Contents

1- GENERAL

► 1.1 - General safety recommendations

- **The balancing machine should only be used by duly authorized and trained personnel.**
- **The balancing machine should not be used for purposes other than those described in the instruction manual.**
- **Under no way should the balancing machine be modified except for those modifications made explicitly by the manufacturer.**
- **Never remove the safety devices. Any work on the machine should only be carried out by duly authorized specialist personnel.**
- **Do not use strong jets of compressed air for cleaning.**
- **Use alcohol to clean plastic panels or shelves (AVOID LIQUIDS CONTAINING SOLVENTS).**
- **Before starting the wheel balancing cycle, make sure that the wheel is securely locked on the adapter.**
- **The machine operator should not wear clothes with flapping edges. Make sure that unauthorized person nel do not approach the balancing machine during the work cycle.**
- **Avoid placing counterweights or other objects in the base which could impair the correct operation of the balancing machine.**
- **For TFT monitors, see the specific instructions attached.**

► 1.1.1 - Standard safety devices

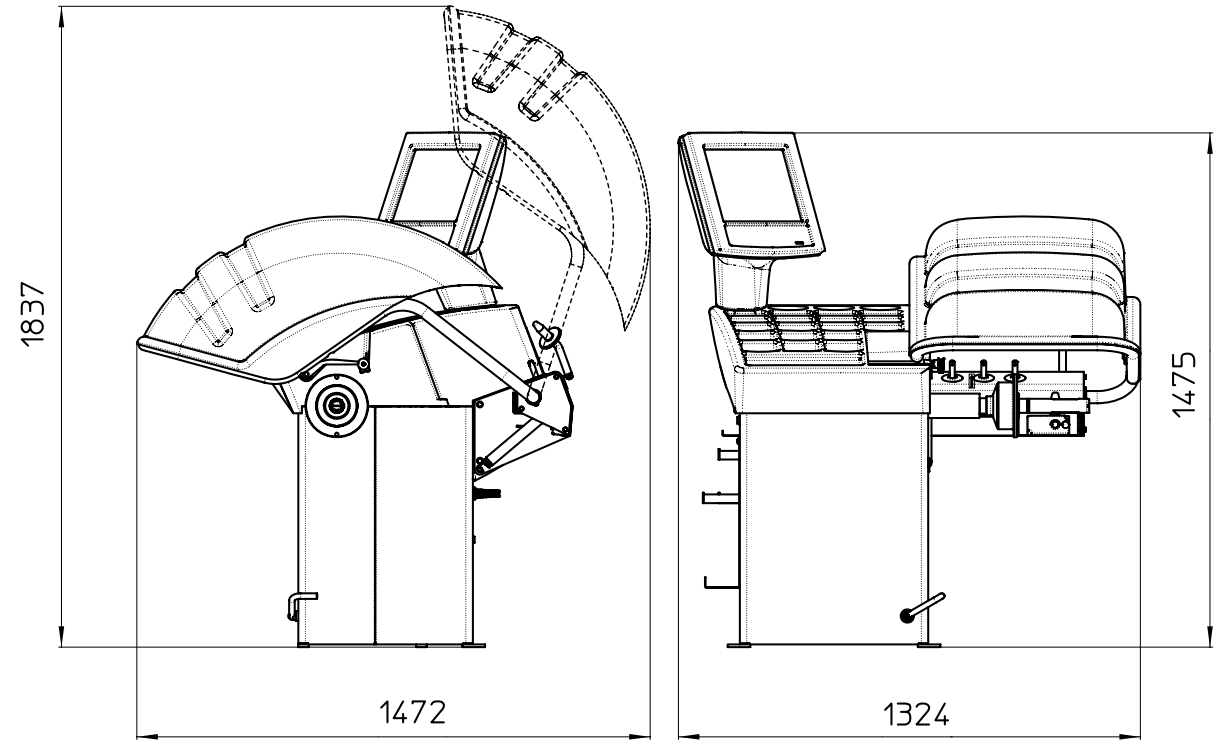
- **STOP push button for stopping the wheel under emergency conditions.**
- **The safety guard of high impact plastic is with shape and size designed to prevent risk of counterweights from flying out in any direction except towards the floor.**
- **A microswitch prevents starting the machine if the guard is not lowered and stops the wheel whenever the guard is raised.**

► 1.2 - Field of application

The machine is designed for balancing car or motorcycle wheels weighing less than 75 kg. It can be operated within a temperature range of 0° to +45°C.
It can measure the geometric radial run-out of the wheels (optional).
It can print a balancing certificate (option).

► 1.3 - Overall dimensions

1



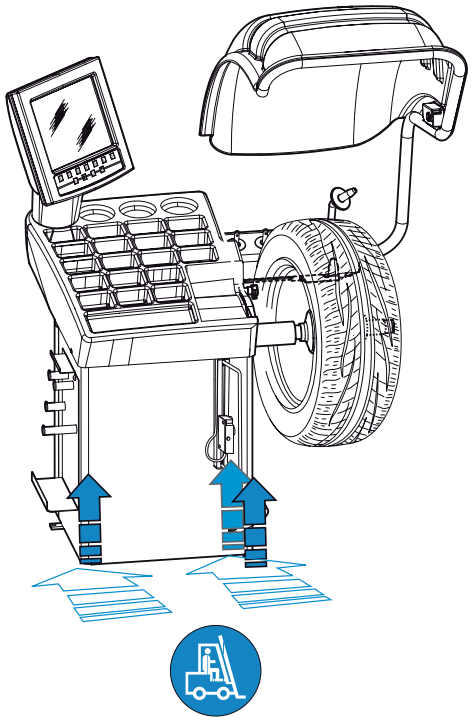
► 1.4 - Specification

Single phase power supply	230 V 50-60 Hz
Protection class	IP 54
Max. power consumption	1,1 Kw
Monitor	TFT 15"
Balancing speed approx.	< 180 min^{-1}
Cycle time for average wheel	(16 Kg - 175/65X15") 6,9 seconds
Fast cycle time for medium wheel	(16 Kg - 175/65X15") 4,9 secondi
Balancing accuracy	< 1 gram
Position resolution	± 1.4 °
Average noise level	< 70 dB(A)
Distance rim - machine	0 - 280 mm (400 mm can be preset)
Rim width setting range	1.5" ÷ 20" or 40 ÷ 510 mm
Diameter setting range	10" ÷ 30" or 265 ÷ 765 mm
Total wheel diameter within guard	1067mm (42")
Total wheel width within guard	500 mm (42")
Min/max. compressed air pressure	7 ÷ 10 Kg/cm^2
	approx. 0.7 to 1 Mpa;
	approx. 7 to 10 BAR;
	approx. 100 to 145 PSI.

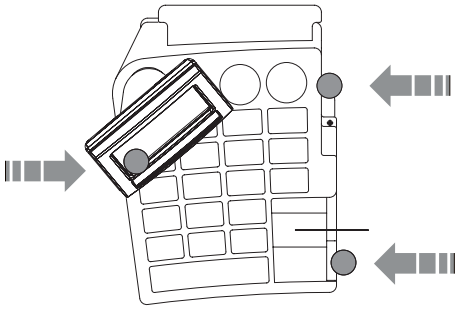
2 - HANDLING AND LIFTING

DO NOT LIFT THE MACHINE BY LEVERING UNDER THE CABINET.

2



2a



3 - COMMISSIONING

► 3.1 - Anchoring

The machine can be operated on any flat non-resilient floor.
Make sure that the machine rests solely on the three support points provided (fig. 2a).
If possible, it is advisable to anchor to the floor using relative mounting feet (see fig. 2a) in the event of continual use with wheels weighing over 35 Kg.

► 3.2 - Electrical connection

The machine is supplied with a single phase mains cable plus earth (ground) (any extension cables must have a cross-section of not less than 2.5 mm^2).
The supply voltage (and mains frequency) is given on the machine nameplate. It may NOT be changed.
Connection to the mains should always be made by expert personnel.
The machine should not be started up without proper earth (ground) connection.
Connection to the mains should be through a slow acting safety switch rated at 4A (230V) and 10 A (115 V).

► 3.3 - Pneumatic connection (SE Version)

For operation of the spindle with pneumatic locking (constant thrust air spring) connect the balancing machine to the compressed air main. The connection fitting is located at the back of the machine. A pressure of at least 7 kg/cm^2 (approx. 0.7 MPa or 7 BAR or 100 PSI) is required for correction operation of the release device.

► 3.4 - Extra safety devices (SE Version)

The wheel is always locked even when there is a pressure or power failure during the balancing cycle. Always actuate the unlocking control pedal with the machine stationary in order to avoid stress and abnormal wear on the adapter.

► 3.4.1 - Manual chuck release

If the power fails, operate as described below to release a mounted wheel :

- Remove the cover on the rear of the base
- Manually turn the controls 1 and 2 located on the valve
- Remove the released wheel
- Turn the controls back to the original position

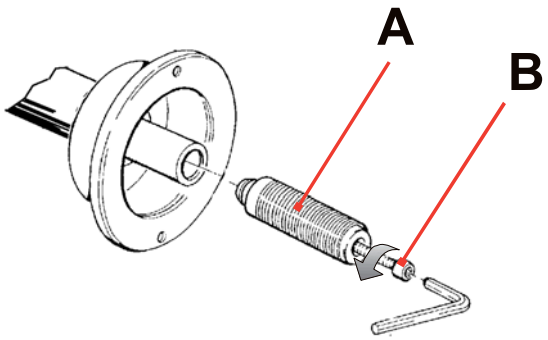
► 3.5 - Adapter mounting

The balancing machine is supplied complete with cone adapter for fastening wheels with central bore. Other optional flanges can be mounted once the terminal part is removed (also see enclosed brochures)

N.B. : Carefully clean the coupling surfaces before performing any operation.

