CE

Wheel balancing machine

Model TROLL 2151
Model TROLL 2156

OPERATING INSTRUCTION

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Wheel balancing machine

Model TROLL 2151
Model TROLL 2156

Serial number

Year

MANUFACTURER

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AUTORIZED SERVICE

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PACKING, TRANSPORTATION AND STORAGE

ATTENTION
All operations concerning packing, lifting, moving, transporting and unpacking must be carried out by qualified personnel only.

Packing

The balancing machine is sent as a complete piece of equipment (quick-change holder, protective screen, balancing machine).
The balancing machine can be packed in a few different ways:

- pallet + stretchy foil + carton box
- pallet + stretchy foil
- pallet + carton box

Transportation 

The package can be lifted or displaced by means of fork-lift or pallet trucks. Once the cargo arrives at its destination, it is recommended to check if its contents have not been damaged during transportation. Is also recommended to check the conformity of the delivery with its bill of lading. In case of non-conformity or transportation damages it is necessary to inform, without delay, the responsible person or carrier about it.
Moreover, the loading should be done with extreme precautions and consideration.

Storage

The equipment should be stored in a dry and dust-free room.

INTRODUCTION

WARNING

This manual is intended for manufacture personnel licensed to service the balancing machine (operator) and those who carry out current maintenance; Before starting any operations concerning the balancing machine or the package, you should read carefully the manual.

This manual contains important information concerning:

PERSONAL SECURITY of the operators and maintenance personnel, BALANCING MACHINE OPERATION.

Manual

This manual is an integral part of the balancing machine and should always accompany the machine even if it is going to be sold.

The manual must be kept in the neighbourhood of the machine in a place of easy access.

Servicing and maintenance personnel must be able to consult the manual rapidly at any moment.

ATTENTION:

IT IS STRONGLY ADVISED TO READ CAREFULLY AND REPEATEDLY CHAPTER THREE IN WHICH VERY IMPORTANT INFORMATION AND WARNINGS CONCERNING SAFETY IS CONTAINED.

Directive 98/37/CE
Directive 89/336/CEE
PN-EN 292-1/2000, PN-EN 292-2/2000, PN-EN 50081-1/1996, PN-EN 50081-2/1996
PN-EN 50082-1/1999, PN-EN 50082-2/1997, PN-EN 294/1994, PN-EN 349/1999
PN-EN 60204-1/2001, PN-EN 61204/2001, PN-EN 61293/2000, 62/2002
PN-EN 983/1999

ATTENTION:

Lifting, transportation, unpacking, assembly, installation, putting in motion, preliminary adjustment and testing, maintenance repairs, technical inspections, transportation do not require the presence of the service personnel but must be carried out with extreme precaution.

The producer does not bear any responsibility for personnel injuries or vehicle and other objects damages if any of the above mentioned operations have been performed not according to the service manual or the balancing machine was used in an improper way.

In the manual only the aspects of the servicing and security which can help operators and servicing personnel in a better understanding of the construction and working of the balancing machine and to allow them to use it the best way possible were enumerated.

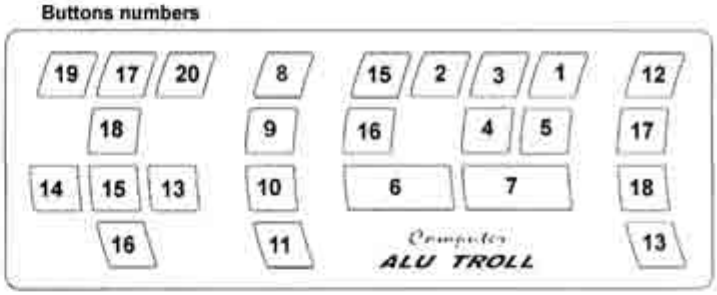
To understand the vocabulary used in the manual, operators must possess specific experience in servicing, maintenance, repairs, workshop works and ability to correctly decode all drawings and descriptions contained in the manual. Operators must also know general and detailed safety requirements obligatory in the installation country.
The word "operator" used in this manual should be understood in the following manner:
OPERATOR: a person licensed to service a balancing machine.

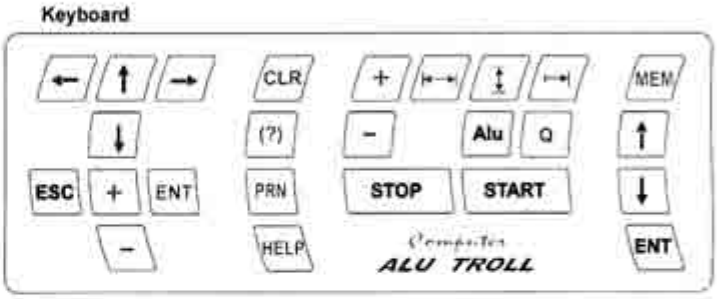
CHAPTER 1 BALANCING MACHINE DESCRIPTION

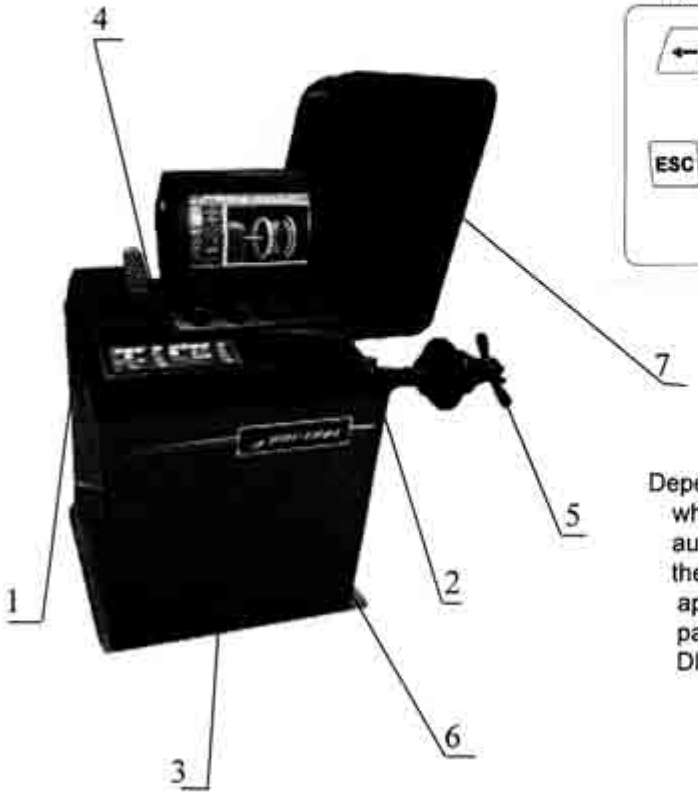
The balancing machine TROLL 2151 and TROLL 2156 are intended for the dynamic balancing of wheels of motor-cars and delivery trucks, in one measurement cycle.
The balancing machine has a speech synthesizer generating voice messages confirming every operation on the balancing machine and suggesting wheel balancing procedures. It has also automatic brake which blocks the wheel at the imbalance spot for every correction plane. The brake will be released after turning the wheel by a minimum 3 degrees of angular measure from the indicated imbalance spot or each time we press the keyboard button causing arrows to disappear.
The balancing machine TROLL 2151 is not equipped with an ultrasonic automatic measurement system for the measurement of geometric parameters of the balanced wheel. All descriptions concerning this system contained in the manual have no application for this balancing machine model.
The balancing machine TROLL 2156 is equipped with an automatic measurement system for the measurement of geometric parameters of the balanced wheel. The wheel parameters are measured during the protective screen closing which is followed by the automatic start of the measurement cycle. Because of an atypical wheel rim profile (in particular for diameters over 15"), the correctness of the automatic reading should be checked and eventually the wheel rim parameters should be entered manually.

1. power switch
2. adjuster
3. rubber washers
4. keyboard
5. quick-release holder
6. housing
7. protective screen

Drawing 1







Depending on the shape and construction of the wheel rim, the differences between the results of an automatic USG measurement and the description of the wheel rim can elevate to:
approximately 0.5 inches in case of WIDTH parameter.approximately 1 inch in case of DIAMETER parameter

Drawing 2

Keyboard and equipment description (drawing 1 and 2)

Attention: In brackets were given voice messages generated by the balancing machine after pressing the indicated button.

1 - button for adjustment of the distance from the internal correction plane of the balanced wheel [DISTANCE]
2 - button for adjustment of the width of the balanced wheel [WIDTH]
3 - button for adjustment of the diameter of the balanced wheel [DIAMETER]
4 - button for choosing the program concerning fixing of balancing slugs [WHEEL RIM TYPE CHANGE]
5 - button for choosing the cut-off threshold [THRESHOLD CHANGE]
6 - button for switching the balancing machine power off [STOP]
7 - button for switching the balancing machine power on [ATTENTION START]
8 - button for clearing previous measurement results [NEW MEASUREMENT]
9 - button for calling of actual imbalance values [RECALCULATION OF IMBALANCES]
10- button for starting the printer (not activated in TROLL 2151-2156)
11- auxiliary button
12- button for calling the balancing machine memory [MEMORY READ-OUT]
13- button for entering subroutines – choice confirmation
14- button for quitting subroutines - quit
15- button for entering parameter changes – increasing values
16- button for entering parameter changes – decreasing values
17- button for moving the cursor upwards
18- button for moving the cursor downwards
19- button for moving the cursor to the left
20- button for moving the cursor to the right

Full specification of voice messages generated by the balancing machine:

- SYSTEM TEST
- SYTEM IN ORDER
- ATTENTION START
- THERSHOLD CHANGE
- WHEEL RIM TYPE CHANGE
- CALIBRATION
- INCORRECT CALIBRATION
- WHEEL BALANCED
- WHEEL NOT BALANCED
- MEMORY READ-OUT
- NEW MEASUREMENT
- IMBALANCE RECALCULATION
- CLOSE PROTECTIVE SCREEN
- ACCELERATING ERROR
- BRAKING ERROR
- WIDTH
- DISTANCE
- DIAMETER
- INCREASE SLUG
- DECREASE SLUG
- SHIFT TO THE RIGHT
- SHIFT TO THE LEFT

WARNING 

The balancing machine was designed and produced for the dynamic balancing of wheels of motor-cars and delivery trucks.
All other applications are not allowed. Wheels should not be washed when placed on the balancing machine.

CHAPTER 2 TECHNICAL SPECIFICATION

Technical data

- max. diameter of a balanced wheel	0.9 m
- wheel rim diameter	10" - 24"
- wheel rim width	2" - 10"
- tolerance of imbalance value indication	1g
- tolerance of imbalance position signalling	3 s
- balancing machine weight	around 100 kg
- overall dimensions: with closed protective screen	1140x900x1150 mm
with open protective screen	1140x1050x1450 mm
- weight of balanced wheel	up to 60 kg
- power of driving engine	0.25 kW
- rotational speed of the spindle (during measurement)	175 rotations/minute
- power supply	230 V / 50 Hz
- pneumatic supply	0.6 – 1.0 MPa

CHAPTER 3 SAFETY

WARNING

This chapter should be read carefully because it contains important information concerning hazards for operators and other persons who use the balancing machine in an inappropriate way.

Below there are explanations concerning hazards and dangers which can occur during the balancing machine operation and maintenance. General and detailed precautions serve to avoid potential hazards.

WARNING

The balancing machine TROLL 3100/3105 was designed for the balancing of motor-car wheels and delivery truck wheels in one measurement cycle. Any work with the balancing machine should be preceded by comprehensively reading and understanding this manual.
All other balancing machine applications are not allowed. In particular the balancing machine is not intended for:
- balancing other elements
- operation other than wheel balancing
- lorry wheel balancing

ATTENTION

The producer does not bear any responsibility for personnel injuries or vehicle and other objects damaged in case of improper or unauthorized use of the balancing machine.

ATTENTION

Anyoperation of the balancing machine is not allowed withoud priorclosing of the whell protective screen. Not satisfying the above-MENTIONED RECOMMENDATIONS CAN PROVOKE SERIOUS HUMAN INJURIES AND IRREPAIRABLE BALANCING MACHINE DAMAGES AND ALSO WHEEL DAMAGES.

General precautions

It is required that the operator and the maintenance technician observe safety rules obligatory in the country of installation.
Besides, the operator and the maintenance technician must observe the following principles:
- to work always in stations defined and described in this manual
- to read inscriptions concerning safety which are placed on the balancing machine and those contained in this manual.

Inscriptions concerning safety are shown in this manual:

Danger– indicates a hazard in being in the proximity of which can provoke serious injuries

Warning– indicates dangerous situations and/or manipulations which can provoke significant or minor injuries.

Caution– indicates dangerous situations or/and manipulations which can provoke minor human injuries or/and damages to the balancing machine, wheel or other objects.

Risk of electric shock– specific inscription located in those places of the balancing machine where the risk of electric shock is particularly high.

Hazards for personnel
In this paragraph potential hazards for the operator are described or other persons finding themselves in the proximity of the balancing machine and who use it in an inappropriate way.

It should always be remembered that any operation on the balancing machine must be preceded by closing of the protective screen (for balancing machines rotating over 120 rotations/minute).

Impact risks
There exists a risk of hitting against some parts of the balancing machine.
With the protective screen open personnel must observe all precautions to avoid hitting against machine parts.

Risk of wheel easing
Before the balancing machine start, it should be checked if the wheel is properly fixed in its holder.

ATTENTION 

IT IS FORBIDDEN TO EVER UNSCREW THE WHEEL DURING MACHINE WORK.

IT IS FORBIDDEN TO EVER LEAVE THE MACHINE WORKING WITHOUT SUPERVISION

Risk of skid 
This hazard can be caused by floor contamination with grease in the proximity of the balancing machine.

THE AREA UNDER THE BALANCING MACHINE AND ITS NEAREST SURROUNDINGS AS WELL AS HOLDERS SHOULD BE KEPT CLEAN.
All oil stains should be removed immediately.

Risk of electric shock
Hazard of electric shock can occur in those balancing machine areas where electric cables are laid.

Use of water sprayers, vapour sprayers (high pressure washing units), dissolvers and paints is not allowed in the neighbourhood of the balancing machine and in particular they should not be in contact with the control desk.

Hazard caused by poor illumination
The operator and the maintenance technician must have the possibility to check if all areas of the balancing machine are properly and uniformly illuminated according to the regulations obligatory in the installation place.

Risk of balancing machine defect during work
To produce a reliable and safe balancing machine, the manufacturer applied suitable materials and manufacturing techniques that are necessary for this type of equipment. Nevertheless the balancing machine should be operated according to the producer's recommendations. Technical inspections (after guarantee period) and other maintenance works described in chapter 7 "MAINTENANCE" should be carried out with specified periodicity.

Wheel weight must never exceed 60 kg.

IMPORTANT 

All operation of the balancing machine contrary to its function causes the danger of seriousdamagesor accidents.That is why it is so crucial to scrupulously observe all recommendations contained in this manual concerning operation, maintenance and safety.

CHAPTER 4 INSTALLATION

WARNING 

These operations can be executed by persons who were earlier trained in servicing the equipment described in this manual. To avoid possible balancing machine damages or danger of causing human injuries it is necessary to observe below the mentioned instructions. Make sure that nobody is within the working area of the machine.

