EASY-LASER®

User Manual

XT

English

05-0835 (EN) Revision 4.0 | 4/13/2018

CONTENTS

VALUES

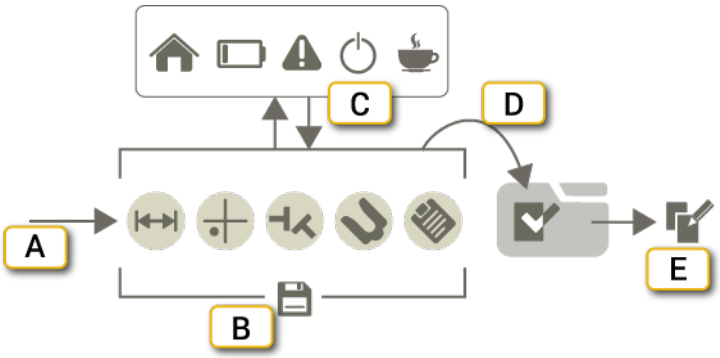
HORIZONTAL

TECHNICAL DATA

LEGAL NOTICE

GENERAL INFORMATION

NEW, CONTINUE AND SAVE



A. Start a program.

B. The measurement is saved automatically through the entire workflow.

C. You can go to the home screen, have a coffee break, charge the batteries or even use another program. Even if you are interrupted, you are able to continue the same measurement session later on.

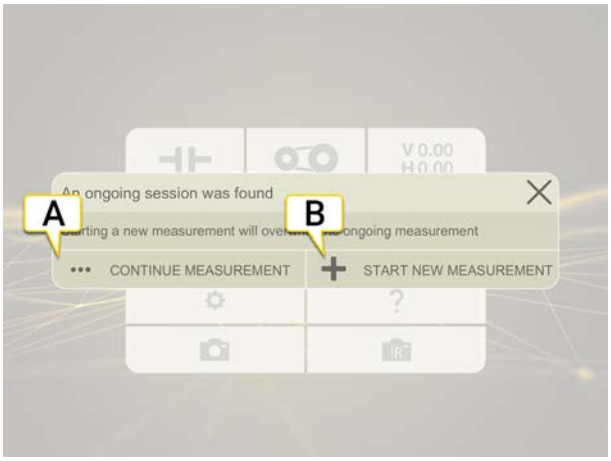
D. When you select Finalize, the measurement file is added to the File manager. See "Finalize" on the next page

E. It is possible to create a editable copy of the finalized measurement. See "File manager" on page 11.

New or Continue session

Tap the program icon to start a new measurement.

If you leave an ongoing measurement session, the next time you will start the same program you are asked if you want to start a new measurement or continue on the previous session.



A. Tap to continue the previous session.

B. Tap to start a new measurement. The ongoing session will be deleted.

Save

The measurement is saved automatically through the entire workflow. When you select Finalize, the measurement file is added to the File manager. See "Finalize" on the next page

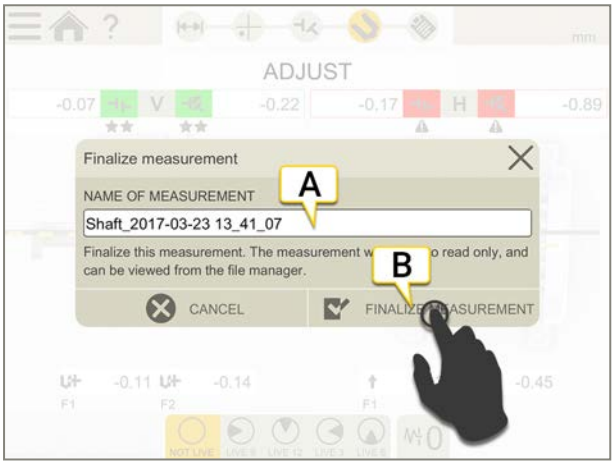
FINALIZE

The measurement is saved automatically through the entire workflow. When you have finished the measurement, you finalize it. When a measurement has been finalized, it is no longer editable. It is however possible to open a copy and continue working were the last session was ended. For information regarding Copy/Edit, See "File manager" on page 11.

Finalize a measurement

Usually, you finalize when you have finished your measurement. See " Report" on page 13.

1. Tap and .
2. Enter a new name, or leave the default name.
3. Tap . The file is finalized and no longer editable. The measurement file is added to the File manager.

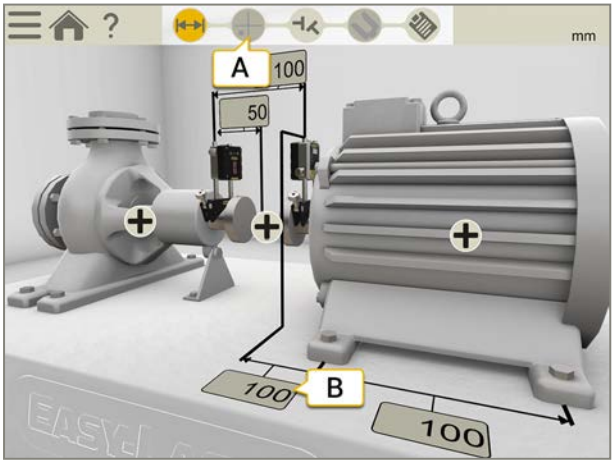


A. Tap here to change the default file name.
B. Tap to finalize the measurement.

View a finalized measurement

1. Tap to open the File Manager.
2. Tap the measurement you want to view.

If you want to create a editable copy of the open measurement, tap and to open a copy of it.



A. Measure view and Adjust view are not active.
B. Distances are visible but not editable.

Create a template

You can choose to finalize before you have finished the measurement. This is a quick way to create a simple template.

1. Enter distances, RPM and thermal compensation for example.
2. Tap  to finalize.
3. Name the file. The file is saved in the File manager.
4. Tap  to open the File manager.
5. Tap  to open a editable copy. This measurement will be saved with a new name when you finalize it.

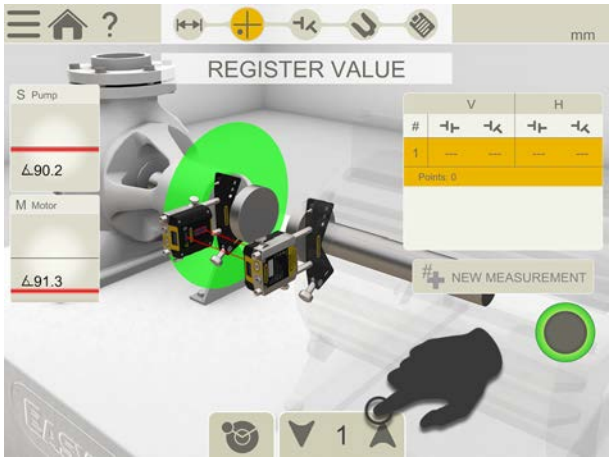
FILTER

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 or closing doors. If the readings remain unstable, increase the filter value (more samples will become available to the statistical filter).

Select filter

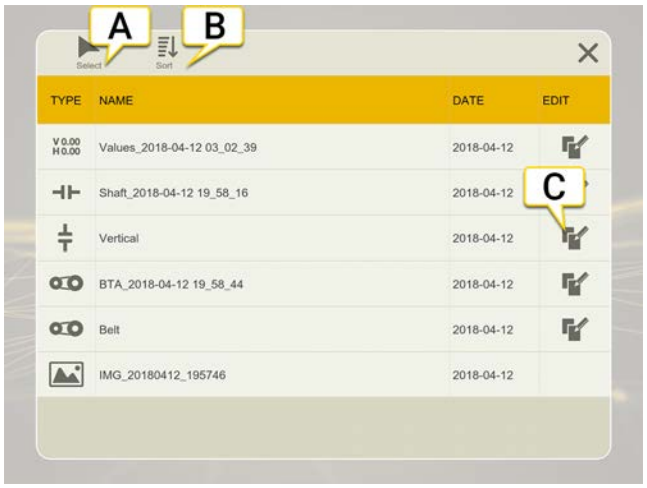
Tap to expand the filter tab. Use as short a time as possible that still produces acceptable stability during the measurement. Default is set to 1. The filter value you choose, will be default next time you start the program.

Select filter on the tab.



FILE MANAGER

On the Start view, tap to open the File Manager.



A. Select files
B. Sort files.
C. Edit/Copy file.

File types

	Measurements. All finalized measurements are stored in File Manager and represented by the corresponding program icon. Tap a file to view. See "Finalize" on page 8.
PDF	Pdf-report. Tap a file to open it. Reports are stored as pdf-files. See " Report" on page 13.
	Excel file. It is not possible to view Excel files in the XT11 Display unit. To view it, share it to a USB memory stick.
	Photos, IR-photos and screenshots. Images are stored as .png-files. The files are named with the date and time they were created. Tap a file to open. See "Camera" on page 24, See "Screenshot" on page 27

Delete files

1. Tap to activate check boxes.
2. Select one or many files.
3. Tap . You will be asked to confirm the deletion.

Share files

1. Tap to activate check boxes.
2. Select one or many files.
3. Tap . On the XT11 it is possible to share to mail or USB.

Sort files

By default, the files are sorted by date.

1. Tap .
2. Select Type, Name or Date. It is possible to have rising or falling order.

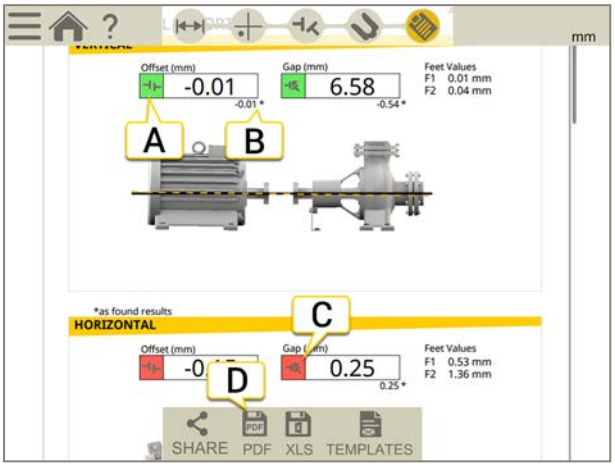
Copy/Edit file

When a measurement has been finalized, it is no longer editable. It is however possible to open a copy and continue working were the last session was ended.

- Tap  to open a editable copy of the selected measurement. This measurement will be saved with a new name when you finalize it.
- If you have a finalized measurement open, tap  and  to open a copy of it.

REPORT

The report covers all details from the measurement. The report is constantly being filled out while the session is carried out. To see the report at its current state, tap in the workflow. The example below shows a report for a Horizontal measurement.



A. Green = within tolerance.
B. The "As found" result is marked with an asterisk (*).
C. In this example the angle result is shown as Gap.
D. Save as a Pdf or Excel file. The files are saved in the File manager.

Save a report

To save a report, you need to finalize the measurement. You can choose to save the report as a Pdf or an Excel file.

1. Tap and .
2. Enter a new name, or leave the default name.
3. Go to Report view.
4. Tap and/or . The report is added to the File manager.

The Excel file is not possible to view in the XT11 Display unit. To view it, share it to a USB memory stick.

See "Finalize" on page 8

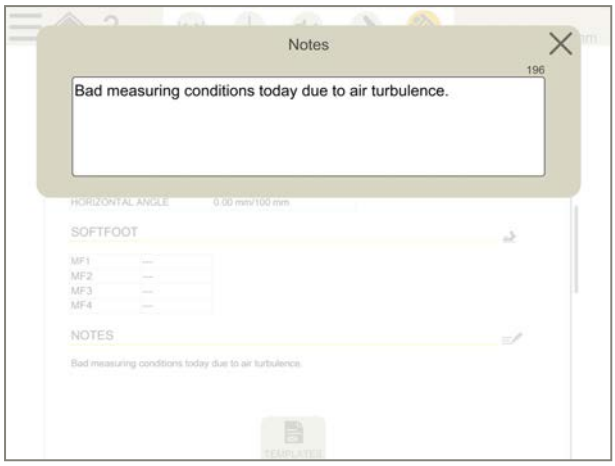
Select a report template

1. Tap to open the report.
2. Tap . A sidebar is displayed.
3. Select a template.

Add a note

1. Tap and .
2. Write a note and tap OK.

The note is visible in the report.



Add a photo

1. Tap and .
2. Tap .
3. Take the photo and tap [OK].

If you are using a template that will include a photo, it is now shown in the report. The photo is also saved in the File Manager.

NOTE! Currently, only one photo can be added to the report. If a new photo is taken, the previous one will be overwritten.

Add user information

The information you enter will be visible in the coming reports that is using the template "Detailed".

1. Tap on the startscreen to open the Settings menu.
2. Tap and enter user information.

See "User information" on page 16

Share a report to USB

1. Tap in the workflow to open the Report view.
2. Insert a USB memory stick.
3. Tap to share the file.

You can also share files from the File manager.

SETTINGS

Tap on the startscreen to open the Settings menu.

See "Wi-Fi" on page 18

See "System information" on page 17

Units

You can choose between metric or imperial units for your measurements. The selected unit is shown in the upper right corner of your screen during your measurements.

1. Tap on the startscreen to open the Settings menu.
2. Tap and select unit and resolution. Default is set to 0.01 mm.
3. Tap to close the Settings view. Your new settings are saved.

Language

1. Tap on the startscreen to open the Settings menu.
2. Tap and select a language.
3. Tap to close the Settings view. Your new setting is saved.

User information

The information you enter will be visible in the coming reports that is using the template "Detailed".

1. Tap on the startscreen to open the Settings menu.
2. Tap and enter user information.

Select logo

1. Insert a USB memory stick to the XT11.
2. Tap and select an image. (If you are not using the XT11, the file manager of your device will be opened.)
3. Tap "Use selected logotype".

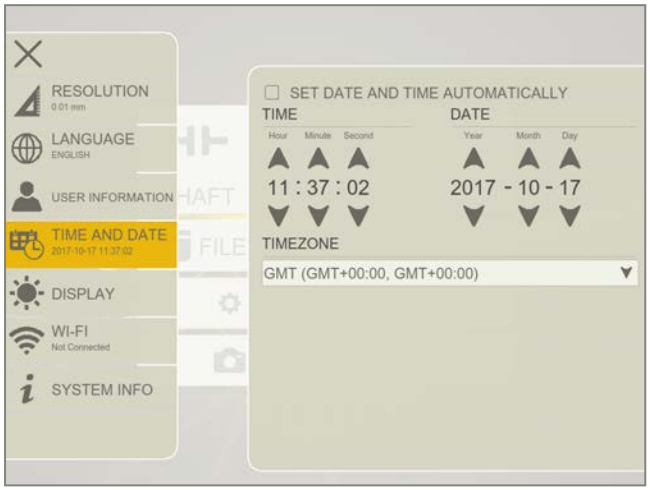
Reset logo

Tap to reset the logotype to standard Easy-Laser.

If you reset the logotype, you have to insert the USB memory stick if you want to select your logotype again.

Time and date

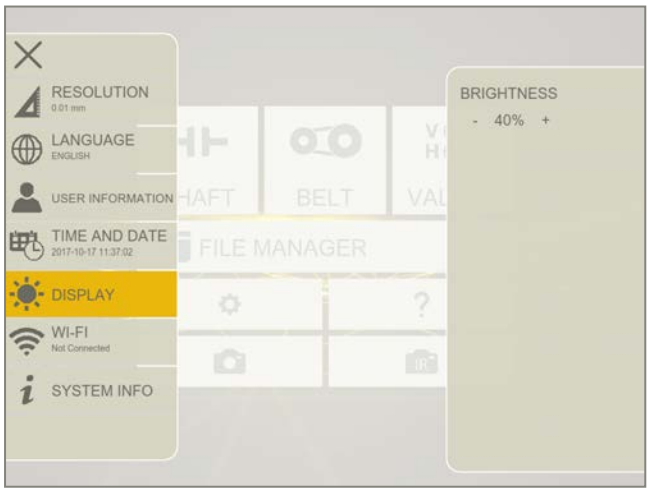
1. Tap on the startscreen to open the Settings menu.
2. Tap to set the time and date.
3. Tap to close the Settings view. Your new settings are saved.



Display

Adjust the brightness to make it easier to read in bright sunlight for example. Remember however that a high contrast consume more battery power. Default is set to 40%

1. Tap on the startscreen to open the Settings menu.
2. Tap and adjust the brightness.
3. Tap to close the Settings view. Your new setting is saved.



System information

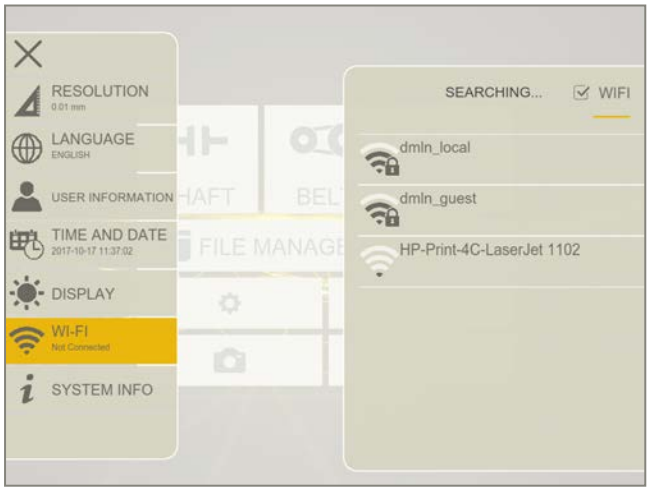
1. Tap on the startscreen to open the Settings menu.
2. Tap to show system information.

Update software

1. Go to our website to check for software updates.
2. Download the updates to a USB.
3. Insert the USB stick.
4. Tap to open Settings and tap the file name to install.

Wi-Fi

1. Tap on the startscreen to open the Settings menu.
2. Tap to open Wi-Fi settings.
3. Tap to close the Settings view. Your new settings are saved.



Icons

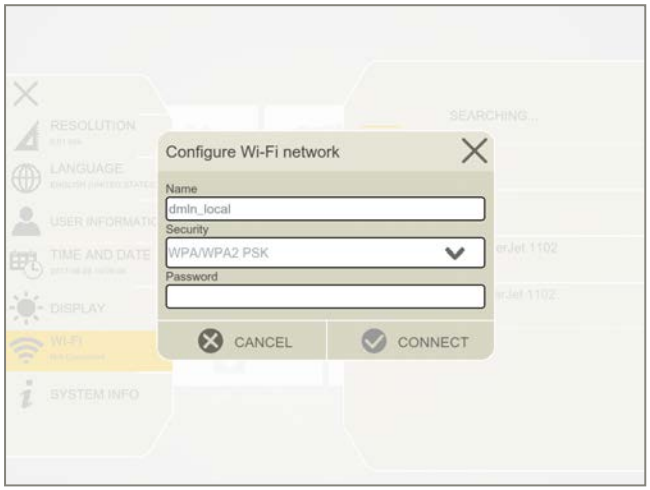
	Connected to a Wi-Fi network.
	A locked Wi-Fi. A password is requested.
	Wi-Fi is turned off. Turn off Wi-Fi if you are in an environment where wifi is not permitted.
	Remove the Wi-Fi network from the list.

	Connected to Wi-Fi, but no Internet connection is detected.
	Tap to display more information regarding the Wi-Fi network and connection.

Select Wi-Fi

Enter the password for the network.

Security options: Open, WEP, WPA/WPA2



DISPLAY UNIT

XT11 STARTSCREEN

A. The info display show battery information. See "Info display on XT11" on the next page.

B. On/Off button.

C. Lock screen/Battery
When the Display unit is off: Press to see the battery status.
When the Display unit is on: Press to lock the touch function on the screen. Prevents unintentional clicks, for instance when moving between work positions.

D. OK button.

E. Tap the screen to open a program.

On the startscreen you will find the icons for the programs you have downloaded, plus some default icons:

	See "File manager" on page 11
	See "Settings" on page 15
	Go to User Manual
	See "Wi-Fi" on page 18
	See "Camera" on page 24
IR	IR camera, optional equipment.

For technical information regarding XT11, See "Display unit XT11" on page 107

INFO DISPLAY ON XT11

The info display gives information about the battery status for both the Display unit and the connected measuring units. When the Display unit is off, you can press to show battery information.

A. Battery information for the connected measuring units.
B. Serial number for the measuring unit. This number is also found on the back of the measuring unit.
C. The screen is locked. Press to enable the touch function on the screen again.
D. Battery information for Display unit XT11.

