



**WHEEL BALANCER PROXY-6PC**

**St. Petersburg 2015**

## INDEX

page

1. General	2
2. Main Technical Specifications	3
3. Operation, Transportation and Storage Conditions	3
4. Contents of Delivery	3
5. Installation Requirements	4
6. Safety Requirements	4
7. Commissioning	4
8. Keyboard and Main Operating Screen	6
9. Mounting a Wheel on a Spindle	7
10. Entering the Wheel Dimensions and Selecting the Arrangement of Balancing Weights	9
11.«AUTOPROGRAMM» Function	11
12.Wheel Balancing	12
13.Adding of the Corrective Weights with the use of a Gauge Handle	15
14.Program «SPLIT» for Balancing Weight Separation	16
15.Program «OPT»	17
16.Program «SEVEN OPERATORS»	18
17.Machine Parameter Setup	19
18.Run-Out Check Function	22
19.Calibration	22
20.Calibration of the measuring channel.	23
21.«TEST» Mode	24
22.Displaying the Machine Information	25
23.Setting up the auto emails mode	26
24.Motorcycle wheel balancing	27
25.Maintenance Service	28
26.Certificate of Acceptance	29
27.Initial Calibration Certificate	29
28.Warranty	29
29.Calibration Procedure	30
30.Contact Information	32

## 1. General.

1.1. The Wheel Balancer (further referred as WB) is equipped with a pneumatic wheel hold-down device, replacing the threaded stud and quick release nut. This device cuts the time of mounting of a wheel on a stand and provides constant wheel clamping force, regardless of the force applied to the clamp nut handle by an operator.

1.2. The WB is a high-precision machine with a microprocessor based information processing and control and is designed for balancing of car, light truck and minibus wheels with a diameter of up to 28 inches and the width of up to 20 inches.

1.3. The WB provides for one cycle normal/static balance check and the calculation of corrective weights mass and positioning along the two correction planes (on an inner and outer sides of a wheel-rim).

1.4. Two-dimensional gauge (extension rod) allows the automatic setting of the distance and diameter in the planes, along which the balancing weights are going to be added. In addition, the software has the «AUTOPROGRAMM» function, allowing setting the scheme of balancing weights locations on steel and aluminum rims, and the «AUTOSTICK» function for precise positioning of adhesive balancing weights with the use of a gauge handle.

1.5. The WB is equipped with a SVGA monitor with a high quality 3D graphics for the display of the information. The «3D-DISK» function allows displaying a 3D wheel projection on the monitor. This makes cleaning and degreasing the exact position of the placement of the balancing weight easier and doesn't require any additional markings.

1.6. For high quality balancing of the light alloy wheels, the WB has the following programs: «SPLIT» - for balancing weights application behind wheel spokes and «OPT» - for optimal positioning of a tire on a disc.

1.7. Option «BRAKES», when necessary, allows reducing balancing process time by connecting an electromechanical brake, so the braking action is performed, not just by the motor, but also by the brake cheek. This should save, on average, 6 seconds per cycle.

1.8. «AUTO-SUPPLY» function automatically spins a wheel further, so there is no need to spin it manually.

1.9. Function «MEMORY» allows keeping a cumulative performance statistics of the machine of a certain operating time period or an individual statistics for each operator (number of starts, successful processes, the number of adhesive and clip-on weights used per unit of time).

1.10. Computer unit is based on an ultramodern high performance industrial microprocessor made by «Texas Instruments».

1.11. Head part of the machine spindle is made by «STORM» or «HAWEKA» and designed to work with any type of adapter for wheel clamping; including motorcycle, flange, and cam or collet type adapters.

1.12. The WB is equipped with a webcam, which allows controlling the work of an operator and the entire site from any location on the planet with an Internet access.

1.13. With connection to the Internet, the WB has the ability to send statistical reports for seven operators via email.

1.14. For increasing the precision of adhesive weights placement in 6-hour mode the WB is equipped with the laser targeting system showing the exact position for adding of the weight.

1.15. The WB is equipped with a disc run-out measurement function, which makes it possible to check the wheel rim curvature visually.

## 2. Main Technical Specifications.

2.1. Accuracy, g	1
2.2. Angular accuracy, angle grad.	2,5
2.3. Wheels parameters:	
- Rim diameter, inch (mm)	9(229)-28(711)
for manual input up to 30(762)	
- Rim width inch (mm)	15(381)-20(508)
- Max. wheel weight, kg	70
2.4. Power supply, V	220 V $\pm$ 10%, 50 Hz
2.5. Power consumption, W	250
2.6. Pneumatic working pressure kg/sm <sup>2</sup>	7-10
2.7. Dimensions (with the hood raised), (mm)	1460x1200x2170
2.8. Machine weight, kg, no more than	110
2.9. Machine weight with packaging, kg, no more than	140

## 3. Operation, Transportation and Storage Conditions.

3.1. The WB is designed for operation in dry and heated work areas. Normal operating conditions: Climatic category - climatic category UHL 4.2 according with GOST 15150-69:

- ambient temperature	+10 - +35 °C,
- relative humidity, no more than	80% at 25 °C.

**IMPORTANT!** Installing of the WB in unheated or periodically heated areas can lead to condensation of moisture on the cold parts and units of the machine, as well as on the electrical equipment. This, in turn, can lead to an electrical leakage in a computer unit (displayed on the monitor as «ERROR 4») and also in a power circuit of the WB, which can cause an electrical shock. Operation of the machine under such conditions is prohibited. Any malfunctions caused as a result of abnormal operating are not covered by manufacturer's warranty.

3.2 Storage conditions in accordance with GOST 15150-69, group 2.

Ambient temperature	-50 to +40 °C
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3.3 Transportation conditions in accordance with GOST 15150-69, group 5.

Ambient temperature	-50 to +50°C
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## 4. Contents of Delivery

4.1 Balancing machine	1 pcs.
4.2 Wheel guard with ultrasound sensor for automatic width measurement of the wheel rim	1 pcs.
4.3 Wheel balancer cone kit for cars (3 pcs)	1 pcs.
4.4. Shaft head with pneumatic clamping device	1 pcs.
4.5. Clamping rod for the pneumatic clamping device	1 pcs.
4.6. Clamping spacer	1 pcs.
4.7. Clamping rod flange with a rubber ring	1 pcs.
4.8. Conical spring (can be inserted into the shaft flange opening. In this case the opening will be closed by the cap and locked with a locking ring)	1 pcs.
4.10. Special pliers	1 pcs.
4.11. LCD monitor	1 pcs.
4.12. Power supply cable	1 pcs.
4.13. Operation manual	1 pcs.
4.14. Webcam with a mounting bracket	1 pcs.

## 5. Installation Requirements.

5.1. After transportation or storage of the WB at below 0°C temperatures it needs to be kept in original packaging at room temperature for at least 2 hours before use.

5.2. The WB should be placed on a flat concrete surface or foundation bed with all its support feet touching the base. Horizontal deviation of the base should not be more than 10mm per 1m. The WB should be bolted solidly to the base with hold-down bolts.

5.3. The use of rubber pads or any other elastic elements for the installation of the WB is prohibited. Vibration level at the place of installation must be minimal. Vibration or resonating frequencies within 1 to 10 Hz are not allowed.

It is prohibited to place the WB near the heating sources, which can overheat WB parts, or electromagnetic sources, which can lead to decrease in measurement accuracy.

5.4. During transportation and mounting of the WB it is prohibited to exert any force on a spindle.

5.5. For normal operation the power supply must be free of any large high-frequency, impulse or switching interferences, such as the ones produced by welding machines or heavy duty equipment, using common circuitry.

**IMPORTANT!** Failure to comply with requirements mentioned in subparagraphs 5.3 and 5.5 can lead to malfunctions of the WB, which are not covered by the manufacturer's warranty.

## 6. Safety Requirements.

6.1. The housing of the WB must be properly grounded.

6.2. Operating the machine with an open power supply unit is prohibited.

**IMPORTANT!** Opening the WB power supply unit cover is allowed only after 1,5-2 minutes after power has been turned off.

6.3. Before starting the main shaft, make sure the wheel is securely fixed on the shaft.

6.4. Prior to starting the machine and until its full stoppage, the wheel must be covered with the wheel guard.

6.5. Laser beam can be dangerous to human eyes.

## 7. Commissioning.

7.1. After transportation or storage at below 0°C temperatures the WB needs to be kept in original packaging at room temperature for at least 2 hours before commissioning.

7.2. Connecting to power source.

Area where the machine is to be installed should be equipped with the grounded outlet. For normal operation of the WB, the power line voltage range should be within 220V  $\pm$ 10%.

7.3. Connection to a pneumatic circuit.

For proper functioning of the pneumatic clamp, the machine should be connected to the pneumatic line with the working pressure of 7-10 kg/cm<sup>2</sup>. Pneumatic line connector is located on the air-preparation unit on the back side of the housing.

For continuous long-term operation of the pneumatic clamp it is necessary to set the oil feeder to deliver 1-2 drop of oil for each ten pneumatic clamp operations. It can be done with the use of oil-feed adjustment screw. Normally, the screw needs to be adjusted 1,5 - 2 turns.

7.4. The room, where the WB will be used, should be clean. To avoid excessive accumulation of the dirt on the monitor, the dust content of the air should be kept at a minimum.

**IMPORTANT!** Excessive pollution of the monitor may decrease its service life



fig.7.1

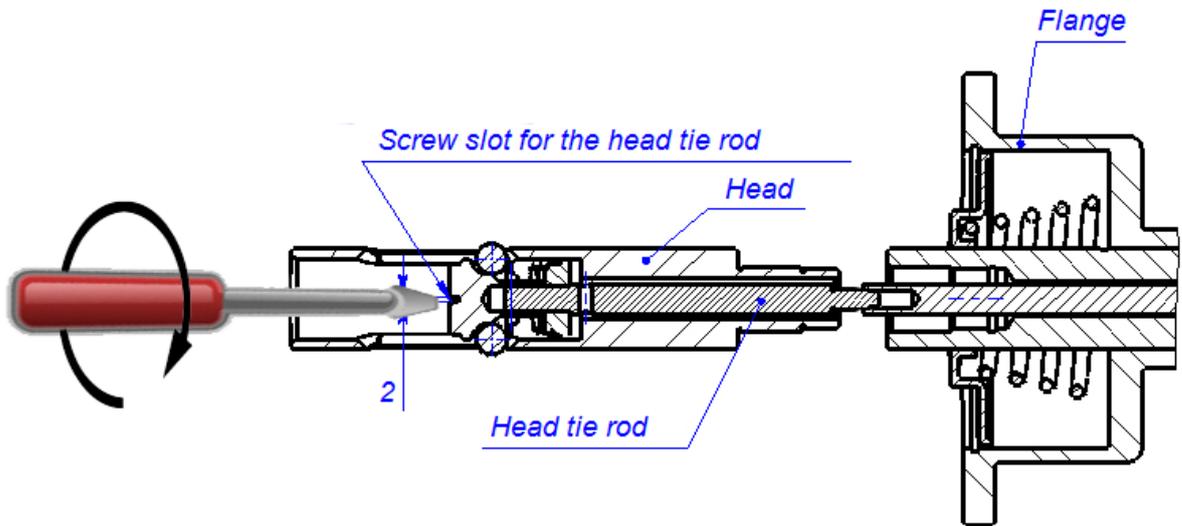


fig.7.1.A

Place the head with the pneumatic clamp on the WB spindle (fig. 7.1). Prior to attaching the head, clean all the mating surfaces with a clean piece of cloth moistened with petrol or petroleum spirit. Any amount of dirt on the mating surfaces of the spindle or the head can lead to unacceptably low accuracy of the measurements. Firstly, with the spindle tie rod extended (the pedal is raised), connect it with the tie rod of the head and tighten it,

