



WBE 4140



de Originalbetriebsanleitung
Radwuchtmaschine

es Manual original
Máquina de equilibrado de ruedas

nl Oorspronkelijke gebruiksaanwijzing
wielbalanceermachine

cs Původní návod k používání
Stroj pro vyvažování kol

en Original instructions
Wheel Balancing Machine

it Istruzioni originali
Equilibratrice per ruote

pt Manual original
Máquina de balanceamento de rodas

tr Orijinal işletme talimatı
Tekerlek balans makinesi

fr Notice originale
Banc d'équilibrage de roues

sv Bruksanvisning i original
Hjulbalanseringsmaskin

pl Instrukcja oryginalną
Wyważarka

zh 原始的指南
车轮动平衡机

Contents

1. Symbols used	29	8. Program structure	38
1.1 Documentation	29	8.1 Wheel balancing	38
1.2 WBE 4140	29	8.2 Rim data	38
<hr/>		8.3 Settings and service	39
2. User information	30	8.3.1 Calibration	39
2.1 Important notes	30	8.3.2 Settings	39
2.2 Safety instructions	30	8.3.3 User-defined settings	39
2.3 Electromagnetic compatibility (EMC)	30	<hr/>	
<hr/>		9. Wheel balancing	40
3. Product description	30	9.1 Selection of vehicle type and balancing program	40
3.1 Intended use	30	9.2 Entering rim data	40
3.2 Prerequisites	30	9.3 Measuring unbalance	41
3.3 Scope of delivery	30	9.4 Attaching balance weights	41
3.4 Special accessories	30	9.4.1 Splitting balance weights	41
3.5 WBE 4140	31	9.4.2 Without Easyfix®	41
<hr/>		9.4.3 With Easyfix®	41
4. Commissioning	32	9.5 Manual vernier caliper	42
4.1 Unpacking	32	9.5.1 Determining rim width	42
4.2 Setting up	32	9.5.2 Attaching balance weights	42
4.3 Fitting the wheel guard	33	9.6 Gauge arm (accessory)	42
4.4 Fitting the wheel guard	33	<hr/>	
4.5 Electrical connection	34	10. Unbalance minimization	43
4.6 Checking the direction of rotation	34	<hr/>	
4.7 Calibration of WBE 4140	34	11. Faults	44
<hr/>		<hr/>	
5. Fitting and removing the flange	35	12. Maintenance	46
5.1 Removing flange	35	12.1 Cleaning and servicing	46
5.2 Fitting flange	35	12.2 Spare and wearing parts	46
<hr/>		12.3 Calibration	46
6. Fitting and removing the wheel	36	12.3.1 Call-up of calibration menu	46
6.1 Securing the wheel	36	12.3.2 Flange calibration	46
6.2 Removing the wheel	36	12.3.3 Calibration of electronic vernier caliper/gauge arm	47
<hr/>		12.3.4 Calibration of WBE 4140	48
7. Operation	37	12.3.5 Reference measurement	48
7.1 Start page	37	<hr/>	
7.2 Monitor display	37	13. Decommissioning	49
7.2.1 Status bar	37	13.1 Temporary shutdown	49
7.2.2 Display field	37	13.2 Change of location	49
7.2.3 Soft key bar	37	13.3 Disposal and scrapping	49
7.2.4 EXIT key	37	13.3.1 Substances hazardous to water	49
7.3 Control panel	37	13.3.2 WBE 4140 and accessories	49
<hr/>		<hr/>	
		14. Technical data	49
		14.1 WBE 4140	49
		14.2 Dimensions and weights	49
		14.3 Operating range	49

1. Symbols used

1.1 Documentation

Pictograms linked with the key words Danger, Warning and Caution are warnings and always indicate an immediate or potential hazard to the user.



Danger!

Immediate danger that could cause serious personal injury or death.



Warning!

Potentially dangerous situation that could cause serious personal injury or death.



Caution!

Potentially dangerous situation that could cause personal injury or damage to property.

! **Important** – warns of a potentially hazardous situation in which the WBE 4140, the test sample or other object in the vicinity could be damaged.

In addition to these warnings, the following symbols are also used:

i **Info** – Details for the application and further useful information.

➤ **Single-step procedure** – instructions for a procedure that can be completed in just one step.

⇒ **Intermediate result** – an intermediate result is displayed during a procedure.

➔ **Final result** – the final result is displayed at the end of the procedure.

1.2 WBE 4140



Disposal

Old electrical and electronic devices, including cables and accessories or batteries must be disposed of separate to household waste.



Heed all the safety instructions and hazard warnings on the products and make sure these are always complete and clearly legible!



Attention – mains voltage applied

Do not open the WBE 4140 when energized. Do not touch live parts.



Direction of wheel rotation

Wheel must turn in direction indicated. (see chapter 4.6)

2. User information

2.1 Important notes


Important information on copyright, liability and warranty provisions, as well as on equipment users and company obligations, can be found in the separate manual "Important notes on and safety instructions for Bosch Tire Equipment". These instructions must be carefully studied prior to start-up, connection and operation of the WBE 4140 and must always be heeded.

2.2 Safety instructions

All the pertinent safety instructions can be found in the separate manual "Important notes on and safety instructions for Bosch Tire Equipment". These instructions must be carefully studied prior to start-up, connection and operation of the WBE 4140 and must always be heeded.

2.3 Electromagnetic compatibility (EMC)


The WBE 4140 satisfies the requirements of the EMC directive 2004/108/EG.

 The WBE 4140 is a class/category B product as defined by EN 61 326. The WBE 4140 may cause high-frequency household interference (radio interference) so that interference suppression may be necessary. In such cases the user may be required to take the appropriate action.

3. Product description


3.1 Intended use

The WBE 4140 is a wheel balancing machine with mechanical attachment for the balancing of passenger vehicle and motorcycle wheels with a rim diameter of 12" – 22" and a rim width of 1" – 13". The WBE 4140 is to be used exclusively for this purpose and solely for the range of applications specified in these instructions. Any other purpose is not consistent with the intended use and is therefore not permissible.

 The manufacturer cannot accept any liability for possible damage arising from improper use.

3.2 Prerequisites

The WBE 4140 must be installed on a flat surface made of concrete or similar material and anchored in position.

 An uneven or vibrating surface can lead to inaccurate unbalance measurements.

3.3 Scope of delivery

Designation	Order number
WBE 4140	Refer to rating plate
Quick-action clamping nut	1 695 616 200
Centering flange	1 695 602 400
Centering cones (3x) and adapters	
Manual vernier caliper	1 695 629 400
Weight pliers	1 695 606 500
Measuring compasses	1 695 652 870
Calibrating weight	1 695 654 377

3.4 Special accessories

Designation	Order number
Wheel lift	1 695 900 004
Set of quick-action clamping cones M10x1.25	1 695 612 100
Third centering cone dia. 89 to 132 mm	1 695 653 449
Fourth centering cone dia. 120 to 174 mm	1 695 606 300
Spacer ring for rims (large rim offset)	1 695 606 200
Three-arm flange for light commercial vehicles	1 695 653 420
Clamping kit for swinging arms (dia. 19 mm)	1 695 654 060
Infinitely variable universal flange for cars (3-4-5 hole)	1 695 654 043
Motorcycle flange	1 695 654 039
Shaft kit, dia. 10 mm	1 695 653 430
Calibration weight (calibrated)	1 695 654 376
Gauge arm	1 695 655 678

