

Laser Shaft Alignment

SHAFT ALIGNMENT (RotAlign Core/RotAlign Elite)

- **Users Manual**

SHAFT ALIGNMENT

(RotAlign Core / RotAlign Elite)

On-board help

Version: 2.0

Edition: 10.2025

Part No.: DOC 54.200.EN

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Introduction

This on-board help provides information to support users of the Product.

How to use the on-board help

The on-board help is accessed through the home screen. Tap  (**Home** icon) then the question mark icon . The on-board help is shown.

Tap the question mark icon  shown on the screen to open the related context sensitive help.



- **(1)** Tap  to return to the start screen.
- **(2)** Tap  to go back.
- **(3)** Tap  to go to the opening page of this on-board help.
- **(4)** Tap  to go forward.
- **(5)** Tap  to search for text in the on-board help. A search field together with an onscreen keyboard appears.
- **(6)** Throughout this on-board help, image thumbnails have been used. Tap the image thumbnail to enlarge the image.
To zoom out and proceed, tap the enlarged image.
- **(7)** The navigation pane hide arrow is used to hide the navigation menu items. Tap the

arrow to hide or show the navigation menu items.

- **(8)** This screen-specific help icon is used to access the context sensitive help.



Note

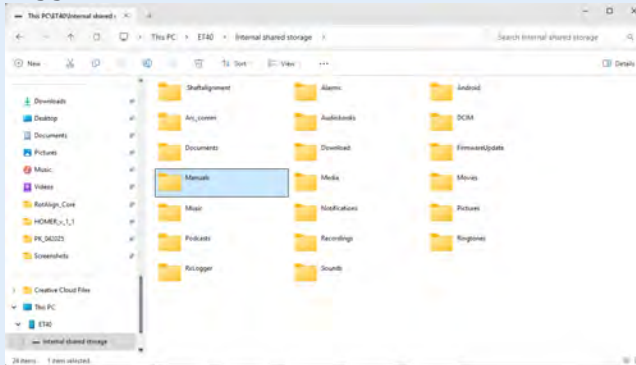
It is recommended to scroll to the bottom of the page to be able to access other related topics which are frequently used throughout the on-board help.

Documentation



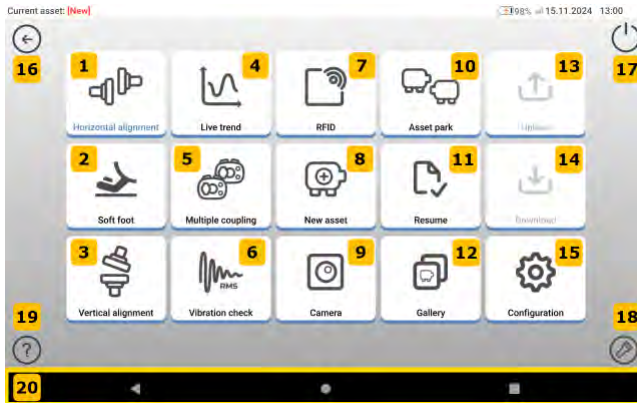
Note

This on-board help and other relevant and related customer documents are saved as PDF files in the folder **Manuals** within the rugged device. To access this folder, the rugged device is connected to a Windows PC. Allow the Windows PC to access the rugged device and then double-click the internal storage to access the required folder.



Home screen

Switch the device on to show the home screen. Alternatively, tap  when in the application to show the home screen.



Note

Features that have not been licensed will not be shown on the home screen or shown grayed out.

Tap the related icon to open related function:

- **1 Horizontal alignment** icon is used to access the horizontal alignment application.
- **2 Soft foot** icon is used to access soft foot measurement.
- **3 Vertical alignment** icon is used to access the vertical alignment application. If this icon is off, tap **New asset** icon (**8**) to start the vertical alignment icon.
- **4 Live Trend** icon is used to access the Live Trend application.
- **5 Multiple coupling/Single coupling** icon toggles between horizontal alignment and Live Trend applications with multiple sensor-laser combinations or a single sensor-laser combination.
- **6 Vibration check** icon is used to access the vibration measurement application.
- **7 RFID** icon is used to open assets assigned to related RFID tags.
- **8 New asset** icon is used to start a new asset (this may be a pump-motor combination).



Note

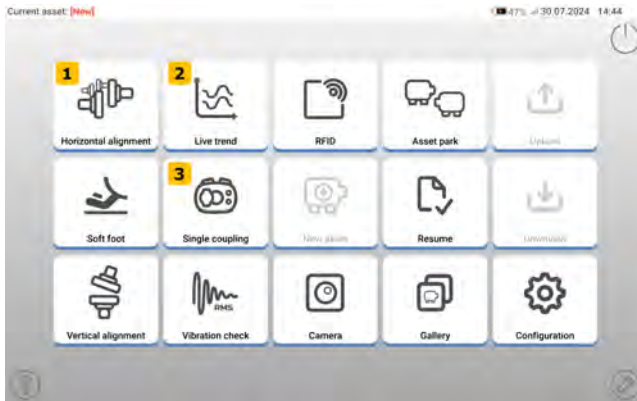
For any opened asset, these applications can be done: shaft alignment, Live Trend, vibration check, soft foot measurement

- **9 Camera** icon is used to access the built-in camera.
- **10 Asset park** icon is used to show all saved assets and templates.
- **11 Resume** icon is used to resume last asset opened (provided it was saved) when the device is switched on.
- **12 Gallery** icon is used to show all images taken within the alignment applications.
- **13 Upload** icon is used to save asset measurements in the Cloud drive.
- **14 Download** icon is used to open asset measurements from the Cloud drive.

- **15 Configuration** icon is used to configure the alignment application settings (which include language, date, time, default settings), and access its built-in mobile connectivity. Mobile connectivity lets the device access the Cloud functionality, which lets files be shared wireless.
- **16 Back** icon is used to return to previous screen.
- **17 Power-off** icon is used to put the rugged device to sleep mode.
- **18 Flashlight** icon is used to turn the rugged device LED flash on/off.
- **19 Help** icon is used to show the on-board help file.
- **20 System action bar** shows three icons. The icons are Back () , Home () , and Recent () .
 -  — used to show previous screen
 -  — used to show the home screen
 -  — used to show recently used applicationsIn an open rugged device, all three icons are on. In a kiosk version of the rugged device, only the Back icon is on. The other two are off.

Home screen — Multiple coupling

The multiple coupling functionality is accessed by tapping the "Multiple coupling/Single coupling" icon [] within the home screen.



- **1** This icon toggles between "Single coupling" and "Multiple coupling". When "Multiple coupling" [] is tapped, then horizontal alignment and Live Trend measurements using multiple sensor-laser combinations is enabled. Note that the icon then toggles to "Single coupling" []. Tapping the "Single coupling" icon enables use of the conventional single sensor-laser combination for horizontal alignment and Live Trend applications.
- **2** This icon is used to access the Multiple coupling functionality.
- **3** This icon is used to access the multiple coupling Live Trend functionality.

Configuration

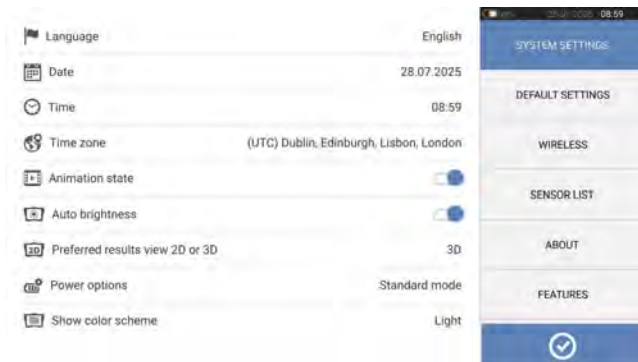


Note

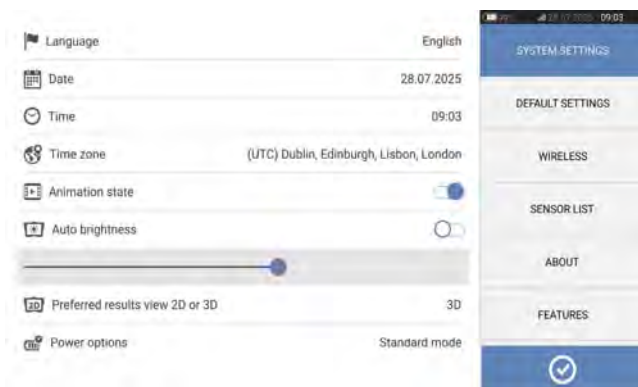
The configuration items shown are related to the product option. Some items will not be shown in open tablet versions.

From the home screen, tap  the configuration icon to access these configuration items:

- **System settings** sets these items:



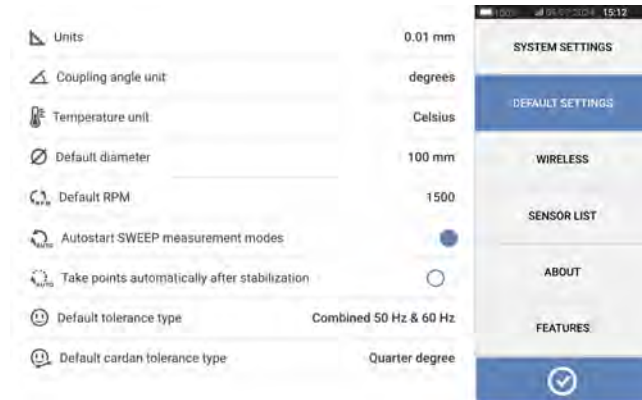
- > Language (system language); > Date; > Time; > Time zone;
- > Animation state — regulates the transition between the dimension, measure and results screens. Two options are available – fast and standard. If **Animation state** is on, the transition between screens is set to standard and therefore noticeable. If off, the transition is fast.
- > Auto brightness – adjusts the display brightness of the touch device. If **Auto brightness** is on, the display brightness adjusts automatically. If off, then the display brightness may be manually adjusted by dragging the brightness slider to the left or right. For open applications, the device brightness is controlled in display settings.



- > Preferred results view 2D or 3D
- > Power options – used to manage the power usage in the touch device. The four power modes available are: **Standard** (the display dims after 10 minutes and goes to sleep mode after 20 minutes), **Maximum** (no dimming and no sleep mode), **Presentation** (the display dims after 1 hour, but never enters the sleep mode) and **Minimum** (the display dims after 3 minutes and goes to sleep mode after 5 minutes). To get out of the sleep mode, press the power key. For open applications, the screen timeout is controlled in display settings.
- > Show color scheme – used to set display appearance either light or dark. Use the pop-

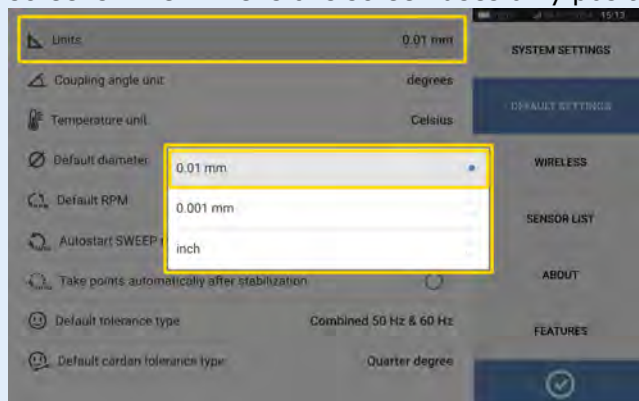
up menu and select necessary appearance.

- **Default settings** are used to set units of length, angle and temperature; the default diameter may be set here. It is also used to activate or deactivate the automatic start of IntelliSweep / Sweep as well as automatic collection of measurements after stabilization, especially in point measurement modes. The type of tolerance to be used may also be set here.



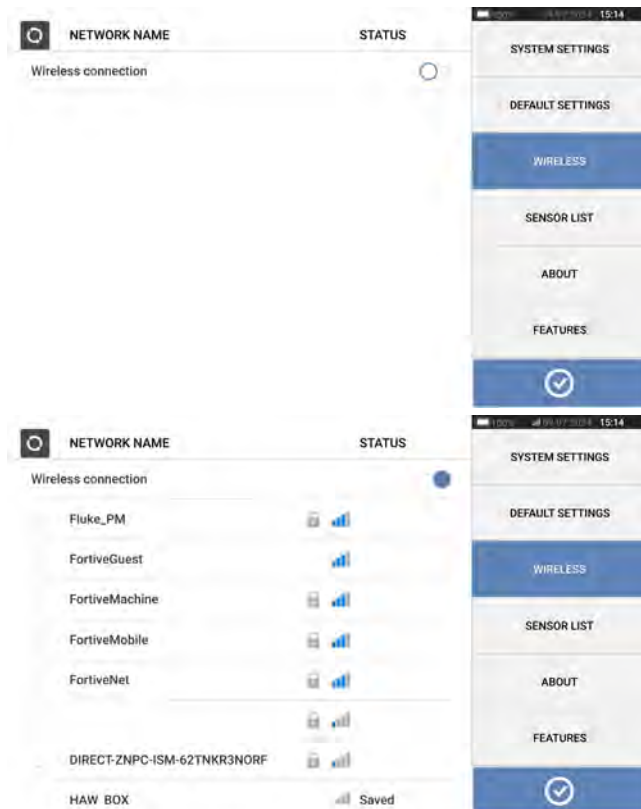
Note

When metric units are used, the resolution of physical quantities used in the device may be set to two (0.01 mm) or three (0.001 mm) decimal places. This measurement precision is available in Measurement, Results and Live Move screens. The Dimensions screen uses only positive integers.



The set time zone is coupled to the default RPM unless the default RPM is edited independently. If the time zone is set, for example, as Central America, the default RPM is 1800. If it is set as London, the default RPM is 1500.

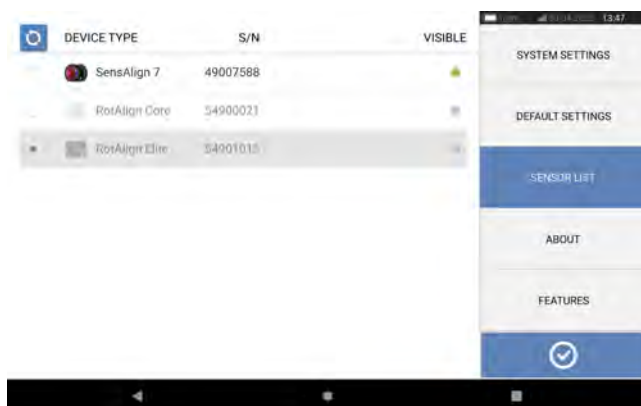
- When activated, **Wireless connection** is used to connect the rugged device to available WiFi networks.



Note

The rugged tablet may be connected only to WiFi networks that do not open separate web browsers to login.

- **Sensor list** shows all available sensors.



- The **About** screen shows the device serial number, firmware version of the application and available memory space.



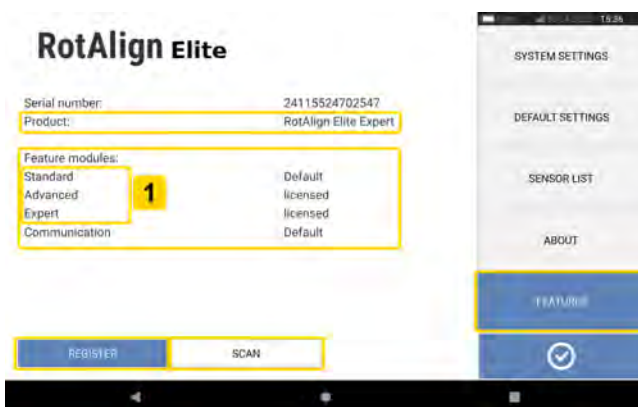
Tap **LICENSES** to see applicable GNU General Public License information.

Tap **REGULATORY** to see device regulatory markings for approved country radio certificates.

Tap **TABLET EULA** to see the device end user license agreement.

Tap **FACTORY RESET** to restore the device to its factory settings. If confirmed, all application data will be deleted, and a new PIN login must be created.

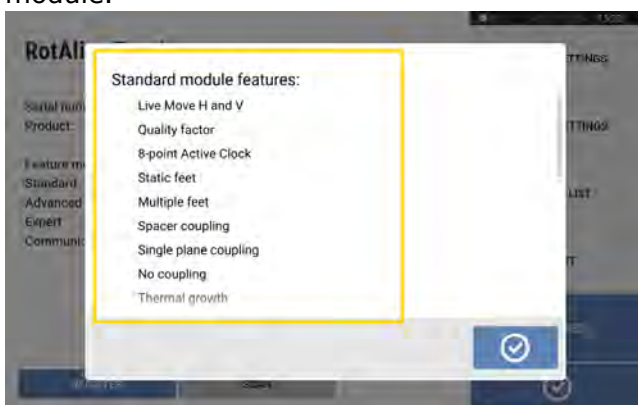
- **Features** shows the product licensed, and the feature modules registered.



Tap **REGISTER** to license any additional features.

Tap **SCAN** to license any additional features through a QR code on the license certificate.

Tap any registered features module (**1**) to see all the features available in the applicable module.



In this example, the module standard has been selected. Scroll down to see all the listed features.

How features are structured

Features are related to type of sensor used. There are two sensor categories: RotAlign Core and RotAlign Elite. The two sensor categories plus the rugged tablet (or the app) give the related product category.

The product is organized into categories, each with a distinct bundle of features.

For RotAlign Core, the available bundles are Starter, Advanced, and Expert.

For RotAlign Elite, the available bundles are Starter, Starter Plus, Advanced, and Expert.



Note

The table shows the structure of the features for the related sensor. The table is NOT binding, and the necessary features must be confirmed by your local sales representative.

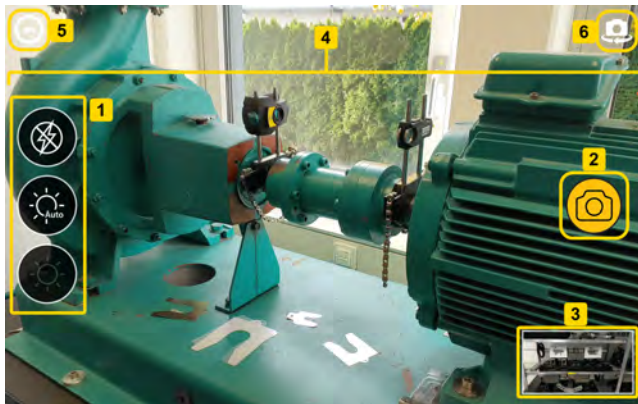
For RotAlign Core, Advanced features can be added only when Starter features are available. To enable Expert features, both Starter and Advanced features must be present.

For RotAlign Elite, Starter Plus features can be added only when Starter features are available. To enable Expert features, Starter, Starter Plus, and Advanced features must all be present.

Sensor category	Starter features	Starter Plus features	Advanced features	Expert features
RotAlign Core	Soft foot, Live Move (V or H), 8-point Active Clock, Static feet, Multiple feet, Quality factor, Standard deviation, Short flexible couplings, Suggested and user-defined tolerances	—	Spacer coupling, Thermal growth, Targets, Vertical Alignment	Continuous Sweep, Multipoint, Post-processing, 3-machine train
RotAlign Elite	Soft foot, Live Move (V and H), 8-point Active Clock, Static feet, Multiple feet, Quality factor, Standard deviation, Spacer coupling, Short flexible couplings, Suggested and user-defined tolerances, Cardan shaft, Thermal growth, Targets, Vertical Alignment, Continuous Sweep, Multipoint, Post-processing, 3-machine train, 6-machine train, Pass mode	Move Simulator, Soft foot diagnosis, Advanced Vertical Alignment with VertiSweep	In-situ Cardan shaft, Intelli modes, Vibration	14-machine train, Multiple coupling, Live Trend

Built-in camera

From the home screen, tap  to start the camera function.



Focus the device on the object to be photographed. The object is displayed on the screen.

- (1) Camera settings for indoor, outdoor and night imaging, plus automatic light setting – Tap necessary light setting icon (Flash may be turned on/off; Auto mode is for automatic light setting).
- (2) Tap  to take a photo of the object focused on the display.
- (3) Tap this location to access the device gallery. All images taken with the device are saved in this location.
- (4) Object to be photographed
- (5) Tap  to return to home screen.
- (6) Tap  to switch between the front- and rear-facing cameras.

Gallery



To view all images saved in the gallery, touch then drag up or down. All images are displayed as miniatures.

- (1) Tap  to go back to the image settings screen where objects may be photographed.

- **(2)** Tap  to go to the home screen.
- **(3)** Tap any miniature to view the image in full scale.

To delete an image from the gallery, tap the necessary image. The image appears in full scale. Tap the trash icon **(1)** to delete the image from the gallery.



Use the arrow icons **2/3** to scroll the images in the gallery.

Tap  **(4)** to go to the gallery home screen.

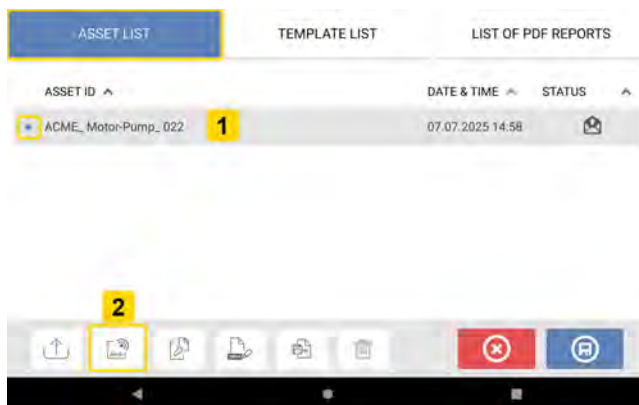
RFID

The rugged device uses this automatic identification technology to perform these:

- Identify assets to be aligned
- Enter related assets directly into the device
- Store data and results under the correct asset automatically

Assign a saved asset to an RFID tag

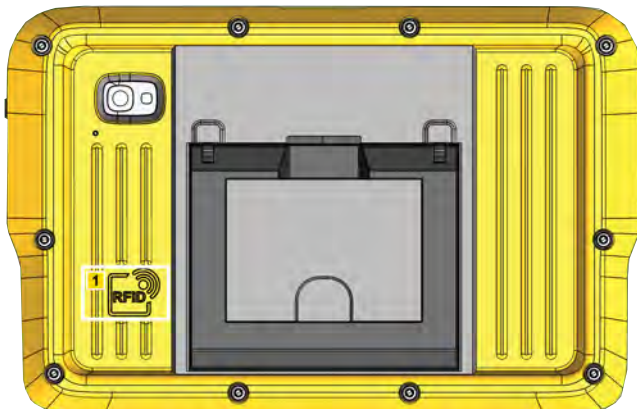
From the home screen, tap  to show assets saved.



Tap the asset (**1**) that is to be assigned to the RFID tag, then tap the RFID icon (**2**).



Position the rugged device such that its built-in NFC antenna is as close to the RFID tag as possible (less than a centimeter).



- **(1)** Near Field Communication (NFC) antenna symbol

As soon as data has been written on the RFID tag, the related hint is shown on the screen.



Tap  to exit the screen.



Note

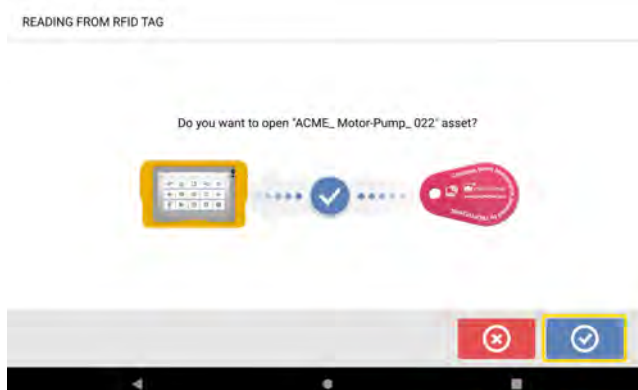
If however, data had already been assigned to the RFID tag, a hint to request data to be overwritten is shown.

Open an asset measurement assigned to an RFID tag

From the home screen, tap .



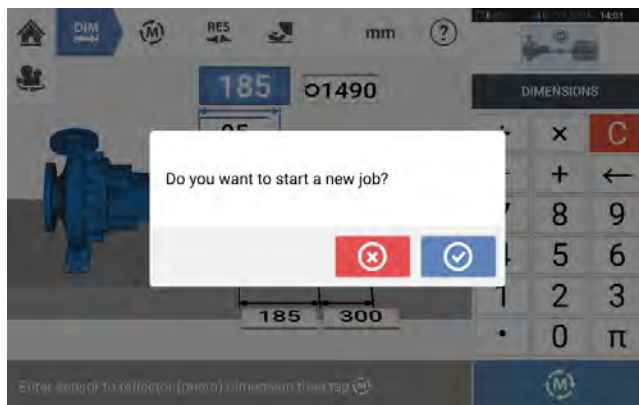
Position the rugged device such that its built-in NFC antenna is as close to the RFID tag as possible (less than a centimeter).



Tap  to open the asset measurement.



The asset name (**1**) is shown on the home screen. Tap the shaft alignment icon (**2**) to start the application.



Note

If however, no data had been written on the RFID tag, a hint on missing information is shown.

Using Cloud drive

To set up the PRÜFTECHNIK Cloud drive, an ALIGNMENT RELIABILITY CENTER 4.0 (ARC 4.0) licence is required. The Cloud drive allows the sharing of up-to-date asset measurements from different devices via the PC software ARC 4.0.

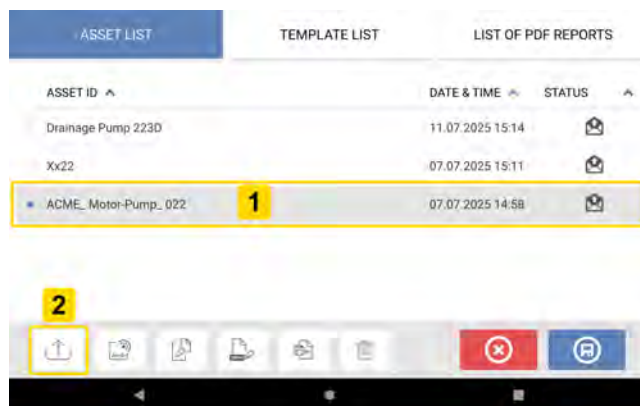


Note

Wireless connection between the rugged device and a network must be established to enable assets to be transferred via ARC 4.0.

Transfer an asset to the Cloud drive

After finalizing a measurement save the asset (1) then upload it to Cloud drive.

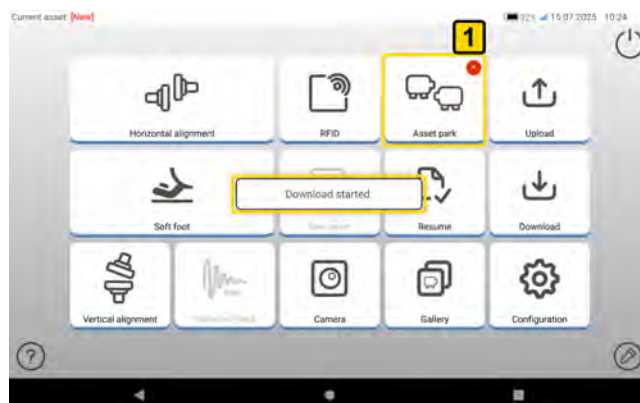


Tap the **Upload** icon (2). The asset appears in ARC 4.0 **Exchange** view with the status **complete**. Drag and drop the asset in its appropriate location on the Cloud drive.

Download an asset from Cloud drive

From the ARC 4.0 **Exchange** view, drag and drop the desired asset into the Name pane. The asset appears with the status **ready**.

From the touch device home screen, tap the **Download** icon (1). The selected asset appears in the asset park (1).



Tap the **Asset park** icon to open the asset in the rugged device.

Components

The main measuring components for shaft alignment are the rugged device, the sensor and the laser (or reflector).

Rugged device



- **1** Power button – used to switch the rugged device on. Press and hold down the power key until the device turns on.
- **2** Ambient light sensor
- **3** Front camera
- **4** USB type C multipurpose connector – used to charge the rugged device or connect the tablet to auxiliary equipment such as a PC
- **5** Rear camera LED flash
- **6** Rear camera

- **7** Location of Near Field Communication (NFC) antenna
- **8** Foldable stand – used to hang device from a railing or lay it down in perfect viewing position
- **9** Protective bumper



Note

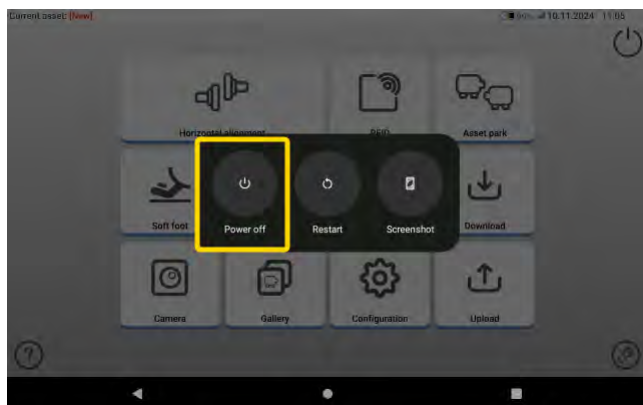
In a kiosk version of the rugged device, only the Shaft Alignment application runs on it; and only in landscape mode. Additional apps cannot be installed on this dedicated device. Additional apps can be installed in an open version.

In a kiosk version, press the **power button** and the **volume down button** simultaneously to capture screen shots.

If the device freezes or is unresponsive, press the **power button** and the **volume up button** simultaneously until the device starts again.

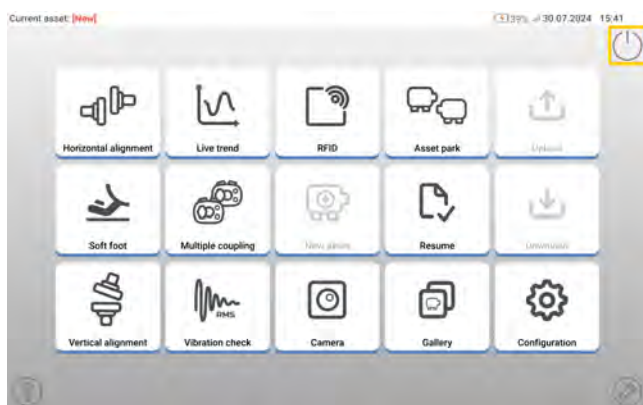
Press and hold down the power button (**1**) to switch the device on. Tap and swipe the touch screen to operate the rugged device.

Press and hold down the power button (**1**). These hints are shown on the screen.

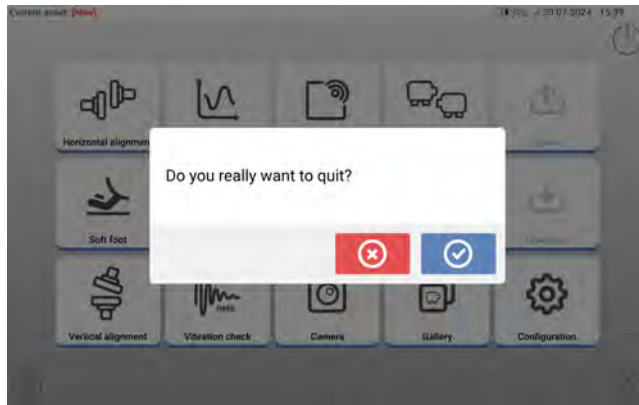


Tap the **Power off** icon to switch the rugged device off.

To exit the Shaft Alignment application, and switch the device to sleep mode, tap the power off icon (] shown on the home screen.



A hint that requires confirmation before the device goes to sleep mode is shown.



Tap  to confirm selection.

Device interface

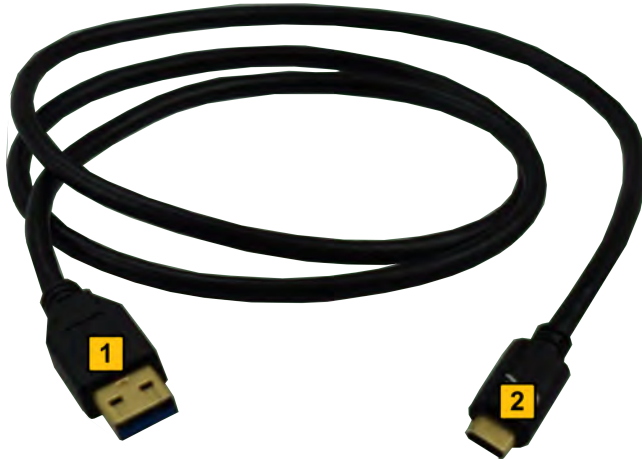


The rugged device's multipurpose connector (**4**) is used to charge the device and connect it to a PC. When connected to a PC, data may be transferred from the tablet or a device firmware update may be performed.

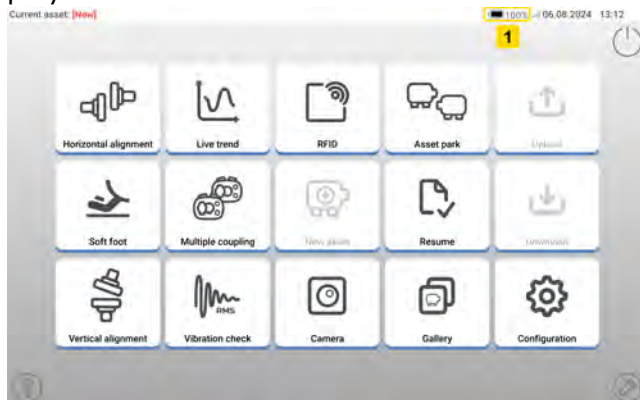
Charge the battery

Charge the battery before using the rugged device for the first time or when the tablet has been unused for extended periods.

Use only the supplied charger and corresponding USB C to USB A cable.



- Connect the standard USB A end (**1**) to the supplied USB charger.
 - Plug the USB C end (**2**) to the rugged device's multipurpose connector.
 - Connect the USB charger to mains supply.
 - When fully charged, disconnect the charger from the rugged device, and then unplug the charger from the mains supply.
- The charge capacity is shown by the power icon (**1**) on the top right corner of the display.



RotAlign Elite components

RotAlign Elite laser

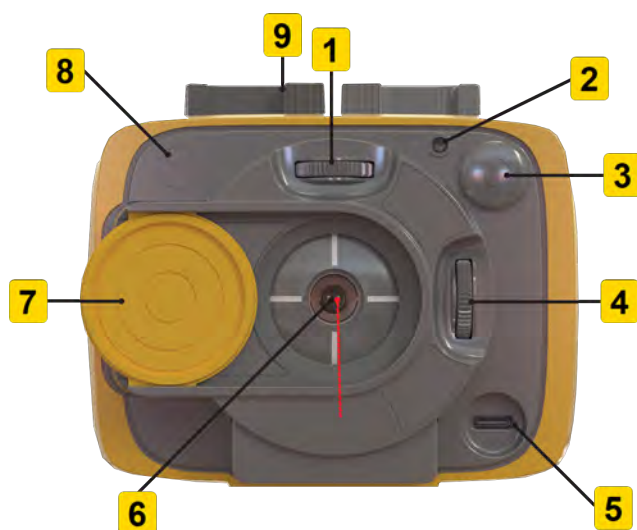
The semiconductor laser diode emits a ray of red light (wavelength 635 nm) which is visible where it strikes a surface. The Class 2 laser beam is emitted with a diameter of approx. 5 mm (3/16").

Press and hold the On/Off switch briefly to turn the laser on. The battery status LED lights red.



WARNING

With the laser on, DO NOT stare into the laser beam!



1: Vertical beam position thumbwheel; **2:** Battery status LED; **3:** On/Off push button switch; **4:** Horizontal beam position thumbwheel; **5:** USB C port; **6:** Laser emission aperture; **7:** Sliding dust cap (yellow); **8:** Reference clock face; **9:** Clamping lever (shown here in locked position)

During setup, adjust the beam by changing its vertical and horizontal angles using the position thumbwheels. Make sure the beam strikes the sensor lens perpendicular to its surface.

The laser is water and dust resistant (IP 65). The internal optics and electronics are internally sealed, to prevent possible contamination.

The laser beam transmits information about the battery status, rotational angle, temperature, and serial number of the laser into the sensor. The sensor then sends this information to the rugged device.

The laser is powered using a 3.6V 8Wh Lithium-Ion rechargeable battery which is attached to the laser unit and must be charged using only the supplied charger/adaptor.

RotAlign Elite sensor

The sensor contains two position detectors, which measure the exact position and inclination of the laser beam as the shafts are rotated. Integrated in the sensor is Bluetooth technology for wireless transmission of measurement data to the rugged device. The sensor also transmits the laser data to the rugged device. Intelligent sensor technology is used to determine shaft rotational angle and machine vibration.



1: On/Off push button switch; **2:** USB C port; **3:** Sensor lens; **4:** Sliding dust cap (red) ; **5:** Laser beam adjustment LED (four in number); **6:** Clamping lever (shown here in the open position); **7:** Clamping lever stopper; **8:** Bluetooth communication LED; **9 :** Battery status LED

These indicator LEDs are positioned at the front of the sensor:

- Battery status LED
- Bluetooth communication LED
- Four beam adjustment LEDs

Laser and sensor labels

Labels used to communicate laser safety, radio country approvals, and other general information are affixed to the housings of the system components.



- **(1)** The laser serial number and inspection label are shown here.
- **(2)** The sensor serial number and inspection are shown here.
- **(3)** The radio country approvals are at the bottom of the sensor.

Rechargeable battery

Both RotAlign Elite laser and sensor are powered by a 3.6 V 8 Wh lithium-ion rechargeable battery. The battery is charged via the USB C port with the supplied charger/adaptor. If the battery capacity is greater than 50% (acceptable capacity for measurement), the battery status LED on both laser and sensor lights up green for 1 second on switching on. During the charging process, the battery status LED blinks green. When the battery is fully charged, the LED lights steady green if the charger remains connected.

Activity	RotAlign Elite laser battery status LED	RotAlign Elite sensor battery status LED
Switch on	Lights up green for 3 seconds when battery run time is > 10 hrs	Lights up green for 3 seconds when battery run time is > 10 hrs
	Blinks green every 3 seconds when battery run time is between 5 – 10 hrs	Blinks green every 3 seconds when battery run time is between 1 – 5 hrs

Activity	RotAlign Elite laser battery status LED	RotAlign Elite sensor battery status LED
	Blinks red every 3 seconds when battery run time is between 1 – 5 hrs	Blinks red every 3 seconds when battery run time is insufficient for longer measurements
	Blinks red constantly when battery run time is < 1 hr	Blinks red constantly when battery run time is < 1 hr
Charging battery	Blinks green when charging	Blinks green when charging
	Lights steady green when fully charged	Lights steady green when fully charged
	Lights red when a failure occurs during charging.	Lights red when a failure occurs during charging

RotAlign Core components

RotAlign Core laser

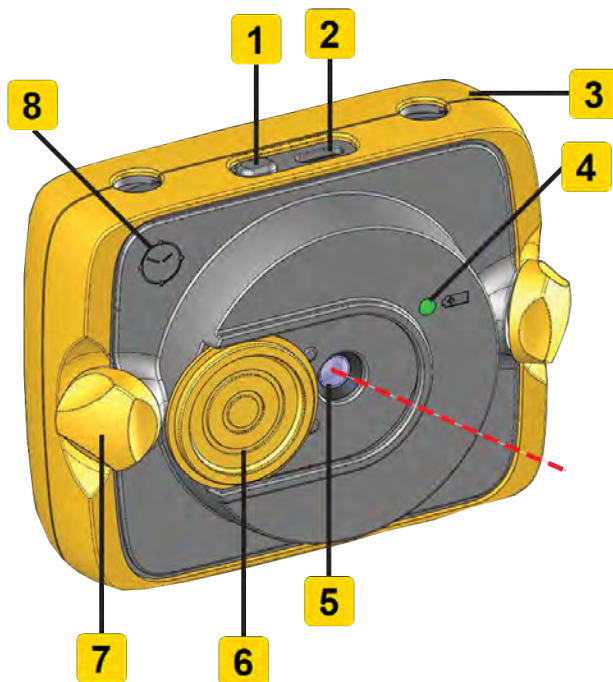
The semiconductor laser diode emits a ray of red light (wavelength 630 – 640 nm) which is visible where it strikes a surface. The Class 2 laser beam is emitted with a diameter of approx. 5 mm (3/16").

Press and hold the On/Off switch briefly to turn the laser on. The battery status LED lights red.



WARNING

With the laser on, DO NOT stare into the laser beam!



1: On/Off push button switch; **2:** USB C port; **3:** Rubber housing; **4:** Battery capacity LED; **5:** Laser emission aperture; **6:** Sliding laser dust cap in open position; **7:** Locking knob; **8:** Reference clock face

The laser beam is fixed. At setup, the laser unit can be moved vertically on the support posts and finely rotated on the shaft to ensure perpendicular incidence on the sensor lens.

The laser is water and dust resistant (IP 65). The internal optics and electronics are internally sealed, preventing possible contamination.

The battery status, rotational angle, temperature, and serial number of the laser unit are transmitted through the laser beam to the sensor. This information is then relayed to the rugged device.

The laser unit is powered by a 3.7 V, 4.7 Wh lithium-ion rechargeable battery, which is attached to the laser unit and must be charged using only the supplied charger/adaptor.

**CAUTION**

As the battery becomes depleted, the color of the battery status LED changes from green (full) to yellow (half full) to red (empty).

Make sure the laser unit is fully charged before you start an alignment job. If the laser unit is not in use for a long time, store it in a cool, dry, and well-ventilated area.

**CAUTION**

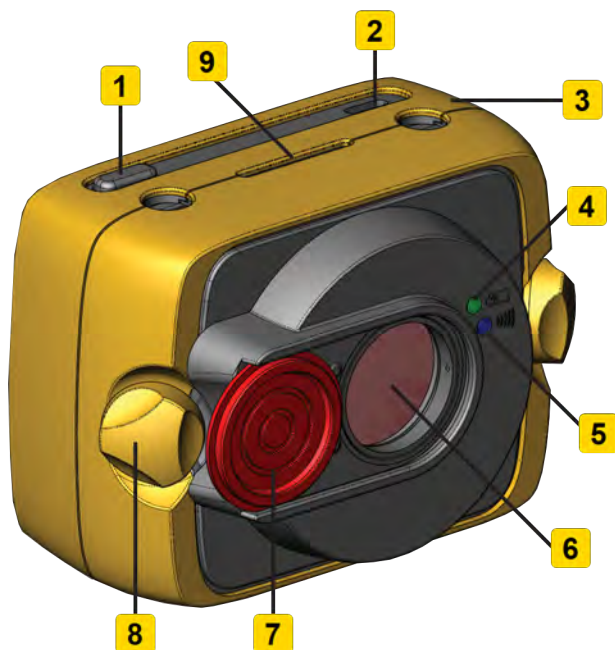
Do not remove the housing hex head screws under any circumstances. This action will void all warranty coverage.

RotAlign Core sensor

The sensor has built-in Bluetooth. It contains two position detectors that measure the exact position of the laser beam as the shafts rotate. The sensor also has an electronic inclinometer to measure shaft rotation.

Two indicator LEDs are on the front of the sensor. The upper LED shows laser beam adjustment and charging status. It lights red, orange, or green depending on the current function. The lower LED shows Bluetooth communication status. It lights blue when scanning and when communication is established.

The sensor is powered by an internal 3.7 V, 4.7 Wh lithium-ion rechargeable battery.



1: On/Off push button switch; **2:** USB C port; **3:** Rubber housing; **4:** Laser beam adjustment and charging LED; **5:** Bluetooth communication LED; **6:** Scratch-resistant lens; **7:** Sensor dust cap in open position; **8:** Locking knob; **9:** Distance marking

Sensor LEDs

Activity	Laser beam adjustment and charging LED	Bluetooth communication LED
Switch on	Lights up red for 1 second, then red or green (depending on the battery capacity) for another second, then continues to blink red	Lights up blue for 1 second then turns off
Laser beam adjustment	Blinks red when laser is OFF Blinks orange when laser is in END position Blinks green when laser centered or in 'laser OK' position	Blinks blue when scanning and when Bluetooth communication is established
Charging	Blinks fast green during fast charge (0% - 90%) Blinks slowly green when charge is > 90% Lights steady green when charge is 100%	

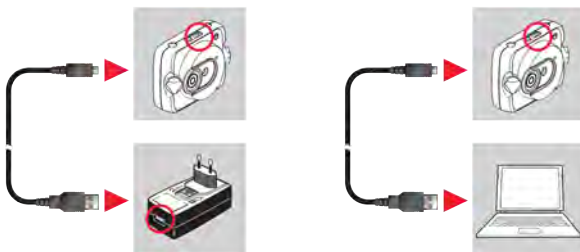
Charge sensor and/or laser

The sensor and/or laser can be charged via the mains supply or a PC.

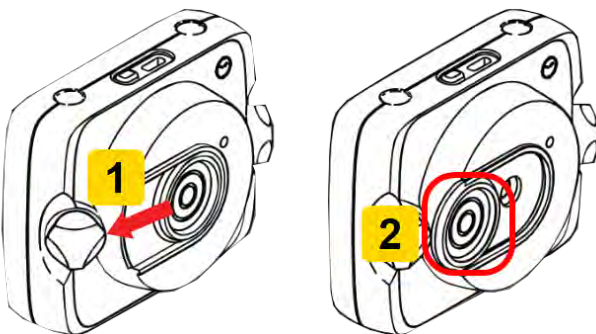


Note

Charging via the mains supply is faster.



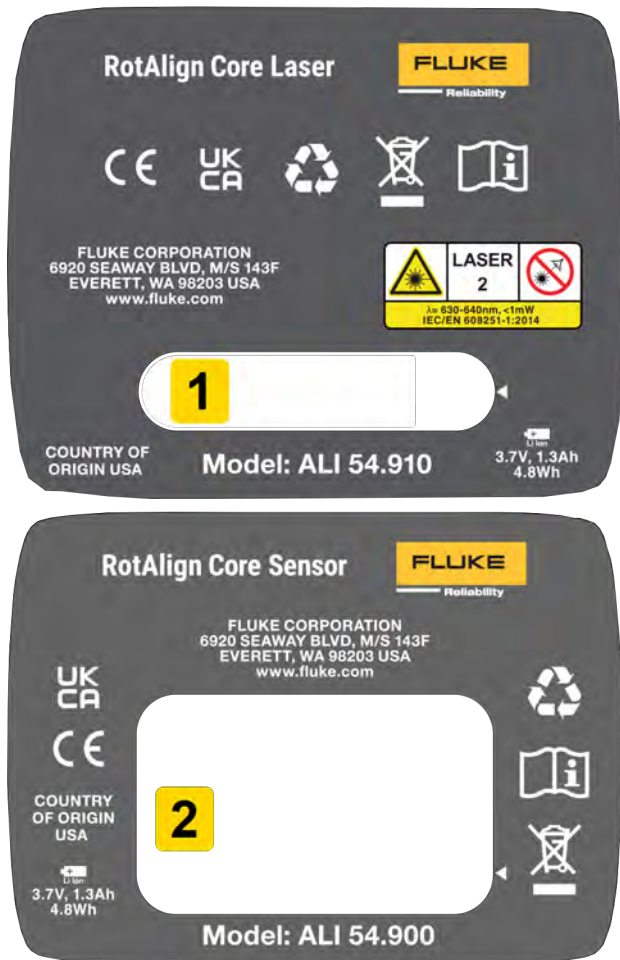
Open the sensor/laser aperture



- **(1)** Slide the dust cap in the direction shown by the bold red arrow.
- **(2)** Dust cap in its open position highlighted in red.

Laser and sensor labels

Labels used to communicate laser safety, radio country approvals, and other general information are affixed to the housings of the system components.



- **(1)** The laser serial number and inspection label are shown here.
- **(2)** The sensor serial number, inspection label and radio country approvals are shown here.

