E710

MANUAL SHAFT

English

05-0461 Revision 3
System version 1.2

CONTENT

INTRODUCTION

Damalini AB

Damalini AB develops, manufactures and markets Easy-Laser® measurement and alignment equipment based on laser technology.

We have more than 25 years of experience from measurement tasks in the field and product development. We also provide measurement service, which means that we ourselves use the equipment we develop, and continuously improve it. Because of this we dare to call ourselves measurement specialists.

Do not hesitate to contact us about your measurement problems. Our expertise will help you solve it in an easy way.

Declaration of conformity

Equipment: Easy-Laser® product range

Damalini AB declares that the Easy-Laser® product range is manufactured in conformity with national and international regulations. The system complies with, and has been tested according to the following requirements:

CE

EMC Directive	2004/108/EG
Low Voltage Directive	2006/95/EC
Laser Classification	Europe: SS-EN-608 25-1-1994 USA: CFR 1040.10/11 - 1993
RoHs Directive	2002/95/EG
WEEE Directive	2002/96/EG

Disposal of old electrical and electronic equipment (Applicable throughout the European Union and other European countries with separate collection programs)

This symbol, found on product or on its packing, indicates that this product should not be treated as household waste when disposed of. It should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed correctly, you will help to prevent potential negative consequences to the environment and human health. For more detailed information about the recycling of this product, please contact your local city office, household waste disposal service or the retail store where you purchased this product.

Quality certificate

Damalini AB is ISO 9001:2008 certified. Certificate number 900958.

Damalini AB confirm, that our products are produced according to applicable national and international regulations and standards. All components are checked before assembly and final products are tested in functionality and visually checked before delivery

The calibration of the equipment fully complies with ISO9001: 2008 #7.6

Limited warranty

This product is manufactured under Damalini's strict quality control system. Should the product fail within two (2) years from the date of purchase under normal usage conditions, Damalini will repair or replace the product free of charge.

1. Using new or refurbished replacement parts.
2. Exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product.

Proof of purchase date should be confirmed, and sent together with a copy of the original purchase document.

Warranty is valid under normal usage described in the user's manual appended with the product. The warranty comprises failure on Easy-Laser® product that could be related to material and/or fabrication errors. The warranty is valid only in the country of purchase.

The warranty is not valid in the following cases:

- If the product is broken due to mishandling or incorrect operation
- If the product has been exposed to extreme temperature, calamity, chock or high voltage.
- If the product has been modified, repaired or disassembled by unauthorized personnel.

Compensation for possible damage due to failure on Easy-Laser® product is not included in the warranty. Freight cost to Damalini is not included in the warranty.

Note!

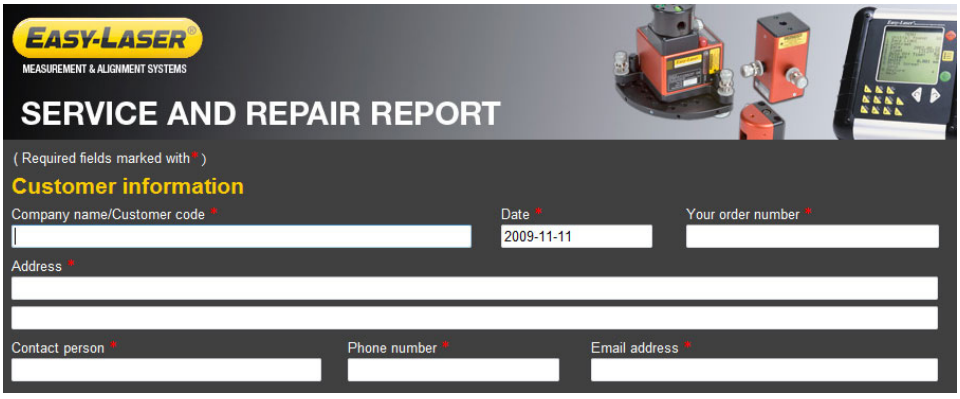
Before delivery of the product for warranty repair, it is the responsibility of the buyer to backup all data. Data recovery is not included in the warranty service and Damalini is not responsible for data that may be lost or damaged during transit or repair.

Service and calibration

Our Service centres will quickly assist you if your measurement system need to be repaired or when it is time for calibration.

Our main Service centre is located in Sweden. There are several local Service centres that are certified to carry out limited service and repair. Contact your local Service centre first before sending your equipment for service or repair. All Service centres are listed on our web site under Service and Calibration.

Before sending your measuring system to our main Service centre, please fill in the online Service and Repair report. www.easy-laser-service.com



Safety precautions

Easy-Laser® is a laser instrument in laser class II with an output power less than 1 mW, which requires the following safety precautions:

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

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.

Note!

The system should not be used in explosive risk areas.

Disclaimer

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

Copyright

We might change and correct the manual in later issues without further information. Changes to the Easy-Laser® equipment may also affect the accuracy of the information.

23 June 2010

Fredrik Eriksson
Quality Manager, Damalini AB

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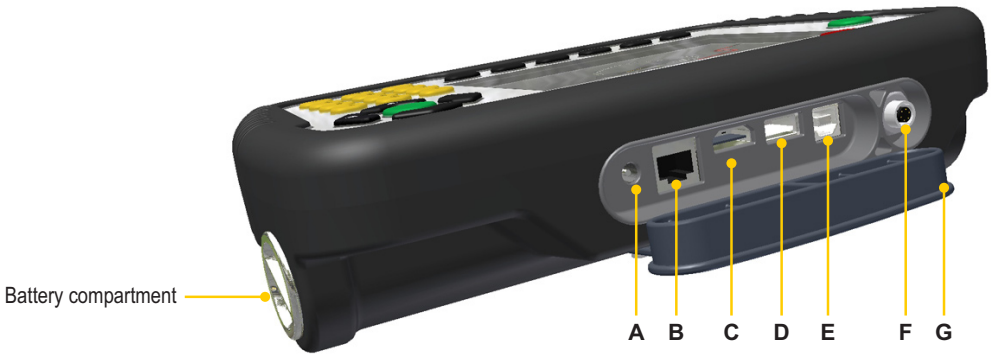
Web: www.damalini.com

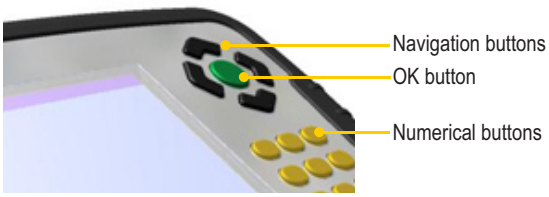
DISPLAY UNIT

A Connection for external power.
B Network connection.
C External connection. Use for projector for example.
D USB A (master). Use for USB memory.
E USB B (slave). Use for connecting to a PC.
F Connection for Easy-Laser® equipment.
G Protective cover.



Navigation buttons

To navigate on the screen, use the navigation buttons. The selected icon is marked with a yellow frame. The navigation buttons are also used to move between the icons in a submenu and to change the values in the fields.



OK buttons

There are two green **OK** buttons and they both work in the same way. Press **OK** to select the currently selected icon for example.

Function buttons

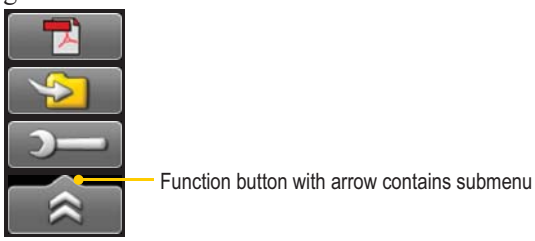
The icons above the function buttons change depending on which view is currently displayed on screen.

Below is a list of the most common icons.

	**Back** to previous view. Press and hold to leave current program.
	**Back**. There is no “previous view”. Leave the current program.
	**More**. Contains a submenu with general functions, such as  (Control panel) and  (Save file).

Submenus

The icons formed as an arrow contain a submenu. Use the navigation buttons to navigate in a submenu. Press **OK** to select.



Status bar

The Status bar contains additional information such as warning icon, current time and Bluetooth® connection.

There are also text messages regarding:

- The selected icon.
- Hints on what information you are expected to fill in.

Status bar icons

	**Warning**. Select the function button to get additional information regarding the warning.
	**Warning**. Displayed when the coordinates has been rotated in the detector. Go to Control panel to rotate coordinates.
	**Display unit charging**. Indicating that a power adaptor is plugged in.
	**Hourglass**. The Display unit is in the middle of a task.
	**Peripheral**. Indicates that a peripheral device is plugged in, such as a projector.
	**Bluetooth®**. Indicates that the Bluetooth® functionality is activated. The number beside indicates the number of Bluetooth® units connected.

Screen dump

It is possible to take screen dumps of what is currently displayed on screen. You can e-mail the screen dump or use it for reports.

Take a screen dump

1. Press and hold the navigation button “up” for 5 seconds.
2. An hour glass is displayed on the status bar.
3. The screen dump is saved in the file system as a .jpg file. It is named with current date and time. Select  to open saved files. *See Measurement file handling*.

LED signals

Right indicator

Yellow	Flashing: The internal battery in the Display unit is charging.