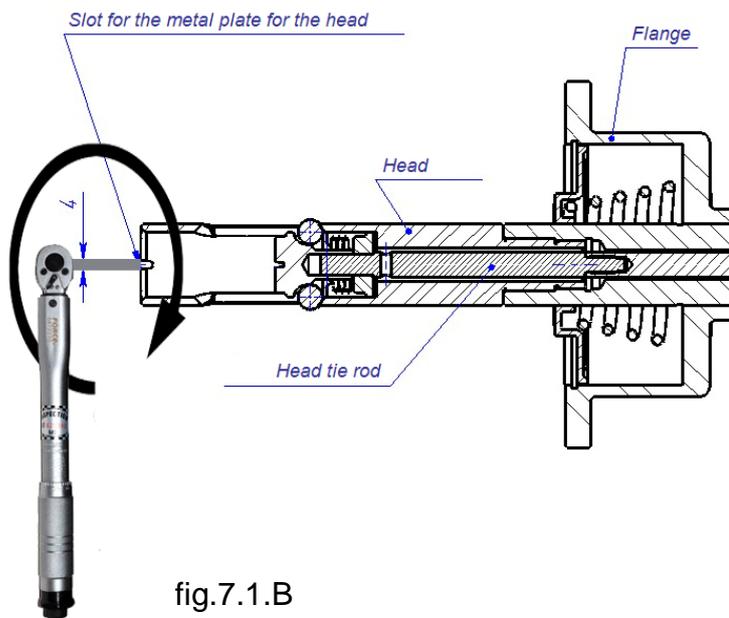
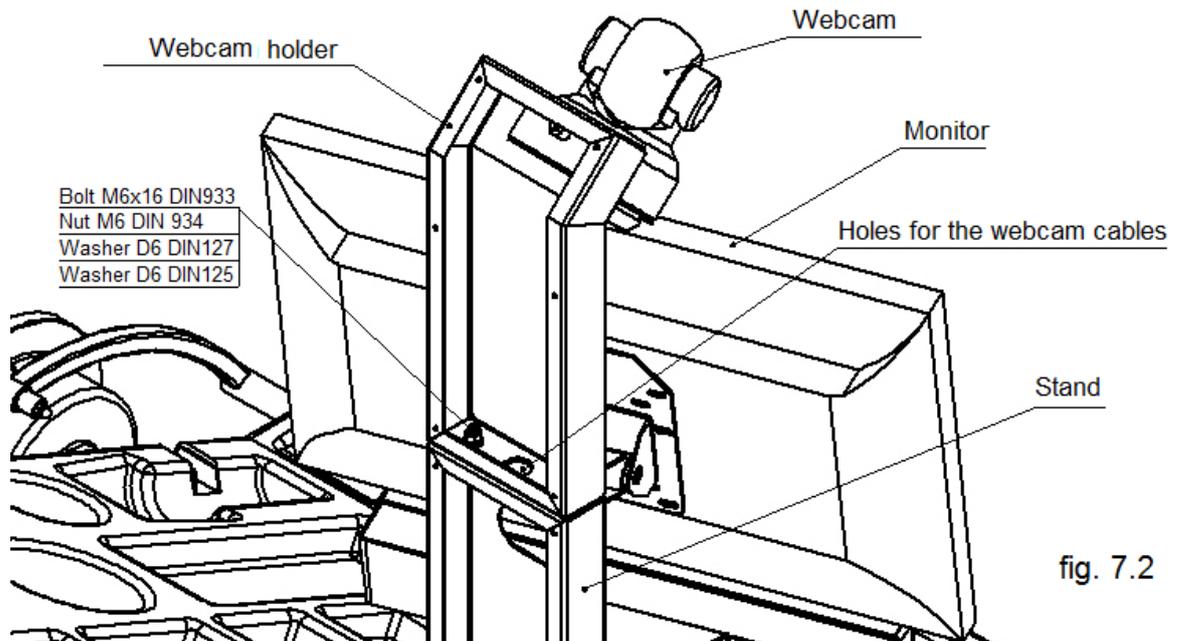


fig.7.1.B

using a screw slot, located in the opening of the front end of the head (fig. 7.1.A). Tightening torque of the head tie rod is 6-8 Nm. Then screw the head into the spindle opening, using the suitable metal plate inserted into the slots on the front end of the head (fig.7.1.B). Tightening torque of the head is 44-50 Nm. Dismantling of the head is performed in reversed order.

7.5. To provide for the safety of the personnel, prior to starting the WB, make sure the power source is correctly connected and properly grounded.

**IMPORTANT!** Operating the equipment without the proper grounding is prohibited!



7.6. To place the wheel guard, insert cable terminal, connected to the ultrasound sensor, into the opening, located on the guard's turning axis. The cable must come out from the opening on the opposite side and into the machine housing opening below. After that, connect the hood frame flange to the turning axis flange with the help of four bolts (included). Plug the ultrasound sensor connector to the machine connector located in the opening on the back panel of the housing, where the cable went.

Position the monitor on the housing stand and attach it with the screws (included), placing them into the provided holes. Connect the power and VGA cables to the monitor, passing it through the holes in the stand first.

7.7. Remove the back cover of the monitor to open the access to the attaching point of the webcam holder. Install the webcam holder on the stand (fig 7.2.). Webcam should be tilted toward the working area. Pass the cables through the holder and the stand and connect them to the webcam. Webcam setup manual is available separately.

7.8. Close the monitor stand and the webcam holder with covers.

## 8. Keyboard and Main Operating Screen

8.1. This model of the WB has a keyboard with 11 buttons placed in two rows (fig. 8.1.). The upper row has 7 buttons, numbered 1 through 7. These buttons have different functionalities, which are indicated by the buttons located on the bottom of the screen. Four buttons from the bottom row have fixed functionalities: button «MENU» - is used for starting the mode «MENU», button «ENTER» -for inputting various parameters into the memory, button «START» - for starting the shaft rotation, button «STOP» - for exiting the modes and returning to the main operational screen and also for the emergency stop of the WB shaft.

8.2. For starting the WB put the power switch, located on the left side housing panel, in position 1.

*Note:* Monitor power turns on when the WB main power switch is turned ON, provided that the monitor switch is already in a turned-on position. If the monitor does not show anything and the indicator is not on, after the WB has been switched on, press the power on button on the monitor.



fig. 8.1

8.3. After the WB has been powered up, the monitor displays brand-name startup screen, which changes to the main operational mode screen in a few seconds. (fig. 8.2).

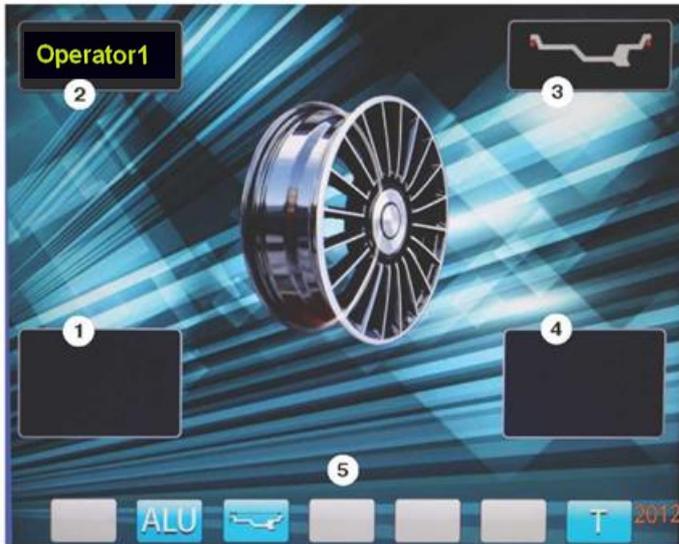


fig. 8.2

Windows 1 and 4 display unbalance figures for internal and external correction planes.

Window 2 displays the operator's name.

Window 3 displays the scheme for positioning of the corrective (balancing) weights.

Window 5 displays the functionalities of the 7 buttons on the keyboard: ALU – for selection of the balancing weights positioning scheme for wheels with aluminum rims; button «A, d, b».- for control and correction of the balanced wheel dimensions; button «T» - for starting the braking device.

## 10.Mounting a Wheel on a Spindle.

9.1. This version of the WB holds down a wheel by means of a pneumatic clamping device, designed in the following manner. On the front end of the shaft, instead of the threaded stud, there is a head to which the clamping rod with spherical annular grooves is attached.

Clamping of a wheel is accomplished in the following manner. The pneumatic valve, controlled by the pedal (pedal is raised), feeds the compressed air to the pneumatic cylinder. Pneumatic cylinder's rod is extended and moves the mechanism inside the head forward all the way in, until the balls touch the front groove edges of the head, with that, the balls recessed with the outer diameter of the head. The clamping rod is easily removed from the head.

To hold down the wheel, place it with its center bore on the shaft, and then place the centering cone and the clamping rod with the thrust bushing. Clamping rod is pulled up to the wheel until the cone enters the central bore of the wheel disc. Then pneumatic valve is shifted to a different position (pedal is down), compressed air is fed to the other chamber of the pneumatic cylinder and its rod is retracted. Gas springs force the tie rod to move back, balls leave the body of the head and get into one of the spherical annular grooves of the clamping rod, ensuring an engagement of the clamping rod and the tie rod. As a result, the force of the gas springs is applied to the clamping rod. The clamping rod, by means of the thrust bushing, applies the force to the cone, which centers the wheel in relation to the shaft and, at the same time, clamps down the disc mounting surface to the shaft flange, ensuring the placement of the wheel along the plane, perpendicularly to the axis of the shaft.

**CAUTION DANGER!** Wheel clamping force exceeds 100 kg, keep your fingers away from the space between the clamping rod and the cone!

The wheel, that is being balanced, can be held on the shaft in two different ways. Depending on the configuration of the disc, the cone can be placed on the outer side of the disc (option "a"), or on the inner side (option "b") (fig. 9.1).

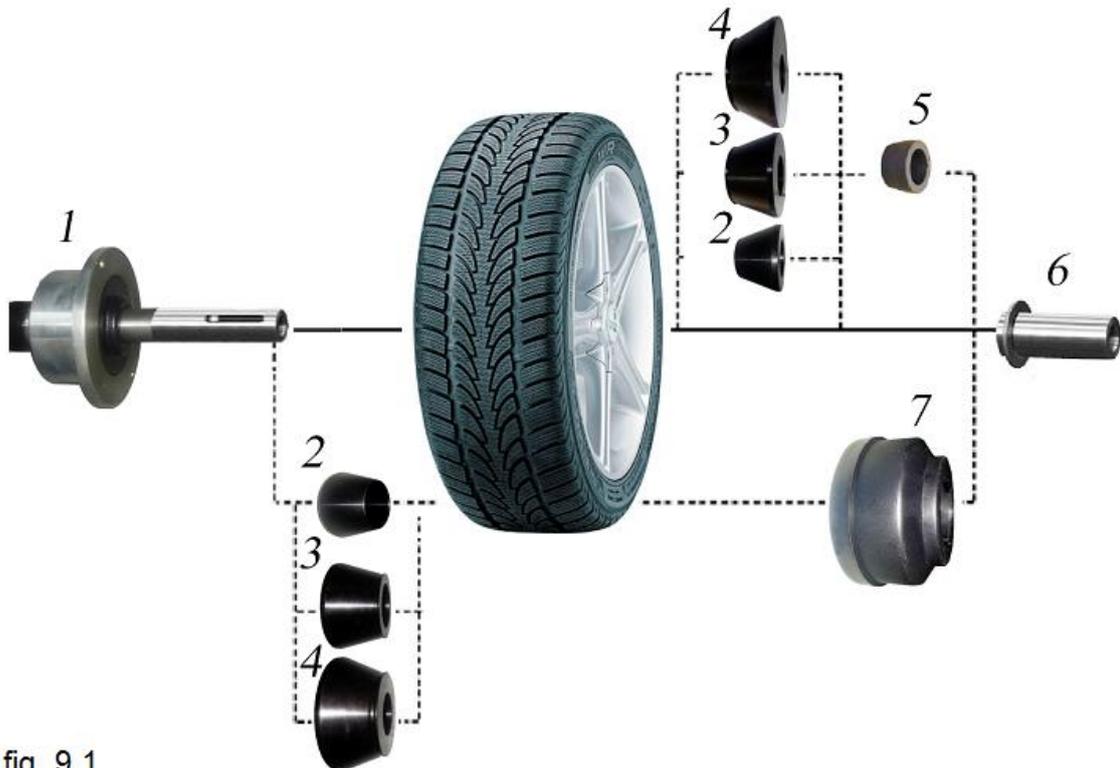


fig. 9.1

The figure 9.1 is showing the following:

- 1 - working part of the WB shaft
- 2, 3, 4, - cones for holding down the car wheels. The proper cone is selected depending on the diameter of the central bore of the wheel rim.
- 5 - clamping spacer
- 6 - clamping rod of the pneumatic clamp
- 7 - clamping cup with a rubber ring

The spring is always placed in the interior of the shaft flange in the machine assembly. The interior of the shaft flange is covered by the cover, which is held down by locking ring. The spacer (5) on the clamping rod (6) needs to be replaced with the cup (7).

9.3. Before placing the wheel on the WB shaft, make sure the wheel is properly cleaned. Mounting and clamping of a wheel is described in the last paragraph of the clause 9.1.

**ATTENTION! VERY IMPORTANT!** For the correct clamping of the wheel, the clamping rod should be pulled to the wheel as close as possible and the cone should enter the center bore of the wheel rim all the way, so the clamping rod travel, during clamping, is kept to a minimum. Non-compliance with this recommendation may lead to the excessive travel of the clamping rod and insufficient clamping force. Insufficient clamping force can cause imprecise centering of the wheel and poor quality of balancing.

