TW F-23

Wheel balancing machine

twinbusch.de

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Read this entire manual carefully before installation or operation of the TW F-23. Follow the instructions strictly.

Twin Busch GmbH | Amperestraße 1 | D-64625 Bensheim
Tel.: +49 (0) 6251-70585-0 | Fax: +49 (0) 6251-70585-29 | info@twinbusch.de

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1. Introduction

A balanced wheel is very important to the performance of your car. The result of an unbalanced wheel can cause premature wear of your shock absorbers, steering and tyres. A balanced wheel is also a major factor to road performance and the prevention of accidents as unbalanced wheels affect road grip and steering.
This equipment is fitted with the new LSI (Large Scale Integrated circuit) which aids the hardware system to calculate information at a high speed.

Read the manual carefully before operating the equipment to ensure safe operation. Dismantling or replacing parts of the equipment should be avoided. Should any repairs be needed please contact the service department.

2. Specification and Features

2.1 Specification

- Max wheel weight: 65kg
- Motor power: 180w
- Power supply: 220v/50Hz
- Balancing precision: ±1g
- Rotating speed: 200r/min
- Cycle time: 8s
- Rim diameter: 10″~24″(256mm～610mm)
- Rim width: 1.5″~20″(40mm～510mm)
- Noise: ＜70db
- Net weight:123Kg
- Dimensions: 960mm×760mm×1160mm

2.2 Features

LCD display, intuitive and flexible operation interface.

- Various balancing modes for self adhesive and clamp weights.
- Automatic Input data of wheel by measure scale.
- Intelligent self-calibrating and measure scale self-labeling function.
- Fault diagnosis and protection function.
- Centreless rim mode
  Balancing with centerless wheels.
  Withφ40 lengthened main axis,suitable for more tire models.

2.3 Working Environment

- Temperature: 5~50℃
- Height above sea level: ≤4000m
- Humidity: ≤85%

Technical changes for purposes of a technical advancement as well as deviation in colour, errors and printing mistakes are reserved.

3. The Constitution of Dynamic Balancer

Two major components of the dynamic balancer are: machine and electricity:

3.1 Machine

The part of machine consists of support, swing support and main shaft; they are together fixed on the frame.

3.2 Electricity system

1. The microcomputer system is made up of the LSI such as new high speed MCU CPU system and keyboard.
2. Automatic measure scale.
3. Testing speed and positioning system consists of gear and opto-electronic coupler.
4. Two-phase asynchronous motor supplies and control circuit.
5. Horizontal and vertical pressure sensor.
6. Hood protection.

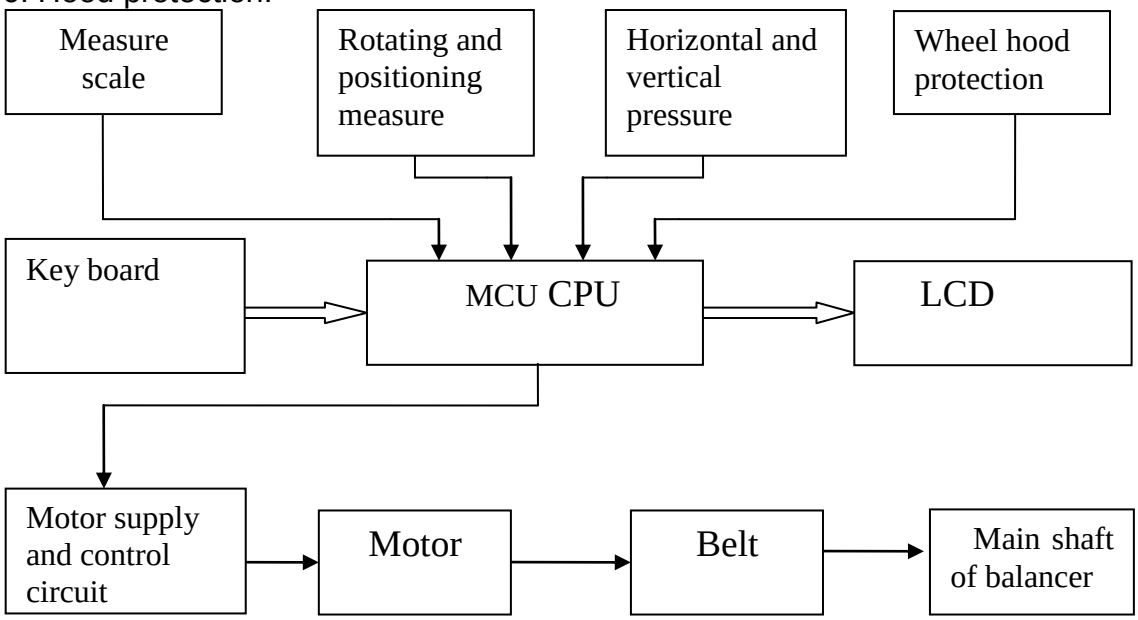


Figure 3-1

4. Installation of the Dynamic Balancer

4.1 Opening and Checking

Open the package and check for missing or damaged parts. Please do not use the equipment and contact the supplier if parts are missing. Accessories and equipment are shown as follow:

Screw stud of drive shaft	1
Balancing pliers	1
Allen wrench	1
Measure caliper	1
Locking nut	1
Adapter (cone)	4
Counterweight (100g)	1
Protection hood (optional)	1

4.2 Installing machine

4.2.1The balancer must be installed on solid ground.

4.2.2Please leave 50cm space around the balancer as working space.

4.2.3 Anchor bolts for mounting the balancer to the floor.

4.3 Installing the protection hood

Install the protection hood frame on the equipment using M10×65 screws.

