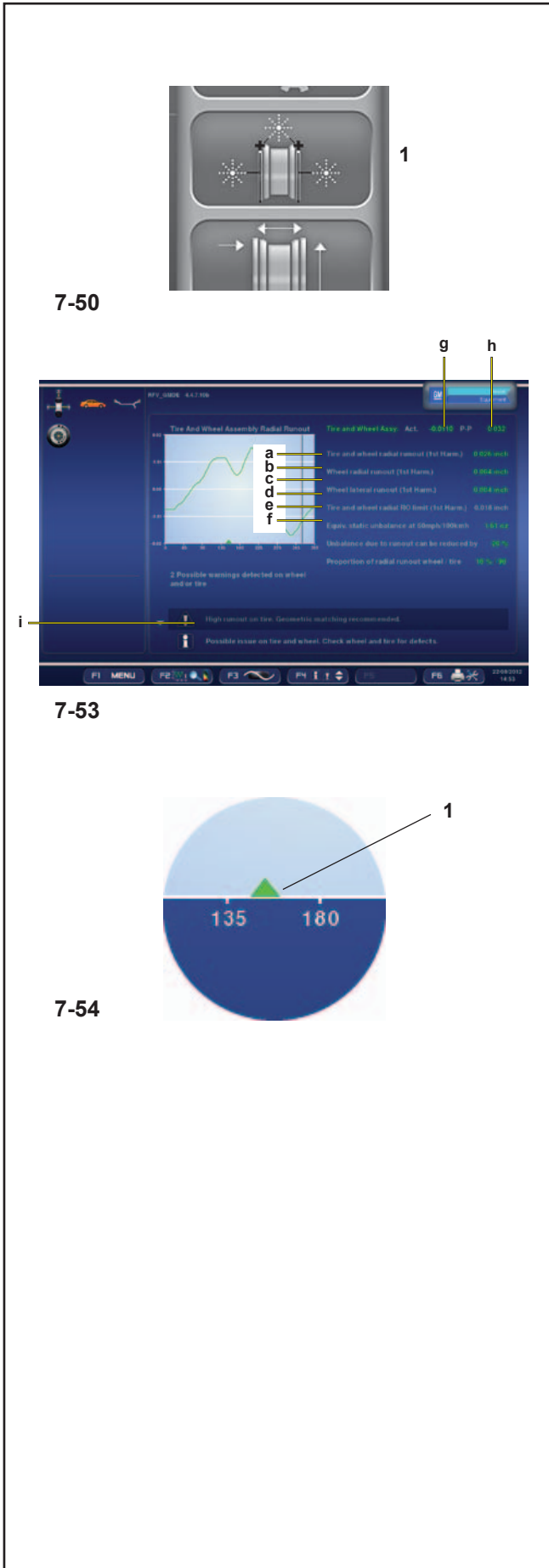
- In the BALANCING or OPTIMA ENTRY screens press the STOP key once to disable, press it a second time to re-enable the function.

- The brake is not activated if the "Rim Cleaning Position Brake Control" function has been activated in the FUNCTIONS menu.

- Wheel radial runout.
- Rim radial runout (if measured).
- Rim lateral runout (if measured).
- Describes the performance improvement if the geometric matching is applied.
- Equivalent static unbalance estimate given by the runout at 100 km/h.
- Runout proportion due to rim or tire.
- Runout value at the position the graph cursor is in, which corresponds to the wheel at 12 o'clock.
- Peak to peak (p-p) graph; the peak to peak value is the difference between the maximum and minimum value.
- Warning of defective rim and/or tire. The software prompts the operator to check for rim or tire defects, suggesting *matching* or automatically showing the screen for the appropriate corrective action, where necessary.

If defects are found, box "i" may display display one or more Warning Messages (Section 7.10.3). Each message may indicate two levels of seriousness, as follows:

For measurements above the limit value, a Problem





7-55

indication is displayed.

For measurements straddling the limit value, the Possible Problem indication is displayed.

If no problems are found with the wheel, tire or rim, the OPTIMA ENTRY screen page shows "OK" (Fig. 7-55).

The appearance of the messages is linked to the limit values set, which the operator can change using the Optima Settings menu (Section 10).

### 7.10.3 Warning Messages

**Wheel assembly problems** messages appear when:

- 1) wheel peak-to-peak *runout* is high  
or
- 2) wheel 1-harmonic *runout* is high and the proportion of *runout* between rim and tire is close to 50 per cent.

**Alert Message (1, Fig. 7-56):**

If no *matching* is recommended:

High *runout* on wheel, but no possibility of improving by *matching*. Check rim and tire for defects.

If *matching* is recommended:

High *runout* on wheel. Geometric *matching* is recommended.

**Warning Message (2, Fig. 7-56):**

Possible issue with wheel, but no possibility of improving by *matching*. Check rim and tire for defects.

If *matching* is recommended:

Potential problem on the wheel. Check rim and tire for defects.

**Rim problems** messages appear when:

- 1) rim radial *runout* is high  
or
- 2) rim lateral *runout* is high  
or
- 3) wheel 1-harmonic *runout* is high and the proportion of *runout* between rim and tire is greater than 60 per cent (high rim 1-harmonic *runout*).

**Alert Message**

If no *matching* is recommended:

High *runout* on rim, but no possibility of improving by *matching*. Check rim for defects.

If *matching* is recommended:

High *runout* on rim. Geometric *matching* is recommended.



1



2

7-56

**Warning Message**

Possible issue with rim, but no possibility of improving by *matching*. Check rim for defects.

If *matching* is recommended:

Potential problem on the rim. Check rim for defects.

**Tire problems** messages appear when:

- 1) wheel 1-harmonic *runout* is high and the proportion of *runout* between rim and tire is less than 40 per cent (low rim 1-harmonic *runout*)

**Alert Message**

If no *matching* is recommended:

High *runout* on tire, but no possibility of improving by *matching*. Check tire for defects.

If *matching* recommended:

High *runout* on tire. Geometric *matching* is recommended.

**Warning Message**

Possible issue with tire, but no possibility of improving by *matching*. Check tire for defects.

If *matching* is recommended:

Potential problem on the tire. Check tire for defects.

The last line of the warning box is:

Press HELP for more information. Press ESC to return to balancing screen.

### 7.10.4 Optima Diagnosis

This Advanced Options function, available in OPTIMA mode, shows additional data and graphs relative to the wheel runout.

#### Runout Advanced Diagnosis

In the **F3** Menu of the OPTIMA DIAGNOSIS screen, use the items listed below to access the Optima Advanced Diagnosis graphs:

##### Menu F3

- 1: Radial Runout Diagnosis.
- 2: Rim Radial/Lateral Runout Diagnosis.
- 3: Multiple Positions Runout Diagnosis.
- 4: Multiple Harmonics Runout Diagnosis.

##### Menu F2

- 6: Go back to the *OPTIMA ENTRY* screen
- 7: Display the data of the 1st, 2nd, 3rd harmonic.
- 8: Radial runout of wheel complete.
- 9: Left radial runout of the tire.
- 10: Radial runout on the right side of the rim.
- 11: Left lateral runout of the tire.
- 12: Right side lateral runout of the tire.

##### Note:

The print keys are available in the **F6** Menu if the printer is enabled.

#### Runout on Multiple Positions

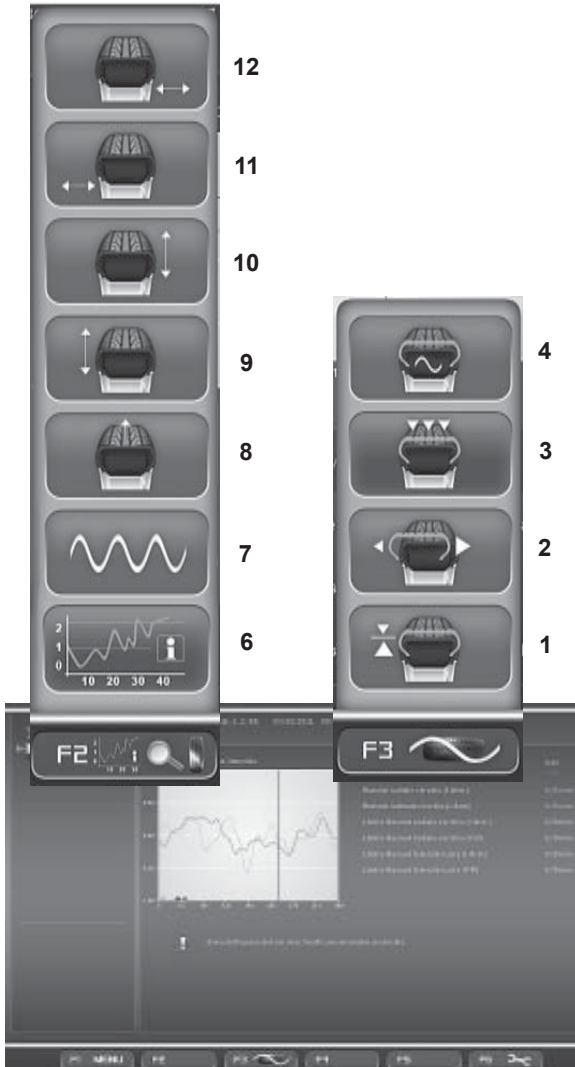
Item **3** of the **F3** Menu (**fig. 7-57**) allows access to the Runout on Multiple Positions screen (**fig. 7-58**).

Displays the data of the Runout detected in portions of the wheel, perpendicular to the axis. Based on the width of the tire, it is divided in various parts, from 3 to 7, for which an independent analysis of the Runout is available.

To enable the function access the “SETTINGS” Screen and access the following:

“**OPTIMA Settings / Measure Wheel Runout in Multiple Positions**”, set “**Enable**” and press “**OK**”.

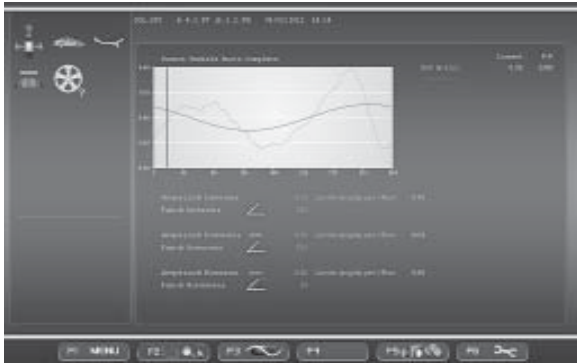
**NOTE: This feature must be activated in setup.**



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7-58



7-59



F2

7-60

### Multiple Harmonics

This function, available in OPTIMA mode, shows additional data relative to the Runout (2nd and 3rd harmonic) .

The **8, 9, 10, 11, 12** items of the **F2** Menu (**fig. 7-57**) allow access to the Multiple Harmonics Runout screens.

Possible screen pages if the thresholds set are exceeded:

- \_ Wheel assembly radial run out
- \_ Left side rim radial run out
- \_ Right side rim radial run out
- \_ Left side rim lateral run out
- \_ Right side rim lateral run out

In each of the five screen pages it is possible to view one after another the graph relative to the three harmonics, using Item **7** of the key **F2**.

To enable the function with the "SETTINGS" Screen, access the following:

**"OPTIMA Settings / Display Subsequent Runout Harmonics"**, set **"Enable"** and press **"OK"**.

In the screens (**Fig. 7-60**) the **F2** key presents the following display items in cycle (**a, b, c**):

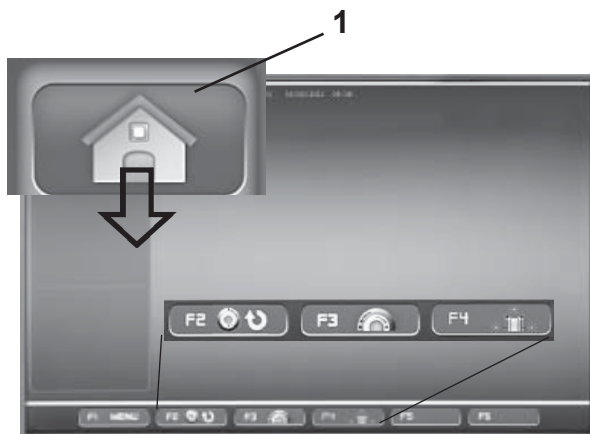
- (a): displays the 2nd harmonic.
- (b): displays the 3rd harmonic.
- (c): go back to display the 1st harmonic.

**Note:**

The printed Report reproduces data and graphs for all three harmonics for the single runout currently selected (see representation in the Printing the Report chapter).

**NOTE: This feature must be activated in setup.**

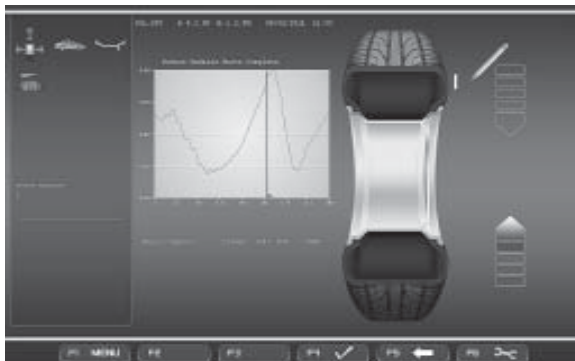




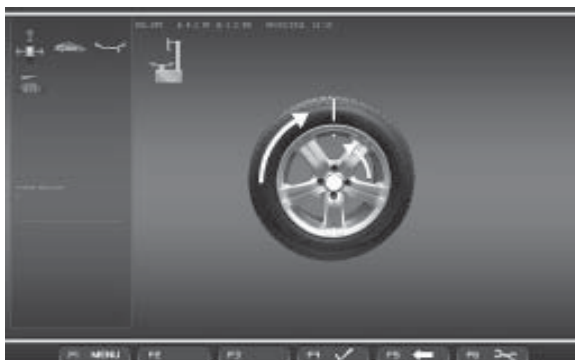
7-61



7-62



7-63



7-64

### 7.10.5 OPTIMA MATCHING

There are two ways to access the Matching procedure:

1) Manually,

From an Optima screen,

- Press **F1** and select *Optimization Entry Screen* (1, Fig. 7-61).
- From here you can continue with:
  - **F2** Continues the interrupted Matching.
  - **F3** Matching from complete wheel.
  - **F4** Matching from rim only.

2) Automatically,

by observing the following conditions:

- RIM ONLY function OFF ("Disabled" for RIM ONLY item in "OPTIMA SETTINGS" screen).
- Perform the rim only run.

#### 7.10.5.1 Geometric Matching

At the end of the wheel measuring run the balancer may prompt carrying out a geometric matching (icon at the top left of the screen), whose diagnosis can provide a substantial improvement to the wheel performance. To start the geometric matching procedure proceed as follows:

- Press **F3** on the "*Optimization Entry Screen*" screen to start the procedure. The control software prompts to position the wheel valve at 12 o'clock (Fig. 7-62).
- Press **F6** to confirm the operation.
- Mark the tire in the position suggested by the control software (fig. 9.4.1-2) and press **F6** to confirm. The control software suggests moving the tire to the tire changer in order to align the mark on the tire with the wheel valve (fig. 9.4.1-3).
- After the tire changer, clamp the wheel on the balancer and confirm with **F6**. The control software prompts to carry out a checking cycle. (Press **F4** to carry out a checking cycle of the runout directly).
- Lower the wheel guard and press **START**: the balancer will start the checking cycle.

At the end of the checking cycle the control software will suggest the new value of the weights and their location on the rim.

During the geometric matching procedure you can return step by step to the previous screens by pressing **F5**. Pressing **F1** displays the balancing screen; press the **ESC** or **STOP** keys to return to the "Optima Matching" screen; from this last press **F1** to continue the previously interrupted geometric matching procedure.



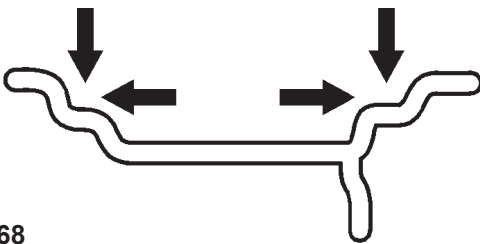
7-65



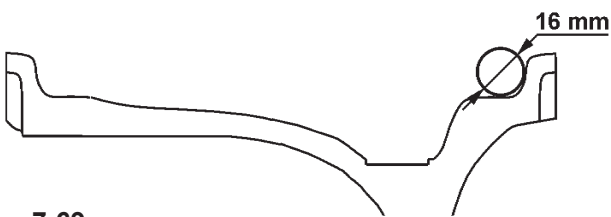
7-66



7-67



7-68



7-69



7-70

### 7.10.5.2 Geometric matching with only the rim

(Fig. 7-65)

- After having clamped the rim to analyze on the balancer, press F6 on the "OPTIMA MATCHING" screen.
- Lower the wheel guard and press the START key: the laser scanners carry out the runout measurement in the bead seats. At the end of the measurement the control software prompts the alignment of the rim valve at 12 o'clock (Fig. 7-66).
- Press F6 to confirm.
- Release the rim and move it to the tire changer to fit the tire (Fig. 7-67).
- After the tire changer, clamp the wheel (rim + tire) on the balancer and confirm with F6.
- Lower the wheel guard and press START: the balancer will proceed with the runout calculation with the tire fitted.

To carry out the geometric matching of the complete wheel proceed as indicated in the "Geometric matching" section.

### 7.10.5.3 Rim Only Diagnosis

Optima can be used to perform an analysis of the rim only and to process its structural parameters, independently of the tire.

If only the rim is clamped, the machine always automatically recognizes the presence of a rim without the tire. The Rim-only feature must be enabled in setup.

To activate the "Rim only diagnosis" function:

- enable "1" in the "Optima Parameters" screen at the "RIM ONLY" item (m, Section 10).
- start the run.

