FIXTURLASER USER´S MANUAL

CONTENT

INTRODUCTION

Congratulations on your choice of the Fixturlaser XA!

We are convinced that you have made the right decision and we hope the system will meet, and even exceed, your expectations.

It is important that you read the sections about safety and care before you proceed with your first measurement.

The purpose of this manual is to guide you through the different procedures and operations of the hardware and software. Since machine installations and setups are often different from each other, we have focused this manual on measurement principles and how to handle the system.

The manual describes applications, functions and equipment that may be available in a Fixturlaser XA system; the ones that are available in your specific system depend upon which application packages and accessories you have selected.

We wish you many successful measurements!

END USER LICENSE AGREEMENT

The rights to use the software in this product are offered only on the conditions that you agree to all the terms stated below, i.e. the end user agreement. By using this product you agree to be bound by this agreement. If you do not accept this agreement your sole remedy is to return the entire unused product, hardware and software, promptly to your place of purchase for a refund.

The user is granted a single license to use the software contained in this product. Use is only permitted on the hardware it has been installed on at the time of purchase. The software may not be removed from the hardware.

The software contained in the system is the property of Elos Fixturlaser AB, any copying or redistribution is strictly prohibited.

Modifying, disassembling, reverse engineering or decompiling the system or any part thereof is strictly prohibited.

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Limited liability: No liability shall exceed the price of the product, and the sole remedy, if any, to any claim shall be a right of return and refund.

Elos Fixturlaser AB or its suppliers shall, to the maximum extent permitted by applicable law, not be liable to any indirect, special, incidental, punitive, and consequential damages arising from the use of the system or any part thereof, authorized or unauthorized.

DECLARATION OF CONFORMITY

In accordance with the EMC Directive 2004/108/EC, the Low Voltage Directive 73/23/EEC, including amendments by the CE-marking Directive 93/68/EEC & EC directives RoHS, 2002/95.

Type of equipment

Alignment System

Brand name or trade mark

Fixturlaser XA

Type designation(s)/Model no(s)

1-0753 Fixturlaser XA D

1-0754 Fixturlaser M1

1-0755 Fixturlaser S1

1-0764 Fixturlaser BT1

1-0839 Fixturlaser UPAD^{XA}

Manufacturer's name, address, telephone & fax no

Elos Fixturlaser AB
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SE-431 21 Mölndal
Sweden

Tel: +46 31 7062800
Fax: +46 31 7062850

The following standards and/or technical specifications, which comply with good engineering practice in safety matters in force within the EEA, have been applied:

Standard/Test report/Technical construction file/Normative document

Emission: EN 61000-6-3:2007.
Immunity: EN 61000-6-2:2005, EN 61000-4-2, -3.
ISO9001:2008 Ref. No/ Issued by: DNV Certification AB Certification No. 2009-SKM-AQ-2704/2009-SKM-AE-1419.

The laser is classified in accordance with the International Standard IEC-60825-1:2007,
USA FDA Standard 21 CFR, Ch 1, Part 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007.

Additional information

The product was CE-marked in 2006.

As manufacturer, we declare under our sole responsibility that the equipment follows the provisions of the Directives stated above.

Date and place of issue

Mölndal 2007-11-20

Signature of authorized person

Hans Svensson, Managing Director

SAFETY

Retain and follow all product safety and operating instructions. Observe all warnings on the product and in the operating instructions.

Failure to observe the safety precautions and operating instructions can cause bodily injury, fire, and damage to the equipment.

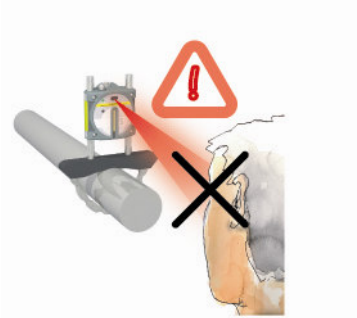
Do not disassemble, modify or use the equipment in other ways than explained in the operating instructions. Fixturlaser will not accept any liability for such use.

LASER PRECAUTIONS

Fixturlaser XA uses laser diodes with a power output of < 1.0 mW. The laser classification is Class 2.

Class 2 is considered safe for its intended use with only minor precautions required. These are:

- Never stare directly into the laser transmitter.
- Never shine the laser directly into anyone else's eyes.



Your system complies with the requirements in:

- SS-EN-60825-1-1994
- British Standard BS 4803 Parts 1 to 3
- Deutsche Industrie Norm DIN JEC 76 (CO) 6
- USA FDA Standard 21 CFR, Ch 1, Part 1040.10 and 1040.11

POWER SUPPLY

Fixturlaser XA is powered by two high-capacity rechargeable Li-Ion cells mounted in the display unit or by the external power unit.

When used in typical conditions the batteries will sustain good capacity for approximately 2-3 years before needing replacement. Contact your sales representative for battery replacement.

The batteries contain safety circuitry to operate safely with the display unit. The unit can therefore only be used with the Li-Ion batteries supplied by Fixturlaser.

WARNING!

USE OF ANY OTHER BATTERIES THAN THOSE SUPPLIED BY FIXTURLASER WILL CAUSE SEVERE DAMAGE TO THE DISPLAY UNIT AND CAN CAUSE RISK FOR PERSONAL INJURY!

Improper replacement of batteries can cause damage and risk for personal injury.

Handle any batteries with care. Batteries pose a burn hazard if handled improperly. Do not disassemble and keep away from heat sources. Handle damaged or leaking batteries with extreme care. Please keep in mind that batteries can harm the environment.

Dispose of batteries in accordance with local regulatory guidelines, if in doubt contact your local sales representative.

Only use the external power adapter supplied by Fixturlaser for use with the system. Using other power adapters can cause damage to the unit and personal injury.

WIRELESS TRANSCEIVER

The XA system can be fitted with an optional Bluetooth wireless transceiver.

Make sure that there are no restrictions on the use of radio transceivers at the site of operation before using the wireless transceivers.

Make sure to put the system in 'transport mode' (see chapter XAD general) before shipping the system by airfreight

WARNING!

Before using the wireless option make sure that there are no restrictions on the use of radio transceivers at the site. Do not use on aircraft.

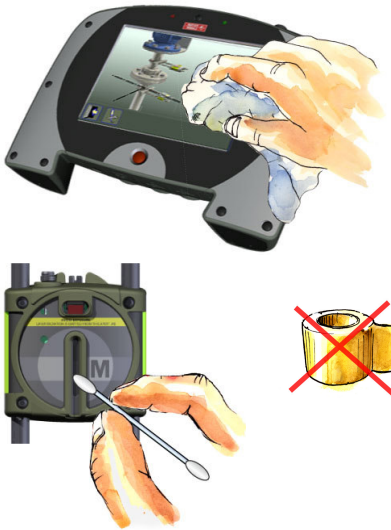
CARE

The system should be cleaned with a cotton cloth or a cotton bud moistened with a mild soap solution, with the exception of the detector and laser window surfaces, which should be cleaned with alcohol.

Do not use paper tissue, which can scratch the detector surface.

Do not use acetone.

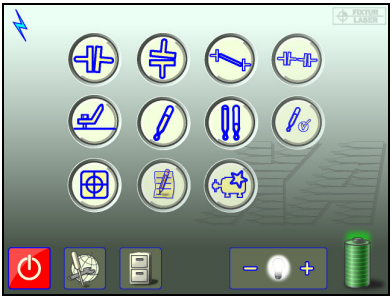
For the best possible function, the laser diode apertures, detector surfaces and connector terminals should be kept free from grease or dirt. The display unit should be kept clean and the screen surface protected from scratches.



The chains on the V-block fixtures are delivered dry. If the system is used in highly corrosive environments, the chains should be oiled.

MAIN MENU

The Fixturlaser XA is available with different programs for specific purposes. The programs included depend upon which application packages and accessories you have selected.



Press the red button to start the system and the Main Menu appears. Here you can select the program that you want to use.

In the Main Menu you will also find the Memory Manager and Global Settings.

APPLICATION PROGRAMS


Shaft Alignment Horizontal Machines


Shaft Alignment Vertical Machines


Shaft Alignment Offset Machines


Machine Train Alignment


Softcheck


Target Values


OL2R


Hot Check


Sensor Display


Text Editor


Machine Defined Data

MEMORY MANAGER


Memory Manager

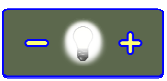
SYSTEM FUNCTIONS

Global Settings

Battery indicator

Wireless indicator

Lit when wireless communication is activated.



Backlight

Off

OFF options

When touching the OFF icon, you will see a dialog box where you can choose whether to turn the unit off, put it to sleep, or return to the main menu.

Off

Sleep

Return

SHAFT ALIGNMENT HORIZONTAL MACHINES

INTRODUCTION

Shaft alignment: Determine and adjust the relative position of two machines that are connected, such as a motor and a pump, so that the rotational centers of the shafts are collinear, when the machines are working in a normal operating condition. Correction of horizontal shaft alignment is done by moving the front and the rear pair of one machine's feet, vertically and horizontally, until the shafts are aligned within the given tolerances. A tolerance table is available in the system.

The Fixturlaser XA system has two measuring units that are placed on each shaft by using the fixtures supplied with the system. After rotating the shafts into different measuring positions the system calculates the relative distance between the two shafts in two planes. The distances between the two measuring planes, distance to the coupling and distances to the machine feet are entered into the system. The display box then shows the actual alignment condition together with the position of the feet. Adjustment of the machine can be made directly, according to the displayed values.

The alignment results can be saved in the memory manager. The measurements in the memory manager can easily be transferred to a PC for further documentation purposes.

MOUNTING

The sensor marked "M" should be mounted on the movable machine and the sensor marked "S" on the stationary machine. The sensors shall be assembled on their V-block fixture, and placed on each side of the coupling.

Hold the V-block fixture upright and mount it on the shafts of the measurement object.

Lift the open end of the chain, tension it so that the slack is removed and attach it to the hook.

Firmly tighten the chain with the tensioning screw. If necessary, use the supplied tensioning tool. Do not over-tighten. If the shaft diameter is too large the chains can be extended with extension chains.

Adjust the height of the sensor by sliding it on the posts until a line of sight is obtained for both lasers. Secure its position by locking both clamping devices on the back of both units.

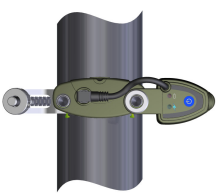
The laser of the M-sensor can be adjusted with the adjustment screw on the top of the unit. There is normally no need to adjust the laser, but this might be necessary when measuring at long distances.

NOTE: Make sure that the adjustment screw is secured with the locking nut after adjustment.

Connect the cables from the sensor units to the connectors on the display unit.

Always let the cables stay connected to the sensor units except when switching between cable communication and wireless communication.

If the wireless communication device is used, make sure that the tightening screw is locked and that the cable between the wireless unit and the sensor unit is connected.



PRE-ALIGNMENT FUNCTIONS

In an effort to obtain the best possible conditions for shaft alignment, it is necessary to perform some pre-alignment checks. In many cases it is necessary to make these checks in order to obtain precise alignment. It is often impossible to reach the desired alignment results if you do not make any pre-alignment checks.

Before going on site, check the following:

- What are the required tolerances?
- Any offsets for dynamic movements?
- Are there any restrictions for mounting the measuring system?
- Is it possible to rotate the shafts?
- What shim size is needed?

Before setting up the alignment system on the machine, check the machine foundation, bolt and shim condition. Also check if there are any restrictions in adjusting the machine (if e.g. there is enough space to move the machine).

After the visual checks have been performed, there are some conditions that have to be considered:

- Check that the machine has the right temperature for alignment.
- Take away old rusty shims (check that you can remove shims).
- Check coupling assembly and loosen the coupling bolts.
- Check soft foot conditions.
- Mechanical looseness.
- Check coupling and shaft run-out.
- Pipe work strain.
- Coarse alignment.

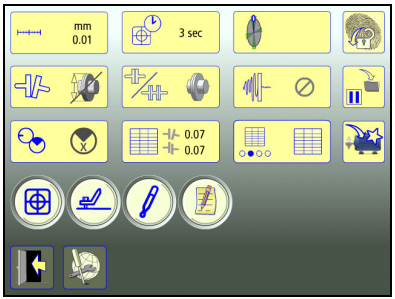
- Check coupling gap (axial alignment).

STARTING THE PROGRAM

Start the program by touching the Horizontal Shaft Alignment icon in the Main Menu.

Go to Settings for selecting measurement method and other settings.

SETTINGS

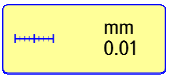


These settings are unique for this application.

For most of the settings, the current selection is shown in the icon.

The functions that are available depend upon which application packages and accessories you have selected.

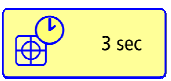
Measurement unit and resolution shown



Opens window for selection of measurement unit and resolution shown.

Resolution shown depends also on connected receiver.

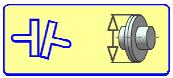
Sampling time



Opens window for selection of sampling time.

A repeatability test can also be made here. See chapter "Repeatability test".

Unit of Angularity

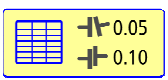


Opens window for activating or de-activating coupling gap.

Measurement method

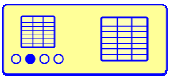
Opens window for selection of measurement method. Express Mode, Tripoint or the Clock method.

Tolerance table



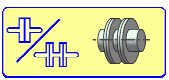
Opens the tolerance table. See chapter ”Tolerance table”.

Tolerance table direct



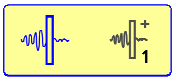
Opens window for activating or de-activating direct opening of the tolerance table, when the application program is started.

Spacer shaft



Opens window for activating or de-activating spacer shaft.

Adjustable screen filter



Opens window for selection of adjustable screen filter (type 1 or 2) or for deactivating the adjustable screen filter.

Note: The adjustable screen filter should be deactivated for normal operation, and only activated in environments with severe vibrations.

Extended alignment

Opens window for activating or de-activating extended alignment.

Sensor display

Starts Sensor Display. See chapter ”Sensor Display”.

Softcheck™

Starts Softcheck. See chapter ”Softcheck”.

Target values

Opens Target values. See chapter ”Target values”.

Notes

Opens Notes, where notes can be entered.

Screen lock

Locks the screen.

Resume function

Stores system data to allow a resume of these data to be performed after OFF.

Add new machine with defined data

Opens window for adding a new machine with defined data to Machine Defined Data.

Entered data, such as distances, Target Values and tolerances, will be saved.

Global settings

Opens Global settings. See chapter "Global settings".

Exit

Exits the Settings and returns to the application.

MEASUREMENT METHODS

In the Horizontal Shaft Alignment program, there are three different measurement methods, the Express Mode method, the Tripoint method and the Clock method. Select the measurement method in Settings.

Express Mode™ method

In the Express Mode method, the alignment condition can be calculated by recording three points while rotating the shafts at least 60°. After recording the 1st point, the other points are taken automatically when the shafts are rotated to a new position and are kept in position for more than 2 seconds.

Tripoint™ method

In the Tripoint method, the alignment condition can be calculated by taking three points while rotating the shaft at least 60°. In this method all points are taken manually.

Clock method

In the Clock method, machinery positions are calculated by taking three points with 180° of rotation. The Clock method is useful when comparing the measurement results with traditional alignment methods using dial gauges and reversed rim method. The method can also be used when the machines are standing on non-horizontal foundations or when the shafts are not coupled.

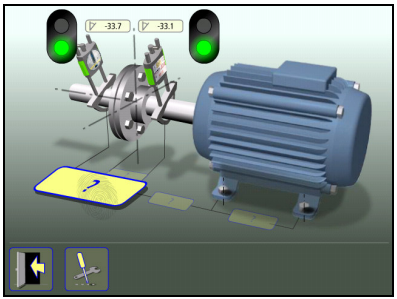
EXPRESS MODE™ METHOD

Select the Express Mode method in Settings.

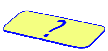
NOTE: The shafts should be coupled during measurement in order to achieve as reliable and accurate results as possible, when using the Express Mode method.

TIP: The larger the angle over which the three points are measured, the fewer moves and repeat measurements will have to be made. Minimum angle between readings is 30° (60° if the distance between the sensors is less than 200 mm).

Enter dimensions

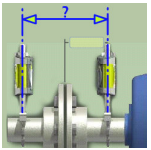


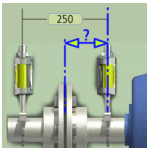
The screen displays the movable machine. The traffic lights show green when the laser hits the detector.



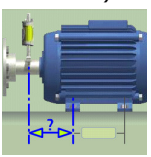
Touch the icon to enter dimensions.

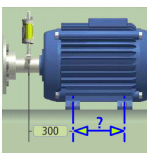
Measure and enter dimensions.





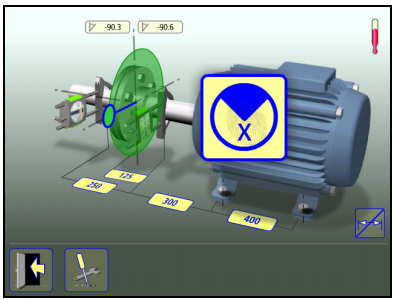
You must enter the distance between the sensors, and the distance between the centre of the coupling and the M-sensor. (If you only wish to check shaft alignment, these are the only necessary distances).





The distance between the M-sensor and the first pair of feet and the distance between the first and the second pairs of feet can be entered now or later (these distances are necessary to provide the feet values).

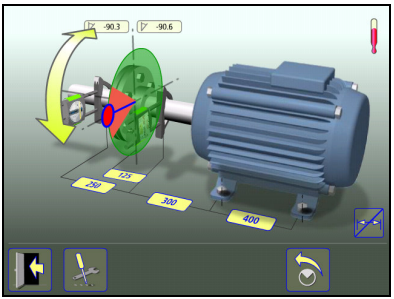
Measurement point registration



Set the sensors so that they are at approximately the same rotational angle at the first measurement position.

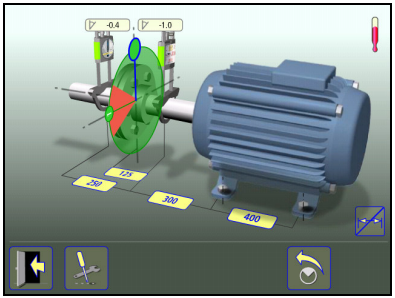
Touch the register icon.

This starts the measurement point registration and registers the first reading.



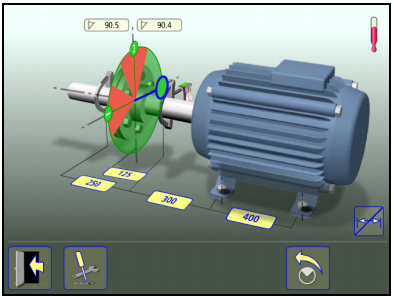
Rotate the shafts to the next position. The shafts have to be rotated over a minimum of 30° (60° if the distance between the sensors is less than 200 mm).

Green sector show permitted positions. Red sector show forbidden positions.



The reading is taken automatically when the sensors have been stationary for 2 seconds.

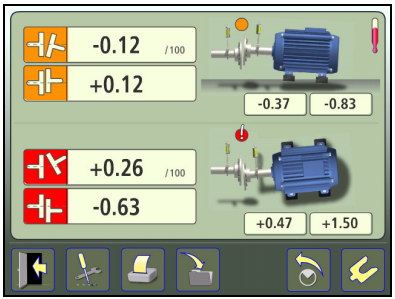
Rotate the shafts to the third position.



The reading is taken automatically when the sensors have been stationary for 2 seconds.

TIP: When registering the third reading at the 3 o'clock position, the sensors will already be in the right position for horizontal alignment.

Measurement results



The Measurement Result screen shows coupling values and foot values in both the vertical and horizontal direction.

The symbol to the left of the coupling values indicates the angular direction and offset, and also if the values are within tolerance.

Within tolerance (green).

Within double tolerance (yellow and inverted).

Out of double tolerance (red and inverted).

A symbol at the coupling indicates the status of the coupling.

Within tolerance.

Within double tolerance.

Out of double tolerance.

The machine picture itself also indicates the coupling alignment.

Save the measurement result.

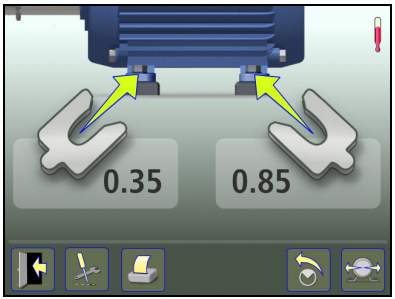
Go to shimming.

