DO NOT START THE MACHINE BEFORE READING CAREFULLY THESE INSTRUCTIONS

REMARK :
Wheel balancing machine TROLL 3100 isn"t equiped an automatic ultrasonic system measurement geometrical parameters of balanced wheel. All description concern the service this system, placed in present manual instruction, arent conforming to this type machine.
The balancing machine TROLL 3105 is provided with an automatic measurement system geometric for measuring parameters of the wheel balanced, start while closing the wheel guard. After closing the guard the measuring cycle is started automaticaly.

1 . APPLICATION AND TECHNICAL DATA

TROLL 3100 / 3105 balancing machine is designed for dynamic balancing of car and van wheels in a single measurement cycle.

TECHNICAL DATA :

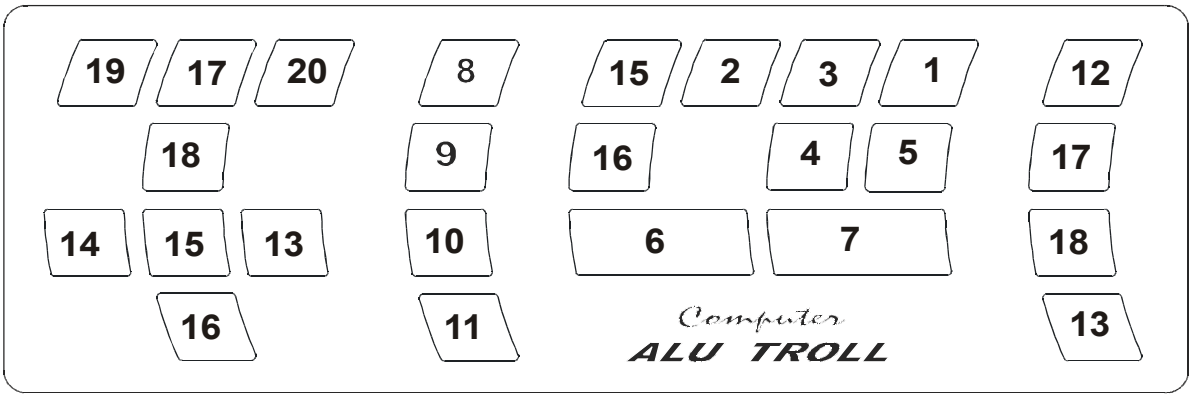
- max. wheel diameter		1,15 m
- wheel diameter		10" - 24"
- wheel width		2" - 10"
- accuracy of unbalance indications		1 g
- accuracy of unbalance location signal		3 stages
- measurement time		3 s
- machine weight		ok. 145 kg
- overall diamensions	with closed shield:	1140x900x1150 mm
	with open shield :	1140x1050x1450 mm
- whell weight		do 60 kg
- drive motor rating		0,25 kW
- spindle spind (during measurement)		230 r.p.m.
- power supply		220 V / 50 Hz
- air supply		0,6-1,0 MPa

The balancing machine TROLL 3100/3105 is equipped with a speach synthetiser, emitting confirmations of each operation performed and suggesting procedures for whel balancing. Indications quantity and position unbalance take reading on monitor measurement.
Programme „hiden weight" allows on the partition and the spacing of balancing slugs on invisible spoken of alloy rim. Balancer is equiped an automatic stop at the top which is blocking of wheel for both point of unbalancing. The brake release is seting after a little displacement (ca. 3 grades) of wheel from shown unbalancing points or after press the button on the keyboard which indicate a disapperation of arrows.

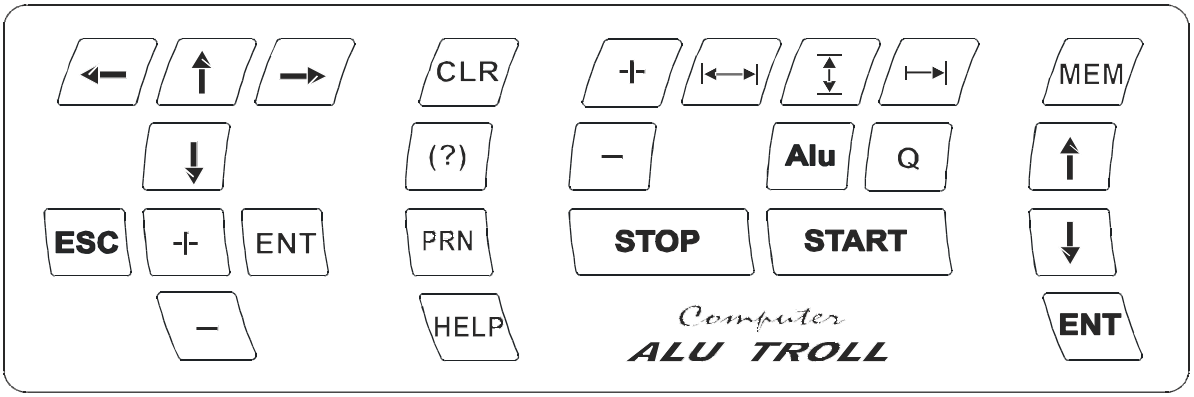
2 . INSTALLATION

TROLL - 3100 / 3105 balancing machine should be installed in a closed, dry room, heated during auttumn / 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.

Buttons numbers



Keyboard



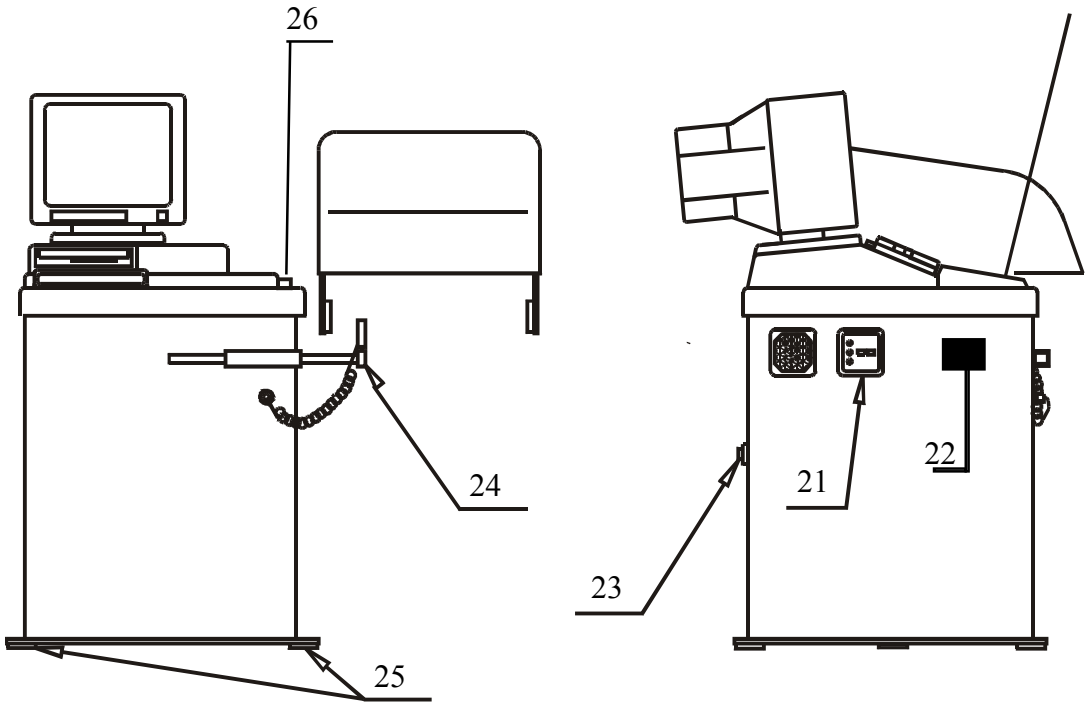


Fig 1 Keyboard and balancing machine

3. CONTROL PANEL DESCRIPTION (figs 1 and 2)

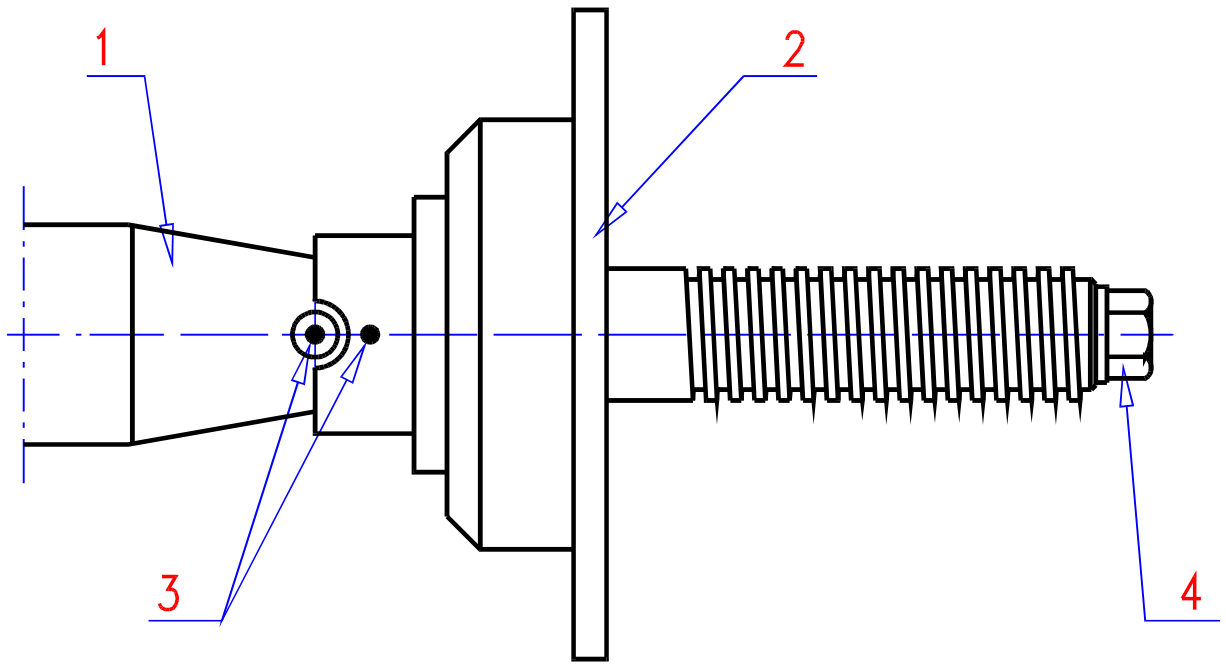
Announcements emitted by the balancing machine after depressing a particular push - button are given in barckets

