Live Move screen

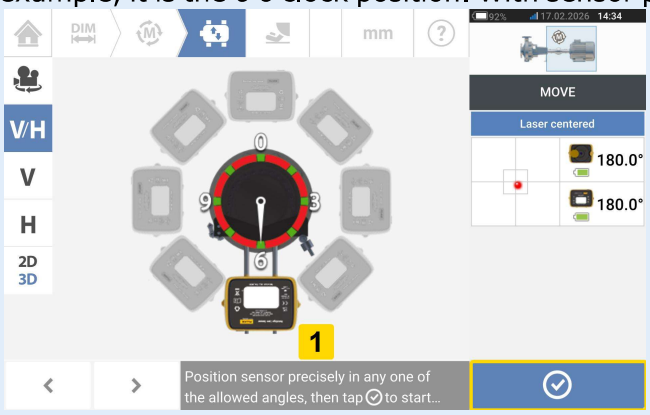
Note
Aligning of machines involves vertical movement through shimming of the machine feet, and horizontal movement by shifting machine sideways.

If the alignment condition of the machines is within tolerance (indicated by or) then there is no need to align the machines.
It is recommended to perform vertical corrections first, since the horizontal condition is easily affected by the process of loosening anchor bolts and inserting and/or removing shims, whereas the vertical condition is less prone to being affected when performing horizontal moves.
It may be necessary to recheck soft foot before proceeding.

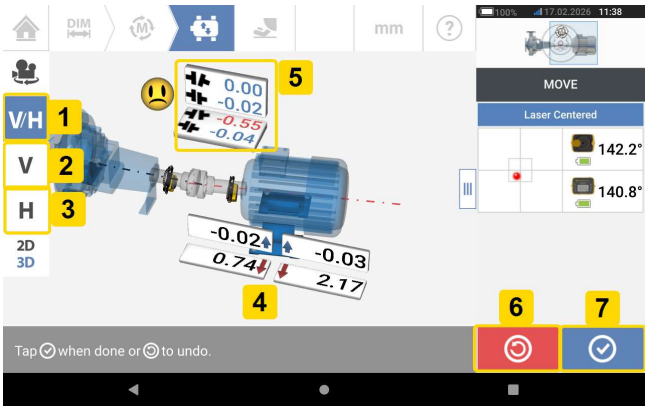
Live Move is monitored in both horizontal (H) and vertical (V) planes simultaneously.

Live Move

Note
If Static measurement mode is selected, the Live Move screen is accessed only after the necessary 45° clock position **(1)** of the sensor and laser has been selected (in this example, it is the 6 o'clock position. With sensor position selected, tap .

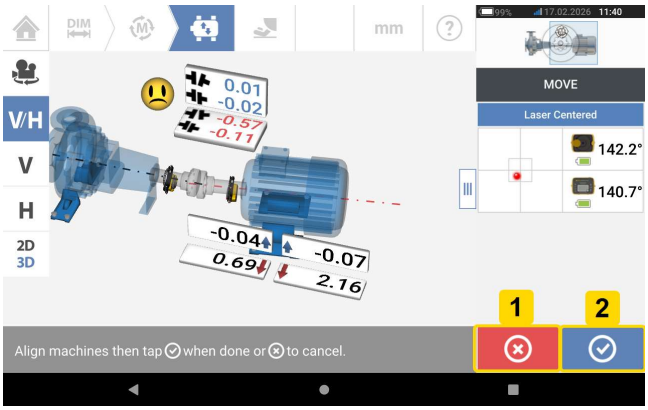


Live Move is monitored in both horizontal (H) and vertical (V) planes simultaneously.



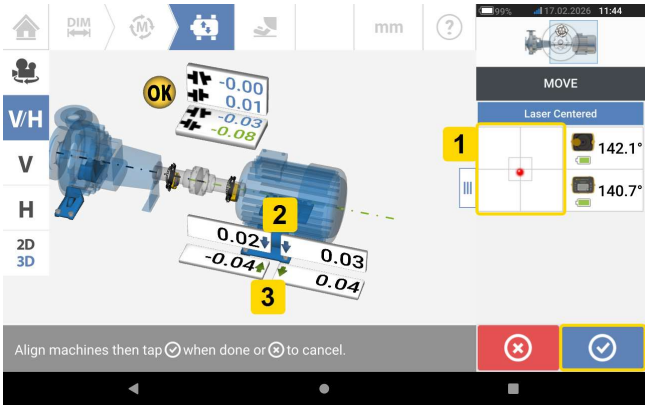
- **(1)** Tap the ***V/H*** icon to follow both vertical and horizontal foot corrections simultaneously
- **(2)** Tap the ***V*** icon to follow the vertical foot corrections
- **(3)** Tap the ***H*** icon to follow the horizontal foot corrections
- **(4)** Arrows indicate direction and magnitude to move machine feet
- **(5)** Tolerance coded gap and offset coupling values
- **(6)** Tap the ***Undo*** icon to measure again, or start Live Move again
- **(7)** Tap the ***Proceed*** icon to measure again, or start Live Move again

When Live Move is detected, this icon  replaces this one  .



- **(1)** Tap  to show the ***Cancel Move*** hint.
- **(2)** Tap  to start Live Move again or measure the machines again.

If the laser beam is centered, tap  to start Live Move automatically.



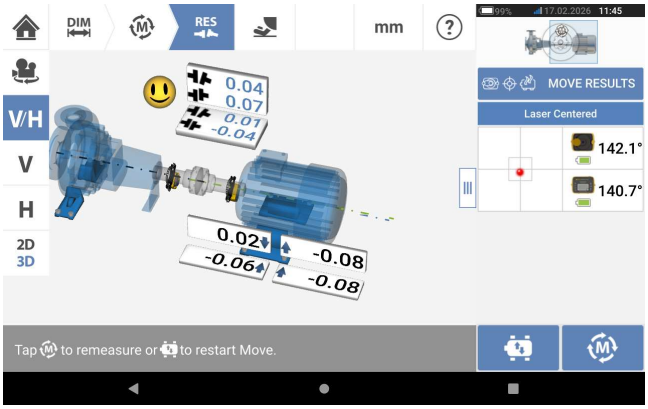
If the laser beam is not centered, tap the detector area on the screen (**1**) to access the XY View.

CAUTION
Do NOT attempt to move the machine using heavy sledgehammer blows. This can cause bearing damage, and also produce inaccurate Live Move results. Jack bolts on the feet or other mechanical or hydraulic devices are recommended for moving machines.

Correct the alignment condition by shimming and moving the machines laterally following the bold vertical (**2**) and horizontal (**3**) arrows. The color coded bold arrows signify the attained coupling tolerance as follows: Blue (excellent condition); Green (good condition) and Red (poor condition). Machines should be moved to within acceptable tolerances indicated by a happy smiley ( ) (excellent tolerance) or an OK icon ( ) (acceptable tolerance) while observing shaft alignment best practices.

Note
The system monitors both horizontal and vertical Live Move simultaneously. If the vertical view (V) is selected when Live Move starts, only the vertical condition is shown, even though both planes are being monitored. Likewise, if the horizontal view (H) is selected, only the horizontal condition is displayed, while both planes continue to be monitored in parallel.

After machines have been moved to within tolerance, tighten the foot bolts then tap .



Tap to measure again, verify the Live Move results, and confirm the new alignment condition.

What is soft foot

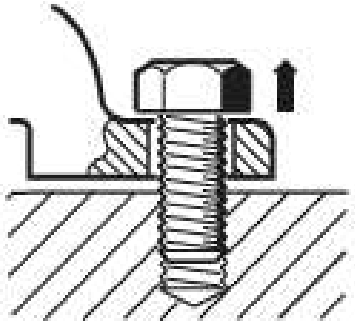
Soft foot is the condition of machine frame distortion. Any cause that results in machine frame distortion when the machine is anchored to its foundation is a soft foot. Some of the principal causes are:

- Non-coplanar machine mounting surfaces
- Deformed machine frame or feet
- External forces e.g. from connecting pipe or bracketry
- Improper shimming or soiled machine feet
- Too many shims under a machine foot (a maximum of 5 shims should not be exceeded)

The consequences of forcibly tightening down the feet are deformed machine frames, bent shafts and distorted bearings. This leads to high vibration and premature machinery failure.

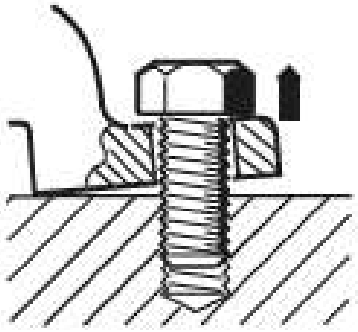
Soft foot should be checked before aligning the shafts. This can be done quickly and conveniently with the aid of the soft foot function. With the sensor and laser mounted on the shaft in the usual way, the system is able to sense any machine movement when the machine bolts are loosened individually. By entering the machine dimensions, the rugged device is able to calculate, from shaft movement, by how much each foot has moved as it is loosened.
Once foot movements have been established, the results are interpreted and translated into shim thicknesses to be placed under the feet. How straightforward this is, depends on the type of soft foot present.

Parallel soft foot



In parallel soft foot, one or more feet are too short or too long. This usually results in the machine rocking on the longer feet. This is corrected by shimming the shorter feet.

Angular soft foot



With angular soft foot, the base of the foot is at an angle to its foundation and they are only partly in contact. In this case, suspect foot is checked with a feeler gauge and corrected by building a custom ‘shim wedge’ or machining the underside of the foot.