Evaluating the result

The angle and offset values are used to determine the alignment quality. These values are compared with the alignment tolerances to determine whether correction is necessary. If suitable tolerances are selected in the tolerance table, the symbols described above indicate if the angle and offset values are within tolerance or not.

The foot values indicate the movable machine's foot positions where corrections can be made.

Shimming



The Shimming screen shows foot values in the vertical direction as suitable shim values (0.05 mm / 1 mils).

The arrows show if shims must be added or removed to adjust the machine in the vertical direction.

The check signs show that shimming is not needed.

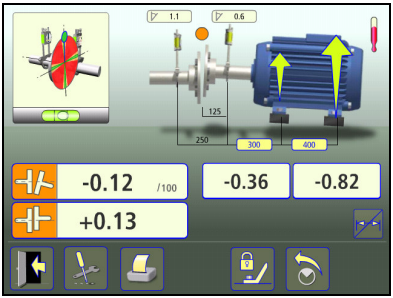
When shimming is completed, continue to alignment for adjustments in the horizontal direction.

Go to alignment.

Alignment

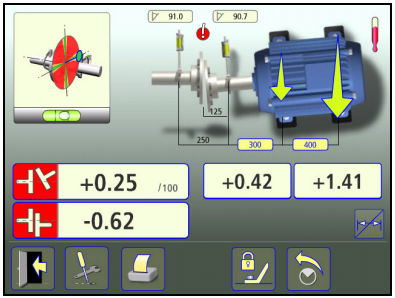
If the machine has been adjusted vertically in the shimming screen, go directly to alignment in the horizontal direction.

If the machine has not been adjusted in the shimming screen, alignment in the vertical direction has to be done first.



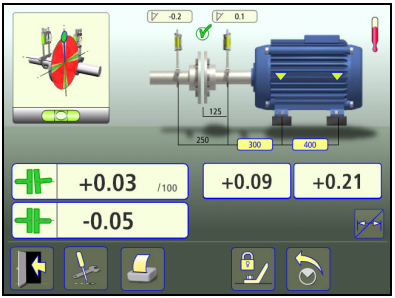
Rotate the shafts to the 12 or 6 o'clock position to make adjustments in the vertical direction. The angle guide helps you to reach the right position.

Adjust the machine vertically until the values for both angular and parallel alignment are within tolerance. The arrows at the feet show in which direction the machine shall be moved.



Rotate the shafts to the 3 or 9 o'clock position to make adjustments in the horizontal direction. The angle guide helps you to reach the right position.

Adjust the machine horizontally until the values for both angular and parallel alignment are within tolerance. The arrows at the feet show in which direction the machine shall be moved.



Rotate the shafts back to the 12 or 6 o'clock position and check that the machine is still within tolerance.

Alignment is now completed. To confirm the result, re-do the measurement.

Re-measure.

TRIPOINT™ METHOD

Select the Tripoint method in Settings.

NOTE: The shafts should be coupled during measurement in order to achieve as reliable and accurate results as possible, when using the Tripoint method.

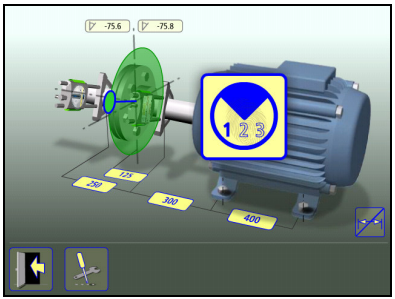
TIP: The larger the angle over which the three points are measured, the fewer moves and repeat measurements will have to be made. Minimum angle between readings is 30° (60° if the distance between the sensors is less than 200 mm).

The Tripoint method works in the same way as the Express Mode method, except for measurement point registration.

Enter dimensions

See the Express Mode method.

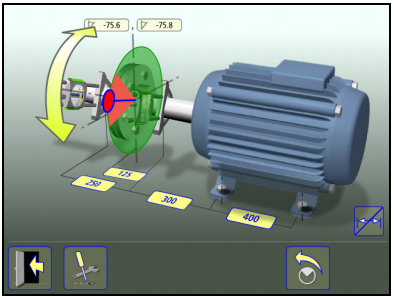
Measurement point registration



Set the sensors at approximately the same rotational angle at the first measurement position.

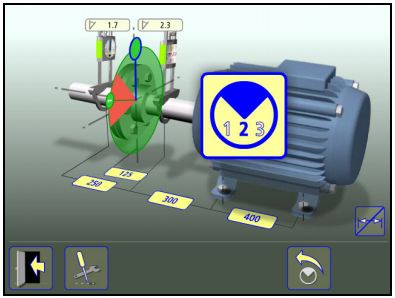
Touch the register icon.

This registers the first reading.



Rotate the shafts to the next position. The shafts must be rotated over a minimum of 30° (60° if the distance between the sensors is less than 200 mm).

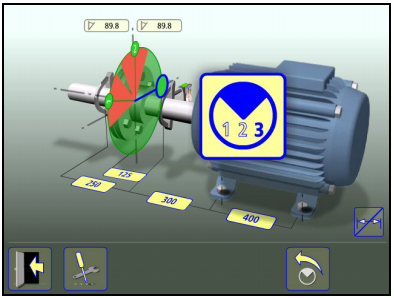
Green sector show permitted positions. Red sector show forbidden positions. The Register icon is not shown if the rotation is less than 30°.



Touch the register icon.

This registers the second reading.

Rotate the shafts to the third position.



Touch the register icon.

This registers the third reading.

TIP: When registering the third reading at the 3 o'clock position, the sensors will already be in the right position for horizontal alignment.

Measurement results

See the Express Mode method.

Evaluating the result

See the Express Mode method.

Shimming

See the Express Mode method.

Alignment

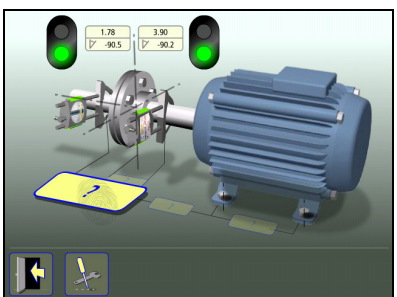
See the Express Mode method.

THE CLOCK METHOD

Select the Clock method in Settings.

The Clock method works in the same way as the Express Mode and the Tripoint method except for measurement point registration and alignment.

Enter dimensions



The screen displays the movable machine. The traffic lights show green when the laser hits the detector.

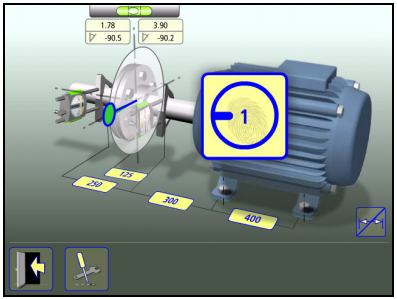
Sensor values are also shown in the Clock method.

Touch the icon to enter dimensions.

Measure and enter dimensions.

You must enter the distance between the sensors and the distance between the centre of the coupling and the M-sensor. (If you only wish to check shaft alignment, these are the only necessary distances).

The distance between the M-sensor and the first pair of feet and the distance between the first and the second pairs of feet can be entered now or later (these distances are necessary to provide the feet values).



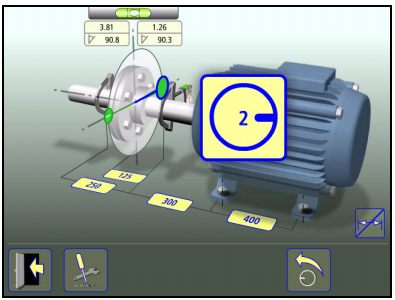
Set the sensors at approximately the same rotational angle at the first measurement position, 9 o'clock.

Touch the register icon.

This registers the first reading.

Rotate the shafts to the next position, 3 o'clock.

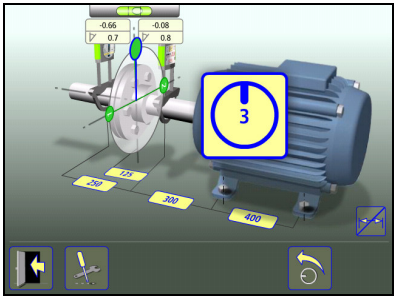
A green sector displays the position.



Touch the register icon.

This registers the second reading.

Rotate the shafts to the third position, 12 o'clock.



Touch the register icon.

This registers the third reading.

Measurement result

See the Express Mode method.

Evaluating the result

See the Express Mode method.

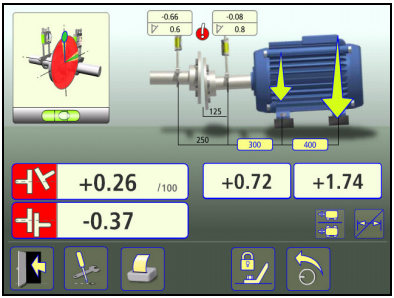
Shimming

See the Express Mode method.

Alignment

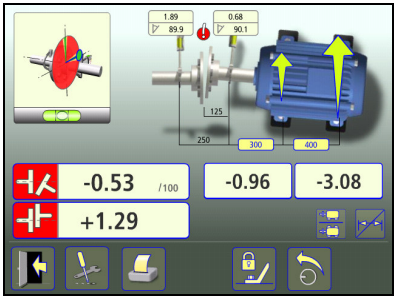
If the machine has been adjusted vertically in the shimming screen, go directly to alignment in the horizontal direction.

If the machine has not been adjusted in the shimming screen, alignment in the vertical direction has to be done first.



Rotate the shafts to the 12 o'clock position to make adjustments in the vertical direction. The angle guide helps you to reach the right position.

Adjust the machine vertically until the values for both angular and parallel alignment are within tolerance. The arrows by the feet show in which direction the machine should be moved.



Rotate the shafts to the 3 o'clock position to make adjustments in the horizontal direction. The angle guide helps you to reach the right position.

Adjust the machine horizontally until the values for both angular and parallel alignment are within tolerance. The arrows by the feet show in which direction the machine should be moved.

Rotate the shafts back to the 12 o'clock position and check that the machine is still within tolerance.

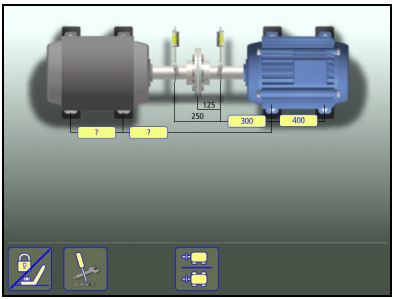
Alignment is now completed. To confirm the result, re-do the measurement.

Re-measure.

FEET LOCK FUNCTION

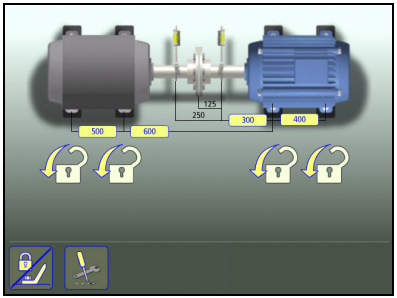
In some cases the machine that is displayed as the movable machine is not movable, or maybe some of the feet are not adjustable. In order to perform proper alignment in these cases, the Feet Lock function can be used. This function allows you to select which feet are locked and which feet are adjustable.

Touch the Feet Lock icon to enter the Feet Lock function.

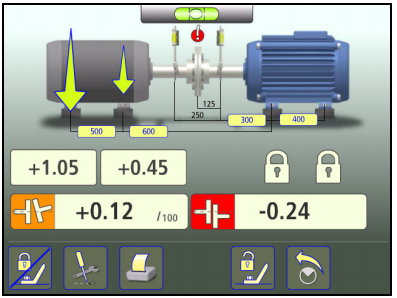


Touch the icon to enter dimensions.

Enter dimensions. The required distances are those between the first and second pairs of feet on the stationary machine and between the first pair of feet on the stationary machine and the first pair of feet on the movable machine.



Select the two pairs of feet you want to lock.

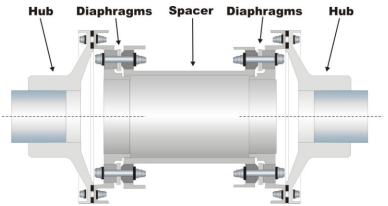


Live values are shown for the two pairs of feet that are not locked.

SPACER SHAFT

The spacer shaft function is used when the alignment is performed on machinery using a membrane coupling. The membrane coupling is a typical high performance coupling, with no backlash, used for maintenance free operation. It is also suitable for high speeds or high temperature applications.

Membrane couplings are normally designed with a spacer shaft between two flexible elements making it possible to compensate for both axial, radial (offset) and angular misalignment. Each flexible element normally consists of a steel disc pack (diaphragms) which has a high torsional stiffness. A single flexible element can only compensate for angular misalignment and cannot take any radial misalignment. To compensate for all types of misalignment, the membrane couplings use two flexible elements with a spacer in between.



When using the spacer shaft function, the misalignment is presented as an angle for each flexible element. The angles can be compared directly to the figures on allowed misalignment normally delivered from the coupling manufacturer.

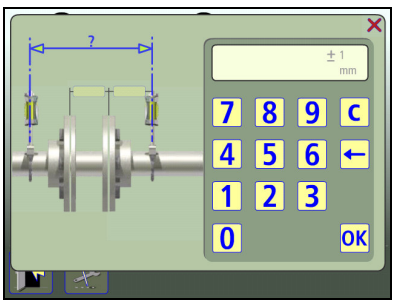
Depending upon the alignment condition, there can be differences in angle between the two flexible elements. The pictures below show different examples of how the angles in the flexible elements can be.

Activate spacer shaft in Settings.

Enter dimensions

Touch the icon to enter dimensions.

Measure and enter dimensions.



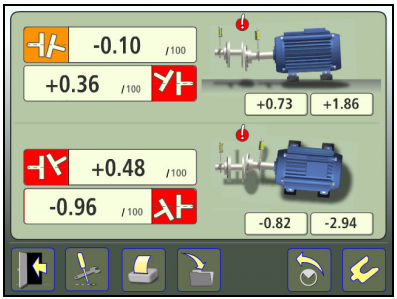
You must enter the distance between the sensors, the "spacer shaft length" and the distance between the "end of the spacer shaft" and the M-sensor. (If you only wish to check shaft alignment, these are the only necessary distances).

The distance between the M-sensor and the first pair of feet and the distance between the first and the second pairs of feet can be entered now or later (these distances are necessary to provide the feet values).

Measurement point registration

See selected measurement method, the Express Mode method, the Tripoint method or the Clock method.

Measurement results



The Measurement Result screen shows coupling values and foot values in both the vertical and horizontal direction.

The symbol to the left or right of the coupling values indicates the angular direction, and also if the values are within tolerance.

Within tolerance (green).

Within double tolerance (yellow and inverted).

Out of double tolerance (red and inverted).

A symbol at the coupling indicates the status of the coupling.

Within tolerance.

Within double tolerance.

Out of double tolerance.

The machine picture itself also indicates the coupling alignment.

Save the measurement result.

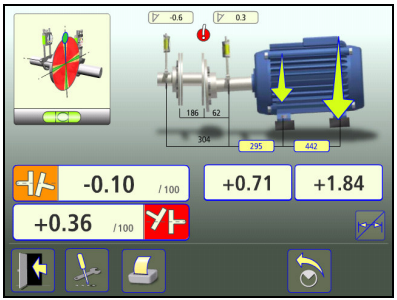
Go to alignment.

Evaluating the result

The angle values are used to determine the alignment quality. These values are compared with the alignment tolerance to determine whether correction is necessary. If suitable tolerance is selected in the tolerance table, the symbols described above indicate if the angle values are within tolerance or not.

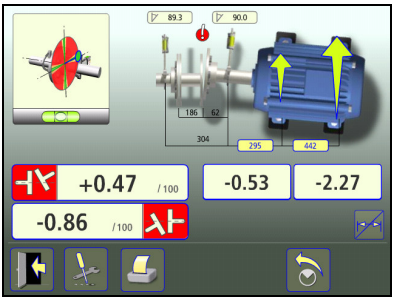
The foot values indicate the movable machine's foot positions where corrections can be made.

Alignment



Rotate the shafts to the 12 or 6 o'clock position to make adjustments in the vertical direction. The angle guide helps you to reach the right position.

Adjust the machine vertically until the values for both angular values are within tolerance. The arrows at the feet show in which direction the machine shall be moved.



Rotate the shafts to the 3 or 9 o'clock position to make adjustments in the horizontal direction. The angle guide helps you to reach the right position.

Adjust the machine horizontally until the values for both angular values are within tolerance. The arrows at the feet show in which direction the machine shall be moved.

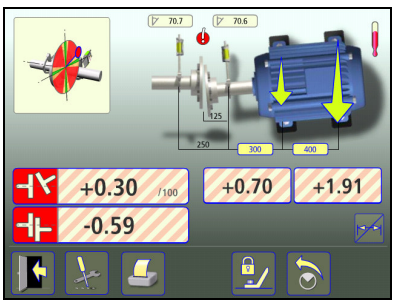
Rotate the shafts back to the 12 or 6 o'clock position and check that the machine is still within tolerance.

Alignment is now completed. To confirm the result, re-do the measurement.

Re-measure.

EXTENDED ALIGNMENT

Extended alignment makes it possible to align even when it is not possible to rotate the shafts to the 12/6 or 3/9 o'clock positions.



Diagonal red stripes in the back of the value fields indicate that Extended Alignment is activated and that the result values are approximate.

Vertical values are shown at the 12/6 o'clock positions +/-45°. Horizontal values are shown at the 3/9 o'clock positions +/-45°. The values are more accurate within +/-15° at the 12/6/3/9 o'clock positions.

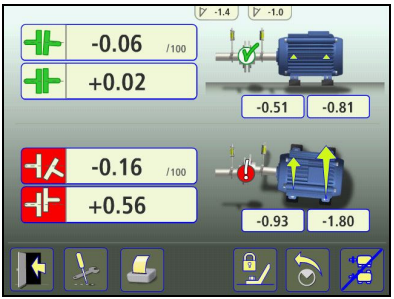
2-AXIS ALIGNMENT

The 2-axis alignment function allows the user to perform adjustments of the movable machine both in vertical and horizontal direction without further rotations of the shafts.

The 2-axis alignment function is used only when the shaft has limited or no possibility to control the positioning of the shafts during rotation. This software function requires the use of 2-axis receivers (RM and RS) together with laser modules (TM and TS).

Note: This function cannot be used during the following conditions:

- Uncoupled shafts
- If the shafts rotates during correction
- If any backlash occurs in the coupling during correction.



The 2-axis alignment screen shows coupling values and foot values in both the vertical and horizontal direction.

NOTE!

When using 2-axis alignment, the measurement units must be still during the alignment.

If they are rotated more than 3°, the view will automatically change to 1-axis alignment.

As long as the measurement units are still, it is possible to change between 1-axis and 2-axis view

Change to 1-axis view.

Change to 2-axis view.

OTHER FEATURES

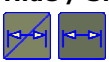
Coupling gap

The result can be presented as a coupling gap.

Activate coupling gap in Settings.

Enter coupling gap in the result screen.

Hide / Show dimensions



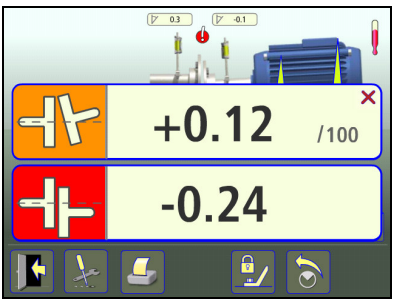
Hide / Show dimensions.

Manual change of view

Manual change of view in the Clock method.

Enlarge values

On the alignment screen, the coupling and feet values can be enlarged by touching them.



Touch the enlarged values to return them to normal size.

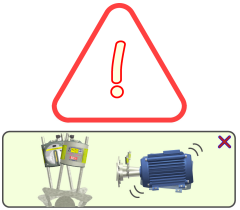
Target Value symbol

When Target Values are used in the measurement, this is indicated with the Target Value symbol in the upper right corner of the Measurement, Result and Alignment screens.

Looseness indicator

The system has a function for detecting coupling backlash and looseness in order to achieve optimum accuracy. The system will display the looseness indicator if one of the following conditions is met:

- The M and S units are more than 3° apart.
- The mutual angular position changes more than 0.7° from that when the first measurement point was taken.