3.5 WBE 4140

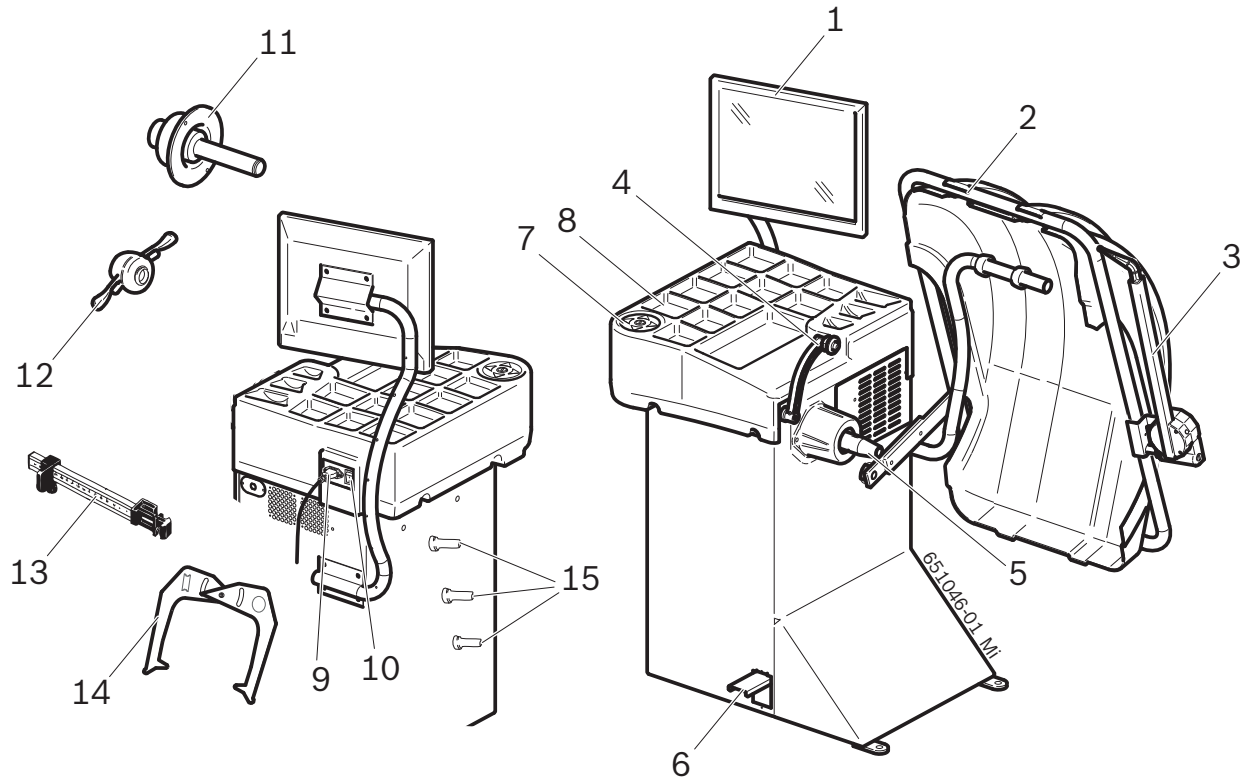



Fig. 1: WBE 4140


Item	Designation	Function/purpose
1	TFT monitor	Software display (measured values and operating instructions)
2	Wheel guard	<ul style="list-style-type: none"> • Protection of operator against flying particles (e. g. dirt, water). • Starting and stopping measurement, refer to Section 8.3.3.
3	Gauge arm (accessory)	Determination of rim width
4	Vernier caliper (electronic)	<ul style="list-style-type: none"> • Recording of rim distance and rim diameter. • Determination of positions for attachment of adhesive weights.
5	Cone of drive shaft	Flange mounting.
6	Pedal	Locking of shaft / wheel.
7	Control panel	Operation of WBE 4140, refer to Section 7.3
8	Tray	For storing balance weights and accessories.
9	Mains socket	Connection for power cord.
10	On/off switch	Switching WBE 4140 on and off.
11	Centering flange	Wheel attachment.
12	Quick-action clamping nut	Centering and attachment of wheel on cone.
13	Manual vernier caliper	Can be used as substitute if the electronic vernier caliper is defective.
14	Measuring compasses	Can be used as substitute if the rim width and rim diameter cannot be recorded electronically.
15	Clamping tool holders	For storing accessories.

4. Commissioning

4.1 Unpacking

1. Remove the steel bands and fasteners.
2. Carefully lift off the packaging.
3. Extract the wheel guard, accessories and packaging material from the packaging unit.

 Check that the WBE 4140 and the accessories are in proper working order and that there are no visible signs of component damage. In case of doubt, do not start up the unit and consult customer service.

 Remove the accessories and packaging material from the packaging unit.

4.2 Setting up

1. Unscrew the screws that secure the WBE 4140 to the pallet.

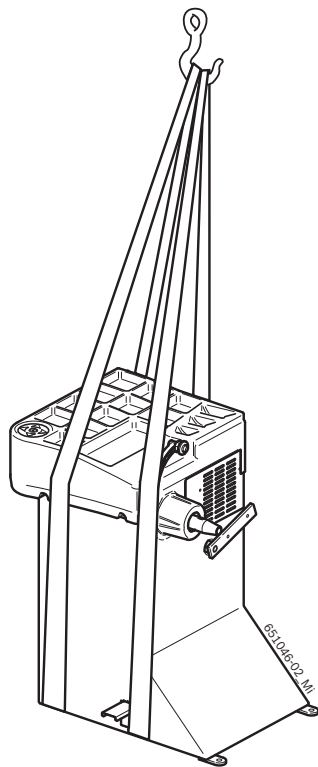


Warning of damages!

The slings can damage the attachments of the WBE 4140.

- Position the slings with care.
- Lift the WBE 4140 carefully.

2. Attach slings of the same length and sufficient load bearing capacity (min. 100 kg) as shown in the drawing.

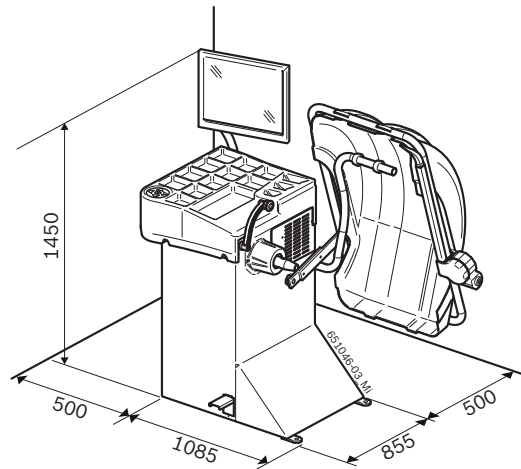



Danger of tilting!

The center of gravity of the WBE 4140 is not in the middle.

- The WBE 4140 must be lifted slowly.

3. Hoist the WBE 4140 with a crane. Erect in the intended area, taking care to comply with the specified minimum distances.



-  To ensure reliable, ergonomic use of the WBE 4140, we advise setting it up at a distance of 500 mm from the nearest wall.




Danger of tilting!


High forces occur during wheel balancing.

- The WBE 4140 must be attached to at least 3 points on the floor.
- Use the screw holes.

4. Secure the WBE 4140 to at least 3 points on the floor.

 Install the machine in an appropriately lit work place, respecting the Standards in force on this subject.

4.3 Fitting the wheel guard

 The back of the WBE 4140 contains 4 blind rivet nuts countersunk in the housing wall.

1. Fasten the supporting arm to the WBE 4140. To do so, screw the 4 supplied Allen screws and 4 washers into the blind rivet nuts and tighten (width A/F 6).

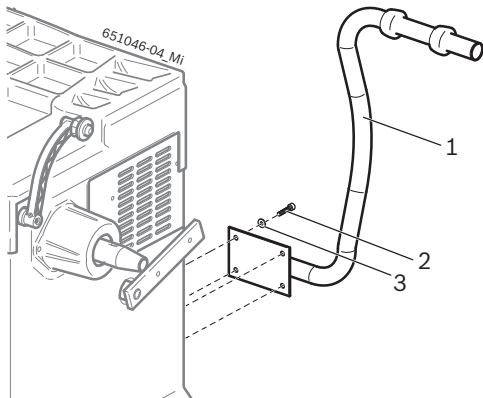



Fig. 2: Fastening the supporting arm to the WBE 4140.

- 1 Supporting arm
- 2 Allen screw
- 3 Washer

2. Screw the wheel guard loosely to the supporting journal with 2 screws and 2 washers (width A/F 6).

 Make sure that the open wheel guard is lying on the supporting arm (rubber buffer).

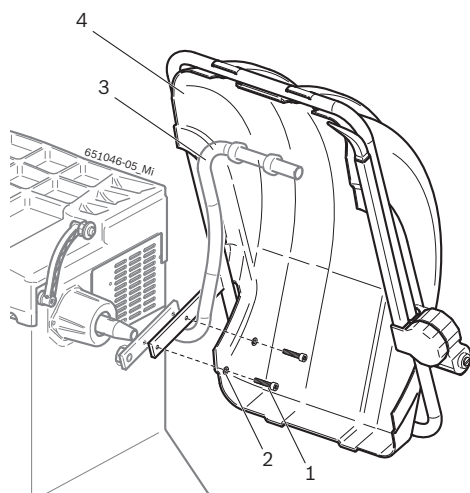



Fig. 3: Securing the wheel guard

- 1 Screw
- 2 Washer
- 3 Supporting arm
- 4 Wheel guard

3. Firmly tighten the screws.

4.4 Fitting the wheel guard

 The back of the WBE 4140 contains 4 blind rivet nuts countersunk in the housing wall.

