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# 1 - General

## 1.1 - General safety regulations
-The wheel balancer may only be used by duly authorized and trained  personnel.
- The wheel balancer must not be used for purposes other than those described in the instruction manual.
- The wheel balancer must not be modified in any way except for those modifications made
  explicitly by the manufacturer.
- Do not remove the safety devices. Any work on the machine must  be carried out by specialised personnel
  only.
- Avoid using 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 flange.
- The machine operator must not wear clothes with flapping parts. Do not allow unauthorized personnel to
  approach the wheel balancer when the cycle is running.
- Avoid placing objects in the base which could impair the correct operation of the wheel balancing machine.


### 1.1.1 - Standard safety devices
- Stop push button for stopping the wheel under emergency conditions.
- The wheel guard is not compulsory since the balancing speed is less than 100 min$^{-1}$.
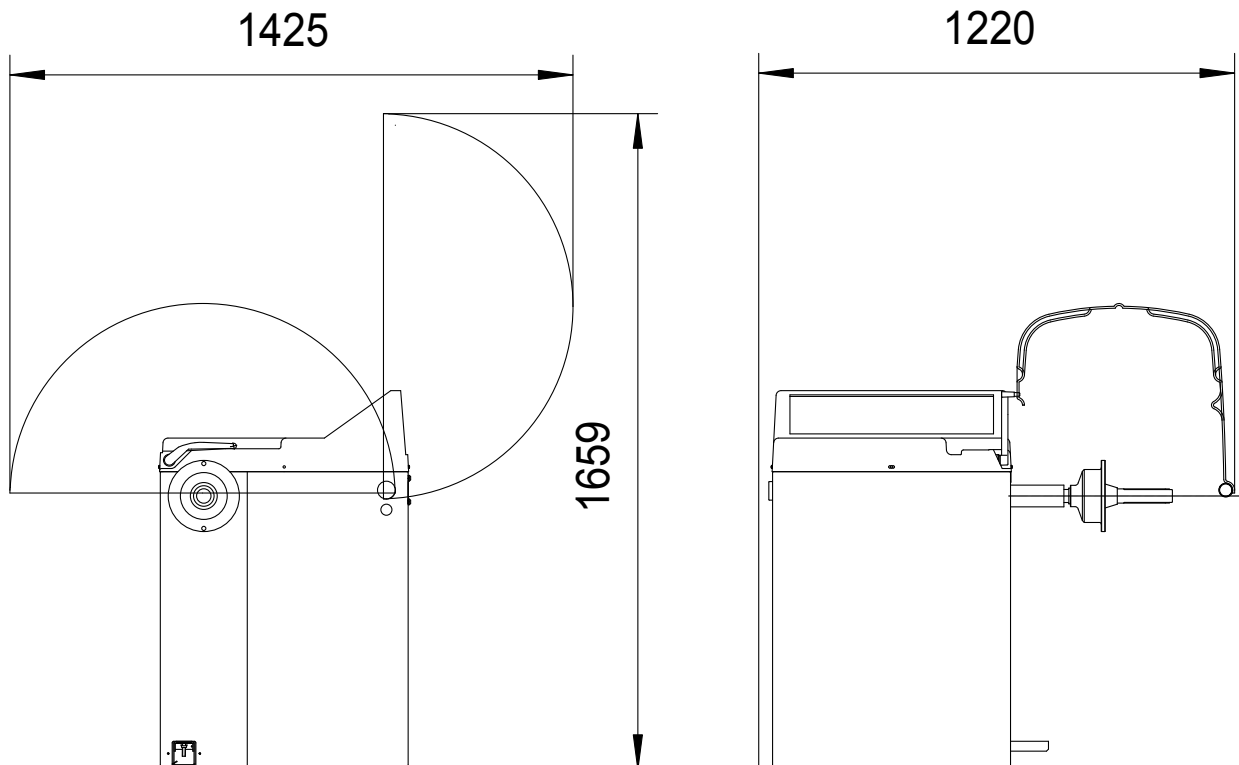
## 1.2 - Field of application
The machine is designed for balancing wheels of cars, light commercial vehicles or motorcycles weighing less than 75 kg.
It can be operated in a temperature range of 0° to + 45° C.
The following functions are provided:  ALU-S; SPLIT;  Unbalance optimisation; Autodiagnostics; Autocalibration.


## 1.3 - Overall dimensions (standard guard)

1

1425

1220

1659

## 1.4 - Technical data

| | |
|---|---|
| Single-phase power supply | 115 / 230 V - 50/60 Hz |
| Protection class | IP 54 |
| Max. power absorbed | 0,8 Kw |
| Balancing speed | < 100 min$^{-1}$ |
| Cycle time for average wheel (14 kg) | 6-8 seconds |
| Max. resolution of measurement | 1 gram |
| Position resolution | ± 1.4 ° |
| Average noise | < 70dB (A) |
| Rim-machine distance | 0 - 265 mm |
| Rim width setting range | 1.5" - 20" or 40 - 510 mm |
| Diameter setting range | 10" - 26" or 265 - 665 mm |