DISMOUNTING THREADED END PIECE

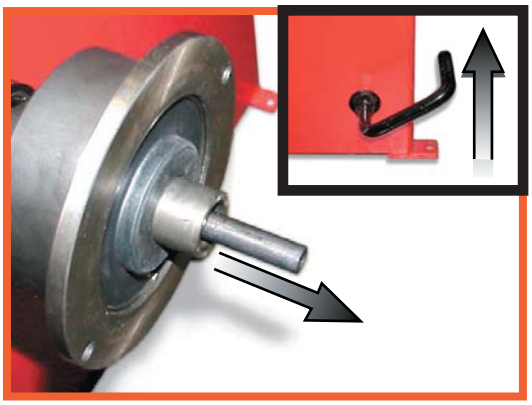
4



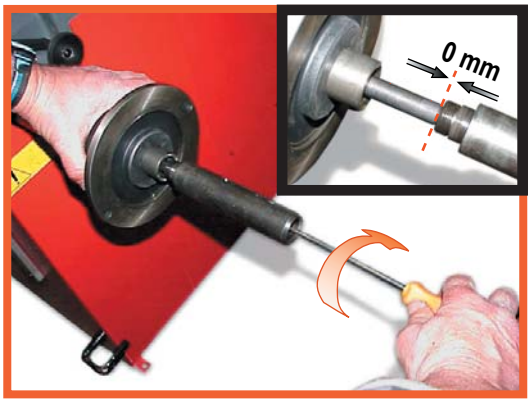
a) Back-off screw B and remove threaded end-piece A.
b) Fit the new adapter.

SE2-Mounting

A



B



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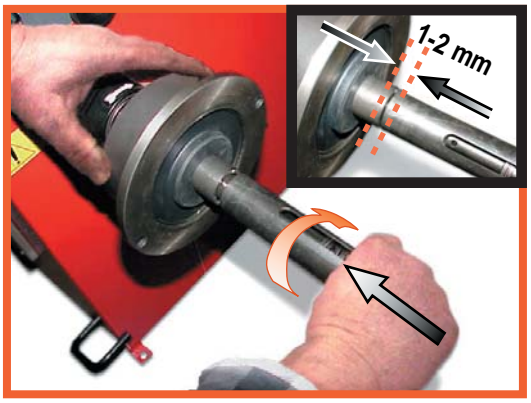

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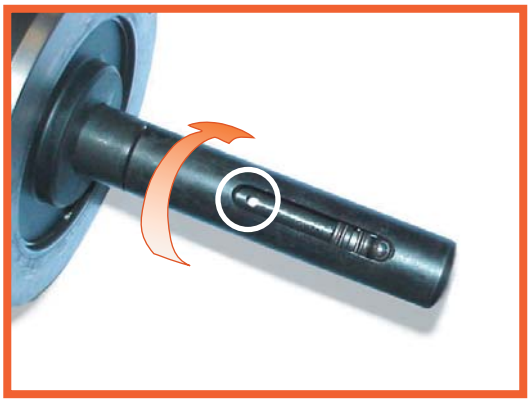

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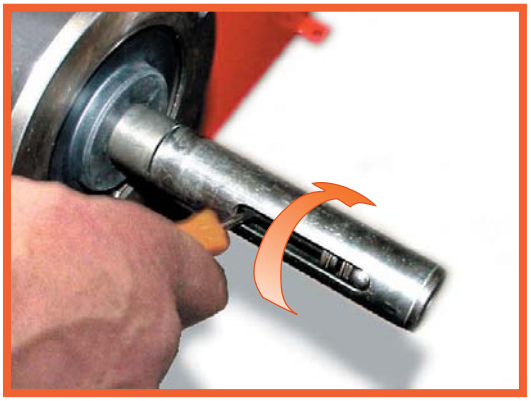
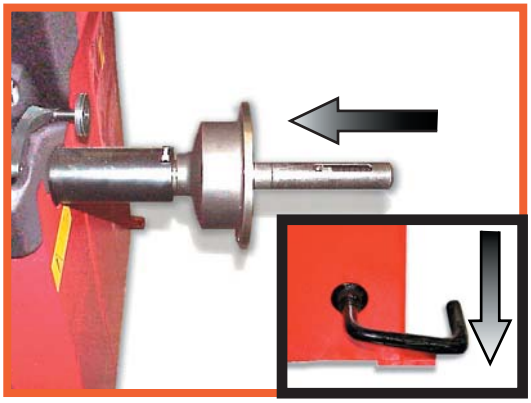


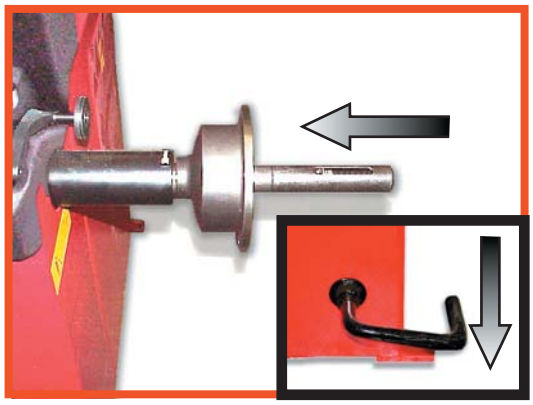
F



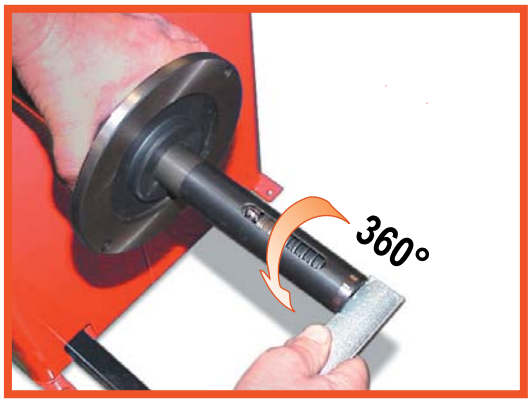
G

SE2-Dismounting

A



B



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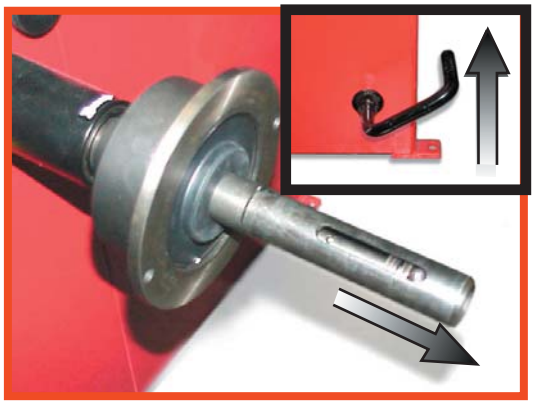

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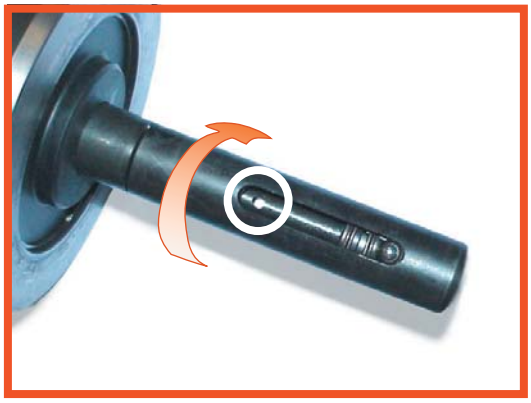

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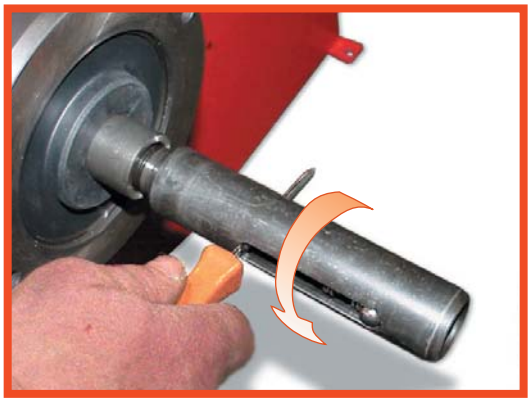
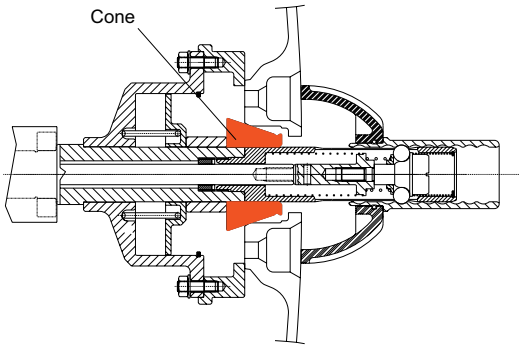




- Quando possibile, centrare le ruote con cono dall'interno (vedi disegno).
- Evitare di usare il manicotto RL con cerchi di ferro.

- *Whenever possible, centre the wheels with the cone from the inside (see the drawing).*
- *Avoid using the RL sleeve with metal rims.*

- Lorsque c'est possible, centrer les roues avec le cône de l'intérieur (voir dessin).
- Eviter d'utiliser le manchon RL avec les jantes en fer.

- *Wenn möglich, die Räder mit Konus von Innen heraus zentrieren (siehe Zeichnung).*
- *Bei Eisenfelgen die Verwendung der Muffe RL vermeiden.*

- Siempre que sea posible, centrar las ruedas con cono desde dentro (véase dibujo).
- Evitar usar el manguito RL con llantas de hierro.

- *Quando possível, centre as rodas com cone pelo lado de dentro (ver figura).*
- *Evite utilizar a luva RL com jantes de ferro.*

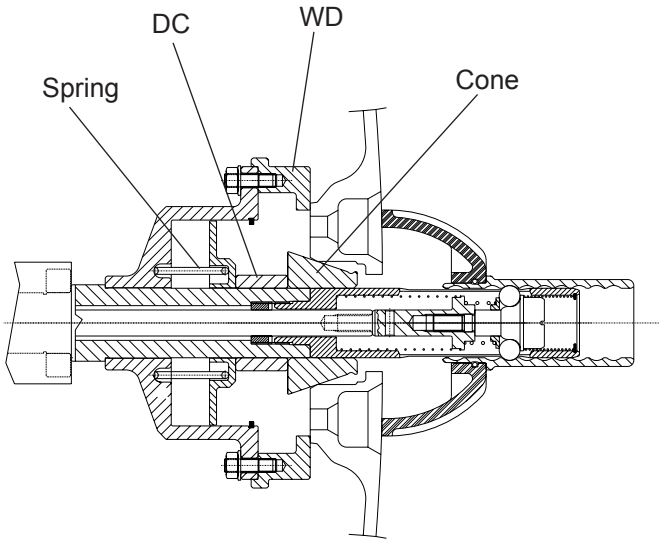
► 3.6 - Guard mounting and adjustment

1. Fasten the components to the base as illustrated in specific exploded view.
2. Correct position is shown in Fig. 1.
3. With the guard closed check that the microswitch prod has slipped into place on the ring.
4. Appropriately adjust the angular position of the control ring.

