WHEEL BALANCERS

USE AND MAINTENANCE MANUAL

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CONTENTS

1. PREFACE

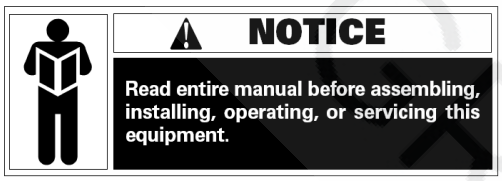
Confirm that the machine including the operation system, tools and accessories are operated normally and without any damage, then hand the machine to the customers and the machine will endue some period of guarantee. During this period, the manufacturer will repair the machine or the non-normal parts of the machine or machine itself free of charge but will not be responsible for the damage, wear, and tear caused by the incorretc usage, transportation and maintenance. And the manufacturer will not notify the customers when he renews the products or improves the production line. The purpose of this manual is to provide the users and owners of this machine with the guide of safety and regulation to make the operators properly maintenance and operates the machine. If you carefully follow this instruction manual, the machine will provide you with the service of higher efficiency and more durable. The following paragraphs will provide you with the danger level related to the machine.

	Danger: operation can cause the serious injury or death.
	Warning: operation can cause the serious damage or unsafe.
	Caution: operation can cause slight wound and the damage of the objects.

*Read the manual carefully before using the machine and keep this manual on the document folder near the machine to check at any time.

* Technical documents should be considered to be an integrated part of the machine and it should be placed together with the machine when being sold to the new owner.

*Only when the serial number and model of the manual are same to the serial number and model on the nameplate, the manual can be considered to be effective.



* Always refer to the described information and instructions of this manual. Operators should be responsible for the operations not described and authorized in the manual.

* Some information in the manual comes from the pictures, it is normal that you will see some differences in the standard machines.

* Do not try other operations except under the guidance of the personnel with experience. If necessary, please contact the authorized service center for help.

The selection for the installation site must be in accordance with the current effective safety regulation. We should specially point out that the installation and operation of the machine must have anti-moisture protective methods. In order to correctly and safely use the machine, you should meet the following environmental requirements:

- RD：<85% (without condensation).
- Environment temperature: 0°---- 50°C.
- The floor of the ground should be enough solid to support the maximum weight of the machine.
- The machine should not be used in an environment with the potential exploded factors.

2. SAFETY REGULATIONS

* Not following the information and overlooking the warning labels may cause series injuries to the operators and other personnel.

* You can only operate the machines after you completely read and understand all damages/warnings.

* The correct use of the machine requires a professional operator who has undertaken suitable training and understands the written descriptions of the manufacturer, is familiar with the safety regulations, and follows all given descriptions and regulations. Futhermore, the operator should be a person without bad habits and is of healthy mentality and physiology.

Before operating the machine, you must have the following these instructions:

- Read and understand the information and the descriptions in the manual
- Fully understand the characteristics and the features of the machine
- Keep the unauthorized personnel away from the operative site
- Be sure the installation is in accordance with the current standards and the regulations
- Be sure that the operators of the machine have the proper training and can operate the machine correctly and safety.
- Before powering off the machine, do not touch the cables, motors, or other electrical elements.

Do not remove or wear out any label of danger, caution, warning, or instruction. If the label is lost or unreadable, you should change it at once. If the label is missing, please contact with the nearest dealer to get it.

- View the accident precaution regulations related to the operation and maintenance of a mechanism of high voltage and rotation
- The manufacturer will not be responsible for damage and accidents caused by the changes and modifications not authorized by the manufacturer.

3. CARRIAGE, HOISTING, STORAGE AND TRANSPORTATION OF THE MACHINE

Place, transport, and store the machine in the manner indicated on the package container. When transporting and hoisting the wheel balancer, do not make the accessory hang, weight tray, balance shaft ,and display cover the weight bearing area because this can cause the damage of the machine, cause precision error, and even the injury to the operator. Due to the construction of the wheel balancer, the center of gravity is off center and to the right; therefore, when the machine is unpacked, the arm of the hydraulic vertical lift of the forklift should be deflected to the right meaning it hshould not exceed 1/4 of the width of the machine. It is best to cover it in a layer of paper shell and rubber to avoid sliding on the machine. When lifting the machine, there should be personnel to hold the machine and the maximum height of the lift should not exceed one meter. If it exceeds one meter, you should fix the machine properly.

If hoisting the wheel balancer, you can pass the wide cloth band through the clearance under the machine. The cloth band must be 2 pieces or more, the load bearing should be more than 500kg, and the length should be of same. The position of the cloth band should be in accordance with the requirement of lifting the machine. When hoisting, it is best that some personnel hold the machine. When lifting or hoisting the machine, the speed should be not more than 35mm/s because the inertia causing the slide and swing of the machine could be dangerous.

Storage: The machine should not be exposed and should be covered with the plastic film. The machine should be stored in a dry/ waterproof and ventilated warehouse. In the storage area, the temperature should be within the range of -10℃～55℃ and RH should be withinin the range of 30%～90%. It is prohibited to store the machine with dangerous chemicals, flammable/explosive materials, or the objects easily subject to dust.

