Operating manual

Runout Measurement Device

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GEB 001 128

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1 General safety instructions

The runout measurement device must only be used as intended and by respectively qualified and authorised personnel who are familiar with these operating instructions and can work in accordance with these instructions!

Prior to each use of the device, it must be checked for visible damage and it must be ensured that the device is only operated when free from defects! Any defects that are identified have to be reported to a superior immediately!

Warning - laser radiation

This symbol indicates potential danger, primarily to persons. (risk of injury)

Some basic instructions must be followed for all lasers:

- **Never look directly into the beam!**
- Define beam paths precisely!
- Avoid dangerous reflections. Pay particular attention to reflective or shiny surfaces as these can cause reflections.
- Turn off the laser after work is completed!

Laser product
CLASS 2

The lasers used are Class 2 laser products. The laser radiation generated is not hazardous to the eyes for short periods of exposure (up to 0.25 s). If you accidentally look into the laser beam for a short period, the eye will be protected by the blink reflex.

NEVER INTENTIONALLY LOOK INTO THE LASER BEAM!

If you have reason to believe that your eyes have been damaged by the laser beam, seek the advice of an eye specialist immediately.

Further safety instructions for working with lasers can be found in the accident prevention regulations DGUV (German Statutory Accident Insurance Association) Regulation 11 *Laser radiation* (previously BGV B2).

The user is independently responsible for proper operation and compliance with safety regulations. All safety instructions and warnings attached to the device must not be removed and must be legible.

The system must be protected against moisture at all times. This applies in particular during transport and storage. Ensure that the storage location is dry and free from dust and that the storage temperature does not fall below 0° C.

The power supply unit is neither waterproof nor splash-proof and must only be used in dry interior rooms.

2 Product description

Runout Measurement Device RPV1300

Item No. 900 008 246

Subject to technical modifications.

Version 2.0 / 2023

2.1 Intended use

- The **runout measurement device RPV1300** has been developed to allow optimisation of runout of large tractor wheels and other heavy vehicle wheels for agricultural and earthmoving machinery.
- It is exclusively intended for quickly measuring runout of the vehicle rim while simultaneously measuring runout of the vehicle tyre.
- Using the runout measurement device allows determination of the ideal positioning of the tyre on the rim through measuring.
- The wheel to be checked must be clamped well centred on the vehicle (tractor / haulier).
- The wheel for testing must have a clear, countable number of tread lugs and be new or as new.

The operator of the runout measurement device rather than the manufacturer, shall be liable for all personal injury and property damage caused by unintended use!

2.2 Description of the area of application:

Tolerances caused by production often cause deviations in runout of rim and tyre. These deviations can have a negative effect on the runout of the wheel through accumulation of the tolerances, causing a vehicle to vibrate and even “bob” when travelling.

(Vehicle vibrations)

The runout of the individual wheel is also tested and – if necessary – optimised to be able to make a statement about this value. The laser sensors of the runout measurement device RPV1300 measure the rim on both sides, in the area of the hump (tyre seating on the rim) and the tyre over the tread lugs and evaluate these using the program.

The RPV1300 program uses the recorded measurement values to determine the best possible position of the tyre in relation to the rim.

Afterwards, the smallest runout between the two components can be achieved through targeted rotation of the tyre on the rim (matching).

2.3 Technical data

Functions of distance measuring:

Distance for measuring range:	65 – 135 mm
Linearity:	± 0.125% of the measuring range
Operating temperature:	-10 °C - +50 °C

Laser:

Measuring distance:	50 …. 350 mm
Laser class:	2 -> DIN EN 60825-1
Wavelength:	660 nm
Maximum pulse power:	2 mW
Protection rating:	IP 67
Electrical power supply:	Lithium ion battery pack: PA-INB76-C17UL4.2.R001 7.2 V / 3500 mAh

Battery charger:

Input:	100 – 240 Volts
Output:	12 V / 2000 mA / 24 W
Ambient temperature:	0 °C – 40 °C

2.4 PC system requirements for RPV1300

Required operating system: Windows 7, 8.1, 10, 11

Minimum hardware requirements:

Processor: Pentium IV – AMD Athlon 1 GHz
RAM: 2 GB
100 MB available hard disk space
Graphics: 1024 x 768 pixel resolution / high colour
Bluetooth: Classic Standard V2.0
CD-ROM drive or USB port (for software installation)

Recommended:

Processor: Intel or AMD with 1.6 Ghz or better
RAM: 4 GB
Graphic card with 16 MB AMD (ATI) or NVIDIA chipset or better
1280 x 1024 pixel resolution / True Colour
Bluetooth: Version 4.0 or higher
USB port (for software installation)
Printer
Sound card

3 Equipment

3.1 Parts list for standard version RPV1300

2 laser sensors including telescopic tube
Item No. 900e008 334

1 laser sensor including support tube
Item No. 900e008 434

3 tripods
Item No. 900e008 340

2 tripod heads incl. tube
Item No. 900e008 332

3 power supply units
Item No. DU0000-00169

1 USB stick
Program RPV 1300
Item No. 900 008 247

1 operating manual
(English)
Item No. GEB 001 128

1 transport case
Item No. 900e008 336

4 Commissioning

The following tasks are required for first use of the runout measurement device:

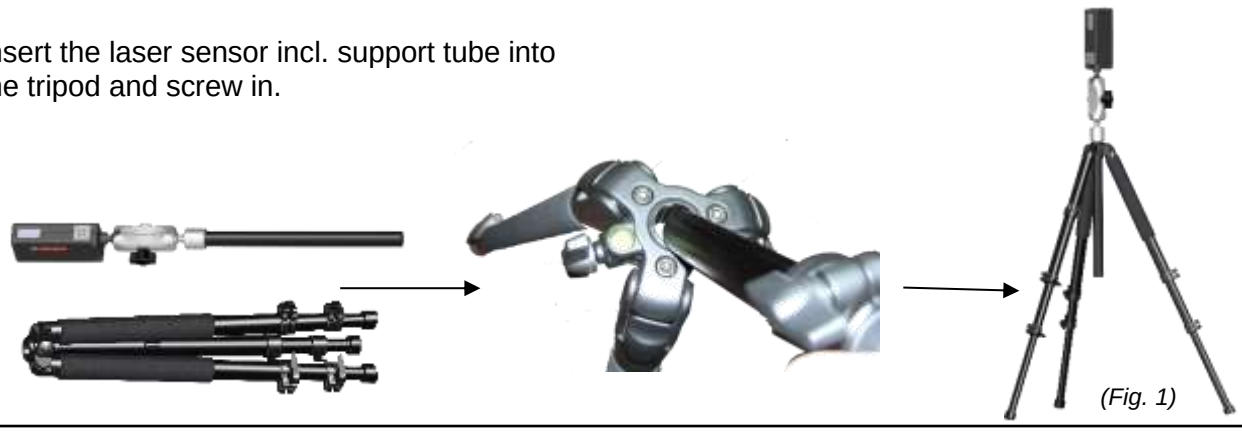
1. Mounting the laser tripods
2. Installing the software in Windows
3. Configuring laser sensors in Windows.

4.1 Mounting the laser tripods

1 tripod for tyre measurement:

Laser sensor incl. support tube with tripod. *(Fig. 1)*

Insert the laser sensor incl. support tube into the tripod and screw in.



(Fig. 1)

2 tripods for rim measurement

Laser sensor incl. telescopic tube with tripod.*(Fig. 3)*

(Fig. 2)

Engage the laser sensor including the telescopic tube into the snap-in fixture on the tripod head.

(Fig. 3)

4.2 Installing the software in Windows

(Fig. 4)

- Close all applications on the computer.
- Start the installation file from the USB stick ***rpv1300setup_1.05.000.exe***
- Confirm the Windows security warning if necessary and click **Run.**
- Read the licence agreement and follow the instructions of the installation wizard. *(Fig. 5)*

(Fig. 5)

Once installation is complete, the RPV icon is added to the desktop. *(Fig. 6)*.

- Following installation, take the USB stick out of the PC.

(Fig. 6)

4.3 The laser sensors

- Switch on all laser sensors with the On/Off button.

The LED permanently lights up red. *(Fig. 7)*

In the further course of measurement preparation, the LED and the laser point can communicate the correct distance to the wheel through flashing at different speeds.
Also see: *Item 7.3 , page 24*

(Fig. 7)

The laser sensors remain switched on as long as the RPV1300 program is running and there is a Bluetooth connection to the PC.

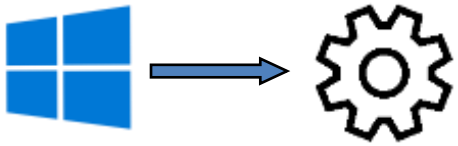
They switch off automatically after approx. 10 minutes when the Bluetooth connection or the RPV1300 program is closed.

The laser sensors can be switched off manually by pressing the On/Off button for approx. 3 seconds.

The service life of the laser sensors with full battery is more than 8 hours.
It is recommended to recharge the battery after one full day in use.