► 3.7 - Spacer WD

When balancing very wide wheels (9”), there is not enough space to turn the distance gauge. To withdraw the wheel from the machine side, fit spacer WD on the adapter body and secure it with the standard issue nuts. When centring the wheel with the cone on the inside, fit the spacer DC to obtain spring thrust.

5



4 - CONTROLS AND COMPONENTS

► 4.1 - Wheel locking

The wheel is automatically locked when reaching the correct angular position for weight application on the inside and outside, turning it slowly by hand. To unlock the wheel, turn it hard to move it from the correct correction position.

If the unbalance is within tolerance, the wheel is not automatically locked.

Pressing the 

button the chuck can be locked/released in any position to facilitate mounting the wheel.

► 4.2 - Pneumatic locking pedal (version SE)

This pedal allows releasing the device fastening the wheel on the adapter. **Do not actuate this pedal during the machine cycle and/or when adapters other than the standard cone adapter are mounted. The pedal has two stable positions: top, wheel unclamped; bottom, wheel clamped.**

► 4.3 - Automatic distance and diameter gauge

This gauge allows measurement of the distance of the wheel from the machine and the wheel diameter at the point of application of the counterweight.

It also allows correct positioning of the counterweights on the inside rim by using the specific function (☛ ***INDICATION OF EXACT CORRECTION WEIGHT POSITION***) which allows reading, on the monitor, the position used for the measurement within the rim (for calibration, ☛ ***CALIBRATION***).

The gauge can be used only with the weight clip (or revolving striker plate) fitted.

► 4.3.1 - Distance gauge locking

The distance gauge is automatically locked when the adhesive weights have reached the correct application distance. To release the gauge, lower it to below 10” diameter.

► 4.4 - Automatic width gauge (optional)

Width gauging is through a SONAR device which measures the distance of the wheel without mechanical contact, merely by closing the guard and each time a valid measurement has been made with ***AUTOMATIC DISTANCE AND DIAMETER GAUGE***.

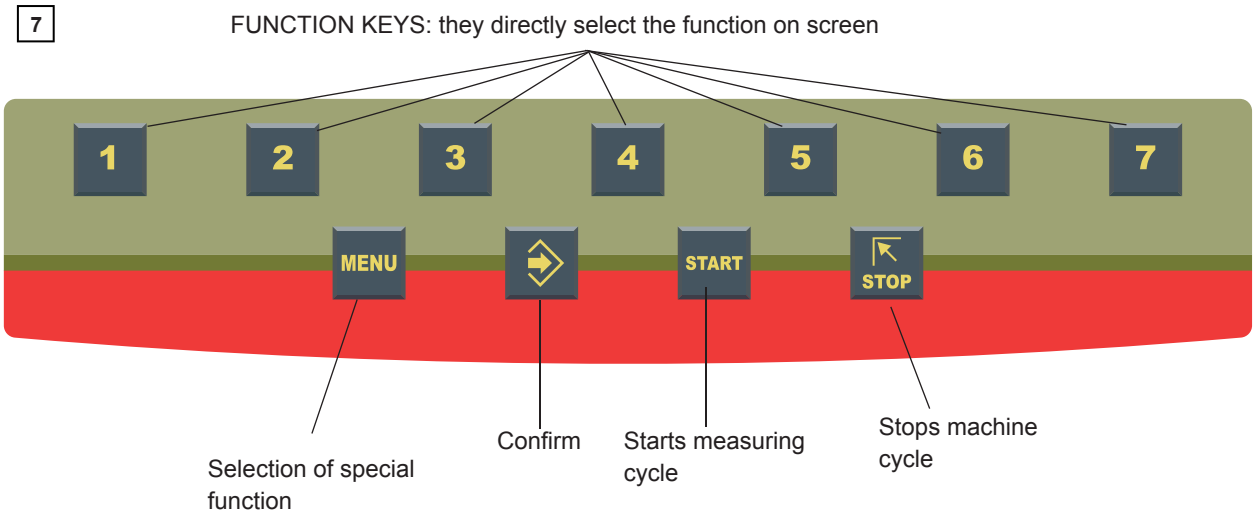
► 4.5 - Clock control

The wheel balancing machine is provided with a clock having a back-up of about one month with the machine switched off. If the machine remains unused for a long period, check date and time settings when restarting (☛ ***CLOCK SET-UP***).

► 4.6 - Printer (option)

Used to print useful information for the vehicle, residual imbalance and eccentricity for the balanced tyre.

► 4.7 - Keyboard

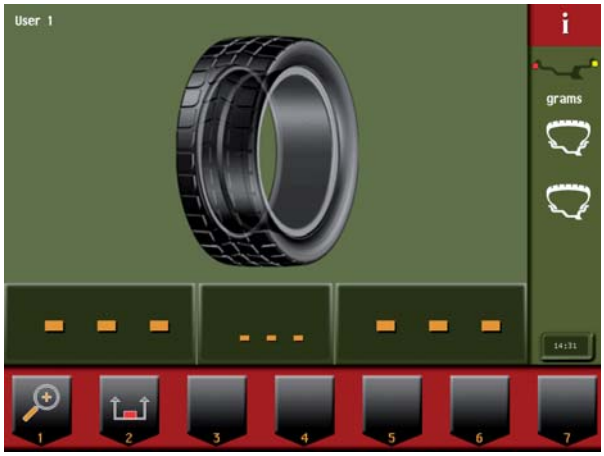


- *Press the buttons with the fingers only: never use the counterweight pincers or other pointed objects.*
- *When the beep signal is enabled (**ACOUSTIC SIGNAL**), pressing of any push button is accompanied by a "beep".*
- *The TFT monitor is NOT the TOUCH SCREEN type.*

5 - INDICATIONS AND USE OF THE WHEEL BALANCER

The monitor shows several information and suggests various alternative ways of use to the operator.
This is through various “screens”.

► 5.1 - Initial screen



Buttons enabled:

: main functions screen (☞ ***MENU ACCESS DIAGRAM***)

: ***STATIC CORRECTION MODE*** selection

: balancing spin (☞ ***RESULT OF MEASUREMENT***)

Dimensions gauge: when extracted, the Dimensions screen is selected (☞ ***PRESETTING OF WHEEL DIMENSIONS)***
If the machine remains on the initial screen for a certain amount of time without being used, the system is automatically switched to a screen-save. Striking of any key, movement of the wheel of distance + diameter gauge will cause automatic switching from the screen-save menu to the initial screen. Automatic start-up operated by the protection system is not available from the screen-saver for safety reasons.

► 5.1.1 - Screen-save screen

Name of the wheel balancer’s owner.

► 5.2 - Menu access diagram

N.B. : - The symbol " ▷▷▷ " indicates the presence of a further menu:

- To return to the previous menu, press button STOP

- To return to the initial screen, press button MENU

► 5.3 - Presetting wheel dimensions

► 5.3.1 - Automatic standard wheel setting

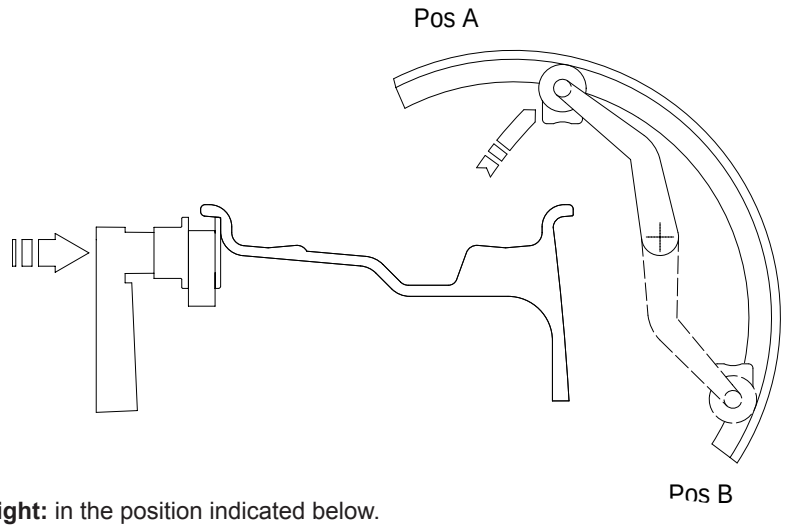
FUNCTION ON INDICATOR: Sonar "WIDTH".

L.T. /SUV FUNCTION ON INDICATOR (see enabled buttons)

The screen appears upon removing the distance + diameter gauge.
The "dimension acquired" message is indicated by the correction weight symbol, which changes from light blue to red.
- Standard wheels: Using the special grip, move the end of the gauge against the rim in one of the positions A/B shown.

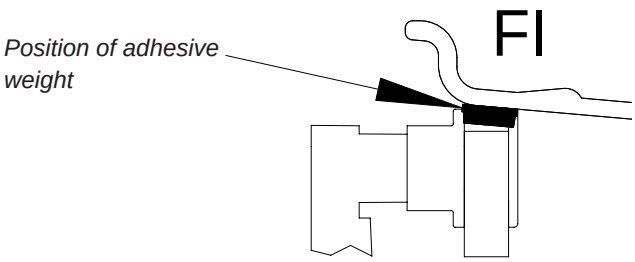
a) **Sprung weight :** in one of the positions A/B indicated in figure 8.

8



b) **Adhesive weight:** in the position indicated below.

8a

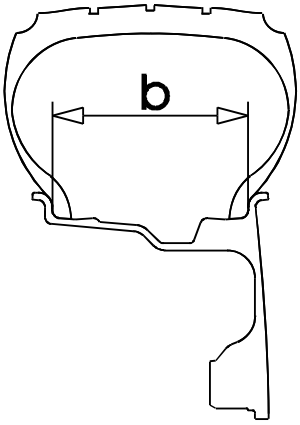


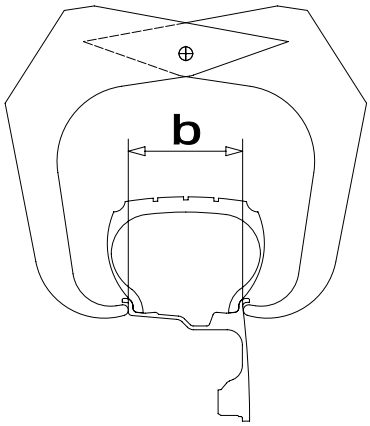
Note: always use the round part of the striker plate.

Hold the gauge in position for at least 2 seconds.
If the acoustic signal is enabled (☛ ***ACOUSTIC SIGNAL***), the acquisition of the dimensions is accompanied by a "beep".

Set the distance+diameter gauge to the rest position:
the current width value is displayed inside the tyre.

