WELCOME TO OUR WORLD

Since the very beginning in 1984, ELOS Fixturlaser 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 almost 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 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.

Disclaimer of warranties: To the maximum extent permitted by applicable law, Elos Fixturlaser 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.

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 2011/65/EU.

Type of equipment

Alignment System

Brand name or trade mark

Fixturlaser NXA

Type designation(s)/Model no(s)

1-0912 Fixturlaser NXA D
1-0913 Fixturlaser M3
1-0914 Fixturlaser S3

Manufacturer's name, address, telephone & fax no

Elos Fixturlaser 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

Emission: EN 61000-6-3:2007.

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

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.

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 2013.

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 2013-03-25

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. 请留意并遵循所有产品安全与操作指导。注意所有警示说明。

Failure to observe the safety precautions and operating instructions can cause bodily injury, fire, and damage to the equipment. 不循序安全警告语操作说明有可能导致受伤，火灾与仪器损坏。

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. 请勿在使用说明不允许的情况下拆卸、修改与使用仪器，否则 Fixturlaser 不承担相应责任。

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.

请勿在运转设备上安装仪器并防止设备意外开启。请确认完全遵循当地关机程序，安全操作规则。

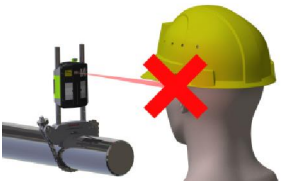
LASER PRECAUTIONS 激光预防措施

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

Fixturlaser NXA 使用二级半导体激光，输出功率小于 1 毫瓦

Class 2 is considered safe for its intended use with only minor precautions required. These are: 二级激光要求：

- Never stare directly into the laser transmitter. 请勿直视激光
- Never shine the laser directly into anyone else's eyes. 请勿将激光照射到他人眼睛



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 电源

Fixturlaser NXA is powered by a high-capacity rechargeable Li-Ion pack mounted in the display unit or by the external power unit. NXA 显示单元内置高能锂电池供电，也可以外部交流供电。

Both the display unit and the measurement units (M3 and S3) 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.

显示单元与激光探头可以在箱内同时充电，充电时请注意不要关闭箱盖，否则有可能损坏充电器。

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. 通常情况下使用电池可以维持 2-3 年，如需更换电池请联系当地供应商。

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. 电池包含安全电路以保证显示单元操作安全，请勿使用非 Fixturlaser 提供的锂电池。

Improper replacement of batteries can cause damage and risk for personal injury. 不正确的电池更换可能导致人身伤害

WARNING!

BATTERY REPLACEMENT SHALL ONLY BE PERFORMED BY AUTHORIZED FIXTURLASER REPRESENTATIVES.

电池更换必须由 Fixturlaser 授权经销商进行

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!

使用非 Fixturlaser 提供的其他品牌电池有可能导致显示单元损坏并有可能引起人身伤害。

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.

小心操作电池，不正确的操作可能导致电池烧毁。请勿拆解电池，并请远离火源。

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

请勿使用其他品牌电源适配器充电。

WIRELESS TRANSCEIVER 无线单元

The Fixturlaser NXA system is fitted with a Bluetooth wireless transceiver.

Fixturlaser NXA 内置蓝牙传输装置

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

使用时请先确保当地关于无线电发射装置的限制规定

Please refer to the chapter “Global settings” on how to turn off the Bluetooth transmitters for use in restricted environments.

在显示使用区域，请参考“全局设定”章节关闭蓝牙传输。

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.

使用时请先确保当地关于无线电发射装置的限制规定。请勿在航空器上使用。

CARE 保养

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.

请使用棉布或棉签蘸肥皂液擦拭显示单元，蘸酒精擦拭激光与接收器窗口

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.

请保持激光发射器窗口，接收器与连接口清洁，勿沾染油污灰尘。请保持显示单元表面清洁，放置刮伤。

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

请勿使用卷纸，否则会刮伤接收器。

Do not use acetone.

请勿使用丙酮

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

新仪器的支架链条是干燥的，如使用环境易腐蚀，可以上油润滑。

DATE OF CALIBRATION DISCREPANCY

标定日期差异

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.

我们的仪器内记录有最新标定的日期。因为生产与仓储原因，此日期会与标定证书日期略有差异。请以标定证书日期为准。

MAIN MENU 主菜单

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

Fixturlaser NXA 内置各种功能，但所显示图标取决于不同的应用包与附件功能。

Press the ON button to start the system and the Main Menu appears.

点击开关键开启系统，进入主菜单。

In the Main Menu you can select the program that you want to use.

主菜单可以任您选择不同的程序

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

同时主菜单也包含存档管理与全局设定。

APPLICATION PROGRAMS

应用程序

Shaft Alignment Horizontal
Machines 卧式轴对中

Shaft Alignment Vertical
Machines 立式轴对中

Machine Train Alignment
设备链对中

Softcheck 软地脚测量

Target Values 目标值预设

Hot Check 运行热态检测

Sensor Display
读数显示

Text Editor
文本编辑

Machine Defined Data
固定机型测量

MEMORY MANAGER

文档管理

Memory Manager

文档管理

SYSTEM FUNCTIONS 系统功能

Global Settings

全局设定

Bluetooth Indicator

蓝牙显示

Backlight

背光亮度

Battery Status

电池电量

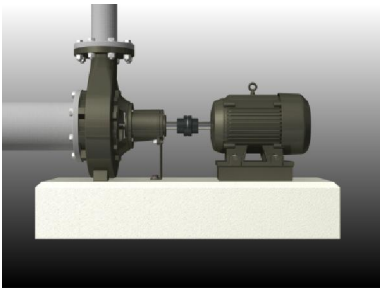
Off

关机

SHAFT ALIGNMENT HORIZONTAL MACHINES
卧式转轴对中

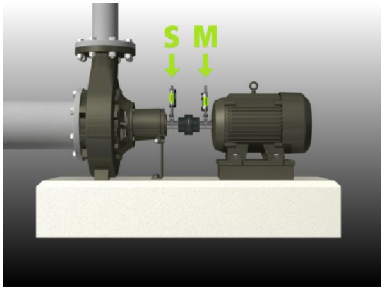
INTRODUCTION 介绍

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. 轴对中：测定和调整两台连接设备，使其旋转中心共线。水平对中的调整是通过调整设备前后脚的高低和水平位移，使其达到公差允许值



The Fixturlaser NXA system has two measuring units that are placed on each shaft by using the fixtures supplied with the system.

NXA 系统有两个测量单元，分别固定在两个轴上



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. ，旋转轴到不同位置，系统会记录两轴的相对位移，并显示对中结果和调整建议。

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.

测量结果可保存

PRE-ALIGNMENT FUNCTIONS

预对中功能

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. 为获得最佳的对中效果，需在测量之前做一些检查工作以保证获得精确测量数据。

Before going on site, check the following:

- What are the required tolerances? 公差要求
- Any offsets for dynamic movements? 是否有动态位移补偿
- Are there any restrictions for mounting the measuring system?安装条件是否受限
- Is it possible to rotate the shafts? 轴是否可以转动
- What shim size is needed? 所需垫片尺寸

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). 安装对中系统之前请检查设备底座，螺丝与垫片情况以及是否有空间限制

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

目测检查完成后，考虑以下情况

- Check that the machine has the right temperature for alignment.
  设备温度是否正常
- Take away old rusty shims (check that you can remove shims).
  移除旧的生锈垫片
- Check coupling assembly and loosen the coupling bolts. 检查连轴器连接情况，松开连轴器螺丝
- Check soft foot conditions.
  检查软脚情况
- Mechanical looseness.机械无负载
- Check coupling and shaft run-out.
  检查 轴与联轴器
- Pipe work strain.
  管道张力
- Coarse alignment.粗对中
- Check coupling gap (axial alignment).检查耦合间隙

MOUNTING 安装

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.

带有 M 的单元安装在可动设备端，标有 S 的安装在固定端。用 V 型夹具固定。

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

将 V 型夹具向上安装在轴上，用锁紧链条固定。

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.

用提供的扳手锁紧螺丝，不要过紧。如轴径过大，需使用延长链条。

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

调整激光器高度直到两侧的激光都可以接收，锁紧两侧的夹子使其固定。

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

注意：调整之后请用锁紧螺母固定

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.

M 激光器的激光可以通过其顶部的调整螺丝进行位置调整。通常并不需要，只要在长距离测量是可能用到。

MEASUREMENT METHODS 测量方法

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.

水平轴对中程序有三种测量法，快捷法，三点法与时钟法

Express Mode™ method 快捷模式

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.

快捷法对中，只需轴每次选择 60 度，自动计算对中情况。当开始测量第一个点以后，在您转动到其它位置后保持 2 秒，其它点自动记录

Tripoint™ method 三点法

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.

三点法需测量三个位置点，每个位置点距离至少 60 度。三点均为手动控制测量。

Clock method 时钟法

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.

时钟法要求轴旋转 180 度，可以与传统的打表法结果进行比较。时钟法也用在地基不水平或转轴无连轴器连接的情况。

STARTING THE PROGRAM

开始程序

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

在主菜单选择卧式或立式对中程序

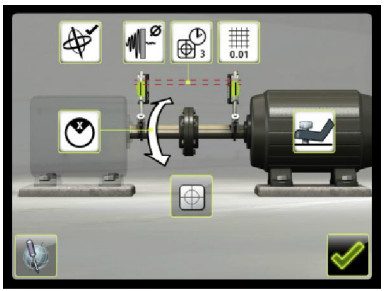
Go to Settings for selecting measurement method and other settings.

设置测量方法及其他

Go to Configuration to configure the measurement.

进入测量配置

SETTINGS 设置



These settings are unique for this application. 此处设置只对此应用有效

For most of the settings, the current selection is shown in the icon.大多数的设置值会直接显示在图标内

The functions that are available depend upon which application packages and accessories you have selected.系统所具有的的功能取决于不同的应用与附件。

Measurement method 测量方法

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

有快捷模式，三点法，时钟法

Resolution shown 分辨率设置

Opens window for selection of resolution shown.
打开窗口设置分辨率

Resolution shown depends also on connected receiver.
分辨率也取决于所连接的接收器类型

Sampling time 采样时间

Opens window for selection of sampling time.
打开窗口设置采样时间

A repeatability test can also be made here. See chapter “Repeatability test”.也可在此处进行重复性测试，参见“重复性测试”章节

Adjustable screen filter 调整显示滤波

Opens window for activating or deactivating the adjustable screen filter. 打开图标激活或关闭

Note: The adjustable screen filter should be deactivated for normal operation, and only activated in environments with severe vibrations.显示滤波功能通常只在现场振动环境很大的情况下使用。

OmniView activation

Opens window for activating or deactivating OmniView.

Softcheck™ 软脚测试

Starts Softcheck. See chapter ”Softcheck”.参见“软脚测试”章节

Sensor Display 读数显示

Starts Sensor Display. See chapter ”Sensor Display”.开启读数显示视图。具体参见“读数显示”章节

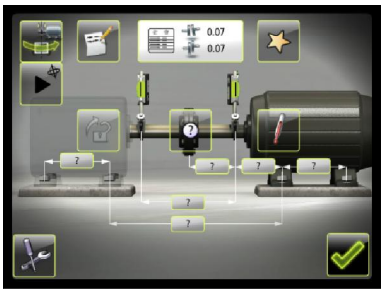
Global settings 全局设定

Opens Global settings. See chapter “Global settings”.

Confirm 确认

Exits the Settings and returns to the application.