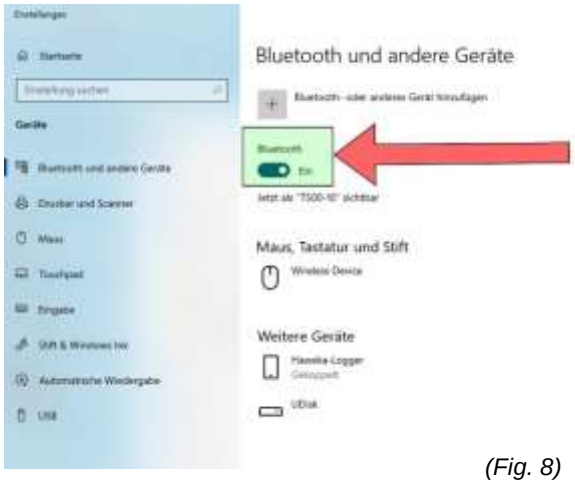
4.4 Registering the laser sensors in Windows via Bluetooth

All laser sensors are switched on.



- Select "***Settings***" under Windows / Start.

- Select category "***Devices***" and click on item "***Bluetooth and devices***".



(Fig. 8)

- Make sure that the Bluetooth function is switched on! *(Fig. 8).*

- Click on "***Add Bluetooth device***"

- In the dialog box "***Add devices***", click on "***Bluetooth***", and all detected laser sensors are displayed *(Fig.9)*.

(Fig. 9)

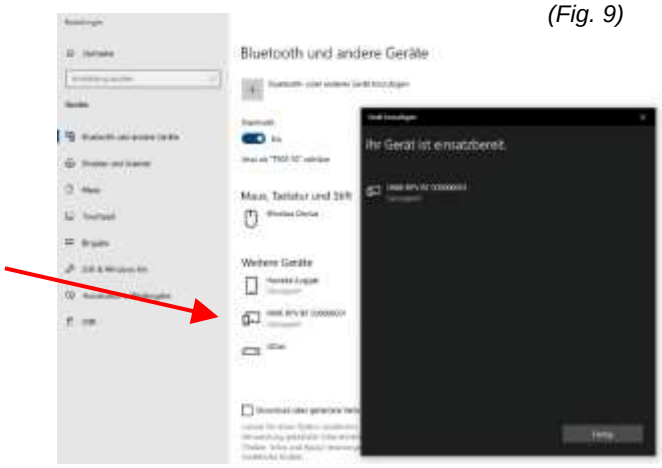
- Select the first laser sensor and wait until Windows has added the device

- Confirm the process with "**Finished**"

- Repeat this process for all other laser sensors.

Every measuring head must be individually coupled in Windows!

If a laser sensor is properly coupled, it is displayed in the device list of Windows *(Fig.10)*.



(Fig. 10)

If the laser sensors are coupled with a different PC at a later stage, they are no longer connected to the initial PC and must first be removed from the device list if the initial PC is being reused, and then added again in Windows!

5 The program RPV1300

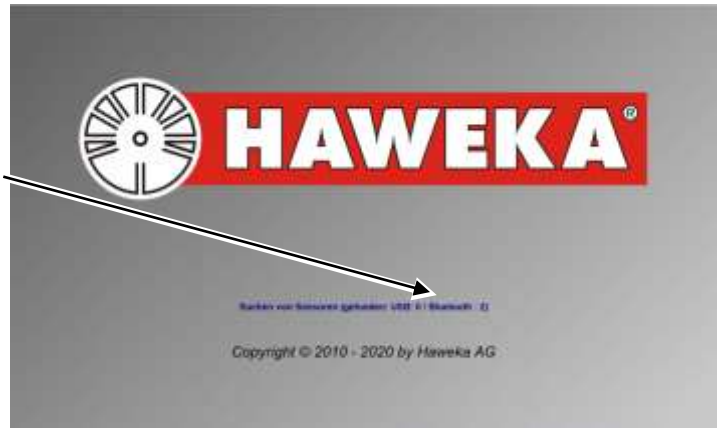
With this program, you can determine the rim and tyre geometry of a tractor wheel (or comparable wheel with rough lug profile).

However, before you start measuring for the first time, you must adjust the most important program parameters for individual use.

5.1 Setting up the software

- Start the program.
  by doubleclicking on the RPV1300 icon.

During program start, the number of found Bluetooth sensors is briefly shown *(Fig.11)*.



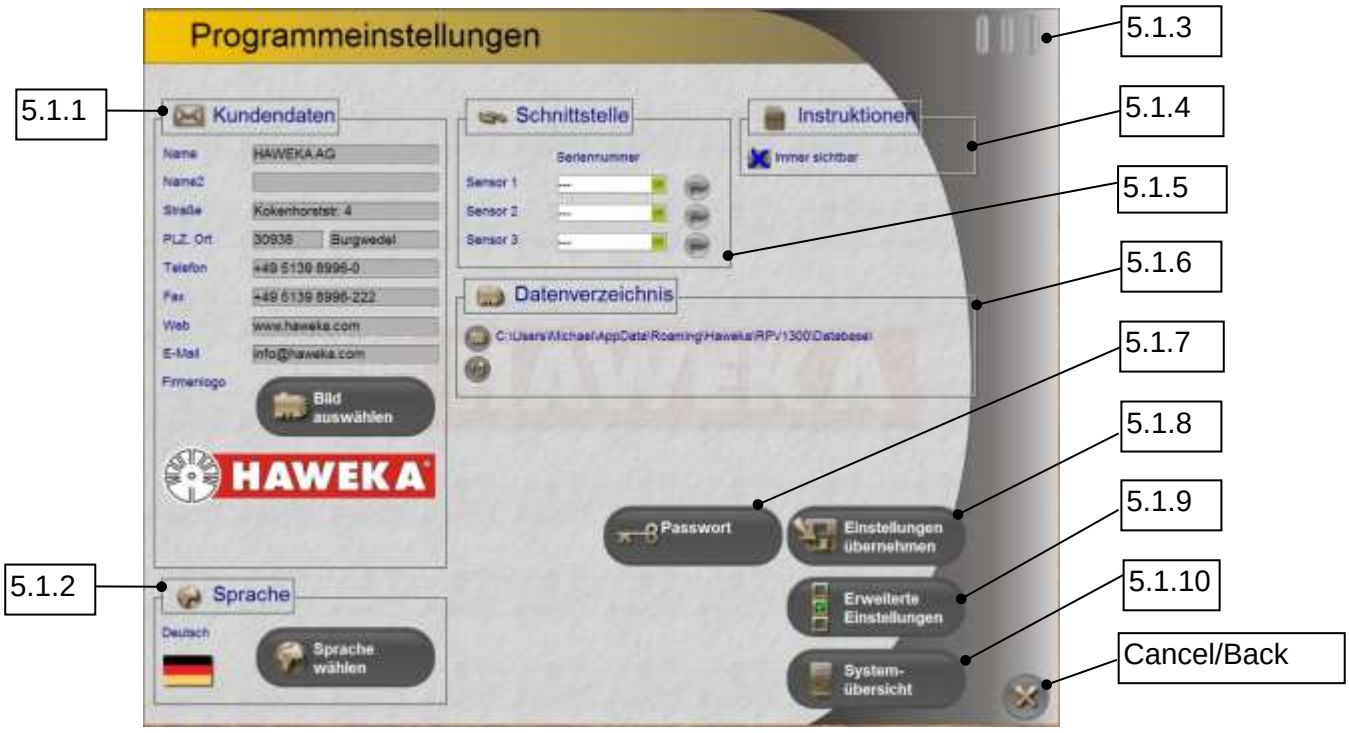
(Fig. 11)

For the first basic setting, the option "***Settings***" must be selected on the start page *(Fig. 12)*.

(Fig. 12)

The **"*Start measurement*"** button only becomes active when at least 2 laser sensors are connected to the PC.

Overview of the program settings



(Fig. 13)

5.1.1 Customer data:

Enter your company information here so that it can be included and later printed on the measurement log. *(Fig. 13)*

Select image button:
A company logo can be stored to also be displayed on the log. Supported file types: BMP, JPG, GIF, PNG.

The image size is scaled. Image files that are too small are enlarged, reducing their quality. The smallest format selected should be around 400 x 200 pixels at 72 dpi.

5.1.2 Language:

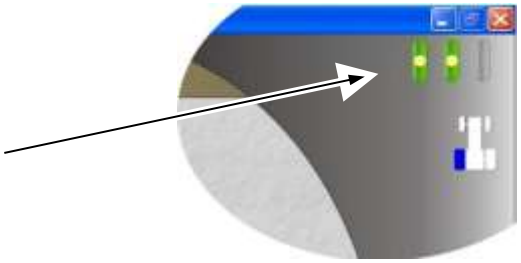
Use the ***Select language*** button to select the language for the menu navigation and all instructions. *(Fig. 14)*

(Fig. 14)

Each input or change of settings must be saved before closing the program setting!