4.4 Installing the drive shaft

Mount the threaded shaft and tighten using the M10 × 150 screw (see figure 4-1)

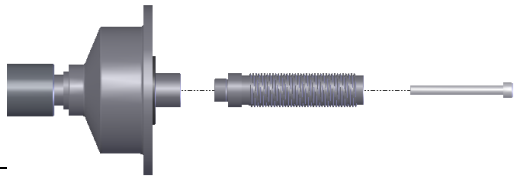
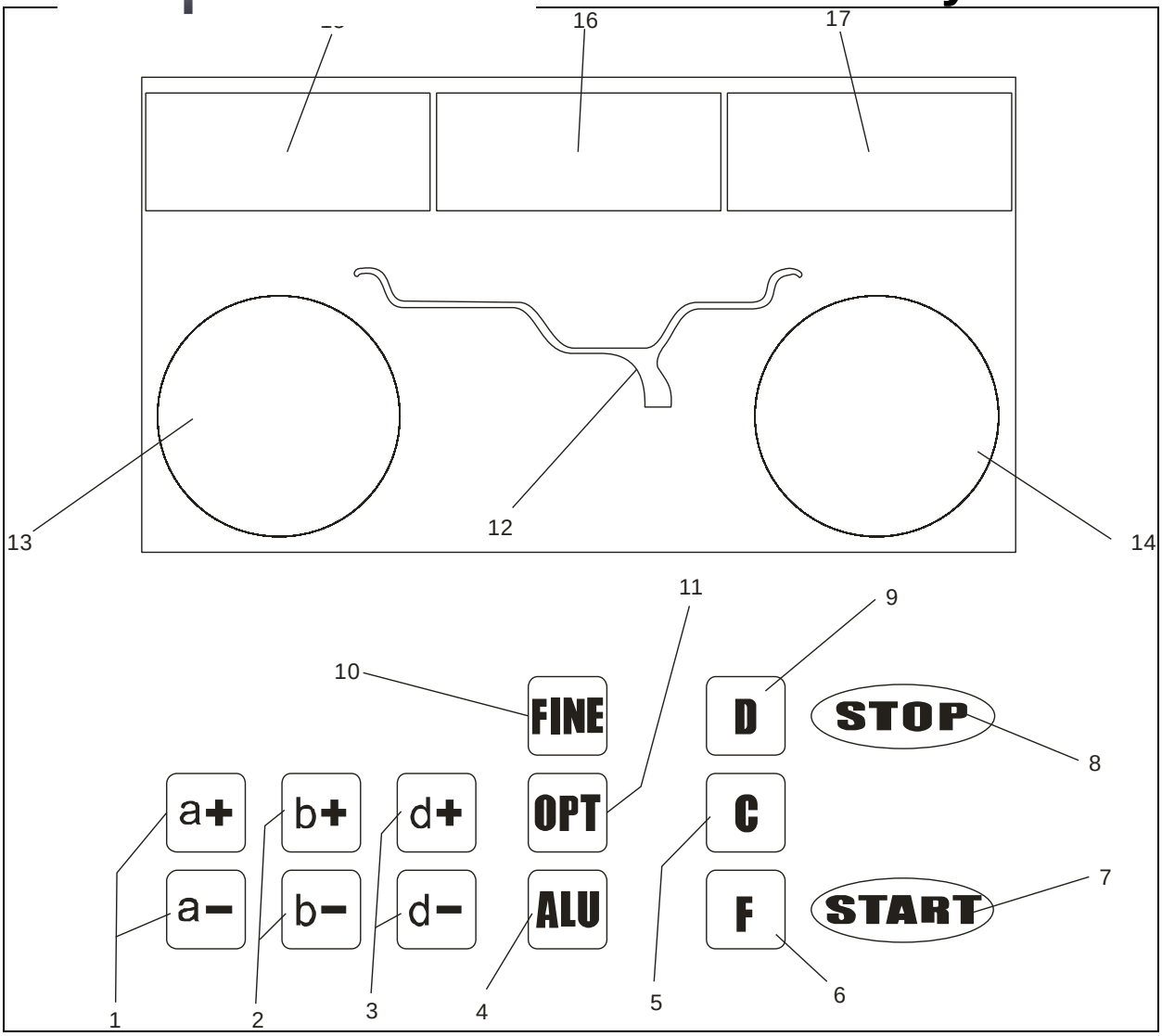


Figure 4-1

5. and function keys



Never use sharp objects to press the buttons!

1- Push buttons, manual DISTANCE (a) setting
2- Push buttons, manual WIDTH (b) setting
3- Push buttons, manual DIAMETER (d) setting
4- Push button , selection of “ALU” mode of correction
5- Push buttons for recalculation and self-calibration
6- Selection, “STATIC” or “DYNAMIC” correction
7- Push button, cycle start
8- Push button, emergency and selection of special functions
9- Push button, self-diagnostics, self-calibration and split imbalance

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10-Push button, imbalance display pitch and threshold
11-Push button, optimization of imbalance and split imbalance
12- Wheel weights position sketch.
13-Inside balance weight position light
14-Outside balance weight position light
15-Inner rim reading or distance.
16-Static or width reading.
17-Outer rim reading or diameter.

6. Installation and Demounting the Wheel

6.1 Checking the wheel

The wheel must be clean, free of stones and objects, remove all the counterweights on the rim. Check the tyre pressure. Check the rim for damage or deformation.

6.2 Mounting the wheel

6.2.1 Select the right sized cone for the rim.
6.2.2 Mounting methods: A. positive positioning; B. negative positioning.
6.2.2.1 Positive (refer to figure 6-1):
6.2.2.2 Negative positioning (refer to figure 6-2):

Negative positioning is commonly used for steel rims, with possible deformation on the outside of the wheel.

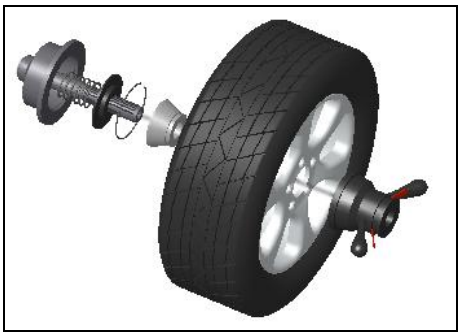


Figure 6-1

Figure 6-2

6.2.3 Mount the wheel and cone on the main shaft. Ensure the cone is in the centre of the wheel before tightening.

6.3 Demounting the Wheel

6.3.1 Hold the wheel to slacken the screw.
6.3.2 Remove from the main shaft.

Note: do not slide the wheel across the threaded shaft.

7. The input methods of wheel data

7.1 Power-on

When the machine is turned on, an automatic initialization will start for approximately two seconds. The machine starts the set dynamic mode automatically, as in Figure 7-1, The wheel size can now be typed in.