Checking and correcting soft foot conditions

The three main types are parallel soft foot, angular soft foot, and induced soft foot. There are instances where the soft foot is a combination of two or more types.
Checking for soft foot is part of machine and job preparation.

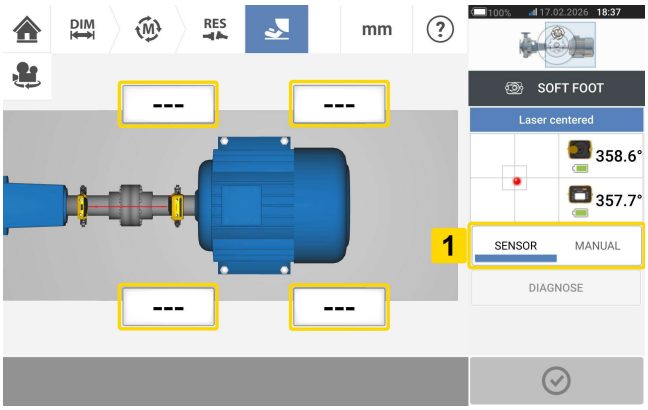
Note
The machine(s) to be checked is/are assumed to have four feet in an approximately square formation. If the machine has six feet, it is advisable to leave the middle feet loose and treat the machine as a four-footed machine. Soft foot is measured only on machine designated as movable.

Soft foot

Soft foot measurement can be started from any screen where the ***Soft foot*** icon ( ) is active. Tap to start soft foot measurement. The values may be determined by sensor measurement or entered manually from values established using manual methods such as feeler gauges and shims.
All four foot bolts must be bolted down before starting measurement.

Sensor measurement

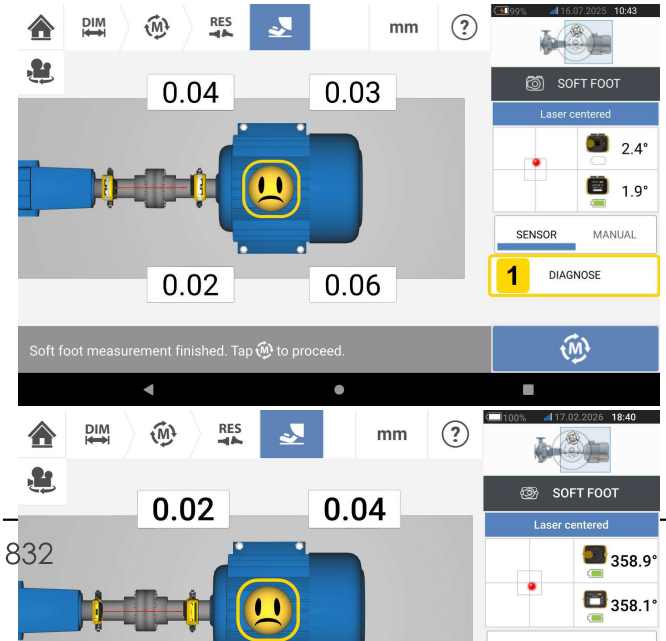
Mount the components, enter all required dimensions, and then adjust the laser beam as required. (You may refer to Mounting components , Dimensions, and Laser beam adjustment.)



Activate sensor measurement by swiping the blue bar (**1**) ***SENSOR***. The laser beam must have the status ***Laser centered*** or ***Laser OK***.
Tap any one of the four pulsating value fields to start soft foot measurement at the related machine foot.
The adjustment screen is shown immediately after any one of the pulsating fields is tapped.

Loosen the corresponding foot bolt (see hint **1**). The recorded soft foot value is displayed (**2**).

When the soft foot value stabilizes, tap or the value recorded (**2**), then tighten the bolt (hint is shown in **1**). If necessary, tap to cancel the soft foot measurement at the related foot. The above soft foot measurement procedure is repeated for all four feet positions.



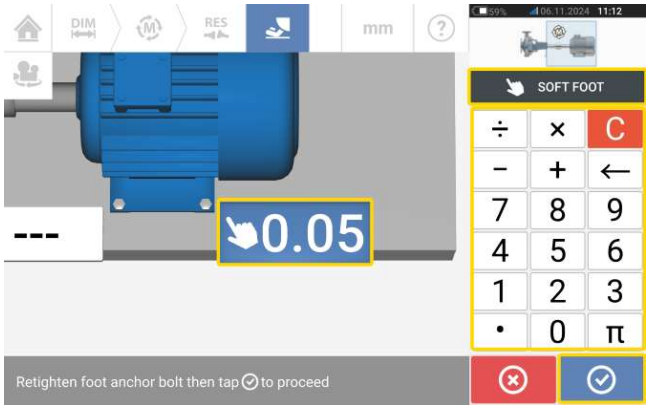
The smiley indicates the soft foot condition. A happy smiley indicates that the measured soft foot is within tolerance and further corrections are unnecessary. Acceptable soft foot tolerance is 0.05 mm (2 mil). A sad smiley indicates that the measured soft foot is out of tolerance and shimming corrections are necessary.

Note
Tap the smiley on the machine image to show the set soft foot tolerance.

Manual entry

Use feeler gauges to calculate manual values. To do this, measure four points around the bolt point with feeler gauges. The calculated values are then entered in the soft foot application. Manual values do not require use of either sensor or laser.
Swipe the blue bar to ***MANUAL***. Manual entries are signified by the finger icon on the display.

Tap any one of the four pulsating value fields then use the onscreen keyboard, and enter the soft foot value at the related machine foot.



Tap  to confirm value. Repeat the procedure for all four feet positions.

The tolerance smiley gives an indication as to whether the soft foot requires correction or not.

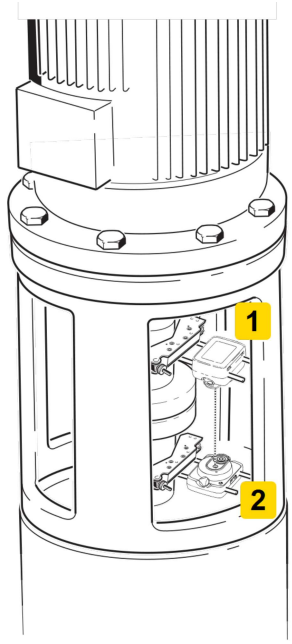
Vertical flanged machines

A typical vertical machine arrangement comprises one machine mounted on top of the other using a bolted flange.

Flange-mounted machines may have a vertical or horizontal orientation. In either case, alignment corrections are made directly at the flange.

Angularity is corrected by inserting or removing shims between the flanges. The rugged device calculates the shimming thickness for each flange bolt.

Offset is corrected by positioning the flange laterally.

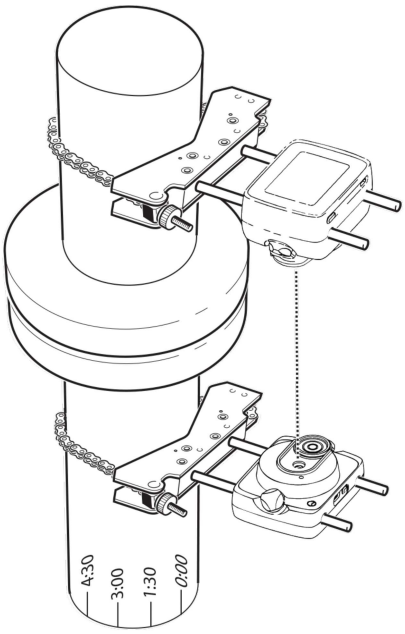


- **(1)** Sensor
- **(2)** Laser

The sensor and laser are mounted on either side of the coupling as for horizontal machines. The laser is mounted on the shaft of the bottom machine, and the sensor on the shaft of the upper machine. As the electronic inclinometer cannot directly determine the rotation angle of vertical shafts, the measurement mode for vertical machines is Static Clock.

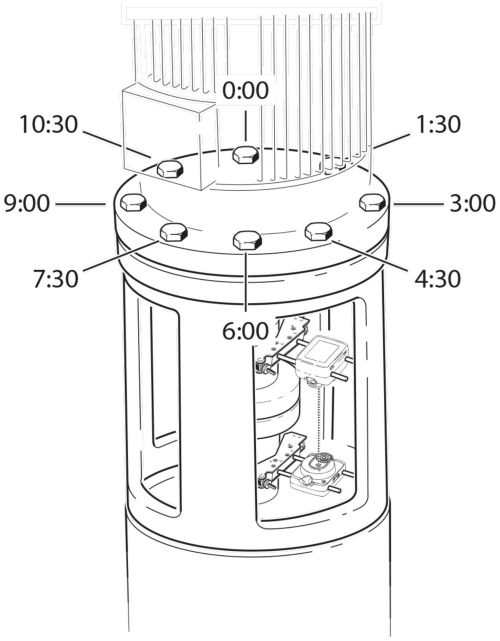
Marking measurement positions

For Static Clock measurement mode, the eight 45° measurement positions used with these procedures must be marked accordingly on the machine.



- Mark a reference position on the machine close to the shaft and in line with a convenient external reference or flange bolt. Likewise, mark a reference point on the shaft.
- Measure the circumference of the shaft and divide by eight.
- Use this distance to make seven more evenly spaced marks on the shaft beginning at your chosen starting point. Number the points counterclockwise as seen from sensor to laser, beginning with 0 first, followed by 1:30, 3:00,4:30, 6:00, 7:30, 9:00 and 10:30.

