

Operating instructions

CWB 600 AI

Wheel balancer



English

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About this manual

This manual covers the HAMMER TOOLS CWB 600 AI with pneumatic wheel clamping. It is based on the supplied manual, version JH202512.1.0 XRDV. The source also describes a manual-clamping reference version; its procedures are explicitly distinguished and do not automatically apply to the offered machine. Section and figure numbers follow the source. Original interface screenshots are retained for recognition; their explanations are provided in this language. Example screen readings are not universal settings.

The confirmed product specifications for the HAMMER TOOLS CWB 600 AI are: maximum wheel weight 70 kg, maximum wheel diameter 1,000 mm, 150 rpm, 230 V / 50 Hz and 0.25 kW motor power. The specifications in section 2.4 have been adapted accordingly. Check the rating plate before connection and operation.

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Note to the user

Thank you for purchasing this product. Read this manual carefully to ensure safe and correct use of the wheel balancer. Keep it readily available for future reference.

- This manual covers the HAMMER TOOLS CWB 600 AI with pneumatic wheel clamping. Sections describing the manual reference version are identified separately; that reference version is not the CWB 600 AI offered in the shop.
- Read this manual first, including the information concerning safety in the design and construction of the wheel balancer.
- Ensure that this manual is supplied to the end user so that the safety instructions can be implemented.
- Do not use the wheel balancer in a potentially explosive atmosphere.

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1 Safety regulations

1.0 Relevant safety reminders

Lighting

Maintain adequate lighting for safe work. The workplace should have an illuminance of 200 lux without creating additional hazards.

Do not use the equipment outdoors. If it is used outdoors, avoid wind, lightning, rain and other hazards.

Use the equipment on level ground without any slope. Check the levelness before installation.

Dismantling and disposal

ENVIRONMENTAL DAMAGE. Only properly trained personnel may dismantle and dispose of the equipment.

Dismantling

To dismantle this product, proceed as follows.

ELECTRICAL HAZARD! Before any decommissioning or dismantling work, disconnect every electrical supply, secure against unintentional reconnection and verify that the supplies are disconnected. Earth and short-circuit them; cover or isolate adjacent live parts. Failure to observe these precautions may result in serious injury or death.

HIGH-PRESSURE HAZARD! Before decommissioning or dismantling, isolate and vent all connected pipes until their pressure is equal to ambient atmospheric pressure.

1.0 Decommissioning and disposal — continued

Failure to depressurise the connections may result in injury.

RISK OF PERSONAL INJURY! Secure the equipment against slipping. It is then ready for transport. Observe all transport instructions.

Disposal

The equipment and its individual components must be disposed of by a specialist company with the appropriate professional competence. The technical service responsible must ensure that:

- components are sorted according to their material types;
- 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 mixtures, separately according to material type and in accordance with local legislation and environmental requirements.

Information about the EC declaration template

The source contains an incomplete EC declaration template: the manufacturer, name and address fields are blank. The following text conveys the information in that template; it is not a new declaration of conformity or a certification by HAMMER TOOLS. The original declaration applicable to the machine must be provided separately.

Declaration — general information

EC declaration of conformity template

According to the wording of the template, the equipment accompanying the declaration conforms to:

- 2006/42/EC — Machinery Directive.
- 2014/30/EU — Electromagnetic Compatibility Directive.

Manufacturer: not completed in the template. Name: not completed. Address: not completed.

The template states that the undersigned declares that the described products meet the essential requirements of the relevant standards, based on the directives above. It also states that the identified equipment has undergone internal manufacturing checks with third-party monitoring of the final assessment. These are statements in the incomplete source template.

Noise declaration — source information

Sound power level: LWA < 85 dB. Associated uncertainty: K = 4 dB. Measurement stated to be in accordance with EN ISO 3746:2010. Stated operating conditions: all motors running at normal operating speed.

The quoted figures are emission levels and are not necessarily safe working levels. Although emission and exposure levels are correlated, that relationship cannot reliably determine whether further precautions are required. Actual worker exposure depends on factors including the characteristics of the room, other noise sources, the number of machines and adjacent processes. Permissible exposure levels may also vary between countries. This information allows the user to make a better assessment of the hazards and risks.

1.1 Safety instructions

- Only authorised and properly trained personnel may operate the machine. Incorrect operation will produce incorrect measurement results.
- Carry out calibration strictly in accordance with this manual. Incorrect calibration will prevent the balancer from working correctly.
- The operating environment must comply with this manual.
- The electrical and compressed-air supplies must meet the equipment requirements.
- The wheel guard must be set so that its protective function is effective.

- Failure to observe the transport and operating instructions in this manual is strictly prohibited. The manufacturer accepts no responsibility for damage or injury resulting from such use.
- Exceeding the measuring range may damage the equipment and result in inaccurate measurements.
- If the operator disregards the safety regulations and damages the equipment by removing a safety device, the manufacturer's safety commitment ceases immediately.

1.2 Safety signs



Warning! All switches are live.



Do not apply force to the balancing shaft when moving the machine.



Keep your hands clear when installing and tightening the rim.



Opening the guard causes the machine to stop for protection.



Protective earth connection.



The laser marker is active. Do not look directly into the beam: risk of eye injury.



Do not stand or step on this part of the machine.



With the guard open, use the foot pedal to clamp or release the wheel on the pneumatic version.



With the guard closed, use the foot pedal to stop measurement and brake the wheel.

2 Technical specifications

2.1 Overall appearance

Fig. 1 — Overall structure. Table 1 — Component descriptions. The manual reference version is distinct from the pneumatic CWB 600 AI offered in the shop.

No.	Description	Manual reference version	Pneumatic CWB 600 AI
1	Wheel guard	Yes	Yes
2	Ultrasonic width gauge B holder	Yes	Yes
3	Ultrasonic sensor	Yes	Yes
4	Main display/control unit	Yes	Yes
5	Front control panel	Yes	Yes
6	Display holder	Yes	Yes
7	ABS cover and weight tray	Yes	Yes
8	Power switch	Yes	Yes
9	Mist lubricator and oil/water separator	No	Yes
10	Cone storage rod	Yes	Yes
11	No. 2 cone	Yes	Yes
12	No. 3 cone	Yes	Yes
13	No. 4 cone	Yes	Yes
14	Cabinet	Yes	Yes
15	Foot pedal	Yes	Yes
16	Balancing shaft	Manual	Automatic
17	Contact-face flange plate	Yes	Yes
18	Automatic measuring arm	Yes	Yes
19	No. 1 cone	Yes	Yes
20	Nylon cup for steel rims	Yes	Yes
21	Quick-release nut / adapter	Quick-release nut	Adapter
22	Wheel guard assembly	Yes	Yes
23	Adhesive-weight working light	Yes	Yes
24	Laser marker	Yes	Yes

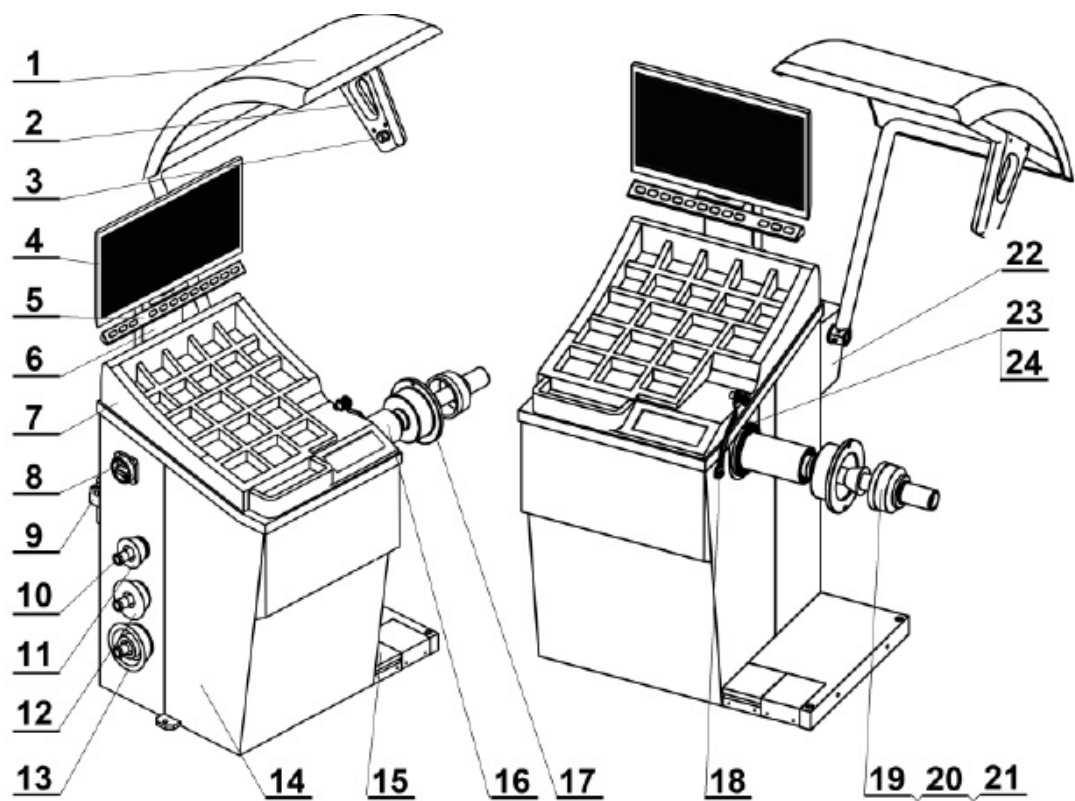


Fig. 1

2.2 Control panel

2.2.1 Operating panel

The operating-panel functions correspond to the buttons shown on the screen (Fig. 2). A button lights up when its function is available.

Fig. 2 — Control keyboard. Table 2 — Control-panel functions.

Buttons	Illumination	Function
F1–F11	Blue	Corresponding on-screen function
F12	Green / red	Start / Stop

2.2.2 Icon descriptions

Table 3 — Main-screen button functions. Buttons are described by their function below; use the corresponding displayed icon.

Function	Description
 User selection	Select User 1 to User 4; see 5.3.12.

Function	Description
	Accessory selection Select the accessory being used; see 5.3.14.
	Weight type selection Select the weight type; see 5.3.3.1.
	Settings Open settings; see Chapter 6.
	Calibration Open the calibration program; see Chapter 7.
	Test Open the test program; see Chapter 8.
	Balancing-position correction Correct the locking position; see the corresponding function in 5.3.15.
	Wheel lock / unlock Press to lock or unlock the wheel.
	Start / Stop Same function as the panel Start/Stop button; starts measurement.

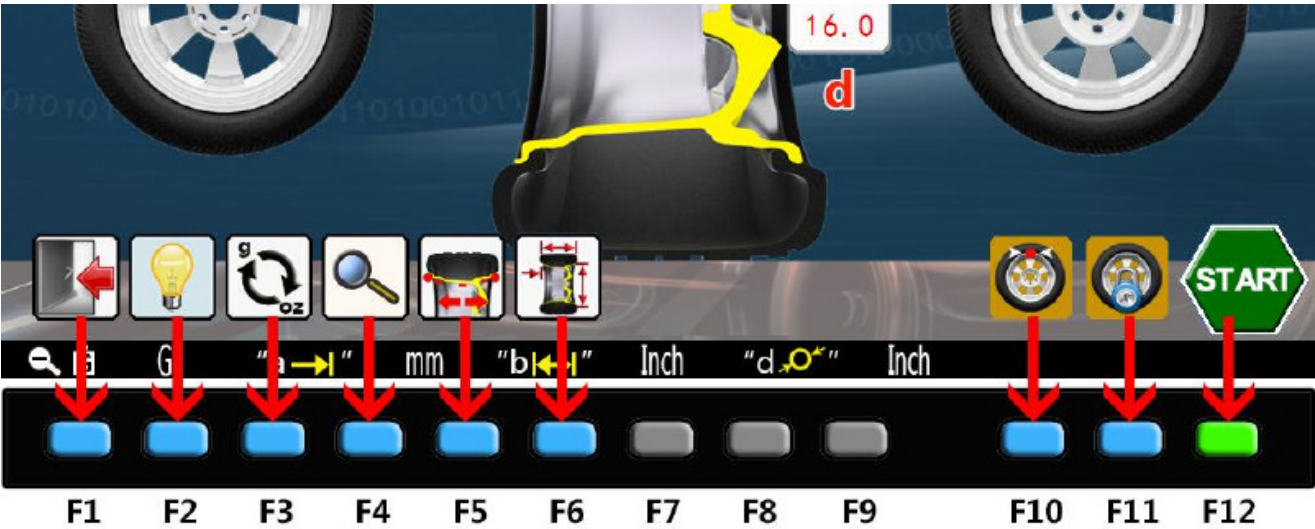


Fig. 2

2.2.2 Status and measurement icons

Table 4 — Screen status icons.

Status / symbol	Meaning
	No accessory No accessory is being used.
	Accessory X, X = 1–6 Accessory No. 1 to No. 6 is being used.
	Motorcycle Motorcycle wheel balancing is selected.
	Car Car wheel balancing is selected.
	User X, X = 1–4 User 1 to User 4 is selected.
Zn	Zn Zinc weight material.
Fe	Fe Iron weight material.
Pb	Pb Lead weight material.
	Lock-position correction Balancing-position lock correction is active.
	Laser marker The laser indicates the unbalance position. Do not look directly at it.
	Sonar B active The ultrasonic B gauge is enabled.
	Sonar B inactive The ultrasonic B gauge is disabled.
	6 o'clock Correction position at 6 o'clock.
	12 o'clock Correction position at 12 o'clock.
	Wheel locked The wheel is locked.
	Cleaning Clean the rim surface where the weight will be attached.

Table 5 — Measurement-screen functions.

	Function	Description
	Return	Return to the main screen.
	Light	Control the working light inside the wheel.
	Weight units	Switch between grams and ounces.
	Fine reading	Read the exact weight value in g or oz.
	Measurement-mode selection	Open mode selection; see 5.3.1.
	Manual parameter entry	Enter wheel parameters manually; see 5.3.2.2.
	OPT	Appears when optimisation is available; see 5.3.6.
	SPL	Appears when weight splitting is available; see 5.3.9.
	6 o'clock adhesive mode	Current mode attaches weights at 6 o'clock. Press to change to 12 o'clock attachment with the automatic arm.
	12 o'clock adhesive mode	Current mode uses the automatic arm at 12 o'clock. Press to change to 6 o'clock attachment.
	Motorcycle accessory balance	Compensate for the motorcycle accessory tare; see 5.3.10.1.
	F1	Automatically locate the unbalance point.
	F2	Lock / unlock.
	Start / Stop	Prompt for starting or stopping measurement.

2.2.2 Settings, calibration and test icons

Table 6 — Settings-screen functions.

	Function	Description
	Information	View information.
	Language	Set the language.
	Guard	Set wheel-guard functions.
	Weights	Set balancing-weight parameters.
	Gauge A	Set A measurement and display.
	Gauge B	Set B measurement and display.
	Gauge D	Set D measurement and display.
	Control panel	Configure the control panel.
	Accessories	Set accessory parameters.
	Return	Return to the main screen.
	Root-menu selection	Hold the corresponding button and rotate the wheel to select a root-menu ring item.
	Row selection	Hold the corresponding button and rotate the wheel to change the selected row.
	Value adjustment	Hold the corresponding button and rotate the wheel to change the selected item.

Table 7 — Calibration-screen functions.

	Function	Description
	Shaft zero	Calibrate shaft zero.
	Weight	Calibrate weight measurement.
 	Gauge A / B / D	Calibrate gauge A, B or D.
		
	Return	Return to the main screen.
	Root-menu selection	Hold the corresponding button and rotate the wheel to select a semicircular root-menu item.
	Enter	Hold the entry button to open the selected item.
	Adjustment	Hold the corresponding button and rotate the wheel to change the selected item.

Table 8 — Test-screen functions.

	Function	Description
	Switches	Test the switches and controls.
	Motor	Test motor control.
	Piezoelectric sensor	Test the piezoelectric sensor signal.
	A/D and B gauges	Test the measuring devices.
	Voltages	Test voltage at the circuit-board nodes.
	Return	Return to the main screen.

	Function	Description
	Selection	Hold the corresponding button and rotate the wheel to select a semicircular root-menu item.
	Enter	Hold the entry button to open the selected item.
	Adjustment	Hold the corresponding button and rotate the wheel to change the selected item.
	Electromagnetic lock	Test the electromagnetic locking control.
	Forward rotation	Test the motor's forward-rotation control.
	Reverse rotation	Test the motor's reverse-rotation control.
	12 o'clock laser	Test the 12 o'clock laser control.
	6 o'clock laser	Test the 6 o'clock laser control.

2.2.3 Button operation

Each button's operating function corresponds to the icon below the display (Fig. 2). Some special buttons control the system in conjunction with rotation of the wheel. Their operation is shown in Fig. 4.

Table 9 — Balancing-mode icons and functions.

	Function	Description
	Dynamic	Select dynamic balancing.
 	EALU1 / EALU2	Select EALU balancing. The source duplicates the label EALU1; refer to the displayed modes and sections 5.3.2 and 5.3.8.
      	ALU1, ALU2, ALU3, ALU4, ALU5, ALU6, ALU7	Select the corresponding ALU mode.

	Function	Description
	PP	Select radial and axial rim runout measurement.
	Motorcycle dynamic	Select motorcycle dynamic balancing.
	Motorcycle static	Select motorcycle static balancing.
	Static 1, 2, 3, 4, 5	Select the corresponding static mode.
	Derived modes	Select derived modes.
	EALU switching	Switch between EALU and other modes.
	Inner rim weight	Select the inner weight position.
	Rim position	Select the corresponding rim position.
	Outer rim weight	Select the outer weight position.
	Car	Car-wheel measurement mode.
	Motorcycle	Motorcycle-wheel measurement mode.
	Rim runout	Radial and axial rim runout measurement mode.

Fig. 4 — Button operation together with wheel rotation.



Fig. 4

2.3 Main functions

Table 10 — Functions of the different versions. The manual reference version is separate from the pneumatic CWB 600 AI.

