

USER MANUAL

# ECO



**acoem**

CREATING ENVIRONMENTS OF POSSIBILITY



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## WELCOME TO OUR WORLD

*Since the very beginning in 1984, ACOEM AB (formerly known as ELOS Fixturlaser AB) has helped industries throughout the world to achieve more profitable and sustainable production. We have reached where we are today by having the courage to think beyond the norm and follow slightly unconventional paths. We have had the courage to make mistakes and find new directions. Through our resolve, ambition and knowledge we have become a global player and a leader in innovative, user-friendly shaft alignment.*

## SUSTAINABLE INNOVATIONS

During our 30+ years in this industry, we have explored, tweaked and tested more than anyone. Some might say we are incurable innovators whereas others might say that we are highly focused. They both probably have a point. If we had not been devoted and

ambitious, we would not have been the first in the industry to have a touch screen. Nor would we have been pioneers in the use of visible lasers and dual measurement heads.

Over the years, we have learnt to never compromise on quality, and we are constantly in search of new, unexplored opportunities by combining advanced technology with design and function. By doing so, we have become the leading innovator in our industry. Not only do we minimize wear, production stoppages and costs, we also help save the environment. Natural resources are in short supply and if we can contribute to a more sustainable world by making it a little bit straighter, we couldn't be happier.

## TRUE COMMITMENT

One reason for our success is our solid commitment. We have ensured that we remain attentive to constantly pick up on the needs of the market. Our expert employees and dedicated dealers in over 70 countries are undoubtedly our most important asset. Satisfaction and team spirit are of particular importance to us and are consistently at the top of our priority list. With experience from a wide range of industries and manufacturing processes, we are fully aware of the problems and needs of our end-customers. We are passionate about what we do and we are driven by the desire to eliminate anything in the industry worldwide that may be even slightly out of line.

## PURE USABILITY

Our design and user-friendliness are carefully interwoven. As we develop new products, they also become cleaner, smarter, more functional and more robust. An industrial environment is demanding, infinitely more difficult to work in and inevitably subject to time pressure. There is no place for equipment with unnecessary functions, complicated interfaces and that is difficult to assemble.

Usability and user friendliness mean everything, not only to us but also to our customers. We have designed products that are easy to learn and can be incorporated quickly. By removing non-essential functions, we make life less difficult for our users – and probably a little more difficult for our competitors.

## 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 ACOEM AB, any copying or redistribution is strictly prohibited.

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

Disclaimer of warranties: To the maximum extent permitted by applicable law, ACOEM AB and its suppliers provide the software contained in this product 'as is' and with all faults, and hereby disclaim all other warranties either expressed, implied or statutory.

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.

ACOEM 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.

ACOEM AB (formerly known as Elos Fixturlaser AB) is since mid-2014 a fully owned subsidiary of ACOEM Group, headquartered in Lyon, France. For more information, please visit [www.acoem.com](http://www.acoem.com)



## **DECLARATION OF CONFORMITY**

In accordance with  
2014/35/EU Low Voltage Directive  
2014/53/EU Radio Equipment Directive  
2012/19/EC Waste electrical and electronic equipment (WEEE)  
2011/65/EU Restriction of the use of certain hazardous substances (RoHS)  
2006/66/EU Battery Directive  
2001/95/EC CE marking directive

### **Type of equipment**

Alignment System

### **Brand name or trademark**

ECO

### **Type designation(s)/Model no(s)**

1-1047 ECO D  
1-1048 M6  
1-1049 S6

### **Manufacturer's name, address, telephone & fax no**

ACOEM AB  
Box 7  
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**

EN 61000-6-3:2007.

EN 61000-6-2:2005, EN 61000-4-2, -3, -4, -5, -6, -11.

EN 61010-1:2010

ISO9001:2015 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-60825-1:2014,  
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.

The wireless device complies with Part 15 of  
the FCC Rules. Operation is subject to the  
following two conditions;

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

#### **Additional information**

The product was CE-marked in 2017.

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

#### **Date and place of issue**

Möln dal 2020-02-20

#### **Signature of authorized person**

A handwritten signature in black ink, appearing to read 'Hans Svensson', with a stylized, sweeping flourish at the end.

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 pre-cautions 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. ACOEM AB will not accept any liability for such use.



