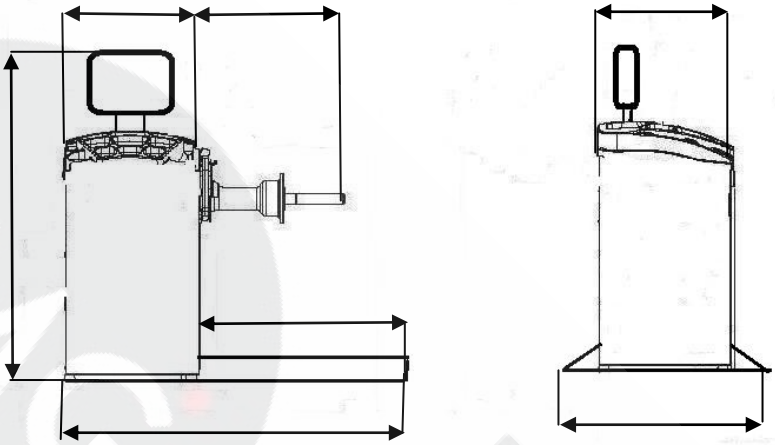
BP46 – VULTURE

CONTENTS

Machine dimensions



Picture F1.1

1. INTRODUCTION

This manual is an integral part of the machine and has to stay with it until it is scrapped.

Read carefully each section of this manual before using the machine. The manufacturer is not responsible for any damage and/or injury caused by failure to follow the instructions in this manual.

We also recommend:

- Keeping the manual near the wheel balancer for easy access
- Keeping the manual in a place protected from dirt
- Not damaging the manual.

In the manual the following symbols are represented:

Indicates operations that require special attention

Indicates prohibitions

Indicates possible danger for the operator

BRIGHT reserves the right to make any change to products in order to improve them.

BRIGHT reserves the right to make any change to this manual without notice.

2. INTENDED USE

This manual is an integral part of the product.

Carefully read the warnings and instructions contained in this manual as they provide important information about SAFE USE and MAINTENANCE.

KEEP THIS HANDBOOK WITH CARE NEAR THE MACHINE TO FACILITATE ANY CONSULTATION BY OPERATORS.

The wheel balancers have been made to balance wheels for automobiles (CAR), off-road vehicles (SUV), lorries (TRUCK). The machines can work on wheels with diameter from 8" to 35" (or from 200 to 890 mm) and width from 2" to 20" (or from 50 to 500 mm). All functions and controls can be set via a number of keys arranged on a panel. The data is displayed on an LED display.

3. GENERAL SAFETY RULES

The wheel balancer must be used exclusively for the purpose for which it has been designed.

Any other use is considered INCORRECT and UNREASONABLE.

The wheel balancer may be used by authorised, trained personnel only.

Do not put any objects in the base which may affect the correct operation of the wheel balancer.

THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY DAMAGE TO PEOPLE OR PROPERTY CAUSED BY UNAUTHORISED PERSONNEL OR IMPROPER, INCORRECT AND UNREASONABLE USE OF THE WHEEL BALANCER.

THE WHEEL BALANCER SHOULD NOT BE MODIFIED OR TAMPERED WITH WITHOUT THE MANUFACTURER'S PERMISSION. ANY UNAUTHORISED CHANGE MADE TO THE EQUIPMENT RELIEVES THE MANUFACTURER FROM ANY LIABILITY IN CASE OF DAMAGE ATTRIBUTABLE TO SUCH ALTERATIONS.

3.1 Safety devices

The machine is equipped with the following safety devices: Rotation STOP [P10] button 

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It is forbidden to tamper with, bypass or remove the safety devices installed, this being a violation of the safety regulations at work.

REMOVING OR TAMPERING WITH SAFETY DEVICES ENTAILS A VIOLATION OF THE EUROPEAN SAFETY DIRECTIVES.

4. TRANSPORT AND HANDLING

The wheel balancer is packed in a carton box on a pallet.

Transport and handling must be carried out BY AUTHORISED PERSONNEL ONLY, using a pallet truck or forklift and adopting appropriate safety measures.

If the machine is not packed, take the following precautions:

PROTECT SHARP EDGES AT THE ENDS WITH SUITABLE MATERIAL (bubble wrap or cardboard).

DO NOT USE METAL WIRE ROPES FOR LIFTING.

SLING WITH STRAPS OF AT LEAST 200 cm IN LENGTH AND WITH A GREATER CAPACITY THAN 3000 kg.

DO NOT USE FORCE ON THE SHAFT AND/OR FLANGE (See Pictures F4.1 and F4.2).

ALWAYS UNPLUG THE POWER SUPPLY CABLE FROM THE SOCKET BEFORE MOVING THE MACHINE.

The environmental working conditions must comply with the following requirements:

- Temperature from 0° C to + 45° C
- Relative humidity from 20% to 95%

5. UNPACKING

After removing the packaging, check the integrity of the appliance making sure there are no visibly damaged parts.

In case of doubt, DO NOT USE THE MACHINE and consult professionally qualified personnel (dealer or manufacturer). The packaging materials (plastic bags, expanded polystyrene, nails, screws, pieces of wood, etc.) must not be left within reach of children as they are potentially dangerous. Take the packaging materials to appropriate collection points if polluting or non-biodegradable.

MAKE SURE YOU HAVE NOT THROWN AWAY THE ACCESSORY BOX WITH THE PACKAGING.

6. INSTALLATION AND COMMISSIONING

After unpacking the various parts of the wheel balancer, ensure they are intact and check for any anomalies, then assemble the parts.

6.1 Electrical connection

The standard version of the machine must be connected to a mains 230V SINGLE PHASE.

To complete the electric connection, apply the plug provided for in the user's country to the machine power supply cable.

ALL THE OPERATIONS REQUIRED TO MAKE THE ELECTRICAL CONNECTION AND ANY WORK (HOWEVER SLIGHT) ON THE ELECTRICAL PARTS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.

Electrical cables must be sized according to the electrical power absorbed by the machine. The user must:

- check that the supply voltage corresponds to the voltage indicated on the nameplate of the machine;
- check the condition of wires and the presence of the ground conductor;
- check that the machine is connected to its own electrical connection, fitted with a proper automatically shutting off device against overcurrent, with 30 mA trip sensitivity (circuit breaker);
- connect the power supply cable to the plug with the utmost care, in accordance with applicable regulations.

WHEN THE MACHINE IS OFF AND UNUSED FOR LONG PERIODS, IT IS NECESSARY TO DISCONNECT THE POWER SUPPLY PLUG TO PREVENT USE BY UNAUTHORISED PERSONNEL.

IF THE CONNECTION TO THE ELECTRICAL LINE OCCURS DIRECTLY THROUGH THE GENERAL ELECTRICAL PANEL, WITHOUT THE USE OF ANY PLUG, IT IS NECESSARY TO SET UP A KEY SWITCH TO RESTRICT THE MACHINE USE EXCLUSIVELY TO QUALIFIED PERSONNEL.

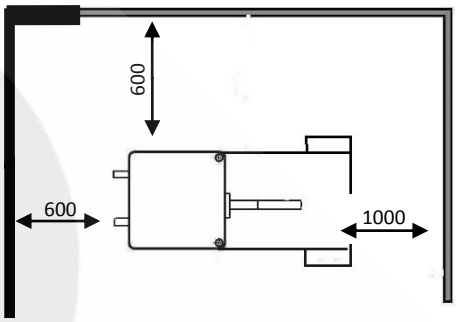
IN CASE OF OPERATIONS ON LINES, MOTOR INTERNAL PARTS OR ANY ELECTRIC EQUIPMENT, IT IS NECESSARY TO CUT OFF POWER FIRST.

DO NOT REMOVE, DAMAGE AND MAKE HAZARD, WARNING, INSTRUCTION AND CAUTION STICKERS ILLEGIBLE. REMOVED OR DAMAGED STICKERS CAN BE FOUND AT THE NEAREST DEALER OF THE MANUFACTURER.

ANY DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THE ABOVE INSTRUCTIONS WILL NOT BE CHARGED TO THE MANUFACTURER AND MAY INVALIDATE THE WARRANTY.

7. INSTALLATION

To install the machine you need a useful space calculated on the basis of the information given in Picture F7.1.



Picture F7.1

From the working position, the user must be able to view the machine and the surrounding area.

THE INSTALLATION AREA MUST BE KEPT CLEAR OF ANY DANGEROUS OBJECTS.

UNAUTHORISED PERSONNEL MUST NOT STAND IN THE WORKING AND INSTALLATION AREAS.

THE MACHINE MUST BE PLACED ON A HORIZONTAL, PREFERABLY CEMENTED OR TILED SURFACE.

AVOID BREAKABLE AND ROUGH SURFACES.

THE SURFACE MUST WITHSTAND THE LOADS TRANSMITTED IN THE OPERATIONAL PHASE.

THE MACHINE MUST BE SECURED TO THE GROUND WITH SCREWS AND EXPANSION PLUGS, ACCORDING TO THE FOLLOWING INSTRUCTIONS.

THE MACHINE MAY BE ONLY USED IN PLACES THAT DO NOT POSE ANY EXPLOSION OR FIRE HAZARDS.

8. USE SUSPENSION

Should the machine not be used for long periods, disconnect the power supply and protect all parts that could be damaged by dust. Grease all parts that could be damaged in case of oxidation. In this specific case, protect the shaft and flange.

9. ENVIRONMENTAL INFORMATION

THE DISPOSAL PROCEDURE DESCRIBED BELOW ONLY APPLIES TO MACHINES WITH THE SYMBOL OF THE CROSSED-OUT WHEELIE BIN ON THEIR DATA PLATES.

The crossed-out wheelie bin symbol, placed on the product and on this page, reminds the user that the product must be disposed of properly at the end of its life. This product may contain substances that can be hazardous to the environment and to human health if it is not disposed of properly. We are therefore providing you with the information below in order to prevent these substances from being released into the environment, and to improve the use of natural resources. Electrical and electronic equipment must never be disposed of in the usual municipal waste but must be separately collected for proper treatment.

Thus, the hazardous consequences that non-specific treatments of the substances contained in these products, or improper use of parts of them, may have on the environment or on human health are prevented. Furthermore, this helps to recover, recycle and reuse many of the materials contained in these products. For this purpose, electrical and electronic manufacturers and distributors set up proper collection and treatment systems for these products.

At the end of the product service life, contact your supplier for information about disposal procedures.

When you purchase this product, your supplier will also inform you that you may return another worn-out appliance to him free of charge, provided it is of the same type and has performed the same functions as the product just purchased.

Any disposal of the product performed in a different way from that described above will be liable to the penalties provided for by the nation regulations in force in the country where the product is disposed of.

We also ask you to adopt other environmentally-friendly measures: recycle the internal and external packaging that the product comes in, and suitably dispose of used batteries (only if contained in the product).

Your help is critical to reduce the amount of natural resources used for manufacturing electrical and electronic equipment, minimise the use of landfills for product disposal and improve the quality of life, preventing potentially hazardous substances from being released into the environment.

10. TECHNICAL DATA

General features

Power supply voltage[(1)]	1Ph 230 V 50/60 Hz 1Ph 110 V 50/60 Hz
Three-phase motor with inverter	0.37 kW
Balancing speed	120 RPM with car wheels
	80 RPM with truck wheels
Maximum displayed imbalance value	999 g.
Car wheel work resolution	X1 (1 g. or 0.1 ounces)
	X5 (5 g. or 0.25 ounces)
Truck wheel work resolution	X1 (10 g. or 0.5 ounces)
	X5 (25 g. or 1 ounce)
Shaft diameter	40 mm
Working environment temperature	from 0 to +45 °C
Storage temperature	from -10 to +60 °C
Storage relative humidity	20% ÷ 95% without condensation
Noise level	< 70 dB(A)

(1) The voltage supply must be specify at the order. It is not possible to connect a machine with supply voltage of 230 V to a mains of 110 V and vice versa.