Function	Manual reference version	Pneumatic CWB 600 AI
Standard dynamic balancing	Yes	Yes
Static modes 1–5	Yes	Yes
ALU1–ALU7 modes	Yes	Yes
EALU1–EALU2 modes	Yes	Yes
OPT optimisation in dynamic and static modes	Yes	Yes
SPL weight splitting and hiding in ALU and EALU modes	Yes	Yes
Radial and axial rim runout measurement	Yes	Yes
Standard motorcycle dynamic balancing	Yes	Yes
Motorcycle static balancing	Yes	Yes
Motorcycle accessory tare compensation	Yes	Yes
g/oz and mm/inch conversion	Yes	Yes
Automatic a–d gauges and working light	Yes	Yes
Automatic ultrasonic b gauge	Yes	Yes
Adhesive-weight placement assisted by the automatic arm	Yes	Yes

Function	Manual reference version	Pneumatic CWB 600 AI
Weight-placement / cleaning position change	Yes	Yes
12 o'clock adhesive-position laser	Yes	Yes
6 o'clock cleaning / adhesive-position laser	Yes	Yes
Automatic positioning and locking	Yes	Yes
Self-calibration	Yes	Yes
Automatic clamping shaft	No	Yes
Manual clamping shaft	Yes	No
Guard protection	Yes	Yes
Self-check and diagnostics	Yes	Yes

2.4 Main technical specifications

The confirmed product specifications for the HAMMER TOOLS CWB 600 AI are: maximum wheel weight 70 kg, maximum wheel diameter 1,000 mm, 150 rpm, 230 V / 50 Hz and 0.25 kW motor power. The specifications in section 2.4 have been adapted accordingly. Check the rating plate before connection and operation.

Table 11 — Technical specifications for the HAMMER TOOLS CWB 600 AI. Maximum wheel mass, maximum wheel diameter, speed, supply voltage and motor power follow the confirmed specifications for the supplied version. Motor power is not a specification of electrical power consumption.

Specification	Value
Single-phase power supply	230 V / 50 Hz
Compressed air — pneumatic version only	0.45–0.8 MPa
Protection rating	IP 54
Motor power	0.25 kW / 250 W
Maximum speed	150 rpm
Cycle time	7–11 s on average
Distance a	10–350 mm; 0.4"–13.8"
Rim diameter d	254–813 mm; 10.0"–32.0"
Wheel width b	38–636 mm; 1.5"–25.0"
Maximum wheel diameter	≤ 1,000 mm; approx. 39.4"

Specification	Value
Maximum wheel mass	≤ 70 kg; approx. 154.3 lb
Measurement error	≤ ±1 g; 0.1 oz
Phase error	≤ ±1°
Automatic gauge error	±1 mm; ±0.1"
Net mass — manual reference version	82 kg; 180.8 lb
Net mass — pneumatic CWB 600 AI	96 kg; 211.6 lb
Noise	< 70 dB
Operating temperature	−20 °C to +50 °C
Relative humidity	≤ 85%

3 Transport and storage

Transport and store the balancer in its original packaging. Observe the stacking instructions on the package. Move the package using a forklift of suitable capacity, as shown in Fig. 5.

Fig. 5 — Packaging and transport.

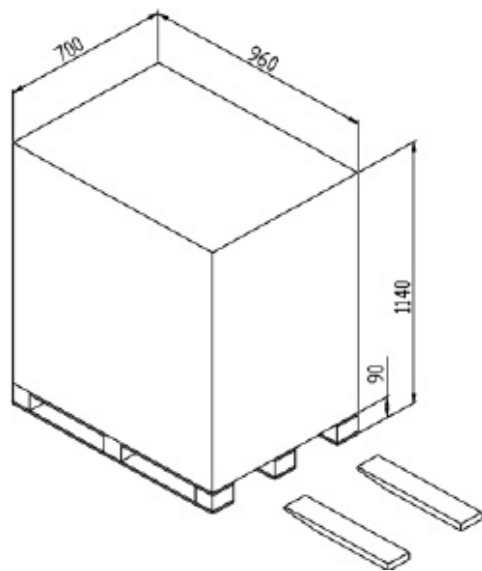


Fig. 5

4 Installation

4.1 Unpacking

- Inspect the package first. If there is any doubt, stop unpacking and contact the supplier and carrier immediately.
- If the package is in good condition, open it and check that the quantity of each component agrees with the packing list. Inspect the machine and accessories.
- Remove the bolts securing the machine to the bottom of the crate. Place the balancer in a stable position.
- If there is any problem or uncertainty, do not use the machine; contact the supplier immediately.

4.2 Installation area

- The operating environment must meet the requirements in 2.4. The floor must be level, solid and free of vibration.
- Power sockets must meet the electrical requirements in 2.4. The pneumatic CWB 600 AI also requires a compressed-air supply meeting 2.4.
- The installation area must provide the clearances shown in Fig. 6 so that all components can operate without obstruction.

Fig. 6 — Space requirements.

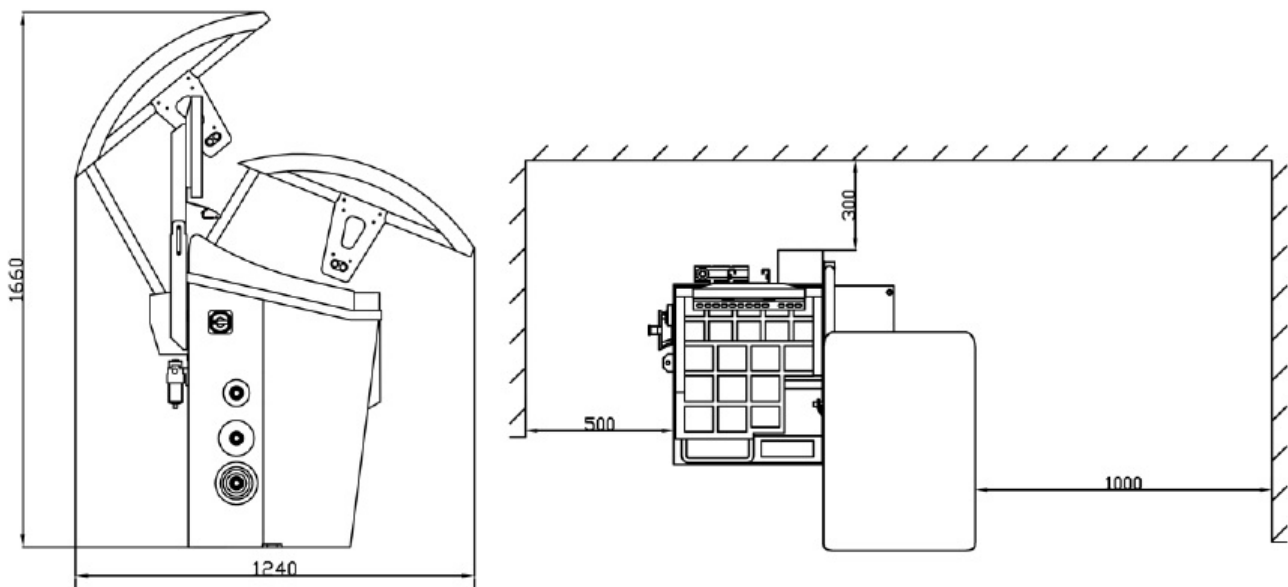


Fig. 6

4.3 Component assembly

Do not expose the balancer to direct sunlight or rain. Provide shelter if it is used outdoors, while observing the safety restrictions on outdoor operation.

4.3.1 Shaft assembly

Remove either the manual reference shaft components (Fig. 7) or the pneumatic automatic shaft components (Fig. 8) from the accessory box and assemble them as illustrated.

4.3.2 Guard assembly

The guard assembly is shown in Fig. 9. Connect the guard-switch plug first, then secure the assembly in the corresponding position.

4.3.3 Cone installation

Install the components as shown in Fig. 10.

Fig. 7 — Manual reference lead-screw shaft assembly, part reference S2226. Fig. 8 — Pneumatic automatic shaft assembly, part reference S2226AL. Fig. 9 — Guard and cone-holder assembly. Fig. 10 — The source caption says power-supply connection; the same figure is also cited for assembly and connection of the display unit.

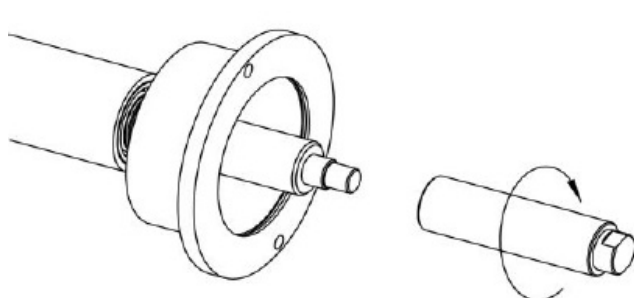


Fig. 7

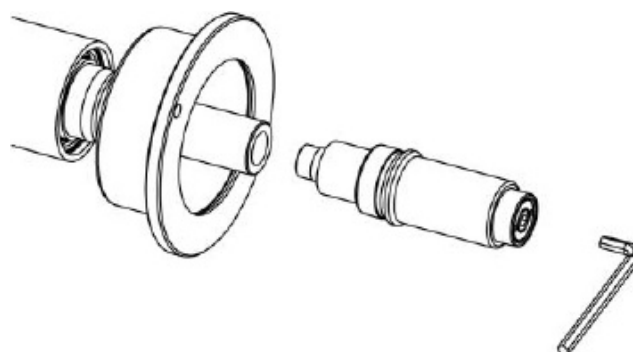


Fig. 8

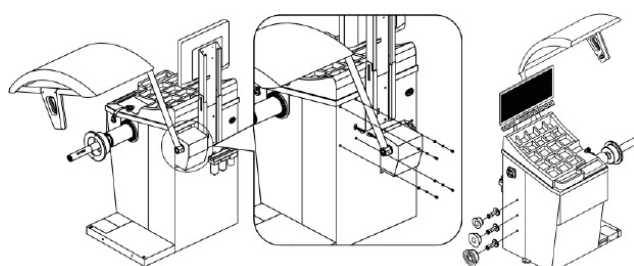


Fig. 9

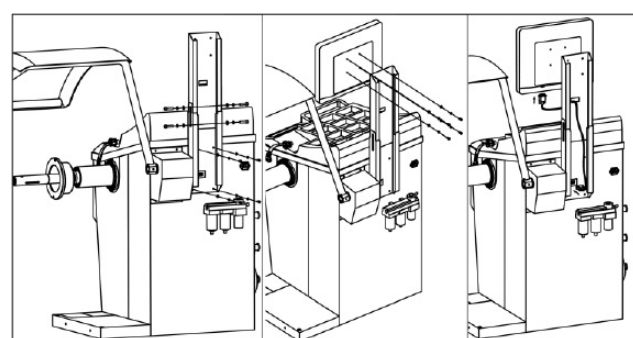


Fig. 10

4.4 Electrical and compressed-air connections

4.4.1 Main display/control unit installation

Connect the display unit as shown in Fig. 10, then connect the VGA cable.

4.4.2 Power connection

Connect the cable as shown in Fig. 11 and plug its other end into the power socket. NOTE: the socket must comply with local standards and the requirements in 2.4.

4.4.3 Compressed-air connection

The air supply must meet 2.4. Adjust the air supply in accordance with the FRL air-treatment unit's operating manual (Fig. 12).

Fig. 11 — Electrical connection. Fig. 12 — Compressed-air connection.

5 Starting operation

5.1 Start-up self-check

Switch on the balancer. The system performs a self-check, then enters the preset balancing mode. The default is dynamic balancing.

Wheel-mounting illustration for the manual reference version: forward mounting and reverse mounting.

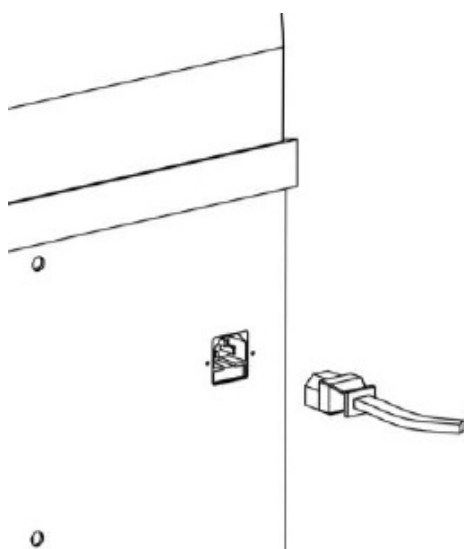


Fig. 11

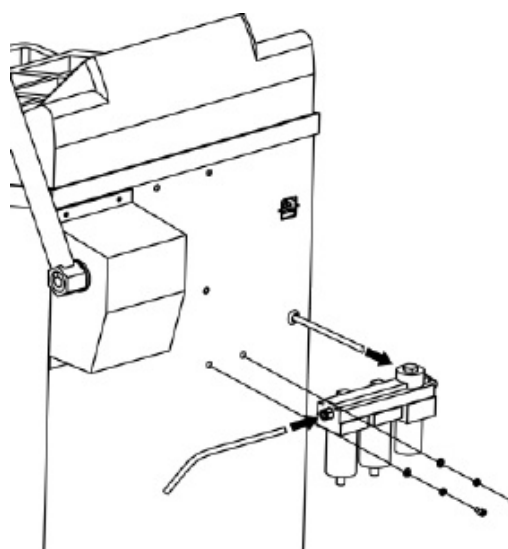


Fig. 12

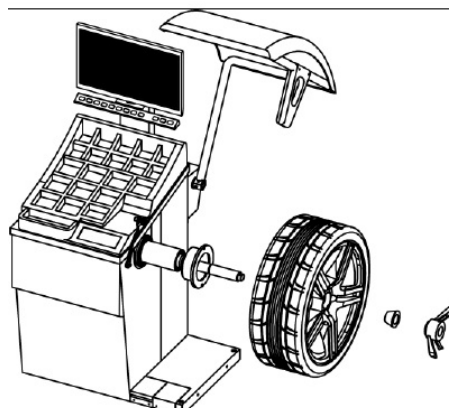
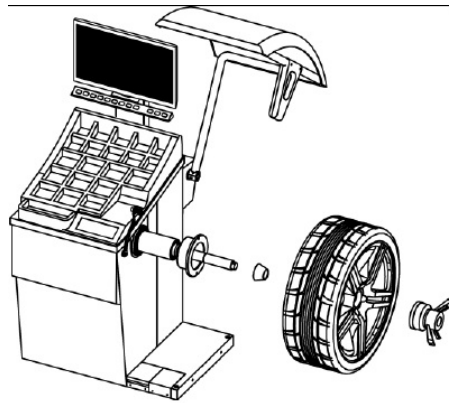


Fig. 13

5.2 Wheel mounting and removal

5.2.1 Manual reference version — wheel mounting and removal

This procedure describes the manual reference version, not the pneumatic CWB 600 AI. Wheels can be mounted in the forward or reverse orientation. First select a cone suited to the rim centre-hole diameter, ensuring that the hole is within the cone's range. Mount the wheel as shown in Fig. 13, then tighten the quick-release nut.

To remove the wheel, unscrew the quick-release nut and remove the wheel and cone.

5.2.2 Pneumatic CWB 600 AI — wheel mounting and removal

As in 5.2.1, two mounting orientations are possible. Select the cone suited to the centre hole, ensuring that the hole is within the cone's range. Mount the wheel as shown in Fig. 14, then press the foot pedal to complete clamping.

To remove the wheel, open the guard, press the foot pedal, then remove the wheel and cone.

NOTE: when mounting a wheel on the pneumatic CWB 600 AI, move the wheel as close as possible to the flange plate. Push the adapter, or locking sleeve, against the rim and press the foot pedal to lock it.

Fig. 14 — Pneumatic wheel mounting: forward orientation, mounting animation, reverse orientation and wheel mounting/removal control.

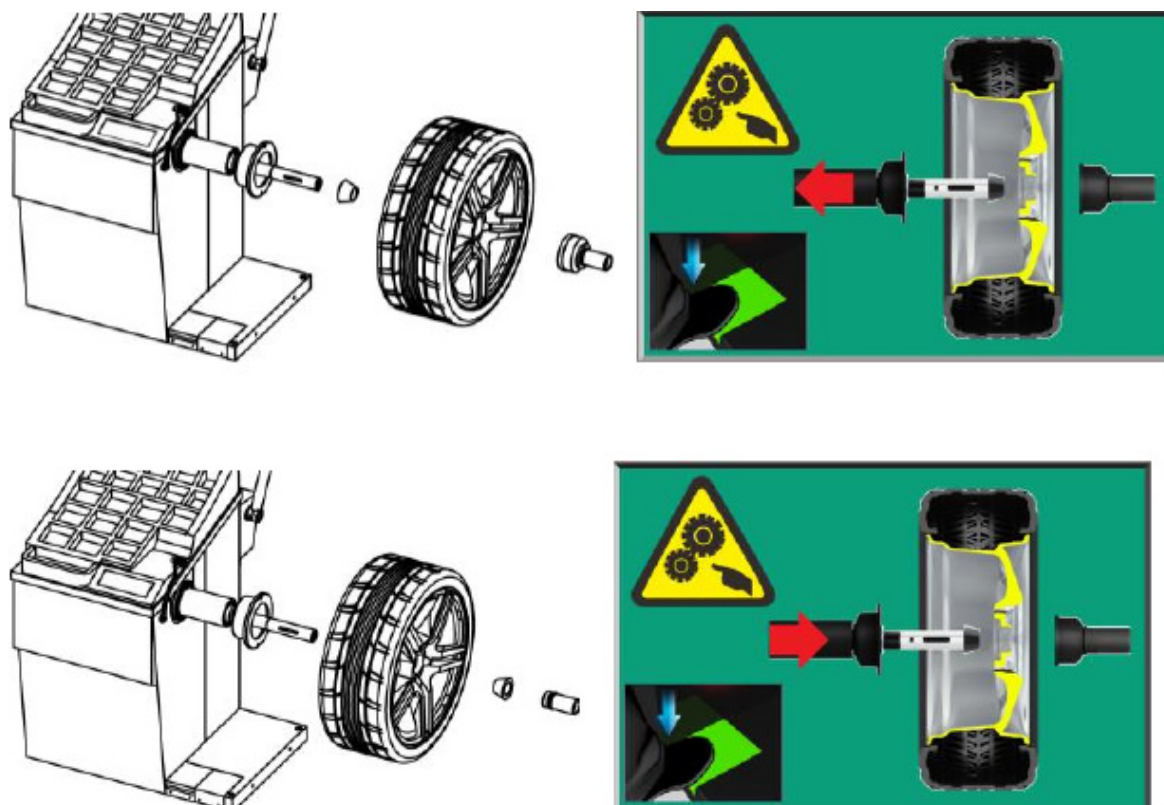


Fig. 14

5.2.3 Mounting special wheels

5.2.3.1 Mounting extra-wide wheels

Extra-wide wheels require the optional XSTD-2X extension flange. Assemble the flange as shown in Fig. 15, then mount the wheel. This accessory increases the wheel width that can be accommodated.