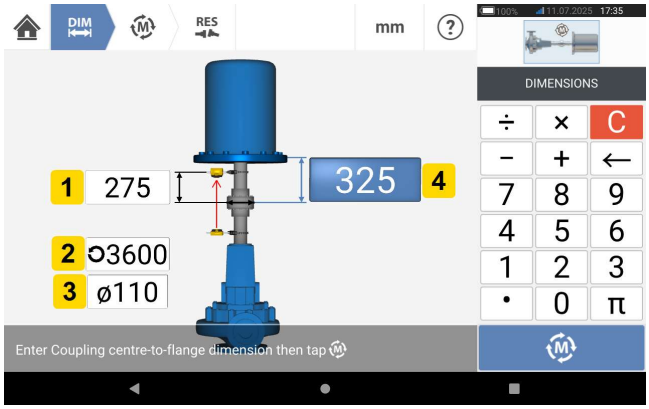
For circular housings, measure the circumference of the machine coupling housing and divide by eight. Use this distance to make eight evenly-spaced marks on the housing beginning at your chosen start point. Number the points clockwise looking down onto the shaft with 0 as the first, followed by 1:30, 3:00,4:30, 6:00, 7:30, 9:00 and 10:30.



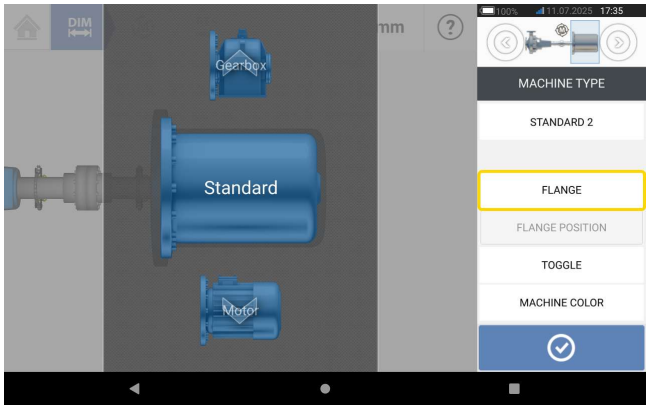
Setup

- Mount the sensor and the laser on either side of the coupling, ensuring that they are aligned with the 0 or reference mark.
- Switch the touch device on, then tap in the home screen to start the vertical alignment application.

  Note: If the icon is inactive, tap to activate the vertical alignment icon.
- Configure the machines as applicable. Tap the machines and select the necessary machine type from the carousel.
- Enter these required machine dimensions:

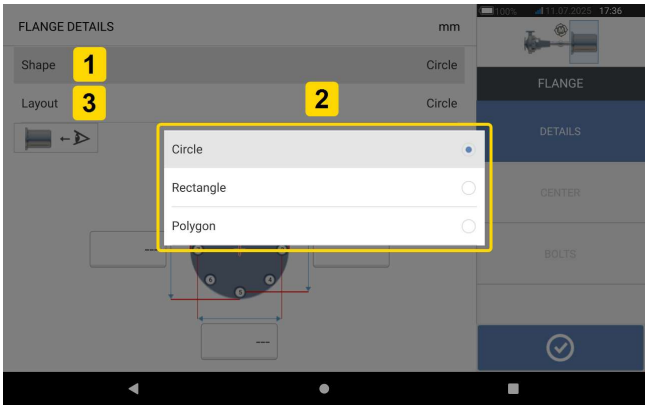


  - **(1)** Sensor to coupling center
  - **(2)** RPM
  - **(3)** Coupling diameter
  - **(4)** Coupling center to flange
- When entering machine dimensions, the flange geometry must be taken into account. Tap the flange-mounted machine.

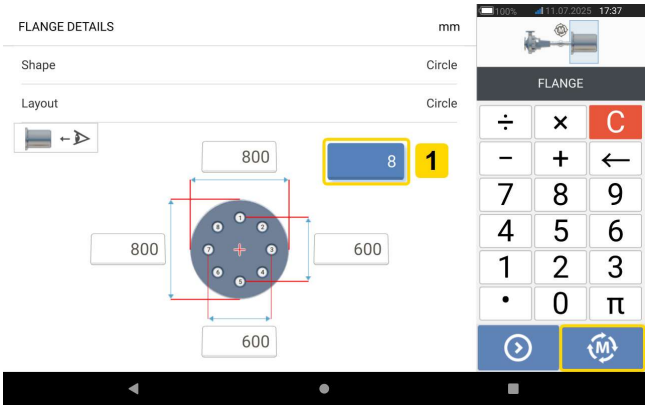


  The menu items on the screen may be used to edit machine name, access the ***Flange details*** screen, change the flange position with respect to the shaft, flip the machine along the shaft axis (toggle) and edit machine color.

- Tap ***FLANGE*** to access the ***Flange details*** screen where the flange may be edited.



- Tap the ***Shape*** area (**1**) to select the shape of the flange from the pop-up menu (**2**) that appears. In the above example, the selected shape of the flange is Circle.
- Tap the ***Layout*** area (**3**) to select the pattern formed by the bolts from the pop-up menu that appears.
- Tap the respective value boxes then use the onscreen keyboard to enter flange dimensions and bolt pattern lengths.



Tap the value box (**1**), then enter the number of bolts directly.

- After all the required dimensions have been entered, tap  to proceed with measuring.

See related topics for measurement procedures for vertical flanged machines.

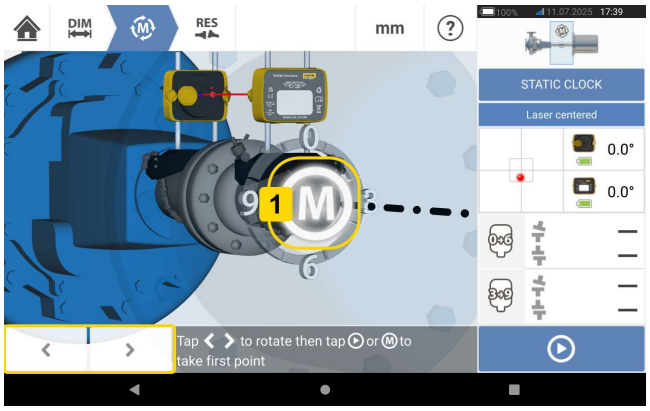
Vertical flanged machines – Static clock

Measure with Static measurement mode

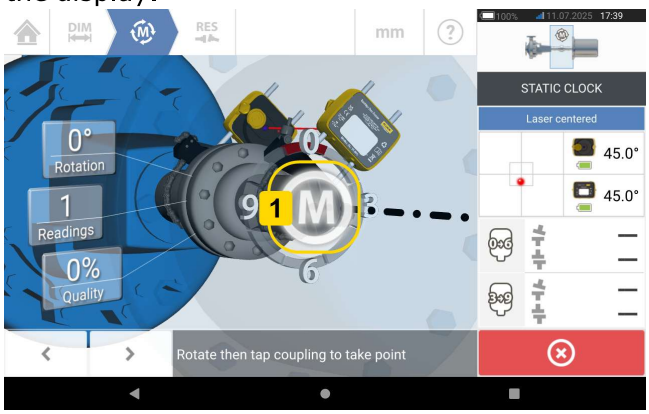
- Center the laser beam.

  Note
  Static measurement mode is used for vertically mounted machines.

- Rotate the shafts to the first measurement position. If using the coupling housing numbering convention, the reference mark and the measurement position 0 should be aligned or matched to each other.

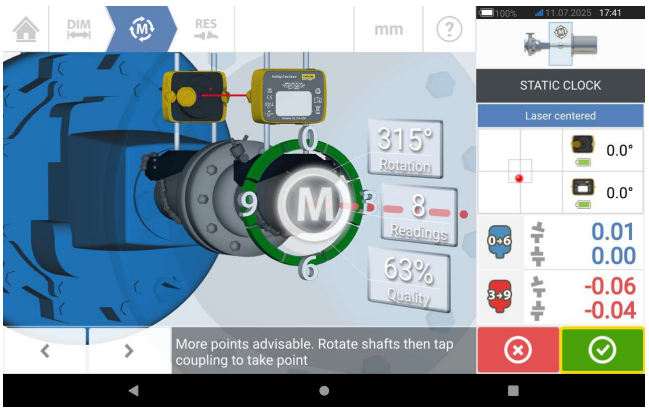


- Use or to position the shown laser and sensor at the angular rotation corresponding to the actual position of the components mounted on the shafts, then tap **M** (**1**) or to take the first measurement point.
- Rotate shaft to the second measurement position (e.g. 1:30). If the chosen measurement position does not correspond to the angle selected automatically on the display, use the navigation keys to manually position the laser and sensor at necessary angle on the display.



  Tap **M** (**1**) to take the measurement point.

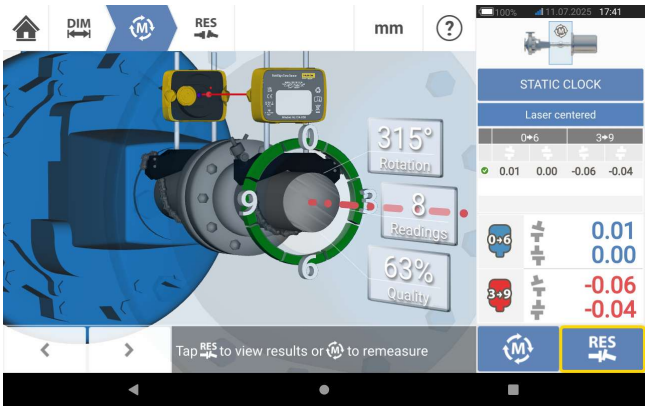
- Take the maximum number of measurement points to maximize the quality of results.



