

# XT770 Shaft alignment

**Step by step**

# Document Information

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## Document description

*This document describes the hardware and software used for shaft alignment and how to setup the tools for measurement.*

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We might change and correct the guide in later issues without further information.

Changes to Easy-Laser® equipment may also affect the accuracy of the information.

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## Disclaimer

Easy-Laser AB and our authorized dealers will take no responsibility for damage to machines and plant as a result of use of Easy-Laser® measurement and alignment systems.

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**>> Safety**



## Shaft Alignment

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## Safety definitions

We use the following definition of Danger, Warning, Caution.



**DANGER** means if the danger is not avoided, it *will* cause death or serious injury.



**WARNING** means if the warning is not heeded, it *can* cause death or serious injury.

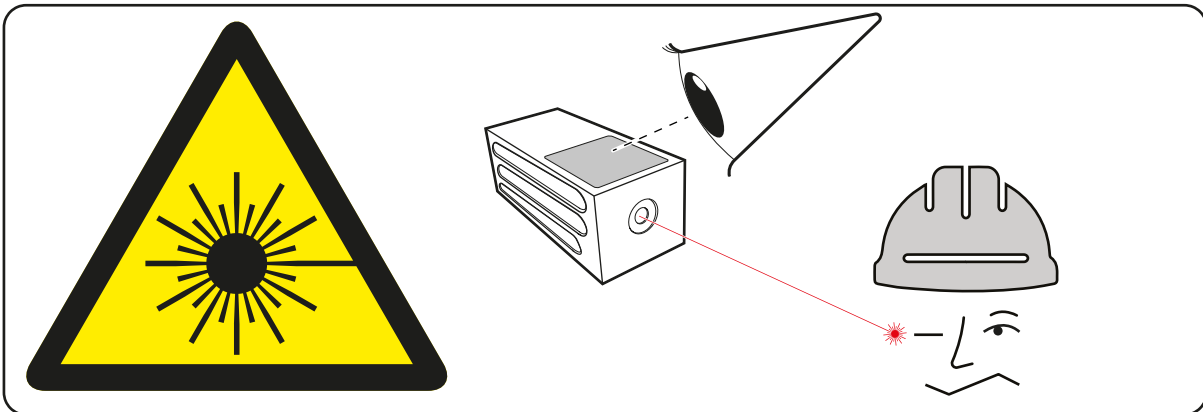


**CAUTION** means if the precaution is not taken, it *may* cause minor or moderate injury.

## Safety instructions

Read the product label and never stare into a laser beam regardless of laser class.

60-0477





## Safety precautions

**NOTE!** Opening the laser units can result in hazardous radiation, and will invalidate the manufacturer warranty.

If starting the machine to be measured would result in injuries, the possibility to unintentionally start it must be disabled before mounting the equipment, for example by locking the switch in the off position or removing the fuses. These safety precautions should remain in place until the measurement equipment has been removed from the machine.

These products are intended for professional use, measurement according to the manual, performed by specially trained personnel.

If these products are not used as intended, the protection provided by the devices may be impaired.

**NOTE!** The system must not be used in explosive risk areas.

## Laser safety

Easy-Laser® is a laser instrument in laser class 2 which requires the following safety precautions:

- Never stare directly into the laser beam
- Never aim the laser beam at anyone's eyes

This document contains information about laser safety according to standard EN 60825-1:2014+A11:2021 and 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.

The information enables the person responsible for the product and the person who actually uses the equipment, to anticipate and avoid operational hazards.

According to EN 60825-1:2014+A11:2021 and 21 CFR 1040.10 and 1040.11, products classified as laser class 2 do **not** require:

- laser safety officer involvement
- protective clothes and eyewear
- special warning signs in the laser working area

if used and operated as defined in this document due to the low eye hazard level.

National laws and local regulations could impose more stringent instructions for the safe use of lasers.

It may be hazardous to look directly into the beam, in particular for deliberate exposure. The beam may cause strong temporary blindness, especially under low ambient light conditions. However, the risk of injury for Class 2 laser products is very low because:

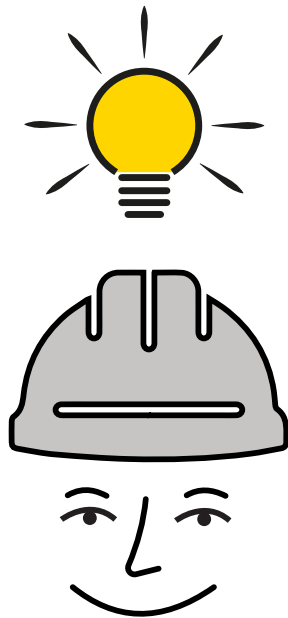
- A. The exposure limits for the laser class include a safety margin, which means that the limits are substantially below those levels of radiation that are known to cause damage.
- B. The natural reflex of the eye to avoid strong light limits unintentional exposure to a very short time (0.25 s).

The following warning symbols are used to indicate Class 2 laser products.

The following warning symbol indicates the aperture where laser light is emitted. Avoid exposure to the eyes.



# >> Planning



<input checked="" type="checkbox"/>	— —
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<input type="checkbox"/>	— —

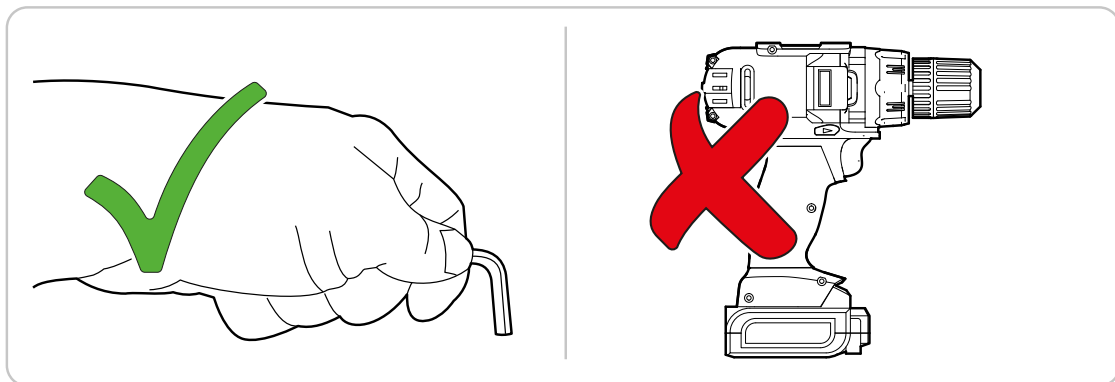
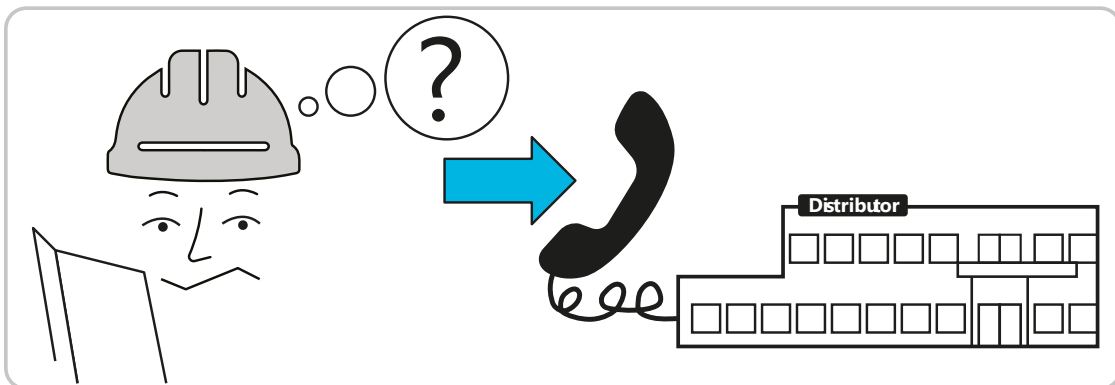




## Things to consider

**NOTE!** This guide is not a substitute for training

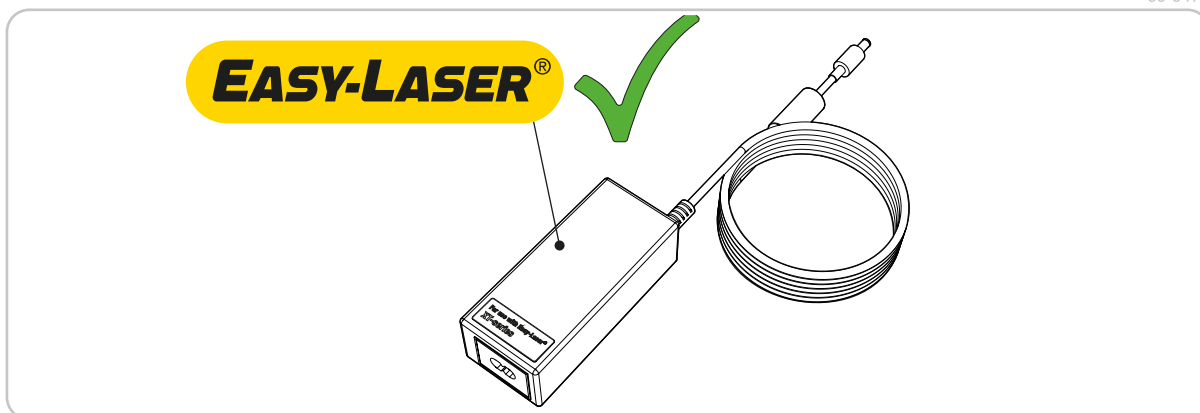
60-0344



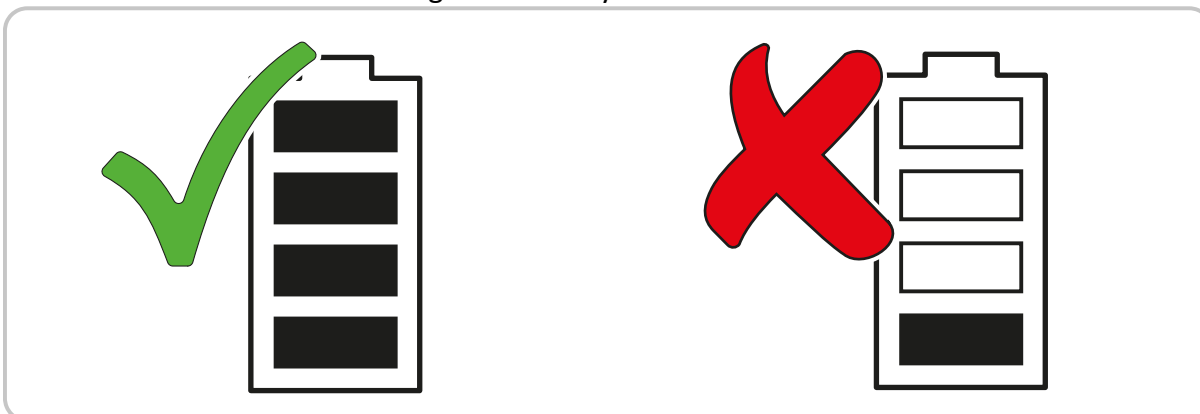
### Batteries

Use only Easy-Laser original charger.

60-0471

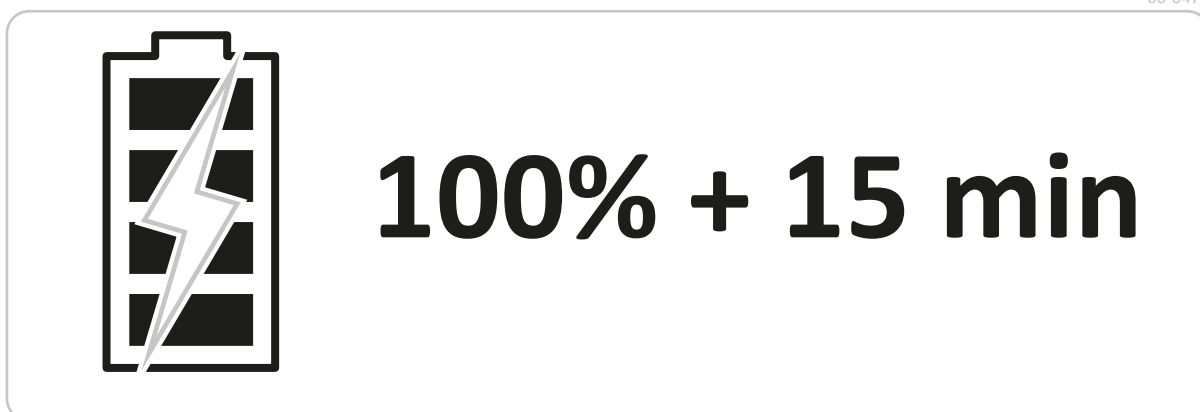


Make sure the batteries are charged and ready for the task.



