SYSTEM IV™

Operations Manual

JohnBean™

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Contents Page

1. Safety rules and function

Fig.1-0 Many Safety Precautions relevant to the unit are described in the Safety Booklet.

1.1 Special hints for the reader

A few special features were used in this manual to facilitate reading and understanding of pictures and written instructions:

- Bullet list: Indicates action that must be taken before to enter the next step

Safety rules are highlighted in grey.

Arrow showing where to look

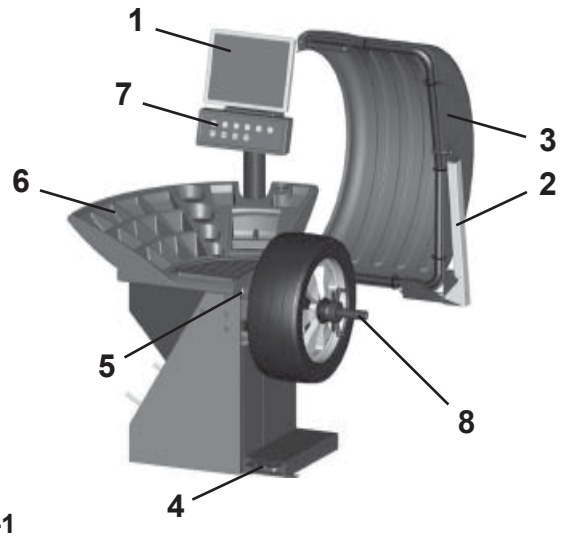
Arrow showing the direction to move

Note:
Provides a suggestion or an explanation.

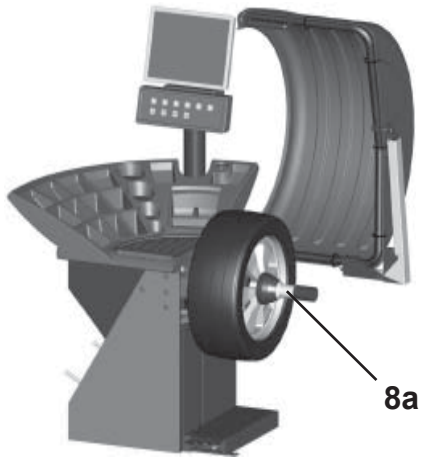
1.2 Scope of application

The wheel balancers are designed for static and/or dynamic balancing of car and light-truck wheels weighing up to 154 lbs (70 kg) and having an overall diameter of 44in (1117 mm).

In addition to conventional balancing operations, irregular running conditions of the wheel caused by geometric deformations of the rims and/or tires, hence unsmooth ride, can be identified, improved or, if possible, even eliminated. By exact adjustment of the two wheel components relative to each other optimum wheel running conditions or at least balance weight minimization can be achieved.



1-1



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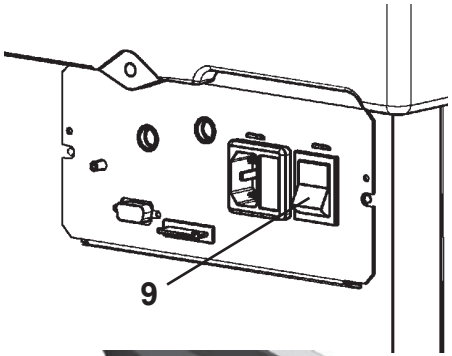
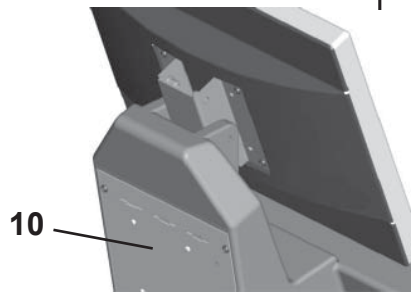




1-3

Fig.1-1 Front view of

1 Monitor
2 Width gauge arm
3 Wheel guard
4 Pedal of main shaft lock
5 Gauge arm for distance and rim diameter
6 Weight box
7 Key pad
8 Wheel Holder Shaft

Fig.1-2 Front view of

Items see figure 1.
8a *Power Clamp* Shaft

Fig.1-3 Rear view of

9 Mains switch and power supply
10 Embedded PC

1.3 General safety rules

Only properly trained and authorized personnel shall be allowed to operate the wheel balancer.
The machine must not be used except for the scope of application and in the way specified in this manual.

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

On no account should safety features be removed or made inoperative.

In general any work on the electrical system such as fitting of a plug or changing of connections, if necessary, must be carried out by a qualified electrician in line with relevant national standards and the regulations of the local power station.

Remove jumper X46 prior to insulation resistance tests (500 V DC) and high voltage tests (1000 V AC) in line with EN 60204-1 (see electrical diagram).

It should be noted that working with technical equipment may always involve an unforeseeable acceptable risk. Therefore the operator should eliminate such dangers in advance by proper and wise behavior.

The following special points should be observed:

Use technical equipment for its specified scope of application only.

Always use suitable and proper equipment and tools.

Follow the instructions, notes and technical data of the machine manufacturer or manufacturer of the wheels to be balanced.

Wear suitable protective clothing and accessories (e.g. goggles, safety shoes, helmet).

For further safety rules to be observed, please refer to the Supplement “SAFETY MEASURES“ and the individual chapters.

1.4 Description of function

Screen and menu keys

The color screen displays the data set, the operating modes, the measured data and symbols and text to help the operator.

The drop down menus, with the lists of all the functions, are on the bottom. The keypad contains the six Menu control keys and the ESC, HELP, START and STOP keys. A touch control vertical cursor and an OK key, on the right, are used to scroll and activate the highlighted options

Gauge arm for distance and rim diameter

Entry of rim diameter and distance between left correction plane and machine is by means of an integrated gauge arm or also via the key pad. In the latter case the relative function key is held pressed while the wheel is rotated to choose the desired inputs and enter them into the electronic unit.

When fitting adhesive weights with the weight holder, the machine will support the operator in relocating the correction position.
Rim width is entered via the menu keys and rotation of the wheel. The input range is identical with the working range of the machine (see § 15. Technical data).

Width gauge arm

Rim width is entered using the width gauge arm, or also by pressing the relative function key and rotating the wheel. The input range is identical with the working range of the machine (see§ 15. Technical data).

Balancing mode

Readings in different balancing modes (weight position on the rim) can be given on the display, depending on the type of wheel to be balanced (car, light-truck, motorcycle, PAX, steel or alloy rim).

Measuring run and measured values

All measurements are taken and stored in one run during the automatic program. On completion of measurement the machine stops automatically and the wheel is slowed down to standstill.
Amounts and locations of unbalance are read out separately for each correction plane.

Store wheel profiles

Wheel profiles permit the storage of values for wheels that for example are balanced frequently in order to save having to enter the wheel data etc. each time. It is possible to store up to 9 wheel profiles.

Error codes

Errors in operation or failures in the electronic or mechanical system are signaled via respective error codes (see § 11. Error codes).

Readjustment by the operator

If several measuring runs are necessary to balance a wheel because balance weight size and position have to be adjusted repeatedly, this is often due to insufficient measurement accuracy.

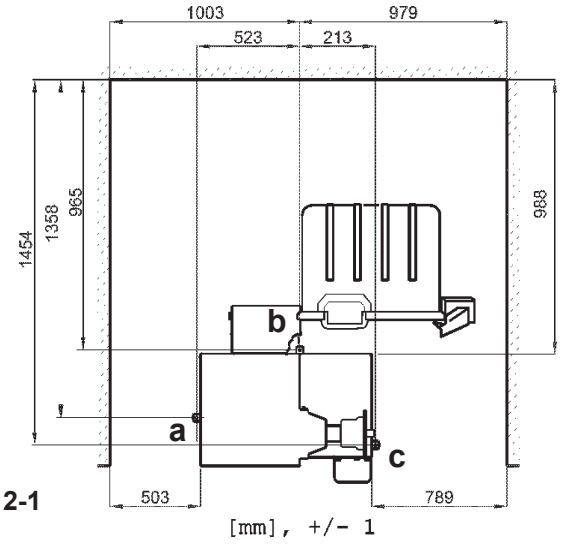
In such case the operator has the possibility of readjusting the machine (see § 13. User Calibration).

Wheel guard

A wheel guard with electric interlocking is mandatory for safety and is part of the standard equipment. The measuring run may only be started with closed guard.
The electronic unit can be programmed by simply changing the relevant mode of operation so that measurement is started by closing the wheel guard (see § 10. Changing modes of operation).

Main shaft lock

The machine has a pedal-operated main shaft lock which is used to retain the wheel in the correction position so that the balance weights can be fitted. This lock is designed only to facilitate orientation of the wheel and must not be used for braking the main shaft.
For machine with *POWER CLAMP* locking system
The pedal also controls the *POWER CLAMP* for clamping the wheel on the balancer.



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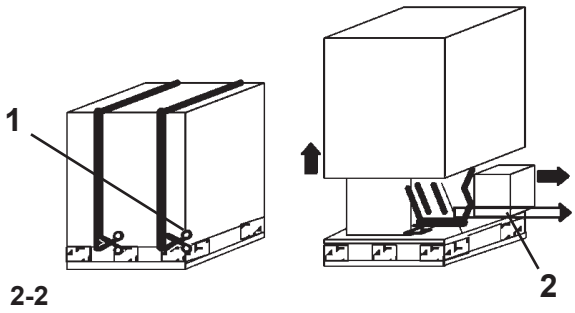

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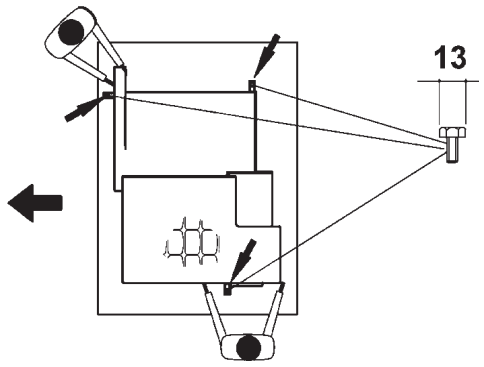

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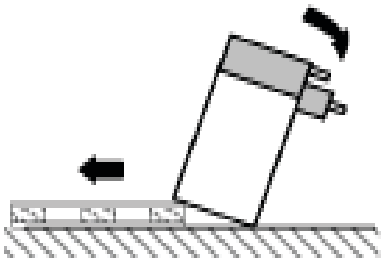

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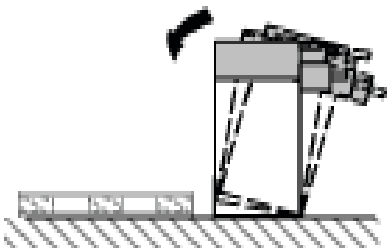


2-5

2. Installation of the machine.

When choosing the site, Health and Safety at Work regulations and the regulations on working environment should be taken into account.

The wheel balancer can be installed on any kind of floor that is level and even (horizontal; tolerance +/- 1°. When level; tolerance up to 2 mm). The weight and overall size of the machine are given in Chapter 15. Technical Data. Before installing the machine on a raised floor, check its carrying capacity.
The machine can operate even if it is not fixed to the floor as long as it rests correctly on the floor at the three points indicated (**a, b, c, Fig. 2-1**).
If metal spacers are used to achieve the necessary floor conditions for installation, the machine must be secured to guarantee long term stability. To secure the machine: mark the position of the machine drill holes on the floor, then move the machine, drill the holes in the floor and insert the screw anchors. Then position the machine back over the holes and insert the bolts. Use metal screw anchors with diameter 10 bolts. The packaging on the pallet (**Fig. 2-2**) guarantees machine condition at delivery.

2.1 Unpacking the machine

The machine should be unpacked by two persons.

Note: When unpacking the machine make sure that the pedal fitted on the machine base and the whole pedal assembly is not damaged.

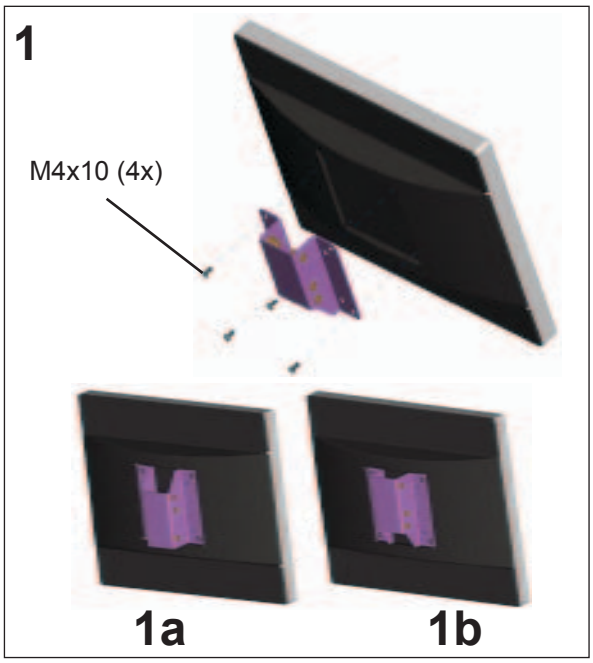
- Cut the strips of the packing (**1, Fig. 2-2**), lift off the packing and set aside the small parts packed in the separate small box (**2, Fig. 2-2**).
- Unscrew the three hexagon screws (width across flats 13 respectively) which hold the machine on the pallet (**Fig. 2-3**).
- Gently lift the machine by weight box and wheel guard carrier (**Fig. 2-3**).
- Then lower one side of the machine on the floor (**Fig. 2-4**).
- Remove the pallet from underneath the machine and gently lower the entire machine onto the floor (**Fig. 2-5**).

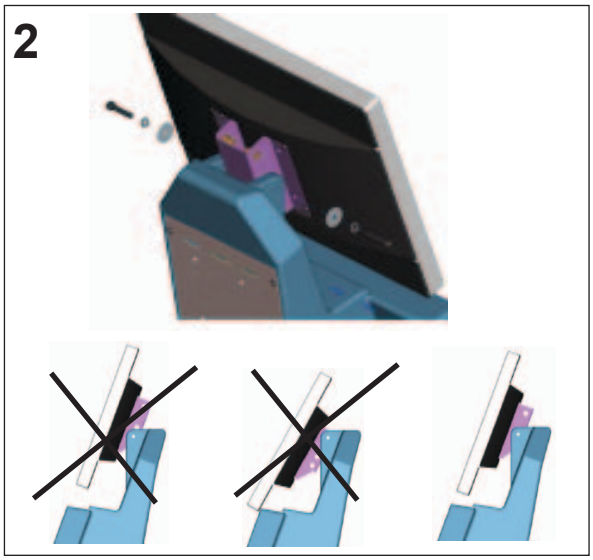
2.2 Relocating the machine

If the machine is transported on site, gently tilt it, taking it by weight box and wheel guard arbor, and push it gently on suitable lifting or mobile industrial handling equipment (e. g. forklift truck, platform truck).

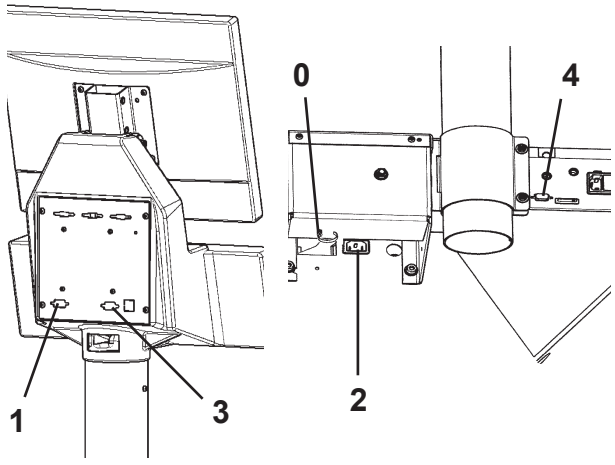
Note:
When moving the machine **do not pick it up by the Vibratory unit** (Wheel Holder Shaft).