When the coupling backlash or looseness is eliminated to avoid any of the above conditions, the looseness indicator will automatically disappear.

It is possible to override the indicator by touching the 'x' in the upper right corner to close the message. The looseness indicator function will then be disabled for the rest of the measurement session.

M and S unit LED function

The front of the M and S units has two LEDs.

Laser operation LED (close to laser):

Continuously green:	Laser is firing.

Status LED (close to detector):

Continuously green:	Unit OK and ready.
Continuously red:	Unit start up or malfunction during start up.
Flashing green:	Unit placed at 9, 12 or 3 o'clock positions (within +/-3°).
Flashing red:	Measurement in progress.

SHAFT ALIGNMENT
VERTICAL MACHINES

INTRODUCTION

Shaft alignment: Determine and adjust the relative position of two machines that are connected, such as a motor and a pump, so that the rotational centers of the shafts are collinear, when the machines are working at a normal operating temperature. Correction of vertical shaft alignment is done by moving the flange of the machine until the shafts are aligned within given tolerances. A tolerance table is available in the system.

The Fixturlaser system has two measuring units that are placed on each shaft by using the fixtures supplied with the system. After rotating the shafts to different measuring positions, the system calculates the relative distance between the two shafts in two planes. The distances between the two measuring planes, distance to the coupling, number of bolts and pitch circle diameter are entered into the system. The display box then shows the actual alignment condition together with the position of the feet. Adjustment of the machine can be made according to the values displayed. The angular misalignment is corrected by placing shims under the bolts and offset is corrected by moving them laterally.

The alignment results can be saved in the memory manager. The measurements in the memory manager can easily be transferred to a PC for further documentation purposes.

MOUNTING

The sensors are mounted as described in chapter "Shaft Alignment Horizontal Machines".

PRE-ALIGNMENT FUNCTIONS

In an effort to obtain the best possible conditions for shaft alignment, it is necessary to perform some pre-alignment checks. In many cases it is necessary to make these checks in order to obtain precise alignment. It is often impossible to reach the desired alignment results if you do not make any pre-alignment checks.

Before going on site, check the following:

- What are the required tolerances?
- Any offsets for dynamic movements?
- Are there any restrictions for mounting the measuring system?
- Is it possible to rotate the shafts?
- What shim size is needed?

Before setting up the alignment system on the machine, check the machine foundation, bolt and shim conditions. Also check if there are any restrictions in adjusting the machine (if e.g. there is enough space to move the machine).

After the visual checks have been performed, there are some conditions that have to be considered:

- Check that the machine has the right temperature for alignment?
- Take away old rusty shims (check that you can remove shims).
- Check coupling assembly and loosen the coupling bolts.
- Check soft foot conditions.

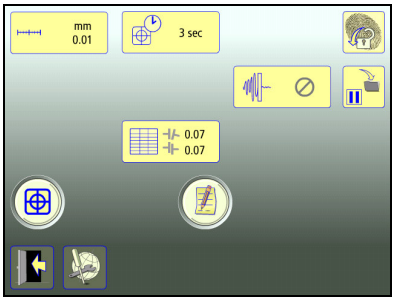
- Mechanical looseness.
- Check coupling and shaft run-out.
- Pipe work strain.
- Coarse alignment.
- Check coupling gap (axial alignment).

STARTING THE PROGRAM

Start the program by touching the Vertical Shaft Alignment icon in the Main Menu.

Go to Settings for selecting settings.

SETTINGS

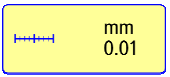


These settings are unique for this application.

For most of the settings, the current selection is shown in the icon.

The functions that are available depend upon which application packages and accessories you have selected.

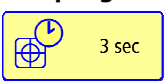
Measurement unit and resolution shown



Opens window for selection of measurement unit and resolution shown.

Resolution shown depends also on connected receiver.

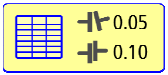
Sampling time



Opens window for selection of sampling time.

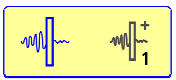
A repeatability test can also be made there. See chapter “Repeatability test”.

Tolerance table



Opens the tolerance table. See chapter "Tolerance table".

Adjustable screen filter



Opens window for selection of adjustable screen filter (type 1 or 2) or for deactivating the adjustable screen filter.

Note: The adjustable screen filter should be deactivated for normal operation, and only activated in environments with severe vibrations.

Sensor display

Starts Sensor Display. See chapter "Sensor Display".

Notes

Opens Notes, where notes can be entered.

Screen lock

Locks the screen.

Resume function

Stores system data to allow a resume of these data to be performed after OFF.

Global settings

Opens Global settings. See chapter "Global settings".

Exit

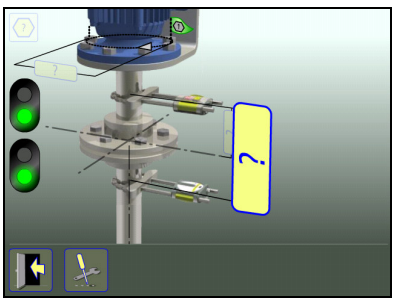
Exits the Settings and returns to the application.

MEASUREMENT

Measurement method

In the Vertical Shaft Alignment program, machinery positions are calculated by taking three points with 180° of rotation.

Enter dimensions



The screen displays the movable machine. The traffic lights show green when the laser hits the detector.

Touch the icon to enter dimensions.

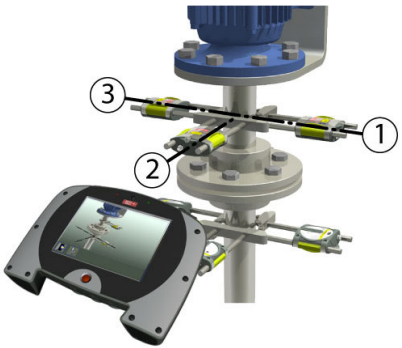
Measure and enter dimensions.

You must enter the distance between the sensors, and the distance between the centre of the coupling and the M-sensor. (If you only wish to check if the shafts are aligned, these are the only distances necessary.)

Entering the pitch circle diameter and the number of bolts can be done now or later (this is necessary in order to obtain the bolt values).

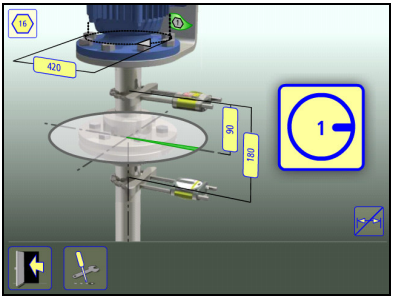
Up to 256 bolts can be entered.

Measurement point registration



Place yourself at the position corresponding to the second measurement position, where it is easiest to turn the shafts through 180°.

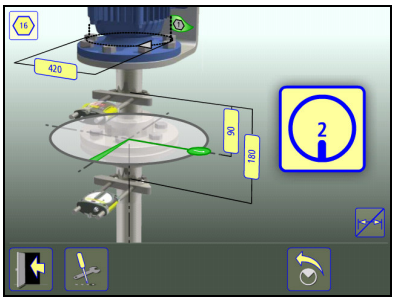
Tip: Mark the positions 1, 2 and 3 before you start measuring.



Set the sensors at approximately the same rotational angle at the first measurement position, with bolt number 1 to the right.

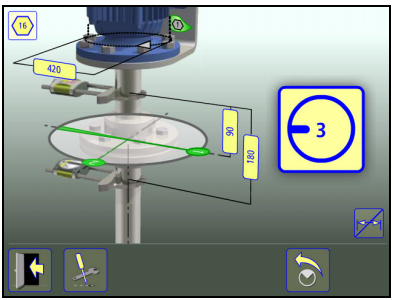
Touch the register icon. This registers the first reading.

Rotate the shafts 90° to the second position (where you are standing).



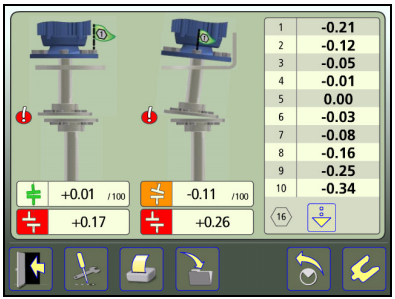
Touch the register icon. This registers the second reading.

Rotate the shafts 90° to the third position, to the left.



Touch the register icon. This registers the third reading.

Measurement results



The Measurement Result screen shows coupling values in both directions, and foot values.

The symbol to the left of the coupling values indicates the angular direction and offset, and also if the values are within tolerance.

Within tolerance (green).

Within double tolerance (yellow and inverted).

Out of double tolerance (red and inverted).

A symbol at the coupling indicates the status of the coupling.

Within tolerance.

Within double tolerance.

Out of double tolerance.

The machine picture itself also indicates the coupling alignment.

Scroll upwards in the bolt list.

Scroll downwards in the bolt list.

Save the measurement result.

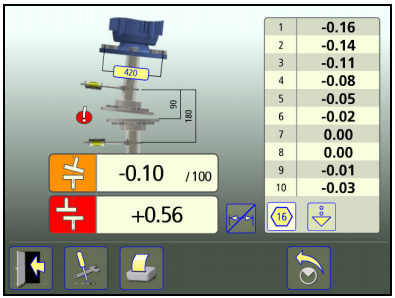
Go to alignment.

Evaluating the result

The angle and offset values are used to determine the alignment quality. These values are compared with alignment tolerances to determine if any correction is necessary. If suitable tolerances are selected in the tolerance table, the symbols described above indicate if the angle and offset values are within tolerance or not.

The foot values indicate the movable machine's foot positions where corrections can be made.

ALIGNMENT



Adjust the angular error by placing shims under the bolts as required (negative bolt value means that shims should be added.) The angular error is displayed live in the first direction when the sensors are placed in position number 1, and in the second direction when they are placed in position number 2.

Now adjust the parallel offset in both directions. The parallel offset is displayed live in the first direction when the sensors are placed in position number 1, and in the second direction when they are placed in position number 2.

Check that both the angular value and the parallel offset are within the required tolerances once the adjustments are completed.

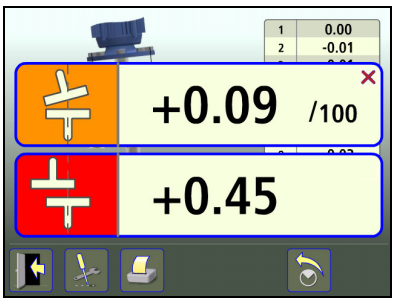
Alignment is now complete. To confirm the result, re-do the measurement.

Re-measure.

OTHER FEATURES

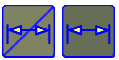
Enlarge values

On the alignment screen, the coupling and feet values can be enlarged by touching them.



Touch the enlarged values to return them to normal size.

Hide / Show dimensions

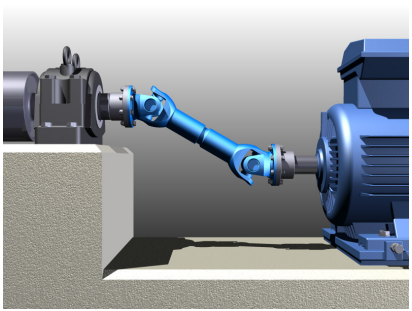


Hide / Show dimensions

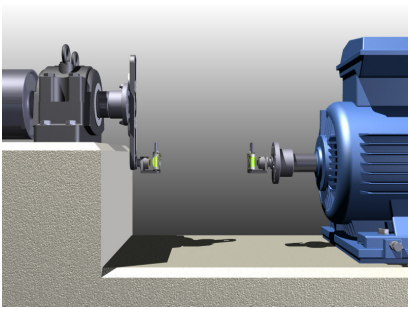
SHAFT ALIGNMENT OFFSET MACHINES

INTRODUCTION

The most common set-up for offset machines is the Z-configuration, where the drive shaft and the driven unit should have rotational centers that are parallel to each other. This configuration can appear in both horizontally and vertically mounted machines.



The Offset laser fixture is adjustable in a plane parallel to the stationary machine's flange face and can be set at any position to eliminate the offset from the driven unit. The dummy rotational centre on the fixture is set in front of the driven unit and any angular misalignment is measured by using the sensors in the Fixturlaser XA system.



Alignment of offset machines with the Fixturlaser XA system involves the following:

- Pre-alignment.
- Mounting the fixtures to eliminate the offset between the rotational centers.
- Coarse alignment using the built-in lasers.
- Precision alignment using the Fixturlaser XA system.

PRE-ALIGNMENT

The machined parts of the Offset fixture allow the dummy axis to be set parallel with a tolerance of better than 0.2 mm per meter. However, if the flange face is deformed, not truly flat, or has a run-out, the accuracy of the system can be compromised. It is important that the flange is clean and that all high spots are removed before mounting the fixtures on the flange. It is also important to use the spacers and washers that are included in the fixture system according to the instructions mentioned in the mounting section of this manual.

Perform the following actions before mounting the fixture on the flange:

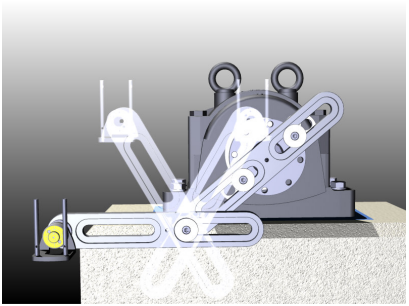
- Dismount the covers and remove the cardan shaft.
- Remove all high spots, such as burs from the bolt holes, and clean the flange faces.
- Check the run-out on the flange faces, using a dial indicator.
- Lock the shaft of the stationary machine before mounting the fixture on the flange.

MOUNTING

Mounting (Stationary)

The Offset fixture comes with a number of methods of attachment. The system is designed so that you can utilize the coupling bolts themselves in most cases when mounting the arm on the flange. Remember to place the steel spacers between it and the face before bolting up. This helps to eliminate any problems with high spots on the surface. The arm can be fixed at any point across the face, but placing it at the outer diameter, rather than across the centre, secures the fixture arm over a longer distance and increases the stability. The offset and the space available determine the set-up of the fixture arrangement. The figures below show different ways of mounting the fixture on the stationary machine.

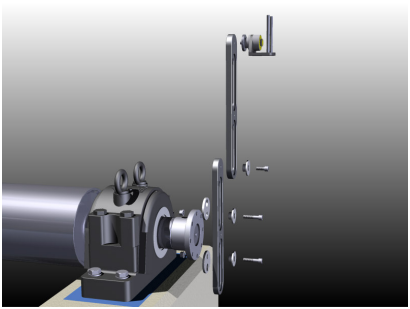
Mounting the fixture with 2 arms is the most flexible set-up, which also covers the entire range in terms of offset.



1. Clean the flange and mount the inner arm on the flange. Make sure to use the hardened washers as spacer between the arm and flange. Try to have as much distance between the two bolts as possible. Use the bolts from the cardan shaft (maximum diameter of the Allen screw = 12 mm) together with the guide washers to fix the arm on the flange. Make sure that the arm has maximum contact surface, equally distributed across the width, with the hardened washers, and that the arm is properly fastened on the flange.

2. Mount the 2nd arm with the turret onto the 1st arm, using the bolt and guide washer. By slightly tightening the arm; it is possible to adjust its position roughly in front of the movable unit.

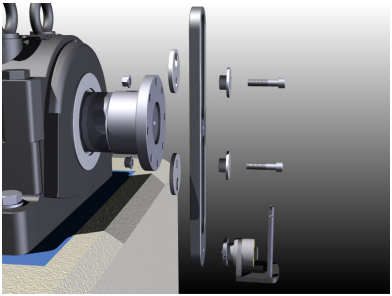
3. Make sure to tighten the bolt that connects the two arms before the fixture is left unsupported.

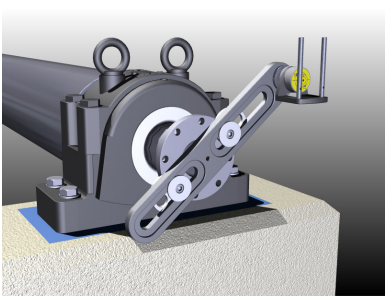


Mounting alternatives (Stationary)

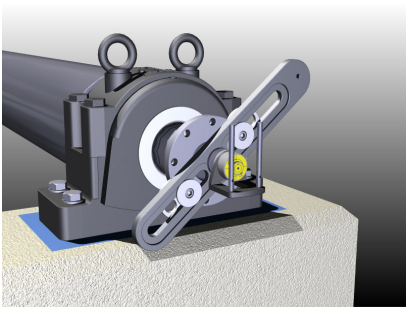
In applications where the flange can be rotated, where access is limited, or where you cannot use the “2-arm set-up”, it is possible to mount just one arm on the flange.

- Mount the arm on the flange and rotate the flange to a position where the "dummy axis" of the turret can hit the centre of the movable machine.
- Make sure to lock the stationary unit in this position to prevent any movement of the flange.
- Make the final adjustment of the arm until the "dummy axis" of the turret hits the centre of the movable machine.
- Tighten the arm’s fastening bolts.



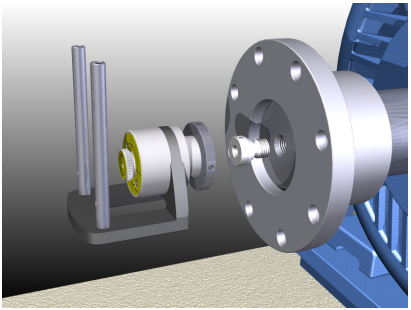


For applications with a small offset, you sometimes have to mount the turret close to the centre and in between the fastening bolts on one arm. In this case, it is necessary to dismount the turret at the end and place it in the centre thread on the arm.



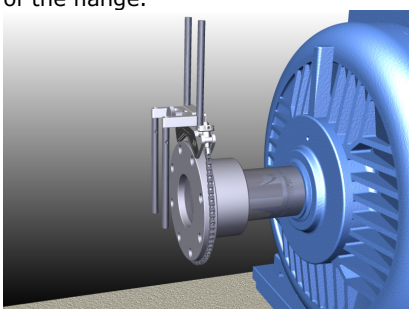
Mounting (Movable)

To attach the turret on the movable machine, the kit is provided with a selection of threaded nuts which will fit common coupling faces that have a threaded hole in the shaft centre. These can be used to secure the turret to the flange face. The adaptors are only used to mount the turret onto shafts that can be rotated. When performing the measurement, it is important to rotate the machine shaft and not the turret itself.

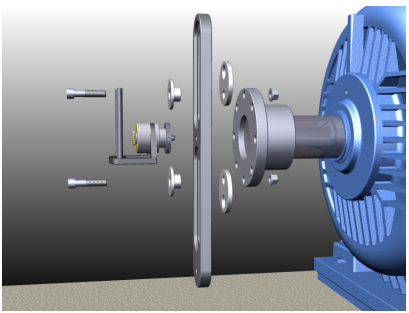


Mounting alternatives (Movable)

If no thread is present in the shaft centre of the movable machine, the M-sensor can be mounted by using the chain fixture, extension bracket (optional) and the longer rods from the Fixturlaser XA system. The chain fixture is attached to the flange. The extension bracket is mounted on the chain fixture so that the rods are positioned in front of the flange.



If the shaft cannot be rotated, an extra arm can be mounted in front of the flange. The threaded hole in the centre of the arm should be positioned near the centre of the shaft. Try to have as much distance as possible between the fastening points.



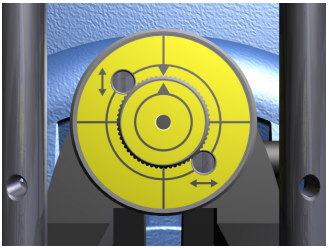
COARSE ALIGNMENT

The purpose of coarse alignment is to align the machines roughly by using the built-in lasers.

The built-in lasers in each turret are pre-adjusted so that the laser beam represents the axis of rotation for the unit it is mounted on.

1. Turn on the built-in laser in the turret on the stationary side, by rotating the laser unit clockwise until it bottoms.

   The lasers may cause interference with each other so it is recommended that the laser pointers are turned on one at a time.



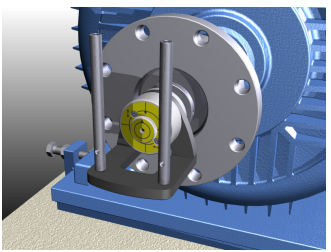
2. Rotate the turret on the stationary side and make sure that the laser beam hits the same spot (within 2 mm). If not, adjust the built-in laser according to steps 5-12.