	The remaining battery power is shown in percentage.
	Battery is low, please charge.
	The battery is being charged. When fully charged it shows 100.
	No batteries, the Display unit is run via the adapter. Contact your Service center.
	The battery in the Display unit has a high temperature. Stop charging the Display unit and let it cool. Start the Display unit and wait.
	At least one of the batteries in the Display unit is damaged or missing.
	The battery is empty, the Display unit will turn off in approx. 5 seconds.
	Cannot start the Display unit. Contact your Service center.
	Unbalanced battery, usually shown after a battery change. Start the Display unit and wait. When the warning is gone, charge the Display unit.
	The cover is open, usually after a battery change. Close the cover.

Lock screen

When the Display unit is on: Press lock the touch function on the screen. Prevents unintentional clicks, for instance when moving between work positions. To unlock, press again.

CHARGE XT11

Charge the display unit by plugging in the power adapter. For information about the battery status See "Info display on XT11" on the previous page. To fully charge the battery takes approximately 3 hours. It is possible to keep on using the equipment while it is charging.

NOTE! When finished working for the day, charge the whole system. Plug in the power adapter to the display unit.

Switch battery

If the battery must be switched, it is recommended that you contact your service center.

CAMERA

1. Tap and . The camera is also available from the start view.
2. Tap [TAKE PHOTO]. The camera is opened.
3. Tap to take a photo.

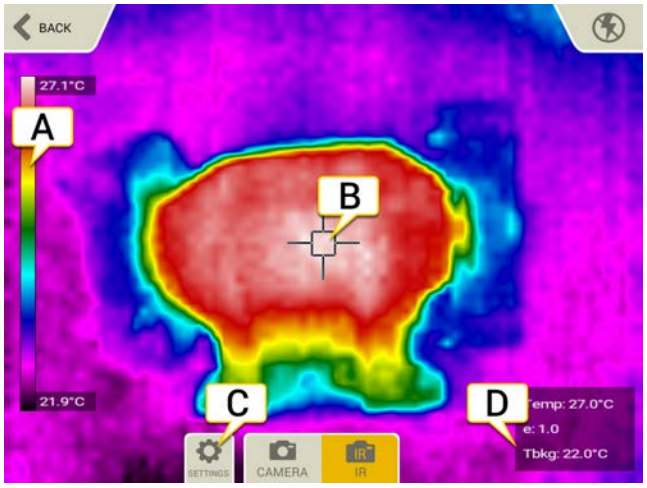
The photo is saved in File manager as a .png file. It is named with current date and time. If you have an ongoing measurement, the photo is added to the report. Currently, only one photo can be added to the report. If a new photo is taken, the previous one will be overwritten.

IR CAMERA

The IR (thermal) camera is optional equipment (Part No. 12-0968) and cannot be retrofitted.

1. Tap and . The camera is also available from the start view.
2. Tap to start the IR camera. Allow the camera to acclimatise for about five minutes in the environment in which it is to be used. This will ensure an optimal IR measurement.
3. Press to take a photo.

An IR photo is saved in the File manager as a .png file. It is named with current date and time. If you have an ongoing measurement, the photo is added to the report. If a new photo/IR photo is taken, the previous one will be overwritten in the report.



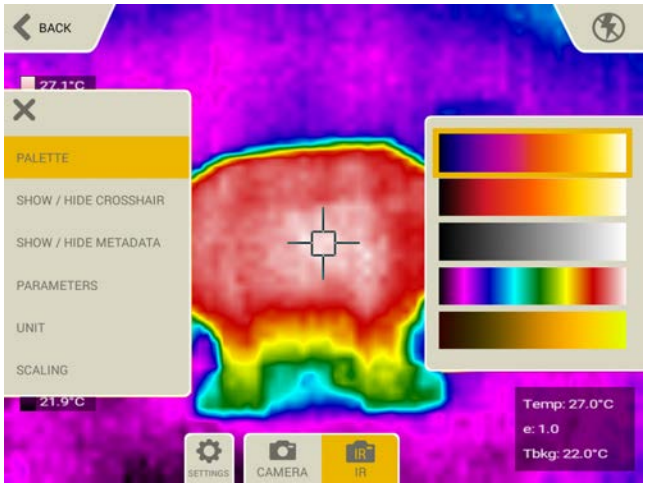
A. Heat scale.

B. Crosshair. This is where the temperature is registered (Temp, e and Tbkg).

C. Tap to open Settings.

D. Temp: The average temperature.
e: The emissivity value.
Tbkg: The reflected background temperature.

Settings



Palette

Change the color presentation of the infrared images. Select between iron, glowbow, grey, rain or yellow.

Show/hide

If you hide the crosshair and/or metadata, it will not be shown on the saved image either.

Emissivity (e)

The emissivity value of the surface/object is captured by the crosshair. The correct emissivity value is important for an accurate calculation. Possible values: 0.01 - 1.00, but we do not recommend value below 0.6. The value is normally set from a list of emissivity values for some common materials.

- 1.00 for a perfect blackbody.
- 0.01 for a perfect shiny (in the infrared spectrum) object.

Background temperature (Tbkg).

The reflected background temperature of the surface/object. Can normally be set to the ambient temperature. Value <382ºC (720ºF). Has no effect when e = 1.00

Unit

Select Celsius or Fahrenheit.

Scaling

By default, manual scaling is **not** used and the heat scale of the image will adjust automatically from the lowest temperature to the highest temperature of the IR image.

If you select manual scaling, you can decide which temperatures you want to visualize.

- Scale max: Enter a temperature (up to 450ºC).
- Scale min: Enter a temperature (down to 0ºC).

SCREENSHOT

It is possible to take screenshots of what is currently displayed on the XT11 screen.

1. Press the button.
2. Tap .
3. The screen dump is saved in File manager as a .png file. It is named with current date and time.

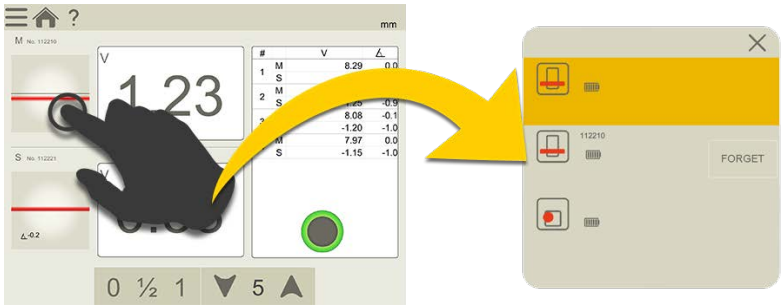
MEASURING UNITS

OVERVIEW

Select measuring units

If you have used any measuring units before, these will automatically be connected. There are also demo detectors available.

1. Tap a target to display the detector list.
2. Select from the list.
3. Tap ✕ to close.



Tap [FORGET] if you do **not** want to connect to the measuring unit automatically.

- See "XT40" on page 31
- See "XT50" on page 34
- See "XT60" on page 36

Charge

Charge the measuring units by plugging in the power adapter intended for the measuring units.

To fully charge the battery takes approx. 2 hours. Operating time for XT40 and XT60 is up to 24 h.

It is possible to keep on using the equipment while it is charging.

NOTE! When finished working for the day, charge the whole system. Plug in the power adapter to the measuring units.

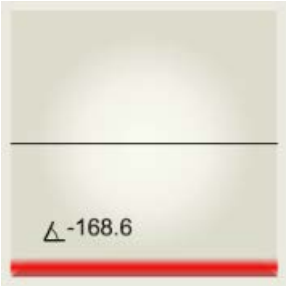
Information in the Display unit

Information regarding the Measuring units is also shown in the Display unit. On the targets you can clearly see when the battery is running low and the inclinometer value for example.

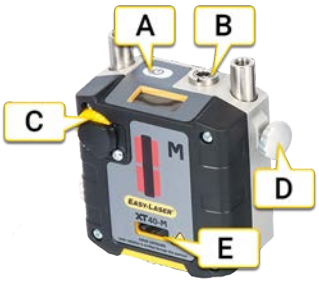
	Battery information.
	No measuring unit is connected. Tap the target to find possible units.
	Inclinometer value. When you move the measuring units, the inclinometer value becomes bigger.

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is still possible to register values when the edge warning is active.



XT40



A. On/Off button
B. Connection for charging cable
C. Laser adjustment knob
D. Locking knob
E. Laser aperture

Info display

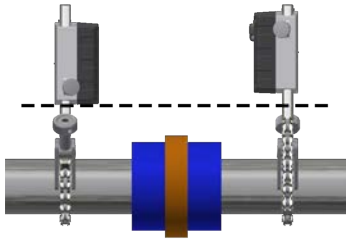
The measuring unit is equipped with an info display showing the angle value and battery information. The info display becomes active when the measuring unit is started.

	During start up, the display shows the version of the equipment. Start up takes approximately 3 seconds.
	The battery icon shows, in percentage, how much battery power that remains.
	The battery is being charged. When fully charged the symbol shows 100.
	Less than 10 % of the battery capacity remains. Charge the unit.
	The unit is unable to give information about the battery. Charge the unit until the battery icon shows 100.
	Something is wrong with the battery. It may be missing or damaged.
	The unit is shutting down. Shutting down takes approximately 3 seconds.
	Malfunction. Restart the unit, if it does not help, please contact your service center.
	System failure. Note the error code and contact your service center. Turn off the unit, do not charge.
	This icon indicates that wireless communication is established between the Display unit and measuring unit.

For technical information regarding the XT40, See "Measuring units XT40" on page 108.

Set up XT40

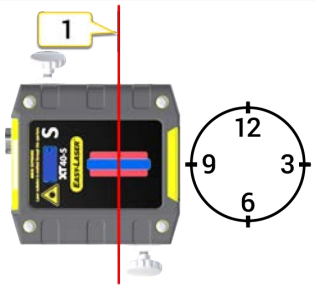
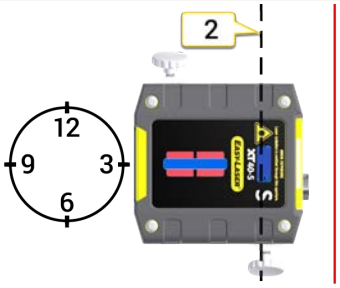
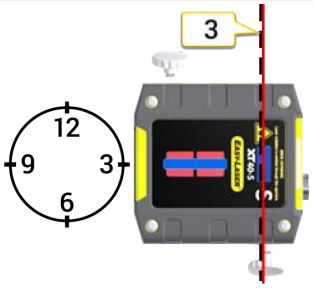
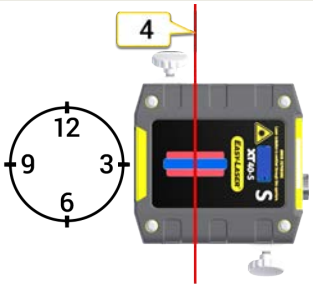
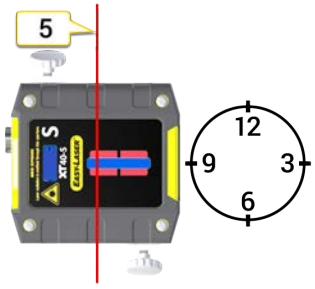
1. Mount the S-unit on the stationary machine and the M-unit on the movable machine. You can place the measuring units up to 10 m apart.
2. Mount the units facing each other. Make sure they are at the approximately same rotational angle and radius. You need to place the measuring units with an offset. See image.



Place the measuring units with an offset

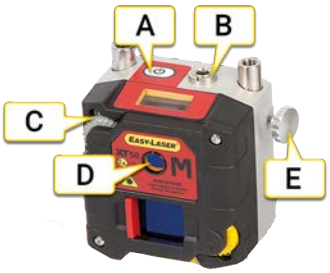
Rough align

When making a new installation, a rough alignment can be necessary. Place the Measuring units on the rods, make sure they are at the approximately same rotational angle and radius. Also make sure that the adjustment knob is adjustable in both directions.

	1. Place the Measuring units at 9 o'clock. Adjust the laser line to the center of both targets. Use the adjustment knob and/or move the detectors on the rods.
	2. Turn the shafts 180º. Make a mark on the rods or machine halfway between the laser line and center of both targets.
	3. Adjust the laser beams half way to the center of targets. Use the adjustment knobs and/or move the detectors on the rods.
	4. Adjust the movable machine until the laser beam hits the center of both targets.
	5. Turn the shafts 180º. Check if both laser lines hit the targets. If not, repeat step 3–5. Turn shafts to 12 o'clock. Repeat all steps for vertical adjustment.

XT50

XT50 is an intrinsically safe laser product, please read the safety instructions. See "XT550 Shaft" on page 116



A. On/Off button
B. Connection for charging cable
C. Laser adjustment knob
D. Locking knob
E. Laser aperture

To rough align the measuring units, See "Set up XT60" on page 37

Info display

The measuring unit is equipped with an info display showing the angle value and battery information. The info display becomes active when the measuring unit is started.

	During start up, the display shows the version of the equipment. Start up takes approximately 3 seconds.
	The battery icon shows, in percentage, how much battery power that remains.
	The battery is being charged. When fully charged the symbol shows 100.
	Less than 10 % of the battery capacity remains. Charge the unit.
	The unit is unable to give information about the battery. Charge the unit until the battery icon shows 100.
	Something is wrong with the battery. It may be missing or damaged.
	The unit is shutting down. Shutting down takes approximately 3 seconds.
	Malfunction. Restart the unit, if it does not help, please contact your service center.
	System failure. Note the error code and contact your service center. Turn off the unit, do not charge.
	This icon indicates that wireless communication is established between the Display unit and measuring unit.

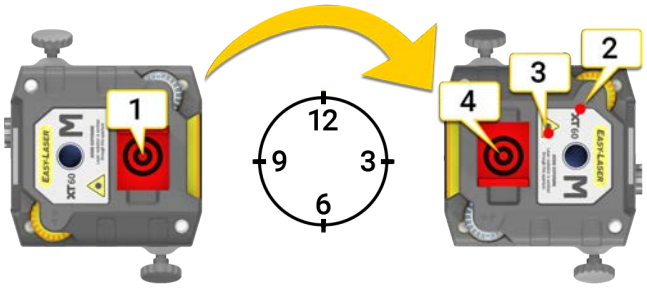
For technical information regarding the XT50, See "Measuring units XT50" on page 110

Set up XT50

1. Mount the S-unit on the stationary machine and the M-unit on the movable machine. You can place the measuring units up to 20 m apart.
2. Mount the units facing each other. Make sure they are at the approximately same rotational angle and radius.

Rough align

When making a new installation, a rough alignment can be necessary. Place the measuring units on the rods, make sure they are at the approximately same rotational angle and radius. Also make sure that the adjustment knob is adjustable in both directions. The example below shows the M-unit, but the procedure is made on both units.



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

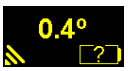
XT60

A. On/Off button
B. Connection for charging cable
C. Laser adjustment knob
D. Locking knob
E. Laser aperture

To rough align the measuring units, See "Set up XT60" on the facing page

Info display

The measuring unit is equipped with an info display showing the angle value and battery information. The info display becomes active when the measuring unit is started.

	During start up, the display shows the version of the equipment. Start up takes approximately 3 seconds.
	The battery icon shows, in percentage, how much battery power that remains.
	The battery is being charged. When fully charged the symbol shows 100.
	Less than 10 % of the battery capacity remains. Charge the unit.
	The unit is unable to give information about the battery. Charge the unit until the battery icon shows 100.
	Something is wrong with the battery. It may be missing or damaged.
	The unit is shutting down. Shutting down takes approximately 3 seconds.
	Malfunction. Restart the unit, if it does not help, please contact your service center.
	System failure. Note the error code and contact your service center. Turn off the unit, do not charge.
	This icon indicates that wireless communication is established between the Display unit and measuring unit.

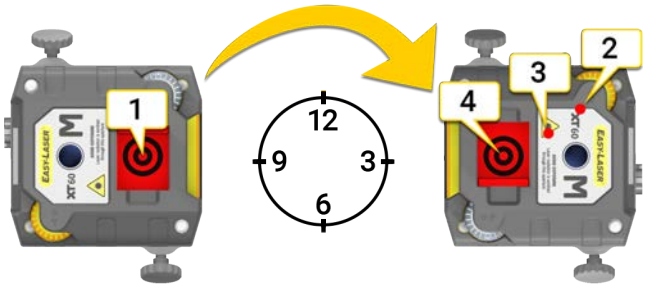
For technical information regarding the XT60, See "Measuring units XT60" on page 113.

Set up XT60

1. Mount the S-unit on the stationary machine and the M-unit on the movable machine. You can place the measuring units up to 20 m apart.
2. Mount the units facing each other. Make sure they are at the approximately same rotational angle and radius.

Rough align

When making a new installation, a rough alignment can be necessary. Place the measuring units on the rods, make sure they are at the approximately same rotational angle and radius. Also make sure that the adjustment knob is adjustable in both directions. The example below shows the M-unit, but the procedure is made on both units.

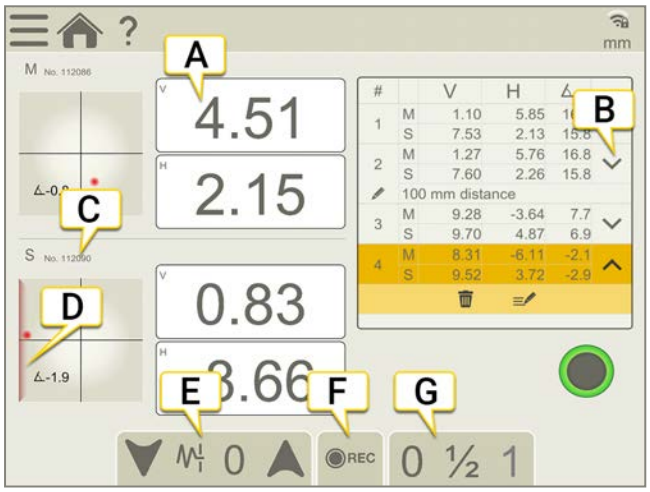


1. Place the units at 9 o’clock. Aim the laser beams at the centre of the targets.
2. Turn the shaft to position 3 o’clock. Note where the laser beams hit.
3. Adjust the laser beams half way to the centre of targets. Use the adjustment knobs.
4. Adjust the movable machine until the laser beam hits the centre of targets.

VALUES

OVERVIEW

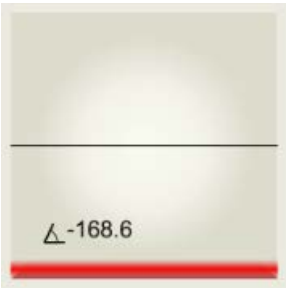
With the program Values, you can see live readings from the detectors. On the start view, tap V 0.00 H 0.00 to open the program.



A. M-unit values.
B. Registered values. In the sub-menu you can delete a measurement or add a note to it.
C. Detector serial number.
D. Edge warning.
E. Filter. See "Filter" on page 10
F. Autorecord. See "Autorecord" on page 43
G. Zero set or halve value.

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is still possible to register values when the edge warning is active.



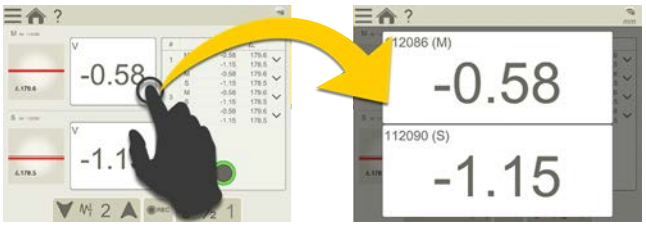
Select measuring units

1. Tap a target.
2. Select a measuring unit and tap Close.

For more information regarding the measuring units, See "XT40" on page 31.

Enlarge the value box

Tap the value box to make it bigger. This is useful when you need to read from a distance.



Delete value

1. Tap ⌄ on the value you want to delete.
2. Tap 🗑 to delete the value.

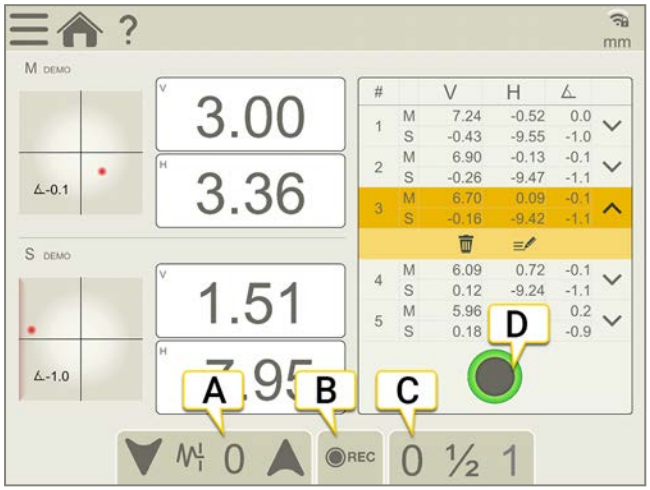
Add a note

Notes are also visible in the report.

