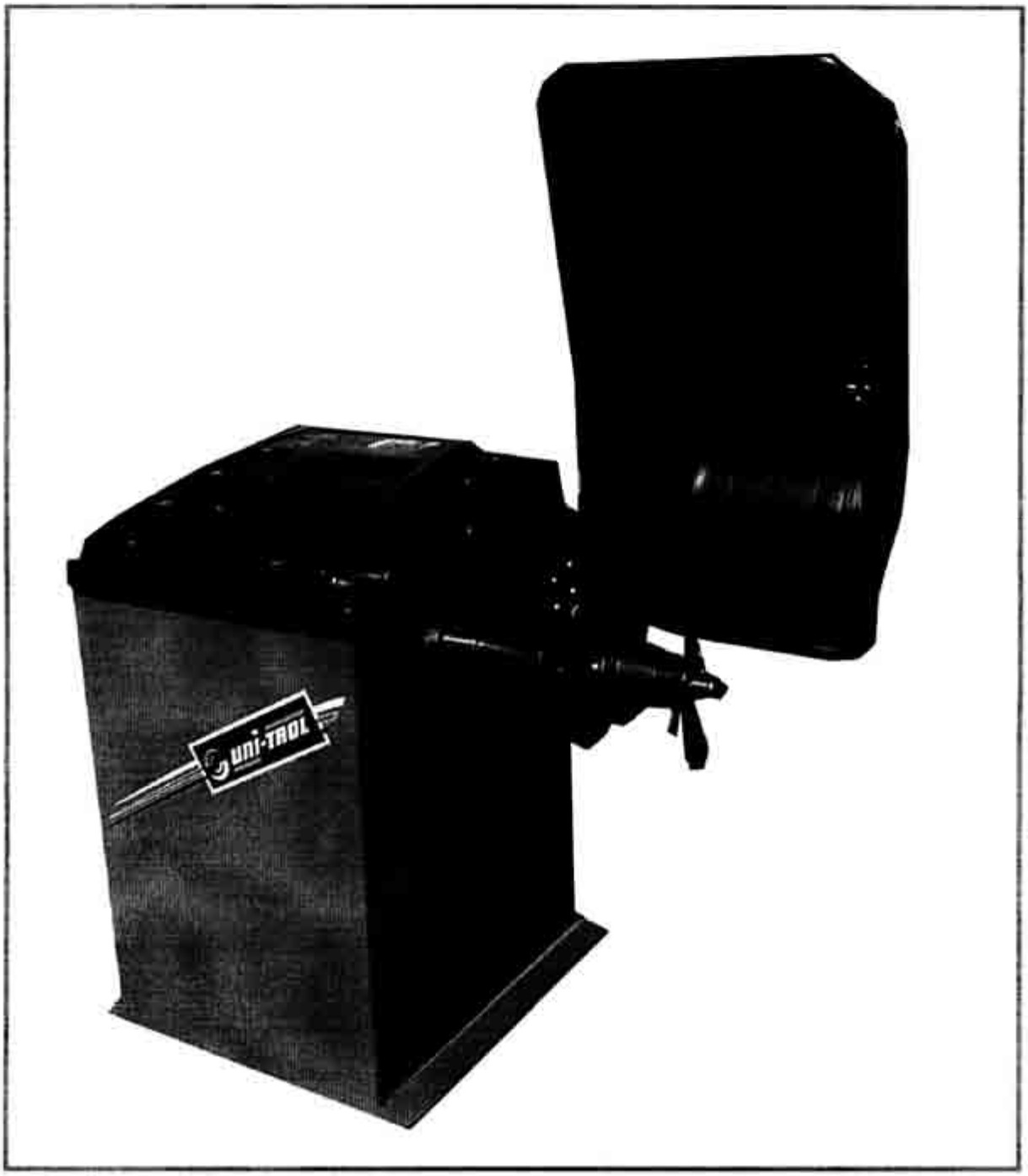
UNI-TROL

CE

TROLL - 2112



OPERATING INSTRUCTION

DO NOT START THE MACHINE BEFORE READING CAREFULLY THESE INSTRUCTIONS

1 . APPLICATION AND TECHNICAL DATA

TROLL -2112 balancing machine is designed for dynamic balancing of car and van wheels in a single measurement cycle.

TECHNICAL DATA:

- max. wheel diameter	0,9 m
- wheel diameter	10" - 24"
- wheel width	2" - 10"
- accuracy of unbalance indications	1 g
- accuracy of unbalance location signal	3 grades
- measurement time	3 s
- machine weight	abt 120 kg
- overall dimensions: with closed shield	1130x 900 x1150 mm
with open shield	1030x1030x1450 mm
- wheel weight	up to 60 kg
- drive motor rating	0,25 kW
- spindle speed (during measurement)	175 r.p.m.
- power supply	220 V / 50 Hz

The balancing machine is equipped with a speech synthetiser, emitting confirmations of each operation performed and suggesting procedures for wheel balancing.

2 . INSTALLATION

TROLL - 2112 balancing machine should be installed in a closed, dry room, heated during autumn / winter season. The machine should be installed on a hard and levelled floor. The balancing machine should be installed on three rubber pads, suppiled with the machine (item 28, fig.2) which should be inserted under the three flat feet welded to the machine base.

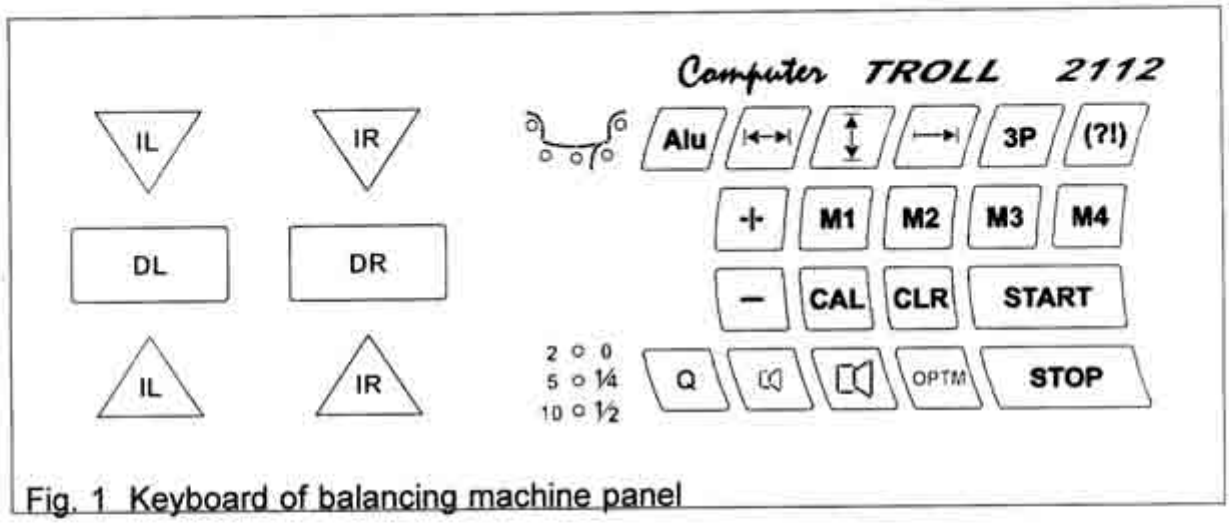


Fig. 1 Keyboard of balancing machine panel

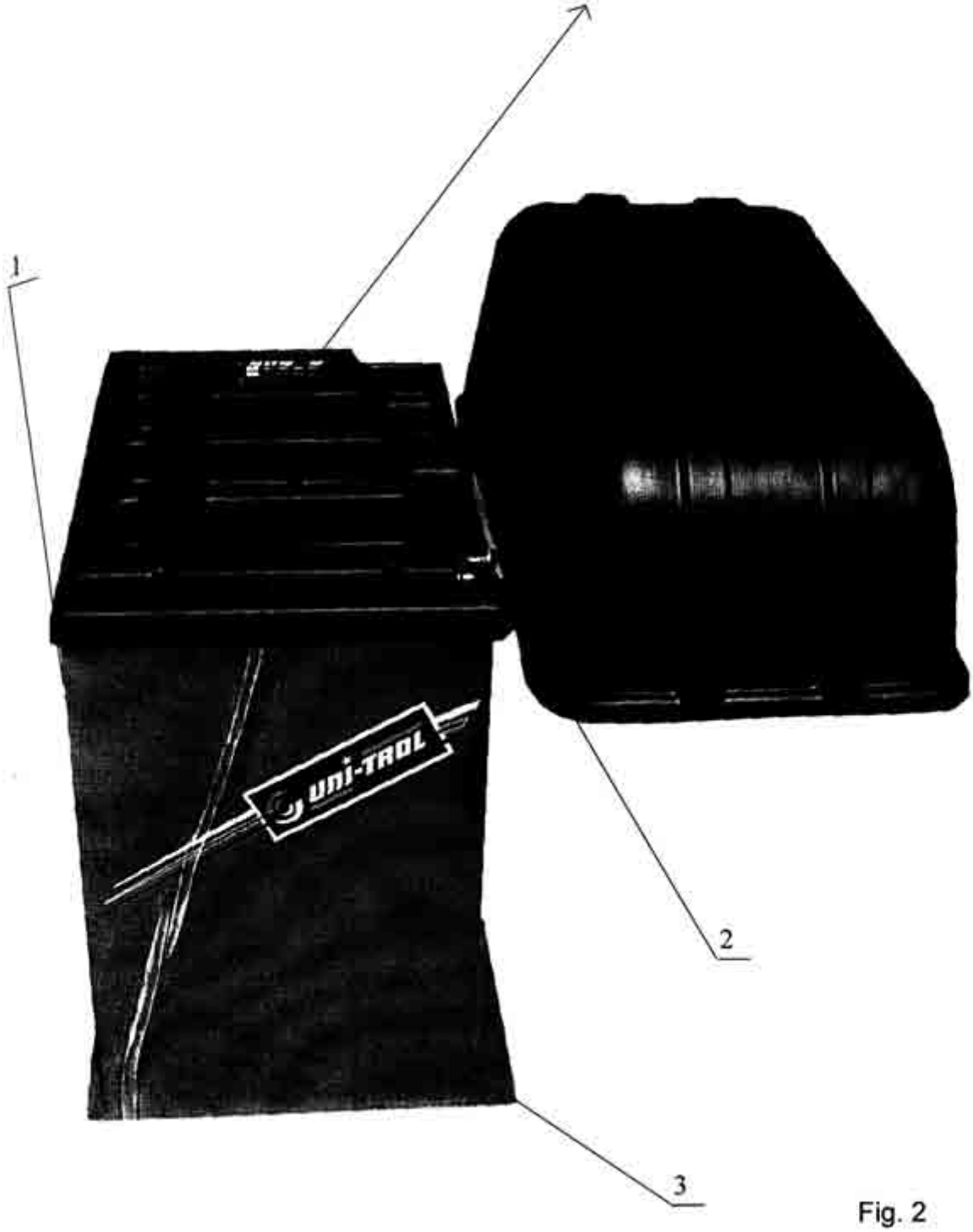


Fig. 2

3. CONTROL PANEL DESCRIPTION (figs 1 and 2)

Announcements emitted by the balancing machine after depressing a particular push - button are given in brackets.