CONFIGURATION 配置



Dimensions 输入尺寸

Tolerance table 公差表

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

Coupling type 联轴器类型

Opens window for selection of coupling type. Normal coupling, coupling gap or spacer shaft.选择联轴器类型

Notes 注释

Opens Notes, where notes can be entered.

Target values 目标值预设

Opens Target values. See chapter ”Target values”.

Add new machine with defined data 添加新定义设备数据

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.

Feet Lock 地脚锁定

Opens Feet Lock.

OmniView synchronization
Omni 视图模式同步

Synchronizes OmniView.

Screen Flip 视图切换

Screen Flip.

Settings 设置

Goes to Settings.

Confirm 确认

Exits the configuration and returns to the application.

EXPRESS MODE™ METHOD
快捷模式

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).

注意：快捷模式要求连轴器连接以便达到尽可能高的可靠性与精度。

提示：选择角度越大，测量重复性越好。可读数的最小角度为 30 度（如激光器距离不足 200 毫米，最小角度为 60 度）

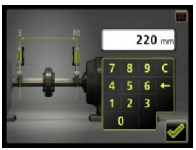
Enter dimensions 输入尺寸

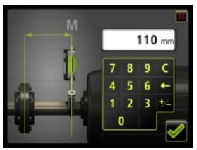
The screen displays the movable machine. The traffic lights show green when the laser hits the detector.

图示可动端设备，信号灯表示激光接收正常

Starts sequence for entering dimensions and tolerance.
点击进入输入尺寸与公差界面

Measure and enter dimensions and tolerance.





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).

必须输入两激光器间距，M 激光器到连轴器中心距。（如只做测量不做调整，此距离即可）

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).

M 激光器到设备前脚距离与设备前后脚距离也可输入或稍后输入（做调整则必须输入）。

Measurement point registration

测量点记录

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

第一个测量位置，将激光器调整至大约相同位置

Touch the register icon.

点击记录按钮

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

开始测量并记录第一个位置读数

The first position can be registered automatically, if the shafts first are rotated counterclockwise more than 3° between 6 o'clock and 12 o'clock and then clockwise more than 3°. 当轴在 6 点与 12 点位置之间逆时针旋转超过 3 度，然后顺时针旋转超过三度时，第一个测量位置可以自动记录

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

静置 2 秒，软件自动记录数据

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). 旋转主轴至第二点位置，最小转动 30 度（如激光距离小于 200 毫米，则最小转的 60 度）。

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

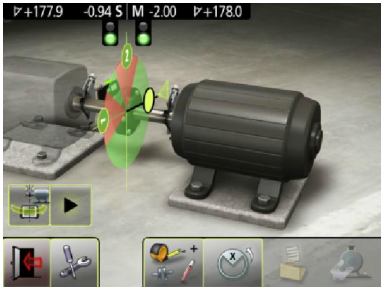
绿色区域表示可测区域，红色为非可测区域

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

激光器旋转至第二点之后保持静止 2 秒，系统自动测量记录。

Rotate the shafts to the third position.

依次旋转至第三点



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

激光器旋转至第三点之后保持静止 2 秒，系统自动测量记录。

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 测量结果

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.

测量结果同时显示水平竖直方向的对中值与调整值。左侧的符号表示位移偏差与角度偏差，以及是否在公差范围内。

Within tolerance (green). 绿色表示在公差范围内

Within double tolerance (yellow and inverted). 橙色表示在两倍公差内

Out of double tolerance (red and inverted). 红色表示超出两倍公差

When a coupling is in tolerance in one direction, this is indicated with a check symbol at the motor.当联轴器在一个方向的测量结果在公差内，显示此图标

The machine picture itself also indicates the coupling alignment.

设备的图片本身也可以显示对中结果的好坏

Save the measurement result.

保存测量结果

Go to shimming

作调整

Evaluating the result 测量结果评估

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.

角度偏差与位移偏差可以衡量对中情况，并计算是否需要进行调整。如果已经选择合适的公差，测量结果会通过不同颜色表示是否在公差范围之内。

地脚调整值给出设备对中需要进行的地脚调整数据。

Shimming 调整

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

垫片界面显示竖直方向地脚调整值

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

箭头表示加或者减垫片

The check signs show that shimming is not needed. 对勾图标表示无需更改垫片厚度

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

垫片加减完成后，继续进行水平方向调整

Go to alignment.

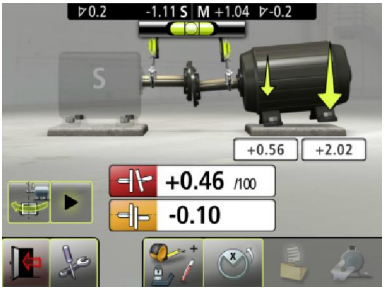
Alignment 对中

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

如竖直方向已完成调整，直接进入水平方向调整

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

如未在垫片界面进行调整，此时可在对中界面先进行竖直方向调整



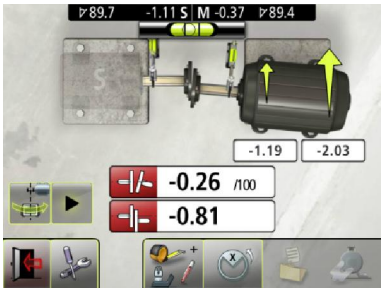
Rotate the shafts to the 12 or 6 o'clock position to make adjustments in the vertical direction. The angle guide helps you to reach the right position.

旋转主轴至 12 点或 6 点钟方向调整竖直方向对中，倾角仪帮您达到正确的位置。

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.

在竖直方向调整设备直到角度与位移同时达到公差范围内。黄色箭头表示需要调整的方向。



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.

旋转主轴到 3 点或 9 点钟方向调整水平对中。

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.

在水平方向调整设备直到角度与位移都达到公差范围内。黄色箭头表示需要调整的方向。

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

主轴转回 12 点或 6 点钟方向，检查测量结果是否发生变化。

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

对中调整完成，为确保对中结果，可以重新测量。

Re-measure.

重新测量

TRIPOINT™ METHOD 三点法

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.

注意：使用三点法测量轴需要连接，为了达到最佳的可靠性与精度

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).

提示：旋转角度越大，重复性越好。旋转角度至少 30 度（激光器距离不足 200 毫米的至少 60 度）

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

除了测量点记录方式以外，三点法与快捷法完全一致。

Enter dimensions 输入尺寸

See the Express Mode method.

参考快捷模式

Measurement point registration

测量点记录

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

激光器调整到相同测量位置

Touch the register icon.

This registers the first reading.

点测量按钮，开始第一点测量

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).

旋转到第二点

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

The Register icon is not shown if the rotation is less than 30°.

绿色区域为允许测量区域。如旋转小于 30 度，测量按钮不显示。

Touch the register icon.

This registers the second reading.

点击测量，记录第二个点

Rotate the shafts to the third position.

旋转至第三点

Touch the register icon.

This registers the third reading.

点击测量，记录第三点

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 测量结果

See the Express Mode method.

参见快捷模式

Evaluating the result 结果评估

See the Express Mode method.

参见快捷模式

Shimming 垫片

See the Express Mode method.

参见快捷模式

Alignment 对中调整

See the Express Mode method.

参见快捷模式

CLOCK METHOD 时钟法

Select the Clock method in Settings.
在设定中选择时钟法测量

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

时钟法测量除了记录点意外，其他操作与三点法，快捷模式相同。

Enter dimensions 输入尺寸

See the Express Mode method.

参加快捷对中模式

Measurement point registration
测量点记录

Set the sensors at approximately the same rotational angle at the first measurement position, 9 o'clock.
将两激光器旋转到相同角度，记录第一个测点

Touch the register icon.
点击记录

This registers the first reading.

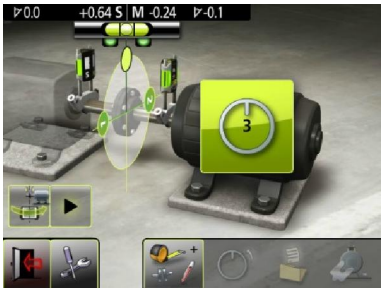
Rotate the shafts to the next position, 3 o'clock. 旋转轴到下一个测量位置，3 点

A green sector displays the position.

Touch the register icon.
点击记录

This registers the second reading.

Rotate the shafts to the third position, 12 o'clock. 旋转轴到第三个测量位置，12 点



Touch the register icon.
点击记录

This registers the third reading.

Measurement result 测量结果

See the Express Mode method.

参见快捷模式

Evaluating the result 测量结果评估

See the Express Mode method.

参见快捷模式

Shimming 垫片

See the Express Mode method.
参见快捷模式

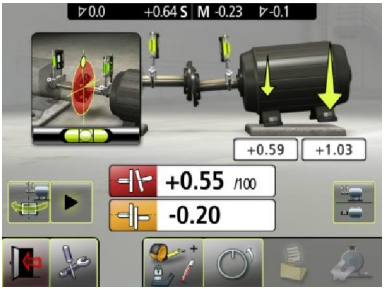
Alignment 对中调整

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

如竖直方向已完成调整，直接进入水平方向调整

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

如未在垫片界面进行调整，此时可在对中界面先进行竖直方向调整

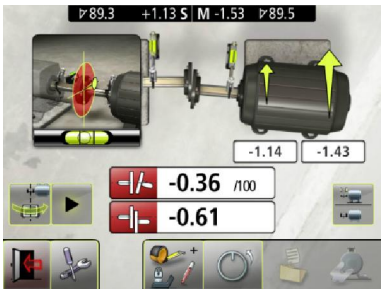


Rotate the shafts to the 12 o'clock position to make adjustments in the vertical direction. The angle guide helps you to reach the right position.

旋转主轴至 12 点或 6 点钟方向调整竖直方向对中，倾角仪帮您达到正确的位置。

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.
在竖直方向调整设备直到角度与位移同时达到公差范围内。黄色箭头表示需要调整的方向。



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.

旋转主轴到 3 点或 9 点钟方向调整水平对中。

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.
在水平方向调整设备直到角度与位移同时达到公差范围内。黄色箭头表示需要调整的方向。

Rotate the shafts back to the 12 o'clock position and check that the machine is still within tolerance. 主轴转回 12 点或 6 点钟方向，检查测量结果是否发生变化。

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

对中完成，为确认测量结果，可重新测量

Re-measure. 重新测量

FEET LOCK FUNCTION 地脚锁定功能

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.
在某些情况下，调整端不可移动或受限。为了达到合适的对中调整，需要地脚锁定功能。此功能允许选择需锁定的地脚与可调整地脚。

Feet Lock is available both in shimming and alignment.

Touch the Feet Lock icon in Configuration to enter the Feet Lock function. 点击地脚锁定按钮进入

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.
输入静止端设备前后地脚的距离，同时输入静止端设备与可动端设备前脚之间的距离。

Select the two pairs of feet you want to lock. 选择需要锁定的一组地脚

Feet Lock Shimming 高低方向锁定

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

未锁定的一组地脚所需加减垫片量显示出来

Feet Lock Alignment 水平对中方向锁定

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

此时数据实时显示未锁定地脚的调整值。

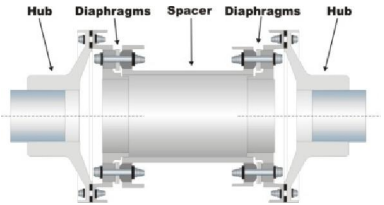
SPACER SHAFT 隔离轴

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.

