1. Safety Instruction

1.0 Related safety reminder

Lighting Keep enough lighting strength in order to use the lift safe. Please provide the 200Lux on site and no additional risk. Don’ t use this lift outdoor. And if user uses it outdoor, please think about the wind, lightning, rain hazards and so on. This machine must stand on a level ground except any slope. Please check the level of the machine before using it .
Dismantling and disposal **ENVIRONMENTAL DAMAGE**. Only appropriately trained personnel may dismantle and dispose of the unit. **Dismantling** To dismantle the this product, proceed as follows: ELECTRICAL HAZARD! When carrying out any decommissioning and dismantling work on the unit, switch off all power supply connections, ensure they cannot be switched on unintentionally and verify that they have been disconnected. Earth and short-circuit them, and cover or otherwise isolate any neighbouring live parts. Failure to do so may lead to serious injuries or death. HIGH PRESSURE HAZARD.

When carrying out any unit decommissioning and dismantling work, close off and empty all the connection pipes until the pressure is the same as the ambient air pressure. Failure to do so may lead to injury.

PERSONAL INJURY!

Secure the unit against slipping.

The unit is ready for transporting.

It is important that all transport information is observed .

Disposal

A specialist company with the appropriate competence must dispose of the unit and individual components. This technical services department must ensure that:

– the components are separated according to material types

– that the operating materials are sorted and separated according to their properties.

ENVIRONMENTAL DAMAGE.

Dispose of all components and operating materials (such as oil, refrigerant and water-glycol mixture) separately according to material and in line with local laws and environmental regulations.

Regular information

EC Declaration of conformity

The equipment which accompanies this declaration is in conformity

with EU Directive(s):

2006/42/EC Machinery Directive

2014/30/EU Electromagnetic Compatibility Directive

Manufacturer:

Name: **LINCOS D.O.O.**
Address: **CELOVSKA CESTA 492, 1000 LJUBLJANA, SLOVENIA**

&

The undersigned declares that the described products meet the essential requirements of the below mentioned standards as based on above mentioned directives.The item of equipments, which identified below, has been subject to internal manufacturing checks with monitoring of the final assessment by third party.

Noise declaration

Sound power level: L_{WA}<85dB
Accompanied uncertainly K=4 dB
This measurement made in according with EN ISO 3746:2010
Applied operating conditions are:
All the motor is running with normal operation speed.

“The figure quoted are emission levels and are not necessarily safe working levels. Whilst there is a correlation between the emission and exposure levels, this can’t be used reliably to determine weather or nor further precautions are required. Factors that influence the actual level of exposure of the workforce include the characteristics of the working room, the other source of noise etc. i.e. the number of the machines and other adjacent processes. Also the permissible exposure level can vary from country to country. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk.”

1.1 Safety Instructions

- The machine should only be used by authorized and suitably trained personnel. Improper operation will lead to wrong measuring results.
- Calibration must be done in strict accordance with the manual. Incorrect calibration will cause the balancer not to work properly.
- Operational environment should conform to regulations of this manual.
- Power supply and air supply must conform to the requirement of this equipment.
- Wheel guard must not be disabled.
- Violating the transport and operation instructions in this manual is strictly prohibited. Manufacturer will not take responsibility for any damage or injury caused by such operation.
- Exceeding the measuring range of the equipment might cause damage and inaccurate measurement.
- If the operator fails to follow the safety regulation and causes damage to the equipment by dismounting the safety device, the manufacturers will stop its safety commitment.

1.2 Safety sign

	Power connection, electrical switch and other electrical indication sign. Electrical shock is dangerous. Please open the electrical cabinet after cut down the power. When switch off, the power supply to the main switch is still alive, please cut down the main supply.
	The protection sign of the balance main shaft is prohibited when moving.
	The sign of preventing hurting the hand when install and tighten up the steel ring.
	The sign of protection that machine will stop working when open protective cover.
	Safety earth sign.
	Laser pointer work hints. Please don't look directly at the laser light to prevent eye damage.
	Please don't tread to avoid damage.
	When the shield is opened, the foot pedal is used for dismounting the tyre. Crushing hazard and entanglement hazard.Don't put hands insert the clamping device and on the rotating tyre.
	When the cover is closed, the foot pedal is used to stop the measurement and stop the brake.

2 Technical Specifications

2.1 Overall Appearance

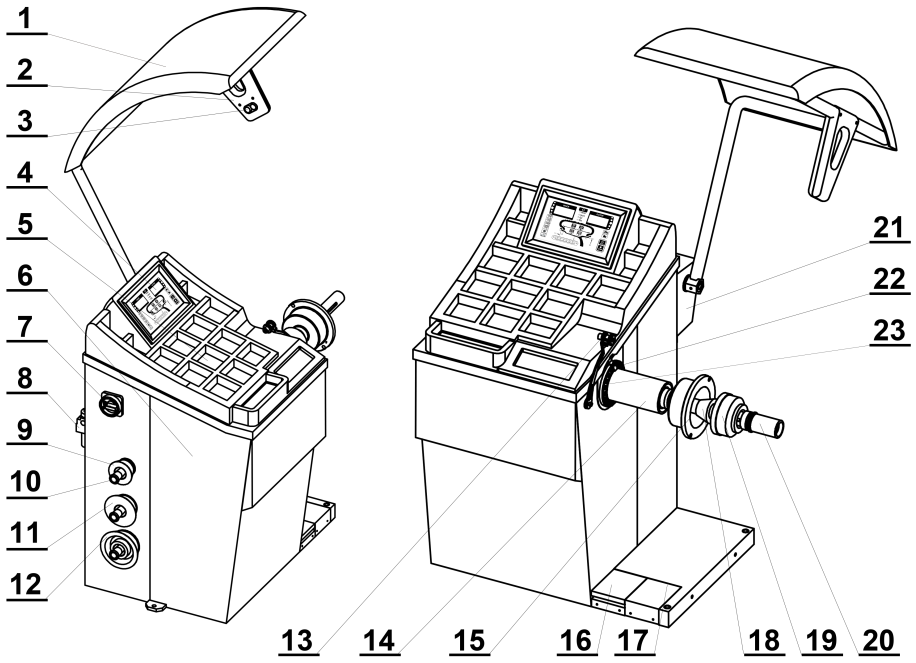


Fig.1 Structure

Table 1 Overall Structure

No.	Description	US-520
1	Wheel guard	√
2	Ultrasonic width gauge B holder	√
3	Ultrasonic sensor	√
4	Control panel	√
5	ABS cover and weight tray	√
6	Cabinet	√
7	Power switch	√
8	Atomized lubricator and oil-water separator	
9	No.2 taper sleeve	√
10	Taper sleeve rod	√
11	No.3 taper sleeve	√
12	No.4 taper sleeve	√
13	Automatic gauge	√
14	Balance shaft	√
15	Fitting surface flange plate	√
16	Foot pedal	
17	Standby switch	
18	No.1 taper sleeve	√
19	Steel ring nylon bowel	√
20	Quick change nut/Adaptor	Nut
21	Guard bag	√
22	Laser marker	√
23	Auxiliary lighting	√

2.2 Control panel

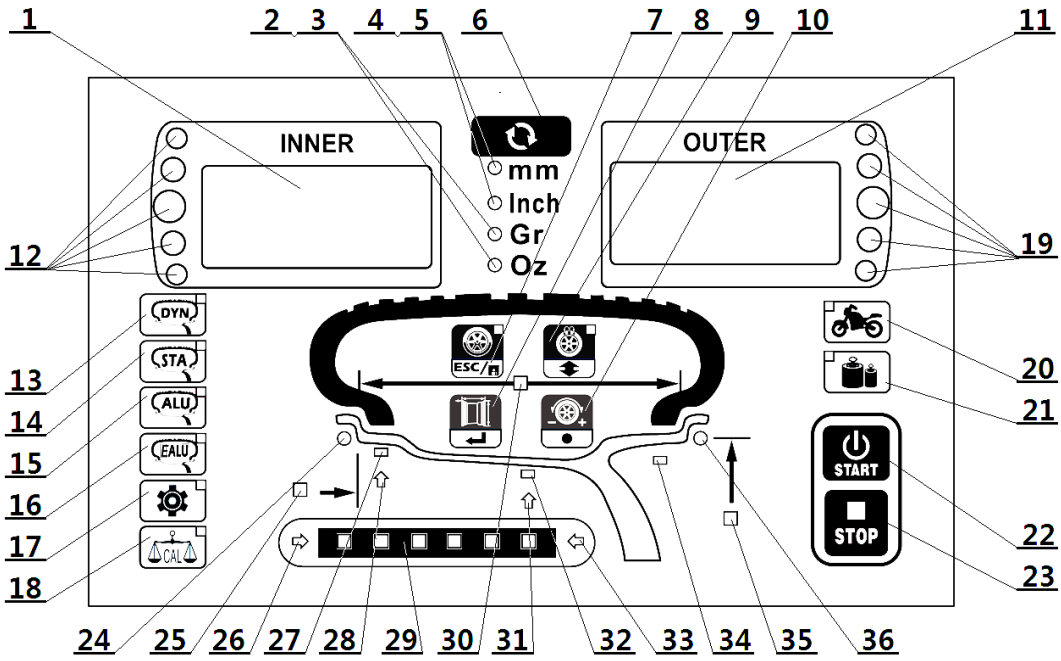


Fig.2 Display Panel

Table.2 Control panel function description

NO.	Description	NO.	Description
1,11	inner/outer unbalance display window	2,3	Weight unit：gram/OZ
4,5	Length unit：mm./in.	6	Weight or length unit shift key
7	OPT key in DYN or STA mode/indicator light; back or save key in settings, calibration or data input state	8	In balancing mode it is used to start inputting data manually / shift button ; In settings and calibration state it is used to edit
9	In EALU mode (SPL) OPY/indicator light ; In settings, calibration state, it is used to turn page.	10	In setting , calibration and parameter input state, press this button and at the same time rotate the wheel to input readings .
12,19	inner/outer unbalance sticking position indicator light	13	Dynamic balance mode option/indicator light
14	Static mode option/indicator light	15	ALU balance modes option/indicator light
16	EALU modes option/ indicator light	17	System settings option button/indicator light
18	Calibration /indicator light	20	Motorcycle balance button/indicator light
21	Min. Unbalance value check button/indicator light	22	Start up button
23	Stop,exit button	24,36	Inner/Outer balance clamping position indicator light
27,32, 34	In sticking weight on alloy rim mode, it is a light indicating sticking position.	25,30, 35	A,b,d position indicator light
26,28, 31,33	Automatic gauge assisted sticking weight position/ direction indicator light	29	Automatic gauge assisted sticking weight position indicator/ assisted progress indicator
23+10	In ALU mode, weight sticking position 12 o’ clock / 6 o’ clock shift button	23+8	Turn on and off wheel light
23+21	Turn on and stay accurate display state	9+10	In motorcycle mode ,accessory reset

2.3 Main Functions

Table 3　function description of all models

Description	US-520
Standard dynamic balance	√
Static mode1，static mode 2，static mode3	√
ALU1~ALU7 balance mode	√
EALU1~EALU2 balance mode	√
OPT balance in dynamic and static balance mode	√
SPL in EALU mode	√
Motorcycle standard dynamic balance	√
Motorcycle static balance	√
Motorcycle accessory reset function	√
Gram/oz, mm./in. shift function	√
Automatic gauge (a-d) and lighting function	√
Ultrasonic automatic gauge （b) function	√
Automatic gauge assisting weight sticking function	√
Weight sticking/cleaning position shift function	√
12o’ clock weight sticking position laser indicating function	√
6o’ clock cleaning sticking position laser indicating function	√
Self- calibration function	√
The shield protection function	√
Breakdown self check and diagnosis function	√

2.4 Main Technical Specifications

Table 4 measurement range

Power voltage(single phase)		220 – 240 V / 50 Hz	
		100 – 110 V / 60 Hz	
Protection grade		IP 54	
Power consumption		180W	
Max RPM		160 r/min	
Cycle time		Average 7-11s	
Measurement range	length-a-	10 mm — 350 mm	0.4 "— 13.8"
	Rim diameter -d-	254 mm — 813 mm	10.0" —32.0"
	wheel width -b-	38 mm — 636 mm	1.5" — 25.0"
	wheel diameter	≤ 1100 mm	≤ 43.3"
	wheel weight	< 75 kg	< 165 lb
Measurement error		≤ ±1g	0.1 oz
Phase error		≤ ±1°	
Automatic gauge error		±1mm	±0.1"
Net weight		82 kg	180.8 lb
Average noise		<70dB	
Working environment		Temperature: -20℃ ~ 50℃	
		Humidity: ≤85%	

3 Transport and Storage

The balancer must be transported and stored in its original package and should be stacked according to the instruction on the package.

Transfer the package with a fork lift as shown in Fig.3.

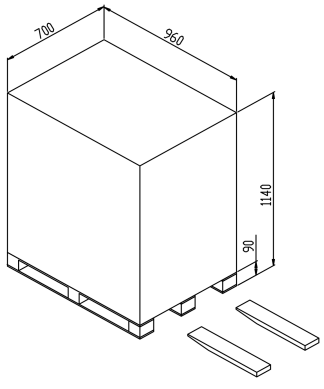


Fig.3 packing and transport!