Installation requirements

The balancing machine has to be installed at safe distance from walls, columns and other equipment.

The room must be equipped with an electric current source and a compressed air installation. The balancing machine can be positioned on any foundation, provided it is perfectly horizontal.

All parts must be uniformly illuminated with light, of which the intensity assures safe completion of all regulation and maintenance works specified in this manual. The presence of shady places, light reflections or dazzling light is unacceptable and all situations which could lead to eye fatigue.

Illumination must be installed according to the regulations obligatory at the installation place (it is the responsibility of the light installation contractor).

Before starting the installation it is recommended to unpack all parts and check if they are not damaged.

All matters concerning displacing and lifting were discussed in chapter "Packing, transport, storage"

Installation place

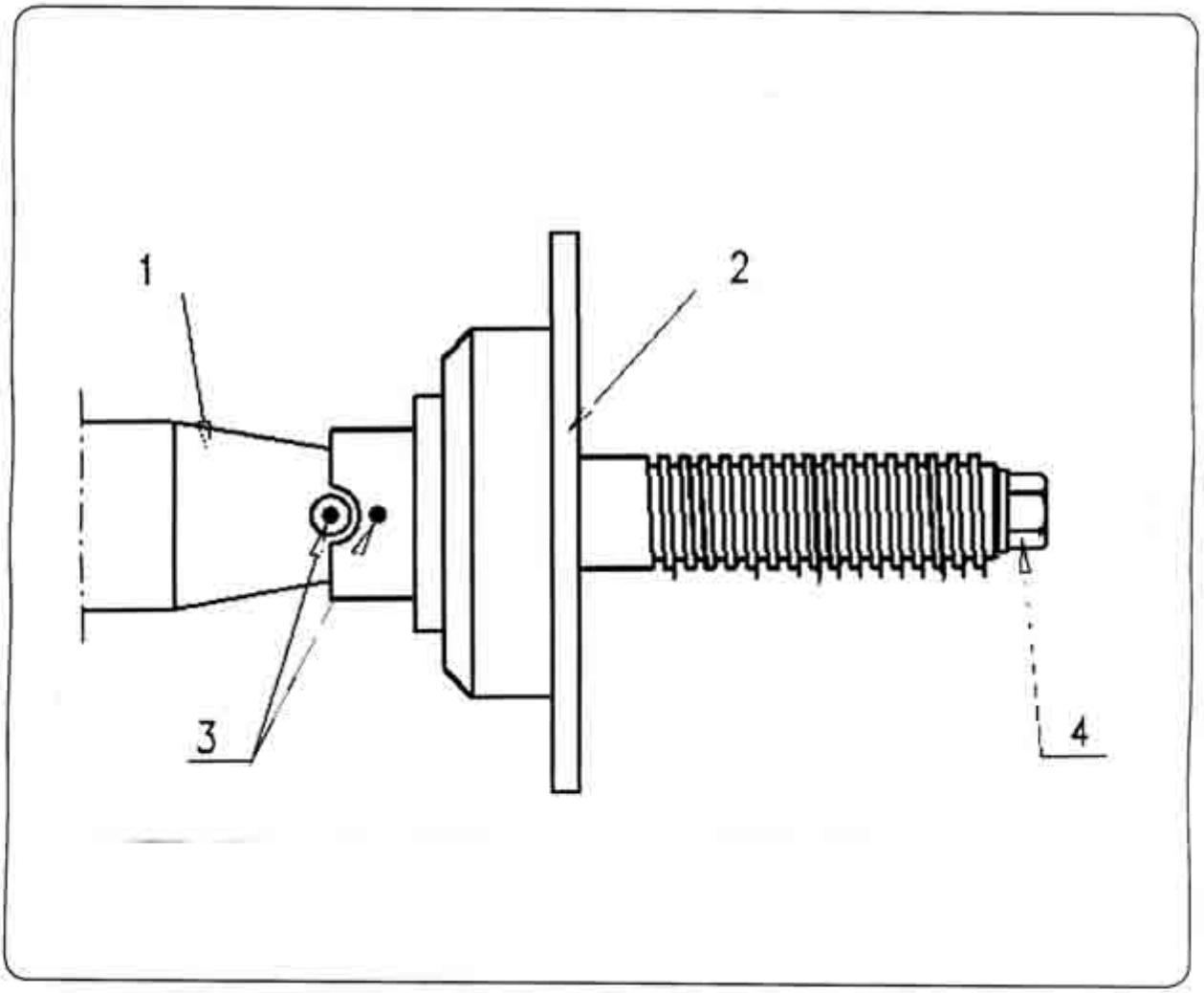
The balancing machine TROLL-2151/2156 should be installed indoors in a dry and heated room during the autumn and winter period. The machine foundation should be hard and levelled. The balancing machine should be seated on three rubber cushions delivered with the machine. Rubber cushions should be put under three flat feet welded to the base.

Holder mounting

Before mounting the holder it is recommended to clean carefully the cone surfaces of spindle "1" and holder "2" with a cloth. Place the holder on the spindle in a way to conserve the position of the markers "3" on spindle pin and the holder, as shown on the drawing 3. Tighten up the holder to the spindle with screw "4".

ATTENTION

Scrupulous cleaning of cone surfaces and the conservation of the holder position in relation to the spindle (markers coincide) is one of the conditions for the correct wheel balancing.



Holder mounting on the balancing machine

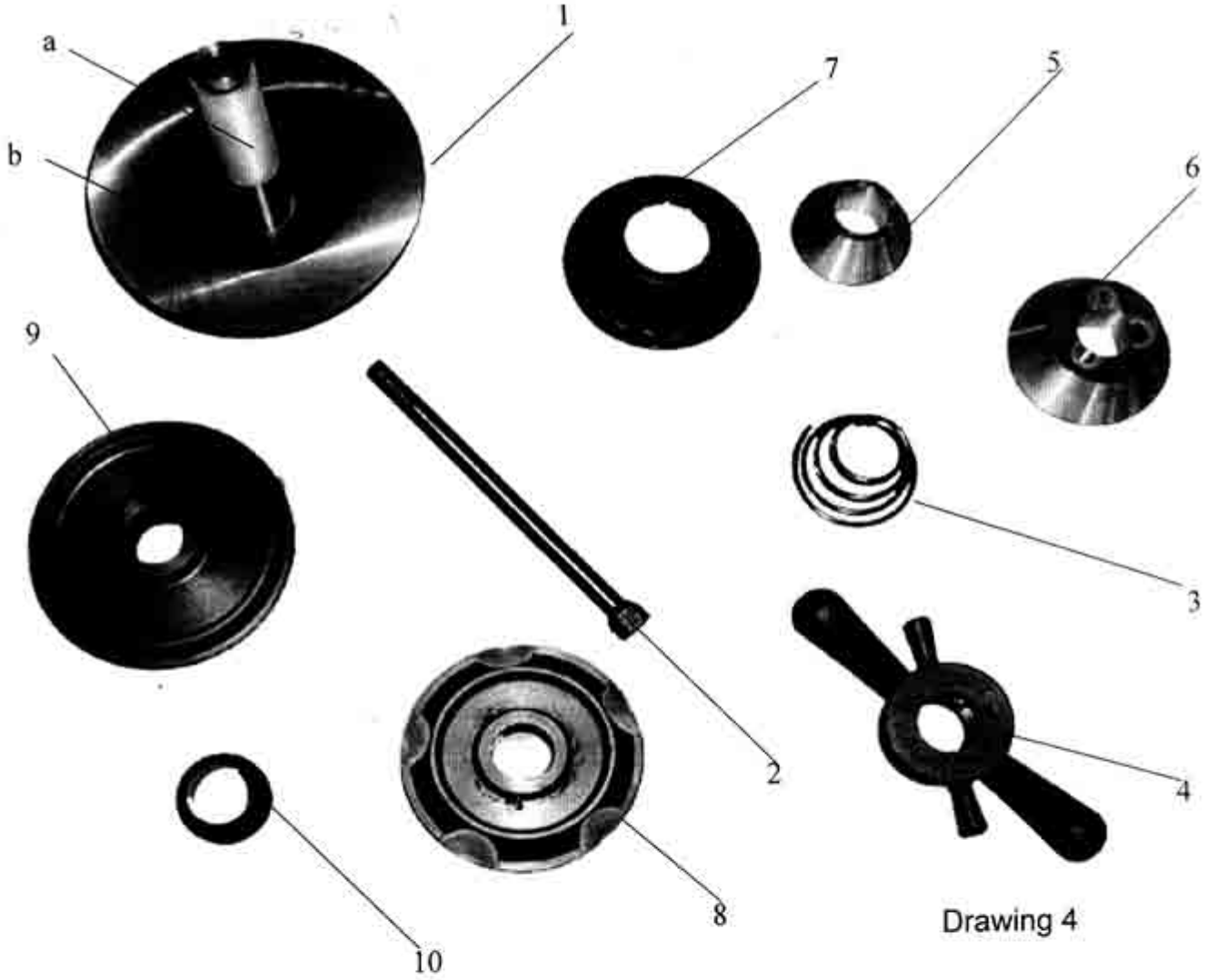
Wheels having a central hole in their rims are fixed in the central holder delivered with the balancing machine. The holder should be mounted on the spindle in a way described within this point.

A t t e n t i o n : It is recommended to wash the wheel before fastening it to the balancing machine so that mud pellets attached to the wheel rim do not upset measurements.

Holder

A quick-change holder is used for fastening wheels of motor-cars and delivery trucks having wheel rims with central holes.

Holder component parts

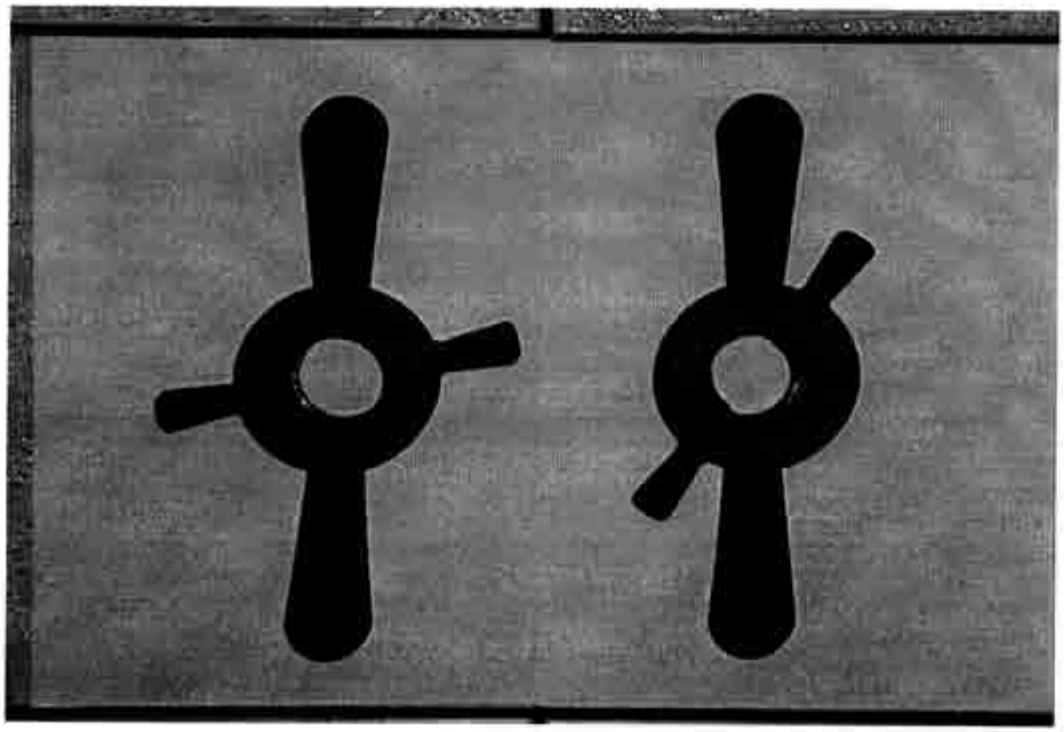


Drawing 4

1 – holder (a – root, b – flange)
2 – screw for fastening the holder to the balancing machine
3 – spring
4 – clamp nut
5 – centring cone number 1
6 – centring cone number 2
7 – nut clamp
8 – centring disk number 1 (with double cone)** 120 – 140 mm
9 – centring disk number 2 (with double cone)** 140 – 160 mm
10- centring cone number 3**

(**) - accessories

Clamp nut



Drawing 5 **L POSITION (play)** **D POSITION (clamp)**

A clamp nut lever turns in relation to the nut body; within limits determined by the cut-out in the nut body (L and D positions).
In L position (play), the nut can be easily shifted along the thread of the holder's root.
In D position (clamp), the nut can be screwed along the thread of the holder's root.

Wheel attachment to the holder

Shift the wheel along the holder's root and hang it on a centring cone by a central hole edge. Place the nut lever into PLAY position and then shift the nut home towards the wheel. Supporting your thumb on a nut bolt (see drawing 6) shift the lever to the left into CLAMP position and screw the nut home, pressing the wheel to the holder's flange.

Drawing 6 Nut screwing

To remove the wheel from the holder (see drawing 7) you have to shift the lever to the right into PLAY position and then unscrew the nut by half a turn. It will be loosened and you can shift it off from the flange and remove the wheel.

Drawing 7 Nut loosening

The holder design and its outfit allow wheels to be fixed having different rim forms and central hole diameters.

1 – application of cones number 5 and 6, with centring from the inside of the rim:

- the nut of holder "5" should have the clamp "7" on (see drawing 4 and 11)
- the cone should be pushed by the spring in a manner which allows the smaller diameter of the spring to lean against the cone base (drawing 10).

2 – application of cones number 5 and 6, with centring from the outside of the rim (see drawi.8):

- nut without clamp
- holder without spring

3 – application of centring disk number 8 or 9 (see drawing 9):

- nut without clamp
- holder without spring

ttttttt

Drawing 8

Drawing 9

Drawing 10

Dismantling of the nut clamp

Drawing 11

In case of wheel mounting by means of centring disks and cones with centring system outside of the rim, you should remove the clamp of the nut.
In order to remove the clamp from the nut, you have to pull the clamp along axis so that it jumps off the nut.
In order to place the clamp you have to press it onto the nut.

CONNECTING THE BALANCING MACHINE

Connecting the balancing machine to the electrical power supply

ATTENTION

The balancing machine has a three conductor cable with a protection plug.
A conductor with green-yellow insulation connected to the balancing machine housing is the PROTECTIVE conductor.