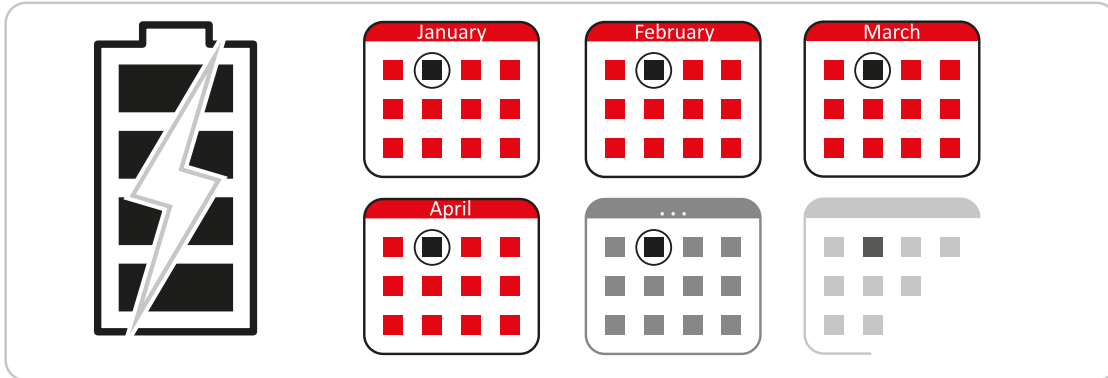
For optimal daily performance charge the batteries to 100% and additional 15 minutes.

60-0472



When the equipment will not be used for an extended period, trickle charge the batteries at least *once a month*.

60-0473

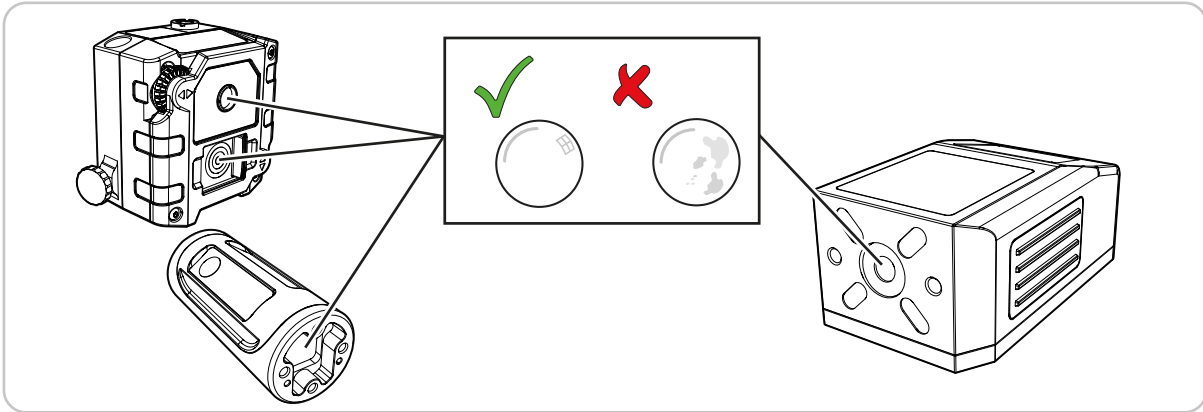




## Before leaving the office

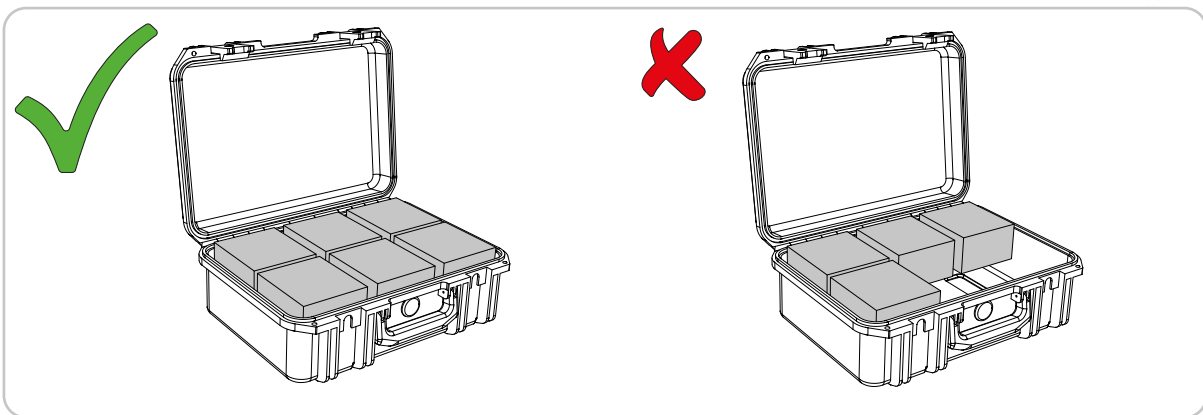
Verify that the lenses are clean. If not, clean them as described in "*Cleaning optics* " on page 19.

60-0423



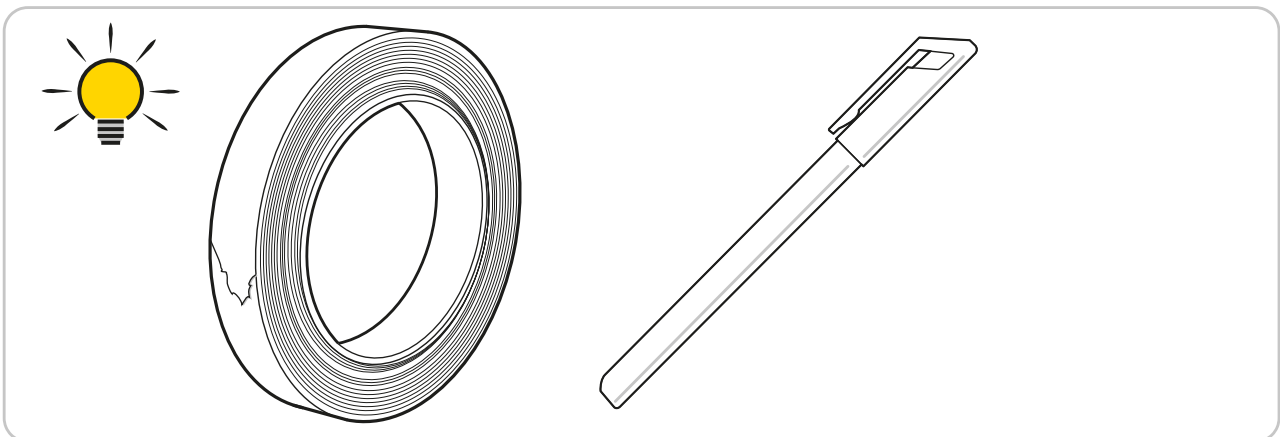
Make sure no items are missing in the case!

60-0274



### Tips!

The following items are nice to have.



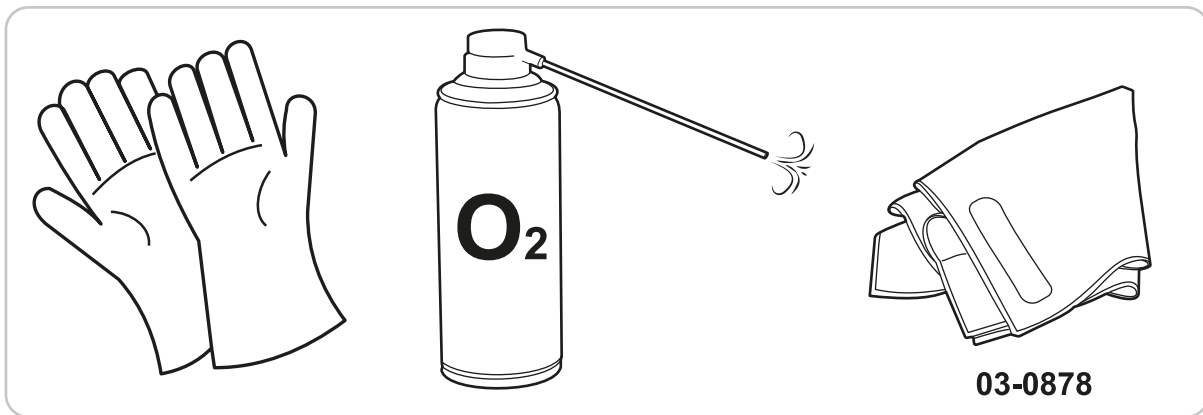
## Shaft Alignment

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- Freezer tape
- Marking pen

## Cleaning optics

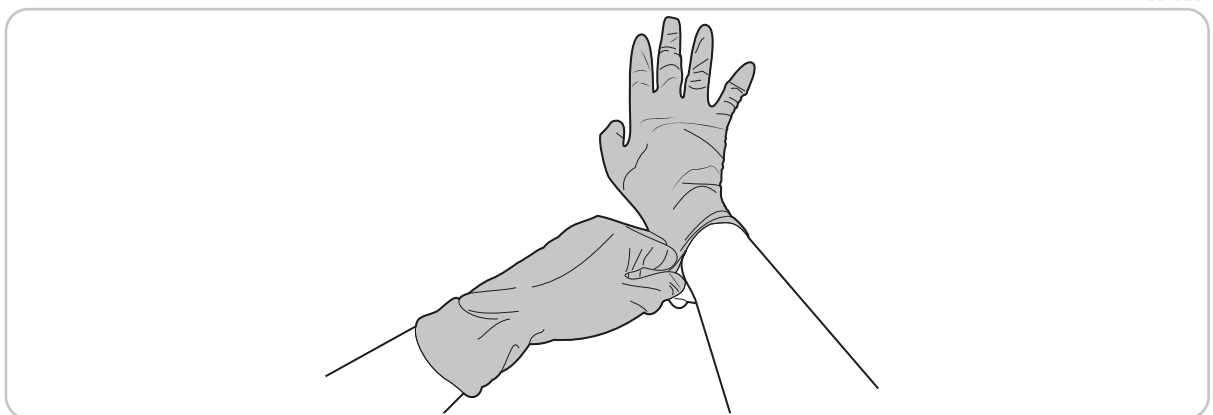
### Tools needed



### Clean the lenses

To clean the optics follow the steps below. This applies to both circular and rectangular lenses.

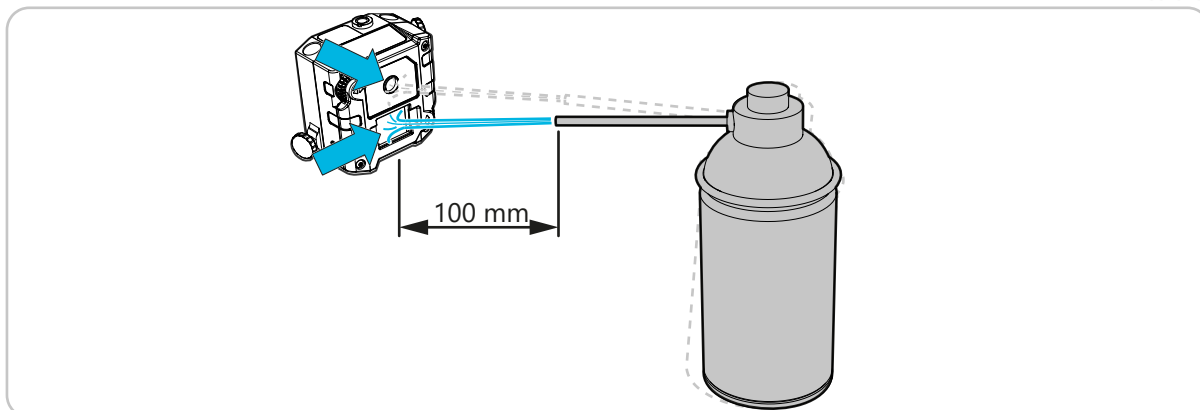
1. Use gloves when working with optics during the whole process.



## Shaft Alignment

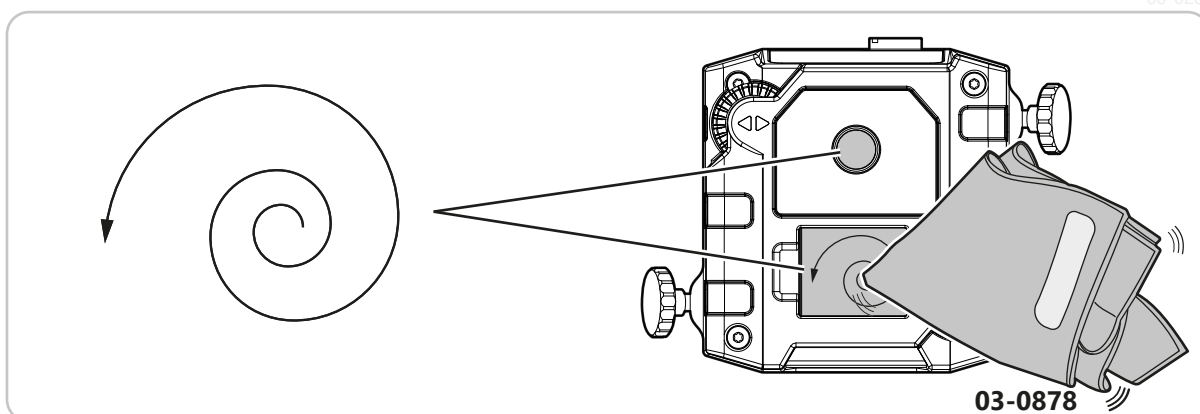
2. Start cleaning the optics with the dust blower/conditioned compressed air. Blow the lens clean from a distance of about *100 mm*.