4 Installation

4.1 Unpack the package

- Check the package first. If there is any doubt, stop unpacking and contact the supplier and shipping agent immediately.
- Open the packing box. Check to make sure that each component quantity is in accordance with the packing list. Check the machine and accessories.
- Remove the bolts which fix the bottom of the box and machine. Place the balancer steady.
- If there is any question, do not use the machine and contact the supplier immediately.

4.2 Installation Field

- The working environment should comply with the requirement in 2.4. The ground should be level, solid without vibration.
- Power sockets should match the power requirements in 2.4.
- Space for installation should meet the requirement described in Fig.4 to make sure all the components work without any limitation.

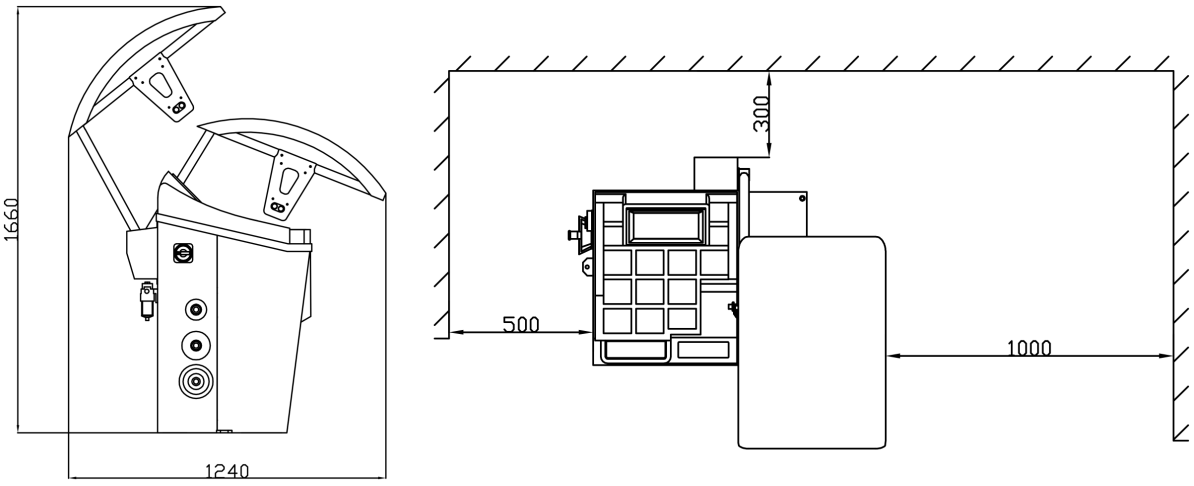


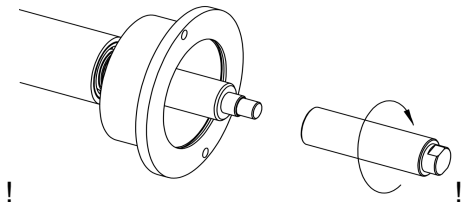
Fig.4 space requirement

- Balancer must not be exposed to sunshine and rain. A shelter should be built if using it outdoors.

4.3 Parts assembly

4.3.1 Shaft assembly

Take out the lead screw(Fig.5), assemble as shown in the figures below.!



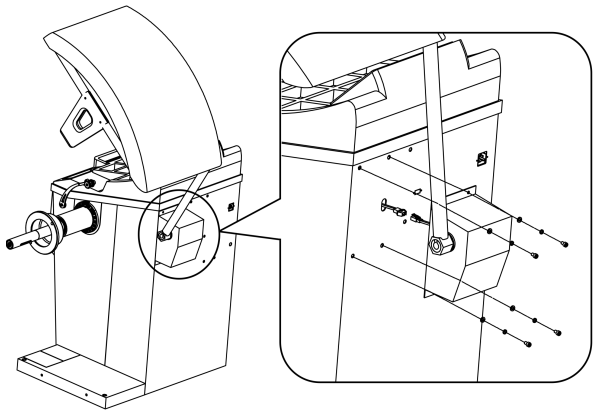
! !

Fig. 5 US-520 shaft lead screw assembly

!

4.3.2 Guard assembly

Guard bag assembly as shown in Fig. 7 Firstly connect the guard switch plug (for US-520, ultrasonic gauge B should be connected too)，then fix the bag in the corresponding place.



!

Fig.7 guard assembly!

4.3.3 Taper sleeve installation（Fig.8） !

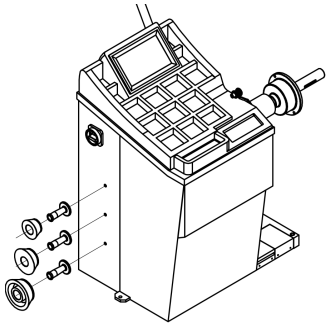


Fig.8 rod sleeve installation

4.4 Power and Air supply connection

4.4.1 Power supply connection

See Fig. 9 and plug the other end in the power socket.

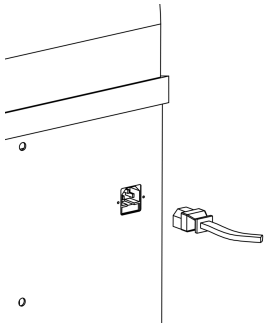


Fig.9 connecting power

NOTE:The power socket must comply with the local standard and requirement in point 2.4 in this manual.

4.4.2Air supply connection（Fig.10）

Air supply must comply with the requirement in point 2.4 in this manual. Adjust the air according to Air Treatment FRL Operation Manual.

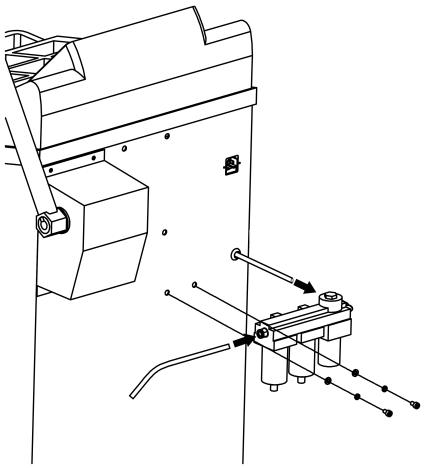
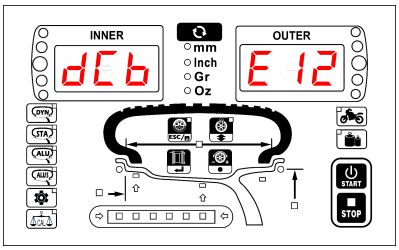


Fig.10

5 Starting to Use

5.1 Startup Self-check

Switch on the balancer ,system start self-check.(Fig.11) and then enter the preset balancing mode. The default mode is dynamic mode.



US-520

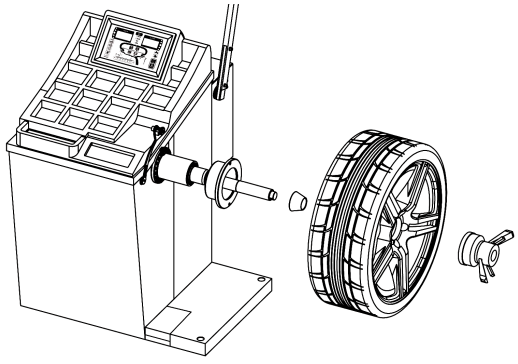
Fig. 11 Start self-check

5.2 Wheel Mounting and Dismounting

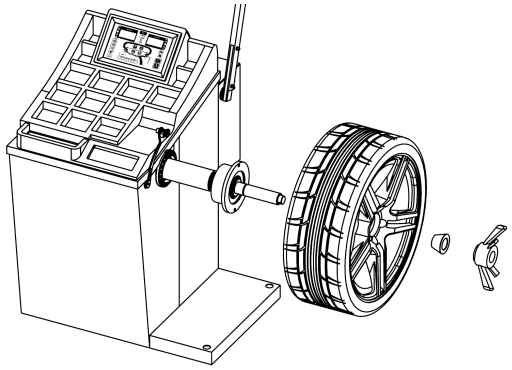
5.2.1 US-520 Wheel Mounting and Dismounting

Mount the wheel in two ways. First choose the sleeve that matches the rim hole size to ensure the central hole is within the range of the cone, then mount the wheel as shown in Fig.12 and finally tighten the quick change nut.

Dismount the wheel by screwing off the quick change nut and removing the wheel and sleeve.



Wheel front assembly



Wheel !"#"!$" assembly

Fig. 12 US-520 Wheel assembly

5.2.2 Mounting special wheels

5.2.2.1 Mounting over-width wheel

An optional accessory XSTD-2X named extension flange is needed to mount over-width wheels. Assemble the flange as shown in Fig.14 and then mount the wheel. This accessory can widen the wheel to be measured.

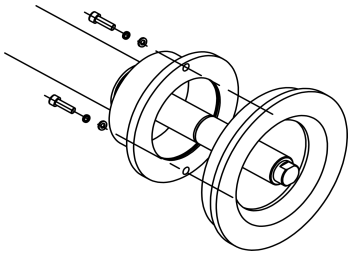


Fig.14 over-width wheel

5.2.2.2 Mounting wheels without central hole

A special accessory XSTD-61 (optional) is needed to mount the wheels without central hole. Mount as shown in Fig.15.

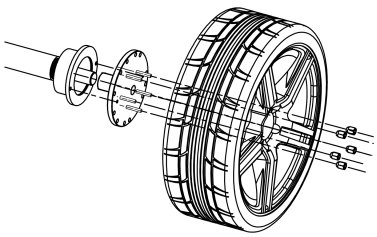


Fig. 15 wheel without central hole

5.3 Operation

Fig.16 shows all balance modes, which are available for different wheel types customers' preference. Except static balance, the others belong to standard dynamic balance. In non –motorcycle balance modes, EALU mode is highly recommended for it is much more convenient, faster and precise. It is a good substitute for traditional ALU balance mode.

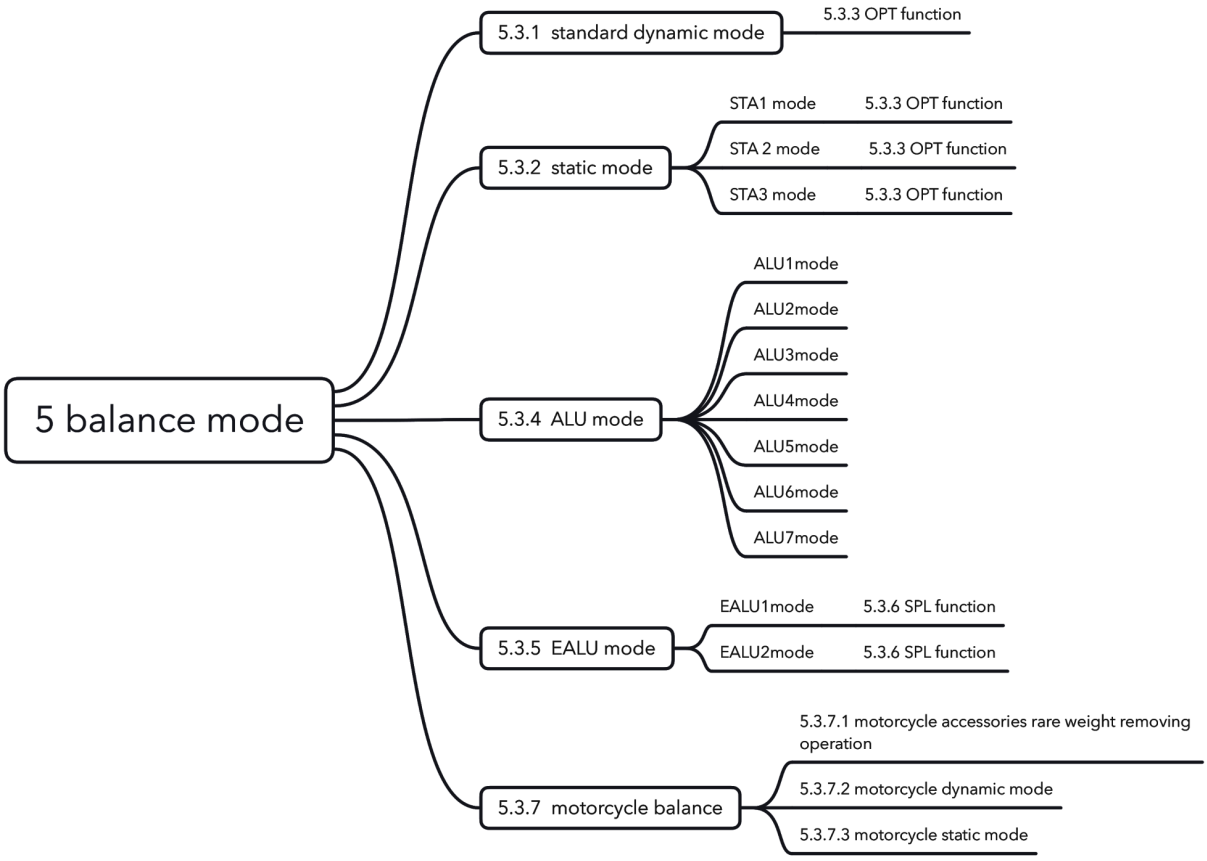


Fig.16 balance mode

5.3.1 Standard Dynamic Balance

The system default starting model is standard dynamic balance. (Fig.17) In other modes, press DYN key to change into dynamic mode. Dynamic balance is a vector balance mode, so for the wheel which is smaller than 2.5 inches, instead of dynamic balance, static balance is recommended.