Fitting and connecting the monitor





2-6



2-7

Fig. 2-6 Fitting the monitor

1) 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.

2) 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.

Fig. 2-7 Connection of monitor and PC

CAUTION
BEFORE CONNECTING THE ELECTRONIC CABLES TURN OFF THE MAINS SWITCH.

- Insert the monitor connector into the VGA socket (**item 1**) of the embedded PC unit.
- Insert the monitor main connector into the socket (**item 2**).
- Insert one end of the connecting lead from the embedded PC to the electronic control of the wheel balancer into the right-hand socket of the embedded PC (**item 3**), and insert the other end into the socket (**item 4**) close to the main switch.

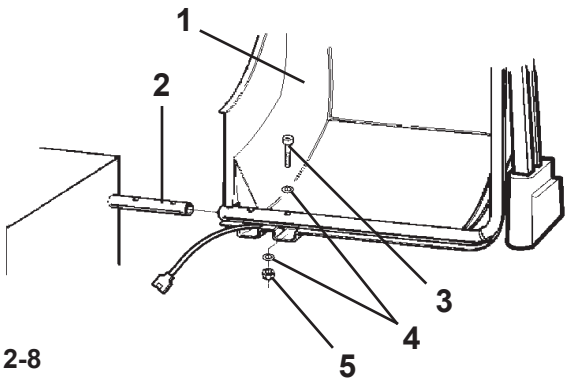
2.3 Mounting the wheel guard

The wheel guard influences the following modes of operation:

- The measuring run is started by closing the wheel guard (code C 13).
- The wheel is braked on lifting the wheel guard during a measuring run (code C 5).

These modes of operation can be changed either permanently, or only as long as the machine is switched on, by means of codes (see § 10. Changing modes of operation).

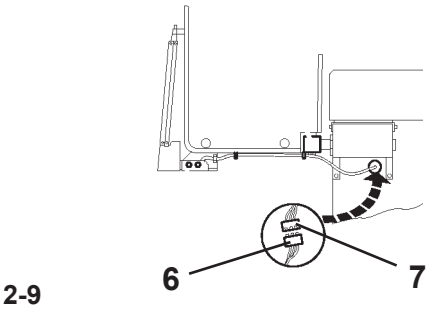
Caution
Since the cable is moved during opening and closing the wheel guard, it must be passed in the band (**0, Fig. 2-7**) under the wheel guard.



2-8

Fig. 2-8

- Slide the wheel guard (**1**) on the arbor (**2**) and raise it until the fastening holes of wheel guard and wheel guard arbor coincide.
- Insert the M10 setscrew (**3**) with washer (**4**) from below, and tighten the hexagon nut (**5**) and washer.



2-9

Fig. 2-9

- Connect the plug of the cable (**6**) with the connector of the machine (**7**) which is projecting out of the opening in the machine cabinet.
- Place the plugs loosely inside the machine through the hole in the machine cabinet.

3 Electrical connection.

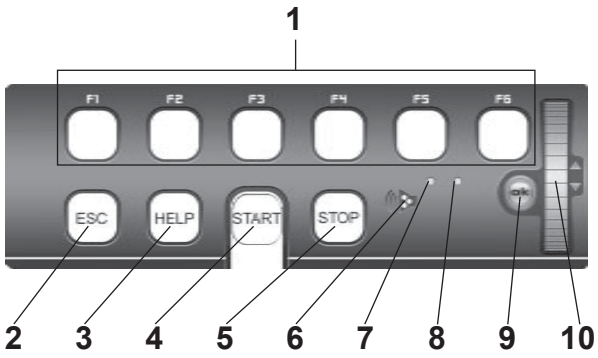
Any work on the electrical system such as fitting of a plug or changing of connections, if necessary, must be carried out by a qualified electrician in line with relevant local and national standards and laws.

Electrical standard equipment and drive motor of the wheel balancer are provided for operation on AC 50/60 Hz, 200 – 240 V or 115 VAC, see plate on rear of balancer for required voltage.

Fusing is by the customer before the plug connector, using slow-blow fuses of 6 – 16 A, or automatic cut-outs of the slowblow type.

4. Controls and displays

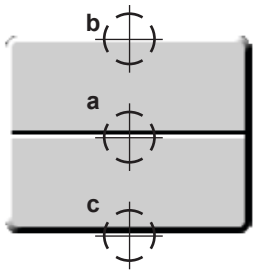
4.1 Key pad



4-1

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)



4-1a

Description of keys

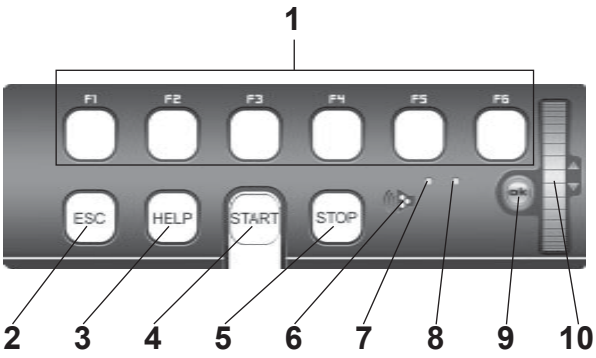
1 Menu keys
Figure 4-1a Keys
– The Menu Keys open the list of functions to perform or continue the operating cycle
All function keys are toggle switch type keys so they have triple commands plus two functions:

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



4-1

2 ESC key
– Exits any Menu.
– Exits the C codes procedures
– Deletes the help information and error messages.

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 §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.

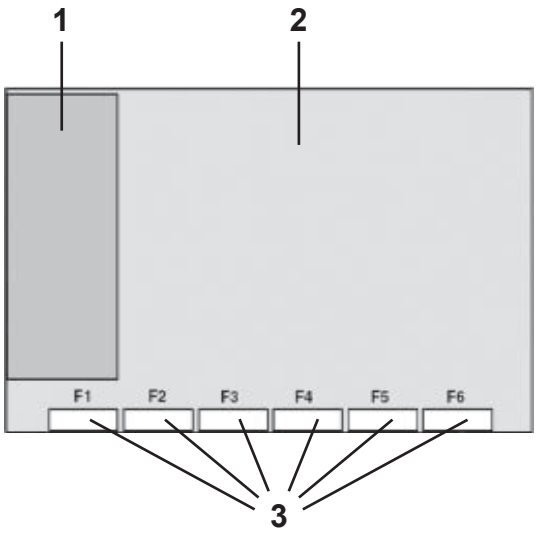
7 Pilot light, Scroll or OK Key active
– When the touch control scroll selector or the OK key are in use, the pilot light switches on to inform the operator that they are operational.

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



4-2

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.

4-3

Fig. 4-3 Initial screen/Main menu

4.3 Pictographs – Symbols

Pictographs are viewed on the screen in all fields: In Information fields, menu fields, and in the display field.

P1

P1 Wheel type 1 – standard - nominal size in inches or millimetres

P3

P3 Rim type 1 – standard rim

Balancing modes


P5


P6

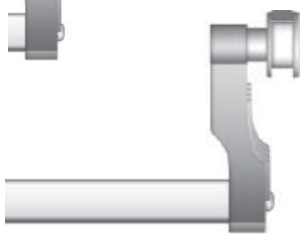

P7


P8


P9


P10


P11


P12

P13

P14

P15

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 Gauge arm for distance and rim diameter

P12 Gauge arm for distance and rim diameter with adhesive weight

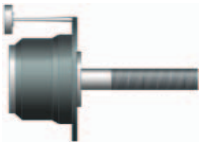
P13 Display of unbalance measured and direction indicator (red arrows or arrow heads)

P14 Correction position reached (green arrows)

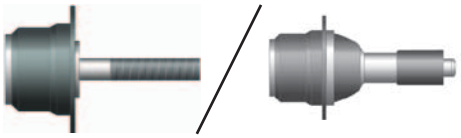
P15 Correction position for both correction planes reached

P16 Compensation run carried out

P17 Start measuring run by pressing the START key or closing the wheel guard.



P18 Calibration weight



P19 Main shaft / Power Clamp

P20 Provide mark on left tire side

P21 Provide mark on right tire side

P24

P25

P24 Fit tire on rim and inflate to the specified inflation pressure.

P25 Turn tire over on rim.

P26

P27

P26 Rotate rim until valve is exactly perpendicular to and above the main shaft.

P27 Rotate wheel until valve is exactly perpendicular to and above the main shaft.

P28

P29

P28 Readjust tire on rim until the mark coincides precisely with the valve.

P29 Readjust tire on rim until the double mark coincides precisely with the valve

P30

P30 Tire changer

4.4 The Menus

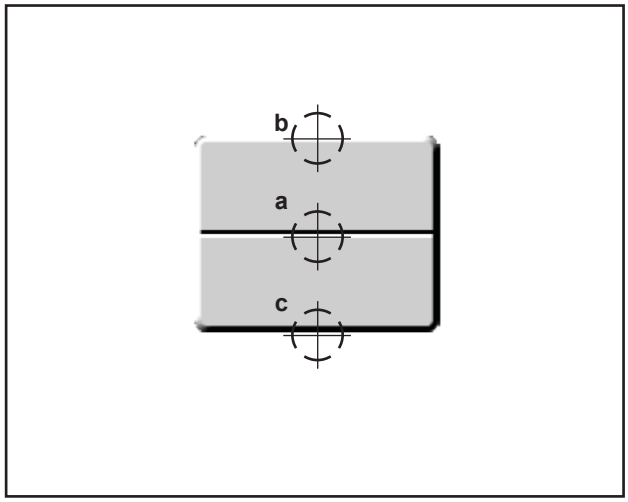
The machine function menus are always on the bottom part of the screen. The active menus can be opened by pressing the relative function key inside the various screens.

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**)



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.

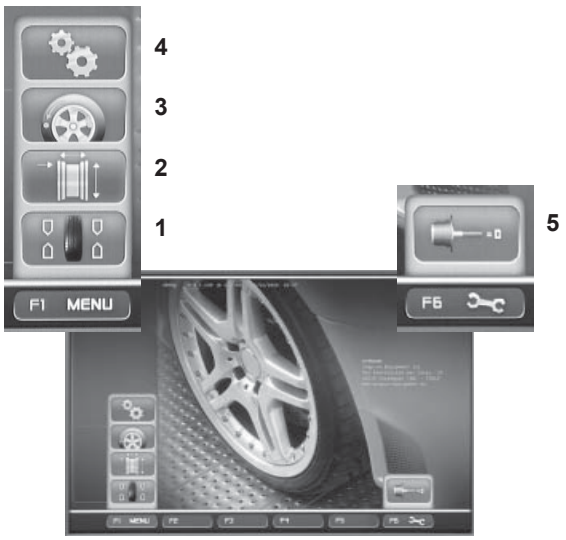
Or, alternatively,

To cancel the selection:

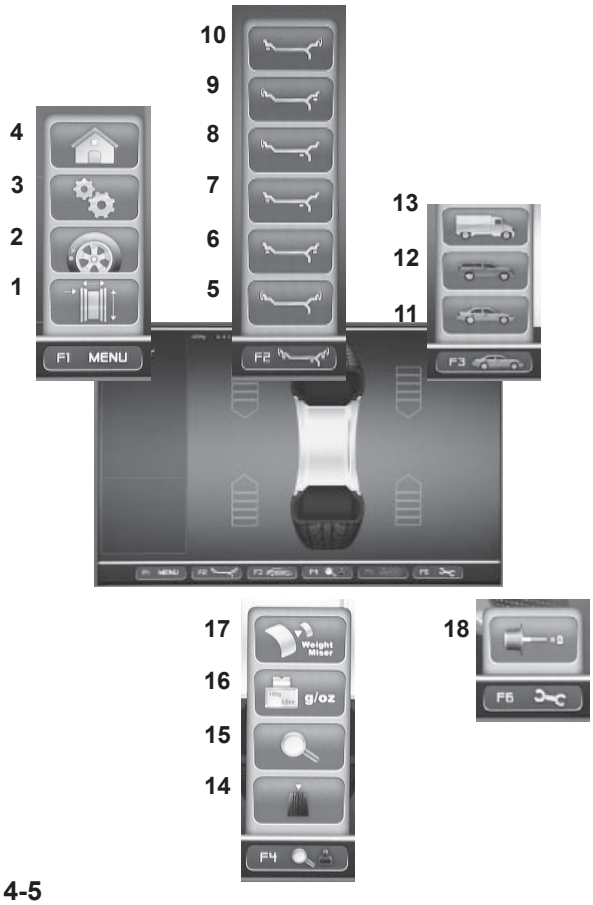
- Press **ESC**; the menu list disappears.
- Press a different Menu key; the new Menu opens and what has been selected up to now is deleted.

Types of Menu

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



4-4



4-5

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 OPTIMIZATION/MINIMISATION
4 Access to SETTINGS

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

Menu **F6**

5 Access to COMPENSATION RUN

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 Normal
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

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

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

Menu **F6**

18 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 Normal
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:

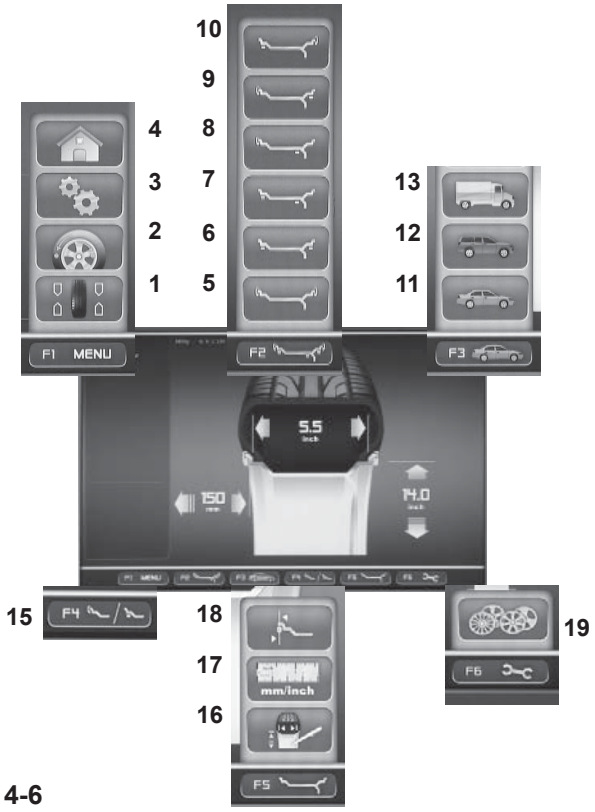
11 CAR Selection
12 SUV Selection
13 VAN Selection

The **F4** menu contains the item *Easy Alu Toggle*:

15 CAR Selection

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

16 WHEEL PROFILE Input
17 MILLIMETERS / INCHES Selection
18 WEIGHTS MOVEMENT Selection
19 LIST OF WHEEL PROFILES Selection



4-6

FUNCTIONS

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

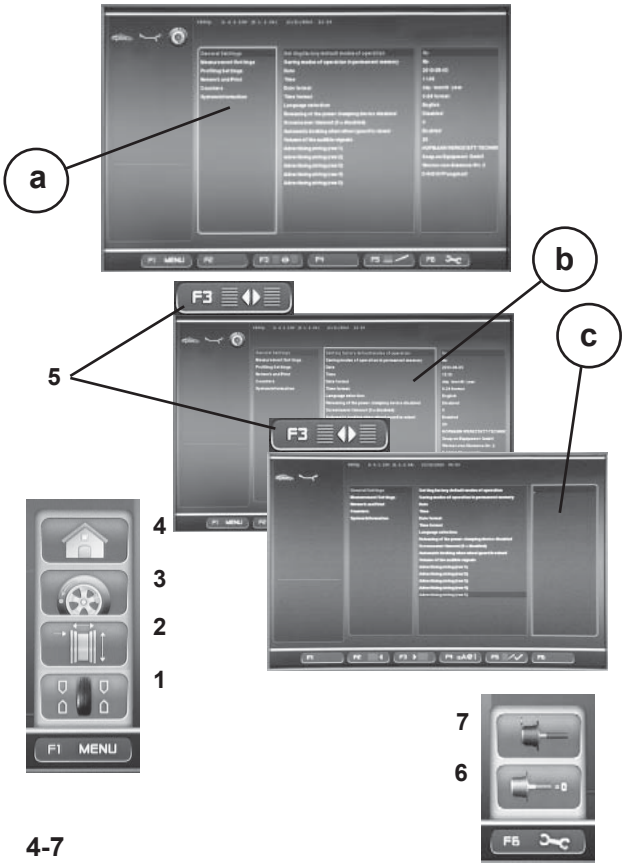
1 Access to BALANCING
2 Access to RIM DATA INPUT
3 Access to OPTIMIZATION
4 Go back to the START SCREEN (HOME)

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 USER CALIBRATION
7 Access to COMPENSATION RUN



4-7

OPTIMIZATION/ MINIMIZATION

The Optimization /Minimization Menu (**Fig. 4-8**), is used to perform the relative procedure for the wheels being worked. An operational sequence, and control screens, guide the user through the entire operation.