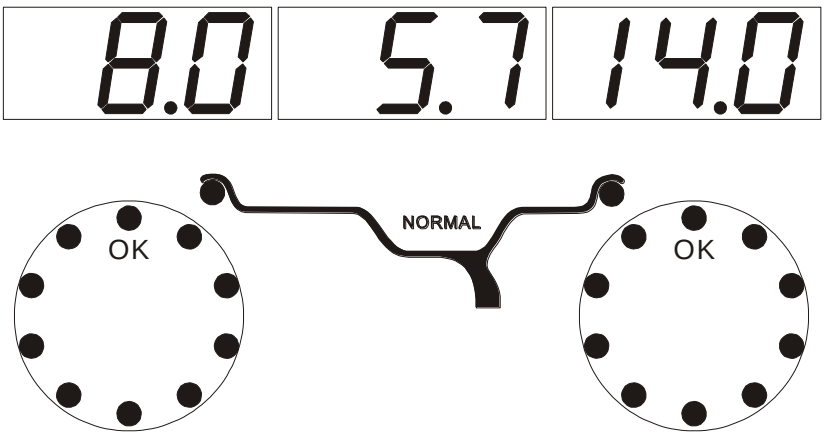


Figure 7-1

7.2 Method for dynamic balance mode

7.2.1 When the power is turned on, the machine starts the normal balance mode and the values shown are only an example.

7.2.2 The machine is now ready for Data input:

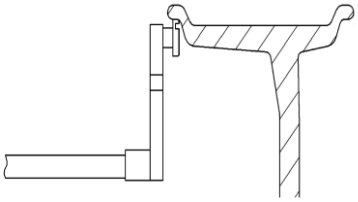


Figure 7-2

Measure the rim size by pulling the scale head to the inside concave on the edge of the rim, figure 7-2, all LED's should turn off, and then the display will show the new measurements figure 7-3.

Figure 7-3

When the scale goes back to the zero position, the LED display shows the measurements of rim.

7.2.3 Should the measurements differ from that of the wheel, they must be typed in manually.

7.2.4 Measuring the width of the wheel.

Use the plastic width measuring caliper, measure the width value of rim then press b+ or b- key to change manually.

Technical changes for purposes of a technical advancement as well as deviation in colour, errors and printing mistakes are reserved.

7.3 ALU-1 to ALU-5 input methods

When using ALU-1 to ALU-5 mode, ALU can be pressed immediately after the input of wheel measurements according to step 7.2. It is not necessary to type in the wheel measurements again.

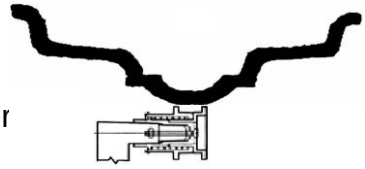
7.4 Static balance mode input method

After turning the power on, press key F, to show the tyre diameter on the right hand side as in Figure 7-4.

Figure 7-4

Adjust the measuring scale to the middle of the rim as shown in figure7-5, the display will be off. When measuring is finished, the machine will make a “beep” tone and will show the reading as in Figure 7-3,

Fig.7.5



The reading shown on right side is the tested rim diameter

7.5 ALU-S balance mode

ALU-S is a “special” mode, it includes the 2 following modes (Figure 7-6):
The picture on the left is ALU-S1, the picture on the right is ALU-S2.

7.5.1 ALU-S1 input method

As show in Figure 7-7, (FI), measure inside of the rim (aI) and diameter(dI), when it shows as Figure 7-3, move the measure scale further to the outside rim(FE), measure the rim outside distance(aE) and diameter(dE), when finish, it will show as Figure 7-9, enther ALU-S1 model.

7.5.2 ALU-S2 balance mode data input method

As show on Figure 7-7, moving the measure scale to the inside rim(FI), measure the rim inside distance(aI) and diameter(dI), when it shows as Figure 7-3, move the measure scale further to the outside rim(FE), measure the rim outside distance(aE) and diameter(dE), when finish, it will show as Figure 7-9, enther ALU-S1 model.

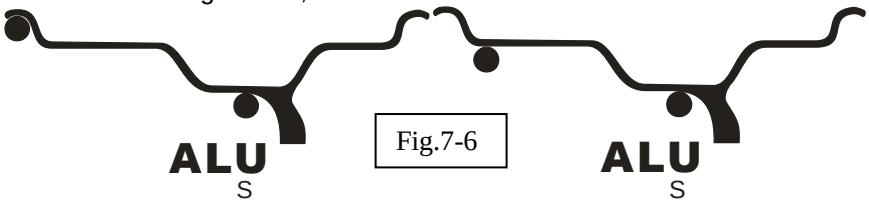


Fig.7-6

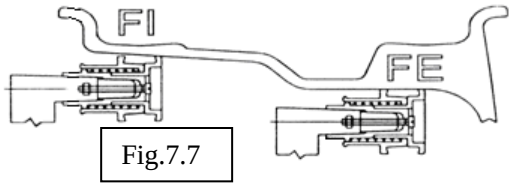


Fig.7.7

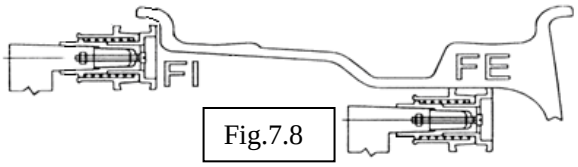


Fig.7.8

Figure 7-9

8.1 Rim Calibration

8.1.1 Press and hold the STOP button then press FINE, figure 8-1, press STOP button or C key to exit.

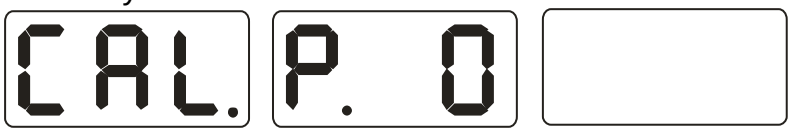


Figure 8-1

8.1.2 Move scale to 0(zero) position, press ALU button, figure 8-2, press STOP button or C button to exit.

Figure 8-2

8.1.3 Move scale to 15, press ALU button, figure 8-3, return the measure scale.

Figure 8-3

8.2 Calibration of wheel diameter

8.2.1 Fit a normal sized wheel to the machine, press and hold STOP button, then press OPT button, figure 8-4, press STOP button to exit;

Figure 8-4

8.2.2 Press d+ or d- to adjust the value of the rim diameter, press ALU button figure 8-5;

Figure 8-5

8.2.3 Move the scale to the inside edge of rim figure 7-2, press ALU button, figure 8-3,to end self-calibration.

8. Calibrating the Balancer

From time to time the calibration should be checked as follows.

9.1 Turn on the machine, wait for the initialization figure 7-1， use a middle size tyre, follow step 7 data input;

9.2 Press D (hold) then C button, figure 9-1, (close the guard), press START, press STOP or C button to exit;

Figure 9-1

9.3 When the machine has stopped figure 9-2,(open the wheel guard)clip a 100 gram counterweight anywhere on the rim, (close the guard)press START button, Press STOP or C button to exit;

Technical changes for purposes of a technical advancement as well as deviation in colour, errors and printing mistakes are reserved.