- ⟷ - Wheel width setting push - button [WIDTH]
- ↕ - Wheel diameter setting push - button [DIAMETER]
- ⇥ - Push - button for setting distance from wheel inside correction plane [DISTANCE]
- M1 - M4 Memory push - button, M1-M4 [MEMORY READ - OUT]
- − - Push - button for entering changes in wheel diameter and width values (subtracting values)
- + - Push - button for entering changes in wheel diameter and width values (adding values)
- CLR - Reset push - button [NEW MEASUREMENT]
- CAL - Balancing machine calibration push - button [CALIBRATION]
- 3P - Push-button for programme„hiden weight"
- Alu - Push - button for programing various weight mounting methods [CHANGE TYPE OF WHEEL]
- ? - Push - button for unbalance conversion [UNBALANCE CONVERSION]
- Q - Diodes determining cut - off threshold value [THRESHOLD CHANGE]
- 🔉 - Voice volume reducing push - button [LOWER - LOWEST]
- 🔊 - Voice volume increasing push - button [LOUDER - LOUDEST]
- STOP - Machine stop push - button [STOP]
- START - Machine start push - button [ATTENTION START]
- IL - Diodes for signalling unbalance position for inside correction plane
- IR - Diodes for signalling unbalance position for outside correction plane
- DL - Unbalance value indicator for inside correction plane
- DR - Unbalance value indicator for outside correction plane
- OPTM - Optimisation subprogramme push - button

1 - Balancing machine master switch
2 - Wheel outside correction plane distance controller
3 - Vibration damping rubber pads

Full list of announcements emitted by the balancing machine

[LOWER]
[LOWEST]
[LOUDER]
[LOUDEST]
[BRAKING ERROR]
[ACCELERATION ERROR]
[CHANGE OF WHELL RIM TYPEI]
[CALIBRATION]
[WRONG CALIBRATION]
[WHEEL BALANCED]
[WHEEL UNBALANCED]
[MEMEORY READOUT]
[MEMORY RECORD]
[NEW MEASUREMENT]
[UNBALANCE CONVERSION]
[SYSTEM OPERATIVE]
[SYSTEM TEST]
[ATTENTION START]
[STOP]
[THRESHOLD CHANGE]
[WIDTH]
[DISTANCE]
[DIAMETER]
[REDUCE WEIGHT]
[INCREASE WEIGHT]
[SHIFT LEFT]
[SHIFT RIGHT]
[CLOSE SHIELD]

4. FITTING BALANCING MACHINE ADAPTER

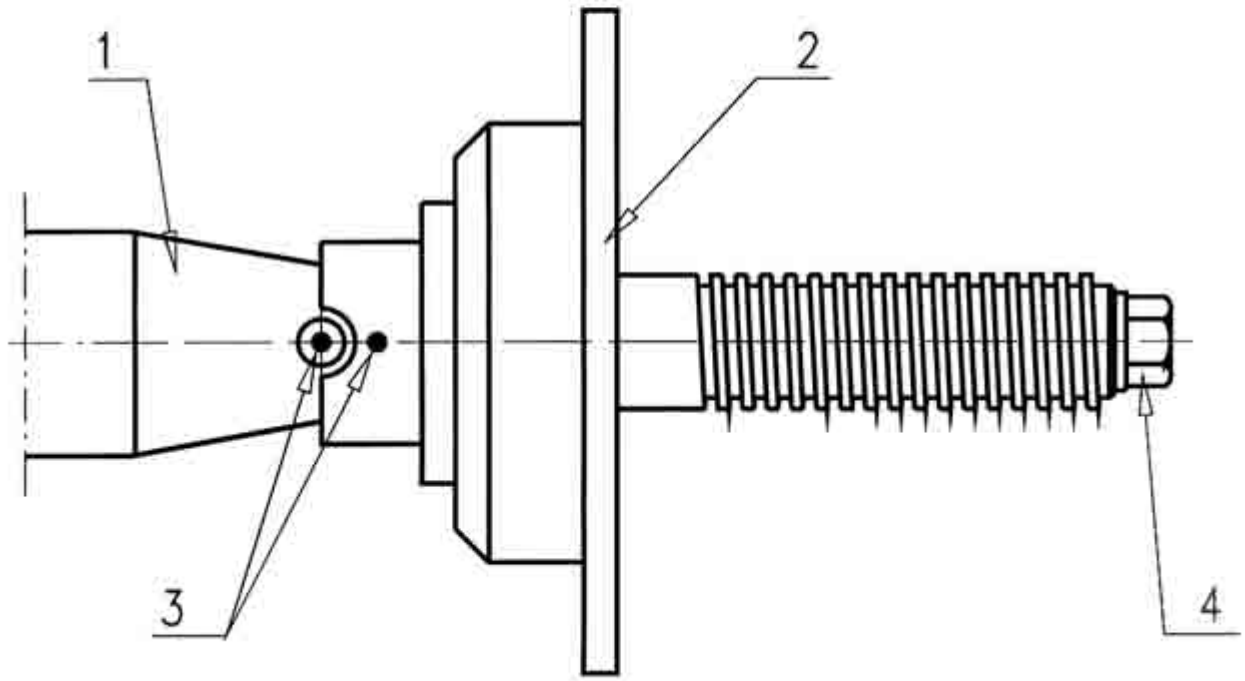


Fig. 3 Fitting adapter without nit, tapers and sleeves

Before mounting the adapter clean thoroughly with a clth taper surfaces of spindle „1" and fixture „2". Install adapter so that markers „3" on spindle dowel and adapter are in the position shown in Fig.

NOTE:
Thorough cleaning of taper surfacecs and apprioprate position of adapter in relation to spindle (markers coinciding) is one of preconditions of correct wheel balancing.

5 . MOUNTING WHEEL SHIELD

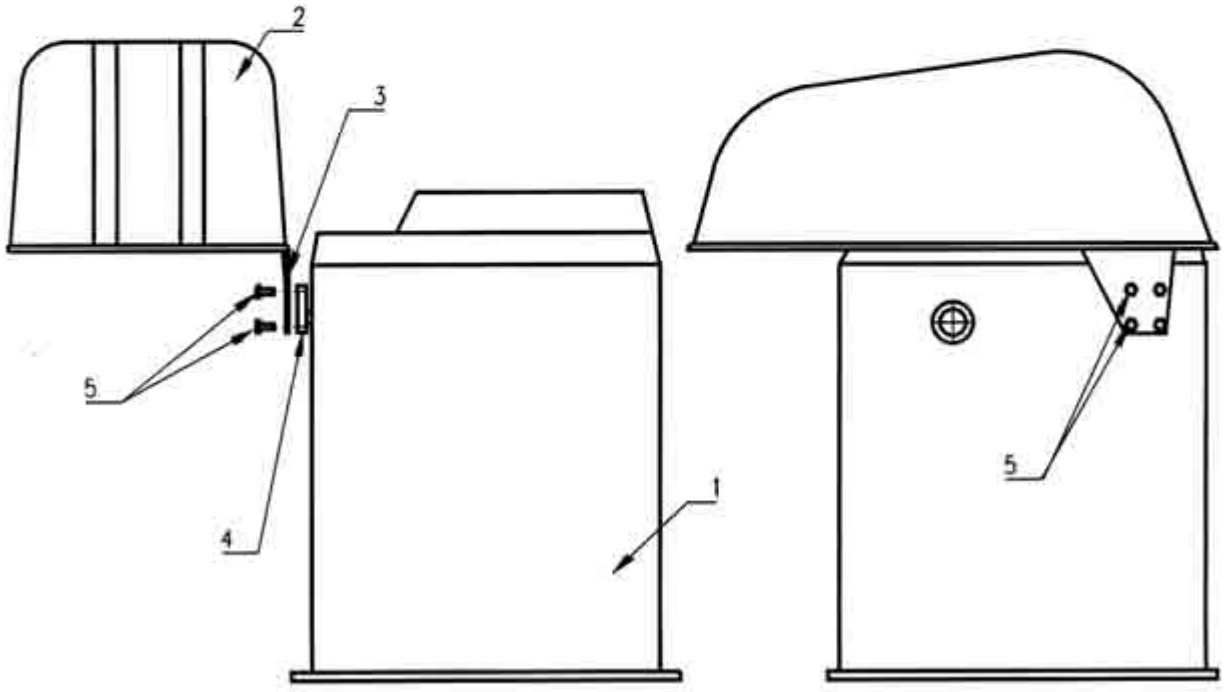


Fig. 4

1-balancing machine
2-wheel shield
3-shield eye
4-shield pivot flange
5-mounting bolts

Set shield (item 2) vertically and fix to shield pivot flange (item 4) by means of four M8 bolts (item 5), passing through shield eye (item 3).

NOTE:
In the mechanism of the shield a damper is provided to limit the opening and closing speed.

6 . CONNECTING - UP THE MACHINE TO POWER SUPPLY

6.1. CONNECT POWER SUPPLY

The balancing machine is provided with a three - conductor power cable.
The conductor with YELLOW - GREEN insulation, connected to the balancing machine housing is a PROTECTIVE conductor.

6.1.1 CONNECTING OF AIR SUPPLY

The air pipe ended of slide valve connect to pneumatic adaptor (no 8 pic 3) on the back wall of balancer

6.2. TEST START OF BALANCING MACHINE.

In order to check for correct electrical connection of the balancing machine, perform steps described in item 7.1. and then depress „START" key. Balancing machine drive will be started now. Spindle sense of rotation should correspond with the arrow on balancing machine housing, next to the spindle . Should the sense of rotation be opposite to the direction of the arrow and the machine generates an announcement [RUN-UP FAULT], interchange two phase wires in the supply cable plug.

A CHILLED BALANCING MACHINE MUST NOT BE CONNECTED TO THE MAINS BEFORE TWO OR THREE HOURS, NECESSARY FOR DRYING ELECTRONIC COMPONENTS AND TO REACH ROOM TEMPERATURE . FAILURE TO DO SO MAY CAUSE SERIOUS DAMAGE TO THE BALANCING MACHINE.

7.OPERATING BALANCING MACHINE COMPUTER

7.1. SWITCH BALANCING COMPUTER MACHINE

Switch main switch „1" on. After about two seconds, the balancing machine will emit and announcement [SYSTEM TEST] followed by sequential coming on and off of all diodes and indicators in the machine control panel, ended with an audio signal and announcement [SYSTEM OPERATIVE]. After this announcement, diodes will light - up determining weight mounting method and diode determining cut - off threshold value.