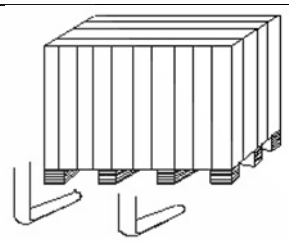
Transportation： When loading the machine, follow the directions on the outer package and fix firmly. No matter what kind of transportation, the environmental temperature and humidity should comply with the storage requirements.

It is prohibited to transport the machine with dangerous chemicals, flammable/explosive materials, or objects easily subject to dust.

Installation

After confirming that the package of the wheel balancer is intact, carry the machine to the installation area.

Environmental requirements at the installation site: temperature 0℃-50℃, RH≤85%, without water source, fire source, dust, flammable and explosive materials and the chemicals. The floor should be flat and solid.



Before installation, detach the upper cover of the package box of the wheel balancer and confirm the machine's accessories shipped together with the machine and the data you purchase according to the packing list. If you have any questions, contact the dealers. The packing materials such as plastic, polystyrene, nail, screw, wood, and the carton must be placed into a scrap box and handled according to the local laws and regulations. During installation, detach the connecting bolt between the wheel balancer and the pallet of the package box and move the machine from the pallet to the installation position. To guarantee a safe and quick operation, there should be a distance of more than 300cm from the wall of the building to the right and rear of the machine. And the distance of more than 200cm from the wall of the building to the left of the machine. After the wheel balancer is moved to the proper position, drill 3 anchor holes on the ground according to the installation hole at the foot of the machine and then use 3 pieces of M10X160 anchor screws to fix the machine on the ground to guarantee the stability and reliability of the machine.

If the machine is not packed, observe following precautions:

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

DO NOT USE METAL WIRE ROPES FOR LIFTING BODY.

SLING WITH STRAPS OF AT LEAST 200 cm IN LENGHT AND WITH A HIGHER FLOW RATE OF 3000 kg.

DO NOT FORCE ON SHAFT AND/OR FLANGE.

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

4. INSTALLATION AND SWITCHING ON

After unpacking the wheel balancer, check the status , integrity, and presence of faults and assemble the components.

4.1 Electrical connection

The standard version of the machine must be connected to a main 230V Single Phase.

A change in the power supply cannot be done by the user; it must be requested to BRIGHT, a dealer, an authorized service center.

To establish the electricity connection, connect the machine’s power supply cable with the plug in used in the country.

ALL OPERATIONS TO ESTABLISH ELECTRICAL CONNECTIONS AND INTERVENTIONS (HOWEVER LIGHT) ON ELECTRICAL PARTS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.

The determination of the proper electrical connection must be carried out according to the electric power consumption that is indicated on machine. The user must:

- Check that the supply voltage corresponds to the voltage indicated on the nameplate of the machine.
- Check the conditions of the wires and the presence of the ground conductor.
- Check if the machine is connected to its electrical connection, fitted with a proper 30 mA sensitive automatic circuit breaker, and against a possible electrical overload over 30 mA;
- Connect the power supply cable to the plug with great care and follow current regulations.

WHEN THE MACHINE IS TURNED OFF FOR A LONG PERIOD IT IS NECESSARY TO DISCONNECT THE POWER PLUG TO AVOID USE BY UNAUTHORIZED PERSONNEL.

IF THE MACHINE IS CONNECTED DIRECTLY TO THE POWER SUPPLY BY MEANS OF THE MAIN ELECTRICAL BOARD AND WITHOUT A PLUG, INSTALL A KEY-OPERATED SWITCH TO RESCTRICT THE MACHINE USE TO EXCLUSIVELY QUALIFIED PERSONNEL.

IN CASE OF OPERATIONS ON ELECTRIC PARTS, CABLES ENGINES OR ANY ELECTRIC DEVICES, IT IS NECESSARY TO CUT OFF THE ELECTRICITY.

DO NOT REMOVE, DAMAGE, AND MAKE COMPLETELY ILLEGIBLE THE STICKERS OF DANGER, WARNING, INSTRUCTIONS AND CAUTION. REPLACE ANY MISSING, DAMAGED OR ILLEGIBLE STICKERS. THE STICKERS CAN BE FOUND AT THE NEAREST DEALER OF MANUFACTURER.

THE DAMAGE DUE TO FAILURE TO COMPLY WITH THE ABOVE WRITTEN INSTRUCTIONS, WOULD NOT BE CHARGED AGAINST THE MANUFACTURER AND IT MAY CAUSE THE INVALIDATION OF THE WARRANTY.

5. INSTALLATION

5.1 Installation area

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

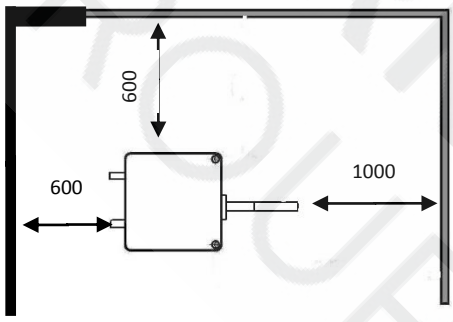


Figure F5.1

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

INSTALLATION AREA MUST BE KEEP CLEAR BY POSSIBLE DANGEROUS OBJECTS.