1- Wheel width setting push - button [WIDTH]
2- Wheel diameter setting push - button [DIAMETER]
3- push - button for setting distance from wheel inside correction plane [DISTANCE]
4- Key for selection of programme for different weight fixing methods [WHEEL TYPE CHANGE]
5- Lock out threshold selection key [THRESHOLD CHANGE]
6- Machine drive off key
7- Machine drive on key [CAUTION START]
8- Reset push - button [NEW MEASUREMENT]
9- Key for inititing current unbalance value recording [UNBALANCE CONVERSION]
10- Printer start key
11- Auxiliary key
12- Balancing machine memory initiating key [MEMEORY READOUT]
13- Subrotine input key
14- Subrotine output key
15- Parameter change key - increase
16- Parameter change key - decrease
17- Cursor up key
18- Cursor down key
19- Cursor left key
20- Cursor right key
21- Balancing machine master switch
22- Printer
23- Socket to connect cabel - lenght shield
24- Sensor run - out measurement in programme minimisation
25- Rubber pad
26- Controller for setting distance of inboard wheel correction plane

Full list announcements emitted by the balancing machine

- SYSTEM TEST
- SYSTEM OPERATIVE
- ATTENTION START
- THRESHOLD CHANGE
- CHANGE OF WHEEL RIM TYPE
- CALIBRATION
- WRONG CALIBRATION
- WHEEL BALANCED
- WHEEL UNBALANCED
- MEMORY READOUT
- NEW MEASUREMENT
- UNBALANCE CONVERSION
- CLOSE SHIELD
- ACCELERATION ERROR
- BRAKING ERROR
- WIDTH
- DISTANCE
- DIAMETER
- REDUCE WEIGHT
- INCREASE WEIGHT
- SHIFT LEFT
- SHIFT RIGHT

4. FITTING BALANCING MACHINE FIXTURE



Rys.2. Fitting fixture without nit, tapers and sleeves

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

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

5. MOUNTING WHEEL SHIELD

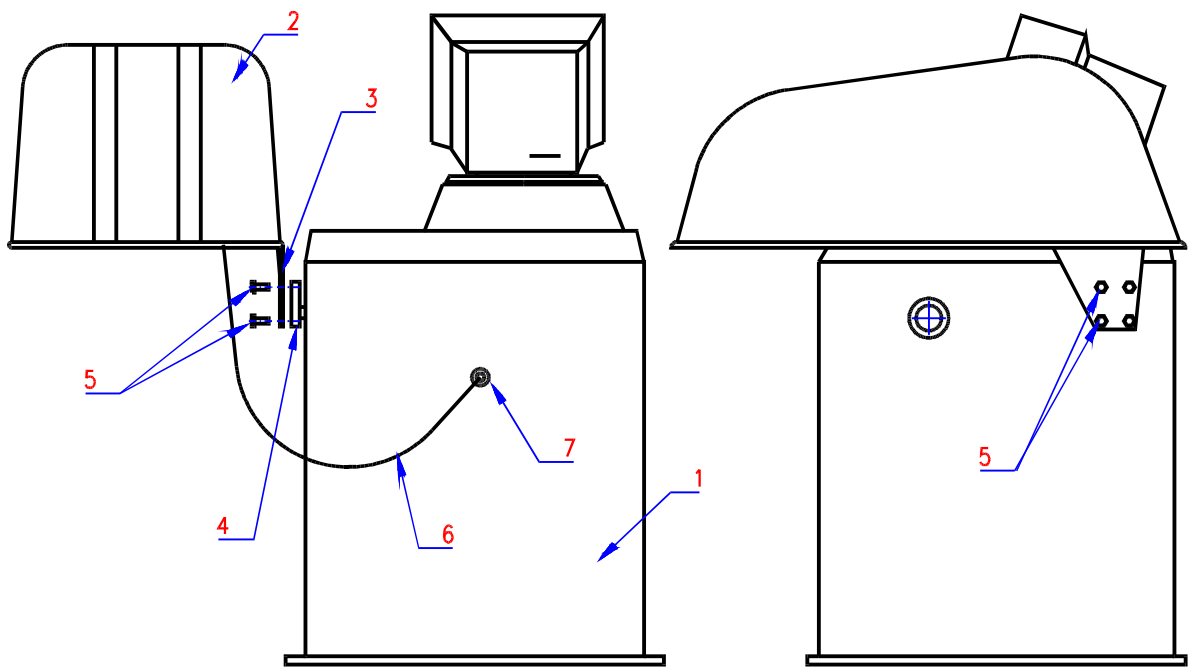


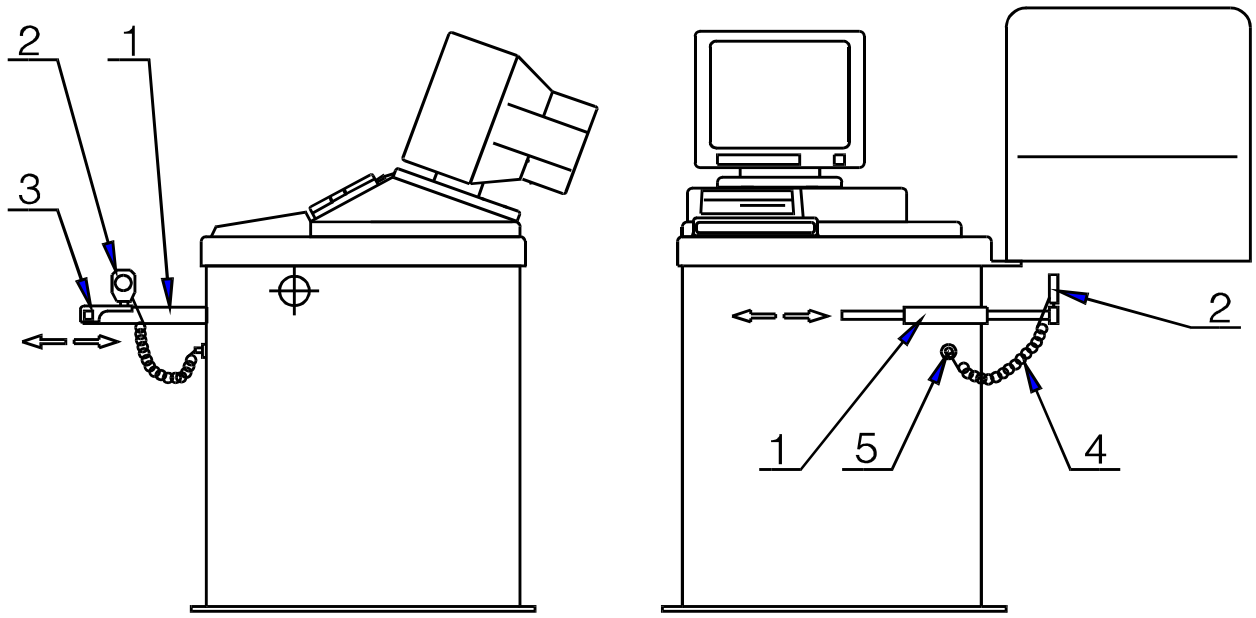
fig. .3. 1- BALANCING
2-WHEEL SHIELD
3- SHIELD EYE
4- SHIELD PIVOT FLANGE
5- MOUNTING BOLTS
6- SHIELD CABLE
7- SOCKET CABLE SHIELD

Set shield (item 2) vertically and fix to shield pivot flange (item 4) by means of four M8 bolts (item5) passing through shield eye (item 3).

Connect guard cable (item 6) to socket (item7). The connected cable must not be strained while opening and closingthe guard, it must be slack.
Unless the cable is connected , the automatic start of the balancing machine will not possible.
NOTE :
In the machanism of the shiekd a dramper is provided to limit the opening and closing speed.

- STOP

6. MOUNTING SENSOR STAND



Rys.4. Zespół czujnika bicia

1- statyw czujnika
2- czujnik
3- końcówka statywu czujnika
4- przewód elektryczny
5- gniazdo czujnika

In order to mount the run - out sensor the following should be done:
- mount the sensor stand „1" in the guide opening (in the housing front panel),
- push the sensor „2" in the end part of the stand „3"
- connect the cable plug „4" with the socket"5" a screw down,

The sensor may be mounted on the stand perpendicularly against the balancing machines side panel (for the radial run - out measuremant) or parallel against the balancing machines side (for the axial run - out measurement).

The cabel „4" is located in the housing "s rear panel. The ultrasonic generator is located in the opening in the sensor is front panel.

NOTE :

The sensor is front panel must be turned towards the part being measured.

In case the sensor is not used, the stand should be positioned so that it could not hinder the wheel balancing .

7. CONNECTING – UP THE MACHINE TO POWER SUPPLY

7.1 Installation power supply balancing machine

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

7.1.1 Connecting of iar supply

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

7.2. Installation and connection of monitor

Particular description in monitor instruction.

7.3. 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.

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

8. OPERATING BALANCING MACHINE COMPUTER

8.1. Switch balancing machine computer

Switch machine master switch on, as well as monitor power supply switch. Balancing machine will emit announcement [SYSTEM TEST] and them [SYSTEM OPERATIVE]. Atest pattern shall appear on monitor screen and then an advertisingimage. After depressing any key of the keyboard (fig 1) the computer will be set in [UNBALANCE MEASUREMENT] subroutine and the image shown in (fig 6) will appear on the monitor screen.

NOTE:

If during the inspection test, key 

(item.14 fig.1),is depressed,system test will be interrupted and advertising image display procedure will be interrupted. The computrer will be immediately set in [UNBALANCE MEASUREMENT] subroutine.

8.2. Select measurement procedure

After depressing the key 

computer is set in SELECT PROCEDURE programme and image,

shown in Fig 5 will appear on the screen.

Entry into respective subroutine is effected by depressing keys.Input to respective subroutine is effected by guiding the cursor to an appropriate position (box with appropriate subroutine) and depressing the key ENT. Cursor guiding - by depressing keys .

Output from respective subroutine - by depressing the key ESC.

SELECT PROCEDURE will appear on the screen, shown in Fig. 5

8.3. Unbalance measurement

Cursor guiding by depressing keys an position UNBALABCE MEASUREMENT (Fig.5) and push button ENT . The computer will set in the subprogramme UNBALANCE

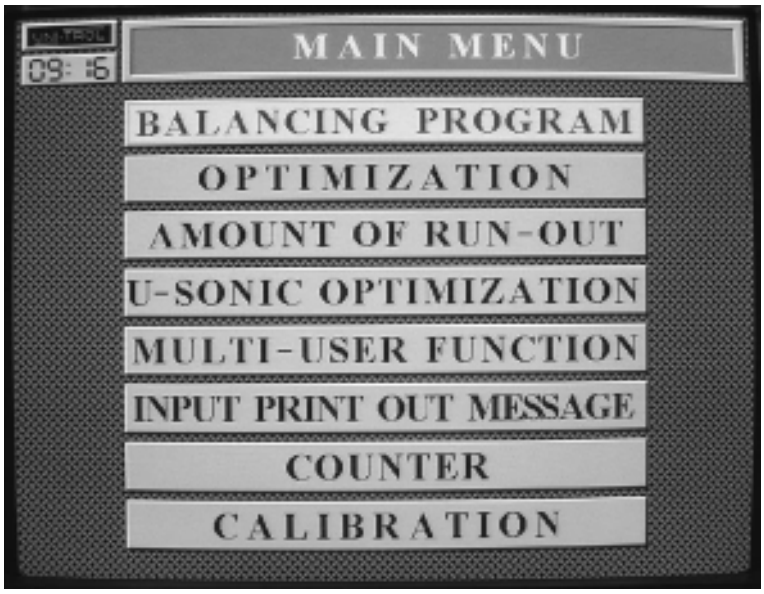


Fig.5

MEASUREMENT, the monitor will show the screen as per figure .6.