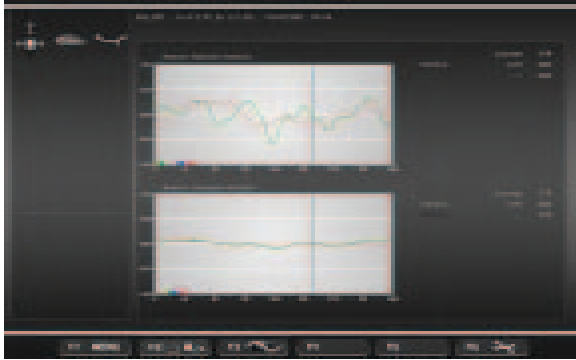
During the run measurements are taken on the lateral internal profiles and on the bead recesses (Fig. 7-68).

The laser reading positions on the rim are the same as the contact points obtained with a circle with 16mm diameter, as shown in figure 7-69.

When the run is complete, the graph showing the curves for the radial Run-out of the right and left bead recesses appears (Fig. 7-70).



## Operation - AUTOMATIC “OPTIMA”



7-71

Only in the RIM ONLY function, the graph shows three different colored markers, indicating the first harmonic peak position for:

Left bead recess - Yellow triangle  
Right bead recess - Red triangle  
Mean of the entire rim - Grey triangle

When the rim is turned, it will be stopped by the brake in each peak position, to facilitate rim marking. The peak markings on the rim can then be suitably combined with the minimum reference present on the tire.

- Press **F2** for further information about the rim Runout (**Fig. 7-71**).

These graphs also show the first harmonic peak markers, combined with the Position Brake.

The “RIM ONLY” diagnosis uses specific limit values, irrespective of those used for the whole wheel. The factory values set are:

First harmonic Radial/Lateral Runout = 0.5

Peak to Peak Radial/Lateral Runout = 0.7.

The values can be changed by the user in the “OPTIMA PARAMETERS” menu.

**Note:** Activating the “RIM ONLY” function also allows a specific printed report to be obtained (if optional printer is present) for the rim only “**Rim diagnostic report**” (see Section 9.9).

**Note:** The function lengthens the measuring cycle to a total of 55 seconds.

## 7.10.6 Changing modes of operation

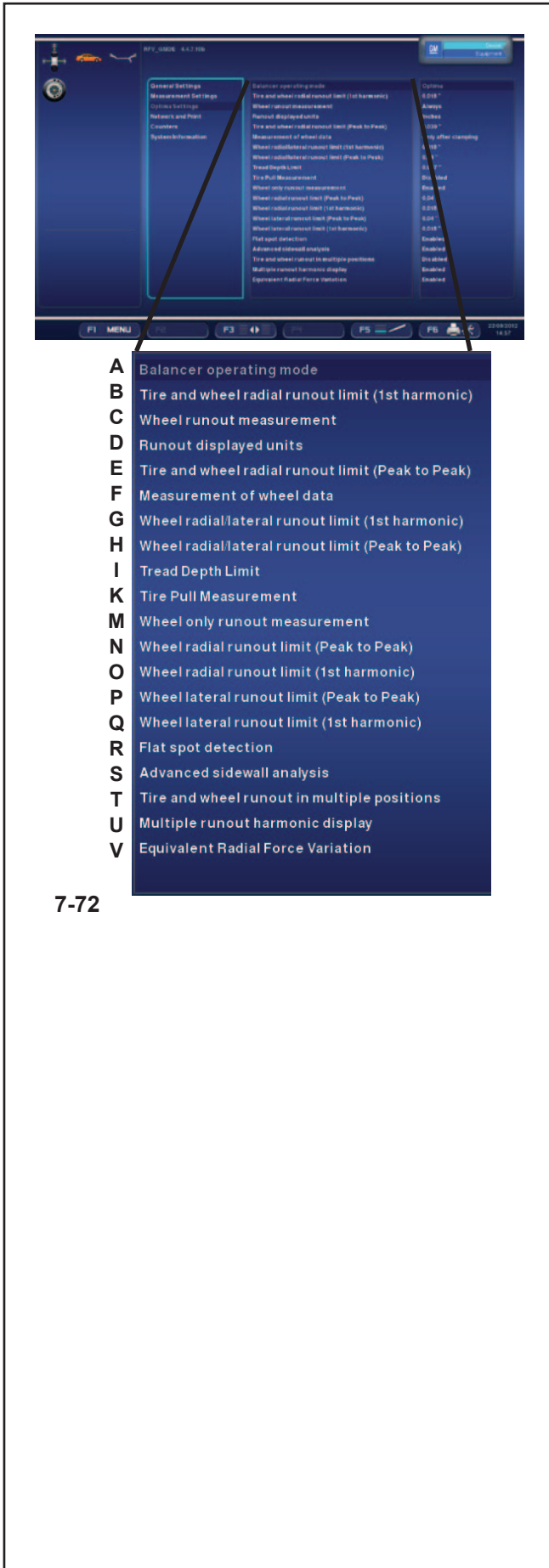
The selection of certain functions (Enabled / Disabled) and the threshold settings by the operator, influence directly the Runout reports and the advanced functions that the machine displays on the screens.

From the Optima Mode you can select custom settings for the parameters listed below.

### 7.10.6.1 OPTIMA SETTINGS

(Fig. 7-72)

- A) Sets the Operating Mode for the current session. Preset value: Optima Full Diagnostic.
- B) Limit (threshold) for wheel first harmonic radial runout. Preset value: 0.7 mm.
- C) Sets the rim runout measurement (if the value is "Limit exceeded" the measurement occurs only if the threshold is exceeded; if the value is "Always" the measurement occurs always). Preset value: Always.
- D) Runout measurement unit selection in mm or inches. Preset value: mm.
- E) Limit (threshold) for wheel peak to peak radial runout. Preset value: 1,5 mm.
- F) The wheel data detection scan occurs always during the first measuring run. This function allows the exclusion of the activation of the laser scanner in the following measuring runs, in order to optimize the operating times whenever it is necessary to carry out more than one measuring run for the same wheel. By assigning value "0" the scan occurs automatically and only at the first measuring run, after fixing the wheel. By assigning value "1" the scan occurs automatically at every wheel measuring run (Preset value).
- G) Limit (threshold) for the Radial/lateral Runout of the 1st Harmonic of the rim only. Preset value: 0.7 mm.
- H) Limit (threshold) for peak to peak radial/lateral runout of rim only. Preset value: 1 mm.
- I) Set the limit value for the Tread Depth TDI. The scale is 0 to 10 mm (0-0,400 inch). Set the value 0 or "0,00" to disable the function; no icon appears on screen. Preset value: 1,7 mm (0,068 inch).
- K) Excludes the Pull reading, in order to optimize the operating times, when this information is not required. The function must be enabled when operating the advanced function "Set of Wheels".



7-72

<b>A</b>	Balancer operating mode
<b>B</b>	Tire and wheel radial runout limit (1st harmonic)
<b>C</b>	Wheel runout measurement
<b>D</b>	Runout displayed units
<b>E</b>	Tire and wheel radial runout limit (Peak to Peak)
<b>F</b>	Measurement of wheel data
<b>G</b>	Wheel radial/lateral runout limit (1st harmonic)
<b>H</b>	Wheel radial/lateral runout limit (Peak to Peak)
<b>I</b>	Tread Depth Limit
<b>K</b>	Tire Pull Measurement
<b>M</b>	Wheel only runout measurement
<b>N</b>	Wheel radial runout limit (Peak to Peak)
<b>O</b>	Wheel radial runout limit (1st harmonic)
<b>P</b>	Wheel lateral runout limit (Peak to Peak)
<b>Q</b>	Wheel lateral runout limit (1st harmonic)
<b>R</b>	Flat spot detection
<b>S</b>	Advanced sidewall analysis
<b>T</b>	Tire and wheel runout in multiple positions
<b>U</b>	Multiple runout harmonic display
<b>V</b>	Equivalent Radial Force Variation

7-72

Set as “Disabled” to cancel the Pull reading during the run. Preset value: Enabled.

- M) Allows selection of RIM ONLY advanced diagnosis. Select “Enabled” = Enables RIM ONLY advanced diagnosis. Select “Disabled” = Enables automatic switching to the MATCHING procedure if the machine detects the presence of the rim only.
- N) Limit (threshold) for RIM ONLY peak to peak radial Runout. Preset value: 0.7 mm.
- O) Limit (threshold) for RIM ONLY first harmonic radial Runout. Preset value: 0.5 mm.
- P) Limit (threshold) for RIM ONLY peak to peak lateral Runout. Preset value: 0.7 mm.
- Q) Limit (threshold) for RIM ONLY first harmonic lateral Runout. Preset value: 0.5 mm.
- R) Manages the Find Flat Spot option. This function detects flattening of the tread. If flat spots are detected, an alert message appears in the Optima Access screen page.  
“1” = Enables search. “0” = Disables search.



4

7-47



7-80



7-81

(a)  
(b)

### 7.10.8 Weight usage tracking

The Weight Tracking function is available in OPTIMA and PROFILING modes and is for saving data relative to wheel imbalances, or the weight mode and the weights indicated for balancing.

Saves the data acquired at the first run, after clamping the wheel on the balancer shaft (Power Clamp activation). This data is effectively acquired in the memory at the moment when the wheel is released.

This function shows the count of all balancing weights used up to that moment and provides a printed report on the following options:

- Weights Used in Grams, from the date of function installation.
- Weights Used in Ounces, from the date of function installation.
- Weights Used in Grams, from the date of user zeroing of the Weight Tracking Counter.
- Weights Used in Ounces, from the date of user zeroing of the Weight Tracking Counter.

To enable the function access the "SETTINGS" screen (4, Fig. 7.47) and select the following:

**"Measurements Settings / Weight usage tracking"**, set **Enabled** and press **OK**.

The Weight Tracking screen page is retrieved from the HOME OR SPLASH screen page using the **F2** key (1, Fig. 7-80).

In the WEIGHT TRACKING screen page: (Fig. 7-81)

- F2:** zeroes the partial table counters
- F3:** to switch from the Partial Table to the Total Table (a) and vice versa (b)
- F6:** prints the Table currently on screen.

**Note:** key **F6** is only visible if the printer is enabled.

## Operation - AUTOMATIC “OPTIMA FULL DIAGNOSTIC”



7-82



4

7-47

### 7.11 “OPTIMA FULL DIAGNOSTIC” Optima Full Diagnostic Mode

The following instructions describe the specific functions of the wheel balancer in “OPTIMA FULL DIAGNOSTIC” mode.

The icon shown in fig. 7-82 indicates the “OPTIMA FULL DIAGNOSTIC” mode is active. The unit operates in Automatic Mode.

When the “OPTIMA FULL DIAGNOSTIC” mode is set with the set up panel, the machine performs the Automatic Advanced wheel data reading procedure.

To enable the mode with the “SET UP” screen,

- Press the **F1** Menu Key and select Set Up (**4**, Fig. 7-74).
- Select the following:

“**OPTIMA Set up / Wheel balancer operating mode**”, set “**Optima Full Diagnostic**” and press “**OK**”.

**Note:**

All the functions described in the previous Automatic Modes, are also available in the “OPTIMA FULL DIAGNOSTIC” Mode.

The difference with this function is the data reading precision of the cameras, which allow for three dimensional images of the wheel to perform an in-depth structural analysis of the tire and rim.

The images, both flat and three dimensional, are presented graphically with a colorimetric gradation. The changes in the colors of the wheel displayed on the screen, indicate the structural and physical conditions of the parts.

The operator is able to assess the degree of wear of the tread with a quick visual analysis and easily identify any irregularities or anomalies such as: flattening, bulges, bubbles on the sidewalls, lack of homogeneity, cuts, and abrasions and surface imperfections, even small and difficult to see with the naked eye, both on the tread and the sides of the tire.

**Note:**

Measuring runs in “OPTIMA FULL DIAGNOSTIC” mode require a longer Cycle Time, due to the high precision three dimensional data reading, compared to the Time required with the “OPTIMA” runs.

## Operation - AUTOMATIC “OPTIMA FULL DIAGNOSTIC”

### 7.11.1 “OPTIMA FULL DIAGNOSTIC” Menus

This section sets out the specific functions of the “OPTIMA FULL DIAGNOSTIC” mode and only the Menu items that refer to this mode.

For information about the other items and icons, refer to the basic chapter “4.4 The Menus”, as well as the Automatic Modes specifications described earlier.

The “Optima Full Diagnostic” function selection items are already displayed from the “OPTIMA” Automatic Mode. Their use is only possible in the “OPTIMA FULL DIAGNOSTIC” mode, with the maximum data reading precision of the cameras.

The **F2** Menu in the “ASSEMBLY RUNOUT INDICATION” screen (Fig. 7-41), contains the items to access the “OPTIMA FULL DIAGNOSTIC” analysis screens:

- 1 Access the “**TREAD PLOT**” screen
- 2 Access the “**3D PLOT**” screen

#### 7.11.1.1 “TREAD PLOT” menu

The “TREAD PLOT” screen (Fig. 7-83) is accessed with Item 1 of the **F2** Menu (Fig. 7-41) in the “ASSEMBLY INDICATION” screen.

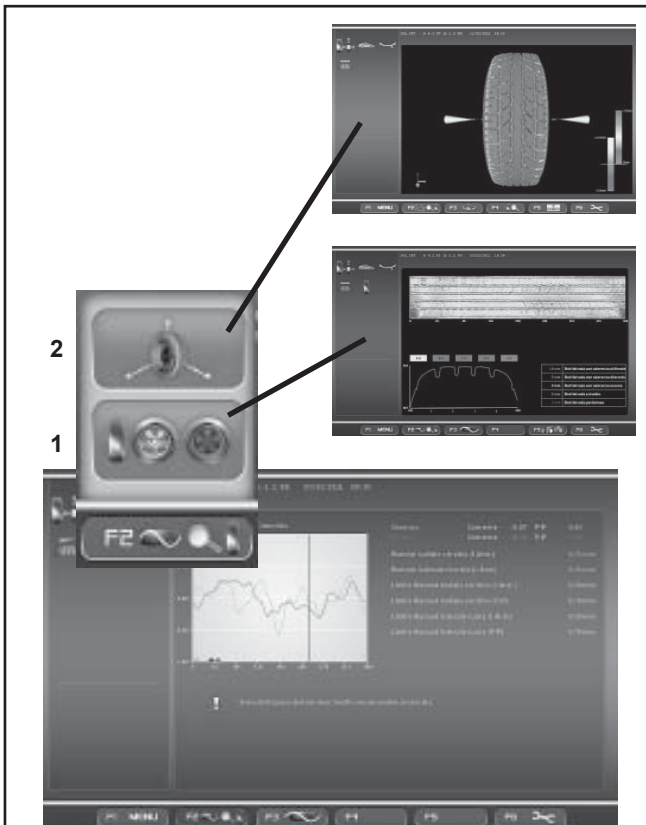
The screen presents a graphical and numerical analysis of the wheel tread.

The screen contains the following Menu Items:

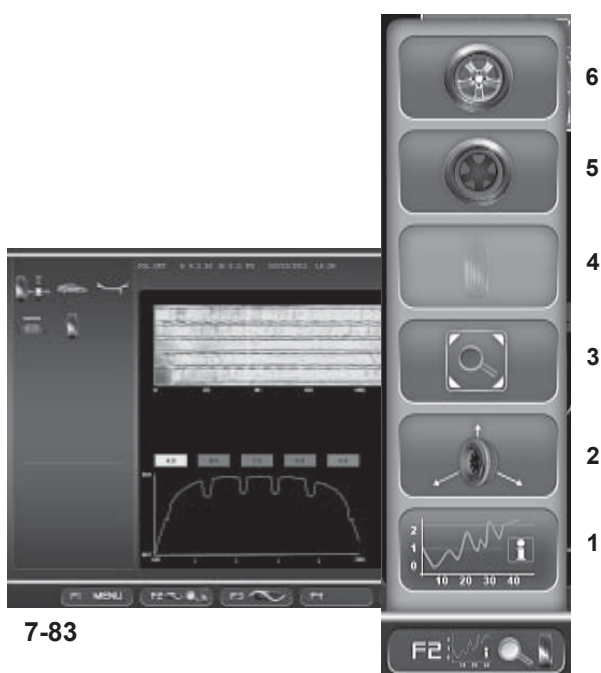
(Fig. 7-83)

**F2** Menu:

- 1 Go back to the “ASSEMBLY INDICATION” screen.
- 2 “**3D PLOT**”, 3D view.
- 3 “**Lens**”, zoom and reset graphic image.
- 4 “**TREAD PLOT**”, tread analysis.
- 5 “**INTERNAL SIDEWALL**”, internal sidewall analysis.
- 6 “**EXTERNAL SIDEWALL**”, external sidewall analysis.



