FIXTUR LASER

FIXTURLASER®
Alignment System

USER'S MANUAL

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VibrAlign

INTRODUCTION

Congratulations to your choice of a Fixturlaser® Alignment system. We hope that this system will fulfill all your expectations, and we know by experience that most users find new areas where this system is of great value.

The manual describes the content of all Fixturlaser® Alignment systems. Overviews at page 1.2 - 1.4 show all applications, functions and main equipment that can be included in your system.

The purpose of this manual is to guide you through the different procedures. Since several of the applications is capable of measuring on a lot of different machines in different industries, we have chosen to describe the principles and how to handle the system components in this manual. We ask you to read the section about safety and care before you proceed with your first measurement.

We wish you many successful measurements.

OVERVIEW OF APPLICATIONS

This is an overview of all the applications in the Fixturlaser® Alignment Systems. Which ones that are included depend on which configuration you have selected?

- ☐  Shaft Alignment Horizontal Machines
- ☐  Shaft Alignment with OL2R
- ☐  Shaft Alignment Vertical Machines
- ☐  Shaft Alignment Cardan Shafts
- ☐  Machine Train Alignment
- ☐  Basic Straightness Measurement (1-axis, 16 points)
- ☐  Advanced Straightness measurement (2-axes, 99 points)
  - ☐  Standard Straightness
  - ☐   Rotational center as reference
  - ☐   Center of bore as reference
  - ☐  Multipoint
  - ☐  Center of tube as reference
  - ☐  Arc Angle
- ☐  Flatness measurement

- ☐  Rectangular plane
- ☐  Circular plane
- ☐  Roll Parallelism
- ☐  Receiver Display
- ☐  Real Time Data Transfer
- ☐  Memory Manager
- ☐  System Set-up

OVERVIEW OF FUNCTIONS

This is an overview of all the functions in the Fixturlaser® Alignment Systems. Which ones that are included depend on which configuration you have selected.

- ☐  Best Displayed Resolution
- ☐  Repeatability Test
- ☐  Softcheck™
- ☐  Thermal Offset
- ☐  Static Feet
- ☐  Tolerance Table
- ☐  Tripoint™
- ☐  Export Function

OVERVIEW OF EQUIPMENT

This is an overview of all the main equipment in the Fixturlaser® Alignment Systems. Which parts that are included depend on which configuration you have selected.

- ☐  Display Unit DU30
- ☐  System Printer
- ☐  Laser Transmitter/Detector TD-M 10
- ☐  Laser Transmitter/Detector TD-S 10
- ☐  Laser Transmitter/Detector TD-M 100
- ☐  Laser Transmitter/Detector TD-S 100
- ☐  Laser Transmitter T110
- ☐  Laser Transmitter T111
- ☐  Laser Transmitter T210
- ☐  Laser Transmitter T220
- ☐  Laser Transmitter T310
- ☐  Receiver R210
- ☐  Receiver R221
- ☐  Receiver R310
- ☐  Angular Prism AP200
- ☐  Positioning Detector FD15
- ☐  Cardan Fixture
- ☐  Delta Fixture™
- ☐  Extruder Fixture

SAFETY AND CARE

POWER SUPPLY

Fixturlaser Alignment Systems are powered by four alkaline batteries, size LR 20, in the display unit or by the optional external power unit. The lifetime of the batteries is approximately 24 hours when the system is used for a typical alignment job. The power indicator in the main menu displays the power from the batteries. When the power is low a battery replacement warning appears on the screen.

The batteries are replaced by opening the caps revealing the battery tubes. There are two batteries in each compartment. The batteries should be positioned with the plus pole pointing inwards the display unit and the minus pole pointing towards the caps. You can use rechargeable NiCd-batteries but you should expect shorter operating time than with alkaline batteries. If the system turns off due to low power, the system returns, after battery replacement or connection of external power, to the application where it was when it turned off. No information is lost!

If the system is to be stored for a longer period of time the batteries should be removed to prevent damage.

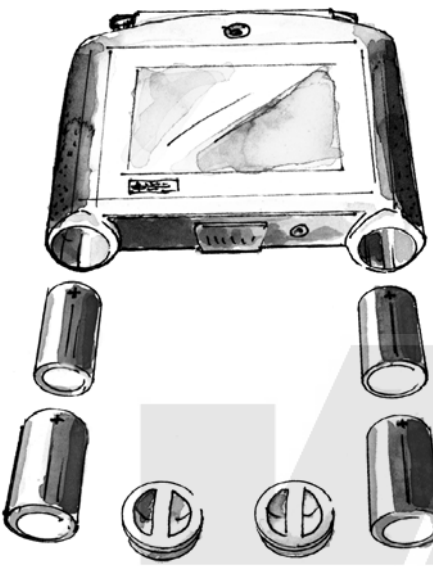
The external power unit is connected to the terminal next to the serial port on the display unit and to a wall socket with 110 - 240 Volts.

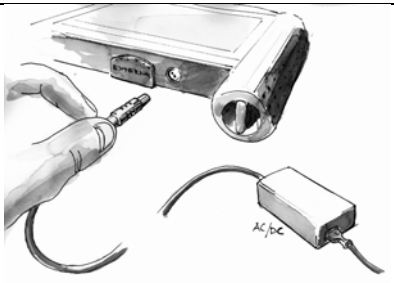
SAFETY

Fixturlaser Alignment Systems use laser diodes with a power output of < 1,0 mW. The laser classification is Class 2 which is considered safe for its intended use with only minor precautions required. These are:

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

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

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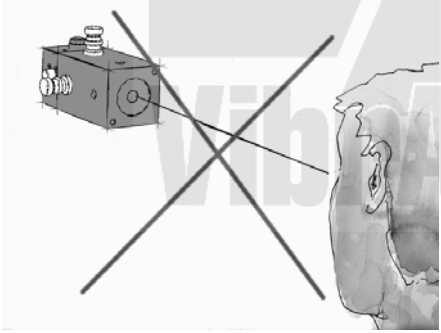
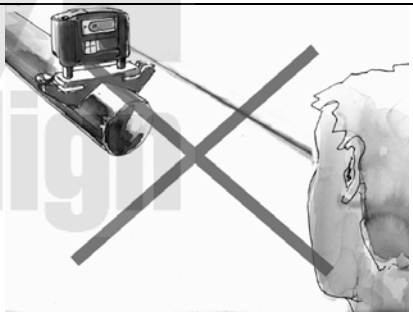




TREATMENT AND CARE

The Fixturlaser Alignment System has been developed for industrial use and is sealed against water and dust in accordance with IP65. The system should be cleaned with a cotton cloth or a cotton bud tipped swab moistened with a mild soap solution with exception for the detector surface, which should be cleaned with alcohol.

Do not use paper tissue, which can scratch the detector surface. For the best possible function, the laser diode apertures, detector surfaces and connector terminals should be kept free of grease or dirt. The display unit should be kept clean and the screen surface protected from scratches.

THE TOUCH SCREEN INTERFACE

A touch screen is, as it says, touch sensitive. A light touch of your fingertip on the displayed icon activates the icon's function. We have found that a clean display with just the necessary information, and with symbols instead of text, makes it much easier to understand, and reduces the input errors from the user to a minimum. The user interface is based upon icons and fill-in boxes. Touching a fill-in box activates a numerical or an alphanumerical keyboard depending on the program you are in. Active, or touchable icons and fill-in boxes, have a grey background.

To get the best visibility it has been necessary to use glass in the touch screen. It is therefore important that you just touch the screen with a light touch of your fingertip or a pointed (but not sharp) object.

CALIBRATING THE TOUCH SCREEN

To get the touch screen to respond correctly to the icons on the display it might be necessary to recalibrate it from time to time.

Screen calibrating procedure:

1. Stand in the Main Menu and look at the screen from your normal viewing angle.
2. Press the start button while pressing somewhere on the screen where there are no icons (for example in the upper right corner) and hold down for about 15 seconds, until the message “Release start button and keyboard to start” appears on the screen.
   When you release the start button and the touch screen you will see a mark in the upper left corner of the screen and the following message on the screen: “Touch keyboard panel at mark”.
3. Touch the mark (+). Use a pointed (but not sharp) object to touch at the center of this mark.
4. Press the start button to continue.
5. Repeat the procedure, step 3 and 4, for the mark in upper right corner, the mark in the center of the screen, the mark in the lower left corner and finally the mark in the lower right corner.
   The message: “Calibration ready. Push start button” will now be displayed.
6. Press the start button to complete the procedure.
7. Note: Do not use any sharp objects when pressing on the screen.

THE PROGRAMS (MAIN MENU)

A Fixturlaser® Alignment System is provided with different programs for specific purposes. The programs included depend on which configuration you have selected.

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


Shaft Alignment Horizontal Machines


Shaft Alignment with OL2R


Shaft Alignment Vertical Machines


Shaft Alignment Cardan Shafts


Machine Train Alignment


Basic Straightness Measurement (1-axis, 16 points)


Advanced Straightness Measurement (2-axes, 99 points)


Flatness measurement

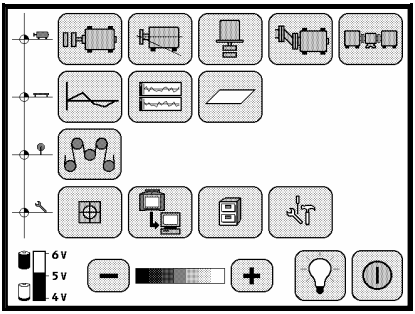

Roll Parallelism


Receiver Display


Real Time Data Transfer


Memory Manager


System Set-up



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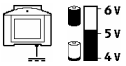
Main Menu – example

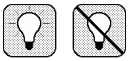


Battery indicator

Showing the voltage level of the batteries or a symbol for external power when this is in use.

Contrast

Touching respectively on each side of the symbol increases and decreases the screen contrast.



Backlight On/Off

The backlight will be on for 5 minutes after last use. (When using external power the backlight is not turned off automatically.)

System Off

Turns off the system.

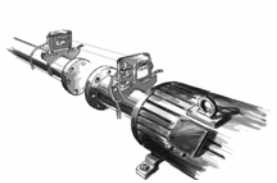
SHAFT ALIGNMENT HORIZONTAL MACHINES

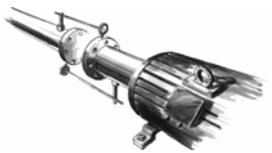
INTRODUCTION

Shaft alignment: Correction of the relative position of two machines that are connected, such as a motor and a pump, so that the centre lines of the shafts form a straight line when the machines are working at normal operating temperature. Shaft alignment means moving the front and the rear pair of feet of one machine, vertically and horizontally, until the shafts are aligned to within given tolerances. A tolerance table is available in the system.

The measurement method is based upon the principle of a reverse indicator alignment system. Instead of steel bars with dials it uses two laser beams. Unlike steel bars the laser beams do not have the disadvantage of sagging and this contributes to the system's high degree of accuracy.

The Fixturlaser System also has two measurement units but in this case these are electronic targets rather than mechanical dial indicators. These are built in together with the laser transmitter in a pair of units, the Transmitter/Detector units (TD-units). With standard dial measurement techniques the results need to be graphed out manually and calculations are needed to establish the corrections required. With the Fixturlaser System all this is done automatically. Real time alignment values are displayed as the machine is moved. You can see the effect of tightening a bolt as soon as it happens.





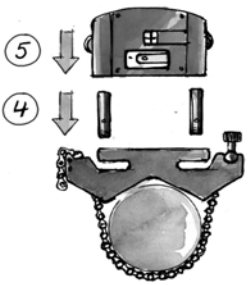
MOUNTING

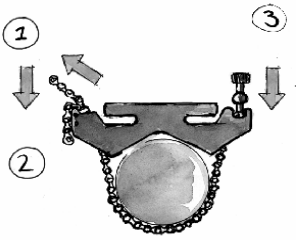
Attach the V-block fixtures on the shafts of the measurement object, one on each side of the coupling. Tighten the tension screws firmly, always using the supplied tool. Do not over-tighten. Mount the rods to the fixture and tighten firmly. Attach the TD-units on the fixtures. The TD-M should be mounted on the moveable machine and the TD-S on the stationary machine. If the shaft diameter is too large the chains can be extended with the optional extension chains.

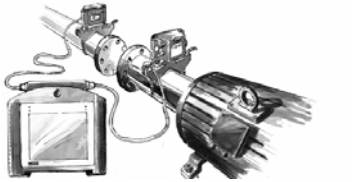
Connect the cables between the display unit and the TD-units. There are two ways you can do this:

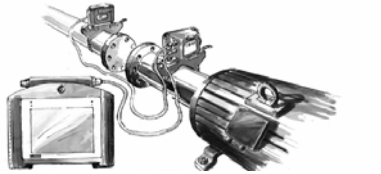
1. Connect one cable between the display unit and one of the TD units. Then connect the second cable between the TD-units.
2. Connect one cable from one of the terminals on the display unit to one of the terminals on TD-M. Then connect the second cable from the other terminal on the display unit to one of the terminals on TD-S.

You can use any of two terminals on each unit. If, for any reason, you detach a cable during measurement you will need to return to the main menu and then restart the measurement program.



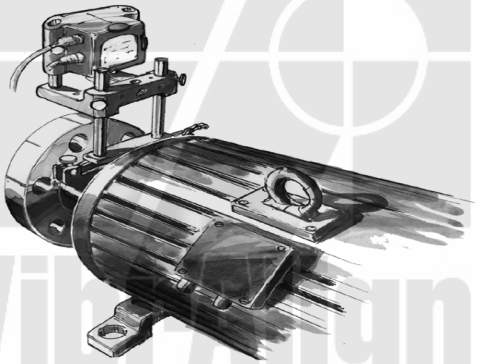






Extension Fixtures (optional in some systems)

The extension fixtures are used together with either the V-block fixtures or the magnet bases. If the space between the machine casing and the coupling/shaft end is too short for a standard set-up this fixture solves the problem



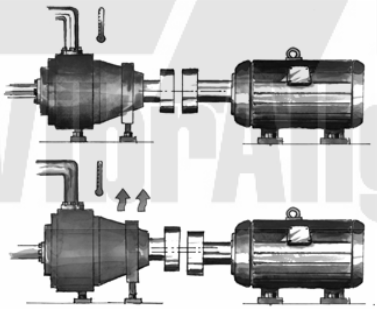
PRE-ALIGNMENT FUNCTIONS

In the efforts to obtain the best possible conditions for a shaft alignment it is necessary to check whether the shafts are bent, the machine base is warped or if there is a soft foot condition. Alignment of machines exposed to pipe strain or thermal growth is easily performed with the Thermal Offset function.

The Basic Straightness program is primarily designed for measurement of shaft and base straightness. See the chapter Basic Straightness measurement.

The Softcheck function makes it possible to check softfoot condition. See the chapter Softcheck.

The Thermal Offset function provides the possibility to pre-set known compensation values for thermal growth. Values required are normally to find in the machine specifications. Accepted values are feet values, clock values and parallel offset/angular error. See the chapter Thermal Offset.



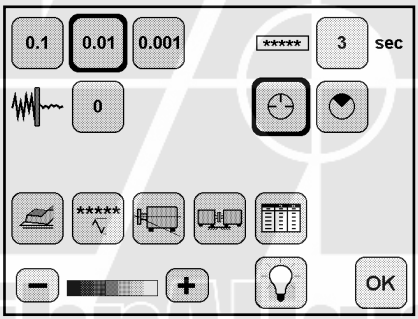
START THE PROGRAM

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

Go to the Application Set-up for selecting measurement method and other settings.

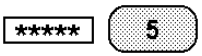
APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.



Displayed measurement value resolution

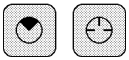
0.1, 0.01 and 0.001 mm / 1, 0.1, 0.01 mils (0.01 mils angle only).



npling time

npling time from 1-99 seconds.

Screen filter
From 0 to 10, where 0 is filter off and 10 is max filter. This slows down the update frequency of the screen values without reducing the accuracy.



Measurement method
The Clock method or the Tripoint™ method.

Softcheck
Starts the sub-function for checking of soft foot conditions.

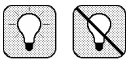
Repeatability Test
Starts the sub-function for repeatability test.

Thermal offset
Input mode for compensation values.

Static feet selection
Recalculates the measurement values according to static feet choice.

Tolerance table
Displays a table with most often used tolerances. Metric or Imperial display depending on settings for displayed units.

Contrast
Touching respectively on each side of the symbol increases and decreases the screen contrast.



Backlight
Turns on and off the screen backlight.

Confirmation
Confirms made selections and returns to the application program.

MEASUREMENT METHODS

In the Horizontal Shaft Alignment program there are two different ways to measure, the Clock method or the Tripoint™ method. Select measurement method in the Application Set-up.

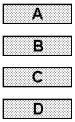
- In the Clock method, machinery positions are calculated with 180 degrees of rotation and the data is always "live". The Clock method is useful when a full 180 degrees swing can be obtained and when machines are easy to turn.
- In the Tripoint™ method, machinery positions can be calculated with as little as 60 degrees of rotation. The data is not always "live". The Tripoint™ method is useful in limited rotation situations or when machines are hard to turn in both directions.

THE CLOCK METHOD

Select the Clock method in the Application Set-up.

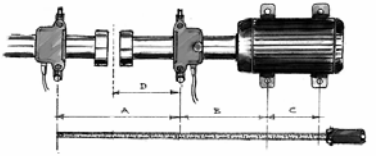
Measurement Procedure

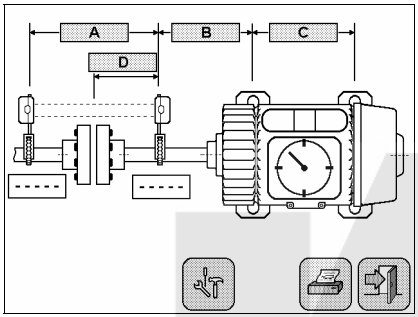
1. The screen shows the movable machine. The grey areas are data entry fields. Measure the distance A. Touch the A field and enter the value. Confirm with OK. Continue with the B and C dimension. The D dimension is set by default to half the A measure, but can be changed by touching the D field and entering the correct value.



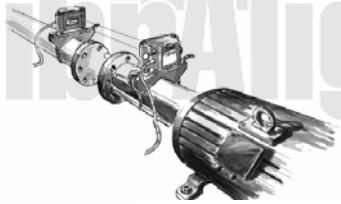
Note: The A dimension is measured from centre to centre of the rods. The B dimension is measured from rod centre to first bolt centre and the C dimension is measured between the bolt centers.

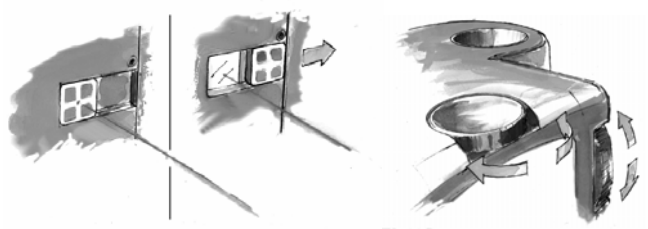
2. Stand by the machine to be adjusted facing the stationary machine.



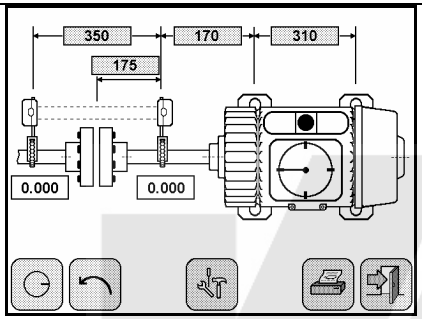


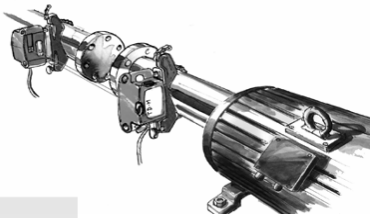
3. Rotate the shafts to the 12 o'clock position, using the inclinometer display with the graphic spirit level. The led on the TD-M unit turns from flashing green to alternate red and green when within ±3° of correct position. The targets should be slid over the detectors. Adjust the lasers to the centre of both targets using the blue adjustment screws.



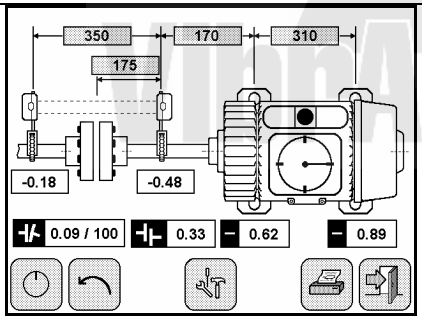


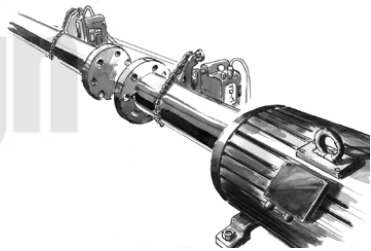
4. By using the inclinometer display, rotate the TD-units to the 9 o'clock position. Slide open the targets, wait until the TD-values appear, and touch the 9 o'clock icon.



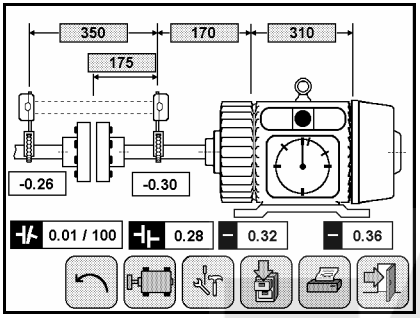


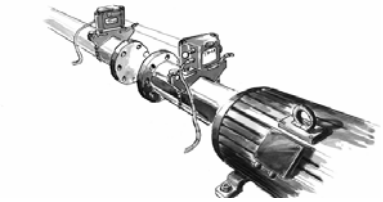
5. Using the inclinometer display, rotate the shafts to the 3 o'clock position and touch the 3 o'clock icon. The screen now displays the current horizontal position of the machine.





6. Rotate the shafts to the 12 o'clock position and touch the 12 o'clock icon. The screen now displays the current vertical position.





Re-measuring of all positions.

Show horizontal view.

Show vertical view.

Open Application Set-up.

Save the measurement. See Memory Manager.

Print a screen dump.