## **WARNING!**

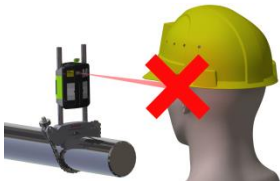
Do not mount equipment on running machines and take all appropriate measures to prevent unintentional start-up of machines. Make sure to fully comply with all appropriate shut down procedures, safety measures and regulations at worksite and local regulations regarding safety in a machine environment.

## LASER PRECAUTIONS

ECO 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.



COMPLIES WITH 21 CFR 1040.10 AND 1040.11  
EXCEPT FOR DEVIATIONS PURSUANT TO  
LASER NOTICE No. 50, DATED JUNE 24, 2007



### CAUTION!

USE OF CONTROLS OR  
ADJUSTMENTS OR  
PERFORMANCE OF  
PROCEDURES OTHER THAN  
THOSE SPECIFIED HEREIN  
MAY RESULT IN HAZARDOUS  
RADIATION EXPOSURE.

Your system complies with the requirements in:

- IEC-60825-1:2007
- British Standard BS EN 60825-1
- DIN EN 60825-1

USA FDA Standard 21 CFR, Ch 1, Part 1040.10 and 1040.11

## POWER SUPPLY

ECO display unit is powered by a rechargeable Li-Ion battery mounted in the display unit or by the external power unit.

The measurement units (M6 and S6) are powered by a rechargeable Li-Ion battery mounted in the units or by the external power unit.



Both the display unit and the measurement units (M6 and S6) can be connected to the charger and charged while lying in the case. It is important that the lid of the case is open during the charging or else the system will not be charged properly and might be damaged.

Do not expose the power adapter to rain or wet conditions.

Always unplug the charger from the electrical outlet after charging.

Leaving a display unit or a measurement unit with an empty battery for a prolonged time can reduce the capacity of the battery or even damage the battery.

If the system is not used for a long time, charge the batteries to approximately 50-75% before storing the system, if kept in storage repeat this every 3-4 month (if needed).

When used in typical conditions the battery 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 ACOEM.

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



## **WARNING!**

BATTERY REPLACEMENT SHALL ONLY BE PERFORMED BY AUTHORIZED ACOEM REPRESENTATIVES.

USE OF ANY OTHER BATTERIES THAN THOSE SUPPLIED BY ACOEM WILL CAUSE SEVERE DAMAGE TO THE DISPLAY UNIT AND CAN CAUSE 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 ACOEM for use with the display unit and the measurement units. Using other power adapters can cause damage to the unit and personal injury.

## WIRELESS TRANSCIVER

The ECO system is fitted with a 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.



### **WARNING!**

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



## CARE

### PACKING THE CASE



### PACKING POWER SUPPLY



Both the display unit and the measurement units (M6 and S6) can be connected to the charger and charged while lying in the case. The power supply must be placed in the case as in picture and the lid of the case must be open during the charging or else the system might be overheated.

## CLEANING

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



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.



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



Do not use acetone.

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

## **DATE OF CALIBRATION DISCREPANCY**

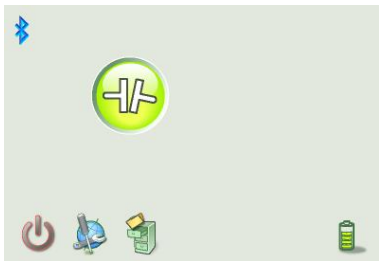
Our instruments store the electronic date of the latest calibration of the instrument. Due to production processes and storage time, this date will differ from the date of the calibration certificate. Hence, it is the date of the calibration certificate which is important and that indicates when the next calibration is due.



## MAIN MENU



Press the On/Off button to start the system and the Main Menu appears.



Select icon with the arrow buttons and confirm with the OK button.

## APPLICATION PROGRAM



Shaft Alignment Horizontal  
Machines

## MEMORY MANAGER



Memory Manager

## SYSTEM FUNCTIONS



Global Settings



Off



Connect to PC  
(only available when the display  
unit is attached to PC with the  
USB cable)



Bluetooth indicator



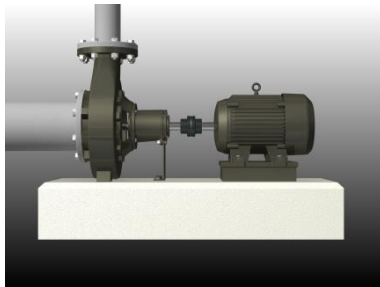
Battery indicator

# **SHAFT ALIGNMENT**

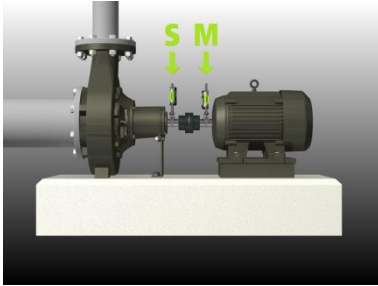
## **HORIZONTAL MACHINES**

### **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 ECO system has two measuring units that are placed on each shaft by using the fixtures supplied with the system.