5.2.3.2 Mounting wheels without a centre hole

Wheels without a centre hole require the optional XSTD-61 special accessory. Mount it as shown in Fig. 16.

Fig. 15 — Extra-wide wheel mounting. Fig. 16 — Wheel without a centre hole.

5.3 Balancing operation

5.3.0 Starting the machine

Turn on the power switch. The system displays the start-up animation (Fig. 17.1), then the main screen (Fig. 17.2). Select the required on-screen options.

To obtain Level One authorisation, hold F11 while switching on until the start-up animation and main screen appear (Fig. 17.3). This screen allows correction of the unbalance-position locking point.

Fig. 17 — Start-up animation, user screen, Level One authorisation and Level Two authorisation.

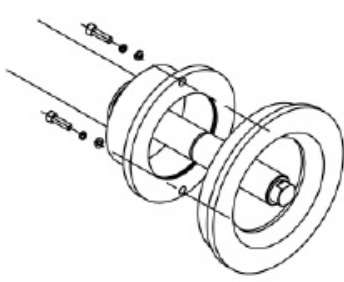


Fig. 15

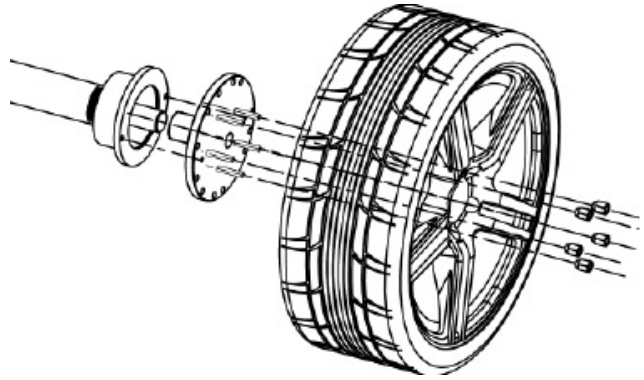
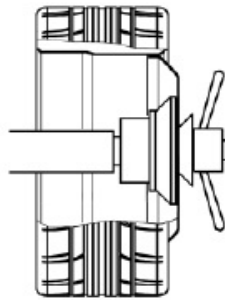


Fig. 16



Fig. 17

5.3.1 Selecting the balancing mode

To obtain Level Two authorisation, hold F12 while switching on until the start-up animation and main screen appear (Fig. 17.4). Level Two provides access to Chapter 6, System settings; Chapter 7, Calibration; and Chapter 8, Test program.

Press the measurement-entry button shown as a green arrow to open the measurement screen. Standard dynamic balancing is the default; the default mode can be changed in system settings (Fig. 18).

All modes are shown in Fig. 19.1. From the measurement screen, press the mode-selection button to open quick selection. The following table retains the source key combinations. The source duplicates both the EALU1 label and the F5 + F5 combination without resolving these ambiguities.

Mode as labelled in the source	Buttons
Dynamic	F3 + F7
EALU1 — first source entry	F4 + F5
EALU1 — second source entry	F3 + F5
ALU1	F4 + F6
ALU2	F4 + F5
ALU3	F3 + F5
ALU4	F3 + F6
ALU5	F4 + F7

Mode as labelled in the source	Buttons
ALU6	F5 + F7
ALU7	F5 + F6
PP	F10
Motorcycle dynamic	F9 + F4 or F9 + F7
Motorcycle static	F9 + F5
Static 1	F3 + F3
Static 2	F4 + F4
Static 3	F5 + F5
Static 4	F5 + F5
Static 5	F7 + F7

Fig. 18 — Opening the measurement screen. Fig. 19 — Balancing modes.



Fig. 18

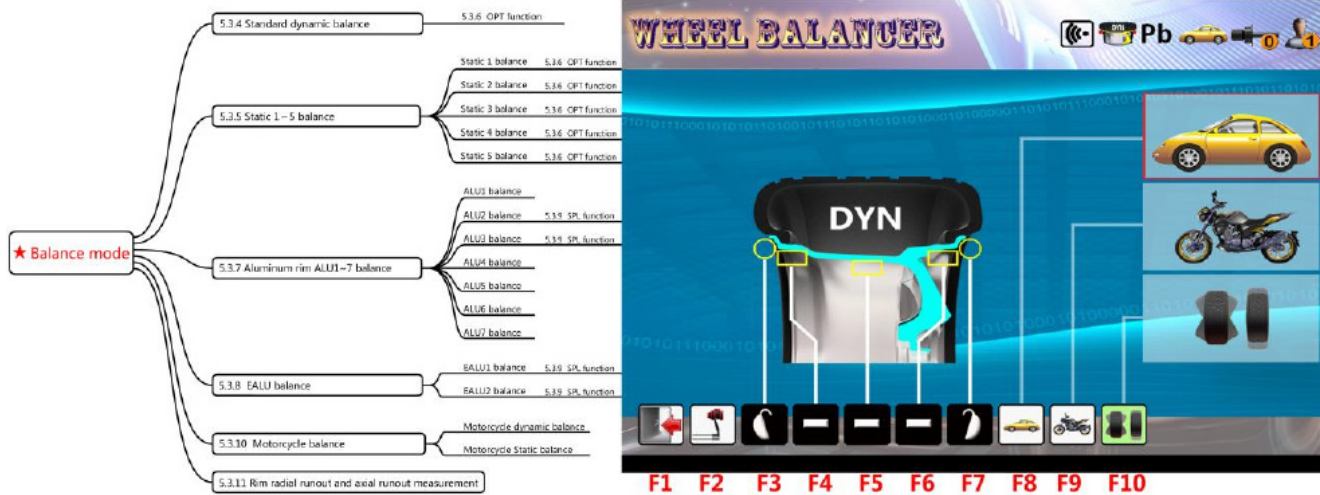


Fig. 19

5.3.2 Wheel parameter entry

In the quick mode-selection screen (Fig. 19.2), use F2–F10 (Fig. 19.3) to select the modes in Fig. 19.1. Press Return to retain the original mode and go back. A maximum of two buttons is needed for quick mode selection.

PP is an assisted inspection and evaluation mode that measures radial and axial rim runout. Apart from the static modes, the other balancing modes are dynamic modes.

For non-motorcycle wheels, EALU is strongly recommended because it is more convenient, faster and more precise. It can replace traditional ALU modes. Enter EALU1 or EALU2 by pulling out the automatic measuring arm to measure the rim; see 5.3.2.1.

In every measurement mode except PP, enter the wheel parameters first (Fig. 20).

Fig. 20 — Parameters: standard A–B–D; EALU2 A–D–A2–D2; EALU1 A1–D1–A2–D2.

5.3.2.1 Automatic wheel parameter entry

Pull out the automatic measuring arm. The screen follows the movement (Fig. 21.1). Return the arm to its home position: A and D are recorded and the system automatically returns to the measurement screen.

Fig. 21 — AD measurement: automatic AD entry; automatic EALU2 selection; automatic EALU1 selection.

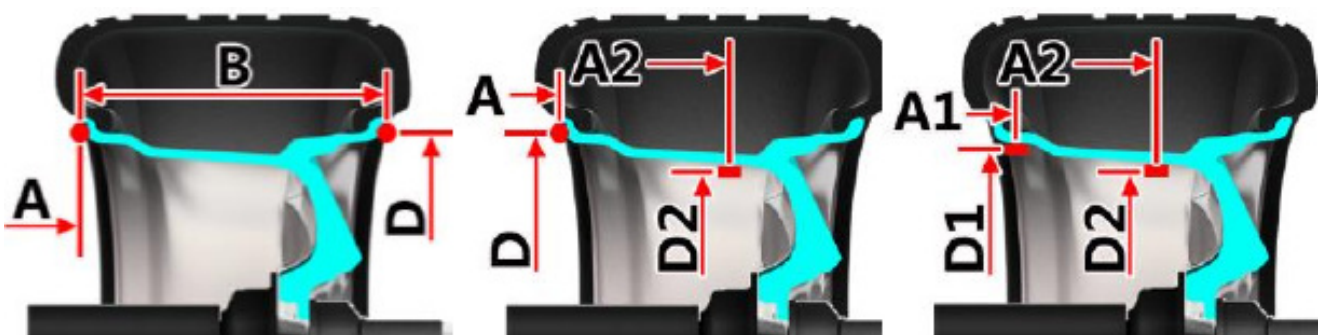


Fig. 20

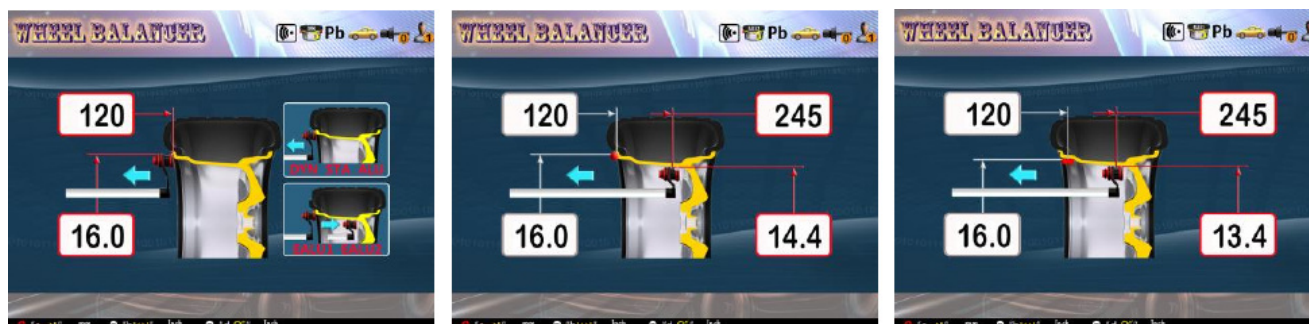


Fig. 21

5.3.2 Automatic and manual entry — continued

The B value is entered automatically before measurement starts when the guard is closed.

If you continue moving the arm to a second point, the system automatically enters EALU1 or EALU2 and acquires A1, A2, D1, D2 or A, A2, D, D2 (Fig. 21.2–3). When the arm returns home, the screen offers the choices shown in Fig. 22. Use the corresponding button to change the mode. If no change is required, ignore the choices and continue in the EALUx measurement mode.

5.3.2.2 Manual wheel parameter entry

Press the manual parameter-entry button to open the entry screen (Fig. 23). In standard dynamic, static 1–5 and ALU1–ALU7 modes, press the parameter-selection button again to select A, B or D. Hold the adjustment button and rotate the wheel simultaneously to change the selected parameter.

During parameter entry, use the unit button to change between mm and inches, or the resolution button to change the display increments: 1 mm / 5 mm or 0.5" / 1.0". The light button controls the working light. Return exits to the measurement screen. Start returns directly to measurement and starts a run.

In EALU2, open entry of A, D, A2 and D2 (Fig. 24). Hold the adjustment button and rotate the wheel to change the selected parameter.

Fig. 22 — AD measurement and mode choices. Fig. 23 — Parameter entry or adjustment in DYN, STA and ALU. Fig. 24 — Parameter entry or adjustment in EALU2.



Fig. 22

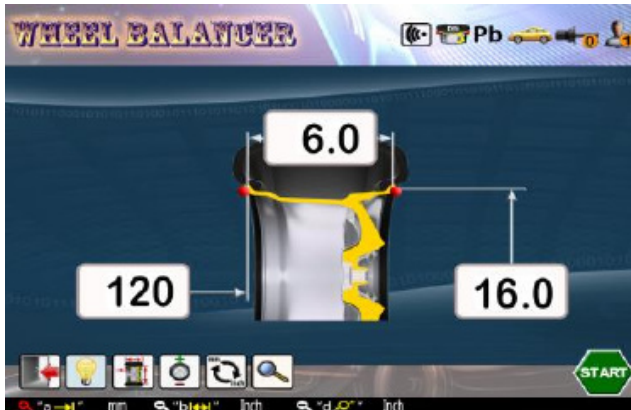


Fig. 23

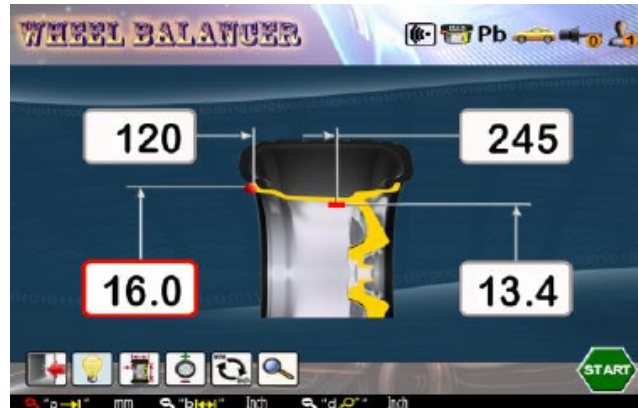


Fig. 24

5.3.2.2 Manual entry — continued

In EALU2, the parameter-entry button opens A, D, A2 and D2 (Fig. 24). Hold the adjustment button and turn the wheel to change the selected value. Press Start to return directly and start EALU2 measurement.

In EALU1, open A1, D1, A2 and D2 entry (Fig. 25). Hold the adjustment button and turn the wheel to change the selected value. Press Start to return directly and start EALU1 measurement.

In motorcycle mode, open A, D, A2 and D2 entry (Fig. 26). Hold the adjustment button and turn the wheel to change the selected value. Press Start to return and start motorcycle measurement directly.

5.3.3 Clip-on and adhesive-weight positions

A car wheel has five correction positions: P1, P2, P3, P4 and P5. At P1 and P5, fit clip-on weights at 12 o'clock. At P2, P3 and P4, attach adhesive weights at 12 o'clock or 6 o'clock (Fig. 27).

5.3.3.1 Weight materials and types

Weight shapes are shown in Fig. 28.

Fig. 25 — EALU1 parameter entry/adjustment. Fig. 26 — Motorcycle parameter entry/adjustment. Fig. 27 — Car-wheel correction positions.

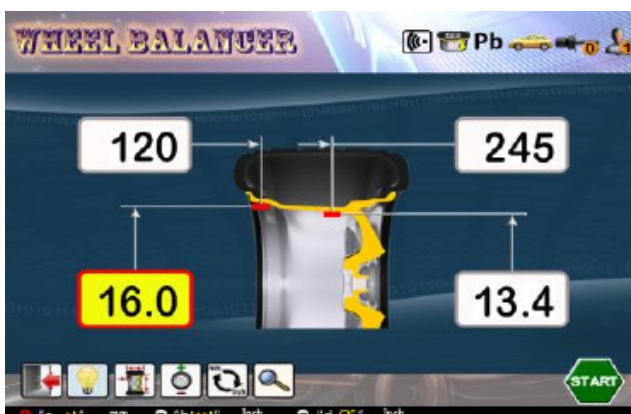


Fig. 25

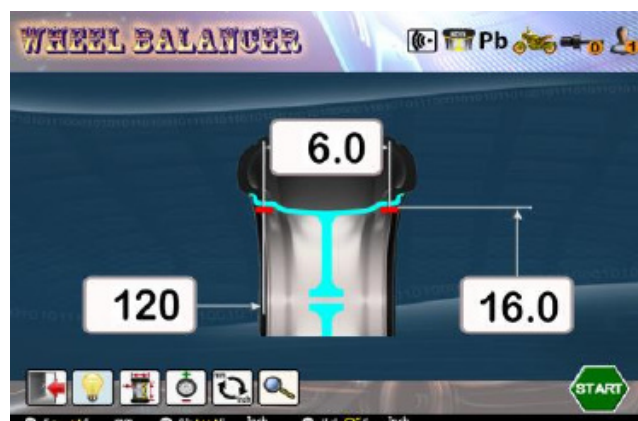


Fig. 26

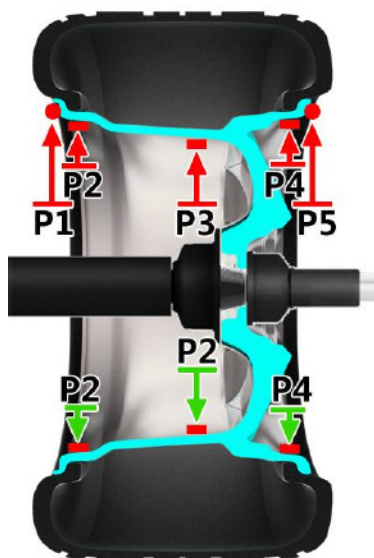


Fig. 27

5.3.3 Weight materials and adhesive positions

Weight materials are Pb (lead), Zn (zinc) and Fe (iron). From the main screen, press weight selection. A selection box opens; choose the corresponding material icon (Fig. 29).

Fig. 28 — Adhesive and clip-on weights. Fig. 29 — Weight material selection.

5.3.3.2 Adhesive-weight positions

Fig. 30 shows positions P2–P4 for attachment at 12 o'clock. The arrangement is the same at 6 o'clock. These predefined positions do not apply to EALU1 or EALU2: their positions are determined by the measuring arm.

Fig. 30 — Adhesive positions P2, P3 and P4.

5.3.4 Standard dynamic balancing

The system defaults to standard dynamic balancing (Fig. 31). From another mode, follow 5.3.1 to select dynamic balancing at start-up. Dynamic balancing is vector balancing carried out at P1 and P5.

Fig. 31 — Standard dynamic balancing.



