Level measurement
for
Motorhomes and caravans

Level light
Level per
Level plus

Operating instructions

Version 2.2.0

1 Contents

2 Warranty and safety

With our Level app, you can easily measure the inclination of your motorhome or caravan using a smartphone or tablet. The Level app is available in three different product variants: Level light, Level pro and Level plus

With the Level light and Level plus product variants, the inclination can be measured using an external sensor from the Chinese company WitMotion. This sensor is not part of the product. Compatibility with the sensor has been tested but cannot be guaranteed. No guarantee is given for these sensors. For information on the safe use of the sensors, please contact the sensor manufacturer.

The Level app is a technical software product that has been tested by us. Nevertheless, complex products can unfortunately have errors that were not noticed during testing. The manufacturer (Dr Dieter August Ackermann, 65plusIT) is not liable for any damage resulting from the use of the Level app.

3 The Level app

With our Level app, you can easily measure the inclination of your motorhome or caravan using a smartphone/tablet or an external sensor. The Level app is available in three different product variants: Level light, Level pro and Level plus.

3.1 Product variants

In the Light and Plus versions of the Level app, external sensors from WitMotion can be connected via Bluetooth in addition to the internal sensors of the smartphone or tablet, which then take over the inclination measurement of the vehicle and can be placed anywhere in the vehicle

The inclination of your vehicle is clearly displayed from the rear to the front and from left to right as an angle the Level app.

The Pro and Plus versions then use the displayed angles to individually calculate how many centimetres the vehicle needs to be raised at each wheel in order to be level. As this height correction for motorhomes depends on the distance between the wheels on the front axle, those on the rear axle and the centre distance, these dimensions can be specified individually in the Pro and Plus versions of the Level app. For caravans, the wheelbase of the wheels on the running axle and the distance between the axle and the support wheel are specified. The Light version does not offer this option.

The sensor for external measurement of the tilt angle is not part of the product and must be purchased separately. Compatibility with the WitMotion BWT901BLECL5.0 and WT9011DCL-BT50 sensors has been tested, but unfortunately cannot be guaranteed. For a compatibility test with your smartphone or tablet, you can use the free Level light version of this app.

3.2 Overview of product variants

			
Product variants	**Level light**	**Level per**	**Level plus**
Front-rear vehicle tilt	✓	✓	✓
Vehicle tilt left-right	✓	✓	✓
Measurement with internal sensor	✓	✓	✓
Measurement with external WitMotion sensor	✓		✓
- WitMotion Sensor WT9011DCL	✓		✓
- WitMotion Sensor WT901BLECL	✓		✓
- WitMotion Sensor BWT901BLECL5.0	✓		✓
Individual height correction		✓	✓
Adjustable wheel spacing		✓	✓
start	✓		✓
Calibration of the internal sensor (smartphone)		✓	✓
Calibration of the external sensor (WitMotion)			✓
Setting the measuring direction smartphone/tablet		✓	✓
Setting the measuring direction of the external sensor			✓
Language setting	✓	✓	✓
Privacy policy	✓	✓	✓
Help	✓	✓	✓
Info	✓	✓	✓

4 Description of the pages

As most of the pages and functions in the Level light, Level pro and Level plus apps are the same, they are described together here.

4.1 Main page (Home)

After starting the app, you will be taken to the main page (Home). You can only start a measurement with a sensor here if you have previously established a connection to a sensor. To do this, select "Connect sensor".

Otherwise, you can take the measurement using the sensors built into the smartphone or tablet itself.

Several setting options and information are available via the "Settings".

If you want to end a measurement but not the entire app, you should navigate to the Home page so that no more measurement data is processed by the app in the background. This is done by clicking the back icon or the home icon.

4.2 Search for and connect sensor

If you have switched on Bluetooth on your smartphone or tablet and the sensor, the sensor will be displayed here in Level light and Level plus with its internal identifier after a short time.

The identifiers for the sensor types are

- WT9011DCL (WT901BLE67)
- WT901BLECL (WT901BLE68)
- BWT901BLECL5.0 (WT901BLE68).