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.

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.



## PRE-ALIGNMENT FUNCTIONS

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 must 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).

## 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. Use the supplied tensioning tool. Do not over-tighten. If the shaft diameter is too large the chains can be extended with extension chains.



Turn the sensors on by pressing their ON buttons.

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.



## STARTING THE PROGRAM



Start the program by selecting the Horizontal Shaft Alignment icon in the Main Menu and press OK.

When the program is started, a tolerance table will be displayed first.




Select tolerance and press OK.




Go to settings for selecting settings.

## TOLERANCE TABLE

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 the system 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.

	 rpm	 mm/100	 mm
	-2000	0.08	0.10
▶	2000-3000	0.07	0.07
	3000-4000	0.06	0.05
	4000-6000	0.05	0.03
	MY TOL	0.06	0.08



### Select tolerance

The arrow to the left indicates selected tolerance.

Select tolerance by scrolling up/down and press OK.

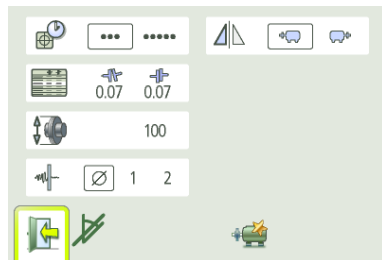


Select the OK icon and press OK to continue to shaft alignment.

### **Enter a customized tolerance**

1. Scroll down to the last row.
2. Enter tolerance name/rotation speed and press OK or scroll to the right.
3. Enter tolerance for the angle values and press OK or scroll to the right.
4. Enter tolerance for the offset values and press OK or scroll to the right.

## SETTINGS



These settings are unique for this application.

### Sampling time



Select normal or long sampling time.

To change sampling time, select the sampling time icon and press OK. Select normal or long sampling time with the left/right buttons and press OK.

Long sampling time is suitable for high vibration environments.

### Tolerance table



Open the tolerance table by selecting the tolerance table icon and press OK.

### Unit of angularity



To change unit of angularity, select the unit of angularity icon and press OK. Enter another unit of angularity and press OK.

### Adjustable screen filter



Select filter off, filter type 1, or filter type 2.

To change adjustable screen filter, select the adjustable screen filter icon and press OK.

Select filter off, filter type 1, or filter type 2 with the left/right buttons and press OK.

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

### Screen flip



Select normal screen or screen flip.

To flip the screen, select the screen flip icon and press OK. Select normal screen or screen flip with the left/right buttons and press OK.

### Turn off inclinometers

If the inclinometers are not functioning properly, e.g. in high vibrations, they can be disabled.



Turns off the inclinometers.

Measurement with disabled inclinometers is described at the end of this chapter.

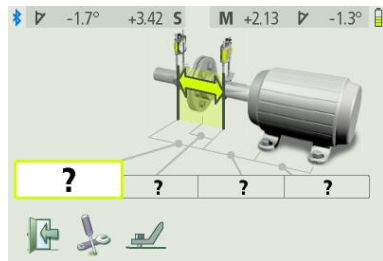
### Exit



Exits the Settings and returns to the application.

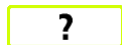


## ENTER DIMENSIONS



You must enter all the distances. The distance between the sensors, the distance between the center 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.

The screen displays the movable machine.



Select the dimension boxes to enter dimensions.

Measure the indicated dimension to the nearest 1 mm for coupling dimensions and 2 mm for foot dimensions.

## SOFTCHECK



Go to Softcheck for checking soft foot conditions.

See chapter “Softcheck”.

## MEASUREMENT METHOD



### **Tripoint™ method**

In the Tripoint method, the alignment condition can be calculated by taking three points while rotating the shaft at least 90°.

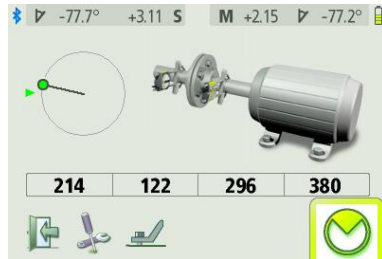
**NOTE:** The shafts should be coupled during measurement in order to achieve as reliable and accurate results as possible, when using the Tripoint method.