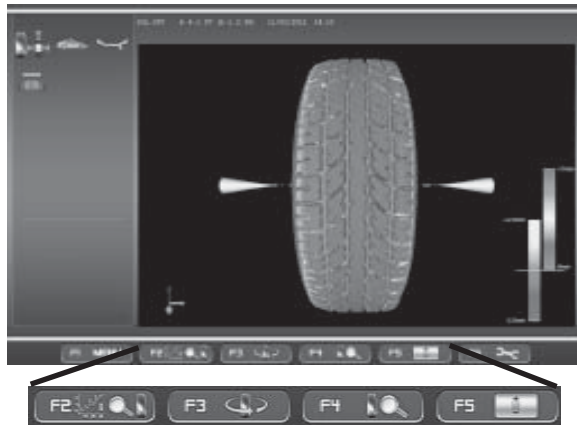
7-41



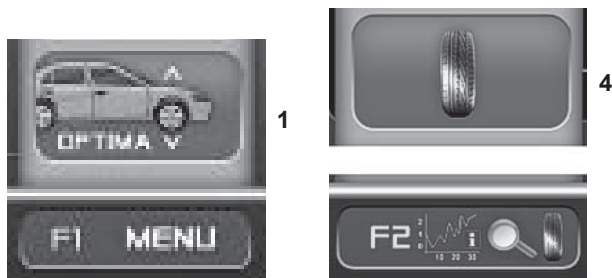
7-83



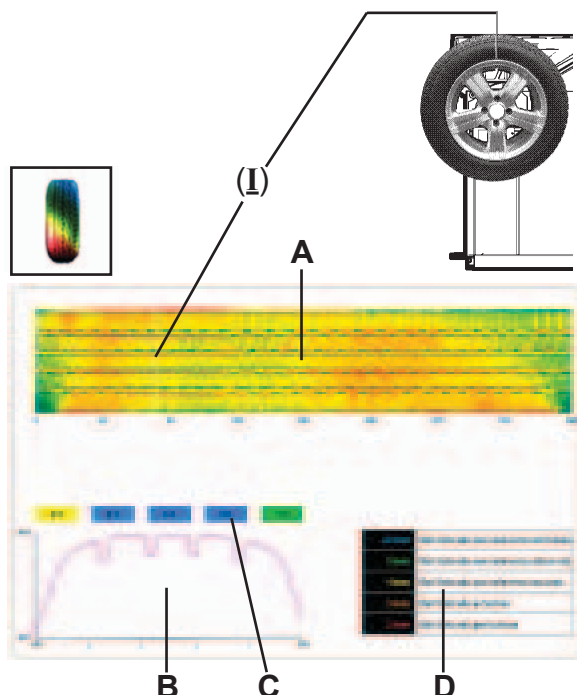
## Operation - AUTOMATIC “OPTIMA FULL DIAGNOSTIC”



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7-85



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### 7.11.1.2 Menu “3D PLOT”

The “3D PLOT” screen (Fig. 7-84) is accessed with Item 2 of the F2 Menu (Fig. 7-41) in the “ASSEMBLY INDICATION” screen.

The screen displays a three dimensional graphic analysis of the complete wheel.

The screen also contains the following Menu items:

(Fig. 7-84) - Menu:

**F2** Go back to the “TREAD PLOT” screen.

**F3** Move the 3D image to the right and the left, compared to the horizontal. Press the left or right key.

**F4** Zoom and reset graphic image.

**F5** Chromatic sensitivity adjustment. Press the high or low key.

### 7.11.2 “OPTIMA FULL DIAGNOSTIC”

#### Operation

- Lock the wheel ☞ Chapter 6
- Perform the measuring run ☞ Chapter 7.10.1

At the end of the run, if the RUNOUT limits are not exceeded, the balancer displays the "Balancing" screen. To display the results of the Optima diagnostic, start from the basic screen and select the following:

#### 7.11.2.1 TREAD PLOT

**F1** Menu, Item “Optima” (1, Fig. 7-85),

**F2** Menu, Item “TREAD PLOT” (4, Fig. 7-85),

The “TREAD PLOT” screen is displayed (Fig. 7-86).

The top displays the flat view of the tread (A), with the various colors referring to the various depths.

#### Note:

The angular position index (I) moves along the trace (A) as the wheel is rotated, it always corresponds to the 12 o'clock physical position on the wheel.

The graph on the bottom (B), reproduces the tread section. Above this numeric indications in colored boxes (C) indicate the depth of the various zones along the whole width.

The values in the boxes and their color, refer to the table on the right (D). The table relates the tread wear limits to the colors that are then displayed in the boxes, according to the data reading.

#### Note:

The table limits cannot be changed by the operator.

#### WARNING

**Tire wear recommendations based on the generally recognized standard for a passenger car equipped with OEM Tires – Other Tire types and applications may not match these recommendations exactly.**



**Operation - AUTOMATIC**  
**“OPTIMA FULL DIAGNOSTIC”**

To display the  
**“INTERNAL SIDEWALL PLOT”**  
 screen select:

**F2** Menu, **“INTERNAL SIDEWALL”** item (**5**, **Fig. 7-87**), displays the screen with the analysis of the internal sidewall (**Fig. 7-88**).

**Fig. 7-88**

The top shows the flat internal tire sidewall view (**E**).

The color provides information on the uniformity of the internal sidewall of the tire and rim, including part of the rim. A uniform color indicates a uniform sidewall, whilst changes in color indicate structural deformations and, if slight, they indicate lack of linearity.

On the bottom there is the graph (**F**), of the section of tread examined. The line reproduces the structure of the tire sidewall and of part of the rim, in the exact point indicated by the angular position index (**I**) along the circumference.

To display the  
**“EXTERNAL SIDEWALL PLOT”**  
 screen select:

**F2** Menu, **“EXTERNAL SIDEWALL”** item (**6**, **Fig. 7-89**), displays the screen with the analysis of the external sidewall (**Fig. 7-90**).

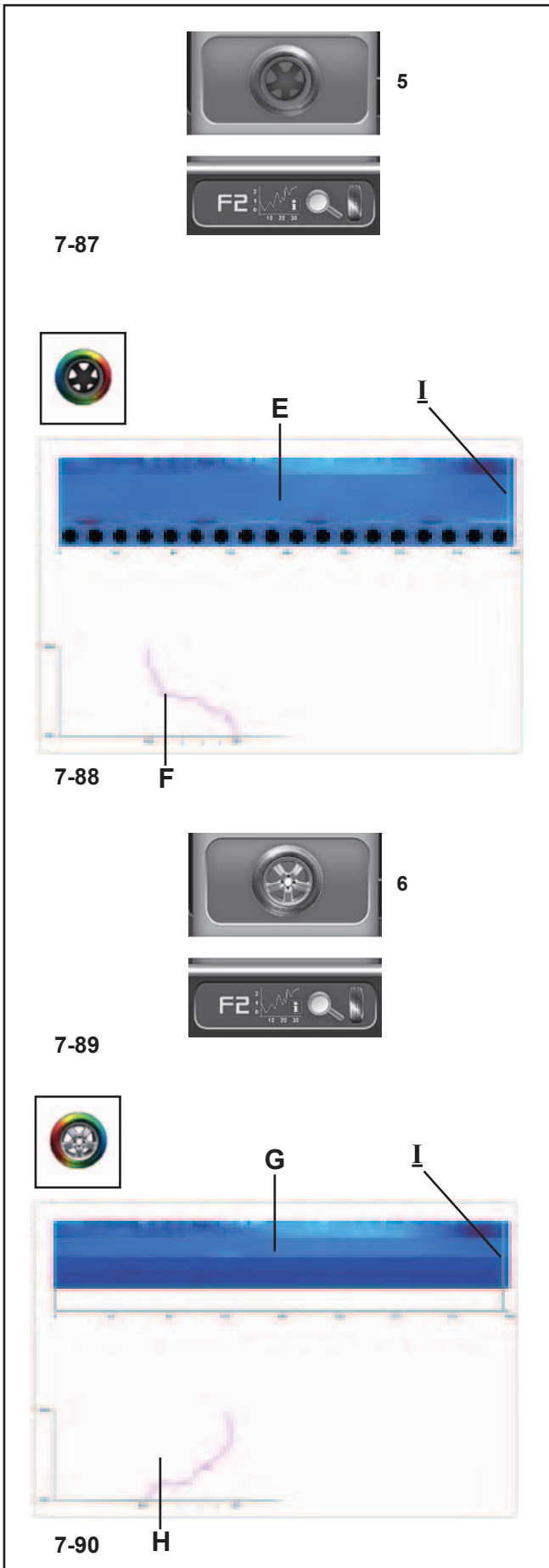
**Fig. 7-90**

The top shows the flat external tire sidewall view (**G**).

On the bottom there is the graph (**H**) with the wheel sidewall profile in the exact position indicated by the index (**I**) in the view (**G**).

**Note:**

The angular position index (**I**) moves along the trace (**E**) or (**G**) as the wheel is rotated, it always corresponds to the 12 o'clock physical position on the wheel.



## Operation - AUTOMATIC "OPTIMA FULL DIAGNOSTIC"

### 7.11.2.2 3D PLOT

To display the results of the "3D PLOT" diagnostic, in the "TREAD PLOT" screen,

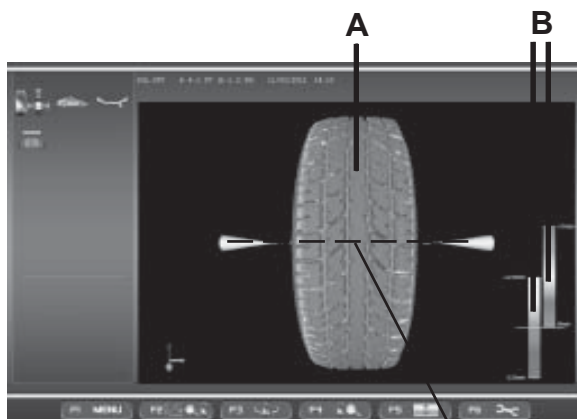
select:

**F2** Menu, "3D PLOT" item (2, Fig. 7-91),

"Loading data..." is displayed, then the "3D PLOT" screen (Fig. 7-92).



7-91



7-92

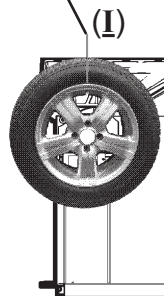


Fig. 7-92

The center of the screen displays the three dimensional reconstruction of the complete wheel (A).

**Note:**

The front wheel view on the screen, "I" index (Fig. 7-92), corresponds to the 12 o'clock physical position and it is updated as the wheel rotates.

The color scale is assigned to the external structure of the tire, according to the changes in height, bulges and dips in the surface. The rim color, grey, is always neutral. On the right there are the scales used to control the colorimetric sensitivity (B).

The left scale refers to the sidewalls, whilst the right scale refers to the tread.

The sensitivity of the color scales applied to the changes in height of the surfaces is controlled with the Menu key **F5**.

**Note:**

The change in color corresponds to the dips and bulges of the surface. To achieve a greater definition compared to a smaller variation in the depth of the tread, compress the range of the color scale applied to the surfaces. Vice versa when analysing a wheel with a deep tread pattern, extend the color scale in order to view larger differences in the tread.

We recommend adjusting the color scale based on the condition of the tread, to highlight all wear irregularities.

To change the sensitivity:

- Press the Menu key **F5** in the high part to compress the colorimetric scale.

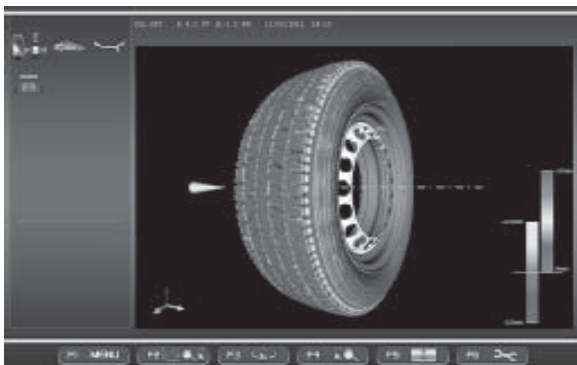
The entire range of colors is used in a more restricted field of variation of the surfaces (worn tread).

- Press the Menu key **F5** in the low part to extend the color scale. The colors indicate the most pronounced differences (deep tread pattern).

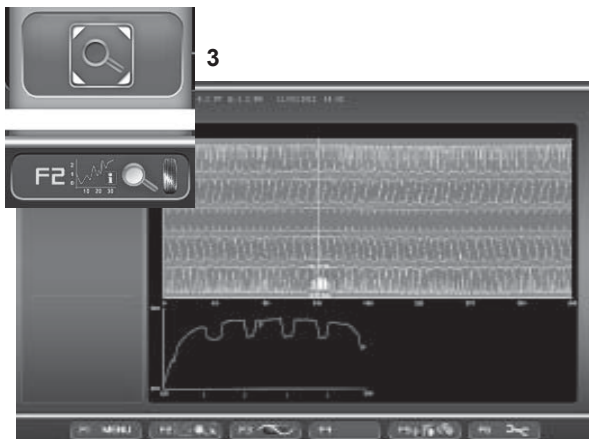
## Operation - AUTOMATIC “OPTIMA FULL DIAGNOSTIC”



7-93



7-94



7-95



7-96

**Fig. 7-93 - Fig. 7-94**

To turn the wheel in relation to the horizontal position:

- Press the Menu key **F3** on the right part to view the internal sidewall of the wheel (**Fig. 7-93**).
- Press the Menu key **F3** on the left part to view the external sidewall of the wheel (**Fig. 7-94**).

### 7.11.2.3 Lens and Zoom

In the “OPTIMA FULL DIAGNOSTIC” screens you can Magnify and Zoom, as follows:

Each “TREAD PLOT”, “INTERNAL SIDEWALL PLOT” and “EXTERNAL SIDEWALL PLOT” screen feature the Magnify function.

- Press the Menu key **F2**, “Lens” item (**3**, **Fig. 7-95**).

The image will be zoomed (**Fig. 7-95**).

Press the key again to return the image to the original view.

In the “3D PLOT” screen you can activate the Zoom, to zoom in or out of the image.

- Press the Menu key **F4** in the top part, to zoom in the image (**Fig. 7-96**).

**Note:**

The zoom is useful for anomalies limited to a small area, as shown in the example.

- Press the Menu key **F4** in the low part, to zoom out the image.

Each time the key is pressed increases, positively or negatively, the level of Zoom.

**Note:**

After having activated the zoom, the wheel can still be rotated manually and turned to the right and left with the function key **F3**, like the basic view with 0 Zoom (**Fig. 7-92, 7-93, 7-94**).

## Operation - AUTOMATIC “OPTIMA FULL DIAGNOSTIC”

### 7.11.3 Fault Indication

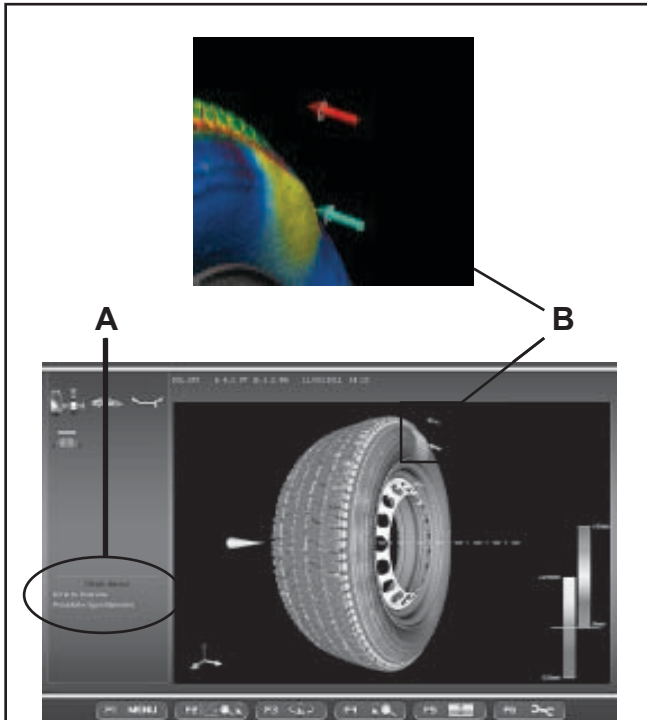
At the end of the “OPTIMA FULL DIAGNOSTIC” measuring run any structural faults will be signalled to the operator in the “3D PLOT” screen.

The faults are indicated with (Fig. 7-97) descriptions (A) and graphs (B).

The short text in the State Bar specifies the problem, whilst the colored arrows and the changes in color in the graph of the wheel identify its position and entity.

#### Note:

Zooming the area of interest and adjusting the colorimetric scale can facilitate identifying the entity of the fault and provide estimates of the variations found on the surface.



7-97

### 7.11.4 Predictive tread wear diagnosis

In the F3 Menu of the OPTIMA DIAGNOSIS “FULL DIAGNOSTIC” screen.

#### Menu F3 (Fig. 7-57)

5 Tire wear prediction diagnosis.

The Predictive tread wear diagnosis function is available in “OPTIMA FULL DIAGNOSTIC” mode. It allows the operator to forecast the wear of the tread in order to program a future maintenance intervention of the tire.

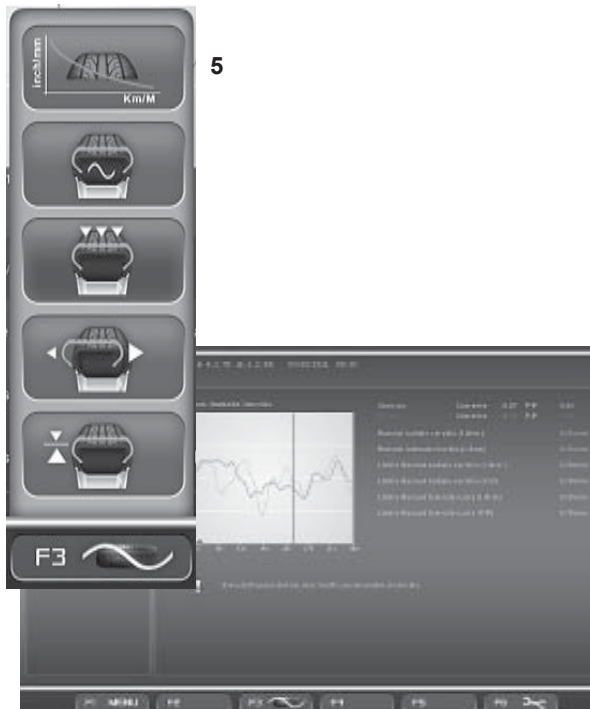
The operator must assign a univocal code for each wheel on which he wants to use the function and insert an external USB memory, to save the data.

With the wheel code the machine collects and stores a series of information for that wheel, such as: Processing date, tread depth, distance travelled. The data is managed by the internal processor in order to produce a tire wear curve.