9.5. The precision of balancing largely depends on the accurate placement of the wheel on the WB shaft. Perform the clamping of the wheel on the WB shaft with great care, and make sure the front surface of the wheel rim is clean and tightly fitted against the shaft flange. Working surfaces of the shaft and cones must be clean and free of indentations.

The working parts of the shaft, flange, cone set and clamping rod should be maintained in clean condition, regularly wiped with the piece of cloth, moistened with lubricating mineral oil

for cleaning and creating the oil film on the surfaces. Protect parts from impacts, which may cause deformations and indentations, affecting the centering of the wheel on the shaft.

**IMPORTANT!** The bigger and heavier the wheel is, the greater effect the incorrect clamping of the wheel on the cone will have on the quality of balancing. For this reason, when clamping large and heavy wheels, using option "b" (the cone is on the inner side of the disc), for more accurate centering of the wheel and for the best results, we recommend using the flange adapter from «Haweka». In this case, the cone provides only for initial centering of the wheel. The final centering of the wheel is done by the flange adapter, which centers the wheel, using clamping holes for an alignment, thus imitating the position of the wheel on the wheel hub of a car. With the tightening of the pneumatic clamp, the pressure is equally spread through adapter pins to the clamping holes of the disk; therefore, the wheel is set on the balancer's shaft in the exact upright position, which provides for ideal accuracy of the wheel mounting and gives the best balancing results.

## 10. Entering the Wheel Dimensions and Selecting the Arrangement of the Balancing Weights.



fig. 10.1

10.1. For correct calculation of the corrective weights mass on the inner and outer sides of the wheel, it is important to accurately enter the wheel dimensions: diameter and width of the disc (parameters  $d$  and  $b$ ), as well as the distance from the WB frame to the inner side of the disc (parameter  $A$ ).

When the WB is powered on, the parameters « $d$ » and « $b$ » are set to the values kept in the memory of the WB. It can be controlled by pressing the button « $A, d, b$ » (number 3 on the figure 10.2).

Initial values for « $d$ » and « $b$ » parameters can be changed at customer's request. This procedure is described further below. Newly entered parameters are deleted when the WB is powered off and must be entered again when the WB is turned on.

10.2. This WB model is equipped with the device, allowing automatic input of the diameter (« $d$ ») of the wheel and the distance (« $A$ »). To accomplish this, you need to use a handle to pull out a gauge from the housing of the WB, place the pin on the end of the handle against

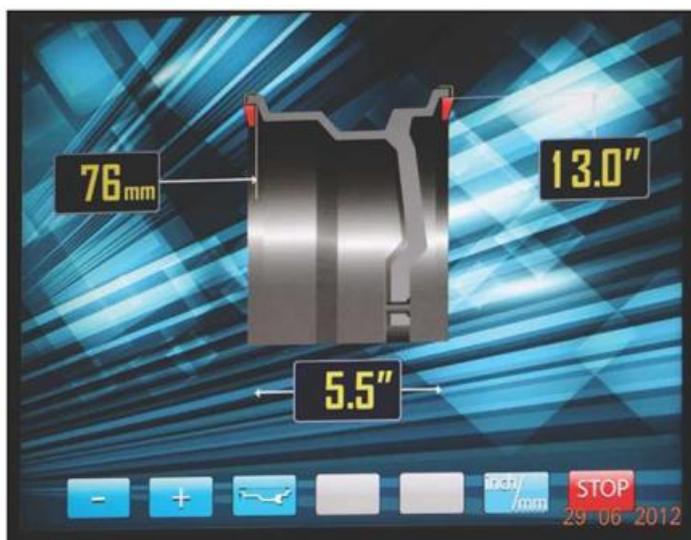


fig. 10.2

the position of the corrective weights placement on the inner side of the disc (fig. 10.1) and hold the gauge in this position until the audio signal goes off. After that, the gauge can be returned to the original position. The screen will switch from the main operating mode to the screen for input of the dimensions (fig 10.2).

The top left window displays the entered distance « $A$ », the distance to the plane of balancing weights positions on the inner side of the wheel rim (in mm).

The top right window shows entered value for the rim diameter.

**Note:** The diameter provided by the rim manufacturer shows the diameter for a tire. With the help of a gauge you can enter the diameter for spring-loaded weights placement, which is bigger than the diameter used for a tire

by about 1 inch. Thus, the diameter entered by the means of a gauge will be greater than the rim/tire diameter provided by the rim manufacturer.

The bottom window shows the width of the wheel rim.

This mode has a function for entering the width of the rim and also for the correction of the rim's diameter and the distance from the WB frame to the wheel, if it is required (buttons «-» and «+»). Buttons «-» and «+», used for correcting the diameter and distance values, are enabled by the «A, d, b» button (button 3 on the fig. 10.2). The corrected value is highlighted in red. The button «A, d, b» allows to switch from the main operating mode screen to the screen for input of the dimensions.

Button «inch/mm» allows for switching between inches and millimeters when entering the values for the diameter and the width of the rim.

Button «STOP» is used for returning to the main operating mode screen.

**Note:** Keep in mind, the width parameter provided by the rim manufacturer shows the diameter for the tire. The real width in the positions of the weights will be larger by the value of the thickness of the rim wall times two.

If the read or measured value of the width of the rim differs from the one shown in the bottom window (fig. 10.2), buttons «-» and «+» will help you to enter the correct value.

10.3. Once the diameter and distance have been entered with the use of the gauge (as per clause 10.2), the right side of the screen will display the image of the ultrasound sensor (fig. 10.4).

To enter the width you will need to slowly lower the wheel guard. The width will be entered automatically. When the value of the width is entered the image of the ultrasound sensor disappears. Automatic input of the width is done in increments of 0,1 inches, so the entered width may not be equal to the width provided by the rim manufacturer, which could have been entered in the increments of 0,5 inches. Entering the distance to the wheel should be done prior to the entering of the width.

10.4. If the automatic input of «A» and «d» parameters is difficult or impossible, for any reason, there is a manual option available for entering of those parameters.

To enter the parameters manually, press the «A, d, b» button once, buttons «-» and «+» will be activated for the input of the parameters. The value in the diameter window is highlighted in red. Using «-» and «+» buttons, set the required diameter. After 2-3 seconds, buttons «-» and «+» return to the width input mode.

To input the distance you will need to use a measuring scale to measure the distance the gauge traveled during the procedures, described in clause 10.2 (distance «A»). Press the button «A, d, b» twice. Use «-» and «+» buttons to set the required distance in the distance window. After 2-3 seconds buttons «-» and «+» return to the width input mode.

10.5. Keep in mind, errors made while entering the parameters will lead to the error in the division of the total unbalance to the unbalances along inner and outer sides of the wheel. In this case, the added weight on one side will change the unbalance number on the other side; moreover, the projection of the values of the unbalance from one side to the other will also lead to the error in determination of the unbalance location.



fig. 10.4

The larger the unbalance, the larger will be the cross-effect. After the first balancing cycle, such errors cause some residual unbalance figures, which can be eliminated during the subsequent cycles. So, all the measurements and entering of the parameters «A» and «b» should be done very carefully. Parameter «A» is measured to the center point of the mass of the weights on the inner plane and parameter «b» is measured from the mass of the weights on the inner plane to the center point of the mass of the weights on the outer plane.

## 11. «AUTOPROGRAMM» Function

11.1. With the use of the «AUTOPROGRAMM» function this balancer can determine the best location for the addition of the weight for steel and aluminum discs.

11.2. «AUTOPROGRAMM» function for steel discs.

Enter the dimensions of the wheel as described in clauses 10.2 and 10.4. The corresponding screen will display the standard balancing procedure with the use of spring-loaded weights (fig 10.2 or 10.4).

11.3. «AUTOPROGRAMM» function for light alloy discs.

Because of their shape, the actual dimensions of the light alloy discs can differ from the default parameters of the programs «ALU1-ALU5». Just like it is described in the clause 10.5, this also leads to the errors in measurements and errors in determination of the masses and positioning of the corrective weights.

To eliminate this problem, we provide the programs «ALU 2R» and «ALU 3R». These programs allow to measure and enter accurate distance and diameter values for adding of the corrective weights for both planes with the use of a dimensions entering gauge.

Programs «ALU 2R» and «ALU 3R» keep the real parameters of the corrections planes in memory, so the calculations of the mass and the positioning of the corrective weights is accomplished with the minimum error, thus speeding up the process of balancing.

11.3.1. «AUTOPROGRAMM» for «ALU 2R».

Pull out the gauge and place it against the position on the left side of the rim on its lip, where you are placing the adhesive weight, and hold the gauge until you hear the audio signal. Then pull out the gauge a little more to the right side of the rim, where you are placing the second weight, and hold it there until you hear the audio signal. The WB will automatically choose the program «ALU 2R» and the monitor will show the parameter input screen (fig.11.1).

11.3.2. «AUTOPROGRAMM» for «ALU 3R».

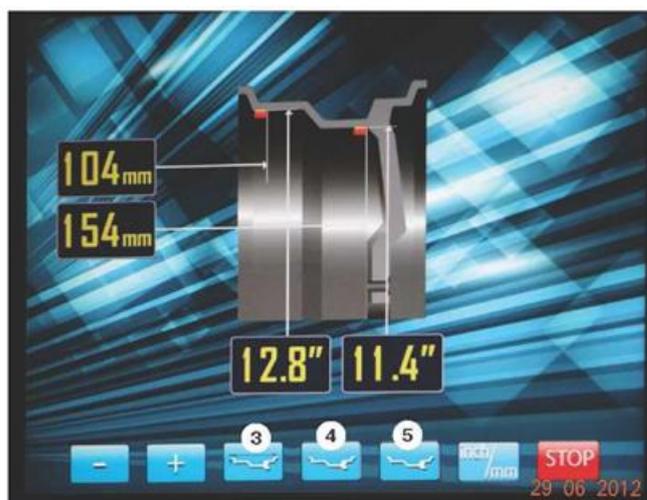


fig. 11.1

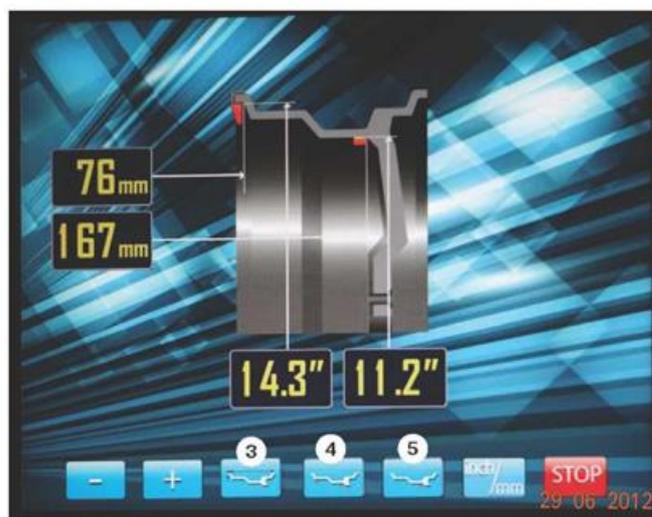


fig. 11.2

Pull out the gauge and place it against the wheel rim flange on the left side, where you are planning to add a clip-on spring-loaded weight, and hold it there until you hear the audio signal. Then, continue to extend the gauge to the right side of the rim, where you are going to place an adhesive weight, and hold it there until you hear the audio signal. The WB will automatically choose the program «ALU 3R» and the monitor will display the parameter input screen (fig.11.2).

Correcting of the clip-on or stick-on weights position can be accomplished using the button 4 (fig. 11.1 and 11.2). If there is a need for quick starting of the static balancing mode, press the button 5. To correct the values entered in the programs «ALU 2R»

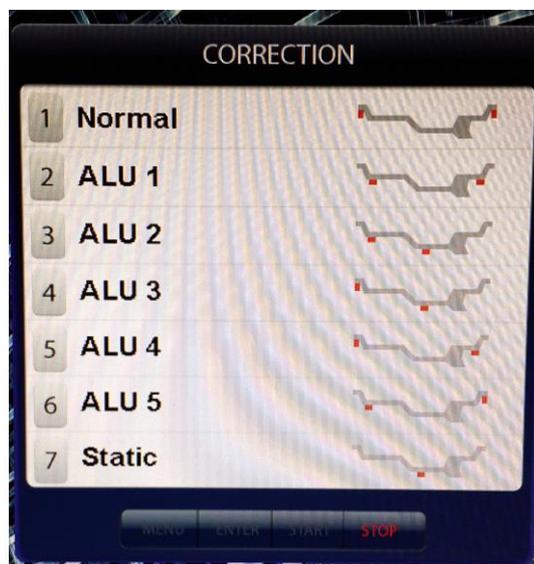


fig. 11.3

and «ALU 3R» use buttons «-», «+» and «A, d, b». Use button «A, d, b» to select the parameter needed to be changed and use buttons «-» and «+» to set the new value.