## 2 - Handling and lifting
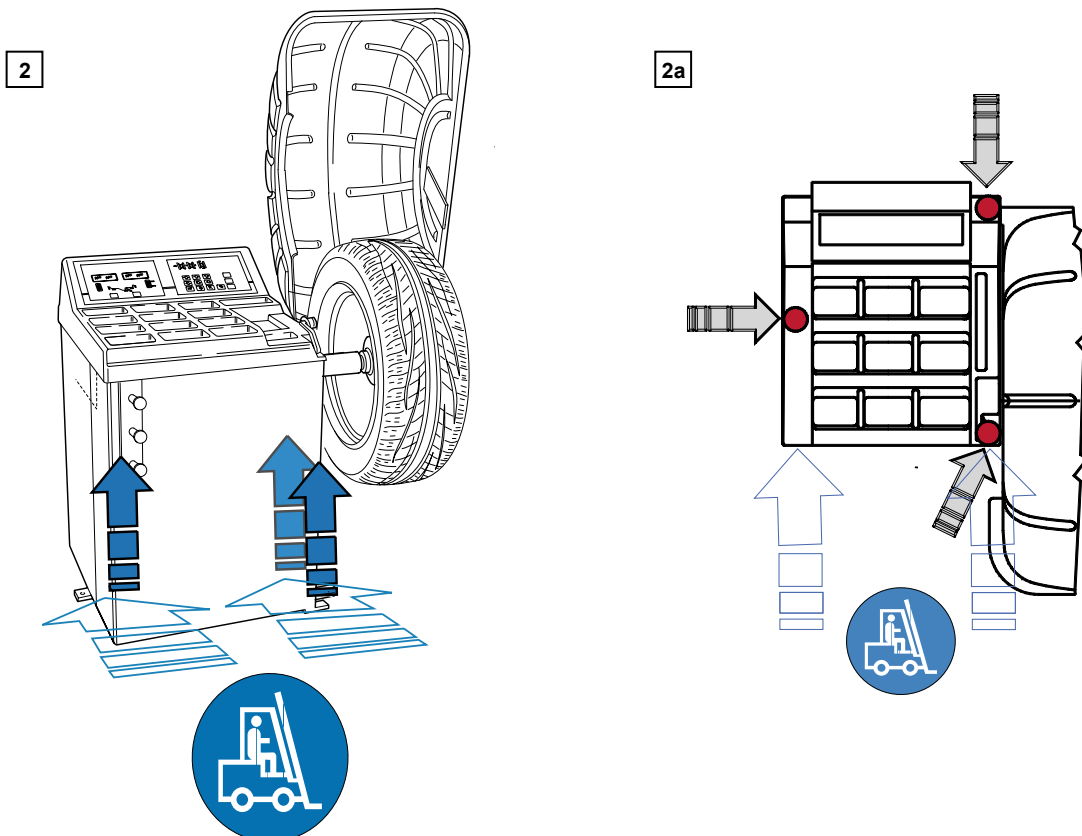


**Note: DO NOT LIFT THE WHEEL BALANCER USING OTHER GRIPS**

## 3 - Startup

### 3.1 - Anchoring
The machine can operate on any flat non resilient floor.
Make sure that the machine rests solely on the three support points provided  (Fig.2a).

### 3.2 - Electrical connection
The machine is supplied with a single-phase mains cable plus earth (ground).
The power supply voltage (and mains frequency) is indicated on the machine identification plate and cannot be changed.
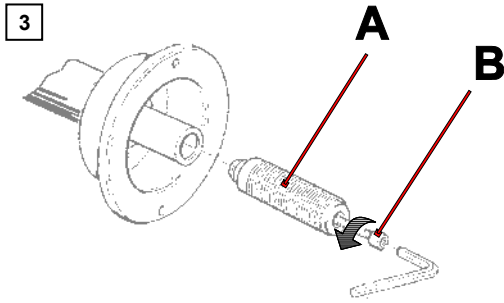Connection to the mains must always be made by expert personnel.
The machine must not be set up without proper earthing.
Connection to the mains should be through a slow acting safety switch rated at 3 A (230V) or 8 A(115 V).
See enclosed diagram.

### 3.3 - Flange mounting



The wheel balancer is supplied complete with cone flanges
for fixing wheels with a central hole. Other optional flanges can be mounted:
**a)** Remove the threaded end-piece A after unscrewing the screw B.
**b)** Mount the new flange (see attached sheets).
**Note:  CAREFULLY CLEAN THE COUPLING SURFACES BEFORE PERFORMING ANY OPERATION.**

### 3.4 - Wheel guard assembly and adjustment (optional)
a) Fasten the components to the base as illustrated in specific exploded view.
b) The position of the wheel guard when closed can be adjusted with relative screw accessible at the back.
Correct position is horizontal.
c) Check that the microswitch is held down when the guard is closed.
d) Adjust the angular position of microswitch control.

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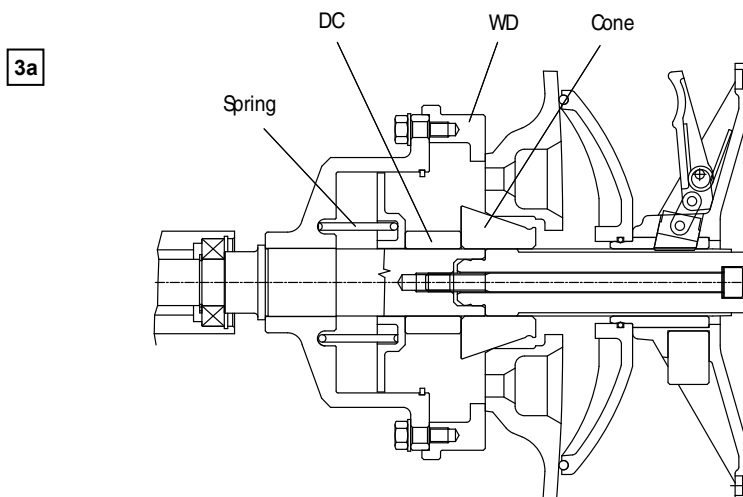


## 4 - Controls and components

### 4.1  - Manual distance measurement gauge
This gauge serves to manually measure the distance between the point of application of the counterweight and the machine.