1. Fasten the supporting arm to the WBE 4140. To do so, screw the 4 supplied Allen screws and 4 washers into the blind rivet nuts and tighten (width A/F 6).

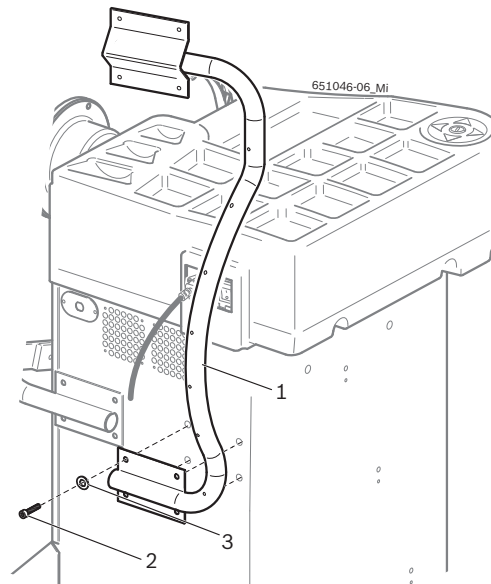


Fig. 4: Fastening the supporting arm to the WBE 4140.

- 1 Supporting arm
- 2 Allen screw
- 3 Washer

2. Attach the monitor to the support arm, tightening the bracket using the 4 screws

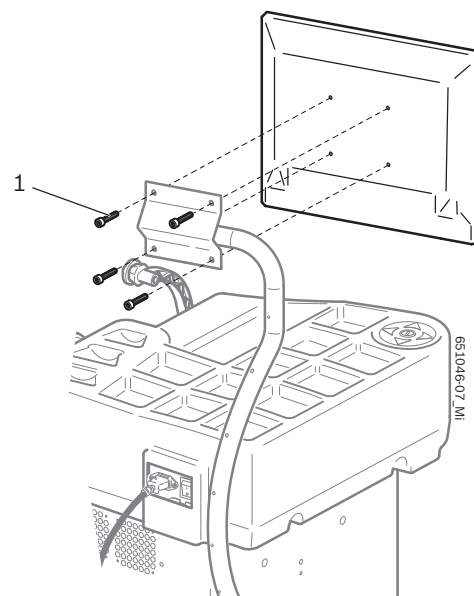


Fig. 5: Fitting monitor

- 1 Allen screw

3. Plug in the monitor power cord (Item 1) at the monitor.
4. Connect the monitor and the WBE 4140 with the VGA connecting cable (Item 2).
5. Fix the two cables to the monitor bracket with the 4 clamps included.

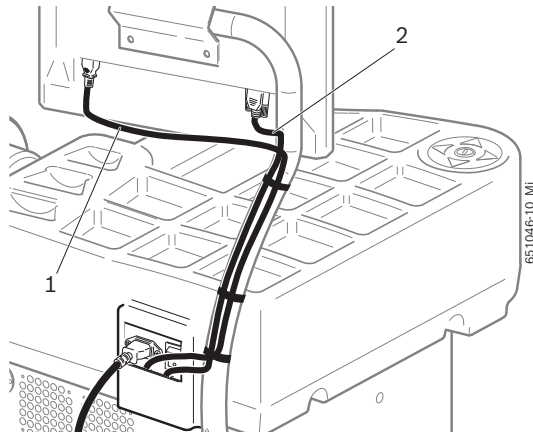


Fig. 6: Monitor attachment
 1 Monitor power cord
 2 Monitor VGA connecting cable

6. Orientate the monitor in the desired position.

4.5 Electrical connection

! The WBE 4140 is only to be connected to the power supply if the mains voltage available corresponds to the rated voltage given on the rating plate.

1. Check whether the mains voltage corresponds to the rated voltage given on the rating plate.
2. Provide fuse protection for the WBE 4140 mains connection in line with locally applicable standards. The customer is responsible for providing fuse protection for the mains connection.
3. Connect the power cord to the WBE 4140.

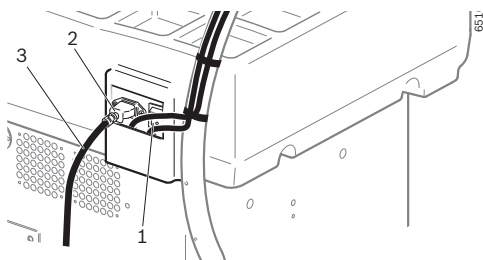


Fig. 7: Electrical connection
 1 On/off switch
 2 Mains connection
 3 Power cord

4.6 Checking the direction of rotation

1. Check that the WBE 4140 is correctly connected to the mains power supply.
2. Switch on the WBE 4140 with the On/Off switch.
3. Close the wheel guard or press the < I > button.
 ⇨ The shaft rotates.
4. Check the direction of rotation of the shaft.

i The correct direction of rotation is indicated by a yellow arrow on the WBE 4140. This arrow is situated to the right of the flange.

i If the direction of rotation is incorrect, the WBE 4140 comes to an immediate stop and displays the error message **Error 3** (see section 11).

4.7 Calibration of WBE 4140

! Calibration must be performed after initial commissioning.

1. Flange calibration.
2. Vernier caliper and gauge arm calibration.
3. WBE 4140 calibration.
4. Perform reference measurement.

i Calibration is described in Section 12.3 .

5. Fitting and removing the flange

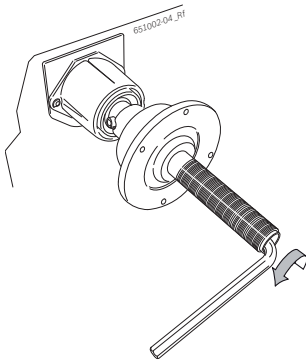
Fitting of the flange is necessary in the following situations:

- Commissioning
- When changing the type of flange (universal - 3/4/5 hole)
- When changing the type of wheel (passenger car - motorcycle)

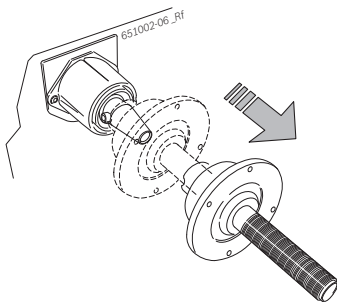
! Balancing accuracy will be impaired if the flange has not been properly fitted to the shaft. Before fitting the flange, clean and degrease (remove corrosion protection) the cone of the shaft and the flange opening.

5.1 Removing flange

1. Press the pedal.
⇒ This blocks the shaft.
2. Slacken off the hexagon socket head bolt.



3. Unfasten the flange by tapping with a rubber-headed hammer on the cone end.
4. Pull the flange off the cone.

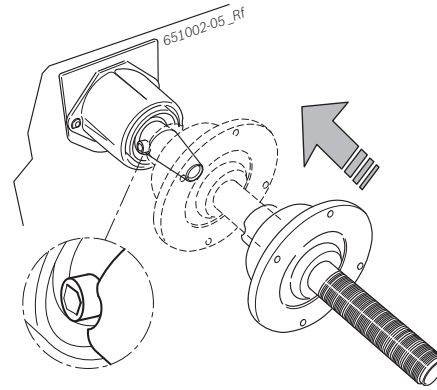


→ Flange detached.

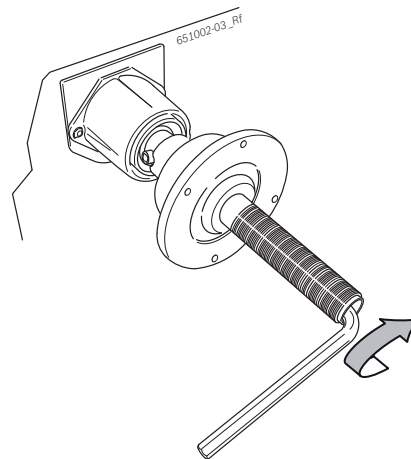
5.2 Fitting flange

i Clean and degrease the cone of the shaft and the flange opening.

1. Press the pedal.
⇒ This blocks the shaft.
2. Slide the flange onto the shaft.



3. Tighten the hexagon socket head bolt.



→ Flange fitted.

6. Fitting and removing the wheel



Risk of trapping!

There is a danger of getting fingers and other body parts trapped while fitting and removing the wheel.

- Wear protective boots and gloves.
- Heavy wheels must always be mounted by two people.
- Do not place fingers between the wheel and the shaft.