Use the button «STOP» to exit the programs «ALU 2R» and «ALU 3R».

#### 11.4. Programs «ALU1-ALU5», «St».

Normally, for balancing light alloy wheels, the adhesive weights should be used. They are placed in the positions different from the ones used for adding the standard slip-on spring-loaded weights. The programs «ALU1-ALU5» are used for this purpose. These programs allow getting the accurate measurements of corrective weights masses when they are being placed in non-standard positions. The dimensions are entered in the same manner, as with the standard spring-loaded weights. (cl.10.2-10.4).

To select a weight positioning scheme in the programs «ALU1-ALU5» you will need to press the button «ALU» on main operating mode screen. It will open the window for weight positioning schemes marked with numbers (fig. 11.3). If, after the entering of the wheel size you see the parameters screen, you have to switch to the main operating mode screen using the button «STOP». To select the required scheme, press the top row button on the keyboard with the corresponding number. Selected weight positioning scheme will appear in the window 3 of the main operating mode screen (fig. 8.2).

## 12. Wheel Balancing

12.1. Measuring the unbalance. Measuring of the unbalance is done in the following sequence.

12.1.1. Power up the WB.

12.1.2. Get the wheel ready for being mounted on the WB:

- clean it from dirt,
- remove all previously added weights, large stones or other foreign objects from the tire tread.

12.1.3. Mount the wheel on the WB as described in chapter 9.

12.1.4. Enter the dimensions of the wheel as per chapter 10.

12.1.5. If necessary, select one of the balancing programs described in the chapter 11.

12.1.6. Start the WB by lowering the wheel guard or pressing the button «START». The image of the wheel disc on the main working mode screen will start to rotate. After the measurement cycle is complete the braking device will stop the WB shaft. Windows 1 and 4 will display the value for the mass of the balancing weights and the image of the disk will show two red dots in the places where the weights should be added. (fig. 12.1).

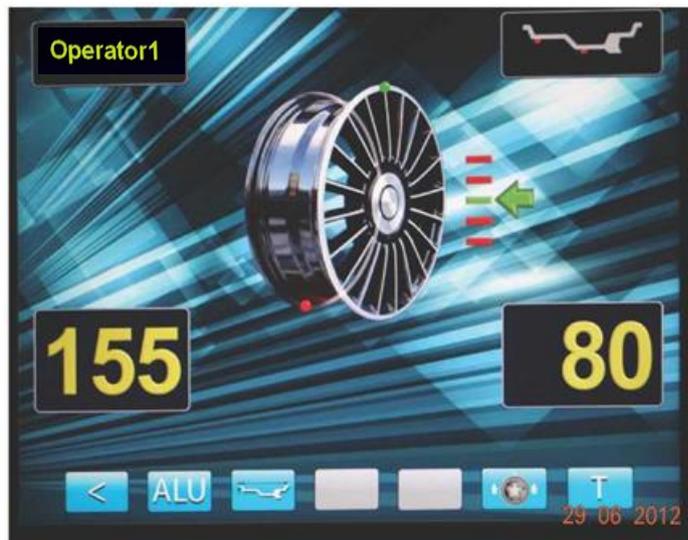


fig. 12.1

12.1.7. If the dimensions were entered incorrectly or the wrong balancing program was selected, there is no need to restart the WB. Just reenter the parameters and the results will be automatically recalculated.

12.2. The program for measuring of the unbalance is set not to count the unbalance of less than 5 gr in any correction plane (factory default). In this case, the windows 1 and 4 show the message «OK» (fig. 8.2). Minimum unbalance to be shown in the windows 1 and 4 is 5 gr. Unbalance greater than 5 gr will be rounded off to the nearest multiple of 5 gr, i.e. the unbalance values of 9, 10, 11 and 12 gr will be shown as 10, the unbalance values 13, 14, 15, 16 and 17 gr - as 15 and so on. To view the unrounded value or the value under 8 gr press the button «<>». This will display the actual unbalance values for this cycle in windows 1 and 4 for 2-3 seconds.

12.3. Placement of the corrective weights.

12.3.1. This balancer is equipped with a function that automatically brings the wheel in the correct position for placement of the corrective weights. The wheel is positioned in such a way, that the weight is being placed on the top – on the vertical line from the center of the shaft (12 o'clock position). The program is set in such a way, that after the measuring cycle the wheel can be positioned either along the correction plane, where the unbalance is at the maximum, or along the left (inner) or right (outer) plane. Adjustment of the wheel position is done with the use of the parameter «Positioning» (refer to the chapter «Machine Parameter Setup»). The switching between the correction planes is done by the button «Position» (the sixth button in the top row of the keyboard).

Raise the wheel guard. The correction plane, on which the weight needs to be placed, is marked by a green dot, showing where to add the balancing weight on the image of the disc, and also by the scale with arrow, appearing on the left or on the right of the disc image.

12.3.2. Select the corrective weight with the mass equal to the figures on the unbalance indicators in the plane, in which the image of the dot and the arrow is in green, and place the weight on this plane at 12 o'clock position.

12.3.3. Press the button «Position». The corrective weight with the mass equal to the figures on the unbalance indicators in the other plane is placed in the same way.

12.3.4. To check the balancing results start the WB again. If the wheel is balanced correctly the indicators 1 and 4 will show the «OK» messages (fig. 8.2.).

If the indicators 1 and (or) 4 show some measurement values, it means the mass of the corrective weight is selected incorrectly or there is an angular error in the positioning of the weight.

Start the WB again and check the balancing accuracy. After the balancing is completed dismount the wheel from the balancer's shaft.

12.3.5. Applying the adhesive weights for balancing of light alloy wheels is easier done at 6 o'clock position rather than at 12 o'clock. In this case, select parameter 1.19 «Installing adhesive weights» from the on the second page of the «SETTINGS» menu. Using buttons «-» or «+», set it to «at 6 o'clock» and press button «ENTER».

If the parameter 1.19 is set to «at 12 o'clock», for quick transition to the positioning of the weight «at 6 o'clock» press button «ENTER».

12.3.6 The WB is design to allow for weight placement directly on the shaft of the machine, but to prolong the life of the WB do not subject it to the high impact forces while adding the weights. It is recommended to perform the final hammering of the corrective weights after dismounting the wheel from the WB shaft.

12.3.7. For measurement values higher than 100 gr for any plane, it is recommended to compensate such a big unbalance with a weight, accounting for 70-80% of the WB measurements, and then, in the next cycle, perform the final balancing of the wheel.

12.4. Sometimes, when the already balanced wheel is turned on the shaft or balanced wheel is placed back on the shaft, the unbalance measurement value is not equal to «0». This may not be the result of an error in measurements, but there may be a mismatch in wheel weight distribution relative to its axes of rotation between the previous measurement and the current measurement, i.e. during these two measurement cycles the wheel had different positions relative to the WB shaft. To minimize this effect the mounting of the wheel on the shaft should be done in accordance with the procedure described in clauses 9.3 and 9.4. The errors in measurements may also be caused by dirt, foreign objects on the flange face or the disc, ovality and other defects of the center bore, wear, defects of the working surfaces of the shaft and cones, high radial and face run-out of the flange face and shaft due to deformations caused by an application of excessive loads or forces.

It should be noted, that difference in unbalance measurements described above (when the position of the wheel relative to the WB shaft has been changed) is approximately twice as large the actual value of the final unbalance. This is due to the portion of the balancing weights, compensating incorrect wheel positioning, is combined with the unbalance caused by the defects described above.

So the deference in measurements of 8 gr and less (15 gr for heavy wheels) should be considered acceptable.

If, after the wheel has been balanced, there is a vibration on the steering wheel during driving, it may have been caused by the unbalance of the brake wheels, drums or other parts rotating along with the wheel. Very often the reason is excessively large permissible error limits and the wear on the hub, center bore or clamping holes of the wheel. The other reason for vibration may be the defects of the disc or the tire, ovality or the wobble of the wheel, dead stroke in the suspension and steering mechanism.

After the wheel has been balanced any final unbalance can be eliminated with the use of a finishing balancing machine, which will compensate the final unbalance of all the rotating parts directly on the axle of a car.

### 13. «AUTOSTICK» Program. Adding of the Corrective Weights with the use of a Gauge Handle in the Programs «ALU-2R» and «ALU-3R» in «AUTOPROGRAMM» Mode.

13.1. As it was mentioned in chapter 10, error in inputting of the dimensions «A» and «b» lead to inaccurate division of the total unbalance along the correction planes and complicate the balancing process. The same error can arise when weights are positioned incorrectly, especially the adhesive weights, when operator places them by sight.

To avoid these errors there is a method of weight placement with the use of the gauge handle.

This mode is used only in conjunction with the programs «ALU-2R» and «ALU-3R», as part of the «AUTOPROGRAMM» function.

If, after the measurement of the unbalance the value is not equal to zero, the mode for positioning of the weights with the use of a gauge will start automatically. When the mode starts the voice system says the phrase «Automatic weight installation» and the main working mode screen on the monitor changes to the weight placement screen (fig. 13.1). With that the wheel automatically brought to 12 o'clock position on the plane set in the parameter «Positioning» (refer to chapter 17 «Machine Parameter Setup»), and the lower part of the screen displays the image of three red arrows in the shape of triangles. The lowest one, pointing upward, moves along with the extension of the gauge and the other two mark the weight placement positions.

**Note:** When setting the parameter 1.19 «Installing adhesive weights», on the «SETTINGS» screen, to the value «at 6 o'clock» the mode of placing the weights with the use of the gauge handle will not start automatically. To start this mode, press the button with an image of a gauge (extension rod).

13.2. Place the weight with the

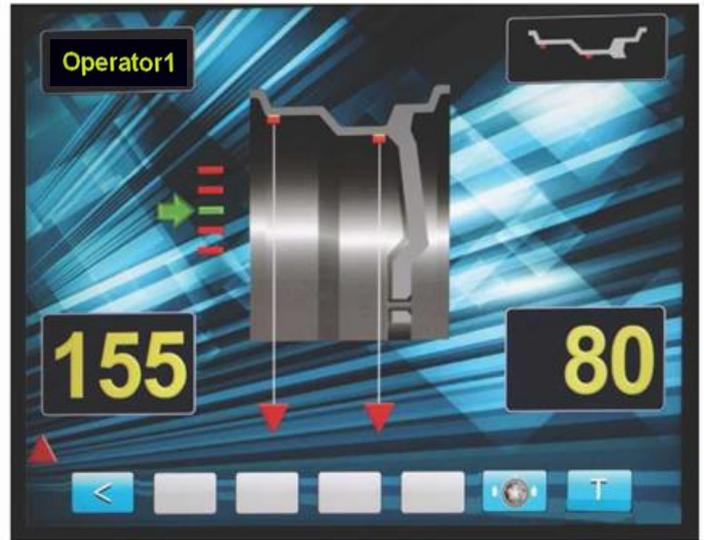


fig. 13.1

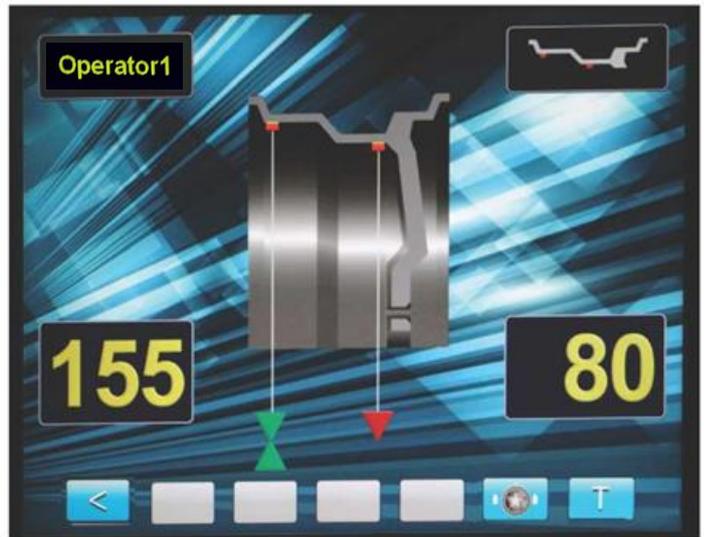


fig. 13.2

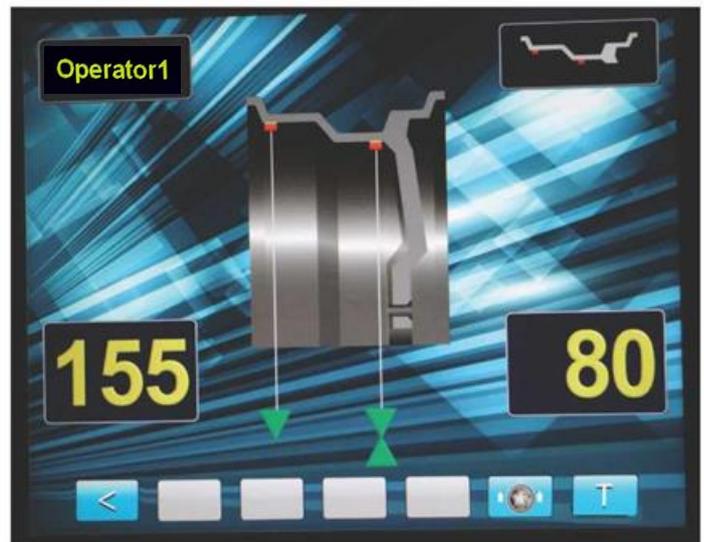


fig. 13.3

mass equal to the value shown on the indicators 1 or 4, depending on the plane, to which the wheel has been brought.