5.1.3 Laser symbol information:

During the entire program execution, the connection to the laser sensors and the measurement processes is continuously checked and displayed at the top right. *(Fig. 15)*



(Fig. 15)

Description of symbols:

Display is grey. The laser sensor is not connected to the system. Unknown state. *(Fig. 16)*

(Fig. 16)

The display flashes yellow and red alternately. The program is attempting to establish a connection with the lasers. *(Fig. 17)*

(Fig. 17)

Display is green. Connection to laser established. *(Fig. 18)*

(Fig. 18)

Display is green with a red centre: The connection is established but no measuring points were found, or flashing during setup of laser sensor. *(Fig. 19)*

(Fig. 19)

Display is green with a yellow centre: Connection is established and wheel was detected. Ready to for measurement recording *(Fig. 20)*

(Fig. 20)

Display is red. Error of measurement recording. *(Fig. 21)*

(Fig. 21)

5.1.4 Instructions

Specifying the default for displaying/hiding operating instructions during measurements. *(Fig. 22)*

(Fig. 22)

The instructions window can be displayed/hidden at any point in the program. Click on the ***Instructions*** button on the respective program page.

5.1.5 Interface for laser sensor:

The program can record up to three laser sensors.

If a laser sensor was detected by the program, the associated serial number is shown *(Fig. 23)*.

(Fig. 23)

By clicking on the round button behind the series number, a quick test of the laser sensors can be performed, and the serial number can be assigned to the respective laser sensor.

Description of symbols:

Button is green:
Laser sensor was connected and detected.

Button is grey:
No laser sensor detected.

Button is red:
Flash test: The laser point and the On / Off button on the laser sensor are flashing.

For correct measuring operation, all buttons must light up in green!

5.1.6 Data directory

All measurements are stored in a log file in a preset storage location, and can later be requested again: *(Fig. 24)*

(Fig. 24)

To change the file location, click on "***Folder***":

To restore the default path, click on the "***Back***" button:
The default path is:
C:\Users\Name\AppData\Roaming\Haweka\RPV1300\Database

5.1.7 Password

This function is used only by our service personnel to carry out any system diagnostics required. *(Fig. 25)*

(Fig. 25)

5.1.8 Saving program settings

Before closing the settings page, all settings must be confirmed with the ***Apply settings*** button. *(Fig. 26)*.

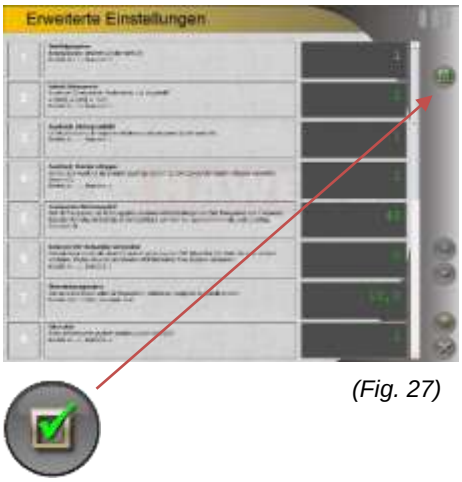
(Fig. 26)

5.1.9 Advanced settings

The user has the option here of personalising the program.

To customise settings, select the applicable parameter in the table and change the value.

The modified entries must be confirmed by clicking the "***Accept values***" *button (Fig. 27)*.



(Fig. 27)

5.1.10 System overview

The system overview provides a list of the components used, the PC, the sensor and the program versions. This information is used by the service engineer to gain an overview of the system in case of malfunction. *(Fig. 28)*

(Fig. 28)

6 Preparing for measurement recording

Different preconditions have to be met on the vehicle wheel for correct measurement.

- **Drive the tyre for approx. 15 min. to warm it up and prevent flat spots**
- **Check that the vehicle has rims and tyres of the same size**
- **Check that the tyre pressure is correct**
- **Remove any dirt from wheel and tyre and clean these**
- **Check wheel for sufficient tread depth (tread lugs have to be clearly visible)**

6.1 Preparatory measures

6.1.1 Jacking up the car

- Secure vehicle against rolling away.
- Lift the vehicle at the axle to be measured using a suitable lifting device until the wheel can be rotated freely *(Fig. 29).*

(Fig. 29)

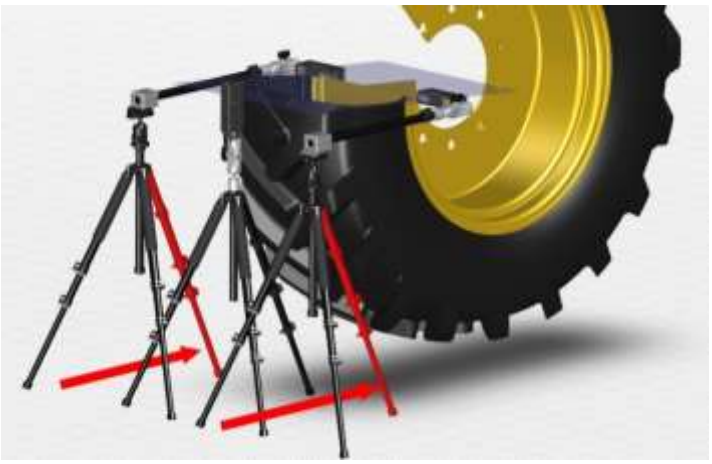
(Fig. 30)

- Prevent vehicle from inadvertent lowering. (e.g. with support stands)

6.1.2 Setup of measuring device on vehicle wheel for **radial runout measurement**

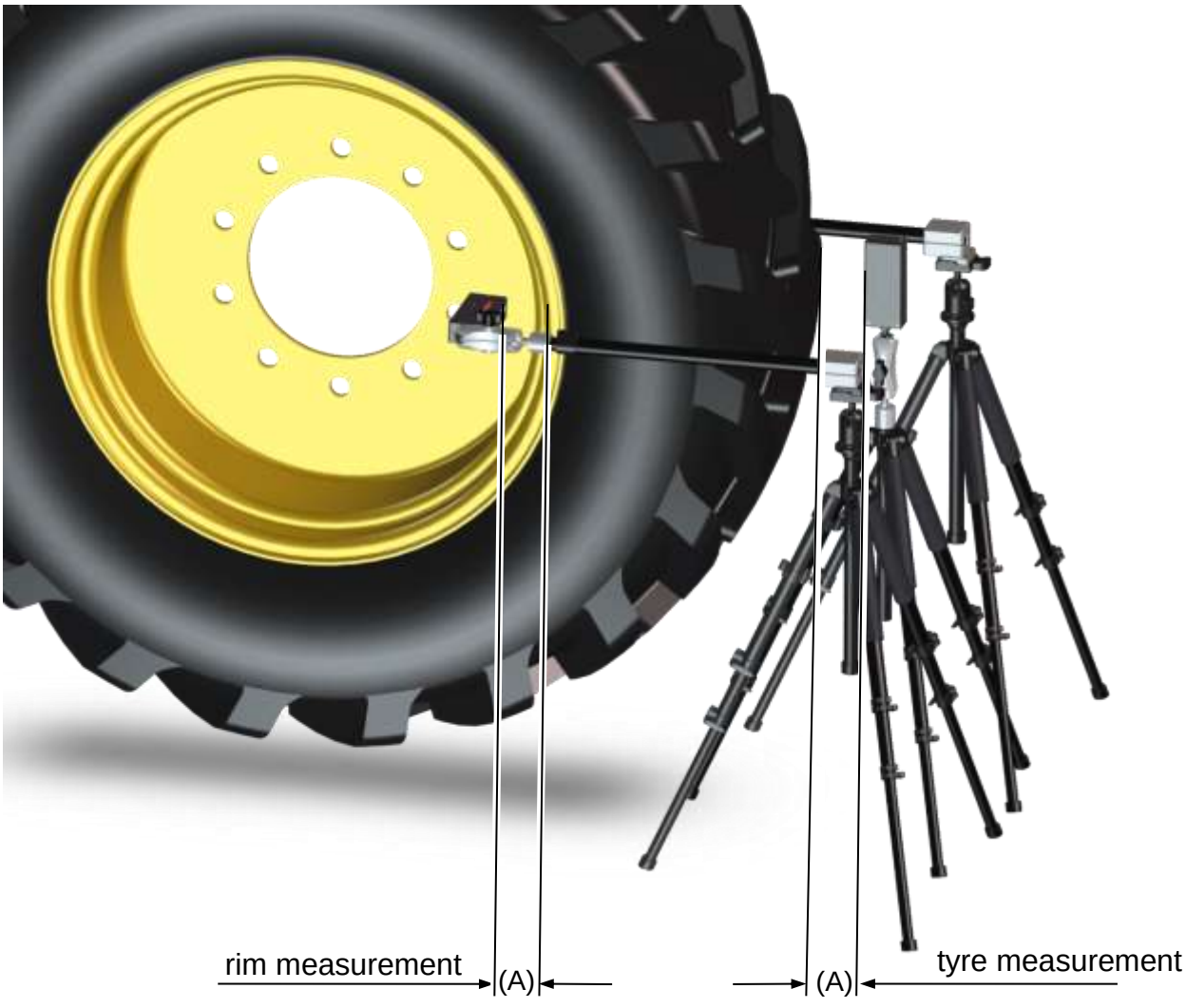
Laser sensors for the rim

When setting up the tripods to the left and right of the vehicle wheel, make sure that these tripods are set up with one leg towards the wheel, as otherwise there is a risk of tipping *(Fig. 31)*.