6.1 Securing the wheel

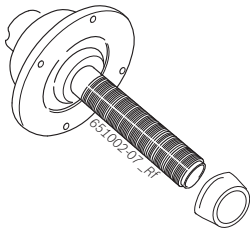


Incorrect or inaccurate measurement results!

An incorrectly or improperly secured wheel adversely affects the accuracy of wheel balancing and therefore the handling of the vehicle.

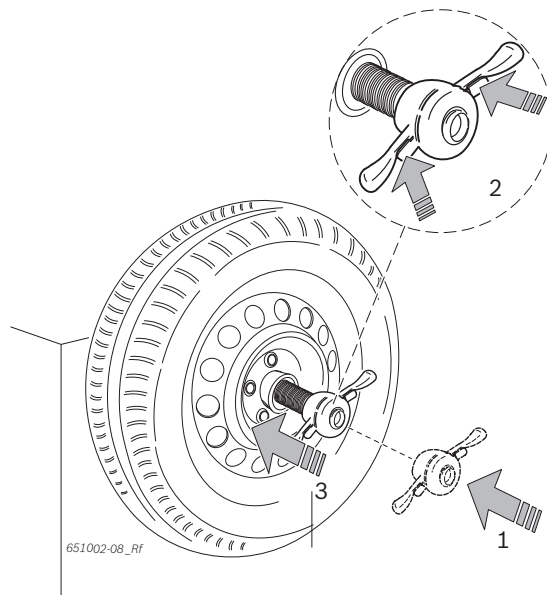
- Use the correct flange.
- Use the specified accessories (cone, spacer rings).
- The rim must make precise contact with the flange. Use a wire brush to remove any dirt.

1. Switch on the WBE 4140 with the On/Off switch.
2. Position a suitable cone on the shaft (flange).

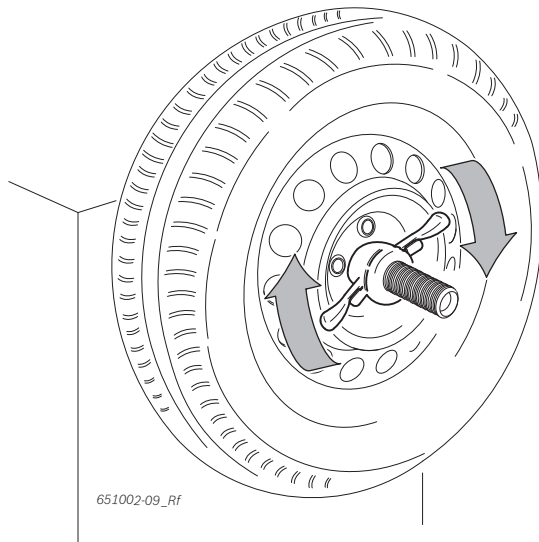


3. Place the wheel on the shaft against the cone.

4. Push the unlocked quick-action clamping nut onto the shaft and press firmly against the wheel.



5. Release the lock and turn the quick-action clamping nut clockwise until the wheel is firmly braced.




→ The wheel is secure.

6.2 Removing the wheel


1. Turn the quick-action clamping nut anti-clockwise and release the wheel.
2. Unlock and take off the quick-action clamping nut.
3. Remove the wheel.

7. Operation



7.1 Start page

 The initialization of the software is displayed approx. 20 seconds after switching on the WBE 4140. The start page is displayed after a further 40 seconds.



 If the image does not appear correctly, carry out self-calibration of the monitor (making reference to the monitor user manual).

The following menus can be selected on the start page:

Symbol	Designation	Access to menu
	Wheel Balancing	Balancing program
	Settings and service	Personal settings, calibration and customer service.

7.2 Monitor display

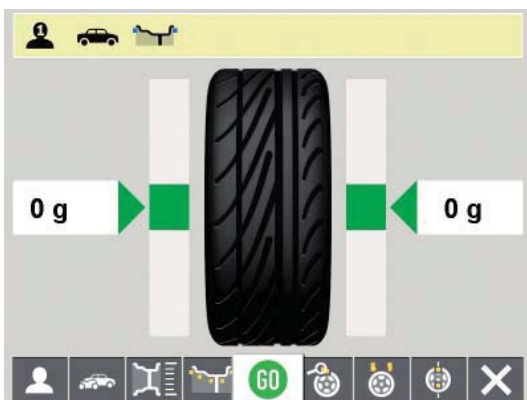


Fig. 8: Balancing main page

- 1 Status bar
- 2 Display field
- 3 Soft key bar

7.2.1 Status bar

The following information is displayed depending on the menu selected:

- Current user.

- Vehicle selected.
- Balancing program selected.
- Number of wheel spokes selected in "Split program".

7.2.2 Display field


The following information is displayed here:

- Rim data and positioning of vernier caliper/gauge arm.
- Information on positioning and mass of the balance weights.


7.2.3 Soft key bar

The soft key bar indicates the functions available in the corresponding menu. The functions are started by pressing the function keys.

7.2.4 EXIT key

Symbol	Description
	Press < I > to return to the previous page.

Pressing this key terminates the menu selected and returns to the previous page.

 Values are only confirmed with < I >.

7.3 Control panel

The WBE 4140 is operated by way of the < I > key and the arrow keys. The corresponding functions are described in Table 1.

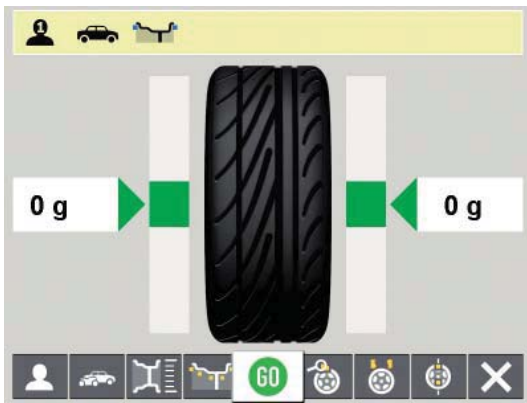











Key	Description
Arrow keys ↑ → ↓ ←	Navigation in the menus and alteration of the rim data values.
< I >	Confirmation of settings. Starts measurement. Ends measurement.

Tab. 1: Control key functions

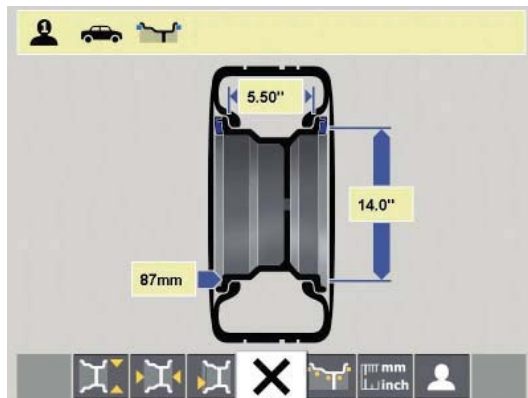
8. Program structure








8.1 Wheel balancing



-  Selection of user 1, 2 or 3. The last settings and rim data selected are assigned to the current user and stored.
-  Selection of type of vehicle (passenger car or motorcycle); the type of vehicle selected is displayed in the status bar.
-  Call-up of the "Enter rim data" menu.
-  Selection of balancing program; 11 passenger car programs, 5 motorcycle programs; the program selected is displayed in the status bar.
-  Starts measurement.
Ends measurement.
-  Display of the exact, non-rounded unbalance measured value.
-  Selection of number of spokes.
The weight can be distributed behind the spokes after measuring the unbalance.
-  Call-up of the "Unbalance minimization" program (refer to Section 10).
-  Press < I > to return to the previous page.






8.2 Rim data







-  Rim diameter input by way of ↑ / ↓ keys
-  Rim width input by way of ↑ / ↓ keys
-  Input of distance between WBE 4140 and rim by way of ↑ / ↓ keys
-  Press < I > to return to the previous page.
-  Selection of balancing program; 11 passenger car programs, 5 motorcycle programs; the program selected is displayed in the status bar.
-  Switching of units (mm / inch)
-  Selection of user 1, 2 or 3. The last settings and rim data selected are assigned to the current user and stored.

8.3 Settings and service







-  Call-up of service menu (customer service only)
-  Call-up of calibration menu
-  Press < I > to return to the previous page.
-  Settings (customer service only)
-  User-defined settings

 The following symbols are used in the selection menus:

-  Automatic transfer (e.g. time)
-  Manual transfer (e.g. via pedal)
-  Function deactivated








8.3.1 Calibration



-  Calibration with "Go" wheel. (Refer to Section 12.3.4).
-  Flange calibration. (Refer to Section 12.3.2).
-  Press < I > to return to the previous page.
-  Vernier caliper and gauge arm calibration. (Refer to Section 12.3.3).