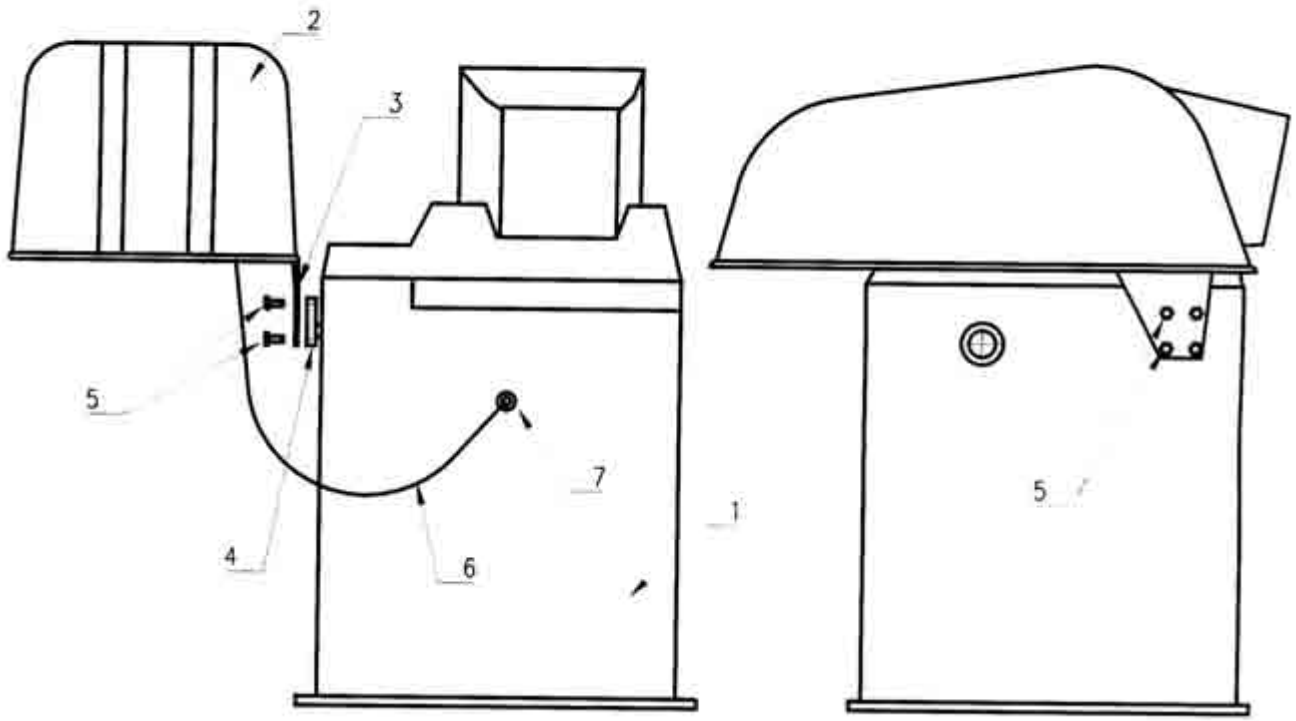
ATTENTION

SWITCHING ON POWER TO THE CHILLED BALANCING MACHINE BEFORE 2 OR 3 HOURS NEEDED FOR DRYING ELECTRONIC ELEMENTS AND REACHING ROOM TEMPERATURE IS NOT ALLOWED. DISREGARD OF THIS REQUIREMENT THREATENS THE BALANCING MACHINE WITH DAMAGE.

Connecting the balancing machine to the pneumatic supply
Connect the feeder cable ended with a snap connector, to the connector pipe (drawing 12 pos. 8) situated on the back wall of the balancing machine.

Monitor mounting and making connection
All details concerning a monitor are included in the monitor operating instructions.

Protective screen mounting



Drawing 12.1

1 – balancing machine
2 – wheel protective screen
3 – screen eye
4 – screen axis flange
5 – fixing screws
6 – screen cable
*7 – screen cable socket
8 – pneumatic supply pipe
9 – 230 V socket

Put the protective screen (pos. 2) in a vertical position and fix it to the screen axis flange (pos. 4) by means of four screws M8 (pos. 5) introduced through the screen eye holes. Connect the screen cable (pos. 2) to the socket (pos. 7). Connected cable should not tighten during screen closing and opening. It should hang slack.
If this cable is not connected, the automatic rim parameters measurement is not possible (TROLL 2156)

ATTENTION

In the screen mechanism there is a dumper which limits the speed of closing and opening. In case of screen fixing in a position different from the vertical one (full opening home), the ultrasonic measurement system of the geometric wheel parameters will not work correctly.
* concerning balancing machine TROLL 2156

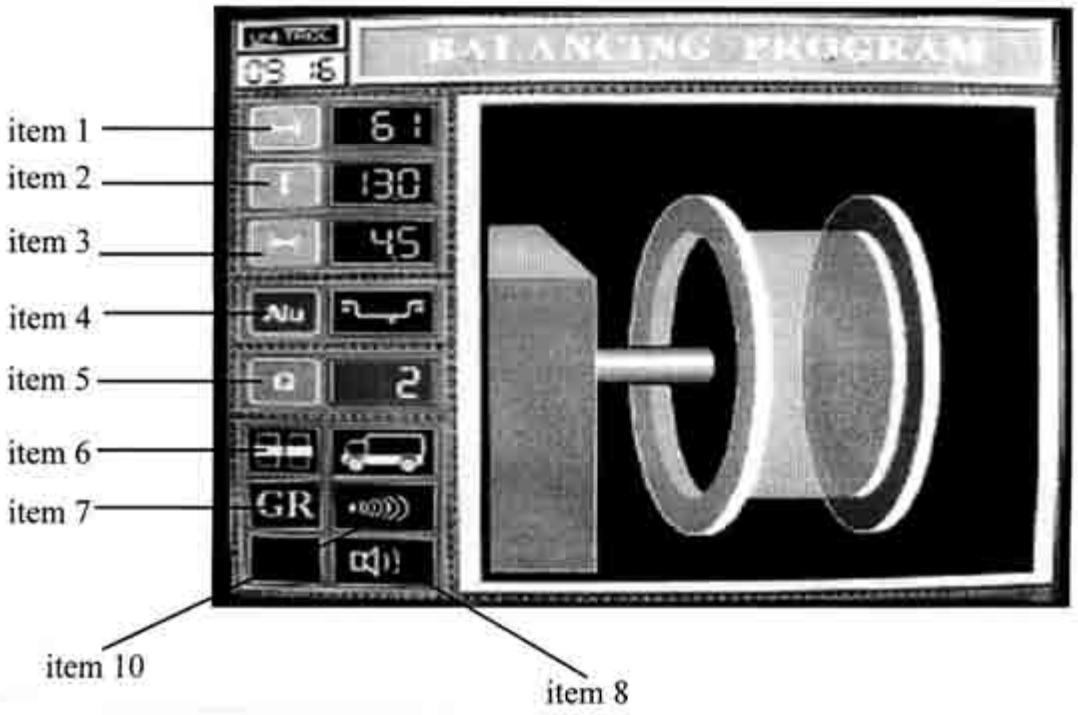
CHAPTER 5 SUBROUTINES DESCRIPTION

Switching on the balancing machine computer

Switch the balancing machine main power and monitor power on (pos. 21 drawing 1). The balancing machine generates the following messages [SYSTEM TESTING] and [SYSTEM IN ORDER]. On the monitor screen a text image will be displayed followed by an advertising image. After pressing any keyboard button (drawing 1) the computer will enter IMBALANCES MEASUREMENT subroutine and on the monitor screen will be displayed a picture presented in drawing 13.

ATTENTION:

If during the testing procedure we press the ESC button (pos. 14 drawing 1), then we interrupt the system testing and by-pass the advertising image displaying. The computer will immediately enter IMBALANCES MEASUREMENT subroutine.



Choice of measurement procedures

After pressing ESC the computer enters PROCEDURE CHOICE and on the monitor screen will be displayed a picture presented in drawing 14.

The corresponding subroutine entry will follow the cursor movement to the right position (rectangle corresponding to the chosen subroutine will change background to yellow) and pressing ENT .

The cursor movement is done by means of ↓ and ↑ buttons.

Any subroutine exits after pressing ESC button.

On the monitor screen CHOOSE PROCEDURE will appear presented in drawing 14.

Determination of measurement cycle parameters

Move the cursor, by means of ↓ and ↑ buttons, to IMBALANCES MEAS-

Setting clock

Enter CHOOSE PROCEDURE subprogram by pressing ESC button. Move the cursor by means of ↓ and ↑ buttons to EDITON OF HEADING (drawing 14) posi-

Drawing 15

By pressing ↓ button move the cursor to position **a** (drawing 15).

By means of + and − buttons set the hour.

Pressing → button move the cursor to position **b.**

By means of + and − buttons set the minutes.

Setting date

The mode of setting date is similar to the time setting.
In position **c** we set the day, in position **d** we set the month and in position **e** the year.

ATTENTION:

After setting data you should store it in the computer memory by pressing ENT button.

Storing headings

and 4.

By means of  and  buttons move the cursor to any square within chosen position.

By means of  and  buttons we enter any letter or digit into the chosen square.

By means of  and  buttons we enter any letter or digit into the chosen

Change of measurement picture

Move the cursor, by means of arrow buttons, to pos. 6 (drawing 13) and press ENT

Return to the previous measurement picture will happen after moving the cursor to position 6 and pressing ENT button.

Change of imbalance units

Move the cursor by means buttons 17 – 20 to pos. 7 (drawing 13). By pressing ENT button we change imbalance units to [GR] (grams) or [OZ] (ounces).

Imbalances measurement

Move the cursor by means of ↑ and ↓ buttons to position IMBALANCES MEASUREMENT (drawing 14) and press ENT button. Computer will enter IMBALANCES MEASUREMENT subprogram and on the monitor screen will be displayed a picture shown in drawing 13.

After starting this subprogram the cursor (red background) always moves to position 5 (Q – cut-off threshold).

Entering measurement settings

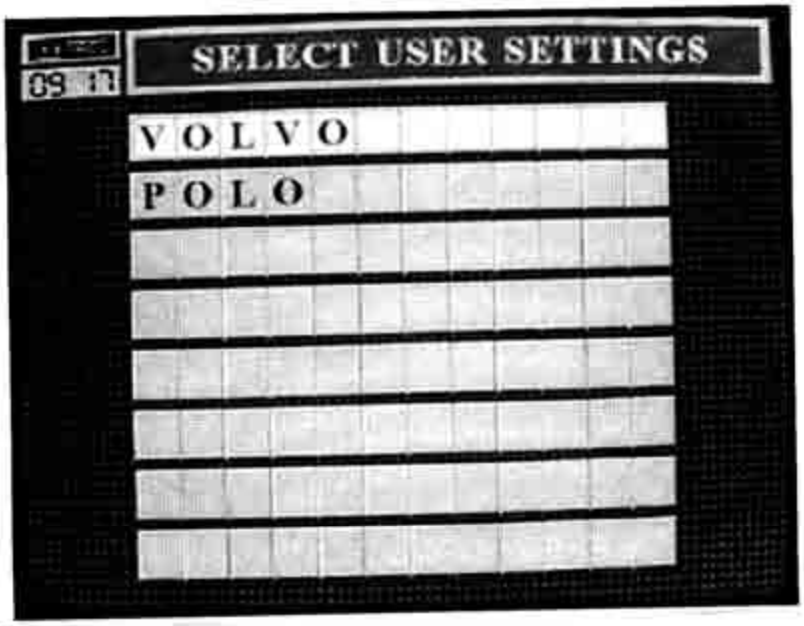
The balancing of every wheel means the determination of an imbalance value in grams for the internal and external correction plane, and the location of an imbalance spot on the wheel.

Because wheels have different geometric dimensions so to be able to determine the unique imbalance values we have to store some necessary data in the machine memory :

- WIDTH, DIAMETER, DISTANCE
- choose the balancing program (ALU)
- enter a cut-off threshold value

Entering of measurement settings from the computer memory
(only for manual start)

If we balance a wheel, of which parameters have earlier been stored in the computer memory, then in order to enter these parameters we have to press MEM button.
The computer generates a message [MEMORY READOUT] and on the monitor screen will be displayed a picture shown in drawing 17.



Drawing 17

Move the cursor by means of  and  buttons to the position where balanced wheel parameters were stored. Pressing  button will enter those parameters

Manual entering of distance parameter

Move the to pos. 1 (drawing 13) by pressing  button or by means of buttons 17, 18, 19, 20 (drawing 1). Cursor's position 1 will be confirmed by the [DISTANCE] message generation
and the set value background changes to red.
The distance setting should be determined in the following way:
a) after moving the adjuster to the wheel rim and then back to its initial position, some apparent value proportional to the adjuster displacement, will appear (see drawing 18a).

ATTENTION: 
When switching on the balancing machine or resetting the computer, the adjuster should be in zero position. Otherwise the [DISTANCE] measurements will be incorrect, because during switching on, the computer reads the adjuster position as zero position.
b) if the automatic measurement does not work then move the adjuster to the wheel rim, read the values from the nonius swing and then store them in the computer memory by means of "  " and "  " buttons.

c) if it is necessary to enter the distance parameter without using the adjuster then you have to proceed in the following way (see drawing 18b).
- by using measuring tape or scale, measure the distance L between the balancing machine wall and the rim edge of the wheel secured in the holder (measurement in centimetres).

$$DISTANCE = (L - 2.5) \times 4$$

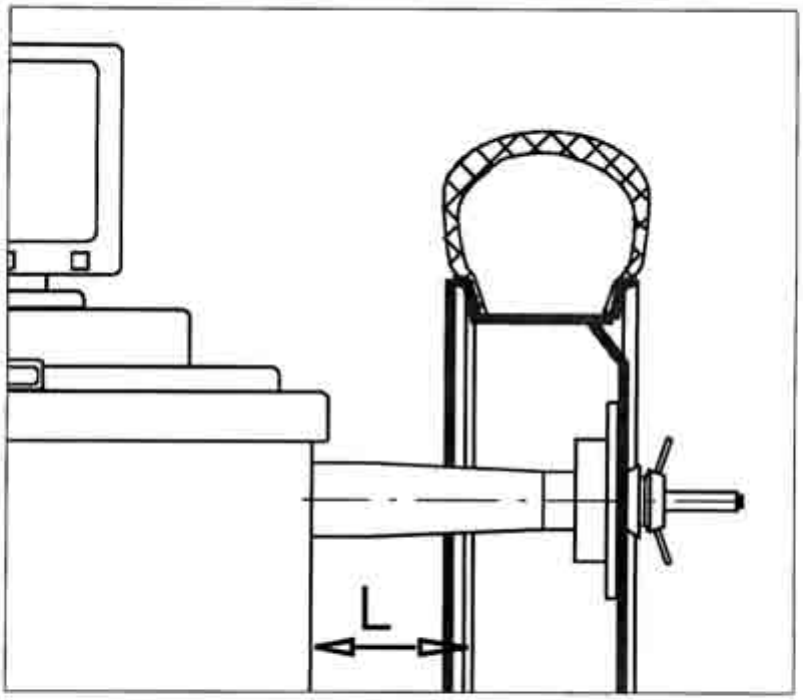
Manual entering of the diameter

Move the cursor to pos. 2 (drawing 13) by pressing  button or by means of buttons 17, 18, 19, 20 (drawing 1). Cursor's position 2 will be confirmed by the [DIAMETER] message generation and the background of the set value changes to red.