7.2. ENTERING WIDTH VALUE

Depress push - button ⟷. The balancing machine will emit announcement [WIDTH]. Symbol **I I** will be displayed on display DL and the value entered the last in the machine memory will be displayed on display DR. By depressing push - buttons + or -, adjust the width value every one half inch, from 2 to 10 inches.

7. 3. ENTERING DIAMETER VALUE

Depress push - button ↕ The balancing machine will emit announcement [WIDTH].
Symbol **=** will be displayed on display DL and the value entered the last in the machine memory will be displayed on display DR. By depressing push - buttons + or - adjust diameter value every one inch, from 10 to 24 inches.

7. 4. ENTERING DISTANCE VALUE

Depress push - button . The balancing machine will emit announcement [DISTANCE]. Symbol - will be displayed on display DL and the value last entered in the machine memory will be displayed on display DR.

Wheel distance setting should be determined as follows:
a) after the positioner has been moved to the rim edge and than back to the start position a number will be shown which is in a proportion to the positioner move (see fig. 5a)
The positioner must not be in the protruded position during the balancing machine switch - on and the computer reset. Otherwise the distance measurements will be false as the computer reads the positioner is position during switch - on as the zero position.
b) in case the distance should be entered without using the positioner the following should be done: (look fig.5 b)
- measure with a rule distance L between balancing machine wall and the rim of the wheel mounted in wheel adapter (measurement in centimetres
- multiply the measured value by four and subtract three, according to formula:

DISTANCE = (L-2,5) x 4

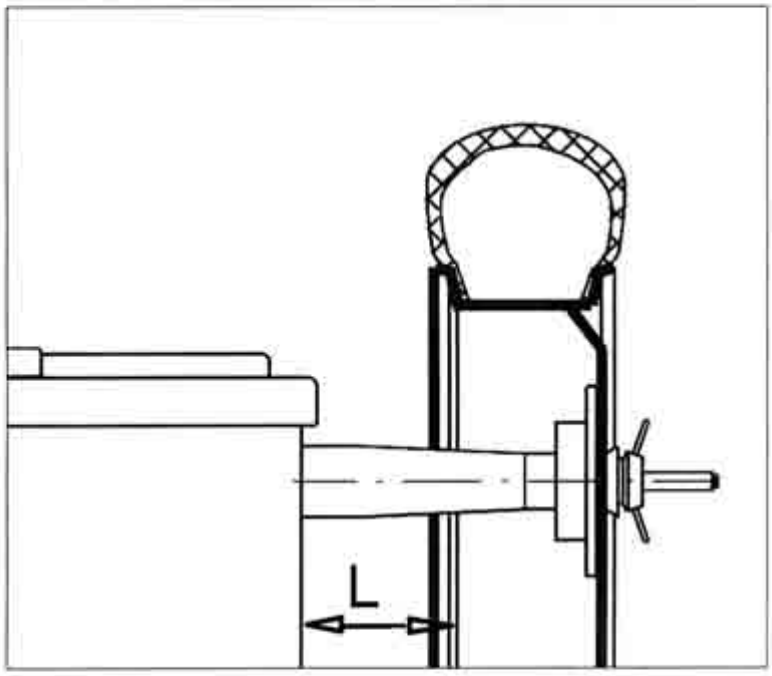


Fig. 5b - L- DISTANCE

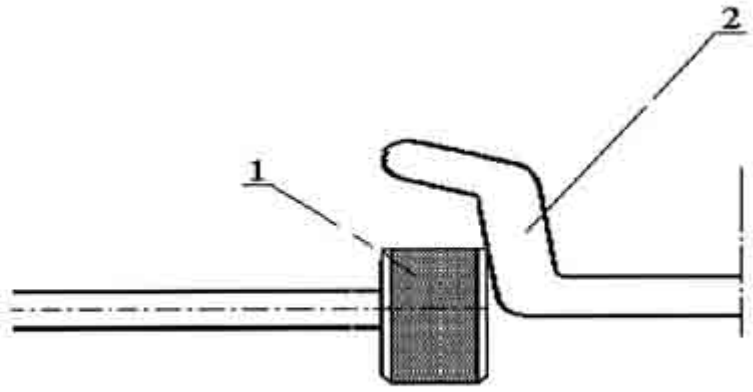


Fig 5a

7. 5. SELECTING BALANCING PROGRAMME

Depending on the desired method of balancing (tapping or sticking weights), a suitable balancing programme is enterend by depressing push - button [Alu], marked ALU. Each depression of the push - button results in an announcement [WHEEL TYPE CHANGE] and in a different lighting - up pattern of diodes .

Alternative 1:

balancing through tapping weights on both whell rim edges

Alternative 2:

balancing trough sticking weights

Alternative 3:

balancing trough tapping one weight on the inside balancing edge and sticking another on the inner wheel rim plane

Alternative 4:

balancing trough sticking one weight on the inside balancing plane and tapping another on the outer wheel rim edge

Alternative 5:

static balancing (for very thin wheel rims, with one weight). Not recommended for car wheels

Alternative 6:

balancing through sticking weights inside wheel rim

Alternative 7:

balancing through tapping one weight on inside correction plane and sticking another inside wheel rim

7.6. ENTERING CUT - OFF THRESHOLD VALUE

By depresing push - button [Q] , cut - off threshold is changed. Each depression is accompanied by announcement [THRESHOLD CHANGE]. 2g, 5g, or 10g threshold may be set what is signalled by appropriate diode lighting - up.

7.7. VOICE VOLUME ADJUSTMENTS

By depresing push - button [◁] voice volume is reduced and be depressing push - button [◁)] the voice volume is increased. With each depression of one of two push - buttons the balancing machine emits an announcement, confirming the adjustment being made e.g.
[LOWER] - [LOWER] - [LOWEST], or [LOUDER] - [LOUDER] - [LOUDEST].

Switching - off the voice:
Depressing and holding push - button [STOP] and simultaneous depression of push - button [◁)] results in switching the voice off. In order to switch the voice back, depress push - button [◁] or [◁)] switching - on the tune

7.8. BALANCING MACHINE MEMORY = MULTI USER FUNCTION

The balancing machine has four memories: M1, M2, M3 and M4 allowing permanent storage of parameters for four different, most frequently balanced wheel types. To enter data memory, e.g. M1 call appropriate parameters by depresing push - buttons [↔], [↕], [→|] and [Alu], set their values by means of push - button [+] or [-], then depress push - button [STOP], hold and simultaneously depress push - button [M1]. The balancing machine will emit announcement
[MEMORY RECORD]. To read out data, recorded earlier in memory M1, depress push - button [M1]. The machine will then emit announcement [MEMORY READ - OUT].
to use other memories, operate push - buttons [M2], [M3] or [M4] respectively.

7.9. STARTING BALANCING MACHINE DRIVE

- Manual start

The balancing machine drive is started by depressing push - button [START]. Unless wheel shield is closed, CASE (shield) will be displayed on displays [DL] and [DR] and the balancing machine will announce [CLOSE COVER]. After closing the cover, press push - button [START] again and the balancing machine will emit announcement [ATTENTION START] and the machine drive will be switched on. Displays [DL] and [DR] will show the same symbols, signifying the start of the measuring cycle. Completion of the measuring cycle is signalled by display of unbalance value and actuation of braking.

- Automatic start

The balancing machine can be programed that it automaticly started after closed the cover of wheel. In this case, the operator doesnt press [START] button but must done succesive operations: Press [STOP] button, hold it up and simultaneously press [?] button. On indicators appeared the incription [AUT - ON]. If the operator press anew above buttons the machine return to previonsoption i.e. it should be put in motion by pressing the button [START]. On indicators appeared the inscription [AUT - OFF]. The option should be confirmed by pressing optional button f.e. [+]
The balancing machine can started also with opened or disassembled the cover. For this purpose the operator must press [STOP] button, hold it up and simultaneously the button [START].

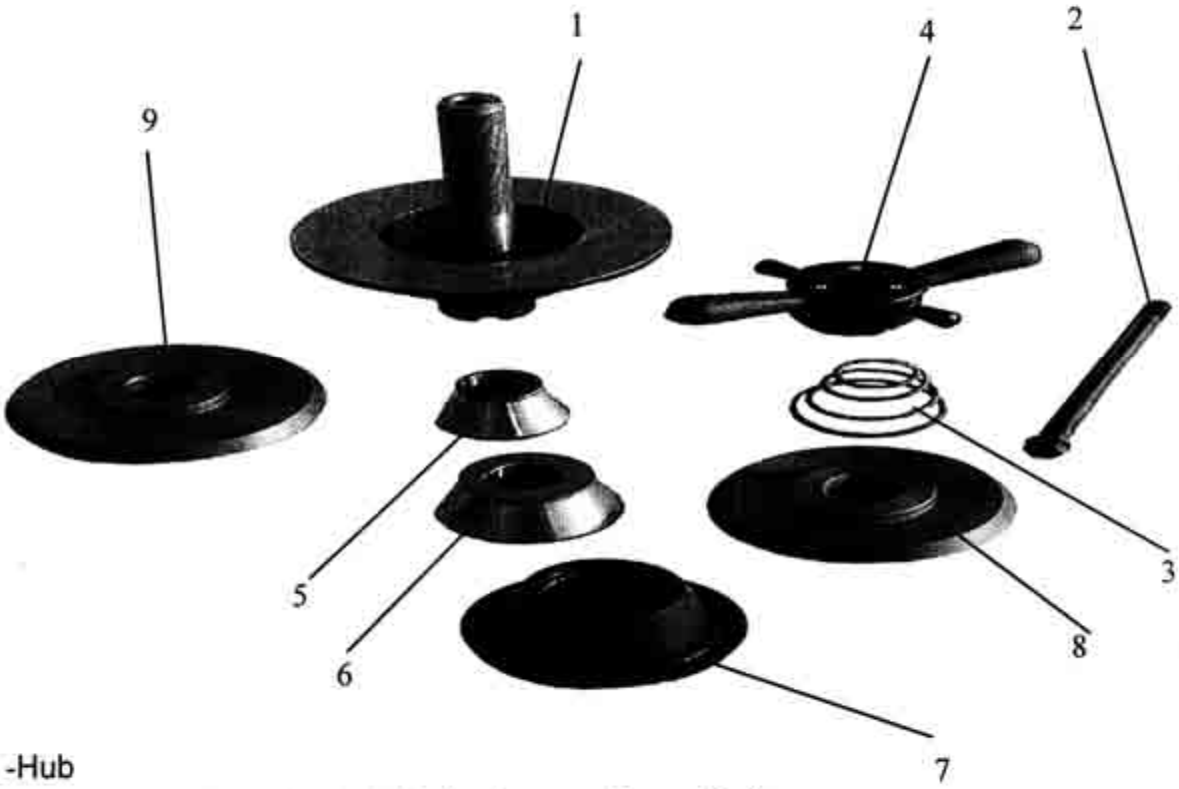
8. WHEEL BALANCING INSTRUCTIONS

8.1. MOUNTING THE WHEEL ON THE BALANCING MACHINE

Wheels with a central hole are mounted in a central adapter, supplied as standard equipment withthe balancing machine. This adapter is to be fitted to the balancing machine spindle as described in item 4 below

8.1.1 QUICK RELEASE ADAPTER

Type QUICK - TROL quick release adapter is intended for mounting car on a van wheels, with central hole wheel rims, on balancing machines .
ADAPTER COMPONENT PARTS (Fig.6):



1 -Hub
2 -Bolt for mounting adapter to balancing machine spindle
3 -Spring
4 -Clamping nut
5 -Centering cone No.1
6 -Centering cone No.2
7 -Pressure ring
8 -Centering disc No.1 (with twin cones)** (120 - 140 mm)
9 -Centering disc No.2 (with twin cones)** (140 - 160 mm)

** extra equipment

CLAMPING NUT (Fig 7)

Clamping nut lever moves in relation to nut body within limits detrmined by slot in nut body (positions L and D). In position L (loose), the nut may be freely moved along adapter rod thread. In position D (clamp), the nut may be screwed onto adapter rod thread.