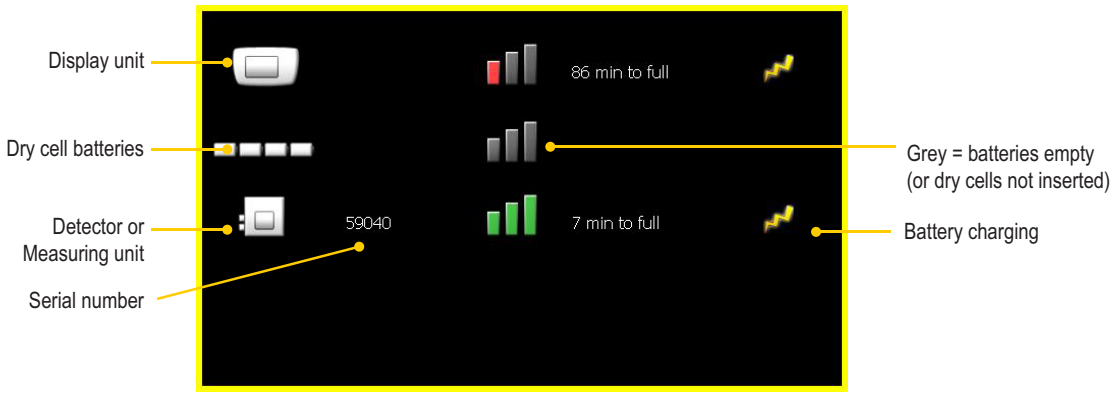
Left indicator

Left indicator has several functions and colours:

Red/Blue	Quick flashing: Reprogramming the system.
Red	Flashing: Warning, for example low battery.
Blue	Flashing: Searching for detectors equipped with Bluetooth®. Fixed light: Connected to detectors equipped with Bluetooth®.
Green	Flashing: Display unit is starting. Fixed light: The internal battery in the Display unit is fully charged.
Light blue	Blinking: Backlight is off, but the Display unit is still on. Press any button to activate the Display unit.

Battery

Select [?] to display the Battery view. This view gives you a good overview of the battery status of all connected equipment.



Note!

When finished working for the day, charge the whole system. Plug in the power adaptor to the Display unit and connect the measuring units by using cable.

Charge the Display unit

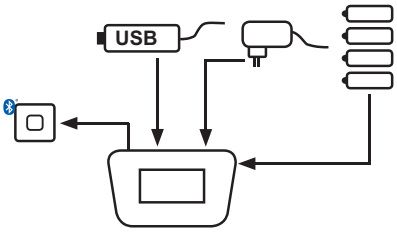
The Display unit can be used from -10ºC to +50ºC. Charge the Display unit within the temperature range of ±0ºC to +40ºC. You can charge the Display unit via:

Power adaptor

With the power adaptor plugged in, you can keep on working.

A PC via USB cable

While you have this connection, the Display unit is blocked.



Dry cell batteries

When you get a battery warning, insert four R14 dry cell batteries in the battery compartment. This will prolong the power of the Display unit so that you can finish your measurement. However, if the internal battery is completely empty, the dry cell batteries are not strong enough to start up the Display unit.

Note!

If you shut the Display unit off while charging, it will charge faster.

Charge the Detector/Measuring units

The detectors and units are charged by the Display unit when connected by cable. If you are using Bluetooth® units, switch to cable when the battery in the Detector/Measuring unit is low.

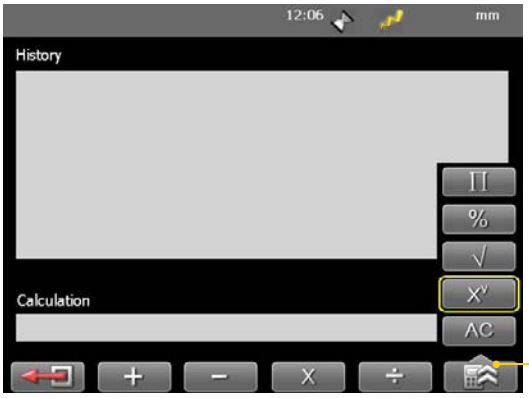
Charge the Bluetooth® units

The Bluetooth® units are powered by the Detector/Measuring units. To save energy, the Bluetooth® units will only connect when you are using a measurement program. There is no power switch on the unit. To switch off, simply unplug the unit. *See also chapter Bluetooth®.*

Calculator

The calculator is found on the Start view and Control panel ( ).

1. Select and to open the calculator.
2. Use the numerical buttons and function buttons to calculate.
3. Use the **OK** button as equal sign.

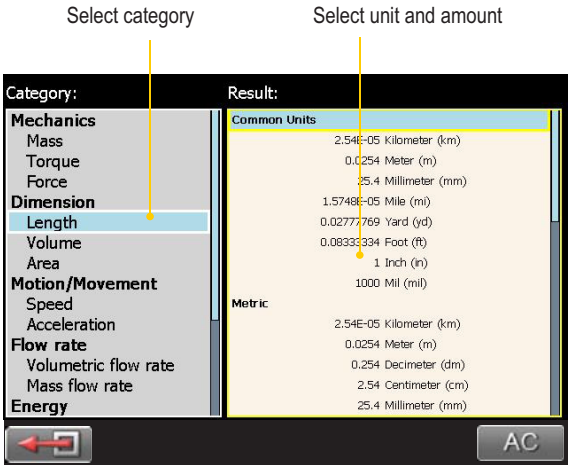


Unit converter

The calculator is found on the Start view and Control panel ( ).

1. Select and to open Unit converter.
2. Select a category. Move using the navigation buttons up and down.
3. Press navigation button right. The result column is activated.
4. Select a unit to convert from.
5. Enter an amount. The other units are recalculated.

In the example below, one inch is selected.



Measurement file handling

Save file

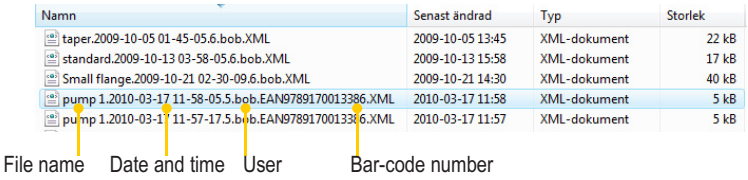
1. Select  and  to save your measurement.
2. Enter a file name. The date and time will automatically be added to the file name. The measurements that you save will be available to other users as well.
3. Press **OK** to save the file.

Save file with bar-code

The bar-code scanner is sold as an addition. The first time you measure a machine, you paste a bar-code on the machine and save the measurement together with the scanned bar-code. Next time you check the same machine, all you need to do is scan the bar-code and all machine data is read.

1. Scan the bar-code on the machine.
2. Enter a file name.
3. Press **OK** to save the file. All measurement data is saved together with the bar-code.

The bar-code number is added to the file name. When you connect the Display unit to a PC the whole file name is shown:



Save as report

At present, only English is available in reports.

1. Save the measurement.
2. Select  and  .
3. Name the file and press **OK**. A report is generated and saved in the filing system.

Company logo

You can replace the logo on the report with your own .jpg file.

1. Name your logo `logo.jpg`. The default logo has the proportions of 230x51 pixels.
2. Connect the Display unit to your PC using the USB-cable.
3. Place your image in the Display units folder `Damalini/custom/reports/logo`.

Date format

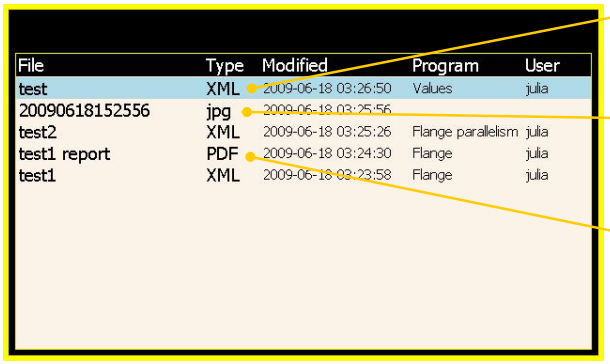
As default, the date and time format is set to Central European Time (CET).

You can change the date and time format used in your PDF reports.

See Control panel > Date and time.

Open file

Select  (found on the start view and Control panel) to open saved measurements. The File manager is displayed. Here you can easily see who has saved the file, when and from which program it was saved. You see files saved by all users.



xml
A measurement file. Select a file and press **OK** to open.

jpg
A screen dump.

PDF
A report. The PDF report can not be opened in the Display unit.

Open with bar-code

- Start the Display unit and scan the bar-code. The **latest** measurement that was made and saved with this bar-code is automatically opened.

  OR

- Select  to open File view. Scan the bar-code on the machine. **All** measurements saved with this bar-code are shown.

Open file as template

You can open a saved measurement and use it to make a new measurement. This is very useful when you have many flanges or machines with the same dimensions for example. This way you do not have to enter the same distances every time.

1. Select  (found on the Start view and Control panel). The File manager is displayed.
2. Select a file in the list and select  . The Edit distance view is displayed.
3. Change distances if needed and proceed to measuring view.

Copy file to USB memory

You can easily copy a saved measurement or other files to a USB memory.

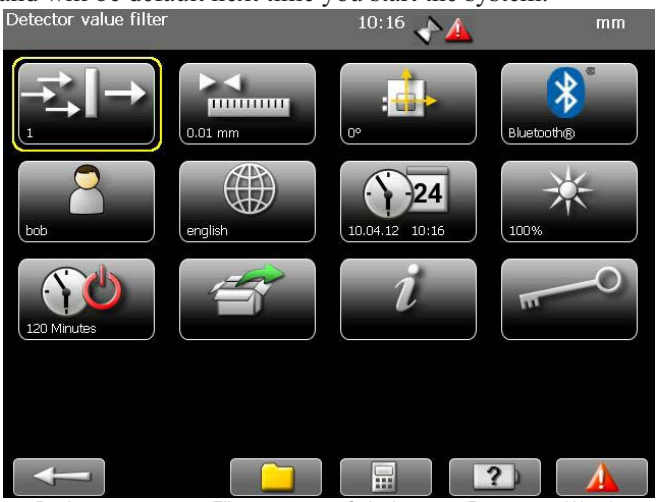
1. Insert a USB memory.
2. Select  . The File manager view is displayed.
3. Select the file you want and select  .
4. A folder is automatically created on the USB memory. The file is saved in the folder `\Damalini\archive\`.

Download file to PC

1. Start the Display unit.
2. Connect the USB cable between the Display unit and PC.
3. While you have this connection, the Display unit is blocked.
4. View and/or copy the files to the PC.

Control panel

Select  and  to open the Control panel. Some of the settings are personal and will be default next time you start the system.



Filter

Select  to open the Filter view.

If the laser beam passes through air with varying temperature, this may influence the direction of the laser beam. If measurement values fluctuate, this could mean unstable readings. Try to reduce air movements between laser and detector by, for instance, moving heat sources, closing doors. If the readings remain unstable, increase the filter value (more samples will become available to the statistical filter).