You can establish a 🔗 connection with the sensor by pressing the button. This may take a few seconds again.

If you uncheck☑ , you will be shown not only Witmotion sensors but all accessible Bluetooth devices when you call up the page again.

4.3 Measurement with sensor

In the upper section, the inclination of the vehicle from rear to front and the inclination from left to right is displayed in degrees and in the interval [-30° - +30°].

If the connection to the external sensor is lost, the Light and Plus versions of the sensor 🔗 can be reconnected.

This takes you to the main and menu page after completing the measurement (recommended).

A height correction can be calculated for the individual wheels based on the individually set wheel spacing of the vehicle so that the vehicle is levelled.

The wheel distances for calculating the height correction can be found here.

Individual wheel distances can only be set in the Pro and Plus versions of the app. Demo values are used in the Light version.

4.4 Measurement with smartphone

In the upper section, the inclination of the vehicle from rear to front and the inclination from left to right is displayed in degrees in the interval [-30° -+ 30°].

You ⚙ can switch directly to the settings in Level pro via .

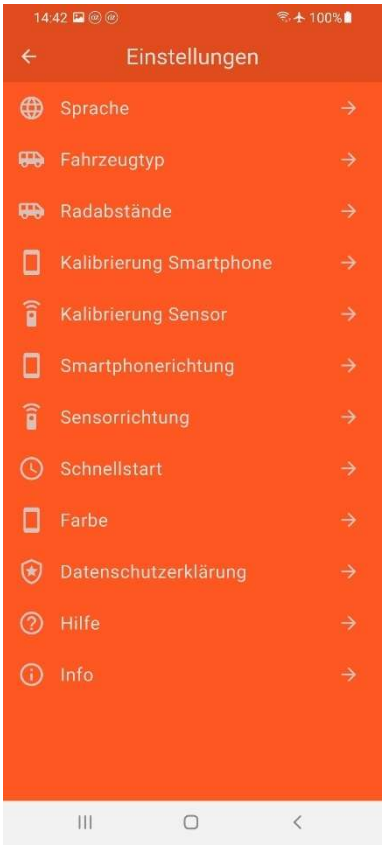
This takes you to the main and menu page after completing the measurement (recommended).

A height correction can be calculated for the individual wheels based on the individually set wheel spacing of the vehicle so that the vehicle is levelled.

The wheel distances for calculating the height correction can be found here.

Individual wheel distances can only be set in the Pro and Plus versions of the app. Demo values are used in the Light version.

4.5 Settings



You can access the settings from various pages and customise how the app works for you.

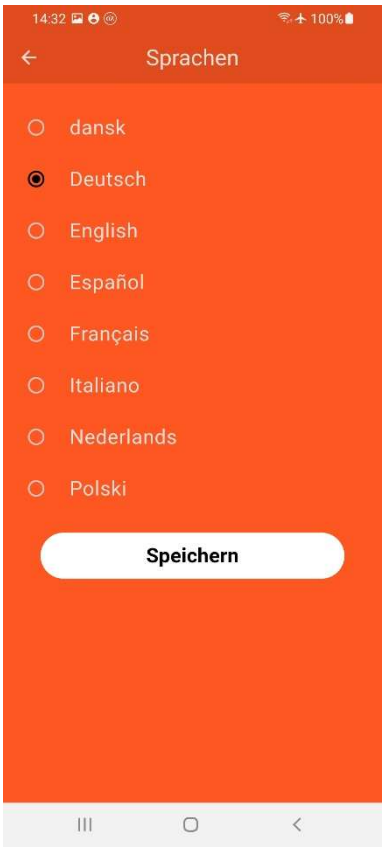
Calibration of the external sensor is only available in the Plus version.

Setting the measuring direction of the smartphone/tablet in the vehicle.

Setting the measuring direction of the external sensor in the vehicle.

The quick start of the app and connecting the sensor is only available in the Light and Plus versions. When you start the app, you are taken directly to the page for measuring with the sensor.