60-0282



3. Use the *Cleaning cloth* (03-0878) or a lint-free paper and start in the center of the optics and work your way out to the edge in a spiral. *Note! Do not use ordinary dry cloth, they could cause scratches.* Give the edge a wipe at the end.

60-0283



4. If there is any dust left on the lenses repeat the steps above.



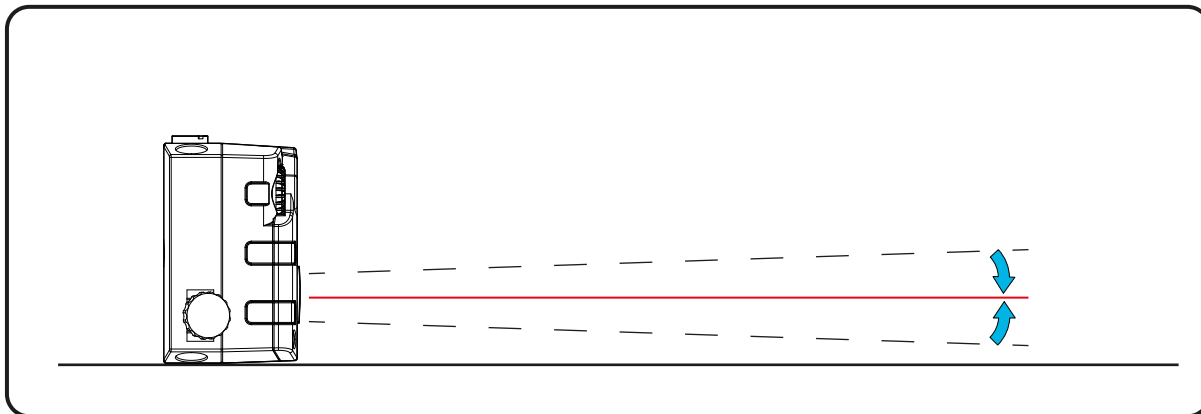
>> On site





## Adjust the laser beam parallel to the surface

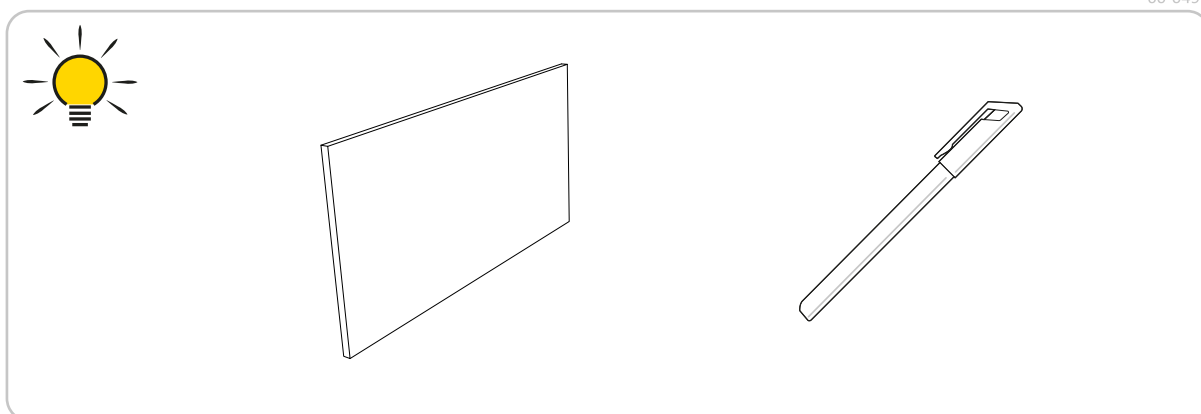
60-0489



When the M-Unit or S-Unit is powered on, it may have been used before, and the laser beam could be adjusted far off the adjustment range. Adjust the beam until it is parallel with the surface.

### Tools needed for these steps

60-0490



- Cardboard for marking
- Pen

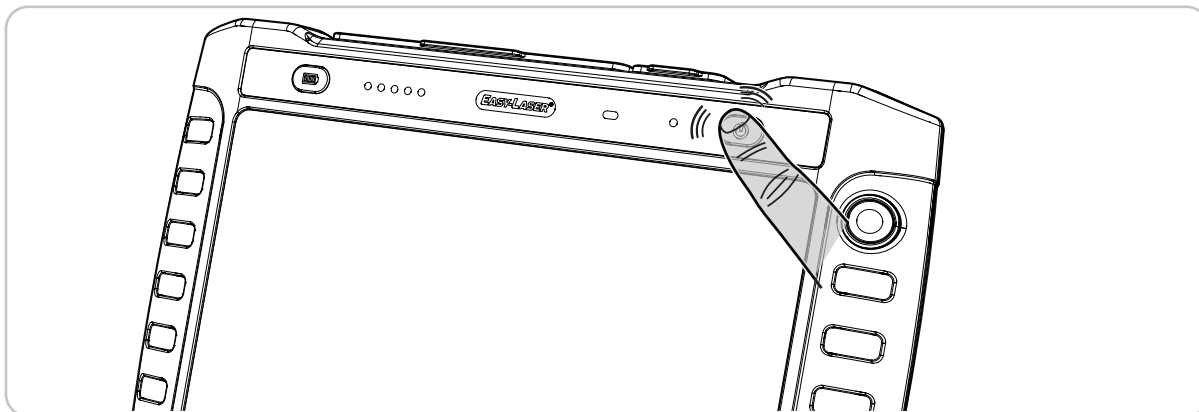
### Adjust the beam step by step:

To adjust the laser beam roughly parallel to the surface follow the steps below:

## Shaft Alignment

1. Start the XT12/App. This is to keep the S-Unit and M-Unit running.

60-0310



2. When the XT12/App is ready, tap **[Values]**.

60-0573



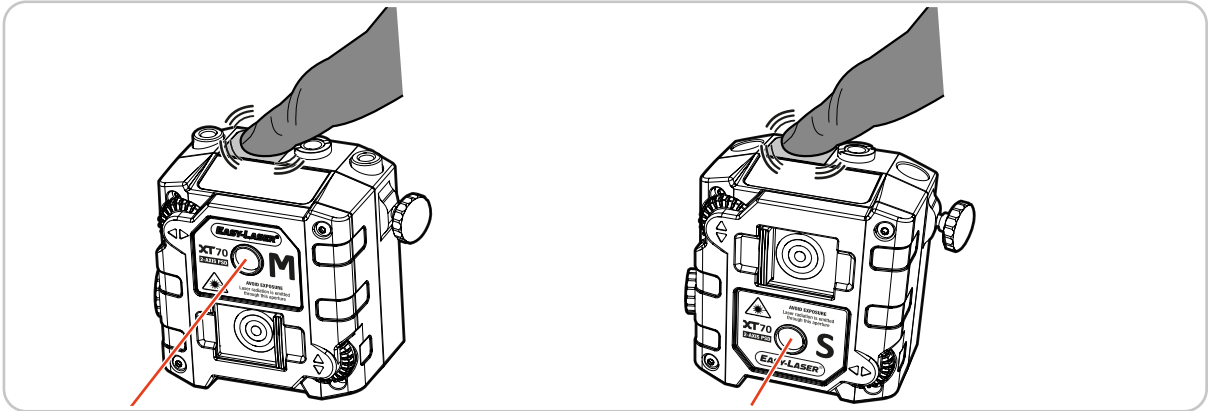
3. Choose to **[... Continue]** or **[START NEW]** measurement.

60-0599



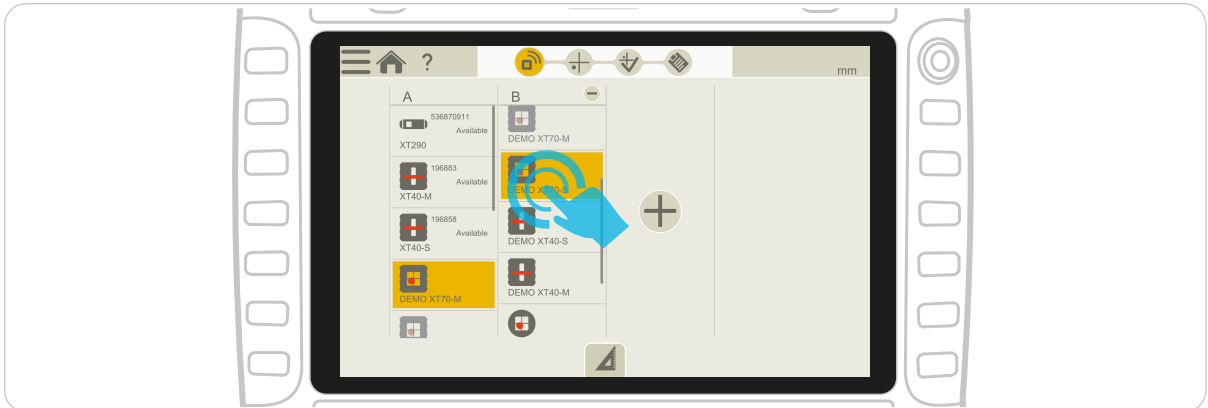
4. Turn on the S-Unit and the M-Unit.

60-0394



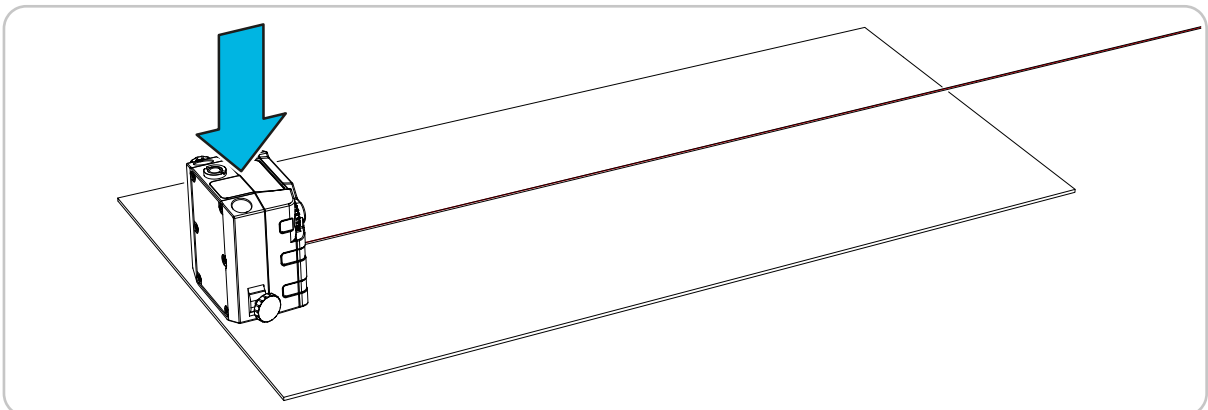
5. Select and connect the S- and M- unit from the list. *This will keep the laser up and running.*

60-0600



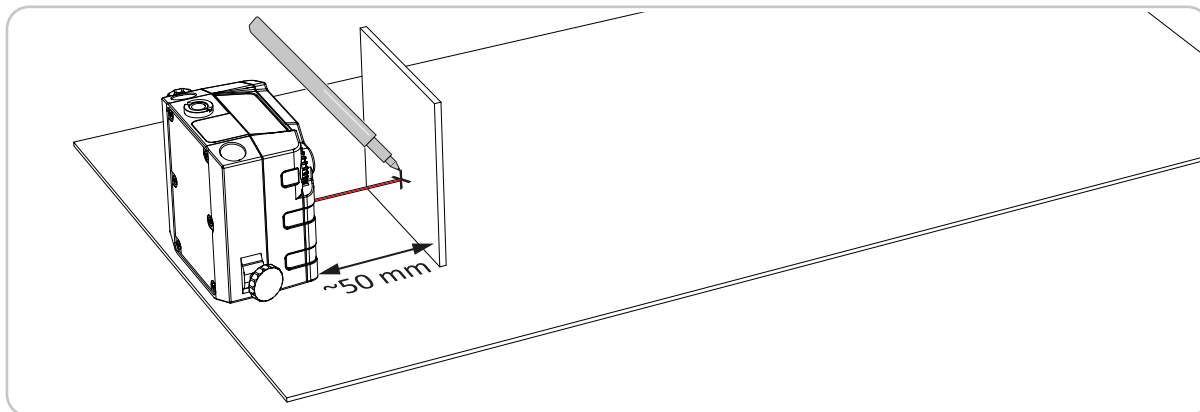
6. Place the unit on a flat surface.