Filter values

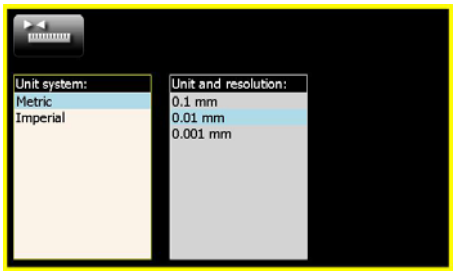
Use as short a time as possible that still produces acceptable stability during the measurement. Default is set to **1**. Normally you will use a filter value of 1-3. If you set the filter type to 0, no filter will be used.

Filter view

Unit and resolution

Personal setting

Select  to open the Units and resolution view. Use the navigation buttons to move between the fields. Set Metric or Imperial and which resolution you want to use. Default is set to 0.01 mm. The selected unit is shown on the Status bar.

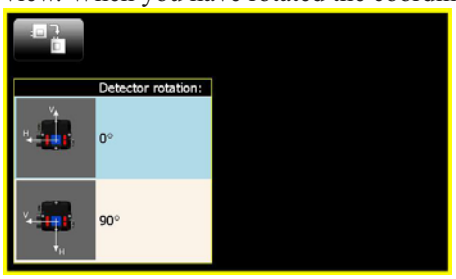


Unit and resolution view

Detector rotation

Personal setting

The coordinate system can be rotated 90º. Select  to open the Detector rotation view. When you have rotated the coordinates, a warning is displayed on the Status bar.

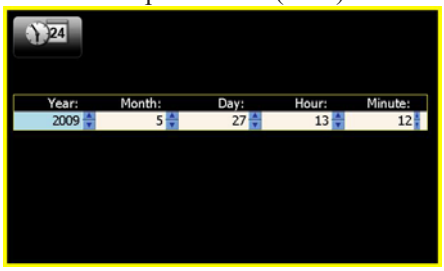


Warning displayed on Status bar

Detector rotation view

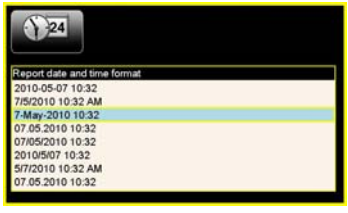
Date and time

Select  to open the Date and Time view. Set the date and time. Default is set to Central European Time. (CET)



Date and time view

Select  to set the date format used in your PDF reports.

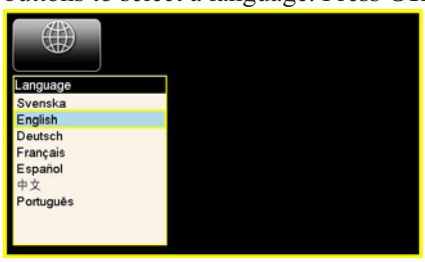


Date and time used in PDF reports

Language

Personal setting

Select  to open the Language view. Default is set to English. Use the navigation buttons to select a language. Press **OK** to save changes.

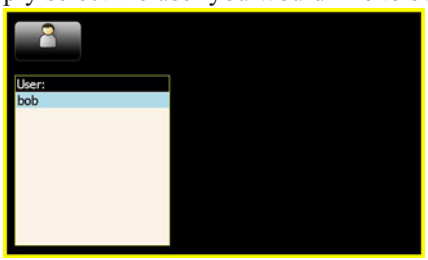


Language view

User

Select  to open the Users view. A user account is used for storing your personal settings.

Use the function buttons  to add or remove users. To switch user, simply select the user you would like to switch to and press **OK**.



User view

Backlight

Personal setting

Select  to open the Backlight view. Use the navigation buttons to move between the fields. Press **OK** to save changes. When backlight is off, the left LED signal will flash to indicate that the Display unit is still on.

Backlight level

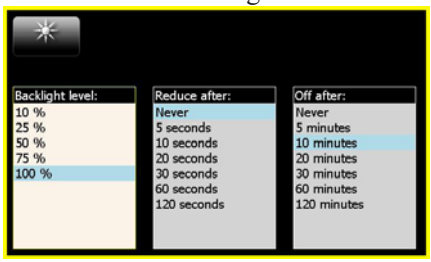
Adjust the backlight to make it easier to read in bright sunlight. Remember however that a high contrast consume more battery. Default is set to 50%.

Reduce after

Set time before backlight reduction as a way to save energy. The Display unit will be dimmed, but is still on. Default is set to Never.

Off after

Set time before backlight off. Default is set to Never.

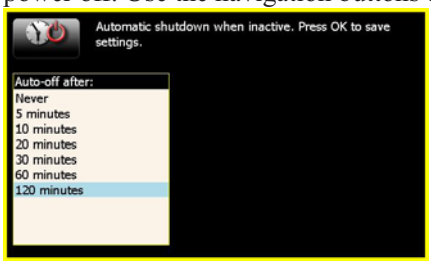


Backlight view

Automatic power off

Personal setting

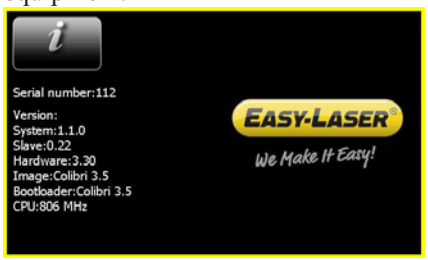
Select  to open the Automatic off view. Select how much time before automatic power off. Use the navigation buttons to select. Press **OK** to save changes.



Automatic power off view

Information

Select  to display the information regarding serial number and version of the equipment.



Information view

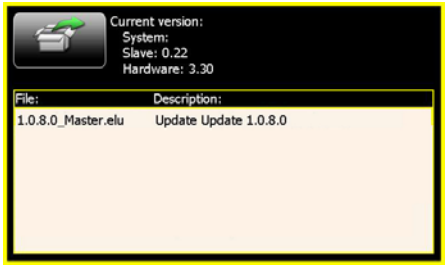
System update

The Display unit can easily be updated with the latest program version.

Note!

Before making a system update, make sure that the internal battery of the Display unit is charged. The battery symbol should be at least yellow.

1. Go to www.damalini.com > Download > Software.
2. Download the update file you need to a USB memory.
3. Unzip the file.
4. Insert the USB memory in the Display unit and select  to display the System update view.
5. Select the update file and press **OK**.
6. The Display unit will automatically restart when the installation is finished.
7. Do not remove the USB memory until the update is finished.



System update view

Bluetooth®

The Display unit is equipped with Bluetooth® wireless technology, which makes it possible for Display unit and detector to exchange data without using cables.

Select  to display the Bluetooth view.

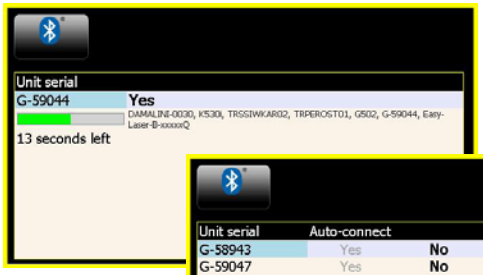
Note!

The Bluetooth® unit is powered by the Detector. To save energy, ***the Bluetooth® connection is only established when you are using a measurement program.***

Set up

This is only necessary when adding new Bluetooth® units to the list.

1. Attach the Bluetooth unit to the detector.
2. Select  to open the Bluetooth® view.
3. Select  to search for Bluetooth® units.
4. The view is updated with the Easy-Laser® Bluetooth® units you can connect to.



Searching for Bluetooth® units

Found Bluetooth® units

Use navigation buttons to toggle between **Yes** and **No**.

5. Select the unit you want to connect to and set Auto-connect to **Yes**, using the navigation buttons. The unit will automatically be connected when you start a measurement program.
6. Press **OK** to save changes and to leave the Bluetooth® view.
7. Enter a measurement program. The Display unit will connect to the selected units. While connecting, the left LED indicator is blinking with a blue light which will turn to a fixed blue light once connected.
8. An icon on the status bar will indicate how many Bluetooth® units are connected.

One Bluetooth® unit connected

Function buttons

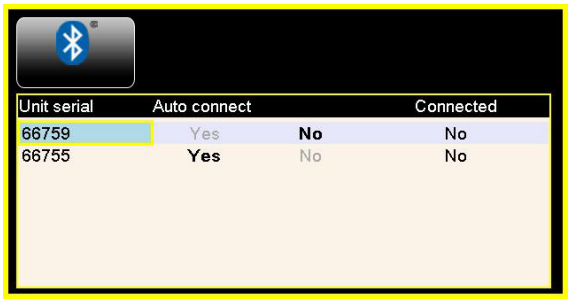
	Remove a Bluetooth® unit from the list.
	Search for Bluetooth® units.
	Cancel search. Use if your Bluetooth® unit is already found.

Use only one Bluetooth® unit

Our Shaft 710 system is delivered with two measuring units. By default both units are set to “Auto connect Yes”. In some cases you might want to use only one unit together with a laser transmitter, for this to work do the following:

1. Attach the Bluetooth unit to the detector.
2. Select  to open the Bluetooth® view.
3. Set the Bluetooth® unit you want to use to “Auto connect **Yes**”.
4. Make sure that the other units are set to “Auto connect **No**”.
5. Enter a measuring program.

The Display unit will connect to the selected unit. This may take a couple minutes.



Note!

Remove Bluetooth® unit from the Measuring unit before putting the equipment in the carrying case. If attached, it will discharge the Measuring unit.

License

It is easy to upgrade your Display unit with additional programs or updates on the programs you already have.

1. Contact your Easy-Laser® distributor if you wish to upgrade your Display unit.
2. We will send you an e-mail with information on how to download the update file.
3. Save the file to a USB memory stick or directly to the Display unit.