Mounting components

Mount brackets



Note

The Product is delivered with fully assembled brackets with both the sensor and the laser already assembled. In this case, the bracket holding the laser is mounted on the shaft on the left side of the couplings or the solid coupling hub on the left side (usually stationary machine). The bracket assembly holding the sensor is mounted on the shaft on the right side of the couplings or the solid coupling hub on the right side (usually moveable machine).

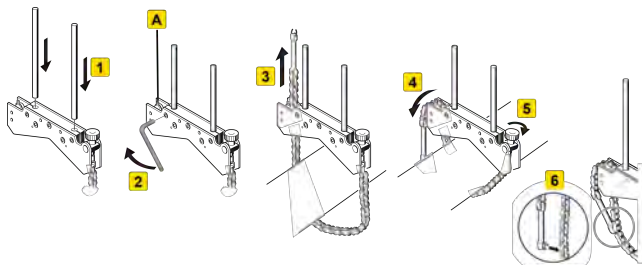
Mount the brackets on either side of the coupling on either the shafts or on the solid coupling hubs, and both at the same rotational position.

To get the highest possible measurement accuracy, and to avoid damage to equipment, obey these instructions:



CAUTION

Ensure that the brackets fit solidly onto their mounting surfaces! Do not use self-constructed mounting brackets, or modify the original bracket configuration supplied by Fluke Reliability (for example, do not use support posts longer than those supplied with the bracket).



- Choose the shortest support posts which will still allow the laser beam to pass over or through the coupling. Insert the support posts into the bracket..
- Fasten them in place by tightening the hex screws on the sides of the bracket frame.
- Place the bracket on the shaft or coupling, wrap the chain around the shaft and feed it through the other side of the bracket: if the shaft is smaller than the width of the bracket frame, insert the chain from the inside of the bracket as shown in the diagram; if the shaft is larger than the bracket width, insert the chain into the frame from the outside.
- Catch the chain loosely on the anchor peg (A).
- Turn the bracket thumbscrew to tighten the assembly onto the shaft.
- Clip the loose end of the chain back onto itself.

The bracket should now be tight upon the shaft. Do not push or pull on the bracket to check, since this could loosen its mounting.

To remove the brackets, loosen the thumbscrew, then remove the chain from its anchor peg.

Mount sensor and laser

Mount the sensor on the support posts of the bracket fixed on the shaft of the right machine (usually moveable machine), and the laser on the support posts of the bracket fixed on the shaft of the left machine (usually reference machine) – as viewed from normal working position. Before mounting both sensor and laser, make sure these are done:

For RotAlign Elite sensor and laser

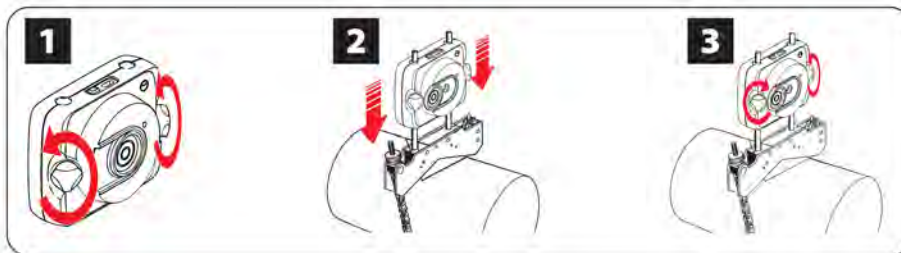


The gray clamping levers must be in the open position (placed to the front) (1). This enables components to slide onto the support posts (2).

Fix both sensor and laser onto their respective support posts.

Lock the gray clamping levers. To lock the levers, push them backwards until they rest on the stoppers (3).

For RotAlign Core sensor and laser



The yellow locking knobs should be loose enough (1) to allow the sensor slide onto the support posts (2).

Fix both sensor and laser onto their respective support posts. Tighten the yellow locking knobs (3).

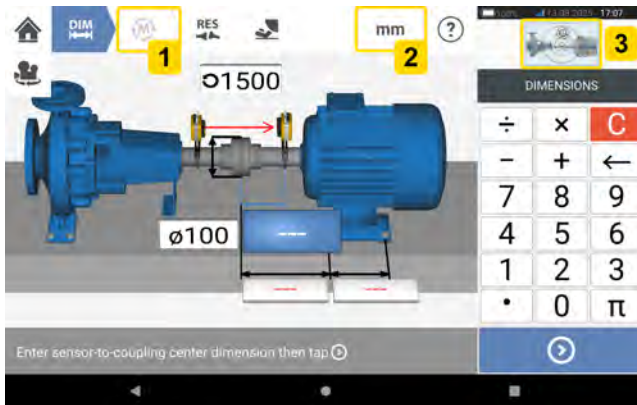
Ensure that the laser can pass over or through the coupling and is not blocked.

Both sensor and laser should be at the same height, as low as possible, yet just high enough for the beam to clear the coupling flange. They should also visually appear to be rotationally aligned to each other.

Make the final adjustments; loosen the brackets slightly if necessary, then rotate them and tighten them again.

Dimensions

From the home screen, tap  the horizontal alignment icon to access the dimensions screen.



- **(1)** Grayed out icons are disabled within the active screen. The **Measure** icon is enabled after all dimensions have been entered.
- **(2)** Tap the measurement units icon **mm** to set necessary units. The icon toggles between **inch** and **mm**.
- **(3)** Tap the slider on the mini train icon to open the triple **Train Manager / Train Setup / Train Fixation** screen.
Note: See section on train setup and fixation for details. Train Manager is described in machine train alignment.

Tap the dimension fields and enter all required dimensions. Alternatively, tap  to proceed to enter next dimension. Dimensions are entered only when the dimension field is highlighted blue.



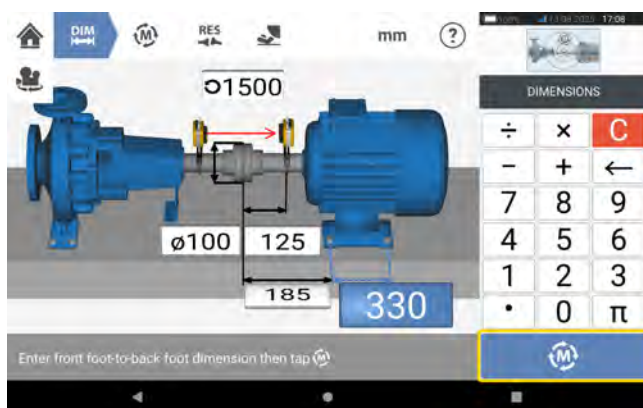
Note

If units are set to Imperial system, inch fractions may be entered as follows: For $\frac{1}{8}$ " enter $1/8 = 0.125$ "; For $10 \frac{3}{8}$ " enter $10 + 3/8 = 10.375$ ". The coupling diameter value may be determined by entering the measured circumference of the coupling and dividing the value by π (pi) ($= 3.142$). For example $33"/\pi = 10.5$ "; Or $330 \text{ mm}/\pi = 105 \text{ mm}$

The rotate machine view icon  is used to rotate the view of the machines and mounted components on the display.

Machine and coupling properties are edited when the related machine or coupling is tapped.

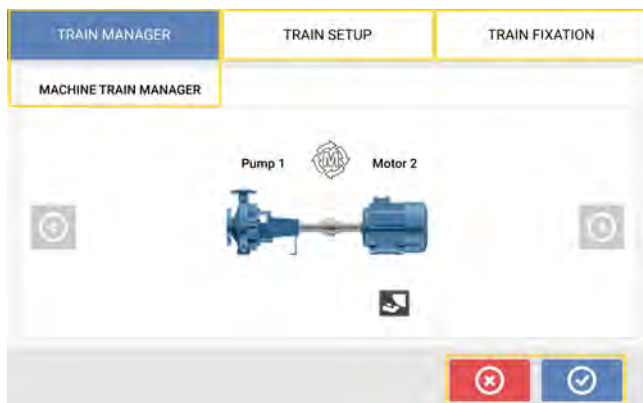
When all required dimensions have been entered, the **Measure** icon  is shown.



Tap  to proceed with measurement.

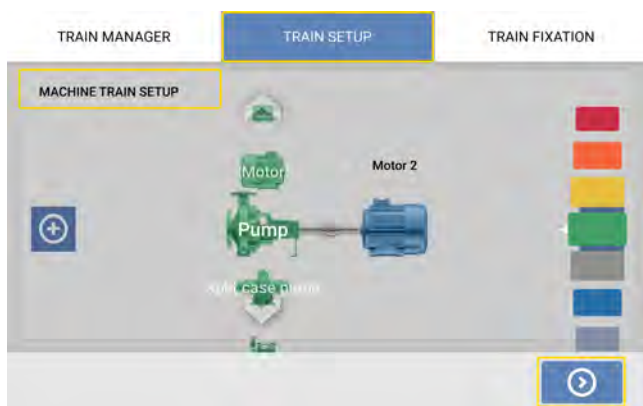
Train setup and fixation

The mini train icon with slider is available in the dimensions, measure and results screens. Tap the slider to open the triple **Train Manager / Train Setup / Train Fixation** screen.



Tap either **TRAIN SETUP** or **TRAIN FIXATION** to open related screen. Alternatively, tap either  or  to return to previous screen.

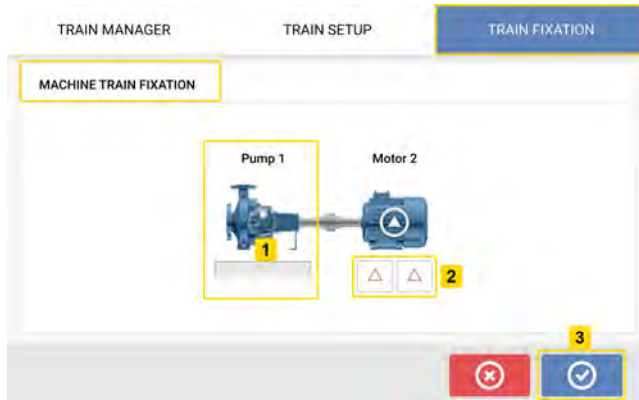
If **TRAIN SETUP** is selected, the machine train setup screen can be used to select necessary machine and coupling types. Machinery color can also be selected.



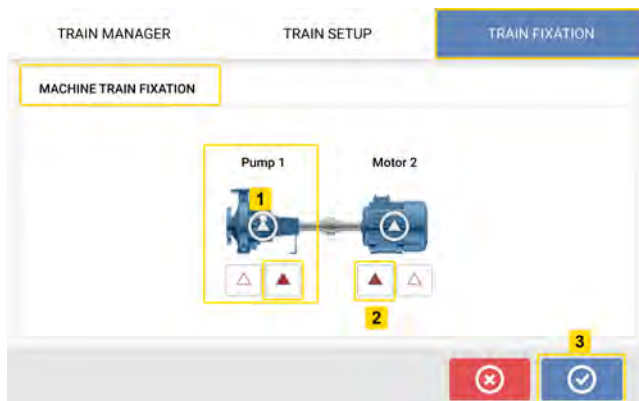
Tap machine or coupling to be specified. If a machine is selected, both machine and color carousels appear. If coupling is selected, only the coupling carousel appears. Use the carousels to specify machine or coupling type, and the machine color. Only one element can specified at a time. After an element has been defined, tap  then proceed to select the next

element. When all machine train elements have been defined, tap  to return to the screen from where the triple **Train Manager / Train Setup / Train Fixation** screen was initially opened.

If **TRAIN FIXATION** is selected, the machine train fixation screen can be used to fix and unfix machine feet pairs or entire machine. This solves machine bolt-bound problems.



In this example, the pump has no feet (**1**) and is permanently fixed. The motor feet pairs (**2**) are unfixed and therefore movable. Tap  (**3**) to return to the screen from where the triple **Train Manager / Train Setup / Train Fixation** screen was initially opened.



To make a machine permanently fixed, tap the symbol (**1**) at the center of the machine. To undo this action, tap the symbol (**1**) again. When a machine is unfixed feet are shown. To fix any machine feet pair tap the necessary feet pair. Fixed feet pairs are shown marked red (**2**).

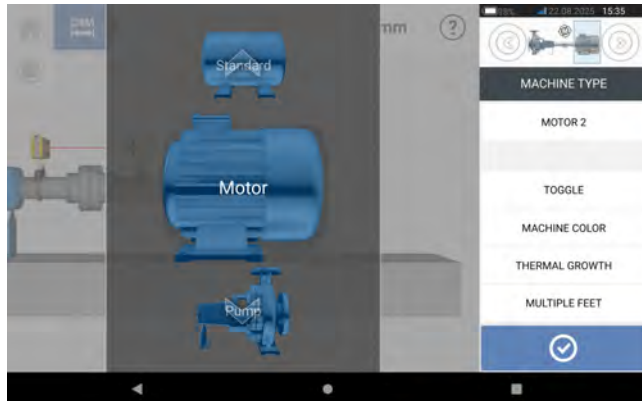
If feet pair are redefined, then machine dimensions must be adjusted. Tap  to open the dimensions screen and enter necessary dimensions.

Machine properties

These lifelike machine graphics are available:

1. Generic standard machine; 2. Motor; 3. Pump; 4. Split case pump; 5. Fan; 6. Center hung fan; 7. Blower; 8. Compressor; 9. Gearbox; 10. Rotor gearbox; 11. Diesel engine; 12. Generator; 13. Gas turbine; 14. Shaft with no supports; 15. Shaft with a single support; 16. Shaft with two supports

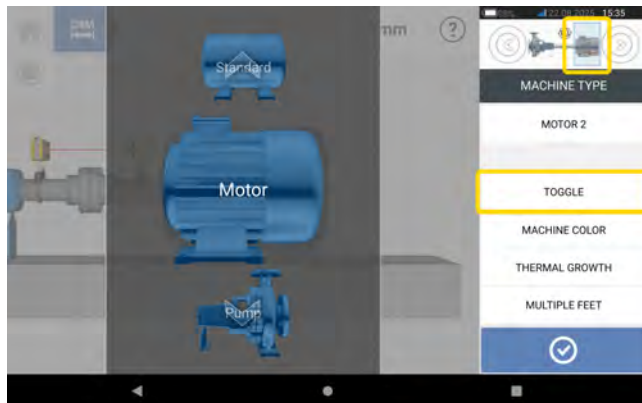
From the dimensions screen, tap the machine to show the respective machine carousel.



Swipe the machine carousel up or down and select necessary machine. Position necessary machine at the centre of the carousel then tap  to confirm selection and return to the dimensions screen.

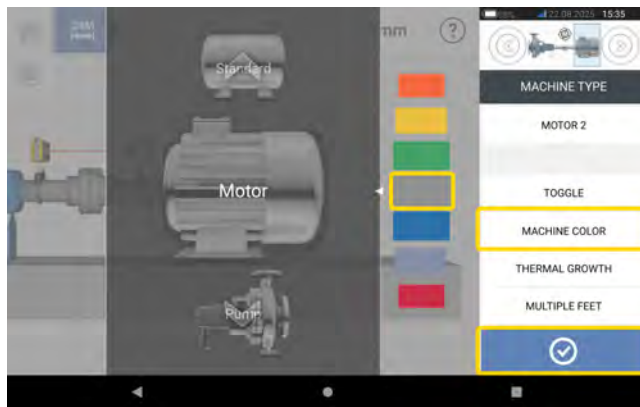
Toggle

Toggle is used to change the orientation of the selected machine along the shaft axes. In the next example, the motor has been flipped so as to connect the non-drive side to the coupling.



Machine colour

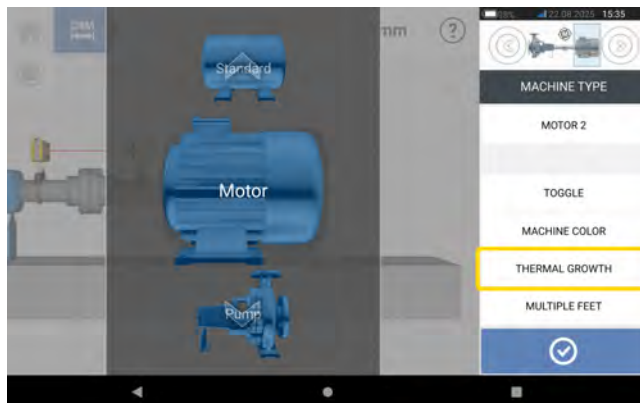
Tap **Machine Color** to select the necessary machine colour. A colour palette is shown.



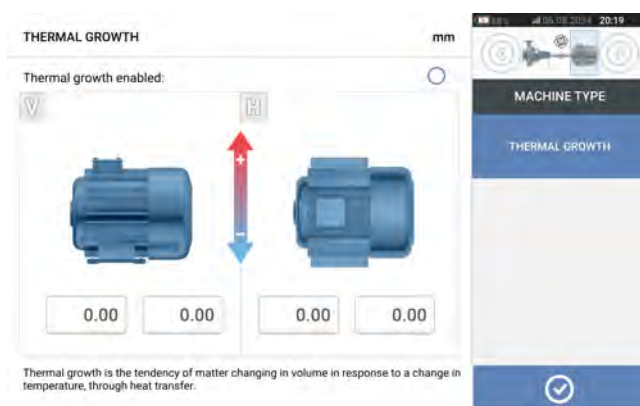
Swipe the colour palette up or down to select the necessary colour then tap  to confirm selection and return to the dimensions. The machines now have the correct colour.

Thermal growth

Thermal growth is the movement of shaft centerlines associated with or due to a change in machinery temperature between the idle and operating conditions.

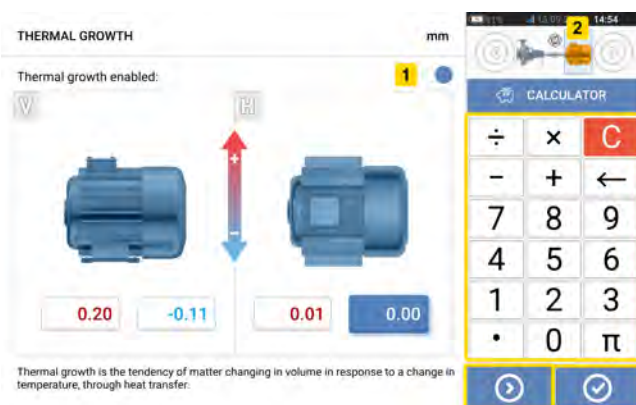


With machine carousel shown, tap the item **Thermal Growth**. The thermal growth screen is shown.



Thermal growth values can be entered only when machine feet have been defined.

To enter any specified thermal growth value at the required foot position, tap the related value box then proceed to enter the thermal growth value. Use the onscreen keyboard. Cycle through the value boxes using . Alternatively, tap the necessary foot position.



Tap or swipe the icon  to the right (**1**). Thermal growth values are switched on. When thermal growth values are on, the related machine within the mini train inset at the top-right corner is shown in orange (**2**). After thermal growth values have been entered, tap  to proceed.

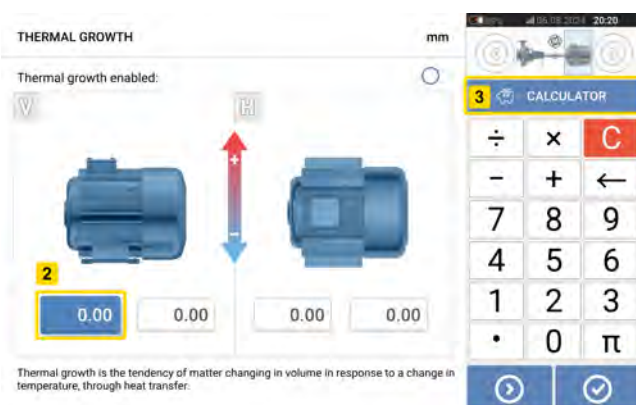
Thermal growth calculator

The calculator is used to calculate thermal growth compensation if no other values are available. Thermal growth is calculated from the material coefficient of linear thermal expansion, expected temperature difference and length of the shaft centerline from the shim plane.

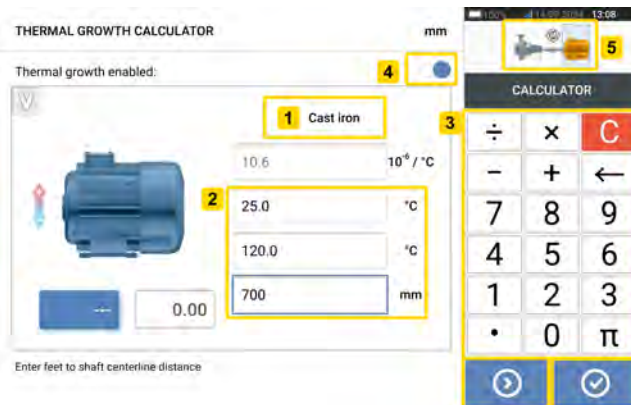
With the thermal growth screen shown, tap value box of feet pair (**1**) where thermal growth is to be entered.



The box is highlighted (**2**), and the **Calculator** tab (**3**) is shown.



Tap **Calculator** tab (**3**) to open the thermal growth calculator screen.

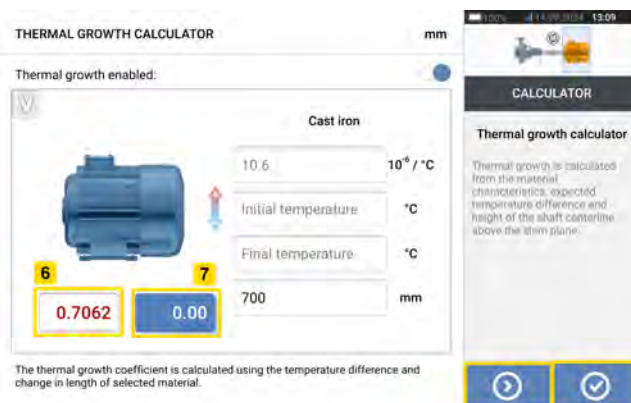


Tap **(1)** and select machine material. The related linear thermal expansion is shown. Enter the three values **(2)** necessary to calculate the thermal growth value for the selected feet pair. Use the onscreen keyboard **(3)**. The three values are:

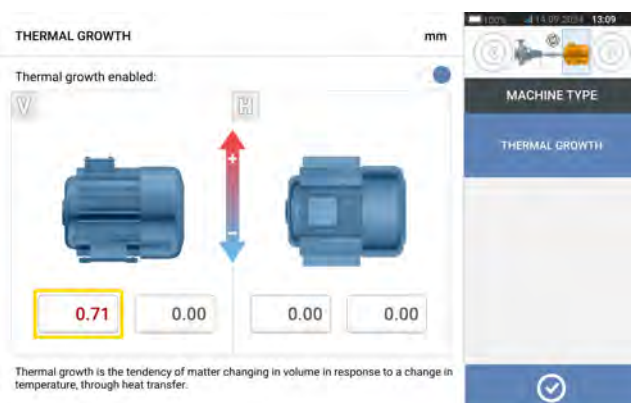
- Ambient temperature (initial temperature)
- Machine running temperature (final temperature)
- Distance from machine base (or shimming plane) to the shaft centerline (length)

With thermal growth values on **(4)**, the related machine within the mini train inset at the top-right corner appears in orange **(5)**.

Tap  to simultaneously show the calculated thermal growth value for the related feet pair **(6)** and toggle to the next feet pair **(7)**.



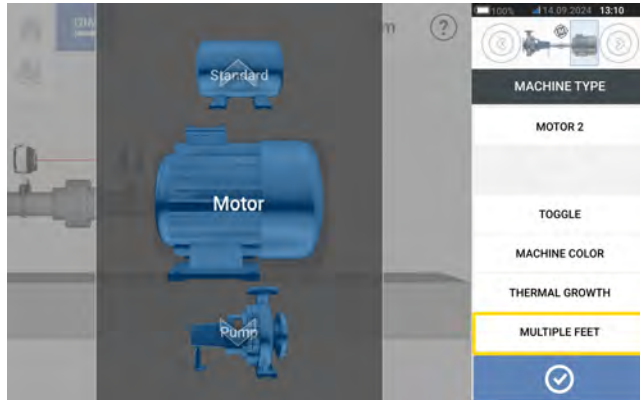
Tap  to return to the thermal growth.



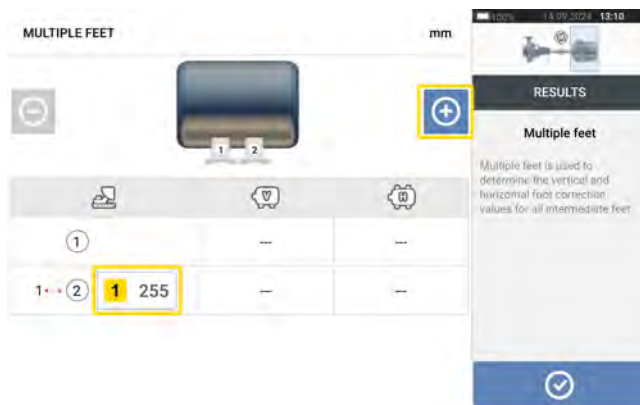
Multiple feet

The item **Multiple feet** is used to determine foot corrections in a multiple feet machine, and is therefore available also in the result screen.

The dimension between the feet is defined in the multiple feet screen. Tap **Multiple feet** to show the screen.



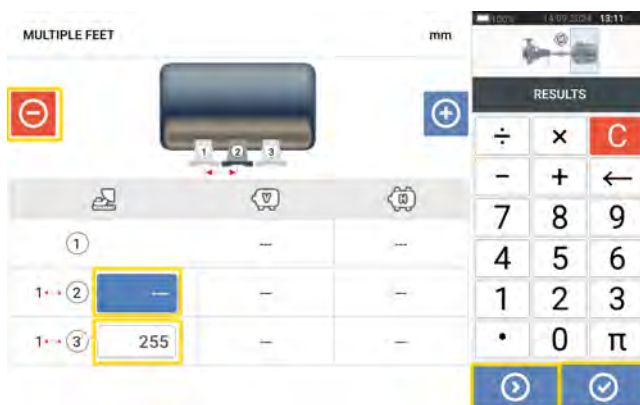
If the dimension between the front feet and the back feet (**1**) has already been entered, it will be shown in the multiple feet screen.



Note

The intermediate machine feet are not displayed in the dimension screen.

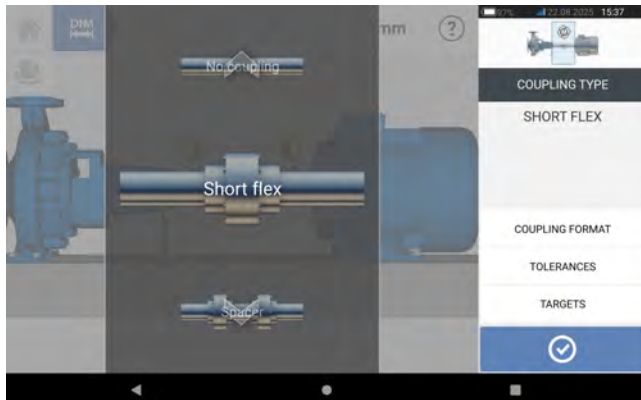
Tap  to add any intermediate feet.



- The intermediate feet pair is added after the front feet.
- Enter this dimension in the row that appears.
- Tap  to delete intermediate feet, if necessary.
- Tap  to exit the multiple feet screen.

Coupling properties

From the dimensions screen, tap coupling to access coupling carousel.



Swipe the carousel up or down and select necessary coupling type. These coupling types are available for selection:



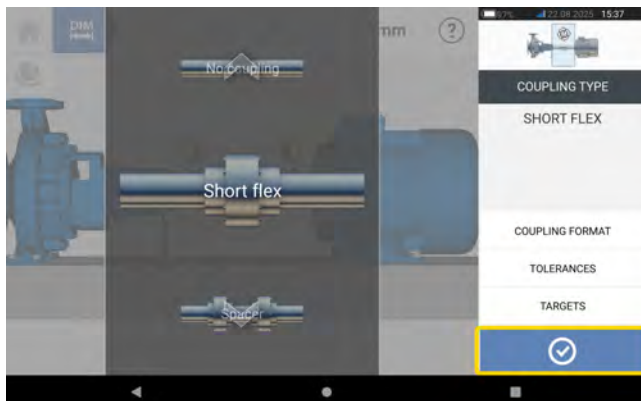
Note

Available coupling types are related to licensed features.

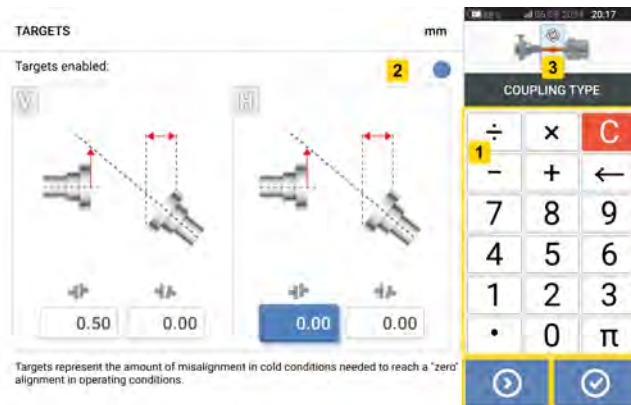
- Short flex — These couplings feature fitted transmission elements with play (such as teeth, claws or bolts) or elastic connecting elements like rubber 'tires' or springs.
- Spacer shaft — When the coupling halves are joined by a spacer element, its length must be entered.
- Cardan shaft — Just as with regular spacer shafts, the shaft length (between coupling planes) must be entered.
- Single plane — The coupling halves are bolted directly together. Loosen the bolts before taking measurements, since they would otherwise distort the true alignment condition.
- No coupling — This coupling format is intended for use with CNC machines. In this format, the length between the two shafts must be entered. The measurement mode for this coupling format is IntelliPoint.

Targets

Targets are misalignment values specified as an offset and an angle in two perpendicular planes (horizontal and vertical) and used to compensate for dynamic loads.



With coupling carousel shown, tap the item **Targets** to open the coupling targets screen.



The shown coupling format depends on the type of coupling selected.

To enter any target specifications at the coupling, tap the related value box then proceed to enter the target value. Use the onscreen keyboard (**1**) which comes into view when any one of the four value boxes is tapped. Use  to cycle through the value boxes. Alternatively, tap the necessary value box.

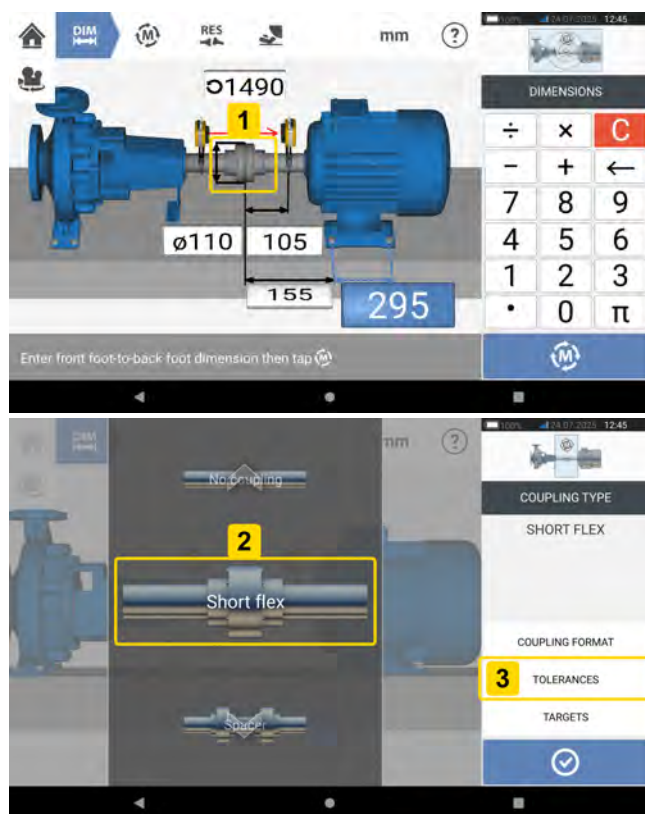
Tap  (**2**) to activate target specification values. When target values are enabled, the coupling (**3**) within the mini train inset at the top-right corner appears in orange. After target values have been entered, tap  to proceed.

Tolerances

Alignment quality is evaluated through comparison with tolerances based upon entered machine dimensions and RPM.

The tolerance ranges are compiled as tables according to type of coupling, coupling format, and diameter (for the gap value) as well as RPM. When the coupling type is spacer, the tolerance table values are determined by the length of the spacer shaft and the RPM.

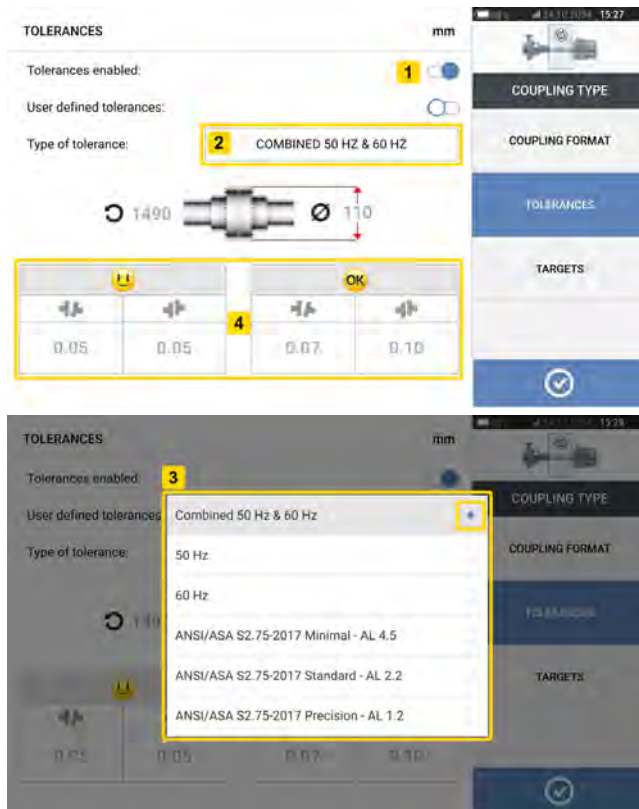
Tolerances are accessed via the dimensions screen.



Tap the coupling (1), then use the carousel that appears to select the necessary coupling type (2). Tap **TOLERANCES** (3) to access the coupling tolerance table.

Available tolerance tables

The available tolerance tables are based on machine operating frequency.

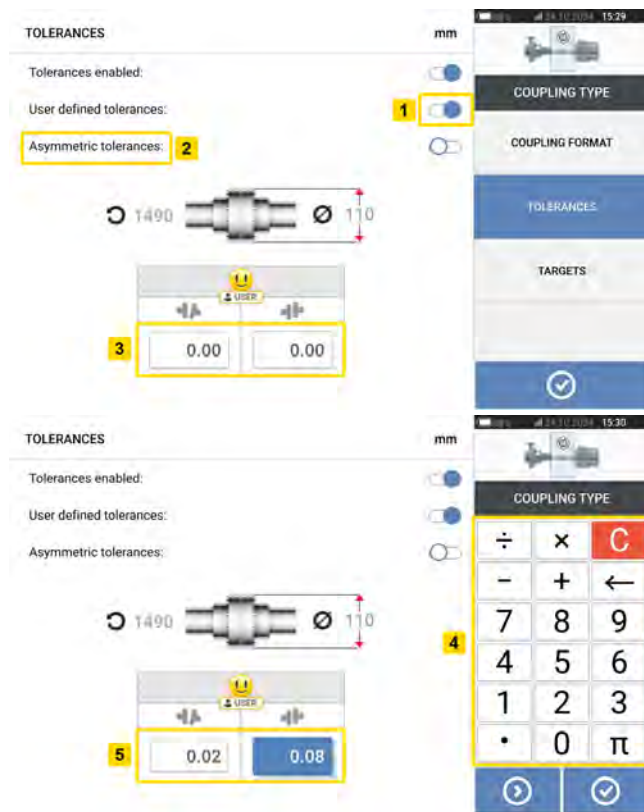


Swipe the icon (1) to the right to enable tolerances. Tap (2) to select wanted type of tolerance. A pop-up menu (3) with available tolerances is shown. Tap necessary type to show the related tolerance table (4).

ANSI standard specification tolerances

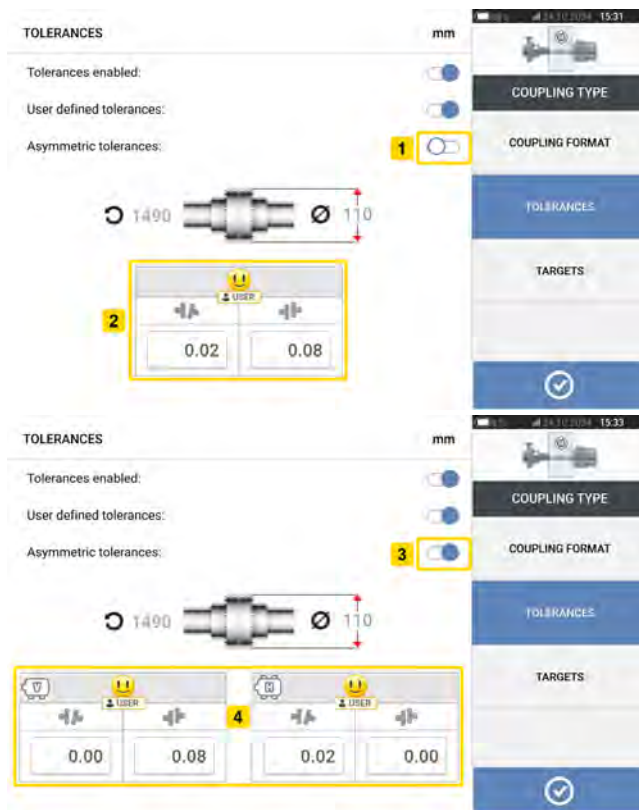
The Acoustical Society of America (ASA) developed shaft alignment tolerances for both short flex and spacer couplings on standard rotating machinery. These tolerances are an approved American National Standards Institute (ANSI) specification, and are grouped into three tiers (minimal, standard and precision).

User defined tolerances



Swipe the icon **(1)** to the right to enable user defined tolerances. Asymmetric tolerances **(2)** can be activated only when user defined tolerances are enabled. In asymmetric tolerances, the tolerance values for the two coupling planes are not the same. Tap **(3)** to edit user defined tolerances using the onscreen keyboard **(4)**. The edited values are then shown **(5)**.

Asymmetric and symmetric tolerances



When asymmetric tolerances have not been enabled (**1**), the shown specified tolerances (**2**) are symmetric. The gap and offset tolerances for both horizontal and vertical planes are identical.

If asymmetric tolerances are enabled (**3**) all four specified values are shown (**4**).

Tolerance table based on coupling format

TOLERANCES mm

Tolerances enabled: ☒

User defined tolerances: ☐

Type of tolerance: COMBINED 50 HZ & 60 HZ

1490 110

1		OK	
0.03	0.05	0.07	0.10

TOLERANCES mm | °

Tolerances enabled: ☒

User defined tolerances: ☐

Type of tolerance: COMBINED 50 HZ & 60 HZ

1490

2		OK	
0.03	0.05	0.04	0.10

COUPLING TYPE

3 **COUPLING FORMAT**

TOLERANCES

TARGETS

For the same type of tolerance, RPM, and coupling diameter, the tolerances value differ according to the coupling format selected. Coupling format **(1)** is gap/offset for short flex coupling, and **(2)** is angle/offset for short flex coupling. Tap **COUPLING FORMAT (3)** to change format.

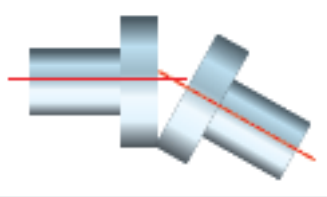
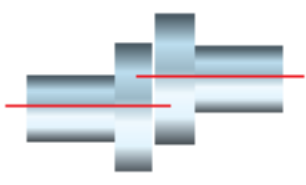


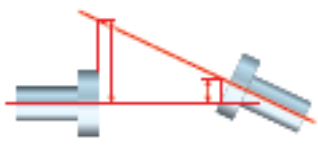
Note

There are no tolerance tables for consolidated spacer shaft coupling formats. Consolidated formats consider the spoolpiece or jackshaft as an extension of either the right or left shaft.

Suggested consolidated shaft alignment tolerances

The following table shows the consolidated (50 Hz and 60 Hz) tolerances

	RPM	metric (mm)		imperial (mils)	
		Acceptable OK	Excellent 😊	Acceptable OK	Excellent 😊
Short flexible couplings Gap (per 100 mm or 10" diameter) 	600	0.15	0.10	14.9	10.0
	750	0.12	0.08	12.3	8.2
	900	0.10	0.07	10.5	7.0
	1000	0.10	0.06	9.6	6.4
	1200	0.08	0.05	8.2	5.4
	1500	0.07	0.04	6.7	4.5
	1800	0.06	0.04	5.7	3.8
	3000	0.04	0.02	3.7	2.5
	3600	0.03	0.02	3.1	2.1
	6000	0.02	0.01	2.0	1.3
	7200	0.02	0.01	1.7	1.1
Offset 	600	0.23	0.13	9.0	5.1
	750	0.18	0.10	7.3	4.1
	900	0.16	0.09	6.1	3.4
	1000	0.14	0.08	5.5	3.1
	1200	0.12	0.07	4.6	2.6
	1500	0.09	0.05	3.7	2.1
	1800	0.08	0.04	3.1	1.8
	3000	0.05	0.03	1.9	1.1
	3600	0.04	0.02	1.6	0.9
	6000	0.02	0.01	1.0	0.6
	7200	0.02	0.01	0.8	0.5

	RPM	metric (mm)		imperial (mils)	
		Acceptable OK	Excellent 😊	Acceptable OK	Excellent 😊
Spacer shaft and membrane (disk) couplings Offset (per 100 mm spacer length or per 1" of spacer length) 	600	0.30	0.18	3.0	1.8
	750	0.24	0.14	2.4	1.4
	900	0.20	0.12	2.0	1.2
	1000	0.18	0.11	1.8	1.1
	1200	0.15	0.09	1.5	0.9
	1500	0.12	0.07	1.2	0.7
	1800	0.10	0.06	1.0	0.6
	3000	0.06	0.04	0.6	0.4
	3600	0.05	0.03	0.5	0.3
	6000	0.03	0.02	0.3	0.2
	7200	0.02	0.01	0.2	0.1

Laser beam adjustment

Laser adjustment wizard

The laser adjustment wizard is the primary laser beam adjustment feature in the rugged tablet. If the sensor is initialized, and the laser beam is not centered, use the wizard to adjust the laser beam correctly. The wizard arrows indicate the direction and amount in which movement should take place.



Note

The laser adjustment wizard process is the same for both RotAlign Core and RotAlign Elite. In the example below, RotAlign Core is used.



- The wizard arrows (1) and (2) show the direction and magnitude in which the laser is to be moved in order to adjust the laser beam correctly.

- The attained laser beam status is shown in **3**.
- **4** shows the position of the laser beam on the position detector.
- The wizard arrows decrease in magnitude and occurrence as the laser beam status improves, disappearing completely once the laser beam is centered.
- Measurement can commence when the laser beam is centered.

If it is necessary to adjust the laser beam without the wizard, see related topics.

Laser beam adjustment (RotAlign Elite)

RotAlign Elite laser and sensor

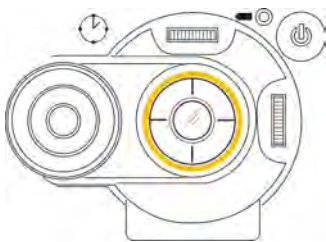
1. Slide the laser dust cap to expose the aperture.



WARNING

The laser **MUST** remain off.

2. With the laser OFF, carry out a preadjustment to ensure that the laser beam will be emitted perpendicular to the laser housing. Use the two yellow beam position thumbwheels to centre the **bulls-eye** as accurately as possible.



3. Press the ON/OFF push button switch to turn the laser on.



WARNING

Do not stare into the laser beam!.

4. With the lens covered, let the laser beam strike the centre of the sensor dust cap.
5. Slide the dust cap to open the lens. Observe the four RotAlign Elite sensor beam adjustment LEDs while adjusting the laser beam using the vertical and horizontal beam positioning thumbwheels. The thumbwheels are used to adjust both the horizontal and vertical laser beam angles.
6. Carry out this adjustment until all four RotAlign Elite sensor LEDs are blinking green once every second.
7. If the LEDs are blinking green twice every second, the angle at which the laser beam enters the sensor is correct, but an offset is present. Eliminate the offset by sliding back the sensor dust cap to cover the lens, then loosen the chain type bracket supporting the sensor and move the sensor sideways. At the same time, release the sensor clamping levers and move the sensor upwards and downwards until the laser beam is centred on the dust cap.



Note

During this adjustment, **DO NOT** touch the laser.

8. Open the sensor lens by sliding the dust cap and check the blinking of the four LEDs. If all four are blinking green once every second, then the laser beam has been correctly centred and measurement may proceed.

Beam adjustment LEDs

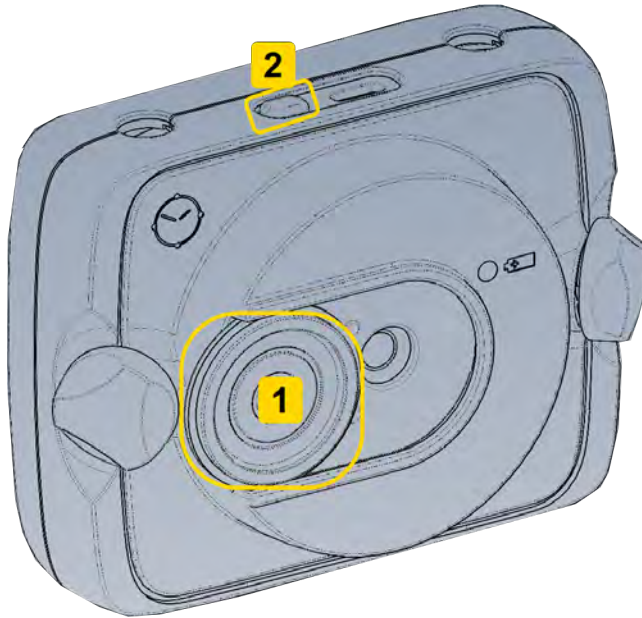
The four beam adjustment LEDs provide additional help when adjusting the laser beam position on the sensor position detectors. The LEDs indicate the angle and position at which the laser beam enters the sensor. The LEDs blink either red or green depending on the angle at which the laser beam strikes the sensor. Green indicates a small angle while red indicates a large angle that must be corrected before beginning measurement.

Activity	Laser beam adjustment LEDs
Switch on RotAlign Elite sensor	All four LEDs light up red then continue to blink every two seconds
Laser beam striking dust cap [laser off]	All four LEDs blink red every second
Laser beam entering sensor with a large angular deviation	One or more LEDs blinks red every second
Laser beam entering sensor with little or negligible angular deviation but with an offset	All four LEDs blink green twice every second
Laser beam entering sensor with neither appreciable angular deviation nor offset	All four LEDs blink green every second

Laser beam adjustment (RotAlign Core)

RotAlign Core laser and sensor

1. Slide the dust cap (1) to the open position to open the laser aperture. Press the On/Off push button switch (2) to turn the laser on. Leave the sensor dust cap in the closed position.