(Fig. 31)

The positions of the laser sensors on the wheel are determined to create a **distance** (**A**) between sensor and measuring point in the range of **65 - 135 mm**. *(Fig. 32)*
During tyre measurement, the distance (A) is measured from the surface of the lug to the sensor.



(Fig. 32)

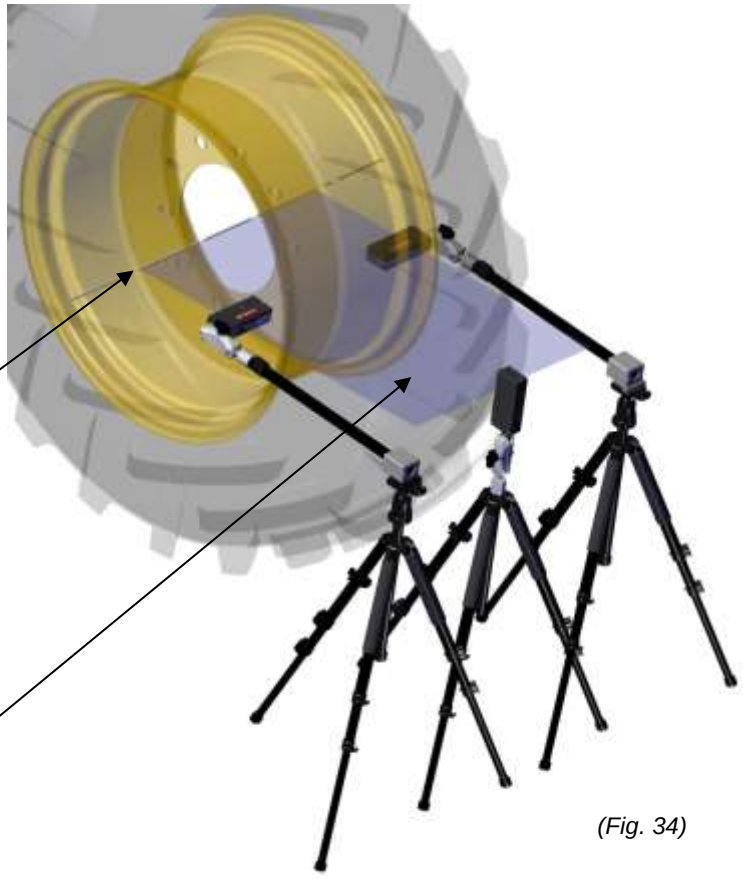
Laser sensor for tyre

The laser sensor is placed away from the centre (to the left or right) of the tread so that the laser point only detects the lugs on one side of the tyre. *(Fig. 33)*

(Fig. 33)

For specific tyre treads, it may be the case that the laser must detect the lugs on both sides. In this case, twice the number of lugs must be entered for measurement.

When setting up the laser sensors, ensure that all laser sensors are aligned on a level passing through the vehicle axle.



The measuring points must be on one level with a tolerance of ±1 cm
(Fig. 34)

(Fig. 34)

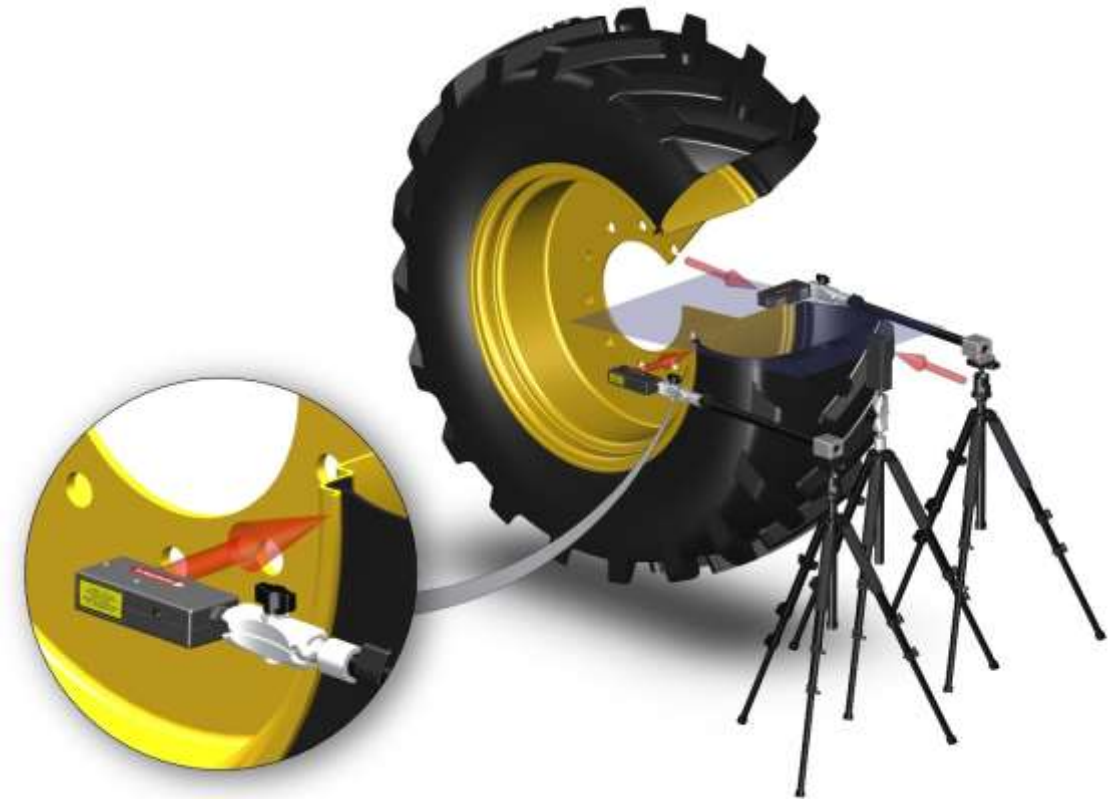
6.1.3 Setting up the measuring device on the vehicle wheel for **axial runout measurement**

For axial runout measurement, the laser sensor, which is positioned on the outside of the vehicle wheel, must be aligned with the rim flange.

(Fig. 35)

(Fig. 36)

- The laser sensor must be rotated by 90 degrees for this purpose, and the tripod or telescopic arm moved accordingly *(Fig. 35+36)*, so that the laser point is still in the measuring level and pointing to the rim flange. *(Fig. 37)*



(Fig. 37)

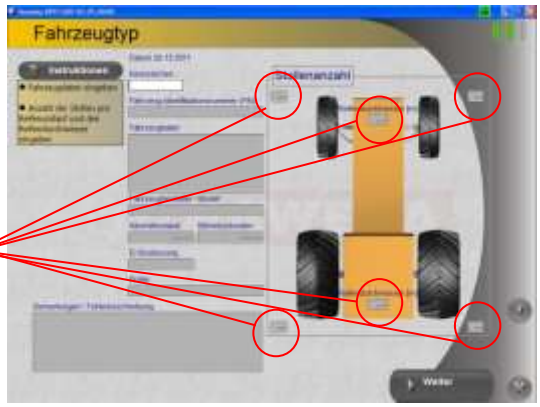
7 Measurement recording

7.1 Entering vehicle, wheel and rim data in the program

The laser sensors are connected to the PC and the program *rpv1300* has been started and is on the start page.

- Click on "***Start measurement***".
- Enter vehicle data.

Entering the correct wheel geometry with number of tread lugs and wheel diameter is mandatory for evaluation *(Fig. 38)*.



(Fig. 38)

The number of tread lugs can be entered for each wheel, but must only be entered once per axle.

The registration must also be entered. All other entries on the left side are optional.

By pressing the ***Continue*** button, the program opens the next page. *(Fig. 39)*

- Select front or rear axle on the model on the right.
- Enter tyre and rim information in the corresponding fields.

(Fig. 39)

(Fig. 40)

<u>Information about centring</u>:

How well is the wheel mounted on the hub? *(Fig. 40)*

This information has NO impact on the calculation of measurement results!

GOOD:	The distance between inside rim opening and wheel hub is the same for the entire circumference.
BAD:	The wheel is not fixed centrally on the wheel hub, the gap is not the same all around.
NOT TESTED:	No information about concentric fit between wheel and hub.
GAP:	A gap value (mm) can be entered here and is also included as a note in the log.
SUSPENSION:	This can be used for entering details about the actual situation of the axle suspension on the vehicle. This information will be displayed on the log.

(Fig. 41)

Measurement recording

7.2 Selecting the wheel to be measured

Depending on the number of previously entered tyres and the rim data, a selection of the wheels to be measured is now available.

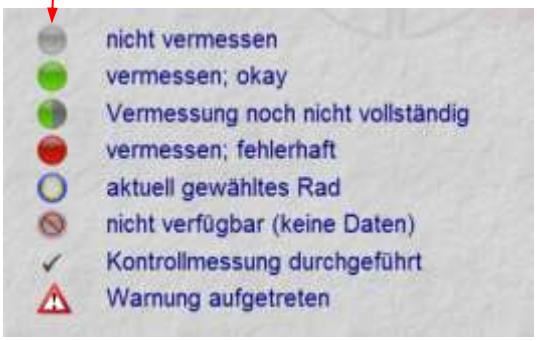
The wheel to be measured can now be selected

- Select by clicking on the circle on the vehicle model.