Exit from the program.

Evaluating Vertical Misalignment

The angle and offset values are used to determine the alignment quality. These values are compared to alignment tolerances to determine whether correction is necessary.

 Positive Angle value
 Negative Angle value
 Positive Offset value
 Negative Offset value

The foot values give the movable machine's position at the feet where corrections are made.

+ Positive values mean that the machine is high and shims must be removed.

– Negative values mean that the machine is low and shims must be added.

Evaluating Horizontal Misalignment

The angle and offset values are used to determine the alignment quality. These values are compared to alignment tolerances to determine whether correction is necessary.

 Positive Angle value
 Negative Angle value
 Positive Offset value
 Negative Offset value

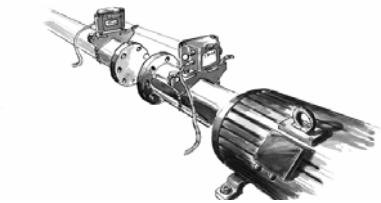
The foot values give the movable machine's position at the feet where corrections are made.

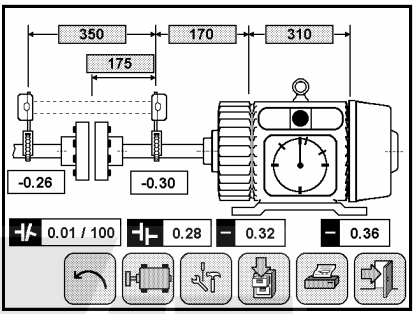
+ Positive values mean that the machine is away from you and must be moved towards you.

– Negative values mean that the machine is towards you and must be pushed away from you.

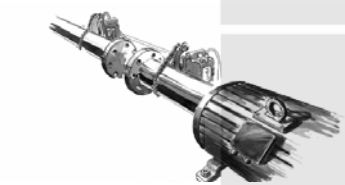
Alignment (Clock method)

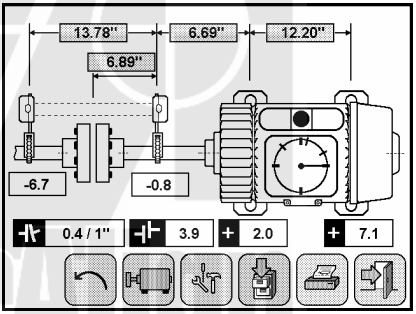
Adjust the machine vertically until the values for both parallel and angular alignment are within tolerances required.





Rotate the shafts to the 3 o'clock position, touch the change view icon and adjust the machine horizontally until the required alignment is achieved.





Rotate the shafts back to the 12 o'clock position, touch the change view icon and check that the machine lies within the required tolerances.

Alignment is now completed. To confirm the result, redo the measurement.

TRIPOINT METHOD

When shafts have a limited rotation or can only be rotated in one direction.

Select the Tripoint™ method in the Application Set-up.

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

TIP: The larger 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°.

Measurement Procedure

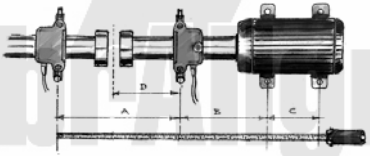
The screen displays the movable machine. Enter dimensions as for the Clock method. Set the TD units so that they are approximately parallel.

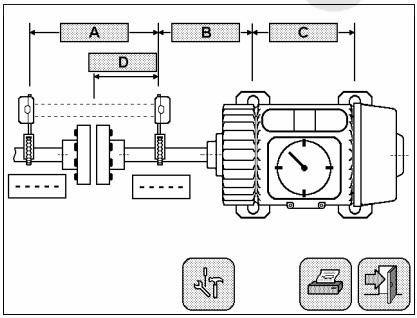
A

B

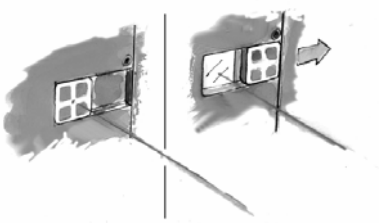
C

D

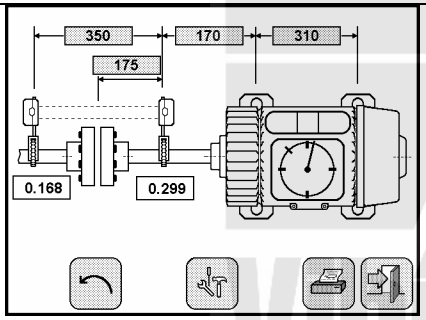


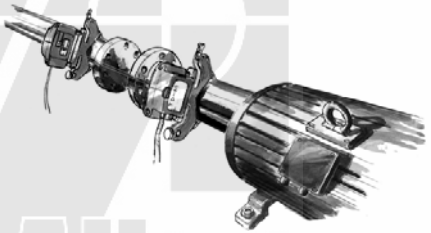


Adjust the lasers to the centre of the targets using the blue adjustment screws.

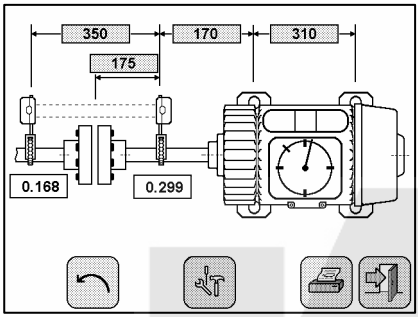


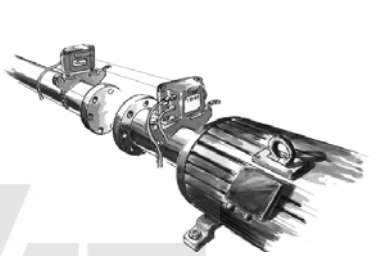
Touch the register icon. This registers the first reading.



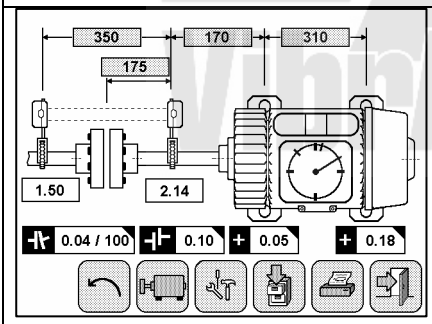


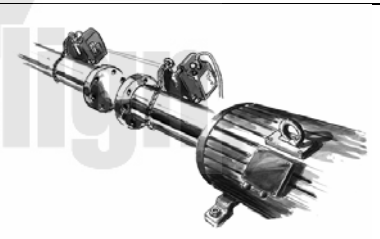
Rotate the shafts to the next desired position. The shafts have to be rotated over a minimum of 30°. The Register icon is not shown if the rotation is less than 30°. Touch the register icon to register the reading.

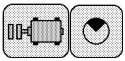




Rotate the shafts to the third position and touch the register icon to register the reading.







If the shafts are rotated to a position where the TD-units are NOT positioned in the 12/6 o'clock or 9/3 o'clock position, the values are displayed with a black mark in the top right corner of the value box and are not real time values. You can toggle between horizontal and vertical position values by using the change view icons.

Re-measuring of all positions.

Show horizontal view.

Show vertical view.

Open Application Set-up.

Save the measurement. See Memory Manager.

Print a screen dump.

Exit from the program.

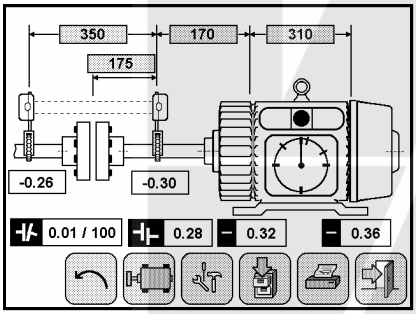
Evaluating Misalignment

See the Clock Method.

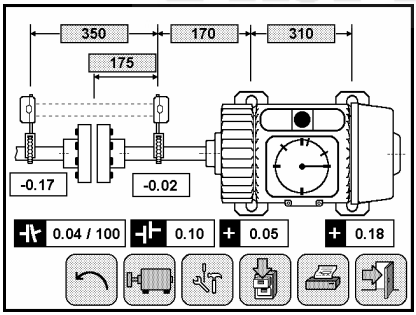
Alignment (Tripoint™)

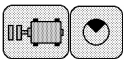
Real time adjustment is only available at 12 and 6 o'clock position for vertical adjustment and 3 and 9 o'clock position for horizontal adjustment. The inclinometer senses which position it is at and automatically updates the readings as the machine is moved. The shaft must be within ±3° from 12/6/9/3 o'clock positions before real time values are available. This is indicated by the led on the TD-M changing from flashing green to alternate red and green light.

Rotate the shafts to the 12 or 6 o'clock position. Adjust the machine vertically until the values for both parallel and angular alignment are within tolerances required.



Rotate the shafts to the 3 or 9 o'clock position, touch the change view icon and adjust the machine horizontally until the required alignment is achieved.





Rotate the shafts back to the 12 or 6 o'clock position, touch the change view icon and check that the machine lies within the required tolerances.

Alignment is now completed. To confirm the result, redo the measurement.

If shaft rotation is not possible the vertical and horizontal views, without real time values, can be used to obtain corrective moves but after a movement is carried out the three point measuring sequence must be repeated. This can be done at any time using the re-measure icon.

DOCUMENTATION

There are three possibilities to document the measurement.

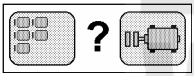
Save the measurement in the system memory. When a measurement is saved in Shaft Alignment for Horizontal Machines it is the measurement result that is stored and not the displayed measurement after performed adjustments. To store this, redo the measurement and then store it.

Print the result.

Export saved measurements to a computer.

RESUME FUNCTION

The Shaft Alignment program for Horizontal Machines is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the Horizontal Shaft Alignment icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

VibrAlign

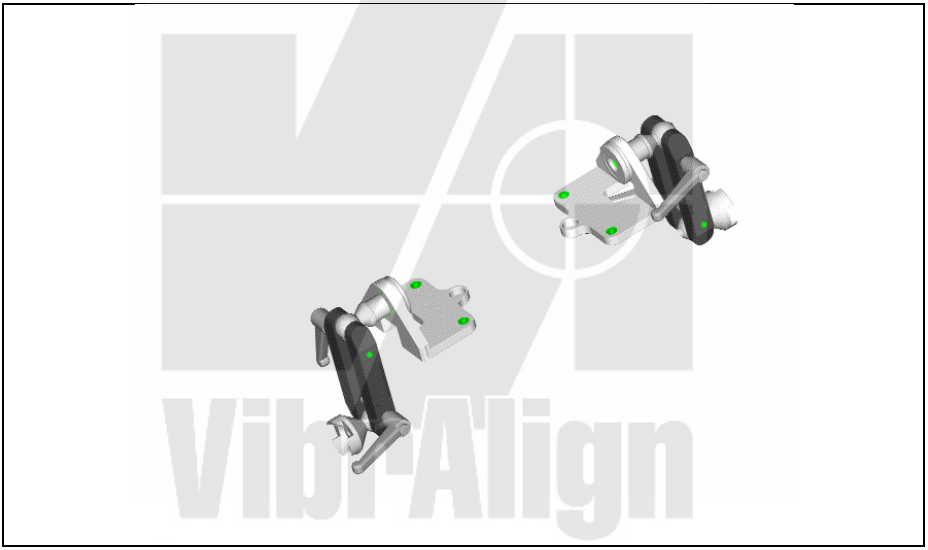
SHAFT ALIGNMENT WITH OL2R

INTRODUCTION

Illustration 1The OL2R fixtures

With the Shaft Alignment with OL2R program it is possible to measure thermal growth and compensate for this in the shaft alignment.

See also Shaft Alignment Horizontal Machines.



START THE PROGRAM

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

Go to the Application Set-up for settings.

APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

Displayed measurement value resolution

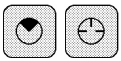
0.1, 0.01 and 0.001 mm / 1, 0.1 and 0.01 mils (0.01 mils angle only).

Sampling time

Sampling time from 1-99 seconds.

Screen filter

From 0 to 10, where 0 is filter off and 10 is max filter. This slows down the update frequency of the screen values without reducing the accuracy.



Measurement method

The Clock method or the Tripoint™ method.

Softcheck

Starts the sub-function for checking of soft foot conditions.

Repeatability Test

Starts the sub-function for repeatability test.

Thermal offset

Input mode for compensation values.

Static feet selection

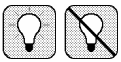
Recalculates the measurement values according to static feet choice.

Tolerance table

Displays a table with most often used tolerances. Metric or Imperial display depending on settings for displayed units.

Contrast

Touching respectively on each side of the symbol increases and decreases the screen contrast.



Backlight

Turns on and off the screen backlight.

Confirmation

Confirms made selections and returns to the application program.

MOUNTING & POSITIONING

Draft Procedure for Mounting OL2R Fixtures on a Horizontal Shaft Machine.

Choose a location on the main body of the machine (bearing housings or adjacent casing) where the fixtures can maintain a clear line-of-sight and the TD-units can be rotated 9, 3 and 12 o'clock without the cable/s binding on adjacent structures. The brackets should ideally be arranged as a mirror image of the machine.

Obtain proper permission to drill and tap a 6M thread (or 1/4" UNC) x 15 mm deep for each tooling ball on a flat surface, or glue a Fixturlaser OL2R adapter on to the machine housing when it is not possible to drill. Fix the tooling ball ensuring that the bolt is as tight as possible using an allen key.

The following procedure should be followed to 'cone-in' each TD in turn to the fixture target on the opposite end.

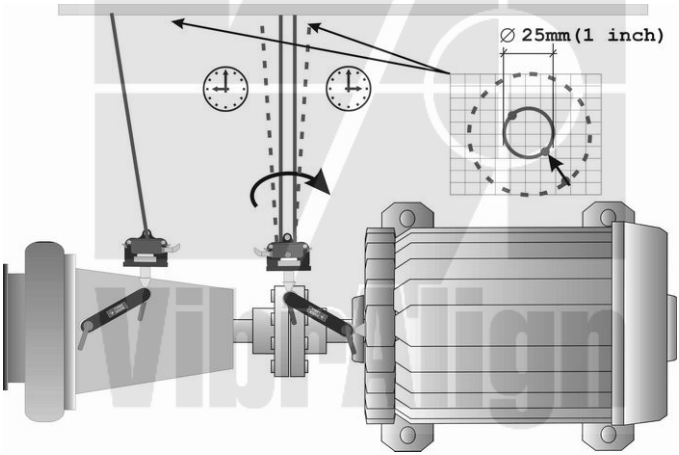
Mount the TD-S on what is determined as the Stationary side fixture. Rotate it to 9 o'clock using the bubble on the side of

the fixture. Adjust the fixture so that the laser is shining on the centre of the target on the other OL2R bracket (the TD-M should not be in place).

Rotate the TD-S to 3 o'clock and find the new location of the beam. Using a wide ruler or a piece of paper determine the half-way position between the centre of the target and where the beam is now located and adjust the beam to that point using the blue thumbwheels on the TD-units.

Move the Stationary end fixture to bring the beam to the centre of the target.

Repeat the procedure until the beam stays precisely in the centre of the target when the TD-S is rotated from 9 o'clock to 3 o'clock.



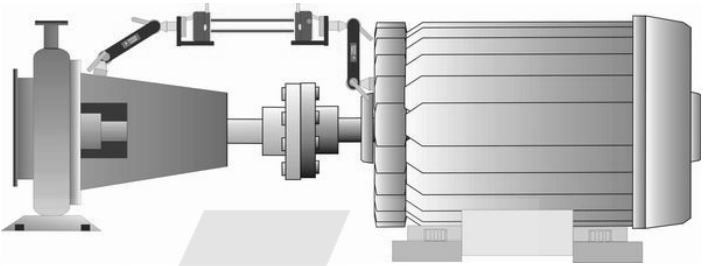
Remove the TD-S and install the TD-M. Repeat the same coning procedure for the TD-M so that when it is rotated the beam stays precisely on the target at the TD-S end.

Install the TD-S and set both TD-units to 12 o'clock. The laser beams should now be located directly under and over the crossline targets on the respective TD-units.

Adjust the top thumbwheel on the TD-M until the beam is precisely in

the centre of the target on the TD-S.

Adjust the bottom thumbwheel on the TD-S until the beam is precisely on the TD-M target.



Check the set-up by rotating the TD-units together to 9 o'clock, 12 o'clock and 3 o'clock. The beams should stay centered on the opposite targets at all three positions.

The set-up is now complete and the OL2R procedure can be followed.

Note. Now it is very important that you do not move the brackets. You will now start measuring the movement between them!

MEASURING OL2R

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

If there are strong vibrations in the machine or high temperatures remove the TD-units before starting the machine.

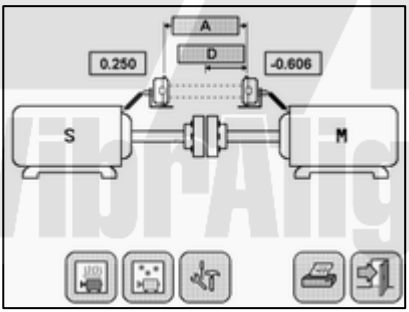
The measurement may be performed either from cold to hot conditions (OL2R) or from hot to cold conditions (R2OL) whichever is the most convenient.

A Enter A-distance

D and D-distance.

Select hot condition

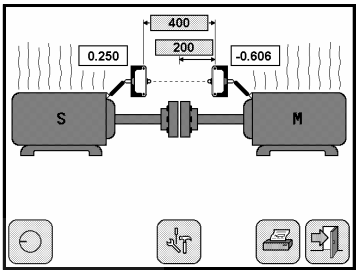
or cold condition.



Hot condition

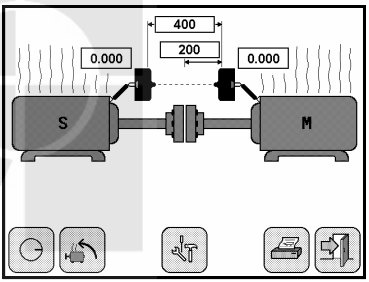
Using the spirit levels on the OL2R-fixtures rotate the TD-units to the 9 o'clock position.

Touch the 9 o'clock icon.



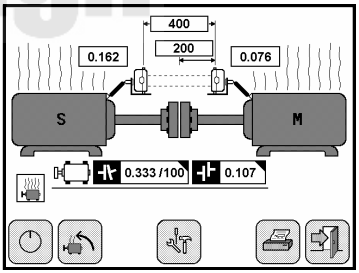
Using the spirit levels on the OL2R-fixtures rotate the TD-units to the 3 o'clock position.

Touch the 3 o'clock icon.

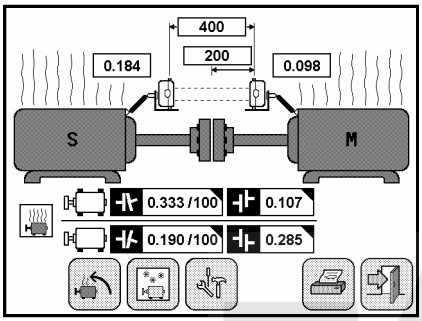


Using the spirit levels on the OL2R-fixtures rotate the TD-units to the 12 o'clock position.

Touch the 12 o'clock icon



When the Hot Condition measurement is accomplished the result for Hot Condition is shown.



Re-measure Hot Condition.

Go to Cold Condition.

Open Application Set-up.

OK

Confirm OL2R-measurement. (The OK-icon is shown when both Hot and Cold Conditions are measured.)

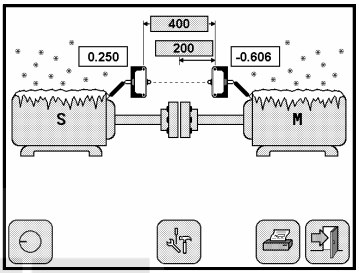
Print a screen dump.

Exit from the program.

Cold condition

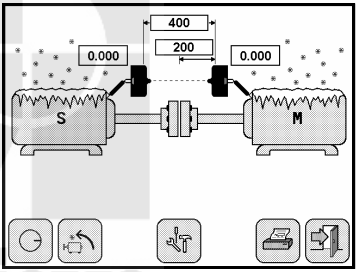
Using the spirit levels on the OL2R-fixtures and rotate the TD-units to the 9 o'clock position.

Touch the 9 o'clock icon.



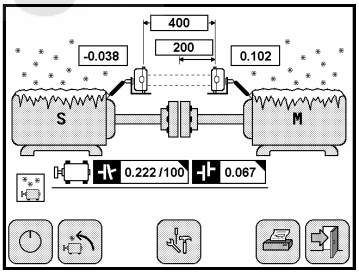
Using the spirit levels on the OL2R-fixtures and rotate the TD-units to the 3 o'clock position.

Touch the 3 o'clock icon.

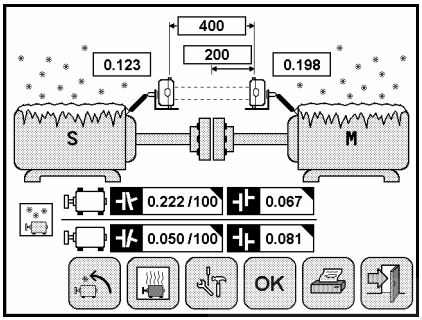


Using the spirit levels on the OL2R-fixtures and rotate the TD-units to the 12 o'clock position.

Touch the 12 o'clock icon.



When the Cold Condition measurement is accomplished the result for Cold Condition is shown.



Re-measure Cold Condition.

Go to Hot Condition.

Open Application Set-up.

OK — Confirm OL2R-measurement. (The OK-icon is shown when both Hot and Cold Conditions are measured.)

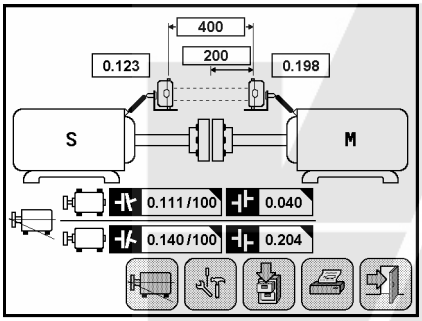
Print a screen dump.

Exit from the program.