The curve extends as far as the minimum tire depth threshold value, by following a logical progression, produced by the stored history.

Memorise at least three measurements over a broad period of time for a reliable wear curve progression.

A greater number of measurements throughout the life of the wheel will result in an increasingly reliable prediction of the tire wear.



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## Operation - AUTOMATIC "OPTIMA FULL DIAGNOSTIC"

The screen contains the following fields:

**Fig. 7-98**

- a** Wheel Id. Identification code.
- b** Km/ miles. Distance covered by the wheel.
- c** Tread Wear Curve graph.
- d** Table with the residual distance to cover and Prediction of the date the threshold limits will be reached.
- e** Current date.
- f** Measured tread depth.

To activate the function, in the "OPTIMA DIAGNOSTIC" screen select:

Menu **F3** , Voce **5** (**Fig. 7-98**),

In the "Predictive" screen, the Menu keys perform the following:

**Fig. 7-99**

- F1** Main Menu.
- F2** Go back to the previous screen.
- F3** Switches between the Wheel Id and Km/miles fields.
- F4** Moves the next position in the Wheel Id field. Press the key in the right or left.
- F5** Changes the value to set in the Km/miles field / Changes the character to set for the Wheel Id . Keep pressed on the top or bottom and then use the Scroll.
- F6** Manages the archive.
  - 1** Introduces the data set
  - 2** Loads from the memory and displays the values for the Wheel Id set.
  - 3** Deletes the wheel data.

In the "**Predictive**" screen, after the run, perform the following:

- Enter the univocal Wheel Id code. The machine always shows the date.

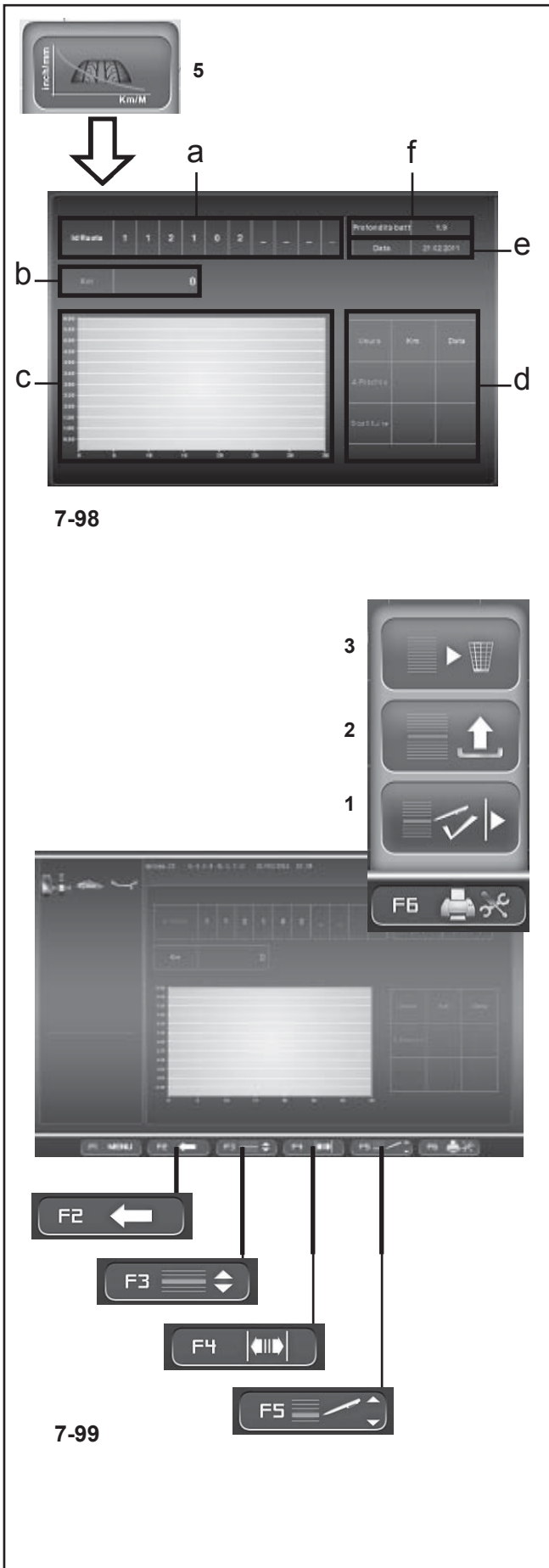
Note:

If the wheel has been memorised previously, enter the code to recall it.

- Go to the Distance covered by the wheel field (**F3**) and enter the distance indicated in the vehicle odometer (**F5**).
- Memorise or update the screen before memorising definitively (**F6**).

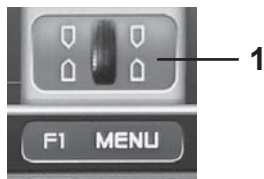
Field "**d**" displays the residual distance to cover and the estimated date for the maintenance to perform the following:

- Tread wear warning level
- Replace the worn tire.





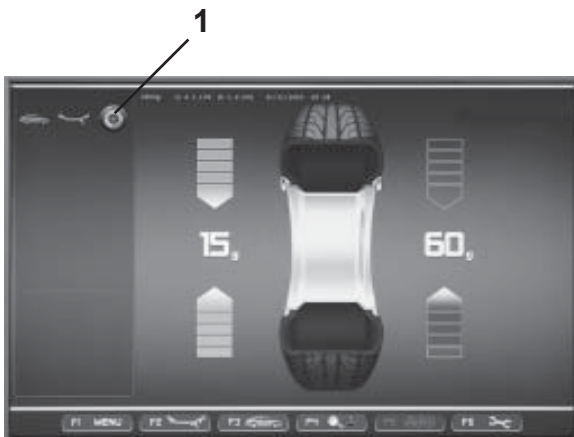
## Balancing and weights Fitting



8-1



8-2



8-3

### 8. Balancing

Preliminary operations:

- If necessary, perform a compensation run (Section 6.4).
- Check the wheel is clamped correctly (Section 6.5).
- Select the Type of Vehicle (Section 7.1.1).
- Read the rim dimension parameters (Chapter 7.2).

If more than one wheel of the same type needs to be balanced (the same nominal dimensions) the data need only be set for the first wheel. The selections stay set until other new data is set or the machine is switched off.

To access the BALANCING screen:

- Press the **F1** Menu Key and select the Balancing item (**1**, Fig. 8-1).

The BALANCING screen (**Figure 8.2**) will open.

#### Fig. 8-2 BALANCING

Menu key details:

**F1** Contains the different screen access options.

**F2** Contains the ALU Type selection options.

**F3** Contains the Type of Vehicle selection options.

**F4** Contains the setting options for:

Static Imbalance

Fine Mode

Grams / Ounces

Weight Miser (if included)

Profile, Optima or full Optima

**F5** Not active

**F6** Contains the COMPENSATION RUN option.

#### 8.1 Measuring imbalance

Having completed the preliminary operations, a Measuring run can be launched:

- Close the wheel guard and press the **START** key.

The BALANCING screen appears (**Fig. 8-3**).

After measurement the balance weights can be fitted, or a weight minimisation or optimization run can be carried out. The specific icon (**1**, Fig. 8-3), indicates that the machine suggests a weight Optimization or Minimisation procedure is carried out.

After measurement the machine stops automatically and the wheel is braked such that the weight for the right (Factory selection) correction plane can be fitted exactly perpendicular to and above the main shaft. The screen shows the unbalance measured for each correction plane and the direction towards correction.

## Balancing and weights Fitting

### Balancing position and weight gauges:

The arrows shown in the BALANCING screen, at the end of the launch, help reach the compensation weight application position rapidly. The operator should turn the wheel to obtain quantity and direction indications from the colour and movement of the arrows, as follows:

**Figure 8-4** (here: vehicle wheel, normal weight position):

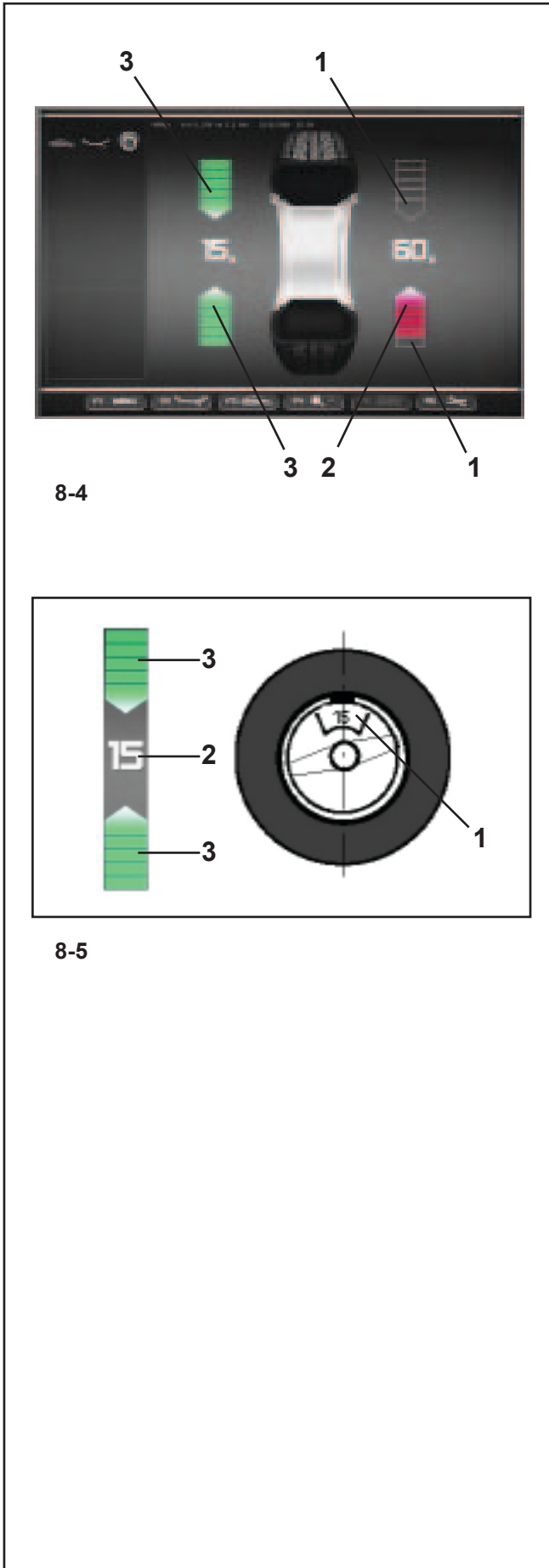
- Left rotation indicator: both the arrows are green, the left side is in the compensation position.
- Right rotation indicator: the lower arrow is orange and indicates the rotation direction to reach the compensation position.

**Figure 8-4** Color specifications

- 1 No color: greater distance from position
- 2 Orange: rotation direction to reach the position, the higher the number of lit segments the more the wheel must be rotated.
- 3 Green: compensation position reached, hold the wheel in this position to apply the weight.

Fig. 8-5 Example of display and correction of the lefthand correction plane.

- 1 Correction weight on rim application position (on the wheel axis)
- 2 Display of amount of unbalance
- 3 Display of correction position - the two arrows light up.

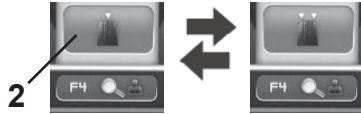




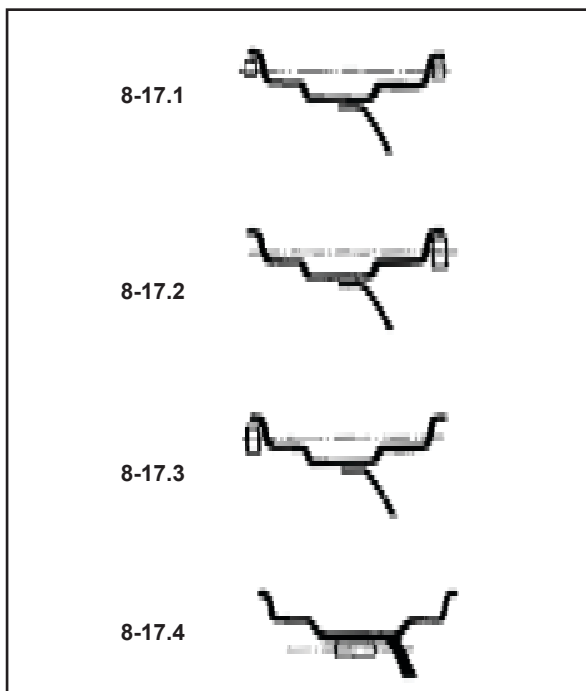
## Balancing and weights Fitting



8-15



8-16



8-17

### 8.1.1 Static unbalance

In general the wheels should be balanced dynamically, i.e. in two correction planes.

If the wheels to be balanced are rather small, only static unbalance should be measured and corrected.

- For the static imbalance indication press the **F4** menu key and then select Static (**2, Figure 8-15**).

A screen as in **Fig. 8-16** comes up.

For correction diameter and possibilities of correction of static unbalance see **Fig. 8-17**.

### Recommendations for fitting balance weights for static unbalance correction

The correction diameter for static unbalance correction is programed as follows:

- nor. same as for correction of dynamic unbalance
- Alu 1 same as for correction of dynamic unbalance
- Alu 2 in the rim disc (drop-center)
- Alu 3 in the rim disc (drop-center)
- Alu 4 at rim flange
- Alu 5 at rim flange

As it is not always possible to correct static unbalance in the ideal rim position, the following recommendations for correction (**Fig. 8-17**) should be observed.

### Balance clips (Alu 0 , Alu 4 and Alu 5)

- With large static unbalance (e. g. 30 g) divide the unbalance into two fairly equal parts and correct it at both sides of the wheel, considering the chosen balancing mode (**Fig. 8-17.1**).
- With small static unbalance fit the balance weight either in the outer or inner correction plane (**Fig. 8-17.2 and 8-17.3**).

The dynamic unbalance created thereby is negligible.

#### Note:

Figures **8-17.1–8-17.3** illustrate how balance clips can be fitted. When adhesive weights are used, or both types are mixed, proceed analogously depending on balancing mode.

- For balancing modes Alu 2 and Alu 3 fit a balance weight in hidden position inside the rim; in this case the correction diameter for static unbalance correction lies inside the rim (**Fig. 8-17.4**).

To display the dynamic imbalance again.

- Press **F4** and select Dynamic (**3, Figure 8-16**).

### 8.2 Applying Balancing Weights

Fitting of balancing weights for the balancing modes is specified and illustrated in this paragraph.

#### 8.2.1 How to fit balance clips

Left correction plane:

After the measuring run the wheel is braked such that the weight for the left correction plane can be fitted exactly perpendicular to and above the main shaft.

- If necessary, index the wheel precisely into the correction position for the left plane. When the correction position is reached, the two arrows (3, Fig. 8-6) light up green.
- Press the pedal of the main shaft lock to hold the wheel in this position.
- Apply the clip on weight to the rim flange, in the compensation position exactly perpendicular to and above the wheel holder shaft (Figure 8- 6).

Right-hand correction plane:

After the measuring run (see § 4.1) the wheel is braked such that the weight for the right correction plane can be fitted exactly perpendicular to and above the main shaft.

- Release the brake pedal.

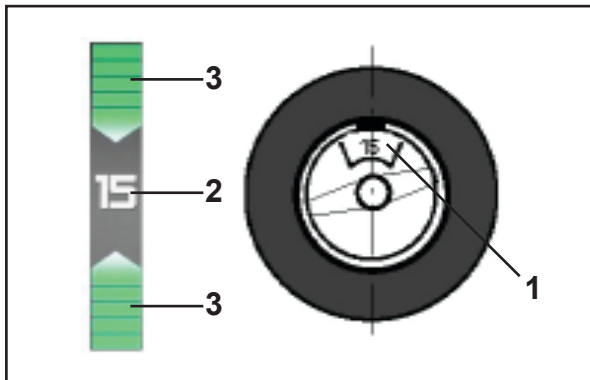
**WARNING: THE WHEEL ROTATES WHEN THE WHEEL GUARD IS OPEN. MAKE SURE THAT THE WHEEL IS NOT BLOCKED BY TOOLS OR THE LIKE. WEAR SAFETY GOGGLES AND TIGHTLY FITTING WORKING CLOTHES.**

- If necessary, turn the wheel again to move it into the right correction plane compensation position.
- Press the pedal of the main shaft lock to hold the wheel in this position.
- Apply the clip-on weight to the rim flange in the correction position exactly perpendicular to and above the wheel holder shaft (Figure 8-6 and 8-7).

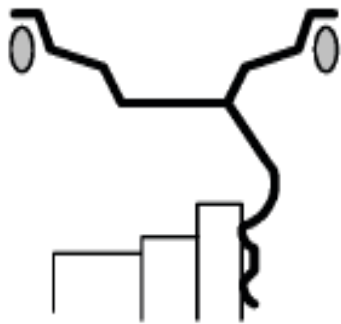
After correction carry out a check run (see § 8.3).

**Note:**

After balancing perform a Test Run (see Chapter 8.3).



8-6



8-7

## Balancing and weights Fitting

### 8.2.2 Using the Laser Pointer



8-16

In Alu 2P and Alu 3P modes the correction planes for adhesive weights are precisely indicated by the laser pointer directly on the rim.

**Note:**

When the indication is given by the laser, the weight must not be fitted at 12 o'clock, but at the bottom of the rim, precisely where indicated by the pointer.

There are at least two positions where the adhesive weights can be fitted, indicated by the Laser pointer, depending on the wheel type and the balancing mode.

When a run is completed correctly the BALANCING screen shows the correction values and the position where the weights must be fitted.