MOUNTING WHEEL IN ADAPTER

Slide wheel on fixture bolt and suspend it by the edge of central hole centering cone detent.
Set nut lever in position RELEASE and push nut against wheel, as far as it will go. Resting thumb on nut pin (as shown in Fig.8) move lever to the right, to position CLAMP and tighten nut, pressing the whell against adapter disc.

Fig.8. Tightening nut

in order to remove wheel from adapter, rest index finger on nut pin (as shown in Fig. 9) and loosen nut by one half turn. It may be then slid off the rod and the wheel may be removed from adapter.

Fig. 9 Loosening nut

This desing of the adapter and its equipment allow to mount wheels of different wheel rim shapes and different central hole diameters. In this respect the user has the following options.

1. to user cone No. 5, or 6, (Fig. 6 and 13)
-with centering from the inside of wheel rim
- adapter nut should have pressure ring in place. (Fig 12)
2. to user cone No. 5,6 (Fig 10)
-with centering from the outside of wheel rim
- nut wthout pressure ring.
3. to use centering disc No. 8 or 9 (as shown in Fig 11)
- nut without pressure ring.

Fig. 10

Fig. 12

Fig.11

REMOVING NUT PRESSURE RING

Fig. 13.

While centering discs and Nos 1, 2, and 3 cones are used for mounting the wheel, if centered from the outside of wheel rim, remove pressure ring from the nut.
In order to remove the pressure ring from the nut, pull the pressure ring axially so that it falls off the detent . To install pressure ring push it onto nut detent.

8 .2. ENTERING MEASURING SETTINGS

Balancing each wheel consists in determination of unbalance value in grams for outside and inside correction planes and its location (position) on the wheel. Wheels are of different dimensions and therefore, to determine unmistakably the amount of unbalance, appropriate data should be entered in the machine memory: [WIDTH], [DIAMETER], and [DISTANCE].

- items - 7.2. - 7.4.
- item 7.5. - select balancing programme
- item 7.6. - entering cut - off threshold value

8.3. ENTERING MEASUREMENT SETTINGS FROM COMPUTER MEMORY (MANUAL START ONLY)

If a wheel whose parameters were recorded in the computer memory ealier (see item.7.8.), is to be balanced, then push - button [M] . Computer will be set in [MEMORY READ OUT],

8 . 4. WHEEL BALANCING MACHINE

After setting measurement settings close the shield and start the balancing machine drive witch switch [START]. During measurement, displays [DL] and [DR] show dashes --- ---. Measuring cycle is carried out without operator's intervention and is completed with displaying unbalance value on displays [DL] and [DR] and automatic braking of the wheel to a speed of about 30 r.p.m.

Unbalance value, e.g. 40g, displayed on display [DL] applies to inside correction plane. Unbalance value shown on display [DR], e.g. 50g, applies to outside correction plane. with the wheel rotating slowly, sound signals of slightly different tone are audible. They appear at such positions of the whell, where diode indicators [IL] and [IR] are green, determining the location of unbalance for inside (indicator [IL]) and outside (indicator [IR]) correction plane.

Please remember :

Whatever is displayed on displays [IL] and [DL] is applicable to inside correction plane, i.e. wheel rim edge closer to balancing machine housing and whatever is displayed on displays [IR] and [DR] is applicable to outside correction plane, i.e. wheel rim edge closer to fixture nut.

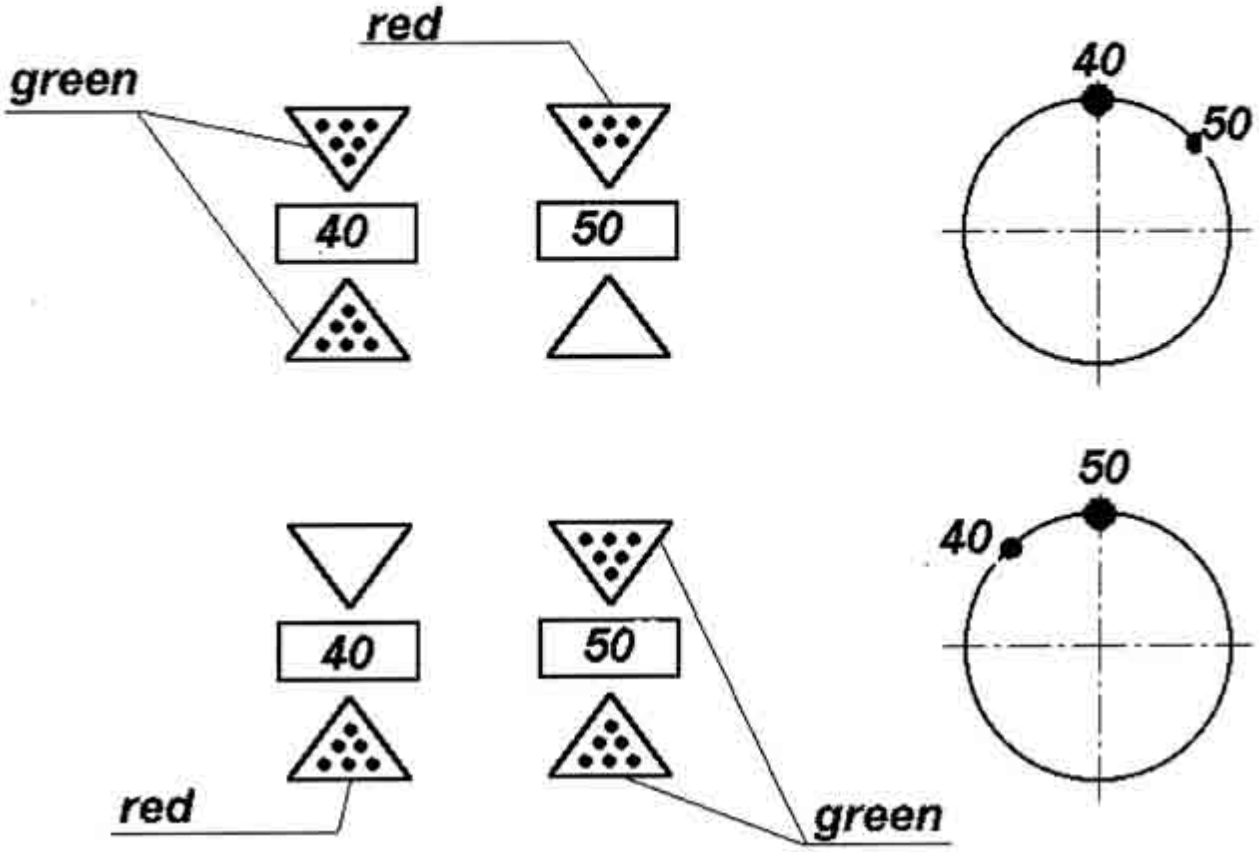
Value of 40g, displayed on display [DL] informs about the need to tap a 40g weight to the inner edge of the rim, in order to balance the wheel.

After opening the shield, rotating the wheel in either direction and watching display [IL] locate the point of unbalance for that plane. An audio signal wiil sound and a green arrow will appear on display [IL] for just one position of the wheel in relation to any reference point. For this wheel position, tap a 40 g weight at the top of the inside of wheel rim.

In a similar way, look for the point of unbalance (location of 50g weight to be fixed) for inside correction plane. Watch display [IR] and upon green arrows lighting - up and audio signal and stop the wheel and fix a 50g weight at the top point on the outside of wheel rim.

NOTE:

If on the display upon starting to locate the point of unbalance, three red diodes are on in the lower arrow, then, for quicker finding the proper position of the wheel, turn the wheel in the direction of the arrow on the housing. This will results in two subsequent diodes lighting - up and later - one more (last diode in the display). Further turning of the wheel in the same direction will result in changing the diode light from red on green.



After fixing weights of specific weight and in specific locations, make a recheck. Theoretically, on displays [DL] and [DR] two zeros should be displayed, meaning that residue unbalance does not exceed 5g, according to the assumed cut - off threshold. In practice, it does not have to be so. Why?

Firstly - balancing weights, irrespective of type, are made to some weight tolerance.

Secondly - the balancing machine measures the unbalance value to 2g, and the unbalance location - to 3g .

Thirdly - a balancing weight is not a concentrated mass but has a certain length, proportionate to its mass. Therefore it is easy to make a positioning error when fixing the weight (shifting the weight in relation to the top point or the wheel rim, indicated by the balancing machine)

It may therefore happen that, after rechecking, we get e.g. 6g for the inside plane and 7g for the outside plane. So, how to procced ?

Case 1

A zero (0) is shown on both displays and the balancing machine announcend [WHEEL BALANCED]. This means that the wheel has been balanced to 5g, as we operated at the cut-off threshold. By depressing push - button [Q] and setting cut - off threshold at 2g level, we can fin whether we have balanced the wheel to 2g. This will be the case if zeros (0) are displayed on both displays. If there appears 3 on one display and 4 on the other one, this will mean that the wheel has been balanced to 4g. After depressing push - button [Q] and seting again the cut - off threshold at 5g level, zeros will reappear on the displays.