4.6 Languages



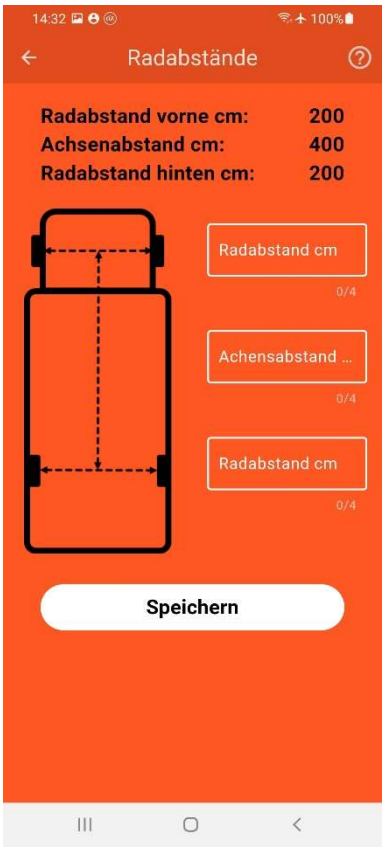
You can choose between eight different languages and save the selected one.

4.7 Vehicle type

You can switch the vehicle type between motorhome and caravan in the app and save this setting.

For motorhomes, the height correction is calculated for four support points and for caravans for three.

4.8 Motorhome wheelbase



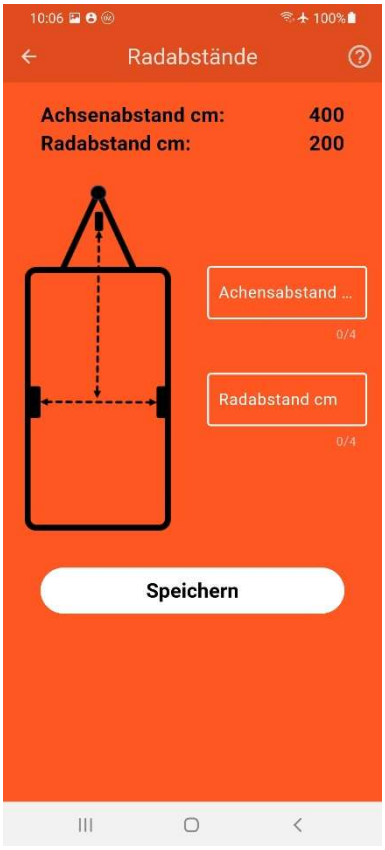
Only in the Level plus and Level pro apps can the wheelbase of your vehicle be entered and saved so that a height correction can be calculated individually.

The currently set wheel distances are displayed in the upper area.

The wheelbases of the front axle, between the front and rear axles and the rear axle are recorded and saved in cm.

This is only possible in Level plus and Level pro. In Level light, the height correction is calculated as a demo with fixed wheel distances.

4.9 Caravan wheelbases



Only in the Level plus and Level pro apps can the wheelbase of your vehicle be entered and saved so that a height correction can be calculated individually.

The currently set wheel distances are displayed in the upper area.

The wheel distances of the support wheel and the rear axle and on the rear axle are recorded and saved in cm.

This is only possible in Level plus and Level pro. In Level light, the height correction is calculated as a demo with fixed wheel distances.

4.10 Smartphone calibration

The smartphone or tablet can be calibrated in Level pro and Level plus. If the smartphone or tablet does not have a level surface or does not display a horizontal plane accurately, you can calibrate the device. To do this, place the device on a level surface and press "Set".

The values can be reset to zero with "Reset".

This function can also be used if you always want to take the measurement in the motorhome or caravan on a non-horizontal surface. To do this, the vehicle must be levelled once and the calibration carried out on the surface in the vehicle where the measurement is always to take place in future.

4.11 Calibration sensor

The sensor can be calibrated in Level plus.