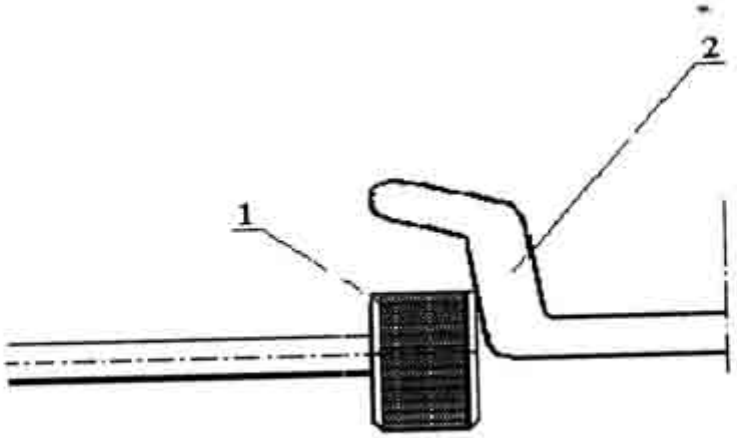
Pressing  or  buttons we can adjust this parameter's values within the range of 10" to 24".

Manual entering of width parameter

Move the cursor to pos. 3 (drawing 13) by pressing  button or by means of buttons 17 - 20 (drawing 1). Cursor's position 3 will be confirmed by the [WIDTH] message generation
and the background of the set value changes to red.



Drawing 18b – **L – distance parameter**



Drawing 18a 1– **adjuster, 2 – wheel rim**

CHOICE OF WORKING MODE OF THE TROLL 2156 BALANCING MACHINE

- **AUTOMATIC START** – by means of  or  buttons go to position 10 (drawing 13 window presented with a pictogram). The balancing machine computer is now programmed on automatic start. In this case the parameters of the wheel secured in the holder, are stored in the machine memory during closing of the protective screen. Once closing has been finished, the machine starts automatically, carries out imbalances measurement, stops the wheel and displays measurement results.

- **MANUAL START** - by means of  or  buttons go to position 10 (drawing 13 window presented without pictogram). The balancing machine computer is now programmed on manual start. In this case the parameters of the balanced wheel are stored in the machine memory manually.

* In case of the TROLL 2151 balancing machine, by pressing 

button, holding it down and pressing simultaneously the **M** button we can change the starting procedure. If the inscription AUT appears in position "10" then the protective screen closing will put the machine's drive in motion. The lack of AUT inscription means that the machine is programmed for manual start and after closing the protective screen, the START button must be pressed to put the machine's drive in motion.

ATTENTION: 

Choice of the balancing program(independently of start procedure).

Move the cursor to pos. 4 (drawing 13) by pressing  button or by means of buttons 17 - 20 (drawing 1). Cursor's position 3 will be confirmed by the [RIM TYPE CHANGE] message generation and the pictogram's background changes to red.

Each pressing of  or  buttons will choose (and display on the monitor)

Option 1:

:oncerns balancing by hammering slugs onto both rim edges

Option 2:

concerns balancing by sticking slugs

Option 3:

concerns balancing by hammering one slug onto the internal rim edge and sticking another one on the external correction plane

Option 4:

concerns balancing by sticking one slug on the internal correction plane and hammering another one onto the external rim edge

Option 5:

concerns static balancing (for very thin rims, one slug used). Not recommended for car wheels balancing.

Option 6:

concerns balancing by sticking slugs inside the rim

Option 7:

concerns balancing by hammering one slug onto the internal rim edge and sticking another one inside of the rim

User's memory

In order to quickly enter parameters for a wheel being balanced you have to carry out the following procedure:

1. Press 

button, hold it down and press simultaneously the MEM button. On the monitor screen will appear a picture – CHOOSE SETTINGS FOR EDITION

2. By means of  or  buttons move the cursor to the reserved position chosen by you in the computer memory

3. Press 

.

On the monitor screen a picture ENTER SETTINGS VALUES will appear.
In positions 2 – 4 were stored parameters of the wheel being balanced, which were transferred from the program IMBALANCES MEASUREMENT.

4. Move the cursor, by means of  or  buttons, to position 1 and store some user specific data (for example: first name) according to the procedure.
Attention:
User specific data can (first name) can also be stored by calling the subroutine EDITION OF SETTINGS

5. Press 

button. The balancing machine generates the message DATA STORED and on the monitor screen the picture IMBALANCES MEASUREMENT will appear with the wheel parameters stored in the computer memory.

Attention: 

Wheel balancing

If the balancing machine has been programmed for automatic start then the spindle drive will be put in motion once the wheel protective screen is closed.

ATTENTION:
Wheel protective screen should be lowered slowly in order to allow the ultrasonic sensor to measure wheel parameters.

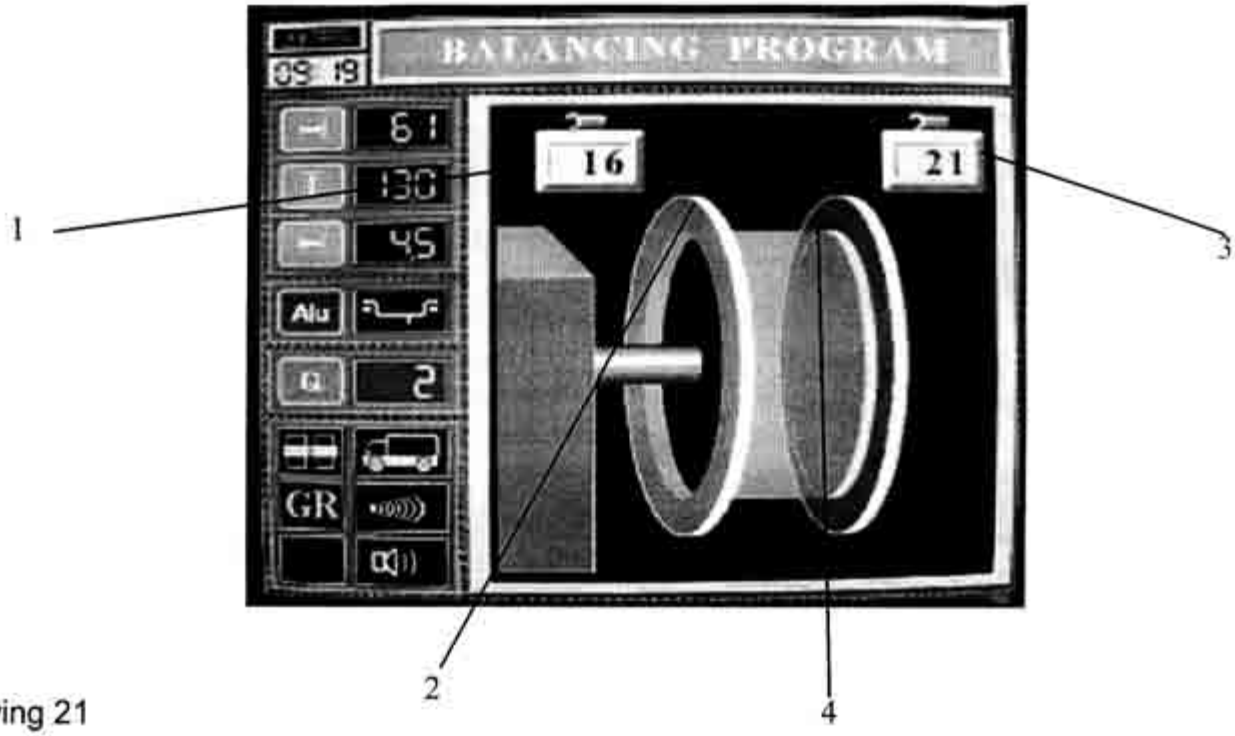
If the balancing machine has been programmed on manual start then after entering the measurement settings and closing the wheel protective screen, you put the balancing machine drive in motion by pressing 

button. If the wheel protective screen is removed from the balancing machine then to be able to put the machine drive in motion, you have to press 

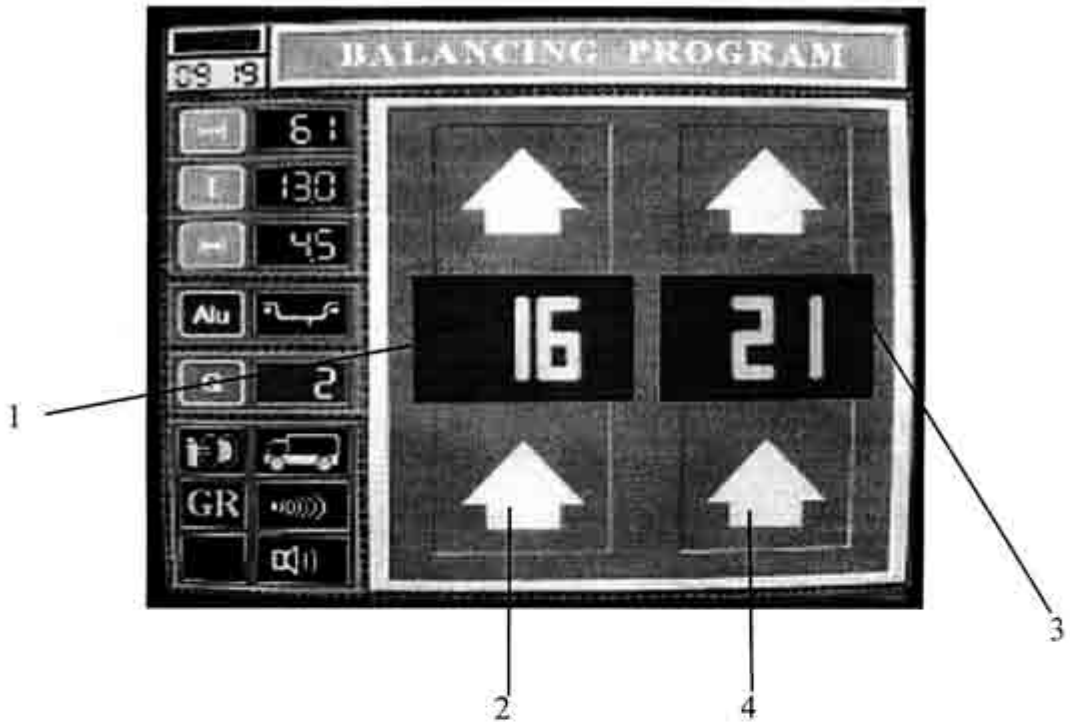
button and holding it down press simultaneously 

button.

After generation of the message ATTENTION START you should release both buttons.



Drawing 21



Please remember the following:

What you see displayed on indicators "1" and "2" (drawing 21 and 22) concerns the internal correction plane of the wheel, in other words the wheel edge which finds itself closer to the balancing machine housing. What you see displayed on indicators "3" and "4" concerns the external correction plane, in other words this wheel edge which finds itself closer to the holder nut.

Let's assume that after completion of the measurement cycle, indicator "1" displays number 16 and indicator "3" displays number 21. It means that in order to remove wheel imbalance you have to add a 20-gram slug to the internal rim edge and a 20 grams slug to the external rim edge.

After opening the protective screen and turning the wheel in any direction, we can see the measurement picture (drawing 21): balls should move along the circumference of the wheel symbol, in accordance with the sense of wheel rotation. Once balls on the left side of the wheel symbol reach the imbalance spot, a sound signal and a brake are switched on. It means that in this wheel position and you should place a 25 grams slug at the highest point of internal rim edge.
Analogically, we search for imbalance spots (spots where you place slugs) for the external correction plane: you turn the wheel and observe the right side of the wheel symbol. Once the right ball reaches the imbalance spot, a sound signal and a brake will be activated. Then you have to place an 80-gram slug at the highest point of the external rim edge. After placing slugs of the proper weight at all detected spots, you can execute a control measurement (repeated activation of measurement cycle). Theoretically, both indicators "1" and "3" should display zeros, meaning that the remaining imbalance value does not exceed 5g (if cut-off threshold has been set to 05). In practice, it does not have to be like this. But why ?

Firstly– correction slugs, independently of their type, are manufactured with some weight tolerance
Secondly– the balancing machine measures imbalances with the precision of up to 2g, and determines pointwise imbalance spots with a precision of 3 degrees of angular measure.

Thirdly– a correction slug is not a concentrated mass, the larger the mass the bigger the length, so when fixing the slug to the rim, a position error can arise (slug displacement in relation to the highest point of the wheel rim, shown by the balancing machine).

After completion of the control measurement, the following cases might occur:

Case 1 :

Both indicators "1" and "3" display zero values, and the balancing machine generates a [WHEEL BALANCED] message. It means that the wheel has been balanced with 5g precision, because we have worked with the cut-off threshold set to 05.

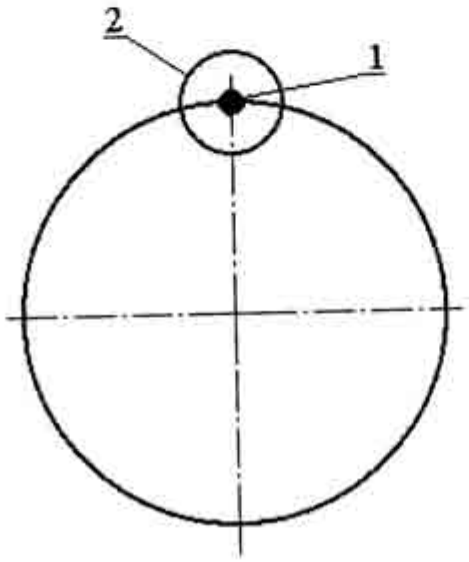
Pressing the  (pos. 5 drawing 1) button and setting the cut-off threshold to 2g, we can conclude that the wheel has been balanced with 2g precision. It will occur if both imbalance indicators display 0 values. If one of the indicators displays, for example 0 grams, and the other 4g, then it would mean that the wheel has been balanced with 4g precision. After pressing  button, and repeated setting of the cut-off threshold to 5g, both indicators

Case 2 :

Let us assume that we have got the following results:
- indicator "1" (internal correction plane) – result 6g,
- indicator "3" (external correction plane) – result 7g,

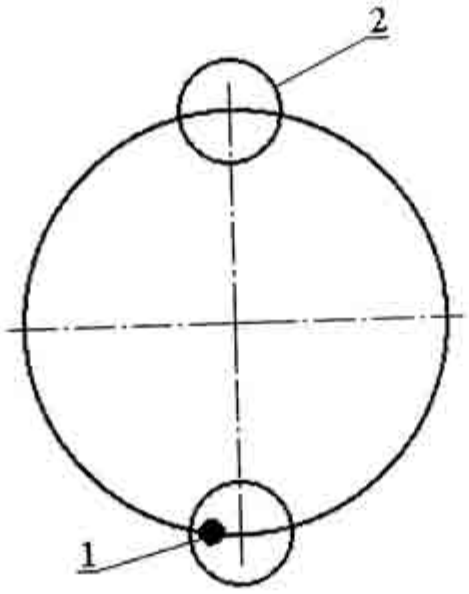
We search for a new imbalance spot successively for both wheels. Once the ball for a corresponding correction plane, finds itself on the wheel symbol in coincidence with the arrow, then the balancing machine can generate the following messages:

- [INCREASE SLUG] – if the new imbalance position overlaps with the old one or is slightly different from it



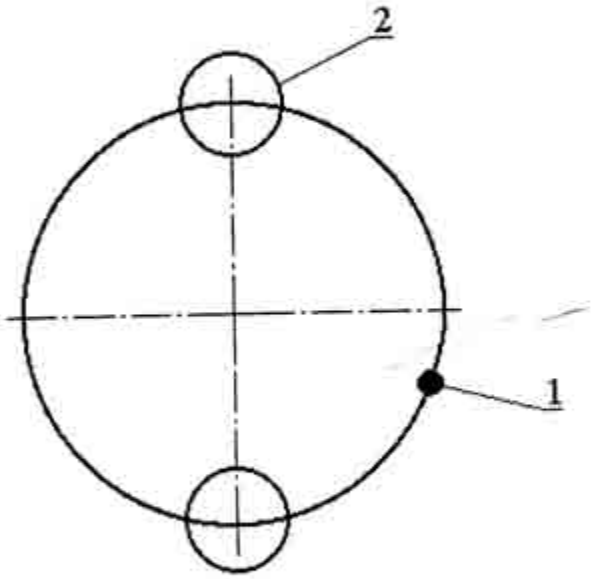
1 – slug 2 – new correction spot

- [DECREASE SLUG] – if the new imbalance position lies exactly on the opposite side of the previously placed slug or is slightly displaced from this point.