3. Loosen fastening screw and adjust the position of the arm until the laser beam hits the target centre on the movable machine. Tighten and verify that the laser beam is still hitting the centre of the target.

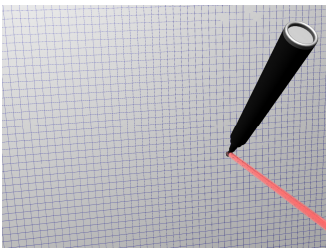
4. Turn off the laser in the turret on the stationary side.

5. Turn on the laser in the turret on the movable machine.

6. Turn the turret until it is standing in a vertical position.

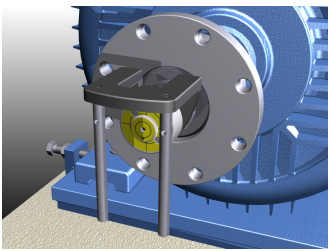


7. Aim the laser onto a target (a piece of paper or cardboard). Make a mark where the laser beam hits.



8. Rotate the **shaft** 180°.

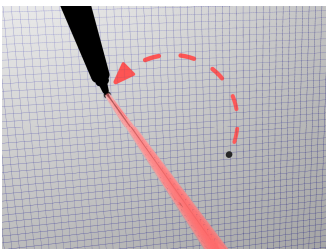
   Note: On the movable side the shaft should be rotated, not just the turret.



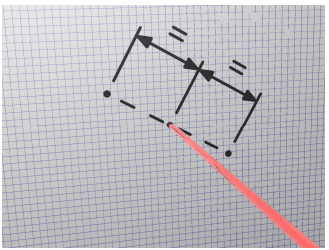
When using this procedure on the stationary side, only the turret shall be rotated 180°.

9. The laser spot should now have moved on the surface, in a pattern of a half circle.

   Make a 2nd mark where the laser beam hits the target.



10. Make a 3rd mark on the target at half the distance between the 1st and 2nd mark.

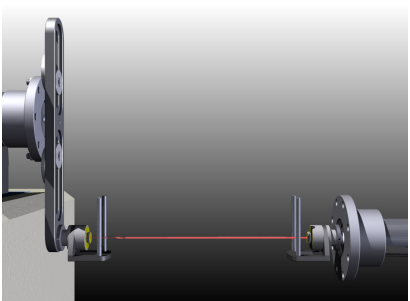


11. Adjust the position of the laser beam until it is hitting the 3rd marking on the target, using the two adjustment screws on the front on the turret. Make sure not to rotate the turret during the adjustment of the laser.

12. Repeat the coning process until the circle is a single spot on the surface during rotation of the shaft.

13. Make a coarse adjustment of the movable machine. Loosen the bolts and adjust the movable machine until both lasers are in the centre of each opposing target.

14. If necessary, re-adjust the arm position to get both lasers in the centre of the targets.

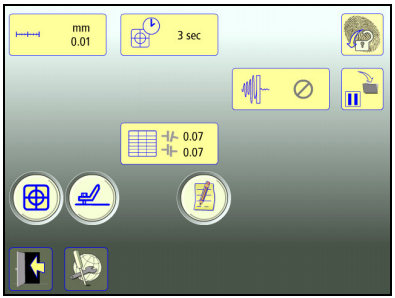


STARTING THE PROGRAM

Start the program by touching the Offset Shaft Alignment icon in the Main Menu.

Go to Settings to selecting measurement method and other settings.

SETTINGS

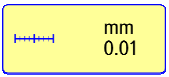


These settings are unique for this application.

For most of the settings, the current selection is shown in the icon.

The functions that are available depend upon which application packages and accessories you have selected.

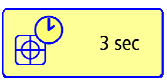
Measurement unit and resolution shown



Opens window for selection of measurement unit and resolution shown.

Resolution shown depends also on connected receiver.

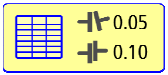
Sampling time



Opens window for selection of sampling time.

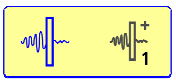
A repeatability test can also be made here. See chapter "Repeatability test".

Tolerance table



Opens the tolerance table. See chapter "Tolerance table".

Adjustable screen filter



Opens window for selection of adjustable screen filter (type 1 or 2) or for deactivating the adjustable screen filter.

Note: The adjustable screen filter should be deactivated for normal operation, and only activated in environments with severe vibrations.

Sensor display

Starts Sensor Display. See chapter "Sensor Display".

Softcheck™

Starts Softcheck. See chapter "Softcheck".

Notes

Opens Notes, where notes can be entered.

Screen lock

Locks the screen.

Resume function

Stores system data to allow a resume of these data to be performed after OFF.

Global settings

Opens Global settings. See chapter "Global settings".

Exit

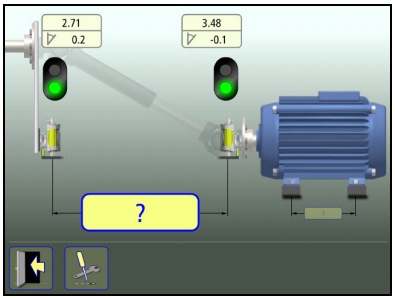
Exits the Settings and returns to the application.

MEASUREMENT

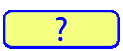
Measurement method

The Clock method is used to provide the result. In the Clock method, machinery positions are calculated by taking three points with 180° of rotation.

Enter dimensions

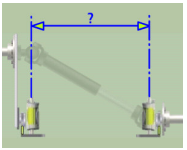


The screen displays the movable machine. The traffic lights show green when the laser hits the detector.

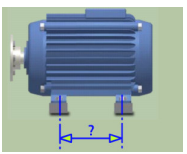


Touch the icon to enter dimensions.

Measure and enter dimensions.

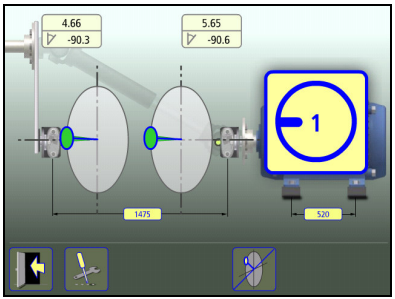


You must enter the distance between the sensors. (If you only wish to check the shaft alignment, this is the only necessary distance.)



The distance between the first and the second pair of feet can be entered now or later (this distance is necessary in order to obtain the feet values.)

Measurement point registration



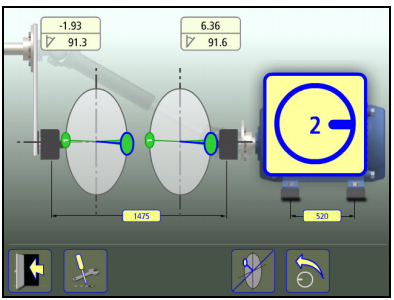
Set the sensors at approximately the same rotational angle at the first measurement position, 9 o'clock. For best result the rotational angles of the two sensors should be within 0.5°.

Touch the register icon.

This registers the first reading.

Rotate the sensors to the next position, 3 o'clock.

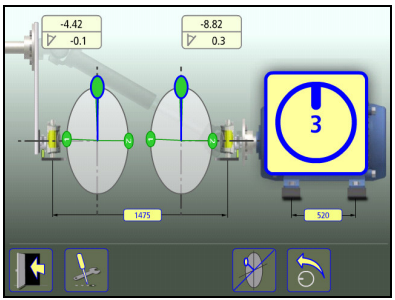
The green sector in the guide function indicates where the sensor should be positioned.



Touch the register icon.

This registers the second reading.

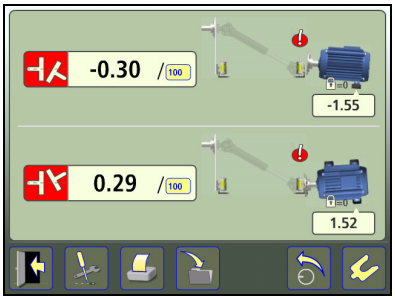
Rotate the sensors to the third position, 12 o'clock.



Touch the register icon.

This registers the third reading.

Measurement results



The Measurement Result screen shows coupling value and feet values in both the vertical and horizontal direction.

The symbol to the left of the coupling values indicates the angular direction and also if the values are within tolerance.

Within tolerance (green).

Within double tolerance (yellow and inverted).

Out of double tolerance (red and inverted).

A symbol at the coupling indicates the status of the coupling.

Within tolerance.

Within double tolerance.

Out of double tolerance.

The machine picture itself also indicates the coupling alignment.

Save the measurement result.

Go to alignment.

Evaluating the result

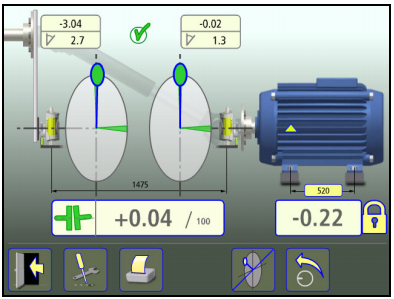
The angle value is used to determine the alignment quality. This value is compared with the alignment tolerances to determine if any correction is necessary. If suitable tolerances are selected in the tolerance table, the symbols described above indicate if the angle value is within tolerance or not.

The feet values give the movable machine's position at the feet where corrections can be made.

ALIGNMENT

Rotate the shafts to the 12 o'clock position to make adjustments in the vertical direction. The angle guide helps you to reach the right position.

Adjust the machine vertically until the value for angular alignment is within the tolerances required. The arrow at the feet shows in which direction the machine should be moved.



Rotate the shafts to the 3 o'clock position to make adjustments in the horizontal direction. The angle guide helps you to reach the right position.

Adjust the machine horizontally until the value for angular alignment is within the required tolerance. The arrows at the feet show in which direction the machine shall be moved.

Rotate the shafts back to the 12 o'clock position and check that the machine is still within the required tolerances.

Alignment is now completed. To confirm the result, re-do the measurement.

Re-measure.

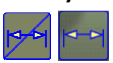
OTHER FEATURES

Enlarge values

On the alignment screen, the coupling and feet values can be enlarged by touching them.

Touch the enlarged values to return them to normal size.

Hide / Show dimensions



Hide / Show dimensions

Change feet reference

The feet reference can be changed by touching the lock.

Touch the lock to change feet reference.

Result presentation

The angular misalignment can be presented at an optional distance.

Touch the distance to change it.

LASER POINTERS

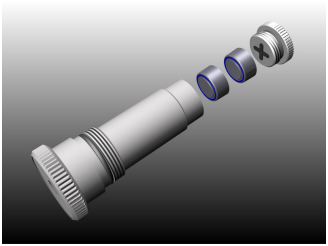
Individually adapted

The laser pointers are individually adapted to their housings and should not be switched with each other.

Changing batteries

When the laser spot slowly starts to fade away, it is time to change the batteries.

Dismount the laser pointer from the turret and open the end cap of the laser device.



Use two SR44 batteries per device, **+** on the batteries must face the cap (LR44 can also be used, but they only have approximately half the capacity of the SR44).

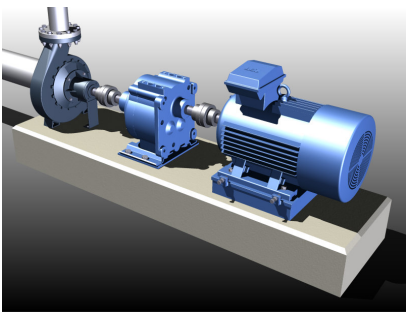
MACHINE TRAIN ALIGNMENT

INTRODUCTION

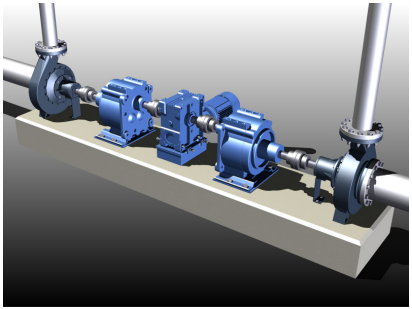
A machine train is a set-up of more than two rotating machines that are connected to each other. A typical machine train application is a motor which drives machinery with a gearbox in between.

When alignment is performed on machine trains, adjustment of one machine will directly affect the alignment of the other machines. Before making any adjustment in a machine train, it is important to know the relative position of each machine in the train. When this is known it is easy to get an overview of the machine train to see which adjustments are needed to align all the machines.

The amount of adjustment needed depends on which machine in the machine train is selected as the stationary machine. In many cases there are also restrictions to the amount of adjustment due to base or bolt bound conditions, which influence the choice of the stationary machine.



Machine Train with 3 machines.



Machine Train with 5 machines.

The machine train program in Fixturlaser XA is especially designed to quickly provide an overview of the position of each machine and to determine which machine should be chosen as stationary, in order to optimize the work with adjustments.

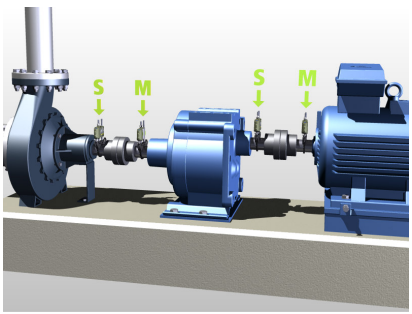
Functions in the program make it possible to align machines to target positions, i.e. Target Values, and to calculate the minimum amount of adjustment to align the entire machine train.

Once the stationary machine has been chosen, the alignment of the rest of the units is performed by using the program for horizontal machines. See also chapter “Shaft Alignment Horizontal Machines”.

MOUNTING

Mounting of the sensors is done as described in chapter "Shaft Alignment Horizontal Machines".

It is important to place the sensors for the stationary and the movable machine on the same side of every coupling.



Try to always be on the same side of the machine train when mounting the sensors, to avoid making any mistakes.

PRE-ALIGNMENT FUNCTIONS & ACTIVITIES

To minimize the time for measurements on site, it is recommended to pre-set the configuration of the machine (distances, machine-ID and target values) and save the configuration in the memory.

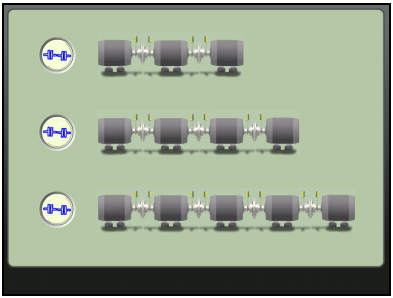
On site, you simply open up the configuration from the memory manager and continue with the measurements for each coupling.

For alignment of machine trains it is important to do some on-site pre-alignment activities besides the ones described in the chapter "Shaft Alignment Horizontal Machines".

- Check the amount of adjustment possible for every machine.
- Check if there is any bolt or base-bound restrictions.
- Check if there are any restrictions to moving the machine due to attached piping, electrical cables, hydraulics or similar equipment.

STARTING THE PROGRAM

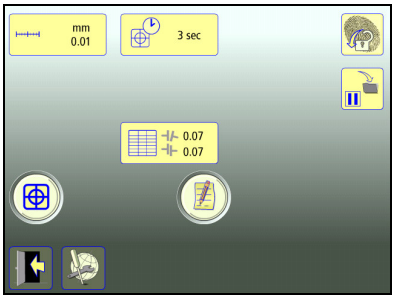
Start the program by touching the Machine Train Alignment icon in the Main Menu.



The screen displays machine trains with 3, 4 or 5 units. Touch the icon for the machine train that corresponds to your application.

Go to Settings for selecting measurement method, and other settings.

SETTINGS

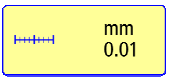


These settings are unique for this application.

For most of the settings, the current selection is shown in the icon.

The functions that are available depend upon which application packages and accessories you have selected.

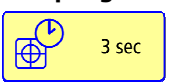
Measurement unit and resolution shown



Opens window for selection of measurement unit and resolution shown.

Resolution shown depends also on connected receiver.

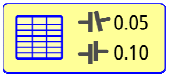
Sampling time



Opens window for selection of sampling time.

A repeatability test can also be made here. See chapter "Repeatability test".

Tolerance table



Opens the tolerance table. See chapter "Tolerance table".

Sensor display

Starts Sensor Display. See chapter "Sensor Display".

Notes

Opens Notes, where notes can be entered.

Screen lock

Locks the screen.

Resume function

Stores system data to allow a resume of these data to be performed after OFF.

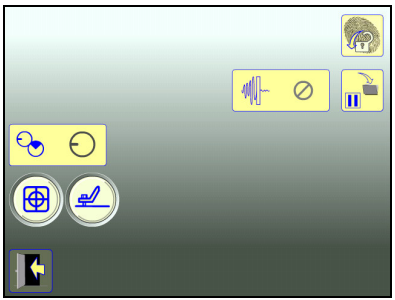
Global settings

Opens Global settings. See chapter "Global settings".

Exit

Exits the Settings and returns to the application.

Settings and functions in Shaft Alignment for Machine Train



The Machine Train program has a separate settings menu for Shaft Alignment.

Measurement method and Softcheck can only be reached from there.

Measurement method

Opens window for selection of measurement method. Express Mode, Tripoint or the Clock method.

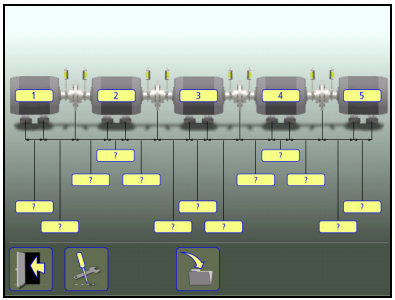
Adjustable screen filter

See settings in chapter "Shaft Alignment Horizontal Machines".

Softcheck™

Starts Softcheck. See chapter "Softcheck".

CONFIGURATION



Enter machine ID

Machine ID for the units is preset to 1, 2, 3… but you can change this to something else.

2 Touch the icon for changing machine ID.

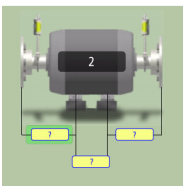
Enter dimensions

? Touch the icon to enter dimensions.

Measure and enter dimensions.

All dimensions must be entered before you can start measuring.

At each unit (except for the end units), there are three distances to enter.

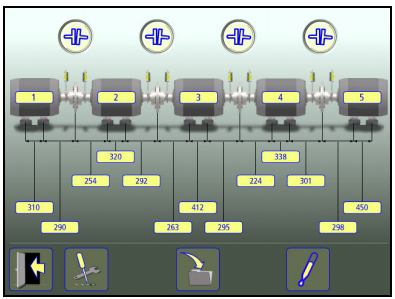


The distance between the centre of the coupling and the first pair of feet.

The distance between the first and the second pairs of feet.

The distance between the second pair of feet and the centre of the coupling.

When all dimensions are entered, the icons for Shaft Alignment at the couplings, and an icon for entering target values, appear.



Enter target values

If needed, target values can be entered. See "Target Values" later in this chapter.

Touch the Target Value icon to enter target values.

Save configuration

The configuration of the machine (distances, machine-ID and target values) can be saved separately, to be opened up later.

Touch the save icon to save the configuration.

MEASUREMENT

Measurement method

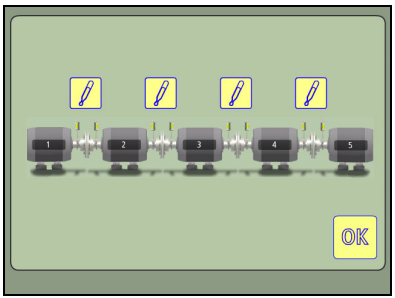
In the Machine Train program, a shaft alignment measurement is first performed at each coupling. The results from all the couplings are then summarized to a total result for the train.

Measuring at the couplings

A part of the Horizontal Shaft Alignment program is used to measure at each coupling. See "Shaft alignment for machine train" later in this chapter.

Touch the Horizontal Shaft Alignment icon to measure at a coupling.

TARGET VALUES



Touch the Target Value icon at the coupling where the target values are to be entered.

The target values can be entered as feet values or angle and offset values, but the result for machine train will always be presented as angle and offset values.

See also chapter “Target Values”.

When Target Values are entered at a coupling, it is indicated with the Target Value symbol at that coupling.