Fig. 28

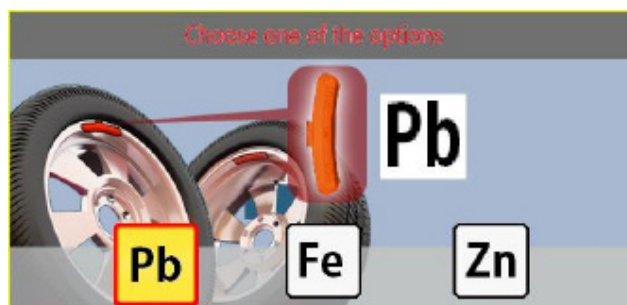


Fig. 29



Fig. 30



Fig. 31

5.3.4 Dynamic measurement and emergency stopping

For wheels narrower than 2.5", static balancing is recommended instead of dynamic balancing.

Enter A and D as described in 5.3.2. B can be measured automatically when the guard is closed (Fig. 32).

5.3.4.1 Dynamic balance measurement

After B has been measured, the system automatically starts the balancing run. If the guard is already closed, press Start to begin measurement (Fig. 33). During measurement, the Start icon changes to Stop.

Measurement stops automatically after approximately 7 seconds. The first stop and lock is at the greatest unbalance point. Dynamic measurement is then complete.

5.3.4.2 Emergency stop during measurement

To stop measurement in an emergency, press Stop, step on the foot pedal or open the wheel guard (Fig. 34).

5.3.4.3 Dynamic correction procedure

Open the guard. The wheel remains locked. The inner 12 o'clock laser marker and working lights turn on automatically.

Fig. 32 — Automatic width measurement. Fig. 33 — Balancing measurement. Fig. 34 — Stopping by pedal, Stop button or opening the guard.



Fig. 32



Fig. 33



Fig. 34

5.3.4.3 Fitting weights in dynamic mode

Follow Fig. 35 to clip the inner weight on at 12 o'clock.

After completing the inner correction, press automatic positioning. The system automatically locates and locks at the outer unbalance point. Follow Fig. 36 to complete outer correction. The dynamic balancing operation is then complete.

Press Unlock and turn the wheel. When the unbalance point is reached, the system brakes in small increments and stops at that point.

With the guard closed, the foot pedal or Stop button stops measurement or brakes the wheel.

Fig. 35 — Fitting the inner clip-on weight. Fig. 36 — Fitting the outer clip-on weight. The source repeats the latter caption.



Fig. 35

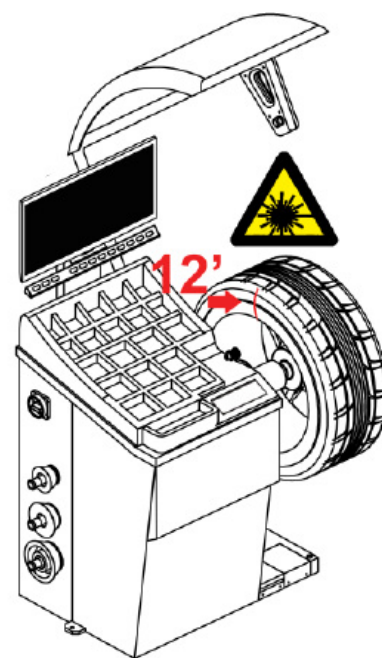
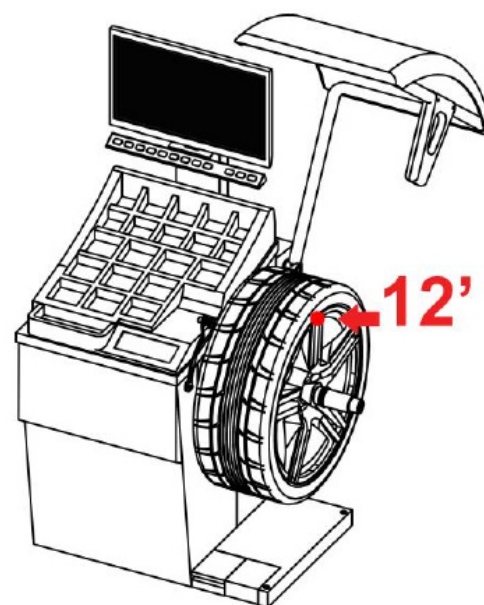


Fig. 36



5.3.5 Static balancing 1–5

With the guard open, the foot pedal on the pneumatic CWB 600 AI controls wheel clamping and release.

There are five static modes corresponding to different correction positions (Fig. 37). STA1, STA2 and STA3 correct on the inner side of the wheel; STA4 and STA5 correct on the outer side. The STA1–STA5 correction positions correspond to P1–P5 respectively. See 5.3.3 for clip-on and adhesive positions.

The following example uses Static 2. Select STA2 as described in 5.3.1. Static balancing uses a single correction point; the source describes it as moment balancing (Fig. 38).

Enter A and D as described in 5.3.2. Only D is actually required in this mode, but the system also acquires the other parameters for use in other modes.

Fig. 37 — Static modes 1, 2, 3, 4 and 5. In the original illustration, the last two thumbnails are incorrectly labelled ALU4 and ALU5 instead of STA4 and STA5; this section describes static modes 4 and 5. Fig. 38 — STA2 measurement screen. Fig. 39 — Wheel-width measurement.



Fig. 37



Fig. 38



Fig. 39

5.3.5 Static measurement and correction

The system therefore acquires A, D and B. B can be measured automatically when the wheel guard is closed (Fig. 39).

5.3.5.1 Static balance measurement

After B measurement, the system automatically starts the balancing run. If the guard is already closed, press Start (Fig. 40). During measurement, the icon changes to Stop.

Measurement stops automatically after approximately 7 seconds, with the wheel at the unbalance point. Static measurement is complete.

5.3.5.2 Static correction procedure

Fig. 41 illustrates weight attachment at 12 o'clock and 6 o'clock.

Fig. 40 — Static measurement. Fig. 41 — Static correction procedure.



Fig. 40



Fig. 41.1



Fig. 41.2



5.3.6 OPT function

Open the guard; the wheel remains locked. The inner 12 o'clock laser marker and lights turn on automatically. Follow Fig. 41.1 and attach the adhesive weight at 12 o'clock to complete correction.

Use the 12 o'clock / 6 o'clock adhesive-position buttons to switch between these positions. Attachment at 6 o'clock is easier and makes cleaning the inner rim surface more convenient (Fig. 41.2).

5.3.6 OPT function

OPT is available only in standard dynamic and static modes. It compensates the tyre unbalance against the rim unbalance to minimise the correction weight that must be added.

The OPT button appears when the conditions are satisfied. See 6.8.6 for the gram threshold and 6.8.7 for the ounce threshold.

5.3.6.1 Starting OPT

Press OPT to start the program (Fig. 42). On the pneumatic CWB 600 AI, an engaged balancing-position lock can release automatically.

5.3.6.1.1 Step 1

First place the valve at 12 o'clock and hold that position. Press the green START control to store the zero position. Mark the tyre with chalk at the same angular position as the valve (Fig. 43.1).

Fig. 42 — OPT operation 1. Fig. 43 — OPT operation 2.



Fig. 42



Fig. 43

5.3.6.1 OPT procedure — continued

5.3.6.1.2 Step 2

Remove the wheel from the balancer. Using a tyre changer, rotate the tyre through 180° relative to the rim. See Fig. 43.2 for the chalk-mark and valve positions.

Remount the wheel on the balancer. Return the valve to 12 o'clock and hold it there. Press the green START control to store zero.

5.3.6.1.3 Step 3

Close the guard or, if it is already closed, press the green START control (Fig. 44.1) to begin OPT measurement. When measurement finishes, rotate the wheel to the indicated position and mark a cross “+” on the tyre (Fig. 44.2). Press the green START control to continue.

5.3.6.1.4 Step 4

Remove the wheel. Using a tyre changer, rotate the tyre until the cross on it aligns with the rim valve (Fig. 45). OPT is complete. The 5 g shown on the outside in the example is the residual static unbalance after OPT.

Press the green START control to finish OPT and return to the original measurement mode. If necessary, press the red STOP control during the procedure to interrupt OPT and return to the original mode.

Fig. 44 — OPT operation 3. Fig. 45 — OPT operation 4.



Fig. 44.1



Fig. 44.2



Fig. 45

5.3.7 Aluminium-rim balancing ALU1–ALU7

Seven ALU modes combine different P1–P5 positions to suit different internal shapes of aluminium rims (Fig. 46).

The following example uses ALU1. Select ALU1 as described in 5.3.1. Measure exactly as described in 5.3.4.1. Enter A and D first; B is entered automatically when the guard is closed.

5.3.7.1 ALU1 correction

After measurement, open the guard. The wheel is locked and the inner 12 o'clock laser marker and lights are on. Follow Fig. 47 to attach the adhesive weight at 12 o'clock. Use the adhesive-position buttons to switch between 12 and 6 o'clock. The exact position is P2 in Fig. 30.

Fig. 46 — ALU1–ALU7 modes.

Mode	Position combination and attachment
ALU1	P2 and P4: adhesive weights inside and outside.
ALU2	P2 and P3: adhesive weights inside and outside.
ALU3	P1 and P3: clip-on inside, adhesive outside.
ALU4	P1 and P4: clip-on inside, adhesive outside.
ALU5	P2 and P5: adhesive inside, clip-on outside.
ALU6	P3 and P5: adhesive inside, clip-on outside.
ALU7	P2 and P4: adhesive weights inside and outside.



Fig. 46 / ALU1



Fig. 46 / ALU2



Fig. 46 / ALU3



Fig. 46 / ALU4



Fig. 46 / ALU5



Fig. 46 / ALU6



Fig. 46 / ALU7

5.3.7 ALU correction — continued

After inner correction, press automatic positioning to locate and lock the outer unbalance point. Outer correction is illustrated in Fig. 49. Attach the weight at 12 o'clock. Use the position button to switch between 12 and 6 o'clock.

The source text refers here to P3 in Fig. 30, whereas the table in Fig. 46 gives P4 for ALU1. Follow the displayed representation of the selected mode; this position-label discrepancy is present in the source.

5.3.7.2 Other ALU correction modes

Fig. 48 illustrates the adhesive and clip-on positions for ALU1–ALU7.

Fig. 47 — ALU1 inner correction at 12 and 6 o'clock. Fig. 48 — ALU1–ALU7 adhesive and clip-on positions.



Fig. 47.1



Fig. 47.2

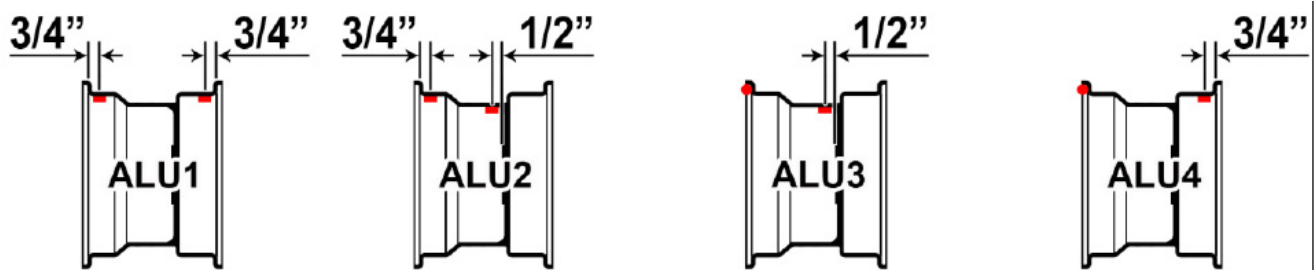
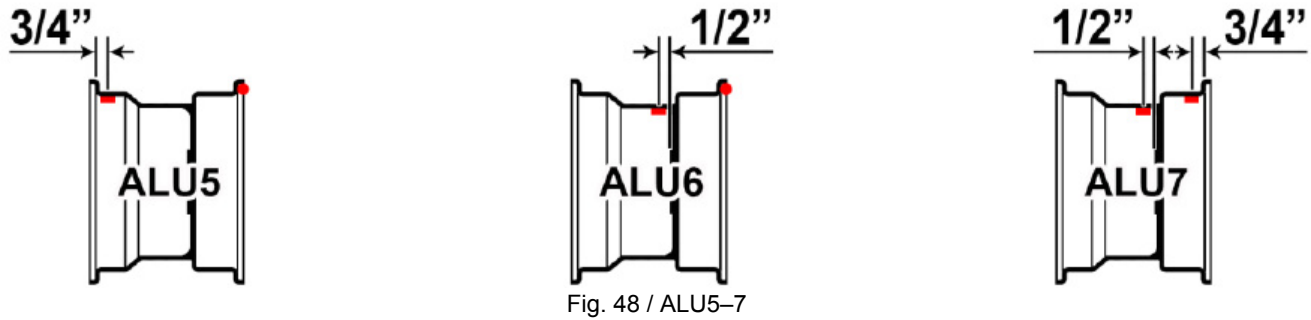


Fig. 48 / ALU1–4



Other ALU modes and EALU balancing

Balancing in the other ALU modes is essentially the same as in ALU1. The differences are the correction positions and whether clip-on or adhesive weights are used (Fig. 48).

According to the source, when changing to another balancing mode after a measurement, a new measurement is not required. Carry out the correction using the newly displayed values.

5.3.8 EALU balancing

EALU provides precise balancing of alloy wheels with the assistance of the automatic measuring arm. Two modes are available: EALU1 and EALU2.

5.3.8.1 Select EALU mode and enter the wheel dimensions

The following section explains how the measuring arm selects the mode and records the required dimensions.

Fig. 49: ALU1 correction at the 12 o'clock and 6 o'clock positions. The source caption says "inner" again, although the accompanying procedure describes the outer correction. Fig. 50: EALU1 mode. Fig. 51: EALU2 mode.



Fig. 49

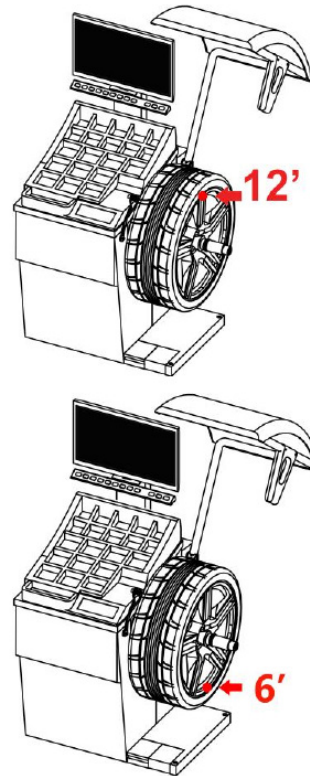


Fig. 50



Fig. 51

EALU measurement and adhesive-weight application

From any measuring mode, follow the automatic wheel-dimension procedure in Section 5.3.2.1. Pull the measuring arm out continuously to the required measuring points to enter EALU1 (Fig. 50) or EALU2 (Fig. 51).

The procedures are the same except for the inner correction: EALU1 uses an inner adhesive weight, whereas EALU2 uses an inner clip-on weight. EALU1 is used for the following example.

5.3.8.2 EALU1 measurement

As in the other modes, close the wheel guard to start measurement. When measurement is complete, the wheel automatically stops and is held at the inner or outer position with the greater unbalance (Fig. 52).

5.3.8.3 Apply adhesive weights in EALU1

5.3.8.3.1 Apply the outer adhesive weight

At the unbalance position, the outer value flashes; the example shows 55 g (Fig. 53). At the same time, an arrow instructs you to pull out the measuring arm.

Select a 55 g adhesive weight, remove its backing film and secure it in the holder at the end of the measuring arm. Pull out the arm as shown in Fig. 53 and apply the weight at the indicated position (Fig. 54). The outer correction is complete.

5.3.8.3.2 Apply the inner adhesive weight

The procedure for positioning the wheel and applying the inner weight continues on the next page.

Fig. 52: EALU1 measurement. Fig. 53: Weight holder at the end of the measuring arm.



Fig. 52



Fig. 53

Inner EALU correction and the SPL function

Press the automatic-positioning control. The system moves the wheel to the inner unbalance position and holds it there. In EALU1, apply the inner weight, 35 g in this example, in the same way as the outer weight (Fig. 54).

In EALU2, attach the clip-on weight indicated in the "INNER" display at the position marked by the laser. Refer also to Fig. 35 for the inner clip-on-weight procedure.

5.3.9 SPL function

SPL divides the effect of one outer adhesive weight into two equivalent correction weights, which can be hidden behind two adjacent spokes without affecting the wheel's appearance. Two modes, SPL1 and SPL2, can be selected in Section 6.8.8.

In ALU2, ALU3, EALU1 or EALU2, press SPL when outer unbalance is present to start the splitting procedure. During the procedure, use the displayed Return/Cancel control or the Stop control to cancel it.

5.3.9.1 SPL1 mode

First select the number of spokes (Fig. 56).

5.3.9.1.1 Select the number of spokes

Use the rotary/value-selection function to select the number of spokes, from 3 to 10. After selecting the number, proceed to the next step.

5.3.9.1.2 Confirm the angular position of a spoke

The following section describes how to set the first spoke position.

Fig. 54: Apply the outer adhesive weight in EALU1. Fig. 55: Inner EALU correction. Fig. 56: Select the number of spokes in SPL1.



Fig. 54



Fig. 55

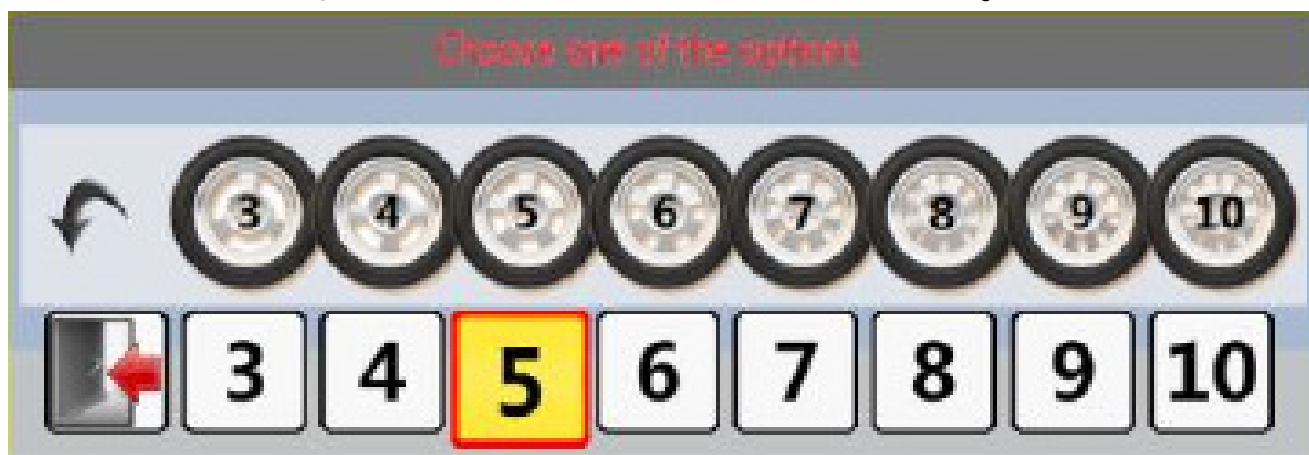


Fig. 56

SPL1 spoke positioning and weight application

Choose any spoke as the starting spoke and rotate it to 12 o'clock (Fig. 57). Press the confirmation control to store this starting position. The splitting calculation is now complete (Fig. 58).