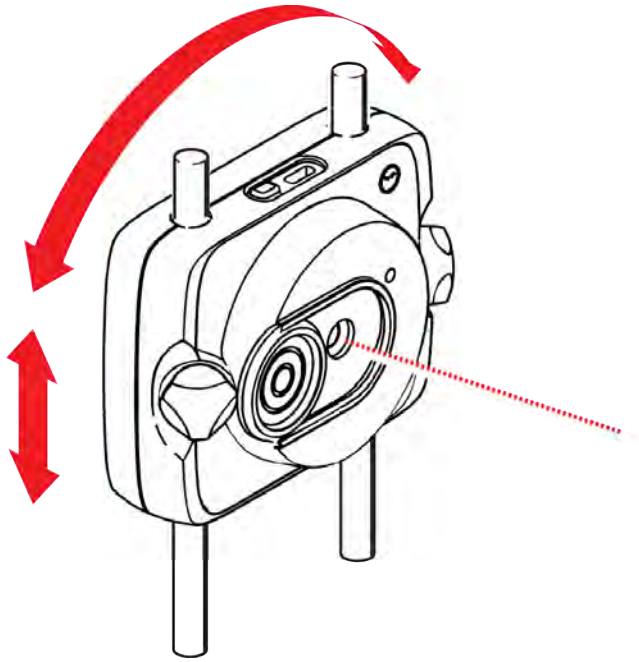
WARNING

Do not stare into the laser beam!

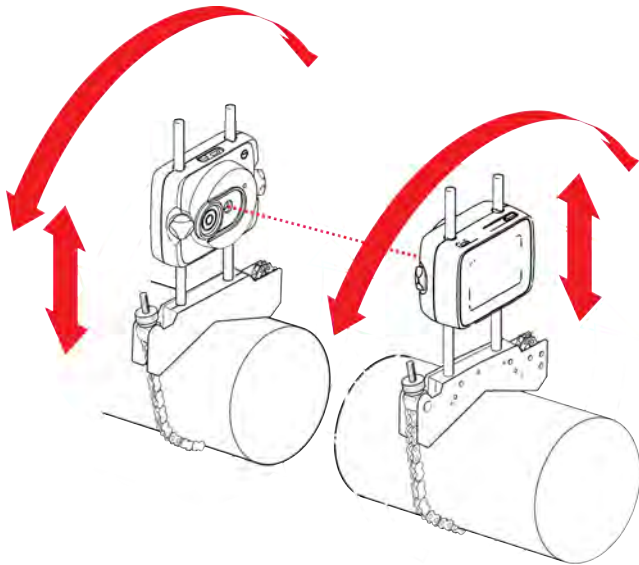
2. If the laser and sensor have been roughly positioned to each other during mounting, the laser beam should strike the sensor dust cap. If the beam be so far off target that it misses the sensor completely, hold a sheet of paper in front of the sensor to locate the beam and readjust it onto the sensor as follows:

3. Reposition the components until the laser beam strikes the sensor cap:

- vertically: loosen the locking knobs and adjust the height.
- horizontally: loosen the bracket and turn the laser and/or sensor brackets into line with one another. Make sure both brackets are rotationally aligned to each other.



4. Make further horizontal and vertical adjustment until the laser beam strikes the center of the sensor dust cap. Slide the dust cap to the open position to open the sensor aperture.



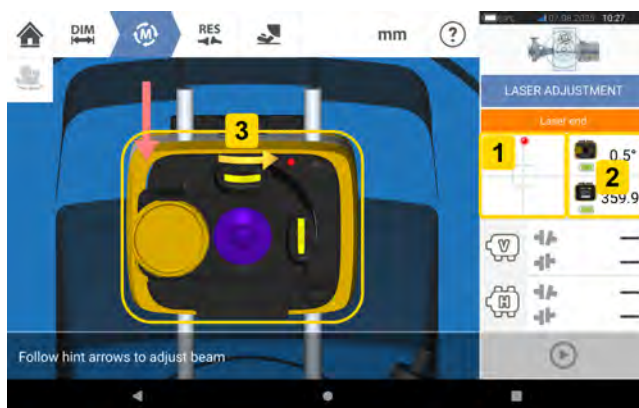
XY View

Use the XY View function to center the laser beam on the position detector before measurement.

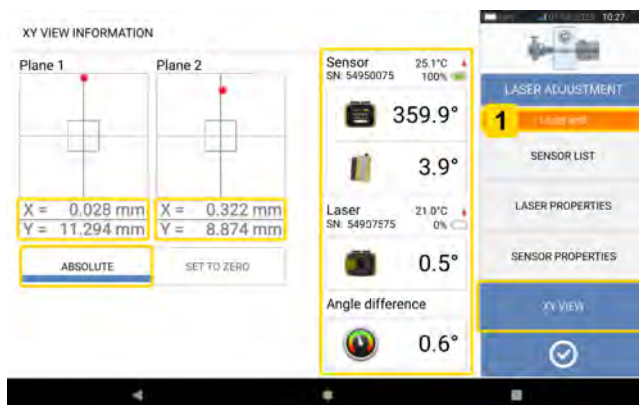


Note

The XY View function is the same in both sensors. In both RotAlign Elite and RotAlign Core, the laser is shown along with two position detectors. In the example below, RotAlign Elite is used.



- Tap the shown detector area (1) to directly access the XY View screen.
- Tap the **sensor/laser** area (2). Select the menu item **XY View** to open the XY View screen.
- Tap the laser (3). Select the menu item **XY View** to open the XY View screen.

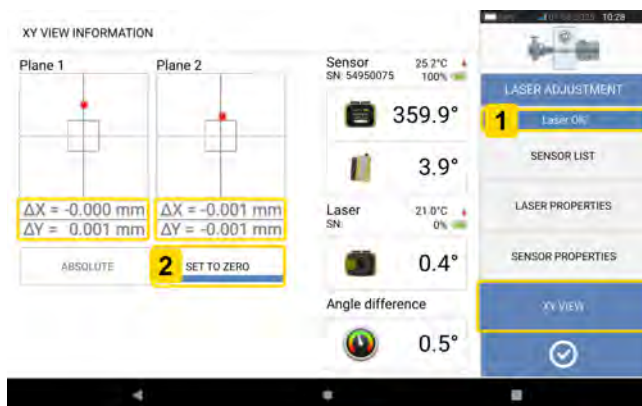


The **XY View Information** screen shows: the absolute X,Y coordinates of the laser beam on the position detector; the angle of the sensor and laser on the shafts; sensor vertical angle; serial numbers of both laser and sensor.

For RotAlign Elite, use both beam position thumbwheels and center the laser beam dots in both planes. For RotAlign Core, loosen the laser locking knobs and adjust its height along the support posts. Then, loosen the laser bracket and rotate it to center the laser beam dot. In some cases it may be necessary to move the sensor along the support posts or sideways. Loosen the chain type bracket and rotate it slightly.

The **Set to zero** function is used to check the effect of environmental and machinery vibration on the measurement.

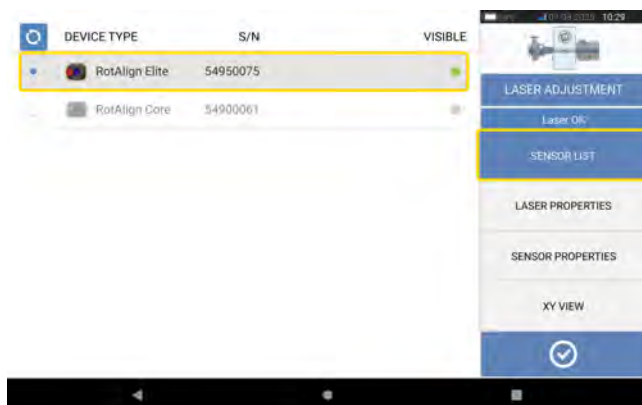
Note: **Set to zero** is active only when the laser beam status (1) is **OK** or **Centered**.



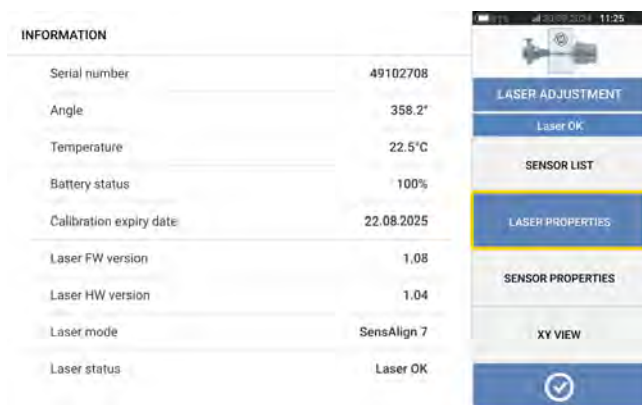
If the laser beam status is **OK** or **Centered** (1), tap **Set to zero** (2) to set the current laser dot position as 0,0. The $\Delta X, \Delta Y$ values are then monitored to check the stability of the values. Tap **Absolute** to go back to the accurate values.

Note: The menu items on the screen are used to show these items:

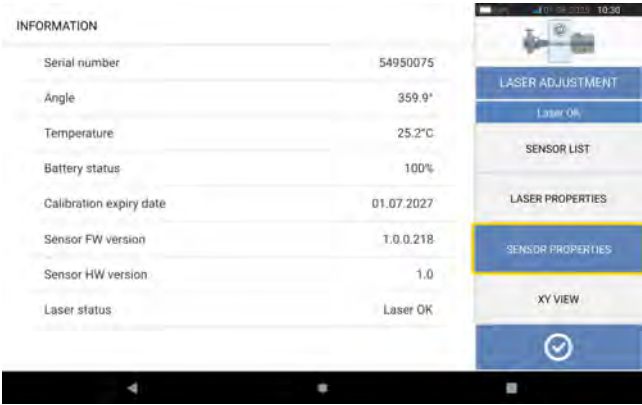
Sensor list – shows serial number of sensors detected or previously used, as well as type of connection used for communication.



Laser properties – shows detailed information of the laser unit in use



Sensor properties – shows detailed information of the sensor unit in use

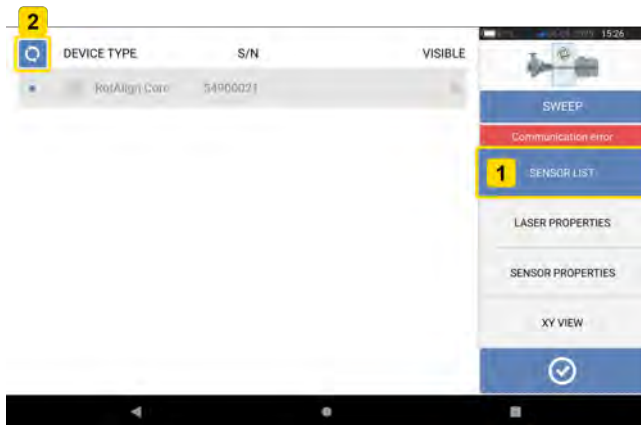


Initializing sensor

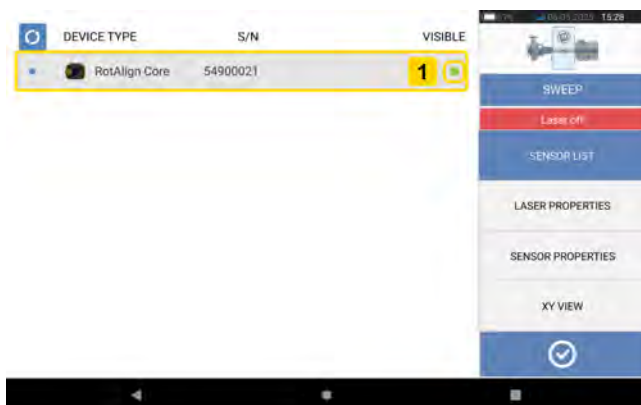
The hint **Communication error** (1) suggests that the sensor has not been initialized although the laser beam may have been correctly adjusted.



Tap the detector and sensor/laser area (2) to open the menu item **SENSOR LIST**.



Tap menu item **SENSOR LIST** (1) to see listed sensors. Tap  (2) to scan for the sensor. The hint **Scanning for sensor(s)** is shown during the scan process.



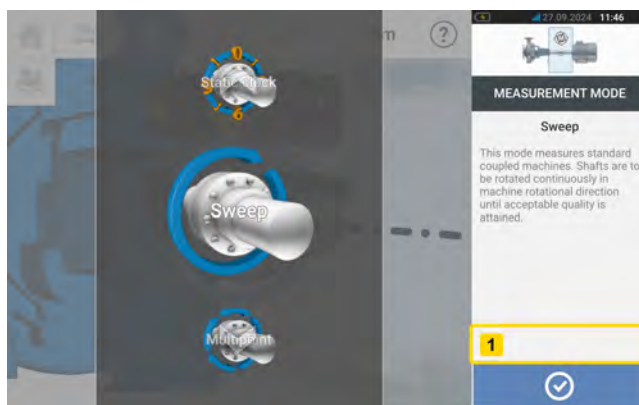
As soon as the sensor is detected, it is shown bold with a green bold dot (1) next to the detected sensor. Tap the listed sensor to initialize it.

Measurement

The necessary measurement mode is selected from the measurement screen.



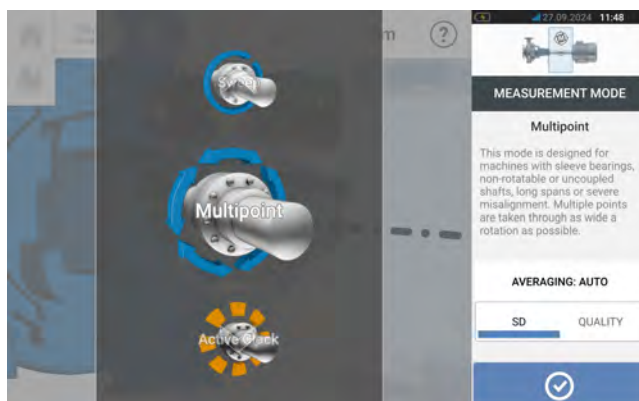
Tap the measurement mode header (1) to open the measurement mode carousel.



Note

In this example, RotAlign Core sensor is used. If RotAlign Elite sensor (with advanced or expert features) is used, the intelligent measurement modes IntelliSweep, IntelliPoint, and IntelliPass can also be selected. If an intelligent measurement mode is selected, the **INTELLI:ON/OFF** button is shown in (1) Tap the button (1) to change the measurement mode, if necessary, from IntelliSweep to Sweep, and vice versa; and from IntelliPass to pass, and vice versa.

Swipe the carousel up or down and select necessary measurement mode.



In the above example, Multipoint measurement mode has been selected. The quality of the measurement is displayed either as a measurement standard deviation (SD) or measurement quality factor.

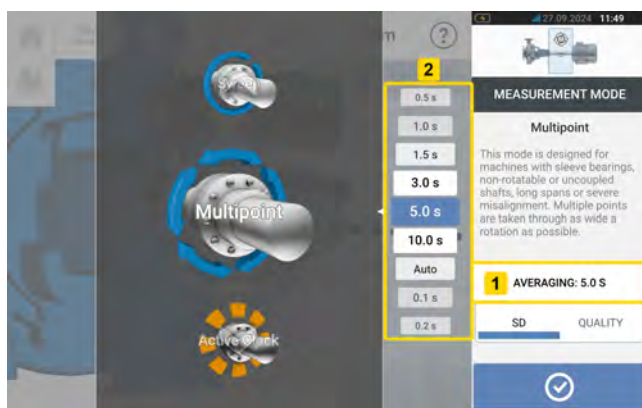
Standard deviation (SD) is the root mean square deviation (mean of the means) of the measurement points. It describes how closely a group of data points are clustered around the average of those data points. It is a measure of the measurement calibre. The smaller the SD, the better the quality of the data collected.

Measurement quality is a factor defined by these measurement and environmental criteria: angular rotation, standard deviation of the measurement ellipse, vibration, rotation evenness, angular rotation inertia, direction of rotation, speed and filter output. The higher the factor, the better the quality of measurement.

Tap **SD** for standard deviation or **QUALITY** for measurement quality. Tap **AVERAGING** to set the averaging.

Averaging

In certain industrial conditions, it is necessary to increase the number of measurements (recorded laser pulses) to be averaged when readings are taken, so as to get the necessary accuracy. Particular cases include environments with increased machinery vibration. An increased averaging also improves the accuracy when sleeve bearings, white metal bearings and journal bearings are measured.



Tap **AVERAGING** (1). A scale (2) used to set the averaging value is shown. Tap necessary averaging value. This value is shown in the **AVERAGING** button (1).

Measurement modes

These measurement modes are available for horizontal machine configurations:

- IntelliSweep measurement – This is the measurement mode used to measure standard coupled machines with anti-friction bearings. It detects error influences such as coupling play, rough rotation and environmental vibration, and automatically eliminates the induced errors.
- Continuous Sweep measurement – This mode is used to measure standard coupled machines. The shafts are rotated continuously in machine rotational direction until acceptable measurement quality is attained.
- IntelliPoint measurement – This mode is used in cases where the uncoupled shafts can be stopped at definite positions (such as in dismantled cardan shafts). It is also used in cases where the shafts are coupled but torsional play exists. This mode ensures that measurement points remain on the same rotational arc hence increasing accuracy.
- IntelliPass measurement – This mode is used in cases where the uncoupled shafts cannot be stopped at definite positions.
- Pass mode – Pass measurement mode is used for uncoupled and nonrotatable shafts (one or both). The laser is rotated past the sensor at different rotational positions.
- Multipoint measurement – This is the mode used to measure uncoupled shafts, non-rotational shafts, sleeve bearings [journal (radial) bearings], white metal bearings, shafts that are hard to turn, shafts with herky-jerky rotation, situations with long spans or severe misalignment that will readily cause the beam to fall out of range.
- Active Clock – In this mode, measurement points are taken at any of the 8 available sectors. A minimum of 3 measurement points is required to determine the alignment condition, but more measurement points over a wider rotational angle is recommended.
- Static measurement – This is the default measurement mode used to measure vertical mounted machines (four feet or flange-mounted). It is also used to measure horizontal machines with uncoupled and nonrotatable shafts.

IntelliSweep measurement

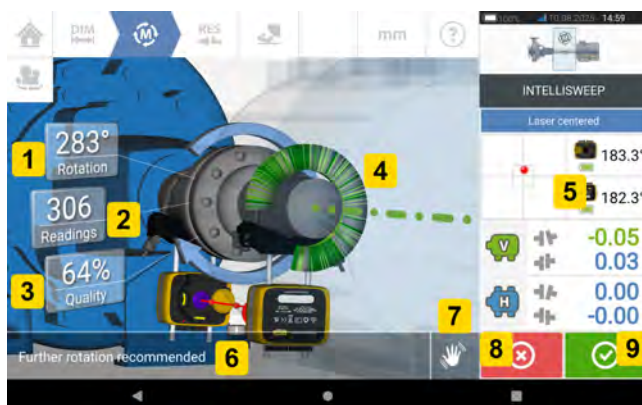
This is the default measurement mode (with RotAlign Elite) and is used to measure standard horizontal coupled machines. The mode actively assists the user by automatic detection of errors, and provides subsequent hints to minimize the errors.



- **(1)** Returns user to home screen
- **(2)** Returns user to dimensions screen
- **(3)** Current measurement screen
- **(4)** Results screen icon
- **(5)** Takes user to soft foot measurement screen
- **(6)** Rotates the view of both machines and mounted components
- **(7)** Laser
- **(8)** Sensor
- **(9)** *Intelli* hint (text)
- **(10)** Tap to start rotating the shafts

When the laser beam has been centered, rotate shafts to start automatic measurement, or tap . Rotate shafts through as wide an angle as possible.

As shafts are rotated, and depending on the physical condition of the machines, the rotational arc changes color from red (quality < 40%) to amber (quality $\geq 40\% < 60\%$) to green (quality $\geq 60\% < 80\%$) to blue (quality $\geq 80\%$). Coupling results are displayed as soon as the measurement quality attains 40% (rotational arc turns amber).



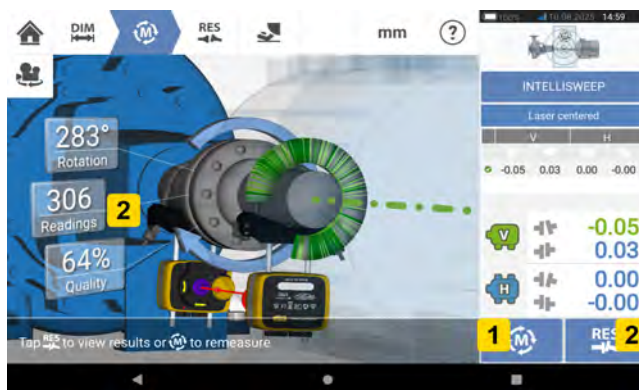
- **(1)** Rotational angle covered by the shafts
- **(2)** Measurement positions taken
- **(3)** Measurement quality
- **(4)** Rotational arc
- **(5)** Coupling results displayed as soon as the measurement quality reaches 40% (rotational arc is orange)
- **(6)** *Intelli* hint (text)
- **(7)** *Intelli* hint (icon)
- **(8)** Cancel button
- **(9)** Proceed button (has same color code as the related measurement quality)

Tap  to cancel the measurement. Tap  to proceed to see results or measure again.



Note

The color of the **Proceed** button () is related to the color of the rotational arc. This shows the attained measurement quality.

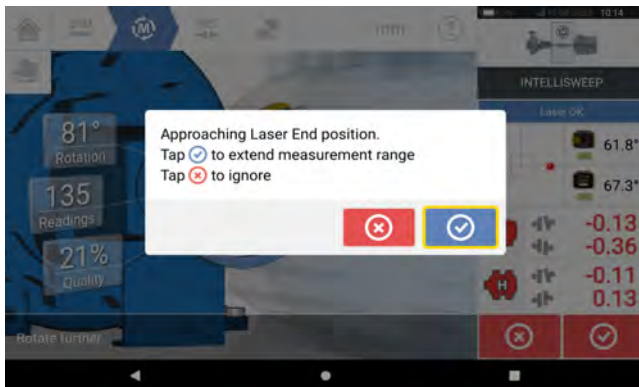


- **(1)** Tap  to measure machines again.
- **(2)** Tap  to view machine foot results.

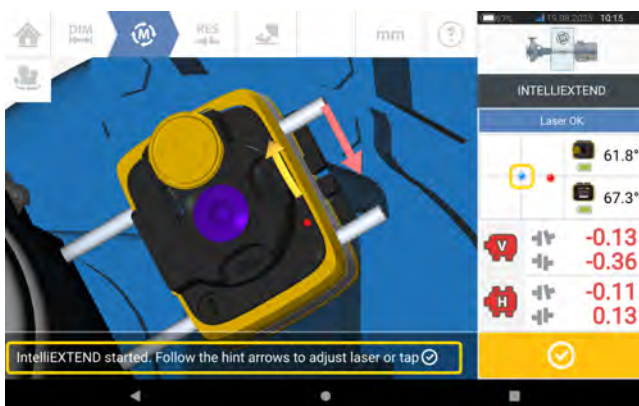
IntelliExtend

This feature automatically activates the extension of the measurement range while in IntelliSweep measurement mode. This range extension allows the adjustment of the laser beam such that it does not miss the detector surface when measuring shafts with gross misalignment or angular misalignment over large distances.

- When measurement is taken with IntelliSweep, and the laser beam approaches the end of the detector surface, a hint is automatically shown on the display.



- Tap [checkmark] to proceed to extend the measurement range.

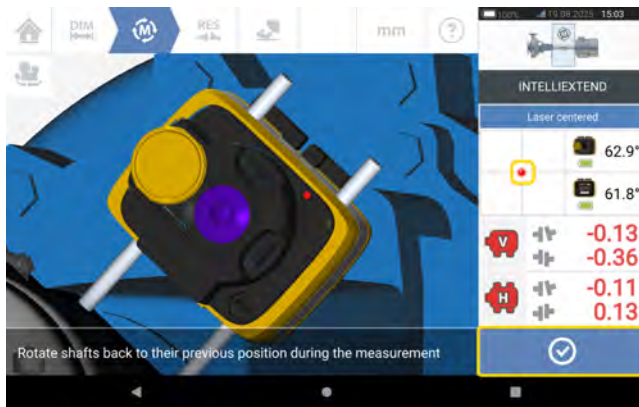


Follow the on-screen hints and use the two beam position thumbwheels to adjust the laser beam dot with the blue dot on the detector area.

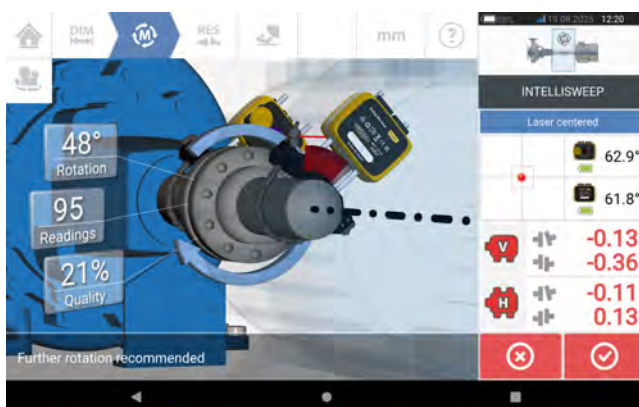


Note

Do not touch the sensor at any time during the adjustment of the laser beam dot.



- When the laser dot is adjusted, Tap  then rotate the shafts further to continue to measure.



- Rotate the shafts through as wide an angle as possible then tap  to proceed to results.



Note

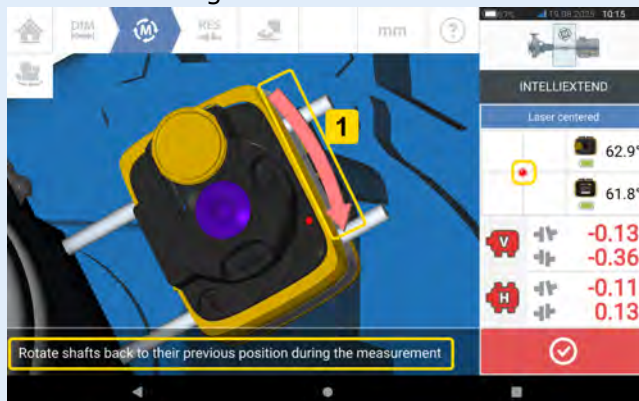
The color of the **Proceed** button () is related to the color of the rotational arc. This shows the attained measurement quality.

Tap  to view machine foot results.



Note

If the sensor is accidentally touched during the adjustment of the laser dot, a bold curved arrow (**1**) is shown. It shows the direction to rotate shafts. Turn the shafts in this direction until the position of last measurement is reached, at which point the bold arrow gets out of view. Proceed as described in 3 above.



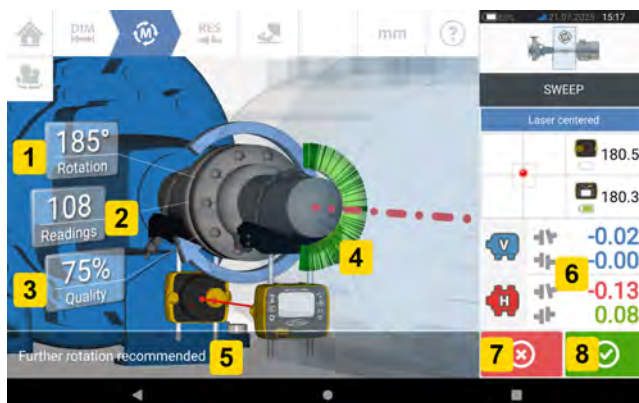
Continuous Sweep measurement

This measurement mode is used to measure standard horizontal coupled machines.



When the laser beam has been centered, measurement can start automatically when the shafts are rotated, or by tapping  or **M (1)**. Rotate shafts through as wide an angle as possible.

As shafts are rotated, and depending on the physical condition of the machines, the rotational arc changes color from red (quality < 40%) to amber (quality $\geq 40\% < 60\%$) to green (quality $\geq 60\% < 80\%$) to blue (quality $\geq 80\%$). Coupling results are displayed as soon as the measurement quality attains 40% (rotational arc turns amber).



- **(1)** Rotational angle covered by the shafts
- **(2)** Measurement positions taken
- **(3)** Measurement quality
- **(4)** Rotational arc
- **(5)** Hint
- **(6)** Coupling results displayed as soon as the measurement quality reaches 40% (rotational arc is orange)
- **(7)** Cancel icon
- **(8)** Proceed icon

Tap  to cancel measurement. Tap  to proceed to see results or measure again.



Note that the color of the **Proceed** icon (

 is related to the color of the rotational arc. This shows the attained measurement quality.

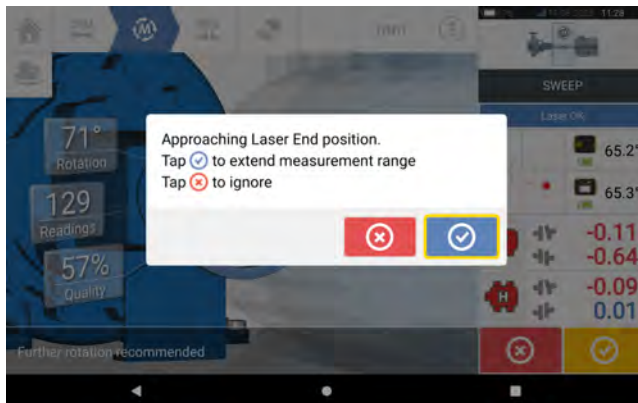


- **(1)** Tap  to measure machines again.
- **(2)** Tap  to view machine foot results.

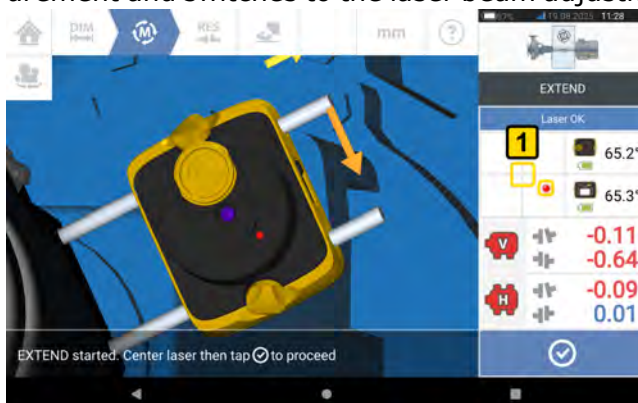
Extend measurement range in Continuous Sweep

This feature automatically activates the extension of the measurement range while in Continuous Sweep measurement mode. This range extension allows the adjustment of the laser beam such that it does not miss the detector surface when measuring shafts with gross misalignment or angular misalignment over large distances.

- When taking measurement using Continuous Sweep, and the laser beam approaches the end of the detector surface, a hint automatically appears on the screen.



- Tap [checkmark] to proceed to extend the measurement range. The program interrupts measurement and switches to the laser beam adjustment screen.

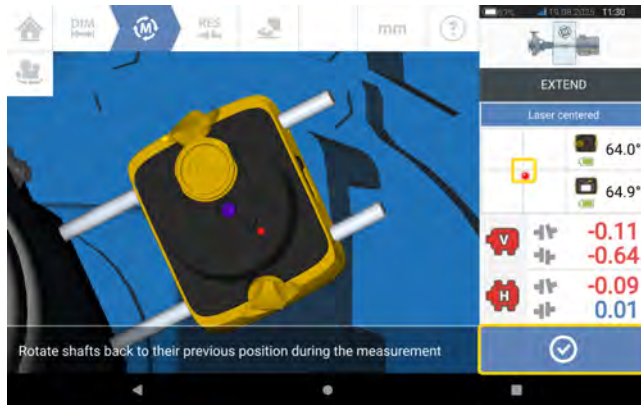


The current beam position is automatically recorded and taken as the starting point for range extension. Follow the on-screen hints to adjust the laser beam dot into the detector area target square (1).



Note

Do not touch the sensor at any time during the adjustment of the laser beam dot.



- When the laser dot is adjusted, tap  then rotate shafts further to continue with measurement.



- After the shafts are rotated through as wide an angle as possible, tap  to proceed to results.



Note

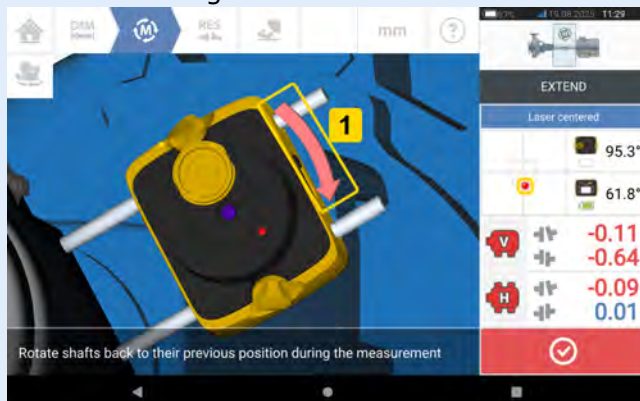
The color of the **Proceed** button () is related to the color of the rotational arc. This shows the attained measurement quality.

Tap  to see machine foot results.



Note

If the sensor is accidentally touched during the adjustment of the laser dot, a bold curved arrow (**1**) is shown. It shows the direction to rotate shafts. Turn the shafts in this direction until the position of last measurement is reached, at which point the bold arrow gets out of view. Proceed as described in 3 above.



IntelliPoint measurement

In this mode, the shaft with the laser is rotated to the position where the laser beam strikes the center of the sensor lens. Measurement is taken when the laser beam strikes the center of the detector.

After the laser beam is centered, let the measure process stabilize. This is done when the needle is placed at the center of the green sector.



Note

To center the needle, both laser and sensor must be at the same rotational angle.

The letter **M** (1) is shown as in the screen below.



Tap **M** to take the measurement point.

Rotate one of the shafts (say one with the sensor) to the next position, then rotate the other shaft (say the one with the laser) until the needle rests in the central blue sector of the onscreen needle indicator (1).

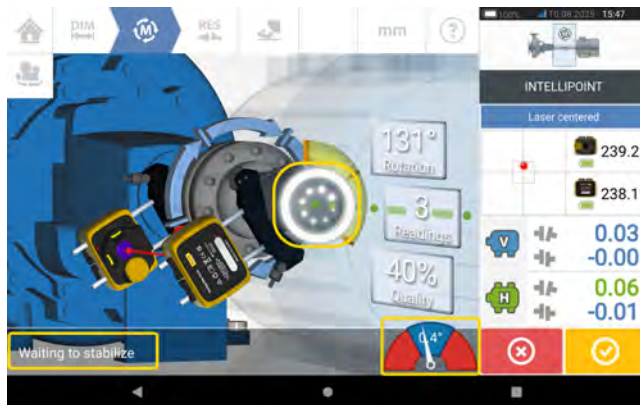


When the needle is in the blue sector, and value stabilization time has been attained, the letter **M** appears (2). Tap **M** to take the measurement point.



Note

Measurements may be taken automatically without having to tap **M** after stabilization, if the auto function is enabled in default settings.



Rotate either head to the next measurement position; repeat the procedure to take measurements through at least three positions over at least 60° of rotation, but more measurements over a wider angle is recommended.



After sufficient measurement points are taken, tap  to finish measurement.



Note

The color of the **Proceed / Finish** button () is related to the color of the rotational arc. This shows the attained measurement quality.



Tap  to view machine foot results.

Multipoint measurement

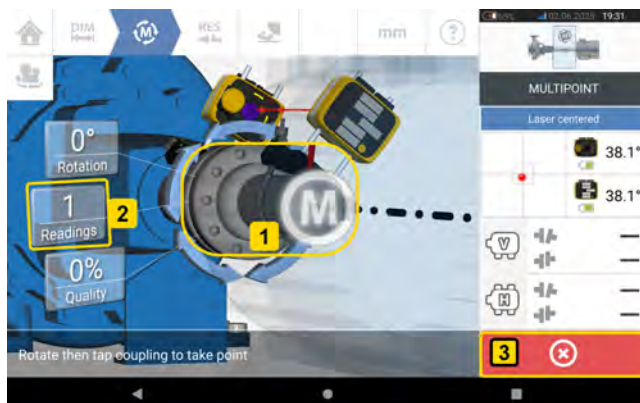
This mode is used to measure shafts which are either difficult to turn continuously or allow measurement only in certain rotational positions. The method can also be used to measure uncoupled shafts, nonrotatable shafts, sleeve bearings, white metal bearings and journal (radial) bearings, shafts that are difficult to turn, shafts with herky-jerky rotation, situations with long spans or severe misalignment that will readily cause the beam to fall out of range.

If not yet completed, enter machine dimensions, then center laser beam.



- **(1) Next** icon – tap to take initial measurement point
- **(2)** Hint to tap 

Tap  to take the initial measurement point then rotate the shafts in their normal direction of operation, to the next measurement position.



- **(1)** Coupling area to be tapped to take next measurement
- **(2)** Number of points already taken
- **(3) Cancel** icon – used to cancel current measurement and start new measurement

Tap the coupling area **(1)** to take the measurement point. Rotate shafts further, then tap the coupling area **(1)** to take measurement points. Take as many measurement points through as wide a rotational angle as possible.



- **(1)** Rotational arc shows points taken and rotational angle covered by the shafts. The arc changes color from red ($< 60^\circ$) -> amber -> green ($> 70^\circ$), when standard deviation is the selected reference.
- **(2)** Rotational angle completed by the shafts for current measurement
- **(3)** Number of measurement points taken for current measurement
- **(4)** Standard deviation attained in current measurement. This option is set when the measurement mode is selected. The other option that can be selected is measurement quality.
- **(5) Proceed** icon – tap to continue to view measurement results

The **Proceed** icon  (whose color changes with the rotational arc) becomes active after three measurement points have been taken.

The horizontal and vertical coupling results are displayed when the shafts are rotated at least over 60° , and a minimum of three measurement positions are recorded. If however, measurement quality has been selected, the coupling results are displayed when the rotational arc **(1)** turns yellow.

Tap  to continue to view results or to measure again.

If required, Live Move may be accessed via the results screen.

Static measurement

This measurement mode is used for uncoupled shafts, nonrotatable shafts and vertical foot-mounted or flange-mounted machines.

If not yet completed, enter dimensions then center laser beam.

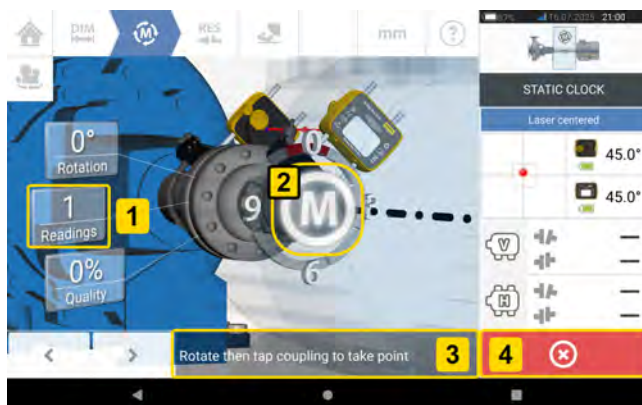
Use the measurement mode carousel and select static measurement mode (Static Clock).



- **(1)** The **left/right** navigation icons are used to position the displayed laser and sensor at the angular position related to the components mounted on the shafts.
- **(2)** On-screen hint to position displayed laser and sensor, then take measurement point

Turn the shafts to any of the eight 45° positions (i.e. 12:00, 1:30, 3:00, 4:30, 6:00, 7:30, 9:00 or 10:30 o'clock position viewed from sensor towards laser). Position shaft as accurately

as possible using either an external inclinometer or protractor. Tap the pulsating **M** or  to take the first measurement point.



- **(1)** Number of points already taken (in this example initial point)
- **(2)** Tap pulsating **M** to take next measurement
- **(3)** On-screen hint to position displayed laser and sensor then take measurement point
- **(4)** **Cancel** icon – used to cancel current measurement and start new measurement

Rotate shaft to the next measurement position. The laser and sensor shown must be at the

same angular position as the mounted components. Use  or  to position the shown laser and sensor, then tap the pulsating **M** **(2)** to take next measurement point.



Note

After a measurement point is taken, the shown laser and sensor move to the next clock position on the screen.

If shaft rotation restrictions hinder the measurements at particular shaft positions, use

< or > to bypass those positions.

Measurements must be taken in at least three positions over 90°, but more measurements over a wider angle is recommended.



- **(1)** Rotational arc showing rotational angle covered by the shafts during measurement. The color of the arc sectors shows the attained measurement quality **(4)**
- **(2)** Rotational angle completed by the shafts for current measurement
- **(3)** Number of measurement points taken for current measurement
- **(4)** Measurement quality for current measurement
- **(5) Proceed** icon – tap to continue to view measurement results. The color of the proceed icon corresponds to the color of the rotational arc which denotes the attained measurement quality.

Active Clock measurement

In Active Clock, measurement points are taken at a minimum of 3 to a maximum of the 8 available sectors. The range in which the sectors become active and therefore points may be taken is the given clock position (in degrees) ± 11.25 degrees. For example, the 1:30 o'clock position will be active when the sensor and reflector are at a rotational angle between 34 - 56 degrees.

Clock position	0:00	1:30	3:00	4:30	6:00	7:30	9:00	10:30
Active Clock range in degrees	349 - 11	34 - 56	79 - 101	124 - 146	169 - 191	214 - 236	256 - 281	304 - 326

Active Clock is used to measure standard horizontal coupled machines. Measurement points are taken at any of the eight available sectors. Three measurement points are necessary to determine the alignment condition.

Once the laser beam has been centered, rotate shafts to the first measurement position



Note

If coupling torsion play (backlash) is suspected, turn the shaft or coupling end where the reflector is mounted. Ensure shafts are turned in the normal rotation direction of the machine, and that the mating parts are engaged. Backlash may also be minimized by taping tight the coupling.

Remember not to touch mounted components. This includes the brackets and the support posts, which are NOT to be used to rotate the shafts.



When the sensor and laser are within the sector range, a pulsating **M** (1) appears. Tap the pulsating M or  to take the first measurement position.



After measurement is taken, the sector is highlighted red. This is an indication of the measurement quality. Rotate shafts to the next sector, then tap the pulsating M to take measurement. Repeat this step for the set active points. The color of the measured sectors shows the attained measurement quality.



The proceed icon  (1) also indicates the attained measurement quality. As a maximum of 8 points can be taken, therefore the hint (2) to take further measurement points. Note: Coupling results (3) are displayed because three measurement points are sufficient to determine the alignment condition.



Note

As shafts are rotated, and depending on the physical condition of the machines, the active clock sectors change color from red (quality < 40%) to amber (quality $\geq 40\% < 60\%$) to green (quality $\geq 60\% < 80\%$) to blue (quality $\geq 80\%$). Coupling results are displayed as soon as the measurement quality attains 40% (active clock sector turns amber).

Once sufficient measurement points have been taken, tap  to proceed to see results or measure again.



Note

The color of the **Proceed** button () is related to the color of the rotational arc. This shows the attained measurement quality.



- (1) Rotational angle covered by the shafts
- (2) Active clock measurement points taken
- (3) Measurement quality attained
- (4) Coupling results displayed as soon as the measurement quality reaches 40% (active clock sector is orange)
- (5) Tap  to measure machines again.
- (6) Tap  to view machine foot results.

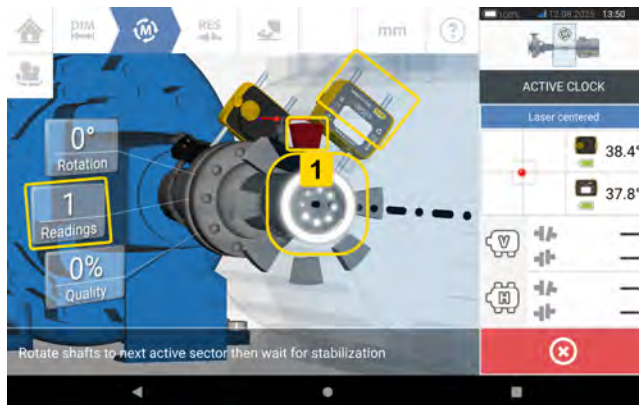
Take measurement points automatically

Measurement points are taken automatically if the default setting item **Take points automatically after stabilization** has been activated. The item **Default settings** is found in configuration.



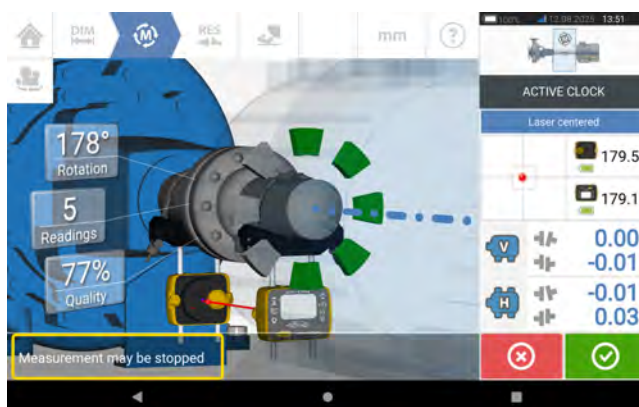
The initial measurement is taken by tapping either the pulsating **M** or  after stabilization.

The shafts are rotated to the next sector range.



When the rotational angle of the sensor and laser is within the sector range, a series of dots in circular motion (**1**) indicate the stabilization process. Once this occurs, stop the rotation of the shafts and wait for the pulsating **M** to appear. The measurement point is taken automatically.

Repeat the procedure until all necessary active clock measurement points are taken.



IntelliPass measurement

In this mode, the shaft supporting the laser is rotated so that the laser beam strikes the sensor lens as it passes it. Measurements are taken when the laser beam passes through the middle sector of the detector.

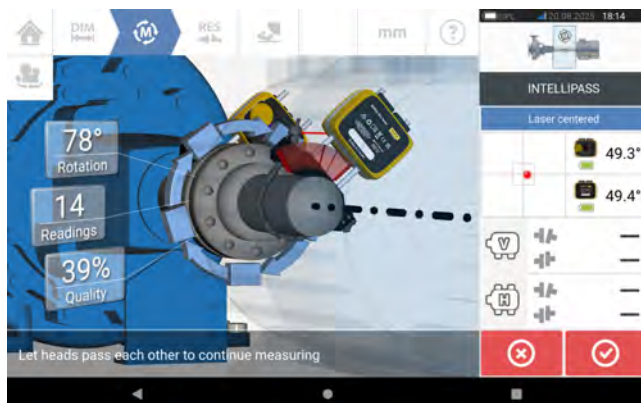
- Center the laser beam. A pulsating **M** (1) indicates that measurement may be taken.



- Tap **M** or  to take initial measurement point.



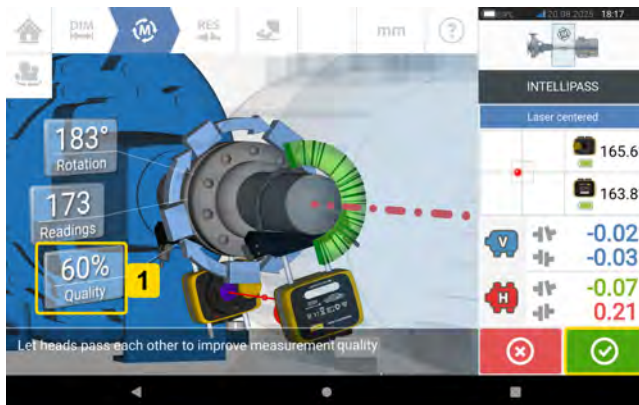
- Rotate the shaft supporting one of the measurement heads (say laser) to the next position, then rotate the shaft supporting the other head (say sensor) slowly past the opposite head. Measurement is automatically taken as the laser beam strikes and passes the sensor detector.



**Note**

The four RotAlign Elite sensor laser beam adjustment LEDs on the front of its housing blink green depending on the position at which the beam strikes the detector.

- Repeat step 3 taking measurements in as many positions and over as wide an angle as possible. It is recommended to aim for a high measurement quality (**1**).



- After taking sufficient measurement positions, tap  to proceed to results.



- Tap  to view results.

**Note**

If only one shaft is not easily rotatable while the other can be freely rotated, always mount the sensor on the nonrotatable shaft (use the magnetic sliding bracket ALI 2.230). Do NOT mount laser on the not-easily-rotatable shaft, even if this means setting up your laser and sensor opposite to the way you normally would for alignment purposes. You can always invert the movable and stationary machines by using the **rotate machine view** functionality. Enter all dimensions in accordance with your actual set-up, following the normal orientation of the laser and sensor in the dimensions screen.