6 / 7 - Set the nominal width, which is normally shown on the rim, or measure the width “b” with the caliper gauge provided.





The other enabled buttons are:

1 — ***USER CONTROL***

3 / 4 / 5 — select the type of weight to apply (***CORRECTION METHODS***).

STOP — return to initial frame

START — Launch balancing.

► **5.3.1.1 - Automatic width measurement**

Gradually lower the guard after carrying out measurement of distance + diameter in automatic mode.
If the width measured is incorrect (out of range), the following message appears:

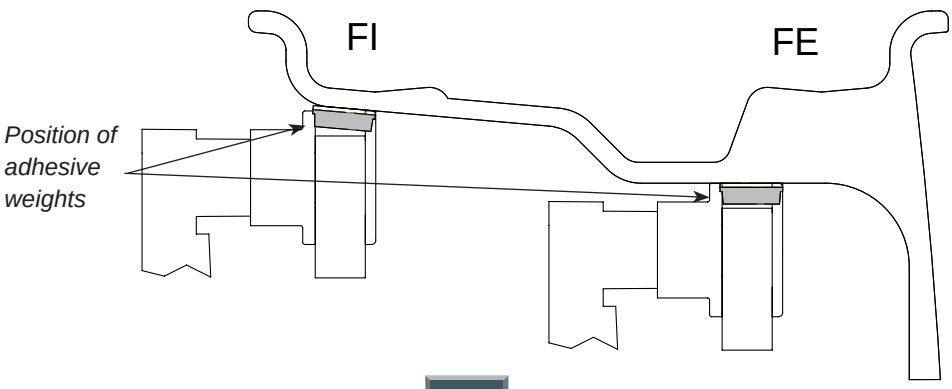
“Sonar measure is out of range:”
“F1 = repeat”
“F2 = manual set-up”

Press F1 to re-lower the guard and repeat the width measurement. Press F2 to go to the dimensions panel for manual insertion of the width measurement. Manually presetting is possible by using the push buttons as described in "***DIMENSIONS".***

► 5.3.2 - ALUS wheel automatic presetting

After the measurement performed for the FI inner side, as indicated in fig. 9, pull out the gauge again to store the data for the FE outer side; choose position A or B (fig. 8) at your choice. Keep this position for at least 2 seconds. When the acoustic signal is enabled (☛ ***ACOUSTIC SIGNAL***), the acquisition is accompanied by a “beep”.

9



After having detected the dimensions, use the **3** key to indicate the type of correction selected for the inner side.

The buttons enabled in the case of:
- *automatic width measurement*
- *automatic ALUS wheel measurement*

are:

1 ☛ ***USER CONTROL***

2 only for automatic width:
This button is used to improve the dimensional calibration of large-diameter wheels such as off-road, trucks, wheels which protrude significantly from the rim. Press this button several times to select the type of tyre projection (from 1.0” to 2.0”). The option is disengaged at the end of current Width Mea surement.

3 selection of clip or adhesive weight for inside.

6 selecting the manual dimension presetting screen

7 / **STOP** return to initial screen.

START balancing run.

N.B.: *The ALUS dimensions can in any case be set manually using the buttons described in “DIMENSIONS”.*

► 5.4 - USER control

Selected by pressing **1** from the automatic setting frame for standard wheels (☞ ***PRESETTING WHEEL DIMENSIONS***).

The wheel balancing machine can be used simultaneously by 4 different users who, through a simple sequence, can memorize their work condition and call it when needed. The names of the users can be stored (☞ ***PRESETTING CLIENT AND USER NAMES***).

1 selecting the user to call up and program

2 recalling the selected user

The system automatically returns to the initial screen with recalculation of the unbalance values on the basis of the effective dimensions of the USER called.

- *The dimensions memorized as USER are lost when the machine is switched off;*
- *The current USER is always displayed in the Measurements and Dimensions screens.*

3 programming the selected user

Remember to set correctly the dimensions in the manner already decribed in the paragraph "PRESETTING OF WHEEL DIMENSIONS".

► 5.5 - Measurement result

SONAR STATUS RADIAL

SONAR STATUS LATERAL ECC.

SONAR STATUS:

GREEN: in measuring position

RED: out of measuring range

After performing a balancing run, the out-of-balance values are displayed as well as arrows useful for positioning the correction weight at the application point. After positioning and locking the wheel, apply the weight vertically at the top. When the beep signal is enabled (☛ ***ACOUSTIC SIGNAL***), reaching of the correction position is accompanied by a "beep".
If the out-of-balance is less than the chosen threshold value, "0K" appears instead of the out-of-balance value to indicate, on that particular side, that the wheel is in tolerance; the residual out-of-balance can be displayed by pressing the button **1**, with an accuracy of 0.5 g (0.1 oz.)

The following buttons are enabled:

1 display of residual out-of-balance.

2 selection of correction mode (STATIC/DUAL SURFACE). When the mode is changed, the unbalance values are recalculated automatically on the basis of the previous spin. Simultaneous display of the dynamic+static unbalance can be enabled through the special function in Setup (see par. ***STATIC ALWAYS ENABLED***).

3 prints the balancing certificate (option)

4 **:** eccentricity measurement graph (OPTIONAL).
N.B : 1. The symbol above the key is displayed in yellow if the first harmonic eccentricity exceeds the limit set in the setup parameters (***FIRST HARMONIC LIMIT***).
2. When this push button is held down for more than 1.5 seconds, eccentricity measurement is temporarily disenabled (enabled in GENERAL SETUP). To re-enable eccentricity measurement, press push button [4] again for more than 1.5 seconds. Every time the machine is switched on, the status of eccentricity measurement reflects the settings in ***GENERAL SETUP***.

6 unbalance split function enable

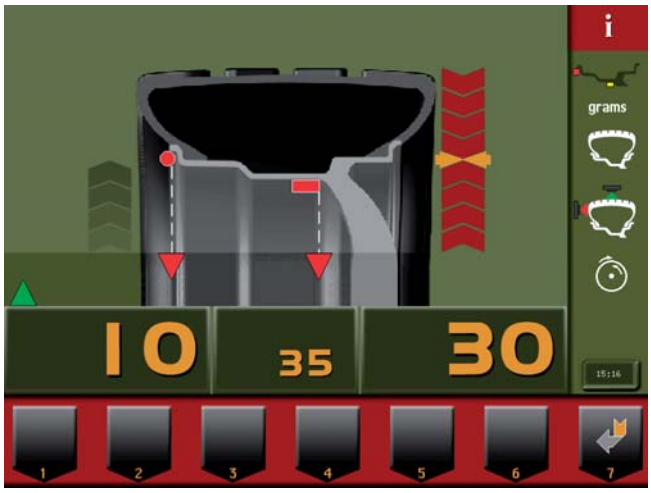
7 enable indication of the longitudinal position of the out-of-balance (☛ ***INDICATION OF EXACT CORRECTION WEIGHT POSITION***)

MENU selection of special functions

START balancing run.

N.B.: if the machine remains on this screen without being used for more than the time preset in the Setup parameters (6), the screen automatically returns to the screen-saver.

► 5.5.1 - Indication of exact correction weight position



It is recommended always to use this function when correcting the out-of-balance with adhesive weights ALUS.
Remember to thoroughly clean the application areas.
In all cases this function allows cancelling approximations in the mounting of counterweights with consequent reduction of the residual unbalance.

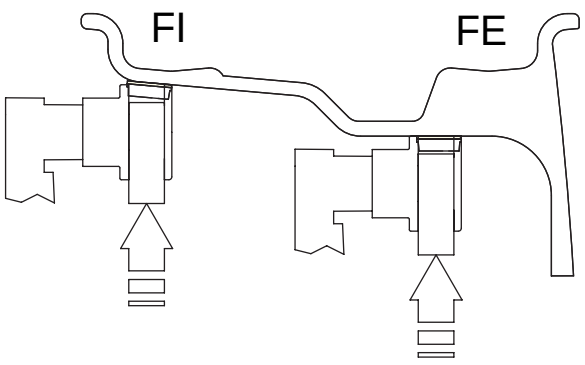
1. Press button **7** on the measurement results screen.

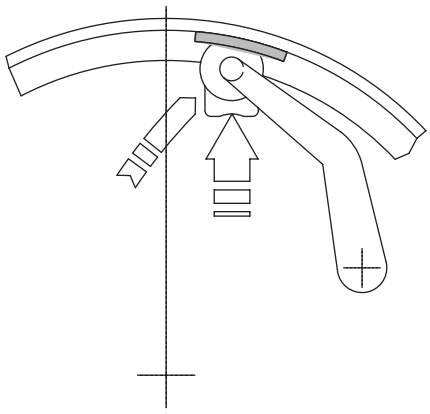
2. Extract the gauge in position A, figure 8.

- A mobile coloured arrow [▲] indicates the approach of the weight towards the correction position.
- When a fixed arrow [▼] is reached, rotate the wheel to correction position (FI or FE) and apply the counterweight by rotating the gauge tip towards the outside, into the position where the pincer touches the wheel (where appropriate use the weight pusher).
- The correction weight application position is automatically reset in relation to the position of the distance + diameter gauge (pos. A, fig. 8).

- *When the acoustic signal is enabled (**ACOUSTIC SIGNAL**), attainment of the fixed arrow status [▼] is accompanied by a "beep".*
- *If gauge locking is enabled (**GAUGE LOCKING**), when a fixed arrow [▼] is reached, the gauge is automatically locked to prevent shifts during application of the correction weight. To release and bring the gauge back to the rest position, lower it to below 10" diameter.*

10





► 5.5.2 - “SPLIT” control

SPLIT is only possible in the event of static unbalance or ALUS external side and is used to hide any adhesive weights correcting unbalance behind the rim spokes.

To split the unbalance detected in two different positions, proceed as follows :

1. Position static unbalance or ALUS external side in the correction position :

2. Select a spoke close to the 12 o’clock postion to be corrected, more it into the 12 o’clock position and press button 6

3. Turn the wheel in the rotation direction indicated on the unbalance display, brining the second spoke to the 12 o’clock position and press button 6.

- Turn the wheel in direction of rotation.

- Turn the wheel in reverse direction of rotation.

4. At this point, two indications appear on screen for positioning of the unbalance correction spokes.
5. Position the spokes indicated on screen in the 12 o’clock position and correct with the value displayed.

Any error in this procedure is clearly shown on screen.
Always follow the information provided by the wheel to optimise correction.