- Select ☰ and 📝 if you want to add a note for the **whole** measurement.
- Tap ⌄ on a value and then 📝 to add a note for the selected value.

MEASURE

1. Tap to register values.
2. Tap and to finalize the measurement. The measurement is saved in the File manager.



A. Filter See "Filter" on page 10
B. Autorecord. See "Autorecord" on the facing page.
C. Halve or zero set value.
D. Tap to register values.

Halve value

1. Tap ½ on the tab to halve the displayed value. Zero point of the target moves halfway towards the laser point.
2. Tap 1 on the tab to return to the absolute value. Zero point of the target returns to the center.

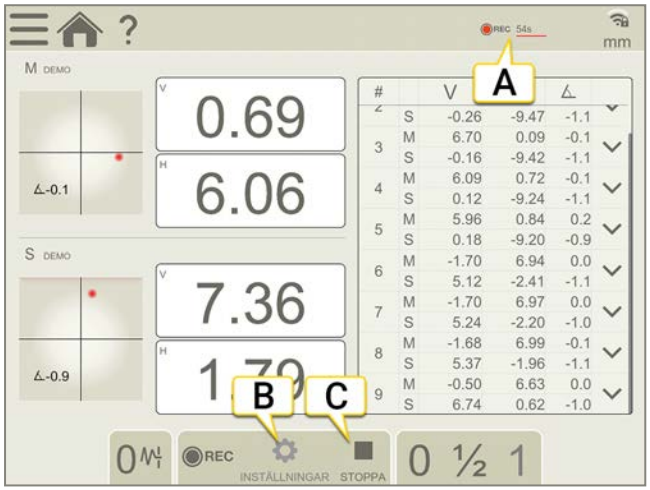
Zero set value

1. Tap 0 on the tab to zero set the displayed value. Zero point of the target moves to the laser point.
2. Tap 1 on the tab to return to the absolute value. Zero point of the target returns to the center.

AUTORECORD

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. Tap REC to open the Autorecord tab.
2. Tap ▶ to start recording values.
3. The recording will start and you can follow the progress on screen.
4. Tap ■ to stop the measurement.



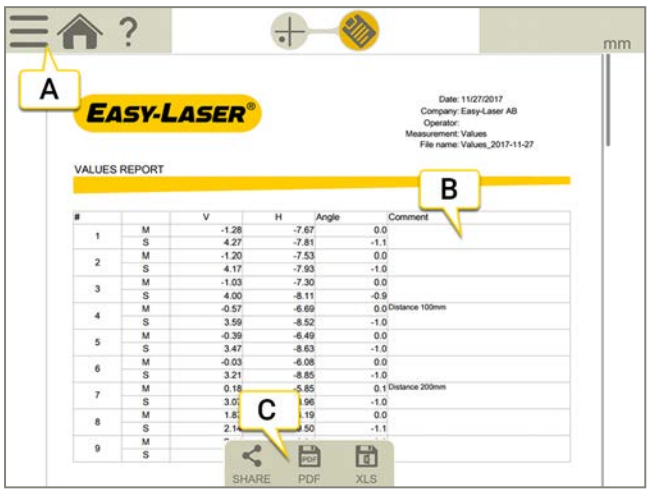
A. Indicates that values are being recorded.
B. Tap to set duration and interval.
C. Stop the measurement.

Duration and interval

1. Tap ⚙ to open Settings.
2. Tap ⏱ to set the interval. Default is set to one second.
3. Tap ⏱ to set the duration. Default is set to one minute.

VALUES REPORT

The report covers all details from the measurement. The report is constantly being filled out while the session is carried out. To see the report at its current state, tap in the workflow.



A. Tap and to finalize the measurement. See "Finalize" on page 8

B. Comments made are visible here. To add a note for the whole measurement, tap .

C. Share and/or save the report.

For information on how to:

- Change the template
- Add a note
- Add a photo
- Change user information
- Save a report
- Share a report to USB

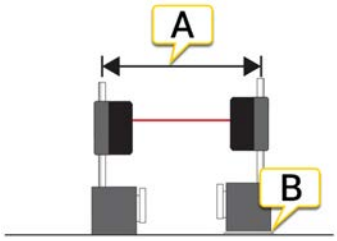
See " Report" on page 13

CALIBRATION CHECK

Use the program Values to check if the detector readings are within specified tolerances.

Quick check

1. Tap 0 to zero set the value.
2. Place a shim under the magnet base to lift the M-unit 1 mm (100 mils). The M-unit's reading shall correspond to the movement within 1 % (1 mil ± 1 digit) (0.01 mm ± 1 digit).
3. Remove the shim from the M-unit.
4. Tap 0 to zero set value.
5. Make a mark to mark out the position of the detector.
6. Place the shim under the magnet base of the S-unit. The S-unit's reading shall correspond to the movement within 1 % (1 mil ± 1 digit) (0.01 mm ± 1 digit).

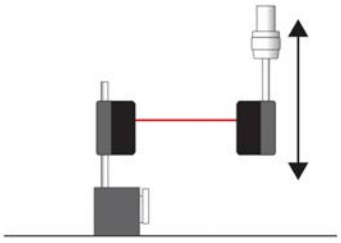


A. Make sure that the distance is kept.
B. Parallel lift to a known distance. Shim exactly 1 mm.

NOTE! The shim must be exactly 1 mm. In this example it is only the M-unit that is checked.

Precision check

1. Fasten one of the measuring units in a machine tool.
2. Tap 0 to zero set value.
3. Move the unit a known distance. Use the movement of a machine tool spindle.
4. The fastened unit's reading shall correspond to the movement within 1 % (1 mil ± 1 digit) (0.01 mm ± 1 digit).



Move the unit a known distance.

NOTE! In this example it is only the unit fastened in the machine that is checked.

HORIZONTAL

WORKFLOW

This program is used for horizontally mounted machines.

The workflow on the top of the screen will guide you through your work. The current view is marked yellow. The report is constantly being filled out while the session is carried out. To see the report at its current state tap in the workflow.

The measurement is saved automatically through the entire workflow. When you have finished the measurement, tap and to finalize it.

- Prepare. See "Prepare" on the next page
- Measure. See "Measure using EasyTurn™" on page 55
- Result. See "Result" on page 63
- Adjust. See "Adjust" on page 69.
- Report. See "Horizontal Report" on page 71.

See also

See "New, continue and save" on page 7

See "Finalize" on page 8

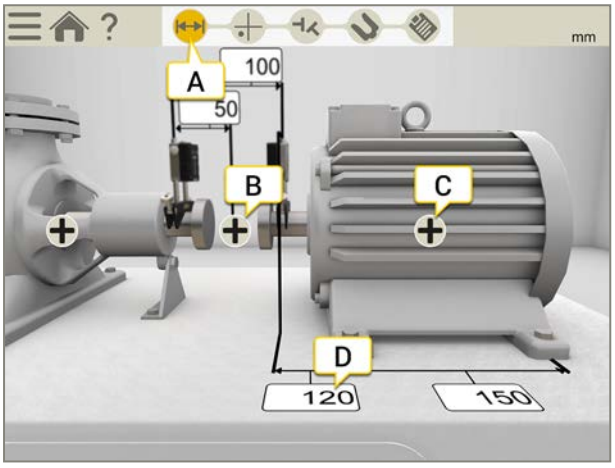
PREPARE

First you need to set up and rough align the measuring units:

- See "Set up XT40" on page 32
- See "Set up XT50" on page 35
- See "Set up XT60" on page 37

On the Prepare view, you enter machine and coupling properties. It is possible to go back to the Prepare view later and enter/alter information.

Tap + to display a property menu for the Coupling or the Machine.



A. The Prepare icon is active in the workflow.
B. Tap to open coupling properties. (Coupling diameter, RPM and Tolerance.)
C. Tap to open machine properties. (Name, Thermal compensation and Softfoot.)
D. Tap any input field to enter distance.

NOTE! Make sure that the measuring units are charged.

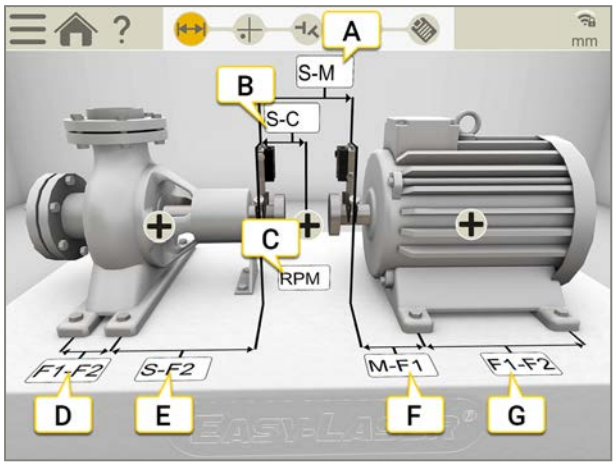
Menu icons

Tap ☰ to open the menu.

	Mirror the machines.
	Show Gap. If you want the result based on the gap of the coupling instead of angle, it is necessary to enter the coupling diameter.
	Add a note to the report. See " Report" on page 13
	See "Camera" on page 24
	Finalize the measurement. See "Finalize" on page 8

Enter distances

Tap any distance input field to enter distance. The field is zoomed in and the keyboard is displayed..



To enter distances on the S-machine, tap + and |↔| to display the fields.

A. Distance between S-unit and M-unit. Measure between the rods.
B. Distance between S-unit and center of coupling.
C. RPM. When you enter rpm, a corresponding tolerance is automatically selected.
D. Distance between first and second feet pair.
E. Distance between second feet pair and S-unit.
F. Distance between M-unit and feet pair one. It is possible to enter a negative value here.
G. Distance between feet pair one and feet pair two.

Required distances

It is possible to skip all distances and go directly to Measure view. If you change a distance later on, the result is recalculated.

- To calculate an offset and angle result, you need to enter at least the distances between S and M.
- Feet values can only be calculated if you have entered the distance between the feet pairs.

Coupling diameter

If you want the result based on the gap of the coupling instead of angle, it is necessary to enter the coupling diameter. The coupling diameter is visible in the report.

1. On the coupling, tap +.
2. Tap ∅.
3. Enter the diameter.

Gap

To show the result as gap, tap ☰ and ⊣⊻.

RPM

The rotation speed of the shafts will decide the demands on the alignment. When you select a rpm value, a matching tolerance is set automatically.

The higher the rpm of a machinery is, the tighter the tolerance must be. The tolerance level "good" is used for re-alignments on non-critical machinery. New installations and critical machines should always be aligned within the tolerance level "excellent". See "Tolerance" on page 74

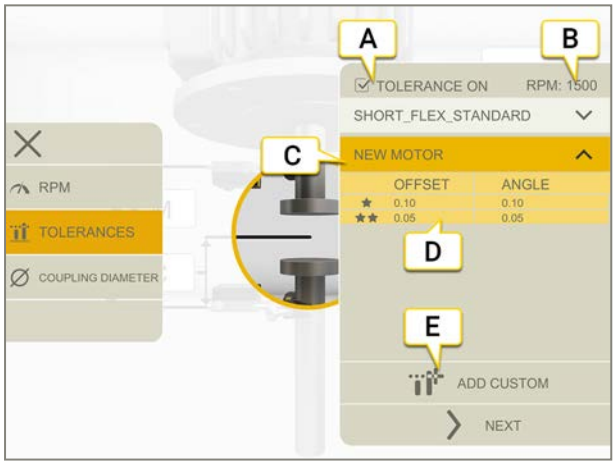
1. Tap the RPM field to enter a value. Or tap + on the coupling.
2. Enter RPM. A tolerance is automatically set to match the RPM you entered.

Tolerance

The rotation speed of the shafts will decide the demands on the alignment. When you select a rpm value, a matching tolerance is set automatically.

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

1. On the coupling, tap +.
2. Tap to display the tolerance menu.

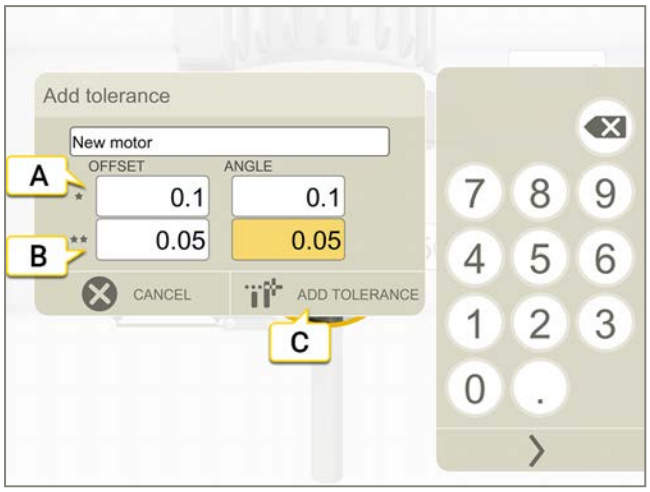


A. Turn tolerance on/off.
B. Current RPM.
C. Selected tolerance.
D. Tolerance levels. Good = ★. Excellent = ★★.
E. Add custom tolerance.

Custom tolerance

Many machines must be aligned very accurately even if they have a lower rpm. You can add your own user defined tolerance.

1. Tap +.
2. Enter offset and angle values.



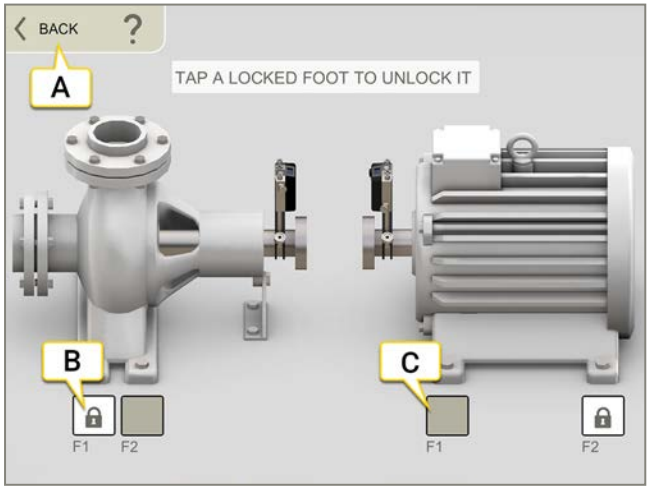
A. Tolerance level "good". Offset and angle.
B. Tolerance level "excellent". Offset and angle.
C. Add the custom tolerance.

Locked feet

This function is useful in cases when a feetpair is difficult or impossible to adjust. The Lock feet function allows you to select which feet that are locked and which that are adjustable. This way you can also choose which machine is to be used as stationary and which as movable. To display feet values on a machine with locked feet, you need to enter the distances.

Lock feet

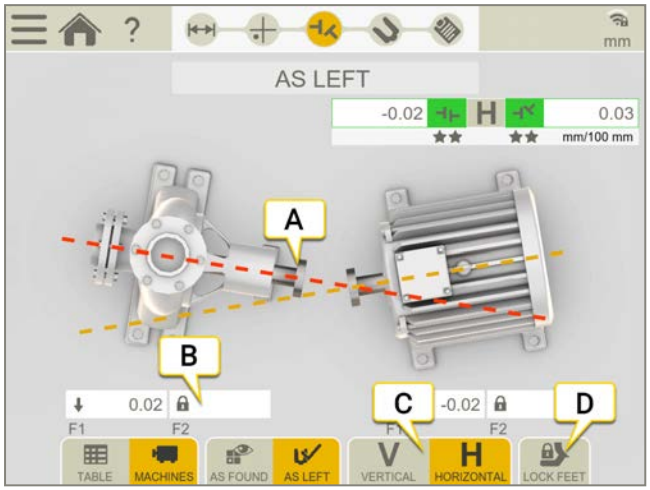
1. Tap + on the S-machine and enter the distances.
2. Tap + on a machine.
3. Tap to display the Lock feet view.
4. Tap in any two fields to lock the corresponding feetpair. If you want to move a lock, simply tap it to unlock and then tap in another field.
5. Tap to go back to Prepare view.



A. Tap to go back to Prepare view.
B. Tap if you want to unlock and move the lock.

C. The field is disabled. If you want to lock this feetpair, you need to unlock and move another lock. It is only possible to have two locked feetpairs.

Locked feet in Result view



A. Both the S- and M-machine are visible when you have locked feet.
B. This feetpair has been locked.
C. Toggle between showing horizontal or vertical result.
D. Tap to display the Lock feet view.

NOTE! To display feet values on a machine with locked feet, you need to enter the distances.

Softfoot

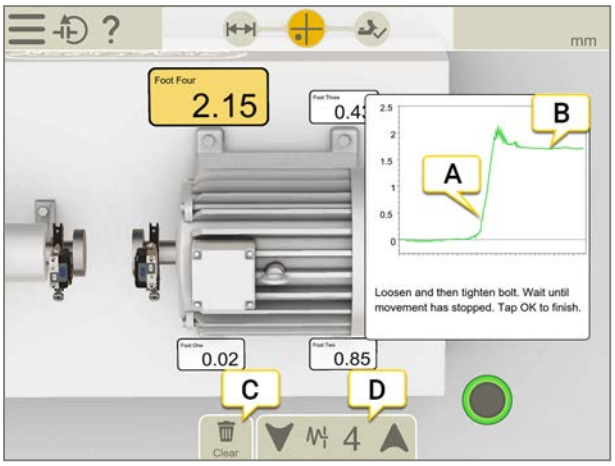
Perform a softfoot check to ensure that the machine is resting evenly on all its feet. A softfoot can be angular and/or parallel. Softfoot can be caused by:

- Twisted machinery foundations.
- Twisted or damaged machinery feet.
- Improper amount of shims under machine feet.
- Dirt or other unwanted materials under machine feet.

Measure

To perform a Softfoot check, you need to enter distances between the feet pairs.

1. Tap on the machine.
2. Tap .
3. Place the detectors at 12 o'clock and rough align if needed.
4. Tap in the workflow.
5. Tap any of the feet value boxes.
6. Loosen bolt and wait for movement. Check the graph to see when the value has stabilized.
7. Tighten the bolt and wait for the value to stabilize again.
8. Tap to register value.
9. Tap another foot to measure. Tap to show the Softfoot result.
10. Tap to return to the Prepare view.



A. Loosen bolt and wait for movement.
B. Movement has stabilized. Tighten the bolt.
C. Tap if you want to clear all softfoot values.
D. Filter.

Filter

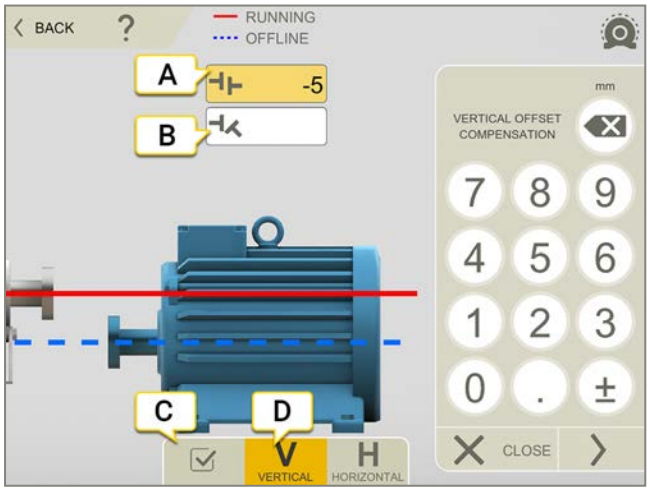
If you have a low filter, the detector filter is increased to filter 4 when you measure Softfoot. If you increase the filter setting while measuring Softfoot, the new filter will be default next time you start Softfoot.

Thermal compensation

During normal operation, machinery is influenced of different factors and forces. The most common of these changes is the change in the temperature of the machine. This will cause the height of the shaft to increase. This is called thermal growth. To compensate for thermal growth, you enter values for cold condition compensation. It can be necessary to place the offline (cold) machine a bit lower to allow thermal growth.

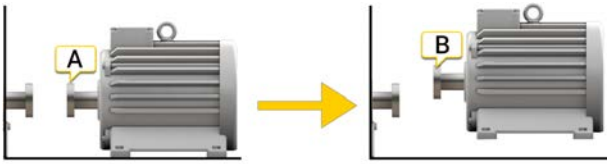
1. Tap + on the machine.
2. Tap to open the Thermal Compensation view.
3. Enter values for Vertical and/or Horizontal compensation. When you enter compensation values, the machine turns blue.
4. Tap to return to Prepare view.