Pass mode



Note

This functionality is NOT available with RotAlign Core features.

In this mode, the shaft supporting the laser is rotated so that the laser beam strikes the sensor lens as it passes it. Measurements are taken when the laser beam passes through the middle sector of the detector.

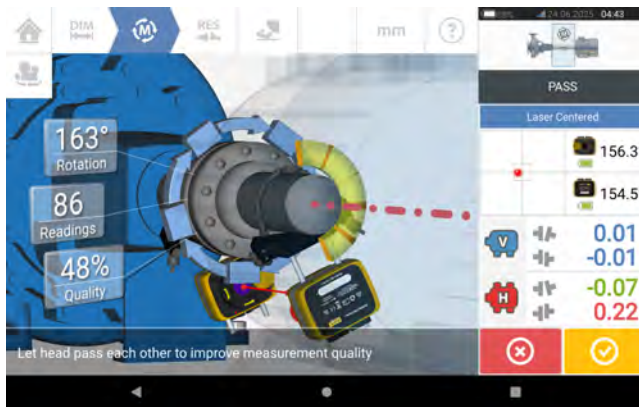
- Center the laser beam. A pulsating **M** (1) indicates that measurement may be taken.



- Tap **M** or  to take initial measurement point.

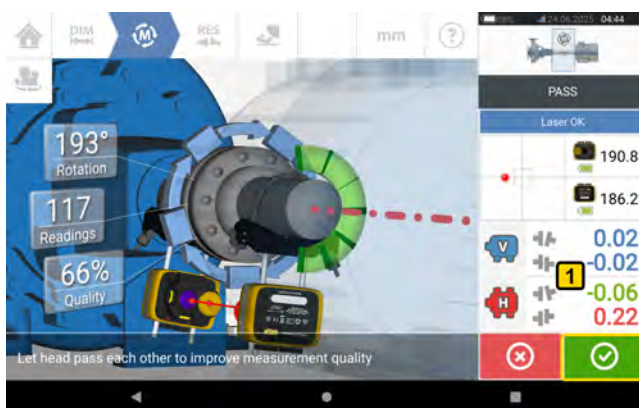


- Rotate the shaft supporting one of the measurement heads (say laser) to the next position, then rotate the shaft supporting the other head (say sensor) slowly past the opposite head. Measurement is automatically taken as the laser beam strikes and passes the sensor detector.

**Note**

The laser beam adjustment LEDs on the front of the sensor housing blink green.

- Repeat step 3 taking measurements in as many positions and over as wide an angle as possible. Coupling results (**1**) will be displayed if measurements have been taken in at least three positions over at least 60° rotation.



- After taking sufficient measurement positions, tap  to proceed to results.

**Note**

The color of the **Proceed / Finish** button () is related to the color of the rotational arc. This shows the attained measurement quality.



- Tap  to view results.



Note

If only one shaft is not easily rotatable while the other can be freely rotated, always mount the sensor on the nonrotatable shaft (use the magnetic sliding bracket ALI 2.230). Do NOT mount the laser on the not-easily-rotatable shaft, even if this means setting up your laser and sensor opposite to the way you normally would for alignment purposes. You can always invert the movable and stationary machines by using the *rotate machine view* functionality.

Enter all dimensions in accordance with your actual set-up, following the normal orientation of the laser and sensor in the dimensions screen.

Manual and dial gauge entries

The measurement table may also be used for these functions:

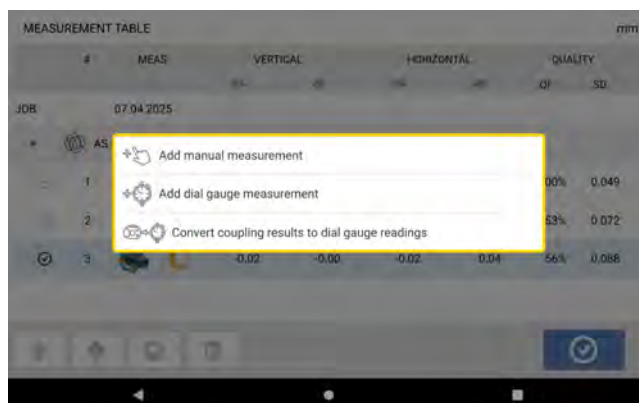
- To enter manual values
- To add a dial gauge measurement and display coupling results
- To convert alignment results from a sensor-laser measurement into the comparable dial gauge values

MEASUREMENT TABLE mm

#	MEAS.	VERTICAL	HORIZONTAL	QUALITY	QF	SD
JOB 07.04.2025						
	AS FOUND	-0.02	-0.00	-0.02	0.04	
1		0.01	-0.01	-0.01	0.09	100% 0.049
2		0.04	-0.02	-0.01	0.00	53% 0.072
3		-0.02	-0.00	-0.02	0.04	56% 0.088

At the bottom of the screen, there is a toolbar with icons for adding a new measurement, deleting, and other functions. The 'Add' icon (a plus sign) is highlighted with a yellow box.

Tap  from the measurement table screen. The manual entry and dial gauge functions are shown.

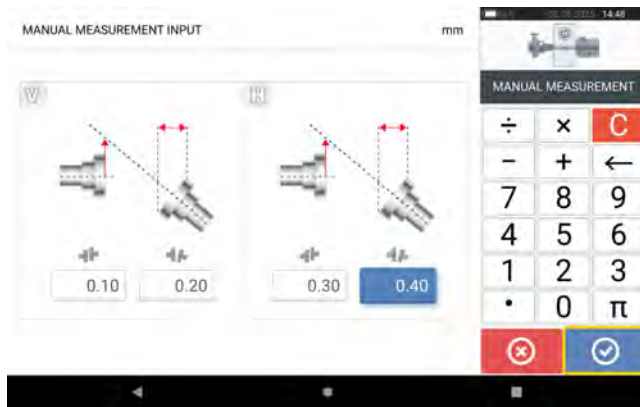


Note

1. If the measurement table is accessed for a new asset without any measurements, the two options available are **Add manual measurement** and **Add dial gauge measurement**.
2. For a new asset, with sensor-to-coupling center dimension entered, the measurement table is shown through the measurement screen. Tap the coupling results area.
3. For a new asset without sensor-to-coupling center dimension, the measurement table is shown through the results screen. Tap the coupling results area.

Enter manual measurement values

With the three items displayed, tap the option "Add manual measurement", then proceed to enter the coupling values manually.



After all values have been entered, tap  to return to the measurement table. The added manual values are shown in the measurement table. The hand symbol next to the entry signifies that it is a manual entry.

MEASUREMENT TABLE

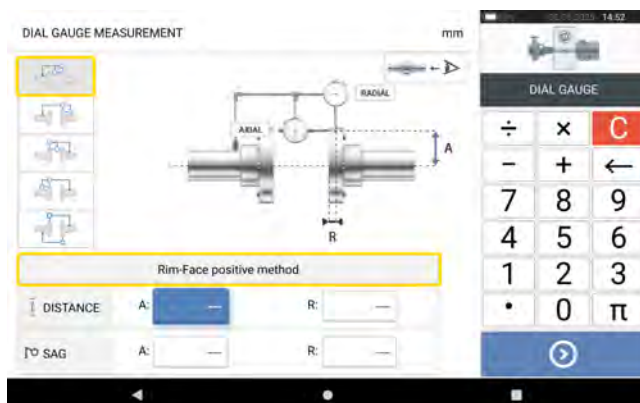
#	MEAS.	VERTICAL	HORIZONTAL	QUALITY	QF	SD
JOB 07.04.2025						
*	AS FOUND	0.20	0.10	0.40	0.30	
1		0.01	-0.01	0.01	0.09	100% 0.049
2		0.04	-0.02	-0.01	0.00	53% 0.072
3		-0.02	-0.00	-0.02	0.04	56% 0.088
4		0.20	0.10	0.40	0.30	— —

Addition of a dial gauge measurement

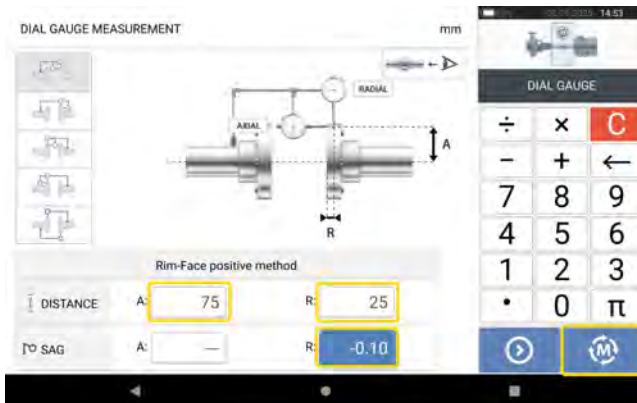
With the three items displayed, tap the option **Add dial gauge measurement**, then select necessary dial gauge set-up. Five set-up methods are available:

- Rim and face (positive)
- Rim and face (negative)
- Rim and face (reversed)
- Rim and face (negative reversed)
- Reverse indicator

In this example, the rim and face (positive) method has been selected.



Enter the required dimensions and the amount of bracket sag.



In this example, the axial distance A is 75 mm, the radial distance R is 25 mm and the indicator bracket sag R is -0.10 mm.



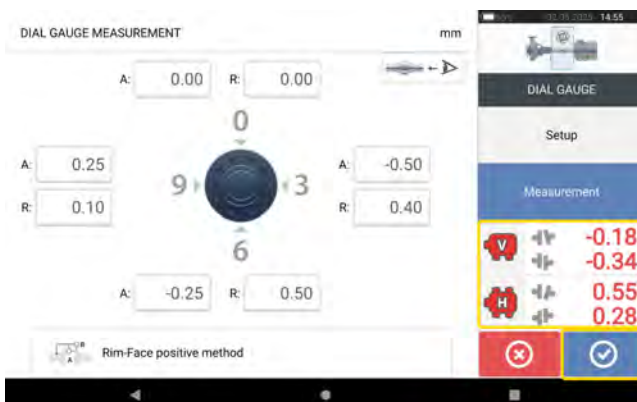
Note

The measure icon  appears as soon as both axial and radial distances have been entered. It is therefore possible to proceed to measurement without entering the sag value.

Enter the measured dial gauge readings.



Tap  to display coupling results.



Dial gauge readings are now shown as coupling results in terms of gap and offset.

Tap  to show the measurement table with the dial gauge measurement is now listed.

MEASUREMENT TABLE mm

#	MEAS	VERTICAL		HORIZONTAL		QUALITY	
		↑	↓	←	→	QF	SD
AS FOUND		-0.18	-0.34	0.55	0.28		
1		0.01	-0.01	0.01	0.09	100%	0.049
2		0.04	-0.02	-0.01	0.00	53%	0.072
3		-0.02	-0.00	-0.02	0.04	56%	0.088
4		0.20	0.10	0.40	0.30	—	—
5		-0.18	-0.34	0.55	0.28	—	—

The dial gauge measurement is shown with the dial indicator symbol next to the entry.

Validity rule

Dial indicator readings are taken at the 12, 3, 6 and 9 o'clock positions. The validity rule states that when shafts are rotated, the sum of the dial indicator readings at the 12 and 6 o'clock positions must equal that of the 3 and 9 o'clock positions.

TOP + BOTTOM = SIDE + SIDE

The validity rule works because readings are taken around the circumference of a circular object.

If the above is not true, then the measurement should be repeated. The device has a function used to check the validity rule. If the entered dial gauge measurement values do not conform to the validity rule, the hint **Normalize** appears on the screen.

DIAL GAUGE MEASUREMENT mm

A: 0.00 R: 0.00

A: 0.35 R: 0.10

A: -0.25 R: 0.35

A: -0.50 R: 0.40

Rim-Face positive method

NORMALIZE

Tap **Normalize** to view the adjusted dial gauge values. Tap to show coupling results directly.

DIAL GAUGE MEASUREMENT mm

A: 0.00 R: 0.00

A: 0.30 R: 0.02

A: -0.25 R: 0.35

A: -0.55 R: 0.33

Rim-Face positive method

-0.18

-0.27

0.62

0.29



From the measurement table, select measurement whose coupling results are to be converted to dial gauge values.

MEASUREMENT TABLE									
#	MEAS.	VERTICAL		HORIZONTAL		QUALITY			
		ΔZ	σ _Z	ΔX	σ _X	QF	SD		
JOB	07.04.2025								
✖	AS FOUND	-0.02	-0.00	-0.02	0.04				
1		0.01	-0.01	0.01	0.09	100%	0.049		
2		0.04	-0.02	-0.01	0.00	53%	0.072		
3		-0.02	-0.00	-0.02	0.04	56%	0.088		

DIAL GAUGE MEASUREMENT

mm

A: 0.00 R: 0.00

0

9 3

A: -0.02 R: -0.00

R: -0.10 R: -0.00

6

A: -0.03 R: -0.10

Rim-Face positive method

Setup

Measurement

V 0.02

H 0.04

0.02

0.04

**Note**

The calculated dial gauge values conform to the validity rule.

This conversion is now listed on the measurement table. Tap  to show the measurement table.



#	MEAS	VERTICAL	HORIZONTAL	QUALITY	
JOB	07.04.2025				
AS FOUND		-0.02	-0.00	-0.02	0.04
1		0.01	-0.01	0.01	0.09 100% 0.049
2		0.04	-0.02	-0.01	0.00 53% 0.072
3		-0.02	-0.00	-0.02	0.04 56% 0.088
4		-0.02	-0.00	-0.02	0.04 - -

The converted coupling results are same as those obtained directly with the device. The dial gauge measurement is shown with the dial indicator symbol next to the entry.

Extend measurement range manually

Measurement range may be extended manually in both Active Clock and Static measurement modes. This range extension helps with the adjustment of the laser beam so that it does not miss the detector surface when shafts with large or angular misalignment are measured. To extend the range during measurement, go to the XY view before the **Laser End** message appears.

- If the laser dot (1) moves away from the center of the detector screen during shaft rotation, tap the detector area (2) to open the **XY view** screen.

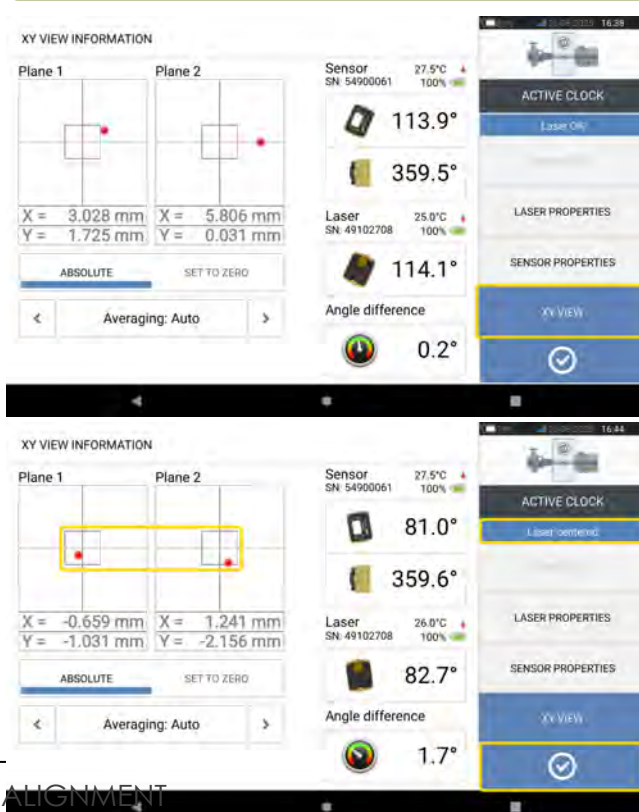


- For RotAlign Core: Move the laser vertically and horizontally to adjust the laser dots on the XY screen. Continue the adjustment until the dots are inside, or very close to, the square targets.
For RotAlign Elite: Use the vertical and horizontal beam positioning thumbwheels to adjust the laser dots on the XY screen. Continue the adjustment until the dots are inside, or very close to, the square targets.



Note

Do not touch the sensor at any time during the adjustment of the laser beam dot.



- With the laser beam centered, tap  then continue with measurement by rotating the shafts further.



- After rotating the shafts through as wide an angle as possible, tap  (1) to proceed to results, then  (2) to view results.



Note

The color of the proceed icon () depends on the attained measurement quality.

Measurement table

The measurement table is used to register and display all Shaft alignment, and any Live Move measurements taken on the current couplings. To access the measurement table, tap either the results repeatability table **(1)** or coupling results **(2)** / **(3)**.



These items are included in the measurement table for each measurement:

MEASUREMENT TABLE						mm	
#	MEAS.	VERTICAL		HORIZONTAL		QUALITY	
	AS FOUND	0.01	0.06	-0.02	-0.11	QF	SD
1	1	0.01	0.03	-0.00	-0.00	60%	0.063
2	2	0.01	0.09	-0.03	-0.21	44%	0.008
	MOVE	0.01	0.05	-0.00	0.01	—	—
	AS LEFT	0.03	0.15	0.01	0.08		
1	1	0.03	0.15	0.01	0.08	95%	0.128

MEASUREMENT TABLE							mm	
MEASUREMENT DETAILS					SENSOR			
DATE & TIME	DISTANCE	REFLECTOR (PRI...	AVG [S]	ROTATION	EXTEND	S/N		
16.05.2025 10:47:39	85	—	Auto	Auto		5490002		
16.05.2025 10:55:58	85	—	Auto	Auto		5490002		
16.05.2025 11:01:40	85	—	0.50			5490002		
16.05.2025 11:10:29	85	—	0.03			5490002		

MEASUREMENT TABLE								mm	
DETAILS				SENSOR		LASER			
REFLECTOR (PRI...	AVG [S]	ROTATION	EXTEND	S/N	RECAL	S/N	RECAL		
—	Auto	Auto		54900021	16.05.2026	00000001	16.05.2026		
—	Auto	Auto		54900021	16.05.2026	00000001	16.05.2026		
—	0.50			54900021	16.05.2026	00000001	16.05.2026		
—	0.03			54900021	16.05.2026	00000001	16.05.2026		

- **(1)** Tap the check box to include the measurement for calculation of the averaged results shown in the results screen. Measurements with a green check mark included in the results. The check mark is grayed out if the measurement is not selected.
- **(2)** Measurements in chronological order
- **(3)** Used measurement mode
- **(4)** The rotational angle covered during measurement
- **(5)** Vertical and horizontal gap and offset values
- **(6)** Measurement quality factor (QF)
- **(7)** Measurement standard deviation (SD)
- **(8)** Date and time when measurement was taken
- **(9)** Dimension sensor-to-coupling center
- **(10)** Averaging used
- **(11)** Direction of shaft rotation during measurement
- **(12)** Serial number of sensor and laser used and recalibration due dates

The **AS FOUND** coupling result (**13**) shows the initial alignment condition of the machines before any Live Move is performed. The displayed result can be an average of selected measurements. In this example, the **AS FOUND** coupling result is the average of the selected measurements numbers 1 and 2.

The **MOVE** result (**14**) shows the alignment condition after Live Move.

The **AS LEFT** coupling result (**15**) shows the alignment condition measured after Live Move. The displayed result can be an average of selected measurements. In this example, the **AS LEFT** coupling result is based on measurement number 1 only.

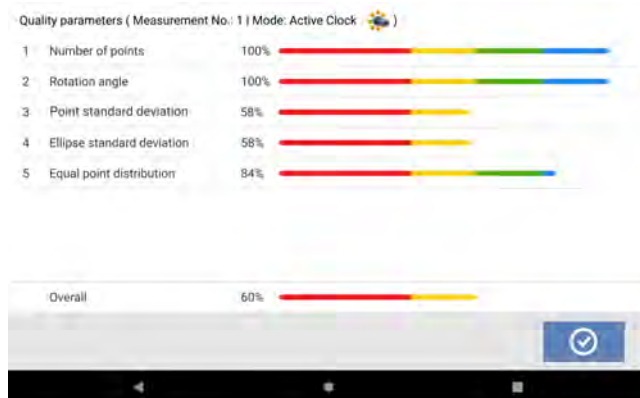
Swipe horizontally to view all columns in the table and vertically to view all rows in the table.

Tap  to enter manual measurement and dial gauge measurement values for the selected measurement (refer to related topics).

Tap  to show the measurement data screen. This screen is used to analyze the ellipse (refer to related topics).

Tap  to go to the video replay screen to see how selected measurement was done.

Tap  to display the weighting of the quality factor parameters of the measurement.



Tap  to delete the selected measurement values from the measurement table.

Note: The row for the selected measurement is highlighted.

Tap  to exit the measurement table.

Measurement quality

These color codes are used to show the measurement quality:

Blue – excellent; Green – acceptable; Yellow – not acceptable; Red – poor

Measurement quality is based on these measurement and environmental criteria:

- Number of points – The higher the number of measurement points taken, the better the effect on the quality factor. The measurement points should be spread over as wide a rotational angle as possible.
- Rotation angle – The wider the rotational angle through which the shafts and/or couplings are rotated during measurement, the better the effect on the quality factor.
- Point standard deviation – For every measurement point, a number of readings are taken depending on the set averaging. Point standard deviation is the root mean square deviation of these readings.
- Ellipse standard deviation – This is the root mean square deviation of the measurement points on the calculated ellipse.

- Equal point distribution – In point measurements, it is advisable to take measurements at equal angular steps, say 0°, 45°, 90°, 135°.
- Environmental vibration – the level of external vibration e.g. from neighbouring running machine(s)
- Rotation evenness – the smoothness of the measurement rotation e.g. if there is any friction during the rotation that 'jerks' the shaft
- Angle rotation inertia – abrupt changes in the measurement rotation speed e.g. releasing and re-applying a break during the rotation
- Rotation direction – change in the measurement rotational direction
- Rotational speed – how fast the sensor and/or shaft is rotated during measurement
- Filter output – the amount of measurement data filtered out

Edit measurement data

To improve the quality of the alignment results, it is possible to edit measurement data that could have been affected by external circumstances such as bracketing touching piping arrangement. The editing options are accessed via the measurement table.

#	MEAS.	VERTICAL	HORIZONTAL	QUALITY
		VF	HF	QF SD
JOB 15.04.2025				
1	AS FOUND	-0.06	-0.62	0.06 0.19
2		-0.05	-0.21	0.16 0.44 69% 0.030
3		-0.06	-0.62	0.06 0.19 41% 0.121

When in the measurement table screen, tap necessary measurement (1) then tap  (2) to access the measurement data screen.

Broken ellipse

The deviation diagram used with the rugged device is referred to as 'broken ellipse'. During measurement, the laser beam traverses an arc that is dependent on the alignment condition of the rotating shafts. Over a complete 360° rotation, the beam describes an ellipse. If the ellipse is cut and laid out flat, it shows the deviation diagram 'broken ellipse'. In this diagram, points out of track are clearly shown.



- **(1)** Tap  or  to cycle through the points.
- **(2)** Currently selected point is active. Tap **NOT ACTIVE** to deactivate the point. A solid circle (**11**) shows an active measurement point. An open circle (**10**) shows a disabled or inactive point.
- **(3)** Shows coupling results for selected measurement. In this example, all measurement points are active.
- **(4)** Tap  to automatically select the point with the highest deviation within the diagram. The cursor (**5**) springs automatically to this point. Note that the icon is inactive when a selected active point has the highest deviation within the group.
- **(5)** The cursor is used to highlight any point in the diagram. The selected point is highlighted blue.
- **(6)** Shows currently shown deviation diagram or sensor plane. Tap icon to cycle through available deviation diagrams and sensor planes. These include:

	Broken ellipse
	Ellipse
	Polar ellipse
	Sensor plane
	Sensor plane zoomed

- **(7)** Currently selected point is inactive. Tap **ACTIVE** to activate point.
- **(8)** Shows coupling results with measurement points deactivated. In this example, two measurement points are deactivated.
- **(9)** The 'undo' icon  is used to reverse all changes made before saving the asset measurement.
- **(10)** Shows measurement point as off (inactive).
- **(11)** Shows measurement point as on (active).

What is the effect of deactivating individual points?

Individual points are deactivated in order to lower the standard deviation value. Change in standard deviation impacts the V and H results displayed in the results repeatability table.

Results



- **(1)** Displays both horizontal and vertical foot results simultaneously
- **(2)** Used to display vertical foot results only
- **(3)** Used to display horizontal foot results only
- **(4)** Used to display foot results in 2-D
- **(5)** Used to display foot results in 3-D
- **(6)** Starts Live Move
- **(7)** Used to generate asset measurement report
- **(8)** Used to save asset measurements in asset park
- **(9)** Used to select results mode
- **(10)** Tapping the slider on the machines icon opens the triple "Train Manager" / "Train Setup" / "Train Fixation" screen (Note: Only "Train Fixation" is active.)
- **(11)** Alignment condition tolerance symbol

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

The 2-D V and H foot results screens show the vertical (V) and horizontal (H) foot positions respectively.

The colors of the bold arrows next to the feet correction values are directly related to the coupling alignment condition as follows:

Blue – excellent (foot should not be moved)

Green – acceptable (if possible foot should remain unaltered)

Red – poor (foot requires moving to attain a better alignment condition)



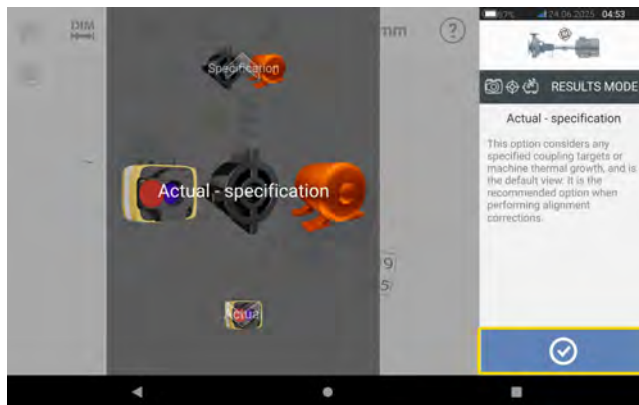


- **(1)** Vertical foot position results
- **(2)** Horizontal foot position results
- **(3)** Vertical coupling results
- **(4)** Horizontal coupling results
- **(5)** Selected results mode
- **(6)** Alignment condition tolerance symbol
- **(7)** Horizontal and Vertical foot results in 2-D

Results options



Alignment results may be displayed in three different options. To access the available options, tap **1**.



Use the results mode carousel to select the necessary results option then tap  to confirm selection.

The following options are available:

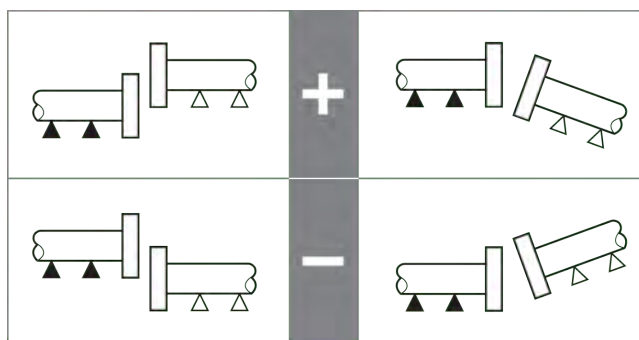
- 'Actual' – used to show just the measured alignment values without regard to any target values or thermal growth values that have been entered, even if they are active
- 'Specification' – shows just the effect of any target specifications and/or thermal growth values that may have been entered and activated, from a baseline of zero, without regard to any measured misalignment
- 'Actual minus Specification' – this option considers any specified coupling targets or machine thermal growth, and is the default view. It is the option that should be used when actually performing alignment corrections

Sign convention

Coupling gap is positive when open at top or side away from viewer. The viewer is considered to be standing in front of the machines as they appear on the display.

Offset is positive when the right shaft axis is higher than the left shaft axis or further away from the viewer than the left axis.

Both vertical and horizontal results show the foot position relative to the centerline of machine designated stationary. Positive values indicate that machine is upwards or away from viewer. Negative values indicate that machine is downwards or towards the viewer.



Multiple feet results

Foot corrections

Foot corrections in a multiple feet machine are viewed from the result screen.



If results are displayed in 3D, tap the machine (1) to access the results multiple feet screen. In 2D, tap the machine centerline (1) to access the multiple feet screen.

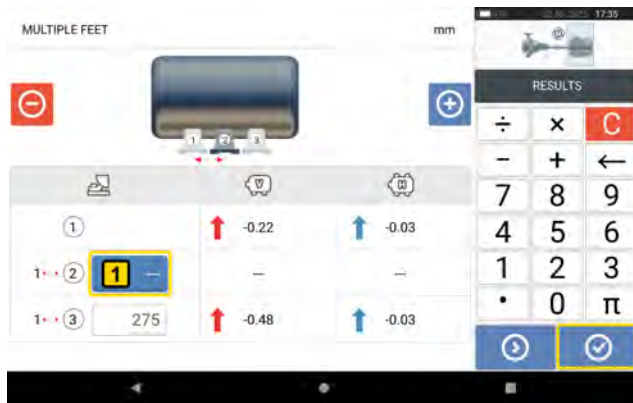


Note

If the machine intermediate feet were already defined within machine properties, then the foot corrections for the intermediate feet will be displayed. In this example, the intermediate feet have not been defined.



Tap  to add any intermediate feet.



Enter the dimension between the front feet and the intermediate feet in the row that appears (1) then tap .

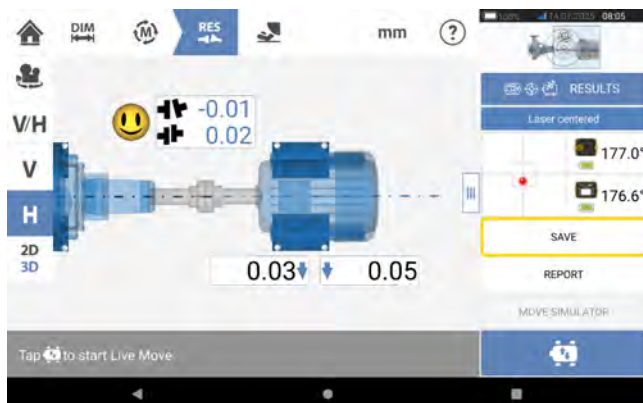


The foot correction values for the intermediate feet appear in the corresponding row.

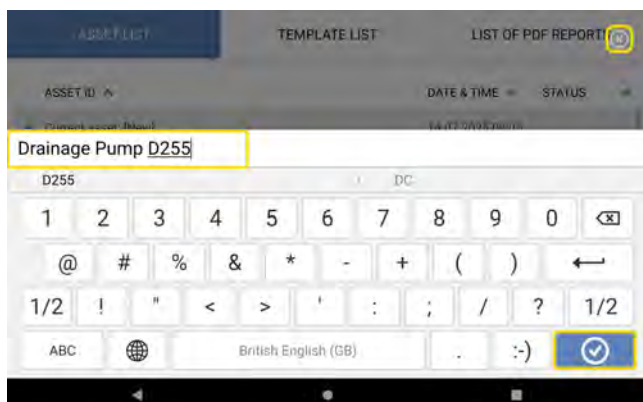
Saving asset measurements

Saving an asset

Before the device is switched off, dimensions, measurements, results and all settings can be saved for analysis, future use or record purposes in the device memory or transferred via Cloud or USB to ARC 4.0 the PC software. Asset measurements are saved from the results screen.



To save an asset measurement, tap the menu item **SAVE** then use the onscreen keyboard to enter the measurement file name.



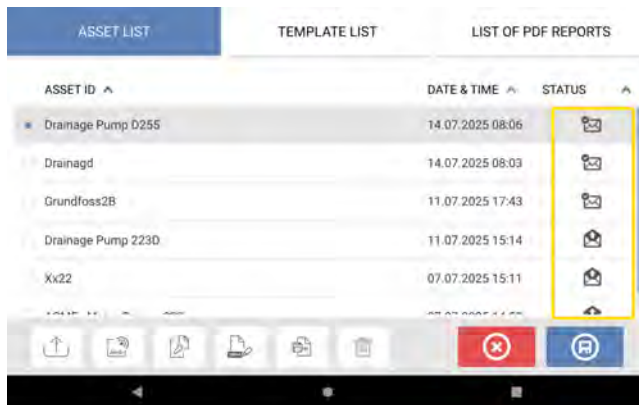
Once asset name has been entered, tap  to save the asset under **Asset park**. This is the location where asset measurements are saved.



Note

If for any given reason, the asset is not to be saved, tap the cancel icon () to cancel saving.

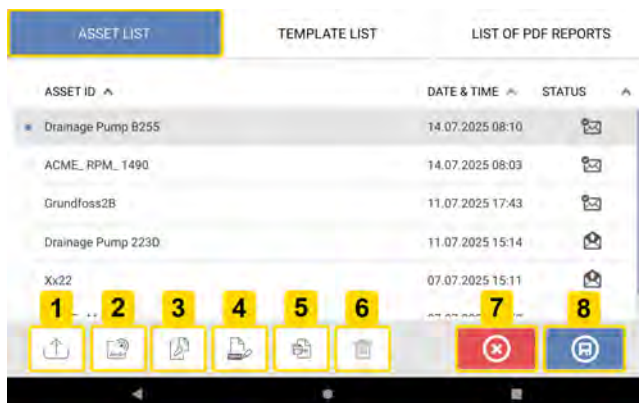
Asset refers to machinery and equipment within a plant. The asset is listed as an Asset ID. Access Asset park via the home screen.



The status envelopes indicate whether an asset has been measured or not.

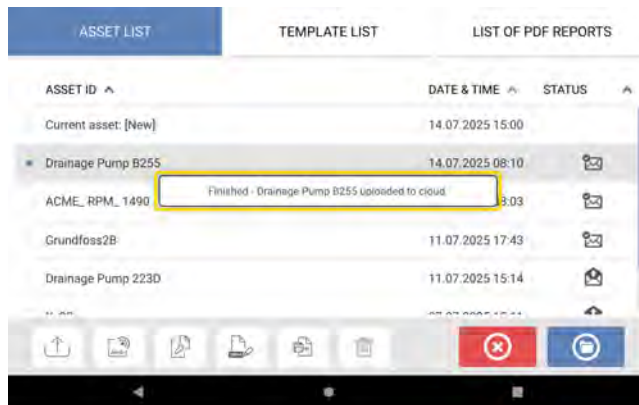
-  This icon shows that the asset has been imported from ARC 4.0 but is yet to be opened.
-  This icon shows that the asset has been opened but the alignment measurement has not been completed.
-  This icon shows that the alignment measurement is in progress.
-  This icon shows that the alignment measurement has been completed.

Asset list options



Tap the related icon to do these actions on the selected asset:

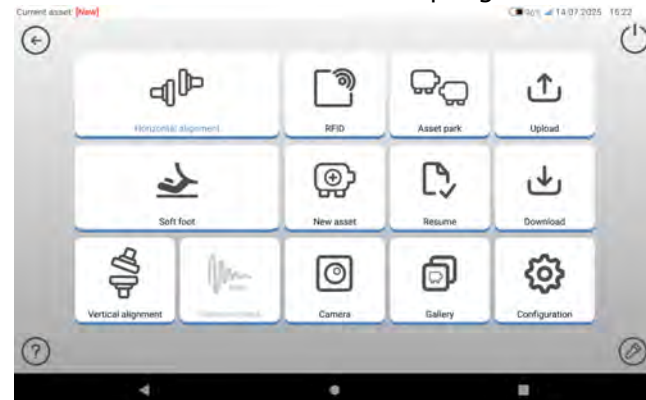
- (1)** Uploads the selected asset to the cloud. Note: The action is completed only if wireless connection is enabled.



- **(2)** Assigns selected asset to an RFID tag.



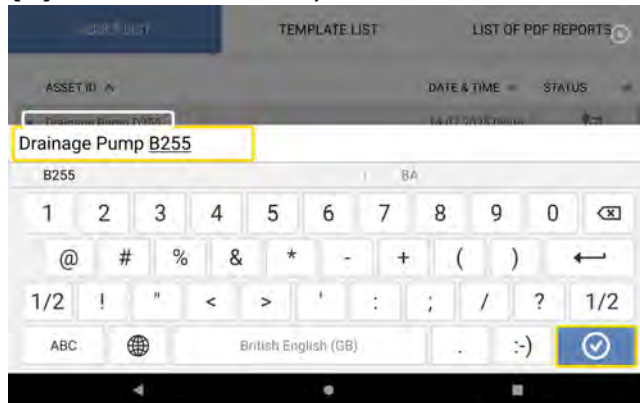
- **(3)** Opens the selected asset as new asset. The new asset will be a copy of the selected asset without the sensor-to-coupling center dimension, and any asset measurements.



Tap the applicable icon to start necessary application. The new asset opens and is edited as required.

Assets opened this way, are used as templates.
This asset is then saved with a new asset name.

- **(4)** Used to edit directly the name of the selected asset.

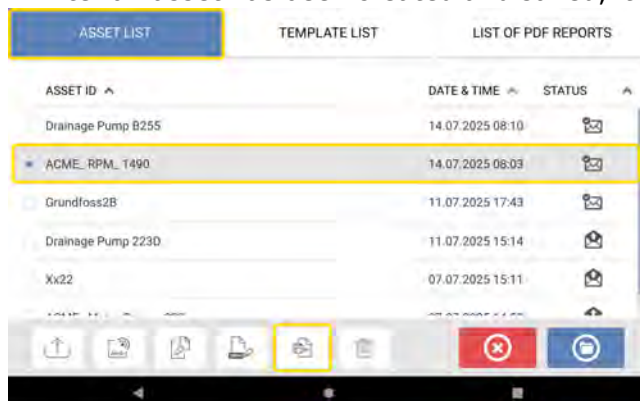


Once completed, tap . The asset will now appear in the asset list with the new name.

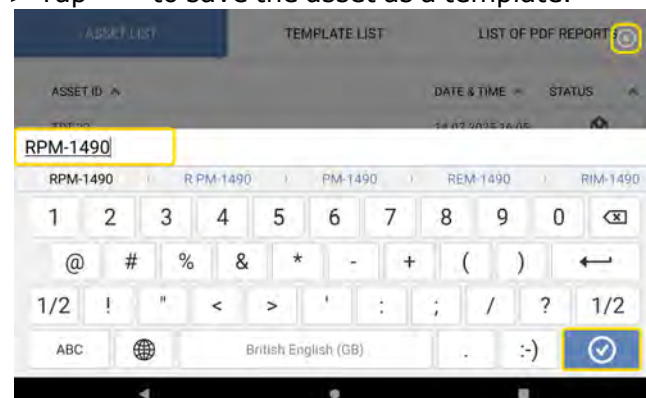
- **(5)** Used to create a template.

A template is a file that serves as a pattern for alignment set-ups that are repeated frequently. Their main purpose is to save time by not having to reconfigure the same set-up many times. It can contain all known dimensions (except sensor-to-reflector), target specifications, thermal growth values, tolerances, preferred measure mode, preferred machine icons and coupling types.

> After an asset has been created and saved, it appears on the asset list.



> Tap  to save the asset as a template.

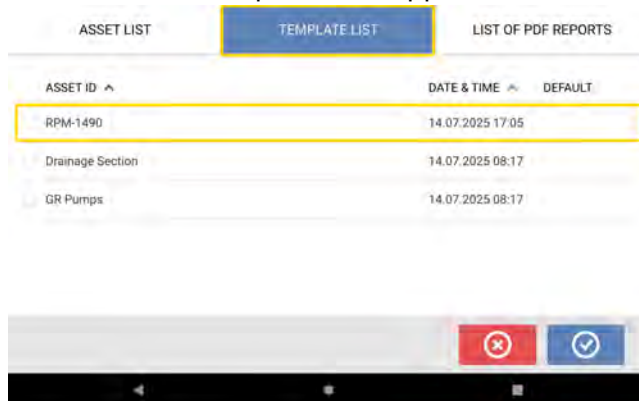


> Enter name of template then tap .

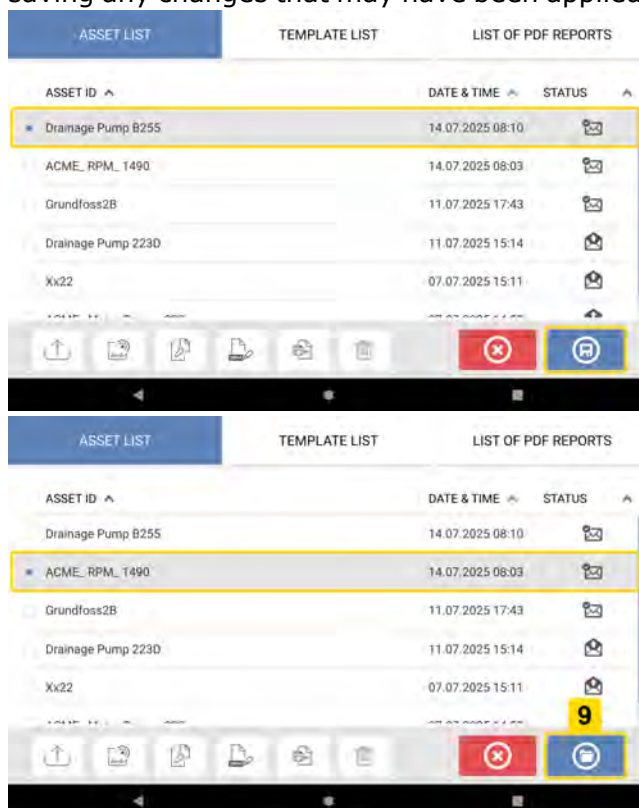
**Note**

If for any given reason, the template is not to be saved, tap the cancel icon to cancel saving.

> The created template now appears on the template list.



- **(6)** Used to delete selected asset.
- **(7)** Used to exit the asset list/template list screen and return to the home screen.
- **(8)** This symbol () signifies that the selected asset is open and running in the background. The symbol serves the dual purpose of either opening the selected asset or saving any changes that may have been applied to the asset but not yet saved.

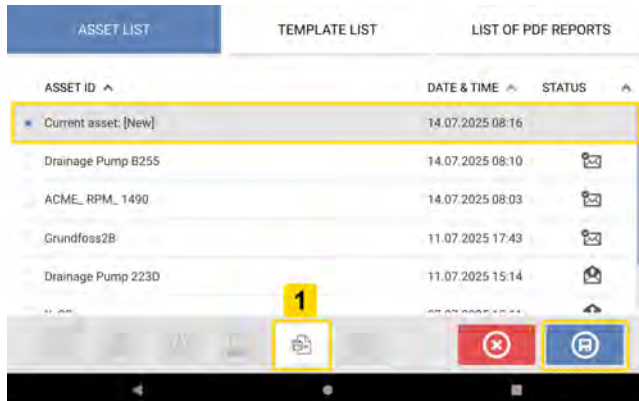


If an asset that was previously saved but currently not open is selected, then the symbol

(9) appears.

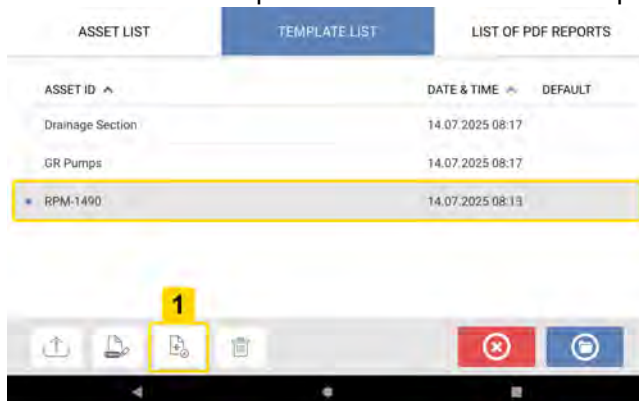
**Note**

If the selected asset has not been previously saved, it can be saved as a template (1). The other asset list options are inactive.

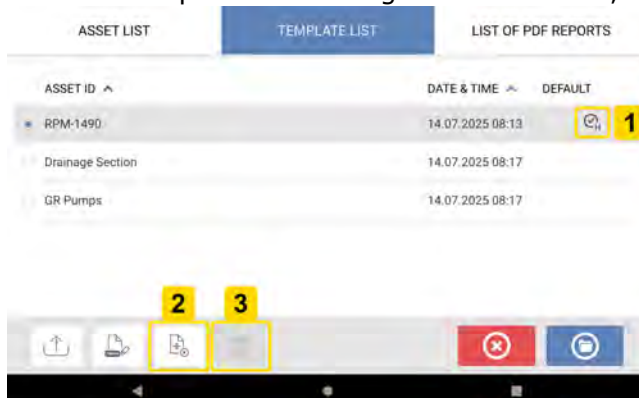
**Default template**

It may be necessary to define any one template as the default template. The default template will be used whenever a new asset is opened within the home screen.

> All available templates are listed on the template list.



> Select template to be designated as default, then tap  (1).

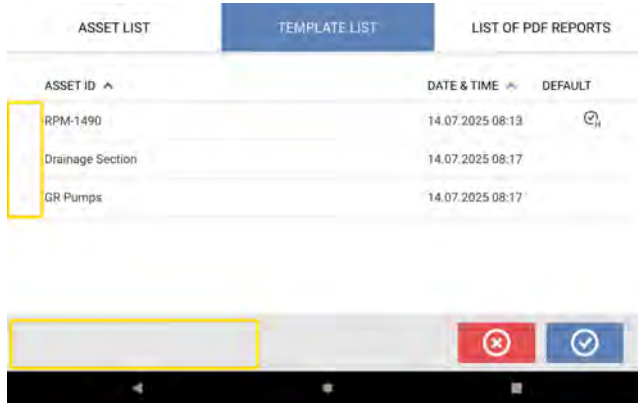


> The default template now appears on the template list with a check mark (1).

> To revert the default template to a normal template, tap  (2).

> **Note:** The designated default template cannot be deleted (3). To delete it, it must first be reverted to a normal template.

Note: If no template is selected, all template list options are unavailable.



Generate reports

Generate measurement reports

Asset measurement reports can be saved directly on the rugged device as PDF, sent via email, or exported as .csv, .json, or .xml files. Measurement reports are generated from the results screen.

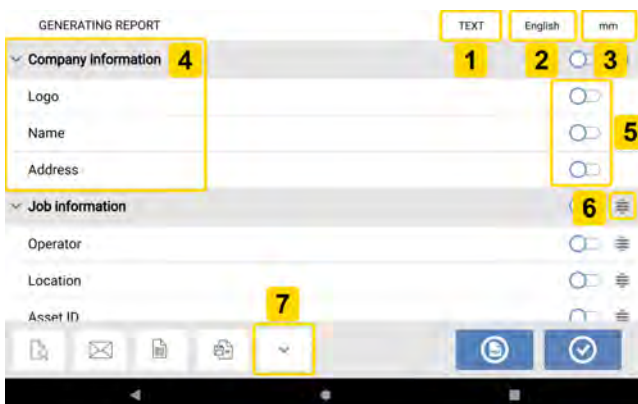


Tap the menu item **REPORT**. The **GENERATE REPORT - REPORT TEMPLATES** screen opens.

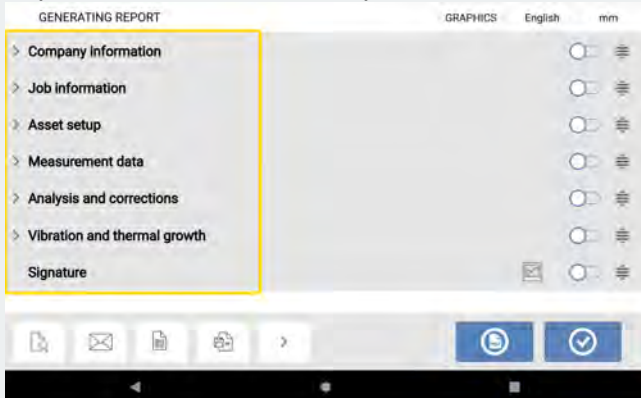


The report can be created with a short or long template, and in either graphical or text format.

Select necessary options, then tap  to proceed.