10.1 Machine dimensions

Depth	
Width without hoister (with base)	
Width with hoister	
Height	

10.2 Working range

Manually adjustable rim size

	mm	inches
Rim/machine distance	2 ÷ 460	
Rim width	50 ÷ 500	2.0 ÷ 20.0
Rim diameter	200 ÷ 890	8.0 ÷ 35.0

Rim size with automatic data set

	mm	inches
Rim width	Max. 490	Max. 19.5
Rim diameter	235 ÷ 710	9.5 ÷ 28.0

Wheel features

Maximum wheel diameter	1250 mm
Max. wheel width (with guard)	590 mm
Noise level	< 70 dB(A)

Table T10.1: Functions for machine model

Functions		NOTES
Wheel data manual acquisition	•	
Distance and diameter automatic acquisition	•	
Balancing accuracy	± 1 g.	
Electromagnetic parking brake	•	
Automatic search for imbalance positions	•	SWI = Stop the Wheel on Imbalance
Distance gauge with weight tray support	•	
Car wheels calibration with zero-settings of the unbalance in the flange	•	
Truck wheels calibration with zero-settings of the unbalance in the flange	•	
Static/Dynamic balancing	•	
Low speed rotation programme for visual check of rim	•	
Grams/ounces selection	•	
Inches/mm selection	•	
Car wheel programs (CAR) STD, ALS1, ALS2	•	
Off-road vehicle wheel programs (SUV) STD, ALS1, ALS2	•	
Truck wheel programs (TRUCK) STD, ALS1, ALS2	•	
STATIC program	•	
DYNAMIC program	•	
HIDDEN WEIGHTS program	•	
STAND BY function	•	
Multi Operators Management	•	
Iron/Zinc/Lead weights selection	•	
Service programs	•	

10.3 Presentation of the machine

1. Distance/Diameter sensor
2. Display/Keyboard panel
3. Weight tray
4. Rocking unit
5. Pin for cones
6. Pneumatic hoister

Picture F10.1

11. SERIAL NUMBER PLATE INFORMATION

- Manufacturer:
- Machine data:
- Brand: CE
- Model:
- Year of construction:
- Serial number:

12. ORDINARY MAINTENANCE

To ensure the efficiency and proper operation of the machine, it is essential to follow the manufacturer's instructions by performing periodic cleaning and routine maintenance.

CLEANING AND ORDINARY MAINTENANCE MUST BE PERFORMED BY AUTHORISED PERSONNEL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS PROVIDED BELOW.

Always keep the flanges clean (do not lubricate them). In addition, during handling, be very careful not to damage them.

To clean the machine, especially the weight tray, use a soft cloth moistened with ethyl alcohol.

BEFORE PERFORMING ANY OPERATION, DISCONNECT THE POWER SUPPLY CABLE FROM THE SOCKET.

DO NOT BLOW COMPRESSED AIR TO CLEAN THE MACHINE.

DO NOT USE WATER OR OTHER LIQUIDS TO CLEAN THE MACHINE.

13. CONTROL PANEL

The machine control panel is shown in Picture F13.1. The control panel allows the operator to give commands and enter or edit data. The same control panel displays the machine balancing results and messages. The functions of the various parts of the control

panel are described in table T13.1. The control panel is provided on the rear with an electronic control board collecting, processing and displaying data.

Picture F13.1: Control panel

Table T13.1: Functions of different parts of the control panel

Pos.	Description
P1	Machine - wheel distance entry key.
P2	Wheel width entry key.
P3	Rim diameter entry key.
P4	Scroll "forward" key of available programs.
P5	Scroll "back" key of available programs.
P6	CAR/TRUCK/SUV wheel type selection key.
P7	F key to access the secondary function of the keys (P7).
P8	Start key to start the motor (P8).
P10	Stop key to stop the motor (P10).

13.1 Keyboard

For your convenience, the keys in this manual are numbered from [P1] to [P10] as shown in Picture F13.1. Next to the reference numbers of the keys, there are icons of the keys themselves for easy reading.

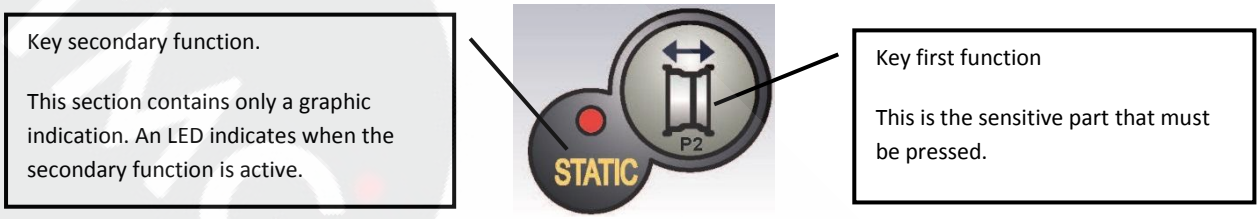
The ten buttons have a main function indicated by a symbol in the bevelled square, and a secondary function indicated by a small icon located nearby. Some of the secondary functions feature an LED to indicate their activation. [P7] 

, [P8] Start 

and [P10] Stop 

do not have secondary functions. The secondary function of the keys is identified in this manual with the codes from [F+P1] to [F+P9] as shown in Picture F13.3.

Picture F13.2: Key example showing the main and secondary function



To enter the secondary function of a key, press the key [P7] 

then, by holding it down, press one of the keys for which a secondary function is desired, then release both keys.

Picture F13.3: Key secondary functions numbering

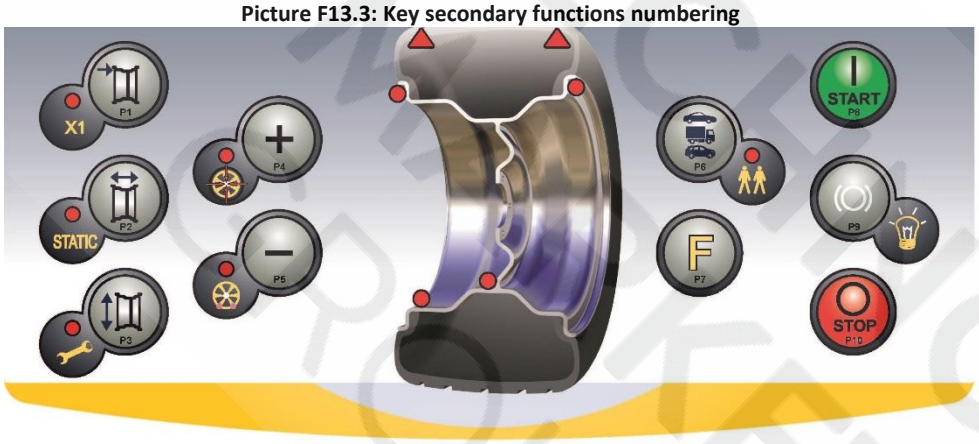


Table T13.2: Settings, programs and menus available in SERVICE mode

SERVICE mode			
Key	*Setting/Program or Menu*	*Key*	*Setting/Program or Menu*
[P1]	Sensors calibration programs	[F+P1]	Not used
[P2]	Not used	[F+P2]	Select weight material in Fe/Zn or Pb
[P3]	Machine calibration	[F+P3]	Exit SERVICE mode (go back to NORMAL mode)
[P4]	Grams/ounces selection	[F+P4]	Read counter with the number of spins
[P5]	Inches/mm selection	[F+P5]	Parameters (Menu with password reserved for technical service)
[P6]	Imbalance threshold view selection	[F+P6]	Not used
[P9]	Not used	[F+P9]	Testing programs

Note: The [P7] 

, [P8] Start 

and [P10] Stop 

keys are not used to access settings, programs or Menus.

13.2 STANDARD, SERVICE, STAND-BY operating modes

The machine features three operating modes:

- STANDARD mode. This mode is enabled when the machine is turned on and allows using the machine to perform wheel balancing.
- SERVICE mode. In this mode, various programs are available for performing settings (such as measurements in grams or ounces) or checking the machine operation (such as calibration).
- STAND-BY mode. After 5 minutes without user activity, the machine automatically switches to STAND-BY mode to reduce electrical consumption (both with wheel guard raised or lowered). The STAND-BY green LED on the control panel flashes when the machine is in this operating mode. All acquired data and settings are retained in STAND-BY mode. When in SERVICE mode, the machine cannot be switched to STAND-BY mode.

  To exit STAND-BY mode, proceed with one of the following options:

  - Press any key (with the exception of [P7] 

);
  - Turn manually the wheel;
  - Remove the Distance and Diameter sensor from the rest position.

Note: The machine will also exit STAND-BY mode by pressing the [P8] Start 

. In these cases spinning will also be started up immediately.

14. TEMPORARY DISTANCE/DIAMETER SENSOR DISABLING

If the machine displays the error code `Err 016` "dis out" (Distance/Diameter sensor not in the rest position) at switching on, although being in rest position, it means that an anomaly occurred in the acquisition system.

It is possible to temporarily disabling the Diameter/Distance sensor by pressing keys [F+P2] 

. The LED  on the control board will light up and flash indicating the automatic acquisition of Diameter/Distance is disabled and the machine is ready to be used.

As it is not possible to use the automatic acquisition system, the wheel dimensions must be entered manually. By turning the machine off and back on again, the error code will re-appear and you will once again need to proceed as described above.

If the automatic acquisition system is malfunctioning and it blocks the machine in a permanent acquisition function, the temporary disabling could be done also after the machine is switched on.

15. MACHINE CALIBRATION

To operate properly, the machine must be calibrated. Calibration allows storing the mechanical and electrical parameters specific to each machine so as to provide the best balancing results.

15.1 When to carry out machine calibration

Table T15.1 lists the cases in which machine calibration should be carried out. Calibration must be carried out whenever one or more of the conditions listed are active.

Table T15.1: Conditions for carrying out machine calibration

Condition	Status	Who must perform it
When the machine is installed at the final user's site	Mandatory	Technical Service
When the electronic circuit board is replaced	Mandatory	Technical Service
When a mechanical part linked to the pick-up signal (pick-up, pick-up compression springs, suspension unit + shaft) is replaced	Mandatory	Technical Service
When the pick-up compression spring adjustment is modified	Mandatory	Technical Service
When the encoder disc is replaced	Mandatory	Technical Service
When a different motorbike adaptor is used since the last calibration for MOTO Wheel Type	Mandatory	Final user and/or Technical Service
When the machine does not provide the best balancing results	Recommended	Final user and/or Technical Service
When there are large, constant variations in the environmental humidity and temperature conditions (for example seasonal changes)	Recommended	Final user and/or Technical Service

The machine requires two independent calibrations:

- Calibration for the CAR/SUV Wheel Type (calibration is the same for both types of wheel);
- Calibration for TRUCK Wheel Type.

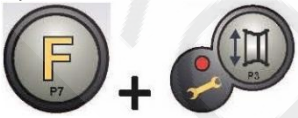
15.2 Machine calibration for TRUCK Wheel Type

There is only one type of TRUCK Wheel calibration.

To perform machine calibration, you must first provide for the following material:

- A balanced wheel with a steel rim having the following dimensions: Diameter 22.5”. Wheels with dimensions similar to those specified can also be used provided that the difference is small. It is not possible to use wheels with aluminium rims.
- A 300-gram weight (preferably made of Iron or Zinc).

To perform the machine calibration, proceed as follows:

1. Switch on the machine;
2. Remove the wheel and any other accessories from the shaft;
3. Press the [F+P3] button 

. The words `SER SER` will be displayed (this means that we have entered in SERVICE mode (service programs);
4. Press the [P3] button 

. The words `CAL TRC` will appear on the screen (machine calibration for truck wheels);
5. Press the [P3] button 

. The words `CAL 0` will be displayed;
6. Press the [P8] Start button 

. The machine will perform a set of four short spins followed by a complete spin. At the end the words `CAL 1` will appear on the screen.