UNAUTHORIZED PERSONNEL MUST NOT STAND NEAR BY THE WORKING AND INSTALLATION AREAS.

THE MACHINE MUST BE PLACED ON A HORIZONTAL SURFACE MADE OF CONCRETE OR TILE.

AVOID BREAKABLE AND ROUGH SURFACES.

SURFACE MUST ENDURE THE STRESS LOAD DURING THE MACHINE OPERATION.

THE MACHINE MUST BE FIXED ON THE FLOOR WITH SCREWS AND EXPANSION PLUGS IN ACCORDING TO FOLLOWING INSTRUCTIONS.

THE USE OF THE MACHINE IS ONLY ALLOWED IN PLACES THAT DO NOT PRESENT RISKS OF EXPLOSION OR FIRE.

6. SUSPENSION OF THE USE

In case the machine is not used for a long time it is necessary to 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.

7. ENVIRONMENTAL INFORMATION

THE DISPOSAL PROCEDURE DESCRIBED BELOW ONLY APPLIES TO MACHINES WITH THE SYMBOL OF THE WASTE BIN WITH A BAR ACROSS IT ON THEIR DATA PLATES.

The crossed-out 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 their 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. Electrical and electronic manufacturers and distributors set up proper collection and treatment systems for these products for this purpose. At the end of the product's working 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 provided 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.

Further measures for environmental protection are recommended: recycling of any packaging of the product and proper disposal for used batteries (only if contained in the product).

8. TECHNICAL DATA

General features

Power supply voltage	

Power consumption	
Balancing speed	
Maximum unbalance calculated	
Accuracy	
Shaft diameter	
Working environment temperature	
Storage temperature	
Storage relative humidity	
Machine weight (without accessories)	
Noise level	

9. ROUTINE MAINTENANCE OF THE WHEEL BALANCER

 Warning

The manufacturer declines all responsibility in the event of claims resulting from the use of non-original spare parts or accessories.

 Warning

Unplug the machine from the socket and make sure that all moving parts have been locked before performing any adjustment or maintenance operation.

 Warning

Do not remove or modify any part of the machine (except for service interventions).

 Caution

Keep the work area clean.

Never use compressed air and/or jets of water to remove dirt or residues from the machine. Take all possible measures to prevent dust from building up or rising during cleaning operations. Keep the wheel balancer shaft, the securing ring nut, the centering cones and flange clean. These components can be cleaned using a brush previously dripped in environmentally friendly solvents. Handle cones and flanges carefully so as to avoid accidental dropping and subsequent damage that would affect centering accuracy. After use, store cones and flanges in a place where they are suitably protected from dust and dirt. If necessary, use ethyl alcohol to clean the display panel. Perform the calibration procedure at least once every six months.

10. CONTROL PANEL

The machine control panel is shown in Figure F10.1. The control panel allows the operator to give commands and enter or edit data. The same control panel displays the balancing results and machine messages. The functions of the various parts of the control

panel are described in table T10.1. The control panel is provided on the rear with an electronic control board collecting, processing and displaying data.