SHAFT ALIGNMENT WITH OL2R

When both Hot Condition and Cold Condition are measured and the OL2R-measurement is confirmed the difference between Hot and Cold Condition is shown. This is the Thermal Offset values (as target values).

It is now possible to do a Shaft Alignment with these Thermal Offset values or save the Thermal Offset values for later use. The Shaft Alignment is done according to the chapter Shaft Alignment Horizontal machines.

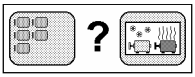


Go to Shaft Alignment using the Thermal Offset values. See the chapter Shaft Alignment Horizontal machines.

Save Thermal Offset values for later use. See Memory Manager.

Resume Function

The Shaft Alignment program with OL2R is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the Shaft Alignment with OL2R icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

SHAFT ALIGNMENT VERTICAL MACHINES

INTRODUCTION & MOUNTING

See Shaft Alignment Horizontal Machines.

START THE PROGRAM

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

Go to the Application Set-up for settings.

APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

Displayed measurement value resolution

0.1, 0.01 and 0.001 mm / 1, 0.1, 0.01 mils (0.01 mils angle only).

Sampling time

Sampling time from 1-99 seconds.

Screen filter

From 0 to 10, where 0 is filter off and 10 is max filter. This slows down the update frequency of the screen values without reducing the accuracy.

Repeatability Test

Starts the sub-function for repeatability test.

Tolerance table

Displays a table with most often used tolerances. Metric or Imperial display depending on settings for displayed units.

Contrast

Backlight

Turns on and off the screen backlight.

Confirmation

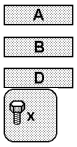
Confirms made selections and returns to the application program.

MEASUREMENT PROCEDURE

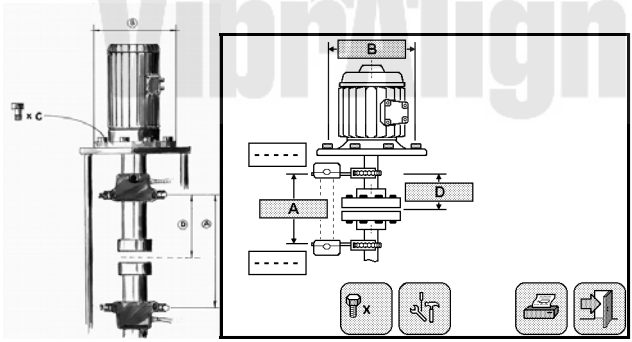
Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

The vertical shaft program calculates the shims required under each bolt to correct angular error and the live display shows the corrections required for concentricity.

The screen shows the movable machine. The grey areas are data entry fields. Measure the distance between the TD units. Touch the A field and enter the value. Confirm with OK. Continue with the B value (Diameter of bolt pattern) and the number of bolts (max 8). The D measure is by default set to half the A measure, but can be changed by touching the D field and entering the correct value. Any values can be corrected if necessary.

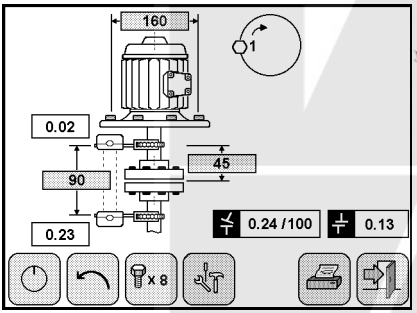


Note: The A dimension is measured from centre to centre of the rods.

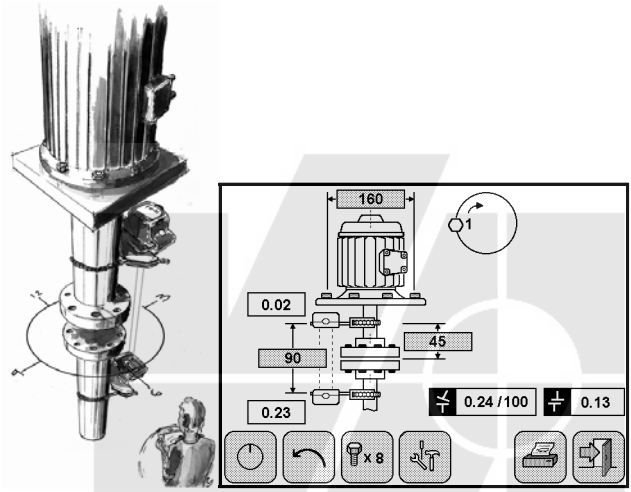


Position yourself at the position that corresponds to 6 o'clock where it is easiest to turn the shafts through 180°. Set the TD units so that they are approximately parallel at the 12 o'clock position. Turn the shafts to where the TD units are positioned at 9 o'clock and touch the 9 o'clock icon. The first bolt is at the position 9 o'clock.

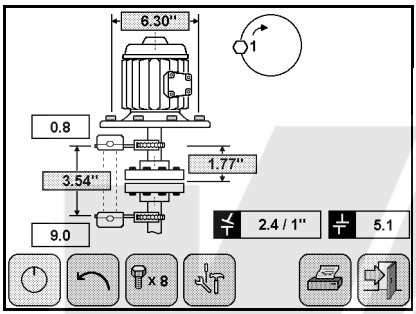
Tip: Mark up the different positions before you start measuring.

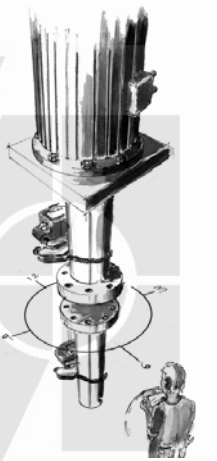


Turn the shafts 180° to the 3 o'clock position. Touch the 3 o'clock icon to register the reading. The displayed values show the current position of the machine in the 9 to 3 o'clock axis.



Rotate the shafts to the 12 o'clock position and touch the 12 o'clock icon. The displayed values show the current position of the machine in the 12 to 6 o'clock axis. The list of values displayed shows the position values for each bolt.





ALIGNMENT

Adjust the angular error by adding shims under the bolts. (Negative bolt value means that shims should be added.) The first bolt value corresponds to the bolt at the 9 o'clock position. The parallelism error is corrected using the live display.

1. Start with correction of the angular error by adding shims where required. The angular error is displayed live in the 12 to 6 o'clock axis when the TD- units are placed at 12 o'clock, and in the 9 to 3 o'clock axis when they are placed at 3 o'clock.
2. Then adjust the parallel offset in the 12 to 6 o'clock axis and 9 to 3 o'clock axis respectively. The parallel offset is displayed live in the 12 to 6 o'clock axis when the TD-units are placed at 12 o'clock, and in the 9 to 3 o'clock axis when they are placed at 3 o'clock.
3. Check that both the angular error and the parallel offset are close to zero in both directions after finishing the adjustment.
4. Alignment is now completed. To confirm the result, redo the measurement.

DOCUMENTATION

There are three possibilities to document the measurement.

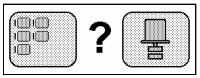
Save the measurement in the system memory. When a measurement is saved in Shaft Alignment for Horizontal Machines it is the measurement result that is stored and not the displayed measurement after performed adjustments. To store this, redo the measurement and then store it.

Print the result.

Export saved measurements to a computer.

RESUME FUNCTION

The Shaft Alignment program for Horizontal Machines is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the Horizontal Shaft Alignment icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

SHAFT ALIGNMENT CARDAN SHAFTS

INTRODUCTION

Cardan Shafts, or offset mounted machines, need to be aligned just as much as an ordinary mounted machine. The cardan shaft with its ball-joints admits an amount of offset mounting of the machines, but it does not tolerate angular error. To be able to accomplish an alignment of an offset mounted machine you will need to use the optional cardan fixtures. The fixtures can be used on machines with up to 900 mm offset and is fitted for use on virtually any kind of coupling.

See also Shaft Alignment Horizontal Machines.

MOUNTING

The cardan fixture (offset fixture) can be mounted on either unit depending on the space available but it is always easier to mount it on the shaft which cannot be rotated, usually the stationary machine.

Dismount the cardan shaft.

Clean the flange faces and remove any high spots such as burs from the bolt holes.

Check the run-out of the flange face using a dial indicator. Mount the dial indicator and rotate the shaft.

Mount the lapped steel bar with the spacers on to the flange face of the stationary machine, either vertically or horizontally.

Mount the adjustable arm on the lapped steel bar.

Mount the revolving bracket on the adjustable arm.

Mount the other revolving bracket on to the flange of the movable machine in any of three ways described below.

If the flange of the rotating shaft has a tapped hole in the centre, mount the revolving bracket with a fitting tapered bolt and washer.

If the flange of the rotating shaft does not have a tapped hole in the

centre, mount the revolving bracket as in 7c or with the chain fixture. Use the extension fixture and the rods.

If the movable machine does not have a tapped hole and cannot be rotated, mount the lapped steel bar with the revolving bracket in its centre.

Mount a target and an extension bracket on each revolving bracket and then mount the rods. Use the long rods in order to slide the TD-units above the targets.

PRE-ALIGNMENT FUNCTIONS

In the efforts to obtain the best possible conditions for a shaft alignment it is necessary to check whether the shafts are bent, the machine base is warped or if there is a soft foot condition.

The Basic Straightness program is primarily designed for measurement of shaft and base straightness. See the chapter Basic Straightness measurement.

The Softcheck function makes it possible to check softfoot condition. See the chapter Softcheck.

START THE PROGRAM

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

Go to the Application Set-up for settings.

APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

Displayed measurement value resolution

0.1, 0.01 and 0.001 mm / 1, 0.1, 0.01 mils (0.01 mils angle only).

Sampling time

Sampling time from 1-99 seconds.

Screen filter

From 0 to 10, where 0 is filter off and 10 is max filter. This slows down the update frequency of the screen values without reducing the accuracy.

Softcheck

Starts the sub-function for checking of soft foot conditions.

Repeatability Test

Starts the sub-function for repeatability test.

Tolerance table

Displays a table with most often used tolerances. Metric or Imperial display depending on settings for displayed units.

Contrast

Touching respectively on each side of the symbol increases and decreases the screen contrast.

Backlight

Turns on and off the screen backlight.

Confirmation

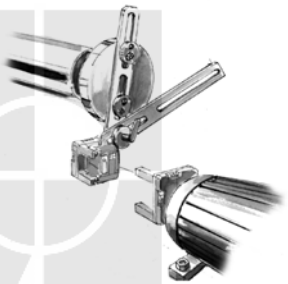
Confirms made selections and returns to the application program.

COARSE ADJUSTMENT

Mount the TD-M unit on the moveable machine and the TD-S unit on the stationary machine.
To ensure that the laser will hit the target when doing the alignment we will need to “cone in” the laser beam.

Slide the TD-M unit above the target

Turn the TD-S unit to a vertical position. Adjust the arm fixture to a position where the laser beam from the TD-S unit hits the target on the movable machine. Note where the laser beam hits the target.

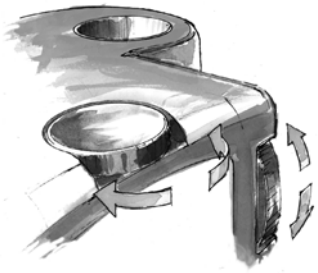


Rotate the TD-S unit 180 degrees.

The laser spot on the target plate of the movable machine will rotate in a circle. The centre of this circle is the axis rotation of the Dummy shaft. Adjust to half the diameter with the blue adjustments screws both vertically and horizontally. Repeat the coning process until the circle is a single spot on the target plate

Adjust the arm with the TD-S unit until the laser beam is centered in the target of the movable machine.

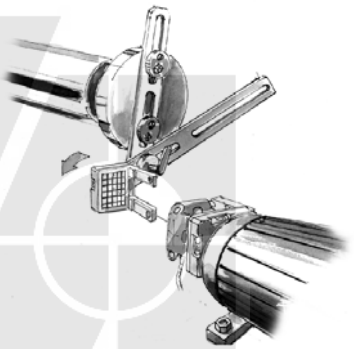
Slide the TD-S unit above the target and slide down the TD-M unit in position in front of the target plate



Turn the TD-M unit vertically (or horizontally) and note where the laser spot hits the target.

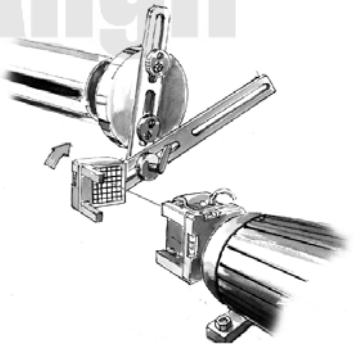
Rotate the shaft of the movable machine 180 degrees

The laser spot on the target plate of the stationary machine will rotate in a circle. Adjust to half the diameter with the blue adjustment screws both vertically and horizontally. Repeat until the circle is one spot on the target plate.



The difference between the laser spot and the centre of the target is the angular error of the movable machine. Adjust the movable machine both vertically and horizontally until the laser spot is centered in the target of the stationary machine.

Slide the TD-M unit above the target and slide down the TD-S unit.



Rotate the TD-S unit and cone in if necessary. The laser spot on the target of the movable machine is now probably off centre. If the difference is more than 3 mm repeat the procedure, step 7-14.

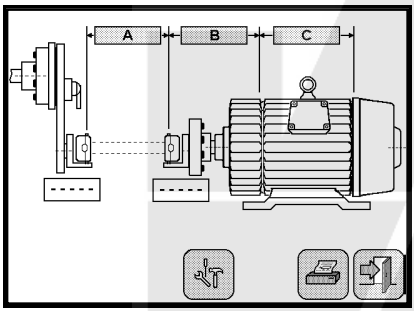
MEASUREMENT PROCEDURE

A
B
C

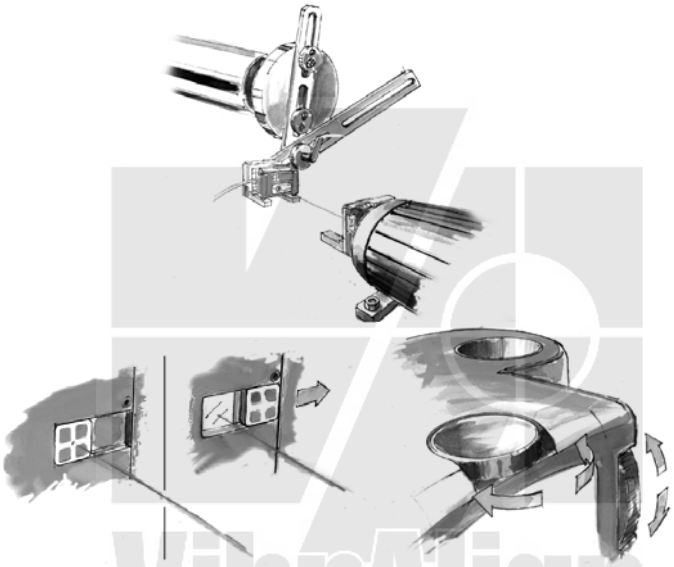
The screen shows the movable machine. The grey areas are data entry fields. Measure the distance A. Touch the A field and enter the value. Confirm with OK. Continue with the B and C dimensions

Note: The A dimension is measured from centre to centre of the rods. The B dimension is measured from rod centre to first bolt centre and the C dimension is measured between the bolt centres.

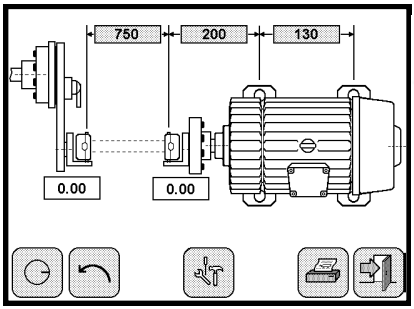
Stand by the machine to be adjusted facing the stationary machine.

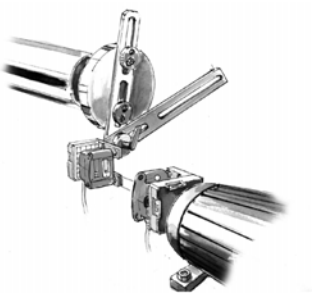


Rotate the TD-units to the 12 o'clock position, using the spirit levels on the TD rotating brackets. The led on the TD-M unit turns from flashing green to alternate red and green when within ±3° of correct position. The targets should be slid over the detectors. Adjust the lasers to the centre of both targets using the blue adjustment screws.

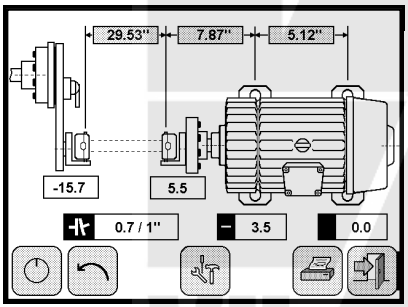


Rotate the TD-units to the 9 o'clock position. Slide open the targets, wait until the TD-values appear, and touch the 9 o'clock icon.

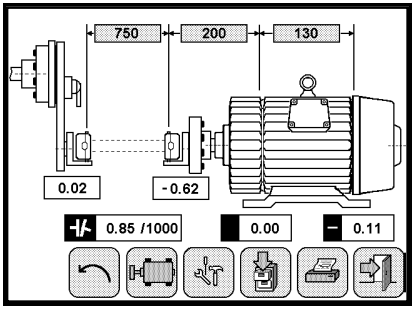




Using the spirit level in the cardan fixture, rotate the shafts to the 3 o'clock position and touch the 3 o'clock icon. The screen now displays the current horizontal position of the machine.



Rotate the TD-units to the 12 o'clock position and touch the 12 o'clock icon. The screen now displays the current vertical position.



ALIGNMENT

Adjust the machine until the values for angular alignment are within tolerances required.

Rotate the TD-units to the 3 o'clock position, touch the change view icon and adjust the machine horizontally until the required alignment is achieved
.

Rotate the TD-units back to the 12 o'clock position, touch the change view icon and check that the machine lies within the required tolerances.

Measurement and adjustment are now completed. To confirm the result, redo the measurement.

DOCUMENTATION

There are three possibilities to document the measurement.

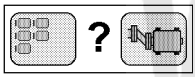
Save the measurement in the system memory. When a measurement is saved in Shaft Alignment for Cardan Shafts it is the measurement result that is stored and not the displayed measurement after performed adjustments. To store this, redo the measurement and then store it.

Print the result.

Export saved measurements to a computer.

RESUME FUNCTION

The Cardan Shaft Alignment program is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the Cardan Shaft Alignment icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

VibrAlign

MACHINE TRAIN ALIGNMENT

INTRODUCTION

A machine train is three or more units with rotating shafts connected to each other with couplings, i.e. driving unit - gearbox - driven unit. With an ordinary shaft alignment system you will have to make an alignment for each machine and then calculate which one to adjust. A cumbersome task with a large risk to make errors. With a Fixturlaser Shaft Alignment System you do all the measurements and then the system makes the calculations and gives you the option to choose the machine you want as the stationary machine.

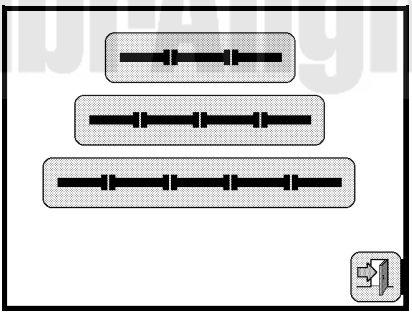
See also Shaft Alignment Horizontal Machines.

START THE PROGRAM

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

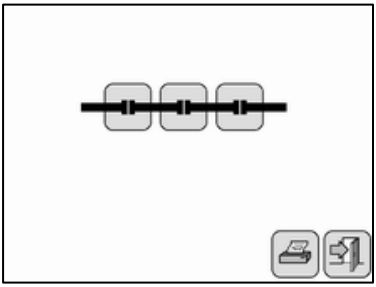
MEASUREMENT PROCEDURE

The screen displays three different applications: 3, 4 or 5 units (2, 3 or 4 couplings). Touch the icon corresponding to your specific alignment.



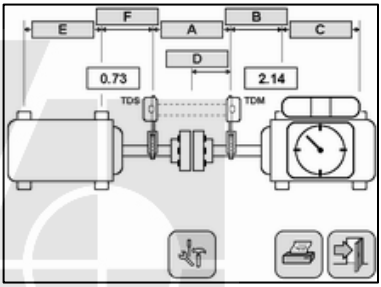
Touch the coupling icon corresponding to the first coupling to measure.

Each coupling is measured in the same way as in the Horizontal Shaft Alignment program.



A
B
C
D
E
F

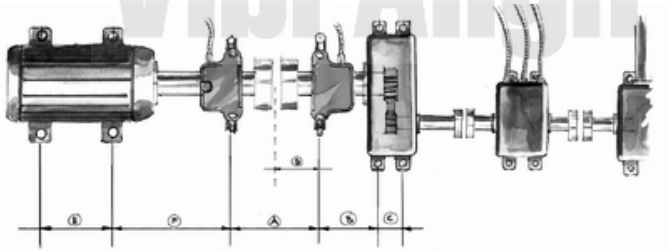
Enter dimensions and follow the procedure in the Horizontal Shaft Alignment chapter. E and F dimensions are also required in a machine train. (The E dimension correspond to the C dimension at the next coupling)



Go to the Application Set-up for selecting measurement method and other settings

OK

Touch the OK icon to proceed to select the next coupling to measure



APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

Displayed measurement value resolution

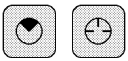
0.1, 0.01 and 0.001 mm / 1, 0.1, 0.01 mils (0.01 mils angle only).

Sampling time

Sampling time from 1-99 seconds.

Screen filter

From 0 to 10, where 0 is filter off and 10 is max filter. This slows down the update frequency of the screen values without reducing the accuracy.



Measurement method

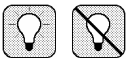
The Clock method or the Tripoint™ method.

Repeatability Test

Starts the sub-function for repeatability test.

Contrast

Touching respectively on each side of the symbol increases and decreases the screen contrast.



Backlight

Turns on and off the screen backlight.

Confirmation

Confirms made selections and returns to the application program.

MEASUREMENT RESULT

When the last coupling is measured and the final touch on the OK icon is made the result is displayed. The screen displays the measurement result in graphics and numericals. The plotted curve represents the measured machine train. The unit that does not have a grey background is by default set to reference (stationary machine). To alter the reference unit just touch a unit symbol. The measurement result displayed beneath the curve are automatically recalculated. To alter between horizontal and vertical result or between coupling values and feet values, touch the change view icons.