7. Mount the wheel on the shaft and enter the wheel dimensions by pressing the [P1] 

, [P2] 

, [P3] 

to select the dimensions for editing, and the [P4] 

or [P5] keys 

to edit the value. If the dimensions of the wheel have been entered before accessing the calibration program, this step can be skipped. It is not possible to enter the data with the automatic acquisition system;
8. Press Start button [P8] 

: the machine will run a spin cycle;
9. At the end of the spin, manually rotate the wheel until the left display shows the value 300. On the inner side of the wheel, at 12 o'clock, apply the 300 g weight.
10. Press Start button [P8] 

: the machine will run a spin cycle;
11. Remove the 300 gr. weight applied on the internal side;
12. At the end of the spin, manually rotate the wheel until the right display shows the value 300. On the outer side of the wheel, at 12 o'clock, apply the 300 g weight.
13. Press Start button [P8] 

: the machine will run a spin cycle;
14. Calibration is finished: the machine automatically exits the calibration program and returns to NORMAL mode, ready to perform balancing.

If you have anomalies during the calibration procedure, the machine will display the error message (for example `ERR 025`). See section ***"21.1 Error codes"*** and act accordingly to eliminate the problem and continue/repeat/cancel the calibration in progress.

Spins stopped using the [P10] Stop button 

can be repeated by pressing the [P8] Start button 

.

How to exit the TRUCK Wheel Type calibration of the machine

At any time it is always possible to exit the calibration procedure in progress by pressing [F+P3] 

. The machine will return to SERVICE mode displaying the `SER SER` writing. To return to NORMAL mode, press [F+P3] again 

. The calibration procedure in progress will be cancelled and the machine will use the previous calibration values.

15.3 Machine calibration for the CAR/SUV Wheel Types

Calibration for the CAR and SUV Wheel Types is the same.

To perform machine calibration, you must first provide for the following material:

- A balanced wheel with a steel rim having the following dimensions: Diameter 15" Width 6". Wheels with dimensions similar to those specified can also be used provided that the difference is small. It is not possible to use wheels with aluminium rims.
- A 50-gram weight (preferably made of Iron or Zinc).

To perform the machine calibration, proceed as follows:

1. Switch on the machine;
2. Remove the wheel and any other accessories from the shaft;
3. Press the [F+P3] button 

. The words SER SER will appear (this means that we have entered SERVICE mode (service programs);
4. Press the [P3] button 

. The words CAL TRC will appear on the screen (machine calibration for truck wheels);
5. Use [P4] 

or [P5] 

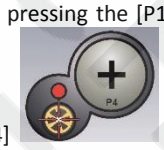
to select the type of CAR calibration (auto-vehicle and light off-road wheels).
6. Press the [P3] button 

. The words CAL 0 will be displayed;
7. Press the [P8] Start button 

. The machine will perform a set of four short spins followed by a complete spin. At the end the words CAL 1 will appear on the screen.
8. Mount the wheel on the shaft and enter the wheel dimensions by pressing the [P1] 

, [P2] 

, [P3] 

to select the dimensions for editing, and the [P4] 

or [P5] keys 

to edit the value. If the dimensions of the wheel have been entered before accessing the calibration program, this step can be skipped. It is not possible to enter the data with the automatic acquisition system;
9. Press Start button [P8] 

: the machine will run a spin cycle;
10. At the end of the spin, manually rotate the wheel until the left display shows the value 50. On the inner side of the wheel, at 12 o'clock, apply the 50 g weight.
11. Press Start button [P8] 

: the machine will run a spin cycle;
12. Remove the 50 gr. weight applied on the internal side;
13. At the end of the spin, manually rotate the wheel until the right display shows the value 50. On the outer side of the wheel, at 12 o'clock, apply the 50 g weight.
14. Press Start button [P8] 

: the machine will run a spin cycle;
15. Calibration is finished: the machine automatically exits the calibration program and returns to NORMAL mode, ready to perform balancing.

If you have anomalies during the calibration procedure, the machine will display the error message (for example ERR 025). See section ***"21.1 Error codes"*** and act accordingly to eliminate the problem and continue/repeat/cancel the calibration in progress.

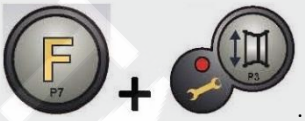
Spins stopped using the [P10] Stop button 

can be repeated by pressing the [P8] Start button 

.

How to exit machine calibration for the CAR/SUV Wheel Type

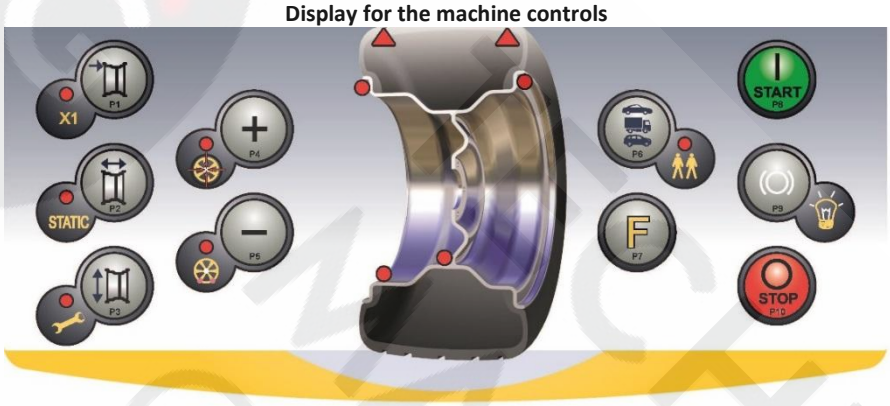
At any time it is always possible to exit the calibration procedure in progress by pressing [F+P3] 

. The machine will return to SERVICE mode displaying the SER SER writing. To return to NORMAL mode, press [F+P3] again 

. The calibration procedure in progress will be cancelled and the machine will use the previous calibration values.

16. USE OF THE MACHINE IN NORMAL MODE

Display for the machine controls



To use the machine, select or set the following:

- Program Type (program for wheels with steel, aluminium or special aluminium rims). Default = program for wheels with steel rims;
- Wheel Type (car, truck, SUV). Default = truck;
- Size of the wheel to be balanced. The measurements can be entered manually (always) or in partially automatic mode.
- Dynamic or Static Balancing. Default = Dynamic;
- Display resolution X1 or X5. Default = X5.

The selections described above can be entered before or after the spin. For any variation of the selections or data settings, the machine will run a recalculation by displaying the new imbalance value.

When the required selections/settings have been made it is possible to run a spin cycle by pressing [P8] Start 

. At the end of the spin, the machine displays the wheel imbalance values.

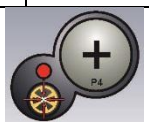
Apply the weights displayed by the machine in the indicated positions, and then run a second test spin. Normally, weights should be applied at 12 o'clock, with the exception of special programs for ALS1 and ALS2 aluminium.

16.1 Program Type

The machine allows the choice between eight different Program Type of balancing as listed in table T16.1.

Table T16.1: Program types available

Program Type	Wheel material	Position of weights along the rim section	Automatic acquisition	Notes
STD	Steel	Default	1 sensor	Default at power-on
ALS1	Aluminium	Default for inner weight, provided by user for outer weight	1 sensor	
ALS2	Aluminium	Provided by user	1 sensor	

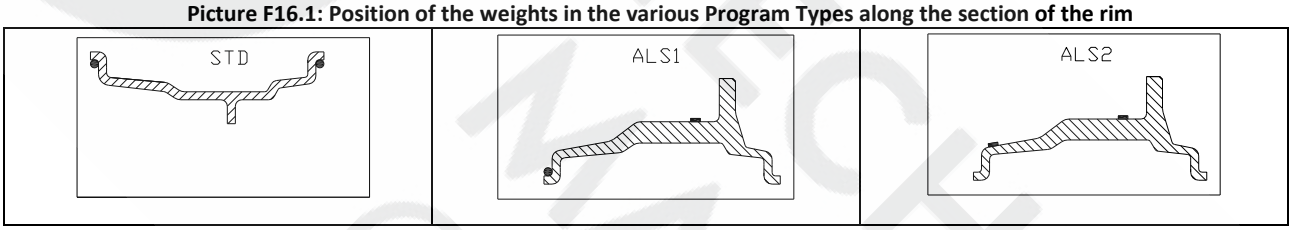
Programs can be selected in NORMAL mode by pressing key [P4]  or [P5]  . On the first press of one of these two keys, the Type of Program currently selected is shown on the displays; if, within a lapse of 1.5 seconds, neither of the two keys is pressed again, the display returns to its previous status without changing the Type of active Program. The following LEDs will light up on the control panel depending on the Type of active Program:

- Program Type LED. See Picture F13.1.
- Imbalance Weight Position LED. See Picture F13.1.

Note: Selecting the STD Program Type eliminates the Static Imbalance display selection.

The selected Program Type also affects the automatic acquisition mode of the wheel measurements as stated in the *Automatic Acquisition* column of Table T16.1. The position of the balancing weights along the section of the rim in the various Program Types is shown in figure F16.1.

Picture F16.1: Position of the weights in the various Program Types along the section of the rim



The angular position of the balancing weights in the various Program Types is shown in table T16.2.

Table T16.2: Angular position of balancing weights in various Program Types

Machine data acquisition system	Program Type								
	STD			ALS1			ALS2		
	Internal plane	External plane	Static Plane	Internal plane	External plane	Static Plane	Internal plane	External plane	Static Plane
Manual	H12	H12	H12	H12	H6	H6	H6	H6	H6
Semi-automatic	H12	H12	H12	H12	Sensor-rim contact point (1)	H6	Sensor-rim contact point (1)	Sensor-rim contact point (1)	H6

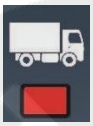
Note **(1)**: if the data acquisition system is disabled, the angular position of the weight will be in the 6 o'clock position.
In table T16.2, "H12" indicates that the angular position of the weight is at 12 o'clock while "H6" indicates that the angular position of the weight is at 6 o'clock.

16.2 Wheel Type

The machine allows choosing between three different Wheel Types as listed in table T16.3.

Table T16.3: Wheel Types to select

Wheel Type	Vehicle	Notes

CAR 	Cars	
TRUCK 	Trucks	Default at power-on
SUV 	Off-road vehicles	Not suitable for balancing truck wheels

Each of the above programs sets specific values to measure wheel sizes and calculate imbalances. The special features of each program are listed in the following paragraphs.

To select a specific Wheel Type, press the [P6] key repeatedly  until the relative LED lights up, as shown in table T16.3.

16.2.1 CAR wheel type (passenger cars)

Selecting the CAR Wheel Type allows balancing passenger car wheels. For off-road vehicles, it may be appropriate to select the SUV Wheel Type (see paragraph below).

To select the CAR wheel type, press the [P6] key repeatedly  until the CAR LED of the LED Wheel Type group lights up. See table T16.3.

16.2.2 TRUCK wheel type

Selecting a TRUCK wheel type allows balancing truck wheels.

To select the TRUCK wheel type, press the [P6] key repeatedly  until the TRUCK LED of the LED Wheel Type group lights up. See table T16.3.

16.2.3 SUV wheel type (off-road vehicles)

Selecting the SUV wheel type allows balancing off-road vehicle wheels. These vehicles are generally equipped with wheels that are larger than normal, and the tyre is relatively large compared to the diameter of the rim (i.e. not the low profile or super low profile types). The selection for this wheel type does not allow balancing truck wheels, because the latter have rims with considerably different profiles.

The choice of the CAR or SUV wheel type is at the discretion of the operator who should run balancing tests to determine which Wheel Type gives the best results for the particular wheel to be balanced.

To select the SUV type wheel, press the [P6] key repeatedly  until the SUV LED of the LED Wheel Type group lights up. See table T16.3. For SUV wheel type all Programs Type listed in table T16.1. are available.