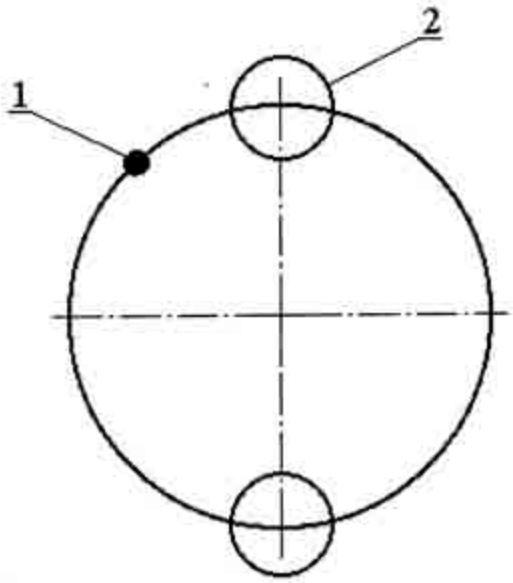
1 – slug 2 – new correction spot

- [SHIFT TO THE RIGHT] – (in accordance with the sense of rotation) – if the previously placed slug lies on the left side of the new correction spot (shift upwards).



1 – slug 2 – new correction spot

- [SHIFT TO THE LEFT] – (opposite to the sense of rotation) – if the previously placed slug lies on the right side of the new correction spot (shift upwards).



1 – slug 2 – new correction spot

ATTENTION
If the indicator "1" displays 0 value (lack of imbalances) then the indicator "2" will not signal any position. The same concerns the indicators "3" and "4".
It can happen that during successive wheel imbalance measurements, having the cut-off threshold set to 5g, the results will vary in a following way:
- first measurement: 0
- second measurement: 6g
- third measurement: 0
- etc.

Those results are incorrect. The imbalance value lies certainly in the neighbourhood of the nominal value of the set to 5g cut-off threshold, and that is why the indicator displays interchangeably the results 0 or 6. For the threshold value of 10g, the results could be 0 or 11.

Balancing of wheels with aluminium rims.

These wheels will be balanced by means of adhesive slugs or the combination of adhesive and hammered slugs. We set a suitable balancing program, taking into consideration the way slugs are fixed (see drawing 29).

ATTENTION
We enter measurement settings in the same way as we did for hammered slugs. These are geometric dimensions of wheel rims. Choosing a suitable balancing procedure (for example both adhesive slugs), results in the balancing machine taking into consideration that the places to fix slugs on correction planes will change. Correction planes will not be the same as those resulting from entered data. Adhesive slugs cannot be removed and stuck again. That is why we always stick slugs 5 – 10 g smaller than indicated by the balancing machine. During repeated measurement we can correct this residual imbalance by sticking another small slug (for example 5g) on a new imbalance spot indicated by the balancing machine. In this way we avoid eventual position correction through slug displacement which is impossible to carry out in the case of adhesive slugs.

Recalculation of imbalances

This  button is used to call from memory the last measurement and to recalculate it according to the actual parameters of the correction planes.
Example:
We stored incorrect data in machine memory, for a wheel being balanced. We carried out measurements, but the results were wrong. If we want to know the real values of imbalances for this wheel, without repeating the measurement, it is sufficient to store the correct data in machine memory and press the  button. The balancing machine generates a mes-

New measurement

If we consider, after the control measurement, that the wheel has been balanced with sufficient precision and one of the indicators shows, instead of zero, for example 6 (with cut-off threshold 5g), then, before starting a new measurement (for another wheel), we must clear all previous imbalances from the machine memory. Otherwise the balancing machine will consider the new measurement as another control measurement for the previously balanced wheel and in spite of correct results of the imbalance value and position, will generate incorrect voice messages. The 

button is used to clear data. After pressing this button the balancing machine will generate a message [NEW MEASUREMENT].

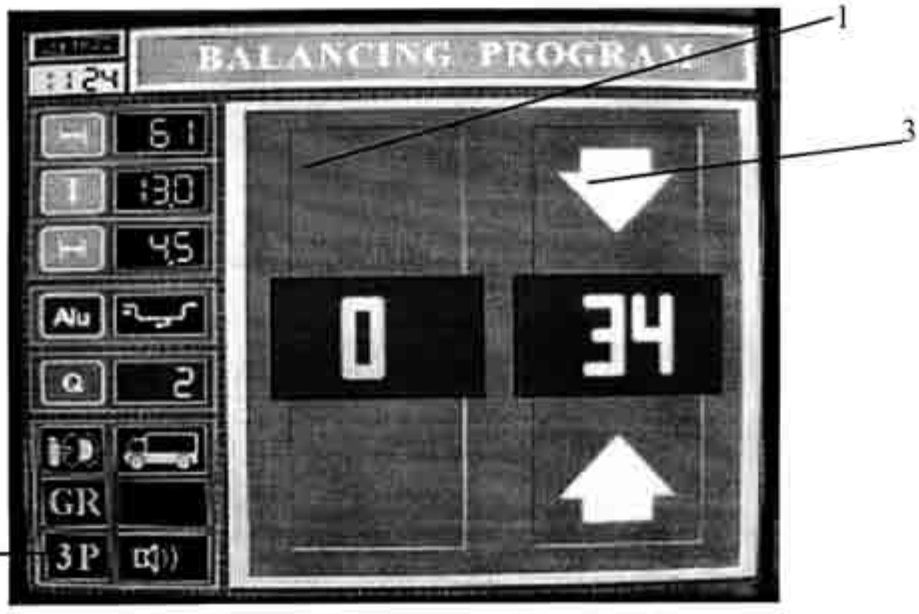
Program "hidden slug"

Program "hidden slug" is used when we want the correction slug not to be seen from the external side of the wheel, within the ALU subprograms (option 6 and 7). By means of this program we can divide the imbalance displayed by the indicator "3" (drawing 23) into two correction slugs which have to be stuck behind the two rim arms (spokes) situated as near as possible to the left and to right of the imbalance spot.

<u>How to execute the "hidden slug" program</u>

1. Choose option 6 or 7 of the balancing program
2. Start measurement cycle
3. The imbalance on the external correction plane, displayed by the indicator "3", can be corrected by means of two slugs, according to the following procedure:

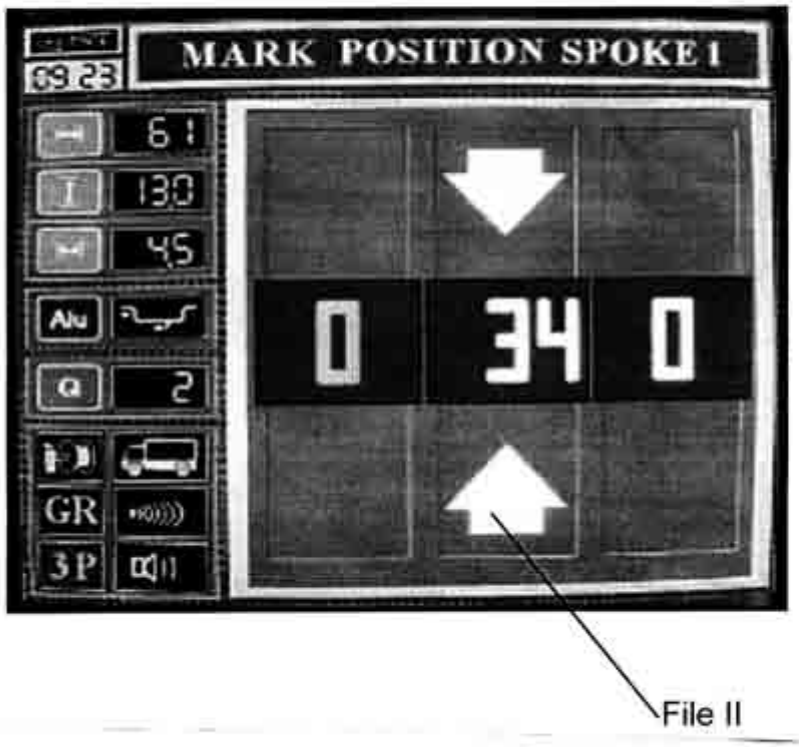
a – move the cursor to the symbol 3P (pos. 9 drawing 23), by means of  and



Drawing 23

Numbers 9 and 18 are imbalance values given as an example

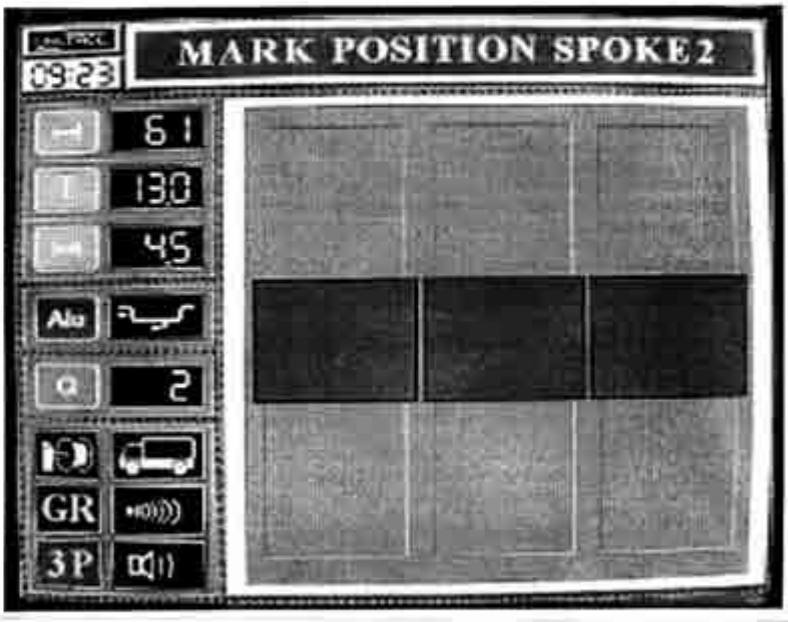
b – press  button. On the screen will appear a measurement picture presented in



drawing 24

c – turn the wheel until the arrows in field II change colour to green and a sound signal is generated. The balancing machine computer indicates, that at this wheel position, the imbalance spot of 34 grams, is situated at the highest point of the rim.

d – turn the wheel to the left until the nearest spoke reaches vertical position and then press  button. The balancing machine computer remembers this wheel position as the fixing place of the first slug, and simultaneously on the monitor screen will appear the follow-



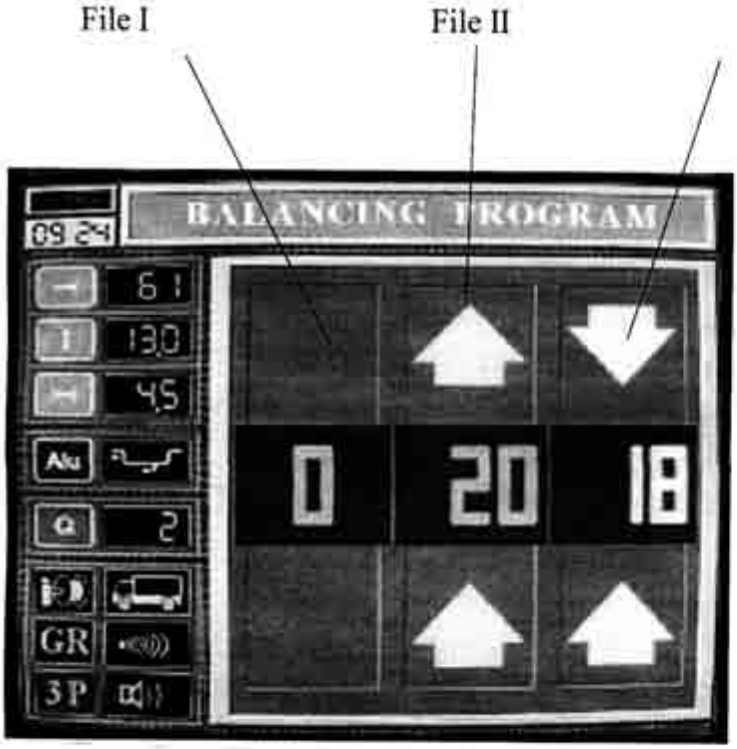
drawing 25

e – turn the wheel to the right from this position until the nearest spoke reaches a vertical position and then press  button. The balancing machine computer remembers this wheel position as a fixing place of the second slug, and simultaneously on the monitor screen will appear the following measurement picture with three information fields, presented in drawing 26.

Field I – indicates the size and position of the correction slug on the internal correction plane.

Field II – indicates the size and position of the first correction slug on the external correction plane, fixed behind the first spoke determined in **d** point.

Field III – indicates the size and position of the second correction slug on the external correc-



Field III interpretation:
correction slug weighs 18 grams;
arrows are turned to the centre, meaning that the slug should be placed in the upper part of the rim, behind the spoke which is in a vertical position

Field II interpretation:
correction slug weighs 20 grams;
to find the spoke behind which the slug should be hidden, you have to turn the wheel in the direction indicated by arrows.

ATTENTION: 

If during the execution of points 3d and 3e, we turn the wheel in the same direction by mistake, then the balancing machine computer will indicate the place to fix the second slug on the opposite side of the wheel. If in both cases we use the same spoke, then in fields II and III will appear the inscription **ddd** which always signals an error in the balancing program execution.

In both above mentioned cases you have to restart the program "hidden slug".