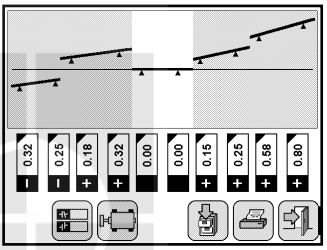

View coupling values.


View feet values.

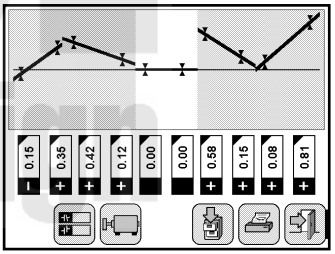

View horizontal result.


View vertical result.


Save the measurement. See Memory Manager.



Vertical result - feet values



Horizontal result - feet values


Print a screen dump.


Exit from the program.

I

ALIGNMENT

After you have decided which machine to use as a reference, you use the Horizontal Shaft Alignment program to align the machine.

DOCUMENTATION

There are three possibilities to document the measurement.

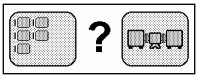
Save the measurement in the system memory.

Print the result.

Export saved measurements to a computer.

RESUME FUNCTION

The Machine Train Alignment program is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the Machine Train Alignment icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

BASIC STRAIGHTNESS MEASUREMENT

INTRODUCTION

In the Basic Straightness Measurement program the laser beam is used as reference. The deviation in distance between the laser beam and the measurement object is measured in two or more positions with the use of the detector unit.

Start the program by touching the Basic Straightness measurement icon in the main menu.

Go to the Application Set-up for settings.

APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

Displayed measurement value resolution

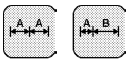
0.1, 0.01 and 0.001 mm / 1, 0.1, 0.01 mils (0.01 mils angle only).

Sampling time

Sampling time from 1-99 seconds.

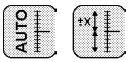
Screen filter

From 0 to 10, where 0 is filter off and 10 is max filter. This slows down the update frequency of the screen values without reducing the accuracy.



Distance

Select between equal or individual distance.



Scale

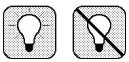
Select between automatic or fix scale.

Repeatability Test

Starts the sub-function for repeatability test.

Contrast

Touching respectively on each side of the symbol increases and decreases the screen contrast.



Backlight

Turns on and off the screen backlight.

Confirmation

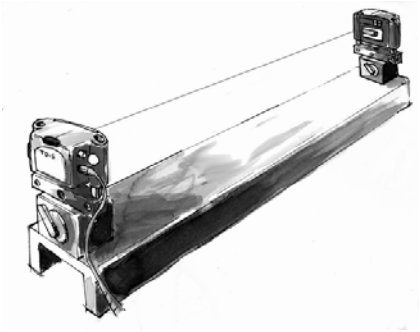
Confirms made selections and returns to the application program.

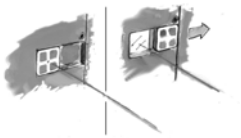
COARSE ADJUSTMENT

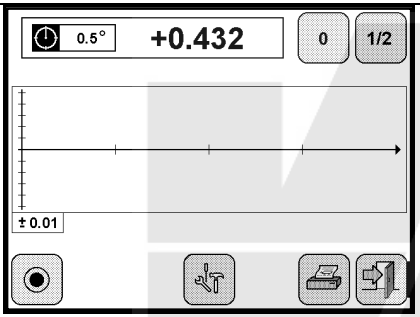
Start the straightness measurement by positioning the laser transmitter (TD-S) at one end of the measurement object.

Position the detector unit (TD-M) as close as possible to the laser transmitter. Adjust the height of the laser transmitter and the detector unit to get the laser beam to hit the centre of the target.

Move the detector unit to the far end of the measurement object. Use the target on the detector unit and the adjustment screws on the laser transmitter to adjust the laser beam to the center of the target.







REPEATABILITY TEST

Before starting the straightness measurement it is recommendable to perform a repeatability test. See the chapter Repeatability Test.

Do the Repeatability Test at the position far from the laser transmitter.

MEASUREMENT POINT REGISTRATION

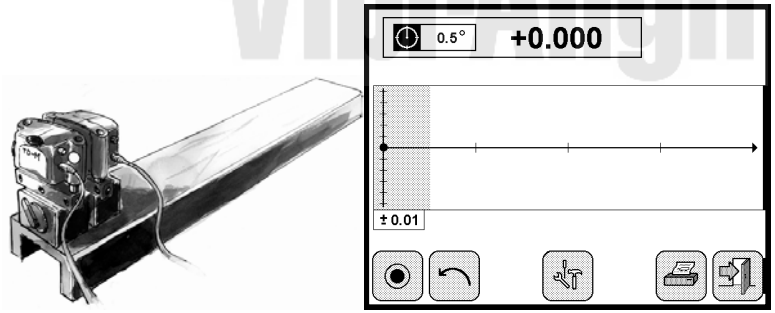
1. Position the detector unit as close to the laser transmitter as possible and open the shutter. Note the angle value displayed on the screen.

Register the measurement value by touching the register icon. The first measurement point is now registered and the value is automatically set to 0 (reference point)

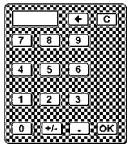
0

1/2

You can zero the detector value, and half it, by touching the corresponding icons before you register the value. If you choose not to use this option the icons will not appear in the rest of the procedure.

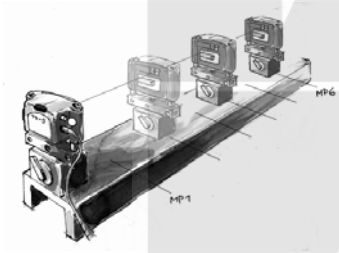


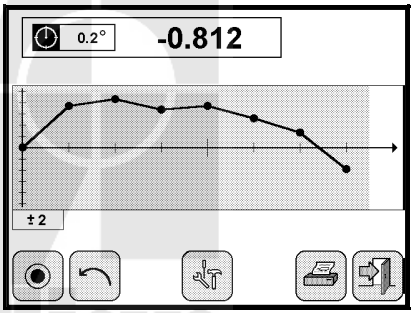
2. Move the Detector to the second measurement point, check that the angle values is the same as at the previous measurement point and touch the register icon



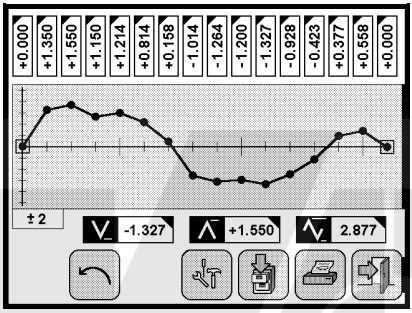
The screen now displays a keypad for entering of the distance between the measurement points. If you have set equal distance in the Application Set-up you can now enter the distance or leave the box blank. If you have selected individual distance the entering of value is mandatory. When the entering of distance is confirmed the second measurement point is displayed on the screen.

3. Move the detector to the next measurement point and repeat the procedure in step 2. Continue until all measurement points are registered. Up to 16 measurement points can be registered in one measurement.





4. When registering of all measurement points are accomplished you can touch the point on the screen that you want to use as a reference point together with the first measurement point. When a measurement point is touched the measuring sequence is ended and no further measurement points can be registered. The screen displays a curve where the first and the selected measurement point is set to zero. Below the curve you will find maximum and minimum values and the difference between these.



If you touch any other measurement point this one is selected as the reference point together with the previous selected point and all values are recalculated.

If one and the same measurement point is touched twice this point is set as reference together with the laser beam.

DOCUMENTATION

There are three possibilities to document the measurement.

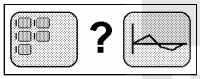
Save the measurement in the system memory. When a measurement is saved in Basic Straightness, it is what you see that is saved. A measurement can be saved several times. For example with different reference points.

Print the result.

Export saved measurements to a computer.

RESUME FUNCTION

The Basic Straightness program is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the Basic Straightness icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

VibrAlign

ADVANCED STRAIGHTNESS MEASUREMENT

INTRODUCTION

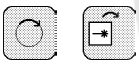
In the Advanced Straightness Measurement program straightness can be measured in two axes. The laser beam is used as reference and the deviation in distance between the laser beam and the measurement object is measured in two or more positions, with the use of the receiver.

Measurement methods

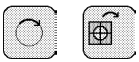
In the Advanced Straightness Measurement program there are different measurement methods. Measurement method is selected in the application set-up.

Standard Straightness. The laser beam is set roughly parallel to a surface or an object. Two points are used as references.

The laser beam is set to level. One point is used as reference.



Straightness with rotational center as reference (rotate laser transmitter). The laser beam is representing an axis of rotation. One point is used as reference. The laser transmitter is rotated 180 degrees in each measurement point to find the axis of rotation.



Straightness with center of bore as reference (rotate receiver). The laser beam is set roughly parallel to a center line. Two points are used as references. The receiver is rotated 180 degrees in each measurement point to find the center of the measurement object.

Straightness with Multipoint. The laser beam is set roughly parallel to a center line. Two points are used as references. The receiver is placed in 3 to 16 positions at each measurement point to find the center of the measurement object.

Straightness with center of tube as reference (for example Extruder). The laser beam is representing an axis of rotation. The center of the measurement object is used as reference. The laser transmitter is either positioned exactly in the axis of rotation or rotated 180 degrees in each measurement point to find the axis of rotation.

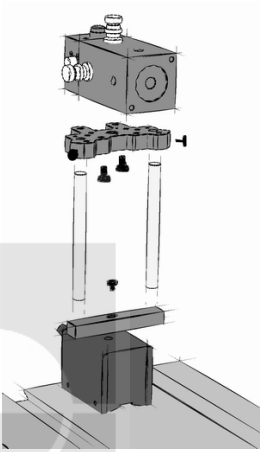
Straightness with Arc Angle (for example Turbine). The laser beam is set roughly parallel to a center line. Two points are used as references. The receiver is placed in 3 positions at each measurement point to find the center of the measurement object.

MOUNTING INSTRUCTION

Mounting of the laser transmitter T111 (or T110)

The T111 (or T110) is mounted on the magnetic base together with the rod adapter, the rods and the universal bracket.

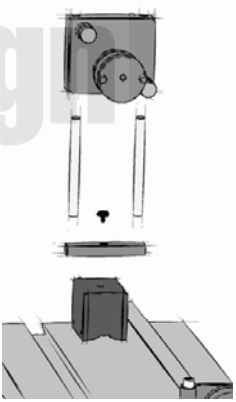
Mount the universal bracket to the T111 (or T110) with the supplied screws. Mount the rod adapter on the magnetic base with the supplied screw. Attach the rods to the rod adapter, then slide the universal bracket with the laser transmitter onto the rods, as in picture.



Mounting of the laser transmitter T210

The T210 is mounted on the magnetic base together with the rod adapter and the rods.

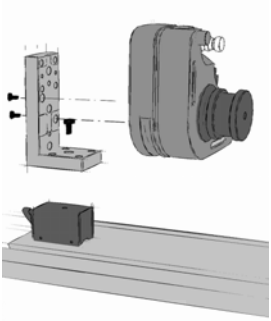
Mount the rod adapter on the magnetic base with the supplied screw. Attach the rods, and then slide the T210 onto the rods, as in picture.



Mounting of the laser transmitter T220

The T220 can either be mounted on a magnetic base together with the angular bracket or be mount

Mount the angular bracket on a magnetic base or on a tripod. Then mount the T220 to the angular bracket, as in picture. Use the supplied screws ed on a tripod.

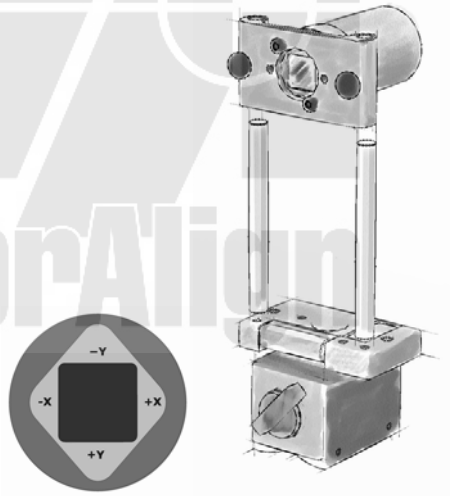


Mounting of the receiver R210

The R210 is mounted on the magnetic base with spirit level together with the receiver adapter and the rods.

Mount the R210 to the receiver adapter with the supplied screws. Mount the rods to the magnetic base with spirit level. Slide the R210 on to the rods, as in picture. (-Y shall be upwards.)

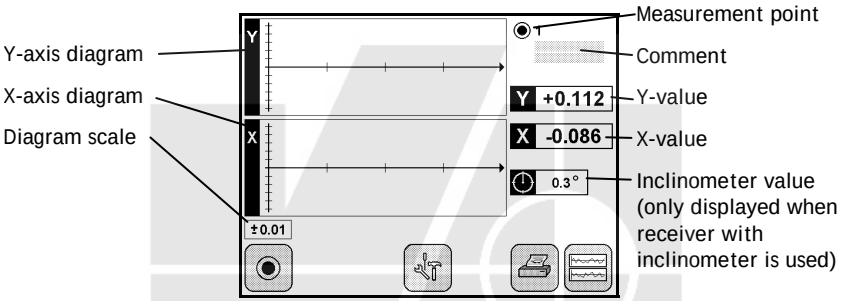
Note: Make sure that the receiver is properly locked in its position.



START THE PROGRAM

Start the program by touching the Advanced Straightness Measurement icon in the Main Menu.

When the program is opened the measurement screen is shown.

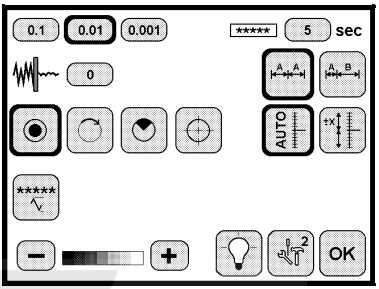


Go to the Application Set-up for selecting measurement method and other settings.

The whole measurement procedure is described for standard straightness. For the other measurement methods only those parts that are different from standard straightness are described.

APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.



Displayed measurement value resolution

0.1, 0.01 and 0.001 mm / 1, 0.1, 0.01 mils (0.01 mils angle only).

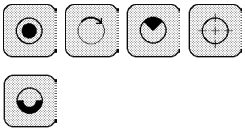
sec

Sampling time

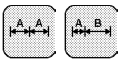
Sets the time (in seconds) used to collect calculation base for measurement values. Select between 1 and 99 seconds.

Screen filter

Sets the screen filter on a scale from 0 to 10 where 0 is disabled and 10 is maximum filtration. This slows down the update frequency of the screen values without reducing the accuracy of the registered values.

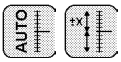


Standard straightness, straightness with rotational center as reference (rotate laser transmitter), straightness with center of bore as reference (rotate receiver), straightness with Multipoint, straightness with center of tube as reference or straightness with Arc Angle can be selected.



Distance

Select between equal or individual distance between measurement points. Equal distance is default.



Scale

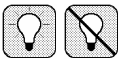
Select between automatic or fix scale. Automatic scale is default.

Repeatability Test

Starts the sub-function for repeatability test.

Contrast

Touching respectively on each side of the symbol increases and decreases the screen contrast.



Backlight

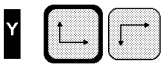
Turns on and off the screen backlight.

Page 2

Goes to Application Set-up page 2.

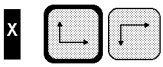
Diagram

YX-, Y- or X- diagram can be selected.



Inversion of Y-diagram

Select between normal or inverted Y-diagram. Normal diagram is default.



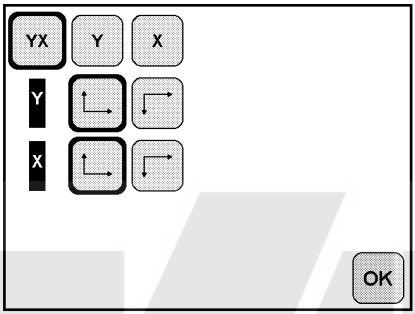
Inversion of X-diagram

Select between normal or inverted X-diagram. Normal diagram is default.

OK

Confirmation

Confirms made selections and returns to the application program.



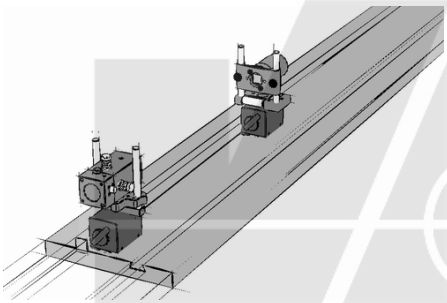
Application Setup page 2

STANDARD STRAIGHTNESS

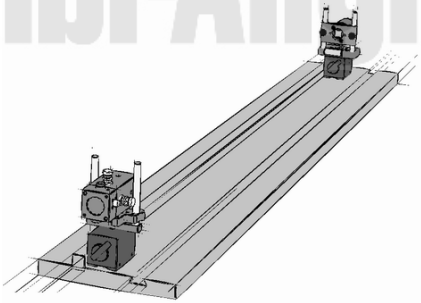
Coarse adjustment

Position the laser transmitter at one end of the measurement object, on the object or on a tripod.

Position the receiver as close as possible to the laser transmitter. Adjust the height of the laser transmitter and the receiver to get the laser beam to hit the centre of the target.



Move the receiver as far from the laser transmitter as possible but still on the measurement object. Adjust the laser beam with the adjustment screws on the laser transmitter so it hits the centre of the target. Repeat until the laser beam hits the target at both ends of the measurement object.

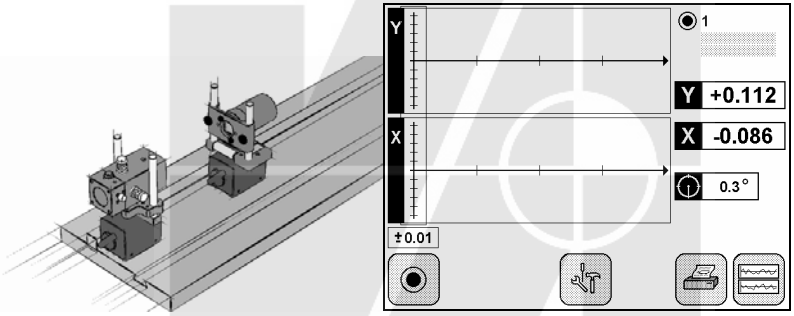


Repeatability test

Before starting the straightness measurement it is recommendable to perform a repeatability test. See the chapter Repeatability Test.

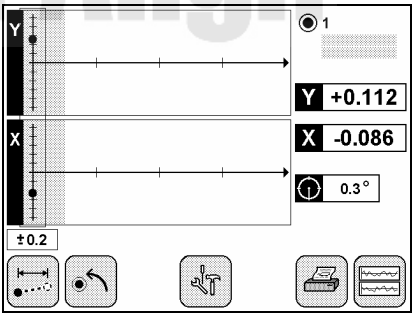
Do the Repeatability Test at the position far from the laser transmitter.

Measurement point registration



Position the receiver at the first measurement point and remove the target.

Touch the register icon to register the measurement point

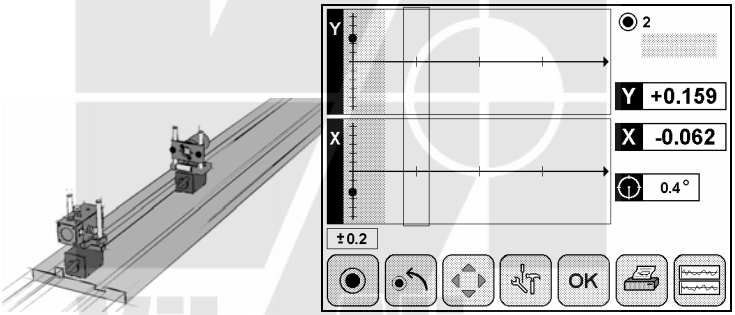


Move the receiver to the second measurement point.

Enter the distance between the first and the second measurement point by touching the distance icon.

The screen now displays a keypad for entering of the distance between the measurement points. If you have selected equal distance in the Application Set-up, you can now enter the distance or leave the box blank. (In this case the distance icon and the keypad only shows up at this point). If you have selected individual distances the entering of distance is mandatory at every measurement point.

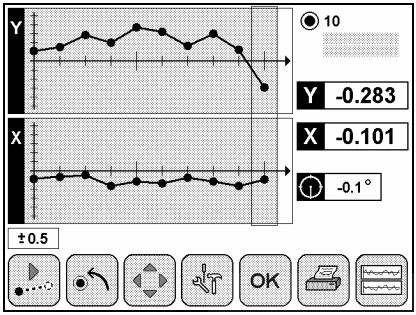
Touch the register icon to register the measurement point.



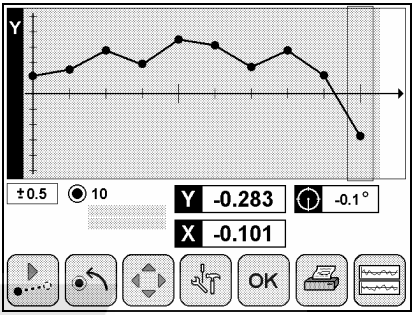
Move the receiver to the next measurement point.

Repeat the procedure in step 5 for the rest of the measurement points. (Up to 99 measurement points can be registered in one measurement.)

Measurement screen



Measurement screen showing Y- and X-diagram



Measurement screen showing Y-diagram

Add or change comment.

Register a measurement point.

Enter the distance between the last measured point and the next point.

Go to the next measurement point (equal distances).

Re-measure the latest measurement point.

Scroll function. Changes to scroll icons.

Scroll one point to the left/right.

Scroll one page to the left/right.

Open Application Set-up.

Confirm the measurement when all measurement points are registered. (After this no more measurement points can be registered.)

Print a screen dump.

Go to the summary screen.

The measurement screen shows a curve over measured points. The measurement point number is shown. The Y-and X-values and angle are shown as live values from the receiver. The diagram scale is also shown below the diagram.