The compensation values are visible in the report.



A. Offset value.
B. Angle value.
C. Turn Thermal compensation on/off. If you turn it off, the values are saved but will not be used.
D. Show V (vertical) or H (horizontal) view.

Example without compensation

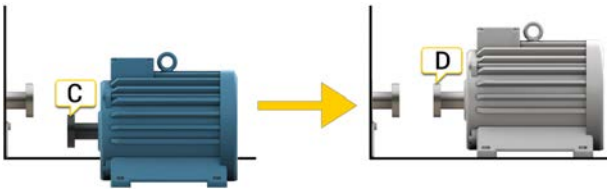


A. Offline, no compensation set. The machines are aligned.

B. Running, the machine "grows" 5 mm, and is no longer aligned.

Example with compensation

In this example we assume a thermal growth of +5 mm in HOT condition. Therefore we compensate with -5 mm in off-line condition.



C. Offline, a -5 mm compensation has been set.

D. Running, the machine grows and will be perfectly aligned!

Name the machine

Use if you want to change the default names on the machines. The name is visible in the report.

1. Tap + on the machine.
2. Tap .
3. Tap the text input field to change the name.

MEASURE USING EASYTURN™

With EasyTurn™, it is possible to measure with as little as 40º spread between the measurement points. However, for an even more accurate result, try to spread the points as much as possible.

Preparations

Before you start measuring, make sure you have done the preparations you need.

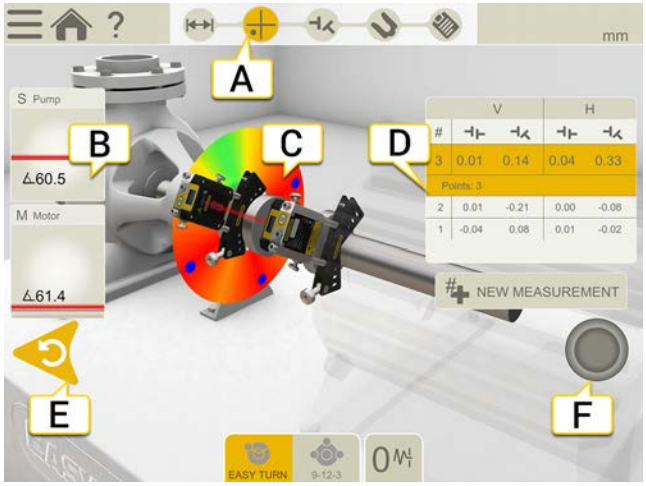
- Mount the measuring units.
- To calculate results, you need to enter at least the distance between the measuring units, see "Enter distances" on page 49.
- Connect measurement units.
- If needed, perform a rough alignment.
- If needed, measure Softfoot. See "Softfoot" on page 52.

Measure

It is possible to switch measuring method before you have registered a value.

1. Tap on the tab to select the method EasyTurn.
2. Adjust laser to the center of the targets. If needed, adjust the units on the rods, then use laser adjustments knobs.
3. Tap to register the first position. A red marking is displayed.
4. Turn the shafts at least 20º.
5. Tap to register the second position.
6. Turn the shafts at least 20º.
7. Tap to register the third position.
8. Tap to go to the Result view, or tap to measure again.

The registered values are saved when you leave the Measure view. If you return to the Measure view, it is possible to do a new measurement.



A. The Measure icon is active in the workflow.
B. Tap to display detector information.
C. Red = turn shafts outside the red marking.
   Green = turn shafts to green area.
   Blue = registered position.
D. Measurement table.

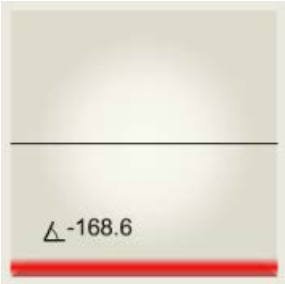
E. Delete registered value.

F. This icon is gray when it not possible to register a value.

	Make a new measurement. This makes it possible to check the repeatability of the measurement.
	Measure using EasyTurn™.
	Measure using 9-12-3.
	Measure using Multipoint.
	Measure using Continuous sweep.
	Set Filter value.

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is still possible to register values when the edge warning is active.



MEASURE USING 9-12-3

The measuring positions are registered at positions 9, 12, 3 o'clock. The inclinometers are not used.

Preparations

Before you start measuring, make sure you have done the preparations you need.

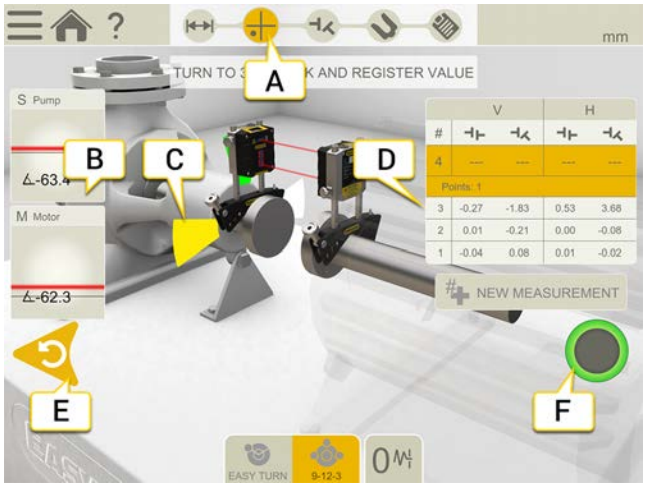
- Mount the measuring units.
- To calculate results, you need to enter at least the distance between the measuring units, see "Enter distances" on page 49.
- If needed, perform a rough alignment.
- If needed, measure Softfoot, see "Softfoot" on page 52.

Measure

It is possible to switch measuring method before you have registered a value.

1. Tap on the tab to select the method 9-12-3.
2. Adjust laser to the center of the targets. If needed, adjust the units on the rods, then use laser adjustments knobs.
3. Turn shafts to 9 o'clock.
4. Tap to register the first position.
5. Turn shafts to 12 o'clock.
6. Tap to register the second position.
7. Turn shafts to 3 o'clock.
8. Tap to register the third position.
9. Tap to go to the Result view, or tap to measure again.

The registered values are saved when you leave the Measure view. If you return to the Measure view, it is possible to do a new measurement.

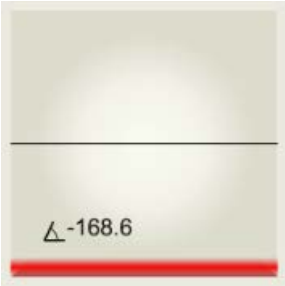


A. The Measure icon is active in the workflow.
B. Tap to display detector information.
C. Yellow = registered position.
   Green = turn shafts to green area.
D. Measurement table.
E. Delete registered value.
F. This icon is gray when it not possible to register a value.

	Make a new measurement. This makes it possible to check the repeatability of the measurement.
	Measure using EasyTurn™.
	Measure using 9-12-3.
	Measure using Multipoint.
	Measure using Continuous sweep.
	Set Filter value.

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is still possible to register values when the edge warning is active.



MEASURE USING MULTIPOINT

Preparations

Before you start measuring, make sure you have done the preparations you need.

- Mount the measuring units. "Multipoint" is available when you use XT60 measuring units.
- To calculate results, you need to enter at least the distance between the measuring units, see "Enter distances" on page 49.
- Connect measurement units.
- If needed, perform a rough alignment.
- If needed, measure Softfoot. See "Softfoot" on page 52.

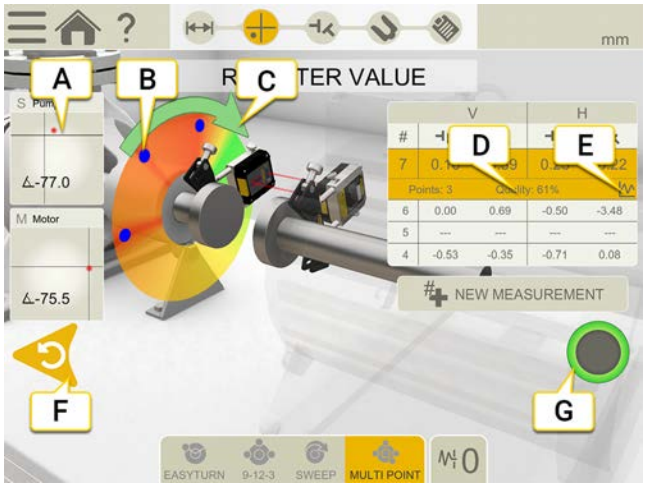
Measure

It is possible to switch measuring method before you have registered a value.

For a more accurate result, try to spread the points as much as possible. The colours indicates where the optimum positions to measure are. Green is best place to measure. Always turn the shaft in the same direction for a more accurate result.

1. Tap on the tab to select the method Multipoint.
2. Adjust laser to the center of the targets. If needed, adjust the units on the rods, then use laser adjustments knobs.
3. Tap to register the first position. The first position is automatically set to zero.
4. Tap to register as many positions as you wish. After three points a result is available.
5. Tap to go to the Result view, or tap to measure again.

The registered values are saved when you leave the Measure view. If you return to the Measure view, it is possible to do a new measurement.



A. Tap to display detector information.
B. Registered measurement point.
C. Measurement direction. If you change direction during the measurement, the arrow turns red.
D. Quality assessment.
E. Tap to display detailed information.
F. Delete registered value.
G. Tap to register values.

	Make a new measurement. This makes it possible to check the repeatability of the measurement.

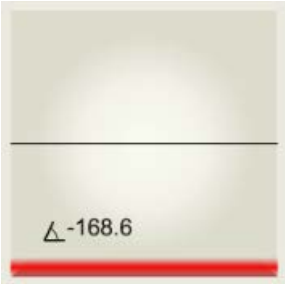
	Measure using EasyTurn™.
	Measure using 9-12-3.
	Measure using Multipoint.
	Measure using Continuous sweep.
	Set Filter value.

Detailed information

Tap to show detailed information. See "Result details" on page 66

Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is still possible to register values when the edge warning is active.



MEASURE USING CONTINUOUS SWEEP

Automatic recording of measurement values during continuous sweeping of the shaft.

There is no limit on the number of points.

Preparations

Before you start measuring, make sure you have done the preparations you need.

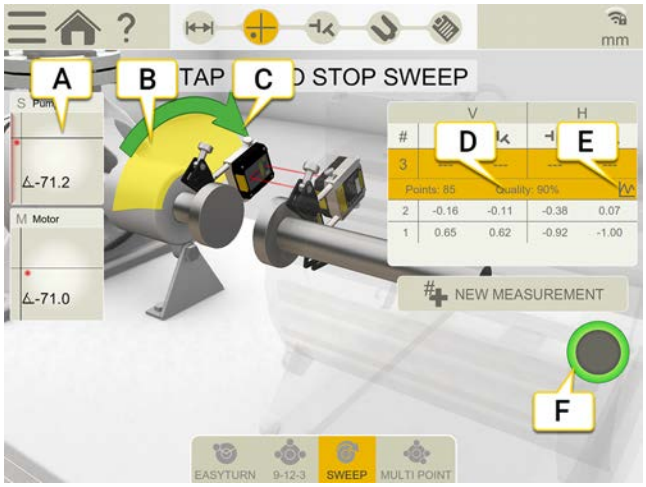
- Mount the measuring units. "Continuous sweep" is available when you use XT60 measuring units.
- To calculate results, you need to enter at least the distance between the measuring units, see "Enter distances" on page 49.
- Connect measurement units.
- If needed, perform a rough alignment.
- If needed, measure Softfoot. See "Softfoot" on page 52.

Measure

It is possible to switch measuring method before you have registered a value.

1. Tap on the tab to select the method Continuous sweep.
2. Adjust laser to the center of the targets. If needed, adjust the units on the rods, then use laser adjustments knobs.
3. Tap to start the measurement.
4. Turn the shafts. Turn the shafts as much as possible for a more accurate result.
5. Tap to stop the measurement.
6. Tap to go to the Result view, or tap to measure again.

The registered values are saved when you leave the Measure view. If you return to the Measure view, it is possible to do a new measurement.



A. Tap to display detector information.
B. Yellow area is where points have been registered.
C. Measurement direction. If you change direction during the measurement, the arrow turns red.
D. Quality assessment.
E. Tap to display detailed information.
F. Tap to start and stop the measurement.

	Make a new measurement. This makes it possible to check the repeatability of the measurement.

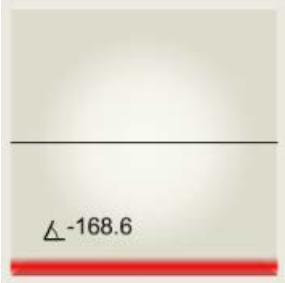
	Measure using EasyTurn™.
	Measure using 9-12-3.
	Measure using Multipoint.
	Measure using Continuous sweep.

Detailed information

Tap to show detailed information. See "Result details" on page 66

Edge warning

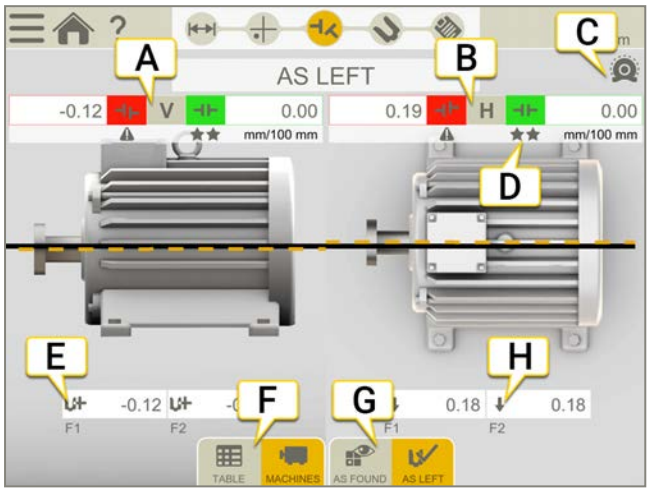
When the laser beam is close to the edge, the edge is “lit up” as a warning. It is still possible to register values when the edge warning is active.



RESULT

On the Result view, the offset, angle and feet values are clearly displayed. Both horizontal and vertical directions are shown. You can go back and forth between the views Measure, Result and Adjust.

Tap if you want to adjust the machine. After you have adjusted, it is possible to go back to the Result view.

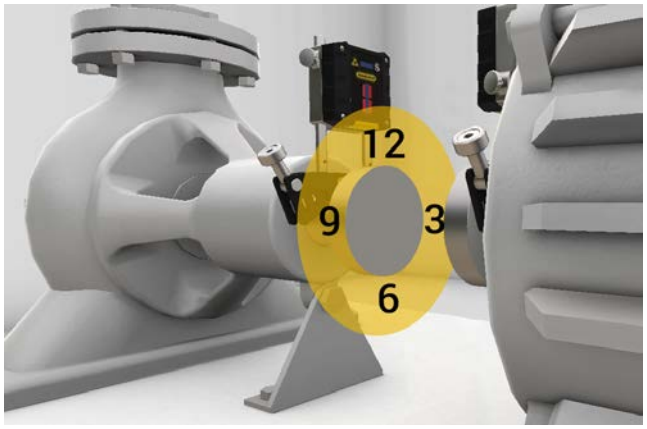


A. Vertical offset and angle values.
B. Horizontal offset and angle values.
C. Thermal compensation has been set.
D. Tolerance indicators.
E. Vertical feet values. If you have locked a feetpair, this is visualized with a lock. See "Locked feet " on page 51
F. Horizontal feet values.
G. Show Table or Machine view. See "Result table" on page 65
H. Show "As found" or "As left" values.

NOTE! When you have locked feet, both machines are displayed and you have to toggle between V and H values.

How to read the values

When reading the values, face the stationary machine (S) from the movable machine (M). Then 9 o'clock is to the left, as in the measuring programs.



As found or As left

On the tabs, it is possible to toggle between showing As found or As left values.

	As found is the latest measurement you made before going to the Result view.
	As left is the latest adjusted result. Available if you have gone to the Adjust view (and shown live values) and returned to Result view.

Tolerance indicators

The tolerance indicators are visible for a while. To show them after they have disappeared, simply tap the value.

★	Indicates the tolerance level "good". Yellow background.
★★	Indicates the tolerance level "excellent". Green background.
⚠	Indicates not within tolerance. Red background.

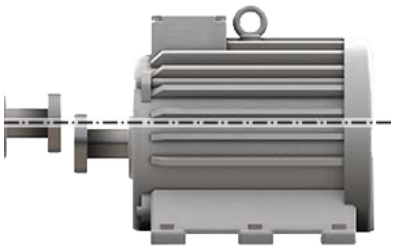
Show Gap

By default, angular error/100 mm is displayed. To show gap, you need to set the coupling diameter.

To show the result as gap, tap ☰ and .

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. These values are important to get within tolerance.

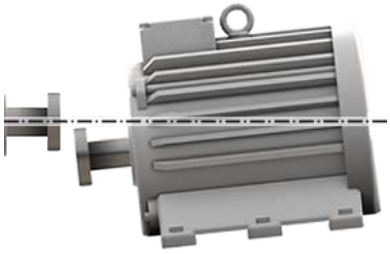


Offset:

The center lines of two axis are not concentric but parallel. This is measured at the coupling centers. In this example, a negative offset is shown.

Angular misalignment:

The center lines of two axis are not parallel. In this example, a positive angle is shown.

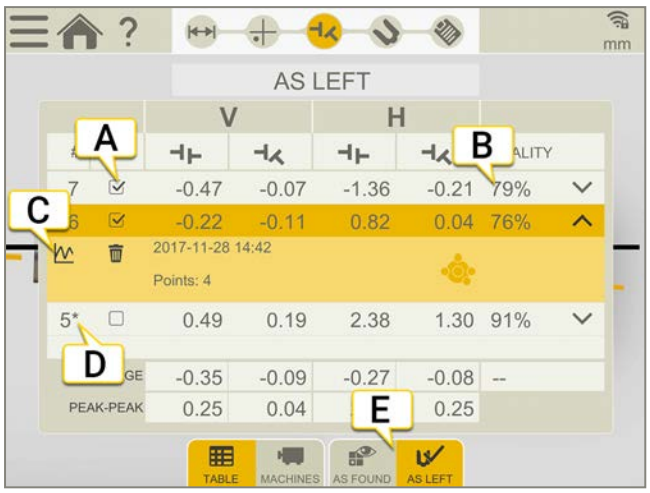


Offset and angular misalignment:

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

Result table

In the Result view, tap to display the table view.



A. Select to use the measurement in the calculations.
B. Quality assessment for the measurement. Available if you have used the method Continuous Sweep or Multipoint.
C. Open detailed view See "Result details" on the next page
D. This measurement has been adjusted.
E. Toggle between showing As found or As left values.

If you want delete a measurement, tap and .

Use

By default, all measurements are included in the calculations. If you deselect measurements, the values for Average and Peak to Peak are updated. The excluded measurements are not included in the calculations, but still visible. The report will not be affected if you hide any measurements, in the report it is always the latest measurements that are shown.

NOTE! It is always the latest measurement and adjustment that are shown in the report.

Average

The average offset and angle values. Calculations are based on the measurements marked as "Use".

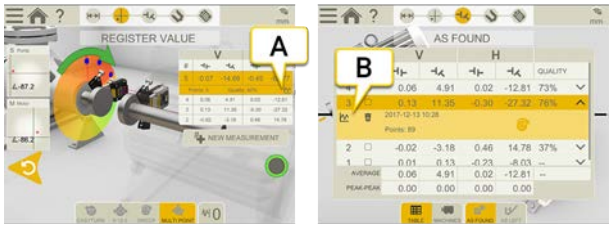
Peak to peak

The total variation in offsets and angles. Calculations are based on the measurements marked as "Use".

RESULT DETAILS

When you have measured using Sweep or Multipoint, you can view details regarding the measurement.

Tap to open the Detailed view. This information is available from the table on the Measurement view, or from the Result table.



A. Measurement view
B. Result table

Sweep details

Measurement error

This graph shows the error of each measurement compared to the whole measurement. The standard deviation of the error is the basis for the quality number "Aquired accuracy". Turbulence, distance between the measuring units and coupling backlash all affect the measurement error.

Shown in mils or mm.

Rotation speed

This graph shows how fast the measurement units are rotated during the measurement. This is the basis for the quality number "Speed and eveness".