The positions of the weights along the section of the rim are the same as those shown in figure F16.1.

16.3 Entering wheel size

The dimensions of the wheel to balance can be entered in two ways:

- Manual Mode.
- Semi-automatic Mode.

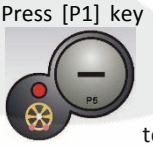
Note: All machines are equipped with a graduated scale for manually measuring distance.

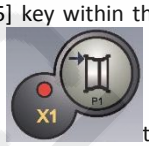
16.3.1 Manual entry of wheel dimensions for the STD and Program Types

To manually enter a wheel size, proceed as follows:

1. Fit the wheel on the shaft and tighten it with the ring nut.
2. Extract the distance sensor and place it on the wheel as shown in Picture F16.2.
3. Read the distance value on the graduated scale as shown in Picture F16.2. The distance value is always expressed in millimetres.
4. Press [P1] key 

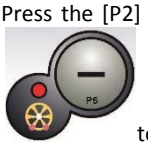
to change distance and then press the [P4] 

or [P5] key within 1.5 seconds 

to enter the read value. If you do not press the [P4] or [P5] key within this time limit, the machine will return to the previous display. In this case, you can press the [P1] key again 

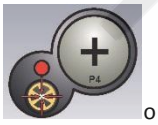
to enter or edit the data.
5. Measure the width of the wheel with the special gauge or read the value of the width indicated on the rim. The value of the width can be in inches or millimetres according to the selected unit of measurement.
6. Press the [P2] key 

to change the width and press the [P4] 

or [P5] key within 1.5 seconds 

to enter the read value. If neither of these two buttons is pressed in this time limit, the machine will return to the previous display. In this case, you can press the [P2] key again 

to enter or edit the data;
7. Read the value of the diameter indicated on the rim or tyre. The value of the diameter can be in inches or millimetres according to the selected unit of measurement.
8. Press the [P3] key 

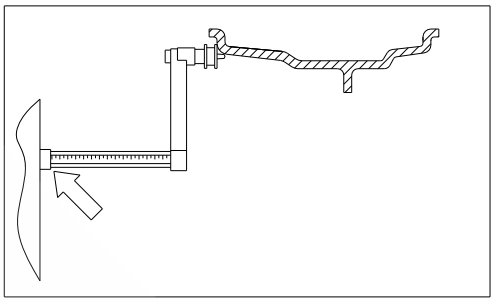
to change the diameter value and then press the [P4] 

o [P5] 

within 1.5 seconds to enter the read value. If neither of these two buttons is pressed in this time limit, the machine will return to the previous display. In this case, you can press the [P3] key again 

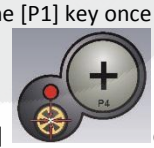
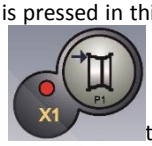
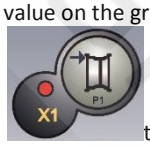
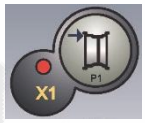
to enter or edit the data.

Picture F16.2: Manual acquisition of wheel dimensions: placing the Distance sensor



16.3.2 Manual entering of the wheel dimensions for ALS1, ALS2 program types

To manually enter a wheel size, proceed as follows:

1. Fit the wheel on the shaft.
2. If the selected program type is ALS1, extract the distance sensor and place it on the wheel as shown in Picture F16.3, otherwise proceed with step 4.
3. If the selected program type is ALS2, remove the distance sensor and place it on the wheel as shown in Picture F16.4.
4. Read the internal plane distance value on the graduated scale. The distance value is always expressed in millimetres.
5. Press the [P1] key once  to view the parameter **di1** (internal plane distance) and, within 1.5 seconds, press the [P4]  or [P5] key  to enter the read value. If neither of these two buttons is pressed in this time limit, the machine will return to the previous display. In this case, you can press the [P1] key again  to enter or edit the data;
6. Remove the distance sensor and place it on the plane selected for the external weight as shown in Picture F16.5.
7. Read the distance value on the graduated scale. The distance value is always expressed in millimetres.
8. Press the [P1] key  twice in quick succession until **di2** (external plane distance) is viewed and, within about 1.5 seconds, press [P4]  or [P5]  tp enter the read value. If neither of these two buttons is pressed in this time limit, the machine will return to the previous display. In this case, you can press [P1]  twice in rapid sequence to enter or edit the data.
9. Press [P3] once  to view **da1** (internal plane diameter) and within about 1.5 seconds press [P4]  or [P5]  to enter the <u>value obtained with one of the two methods specified in the below note</u>. If neither of these two buttons is pressed in this time limit, the machine will return to the previous display. In this case, you can press the [P3] key again  to enter or edit the data.

10. Press [P3] twice in quick succession  to view **da2** (external plane diameter) and within about 1.5 seconds press [P4]  or [P5]  to enter the value obtained with one of the two methods specified in the below note. If neither of these two buttons is pressed in this time limit, the machine will return to the previous display. In this case, you can press [P1]  twice in rapid sequence to enter or edit the data.

*NOTE: The nominal wheel diameter does not match the diameters where the weights are actually applied. Two methods are possible to determine diameters **da1** and **da2** to be entered into points 9) and 10) of the procedure.*

*MANUAL MEASUREMENT OF DIAMETERS **da1** AND **da2***

*With this method, a manual measurement of diameters **da1** and **da2** or of just the external diameter **da2** (depending on the active Program Type) with the aid of a measuring tape. The values to be entered are shown in table T16.4.*

Table T16.4: Measurement of diameters da1 and da2 to manually enter data

Program Type	*Internal diameter da1*	*External diameter da2*
ALS1	*Enter the nominal rim diameter.*	*Enter the actual diameter* da2 *measured with the aid of a measuring tape. The measurement must be performed on the balancing plane chosen for **da2**.*
ALS2	*Enter the actual diameter* da1 *measured with the aid of a measuring tape. The measurement must be performed on the balancing plane chosen for **da1**.*	*Enter the actual diameter **da2** measured with the aid of a measuring tape. The measurement must be performed on the balancing plane chosen for **da2**.*

*ENTERING **da1** AND **da2** STARTING FROM THE DIAMETER NOMINAL VALUE*

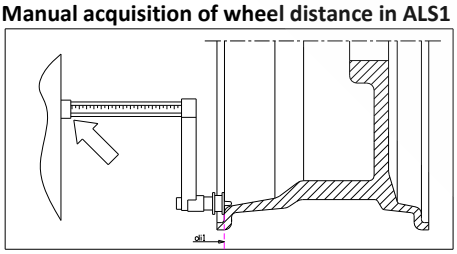
According to this second method, the nominal wheel diameter is used with the corrections indicated in table T16.5.

Table T16.5: Determining diameters da1 and da2 starting from the nominal rim diameter

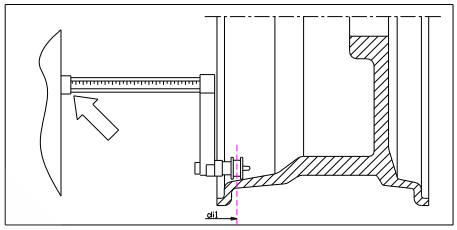
Program Type	*Internal diameter da1*	*External diameter da2*
ALS1	*da1 = nominal rim diameter.*	*da2 = nominal diameter – 2.0 inches (or 50 mm.).*
ALS2	*da1 = nominal diameter – 1.0 inch (or 25 mm.).*	*da2 = nominal diameter – 2.0 inches (or 50 mm.).*

Since manual measuring is not required, this method is faster but the results may be slightly less accurate.

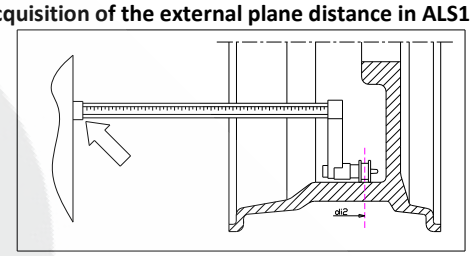
Picture F16.3: Manual acquisition of wheel distance in ALS1 Program Type



Picture F16.4: Manual acquisition of the internal plane distance in ALS2 Program Type



Picture F16.5: Manual acquisition of the external plane distance in ALS1 and ALS2 Program Types

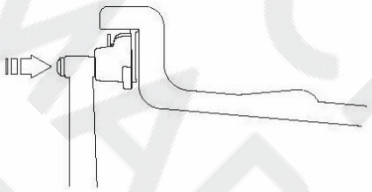


16.3.3 Automatic acquisition of the wheel dimensions for STD Program Types

To automatically introduce the wheel size data, proceed as follows:

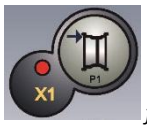
1. Fit the wheel on the shaft.
2. Extract the Distance/Diameter sensor and place it on the rim as shown in picture F16.6;
3. Wait to hear the long acquisition beep and then set the Distance/Diameter sensor back to the rest position;
4. Manually introduce the rim width. The width of the rim is normally printed on the rim itself. Alternatively use the appropriate width measuring gauge.

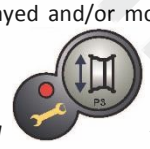
Picture F16.6: Automatic data acquisition in STD programs



16.3.4 Automatic acquisition of the wheel dimensions for the ALS1, ALS2 program types

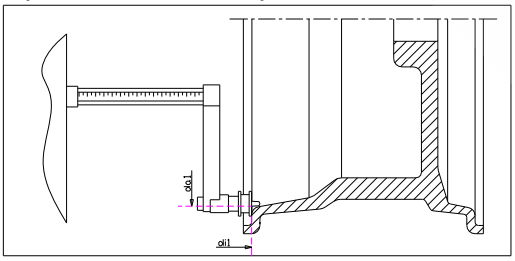
To automatically enter the dimensions of the wheel in the ALS1 and ALS2 program types proceed as follows:

1. Fit the wheel on the shaft.
2. Extract the Distance/Diameter sensor and place it on the plane chosen as the internal plane. The position is different depending on the programs selected ALS1 or ALS2. See pictures F16.7 and F16.8;
3. Wait to hear the long acquisition beep and then set the sensor back to the rest position;
4. Extract the Distance/Diameter sensor and place it on the plane chosen as the external plane. See picture F16.9;
5. Wait to hear the long acquisition beep and then set the sensor back to the rest position;
6. The dimensions of the wheel have been acquired and the values can be displayed and/or modified by pressing [P1] 

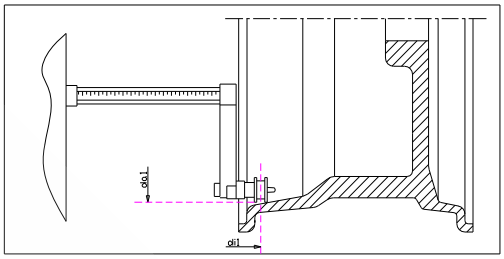
for the di1/di2 values (internal/external plane distance) and [P3] 

for the da1/da2 values (internal/external diameter plane).

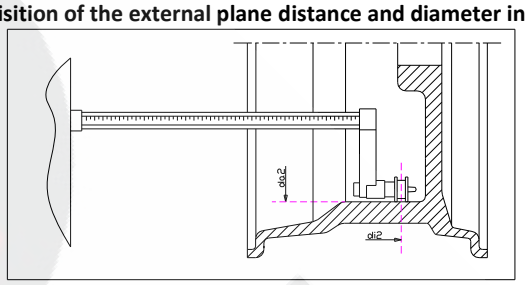
Picture F16.7: Automatic acquisition of the internal plane distance and diameter in ALS1 Program Type



Picture F16.8: Automatic acquisition of the internal plane distance and diameter in ALS2 Program Type



Picture F16.9: Automatic acquisition of the external plane distance and diameter in ALS1 and ALS2 Program Type



Note: acquisition of the inner position is confirmed by a long beep followed by a short beep while the acquisition of the outer position is confirmed by a long beep followed by two short beeps.