After this subprogramme has been initiated , the cursor will always point item 5 (Q - cut - off threshold).

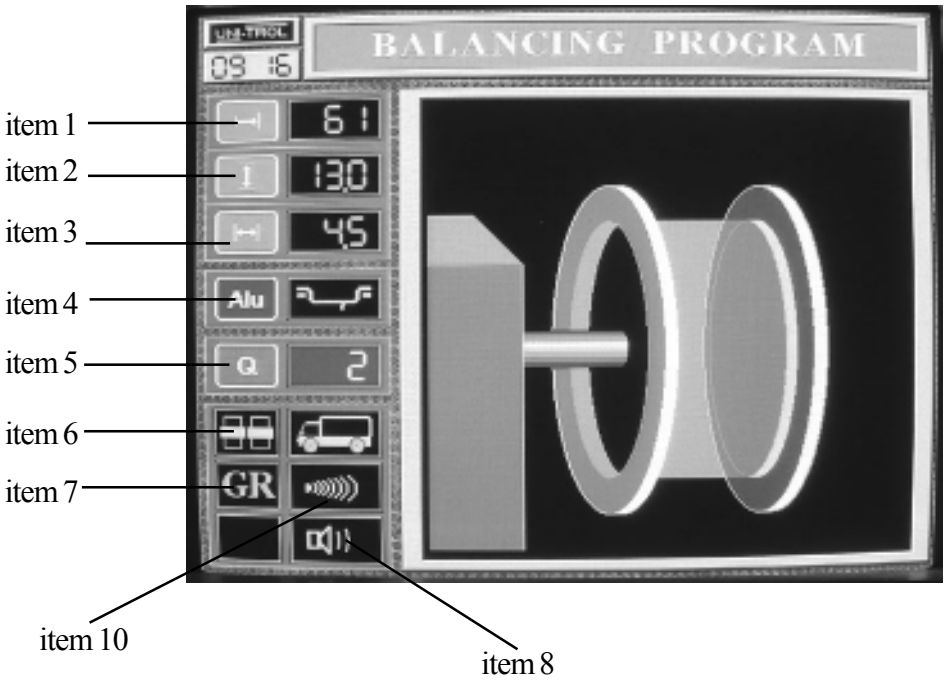


Fig 6

Guide cursor to position 10 (fig.6) with keys 17, 18, 19, 20 (fig.1). It is choice between automatic and manual start.

- **AUTOMATIC START** - by means of keys + or − setting iconrepresenting pictogram D)))) . Balancing machine comuter will be then programmed for automatic start. In this case, parameters of the wheel, mounted in the chuck, will be entered in machine memory during wheel guard closure and after closing the guard the machine will start automatically, measure unbalance value, stop the wheel and display measurement results.

- MANUAL START- by means of keys + or − setting in position 10. Balancing machine computer will br then programmed for manual start. In this case, parameters of the wheel to be balanced are entered to machine memeory, as described in items 8.3.1. - 8.3.3.

Above is concerning balancer TROLL 3105 Automatic start in balancer TROLL 3100 is setting other way. The change of mode starting will be realized by simultaneous pressing the button STOP and button (?) . If will show inscription AUT in position „10" (fig 6). The automatic starting will be connected after a closing of guard. If the inscription AUT isn"t shown. It means that machine is programming in manual start. The engine is connecting after pressing the button START .

8.3.1. Entering DISTANCE parameter manualy.

Guide cursor to position.1 (fig.6) over depressing key  or keys 17, 18, 19, 20 (fig.1). The machine will emit [DISTANCE] announcement.
Wheel distance setting should be dtermined 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. 7a)

NOTE:

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.7 b)
- measure with a rule distance L between balancing machine wall and the rim of the wheel mounted in wheel chuck (measurement in centimetre)s
- multiply the measured value by four and subtract three, according to formula:

DISTANCE = (4 x L) - 3

8.3.2. Entering „DIAMETER" parameter manually.

Guide cursor to position 2 (fig..6)over depressing key  or by means of arrow 17 - 20. The machine will emit [DIAMETER] announcement.

Depressing keys  or  the value of this parameter is from 10 to 24 inches.

8.3.3. Entering „WIDTH" parameter manually.

Guide cursor to position „3" (fig 6)  or by means of arrow 17 - 20. The machine will emit [WIDTH] announcement. Depressing keys  or  the value of this parameter is from 2 to 10 inches

8.3.4. Balancing Programm Selection

(irrespective of start) Guide cursor to position 4 (fig.6) over depressing key  or by means arrow 17 - 20. The balancing machine will emit [WHEEL TYPE CHANGE]

By depressing key  or  it choice of the variant of balancing slug accordingly to the wheel rim type.

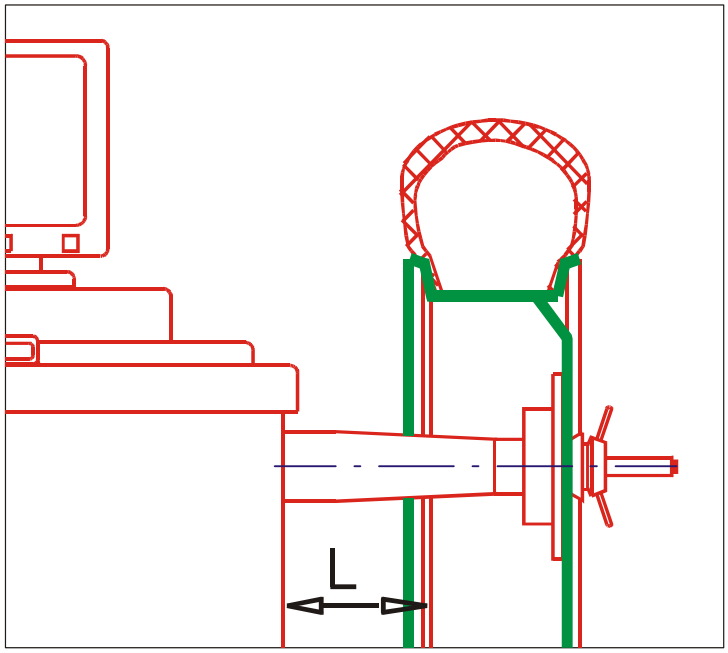


Fig7b . L - DISTANCE

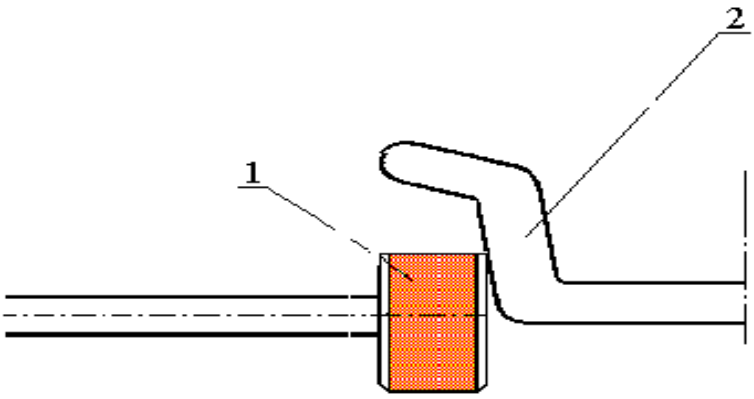


Fig 7 a

alternative 1

balancing through tapping weights on both wheel rim edges

alternative 2:

balancing trough sticking weights

alternative 3:

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

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 trough sticking weights inside wheel rim

alternative 7:

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

8.3.5. Entering Cut - Off Threshold Value

Guide cursor to position 5 (fig.6) over push - button Q or by means of arrow. The balancing machine will emit [THRESHOLD CHANGE].

Push- button + or − cut - off is changed 0g, 2g, 5g or 10g threshold may be set.

NOTE:
Entering cut - off threshold value"0" is changed automatic on value „2" after starting balancing machine.

8.3.6. Voice Volume Adjustment

Guide cursor by means of arrow to position 8 (fig.6). Over push button + or − we change voice volume adjustment.

8.3.7. Change of Measurement Pattern

Guide cursor by means of arrows to position 7 (fig.6) and push - button ENT .
Measurement pattern, shown in Fig 8 will be displayed on monitor screen.

Fig.8.

Return to previous measurement pattern is effected by guiding the cursor to item 6 and push - button ENT .

8.4. Setting Edit

Enter SELECT PROCEDURE subroutine by pressing key ESC .

Guide cursor keys ↑ ↓ to position SETTING EDIT (Fig.5).

Push - button ENT . The computer will be set in SETTING EDIT suroutine and image shown in Fig 9 will be displayed on monitor screen.

Fig.9.

Computer has the capability of recording and storing parameters of eight different, most frequently balanced, wheels.

8.4.1. Recording parameters in memory

Guide cursor keys ↑ ↓ to position where data of a particular wheel are to be recorded.

Example: recording wheel data of VOLVO car in position 1 (Fig.9):

Push - button ENT . Computer will be set in DETERMINE SETTING VALUES subroutine and image shown in Fig 10 will appear on the screen.

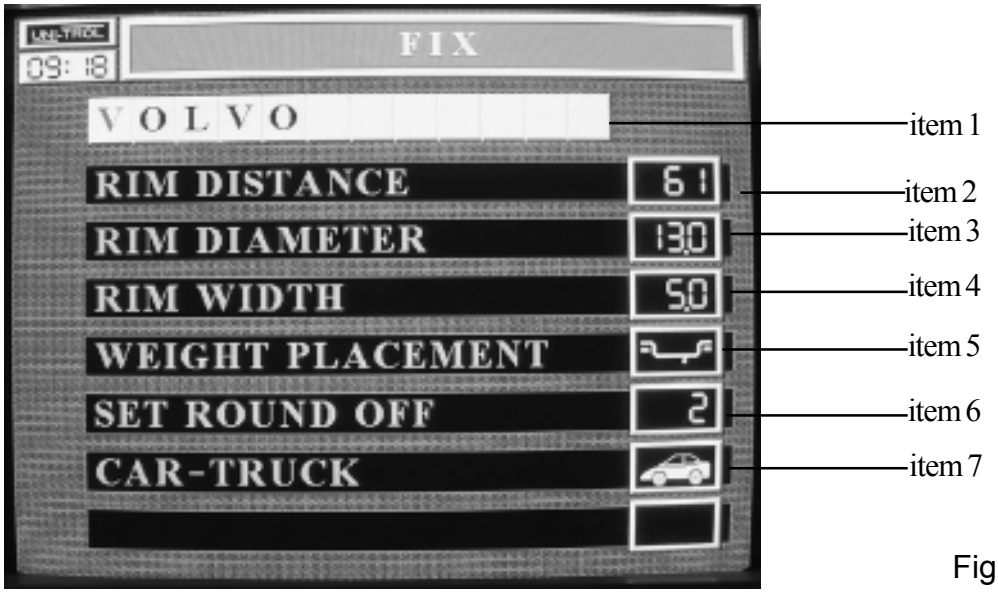


Fig.10.