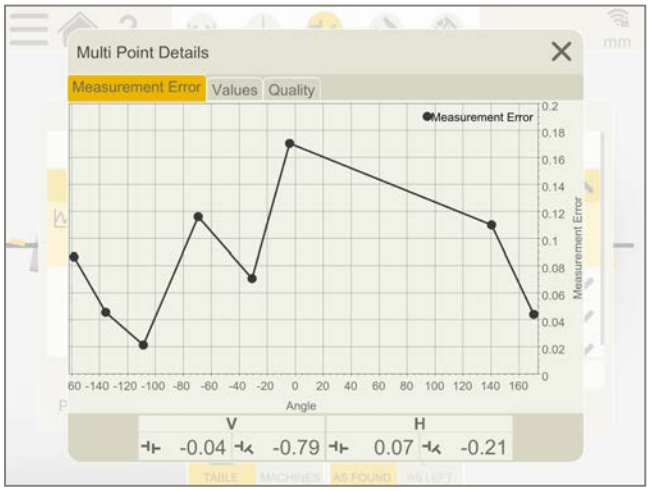
Quality

The quality assessment is a sum of the following quality factors:

- **Rotation angle**. How much of the turn that is measured. For an accurate result, try to have as large rotation angle as possible.
- **Acquired accuracy**. Actual accuracy of the measured values from the units. If the acquired accuracy is low, it may depend on for example air turbulence or bearing clearance.
- **Temperature stability**. Measured temperature variation in the measuring units. If the stability is low, remeasure when the temperature has stabilized.
- **Speed and evenness**. Speed of the rotation.
- **Measurement direction**. Indicates the consistency in your measurement direction. It is better to move the measurement units in the same direction during the entire measurement. A low value indicates the direction has changed during measurement, which may hurt the measurement quality.

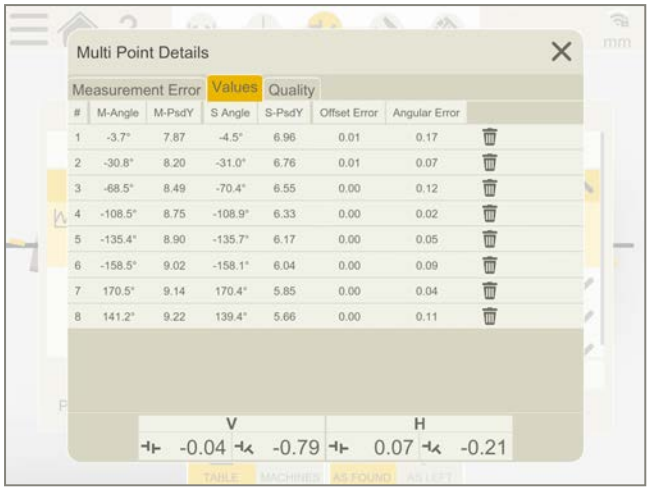
Multipoint details

Measurement error



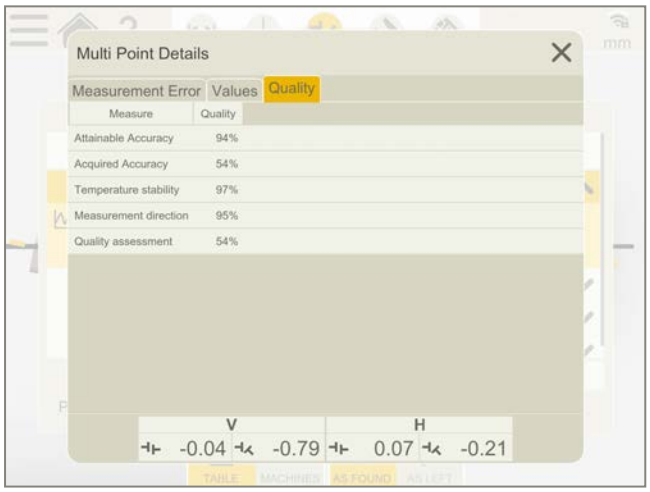
This graph shows the error of each measurement compared to the whole measurement. The error of each measurement point is how much it deviate from the whole measurement. Shown in offset and angle.

Values



All registered values.

Quality



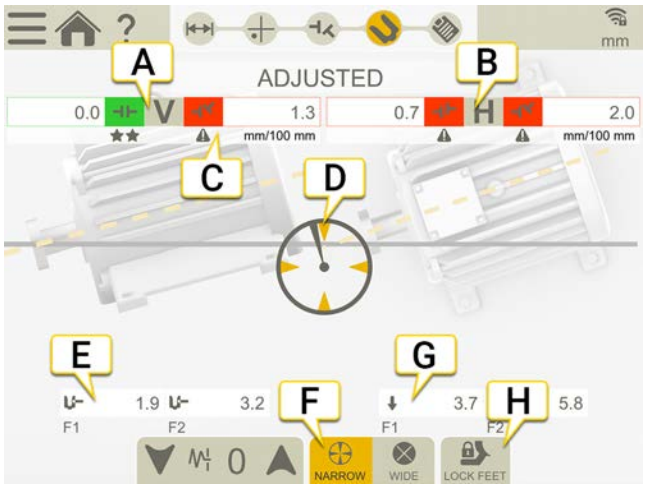
The quality assessment is a sum of the following quality factors:

- **Attainable accuracy**. The maximum accuracy that can be attained. Many measurement points that also have a good spread, will statistically ensure a high accuracy.
- **Acquired accuracy**. Actual accuracy of the measured values from the units. If the acquired accuracy is low, it may depend on for example air turbulence or bearing clearance.
- **Temperature stability**. Measured temperature variation in the measuring units. If the stability is low, remeasure when the temperature has stabilized.
- **Measurement direction**. Indicates the consistency in your measurement direction. It is better to move the measurement units in the same direction during the entire measurement. A low value indicates the direction has changed during measurement, which may hurt the measurement quality.

ADJUST

In the Adjust view, live values are displayed. When reading the values, face the stationary machine from the movable machine. For information how to read the values, See "Result" on page 63. Values within tolerance are green.

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. Remeasure or go to Report view.



A. Vertical offset and angle values.
B. Horizontal offset and angle values.
C. Tolerance indicators.
D. Turn to live
E. Add or remove shims.
F. Arrow show how to adjust the horizontal values.
G. Toggle between narrow or wide live sectors.
H. Lock feet. See "Locked feet " on page 51

Tolerance indicators

★	Indicates the tolerance level "good". Yellow background.
★★	Indicates the tolerance level "excellent". Green background.
⚠	Indicates not within tolerance. Red background.

See "Tolerance" on page 74

Live values with inclinometer

With the programs EasyTurn, Sweep and Multipoint, the inclinometer controls when live values are shown. Use the indicator to turn to a live position.

- Narrow, live values are shown when the units are positioned within (±2°) of the clock positions.
- Wide, live values are shown when the units are positioned within (±44°) of the clock positions.

Narrow and wide indicators

Live values without inclinometer

With the program 9-12-3 the inclinometer is not used, instead you manually show in which position your measurement units are.

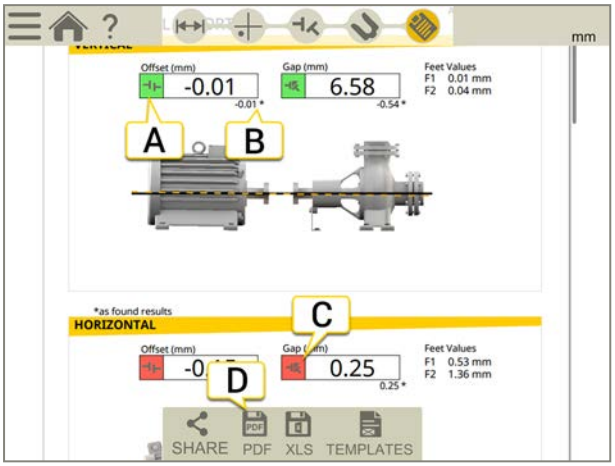
1. Turn the shafts with detectors to a live position.
2. Tap the corresponding live option, see below.
3. Tap  before you leave the live position.

Live options:

	Not live. If you want to change live position, you need to select this first and then the new position.
	Live at 9 o'clock.
	Live at 12 o'clock.
	Live at 3 o'clock.
	Live at 6 o'clock.

HORIZONTAL REPORT

The report covers all details from the measurement. The report is constantly being filled out while the session is carried out. To see the report at its current state, tap in the workflow.



A. Green = within tolerance.
B. The "As found" result is marked with an asterisk (*).
C. In this example the angle result is shown as Gap.
D. Save as a Pdf or Excel file. The files are saved in the File manager.

For information on how to:

- Change the template
- Add a note
- Add a photo
- Change user information
- Save a report
- Share a report to USB

See " Report" on page 13

Finalize the measurement.

Tap and to finalize the measurement. See "Finalize" on page 8

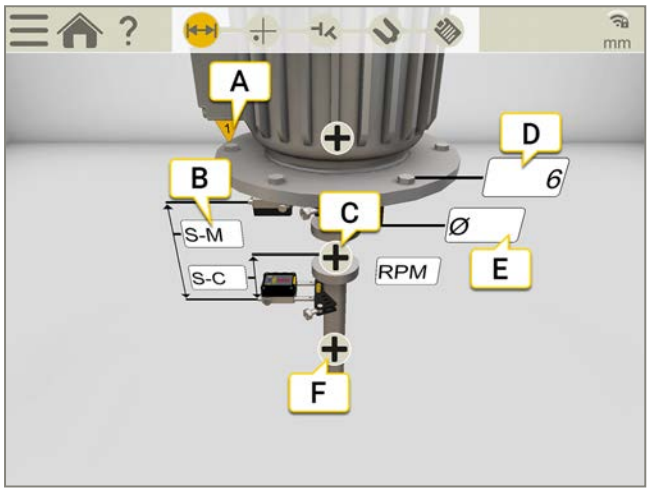
VERTICAL

PREPARE

First you need to set up and rough align the measuring units:

- See "Set up XT40" on page 32
- See "Set up XT60" on page 37

On the Prepare view, you enter machine and coupling properties. It is possible to go back to the Prepare view later and enter/alter information. Tap + to display a property menu for the Coupling or Machine.



A. The first bolt. Placed at 9 o'clock.
B. Tap field to enter distance.
C. Tap to open coupling properties. (RPM, tolerance and coupling diameter.)
D. Number of bolts, default is set to 6. Four, six, eight and ten are possible values.
E. Tap to enter the diameter of the bolt circle.
F. Tap to enter machine name.

NOTE! Make sure that the measuring units are charged.

Coupling diameter

If you want the result based on the gap of the coupling instead of angle, it is necessary to enter the coupling diameter. The coupling diameter is visible in the report.

1. On the coupling, tap +.
2. Tap Ø.
3. Enter the diameter.

Gap

To show the result as gap, tap ☰ and .

RPM

The rotation speed of the shafts will decide the demands on the alignment. When you select a rpm value, a matching tolerance is set automatically.

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

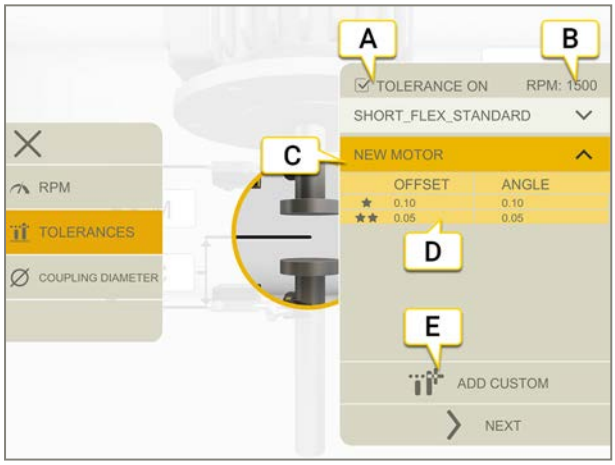
1. Tap the RPM field to enter a value. Or tap + on the coupling.
2. Enter RPM. A tolerance is automatically set to match the RPM you entered.

Tolerance

The rotation speed of the shafts will decide the demands on the alignment. When you select a rpm value, a matching tolerance is set automatically.

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

1. On the coupling, tap +.
2. Tap to display the tolerance menu.

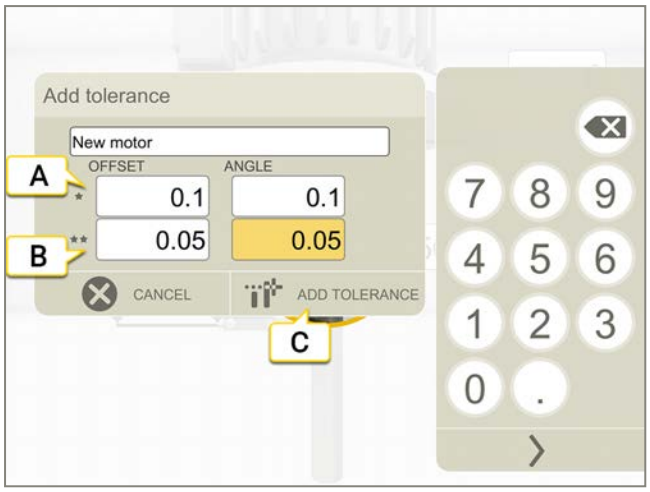


A. Turn tolerance on/off.
B. Current RPM.
C. Selected tolerance.
D. Tolerance levels. Good = ★. Excellent = ★★.
E. Add custom tolerance.

Custom tolerance

Many machines must be aligned very accurately even if they have a lower rpm. You can add your own user defined tolerance.

1. Tap .
2. Enter offset and angle values.



A. Tolerance level "good". Offset and angle.
B. Tolerance level "excellent". Offset and angle.
C. Add the custom tolerance.

Name the machine

Use if you want to change the default names on the machines. The name is visible in the report.

1. Tap + on the machine.
2. Tap .
3. Tap the text input field to change the name.

MEASURE

The measuring positions are registered at positions 9, 12, 3 o’clock.

Preparations

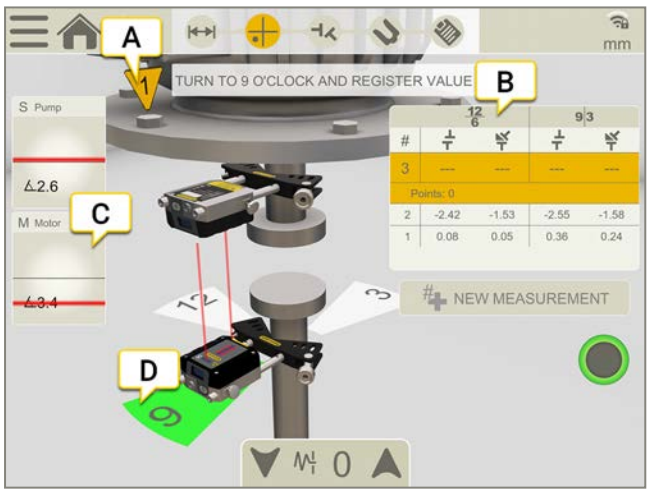
Before you start measuring, make sure you have done the preparations you need.

- Mount the measuring units.
- To calculate results, you need to enter the distance between the measuring units.
- If needed, perform a rough alignment.

Measure

1. Position the units at 9 o’clock, at bolt number one. Make sure that it is possible to also position the units at 12 and 3 o’clock.
2. Tap to register the first position.
3. Turn shafts to 12 o’clock.
4. Tap to register the second position.
5. Turn shafts to 3 o’clock.
6. Tap to register the third position.
7. Tap to go to the Result view, or tap to measure again.

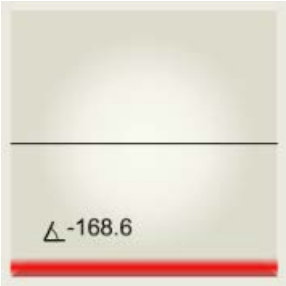
The registered values are saved when you leave the Measure view. If you return to the Measure view, it is possible to do a new measurement.



A. The first bolt. Placed at 9 o’clock.
B. The table displays offset and angle values in the directions 12-6 and 9-3 o'clock.
C. Tap to display detector information.
D. Yellow = registered position.
Green = turn shafts to green area.

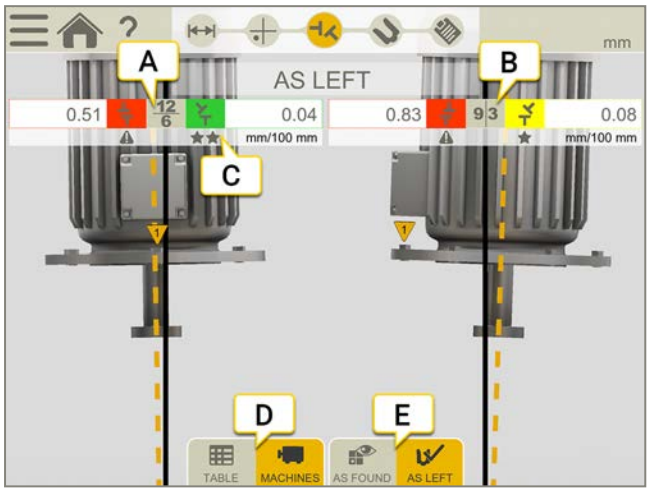
Edge warning

When the laser beam is close to the edge, the edge is “lit up” as a warning. It is still possible to register values when the edge warning is active.


△-168.6

RESULT

The result is displayed as sideways offset in the coupling and angular error between shafts. In the directions 12-6 and 9-3. Tap if you want to adjust the machine. After you have adjusted, it is possible to go back to the Result view.



A. Values are displayed live in the direction 12-6.
B. Values are displayed live in the direction 9-3.
C. Tolerance indicators.
D. Show Table or Machine view. See "Result table" below
E. Show "As found" or "As left" values.

As found or As left

On the tabs, it is possible to toggle between showing As found or As left values.

	As found is the latest measurement you made before going to the Result view.
	As left is the latest adjusted result. Available if you have gone to the Adjust view (and shown live values) and returned to Result view.

Tolerance indicators

The tolerance indicators are visible for a while. To show them after they have disappeared, simply tap the value.

★	Indicates the tolerance level "good". Yellow background.
★★	Indicates the tolerance level "excellent". Green background.
⚠	Indicates not within tolerance. Red background.

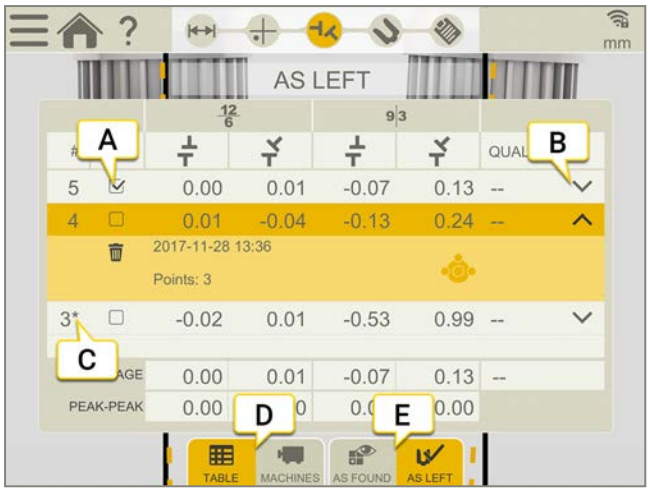
Show Gap

By default, angular error/100 mm is displayed. To show gap, you need to set the coupling diameter.

To show the result as gap, tap and .

Result table

In the Result view, tap to display the table view.



A. Select to use the measurement in the calculations.
B. Tap to display more information.
C. This measurement has been adjusted.
D. Toggle between showing machine or table view.
E. Toggle between showing As found or As left values.

If you want delete a measurement, tap and .

Use

By default, all measurements are included in the calculations. If you deselect measurements, the values for Average and Peak to Peak are updated. The excluded measurements are not included in the calculations, but still visible. The report will not be affected if you hide any measurements, in the report it is always the latest measurements that are shown.

Average

The average offset and angle values. Calculations are based on the measurements marked as "Use".