Figure 9-2

9.4 When the machine has stopped, **figure** 9-3, Demount the wheel, the calibration process is finished.

Figure 9-3

NB：when calibrating the machine, make sure that the wheel measurements are correct, and the 100 gram counterweight must be correct, otherwise calibration will be wrong and the machine will give false readings.

9. Balancing Operations

10.1 Changing the Balance mode

10.1.1 Press the F button to switch between Dynamic and static balance mode.
Dynamic mode: (normal mode), apply weights as shown in figure 10-1.
Static mode: Apply weights as shown in figure 10-2.

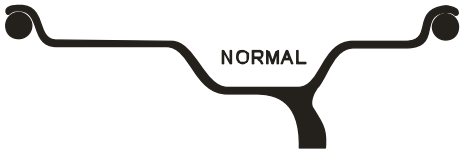


Figure 10-1

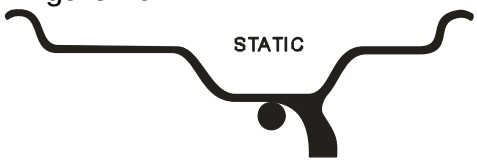


Figure 10-2

10.1.2 (ALU button), switches the CPU system between ALU-1~ALU-5 mode.
ALU-1 mode: Apply weights as shown in Figure 10-3.
ALU-2 mode: Apply weights as shown in Figure 10-4.

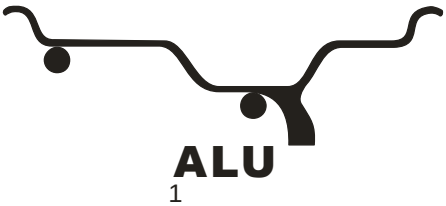


Figure 10-3

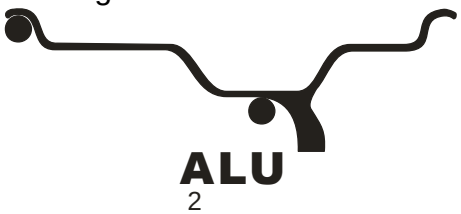


Figure 10-4

ALU-3 mode: Apply weights as shown in Figure 10-5.
ALU-4 mode: Apply weights as shown in Figure 10-6.

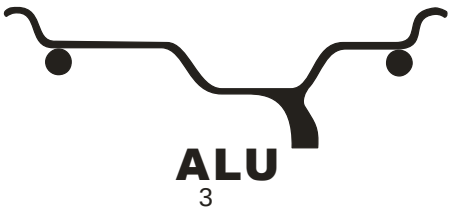


Figure 10-5

Figure 10-6

ALU-5 mode: Apply weights as shown in Figure 10-7.

Figure 10-7

10.1.3 Splitting and Hiding weights Mode:

ALU-S If the position of the weight is between the spokes, ALU-S mode can split the counterweight position. Divide the counterweight and place behind the spokes. See figure 10-8.

Figure 10-8

10.2 Balancing in Normal mode

10.2.1 Follow the instructions in figure 7.2 (rim measurements).

10.2.2 Put down the wheel guard and press START, when the wheel stops the LED display shows the amount of weight needed.

10.2.3 Slowly spin wheel manually until the inside weight position indicator lights up (figure 5-1(13), apply counterweight at a 12 o'clock position (inner side of rim), figure10-9;

10.2.4 Repeat the procedure for the outside weight (figure 5-1(14) figure10-10;

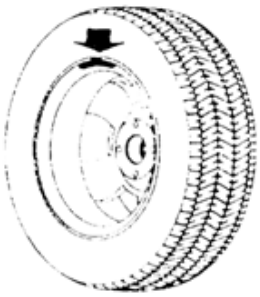


Figure 10-9

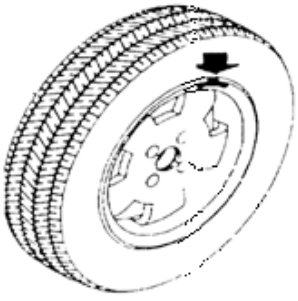


Figure 10-10

Technical changes for purposes of a technical advancement as well as deviation in colour, errors and printing mistakes are reserved.

Figure 10-11

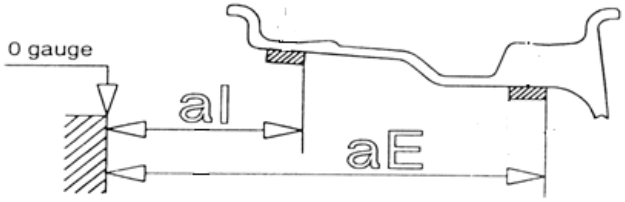


Figure 10-12

. ALU-S1 Automatic tracking process.

10.5.5 Follow the instructions in figure 7.2 (rim measurements).

10.5.6 Close the guard, press START, when it stops rotate the wheel the display shows the needed weight on the two sides of display.

10.5.7 Press STOP and ALU, when it shows the horizontal lines in the middle of display, put the adhesive weights on the measure scale head (Adhesive side facing up), rotating the wheel slowly, when all of the lights of the inside weights light up(Figure 5-1(13)), pull out the measure scale, when 5 black square on the left are showing (Figure 10-13), stick the weight on the rim (Figure 10-15).