Guide cursor keys ↑ ↓ to position 1 (Fig.10), with keys , ← → and then set cursor in box first from the left. Push - buttons + − so as to have letter P appear in this box. By means key → enter subsequent box and key + so as to have letter O appear. Following this procedure complete the word VOLVO.

Guide cursor keys ↑ ↓ to position 2 and by means of keys + − determine DISTANCE value appropriate for the particular wheel type.

In silimar manner, programme WHEEL DIAMETER in pos.3, WHEEL WIDTH in pos.4, WHEEL TYPE in pos.5 and MEASUREMENT ACCURACY in pos.6.

By pushing button ESC this data are entered to computer memory what is conform by announcement MEMORY RECORDING. On monitor screen image shown in Fig 9 will appear with name VOLVO.

8.5. Heading Edit

Input to PROCEDURE SELECT subroutine by pushing button ESC .

Guide cursor with keys ↑ ↓ to position HEADING EDIT (Fig rys.5)and push button ENT . The computer will be set up in HEADING EDIT position and image shown in Fig.11 will be displayed on monitor screen.

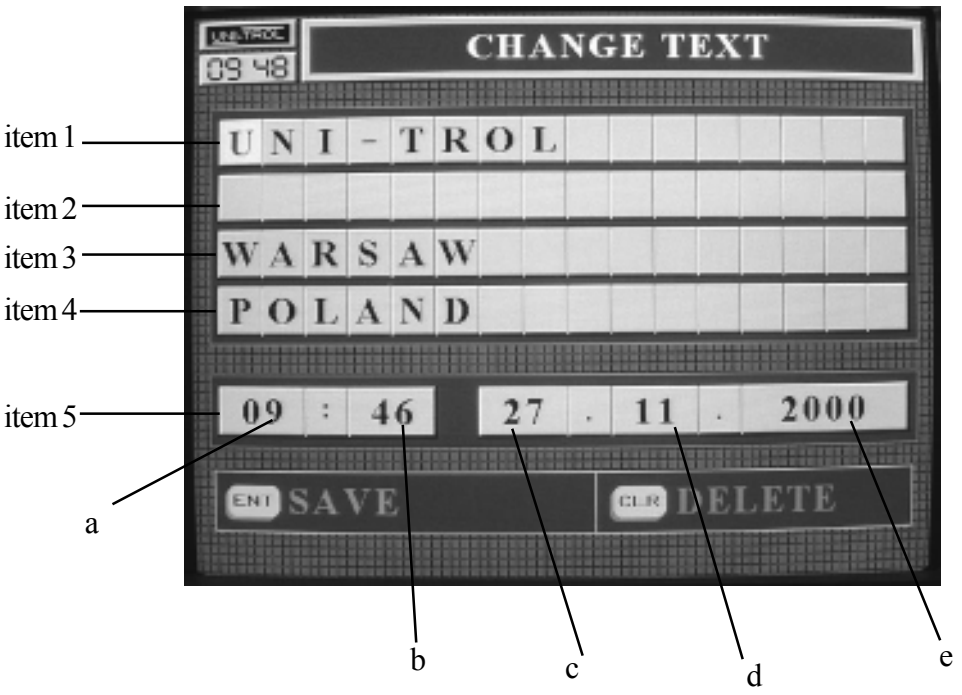
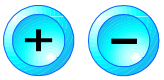


Fig 11

8.5.1. Recording heading edit

Buttons  guide cursor to position from 1 to 4 (Fig.11).

Buttons  guide cursor on box to position from 1 to 4.

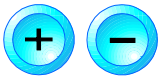
Buttons  choice box and setting any letter or figure.

In positions from 1 to 4 enter name of the works (name, adress, phone).

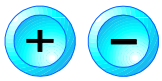
After settingin each position, store them in memory by pushing button  . Output from respective subroutine by pushing button  .

8.5.2. Setting time

Push button  guide cursor to position 5a (Fig.11).

Buttons  set hour

Push button  guide cursor to position 5b.

Buttons  set minutes.

8.5.3. Setting data

Setting data is similar to setting time
Set date in c - month in d - year in e.

NOTE:

After setting data in each position , store them in memory by pushing button ENT .

8.6. Measurement counter

Enter SELECT PROCEDURE subroutine by pushing button ESC . Guide cursor with keys ↑ ↓ to position MEASUREMENT COUNTER and press ENT. The computer will be set in MEASUREMENT COUNTER subroutine and image, shown in Fig.12 will appear on monitor screen.

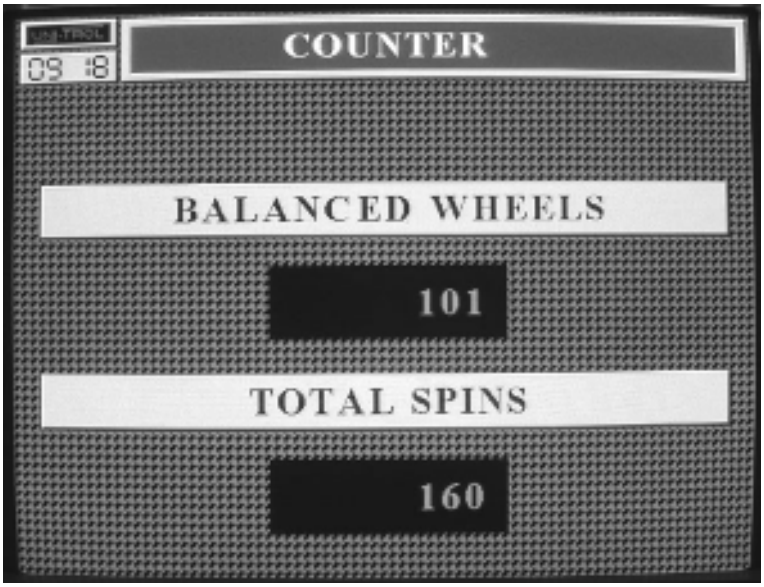


Fig.12.

9. WHEEL BALANCING INSTRUCTIONS

9.1. Mounting The wheel On The Balancing Machine

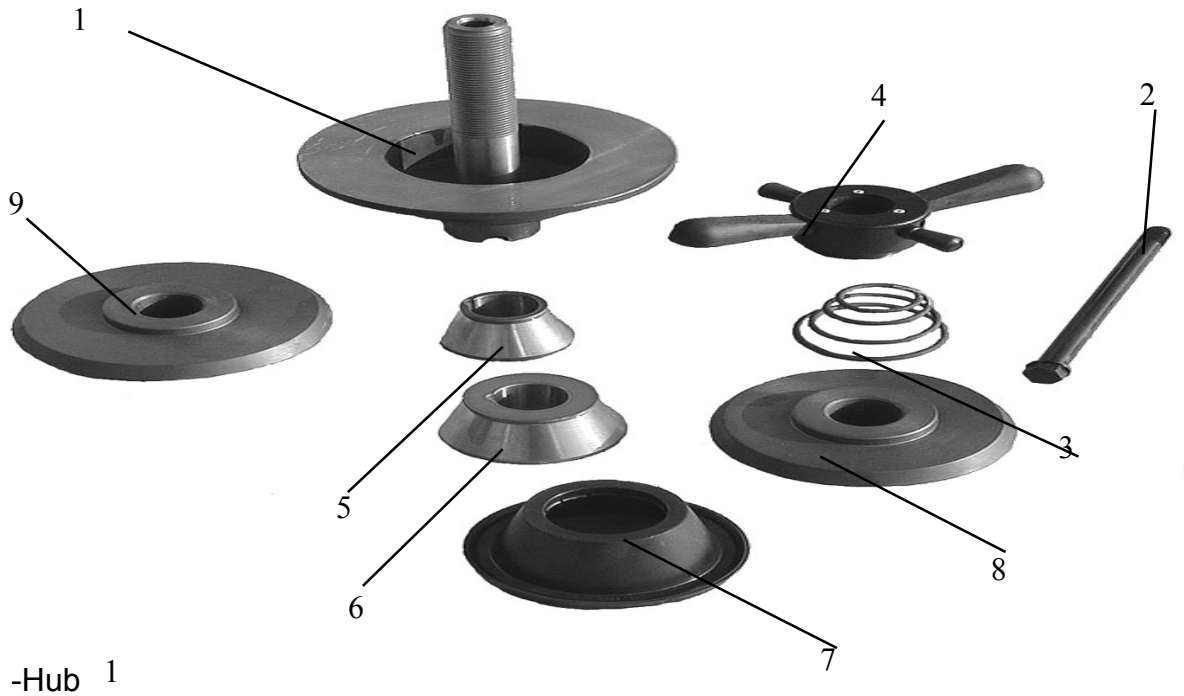
Wheels with a central hole are mounted is a central fixture, supplied as standard equipment withthe balancing machine. This fixture is to be fitted to the balancing machine spindle as decsribed in item 4 below.

NOTE: It is recommended to wash the wheel prior to mounting on the balancing machine to prevent distortion of measurement by mud particles.

9.1.1 Quick release fixture

Type QUICK - TROL quick release fixture is intended for mounting car on a van wheels, with central hole wheel rims, on balancing machines

FIXTURE COMPONENT PARTS (Fig.13):



1 -Hub 1

2 -Bolt for mounting fixture to balancing machine spindle

3 -Spring

4 -Clamping nut

5 -Centering taper No.1

6 -Centering taper No.2

7 -Pressure ring

8 -Centering disc No.1 (with twin taper)** (120 - 140 mm)

9 -Centering disc No.2 (with twin taper)** (140 - 160 mm)

** extra equipment

CLAMPING NUT (Fig 14)

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 fixture rod thread. In position D (clamp), the nut may be screwed onto fixture rod thread.

MOUNTING WHEEL IN FIXTURE

Slide wheel on fixture bolt and suspend it by the edge of central hole centering taper 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.15) move lever to the right, to position CLAMP and tighten nut, preesing the whell against fixture disc.

Fig..15. Tightening nut

in order to remove wheel from fixture, rest index finger on nut pin (as shown in Fig. 16) and loosen nut by one half turn. It may be then slid off the rod and the wheel may be removed from fixture.

Fig. 16 Loosening nut

This desing of the fixture 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 taper No. 1, 2,
-with centering from the inside of wheel rim
- fixture nut should have pressure ring in place.
2. to user taper No. 1, 2,
-with centering from the outside of wheel rim (as shown in Fig 17)
- nut wthout pressure ring.
3. to use centering disc No. 1 or 2 (as shown in Fig 18)
- nut without pressure ring.

Fig. 17

Fig.18

Fig. 19

REMOVING NUT PRESSURE RING

Fig. 20.