## 4.2 - Keyboard and display



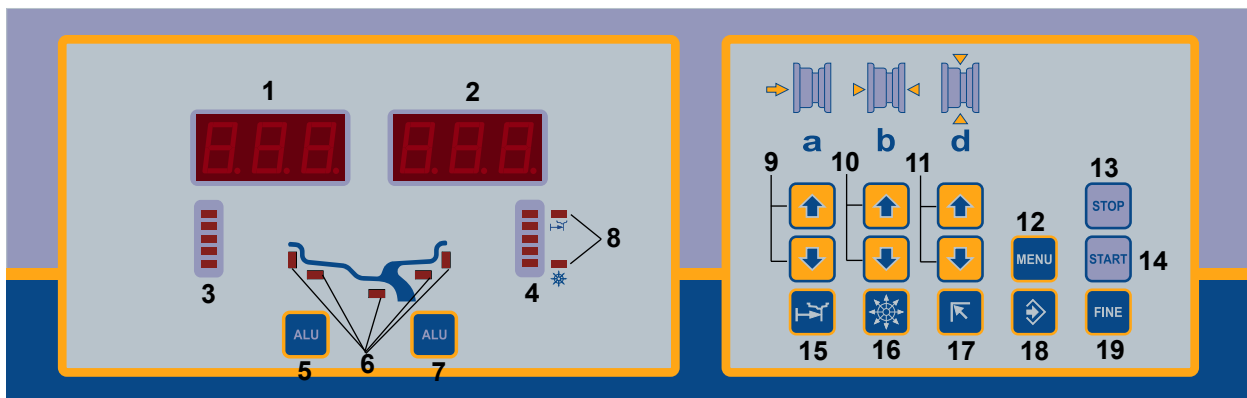| 1-2 | Digital readouts, AMOUNT OF UNBALANCE, inside/outside | 11 | Manual DIAMETER setting button |
| 3-4 | Digital readouts, POSITION OF UNBALANCE, inside/outside | 12 | Push button, FUNCTION MENU |
| 5 | Inside correction mode selection button | 13 | Balancing cycle stop button |
| 6 | Indicators, correction mode selected | 14 | Balancing cycle start button |
| 7 | Outside correction mode selection button | 15 | Position repeater push button (not used) |
| 8 | Special function indicators | 16 | Push button, SPLIT (unbalance resolution) |
| 9 | Manual DISTANCE setting button | 17 | HOME push button |
| 10 | Manual WIDTH setting button | 18 | MENU selection confirmation pushbutton |
|  |  | 19 | Push button, unbalance reading < 5 g (.25 oz) |

**Note: Press buttons only with your fingers. Do not use the counterweight grippers or other pointed objects.**

### 4.2.1 - Function menu management



**MENU**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **OPE.** | | ➡ | See chapter on *UNBALANCE OPTIMISATION* | | | | |
| **-d-** | | ➡ | **-d-** | 00 | ⬇ ⬆ | mm/inch diameter | ➡ CONFIRM |
| **-b-** | | ➡ | **-b-** | 00 | ⬇ ⬆ | mm/inch width | ➡ CONFIRM |
| **SP.** | | ➡ | **SP.** | OFF | ⬇ ⬆ | start from guard closing | ➡ CONFIRM |
| **APP.** | | ➡ | **APP.** | 5 | ⬇ ⬆ | approx. -5 g or 0.1-0.25 oz | ➡ CONFIRM |
| **SEE** | **UP** | ➡ | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| ⬇ ⬆ | **di A** | **Gn.** | ➡ | See chapter on *AUTODIAGNOSTICS* | | |
| | **CAL.** | | ➡ | See chapter on *AUTOCALIBRATION* | | |
| | **-U-** | | ➡ | **-U-** | **Gr.** ⬇ ⬆ | g/oz unit of measure unbalance ➡ CONFIRM |