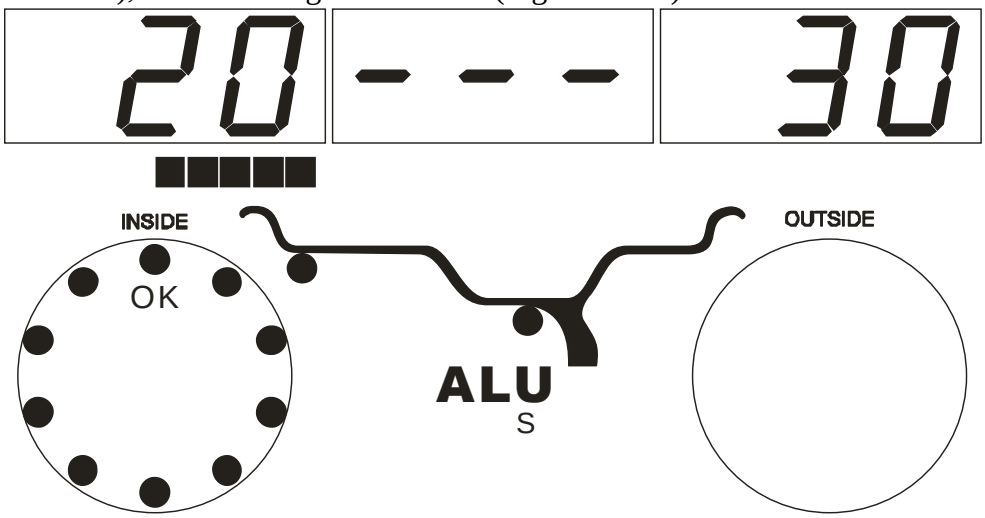


Figure 10-13

10.5.8 Follow the same procedure as in 10.5.7 for the outside.

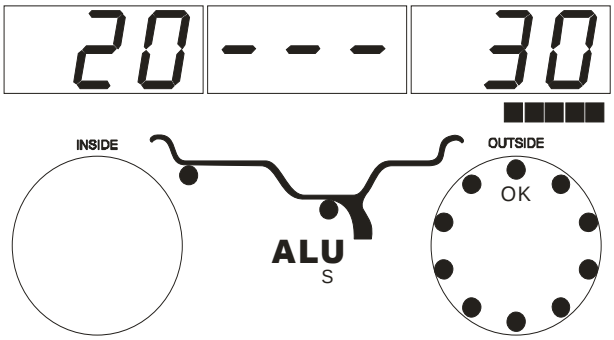


Figure 10-14

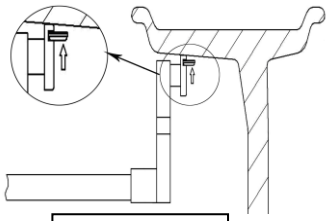


Fig. 10-15

Figure 10-15

10.6 ALU-S2 balance mode

. ALU-S2 manual operation

10.6.1 Follow the instructions in figure 7.2 (rim measurements).

10.6.2 Close the guard, press START, when it stops rotate the wheel, the display shows the needed weight on the two sides of the display.

10.6.3 Rotate the wheel slowly, when all the inside indication lights are on (Figure 5-1(13)), stick the required weights at the 12 o'clock on the inside of the rim.

.ALU-S2 automatic operation.

10.6.5 Follow the instructions in figure 7.2 (rim measurements).

Rotate the wheel slowly, when all the inside indication lights are on (Figure 5-1(13)), stick the required weights at the 12 o'clock on the inside of the rim.

10.6.8 Press STOP and ALU, when it shows the horizontal lines in the middle of display, put the adhesive weights on the measure scale head (Adhesive side facing up), rotating the wheel slowly, when all of the lights of the inside weights light up(Figure 5-1(13)), pull out the measure scale, when 5 black square on the left are showing (Figure 10-13), stick the weight on the rim (Figure 10-15).

NB: when using the automatic method, make sure all LED lights are displayed - - -, if not, do not move the scale, press STOP and ALU, when all LEDs are displayed - - -, you can now stick the weights on.

10.7 Weight splitting mode

This mode is just suitable for ALU-S balancing.

To hide weights proceed as follows:

10.7.1 Press a+, to go back to Figure 7-1 interface, press D and OPT. You can now type in the amount of spokes (Figure 10-16). Press b+ or b- to give in the amount of spokes, press D and OPT to save and return. Now you can turn the wheel to the highest point next to the spoke. press D and OPT, to enter the mode and press D and OPT to quit.

Figure 10-16

.Splitting weights manually

10.7.2 When adding weights on the inside, take the same steps as in 10.5.3(ALU-S1) or 10.6.3(ALU-S2).

10.7.3 Rotating the wheel slowly, when all the LEDs light up on the outside (Figure 5-1(14)), Stick the first weight on the 12 o'clock position of the outside wheel.

10.7.4 Rotating the wheel again, do the same procedure for the second weight.

.Splitting weights automatically

10.7.5 Inner side of the rim, carry out the steps 10.5.7(ALU-S1) and 10.6.7(ALU-S2).

10.7.6 Rotate the wheel and use the scale head to apply weight no.1 (Figure 5-1(14)),

10.7.7 Rotating the wheel again, stick on the weight no.2 using the automatic method.

Technical changes for purposes of a technical advancement as well as deviation in colour, errors and printing mistakes are reserved.

10.8 ALU-X balance mode

This mode is for attaching weights to centreless wheels, (Adaptor is needed! Universal wheel flange) Attachment positions are shown in Figure 10-17.

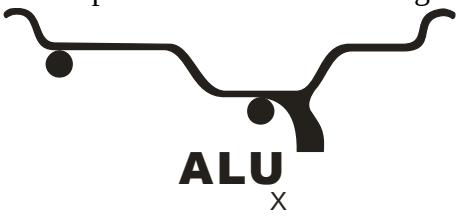


Figure 10-17

10.8.1 Follow the instructions in figure 7.2 (rim measurements).
10.8.2 Press key D and ALU, to enter ALU-X mode.
10.8.3 Put down the guard, press START, the weights can be applied in the 12 o'clock position.

10.9 Recalculation

If it's necessary to readjust this can be done by simply pressing (C)

10. Gram and Oz conversion

12.1 Press STOP and a+ or a-, for gram.

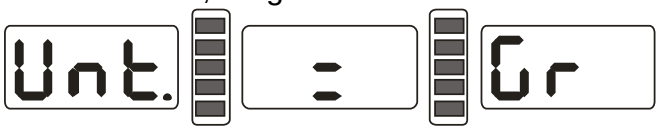


Figure 12-1

12.2 Press b+ or b- for Oz**,**

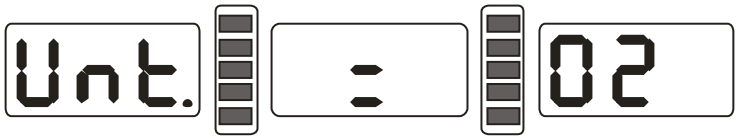


Figure 12-2

12.3 Press b+ or b- to switch between gram and Oz;
12.4 Press a+ to save setup and exit.

11. INCH and MM conversion operation

This operation for input dimension B value and D value conversion (INCH-MM).

With power-on interface(Figure 7-1), press STOP and d- or d+, can be changed between INCH/MM. When it has Decimal point, it is INCH, if not, it is MM.

12. Wheel guard settings

This function can be set to start the machine automatically or by pressing start when the guard is closed.