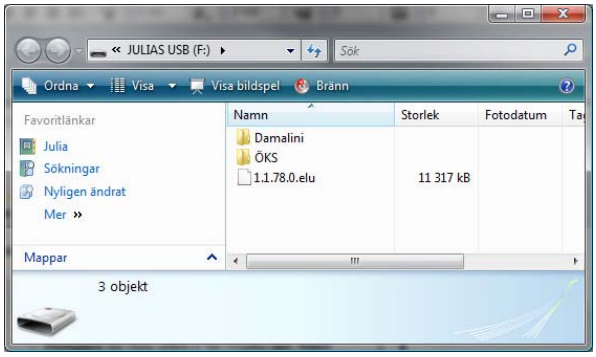
Save file on USB

1. Save the downloaded license file to a USB memory stick.
2. Insert the USB memory stick in the Display unit.
3. Select  and  to display the License view.

4. Select  to search for licenses.
5. Press **OK** to import license.

Save file to Display unit

1. Connect the Display unit to a PC.
2. Save the license file to the root of the Display unit’s storage.

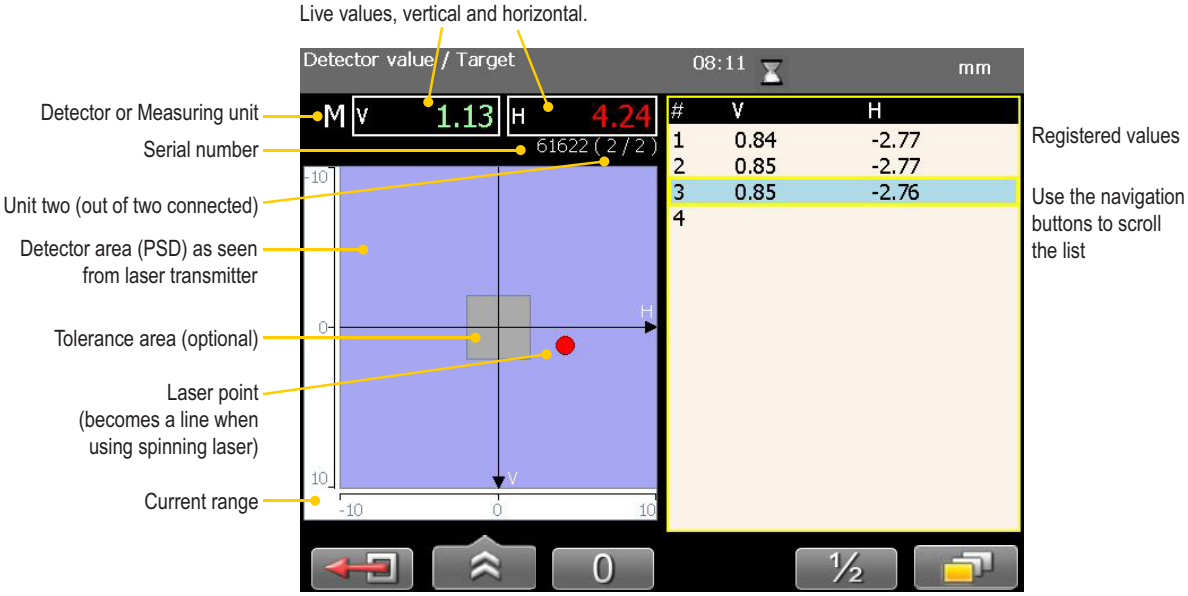


3. Select  and  to display the License view.
4. Select  to search for licenses.
5. Press **OK** to import license.

PROGRAM VALUES

Select  to open the Values view. With the program Values, you can see live readings from the detectors. As default, a target and a table is displayed. The laser point is displayed on the target.

Press **OK** to register values.

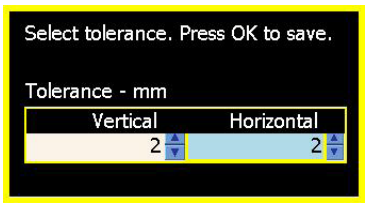


Function buttons

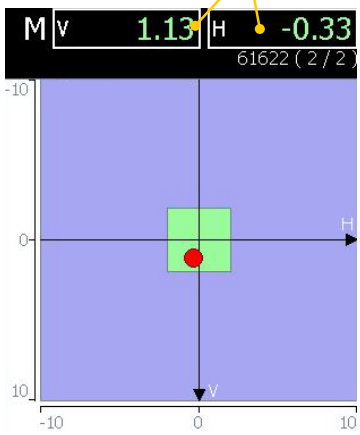
	Back. Leave program.
	More. Select to display a sub-menu, see icons below.
	Open Control panel. *See User interface > Control panel.*
	Set tolerance. *See next page.*
	Zoom. *See next page.*
	Save file. *See User interface > Measuring file handling.*
	Auto record. *See Automatic recording.*
	Delete registered values.
0	**Zero set**. Set current value to zero.
½	**Halve**. Halve displayed value.
1/1	**Absolute**. Return to absolute value. Only available after zeroing or halving.
	Views. Choose how to display values. Use left and right navigation button to switch between two or more detectors when only one target is displayed.

Tolerance

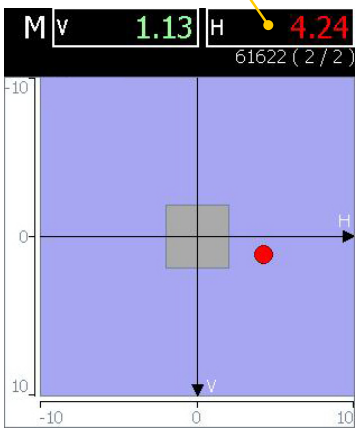
1. Select  and  to set tolerance.
   It is possible to set different tolerance in vertical and horizontal direction.
2. Use navigation buttons to move between the fields and to change the tolerance.
3. Press **OK**.



Live values and marking displayed in green when within tolerance.

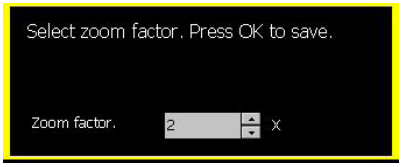


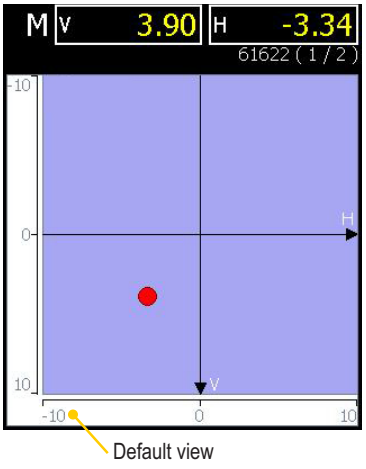
Live values displayed in red when outside tolerance.



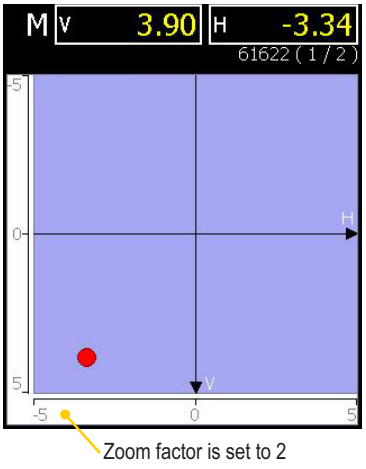
Zoom

1. Select  and  to zoom.
2. Select a zoom factor between 1–5. Use navigation buttons to increase or decrease zoom factor.
3. Press **OK**.





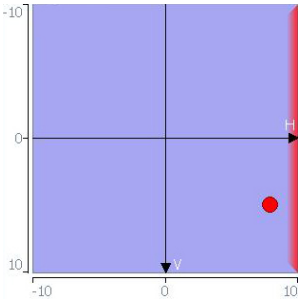
Default view



Zoom factor is set to 2

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is not possible register values when you see the edge warning. Values registered here are not fully reliable.



Halve or Zero set value

Halve value

Select ½ to Halve displayed value.

Zero point of the PSD moves halfway towards the laser point.

Zero set value

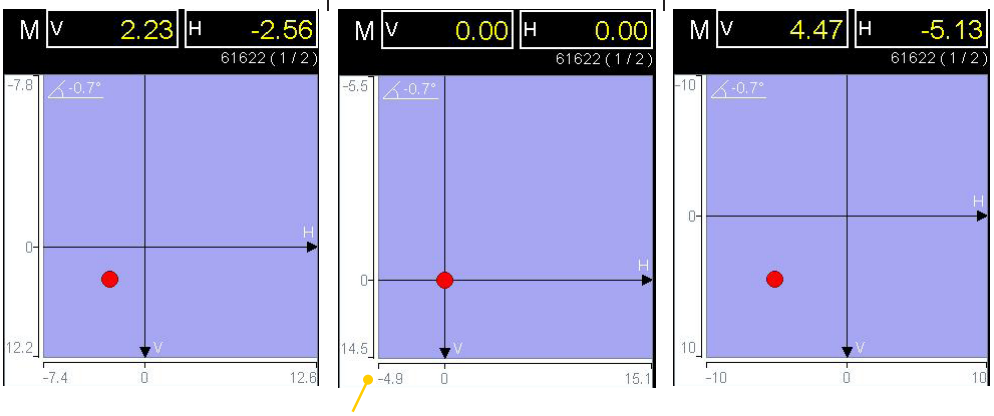
Select 0 to zero set displayed value.

Zero point of the PSD moves to the laser point.

Absolute value

Select 1/1 to return to the absolute value.

Zero point of the PSD returns to the PSD centre.