Figure F10.1: Control panel

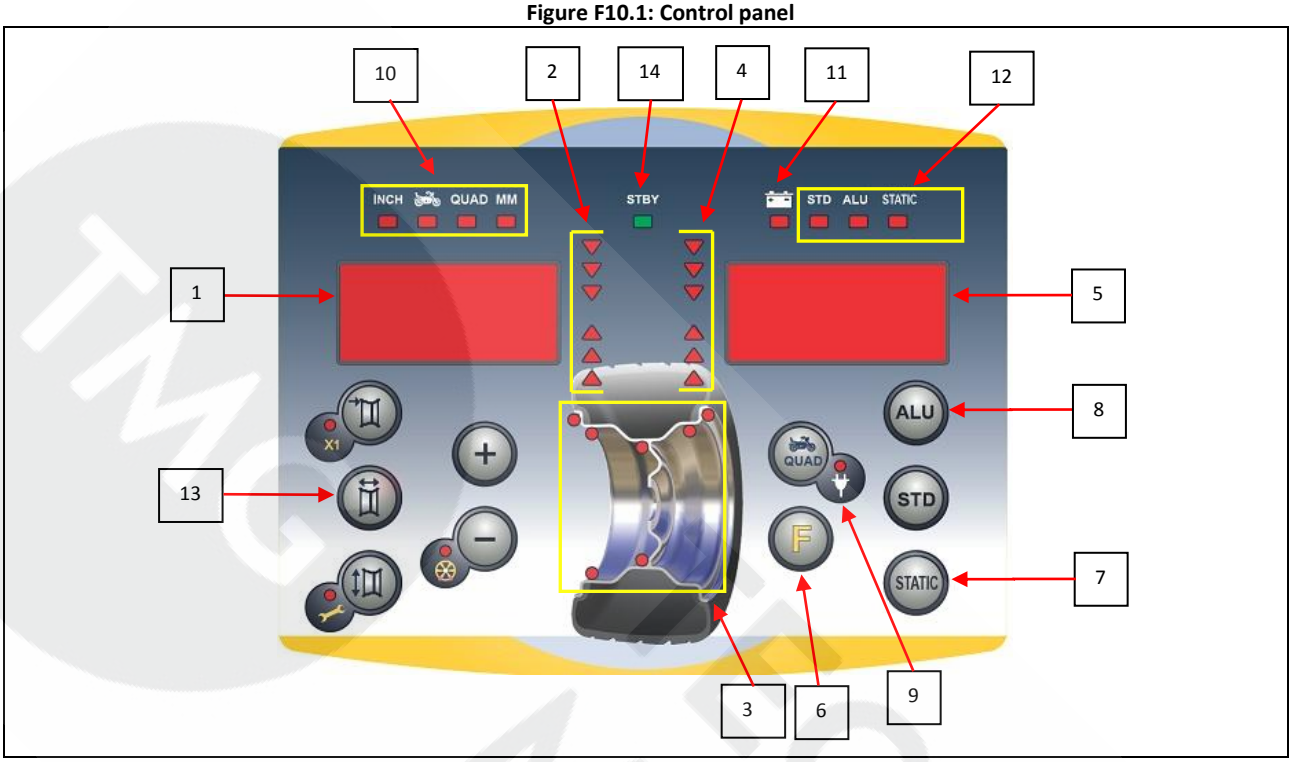


Table T10.1: Functions of different parts of the control panel

Pos.	Description
1 – 5	Display to show inside/outside imbalance value.
2 – 4	Light indicator showing inside/outside imbalance angular position.
3	Imbalance Weight Position light indicator. Group of 5 LEDS (red). Position depends by the Program and Wheel Type selected.
6	"F" key to access the secondary function of the keys (P7).
7	STATIC program selection key (P10).
8	ALU program selection button (P8).
9	MOTO/QUAD selected Wheel Type light indicator (red).
10	Light indicator of the selected unit of measurement: inches/mm. Group of two light (red) indicators to indicate the selected unit of measurement.
11	Charging indicator light with battery (Optional).
12	Selected Program Type light indicator (STANDARD/ALU/STATIC). Group of 3 light (red) indicators to indicate the selected Program Type.
13	Example of standard key: it has a main function (big icon shown inside the key) and a secondary function (small icon shown outside the key).
14	Active stand-by light indicator.

10.1 Keyboard

For your convenience, the keys in this manual are numbered from [P1] to [P10] as shown in Figure F10.1. 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 leveled square, and a secondary function indicated by a small icon located nearby. Some of the secondary functions feature an LED to indicate their activation. The keys [P7] 

, [P8] 

, and [P10] 

do not have a secondary function. The secondary function of the keys is identified in this manual with the codes from [F+P1] to [F+P9] as shown in Figure F10.3.

Figure F10.2: Key example showing the main and secondary function

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

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

Figure F10.3: Key secondary functions numbering

Table T10.2: Settings, programs and menus available in SERVICE mode

SERVICE mode			
Key	*Setting/Program or Menu*	*Key*	*Setting/Program or Menu*
[P1]	Not used	[F+P1]	Not used
[P2]	Not used	[F+P2]	Not used
[P3]	Machine calibration	[F+P3]	Exit SERVICE mode (return to the NORMAL mode)
[P4]	Grams/ounces selection	[F+P4]	Read counter with the number of launches
[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] ALU 

and [P10] STATIC 

keys are not used to access settings, programs and menus.

10.2 STANDARD, SERVICE, STAND-BY operating modes

The machine features three operating modes:

- STANDARD mode. This mode is enabled after the machine is turned on and it is possible to perform the wheels balancing;

- SERVICE mode. In this mode various utility programs are available for setting parameters (such as grams or ounces) or checking the machine operations (such calibration);
- STAND-BY mode. After 5 minutes of inactivity, the machine will automatically go into STANDBY mode to reduce power consumption. The STAND-BY green LED on the control panel flashes when the machine is in this operating mode. All acquired data and settings are held in STAND-BY mode. In the SERVICE mode is not possible to switch to STAND-BY mode. To exit from STAND-BY mode choose by any of the following means:
  - Press any key (with the exception of [P7] );
  - Rotate manually the motorcycle flange so that the wheel will turn counterclockwise

Note: The machine will exit STAND-BY mode also by pressing the [P8] ALU  *key.*

11. MACHINE CALIBRATION

To function 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.

11.1 When to carry out machine calibration

Calibration must be carried out whenever one or more of the conditions listed are active.

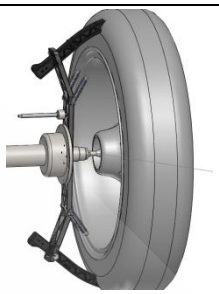
11.2 Machine calibration for the MOTO/QUAD wheel type

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

- A balanced wheel with an aluminum or a steel rim (Recommended dimensions: Minimum Diameter 17”).
- Calibration weight supply as standard.