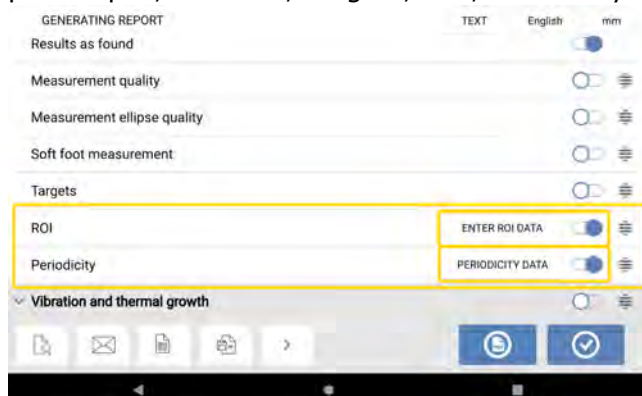


- | | |
|---|---|
| 1 | Tap to switch between text and graphical report formats |
| 2 | Tap to select the language for the report |

3	Tap to switch between mm and inches
4	Tap to expand or collapse the section to see the related sub-items
5	Tap the related icon to turn on or off items that will appear in the report Note: In this example, all items are off
6	Hold the icon and drag up or down to reposition the section
7	Tap to show all available report sections 

Sections of the report

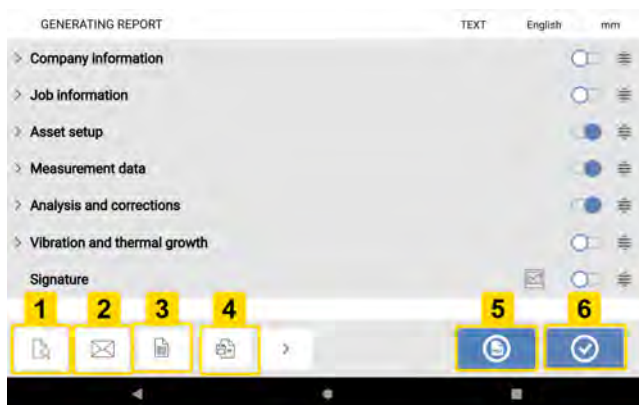
- **Company information:** Logo, Name, Address
- **Job information:** Operator, Location, Asset (Machine) ID*, Comment, Date**
*Asset ID appears only after the asset has been saved
**Date is set automatically
- **Asset setup:** Description, Graphical overview, Dimensions, Tolerances, Components, Images
- **Measurement data:** Shows all key measurement results, plus historical values and tables
- **Vibration and thermal growth:** Vibration measurement, Thermal growth
- **Analysis and correction:** Graphical results, Train corrections, Measurement quality plus ellipse, Soft foot, Targets, ROI, Periodicity



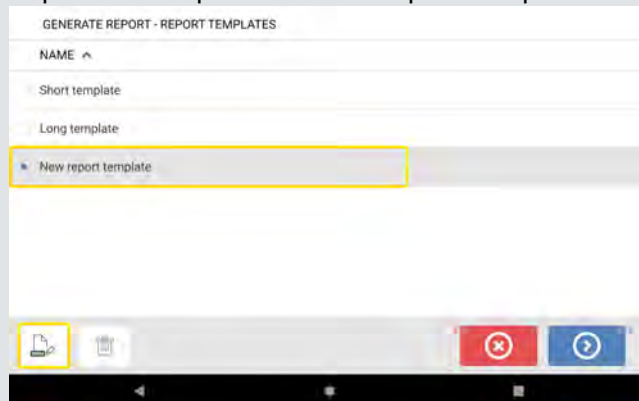
If either ROI (Return on Investment) and/or Periodicity are on, related data must be entered and edited. To do so, tap **ENTER ROI DATA** or **PERIODICITY DATA** as necessary.

Note: Periodicity is a measure of how often specific actions must be done to ensure optimal performance, reliability, safety, and longevity of a machine.

Other generating report screen elements

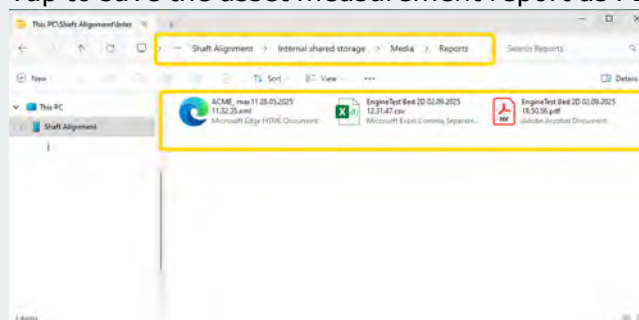


- | | |
|---|---|
| 1 | Tap to preview report |
| 2 | Tap to send report as PDF via email |
| 3 | Tap to export report as a .csv, .json, .xml file, or send it to ARC 4.0 |
| 4 | Tap to save report as a new report template. |



The new template has a generic name. Tap  to edit it.

- | | |
|---|--|
| 5 | Tap to save the asset measurement report as PDF on the rugged device |
|---|--|



The report is in the folder **Reports** found in this path: **Shaft Alignment\Internal storage\Media\Reports**

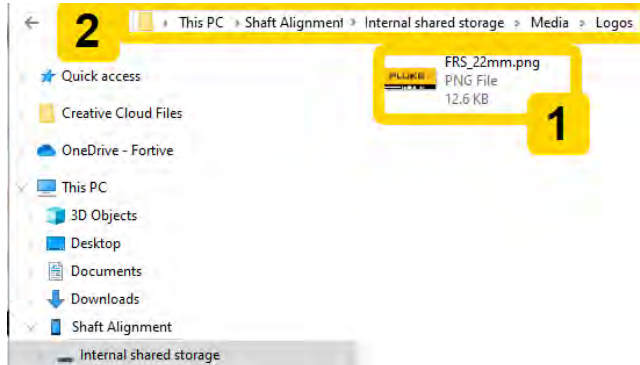
Note: The generated PDF report saved together with the asset can also be opened via the software platform ARC 4.0 in **Asset Attachments**.

- | | |
|---|---|
| 6 | Tap to save entered information and exit the report generation screen |
|---|---|

Report logo

The necessary report logo must initially be saved within the rugged device before it can be added to the measurement report. These image formats are supported: png, bmp, jpg and jpeg

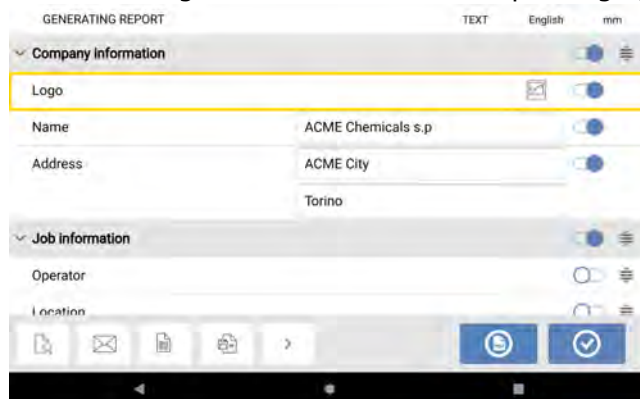
- Connect the rugged device to a PC.



Save the necessary logo (1) in the folder **Logos** found in this path: **Shaft Alignment\Internal storage\Media\Logos (2)**

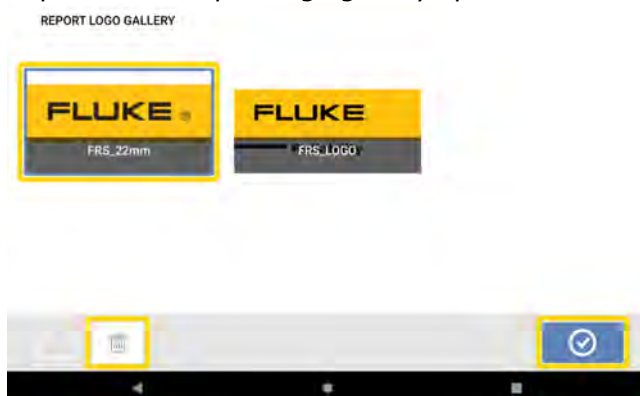
- Disconnect the rugged device from the PC.

The added logo will be shown in the report logo gallery.



To add the logo to the report, the item **Logo** must be on.

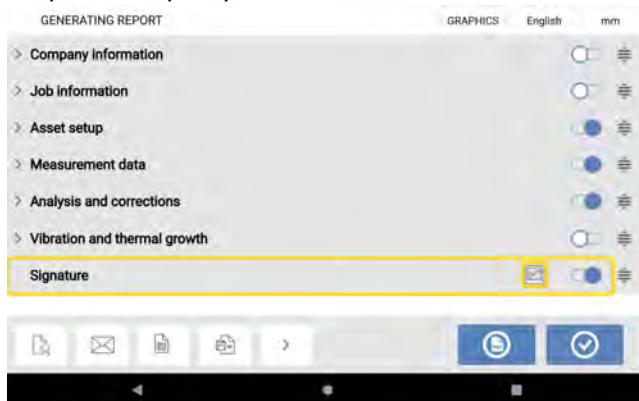
- Tap . The report logo gallery opens.



- Tap the necessary logo and then tap . The selected logo will now appear on the PDF measurement report when **Logo** is on.
Note: The delete icon is active. In this case, the added logo can be deleted from the gallery.

Add signature to report

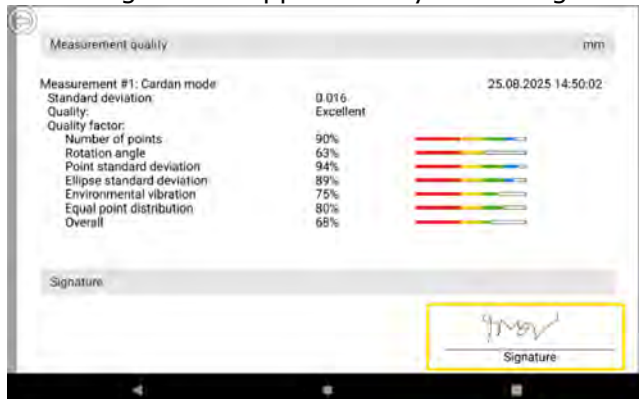
A signature on the report ensures authenticity and verifies that the job was reviewed by the responsible party.



In the generating report screen, turn **Signature** on, then tap .



Use a finger or an applicable stylus and sign on the device display, then tap  to exit.



The signature is shown at the bottom of the report if the item **Signature** is on.

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 OK) 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.

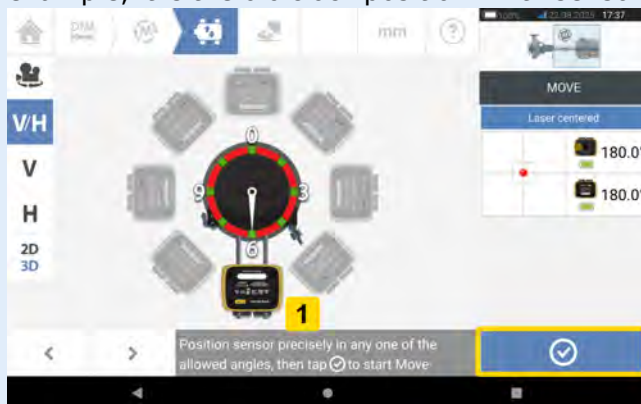
Live Move is monitored in both horizontal (H) and vertical (V) planes simultaneously.

Live Move with RotAlign Core or RotAlign Elite



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.

Move simulator



Note

This functionality is NOT available with RotAlign Core features.

As the name suggests, the Move simulator is used to simulate shim values and horizontal movement corrections that are required to correct the alignment condition. The simulator takes into account the shim thickness available and the amount by which the machines can be physically moved.



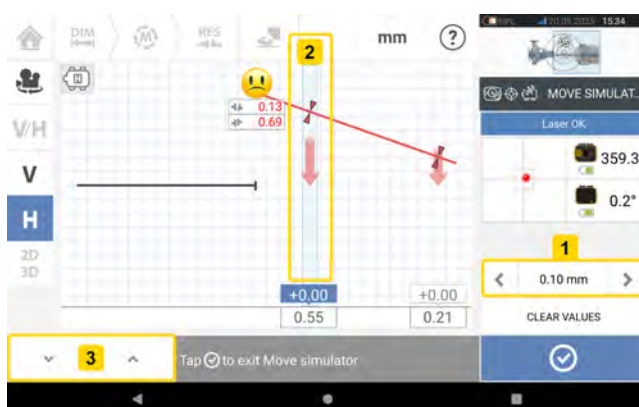
Note

Move simulator can be used only on a single plane (either **V**ertical or **H**orizontal). Simulation is possible for the current (or "as left") measurement only. And the simulation is carried out in 2D or 3D view.

The Move simulator is initiated from the results screen. After measurement is made, display the results in either 2D or 3D and only on a single plane.



Tap **MOVE SIMULATOR (1)**.



Tap  to increase movement step value or  to decrease step value (**1**). The step value ranges from 0.025 mm – 1.0 mm for metric units and 1.0 thou – 40.0 thou for imperial units.

Tap machine feet pair to be simulated. A light blue cursor appears on the selected feet pair (**2**).

With the cursor on the selected feet pair, tap  to move the machine downwards (in **V**ertical view) or towards viewer (in **H**orizontal view) by the movement step value factor. Tap  to move the machine upwards (in **V**ertical view) or away from viewer (in **H**orizontal view) (**3**) by the movement step value factor. Carry out the simulation and observe the displayed color-coded shaft and coupling, the bold tolerance arrows and the smiley. Aim for a happy smiley (indicated by blue shaft and tolerance arrows) or an **OK** smiley (indicated by green shaft and tolerance arrows).



The amount and direction in which the machine can be moved are displayed on the value boxes (**1**) above the measured feet values.

To remove the simulation values, tap **CLEAR VALUES** (**2**).

Tap  (**3**) to exit the Move simulator.

What is soft foot

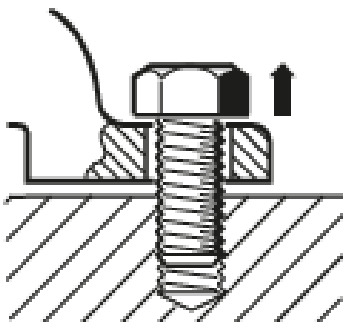
Soft foot is the condition of machine frame distortion. Any cause that results in machine frame distortion when the machine is anchored to its foundation is a soft foot. Some of the principal causes are:

- 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.

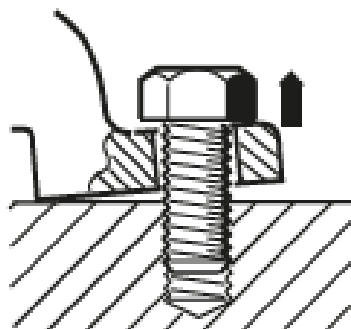
Soft foot should be checked before aligning the shafts. This can be done quickly and conveniently with the aid of the soft foot function. With the sensor and reflector mounted on the shaft in the usual way, the system is able to sense any machine movement when the machine bolts are loosened individually. 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

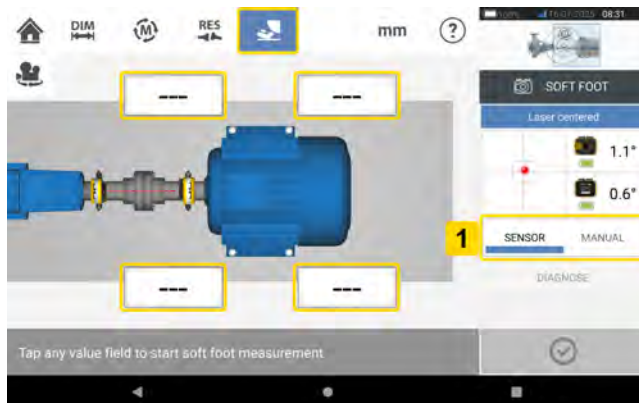
The machine(s) to be checked is/are assumed to have four feet in an approximately square formation. If the machine has six feet, it is advisable to leave the middle feet loose and treat the machine as a four-footed machine. Soft foot is measured only on machine designated as movable.

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

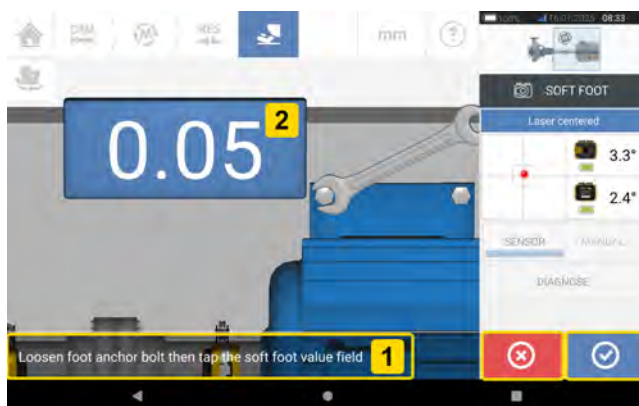
Mount the components, enter all required dimensions, and then adjust the laser beam as required. (You may refer to Mounting components , Dimensions, and Laser beam adjustment.)



Activate sensor measurement by swiping the blue bar (**1**) **SENSOR**. The laser beam must have the status **Laser centered** or **Laser OK**.

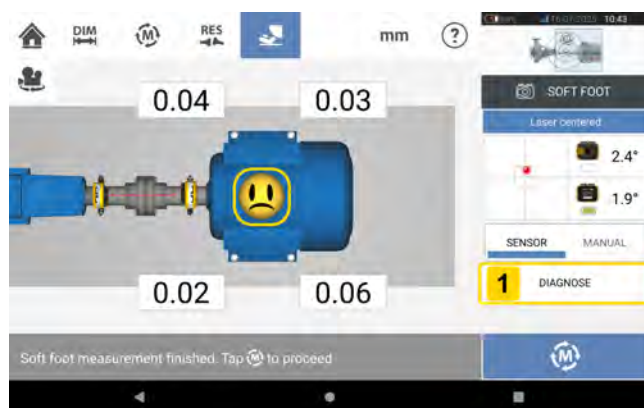
Tap any one of the four pulsating value fields to start soft foot measurement at the related machine foot.

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.

If soft foot is detected, and the soft foot diagnosis feature is licensed, the item **DIAGNOSE (1)** is shown. Tap **DIAGNOSE** to start the soft foot wizard which guides the user through diagnosis and correction of soft foot.



Note

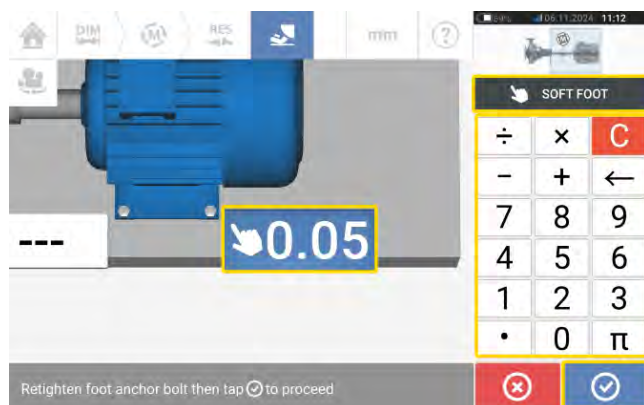
Tap the smiley on the machine image to show the set soft foot tolerance.

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.

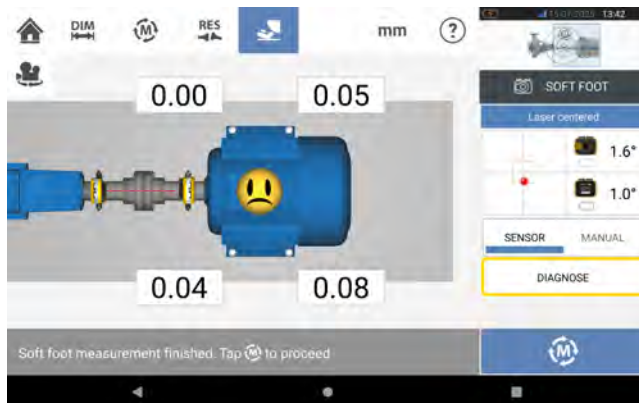
Tap any one of the four pulsating value fields then use the onscreen keyboard, and enter the soft foot value at the related machine foot.



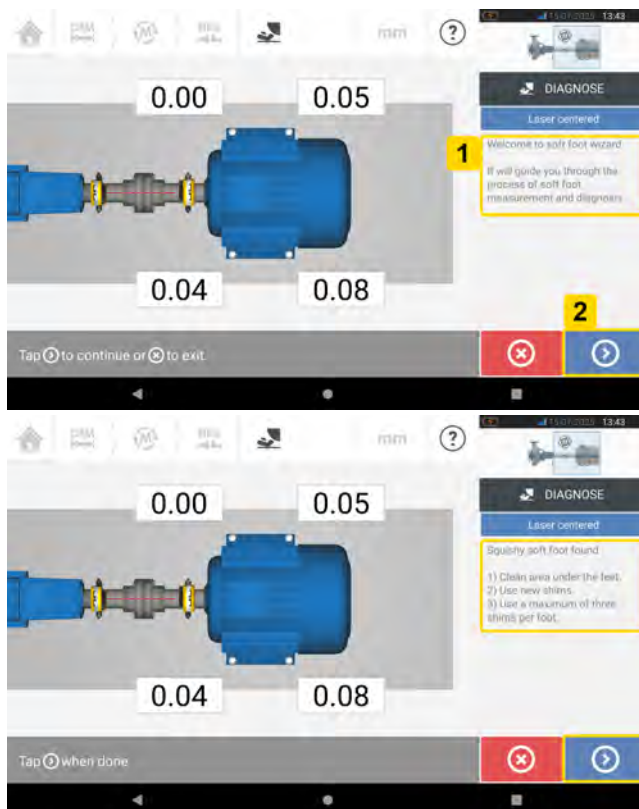
Tap  to confirm value. Repeat the procedure for all four feet positions.

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

Soft foot wizard



Tap **DIAGNOSE** to start the soft foot wizard. The wizard guides the user through diagnosis and correction of soft foot.



A welcome hint (1) appears after the wizard is started. Tap  (2) to proceed to the next wizard step. Follow the wizard instructions carefully. Hints on the type of soft foot detected and the suggested action will be displayed.



Note

The wizard steps are dependent on the type of soft foot detected.

Types of soft foot

These include:

- Rocking soft foot – in this case, the highest values are diagonally opposed
- Angled soft foot – mostly observed in machine with bent foot or when the base plate is bowed
- Squishy soft foot – results from dirt or too many shims
- Induced soft foot – due to external forces such as pipe strain



Cycle through all the given wizard steps. When finished, the hint ***Wizard finished*** (1) is shown.

Tap  to go back to the soft foot measure screen. Measure soft foot again to check whether soft foot has been removed.

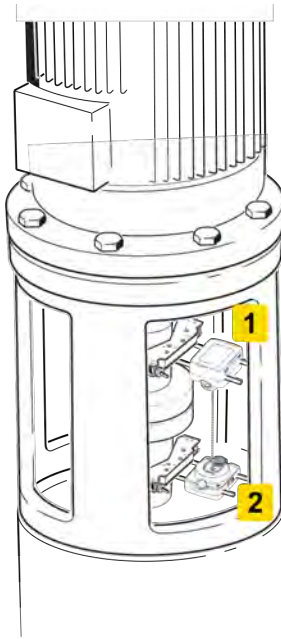
Vertical flanged machines

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.

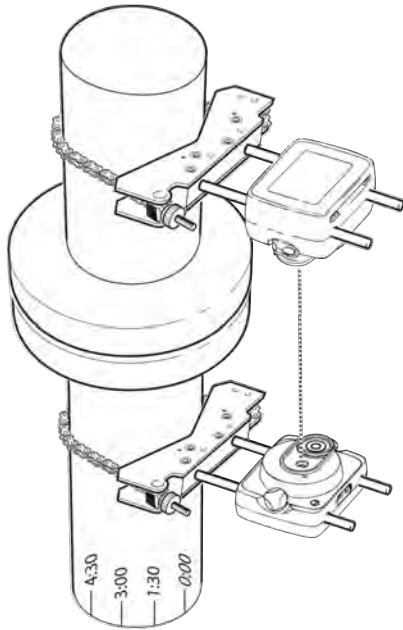


- **(1)** Sensor
- **(2)** Laser

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.

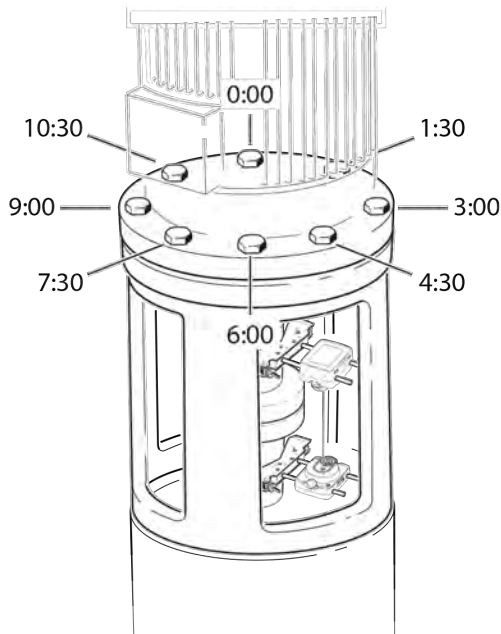
Marking measurement positions

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

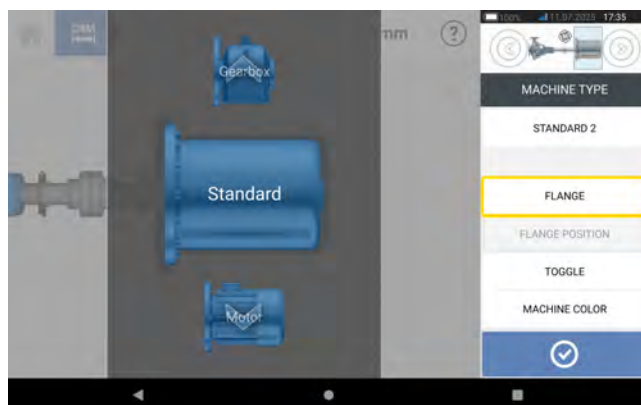
- Mount the sensor and the laser on either side of the coupling, ensuring that they are aligned with the 0 or reference mark.
- Switch the touch device on, then tap  in the home screen to start the vertical alignment application.

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:

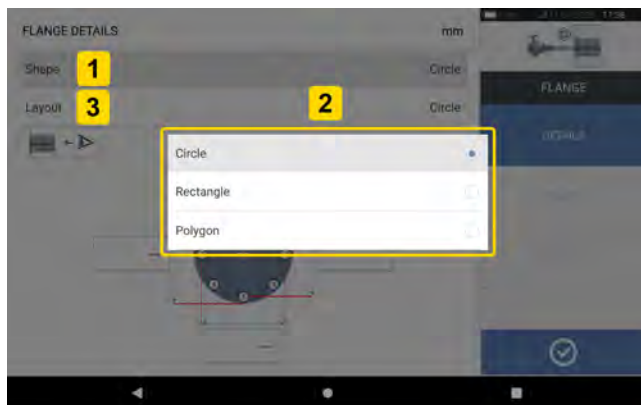


- **(1)** Sensor to coupling center
- **(2)** RPM
- **(3)** Coupling diameter
- **(4)** Coupling center to flange
- When entering machine dimensions, the flange geometry must be taken into account. Tap the flange-mounted machine.

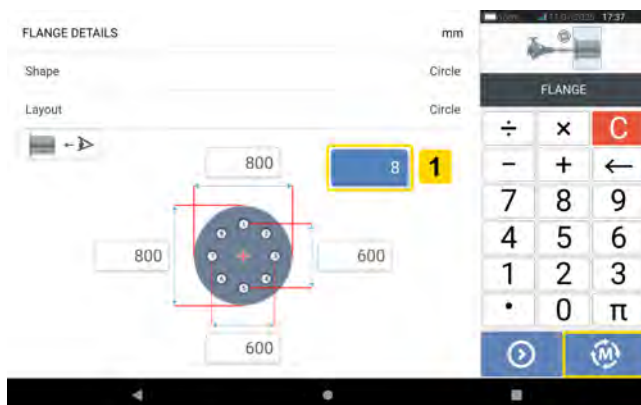


The menu items on the screen may be used to edit machine name, access the **Flange details** screen, change the flange position with respect to the shaft, flip the machine along the shaft axis (toggle) and edit machine color.

- 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 – vertiSweep



Note

This functionality is NOT available with RotAlign Core features.

Measure with vertiSweep

- Center the laser beam.



Note

vertiSweep is the default measurement mode for vertically mounted machines. To use the alternative Static clock measurement mode, tap (1) shown in screen below.

- Position the shafts such that sensor and laser are both at the **0** reference mark position.



- Use  or  and select the direction in which the shafts will be rotated. Once the direction to rotate the shafts is selected, measurement is activated and the letter **M** (1) appears and also  (2) becomes active.



- Tap either **M** or  then rotate the shafts through an angle greater than 360°.



Note

The color of the **Proceed** button () (1) is related to the color of the rotational arc. This shows the attained measurement quality.

- After rotating the shafts through the required angle, tap  (1) to show coupling results.

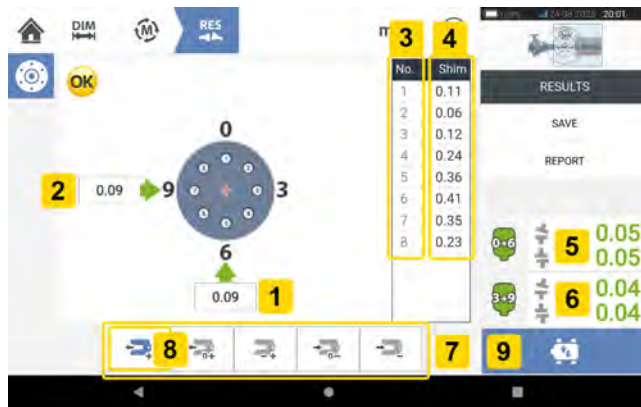


- Tap  (1) to show shimming corrections.



Note

If the measurements have a high standard deviation [>0.05 mm (>2 thou)] resulting from say bearing play, stiff coupling or radial play in coupling, a hint suggesting the use of Static measurement mode appears on the screen. In this case, the measurement mode should be changed to Static measurement.



- **(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

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

Vertical flanged machines – Static clock

Measure with Static measurement mode

- Center the laser beam.



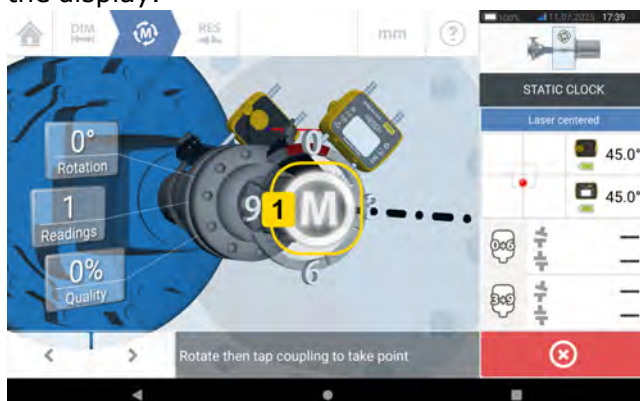
Note

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.

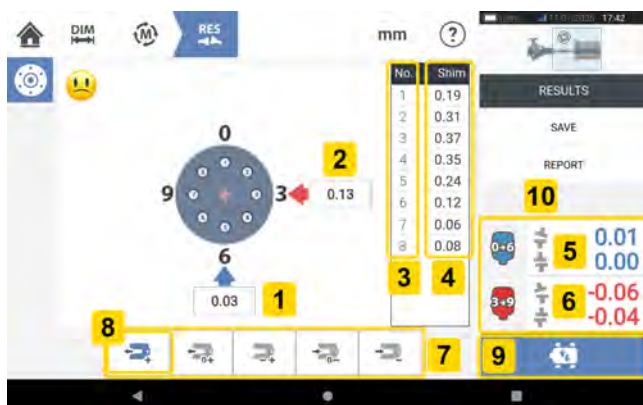


Note

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



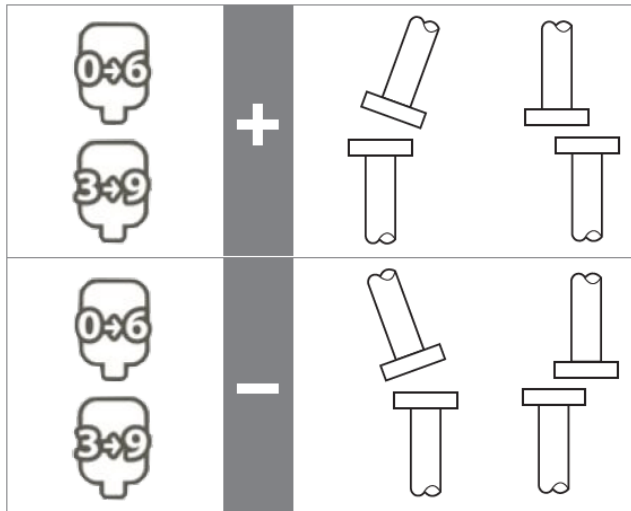
Shimming modes are defined as follows:

- **(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.

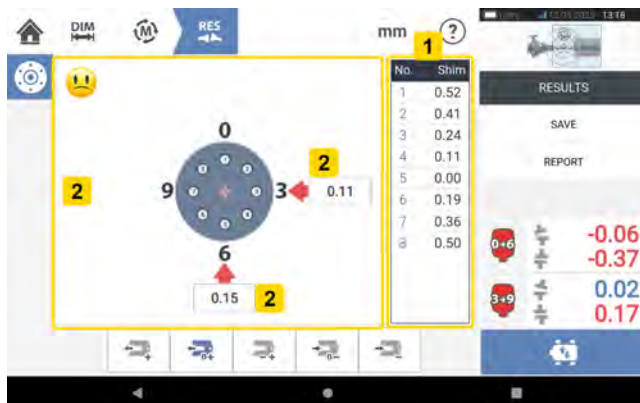
Note: The little clock face on the laser serves as a reminder of the viewpoint.

**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.

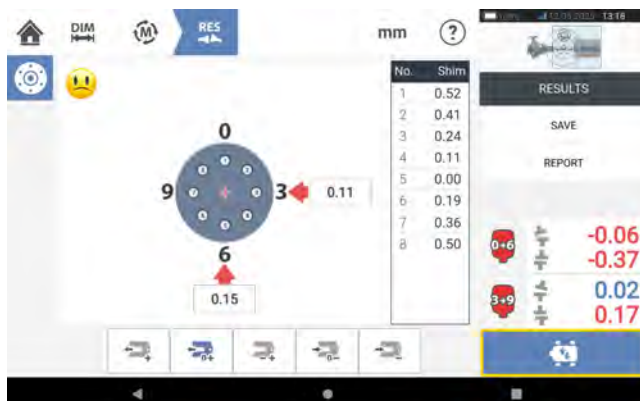
2. Angularity corrections are made by shimming. The shimming values at the respective bolt positions are shown on the screen. Insert (or remove) shims with the correct thickness under the selected bolt. (Refer to shimming modes in related topics.)

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

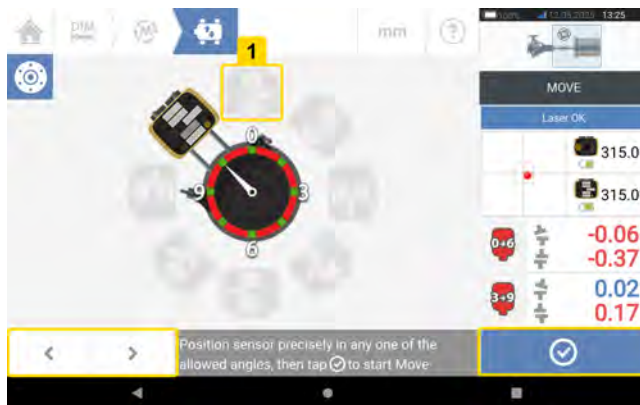
4. Once satisfied that overall angular misalignment is in tolerance, and no more shimming is required, proceed to correct offset.

Correct offset

1. Use the Live Move function to correct offset.

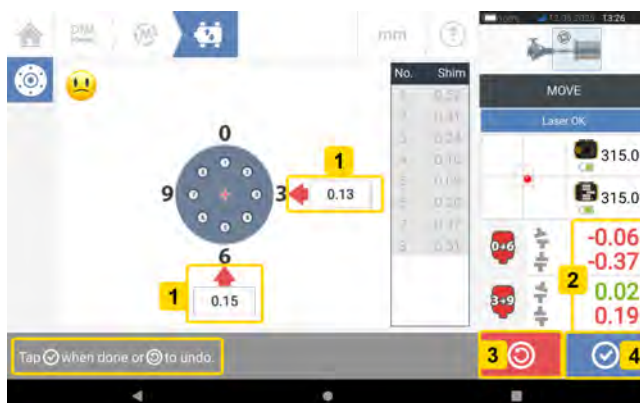


2. Tap  to start Live Move. A hint screen to position both sensor and laser in any one of the eight designated 45° positions (12:00, 1:30, 3:00, 4:30, 6:00, 7:30, 9:00 or 10:30 o'clock position – as viewed from sensor towards laser) is shown.



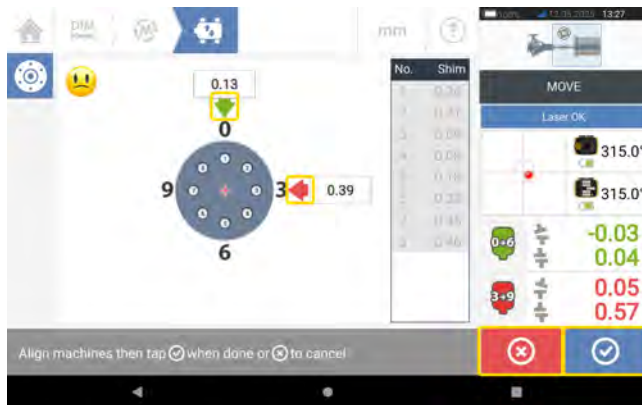
3. Use  and  to place the displayed sensor at the necessary 45° position. Alternatively, tap necessary position (for example **1**) to move the sensor on the screen to this position (**1**). This position is the same as the angular position of the sensor and laser on the shafts. In this example, 12:00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

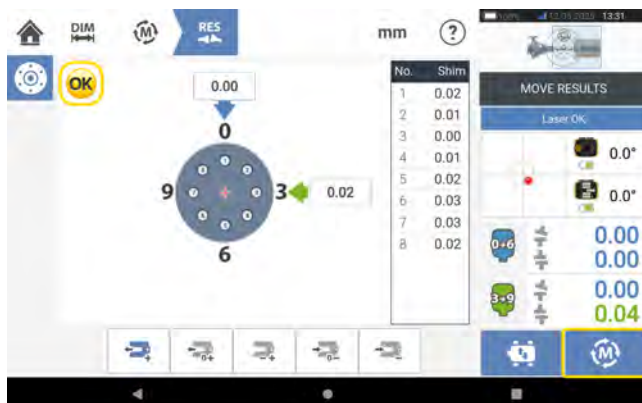


Once Live Move has been detected, the **Cancel** icon  replaces the **Undo** icon .

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 , tighten the flange bolts then tap  and measure again to check and confirm if the new alignment condition is in tolerance.

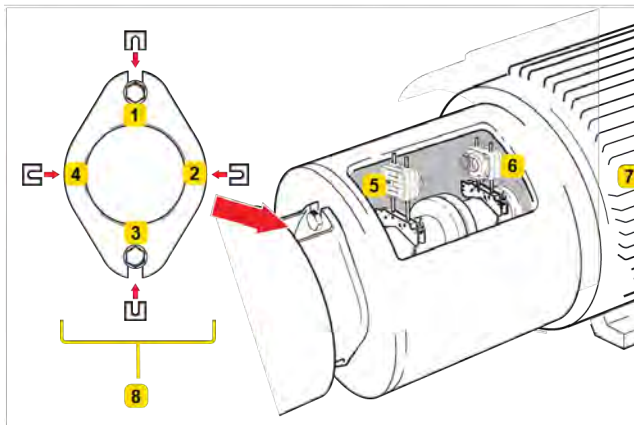
6. If not, repeat the above steps until alignment is in tolerance.

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.

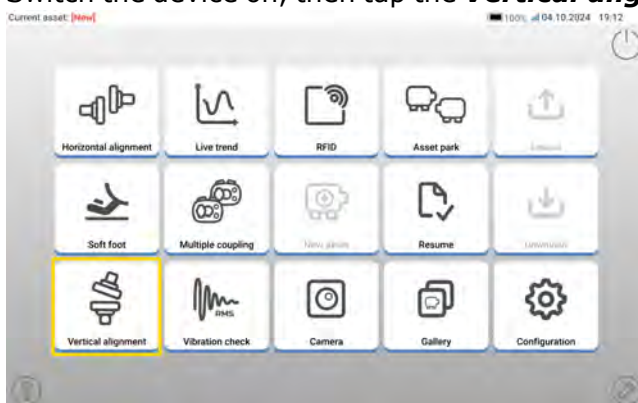


- **(1) – (4)** Flange shimming positions
- **(5)** Laser
- **(6)** Sensor
- **(7)** Machine to be aligned
- **(8)** End view of flange (as seen from left)

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.

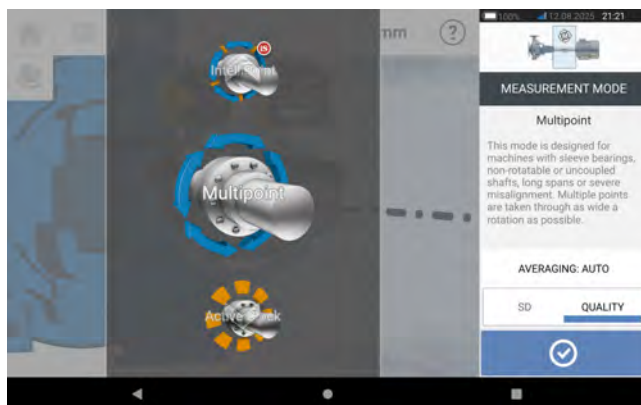


- Proceed to configure the machines as described in Vertical flanged machines.

- 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).



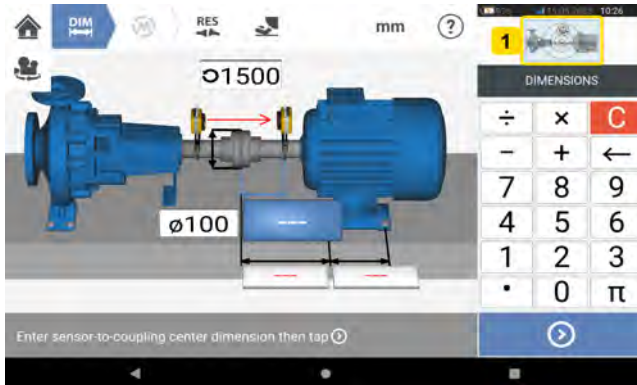
The coupling results icons for the horizontal flange application show 0-6 (for **V**ertical) and 3-9 (for **H**orizontal).

Machine train alignment

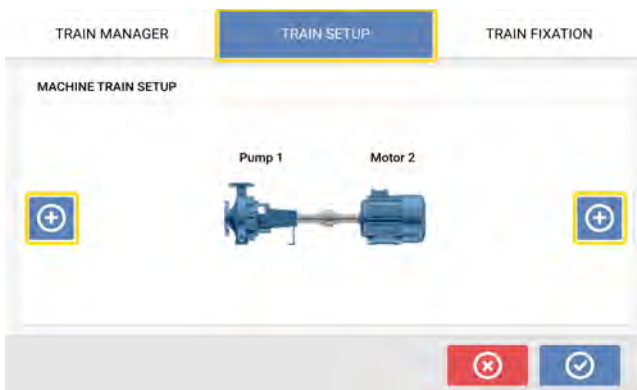
This is a step-by-step approach to measure the alignment condition of a three-machine train . With RotAlign Elite Expert features, groups of up to 14 machines coupled together can be measured.

The components are mounted and laser beam adjusted as necessary.

From the home screen, tap  to open a new measurement file.



Tap the mini train inset at the top-right corner (**1**) to access the **TRAIN SETUP** screen.



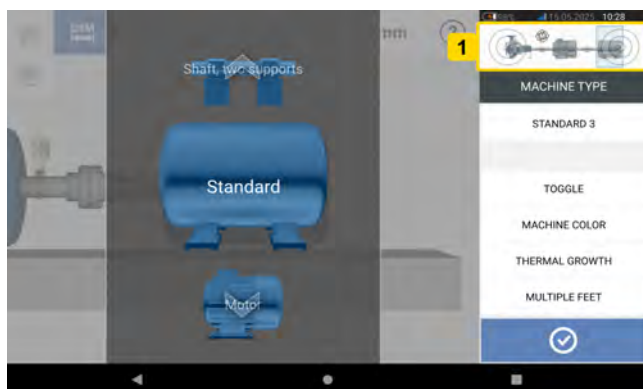
Tap either of the two **Add machine** icons () to add a machine to the respective side of the train.



The **Add machine** and **Scroll machine train arrow** icons are grayed out when inactive.

When active, the **Scroll machine train arrow** icon () is blue and signifies there are machines in the respective directions that are currently not on display. The active arrows are used to scroll these machines into view.

After the necessary number of machines are added to the train, tap  to return to the dimensions screen then use the carousel to configure the machines as necessary.



To access the different elements within the machine train, tap the corresponding element within the mini train inset (**1**) at the top right corner of the screen.

Alternatively, the necessary machine and coupling types plus the machinery color are specified within the **TRAIN SETUP** screen.



Tap the element to be specified then use the related carousel to select necessary machine or coupling type. The machine carousel (**1**) is shown together with the color carousel (**2**). After necessary element is specified, tap  to proceed. In this example the selected machine is a gearbox (**3**) and the selected color is green (**4**).

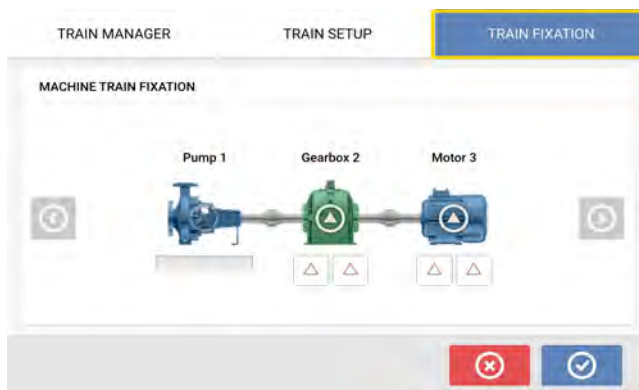


When all machine train elements have been specified, tap  to return to the dimensions screen to enter the necessary machine train dimensions.



If necessary, tap the machine name to edit.

The mini train inset is also used to open the **TRAIN FIXATION** screen, which is used to fix and unfix machine feet pairs or entire machine.



The mini train inset is also used to open the **TRAIN MANAGER** screen, which is used to select a maximum of three machines that are to be shown fully, and with the related dimensions.



Use the sliders and select machines to be shown fully.



Note that the machines selected within the train manager screen are the same ones displayed in both the dimensions and results screens.

Tap  to return to the dimensions screen which shows the selected section of the machine train with the related dimensions.

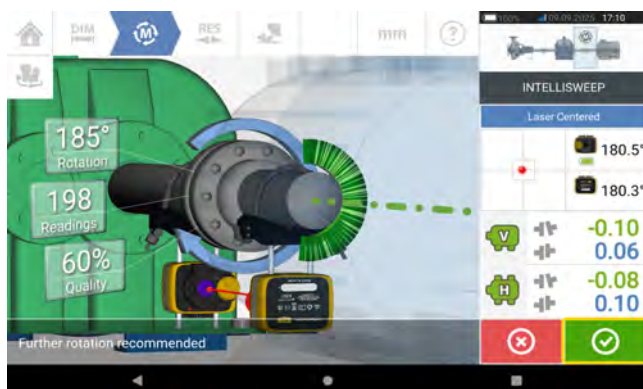


Measurement

Tap  from the dimensions screen then proceed to initialize sensor mounted across the coupling as shown on the machine train inset (1).