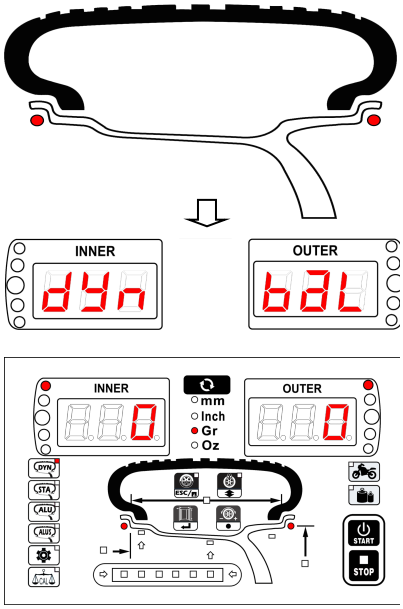


Fig. 17 dynamic mode

5.3.1.1 Standard Dynamic Balance Measurement

See Fig.18. US-520 have 3 steps.

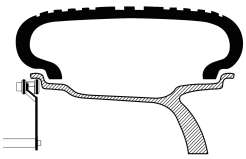
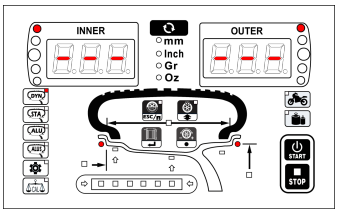
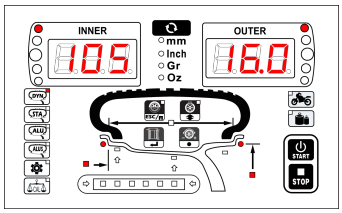
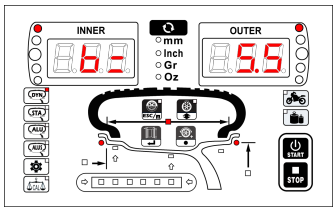
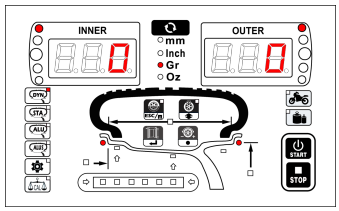
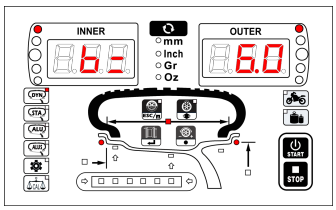
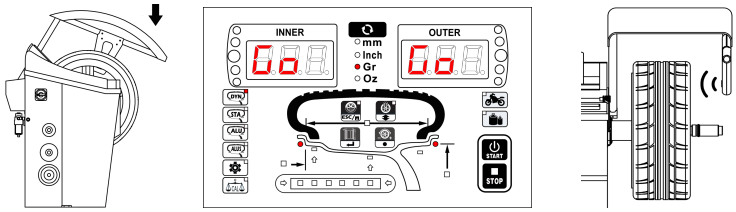
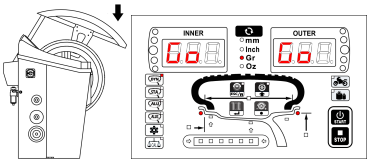
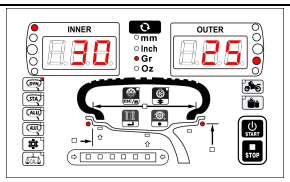
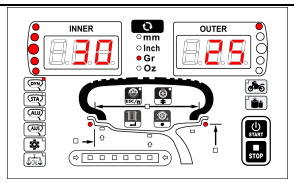
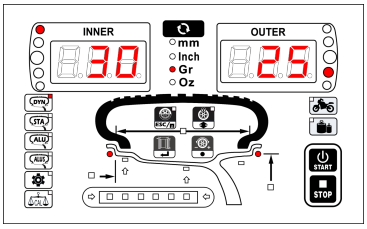
<table>
<tr><th>step</th><th></th><th>US-520</th><th></th></tr>
<tr><td rowspan="2">1</td><td> 
Pull out gauge and attach it to the rim edge</td><td> 
wait for 1second</td><td> 
measurement result a=105mm d=5.5 Inch</td></tr>
<tr><td> 
Gauge back , width input</td><td colspan="2"> 
Gauge back, waiting for measurement</td></tr>
<tr><td>2</td><td> 
Press , rotate wheel to input width B = 6.0 Inch</td><td colspan="2"> 
Close the guard, start wheel rotation measurement, ultrasonic gaug e B gets width reading automatically.</td></tr>
<tr><td>3</td><td> 
Close the guard , start wheel rotation measurement</td><td> 
Measurement finished , display result (inner 30g unbalance , outer 25g unbalance)</td><td> 
Measurement finished, display result and locate the biggest unbalance point (inner 30g , outer 25g)</td></tr>
<tr><td>4</td><td> 
Measurement finished, display result (inner 30g unbalance , outer 25g unbalance)</td><td colspan="2"></td></tr>
</table>

Fig.18 Standard Dynamic Balance measurement

5.3.1.2 Balancing Operation

Open the guard（Fig.19），follow Fig. 20 to operate.

US-520 locate the balance point manually.

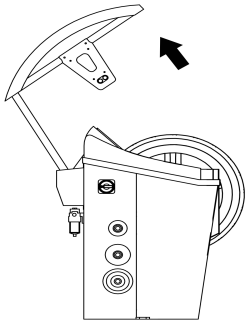


Fig.19 Open the guard

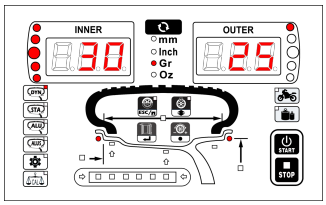
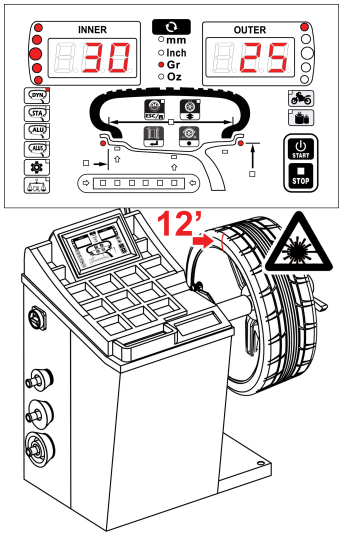
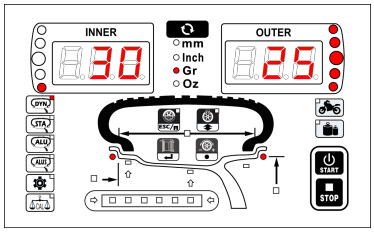
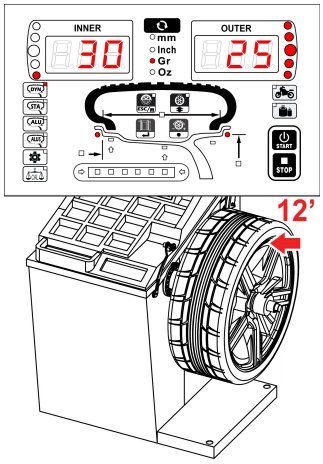
step	US-520
1	 Rotate wheel to the inner unbalance position
2	 Hit 30g weight on the inner position indicated by the laser 30g，inner balance is done.
3	 Rotate the wheel to outer unbalance position
4	 Hit a 25g weight on the 12’ . outer balance is done. Remove the wheel from the balancer according to 5.2.1

Fig.20 Balancing operation

5.3.2 Static balance

Press (STA) button to change into STA1 measurement mode. Keep pressing (STA) to change to STA1- STA3. Wheels can achieve moment balance with the rotating shaft through static balance. After standard dynamic balance measurement, static balance operation can be done directly by skipping the measurement process 5.3.2.1 below

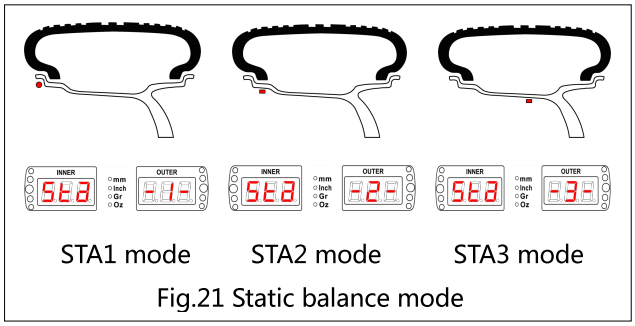


Fig.21 Static balance mode

5.3.2.1 **Static balance measurement** (TakingSTA1 as an example See Fig.22)

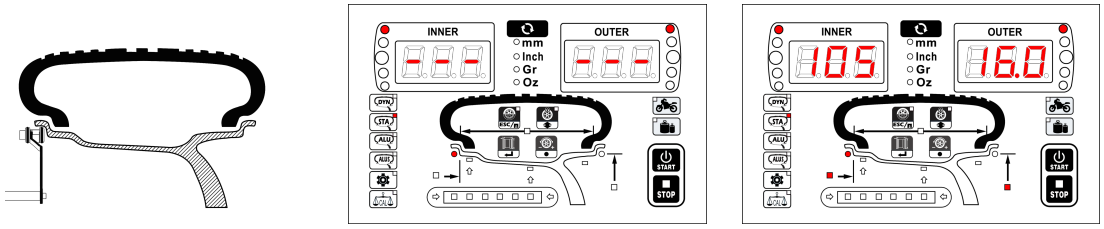
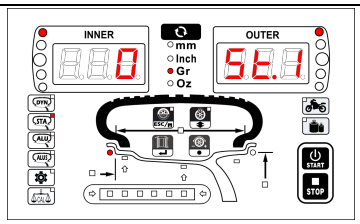
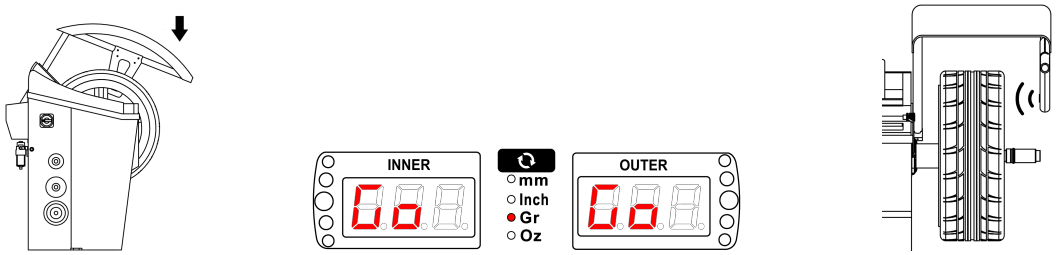
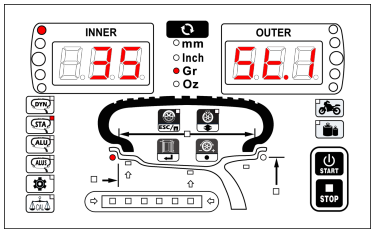
step	US-520
1	 Pull out gauge and attach it to rim edge　　wait for 1 second　　display result　a=105mm  Gauge back, waiting for measurement
2	 Close the guard , start wheel rotation measurement. Only measure the diameter, no need to input width.
3	 Measurement finished, display result (35g unbalance)

Fig.22 Static balance measurement

5.3.2.2 Balancing operation

Open the guard （Fig.19），follow Fig. 23 to operate. US-520 locate the balance point manually.

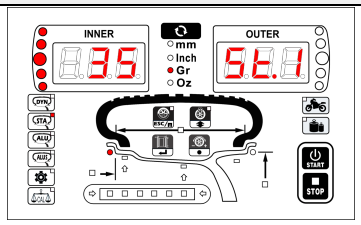
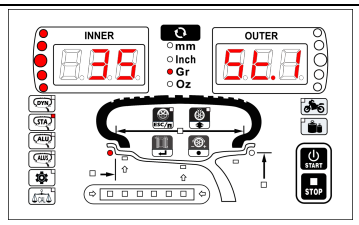
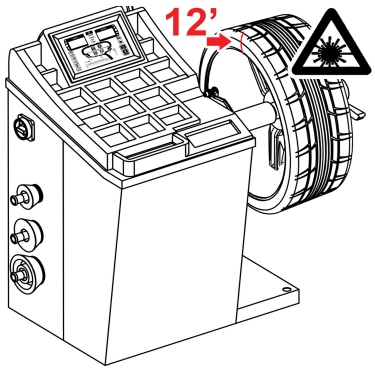
step	US-520
1	 Rotate wheel to the unbalance position
2	  Hit 35g weight on the inner position indicated by the laser，static balance is done.。

Fig.23 Balancing operation

5.3.2.3 Difference between STA1, STA2 and STA3

The balance positions are different. Due to this, STA1 clamps weight on the rim edge ,while STA2 and STA3 stick the weight on the inside of the rim. The unbalance values change with the radius.