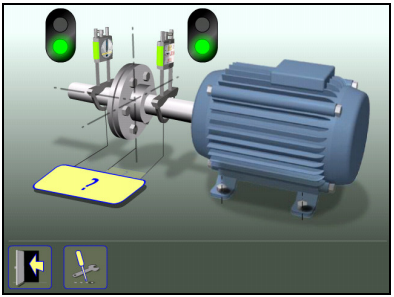
SHAFT ALIGNMENT FOR MACHINE TRAIN

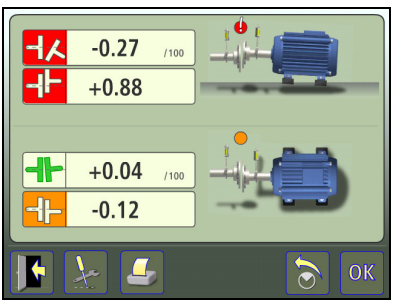
See also chapter “Shaft Alignment Horizontal Machines”.

All the measurement methods that can be used for Shaft Alignment of Horizontal machines can also be used here.

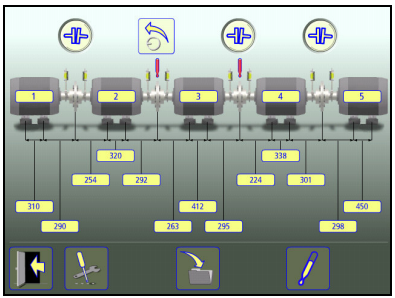
The distance between the sensors and the distance between the centre of the coupling and the M-sensor must be entered for each coupling. (The distance between the M-sensor and the first pair of feet and the distance between the first and the second pairs of feet are not needed here).

On the result screen for the coupling, only coupling values are shown.



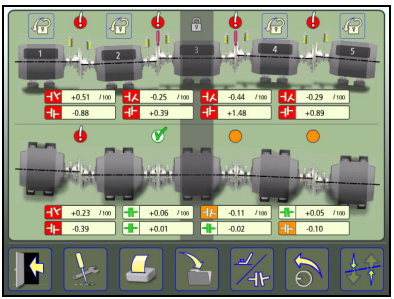


When a coupling is measured, the icon for Shaft Alignment at that coupling is replaced by a re-measuring icon.



When all the couplings have been measured, the result screen for the train will be shown.

MEASUREMENT RESULTS



Result screen with coupling values.

The Measurement Result screen shows coupling values and foot values in both the vertical and horizontal direction.

One of the units is automatically set to reference according to the Minimum Moves function.

The reference can be changed by touching the lock icons.

The symbol to the left of the coupling values indicates the direction of the angle and the offset, and also if the values are within tolerance.


Within tolerance (green).


Within double tolerance (yellow and inverted).


Out of double tolerance (red and inverted).

A symbol at each coupling indicates the status of the coupling.


Within tolerance.


Within double tolerance.


Out of double tolerance.

The machine picture itself also indicates the coupling alignment.

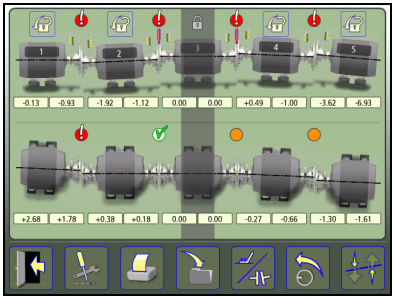

Save the measurement result.


Change between viewing the coupling values and the feet values.


Re-measure or change configuration. (This icon returns you to the configuration screen.)


Minimum Moves (a reference based on the Minimum Moves function will be selected).


Select another reference.



Result screen with feet values.

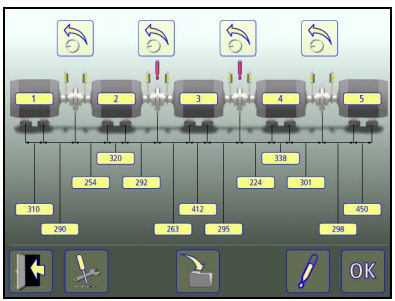
EVALUATING THE RESULT

The angle and offset values are used to determine the alignment quality. These values are compared with alignment tolerances to determine if any correction is necessary. If suitable tolerances are selected in the tolerance table, the symbols described above indicate if the angle and offset values are within tolerance or not.

The feet values give the movable machine's position at the feet where corrections can be made.

RE-MEASURE OR CHANGE CONFIGURATION

When the re-measure icon is touched on the result screen, you will return to the configuration screen, where you can re-measure or change the configuration.



Re-measure a coupling.

Touch the icon to change machine ID.

Touch the icon to change dimensions.

Change Target Values.

Confirm changes and return to the result screen.

ALIGNMENT

Once you have decided which machine to use as a reference, the Horizontal Shaft Alignment program can be used to align the machines.

See the chapter "Shaft Alignment Horizontal Machines".

OTHER FEATURES

Minimum Moves

The Minimum Moves function selects the reference machine that involves the smallest amount of adjustment.

In the calculations for this function, priority is given to minimizing horizontal adjustments and removal of shims.

If you touch the Minimum Moves icon, a reference will be selected based on the Minimum Moves function.

SOFTCHECK™

INTRODUCTION

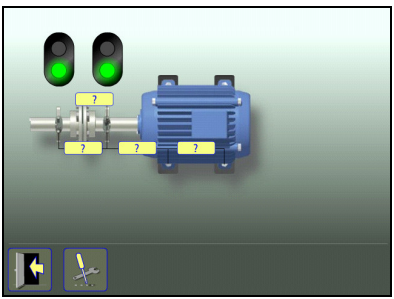
A soft foot condition needs to be corrected before any alignment takes place. If not, the measurement result will be of no value. It is more or less impossible to establish if there is a soft foot condition without using some kind of measurement tool. The Fixturlaser Alignment System's built-in Softcheck program checks each foot and displays the result in mm or mils.

The Softcheck program is entered from the Main Menu or from Settings in the Application program.

STARTING THE PROGRAM

Start the Softcheck by touching its icon in the Main menu or the Settings.

Go to Settings for selecting settings.



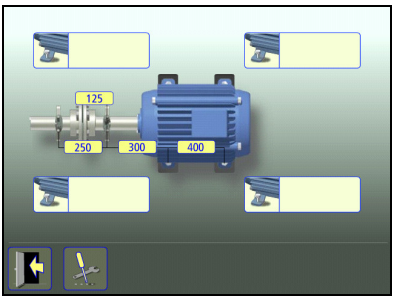
Place the TD-units at the 12 o'clock position.

?

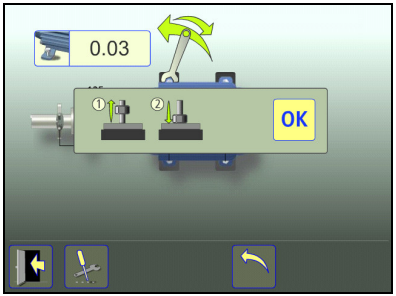
Enter dimensions. You must enter the distance between the sensor units, the distance between the M-unit and the first pair of feet, and the distance between the first and the second pairs of feet, before checking for soft foot.

Check that all foot bolts are firmly tightened.

MEASUREMENT VALUE REGISTRATION



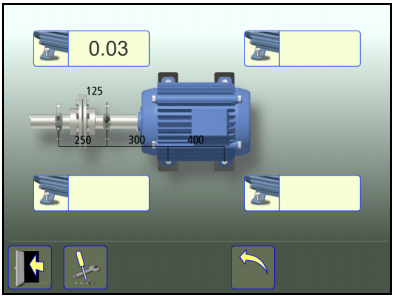
Select a bolt of your choice by touching its icon.



Loosen the bolt fully and then tighten it firmly, preferably with a dynamometric wrench.

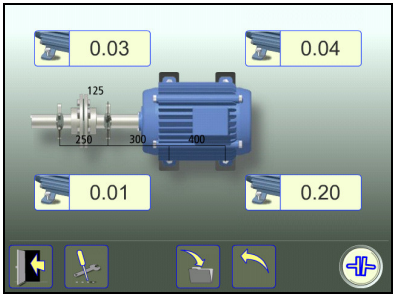
OK

Register the measurement value by touching the OK icon.



Continue with the rest of the bolts.

Re-measurements can be done at any time by touching the icon for the requested bolt again.



Make the necessary corrections and then check each foot again (the values show approximately how many shims that are needed to eliminate the soft foot).

DOCUMENT THE RESULT

Touch the save icon to save the measurement result.

SHAFT ALIGNMENT

Go to shaft alignment by touching this icon.

TARGET VALUES

INTRODUCTION

Most machines develop a certain amount of heat while running. In the best case both the driving and the driven machine are affected equally requiring no input of compensation values. But in some applications the driven machine is either hotter, i.e. a pump for hot liquid, or cooler than the driving machine.

Machine manufacturers define the thermal expansion of machines differently, but in most cases you will find it as a factor of deliberate misalignment expressed in parallel offset and angular error.

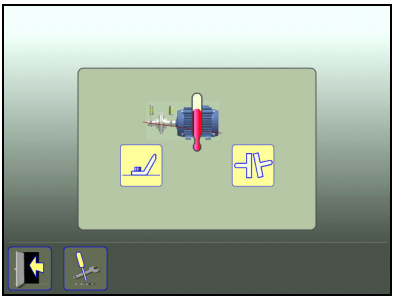
In the Fixturlaser XA system, you can pre-set target values before starting your alignment work. Accepted values are feet values and angle and offset values.

The entered values are target values. Target values mean that these are the values at which the machine should be positioned when not running (cold condition) in order to obtain correct alignment while the machine is running (hot condition).

STARTING THE PROGRAM

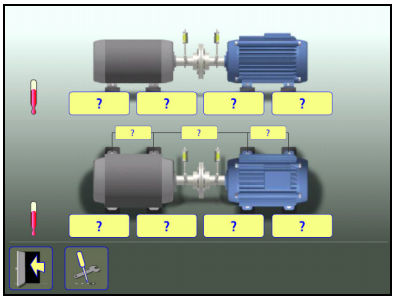
Start the Target Values program by touching the icon in the Main Menu or the Settings.

Go to Settings for selecting settings.



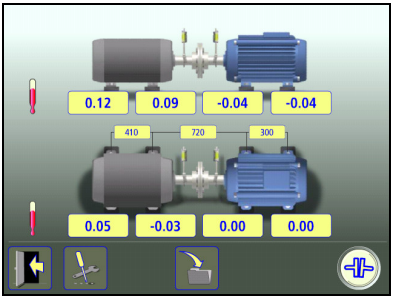
Select one of two ways to express the offset values: Feet values or angle and offset values.

FEET VALUES



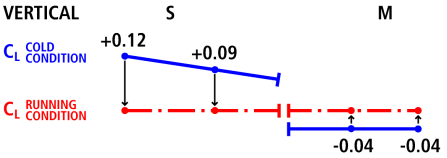
?

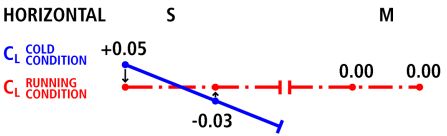
Touch the feet value boxes. Enter target values for the feet in mm or mils according to the pre-set measurement unit together with the required distances.



In the example above, the stationary machine will shrink vertically by 0.12 mm at the rear feet and 0.09 mm at front feet while the movable machine will expand 0.04 mm while running.

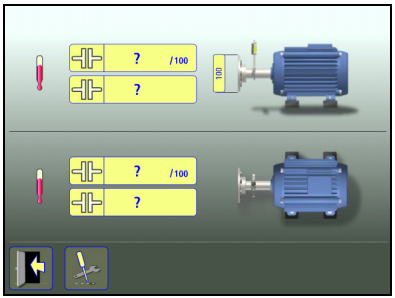
Horizontally, the rear feet will move 0.05 mm towards you and the front feet will move 0.03 mm away from you while the movable machine does not change its position while running.





After having entered these feet values, the system calculates how the movable machine should be positioned (target position) in cold condition in order to obtain perfect alignment during running condition.

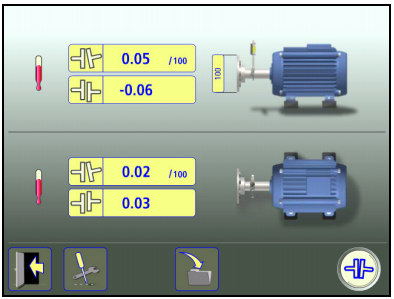
ANGLE AND OFFSET VALUES



?

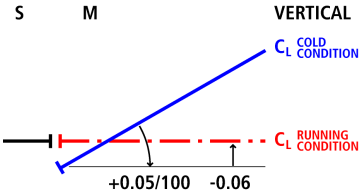
Touch the value boxes and enter target values for the angles in mm/100 mm and target values for the offsets in mm, or mils/inch and mils, according to the pre-set measurement unit.

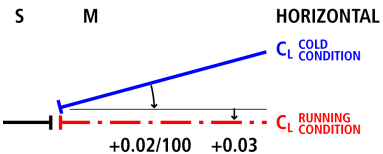
Coupling gap can be entered if this has been activated in the Settings.



In the example above, the movable machine should be vertically adjusted to a position with an angular misalignment of +0.05 mm/100 mm and an offset of -0.06 mm.

Horizontally, the movable machine should be positioned with a +0.02 mm/100 mm angular misalignment and a +0.03 mm offset, in cold condition to obtain perfect alignment while running.





DOCUMENT THE TARGET VALUES

Touch the save icon to save the target values.

SHAFT ALIGNMENT

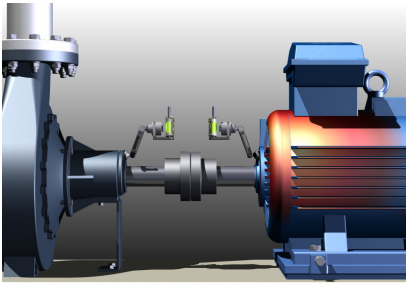
Go to shaft alignment by touching this icon.

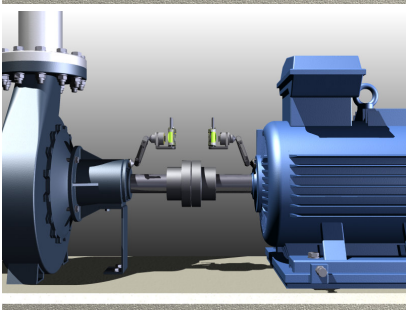
OL2R (OFF LINE TO RUNNING)

INTRODUCTION

If you have unexplainable vibrations in your pump-motor installation, this application can help reduce your doubts (and your vibrations).

OL2R measurements use a special fixture that allows measurement while the machine is running. In this way, both the thermal influences and the load that is put into the pump as well as movement in foundations and pipe strains will be taken into account.





In order to determine dynamic movements, the OL2R laser fixtures are mounted on the two machines that are to be checked. The turrets make it possible to measure the alignment between the two “dummy” axes, by using the Fixturlaser XA system. The measurement is performed in both running and cold condition and the system calculates the difference in alignment, determined as dynamic movements between the machine’s two conditions, and is expressed as target values. These target values can be used when the actual shaft alignment is performed.

IMPORTANT NOTES!

- It is very important that you do not remove or adjust the fixtures between the measurements in hot and cold condition.
- If the OL2R fixtures are mounted in a harsh environment, we strongly recommend that the laser pointer is dismounted from the fixture after it has been adjusted.
- The lasers may cause interference with each other so it is recommended that the laser pointers are turned on one at a time.

WARNING!

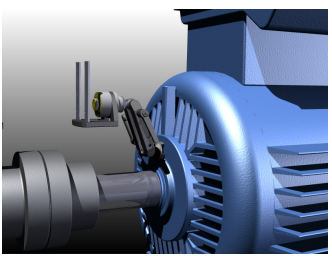
Make sure that all safety equipment is fully mounted on the machine before starting the measurement. Cables must be kept away from couplings and other moving parts.

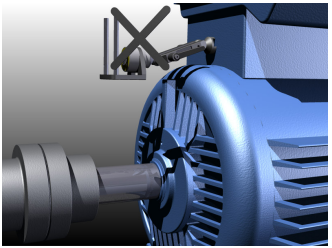
WARNING!

Make sure to fully comply with the local safety regulations for rotating machinery.

MOUNTING & COARSE ALIGNMENT

1. Choose a location on the machine casing (or bearing housing) where the fixtures can maintain a clear line-of-sight and where the turrets can be rotated freely with the measuring units in place. Try to mount the fixtures as close as possible to the rotational axis of both machines.

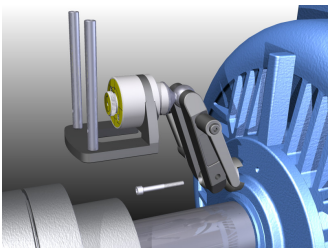




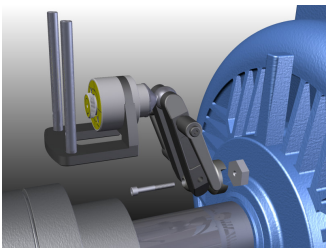
2. Obtain permission to drill and tap a M6 thread (or ¼" UNC) with a depth of 15 mm (0.6").

   Alternatively, glue an OL2R adapter (optional) on the machine casing.

3. Mount the tooling ball on each machine. Ensure that the bolt is tightened and that the arrangement is firmly mounted on the machine casing.

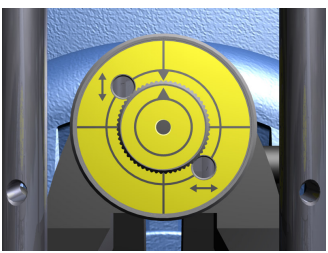


Mounting with OL2R adapter (optional):

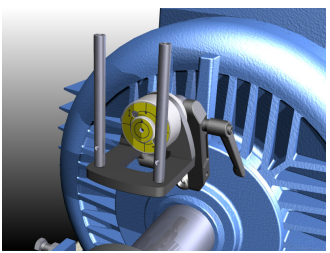


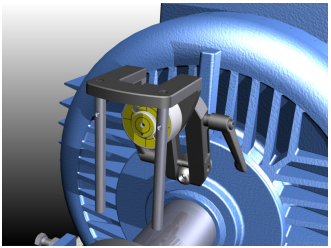
4. Turn on the built-in laser in the turret, by rotating the laser unit clockwise until it bottoms.

   The lasers may cause interference with each other so it is recommended that the laser pointers are turned on one at a time.

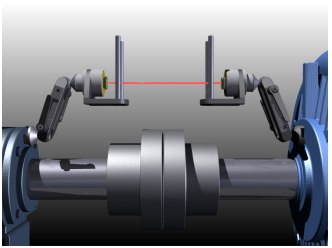


5. Check that the laser is adjusted to the rotational centre by rotating the turret on each fixture. The projected laser beam should stay on the same spot during rotation (within 2 mm). If not, adjust the laser beam according to the procedure described at the end of this chapter.





6. Adjust the fixtures until both the lasers hit the centre of the opposing target. Tighten the screw on the fixture and make sure that it is stable while rotating the turrets.



7. Turn off the laser beams in the fixtures and mount the Fixturlaser XA sensors on the fixture rods. Make sure that the unit marked M is mounted on the movable machine and the S unit is mounted on the stationary machine.

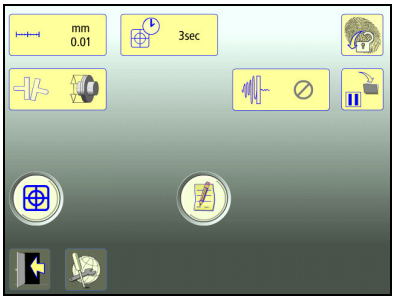
8. Connect the cables or turn on wireless communication to enable communication with the display box.

STARTING THE PROGRAM

Start the program by touching the OL2R icon in the Main Menu.

Go to Settings for selecting settings.

SETTINGS

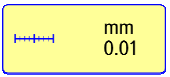


These settings are unique for this application.

For most of the settings, the current selection is shown in the icon.

The functions that are available depend upon which application packages and accessories you have selected.

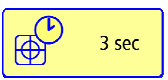
Measurement unit and resolution shown



Opens window for selection of measurement unit and resolution shown.

Resolution shown depends also on connected receiver.

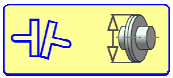
Sampling time



Opens window for selection of sampling time.

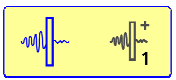
A repeatability test can also be made here. See chapter “Repeatability test”.

Unit of Angularity



Opens window for activating or de-activating coupling gap.

Adjustable screen filter



Opens window for selection of adjustable screen filter (type 1 or 2) or for deactivating the adjustable screen filter.