The measurement mode used to measure the coupling in this example is IntelliSweep (2).



Rotate the shafts through as wide an angle as possible, then tap  to finish measure on the specified coupling.



Note that the color of the **Proceed** icon () is related to the color of the rotational arc. This shows the attained measurement quality.



Tap  to switch measurement to the next coupling.

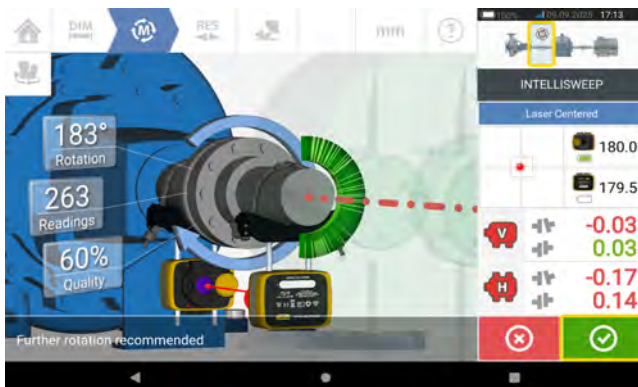
Switch both laser and sensor off then dismount them from the presently measured coupling and mount them across the next coupling. When ready, switch both laser and sensor on.



Note

When the laser and sensor are moved to the next coupling position, make sure that the dimension from sensor to coupling center is entered correctly in the dimensions screen. Always make sure the coupling to be measured is the one highlighted (**1**) in the mini train inset.

In this example, IntelliSweep is the measurement mode (**2**) used to measure the next coupling. If necessary, the measurement mode can be changed.



When measurement across both couplings is completed, tap  to proceed to view results.



Note that the color of the **Proceed** icon () is related to the color of the rotational arc. This shows the attained measurement quality.



Tap **RES** to show and evaluate both feet and coupling results.



Note

The feet results shown **(1)** are for the coupling(s) selected **(2)** in the mini train inset. To see all feet results on one screen, tap the **Results** icon **(3)**.

Tap , the **Move** icon, to perform alignment corrections. These involve vertical correction with shims and horizontal movement of the three-machine train.

Live Move – machine train alignment

Decide which pair of machines to move in a train, one may need to re-install and re-adjust the laser and sensor across the chosen coupling. Be sure to install the sensor at exactly the same location on the shaft or coupling as previously, or re-enter the new correct distance from the sensor to the coupling. In this example, the chosen machine pair is pump (left machine) and gearbox (right machine) as shown by the highlighting window on the mini train inset (**1**).



Tap  to start Live Move. If all machines are designated movable, then the "Fixed feet" screen for the selected coupling position appears.

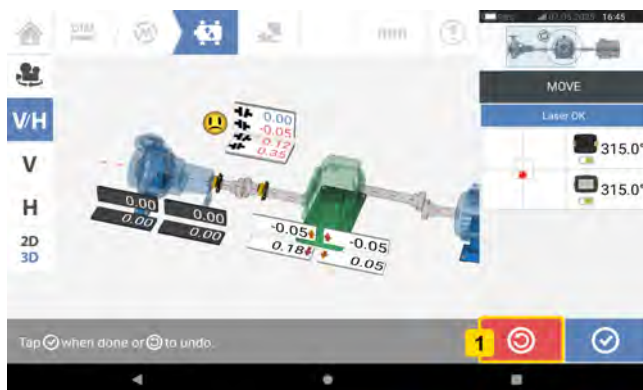


Note

The grayed out machine indicates that the measurement focus (see mini train inset [**1**]) is NOT on the coupling next to this particular machine but to the coupling connecting the other two machines.



Tap feet on the machine train to be designated stationary then tap  to proceed with Live Move.



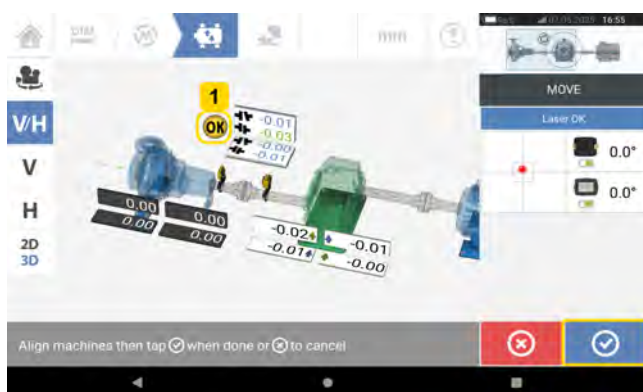
Start machine corrections. As soon as machine movement is detected, the "Undo" icon  is replaced by the "Cancel" icon .



CAUTION

Do NOT attempt to move the machine with 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 to move machines.

Move the machines until the alignment condition is within the specified tolerance.



The smiley (1) gives an indication of the alignment condition. Tap  to finish Live Move. Tap the mini train inset, then select **TRAIN MANAGER**. Use the sliders and select the complete machine train. See the alignment condition of the complete machine train.



Tap  and remeasure to confirm the alignment condition. If the smiley icons show a happy face or an OK, then the alignment condition is within tolerance. If not, repeat the Live Move procedure.

Multiple coupling



Note

This functionality is available only in RotAlign Elite Expert.

What is multiple coupling?

Multiple coupling is used to determine the alignment condition of multiple-element drives with three or more machines without the need to mount or dismount components as in conventional alignment methods. The functionality may be used to measure up to six couplings simultaneously.

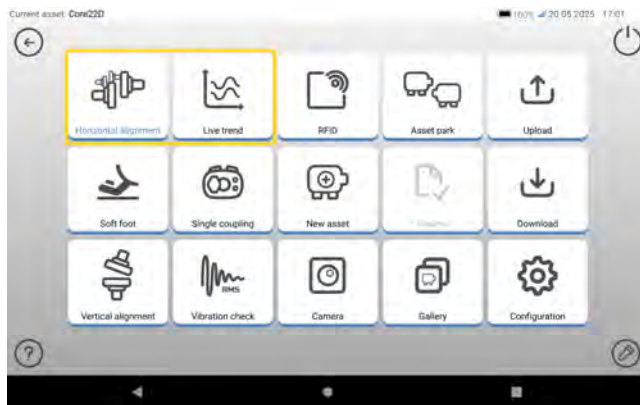
The measurement screen can display up to three coupling positions simultaneously.

Prerequisite to perform multiple coupling

To be able to use this functionality, the user must be in possession of multiple sensor-laser head combinations as well as the corresponding fastening brackets.

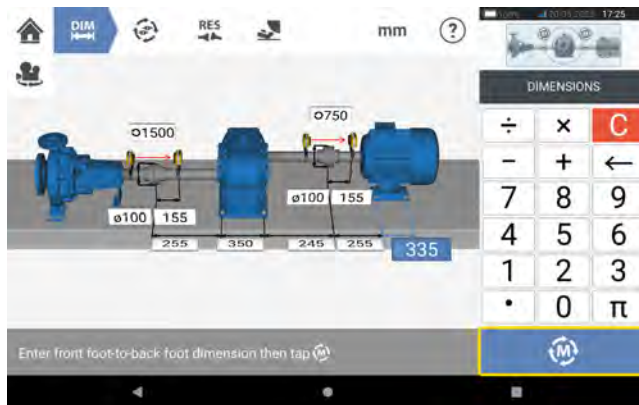
Access the multiple coupling functionality

From the home screen, tap  to start the multiple coupling functionality. When Multiple coupling is selected, the multiple coupling for horizontal shaft alignment and Live Trend for multiple coupling icons are on.

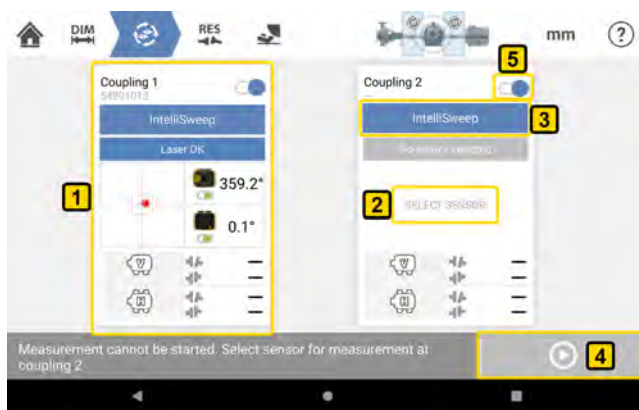


Tap  to start the horizontal shaft alignment multiple coupling functionality. The application starts with a default pump-gearbox-motor template.

- After the application is started, configure the machines as necessary.



- Ensure that the measurement components have been mounted as required.
- Tap  to start multiple coupling measurement.



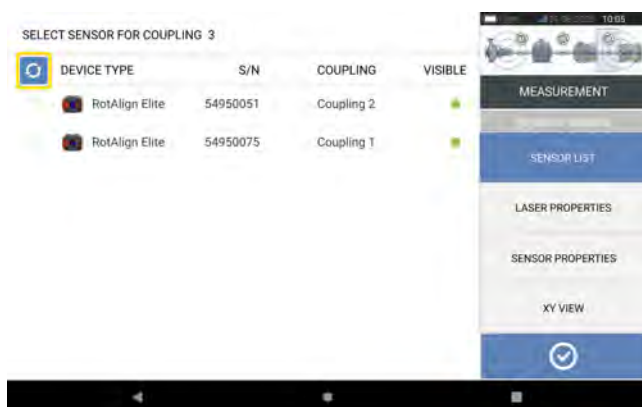
- **(1)** In this example, the sensor at coupling position 1 has been initialized and ready for measurement.
- **(2)** At coupling position two, the sensor to be used has not been assigned. Tap **SELECT SENSOR** to select and initialize the available sensor.
- **(3)** Tap the measurement mode header, and select measurement mode to be used at the related coupling position. The measurement modes carousel opens and the necessary measurement mode is selected.
- **(4)** Measurement cannot be started until all sensors at the related coupling positions have been initialized.
- **(5)** Tap  to disable related coupling position. This is necessary if a coupling position is to be ignored during alignment. Tap  to enable the related coupling position if necessary.

Select and initialize sensors in multiple coupling

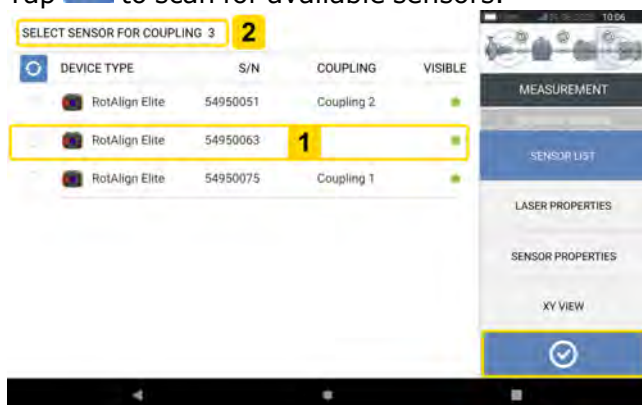
If, at any coupling position, the sensor has neither been selected nor initialized, the hint **SELECT SENSOR** is shown on the measurement screen.



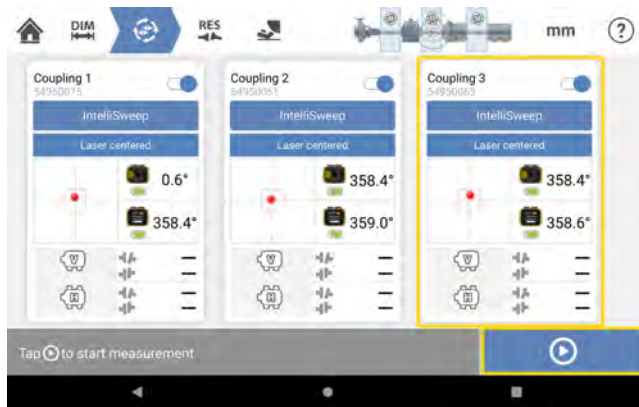
Tap **SELECT SENSOR** then continue with sensor initialization.



Tap  to scan for available sensors.



When the sensor is detected, it is listed with a bold green dot next to it. Tap (1) to select the sensor for the required coupling position (2), then tap  to proceed with measurement.

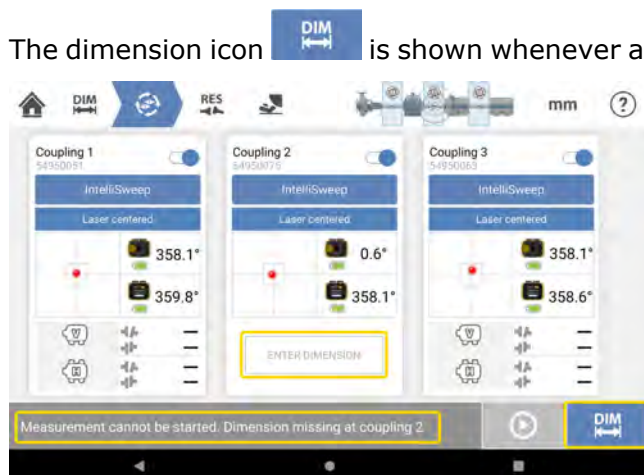


Tap  to start multiple coupling measurement.

Missing dimensions in multiple coupling

If any dimension is missing in multiple coupling measurements, a hint will be shown on the measurement screen.

- The hint **ENTER DIMENSION** appears only when any coupling center-to-sensor dimension is missing.
- The dimension icon  is shown whenever any dimension is missing.



Tap either **ENTER DIMENSION** or  to access the dimensions screen and enter the required value. In this example, the missing dimension is the coupling center-to-sensor dimension on the second coupling.

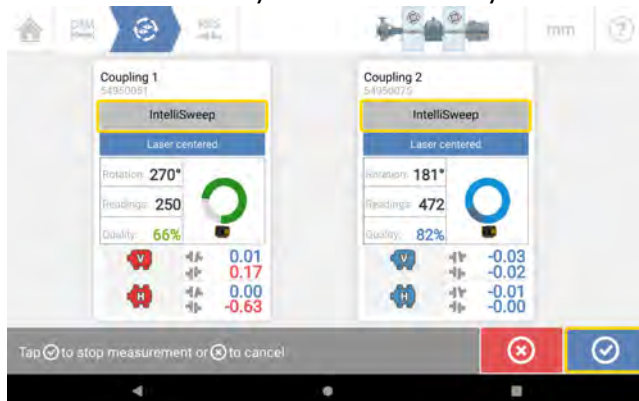


Take multiple coupling measurements



- **(1)** In this example, both IntelliSweep and Multipoint measurements are used. In IntelliSweep, measurement points are taken continuously as the shafts are rotated.
- **(2)** In Multipoint or IntelliPoint measurements, tap  or the **M** within the rotational arc to take readings at the selected measurement points.
- **(3)** Tap  to cancel entire measurement if required.
- **(4)** Tap  to finish measurement.

If using IntelliSweep measurement for all designated coupling positions, measurement is taken automatically and continuously as the shafts are rotated.

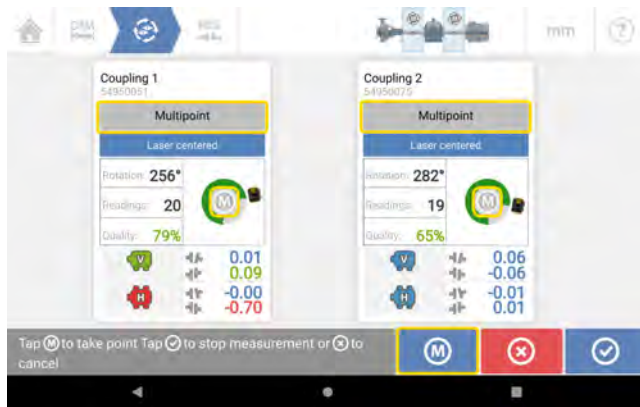


Note

The color of the **Proceed / Finish** button () is related to the color of the rotational arc. This shows the attained measurement quality. Red denotes (overall quality factor < 40%); Amber denotes (overall quality factor >40%<60%); Green denotes (overall quality factor >60%<80%); Blue denotes (overall quality factor >80%).

Take measurements (Multipoint / IntelliPoint)

If only Multipoint/ IntelliPoint measurements are used at all designated coupling positions, tap  or any **M** within the rotational arc at any coupling to take readings at the selected measurement points for all active couplings simultaneously.



Evaluate multiple coupling results

Tap  when measurement is finished.



Note

The color of the **Proceed / Finish** button () is related to the color of the rotational arc. This shows the attained measurement quality.



Tap  to view machine foot results.



Refer to results.

Align multiple element drive trains



Note

It is highly recommended that such demanding alignment tasks be carried out by experienced alignment personnel. Use all information available with regard to the drive train to be aligned.

After measuring all couplings on the multiple element drive train simultaneously, display the train results and optimize corrections. Before carrying out any real machine corrections you may use the Move simulator function to determine the foot correction values required to reposition the machines to achieve a collinear shaft operation.

Multiple coupling simultaneous Live Move

The alignment corrections involving shimming and the lateral positioning of the entire multiple element drive train can be followed in a real-time interactive display.

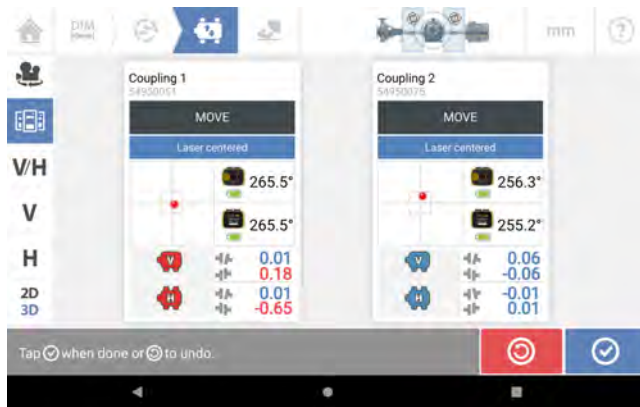


Tap  to start Live Move.

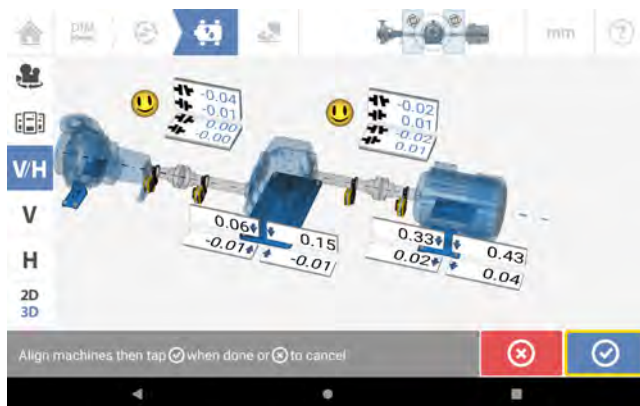


Note

Tap  to see the coupling results at the active coupling positions during Live Move.



While observing all plant and machinery maintenance requirements, the corrections are carried out as appropriate.



When a good alignment condition is attained, tap  to finish Live Move.

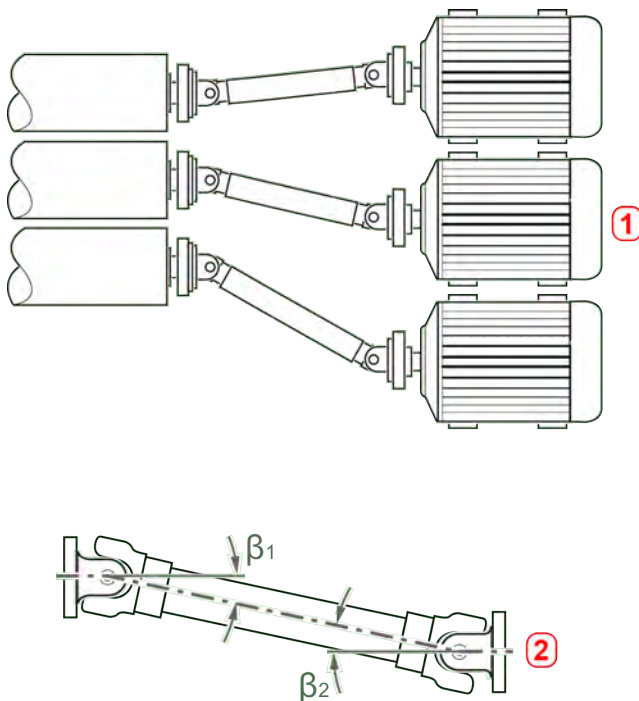


The alignment is considered successful after rechecking alignment by taking another set of measurements, and the displayed results are within tolerances.

Cardan shaft alignment

Cardan drives are installed and operated with a large offset between the driver and the driven shaft. Depending on the type of cardan shaft in place, a minimum deflection angle of the universal joints may be necessary in order to ensure sufficient lubricant circulation, which in turn prevents the universal joints from seizing. A large difference in the deflection angles β_1 and β_2 (refer to image below) leads to rapid fluctuation of the driven shaft RPM during operation, which can lead to grave consequences for electronically-controlled synchronous and asynchronous AC drive motors.

For smooth operation the machines should be aligned such that the driving and driven machine shaft centerlines are parallel. Precise alignment reduces the rotational irregularities of the cardan shaft to a minimum, so that the uneven bearing loading during cardan shaft rotation is also minimized, the service life of the components is extended and the chance of unexpected machine failure is reduced.



- (1) Positioning of machines in an area with limited space
- (2) For optimal running condition, the deflection angle β_1 and β_2 should be equal.

Measurement procedures in the cardan application

For cardan applications, select the coupling type **Cardan** when configuring the machines.

These measurement procedures are available for cardan applications:

- Cardan rotating plane – This is the default measurement procedure for cardan applications when using RotAlign Elite Advanced features. This procedure allows precise measurement of machines joined by cardan shafts without having to remove the cardan shaft. This procedure is used in conjunction with cardan rotating arm bracket.
- IntelliPoint– In this procedure, the cardan must be dismantled. Measurement is carried out using IntelliPoint measurement mode in conjunction with the cardan offset bracket.
- Static clock – In this procedure, the cardan must be dismantled. Measurement is carried out using static measurement mode in conjunction with the cardan offset bracket.

- Multipoint – In this procedure, the cardan must be dismantled. Measurement is carried out using Multipoint measurement mode in conjunction with the cardan offset bracket.

Cardan shaft alignment - Using rotating arm bracket



Note

This functionality is available only in RotAlign Elite Advanced and RotAlign Elite Expert features.

Measurement using the rotating arm bracket allows precise measurement of machines joined by cardan shafts without having to remove the cardan shaft, which must be rotated to take measurements.



Note

Based upon experience, it is suggested that both laser and sensor should first be mounted on their respective brackets together with the anti-torsion bridges, then the bracket assemblies with the components mounted on the respective machine shafts.

It must be ensured that the surface where the cardan rotating arm bracket is to be mounted is clean, smooth, cylindrical, even and provides the necessary surface contact. Should the surface be painted, ensure that paint is stripped off the four areas with contact to the bracket 'V' frame.



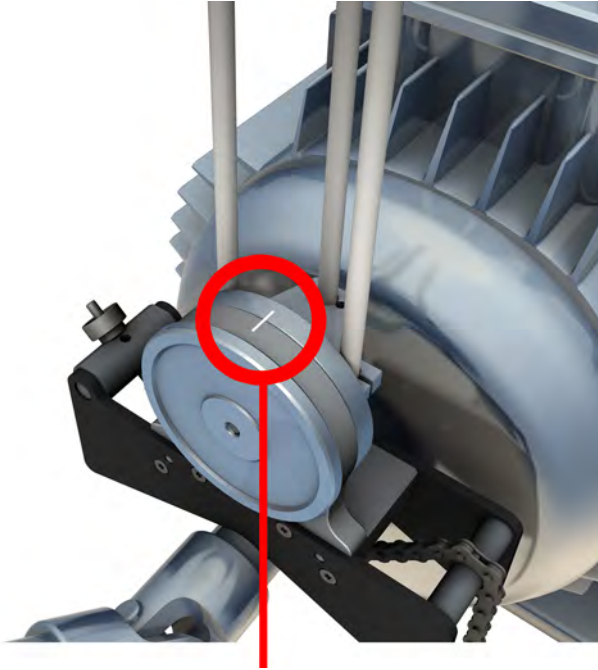
- **(1)** Cardan rotating arm bracket for mounting sensor
- **(2)** Large chain type bracket for mounting laser

Mounting laser and sensor

1. With the laser OFF, carry out a pre-adjustment to ensure that the laser beam will be emitted perpendicular to the laser housing. Use the two yellow beam position thumbwheels to center the **bulls-eye** as accurately as possible, then mount it on the support posts of the large chain type bracket.
2. Mount an anti-torsion bridge on the laser support posts to provide the necessary rigidity to the long support posts.
3. Mount the sensor on the support posts of the cardan rotating arm bracket then mount an anti-torsion bridge on the sensor support posts to provide the necessary rigidity to the long support posts.

Mounting the brackets on the shafts

Mount the large chain type bracket holding the laser on the shaft of the left machine (usually reference machine), and the cardan rotating arm bracket holding the sensor on the shaft of the right machine (usually moveable machine) – as viewed from normal working position. Ensure that both markings on the rotating arm are in line.



Use the external inclinometers to position both brackets at the same rotational angle. Remove the external inclinometers, then switch the laser on.



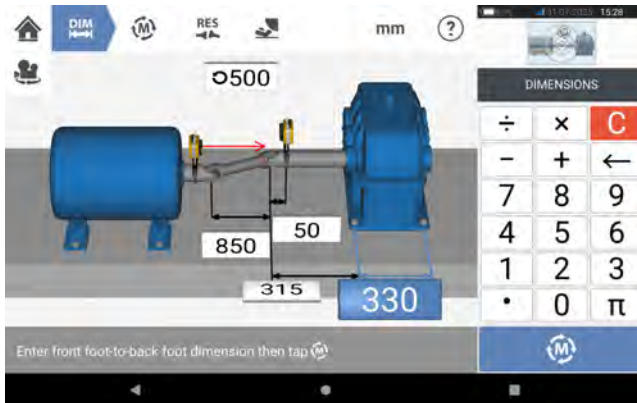
WARNING

Do not stare into the laser beam!.



Cardan shaft alignment - Rotating plane measurement procedure

1. Switch sensor, laser and the touch device on, then proceed to set up the machines.

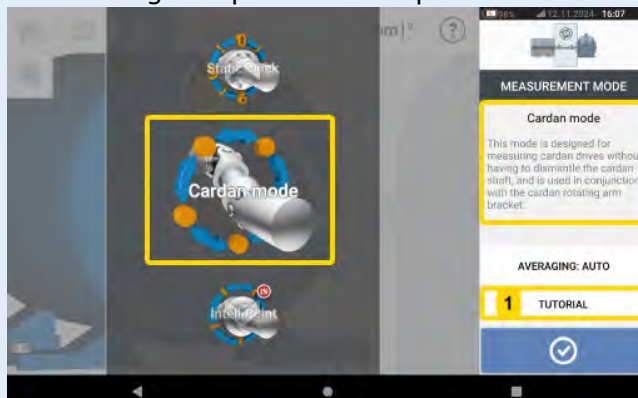


2. After setting up the machines and entering all required machine dimensions, tap  to proceed with measurement.



Note

Cardan mode (cardan rotating plane) is the default measurement mode for cardan shafts. It is recommended that users familiarize themselves with the steps required for the rotating arm procedure. Tap **CARDAN MODE (1)** to show the description panel.

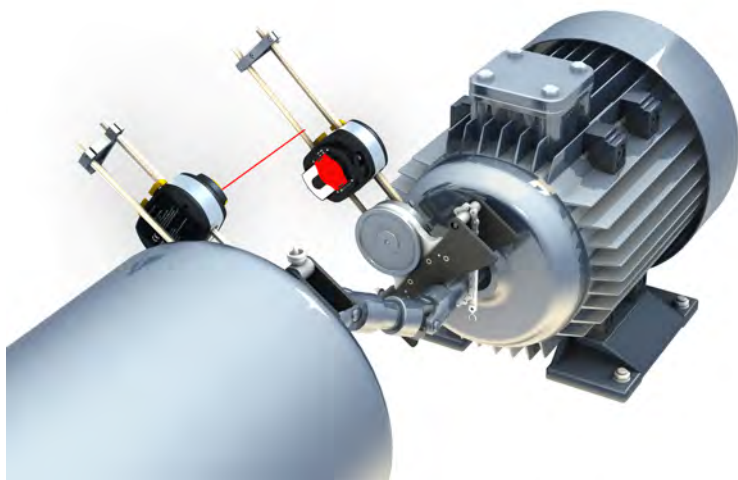


Tap **TUTORIAL (1)** to see how to use cardan mode.

Take measurements

In a crowded plant, it is necessary to determine the optimal position to start measurement. The objective is to ensure that the line of sight between the sensor and the laser is maintained through as wide a rotational angle as possible when the cardan shaft is rotated in its normal direction of machine rotation.

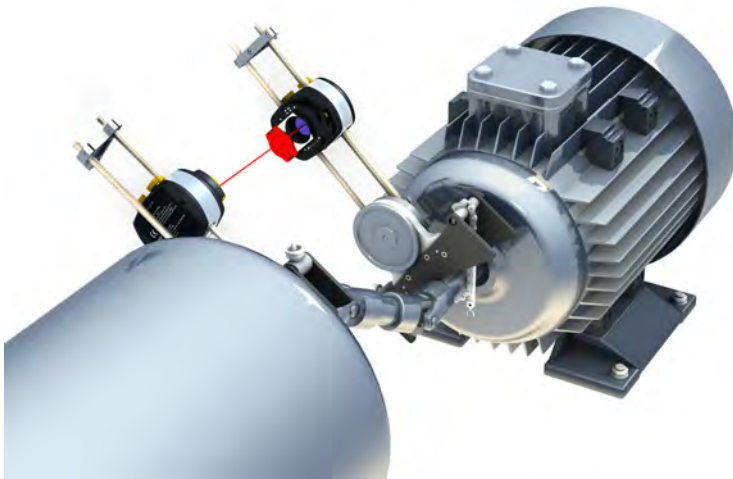
1. Rotate the cardan shaft in the normal direction of machine rotation to the first measurement position.
2. Loosen the rotating arm wheel, then rotate the frame with the support posts until the laser beam strikes the middle sensor support post.
3. When the laser beam strikes this support post, retighten the rotating arm wheel.



4. Loosen the sensor by pushing the yellow sensor clamping levers to the open position, and then slide the sensor up and down the support posts to ensure that the laser beam strikes the center of the red sliding dust cap.
5. Fasten the sensor at this position by locking the yellow clamping levers, and then slide the dust cap so that the laser beam strikes the sensor aperture.

**Note**

DO NOT touch the two yellow beam position thumbwheels.



6. The laser beam should now be seen in the laser adjustment screen.



7. When measurement has stabilized, the letter **M** (1) is shown.



Note

For this measurement procedure automatic measurement after stabilization must be disabled in default settings.

8. Tap **M** to take the measurement point.

9. Slide the red sensor dust cap to cover the sensor aperture, then rotate the cardan shaft approximately 10° - 20° to the next measurement point.



Note

Determine this position depending on the accessible angle of rotation, and the minimum requirement of five measurement points through a rotational angle greater than 60°.

10. Repeat steps 2 to 8 for all necessary measurement points.



Note

Taking measurements at points evenly distributed along the rotational arc has a positive influence in the quality of the measurement attained.



11. After sufficient measurement points are taken, tap  to finish measurement.

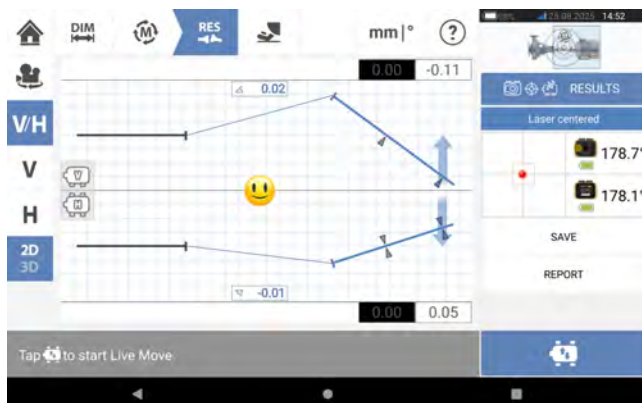


Note

The color of the **Proceed / Finish** button () is related to the color of the rotational arc. This shows the attained measurement quality.



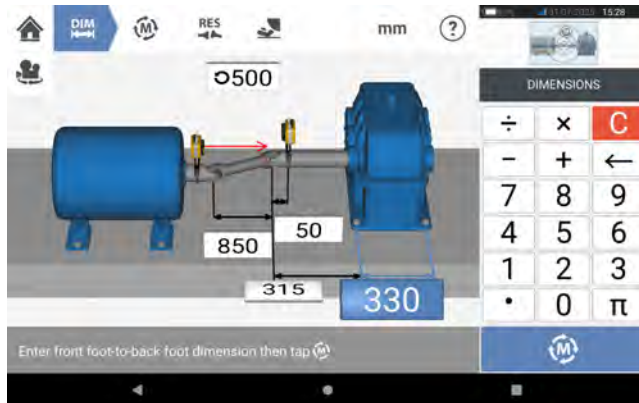
12. Tap  to view cardan alignment results.



Cardan shaft alignment – IntelliPoint measurement procedure

This measurement procedure is used in conjunction with the cardan offset bracket. In this procedure, the cardan shaft that connects the machines must be dismantled during measurement.

1. Switch sensor, laser and the touch device on, then proceed to set up the machines.



2. After the machines are set up, and all necessary machine dimensions entered, tap  to proceed with measurement.



3. Tap **1** to open the measurement mode screen.
4. Swipe the carousel (**2**) and select **IntelliPoint** (**3**).
5. Tap  (**4**) to continue to measure.

Take measurements



1. With the laser beam centered, and the needle exactly at the center of the green sector (**1**), wait for stabilization.



Note

To center the needle, both laser and sensor must be at the same rotational angle.

2. When measuring is stabilized, the letter **M** is shown (**2**).



Note

For this measurement procedure automatic measurement after stabilization has to be disabled in default settings.

3. Tap **M** to take the measurement point.
4. Rotate the sensor to the next measurement position.



5. Turn the laser-side shaft and observe the onscreen needle indicator (**1**). Measuring only stabilizes when the needle is in the blue sector.
6. When measuring has stabilized, tap **M** (**2**) to take the measurement.
7. Repeat steps 4 – 6 and take measurements in as many positions over as wide an angle as possible. Make sure that the measurement quality is acceptable.



Note

The color of the **Proceed / Finish** button () is related to the color of the rotational arc. This shows the attained measurement quality.

8. When a good enough measurement quality (1) has been attained, tap  (2) to stop measurement. Tap  (3) to view cardan alignment results.

Evaluation and alignment

Offset has no real influence in the alignment condition but any angularity at the rotational axes must be corrected.



As only angularity must be corrected in cardan shaft alignment, results displayed show only foot values for one pair of feet. Angularity may be presented in mrad or degrees. Cardan shaft units are set under default settings in configuration.



Note

A PRÜFTECHNIK cardan shaft tolerance table is available for $1/2^\circ$ and $1/4^\circ$ limits. The required tolerance type may be set under default settings in configuration.

Out of tolerance machines may be repositioned with the help of the Live Move function.

Cardan shaft alignment – Using cardan offset bracket

Cardan offset brackets

Two types of cardan offset brackets are available.

- The large type allows precise measurement of machines joined by cardan shafts over distances of up to 10 m (33 ft) and shaft offsets of up to 1000 mm (39 3/8 in.).
- The smaller type also referred to as Lite, allows precise measurement of machines joined by cardan shafts over distances of up to 3 m (10 ft) and shaft offsets of up to 400 mm (15 3/4 in.).
- Mounting large cardan offset bracket — see related topics
- Mounting cardan offset bracket lite — see related topics

**Note**

Both sets of cardan offset brackets (large and lite) can be used with RotAlign Elite sensor and laser.

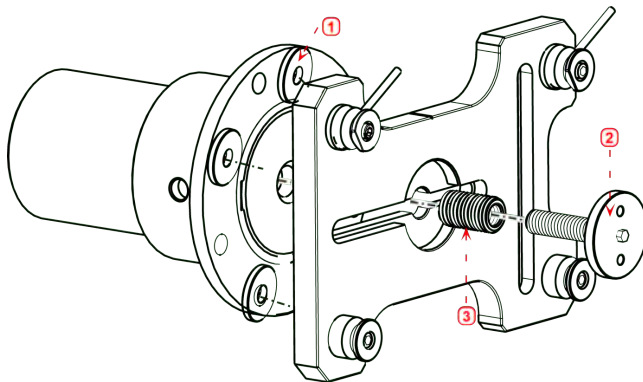
Mounting large cardan offset bracket (RotAlign Elite laser)

Mounting the large cardan offset bracket and adjusting RotAlign Elite laser

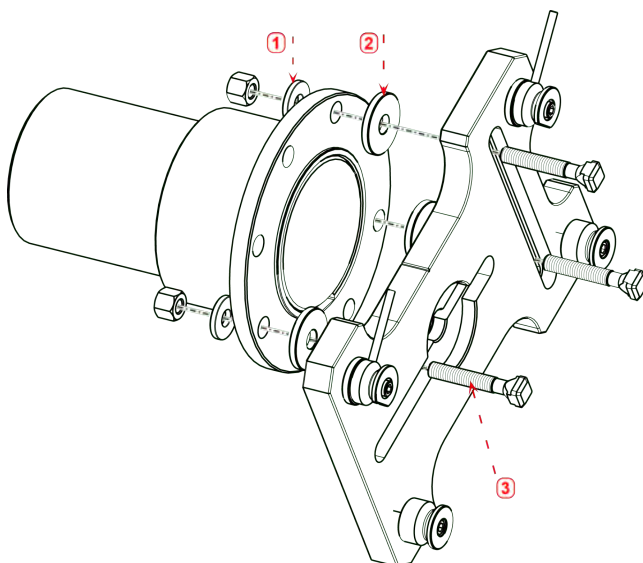
Mount bracket

1. Mount the faceplate on the face of the coupling using the bolts supplied. The bracket is usually mounted on the coupling face of the non-rotatable shaft, for example, the roll in a paper mill. Two different mounting arrangements are available:

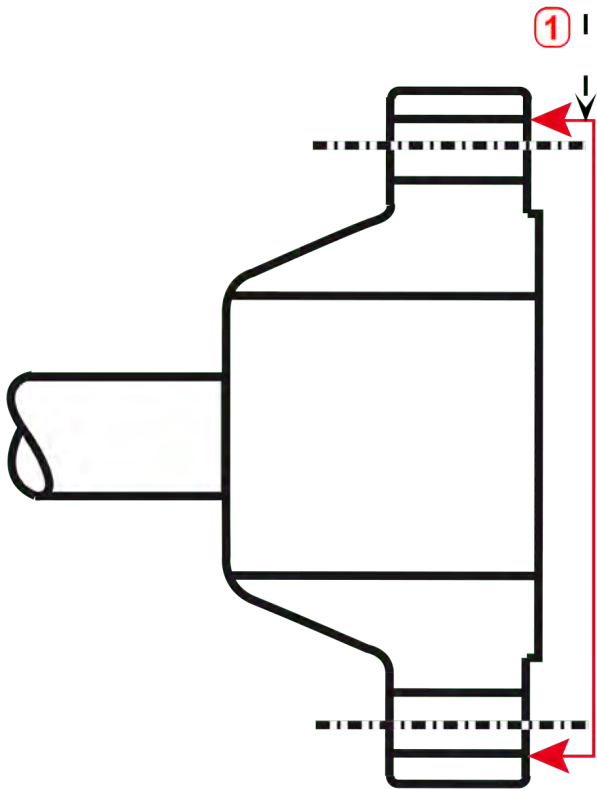
- If the shaft end or coupling face has a threaded hole in its center, the easiest and most rigid mounting method is to use the large center bolt as shown below. A thread adapter may be used as shown to fit the center bolt to larger bores.



- **(1)** Spacer
- **(2)** Center bolt – loosened and tightened using a spanner with a 17 mm (43/64") opening
- **(3)** Thread adapter
- The faceplate may also be attached to the coupling face using the three T-nut bolts, forming a three-point mounting.



- **(1)** Washer
- **(2)** Spacer
- **(3)** T-nut bolt



- **(1)** Reference surface

This coupling example has a raised face flange. The provide spacers are used to create a three-point plane to ensure that the faceplate and the coupling surface are joined together.

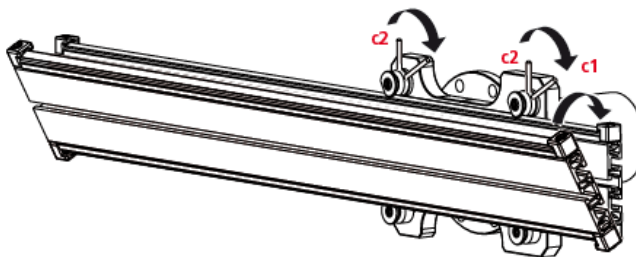


Note

Do not bolt down the faceplate as the laser is still to be adjusted.

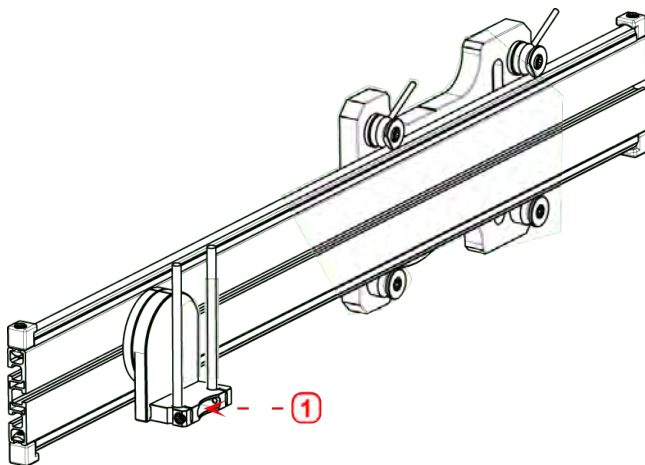
If the coupling has a raised face, the precision machined spacers are used as shown in order to separate the faceplate from the raised inner section of the coupling face while connecting the faceplate to the coupling face which is the reference surface.

2. Place the rail in the faceplate as shown below (**c1**), then use the two top levers (**c2**) to tighten the slide into place. Ensure that the center groove on the rail faces outwards.



Mount laser holder assembly on the rail

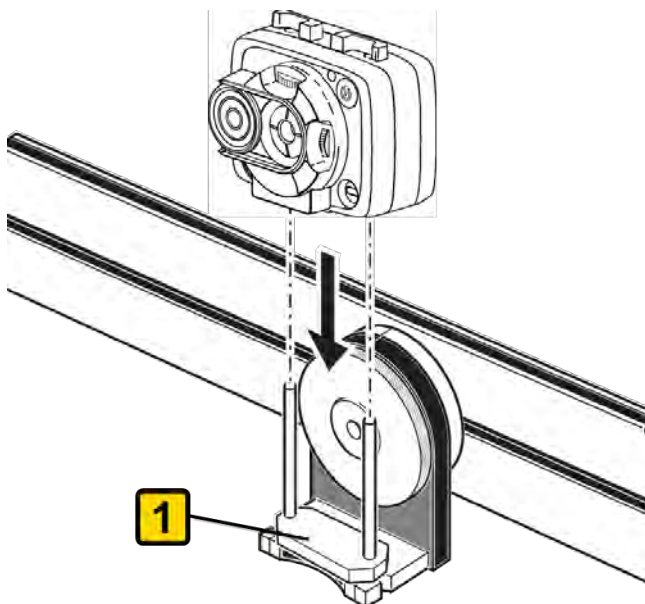
1. Loosen the handwheel slightly, then slide the laser holder assembly down the center groove of the rail.



- **(1)** Laser holder

Mount and adjust laser

1. Slide the distance plate down the support posts.
2. Slide RotAlign Elite laser onto the posts until it rests on the distance plate.



- **(1)** Distance plate

3. Mark a set of target crosshairs on the shaft rotation centerline of the other machine coupling (if the flange has a center hole, a temporary target surface such as a dust cap may be affixed to the hole).

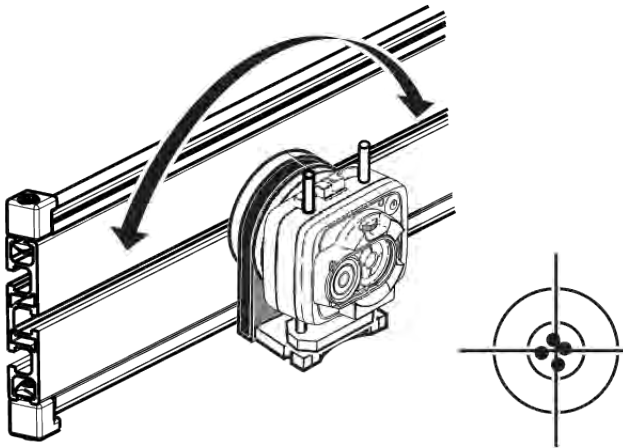
4. Switch on the laser and adjust the beam to strike the center of the target on the opposite coupling.

- The objective is to adjust the laser beam such that it is colinear to the rotational axis of the laser holder assembly; making it possible to shift the laser assembly holder rotational axis.

**Note**

The distance plate influences the offset by positioning the laser beam on the same axis as the rotational axis of the laser holder assembly.

- The two laser beam position thumbwheels are used to adjust the angular position of the laser beam. By rotating the laser assembly holder, the laser beam traces an 'approximate' circle. If the 'approximate' circle is a single dot at the center of the target, then the laser beam has been adjusted correctly. If that is not the case, repeat the laser beam adjustment process until the 'approximate' circle corresponds to a 'single dot' position.

**Note**

As soon as a single dot position has been achieved, do not touch the laser thumbwheels.

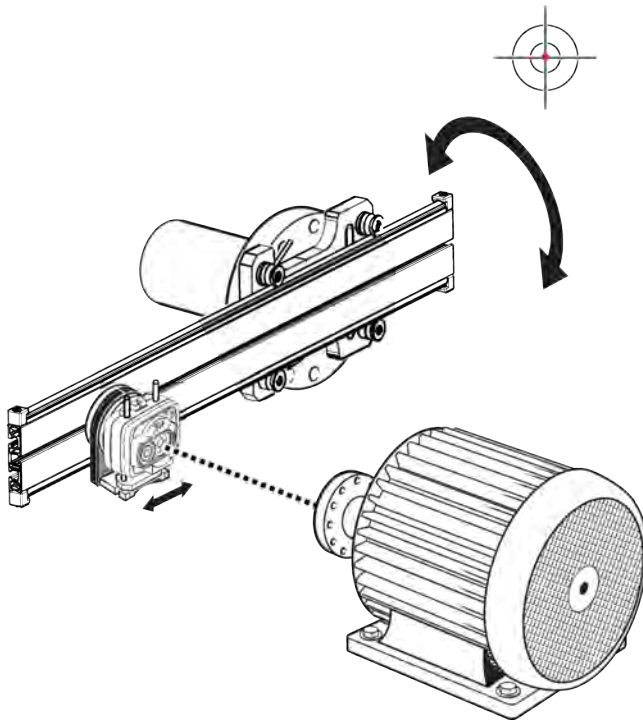
Adjust the laser beam to the machine rotational axis

In this step, the laser holder assembly is adjusted on the bracket such that the laser holder rotational axis is roughly colinear with the rotational axis of machine to be aligned (which could be a motor or a gearbox).