**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 45°.



A green flashing arrow suggests suitable measurement positions.

## MEASUREMENT POINT REGISTRATION

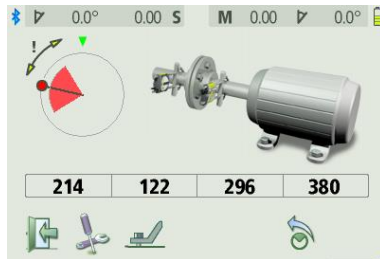


Set the sensors so that they are approximately at the same rotational angle at the first measurement position.



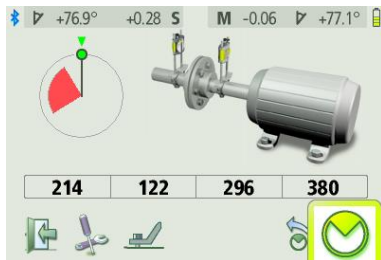
Select the register icon and press OK.

This registers the first reading.



Rotate the shafts to the next position. The shafts must be rotated over a minimum of 45°.

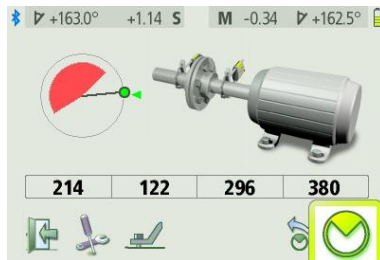
Green sector show permitted positions. Red sector show forbidden positions. The Register icon is not shown if the rotation is less than 45°.



Select the register icon and press OK.

This registers the second reading.

Rotate the shafts to the third position.

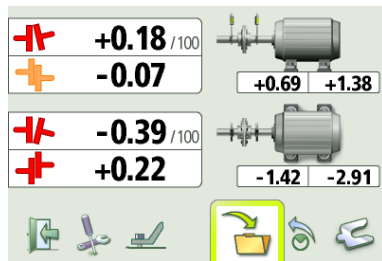


Select the register icon and press OK.

This registers the third reading.

TIP: By registering the third reading at the position 3 o'clock, 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.

Vertical results are displayed at the top of the screen, horizontal results at the bottom.

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



Within tolerance (green).



Within double tolerance (yellow).



Out of double tolerance (red).

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



Within tolerance.

## 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.

Depending on the result, the program will also guide the user.

First, the program will always recommend the user to save the measurement.

Then, if the measurement result shows that the machine is misaligned, the user will be recommended to go to shimming.

If the measurement result is within tolerance, the system will recommend the user to exit the measurement.



Save the measurement result.



Go to shimming.

## VERTIZONTAL™

Align faster with the VertiZontal Moves feature.



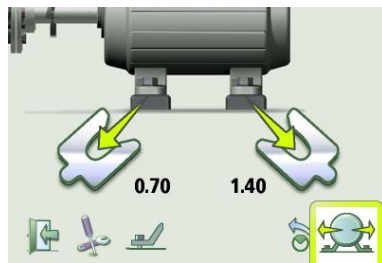
First correct the vertical misalignment in the shimming screen. The system shows how much you need to remove or add shims in order to correct the machine vertically.



Next correct the horizontal misalignment in the alignment screen. The system goes live and will deliver real time values during the adjustment phase.



## SHIMMING



The Shimming screen shows foot values in the vertical direction as suitable shim values.

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.

If shimming is needed, loosen all the bolts on the movable machine and follow screen instructions for inserting or removing shims.

When shimming is completed, continue to alignment for adjustments in the horizontal direction. Do not re-tighten the bolts.



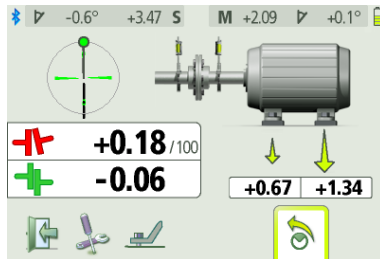
Go to alignment.

## 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 must be done first.

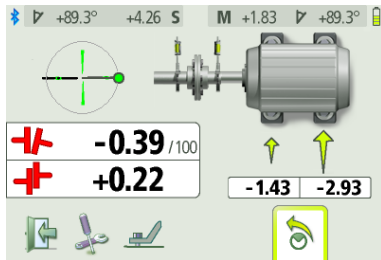
### Vertical direction



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.