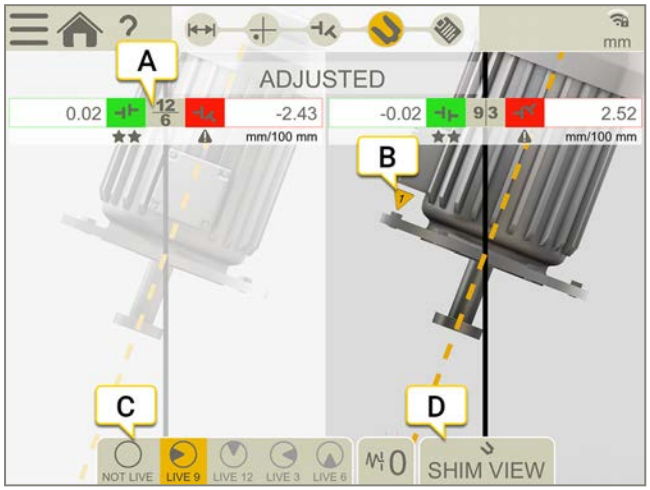
Peak to peak

The total variation in offsets and angles. Calculations are based on the measurements marked as "Use".

NOTE! It is always the latest measurement and adjustment that are shown in the report.

ADJUST

1. Compare the offset and angular error to the tolerance demands.
2. If the angular error need to be adjusted, please shim the machine first, then adjust the offset.
3. Tighten the bolts and remeasure.



A. Values are displayed live in the direction 12-6 or 9-3.
B. The first bolt is placed at 9 o'clock.
C. Live positions.
D. Open the Shim view. See "Shim values" on the facing page

Live positions

1. Turn the shafts with detectors to a live position.
2. Tap the corresponding live option, see below.
3. Tap ◯ before you leave the live position.

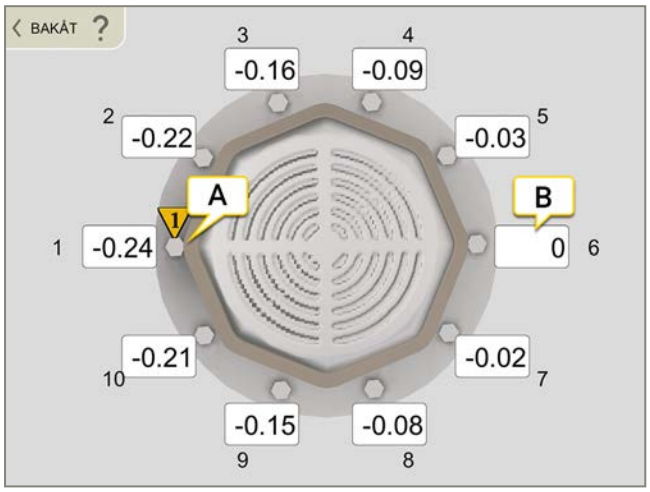
Live options:

◯	Not live. If you want to change live position, you need to select this first and then the new position.
◔	Live at 9 o'clock.
◔	Live at 12 o'clock.
◔	Live at 3 o'clock.
◔	Live at 6 o'clock.

Shim values

To view this, you need to enter number of bolts and diameter of bolt circle on the Prepare view.

1. Select to open Shim value view. The values are not live.
2. Read the values. The highest bolt is calculated as 0.00. Values below zero indicates that the bolt is low and need shimming.
3. Select to return to the Result view. If you have adjusted the machine, you need to remeasure the coupling.

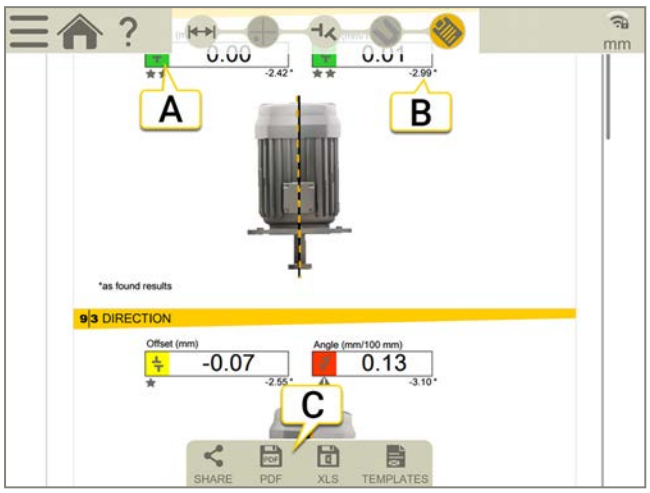


A. First bolt at 9 o'clock.
B. The highest bolt is calculated as 0.00.

NOTE! If you shim the machine, remeasure from position 9 o’clock to update all measurement values.

VERTICAL REPORT

The report covers all details from the measurement. The report is constantly being filled out while the session is carried out. To see the report at its current state, tap in the workflow.



A. Green = within tolerance.
B. The "As found" result is marked with an asterisk (*).
C. Save as a Pdf or Excel file. Possible when you have finalized the measurement. The files are saved in the File manager.

For information on how to:

- Change the template
- Add a note
- Add a photo
- Change user information
- Save a report
- Share a report to USB

See " Report" on page 13

Finalize the measurement.

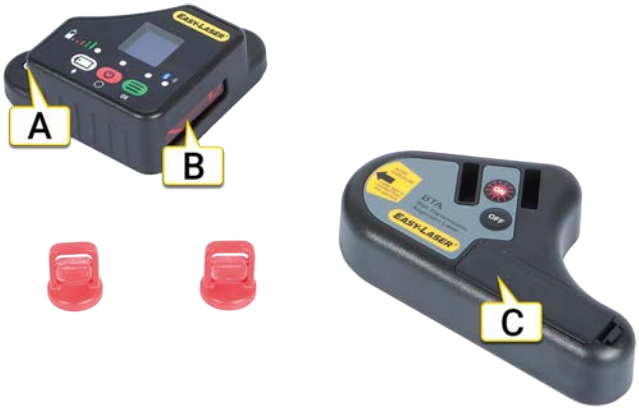
Tap and to finalize the measurement. See "Finalize" on page 8

BELT

OVERVIEW

Easy-Laser® BTA system consists of a laser transmitter and a detector. Magnetic mountings on laser and detector make it easy to mount the equipment. Non-magnetic sheave/pulleys can be aligned as the units are very light and can be mounted using double-sided tape. All types of sheave/pulleys can be aligned, regardless of belt type. You can compensate for sheaves of varying widths.

For technical information, See "XT190 BTA" on page 119



A. Connector
B. Detector aperture
C. Battery Alkaline 1xR6 (AA) 1.5 V

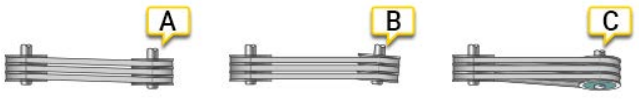
NOTE! If not using the system for a long period of time, remove the battery from the laser transmitter.

Belt types

A. V-belt
B. Flat belt
C. Timing belt
D. Chain drives

Offset and angular misalignment

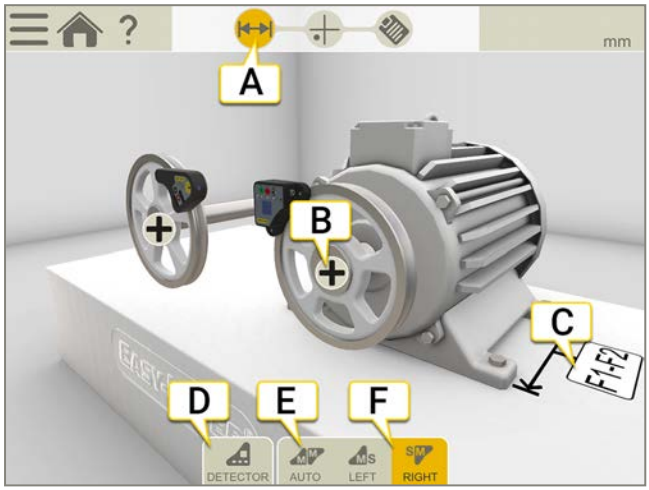
The misalignment can be offset or angular. It can also be a combination of both.



A. Offset
B. Angular
C. Both offset and angular misalignment.

PREPARE

- Check the sheaves for radial runout. Bent shafts will make it impossible to perform an accurate alignment.
- Check the sheaves for axial runout. If possible, adjust with the mounting screws of the bushings.
- Make sure that the sheaves are clean from grease and oil.
- The distance from the belt to the axial face of the sheave can be different on the two sheaves. See "Sheave width" on the next page

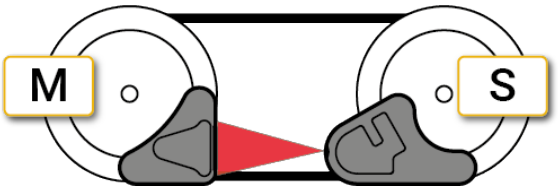


A. The Prepare icon is active in the workflow.
B. Tap to open machine properties. (Sheave width and tolerance.)
C. Tap input field to enter distance.
D. Tap to select detector.
E. The Display unit automatically recognize where the units are placed.
F. Set M-unit to the left or right.

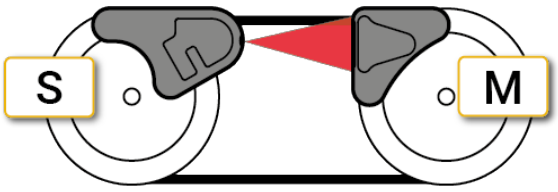
Mount the units

The units are mounted on a flat machined surface with magnets. The magnets are very strong, try to soften the touch by putting just one magnet to sheave first, then turning the other ones in. Non-magnetic sheave/pulleys can be aligned as the units are very light and can be mounted using double-sided tape.

1. Mount the laser transmitter on the stationary machine.
2. Mount the detector on the movable machine.
3. Make sure all magnetic surfaces are in contact with the sheave.



OR



NOTE! All of the magnetic surfaces must be in contact with the object.

Menu icons

Tap to open the menu.

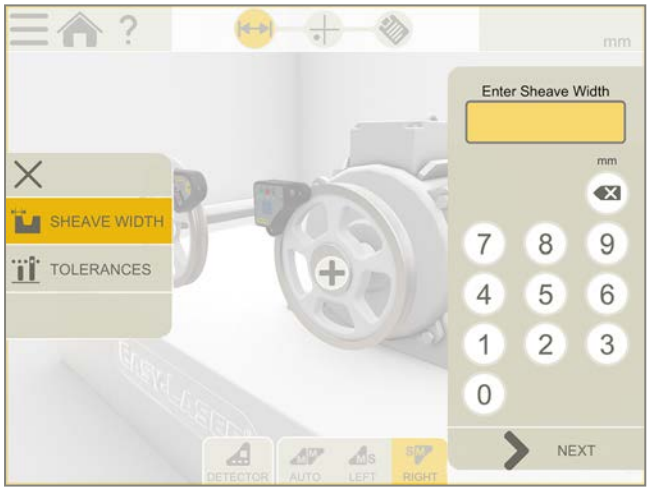
	Add a note to the report. See "Belt Report" on page 92
	See "Camera" on page 24
	Finalize the measurement. See "Finalize" on page 8

Sheave width

Enter sheave width in program

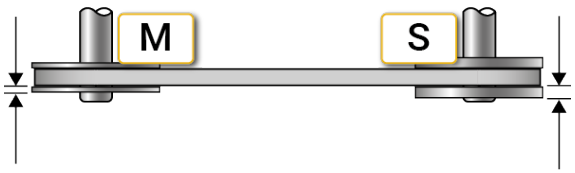
The distance from the belt to the axial face of the sheave can be different on the two sheaves. To calculate a possible offset the system requires **both** sheave face widths.

1. Tap to open machine properties.
2. Measure the distance from the belt to the axial face of the sheave.
3. Enter the value.



Different sheave width without program

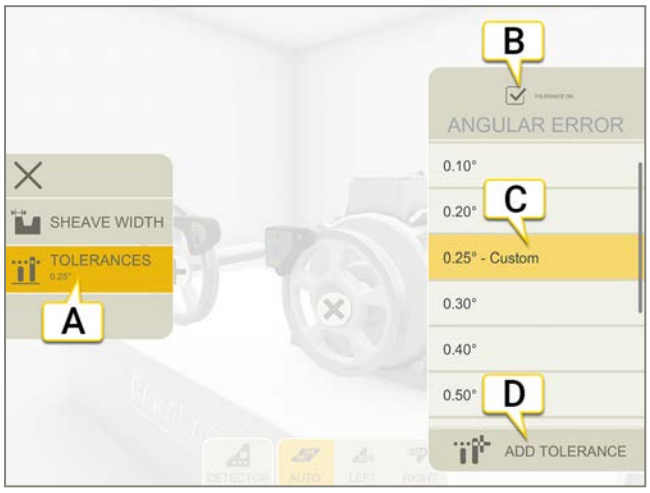
If the sheaves have different face widths, just add or subtract the difference from the zero value to get the value for perfect alignment.



Sheaves with different face widths.

Tolerance

1. Tap + to open machine properties.
2. Enter the value.



A. Selected tolerance.
B. Tap to select if you want to use a tolerance or not.
C. Tap to select a tolerance.
D. Add a custom tolerance.

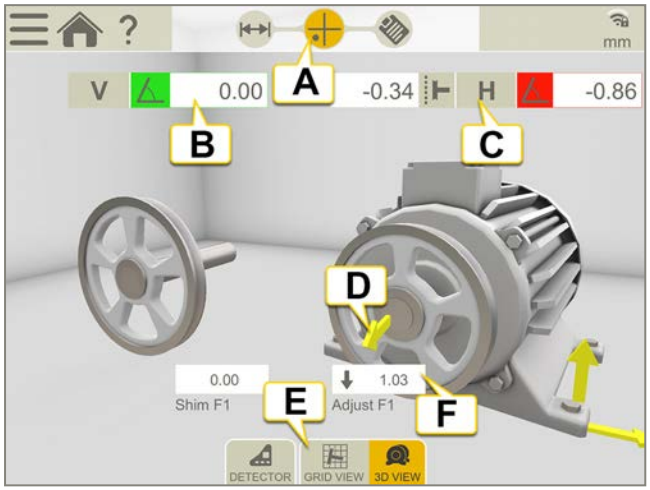
Tolerance table

Recommended maximum tolerances from manufacturers of belt transmissions is 0.25–0.50°. Recommendations are always dependent on belt type. Please consult the design manual of the specific belt type.

<°	mm/m mils/inch
0.1°	1.75
0.2°	3.49
0.3°	5.24
0.4°	6.98
0.5°	8.73
0.6°	10.47
0.7°	12.22
0.8°	13.96
0.9°	15.71
1.0°	17.45

MEASURE WITH DISPLAY UNIT

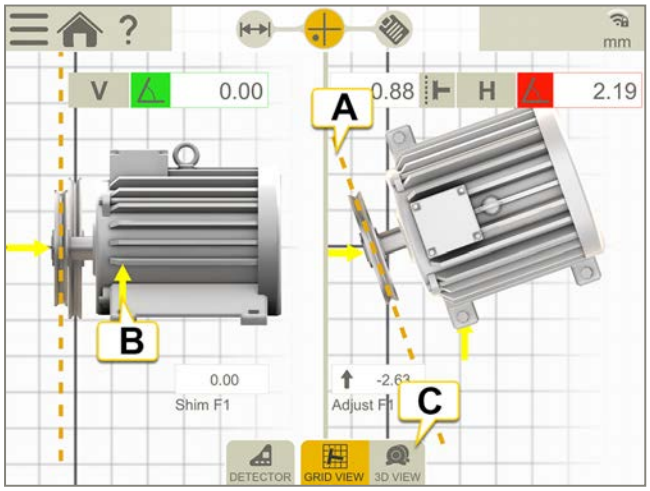
Make sure that the laser line hits the detector aperture. The Display unit shows the offset and angular misalignment. The laser transmitter flashes when the battery is low. Change the batteries before you continue to measure. The E190 BTA can also be used as a separate tool. See "Measure without Display unit" on page 90



A. The Measure icon is active in the workflow.
B. Vertical angular error. To set tolerance, See "Tolerance" on the previous page.
C. Horizontal angular and offset error.
D. Adjustment arrows show how to move the machine.
E. Toggle between showing grid and machine view.
F. Feet values.

Grid view

Tap  to show the grid view.



A. The yellow line amplifies the offset and angle for an easier adjustment.
B. Adjustment direction.
C. Switch to 3D view.

Menu icons

Tap  to open the menu.

	Add a note to the report. See " Report" on page 13
	See "Camera" on page 24
	Finalize the measurement. See "Finalize" on page 8

Adjust

Start by adjusting the sheave, and then the machine.

- Correct offset by moving the movable machine with axial jackscrews, or by repositioning one of the sheaves on its shaft.
- Correct vertical angular error by shimming the movable machine.
- Correct horizontal angular error by adjusting the movable machine with lateral jackscrews.

When you adjust the machine one way, it often affects the machine's other alignment conditions. Which means this process may have to be repeated several times.

NOTE! If not using the system for a long period of time, remove the battery from the laser transmitter.

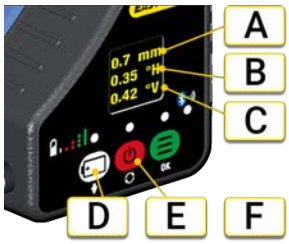
MEASURE WITHOUT DISPLAY UNIT

The XT190 BTA can be used as a separate tool.

Measure

To change between XT or E-system, see Settings below.

1. Press to start the detector and ON to start the laser transmitter.
2. Read the values. Offset, horizontal angle and vertical angle are displayed.
3. Adjust machine, see See "Measure with Display unit" on page 88.



A. Offset (mm or inch)
B. Horizontal angle
C. Vertical angle
D. Settings
E. On/Off
F. Battery

Settings

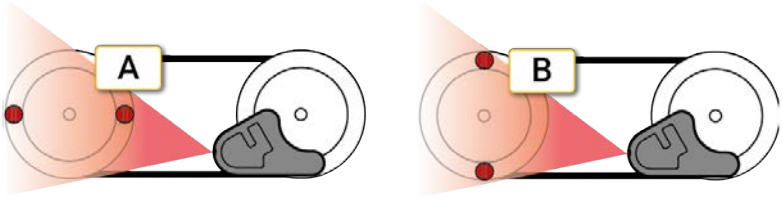
Press to open the settings view. Use to move up and down in the menu.

- Press to switch position on the M and S-unit.
- Toggle between mm and inch with .
- Press to select XT or E-system.

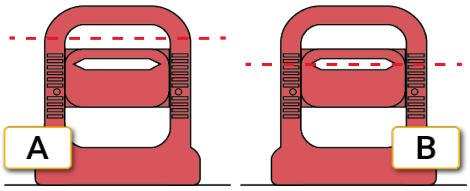
Different sheave width

See "Sheave width" on page 86

Align with targets

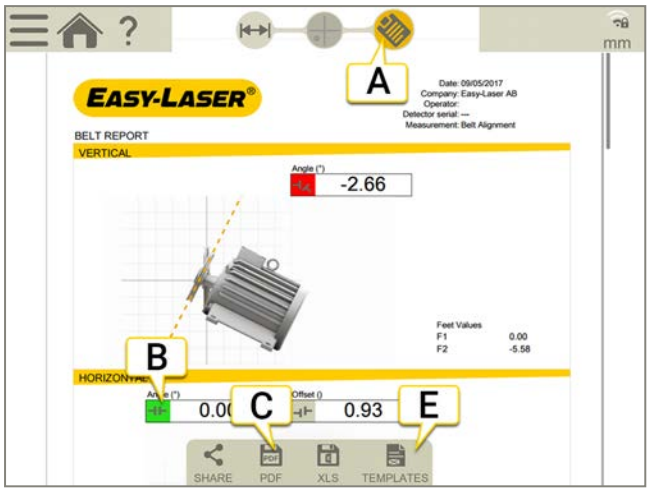


A. Horizontal alignment
B. Vertical alignment



A. Misaligned sheave
B. Aligned sheave, the laser beam disappears in the slot of the target.

BELT REPORT



A. The report icon is active in the workflow.
B. Green = within tolerance.
C. Save as a Pdf or Excel file. The files are saved in the File manager.
D. Tap to select a template. See " Report" on page 13

NOTE! The functions Share and Save as Pdf or Excel file are available after the measurement has been finalized.

For information on how to:

- Change the template
- Add a note
- Add a photo
- Change user information
- Save a report
- Share a report to USB

See " Report" on page 13

Finalize the measurement.

Tap and to finalize the measurement. See "Finalize" on page 8

VIBRATION

OVERVIEW

Easy-Laser® XT280 is a simple to use vibration monitoring and analysis tool that allows easy display of vibration signals. The XT280 automatically performs vibration analysis functions based on machine running speed to help diagnose faults such as unbalance, misalignment and looseness. The system is designed to enable you to take vibration measurements from assets (e.g. pumps, motors, fans and bearings). The unit displays vibration frequency plots and allows vibration severity and bearing condition to be monitored.