Two outer correction positions are shown, except when the original correction position is already directly behind a spoke. Both adhesive-weight positions are behind spokes. Their masses and positions together produce the same vector correction as the original single weight (Fig. 59).

Press the automatic-positioning control to move to and hold the first correction position (Fig. 60). Apply the first weight as shown in Figs. 53 and 54. Press the control again to move to the other position, and apply the second weight.

SPL1 is convenient for evenly spaced spokes. It is limited when the spokes have another arrangement. For example, the spokes in Fig. 61.1 can only be split in the illustrated manner, and the adjacent spokes in Fig. 61.2 cannot be split using this method.

Fig. 57: Set the spoke angle in SPL1. Fig. 58: SPL operating screen. Fig. 59: Vector splitting. Fig. 60: SPL correction screen. Fig. 61: Examples of splitting limitations.



Fig. 57



Fig. 58



Fig. 59



Fig. 60

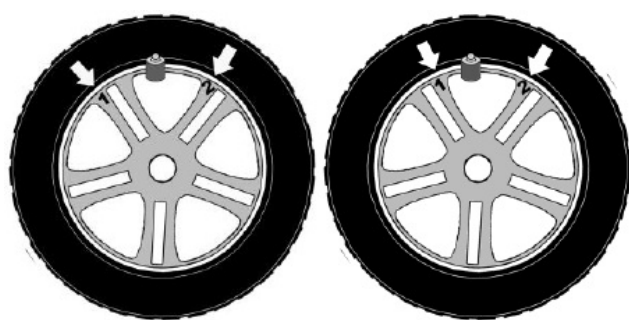


Fig. 61

5.3.9.2 SPL2 and motorcycle balancing

SPL2 is the more flexible method. It allows two adjacent spokes to be selected individually, including unevenly spaced spokes.

5.3.9.2.1 Select the first spoke

Select the first spoke close to the unbalance position (Fig. 62.1–2). Rotate it to 12 o'clock and press the confirmation control.

5.3.9.2.2 Select the second spoke

Select the second spoke close to the other side of the unbalance position (Fig. 62.3). Rotate it to 12 o'clock and confirm. The SPL2 calculation is complete.

As in SPL1, two correction positions appear after splitting, with both adhesive-weight positions behind spokes. The masses and positions of these two correction weights have the same vector effect as the original single weight (Fig. 58).

5.3.10 Motorcycle balancing

Motorcycle balancing includes dynamic and static modes and requires the appropriate special accessories. From any measuring mode, use the mode-selection procedure in Section 5.3.1 to select motorcycle balancing (Figs. 63 and 67).

Fig. 62: SPL2 procedure—unbalance position, confirm the first nearby spoke at 12 o'clock, then confirm the spoke on the other side at 12 o'clock. Fig. 63: Motorcycle dynamic mode.



Fig. 62



Fig. 63

Motorcycle-accessory compensation and dynamic balancing

5.3.10.1 Remove the effect of the motorcycle accessory's own unbalance

The machine provides a dedicated accessory-compensation function to remove the effect of the motorcycle accessory's own unbalance and improve measurement accuracy.

Install the motorcycle accessory as shown in Fig. 64. Press the accessory-compensation control to open the procedure (Fig. 65). Close the wheel guard to start the accessory measurement. When measurement is complete, the inner and outer displays both show "0,0". Accessory compensation is complete.

5.3.10.2 Motorcycle dynamic balancing

The measuring and correction steps are the same as those for standard dynamic balancing in Section 5.3.4.1. Adhesive weights are used in this mode. Refer to Section 5.3.3 for the weight positions.

5.3.10.3 Motorcycle static balancing

Mount the motorcycle wheel as shown in Fig. 66. The remaining procedure continues in the following section.

Fig. 64: Install the motorcycle accessory. Fig. 65: Compensate for the motorcycle accessory's own unbalance. Fig. 66: Mount the motorcycle wheel.

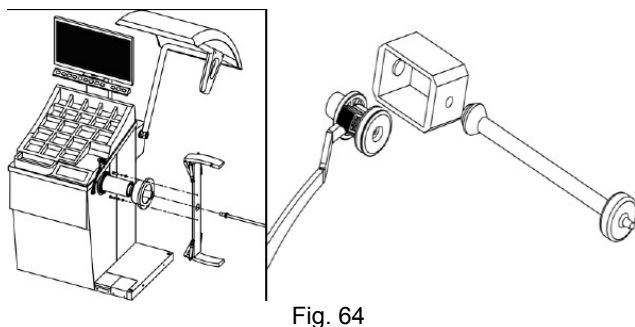


Fig. 64



Fig. 65

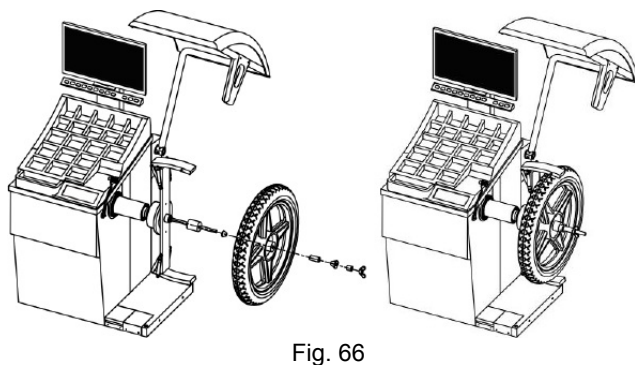


Fig. 66

Motorcycle static correction and rim runout measurement

Mount the wheel on the balancer as shown in Fig. 66. Follow the measuring and correction steps in Section 5.3.5.1 for static balancing. The source calls this “standard dynamic” here, but refers to the static-balancing section. Attach the weights as shown in Fig. 68.

Fig. 67: Motorcycle balancing measurement. Fig. 68: Weight for motorcycle static balancing.

5.3.11 Measure radial and axial rim runout

From any measuring mode, follow Section 5.3.1 to select the rim runout mode, called PP measurement (Fig. 69).

This mode helps the operator assess the rim objectively by measuring radial and axial runout and locating the position of the greatest runout.

The measurement must be taken on the surface at the inner rim edge. Remove any clip-on weights from this area so that they do not obstruct the measuring surface.

Fig. 69: PP rim runout measurement.



Fig. 67

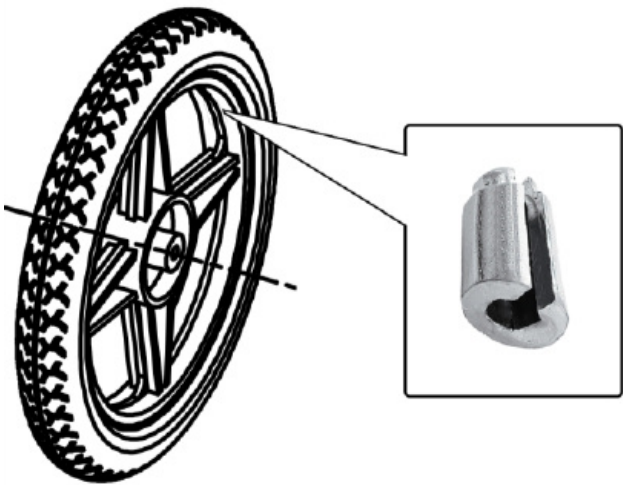


Fig. 68



Fig. 69

PP measurement and user management

With your left hand, pull out the measuring arm as shown in Fig. 69 until it contacts the inner wall of the rim-edge groove. Keep the O-shaped ring at the end of the arm against the rim so that the measuring end can roll in the groove. Then press the displayed Next control with your right hand.

Continue holding the O-shaped ring against the rim with your left hand. Slowly rotate the wheel forwards with your right hand to start runout measurement (Fig. 70).

When measurement is complete, the machine beeps and displays the result shown in Fig. 70. The curves represent radial and axial changes over one revolution. Changes within the indicated limits signify an acceptable rim condition for this test. Press the completion/Return control to finish measurement and return to the main screen.

5.3.12 Multiple-user management

This function manages the different modes and preferences used by different operators. Press the user-selection control on the main screen, then select the current user with the corresponding key (Fig. 71). The selection is saved automatically.

When switching to another user, the machine first saves the previous user's settings and then loads the new user's settings.

Fig. 70: PP runout result. Fig. 71: Change the current user.

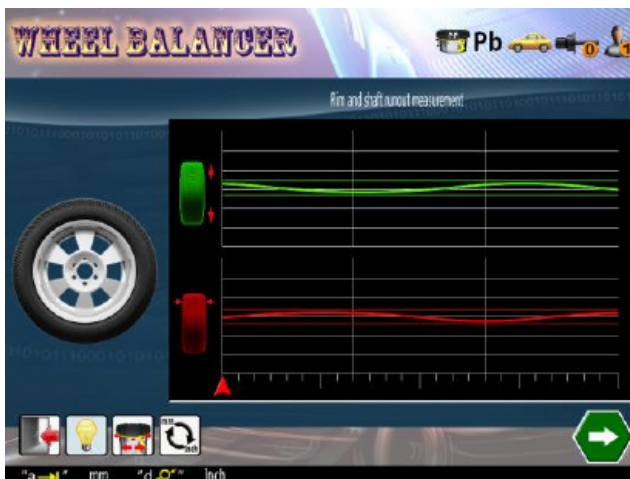


Fig. 70

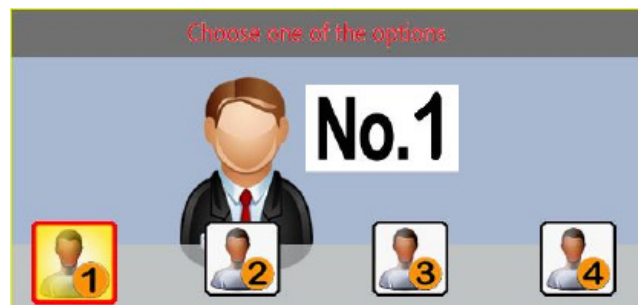


Fig. 71

User profiles, weight material and accessories

Saved user settings include measuring mode, wheel dimensions, units, weight type and operating preferences. In balancing mode, the current user is displayed at the top left of the screen.

The number of operating cycles for each user can also be checked under the usage information in Section 6.1. This function can manage different operators or teams, or separate batches of wheels with different parameters, for example in tyre production.

5.3.13 Select the correction-weight material

Press the weight-material control on the main screen. Follow the selection procedure in Section 5.3.3.1 (Fig. 72). In balancing mode, the selected material is displayed at the top left: Zn, Fe or Pb.

Source inconsistency: this paragraph of the source says “Pt”, whereas the material description and Table 4 specify “Pb” for lead. “Pt” is recorded here as a source discrepancy, not an additional supported weight material.

5.3.14 Use accessories

Press the accessory-selection control on the main screen. Select the accessory number with the corresponding key and install that accessory. The selection is saved automatically (Fig. 73).

If accessory management has been configured under Section 6.9, the current accessory number is displayed at the top left in balancing mode.

Fig. 72: Weight-material selection. Fig. 73: Accessory management. The additional Chinese caption in the source also refers to weight-material management.

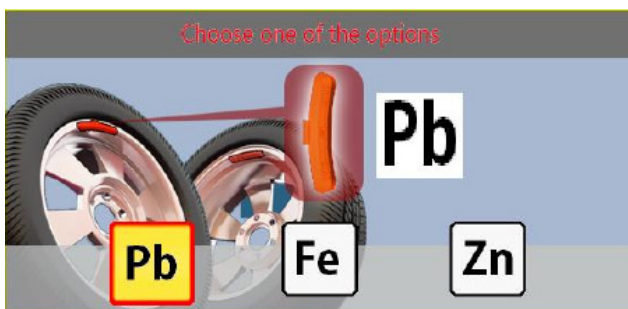


Fig. 72

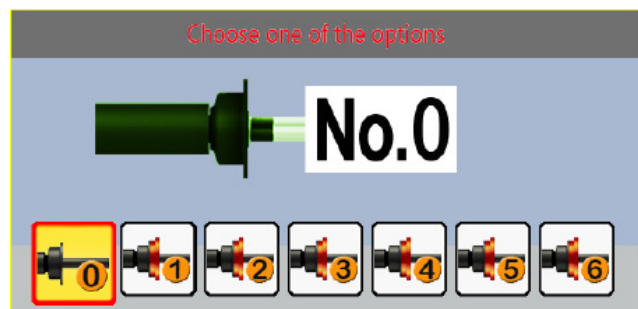


Fig. 73

5.3.15 Additional functions

5.3.15.1 Display precise unbalance values

During balancing, press and hold the magnifying-glass control. The inner and outer boxes show the precise unbalance values (Fig. 74.2). Release it to return to the rounded or incremented display (Fig. 74.1).

To retain the precise-value display, press the magnifying-glass control and the wheel Lock/Unlock control (the wheel-and-padlock symbol) at the same time.

5.3.15.2 Display precise length values

During parameter entry, press the magnifying-glass control to switch between precise and incremented length displays (Fig. 74.3).

5.3.15.3 Rim-cleaning position

This function is provided in adhesive-weight modes to make it easier to clean the inner rim surface before applying a weight. Use the 12 o'clock/6 o'clock controls to switch between these application positions. The exact position is shown on the screen or by the laser marker (Fig. 75).

Fig. 74: Rounded display, precise display and length-display selection. Fig. 75: Cleaning and adhesive-weight positions.

	Mode	Effect of switching between 12 o'clock and 6 o'clock
	ALU1	Switch the inner and outer adhesive-weight positions together.
	ALU2	Switch the inner and outer adhesive-weight positions together.
	ALU3	Inner clip-on weight remains at 12 o'clock; switch the outer adhesive position.
	ALU4	Inner clip-on weight remains at 12 o'clock; switch the outer adhesive position.
	ALU5	Outer clip-on weight remains at 12 o'clock; switch the inner adhesive position.
	ALU6	Outer clip-on weight remains at 12 o'clock; switch the inner adhesive position.
	ALU7	Switch the inner and outer adhesive-weight positions together.
	EALU1	Switch the inner and outer adhesive-weight positions together.
	EALU2	Inner clip-on weight remains at 12 o'clock; switch the outer adhesive position.

	Mode	Effect of switching between 12 o'clock and 6 o'clock
	STA2	Switch the inner adhesive position between 12 o'clock and 6 o'clock.
	STA3	Switch the inner adhesive position between 12 o'clock and 6 o'clock.
	STA4	Switch the outer adhesive position between 12 o'clock and 6 o'clock.

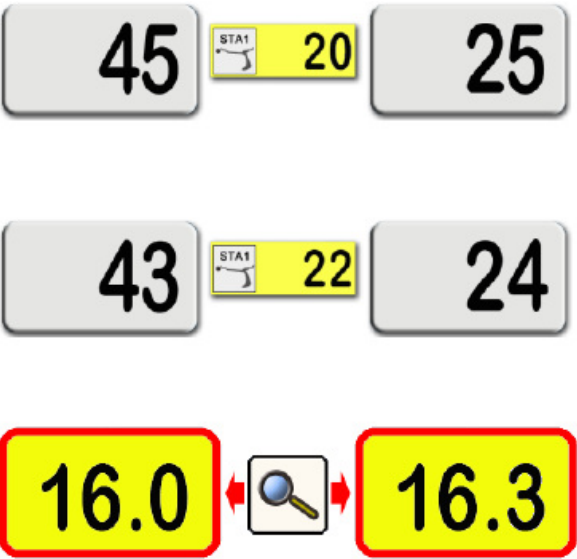


Fig. 74

Lighting, sleep mode and balancing strategy

5.3.15.4 Lighting

The machine can illuminate the adhesive-weight position and measuring-arm contact area. In any measuring mode, use the lamp control to switch this temporary lighting on or off. For protection, the light switches off automatically after 100 seconds.

5.3.15.5 Sleep mode

Configure this function as described in Section 6.8.3. If there is no operation during the selected delay, the machine enters sleep mode automatically (Fig. 76: a black screen with a moving logo).

At the same time, the system releases or switches off the relevant electrically powered components and shows the sleep state. Pressing any key or performing another operating action wakes the machine again.

5.3.15.6 Precision mode and weight-saving mode

Select weight-saving mode under Section 6.4.3. In precision dynamic balancing, the machine displays “0” and “0” when both the inner and outer residual unbalance are below the standard threshold of 5 g and the total static residual unbalance is also below 5 g. This is treated as complete balancing in the described procedure. Precision mode considers residual unbalance to improve balancing quality.

Compared with precision mode, weight-saving mode is intended to meet the accuracy requirement while minimising the amount of correction weight used. This can reduce weight costs over time.

Fig. 76: Sleep mode.



Fig. 76

Units, precise display and stop-position correction

5.3.15.7 Change units during operation

During unbalance measurement, press the unit control to change between g and oz. During wheel-parameter entry, use the unit control to change between mm and inches at any time.

5.3.15.8 Display precise values during operation

Press and hold the magnifying-glass control to display precise g/oz unbalance values. During wheel-parameter entry, press the same control to display precise parameter values.

5.3.15.9 Correct the braking and holding position—Level One authorisation

Use this function when the machine brakes and holds the wheel at an incorrect unbalance position.

This paragraph of the source says to hold a Start button until the main screen appears. However, the specific Level One start-up procedure in Section 5.3.0 is to hold F11 while switching on the machine. Follow that access procedure and identify the correction symbol on the screen; the source wording is inconsistent here.