隔离轴对中功能主要用于使用弹性隔离联轴器的设备。此联轴器是一种典型的高性能联轴器，无齿轮间隙，维护时可自由操作，同时适用于高速货高温应用。

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.

弹性隔离联轴器通常设计两端带有弹性元件的中间轴，可有效补偿两端轴向径向的平行偏于与角度误差。每个弹性元件通常包含铁质膜片，具有高扭转劲度。单个弹性元件只能补偿角度误差；双弹性元件中间带隔离轴则可补偿各种类型的不对中。



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. 使用隔离轴对中功能，不对中结果表示为每端的角度误差，可以直接与制造商出厂的规格作比较。

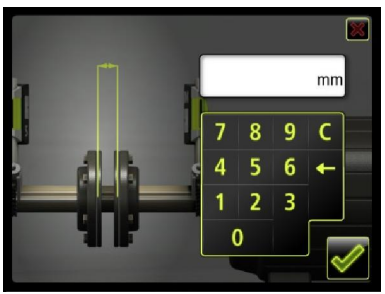
Depending upon the alignment condition, there can be differences in angle between the two flexible elements. The pictures below show different examples of how the angles in the flexible elements can be.根据不同的对中状况，隔离轴对中有以下几种典型情况。

Activate spacer shaft in Configuration.

Enter dimensions 输入尺寸

Starts sequence for entering dimensions and tolerance.

Measure and enter dimensions and tolerance. 输入尺寸与公差



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).隔离轴对中测量必须输入激光器间距，隔离轴长度，隔离轴末端与 M 激光器距离（这些是测量必须的尺寸）

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).M 激光器到前地脚距离，前后地脚间距可此时输入或稍后输入，已方便计算地脚调整值。

Measurement point registration

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

Measurement results 测量结果

The Measurement Result screen shows coupling values and foot values in both the vertical and horizontal direction.测量结果界面同时显示水平方向与竖直方向联轴器对中结果，地脚调整值。

The symbol to the left or right of the coupling values indicates the angular direction, and also if the values are within tolerance.符号显示对中角度开口方向，以及是否在公差范围内

Within tolerance (green).

公差内（绿色）

Within double tolerance (yellow and inverted).

两倍公差内（黄色）

Out of double tolerance (red and inverted).

超出两倍公差

When a coupling is in tolerance in one direction, this is indicated with a check symbol at the motor.

当联轴器对中结果处于公差内，电机端显示此图标。

The machine picture itself also indicates the coupling alignment.

电机本身的图片也可以反映对中状况

Save the measurement result.

保存对中结果

Go to shimming

进入调整

Evaluating the result 结果评估

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.

角度对中结果用以评估对中质量，与公差比较是否需要调整。如正确选择了公差范围，则系统可显示结果是否处于公差范围。

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

Shimming 加减垫片

See the Express Mode method.

参见快捷对中模式

Alignment 对中调整

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

如竖直方向已在加减垫片界面进行，可直接进入水平方向调整。

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

如竖直方向未调整，则需要首先进行竖直方向调整。

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.将轴旋转到 12 点或 6 点方向进行竖直调整。

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.调整直到角度与平行偏差都处于公差范围内。

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.将主轴旋转到 3 点或 9 点位置进行水平调整。

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. 调整直到角度与平行偏差都处于公差范围内。

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

再次旋转轴到 12 点或 6 点位置，检查竖直方向是否仍然在公差内。

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

调整完成，重测以验证。

Re-measure.

重测

OMNIVIEW 多视角功能

OmniView enables the user to automatically see the machine set-up from the actual view (i.e. from the view where the user is standing).多视角视图可自动让用户在不同视角得到设备视图（如从用户所占位置的视角）

Activate OmniView 开启多视角功能

Activate OmniView in Settings.

Synchronize OmniView 同步视角

To use OmniView it has to be synchronized.

1. Place the display unit so that the machine set-up matches the view on the screen. 将显示单元至于设备目前正确的视角
   If necessary you can change the view in the display unit until it matches the machine set-up.如需要可以更换视角直到视图正确

2. Touch the ‘synchronization’ icon.开启视图同步功能

You will now be able to move around the machine and have the view changed automatically depending on the actual orientation of the display unit.然后可携带

显示单元环绕设备，此时显示单元会根据设备位置自动切换视图。

In measurement and live alignment screens you can view the motor from either side (i.e. motor on the right or motor on the left) or from behind. In other screens (i.e. configuration, results etc) you can view the motor from either side, but not from behind.

在测量与实时调整界面，可以从各个角度看到调整端的数据

After use and several view changes the view might become out of synchronization with the real machine. If so, please synchronize again. This is done by touching the 'desynchronization' icon and adjusting the view and then touching the 'synchronization' icon again to restart OmniView. 多次使用与切换后，视图有可能与真实视图不同，此时需要再次同步。点击取消同步图标，调整视图正确后再次同步即可。

Calibrate OmniView 校准多视图

Before the first use OmniView need to be field calibrated. This procedure need to be performed after storage, temperature changes or extensive use.
第一次使用多视图之前，需要进行场校准。此步骤需要在存储或温度变化之后进行。

1. Put the display unit down on a completely stable surface.
   将显示单元置于完全稳定的表面

2. Press the ‘synchronization’ icon for 5 seconds.点击同步图标保持 5 秒

3. Confirm and wait for the calibration to finish. 确定，等待校准完成
   Do not hold or touch the display unit during the calibration! 校准过程中请勿触摸屏幕或触动显示单元

SCREEN FLIP 屏幕切换

Screen Flip enables the user to manually see the machine set-up from the actual view.

屏幕切换功能可让用户手动切换视图

To use Screen Flip, OmniView has to be deactivated. This is done in Settings.

使用屏幕切换功能，多视图功能需要关闭，在设置中完成。

You will now be able to change the view manually. 点击此图标进行视图切换

OTHER FEATURES 其他特性

Coupling gap 联轴器间隙

The result can be presented as a coupling gap. 结果可表示成联轴器间隙

Activate coupling gap in Configuration.在设置中激活联轴器间隙功能

Enlarge values 放大数值

On the alignment screen, the coupling values, feet values and sensor values can be enlarged by touching them.在对中调整界面，各种数据可以通过点击放大。

Touch the enlarged values to return them to normal size.

再次点击会恢复正常大小

Manual change of view 手动切换

Manual change between horizontal and vertical view in the Clock method.
This disables the inclinometers.手动切换水平与竖直方向视图，需要关闭倾角仪功能。

Target Value symbol 目标值预设

When Target Values are used in the measurement, this is indicated with the Target Value symbol in the Measurement, Result and Alignment screens.当启用预设的目标值后，此图标会显示

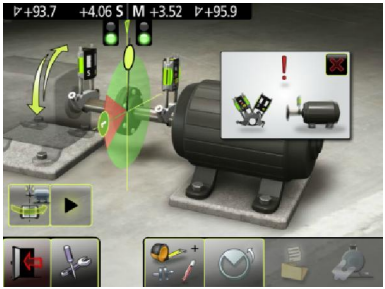
Looseness indicator 松动标识

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:

系统通过此功能监测联轴器间隙与松动，以达到优化的精度。如下列情况之一发生则松动标识出现：

- The M and S units are more than 3° apart.两激光单元角度差大于 3 度
- The mutual angular position changes more than 0.7° from that when the first measurement point was taken.第一点测量完成后两激光器同步角度大于 0.7 度



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

联轴器间隙与松动消除之后，此图标自动消失

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.

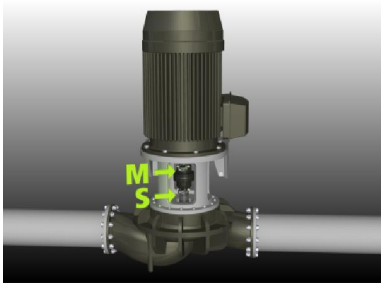
点击“x”图标可以忽略松动显示，此次
测量之后的过程均不再显示。

SHAFT ALIGNMENT VERTICAL MACHINES 立式转轴对中

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. 轴对中：测定和调整两台连接设备，使其旋转中心共线。水平对中的调整是通过调整设备前后脚的高低和水平位移，使其达到公差允许值

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.

NXA系统有两个测量单元，分别固定在两个轴上，旋转轴到不同位置，系统会计算两轴的相对位移，并显示对中结果和调整建议。角度偏差调整需增减垫片，位移偏差需侧向移动。

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.

测量结果可保存

PRE-ALIGNMENT FUNCTIONS

预对中功能

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.

为获得最佳的对中效果，需在测量之前做一些检查工作以保证获得精确测量数据。

Before going on site, check the following:

What are the required tolerances?

公差要求

Any offsets for dynamic movements?

是否带有动态补偿

Are there any restrictions for mounting the measuring system?

安装条件是否受限

Is it possible to rotate the shafts?

轴是否可旋转

What shim size is needed?

所需垫片类型

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).

安装对中系统之前请检查设备底座，螺丝与垫片情况以及是否有空间限制

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

目测检查完成后，考虑以下情况

- Check that the machine has the right temperature for alignment? 设备温度是否正常
- Take away old rusty shims (check that you can remove shims). 移除生锈垫片
- Check coupling assembly and loosen the coupling bolts. 检查联轴器连接情况，松开连接螺栓
- Check soft foot conditions. 检查软脚情况
- Mechanical looseness. 机械松动
- Check coupling and shaft run-out. 检查联轴器与轴的磨损情况
- Pipe work strain. 管道应力
- Coarse alignment. 粗调整
- Check coupling gap (axial alignment). 检查联轴器间隙

MOUNTING 安装

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

激光器安装参加“卧式轴对中”章节

MEASUREMENT METHODS 测量

In the Vertical 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.

立式轴对中程序有三种测量法，快捷法，三点法与时钟法

Express Mode™ method 快捷法

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.

快捷法对中，只需轴每次旋转60度，自动计算对中情况。当开始测量第一个点以后，在您转动到其它位置后保持2秒，其它点自动记录

Tripoint™ method 三点法

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.

三点法需测量三个位置点，每个位置点距离至少60度。三点均为手动控制测量。

Clock method 时钟法

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.

时钟法要求轴旋转180度，可以与传统的打表法结果进行比较。时钟法也用在地基不水平或转轴无连轴器连接的情况。

STARTING THE PROGRAM 开始程序

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

点击立式对中图标开始

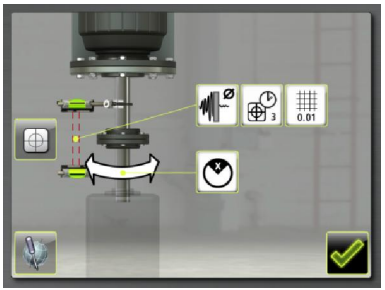
Go to Settings for selecting measurement method and other settings.

进入测量方法设置

Go to Configuration to configure the measurement.

进入配置视图配置测量

SETTINGS 设定



These settings are unique for this application. 设定只对此应用有效

For most of the settings, the current selection is shown in the icon. 大部分的应用设置会显示在图标中

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

所设功能取决于选择的应用套装与附件。

Measurement method 测量方法

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

Resolution shown 分辨率

Opens window for selection of resolution shown.

Resolution shown depends also on connected receiver.

Sampling time 采样时间

Opens window for selection of sampling time.

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

Adjustable screen filter 可调屏幕滤波

Opens window for activating or deactivating the adjustable screen filter. 可激活与关闭滤波功能

Note: The adjustable screen filter should be deactivated for normal operation, and only activated in environments with severe vibrations.通常此功能只在环境振动大时开启

Sensor Display 传感器显示

Starts Sensor Display. See chapter ”Sensor Display”.