60-0433



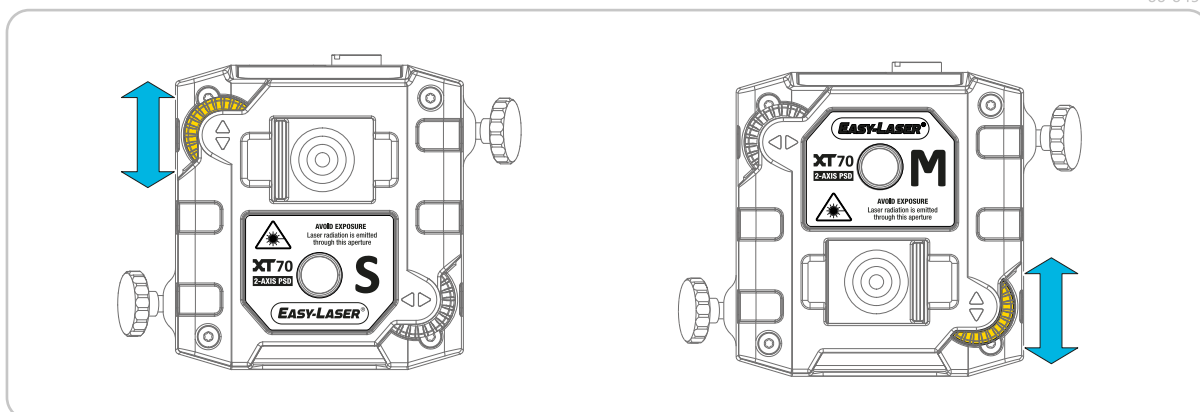
7. Use an object suitable for marking where the Laser transmitter dot hit the object. Put it about *50 mm* in front of the unit. Put a mark where dot appears. *Note that there is a difference in height of the laser transmitter on the M-Unit and the S-Unit. You can't use the same marking for both units.*

60-0395



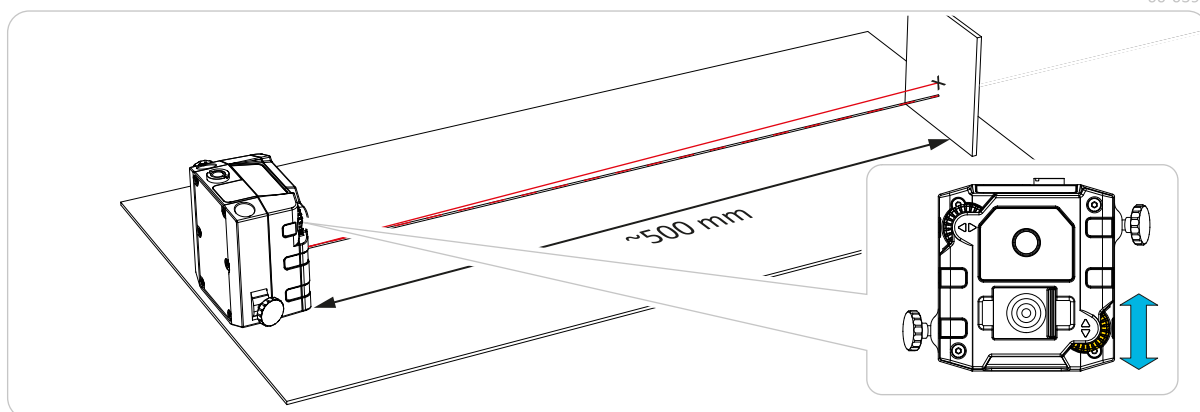
8. Use the yellow knobs to adjust the beam vertically.

60-0492



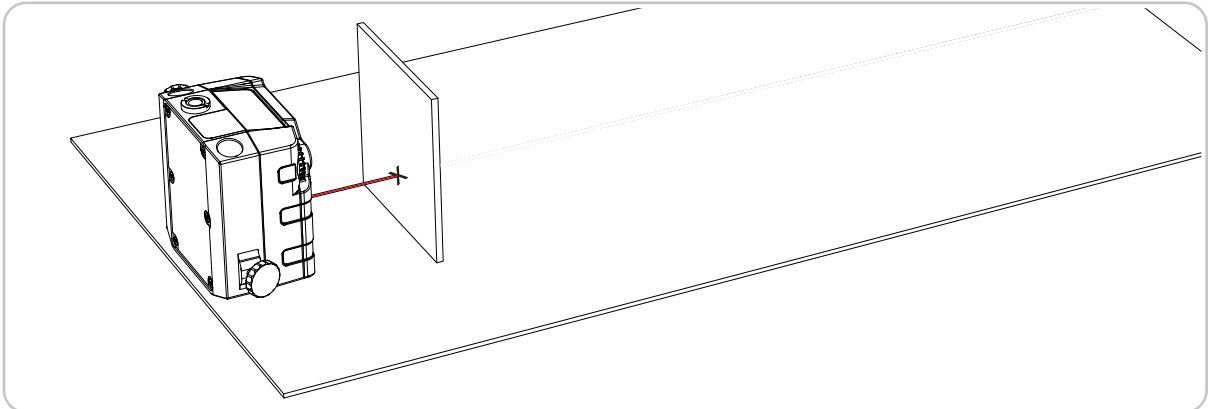
9. Move the object about *500 mm* away from the unit and adjust the beam to the marking using the yellow knob.

60-0396



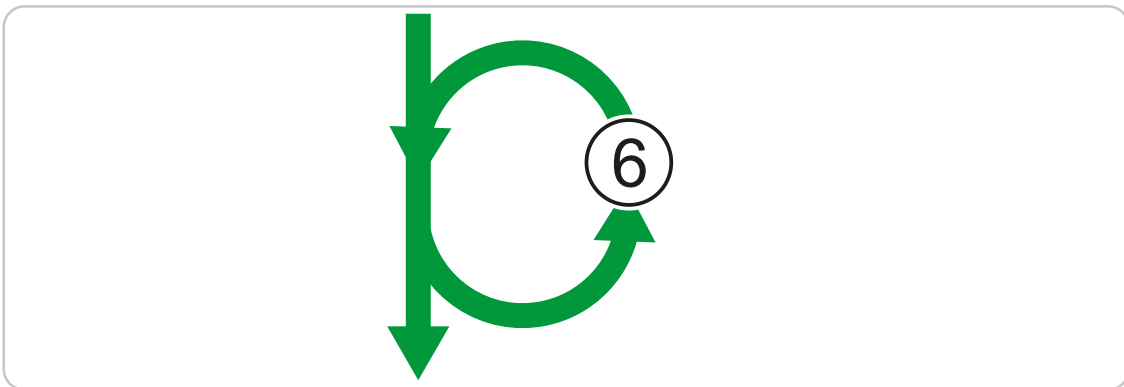
10. Move the object back to *50 mm* from the unit a verify that the object hits the same marked location as before.

60-0434



11. Repeat the steps above, from step 6 for the other unit.

60-0602



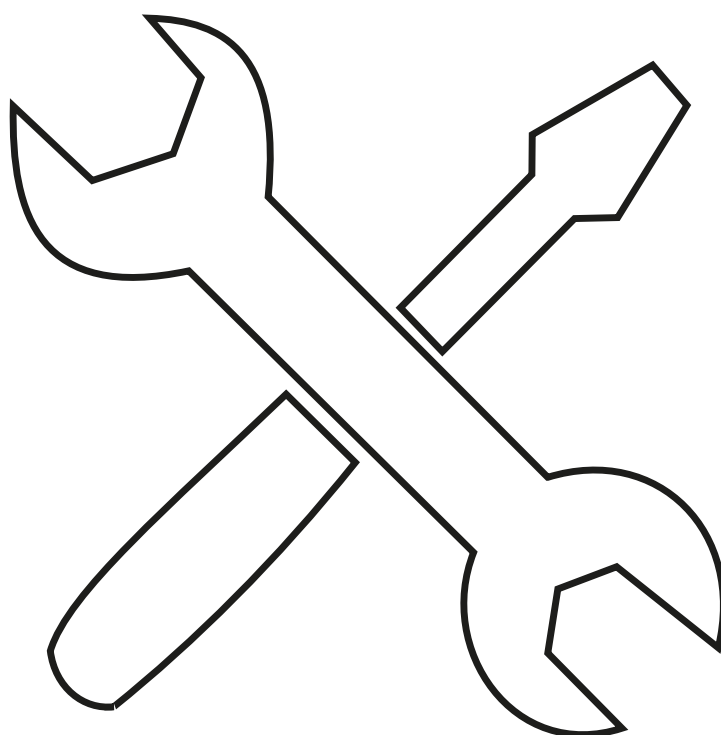
12. Now the laser beam is parallel adjusted.







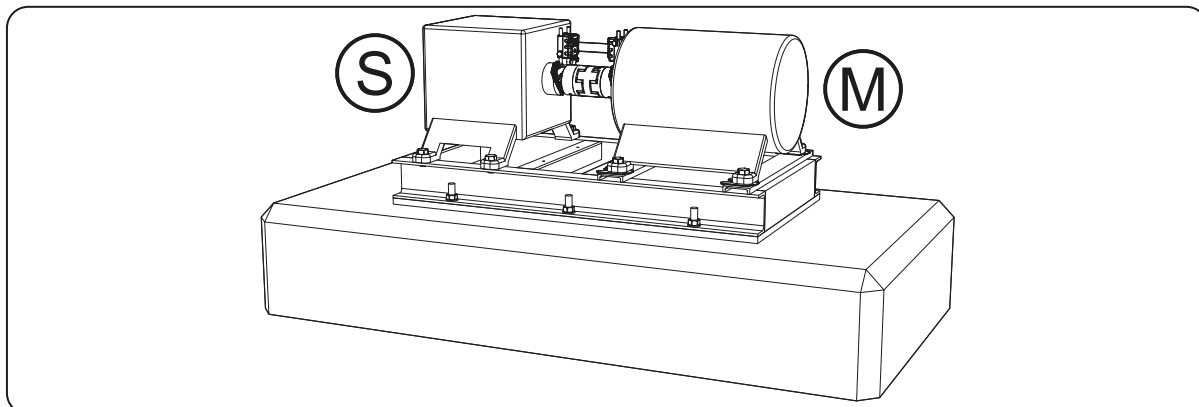
# Mounting





## Mount the shaft bracket and detector

60-0580



### Tools needed for these steps

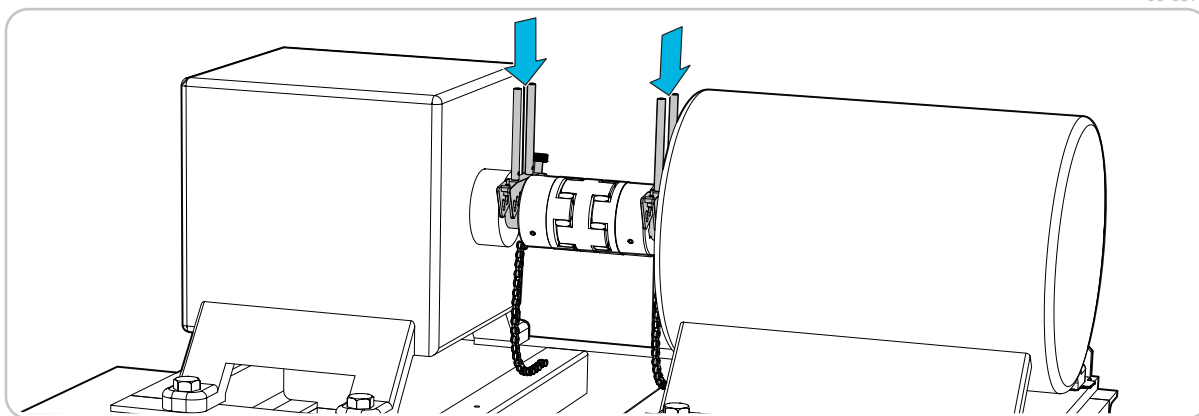
No special tools needed.

#### Mounting step by step

To mount the shaft bracket and the detector follow the steps below:

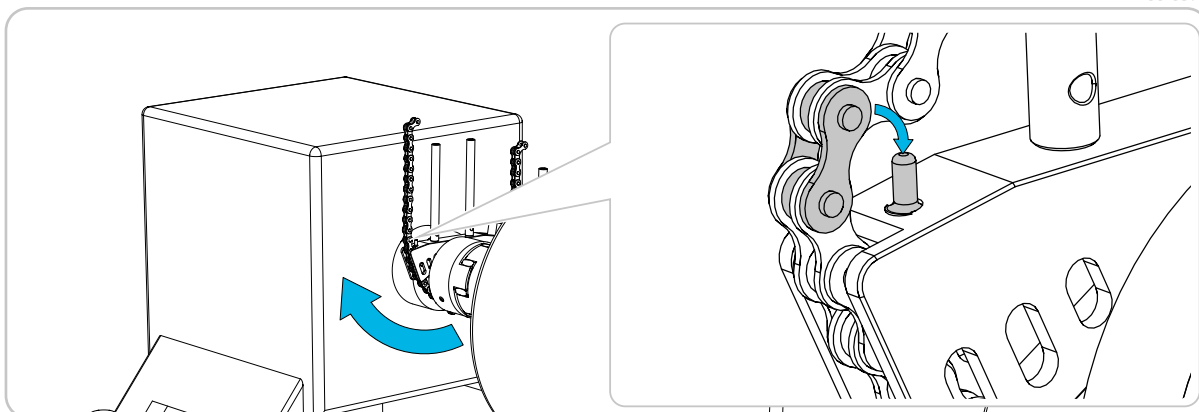
1. Place the shaft brackets on the shaft.