8.3.2 Settings



-  Activates or deactivates the vernier caliper and the gauge arm.
-  Press <OK> to return to the previous page.
-  Positioning of adhesive weight (electronic vernier caliper, manual vernier caliper (3, 6 or 12 o'clock)).
- 
- 
- 
- 

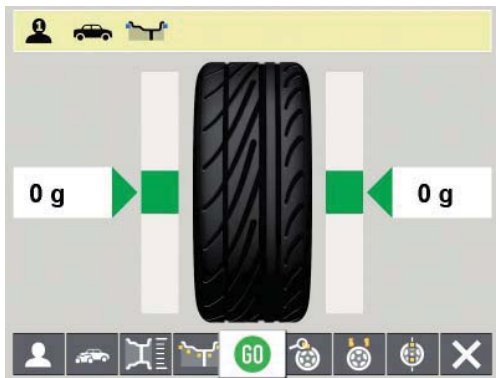
8.3.3 User-defined settings



-  Activates or deactivates the screen saver
-  Activates or deactivates acoustic acknowledgement signal
-  Language selection.
-  Activates or deactivates automatic start (start of measurement by closing wheel guard)
-  Press < I > to return to the previous page.
-  Selection of weight display grams (g) or ounces (oz)
-  Selection of weight resolution 1 g / 0.05 oz or 5 g / 0.25 oz
-  Residual value suppression: Entry of weight value below which the value "0" is to be displayed.

9. Wheel balancing

1. Switch on the WBE 4140 at the on/off switch.
 ⇒ The "Start page" is opened.
2. Open the "wheel balancing main page" with < I >.



9.1 Selection of vehicle type and balancing program

ⓘ Static balancing is recommended for wheels with a width of less than 3.5": In this case only the rim diameter value is entered. The values for distance and width of the rim can be set arbitrarily in inches or mm.

1. Check the currently selected **type of vehicle** (passenger car or motorcycle) in the status bar, alter if necessary and confirm with < I >.
2. Check the currently selected **balancing program** in the status bar, alter if necessary and confirm with < I >.

	Static balancing on plane 3
	Static balancing on plane 2
	Static balancing on plane 1
	Pax2: Pax rim for concealed adhesive weights
	Pax1: Pax rim with adhesive weights
	Alu5: Adhesive weights on inside / clip-on weights on outside
	Alu4: Clip-on weights on inside / adhesive weights on outside*
	Alu3: Clip-on weights on inside / concealed adhesive weights on outside
	Alu2: Concealed adhesive weights
	Alu1: Standard program for adhesive weights*
	Standard program for clip-on weights

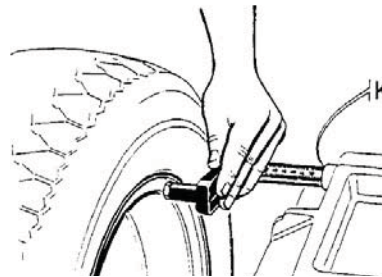
* The weight must be raised slightly if the adhesive weight cannot be attached in the vicinity of the outer edge of the rim (rim flange) on account of the design of the rim.

9.2 Entering rim data

ⓘ If electronic wheel data recording is not possible, the wheel data can also be entered manually.

ⓘ The electronic gauge arm is not required for the balancing programs Alu2, Alu3 and Pax2 (Easyfix®). Both measurement locations are recorded with the vernier caliper.

1. Apply the electronic vernier caliper for rim distance and rim diameter to the rim.



- ⇒ The measurement location is indicated on the monitor in accordance with the balancing program selected.
- ⇒ Storage of the position is confirmed by an acoustic signal and the position data are displayed.

ⓘ The rim width can be read off the rim or determined with the measuring compasses.

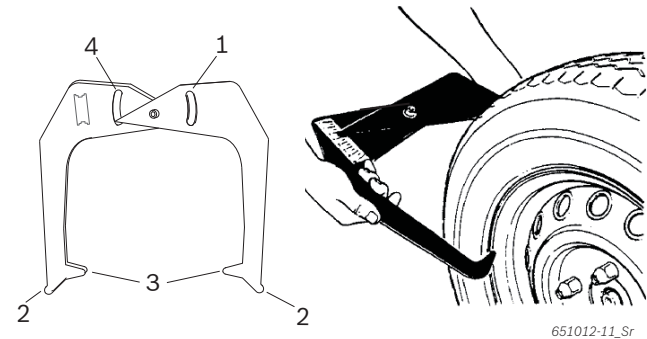




Fig. 9: Determining rim data with measuring compasses

- 1 Rim diameter scale
 - 2 Outer tip for rim diameter
 - 3 Inner tip for rim width
 - 4 Rim width scale
2. Apply the inner tips of the measuring compasses to the rim flange.
 3. Read the value off the rim width scale.
 4. Enter the rim width determined.

9.3 Measuring unbalance


 A wheel can only be correctly balanced if all the settings correspond to the mounted wheel.

 Measurement can be stopped at any time:


- Press the <STOP> key.
- Open the wheel guard.

1. Close the wheel guard.
 - ⇒ The unbalance measurement commences automatically.
 - ⇒ On completion of measurement the values of the balance weights required are shown on the display.
 - On left of display inner balancing plane,
 - on right of display outer balancing plane.
2. Open the wheel guard.

9.4 Attaching balance weights

 If the unbalance measured at the wheel is extremely high (e. g. static unbalance >50 g) it is advisable to perform "**Unbalance minimization**" (refer to Section 10).

9.4.1 Splitting balance weights

 The "**split program**" is called up after measurement if the balance weights have to be attached at a certain position (e.g. behind the spoke or spokes). We recommend attachment using Easyfix®.


1. Select the split program and the number of spokes.




2. Move the required position (e.g. a spoke) to the 12 o'clock position.
 3. Confirm with < I >.
- The split weights and positions are indicated.

9.4.2 Without Easyfix®


1. Turn the wheel by hand.
 - ⇒ As soon as the correct position for attachment of a balance weight has been reached, a green square appears on the monitor.

 Blue squares on either side of the tyre on the monitor indicate the direction in which the wheel has to be turned to move it to the correct position for the next balance weight.


2. Select a balance weight of the required value (next to the green square).
3. Attach the balance weight at the highest vertical position (12 o'clock) of the wheel.

 The position depends on the setting selected for the attachment location (refer to Section 8.3.2)


4. Repeat the procedure for the 2nd balance weight.

 After attaching the balance weights, the unbalance must be measured again for an exact check of the balance.


9.4.3 With Easyfix®

 Only the 3 programs Alu2, Alu3 and Pax2 support the attachment of the adhesive weights with Easyfix®.

1. Turn the wheel by hand.
 - ⇒ As soon as the correct position for attachment of a balance weight has been reached, the wheel is locked in position and a green square appears on the monitor.

 Blue squares on either side of the tyre on the monitor indicate the direction in which the wheel has to be turned to move it to the correct position for the next balance weight.

2. Select an adhesive weight of the required value (next to the green square).
3. Insert the adhesive weight in the vernier caliper.
4. Move the vernier caliper into the rim.
 - ⇒ The attachment location of the adhesive weight is indicated.
 - ⇒ The vernier caliper is locked at this position (the colour of the square changes from yellow to green).
5. Attach the adhesive weights with the aid of the vernier caliper.
6. Repeat the procedure for the 2nd balance weight.

 After attaching the balance weights, the unbalance must be measured again for an exact check of the balance.

9.5 Manual vernier caliper

In the balancing programs Alu2, Alu3 and Pax2 the manual vernier caliper permits determination of the rim width as well as simple positioning and attachment of the adhesive weights.