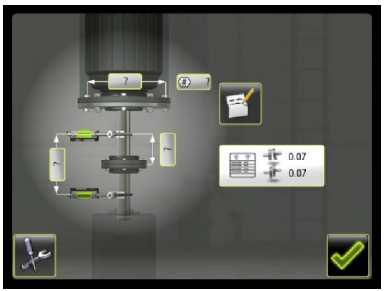
Global settings 全局设定

Opens Global settings. See chapter “Global settings”.

Confirm 确认

Exits the Settings and returns to the application.

CONFIGURATION 配置



Dimensions 尺寸

Tolerance table 公差表

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

Notes

Opens Notes, where notes can be entered.

Settings

Goes to Settings.

Confirm

Exits the configuration and returns to the application.

EXPRESS MODE™ METHOD

快捷模式

Select the Express Mode method in Settings. 选择快捷模式测量

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. 当使用快捷模式时，为获得更精确和可靠的数据，请保持联轴器连接。

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).

注：旋转三个位置的角度间距越大，测量结果越精确。最小角度为 30 度（当激光器间距小于 200mm 时需要最小 60 度）

Enter dimensions 输入尺寸

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

图示可动端设备，信号灯表示激光接收正常

Starts sequence for entering dimensions and tolerance.
点此图标输入尺寸与公差

Measure and enter dimensions and tolerance.

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.)

必须输入两激光器间距，M激光器到连轴器中心距。（如只做测量不做调整，此距离即可）

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.

输入节距园直径与总螺栓数（为获得螺栓调整值，此数值必须输入）

Measurement point registration
测量点记录

Before starting the measurement you have to select a bolt to be bolt number 1.
开始测量之前需要选定 1 号螺栓

The first measurement position has to be at bolt number 1.测量从 1 号螺栓开始

Set the sensors at approximately the same rotational angle at the first measurement position, at bolt number 1.
将两个激光器调整至大约相同位置，测量第一个点。

Touch the register icon. 记录

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). 旋转轴到下一个位置，需要超过 30 度（如激光器间距小于 200mm，需要超过 60 度）

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

绿色区域表示可测量区域，红色表示禁止区域

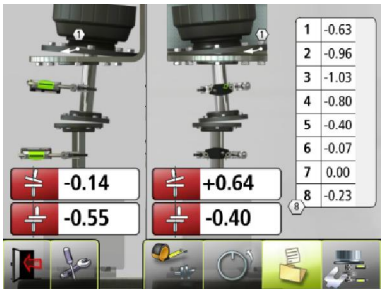
The reading is taken automatically when the sensors have been stationary for 2 seconds.静止 2 秒之后自动记录第二个点

Rotate the shafts to the third position.

旋转到第三个位置

The reading is taken automatically when the sensors have been stationary for 2 seconds. 静止 2 秒之后自动记录第三个测量点

Measurement result 测量结果



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

测量结果同时显示两个方向的对中值与调整值

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

左侧的符号表示位移偏差与角度偏差，以及是否在公差范围内。

Within tolerance (green).
公差内（绿色）

Within double tolerance (yellow and inverted).
两倍公差内（橙色）

Out of double tolerance (red and inverted). 两倍公差外（红色）

When a coupling is in tolerance in one direction, this is indicated with a check symbol at the motor.

The machine picture itself also indicates the coupling alignment.

Save the measurement result.

Go to shimming

Evaluating the result 测量结果评估

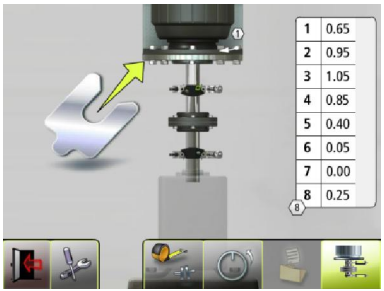
The angle and offset values are used to determine the alignment quality. These values are compared with alignment tolerances to determine if any correction is necessary. If suitable tolerances are selected in the tolerance table, the symbols described above indicate if the angle and offset values are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

角度对中结果用以评估对中质量，与公差比较是否需要调整。如正确选择了公差范围，则系统可显示结果是否处于公差范围

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

地脚数值显示所需进行的地脚调整量

Shimming 垫片调整



The Shimming screen shows foot values as suitable shim values (0.05 mm / 1 mils).垫片视图显示根据垫片厚度所需的调整量

Adjust the angular error by placing shims under the bolts as required.

通过在螺栓下放置垫片调整角度

The arrow show if shims must be added to adjust the machine.

箭头表示需调整垫片

The check sign shows that shimming is not needed.

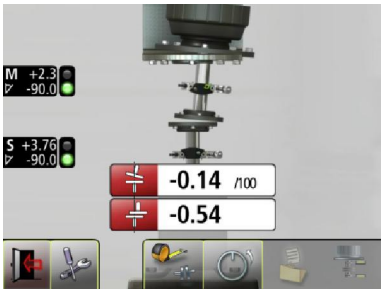
对勾标志表示无需调整

When shimming is completed, continue to alignment for adjustments of parallel offset.

调整垫片完成后，继续调整平行偏移

Go to alignment.

Alignment 对中调整



If the angular error has been correctly adjusted in the shimming screen the angular value should now be in tolerance. 如角度误差已在垫片界面修正，此时应显示公差内。

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.

现在调整两个方向的平行偏移。当激光器处于螺栓 1 位置时，显示螺栓 1 方向的结果；处于螺栓 2 位置时，亦然。

Check that both the angular value and the parallel offset are within the required tolerances once the adjustments are completed. 调整完成再次旋转确认。

Alignment is now complete. To confirm the result, re-do the measurement. 重新测量已确认对中结果

Re-measure.

TRIPOINT™ METHOD 三点法

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.

当使用快捷模式时，为获得更精确和可靠的数据，请保持联轴器连接。

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).

注：旋转三个位置的角度间距越大，测量结果越精确。最小角度为 30 度（当激光器间距小于 200mm 时需要最小 60 度）

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

三点法除记录测量点方法之外其余与快捷模式一致。

Enter dimensions 输入尺寸

See the Express Mode method.

参见快捷模式

Measurement point registration
测量点记录

Before starting the measurement you have to select a bolt to be bolt number 1.
开始测量之前需选定一个螺丝作为 1 号

The first measurement position has to be at bolt number 1. 测量从螺丝 1 位置开始

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

将两个激光器调整至大约相同位置，测量第一个点。

Touch the register icon. 记录

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). 旋转轴到下一个位置，需要超过 30 度（如激光器间距小于 200mm，需要超过 60 度）

Green sector show permitted positions.
Red sector show forbidden positions.
The Register icon is not shown if the rotation is less than 30°. 绿色区域表示可测量区域，红色表示禁止区域

Touch the register icon. 记录

This registers the second reading.

Rotate the shafts to the third position.

选择到第三个位置

Touch the register icon. 记录

This registers the third reading.

Measurement results 测量结果

See the Express Mode method.

参见快捷模式

Evaluating the result 结果评估

See the Express Mode method.

参见快捷模式

Shimming 垫片调整

See the Express Mode method.

参见快捷模式

Alignment 对中调整

See the Express Mode method.

参见快捷模式

CLOCK METHOD 时钟法

Select the Clock method in Settings.

选择时钟法测量

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

除记录点方法之外，其余操作与快捷模式相同

Enter dimensions 输入尺寸

See the Express Mode method.

参见快捷模式

Measurement point registration
测量点记录

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

站在第二测量点位置，此位置需方便将轴旋转 180 度

The first measurement position has to be at bolt number 1.

从螺丝 1 位置开始测量

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

开始测量前标出 1，2，3 点的位置

Set the sensors at approximately the same rotational angle at the first measurement position, with bolt number 1 to the right. 第一个测量位置，将激光器调整至大约相同位置

Touch the register icon. 记录

This registers the first reading.

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

旋转 90 度到第二测点（您所站位置）

A green sector displays the position.

Touch the register icon.

This registers the second reading. 记录第二点

Rotate the shafts 90° to the third position, to the left. 旋转 90 度到第三点位置

A green sector displays the position.

Touch the register icon.

This registers the third reading. 记录第三点

Measurement result 测量结果

See the Express Mode method.

参见快捷模式

Evaluating the result 结果评估

See the Express Mode method.

参见快捷模式

Shimming 垫片调整

See the Express Mode method.

参见快捷模式

Alignment 对中调整

See the Express Mode method.

参见快捷模式

MACHINE TRAIN ALIGNMENT

机组对中

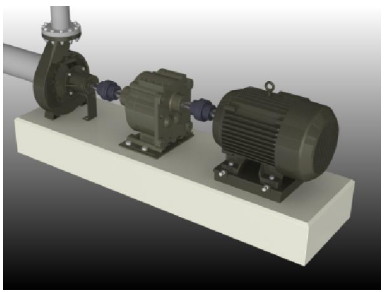
INTRODUCTION 介绍

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. 机组是一组两台以上互相连接的旋转设备。典型的机器链为一套中间带有齿轮箱的电机系统

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. 当做机器链调整时，一台设备的调整会直接影响到其它设备的对中，所以开始调整之前了解机器链中各设备的相互关系相当重要。了解清楚之后就可以很容易得到整个设备链的总览情况，从而找到需要调整的设备。

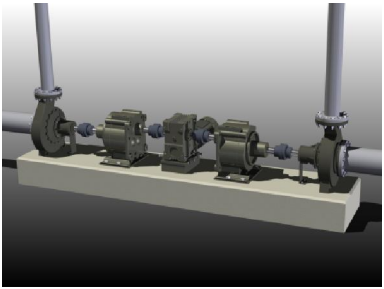
The amount of adjustment needed depends on which machine in the machine train is selected as the stationary machine. In many cases there are also restrictions to the amount of adjustment due to base or bolt bound conditions, which influence the choice of the stationary machine. 需要调整的设备

取决于那一台设备作为静止的参考。很多情况下基座和螺栓的调整范围会影响到参考设备的选择。



Machine Train with 3 machines.

三台设备的机组



Machine Train with 5 machines.
五台设备的机组

The machine train program in Fixturlaser NXA 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.

Fixturlaser NXA中的机组
对中程序为您提供快速的设备位置总览，
方便您选择选择参考设备优化对中调整

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.

程序会指导您将设备调整到目标位置，同时计算对准机器链需要调整的总量

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”.

一旦参考设备确定，其它设备的对中可使用水平对中程序，参见“水平转轴对中”章节

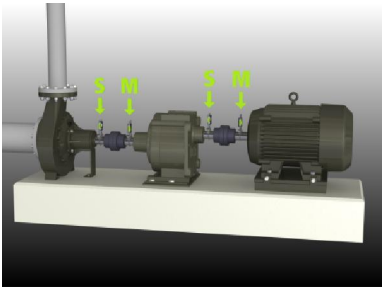
MOUNTING 安装

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

激光器安装参见“卧式转轴对中”

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

确保固定端和可动端激光器在每个连轴器两端保持同样的安装顺序



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

为避免失误，请每次都将激光器安装在机组同一侧

PRE-ALIGNMENT FUNCTIONS & ACTIVITIES 预对中

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.

为缩短在线测量时间，建议您预设设备参数（距离，设备编号以及目标值）并保存

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

在线测量时，只需从存储器打开配置文件就可以继续测量。

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”.