60-0576



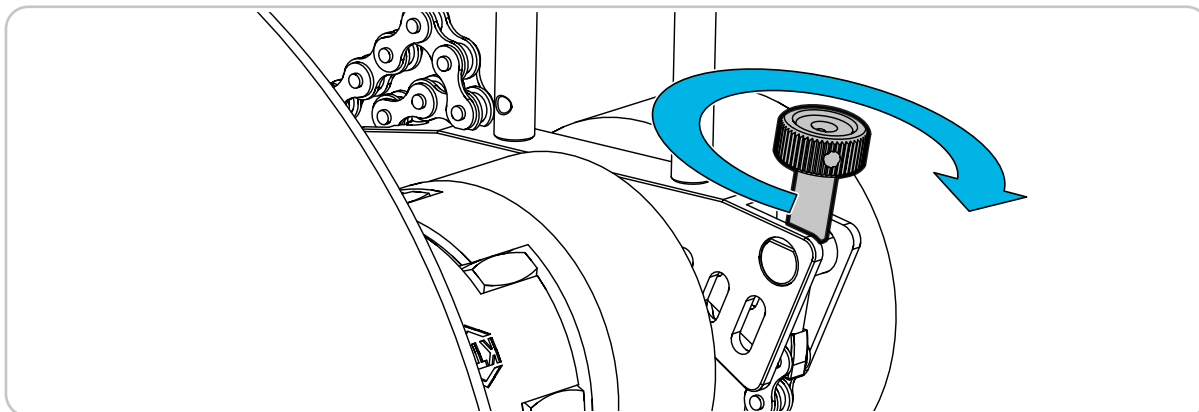
2. Tighten the chain so it rests against the shaft and attach the chain to the pin.

60-0577



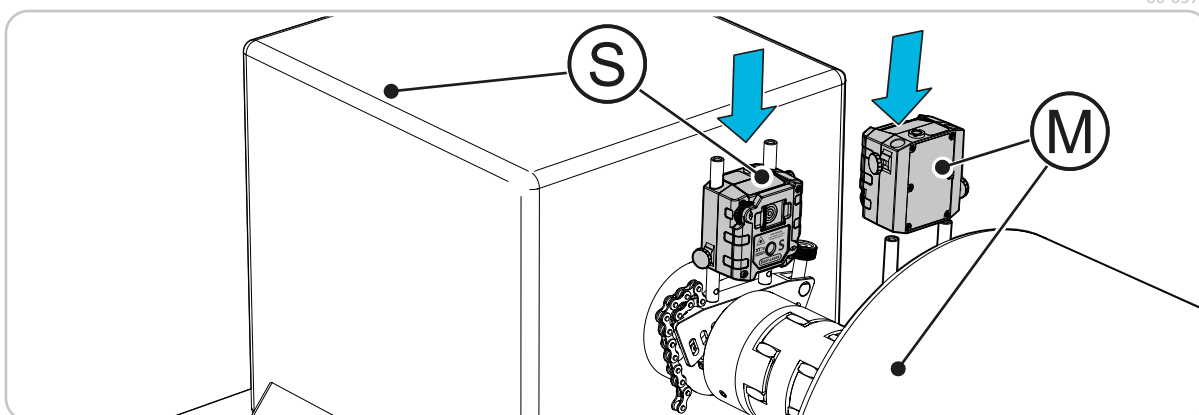
3. Tighten the screw using hand power.

60-0578



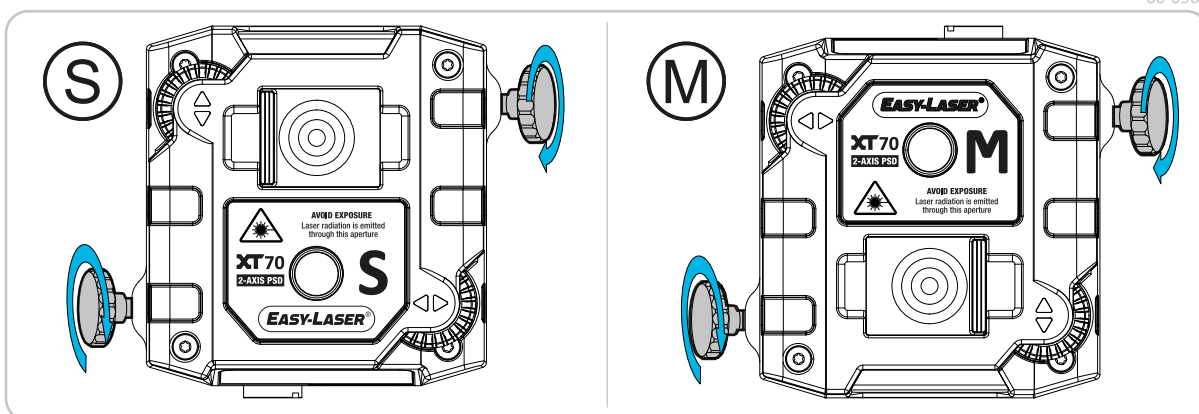
4. Mount the respective S-Unit and M-Unit on the bracket.

60-0579



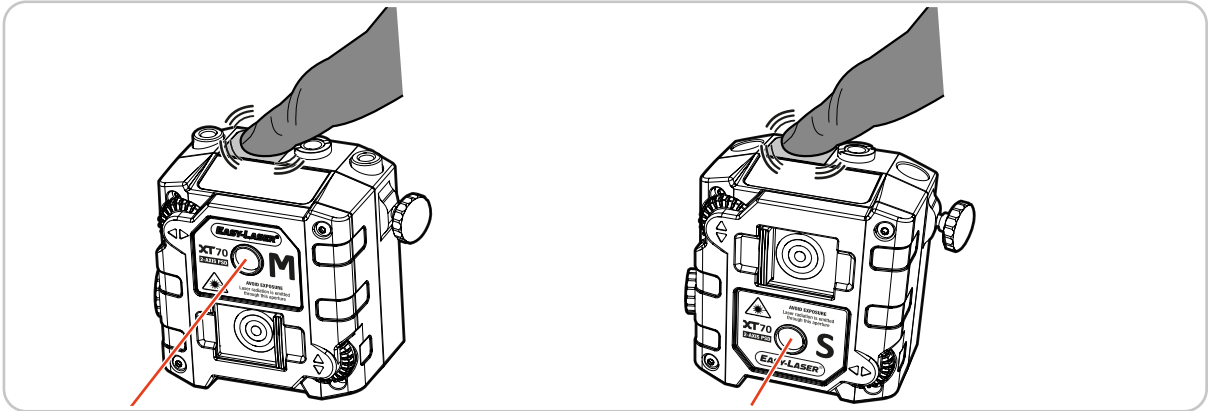
5. Tighten the screws.

60-0562



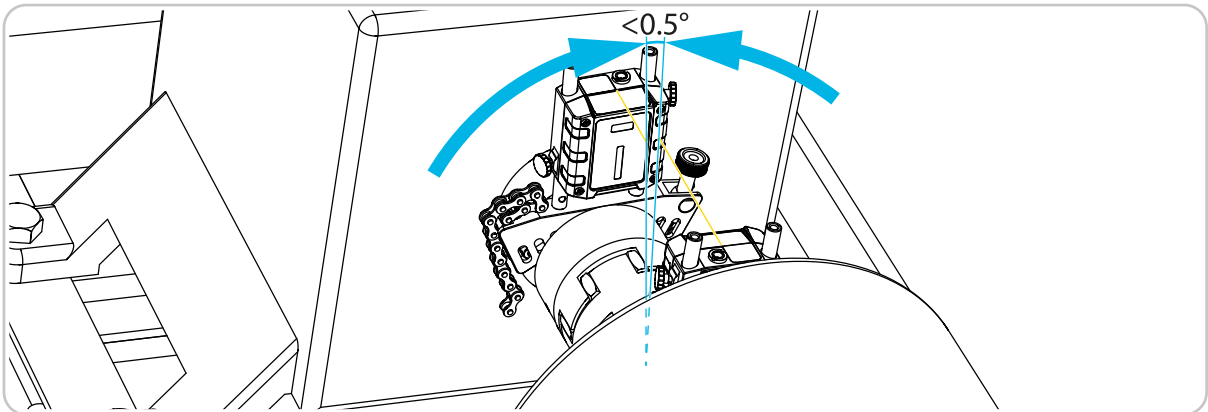
6. Power up the S-Unit and M-Unit if not already done.

60-0394



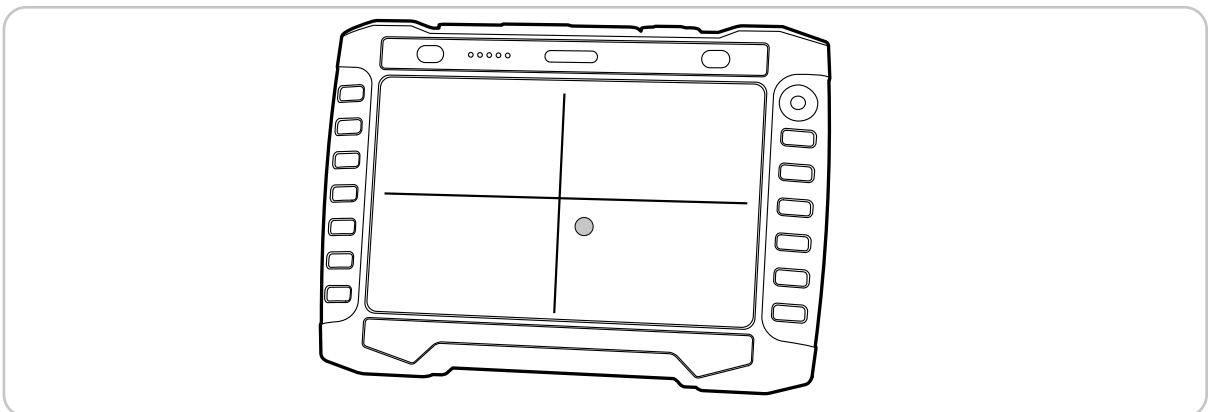
7. Set the angle of the detectors within  $0.5^\circ$  from each other.

60-0626



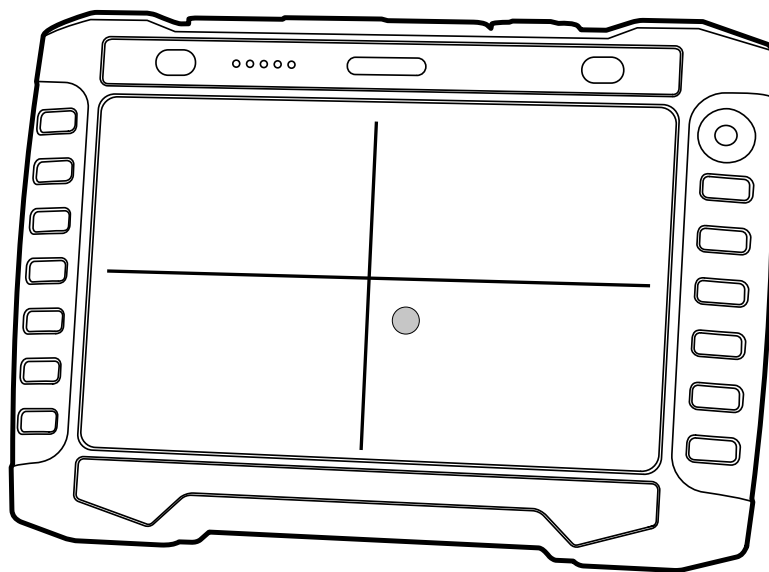
8. The system is now ready for measurement.