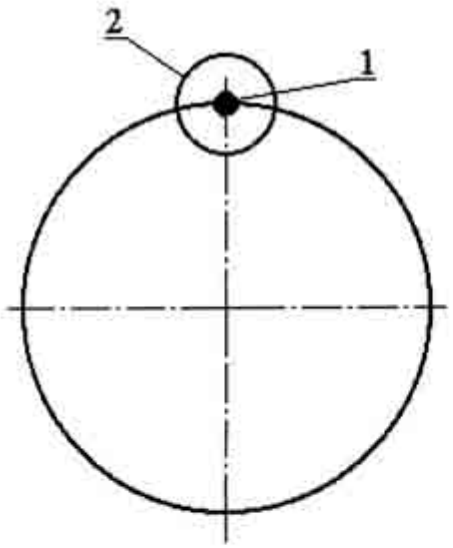
Case 2

After balancing a wheel, the following results were obtained :

- display [DL] (inside correction plane) - 6
- display [DR] (outside correction plane) - 7

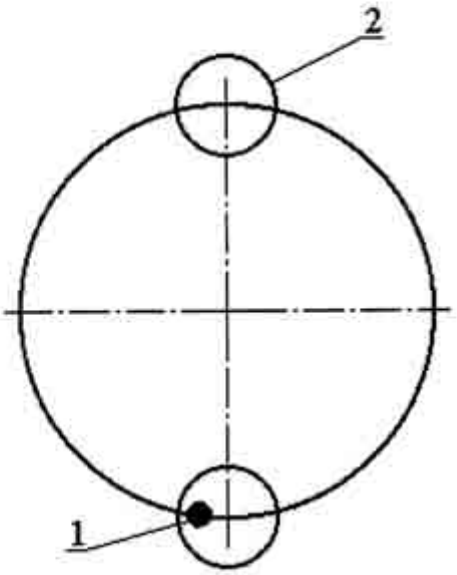
Further operations comprise positioning the wheel according to the new location of unbalance (fo r each correction plane). The balancing machine may emit the following announcements :

- **[INCREASE WEIGHT]** - if the new location of unbalance coincides with the old one or is close to it.



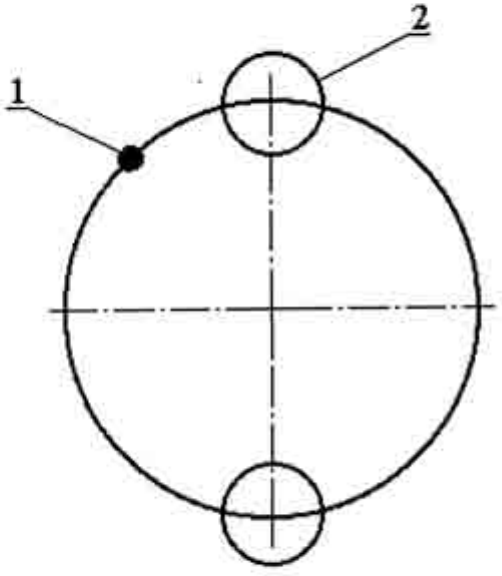
1 - weight 2 - new correction point

- **[REDUCE WEIGHT]** - if the new location of unbalance is directly opposite the weight, fixed previously or is close to this point.



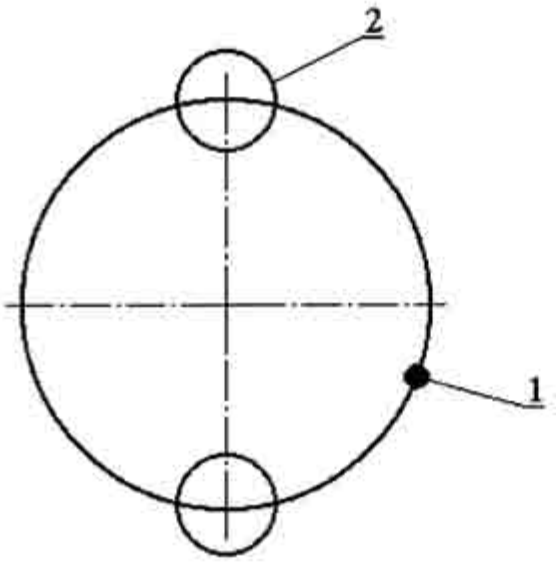
1 - weight 2 - new correction point

- **[SHIFT RIGHT]** - (i.e. clockwise) - if the weight, previously fixed, is to the left of the new correction point



1 -weight 2 - new correction point

- **[SHIFT LEFT]** - (i.e. anticlockwise) - if the weight, previously fixed, is to the right of the new correction point.



1 - weight 2 - new correction point

It is difficult to determine precisely by what distance a weight should be shifted in order to correct such residue unbalance. This depends on the size of weight fixed and also on the unbalance value to be corrected. In general terms, a larger weight requires less shift correction and also a small residue unbalance requires a small shift correction.

NOTE :

If zero (0) (no unbalance), is displayed on display [DL], there will be not location display on display [IL]. The same applies to displays [DR] and [IR] . It may happen that in subsequent measurement of wheel unbalance, at cut - off threshold set at e.g. 5g, the results will be as follows:

- first measurement : 0
- second measurement: 6 g
- third measurement: 0
- etc.

These results are not no errors. The unbalance value is for sure, close to the nominal value of 5g cut - off threshold set and therefore 0 or 6 appear alternatively. For 10g threshold the results may be 0 or 11.

8 . 5. BALANCING WHEELS WITH LIGHT ALLOY RIMS

These whels are balanced with stuck weights or a combination of weights, stuck and tapped.With push - button [Alu] set appropriate balancing programme, depending on the method of fixing weights (see item 7.5).

NOTE:
Measurement settings are entered in the same way for tapped weights. These are geometrical dimensions of wheel rim. Selection of appriopriate balancing method (e.g. both weights stuck) results in the balancing machine taking into account the location of fixing weights - on appropriate balancing places, different from those resulting from data entered.

8 . 6. CONVERSION UNBALANCE

Push - button marked [?] is used for unbalance conversion.
Example:

Data, inccorect for the wheel balanced, were entered in the machine memory. The measurement was carried out but the results were incorrect. If we want to know the true unbalance values for this wheel without another measurement, it is enough to enter with push - buttons [↔] [↕] [→|] and [Alu] correct data in the machine memory and depress push - button [?]. The balancing machine will anounce [UNBALANCE CONVERSION] and display correct unbalance values.

8 . 7. NEW MEASUREMENT

If after a recheck, we find that the wheel has been balanced with sufficient accuracy on one of the displays e.g. number 6 is displayed instead of a zero (at 5g cut - off threshold), then, before commencing a new measurement (for another wheel) the values of previous unbalance must be erased from the macine memory. Otherwise, the balancing machine will treat the new measurement as a subsequent recheck of the wheel previously balanced. To erase, use push - button [CLR]. After depressing the push - button, the balancing machine will announce [NEW MEASUREMENT]

9. OPTIMISATION

Optimisation should be performed as a preliminary operation, before balancing the wheel by means of weights. Before carrying out optimisation, enter wheel date in the machine memory according to item 8.2 of the balancing instructions.
Optimisation means such positioning of wheel rim and tyre, in relation to each other, that wheel rim unbalance and tyre unbalance cancel themselves out, which results in a smaller weight needed for wheel balancing.
Unbalances of tyre and of wheel rim are measured in a twin measuring cycle and the measurement result takes into account both balancing planes, at the same time.

9.1. Carrying Out Optimisation

In order to operate the optimisation system, depress push - button [OPTM] (see Fig. 1). OPT will appear on display [DL].
Mount wheel rim only in balancing machine central adapter so that valve hole is precisely aligned with markers on spindle and adapter (see section 4, operating instructions).
Start the machine with push - button [START]. FEL will appear on display [DL]. After stopping the balancing machine, remove wheel rim, install tyre and inflate.

Mount complete wheel in the balancing machine fixture in the same position as the wheel rim had been mounted, i.e. the valve should be positioned facing markers on spindle and fixture. Depress push - button [START]. OPO will appear on display [DL]. After the spindle has stopped, F__ will be displayed on display [DL] and, on display [DR] e.g. 020 will appear, where „F" means wheel rim, „0" means tyre and number 20, in this case, is the sum of unbalance for both wheel balancing planes. This means that, after optimisation, weights 20 g lighter (in total) may be used, than it would have been required if optimisation were not performed.
After opening the wheel cover, determine the locations of wheel rim and tyre unbalance, by rotating the wheel slowly be hand and watching displays [IL] and [IR] (see item 8.5). When display [IL] lights up green, make a chalk mark at the top of the wheel rim, in the vertical plane through balancing machine spindle centre line. When display [IR] lights up green, make a chalk mark at the top of the tyre, in the vertical plane through spindle centre line.

Now, remove the wheel from the balancing machine and move the tyre in the relation to the wheel rim so that chalk marks on tyre and wheel rim coincide. This is optimum relative position of wheel rim and tyre.

NOTE :

If, after completion of measuring cycle appears on display [DR] the positioning of tyre in relation to wheel rim is optimal.
In order to leave optimisation subprogramme, depress again push - button [OPTM]. Afterwards, balance wheels as described in section 8 of the operating instructions.

10. Programme "HIDE WEIGHT"

Programme "hide weight" is using when we want to in subroutines ALU (variant 6 and 7) corrective weight was invisible for external side of wheel. Programme allow to divide the [DR] unbalancing weight on two other which should to stick at the back of neighbouringst spokes of unbalancing point.

Way of realization of programme "hide weight"

1. To choose variant "6" or "7" of programme of balancing according to point 7.5 .
2. To start measure cycle of unbalancing.
3. After stop of wheel to correct results of unbalancing according [DL] to point 7.4 or 7.5 .
4. The unbalancing shown on the right indicator [DR] to correct two weights according to below procedures:

4.1 To establish a position of wheel so, that place of unbalancing will be at the top [DR] of wheel. The unbalancing point will enclose the sound signal as well as will change the colour of arrow [IR] - on green.

4.2 To press button [3P] . The indicator will display [DL] inscription "3P". The LED indicator will display [DR] inscription P-1.

4.3. To turn wheel unclockwise from position definited in pkt 4.1 to moment, when the nearest spoke will reach a vertical position. The operator will accept this position by pressing the button [+] . Machine will remember this position of wheel as place of sticking of first corrective weight . The indicator will display [DR] inscription P-2.

4.4 To turn wheel clockwise from position definited in pkt 4.3 to moment, when the second spoke will reach vertical position. The operator will accept this position by pressing the button [+] again.

4.5 . Indicators should display [DR] new values of weights which will stick in places earlier defined in points 4.3 and 4.4 . The moment of obtainment of suitable position of wheel will be signal of sound and change of colour of values of needed [DR] corrective weights and colour of arrow [IR] - on green.

4.6. To stick corrective weights and to go out from programme "Hide weight" by the pressing button [STOP] . To start measure cycle and to check a correct balancing of wheel.