To make the corrections,

- Select an adhesive weight of the indicated size and adjust it to the wheel radius by bending.
- If necessary, index the wheel precisely into the correction position for the left plane. When the correction position is reached, the two arrows on the screen light up green.
- Press the pedal of the main shaft lock to hold the wheel in this position.
- Clean the fitting position before attaching the adhesive weights.
- Fit the balancing weight and firmly press the adhesive weight onto the rim.
- Fit the second adhesive weight in the same manner (**Fig. 8-16**).

The position for fitting the weights indicated by the Laser pointer can be varied for each correction plane.

- See "RELOCATION" (section 7.8).

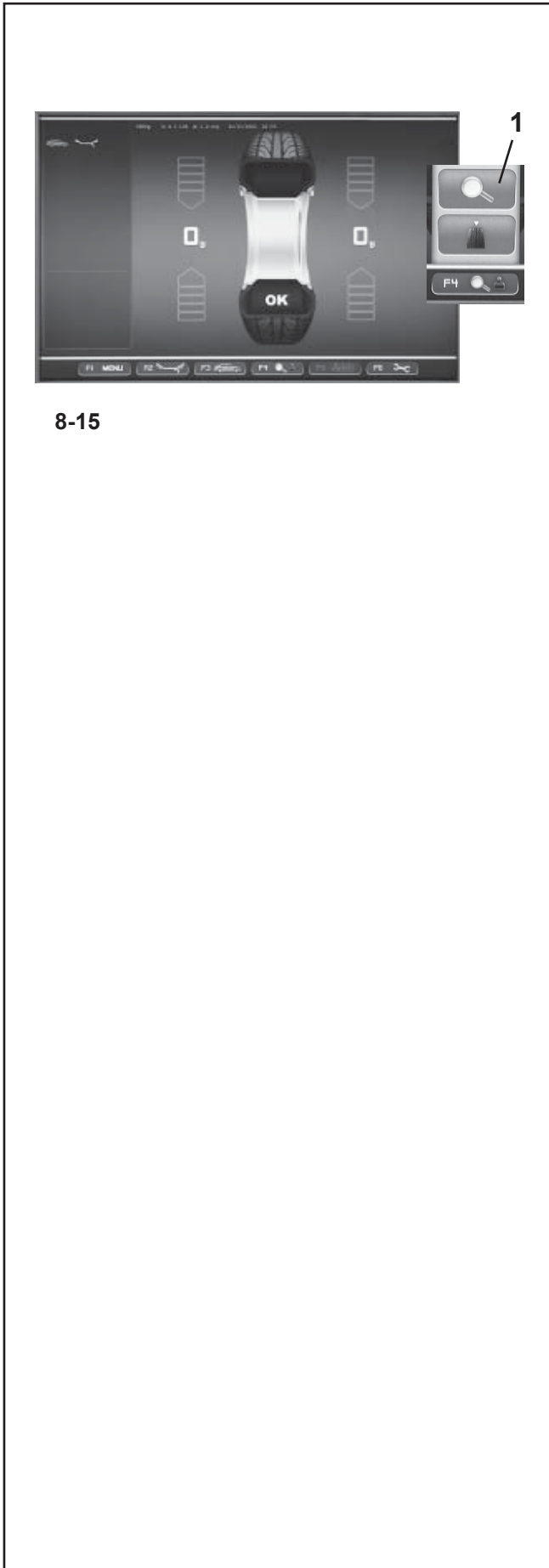
### 8.3 Test Run

- After applying the balance weights perform a Test Run.

Having finished the Test Run, if the wheel is balanced correctly, both the numerical indicators should indicate 0 and an OK should be displayed (**Fig. 8-15**).

**Note:**

If there is no OK reading, dynamic unbalances below the tolerance limit (suppression preset to 3.5 g) add to a static unbalance above the tolerance limit. Press the end indication key in Menu **F4 (1, Figure 8-15)** and the residual imbalance values will appear for several seconds and then they can be eliminated.



8-15

## Behind-the-spokes placement

### 8.4 Behind-the-spokes placement

When spoked wheels are balanced, the behind-the-spokes placement mode (also called split weight mode) allows balance weights which would have to be fitted between two spokes according to the measured unbalance (hence would be visible from outside) to be placed in hidden position behind two spokes adjacent to the unbalance location (see example, **Fig. 8-16**).

After a measuring run the electronic unit calculates the behind-the-spokes placement automatically and reads the relative balance weight locations on the screen.

The operating steps for the behind-the-spokes placement mode are described and illustrated below.

#### 8.4.1 Selecting the Hidden Weight Mode

The behind-the-spokes placement mode is activated with the menu key **F5** in the screen **BALANCING**. Weights can be positioned behind the spokes in the Alu 2, Alu 2P, Alu 3 and Alu 3P (hidden compensation weight) balancing modes and can be selected in these spheres as required.

**Note:**

The "Hidden Weight" selection key is only active after the number of spokes have been entered using the **F5** menu key.

#### How to proceed

After this run, in the **BALANCING** screen:

- Use the **F5** menu to select the number of spokes in the wheel on the machine (if not already entered) (**Fig. 8-19**).

The Status Bar field displays the indication: number of spokes set.

The number of spokes can vary from 3 to 15.

- Rotate the wheel so that a spoke is centered relative to and above the main shaft (**Fig. 8-18, arrow**).

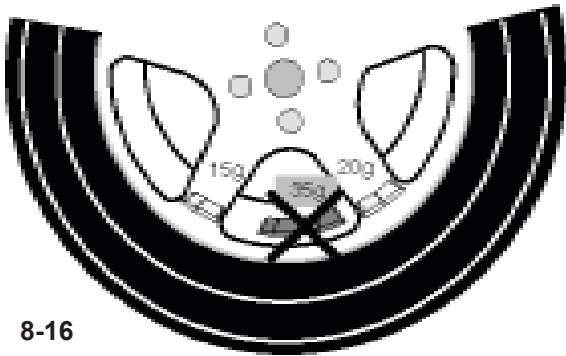
**Note:**

We suggest you keep the wheel in position with the brake pedal until the selection has been made.

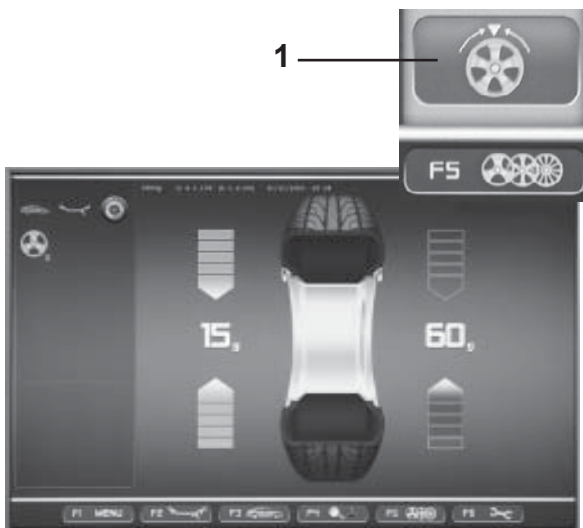
- Use the **F5** menu key to select the Hidden Weight behind spokes item (**1, Fig. 8-17**).

The function is now selected and on the right of the screen two balancing gauges are shown instead of one.

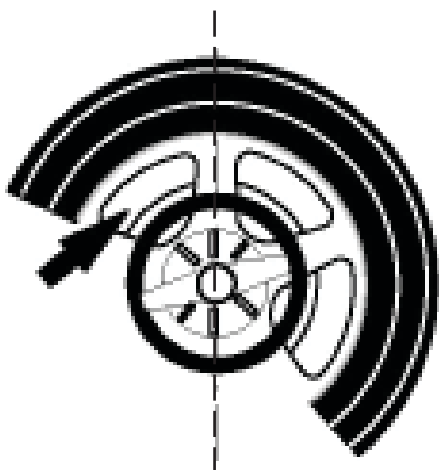
- Proceed, if necessary, with Optimization/Minimisation, or apply the compensation weights directly (Chapter 9.3).



8-16



8-17



8-18

## Behind-the-spokes placement

To exit the Hidden Weight mode and display the normal indication of imbalances (**Fig. 8-17**) proceed in the same way:

- Use the **F5** menu to select the Hidden Weight item (**1, Fig. 8-19**). The imbalances for the left and right compensation planes are displayed.

In this way wheels without spokes can be balanced even when you are working with a program for weights behind the spokes without having to change the Alu program for a different weight placement.

In any case, as long as an Alu 2, Alu 2P, Alu 3 or Alu 3P are set, weight placement behind the spokes can be activated at any time.

Exiting the BALANCING screen does not exit the Hidden Weight function.

### Notes

The unbalance reading is only subdivided on two fitting positions when the spoke position is stored (Fig. 8-20).

When balancing with counterweights positioned behind the spokes if you also need to perform an Optimization/Minimisation run, do it before applying the weights.

After running an Optimization/Minimisation procedure by selecting the weights positioned behind the spokes mode, the imbalance indicated is automatically split into two application points behind the spokes.



8-19



8-20

## Behind-the-spokes placement

### 8.4.2 Weights placement

#### How to fit adhesive weights on the left side of the rim disc

- Clean the fitting position before attaching the adhesive weights.
- Fit adhesive weights on the left side of the rim disc as described in chapter 8.2.2.



8-21

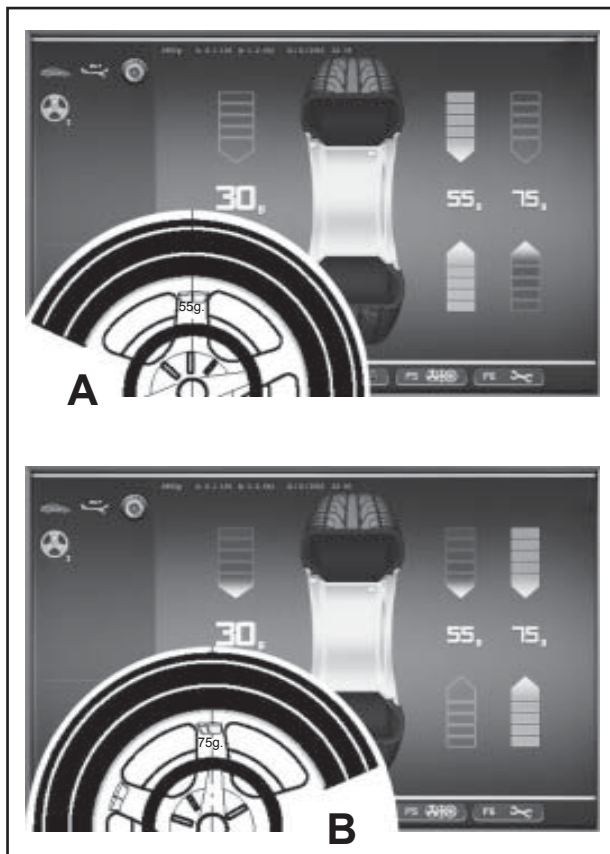
#### Applying hidden adhesive weights

The measured values and the positioning arrows for the two correction positions behind the spokes (**Figure 8-21**) are given on the right of the Indications Field.

- Turn the wheel to move one of the split imbalances, on the right side (**A, Figure 8-22**) into the compensation position (green arrows), then lock the wheel with the brake pedal.
- Clean the application point before attaching the adhesive weight.
- Apply the balance weight (in the example 55 grams, **A, Figure 8-22**) at the point indicated.
- Turn the wheel to reach the remaining split right side weights compensation position, then lock the wheel with the brake pedal.
- Having cleaned the area affected, apply behind the second spoke the weight of the value indicated (in the example 75 grams, **B, Figure 8-22**).

#### Note:

Applying split weights does not involve priorities. The operator can choose which to apply first.



8-22



## 9. Optimization/ Minimisation

### 9.1 General

Optimization is a finer form of matching.

During the opto-ride procedures the rim and tire are adjusted relative to each other on the basis of different unbalance measurements. This generally means that, where present, lateral and radial run-out and radial and lateral force variations are reduced and thus wheel running conditions optimised. In addition, the mass (balance weight) necessary for balancing can be reduced.

If optimization is not desired, it is possible to achieve weight minimisation (so-called matching).

This is possible if the rim does not exhibit geometric deformations, in other words when unsmooth wheel running conditions are a result of a non-uniform tire.

In this case the unbalance of the rim can be readjusted relative to the unbalance of the tire such that the unbalances compensate each other and the smallest possible weight for unbalance correction is determined.

### 9.2 Instructions for the optimization / weight minimisation programs

When balancing a wheel, by pressing this key (1, Fig. 9-1) you can recall the Optimization and/or Minimisation cycle screen (Fig. 9-2).

Using the F4 Menu (Fig. 9-2), you can select the item for starting the OPTIMIZATION (1, Fig. 9-2) or MINIMISATION (2, Fig. 9-2) cycle.

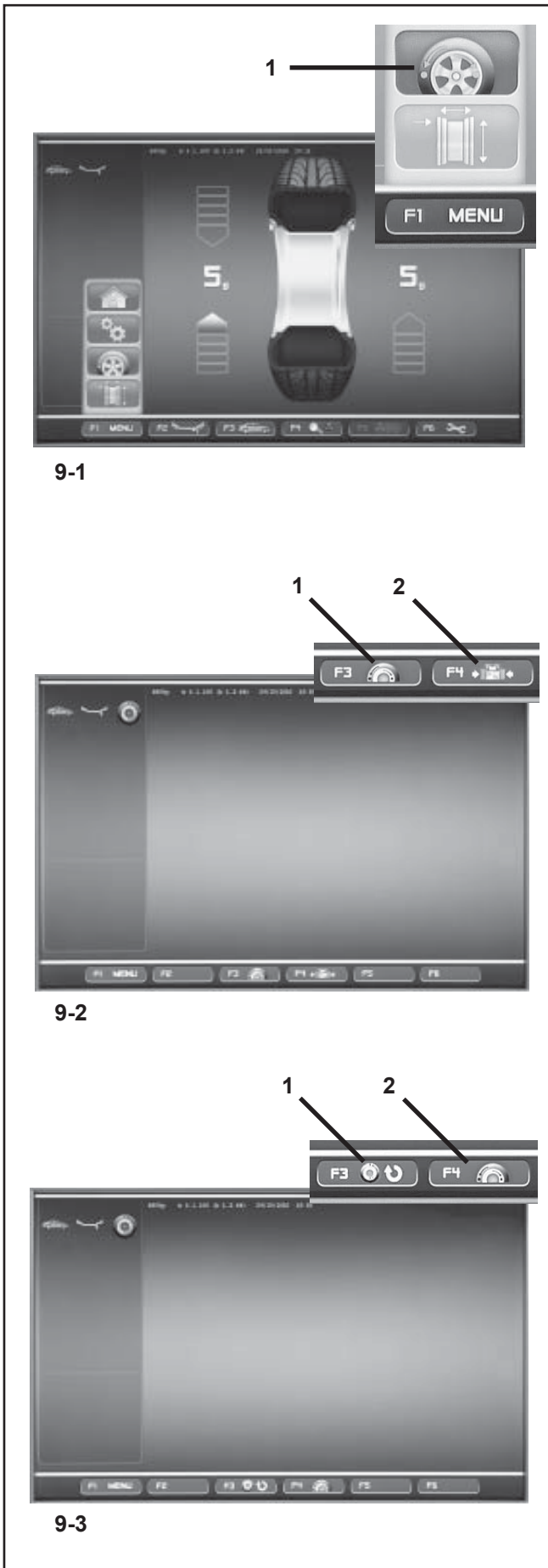
After being started, the cycle can be suspended at any time, for example, to allow a second operator to balance another wheel. The point at which the program was interrupted, the dimensions of the previous rim and all the measurements taken on it will be saved in the electronic control unit memory. So to continue from the exact point you were at, all you need to do is refit the wheel that has been interrupted and recall the suspended program. From the screen (Fig. 9-3):

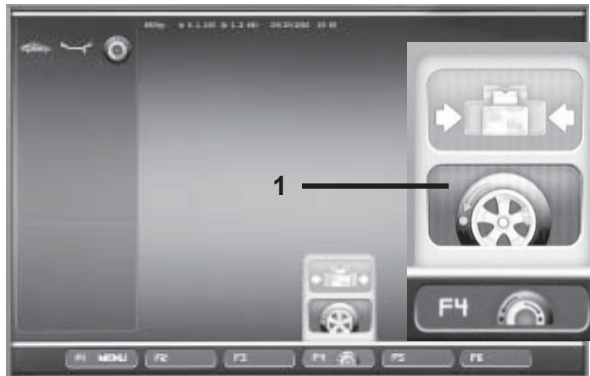
Recall the suspended cycle by pressing F3 (1, Fig. 9-3).

Use F4 (2, Fig. 9-3) to start a new Optimization/ Minimisation cycle; the data saved in the memory will be deleted.

During an Optimization/Minimisation cycle, if a run is interrupted because the STOP key is pressed (e.g. because of an emergency), the machine retains the program position while waiting for the run to be repeated. A measuring run must always be launched using the START key.

### 9.3 Start optimization/weight minimisation

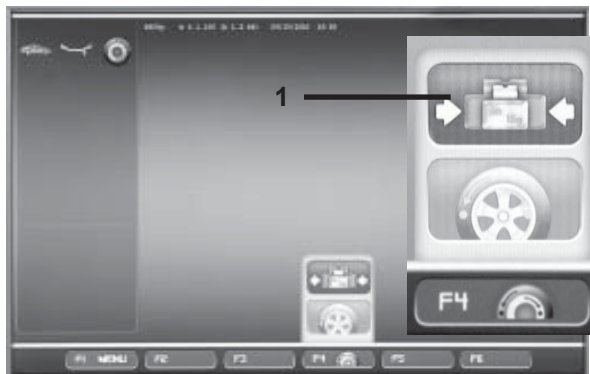




9-2a



9-4



9-2b



9-5

- To perform a Minimisation run correctly clamp a complete wheel (Section 6.5) or just the rim for an Optimization run.
  - For a MINIMISATION run, check that the tire is correctly mounted on the rim (Axial run-out test) and that it is pumped up to the set pressure.
- Select the Vehicle Type (Section 7.1.1).
- Read the rim dimension parameters (Chapter 7).
- Launch a Measuring run.
- On the BALANCING screen press the **F1** Menu key, and then select the Optimization item (**1**, Fig. 9-1).