16.4 Use of the special program types for ALS1 and ALS2 aluminium wheels

The machine has two special Program Types for aluminium wheels called ALS1 and ALS2.

These two programs allow the user to select the planes for balancing weight application. This allows balancing aluminium wheels having particular shapes, difficult to perform with standard program where the weight are applied in precise positions.

The difference between ALS1 and ALS2 program is that in ALS1 Program Type the user could select freely the outer balancing positions (inner position) instead in ALS2 Program Type the user could select freely both of balancing positions.

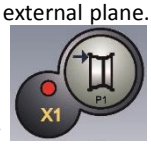
The ALS1 or ALS2 program types use only the Distance/Diameter sensor to acquire the balancing planes chosen by the user. The width sensor is not used.

The use of the ALS1 or ALS2 program types is divided into three parts:

- Acquisition of balancing planes;
- Balancing spin;
- Search of the balancing planes for weight application.

Note: guided acquisition and research of balancing planes could be performed only if the Distance/diameter sensor is installed and enabled. If these conditions do not occur follow the instructions described on paragraph 16.4.4 Use of the ALS1 or ALS2 program types without automatic acquisition.

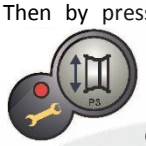
16.4.1 Acquisition of the balancing planes

At this stage the balancing positions are acquired. During the acquisition two pairs of values about distance and diameter are stored. These pairs are named `di1` and `da1` (distance 1 and diameter 1) for the internal plane and `di2` and `da2` (distance 2 and diameter 2) for the external plane. After performing the acquisition it is possible to display (and also modify) these pairs of values by pressing [P1] key 

for the distance and [P3] key 

for the diameter.

Then by pressing [P1] 

distance values di1 and di2 will be displayed alternately. Then by pressing [P3] 

distance values da1 and da2 will be displayed alternately.

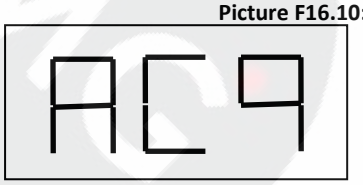
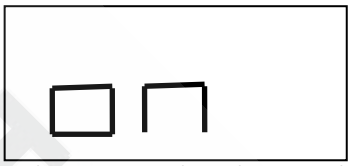
To carry out the acquisition, proceed as follows:

1. Select the ALS1 or ALS2 program types by repeatedly pressing [P4] 

or [P5] 

Every time ALS1 or ALS2 Program Type is selected, the machine will automatically set the mode for balancing planes acquisition and will confirm it for about 1 second by displaying the message as shown in picture F15.10;

Picture F16.10: Message "Set of Balancing planes acquisition"

2. Extract the Distance/Diameter sensor and place it on the rim that corresponds to the internal plane chosen to apply the balancing weight. See picture F16.7 for the ALS1 program type and picture F16.8 for the ALS2 program type;
3. Keep the sensor in the rest position until you hear the acquisition beep. If the sensor is left in the rest position for a longer time, further acquisition probing of that plane will be run without consequences;
4. Quickly release the Distance/Diameter sensor in the rest position. If you take too long on this operation the machine could acquire an incorrect plane: in this case place the sensor back in its rest position and repeat acquisition;
5. Extract the distance/Diameter sensor and place it on the rim corresponding to the external plane chosen to apply the balancing weight. See picture F16.9;
6. Keep the sensor in the rest position until you hear the acquisition beep. If the sensor is left in the rest position for a longer time, further acquisition probing of that plane will be run without consequences;
7. Quickly release the Distance/Diameter sensor in the rest position. If you take too long on this operation the machine could acquire an incorrect plane: in this case place the sensor back in its rest position and repeat acquisition.

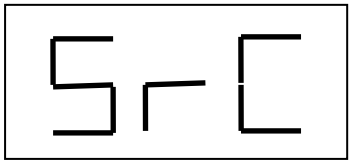
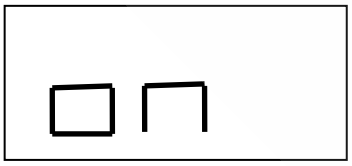
16.4.2 Balancing spin

Press [P8] Start 

or lower the wheel guard to run a balancing spin. Once the spin cycle is completed, the imbalance values calculated, according to the balancing planes chosen, will be displayed.

Moreover the machine will automatically set the mode for balancing planes search and will confirm it for about 1 second by displaying the message as shown in picture F16.11.

Picture F16.11. Message "Balancing planes research selected"

16.4.3 Search of the balancing planes

The purpose of the balancing planes research is to find the balancing planes which were previously selected by the operator in order to apply the balancing weights.

Proceed as follows:

1. Apply the weight identified on the left screen (internal weight);
2. Manually rotate the wheel until all the internal imbalance position leds light up (see picture F13.1). Block the wheel in this position using the pedal brake or electromagnetic brake (if present);
3. Slowly extract the sensor until you hear the continuous beep indicating that the internal balancing plane has been reached. The left display helps the operator in this operation by indicating the direction in which the sensor must be moved. See pictures F16.12, F16.13 and F16.14;

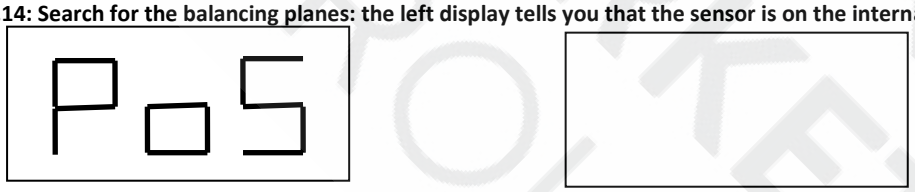
   NOTE 1: the left display will be switched off if the Program Type selected is ALS1 because the balancing weight must be always placed on the rim internal plane.

   NOTE 2: the picture F16.14 will be not displayed and the continuous beep will be not heard if the tyre will be not placed in the correct position as shown in paragraph 2).

Picture F16.12: Search for the balancing planes: the left display indicates to pull forward the sensor gauge (move to the right) to find the precise internal position of the balancing planes

Picture F16.13: Search for the balancing planes: the left display tells you to move the sensor back (move to the left) to find the exact position of the internal balancing plane

Picture F16.14: Search for the balancing planes: the left display tells you that the sensor is on the internal balancing plane exactly



4. Block the Distance/Diameter sensor at this distance, then, rotate it until the adhesive weight sticks on the rim. The sensor contact point will be a midway position between 12 o'clock and 6 o'clock, depending on the rim diameter. See also table T16.6;
5. Unlock the wheel and repeat steps 2 to 6 for the external weight. This time extract the Distance/Diameter sensor until the right display shows the same message as described in pictures F16.13, F16.14 and F16.15;
6. Perform a test wheel spin for the balancing.

   If you have to balance an identical wheel, it is possible to skip the data acquisition of the balancing planes and perform immediately with the balancing spin and then with the search for balancing planes. The balancing planes used for the calculation will be the same as stored before by the machine.

16.4.4 Use of the ALS1 or ALS2 program types without automatic acquisition

When a machine is not equipped with the automatic acquisition system by Distance/Diameter sensor or when the sensor itself has been disabled, you can still use the ALS1 or ALS2 special programs.

Since it is not possible to automatically acquire the two planes with the Distance/Diameter sensor, you must manually enter the two pairs of dimensions `di1/da1` and `di2/da2` as shown in chapter 15.3.2 *Manual entering of the wheel dimensions for the ALS1, ALS2 program types*.

After the spin, the angular position of the balancing weights is specified in table T16.6.

Table T16.6: Angular position of the balancing weights in the ALS1 and ALS2 Program Types without automatic acquisition system

Program Type	Internal Plane	External Plane	Static Plane
ALS1	H12	H6	H6
ALS2	H6	H6	H6

To find the position along the rim section, remove the Distance sensor until you read the manually-set distance value `di1` or `di2`, on the graduated scale. At that point, you must take note of the plane identified by the sensor and apply the weight in the angular position shown in table T16.6. In the case of Program Type ALS1, the `di1` position always corresponds to the rim internal edge.

16.4.5 Use of the Program Types ALS1 or ALS2 without the preliminary acquisition of balancing planes

It is possible to perform a spin when any Program Type other than ALS1 or ALS2 is active, and then select the ALS1 or ALS2 Program Type. The machine will calculate the imbalance values again according to the new Program Type selected.

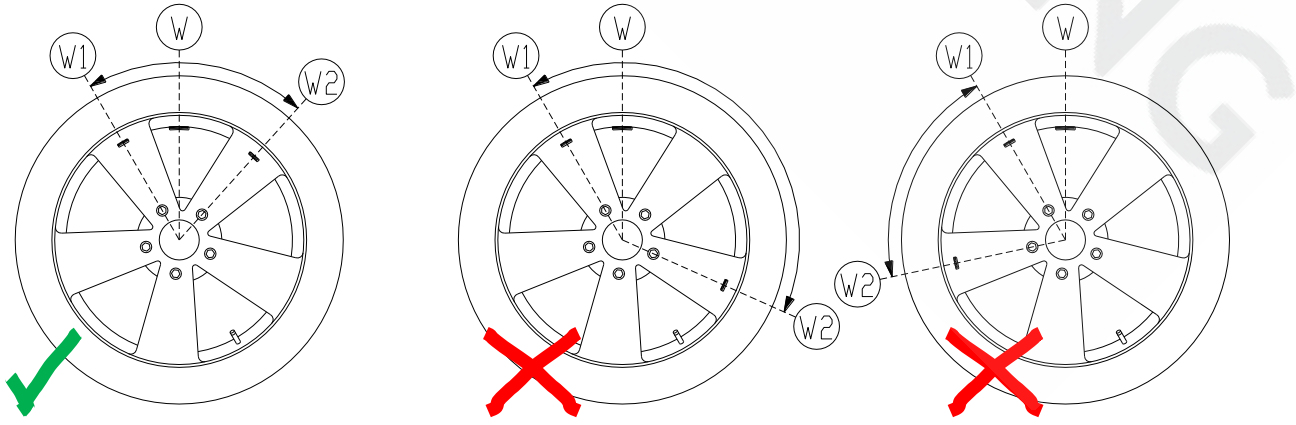
In this case, however, the imbalance values displayed are obtained using the balancing planes (i.e. the two previously acquired dimension pairs `di1/da1` and `di2/da2`) or, in the absence of the latter, by default.

17. HIDDEN WEIGHTS PROGRAM

This program divides the external weight W into two weights W1 and W2 (smaller than the initial external weight W) located in either of two positions selected by the operator.

The two weights W1 and W2 must form a maximum angle of 120° including the external weight W, as shown in Picture F17.1.

Picture F17.1 Hidden Weights Program: valid and invalid conditions for use. In this example, the W external balancing weight is marked at 12 o'clock (H12), but it can also be marked at 6 (H6) or 3 o'clock (H3): see text



VALID	NOT VALID!	NOT VALID!
The angle between weights W1 and W2 is < 120° and includes initial external	The angle between weights W1 and W2 is ≥ 120°.	External imbalance W is not within W1 and W2.

The Hidden Weights program is used for aluminium rims when:

- You want to hide the external weight behind two spokes for aesthetic reasons;
- The position of the external weights coincides with a spoke therefore a single weight cannot be applied.

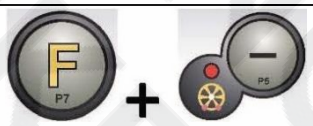
NOTE: This program can be used with any Program Type and with any Wheel Type. It can also be used to divide the static weight into two separate weights (especially useful with wheels for motorbikes).