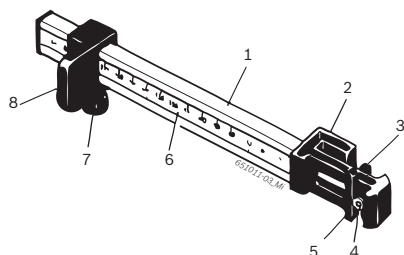
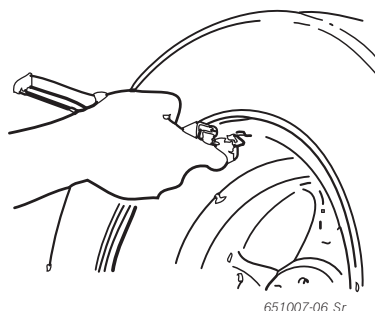


Fig. 10: Manual vernier caliper

- 1 Vernier caliper grip
- 2 Vernier caliper head
- 3 Inner weight pliers
- 4 Ejector
- 5 Outer weight pliers
- 6 Scale
- 7 Knurled screw
- 8 Slider with stop

9.5.1 Determining rim width

1. Position the manual vernier caliper with the slider at the inner rim edge.




2. Move the outer weight pliers to the position at which the balance weights are to be attached.
3. Secure the slider with the knurled screw.
4. Read off the dimension and enter as rim width in "mm".
5. Start measurement "Balancing wheel".
6. Measurement evaluation:
 - ⇒ The value for the adhesive weight to be attached by way of the inner weight pliers (Alu2 and Pax2) or as clip-on weight (Alu3) appears in the left-hand display.
 - ⇒ The value for the adhesive weight to be attached by way of the outer weight pliers appears in the right-hand display.

9.5.2 Attaching balance weights

1. Move the wheel to the corresponding position 12, 3 or 6 o'clock (refer to Section 8.3.2).
2. Insert the adhesive weight required in the outer weight pliers.
3. Position the slider at the edge of the rim.
4. Place the adhesive weight with the ejector at the corresponding position and press on.

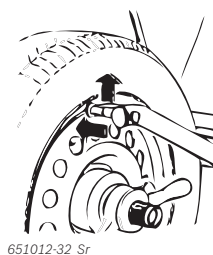


5. Insert the second adhesive weight required in the inner weight pliers.
6. Position the slider at the edge of the rim.
7. Position the adhesive weight with the ejector and press on.

 The clip-on weight is positioned and secured in the balancing program Alu3.

9.6 Gauge arm (accessory)

1. Apply the electronic gauge arm for rim width to the rim.



- ⇒ The measurement location is indicated on the monitor in accordance with the balancing program selected.
 - ⇒ Storage of the position is confirmed by an acoustic signal and the position data are displayed.
- ➔ The individual values have now been read in and are displayed on the monitor.

10. Unbalance minimization

If the unbalance measured at the wheel is extremely high (e.g. static unbalance >50 g) it is advisable to perform "**Unbalance minimization**".

The program permits minimization of the total unbalance by providing compensation for the static unbalance of the tyre by way of that of the rim.



- From the "**wheel balancing main page**" press → → → and < I >.
- ⇒ "**Unbalance minimization**" is opened.

! Work as accurately as possible throughout the entire procedure. Follow the instructions shown on the monitor.

PHASE 1 to PHASE 4:

1. Close the wheel guard.
⇒ Measurement commences.
2. Turn the wheel until the valve is in the 12 o'clock position.
3. Press < I >.
⇒ The reference position of the wheel on initial starting is stored.
4. Make a reference mark on the tyre (corresponding to the position of the valve).
5. Detach the wheel from the flange.
6. Turn the tyre on the rim through 180 degrees.

I The mark previously made provides a guide.

7. Clamp the wheel.
8. Turn the valve to the 12 o'clock position.
9. Press < I >.
⇒ The new position of the wheel on the flange is stored.
10. Close the wheel guard.

➔ Measurement commences.

Values obtained:

- Rim unbalance
- Current unbalance
- Tyre unbalance
- Minimum possible unbalance

I After studying the values, further unbalance minimization is required (PHASE 5 to 7).

PHASE 5 to PHASE 7:

1. Turn the wheel until the arrows on the monitor are centered.
2. Mark the tyre at the 12 o'clock position.
3. Press < I >.
4. Detach the wheel from the flange.
5. Turn the tyre on the rim until the mark coincides with the position of the valve.
6. Clamp the wheel.
7. Turn the valve to the 12 o'clock position.
8. Press < I >.
⇒ The new position of the wheel on the flange is stored.

I To turn the tyre on the rim it may be necessary to deflate the tyre, unseat it again and re-inflate after turning.

9. Close the wheel guard.
⇒ The test run commences.

I If the test run is to be repeated, the monitor displays an appropriate message. In this case, continue again with minimization (PHASE 5 onwards).

➔ On completion of the test run, the unbalance is automatically compared to the minimum residual unbalance value. If the difference between these two values is below the maximum permissible level, the tyre and rim are optimally matched.


10. Press < I >.
⇒ Return to "**main page**".


I If the test run is not properly completed, the entire procedure (as of PHASE 1) must be repeated.

11. Press < I >.

➔ Return to "**main page**".

11. Faults

 Other possible malfunctions are primarily of a technical nature and are to be checked and if necessary rectified by a qualified engineer. Always contact the customer service of your authorized Bosch equipment dealer.

 To enable action to be taken quickly, it is important to inform customer service of the specifications on the rating plate (label on the flange end of the WBE 4140) and the nature of the problem.

Faults	Causes	Remedy
The displays do not light on switch-on	<ol style="list-style-type: none"> 1. Defective fuse or missing phase 2. Damaged fuse in electrical connection 3. Damaged fuse in control/display panel 	<ol style="list-style-type: none"> 1. Check the mains connection. 2. Replace the fuse in the electrical connection. 3. Replace the fuse in the control/display panel. Inform customer service. <p>Caution: Repeated fuse damage is an indication of a malfunction.</p>
1	<ol style="list-style-type: none"> 1. Setting and calibration data lost from PCB memory 2. One or more calibration operations (setting, calibration of electronic vernier caliper/gauge arm) not performed 	Check and correct calibration and settings.
2	Wheel guard raised prior to completion of measurement	Wait for end of measurement before raising wheel guard.
3	<ol style="list-style-type: none"> 1. Backward rotation of wheel on start of measurement 2. Incorrect connection of motor 	<ol style="list-style-type: none"> 1. Check that wheel is stationary on starting and stop it turning backwards on starting. 2. Check proper connection of motor.
4	<ol style="list-style-type: none"> 1. No motor operation, motor does not attain the necessary speed 2. Fault in electrical connection 3. Fault in PCB 	<ol style="list-style-type: none"> 1. Check mains voltage (probably too low). 2. Check electrical connection or power cord. 3. Replace the PCB.
5	<ol style="list-style-type: none"> 1. Balance weight not attached to wheel 2. Measurement sensors not correctly connected 	<ol style="list-style-type: none"> 1. Repeat calibration from the start and attach balance weight as specified by the process. (refer to 12.3). 2. Check the connection of the measurement sensors.
6	<ol style="list-style-type: none"> 1. Wheel guard not lowered 2. Damage to wheel guard safety switch 	<ol style="list-style-type: none"> 1. Lower wheel guard with wheel attached. 2. Replace wheel guard switch.
7	Excessive phase difference between the 2 measurement sensors	<ol style="list-style-type: none"> 1. Check for correct attachment of calibration weight. 2. Check machine connection; WBE 4140 probably not stable and vibrating excessively. 3. Check contact between measurement sensor and PCB. 4. Replace measurement sensor. 5. Replace PCB.
8	Inner measurement sensor not correctly connected, defective or open circuit in wire	<ol style="list-style-type: none"> 1. Check connection of left measurement sensor. 2. Replace measurement sensor.
9	Outer measurement sensor not correctly connected, defective or open circuit in wire	<ol style="list-style-type: none"> 1. Check connection of right measurement sensor. 2. Replace measurement sensor.
10	<ol style="list-style-type: none"> 1. Measurement sensor for position recognition defective 2. No motor operation 	<ol style="list-style-type: none"> 1. Check connection of light barrier PCB. 2. Check that the light barrier PCB is protected against light and provide a cover if necessary. 3. If the fault persists, check and if necessary replace the light barrier PCB. 4. Check the mains connection.
11	<ol style="list-style-type: none"> 1. Measurement sensor for phase recognition defective 2. No motor operation 	<ol style="list-style-type: none"> 1. Check connection of light barrier PCB. 2. Make sure the light barrier PCB is protected against light and provide a cover if necessary. 3. Check and if necessary replace the light barrier PCB. 4. Check the mains connection.
17	Weight outside setting range (weight required for balancing is more than 250 g)	<ol style="list-style-type: none"> 1. Check whether the wheel is correctly attached to the flange. 2. Determine the outer weight position (nevertheless), attach a 100 g weight and start a different measurement.
18	Wheel data not entered	Enter wheel data before performing measurement.
19	Input signal of right measurement sensor lower than that of left sensor	Interchange the connections of the two measurement sensors.