Press STOP and C, figure 14-1. This function can be turned off or on.
Press b+ or b- to switch function between "ON" and "OFF";
Press a+ key to save settings and exit.

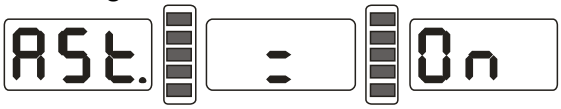


Figure 14-1

13. Other function settings

15.1 Minimum value setting

After setting the minimum value display all wheels balanced with less than the given value will be shown as 0(zero) by pressing the FINE button the true value will be shown. Press STOP and D, and the minimum value can be set to either 5, 10 or 15 grams , by pressing b+ or b-. Press a+ to save settings and enter next step;

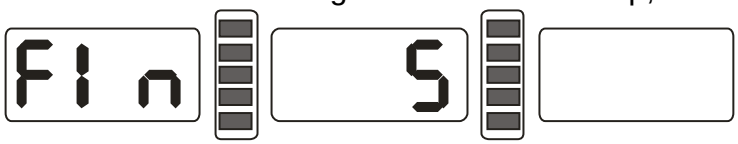


Figure 15-1

15.2 Key-tone function settings

This function can turn the tone on or off.

See 15.1 press a+ enter settings, 15-2, ON-Off function, Press b+ or b- to switch between “ON” and “OFF”. Press a+ key to save settings and enter next step;

Figure 15-2

14. Machine test function

This function is to check all functions and signals and will provide information for trouble analyses.

16.1 LED check

Press D and all the LEDs will be activated, the LCD display can now be checked, press C to exit.

Figure 16-1

16.2 Position sensor signal check

This function is to check the position sensor, main shaft and main board.

Slowly turn main shaft, clockwise to increase and anticlockwise to decrease the value, the correct value is between 0 - 63. Press ALU, to enter distance sensor check. Press C to exit.

16.3 Distance sensor signal check

This function checks the distance sensor and main board signal circuit.

Press ALU, figure 16-2, move the measuring scale, and the value will change.

Press ALU, to enter diameter sensor signal check. Press C exit.

Figure 16-2

Technical changes for purposes of a technical advancement as well as deviation in colour, errors and printing mistakes are reserved.

16.4 Diameter sensor signal check

This function is to check the diameter sensor and main board signal circuit.
Press ALU see figure 16-3, turn measuring scale and the value will change.
Press ALU to enter main shaft pressure sensor signal check.

Figure 16-3

16.5 Pressure sensor signal check

This function will check the main shaft pressure sensor and main board.
Press ALU see figure 16-4, gently press the main shaft, the right and left LED display value will change. Press C exit.

Figure 16-5

15. Safety Protection and Trouble Shooting

17.1 Safety protection

17.1.1 Under no circumstances should the machine be used if malfunction is detected.

17.2 Trouble shooting

17.2.1 If the wheel does not rotate after pressing START, LED displays Err-1. Check motor, computer board and cable connections;

17.2.2 If the wheel rotates and LED displays Err-1.
Check position sensor, computer board and cable connections;

17.2.3 If the wheel still rotates after balancing,
Check brake adjustment, power supply, computer board and cable connections;

17.2.4 When the power is turned on and LED displays --- see figure 17-1
scale calibration is necessary or adjust/ replace sensor.

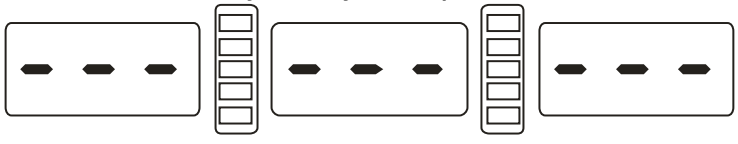


Figure 17-1

17.2.5 Automatic rim measurement differs from actual rim size. Recalibrate the scale.

17.2.6 If the display does not work when the power is turned on, check the power switch indicator light, then check power supply board and the computer board.

16. Maintenance

18.1 Standard maintenance

Before starting work on the machine please switch off the power-supply.

18.1.1 Check belt tension.

Check all wire connections

Check screws and bolts for tightness

18.2 Replacing the sensor

18.2.1 If the machine is showing false readings which do not improve after calibration. Sensor replacement could be necessary.

18.2.2 Replacement and adjustment of pressure sensor should be carried out as follows:

1. Loosen the nuts 1, 2, 3, 4, 5.
2. Dismantle the sensor.
3. Replace parts No.6, 7 of the sensor.
4. Re fit the sensor to the Figure 18-1. (Pay attention to the sensor's direction.)
5. Do not over tighten!
6. The replacement of circuit boards and sensors should be carried out by a professional.