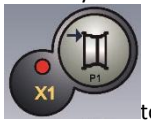
Hidden Weights Program with disabled sensor

To use this program, proceed as follows:

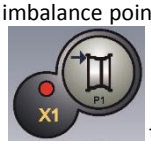
1. Perform wheel balancing without applying the external weight.
2. Rotate the wheel manually until all external imbalance search LEDs light up (see detail [9] in Picture F17.1).
3. For easy of use make a reference mark on the tyre in the imbalance position at 6 o'clock;
4. Press [F+P5]  to run the Hidden Weights program. If the wheel is balanced on the external side, the machine will display error code Err 050 to indicate that the operation is not allowed.
5. If instead there is an imbalance on the external side, the machine will display the message shown in Picture F17.2.

Picture F17.2 W1 weight position input

NOTE: You can exit the "Hidden Weights" program at any time by pressing [F+P5]. 

6. Manually rotate the wheel anticlockwise up to the point where you want to apply the external weight W1, and press [P1]  to confirm. The angle formed by W1 and by the initial external weight W must be less than 120°.
7. If the angle chosen is higher than 120° the machine displays the error code Err 051, indicating another point of choose. If instead the angle is less than 120°, the machine will display the message shown in Picture F17.3, allowing the operator to continue with the next step.

Picture F17.3: Input of the weight W2 position

8. Manually turn the wheel clockwise passing the imbalance point (previously identified) up to the point at which you want to apply the external weight W2 and press [P1] 

to confirm. The angle formed by weights W1 and W2 must not be less than 120° and must include external weight W.
9. If external weight W is not included between the positions of weights W1 and W2, the machine will display error code Err 052, thus indicating to repeat the procedure in step 7. If instead the angle chosen is less than 120°, the machine will immediately display the external weight W2 value.
10. Block the wheel and apply external balancing weight W2 as indicated on the display. Refer to table T16.2 for the exact application point of the external weight.
11. Manually rotate the wheel until external weight value W1 appears on the left display.
12. Block the wheel and apply external balancing weight W1 as indicated on the display. Refer to table T16.2 for the exact application point of the external weight.
13. The procedure of the Hidden Weights program has been completed: press [F+P5] 

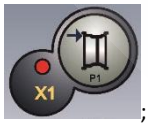
to exit and perform the balancing test spin.

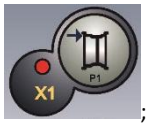
NOTE: Picture F18.1 indicates the position of the external weight at the 12 o'clock, but this is valid only for certain Program Types.

Hidden Weights Program with enabled sensor

To use this program, proceed as follows:

1. Perform wheel balancing without applying the external weight.
2. Rotate the wheel manually until all external imbalance search LEDs light up (see detail [9] in Picture F17.1).
3. For easy of use make a reference mark on the tyre in the imbalance position at 12 o'clock;
4. Press [F+P5] 

to run the Hidden Weights program. If the wheel is balanced on the external side, the machine will display error code Err 050 to indicate that the operation is not allowed.
5. If there is an imbalance on the external side instead, the machine will display the message shown in picture F17.2;
6. Manually turn the wheel anti-clockwise and make a mark on the first spoke at the 12 o'clock position;
7. Confirm by pressing 

;
8. The machine displays the message in picture F17.3;
9. Manually turn the wheel anti-clockwise and make a mark on the second spoke at the 12 o'clock position;
10. Confirm by pressing 

;
11. The display shows the two weights to be applied behind the two spokes;
12. Behind the two spokes, apply weights W1 and W2 at 12 o'clock, shown on the screen;
13. The procedure of the Hidden Weights program has been completed: press [F+P5] 

to exit and perform the balancing test spin.

18. SECOND OPERATOR

The machine has two separate memories allowing two operators to work simultaneously with different settings. This feature can make operations at the workshop quicker because when, for example, an operator is busy with removing or remounting a tyre, the other operator can use the machine to perform balancing operations and vice versa.

In this manual, the two operators are defined as *operator 1* and *operator 2*.

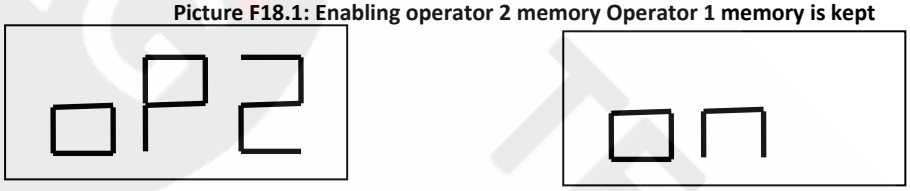
When operator 1 has completed his tasks on the machine or is involved in other activities, operator 2 can work with the machine using the settings for the wheel type he is working on <u>without altering the settings entered by operator 1</u>.

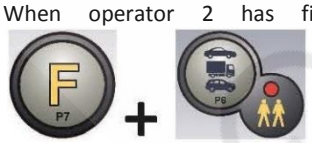
When the machine is switched on, the two memories are set with the same values by default.

To use this function, operator 2 must proceed as follows:

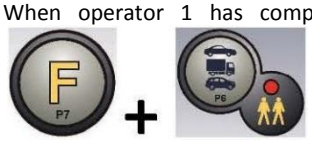
1. When the machine is free, press [F+P6]  to select operator 2. The LED next to the button will light up telling you that operator 2 is active. The message shown in picture F18.1 will appear on the screen for one second;

Picture F18.1: Enabling operator 2 memory Operator 1 memory is kept



2. Perform all desired settings for wheel dimensions, Program Type, Wheel Type and unit of measurement. The settings of operator 1 are stored in memory;
3. Perform balancing of the wheel or wheels;
4. When operator 2 has finished his task on the balancing machine, operator 1 presses [F+P6]  and thus restores all settings used by the latter. The LED next to the button will switch off telling you that operator 1 is active. The message shown in picture F18.2 will appear on the screen for one second;

Picture 18.2: Disabling operator 2 memory Operator 1 memory will be retrieved

5. When operator 1 has completed his tasks on the balancing machine, the operator can press [F+P6] keys  again to restore the wheel settings entered by him in step 2;
6. Tasks can continue, alternating the two operators.

An operator can change the following settings without editing the settings entered by other operators:

- Wheel dimensions (distance, width, diameter);
- Program Type (STD, ALS1, ALS2);
- Wheel Type (CAR, TRUCK, SUV);
- Unit of weight (grams or ounces);
- Unit of measurement of the wheel dimensions (millimetres or inches);
- Type of balancing weights material (Fe/Zn or Pb).

NOTE: the settings for the wheel's units of weight and dimension entered by operator 2 are not stored in the machine's permanent memory and therefore will remain active only until the machine is switched off.

19. UTILITY PROGRAMS

Utility programs are available only in NORMAL mode.

19.1 Selection of the imbalance display resolution

The machine has two wheel imbalance display resolutions. The two resolutions are defined as X1 (high resolution) and X5 (low resolution).

The resolution with which the imbalances of the wheel are displayed varies depending on the weight unit of measurement as indicated in table T19.1.

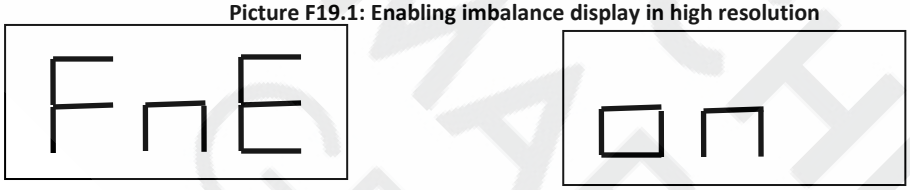
Table T19.1: Display resolution

Set resolution	Imbalance unit of measurement	Display resolution	Notes
X1 (High resolution)	Grams	1 gram	
	Ounces	0.1 ounces	
X5 (Low resolution)	Grams	5 grams	The X5 resolution is set by default at start-up
	Ounces	0.25 ounces	

To view the X1 resolution imbalance (high resolution), press [F+P1] 

. The machine will display the message visible in Picture F19.1 for one second and the LED next to the button lights up. Imbalance values are now displayed in X1 resolution (high resolution).

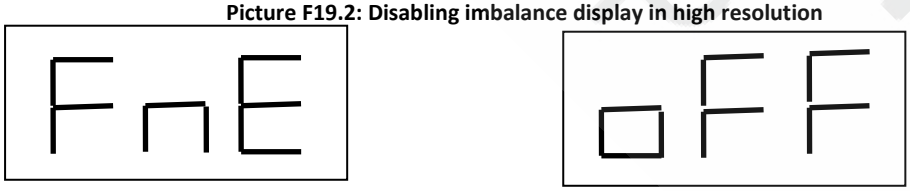
Picture F19.1: Enabling imbalance display in high resolution



To return to viewing in X5 resolution (low resolution), press [F+P1] 

. The machine will display the message visible in Picture F19.2 for one second and the LED next to the button will turn off. Imbalance values are now displayed in X5 resolution (low resolution).

Picture F19.2: Disabling imbalance display in high resolution

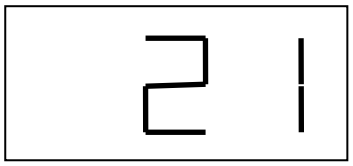


19.2 Selection of the static imbalance display

To view the static imbalance, press [F+P2] 

. The machine will show the static imbalance value on the display as seen in picture F19.3, and the LED next to the button lights up.

Picture F19.3: Static imbalance display enabled. The right display indicates the entity of the static imbalance



To return to dynamic imbalance display, press [F+P2] 

+ 

. The LED next to the button will turn off.

19.3 Electromagnetic clamping brake

The electromagnetic clamping brake is useful to block the wheel in any position defined by the user and to simplify some operations such as the application or removal of balancing weights.

If present, the electromagnetic clamping brake is also used in the automatic or manual stopping of the wheel on imbalance positions described in chapter 19.5 *SWI Wheel stop procedure on the positions of imbalance.*

To activate the electromagnetic clamping brake, press [P9] 

. To deactivate the electromagnetic clamping brake, press [P9] 

again.

The electromagnetic clamping brake is deactivated automatically in the following cases:

- Every time a balancing spin is run;
- Every time a SWI procedure is performed (stop of the wheel on the imbalance position) at low speed;
- After one minute of continuous activation (to avoid overheating of the brake itself).

The electromagnetic clamping brake can be used manually only in NORMAL mode. It cannot be used in the SERVICE mode.

19.4 SWI wheel stop procedure on the positions of imbalance

Machines equipped with the electromagnetic clamping brake are capable of automatically stopping the wheel at the first imbalance angular position that is reached during rotation. This allows the operator to have the wheel in position ready for the application of the balancing weight thus increasing work and productivity speeds.

The procedure is referred to with the short English acronym SWI (Stop the Wheel on Imbalance). Within this manual, this acronym will be used to refer to the wheel stop procedure on the positions of imbalance.

The SWI procedure has three different operating modes indicated in table T19.2.

Table T19.2: Types of SWI procedures available

SWI mode	When it is or when it can be run	Who can run the SWI procedure	Notes
Automatic	At the end of every spin.	Machine	This is performed only if there is at least one imbalance value on the wheel. Otherwise, conventional braking will occur.
Low speed	At the end of the spin, when the wheel is stationary and the wheel guard is raised.	Operator	The procedure is started up by pressing [P9] Start 

: the wheel starts up at low speed until it reaches the first imbalance angular position. |
| Manual | At the end of the spin by manually rotating the wheel with wheel | Operator | At each passage of the wheel in an angular position of imbalance, the electromagnetic |

	guard raised.		clamping brake will be enabled for 30 seconds.

The three SWI modes have functions that are slightly different one from the other although, in all modes, the ultimate goal is to block the wheel at an angular position of imbalance and make operator's tasks quicker.

19.4.1 Automatic SWI procedure

During the automatic SWI procedure, the machine will measure rotational speed during braking at completion of the spin and, when this reaches a predetermined value, it will release the brake allowing the wheel to spin freely by inertia. When the speed is low enough, the machine will wait until the wheel passes through one of the angular positions of imbalance, therefore, it will enable the electromagnetic clamping brake.