**STOP** / ↖ **RETURN TO MEASUREMENT FRAME**
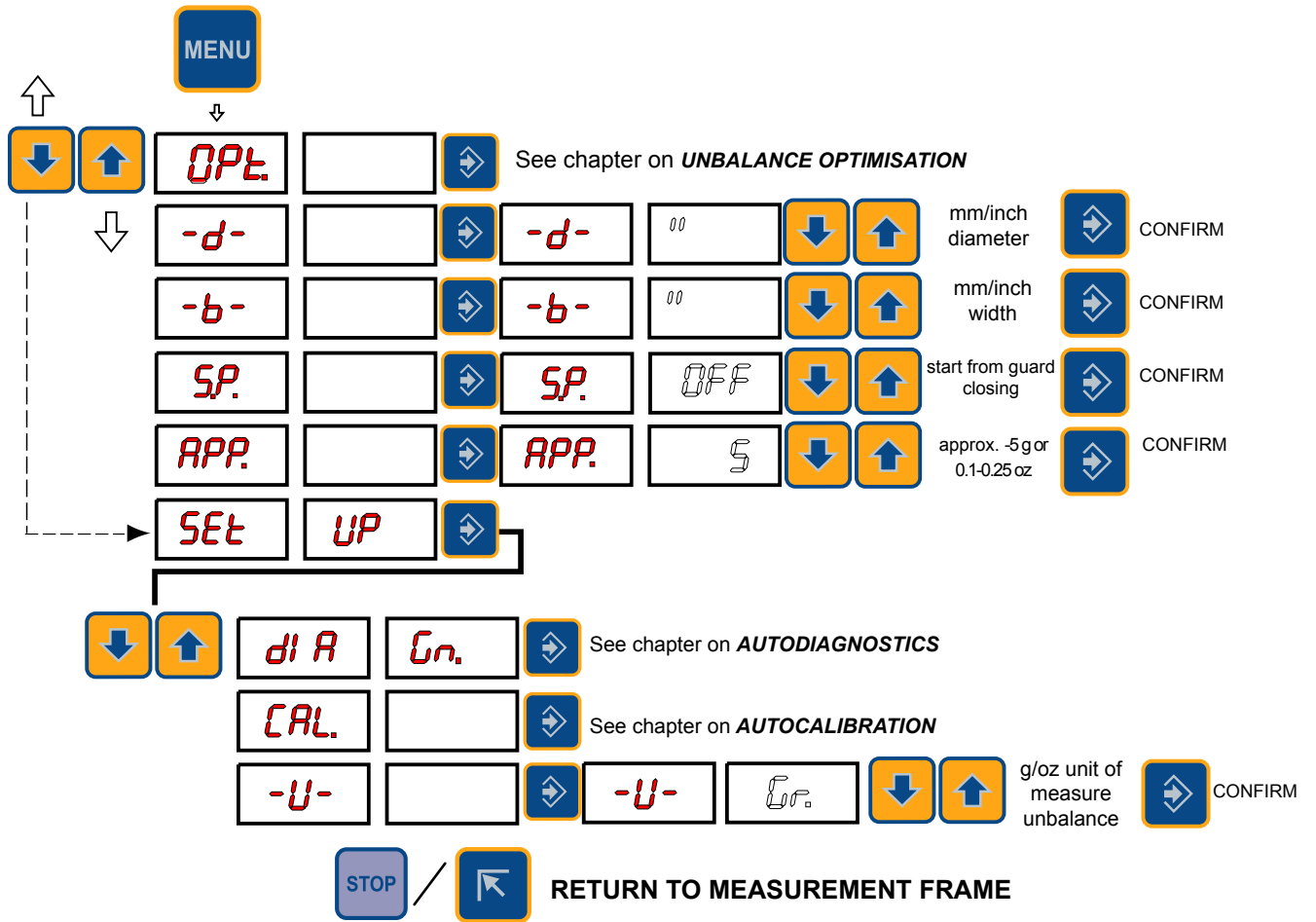
# 5 - Instructions for use of the wheel balancer

## 5.1 - Setting the wheel dimensions
**a)**

**DYNAMIC balancing of steel or light alloy rims with application of clip-on weights on the edge of the rim.**

From the measurement frame, press [ALU] inside and outside to select the desired correction mode.
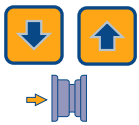
The illuminated LEDs indicate the position where the weights should be applied. If a spin has already been carried out, each time the mode is changed, the processor automatically recalculates the unbalance values on the basis of the new setting.

**- Measuring**

`5`

Reading **a**

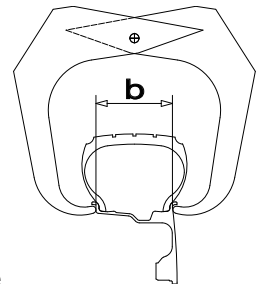**b**

**d**
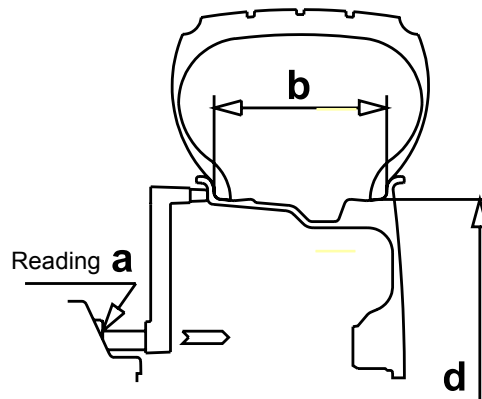
**- Setting**

- Set the distance "a" between the inside of the wheel and the machine
  - `-a-`  `80`

- Set the nominal width, normally indicated on the rim, or measure the width "b" using the caliper gauge supplied.
  - `-b-`  `5.7`

  **b**

- Set the nominal diameter "d" indicated on the tyre.
  - `-d-`  `140`

**This setting is also valid for the following correction modes:**

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

Balancing of light alloy rims with application of adhesive weights on the shoulders of the rims. The position of the weights is fixed from the edges of the rim to the inside of the rim.

Combined balancing: adhesive weight on the outside and clip-on weight on the inside. The position of the outside weight is fixed from the outside edge of the rim to the inside of the rim.