To return to the starting point you have to press the M button (imbalances recalculation) – then the machine returns to the picture shown in drawing 23, or press the 

BALANCING MACHINE CALIBRATION

The balancing machine is equipped with a calibration system which allows users to tune the machine individually. The calibration will be carried out in case of a suspicion that the machine indications are incorrect (caused by aging of electronic elements, temperature, transportation shocks, etc.).
The balancing machine calibration should be carried out in the following way:

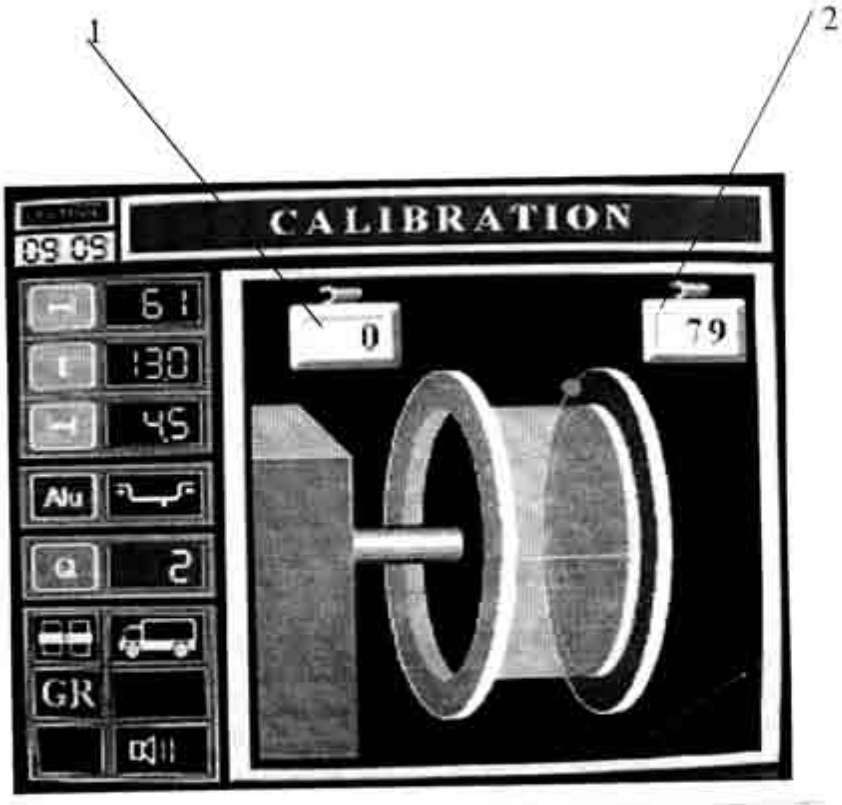
1. Start the CALIBRATION subprogram in the machine computer.

To carry out the test, you should choose a car wheel with known parameters and possibly a small imbalance value, and place it into the holder.
Store in the computer memory parameters of measurements settings in one of the earlier described ways.

2. Hammer a slug weighing 80g onto the external wheel rim edge, at some arbitrary place.

3. Press the 

button or activate the automatic start procedure. The balancing machine drive will be put in motion. The measurement cycle is ended with the automatic braking of the balancing machine spindle and displaying 0 on indicator "1" and 79 or 80 on



drawing 27

ATTENTION

Appearance of other values on the indicators, shows that the calibration was erroneous. The reason for this can be, for example, a large imbalance of the wheel used for the calibration. You should displace the 80g slug by 180 degrees (to fix it on the opposite side in relation to the previous position – of course also on the external wheel rim) and repeat the calibration procedure.

4. Remove the 80g slug used for calibration. Star the IMBALANCES MEASUREMENT sub-program in the machine computer and start the balancing machine in order to check the imbalance value of the wheel used for testing.
If both indicators "1" and "2" display zero values for the external and internal correction planes, then it would mean that the wheel used for calibration was balanced and the whole calibration procedure should be considered completed.

5. If the control measurement carried out according to point 4, showed the existence of imbalances, then you should balance the wheel in order to obtain 0 grams indications for both correction planes and repeat calibration procedure according to points 2 and 3. Finally check the wheel balancing according to point 4.
The calibration is correct if indicators display following results:

- 0 and 79 or 0 and 80 after the execution of operations according to points 2 and 3,
- 0 and 0 after checking the test wheel's balance according to point 4.

ATTENTION:

One of the conditions necessary for a correct calibration and correct balancing machine indications is the installation of the machine in a dry and dust-free room. The balancing machine, as any measuring device based on processor systems, is not very resistant to humidity.
The appearance of humidity in the machine might cause incorrect indications but not durable damage. When you notice some unnatural results of measurements, like for example large, 3-digit values of imbalance for motor-car wheels or considerable differences in results for successive measurements of the same wheel, then you should completely dry the electronic main board of the balancing machine. Removing the machine cover in order to dry the main board, for example with a hair-dryer, will not cause the loss of guarantee.
The appearance of moisture is characteristic of variable atmospheric conditions (autumn-winter and winter-spring periods) and therefore you should pay special attention to assure suitable operation conditions for the balancing machine.

OPTIMIZATION

The optimization is a wheel control test allowing a tyre to be placed onto a wheel rim in such a way that the imbalance of the rim will compensate the imbalance of the tyre. Thanks to this, smaller slugs will be needed for wheel balancing.
Tyre and rim imbalances are measured in a double measurement cycle and the measurement takes into consideration both correction planes of the wheel simultaneously.
The optimization should be applied as a preliminary operation ahead of the wheel balancing by means of slugs. Before the optimization start, you should manually store wheel parameters in computer memory. Call the OPTIMIZATION subprogram in the machine computer. Within this subprogram you cannot use automatic start.

OPTIMIZATION PROCEDURE

The wheel rim should be placed into the balancing machine holder in a specific way, for example such that the vent coincides with the spindle and holder markers.

Press 

button. On the monitor screen will be displayed a picture EMPTY RIM MEASUREMENT. Press 

button again - the balancing machine drive will be put in motion, which is confirmed by a message [ATTENTION START]. When the balancing machine stops, on the monitor screen a picture EMPTY RIM IMBALANCES will be displayed, which indicates the imbalance value and its position. Take the rim off the holder, put on a tyre and pump it up to a prescribed pressure. Place the complete wheel into the balancing machine holder, in the same position in which the empty rim was placed i.e. that the vent should coincide with the spindle and holder markers. Press 

T button. On the monitor screen a picture RIM WITH TYRE MEASUREMENT will be displayed. Press the 

button again - the balancing machine drive will be put in motion, which is confirmed by a message [ATTENTION START]. When the balancing machine stops, on the monitor screen a picture RIM WITH TYRE IMBALANCES will be displayed, which indicates the imbalance value and its position.

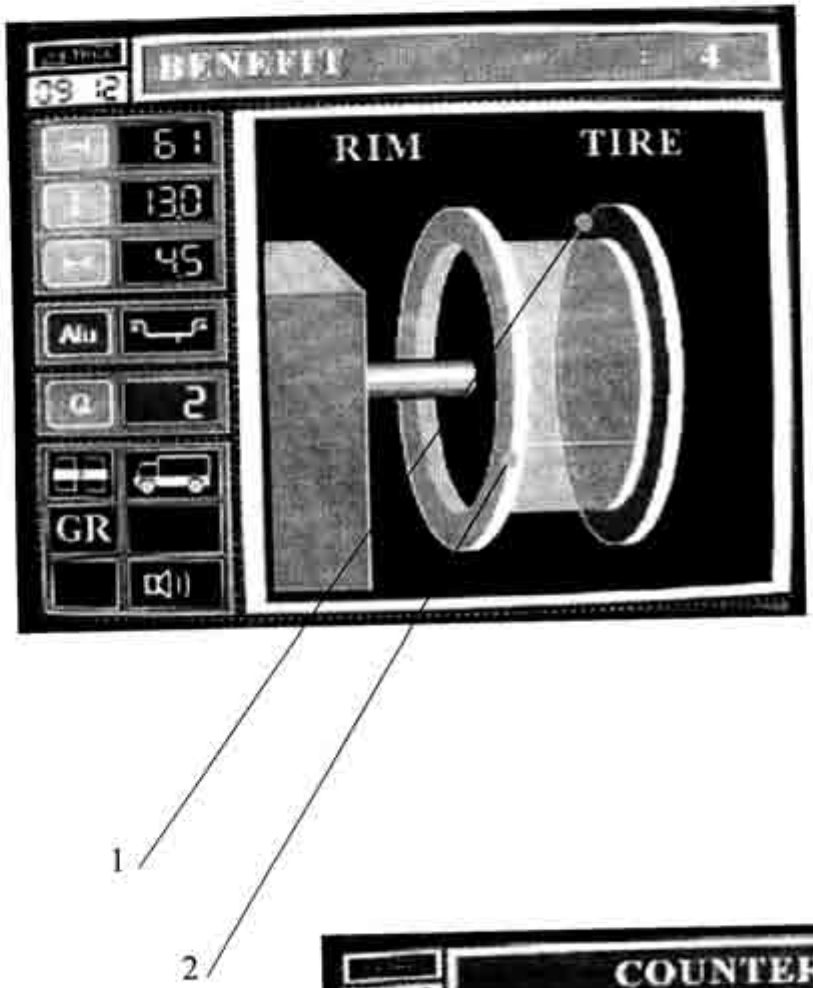
Press 

button. On the monitor screen will be displayed a picture from drawing 28.
After opening of the wheel protective screen, we should determine the position of the rim and tyre imbalances, by turning manually the wheel and observing indicators "1" and "2" (draw-

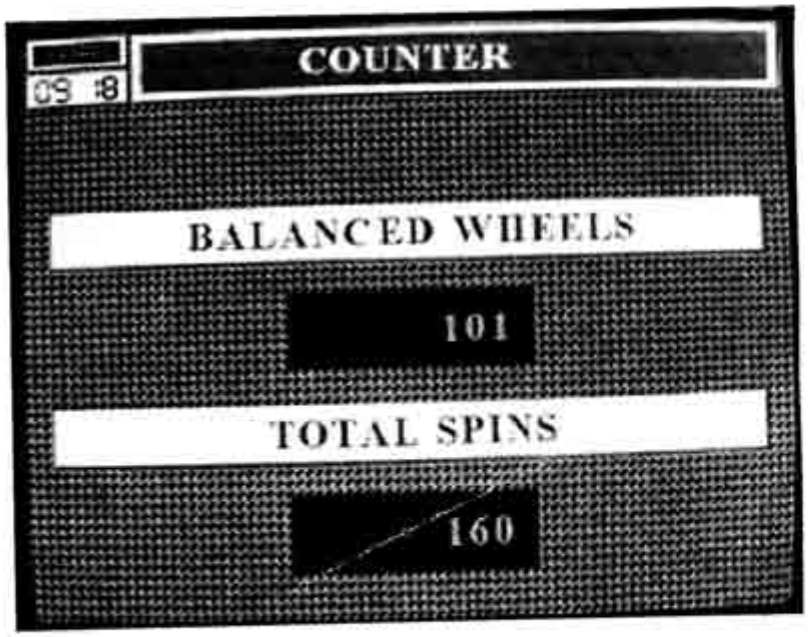
ATTENTION:
When the optimization gain equals 0 grams, then the tyre position in relation to the rim, is considered to be optimal.

Measurements counter

Call the CHOOSE PROCEDURE subprogram by pressing ESC button. Move the cursor, by means of ? and ? buttons, to the position MEASUREMENT COUNTER and press ENT; on the monitor screen will be displayed a picture from drawing 29.



drawing 28



drawing 29

CHAPTER 6 ADDITIONAL REMARKS

The balancing slugs should be finally hammered onto the rim edge, after the wheel has been balanced and taken off the balancing machine holder.
In case of a large imbalance in one plane, for example 90g, and a small imbalance in the second plane, for example 10g, we advise to hammer only a 90g slug and repeat the measurement which could show that after the "worse" wheel plane has been balanced, the imbalance value on the second plane will fall below the previously measured value of 10g.
If the imbalance is larger than 100g then you should hammer a large slug (for example 80g, 90g, 100g) and displace it by a few centimetres aside of the point indicated by the balancing machine. Then conduct another measurement and hammer onto the rim some additional small slugs having the weight indicated by the balancing machine.

In case of momentary electrical interference you should reset the computer by pressing the

button, holding it down and pressing simultaneously the

button, or

by disconnecting the balancing machine power supply, with a master switch. The spindle tip and the holder of the balancing machine should be lubricated with machine oil or any other mineral oil.

ATTENTION
The holder should be kept clean. It concerns in particular the surfaces of the centring cones, the disk and the internal cone of the root, because they have the principal influence on the precision with which the wheel is positioned in the holder and the holder is positioned on the balancing machine spindle i.e. on the precision of the wheel imbalance measurements.

During transportation you should not grab the balanci ng machine bythe spindle.

GUARANTEE

All eventual repairs and adjustments should be carried out by the producer. Machine repairs carried out on your own, within the guarantee period but without consulting the producer's service, would cause the loss of guarantee.

The producer reserves himself the right to introduce changes and improvements in his products, which could cause incompatibilities with the information included in this instruction manual.
In case of any doubt, please contact us by telephone or e-mail.

CHAPTER 7 MAINTENANCE

Maintenance should be conducted by experienced personnel having a deep knowledge concerning the principles of the balancing machine operation. During the maintenance process you should observe all precautions in order to avoid any accidental balancing machine start. The master switch should be set in position 0. You should also observe all instructions given in chapter 3 "Safety".

Periodical maintenance

In order to keep the balancing machine in a good operational state you should observe the below mentioned indications:

DISREGARD OF THESE RECOMMENDATIONS WILL DISMISS THE PRODUCER FROM

ANY RESPONSIBILITY INCLUDED IN GUARANTEE.

1. Clean your balancing machine at least once a month without using chemical washing agents or high pressure spray guns.
2. Check periodically the operational state of your equipment.
3. Periodically lubricate all holders.
4. Once a year check the state of conductors.
5. We suggest to integrate the pneumatic system with the air preparation unit.

WARNING

ALWAYS REMOVE ALL IMPURITIES FROM AROUND THE BALANCING MACHINE !

CHAPTER 8 MACHINE SCRAPPING

ATTENTION

DURING MACHINE SCRAPPING YOU SHOULD OBSERVE ALL PRECAUTIONS DESCRIBED IN CHAPTER 3, APPLIED ALSO DURING ASSEMBLY.

As well as assembly, disassembly also has to be executed by trained staff exclusively.
All metal parts should be utilized as metal scrap. In all cases of machine scrapping, the utilization of all materials has to be conducted according to the rules obligatory in the country of installation.
One should also notice that for tax purposes, effective machine scrapping should be documented in reports and forms conforming to the rules obligatory in the installation country.

Fireprotection
The present machine does not constitute fire hazard. In every case, room in which the balancing machine was installed, has to fulfil requirements of fire protection regulations obligatory in the installation country.
Always keep one or more portable fire extinguishers within reach of operator's hand (operator zone), in order to prevent any fire hazard.

Accident prevention
During lifting/sinking, shifting, installing, assembly and disassembly of the balancing machine, one should observe all precautions provided in regulations concerning accident prevention obligatory in the installation country. Moreover, all regulations concerning fork-lift trucks have to be observed.

CHAPTER 9 DIAGNOSTICS AND TROUBLESHOOTING

ATTENTION
During diagnostics and repairs one should observe all precautions described in chapter 3 "SAFETY" and in chapter 7 "MAINTENANCE".