Note the change of the current range

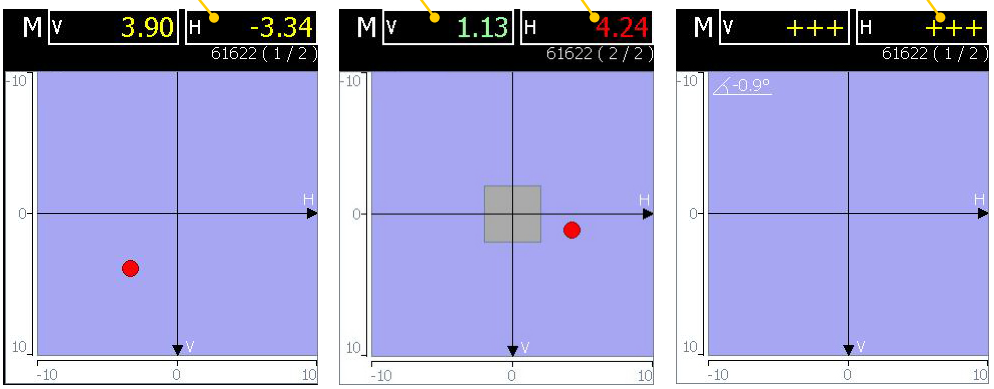
Live values – colours

Live values are normally yellow

Green when within tolerance

Red when outside tolerance

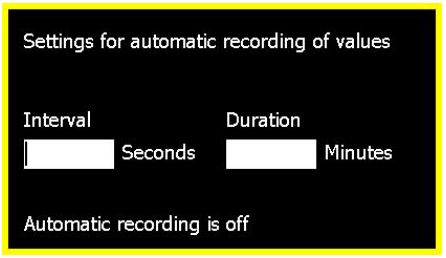
Loss of signal, laser beam interrupted for example



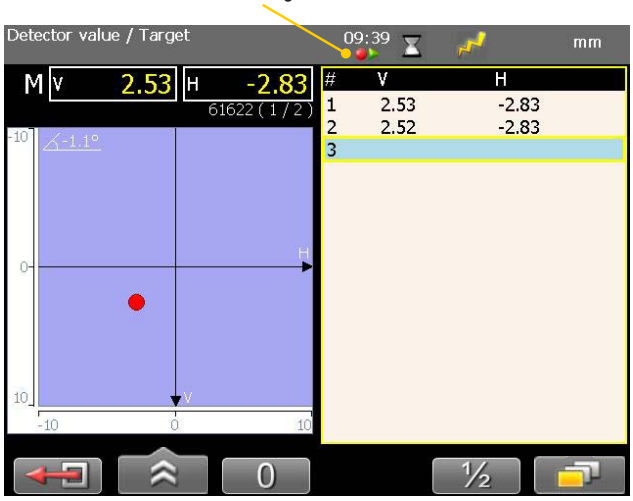
Automatic recording

In Values, it is possible to make automatic recording of values. This is very useful when you want to register values during a longer time period for example.

1. Select  and  to start automatic recording.
2. Select Interval.
3. Press navigation button “right”.
4. Select Duration.
5. Press **OK**. The recording will start and you can follow the progress on screen.



Icon indicates that values are being recorded



Views

You can decide how to display the current values. As default a target and a table is displayed, but you can choose to show only target for example.

Select  to display the different layout options, see image below.

Note!

Use left and right navigation button to switch between two or more detectors when only one target is displayed.

SHAFT PROGRAMS

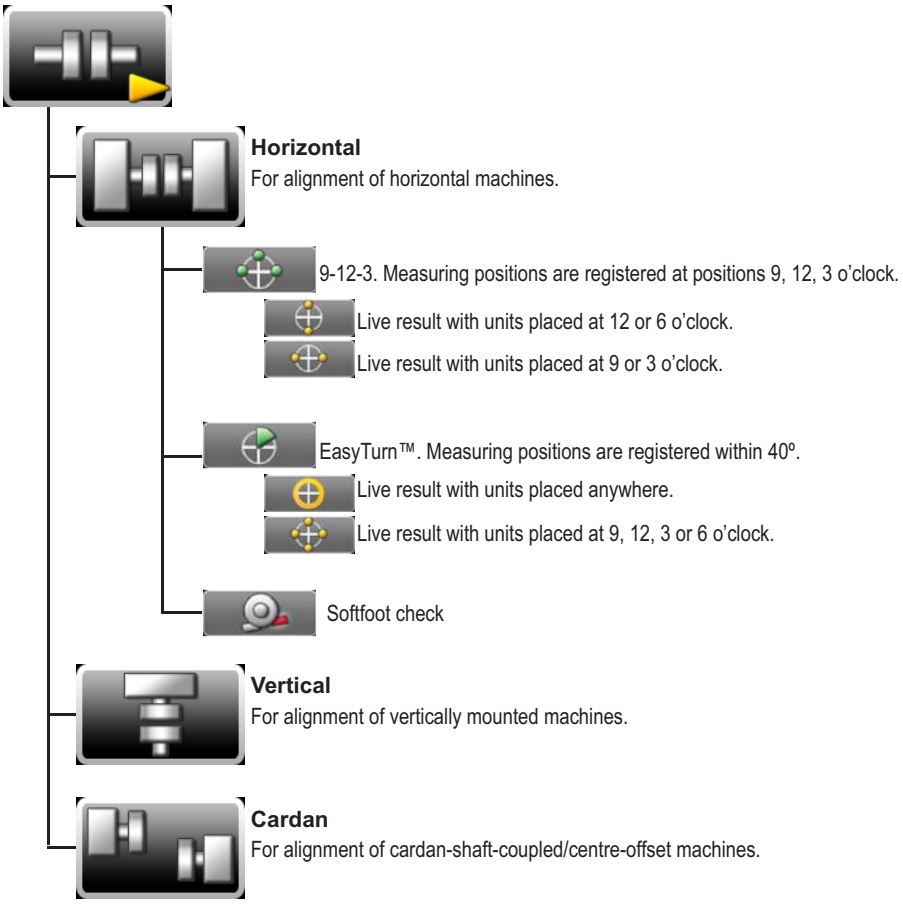
Preparations

Before starting a measurement, there are several things that are good to check to ensure a good and accurate measurement.

- Ensure a good measurement environment. Strong sunlight, warning lights, vibrations and temperature gradients can affect the readings.
- Make sure the surface is clean.
- Ensure that the foundation of the machine is stable.
- Check for play and clearance in the bearing.

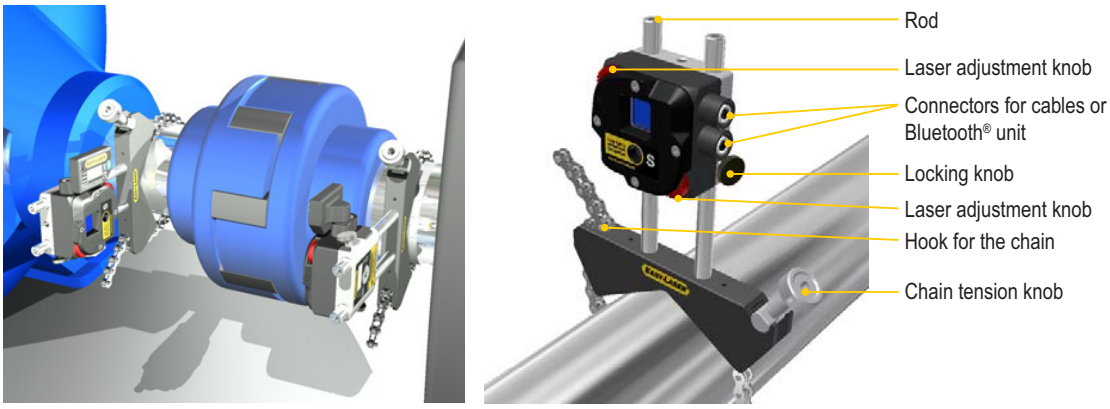
Choose program

There are several shaft alignment programs. Choose the one suitable for your alignment needs.

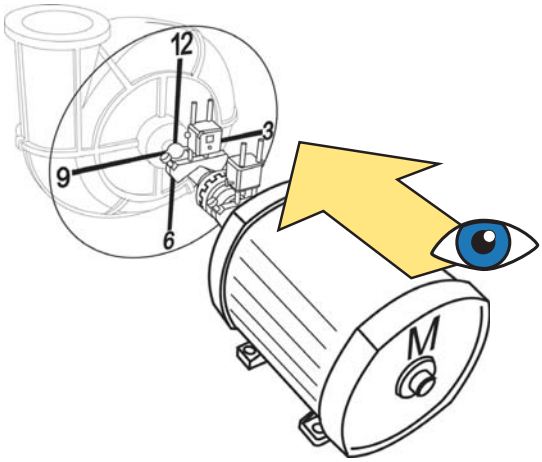


Mount the units

1. Mount the S-unit on the stationary machine and the M-unit on the movable machine.
2. Mount the units facing each other. Make sure they are at the approximately same rotational angle and radius.



Mounted measuring units



Face the stationary machine (S) from the movable machine (M).

Connect cables or Bluetooth® units

Cable

The measuring units has two connectors that are used for cables or Bluetooth® units.

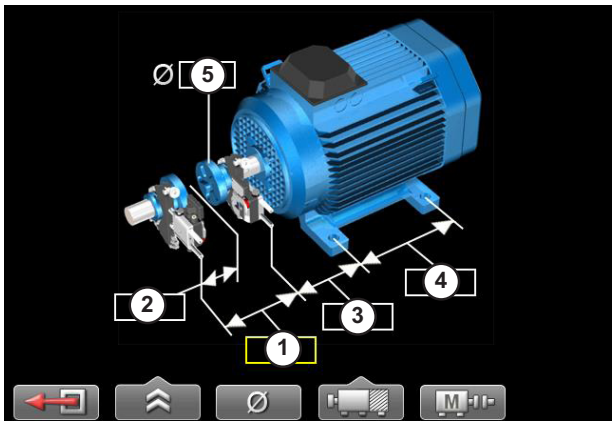
1. Connect a cable to the Display unit. Connect the other end to any of the measuring units.
2. Connect the second cable between the measuring units.

Bluetooth®

The Display unit is equipped with Bluetooth® wireless technology, which makes it possible for Display unit and detector to exchange data without using cables. For more information, see chapter User interface > Bluetooth®.

Enter distances

1. Select  and  to open Horizontal program.
2. Enter distances. Confirm each distance with **OK**. The mandatory distances are needed for measuring the machine.