60-0431





# Measure

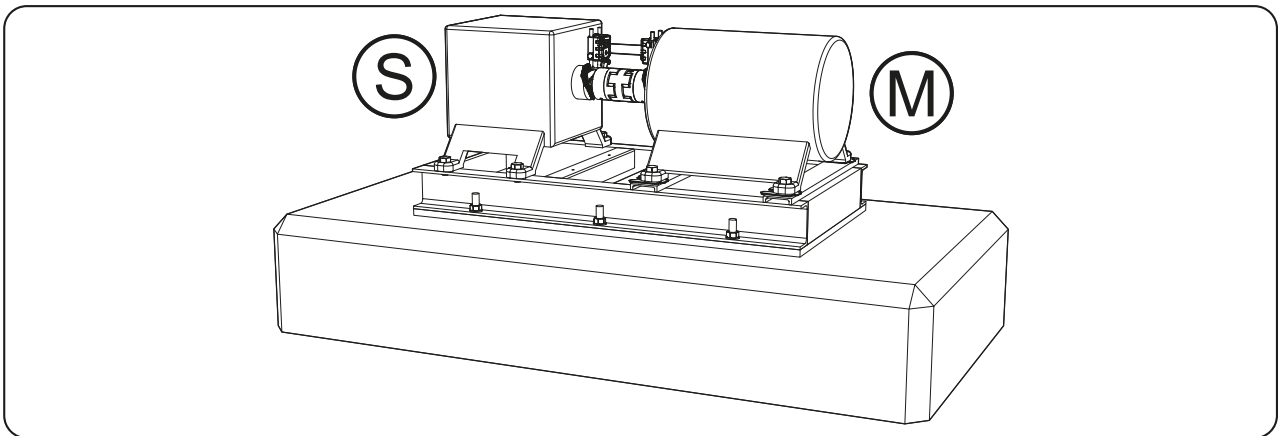






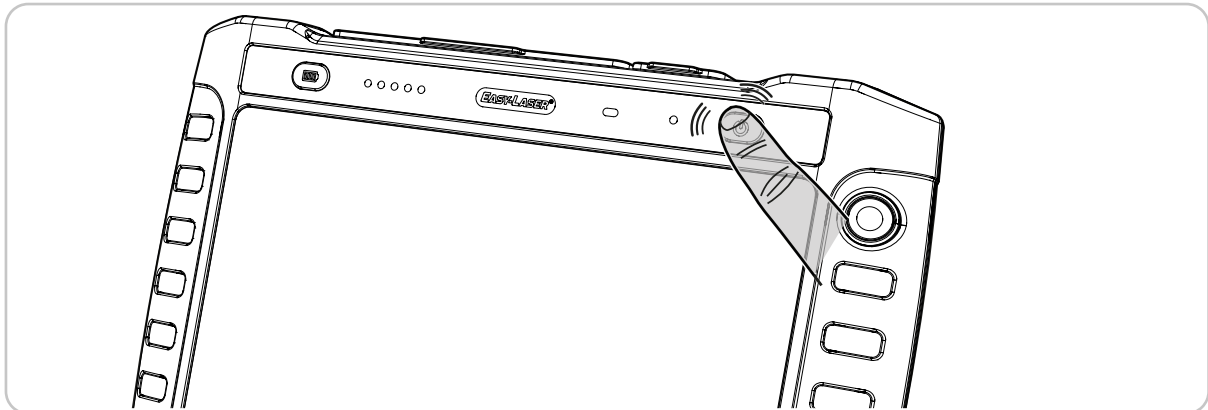
## Measure the shaft alignment

60-0580



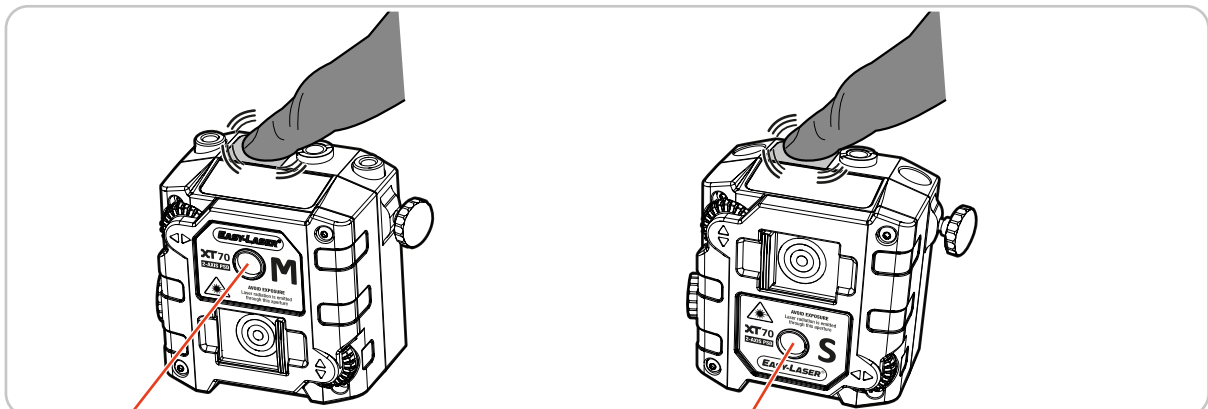
1. Power up the XT12 if not already done.

60-0310



2. Power up the S-Unit and M-Unit if not already done.

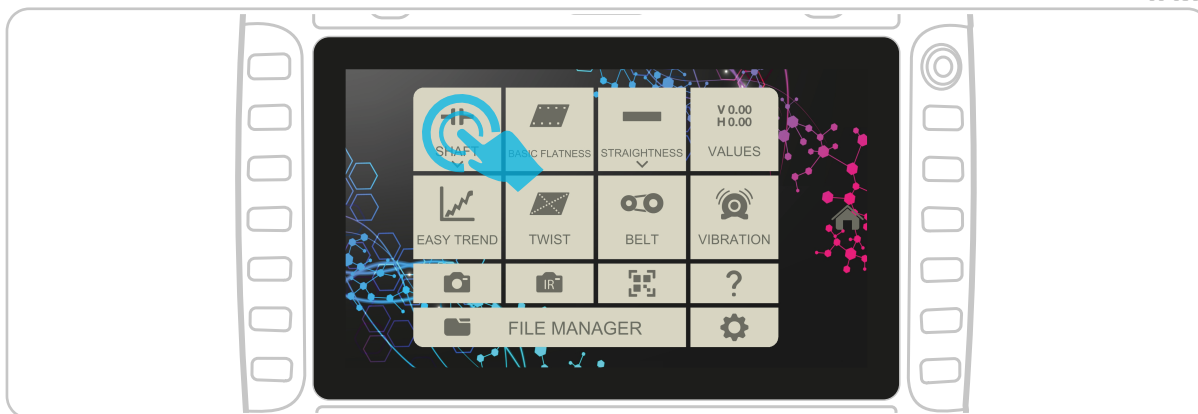
60-0394



## Shaft Alignment

3. Tap the **[SHAFT]** button.

60-0366



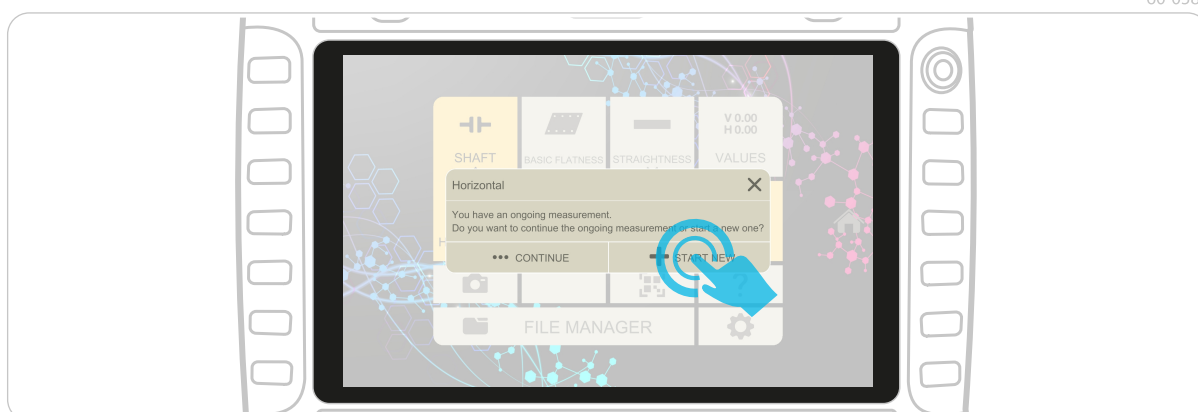
4. Tap the **[HORIZONTAL]** button.

60-0575



5. Choose to **[... Continue]** or **[START NEW]** measurement, if the option is given.

60-0581



6. Enter the measurements **S-M**, **RPM**, **M-F1** and **F1-F2**. *Tips! Measure from the center of the rods for S-M and M-F1.*

60-0582



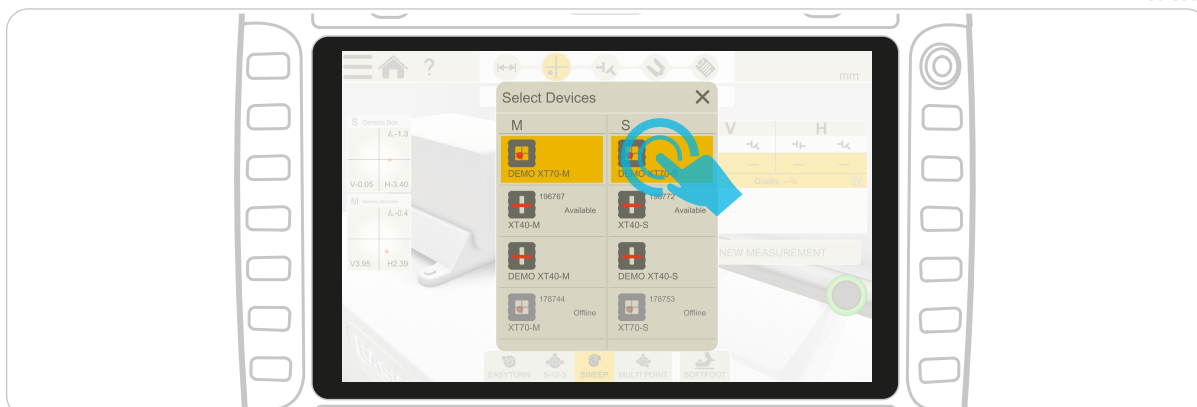
7. Tap the **[MEASURE]** button at the top of the screen.

60-0583



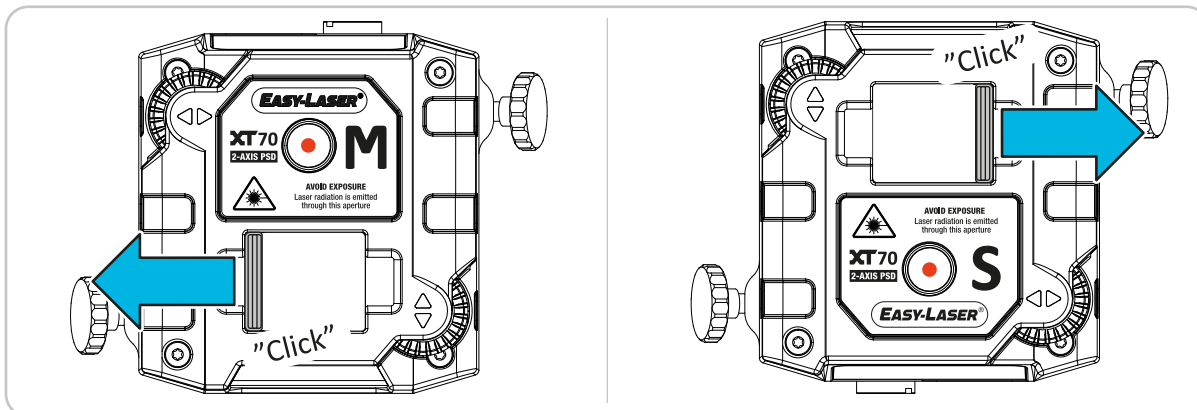
8. Select devices if this hasn't already been done.

60-0584



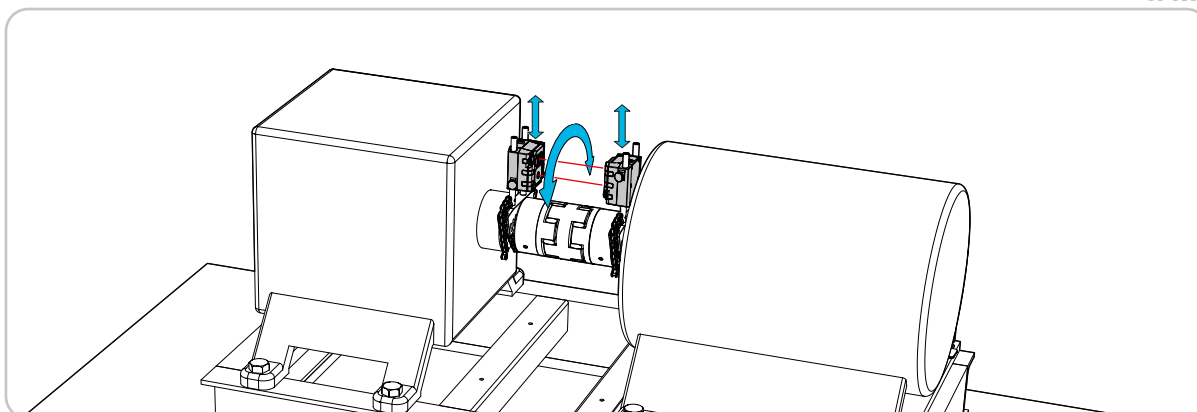
9. Open the lid on the *S-Unit* and the *M-Unit*, if not already done.