19.4.2 SWI procedure at low speed

In the low speed SWI procedure, the wheel has already run the spin and is stationary. If the operator presses [P8] key Start 

with the wheel guard raised, the machine will apply slight acceleration to the wheel and then let it spin by inertia. When the speed is low enough, the machine will wait until the wheel passes through one of the angular positions of imbalance, therefore, it will enable the electromagnetic clamping brake.

19.4.3 Manual SWI procedure

In this mode, the SWI procedure is activated by having the operator manually rotate the wheel. When the wheel passes through an angular position of imbalance, the machine will enable the electromagnetic clamping brake.

Angular positioning accuracy depends on many factors. The main ones being: wheel dimensions and weight, electromagnetic brake adjustment, temperature, belt tension. In all cases, consider the following:

- If the electromagnetic clamping brake is disabled, the SWI procedure will not be run in any of three modes;
- If revolution speed decreases abruptly due to wheel inertia during the automatic SWI procedure or the low speed SWI (e.g. due to excessive friction with rotating mechanical parts) the machine applies a little extra acceleration to the wheel itself in order to reach the first angular position of imbalance. If, despite this, the wheel does not reach this position, the SWI procedure is aborted after 5 seconds and the machine displays the error code Err 042;
- When using the manual SWI procedure, precision also depends on the speed that the operator turns the wheel at: excessively high or low speeds reduce precision.

19.5 Rotation at low speed to run a visual control of the tyre/rim

The machine has a LOW SPEED PROGRAM to decrease shaft revolution speed to perform a visual check on the tyre on the rim.

To start the program press [F+P4] 

.

Press [P4] 

and [P5] 

to increase or decrease shaft revolution speed within a range of 4 ÷ 50 RPM.

20. "SERVICE" MODE

In this mode, the machine allows the user to enter certain settings (for example, selection of the units of measurement) or use special testing (to check the machine operation) or configuration programs.

Some testing and configuration programs are included in Menus while setting programs are available with direct access via buttons. See table T13.2 for the full list of settings, programs and menus available in SERVICE mode.

Note: Some testing or configuration programs are not available to the end user but only to technical support personnel.

To access SERVICE mode, proceed as follows:

1. Switch the machine on and wait for the initial test to finish. After running the initial test, the machine is in NORMAL mode.
2. Press the [F+P3] button  . The machine will enter SERVICE mode and display the Ser Ser messages. See picture F20.1;

Picture F20.1: SERVICE mode enabled

3. To exit the SERVICE mode, you must first exit any Menus and test programs and return to the messages display shown in picture F20.1;
4. Press [F+P3]  : the machine will return to NORMAL mode.

[P1] MENU Sensor calibration programs

The sensor calibration Menu is reserved for the technical support personnel and therefore is not described in this manual.

[P2] Not used

This button is not currently used in SERVICE mode.

[P3] Machine calibration

This button allows you to access the machine calibration procedure as described in detail in section ***"16 Machine calibration"***.

[P4] Select grams/ounces

This button allows you to display and/or change the currently selected weight unit of measurement. The units available are grams (GRAM) and ounces (OUNCE).

DISPLAY OF CURRENT UNIT

To display the current unit of measurement, briefly press [P4]  . The unit selected is displayed for three seconds, after which the machine returns to display Ser Ser.

CHANGE OF CURRENT UNIT

To change the current unit of measurement, keep [P4]  pressed for three seconds. The new unit of measurement will be displayed, after which the machine returns to display Ser Ser.

The unit of measurement selected is maintained even after turning off the machine.

[P5] Select inches/millimetres

This button allows you to display and/or change the wheel's unit of dimension currently selected. The units available are inches (INCHES) and millimetres (MILLIM).

DISPLAY OF CURRENT UNIT

To display the current unit of measurement, briefly press [P5]  . The unit selected is displayed for three seconds, after which the machine returns to display Ser Ser.

Press any key to exit the display of the current unit without waiting for three seconds.

CHANGE OF CURRENT UNIT

To change the current unit of measurement, keep [P5]  pressed for three seconds. The new unit of measurement will be displayed, after which the machine returns to display Ser Ser.

The unit of measurement selected is maintained even after turning off the machine.

[P6] Select the imbalances view threshold

This button allows you to edit the imbalance display threshold. This procedure is intended for technical support personnel, therefore it is not described in this manual.

[P9] Not used

This button is not currently used in SERVICE mode.

[F+P1] Not used

This button is not currently used in SERVICE mode.

[F+P2] Select weights material Fe/Zn or Pb

This button allows you to select the balancing weight material. The options available are listed in table T20.1. The selection of the material type slightly changes the balancing results because the weights in Iron/Zinc are lighter than those in Lead and therefore are larger. The machine takes account of these differences when calculating the imbalance.

Table T20.1: Balancing weights materials

Option	Type of balancing weight material	Notes
Fe	Iron or Zinc	This material has been set by default.
Pb	Lead	In some countries (such as those of the European Community), Lead weights are prohibited by law.

DISPLAY OF CURRENT TYPE OF MATERIAL

To display the current type of material briefly press [F+P2]  . The type of material currently selected is displayed for three seconds, after which the machine returns to display Ser Ser.

Press any key to exit the display of the current type of material without waiting three seconds.

CHANGE OF CURRENT TYPE OF MATERIAL

To change the current type of material hold down  for three seconds. The new type of material will be displayed, after which the machine returns to displaying Ser Ser.

The type of material selected is maintained even after the machine has been turned off.

Note: if Lead has been selected as material, at every machine start-up a message indicating the selection of this material will appear for one second after the initial test. This signal will not be viewed if Iron/Zinc is selected as material.

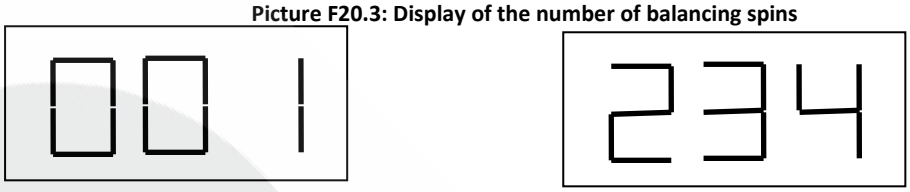
[F+P3] Exit the SERVICE mode

This button allows the machine to exit SERVICE mode and return to NORMAL mode.

[F+P4] Read spin number counter

By pressing this button, the total number of balancing spins run by the machine is displayed. The number of spins is shown on both displays. Picture F20.3 shows an example of a machine's display that has run 1,234 balancing spins.

Picture F20.3: Display of the number of balancing spins



Balancing spins that were interrupted are not included in the total count of balancing spins (for example, those stopped by pressing [P10] key Stop 

or those interrupted by raising the wheel guard) and all those run in the SERVICE mode.

[F+P5] Parameters

The Parameter menu is intended for technical support personnel and, therefore, is not described in this manual. Access to this menu is protected by password.

[F+P6] Not used

This button is not currently used in SERVICE mode.

[F+P9] MENU Test Programs

This menu allows you to run tests for some machine functions. The Menu has the following options:

- `EnC` Encoder disc test.
- `RPM` Number of shaft RPMs test.
- `SIG` Pick-up signals test.
- `dPy` Display test.
- `tAS` Keypad test.
- `UFc` Converter voltage-frequency test.
- `SMo` Shaft smoothness test;
- `Ret` Returns to SERVICE mode

To scroll through the different menu options, press [P4] 

o [P5] 

until the desired option is viewed, then press [F+P9] 

to confirm.

NOTE: The testing programs listed are mainly reserved for technical support personnel but may also be run by end users as they do not impair the machine operation.

EnC Encoder disc test

This test allows you to control the function of the encoder disc which informs the machine of the angular position of the shaft. A number indicating the angular position will appear on the right display; this number must be included between 0 and 255.

To exit the testing program, press [F+P9] 

.

RPM Number of shaft RPMs test

This test allows you to control the number of shaft RPMs during the spin. A number indicating the speed of the shaft will be viewed on the right display.

By pressing [P8] Start 

the machine will run a spin cycle and at the end of this will display the number of shaft RPMs.

To exit the testing program, press [F+P9] 

.

SIG Pick-up signals test

This program allows you to check the pick-up signal. To run the test, you will need to mount a balanced wheel with a steel rim, 15" in diameter and 6" in width (or as similar as possible) on the machine. A 50-gram weight must be applied on the external side of the wheel.

By pressing [P8] Start 

the machine will run continuous spinning and the pick-up signals to the three attenuation processes (Attenuation 1, Attenuation 2, Attenuation 4).

To complete the test, press [P10] Stop 

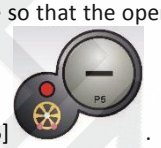
or raise the wheel guard.

To exit the testing program, press [F+P9] 

.

dPy Display test

The display testing program will light up all the LEDs and the 7-segment displays in sequence so that the operation thereof can be checked. To turn on all LEDs and display segments in sequence, press [P4] 

o [P5] 

.

To exit the testing program, press [F+P9] 

.

tAS Keypad test

The keypad testing program is used to check the operation of all the keys on the control panel. Every time a key is pressed, its code appears on the screen: for example, if you press [P8] Start 

code "P8" appears, if you press [P10] Stop 

code "P10" appears, and so forth.

The code of the key [P7] 

is not displayed.

To exit the testing program, press [F+P9] 

.

UFc Converter voltage – frequency test

The converter voltage – frequency test shows two numbers on the displays that represent the electronic control board conversion values.

These values are used by technical support personnel to determine the operational status of the board.

To exit the testing program, press [F+P9]  .

SMo Shaft smoothness test

This program allows you to measure the smoothness of the shaft.

These values are used by technical support personnel to determine the functioning status of the machine.

To measure the smoothness of the shaft proceed as follows:

1. Remove the wheel and any other accessory from the shaft. This is very important because otherwise the value measured will be completely meaningless;
2. Press [P8] Start  or lower the guard: the machine runs a sequence of brief motor ignitions, and each time it lets the shaft stop spinning by inertia;
3. Upon completion of the sequence the machine displays the value of the smoothness measured. The smoothness value is not absolute but refers to a sample machine whose smoothness value has been set at 1.00. The value measured is stored in the permanent memory of the machine in order to be used in the functions that are connected to the smoothness of the shaft.

To exit the testing program, press [F+P9]  .

Ret Returns to SERVICE mode

This Testing Program menu option returns the machine to SERVICE mode.

21. SIGNALLING

When abnormal operating conditions occur, the machine emits two types of signal:

- Error
- Warning

The Error signal is always accompanied by a triple beep indicating that the machine cannot run the command given by the operator, or, during operation, conditions were encountered that prevent the action in progress from continuing.

The Warning signal is always accompanied by a double beep that prompts the operator to perform a particular action, or refers to the fact that the machine has changed status. In any case, the requested operation is not prevented, or the current function is completed.

21.1 Error codes

The machine indicates error conditions by alternating the display of an error code with a brief description (in English) of the error cause. The list of error codes and brief descriptions is provided in table T21.1. The machine displays the code for different times depending on the error code itself, as indicated in the column "Error display" in table T21.1.

Table T21.1: Error codes

Error code	Brief description	Display error[(1)]	Description	Notes
000 to 009	INT ERR		Machine parameters internal error.	Contact technical support.
010	REV SPN		Reverse rotation of the wheel.	Contact technical support.