The **F4** key is used to advance the procedure.

4-8

WHEEL PROFILES

The Wheel Profiles item (**Fig. 4-9**) is recalled from the Rim Data Input Menu.
It is used to memorize and recall from a list, complete wheel data settings.

The **F6** Menu in the Rim Data Input screen with the item:
1, Fig. 4-9 Access to LIST OF WHEEL PROFILES

1

4-9

The desired wheel profile can be selected form the List screen, by scrolling the available Items with the Cursor. Press OK to activate the selection.

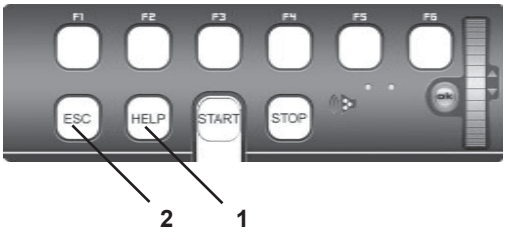
TEXT COMPOSITION

The Text Composition (**Fig. 4-10**), is used to set and memorize a five line text in the Start screen.
The text composition is performed directly in the Settings screen, at the *General settings* item.
Press **F3** to access the central panel in order to select with the OK key, one of the five lines available (line 1), (line 2), (line 3), (line 4) and (line 5).
In the panel on the right an underscore identifies the writing/ change position on the line.
Use the Cursor to select the font to input.
Press **F4** to select the type of font and **F2**/ **F3** to move right or left along the line.
Press OK and then **F3** to input the text and move to the next line.
Select another line and proceed in the same way.

4-10

4.5 Help information

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



4-4

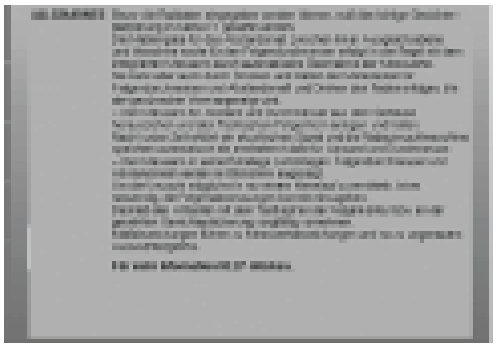
Display help information

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

The first screen with help information appears, e. g. to the screen RIM DATA INPUT (**Fig. 4-5**).

- 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. 4-6**) appears.



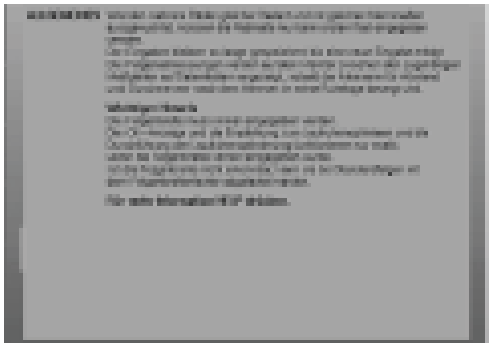
4-5

Note

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

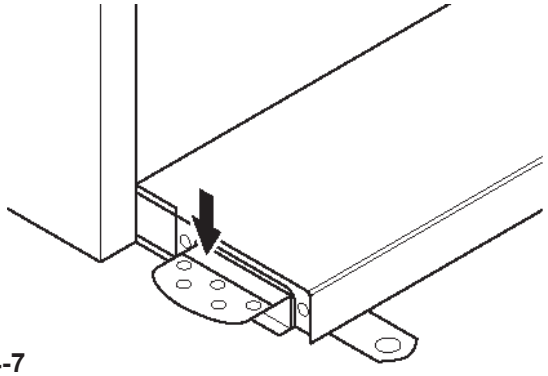
Quit help information

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



4-6

4.6 Main shaft lock



4-7

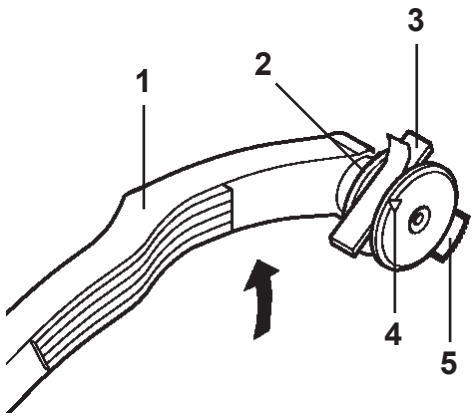
Fig. 4-7 Pedal of main shaft lock

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.

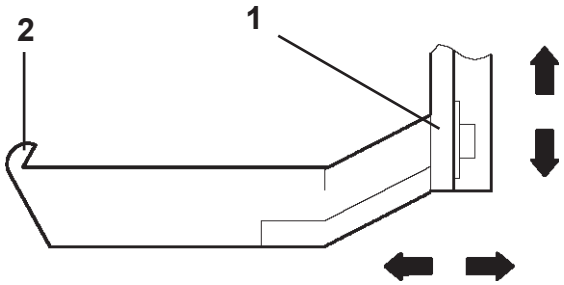
4.7 Gauge arms



4-8

Fig. 4-8 gauge arm for distance and rim diameter

1 Gauge arm, can be extended and hinged upwards
2 Weight holder to locate the adhesive weight both for identification of subsequent fitting position and for actual fitting of the balance weight
3 Adhesive weight held in weight holder
4 Gauge head to identify rim dimensions on a variety of rim profiles
5 Spring-suspended applicator



4-9

Fig. 4-9 width gauge arm

1 Gauge arm, can be moved in horizontal and vertical direction.
2 Gauge head to identify rim dimensions on a variety of rim profiles.

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.

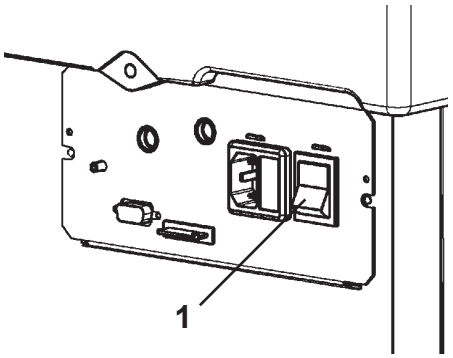
- Switch on the machine by the mains switch (**1, Fig. 5-1**).

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.



5-1

5-2

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 OPTIMISATION
Access to SETTINGS
F2 Not assigned
F3 Not assigned
F4 Not assigned
F5 Not assigned
F6 Access to COMPENSATION RUN

5-3

5.1 Status at switching on

The electronic unit is factory-adjusted to the following modes of operation, which are available after switching on:

– wheel type 1 (car wheel with nominal dimensions in inches, width 6.5" and diameter 15.0")
– entry of rim data in inches
– display of amount of unbalance in .25 oz. increments
– suppression of minor unbalance readings (limit set to .125 oz)
– automatic braking of wheel when guard is opened during the measuring run
– compensation of adaptor unbalance switched off
– start of measuring run by START key only

5.2 Error codes at power on

If an error code occurs it must be acknowledged by pressing the STOP key or ESC key. No audible signal is given.

The following malfunction codes may occur at power-on:

Blue Screen

The communication between the microcontroller and embedded PC is interrupted.

- Check connecting lead

E3

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

- Move gauge arm to its home position. Press the STOP key or the ESC key.

E4

The width gauge arm is not in home position.

- Move gauge arm to its home position. Press the STOP key or the ESC key to continue.

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.

E92

During the second attempt the gauge arm for distance and rim diameter was still not in the home position. Both gauge arms are rendered inoperative.

- Wait 3 seconds, or press the STOP key or the ESC key to continue.

E93

During the second attempt the width gauge arm was still not in the home position. The gauge arm is rendered inoperative.

- Wait for 3 seconds, or press the STOP key or the ESC key.

E145

The contents of both permanent memories are different, but both contain valid data.

E900

Unknown machine model.

E901

The machine is not calibrated.

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 key or the ESC key.

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.

Fatal error codes
The self–test program has detected an error and displays a alphanumeric code consisting of six digits and/or letters.

C10 800
Line voltage under 170 V. Balancing is feasible if the motor can drive the main shaft to the measuring speed. Wheel data may be lost.

- Bring the line voltage to within a range of 200 - **230** - 240 Volts with an input transformer.

C10 801
Line voltage over 265 V. Damage to the electronic unit of the machine is likely!

- Turn off mains switch!
- Bring the line voltage to within a range of 200 - **230** - 240 Volts with an input transformer.

Any damage resulting from repeated occurrence of this error code is not covered by the guarantee.

C10 804
Line voltage over 275 V. Damage to the electronic unit of the machine is likely!

- Turn off mains switch!
- Bring the line voltage to within a range of 200 - **230** - 240 Volts with an input transformer.

Any damage resulting from repeated occurrence of this error code is not covered by the guarantee.

6. Clamping the wheel

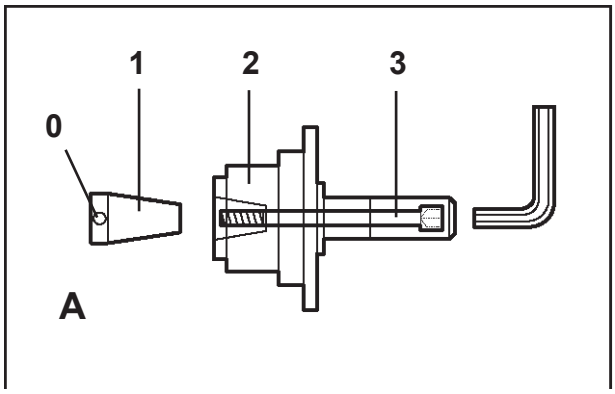
In their technical documentation many motor–vehicle manufacturers specify the kind of wheel mounting on the vehicle (center bore, or stud location). The required clamping and centering means have to be selected among the different versions available.

Note
Please note that only such clamping and centering means that fit properly on the machine and are designed for use on it are used. In order to keep pace with technical progress, machines or clamping and centering means might undergo design revisions so that newer versions of clamping and centering means may not be compatible with existing machines, or older versions not compatible with new machines.

The application and handling of the proper clamping and centering means is described in the literature given separately for each device (survey on clamping means, operation manuals for the different clamping means).

6.1 Fitting the centering tool and Manual Clamping

For transport reasons when the machine is delivered the Clamping Device (**2, Figure 6-1A**) may not be assembled. In this case it is always supplied with the machine kit and should be fitted on the Centering Cone (**1, Figure 6-1**) by the customer.
Only clean, mechanically precise and correctly assembled tools can guarantee high precision balancing.



6-1

Fig. 6-1 Fitting the wheel adaptor

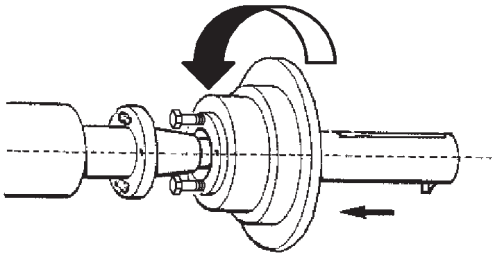
6-1.A MZV–4 cone adaptor for rims with center bore location, or at least sufficiently accurate center bore. Various accessories are available for this wheel adaptor.

6.2 Fitting the Power Clamp device - Only for “p” type machines

Figure 6-1a

Note
If the machine is retooled for the power clamping device, reset the mode of operation **C22** to status On **”Releasing the power clamping device is disabled”**.

Move the clamping jaws to unclamped position.
Unscrew the taper nut and place aside.
Remove the special clamping means, if mounted, from the cone of the main shaft.
Mount the basic body of the clamping device, screw it onto the tie rod by turning it to the end of the thread and then release it again by a quarter of a revolution.
Slide the basic body by hand onto the cone, inserting the screw heads through the bayonet disc.
Turn the basic body until the screw thread is contacting the bayonet disc.
Slide on the clamping sleeve with clamping head and clamp.
Tighten the screws evenly with an open end wrench, width across flats 13 mm.



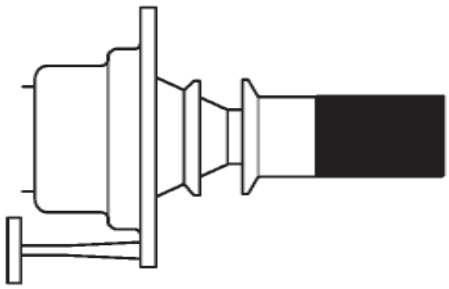
6-1a

6.3 Preparing for calibration

For readjustment of a p balancer 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. 6-1b**) on the chuck.
- Start the clamping process.

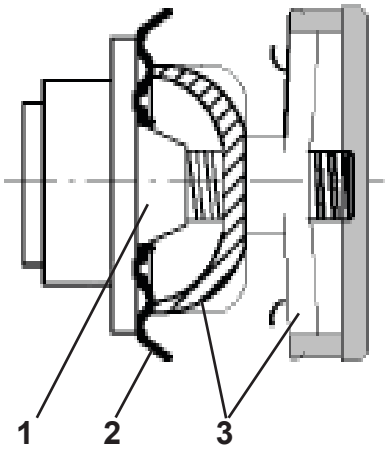
The device should be calibrated exactly as described in the following chapters “Compensation Run” and “User Calibrations”.



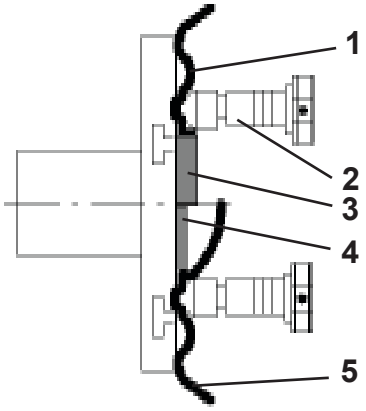
6-1b

6-2

6-3



6-4



6-5

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, especially a motorcycle wheel adaptor (also see § 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. 6-2**) press the menu key **F6** for electrical compensation of unbalance in clamping means (**1, Fig. 6-2**).
- 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. The **F6** menu key indicates a different Cancel Compensation symbol (**Fig. 30**).
This mode of operation is retained until deleted by pressing menu key **F6** (**1, Fig. 6-3**) again, by starting readjustment or an optimisation run, or by switching off the machine.

6.5 Clamping car and light–truck wheels

Before clamping the wheel read the rim width from the rim or tire.
If the rim diameter is not to be determined using the gauge arm for distance and diameter but entered manually, also read the rim diameter prior to clamping the wheel.
When using cone adaptors, the clamping nut should never be tightened using a hammer or similar object.

- Before clamping the wheel make sure the contact surfaces on wheel adaptor and rim are free from dirt and grease.
- Clamp the wheel depending on the adaptor used, making sure that it is exactly centerd and securely clamped.

Fig. 6-4 Cone adaptor to clamp center bore located wheels

1 Cone
2 Rim
3 Clamping head with clamping nut

Fig. 6-5 Universal clamping adaptor for clamping stud hole located wheels or wheels with closed rim. This clamping adaptor is also capable of clamping center bore located wheels when suitable centering rings (optional extra) are used.