11 . CALIBRATION

The balancing machine has a self - calibration system, allowing the user to tune the machine himself. Calibration is to be performed if incorrect indications are suspected (due to ageing of electronic components, temperature effects, shocks in transport etc.).

Calibration should be performed as follows:

1. Select test a car wheel of know parameters and, if possible, of small unbalance, and mount it in the balancing machine adapter. Enter diameter and width data in machine memory, using appropriate push - buttons on balancing machine keyboard.
Enter distance by means of edge finder, pushing it against wheel rim edge. Set cut - off threshold to minimum value, i.e. 2 g.
Remember that parameters of width, diameter , distance and balancing programme must conform with parameters of wheel used for test.

2. Tab a weight of 80 g anywhere on the outer edge of wheel rim.

3. Depress and hold for abt. 5 seconds push - button CAL. The balancing machine will announce [CALIBRATION] and then [ATTENTION START].
After hearing this announcement release push - button CAL. The balancing machine drive will be switched on. The measuring cycle ends with automatic braking of the balancing machine spindle and display of numbers 0 and 79 or 0 and 80.

NOTE:
Apperance of different values means an error in calibration. The cause may be e.g. substantial unbalance of the wheel used for testing. In such case you have to shift a weight of 80g by 180 (tab it as opposite in relation to its former position - of course, on the outer edge of wheel rim) and repeat the process of calibration.

4. Remove the weight of 80 g used for calibration and press START push - button to switch on the balancing machine drive in order to check the extent of unbalance of the tested wheel..
Appearance of zero of the display, for inside and outside balancing planes means that the wheel used for calibration was balanced and the entire calibration process should be considered completed.

5. If reaching according to item 4 proves an unbalanced condition, balance the wheel so that 0 g is displayed for both balancing planes and then repeat the balancing process according to items 2 and 3 and check wheel balance according to item 4.
Calibration is correct if the following indications are displayed:
- 0 and 79 or 0 and 80 after test according to items 2 and 3
- 0 and 0 after checking test wheel balance according to item 4.

NOTE:
A precondition for correct calibration and correct indications of the balancing machine is its installation in a dry and dust - free room. Like any measuring equipment built with the use of processor systems, it has poor moisture resistance. Moisture in the equipment will not result in lasting damage, but will cause merely indication errors. Therefore, in the case of abnormal measurement results, such as high, three - figure unbalance values of a car whell or substantial indication differences in subsequent measurements of the same wheel it is absolutely necessary to dry the main electronic board of the balancing machine. Removal of the cover and drying the main board with e.g. a hair dryer does not make the warranty invalid.
Moisture most frequently appears during changing weather conditions (attum / winter and winter / spring seasons) therefore special care should be taken to ensure proper operating conditions for the balancing machine

12 . NOTES ON OPERATION

Weight should be finally hammered to the wheel rim edge after the whell has been balanced and removed from balancing machine fixture.
In the case of major unbalance in one plane - e.g. 90g and a minor one in another plane - e.g. 10g, we recommended to fix a 90g weight only and to repeat the measurement as it may happen that after balancing the „worse" plane the unbalance value of the other plane will drop below 10g value, measured previously.
If the unbalance is more than 100g fix a large weight (e.g. 80g, 90g, 100g) and shift it several centimetres from the point indicated by the balancing machine. Then repeat measurement and fixc additional small weights of masses indicated by the balancing machine.Then repeat measurement and fix additional small weights of masses indicated by the balancing machine.

Balancing machine spindle end and adapter should be preserved with machinery oil or other mineral oil.

In transport never grip the balancing machine by the spindle.

13. WARRANTY

All repairs (if any) and adjustments are performed by the manufacturer. Repairs carried out by the buyer will entail loos of warranty.

TABLE OF CONTENTS

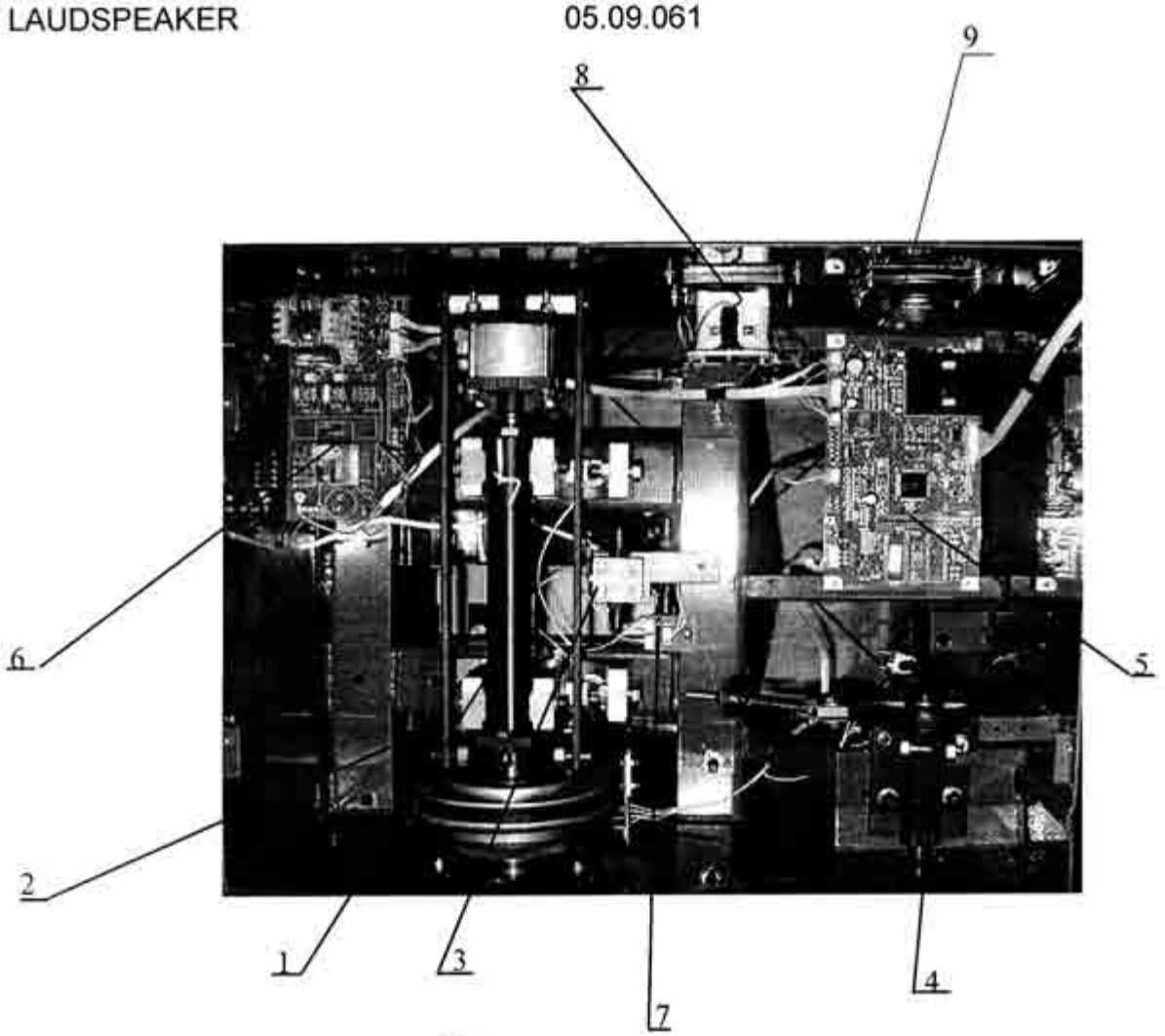
SPARE PARTS CATALOGUE

ATTENTION

The replacement of parts or any repairs of the balancing machine require observation of all PRECAUTIONS given in chapter 7 „MAINTENANCE" and in chapter 3 „SAFETY".
One should make full use of all resources in order to:
AVOID ACCIDENTS RESULTING FROM THE BALANCING MACHINE START:
-the master switch should be interlocked in position „0"
-during the execution of all maintenance works, the interlock button should be in possession of the maintenance technician.

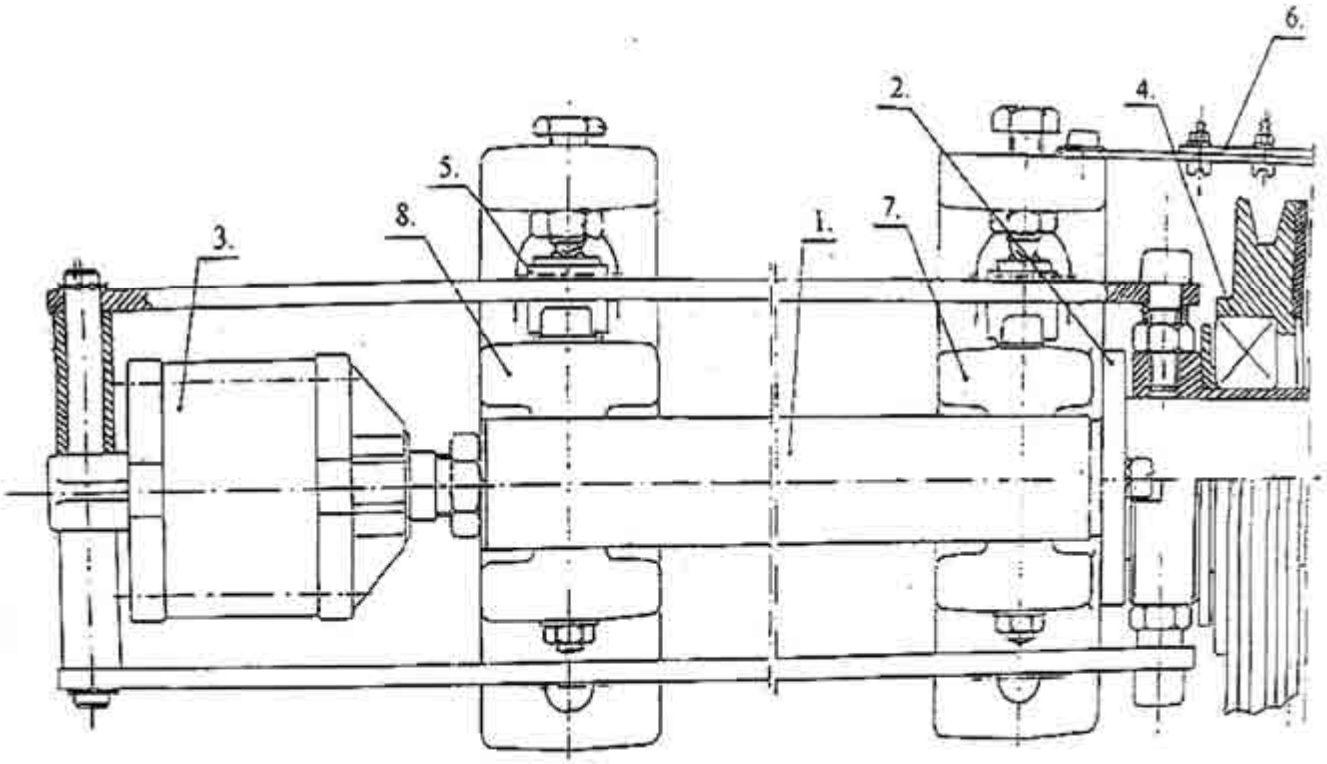
Procedure of ordering spare parts
When ordering spare parts one should exactly specify:
-serial number and production year of the balancing machine,
-needed quantity.
The order has to be transferred directly to the producer.