- Tap  to proceed to view measurement results.

Note

The color of the ***Proceed*** icon () denotes the attained measurement quality.

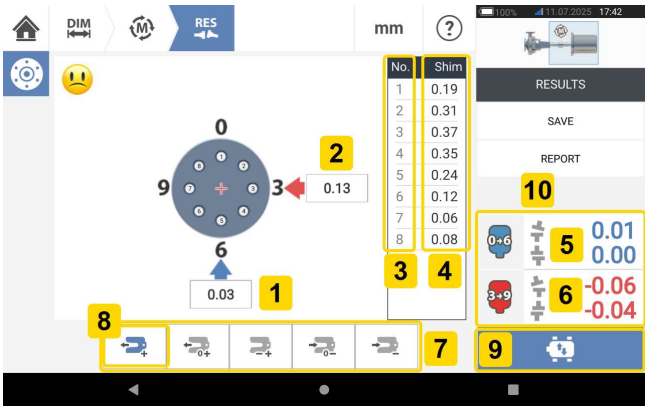


Note

If flange dimensions have not been defined, the flange icon  appears. Tap  to enter missing flange dimensions.

- Tap  to view measurement results.

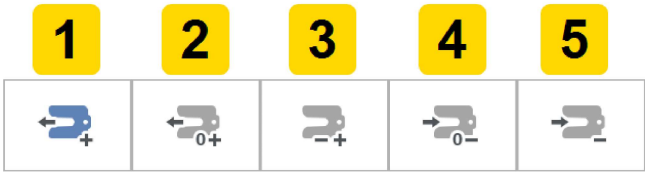
Vertical results



- **(1)** Flange correction in 0-6 direction
- **(2)** Flange correction in 3-9 direction
- **(3)** Bolt position
- **(4)** Shimming values
- **(5)** Coupling gap and offset in the 0-6 direction
- **(6)** Coupling gap and offset in the 3-9 direction
- **(7)** Shim correction modes
- **(8)** Shim correction mode used in this example
- **(9)** Initiates Live Move
- **(10)** Tapping the coupling results area accesses the measurement table.

In the results screen, the three icons  – dimensions, measurement and results – are active and may be used anytime.

Shimming modes

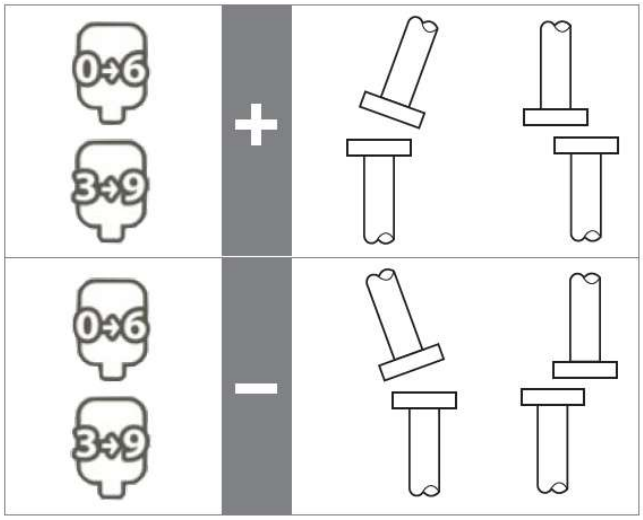


Shimming modes are defined as follows:

- **(1)** mode indicates ***all positive*** shimming
- **(2)** mode indicates ***zero/plus*** shimming. In this mode, one bolt position is set to zero and the rest are positive
- **(3)** mode indicates ***optimized*** shimming. In this mode, half of the corrections will positive, and the other half negative.
- **(4)** mode indicates ***zero/minus*** shimming. In this mode, one bolt position is set to zero and the rest are negative.
- **(5)** mode indicates ***all negative*** shimming

Sign convention

POSITIVE GAP opens towards 0:00 or 3:00
POSITIVE OFFSET if the top coupling half is offset towards 0:00 or 3:00

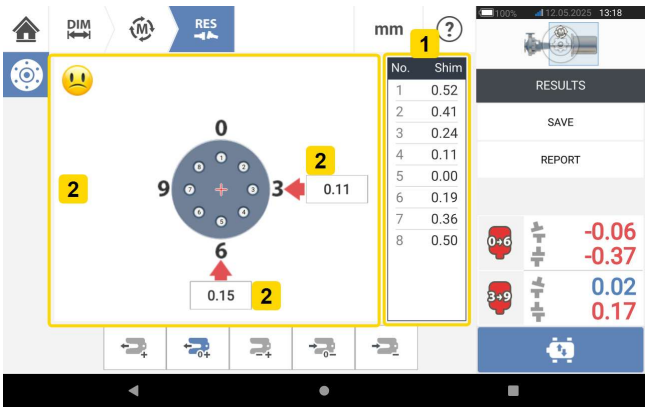


Viewpoint is always determined by looking from the sensor towards the laser.
Note: The little clock face on the laser serves as a reminder of the viewpoint.

WARNING
When the sensor is switched on, the laser beam is emitted. DO NOT stare into the laser beam!

Live Move – Vertical machines

To align vertical mounted machines, correct angularity and offset.



- **(1)** To correct angularity, shim at the given bolt locations.
- **(2)** To correct offset, move the machine laterally.

Correct angularity

It is recommended (but not necessary) to correct angularity first:

1. Loosen the flange bolts then lift the movable machine.

> **WARNING**
> The machine bolts must be undamaged and removable.

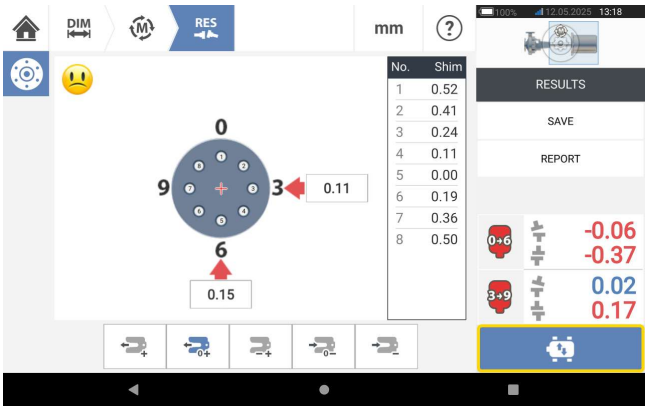
2. Angularity corrections are made by shimming. The shimming values at the respective bolt positions are shown on the screen. Insert (or remove) shims with the correct thickness under the selected bolt. (Refer to shimming modes in related topics.)

3. Tighten the bolts back down, then take another set of readings to confirm shimming corrections; repeat shimming if necessary.

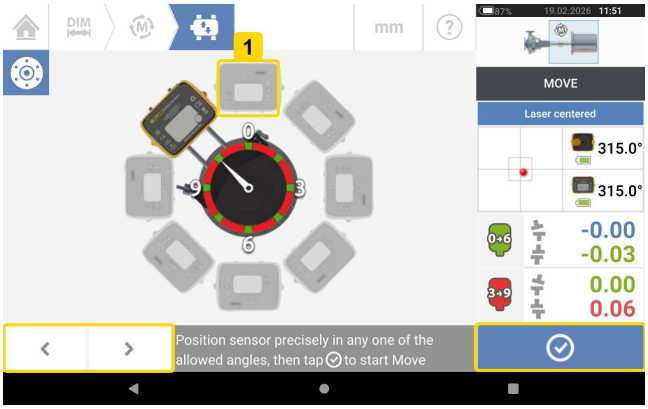
4. Once satisfied that overall angular misalignment is in tolerance, and no more shimming is required, proceed to correct offset.

Correct offset

1. Use the Live Move function to correct offset.



2. Tap  to start Live Move. A hint screen to position both sensor and laser in any one of the eight designated 45° positions (12:00, 1:30, 3:00, 4:30, 6:00, 7:30, 9:00 or 10:30 o'clock position – as viewed from sensor towards laser) is shown.

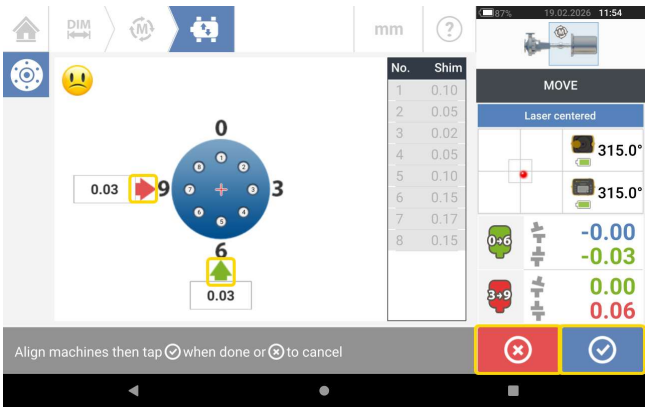


3. Use  and  to place the displayed sensor at the necessary 45° position. Alternatively, tap necessary position (for example **1**) to move the sensor on the screen to this position (**1**). This position is the same as the angular position of the sensor and laser on the shafts. In this example, 12:00 o'clock is the selected angular position for sensor and laser.