To perform the machine calibration, proceed as follows:

Phase	Description	
1	Switch on the machine.	
2	Press the [F+P3]  . The display will show the message `SER – SER` (this indicates that we have entered Service mode).	
3	Press [P3]  . The message `CAL – Mot` will be shown on the display (machine calibration for passenger car and off-road vehicle wheels).	
4	Mount the wheel with aluminum or steel (Recommended dimensions: Minimum Diameter 17”) on the MOTO flange.	
5	Press [P3]  . The message shown `CAL – 0` will appear on the display.	

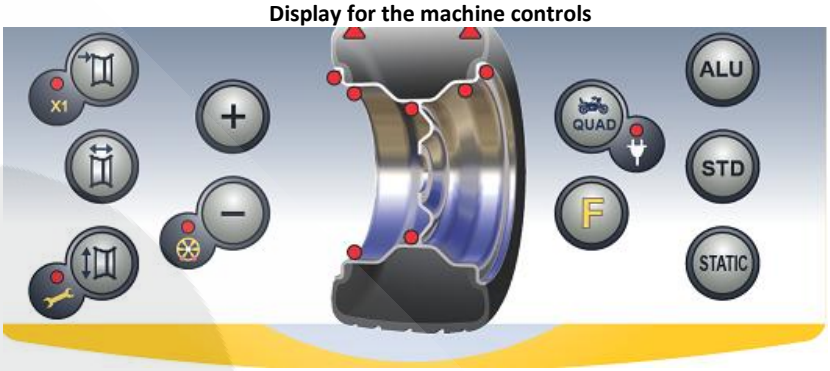
6	Make sure the MOTO flange is mounted in such a way that **the "CAL" words on the flange of the shaft and on the MOTO flange are aligned.** Put the flange for motorcycles in the **vertical position**.	
7	Press [P3]  . The display shows the message `CAL - 1`. If the weight position is significantly different from the vertical position, the machine will refuse to perform the spin *and it will display an error code* `Err 043`.	
8	Rotate manually the motorcycle flange so that the wheel will turn counterclockwise.	
9	After the launch put the MOTO flange in the **vertical position** and the display shows the message `50 - CAL`, apply the calibration weight on the inside. The calibration weight is applied on the hole that has stamped the "CAL" indication with the calibration weight in the upper part.	
10	Rotate manually the motorcycle flange so that the wheel will turn counterclockwise.	
11	At the end of the spin, move the motorcycle adaptor in a **vertical position** until the display show the written `CAL - 50`, apply the calibration weight on the external side. The calibration weight must be applied in the hole marked “CAL” and with the calibration weight in upper part.	
12	Rotate manually the motorcycle flange so that the wheel will turn counterclockwise.	
13	At the end of the spin, the MOTO wheel type calibration is finished and the machine will switch to NORMAL mode, ready to run the balancing.	

How to exit the MOTO wheel type calibration of the machine

At any time it is always possible to exit the calibration procedure during its progress by pressing [F+P3]  . The machine will return to SERVICE mode displaying the `SER SER` writing. To return to NORMAL mode, press the [F+P3] key again [F+P3]  . The calibration in progress will be cancelled and the machine will use the values of MOTO wheel type calibration which were previously stored. Also in this case the MOTO wheel type and the ALU1 Program Type will remain set. The wheel dimensions will be those which were automatically set by the machine for this kind of calibration.

12. USE OF THE MACHINE IN NORMAL MODE

Display for the machine controls



To use the machine, you must select or set as follows:

- Tipo di Programma (programma per ruote MOTO o QUAD). Programs for wheels MOTO ALU1;
- Tipo di Ruota (MOTO, QUAD). Default = MOTO;
- Dimensions of the wheel to balance. Sizes must always be entered manually;
- 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 selection or data settings, the machine will run a calculation by displaying the new values of imbalance.

After making the desired selections/settings it is possible to rotate manually the motorcycle flange so that the wheel will turn counterclockwise. During the launch the machine displays the correct speed of launch.

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

Apply the weights displayed by the machine at the indicated positions and then run a second test spin. Normally the weights are applied at 12 o'clock.

12.1 Program Type

The machine allows choosing among eight different Balancing Program Types as listed in table T12.1.