13.3. Extend the gauge watching the movement of the lower red triangle. When the gauge extends the distance equal to the distance set by the weight position in the mode «AUTOPROGRAMM» (refer to clauses 11.2 and 11.3) the lower triangle will align itself with the triangle marking the position of the weight. Both triangles will become green (fig.13.2 and 13.3) and the audio signal will sound.

13.4. Turn the handle so the weight in the clamp is pushed against the wheel rim. Press the button to stick the weight to the wheel rim.

13.5. Press the button on the clamp of the handle, move the clamp away from the placed weight and return the gauge to the initial position (the clamp button must be on the top plastic lid of the WB). The wheel will be brought to the position for placement of the weight along the other plane automatically.

13.6. Place the weight with the mass, equal to the value for another plane, into the handle of the gauge. Place it on the wheel rim in the same way as it is described in clauses 13.2 - 13.5, and in accordance with the position of the lower triangle and the triangle marking the position of the weight for another plane.

**Note:** 1. In the mode of the weight placement with the use of a gauge, the weight is not being added at the position where the gauge handle is reaching the rim and not at 12 o'clock position. The wheel will span to the required position automatically.

2. If the parameter «Positioning» is set to «OFF», the weight placement mode with the gauge handle will not start automatically.

13.7. Start the WB for unbalance correction control.

13.8. If necessary, the program for weight placement with a gauge handle can be deactivated with the button «STOP».

#### 14. Program «SPLIT» for Balancing Weight Separation

14.1. The program «SPLIT» is used for balancing the wheels with high quality discs made from light alloys to preserve the exterior appearance of the wheel by placing the invisible weights behind the disc's spokes.

The program «SPLIT» can only be used for the schemes when the outer unbalance correction plane is located behind the spokes of the disc, i.e. for «ALU 2R» and «ALU 3R» modes. The program allows splitting the value of the balancing weights in two parts in such a way, that both of them end up in the position behind the spokes.

14.2. Prior to using the program «SPLIT», the wheel should be mounted on the machine, the parameters entered and the programs «ALU 2R» and «ALU 3R» selected. The programs «ALU 2R» and «ALU 3R» should be used with «AUTOPROGRAMM» function, because in «AUTOPROGRAMM» mode the weight placement with the use of the gauge is possible.

14.3. After the WB has been started and the unbalance measurement results acquired, the operator evaluates the need to split the weight on the right side of the rim. If the position of the



fig. 14.1

balancing weight placement will be behind the spokes, the program «SPLIT» will help to split it and place it behind the spokes.

**IMPORTANT!** If the programs «ALU 2R» or «ALU 3R» are used with the function «AUTOPROGRAMM», after the WB has been started and the unbalance measurement results acquired, the machine will automatically enter the weight placement mode with the use of a gauge handle. Now, to start the program «SPLIT», you will need to switch to the main operating mode screen by pressing the button «STOP».

14.4. Then move the next right spoke, relative to the place of the balancing weight positioning, vertically (12 o'clock position) and press the «SPLIT» button. The main operating mode screen will display the yellow dot for the positioning of the first part of the balancing weight. Then move the next left spoke relative to the place of the balancing weight positioning vertically (12 o'clock position) and press the «SPLIT» button. The main operating mode screen will show the yellow dot for the positioning of the second part of the balancing weight (fig 14.1).

Now, the balancing weight on the right side of the disc is split in two parts behind two neighboring spokes and you can start adding the balancing weights.

14.5. Perform the placement of the balancing weights according to the method described in clauses 12.3.2 and 12.3.3.

14.6. If the programs «ALU 2R» or «ALU 3R» were used with the function «AUTOPROGRAMM», the balancing weight can be added with the use of the gauge handle as described in clauses 13.2-13.6. To enter this weight placement mode press button «4».

14.7. Start the WB to check the balancing results. If the values are not equal to zero, perform the necessary corrections.

14.8. Press «STOP» button to exit the «SPLIT» program.

## 15. Program «OPT»

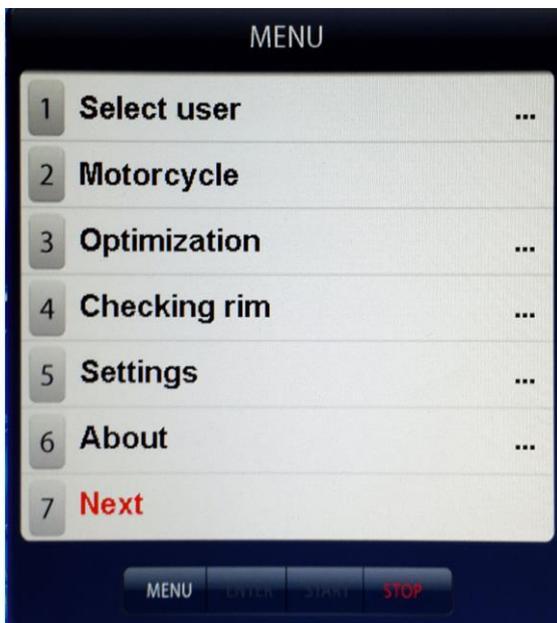


fig. 15.1

15.1. The «OPT» program provides the optimal positioning of the tire on the disc in terms of minimal static unbalance of the wheel. Also it reduces the mass and the quantity of the balancing weights needed for wheel balancing, as well as minimizes the residual wheel eccentricity. The «OPT» program is recommended for use when static unbalance of the wheel is greater than 30 gr.

15.2. To enter the «OPT» program press button «MENU». The screen will display the window shown in the fig. 15.1. Then select the option «Optimization» by pressing the button «3». The screen will display window shown in fig. 15.2. Follow the directions on the screen.

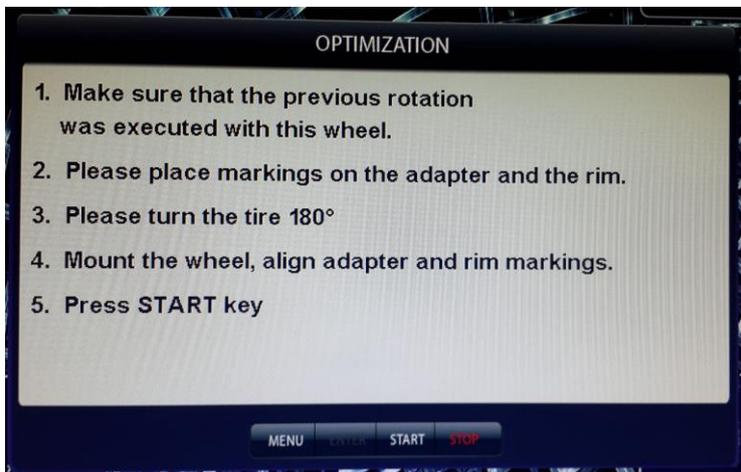


fig. 15.2

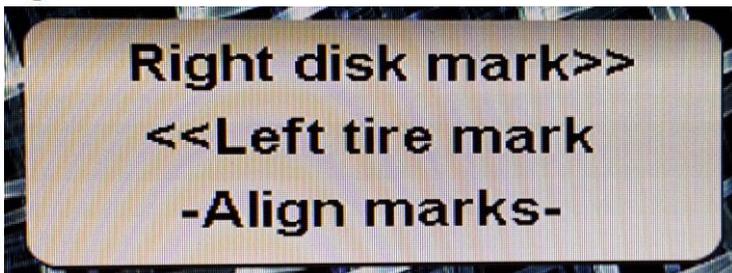


fig. 15.3

15.3. After completing the instructions in item 5 (fig. 15.2) you will see the following window on the monitor - (fig. 15.3). The value of the static unbalance will be displayed on the indicator 1 and the indicator 4 will display the value of the unbalance you will get after the completion of the «OPT» program. Put the, markings on the tire according to the instructions in the window (fig. 15.3).

15.4. Dismount the wheel from the WB shaft and place it on the tire fitting machine. Turn the tire relative to the disc so the markings align.

15.5. Put the wheel back on the shaft of the WB and align the wheel disk based on the markings made in procedure described in clause 15.2. Start the WB and balance the wheel as described in the chapter 12.

15.6. Press the «STOP» button to exit the «OPT» program.

## 16. Program «SEVEN OPERATORS»

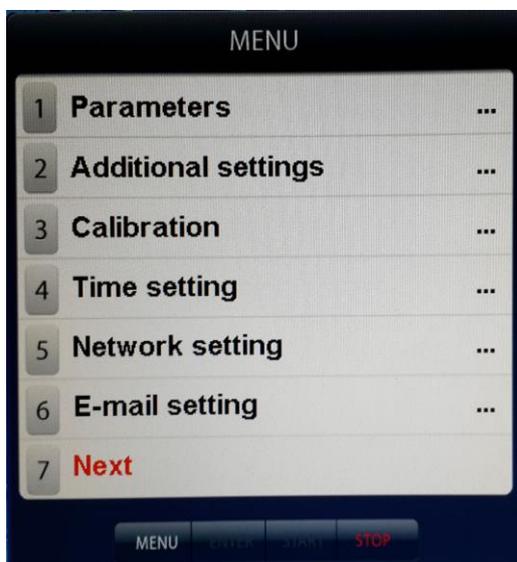


fig. 16.1

16.1. Very often there are multiple operators working in the tire fitting area, servicing the vehicles with different types of tires. It would be very convenient not to have to enter the new wheel dimensions every time and the switch between the different types of wheels could be done simply by switching the name of the operator. Besides this, the operator can choose any combination of options from the MENU «SETTINGS», and it will be saved under the name of this operator. This function is available with the program «SEVEN OPERATORS».

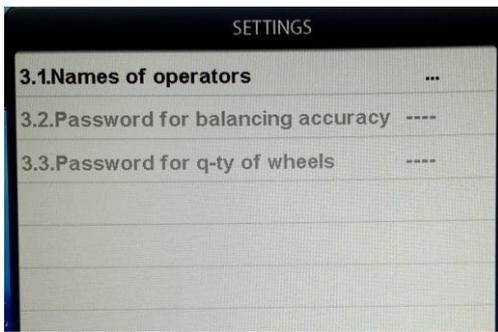


fig. 16.2

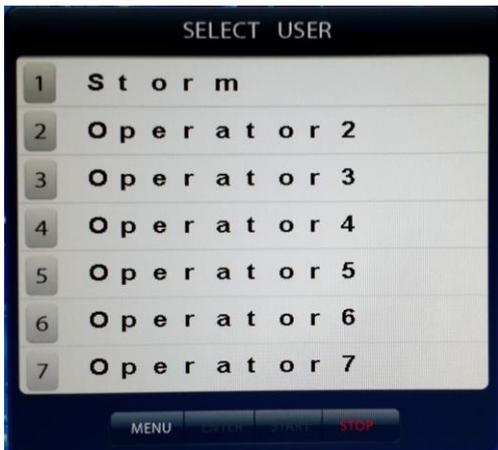


fig. 16.3

## 16.2. Entering the operator.

16.2.1. Press the button «MENU». The window MENU will appear on the screen (fig. 15.1). Press button 7 «Next» - the monitor will display the second page of the MENU screen (fig. 16.1). Select «Additional settings» by pressing the button 2. The menu «SETTINGS» will appear on the screen (fig. 16.2). Press the button 1 «Names of operators» - the screen will display the window «SELECT USER» with the list of the operators (fig. 16.3).

16.2.2. Press the button for the required operator. If the number has no name the word «Operator» will be deleted and in this space you can enter the name of the operator. The name can be entered using buttons «↑» and «↓» (UP and DOWN). Pressing of this buttons displays the sequential list of Cyrillic and Latin alphabet letters and numbers from 0 to 9. Press buttons «←» and «→» (LEFT and RIGHT) to move to the next letter. After the name has been entered, press the «ENTER» button and the name will be recorded. If this number already had a name of the operator assigned to it, you can enter a new name by using the buttons «↑», «↓», «←» and «→». Press «ENTER» after entering a new name.