Tap  to continue.

- **(1)** Arrows show direction and magnitude to move machine
- **(2)** Tolerance coded gap and offset coupling values
- **(3)** Tap  to measure again or to start Live Move again
- **(4)** Tap  to measure again or to start Live Move again

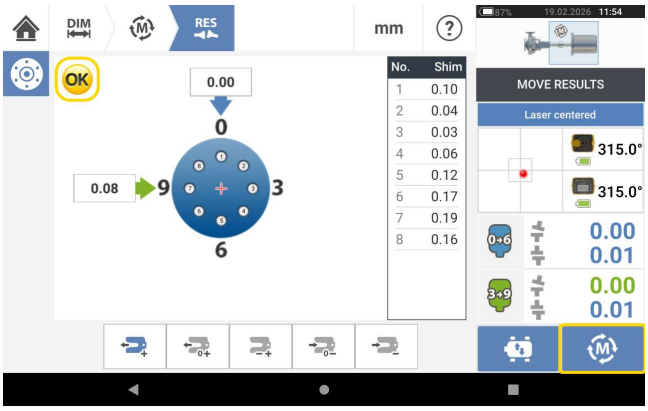
4. Loosen the flange bolts then move the machine laterally in the direction of the color coded bold arrows to perform offset corrections.



Once Live Move has been detected, the ***Cancel*** icon replaces the ***Undo*** icon .

If you tap , the hint ***Cancel Move*** is shown.
The color coded bold arrows show coupling tolerance as follows: Blue (excellent condition); Green (good condition) and Red (poor condition). The color of the arrows changes with the movements automatically. Monitor the arrows on the Live Move screen.

- Corrections should be brought as close as possible to zero.
- Use appropriate tools (e.g. jackscrews) to position the machine.
- Take care not to let the shims slip out of place during lateral positioning.



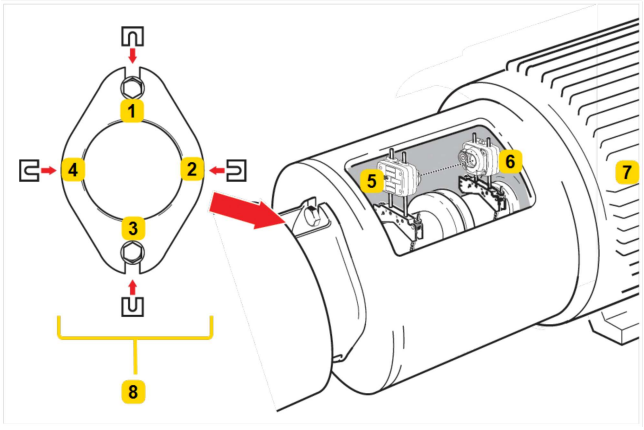
5. When offset is in tolerance as shown by a happy smiley [ ] (excellent tolerance) or an OK icon [ ] (acceptable tolerance), tighten the flange bolts then tap and measure again to check and confirm if the new alignment condition is in tolerance.

6. If not, repeat the above steps until alignment is in tolerance.

Horizontal flanged machines

Flange-mounted horizontal machines

When machines are joined by means of flange, their alignment is determined by inserting the proper combination of shims at the flange bolts and, depending on the flange type, between the faces of the flanges. The requirements are similar to those for aligning vertical machines. When the shaft rotates around a horizontal axis, the electronic inclinometer detects the rotational position during measurement, which may be taken in any necessary measurement mode.
Based on the measurements taken, the touch device determines the thicknesses of shims to be fitted between the flanges required to align the shafts.

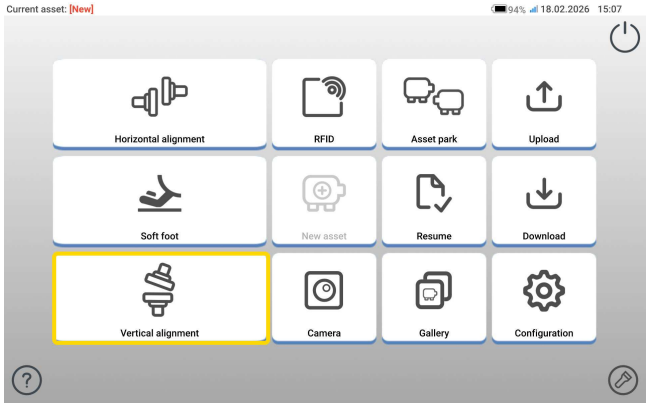


- **(1) – (4)** Flange shimming positions
- **(5)** Laser
- **(6)** Sensor
- **(7)** Machine to be aligned
- **(8)** End view of flange (as seen from left)

Shown here are the shimming locations for a two-bolt flange, a special case of the normal circular flange shape.

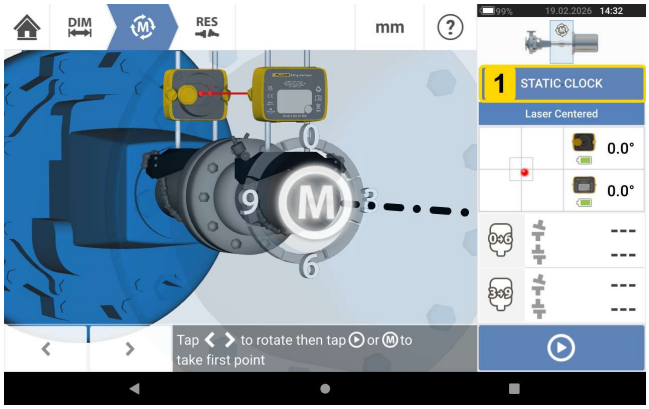
Set-up

- Mount the laser and the sensor as required (horizontally).
- Switch the device on, then tap the ***Vertical alignment*** icon in the home screen.

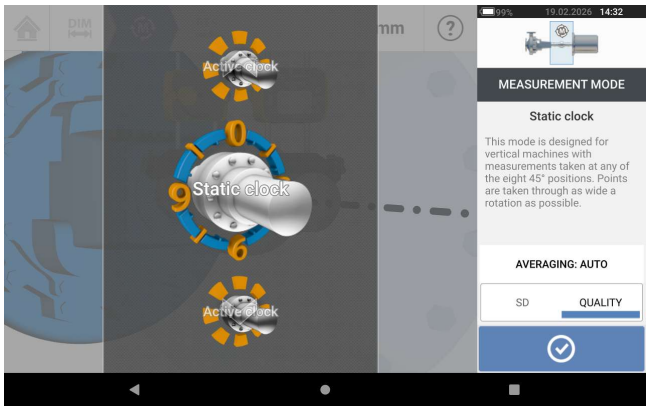


- Proceed to configure the machines as described in Vertical flanged machines.

- Due to the horizontal mounting of both sensor and laser, all related horizontal shaft alignment measurement modes are available once the sensor has been initialized.



- Tap **1** and select the necessary measurement mode then proceed to carry out measurement. (See Measurement modes).

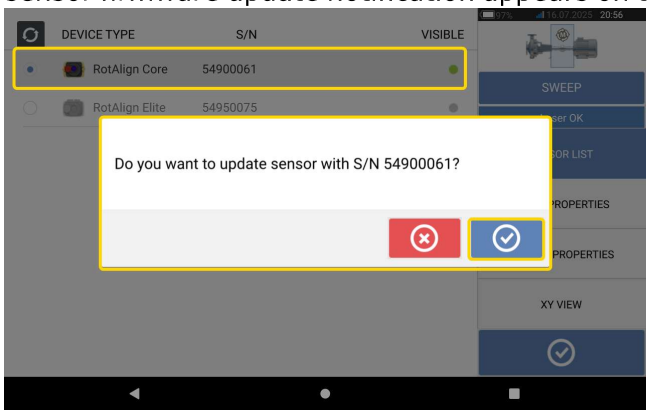


The coupling results icons for the horizontal flange application show 0-6 (for **V**ertical) and 3-9 (for **H**orizontal).

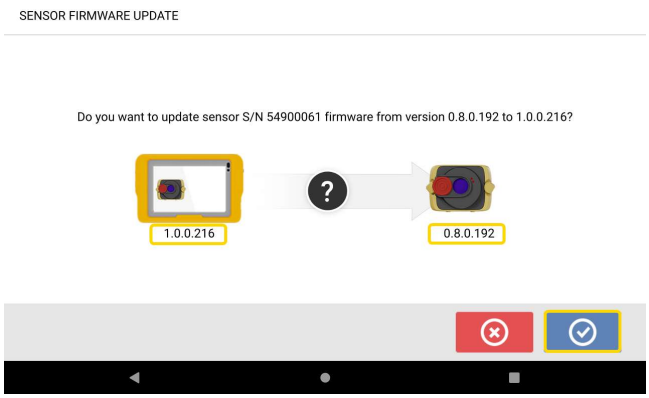
Core sensor firmware update

Update sensor firmware to a newer version

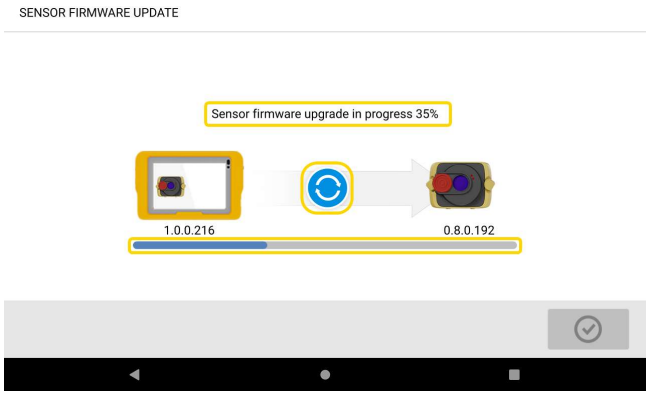
It is possible to carry out a sensor firmware update directly via the rugged touch device. If a sensor with an older firmware version is connected via Bluetooth to the rugged device, a sensor firmware update notification appears on the display.