1 Rim with center bore (center bore location)
2 Quick–clamping nut
3 Centering ring for center bore located wheels
4 Centering ring for closed rims with centering recess
5 Closed rim

7. Pre Run settings

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

- **Vehicle type** (always to be entered manually)
- **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.

The automatic ***Easy Alu*** data acquisition function can be used to obtain more precise imbalance calculations. The automatic procedure in fact enters REAL (effective) data from measurements taken directly on the rim.

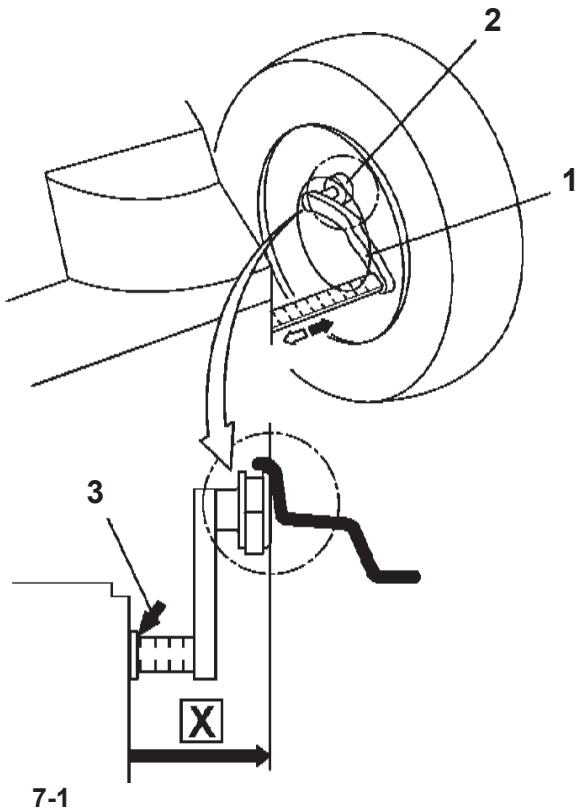
7.1 Data readings

Recommendation

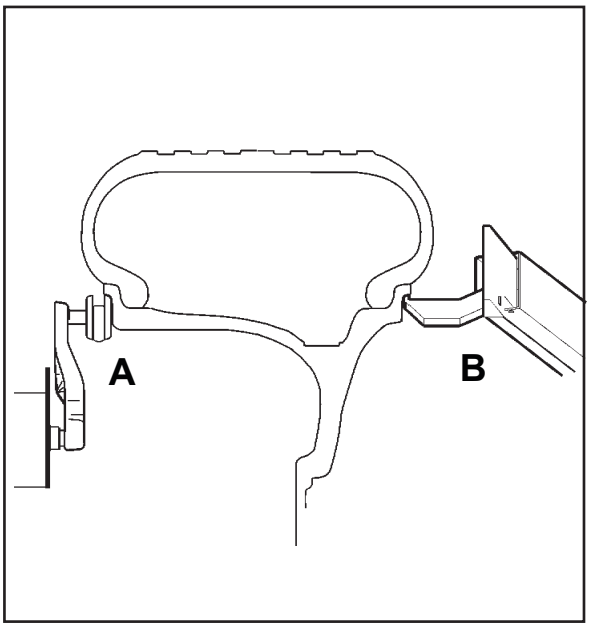
For normal balancing procedures it is always better to enter data using the automatic data reading system in the ***Easy Alu*** function.

This function enables the machine to operate on real data and to give, after the measuring run, more precise compensation positions and weights that can be applied to the wheel with the help of the Auto-Stop-System - (Only Power Clamp model).

The ***Easy Alu*** function allows wheel data to be read and entered in a single, simplified operating phase (Chapter 7.2).



7-1



7-2

7.1.1 Determination of distance and diameter

The internal Calibration Gauge for distance and diameter is used to enter the distance between the machine and the left correction plane, as well as the nominal rim diameter/ correction diameter.

The internal Calibration Gauge allows the effective correction planes and diameters of the adhesive weights fixed to the bead seats and hidden weights to be calculated exactly.

The dimensions of the balance weights are detected, on the basis of real data, or rather on measurements taken directly by the Gauges if the automatic Easy Alu function is used. If the data is entered manually these figures are calculated on the basis of nominal values by adding or subtracting the average correction values (Chapter 8.2.3).

Fig. 7-1 Internal Calibration Gauge for rim distance and diameter.

1 Internal Calibration with gauge head
2 Gauge head
3 Reference edge for distance reading

– Using the distance and diameter measurement Internal Gauge (**Figure 7-2.A**) the distance between the machine and the left correction plane is detected and obtained automatically as well as the diameter of the rim.
– Using the width measurement External Gauge (**Figure 7-2.B**), the width of the rim is read.

Application:

- Extract and rest the Gauge Head on the rim and keep it in position until an audible signal is heard.
- Move the Gauge to the idle position.

Note:
The Gauges must be positioned then returned to the idle position, one at a time with no priorities whatsoever between inside and outside.

When the measurements have been completed and the idle position is reached, the rim dimensions are shown on the screen in the indicator fields between the relative arrows. A selection of weight positions (Alu type) is also shown.

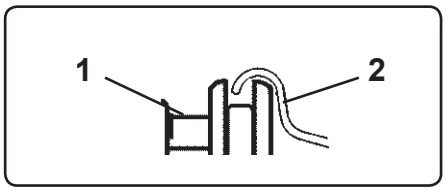
If the Gauges do not function correctly or if the correction positions on the wheel on the machine are outside the calibration reading field, it is still possible to set the dimensions from the menu and proceed in manual mode (Chapter 7.3).

7.1.2 Gauge head application on various Wheel types

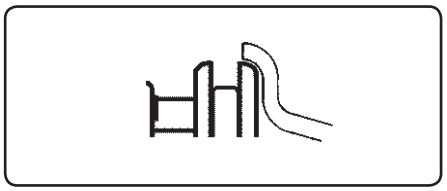
In order to be able to determine unbalance in a single measuring run, the rim dimensions have to be entered
correctly. Therefore proceed with utmost care and as is shown in the Figures when applying the gauge head
on the rim in the desired weight fitting position. Incorrect application will result in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

Fig. 7-3a to **7-3g** show correct application (with and without adhesive weight) of the gauge head on various rims and for various weight fitting positions.

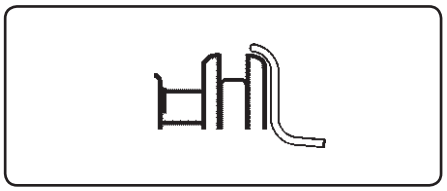
a



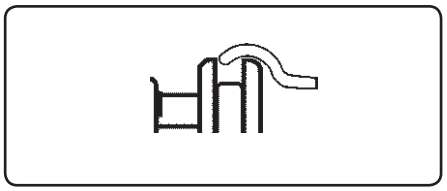
b



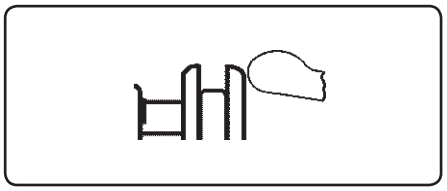
c



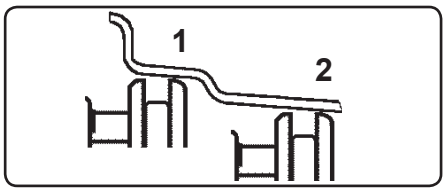
d



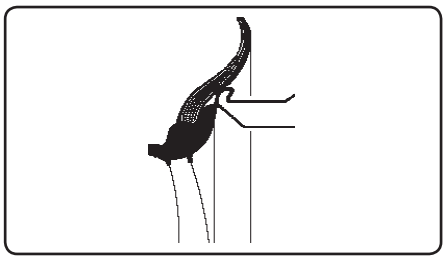
e



f



g



7-3

Fig. 7-3 a Standard wheel – Steel rim

1 Gauge head
2 Rim

Fig. 7-3 b Standard wheel – Alloy rim

Fig. 7-3 c Light-truck wheel – Steel rim

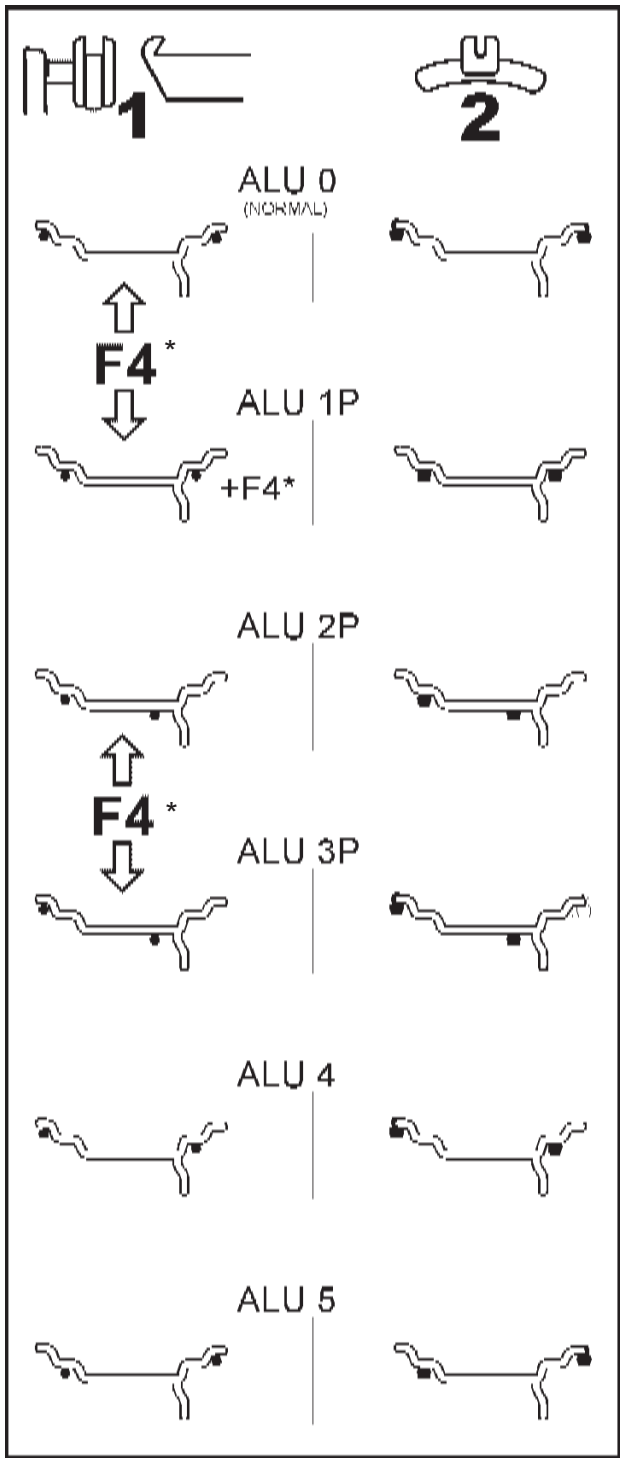
Fig. 7-3 d Light-truck wheel – 15° taper steel rim

Fig. 7-3 e Alloy wheel - Rim without a housing for clip-on weights

Fig. 7-3 f Alloy wheel – Adhesive weights

1 Left correction plane, first application position
2 Right correction plane, second application position.

Fig. 7-3 g Softline rim – application of rim width gauge



7-4

* F4 = Easy Alu Toggle

7.1.3 Reading positions for various Alu types

Fig. 7-4 shows the corrected reading positions of the measurement calibrations on different types of rim (1), depending on the required weight application positions (2); adhesive and clip-on weights.

Note:
The Alu1P mode is included in the *Easyalu* function, but must be recalled from the Menu after the gauges have been positioned on the rim.

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

Fig. 7-4
• = Point of application of gauge arm (**1**)
= Given weight position (**2**)

normal Normal weight and 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 1P Adhesive weights applied symmetrically to the rim flanges; the compensation planes for the adhesive weights are read precisely using the internal and external gauge arm. After reading, recall mode from Menu F4.

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 2P Adhesive weights - Adhesive weight on rim flange, adhesive weight hidden in rim disc; the compensation planes for the adhesive weights are read precisely using internal calibration

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 3P Clip-on weight on left rim flange, adhesive weight hidden in rim disc; the compensation planes for the adhesive weight is read precisely using internal calibration.

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.

7.2 *Easy Alu* function

The *Easy Alu* function automatically recognizes the Alu required by the operator and the rim dimension parameters.
Once the gauge or gauges have been positioned on the rim. The machine presents only the possible Alus in relation to the contact points selected by the operator.

Note:
Alu 4 and Alu5 are not included in the *Easy Alu* function. They require manual setting by the operator.

Preparations:
– Wheel correctly clamped (see § 6.3).
– Select the Vehicle type (Chapter 7.1.1).

7.2.1 Automatic rim dimension reading and setting and Alu Mode

Important
Apart from Alu 2P and 3P that only the internal gauge is used for, in Alu0 (normal) and Alu1P modes the width of the rim must always be acquired with the external gauge arm.
The OK indication and recommendation for optimisation, as well as the optimisation procedure itself, will only be accurate if the rim width has been correctly entered.

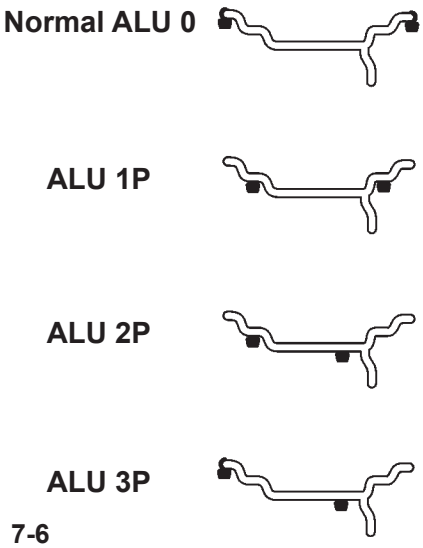
Automatic rim distance and diameter reading with an internal gauge arm

- 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).

7-5



7-6

7-6a

Reading the rim width automatically with the external gauge arm

- Lower the width measurement gauge on the wheel guard, move it up to the rim and rest the gauge head on the rim flange for Alu0(normal), or on the flange for Alu1P, so hold it in position.

Shortly afterwards the machine emits an audible signal to indicate that the rim width has been read.

- Move the gauge arm into position.

If the internal position is read first, all the wheel dimensions required and the Alu type are read on the basis of the contact points chosen by the operator on the rim.

Rim width, distance and the rim diameter are read out on the screen RIM DATA ENTRY (**Fig. 7-5**). The machine automatically detects the type of Alu according to the contact points on the rim worked on;
Alu0(normal), Alu1p, Alu2p or Alu3p (**Fig. 7-6**).

Note:
Readings with an internal or external gauge arm must be taken one at a time.

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**).

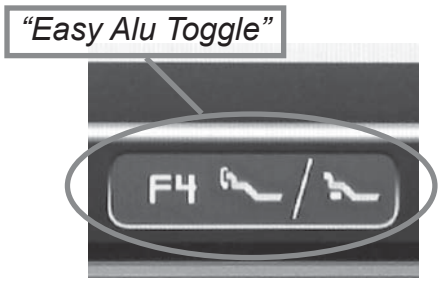
The machine is ready to proceed with the measuring run (Chapter 8.1).

Note:
After the run, the Alu selection can be changed and the values re-calculated as required. The machine automatically updates the compensation values, according to the different positioning of the weights requested to avoid further runs.

To change the weight application mode maintaining an operating mode based on REAL data *(Easy Alu)*:

- Position the gauges in the new positions on the rim and hold it into position until you hear the audible signal.
- Move the gauge arms into the idle position.

The machine automatically recalculates the results. Another measuring run is not required.