**Note**

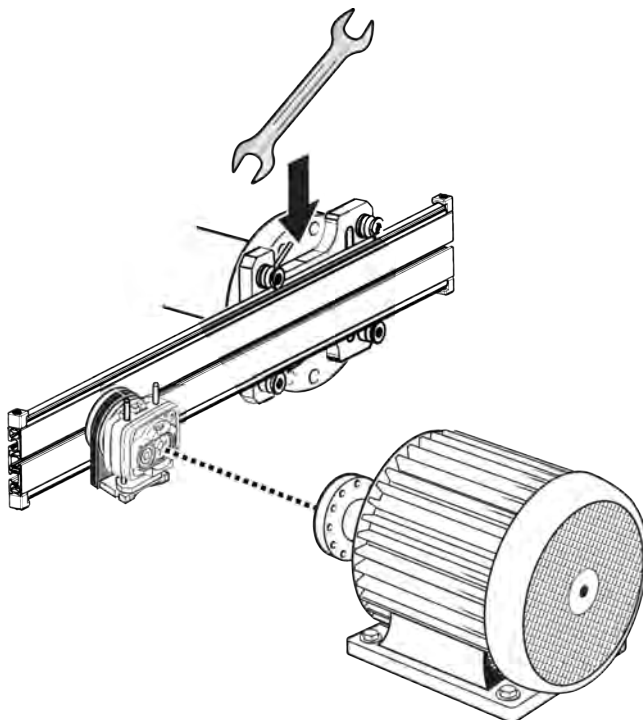
During this procedure, DO NOT touch the laser beam position thumbwheels.

1. Carry out the vertical and horizontal adjustment of the laser holder assembly by sliding it horizontally through the center groove on the rail and positioning it vertically by rotating the rail.
2. Repeat the above procedure until the laser beam strikes the center of the target placed on the rotational axis of machine to be aligned.



Once the laser beam has been centered on the target, tighten the faceplate on the coupling face.

- If using the center bolt, tighten this using the provided 17 mm (43/64") open end spanner (wrench).

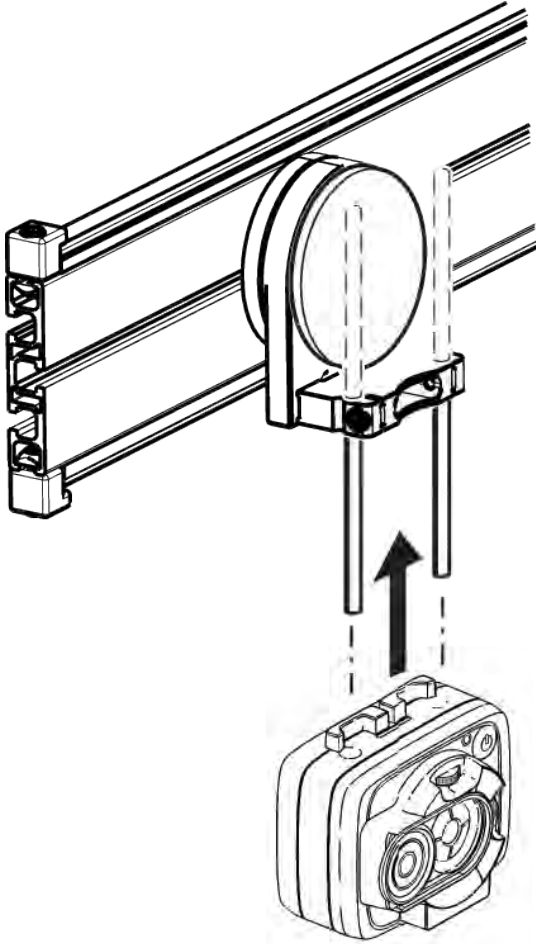


- If using the T-nut bolt, tighten them as appropriate.

Position laser and mount sensor for measurement

In this step, the laser is remounted on the underside of the laser holder while the sensor is mounted on the shaft of the machine to be aligned.

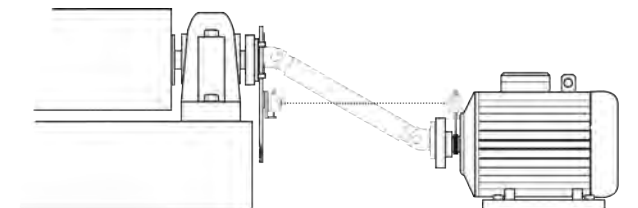
1. Switch off the laser and remove it from its holder.
2. Using the provided M4 Allen key, loosen the support posts then slide them through the laser holder base so that they protrude from the other side.
3. Retighten the M4 Allen screws to secure the support posts, then remount the laser onto the support posts.



4. Use the chain-type bracket or appropriate magnetic brackets to mount the sensor on the shaft of the machine to be moved (such as the motor or gearbox). The sensor is aligned to the laser by pushing or sliding the bracket supporting the sensor.

**Note**

DO NOT touch the laser or its laser position thumbwheels.

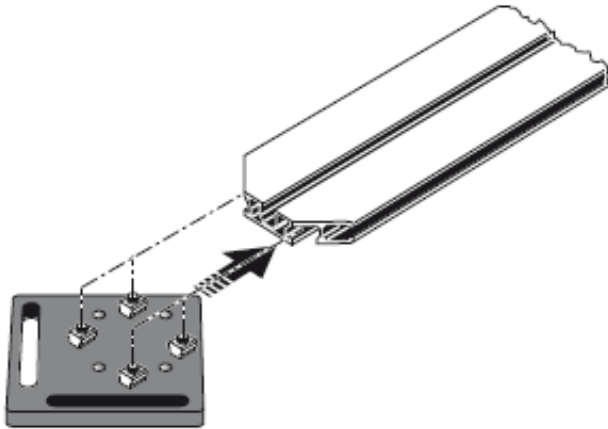


Mounting cardan offset bracket lite (RotAlign Elite laser)

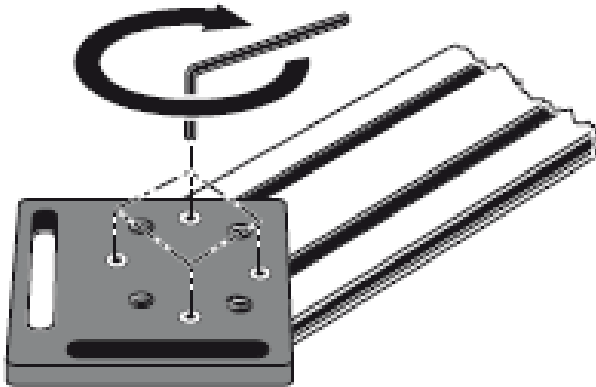
Mount the cardan offset bracket lite and adjust RotAlign Elite laser

Mount the faceplate to the rail

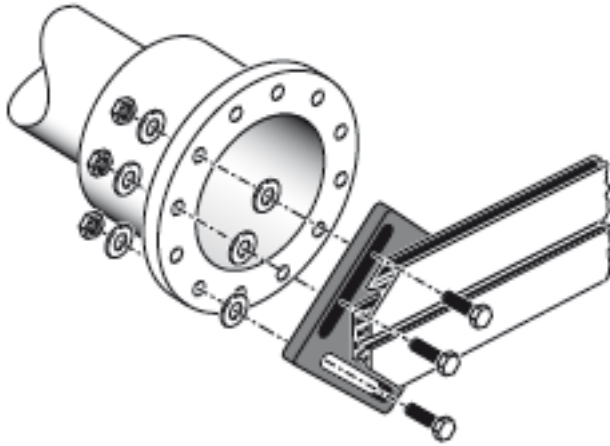
1. Slide the the faceplate down the rail as shown below. The four T-nuts should sit in the grooves.



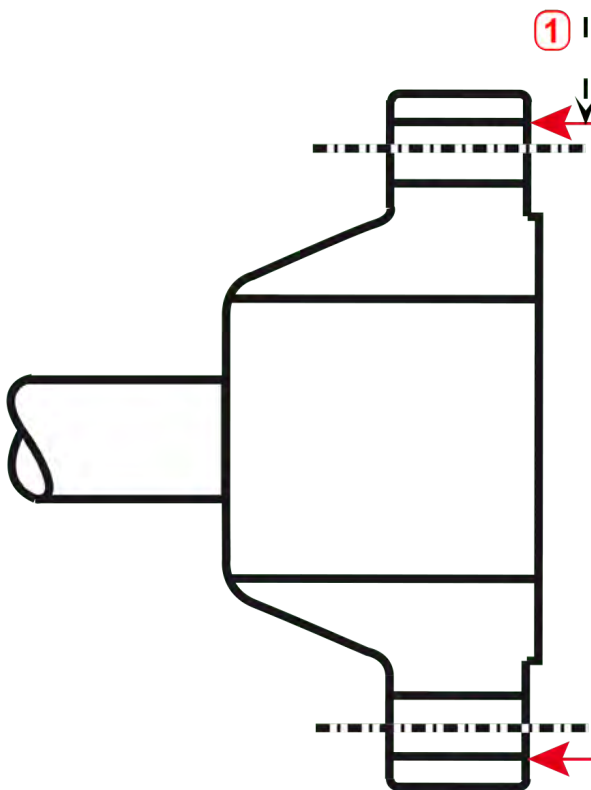
2. After positioning the faceplate on the rail, tighten the four socket head screws using the provided M5 allen key.



3. Mount the bracket assembly to the coupling face of the non-rotatable shaft. If the coupling face has a raised rim, the precision machined spacers are used as shown below in order to separate the bracket faceplate from the coupling face.



- (Without the spacers, there would be no direct contact between the faceplate and the coupling surface surrounding the bolt holes – exactly the location where the faceplate and coupling are being joined.)



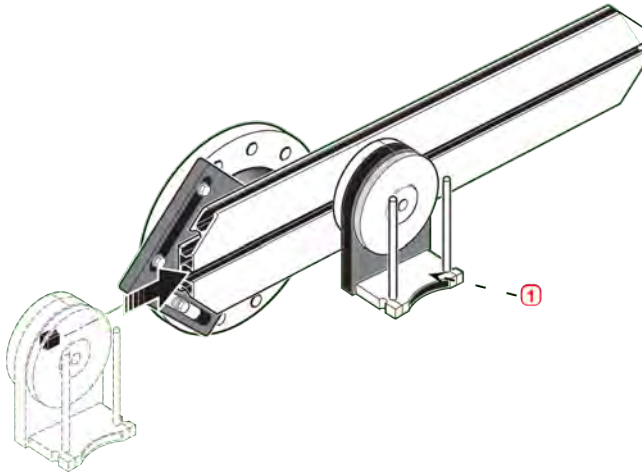
- **(1) Reference surface**
- The coupling shown above has a raised face flange. The provided spacers are used to create a three-point plane to ensure that the faceplate and the coupling face, which is the reference surface are joined together.


Note

The center part of the coupling face must not be used as a reference surface.

Mount the laser holder assembly on to the rail

1. Loosen the handwheel slightly, then slide the laser holder assembly down the center groove of the rail, with the T-nut acting as a guide.

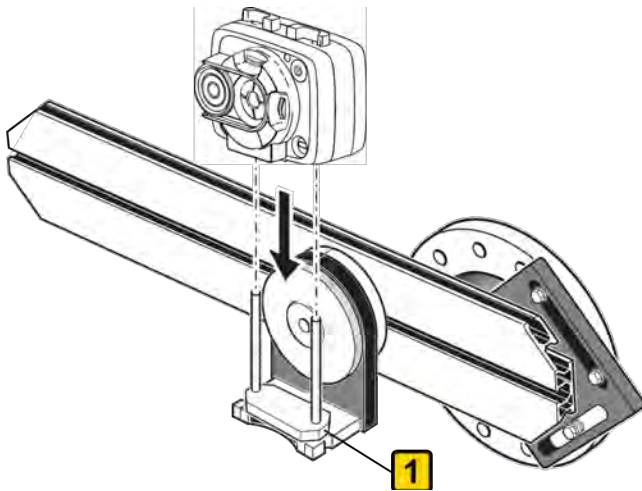


- **(1)** Laser holder

Mount and adjust RotAlign Elite laser

In this step, the laser beam is adjusted such that it is roughly colinear to the rotational axis of the laser holder assembly.

1. Slide the distance plate down the support posts.
2. Slide the laser onto the posts until it rests on the distance plate.



- **(1)** Distance plate

3. Mark a set of target crosshairs on the shaft rotation centerline of the other machine coupling (if the flange has a center hole, a temporary target surface may be affixed to the hole).
4. Switch on the laser and adjust the beam to strike the center of the target on the opposite coupling:
 - The objective is to adjust the laser beam such that it is roughly colinear to the rotational axis of the laser holder assembly; this will make it possible to make fine adjustments to the laser holder assembly's position afterwards, without having to realign the laser beam itself.

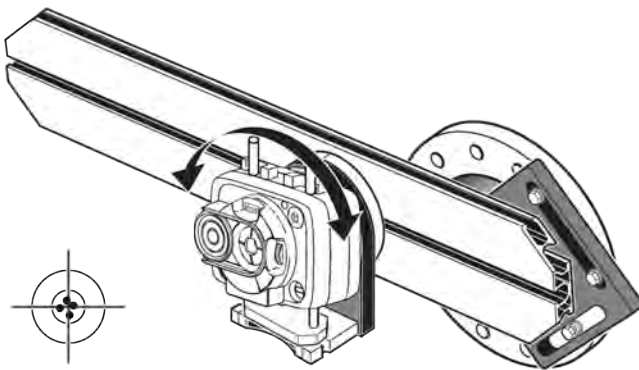
**Note**

The distance plate influences the offset by positioning the laser beam on the same axis as the rotational axis of the laser holder assembly.

- The two beam position thumbwheels are used to adjust the angular position of the laser beam. By rotating the laser assembly holder, the laser beam traces an 'approximate' circle. If the 'approximate' circle is a single dot at the center of the target, then the laser beam has been adjusted correctly. If that is not the case, repeat the laser beam adjustment process until the 'approximate' circle corresponds to a 'single dot' position.

**Note****Laser adjustment tip:**

If the beam describes a circle rather than a dot at the target when rotating the laser holder assembly, then note how big the circle is and use the beam position thumbwheels to move the laser beam back by half the distance it has moved when rotating the laser holder assembly 180° from its start position. Do this both vertically and horizontally. When correctly adjusted, you should be able to rotate the laser holder assembly a full 360° without the laser dot moving from the target center.

**Note**

As soon as a single dot position has been achieved, do not touch the laser thumbwheels.

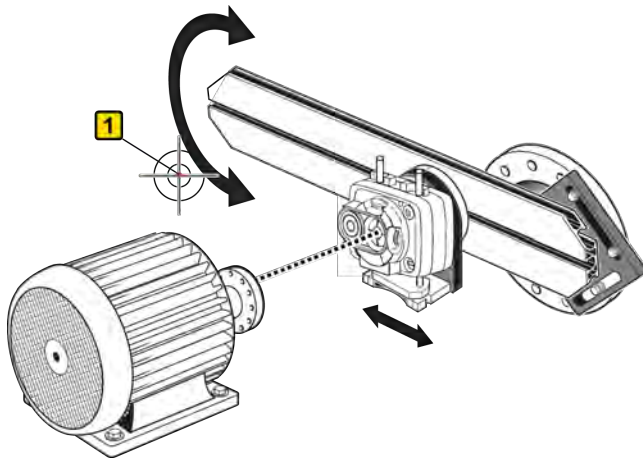
Adjust laser beam to machine's rotational axis

In this step, the laser holder assembly is adjusted on the bracket such that the laser holder rotational axis is colinear with the rotational axis of machine to be aligned (which could be a motor or a gearbox).

**Note**

During this procedure, DO NOT touch the beam position thumbwheels.

1. Carry out the vertical and horizontal adjustment of the laser holder assembly by sliding it horizontally through the bracket rails and positioning it vertically by rotating the bracket.



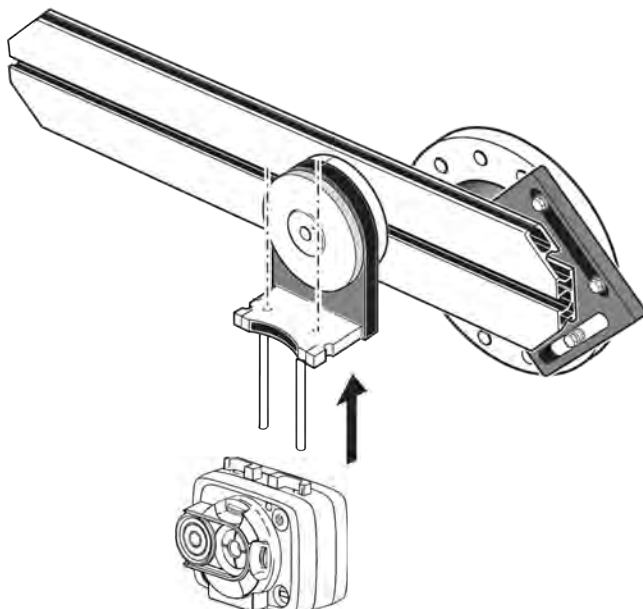
- **(1)** Laser dot

2. Repeat the above procedure until the laser beam strikes the center of the target placed on the rotational axis of machine to be aligned.
3. Once the laser beam has been centered on the target, tighten the faceplate on the coupling face using the provided hexagon socket head screws.

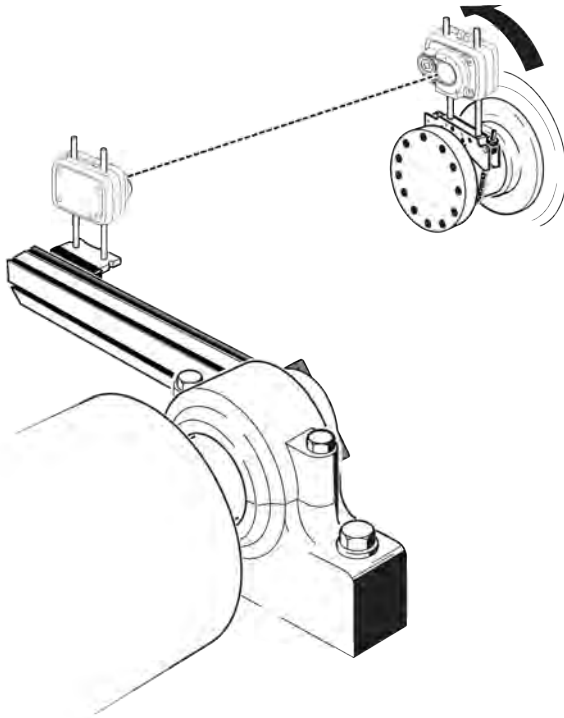
Position RotAlign Elite laser and mount RotAlign Elite sensor for measurement

In this step, the laser is remounted on the underside of the laser holder while the sensor is mounted on the shaft of the machine to be aligned.

1. Switch off the laser and remove it from its holder.
2. Using the provided M4 Allen key, loosen the support posts then slide them through the laser holder base so that they protrude from the other side.



3. Retighten the M4 Allen screws to secure the support posts, then remount the laser onto the support posts.
4. Use the chain-type bracket or appropriate magnetic brackets to mount the sensor on the shaft of the machine to be moved (such as the motor or gearbox). The sensor is aligned to the laser by pushing or sliding the bracket supporting the sensor.

**Note**

DO NOT touch the laser or its laser position thumbwheels.

Live Trend



Note

This functionality is available only in RotAlign Elite Expert.

What is Live Trend?

Live Trend is an application used for live monitoring of machine movements arising from thermal growth, machine foundation movement and changes in operating load. The application is also used to check pipe strain. Live Trend can additionally be used to track machine drift as raw sensor data in the X,Y coordinates.

Live Trend packages

To be able to mount both sensor and laser on the machines to be monitored, two bracket packages are available.

- ALI 4.005/2-10 — Live Trend add-on module with magnetic brackets
- ALI 4.005/2-20 — Live Trend add-on module with PERMAFIX brackets

ALI 4.005/2-10 Live Trend add-on module with magnetic brackets	
Part number	Component
ALI 14.310	Live Trend magnetic bracket for mounting laser and sensor including 115 mm support posts (Note that this package contains 2 no. ALI 14.310)
ALI 14.320	Magnetic bracket for Bluetooth module (for RotAlign sensor)
ALI 2.191	Anti-torsion bridge (Note that this package contains 2 no. ALI 2.191)
ALI 2.193	Live Trend case for magnetic brackets
ALI 4.743	RotAlign Ultra Shaft Expert firmware voucher
5306155	USB memory stick
DOC 04.100.en	Live Trend Getting started
0 0739 1055	2.5 mm allen key

See package components in following images.

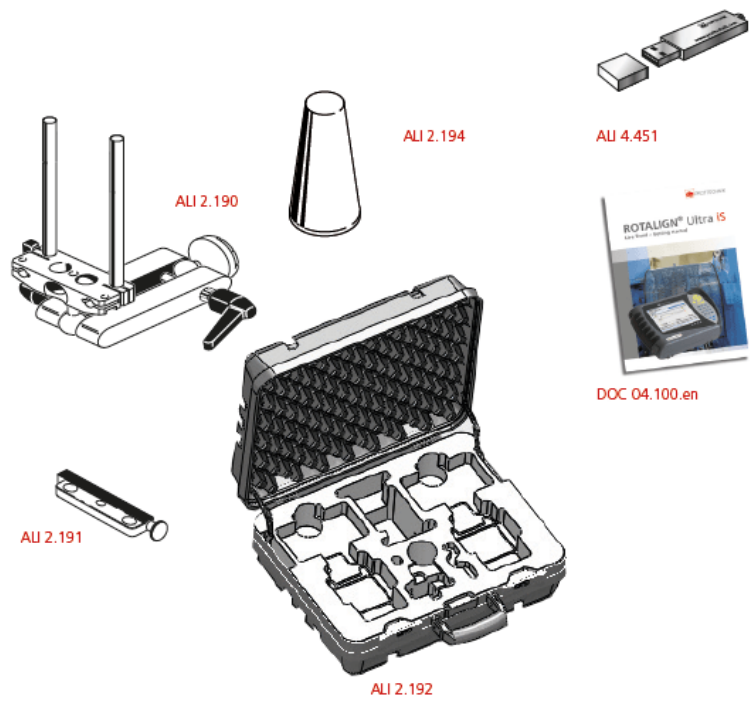

ALI 4.005/2-20 Live Trend add-on module with PERMAFIX brackets

Part number	Component
ALI 2.190	PERMAFIX mounting bracket for laser and sensor (Note that this package contains 2 no. ALI 2.190)
ALI 2.191	Anti-torsion bridge (Note that this package contains 2 no. ALI 2.191)
ALI 2.192	Live Trend case for PERMAFIX brackets
ALI 2.194	Striking cone
ALI 4.743	RotAlign Ultra Shaft Expert firmware voucher
5306155	USB memory stick
DOC 04.100.en	Live Trend Getting started


Note

As stated in the copyright, package contents may also vary from those listed here. Check and ensure that the delivered package items conform to the purchase order and the packing list. Reference may also be made to the online product catalog. Contact Fluke Reliability or your local sales representative if any package items are damaged or missing.

See package components in these images.



Mounting Live Trend brackets

Mount the necessary Live Trend measurement brackets as described in "RotAlign Ultra iS Live Trend getting started" DOC 04.100.en which is included in the Live Trend packages.

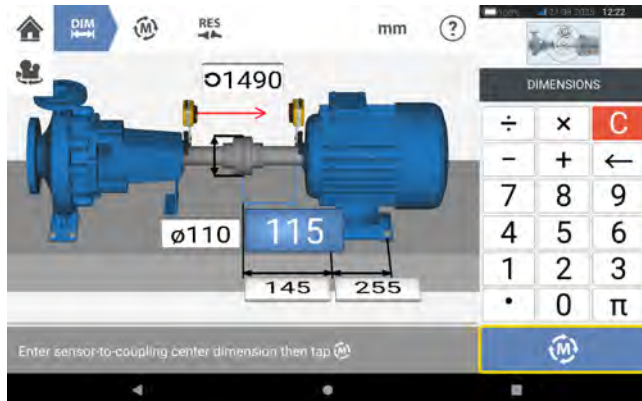
Live Trend setup

Use the dimensions screen to define the machines to be monitored.

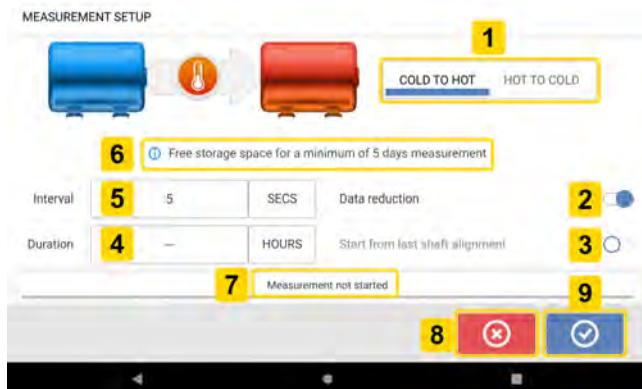


Note

Live Trend brackets are mounted on the machines and NOT on shafts.

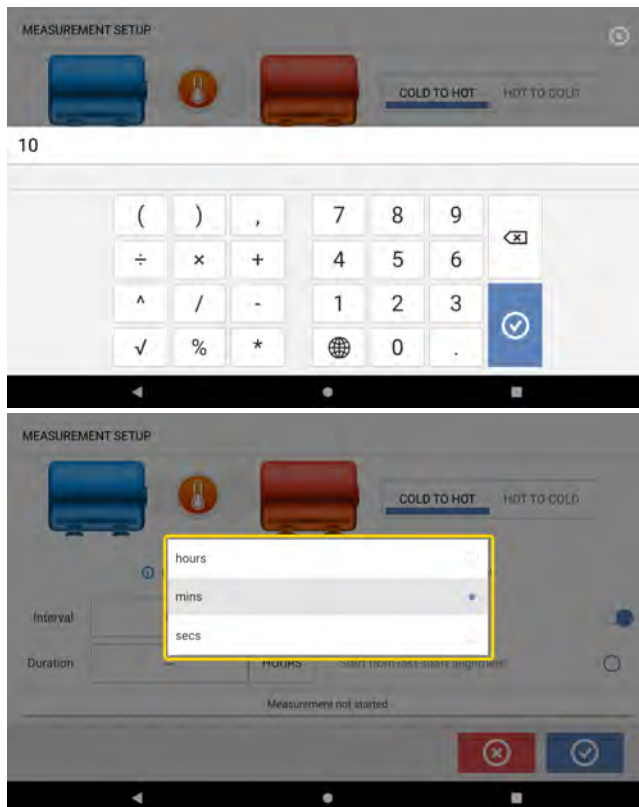


After entering all necessary dimensions, tap  then proceed to set sampling interval and measurement duration in the setup screen that appears.



In the setup screen, the following measurement parameters and machine running condition are defined:

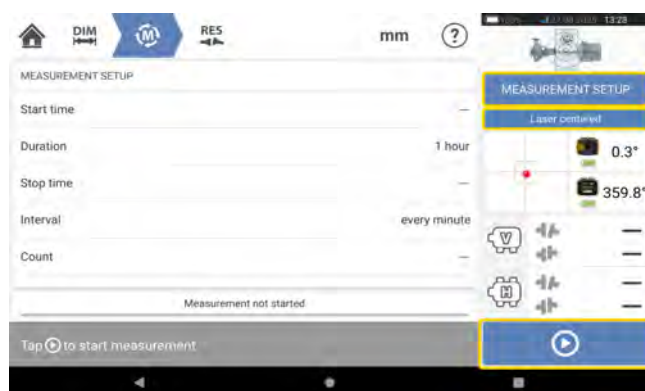
- **(1)** The machine running condition is set by swiping the blue button to either **Cold to hot** or **Hot to cold**.
- **(2) Data reduction** is a process whereby readings are only taken when significant events take place. This helps reduce the volume of unnecessary data. Data reduction is set as default. A check mark appears within the blue button. Swipe the button to the left to deactivate Data reduction.
- **(3) Start from last shaft alignment** sets the last shaft **As left** alignment condition as the starting point of the Live Trend measurement. This option is only active if a shaft alignment measurement had been carried out on the particular asset.
- **(4) Duration** is set in either hours, minutes or seconds. It is the time set for the entire measurement.
- **(5) Interval** is set in either hours, minutes or seconds. It is the time that elapses between taking readings.



Tap the respective value box then enter the duration or measurement interval using the onscreen keyboard. Tap  to exit the onscreen keyboard and return to the setup screen. Tap the respective unit of time box then select necessary unit from the units window that pops up.

- **(6)** The indicated free storage capacity is based on the sampling interval.
- **(7)** The bar shows the current status of the measurement.
- **(8)** Tap  to cancel the setup
- **(9)** Tap  to proceed with Live Trend measurement

Live Trend – Measurement

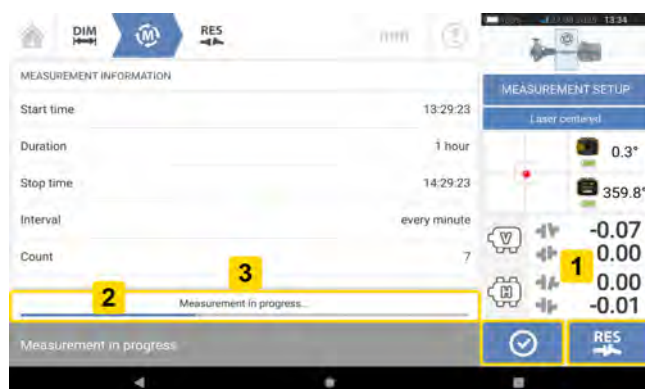


If the sensor has been initialized, and laser beam centered, tap  to start Live Trend measurement. (If not, refer to Initializing sensor and Laser beam adjustment.)



Note

DO NOT touch the laser or adjust the laser beam once measurement has started.



When measurement is started, the Measurement screen shows the current coupling gap and offset values (1). The blue measurement progress bar (2) shows the approximate percentage of completed measurement. The time measurement commenced, the scheduled duration, time when measurement will end, the sampling interval and number of measurements taken are also shown.

The measurement status bar (3) indicates when measurement is completed. Tap  to stop current measurement before set duration ends. Tap  to evaluate results.

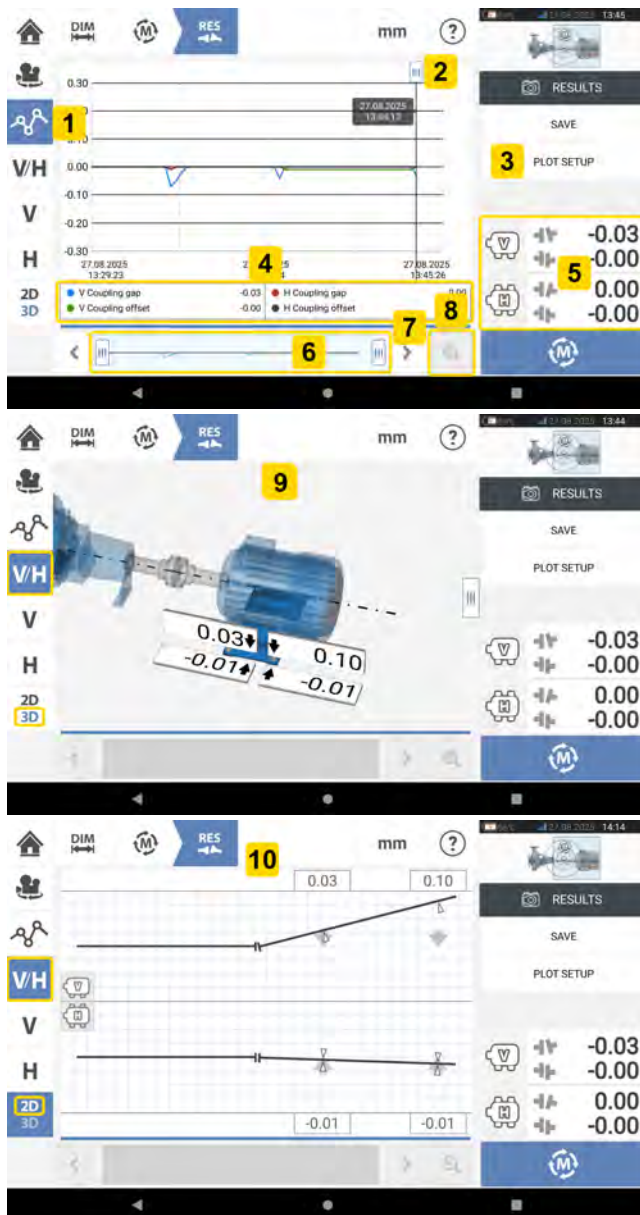


Note

Results may be viewed with measurement in progress. Tap  to view feet results and measurement plots.

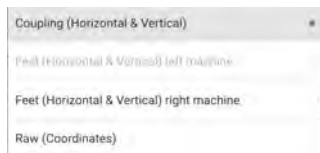
Live Trend – Evaluating results

Results screen overview



Interpreting the results screen

- **(1)** The **Plots** icon is used to display the results in form of plots. The type of data displayed on the plot is selected via the menu item **PLOT SETUP (3)**.
- **(2)** The cursor which is freely movable possesses a data tip that shows the date and time of the position on the graph. The displayed coupling and feet results correspond to the current cursor position.
- **(3)** The menu item **PLOT SETUP** is used to select type of data to be displayed on the plots. These options are available:



- Tap **Coupling (Horizontal & Vertical)** to display coupling gap and offset value plots
- Tap **Feet (Horizontal & Vertical) left machine** to display left machine feet value plots
- Tap **Feet (Horizontal & Vertical) right machine** to display right machine feet value plots
- Tap **Raw (Coordinates)** to display plots of raw XY values on both position detectors
- **(4)** Displayed results correspond to current cursor position and selected plot setup.
- **(5)** The displayed coupling results correspond to the current cursor position. Tap coupling results **(5)** to access the Live Trend log.
- **(6)** This area is used to control the time range of the Live Trend application.



The two sliding bars are used to adjust the time range of the plots on the screen. The left bar shows the start of the selected range. The right bar shows the end. The graph shows the timestamps for both bars. It also shows a midpoint timestamp, which is at half of the selected range. The cursor and its timestamp always stay on the screen. To move the cursor, drag it across the graph or use or **(7)**.

- **(7)** Tap or to position cursor at necessary position.
- **(8)** Tap or to toggle cursor between final measurement position and previously selected measurement position respectively.
- **(9)** The 3-D results shows the coupling and feet results for the reading at current cursor position **(2)**.
- **(10)** The 2-D (V/H) results shows the coupling and feet results for the reading at current cursor position **(2)**.

Live Trend – Log

What is a Live Trend log?

A Live Trend measurement log is a table that records the results of all measurements taken during the live monitoring of the machine. These items are also included in the log:

- Vertical and Horizontal coupling results for every recorded measurement
- Markers
- Date and time when each measurement was taken
- Laser status at time of measurement (this could be **Laser centered** or **OK** or **Laser end** or **Laser weak**)
- The averaging time for each measurement
- The sensor raw values that include X,Y coordinates on both position detectors, the rotational angle and the temperature
- The laser raw values that include the rotational angle and the temperature
- Velocity RMS
- Both sensor and laser serial numbers and their respective recalibration dates

Swipe horizontally to view all columns in the log and vertically to view all rows in the log.

LIVE TREND LOG

	VERTICAL		HORIZONTAL		MARKERS	TIME	STATUS
#	AVG	COUPLING	AVG	COUPLING			
1	0.00	0.00	0.00	0.00		27.08.2025 13:29:23	Laser centered
2	-0.00	-0.00	0.00	0.00		27.08.2025 13:32:45	Laser centered
3	-0.07	0.00	0.00	-0.01		27.08.2025 13:33:00	Laser centered
4	-0.05	0.00	0.00	-0.00		27.08.2025 13:33:15	Laser centered
5	-0.02	-0.00	0.00	-0.00		27.08.2025 13:33:30	Laser centered
6	-0.00	-0.00	0.00	0.00		27.08.2025 13:33:45	Laser centered
7	-0.00	-0.00	0.00	0.00		27.08.2025 13:37:43	Laser centered

LIVE TREND LOG

STATUS	AVG (s)	X1	Y1	X2	Y2	SENSOR ANGLE	SENSOR RAW VALUE
Laser centered	0.05	0.159	-1.593	0.127	0.467	359.6	
Laser centered	5.00	0.160	-1.591	0.127	0.467	359.8	
Laser centered	5.00	0.159	-1.497	0.113	0.343	359.8	
Laser centered	5.00	0.159	-1.523	0.117	0.379	359.8	
Laser centered	5.00	0.157	-1.563	0.122	0.434	359.8	
Laser centered	5.00	0.160	-1.589	0.127	0.468	359.8	
Laser centered	5.00	0.162	-1.586	0.128	0.468	359.8	

LIVE TREND LOG mm

RAW VALUES

SENSOR ANGLE	SENSOR TEMPERATURE [°C]	LASER ANGLE	LASER TEMPERATURE [°C]	VELOCITY RMS [MM/S]
359.6	29.4	0.3	29.4	—
359.8	29.4	0.3	29.4	0.00
359.8	29.4	0.3	29.4	0.00
359.8	29.4	0.3	29.4	0.00
359.8	29.4	0.4	29.4	0.00
359.8	29.4	0.4	29.4	0.00

ALL MARKERS

LIVE TREND LOG mm

ANGLE	LASER TEMPERATURE [°C]	VELOCITY RMS [MM/S]	S/N	RECAL	S/N	RECAL
.3	—	—	54950075	01.07.2027	49102708	01.07.20
.3	—	0.00	54950075	01.07.2027	49102708	01.07.20
.3	1	0.00	54950075	01.07.2027	49102708	01.07.20
.3	—	0.00	54950075	01.07.2027	49102708	01.07.20
.3	—	0.00	54950075	01.07.2027	49102708	01.07.20
.4	—	0.00	54950075	01.07.2027	49102708	01.07.20
.4	—	0.00	54950075	01.07.2027	49102708	01.07.20

ALL MARKERS

The reading highlighted in the log is related to the cursor position on the plot.

- (1) Reading highlighted in the log. Tap  to view results.



The cursor position (1a) is related to reading highlighted in the log. The shown coupling results (1b) relate to those highlighted in the log.

- (2) Tap either **ALL** or **MARKERS**. The selected option is shown with a blue bar below it. When **ALL** is selected, the log displays all readings taken. When **MARKERS** is selected, only readings with markers are displayed.
- (3) Tap  or  to toggle cursor between currently highlighted reading and the last recorded reading respectively.
- (4) Tap  to assign marker to highlighted log reading.
- (5) Tap  to set highlighted log reading to zero.
- (6) Tap  to view results.

Live Trend – Markers

What are markers?

In the Live Trend application, markers are points on the graph that highlight significant events during a measurement. These may include machine startup or machine shutdown. These markers are available:

-  **Hot** – used to indicate the running condition or when machinery has warmed up
-  **Cold** – used to indicate the initial running phase from being stationary
-  **Custom** – a customer-specified marker
-  **Start** – used to indicate point where the machines are started
-  **Stop** – used to indicate the point where machines are shut off

Apply markers

Markers are applied in the log. The log is accessed from the measurement or results screen.



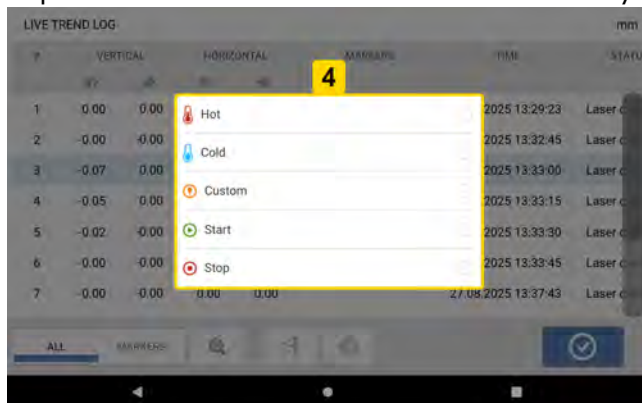
Tap the area where the coupling results are displayed (1). This opens the Live Trend log.

LIVE TREND LOG

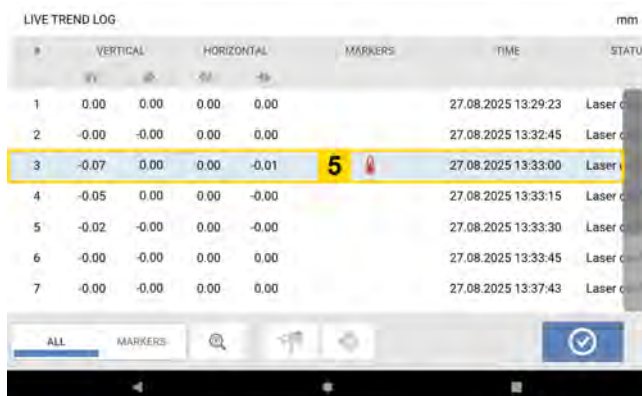
	VERTICAL	HORIZONTAL	MARKERS	TIME	STATUS
1	0.00	0.00	0.00	27.08.2025 13:29:23	Laser c
2	-0.00	-0.00	0.00	27.08.2025 13:32:45	Laser c
3	0.07	0.00	-0.01	27.08.2025 13:33:00	Laser c
4	-0.05	0.00	-0.00	27.08.2025 13:33:15	Laser c
5	-0.02	-0.00	-0.00	27.08.2025 13:33:30	Laser c
6	-0.00	-0.00	0.00	27.08.2025 13:33:45	Laser c
7	-0.00	-0.00	0.00	27.08.2025 13:37:43	Laser c

ALL MARKERS

Tap measurement where a marker is necessary (2) then tap  (3).



Tap necessary marker from available list (4).



The log table then shows selected measurement with necessary marker (5).

User-specified markers

User-specified markers are set using the marker **Custom**. Tap the necessary measurement from the log then tap . Tap **Custom** from the shown list of markers. Use the keyboard that appears to customize the marker data tip. Data tip is a small display that appears on the cursor. It shows the date, time and customized marker information at the current cursor position.

Set measurement point to zero

If necessary, any measurement point may be set to zero. Use the **set to zero** marker .



Note

Only one measurement point may be set to zero with the **set to zero** marker.

LIVE TREND LOG

	VERTICAL	HORIZONTAL	MARKERS	TIME	STATUS
5	-0.02	-0.00	0.00	0.00	27.08.2025 13:33:30 Laser c
6	-0.00	-0.00	0.00	0.00	27.08.2025 13:33:45 Laser c
7	-0.00	-0.00	0.00	0.00	27.08.2025 13:37:43 Laser c
8	-0.04	0.00	0.00	-0.00	27.08.2025 13:37:58 Laser c
9	-0.00	-0.01	0.00	0.00	27.08.2025 13:38:13 Laser c
10	-0.00	-0.01	0.00	0.00	27.08.2025 13:43:58 Laser c
11	-0.03	-0.00	0.00	0.00	27.08.2025 13:44:13 Laser c

ALL MARKERS

In the log, tap the measurement where the **set to zero** marker is to be applied (1). Tap (2) to set the point to zero.



LIVE TREND LOG

	Δ VERTICAL	Δ HORIZONTAL	MARKERS	TIME	STATUS
5	0.01	0.00	-0.00	-0.00	27.08.2025 13:33:30 Laser c
6	0.03	-0.00	-0.00	0.00	27.08.2025 13:33:45 Laser c
7	0.03	-0.00	-0.00	0.00	27.08.2025 13:37:43 Laser c
8	-0.01	0.01	-0.00	-0.00	27.08.2025 13:37:58 Laser c
9	0.03	-0.00	-0.00	0.00	27.08.2025 13:38:13 Laser c
10	0.03	-0.01	-0.00	0.00	27.08.2025 13:43:58 Laser c
11	0.00	0.00	0.00	0.00	27.08.2025 13:44:13 Laser c

ALL MARKERS

The **set to zero** marker appears on the measurement (3) with the vertical and horizontal coupling values set to zero. Coupling values (4) are then displayed relative to the point set to zero.



Note

Only one marker may be applied to any specific measurement. The special **set to zero** marker is the only one that may be combined with another marker.

Delete markers

LIVE TREND LOG

	Δ VERTICAL	Δ HORIZONTAL	MARKERS	TIME	STATUS
3	-0.04	0.01	0.00	-0.01	27.08.2025 13:33:00 Laser cent
7	0.03	-0.00	-0.00	0.00	27.08.2025 13:37:43 Heating up Laser cent
11	0.00	0.00	0.00	0.00	27.08.2025 13:44:13 Laser cent

ALL MARKERS

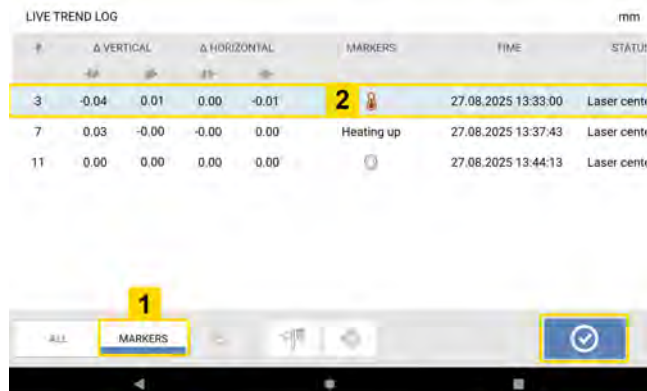
Tap **MARKERS** (1) in the log. Only measurements with markers will be shown. Tap the meas-

urement whose marker is to be deleted (**2**). A bin icon appears next to the marker icon (**3**).

Tap the related delete icon. In this example, it is the **set to zero** delete icon().

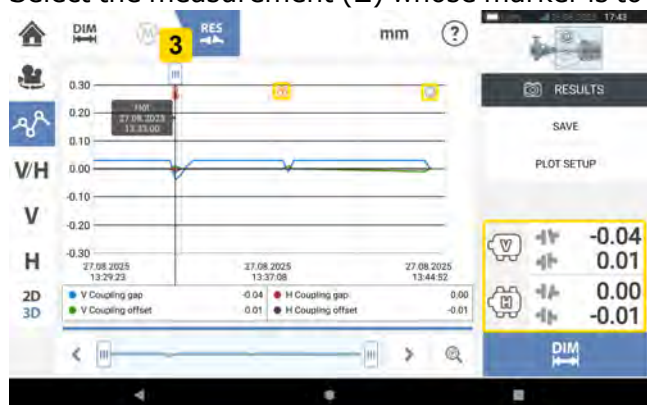
Identify markers

Use the log to identify markers on the plots.



In the log, tap MARKERS (**1**). Only measurements with markers will be shown.

Select the measurement (**2**) whose marker is to be identified then tap  to see the plots.



The cursor on the plots (**3**) is related to the measurement highlighted in the log (**2**).

In this example, the highlighted measurement is number 3, and the Hot marker () is

applied to it. The custom marker () **Heating up** and the **set to zero** marker are applied to measurements 7 and 11 respectively.

Live Trend in multiple coupling



Note

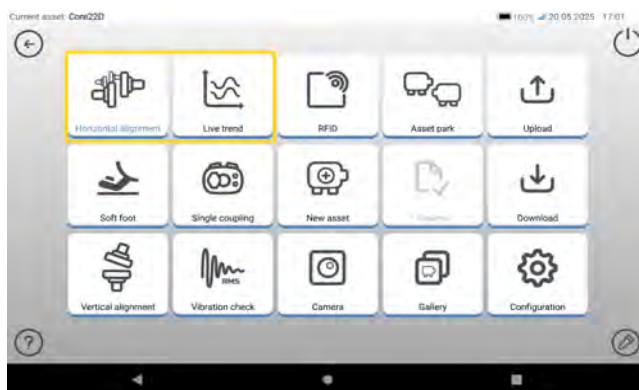
This functionality is available only in RotAlign Elite Expert.

What is Live Trend in multiple coupling?

This functionality is used to perform Live Trend measurements of multiple-element drives with three or more machines simultaneously. The functionality may be used to measure up to seven machines.