After the operators name has been recorded, press the «STOP» button to return to the main operating mode screen.

## 16.3. Retrieving the operator and recording its settings.

16.3.1. Press the button «MENU». The window MENU will appear on the screen. Press the button 1 «Select a user». The screen will display the window «SELECT USER» with the list of the operators. (fig. 16.3).

16.3.2. Press the button for the required operator. The program will switch to the main operating mode screen and the operator's name will be displayed in the window 2 (fig. 8.2).

16.3.3. To record settings for this operator, select them as described in the chapter 17 «Machine Parameter Setup» and press the button «ENTER». Now the selected settings for this particular operator are recorded in the machines memory.

The sizes of the wheel and the weight positioning scheme, entered by this operator, will be kept until the other values are entered.

**Note:** The sizes of the wheel and the weight positioning scheme, entered by the operator, will not be saved when the machine is powered down.

## 17. Machine Parameter Setup (SETTINGS)

The software of the WB contains the whole set of parameters, allowing to make the machine as much user friendly and make sure it meets all needs of the customers. To set the parameters press the «MENU» button. The window MENU will appear on the screen (fig. 15.1). Press the button 5 «Settings». The monitor will display the parameter setting window (fig. 17.1).

17.1. Parameter 1.1 «Balancing accuracy» sets the minimal unbalance value, displayed in windows 1 and 4 (refer to clause 12.2). To change it, use the buttons «↑» and «↓» to select the required parameter (highlighted in color). Set the required value using buttons «+» or «-». Press

the button «ENTER» to return to the mode MENU, press the button «STOP» to return to the main operating mode screen.

**IMPORTANT!** If the technical manager wants to restrict the change of the parameter 1.1 «Balancing accuracy» by the operators, a password can be set on this option.

To add a password press the button «MENU», then press the button 7 «Next» to get to the second MENU page. Select option 2 «Additional settings» by pressing number 2. The window shown on the fig. 17.2 will be displayed. Using button «↓», select the option «Password for balancing accuracy» and press button «+». The screen will display the window shown on the fig. 17.3. Enter the four figure code and press «ENTER». From now on, the machine will ask to enter the code if someone wants to change this parameter.

To change the code, select the option «Password for balancing accuracy» and press the «+» button. The window (fig. 17.3) will display the request «Please enter 4-letter old code». Enter the old code and press «ENTER». The window (fig. 17.3) will display the request « Please enter 4-letter new code». Enter the new code and press «ENTER». If you press the button «STOP» when entering the new code, the password option on the setting the parameter «Balancing accuracy» will be removed.

17.2. Setting the initial values for diameter and width of the wheel's disk on the startup of the WB (refer to clause 10.1.) is done, using the following parameters: 1.2 «Start diameter» and 1.3 «Start width». To change the value, select the required parameter using buttons «↑» and «↓» and set the required value using buttons «+» and «-». Press «ENTER» to save the parameter and «STOP» to return to the main operating mode screen.

17.3. Setting the units of measurement for the diameter and the width (inches or mm) - parameter 1.4 «Units of measure». Select the parameter using buttons «↑» and «↓» and choose the required units of measurement using buttons «+» and «-». Press «ENTER» to save the value and «STOP» to return to the main operating mode screen.

17.4. The WB software contains several phrases accompanying main operations, for example, entering of the geometrical dimensions placement mode with the use of a gauge etc. The audio can be turned off. Select parameter 1.5 «Sound» using buttons «↑» and «↓», set its value to «OFF» using buttons «+» or «-». Press «ENTER» to save the setting and «STOP» to return to the main operating mode screen.

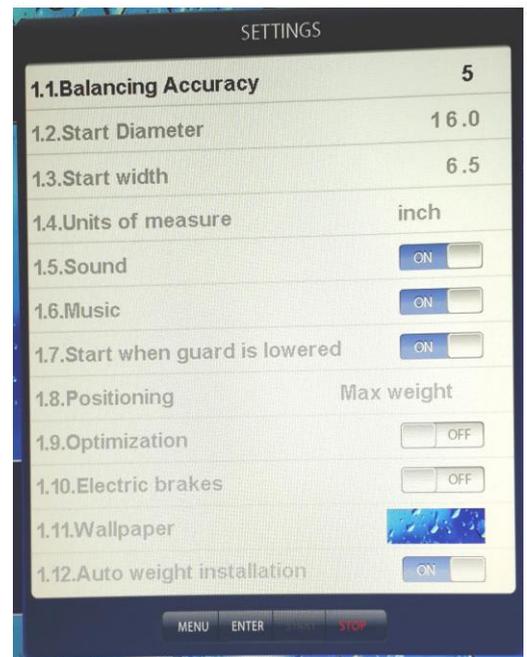


fig. 17.1

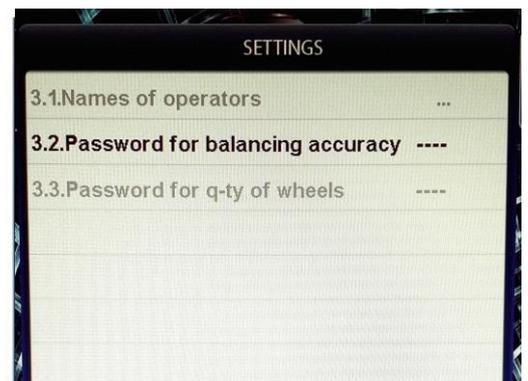


fig. 17.2

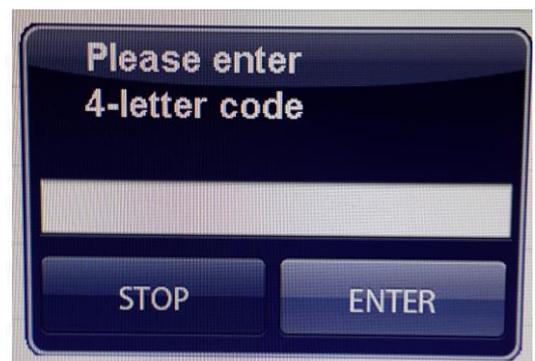


fig. 17.3

17.5. Parameter 1.6 «Music». If the parameter «Music» is set to «ON», when you turn the power on, you hear the music playing. To change this option choose the parameter 1.6 using buttons «↑» and «↓» and set it to «OFF» using buttons «+» or «-». Press «ENTER» to save the setting and «STOP» to return to the main operating mode screen.

17.6. Starting the WB by lowering the wheel guard – parameter 1.7 «Start when wheel guard is lowered». To change this option choose the parameter 1.7 using buttons «↑» and «↓» and set its value to «ON» or «OFF» using buttons «+» or «-». Press «ENTER» to save the setting and «STOP» to return to the main menu screen.

17.7. Adjusted positioning by plane - parameter 1.8 «Positioning». To change this option choose the parameter 1.8, using buttons «↑» and «↓» and set its value using buttons «+» or «-»:

- initial plane specific positioning to rectify maximum unbalance
- left (inner) plane specific positioning
- right (outer) plane specific positioning
- initial positioning is turned off (pressing the button «Position» turns the option ON).

Press «ENTER» to save the setting and «STOP» to return to the main operating mode screen.

17.8. The program for minimization of the residual static unbalances - parameter - 1.9 «Optimization».

If this option is not available due to the setting of the minimum unbalance in windows 1 and 4 (refer to clause 17.1.1), and the masses of the corrective weights are divisible by 5, there may be some residual unbalance left, after the wheel has been balanced.

When the program for minimization of the residual static unbalances is turned on, the mass and positioning of the corrective weights are calculated in order to get the minimal residual static unbalance.

To turn this program on, select the parameter 1.9 using buttons «↑» and «↓» and set its value using buttons «+» or «-». Press «ENTER» to save the setting and «STOP» to return to the main operating mode screen.

17.9. Parameter 1.10 «Electric brakes». After the measurement cycle has been completed the machine stops the wheel. To reduce the braking time the braking electromagnet can be used. To change the setting of this parameter select the option 1.10, using buttons «↑» and «↓», and set its value using buttons «+» or «-». Press «ENTER» to save the setting and «STOP» to return to the main operating mode screen.

17.10. Parameter 1.11 «Wallpaper». The WB software has several screen background options, which can be changed by the user. To change the background select the parameter 1.11 using buttons «↑» and «↓» and set the desired background, using buttons «+» or «-» (the background sample will appear on the line). Press «ENTER» to save the setting and «STOP» to return to the main operating mode screen.

17.11. Parameter 1.12 «Auto weight installation». When entering the sizes of the wheel and the positioning of the balancing weights, using the programs »ALU 2R« or »ALU 3R« with function «AUTOPROGRAMM» (refer to clause 11.3) and after the measurement cycle has been completed, the mode for weight placement with the use of the gauge handle kicks in, which is not always convenient. This option can be turned off by turning ON the parameter 1.12.

To change this parameter select the option 1.12 using buttons «↑» and «↓» and set its value using buttons «+» or «-». Press «ENTER» to save the settings.

17.12. The second page of the parameter setup screen (fig. 17.4.). Use button 5 to swap pages.

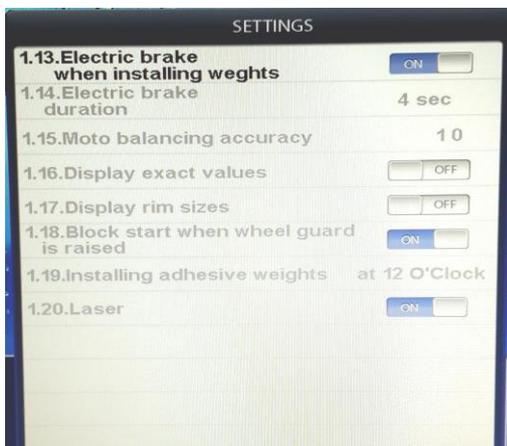


fig. 17.4

as for the other parameters.

17.15. Parameter 1.16 «Display exact values». If this parameter is set to «ON», the windows with unrounded unbalance values will appear on the screen next to the windows 1 and 4 and there is no need to press the button «<>».

17.16. Parameter 1.17 «Display rim sizes». If this parameter is set to «ON», the screen displays the small window, showing the values for inputted dimensions «A», «d» and «b».

17.17. Parameter 1.18 «Block start when wheel guard is raised». If this parameter is set to «ON», pressing the button «START» with the wheel guard raised, the screen displays the error message «The wheel guard is not lowered».

17.18. Parameter 1.19 «Installing adhesive weights» has two options; «at 6 o'clock» and «at 12 o'clock». The user can select either option (refer to the clause 12.3.5).

17.19. Parameter 1.20 «Laser». If this parameter is set to «ON» and the option 1.19 is set to «at 6 o'clock» the place for adding of the adhesive weights is highlighted by the laser line.

After all the setting has been entered, press the button «STOP» to return to the main operating mode screen.

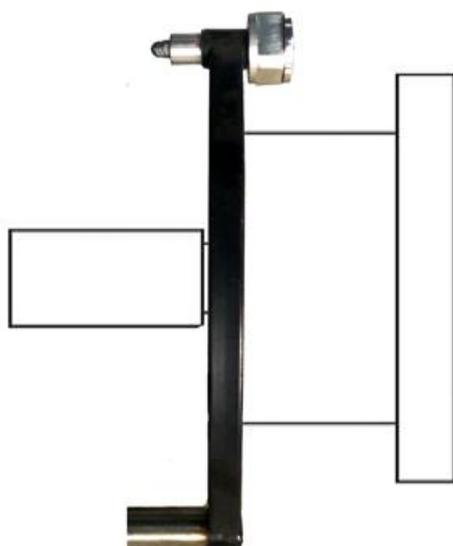


fig. 18.1

## 18. Run-Out Check Function

In order to check the run-out of the disc visually, it is not necessary to measure the unbalance. This function starts the spinning of the wheel whenever the button «START» is pressed and until the button «STOP» is pressed, or for the duration of 30 seconds.

## 19. Calibration

For wheel unbalance measurement the WB has main and secondary measuring channels:

- measuring the distance to the wheel;
- measuring the diameter of the rim;
- measuring the width of the rim;

all mentioned channels are calibrated separately.

19.1. Calibration of channels for measuring the distance to the wheel, diameter and width of the rim.

19.1.1. Calibration of the distance measuring channel. To evaluate the inaccuracies in measurement of the distance, pull out the gauge and press the side surface of its handle against the back end of the shaft flange, as shown on the fig. 18.1. The screen for input of the dimensions will display the value for the distance (refer to fig. 10.2). If the distance is not equal to  $135 \pm 5$  mm, the distance input device needs to be calibrated.