Y- and X-values at measured points can be looked at by scrolling. (These values are shown in relation to selected references.)

When the measurement is confirmed the measurement screen is replaced by the detailed diagram screen.

Selecting reference points

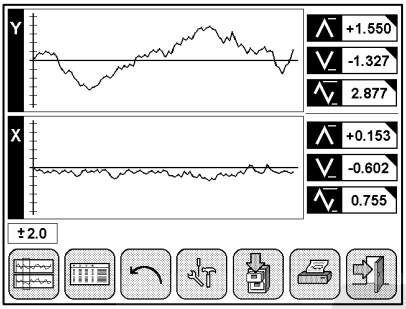
Reference points can be selected in the measurement screen and in the detailed diagram by touching the points.

To select one reference point, touch the point that you want to select as reference. If a new reference point is selected when there are already one or two reference points, touch the same point twice to get it to be the only reference.

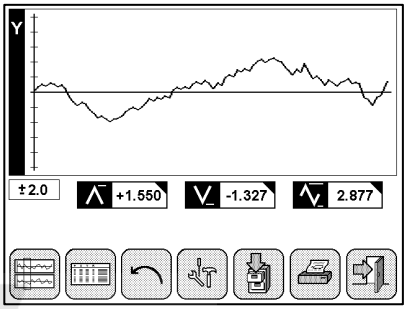
To select a second reference point, touch it and it will be reference together with the first one. If a new reference point is selected when there are already two reference points the first selected will be replaced.

To delete all references, touch three times at the same point.

Summary screen



Summary screen showing Y- and X-diagram



Summary screen showing Y-diagram

Go to the detailed diagram.

Go to the list of measurement points.

Re-measuring of all measurement points.

Open Application Set-up.

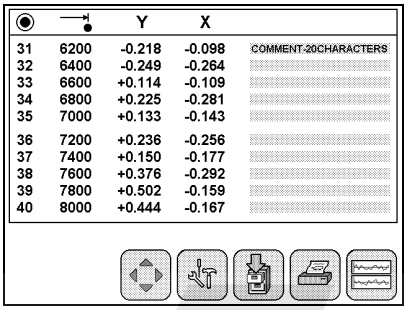
Save the measurement. See Memory Manager.

Print a screen dump.

Exit from the program.

The summary screen shows a curve over all the measurement points. Maximum and minimum values and the difference between these are also shown. The diagram scale is also shown below the diagram.

List of measurement points



List screen

I

Add or change comment.

Scroll function. Changes to scroll icons.

Scroll one point to the up/down.

Scroll one page to the up/down.

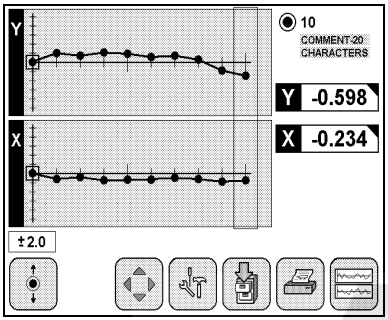
Open Application Set-up.

Print a screen dump.

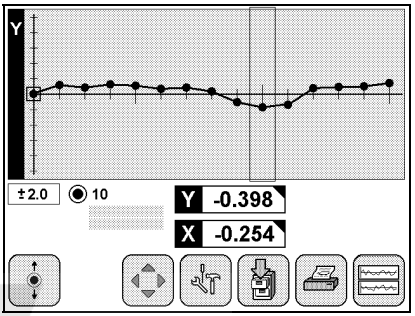
Return to the summary screen.

The List screen shows a list over all the measurement points (ten at a time). The measurement point number, the distance from the first measurement point, Y-values, X-values and eventually comment are shown.

Detailed diagram



Detailed screen showing Y- and X-diagram



Detailed screen showing Y-diagram

Add or change comment.

Align a measurement point. See Alignment of measurement point.

Scroll function. Changes to scroll icons.

Scroll one point to the left/right.

Scroll one page to the left/right.

Open Application Set-up.

Save the measurement. See Memory Manager.

Print a screen dump.

Return to the summary screen.

The detailed screen shows a curve over a limited number of the measurement points at a time. The measurement point number, Y-and X-values and eventually comment are shown for the measurement point that is marked in the diagram. The diagram scale is also shown below the diagram. Y- and X-values at different points can be looked at by scrolling.

Evaluation of measurement result

The result is presented in relation to selected references. The direction is depending on how the receiver is placed. If the receiver is placed according to the mounting instructions Y-values are showing the vertical direction and X-values the horizontal direction.

In the vertical direction (Y) positive values mean that the measurement object at this point is high and negative values that the measurement object is low.

In the horizontal direction (X, looking at the receiver from the laser transmitter) positive values mean that the measurement object at this point is to the left and negative values that the measurement object is to the right.

In the diagrams upwards correspond to positive values (if this is not changed in the application set-up.)

A result box with a filled triangle in the upper right corner shows that the value is fixed (not live).

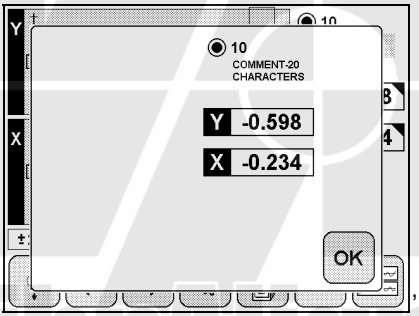
Alignment of measurement point

When alignment of measurement point is selected, the measurement point alignment screen is shown. The actual values for the selected point go live and alignment can be made against zero. Zero will be in accordance to selected references.

Note: It is recommended to set the screen filter to 0 when aligning.

1. Position the receiver at the measurement point that should be aligned. Scroll to the corresponding measurement point in the detailed screen.

Go to the measurement point alignment screen by touching the alignment icon in the detailed screen.



Measurement point alignment screen

2. Align the selected measurement point to zero. Touch OK to confirm adjusted values.

The program returns to the detailed diagram with the adjusted values.

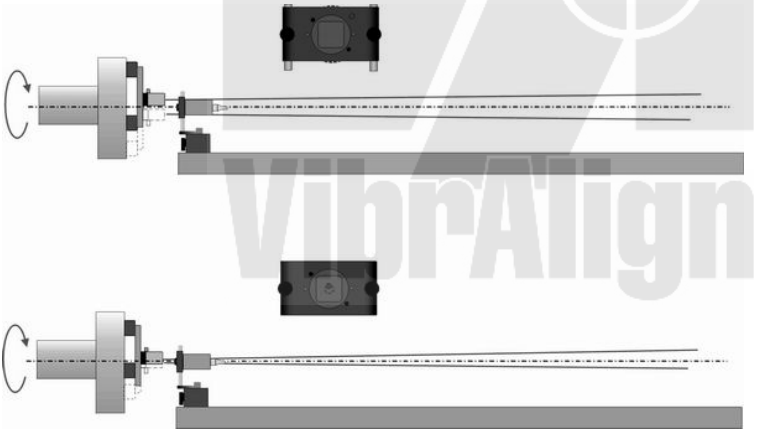
Note: Depending on your application, alignment at one point might affect other measurement points. It is therefore recommended to remeasure all points when all adjustments are made.

STRAIGHTNESS WITH ROTATIONAL CENTER AS REFERENCE (ROTATE LASER TRANSMITTER)

For complete description see also standard straightness.

Coarse centring the laser transmitter

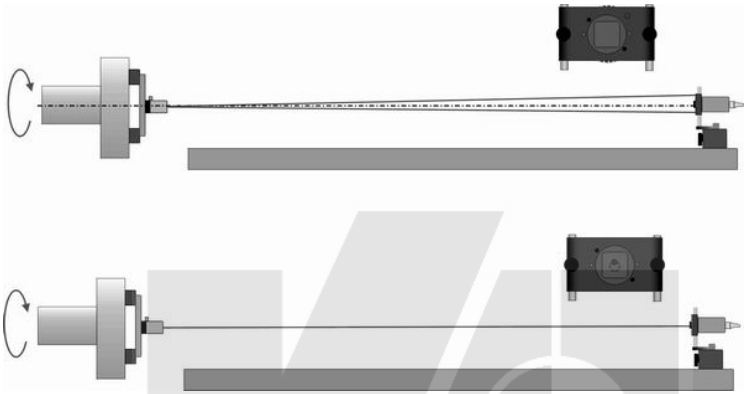
1. Position the laser transmitter in the center of the rotating part of the measurement object.
2. Position the receiver as close as possible to the laser transmitter. Adjust the receiver to get the laser beam to hit the centre of the target.
3. Rotate shaft 180°.
4. Move the laser transmitter half the distance back to the center of the target.
5. Re-adjust the receiver to get the laser beam to hit the center of the target.



6. Angle adjustment: Move the receiver as far from the laser transmitter as possible but still on the measurement object. Adjust the angle of the laser beam (with the adjustment screws) by coning.
   Coning principle: The axis of rotation is made into a single point at a distance from the shaft end. This is made by rotating the laser transmitter

180°. By o adjusting the angle of the laser beam the diameter of the projected circle decreases until the beam creates a spot.

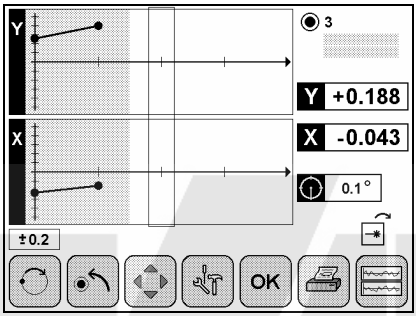
7. Adjust the receiver (if necessary) to get the laser beam to hit the centre of the target.



8. Move the receiver to the first measurement point.
   If the laser beam does not hit the centre of the target repeat step 2-7.

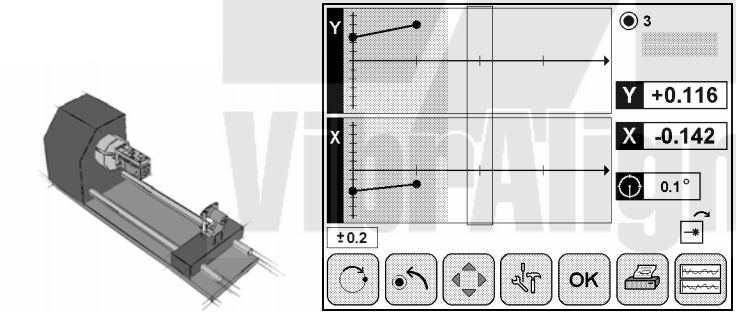
Measurement point registration

Using this method, the procedure at every measurement point is made in three steps. A symbol indicates selected method. For complete measurement procedure see also standard straightness.

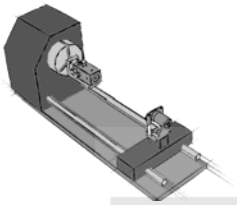
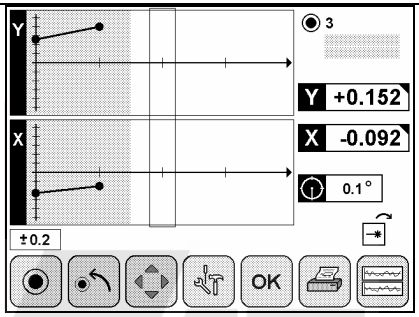
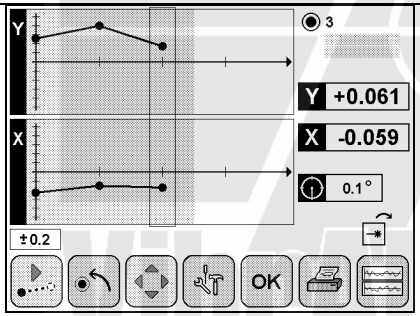


1. Place the laser transmitter with the housing in level.

Register the values in the position before rotation.



2. Rotate the laser transmitter 180 o (in level).

	Register the values in the position after rotation.
 	
3. Register the measurement point.	
	Touch the register icon
	

Note: The positions before and after rotation must be the same at every measurement point. When aligning the laser transmitter may be positioned at either the position before or after rotation.

STRAIGHTNESS WITH CENTER OF BORE AS REFERENCE (ROTATE RECEIVER)

For complete description see also standard straightness.

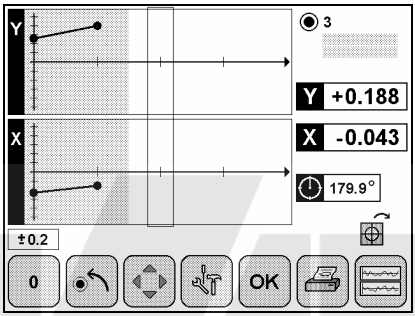
Coarse adjustment

1. Locate the approximate centre of the bore with a tape measure and place the receiver at this centre.
2. Position the laser transmitter as close as possible to the first bore so that the laser beam hits the centre of the target.
3. Rotate the receiver 180 o and slide it to correct half of the difference between the laser spot and the centre.
4. Adjust the laser transmitter so that the laser beam hits the centre of the target.
5. Move the receiver to the last bore. Adjust the angle of the laser beam with the adjustment screws so that it hits the centre of the target.
6. Move the receiver to the first measurement point.

   If the laser beam does not hit the centre of the target adjust the laser transmitter and then move the receiver to the last measurement point and adjust the angle of the beam.

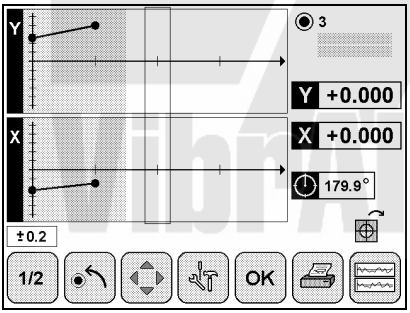
Measurement point registration

Using this method, the procedure at every measurement point is made in three steps. A symbol indicates selected method. For complete measurement procedure see also standard straightness.



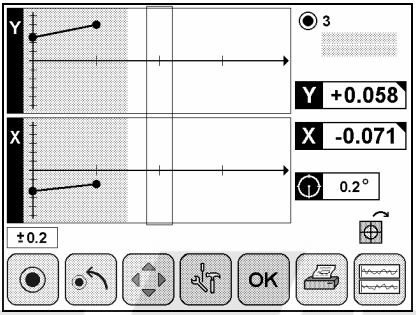
1. Place the receiver upside-down in level.

0 Register the values in the position before rotation. Zeroing.



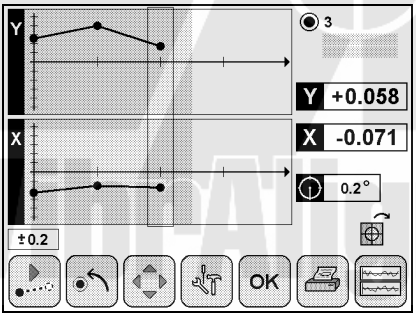
2. Rotate the receiver 180° (in level).

1/2 Register the values in the position after rotation. Halving.



3. Register the measurement point.

Touch the register icon.



Note: The positions before and after rotation must be the same at every measurement point. When aligning the receiver must be positioned at the position after rotation.

STRAIGHTNESS WITH MULTIPOINT

For complete description see also standard straightness.

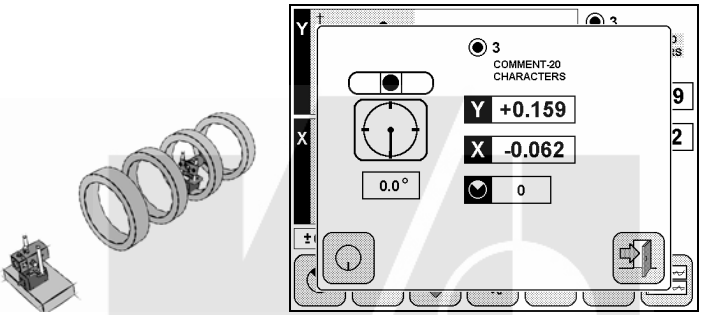
Coarse adjustment

1. Place the receiver at the first bore with the fixture at 6 o´clock.
2. Locate the approximate centre of the bore with a tape measure and place the receiver at this centre.
3. Position the laser transmitter as close as possible to the first bore so that the laser beam hits approximately 2 mm under the centre of the target.
4. Move the receiver to the last bore. (If this bore has another diameter than the first one adjust the receiver as in step 2.) Adjust the angle of the laser beam with the adjustment screws so it hits approximately 2 mm under the centre of the target.
5. Move the receiver to the first measurement point.
   If the laser beam does not hit approximately 2 mm under the centre of the target repeat step 2-5.

Measurement point registration

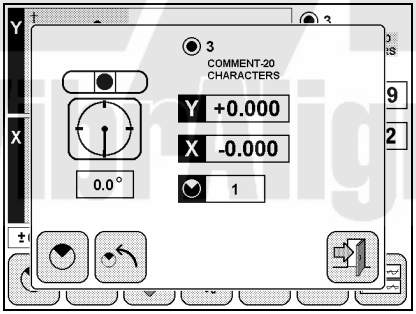
Using the Multipoint method, the procedure at every measurement point is made in a sub-screen. For complete measurement procedure see also standard straightness.

Measurement values have to be taken in at least 3 positions and can be taken in up to 16 positions. The first position has to be at 6 o'clock.



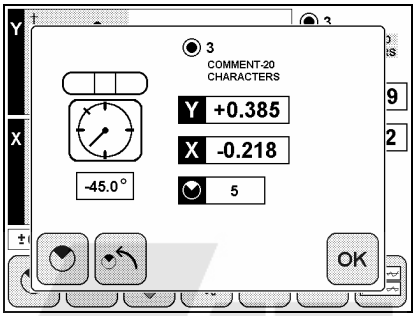
1. Place the receiver at the position 6 o'clock, in level.

Register the values at the position 6 o'clock



2. Rotate the receiver to another appropriate position.

Register the values at this position. Repeat step 2 for at least one more position.

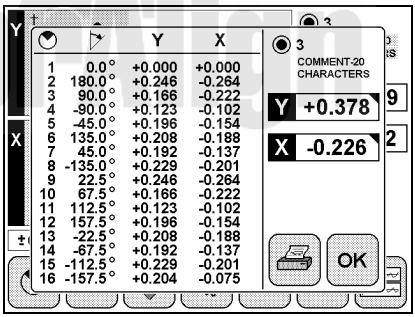


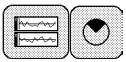
3. If so desired, the latest position can be re-measured.

Re-measuring of the latest position

4. Confirm the Multipoint measurement and register the values for the measurement point.

Touch the OK icon.





5. When the Multipoint measurement is confirmed a list of the values at each position is shown. With this list it is possible to check that the position values are at a circle with its center at YX. The list can be printed.

Print a screen dump of the list.

Return to 2-axes Straightness Measurement.

STRAIGHTNESS WITH CENTRE OF TUBE AS REFERENCE

For complete description see also standard straightness.

Introduction

The purpose of the measurement is to align the diameter center of the measurement object in relation to a reference line, represented by the laser beam. The laser beam is used to project the axis of rotation of the reference object. This method is used in applications where the reference object is positioned away from the measurement object, e.g. having the rotary flange on a gearbox as a reference when measuring a bearing journal on a propeller shaft installation or an extruder barrel.

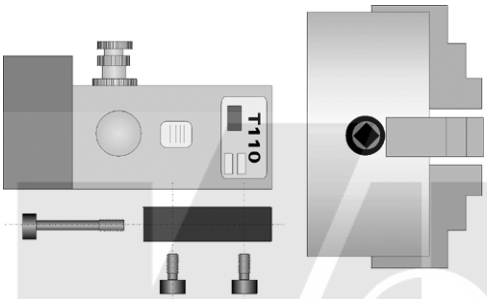
When performing the measurement the center of the fixture in which the receiver is mounted is arranged to represent the center of the tube. The diameter of the tube has to be the same throughout its length.

The method can either be used with or without rotating the laser transmitter at every measurement point. When rotating the laser at every measurement point it is not necessary to center the laser exactly to the center of the rotary flange. When not rotating the laser transmitter at every point the laser has to be positioned exactly in the rotational axis of the rotary flange.

In the following the measurement principle is described using an extruder barrel as example. The procedure describes how to perform the measurement when rotating the laser transmitter at every point. This method is based on the principle of “coning”.

Mounting of the laser transmitter T110 (or T111) to a four jaw chuck

Align the laser roughly before mounting. Mount the T110 (or T111) to the adapter plates and four jaw chuck with the supplied screws, as in picture.



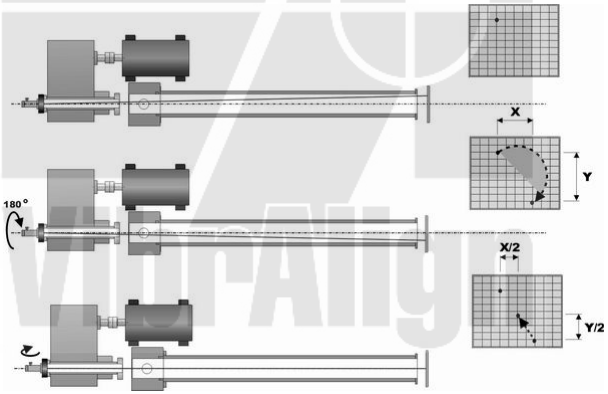
Mounting of the receiver R210 in an extruder fixture

Mount the R210 to the extruder fixture with the supplied screws, as in picture. (-Y shall be upwards.)

Coarse adjustment of the laser beam

In order for the laser beam to hit within the detector surface during the entire measurement the laser beam is coarsely aligned and centered to the gearbox rotational center.

1. Mount and center the laser transmitter on the gearbox flange. Place a piece of graph paper over the die end of the barrel. This graph paper will be used as a target for the coarse alignment procedure.
2. Mark the position of the beam on the graph paper.
3. Rotate the gearbox shaft 180°.
4. Using the micrometer screws on the laser transmitter eliminate the angle of the beam by adjusting the laser beam to half the distance from the starting position.
5. Repeat step 1–4 until the laser makes a steady spot while rotating the shaft 360° degrees.