Combined balancing: adhesive weight on the inside and clip-on weight on the outside. The position of the inside weight is fixed from the edge of the rim to the inside of the rim
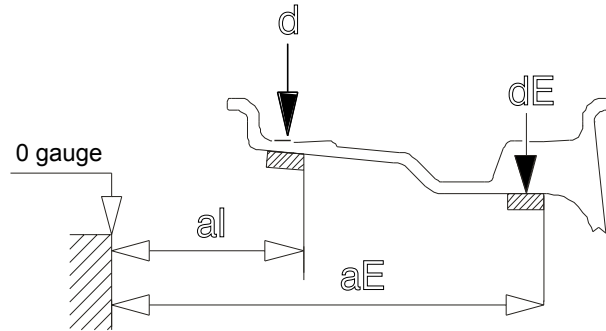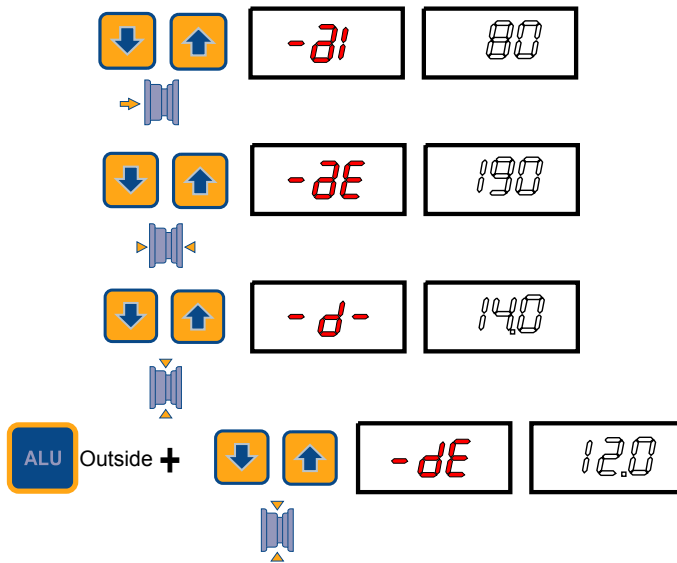
**Balancing of alloy rims with hidden application of the outside adhesive weight. The position of the weights can be set.**

**- Measuring:**

6



**b)**



**(Nominal)**

*Note: Hold the* [ALU] *button down for more than 2 seconds when the value of any one of the dimensions appears on the display.*

**Note:** not setting dE as it is automatic, dE = d - 2"

**c)**

Combined balancing: clip-on weight on the inside and hidden adhesive weight on the outside (Mercedes).
The position of the weights can be set.

**- Measuring:**

| 7 |

d

dE

0 gauge

al

aE

**Setting:**

⬇️ ⬆️  ` - al `  ` 80 `

⬇️ ⬆️  ` - aE `  ` 190 `

⬇️ ⬆️  ` - d - `  ` 140 `   **(Nominal)**

ALU  Outside  **+**  ⬇️ ⬆️  ` - dE `  ` 12.0 `

*Note: Hold the* ALU

*button down for more than 2 seconds when the value of any one of the dimensions appears on the display.*

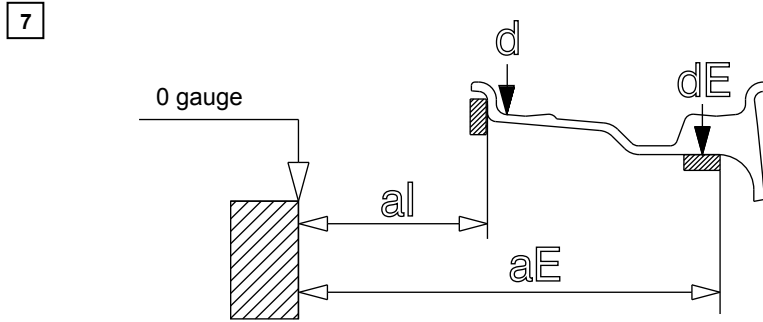**Note:** not setting dE as it is automatic, dE = d - 2"

## 5.2 - Measurement result

**Inside correction**

**Outside correction**
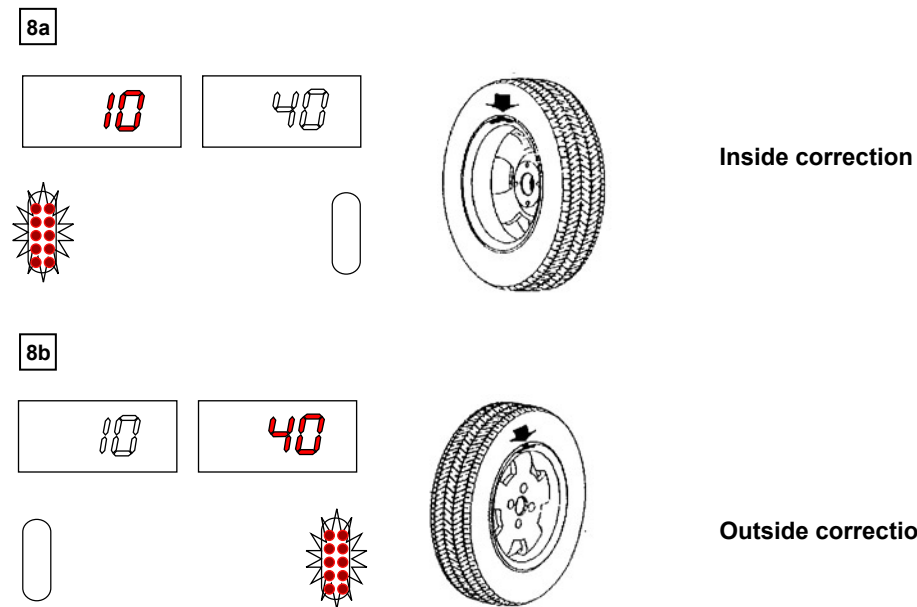
After performing a balancing spin, the amounts of unbalance are shown on the digital readouts.
The illuminated LEDs 3 and 4 indicate the correct angular position of the wheel to mount the counterweights (12 o'clock).