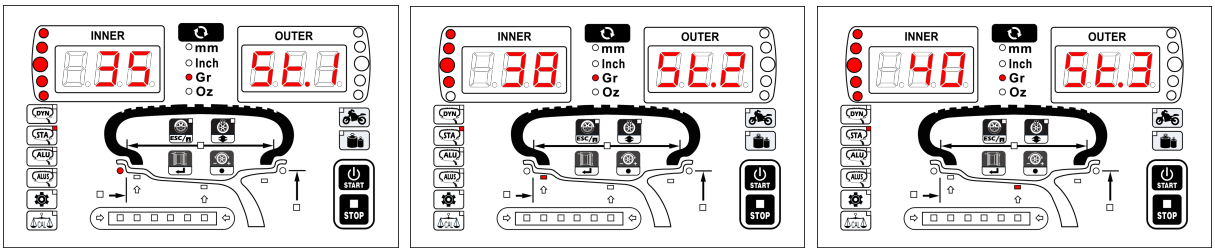
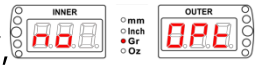


Fig.24 difference between STA1，STA2 and STA3

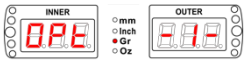
5.3.3 OPT Function

OPT can only be used in standard dynamic mode and static mode. This function is to compensate the unbalance between the wheel and the steel rim so as to reduce the weight to be added as light as possible.

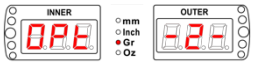
5.3.3.1 Start OPT

In standard dynamic or static mode, press to start this function. When the total static balance value is less than the set value stated in chapter 6.7, 

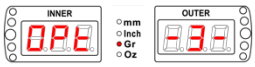
will appear meaning OPT is needed and automatically returns to the current state. When starting OPT 1.

5.3.3.2 Step 1 

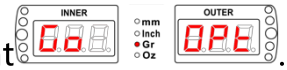
Firstly mark with a chalk a reference point which is corresponding to the valve, then rotate the valve to 12 o’ clock and stay there, press or to enter OPT2.

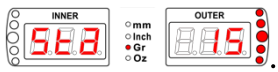
5.3.3.3 Step 2 

Remove the wheel from the balancer, take off the tire from the rim with a tire changer. Mount the rim on the balancer again, rotate the valve to 12 o’ clock again and stay there, press or to enter OPT3.

5.3.3.3 Step 3 

5.3.3.3.1 Doing OPT measurement

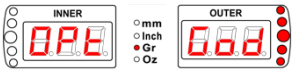
Close the guard ,start OPT measurement 

. When finished, it shows 15g residual unbalance value (supposed) after OPT 

. Rotate the wheel till all indicators outside are lighted, mark the rim at 12 o’ clock with a chalk.

5.3.3.3.2 Optimizing rim and tire mounting

Remove the rim from the balancer , with the aid of the changer, refit the rim and

tire with the reference mark coinciding. The OPT is finished. Press any button, it shows 

and goes back to the previous measurement state.

5.3.3.4 Exit OPT

During measurement , OPT can be stopped by pressing STOP and goes back to the previous measurement state.

5.3.4 ALU Balance

In other measurement mode, pressing ALU button can change into ALU1 mode.

Keep pressing ALU button can change between ALU1-ALU7 modes (Fig.25) .

After standard dynamic measurement, going directly to ALU mode can skip ALU measurement and performing balancing operation.

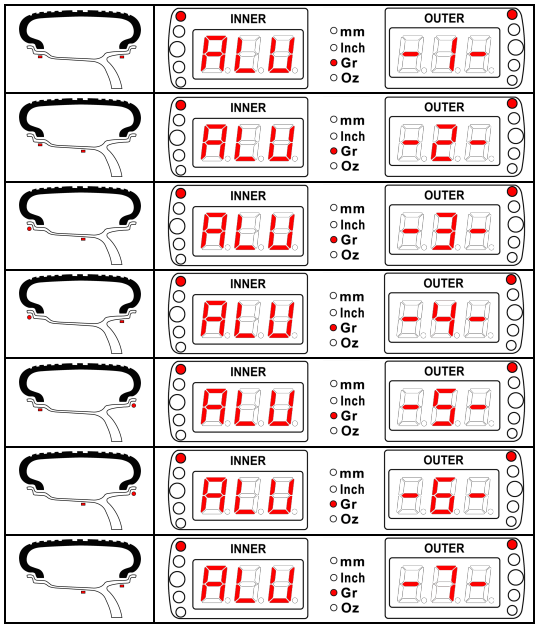


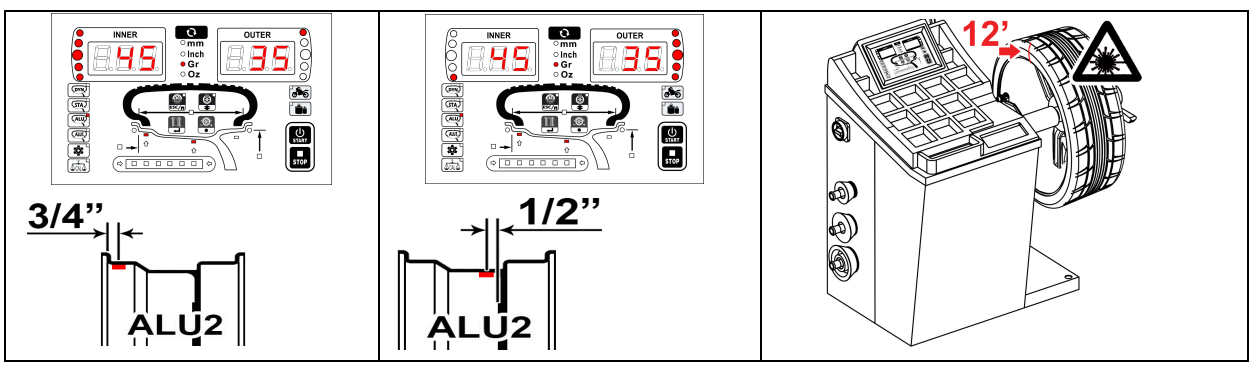
Fig. 25 ALU mode

5.3.4.1 ALU Balance measurement

ALU balance measurement is the same as standard dynamic measurement process, In a selected ALU mode, operate referring to Fig.18.

5.3.4.2 ALU Balance operation

Take ALU2 mode as an example. Open the guard , follow the instructions in Fig. 26.



US-520 locates inner and outer unbalance position manually. Balancing operation

Fig.26 ALU

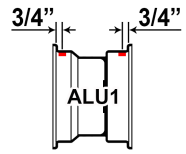
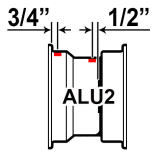
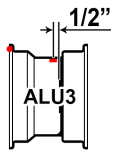
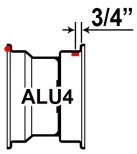
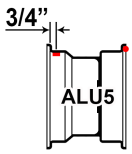
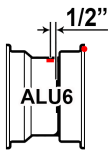
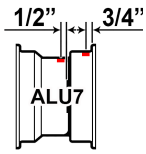
ALU1	ALU2	ALU3	ALU4	ALU5	ALU6	ALU7
						

Fig. 27　ALU1-7 sticking and clamping position

Where to stick the weight depends on the rim shape. Choose the longer distance surface to stick and stick or clamp the weight as shown in Fig.27, then ALU balance is completed.

5.3.5 EALU Balance

EALU balance is a special feature of this balancer. It performs precise AlU balancing with the aid of automatic gauges. There are two modes: EALU1 and EALU2.

5.3.5.1 Enter EALU mode (Fig.28)

In any measurement modes，pull out the gauge to position 1 and then to position 2，then gauge back. The balancer will automatically enter the selected mode by calculating the rim structure and measured position.

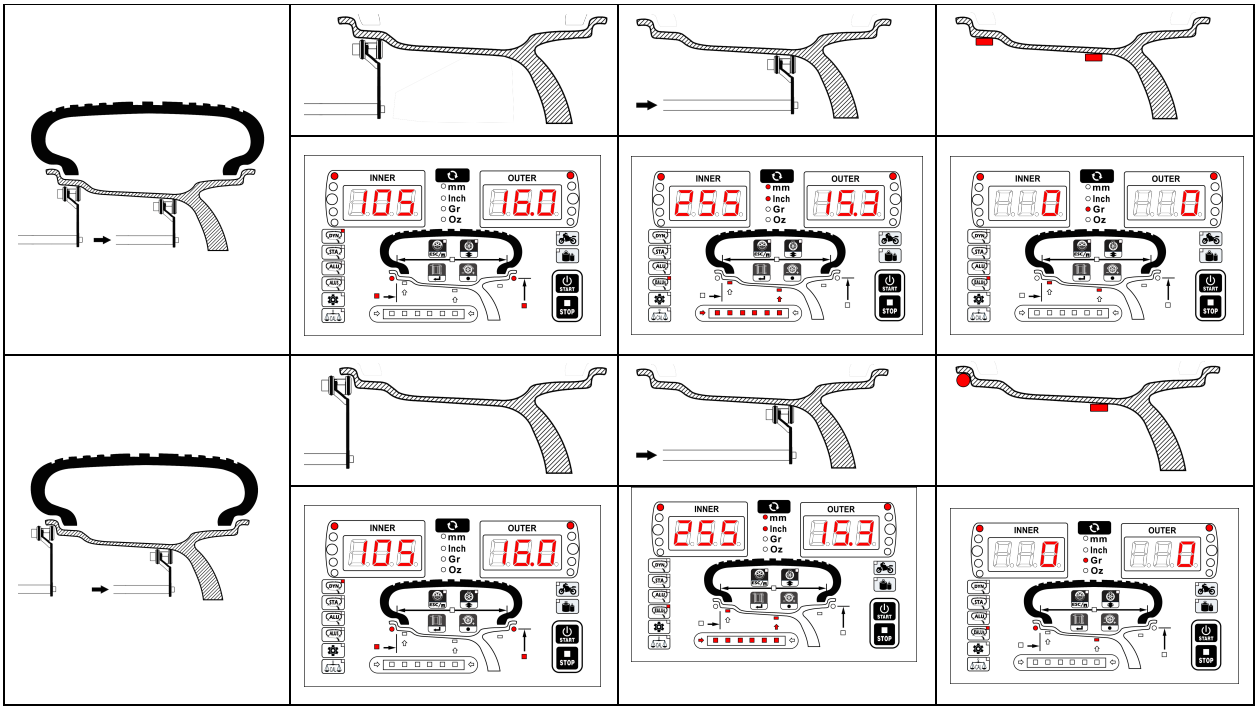


Fig.28　EALU balance measurement mode

5.3.5.2 EALU balance measurement

Same as other modes, close the guard to start measurement. When finished (for example EALU1，Fig.29），US-520 have to locate the unbalance position manually.

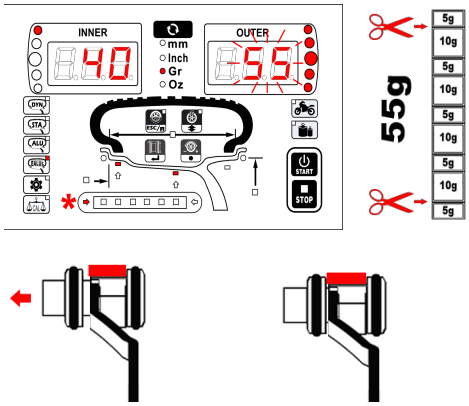


Fig.29 EALU balance measurement

5.3.5.3 EALU sticking weight operation

5.3.5.3.1 EALU outer sticking weight

At the unbalance position(for example outside 55g），the outer reading flashes and meantime the arrow indicates pulling out the gauge. Take a 55g weight， remove the back cover from the it and clip it on the end of the gauge with the glue face up，（Fig.29）.

Pull out the gauge, operate as shown in Fig.30，stick the weight on the indicated position.

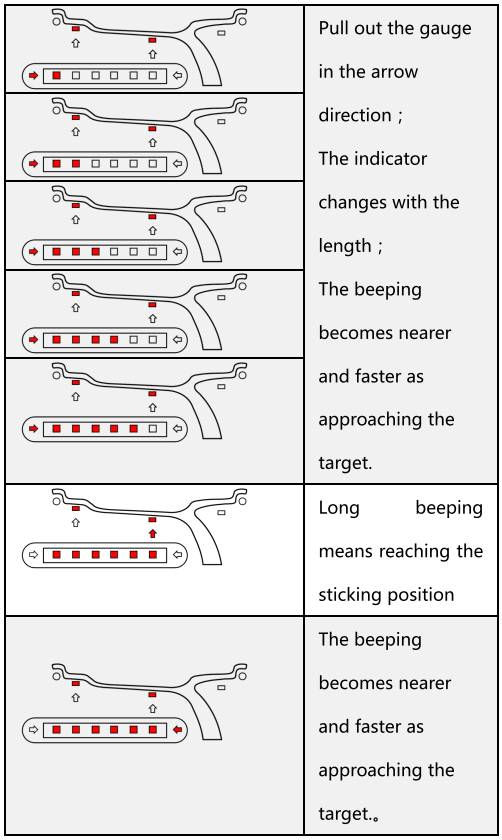


Fig. 30 EALU sticking optical sound prompt

5.3.5.3.2 EALU inner sticking weight operation

For US-520, unbalance position have to be located manually.