Note: The adjustable screen filter should be deactivated for normal operation, and only activated in environments with severe vibrations.

Sensor display

Starts Sensor Display. See chapter "Sensor Display".

Notes

Opens Notes, where notes can be entered.

Screen lock

Locks the screen.

Resume function

Stores system data to allow a resume of these data to be performed after OFF.

Global settings

Opens Global settings. See chapter "Global settings".

Exit

Exits the Settings and returns to the application.

MEASURING OL2R

Measurement Method

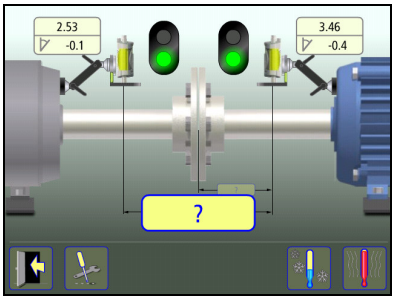
In the OL2R program, a measurement is made in cold condition (machine off line) and another one in hot condition (machine running) to provide the target values.

The Clock method is used to provide the result in each condition. In the Clock method, machinery positions are calculated by taking three points with 180° of rotation.

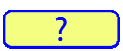
The target values are calculated by subtracting the measurement result in cold condition from the measurement result in hot condition.

You can measure the conditions in optional order and the cold and hot conditions can both be saved separately.

Enter dimensions

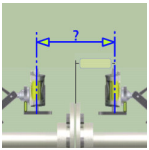


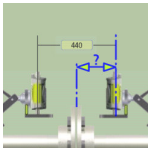
The screen displays the movable machine. The traffic lights show green when the laser hits the detector.



Touch the icon to enter dimensions.

Measure and enter dimensions.





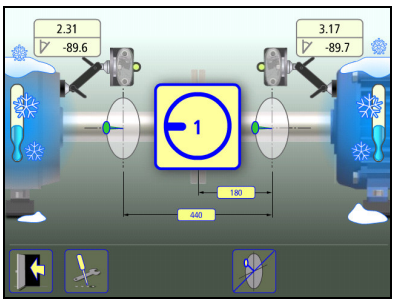
You must enter the distance between the sensors and the distance between the centre of the coupling and the M-sensor.

Go to measurement in cold condition.

Go to measurement in hot condition.

MEASUREMENT IN COLD CONDITION

Measurement point registration

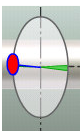


Set the sensors at approximately the same rotational angle at the first measurement position, 9 o'clock. For best results the rotational angles of the two sensors should be within 0.5°.

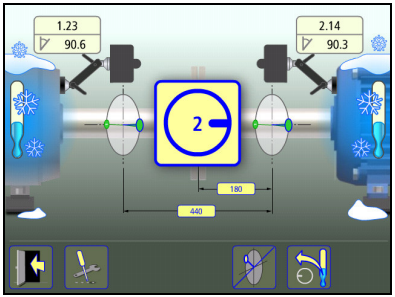
Touch the register icon.

This registers the first reading.

Rotate the turrets to the next position, 3 o'clock.



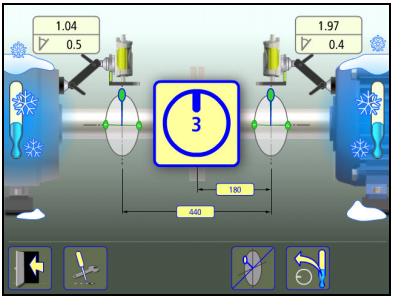
The green sector in the guide function indicates where the sensor should be positioned.



Touch the register icon.

This registers the second reading.

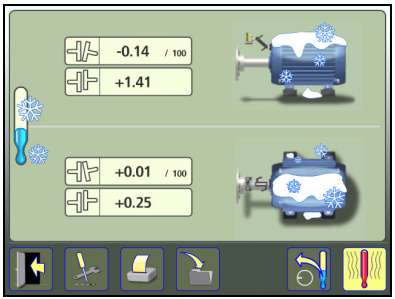
Rotate the turrets to the third position, 12 o'clock.



Touch the register icon.

This registers the third reading.

Measurement results



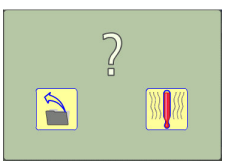
The Measurement Result screen shows coupling values for the measurement in cold condition.

The measurement result in cold condition can be saved separately.

Save the measurement result.

Once the cold condition has been measured, you can continue by measuring the hot condition, or open a previously saved measurement for the hot condition.

Go to hot condition.



Select a saved measurement for hot condition or measure the hot condition.

When both the cold condition and the hot condition have been measured, you can go to target values.

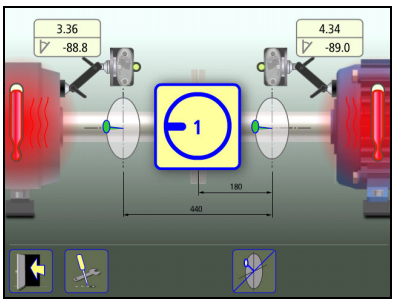
Go to target values.

It is also possible to re-measure the cold condition.

Re-measure cold condition.

MEASUREMENT IN HOT CONDITION

Measurement point registration

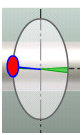


Set the sensors at approximately the same rotational angle at the first measurement position, 9 o'clock. For best results the rotational angles of the two sensors should be within 0.5°.

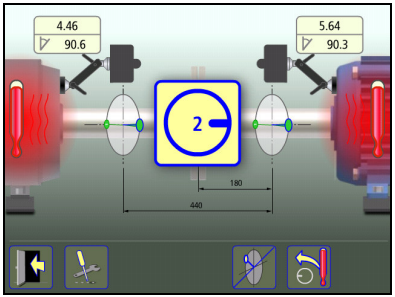
Touch the register icon.

This registers the first reading.

Rotate the turrets to the next position, 3 o'clock.



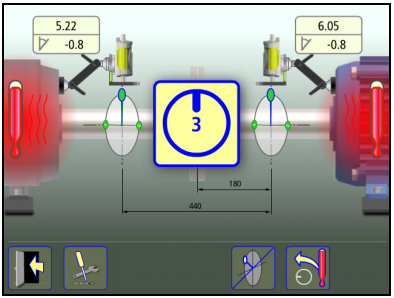
The green sector in the guide function indicates where the sensor should be positioned.



Touch the register icon.

This registers the second reading.

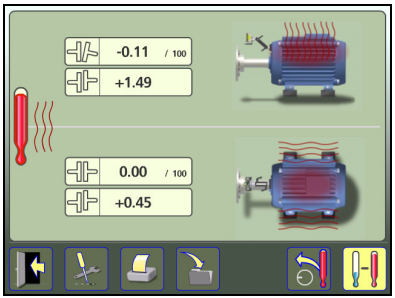
Rotate the turrets to the third position, 12 o'clock.



Touch the register icon.

This registers the third reading.

Measurement results



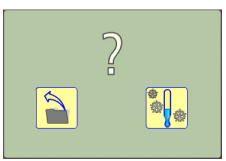
The Measurement result screen above shows the coupling values for the measurement in hot condition.

The measurement result in hot condition can be saved separately.

Save the measurement result.

Once the hot condition has been measured, you can continue by measuring the cold condition or open a previously saved measurement in the cold condition.

Go to cold condition.



Select a saved measurement in cold condition or measure the cold condition.

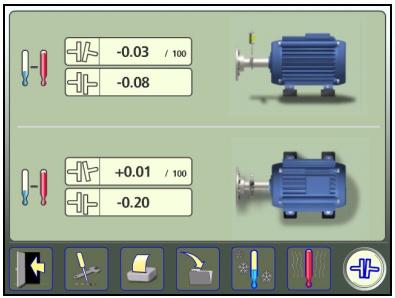
Once both the cold condition and the hot condition are measured you can go to target values.

Go to target values.

It is also possible to re-measure the hot condition.

Re-measure hot condition.

TARGET VALUES



The Measurement Result screen shows the target values.

Document the target values

Touch the save icon to save the target values.

Shaft Alignment

Go to shaft alignment by touching this icon.

Check or re-measure

Go back to measurement in cold condition.

Go back to measurement in hot condition.

OTHER FEATURES

Coupling gap

The target values can be presented as a coupling gap.

Activate coupling gap in the Settings.

Guide functions

The guide functions can be deactivated and activated again.

Deactivate guide functions.

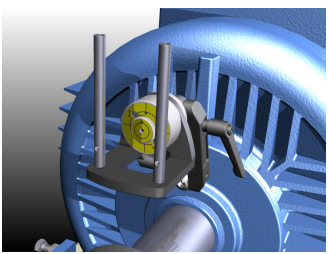
Activate guide functions.

TIP: Deactivate the guide function when vibration levels are high.

ADJUSTMENT OF THE BUILT-IN LASER

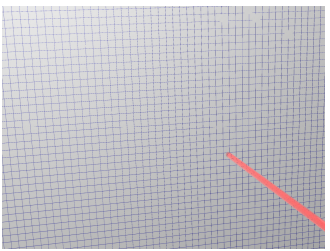
If the beam from the built-in laser diode is not aligned with the rotational axis of the turret, the laser must be adjusted using the following instruction.

1. Mount the fixture on a solid base or machine casing and firmly tighten all fixation screws.

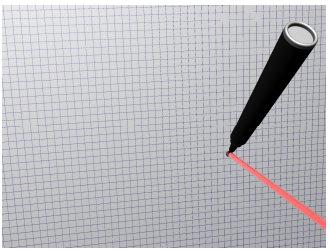


2. Turn on the built-in laser in the turret, by rotating the laser units clockwise until it bottoms.

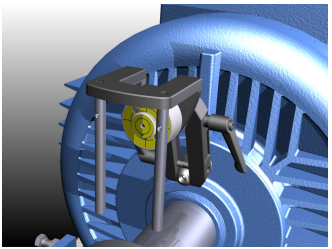
3. Aim the laser onto a target (a piece of paper or cardboard) at a distance of 3-5 m.



4. Make a mark on the spot where the laser beam hits the target.

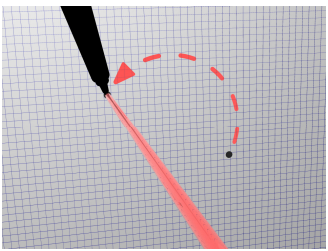


5. Rotate the turret 180°.

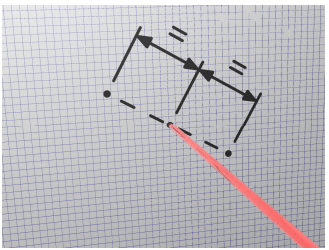


6. The laser spot should now have moved on the surface, in a pattern of a half circle.

   Make a 2nd mark where the laser beam hits the target.



7. Make a 3rd mark on the target at half the distance between the 1st and 2nd mark.



8. Adjust the position of the laser beam until it hits the 3rd marking on the target, using the two adjustment screws on the front on the turret. Make sure not to rotate the turret during the adjustment of the laser.

9. Control the alignment by rotating the turret 180° once again. The laser should now be at the same spot during rotation (within 2 mm).

10. Align the laser on the 2nd fixture as described in steps 1-8.

LASER POINTERS

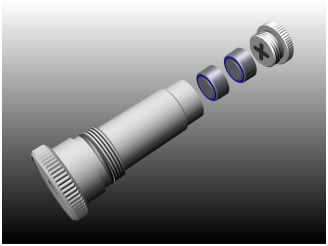
Individually adapted

The laser pointers are individually adapted to their housings and should not be switched with each other.

Changing batteries

When the laser spot slowly starts to disappear, it is time to change the batteries.

Dismount the laser pointer from the turret and open the end cap of the laser device.



Use two SR44 batteries per device, **+** on the batteries must face the cap. (LR44 can also be used, but they only have approximately half the capacity of the SR44.)

HOT CHECK

INTRODUCTION

If you have un-explainable vibrations in your pump-motor installation, this application can help reduce your doubts (and your vibrations).

If you do not have the OL2R laser fixtures and do not have the possibility of measuring while the machine is running, it is still possible to check the thermal influences on the machine.

The Hot Check is performed by performing a measurement just after the machine has been shut off, and another measurement when the machine has been shut off so long that it has reached ambient temperature. The Hot Check application is then used to compare these two measurements. The difference between the two measurements can be used as target values when shaft alignment is performed.

WARNING!

The machine must be shut off before starting the measurement.

MEASUREMENT METHOD

In the Hot Check program, a measurement in the cold condition is compared with a measurement in the hot condition to provide the target values.

The target values are calculated when the measurement result in the cold condition is subtracted from the measurement result in the hot condition.

The Horizontal Shaft Alignment program is used to measure these conditions. The measurement in hot condition is done just after the machine has been shut off. The measurement in cold condition is done when the machine is shut off and has dropped to the ambient temperature.

MEASURE HOT CONDITION

Shut off the machine.

Perform a measurement in the Horizontal Shaft Alignment program, just after the machine has been shut off. See the chapter "Shaft Alignment Horizontal Machines".

Save this measurement.

MEASURE COLD CONDITION

Wait until the machine has dropped to the ambient temperature.

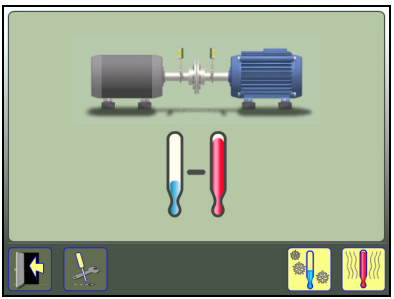
Perform another measurement in the Horizontal Shaft Alignment program. See the chapter "Shaft Alignment Horizontal Machines".

Save this measurement.

STARTING THE PROGRAM

Start the program by touching the Hot Check icon in the Main Menu.

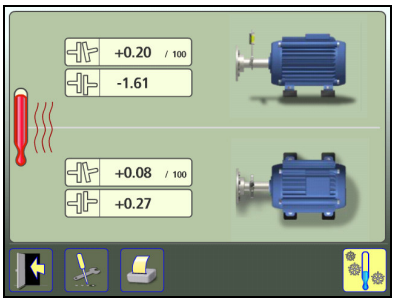
MAKING A HOT CHECK



Select a saved measurement in hot condition.

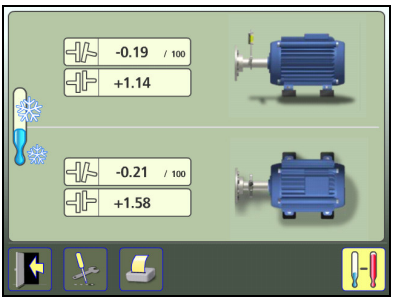
Select a saved measurement in cold condition.

Measurement in hot condition



The Measurement Result screen shows coupling values for the measurement in hot condition.

Measurement in cold condition

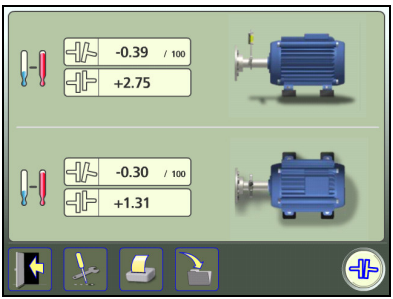


The Measurement Result screen shows coupling values for the measurement in cold condition.

When both cold condition and hot condition values have been chosen, you can go to target values.

Go to target values.

TARGET VALUES



The Measurement Result screen shows the target values.

Document the target values

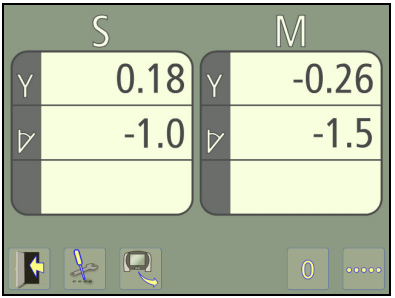
Touch the save icon to save the target values.

Shaft Alignment

Go to shaft alignment by touching this icon.

SENSOR DISPLAY

On the Sensor Display, the values from the connected sensor(s) are displayed. It is also possible to zero, record values to file etc.

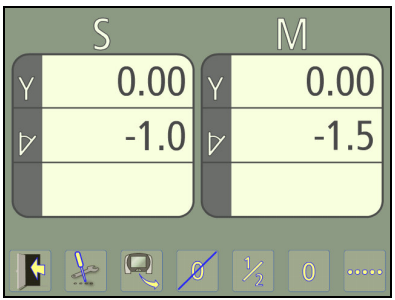


Start the program by touching the Sensor Display icon in the Main Menu.

Go to Settings for selecting settings.

FUNCTIONS

When entering Sensor Display the raw data from the sensor(s) connected are displayed. If any value is missing, ------ is shown. There are extensive functions available, e.g. zeroing.



These are the functions available.

Record values to file.

Zero the values.

Half the values (only available when Zero is active).

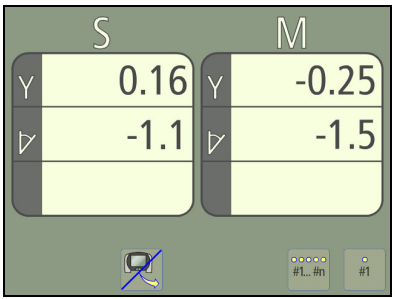
Reset values to raw data (only available when Zero is active).

Sample and display a single value.

Return to live values (only available when a value has been sampled).

Record values

This function allows you to record values that are sampled from the sensor(s) and store them in a file.



Start continuous recording (all values are recorded until the function is stopped).

Stop continuous recording (only available when continuously record is active).

Record single values.

Exit record values and return to live values.

Recording can be stopped and started several times and all the recorded values will be stored in the same file.

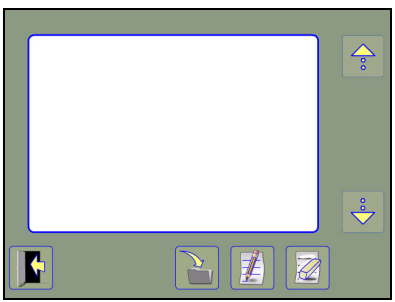
The recorded values are stored in a text file with a time stamp for each measurement.

NOTE: If record values are started when a single value has been sampled and displayed, only that value will be stored.

TEXT EDITOR

In the text editor, a text can be written, edited and saved separately.

Start the program by touching the Text Editor icon in the Main Menu.



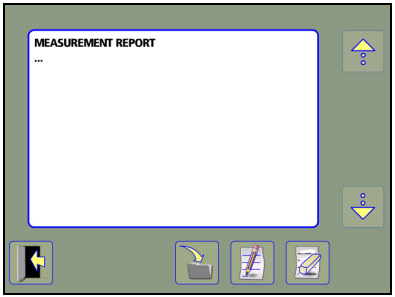
Write or edit text.

Erase all the text.

Save the text.

Scroll upwards in the text.

Scroll downwards in the text.


MEASUREMENT REPORT
...

MACHINE DEFINED DATA

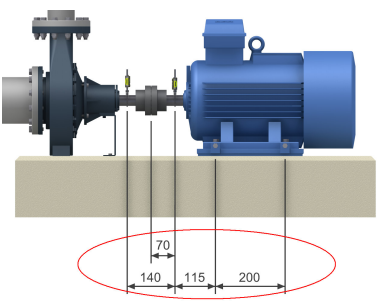
INTRODUCTION

If the sensors are placed at the same place each time a machine (or more identical machines) is measured, it can be convenient to preload the relevant parameters. The data that can be preloaded are:

- The name of the specific machine,
- Distances for the machine, the distance between the sensors (where fixture points are fixed), the distance between the centre of the coupling and the M-sensor, the distance between the M-sensor and the first pair of feet and the distance between the first and the second pairs of feet,
- Target Values as feet values or angle and offset values.
- Tolerances.

NOTE!

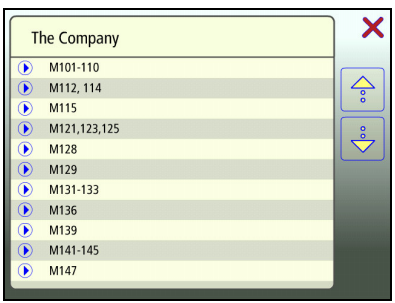
When using Machine Defined Data, the sensors must always be placed according to the preloaded distances to get correct measurement results.



STARTING THE PROGRAM

Start the program by touching the Machine Defined Data icon in the Main Menu.

USING MACHINE DEFINED DATA



A list of machine types with preloaded data is shown.