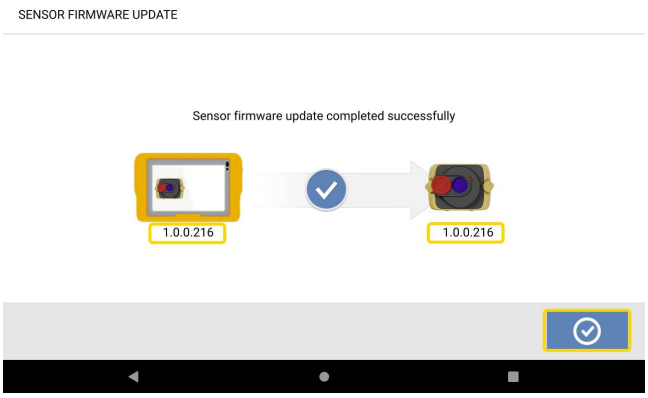
It is recommended to update the sensor firmware. Tap  to proceed to update the sensor. The sensor firmware update screen is shown.



The screen shows that a newer sensor firmware version is available within the rugged touch device. Tap  to update the sensor connected via Bluetooth.



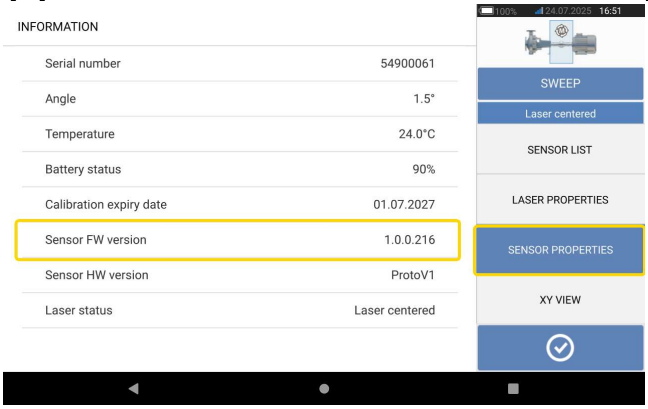
When the update process is successfully completed, this screen is shown.



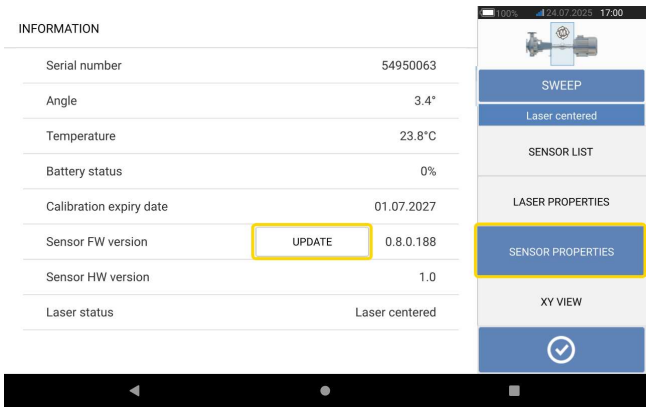
The sensor has now been updated to the newer version available on the rugged touch device.

Tap  to exit the update screen.

The new sensor firmware version appears under ***Sensor properties***. Tap either sensor area **(1)** on the measurement screen to show sensor properties.



If the sensor firmware update is not done when the notification appears, the update can be started through ***Sensor properties***. A hint is shown next to the older sensor firmware version.



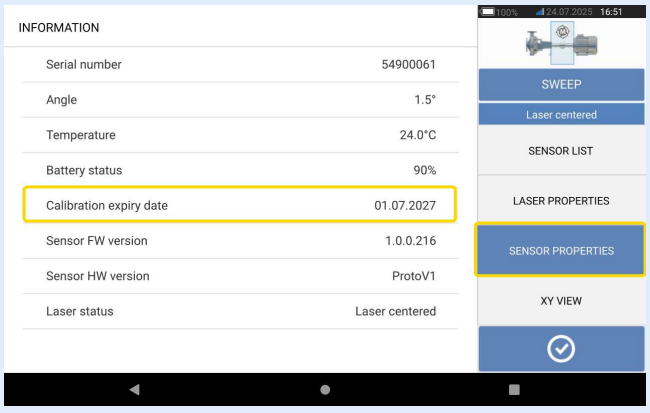
Tap ***UPDATE*** to proceed with the sensor firmware update.

Note
The sensor firmware update notification continues to appear once per day until the firmware update is completed.

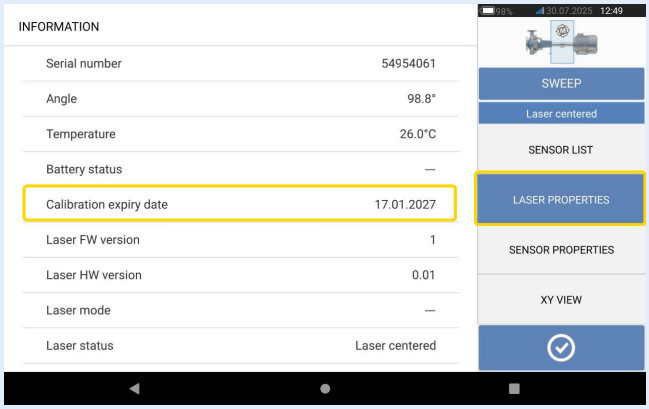
Notification on sensor and laser calibration

Note
The calibration accuracy of both the sensor and the laser should be checked every two years as indicated on the round label affixed to the back of the respective component. Both sensor and laser should be returned to an authorized Fluke service center for calibration checking and inspection. You may contact your local Fluke representative for assistance or visit www.pruftechnik.com.

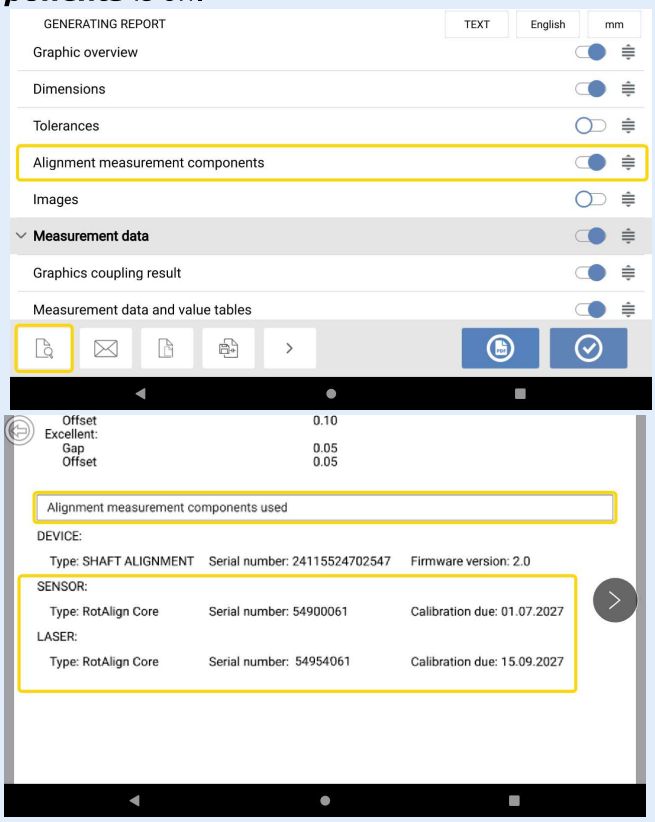
Note
The sensor calibration due date is also found under ***Sensor properties***.



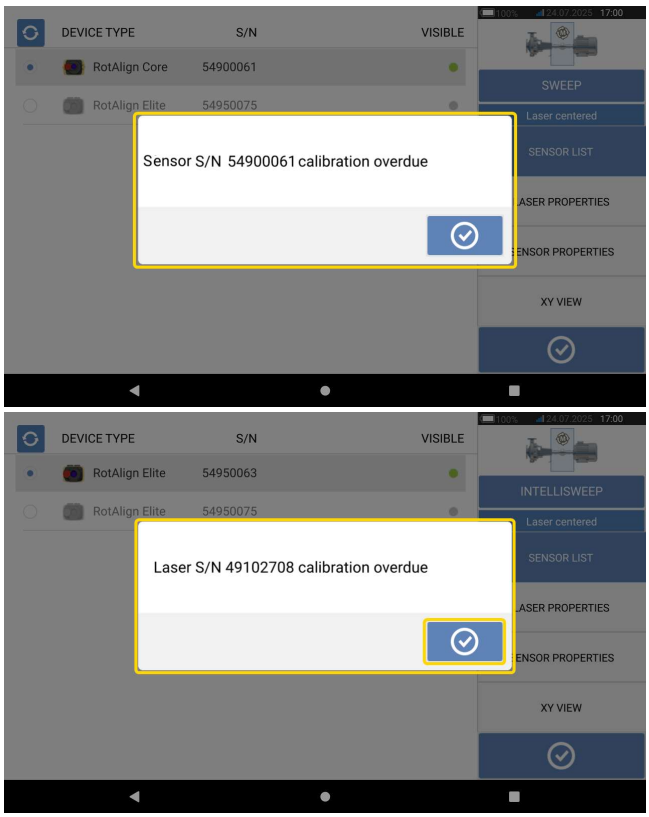
The laser inspection due date is also found under ***Laser properties***.