Faults	Causes	Remedy
20	<ol style="list-style-type: none"> 1. Pedal pressed during measurement 2. Irregular rotational speed of motor 3. Wheel speed below minimum value 	<ol style="list-style-type: none"> 1. Do not press pedal whilst motor is in operation. 2. Make sure the WBE 4140 is not subjected to any impact during measurement. 3. Check mains voltage (probably too low).
21	The PCB has detected an excessively high wheel speed with the wheel guard open (shaft rotating at high speed although the machine has not been started): Power supply unit is deactivated	<ol style="list-style-type: none"> 1. Switch off the WBE 4140 . 2. Lower the wheel guard, switch the WBE 4140 on again without moving the wheel. 3. If the error message persists, contact customer service.
22	Irregular measurement sensor signals	<ol style="list-style-type: none"> 1. Check that the light barrier PCB is protected against light and provide a cover if necessary. 2. Check and if necessary replace the light barrier PCB. 3. Check and if necessary replace the display PCB.
29	ATTENTION: One vernier caliper not in rest position.	<ol style="list-style-type: none"> 1. Set vernier caliper to rest position. 2. Repeat calibration of electronic vernier caliper.
30	Gauge arms deactivated.	Perform calibration prior to reactivation.
31	Pedal being pressed. Deactivation takes place.	
32	Pedal has been pressed.	
33	Incorrect operating system	Use a different PCB.

12. Maintenance

12.1 Cleaning and servicing



Before performing cleaning and servicing work, always switch off the WBE 4140 at the on/off switch and unplug the mains connector.



Do not use any solvent-based cleaning agents. Use alcohol or similar cleaning agents for plastic parts.

The following work is essential to ensure proper operation and high performance of the WBE 4140:

Servicing	Weekly
Clean moving mechanical parts, treat with spray oil or kerosene and lubricate with engine oil or a suitable grease.	x

12.2 Spare and wearing parts

The manufacturer cannot accept any liability for damage arising from the use of non-genuine replacement parts.

Designation	Order number
Standard centering flange	1 695 602 400
Quick-action clamping nut	1 695 616 200
Centering cone 42 - 64,5 mm	1 695 632 500
Centering cone 54 - 79,5 mm	1 695 652 862
Centering cone 74 - 111,5 mm	1 695 605 600
Weight pliers	1 695 606 500
Manual vernier caliper	1 695 629 400
Test clip	1 695 652 870
Calibration weight	1 695 654 377
Calibration weight (calibrated)	1 695 654 376
Voltage sticker	1 695 100 789
Direction of wheel rotation sticker	1 695 653 878

Tab. 2: Spare and wearing parts

12.3 Calibration

As part of service and upkeep (every six months), on flange replacement or in the event of measurement inaccuracies, it is advisable to calibrate the WBE 4140 in the following sequence:

1. Flange calibration.
2. Vernier caliper and gauge arm calibration.
3. WBE 4140 calibration.
4. Perform reference measurement.

12.3.1 Call-up of calibration menu

1. Call up the "Settings and service" menu.



2. Enter the password: <=> <=> <↑>.
→ The calibration menu is displayed.



	Calibration with "Go" wheel
	Flange calibration
	Return to main page.
	Vernier caliper and gauge arm calibration

12.3.2 Flange calibration

Follow the instructions shown on the monitor.

1. Fit the flange (refer to Section 5).

Do not clamp the wheel, do not use any clamping tools.

2. Select flange calibration and confirm with < I >.



- ⇒ Calibration is started.
- 3. Close the wheel guard.
- ⇒ Measurement commences.
- Flange calibration completed.
- Unbalance set to "0".

12.3.3 Calibration of electronic vernier caliper/ gauge arm

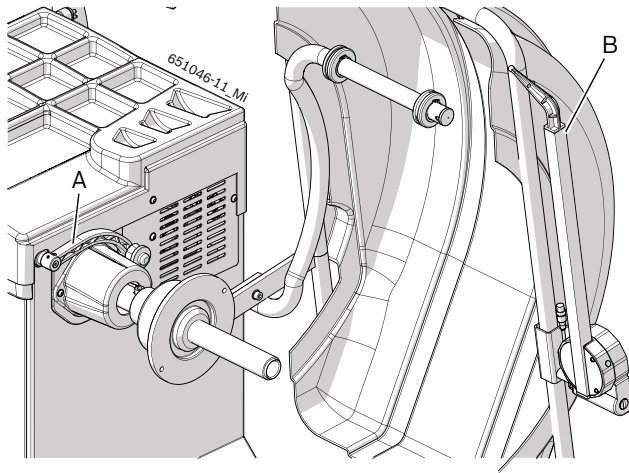
 Follow the instructions shown on the monitor.

1. Select calibration of the slide caliper and of the angular width gauge and confirm using < I >.

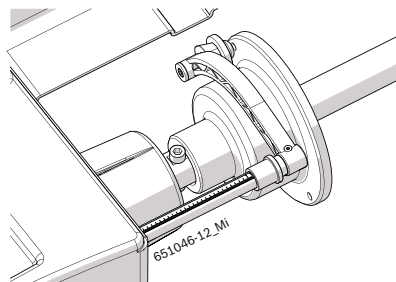


⇒ Calibration begins.

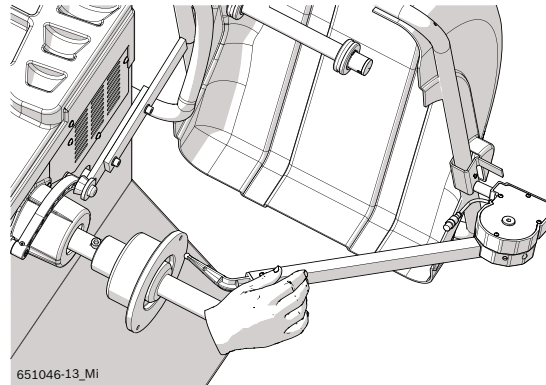
2. Move the slides with distance A and width B to standby position and press < I >.



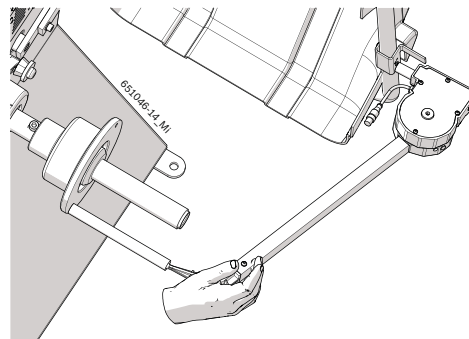
3. Move the reading cursor of distance 0 mm. Set the value read and press < I >.
4. Move the cursor of distance A against the interior of the flange. Measure and set the value read and press < I >.



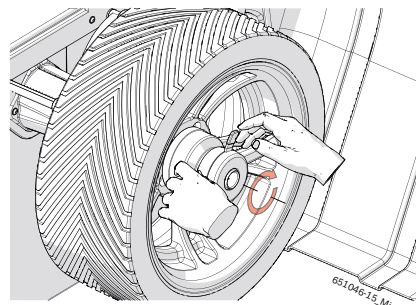
5. Keeping the distance A cursor in standby, move the cursor of width B width against the external part of the flange and press < I >.



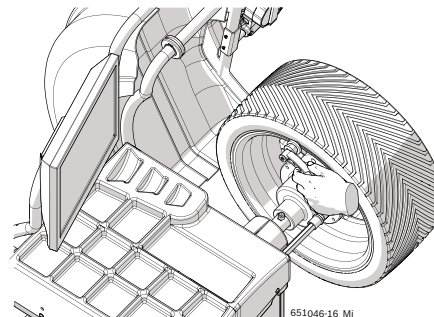
6. Assemble the width calibration pin on the external part of the flange. Move the width cursor against the end of the pin and press < I >.



7. Remove the pin and assemble a 14" or 15" steel sample wheel using the relevant hold-down nut.



8. Set the wheel measurements and, with the distance reading cursor resting on the wheel itself, press < I >.



⇒ Procedure completed.

Calibration of the electronic slide calliper/ angular width gauge without external gauge


1. Select calibration of the slide calliper and the angular width gauge and confirm using < I >.



2. Move the distance cursor to standby position and press < I >.
3. Move the distance reading cursor to 0 mm. Set the value read and press < I >.
4. Move the distance reading cursor to 200 mm. Set the value read and press < I >.
5. Assemble a 14" or 15" steel sample wheel. Set the value read and press < I >.
6. Set the wheel measurements and, with the distance reading cursor resting on the wheel itself, press < I >.

→ Procedure completed.