Select machine

Machines can be selected by touching its machine name.

Scroll

Scroll upwards.

Scroll downwards.

Continue to Shaft Alignment

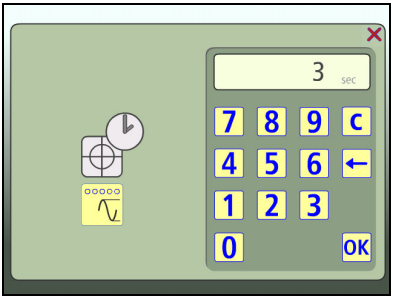
Continue to Shaft Alignment with machine defined data for the selected machine.

REPEATABILITY TEST

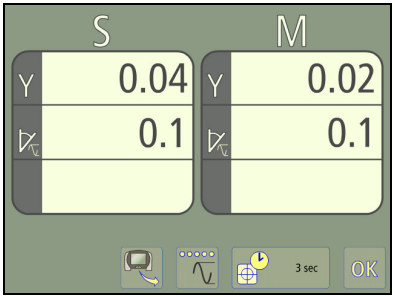
Before starting the measurement it is recommended to perform a repeatability test to set the correct sampling time. With the correct sampling time, it is possible to reduce the influence of external conditions (e.g. air turbulence or vibrations) that otherwise would compromise the accuracy of the measuring result.

Perform the Repeatability Test at a position far away from the laser transmitter, if there are to be several measurement positions during a set of measurement.

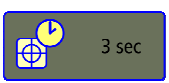
The Repeatability Test function is accessed from the Sampling Time window.



The Repeatability Test takes 5 readings with the selected sampling time and shows the difference between highest and lowest value. This difference will decrease when selecting a longer sampling time.



Start Repeatability Test (i.e. take 5 readings and presents repeatability results).



Change Sampling Time.

Record repeatability results to file.

Return to sampling time.

Adjust the sampling time and re-do the repeatability test until a satisfactory result is achieved.

Press OK and you will return to the sampling time with the latest sampling time tested.

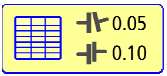
TOLERANCE TABLE

INTRODUCTION

Alignment tolerances depend to a large extent on the rotation speed of the shafts. Machine alignment should be carried out within the manufacturer's tolerances. The table provided in Fixturlaser XA can be helpful if no tolerances are specified. The suggested tolerances can be used as a starting point for developing in-house tolerances when the machinery manufacturer's recommended tolerances are not available. The tolerances are the maximum allowed deviation from desired values.

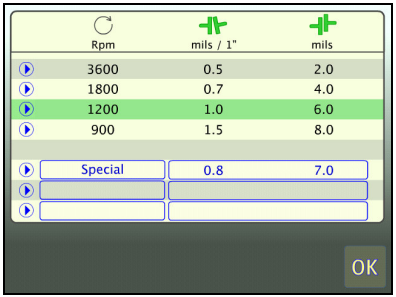
It is also possible to enter customized tolerances.

OPEN THE TOLERANCE TABLE



Open the Tolerance Table by touching this icon in the Settings.

Tolerance Table mm-mode



Tolerance Table inch-mode

SELECT TOLERANCE

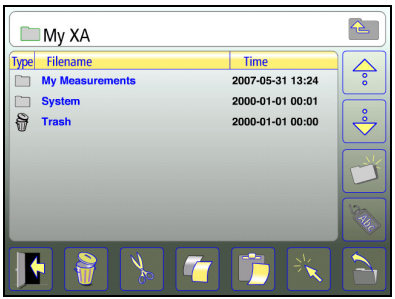
Select the tolerance to use in the alignment by touching one of the arrows to the left.

ENTER CUSTOMIZED TOLERANCES

Customized tolerances can be entered by touching any of the framed fields, name/rotation speed to the left and tolerance values to the right.

MEMORY MANAGER

FILE MANAGER



Sort files and folders

Measurements can be sorted by Type, Name or Date by touching the headline.

Select file or folder

Files or folders can be selected by touching them.

Folder up

Go up one level in the file structure.

Scroll

Scroll upwards.

Scroll downwards.

New folder

Creates new folder.

Change name of file or folder

Opens keypad for changing name of marked file or folder.

Open file or folder

Opens selected file or folder.

Select files

By activating this icon, multiple files can be selected.

Cut

Cuts selected items.

Copy

Copies selected items.

Paste

Pastes items that have been cut or copied.

Delete

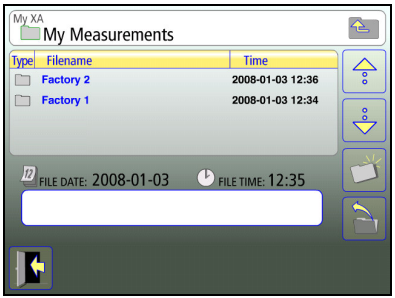
Deletes selected items.

Exit

Exits the Memory Manager.

NOTE: When there are a lot of files in the memory, processing can be slow.

SAVE MEASUREMENT



When saving a measurement, both a text file and a picture file (jpeg) are created.

Enter file name

Touch the white field to enter a file name.

Confirm

Confirm.

TRANSFER FILES TO A PC

Display Unit XA D

Files can be transferred to a PC using a memory stick (USB).

Insert the memory stick in the USB port of the display unit, and the memory stick will be available in the File Manager.

Files can be transferred to the memory stick with the cut/copy/paste functions in the File Manager. To transfer several files, use the select files function.

The memory stick has to be open when pasting files.

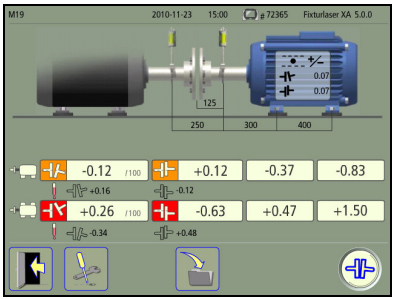
The transfer of several files can take some time.

In the PC there will be two files for each measurement, a picture file (jpeg) and a text file. The picture file shows the same picture as in the memory. The text file shows just the measurement data.

Display Unit UPAD^{XA}

See chapter **"**Display Unit UPAD^{XA}**".**

SHAFT ALIGNMENT FOR HORIZONTAL MACHINES



The screen displays measurement results, dimensions, comment if any, target values if any, file name, date and time, serial number of the display unit, program, program version and tolerances.

It is possible to go to Shaft Alignment for horizontal machines to continue measuring. Any comment, any target values and dimensions that are not related to the positions of the sensors will be uploaded.

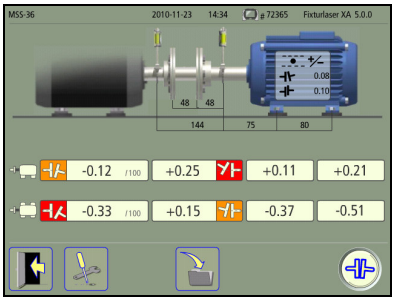
Exits the measurement file.

Settings.

Touch the save icon to save any changes.

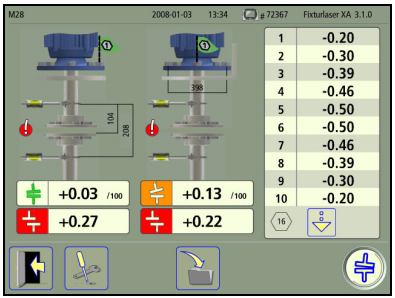
Go to shaft alignment by touching this icon.

Spacer Shaft



Saved Spacer Shaft measurement.

SHAFT ALIGNMENT FOR VERTICAL MACHINES



The screen displays measurement results, dimensions, comment if any, file name, date and time, serial number of the display unit, program and program version.

It is possible to go to Shaft Alignment for vertical machines to continue measuring. Any comment and dimensions that are not related to the positions of the sensors will be uploaded.

Scroll upwards in the bolt list.

Scroll downwards in the bolt list.

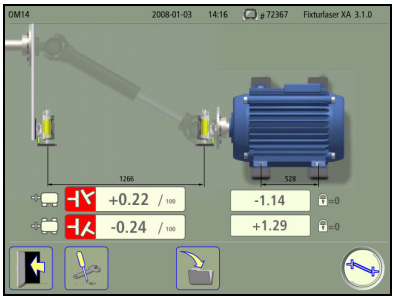
Exits the measurement file.

Settings.

Touch the save icon to save any changes.

Go to shaft alignment by touching this icon.

SHAFT ALIGNMENT FOR OFFSET MACHINES



The screen displays measurement results, dimensions, comment if any, file name, date and time, serial number of the display unit, program and program version.

It is possible to go to Shaft Alignment for Offset machines to continue measuring. Any comment and dimensions that are not related to the positions of the sensors will be uploaded.

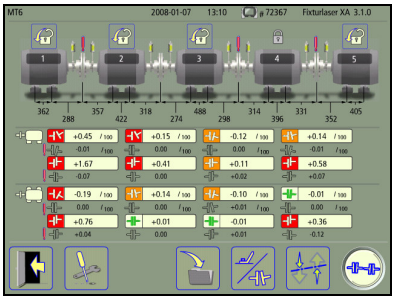
Exits the measurement file.

Settings.

Touch the save icon to save any changes.

Go to Offset shaft alignment by touching this icon.

MACHINE TRAIN ALIGNMENT



The screen displays measurement results, dimensions, target values if any, file name, date and time, serial number of the display unit, program and program version.

It is possible to go to Machine Train Alignment to continue measuring. Any comment, any target values and dimensions will be uploaded.

Select another reference.

Exits the measurement file.

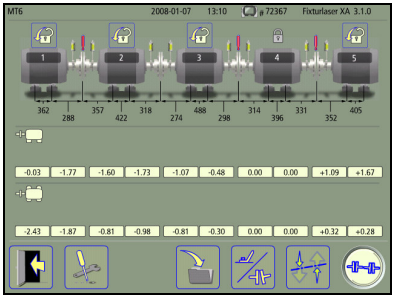
Settings.

Touch the save icon to save any changes.

Change between viewing of coupling values and feet values.

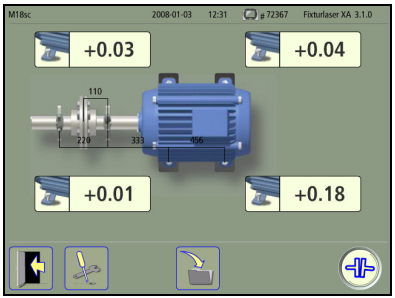
Minimum Moves. (Reference according to the Minimum Moves function will be selected.)

Go to Machine Train Alignment by touching this icon.



Feet value view.

SOFTCHECK



The screen displays measurement results, dimensions, file name, date and time, serial number of the display unit, program and program version.

It is possible to go to Shaft Alignment for horizontal machines to continue measuring. Any comment and dimensions that are not related to the positions of the sensors will be uploaded.

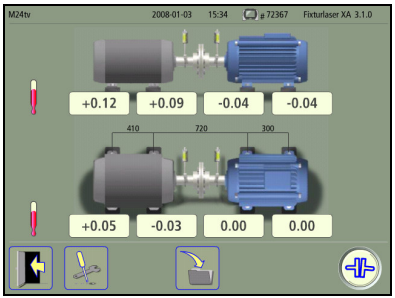
Exits the measurement file.

Settings.

Touch the save icon to save any changes.

Go to shaft alignment by touching this icon.

TARGET VALUES



The screen displays saved target values, any dimensions, file name, date and time, serial number of the display unit, program and program version.

It is possible to go to Shaft Alignment for horizontal machines to continue measuring. The target values, any comment and dimensions that are not related to the positions of the sensors will be uploaded.

Exits the measurement file.

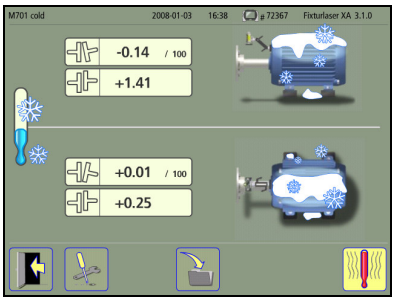
Settings.

Touch the save icon to save any changes.

Go to shaft alignment by touching this icon.

OL2R

Cold condition



The screen displays measurement results, file name, date and time, serial number of the display unit, program and program version.

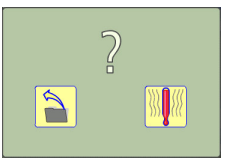
It is possible to go to OL2R for measuring in hot condition or to open a previously saved measurement in hot condition.

Exits the measurement file.

Settings.

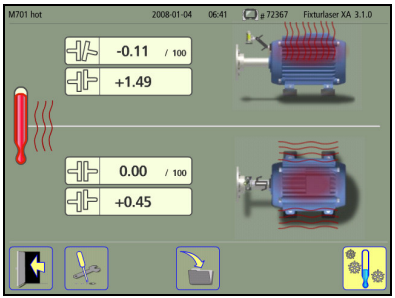
Touch the save icon to save any changes.

Go to OL2R (hot condition) by touching this icon.



Select a saved measurement in hot condition or measure in hot condition.

Hot condition



The screen displays measurement results, file name, date and time, serial number of the display unit, program and program version.

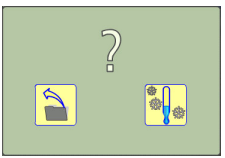
It is possible to go to OL2R for measuring in cold condition or open a previously saved measurement in cold condition.

Exits the measurement file.

Settings.

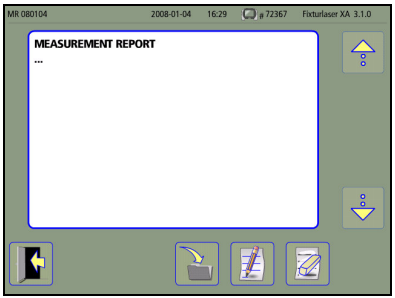
Touch the save icon to save any changes.

Go to OL2R (cold condition) by touching this icon.



Select a saved measurement in cold condition or measure a cold condition.

TEXT EDITOR



The screen displays the saved text, file name, date and time, serial number of the display unit, program and program version.

Text files with recorded values from Sensor Display can also be opened here.

Exits the text file.

Touch the save icon to save any changes.

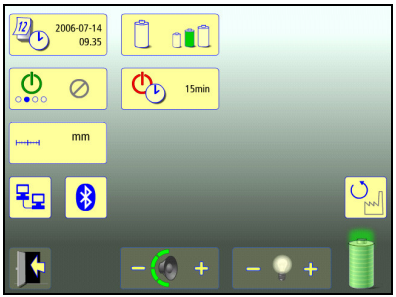
Write or edit text.

Erase all the text.

Scroll upwards in the text.

Scroll downwards in the text.

GLOBAL SETTINGS

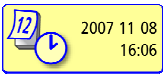


The global settings menu includes settings that are universal for all applications.

For most of the settings, the current selection is shown in the icon.

The program version number is also shown on this screen.

Date and time

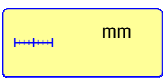


Opens window for date and time settings.

Auto-start

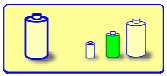
Opens window for selecting automatic start of application program.

Measurement unit

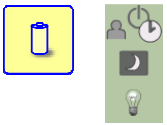


Changes between mm mode and inch mode.

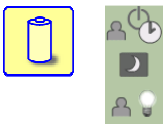
Power saving



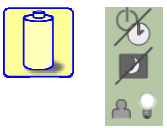
Opens window for selecting power saving level.



Auto-off as selected.
Screen saver 5 min.
Backlight low.

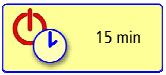


Auto-off as selected.
Screen saver 5 min.
Backlight as selected.



Auto-off deactivated.
Screen saver deactivated.
Backlight as selected.

Auto-off



Opens window for auto-off time setting.

Network settings

Opens window for network settings.

When the network settings are changed, the system will reboot.

Wireless settings

Opens window for wireless settings.

Factory settings

Resets to factory settings.

The factory settings are:

Auto-start: Deactivated.

Measurement unit: mm.

Resolution shown: 0.01 mm. (0.1 mils.)

Power saving: Medium.

Auto-off: 15 min.

Wireless communication: Deactivated.

Volume: Maximum.

Backlight: Medium.

Sampling time: 3 seconds.

Unit of Angularity: Coupling gap deactivated.

Measurement method: Express Mode.

Tolerance table: 0.07 mm / 100 mm, 0.07 mm. (1.0 mils / 1”, 6.0 mils.)

Tolerance table direct: Activated.

Spacer shaft: Deactivated.

Adjustable screen filter: Deactivated.

Volume

Adjusts the volume.

Backlight

Adjusts the backlight.

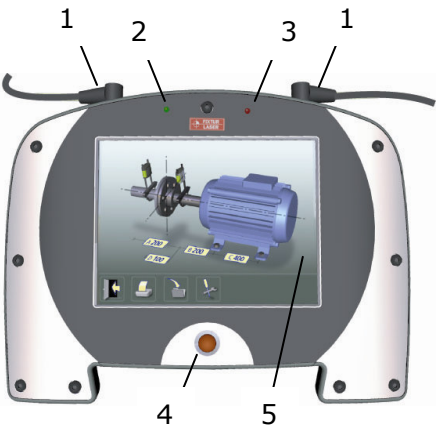
Battery indicator

Shows the battery level.

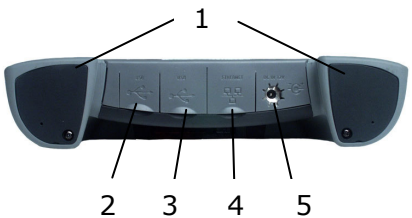
Exit

Exits the global settings.

DISPLAY UNIT XA D



1. RS-485 connectors (IP 65)
2. Battery status indicator
    a. Flashing red – low batteries
    b. Continuously red - charging
    c. Flashing green – fully charged
3. Status indicator
    a. Continuously green – in on mode
    b. Flashing green – in sleep mode
4. On/sleep/off button
5. The display unit is equipped with a 6.4” touch screen as the main user interface.



1. Battery compartment
2. USB slave
3. USB master
4. Ethernet
5. External power

OPERATING MODES

The display unit has three operating modes: On, Sleep and Off.

Whether it is in sleep or off, it is always turned on by a short press on the On/Off button.

To turn off the unit or put it in the sleep mode, touch the Off icon in the main menu.

You can then choose whether to turn the unit off, put it to sleep or return to the main menu by touching the appropriate icon in the dialog box.

Off

Sleep

Return

It is also possible to put the unit in sleep mode at any stage of the program, by pressing the On/Off button.

In case the system fails to respond, it is possible to turn it off by pressing down the On/Off button for more than 5 seconds.

When in sleep mode the computer stores its state in the memory so when turned on again it will return to the same state as it had when it went to sleep.

The unit will consume a small amount of power even when in sleep mode so to prevent draining the batteries the unit will automatically go to the off mode after 4 hour or when the batteries are low.

TRANSPORTATION MODE

The unit can be put into a transportation mode where the batteries are completely disconnected from the system. This is done by removing the external power and turning off the unit.

When in the off state press the button for at least 5 seconds until the left LED flashes once. It is now in transportation mode. To turn a unit on from transportation mode you will have to connect the external power and press the On button.

Transportation mode should be used whenever the display unit is transported by air or when in long-term storage.

CONNECTIONS

- RS 485; Communication with sensors (IP 65).
- USB slave; for attaching the display unit to a PC.
- USB master; for attaching USB peripherals such as USB Memory Stick.
- Ethernet; used to establish a network connection for communication with the display unit.

WARNING!

To fulfill the IP 65 classification, the lids protecting the USB and Ethernet ports must be properly sealed. Do not use these connections in wet conditions.

POWER SUPPLY

Fixturlaser XA is powered by two high-capacity rechargeable Li-Ion cells in the display unit, or by the external power unit.

The operating time of the batteries is approximately 15-20 hours when the system is used for a typical alignment work (50% on 50% sleep). The power indicator in the main menu displays the capacity of the batteries. When the capacity is low a battery low warning appears on the screen.

To prolong the operating time the backlighting of the screen should be used moderately.

If the system turns off due to low power, the resume function will save the data. When the system is turned on again after battery recharge or

connection of external power, you will be prompted to choose whether to return to the state when the unit was turned off (i.e. resuming operation without loss of data) or start the main menu.

The external power unit is connected to the external power connector on the display unit and to a wall socket with 110 - 240 Volts.