Table T12.1: Program types available

Program Type	Wheel material	Weight position along the rim selection	Notes
 ALU1	Aluminum	Default	Default at switching on
 STA	Steel/Aluminum	Default	
 STD	Steel	Default	

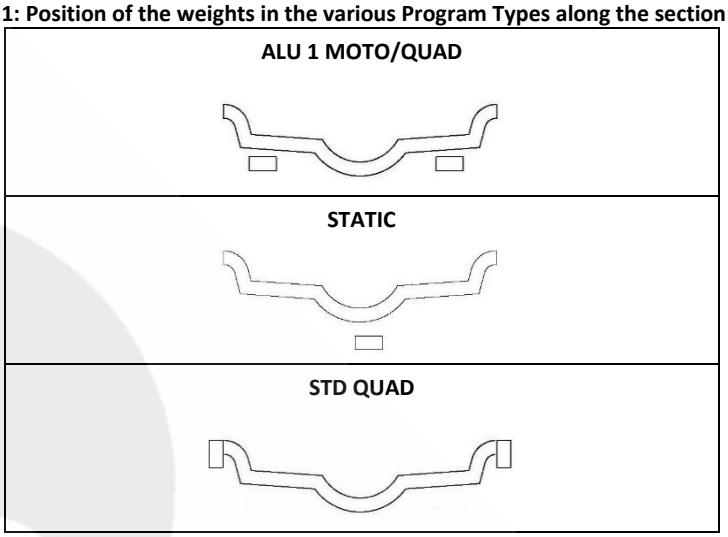
By pushing one of the buttons showed above, on the display it will be appeared the Program Type selected.

The following LEDs will light up on the control panel depending on the Type of active Program:

- Program Type LED.
- Imbalance Weight Position LED.

The position of the balancing weights along the section of the rim in the various Program Types is shown in figure F12.1.

Figure F12.1: Position of the weights in the various Program Types along the section of the rim



The angular position in which to apply balancing weights in the various Program Types is shown in table T12.2.

Table T12.2: Angular position of the balancing weights in the various program types

Program Type						
Machine data acquisition system	ALU1 MOTO			STD QUAD		
	Internal plane	External plane	Static Plane	Internal plane	External plane	Static Plane
MOTO MEC	**H12**	**H12**	**H12**	**H12**	**H12**	**H12**

12.2 Wheel Type

The machine allows choosing one of three different Wheel Types, as listed in table T12.3.

Table T12.3: Wheel types available

Wheel type	Vehicle	Notes
MOTO 	Motorcycles	Default at switching on
QUAD 	Quad	

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 [P6]  until the corresponding LED lights up, as shown in table T12.3.

12.2.1 MOTO Wheel type

The selection of MOTO wheel type allows the balancing for the motorbike wheels.

These wheels must be fit on the shaft by using a specific motorcycle wheel adaptor. Since the motorcycle adaptor keeps farer the wheel from the machine, it is necessary to install an appropriate extension for the distance gauge (Figure F12.1.1).

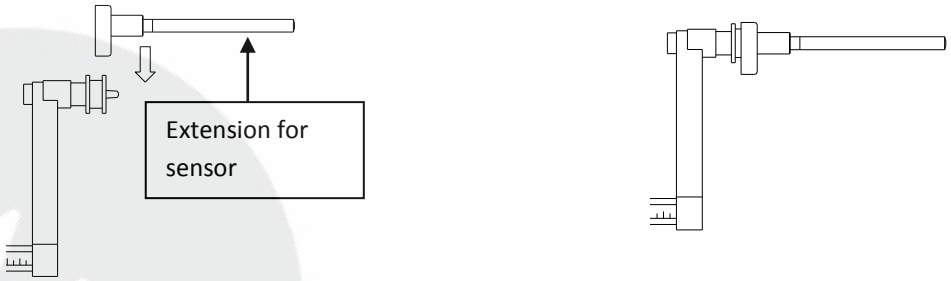
The MOTO wheel type is selected by default at switching on. See table T12.3.

When MOTO wheel type is active, ALU1 Program Type is selected automatically. The weight position to be applied on rim section, it is the Program Type ALU1 as showed in figure F12.2.

When the wheel type MOTO is activated, it is possible to display the dynamic or static imbalance, by pressing keys [P10] 

if the wheel width entered is less than 114 mm (or 4.5 inches) the static imbalance is always displayed.

Figure F12.1.1: Fitting the extension for Distance/Diameter sensor to measure motorbike wheels



Every time the flange for motorbikes is taken down (for example, to balance wheels for vehicles) and then put back in, it is always necessary to line up the "CAL" markings on the flange and flange for motorbikes. If this is not observed, balancing precision may be compromised.

12.2.2 QUAD Wheel type

The selection of MOTO wheel type allows the balancing for the QUAD wheels.

To select the QUAD, press the QUAD [P6] 

key until the QUAD LED of the LED Wheel Type group lights up.

The positions of the weights along the section of the rim are the same as those shown in Figure F12.2.

When the wheel type QUAD is activated, automatically, it is selected on the STD Program Type.

The balancing of wheel type QUAD could be performed also with ALU Program Type by pressing the button [P8] 

; STATIC Program Type by pressing the button [P10] 

.

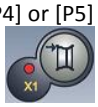
12.3 Entering wheel dimensions

The dimensions of the wheel to balance can be entered in manual mode only.