60-0430



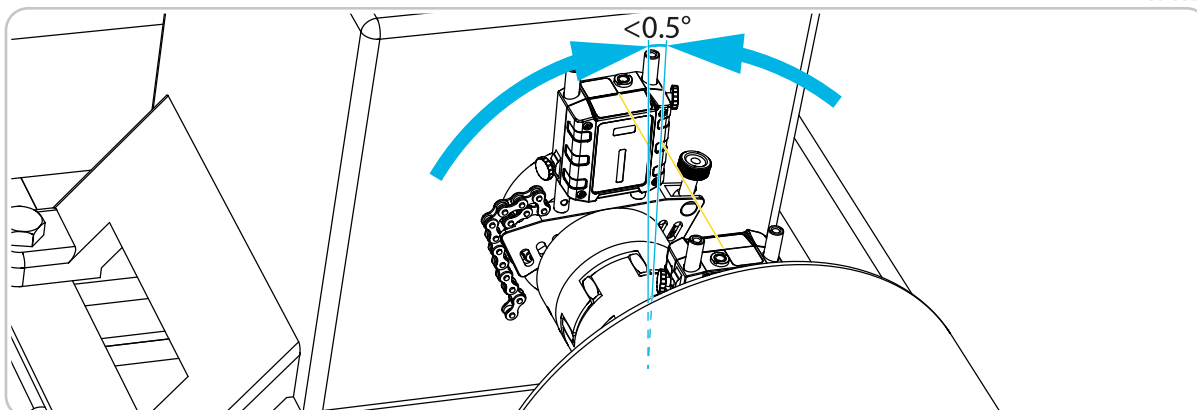
10. Adjust the height of the *S-Unit* and the *M-Unit* so the laser beam are within the detector area.

60-0598



11. Finally, ensure that the detectors are within a  $0.5^\circ$  angle relative to each other; adjust if necessary.

60-0626



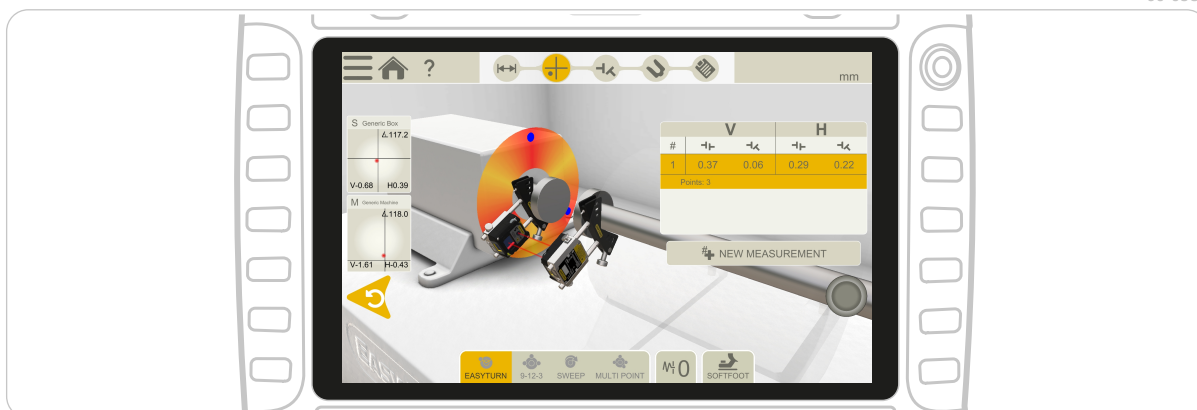
12. Use the method you prefer the most. *Note! if you choose the 9-12-3 method, you must register the points in that specific order.*

60-0585



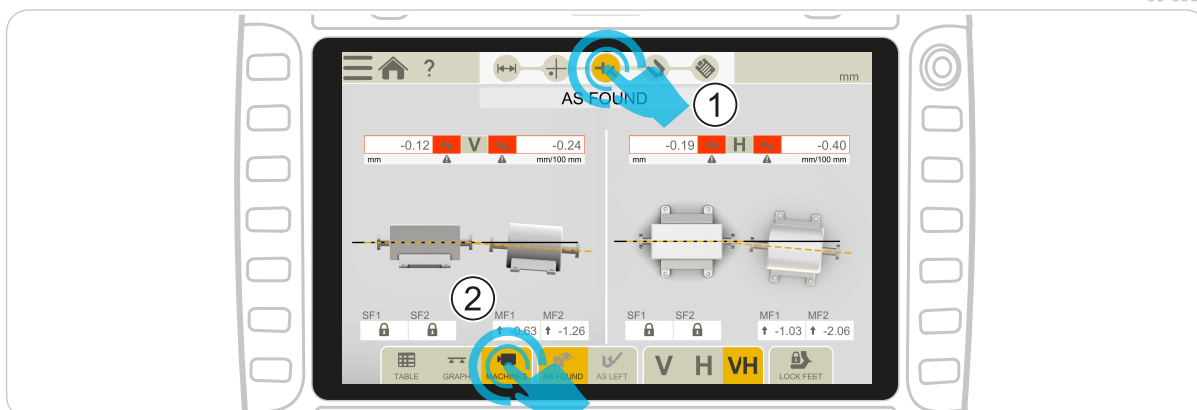
13. In this example we use *EASYTURN* method, place the detectors in a green area (*ONLY rotate the detectors by holding the shaft*) Do not block the laser beam! and press the green button, on the screen or on the XT12. Repeat the step for all green positions, at least three points are needed.

60-0586



14. Tap the **[RESULT]** button at the top of the screen (1) and on the **[MACHINES]** button (2) at the bottom, if not already selected.

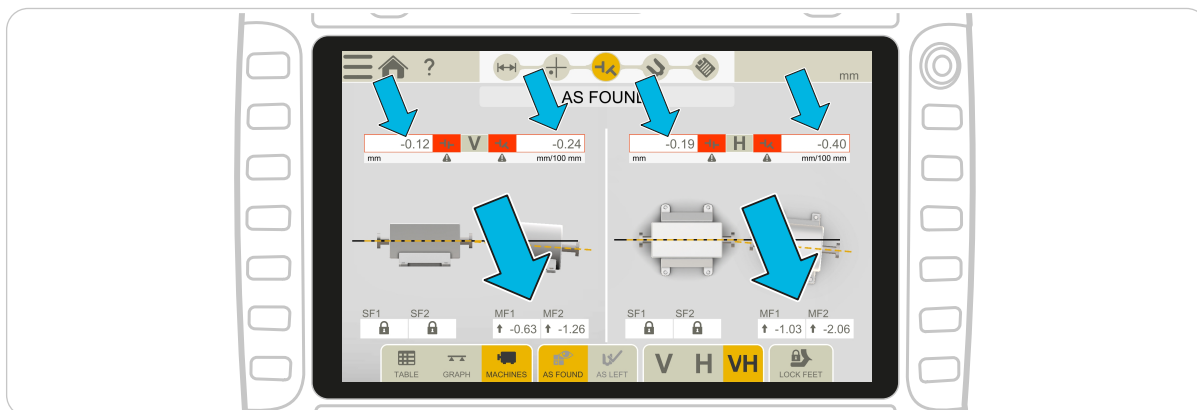
60-0587



## Shaft Alignment

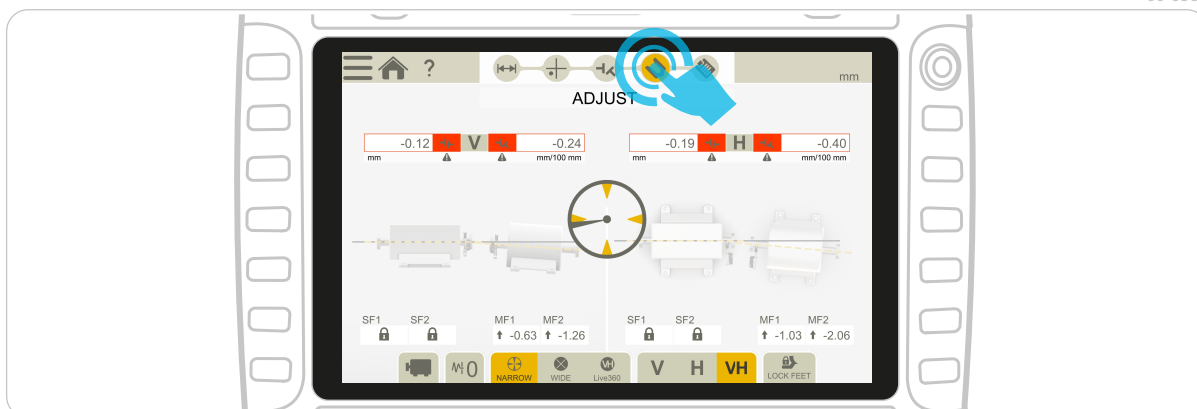
15. The axle deviation is shown on the screen and in which direction the motor should be adjusted.

60-0588



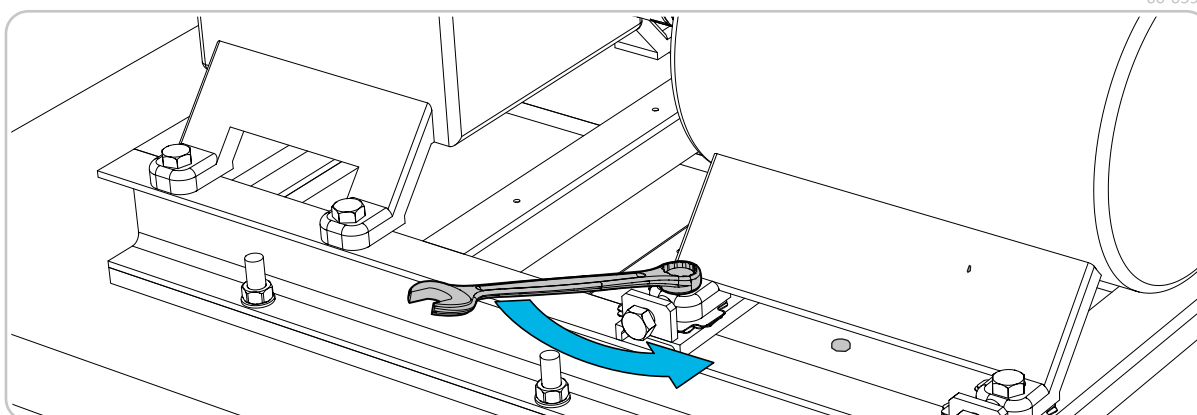
16. Tap the **[ADJUST]** button at the top of the screen.

60-0589



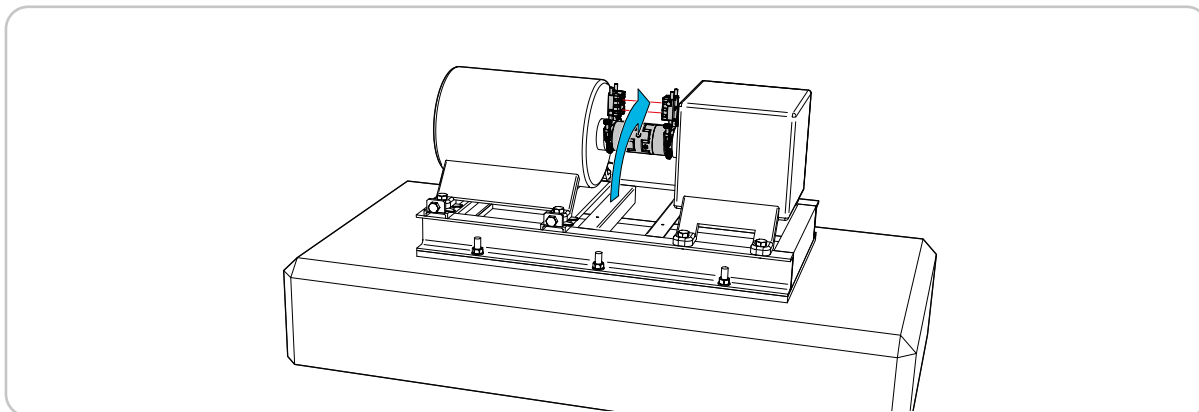
17. Write down, or take a screenshot of, the values for the shims *before* you loosen the bolts, *these values change when the bolts are loosened*..Loosen the bolts on the motor.

60-0592



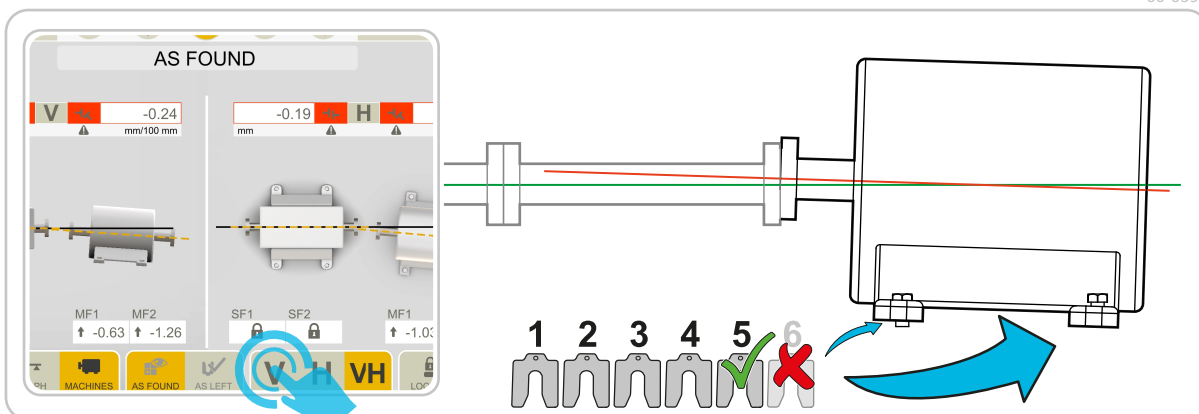
18. Rotate the detectors to 0° for the vertical adjustment.