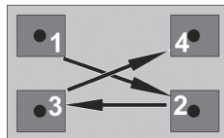
## Horizontal direction



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. Make the largest adjustment first. The arrows indicate the direction of adjustment.

Tighten the bolts using the tightening sequence, as below.



## Check and re-measure

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.

## OTHER FEATURES

### Looseness indicator



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

- The M and S units are more than  $3^\circ$  apart.
- The mutual angular position of the M and S units changes more than  $0.7^\circ$  at the following measurement points, compared to the first measurement point.

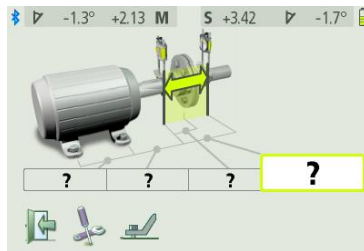
When the coupling backlash or looseness is eliminated to avoid any of the above conditions, the looseness indicator will automatically disappear.

### Screen flip



The screen can be flipped to get the motor at the left side.

Select screen flip in settings.



## Measurement with disabled inclinometers

If the inclinometers are not functioning properly, e.g., in high vibrations, they can be disabled.

- Turn off the inclinometers in Settings.

When the inclinometers are disabled, the system will work as normal with the following exceptions:

- The readings must be registered according to the "clock method". Register the first reading at 9 o'clock, rotate the shafts 180° and register the second reading at 3 o'clock, rotate 90° back to 12 o'clock to register the third and final reading.

- During alignment, use the up and down buttons to change from horizontal to vertical view of the machine and vice versa.



Change view.

**NOTE:** When disabling the inclinometers, they will remain disabled until leaving the Shaft Alignment application for the Main Menu.



## SOFTCHECK™

### INTRODUCTION

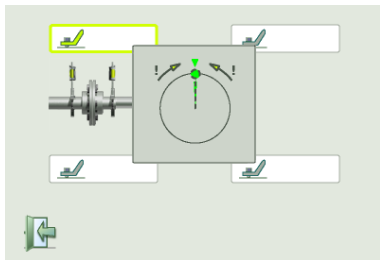
A soft foot condition needs to be corrected before any alignment takes place. If not, the measurement result will be of no value. It is more or less impossible to establish if there is a soft foot condition without using some kind of measurement tool. The Softcheck program checks each foot and displays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

The Softcheck program is entered from the Horizontal Shaft Alignment program.

### STARTING THE PROGRAM



Start the Softcheck by selecting its icon in the Shaft Alignment program and press OK.

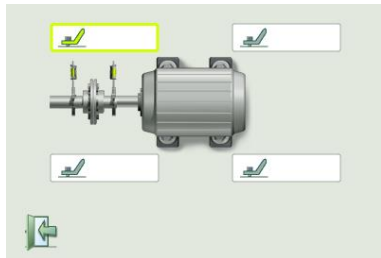


Place the sensors at the 12 o'clock position.

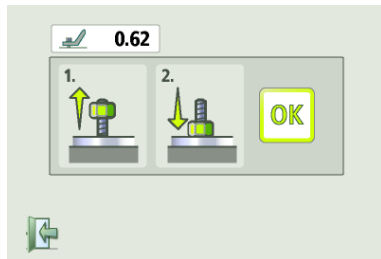
All the distances must be entered, before checking for soft foot.

Check that all foot bolts are firmly tightened.

## MEASUREMENT VALUE REGISTRATION



Select a bolt of your choice  
and press OK.

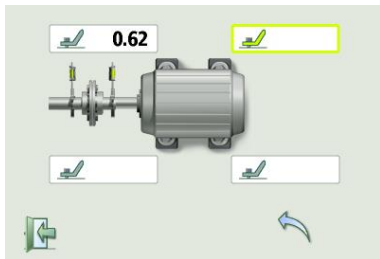


Loosen the bolt fully and then tighten it firmly,  
preferably with a dynamometric wrench.



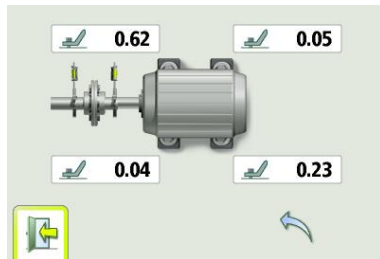
Press OK to register the  
measurement value.