While centering discs and Nos 1, 2, and 3 tapers 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.

9.2. Entering measuring settings

DISTANCE - see position 8.3.1.
Balancing machine is programmed for automatic start. In such case geometrical parameters of the wheel mounted in the chuck , will be entered in the machine memory while closing the wheel guard and after closing the guard the machine is started automatically , measures unbalance values stops the wheel and displays measurement results.
in items 8.3.1. - 8.3.3.
item 8.3.4. - select balancing programm
item 8.3.5. - entering cut - off threshold value

9.3. Entering measurement settings from computer memory (manual start only)

If a wheel whose parameters were recorded in the computer memory ealier (see item.8.7.1), is to be balanced, then push - button MEM .

Computer will be set in [MEMORY READ OUT], and image shown in Fig.21. will appear on the screen.

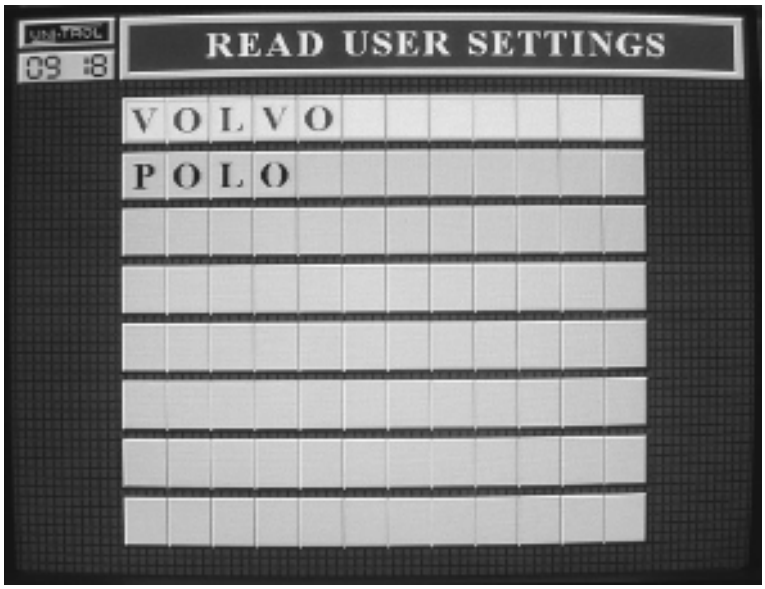


Fig.21.

Guide cursor keys   to position , when setting particulars dane wheel balancing.

Pushing button 

enter parameters of the whell as correct measurements settings. The computer will be set in UNBALANCE MEASUREMENT Fig .6.

9.4. Balancing wheels

Measurement of unbalance data if balancing nachine has been programmed for automatic start, spindle drive will be started upon closing the wheel guard.

NOTE:
Lower wheel guard slowly to allow time for ultrasonic sensors to complete measurement of wheel parameters. If the guard is closed too quickly the machine will not start.

Measurement of unbalance data if balancing machine has been programmed for manual start, closing the wheel guard and pushing button 

.If wheel guard is remove it spindle drive will be started after pushing button 

and the same time push button 

.

Working cycle is performing without operator's interference until the projection on indicators the value of unbalancing and automatic checking braking to 30 r.p.m. Each turn should be audible signals a different freguencies other for left and right side of wheel. Signals are generated at the moment when red balls (indicator no 2 or 3 - see picture 22) are on the top symbol of wheel or when arrows (indicator no 2 or 4 - see picture 23) changed red on green colour.

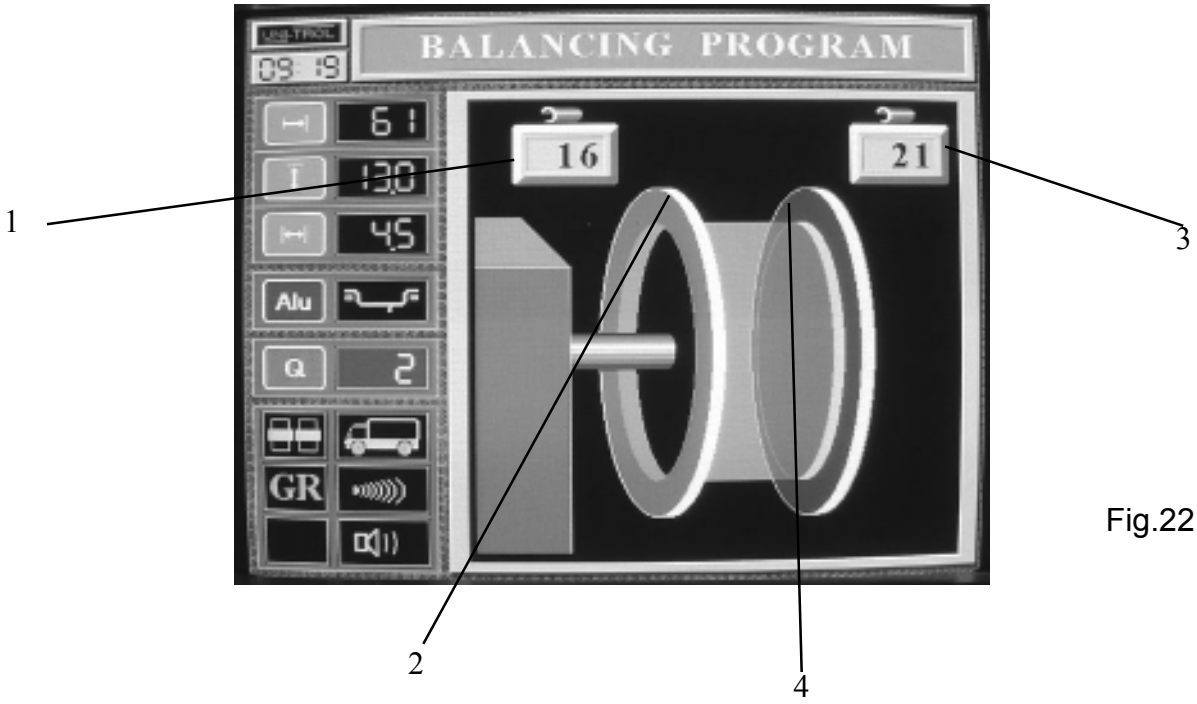


Fig.22.

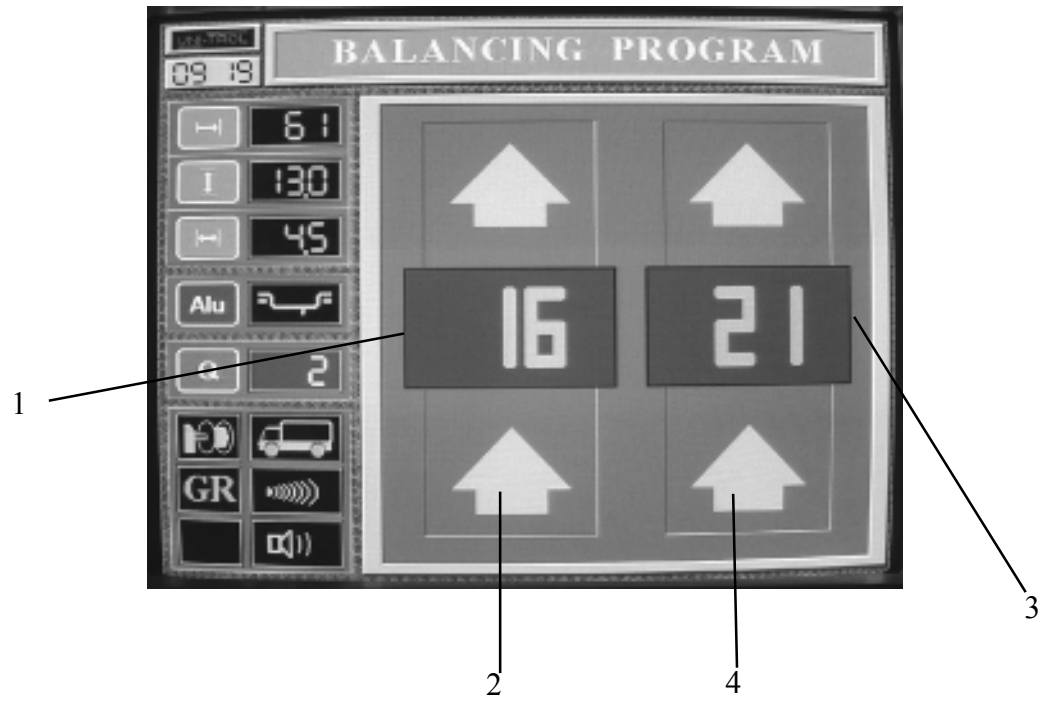


Fig.23.

Please remember:

Whatever is displayed on displays „1" and „2" (Fig 22 i 23) applicable to inside correction plane i.e.dotyczy whell rim edge closer to balancing machine housing and whatever is displayed on displays „3" and „4" is applicable to outside correction plane i.e. wheel rim edge closer to fixture nut

Value of 25 displayed on display „1" informs about the need to tap a 78 g weight to the inner edge of the rim in order to balance the wheel, that means for the purpose of liquidate unbalance on inside balancing plane nailed the weight a 25 g an on outside plane nailed the weight 80g.

After opening the shield rotating the wheel in either direction direction and watching display (fig 18) locate the point of unbalance for that plane. For this wheel position tap a 25 g weights at the top of the inside of wheel rim.

In a similar way, look for the point of unbalance for inside correction plane . In moment audio signal stop the wheel and fix a 80 g weight at the top pointon the outside of wheel rim.

NOTE:

ALUTROL - 3005 balancing machine has automatic brake stopping wheel in unbalance location for correction plane. Release brake foolowing after turn wheel about min. 3 stages from unbalance location, as well as after pushing buttons 

or 

.

After fixiing weights of specific weight and in soecific location make a recheck.Theoretically, on displays „1”and „3' two zeros should be displayed meaning that resiude 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 weightc tolerance.

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

Thirdly - a balancing weights is not a concetrated mss but has a certine lenght 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 wheel rim indicated by the balancing machine.

Case 1 :

A zero on both displays and the balancung machine announced [WHEEL BALANCED]. This means that the wheel has been to 5g as we operated at the cut - threshold. Push - button Q (item 5 fig. 1) and (?) 9 item 9 fig 1) and setting cut threshold at 2 g level we can say whether we balanced the wheel with point of accuracy up to 2 g. It will happen when on both non - balancement indicators the value „0” will appear if however the value 2 g for example appe-ars on one indicator and 4 g - on the second one it means that will balanced the wheel with the point of accuracy up to 4g. After pressing the button „Q” and setting the cut -off threshold again on 5 g the value „0” will appear on the indicators.