1. SHAFT UNIT	02.00.00
2. ENGINE UNIT	03.00.00.
3. COMPRESSED AIR UNIT	05.00.00.
4. HOOD UNIT	06.00.00.
5. MAIN BOARD	P-PG-2112
6. POWER BOARD	P-S1F2pn
7.SENSOR BOARD	P-CzOSO
8. MAIN SWICH	05.05.005
9. LAUDSPEAKER	05.09.061



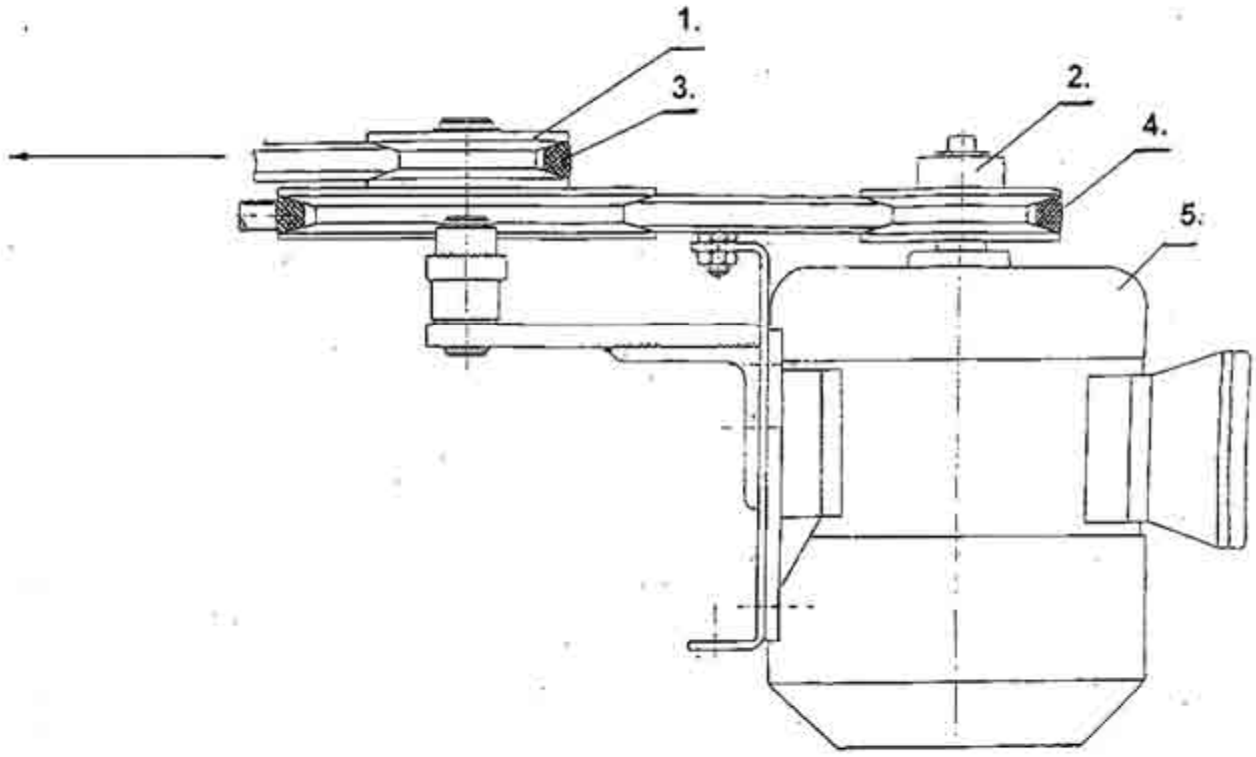
SHAFT UNIT 02.00.00

1. BALANCER SHAFT	02.01.00
2. BRACKET HANGING OF CLUTCH	02.02.00
3. CYLINDER OF FRICTION CLUTCH	02.03.00
4. SLIDING COLLAR OF CLUTCH	02.04.00
5. PIEZO SENSOR	02.05.00
6. TACHOMETER BOARD	02.06.00
7. FRONTAL BRACKET	02.00.01
8. REAR BRACKET	02.00.02

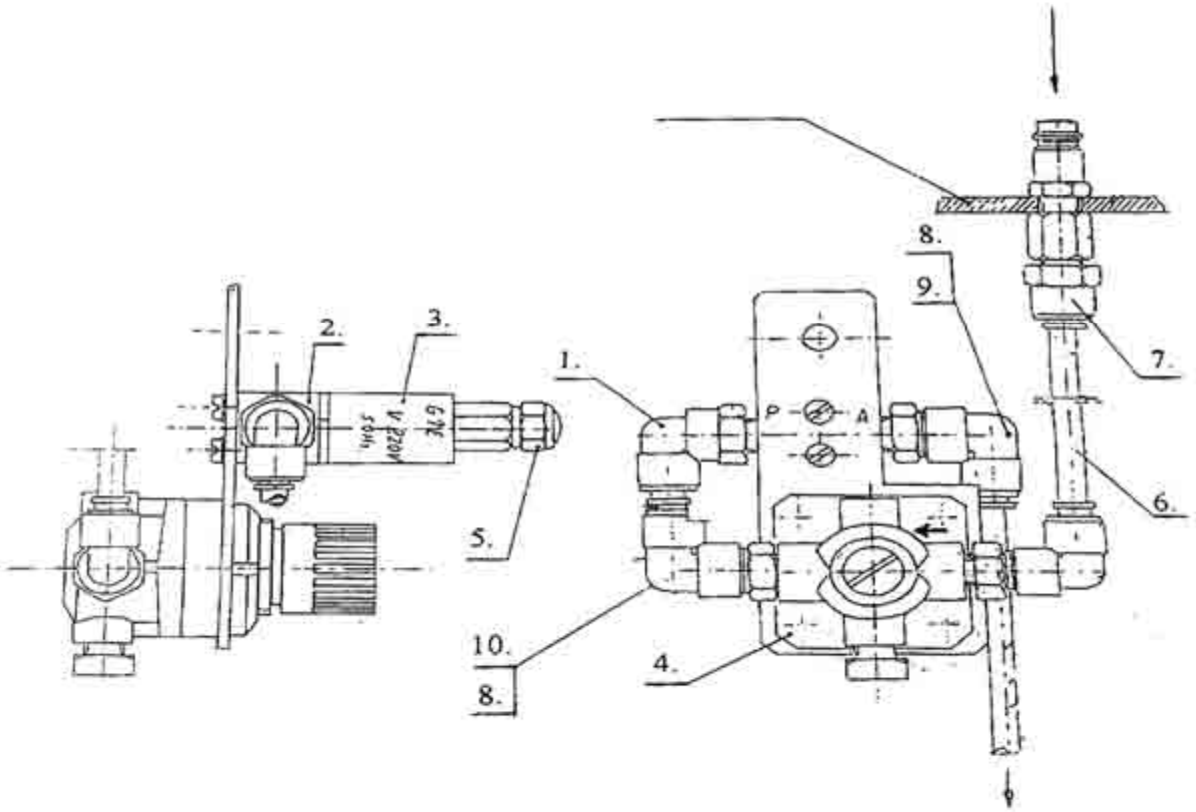


ENGINE UNIT 03.00.00

1. INTERMEDIATE BELT PULLEY	03.00.01
2. SUPPORT BELT PULLEY	06.04.026
3. WEDGE BELT 13x1000	05.08.301
4. WEDGE BELT 13x670	05.08.305
5. ELECTRIC MOTOR TYPE SEMH 71	05.06.002