设备链对中，除了参照水平转轴对中之外，在线的预对中也非常重要。

- Check the amount of adjustment possible for every machine. 检查每台设备的可调范围
- Check if there is any bolt or base-bound restrictions. 检查是否存在螺栓或地基调整限制
- Check if there are any restrictions to moving the machine due to attached piping, electrical cables, hydraulics or similar equipment. 检查设备调整过程是否会受到管路，电线，水管或类似物体的限制。

STARTING THE PROGRAM 开始程序

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

点击主菜单的机组对中按钮开始测量程序

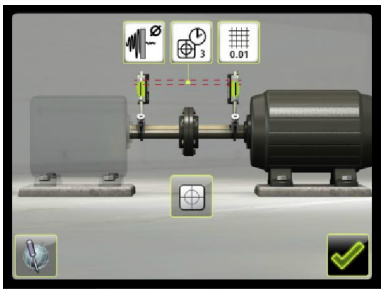
The screen displays machine trains with 3, 4 or 5 units. 屏幕显示 3、4 和 5 个单元的设备链

Touch the icon for the machine train that corresponds to your application. 根据您的需要选择应用

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

设置测量方法及其他

SETTINGS 设置



These settings are unique for this application. 设置只对本次测量有效

For most of the settings, the current selection is shown in the icon. 大部分的设置，所选项均会在图标显示出

The functions that are available depend upon which application packages and accessories you have selected. 所选功能取决于您选择的组件和附件

Resolution shown 分辨率

Opens window for selection of resolution shown.

Resolution shown depends also on connected receiver. 分辨率取决于所连接的接收器类型

Sampling time 采样时间

Opens window for selection of sampling time.

A repeatability test can also be made here. See chapter “Repeatability test”. 重复性测试也可在此进行，参见“重复性测试”章节。

Adjustable screen filter

Opens window for activating or 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”.

Global settings

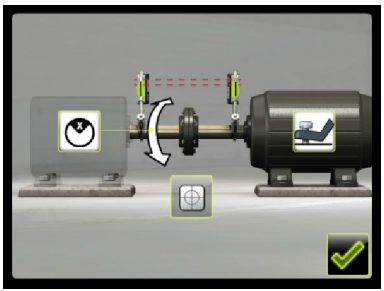
Opens Global settings. See chapter “Global settings”.

Confirm

Exits the Settings and returns to the application.

Settings and functions in Shaft Alignment for Machine Train

机组对中的设定与功能



The Machine Train program has a separate settings menu for Shaft Alignment. 机组对中程序设定菜单与转轴对中程序相互独立

Measurement method and Softcheck can only be reached from there.

测量方法与软脚测试设定只能在相应处

Measurement method 测量方法

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

Softcheck™ 软脚

Starts Softcheck. See chapter ”Softcheck”.

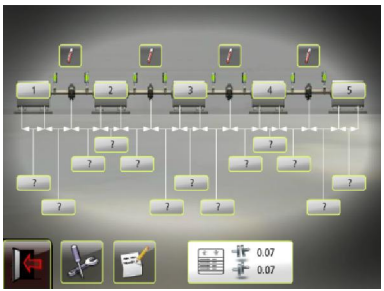
Sensor Display

Starts Sensor Display. See chapter ”Sensor Display”.

Confirm

Exits the Settings and returns to the application.

CONFIGURATION 配置



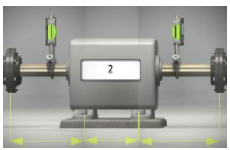
Enter dimensions 输入尺寸

Touch the icon to enter dimensions.

Measure and enter dimensions.
测量与尺寸输入

All dimensions must be entered before you can start measuring. 开始测量之前必须输入所有距离

At each unit (except for the end units), there are three distances to enter. 除末端之外，所有设备都需要输入 3 个距离



The distance between the centre of the coupling and the first pair of feet.
连轴器中心距设备前脚

The distance between the first and the second pairs of feet. 前后地脚距离

The distance between the second pair of feet and the centre of the coupling. 设备后脚距联轴器中心尺寸

Tolerance table 公差表

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

Machine ID 设备编号

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

设备编号默认为 1，2，3… 但可以更改

Touch the icon for changing machine ID.

Target values 输入目标补偿值

Opens Target values. See chapter ”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.

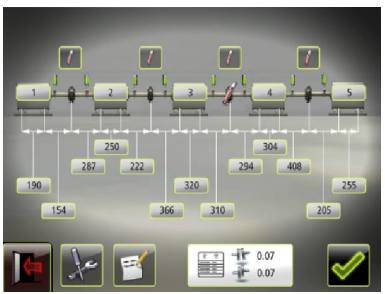
如需可输入目标补偿值，参见“目标值”章节

Notes 注释

Opens Notes, where notes can be entered.

Settings 设置

Goes to Settings.



Confirm 确认

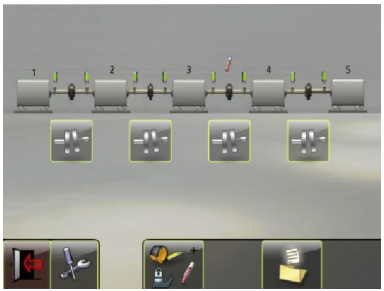
Confirms the configuration and continues to summary screen.

Save configuration 保存配置文件

The configuration of the machine (distances, machine-ID and target values) can be saved separately, to be opened up later. This is done in the summary screen.

MEASUREMENT 测量

Summary screen 总览



When the configuration has been confirmed the summary screen is shown.

确认完配置之后，屏幕出现总览图

Touch the save icon to save the configuration.

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.

机组对中程序中，首先在每个联轴器上测量转轴对中，然后将所有联轴器对中结果综合，形成机组对中数据

A part of the Horizontal Shaft Alignment program is used to measure at each coupling.

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

Shaft alignment for machine train
机组的转轴对中

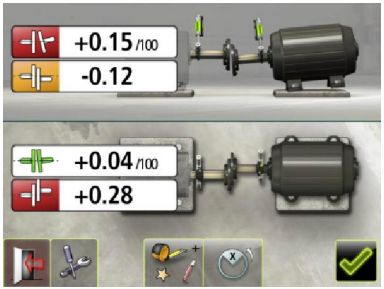
See also chapter “Shaft Alignment Horizontal Machines”.
参见“卧式转轴对中”章节

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

所有卧式转轴对中适用的测量方式在此均适用

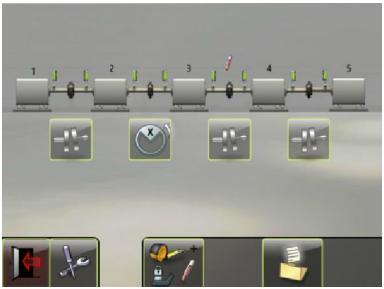
The distance between the sensors and the distance between the centre of the coupling and the M-sensor must be entered for each coupling. (The distance between the M-sensor and the first pair of feet and the distance between the first and the second pairs of feet are not needed here). 激光器间距与连轴器间距必须输入，M 端激光器与地脚间距此处无需输入

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 in the summary screen.

当某连轴器已经测量过，图标会由原来的测量按钮显示为重新测量



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

当所有的测量完成之后，机组对中结果就会显示出来。

MEASUREMENT RESULTS

Result screen with coupling values.

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

测量结果同时显示水平和垂直方向的开口偏移

One of the units is automatically set to reference according to the Minimum Moves function. 系统会选择所需调整最小的一个单元，将其自动设置为参考

The reference can be changed by touching the lock icons.

参考单元可通过按锁定按钮更改

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).

When a coupling is in tolerance in one direction, this is indicated with a check symbol.

The machine picture itself also indicates the coupling alignment.

Save the measurement result.保存

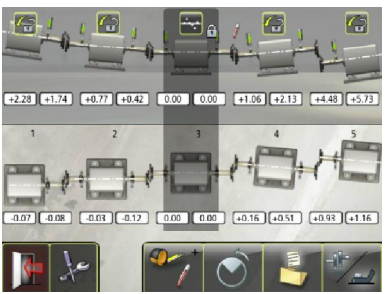
Change between viewing the coupling values and the feet values.更改联轴器与地脚值

Re-measure (This icon returns you to the summary screen.) 重测

Change configuration.更改配置

Minimum Moves (a reference based on the Minimum Moves function will be selected).最小调整值

Select another reference.
选择其他基准



Result screen with feet values.

带地脚调整值的测量结果

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.

角度与位移偏差决定对中质量，测量结果会与公差进行比较，检查设备是否需要调整。如果测量前已经选择了公差范围，测量结果会显示是否超差。

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

地脚调整值表示每个设备地脚需要调整的大小。

ALIGNMENT 对中调整

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

当您选定某一个参考单元之后，卧式对中程序会帮您对中需要调整的设备。

See the chapter “Shaft Alignment Horizontal Machines”.

参见“卧式转轴对中”章节

OTHER FEATURES 其他特性

Minimum Moves 最小调整值

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

此功能可以选择所需调整最小的设备单元为参考。

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

计算时优先考虑水平方向调整和减垫片

If you touch the Minimum Moves icon, a reference will be selected based on the Minimum Moves function. 按此按钮选择最小调整值单元为参考单元。

Target Value symbol 目标值预设

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

SOFTCHECK™ 软脚测试

INTRODUCTION 介绍

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.

在对中调整开始前，应先进行软脚测试，否则对中结果是没有意义的。如果没有使用专业工具，软脚情况通常很难发现。Fixturlaser 对中测量系统内置软脚测试程序可以帮您精确检测软脚情况。

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

主菜单或某应用的设定菜单都有软脚测试

STARTING THE PROGRAM 开始程序

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

点此按钮开始软脚测试

Go to Settings for selecting settings.

点此按钮进行设置

ENTER DIMENSIONS 输入尺寸

Place the TD-units at the 12 o'clock position. 将激光器放置在 12 点位置

Starts sequence for entering dimensions and tolerance.

点此进入尺寸与公差输入

Measure and enter dimensions.

输入尺寸

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.

开始软地脚测量之前，必须输入激光器间距，M 端激光器与前地脚间距，以及设备前后地脚的间距。检查每个地脚螺栓是否拧紧。

MEASUREMENT VALUE REGISTRATION 测量

Select a bolt of your choice by touching its icon. 选择你需要测量的地脚

1. Loosen the bolt fully and wait a few seconds. 完全松开此地脚，等待几秒
2. Tighten the bolt firmly, preferably with a dynamometric wrench. 重新固定螺栓，尽可能使用扭矩扳手
3. Register the measurement value. 记录测量数据

Register the measurement value by touching the confirmation icon. 确认

Continue with the rest of the bolts.

继续测量其他螺栓

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

任何时间都可重新测量

MEASUREMENT RESULT AND CORRECTIONS 测量结果与修正

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). 根据测量结果做调整，然后重新测量。（测量结果指导您需要什么垫片以消除软脚）

DOCUMENT THE RESULT

Touch the save icon to save the measurement result.

点此按钮保存测量结果

SHAFT ALIGNMENT

Go to shaft alignment by touching this icon.

点此按钮进入轴对中

TARGET VALUES 目标值预设

INTRODUCTION 介绍

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.