1 Distance between S-unit and M-unit.
Measure between the rods. **Mandatory**.

2 Distance between S-unit and centre of coupling. **Mandatory**.

3 Distance between M-unit and first feet pair.

4 Distance between feet pair one and feet pair two.

5 Coupling diameter. Optional, select  to activate field.

Function buttons

	**Leave program**.
	**Control panel**.
	**Diameter**. Select to enter coupling diameter. This is necessary if you want the result based on the gap of the coupling instead of angle.
	Contains a sub-menu.  **Show three feet pairs**. Add a feet pair.  **Show two feet pairs**.
	Toggle button. Show movable machine to the left or to the right.
	**Continue**. Available when you have entered the mandatory distances.

Accuracy of entered distances

If the distance S–M is 1000 mm and you enter wrong by 10%, the angular deviation will be affected only by 0.01 mm/100 mm.

When you enter the distances between the machine bolts to make it possible for the measurement system to calculate the adjustment values for F1 and F2, the values will also be affected by the width of the shims. If the foundation isn't straight and flat, the machine might rest on the edge of the shims, and not on the middle of it.

Conclusion: ±10% is acceptable when entering the distances, because this will affect the angular deviation very little, and because there are other factors that are hard to compensate exactly for.

Example

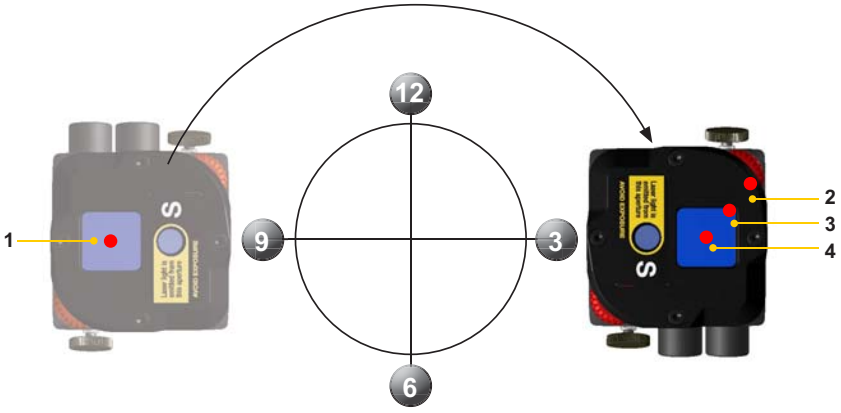
If the distance between S–M is 100 mm and you add an error of 10 mm, this will affect the measurement result by 10%. If the Display unit reads an angle of 0.10 mm/100, the reading will differ 0.01 mm/100 from correct value.

Rough alignment

When making a new installation, a rough alignment can be necessary.

Select  and  to open Horizontal program. Enter distances. Confirm each distance with **OK**. The measure view is displayed

1. Place the detector at 9 o'clock. Aim the laser beam at the centre of the targets.
2. Turn the shaft to position 3 o'clock. Note where the laser beam hits the detector.
3. Adjust the laser beam half way to the centre of targets.
4. Adjust the movable machine until the laser beam hits the centre of targets.

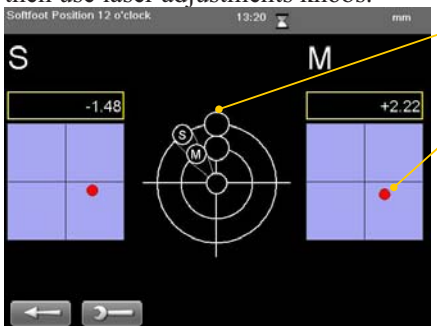


The example shows the S-unit, but the procedure is made on both units.

Softfoot

Perform a softfoot check to ensure that the machine is resting evenly on all its feet.

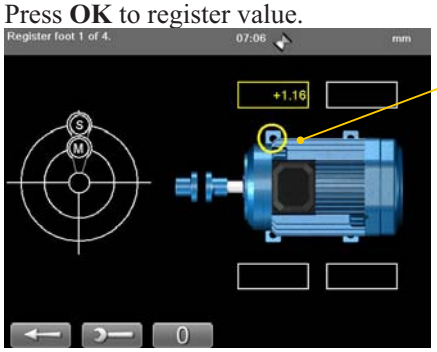
1. Select  and  to open Horizontal program.
2. Enter distances. Confirm each distance with **OK**. To perform a Softfoot check, you need to enter distances between the feet pairs. The measure view is displayed.
3. Select  . Softfoot is only available before you have registered any measurement points.
4. Tighten all feet bolts.
5. Turn the shaft with measuring units to 12 o'clock.
6. Adjust laser points to the centre of target. If needed, adjust the units on the rods, then use laser adjustments knobs.



Turn the measuring units to 12 o'clock.

Adjust laser point to centre of target.

7. Press **OK**. The first bolt is marked with yellow.
8. Press  to zero set.
9. Loosen and then retighten the first bolt.
10. Press **OK** to register value.

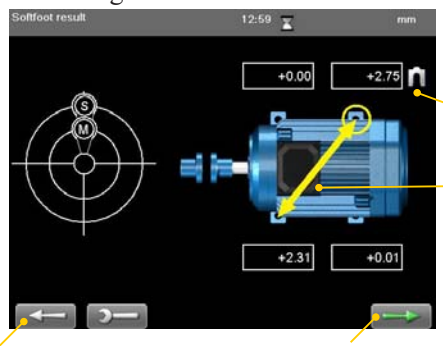


Loosen and retighten bolt before register value.

Note!

Use navigation button "left" to go to previous foot.

11. Repeat step 8 and 10 on the following feet. A result is displayed.
12. Shim the foot with the largest movement.
13. Do a Softfoot check again.



Shows the approx. shim value

Arrow indicating that the machine is tilting in this direction.

Remeasure from foot 1. Use navigation button "left" to go to previous foot.

Select to return to measuring with EasyTurn™ or 9–12–3.

If the largest movement is opposite from the smallest it is not a conventional softfoot and you will be asked to check the foundation.

EasyTurn™

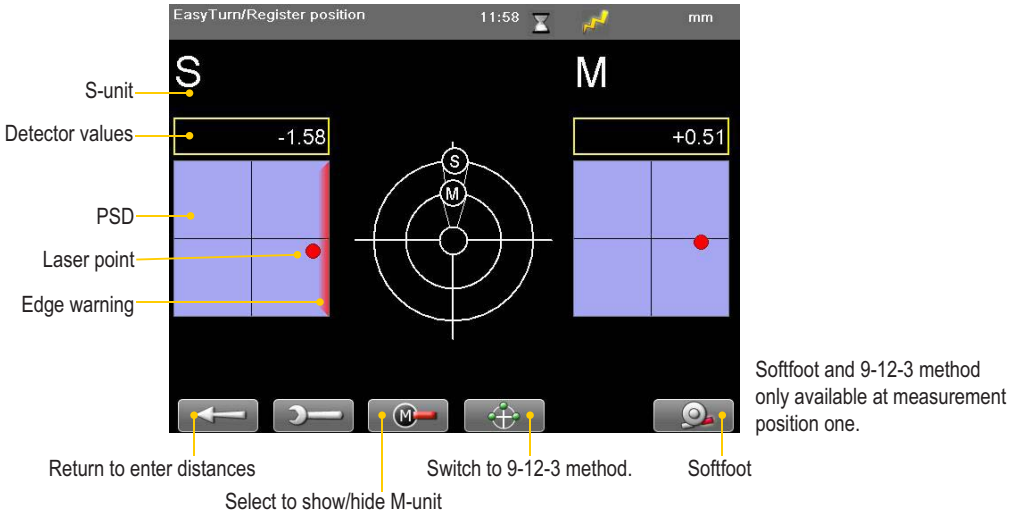
Preparations

Follow the preparations as described in the previous chapter.

1. Mount the measuring units.
2. Connect cables or Bluetooth® units.
3. Enter distances, confirm each distance with **OK**.
4. If needed, perform a rough alignment.
5. If needed, perform a Softfoot check.

Measure

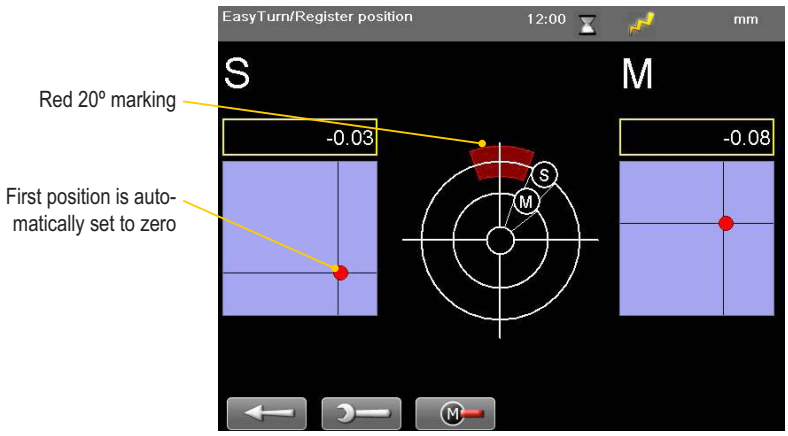
By default, the EasyTurn™ alignment method is displayed. If you want to use the 9-12-3 method, select  .



Function buttons

	**Back**. Return to enter distances.
	**Open Control panel**.
	Toggle button. Select to show/hide M-unit. Show M-unit if you have uncoupled shafts.
	Switch to 9-12-3 method.
	**Open Softfoot view**. Perform a softfoot check. Only available at measurement position 1. *See chapter Softfoot*.

1. Adjust laser points to the centre of the PSD´s. If needed, adjust the units on the rods, then use laser adjustments knobs.
2. Press **OK** to register first position. The first position is automatically set to zero. A red marking is displayed.
3. Turn shafts outside of the red 20º marking.
4. Press **OK** to register second position.
5. Turn shafts outside of the red markings.
6. Press **OK** to register third position.
7. The result is displayed.