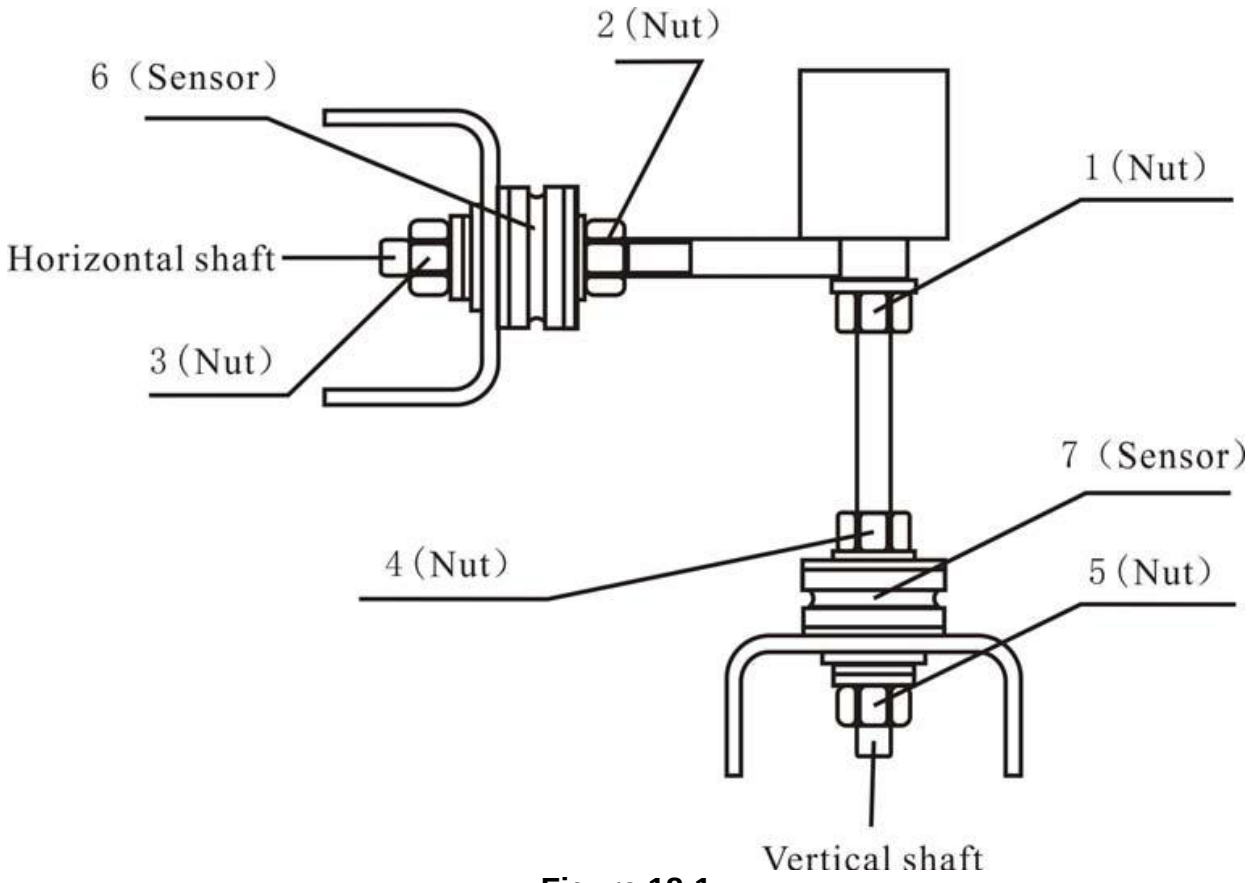


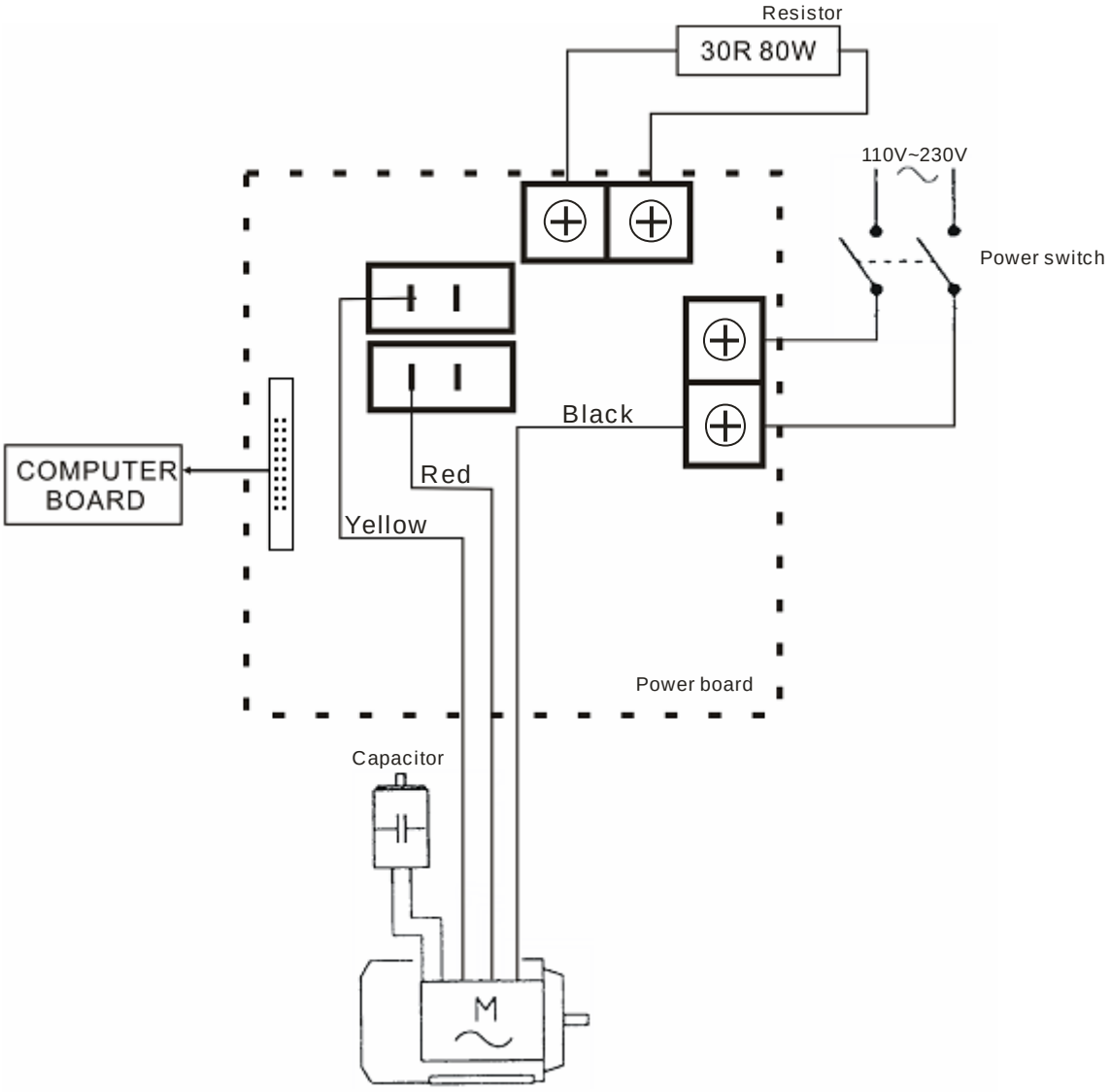
Figure 18-1

Technical changes for purposes of a technical advancement as well as deviation in colour, errors and printing mistakes are reserved.