7-7

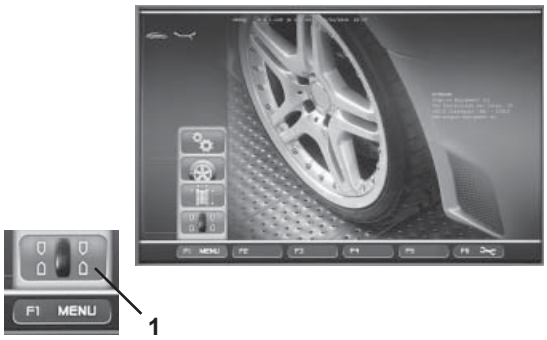
7.2.2 "*Easy Alu Toggle*" function

Automatic correcting the Alu proposed

Depending on the gauge contact points on the rim, the machine has interpreted a probable Alu mode required by the user. Every time the Alu presented by the machine does not correspond exactly to the one required it can be corrected using the "*Easy Alu Toggle*" function.

- Press the **F4** key (**Fig. 7-7**) if you want the alternative Alu mode to that suggested for the rim being worked on.

Note:
The Alu can only be changed before the run or before the imbalance display request (gauges are applied after the run to select a completely different Alu.
The position for adhesive weights can be precisely located with the Auto-Stop-System - (Only Power Clamp model) by using the Gauge Arm.



7-8

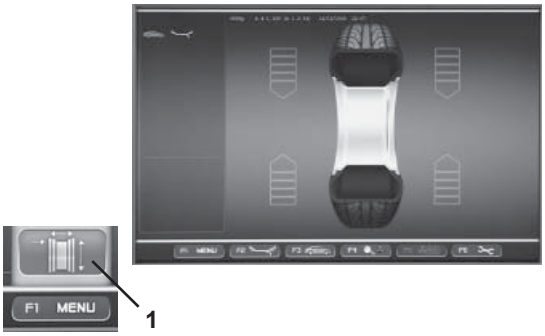
7.3 Menu settings

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 ENTERING RIM DATA screen (**Fig. 7-10**):

- On the main Menu (**Fig. 7-8**) press the **F1 MENU** key and select the BALANCING item **1**.

The BALANCING screen (**Fig. 7-9**) will open.



7-9

- On the BALANCING screen (**Fig. 7-9**) press the **F1 MENU** key and select the ENTERING RIM DATA item **1**.

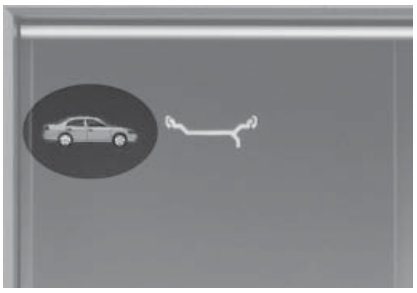
The ENTERING RIM DATA screen (**Fig. 7- 10**) will open.

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

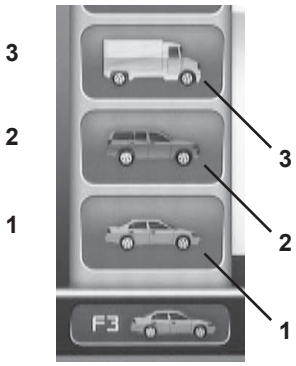
7-10

7-9

7-10



7-11



7-12

7.3.1 Selecting the Type of Vehicle

The Type of Vehicle must always be set even if an automatic function is used and it must be done before extracting the rim position reading arms.

- On the BALANCING and ENTERING RIM DATA screen **Fig. 7-9/7-10** press the menu key **F3 Fig. 7-12** to select the Type of Vehicle.

- Select the TYPE OF VEHICLE item according to the rim on the machine.

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. 7-11**.

Fig. 7-12 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 ENTERING RIM DATA screen **Fig. 7-10**.

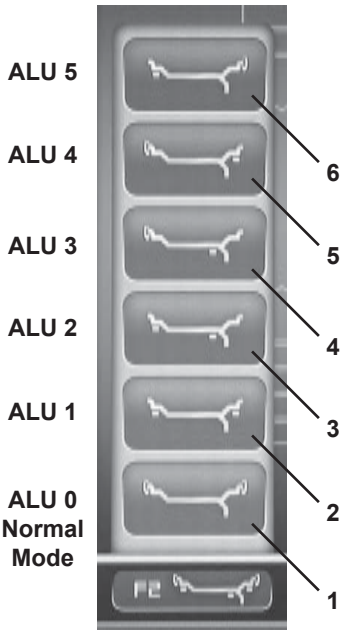
2 SUV vehicle wheel - nominal dimensions in **inches**.

3 Light industry vehicle wheel (Van) - nominal dimensions in **inches**. Executable steps are expressed in the “Product Requisite” table at the end of the manual. 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 .35oz (10 g) and 5 g respectively. Thresholds for the WeightMiser (optional) correspond to 1.5 times this value (see specific Weight Miser™ user’s handbook).

7-9

7-10

7-13



7-14

7.3.2 Manual ALU selection

- On the BALANCING and ENTERING RIM DATA screen (**Fig. 7-9/7-10**) press the **F2** MENU key (**Fig. 7-14**) to select a specific ALU mode.

- Select the ALU item corresponding to the required weight location.

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

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.

Note:

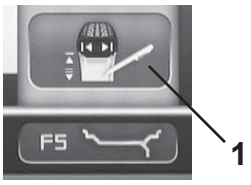
Thanks to the *Easy Alu* function after the operator has taken the rim measurements using the gauges, in the weight application positions the machine electronically processes the wheel data and automatically proposes an ALU mode, on the basis of the contact positions chosen by the operator.

The ALU mode presented automatically by the machine can be changed using the F4 Menu, or by extracting the arms again and positioning them differently on the rim.

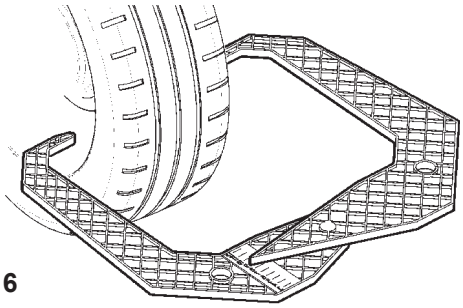
Suggestion

Even if it is available, we suggest you do not select the ALU mode manually for normal balancing procedures. Changing the ALU from Menu F2 in fact, if carried out before or after a run, cancels the use of the Real Data obtained with the *Easy Alu* procedure.

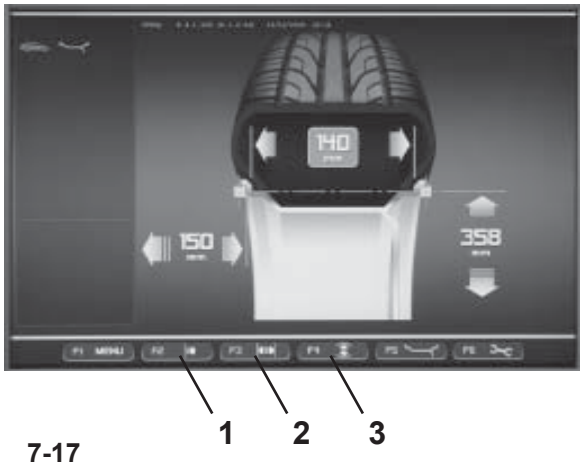
The machine proceeds by processing the Real Data as if they were Nominal Data (entered manually). Balancing will not be as precise and no more ALU P modes will be available even if selected.



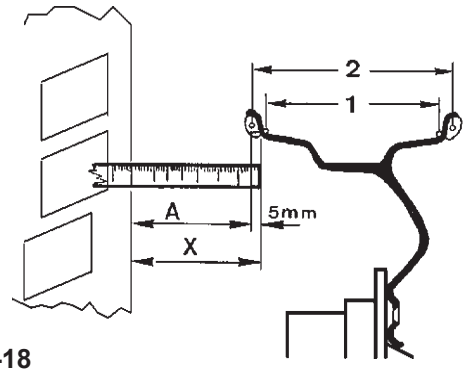
7-15



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 outside of the *Easyalu* function.
If data is changed manually, before or after a run, the system immediately exits the automatic function and inhibits real data based measurements (Alu P).

- Access the ENTERING RIM DATA screen and select the EDIT MEASUREMENTS item (**1, Fig. 7-15**) by selecting the Menu key **F4**.

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.

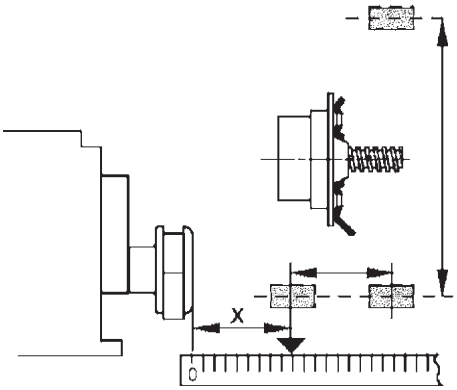
7.3.3.3 Entering the rim diameter

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

7-20



7-21

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 (Normal) mode is automatically recalled when selected.

The dimensions are always displayed in millimetres.

- Measure directly on the wheel to be balanced the distance X and the effective compensation measurements (weight center) 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.

7.5 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.

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 tire/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 (Alu mode)
- Type of Vehicle
- Traceability positions (list from 1 to 9)
- Number of spokes (if loaded previously)

7-22

Fig. 7-22 PROFILE

Assignment of menu fields:

F1 Access to Basic Menu

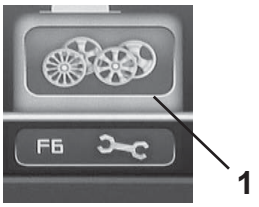
F2 Not assigned

F3 Saves current profile in permanent memory

F4 Not assigned

F5 Applies a wheel profile selected from the memory

F6 Not assigned



7-23

7-24

7-25

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 and the *EasyAlu* and *Easy Alu Toggle* readings if an Alu P is required.
- 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.

- 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.

7.5.2 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**).

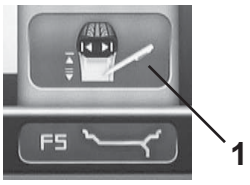
The WHEEL PROFILES screen (**Fig. 7-24**) will open.

- 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

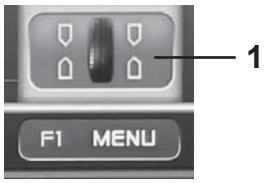
- Return to the ENTERING RIM DATA screen (Menu **F1**).
- Press the **F5** Menu key to select the item (**1, Fig. 7-15**).

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.

Note:

Entry of a new data via manual setting involves exit from any preselected Alu P mode. The machine will present the nominal Alu corresponding to the Alu P set before.



8-1

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.

8-2

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
End of weight reading
Grams / Ounces
Weight Miser (if included)

F5 Not active
F6 Contains the COMPENSATION RUN option.

8.1 Measuring imbalance

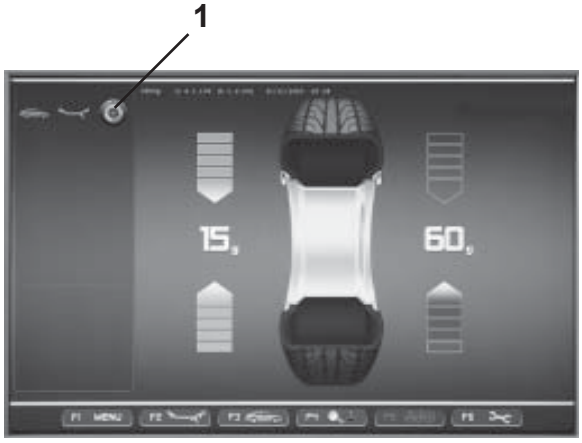
Having completed the preliminary operations, a Measuring run can be launched:

- Press the START key or lower the wheel guard according to which function has been preselected.

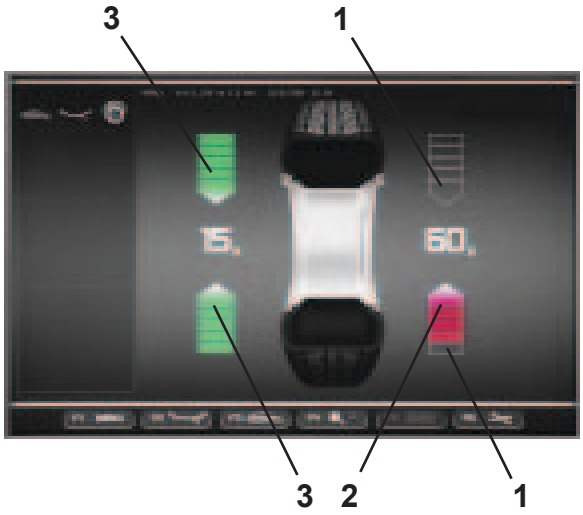
The BALANCING screen appears (**Fig. 8-3**).

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

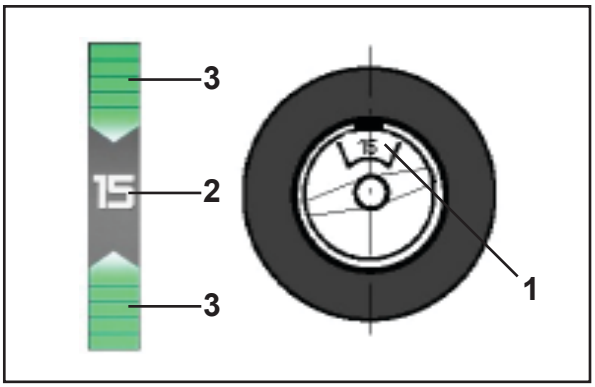
After measurement the machine stops automatically and the wheel is braked such that the weight for the left (Factory selection) correction plane can be fitted exactly perpendicular to and above the main shaft. The screen shows the unbalance measured for each correction plane and the direction towards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



8-3



8-4



8-5

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 color 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 red and indicates the rotation direction to reach the compensation position.

Figure 8-4 Color specifications

1 No color: greater distance from position

2 Red: 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.

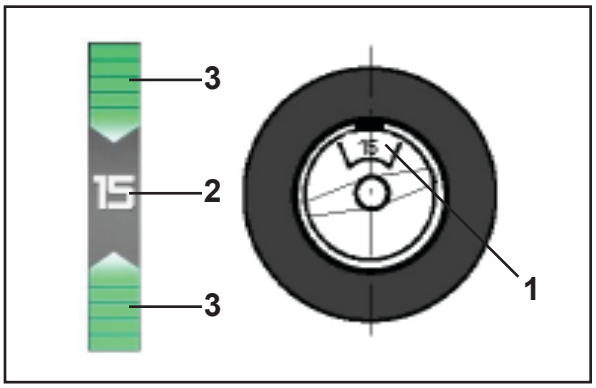
Fig. 8-5 Example of display and correction of the lefthand correction plane.

1 Correction weight on rim application position (on the wheel axis)

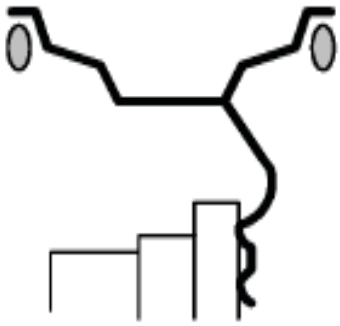
2 Display of amount of unbalance

3 Display of correction position - the two arrows light up.

8.2 Applying Balancing Weights



8-6



8-7

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 mesuring 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 mesuring run 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.
- press the START key

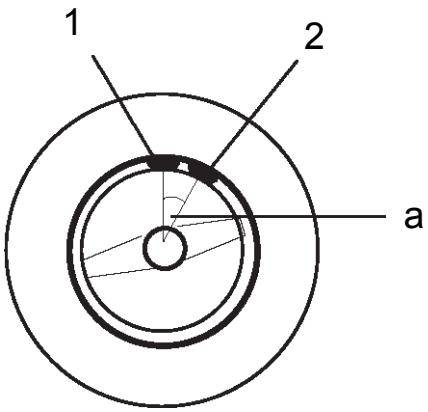
The wheel rotates when the wheel guard is open.
Make sure that the wheel is not blocked by tools or the like.
Wear safety goggles and tightly fitting working clothes.