The OPTIMIZATION screen (Fig. 9-2) is displayed.

You can now start the procedure as follows.

### Start weight optimization

- Press the **F4** Menu key and then select the Start Optimisation item (**1**, Fig. 9-2a).

The OPTIMIZATION 1 screen (Fig. 9-4) is displayed.

Continue as described in Chapter 9.3.2.

### Start weight minimisation

- Press the **F4** Menu key and then select the Start Minimisation item (**1**, Fig. 9-2b).

The MINIMISATION 1 screen (Fig. 9-5) is displayed.

- Proceed from the MINIMISATION 1 item as described in Chapter 9.3.1.

### Recalling Optimization/ Minimisation

#### Note:

If a previously interrupted Optimization/Minimisation run is in the memory, when the Optimization item is selected from the F1 Menu, the OPTIMIZATION screen (Fig. 9-4) is displayed. The interrupted cycle can be restarted using the **F3** Menu key. The program will proceed from exactly the point at which it was interrupted.

- Clamp the wheel removed previously when the Optimization/Minimisation run was interrupted.
- Press the menu key **F3**.

The screen in which optimization/weight minimisation was previously interrupted is displayed.

- Proceed according to the current program stage.

### 9.3.1 Minimisation Cycle

**Fig. 9-6** MINIMISATION 1

(First measuring run of tire/rim assembly)

- Position the valve exactly perpendicular to and above the wheel holder shaft.
- Enter the valve position by pressing menu key **F4** (Fig. 9-6).

The MINIMISATION 2 screen (Fig. 9-7) is displayed.



**9-6**



**9-7**

**Fig. 9-7** MINIMISATION 2

START? is signalled on the screen.

- If necessary, go back by pressing menu key **F5**.
- Close the wheel guard and press the **START** key.

A measuring run is performed.

- Next proceed as for optimization, starting at the screen as shown in chapter 9.5.

## 9.3.2 Optimization Cycle

Having accessed the OPTIMIZATION 1 screen (Figure 9-4), as indicated at the start of this chapter.



9-4

Fig. 9-4 OPTIMIZATION 1

(Compensation run of rim only)

- Turn the rim until the valve is exactly perpendicular to and above the wheel holder shaft.
- Enter the valve position by pressing menu key **F4**.



9-8

The OPTIMIZATION 1 screen (Fig. 9-8) is displayed.

Fig. 9-8 OPTIMIZATION 2

START? is signalled on the screen.

- Close the wheel guard and press **START**.



9-9

When the run finishes the OPTIMIZATION 3 screen is displayed (Figure 9-9).

Fig. 9-9 OPTIMIZATION 3

- Mount the tire correctly on the rim and inflate to specified inflation pressure (make sure the mounting guide rim of the tire is correctly seated).
- Confirm by pressing menu key **F4**.



9-10

The OPTIMIZATION 4 screen (Fig. 9-10) is displayed.

## Optimization/ Weight minimisation



9-10



9-11



9-12



9-13

Fig. 9-10 OPTIMIZATION 4

(first measuring run of tire/rim assembly)

- Clamp the wheel on the balancer.
- Position the valve exactly perpendicular to and above the wheel holder shaft.
- Enter the valve position by pressing menu key **F4**.

The OPTIMIZATION 5 screen (Fig. 9-11) is displayed.

Fig. 9-11 OPTIMIZATION 5

START? is signalled on the screen.

### Note:

The **F5** key allows you to move back a step.

- Close the wheel guard and press **START**.

When the run finishes the OPTIMIZATION 6 screen is displayed (Figure 9-12).

### 9.3.3 Continue minimisation and optimization

Fig. 9-12 OPTIMISATION 6

(second measuring run of tire/rim assembly)

From this screen weight minimisation is carried out in the same way as optimisation.

- Rotate the wheel into marking position following the arrows.
- In this position mark a **mark** the outside of the tire at the point exactly perpendicular to and above the wheel holder shaft.

### Note:

The **F5** key allows you to move back a step.

- Confirm by pressing menu key **F4**

The OPTIMIZATION 7 screen (Fig. 9-13) is displayed.

### Reading H 1

If **H1** is displayed, which is possible, continuing the Optimization run is not recommended as the measurement values that activate the invitation to perform an Optimization run are below the preset threshold limit.

Interrupting Optimization:

- Proceeding with any other operation will interrupt the Optimization/Minimisation run in progress. The function will be completely deleted from the memory only when a new Optimization/Minimisation cycle is started, or when the machine is switched off.





9-14



9-15



9-16



9-17

Continuing Optimization:

### Figure 9-13 OPTIMIZATION 7

- Remove the wheel from the balancer.
- Using the tire-changer, fit the tire back on the rim until the notch and the valve on the rim are in line.
- Confirm by pressing menu key **F4**.

The OPTIMIZATION 8 screen (**Fig. 9-14**) is displayed.

### Fig. 9-14 OPTIMIZATION 8

(3rd measuring run of tire/rim assembly)

- Clamp the wheel on the balancer.
- Turn the wheel until the valve is exactly perpendicular to and above the wheel holder shaft.
- Enter the valve position by pressing menu key **F4**.

The OPTIMIZATION 9 screen (**Fig. 9-15**) is displayed.

### Fig. 9-15 OPTIMIZATION 9

START? is signalled on the screen.

#### Note:

The **F5** key allows you to move back a step.

- Close the wheel guard and press **START**.

When the run terminates either the screen OPTIMIZATION 10, outside (**Fig. 9-16**) or the screen OPTIMIZATION 10, inside (**Fig. 9-17**) is displayed.

In this case the operator has to choose how to continue by choosing from the **F4** Menu key options (1/2, **Figure 9-17a**)

### Reading H 0

Optimum condition has been achieved and cannot be improved.

- Continue as shown on screen OPTIMIZATION 14 (**Fig. 9-22**).

### Reading H 2

Wheel running conditions cannot be improved. However, it is possible to readjust the tire relative to the rim to obtain a quite considerable minimisation of balance weights (i.e. smaller weights) without having an adverse effect on wheel running conditions.

- Continue as shown on screen OPTIMIZATION 10 (**Fig. 9-16**).

## Optimization/ Weight minimisation



9-16



9-17a

1 2



9-18



9-19

Fig. 9-16 OPTIMIZATION 10, outside

- Rotate the wheel into marking position following the arrows.
- In this position make two **marks** on the **outside** of the tire exactly on the wheel holder shaft.

### Note

The **F5** key allows you to move back a step.

- Confirm by pressing menu key **F4**.

The OPTIMIZATION 11 screen (Fig. 9-18) is displayed.

Fig. 9-17 OPTIMIZATION 10, inside

### Option 1: TIRE NOT TURNED OVER

If the tire must not be turned over on the rim:

- Press the **F4** Menu key to select the “**NOT TURNED OVER**” item (**1, Fig. 9-17a**); the machine will re-propose “OPTIMIZATION 10, external” (Fig. 9-16) and the operator can continue following the indications in the previous step.

### Option 2: TIRE TURNED OVER

If the tire is turned over on the rim:

- Press the **F4** Menu key to select the “**CONFIRM**” item (**2, Fig. 9-17a**) and continue as follows.
- Turn the wheel to the position marked by the notch (green direction arrows)
- In this position make two **marks** on the **inside** of the tire exactly perpendicular to the wheel holder shaft.

### Note:

The **F5** key allows you to move back a step.

- Confirm by pressing menu key **F4**.

The OPTIMIZATION 11, turn screen (Fig. 9-19) is displayed.

Fig. 9-18 OPTIMIZATION 11

- Using the tire-changer, push the tire along the rim until the double mark and the valve on the rim are in line with the valve.
- Confirm by pressing menu key **F4**.

The OPTIMIZATION 12 screen (Fig. 9-20) is displayed.





9-19



9-20



9-21



9-22

Fig. 9-19 OPTIMIZATION 11, turn

- Remove the wheel from the balancer.
- Using the tire-changer, turn the tire over on the rim.
- Push the tire along the rim until the double notch and the valve on the rim are in line with the valve.
- Confirm by pressing menu key **F6**.

The OPTIMIZATION 12 screen (**Fig. 9-20**) is displayed.

Fig. 9-20 OPTIMIZATION 12

(4th measuring run of tire/rim assembly)

- Clamp the wheel on the balancer.
- Position the valve so it is exactly perpendicular to the wheel holder shaft.
- Confirm the valve position by pressing menu key **F6**.

The OPTIMIZATION 13 screen (**Fig. 9-21**) is displayed.

Fig. 9-21 OPTIMIZATION 13

START? is displayed on the screen.

**Note:**

The **F5** key allows you to move back a step.

- Close the wheel guard and press **START**.

A measuring run is performed.

The OPTIMIZATION 14 screen (**Fig. 9-22**) is displayed.

### 9.3.4 Finish weight minimisation / optimization

**Fig. 9-22** OPTIMIZATION 14

If the wheel running conditions are optimal, the following codes can be displayed:

- H0** Wheel running conditions cannot be improved by optimization.
- H1** Further optimization not recommended but feasible.
- H2** Weight minimisation is recommended, optimization can achieve no further improvement.



**9-22**



**9-23**

If optimization has been performed:

The graphic OK shows that optimization was carried out correctly and has been completed successfully.

If minimisation has been performed:

The pictograph OK shows that minimisation was carried out correctly and has been completed successfully.

To return to the BALANCING screen:

- Press the **F1** Menu key and select the BALANCING item (**Figure 9-23**).

## Setting Parameters

### 10. Operating Mode - Selecting and Setting Parameters

Normal operation usually does not require any modification of the factory-adjusted modes of operation or their factory-adjusted state.

Variations, however, can be made by selecting certain specific items in the SETTINGS screen. In addition to the changes made to the functioning modes, from this menu various counters can be displayed showing the operations carried out over time by the balancer.

#### Recalling the SETTINGS screen

- Press the **F1** Menu key on the main menu (**Fig. 10-1**) and select the SETTINGS item (**1, Fig. 10-1**).

The SETTINGS screen **Figure 10-2** will open and the Basic List panel will be immediately active (**1, Fig. 10-2**), (CATEGORIES).

The various items can be selected using the **SCROLL** command and then by confirming with **OK**.

An active panel presents an illuminated image of the flange.

When an item is selected the panel that contains it turns a darker color.

#### CATEGORIES (1, Figure 10-2)

- Using the **SCROLL** command select a Category:
  - **General Settings**
  - **Measurement Settings**
  - **Optima Settings**
  - **Network and Print**
  - **Counters**
  - **System information**
- Confirm by pressing the **OK** key.

This takes you to the central PARAMETERS panel (**2, Fig. 10-2**).

#### PARAMETERS (2, Figure 10-2)

- Use **SCROLL** to select a parameter or rotate the shaft.
- Confirm by pressing the **OK** key.

The selector shifts to the VALUES panel (**3, Fig. 10-2**) so that changes can be made or information acquired.

#### VALUES (3, Figure 10-2)

- Select the desired item and confirm the change following the procedure explained previously (**SCROLL + OK**).

#### Note:

Values cannot be changed in the Counters or Information categories.

The **F3** key activates alternately the CATEGORIES and the PARAMETERS panel.

- Press the **F1** key to return to the INTRODUCTION screen and select the relative item (**1, Fig. 10-2a**).



10-1

1

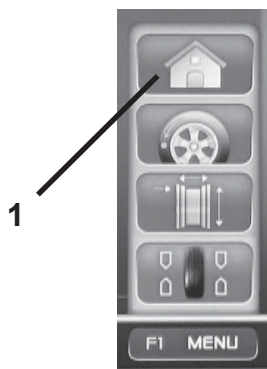


10-2

1

2

3



10-2a

1

## Setting Parameters

### Saving Changed Parameters

Changes to operating modes can be saved permanently using the "Saving operating modes in the permanent memory" function so they are retained every time the machine is started up.

Operating modes that are changed but not saved are reset to the pre-change value after the machine has been switched off.

The possible changes of modes and the necessary inputs are described in the following.

### Saving modes of operation in permanent memory

**No\*** = No storage

**Activate** = Fixes the data in the permanent memory

Store in the permanent memory – a three-tone signal is given to acknowledge acceptance.

If the mode stored in the permanent memory is to be changed, enter the desired state (e. g. on or off) for the mode in question and transfer it into the permanent memory.

## 10.1 List of modes of operation

### Setting modes of operation as recommended

See chapter 5. Switching on the machine.

**No\*** = No action

**Activate** = Factory-adjusted modes of operations are set.

The selected mode of operation can be transferred to the permanent memory.

### Language selection

Selecting the menu language. A number of languages are available, such as: English, German, Italian, French, Spanish, Portuguese.

### Volume of the audible signals

Scale of volume 0 to 100 (low - high).

Factory-adjusted to 50.\*

The volume is not changed until the OK or F5 key is pressed for saving the mode.

The selected mode of operation can be transferred to the permanent memory.

\* = Factory adjusted mode

## Setting Parameters

### Resolution of the unbalance amount readings

Selecting the resolution of unbalance readings in 1 or 5 g, or 0.05 or 0.25 oz increments.

**Normal\*** = 5 g (0.25 oz) increments

**Fine** = 1 g (0.05 oz) increments

The selected mode of operation can be transferred to the permanent memory.

### Suppression of minor unbalance amount readings

Disabled = Suppression off

Enabled \* = Suppression on

The selected mode of operation can be transferred to the permanent memory.

### Setting threshold value for unbalance suppression in g

Selecting the limit (threshold) value for suppression of minor unbalance readings in grammes, or ounces. The unit (gms or oz) depends on the settings made under "Measurement limit of the unbalance amount readings".

#### Grams:

Range 3.50 to 20.0 g

Factory-adjusted to 3.5 g

#### Ounces:

Range 0.25 to 2.00 oz

Factory-adjusted to 0.25 oz

The selected mode of operation can be transferred to the permanent memory.

### Measurement limit of the unbalance amount readings

Selecting unbalance readings in grams or ounces, active when the machine is switched on.

Gram \* = Readings in grams

Ounze = Readings in ounces

The selected mode of operation can be transferred to the permanent memory.

### Number of turns

5 to 25 revolutions possible.

Factory-adjusted to 10.\*

The selected mode of operation can be transferred to the permanent memory.

#### Note:

Reducing the number of measurement revolutions will reduce the accuracy of measurement.

\* = Factory adjusted mode

## Setting Parameters

### Starting the measuring run by closing the wheel guard

**Disabled\*** = Start via START key

**Enabled** = Start via wheel guard\*

The selected mode of operation can be transferred to the permanent memory.

\*Factory default

### Automatic braking when the wheel guard is raised

**Disabled** =No braking

---

**WARNING: WHEN THE GUARD IS LIFTED, THE WHEEL IS NOT BRAKED AND CONTINUES TO ROTATE FROM INERTIA. MAKE SURE THAT THE WHEEL IS NOT BLOCKED BY A TOOL OR SIMILAR ITEM. WEAR SAFETY GOGGLES AND TIGHTLY FITTING WORKING CLOTHES.**

---

**Enabled \*** = Braking

The selected mode of operation can be transferred to the permanent memory.

### Adjusting the DATE/TIME COUNTERS

The flashing cursor in the Values panel identifies the character that can be changed at that moment using the **SCROLL** command.

You can move backwards and forwards in the date and time fields using the **F2 & F3** commands.

#### **Date: Day**

Actual date: selection of the day.

#### **Date: Month**

Actual date: selection of the month.

#### **Date: Year**

Actual date: selection of the year.

#### **Time: Hour**

Actual time: selection of the hour.

#### **Time: Minute**

Actual time: selection of the minute.

#### **Note:**

Changes to the date and time are immediately active and are retained when the machine is next started without needing to be saved to the permanent memory.

\* = Factory adjusted mode

# Setting Parameters

## 10.2 Counters

Every measuring run actually completed is stored. Maximum count is 999,999 runs. Once this number is reached, the counter is reset to zero. The information is primarily useful for statistical purposes, e. g. to obtain evidence of load intervals of parts when defective, or of monthly (yearly) use of the machine, etc. The measuring runs performed while the machine is on are transferred into the permanent memory and added when it is switched off. The counter cannot be reset or changed.

- Select the “Counters” category (1, Fig.10-3) in the SETTINGS screen (Figure 10-2). The data immediately available in the Values field are the following:

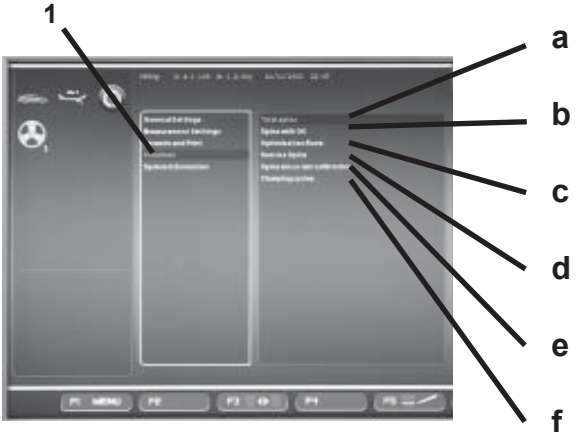
### List of Counters (Figure 10-3)

- a Total spins = Total number of measuring runs
- b Spins with o.k. = Number of measuring runs where balance quality was considered OK
- c Optimization = Number of optimizations or minimisations runs
- d Service = Number of measuring runs in service mode
- e Since last calibration = Number of measuring runs since the last calibration
- f Clamps = Total number of wheels clamped



10-2

3



10-3

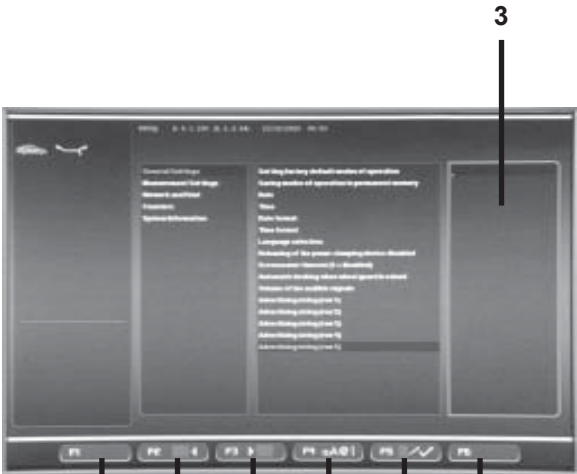
## 10.3 Input of promotional text

- Select the “General Settings” category in the SETTINGS screen (Fig. 10-2), then select one of the 5 parameters in the central panel “Promotional Text” and enter it using the OK or F5 key.