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

To manually introduce the wheel size, proceed as follows:

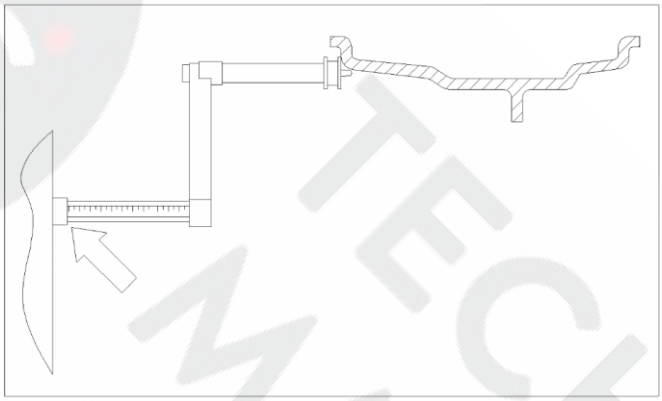
1. Fit the wheel on the shaft and tighten it with the ring nut.
2. Extract the distance sensor and place it on the wheel as shown in Figure F12.3;
3. Read the distance value on the graduated scale as shown in Figure F12.3. The distance value is always expressed in millimetres;
4. Press [P1] key 

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]  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 [P3]  again to enter or edit the data.

Figure F12.3: Manual acquisition of the wheel size: distance sensor fixing

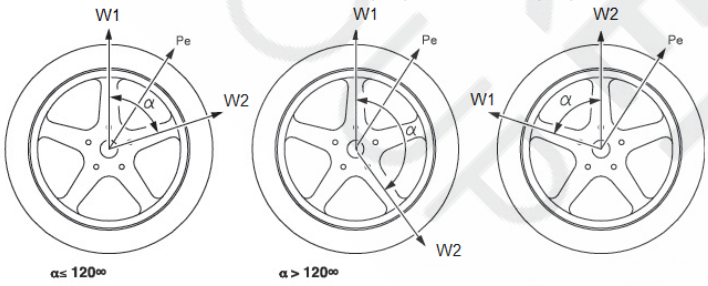


13. HIDDEN WEIGHTS PROGRAM

This program divides the external weight W in two weights W1 and W2 (smaller than the initial external weight W) located in any 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 Figure F13.1.

Figure F13.1: Hidden Weights Program: valid and invalid conditions for use. In this example, the external balancing weight W is marked at 12 o'clock (H12), but it can also be marked at 6 o'clock (H6) or 3 o'clock (H3): see text



The Hidden Weights program is used for aluminum 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).

To use the HIDDEN WEIGHTS program, proceed as follows:

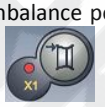
1. Perform wheel balancing without applying the external weight;
2. Rotate the wheel manually until all external imbalance search LEDs light up;
3. For ease of use, make a reference mark on the tyre in the imbalance position at 12 o'clock;
4. Press [F+P5]  to run the Hidden Weights program. If the wheel is balanced on the external side, the machine will display error code `Err 050` to indicate that the operation is not allowed;
5. If instead there is an imbalance on the external side, the machine will display the message shown in Figure F13.2;

Figure F13.2: 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 error code `Err 051` thus indicating to choose another point. If instead the angle is less than 120°, the machine will display the message shown in Figure F13.3, allowing the operator to continue with the next step;

Figure F13.3: W2 weight position input

8. Manually rotate the wheel anticlockwise passing through 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;
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;
13. The procedure of the Hidden Weights program has been completed: press [F+P5]  to exit and perform the balancing test launch.

14. UTILITY PROGRAMS

Utility programs are available only in NORMAL mode.

14.1 Selecting the imbalance display resolution

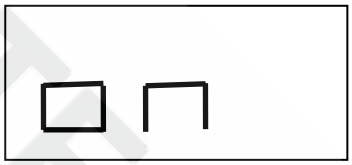
The machine has two wheel imbalance display resolutions. The two resolutions are defined as X1 (high resolution) and X5 (low resolution). The resolution with which the imbalances of the wheel are displayed varies depending on the weight unit of measurement as indicated in table T14.1.

Table T14.1: 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 switching on
	Ounces	0.25 ounces	

The machine will display the message visible in Figure F14.1 for one second and the LED next to the button lights up. Imbalance values are now displayed in X1 resolution (high resolution).

Figure F14.1: 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 Figure F14.2 for one second and the LED next to the button will turn off. Imbalance values are now displayed in X5 resolution (low resolution).

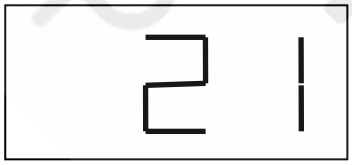
Figure F14.2: Disabling imbalance display in high resolution

14.2 Selection of the static imbalance display

To view the static imbalance, press [P10] 

. The machine will show the static imbalance value on the display as seen in figure F14.3 and the LED next to the button lights up.

Figure F14.3: Static imbalance display enabled. The right display indicates the entity of the static imbalance



To return to dynamic imbalance display, press [P10] 

. The LED next to the button will turn off.

15. "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.

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]  keys The machine will enter SERVICE mode and display the `Ser Ser` messages. See Figure F15.1;

Figure F15.1: SERVICE mode enabled

3. To exit SERVICE mode, you must first exit any testing Menus and programs, and then return to the messages display shown in Figure F15.1.