If necessary,

- Turn the wheel again to move it into the right correction plane compensation position. 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 correction position exactly perpendicular to and above the wheel holder shaft (**Figure 8-6 and 8-7**).

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

8-8



8-10

8.2.2 How to fit adhesive weights using the gauge head

The weight application using a gauge head function is only enabled when one of the Alu P modes is active.

Note:

Before extracting the Gauge arm to apply weights, always check that the “Alu P” indication is present in the Status Bar (**Fig. 8-8**).

Warnings

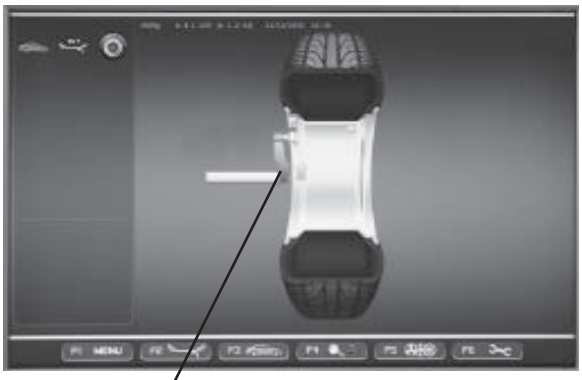
When you move the measuring gauge up to the rim in order to apply a weight with the gauge, if the machine begins to take a new reading of the rim measurements it means that the data for finding the compensation plane are not available. This means that either an error was made in applying the gauge arm, or the adhesive weight cannot be fitted on the rim using the gauge head. In this case refer to § 8.2.3.

After extracting the distance and diameter acquisition gauge, the video shows its exact position by means of an animation of the moving arm and a red arrow indicates the exact balancing weight application position.
Once the compensation plane has been reached, the automatic stop system - (Only Power Clamp model) locks the arm and the indicator arrow passes from red to green and at the same time an audible signal is heard.
Every time the gauge head moves beyond the compensation plane, the indicator arrow will turn red again. In this case it will move slowly back to the position indicated.

Note:

The Auto-Stop-System -ASS- (Only Power Clamp model) **will not lock** the gauge arm for distance and rim diameter in the following cases:

- the gauge arm is moved too quickly
- the correction position is not precisely indexed
- the angle a (**a, Fig. 8-10**) between the correction positions in both correction planes (**1 and 2,Fig. 8-10**) is very small.

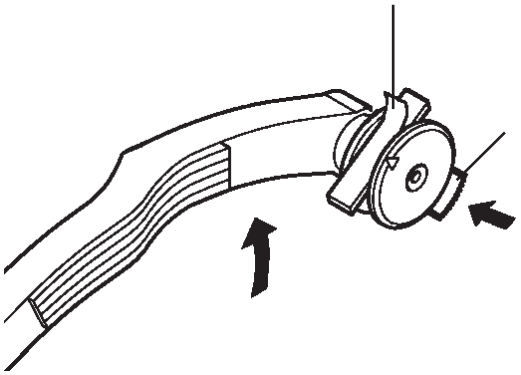


8-11 1

How to fit adhesive weights in the left correction plane

After the mesuring run (see § 8.2) the wheel is braked such that the weight for the left (Factory selection) correction plane can be fitted exactly perpendicular to and above the main shaft.

- If necessary, index the wheel to the exact correction
  position in the left correction plane.
- Press the pedal of the main shaft lock to hold the wheel in this position.
- Before applying the adhesive weight clean the application point on the rim.
- Center and clamp an adhesive weight as indicated by the unbalance readings in the weight holder of the gauge head and remove the cover film (**a,Fig. 8-12**).
- Move up the gauge head with the weight at the application point on the rim until the automatic stop system -ASS- (Only Power Clamp model) stops the Gauge Arm (**1,Fig. 8-11**).
- In this position rest the gauge head with the weight on the rim and press the weight against the rim using the applicator while the arm moves back down (**b,Fig. 8-12**).
- Firmly press the adhesive weight on the rim by hand.



8-12

How to fit a hidden adhesive weight

The wheel guard is open and the positioning brake is activated.

The wheel rotates when the wheel guard is open.
Make sure that the wheel is not blocked by a tool or similar item.

- Release the brake pedal.
- Press the START key.

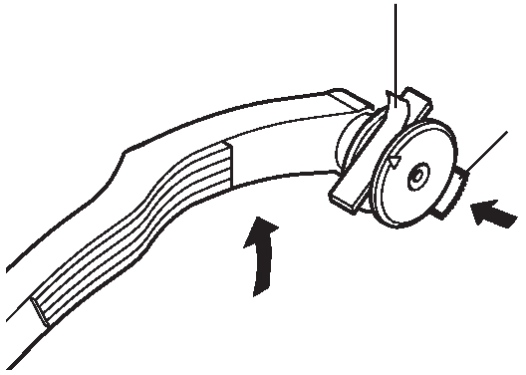
The wheel will turn once at the most and is then braked automatically so that the adhesive plane on the right plane can be applied using the Gauge Arm.

If necessary,

- Index the wheel to the exact position for correction in the right correction plane. On reaching the correction position only the two arrow-heads light up.

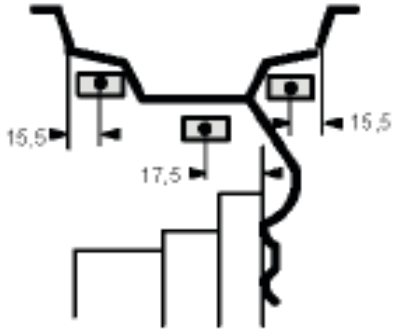
When the position is reached, two green arrows appear

- Press the pedal of the main shaft lock to hold the wheel in this position.
- Clean the fitting position before attaching the adhesive weights.
- Insert at the center of the gauge arm an adhesive weight that complies with the imbalance measured and remove the protective tape from the adhesive strip (**a, Fig. 8- 12**).



8-12

8-13



8-14

8-15

- Move up the gauge head with the weight at the application point on the rim until the automatic stop system -ASS- (Only Power Clamp model) stops the Gauge Arm exactly at the second application point; green arrow **(1,Fig. 8-13)**.
- In this position rest the gauge head with the weight on the rim and press the weight against the rim using the applicator while the head moves back down **(Fig. 8-12.b)**.
- Move the arm to the idle position and press the adhesive weight firmly against the rim with your hand.

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

Weight minimisation or optimisation can be carried out afterwards.

8.2.3 How to fit adhesive weights based on given dimensions

If the correction positions are not accessible with the gauge arm and the wheel dimensions have been entered using the function keys:

- Fit adhesive weights in the given positions according to the balancing mode. Make sure to observe the given positioning dimensions (**Fig. 8-14**).

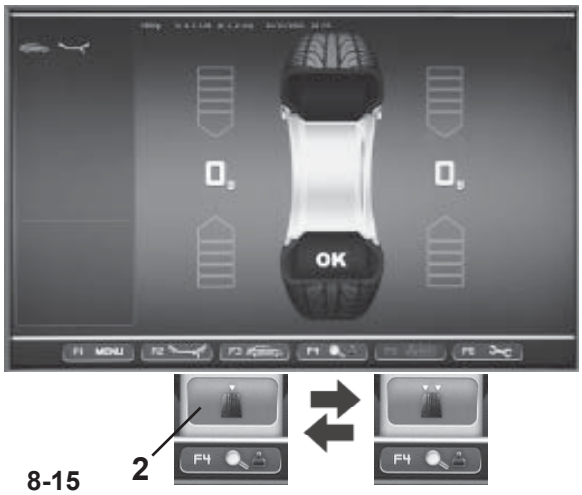
Dimensional tolerances result in slight deviations of the measured values so that the weight may need to be repositioned after the check run. In this case an OK indication is not displayed after the check run.

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 .125 z (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

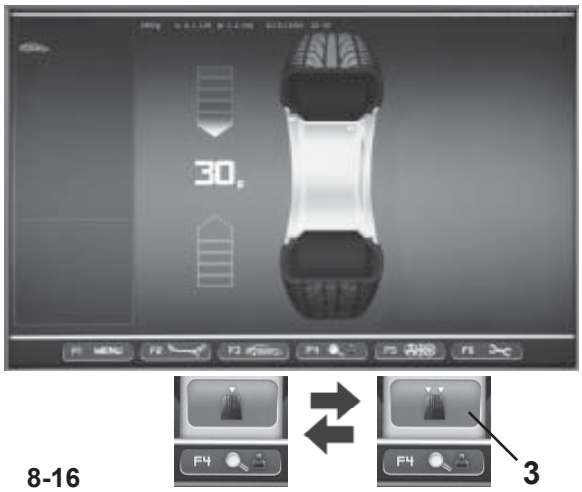
8.4 Static unbalance

In general the wheels should be balanced dynamically, i.e. in two correction planes.
If the wheels to be balanced are rather small (e. g. motorcycle wheels), 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**.



8-16

Recommendations for fitting balance weights for static unbalance correction

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

nor. same as for correction of dynamic unbalance

Alu 1 same as for correction of dynamic unbalance

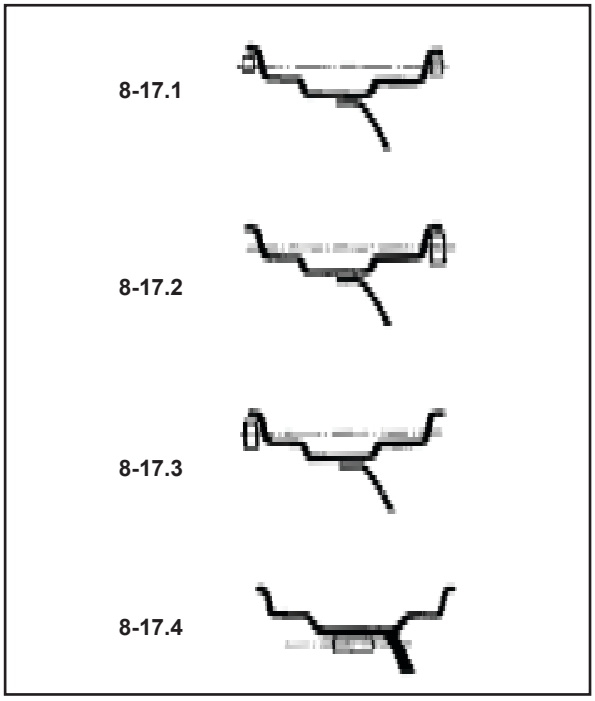
Alu 2 in the rim disc (drop-center)

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.



8-17

Balance clips (Alu 0 (Normal) , 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.

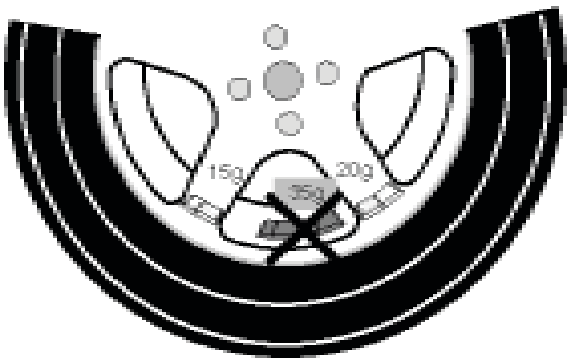
- Press **F4** and select Dynamic (**3,Figure 8-16**).

9. Behind–the–spokes placement

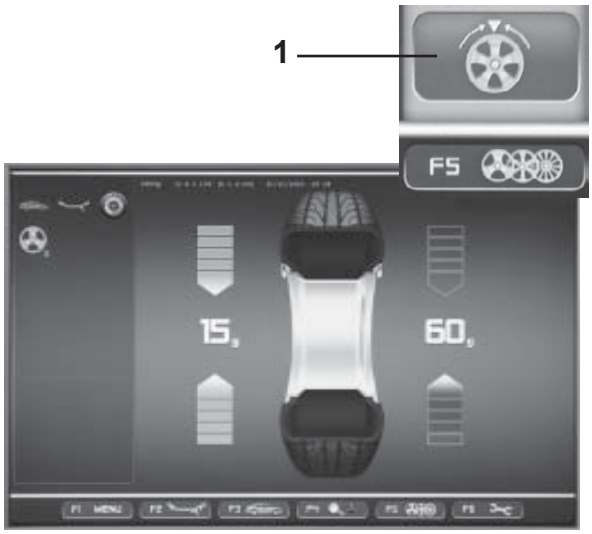
When spoked wheels are balanced, the behind–the–spokes placement mode (also called split weight mode) allows balance weights which would have to be fitted between two spokes according to the measured unbalance (hence would be visible from outside) to be placed in hidden position behind two spokes adjacent to the unbalance location (see example, **Fig. 9-1**).

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

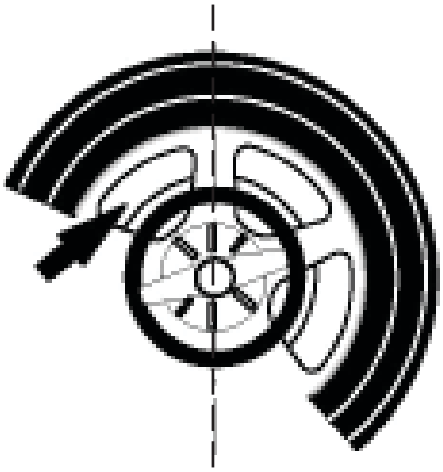
The operating steps for the behind–the–spokes placement mode are described and illustrated below.



9-1



9-2



9-3

9.1 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. 9-4**).

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. 9-3, 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. 9-2**).

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

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

To exit the Hidden Weight mode and display the normal

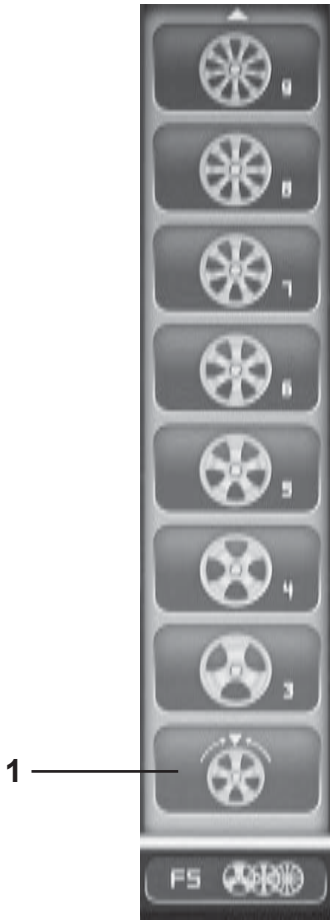
indication of imbalances (**Fig. 9-2**) proceed in the same way:

- Use the **F5** menu to select the Hidden Weight item (**1,Fig. 9-4**). 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.



9-4

Note:
The unbalance reading is only subdivided on two fitting positions when the spoke position is stored (**Fig. 9-5**).

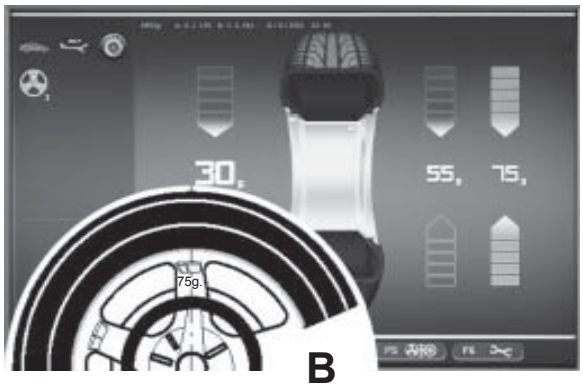
When balancing with counterweights positioned behind the spokes if you also need to perform an Optimisation/ Minimisation run, do it before applying the weights.

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

9-5

9.3 Weights placement

9-6



9-7

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 § 8.2.2.