Continue with the rest of the bolts.

Re-measurements can be done at any time by selecting the requested bolt again and press OK.



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).

## SHAFT ALIGNMENT







Return to shaft alignment by selecting the Exit icon and press OK.

# MEMORY MANAGER

## FILE MANAGER

<b>M218</b>	<b>ALIGNED</b>	2017-05-20 11:12
<b>M218</b>		2017-05-20 10:55
<b>M217</b>	<b>ALIGNED</b>	2017-05-20 10:35
<b>M217</b>		2017-05-20 10:20
<b>M212</b>		2017-05-18 15:38
<b>M196</b>		2017-05-18 14:44
<b>M194</b>		2017-05-18 14:08
<b>M190</b>		2017-05-18 13:21



### Select file

Files can be selected by scrolling.



Scroll upwards.



Scroll downwards.

### Open file



Opens selected file.

### Archive



Goes to archive

(only available when it contains folders with older files).

### Delete



Deletes selected file.

### Exit



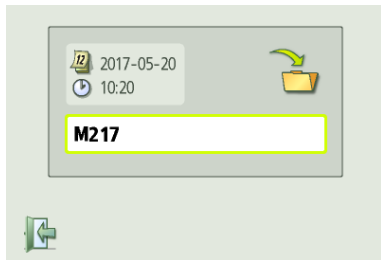
Exits the Memory Manager.

The Memory has the capacity to store approximately 1500 measurements. When the number of measurements, exceeds 100 measurements in the file manager, a folder with the older files will be automatically created. These folders can then be found in the archive.

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 (bmp) are created.



### Enter file name

Enter file name with the keyboard when the file name field is selected.

### Confirm



Confirm.

## TRANSFER FILES TO A PC

1. Turn on the display unit and stay in the Main Menu.
2. Attach the display unit to the PC with the USB cable.



3. Touch the connect to PC icon.

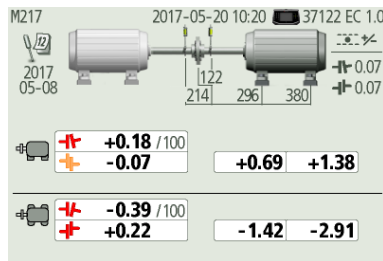
The display unit will appear as a mass storage device on the PC.

4. 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 (.bmp) 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 full memory.

## SHAFT ALIGNMENT FOR HORIZONTAL MACHINES



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



Exits the measurement file.



Scrolls to measurement saved after the one displayed.



Scrolls to measurement saved prior to the one displayed.



Deletes the measurement file.





## 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



#### Date settings

To change date, select the date icon and press OK. Enter year and press OK. Enter month and press OK. Enter day and press OK.

### Time



#### Time settings

To change time, select the time icon and press OK. Enter hour and press OK. Enter minute and press OK.

## Measurement unit



Changes between mm mode and inch mode

To change measurement unit, select the measurement unit icon and press OK. Select mm or inch with the left/right buttons and press OK.

## Bluetooth settings



Bluetooth settings

Open the Bluetooth settings by selecting the Bluetooth settings icon and press OK.

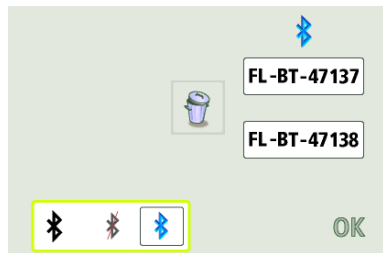
## Exit



Exits the global settings.

## BLUETOOTH SETTINGS

### Communication



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

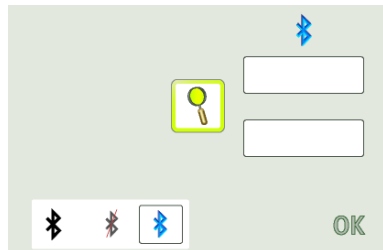


Changes between Bluetooth on and off.

To turn on or off Bluetooth, select the communication icon and press OK. Select Bluetooth on or off with the left/right buttons and press OK.

You must exit the settings menu for the changes to take place.

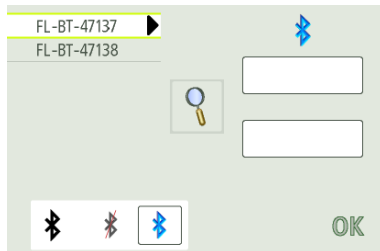
## Pairing Bluetooth units



Select the search icon and press OK, to search for units that are pair able.