Press the button «MENU». In the window MENU select the option «Calibration» by pressing corresponding button in the top row of the keyboard. The window «CALIBRATION» will open. Select option 2 «Distance calibration» by pressing button 2 in the top row of the keyboard. This will open the window «DISTANCE CALIBRATION» (fig. 18.3). Pull out the gauge and press the side surface of its handle against the back end of the shaft flange, as shown on the fig. 18.1 and press the button «ENTER». The item 2 «Insert the distance handle into the position 1 and press ENTER button» in the window «DISTANCE CALIBRATION» will be highlighted.

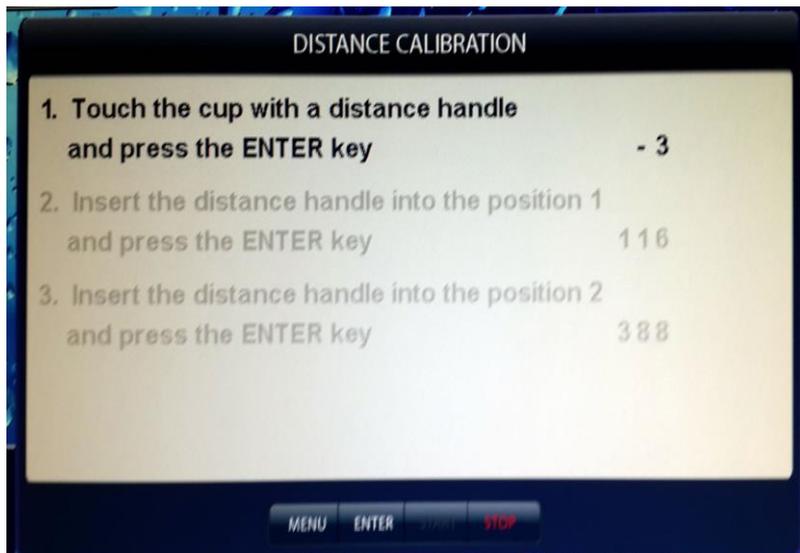


fig. 18.3

**Note:** If you only wish to calibrate the distance measuring channel and skip calibrating the diameter measuring channel, you need to quit the «DISTANCE CALIBRATION» menu by pressing the button «START». The message «parameters recorded» will appear and the monitor will display the main operating mode screen.

19.1.2. The calibration of the disc diameter measuring channel. Place the calibration sampler on the shaft of the WB for calibration. Insert the tip of the gauge handle into the lower hole of the sampler and press «ENTER». The item 3 «Insert the distance handle into the position 2 and press ENTER button» in the window «DISTANCE CALIBRATION» will be highlighted. Follow the directions in the item 3. The message «Parameters recorded» will appear. Press the button «STOP» to return to the main operating mode screen.

19.1.3 The calibration of the ultrasound sensor for automatic input of the wheel rim's width. The WB is equipped with the ultrasound sensor for the automatic input of the wheel rim's width. To calibrate this sensor press the button «MENU». Then select the item 4 «Width calibration» by pressing the button 4 in the top row of the keyboard on the MENU screen. The window «WIDTH CALIBRATION» will appear.

Measure the distance from the tip of the gauge handle to the tip of the ultrasound sensors' projector. Input the measured value (minus 5mm) using buttons «+» and «-» and press «ENTER».

**Note:** The figures in the windows are conditional.

## 20. Calibration of the measuring channel

**IMPORTANT! The calibration is performed in two cycles (the wheel is span twice)!**

20.1. If you have any doubt as of the accuracy of the corrective weights masses measurements, you can perform calibration of the WB unbalance measuring channel.

20.2. Press the button «MENU». Select the item 1 «Main calibration» by pressing the button «1» in the top row of the keyboard on the MENU screen. The window «MAIN CALIBRATION» will appear (fig. 19.1).

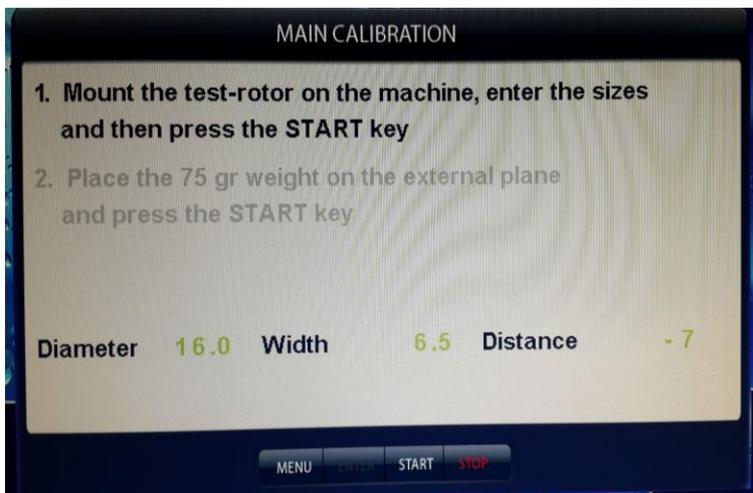


fig. 19.1

«Place the 75gr weight on the external plane and press the START button».

20.6. Place the weight with the mass equal to  $75 \pm 0,5$ gr on the outer side of the wheel. Start the WB.

20.7. After second calibration cycle is completed, the screen will display the changing numbers and the message «CALIBRATION IS COMPLETE» will appear.

20.3. Place an average size assembled wheel (with unbalance on both sides of no more than 25 gr) on the shaft of the WB.

20.4. Enter the dimensions of the wheel.

**IMPORTANT!** If the dimensions are entered incorrectly the results of the calibration will also be incorrect, as well as the all following measurements.

20.5. Start the WB by pressing the button «START». After the first cycle is completed, the window (fig. 19.1) will display the second step:

## 21. «TEST» Mode

Press the button «MENU». Select the item 7 «Next» by pressing the button 7 in the top row of the keyboard on the MENU screen. The second MENU screen will open (refer to fig. 16.1). Select item 3 «Test» by pressing the button 3 in the top row of the keyboard. The window TECT will open (fig. 21.1).

In the line «Angle sensor» there will be a number, changing from 0 to 143 for each one turn of the shaft. The indicators R0 and R1 must blink steadily with the steady rotation of the shaft. The indicator R\_0 should give out 1 flash for one turn of the shaft.

The line «Distance sensor» display the value, changing by 50-60 units with the extension of the gauge.

The line «Rim diameter sensor» displays the number, steadily changing with the turning of the gauge handle for entering of the distance.

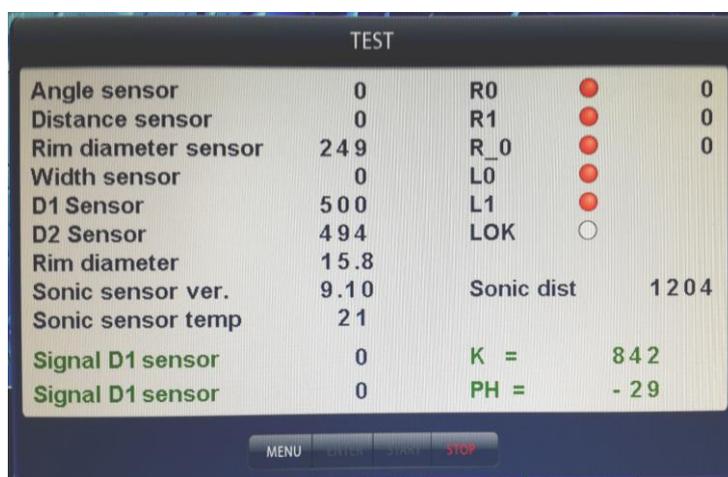


fig. 21.1

The lines for «Sonic sensor» display the sensor's version, temperature and the distance to the surface, whenever some surface is brought to the sensor.

Sensor D1 and sensor D2 represent the average levels of signals from the sensors and should fluctuate around the value of 500. Lines «Signal D1 sensor» and «Signal D2 sensor» display sensor signal values after the measuring cycle.

«K» and «PH» are the internal parameters.

All values on the fig. 21.1 have an illustrative purpose only.

To leave the TEST mode press the button «STOP».

## 22. Displaying the Machine Information

ABOUT				
Soft. ver.	V7.26	Date of reset	15.05.2015	
	Nr.wheels	Nr.starts	W.clips	W.sticks
Storm	000000	000001	000000	000000
Operator2	000000	000000	000000	000000
Operator3	000000	000000	000000	000000
Operator4	000000	000000	000000	000000
Operator5	000000	000000	000000	000000
Operator6	000000	000000	000000	000000
Operator7	000000	000000	000000	000000
Total	000000	000001	000000	000000

fig. 22.1

Press the button «MENU». Select the item 6 «About » by pressing the button 6 in the top row of the keyboard on the MENU screen. The following window will open – fig. 22.1. The window shows the software version information (top left) and the number of wheels balanced by each operator (first column). The second column contains the number of starts, performed by each operator. The third and fourth columns have the combined mass of clip-on and stick-on (adhesive) weights respectively. Just above the masses of

the weights there is a date of the last reset. To reset the mass of the weights hold down the button 6 for 30 seconds.

**IMPORTANT!** If the technical manager wants to restrict the viewing of the information about the machine by the operators, a password can be set on this option.

To set the password, press the button «MENU». Press the button 7 «Next» to go to the second MENU page. Select the item 2 «Additional settings» by pressing the button 2. The following window will open. Select option «Password of q-ty of wheels» using button «↓», then press the button «+» to open the next window (fig. 22.3). Enter the 4 digit code and press «ENTER». Now, whenever there is a request to view the number of balanced wheels, the window (fig. 22.1) will be empty. To view the information about the number of balanced wheels, press the button 1. The following window will appear (fig. 22.3). Enter the code and press «ENTER».

To change the code, select the option «Password for balancing accuracy» and press the «+» button. The window will display the request « Please enter 4-letter old code». Enter the old code and press «ENTER». The window will display the request « Please enter 4-letter new code». Enter the new code and press «ENTER». If you press the button «STOP» when entering the new code, the password option on the viewing of the information about the number of balanced wheels will be removed.

## 23. Setting up the auto emails mode

23.1. If connected to the Internet, the WB can send an email letter with the statistics of the machine operations. To provide for this functionality you need to connect the machine to the Ethernet with a category 5e cable no more than 75 m in length. An Ethernet port is located on the back wall of the machine. To update the time, network and email settings press the button «MENU» to get to the first MENU screen (fig. 15.1). Press the button 7 «Next» to go to the second MENU screen (fig. 16.1) and select the corresponding item.

### 23.2. Time and Date settings.

To change the parameters use buttons «+» or «-», to move between items of the menu use buttons «↑» and «↓», to quit time and date setting mode press «ENTER». Parameter 4.2 «Sending messages» can be set to once a day on Mondays at 12 noon once a week (messages sent on Mondays at 12 noon) or once a month (messages sent on the 1<sup>st</sup> of each month at 12 noon). If the machine is turned off, the email will be sent when the machine is powered on and after the next scheduled time.

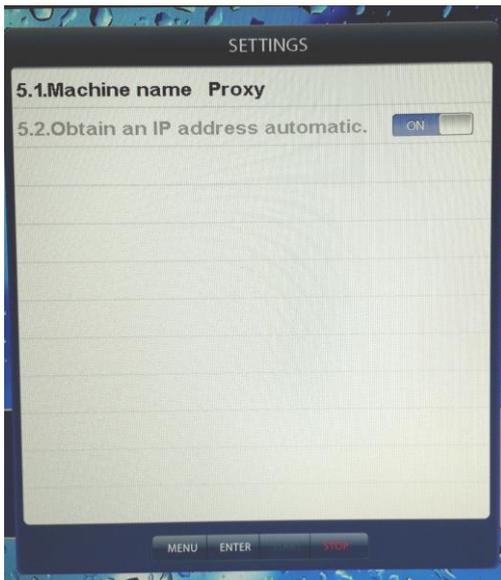


fig. 23.2

### 23.3. Network settings (fig. 23.2).

To change parameters use buttons «+» or «-», to move between items of the menu use buttons «↑» and «↓», to quit network setting mode press «ENTER».

Parameter 5.1 «Machine name». This is the name that will be the sender of the emails and under this name the machine can be identified on the network. Use the buttons «↑» and «↓» to choose a character, buttons «←» and «→» to move the cursor, button «DEL» to delete a character and button «ENTER» to exit the editing mode. The machine name cannot have any spaces.

Parameter 5.2 «Obtain an IP address automatic». If the network has a DHCP (Dynamic Host Configuration Protocol), the network setting can be received automatically. If this parameter is set to «OFF», the network setting must be set manually.

### 23.4. Email settings (fig. 23.3).

To edit parameters, use the buttons «+» or «-», to move between items use the buttons «↑» and «↓» and to save the Email settings press the button «ENTER».

Parameter 6.1 «E-mail» - is the email address to which the emails will be sent. Use the buttons «↑» and «↓» to choose a character, buttons «←» and «→» to move the cursor, button «DEL» to delete a character and button «ENTER» to exit the editing mode. The button 6 is used for connection to the SMTP (Simple Mail Transfer Protocol) and analogous to the ping command. The button 7 sends an email to the set email address.