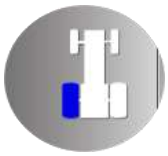
(Fig. 42)

The circle symbol (evaluation symbol) on each vehicle wheel indicates the current status. *(Fig. 42)*

All possible wheel statuses between the individual measuring procedures are graphically displayed in the circle and described in the program.



A symbol for the wheel selection appears at the top right of the program. *(Fig. 43)*



(Fig. 43)

- Then click on the "***Continue***" button.

A query is displayed for checking the wheel centring with the note that the correct mounting of the wheel is of great importance for the recording of the measurement values. *(Fig. 44)*

(Fig. 44)

The answer in this dialog box has no impact on the calculation of the measurement values.

The "***Control measurement***" button only becomes active once a measurement on the wheel was performed.

(Fig. 45)

The control measurement is intended to measure the same wheel again following matching of a wheel (turning of the tyre on the rim), to be able to check the result. *(Fig. 45)*

For more information, see item 8.1 Control measurement on page 30.

With the "***Comments***" button *(Fig. 46)* , general comments and further information can be entered for the vehicle, which will also be included in the log.

(Fig. 46)

Click on "***Save***" *(Fig. 47)* to save the entire measurement process after completing the task.

The measurement can later only be retrieved and continued via the log.

(Fig. 47)

The "***Print***" button *(Fig. 48)* allows the recorded data to be printed on an installed printer as an individual log or as an overview.

(Fig. 48)

Once the wheel has been selected and any comments on the selected wheel have been entered, the laser sensors are assigned by clicking on the "***Continue***" button. *(Fig. 49)*

(Fig. 49)

Measurement recording

7.3 Assigning the laser sensors

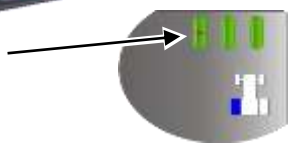
- Now the positions of the individual laser sensors must be assigned to the program *(Fig. 50)*.

(Fig. 50)

The laser sensors are activated one after another on the real measuring device for this purpose.
The laser point and the LED flash on the On/Off button of the respectively active laser sensor for the assignment. *(Fig. 51)*.

(Fig. 51)

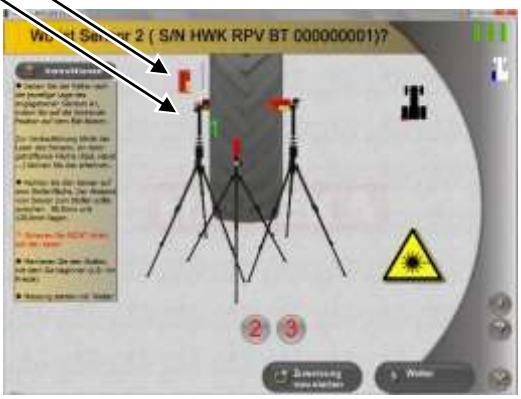
The top right section of the screen *(Fig. 52)* shows that a laser sensor is active.



(Fig. 52)

All 4 laser sensors flash in the image in the program, and depending on the position of the sensor, a decision can be made whether a radial runout or axial runout measurement is to be performed.

Axial runout measurement = vertical sensor
Radial runout measurement = horizontal sensor



(Fig. 53)

- Find the actively flashing laser sensor on the measuring device.
- Confirm the actual position of the laser sensor on the screen by selecting it in the flashing graphic. *(Fig. 53)*

If there is a warning when assigning the laser sensors *(Fig. 54 + 55)*

- Correct the distance to the rim or tyre and repeat the process.

The correct distance to the wheel can be conveniently determined on the laser sensor through the flashing at different speeds

fast flashing	slow flashing
Distance to wheel correct	Distance too close or too far

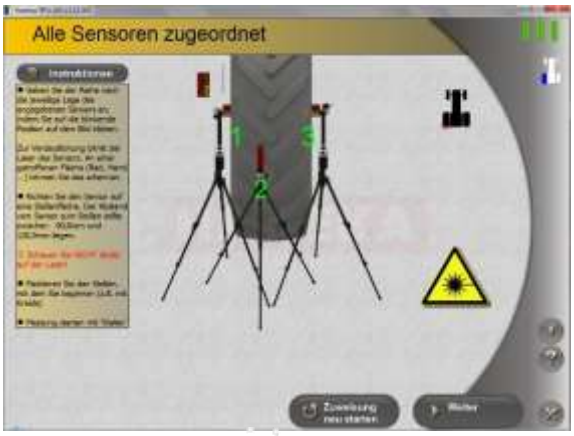
(Fig. 54)

(Fig. 55)

- The position of the first laser sensor has been assigned, and the digit “1” is displayed. *(Fig. 53)*

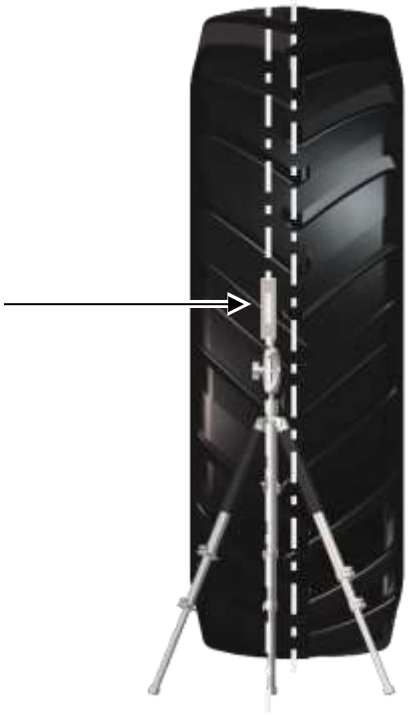
- Repeat the assignment for all other laser sensors.

- When all laser sensors have been assigned (1,2 3), select the "***Continue***" button *(Fig. 56)*



(Fig. 56)

The exact position must be determined because the position of the laser sensor for the tyre tread can be at any point outside the wheel centre.
(Fig. 57)



(Fig. 57)

- Select the laser sensor position as described in figure 58.

Large tyres are usually made from two mould halves. This means there may be a possible displacement of the mould halves.
In order not to measure the other tyre half accidentally during a control measurement, the user must remember the side to be measured.

(Fig. 58)

When all laser sensors for the program have been clearly defined, the program can begin measurement recording on the wheel.

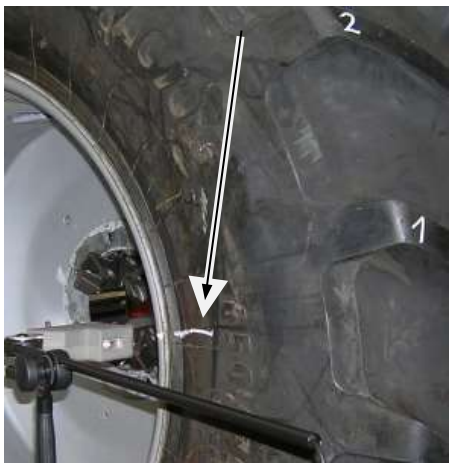
Measurement recording

7.4 Markings on the wheel

Before starting the measurement, you should always apply markings to wheel and rim. (e.g. with chalk or grease pencil)

- The first marking is the starting point on the 1st lug and informs the start and end of the measurement.
- Also mark the 2nd tread lug. This information helps you to repeat the selected direction of rotation of the wheel during measurement. *(Fig. 59)*
- Equally important is a marking on the rim and tyre, for knowing the exact position of the rim in relation to the tyre before and after measurement in case of a possible matching procedure. *(Fig. 60)*

(Fig. 59)



(Fig. 60)

7.5 Rotational speed during measurement recording

The correct rotational speed must be ensured.
Also see item 7.7, "*Error during wheel measurement*".

Wheel diameter (m)	max. speed (1/min)	min. speed (1/min)
1	3.17	0.64
1.1	2.88	0.58
1.2	2.64	0.53
1.3	2.44	0.49
1.4	2.26	0.45
1.5	2.11	0.42
1.6	1.98	0.40
1.7	1.86	0.37
1.8	1.76	0.35
1.9	1.67	0.34
2	1.59	0.32
2.1	1.51	0.30
2.2	1.44	0.29
2.3	1.38	0.28
2.4	1.32	0.27
2.5	1.27	0.25
2.6	1.22	0.24
2.7	1.17	0.24
2.8	1.13	0.23
2.9	1.09	0.22
3	1.06	0.21

Measurement recording

7.6 Start wheel measurement

When:

- ✓ **all wheel data have been entered,**
- ✓ **the laser sensors have been positioned correctly and assigned to the program,**
- ✓ **the wheel to be measured has been marked on rim and tyre,**
- ✓ **the wheel can be rotated freely,**

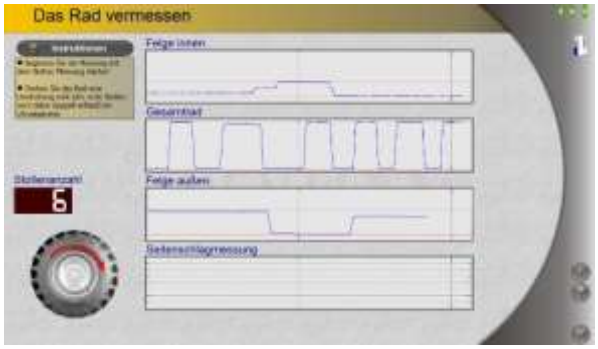
the wheel measurement can be started.