012	NO STP		The wheel cannot be stopped at the end of the spin.	Check the mains voltage. If the checks do not lead to any results, contact technical support.
014	NO SPN		The wheel does not spin.	Contact technical support.
015	(Blocked key code)	PERMANENT UNTIL TURNED OFF	Keypad blocked at start-up.	Release all keys, then turn off or restart the machine. If the error persists, contact technical support.
016	DIS OUT	OPERATOR ACTION	WARNING: Distance sensor is not in rest position at start-up of the machine or when [P8] Start is pressed.	Set the sensor to its rest position: the error should disappear. If the error persists, contact technical support.
018	NO BTI		Impossible to communicate with expansion board.	Contact technical support.
019	NO CP		WARNING: Communication process failure.	Turn the machine off and then on again. If the error persists contact technical support.
020	NO EEP		Lack of communication with the eeprom memory.	Contact technical support.
021	EEP ERR	OPERATOR CONFIRMATION	No machine calibration data or incorrect calibration data.	Carry out calibration for the CAR/SUV Wheel Type and/or for the TRUCK Wheel Type. If the error persists, contact technical support.
022	-A- OUT	OPERATOR CONFIRMATION	ERROR: Pick-up channel A too high.	Excessive imbalance or anomaly. Turn the machine off and then on again. If the error persists, check for pick-up failure Replace pick-up code.
023	-B- OUT	OPERATOR CONFIRMATION	ERROR: Pick-up channel B too high.	Excessive imbalance or anomaly. Turn the machine off and then on again. If the error persists, check for pick-up failure Replace pick-up code.
024		OPERATOR CONFIRMATION	ERROR: Internal timer channel too high.	Excessive imbalance or anomaly. Turn the machine off and then on again. If the error persists, check for pick-up failure Replace pick-up code.
025	SHF IMB	OPERATOR CONFIRMATION	Presence of weight during the Cal0 calibration phase.	Remove the weight and repeat the spin of the Cal0 phase. If the error persists, contact technical support.
026	NO -A-	OPERATOR CONFIRMATION	Spin without weight or no pick-up A signal in the Cal2 calibration phase.	Apply the intended weight and repeat the spin. If the error persists, contact technical support.
027	NO -B-	OPERATOR CONFIRMATION	Spin without weight or no pick-up B signal in the Cal2 calibration phase.	Apply the intended weight and repeat the spin. If the error persists, contact technical support.
028	INN IMB	OPERATOR CONFIRMATION	Spin with weight on the internal side during the Cal3 calibration phase. In this phase, the weight must be on the internal side.	Remove the weight from the internal side and repeat the spin. If the error persists, contact technical support.

030	CAR CAL	OPERATOR CONFIRMATION	No calibration data for the CAR/SUV (passenger car and off-road vehicle) Wheel Type.	Carry out the calibration of the machine for the CAR/SUV Wheel Type.
031	TRC CAL	OPERATOR CONFIRMATION	No calibration data for the TRUCK Wheel Type.	Carry out machine calibration for the TRUCK Wheel Type.
032	DIA CAL	OPERATOR CONFIRMATION	WARNING: Diameter sensor not calibrated.	ONLY TECHNICAL PERSONNEL. Calibrate the Diameter sensor.
036	NO IMB		WARNING: Absence of wheel imbalance in DYNAMIC mode. It is not possible to run the low speed SWI procedure.	
037	NO IMB		WARNING: Absence of wheel imbalance in STATIC mode. It is not possible to run the low speed SWI procedure.	
039	W.GUARD		WARNING/ERROR The wheel guard is open: the requested action cannot be performed.	Check guard MICRO switch.
044	DIA OFF	OPERATOR CONFIRMATION	WARNING: Diameter sensor disabled or missing. It is not possible to perform the action required.	ONLY TECHNICAL PERSONNEL. Make sure that the sensor is connected and enabled.
046	NO DIA	OPERATOR CONFIRMATION	WARNING: The Diameter sensor is enabled but disconnected.	NOTE: if [F+P2] is pressed the machine acquisition system is temporarily disabled and operation can be continued.
048	CAL FAR	OPERATOR CONFIRMATION	WARNING: The Diameter sensor is too far from the calibration point.	ONLY TECHNICAL PERSONNEL. Re-position the Diameter sensor into the correct calibration position.

050	NO HYD	OPERATOR CONFIRMATION	WARNING: Absence of wheel external imbalance. It is not possible to use the Hidden Weight program.	
051	TOO FAR	OPERATOR CONFIRMATION	WARNING: Hidden Weights programme: the selected point is too far from the external imbalance position.	The point must be included up to 120° from the external imbalance position.
052	NOT INC	OPERATOR CONFIRMATION	WARNING: Hidden Weights programme: the external imbalance position is not between the selected W1 and W2 points.	Choose W1 and W2 points so that they include the external imbalance position.
054	CAB DSC		Inverter cable with connection.	Connect inverter cable.
055	NO OPT		OPERATOR CONFIRMATION	WARNING: The static imbalance of the wheel is too low: the Optimisation programme cannot be used.
056	HIG TMP		High temperature on inverter.	Contact technical support.
057	OVR VOL		Over voltage on inverter.	Contact technical support.
058	UND VOL		Under voltage on inverter.	Contact technical support.
059	SOV RA		Inverter overload.	Contact technical support.

(1) The error code can be exited in the following ways:

OPERATOR CONFIRMATION	The machine exits the error code display when the operator presses any key (except for [P7] ).
OPERATOR ACTION	The machine exits from the error code display when the operator performs an action linked to said error code (for example, ERR 016, brings the Distance sensor back to the rest position).
ONCE	The machine displays the error code and its brief description just once, then it returns to the previous status.
PERMANENT	The machine permanently displays this error code until being turned off, therefore the error code cannot be exited.

21.2 Acoustic signals

The machine emits different acoustic signals based on its status. The acoustic signals are listed in table T21.3.

Table T21.3: Acoustic signals

Signalling	Meaning	Notes
Short beep	Selecting a program or a function	
Long beep	Acquisition.	• Acquisition of a value. • Wheel dimension acquisition in STD Type programs.
Long beep + 1 Short beep		Acquisition of internal plane in ALS1 or ALS2 Programme Types.
Long beep + 2 Short beep		Acquisition of external plane in ALS1 or ALS2 Programme Types.
Double beep	Warning.	A particular condition has occurred that requires the operator's attention.
Triple beep	Function not available or Error.	The requested function is not available or an error condition has occurred.
Short Beep + Long beep	Storing one or more values in the permanent memory (eeprom) of the circuit board.	One or more values have been stored in the permanent memory of the circuit board (for example, at completion of calibration phases).
Intermittent beep	Adjustment.	Signal used in some service programmes to simplify sensor adjustment.

The acoustic signal is also heard for about two seconds at machine start-up allowing the operator to check the operation of the alarm (buzzer).

21.3 Special visual signals

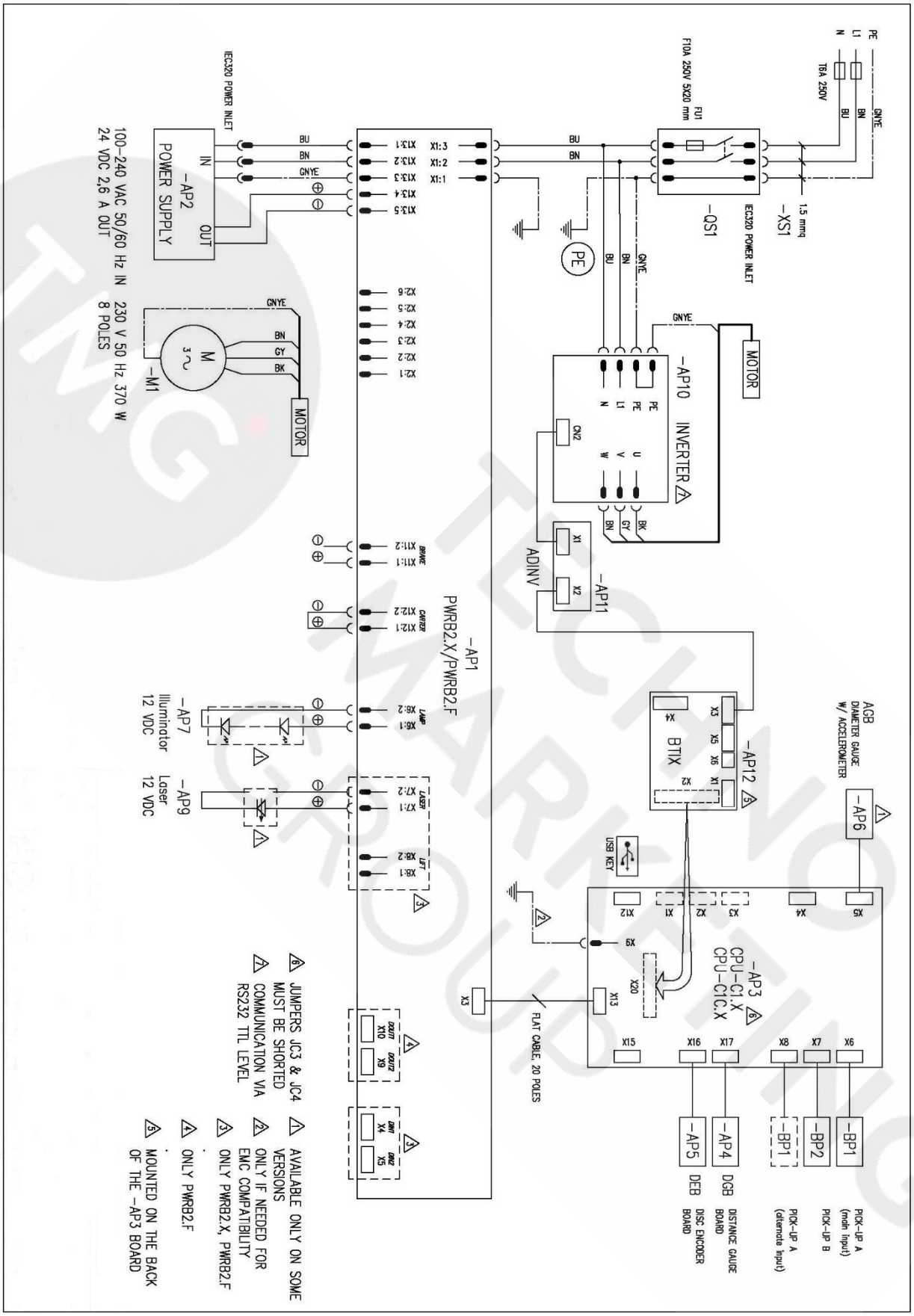
The machine gives special visual signals in certain cases. The special visual signals are listed in table T21.4.

Table T21.4: Special visual signals

Signalling	Meaning	Notes
Three decimal points lit on one or both displays	Imbalance exceeds 999 grams.	This signal can be caused by: • No machine calibration. • Incorrect measures of the wheel size. • Incorrect setting of the Wheel Type. • Incorrect setting of the Program Type.
Flashing green STBY LED	The machine is in STAND-BY mode.	All LEDs and displays are switched off. To exit STAND-BY mode, press any button. (except for [P7] ).
The left (or right) display is flashing	a) A user action is being waited for. b) The Diameter or Width sensor is not calibrated.	a) The user's action may be pressing a key to confirm or continue the procedure in progress, or the selection of a value or a menu option. b) Call the technical support to carry on with the calibration of the Diameter and Width sensor. To continue with the operation, you can temporarily disable the sensors by pressing [F+P2] keys  .
The sensors disabling LED is flashing	a) Both of the sensors have been temporarily disabled. b) The width sensor has been temporarily disabled.	The disabled status will last until the machine has been turned off.

22. ELECTRICAL SYSTEM

Picture F22.1: Machine wiring diagram



23. FIRE PROTECTION EQUIPMENT TO BE USED

	Dry materials	Flammable liquids	Electrical equipment

Hydraulic	YES	NO	NO
Foam	YES	YES	NO
Powder	YES*	YES	YES
CO_2	YES*	YES	YES

YES*: Can be used in the absence of more appropriate means or for small fires.

The information in the table above is general and can be used as a rough guide. For the responsibility for the use of each type of extinguisher, refer to the manufacturer.