The position-correction control appears on the main screen. Press it to enable correction; the corresponding active-status symbol appears.

During balancing measurement and automatic positioning, the system learns the required correction for the braking point. After measurement, it returns to the main screen. Press the correction control again, or restart the machine, to end the learning procedure. When measuring a rim of the same size, the machine will then brake and hold at the corrected unbalance position.

The following settings require Level Two access, as described in Section 5.3.0.

6 System settings—Level Two authorisation

6.0 Navigate the system settings

Press the Settings control on the main screen to open the system settings (Fig. 78).

Hold the main-menu selection control and turn the wheel to select a main-menu item (Fig. 77). Use the submenu-selection control together with wheel rotation to select the required submenu item.

In a submenu, hold the value-adjustment control and turn the wheel to change the selected item. In the main menu, press Return to save the settings and return to the main screen.

6.1 View information

Fig. 79 shows the information screen.

6.1.1 Software version

Displays the software version number. The user cannot change this value.

Fig. 77: Navigate system settings. Fig. 78: System-settings screen. Fig. 79: Information enquiry.

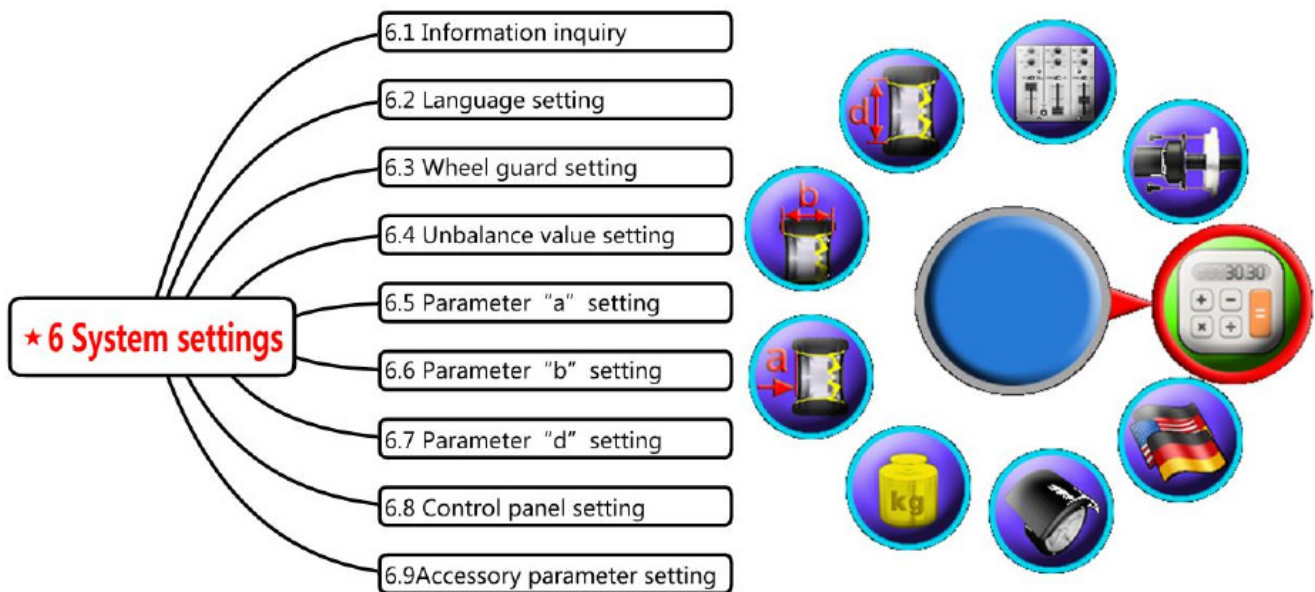


Fig. 77



Fig. 78

★ 6.1 Information inquiry

6.1.1 Software version	1.01.01
6.1.2 Hardware version	1.00.01
6.1.3 Issue date	01-01-2018
6.1.4 Usage information	10
6.1.5 Weight consumption quantity	130
6.1.6 The current running times	10
6.1.7 The current consumed weight quantity	130
6.1.8 Production number	XXXX-XXXX-XXXX-XXXX
6.1.9 Production Date	01-01-2019

Fig. 79

Machine information and language

6.1.2 Hardware version

Displays the hardware version number. The user cannot change this value.

6.1.3 Release date

Displays the software release date. The user cannot change this value.

6.1.4 Total operating cycles

Records the machine’s total number of operating cycles. The user cannot clear this counter.

6.1.5 Total weight consumption

Records the total quantity of correction weights used by the machine. The user cannot clear this counter.

6.1.6 Operating cycles in the current period

Records the number of operating cycles in the current period. The user can clear this counter.

6.1.7 Weight consumption in the current period

Records the quantity of correction weights used in the current period. The user can clear this counter.

6.1.8 Product number

Displays the serial number assigned at the factory. The user cannot change it.

6.1.9 Production date

Displays the production date. The user cannot change it.

6.2 Language selection

Hold the displayed selection control and turn the wheel to select a language (Fig. 80).

The source states that version 1.01.00 includes 16 languages, but its text lists only 13: English, German, Chinese, Traditional Chinese, Spanish, Korean, Japanese, Russian, Turkish, Hungarian, Romanian, Slovenian and Italian. Fig. 80 shows 16 options with a different language selection. Check the language menu in the installed software to establish the options actually available; no additional languages are assumed here.

Fig. 80: Select a language.



Fig. 80

6.3 Wheel-guard settings

The guard's protective function must be effective to protect the operator and must comply with applicable local requirements.

Hold the submenu-selection control and turn the wheel to select the required item. Confirm the selection and change the setting as required (Fig. 81).

6.3.1 Wheel-guard protection

When set to "active", measurement can start only when the guard is closed. Opening the guard during measurement brakes the wheel and stops the machine.

When set to "inactive", the source states that the guard position or operation has no effect on the machine. Describing this setting does not override the requirement for an effective protective guard function.

6.3.2 Start measurement automatically when closing the guard

When set to "active", measurement starts as soon as the guard is closed. Use of this function must comply with local requirements.

6.3.3 Automatic guard opening and closing

If the required accessory is installed, activate this function. The corresponding Open/Close controls then operate the guard automatically. The guard can also be opened and closed manually. This function requires the appropriate accessory.

Fig. 81: Wheel-guard settings.

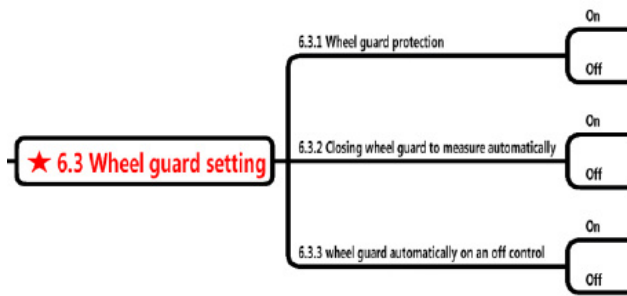


Fig. 81

6.4 Unbalance display and 6.5 parameter a

6.4 Unbalance-value settings

6.4.1 Minimum displayed value in grams

When the selected unit is grams, only values greater than the minimum value in grams are displayed.

6.4.2 Minimum displayed value in oz

When the selected unit is oz, only values greater than the minimum value in oz are displayed.

6.4.3 Balancing strategy

Two strategies are available: “weight-saving mode” and “precision mode”. Selecting weight-saving mode applies its calculation method; selecting precision mode applies the corresponding precision calculation. See also Section 5.3.15.6.

6.5 Parameter a settings

Fig. 83 shows the settings for distance a.

6.5.1 Start-up default a value in mm

When mm is selected, the start-up default a value is expressed in millimetres.

6.5.2 Start-up default a value in inches

When inches are selected, the start-up default a value is expressed in inches.

Fig. 82: Unbalance-value settings. Fig. 83: Parameter a settings.

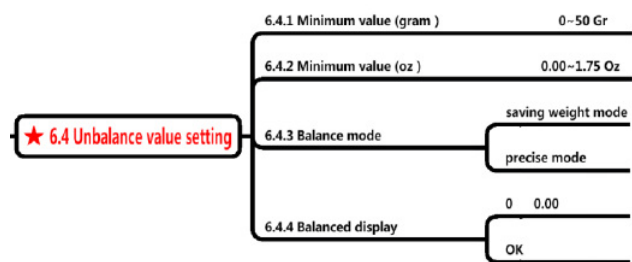


Fig. 82

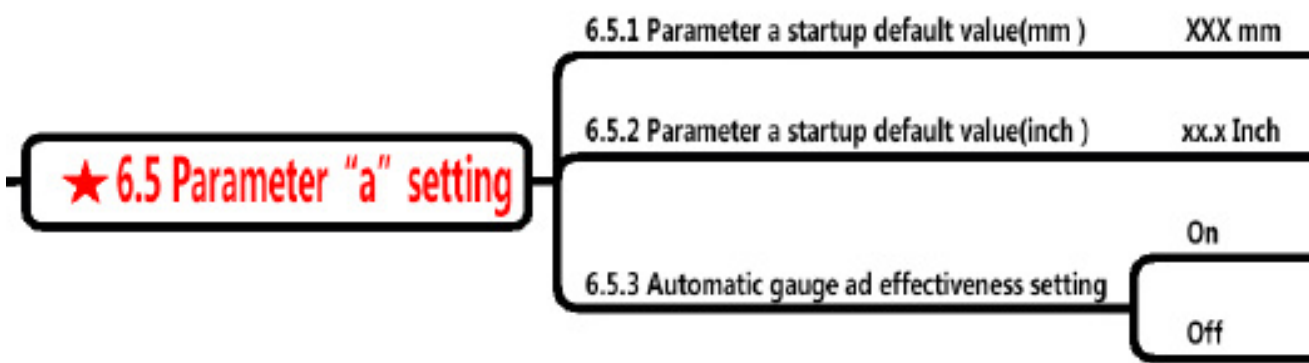


Fig. 83

Parameters a, b and d; control-panel settings

6.5.3 Enable automatic a/d measurement

The automatic a and d measuring devices form one assembly. This setting enables or disables both together.

6.6 Parameter b settings

Width b can be measured by sonar or entered manually. The source refers to Fig. 85 for the setting items.

6.6.1 Start-up default b value in mm

When mm is selected, the start-up default b value is expressed in millimetres.

6.6.2 Start-up default b value in inches

When inches are selected, the start-up default b value is expressed in inches.

6.6.3 Enable automatic b measurement

The sonar b sensor measures at the outer rim edge. This setting enables or disables its automatic measuring function.

6.7 Parameter d settings

Fig. 85 shows the settings for diameter d.

6.7.1 Start-up default d value in mm

When mm is selected, the start-up default d value is expressed in millimetres.

6.7.2 Start-up default d value in inches

When inches are selected, the start-up default d value is expressed in inches.

6.7.3 Enable automatic a/d measurement

This is the same joint a/d setting as described in Section 6.5.3.

6.8 Control-panel settings

Refer to Fig. 86 for the setting items.

Fig. 85: Parameter d settings.

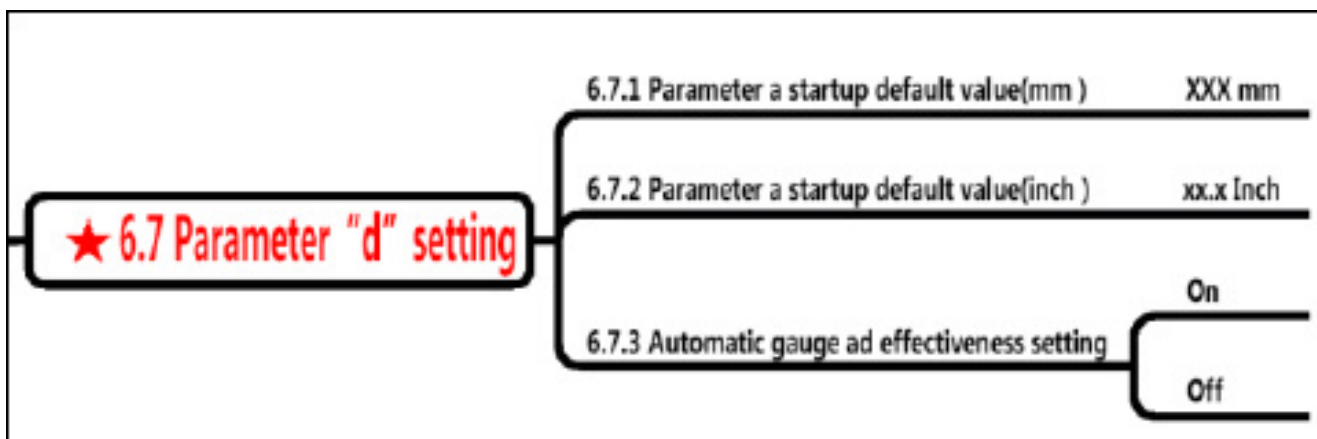


Fig. 85

6.8 Control-panel settings—continued

6.8.1 Beeper

Enable or disable the beeper. If it is disabled, the adhesive-weight application beeps are also disabled.

6.8.2 Adhesive-weight guidance beeps

In EALU mode, beeps supplement the screen animation while the measuring arm is pulled towards the adhesive-weight position. The closer the arm gets to the correct position, the faster the beeps sound. A continuous tone sounds when the position is reached.

6.8.3 Sleep-mode setting

Enable or disable sleep mode, or select the delay using the rotary/value-selection function. Available delays are 5, 10, 15, 20, 25, 30, 40, 50, 60, 90, 120 and 240 minutes, plus 0 minutes. A value of 0 disables the screen saver/sleep function.

6.8.4 Laser-indicator setting

Enable or disable the laser indicators for the 12 o'clock and 6 o'clock clip-on or adhesive-weight positions.

6.8.5 Weight-application light

This setting controls the light inside the wheel.

6.8.6 OPT start threshold in grams

Set the minimum value for enabling OPT. OPT becomes available when the maximum static unbalance exceeds this threshold.

Fig. 86: Control-panel settings.

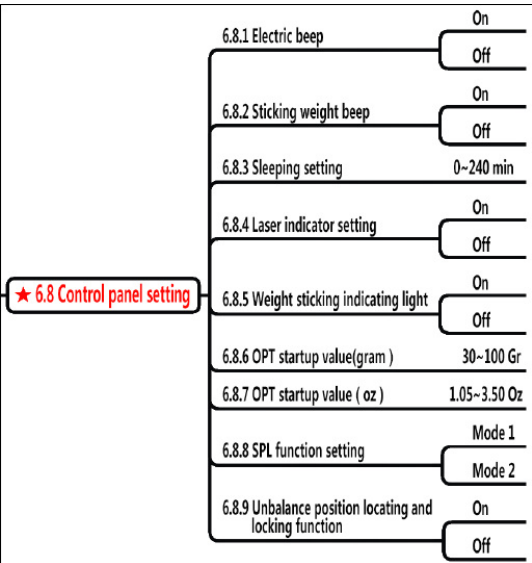


Fig. 86

OPT, SPL, accessories and calibration

6.8.7 OPT start threshold in oz

Set the minimum value in oz for enabling OPT. OPT becomes available when the maximum static unbalance exceeds this threshold.

6.8.8 Select the SPL mode

The split mode can be set to “SPL -1-” or “SPL -2-”. Select the method appropriate to the spoke arrangement and the required procedure.

Source inconsistency: the text in Section 6.8.8 reverses the two methods. The detailed procedures in Section 5.3.9 define SPL1 by selecting the number of spokes and SPL2 by selecting two adjacent spokes individually. Those detailed procedures are retained in this revised manual.

6.8.9 Automatic positioning and holding

This setting controls use of the electric motor brake for positioning and holding the wheel at the correction point.

6.9 Accessory-parameter settings

The system provides six numbered accessory positions, No. 1 to No. 6. Select them with the accessory control on the main screen (Fig. 87). Six stored accessory positions do not mean that all six accessories are included with the machine.

7 Calibration program—Level Two authorisation

Press the Calibration control on the main screen to open the calibration program. Fig. 88 shows the available items. On entering the program, the screen in Fig. 89 appears.

Fig. 87: Accessory-parameter settings. Fig. 88: Calibration program.

★ 6.9Accessory parameter setting	Accessory 1 setting	0~200 mm
	Accessory 2 setting	0~200 mm
	Accessory 3 setting	0~200 mm
	Accessory 4 setting	0~200 mm
	Accessory 5 setting	0~200 mm
	Accessory 6 setting	0~200 mm

Fig. 87



Fig. 88

7.1 Shaft zero calibration and 7.2 weight calibration

Hold the selection control and turn the wheel to choose an item in the calibration main menu (Fig. 89). Press the confirmation control to open it.

7.1 Shaft zero calibration

Shaft zero calibration compensates for the shaft's own unbalance in software. Prepare a wheel and a piece of chalk before starting.

Use the selection control and wheel rotation to select shaft zero calibration (Fig. 90), then confirm.

Mount the wheel and make a chalk reference mark on its inner side (Fig. 91). Close the wheel guard, or press Start if the guard is already closed, to perform the first measurement.

After measurement, release the wheel clamp. Rotate the wheel through 180° relative to the shaft, then securely clamp it again (Fig. 92).

Close the guard again, or press Start if it is already closed, to perform the second measurement. Shaft zero calibration is complete when that measurement ends.

7.2 Weight calibration

Prepare a wheel and a standard 100 g test weight. Calibration has three steps. Use the selection control and wheel rotation to select weight calibration (Fig. 93), then confirm.

Fig. 89: Calibration screen. Fig. 90: Shaft zero calibration. Fig. 91: Shaft zero calibration, step 1 of 2. Fig. 92: Shaft zero calibration, step 2 of 2.



Fig. 89



Fig. 90



Fig. 91



Fig. 92

Weight calibration—three measurements

Step 1: Mount a wheel; the recommended size is 13–20". Enter the wheel dimensions as described in Section 5.3.2. Close the guard, or press Start if it is already closed. After measurement, the screen shown in Fig. 94 appears. Step 1 is complete.

Step 2: Attach the 100 g test weight to the outer rim position shown in the illustration. Close the guard, or press Start if it is already closed. After measurement, the screen shown in Fig. 95 appears. Step 2 is complete.