In EALU1 balance mode，inner and outer balance operation are the same. See Fig.31.

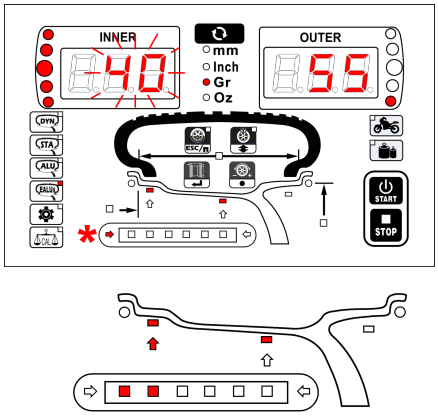


Fig.31 EALU1 inner unbalance position

In EALU2 balance mode， inside is clamping weight operation（see Fig.20）. Clamp the weight shown in “INNER” on the position indicated by the laser.

5.3.6 SPL Function

This function is to split an unbalance weight that needs to be stuck on the outside into 2 equivalent weights and hide them behind the two neighboring spokes so as not to affect the rim appearance. It has two modes,SPL1 andSPL2, which can be selected by the settings in chapter 6.8. In EALU mode, if there is unbalance outside , press button to enter

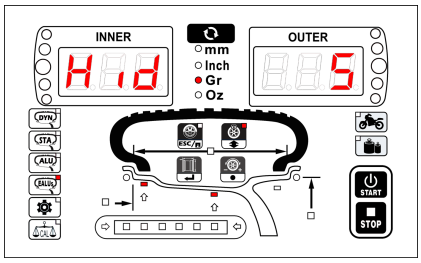


Fig.32 SPL1 mode select spoke amount

Hid=3	Hid=4	Hid=5	Hid=6	Hid=7	Hid=8	Hid=9	Hid=10
							

Fig.33 split according to the number of spokes

SPL operation. During SPL operation press STOP can stop it.

5.3.6.1 SPL1 mode

The first step in SPL1 mode is to select the number of spokes. (Fig.32)

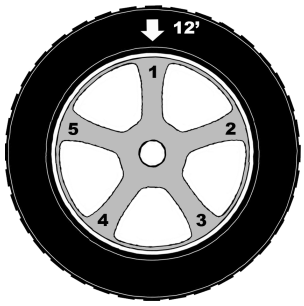


Fig.34 confirm the phase

5.3.6.1.1 Select the number of spokes

Press button and at the same time rotate the wheel , the number of spokes (ranging 3-10) can be input fast.

5.3.6.1.2 Confirm spoke phase

Take any spoke as the start one and rotate it to 12 o' clock, press or to confirm the start point. Split function is finished.

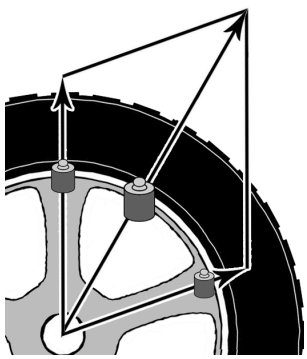


Fig. 35 vector split

After split, two unbalance position will appear on the outside (the original unbalance position is just appear behind one spoke is an exception), both of the sticking position are behind the spokes and the total wight and positions are equivalent to the original one weight. (Fig.35)

Fig.36 SPL1

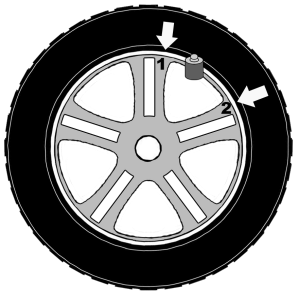


Fig.37 SPL2

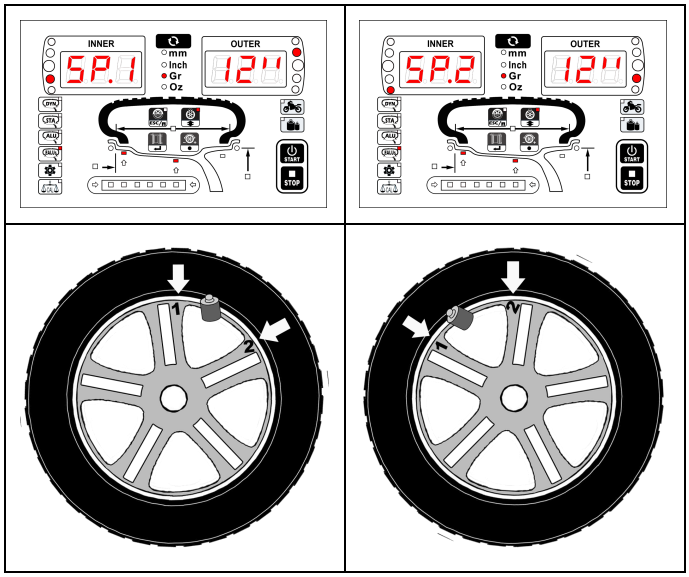


Fig. 38 SPL2 operation

SPL1is convenient to do for regularly distributed spokes. However, there is a limitation for other structure spokes. For instance, in Fig. 36 spokes can only be split in this way while in Fig.37, neighboring spokes cannot be split.

5.3.6.2 SPL2 mode'

SPL2 enables the unbalanced neighboring spokes splitting possible.

5.3.6.2.1 Select the first spoke

Select Spoke1 near the unbalance position (Fig.38) , at 12o' clock press or to confirm.

5.3.6.2.2 Select the second spoke

Select Spoke 2 near the unbalance position2 (Fig.38) . At 12 o' clock press or to confirm , SPL2 split is finished.

Same as SPL1 , two unbalance position will appear after split and the sticking

positions are behind the spokes. The weight and position of the two counterweights are equivalent to the original one weight. (Fig.35)

5.3.7 Motorcycle balance

Motorcycle balance consists of dynamic and static balance and needs to be performed with special accessories. Press  to enter motorcycle dynamic balance mode. (Fig.39)

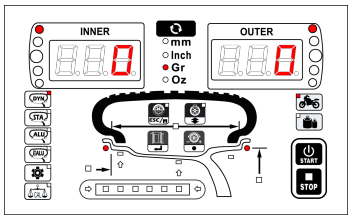


Fig.39 motorcycle balance mode

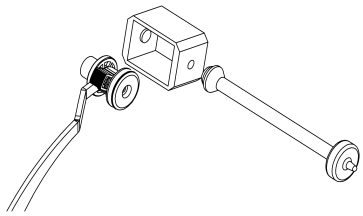


Fig. 40 extension gauge

As instructed in Fig.41, install the special clamps and extension gauge. (fig.40)

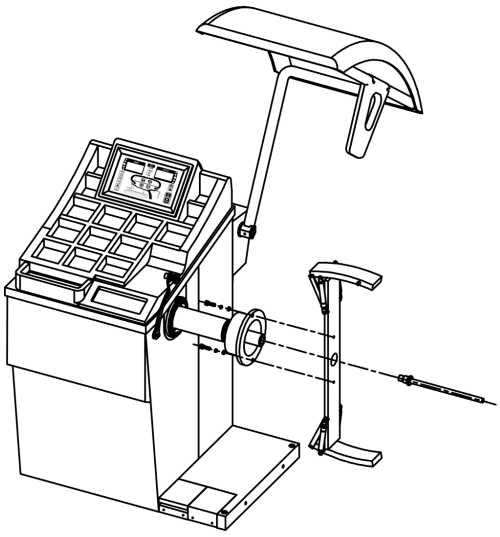


Fig.41 motorcycle special clamp

5.3.7.1 Accessories tare weight removing operation

The balancer has a special accessories tare weight removing function, which means removing the tare weight of the accessories to ensuring more precise measurement. Press  and  simultaneously to enter tare weight removing operation. (Fig.42) Close the guard to start tare weight removing operation. When measurement finished, both inner and outer display 0,0. Tare weight removing finished.

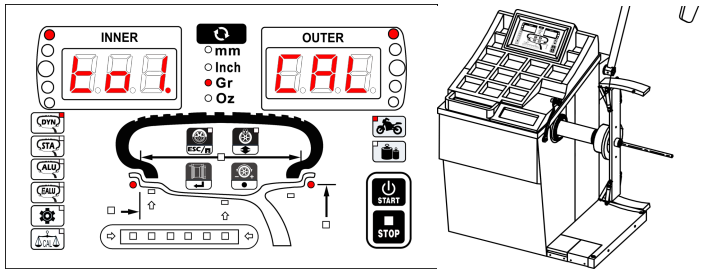


Fig.42 motorcycle accessory tare weight removing

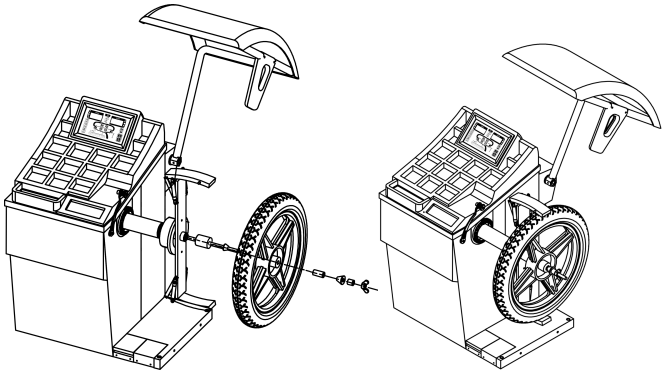


Fig. 43 motorcycle special clamp installation

5.3.7.2 Motorcycle dynamic balance operation

Mount the wheel on the balancer, then follow the steps of standard dynamic in Chapter 5.3.1.

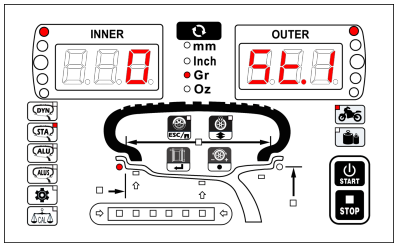


Fig.44 motorcycle static measurement

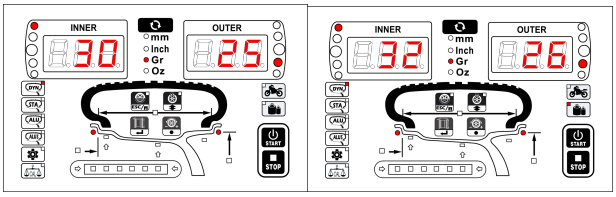
5.3.7.3 Motorcycle static balance operation

In motorcycle balance mode, press STA to enter motorcycle static mode, then follow the instructions in Chapter 5.3.2.

5.3.8 Additional functions

5.3.8.1 Balance value precise display function'

During balancing operation , press and do not loosen the button , " INNER" and "OUTER" will display unbalance value. Loosen will return to quantifying display state. If keeping displaying precise state, press STOP and simultaneously.



quantifying display precise display

Fig.45 display precise value

5.3.8.2 Wheel cleaning mode

This cleaning function is designed for weight sticking mode so as to ensure the surface of the wheel is clean enough to stick the weight on. Press STOP and at the same time , the window shows sticking position is 12" or 6" (cleaning) position , (Fig.46) and the laser will indicate the exact position too.

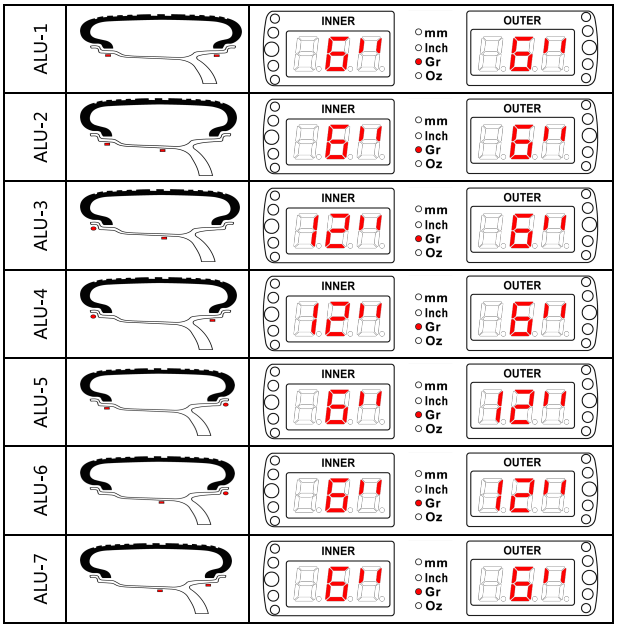


Fig.46 cleaning state

5.3.8.3 Lighting function

The balancer has a function to light the weight sticking position and gauge measurement position.

In any measurement mode， switch on or off the lighting power by pressing  and  simultaneously to supply the temporary light. For protection, the light will be off automatically after 100 seconds .

5.3.8.4 Sleeping function

This function can be set as stated in Chapter 6.5.3. If not operated during the set sleeping time, the balancer will sleep automatically, meantime, system will turn off the main electricity powered parts and display sleeping state. Press any key or any operation will wake it up to work again.

5.3.8.5 Precise balance mode and weight saving balance mode

Weight-saving mode can be set in 6.3.3. In dynamic balance mode, for precise balance, when inner and outer unbalance value is <5g(the standard), the total static balance value is <5g too, it will show“0”，“0”. Otherwise it will enter static balance mode automatically to display the static unbalance value. Precise balance mode can remove the residual unbalance.