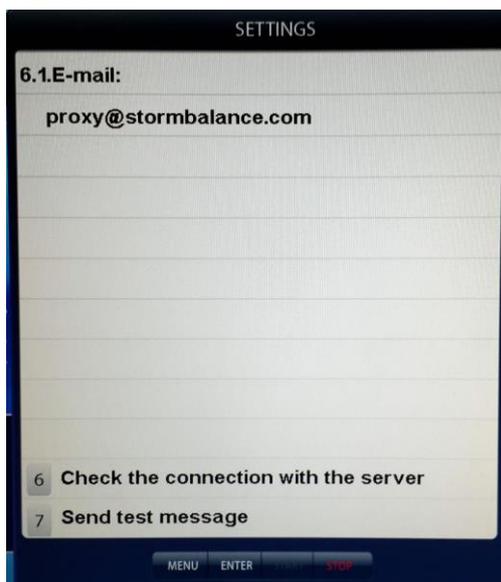


fig. 23.3

The email sample:

This operation report is for the Balancing Stand 'Proxy\_6pc'.

The date of the reset of the total weights mass - 20.08.2014.

---

	Nr wheels	Nr starts	Clips	Sticks
1. Operator1	00000000	00000000	00000000	00000000
2. Operator2	00000000	00000000	00000000	00000000
3. Operator3	00000000	00000000	00000000	00000000
4. Operator4	00000000	00000000	00000000	00000000
5. Operator5	00000000	00000000	00000000	00000000
6. Operator6	00000000	00000000	00000000	00000000
7. Operator7	00000000	00000000	00000000	00000000
Total	00000000	00000000	00000000	00000000

---

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The appearance of the email may vary depending on the email browsing program, especially the width of the spaces – which can cause the shifting of the columns.

## 24. Motorcycle wheel balancing.



fig. 23.1

24.1. Mounting of the motorcycle wheel on the stand is done with the help of a special adapter (purchased separately). The threaded stud must be removed from the WB shaft (refer to clause 7.4) and replaced with a balancing shaft from the moto adapter kit. The motorcycle wheel is then mounted according to the moto adapter instruction manual.

24.2. To enter the motorcycle balancing mode, press the button «MENU». Select the item 2 «Motorcycle» on the MENU screen (fig. 15.1), by pressing the button 2 in the top row of the keyboard. The main operating mode screen

should display the image of a motorcycle and the message «Attention! Place the attachment onto the distance handle».

24.3. Place the attachment on the extension (included in the moto adapter package). Enter the distance to the wheel by extending the gauge and placing the attachment against the weight placing position.

24.4 When the motorcycle balancing mode is selected, the static balancing program – the most used program for motorcycle wheel balancing - automatically starts.

24.5 Further steps for the motorcycle wheel balancing are the same as for the balancing of car wheels.

24.6 To exit the motorcycle wheel balancing mode, press the button «MENU». Select the item 2 «Car» on the MENU screen (fig. 15.1), by pressing the button 2 in the top row of the keyboard. The image of a motorcycle on the main operating mode screen will disappear.

## 25. Maintenance Service.

25.1. To function normally during the entire operating life the WB requires regular servicing. The frequency of maintenance service depends on the working and environmental conditions, as well as the operating rate.

Recommended types and time intervals of maintenance operation:

- daily maintenance
- quarterly cleaning
- belt tension adjustment and brake unit clearance check –as required.

Before opening for maintenance, the WB should be disconnected from the power source.

### 25.2 Daily maintenance.

After the completion of each work day clean the housing of WB from any dirt and dust. Wipe the working parts of the spindle, flange, stud and the clamping set with the piece of cloth moistened with mineral oil.

**IMPORTANT!** Every day, during the working process, keep the mounting faces of the spindle, stud, cones and adapter clean and wipe it with the piece of cloth moistened with mineral oil when required, to avoid early wear and mechanical failures.

### 25.3.Cleaning the WB.

Every three month the dust and wear products of the transmission and brake unit, which accumulate on the interior of the WB, should be removed. The cleaning must be performed with the use of a vacuum cleaner. Air blasting cleaning of the WB interior may cause some conducting particles to get into the sensor circuits and electronic components and is strictly prohibited.

During cleaning pay special attention to the optoelectronic sensors on the devices for entering the distance and measuring the spindle rotational angle. The circle with the dark and light bands on the front end of the spindle sheave and the measuring scale with the same bands on the distance entering gauge need to be wiped with a dry or slightly damp soft cloth. Never use organic solvents! The optoelectronic sensors elements should be cleaned with a clean soft brush.

If there is a reason to suspect that the distance or angle measurements are faulty, carefully disassemble the optoelectronic sensors and thoroughly wipe the surfaces of light-emitting and photo diodes with the soft piece of cloth moistened in alcohol, after which place them back.

**IMPORTANT!** When reassembling the optoelectronic sensors make sure to provide for the clearance of at least 0,8-1,2 mm between the light-reflective surface with the dark and light bands and the faces of the photocells on the optical sensor board. This applies especially to distance entering sensors, because if the clearance is less than 0,8 mm, there is a possibility of scratching of the light-reflecting band because of the lost motion play off a measuring scale guide bar.

**Note:** When using the optoelectronic sensors with a comparator instrument (additional microchip), the mentioned clearance should be within 2-3 mm.

25.4. Adjust belt tension by moving the motor support assembly. With normal tension on application of a force of 0,8-1,0 kg, the belt deflection should be 15-20 mm.

25.5. To adjust the clearance between the electric magnet and the brake disk; ease off two bolts that hold electric magnet bracket. Pull back the bracket, set the clearance within 1-1,5 mm and tighten the bracket bolts.

## 26. Certificate of Acceptance.

Balancing stand Proxy-6pc, manufacturing number \_\_\_\_\_  
Complies with Technical Specifications 4577-001-30645255-2011 and ready for operation.

Production Date « \_\_\_\_ » « \_\_\_\_\_ » 201\_\_.

Head of the Enterprise \_\_\_\_\_

stamp here.

## 27. Initial Calibration Certificate.

Control measuring device verification officer stamp here

« \_\_\_\_ » \_\_\_\_\_ 201\_\_.

## 28. Warranty.

Manufacturer warrants compliance of products with the requirements of the present Specifications subject to adherence to the operation, transportation and storage conditions. Claims are not accepted for the WB with defects caused by the user, the WB with deviations from the assigned parameters, which can be remedied by the adjustments provided in this instruction manual.

Product warranty period – 1 (one) year from the date of the shipment to the customer, but no more than 18 months from the Production Date.

Date of the shipment « \_\_\_\_ » « \_\_\_\_\_ » 201\_\_ .

Signature \_\_\_\_\_

stamp here.

## 29. Calibration Procedure.

The following calibration procedure is applied to balancing machines manufactured by «STORMBALANS» LLC, St. Petersburg in accordance to Technical Specifications 4577-001-30645255-2011. This calibration procedure establishes the methods for initial and periodical calibrations of this equipment.

The interval between calibrations – 1 year.

### 1. Calibration Stages And Instruments.

1.1. The calibration procedure should include the stages, described in the Table 1.

**Table 1**

Stage	Paragraph number	Calibration Instruments, accessory equipment and technical characteristics	Stages of	
			Initial calibration	Periodical calibration
Visual inspection	5.1	Visually	yes	yes
Testing	5.2	Car wheel assembly	yes	yes
Software validation	5.3		yes	yes
Determination of the metrological characteristics: - determination of the zero drift; - determination of the absolute error while measuring the unbalance mass for one correction plane; - determination of the absolute error while measuring the angular position of the unbalance mass	5.4	Weigh-scales in accordance with GOST P 53228-08 with scale capacity of 300 gr and accuracy readability of 0,1 gr. Car wheel assembly. Weights 25, 50, 75 and 100 gr $\pm$ 0,5gr.	yes	yes

To ensure the required accuracy of measurements, it is admissible to use the calibration instruments and accessory equipment not listed in Table 1, provided it has valid certificates.

### 2. Safety Requirements.

- 2.1. It is strictly prohibited to work on the machine with its housing covers removed.
- 2.2. The WB housing must be properly grounded.
- 2.3. Touching rotating parts of the WB before full stop is strictly prohibited.
- 2.4. From the start of the WB and until its full stop the wheel must be covered with wheel guard (if supplied).
- 2.5. The calibration procedure must be performed only in the presence of the operator, responsible for operating of this machine.

### 3. Calibration Conditions.

The following conditions must be observed while performing the calibration procedure: the room temperature - 20 ( $\pm$  10) °C; the changes in room temperature should be no more than 2 °C per hour; relative humidity 65 ( $\pm$  15) %.

#### 4. Preparation for Calibration.

4.1. Prior to carrying out the calibration procedure all the requirements for correct installation and connection of the WB must be performed.

4.2. All the maintenance and calibration procedures must be performed in accordance with this Operation Manual.

#### 5. Carrying Out Of the Calibration.

5.1. Visual inspection. The visual inspection should establish the following:

- the machine has no visible damage;
- all operating controls function normally;
- working surfaces of the shaft and clamping devices are free of indentations and scoring marks.

5.2. Testing.

5.2.1. Perform the test start of the WB in accordance with this Operation Manual. After the measurement cycle is complete the display must show the values for the unbalance mass and its angular position.

5.3. Software validation.

5.3.1 After the machine is started, press the button «MENU». Select the item 6 «About» by pressing the button 6 in the top row of the keyboard on the MENU screen. The software version number will be displayed in the top left corner of the screen (fig. 22.1). The software version number should match the one, indicated in the machine description.

5.4. Determination of the metrological characteristics.

5.4.1. Determination of the zero drift.

Mount the wheel and balance it in accordance with this Operation Manual, so the resulted residual balance values are equal to zero or do not exceed 1 gr. Then, start the WB and, after the stop, record the readout on the indicators for the corrective weights for inner and outer planes of the wheel. Repeat the measurements twice more. Calculate the average value of the readouts. The zero drift (the average of the unbalance mass) for each wheel plane should not exceed  $\pm 3$  gr.

5.4.2. Determination of the absolute error while measuring the unbalance mass for one correction plane.

Verify the masses of the control weights with nominal values of 25, 50, 75 и 100 gr. The mass of the control weights should be verified using weigh-scales with a scale interval equal to 0,1 gr. Actual masses of the control weights should not differ from the nominal values by more than 0,5 gr.

Place the control weight with the mass of 25 gr on the outer plane of the wheel. Perform the measurement of unbalance for outer and inner planes of the wheel three times. Record unrounded values.

Place the control weight with the mass of 25 gr on the inner plane of the wheel. Perform the measurement of unbalance for outer and inner planes of the wheel three times.

The mass of unbalance should be the average value of all the measurements.

The same procedure should be done with weights with a mass of 50, 75 and 100 gr.

Unbalance measuring error for the plane with added control weight is calculated based on the following formula:

$$DM_i = |Mp_i - M_k|,$$

where  $Mp_i$  – the value of unbalance, measured by the WB.

$M_k$  – the mass of the control weight (actual mass of unbalance value). Absolute zero drift error is determined for a plane with no weight added.

Obtained values must not exceed  $\pm(3+0,1M_k)$ .

5.4.3. Determination of the absolute error while measuring the angular position of the unbalance mass.

Place the control weight with the mass of 75 gr on the inner plane of the wheel.

Determine the location for placement of the balancing weight. Measure the distance

from the control weight's center of balance to the vertical line going through the center of the spindle axle with a ruler (0 – 300 mm GOST 427). Perform this procedure no less than three times.

Unbalance mass angular position measuring error is calculated based on the following formula:

$$a = 114,6 L_{cp}/D,$$

where  $L_{cp}$  – is the average value of the distance from the control weight's center of balance to the vertical line going through the center of the spindle axle (in mm);

$D$  – the diameter of the wheel disc (in mm).

The same measurements are done with the appropriate control weight placed on the inner lip of the calibration disc.

Unbalance mass angular position measuring error must not exceed  $\pm 5^\circ$ .

## **6. Calibration Results Certification**

6.1. Positive results of the initial calibration is recorded in the machine data sheet with the date of the calibration authenticated by the stamp of the verification officer.

6.2. Positive results of the periodical calibration is certified by the Calibration Certificate.

6.3. The balancer failed to meet the requirements of this method are rejected and not approved for use. The certificate is nullified. The certificate of unserviceability, with the reasons for rejection listed, is issued in accordance with Regulation «PR 50.2.006-94» - « Procedure for calibration of measurement equipment».

**The "STORM" Company**

**www.stormbalance.com**

**Tel/fax: + 7 (904) 332-18-15**

**E-mail: export@stormbalance.com**