Uncoupled shafts

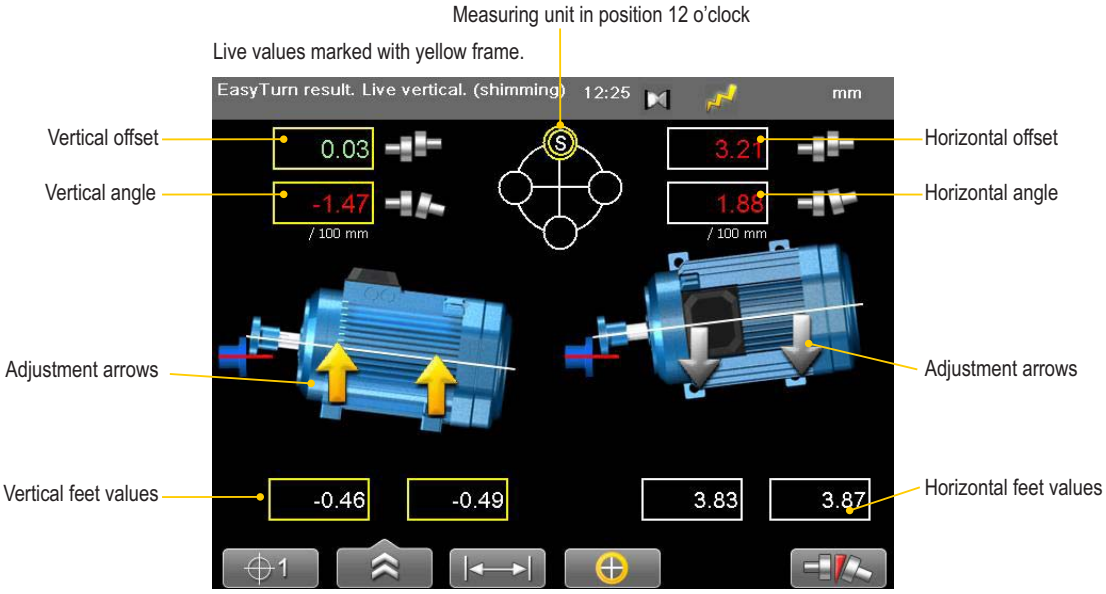
1. Select  to show M-unit.
2. Position the M-unit so it faces the S-unit. If the laser from the S-unit hits the edge on the PSD of the M-unit, **adjust the M-unit´s position**.

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is not possible register values when you see the edge warning. Values registered here are not fully reliable.

Result

Offset, angular and feet values are clearly displayed. Both horizontal and vertical direction are shown live, which makes it easy to adjust the machine. Values within tolerance are green.

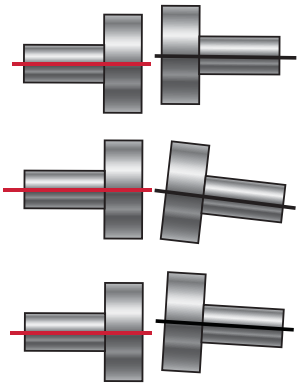


Function buttons

	**Remeasure** from measurement position one. All entered distances are kept.
	**More**. Select to display a sub-menu.
	 **Open Control panel**. *See User interface > Control panel*.
	 **Save file**. *See User interface > Measuring file handling*.
	 **Save as report**. *See User interface > Measuring file handling*
	 **Set tolerance**. You can set the tolerance for the machine. If the machine is within tolerance, the numbers are green. If the numbers turn red, the machine needs adjustment. *See Tolerance.*
	 **Set thermal growth.** *See Thermal growth.*
	 **Set RefLock.** *See RefLock (Locked feet)*.
	 **Show target**. This is a quick way to see where the laser beam hits the target and how the measuring units are positioned.
	**Edit distances**. Press **OK** to confirm changes. The result is recalculated.
	Toggle button. Switch between showing live values at position 9, 12, 3 and 6 o'clock or live values at any angle. *See Live values on next page.*
	Toggle button. Switch between to show gap and show angular error per 100 mm. For this to work you need to set the coupling diameter.

Offset and angle values

The offset and angle value indicate how well the machine is aligned at the coupling. They appear in both horizontal and vertical direction.



Offset
The centre lines of two axis are not concentric but parallel.
This is measured at the coupling centres.

Angular misalignment
The centre lines of two axis are not parallel.

Offset and angular misalignment
Misalignment is often a combination of both offset and angular misalignment.

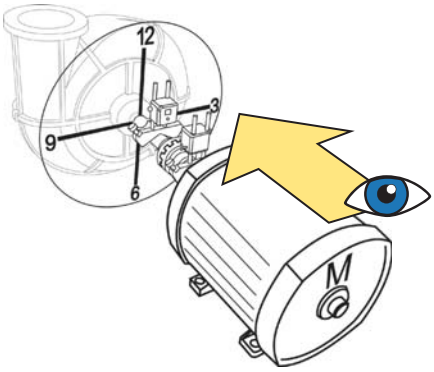
Feet values

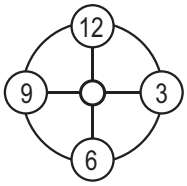
The feet values show the position of the machine where the adjustment is made.

Live values

When reading the values, face the stationary machine from the movable machine.
Positions for measuring units as seen from the movable machine.

Live values are marked with yellow frame.





Face the stationary machine (S) from the movable machine (M).

Live values at positions 9, 12, 3 and 6

Select  to show vertical or horizontal values.

- Vertical values are live with the units in position 12 or 6 o'clock.
- Horizontal values are live with the units in position 9 or 3 o'clock.

Live values at any angle

Select  to show live values no matter where the units are positioned.

Adjustment

Adjust the machine if needed.

1. Shim the machine according to the vertical feet values.
2. Adjust the machine sideways according to the live horizontal values.
3. Tighten the feet.
4. Select  to remeasure.

9–12–3

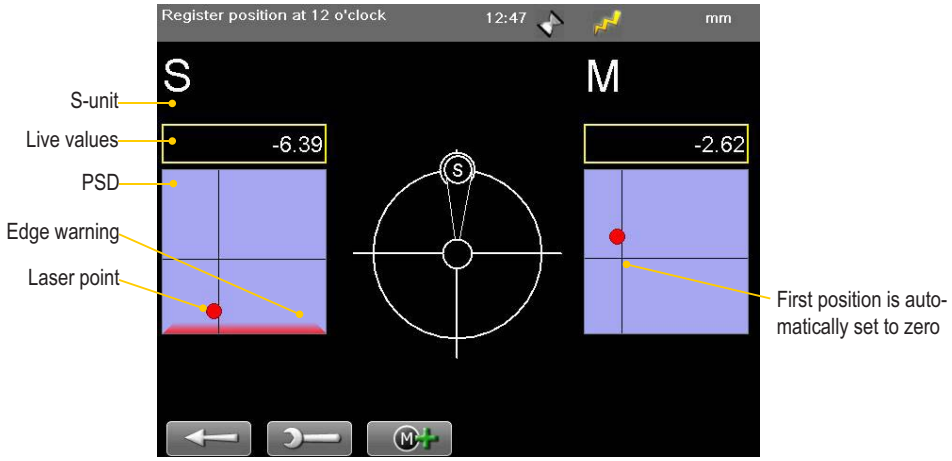
Preparations

Follow the preparations as described in the previous chapter.

1. Mount the measuring units.
2. Connect cables or Bluetooth® units.
3. Enter distances, confirm each distance with **OK**.
4. If needed, perform a rough alignment.
5. If needed, perform a Softfoot check.

Measure

1. Select  to switch to 9-12-3.
2. Turn shafts to 9 o'clock.
3. Use laser adjustments knob to adjust laser points to the centre of the PSD´s. If needed, adjust the units on the rods.
4. Press **OK** to register first position. The first position is automatically set to zero.
5. Turn shafts to 12 o'clock.
6. Press **OK** to register second position.
7. Turn shafts to 3 o'clock.
8. Press **OK** to register third position.
9. The result is displayed.



Function buttons

	**Back**. Return to enter distances.
	**Open Control panel**.
 	Toggle button. Select to show/hide M-unit. Show M-unit if you have uncoupled shafts.
	Switch to EasyTurn™ method.
	**Open Softfoot view**. Perform a softfoot check. Only available at measurement position 1.

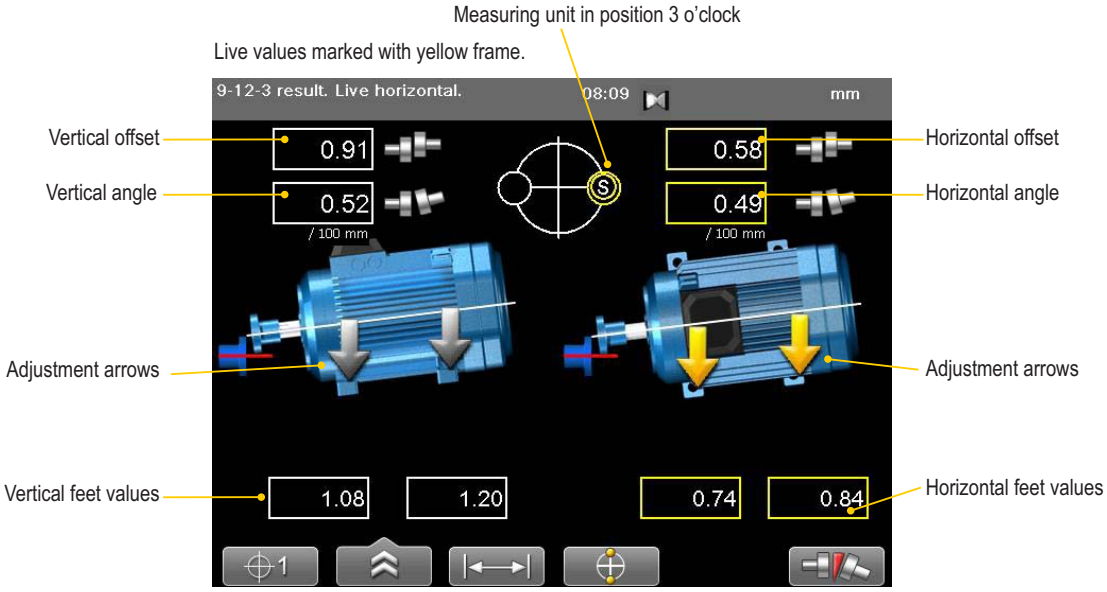
Uncoupled shafts

1. Select  to show M-unit.
2. Place M-unit so it faces the S-unit. If the laser from the S-unit hits the edge on the M-unit, **adjust the M-unit´s position**.