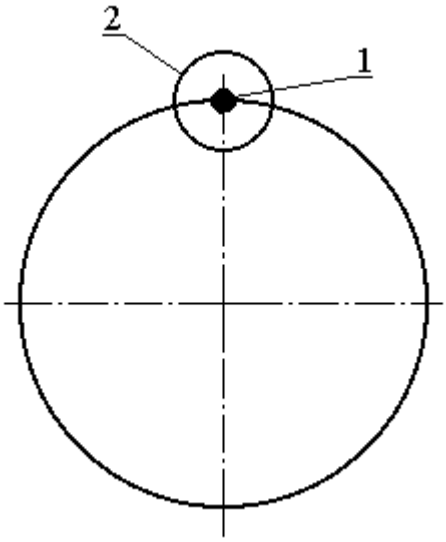
Case 2:

After balancing a wheel the following resultswere obtained :

- displays „1” (inside correction plane) - 6
- displays „3”(inside correction plane) - 7

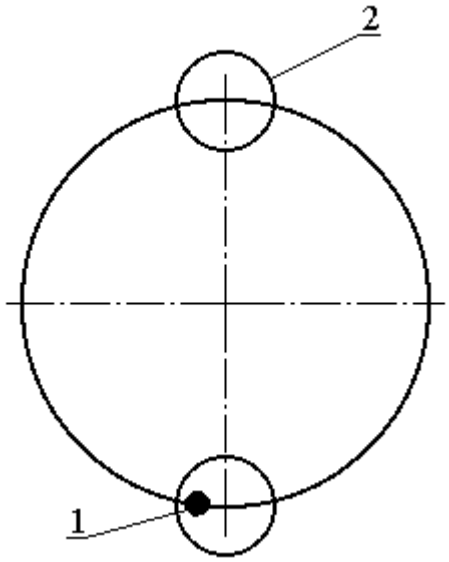
Further operations comprise positioning the wheel according to the new location of unbalance (for each correction plane) The balancing machine may emit the following announcements

[INCREASE WEIGHT] - in the new location of unbalance coincidens with the old one or is lose to it.



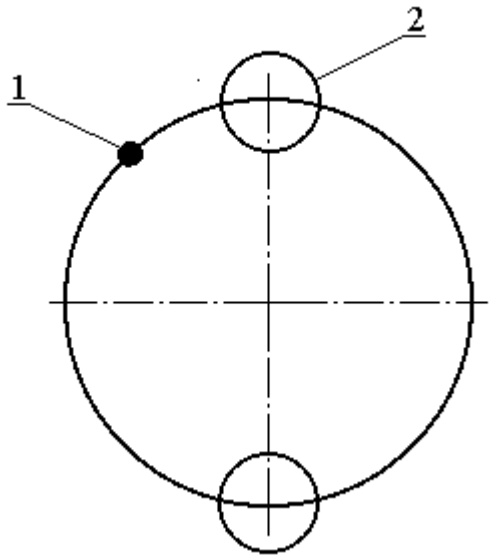
1-weight new correction plane

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



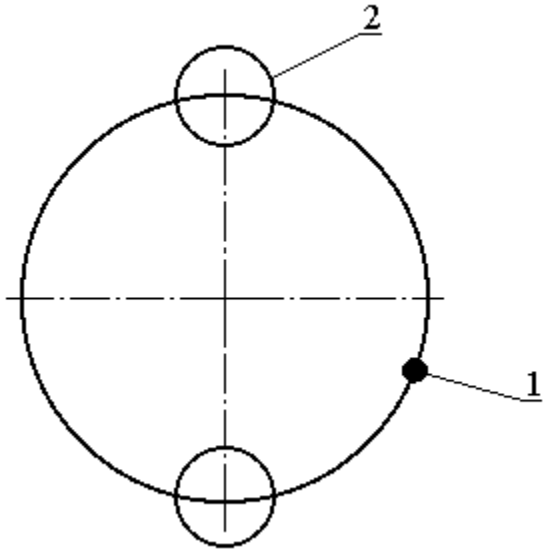
1 - weight 2 - new correction plane

- [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 reside unbalance requires a small shift correction.

NOTE :
If zero (no unbalance) is displayed on display „1” there will be not loacation display on display „2” . The same applies to displays „3” and „4” .
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 : 5g
- 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 5 appear alternatively. For 10g threshold the results may be 0 or 10.

9.5. Balancing light - alloy wheels

Light - alloy wheels are balanced by means of stick - on weights or combination of stick - on and studded weights. Set appopriate balancing programme according to the method of fixing weights (see item 8.3.4) .

NOTE :
Measurement settings are entered as for studded weights. these are geometrical dimensions of the whell rim. Selection of appoprite balancing method (e.g. both weights stick- on) results in the balancing machine taking into account the change in weight fixing points - on respective correction planes different from those resulting from the entered data.

Stick - on weights must not be removed and replaced. Therefore after unblance value has been displayed stuck always a weight 5 -10 g lighter than that indicated by the machine. After second measurement this unbalance may be corrected by sticking another small weight (e.g. 5 g) at the new balance point as indicated by the machine. In such way possible position correction by shifting the weights is avoided which in the case of stick -on weights is not possible.

9.6. Conversion of 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, enough to enter in the machine memory (see item 8.3.2 - 8.3.4.) correct data and push - button

9.7. 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 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 machine 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].

9.8. Concealed weight programme

„Concealed weight" programmeis used in balancing spoke wheels when on the outboard correction plane the point of unbalance is sittuated in the space between spokes and it is desired that the weight is invisible from outside the wheel. By means of this programme, the unbalance value shown on display "3" (Fig.24)
may be split between two balancing weights to be stuck at the back of two spokes, situated at the least distance from the point of unbalance.
Procedure for „Concealed Weight" programme:

1. Select version 6 or 7 of the balancing programme (as per item 8.3.4)
2.Enter measurement settings [WIDTH, DIAMETER, DISTANCE] for a particu;ar wheel type and start with key the measurement cycle of the balancing machine.
3. After the wheel is stopped correct the unbalance in the inboard correction plane, indicated on display „1" in the usual way, as described in items 9.4 i 9.5 .
4. Unbalance in the outboard correction plane shown on display „3" is to be corrected with two weights according to the following procedure :

a - guide cursor keys and on symbol 3P (item.9 Fig.24)

Fig.24.

b -push - button ENT . Measurement pattern shown in Fig .25 will appear on monitor screen

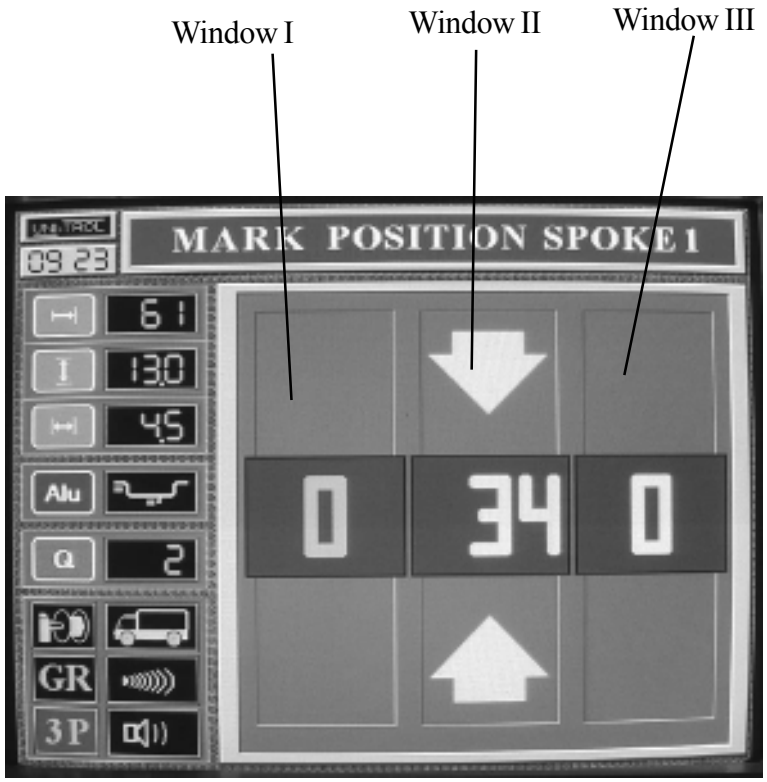


Fig.25.

c -rotate the wheel until arrows in box II change colour to green and a signal is sounded. Balancing machine computer shows this wheel position as 9g unbalance point situated at the tompost point of the wheel rim.

d - from this position rotate the wheel anticlockwise until the nearest spoke reaches vertical position and depress key + .The machine computer will remember this wheel position as the fixing point of the first weight and at the same time subsequent measurement pattern will appear on monitor screen as shown in Fig 26.

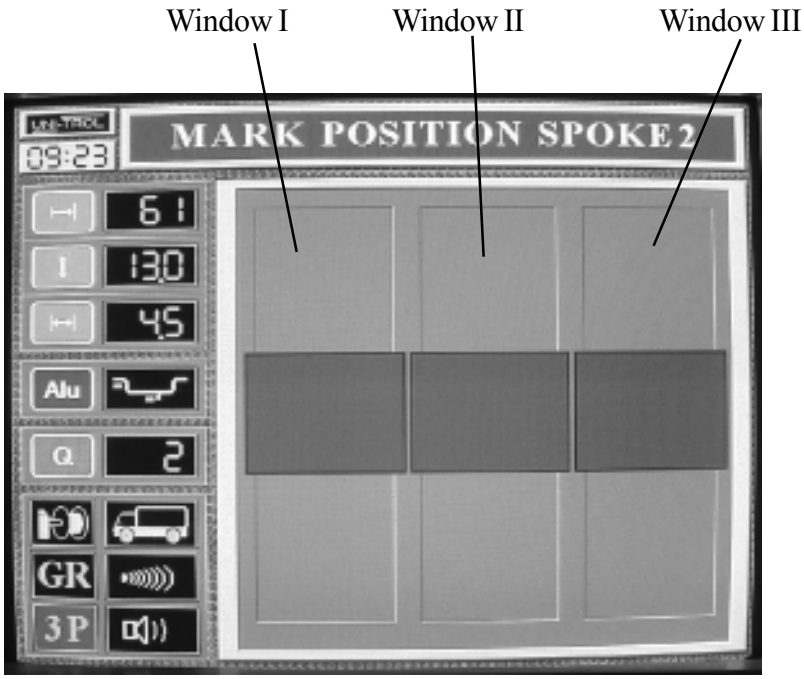


Fig.26 .

e - from this position rotate the wheel clockwise until the nearest spoke reaches vertical position and depress key + . Machine computer will remember this wheel position as the fixing point of the second weight and on the monitor screen a subsequent measurement pattern with three windows will appear as shown in Fig.27.