For the 1st tread lug to be completely recorded, the process is started in the notch before the first tread lug.

- Click on the "***Start measurement***" button *(Fig. 61)*
- Start turning the wheel evenly.

(Fig. 61)

The screen shows the number of measured tread lugs and displays the measurement values graphically.*(Fig. 62)*



(Fig. 62)

When the wheel has been moved by one full rotation until the first tread lug was recorded a second time, a signal can be heard and the measurement is completed.

For errors during measurement value acquisition, refer to item 7.7, page 29.

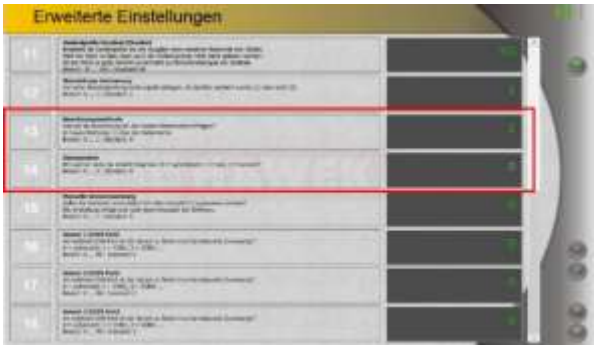
After measurement, the overview page with the measurement results for the individual wheel is automatically displayed.

Depending on which parameter was selected in the Advanced settings (items13 + 14), the overview page is shown in different configurations. *(Fig. 63)*

Item 13 **Calculation method**

Item 14 **Data view**

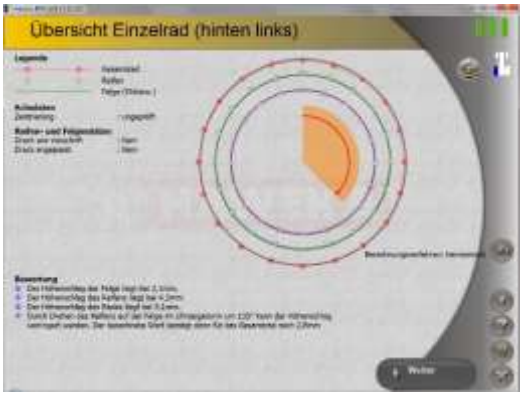
(*Also see "Overview of program settings", page 13 "Advanced settings", item 5.1.9*)



(Fig. 63)

For the further description, the harmonic calculation method and initially the circle diagram (wheel) was selected in the Advanced settings.

After measurement, the overview page for the individual wheel is displayed.



(Fig. 64)

Measurement results as circle diagram (wheel)

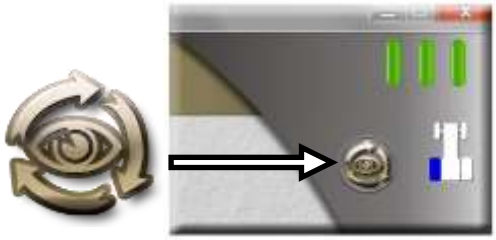
The measurement values are displayed as a circle diagram and with a sector of the circle, if there is a calculated match suggestion.

This sector of the circle shows how far the tyre would have to be turned clockwise on the rim to minimise the radial runout of the measured wheel. *(Fig. 64)*

In harmonic calculation, the match suggestion is made in degrees, in linear calculation, the tread lugs are specified or counted.

The measurement result can be displayed differently in the program.

- By clicking on the circular “eye” symbol at the upper right edge of the screen, you can toggle between the displays *(Fig. 65).*



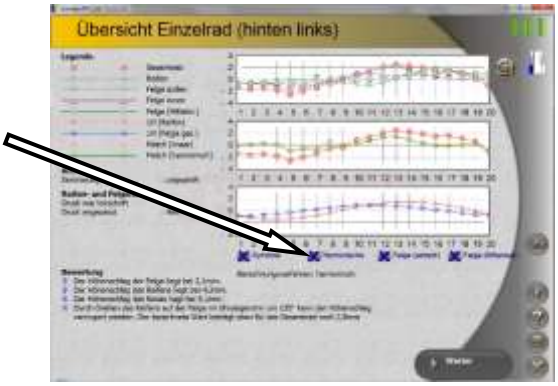
(Fig. 65)

The display in the linear diagram provides a lot of additional information, and the diagram for the harmonic calculation method can additionally be activated here, if it was previously selected in the “Advanced settings”. *(Fig. 66)*.

The results are displayed under the item Evaluation on the screen.

This additional information is particularly useful for the engineers in tyre development.

After each completed measurement process of a wheel, the program returns to the selection page *(Fig. 49, page 23)*. to select another wheel and start a new measurement.



(Fig. 66)

Measurement recording

7.7 Error during wheel measurement

- Shifting of the laser sensors on the wheel

If during measurement, the following message is displayed
- ***Measuring value error on the first tread lug***! - the program has detected an inaccuracy to the control point from the first tread lug. *(Fig. 67)*
This message can appear when one or more laser sensors have changed their aligned position to the wheel during measurement.

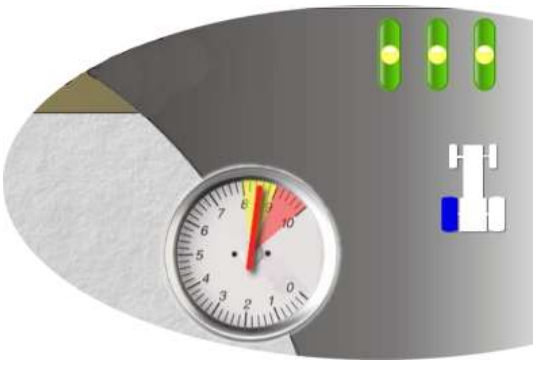
(Fig. 67)

- When measuring steered wheels, the steering must be blocked.
- Check the position of the laser sensors. It is recommended to repeat the measurement.
- Start measurement in the notch before the first tread lug.
- If required, change the threshold value for error detection in the "***Advanced settings"*** under item 9.

- Excessive rotational speed of the wheel

If the rotational speed is exceeded only briefly during measurement, a speedometer symbol is displayed on the right edge of the screen. *(Fig. 68)*

The measurement can be continued.



(Fig. 68)

If the rotational speed is exceeded for a longer period of time, the program cannot record the measurement values correctly any longer and a warning message is displayed. *(Fig. 69)*

The measurement should be restarted.

(Fig. 69)

8 Control measurement after matching

8.1 Control measurement

When the runout on the wheel has been corrected by the matching procedure, a corrective measurement for this wheel can be performed. For this, the measuring device must be aligned on the corrected wheel.

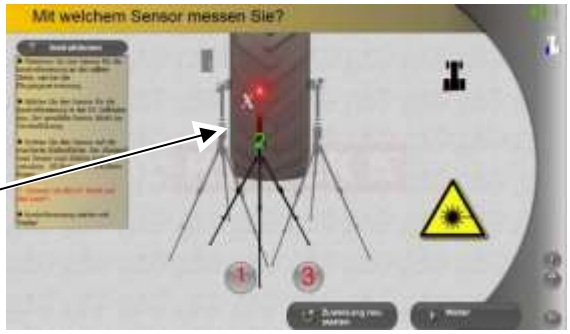
- Select the "***Control measurement***" button (*fig. 70*)

(Fig. 70)

The laser sensor for the new tyre measurement must be re-assigned to the program.

- Select the respective laser sensor on the diagram on the monitor, and check whether this actually flashes on the tyre lug *(Fig. 71).*

The "**X**" on the tyre in the diagram indicates the first measured tread lug from the initial measurement.



(Fig. 71)

- The wheel must be rotated into position far enough so the measurement can be started on this first tread lug "X" again. *(Fig. 71)*
- Click on the "***Continue***" button and start evenly turning the wheel.

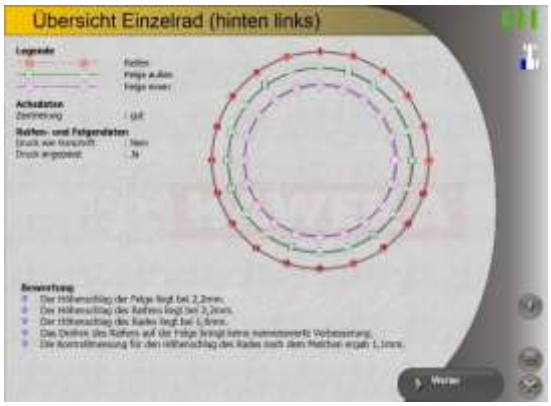
The screen shows the number of measured tread lugs and displays the measurement values graphically. *(Fig. 72)*

(Fig. 72)

- The wheel is turned by a complete rotation, until the tread lug is recorded a second time. A signal can be heard and measurement is complete.