Step 3: Remove the test weight from the outside and attach it to the inside of the wheel. Close the guard, or press Start if it is already closed. When this measurement ends, weight calibration is complete and the system returns to the main menu shown in Fig. 90.

7.3 Calibrate gauge a

Prepare the XSTD-02 calibration gauge (Fig. 96).

Figs. 93–95: Weight-calibration screens. The source labels both Figs. 93 and 94 "program 2"; follow the three-measurement sequence above. Fig. 96: XSTD-02 calibration gauge.



Fig. 93



Fig. 94

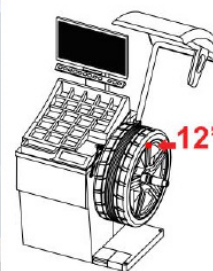


Fig. 95

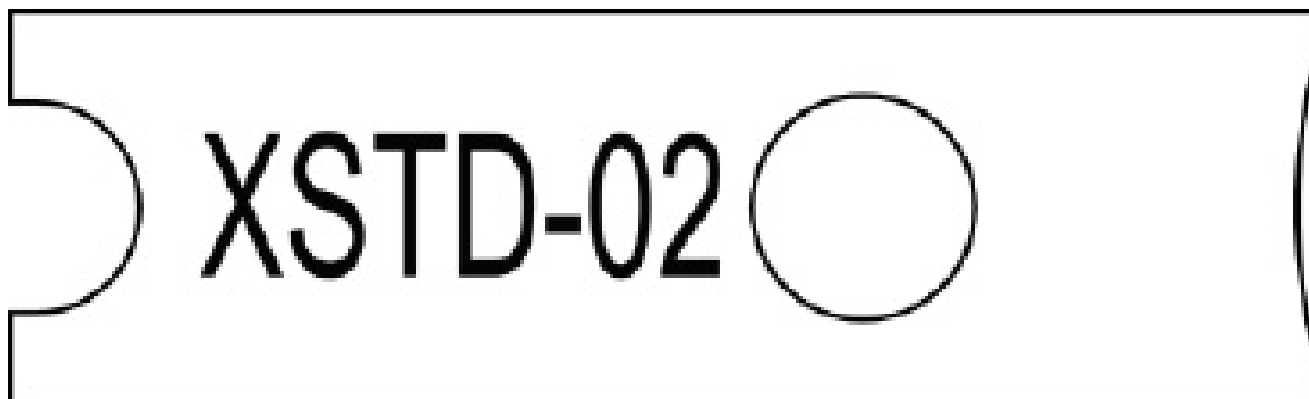
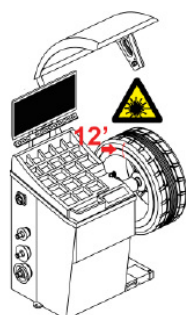


Fig. 96

7.3 Calibrate a and 7.4 calibrate d

Select the a-calibration symbol and press the confirmation control to open the program (Fig. 97.1).

Return measuring arm a to its zero position and confirm the zero point. The next screen appears (Fig. 97.2).

Place the calibration gauge between the measuring arm and the machine cabinet as illustrated. Confirm this calibration step. The verification screen appears (Fig. 98).

Pull out measuring arm a. The value at the top right updates continuously to show the current distance a. Return the arm to its zero position. Calibration is complete and the system returns to the main menu shown in Fig. 90.

7.4 Calibrate gauge d

Prepare the XSTD-02 calibration gauge (Fig. 96). Select the d-calibration symbol and confirm to open the program (Fig. 99.1).

Return measuring arm d to its zero position and confirm the zero point. The next screen appears.

Place the calibration gauge between the measuring arm and the balancer shaft as shown in Fig. 99.2. Confirm the calibration step. The laser-position alignment and verification follow.

Fig. 97: Calibrate a. Fig. 98: Verify a. Fig. 99: Calibrate d.

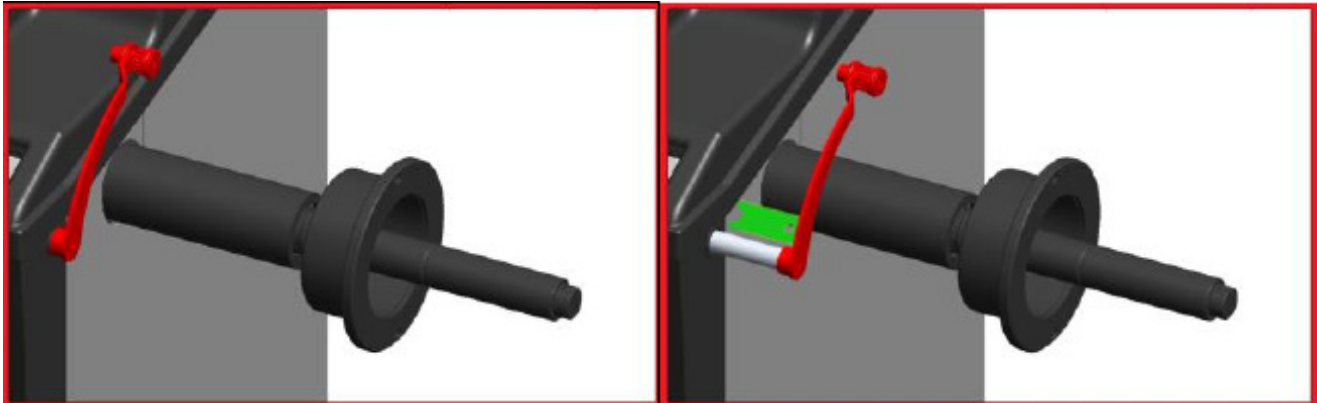


Fig. 97

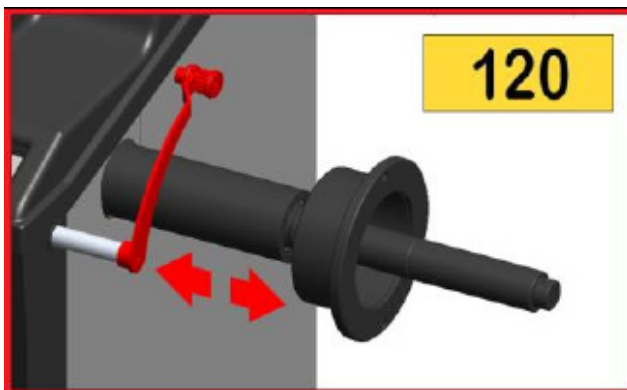


Fig. 98

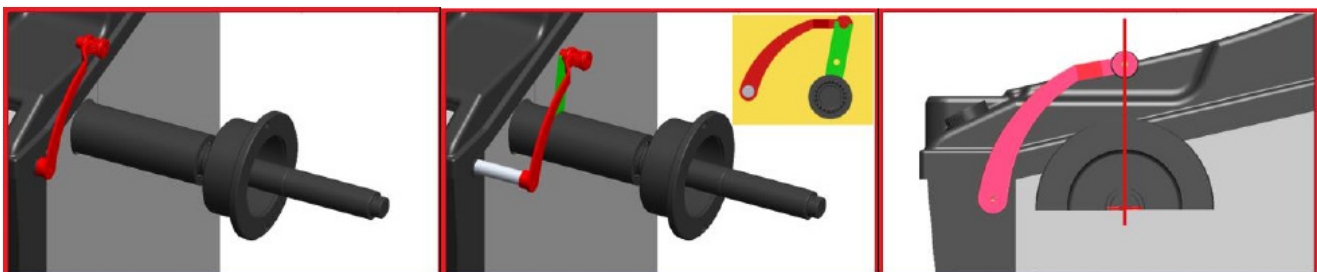


Fig. 99

Complete d calibration and 7.5 calibrate b

The 12 o'clock laser is now on. Align the centre of the measuring-arm tip with the laser beam. Press the confirmation control to complete calibration and open the verification screen (Fig. 100).

Move measuring arm d. The value at the top right updates continuously to show its current measurement. Return the arm to zero. Calibration ends automatically and the system returns to the main menu in Fig. 90.

7.5 Calibrate gauge b

Prepare a flat 300 × 300 mm cardboard sheet and a ruler. Select the symbol shown in Fig. 101.1 and confirm to open the b-calibration program (Fig. 101.2).

- a. Measure with the ruler and position the flat sheet 400 mm from the sonar sensor, as illustrated.
- b. Alternatively, place the sheet at another accurately measured distance, for example 151 mm. Hold the value-adjustment control and turn the wheel until the value in Fig. 101.2 matches the actual distance—151 mm in this example.
- c. Press the confirmation control to complete calibration and enter the verification screen (Fig. 102).

Fig. 100: Verify d. Fig. 101: Calibrate b. Fig. 102 is captioned as b verification in the source, but repeats the d-arm image from Fig. 100. For b verification, follow the described flat-sheet and sonar procedure, not movement of the d arm.

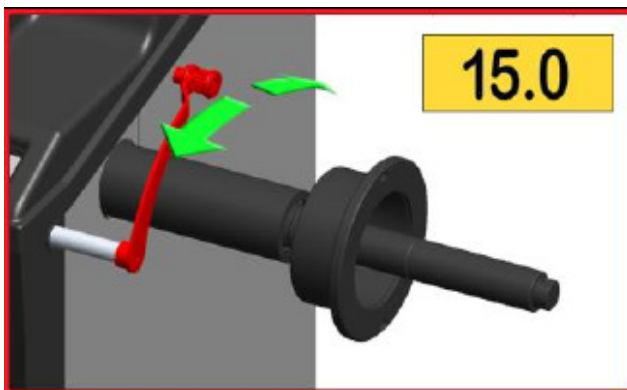


Fig. 100



Fig. 101

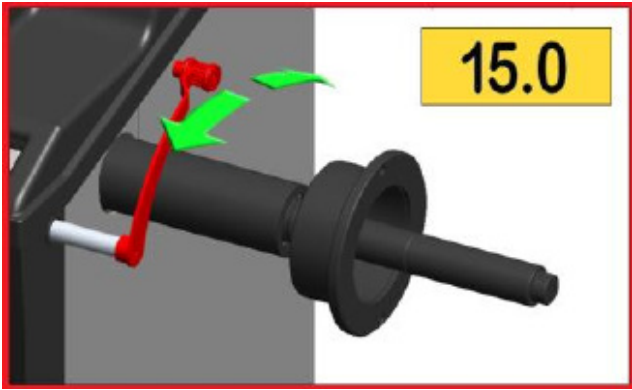


Fig. 102

8 Test programs—Level Two authorisation

d. Move the sheet away from the sonar sensor. The actual distance is displayed continuously at the top right of the verification screen.

8 Test programs

These programs check important components inside the machine. Qualified specialists can inspect the internal operating status and identify faults.

Press the Test control on the main screen to open the test-program main menu (Fig. 103). Press Return to go back to the main screen.

Hold the selection control and turn the wheel to select an item (Fig. 104). Confirm to open the individual test.

8.1 Switch and function test

As shown in Fig. 105, use the lamp control to switch the work light on and off. Use the separate laser controls to switch the 12 o'clock and 6 o'clock lasers on and off.

8.1.1 Test keys and indicators

The procedure for testing keys F1–F12 continues on the following page.

Fig. 103: Test programs. Fig. 104: Test-program main screen. Fig. 105: Switch test.

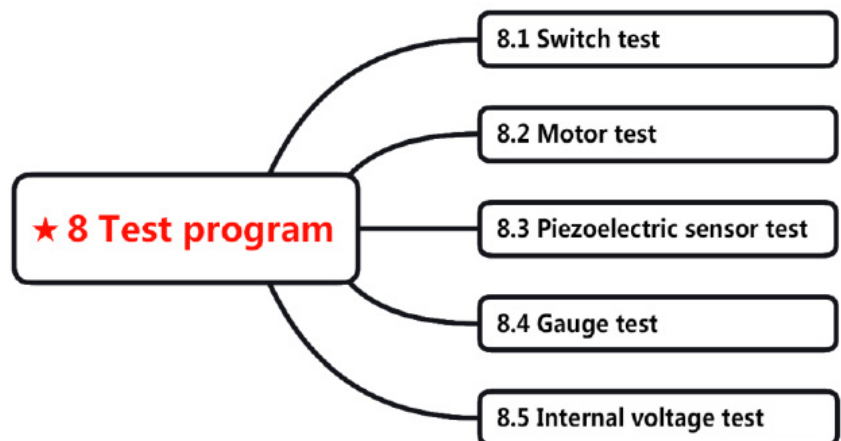


Fig. 103



Fig. 104



Fig. 105

Key, laser and motor tests

Press F1 through F12 in turn. The corresponding key number must be displayed.

8.1.2 Test F4 and the light

Press the lamp control. The light symbol and the lamp inside the wheel must switch on and off together. Use this to check that the components work correctly.

8.1.3 Test the 12 o'clock and 6 o'clock lasers

Press the separate controls for the 12 o'clock and 6 o'clock lasers. Each laser must switch on independently. Check the corresponding control and laser marker for correct operation.

8.1.4 Return to the main menu

Press Return to go back to the test-program main menu.

8.2 Motor test

This test checks the motor, electric brake and shaft encoder (Fig. 106).

8.2.1 Motor control

Press the forward control to run the motor forwards. Hold the reverse control to run it in the opposite direction. The second line at the top right displays the actual speed in r/min. Check the motor drive, direction-changing function and associated electrical circuit.

8.2.2 Electric-brake test

Use the brake control to switch the electric brake on and off. Check both the brake and its driver for correct operation.

8.2.3 Shaft-angle test

Rotate the wheel forwards. The shaft angle, from 0° to 359°, is displayed continuously at the top right. Use this indication to check that the encoder works correctly.

Fig. 106: Motor test.

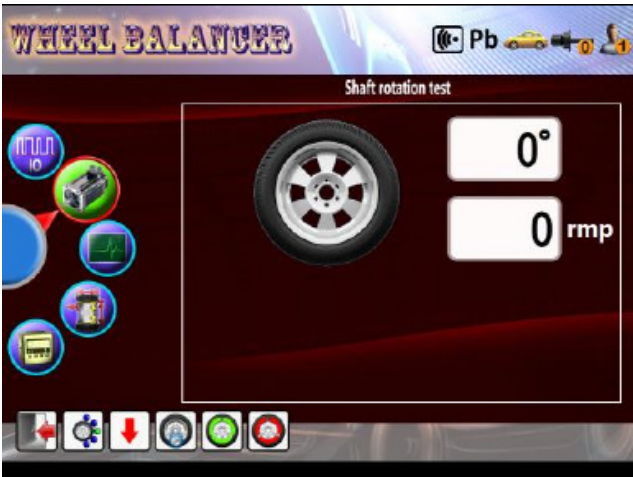


Fig. 106

Sensor, measuring-arm and voltage tests

8.2.4 Return to the main menu

Press Return to go back to the main menu.

8.3 Piezoelectric-sensor test

Open the test screen and tap the shaft. The screen displays the piezoelectric-sensor signal waveform in real time (Fig. 107). Check that the signal is correct. Press Return to go back to the main menu.

8.4 Measuring-device test

Open the test screen and pull out measuring arm a/d. The a and d values are displayed continuously. Hold a hand near the sonar sensor; the B value must also update continuously (Fig. 108). Press Return to go back to the main menu.

8.5 Internal-voltage test

The screen displays voltages at the electronic-board measurement points (Fig. 109). Table 12 gives the normal ranges. Press Return to go back to the main menu.

Table 12: PCB voltages.

Voltage	Display code	Normal range
+12 V	V12	10.5–13 V
VCC	Vcc	4.7–5.3 V
VDD	Vdd	3.0–3.4 V
AVCC	AVc	4.7–5.3 V
AVSS	V5	–5.3 to –4.7 V

Voltage	Display code	Normal range
-12 V	V=	-13 to -10.5 V

Fig. 107: Piezoelectric-sensor test. Fig. 108: Automatic measuring-device test. Fig. 109: Internal-voltage test.

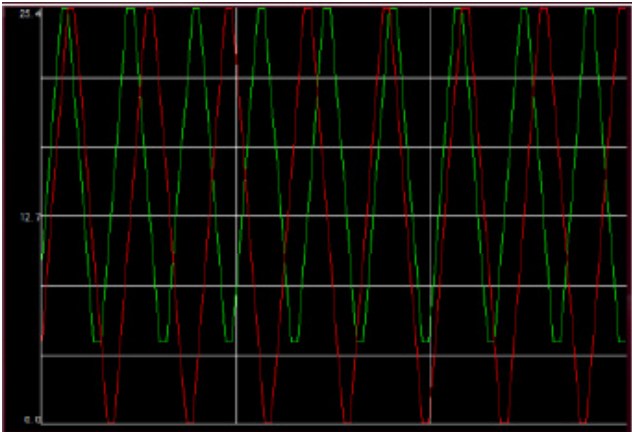


Fig. 107

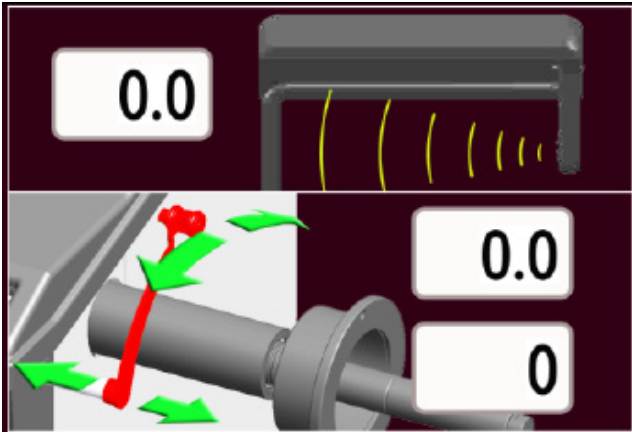


Fig. 108

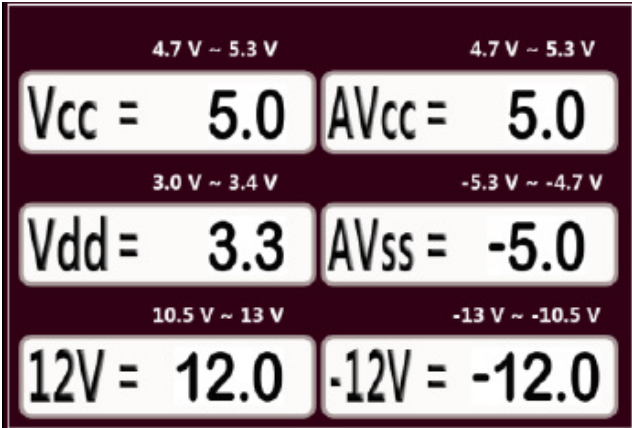


Fig. 109

9 Prompts and troubleshooting

Tables 13 and 14 list common screen prompts and their meanings. The numbers below are the source table's item numbers, not newly assigned error codes.