大部分设备在运行过程中都会发热，最好的情况是驱动端和被驱动端发热情况一样，无需补偿。不过有些情况下两端的温度并不一致。

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. 生产厂家会定义每台设备的热膨胀系数，但大多数情况下只是作为测量结果的平行偏差和角度偏差的来表示的。

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

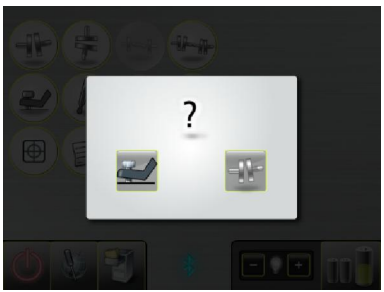
Fixturlaser NXA 系统可以方便您在对中开始之前预设地脚值，角度与位移偏差。

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).

输入值为目标值。也就是设备在未运行状态下对中调整，在运行状态下达到正常对中状态。

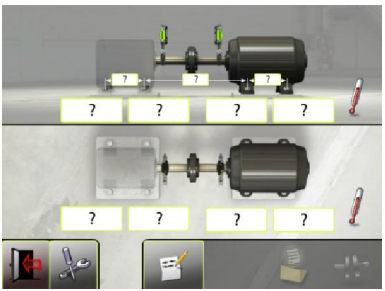
STARTING THE PROGRAM 开始程序

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



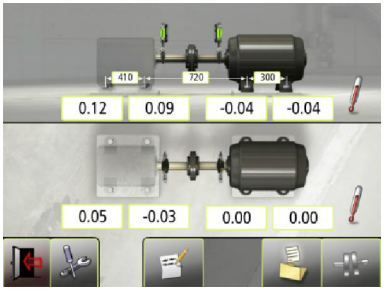
Select one of two ways to express the offset values: Feet values or angle and offset values. 选择任意一种方式输入补偿值：地脚值或角度位移偏差值

Feet values 地脚值



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.

点击地脚值按钮，根据预设单位输入目标值（mm 或 mils）

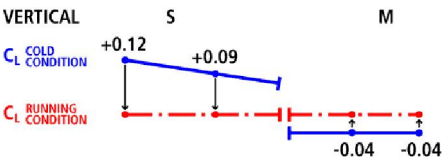


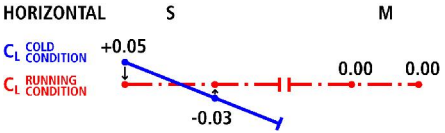
In the example above, the stationary machine will shrink vertically by 0.12 mm at the rear feet and 0.09 mm at front feet while the movable machine will expand 0.04 mm while running.

此例中竖直方向，静止端设备后脚会膨胀 0.12 毫米，前脚会膨胀 0.09 毫米；可动端设备在运转过程中会下降 0.04 毫米。

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.

水平方向，如可动端设备在运转中不会改变位置，静止端设备后地脚需要向远离测量者方向移动0.05毫米，前地脚需要向靠近测量者方向移动0.03毫米。

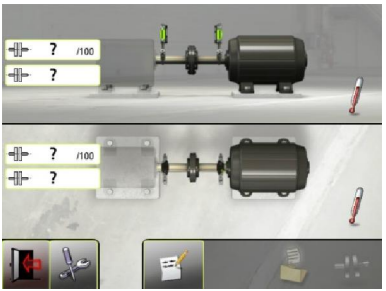




After having entered these feet values, the system calculates how the movable machine should be positioned (target position) in cold condition in order to obtain perfect alignment during running condition.

输入完这些地脚值之后，系统会计算可动端设备在未运转状态需要调整的位置，以达到设备运转之后达到完美对中。

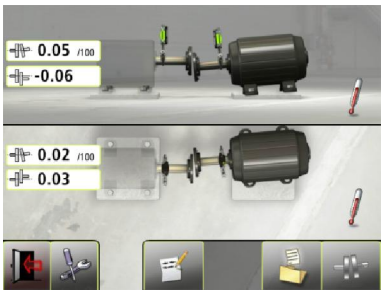
ANGLE AND OFFSET VALUES
角度与位移偏差



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. 点击预设按钮输入角度与位移的目标预设值

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

连轴器开口设置如果已经激活，也可输入

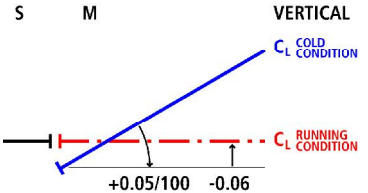


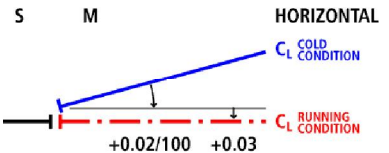
In the example above, the movable machine should be vertically adjusted to a position with an angular misalignment of +0.05 mm/100 mm and an offset of -0.06 mm.

此例中，设备未运转条件下，可动端设备在竖直方向需要调整至角度 0.05mm/100mm，位移－0.06mm；

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.

水平方向需调整至角度 0.02mm/100mm，位移 0.03mm。在设备正常运转情况下即可达到对中。





DOCUMENT THE TARGET VALUES

Touch the save icon to save the target values.

点击存储按钮保存预设值

SHAFT ALIGNMENT

Go to shaft alignment by touching this icon.

进入轴对中

HOT CHECK 运行热态检测

INTRODUCTION 介绍

If you have un-explainable vibrations in your pump-motor installation, this application can help reduce your doubts (and your vibrations).如您的设备出现不可解释的振动，此应用可能帮您消除

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.

如您没有 OL2R 动态测量组件，无法在设备运转时动态测量，仍然可能检查设备热膨胀的影响

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.

运行热态检测分别在设备刚刚停止后和停止很长时间已经处于常温时测量两组结果，然后进行比较，得到补偿值

WARNING! 警告

The machine must be shut off before starting the measurement.

测量时设备必须处于关闭状态

MEASUREMENT METHOD 测量方法

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. 运行热态检测将冷态的测量结果与热态的结果进行比较得到补偿值

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

热态的结果减去冷态的结果，得到补偿值

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.

热态测量需要在设备刚刚关停时进行，冷态测量需要设备已达到常温。

MEASURE HOT CONDITION 热态测量

Shut off the machine. 关闭设备

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

实施一次卧式轴对中测量，操作过程参见“卧式转轴对中”章节

Save this measurement. 保存测量结果

MEASURE COLD CONDITION 冷态测量

Wait until the machine has dropped to the ambient temperature.

等待直到设备降至常温

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

实施一次卧式轴对中测量，操作过程参见“卧式转轴对中”章节

Save this measurement. 保存测量结果

STARTING THE PROGRAM 开始程序

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

MAKING A HOT CHECK 运行热态测量

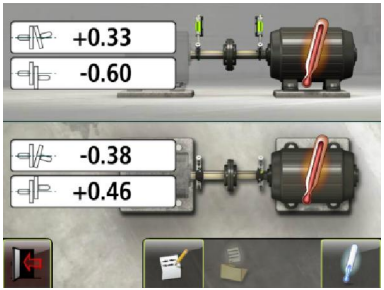
Select a saved measurement in hot condition.

选择热态的保存结果

Select a saved measurement in cold condition.

选择冷态的保存结果

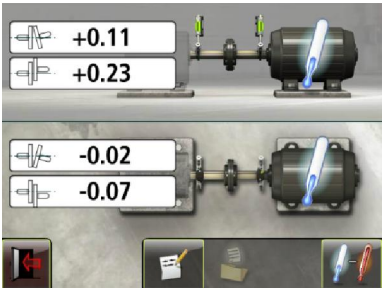
Measurement in hot condition



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

测量结果界面显示热态测量值

Measurement in cold condition



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

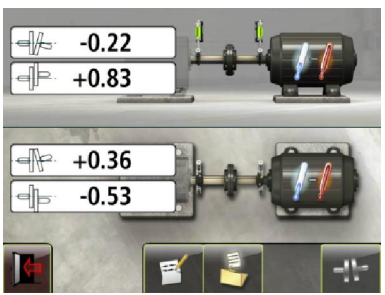
测量结果界面显示冷态测量值

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

当两个结果都选中之后，可进行补偿

Go to target values.

TARGET VALUES 目标补偿值



The Measurement Result screen shows the target values. 测量结果显示补偿值

Document the Target Values 保存

Touch the save icon to save the target values.

Shaft Alignment 转轴对中

Go to shaft alignment by touching this icon.

进入转轴对中

SENSOR DISPLAY 传感器显示

On the Sensor Display, the values from the connected sensor(s) are displayed. It is also possible to zero, record values to file etc. 在传感器显示中，激光器的数值可直接显示出来，可置零，记录。

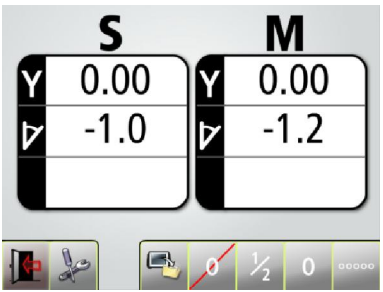
Start the program by touching the Sensor Display icon in the Main Menu.

Go to Settings for selecting settings.

FUNCTIONS 功能

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.

进入传感器显示界面，激光器的读值会显示出来，如无读数会显示“-----”



These are the functions available.功能

Record values to file.

记录数值

Zero the values. 置零

Halve the values (only available when Zero is active). 置 1/2

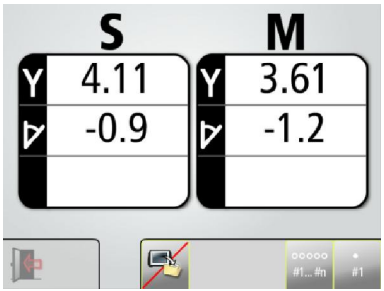
Reset values to raw data (only available when Zero is active). 取消置零

Sample and display a single value. 采样并显示

Return to live values (only available when a value has been sampled). 返回实时值

Record values 记录数值

This function allows you to record values that are sampled from the sensor(s) and store them in a file. 将采样值保存成文件



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

开始连续采样

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

停止连续采样

Record single values.

记录单值

Exit record values and return to live values. 推出记录模式

Recording can be stopped and started several times and all the recorded values will be stored in the same file. 可重复开始与停止记录，所以数值保存在同一文件

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

记录值保存成文本文件，有时间节点。

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

如记录时正单值采样与显示，则只会保存此单值

TEXT EDITOR 文本编辑

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. 进入文本编辑

Touch the text field to write or edit a text.

点击文本编辑区域输入或编辑文字

Save the text. 保存

Erase all the text. 删除

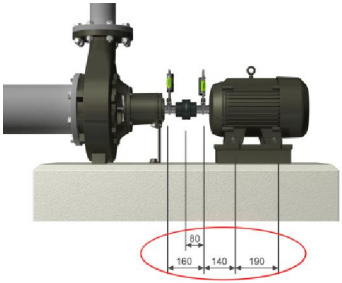
MACHINE DEFINED DATA
自定义设备数据

INTRODUCTION 介绍

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:

如每次激光器都固定在相同位置，则相应的尺寸数据可以预置，测量时直接读取

- The name of the specific machine, 特定机型命名
- 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, 测量所需的各个尺寸
- Target Values as feet values or angle and offset values. 预设的目标补偿值
- Tolerances. 公差



NOTE! 注意

When using Machine Defined Data, the sensors must always be placed according to the preloaded distances to get correct measurement results. 当使用自定义的设备数据时，激光器必须放置在相同的位置以获得正确测量结果

STARTING THE PROGRAM 开始程序

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

USING MACHINE DEFINED DATA 使用自定义数据

A list of machine types with preloaded data is shown.

之前保存的自定义数据列表

Select machine 选择

Machines can be selected by touching its machine name.

This starts Shaft Alignment with machine defined data for the selected machine.