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is not possible register values when you see the edge warning. Values registered here are not fully reliable.

Result



Function buttons

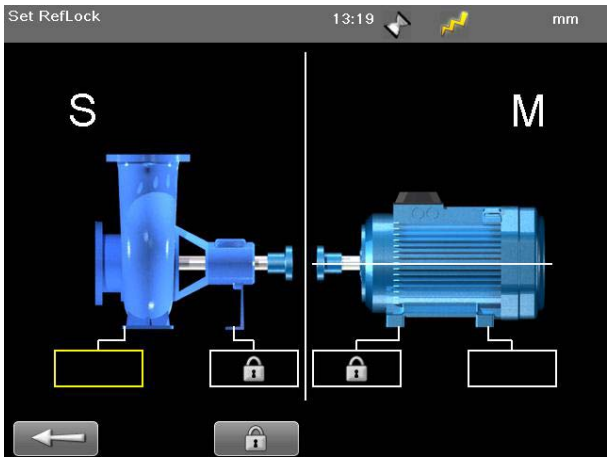
	Toggle button. Switch between showing horizontal or vertical live values.

For more information regarding function buttons and result, *see EasyTurn > Result*.

RefLock™ (Locked feet)

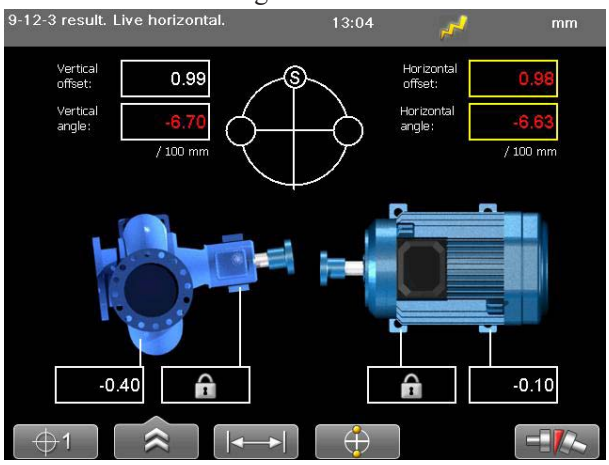
From the result view, you can select the function RefLock™. Here you can choose any two feet pairs as locked and choose which machine is to be used as stationary and which as adjustable.

1. Select  and  from the result view. The Edit distance is displayed.
2. Enter distances for the S-machine. The RefLock view is displayed.



RefLock view

3. Navigate using the left and right navigation button.
4. Select  to lock the selected feet pair.
5. Select  to unlock.
6. Press OK to save changes and return to the result view.



Result view with locked feet

Function buttons

	**9-12-3 program** Toggle button. Switch between showing horizontal or vertical live values.
	**EasyTurn™ program** Toggle button. Switch between live values at position 9, 12, 3 and 6 o'clock or live values at any angle.

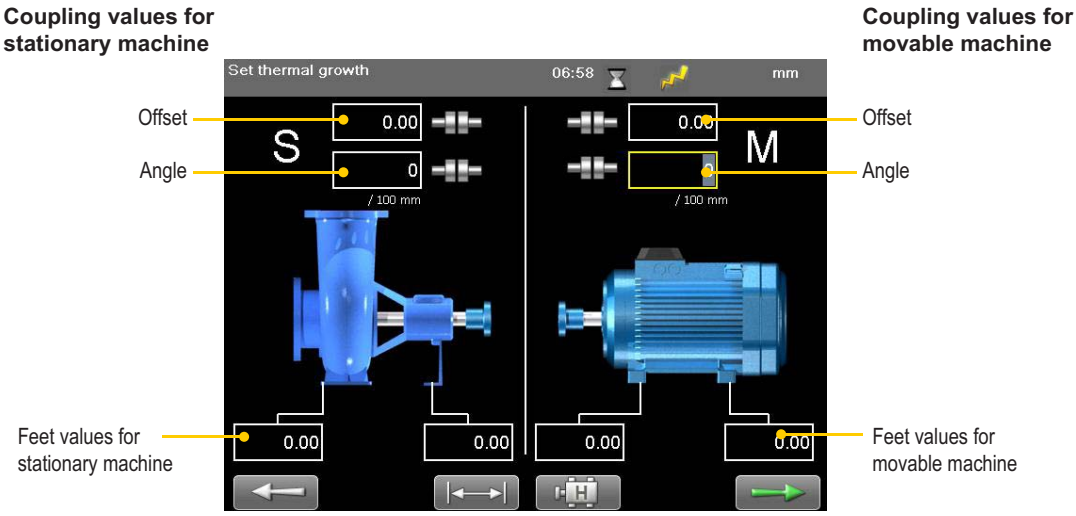
Note!

RefLock™ *is available when performing a Horizontal alignment. Not available for Vertical or Cardan.*

Thermal growth

During normal operation, machinery is influenced of different factors and forces. The most notable of these changes is the change in the temperature of the machine. This will change the length of the metal in the machine. This is called thermal growth.

Select  and  from the result view. The Thermal growth view is displayed. You can enter values for thermal growth on the coupling **or** the feet values.



Function buttons

	Edit distances.
	Toggle button. Enter horizontal or vertical values.
	Select to go back to the result view.

Coupling values

1. Enter a value for offset and/or angle. Use navigation buttons to move between fields.
2. Press **OK**. The feet values are recalculated.
3. Select  if you want to enter horizontal values.
4. Select  to save changes and return to the result view.

Feet values

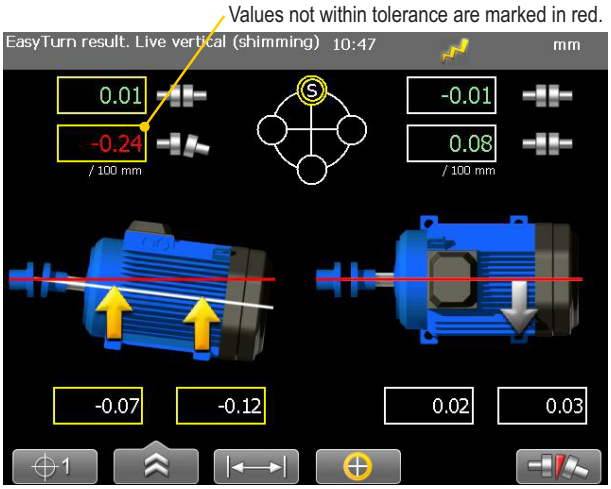
1. Use the navigation buttons to move between fields.
2. Enter a feet value. The values for offset and angle are recalculated.
3. Select  if you want to enter horizontal values.
4. Select  to save changes and return to the result view.

Note!

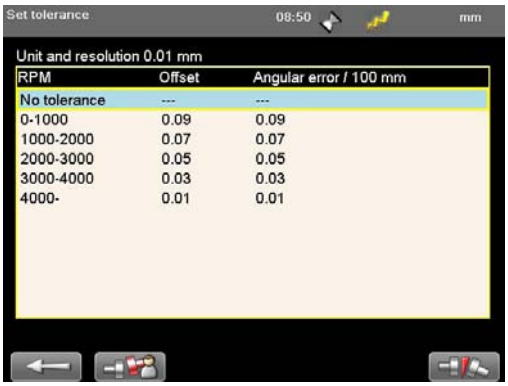
Thermal growth is available when performing a Horizontal alignment. Not available for Vertical or Cardan.

Tolerance

The measurement result can be checked against predefined tolerance tables or values that you determine yourself. This way you can quickly see if the alignment is within tolerance.



1. Select  and  to open tolerance table.
2. Use navigation buttons to navigate in the table.
3. Press **OK** to confirm.

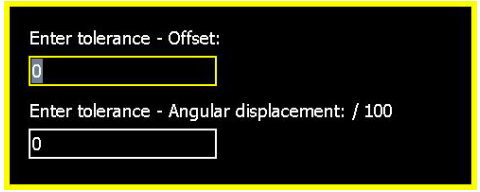


Gap or angular error

Select  to switch between showing gap or angular error per 100 mm. To show gap, you need to set the coupling diameter when you enter distances.

User defined tolerance

1. Select  to define your own tolerance.
2. Enter your tolerance for offset and angular error.
3. Press **OK**. Your user defined tolerance is added to the list.



Tolerance table

The rotation speed of the shafts will decide the demands on the alignment. The table on this side can be used as a guidance if no other tolerances is recommended by the manufacturer of the machines.

The tolerances is set to the maximum allowed deviation from accurate values, with no consideration to if that value should be zero or compensated for thermal growth.

Offset misalignment

	Excellent		Acceptable	
rpm	mils	mm	mils	mm
0000-1000	3.0	0.07	5.0	0.13
1000-2000	2.0	0.05	4.0	0.10
2000-3000	1.5	0.03	3.0	0.07
3000-4000	1.0	0.02	2.0	0.04
4000-5000	0.5	0.01	1.5	0.03
5000-6000	<0.5	<0.01	<1.5	<0.03

Angular misalignment

	Excellent		Acceptable	
rpm	mils/”	mm/100mm	mils/”	mm/100mm
0000-1000	0.6	0.06	1.0	0.10
1000-2000	0.5	0.05	0.8	0.08
2000-3000	0.4	0.04	0.7	0.07
3000-4000	0.3	0.03	0.6	0.06
4000-5000	0.2	0.02	0.5	0.05
5000-6000	0.1	0.01	0.4	0.04

The higher the rpm of a machinery is, the tighter the tolerance must be. The acceptable tolerance is used for re-alignments on non-critical machinery. New installations and critical machines should always be aligned within the excellent tolerance.

Show target

1. Select  and  to open a target. This is a quick way to see where the laser beam hits the target and how the measuring units are positioned.
2. Select  to close the target.