Table 13.1: Prompts and remedies.

No.	Condition / prompt	Remedy
1	At start-up, the measuring arm has not returned to its zero position.	Return the arm to zero and press F12.
2	With guard protection active, the guard opens during operation and the wheel brakes suddenly.	The current measurement has stopped. Repeat the measurement.
3	With guard protection active, measurement is requested while the guard is still open.	Close the wheel guard.
4	The splitting angle is too large in SPL1.	Repeat the weight-splitting procedure.
5	Wheel speed is too low during measurement.	If this prompt persists and measurement cannot be completed, check the shaft encoder. If it occurs only with small wheels, contact the manufacturer or responsible service provider for a solution.
6	A started measurement has been stopped manually.	The current measurement has stopped. Repeat the measurement.

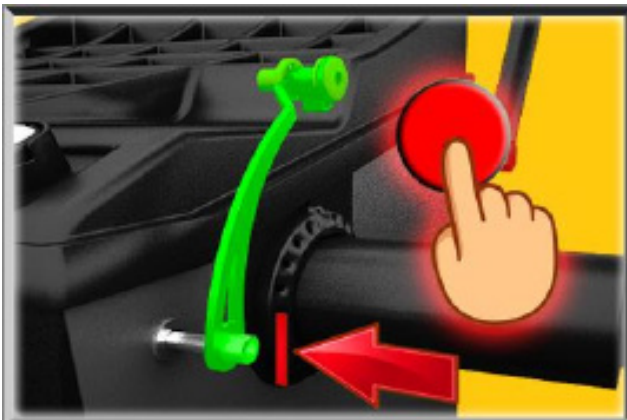


Fig. 13.1 / 1



Fig. 13.1 / 2



Fig. 13.1 / 3



Fig. 13.1 / 4



Fig. 13.1 / 5



Fig. 13.1 / 6

Additional operating and waiting messages

Table 13.2: Additional prompt.

No.	Condition / prompt	Remedy
7	In EALU mode, the machine is ready for adhesive-weight application and a measurement control is pressed to request another measurement.	You may continue applying the weight. If new wheel parameters are required instead, operate the rotary/selection function for parameter entry.

Table 14: Status messages.

No.	Meaning
1	Saving values. Please wait.
2	Measurement in progress. Please wait.
3	Measuring wheel width. Please wait.



Fig. 13.2 / 7



Fig. 14 / 1



Fig. 14 / 2



Fig. 14 / 3

10 Appendix—manual reference version electrical diagram

10.1 Electrical circuit diagrams

10.1.1 Manual reference version—not the supplied CWB 600 AI

Fig. 110 is the electrical circuit diagram for the additional manual-clamping version described in the source. It is included for reference only. The diagram for the pneumatic HAMMER TOOLS CWB 600 AI follows in Fig. 111.

Fig. 110: Electrical circuit diagram, manual reference version.

Diagram-label glossary

Label in the original diagram	Meaning
laser lighting assembly	Laser and work-light assembly
raster	Encoder scale / disc
12" Lazer	12 o'clock laser
6" Lazer	6 o'clock laser
Light	Work light
Piezoelectric Sensor 1	Piezoelectric sensor 1
Piezoelectric Sensor 2	Piezoelectric sensor 2
Sensor Board	Sensor PCB
Auto Ruler	Automatic measuring arm
keyboard plate	Keypad PCB
CPU Board	CPU / main control PCB
Guard Switch	Wheel-guard switch
Ultrasonic ruler	Ultrasonic measuring sensor
VGA Board	VGA PCB
VGA	VGA connection
TFT	TFT display
Motor	Motor
~220–240 V	AC supply indicated in the diagram
L / N / PE	Line / neutral / protective earth

Technical identifiers and connector labels remain unchanged, including C0–C6 and C8–C11, J1, J2, J3, J6, J9, J13, JP1, JP2, J1-10, J2-2, J3-2, J4-10, J1A, J5A, J1K, TC, FS1 1A, FS2 2A, FU 2A, M, T, QS, XS and XP. Refer to the diagram for their connections. This glossary does not change any fuse rating or voltage shown in the source diagram.

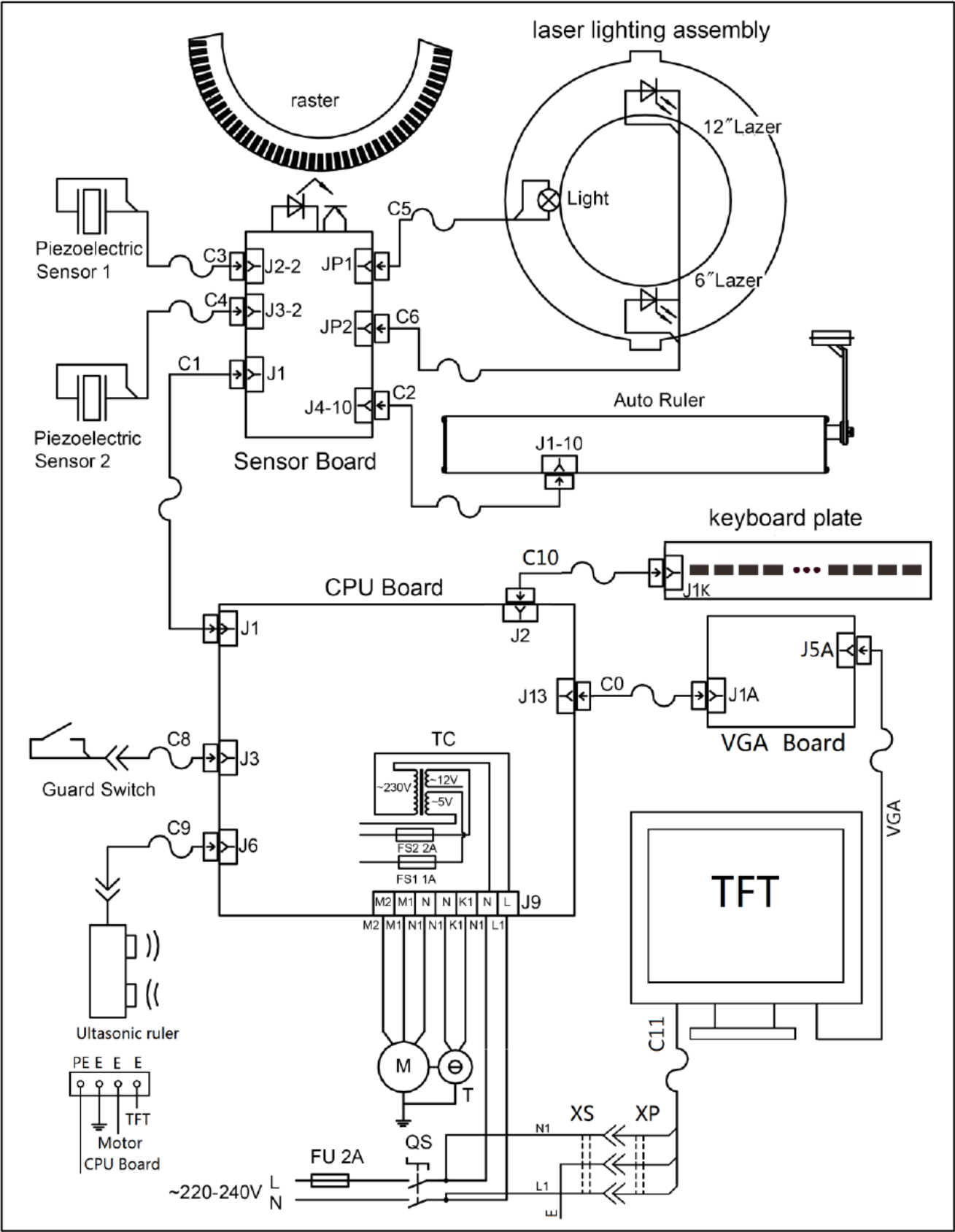


Fig. 110

10.1.2 CWB 600 AI electrical circuit diagram

Fig. 111 shows the electrical circuit diagram for the pneumatic HAMMER TOOLS CWB 600 AI. Compared with the manual reference version, it includes the foot switch and valve control.

Fig. 111: Electrical circuit diagram, CWB 600 AI with pneumatic wheel clamping.

Diagram-label glossary

Label in the original diagram	Meaning
laser lighting assembly	Laser and work-light assembly
raster	Encoder scale / disc
12" Lazer	12 o'clock laser
6" Lazer	6 o'clock laser
Light	Work light
Piezoelectric Sensor 1	Piezoelectric sensor 1
Piezoelectric Sensor 2	Piezoelectric sensor 2
Sensor Board	Sensor PCB
Auto Ruler	Automatic measuring arm
keyboard plate	Keypad PCB
CPU Board	CPU / main control PCB
Foot Switch	Foot switch
Guard Switch	Wheel-guard switch
Ultrasonic ruler	Ultrasonic measuring sensor
VGA Board	VGA PCB
VGA	VGA connection
TFT	TFT display
Motor	Motor
~220–240 V	AC supply indicated in the diagram
L / N / PE	Line / neutral / protective earth

Technical identifiers and connector labels remain unchanged, including C0–C11 and C_VGA, J1, J2, J3, J4, J6, J7, J9, J13, JP1, JP2, J1-10, J2-2, J3-2, J4-10, J1A, J5A, J1K, TC, FS1 1A, FS2 2A, FU 2A, YV, M, T, QS, XS and XP. YV identifies the valve-control circuit in this diagram. Connector and terminal numbers must be read directly from the original diagram. This glossary does not change its fuse ratings or voltage values.

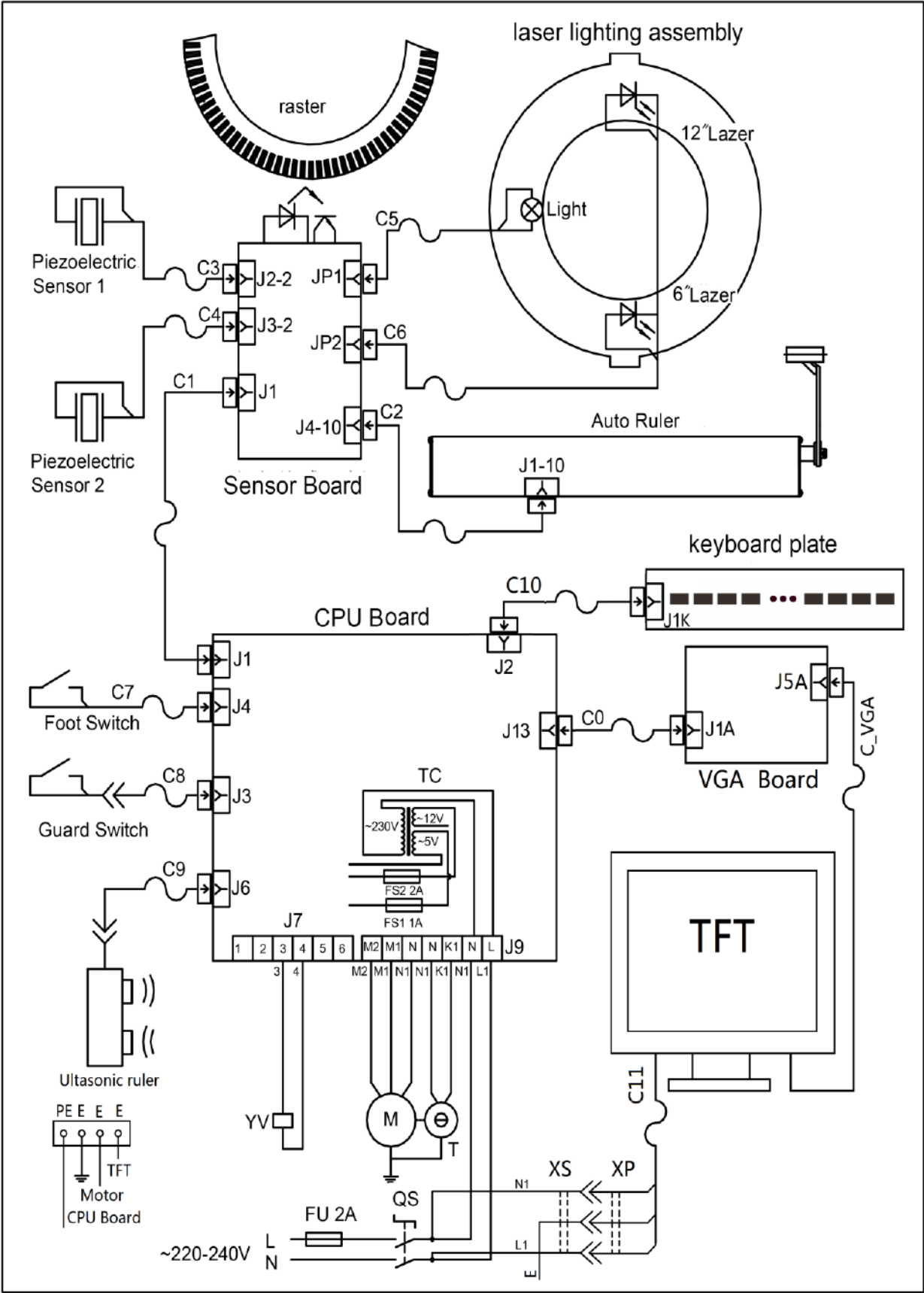


Fig. 111

10.2 Pneumatic circuit diagram

10.2.1 Pneumatic HAMMER TOOLS CWB 600 AI

The diagram shows the pneumatic release mechanism of the CWB 600 AI. The source label “Pneumatic unlock structure” refers to this pneumatic release mechanism.

Fig. 112: Pneumatic circuit diagram, CWB 600 AI.

The component and line identifiers C1, YV, B1, S1, P1, P2, P3 and P4 are retained from the source. Port numbers 1, 2, 3, 4 and 5 also remain unchanged. The diagram shows the cylinder, directional valve, air-treatment assembly and their connections; the identifiers provide the reference within this diagram.

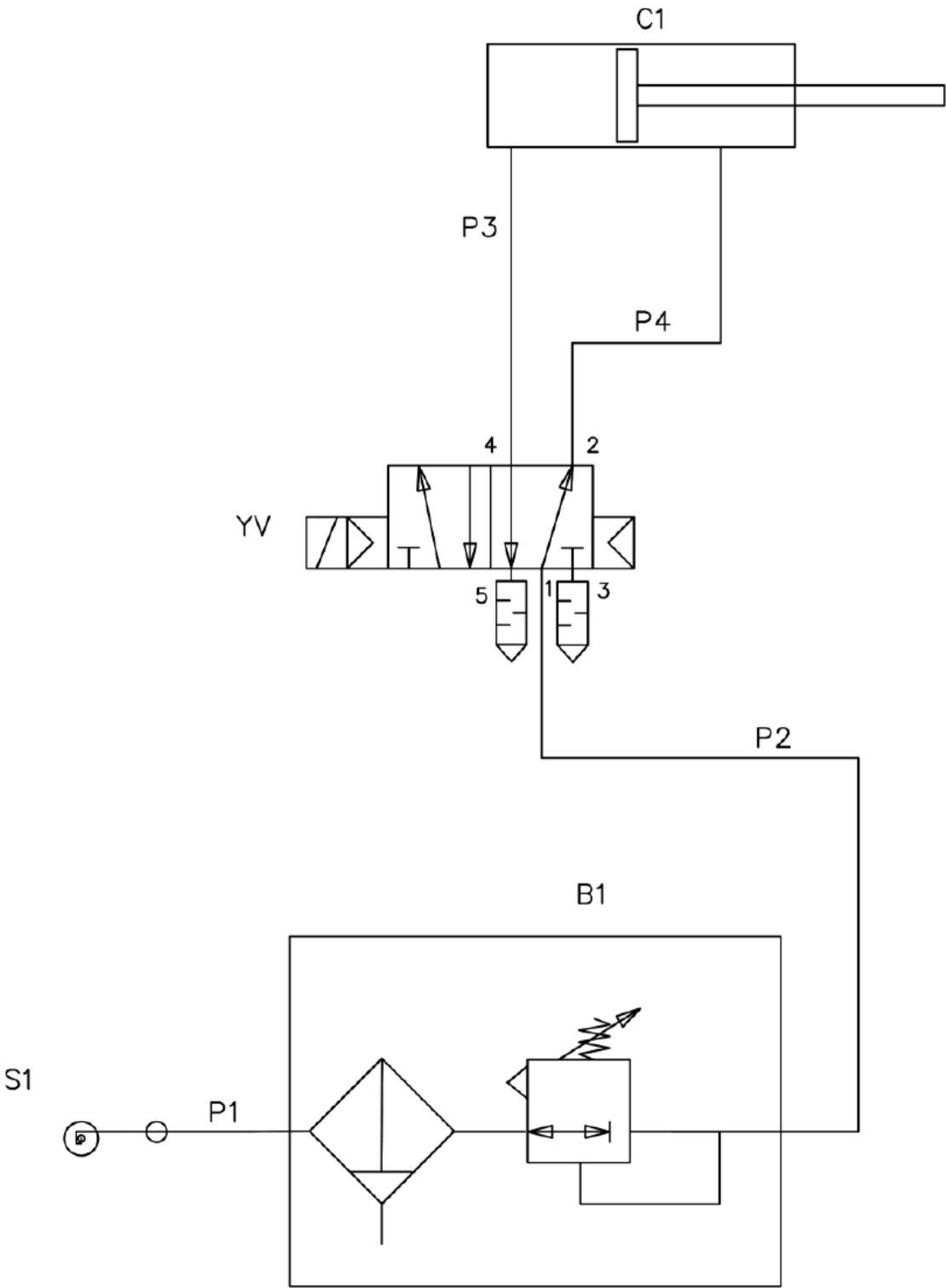


Fig. 112