A. On/Off. It will automatically turn off if not used for 1 minute. Change the default setting in the Device settings. If the XT280 is connected to the Vibration program, the auto-off is disabled.

B. Press ☰ to show Configuration menu.

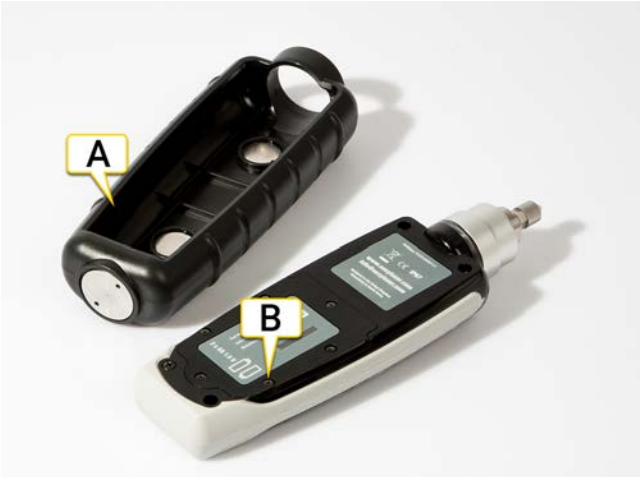
C. Press show Asset manager.

For information regarding technical data: See "XT280 VIB" on page 121

Replace the batteries

The XT280 uses two AA batteries.

1. Remove the protective cover (A).
2. Unscrew the battery cover (B) and replace the batteries.



NOTE! If not using the system for a long period of time, remove the batteries.

CONFIGURATION

1. Press ☰ to open the Configuration menu.
2. Move up and down in the menu using the arrow buttons.
3. Press ● to select the highlighted item.

Left and right arrow buttons can be used to move backward and forward through the menus.

Live update

It is possible to have the XT280 continuously display readings that are taken at intervals of approx. 1 second. It is possible to use live update with the basic readings screen, the VA bands screen or 100 line frequency spectrum.

Press ● to register a value at any time during live update. A full (800 line) resolution reading is registered.

NOTE! Live values are not displayed in the Vibration program.

Setup Wizard

Selecting the Setup Wizard opens a dialogue that allows the machine running speed to be entered and the ISO alarm levels to be set automatically according to the size and type of machine to be monitored.

Run speed

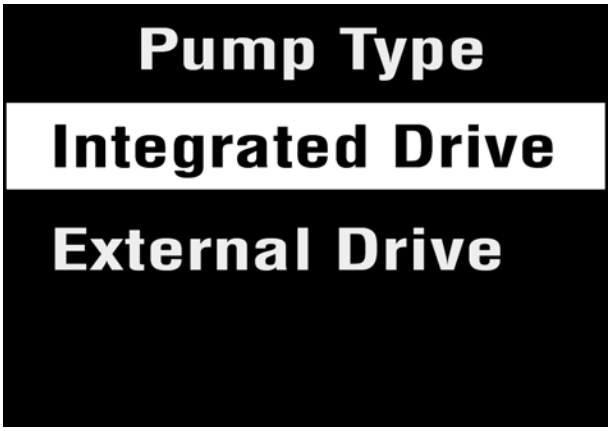
The first Setup Wizard screen shows the currently selected running speed in the pre-selected units (Hz or RPM).

1. Press the up arrow button (to increase run speed) or down arrow button (to decrease run speed).
2. Press to confirm. Machine type settings is displayed.

Machine type

The second Setup Wizard screen allows you to select machine type (motor or pump)

- If a **motor** is selected the size must be selected (under or over 300kW).
- If a **pump** is selected, it must be specified whether it has an integrated or external drive unit.



Selecting the machine type and size allows the ISO alarm levels to be set accordingly, as does specifying the type of mounting (rigid or flexible). As a basic “rule of thumb”, unless a machine is bolted down to a concrete floor, its mounting should be considered as being flexible. Most motors and pumps are mounted on some kind of frame or structure and as such should definitely be considered as flexibly mounted.

Manual setup

Velocity settings

1. Select Velocity alarms.
2. Set the alarm levels at which the velocity readings change color. Normal levels are displayed on a green background.
3. Press arrow left to go back to Manual setup.

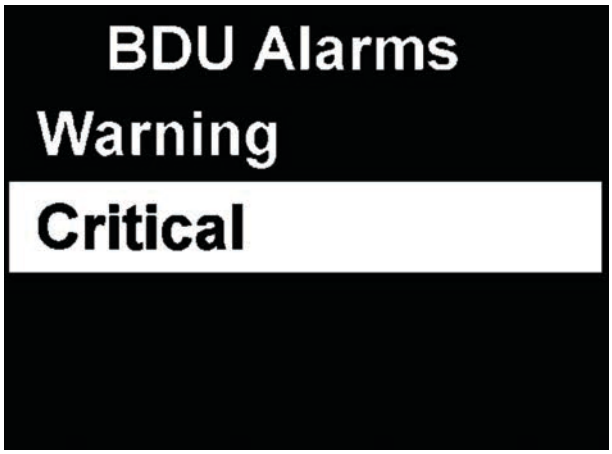
- **Warning**. Yellow readings, default is set to 4.5 mm/s. Use up and down arrows to change the setting.
- **Critical**. Red readings, default is set to 7.10 mm/s. Use up and down arrows to change the setting.

BDU alarm settings

1. Select BDU alarms.
2. Set the alarm levels at which the BDU readings change color. Normal levels are displayed on a green background.
3. Press arrow left to go back to Manual setup.

- **Warning**. Yellow readings, default is set to 50. Use up and down arrows to change the setting.
- **Critical**. Red readings, default is set to 100. Use up and down arrows to change the setting.

These levels are typical for medium sized machine bearings operating at run speeds in the region of 1000 to 3000 RPM. Larger bearings or higher run speeds may need increased BDU threshold values to identify worn or bad bearings.



Run Speed

1. Select Run speed.
2. Select a run speed using the up and down arrow buttons.
3. Press arrow left to go back to Manual setup.

Device settings

Use the down arrow button to see all device settings. Pressing  to select a setting. Press arrow left to return to the previous menu.

Auto Off Time

From 1 minute up to 60 minutes. If the XT280 is connected to the Vibration program, it will not turn off.

Brightness

- Mode. Select Standard or High
- Level. Set anywhere between 1 (least brightness) up to 10 (full brightness).
- Auto Dim Time. Set the time using the up and down arrows.

Language

Only English is available.

Factory reset

Select to return to the default settings. Select to return to metric or imperial default settings.

Graph Mode

Set to display the frequency spectrum as either a Line graph or a Bar graph.

Color Scheme

Configured as standard (full colour) or monochrome, e.g. for convenient viewing in direct sunlight.

Time & Date

Setting can be achieved using the up, down, left and right arrow buttons

Units

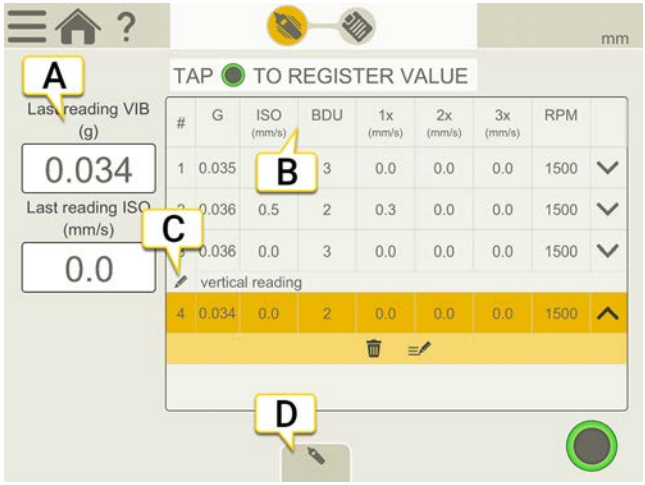
- Velocity. Select mm/s or inch/s.
- Run speed. Select Hertz (Hz), revolutions per minute (RPM) or cycles per minute (CPM).
- Velocity type. Select RMS or Peak.
- Displacement. Select Peak (Pk) or Peak to peak (Pk-Pk).

Information

Version number, serial number and Mac ID.

MEASURE WITH DISPLAY UNIT

1. Press ⏻ to start the XT280.
2. Set the appropriate configurations in the XT280 menus. See "Configuration" on page 95.
3. Place the XT280 on a rigid part of the machine as close as possible to the desired measurement point (e.g. bearing block) using the magnet mount.
4. Tap to connect to an XT280 device.
5. Tap to register values. Either on the XT280, or on the Display unit. It will take 3-5 seconds to register a value.



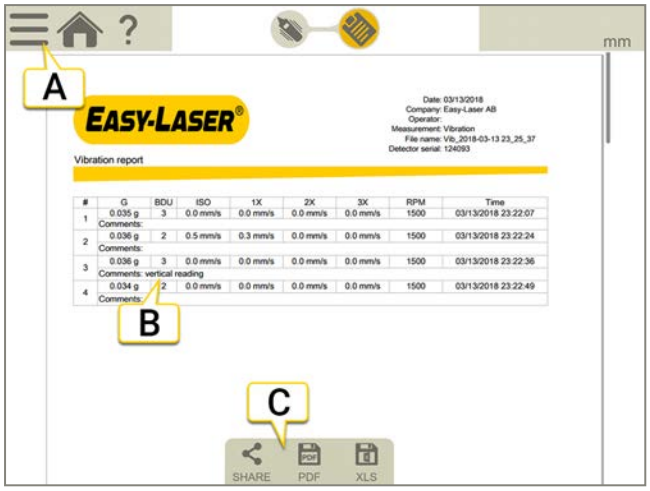
A. The latest readings are displayed here.
B. For information regarding these values See "Result" on page 102
C. It is possible to add a note to a measurement point.
D. Tap to select a XT280 device.

Add a note

Notes are also visible in the report.

- Select ☰ and ✎ if you want to add a note for the **whole** measurement.
- Tap ⌄ on a value and then ✎ to add a note for the selected value.

Report



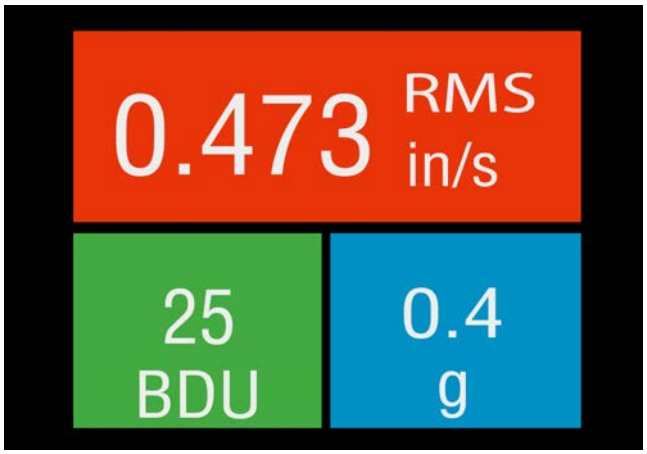
A. Tap here to finalize the measurement. See "Finalize" on page 8
B. The comments are visible in the report.
C. Tap to save the finalized report as pdf or xls. The files are saved in the File manager.

MEASURE WITHOUT DISPLAY UNIT

The XT280 can be used as a separate tool.

Measure

1. Press ⏻ to start the XT280.
2. Set the appropriate configurations in the XT280 menus. See "Configuration" on page 95.
3. Place the XT280 on a rigid part of the machine as close as possible to the desired measurement point (e.g. bearing block) using the magnet mount.
4. Press ● to register a value. It will take 3-5 seconds to register a value.

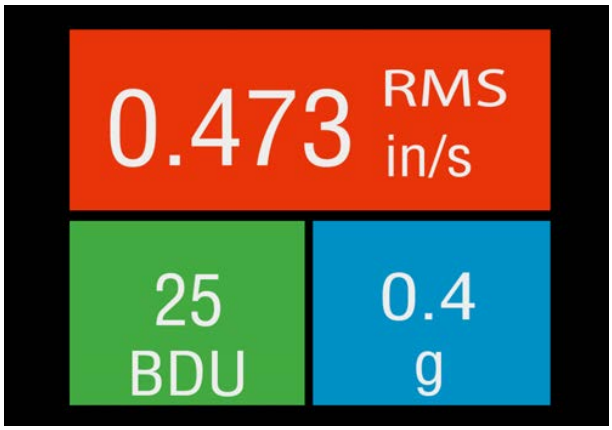


Three values are displayed. The Velocity and BDU values are color coded to show their alarm status.

- Velocity. RMS or Peak (shown in mm/second or inch/s)
- Bearing Noise in BDU (Bearing Damage Units)
- Total g (acceleration)

For more information See "Result" on the next page

RESULT



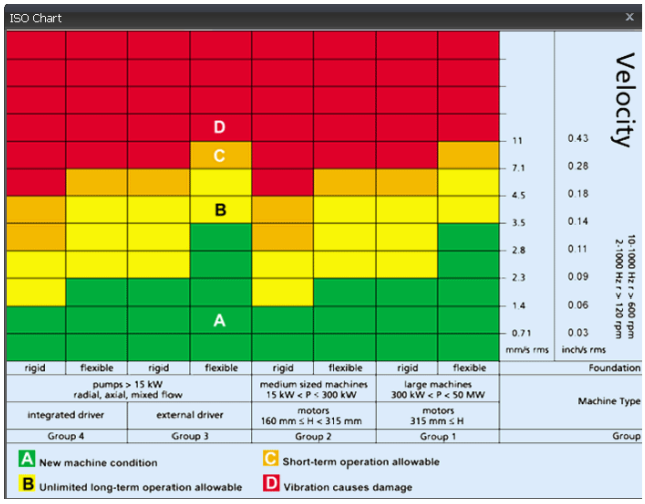
Three values are displayed. The Velocity and BDU values are color coded to show their alarm status.

- Velocity. RMS or Peak (shown in mm/second or inch/s)
- Bearing Noise in BDU (Bearing Damage Units)
- Total g (acceleration)

See "Vibration analysis" on page 104

RMS value

The ISO value (in mm/s or inch/s) is the RMS (average) of the vibration velocity in the frequency band 10Hz (600 RPM) to 1kHz (60,000 RPM) or 2Hz (120 RPM) to 1kHz (60,000 RPM), as specified by the ISO standard. The correct frequency band is automatically selected by the XT280 based on running speed. The background is colour coded according to the ISO 10816-1 vibration velocity level chart (see below). The colour coded background indicates the condition of the machine according to the size and type of machine selected. See "Configuration" on page 95.



ISO 10816-1:1995. Mechanical vibration - Evaluation of machine vibration by measurements on non-rotating parts.

Bearing Noise (BDU)

Bearing noise (high frequency vibration) in Bearing Damage Units (BDU), where 100 BDU corresponds to 1g RMS (average) vibration measured above 1kHz. This is a measure of the wear state of the bearings in the equipment being monitored. The higher the number, the more worn the bearing.

It is commonly held that 1g of high frequency vibration (100 BDU) corresponds to a relatively high level of bearing noise and so can be considered indicative of a damaged bearing. In other words, it may be helpful to think of the Bearing Noise figure as being very roughly equivalent to “percentage” of bearing wear.

By default, the bearing noise is displayed on a

- Red background if it is above 100 BDU
- Amber background between 50 and 100 BDU
- Green background below 50 BDU.

The BDU alarm levels can be changed. See "Configuration" on page 95

Total acceleration (g)

This is the RMS (average) value of the total vibration acceleration measured by the meter over its entire frequency range (2Hz to 10kHz). This reading is shown in units of g (Earth’s gravitational constant, where 1g = 9.81 m/s^2).

RMS displacement

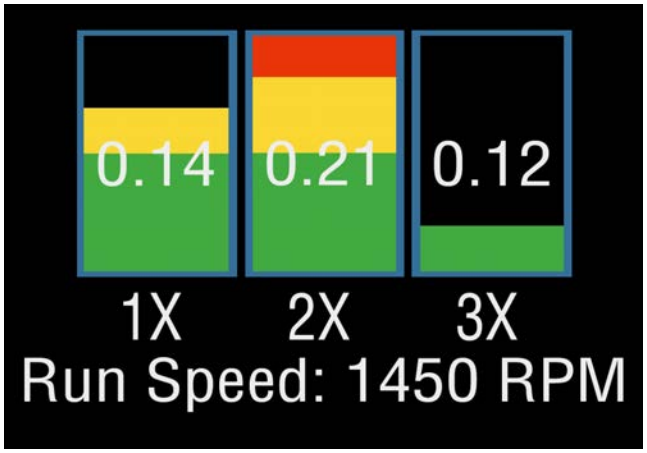
Press the left (<) or right (>) arrow button when the reading screen is displayed will display RMS displacement (in µm or mils) on a blue background. Press either arrow button again will revert to display of the ISO value (mm/s or inch/s).

Vibration analysis

Press the down arrow to display the readings of vibration velocity (mm/s or inch/s), or displacement (µm or mils) if selected, broken down into each of 3 bands.

The display shows the vibration level in frequency ranges that are all based on multiples (1X, 2X and 3X) of the specified Run Speed of the machine as displayed beneath the 3 bar graphs.

In order to perform a vibration analysis it is important that the running speed of the machine is entered correctly. This can be done with the Setup Wizard. See "Configuration" on page 95



The frequency ranges of the VA bands are based on the following multiples of running speed:

1X = Unbalance

The level of vibration in the frequency band based on the running speed is usually indicative of how well balanced the machine is. A large vibration at the running speed usually indicates that the machine is out of balance. However even a very well balanced machine will typically show some vibration at the running speed but this figure should ideally be quite low (e.g. typically less than about 2 mm/sec for a medium sized machine).

2X = Misalignment

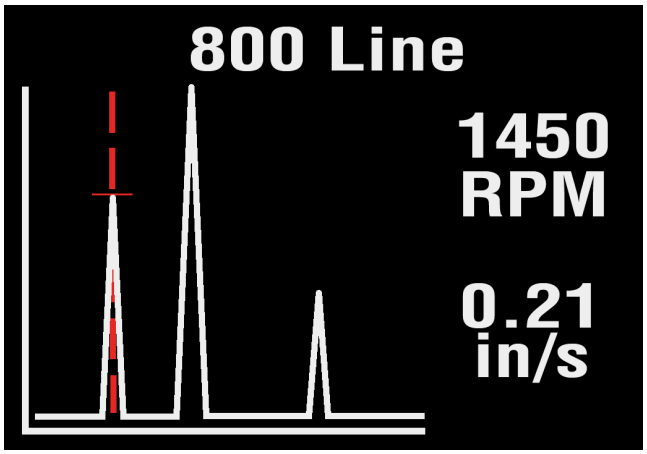
A high level of vibration in the frequency band centered at twice the running speed is a possible indication of misalignment. This is based on the fact that shaft misalignment can result in a double peak in the waveform due to there being two different centers of gravity (one from each shaft). In other words the accelerometer picks up a peak as each centre of gravity passes by and hence there will be two positive and two negative peaks each revolution of the shaft. This will typically give rise to a vibration signal at double the running speed of the machine.

3X = Looseness:

High vibration in the frequency band centered at 3 times running speed is a possible indication that something may be loose (e.g. loose mounting bolts, weak foundations etc.) as it is not usual to see third order vibration in a machine unless there is some structural looseness that is being “excited” by the vibration of the machine.

Frequency spectrum

Press the down arrow button once more to display vibration levels shown as a frequency spectrum in the range from 0 to 1kHz. The heights of the peaks indicate the RMS vibration level (in mm/s or inch/s) at each frequency point in the spectrum. The readings to the right of the screen show the frequency (in Hz or CPM) and the RMS vibration level (in mm/s or inch/s) at the position of the cursor (red dotted line). The cursor position can be moved by use of the left (<) and right (>) arrow buttons.



Pressing the down arrow button increases the resolution of the frequency axis from 100 Lines (i.e. 10Hz or 600 RPM resolution) to 800 Lines (i.e. 1.25Hz or 75 RPM resolution). Increasing the resolution effectively zooms into the frequency spectrum. In order to display the full spectrum at the higher resolution the display must be scrolled using the left and right arrow buttons.

ASSET MANAGEMENT

1. Press  to open the Asset Manager, the Machines menu is displayed (four machines).
2. Scroll the list with the up and down arrow buttons.
3. Press  to select a machine. This brings up a list of measurement points for that machine.

Measurement point

Each machine can have up to 10 VibPoints.

1. Scroll the list of measurement points by using the up and down arrow buttons.
2. Press  to select a VibPoint. The various options for each VibPoint are displayed.