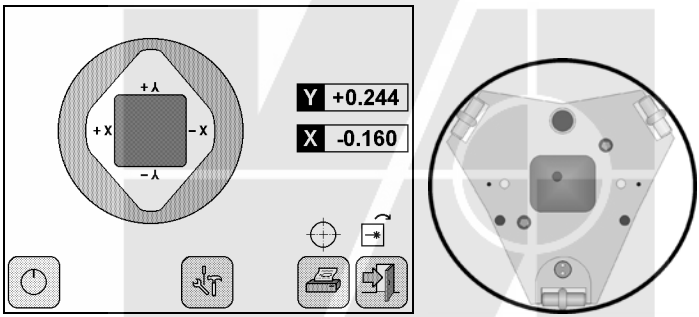
Zeroing of centerpoint

Using the method with zeroing of centerpoint, the center of the measurement object is set to zero (reference). (Other references can not be selected.) A symbol indicates the selected method and another symbol indicates if rotation of laser is selected.

The zeroing of centerpoint is made in three steps.

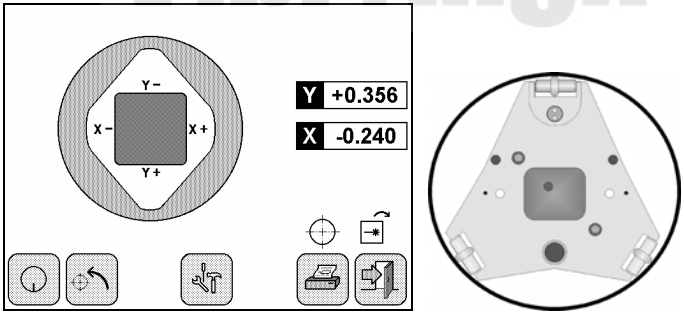
1. Place the fixture with the receiver upside down at the die end of the barrel.

Register the values at the 12 o'clock position



2. Rotate the fixture with the receiver 180°.

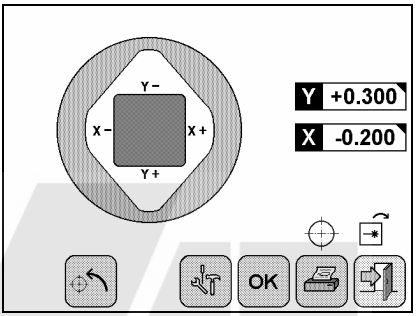
Register the values at the 6 o'clock position.



3. If desired, the centerpoint can be re-measured.

Re-measuring of centerpoint.

Confirm zeroing of centerpoint. Press the OK-icon.

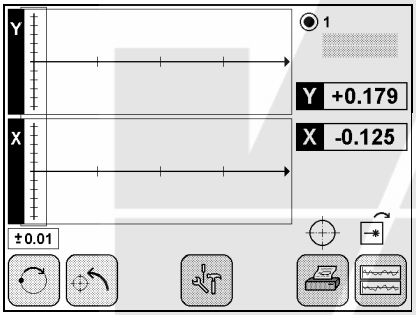


Measurement point registration with rotation of laser transmitter at every point

For complete measurement procedure see also standard straightness.

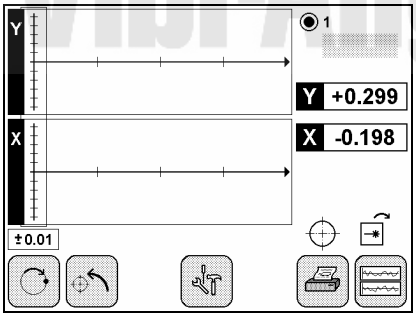
1. Position the target/receiver at the first measurement point, at the feed throat end, and turn the laser transmitter to 0°. To avoid fixture rotation when pulling the fixture to the position at the feed throut end, use line holder to center the line in tube.

Register the values in the position before rotation.



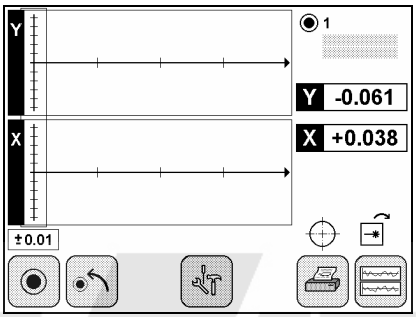
2. Turn the laser transmitter 180°.

Register the values in the position after rotation.

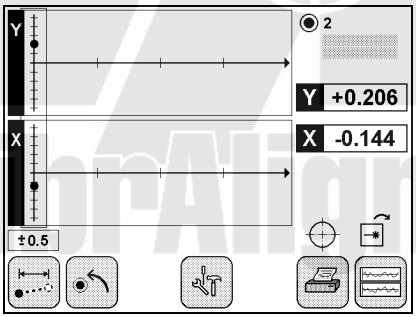


3. Register the measurement point.

Touch the register icon.



4. Move the target/receiver to measurement point 2 and rotate the laser transmitter to the 0° position. Always rotate in the same direction to avoid influence of backlash in gearbox. Repeat step 1-3 for each point to be measured.



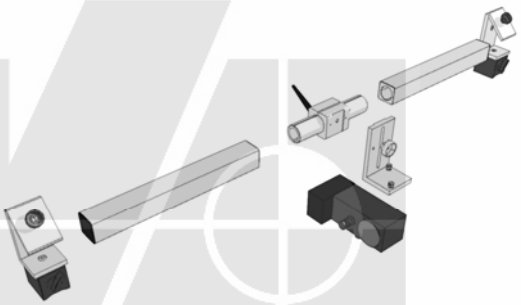
STRAIGHTNESS WITH ARC ANGLE

For complete description see also standard straightness.

Note: Equal distances between measurement points is default. Do not forget to change to individual distances when this is the case.

Mounting of the laser transmitter T110 (or T111) to the transmitter section

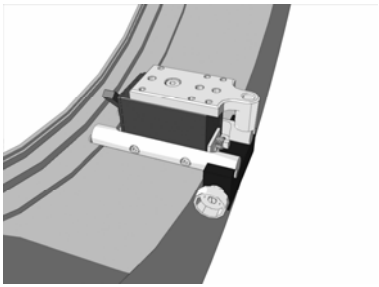
Mount the T1110 or T111 to the transmitter section, as in picture.



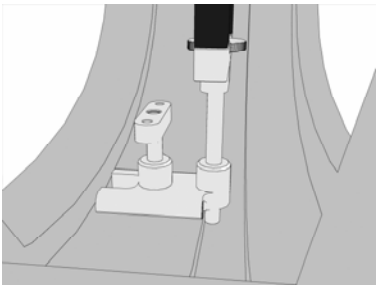
Mounting of the receiver R221 to the receiver fork

Mount the R221to the receiver fork, as in picture.

Placing of the fixtures for the probe



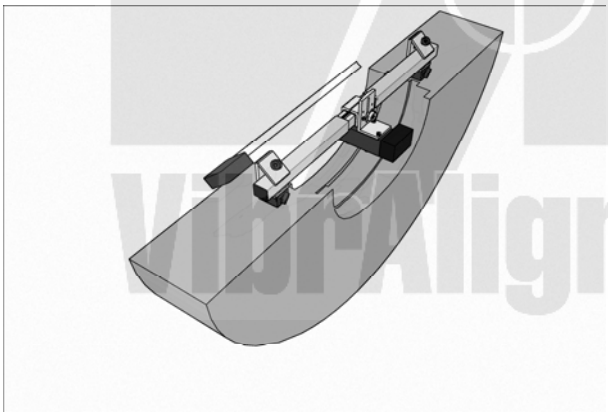
Magnetic Turbine Fixture



Probe guide

Coarse adjustment

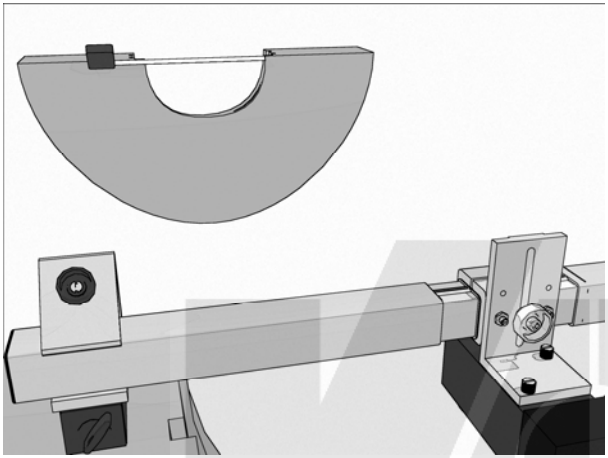
1. Place the laser transmitter as close as possible to the first bore. Make sure that the transmitter and its fixture is firmly attached to the casing.



2. Adjust the position of the laser, sideways and in height, until the laser beam is within 1-2 mm from centre of the first reference bore, by using the tape measure.

3. Adjust the angle of the laser beam, horizontally and vertically, by using

the micrometer screws on the laser transmitter to get it in the center of the second reference bore. Use a tape measure to get the beam into the center within 1-2 mm.



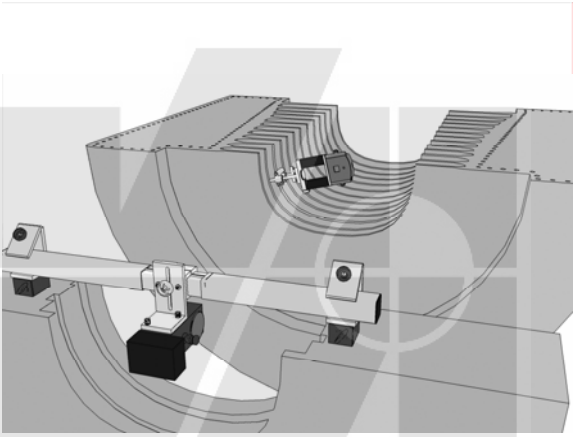
4. If necessary, repeat the procedure for coarse adjustment until the beam is centred in both reference bores.

Measurement point registration

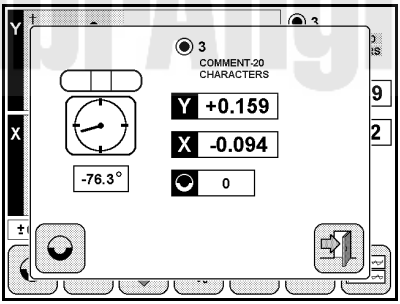
Using the Arc Angle method, the procedure at every measurement point is made in a sub-screen. For a complete measurement procedure, see also standard straightness.

For each measuring point, measurement values has to be taken in 3 positions.

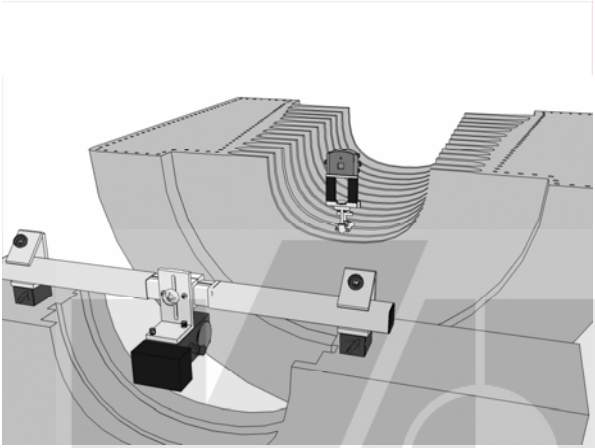
Important: Make sure that the entire laser beam falls inside the detector area on the receiver at all positions, before stating the registration.



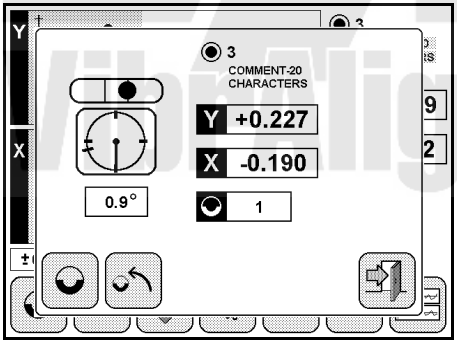
1. Place the receiver at the first position and make sure that it is properly attached to the surface.



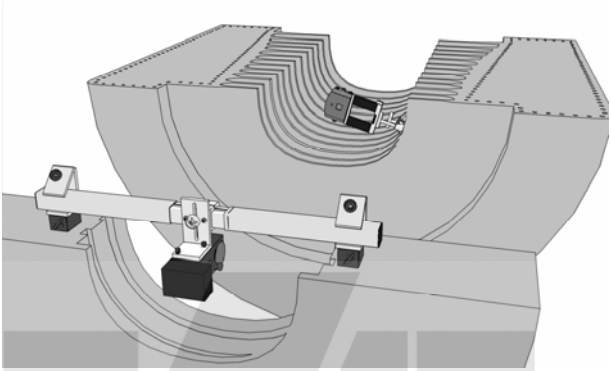
Register the values at the 1st position, by touching the icon for registration of positions in the Arc Angle method.



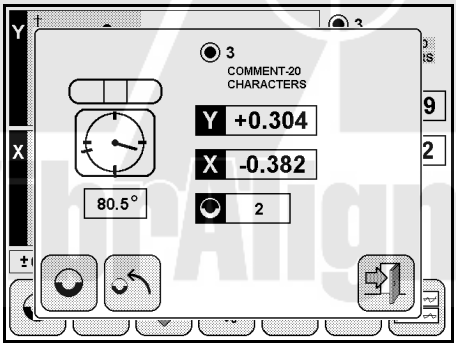
2. Rotate the receiver to a 2nd appropriate position. (Minimum angle between positions is 30 degrees).



Register the values at the 2nd position.



3. Rotate the receiver to the 3rd appropriate position. (Minimum angle between positions is 30 degrees).



Register the values at the 3rd position.

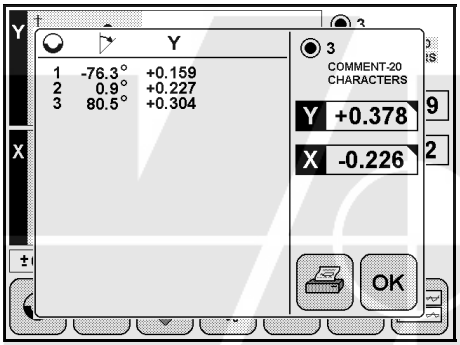
If desired, the latest position can be re-measured.

Re-measuring of the latest position.

4. Confirm the Arc Angle measurement with the 3 readings.

Touch the OK-icon.

5. When the Arc Angle measurement is confirmed, a list of the values at each position is shown. With this list it is possible to check that the position values are at a circle with its center at YX with an external evaluation. The list can be printed.



Print a screen dump of the list.

Return to 2-axes Straightness Measurement by touching the OK-icon.

6. Move the receiver to the next measurement point and continue the measurement sequence as described above.

DOCUMENTATION

There are three possibilities to document the measurement.

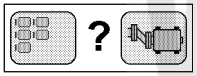
Save the measurement in the system memory. When a measurement is saved in Advanced Straightness, it is what you see that is saved. A measurement can be saved several times. For example before and after alignment or with different reference points.

Print the result. Print the summary screen first and then the list to get a complete documentation of all measurement points. To get a better view of specific parts of the measurement print the detailed screen.

Export saved measurements to a computer.

RESUME FUNCTION

The Advanced Straightness Measurement program is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the Advanced Straightness Measurement icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

VibrAlign

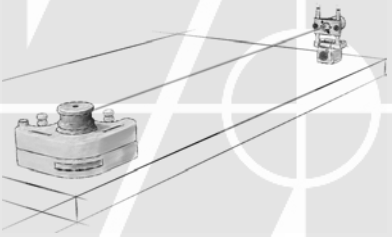
FLATNESS MEASUREMENT

INTRODUCTION

In the Flatness Measurement program a laser plane is used as reference. The deviation in distance between the laser plane and the measurement object is measured in one or more positions with the use of the receiver.

The laser plane can either be created by three reference points or by leveling, where the laser plane is put in level and where one measuring point is the reference.

In the program there is support for both rectangular and circular objects.



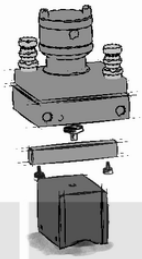
MOUNTING INSTRUCTION

Mounting of the laser transmitter T210

The T210 can either be mounted on a magnetic base or on a tripod.

When using the magnetic base, mount the rod adapter on the magnetic base with the supplied screw. Attach the T210 onto the adapter with the two supplied screws, as in picture.

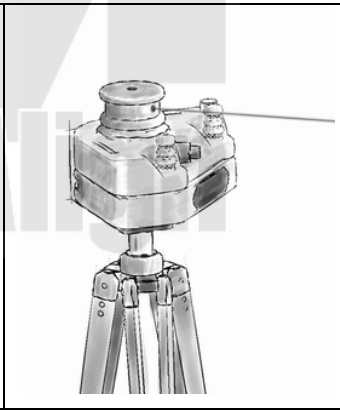
On a tripod, use the supplied screws to attach the T210.



Mounting of the laser transmitter T220

The T220 can either be placed directly on the measurement object or be mounted on a tripod.

Mount the T220 on a tripod as shown in picture. Use the supplied screws.

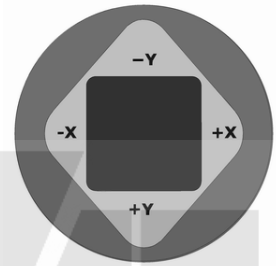


Mounting of the receiver R210

The R210 is mounted on the magnetic base with spirit level together with the receiver adapter and the rods

Mount the R210 to the receiver adapter with the supplied screws. Mount the rods to the magnetic base with spirit level. Slide the R210 on to the rods, as in picture. (-Y shall be upwards.)

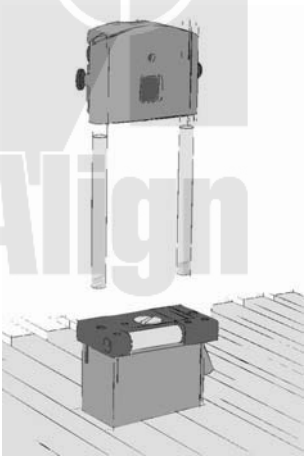
Note: Make sure that the receiver is properly locked in its position.



Mounting of the TD-M 100

The TD-M 100 is mounted on the magnetic base with spirit level together with the rods.

Mount the rods to the magnetic base with spirit level. Then mount the TD-M 100 to the rods, as in picture.



START THE PROGRAM

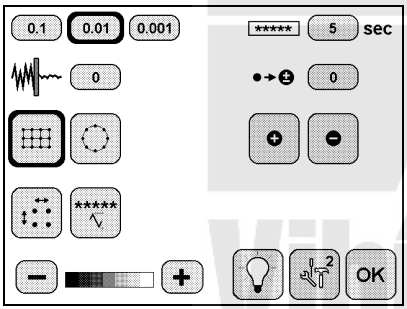
Start the program by touching the Flatness Measurement icon in the Main Menu.

When the program is opened the configuration screen is shown.

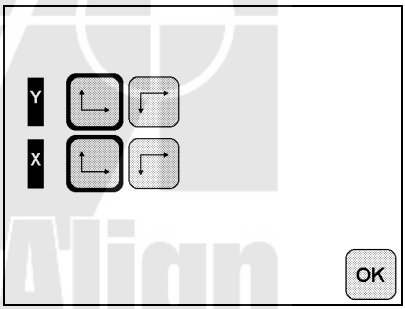
Go to the Application Set-up for selecting configuration and other settings.

APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.



Application Set-up



Application Set-up page 2

Displayed measurement value resolution

0.1, 0.01 and 0.001 mm / 1, 0.1, 0.01 mils (0.01 mils angle only).

Sampling time

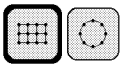
Sets the time (in seconds) used to collect calculation base for measurement values. Select between 1 and 99 seconds.

Screen filter

Sets the screen filter on a scale from 0 to 10 where 0 is disabled and 10 is maximum filtration. This slows down the update frequency of the screen values without reducing the accuracy of the registered values.

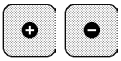
Tolerance

Sets the tolerance. When the tolerance is set symbols are showing if a measurement point is inside or out of tolerance.



Configuration

Rectangular or circular configuration can be selected.



+ or - values only

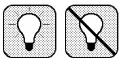
When selecting positive or negative values only suitable references are automatically selected. Use only after points are measured.

Repeatability Test

Starts the sub-function for repeatability test.

Contrast

Touching respectively on each side of the symbol increases and decreases the screen contrast.

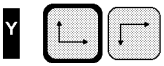


Backlight

Turns on and off the screen backlight.

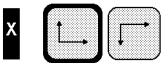
Page 2

Goes to Application Set-up page 2.



Inversion of Y-values

Select between normal or inverted Y-values. Normal is default.



Inversion of X-values

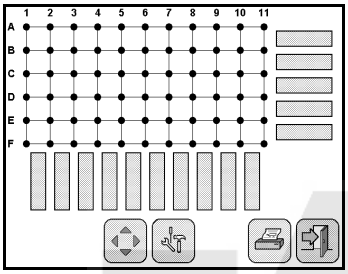
Select between normal or inverted X-values. Normal is default.

Confirmation

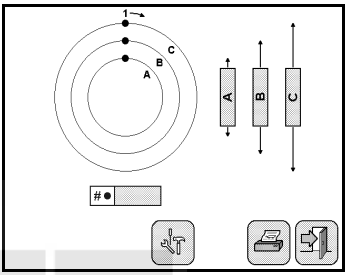
Confirms made selections and returns to the application program.

CONFIGURATION

In the Flatness Measurement program you can select between rectangular and circular configuration.



Configuration screen – rectangular



Configuration screen - circular

Rectangular: Enter distances between measurement points.
Circular: Enter diameters.

#● Enter number of measurement points at a circle (circular only). Max 16.

Scroll function (rectangular only). Changes to scroll icons.

Open Application Set-up.

OK Confirm configuration and go to measurement screen.

Print a screen dump.

Exit from the program.

Rectangular configuration

Up to 11 x 11 points can be measured. Number of points is selected by entering distances.

Equal distances can easily be entered by enter them at the last point (most far from A1). The same distance will then be filled in all empty boxes towards A1.

Distances can be changed and removed until the measurement result is confirmed. To remove a distance, enter 0. When removing a distance, distances beyond that distance will also be removed. Distances cannot be removed if a measured point is beyond the distance.