REPEATABILITY TEST
重复性测试

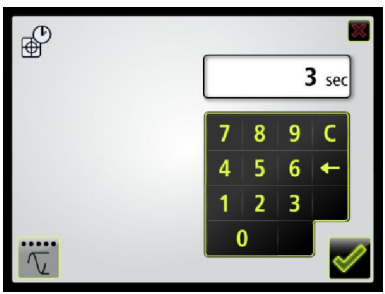
Before starting the measurement it is recommended to perform a repeatability test to set the correct sampling time. With the correct sampling time, it is possible to reduce the influence of external conditions (e.g. air turbulence or vibrations) that otherwise would compromise the accuracy of the measuring result. 测量开始之前，推荐您使用重复性测试结果设置采样时间，以减少外部环境可能带来的影响（如空气湍流与振动），否则有可能带来精度影响

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.

如有一系列的测量点，可选择距离最远的点进行重复性测试。

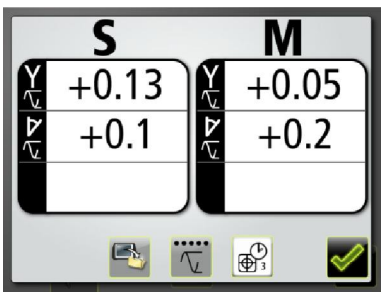
The Repeatability Test function is accessed from the Sampling Time window.

点击此按钮进入重复性测试



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.

重复性测试会在设定的采样时间内读取 5 个数值并显示最高与最低的差值。采样时间越长，此差值越小。



Adjust the sampling time and re-do the repeatability test until a satisfactory result is achieved. 不断调整采样时间并进行重复性测试直到得到满意的结果

Touch confirm and you will return to the sampling time with the latest sampling time tested. 点击确认，返回，此时为最新设置的采样时间

Start Repeatability Test (i.e. take 5 readings and presents repeatability results). 开始重复性测试

Change Sampling Time. 更高采样时间

Record repeatability test results to file.

保存重复性测试结果

Confirm and return to sampling time.

确认并返还采样时间

TOLERANCE TABLE 公差表

INTRODUCTION 介绍

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 NXA 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.

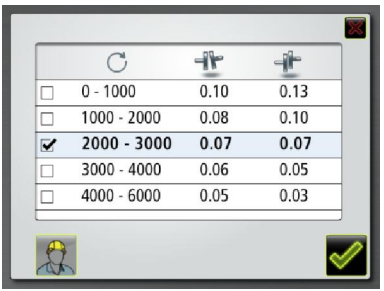
对中的公差取决于轴的转速，结果须达到制造公差内。当没有现成的公差要求时，NXA 提供的公差表可根据转速指导公差设定。

It is also possible to enter customized tolerances.

公差也可自行设定

OPEN THE TOLERANCE TABLE
打开公差表

Open the Tolerance Table by touching this icon in Configuration.



Tolerance Table mm-mode

公差表：毫米模式

Tolerance Table inch-mode

公差表：英寸模式

SELECT TOLERANCE 选择公差

☐ Select the tolerance to use in the alignment by touching its check box to the left.
点此框选定所需公差

Confirm 确认

CUSTOMIZED TOLERANCES

自定义公差

Customized tolerances can be entered in the customized tolerance table.

可在自定义公差输入所需公差

Goes to customized tolerance table. 进入自定义公差表

Enter customized tolerances by touching any of the fields, name/rotation speed to the left and tolerance values to the right.

点击相应的空白区域输入公差，名称等。

Returns to standard tolerance table. 返回标准公差表

MEMORY MANAGER
存储器管理

EXPRESS MANAGER 快捷管理

Express Manager makes it easy to transfer files to a PC.

快捷管理让文件到电脑的传输更加方便

Insert a USB flash drive in the display unit while standing in the Main Menu and the Express Manager appears.

在主菜单界面插入 U 盘，直接进入快捷管理模式

In the Express Manager measurements are sorted by date without folders.

快捷管理模式中测量结果根据日期分类，不包含文件夹

Open file 打开文件

Touch a file to open it.点击文件打开

Select files 选择文件

Touch the check box to the left to select a file. 点左框选择文件

Touch the select all files icon to select all files. 点击多选图标可以选择所有文件

Transfer files to USB flash drive
导出文件到 U 盘

Transfer selected files to USB flash drive.将所选文件导出到 U 盘

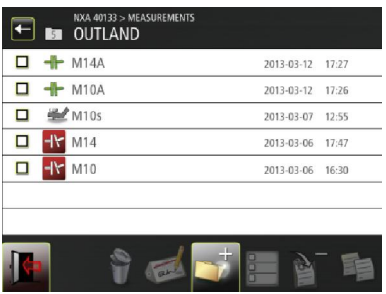
Delete files 删除文件

Delete selected files. 删除所选文件

STANDARD MANAGER 标准管理模式

In the Standard Manager all editing functions are available. 标准管理模式可实现全部功能

Open the Standard Manager from the Main Menu. 从主菜单进入标准管理



Measurements are sorted by date in folders. 测量结果根据日期保存在文件夹

Open file or folder 打开文件或文件夹

Touch a file or folder to open it. 点击文件或文件夹打开

Select files 选择文件

Touch the check box to the left to select a file.点击左框选中文件

Select all files. 多选文件

Deselect all files.取消选定

Cut, Copy and Paste 剪切复制与粘贴

Cut selected items.

剪切选中目标

Copy selected items.

复制所选目标

Paste items that have been cut or copied.

粘贴

New folder 新文件夹

Create a new folder.

创建新文件夹

Change name of file or folder 改名

Change name of selected file or folder.更高文件或文件夹名

Delete 删除

Delete selected items.删除所选目标

Folder up 返回上一级

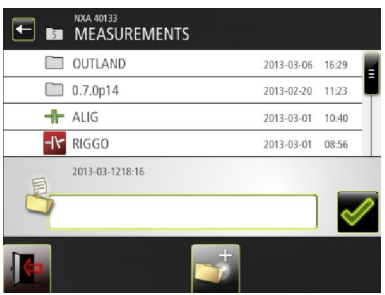
Go up one level in the file structure.返回上一级文件夹

Exit 退出

Exit the Standard Manager.

退出标准存储器管理

SAVE MEASUREMENT 保存结果



Enter file name 命名

Touch the white field to enter a file name.

Confirm 确认

Confirm.

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

保存后，同时生成文本文件与图片

TRANSFER FILES TO A PC 传输文件

Files can be transferred to a PC using a USB flash drive. 通过 U 盘导出到电脑

Express Manager 快捷管理

Express Manager is the easiest way to transfer files to a PC. See “Express Manager”. 参见“快捷管理”

Standard Manager 标准管理

Standard Manager can also be used to transfer files to a PC. 标准管理同样可导出数据至电脑

Insert the USB flash drive in the USB port of the display unit, and the USB flash drive will be available in the Standard Manager. 插入 U 盘，在标准管理界面内可见

Files can be transferred to the USB flash drive with the cut/copy/paste functions in the Standard Manager.

通过复制剪切粘贴功能将测量结果导出至 U 盘

The USB flash drive has to be open when pasting files.

Files in the PC 电脑数据

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.

电脑读取数据时，有两个测量结果文件。一个是 jpeg 图片，一个是 text 文本。图片与显示单元测量时界面一致，文本保存有所有测量数据

SHAFT ALIGNMENT
HORIZONTAL MACHINES 卧式轴对中

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.

屏幕会显示测量结果，尺寸，注释，目标值，文件名，时间，激光序列号，程序及版本。

Add new Machine with Defined Data

Add new Machine with Defined Data.

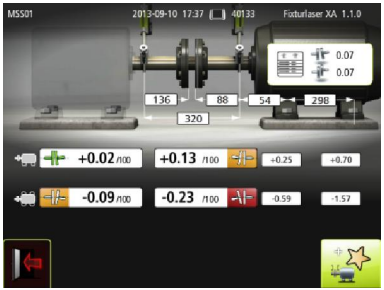
将自定义数据加入列表

Exit

Exit the measurement file.

退出测量结果文件

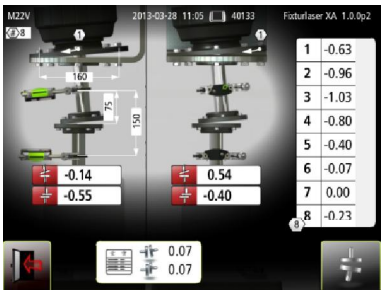
Spacer Shaft 隔离轴



Saved Spacer Shaft measurement.

保存隔离轴对中结果

SHAFT ALIGNMENT VERTICAL MACHINES



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

屏幕会显示测量结果，尺寸，注释，目标值，文件名，时间，激光序列号，程序及版本。

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.

可以在此界面直接继续测量。注释，预设值与尺寸等与激光器位置无关的参数会直接沿用。

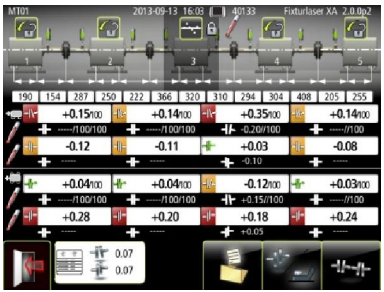
Go to Shaft Alignment 进入轴对中

Go to Shaft Alignment for vertical machines.

Exit 退出

Exit the measurement file.

MACHINE TRAIN ALIGNMENT
机组对中



The screen displays measurement results, dimensions, 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 Machine Train Alignment to continue measuring. Any comment, any target values and dimensions will be uploaded.

屏幕会显示测量结果，尺寸，注释，目标值，文件名，时间，激光序列号，程序及版本。可以在此界面直接继续测量。注释，预设值与尺寸等与激光器位置无关的参数会直接沿用。

Change between viewing the coupling values and the feet values.切换地脚与对中结果

Minimum Moves (a reference based on the Minimum Moves function will be selected).最小化调整量

Select another reference. 选择其他参考

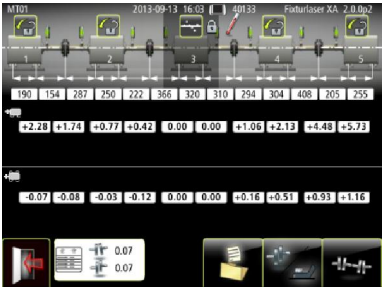
Save changed measurement result. 保存

Go to Machine Train Alignment.

进入机组对中

Exit the measurement file.

退出保存结果界面



Feet value view.

地脚值

SOFTCHECK 软脚测试

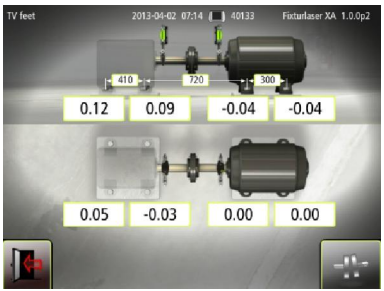
The screen displays measurement results, dimensions, file name, date and time, serial number of the display unit, program and program version.

屏幕会显示测量结果，尺寸，注释，目标值，文件名，时间，激光序列号，程序及版本。

Exit 退出

Exit the measurement file.

TARGET VALUES 目标预设值



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.

屏幕会显示测量结果，尺寸，注释，目标值，文件名，时间，激光序列号，程序及版本。可以在此界面直接继续测量。注释，预设值与尺寸等与激光器位置无关的参数会直接沿用。

Go to Shaft Alignment 进入轴对中

Go to Shaft Alignment for horizontal machines.