If the calibration due date has expired, the due date will be highlighted red.
Both sensor and laser calibration due dates will also be shown on the asset measurement report if ***Generating report*** menu item ***Alignment measurement components*** is on.



If the calibration due date of sensor and/or laser have expired and the components are connected via Bluetooth to the rugged touch device, the related calibration expiry notification is shown on the screen.



Tap  to close the notification.

Best practice

Mount sensor and laser

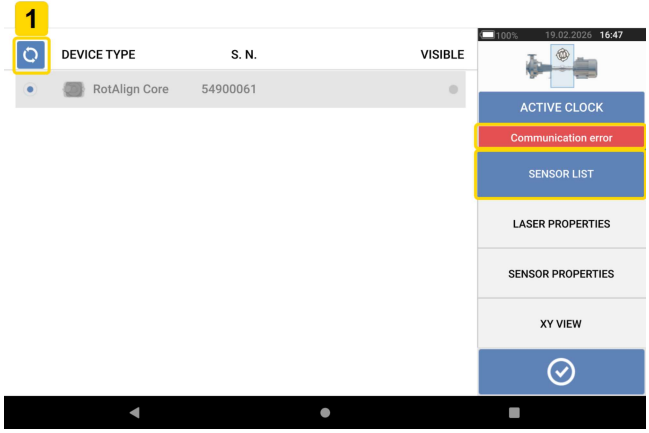
- The dimensions screen shows the sides where the sensor and laser are to be mounted. If necessary, use  , the camera icon to rotate the view on the screen to allow machines be viewed as they physically appear.
- Mount the brackets directly on the shafts or couplings.
- Mount sensor and laser as low as possible on the supplied support posts. The couplings must not block the path of the laser beam.
- Mount laser on the machine designated stationary and sensor on the machine designated moveable.
- Both sensor and laser must not touch one another or the machine casings during shaft rotation.

Enter dimensions

- Dimensions measured to within ± 3 mm (± 1/8 in.) using a tape measure with 1 mm (or 1/32 in.) divisions are acceptable.
- When entering the dimension between the front and back feet, use the distance between the center of the two foot bolts.
- When dimensions are measured from the sensor, and an industrial tape measure is used, insert the hook in the slot (**1**) at the top of the sensor.

Initializing sensor

- Should communication error occur, tap detector area below the hint ***Communication error*** then tap ***SENSOR LIST*** to check whether the sensor has been detected.
- Any new Bluetooth connection must initially be scanned before communication between sensor and the rugged device can be established. Tap  (**1**) to start to scan.



Causes that can influence measurement

- Incorrect or loosely mounted bracket frame and/or support posts
- Incorrect or loosely mounted sensor and/or laser on the support posts
- Loose machine anchor bolts
- Unstable or damaged machine foundation
- Mounted components strike machine foundation or machine casings or frame during shaft rotation
- High breakaway torque from rotatable and non-rotatable shafts
- Coupling backlash
- Change of rotational direction during and between measurements
- Mounted components moved during shaft rotation
- Uneven shaft rotation
- Change in temperature within machines
- External vibration from other rotating machines

Results and Live Move

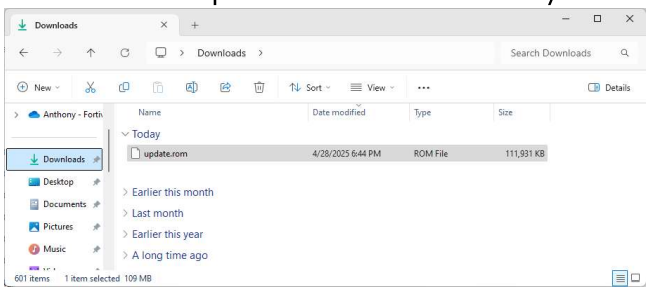
- V is the vertical orientation of the machines viewed from the side.
- H is the horizontal orientation of the machines viewed from the top.
- The foot results which are used for misalignment correction, are position values with respect to the reference machine.
- The bold colored foot tolerance arrows show the direction and magnitude in which to move the machine. The color code also shows the alignment tolerance.

Appendix

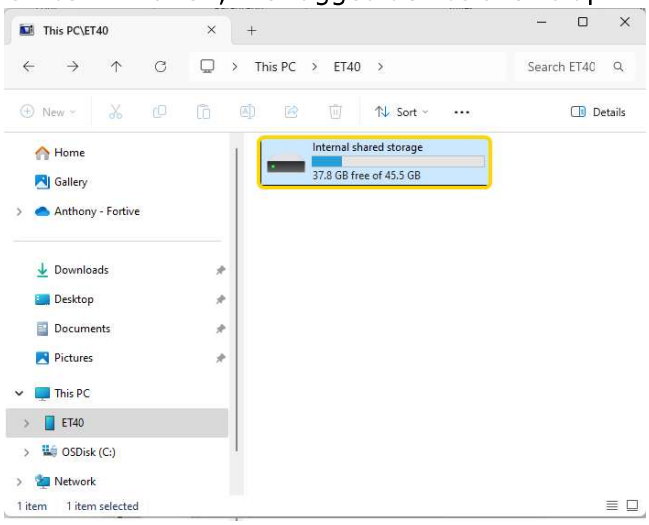
Update device to a newer firmware version

Check the website www.pruftechnik.com to obtain the latest version. If in doubt, please contact your local representative or Fluke.

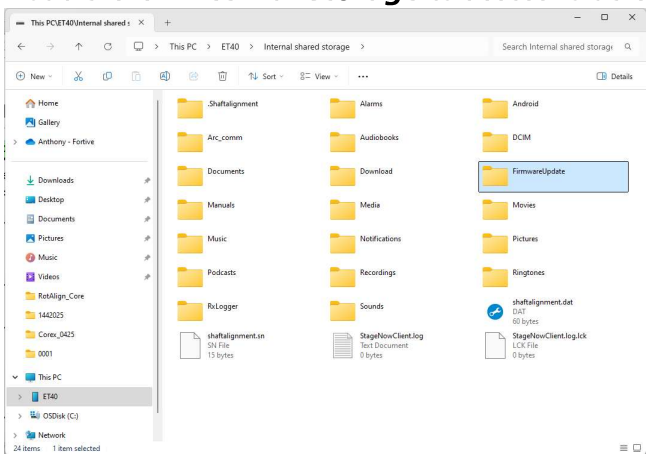
- Download the update file to the necessary directory on a PC.



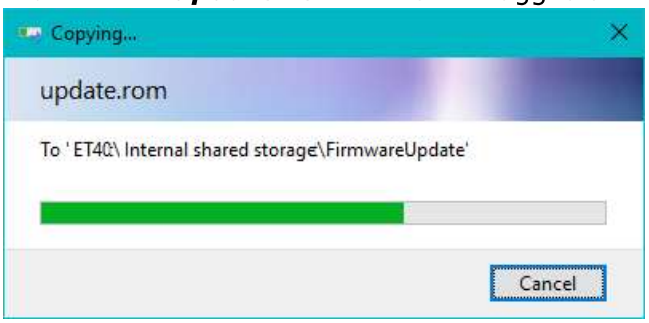
- Switch the rugged device on then connect it to the PC. A hint to allow the Windows PC access the rugged device appears.
- On confirmation, the rugged device shows up in the File Explorer.

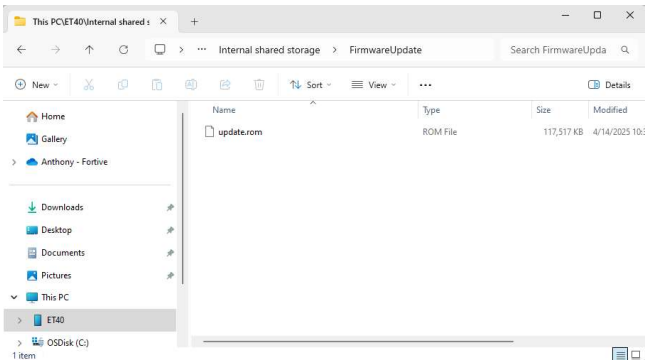


- Double-click ***Internal storage*** to access folders in the rugged device.

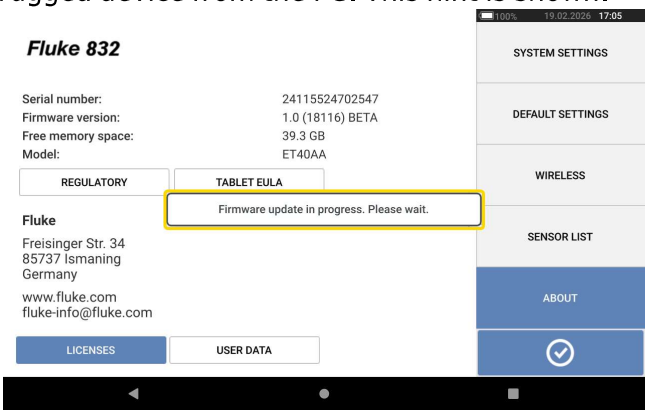


- Transfer the ***update.rom*** file to the rugged device folder ***FirmwareUpdate***.