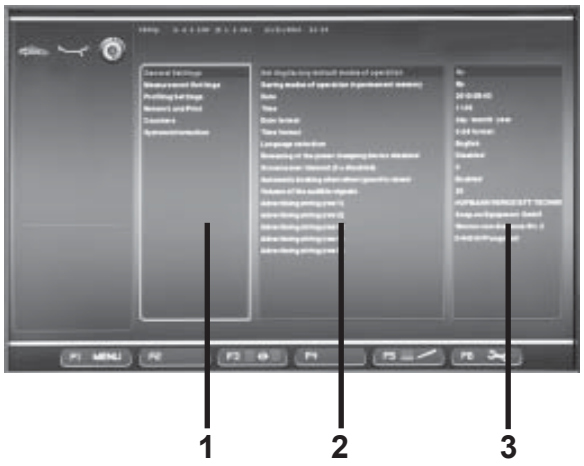
Applying hidden adhesive weights

The measured values and the positioning arrows for the two correction positions behind the spokes (**Figure 9-6**) are given on the right of the Indications Field.

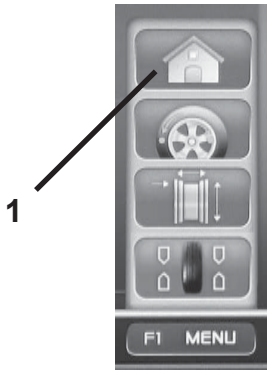
- Turn the wheel to move one of the split imbalances, on the right side (**A,Figure 9-7**) into the compensation position (green arrows), then lock the wheel with the brake pedal.
- Clean the application point before attaching the adhesive weight.
- Apply the balance weight (in the example 55 grams, **A,Figure 9-7**) 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 9-7**).

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

10-1



10-2



10-2a

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**
- **Setting Measurements**
- **Network and Printer connections**
- **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.
- 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 PARAMETERS and the VALUES panel.

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

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 § 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 before the OK o F5 key is pressed for quitting the mode.
The selected mode of operation can be transferred to the permanent memory.

* = Factory adjusted mode

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 grammes or ounces, active when the machine is switched on.

Gram = Readings in grammes

Ounce* = 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

Starting the mesuring 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.

Automatic braking when the wheel guard is raised

Disabled=No braking

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.

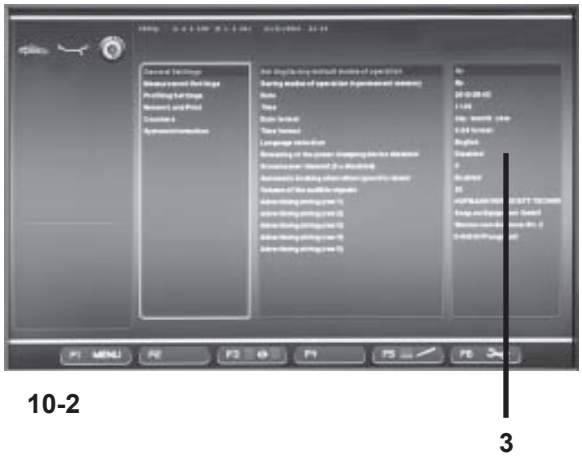
Time: Minute
Actual time: selection of the minute.

Note
Changes to the date and time are immediately active and are retained when the machine is next startedwithout needing to be saved to the permanent memory.

* = Factory adjusted mode

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.



10-2

- 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

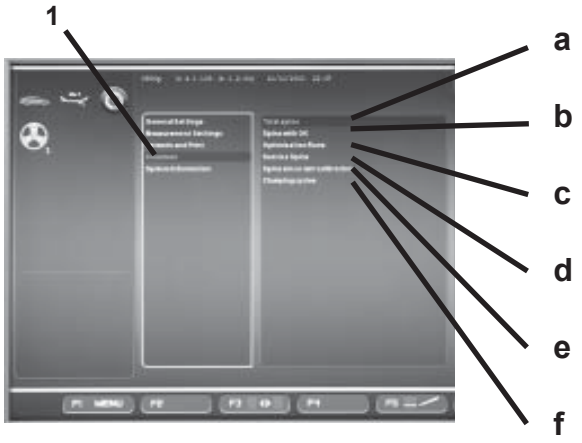
b Spins with o.k. = Number of measuring runs where balance quality was considered OK

c Optimisation runs = Number of optimisations or minimisations

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

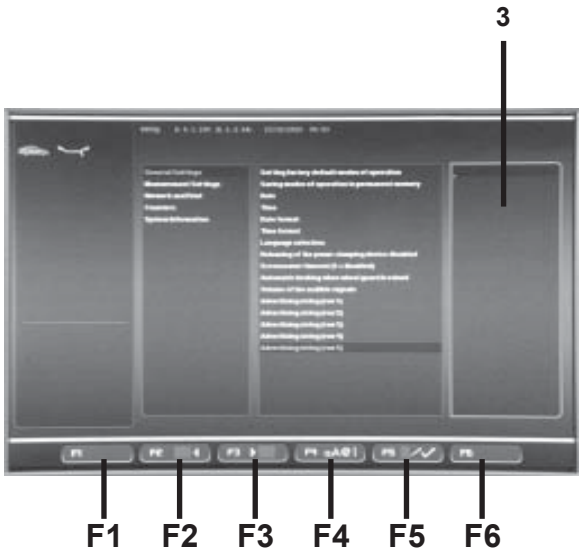


10-3

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.

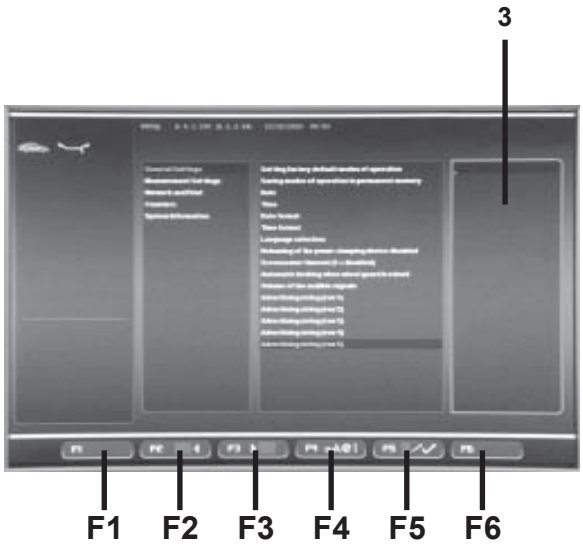
The TEXT COMPOSITION mode is activated; in the Values field (**3, Fig.10-4**) a point identifies the position where the text will be entered and the Menu keys are assigned different functions as follows:



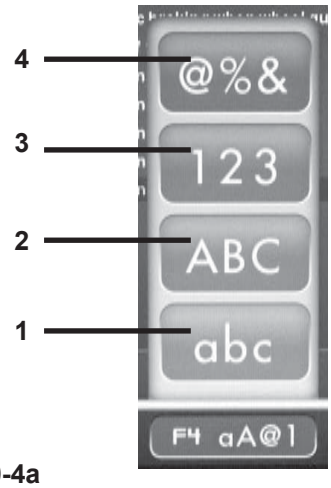
10-4

Figure 10-4
Menu key functions in TEXT COMPOSITION mode

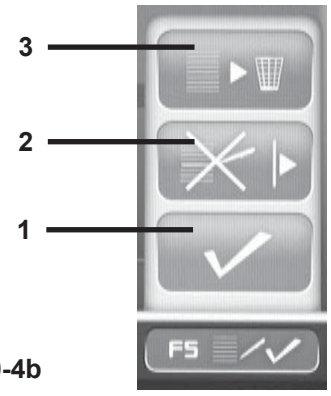
F1 Not assigned
F2 Moves back by one character on the line
F3 Moves forward by one character on the line
F4 Opens Character Types menu
F5 Opens the Menu: Save text, Restore “UNDO” text, Delete text.
F6 Not assigned.



10-4



10-4a



10-4b

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 .

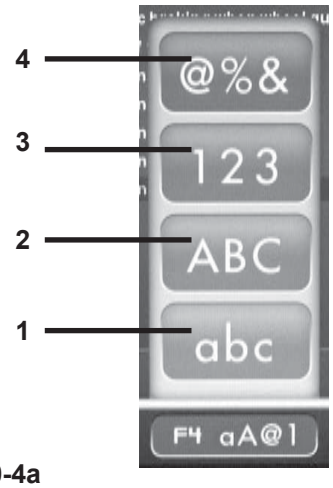
Example of how to enter a text

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.

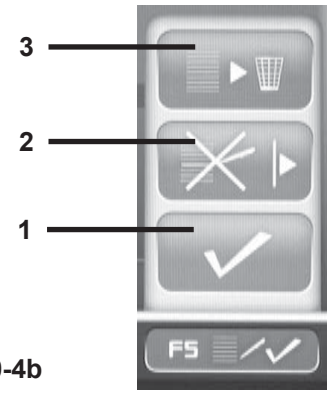
For example to enter the following text:**Garage - 1**

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 "-".
- Press **F3**.
- Using the SCROLL select the space " "(between letter A and letter Z).
- Press **F3**.



10-4a



10-4b

- 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

Errors in operation	**-**	**Error code E**
Warnings	**-**	**Error code H**
Fatal error code	**-**	**300 or C10**

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 optimisation or minimisation programs).

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

E15
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.

E92
The gauge arm for distance and rim diameter is defective.

- Call service.
- As long as the gauge arm is defective, enter distance and nominal rim dimensions by pressing the function keys and rotating the wheel (§ 3.3.3).

E93
The width gauge arm is defective.

- Call service.
- As long as the gauge arm is defective, enter distance and nominal rim dimensions by pressing the function keys and rotating the wheel (§ 3.3.1).

E145
The contents of both permanent memories are different, but both contain valid data.

E900
Unknown machine model.

E901
The machine is not calibrated.

H0
Wheel running conditions cannot be improved by optimisation.

H1
Further optimisation not recommended but feasible.

H2
Weight minimisation is recommended, optimisation can achieve no further improvement.

H3
Optimisation not recommanded.

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.

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.

Fatal error codes

The display shows an alphanumeric code consisting of six digits and/or letters. When messages are read out starting 300XXX the error occurred during the internal operational check, if it is C10XXX it occurred during the self–test after the machine was switched on.

- If necessary, call service.

300 800 or C10 800
Line voltage under 170 V. Balancing is feasible if the motor can drive the main shaft to the measuring speed. Wheel data may be lost.

- Bring the line voltage to within a range of 200 - 230 - 240 Volts with an input transformer .

300 801 or C10 801
Line voltage over 265 V. Damage to the electronic unit of the machine is likely!

- Turn off mains switch!
- Bring the line voltage to within a range of 200 - 230 - 240 Volts with an input transformer.

Any damage resulting from repeated occurrence of this error code is not covered by the guarantee.

300 804 or C10 804
Line voltage over 275 V. Damage to the electronic unit of the machine is likely!

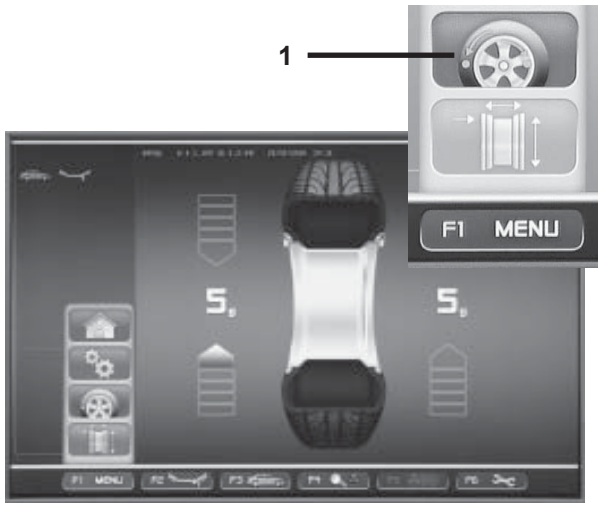
- Turn off mains switch.
- Bring the line voltage to within a range of 200 - 230 - 240 Volts with an input transformer.

Any damage resulting from repeated occurrence of this error code is not covered by the guarantee.

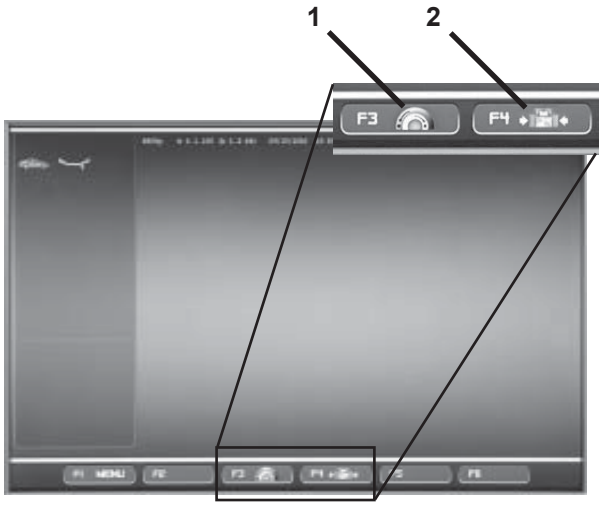
Error messages by means of acoustic signals

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.

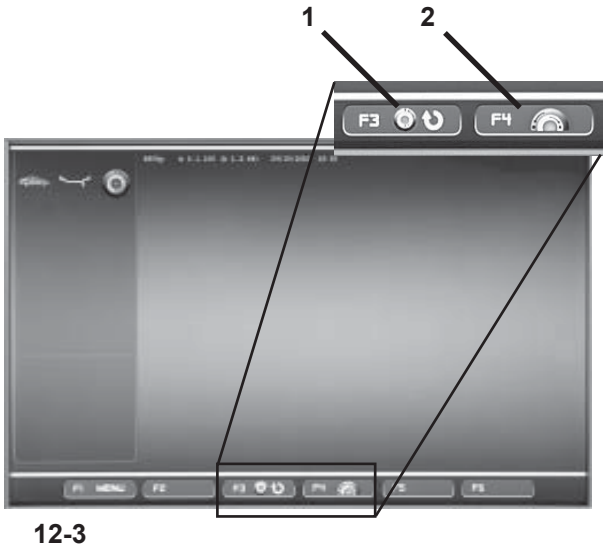
- Switch off the machine.
- Call service.



12-1



12-2



12-3

12 Optimisation/ Minimisation

12.1 General

Optimisation 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 optimisation is not desired, it is possible to achieve weight minimisation (so–called matching).

This is e. g. 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.

12.2 Instructions for the optimisation / weight minimisation programs

When balancing a wheel, by pressing this key **(1, Fig. 12-1)** you can recall the Optimisation and/or Minimisation cycle screen **(Fig. 12-2)**.

Using the F4 Menu **(Fig. 12-2)**, you can select the item for starting the OPTIMISATION **(1, Fig. 12-2)** or MINIMISATION **(2, Fig. 12-2)** 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 where at, all you need to do is refit the wheel that has been interrupted and recall the suspended program.

From the screen **(Fig. 12-3)**:

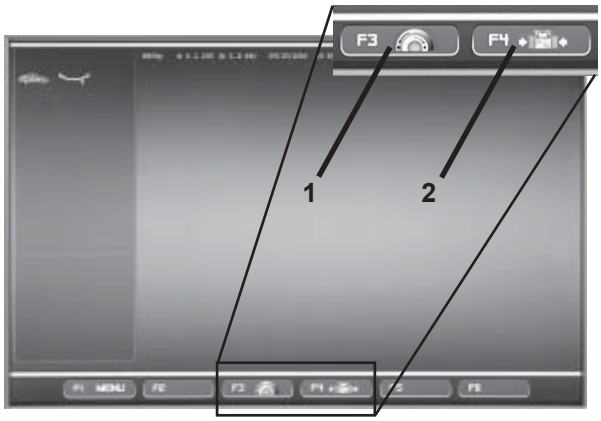
Recall the suspended cycle by pressing **F3 (1, Fig. 12-3)**.