After the measurement, the program automatically switches to the result with the circle diagram.

The individual results are displayed under the item Evaluation *(Fig. 73).*



(Fig. 73)

Select the "***Continue***" button, and the control measurement is complete.

Control measurement

On the overview page on the measured wheel, the program displays the symbol for a completed control measurement. *(Fig. 74)*

- Select a different wheel on the vehicle to carry out another measurement.
- For measurement of the next wheel, the laser sensors must be repositioned and realigned. See item 6.1.2 from page 18 and then repeat the work steps again as described from item 7.3**.** Assigning the laser sensors .

(Fig. 74)

9 Completing the measurement recording

Once the measurements have been completed on all required vehicle wheels, the results can be printed and the measurement values can be stored.

9.1 Creating a log printout

Two different logs can be created for each wheel, whereby the full overview is only created once for the vehicle. *(Fig. 75)*

<u>Example:</u>
Four wheels have been measured on a vehicle, and all three options have been selected for the printout.
A total of nine printouts are created in this case.
Each printout must be individually confirmed here.

(Fig. 75)

The printer should be a PDF printer. This way, you can store the printouts directly on the PC and then print the PDF file on your printer.

9.2 Save and finish

This command completes the measurement and stores all measurement values with the associated vehicle data. These data can be loaded again later via the log display.
(Fig. 76)

(Fig. 76)

10 Show log

Click the "***Show log***" button on the start page to reopen a saved measurement session. *(Fig. 77)*

(Fig. 77)

A list of all saved measurement sessions with a preview is displayed when selecting "***Show log"***. *(Fig. 78)*

(Fig. 78)

When the dataset for a measurement session has been saved, further measurements can later be carried out on this vehicle.
Select the "***Next***" button to do this.

Use the "***Display***" button to display the selected dataset of a measurement session with all measurement values. *(Fig. 79)*

(Fig. 79)

Clicking on the respective evaluation symbol on the overview page of the tyre measurement displays the individual tyre view. *(Fig. 80)*

(Fig. 80)

11 Maintenance

To ensure flawless measuring on tyre and rim, the laser sensors have to be kept free from dirt at all times.

	The measuring device and accessories must be used and maintained with great care at all times.
	Clean the protective screen for the laser sensors with a dry, soft cloth if necessary. Never use alcohol or other liquids!
	Only use the supplied battery charger to charge the batteries in the laser housing. This charger conforms to European safety standards and has been designed specifically for use with the batteries.

12 Notice regarding disposal

The laser sensors and batteries must not be disposed off as regular waste. You can return the laser housings to us within the scope of implementation of the Electrical and Electronic Equipment Act (law on putting into circulation, return and environmentally-friendly disposal of electrical and electronic equipment).

Send these to us directly (sufficiently stamped). We will dispose of the electronic components correctly and in an environmentally-friendly manner.

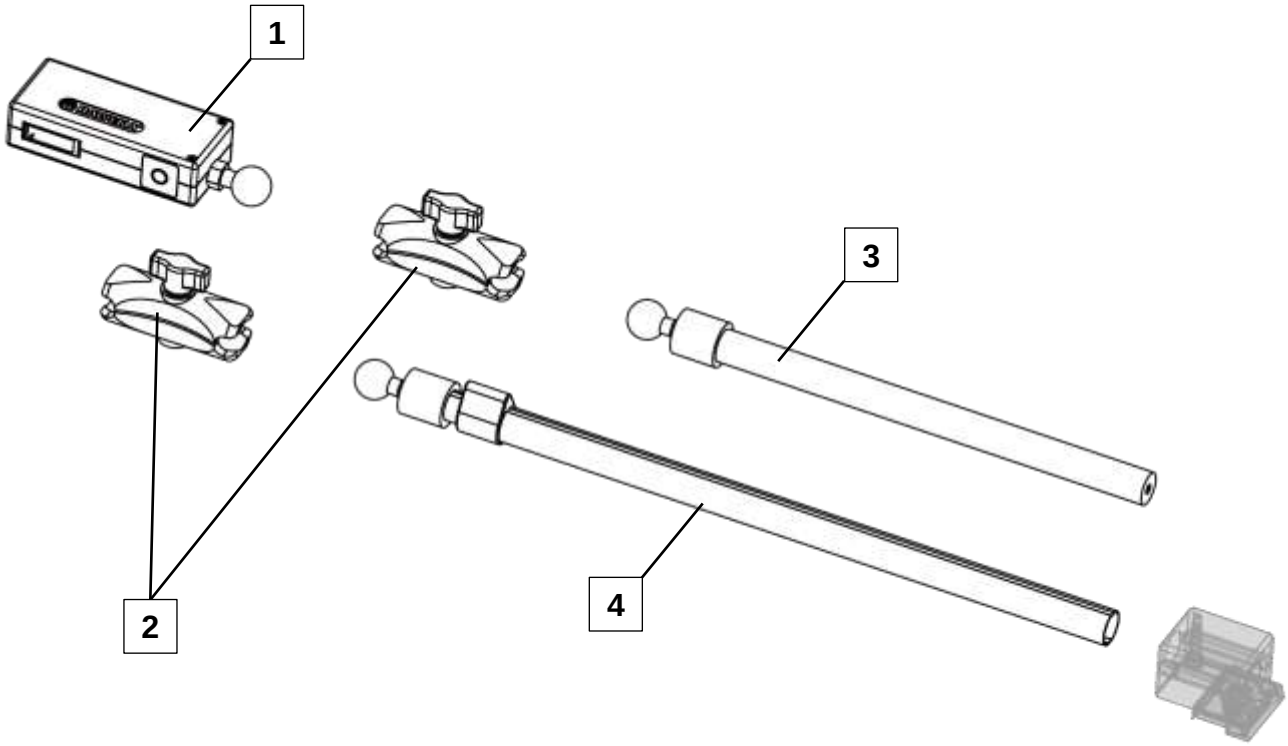
13 Error description

Operators may only redress errors that are clearly the result of operating or maintenance errors!

Description	Possible causes	Troubleshooting
Bluetooth error message when starting the program – "*The connection could not be established, as the name is duplicate"*	The laser sensor has already been registered at another PC	Click on Cancel for the error message. Close the program. The sensor must be decoupled for the PC that was first registered. Restart the program. Note: There is a risk of malfunctions when the PCs are simultaneously run within the range of the Bluetooth signal.
There is no connection to one or multiple laser sensors after program start	Sensors are not coupled with Windows	Check in the Windows settings whether there is a Bluetooth connection. – Register the sensors in the Windows settings.
	Laser sensor is switched off	Check whether the sensors are switched on
	The battery of the laser measuring head is empty	Charge the battery of the laser sensor with the battery charger.
The laser sensors cannot detect a signal to the rim or tyre	The laser sensors are not at the correct distance to the object.	Reposition the laser sensors to the object. Measurement distance: **65 – 135 mm**
	The laser sensors are badly damaged or dirty.	Clean the laser sensors. Swap the laser sensors in their positions. If the error always occurs on the same laser sensor, replace it with a new one.
Measurement results are not realistic	Error during measurement recording	Repeat the measurement, ensuring stable setup and watching the rotational speed of the wheel. See table on page 26
	Wheel dirty or rim corroded.	Clean the tyre tread and the rim in the area of the measurement recording.

14 Spare Parts

Runout measurement device: RPV1300 Item No. 900 008 246



Position.	Part No.	Description
1	900e008 437	Laser sensor
2	DU0000-00159	Ball adapter (1 unit)
3	900e008 468	Replacement support tube
4	900e008 467	Replacement telescopic tube

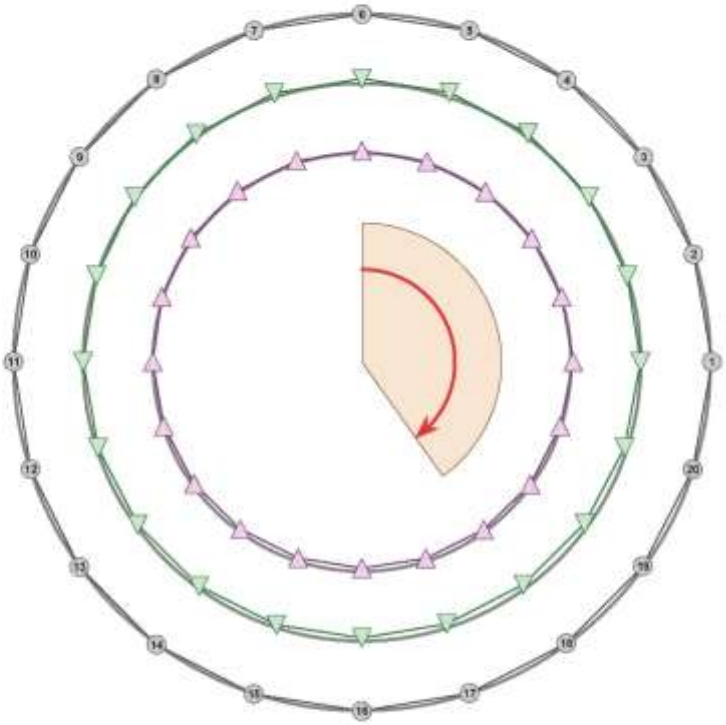
15 Appendix

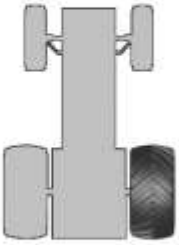
15.1 Measurement log for individual wheel – circle diagram

HAWEKA GmbH
Kokenhorststr. 4
30938 Burgwedel
Telefon +49 5139 8996-0 — Fax +49 5139 8996-222
Web www.haweka.com — E-Mail info@haweka.com

Mechaniker: .....