Circular configuration

Up to 3 circles with 16 points at each circle can be measured. Number of points is selected by entering diameters and number of points at a circle.

Diameters and number of points at a circle can be changed until the measurement result is confirmed. When changing number of points it has to be a multiple of the origin number of points. Circles and number of points at a circle cannot be removed.

Coarse Adjustment - When Using 3 Reference Points

Position the laser transmitter at one end of the measurement object, on the object or on a tripod.

Mark the measuring points and name them as they will be shown in the flatness software (A1, A2 etc).

Position the receiver as close as possible to the laser transmitter. Adjust the height of the laser transmitter and the receiver to get the laser beam to hit the centre of the target.

Move the receiver to a second point on the measurement object at a far distance from the transmitter. Adjust the angle of the laser beam, with one of the adjustment screws, so it hits the centre of the target.

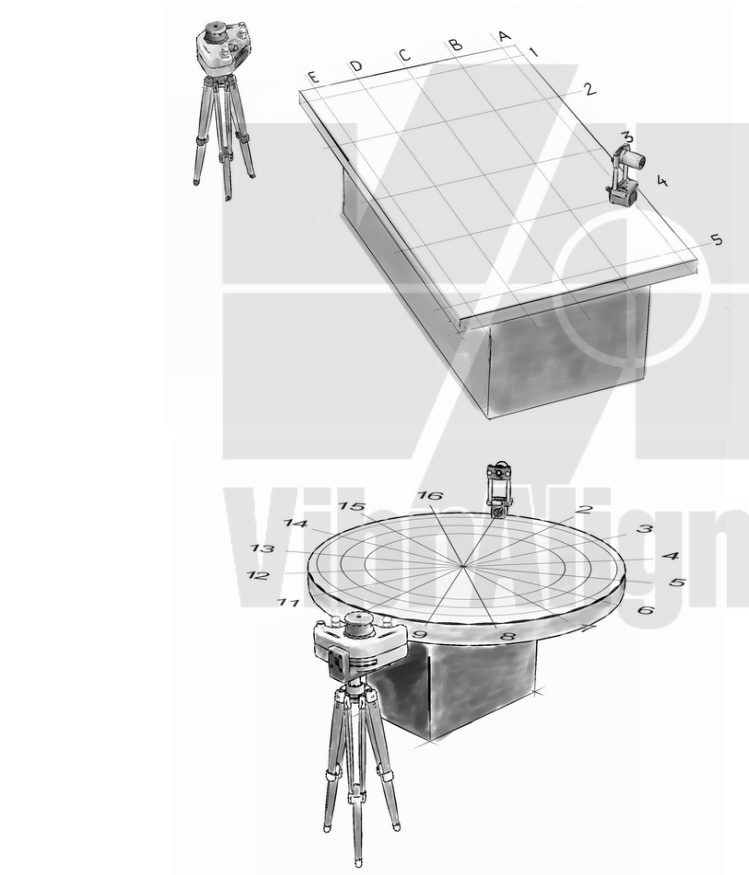
Move the receiver to a third point on the measurement object at a far distance from the transmitter. Adjust the angle of the laser beam, with the second adjustment screw, so it hits the centre of the target.

Repeat the procedure until the laser beam hits the centre of the target at all three points. Check that the beam falls into the target centre at all measurement points before starting the flatness measurement.

REPEATABILITY TEST

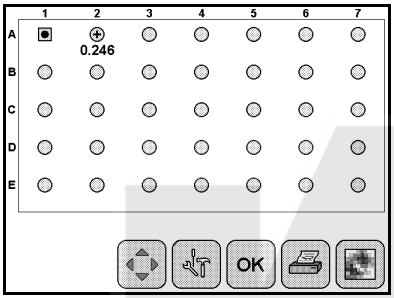
Before starting the flatness measurement it is recommendable to perform a repeatability test. See the chapter Repeatability Test.

Do the repeatability test at a position far from the laser transmitter.

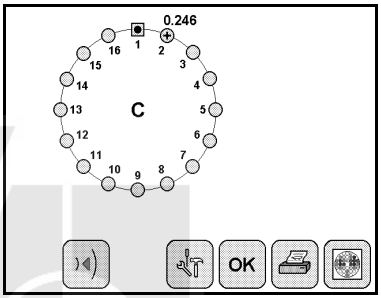


MEASUREMENT POINT REGISTRATION

The measurement screen shows a part of the plane (max 5 x 7 points in a rectangular plane and a circle in a circular plane). The measurement points are shown with an icon and, for the points outside tolerance, also a value.



Measurement screen - rectangular



Measurement screen - circular


Touching at a measurement point opens the sub-screen for registering.


Scroll function (rectangular only). Changes to scroll icons.


Scroll to a smaller circle (circular only).


Scroll to a bigger circle (circular only).


Open Application Set-up.

Confirm the measurement result and end the registering.


Print a screen dump.

Go to the summary screen.

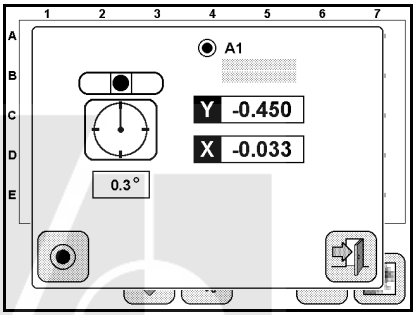
Sub-screen for measurement point registration

Position the receiver at the measurement point and remove the target.

Add or change comment.

Register the measurement point.

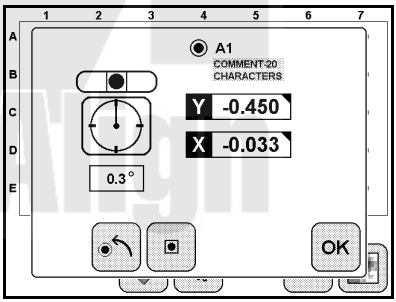
Exit from the sub-screen.



Display of X-value and inclinometer depend on receiver in use

Re-measuring of the measurement point.

OK Confirm the measurement point.



A result box with a triangle in the upper right corner shows that the value is fixed (not live). (X-value will not be stored.)

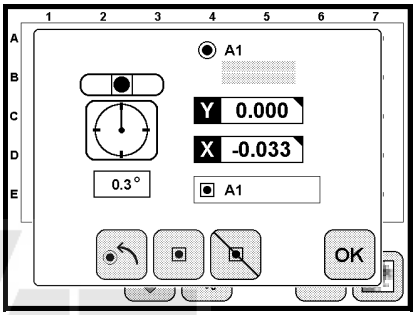
Selecting reference points

Reference points are selected in the sub-screen.

Select as reference point.

Delete all reference points.

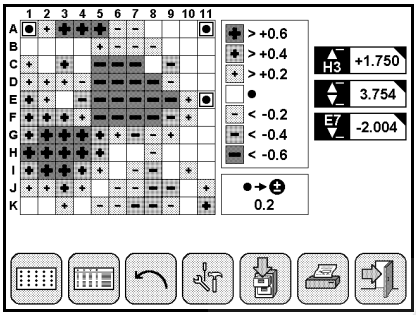
OK Confirm.



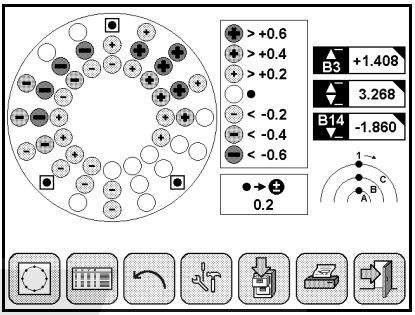
If a new reference point is selected when there are already three reference points the first selected will be replaced.

It is not possible to select three reference points in a straight line.

SUMMARY SCREEN



Summary screen - rectangular



Summary screen - circular

The summary screen shows all the measurent points in a diagram with symbols showing if the point is inside or out of tolerance. Beside this diagram the tolerance and an explanation for the symbols are shown (inside tolerance or out of tolerance with more than 1x, 2x or 3x). Maximum and minimum values and the difference between these are also shown.


Go to the detailed diagram.

Go to the list of measurement points.

Re-measuring of all measurement points.

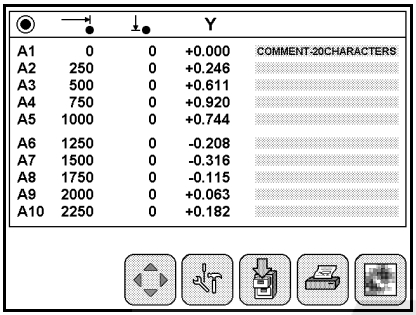
Open Application Set-up.

Save the measurement. See Memory Manager.

Print a screen dump.

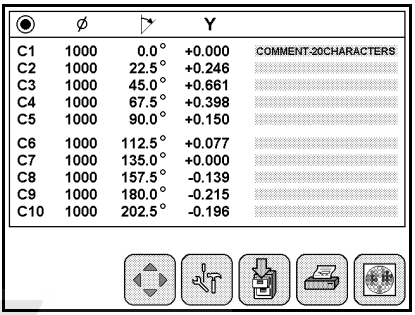
Exit from the program.

LIST OF MEASUREMENT POINTS



			Y	
A1	0	0	+0.000	COMMENT-20CHARACTERS
A2	250	0	+0.246	
A3	500	0	+0.611	
A4	750	0	+0.920	
A5	1000	0	+0.744	
A6	1250	0	-0.208	
A7	1500	0	-0.316	
A8	1750	0	-0.115	
A9	2000	0	+0.063	
A10	2250	0	+0.182	

List screen - rectangular



	⌀		Y	
C1	1000	0.0°	+0.000	COMMENT-20CHARACTERS
C2	1000	22.5°	+0.246	
C3	1000	45.0°	+0.661	
C4	1000	67.5°	+0.398	
C5	1000	90.0°	+0.150	
C6	1000	112.5°	+0.077	
C7	1000	135.0°	+0.000	
C8	1000	157.5°	-0.139	
C9	1000	180.0°	-0.215	
C10	1000	202.5°	-0.196	

List screen - circular

The list screen shows all the measurement points in a list with distances, values and eventually comments.

Add or change comment.

Scroll function. Changes to scroll icons.

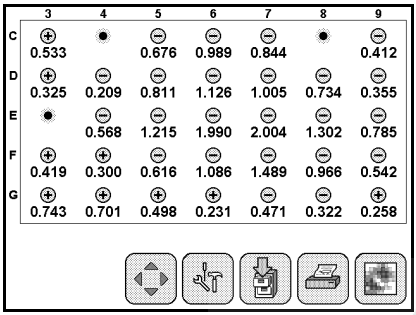
Open Application Set-up.

Save the measurement. See Memory Manager.

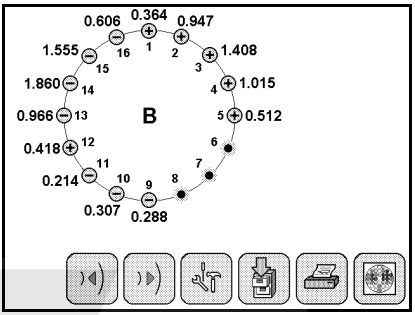
Print the list.

Return to the summary screen.

DETAILED SCREEN



Detailed screen - rectangular



Detailed screen - circular

The detailed screen shows a part of the plane (max 5 x 7 points in a rectangular plane and a circle in a circular plane). The measurement points are shown with an icon and, for the points outside tolerance, also a value.

Touching at a measurement point opens the sub-screen for measurement point alignment.

Scroll function (rectangular only). Changes to scroll icons.

Scroll to a smaller circle (circular only).

Scroll to a bigger circle (circular only).

Open Application Set-up.

Save the measurement. See Memory Manager.

Print a screen dump.

Return to the summary screen.

EVALUATION OF MEASUREMENT RESULT

The result is presented in relation to selected references. The direction is depending on how the receiver is placed. If the receiver is placed according to the mounting instructions Y-values are showing the vertical direction.

In the vertical direction (Y) positive values mean that the measurement object at this point is high and negative values that the measurement object is low (if this is not changed in the application set-up.)

A result box with a filled triangle in the upper right corner shows that the value is fixed (not live)

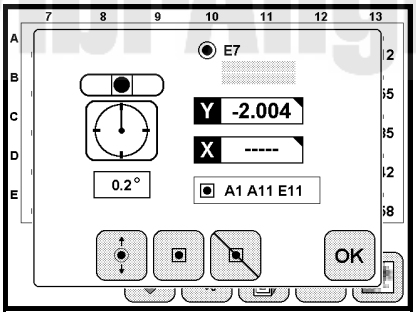
ALIGNMENT OF MEASUREMENT POINT

When alignment of measurement point is selected, the sub-screen for measurement point alignment is shown.

Note: It is recommended to set the screen filter to 0 when aligning.

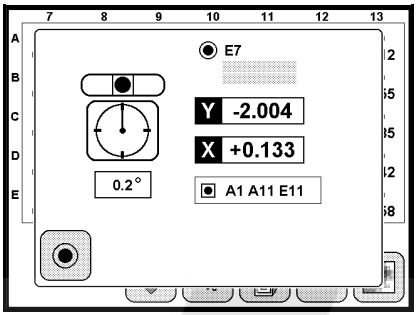
Position the receiver at the measurement point that should be aligned.

Touch the alignment icon. Make sure that the laser beam hits the target. The actual values for the selected point go live and alignment can be made against zero. Zero will be in accordance to selected references.



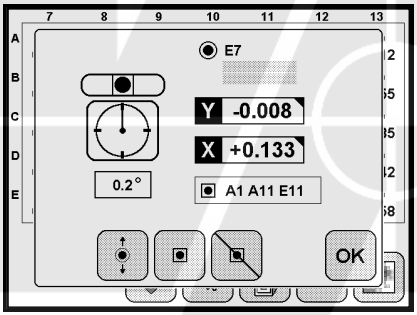
Align the selected measurement point to zero.

Touch the register icon.



OK

Touch OK to confirm adjusted value.



The program returns to the detailed screen with the adjusted value.

Note: Depending on your application, alignment at one point might affect other measurement points. It is therefore recommended to remeasure all points when all adjustments are made.

DOCUMENTATION

There are three possibilities to document the measurement.

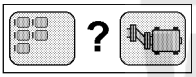
Save the measurement in the system memory. When a measurement is saved it is what you see that is saved. A measurement can be saved several times. For example before and after alignment or with different reference points.

Print the result. Print the summary screen first and then the list to get a complete documentation of all measurement points. To get a better view of specific parts of the measurement print the detailed screen.

Export saved measurements to a computer.

RESUME FUNCTION

The program is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the program icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

VibrAlign

ROLL PARALLELISM

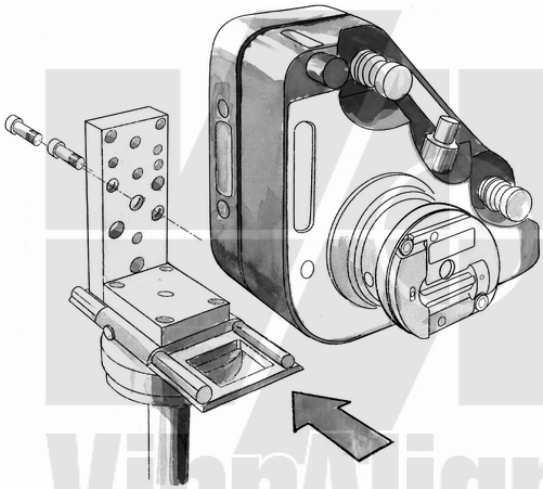
INTRODUCTION

The principle of roll parallelism measurement is to select a reference and measure each roll in relation to this reference. The reference can be either an existing floor reference line, running alongside the machine, or any of the rolls. The laser beam is used to replace the reference and the Angular Prism to transpose it to the roll to be measured. When you are taking readings on the roll you are actually measuring the deviation in the distances between the roll surface and the reference in two measure- ment points. The roll can be adjusted directly or when all rolls have been measured. The adjustments are made with real time values on the screen.

The procedure described in this chapter is for using a floor reference.

Mounting of the lasertransmitter T220

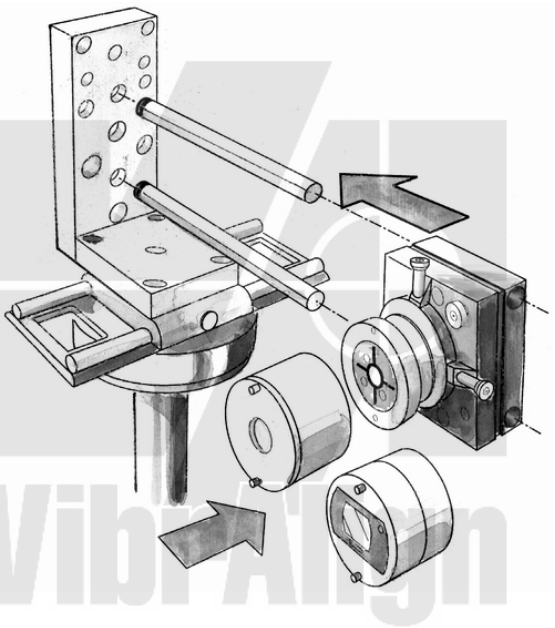
The T220 is mounted on one of the tripods together with the Slide Table and the Angular Bracket. The Slide Table is firstly mounted to the tripod with a 5/8” screw, or via the M6x12 screw. The Angular Bracket is attached to the Slide Table with the supplied screws. The T220 is mounted to the Angular Bracket with supplied screws as in picture. Tighten the screws well, but do not over-tighten.



Mounting of the Angular Prism

You will need to mount the Slide Table and the Angular Bracket before you mount the Angular Prism. Attach the two long Rods on the Angular Bracket. Use the supplied tool to tighten the Rods. Mount the Angular Prism on the Rods with one adjustment screw pointing upwards and the other pointing away from the bracket to get easy access to them.

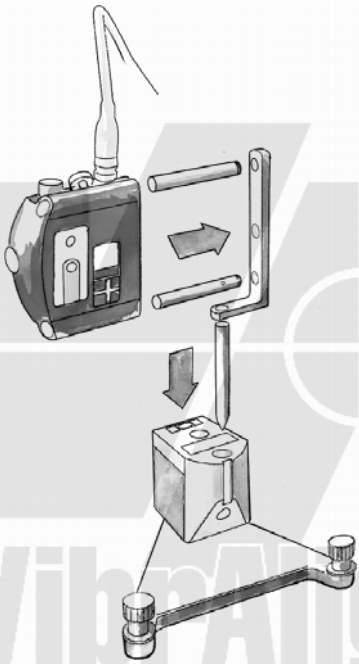
The Prism Head and the FD15 are mounted and dismounted, without using any tools.



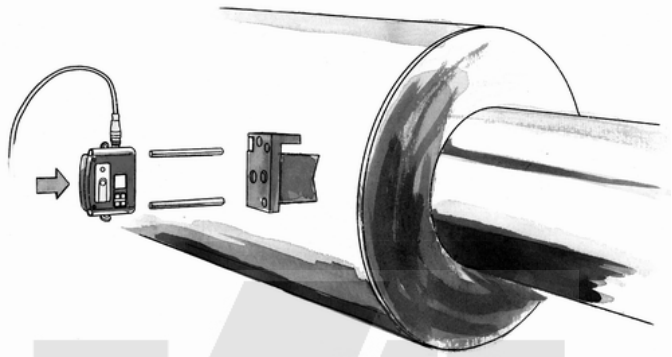
Mounting of the Datum Mark Pick-Up Fixture

The Detector Probe Guide is mounted as in the picture using the short Rods. Use the supplied tool to tighten the rods. The Detector is positioned flat to the fixture with the cable connectors pointing upwards.

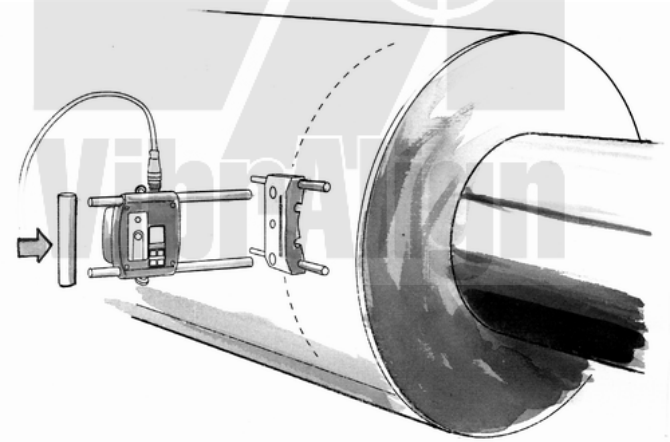
The Detector Probe Guide is fixed to the Triangular Basae with the magnet by turning the lever.



Mounting of the Magnet Base Fixture



Mounting of the Roll fixture



COARSE ADJUSTMENT

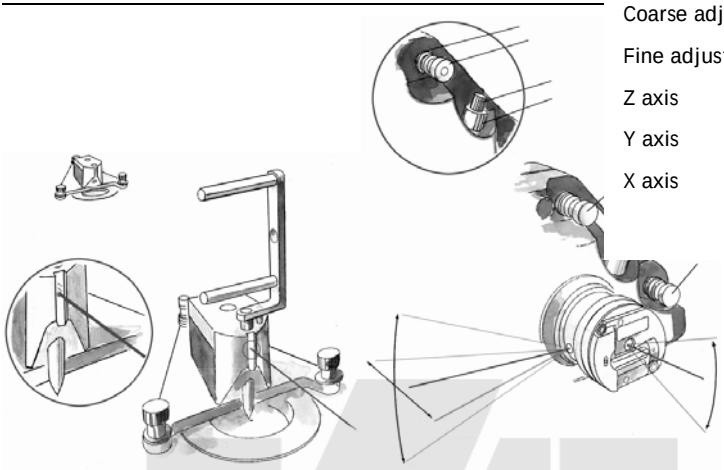
The first thing you will need to do in a roll parallelism measurement is to line up the laser beam parallel to a reference. It is not necessary to do this accurately. It is only required that you adjust the beam to hit the detector surface. The software handles the deviation between the laser beam and the reference.

The reference can be either floor datum marks (floor monuments) or a roll. The following procedure will describe how to set up the equipment using floor datum marks as reference. Rough line up of the laser using a roll as the reference is de- scribed in the application notes.