When the external power supply is connected, the unit will automatically start charging the batteries. This will be indicated by the battery status LED. The charging time is approximately 7 hours for fully drained batteries. The charging time will be longer if the unit is turned on while being charged.

When used in typical conditions the batteries will sustain good capacity for approximately 2-3 years before needing replacement. Contact your sales representative for battery replacement.

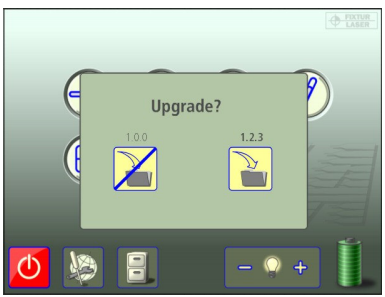
The batteries contain safety circuitry to operate safely with the display unit. The unit can therefore only be used with the Li-Ion batteries supplied by Fixturlaser.

Improper replacement of batteries can cause damage and risk for personal injury. Please refer to the chapter on safety for further instructions.

UPGRADING THE SOFTWARE

Upgrades to the software will be sent out or made available for download on our website. The upgrade will be in a compressed zip-file, there is no need decompress it.

Put the zip-file on a USB-stick. Insert the USB-stick in the display unit. The upgrade file will be automatically detected by the software and the following screen will appear.



You can choose between exiting (and not upgrading) or installing the new software version. The version numbers of the existing and the new software are displayed above the buttons.

To proceed with the installation perform the following:

- Touch the upload new software icon.
- The box will turn itself off and reboot.
- The new software will be uploaded from the USB stick during the start up. This will take several minutes. Do not remove the USB stick during the installation, unless you are instructed to do so, (in some cases, you may be asked to remove and insert the USB stick).
- When the upgrade is finished the system starts the Fixturlaser XA application automatically.

NOTE: If, after several minutes, the unit hasn't booted up and started the XA application, please check if the light from status LED on the USB-stick is flashing or constant.

- If it is flashing files are being transferred - this is OK, wait until the display unit starts.
- If there is no flashing the display unit will need to be manually rebooted. Turn the unit off by pressing the on/off button for approximately 5 seconds. Turn the unit on with a short press on the on/off button. Wait for several minutes until the display unit starts.
- DO NOT REMOVE the USB stick until the application has started up, unless you are instructed to do so.

Settings and stored measurements will not be affected by an upgrade.

If you have a USB-stick with another software version than the current inserted in the display unit, the upgrade window will appear every ten seconds. Remove the zip-file from the USB-stick to prevent this.

FLASH

Fixturlaser XA contains Macromedia® Flash™ technology by Adobe Systems, Inc.

CALIBRATING THE TOUCH SCREEN

In order to make the touch screen to respond to the icons on the display, it may be necessary to recalibrate it from time to time.

Screen calibration procedure:

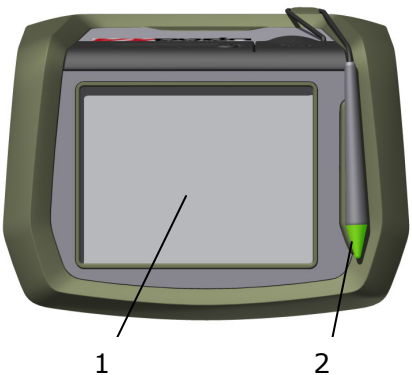
- Start the system.
- Wait until the main menu appears.
- Press down on the screen somewhere outside of the icons for 10 seconds.
- The screen calibration function should start.
- Touch and hold down on the target displayed until it moves.
- Repeat the step above on the 4 new positions of the target.
- When the target disappears, touch somewhere on the screen to finish and store the settings. (If, after the calibration procedure, you don't touch the screen to confirm within 30 seconds the calibration procedure will start again.)

NOTE:

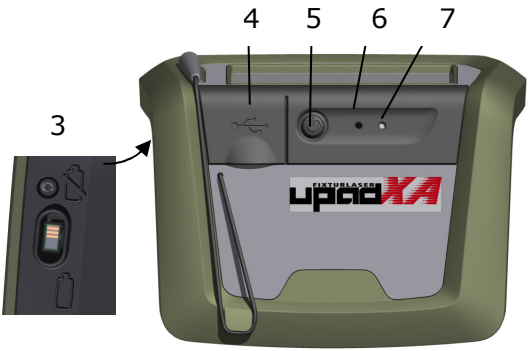
For best results please use a stylus for calibration.

The calibration procedure will not work if you are using the auto-start function. Please turn this function off before restarting the display unit.

DISPLAY UNIT UPAD XA



1. The display unit is equipped with a 3.5” touch screen as the main user interface.
2. Stylus
3. On/Off power switch (underneath the unit)

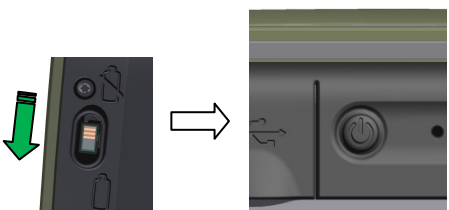


4. USB slave connector
5. On/sleep button
6. Hardware reset
7. Status indicator
    a. Flashing green – on
    b. Continuously orange - charging

OPERATING MODES

The display unit has three operating modes: On, Sleep and Off (Transportation) mode.

To turn on the unit, make sure that the power switch in the back is turned on and then press the on button at top of the unit.



The unit can be toggled between sleep mode and On mode by a short press on the On/sleep button.

NOTE!

Sleep mode should only be used for short periods of time during use to conserve battery time. Do not store the unit overnight or longer in sleep mode since this will drain the battery.

The Off icon in the main menu should be used to put the unit in off mode together with the power switch in the back of the unit.

NOTE! You need to use the power switch in the back of the unit to turn it off completely in order not to drain the battery.

It is also possible to put the unit in sleep mode at any stage of the program, by pressing the On/sleep button.

When in sleep mode the computer stores its state in the memory so when turned on again it will return to the same state as it had when it went to sleep.

The unit will consume a small amount of power even when in sleep mode so for longer times of inactivity (overnight or longer) the unit should be put in off mode.

In case the system fails to respond, it is possible to reset by using the stylus to press the hardware reset button.

CHARGING THE BATTERY

When charging the battery, the unit should be switched On completely.

NOTE!

The unit should be On in order to achieve the best charging. The unit will not be completely charged when in sleep mode.

DO NOT try to charge the battery when in off mode, this is not possible.

CONNECTIONS

- Bluetooth; Communication with sensors.
- USB slave; for attaching the display unit to a PC.

WARNING!

To fulfill the IP 54 classification, the lid protecting the port must be properly sealed. Do not use the USB connection in wet conditions.

POWER SUPPLY

Fixturlaser UPAD^{XA} is powered by a high-capacity rechargeable Li-polymer battery, or by the external USB charger or by connecting the unit to a PC.

The operating time of the batteries is approximately 6-10 hours when the system is used for a typical alignment work (50% on 50% sleep). The power indicator in the main menu displays the capacity of the batteries. When the capacity is low a battery low warning appears on the screen.

To prolong the operating time the backlight of the screen should be used moderately.

If the system turns off due to low power, the resume function will save the data. When the system is turned on again after battery recharge you will be prompted to choose whether to return to the state when the unit was turned off (i.e. resuming operation without loss of data) or start the main menu.

The external USB charger is connected to the external power connector on the display unit and to a wall socket with 110 - 240 Volts.

When the external power supply is connected, the unit will automatically start charging the battery if the unit is switched on. This will be indicated by the battery status LED. The unit should not be in sleep mode when charged in order to achieve optimum charging.

The charging time is approximately 6-8 hours for fully drained battery. The battery symbol will not indicate the amount of charge when charging. To

see the amount of charge, unplug the unit and wait for the battery indication to update. The charging time will be longer if the unit is charged from a PC.

NOTE!

If the batteries are completely drained the unit needs to be charged for approximately an hour or sometimes more before it can be switched on.

When used in typical conditions the batteries will sustain good capacity for approximately 3 years before needing replacement. Contact your sales representative for battery replacement.

To operate safely with the display unit the batteries contain safety circuitry. The unit can therefore only be used with the Li-polymer batteries supplied by Fixturlaser.

Improper replacement of batteries can cause damage and risk for personal injury. Please refer to the chapter on safety for further instructions.

TRANSFER FILES TO AND FROM A PC

- Turn on the display unit and stay in the Main Menu.
- Attach the display unit to the PC with the USB cable. The display unit will be automatically detected and will appear as a mass storage device on the PC.
- **NOTE:** The display unit must be turned on and in the Main Menu before it is connected to the PC in order for the display unit to appear on the PC.
- The files in the display unit can be transferred to the PC using the ordinary functions in Windows Explorer (i.e. cut, copy or drag and drop).

In the PC, there will be two files for each measurement; a picture file (.jpg) and a text file (.txt). The picture file shows the same picture as in the memory. The text file shows just the measurement data.

It is recommended that you delete the files from the display unit after they have been safely transferred in order to avoid filling up the memory.

TRANSPORTATION

For transportation the unit should be put into off mode where the batteries are completely disconnected from the system.

To put the unit in off mode first go to the main menu and press the off icon, then slide the battery switch underneath the unit to the disconnected position.

NOTE!

Off mode should be used whenever the display unit is transported by air or when in storage.

DO NOT try to charge the battery when in off mode.

UPGRADING THE SOFTWARE

In case upgrades to the software will be necessary they will be sent out or made available for download on our website. The upgrade will be in a compressed zip-file, there is no need decompress it.

Connect the unit to a PC and transfer the upgrade file to the System folder on the UPAD^{XA}. Disconnect the unit from the PC. The upgrade file will be automatically detected by the software and the following screen will appear.

You can choose between exiting (and not upgrading) or installing the new software version. The version numbers of the existing and the new software are displayed above the buttons.

To proceed with the installation perform the following:

- Touch the upload new software icon.
- The box will turn itself off and reboot.

- When the upgrade is finished the system starts the Fixturlaser XA application automatically (note: this will take several minutes).

Settings and stored measurements will not be affected by an upgrade.

If you have another software version than the current inserted in the display unit, the upgrade window will appear every ten seconds. Remove the zip-file from the System folder to prevent this.

FLASH

Fixturlaser UPAD^{XA} contains Macromedia® Flash™ technology by Adobe Systems, Inc.

CALIBRATING THE TOUCH SCREEN

In order to make the touch screen to respond to the icons on the display, it may be necessary to recalibrate it from time to time.

Screen calibration procedure:

- Start the system.
- Wait until the main menu appears.
- Press down on the screen somewhere outside of the icons for 10 seconds.
- The screen calibration function should start.
- Touch and hold down on the target displayed until it moves.
- Repeat the step above on the 4 new positions of the target.
- When the target disappears, touch somewhere on the screen to finish and store the settings. (If, after the calibration procedure, you don't touch the screen to confirm within 30 seconds the calibration procedure will start again.)

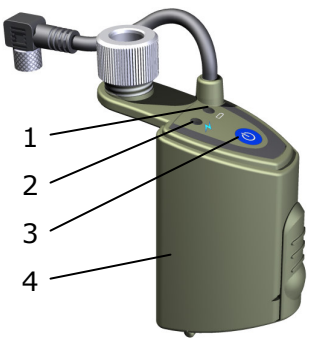
NOTE:

For best results please use a stylus for calibration.

The calibration procedure will not work if you are using the auto-start function. Please turn this function off before restarting the display unit.

WIRELESS OPTION

The optional "Wireless Option" consists of two wireless transceivers/battery packs. This option replaces the standard cable. The wireless option uses standard Bluetooth technology.



1. Battery status indicator.
    a. Flashing red – low battery.
2. Status indicator.
    a. Continuously green – ON and connected.
    b. Flashing green – ON and trying to connect.
3. On/off button.
4. Battery compartment.

OPERATION

If your system has the wireless option you can choose whether to communicate via cables or the wireless transceivers, this is done by choosing the appropriate communication mode in the wireless settings part of global settings (see below).

Note: Cable communication and wireless communication cannot be used at the same time.

In order for the display unit to communicate with the wireless units they need to be paired. This is normally done at the factory when a system is ordered. If this is not the case please refer to the section "Pairing wireless units".

WARNING!

Before using the wireless option make sure that there are no restrictions on radio transceivers on the site. Do not use on aircraft.

For the fastest connection turn on the wireless units/battery packs before turning on the display unit. It can take up to one minute for the wireless units to connect. When connected the status LED will become continuously green.

When a connection is established the system will work in the same manner as with cables. There will however be a slight delay in the communication with the sensor(s) connected. Long distances and rough environments can further affect the data transmission speed

adversely. This will make the display unit appear slower.

If the connection for some reason should be lost, the system will try to resend messages for 5 seconds after which it will automatically try to reconnect.

POWER SUPPLY

Each Wireless unit/battery pack contains 3 AA (LR6) batteries. These batteries are used to supply power both to the wireless unit as well as to the sensor it is connected to.

When connected to Fixturlaser M or S the operating time will be over 8 hours continuously measuring.

The battery warning LED will flash when the batteries need to be replaced.

Note: Turn the Wireless units/battery packs off before attempting to replace the batteries.

Battery replacement

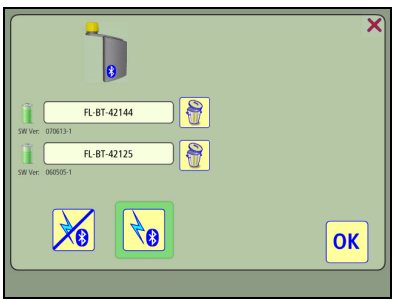
1

2

3

WIRELESS OPTION SETTINGS

The Wireless Option Settings are accessed from the Global Settings.



The communication mode of the display unit can be set here. There are two modes:

Wireless on – communication via wireless units (cables disabled).

Wireless off – communication by cable.

You have to exit the settings menu in order for the changes to take place.

Information on which units are paired to the display unit is displayed. The display unit will only communicate with units that are paired and displayed in the list.

There is also a battery indicator for each wireless unit (requires that the unit is turned on and that the wireless link is on).

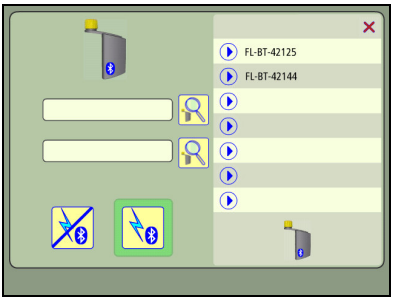
Pairing wireless units

If no units are displayed in window touch the search button to search for units that are available. If there already are units paired to the display unit press the garbage can to release them.

Release paired wireless battery packs.

Search for wireless battery packs.

When the search is finished a list of pair able units will be displayed. Notice – the wireless units/battery packs must be switched on for the display unit to discover them. The display unit will only discover units approved by Fixturlaser.



Choose the unit to pair with the display unit from the list. That unit will be automatically paired and stored by the display unit.

TROUBLESHOOTING

There are three major factors that can affect the system's ability to connect and communicate; distance between transceivers, obstructions between transceivers and electromagnetic interference.

The wireless units will not connect

Try these steps until the units connect:

- Make sure that communication mode Wireless is on.
- Go into the setting and check that the wireless units that are used are paired with this display unit.
- If possible bring the wireless units and the display unit close together without any obstructing objects between them – wait one minute.
- Restart the wireless units – wait one minute.
- Turn off both the wireless units and the display unit. Restart the wireless units. Restart the display unit. Wait one minute.
- Go into the settings and release the paired unit. Search for pairable units. If none are available they are either out of range, or unable to communicate due to interference or damage. If the units are available, choose them and they will be paired and automatically connected when the settings menu is exited.
- If still not connected, try at another location or contact your nearest Fixturlaser representative.

PRINTING

HOW TO PRINT

Insert the memory stick in the USB port of the display unit and the memory stick will be available in the File Manager.

Transfer the measurements to print from the memory to the memory stick, with the copy/paste functions in the File Manager.

Insert the memory stick in the USB port of the printer and select a measurement to print.

Also read the manual for the specific printer.

NOTE: Some memory sticks will not work with some printers.

SCREEN DUMP

At several places in the programs it is possible to take a screen dump.

Touch the print icon to take a screen dump.

When a screen dump is taken it will be saved in the memory, named as "ScreenDump#". The screen dump can then be printed as described under "how to print".

TECHNICAL SPECIFICATION – FIXTURLASER XA D

XA D Part. No. 1-0753

Housing material	Anodized aluminum and high impact ABS plastic moulded over with TPE rubber
Operating temperature	0 to 40°C (32 to 104°F)
Storage temperature	-20 to 70°C (-4 to 158°F)
Relative humidity	10 – 90%
Long term storage temperature	Room temperature 18 to 28°C (64 to 82°F)
Weight	1.5 kg (3.31 lbs) with batteries
Dimensions	244 mm x 188 mm x 55 mm (9.6 in x 7.4 in x 2.1 in)
Environmental protection	IP 65
Processor	400 MHz Intel X-Scale
RAM	64 Mb
Flash storage memory	128 Mb
Display	Colour TFT-LCD backlit with wide angle viewing technology
Display size	6.4” diagonal (131 x 98 mm)

Display resolution	Full VGA 640x480 pixels
Colour depth	262 000 colours
Interface	6.4” polyester laminated touch screen with enhanced transmission
Peripherals	2 RS-485 1 USB slave port, 12 Mbps 1 USB host port, 1.5 / 12 Mbps, OHCI v1.0 compliant 1 Ethernet 10/100BaseT RJ45
Wireless communication	Optional Class I Bluetooth transceiver with multi-drop capability
Power supply	Dual high performance rechargeable Li-Ion batteries or external power supply
Operating time	20 hours typical use
Battery charging temperature	5 to 35°C (41 to 95°F)
LED indicators	Unit state and battery state indicators

TECHNICAL SPECIFICATION – FIXTURLASER UPAD^{XA}

UPAD^{XA} Part. No. 1-0839

Housing material	Anodized aluminum and high impact ABS plastic moulded over with TPE rubber
Operating temperature	0 to 50 °C (32 to 122°F)
Storage temperature	-20 to 70°C (-4 to 158°F)
Relative humidity	10 – 90%
Long term storage temperature	Room temperature 18 to 28°C (64 to 82°F)
Weight	336 g (0.74 lbs) with batteries
Dimensions	128 mm x 90 mm x 25 / 85 mm (5.0 in x 3.5 in x 1.0 / 3.3 in)
Environmental protection	IP 54
Processor	520 MHz Intel X-Scale
RAM	128 Mb
Flash storage memory	512 Mb, approx 10 000 measurements
Display	Transreflective colour TFT-LCD backlit with touch screen
Display size	3.5” diagonal (70 x 55 mm)

Display resolution	Full VGA 640x480 pixels
Colour depth	262 000 colours
Interface	Touch screen with enhanced transmission
Peripherals	1 USB Mini slave port, 12 Mbps
Wireless communication	Class II Bluetooth transceiver with multi-drop capability
Power supply	High performance rechargeable Li-Polymer battery or external power supply
Operating time	10 hours typical use
Battery charging temperature	5 to 35°C (41 to 95°F)
LED indicators	Unit state and battery charging indicators

TECHNICAL SPECIFICATION – FIXTURLASER M1/S1

M1 Part. No: 1-0754

S1 Part. No: 1-0755

Housing material	Anodized aluminum and high impact ABS plastic over molded with TPE rubber
Operating temperature	-10 to 60°C (14 to 140°F)
Storage temperature	-20 to 70°C (-4 to 158°F)
Relative humidity	10 – 90%
Weight	186 g (6,56 oz)
Dimensions	79 mm x 77 mm x 33 mm (3.1 in x 3.0 in x 1.3 in)
Environmental protection	IP 65
Laser	650 nm class II diode laser
Laser line fan angle	6°
Laser line width ($1/e^2$)	1.6 mm
Laser line divergence (full angle)	0.25 mrad
Laser power	< 1 mW

Measurement distance	Up to 10m
Detector	CCD
Detector length	30 mm (1.2 in)
Detector angular sub tense	30 mrad/m (3 mm/100 mm per meter)
Detector resolution	1 µm
Measurement accuracy	0.3% ± 7 µm
Ambient light protection	Optical filtering and ambient light signal rejection
Inclinometer resolution	0.1°
Inclinometer accuracy	±0.5°
LED indicators	Laser transmission and status indicators

TPS AI GRASP

upadXA

XA PRO

XA ULTIMATE

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www.fixturlaser.com

ELOS FIXTURLASER