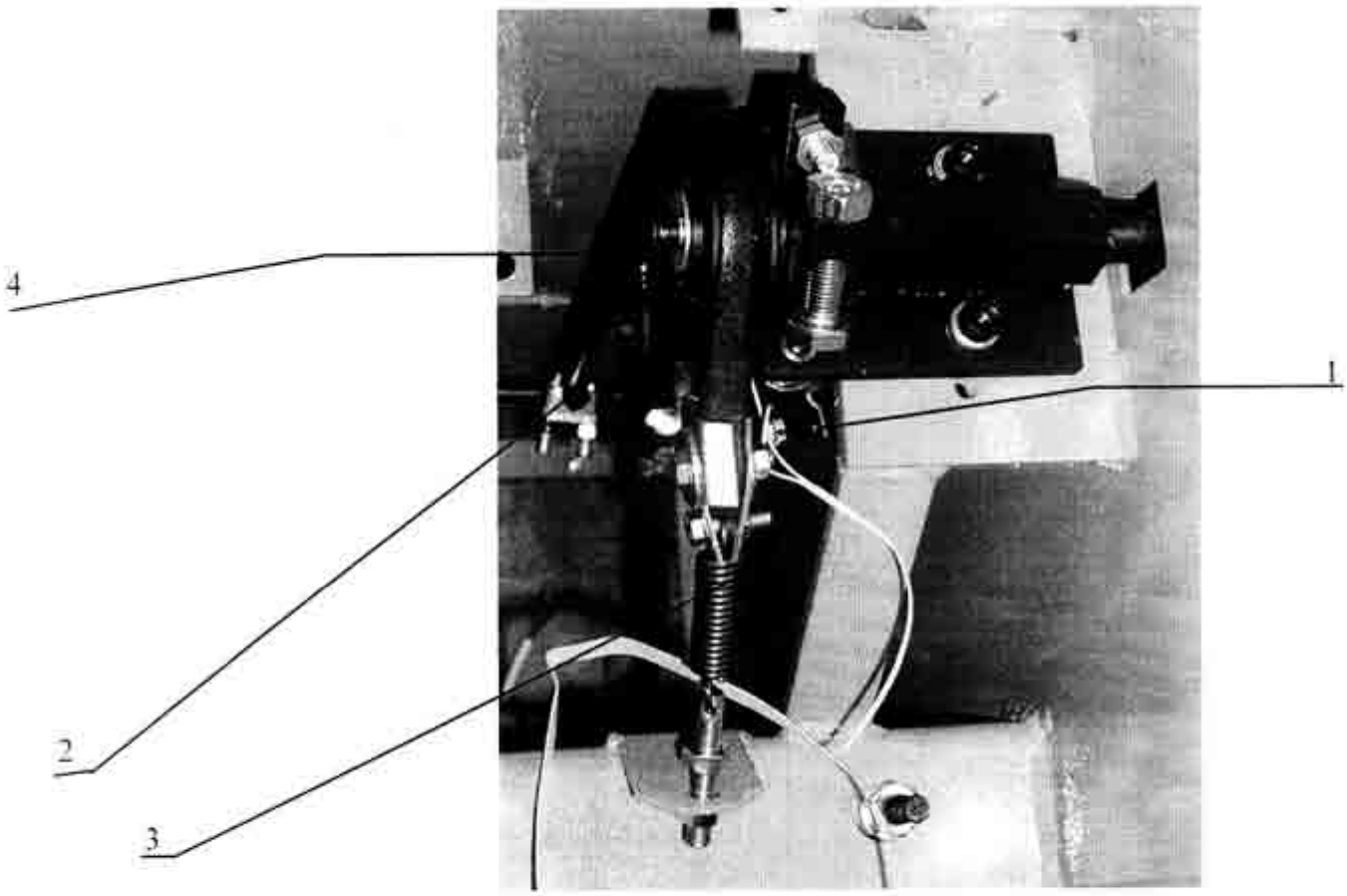


COMPRESSED AIR UNIT	05.00.00
1. ANGLE CONNECTION	05.01.00
2. SELENOID VALVE A 331	07.01.017
3. COIL OF SELENOID VALVE G7E	07.01.018
4. PRESSURE REGULATOR M004-R00	07.06.025
5. SILENCER 2901-1/8	07.06.501
6. PIPE 6 X4	07.05.003
7. CONNECTION ϕ6 X 1/8	07.06.502
8. ANGL;E COLLECTION ϕ6	07.06.406
9. CONNECTION ϕ6 X 1/8	07.06.601
10. CONNECTION ϕ6 X 1/4	07.06.602



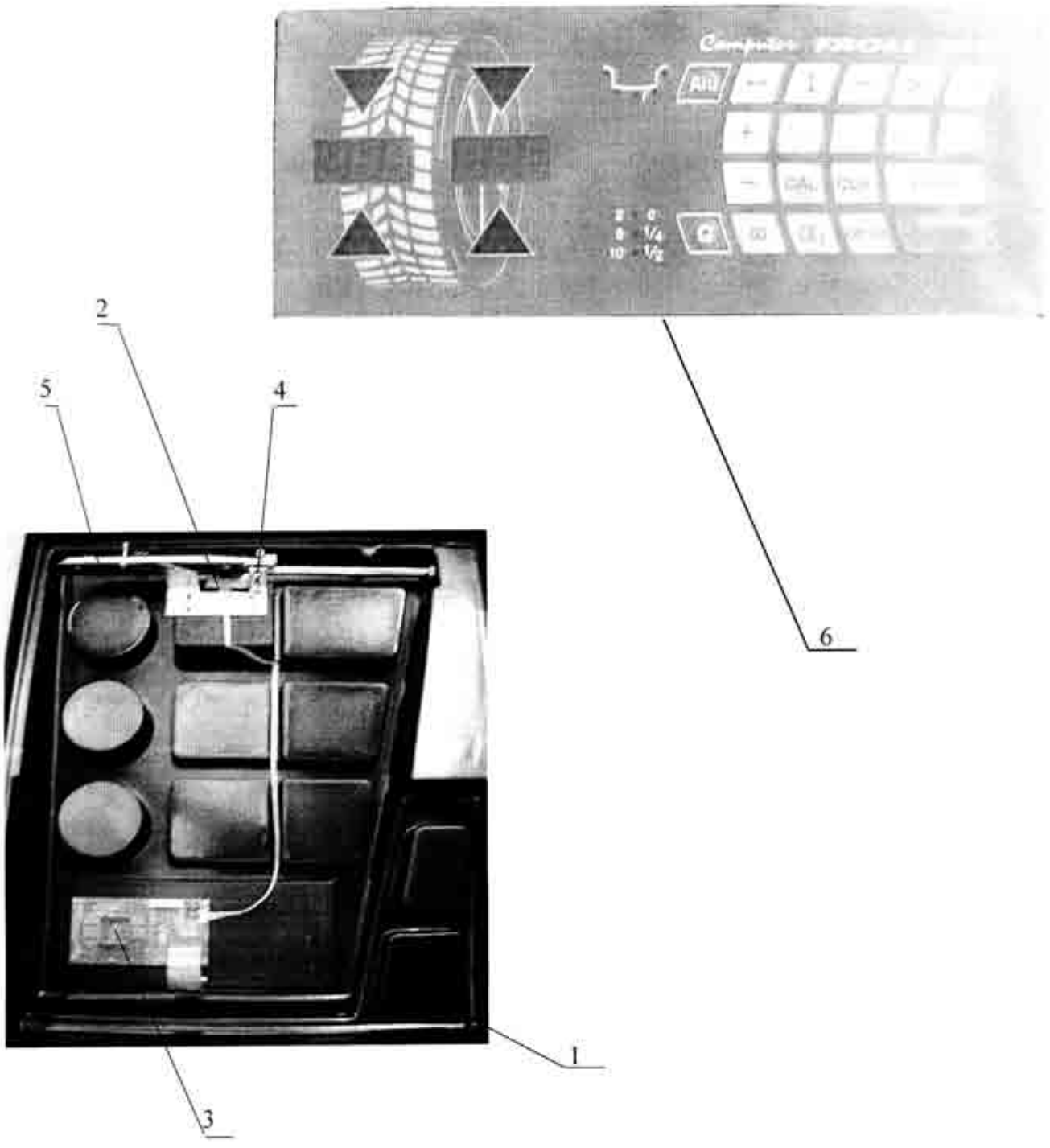
HOOD UNIT	06.00.00

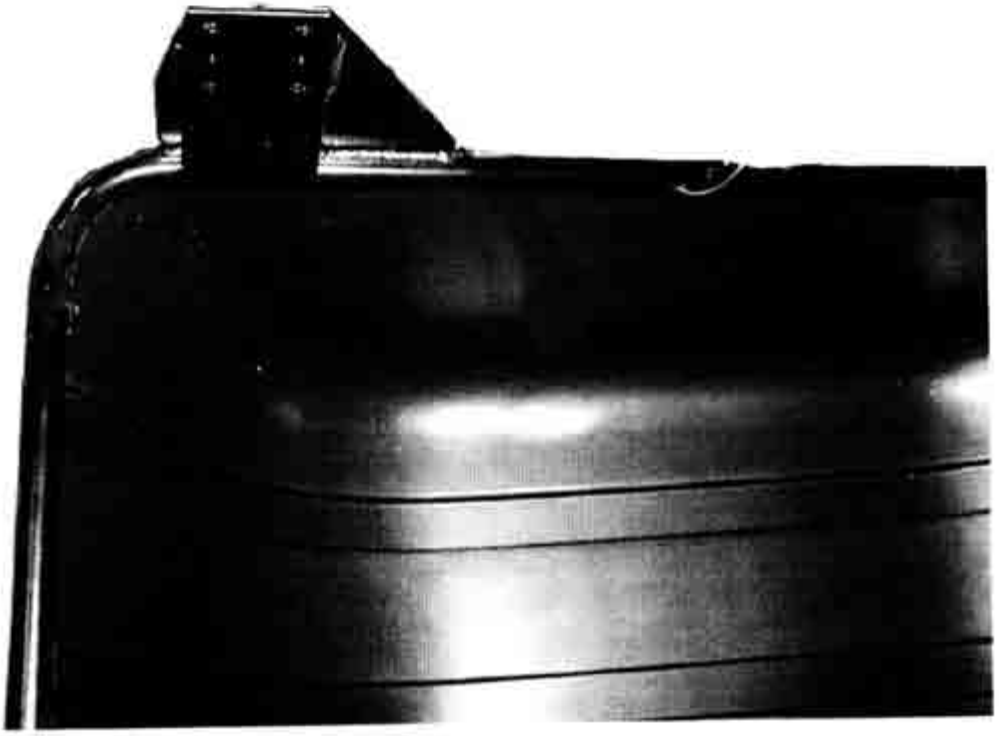
1.SWICH	05.09.121
2. BELT PULLEY	06.04.026
3. SPRING S-733	06.01.004
4. WEDGE BELT	05.08.305



TOP COVER UNIT 04.00.00

1. PLASTIC TOP COVER	04.00.03-2112
2.DISTANCE OPTOCOUPLERS BOARD	P-TRN
3.KEYBOARD BOARD	P-WS 112
4. PLASTIC BRACKET	06.01.123
5. TOOTHED BAR	06.01.124
6.KEYBOARD	06.02.026





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WHEEL BALANCING MACHINES TYRE CHANGERS EQUIPMENTS FOR TYRESHOPS

Statistic number : 008132994 **Tax number** : 527 - 020 - 52 - 46

CE Conformity Declaration

in accordance with directives : 98/37/CE and 89/336/CEE

We : **Uni-trol Co. Ltd.**
Ul. Estrady 56
01-932 Warsaw
Poland

declare, under our exclusive responsability, that the product

Wheel balancing machine **TROLL 2112**

to which this declaration refers, is in conformity with the following provisions of law :

- **directive 98/37/CE (the safety of machinery);**
- **directive 89/336/CEE and following modifications (the electromagnetic compatibility).**

For verification of conformity with the provisions of law were consulted the harmonized standards or other norms documents :

- PN - EN 292 – 1 / 2000	Basic concepts, general principles for design – Part 1;
- PN - EN 292 – 2 / 2000	Basic concepts, general principles for design – Part 2;
- PN - EN 50081 – 1 / 1996	Generic emission standard, residential, commercial and light industry;
- PN - EN 50081 – 2 / 1996	Generic emission standard, industrial environment;
- PN - EN 50082 – 1 / 1999	Generic immunity standard, residential, commercial and light industry;
- PN - EN 50082 – 2 / 1997	Generic immunity standard, industrial environment;
- PN - EN 294 / 1994	Safety distances to prevent danger zones being reached by the upper limbs;
- PN - EN 349 / 1999	Minimum gaps to avoid crushing of parts of the human body;
- PN - EN 60204 – 1 / 2001	Safety of machinery – Electrical equipments of machines – Part 1;
- PN - EN 61204 / 2001	Low voltage power supply devices dc output – Performance characteristics and safety requirements;
- PN - EN 61293 / 2000	Marking electrical equipments with ratings to electrical supply - Safety requirements;
- 62 / 2002	Electrical accesories;
- PN - EN 983 / 1999	Safety of machinery – Safety requirements for fluid power systems and their components - Pneumatics

This declaration is valid for all products which are produced in accordance with the technical documentation which is part of this declaration.

Wiesław Roguski
Chairman of Board

Warsaw, 10.01.2003

Signature

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