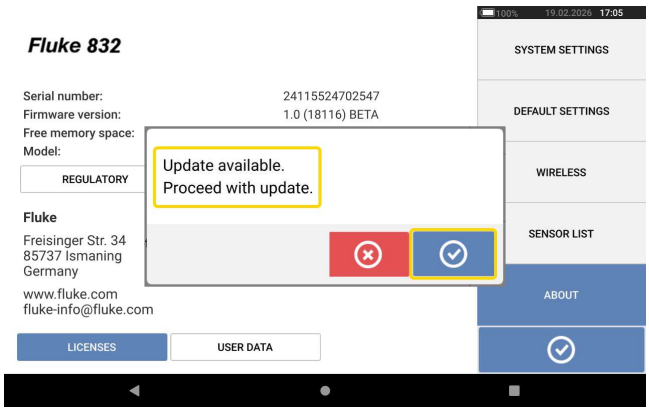




- After the update file has been copied to the ***FirmwareUpdate*** folder, disconnect the rugged device from the PC. This hint is shown.



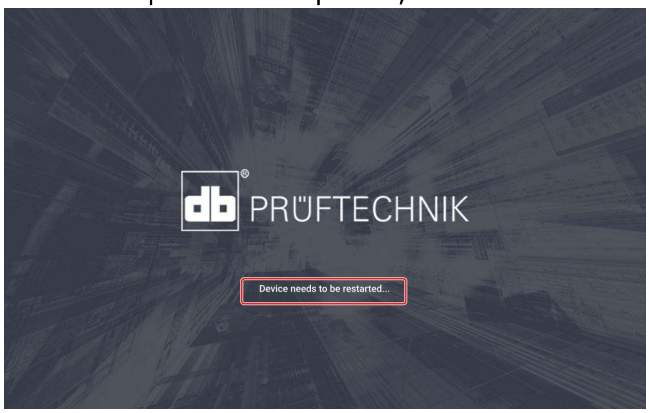
Note
DO NOT tap the device or press any of the hard keys. Wait for the next hint to appear.



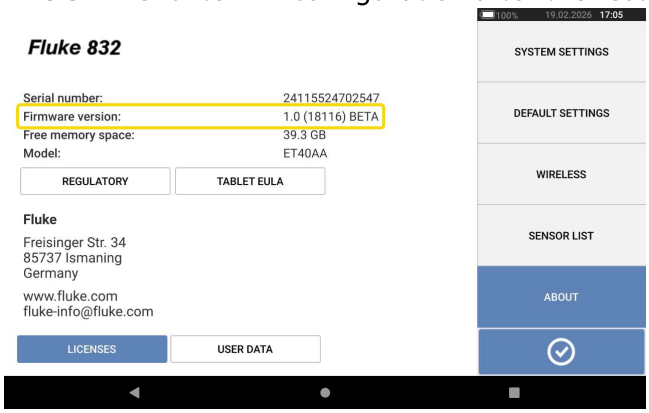
- Tap  to proceed with the firmware update

> **Note**
> Follow all the update instructions carefully, and confirm all requested installations.

- Once the update is completed, a hint to restart the tablet device appears.



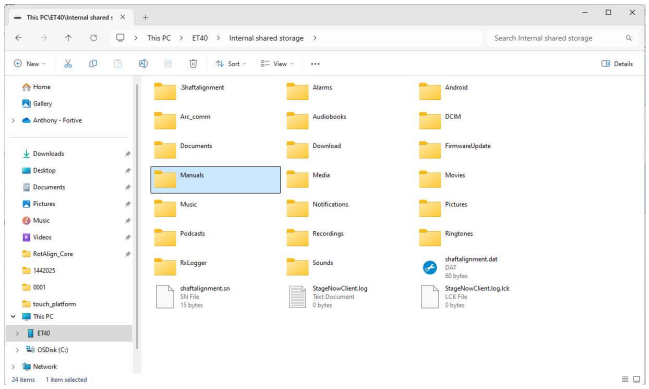
- Press and hold down the power key briefly. ***Power off*** and ***Restart*** icons appear on the display.
- Tap ***Restart***. The update is now completed and may be checked and confirmed in the ***ABOUT*** menu item in configuration after the restart.



Documentation

This on-board help and other relevant and related customer documents are saved as PDF files in the folder ***Manuals*** within the ruggedized tablet. To access this folder, the ruggedized tablet

is connected to a Windows PC. Allow the Windows PC to access the ruggedized tablet and then double-click ***Internal storage*** to access the required folder.



The content in this document is available also on the rugged device as context sensitive help.

Tap the question mark icon ⓘ wherever it is available to show the context sensitive help.

Technical data – Rugged tablet

832 rugged tablet	
CPU	Processor: Octa-Core (8): 2.2 GHz (2) and 1.8 GHz (6) Memory: 4 GB LPDDR4X SDRAM/64 GB UFS Flash
Display	Corning® Gorilla® Glass Resolution: 1280 x 800 Pixel Size: 203.1 mm (8")
Connectivity	Wi-Fi: IEEE 802.11 a/b/g/n/ac/d/h/i/r/k/v/w/mc/ax 2x2 MU-MIMO; Wi-Fi® certified; IPv4, IPv6 (Wi-Fi 6) Bluetooth Version: 5.1 / 2.1+EDR Class 2 (Bluetooth LE) RFID
Camera	Main Camera - Resolution: 13.0 MP Auto Focus Front Camera - Resolution: 5.0 MP
Environmental protection	IP65 (dustproof, water jets resistant)
Temperature range	Operation: -20°C to 50°C (-4°F to 122°F) Storage: -40°C to 70°C (-40°F to 158°F)
Battery	Type: Li-ion Polymer rechargeable battery 3.87 V / 6100 mAh / 23.61 Wh Operating time: Up to 11 hours
Dimensions	Approx. 267 x 171 x 35 mm (10 33/64" x 6 47/64" x 1 3/8")
Weight (with hand straps)	Approx. 930 g (2.1 lbs)

Technical data – Core sensor

Core sensor ALI 54.900	
Type	6-axis sensor: 2 planes (4 displacement axes and 2 angles) Measurement area: Unlimited, dynamically extendable Measurement resolution: 1 µm (0.04 mil) and angular 10 µRad Transmitted measurement rate: Approx. 20 Hz Measurement error: <2% Optical measurement range: 14 x 14 mm (35/64" x 35/64")
Inclinometer	Resolution: 0.1° Error: Roll ±1°; Pitch ±3°
LED indicators	1 LED for laser adjustment and battery status 1 LED for BT communication
Power supply	Battery: Lithium-Ion rechargeable battery 3.7 V / 4.7 Wh Operating time (continuous use): 30 hours Charging time: 2.5 hours for up to 80%; 4 hours for up to 100% Charging supply: USB-C (5 V DC, 500 mA. Use only certified USB charger with limited power according to IEC/EN 61010-1 or LPS/PS2 output according to IEC/EN 62368-1)
External interface	Integrated low power 2.4 GHz radio (BT LE) USB 2.0 Full speed
Radio transmission distance	Up to 50 m (160 ft) direct line of sight
Environmental protection	IP 65 (dustproof and water jets resistant), shockproof Relative humidity: 10% to 90% Usage: Up to 3000 m above sea level Pollution Degree 4 (use appropriate power supply)
Ambient light protection	Yes
Temperature range	Operation: -10°C to 50°C (14°F to 122°F) Charging: 0°C to 35°C (32°F to 95°F) Storage: -20°C to 50°C (-4°F to 122°F)
Dimensions	Approx. 104 x 72 x 54 mm (4 3/32" x 2 53/64" x 2 1/8")
Weight	Approx. 231 g (8.1 oz)
CE conformity	Refer to the CE compliance certificate in www.pruftechnik.com
Country radio certifications	Approvals granted for specific regions (refer to the provided 'Safety and general information' document)

Technical data – Core laser

Core laser ALI 54.910	
Type	Semiconductor laser diode Fixed laser
Beam divergence	0.3 mrad
Beam power	< 1mW
Wavelength	630-640 nm (red, visible)
Safety class	Class 2 according to IEC 60825-1:2014 The laser complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019. Safety precaution: Do not look into laser beam
Laser separation distance	Up to 10 m
LED indicators	1 LED for battery level and charging status
Inclinometer	Resolution: 0.1° Error: Roll ±1°
Power supply	Battery: Lithium-Ion rechargeable battery 3.7 V 4.7 Wh Operating time (continuous use): 40 hours Charging time: 2.5 h for up to 80%; 4 h for up to 100% Charging supply: USB-C (5 V DC, 500 mA. Use only certified USB charger with limited power according to IEC/EN 61010-1 or LPS/PS2 output according to IEC/EN 62368-1)
Environmental protection	IP 65 (dustproof and water jets resistant), shockproof Relative humidity: 10% to 90% Usage: Up to 3000 m above sea level Pollution Degree 4 (use appropriate power supply)
Temperature range	Operation: -10°C to 50°C (14°F to 122°F) Charging: 0°C to 35°C (32°F to 95°F) Storage: -20°C to 50°C (-4°F to 122°F)
Dimensions	Approx. 101 x 75 x 37 mm (3 31/32" x 2 61/64" x 1 29/64")
Weight	Approx. 190 g (6.7 oz)
CE conformity	Refer to the CE compliance certificate in www.pruftechnik.com