Access the Live Trend multiple coupling functionality

From the home screen, tap  to start the multiple coupling functionality. When Multiple coupling is selected, the only icons active are Live Trend for multiple coupling and multiple coupling for horizontal shaft alignment.



Tap  to start the Live Trend for multiple coupling functionality. The application starts with a default pump-gearbox-motor template.

Setup

- After the application is started, configure the machines as appropriate.

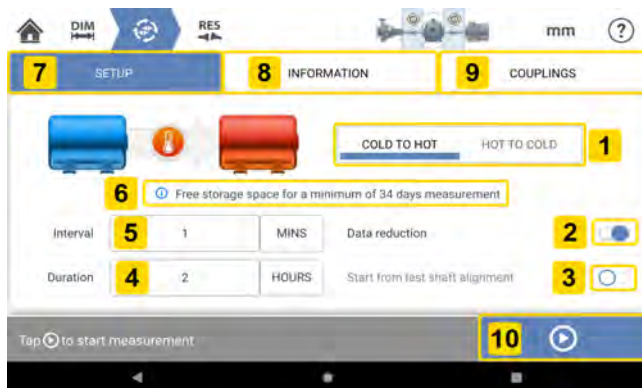


- Make sure that the measurement components have been mounted as required.

**Note**

Live Trend brackets are mounted on the machines and NOT on shafts.

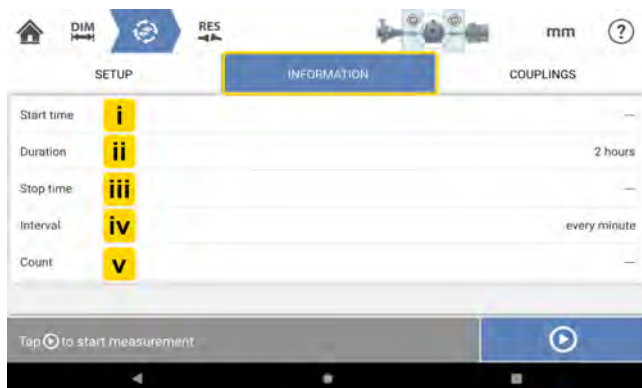
- When all necessary dimensions have been entered, tap  then proceed to set sampling interval and measurement duration in the setup screen that is shown.

**Items under *SETUP***

- (7) Tap **SETUP** to display the measurement parameters and machine running condition (1) to (6) which are defined in Live Trend setup.

Items under *INFORMATION*

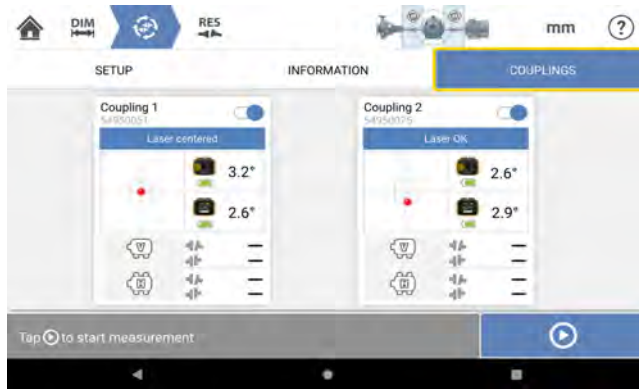
- (8) Tap **INFORMATION** to display these times:



- i) Time measurement started
- ii) Elapsed time (or duration if measurement has not been started)
- iii) Time when measurement stopped
- iv) Time between measurements
- v) Number of measurement samples taken.

Items under *COUPLINGS*

- (9) Tap **COUPLINGS** to open the measurement screen where sensor initialization and laser beam adjustment can be made if necessary.



- **(10)** If setup is completed, tap  to proceed with measurement.

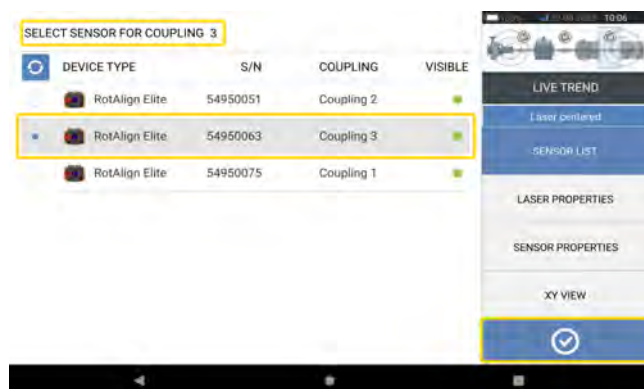
LT in multiple coupling – selecting and initializing sensors

Live Trend in multiple coupling – selecting and initializing sensors

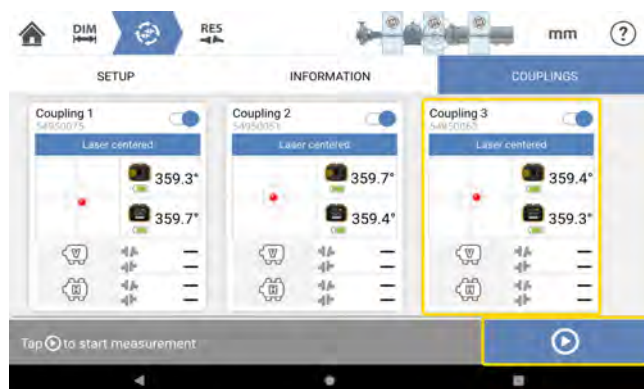
If at any coupling position, the sensor has neither been selected nor initialized, the hint **SELECT SENSOR** is shown when **COUPLINGS** is selected.



Tap **SELECT SENSOR** and proceed with sensor initialization.



After sensor is selected for required coupling position, tap  to proceed with measurement.



Tap  to start multiple coupling Live Trend measurement.

LT in multiple coupling – missing dimensions

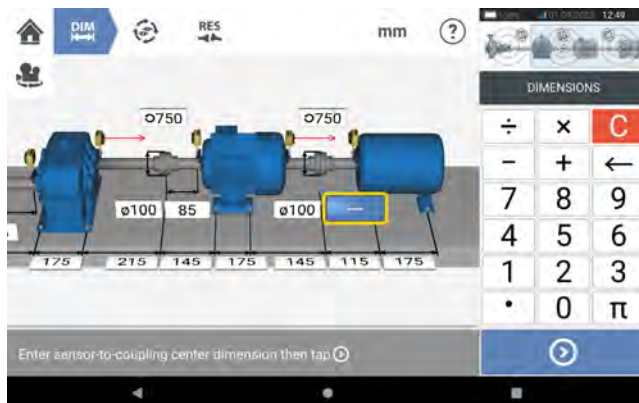
Live Trend in multiple coupling – missing dimensions

If any dimension is missing in Live Trend measurements of multiple-element drives, a hint will be shown in the measurement screen.

- The hint **ENTER DIMENSION** only appears when any coupling center-to-sensor dimension is missing.
- The dimension icon  appears whenever any dimension is missing.



Tap either **ENTER DIMENSION** or  to access the dimensions screen and enter the required dimension. In this example, the missing dimension is the coupling center-to-sensor dimension on the third coupling.



LT measurement in multiple coupling

Live Trend measurement in multiple coupling

- If the sensors have been initialized, and laser beam centered, tap  to start multiple coupling Live Trend measurement.



Note

DO NOT touch the sensors or lasers in use, and do not adjust the laser beams when measurement has started.



- When measurement is started, the measurement screen shows the current coupling gap and offset values at all couplings (1).



Note

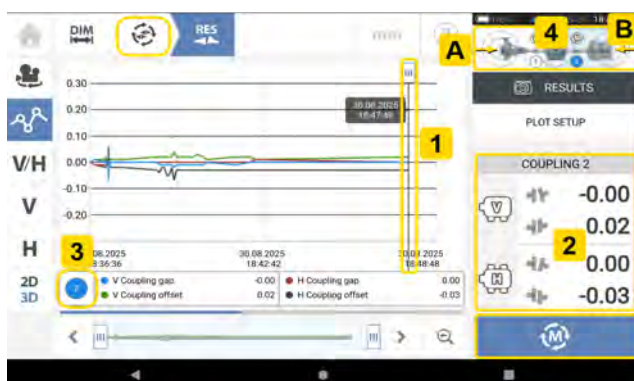
Tap the coupling values frame to open the Live Trend log.

- The blue measurement progress bar (2) shows the approximate percentage of completed measurement. Tap **INFORMATION** to show the time measurement commenced, the scheduled duration, time when measurement will end, the sampling interval and number of measurements taken.

The measurement status bar (3) shows the current status of the measurement.

Tap  to stop current measurement before it ends.

Tap  during measurement to show live measurement results.



- (1) The cursor shows current live results on the plots for the selected coupling.

- **(2)** Live coupling results for selected coupling (in this case coupling 2) are shown.
- **(3)** Shows coupling whose current live results are on display (in this case coupling 2).
- **(4)** Mini train inset used to select coupling whose live results are to be displayed. Select necessary coupling by tapping the arrow located at its respective end (in this example arrow at end **B** for coupling 2).
- Tap either  or  to return to the measurement screen which shows all coupling positions.

LT results in multiple coupling

Live Trend results in multiple coupling



Tap **RES** to show and evaluate results. Results can be evaluated during or after measurement.

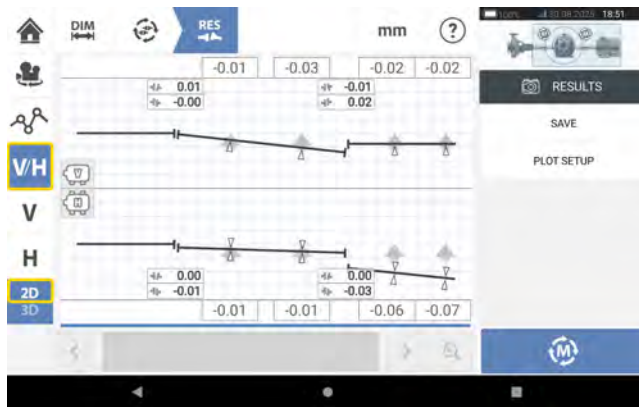
Results are shown as plots, feet results, and coupling values.



Note

To open the Live Trend log, tap the coupling values frame (1).





Simple vibration check

If necessary, the vibration velocity of any asset may be measured. Note that the measured value is not based on any known or standard vibration norms but is a simple indication of any vibration that may be prevalent while the asset is in operation.

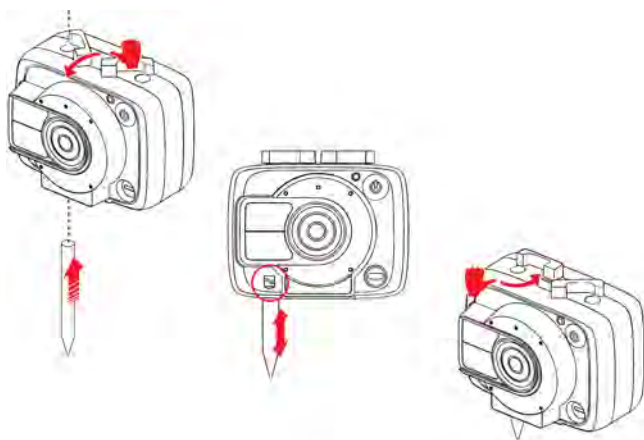
This simple measurement is carried out using the touch device, RotAlign Elite sensor and the vibration check probe.



Note

Vibration check is possible only with the intelligent RotAlign Elite sensor.

Apply the vibration check probe



Insert the probe in the RotAlign Elite sensor hole with a countersink such that the black base of the probe tip rests firmly on the sensor housing. Use the clamping lever to lock in the probe. Switch the sensor on by pressing its On/Off push button switch.

Open or create a new asset then tap  the home screen icon.

Tap  to open the vibration measurement screen.

Take measurement



With the probe securely locked in, place it on the appropriate measurement location while holding the sensor firmly.



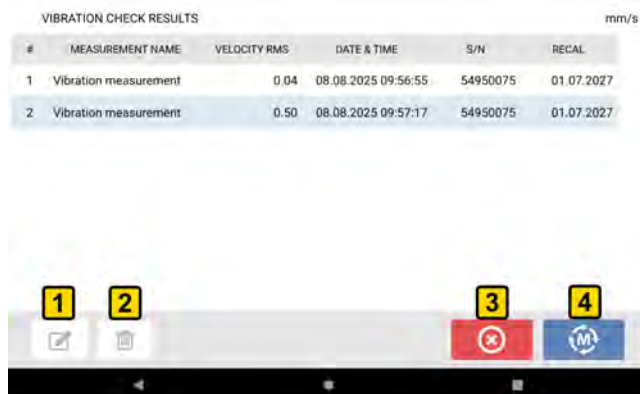
WARNING

Exercise CAUTION when carrying out vibration measurement using the vibration check probe.



- **(1)** Used to start measurement
- **(2)** Used to exit the vibration check application
- **(3)** Used to open the Vibration check results screen

Tap  to start measurement. Hold the sensor firmly until measurement is completed. The time taken depends on the severity of the vibration, and can take up to 15 seconds. Once a measurement is completed, the Vibration check results screen opens, and shows the measured velocity rms value.



- **(1)** Used to edit the name of the measurement if necessary
- **(2)** Used to delete undesired measurement values
- **(3)** Used to exit the vibration check application
- **(4)** Used to remeasure



Note

To edit the measurement name if necessary, tap the name then use the onscreen keyboard.

RotAlign Elite sensor firmware update

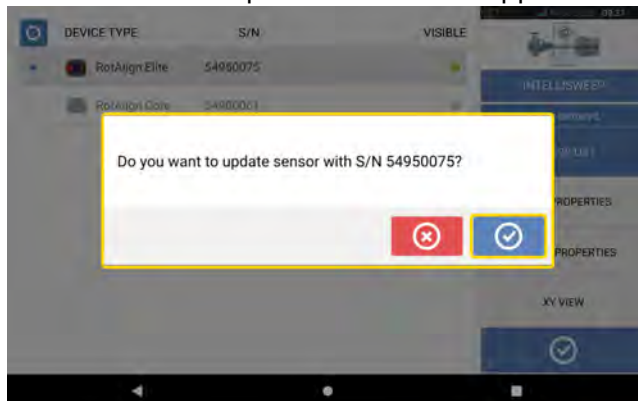


Note

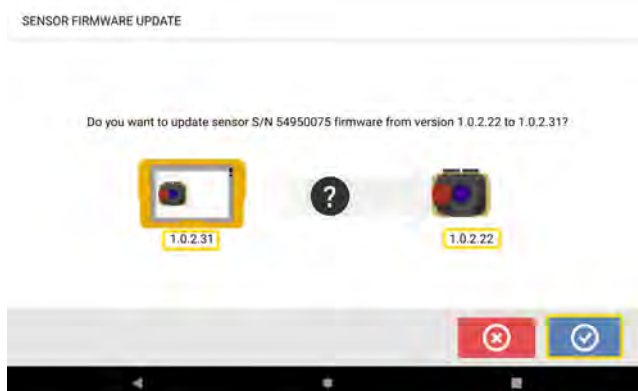
If the sensor firmware is outdated, an update is recommended.

Update sensor firmware to a newer version

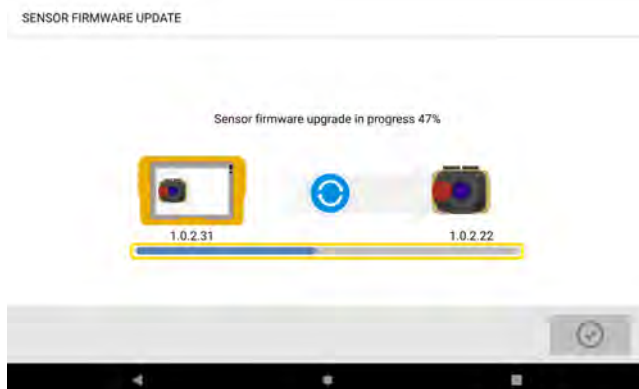
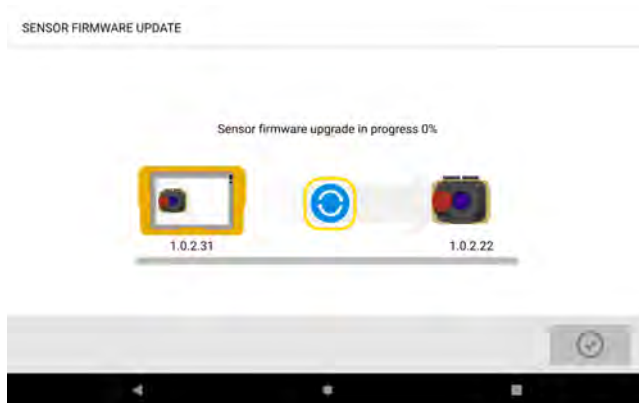
It is possible to carry out a sensor firmware update directly via the rugged touch device. If a sensor with an older firmware version is connected via Bluetooth to the rugged device, a sensor firmware update notification appears on the display.



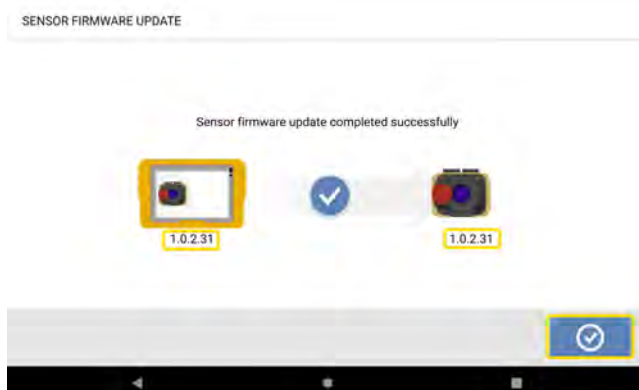
It is recommended to update the sensor firmware. Tap  to proceed to update the sensor. This sensor firmware update screen is shown.



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



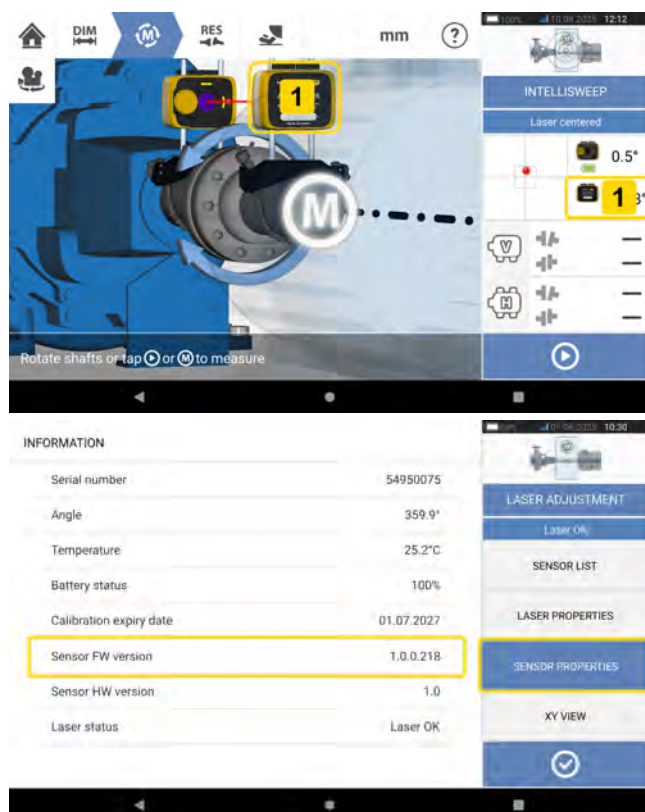
When the update process is successfully completed, this screen is shown.



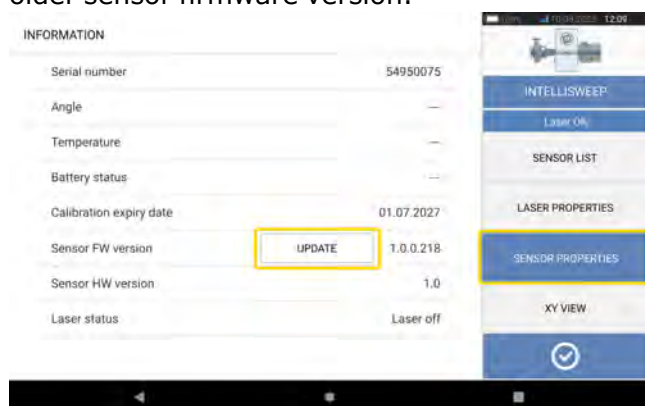
The sensor has now been updated to the newer version available on the rugged touch device.

Tap  to exit the update screen.

The new sensor firmware version appears under **SENSOR PROPERTIES**. To go to **SENSOR PROPERTIES**, tap any of the two sensor areas marked **(1)** on the measurement screen.



If the sensor firmware update is not carried out when the notification appears, the update action may be initiated via **SENSOR PROPERTIES**. An **UPDATE** hint appears 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

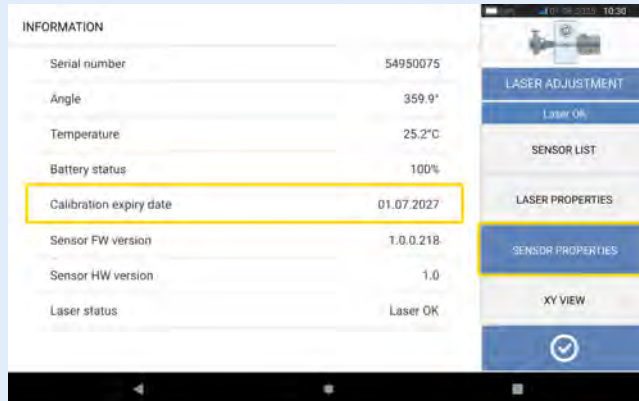
The calibration accuracy of both the sensor and the laser should be checked every two years as indicated on the round label affixed to the bottom of the respective component. Return both sensor and laser to an authorized Fluke Reliability service center for

calibration check and inspection. Contact your local Fluke representative for assistance or visit www.pruftechnik.com.

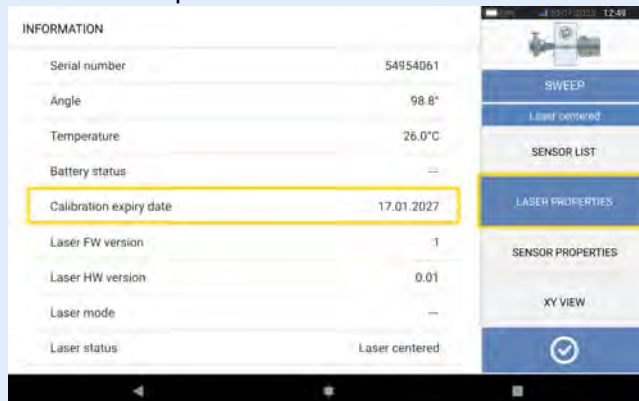


Note

The sensor calibration due date is also be found under **SENSOR PROPERTIES**.

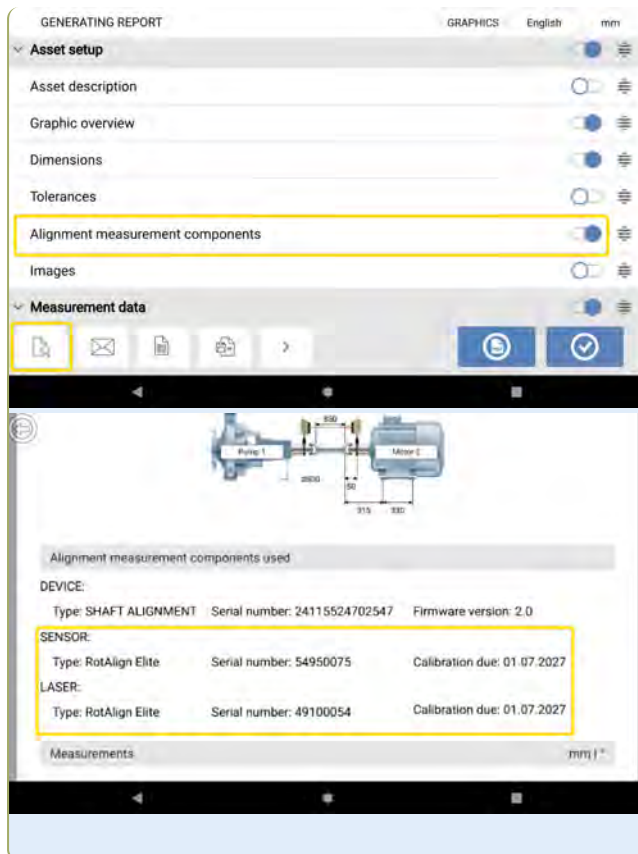


The laser inspection due date is also found under **LASER PROPERTIES**.

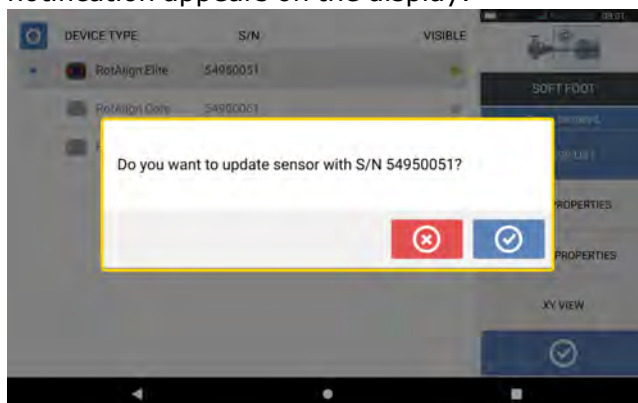


If the calibration or inspection due date has expired, the due date will be highlighted red. Both the sensor and laser calibration due dates will also appear on the asset measurement report if the **GENERATING REPORT** menu item **Alignment measurement components** is activated.

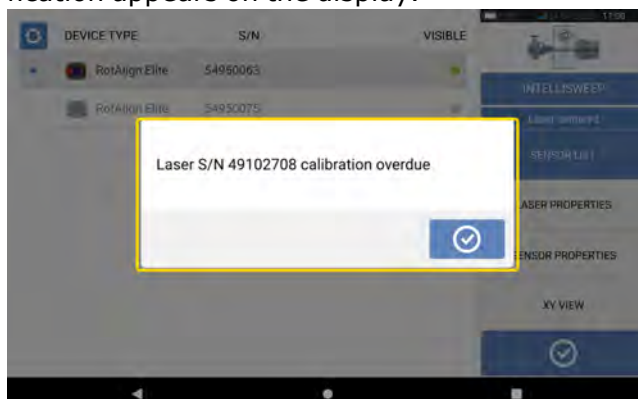




If the calibration due date of sensor and/or laser have expired and the components are connected via Bluetooth or cable to the rugged touch device, the corresponding calibration expiry notification appears on the display.



If the laser inspection due date has expired, and the laser is in use, an inspection expiry notification appears on the display.

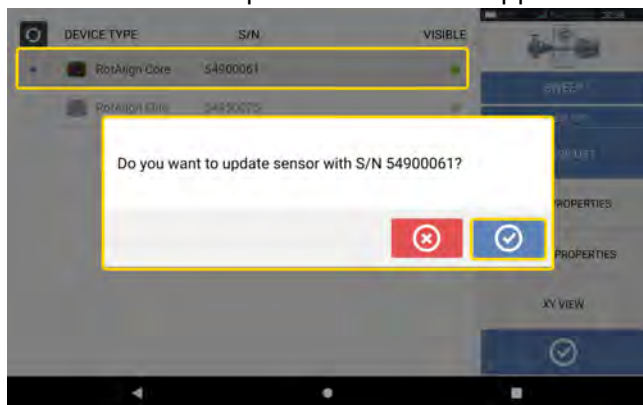


In both cases, tap  to close the respective notification.

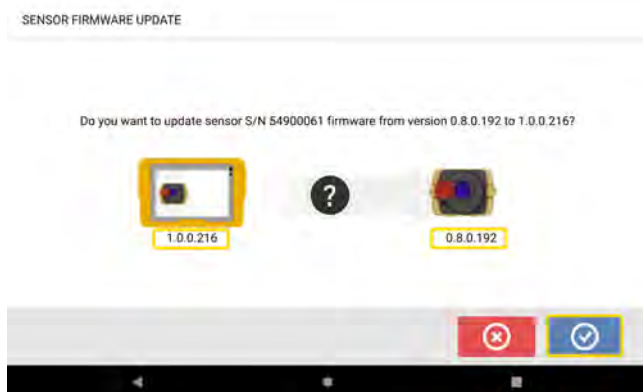
RotAlign Core sensor firmware update

Update sensor firmware to a newer version

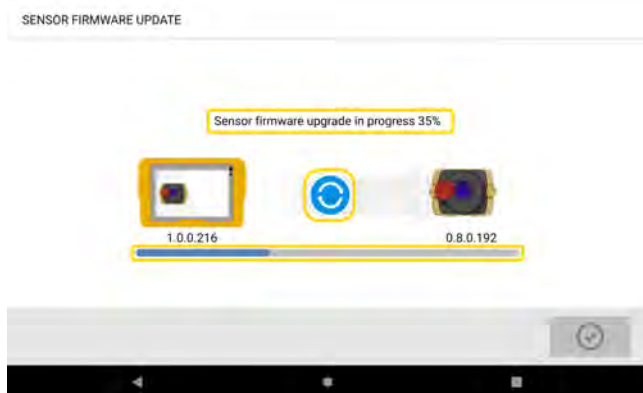
It is possible to carry out a sensor firmware update directly via the rugged touch device. If a sensor with an older firmware version is connected via Bluetooth to the rugged device, a sensor firmware update notification appears on the display.



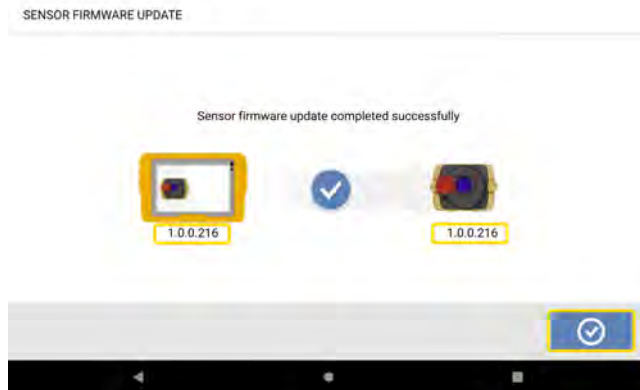
It is recommended to update the sensor firmware. Tap  to proceed to update the sensor. The sensor firmware update screen is shown.



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.

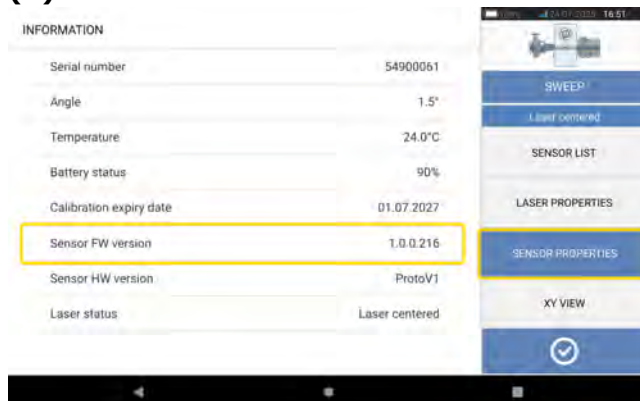


The sensor has now been updated to the newer version available on the rugged touch device.

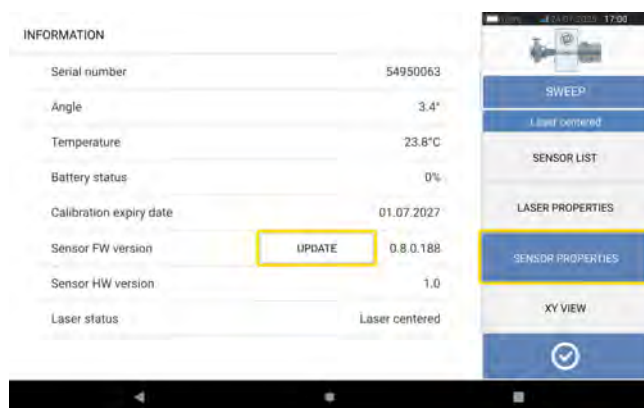
Tap  to exit the update screen.



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



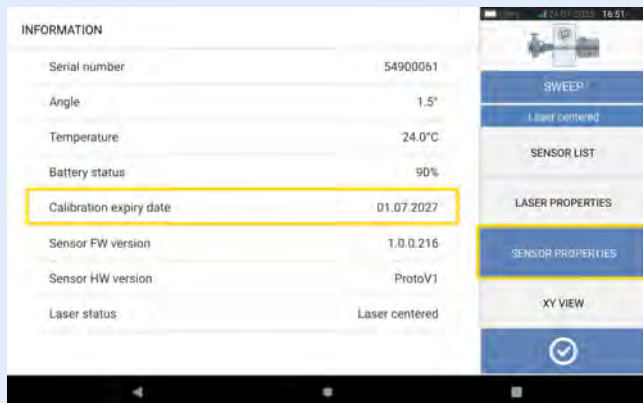
Note

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 Reliability service center for calibration checking and inspection. You may contact your local Fluke representative for assistance or visit www.pruftechnik.com.

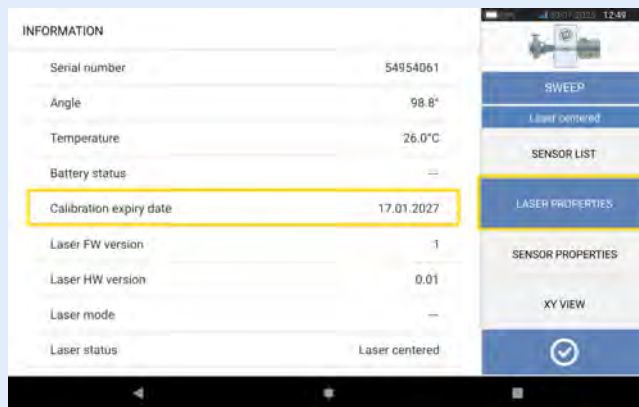


Note

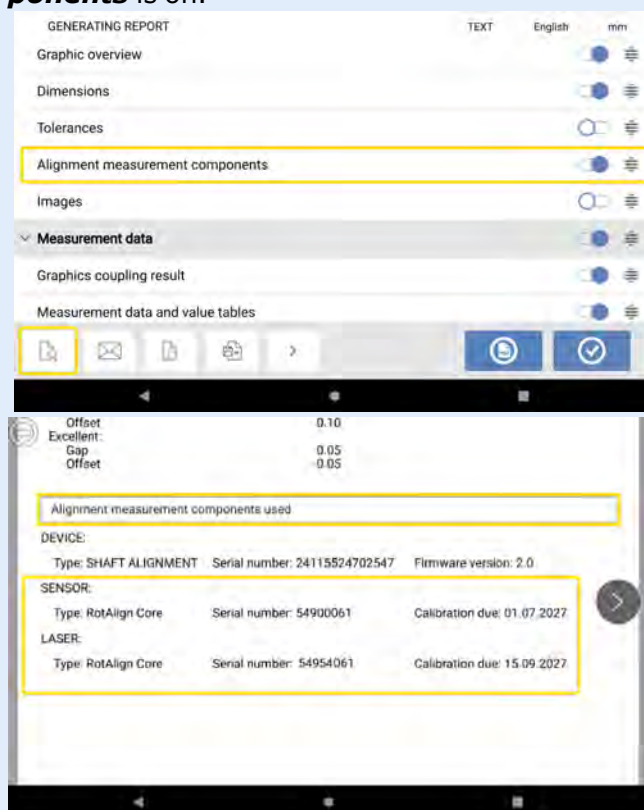
The sensor calibration due date is also found under **Sensor properties**.



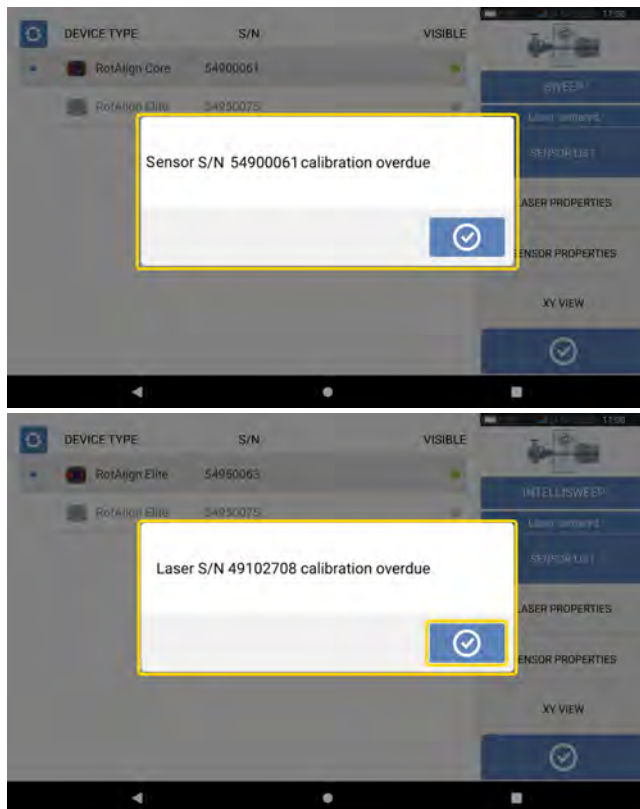
The laser inspection due date is also found under **Laser properties**.



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

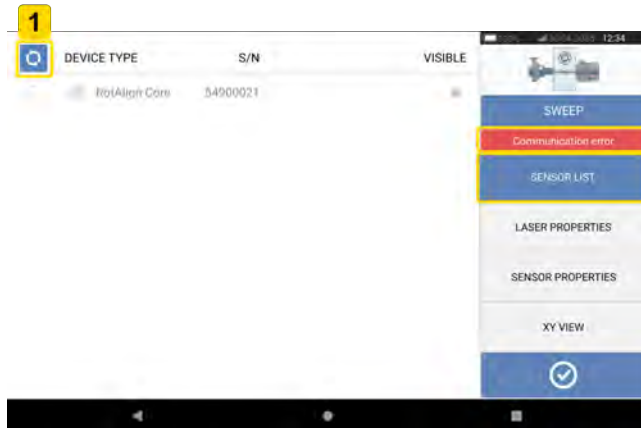
- Dimensions measured to within ± 3 mm ($\pm 1/8$ in.) using a tape measure with 1 mm (or 1/32 in.) divisions are acceptable.
- When entering the dimension between the front and back feet, use the distance between the center of the two foot bolts.
- When dimensions are measured from the sensor, and an 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

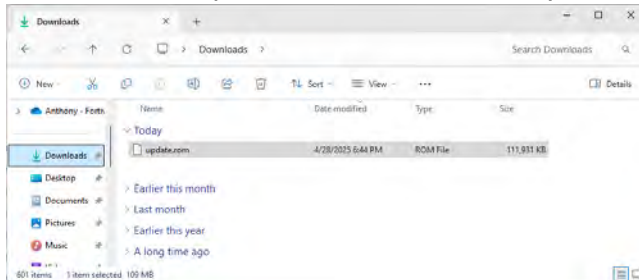
- V is the vertical orientation of the machines viewed from the side.
- H is the horizontal orientation of the machines viewed from the top.
- The foot results which are used for misalignment correction, are position values with respect to the reference machine.
- The bold colored foot tolerance arrows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

Appendix

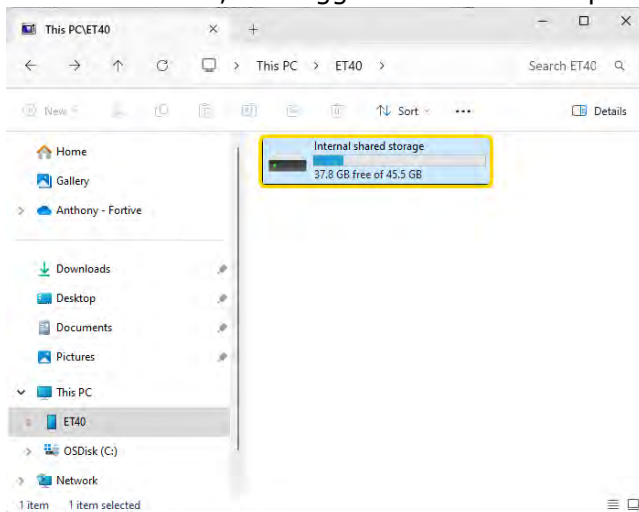
Update device to a newer firmware version

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

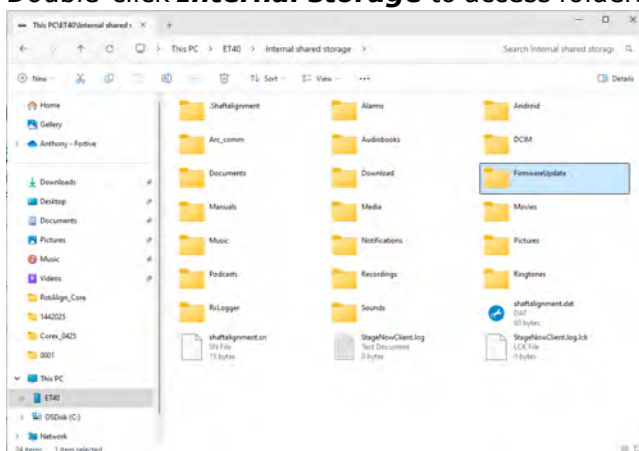
- Download the update file to the necessary directory on a PC.



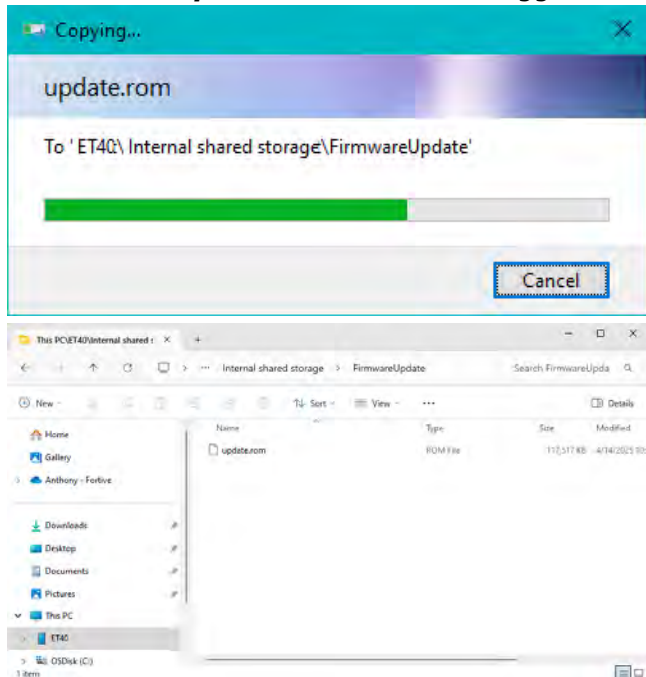
- Switch the rugged device on then connect it to the PC. A hint to allow the Windows PC access the rugged device appears.
- On confirmation, the rugged device shows up in the File Explorer.



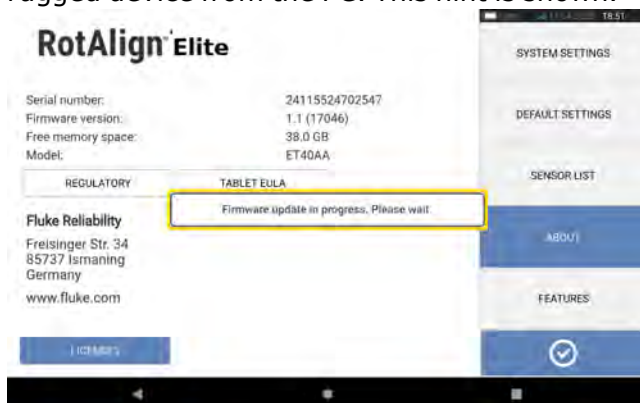
- Double-click **Internal storage** to access folders in the rugged device.



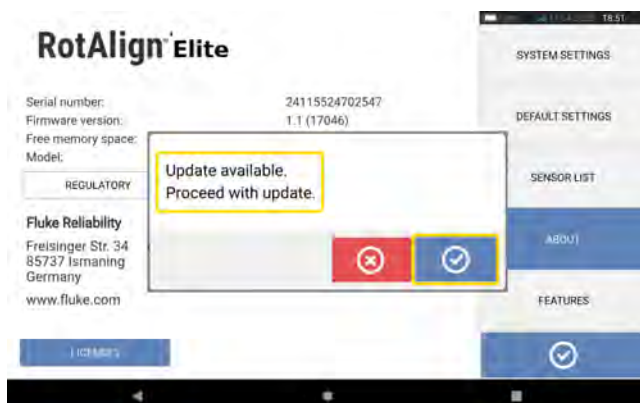
- Transfer the **update.rom** file to the rugged device folder **FirmwareUpdate**.



- 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

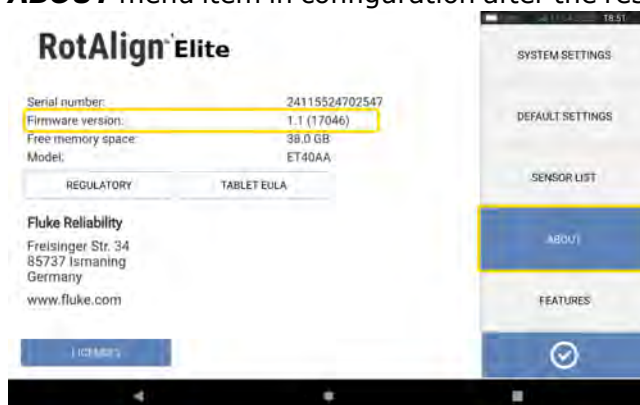
**Note**

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.

Technical data – Rugged tablet

SHAFT ALIGNMENT 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 – RotAlign Elite sensor

RotAlign Elite sensor ALI 54.901	
Type	Type: 6-axis sensor: 2 planes (4 displacement axes and 2 angles) Measurement area: unlimited, dynamically extendible Measurement resolution: 1 µm (0.04 mil) and angular 5 µRad Transmitted measurement rate: Approx. 20 Hz Measurement error: <1% Optical measurement range: 20 x 20 mm (25/32" x 25/32")
Inclinometer	Resolution: 0.1° Error: Roll $\pm 0.5^\circ$; Pitch $\pm 2.0^\circ$
Vibration measurement	mm/s, RMS, 10Hz to 1kHz, 0 mm/s – 5000/f • mm/s ² (f in Hertz [1/s])
LED indicators	4 LEDs for laser adjustment 1 LED for BT communication 1 LED for battery status
Power supply	Battery: Lithium-Ion rechargeable battery 3.6 V 8 Wh Operating time (continuous use): 55 hours Charging time: 4.5 hours for up to 80%; 6.5 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 40°C (32°F to 104°F) Storage: -20°C to 50°C (-4°F to 122°F)
Dimensions	Approx. 104x 85 x 59 mm (4 3/32" x 3 11/32" x 2 21/64")
Weight	Approx. 313 g (11 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 – RotAlign Elite laser

RotAlign Elite laser ALI 54.911	
Type	Semiconductor laser diode Adjustable 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 $\pm 0.5^\circ$
Power supply	Battery: Lithium-Ion rechargeable battery 3.6V 8Wh Operating time (continuous use): 90 hours continuous use Charging time: 4.5 h for up to 80%; 6.5 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 40°C (32°F to 104°F) Storage: -20°C to 50°C (-4°F to 104°F)
Dimensions	Approx. 104 x 85 x 59 mm (4 3/32" x 3 11/32" x 2 21/64")
Weight	Approx. 320 g (11.3 oz)
CE conformity	Refer to the CE compliance certificate in www.pruftechnik.com

Technical data – RotAlign Core sensor

RotAlign 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 $\pm 1^\circ$; Pitch $\pm 3^\circ$
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): 40 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 – RotAlign Core laser

RotAlign 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 $\pm 1^\circ$
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