If the unbalance is less than the threshold value selected, $\textbf{0}$ is displayed instead of the unbalance value; with [FINE]

the values below the threshold can be read, selected gram by gram.

**Note :** in the case of wheels with a diameter less than or equal to 13" and at temperature conditions near 0°, the wheel balancer automatically inserts a special measuring cycle composed of two successive measurements.
The accuracy of the unbalance values and the reliability of the wheel balancer remain unchanged. This type of operation is reset each time the wheel balancer is started.

## 5.3 - Recalculation of the unbalance values

Press [↖] after new setting of the measurement.

## 5.4 - Split function (hidden weight)

The SPLIT function is used to position the adhesive weights behind the wheel spokes so that they are not visible. This function should be used only in the case of static unbalance or where the hidden adhesive weight is to be applied on the outside. Input the wheel dimensions and do a spin.

Start the SPLIT function as follows:



Example of display prior to SPLIT function
- Place the wheel in the outside unbalance correction position.
- Set one of the top spokes (preferably the one to the left of the unbalance) to 12 o'clock.

- Press the button 

- Follow the UP/DOWN indication of the positioning LEDs and set the second top spoke to 12 o'clock.

- Press button 
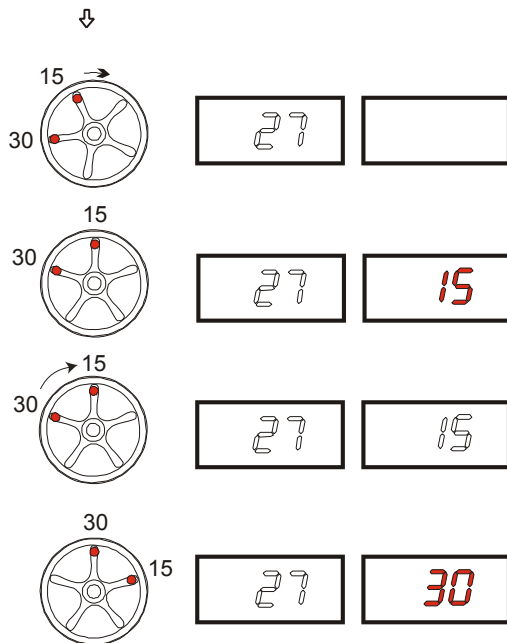
 - Set the first split unbalance to correction position 1

 - Correction position 1

 - Set the second split unbalance to correction position 2

 - Correction position 2

**N.B.:** *If error 24 is displayed, repeat the SPLIT function ensuring that the minimum distance between the spokes is greater than 18 degrees. If error 25 is displayed,repeat the split function ensuring that the maximum distance between the spikes is smaller than 120 degrees.*

To return to normal unbalance display, press any button.

To carry out a new spin, press the START button.

## 5.5 - Out of balance optimization

- This function serves to reduce the amount of weight to be added in order to balance the wheel
- It is suitable for static unbalance greater than 30 g.
- It improves the residual eccentricity of the tyre.

| OPt. | |

⬇ No previous unbalance measurement

⬇

Unbalance already measured

| StA | rt |

⬇

START

⬇

unbalance measurement

| C__ | 180 |

START
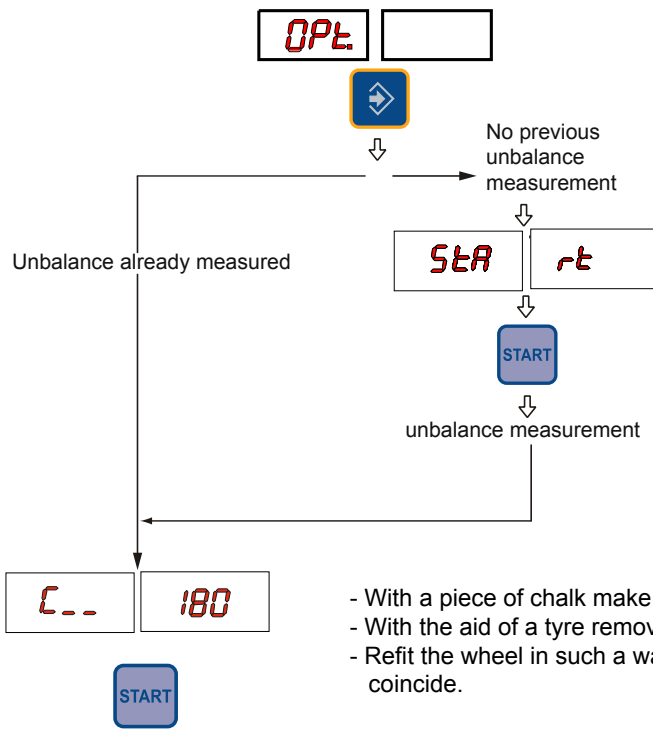
- With a piece of chalk make a reference mark on the flange and the rim
- With the aid of a tyre remover, turn the tyre on the rim by 180°
- Refit the wheel in such a way that the reference marks on the rim and the flange coincide.