- Take Reading – takes a new reading and saves it to this VibPoint.
- Run Speed – set the run speed.
- Save Reading – saves the previously taken reading to this VibPoint.
- Load Reading – loads a saved reading (e.g. for re-display)

TECHNICAL DATA

DISPLAY UNIT XT11

Part. no 12-0961

A. IR Camera (optional)
B. 13 Mp Camera
C. LED Light
D. Fastening points for shoulder strap (x4)
E. Charger
F. USB A
G. HDMI connector
H. USB B

Display unit

Type of display/size	SVGA 8" colour screen, backlit LED, multitouch
Battery type	Heavy duty Li Ion chargeable
Operating time	Up to 16 h continuously
Connections	USB A, USB B, Charger, AV
Communication	Wireless technology
Camera, with diode lamp	13 Mp
IR camera (optional)	FLIR LEPTON® Long Wave Infrared
Help functions	Built-in manual
Environmental protection	IP class 66 and 67
Operating temperature	-10–50 °C
Storage temperature	-20–50 °C
Relative humidity	10–95%
OLED display	96x96 pixels
Housing material	PC/ABS + TPE
Dimensions	WxHxD: 274x190x44 mm [10.8x7.5x1.7”]
Weight	1450 g [51.1 oz]
FCC ID	FCC ID: 2AFDI-ITCNFA324
IC	9049A-ITCNFA324

MEASURING UNITS XT40

Part. no 12-0943

Part. no 12-0944

The XT40 measuring units have large 30mm PSD, and OLED displays which shows the angle of the units.

Type of detector	TruePSD 30 mm [1.2"]
Communication	Wireless technology
Battery type	Heavy duty Li Ion chargeable [3.7 V, 7.4 Wh, 2000 mAh]
Operating time	Up to 24 h continuously
Resolution	0.001 mm [0.05 mils]
Measuring errors	<1%
Measurement range	Up to 10 m [33 feet]
Type of laser	Diode laser
Laser wavelength	630–680 nm
Laser class	Safety class 2
Laser output	<0.9 mW
Electronic inclinometer	0.1° resolution
Environmental protection	IP class 66 and 67
Operating temperature	-10–50 °C
Storage temperature	-20–50 °C
Relative humidity	10–95%
OLED display	128x64 pixels
Housing material	Anodized aluminum + PC/ABS + TPE
Dimensions	WxHxD: 76x76.7x39.3 mm [3.0x3.0x1.5”]
Weight	245 g [8.6 oz]
FCC ID	FCC ID: QOQBGM111
IC	5123A-BGM111

Laser classification

The XT40 is classified as laser class 2, for more information, See "Safety precautions" on page 124

These products are safe under reasonably foreseeable conditions of operation and are not harmful to the eyes provided that the products are used and maintained in accordance with this User Manual.

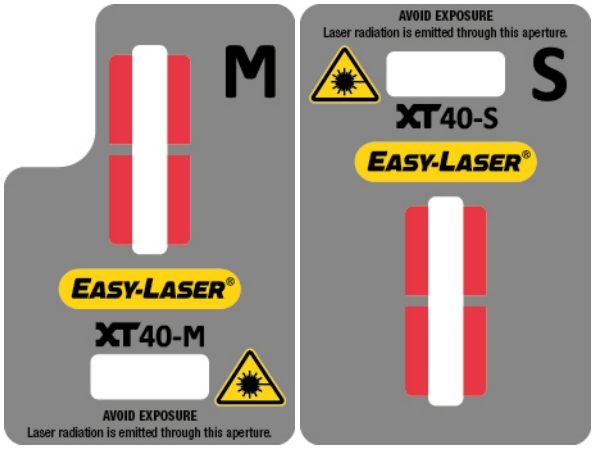
Average power	Max. 0.6 mW
Pulse duration	4–6 µs
Pulse energy	Max. 8 nJ
Wavelength	630–680 nm
Beam divergence	1.5 mrad x 200 mrad
Pulse repetition frequency	75–120 kHz

A. Laser beam on M-unit
B. Laser beam on S-unit

Labels with safety precautions

Label on the back of XT40:

Label on the front of XT40:



MEASURING UNITS XT50

XT50 is an intrinsically safe laser product, please read the safety instructions. See "XT550 Shaft" on page 116

Part. no 12-1027

Part. no 12-1028

Charge XT50

Charge the measuring units by plugging in the power adapter intended for the measuring units. To fully charge the battery takes approx. 2 hours.

NOTE! Never charge the unit in intrinsic safety zone and only use the included Easy-Laser charger.

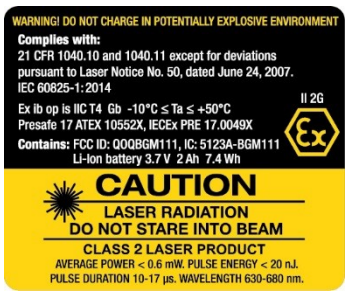
Type of detector	1 axis TruePSD 20x20 mm [0.79x0.79"]
Communication	Wireless technology
Battery type	Heavy duty Li Ion chargeable
Operating time	Up to 20 h continuously
Resolution	0.001 mm [0.05 mils]
Measuring errors	<1%
Measurement range	Up to 20 m [66 feet]
Type of laser	Diode laser
Laser wavelength	635–670 nm
Laser class	Safety class 2
Laser output	<1 mW
Electronic inclinometer	0.1° resolution
Environmental protection	IP class 66 and 67
Operating temperature	-10–50 °C
Storage temperature	-20–50 °C
Relative humidity	10–95%
OLED display	128x64 pixels
Housing material	Anodized aluminum + PC/ABS + TPE
Dimensions	WxHxD: 76x76.5x50.9 mm [3.0x3.0x2.0"]
Weight	316 g [11.1 oz]
Ex classification	Ⓔx II 2 GD Ex ib op is IIC T4 Gb, -10°C ≤ Ta ≤ +50°C
IC	Presafe 17 ATEX 10552X, IECEx PRE 17.0049X

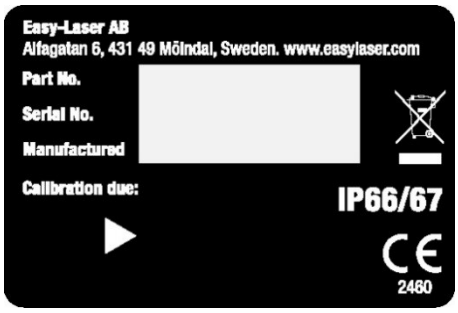
Laser classification

Average power	Max. 0.6 mW
Pulse duration	10–17 µs
Pulse energy	Max. 20 nJ
Wavelength	630–680 nm
Beam divergence	< 1.5 mrad
Pulse repetition frequency	32–47 kHz

A. Laser beam on M-unit
B. Laser beam on S-unit

Labels with safety precautions




Easy-Laser AB
Alfagatan 6, 431 49 Mölndal, Sweden. www.easylaser.com
Part No.
Serial No.
Manufactured
Calibration due:
IP66/67
CE
2460

MEASURING UNITS XT60

Part. no 12-1028

Part. no 12-1029

The XT60 measuring units have large 20x20mm PSD, and OLED displays which shows the angle of the units.

Type of detector	1 axis TruePSD 20x20 mm [0.79x0.79"]
Communication	Wireless technology
Battery type	Heavy duty Li Ion chargeable [3.7 V, 7.4 Wh, 2000 mAh]
Operating time	Up to 24 h continuously
Resolution	0.001 mm [0.05 mils]
Measuring errors	<1%
Measurement range	Up to 20 m [66 feet]
Type of laser	Diode laser
Laser wavelength	630–680 nm
Laser class	Safety class 2
Laser output	<1 mW
Electronic inclinometer	0.1° resolution
Environmental protection	IP class 66 and 67
Operating temperature	-10–50 °C
Storage temperature	-20–50 °C
Relative humidity	10–95%
OLED display	128x64 pixels
Housing material	Anodized aluminum + PC/ABS + TPE
Dimensions	WxHxD: 76x76.4x45.9 mm [3.0x3.0x1.8"]
Weight	272 g [9.6 oz]
FCC ID	QOQBGM111
IC	5123A-BGM111

Laser classification

The XT60 is classified as laser class 2, for more information See "Safety precautions" on page 124.

These products are safe under reasonably foreseeable conditions of operation and are not harmful to the eyes provided that the products are used and maintained in accordance with this User Manual.

Average power	Max. 0.6 mW
Pulse duration	10–17 µs

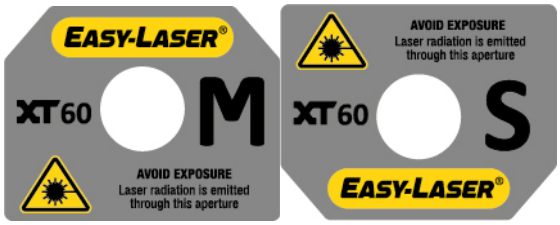
Pulse energy	Max. 20 nJ
Wavelength	630–680 nm
Beam divergence	< 1.5 mrad
Pulse repetition frequency	32–47 kHz

A. Laser beam on M-unit
B. Laser beam on S-unit

Labels with safety precautions

Label on the back of XT60:

Label on the front of XT60:



XT440 SHAFT

System Easy-Laser® XT440 Shaft with Display unit XT11, Part No. 12-0967

A complete system contains

1	Display unit XT11
1	Measuring unit XT40-M
1	Measuring unit XT40-S
2	Shaft brackets with chains and rods
4	Rods 60 mm [2.36”]
1	Measuring tape 3 m [9.8’]
1	Hexagon wrench set
1	Charger (100–240 V AC)
1	DC split cable for charging
1	DC to USB adapter, for charging
1	Shoulder strap for display unit
1	Quick reference manual
1	Cleaning cloth for optics
1	USB memory with manuals
1	Documentation folder
1	Carrying case Medium Weight: 7.2 kg [15.9 lbs], Dimension WxHxD: 460x350x175 mm [18.1"x13.8"x6.9"]

Customize your XT11

(Note that these options cannot be retrofitted)

Part No. 12-0968	IR Camera added to XT11
Part No. 12-0985	Camera removed from XT11

XT550 SHAFT

XT550 is an intrinsically safe laser shaft alignment system, please read the safety instructions below.

Easy-Laser® XT550 Shaft system (12-1031) includes:

1	Measuring unit XT50-M
1	Measuring unit XT50-S
2	Shaft brackets with chains and rods
4	Rods 60 mm [2.36"]
2	Rods 120 mm [4.72"]
2	Extension chains 900 mm [35.4"]
1	Measuring tape 3 m [9.8']
1	Rod tool
1	Charger (100–240 V AC)
1	DC split cable for charging. Length 1 m [39.4”]
1	Quick reference manual
1	Cleaning cloth for optics
1	USB memory with manuals
1	Carrying case Ex/ATEX (with conductive plastic and foam)

System 12-1097 also includes:

Display unit ecom Tab-Ex®. (For full technical specification, see www.ecom-ex.com)

Type of display/size	TFT 8" colour screen
Operating system	Android™ 5.1.1
Operating time	Up to11 h continuously
Communication	Bluetooth® LE4.0 Wireless technology, WiFi
Camera	3 Mp with flash (rear), 1.3 Mp (front)
Operating temperature	-20–50 °C
Dimensions	WxHxD: 162x256x33 mm [6.4x10.1x1.3"]
Weight	1250 g [2.75 lbs]
Ex classification	Ex II 2 GD Ex db ia op is IIC T5 Gb, -20°C ≤ Ta ≤ +50°C
Ex certificat number	Sira 15 ATEX 1205X, IECEx SIR 15.0075X

For technical data regarding measuring units XT50. See "Measuring units XT50" on page 110

Declaration of conformity

Product: Easy-Laser® XT550

Easy-Laser AB declares that Easy-Laser® XT550 is manufactured in conformity with national and international regulations.

The system has been tested and complies with following standards and requirements:

- EMC directive: 2014/30/EU
- Low voltage directive: 2014/35/EU
- Atex directive: 2014/34/EU
- Rohs directive: 2011/65/EU
- Weee directive: 2012/19/EU

Easy-Laser® XT550 complies with the harmonized standards:

- ISO9001:2015
- EN 60079-0:2012

- EN 60079-11:2012
- EN 60079-28:2015
- EN 60825-1:2014
- USA: CFR 1040.10/11

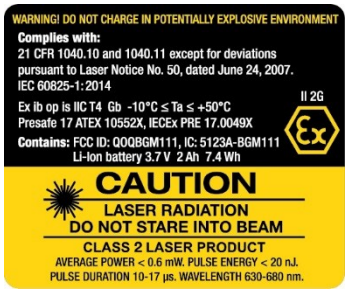
Ex classification: II 2G Ex ib op is IIC T4 Gb

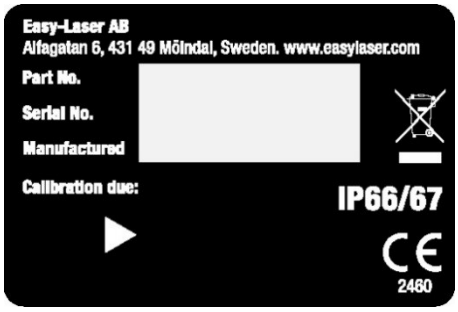
Ambient temperature: -10° ≤ ta ≤ 50°C

Ex certificate: Presafe 17 ATEX 10552X, IECEx PRE 17.0049X

Safety precautions / Warning!

- Always read and follow operation instructions
- Never charge the unit in intrinsic safety zone
- Opening the housing of the units will invalidate the Ex-rating, voids warranty and may result in hazardous light exposure.
- All repairs must be done by Easy-Laser main service center
- Only use the included Easy-Laser charger





XT660 SHAFT

System Easy-Laser® XT660 Shaft with Display unit XT11, Part No. 12-1058 (Medium case)

A complete system contains

1	Display unit XT11
1	Measuring unit XT60-M
1	Measuring unit XT60-S
2	Shaft brackets with chains and rods
4	Rods 60 mm [2.36”]
2	Extension chain 900 mm [35.4"]
1	Measuring tape 3 m [9.8’]
1	Hexagon wrench set
1	Charger (100–240 V AC)
1	DC split cable for charging
1	DC to USB adapter, for charging
1	Shoulder strap for display unit
1	Quick reference manual
1	Cleaning cloth for optics
1	USB memory with manuals
1	Documentation folder
1	Carrying case Medium Weight: 7.2 kg [15.9 lbs], Dimension WxHxD: 460x350x175 mm [18.1"x13.8"x6.9"]

Customize your XT11

(Note that these options cannot be retrofitted)

Part No. 12-0968	IR Camera added to XT11
Part No. 12-0985	Camera removed from XT11

XT190 BTA

Clean the units and the windows at the apertures with a dry cotton cloth.

Part. no 12-1053

Laser transmitter

Sheave diameter	> 60 mm [2.5”]
Laser class	2
Output power	<0.6 mW
Laser wavelength	630–680 nm
Beam angle	60°
Accuracy	Parallelity: < 0.05°, Offset < 0.2 mm [0.008”]
Battery type	1xR6 (AA) 1.5 V
Battery operation	8 hours cont.
Operating temperature	-10ºC to +50ºC
Material	ABS plastics / Hard anodized aluminium
Dimensions BxHxD	145x86x30 mm [5.7x3.4x1.2”]
Weight	270 g [9.52 oz]

NOTE! If not using the system for a long period of time, remove the battery from the laser transmitter.

Laser classification

The XT60 is classified as laser class 2, for more information See "Safety precautions" on page 124.

These products are safe under reasonably foreseeable conditions of operation and are not harmful to the eyes provided that the products are used and maintained in accordance with this User Manual.

A. Laser aperture

Label with safety precautions

Detector

Sheave diameter	> 60 mm [2.5”]

Displayed resolution	(Changeable between mm/inch) Axial offset: 0.1 mm [0.005”] Angular value: 0.1°
Measurement distance	Up to 3 m [9.8’] between transmitter and detector
Measurement range	Axial offset: ±3 mm [0.12”] Angular value: ±8°
Display resolution	Offset: 0.1º Angle:0.01º
Display type	Yellow OLED 96x96 pixels
Connection	Wireless technology
Battery type	Li-Ion
Battery operation	5 hours continuously
Housing material	ABS plastics / Anodized aluminium
Dimensions BxHxD	95x95x36 mm [3.7x3.7x1.4”]
Weight	190 g [6.7 oz]

Detector battery

Press to see the battery status of the detector. While the battery is charging, there is a green flashing light. The laser transmitter flashes when the battery is low. Change the batteries before you continue to measure.

- Red, flashing once: Battery empty.
- Red, flashing twice: Battery needs charging.
- Green, flashing three times: Good.
- Green, fixed light: Battery full.

XT280 VIB

Part No. 12-1050

Size	200 mm x 60mm x 26mm
Weight	280g
Environmental	
Water, sand and dust	IP67 Waterproof
Operating temperature	0°C to 50°C
Storage temperature	-20°C to 70°C
Power supply	2 x AA batteries
Battery life	Auto power OFF - typically 20 hours continuous operating time depending on brightness setting.
Frequency range	2 Hz to 1 kHz (ISO) 1 kHz to 10 kHz (BDU)
Max frequency resolution	1.25 Hz @ 800 lines FFT setting Acceleration in g Velocity in mm/s (or inch/s) Bearing noise in BDU (bearing damage units) Displacement (mm, microns, inch)
Displayed Frequency Units	Hertz (Hz), RPM or CPM
Input range	User selectable with accelerometer sensitivity
Dynamic range	96 dB (0.01g resolution)
VA diagnostic bands (RPM = run speed)	Unbalance 1x RPM Alignment 2x RPM Looseness 3x RPM

Optional equipment

Stinger 03-1326

Magnet 03-1327

LEGAL NOTICE

Declaration of conformity

Equipment: Easy-Laser® product range

CE

Easy-Laser 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:

EMC Directive	2014/30/EU
Low Voltage Directive	2014/35/EU
Laser Classification	Europe: SS_EN 60825-1 USA: CFR 1040.10/11s
RoHs Directive	2011/65/EU
WEEE Directive	2012/19/EU
R&TTE Directive	1999/5/EC

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

For devices with wireless connection: This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. this device may not cause harmful interference
2. this device must accept any interference received, including interference that may cause undesired operation.

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

Easy-Laser AB is ISO 9001:2008 certified. Certificate number NO-900958.

Easy-Laser 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

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.

Disclaimer

Easy-Laser 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.

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 Easy-Laser AB is not responsible for data that may be lost or damaged during transit or repair.

Limited warranty

This product is manufactured under Easy-Laser AB's strict quality control system. Should the product fail within three (3) years from the date of purchase under normal usage conditions, Easy-Laser AB 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.

Lithium Ion battery limited warranty

Lithium ion batteries inevitably lose power during their lifetimes, depending on usage temperatures and the number of charging cycles. Therefore, the internal rechargeable batteries used in the E-series are not included in our general 2-year warranty. There is a 1 year warranty for the battery capacity not to fall below 70 % (a normal change means that the battery must have more than 70 % capacity after more than 300 charging cycles). A 2 year warranty applies if the battery becomes unusable because of a manufacturing fault or factors that Easy-Laser AB could be expected to have control of, or if the battery displays abnormal loss of capacity in relation to use.

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.

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 User Manual contains information about laser safety according to international standard IEC 60825-1: 2007 and 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24 2007. IEC 60825-1:2014.

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 IEC 60825-1: 2007, 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 User Manual due to the low eye hazard level.

National laws and local regulations could impose more stringent instructions for the safe use of lasers than IEC 60825-1: 2007.

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. Unintentional eye exposure would rarely happen under worst case conditions, e.g., when the beam travels exactly through the center of the pupil, and that the eye lens focuses the light precisely on the retina.
B. 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.
C. The natural reflex of the eye to avoid strong light limits unintentional exposure to a very short time (0.25 s).

Traveling with your measurement system

The system includes lithium-batteries. For more information see the product specifications in Technical data. When travelling by airplane with your measurement system we strongly recommend that you check which rules that apply for each airline company.

Specifications for built-in rechargeable batteries

Easy-Laser Part No.	Type	Voltage	Output	Capacity	Included in Part No.
12-0953	Li-Ion	3.7 V	7.4 Wh	2000 mAh	12-0944, 12-0943, 12-1028, 12-1029
12-0952	Li-Ion	7.4 V	39.22 Wh	5300 mAh	12-0961 (2 pcs)

Service and calibration

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

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

Before sending your measuring system to our main Service center, please fill in the online Service and Repair report.