Datum: 24.11.2020, 10:36
Kennzeichen:H-WK 2023





Felge	3,6 mm
Reifen	1,1 mm
Rad	4,2 mm
Seitens.	-,- mm
Kontrolle	4,2 mm
Fülldruck	--,- bar
Profiltiefe	----,- mm

Legende
Reifen
Felge außen
Felge innen

Bewertung
- Der Höhenschlag der Felge liegt bei 3,6mm.
- Der Höhenschlag des Reifens liegt bei 1,1mm.
- Der Höhenschlag des Rades liegt bei 4,2mm.
- Durch Drehen des Reifens auf der Felge im Uhrzeigersinn um 145° kann der Höhenschlag verringert werden. Der berechnete Wert beträgt dann für das Gesamtrad noch 3,2mm
- Die Kontrollmessung für den Höhenschlag des Rades nach dem Matchen ergab 4,2mm.
- Berechnungsverfahren: harmonisch

Achsdaten
Zentrierung : ungeprüft

Reifen- und Felgendaten
Druck wie Vorschrift : Nein
Druck angepasst : Nein

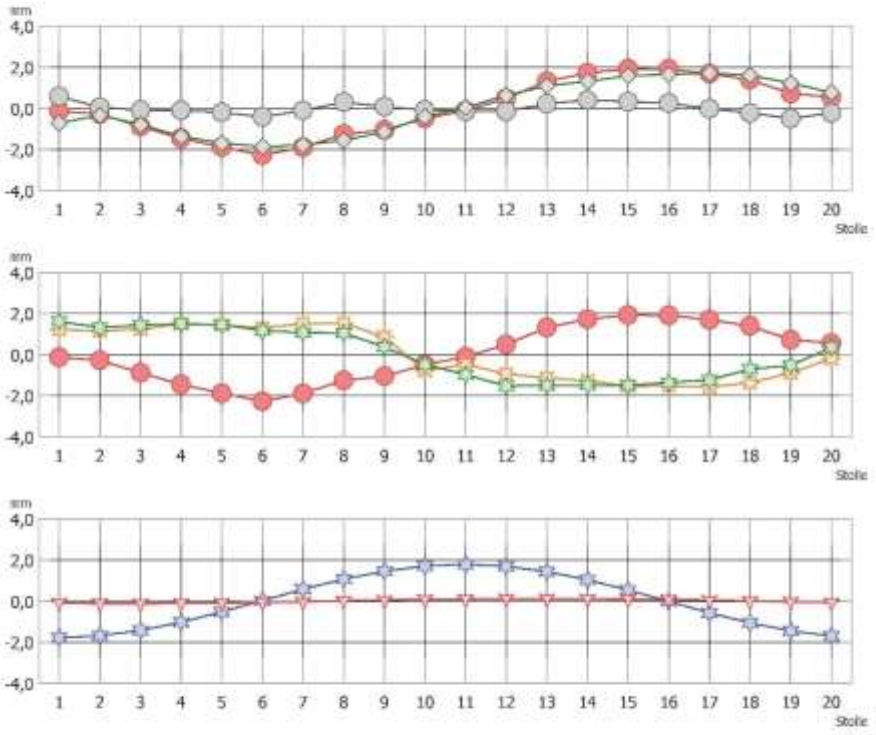
 http://www.haweka.com E-Mail: info@haweka.com

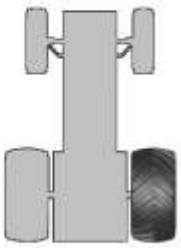
15.2 Measurement log for individual wheel – line diagram (with harmonic calculation)

HAWEKA GmbH
Kokenhorststr. 4
30938 Burgwedel
Telefon +49 5139 8996-0 — Fax +49 5139 8996-222
Web www.haweka.com — E-Mail info@haweka.com

Mechaniker: .....

Datum: 24.11.2020, 10:36
Kennzeichen: H-WK 2023





Felge	3,6 mm
Reifen	1,1 mm
Rad	4,2 mm
Seitens.	-,- mm
Kontrolle	4,2 mm
Fülldruck	--,- bar
Profiltiefe	----,- mm

Legende
Gesamtrad
Reifen
Felge (Mittelw.)
1H (Reifen)
1H (Felge ges.)
Match (linear)
Match (harmonisch)

Bewertung
- Der Höhenschlag der Felge liegt bei 3,6mm.
- Der Höhenschlag des Reifens liegt bei 1,1mm.
- Der Höhenschlag des Rades liegt bei 4,2mm.
- Durch Drehen des Reifens auf der Felge im Uhrzeigersinn um 145° kann der Höhenschlag verringert werden. Der berechnete Wert beträgt dann für das Gesamtrad noch 3,2mm
- Die Kontrollmessung für den Höhenschlag des Rades nach dem Matchen ergab 4,2mm.
- Berechnungsverfahren: harmonisch

Achsdaten		Reifen- und Felgendaten	
Zentrierung	: ungeprüft	Druck wie Vorschrift	: Nein
		Druck angepasst	: Nein

 http://www.haweka.com E-Mail: info@haweka.com

15.3 Measurement log for overview

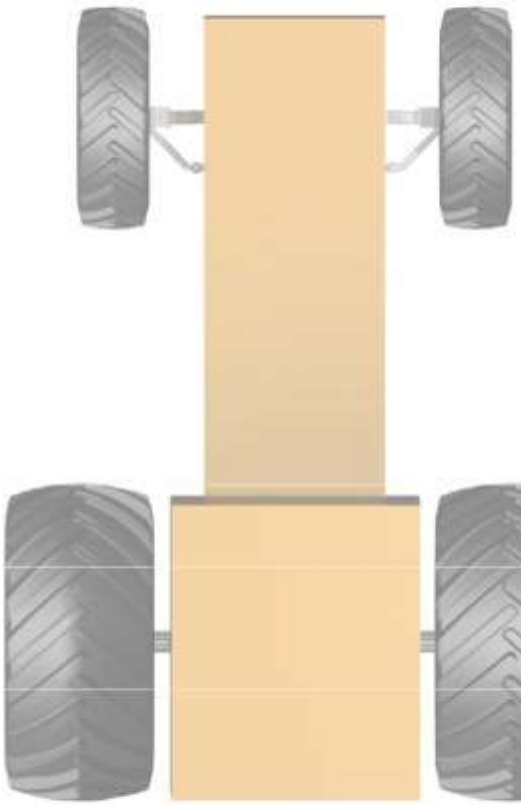
HAWEKA GmbH
Kokenhorststr. 4
30938 Burgwedel
Telefon +49 5139 8996-0 — Fax +49 5139 8996-222
Web www.haweka.com — E-Mail info@haweka.com

Mechaniker: .....

Datum: 24.11.2020, 10:36
Kennzeichen: H-WK 2023

Felge	3,5 mm
Reifen	0,9 mm
Rad	4,4 mm
Seitens.	-,- mm
Kontrolle	4,3 mm
Fülldruck	--,- bar
Profiltiefe	----,- mm

Felge	3,6 mm
Reifen	0,9 mm
Rad	4,3 mm
Seitens.	-,- mm
Kontrolle	4,3 mm
Fülldruck	--,- bar
Profiltiefe	----,- mm



Felge	3,5 mm
Reifen	1,4 mm
Rad	4,3 mm
Seitens.	-,- mm
Kontrolle	4,4 mm
Fülldruck	--,- bar
Profiltiefe	----,- mm

Felge	3,6 mm
Reifen	1,1 mm
Rad	4,2 mm
Seitens.	-,- mm
Kontrolle	4,2 mm
Fülldruck	--,- bar
Profiltiefe	----,- mm

 http://www.haweka.com E-Mail: info@haweka.com

16 EC Declaration of Conformity

The manufacturer:	**HAWEKA GmbH** **Kokenhorststrasse 4** **D-30938 Burgwedel**
hereby declares that the system described in the following,	**Runout measurement device for heavy vehicle tyres of utility vehicles** **Type: RPV 1300**
conforms to the following guidelines and standards.	**EMC Directive 2014/30/EC** **Low-Voltage Directive 2014/35/EC**

Applicable European standards:

EMC standard for radio equipment and services with short-range (SRD)	ETSI EN 301 489-01 ETSI EN 301 489-03
Electromagnetic compatibility of multimedia devices and equipment - requirements related to interference emissions	DIN EN 55032, 08.2022
Safety of laser products	EN 60825-1

Structural modifications which affect the technical data provided in the Operating Instructions and the intended use invalidate this Declaration of Conformity!

Chairman of the Board
Dirk Warkotsch

(Signature)

Burgwedel, 01/03/2023

CE

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