► 5.5.3 - Correction mode

After having performed automatic measurement of the inner side, it is possible to place the correction weights as required by pressing pushbuttons **3** , **4** and **5**

In the event of automatic measurement of both sides, if the difference between the inner and outer diameters is greater than or equal to 2", the system sets the inner side spring weight.

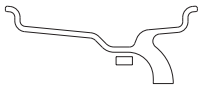
To modify this presetting, press the **3** *button.*

To display static unbalance, press the **2** button on the measurement screen (for ALUS static, the inner side diameter is always considered).

Possible types of correction:

11

Balancing of steel or light alloy rims with application of clip-on weights on the rim edges



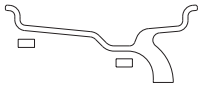
The STATIC mode is necessary for motorcycle wheels or when it is not possible to place the counterweights on both sides of the rim.

Balancing of light alloy rims with application of adhesive weights on the rim shoulders.

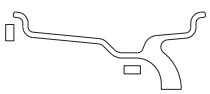
Combined balancing: adhesive weight on the outside, clip-on weight inside.

Combined balancing: clip-on weight outside and adhesive weight inside.

ALU S :

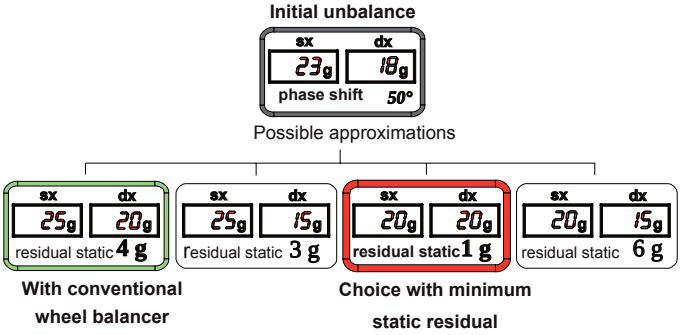


Balancing of alloy rims with hidden application of the adhesive weight on the outside.



Combined balancing: clip-on weight inside and adhesive hiddenweight outside (Mercedes).

► 5.5.4 - Automatic minimization of static unbalance



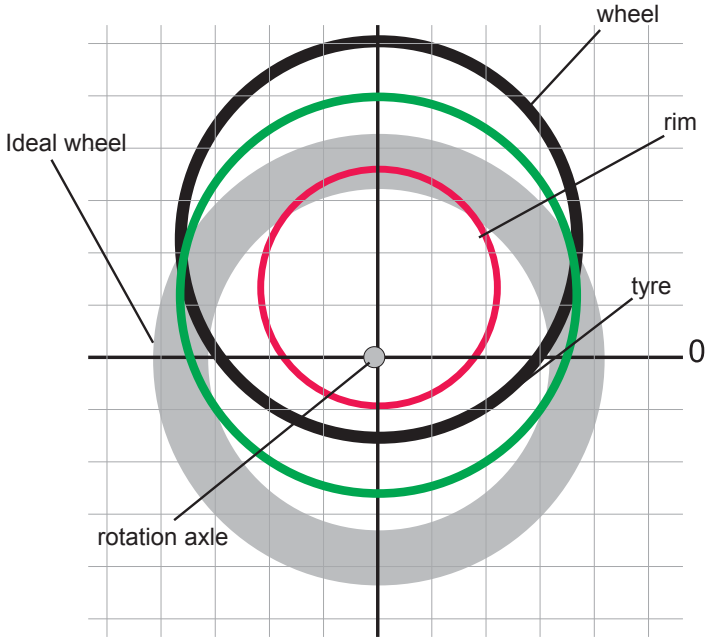
This program is designed to improve the quality of balancing without any mental effort or loss of time by the operator. In fact by using the normal commercially available weights, with pitch of 5 in every 5 g, and by applying the two counterweights which a conventional wheel balancer rounds to the nearest value, there could be a residual static unbalance of up to 4 g. The damage of such approximation is emphasized by the fact that static unbalance is cause of most of disturbances on the vehicle. This new function, resident in the machine, automatically indicates the optimum entity of the weights to be applied by approximating them in an “intelligent” way according to their position in order to minimize residual static unbalance.

► 5.6 - When and why MATCHING

The software associated with eccentricity measurement is a powerful tool for determining the need to perform relative rotation between the rim and tyre in order to reduce the eccentricity of the wheel down to acceptable limits. The principle adopted is based on the consideration that a rim with acceptable tolerance, mounted with an acceptable tyre, can statistically generate a total eccentricity which is not acceptable but can be improved by matching.

Generally speaking, rim measurement is not necessary, accurate or useful because:

- To measure the rim it is necessary to remove the tyre. There can by coarse errors on the outside (e.g. aluminium wheels!)
- The two rim sides can be eccentric in a very different way. Therefore to which one to make reference? What is the effect on the tyre mounted?
- To improve the eccentricity of a wheel, **the rim should be eccentric**, to compensate the tyre. And viceversa.
- If after a rotation by 180° of a wheel, the value is still out-of-tolerance, either the tyre or rim are too eccentric: One of the two must be replaced!



Example 1

Rim + 0.8 mm / 0,030”

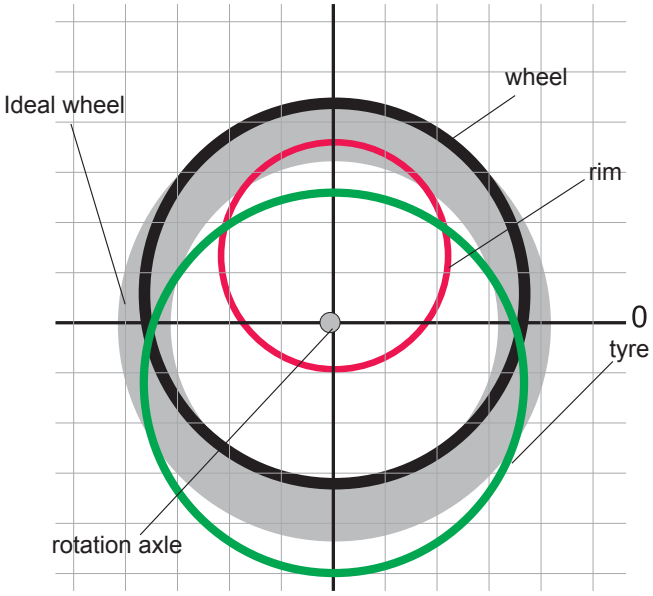
Tyre + 0.6 mm / 0,0225”

Wheel + 1.3 mm / 0,05”

Eccentricity of the wheel is excessive, due to an acceptable rim or tyre but randomly placed in an “unfortunate” relative position.

SOLUTION:
Rotate the tyre on the rim by 180°

RESULT:
wheel eccentricity 0.3 - 0.4 mm / 0,010” - 0,015”
(in tolerance)



Example 2

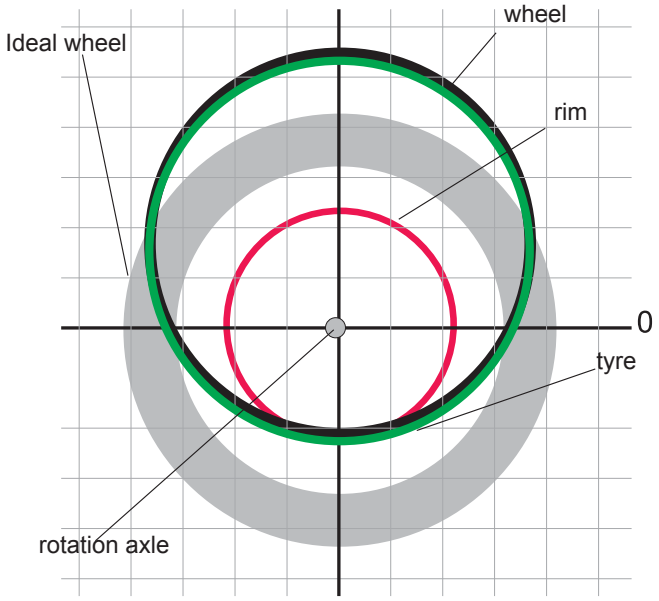
Rim + 0.8 mm / 0,030”

Tyre - 0.6 mm / 0,0225”

Wheel + 0.3 mm / 0,010”

Eccentricity of the single items has been compensated.

The wheel is acceptable.



Example 3

Rim 0 mm

Tyre + 1.2 mm / 0,045”

Wheel + 1,2 mm / 0,045”

Eccentricity of the wheel cannot be compensated by the rotation because the rim is perfect!

SOLUTION:
Rotate the tyre on the rim by 180°

RESULT:
no improvement is obtained

► 5.6.1 - Presetting of tolerance on the machine

There is no general rule concerning acceptability of an eccentricity value . As a first approximation we consider it correct to use a threshold of 1 to 1.5 mm / 0,0375” ÷ 0,056”. The E/ECE/324 standard prescribes 1.5 mm / 0,056” as max. eccentricity of a rebuilt tyre.

► 5.6.2 - Value of static unbalance, correlated with eccentricity

Clear indication is given in the Measurement screen of both the value and position of the static unbalance as well as the eccentricity. In fact, it is interesting to check the correlations of the two values, above all of the two positions. When the two positions have a similar angle (± 30° one from the other), there is a **clear sign that an eccentricity is present which can be compensated by matching.**

► 5.6.3 - Value of unbalance corresponding to eccentricity

For user’s reference, the centrifugal force is calculated corresponding to a certain speed, compared to the force generated by the eccentricity present on the tyre (calculated with an approximate average elastic constant).

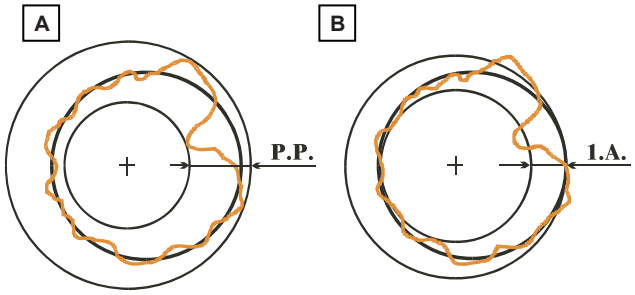
► 5.7 - Eccentricity measurement

The much enlarged figures show the outer tyre surface and axis of wheel rotation.

Fig. A - shows measurement of the total Peak-to-Peak eccentricity defined as maximum radial deviation of the tyre surface.

Fig. B - shows measurement of the eccentricity of the 1st harmonic, i.e. the eccentricity of that circle which "recopies" the tyre shape, by averaging the local deviations of the tyre from the round shape.