Use F4 **(2, Fig. 12-3)** to start a new Optimisation/ Minimisation cycle; the data saved in the memory will be deleted.

During an Optimisation/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.

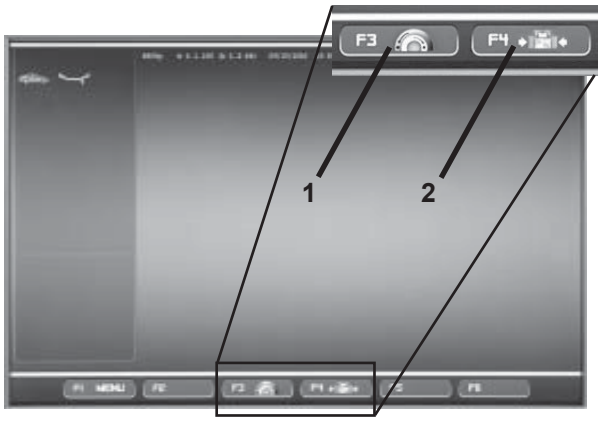
A measuring run must always be launched using the START key.

During the Optimisation/Minimisation cycle, even if the operator has previously set a compensation on the locking tool, it is not activated.



12-2

12-4



12-2

12-5

12.3 Start optimisation/weight minimisation

— To perform a Minimisation run correctly clamp a complete wheel (Section 6.5) or just the rim for an Optimisation 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 Optimisation item (**1, Fig. 12-1**).

The OPTIMISATION screen (**Fig. 12-2**) is displayed.

You can now start the procedure as follows.

Start weight optimisation

— Press the **F4** Menu key and then select the Start Optimisation item (**1, Fig. 12-2**).

The OPTIMSATION 1 screen (**Fig. 12-4**) is displayed.

Continue as described in Chapter 12.3.2.

Start weight minimisation

— Press the **F4** Menu key and then select the Start Minimisation item (**2, Fig. 12-2**).

The MINIMISATION 1 screen (**Fig. 12-5**) is displayed.

— Proceed from the MINIMISATION 1 item as described in Chapter 12.3.1.

Recalling Optimisation/ Minimisation

Note:

If a previously interrupted Optimisation/Minimisation run is in the memory, when the Optimisation item is selected from the F1 Menu, the OPTIMISATION screen (**Fig. 12-4**) is displayed.The interrupted cycle can be restarted using the **F3** Menu key. The program will proceed from exactly the point at which is was interrupted.

— Clamp the wheel removed previously when the Optimisation/Minimisation run was interrupted.

— Press the menu key **F3**.

The screen in which optimisation/weight minimisation was previously interrupted is displayed.
— Proceed according to the current programme stage.

12-6

12-7

12.3.1 Minimisation Cycle

Fig. 12-6 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 **F**4 (Fig. 12-6).

The MINIMISATION 2 screen (Fig. 12-7) is displayed.

Fig. 12-7 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 optimisation, starting at the screen as shown in § 12.5.

12.3.2 Optimisation Cycle

12-4

Having accessed the OPTIMISATION 1 screen (**Figure 12-4**), as indicated at the start of this chapter.

Fig. 12-4 OPTIMISATION 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**.

The OPTIMISATION 1 screen (**Fig. 12-8**) is displayed.

12-8

Fig. 12-8 OPTIMISATION 2

START? is signalled on the screen.

Note:

If necessary you can turn the wheel backwards using the **F5** Menu key.

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

When the run finishes the OPTIMISATION 3 screen is displayed (**Figure 12-9**).

12-9

Fig. 12-9 OPTIMISATION 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**.

The OPTIMISATION 4 screen (**Fig. 12-10**) is displayed.

12-10

12-10

12-11

12-12

12-13

Fig. 12-10 OPTIMISATION 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 OPTIMISATION 5 screen (**Fig. 12-11**) is displayed.

Fig. 12-11 OPTIMISATION 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 OPTIMISATION 6 screen is displayed **(Figure 12-12)**.

12.3.3 Continue minimisation and optimisation

Fig. 12-12 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 **notch** 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 OPTIMISATION 7 screen (**Fig.** 12-13) is displayed.

Reading H 1

If **H1** is displayed, which is possible, continuing the Optimisation run is not recommended as the measurement values that activate the invitation to perform an Optimisation run are below the preset threshold limit.
In any case the cycle can be continued to obtain lower noise levels, also for values below the threshold limit (critical vehicle).

Interrupting Optimisation:

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

Continuing Optimisation:

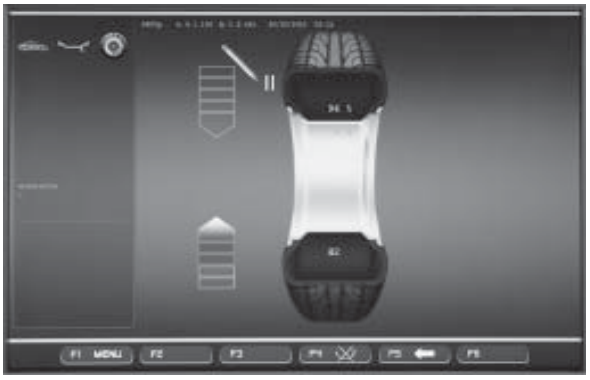
Figure 12-13 OPTIMISATION 7

- Remove the wheel from the balancer.
- Using the tire-changer, fit the tire back on the rim until

12-14

12-15

12-16



12-17

the notch and the valve on the rim are in line.

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

The OPTIMISATION 8 screen (**Fig. 12-14**) is displayed.

Fig. 12-14 OPTIMISATION 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 OPTIMISATION 9 screen (**Fig. 12-15**) is displayed.

Fig. 12-15 OPTIMISATION 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
The screen OPTIMISATION 10, outside (**Fig. 12-16**) or the screen OPTIMISATION 10, inside (**Fig. 12-17**) is displayed.
In this case the operator has to choose how to continue by choosing from the **F4** Menu key options **(1/2,Figure 12-17a)**

Reading H 0

Optimum condition has been achieved and cannot be improved.

- Continue as shown on screen OPTIMISATION 14 (**Fig. 12-22**).

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 OPTIMISATION 10 (**Fig. 12-16**).

12-16

Fig. 12-16 OPTIMISATION 10, outside

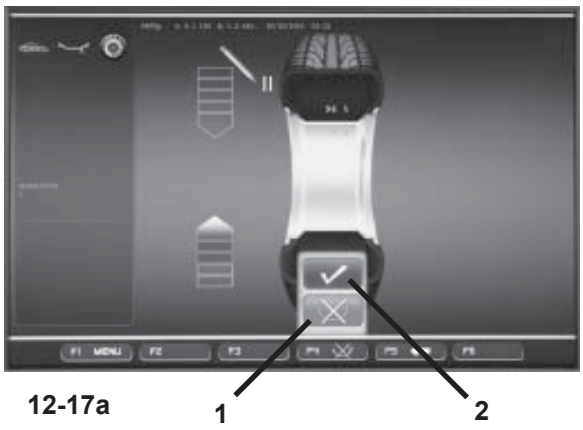
- Rotate the wheel into marking position following the arrows.
- In this position **mark a double notch** on the **outside** of the tire exactly on the wheel holder shaft.

Note

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

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

The OPTIMISATION 11 screen (**Fig. 12-18**) is displayed.



12-17a

Fig. 12-17 OPTIMISATION 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. 12-17a**); the machine will re-propose "OPTIMISATION 10, external" (**Fig. 12-16**) 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. 12-17a**) and continue as follows.
- Turn the wheel to the position marked by the notch (green direction arrows)
- In this position **mark a double notch** 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 OPTIMISATION 11, turn screen (**Fig. 12-19**) is displayed.

12-18

Fig. 12-18 OPTIMISATION 11

12-19

- Using the tire-changer, 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 **F4**.

The OPTIMISATION 12 screen (Fig. 12-20) is displayed.

12-19

Fig. 12-19 OPTIMISATION 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 OPTIMISATION 12 screen (**Fig. 12-20**) is displayed.

12-20

Fig. 12-20 OPTIMISATION 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 OPTIMISATION 13 screen (**Fig. 12-21**) is displayed.

12-21

Fig. 12-21 OPTIMISATION 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 OPTIMISATION 14 screen (**Fig. 12-22**) is displayed.

12-22

12-22

12-23

Finish weight minimisation / optimisation

Fig. 12-22 OPTIMISATION 14

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

H0 Wheel running conditions cannot be improved by optimisation.

H1 Further optimisation not recommended but feasible.

H2 Weight minimisation is recommended, optimisation can achieve no further improvement.

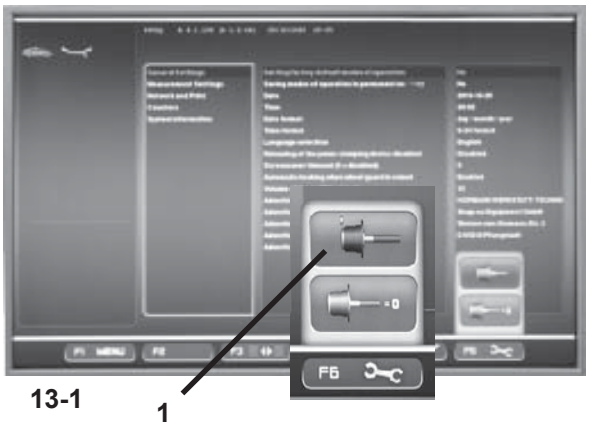
If optimisation has been performed:
The pictograph OK shows that optimisation was carried out correctly and has been completed successfully.
If minimisation has been performed:

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 12-23**).

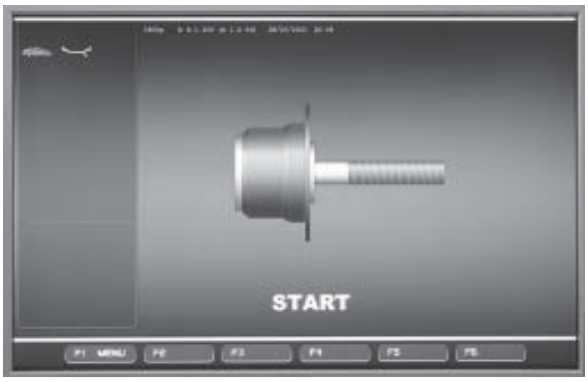
13. User Calibration



13-1

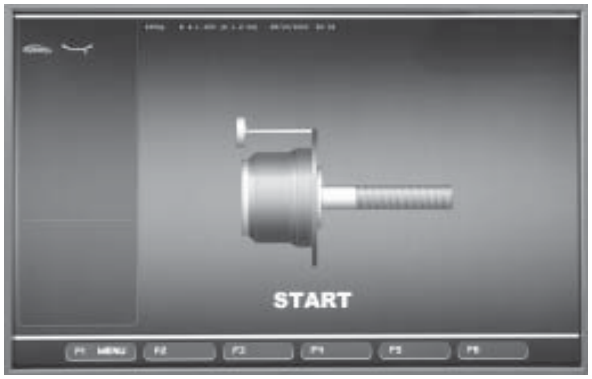
If numerous measuring runs are required to balance a wheel because the balance weight sizes and positions need to be repeatedly adjusted, it means the machine is not operating with sufficient measuring precision. If this is the case the operator can electronically calibrate the rotating masses on the 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.



13-2

Important:
User Calibration 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.



13-3

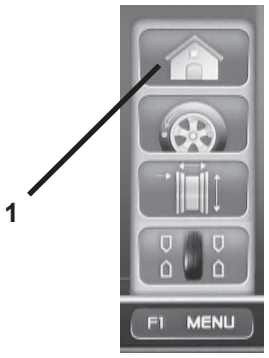
Readjustment

- 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.



13-4

- 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)**.

14. Maintenance

The wheel balancers require almost no maintenance. Their bearings are greased for life and sealed. The drive belt does not require particular checks. If defects occur which cannot be eliminated by the user (error codes not mentioned under § 11. Error codes), contact the after-sales service.

Particular attention should be paid to the cone of the shaft and the clamping means. Balance quality depends considerably on their condition. Keep the tools clean at all times and if they are not in use they lubricate them with a thin film of non-corrosive oil and store them in a sheltered place.

If defects occur which cannot be eliminated by the user (e.g. error codes are displayed that are not mentioned in Chapter 11 Error Messages), contact the after-sales Service.

14.1 After-sales service

Contact your area agent.

The company website provides information about the Customer Assistance service around the world:

http://www.snaponequipment.com/johnbean

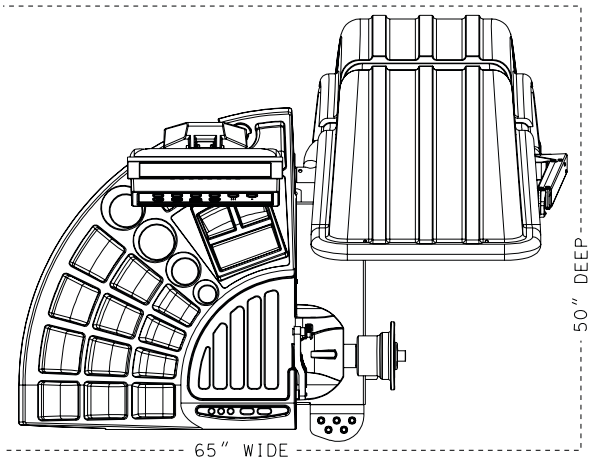
Manufacturing Facility
Snap-on Equipment Inc
309 Exchange Ave
Conway AR, 72032

15. Technical data

Machine dimensions	see **Fig. 15.1**

Height of machine with wheel guard open (1905mm)	7 5 ”
Weight of machine	320lbs - 145 kg
Weight of POWER CLAMP machine	330lbs - 150 kg
Power supply 1ϕ	AC 115V 50/60 Hz

Motor rating	0.12 kW
Balancing speed	< 200 rpm
Measuring time	6-8 s
Max. unbalance reading	400 g (14 oz)
Resolution of amount reading	1/5 g or 0.05/0.25 oz
Resolution of position reading	0.7 deg.
Working temperature	0–50 °C
Relative humidity	10–90 %
Noise level	< 70 dB (A)



15-1

Working range

Distance rim – machine	0–290 mm
Rim width	3–20 inches
Rim diameter	8–30 inches
Max. Tire diameter	44” (1117mm)
Max. wheel diameter	30” (762 mm)
Max. wheel width	20in (530 mm)
Max. wheel weight	154 lbs. (70 kg)

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Product requirements

Imbalance weight resolution/suppression

Resolution / Vehicle type	Normal	Fine	Suppression
Light truck rim	10 g - 0.50 oz	1 g - 0.05 oz	= 2x Car rim type
Car rim	5 g - 0.25 oz	1 g - 0.05 oz	3.5 g - 0.12 oz (Default values)

Rim dimensions

Vehicle type	Distance (Manual)	Width min-max	Width Step	Diameter min-max	Diameter Step
Light Truck [inch]	0 - 400 mm	1” - 20”	0.5”	8” - 14” 14” - 20” 20” - 30”	1” 0.5” 1”
Light Truck [millimeter]	0 - 400 mm	25mm - 505mm	10mm	190mm - 760mm	10mm
Car [inch]	0 - 400 mm	1” - 20”	0.5”	8” - 14” 14” - 20” 20” - 30”	1” 0.5” 1”
Car [millimeter]	0 - 400 mm	25mm - 505mm	10mm	190mm - 760mm	10mm

USA
Equipment Services
309 Exchange Avenue
Conway, Arkansas 72032
Tel.: (800) 225-5786
email: soecustomerservice@snapon.com

CANADA
6500 Millcreek Drive
Mississauga, Ontario
Canada L5N 2W6
Tel: (905) 814-0114
Fax: (905) 814-0110

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Manufacturing Facility
Snap-on Equipment S.r.L.
Via Provinciale per Carpi 33,
42015 Correggio (R.E.), Italy
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