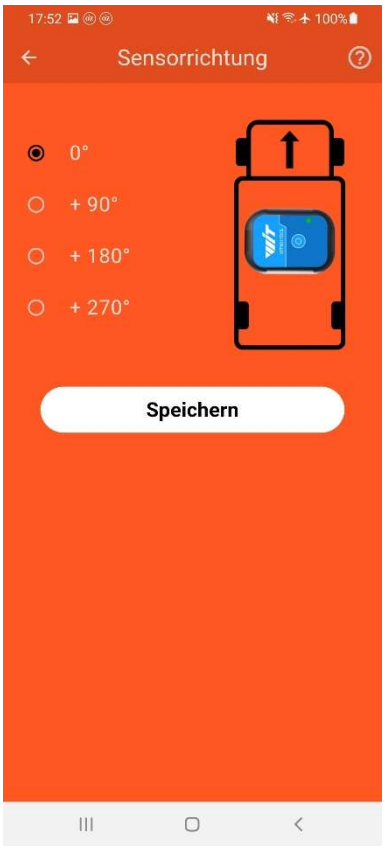
If the sensor is to be mounted on a non-horizontal plane in the vehicle (max. +/-30°), the sensor can be calibrated so that this plane is considered horizontal for the sensor.

To do this, the vehicle must be levelled once and the calibration must then be carried out so that the sensor knows what it should consider to be level.

The tilt values can be reset to 0 with "Reset".

Further information on mounting the sensor can be found in chapter 4.4.

4.12 Sensor direction

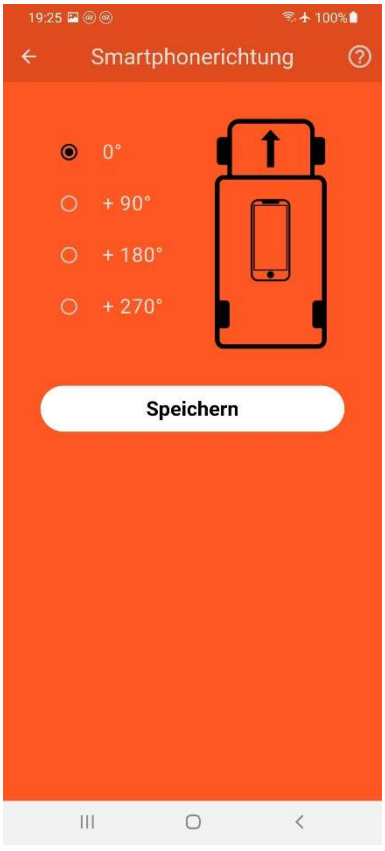


The direction of the sensor for the measurement can be set in Level plus.

By defining the sensor direction, it is possible to position the sensor even more individually in your vehicle. You have four different options for horizontal mounting, whereby the X direction of the sensor is rotated clockwise by 90° in each case.

Further information on mounting the sensor can be found in chapter 5.4.

4.13 Smartphone direction



The direction of the smartphone/tablet for the measurement can be set in Level plus and Level pro.

By defining the measuring direction of the smartphone/tablet, you have the option of positioning the smartphone/tablet even more individually in your vehicle for the measurement. You have four different options for horizontal measurement, whereby the X direction of the smartphone/tablet is rotated clockwise by 90° in each case.

4.14 Quick start

You can set up the quick start for the connected sensor so that the page with the measurement of the sensor is displayed immediately after mounting, connecting and calibrating the sensor in the vehicle after starting the Level app.

Of course, Bluetooth must be switched on in the smartphone or tablet and the sensor must be switched on when the app is started so that the measurement page is displayed after starting the app. However, this can take a few seconds, as the sensor must first be searched for, found and then connected via Bluetooth in the background.

You can switch off the quick start again here with "Reset"

4.15 Colour

Here you can adjust the colour to your individual taste.

5 Inclination measurements

The inclination measurement records the inclination of the vehicle from rear to front and from left to right and displays this in angular degrees.

The inclination is measured either with the internal sensors of the smartphone or tablet in all app versions and additionally with an external sensor from WitMotion (WitMotion Shenzhen Co.,Ltd (wit-motion.com) in the Light and Plus versions.