Obviously the P.P. measurement is normally greater than that of the 1st harmonic. Tyre manufacturers normally supply two different tolerances for the two eccentricities.



The radial and lateral eccentricity measurements are automatically carried out after the unbalance measurement without having to go into particular procedures. Remember to position the sonar sensors in front of the surface to be measured before pressing the START button.

The maximum limit of the first harmonic can be set (***FIRST HARMONIC LIMIT***). When this limit is exceeded, the wheel balancer displays the red symbol above the 4 button to indicate an eccentricity condition that needs to be corrected.

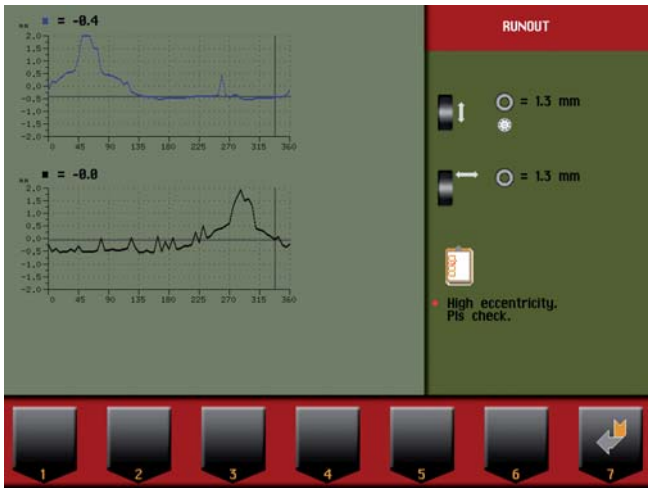
To go to the eccentricity measurement management frame, press the button **4** from the unbalance measuring frame:

The following buttons are enabled:

1 to go to rim eccentricity measurement

3 to print the eccentricity values measured (option)

5 to display the graph of peak/peak values

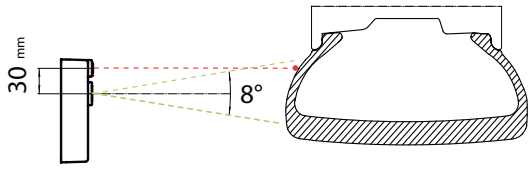


P/P GRAPH: represents the peak/peak eccentricity whose actual value is displayed and updated by turning the wheel.

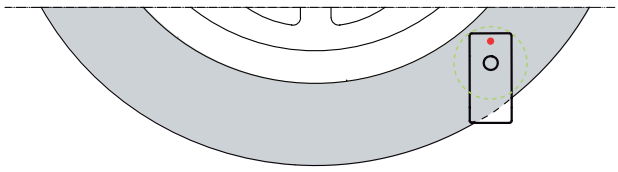
6 to go to a frame where important information on eccentricity is displayed, among which the unbalancing effect the first harmonic eccentricity measured at an average speed of 75 miles/h may have.

7 to return to the unbalance measurement frame.

SONAR LR INSTRUCTION



FRONT VIEW



LATERAL VIEW

In order to obtain the correct lateral eccentricity values, the sonar cone must be positioned inside the tyre shoulder. The function of the LED is to make it easier to position the sonar correctly, but always bear in mind that it does not indicate the focus of the pad as it is situated 30 mm further down.

The rim eccentricity measurement is important in order to try and reduce the total eccentricity of the wheel simply by turning the tire on the rim.

- Press the button 

from the eccentricity graph display frame
- Hold the gauge as shown in Photo A in such a way that it does not turn during the measurement
- Rest the round part of the gauge tip inside the rim as shown in Photo B.

A

B

- Press the  button and slowly turn the wheel by hand, keeping a constant pressure on the gauge tip until the following frame appears:

The total eccentricity, the rim and the tire values are simultaneously showed. Before passing to tire rotation on the rim, check that the rotation result indicated on-screen is within tolerance. It is possible to set the minimum correction limit below which it is never considered appropriate to intervene (***MINIMUM CORRECTION LIMIT***), and the maximum first harmonic eccentricity limit of the rim below which it is considered of little use to turn the tire on the rim (***FIRST HARMONIC LIMIT***).

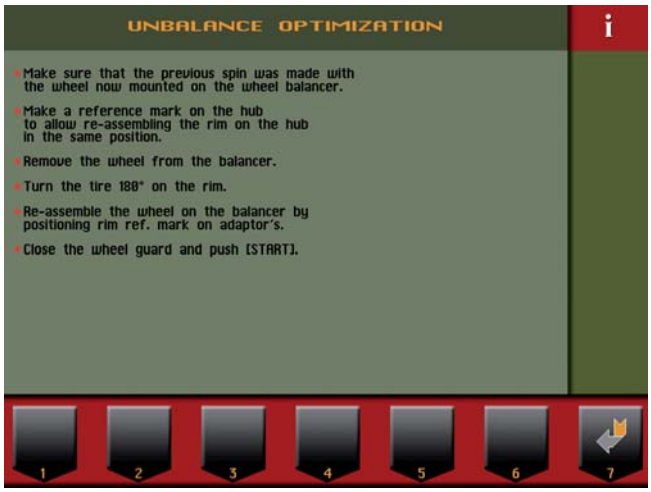
The following buttons are enabled:

3 prints the eccentricity values measured (option)

7 returns to the eccentricity graph display frame.

6 - MENU

► 6.1 - Out of balance optimization



The symbol  is displayed automatically for static out-of-balance exceeding 30 grams (1.1oz).
The program allows total wheel out-of-balance to be reduced by compensating, when possible, tyre and rim out-of-balance values. It requires two runs, rotating the tyre on the rim on the second run.

Having performed a run, press **MENU** + **1** and follow the on-screen instructions.

► 6.2 - Dimensions

If necessary, the dimensions can be input or edited in manual mode as follows:

- press MENU + 2 or else press 6 or from the automatic dimension setting screen (which can be reached by pulling out the distance + diameter gauge);
- press 1 to select the dimension to be preset (white);
- press 2 / 3 to preset the required value;
- press 5 press to change unit of measurement.

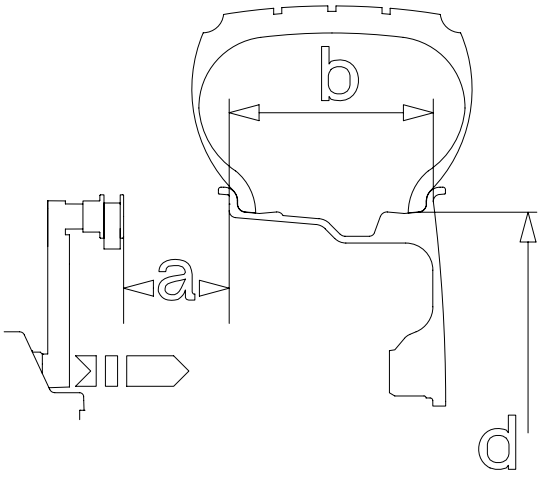
Dimension definition for corrections with clip-on weights:

d = DIAMETER: preset the nominal diameter stamped on the rim.

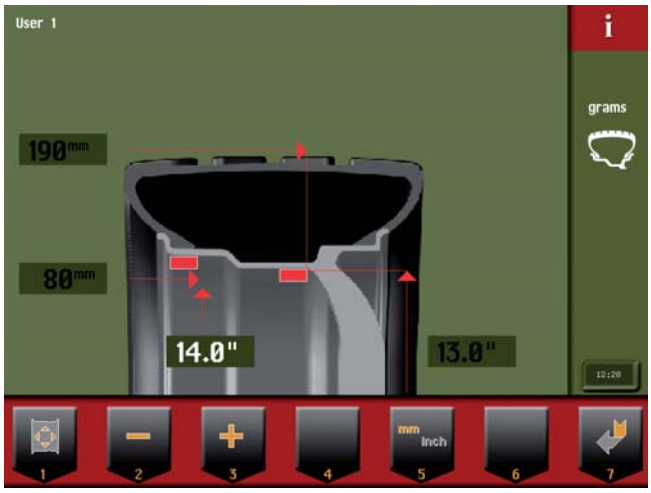
b = WIDTH: Preset the nominal width which is normally stamped on the rim (☞ ***AUTOMATIC STANDARD WHEEL SETTING***)

a = DISTANCE: set the distance of the internal side of the wheel from the machine, measuring it as described in fig. 12.

12



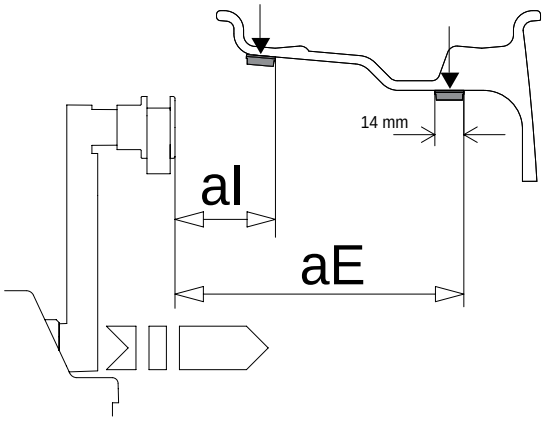
- INNER ADHESIVE WEIGHTS (ALU S)



Even in correction mode with adhesive weights, the dimensions can be input or modified manually using the buttons shown on screen in accordance with the technical data displayed.

For a better understanding of the screen contents, refer to the following outline:

13



N.B.: Correct manual setting of ALU S envisages aE > aI + 1.5" (38 mm)..
If this condition is not observed:

- *an error message is displayed at the top of the screen;*
- *exit from the ALU S manual panel is disenabled until correct aI/aE values are set.*

► 6.3 - Statistics

DAILY N° OF RUNS:
Indicates the number of runs performed as from switching on the machine.
Such parameter is automatically reset after switching the machine off.

TOTAL N° OF RUNS:
Indicates the number of runs starting from the date indicated in square brackets.
This parameter remains memorized even when the machine is switched off.

DAILY WEIGHT SAVED
Indicates the weight saved when using the IC instead of the standard correction method from the moment the wheel balancer is turned on. This parameter is automatically reset after turning off the machine.

TOTAL WEIGHT SAVED
Indicates the weight saved when using the IC instead of the standard correction method from the date indicated in square brackets. This parameter remains memorized even when the machine is switched off.

The following buttons are enabled:

1 / 2 / 3 / 4 : Press to reset the relative counter.
For the TOTAL counters a correct password must be entered.