PROBLEM	POSSIBLE CAUSES	REMEDY
The balancing machine does not generate the control text connections are in good condition	Electrical system defect	Check fuses, check if all electrical - no power supply
The engine works, but the spindle remains motionless check if all pneumatic connections are in good	No pneumatic supply, pneumatic system defect	Check supply pressure,
Noisy work of the balancing machine	Low supply pressure, incorrect belt tension	Set the right supply pressure, adjust the belt tension
The spindle of the balancing machine does not stop once the measurement	tachometer out of order	Transoptor board of the Blow through the transoptors with dry air
Unstable, incorrect indications of the distance adjuster	Transoptor board of the adjuster out of order broken teeth of the bar	Blow through the transoptors with dry air, replace the bar
Improper operation of the protective screen	Incorrect tension of the shock absorber"s spring	Adjust the tension of the shock
Keyboard buttons do not activate all functions keyboard	Poor contact of the keyboard connections to the indicato board and the main board keyboard defect	Check all contacts, replace
Incorrect indications for different wheel nut,replace mountings	Dirty cone of the spindle, worn out centering cone, damaged nut, replace damaged	Clean dirty elements the cone,replace the the holder

WE ALWAYS RECOMMEND YOU TO CONSULT OUR SERVICE

C. 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.

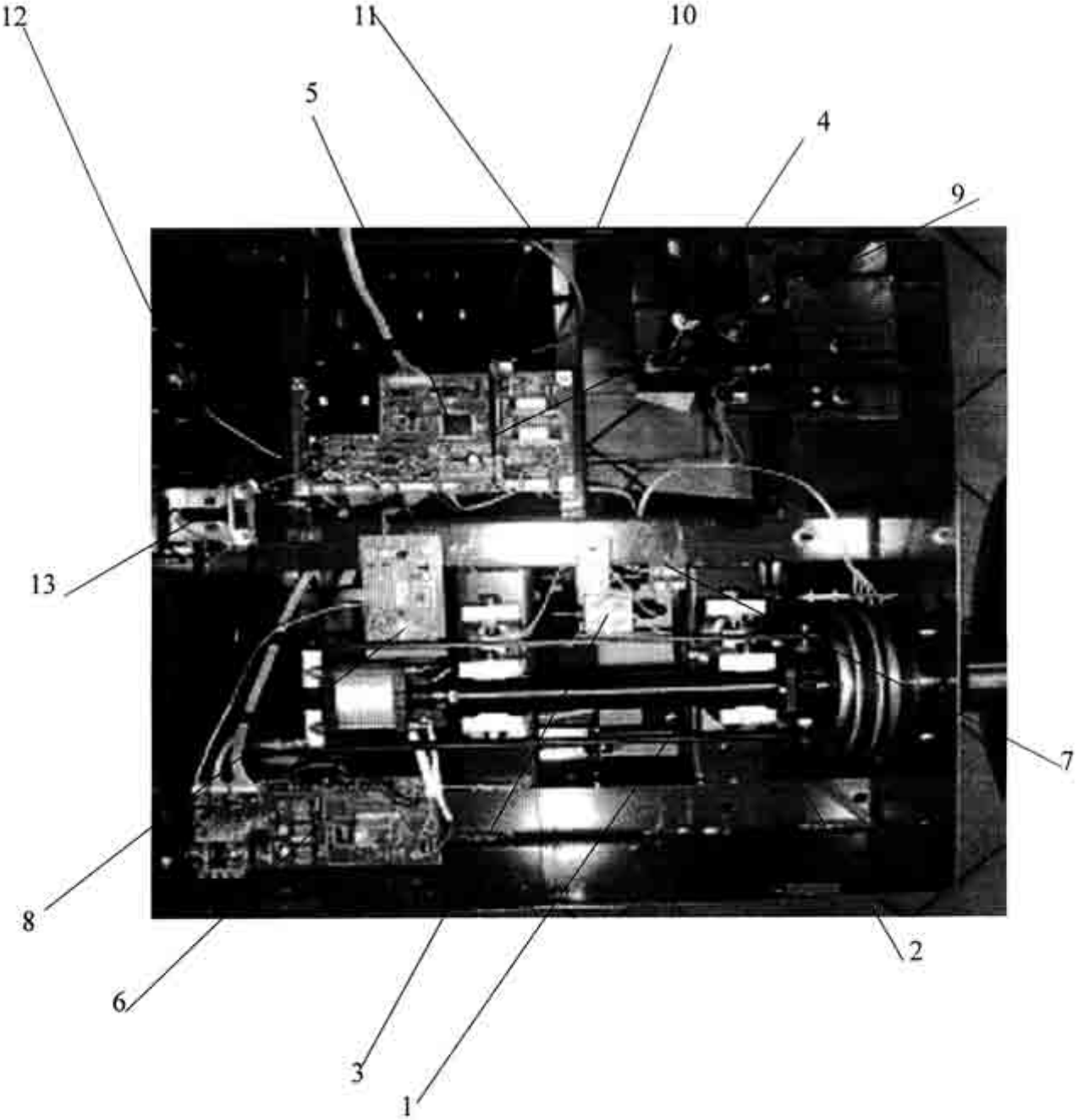
Procedure of ordering spare parts

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.

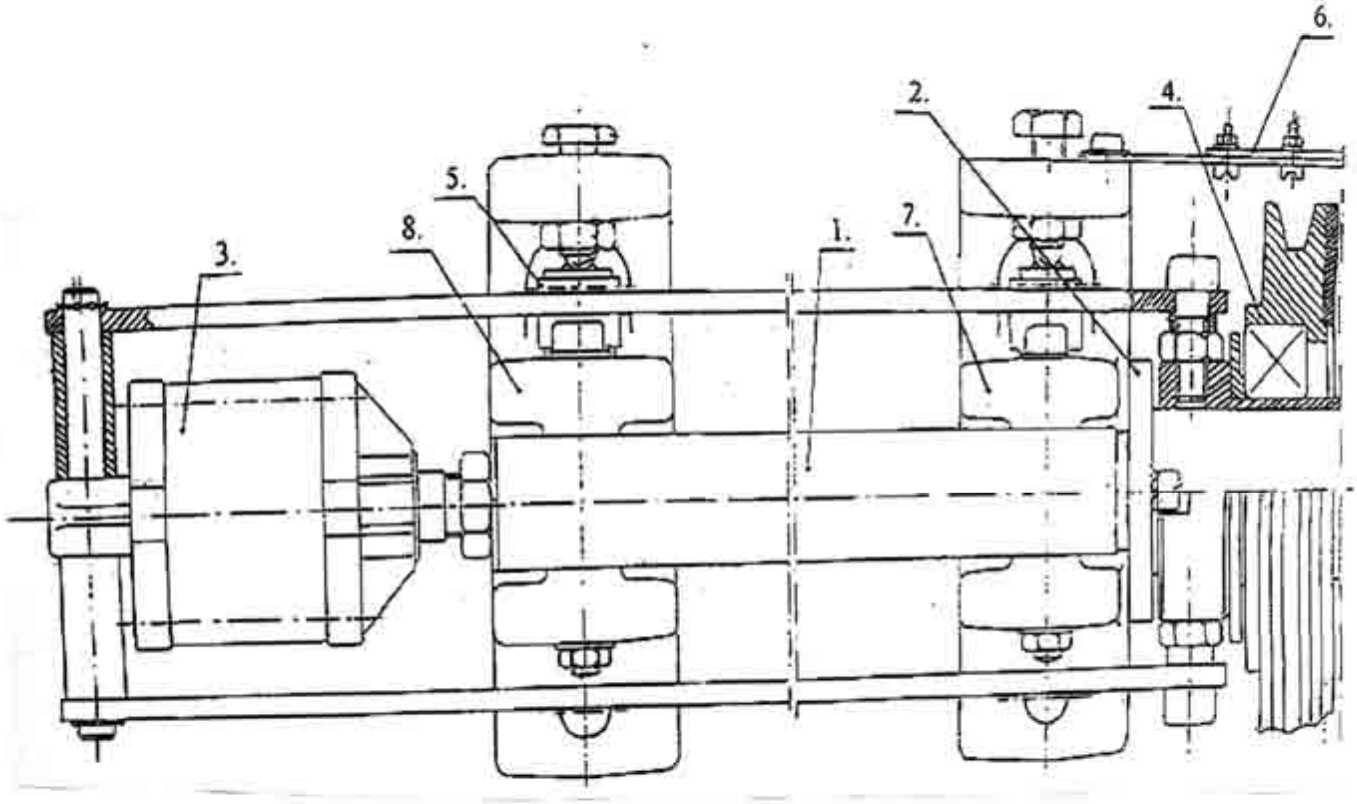
Wheel balancing machine

1. Shaft unit	02.00.00
2. Engine unit	03.00.00
3. Compresed air unit	05.00.00
4. Ultrasonic hood unit	06.00.00 - USG-TROLL 2156
5. Main board	P-PG-2156
6. Power board	P-S1F2pn
7. Sensor board	P-Cz OSO
8. Ultrasonic board	P-USG- TROLL 2156
9. Video board	TVGA - 9000
10. Monitor D-sub cable	P-P4ET
11. Ultrasonic connection cable	P-2eKP- TROLL 2156
12. Laud speaker	05.09.061
13. Main switch	05.05.005



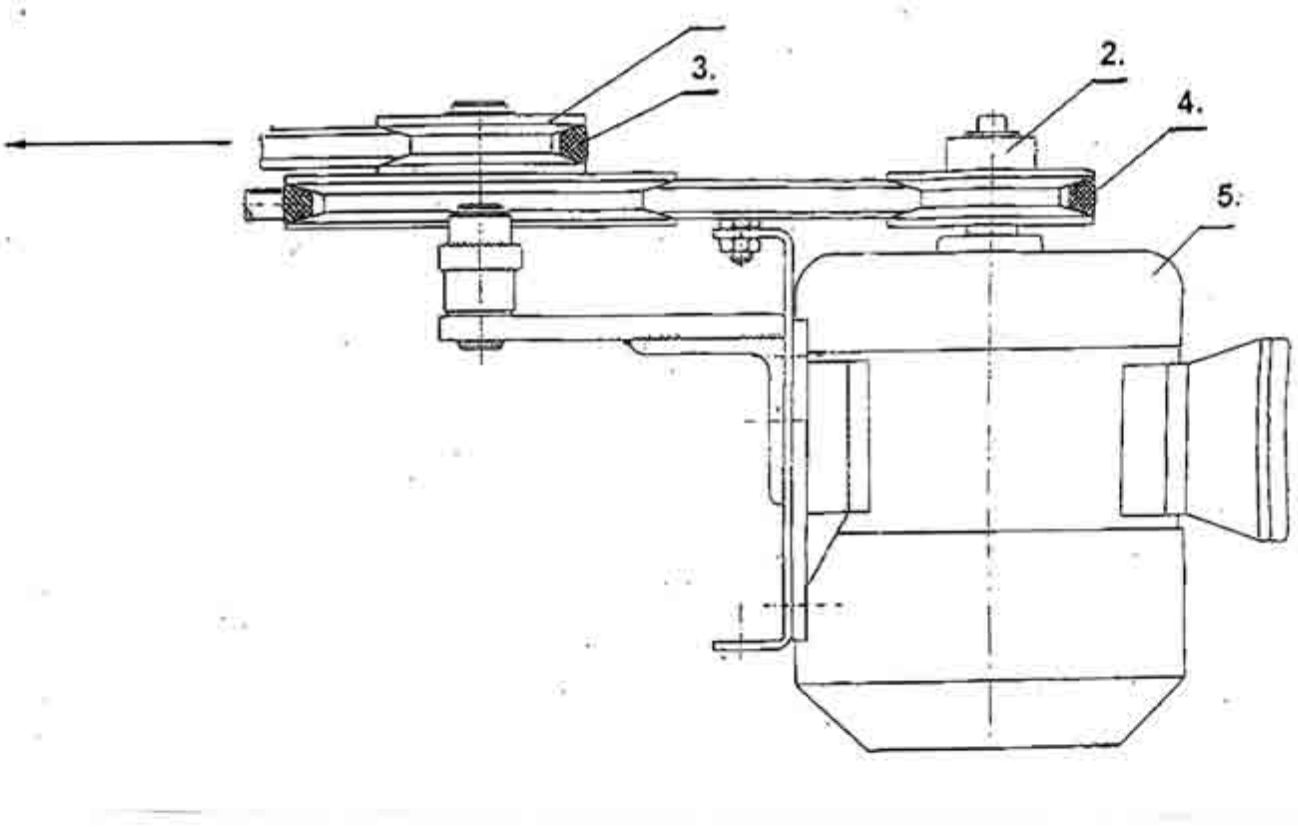
SHAFT UNIT 02.00.00

1. Balancer shaft	02.01.00
2. Bracket hanging of a clutch	02.02.00
3. Cylinder of friction clutch	02.03.00
4. Sliding collar of a clutch	02.04.00
5. Piezo sensor	02.05.00
6. Tachometer plate	02.06.00
7. Frontal bracket	02.00.01
8. Rear bracket	02.00.02