[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 ***"11 Machine calibration"***.

[P4]  ***- Grams/ounces selection***

This button allows you to display and/or change the currently selected weight unit of measurement. The units available are grams (`GRAM`) e 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]  ***- Inches/millimetres selection***

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] - Imbalance display threshold selection

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+P3] - Exiting SERVICE mode

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

[F+P4] - Read launch number counter

By pressing this button, the total number of balancing launches run by the machine is displayed. The number of launches is shown on both displays. Figure F15.3 shows an example of a machine display that has run 1234 balancing launches.

Figure F15.3: Display of the number of balancing launches

[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

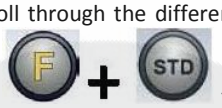
This button is not currently used in SERVICE mode.

[F+P9] - Testing Program MENU

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;
- `Ret` Returns to SERVICE mode.

To scroll through the different menu options, press [P4]  or [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 launch. A number indicating the speed of the shaft will be viewed on the right display.

Perform a manual spin, by pushing the motorcycle adaptor counterclockwise. During the launch, the number of RPMs of the shaft is displayed.

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.

Perform a manual spin, by pushing the motorcycle adaptor counterclockwise. The pick-up signal values are viewed on the display.

To end the test, manually lock the rotation.

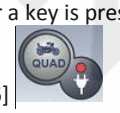
To exit the testing program, press [F+P9]  .

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]  or [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. Whenever a key is pressed, the code thereof appears on the display: e.g., by pressing [P4]  the “P4” code is displayed; by pressing [P6]  the “P6” code is displayed, and so on.

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] 

.

Ret Returns to SERVICE mode

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

Press [F+P3] 

: the machine will return to NORMAL mode.

16. SIGNALS

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

- Error
- Warning

The Error signal is always accompanied by three beeps, 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 two beeps that prompt the operator to perform a particular action, or it 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.

16.1 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 description outlines is provided in table T16.1. The machine displays the code for different times depending on the error code itself, as indicated in the column "Error display" in table T16.1.

Table T16.1: Error codes

Error code	Brief description	Error display[1]	Description
000 to 009	INT ERR		Machine parameters internal error.
011	SPd Lou		Rotation speed is too low.
015	Key code stuck	PERMANENT UNTIL TURNED OFF	Keypad blocked at start-up.
019	NO CP	OPERATOR CONFIRMATION	No communication processor
020	NO EEP	OPERATOR CONFIRMATION	No communication with the eeprom memory.
021	EEP ERR	OPERATOR CONFIRMATION	Lack of machine calibration data or incorrect calibration data.
022	-A- OUT	OPERATOR CONFIRMATION	
023	-B- OUT	OPERATOR CONFIRMATION	
024	TIM OUT	OPERATOR CONFIRMATION	
026	NO -A-	OPERATOR CONFIRMATION	Launch without weight or no pick-up A signal in the Cal2 calibration phase.
027	NO -B-	OPERATOR CONFIRMATION	Launch without weight or no pick-up B signal in the Cal2 calibration phase.
043	NO VRT	OPERATOR CONFIRMATION	WARNING: The flange for motorbikes was not exactly vertical when [P8] Start was pressed during the MOTO Cal2 and Cal3 calibration phases.
050	NO HYD	OPERATOR CONFIRMATION	
051	TOO FAR	OPERATOR CONFIRMATION	Hidden Weights program: the selected point is too far from the external imbalance position.
052	NOT INC	OPERATOR CONFIRMATION	Hidden Weights program: the external imbalance position is not included between the W1 and W2 selected points.
061	BAD CMD	OPERATOR CONFIRMATION	
062	BAD TAS	OPERATOR CONFIRMATION	

[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 the display of the error code when the operator takes an action related to the error code itself.
ONCE	The machine displays the error code and its brief description once, then it returns to the previous status.
PERMANENT	The machine permanently displays this error code until its turn-off, therefore the error code cannot be exited.

16.2 Warning codes

The machine alerts the operator of the warning codes by alternating the display of the warning code with the brief description (in English) of the warning and remains in this status until the operator has pressed any key (except for [P7] ).

Table T16.2: Warning codes

Warning code	Brief description	Warning display	Description	Notes
000			RESERVED.	
001	DO OPT	ONCE	Excessive wheel imbalance: it is	

			advisable to use the Optimisation program.	
002 a 010			RESERVED.	

16.3 Special visual signals

The machine gives special visual signals in certain cases. The special visual signals are listed in table T16.3.

Table T16.3: Special visual signals

Signal	Meaning	Notes
Three decimal points lit on one or both displays	Imbalance exceeds 999 grams.	This signal can be triggered due to: • Lack of machine calibration; • Incorrect measures of the wheel dimensions; • Incorrect setting of the Wheel Type; • Incorrect setting of the Program Type.
Flashing green STBY LED	The machine is in the 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 user action is being waited for.	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.

17. FIRE PREVENTION MEANS TO USE

	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. The responsibility for the use of each type of extinguisher must be obtained from the manufacturer.

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