Weight -saving balance mode can not only meet requirement of the precision but also save the weight at its best, thus gradually help save money.

5.3.8.6 Live unit shift function

When doing unbalance measurement or inputting wheel parameter, gram/oz or mm/ inch can be changed between at any time by pressing  button.

6 System Setup

6.0 System settings navigation

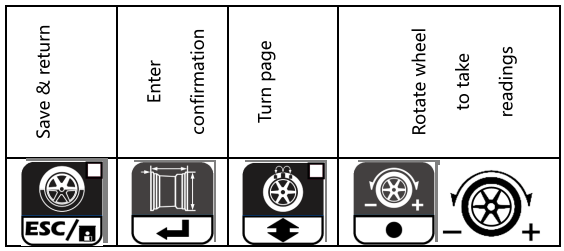


Fig.47 button function

Press to enter system settings. The b uttons as shown in Fig.47 are used to edit or save.

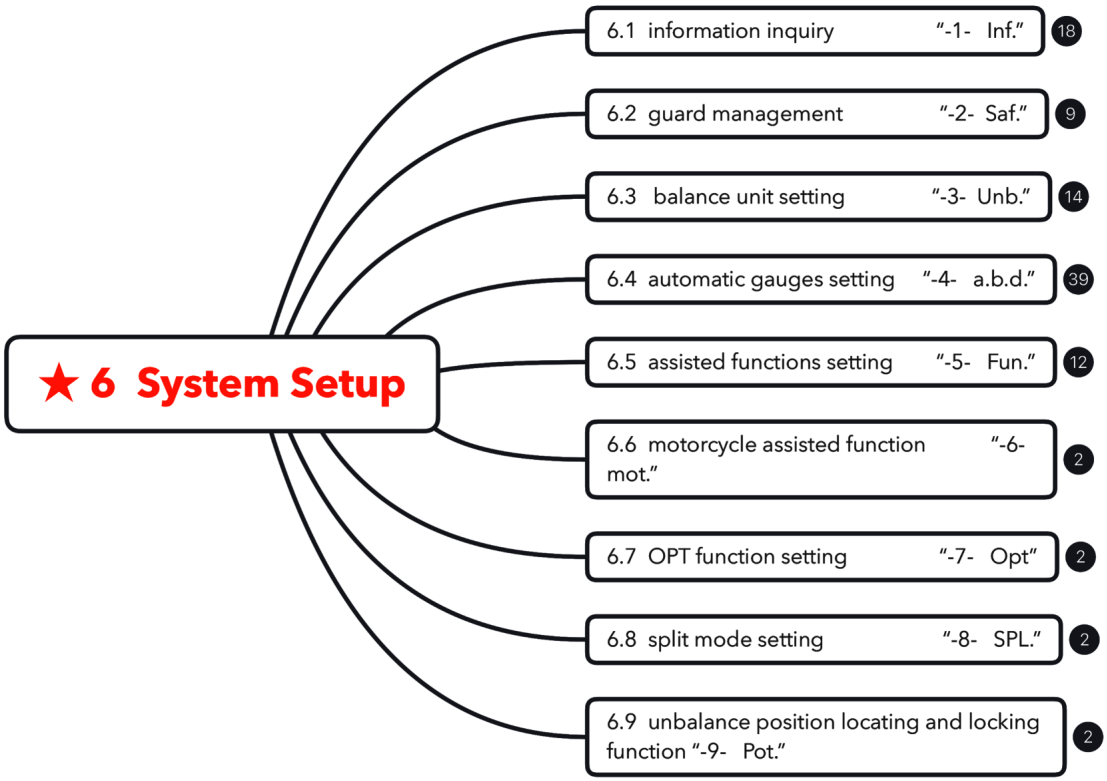


Fig.48 system settings

6.1 Information inquiry (Fig.49)

6.1.1 Program information

This setting provides version number and issue date .

6.1.2 Error information

This setting is to check the system error through the

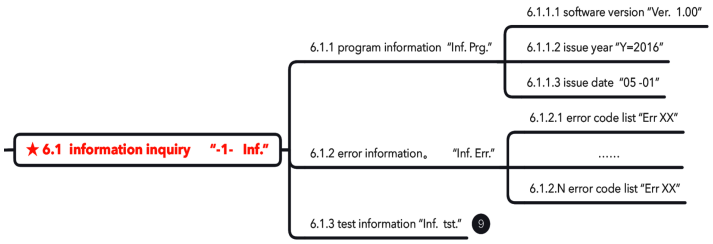


Fig.49 information inquiry

error code. It is blank if no error exists.

6.1.3 Test information (Fig.50)

It is a built in tool to diagnose the working state of each unit of the balancer.

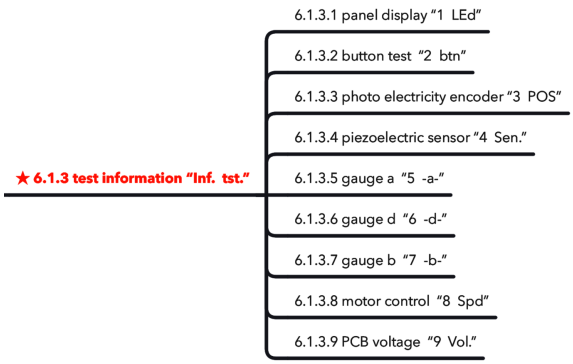


Fig.50 test information

6.1.3.1 Display panel test

Entering this setting, the digital tubes and LED indicator will be lit on one by one with the electric beeping.

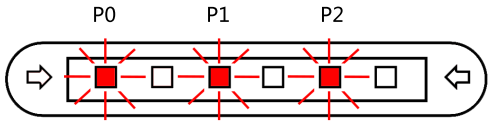


Fig.51 phase test

6.1.3.2 Button test

Entering this setting, the corresponding numbers of buttons on the panel, guard switch and foot pedal switch will be displayed on "INNER" "OUTER" .Exit the button test by pressing START and STOP at the same time.

6.1.3.3 Photo electricity encoder test

Entering this setting, rotate the wheel, then ,"INNER" "OUTER" will display rotating angle POS = 0°~359°. 同时 P0 , P1 , P2 指示灯代表编码器实时状态。(图 51)

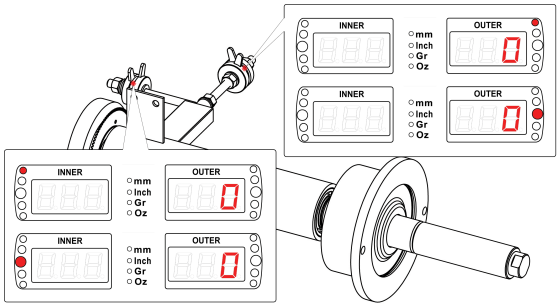


Fig.52 piezoelectric sensor test

6.1.3.4 Piezoelectric sensor test

Entering this setting, the corresponding data of different sensors will be displayed on the screen (Fig.52) . Data changes between -2048 +2048 with pressure . Static data is approximate 0.

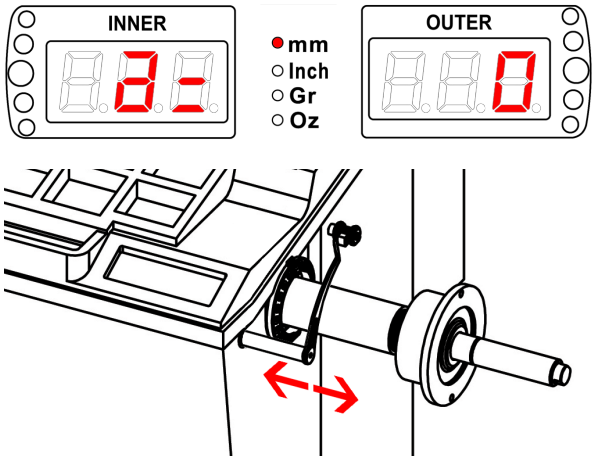
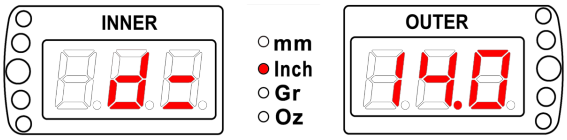
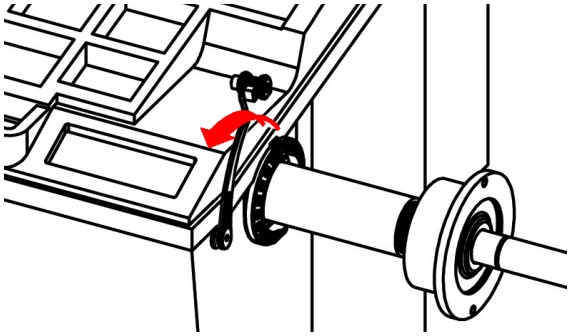


Fig.53 gauge a test

Each sensor has two pathes and converts by pressing .



6.1.3.5 Gauge a test



Entering this setting , pull a d, the length pulled out should be the same as the reading ranging a=0~350mm. (Fig.53)

Press to change the length unit.

6.1.3.6 Gauge d test

Entering this setting , raising the gauge a d ,the corresponding rim diameter will be displayed (Fig.54 d=14.0 Inch) 。

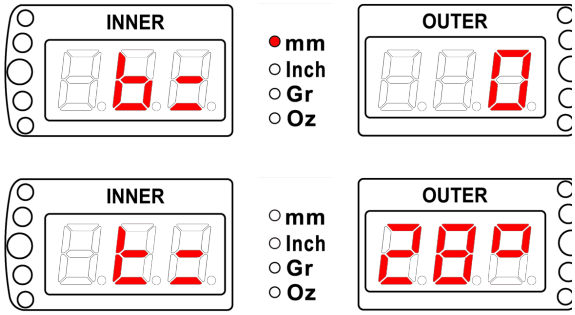


Fig.55 gauge d test

Press to shift between diameter and angle.

Press toe change the diameter unit.

6.1.3.7 Gauge b test

Entering this setting , put the hand or an object near the ultrasonic gauge B, the reading on the screen will change with the distance between the object and the ultrasonic probe. (Fig.55)

Press to shift to the temperature compensation test state. The temperature is the room temperature.

Press to change the width unit.

6.1.3.8 Motor control

Entering this setting , it shows as

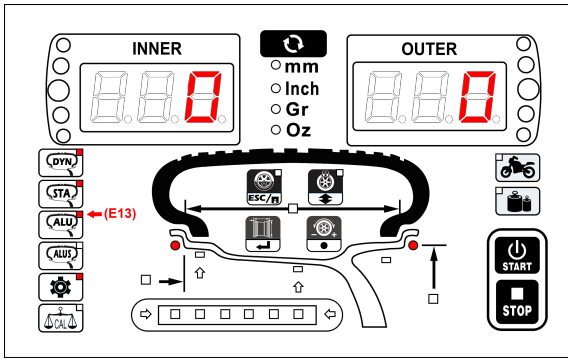


Fig.56 motor control test

Fig.56.Control the motor by pressing and not loosening the corresponding button shown in Fig.57 ,During rotation "INNER" and "OUTER" windows display the balancing shaft live speed with the unit r/min.

Motor forward turning	Motor backward turning
	

Fig.57 function of buttons

6.1.3.9 PCB voltage test

Entering this setting, the voltage of all key nodes on the PCB will be displayed. Refer to Table 5 for the exact voltage range .

Table 5 PCB voltage

Name	+12V	VCC	VDD	AVCC	AVSS	-12V
Code	"V12"	"Vcc"	"Vdd"	"AVc"	"V5"	"V="
Scope	10.5~13V	4.7~5.3V	3.0~3.4V	4.7~5.3V	-5.3~-4.7V	-13~-10.5V

6.2 Guard Management

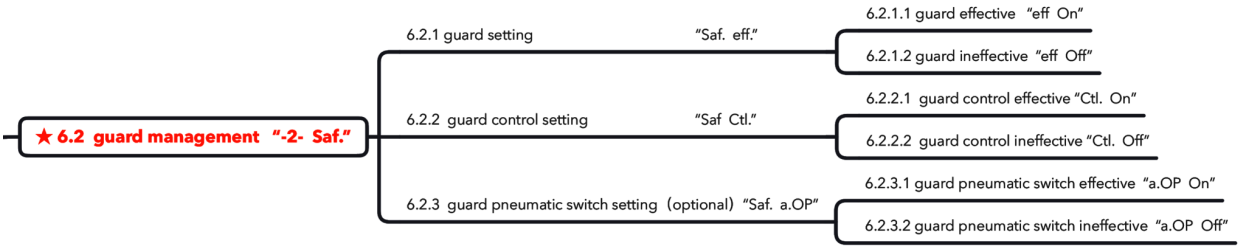


Fig.58 guard management

6.2.1 Guard effectiveness setting

The guard must be set effective to protect the operator.

When set effective, the measurement can be started only when guard is closed. If the guard is opened during measurement, the balancer will be braked and stop automatically.

When set ineffective, the items in 6.2.2 and 6.2.3 will not appear. Whether the guard is installed or not will not influence the balancer work.

6.2.2 Guard control effectiveness setting

When set effective, close the guard and at the same time start up guard control to start balance measurement.