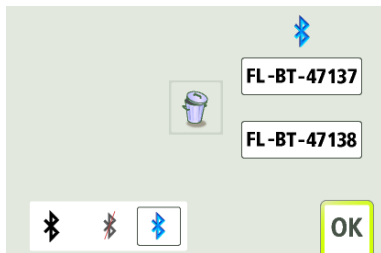
Pair able units will appear in the search list to the left.

Bluetooth units must be switched on for the display unit to discover them. The display unit will only discover ACOEM units.



Select the units to pair in the search list and press OK.  
(Maximum two units.)

Paired units will be moved to the boxes below the blue B.



Units that are paired to the display unit are shown in the boxes below the blue B.

The display unit will only communicate with units that are paired and displayed in the boxes.



Select the OK icon and press OK to confirm Bluetooth settings.

## Unpairing Bluetooth units

If there are units paired to the display unit, they must be unpaired before it is possible to pair new units.



Select the delete icon and press OK, to unpair units.



## DISPLAY UNIT ECO D



1. Alfa-numeric keyboard
2. LED indicator
3. ON/OFF button
4. Navigation buttons
5. USB micro slave

## OPERATING MODES

The display unit has two operating modes: On and Off.

The display unit is turned on by a short press on the On/Off button.



To turn off the unit, select the Off icon in the main menu and press OK or while in the main menu press the On/Off button on the front.

In case the system fails to respond, it is possible to turn it off by pressing down the ON button for more than 15 seconds.

## CONNECTIONS

- USB micro slave; for attaching the DU to a PC.



### **WARNING!**

Do not use the USB connection in wet conditions.



## POWER SUPPLY

ECO display unit is powered by a rechargeable Li-Ion battery in the display unit, or by the external power unit.

The operating time of the batteries is approximately 8 hours when the system is used for a typical alignment work.

The external power unit is connected to the USB micro 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 8 hours for fully drained batteries. The charging time will be longer if the unit is turned on while being charged.

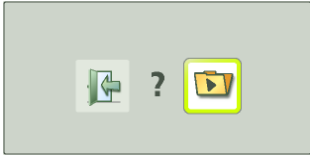
When used in typical conditions the batteries will sustain good capacity for approximately 2-3 years before needing replacement. Contact

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

## RESUME FUNCTION

If the system is turned off due to low power, the resume function will save the data.



When the system is turned on again after battery charge, you will be prompted to choose whether to return to the stage when the system was turned off (i.e. resuming operation without loss of data) or start the main menu.

## UPGRADING THE SOFTWARE

Any upgrades of the software will be distributed or made available for download on our website.

1. Turn on the display unit and stay in the Main Menu.
2. Attach the display unit to the PC with the USB cable.



3. Touch the connect to PC icon.

The display unit will appear as a mass storage device on the PC.

4. Copy the file containing the new software to the display unit.

**NOTE:** A zipped file must be unzipped before copying it to the display unit.

5. Disconnect the display unit from the PC and wait until the display unit turns itself off (this can take several minutes).
6. Turn on the display unit. The upgrade file will be automatically detected and installed. This can take approximately one minute. Wait until the Main Menu is displayed, and the DU is then ready to be used again.

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

The upgrade file will be automatically deleted from the display unit when the upgrade is completed.



## SENSORS M6 AND S6



1. ON/OFF button with status indication LED
  - a. Continuously green – On
2. Mini USB for charging
3. Laser transmission indication LED
  - a. Green – laser transmission
4. Bluetooth indication LED
  - a. Continuously blue – paired and ready.
  - b. Flashing blue – searching/ready to pair
  - c. No light – Bluetooth disabled.



5. Battery status button – press to instantly show the battery status (also works when the unit is switched off).

6. Battery status LED
  - a. One LED continuously red – less 10% charge left.
  - b. One LED flashing red – less than 5% charge left.
  - c. One LED continuously orange – charging
  - d. One LED continuously green – fully charged.
7. Battery status LED when battery button is pressed
  - a. Continuously green – battery status
  - b. Rolling green – battery charging

## OPERATING MODES

M6 and S6 units has two operating modes: On and Off.

Turn the units on and off by pressing the ON/OFF button firmly.

In case the units fail to respond, it is possible to turn it off by pressing down the ON button for more than 10 seconds.