Window **I** - indicates size and position of balancing weight in the inboard plane
Window **II** - indicates size and position of the first weight in outboard correction plane fixed behind the first spoke as determined in item c.
Window **III** - Indicates size and position of the second weight in the outboard correction plane fixed behind the second spoke as determined i item **d**

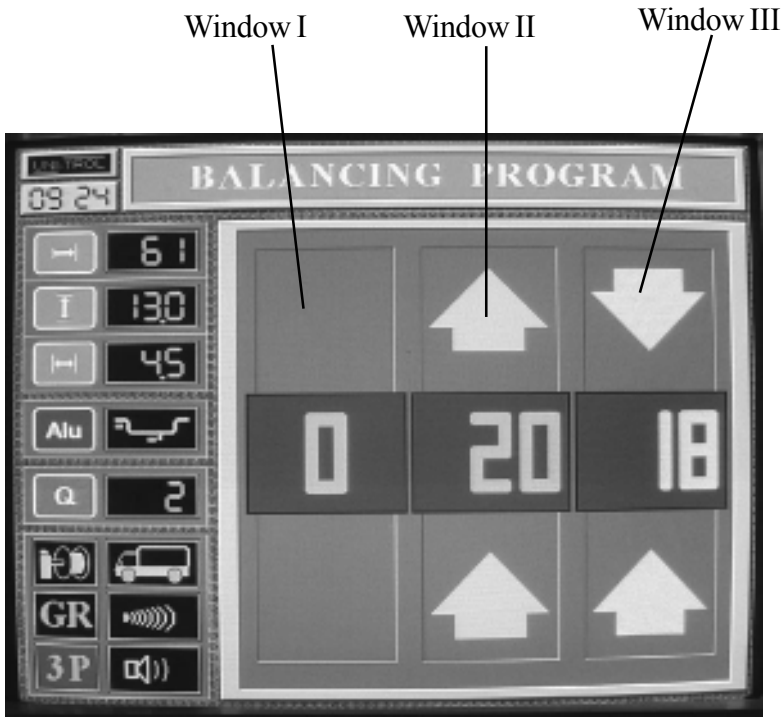


Fig .27.

Interpretation Window III
The balancing weight is 13 gram weighty, arrows are inward mean, that the weight must be fixed at the top of rim, after rear of spoke which is vertical position at the moment.
Interpretation Window II
The balancing weight is 8 gram weighty, for purpose of fiding the spoke to fixing of wheight is necessary to turn of wheel in direction showed by arrows.

NOTE :

If performing operations described in items 4c and 4d the wheel is rotated by mistake, in the same direction balancing machine computer will indicate the fixing point of the second weight on the opposite side of the wheel. If however the same spoke is located twice letters **ddd** will appear in windows II and III which always indicate an error in performance of the balancing programme.
In both cases „ Concealed Weight" programme mast repeated from the beginning.

To return to the starting point depress key (?) (unbalance conversion) - and the machine will return to the image shown in Fig 24 or depress key START .

9.9. Multi user function

Balancing machine is equiped erasable memory destined for some user. They can writing and reading easy parameters of wheel the servicing car.
For the purpose of parameters balanced wheel to memory of machine, user should carry out below options.

1. Press and hold down push - button 

and simultaneously 

. On the screen should appear the inscription „ Select user settings” - pic 9.

2. With the aid of push - buttons  or  operator select memory resserved for him F.E. pos. 7

3. Press push - button 

. On the screen should appear inscription „Fix” - pic 10.
Inlines 2 - 6 had wrote parameters balanced wheel which were transfered from balancing program.

4. With the aid push - buttons  or  operator select position 1 and should wrie according to procedure (see point 8.4.1.) yours characteristic data F.E. first name.

REMARK:

User can input to memory a characteristic data with the aid a program „MULTIUSER FUNC-TION” as show in point 8.4.

5. Press button 

. Machine should generated message „ Input to user memory” and on the soreen should appear inscription : Balancing programm” with all changed parameters of wheel.

REMARK:

Recall parameters of wheel from memory is possible according to point 9.3.

10. OPTIMISATION

Optimisation means such positioning of wheel rim and tyre in relation to each other thet wheel rim unbalance and tyre unbalance cancel themselves out which results in a smaller weight needed for wheel balancing.
Unbalance 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.
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 . 8.3.1 - 8.3.4 .

OPTIMISATION
Mount wheel rim only in balancing machine chick so that valve holes are located precisely opposite marks on spindle and chuck (see section.4).

Push - button 

.MEASUREMENT OF WHEEL RIM ONLY image will appear on monitor.

Deprees START key again - balancing machine drive will start to be confirmed by [CAUTION START] announcement. After the balancing machine has stopped WHEEL RIM ONLY UNBALANCE message will appear on monitor screen stating unbalance point and value.
Remove wheel rim from chuck fit tyre and inflate to specified pressure. Mount complete wheel in balancing machine chick in the same position as wheel rim alone was installed, i.e. valve should face markers on chuck and spindle.Push - button 

.Image TYRED WHEEL MEASUREMENT will appear on monitor screen. Depress again START key - balncing machine drive will start to be confirmed by announcement [CAUTION START]
Upon completion of measurement cycle and machine stoppage image TYRED WHEEL UNBALANCE will appear on monitor screen indicating wheel unbalance point and value

Push - button 

.Image shown in Fig.28.will appear on the screeen.

After opening of wheel rim and tyre unbalance by rotating the wheel by hand and watching indicators „1" and „2". When indicator „1" will reach its top position and a sound signal will be heard mark with chalk the top point on the wheel rim in vertical place through spindle centre line. When indicator „2" will reach its top position (sound signal will be heard) mark with chalk the topmost point of the tryre.
Remove wheel from balancing machine and shift tyre in relation to wheel rim in such a way that chalk marks on rim and tyre are next to each other.

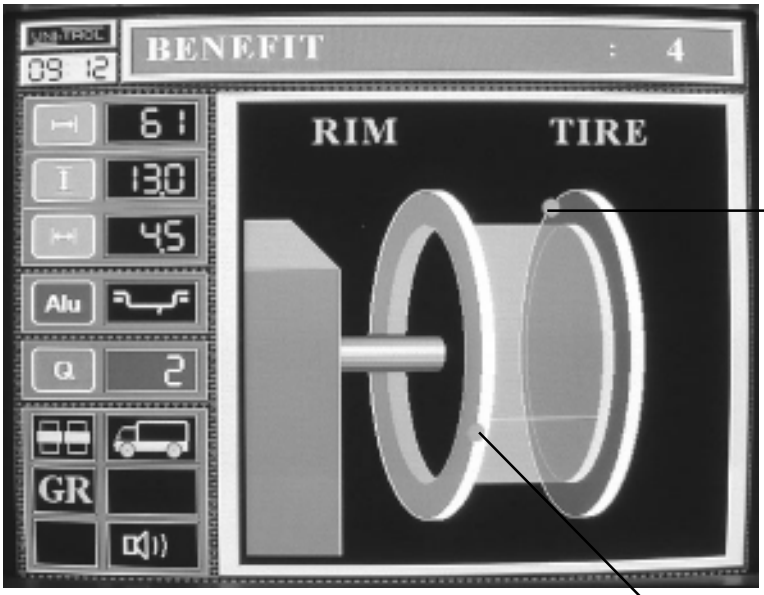


Fig.28.

NOTE:

In the case when optimisation gains 0g, the position of the tyre in respect of wheel rim is optimum.

11. RUN - OUT MEASUREMENT INSTRUCTIONS

Set balancing machine computer to RUN - OUT MEASUREMENT subroutine.Methods of accessing this subroutine and its operation are set out in item 8.5.
Make measurement with wheel guard up.
Mount wheel (or wheel rim only if wheel rim run - out is to be measured)in balancing machine chuck. Set distance of sensor from wheel (or wheel rim) surface so that sensor position indictor, visible on the screen
(Fig 29) as a verticaly line is near the centre of sensor positioning area.

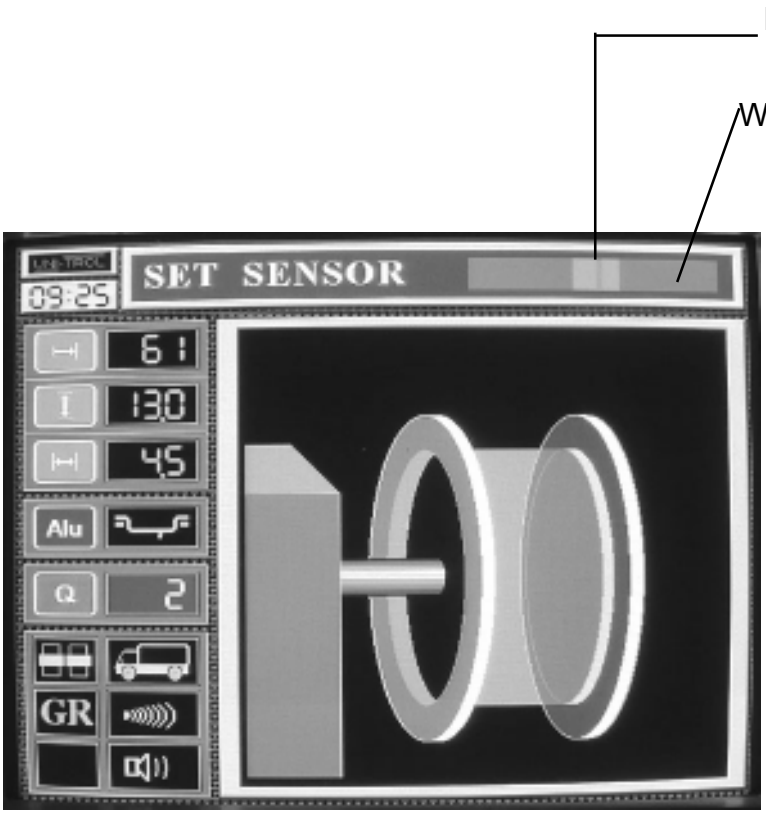


Fig.29.

Then rotate the wheel by hand - a chime will signal the commencement of run - out measurement. On monitor screen message WHEEL RUN - OUT MEASUREMENT IN PROGRESS will appear. continue to rotate the wheel (always in the same direction) until chime is heard and WHEEL RUN - OUT VALUE appears on the screen, with run - out value in mm (Fig 30).

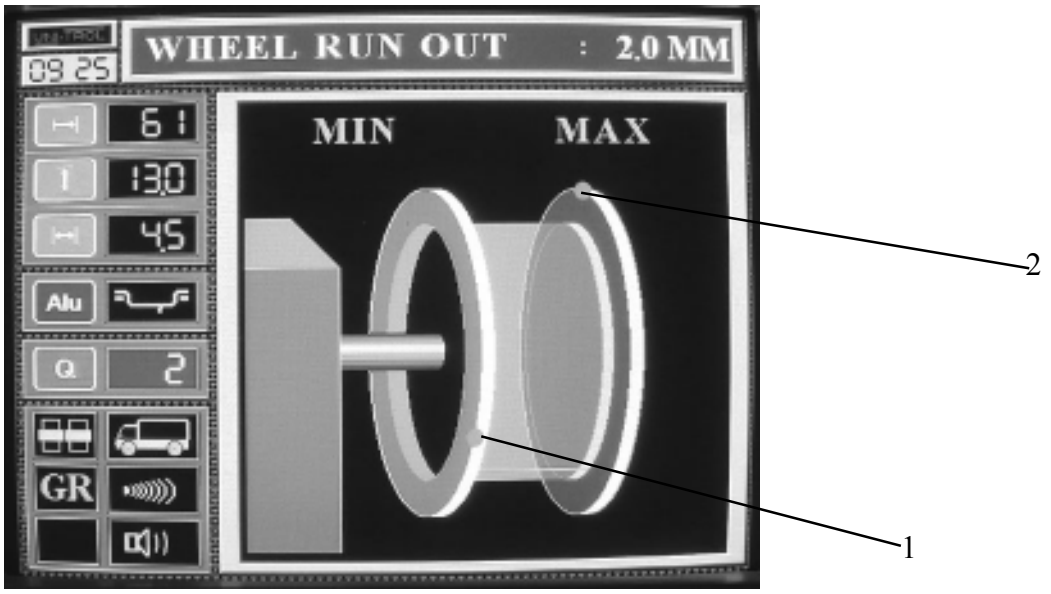


Fig.30.