12.3.4 Calibration of WBE 4140

 Follow the instructions shown on the monitor.


1. Attach a motor vehicle wheel of medium size (e.g. width 5.5", diameter 14") and in very good condition to the flange.
2. Select WBE 4140 calibration and confirm with < I >.




⇒ Calibration is started.


3. Enter the rim data and confirm with < I >.
4. Press < I >.
 - ⇒ Measurement commences.
5. Enter any balance weight between 40 g and 120 g and confirm with < I >.
6. Attach a balance weight of the value entered to the inner side of the wheel.
7. Press < I >.
 - ⇒ Measurement commences.
8. Turn the wheel until the balance weight is in the 12 o'clock position.
9. Remove the balance weight from the inner side of the wheel and attach it to the outer side (12 o'clock).
10. Press < I >.
 - ⇒ Measurement commences.
11. Turn the wheel such that the weight is in the 6 o'clock position.
12. Press < I >.

→ This completes calibration.


 The calibration made is permanently stored automatically.


12.3.5 Reference measurement

 Exact centering of the wheel is a basic prerequisite for this reference measurement and for all balancing operations.

 Sound and automatic start are active in the following description (refer to Section 8.3.3).

1. Attach a motor vehicle wheel of medium size (e. g. width 5.5", diameter 14") and in very good condition to the flange.
2. Enter the wheel data (refer to Section 8.2).
3. Close the wheel guard.
 - ⇒ Measurement commences.
4. Create an artificial unbalance by attaching a test weight of e. g. 60 g to one of the two sides.
5. Close the wheel guard.
 - ⇒ Measurement commences.
 - ⇒ The WBE 4140 must display precisely this unbalance (value and position) on this side. The value indicated for the other side must not exceed 5 g.

 To check the position of the unbalance, turn the wheel until the position recommended for attachment of the balance weights is attained. The test weight attached must be vertically beneath the axis of rotation (6 o'clock position).

 Calibration must be repeated in the following cases:

- Deviation from specified unbalance value (greater than 1 g on test weight side, more than 5 g on other side).
- Deviation from specified unbalance position (test weight not between 5:30 and 6:30 position).

6. Remove the test weight.
7. Release the wheel and turn it through approx. 35°.
8. Re-attach the wheel.
9. Close the wheel guard.
 - ⇒ Measurement commences.

→ On completion of this reference measurement, the display must not exceed a maximum unbalance of 10 g per side (15 g for particularly heavy wheels). This error may be caused by the rim centering tolerances. If this reference measurement indicates greater unbalance, the components used for centering the wheel must be checked for wear, play and contamination.

13. Decommissioning

13.1 Temporary shutdown

In the event of lengthy periods of non-use:

- Unplug the electrical connection.

13.2 Change of location

- If the WBE 4140 is passed on, all the documentation included in the scope of delivery must be handed over together with the unit.
- The WBE 4140 is only ever to be transported in the original or equivalent packaging.
- Unplug the electrical connection.
- Heed the notes on initial commissioning.
- Bolt the WBE 4140 back onto the pallet.

13.3 Disposal and scrapping

13.3.1 Substances hazardous to water

! Oils and greases as well as refuse containing oil and grease (e.g. filters) represent a hazard to water.

1. Substances hazardous to water must not be allowed to enter the sewage system.
2. Substances hazardous to water must be disposed of in accordance with the applicable regulations.

13.3.2 WBE 4140 and accessories

1. Disconnect the WBE 4140 from the mains and detach the power cord.
2. Dismantle the WBE 4140 and sort out and dispose of the different materials in accordance with the applicable regulations.



The WBE 4140 is subject to the European directive 2002/96/EC (WEEE).

Dispose of used electrical and electronic devices, including cables, accessories and batteries, separately from household waste.

- Make use of the local return and collection systems for disposal.
- Proper disposal of the WBE 4140 prevents environmental pollution and possible health hazards.

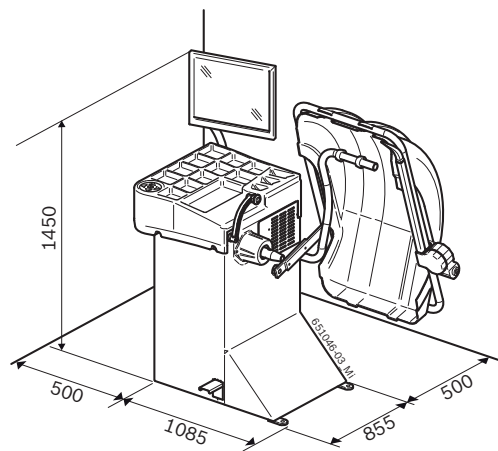
14. Technical data

14.1 WBE 4140

Function	Specification
Balancing speed	210 U/min 50 Hz / 250 U/min 60 Hz
Measurement resolution	1/5 g (0.01/0.25 oz)
Noise level	< 70 dB
Power	0,7 kW
Voltage (depending on version ordered)	115 V 1~ (60 Hz) / 115 V 1~ (50 Hz) / 230 V 1~ (50 Hz) / 230 V 1~ (60 Hz)
Degree of protection	IP 22

14.2 Dimensions and weights

Function	Specification
WBE 4140 (H x W x D) max.	1450 x 1085 x 855 mm
Weight	97 kg



14.3 Operating range

Function	min – max
Rim width	1" – 13"
Rim diameter	12" – 22"
Maximum wheel diameter	820 mm
Maximum wheel weight	60 kg

Sommaire

1. Symboles utilisés	51	8. Structure du programme	60
1.1 Documentation	51	8.1 Equilibrer une roue	60
1.2 WBE 4140	51	8.2 Données de la jante	60
		8.3 Réglages et entretien	61
		8.3.1 Calibrage	61
		8.3.2 Réglages	61
		8.3.3 Réglages personnalisés	61
2. Consignes d'utilisation	52	9. Equilibrer une roue	62
2.1 Remarques importantes	52	9.1 Sélectionner le type de véhicule et le programme d'équilibrage	62
2.2 Consignes de sécurité	52	9.2 Entrer les données de la jante	62
2.3 Compatibilité électromagnétique (CEM)	52	9.3 Mesurer le déséquilibre	63
		9.4 Fixer les masselottes d'équilibrage	63
		9.4.1 Répartir les masselottes d'équilibrage (splitter)	63
		9.4.2 Sans Easyfix®	63
		9.4.3 Avec Easyfix®	63
		9.5 Coulisseau de mesure manuel	64
		9.5.1 Détermination de la largeur de jante	64
		9.5.2 Mise en place des masselottes d'équilibrage	64
		9.6 Bras de mesure (optionnel)	64
3. Description du produit	52	10. Réduire le déséquilibre	65
3.1 Utilisation conforme	52		
3.2 Conditions préalables	52	11. Défauts	66
3.3 Fournitures	52		
3.4 Accessoires spéciaux	52	12. Maintenance	68
3.5 WBE 4140	53	12.1 Nettoyage et entretien	68
		12.2 Pièces de rechange et d'usure	68
		12.3 Calibrage	68
		12.3.1 Appel du menu de calibrage	68
		12.3.2 Calibrer la bride	68
		12.3.3 Calibrage du coulisseau de mesure électronique/jauge largeur angulaire	69
		12.3.4 Calibrage du WBE 4140	70
		12.3.5 Mesure de contrôle	70
4. Première mise en service	54	13. Mise hors service	71
4.1 Déballage	54	13.1 Mise hors service provisoire	71
4.2 Mise en place	54	13.2 Déplacement	71
4.3 Monter le capot de protection	55	13.3 Elimination et mise au rebut	71
4.4 Monter l'écran	55	13.3.1 Substances dangereuses pour les eaux	71
4.5 Raccordement électrique	56	13.3.2 WBE 4140 et accessoires	71
4.6 Contrôler le sens de rotation	56		
4.7 Calibrer le WBE 4140	56	14. Caractéristiques techniques	71
		14.1 WBE 4140	71
		14.2 Dimensions et poids	71
		14.3 Domaine d'application	71
5. Monter et démonter la bride	57		
5.1 Démonter la bride	57		
5.2 Monter la bride	57		
6. Fixer e retirer la roue	58		
6.1 Fixer la roue	58		
6.2 Retirer la roue	58		
7. Utilisation	59		
7.1 Page de démarrage	59		
7.2 Affichage	59		
7.2.1 Barre d'état	59		
7.2.2 Zone d'affichage	59		
7.2.3 Barre de touches programmables	59		
7.2.4 Touche EXIT	59		
7.3 Panneau de commande	59		