The TEXT COMPOSITION mode is activated; in the Values field (3, Fig.10-4) a point identifies the position where the text will be entered and the Menu keys are assigned different functions as follows:

**Figure 10-4**  
Menu key functions in TEXT COMPOSITION mode

- F1 Not assigned
- F2 Moves back by one character on the line
- F3 Moves forward by one character on the line
- F4 Opens Character Types menu
- F5 Opens the Menu: Save text, Restore “UNDO” text, Delete text.
- F6 Not assigned.



10-4



## Setting Parameters

### Text field

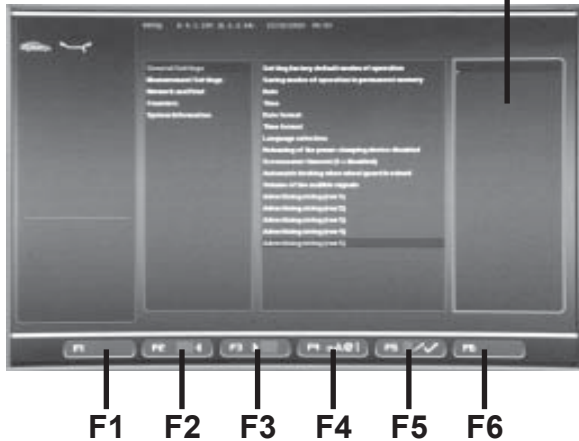
The text field has five lines of 25 characters each. The spaces between words must be filled with blanks that are located between the Upper Case and Lower Case letter A and Z.

- Use the SCROLL to select the character you wish to insert.
- Using the **F3** key, then move the cursor to the right by one position, insert another letter and continue like this until the text is complete.

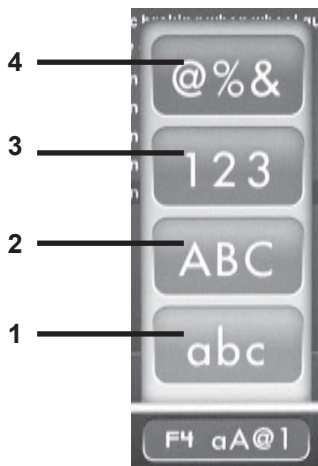
#### Note:

The **F2** key allows you to move the cursor back if you need to return to a previous character.

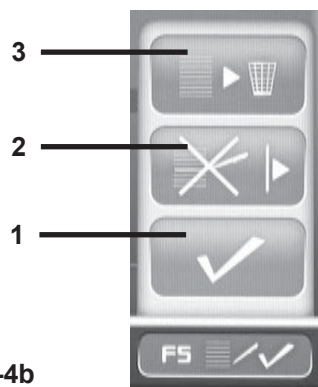
- At the end of the current line, select the tick sign (**1, Fig. 10-4b**) in Menu **F5**, to save the message .



10-4



10-4a



10-4b

### Example of how to enter a text

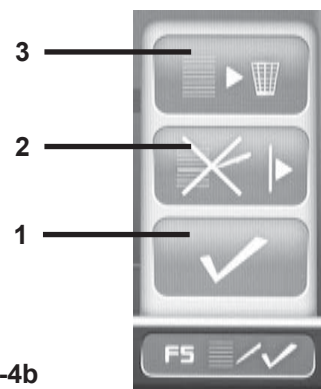
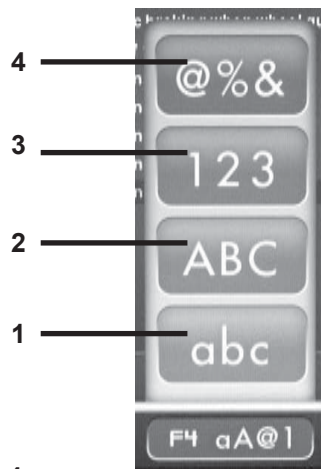
We suggest that you write the text down on a piece of paper first so you can count the number of characters and have a draft to follow when entering text.

For example to enter the following text: **Garage - 1**

Once you have accessed the Values field (**3, Fig. 10-4**) proceed as follows:

- Use the SCROLL command to reach the first letter “**G**” in this example.
- Press the **F3** key to move to the next position in the message to be written.
- Press the **F4** key and using the SCROLL command select the type of Lower Case letter (**1, Fig. 10-4a**), and confirm by pressing **OK**.
- Using the SCROLL command select the letter “**a**”.
- Press **F3**.
- Press **F4** and select the Lower Case letter (**1**).
- Using the SCROLL command select the letter “**r**”.
- Press **F3**.
- Press **F4** and select the Lower Case letter (**1**).
- Using the SCROLL command select the letter “**a**”.
- Press **F3**.
- Press **F4** and select the Lower Case letter (**1**).
- Using the SCROLL command select the letter “**g**”.
- Press **F3**.
- Press **F4** and select the Lower Case letter (**1**).
- Using the SCROLL command select the letter “**e**”.
- Press **F3**.
- Using the SCROLL select the space " "(between letter A and letter Z).
- Press **F3**.
- Press **F4** and select Special Letters (**4, Fig. 10-4a**).
- Using the SCROLL command select “**-**”.

## Setting Parameters



- Press **F3**.
- Using the SCROLL select the space " "(between letter A and letter Z).
- Press **F3**.
- Press **F4** and select the type of Number (**3**, Fig. 10-4a).
- Using the SCROLL command select "1".

The text on this line is now complete.

So you can move on to the next line and write something else, or choose an option from the ones available using the **F5** Menu key (Fig. 10-4b).

### Saving or deleting text inputs

Having completed a text:

to save it in the permanent memory,

- Press **F5** and select the tick sign "CONFIRM" (1, Fig. 10-4b).

or (if you have changed an existing text) to delete the changes you have just made,

- Press **F5** and select "UNDO" in the Menu (2, Fig. 10-4b).

Or to delete the entire line of text,

- Press **F5** and select "CANCEL" (3, Fig. 10-4b).

If the text that has been set or changed is not confirmed by pressing **OK** or **F5** and the "CONFIRM", tick sign, it will be lost.

### 11. Error codes

<b>Errors in operation</b>	-	<b>Error code E</b>
<b>Warnings</b>	-	<b>Error code H</b>
<b>Fatal error code</b>	-	<b>300 or C10</b>

#### E1

Rim dimensions were entered incorrectly, or incompletely.

- When the error code is read out, enter data once again.

#### E2

Wheel guard is not closed.

#### E3

The gauge arm for distance and rim diameter is not in home position.

#### E4

The width gauge arm is not in home position.

#### E5

Range of electrical compensation exceeded (wheel adaptor has unacceptable unbalance).

- Press STOP or ESC-key.
- Check wheel adaptor, repeat compensation run.

#### E6

The calibration weight was not fitted for readjustment.

- Press STOP or ESC-key.
- Repeat readjustment.

#### E7

With this wheel type it is not possible to choose a balancing mode.

- If necessary, choose another wheel type.

#### E8

Valve position was not entered in electronic unit (error code only in optimization or minimisation programs).

- Position valve exactly perpendicular to and above main shaft and press the **OP** key.

#### E14

The *power clamp* device is not clamped.

The measuring run has been started with the device not clamped correctly.

- Release the wheel and then clamp it correctly.

#### E15

## Error codes

Corrective term of readjustment is out of range. During readjustment values were determined which exceed, or fall short of, the given adjustment value.

- Use clamping means supplied with the machine, or have basic calibration carried out (service).

### **E16**

During the first readjustment run by the operator the calibration weight was fitted by mistake.

- Unscrew the calibration weight and start the measuring run again.

### **E17**

Wheel slips on clamping means.

The clamping nut is not well tightened, the main shaft accelerates too quickly. The machine will stop.

- Firmly tighten the clamping nut, or in special cases press the **START** key a little bit longer.

### **E83**

During a measuring run the measured data have been made useless under the effect of outside pulses (e. g. vibrations) and measurement was interrupted.

- Repeat the measuring run.

### **E88**

The rotating speed of the main shaft exceeds the safety limit.

### **E89**

A key is jammed or the pedal switch is closed.

- Find and release jammed key.

Or

- Press **STOP** or **ESC**-key to check the switch.

If the error cannot be remedied, the pedal function is switched off by pressing the **STOP** key or the **ESC** key. Call service.

### **E141**

The content of the number 1 permanent memory is not reliable. The balancing can only be performed in certain conditions.

- Call technical support.

### **E144**

The CRC of the EEPROM 1 and 2 are incorrect.

### **E145**

## Error codes

The contents of both permanent memories are different, but both contain valid data.

### **E341**

The content of the number 2 permanent memory is not reliable. The balancing can only be performed in certain conditions.

- Call technical support.

### from **E360** to **E398**

The Cameras system is not operating correctly.

- Switch the machine off and back on. If the problem persists, call technical support.

### **E900**

Unknown machine model.

### **E901**

The machine is not calibrated.

## Error codes

### H0

Wheel running conditions cannot be improved by optimization.

### H1

Further optimization not recommended but feasible.

### H2

Weight minimisation is recommended, optimization can achieve no further improvement.

### H3

Optimization not recommended.

### H20

Correction plane cannot be re-located with the gauge arm for distance and rim diameter.

- Measure the correction plane and switch to dynamic unbalance reading.

### H21

The indexed position is not the one for the correction plane in which the adhesive weight is to be fitted with the gauge arm.

- Index the correct position for this correction plane prior to fitting the adhesive weight.

### H80

Readjustment feature not foreseen during basic calibration. Consequently readjustment by the operator is not possible.

- Press on **STOP** or **ESC** key, error code is deleted.
- Call service for calibration of the machine.

## Error codes

### H82

The self-test was disturbed (e.g. by rotating the wheel).

- The message is displayed for 3 seconds, after which the measurement is repeated (max. 10 times), or aborted by pressing the **STOP** or **ESC** key.

### H90

The wheel was accelerated too slowly or decelerated too slowly after a measuring run.

If the main shaft does not reach the required speed, check whether the wheel shaft lock is actuated or whether the weight of the wheel is excessive. In this case:

- Release main shaft lock.
- Make sure that the shaft with clamped wheel can rotate freely.
- Turn the wheel by hand and then press on **START** key.
- If the error cannot be remedied: call service.

### H91

Speed variations during measuring run. The main shaft lock may be operated.

- Release main shaft lock.
- Make sure that the shaft with clamped wheel can rotate freely.
- Repeat the measuring run.

### H948

### H949

Fault during self-test at start-up.

The firmware is not aligned with the User Interface version currently in use.

#### **Note:**

Wheel balancer operation is not compromised.

- You can continue using the machine.
- Consult the technical assistance department for further information.

Error messages can also be indicated by means of acoustic signals. The service technician can locate and eliminate the corresponding error by means of the number of tones, their frequency and duration (long/short) and the length of the pauses.



## Readjustment by the operator

### 12. User Calibration

If numerous measuring runs are required to balance a wheel because the balance weight sizes and positions need to be repeatedly adjusted, it means the machine is not operating with sufficient measuring precision. If this is the case the operator can electronically calibrate the rotating masses on the machine; which is called User Calibration.

A calibration run takes longer than a regular measuring run. Following User Calibration any residual compensation will be cancelled.

---

#### IMPORTANT:

**USER CALIBRATIONS SHOULD ONLY BE PERFORMED WITH NOTHING ON THE SHAFT; AND WITH NO EXTERNAL TOOLS WHATSOEVER ON THE WHEEL HOLDER. ONLY FOR MACHINES WITH A POWER CLAMP: WITH "P" MODELS ONLY THE CLAMPING TOOL SUPPLIED WITH THE MACHINE SHOULD BE LOCKED.**

---

#### Readjustment

- Make sure that only the clamping tool (and no other wheel or clamping device) is clamped on the machine shaft.
- Press the F6 key in the SETTINGS menu (Fig. 13-1) and select the CALIBRATION item (1, Fig. 13-1).

The CALIBRATION screen (Figure 13-2) will open.

- Close the wheel guard, press the **START** key and launch the first calibration run (if the run takes a long time it means residual imbalances have been detected).
- Screw the Calibration weight onto the threaded hole in the wheel support flange (Figure 13-3).
- Press the **START** key and launch a second calibration run (to detect correction values).

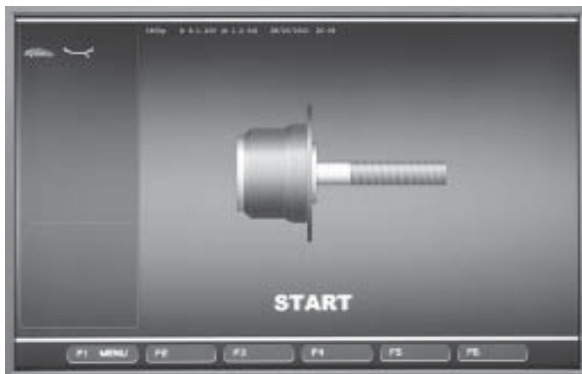
After the second run the electronic control unit processes the values taken during the calibration runs and writes them in the permanent memory. When this has finished an audible 3-tone signal is heard to indicate that User Calibration has terminated.

- Unscrew the Calibration weight from the flange and put it back in its designated place in the Weight Holder Tray.
- Press the **F1** key to return to the INTRODUCTION screen and select the relative item (1, Fig. 13-4).



13-1

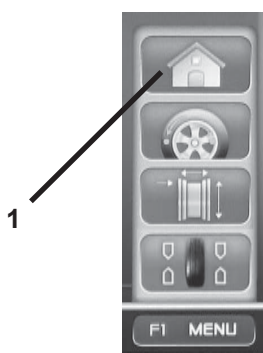
1



13-2



13-3



13-4

### 13. Maintenance

The internal mechanical parts of your equipment require almost no maintenance. All the bearings are greased for life and sealed. The drive belt does not require particular checks.

Particular attention should be paid to the wheel centering cones and the relative clamping parts, that must always be clean and in a good state. Always keep the wheel clamping equipment thoroughly clean, both during operation and when not in use. When not in use lubricate all metal parts with non-corrosive oil and store in a dry and safe location. Balance quality depends considerably on their condition.

If defects occur which cannot be eliminated by the user (error codes not mentioned under § 11. Error codes), contact the after-sales service.

---

**WARNING: PRIOR TO MAINTENANCE OR REPAIR WORKDISCONNECT THE MACHINE FROM THE MAINS SUPPLY AND PROTECT AGAINST UNINTENTIONALSWITCHING ON.**

---

**Note:**

This unit must not be opened by the operator, apart from following the instructions below.

#### 13.1 Programed Cleaning

##### Every Week:

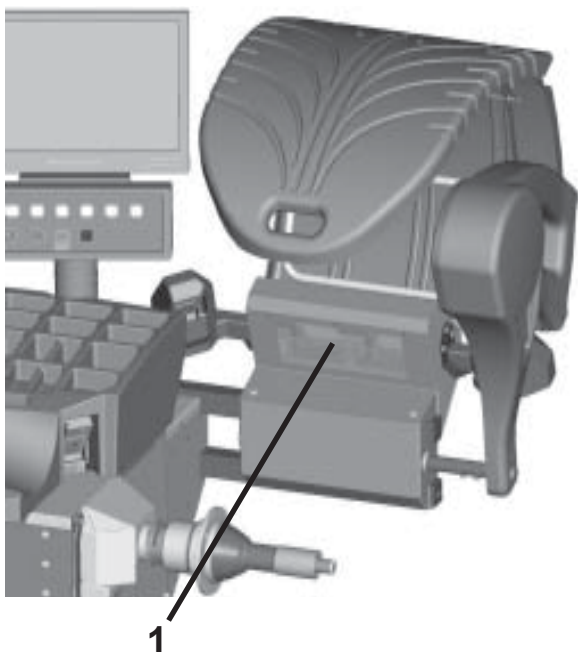
##### Rear Camera glass

The seating of the rear Camera (1, fig. 13-1) is fitted with a protective glass, which must be cleaned regularly.

- Clean only with a non-synthetic, clean, dry and soft cloth in order not to scratch the surface of the glass.

To remove oil or grease,

- wet the cloth slightly with a specific glass detergent can clean carefully.



13-1

## Maintenance

### Every Day:

#### Cones and Wheel clamping parts

At the end of every working day, after switching off the machine, clean the clamping cones and the Power Clamp lock nut, as well as any special Flanges used, and return to their positions.

Perform the following maintenance operations:

- Clean only with a clean, dry and soft cloth.
- Check the mechanical conditions; the parts must not have any abrasions, dents or incisions.
- Check the wear conditions and, if necessary, clean the wheel clamping shaft and the relative cone clamping ratchets.

If there are any permanent faults, consult the Customer Technical Support service.

### 13.2 Changing the mains fuse

Refer to Figure 13-2.