The point of max. run out is located by rotating the wheel untill ball marked with digit „2" reaches the topmost point of the wheel symbol (a sound signal will be heard then). In a similar way the point of max run - out towards the wheel centre is located 9ball „1"should reach the topmost point of the wheel symbol)

Depress key 

. Image shown in Fig.31. will appear on monitor screen.

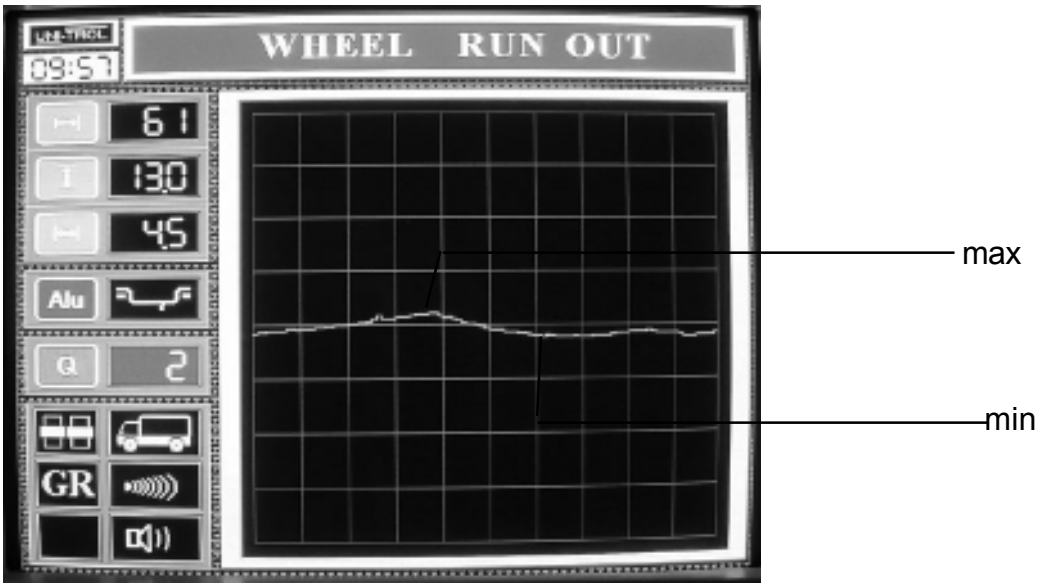


Fig.31.

12. MINIMISATION INSTRUCTIONS

Minimisation is a test allowing such positioning of tyre in relation to wheel rim that minimum radial run - out of complete wheel in obtained.
Minimisation test is to be carried out with wheel guard up.
Set balancing machine computer in MINIMISATION subroutine as described in item.8.6.
Mount wheel rim (without tyre) in machine chick so that valve hole is directly situated opposite markers on spindle and chuck (Fig.4).
Set run - out as described in Section 11.
Rotate wheel rim in direction shown by arrow on balancing machine housing above the spindle. Commencement of measurement process is signalled by chime and display of WHEEL RIM RUN - OUT MEASUREMENT IN PROGRESS. Rotate wheel rim slowly until chime signalling the end of the measurement is heard. On the screen, message WHEEL RIM RUN - OUT VALUE will be displayed showing run - out value in milimeters.

Remove wheel rim from chuck, fit tyre and inflate to specified pressure. Mount complete wheel in balancing machine chuck so that the valve is directly opposite the markers on chuck and spindle . Depress key 

. TYRE RUN OUT MEASUREMENT will appear on monitor screen, to be replaced, after a while with SET SENSOR. Set sensor as described in section II. Rotate whell so that chime is heard and TYRE RUN OUT MEASUREMENT is displayed on the screen. Rotate wheel further until chime signalling the end of yhe measurement is heard. Message TYRE RUN OUT VALUE will appear on monitor screen with run out value in milimeters.

Depress key 

. Image shown in Fig. 32. will appear on monitor screen.

Now locations of max. wheel rim and tyre run - out are to be determined by rotating the wheel by hand and watching indicators „1” and „2”

When indicator „1” reaches the topmost point of the wheel symbol (a sound will then be heard) mark with chalk the wheel rim at its topmost point in vertical plane through spindle centre line.

Rotate wheel so that indicator „2” reaches the top of the wheel symbol and mark with chalk tyre at its topmost point in vertical plane through spindle centre line.

Remove wheel from chuck and move tyre in relation to wheel rim so that chalk marks on wheel rim and tyre coincide.

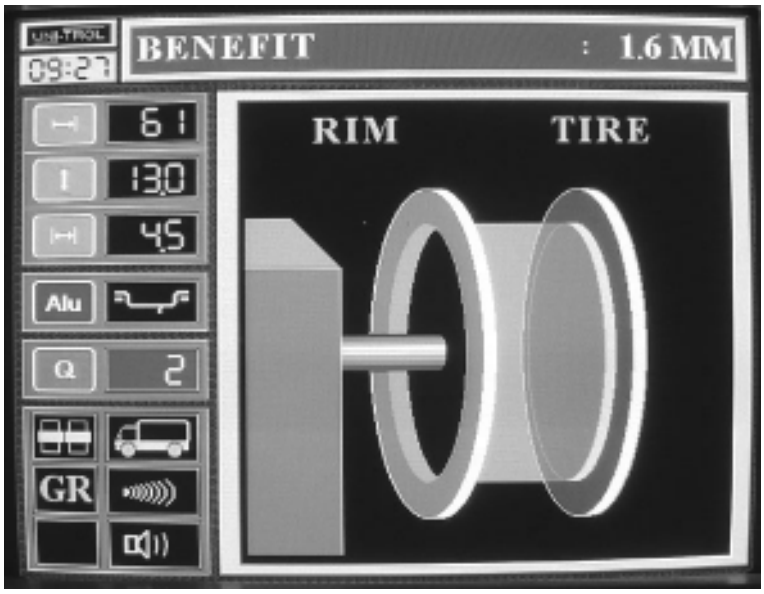


Fig.32

NOTE :
In the case when minimisation gains O mm the position of the tyre in relation to the wheel rim is optimal.

13. CALIBRATION

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

Calibration should be performed as follows:

1. Set balancing machine computer in subroutine CALIBRATION (see item 8.10.)

Select test a car wheel of know parameters and if possible, of small unbalance and mount it in the balancing machine fixture. Enter diameter and width data in machine memory, using apporiate push - buttons on balancing machine keyboard (see items 8.3.1-8.3.3). Enter distance by means of edge finder pushing it against wheel rim edge. Set cut - off threshold to minimum value i.e. 2g.

May be automatic start.

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

3. Push - button 

or automatic start . The measuring cycle ends with automatic braking of the balancing machine spindle and display „1" 0 and display „2" 79 or 80. (Fig.33).

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. Set balancing machine computer in subroutine UNBALANCE

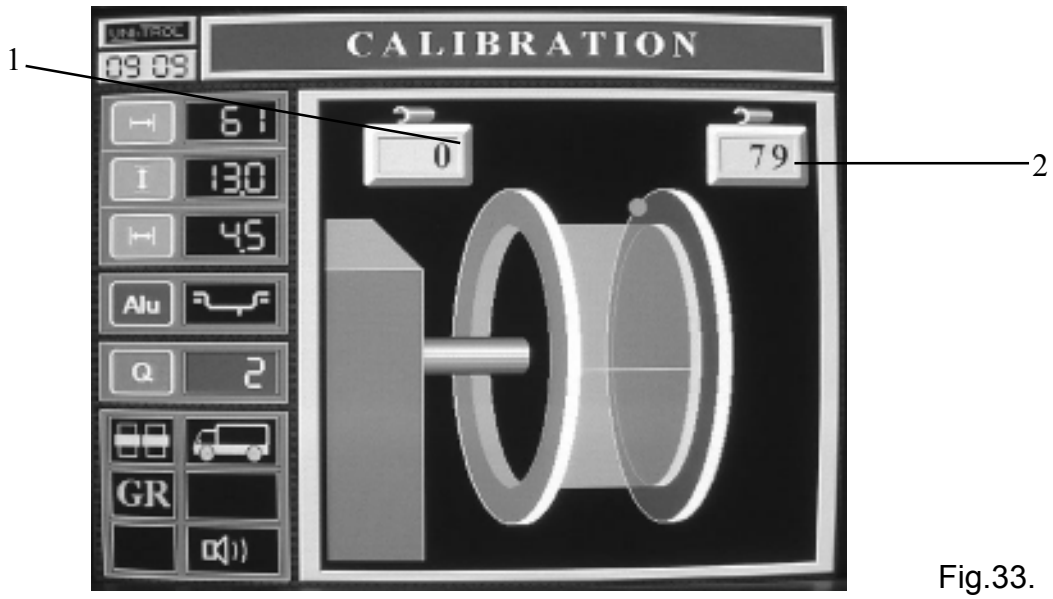


Fig.33.

MEASUREMENT and push - button 

. switch on the balancing machine drive in order to check the extent of unbalance of the tested wheel.
Appearance of zero 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 0g 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.
- 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 wquipment 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 wheel or substantial indication differences in susequent 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 (auttum / winter and winter / spring seasons) therefore special care should be taken to ensureproper operating conditions for the balancing machine.

14. PRINTER

Before starting the balancing machine place printer in the socket located in the socket placed in the top above the keyboard (see Fig 1 item 22) and connect the two printer power supply cables. After switching printer power switch on (located on the rearside of the printer, on the right) LED at the bottom of the printer will light up.
The printer thus started, will automatically print the following data (after the wheel has been balanced and noughts displayed on display „1” and „2”
- worshop data, received in HEADING EDIT programme (item. 8.5)
- real time
- date
- wheel data
- measured original unbalance value, for each correction plane
- corrected unbalance (0g) for each correction plane

A key 

is used for manual printer control. After each depression of this key, the printer will

print the results of the latest measurement (irrespective of unbalance value). Key „28” does not reset printer automatic operation mode.
If printing is not required switch printer power supply will switch on the back plate. It is recommended to switch the printer off prior to switching balancing machine power supply off.

15 . 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, 1000g) 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

16. WARRANTY

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

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