17. Error code list

Code	meanings	cause	remedy
Err 1	Main shaft does not rotate	1.motor fault 2.position sensor fault 3.power supply board fault 4.computer board fault 5.loose connection	1.change motor 2.change position sensor 3.change power supply board 4.change computer board 5.check cable connections
Err 2	The rotation is lower than 60r/min	1. position sensor fault 2. wheel not tight or too light 3. motor fault 4. drive belt loose or too tight 5. computer board fault	1. change position sensor 2.tighten wheel 3. change motor 4.adjust drive belt 5. change computer board
Err 3	Miscalculation	too high imbalance	Repeat the self-calibration change computer board
Err 4	Main shaft turns in the wrong direction	1. position sensor fault 2. computer board fault	1. change position sensor 2. change computer board
Err 5	Wheel guard fault	1. loose connection 2. computer board fault	1.Reconnect 3.Change computer board
Err 6	Sensor signal not working	1. power supply board fault 2. computer board fault	1. change power supply board 2. change computer board
Err 7	Loss of memory data	1. Incorrect self-calibration 2. computer board fault	1. Repeat the self-calibration 2. change computer board
Err 8	Calibration memory fault	1.100 gram weight forgotten by calibration 2. power supply board fault 3. computer board fault 4. Pressure sensor fault 5. Loose connections	1.Recalibrate with 100g 2. change power supply board 3. change computer board 4.change Pressure sensor 5.check cable connection

18. Power supply circuit diagram



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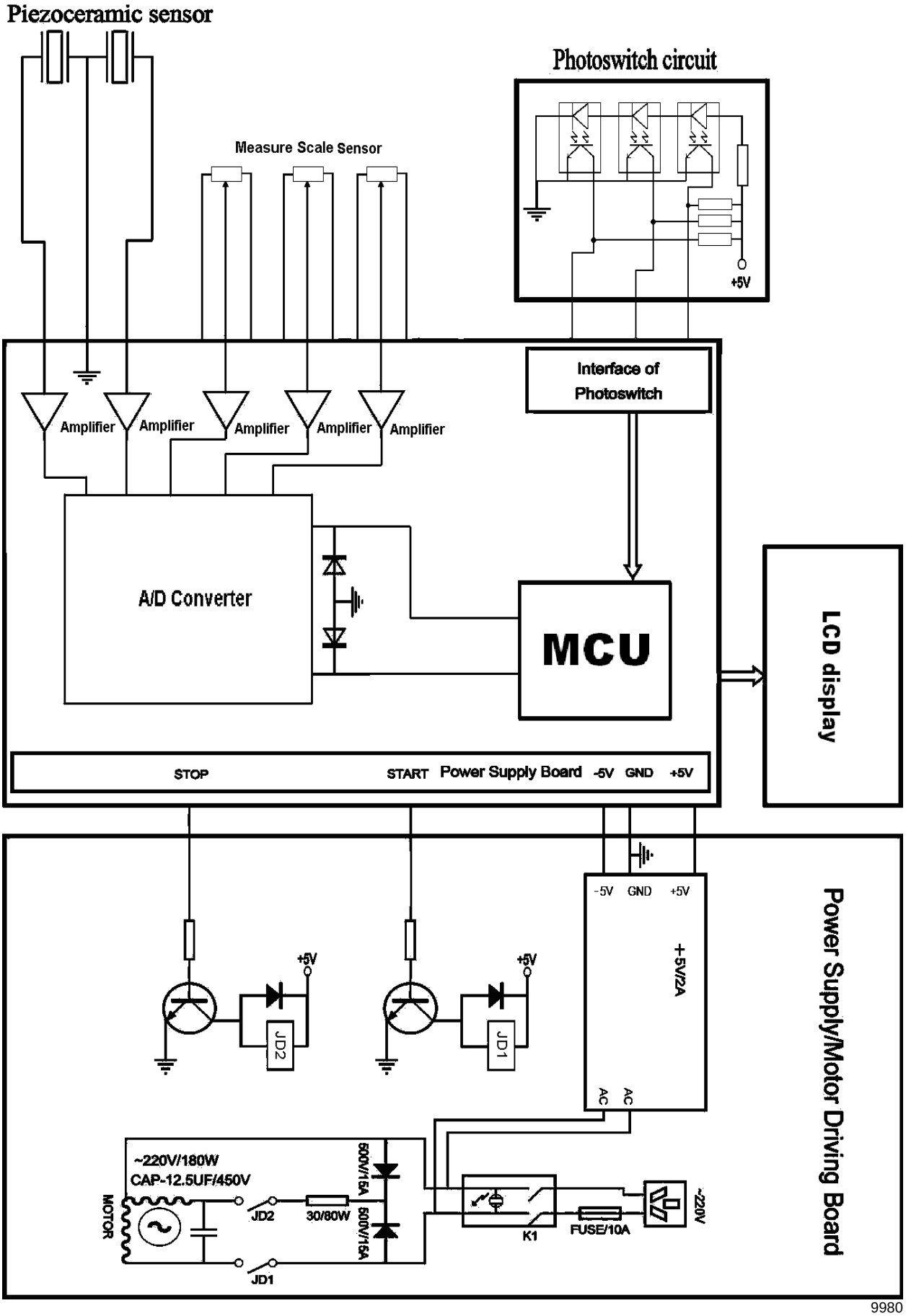
Attach figure 1 System circuit diagram



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Space for notes:

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Look at our videos!
The perfect addition to the manual.

Just scan Qr-Code or copy this link:

Instruction video

http://www.youtube.com/watch?v=Q2BjHB1GZjs

Calibration video

http://www.youtube.com/watch?v=-6zMeb2GZVU

Twin Busch App

Official Youtube Channel
Twin Busch Germany

EG-declaration of conformity

CE

TWIN BUSCH GERMANY

The company

Twin Busch GmbH | Amperestr. 1 | D-64625 Bensheim

declares hereby, that the **wheel balancer**

TW F-23

serial no. _____

in the configuration placed on the market by us, meets the relevant safety and health requirements, as required by the following EC directive(s) in it's/their current version(s).

EG-directive(s)

2004/108/EC EMC directive

Applied harmonized standards and regulations

EN 61000-6-2:2005, EN 61000-6-4:2007, EN 61000-3-2:2006+A1:2009+A2:2009, EN 61000-3-3:2008

CE Certificate

CE-C-1126-13-87-02-3A

date of issue:	17.12.2013
place of issue:	London
technical file no.:	TF-C-1126-13-87-02-3A

Certification body

CCQS UK Ltd.,
Level 7, Westgate House, Westgate Road,
London W5 1YY UK
Notified Body Appointment No. 1105

Any alteration to the equipment, improper use or installation void this declaration.

Authorized person to compile technical documentation is: Michael Glade (adress as below)

TWIN BUSCH GERMANY
TWIN BUSCH GmbH
Amperestr. 1 · 64625 Bensheim
Tel. 06251 / 70585-0 · Fax: 70585-29

Authorized signatory: Michael Glade
Bensheim, 14.11.14 Qualitätsmanagement

Twin Busch GmbH | Amperestraße 1 | D-64625 Bensheim
Tel.: +49 (0) 6251-70585-0 | Fax: +49 (0) 6251-70585-29 | info@twinbusch.de