Exit 退出

Exit the measurement file.

TEXT EDITOR 文本编辑

The screen displays the saved text.

Touch the text field to write or edit a text.

Save the text.

Erase all the text.

Exit the measurement file.

GLOBAL SETTINGS 全局设定

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

全局设定菜单包含其它应用的设定

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

对大部分设定来说，当前设定值均直接显示

The program version number is also shown on this screen.

程序版本号同时显示

Date and time 日期与时间

Opens window for date and time settings. 打开窗口进行日期时间设定

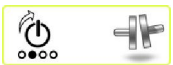
Measurement unit 测量单位

Changes between mm mode and inch mode. 选择毫米或英寸

Bluetooth settings 蓝牙设定

Opens window for bluetooth settings.

Auto-start 自动开始程序



Opens window for selecting automatic start of application program.

Battery status 电池状态

Opens window for battery status information.

Backlight 背光亮度

Adjusts the backlight.

Service settings 服务模式设定

Opens service settings. Requires access code.

服务模式设定需要密码

BLUETOOTH SETTINGS 蓝牙设定

Communication mode 通讯模式

Activate Bluetooth 蓝牙

Deactivate Bluetooth and activate cable communication. 取消蓝牙，改用电缆模式

Pairing Bluetooth units 蓝牙单元匹配

Touch the search icon to search for units that are pair able. 点击搜索按钮寻找可匹配蓝牙装置

Search for Bluetooth units.

Pair able units will appear in the search list to the left. 可匹配装置会显示在列表左侧

The wireless units must be switched on for the display unit to discover them. The display unit will only discover units approved by Fixturlaser.

蓝牙单元必须开启，主机只会发现 Fixturlaser 提供的蓝牙装置

Touch the units to pair in the search list. (Maximum two units.) 点击蓝牙单元完成匹配（最多两个）

Paired units will be moved to the pair list to the right.

完成匹配的激光单元会进入右侧列表

Units that are paired to the display unit are marked with a blue B to the left of them. The display unit will only communicate with units that are paired and displayed in the list. 匹配好的蓝牙单元会用蓝色 B 符号标识，主机只会与匹配好的单元进行通信。

If there are units paired to the display unit, they have to be unpaired before it is

possible to pair new units. 如蓝牙单元已经与某主机匹配，则匹配新蓝牙之前需要将老的匹配取消

Unpairing Bluetooth units 取消匹配

☐ Touch the check box to select a unit. 点击左框选择蓝牙单元

Touch the delete icon to unpair selected units.

点击删除图标取消匹配

DISPLAY UNIT NXA D 显示单元

1. 6.5” Touch screen 触摸屏
2. On button with status LED 指示灯
   a. Continuously green – ON 持续绿色—开启
3. Battery Status button – press to instantly show the battery status when the unit is switched off.

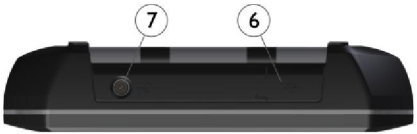
   电池状态按钮--长按显示电池电量，即使显示单元处于关闭状态
4. Display Unit battery status 电池状态显示
   a. Continuously green – battery capacity 持续绿色-电量多少
   b. Rolling green – charging 滚动绿色-充电中

c. First LED flashing red - <10% capacity 第一个 LED 红灯闪—小于 10%电量

5. Measurement Unit battery status* 测量单元电池状态

*) Will only work when the Display Unit is turned on and communicating with measurement units. If more than one measurement unit is used the LEDs will show the battery status of the measurement unit with the least charge.

只有在显示单元开启并且与激光单元通信正常情况下才能显示，如同时连接两个激光单元，则显示电量少的一个。



6. USB master (IP 67) USB 接口（IP67）

7. External power (IP 67) 外部电源接口（IP67）

OPERATING MODES 操作模式

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

显示单元有两种工作模式：开启与关闭

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

关闭显示单元或进入休眠模式，从主菜单点击关闭图标

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.

如图标没有反应，也可以长按电源键 15 秒关闭显示单元

CONNECTIONS 连接

The main connection for the Display Unit is the built in Bluetooth connection. See chapter “Global settings” for instructions on how to pair measurement units.

显示单元的主要通信连接通过蓝牙，参见“全局设定”匹配蓝牙单元

In areas with restrictions on using wireless technology it is possible to use a custom cable available from Fixturlaser together with the USB master connection. Contact your local sales representative for more information.

在蓝牙受限区域，也可以使用 USB 电缆连接，请联络当地经销商。

NOTE! 注意

Standard USB cables cannot be used to communicate with Fixturlaser measurement units.

标准 USB 电缆无法在 Fixturlaser 测量单元使用

See chapter “Global settings” for instructions on how to enable cabled operation. 参见“全局设定”如何使用电缆连接

The USB master can be used with USB flash drives to transfer files to a PC for storage.

可以使用 USB 电缆传输存储文件

POWER SUPPLY 电源

Fixturlaser NXA is powered by a high-capacity rechargeable Li-Ion pack in the display unit, or by the external power unit.

Fixturlaser NXA 使用高性能可充电锂电池，或连接外部电源

The operating time of the batteries is approximately 8-10 hours when the system is used for a typical alignment work (continually on with 50% backlight).

电池可以持续工作 8-10 小时（屏幕背光 50%）

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

可适当调节屏幕背光以延长使用时间

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.

显示单元因电量过低关闭时，恢复功能会保存当前数据，重新充电或连接外部电源，开启之后可选择是否回复到之前测量或重新进入主菜单。

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

外部电源工作电压 110-240 伏

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 5-6 hours for fully drained batteries. The charging time will be longer if the unit is turned on while being charged.

连接外部电源时，系统自动充电，电池 LED 指示灯会显示电池状态。完全充满需要大约 5-6 小时。如充电时显示单元处于开启状态，充满时间会延长。

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 re-placement.

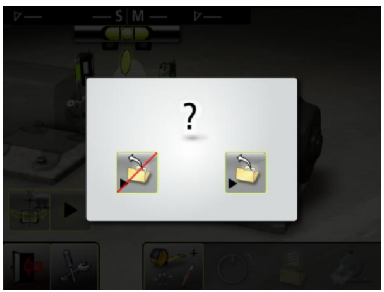
典型的使用状况下电池可使用 2-3 年，如需更换电池请联络当地经销商。

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.

电池包含安全电路，请勿使用非 Fixturlaser 提供的电池。不当的电池更换可能导致人身伤害。

RESUME FUNCTION 恢复功能

If the system is turned off due to low power, the resume function will save the data. 如因电量过低关机，系统会自动保存当前数据。



When the system is turned on again after charging the batteries, 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.

充电后系统重新开启，可以选择继续刚才的测量或重新进入主菜单（恢复测量的数据已保存）。

CALIBRATING THE TOUCH SCREEN 屏幕校准

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. 为保持触摸屏的准确性，需要经常校准屏幕

Screen calibration procedure:

校准步骤如下：

- Start the system.开启系统
- Wait until the main menu appears. 直到主菜单显示
- Press down on the screen somewhere outside of the icons for 10 seconds. 在空白区域长按屏幕 10 秒
- The screen calibration function should start. 屏幕校准程序启动
- Touch and hold down on the target displayed until it moves. 点击目标位置直到下一个点
- Repeat the step above on the 4 new positions of the target.重复 4 个位置
- 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.) 目标点消失后，点击空白处保存设定（如 30 秒内未确认，屏幕校准程序再次启动）。

NOTE! 注意

For best results please use a stylus for calibration.

为获得最佳的校准效果，请使用尖利物

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

如您选择启动后自动进入测量程序，校准功能无法使用。需要取消此功能后重新启动。

SENSORS M3 AND S3

激光器 M3 与 S3

1. ON/OFF button with status indication LED 电源键与状态指示灯

   a. Continuously green – On

      长绿—开启

   b. Switching green/red – Gyro activated.

      红绿切换—陀螺仪激活

2. Mini USB for charging

   Mini USB 充电接口

3. Laser transmission indication LED

   激光传输指示灯

   a. Green – laser transmission

      绿色—激光发射中

4. Bluetooth indication LED 蓝牙指示灯

   a. Continuously blue – paired and ready. 长蓝—匹配就绪

   b. Flashing blue – searching/ready to pair

      蓝闪—搜索与匹配中

   c. No light – Bluetooth disabled.

      无灯—蓝牙关闭

5. Battery status button – press to instantly show the battery status (also works when the unit is switched off). 电池状态按钮—显示当前电量（即使激光单元处于关闭状态）

6. Battery status LED 电池状态 LED

   a. One LED continuously red – less 10% charge left. 一个红灯持续亮—剩余 10%电量

   b. One LED flashing red – less than 5% charge left. 一个灯闪烁—少于 5%电量

c. One LED continuously orange – charging
一个橙灯长亮—充电中

d. One LED continuously green – fully charged.
一个绿灯持续亮—充满

7. Battery status LED when battery button is pressed 当电池状态按钮按下时

a. Continuously green – battery status 绿灯长亮—电池电量

b. Rolling green – battery charging 滚动绿色—充电中

OPERATING MODES 工作模式

M3 and S3 units has two operating modes: On and Off. 开启与关闭

Turn the units on and off by pressing the ON/OFF button firmly. 按开关键开启与关闭

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.

如正常关闭没有反应，长按 10 秒可以关闭

CONNECTIONS 连接

Bluetooth connection 蓝牙连接

The main connection for M3 and S3 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.

激光单元的主要通信通过蓝牙，参见“全局设定”匹配蓝牙单元

Cabled operation and enabling/disabling the Bluetooth transmission 电缆操作与开启/关闭蓝牙

In areas with restrictions on using wireless technology it is possible to use a custom cable available from Fixturlaser together with the mini USB connector. Contact your local sales representative for more information.

在蓝牙受限区域，也可以使用 USB 电缆连接，请联络当地经销商。

NOTE!

Standard USB cables cannot be used to communicate with Fixturlaser measurement units.

标准 USB 电缆无法在 Fixturlaser 测量单元使用

See chapter “Global settings” for instructions on how to enable cabled operation in the DU.

参见“全局设定”如何使用电缆连接

To avoid accidental Bluetooth transmission in a restricted area the

Bluetooth function can be completely disabled – contact your local sales representative for more information.

为避免在受限区域使用蓝牙传输，蓝牙功能应完全关闭，请联络当地经销商

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. 如蓝牙未激活（蓝牙指示灯无任何闪烁），快速按电池状态按钮 5 次可激活蓝牙。

POWER SUPPLY 电源

The M3 and S3 units are powered by a high-capacity rechargeable Li-Ion cell, or by the external power unit.

M3,S3 激光单元使用高性能可充电锂电池，或连接外部电源

The operating time of the batteries is approximately 17 hours when the system

is used for a typical alignment work (continuously on).

电池可连续使用 17 小时

The M3 and S3 units can be charged with the supplied combined charger or any 5V USB charger or battery life extender. 可使用组合的充电器通过 5V USB 接口充电

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.

当外部电源连接后，激光单元自动开始充电。电量指示灯第一个会变成橙色。完全充满后会变成绿色。按下电量状态按钮可监控电池状况。

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.

完全充满需要 8 个小时，如激光单元开启，充满时间更长。

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 re-placement.

典型的使用状况下电池可使用 2-3 年，如需更换电池请联络当地经销商。

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

电池包含安全电路，请勿使用非

Fixturlaser 提供的电池。不当的电池更换

可能导致人身伤害。