6 : Prints some statistical values (optional)

STOP : To return to the previous screen

MENU : to return to the measurement screen

► 6.4 - Calibrations (*MENU ACCESS DIAGRAM*)

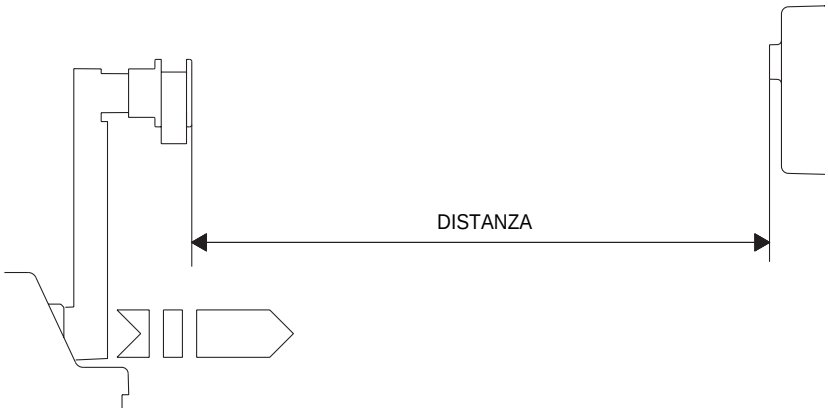
To access "Calibrations and reserved functions", a password must be given.
Any incorrect operation within the functions described below could impair the peration of the wheel balancing machine. Unauthorized use will cause cancellation of the machine warranty.

► 6.4.1- Gauge calibration

Select the gauge to be calibrated and follow the on-screen instructions.

N.B.: in width gauge calibration, the dimension needs to be set:
A - DISTANCE GAUGE AT REST POSITION
SONAR "ZERO" DISTANCE

14



► 6.4.2 - Wheel balancing machine calibration

For machine calibration, proceed as follows:
- Mount an average size wheel with steel rim. Es.: 6" x 14" (± 1")
- Preset the wheel dimensions with GREAT CARE.
- Follow the on-screen instructions.

► 6.4.3 - Type of spin

You can select between STANDARD and FAST. STANDARD mode is normally adopted on all the wheel balancers. FAST mode allows obtaining stable unbalance values in a shorter cycle time than STANDARD.

► 6.5 - General setup (*Menu access diagram*)

The Setup screen provides the user with many possibilities required for presetting the machine in relation to his own requirements. Such settings remain unaltered even when the machine is switched off.

The following buttons are enabled:

: return to previous window

: return to measurement screen

from 

to 

: for parameter selection.

► 6.5.1 - Language

This function allows selection of the language to be used for displaying descriptive and diagnostic messages regarding machine operation.

► 6.5.2 - Screen-saver

If enabled (ON), if the machine is left unused on the initial frame, the screen saver automatically comes on. The function can be disabled by setting “OFF”.

► 6.5.3 - Acoustic signal

When “ON” is selected, the acoustic signal (beep) is enabled in the following cases:

- when any push button is pressed;
- when dimensions are acquired in automatic mode;
- when the correct angular position for weight application is reached in the Measurement screen;
- when the correct angular position for weight application is reached in the Position Repeater screen.

► 6.5.4 - Setting the clock

Used to set date and time correctly. Follow the instructions on the screen.

► 6.5.5 - Options

► 6.5.5.1 - Eccentricity setup

Enables display of a menu where *the following parameters can be set:*

Side eccentricity measurement enable	Enables/disenables lateral eccentricity measurement.
Radial eccentricity measurement enable	Enables/disenables radial eccentricity measurement.
Eccentricity unit of measure	It is possible to select display of eccentricity measurements in mm or inches.
First harmonic limit	The first harmonic limit beyond which it is felt suitable to rotate the tyre on the 180° rim. Recommended Limit = 1.2 mm.
Rim first harmonic limit	Represents the first harmonic limit of the rim below which it is not considered appropriate to turn the tyre on the rim. Recommended limit: 0.3 mm.
Minimum correction limit	Represents the minimum correction limit obtainable below which it is not considered appropriate to turn the tyre on the rim. Recommended limit: 0.8 mm.

► 6.5.5.2 - Positioning

Automatic positioning enable of the outside or static side at the end of the spin.

► 6.5.5.3 - Enabling of serial output RS232C

This option enables/disables the sending of the measured unbalance and phase values to serial output RS232C.

Transmission speed	*9600 baud*
Data format	*1 bit Start*
	8 bit Data
	None parity
	1 bit Stop

At the end of each unbalancing measuring spin, the balancing machine transmits the data regarding the measured unbalance. The items of data transmitted via serial line are in ASCII format and are separated between each other by the <cr> character (0x0d).

Sending sequence is as follows:

- 00000 <cr>
- Value of correction weight, left side <cr>
- Correction phase, left side <cr>
- Value of correction weight, right side <cr>
- Correction phase, right side <cr>

The first 5 zero bytes represents the start of transmission message. The correction values are expressed in grams, in steps of .1 gram.
The phase values are expressed in degrees, in the range 0 ÷ 359.

► 6.5.5.4 - Printer enabling (optional)

Enable/disable printer and relative print options.

If the options RS232 serial port and printer are enabled at the same time, both will malfunction.

► 6.5.5.5 - Wheel locking enable

Enables/disables wheel locking in the correction position (***WHEEL LOCKING***).
The possible options are:
OFF: disabled
ON: enabled
ALUS : enables wheel locking in position for the ALUS correction mode only.

Wheel locking by means of the button STOP is always enabled.

► 6.5.5.6 - Gauge locking enable

Enables/disables distance gauge locking when the correct distance has been reached to apply the adhesive weight to correct the unbalance.
To release the gauge, lower it to below 10” diameter.

► 6.6 - Balancing setup

► 6.6.1 - Unit of unbalance measurement

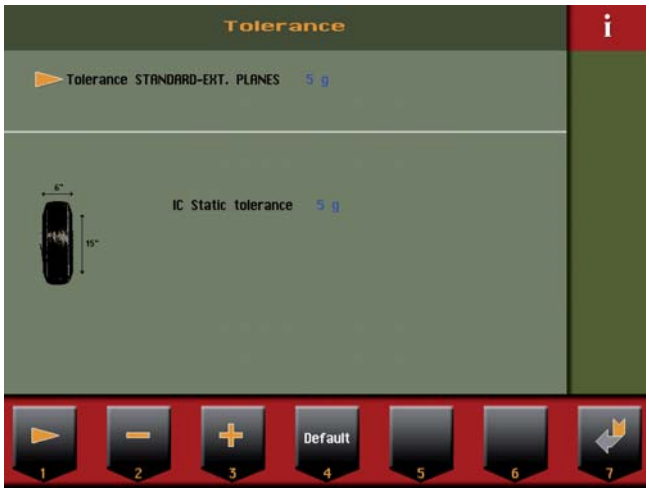
It is possible to select whether to display the unbalance values expressed in grams or ounces.

► 6.6.2 - Unbalance display pitch

This represents the unbalance display pitch and varies in relation to the unit of measurement selected. The selection “5 g” (1/4 oz) enables display of the correction values on both sides such as to bring the static unbalance to 0 (theoretical). **It is recommended to preset this function as standard on the machine as it improves the balancing quality. The computer makes a complex calculation which allows cancelling the residual static unbalance by varying the value and position of the counterweights fixed in steps of 5 grams (1/4 oz).**

► 6.6.3 - Tolerance (also *CORRECTION METHOD*)

This is the unbalance threshold below which the word “OK” instead of the unbalance value appears on the screen at the end of the spin:



The tolerance varies based on the correction method selected.
In the case of IC (Intelligent Correction), set the static tolerance limit and the average weight of a reference wheel of 6” in width and 15” in diameter.

The following buttons are enabled:

1	parameter selection during setting
2 / 3	parameter decrease/increase during setting
4	default parameter setting recommended by the manufacturer
7	return to previous frame.

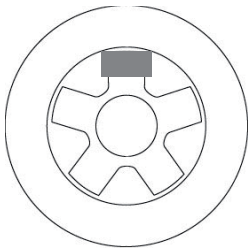
► 6.6.4 - Run with guard closed

When “ON” is selected, automatic run start is enabled when the guard is closed.

► 6.6.5 - Opposite position

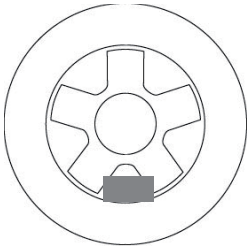
The normal balancing condition requires the correction weight to be applied at the top (12 o'clock) when the symbol is displayed:

Apply the correction weight at the top (12 o'clock)



If OPPOSITE POSITION is enabled, the application position for the bottom weight is also indicated on the phase display (6 o'clock) to facilitate cleaning the rim and the relative application of adhesive weights. The symbol used is:

Apply the correction weight at the bottom (6 o'clock)



► 6.6.6 - Static always enabled

Simultaneous display of the selected correction plane unbalance as well as STATIC unbalance can be enabled/disabled. The static frame can always be selected by pressing the 

button from the measuring frame.

► 6.6.7 - Correction method

One of the three possible correction methods can be selected based on the specific requirements of the customer.

► 6.6.7.1 - Standard correction method

The wheel balancer considers the unbalance within tolerance when the value of each single plane is lower than the tolerance set.

► 6.6.7.2 - External plane correction method

If correcting with adhesive weights, the unbalance is considered within tolerance when the recalculated external plane weight (clip-on weights) is lower than the tolerance set.
Additional windows appear on the screen always displaying the residual external plane value (clip-on weight):

► 6.6.7.3 - IC (intelligent correction) correction method

The correction plane unbalance is considered within tolerance when both the STATIC and the DYNAMIC TORQUE unbalances are lower than the tolerance set.
This correction method allows considerably reducing the weight to be applied, yet maintaining excellent balancing quality. An icon appears on the screen showing the value of weight saved with respect to standard balancing.

If a special icon appears near the button 5, it means that the wheel balancer is suggesting static balancing, however, such that also the dynamic torque unbalance will be brought within tolerance.

When pressing the button 5, the position repeater frame is accessed which clearly indicates where the weight should be positioned in the rim.

When the button 1 is pressed, as well as the actual unbalance values a window is also displayed indicating the static and dynamic torque unbalances.

***NOTE**: The innovative IC software has been designed to reduce the amount of weight used to correct the unbalance, leaving a residual unbalance on the wheel within the set tolerances.*
The tolerance used by the machine is obtained from a tolerance of a reference wheel, modified in order to make the vibration generated by the reference wheel comparable with that in use.
This is obtained according to the coded theory of the ISO standards.
In general, a wheel balanced using IC has a higher residual unbalance than a wheel balanced at best using the conventional method, but, although generating a tolerable vibration from the vehicle, it has the advantage of considerably reducing the counterweights used.