6.2.3Guard pneumatic switch setting (optional)

When installing this accessory, set it effective. Press START or STOP, the guard will automatically close or open.

Guard can be opened or closed manually too.

6.3 Balance unit setting

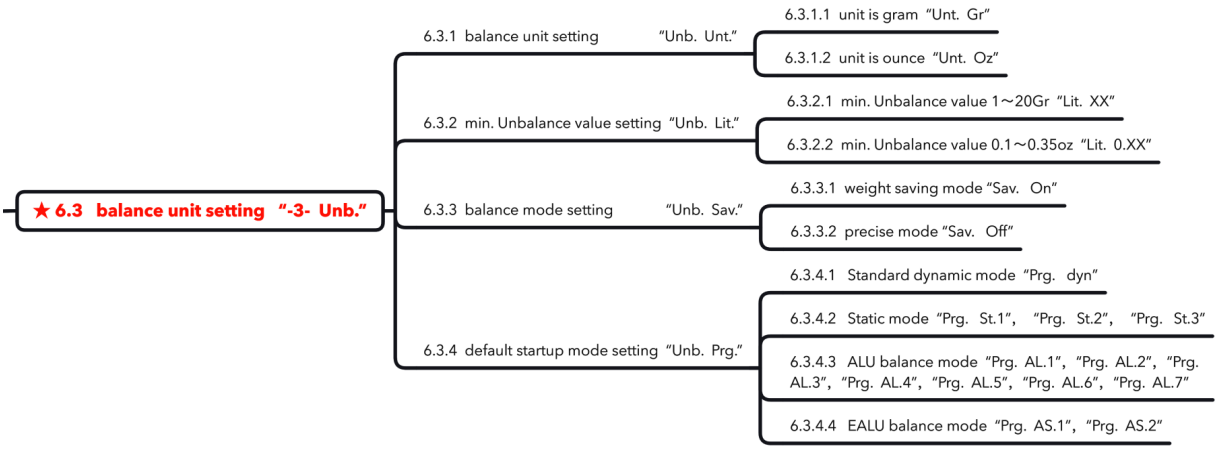


Fig.59 balance unit setting

6.3.1 Default balance unit

Gram or ounce.

6.3.2 Minimum unbalance value setting

The range is 0~50 grams or 0~1.75 oz. Any value less than this is invisible.

6.3.3 Balance mode setting

In this setting "On" means weight-saving mode ; "Off" means precise mode.

6.3.4 Default startup mode setting

The factory default startup mode is standard dynamic balance. (Table 6)

Table 6 starup mode setting

	Display code						
Standard dynamic balance	"#$%&'	!	!	!	!	!	!
Static balance 1~3	"()&*'!	"( )&+'!	"()&,'!	!	!	!	!
ALU balance 1~7	"-.&*' !	"-.&+'!	"-.&,' !	"-.&/' !	"-.&0'!	"-.&1'!	"-.&2'!
EALU balance 1~2	"-(&*' !	"-(&+'!	!	!	!	!	!

6.4 Automatic gauges settings（Fig.60）

6.4.1Automatic gauge a unit

mm/Inch.

6.4.2 Automatic gauge a resolution

Metric system:1mm/5mm

British system：0.1”/0.2”

6.4.3 Automatic gauge a startup default value

The range of default value is 10~350mm. Default value is 115mm.

Fig.60 automatic gauges setting

6.4.4 Automatic gauge d unit

mm/Inch.

6.4.5 Automatic gauge d resolution

Metric system：1mm/5mm British system：0.1Inch/0.5Inch

6.4.6 Automatic gauge d startup default value

The range of default value is 254~813mm（10 Inch~ 32 Inch）. The default value is 572mm（22.5 Inch）.

6.4.7 Automatic gauge b unit

mm/Inch.

6.4.8Automatic gauge b resolution

Metric system：1mm/5mm　　British system：0.1Inch/0.5Inch

6.4.9 Automatic gauge b startup default value

The range of default value is 38~636mm（1.5 Inch~ 25 Inch）. The default value is 209mm（8.25 Inch）.

6.4.10 Automatic gauge ab effectiveness setting

Automatic gauge a and d are assembled together. This setting can turn on or off the ad at the same time. This function is used to turn it off when the automatic gauge has error and then input the ad values manually.

6.4.11 Automatic gauge ab lighting control setting

This setting is used to turn on or off the light effectiveness.

6.4.12 Automatic gauge b effectiveness setting

This setting is to turn on or off the gauge b effectiveness.

6.5 Assisted functions setting（ Fig.61）

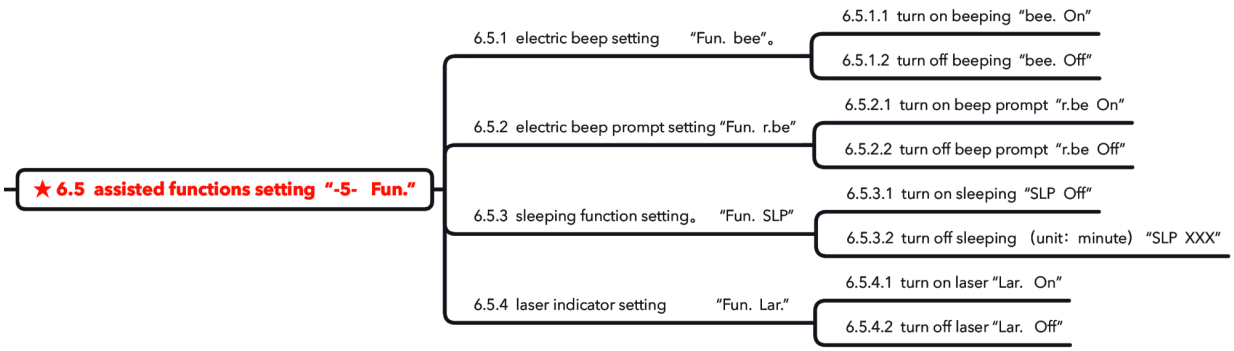


Fig. 61 assisted functions setting

6.5.1 Electric beep setting

On /off electric beep.

6.5.2 Electric beep sound setting

Turn on/off automatic beep while weight sticking.

6.5.3 Sleeping function

Entering the setting, set sleeping off or on or set sleeping time with the roller. （5min，10min，15min，20min，25min，30min，40min，50min，60min，90min，120min）。

6.5.4 Laser indicator function setting

Off or on weight clamping position laser indicator.

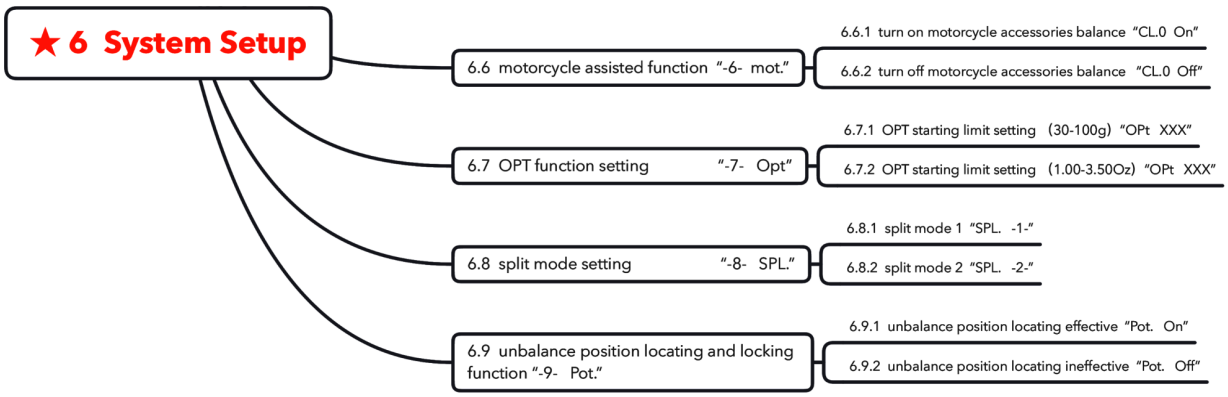


fig.62 function settings

6.6 Motorcycle assisted function

Off /on motorcycle accessories balance function.

6.7 Optimization （OPT）function setting

This function is to set the minimum value for doing OPT. The range is 30gram~100gram(1.00~3.50OZ). When the maximum static balance value is over this value, OPT can be done.

6.8 Split mode setting

The current split modes consists of "SPL -1-" and "SPL -2-".

7 Calibration program

Press  to enter calibration directory. Press  button or roller to select the option,then press  to enter. See Fig.47 for button functions.

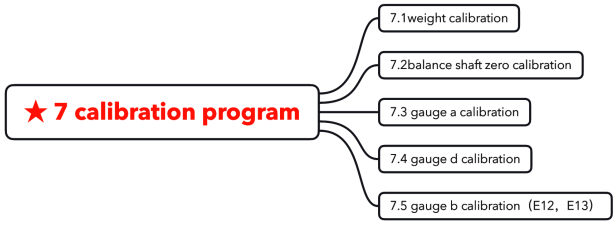


Fig.63 calibration software

7.0 Calibration program directory (Fig.63)

7.1 Weight calibration

7.1.0 Calibration tool

Table 7 calibration program directory

Directory	Code	Content
3 45678)!9:;6<=:)6>%		Calibrate the balance value with standard test weight
3 balance shaft zero calibration		Calibrate the unbalance weight of shaft
3 !7:?75! a calibration		Gauge a zero calibration
3 !7:?75! d calibration		Gauge d zero calibration and sticking position calibration
3 7: ?75!< calibration!		Gauge b zero calibration

A wheel with steel rim (14~17inch suggested) and a 100g (3.50oz) standard weight supplied with the balancer. Entering weight calibration, follow the 3 steps in 7.1.1 ~ 7.1.3. Firstly, zero calibration.

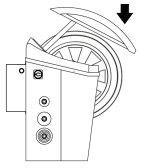
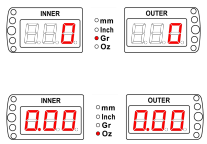
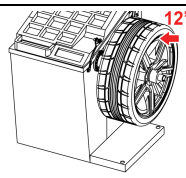
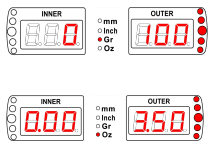
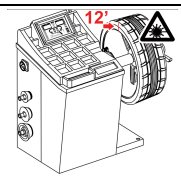
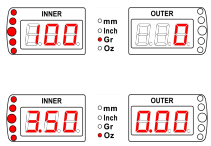
Step	Operation	Display	Unit
Zero calibration wheel			gram / ounce
Outer test weight calibration			gram / ounce
Inner test weight calibration			gram / ounce

Fig.64 weight calibration program

7.1.1 zero calibration

Mount the wheel on the balancer, close the guard and do zero calibration measurement. (Fig. 64.1)

After measurement, it will go to outside standard test weight calibration automatically.

7.1.2 Outside standard test weight calibration

As shown in Fig. 64.2, clamp a 100 gram standard test weight at 12 o' clock, close the guard to start calibration measurement. After measurement, it will go directly to inside standard test weight calibration.

7.1.3 Inside standard test weight calibration

Remove the outside standard test weight from outside (Fig.64.3) , clamp it at 12 o' clock inside and do calibration measurement. After measurement, weight calibration is finished and return to 7.0.

7.2 Balance shaft zero calibration

7.2.0 Calibration tool

A wheel with steel rim (14~17 inch suggested) . Two steps are as below.

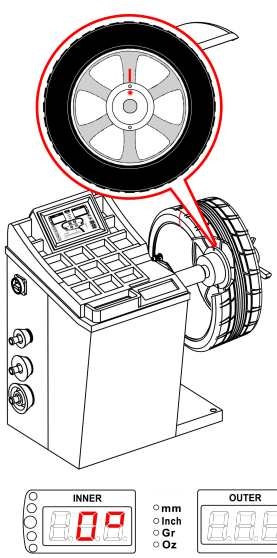


Fig.65 shaft calibration step 1

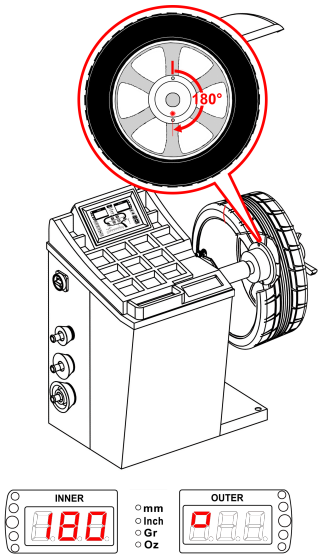


Fig.66 step 2

7.2.1 Step 1 (Fig.65)

Mount the wheel and mark the inner rim and shaft. Close the guard to start shaft calibration measurement. After measurement loosen the wheel and turn the corresponding position of wheel and shaft by 180 degrees ,then fix it again。

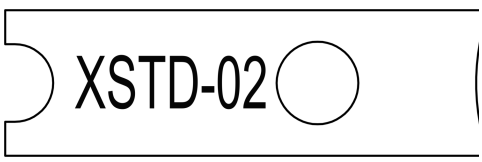


Fig.67 XSTD-02 caliper

7.2.2 Step 2 (Fig.66)

Close the guard to start calibration. After measurement, the calibration is completed and return to 7.0.