WT901BLECL
BWT901BLECL5.0

WT9011DCL-BT50

5.1 Measurement with internal sensor

When measuring with the internal sensor, the smartphone or tablet must be placed with the top edge of the device facing in the direction of travel and with the screen facing upwards on the surface that is to be horizontal

If the smartphone or tablet cannot be positioned horizontally because the smartphone or tablet does not have a flat surface to rest on due to a protective cover or elevation on the device itself, or if the measurement in the vehicle should always be taken on the same non-horizontal surface, the smartphone or tablet can be calibrated in the Level pro and Level plus apps. To do this, the vehicle must first be brought into a horizontal position and then the smartphone or tablet must be calibrated at the point where the measurement is always to be taken.

The measuring direction of the smartphone or tablet can be set in the Level pro and Level plus apps.

5.2 Measurement with external WitMotion sensor

The great advantage of an external sensor is that it can be placed anywhere in the vehicle and can transmit the tilt angle to the smartphone or tablet. This means that the inclinations can be displayed on the smartphone or tablet regardless of the position of the smartphone or tablet and you can always see the current orientation of the vehicle. The smartphone or tablet can be positioned so that it is visible to the driver.

The WitMotion sensors are connected via Bluetooth. The connection is currently only available for the sensors

-
- WT901BLECL
- BWT901BLECL5.0

tested. Both sensors must be purchased separately from WitMotion and are not part of the product. **Compatibility with WitMotion sensors has been tested but cannot be guaranteed.**

The sensors have a small battery that can be charged via USB-C. After switching on, a Bluetooth connection can be established. To do this, Bluetooth must be switched on in your smartphone or tablet.

5.3 Information on the sensors

Further information on the sensors can be obtained directly from the WitMotion links. The sensors can be purchased directly from the Chinese manufacturer or in the well-known online shops, whereby the prices can vary greatly. In some cases, very high shipping costs are also charged. We ordered our test sensors directly from the manufacturer.

Company links

WitMotion Shenzhen Co.,Ltd (wit-motion.com

WitMotion Wireless Acceleroemter; RTK module muti-band, muti-system (witmotion-sensor.com)

Link to sensors

Bluetooth Accerometer Series - WitMotion (witmotion-sensor.com)

5.4 Positioning the external sensor

When positioning the sensor in the vehicle, you should ensure that the battery can be charged easily and that you can operate the sensor's on/off switch easily. Alternatively, you can of course also leave the BWT901BLECL5.0 or WT901BLECL sensor, which has an on/off switch, switched on at all times and connect it permanently to a USB-C power supply in the vehicle.

In order for the sensor to measure the correct inclination of the vehicle, it must be placed on any horizontal surface so that the X-axis points exactly in the direction of travel of the vehicle and the Y-axis points exactly to the left. If you choose a surface that is not completely horizontal, you have the option of calibrating the sensor in the Level app. However, the deviation of the mounting surface from the horizontal surface must not exceed +30° and must not fall below -30°.

To calibrate, you must bring your vehicle into a horizontal position once and then start the calibration of the sensor. In this case too, the X-axis must point forwards in the direction of travel of the vehicle and the Y-axis to the left. The Level app memorises the deviation through the calibration and corrects future measurements by this deviation. Of course, the calibration can also be reset.

WT901BLECL
BWT901BLECL5.0

WT9011DCL-BT50

Calibration therefore consists of the following steps.

Step 1:
Mount the sensor in the vehicle on a surface that does not deviate more than [-30° - +30°] from the desired plane. The sensor must have its X-axis pointing forwards and its Y-axis pointing to the left.

Step 2:
Move the vehicle to the desired zero level.

Step 3:
Calibrate the sensor in the app to save and set the zero level.

After step 3, all measured values are displayed relative to the defined zero level.

If it is not possible to position the sensor in your vehicle so that X points in the direction of travel and Y points to the left, you can also rotate the sensor by 90°, 180° or 270° horizontally. You can set this in the Level app under Sensor direction.