## CONNECTIONS

### Bluetooth connection

The main connection for M6 and S6 units is the built in Bluetooth connection. The units will automatically connect to the display unit when turned on as long as they are paired. See chapter “Global settings” for instructions on how to pair measurement units to the display unit.

To avoid accidental Bluetooth transmission in a restricted area the Bluetooth function can be completely disabled – contact your local sales representative for more information.

If the Bluetooth has been disabled (as indicated by the fact that the Bluetooth LED is not flashing or continuously blue when the unit is turned on) it can be enabled by pressing the battery status button quickly 5 times in a row.

## POWER SUPPLY

The M6 and S6 units are powered by a rechargeable Li-Ion cell, or by the external power unit.

The operating time of the batteries is approximately 12 hours when the system is used for a typical alignment work (continuously on).

The external power unit is connected to the USB mini connector on the units 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 first battery status LED turning orange, when the unit is fully charged the LED will turn green. By pressing the battery status button, the exact charging status can be monitored.

The charging time is approximately 8 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 unit. The unit can therefore only be used with the Li-Ion batteries supplied by ACOEM. Improper replacement of batteries can cause damage and risk for personal injury. Please refer to the chapter on safety for further instructions.



## TECHNICAL SPECIFICATION – ECO D

### Art. No. 1-1047

Housing material	ABS plastic
Operating temperature	0 to 50°C (32 to 122°F)
Storage temperature	-20 to 70°C (-4 to 158°F)
Relative humidity	10 – 90%
Weight	346 g (1.54 lbs) with batteries
Dimensions	181 mm x 106 mm x 34 mm (7.1 in x 4.2 in x 1.3 in)
Environmental protection	IP 65
Flash storage memory	500 MB
Display	Colour TFT-LCD backlit
Display size	4" diagonal (84 x 56 mm)
Display resolution	400x272 pixels
Colour depth	16 000 000 colors
Interface	Membrane Switch Keyboard
Peripherals	1 USB micro slave port (Micro)
Wireless communication	Class I Bluetooth transceiver with multi-drop capability
Power supply	Rechargeable Li-Ion battery or external power supply
Operating time	8 hours continuous use

Battery Charging time (system off, room temperature)	8 h
Battery Capacity	10.4 Wh
LED indicator	Battery state indicator

## TECHNICAL SPECIFICATION – M6 AND S6

### Art. No. M6 1-1048, S6 1-1049

Housing Material	Anodized Aluminum frame and ABS plastic over molded with TPE rubber
Operating Temp	0 to 50°C (32 to 122°F)
Storage Temp	-20 to 70°C ( -4 to 158°F)
Long term storage temp	Room temp. 18 to 28°C (64 to 82°F)
Battery Charging Temp	0 to 40°C (32 to 104°F)
Relative humidity	10 – 90%
Weight	M6: 200 g (7.1 oz) with battery S6: 188 g (6.6 oz) with battery
Dimensions	86 mm x 77 mm x 33 mm (3.4 in x 3.0 in x 1.3 in)
Environmental protection	IP65 (Dust tight and protected against water jets)
Laser	650 nm class II diode laser
Laser line fan angle	6°
Laser line width (1/e <sup>2</sup> )	1.6 mm
Laser line divergence (full angle)	0.25 mrad
Laser power	< 1 mW
Measurement distance	Up to 3 m
Detector	Digital line sensor
Detector length	20 mm (0.8 in)

Detector angular subtense	30 mrad/m (3mm/100mm per meter)
Detector resolution	0.01 mm
Measurement accuracy	1% $\pm$ 1 digit
Signal processing:	Digital signal processing with Sidespot rejection, edge detection, ambient light elimination and anti-vibration mode
Ambient light protection	Optical filtering and digital ambient light signal elimination
Inclinometer resolution	1°
Inclinometer accuracy	$\pm 3^\circ$
Wireless communication	Class I Bluetooth transmitter
Communication range	10 m (33 ft)
Connectors	1 USB Mini port (IP67); Charging: 5V, 0.5A
Power supply	Li Ion battery or external power.
Operating time:	12 hours continuous use (measuring)
Battery Charging time (system off, room temperature)	8 h
Battery Capacity	10.4 Wh
LED indicators	Unit state, laser transmission and 5 battery status indicators with instant battery check

Specifications are subject to change without notice.





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CREATING ENVIRONMENTS OF POSSIBILITY

Publication No. P-0316-GB

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