► 6.7 - Special functions

► 6.7.1- Presetting the customer and user name

The machine can be customized by presetting:
a) The name appearing on the initial screen (screen-saver).
b) The name of 4 different machine users (USER NAME).

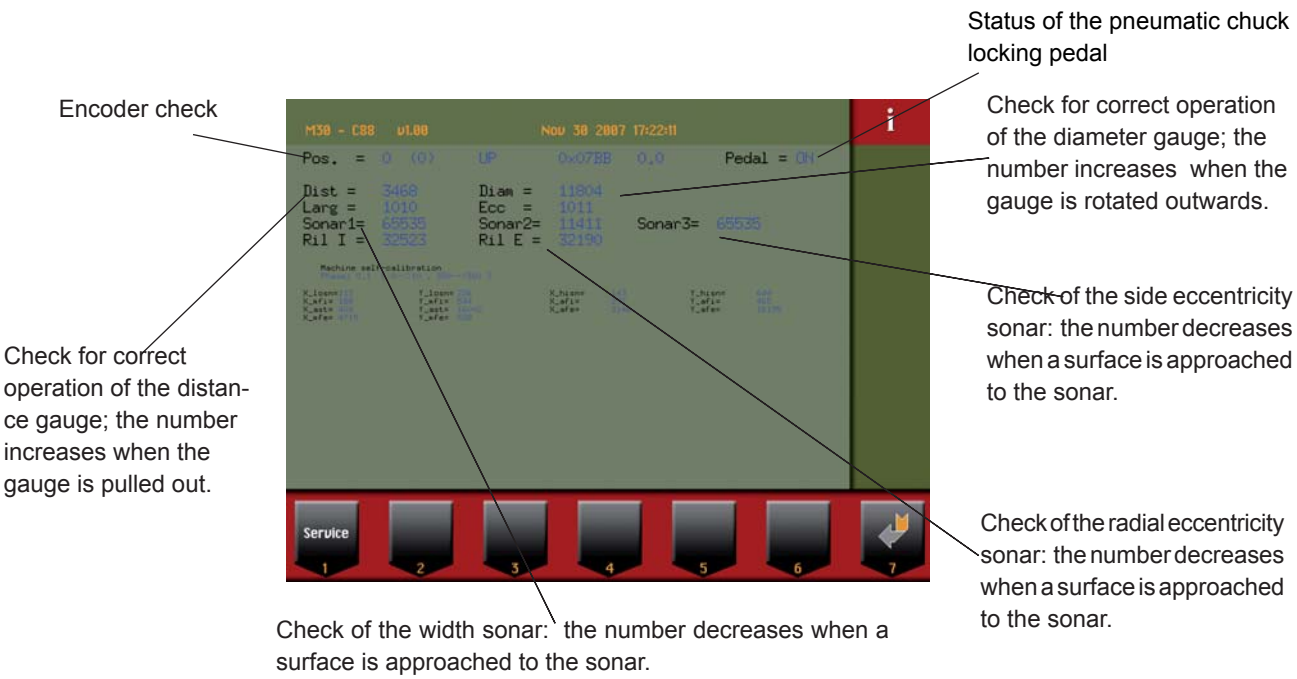
► 6.7.2 - Wheel balancing machine self-test

An automatic self-diagnostic cycle is provided for easier trouble-shooting. At the end of the self-diagnostic cycle, several parameters are displayed which are useful for the Technical Service Department in order to identify machine faults.

Returns to previous menu

Encoder test: Runs an automatic test cycle of the encoder. Report any faults to Technical Service.

CHECKING THE ENCODER
When the spindle is rotated:
- the angular position “POS” should vary from 0 to 128;
- the wording **“UP**” should appear when rotated clockwise and “**DOWN**” when rotated in the opposite direction.



In the event of failure or faulty operation of the wheel balancing machine, notify the Technical Service of all the parameters displayed.

7 - ERRORS

ERRORS	CAUSES	CONTROLS
Black	The wheel balancer does not switch on.	1. Verify correct connection to the mains. 2. Verify and eventually replace the fuses on the power card. 3. Verify monitor function. 4. Replace the computer board.
Err. 1	No rotation signal.	1. Verify belt tautness. 2. Verify the function of the phase pick-up board and, in particular, the reset signal. 3. Replace the phase pick-up board. 4. Replace the computer board.
Err. 2	Speed too low during detection. During unbalance measurement rotation, wheel speed is less than 42 rpm.	1. Make sure that a vehicle wheel is mounted on the wheel balancer. 2. Verify belt tautness. 3. Verify the function of the phase pick-up board and, in particular, the reset signal. 4. Replace the computer board.
Err. 3	Unbalance too high.	1. Verify wheel dimension settings. 2. Check detection unit connections. 3. Perform machine calibration. 4. Mount a wheel with more or less known unbalance (less than 100 grammes) and verify the response of the machine. 5. Replace the computer board.
Err. 4	Rotation in opposite direction. After pressing [START], the wheel begins to rotate in the opposite direction (anti-clockwise).	1. Verify the connection of the UP/DOWN – RESET signals on the phase pick-up board.
Err. 5	Guard open The [START] pushbutton was pressed without first closing the guard.	1. Reset the error by pressing pushbutton [7]=End. 2. Close the guard. 3. Verify the function of the protection uSwitch. 4. Press the [START] pushbutton.
Err. 7 / Err. 8	NOVRAM parameter read error	1. Repeat machine calibration 2. Shut down the machine. 3. Wait for a minimum time of ~ 1 Min. 4. Re-start the machine and verify correct operation. 5. Replace the computer board.
Err. 9	NOVRAM parameter write error.	Replace the computer board.
Err. 11	Speed too high error. During unbalance measurement rotation, wheel speed is more than 270 rpm.	1. Check if there is any damage or dirt on the timing disc. 2. Verify the function of the phase pick-up board and, in particular, the reset signal. 3. Replace the computer board.
Err.14/ Err.15/ Err.16/ Err.17/ Err.18/ Err.19	Unbalance measurement error.	1. Verify phase pick-up board function. 2. Check detection unit connections. 3. Verify machine earth/ground connection. 4. Mount a wheel with more or less known unbalance (less than 100 grammes) and verify the response of the machine. 5. Replace the computer board.

Err. 20	The wheel comes to a halt before completing positioning correctly.	1. Make sure that the wheel to be balanced is at least 10” in diameter. 2. Verify the correct setting of wheel dimensions on screen. 3. Verify belt tautness. 4. For wheels less than 12” in diameter wheels: disenable the eccentricity measurement procedure.
Err. 22	Maximum number of spins possible for the unbalance measurement has been exceeded.	1. Check that a vehicle wheel has been mounted on the wheel balancer. 2. Check belt tautness. 3. Check functioning of the phase generator and, in particular, the reset signal. 4. Replace the computer board.
Err. 30	Clock error	Replace the computer board.
Err.40/ Err.41/ Err.42/ Err.43	Eccentricity graph plotting procedure error.	Perform a new eccentricity measurement.
Err.45/ Err.46/ Err.47/ Err.48	Eccentricity graph value display readout error.	Perform a new eccentricity measurement.
Err.50/ Err.51/ Err.52/ Err.53	Eccentricity graph current value cursor plotting procedure error.	Perform a new eccentricity measurement.
Err.54	Sonar readout error. Sonar value readout impossible.	1. Position the eccentricity measurement sonar correctly before performing the measurement. 2. Check eccentricity sonar connections. 3. Check the power supplies on the power board. 4. Replace the eccentricity measurement sonar. 5. Make sure that the wheel does not halt before completing at least 4/5 revolutions after the first braking impulse. 6. Verify belt tautness. 7. Replace the computer board.
Err.55	Sonar readout error. Sonar values are insufficient for correct measurement of eccentricity.	1. Position the eccentricity measurement sonar correctly before performing the measurement. 2. Make sure that the wheel does not halt before completing at least 4/5 revolutions after the first braking impulse. 3. Verify belt tautness. 4. Mount a wheel of medium dimensions (14”x5 ¾”) and perform an eccentricity measurement . If in these conditions error 55 no longer occurs, this means that the wheel inertia causing the problem is such as to half the wheel before having acquired the minimum number of values necessary for reliable eccentricity measurement.
Err.56	Lateral Sonar readout error. Lateral Sonar value readout impossible.	1. Position the eccentricity measurement lateral sonar correctly before performing the measurement. 2. Check eccentricity lateral sonar connections. 3. Check the power supplies on the power board. 4. Replace the eccentricity lateral sonar. 5. Make sure that the wheel does not stop before completing at least 4/5 revolutions after the first braking impulse. 6. Verify belt tautness. 7. Replace the computer board.
Err.57	Lateral Sonar readout error. Lateral Sonar values are insufficient for correct measurement of lateral eccentricity.	1. Position the eccentricity lateral sonar correctly before performing the measurement. 2. Make sure that the wheel does not stop before completing at least 4/5 revolutions after the first braking impulse. 3. Verify belt tautness. 4. Mount a wheel of medium dimensions (14”x5 ¾”) and perform an eccentricity measurement . If in these conditions error 57 no longer occurs, this means that the wheel inertia causing the problem is such as to half the wheel before having acquired the minimum number of values necessary for reliable lateral eccentricity measurement.
Err.58	Radial and lateral Sonar readout error. Radial and lateral Sonar value readout impossible.	1. Check points Err. 54 2. Check points Err. 56

Err.59	Radial and lateral Sonar readout error. Lateral and radial Sonar values are insuffi-cient for correct measurement of radial and lateral eccentricity.	1. Check points Err. 55 2. Check points Err. 57
Err.65	Printer timeout	1. Check that a printer is present. 2. Check the code of the processor card. 3. Check the printer <-> processor card connection. 4. Run the printer test function.
Err.66	Printer buffer error	1. Reset the printer. 2. Repeat the print function.

8 - ROUTINE MAINTENANCE

► 8.1 - Scheduled maintenance

Switch off the machine from the mains before carrying out any operation.

► 8.2 - Replacing fuses

Remove the weight holder shelf to gain access to the power supply board where the 4 fuses are located (☛ Exploded Drawings). If fuses require replacement, use ones of the same current rating. If the fault persists, contact Technical Service.

NONE OF THE OTHER MACHINE PARTS REQUIRE MAINTENANCE.