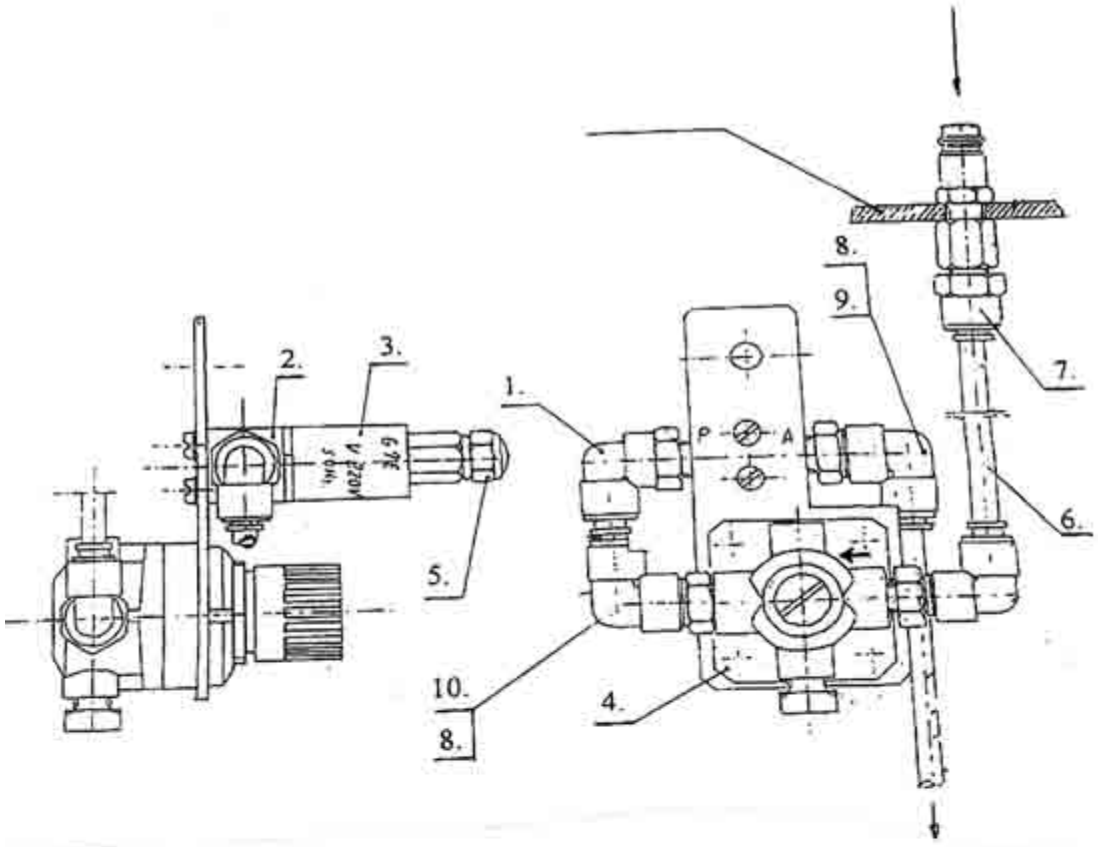
ENGINE UNIT 03.00.00

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



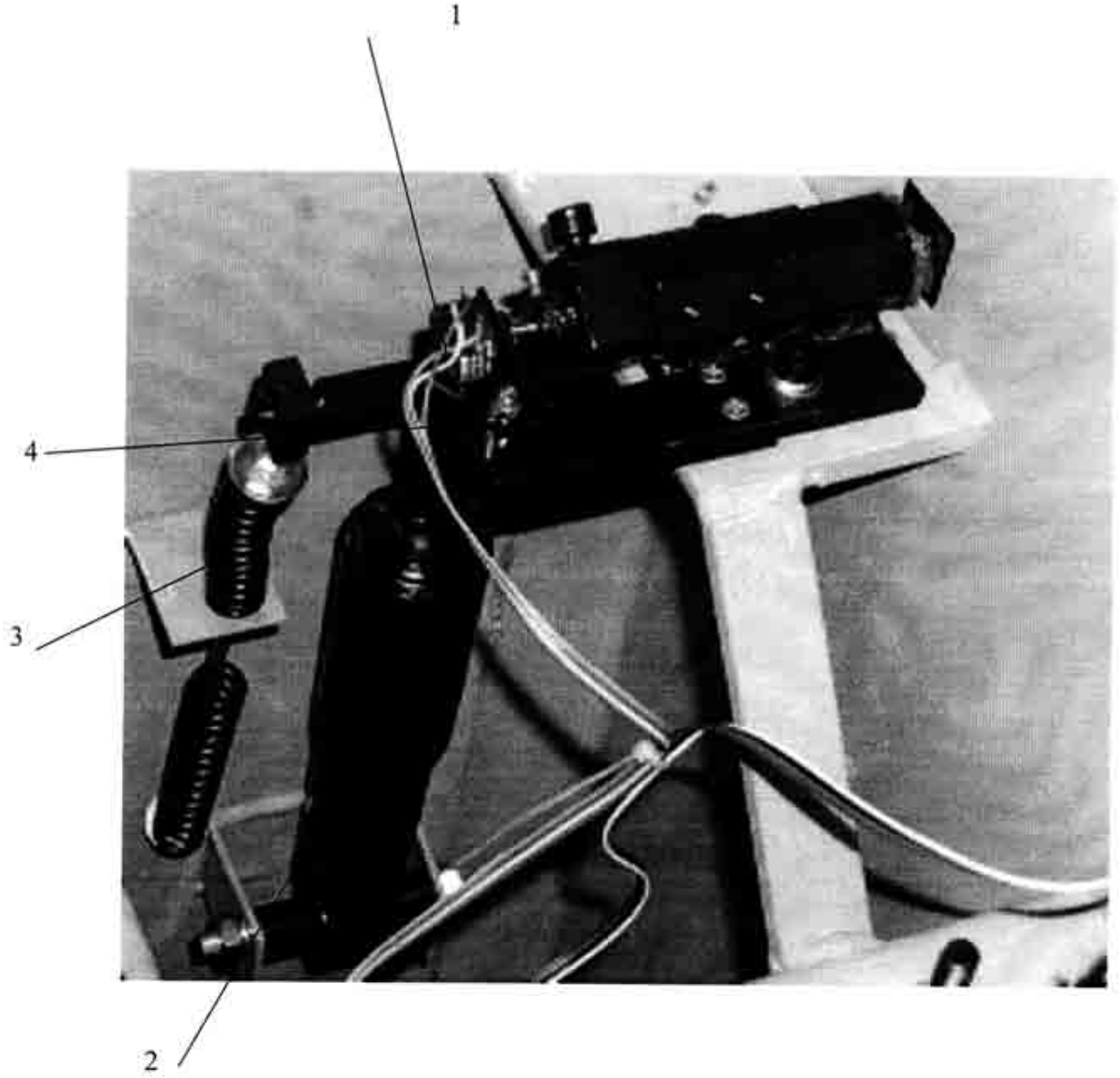
COMPRESSED AIR UNI 05.00.00

1. Angle connection	05.01.00
2. Selenoid value A331	07.01.017
3. Coil selenoid valve	07.01.018
4. Pressure regulator	07.06.025
5. Silencer 29011/8"	07.06.501
6. Pipe 6x4	07.05.003
7. Connection1/8"	07.06.502
8. Angle connection o 6	07.06.406
9. Connection 6 1/8"	07.06.601
10.Connection 6 1/4"	07.06.602



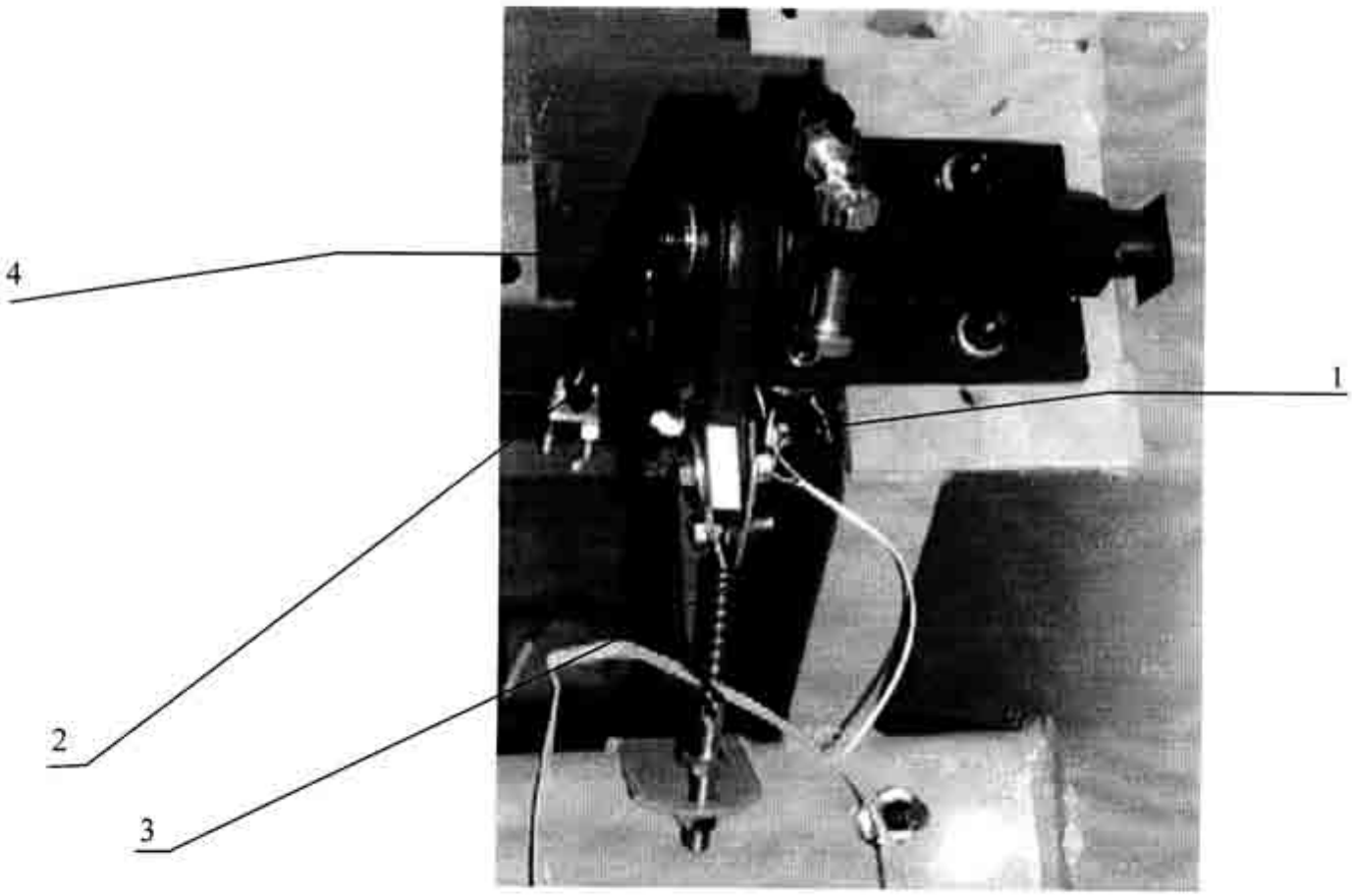
ULTARSONIC HOOD UNIT

1. Potentiometer	04.02.601
2. Telescopic shock absorber	05.09.003
3. Spring S-733	06.01.024
4. Spring R-281	06.01.071



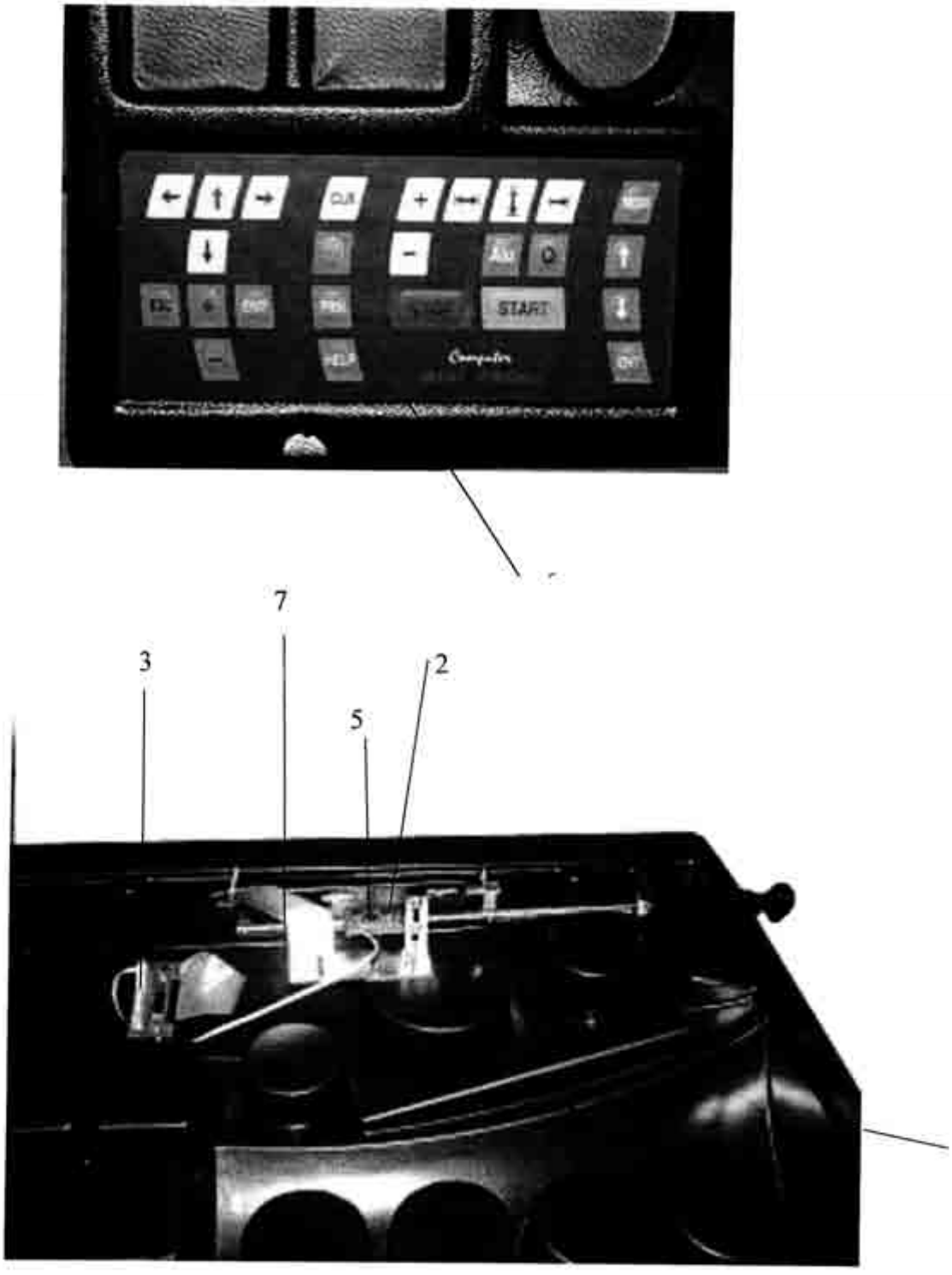
HOOD UNIT

1. Switch	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

1. Plastic top cover	04.00.03 -
2. Distance optocovplers plate	P-TRN
3. Keyboard plate	P-KL
4. Plastic bracket	06.01.123
5.Toothed bar	06.01.124
6. Keyboard	06.02.028



ULTRASONIC HOOD 09.00.00-USG

1. Hood	09.00.01
2. Connection cord	P-2eKO
3. Ultrasonic sensor	05.07.007 - TROLL 2156

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e-mail:office@unitrol.com.pl.

WHEEL BALANCING MACHINES TYRE CHANGERS EQUIPMENTS FOR TYRESHOPS

Statistic number : 008132994 - 020 - 52 - 46

Tax number : 527

CE Conformity Declaration

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

We : **Uni-trol Sp. z o.o.**
Ul. Estrady 56
01-932 Warsaw
Poland

declare, under our exclusive responsability, that the product

Wheel balancing machine TROLL 2151

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 characteristics	Low voltage power supply devices dc output - Performance and safety requirements;
- PN - EN 61293 / 2000	Marking electrical equipments with ratings to electrical supply - Safety requirements;
- 62/2002 = EN 60799 / 1998	Electrical accesories - Cord sets and interconnection cord sets.
- 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.

UNI-TROL Sp. z o.o.
ul Estrady 56, 01-932 Warszawa
tel./fax (0-22) 8349013-14, 8179422
NIP 527-020-52-46

Wiesław Roguski
Chairman of Board

Warsaw, 10.01.2003

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We : **Uni-trol Sp. z o.o.**
Ul. Estrady 56
01-932 Warsaw
Poland

declare, under our exclusive responsability, that the product

Wheel balancing machine TROLL 2156

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 :

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- 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;
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Warsaw, 10.01.2003