- Switch off the unit.
- Unplug the power cable from the power outlet.
- Remove the power cable from the machine mains socket.
- Pull out the fuse holder (2).
- Replace the damaged fuse with another fuse having an identical rating.
- Return the unit to its original functioning state, by following the steps above in reverse.

#### 13.2.1 After-sales service

Contact your area agent.

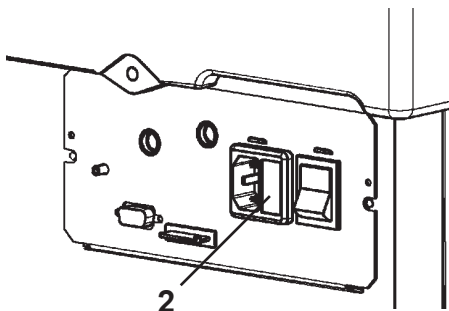
The company website provides information about the Customer Assistance service around the world:

#### USA

Snap-on Equipment  
309 Exchange Avenue  
Conway, Arkansas 72032  
Tel.: (800) 225-5786

#### CANADA

Snap-on Equipment  
6500 Millcreek Drive  
Mississauga, Ontario  
Canada L5N 2W6  
Tel: (905) 814-0114  
Fax: (905) 814-0110



13-2

## Disposal

### 13.3 Disposing of the unit.

When you decide to get rid of your unit, contact your reseller for a quote or for the regulations on disposal which apply to the unit.

#### 13.3.1 DISPOSAL IN EU COUNTRIES

##### For waste electrical and electronic equipment

At the time of disposal, at the end of the lifetime of this equipment, you must:

1. NOT dispose of the equipment as municipal waste and separate collection is mandatory.
2. Ask the retailer about collection points authorised for regular disposal.
3. Stick to the standards for correct waste management, to prevent potential effects on the environment and human health.



This symbol indicates that separate collection of waste electrical and electronic equipment is mandatory for scrapping.

## Installation Instructions

### i. Installation requirements.

#### Space requirements.

The drawings show the minimum safety requirements.

Drawing i.1 has two sets of dimensions:

- 1 dotted lines: for measurements regarding the holes for fixing the machine to the floor.
- 2 continuous lines: for measurements regarding overall machine surface space

#### Floor requirements.

The cured concrete floor should be:

- horizontal; +/- 1° tolerance
- even; within 2 mm
- able to bear the weight of the balancer as stated in Chapter 2 of the Operator's Manual.

The floor on which the balancer will be installed should not relay vibrations from other devices or from outside the building. External vibrations may affect the accuracy of the unit.

When the desired location has been determined, ensure the balancer rests firmly and fairly level on the three support tabs. Use the three 3/8-16x3.0" (p.n. 1-18159B) anchor bolts to secure the unit to the floor. remove any loose concrete debris from the drilling process. Tighten the anchors firmly.

**Note:** The balancer must be firmly bolted directly to the floor.

#### Power supply requirements.

Refer to Chapter 2 of the Operator's Manual for mains power requirements.

---

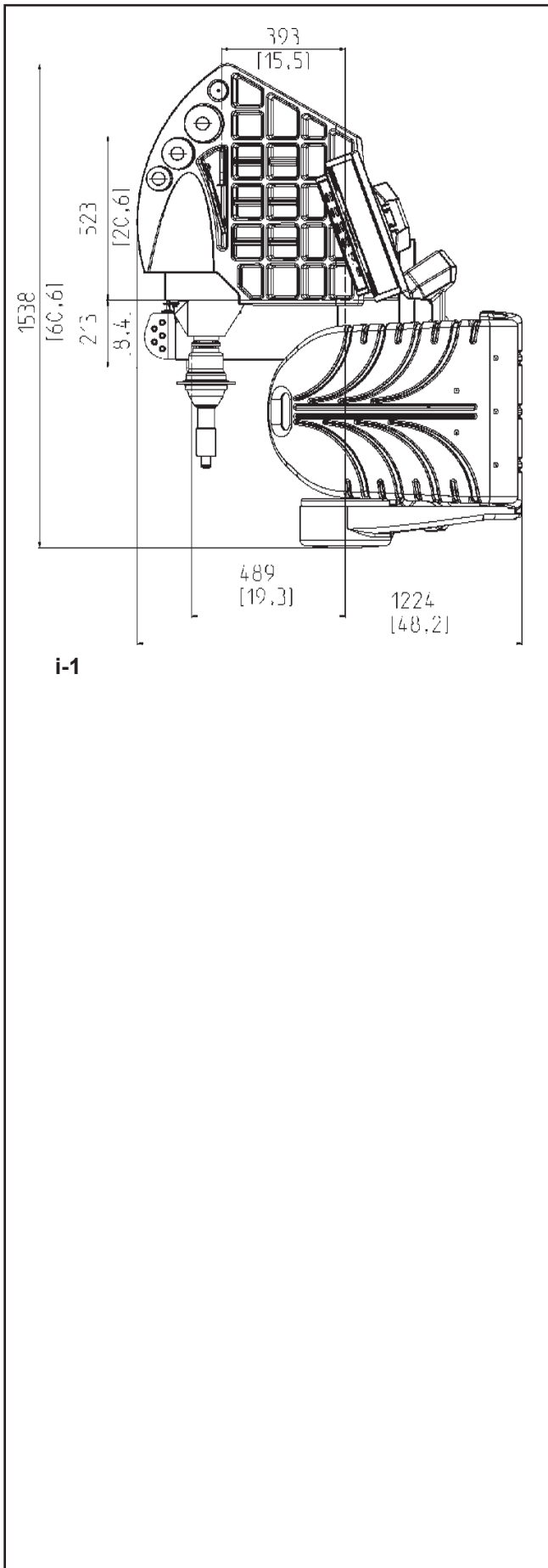
**WARNING:** ENSURE THAT AN APPROVED WALL MAINS OUTLET IS AVAILABLE.

---

---

**WARNING:** NEVER GUIDE POWER SUPPLY CABLES OVER THE FLOOR, UNLESS PROTECTED BY AN APPROVED COVER.

---



## Installation Instructions

### ii Transportation, unpacking and contents.

#### Transportation.

The wheel balancer is supplied on a pallet.

- Use a pallet truck (**Figure ii-1**) to bring the wheel balancer to its working area.

#### Unpacking.

**WARNING: PREVENT THE STRAPS FROM SPRINGING LOOSE AFTER BEING CUT.**

- Cut the straps.
- Open the top of the box.
- Remove staples at the bottom of the box. Lift the box up and over the unit.
- Carefully unwrap the balancer and spare parts supplied.
- Check the contents of the shipment.

#### Contents.

The shipment contains:

- a wheel balancer.
- a Technical Documentation package.
- the accessories mentioned in Section 3.
- 3 storage hooks and flanges.
- a mains power cable.
- a wheel guard assembly (if present).
- a monitor

#### Tools required.

- screwdriver / bar (diameter 4.5-5 mm)
- keys: 13, 16, 20 mm

#### Positioning.

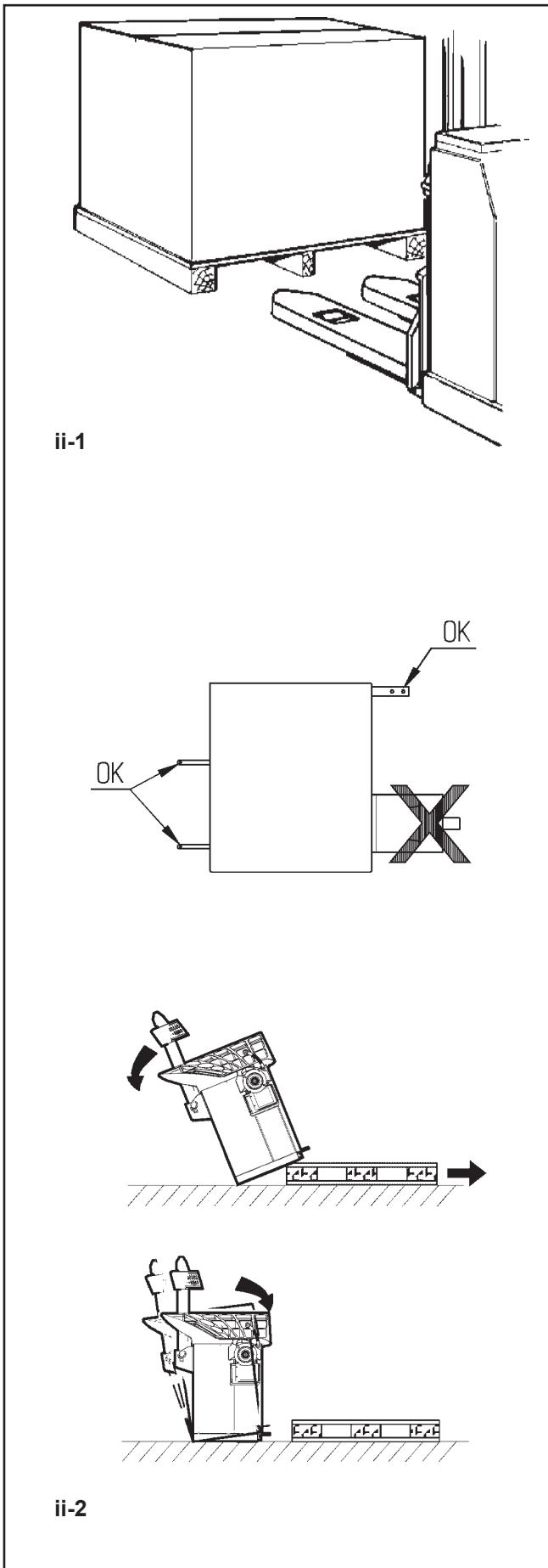
- Remove the bolts that secure the wheel balancer on the pallet.

**CAUTION: DO NOT LIFT OR MOVE THE WHEEL BALANCER BY THE MAIN SHAFT OR MEASURING UNIT.**

- Refer to **Figure ii-2**. Move the wheel balancer from the pallet to its working location.

#### Note:

Use the storage hooks (mount as instructed in Chapter iii) and/or the wheel guard shaft (if present) to handle the wheel balancer.



## Installation Instructions

### iii Installation procedures.

#### Wheel balancer:

Refer to the drawing in i for correct wheel balancer positioning. If the wheel balancer needs securing, we recommend fixing elements with a diameter of 8 mm, quality 8.8 or higher.

#### Supports for Accessories:

- Unpack the 4 threaded accessory support studs and the support plates.
- Refer to Figure iii-1. Fit the 4 threaded accessory support studs and the plates.

#### Clamping devices:

- Put the clamping devices on the accessory studs.

#### Power Clamp device:

Figure iii-2. Installation instructions are in Chapter 6

#### Monitor:

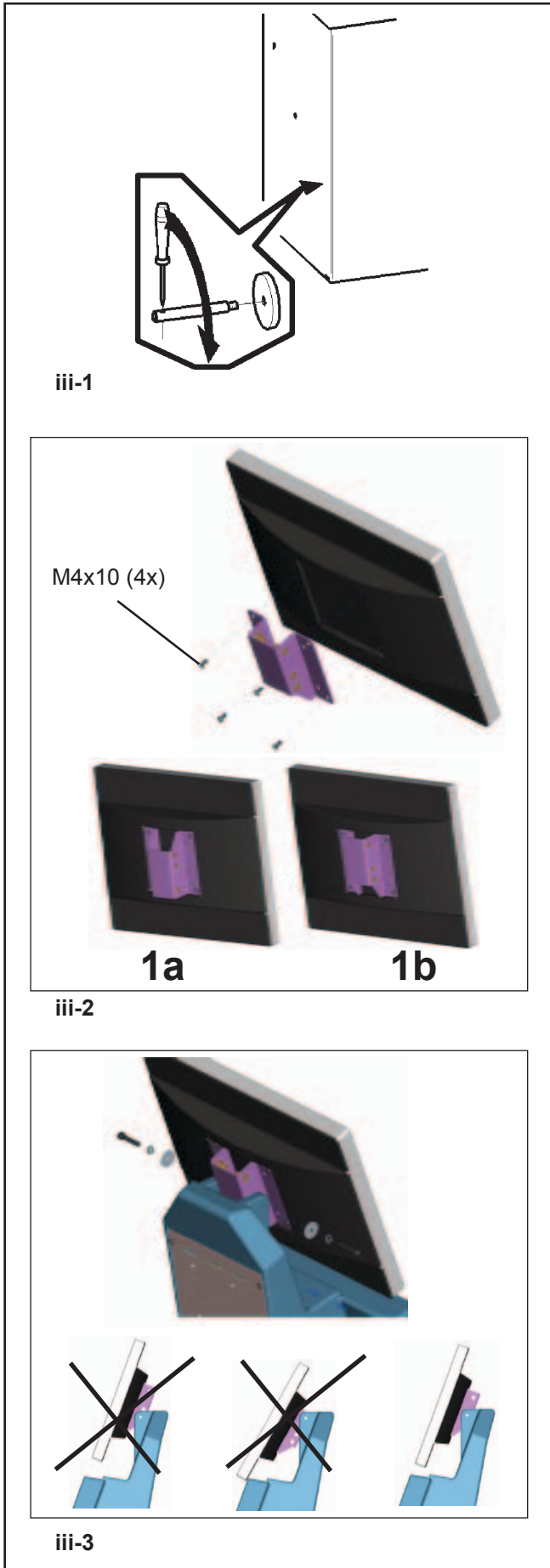
Figure iii-3 Fitting the monitor

iii-2) The VESA support has three different fixing points, which thanks to the two possible fitting positions (1a-1b) provide 5 different possible fixing heights.

The 4 screws needed (M4x10) to fix the VESA support to the monitor are part of the kit supplied.

iii-3) When fitting the monitor assembly you must choose the appropriate fixing point.

The monitor assembly must be positioned in such a way as to leave a minimum gap vertically between the monitor and the keyboard support, allowing its angle to be adjusted.





## Installation Instructions

### Fitting and connecting the monitor

**Figure iii-4** Fitting the monitor support post (1, Fig. iii-4)

- Run the connecting cables (2, Figure iii-4) into the box.
- Fix the column (1, Figure iii-4) to the back of the box, by the two metal bands (3, Figure iii-4).

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**CAUTION: SET THE MAIN ON/OFF SWITCH TO THE OFF POSITION BEFORE CONNECTING THE ELECTRICAL CABLES**

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**Figure iii-5** Connecting the monitor and the PC

- Insert the monitor connector into the right-hand socket (1, Fig. iii-5) of the embedded PC unit.
- Insert one end of the connecting lead from the embedded PC to the electronic control of the wheel balancer into the left-hand socket of the embedded PC (item 2), and insert the other end into the socket close to the main switch (4, Fig. iii-5).

A conventional external PC can be connected at the center socket (3, Figure iii-5).

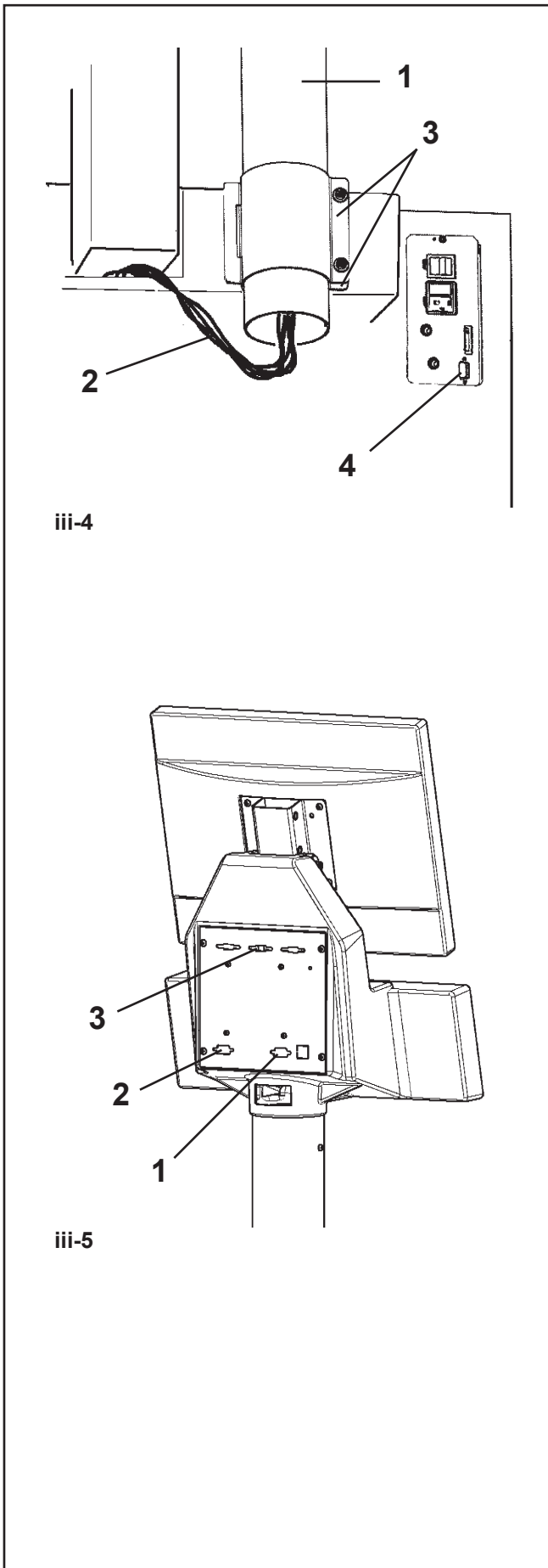
### iv Test procedures.

- Balance a wheel to less than 0.25 oz. (5 grams) per plane.
- Perform a User Calibration. See Chapter 6.3.1.

### v Instructing the operator.

*(Following applies only if a unit is installed by a service Technician)*

- Show and explain the Safety Booklet.
- Show the operator how to switch the unit on and off.
- Show the operator how to perform an emergency stop.
- Show the operator how to select a wheel type, enter data and apply a weight.







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