| 45 | 80↵ |

- RH display:  percentage reduction value
- LH display:  actual static unbalance value which can be reduced by rotation

TYRE POSITION
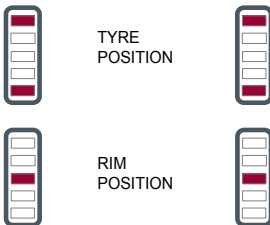
RIM POSITION

- Mark the two positions of the rim and tyre, and turn the tyre on the rim until the positions correspond in order to obtain the optimization on the display.

STOP

**CANCEL OPTIMISATION IN ANY PHASE**

## 5.6 - Automatic minimisation of static unbalance

Initial unbalance

| sx | dx |
|----|----|
| 23g | 18g |

Phase shift 50°

Possible approximations

| sx | dx | | sx | dx | | sx | dx | | sx | dx |
|----|----|---|----|----|---|----|----|---|----|----|
| 25g | 20g | | 25g | 15g | | 20g | 20g | | 20g | 15g |

static residue 4 g       static residue 3 g       **static residue 1 g**       static residue 6 g

With traditional wheel balancer                    Choice with minimum static unbalance
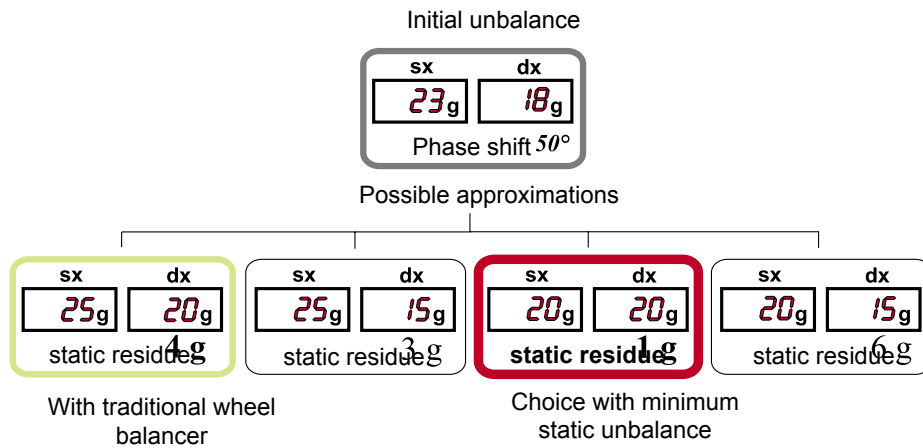
This program is designed to improve the quality of balancing without any mental effort or waste of time by the operator. In fact, using the normal weights available on the market (pitch of 5 in every 5 g) and applying the two counterweights which a conventional wheel balancer rounds to the nearest value, a residual static unbalance of up to 4 g may result. The damage of such approximation is emphasized by the fact that static unbalance is the cause of most disturbances on vehicles. This new function automatically indicates the optimum entity of the weights to apply by approximating them in an "intelligent" way according to their position in order to minimize residual static unbalance.

## 6.1 - Autodiagnostics

| di A | Cn. |
|------|-----|

Performs tests useful for maintenance staff.

## 6.2 - Autocalibration

For autocalibration proceed as follows:
- Fit a metal wheel of average dimensions on the shaft. Example 6" x 14" (± 1")
- Set the exact dimensions of the wheel mounted.

**CAUTION !!** Setting incorrect dimensions will result in the machine not being properly calibrated and hence all the subsequent measurements will be incorrect until a new autocalibration is performed with the correct dimensions!!

| CAL. | |
|------|--|

[→]

| StA | rt |
|-----|----|

[START]          - Perform a spin under normal conditions.

| Add | 100 |
|-----|-----|

[START]          - Add a 100 g. sample weight (3.5 oz) on the outside in any angular position.

| 100 | Add |
|-----|-----|

[START]          - Shift the sample weight from the outside to the inside keeping the same angular position.

| r°ᄀ | |
|-----|--|

[→]              - Turn the wheel until the sample weight is in the 12 o'clock position.

| CAL. | |
|------|--|

                 **END OF AUTOCALIBRATION**

[STOP] [↖]       **CANCEL AUTOCALIBRATION IN ANY PHASE**

# 7 - Errors

During machine operation there may be various causes of malfunctioning which, if detected by the microprocessor, are indicated on the display:

| Err. | -5- |

| ERRORS | CAUSES | CONTROLS |
|---|---|---|
| Black | The wheel balancer does not come on. | 1. Check proper connection to the mains.<br>2. Check and if necessary replace the fuses on the power board.<br>3. Replace the computer board. |
| Err. 1 | No rotation signal. | 1. Check belt tautness.<br>2. Check functioning of the phase generator and, in particular, the reset signal.<br>3. Replace the phase generator.<br>4. Replace the computer board. |
| Err. 2 | Too low speed during measurement. During the unbalance measurement revolutions, the wheel speed has fallen to below 42 rpm. | 1. Check that a vehicle wheel has been mounted on the wheel balancer.<br>2. Check belt tautness.<br>3. Check functioning of the phase generator and, in particular, the reset signal.<br>4. Replace the computer board. |
| Err. 3 | Too high unbalance. | 1. Check the wheel dimension setting.<br>2. Check the sensor connections.<br>3. Run the machine calibration function.<br>4. Mount a wheel with a more or less known unbalance (less than 100 grams) and check the machine response.<br>5. Replace the computer board. |
| Err. 4 | Rotation in opposite direction. After pressing [START], the wheel starts turning in the opposite direction (anticlockwise). | 1. Verify the connection of the UP/DOWN - RESET signals on the phase generator. |
| Err. 5 | Guard open The [START] pushbutton was pressed without first closing the guard. | 1. Reset the error.<br>2. Close the guard.<br>3. Verify the function of the protection uSwitch.<br>4. Press the [START] button. |
| Err. 7 /<br>Err. 8 /<br>Err. 9 | NOVRAM parameter read error | 1. Repeat machine calibration<br>2. Shut down the machine.<br>3. Wait for at least ~ 1 min.<br>4. Restart the machine and check proper functioning.<br>5. Replace the computer board. |
| Err. 11 | Too high speed error. The average spinning speed is greater than 240 rpm. | 1. Check if there is any damage or dirt on the timing disc.<br>2. Check functioning of the phase generator and, in particular, the reset signal.<br>3. Replace the computer board. |
| Err.14/<br>Err.15/<br>Err.16/<br>Err.17/<br>Err. 18/<br>Err. 19 | Unbalance measurement error. | 1. Check functioning of the phase generator.<br>2. Check the sensor connections.<br>3. Check the machine earthing connection.<br>4. Mount a wheel with a more or less known unbalance (less than 100 grams) and check the machine response.<br>5. Replace the computer board. |
| Err.21 | Motor on for more than 15 seconds. | 1. Check functioning of the phase generator.<br>2. Check the connections on the power board.<br>3. Replace the computer board. |
| 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.<br>2. Check belt tautness.<br>3. Check functioning of the phase generator and, in particular, the reset signal.<br>4. Replace the computer board. |
| Err. 24 | Distance between the spokes smaller than 18 degrees. | 1. The minimum distance between the spokes where to split the unbalance must be greater than 18 degrees<br>2. Repeat the SPLIT function increasing the distance between the spokes. |
| Err. 25 | Distance between the spokes greater than 120 degree | 1. The minimum distance between the spokes where to split the unbalance must be smaller than 120 degrees<br>2. Repeat the SPLIT function increasing the distance between the spokes. |

| Err.32/ Err.33/ Err.34/ Err.35/ Err.36/ Err.37 | Errors related to test functions of the wheel balancer. | 1. Cancel the error and continue using the wheel balancer as normal. |
| --- | --- | --- |

## 7.1 - Inconsistent unbalance readings

It may occur that after balancing a wheel, when removing it from the wheel balancer and then remounting it, the wheel is not balanced.

This is not the result of an incorrect indication by the machine, but only of incorrect mounting of the wheel on the flange, i.e. in the two mountings the wheel has assumed a different position with respect to shaft axis of the wheel balancer. If the wheel has been mounted on the flange with screws, it may be that the screws have not been tightened correctly in gradual criss-cross manner one after the other, or (as often occurs) holes have been drilled in the wheel with too wide tolerances.

Small errors, up to 10 grams (0.4 oz), are to be considered normal in wheels locked with a cone: the error is normally greater for wheels locked with screws or studs.

If, after balancing, the wheel is still unbalanced when refitted on the vehicle, this could be due to the unbalance of the brake drum or very often is due to the screw holes in the rim and the drum drilled with too wide tolerances. In this case a readjustment would be advisable using the wheel balancer with the wheel mounted.

# 8 - Routine maintenance

Before carrying out any operation on the machine, cut the power supply to the machine.

## 8.1 - Replacing the protection fuses

A protection fuse is fitted on the power board, accessible by dismantling the weight shelf (see Exploded Drawings). If fuses require replacement, use ones with an identical current rating.

If the fault persists, contact Technical Service.

**NONE OF THE OTHER MACHINE PARTS REQUIRE MAINTENANCE.**

# 9 - List of recommended spare parts (references on exploded drawings)

| CODE | DESCRIPTION |
| --- | --- |
| 020600503 | Bearing 6005 - 2Z Ø 25/47/12 |
| 181198630 | Spring 19863P |
| 080077004 | Rigid belt Poly V - TB2 - 770 - 4 crested |
| 67M60192A | Phase generator board with cable |
| 05PR61754 | LEXAN panel |
| 181206560 | Distance gauge spring |
| 681002000 | Fuse DM5x20 - 20A |
| 511242101 | Bipolar stub switch |
| 86SC61880 | Computer board |

**SPECIAL PARTS FOR 230 V MACHINES**

| | |
| --- | --- |
| 50FG59009 | Single-phase motor 230V/50-60 Hz - 0.12Kw HB63B-4 |
| 568001058 | Capacitor 10MF 450V Faston vite/screw M8 |
| 67M56989E | Power board |

**SPECIAL PARTS FOR 115 V MACHINES**

| | |
| --- | --- |
| 50FG61456 | Single-phase motor 115V/50-60 Hz - 0.12Kw HB63B-4 |
| 568003558 | Capacitor 35MF 450V Faston vite/screw M8 |
| 67M56989F | Power board |