7.3 Gauge a calibration

7.3.0 Calibraiton tool

XSTD-02 ,a calibration caliper equipped with the machine (Fig.67)

Entering gauge a calibration program, firstly return to zero (Fig.68.1) ,press button , display “CL.a 100” .Put the calibration caliper between the gauge and the balancer cabinet (68.2) and then press, it shows “a= XXX” which is changing with the gauge pulling (Fig.68.3). Return the gauge to zero and finish a calibration and goes back to 7.0.

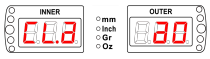
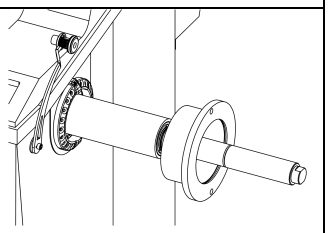
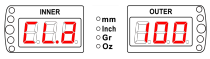
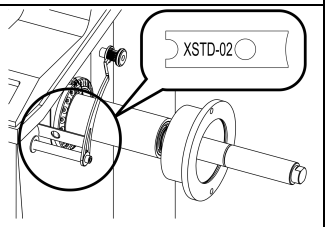
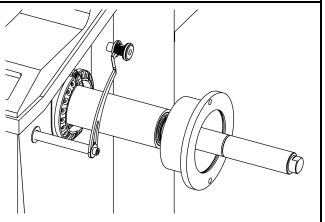
Step	Display	Operation
1		
2		
3		

Fig. 68 gauge a calibration

7.4 Gauge d calibration

7.4.0 Calibration tool

XSTD-02, a calibration caliper equipped with the machine.(Fig.67).

7.4.1 Gauge d calibration Step1

Entering d calibration program, firstly return the gauge to zero (Fig.69.1) , it shows “CL.d d0” .

7.4.2 Gauge d calibration Step 2

(Fig.69.2)

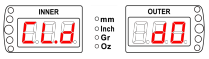
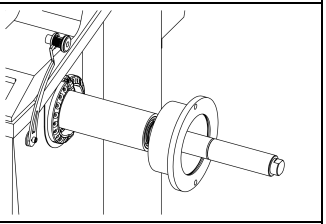
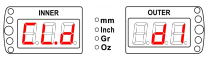
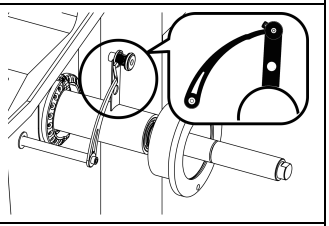
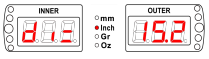
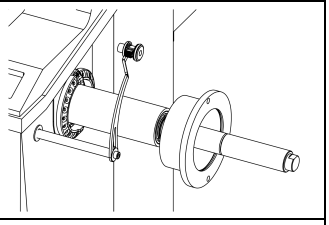
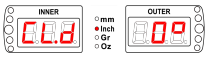
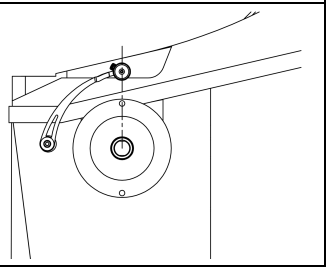
Step	Display	Operation
1		
2		
		
3		

Fig. 69 gauge d calibration

Press , it shows “CL.d d1” . Put the calibration caliper between the gauge and the balance shaft and then press , it shows “d= X.XX” which is changing with the gauge pulling.

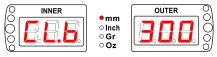
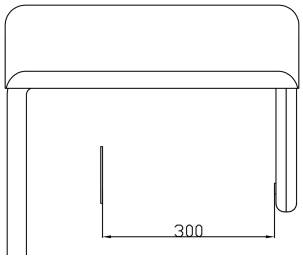
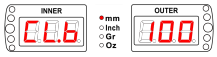
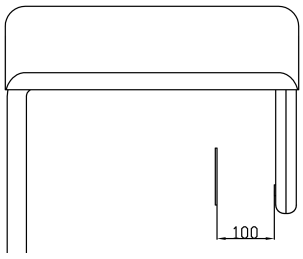
Step	Display	Operation
1		
2		

Fig.70 b calibration

7.4.3 Gauge d calibration Step3

（Fig.69.3）

Press , laser indicator lights up. Make the gauge head at the same line with the laser indicator and then press, gauge d calibration is finished and goes back to 7.0.

7.5 Gauge b calibration

Entering this setting, put a dam board at the place 300mmb from gauge b （Fig.70.1），press ;

Move the dam board to the place 100mm from the gauge b（Fig.72.2），press, gauge b calibration is finished and goes back to 7.0.

8 Errors and solutions

8.1 Common code description

Table 8 common code description

NO.	code	description	NO.	code	description
1	"Off Off"	Emergency stop with button	2	"Go Go"	measuring
3	"--- --|"	Dismount wheel with automatic shaft state	4	"|-- ---"	Mount wheel with automatic shaft state
5	" - - "	Sleeping state	6	"a= xxx"	Input a state
7	"d= xxx"	Input parameter state	8	"b= xxx"	Input b state
9	"a1= xxx"	Input a1 state	10	"a2= xxx"	Input a2 state
11	"d1= xxx"	Input d1 state	12	"d2= xxx"	Input d2 state
13	" 6" "	Cleaning position at 6 o' clock	14	" 12" "	At 12 o' clock position operation
15	" Opt "	Optimizing operation	16	" SPL "	Split operation
17	" Hid "	Spoke amount in SPL1 mode	18	" SP.1 "	The first spoke in SPL2 mode
19	" SP.2 "	The second spoke in SPL 2 mode	20	" tol. CAL "	Motorcycle accessory tare weight removing operation
21	" dyn bal "	Dynamic balance	22	"St.1" ~ "St. 3"	Static 1~ static 3
23	"ALU -1-" ~ "ALU -7-"	ALU mode 1~7	24	"AL.S -1-" ~ "AL.S -2-"	EALU mode1~2

8.2 Error code description and solution

Table 9 error code and solution

NO.	code	description	solution
1	“Err 00”	Lift car does return to place.	Put down the lift car on the ground.
2	“Err 01”	Guard is open when pressing startup button.	Close the guard. If error still exists, it means guard switch goes wrong.Refer to chapter6.2.1, turn off the guard effective. After replacing the guard switch, turn it on again.
3	“Err 02”	Spinning speed does not reach the standard.	Refer to 6.1.3.8 节 to check motor spinning ; Check power board if motor is disabled ; Motor is enabled but shaft does not spin, check whether the belt is off or break ; If spinning normally but speed is not high, check the optical electricity encoder ; If speed display is normal but by eye less than 150r/min, check the power supply is 60Hz or 50Hz. Contact the manufacturer for correctness.
4	“Err 10”	Gauge A disabled	Power off and restart the machine. If error still exists, refer to 6.1.3.5 to check a. If a is abnormal, contact service people; turn off ad function as instructed in 6.4.10 and input a value manually before service.
5	“Err 11”	Gauge A has not been calibrated	Refer to 7.3 to calibrate it.
6	“Err 12”	Gauge A has not return to zero.	Pull back a to the zero.
7	“Err 15”	Gauge D disabled	Power off and restart the machine. If error still exists, refer to 6.1.3.6 to check d. If d is abnormal, contact service people; turn off ad function as instructed in 6.4.10 and input ad value manually before service.
8	“Err 16”	Gauge D has not been calibrated.	Refer to 7.4 to do calibration.
9	“Err 20”	Gauge B disabled	Power off and restart the machine. If error still exists, refer to6.1.3.7to check b. If b is abnormal, check whether the connection is off or not (Fig.7). Contact service if not dealt with properly ; turn off b function as instructed in 6.4.12 and input b value manually before service.
10	“Err 21”	Gauge B has not been calibrated.	Refer to 7.5 to do calibration.
11	“Err CAL”	Factory settings has not been done.	Contact the manufacturer for instruction.
12	“Err Dat”	Gauge calibration process is wrong.	It means wrong operation during the calibration. Refer to Chapter 7 for correct calibration operation.
13	“ Err SYS ”	System error	Contact the after sales service.

9. Maintenance

9.1 Electrical parts

Power fuse: FS1, FS2 on the FU and power board at the entrance .

It is easy to fuse with a fuse in case of an accident such as organization carlton, motor locked-rotor etc.

After opening the switch, the balancer does not show or cannot work . It will be solve the problem to replace the fuse after removing external carlton and other factors .

9.2 Air source maintenance

Discharge water from the oil-water separator.

Add oil to the oil cup regularly.

Check the air road every two months to ensure no leakage.

9.3 Belt replacement

Please replace the belt after one hundred thousand times operation .

9.4 Taper sleeve and Quick nut

The taper sleeve is worn for a period of time. It is recommended to replace it when the wearing capacity of the shaft is more than 0.1mm or when the cone surface has obvious groove or the usage more than twenty thousand times.

The wear of quick nut also affects the measurement precision, and suggest to replace it with 20,000.

10. Spare parts list

Table 10 spare parts list

NO.	Code	Name	Note
1	01.21.50.01	Taper sleeve 1	
2	01.21.50.02	Taper sleeve 2	
3	01.21.50.03	Taper sleeve 3	
4	01.21.50.04	Taper sleeve 4	
5	01.21.50.05	Quick nut	
6	Q.1.1.1	Oil-water separator	
7	01.23.07.01	Belt	
8	Y.1.19.1.8	Fuse	

11. Appendix

11.1 Electrical theory

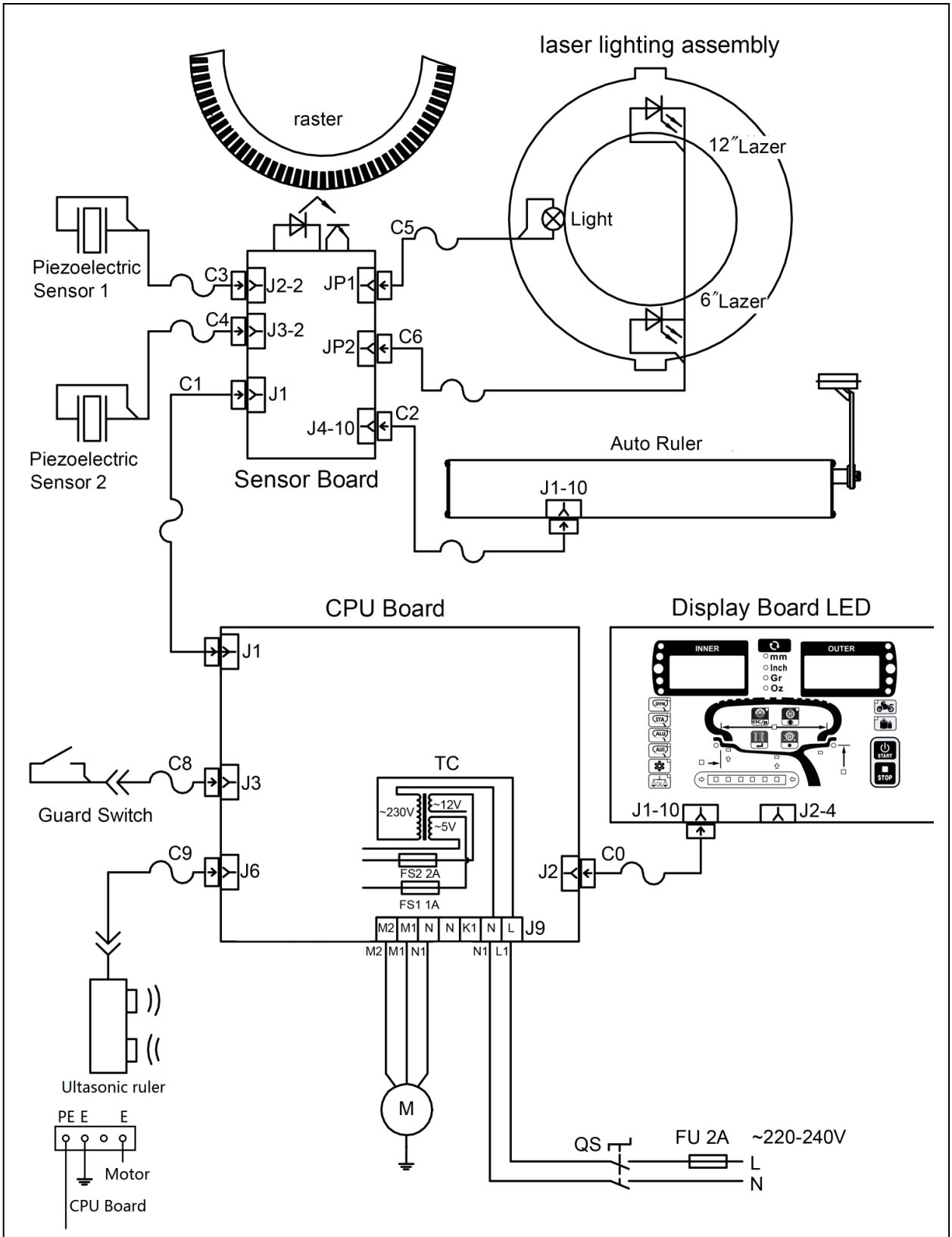


Fig.72 US-520 Electrical Theory