60-0682



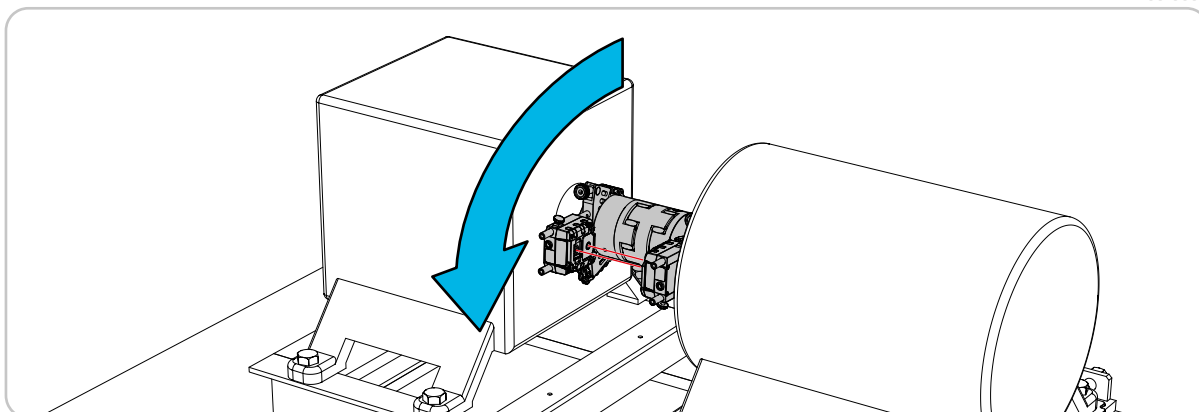
19. Tap the [V] button and adjust the motor (M), preferably starting with the vertical direction first, as the horizontal will be easier to perform afterward.  
*Note! Never use more than 5 shims at the same foot.*

60-0590



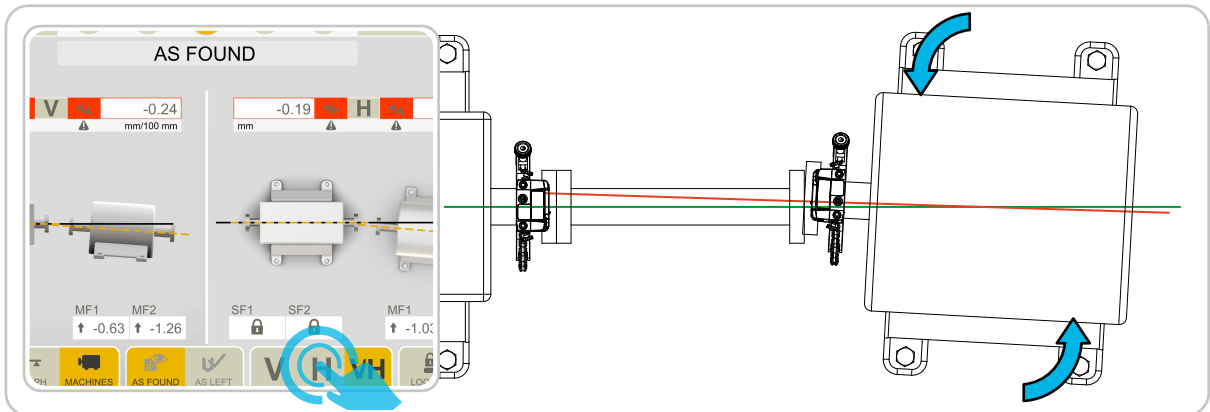
20. Rotate the detectors to 90° for the horizontal adjustment.

60-0604



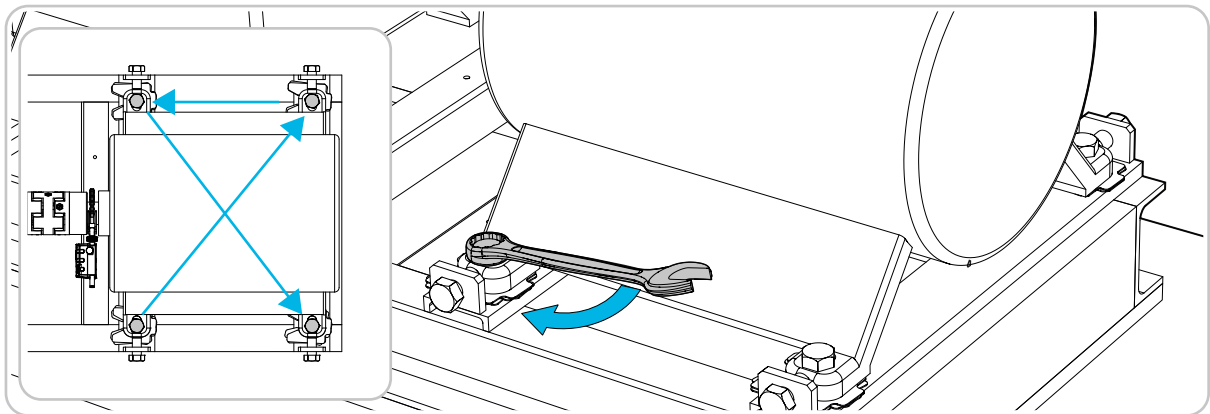
21. Tap the **[H]** button and adjust the motor horizontally using the jackbolts as suggested of the software.

60-0591



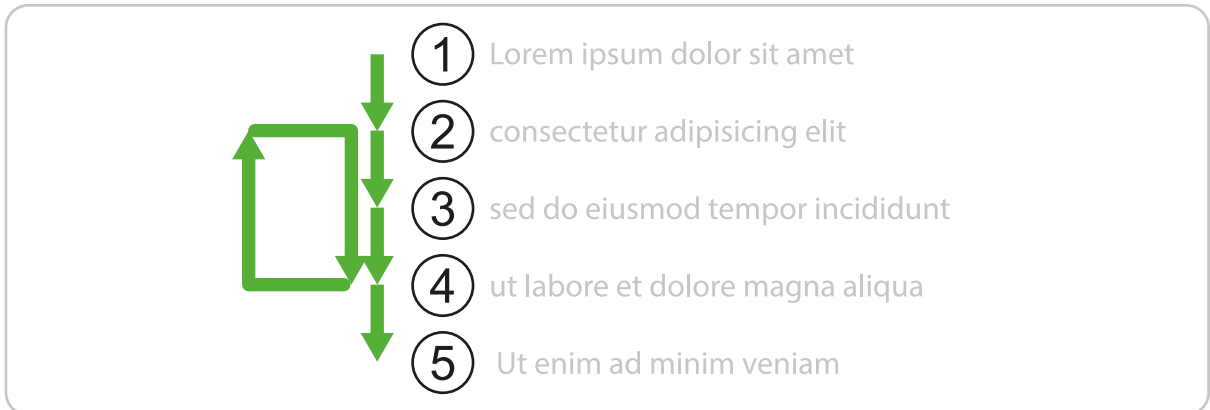
22. Cross-tighten the bolts to avoid introducing errors when tightening them. Don't forget to account for the specified torque, if any.

60-0594



23. When satisfied with the adjustment repeat from *step 12* to verify the new positions.

60-0666






24. For a report on the result tap on the **[REPORT]** button at the top.

60-0595



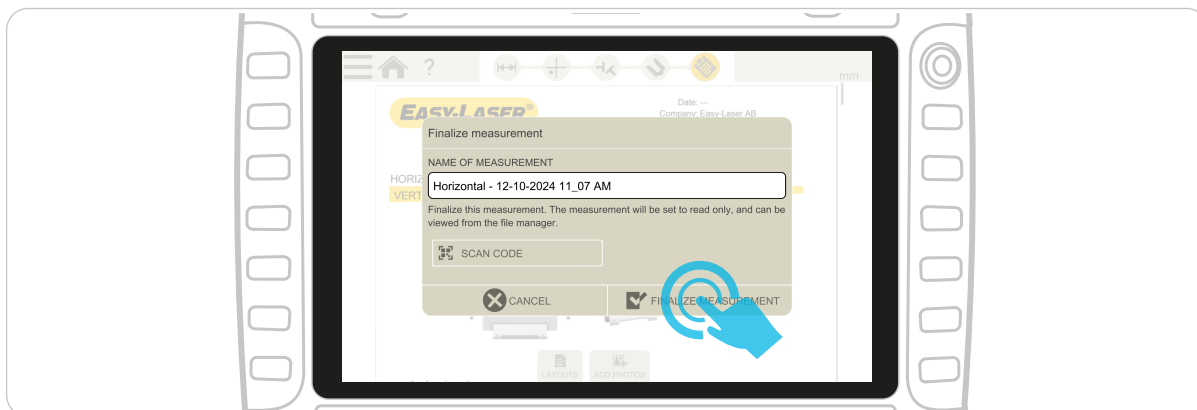
25. At the report screen photos can be added as well as notes. The **[NOTES]** and **[CAMERA]** are found under the burgermenu () at top left.

60-0596



26. The **[FINALIZE]** choice saves the report. Enter a name or choose the suggested. Tap **[FINALIZE MEASUREMENT]** to end this measurement.

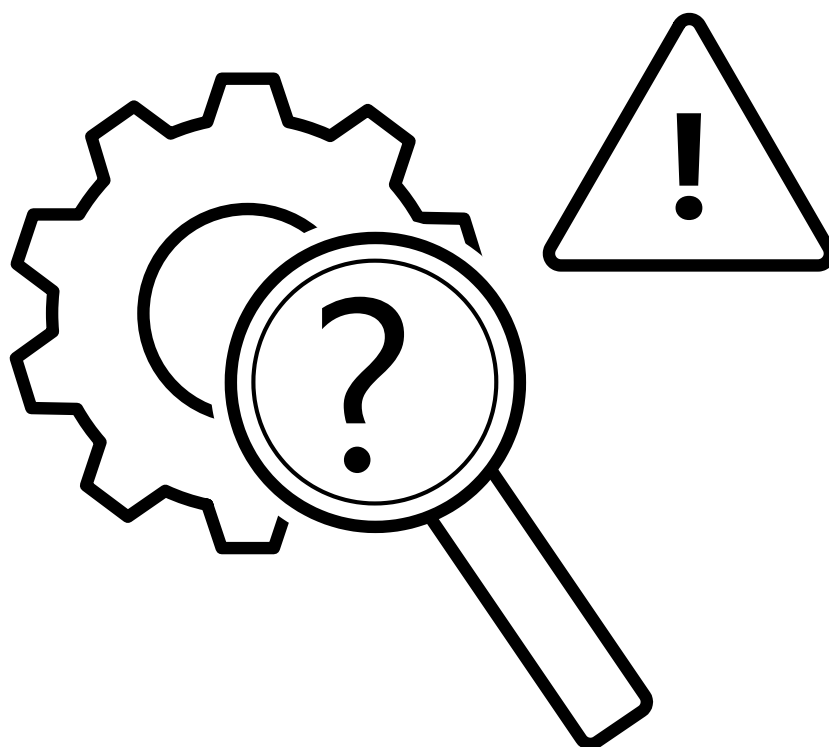
60-0597



27. The measurement is finished.



# >> Troubleshooting





## Measured values do not repeat

**Problem:** When re-measuring, previous measurement values are not repeated

*When re-measuring previous measurement values should repeat. But they don't, they change.*

### Solution:

The following things should be checked:

#### Check brackets

- Is any of the physical equipment loose?
- Is something stuck mechanically?
- Are the magnets stuck?
- Are the Laser bracket arms tightened?
- Are the adjustment screw on the offset hub, or locking screws on micrometer screws, tight?
- Are the detector rods tight?

#### Measurement points on the object

- What do the surfaces look like on the measurement object, is the surface of the measurement object dirty? The measurement result will never be better than the measurement surfaces.
- Do you measure at the same points when re-measuring? Use the same points as for the first measurement.
- Are all brackets correctly fitted (contact on all points on the slide bracket/probe)?

#### External factors

- Vibrations?
- Is the object moving (thermal growth during measurement)?
- Direct sunlight or welding nearby?

- Are the optics cleaned?
- Is there other work in progress that affects the measurement object?

## No measurement values

### Problem: No measured values are visible

*All the components are in place but no measurement values are visible*

### Solution:

If no values are visible check the following:

- Low battery level in the laser transmitter?
- Target lid on the detector not open, or partly open?
- Correct detector connected to the system?
- The laser beam is far outside the target when rotating the detector? - Perform a pre-aligning of the laser transmitter and try again.



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