Coarse setting of the Laser Transmitter T220

Position the Triangular Bases over two of the datum floor marks. The Triangular Base is leveled using the spirit level on the Detector Probe Guide and the adjustment screws on the Triangular Base. Adjust the level in two directions. Position the Detector Probe Guide with the Detector Probe and fix it with the tip of the probe on the datum mark. The reflecting tape should face the Laser Transmitter. When one of the Triangular Bases is correctly positioned carefully lift up the Detector with the Detector Probe and repeat the procedure for the second Triangular Base.

Position the tripod with the Laser Transmitter so that the laser beam lines up as close to the reflecting tape as possible. Note that the entire laser spot must hit the Detector surface without being blocked. A too steep angle between the laser beam and the Detector may result in unreadable signals. Carefully move the tripod until you reach the best possible position



Coarse adjustment

Fine adjustment

Z axis

Y axis

X axis

Aim the laser beam to the center of reflecting tape on the closest Datum Mark Pick-Up Fixture. Turn the turret on the T220 until the beam hits the reflecting tape on the furthest Datum Mark Pick-Up Fixture.

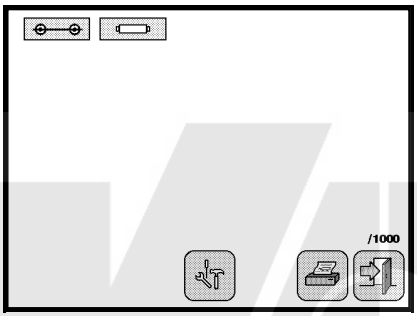
Center the beam on the furthest reflecting tape. If the distance is large you may need to rotate the tripod head, if not you can use the lower micrometer screw on the T220.

Turn the turret until the laser beam hits the reflecting tape on the closest Datum Mark Pick-Up Fixture. Centre the beam by adjusting the T220 sideways with the Slide Table.

Repeat step 4 and 5 until the laser beam hits both reflecting tapes by just turning the turret.

START THE PROGRAM

Start the program by touching the Roll Parallelism icon in the Main Menu.



Go to the Application Set-up for settings.

APPLICATION SET-UP

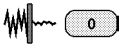
Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

0.1 **0.01** 0.001 — Resolution

Sets the displayed measurement resolution to 0.1 – 0.01 – 0.001 mm in metric mode and 1 – 0.1 – 0.01 mils in imperial mode (0.01 mils angle only).

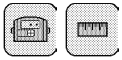
***** **5** sec — Sampling time

Sets the time (in seconds) used to collect calculation base for measurement values. Select between 1 and 99 seconds.



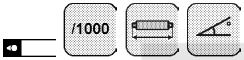
Screen filter

Sets the screen filter on a scale from 0 to 10 where 0 is disabled and 10 is maximum filtration. This slows down the update frequency of the screen values without reducing the accuracy.



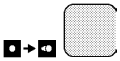
Measurement registering

Select between registering with detector or by manual entry.



Result display

Sets how the measurement result is displayed. Select between per 1000 mm (per 1”), per roll length or as an angle.



Tolerance

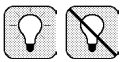
Sets the tolerance for when the zero-value of the roll symbol should be displayed.

Repeatability Test

Starts the sub-function for repeatability test.

Contrast

Touching respectively on each side of the symbol to increase and decrease the screen contrast.

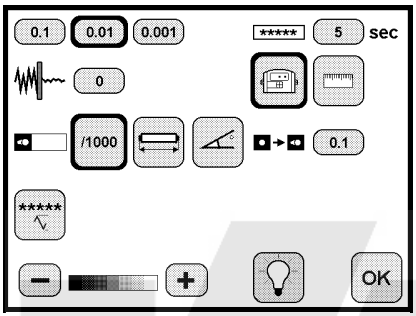


Backlight

Turns on or off the screen backlight.

Confirmation

Confirms made selections and returns to the application program.



ESTABLISHING THE REFERENCE

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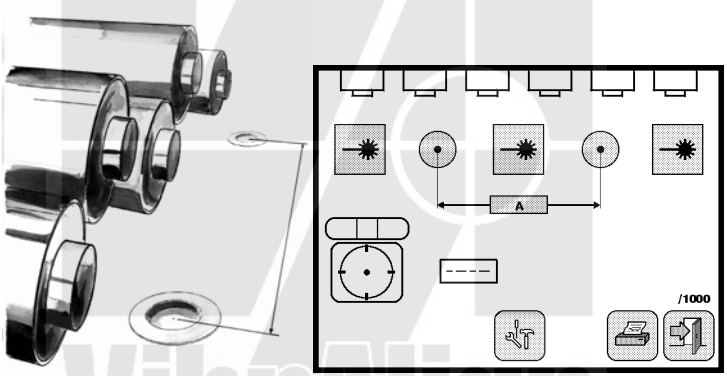
Select Reference line in the Roll Parallelism Program

The screen displays a top view of your working area with three possible positions for your T220. Select the one according to your situation

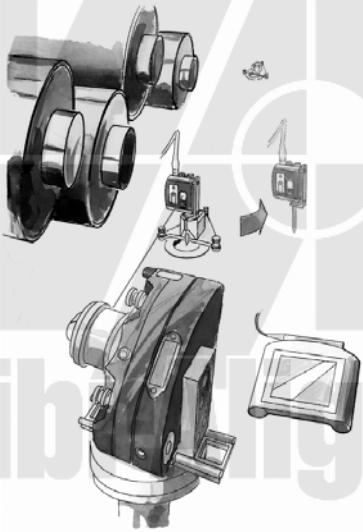
Measure the distance between the two datum marks where you have positioned the Datum Mark Pick-Up Fixtures with a tape measure. Touch the “A”-icon and enter the distance in mm or inch depending on the System setup. Touch OK.



Mount the Detector unit on one of the floor fixtures. Note that the cable connection must be pointing upwards. Turn the T220 turret until the laser beam hits the Detector surface. Use the cross hair on the Detector if necessary.

Touch the Datum Mark icon on the Display unit corresponding to the actual position of the Detector. Wait until measurement values appear on the screen before you remove the Detector. This may take a few seconds depending on the selected Sampling Time in the Application setup.

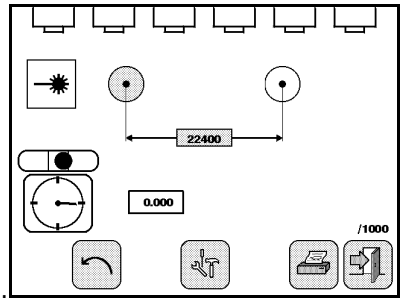
Move the Detector to the second Datum Mark Pick-Up Fixture and repeat the procedure.



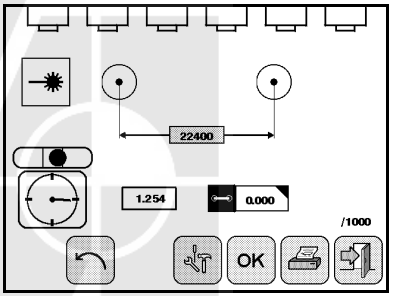
Touch the OK icon.

Touch the re-measure icon if you need to re-measure.

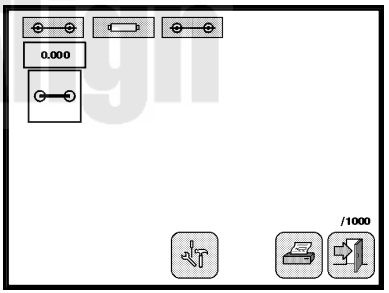
The reference is now established and measurement of the rolls can start. You can always go back and re-check the reference at any time during the measurement process. To do so touch the Re-check icon at the far right in the Summary screen. This might be necessary if there are people working in the area. It is essential to the measurement result that the T220 remains untouched during the process. If moved, only the slightest, it is devastating to the measurement result and you will have to start over again.



The reference screen with one point measured



The reference screen with both points measured.



The summary screen when the reference is established.

SETTING UP THE ANGULAR PRISM

Before the centering process can start the laser beam has to be leveled. The easiest way to achieve this is to use the tape measure to set the distance between the laser beam and the floor equally on two locations; the first location close to the T220, the second location close to the Angular Prism.

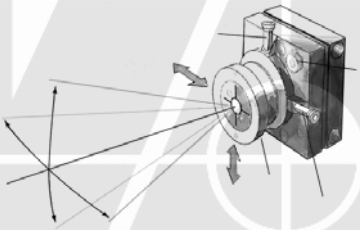
Position the tripod with the Angular Prism over the reference line at the roll you want to measure. Roughly adjust the Angular Prism horizontally and vertically , by raising/lowering the tripod and using the Slide Table, so that the laser beam hits the center of the Angular Prism. The deflected beam should run along the roll to be measured at a distance from the roll between 50 – 200 mm (2” – 7,5”). The tripod should rest stable on the floor and the tripod platform be roughly leveled.

Coarse centring and collimating of the Angular Prism

Uncover the mirror by removing the Prism Turret. Coarsely adjust the Angular Prism adjusting the tripod height and using the Slide Table.

Make a fine adjustment to the Angular Prism using the adjustment screws for parallel movement in the X and Y directions so that the laser spot hits the centre of the mirror..

Adjust the reflected beam so it hits the laser aperture on the T220 by using the tilt adjustment screws on the Angular Prism. Check that the laser beam still hits the center of the mirror. If necessary, adjust parallel and then angular again.



Fine centering of the Angular Prism

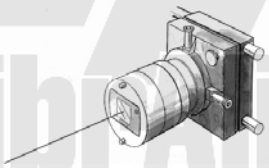
Attach the FD15 (the centering Detector) on the Angular Prism turret and turn on its power. The LED flashes green light when turned on, and not reading any laser spot. When the laser beam hits the detector surface the light turns to permanently green or red. Rotate the turret so that the color marks are on each side (left – right).

The LED on the FD15 is now permanently green or red. Green light indicates that the Angular Prism needs to be adjusted horizontally, e.g. moved towards red and vice versa. Use the adjustment screws on the side of the turret for adjustments horizontally. The moment when the light turns from red to green or green to red, the correct position is reached.

Rotate the turret 90 degrees, color marks at top – bottom. Repeat the above procedure. Use the adjustment screw for vertical movements until the LED changes color.
Repeat step 2 and 3 if necessary.

Check that the laser beam is reflected back to the laser aperture on the T220.

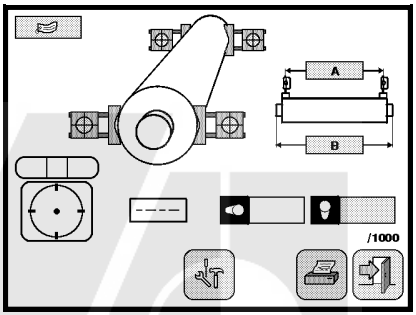
Replace the FD15 with the Angular Prism head.



ROLL MEASUREMENT

Select Roll measurement in the Roll Parallelism Program. The screen shows the roll viewed from the driver's side.

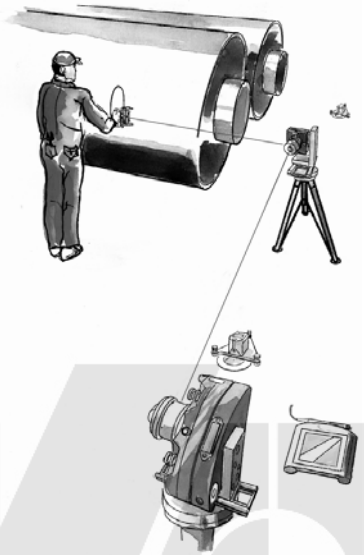
Touch the ID icon and enter the Roll ID. (This is mandatory). You can use 8 alphanumerical characters. Touch OK.



A
B

Measure the distance between the positions on the roll, where you are going to take readings. Touch the "A" symbol and enter the distance (mm or inch depending on system settings). Touch OK. If you have chosen to display the result per roll length you will also need to enter the B value (roll length).

Position the Detector on one of the desired measurement points. Adjust the Detector angle so it is leveled using the inclinometer display on the screen or, until the LED on the Detector turns from flashing green to red, or vice versa. Direct the laser beam to the Detector by rotating the turret on the Angular Prism. Touch the icon corresponding to the Detector position.

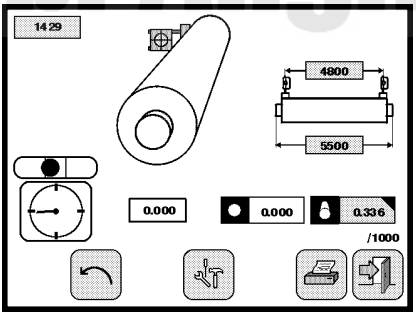


Move the Detector to the second measurement point, adjust the angle, direct the beam and touch the Detector icon on the screen. The deviation is now displayed. The symbol indicates the direction of the deviation.

The vertical deviation can now be entered. Measure the deviation using a machine level. Touch the icon for manual entry and enter the deviation. Touch OK.

OK

Touch OK to confirm the measurement results. You will now return to the Summary Screen.



Manual entry of measurement values

Sometimes it is impossible to measure a roll with the Detector. In those cases it can be necessary to enter the values manually.

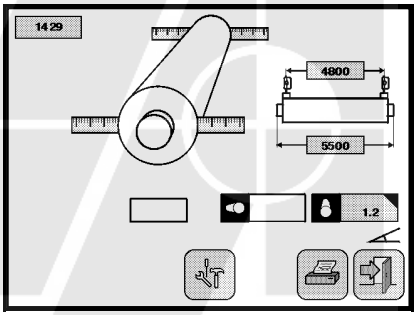
Select Manual Entry in the Application Setup.

Position a ruler, in level, on the first measurement point and direct the laser beam. Read the value where the laser beam hits the ruler. Touch the Ruler icon that corresponds to the measurement position and enter the value. Values are entered in mm or mils. Touch OK.

Repeat the procedure above for the second measurement point

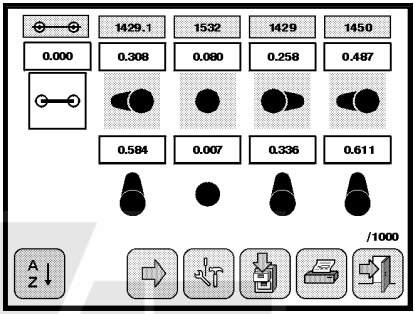
OK

Touch OK to confirm the measurement result and return to the Summary Screen.



SUMMARY SCREEN

The Summary Screen is updated as new rolls are measured. To the right of the most recently measured roll there is a new symbol for rolls to be measured. Up to 50 rolls can be measured.




Measure new roll.


Change of reference. Select any roll or the Reference line to become the new reference by touching its icon. All values are recalculated.


Re-check of reference. (See next page)


Re-measurement of a roll. Touch the Roll ID to enter the measurement screen for that particular roll.


Alignment of a roll. Touch the Roll ID to enter the measurement screen for that particular roll.


Sort the rolls. The rolls are sorted on ID in ascending order. The most left sign is sorted firstly. Sort order: 0-9, a-z (I.e. 11 comes before 2, and 02 comes before 11).



Scroll left/right.


Open Application Set-up.

Save the measurement. See Memory Manager.

Print a screen dump.

Exit from the program.

CHECK THE REFERENCE LINE

To ensure yourself that the T220 has not been moved during the measurement procedure a check of the reference line is recommended.

Select the icon for the reference line at the far right in the Summary Screen. (This appears only if you have established a reference line previously.)

Accomplish the measurement procedure as described in Establishing the reference line.

This reference line check will appear as one of the measurements made. Compare this one with the original reference line measurement to check that the reference laser beam has not moved. If it has move, previous measurements has to be re-made.

ALIGNMENT

Touch the Roll ID of the roll you want to align in the Summary Screen.

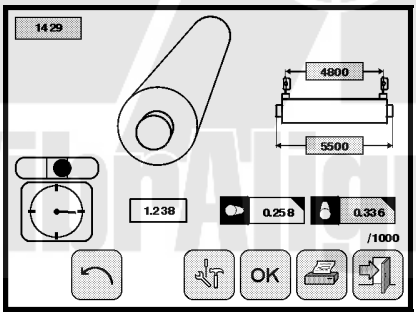
Touch the re-measure icon.

Position the Detector on the measurement point at the end of the roll that is considered as fixed (non-adjustable) and direct the laser beam. Touch the icon corresponding to the Detector position. The deviation is zeroed.

Move the Detector to the second measurement point and direct the laser beam. The measurement values are continuously updated. Adjust the roll towards zero until the deviation is within tolerances

Re-measure the roll when the adjustments are finished.

Touch OK to confirm the measurement result.



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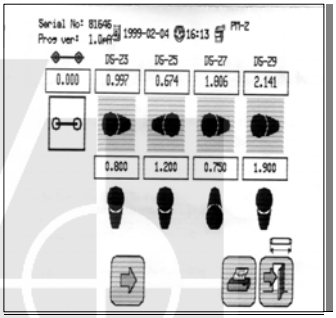
DOCUMENTATION

There are three possibilities to document the measurement.

Save the measurement in the system memory. When a measurement is saved it is what you see that is saved. A measurement can be saved several times. For example before and after alignment or with different reference points.

Print the result. Print the summary screen first and then the list to get a complete documentation of all measurement points. To get a better view of specific parts of the measurement print the detailed screen.

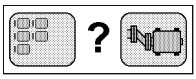


Export saved measurements to a computer.

RESUME FUNCTION

The program is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.

When the system is restarted after resume a selection box appears. Touch the program icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.



VibrAlign

RECEIVER DISPLAY

INTRODUCTION

In the Receiver Display program the screen displays the values from the connected receiver(s). The values can be treated with some functions.

Start the program by touching the Receiver Display icon in the Main menu.

Go to the Application Set-up to change the settings.

APPLICATION SET-UP

Settings unique for this application can be made in the Application Set-up. Which functions that are available depend on which system you have selected.

Resolution

Sets the displayed measurement resolution to 0.1 – 0.01 – 0.001 mm in metric mode and 1 – 0.1 – 0.01 mils in imperial mode (0.01 mils angle only).

Sampling time

Sets the time (in seconds) used to collect calculation base for measurement values. Select between 1 and 99 seconds.

Screen filter

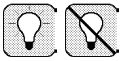
Sets the screen filter on a scale from 0 to 10 where 0 is disabled and 10 is maximum filtration. This slows down the update frequency of the screen values without reducing the accuracy.

Repeatability Test

Starts the sub-function for repeatability test.

Contrast

Touching respectively on each side of the symbol to increase and decrease the screen contrast.



Backlight

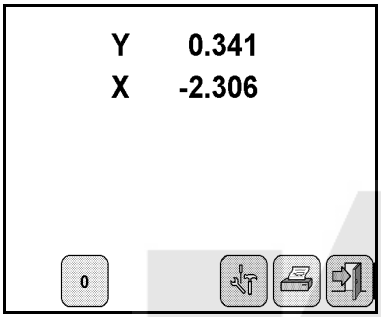
Turns on or off the screen backlight.

Confirmation

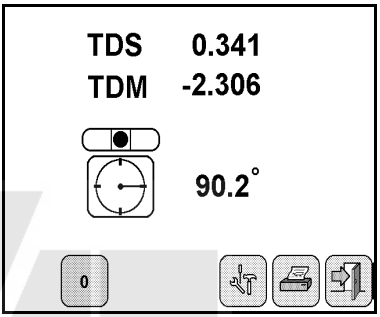
Confirms made selections and returns to the application program.

RAW DATA

The screen displays the raw data from the receiver(s). If any value is missing ---- is shown. The inclinometer display shows the TD-M position.



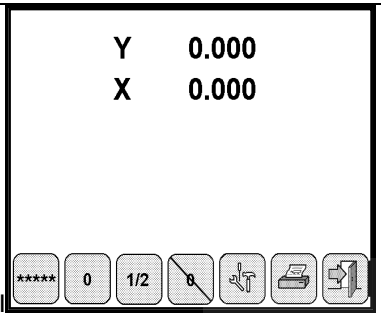
R-210 connected



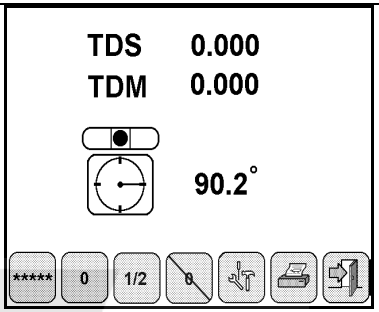
TD-M & TD-S connected

By touching the zero icon, the values will be zeroed and additional functions will be available.

FUNCTIONS



R-210 connected



TD-M & TD-S connected

Read and freeze values with the selected sampling time.

Zero the values.

Half the values.

Reset values to raw data.

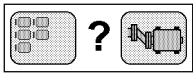

Open Application Set-up.


Print the values.


Exit from the program.

RESUME FUNCTION

The program is supported by a resume function, which stores all the necessary data temporarily. The resume function enters when the system is shut off automatically (auto off) or when the low battery warning is shown.



When the system is restarted after resume a selection box appears. Touch the program icon to get back to the saved data or touch the Main Menu icon to cancel and go to the Main Menu.

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REAL TIME DATA TRANSFER

This program sends the data from the receiver units to the serial port. The information displayed on the screen is what is sent to the connected computer.

Note! It is recommended that external power is used during the transfer.

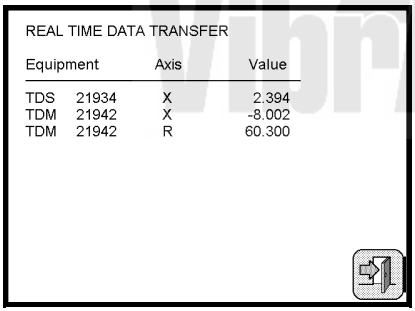
Screen information:

Example when a TD-S and a TD-M unit are connected.

TDS	unit serial no	x (axis)	transmitted value
TDM	unit serial no.	x (axis)	transmitted value
TDM	unit serial no	r (inclinometer)	transmitted value

Example when an R210 is connected.

R210	unit serial no.	y (axis)	transmitted value
R210	unit serial no.	x (axis)	transmitted value



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MEMORY MANAGER

GENERAL FUNCTIONS

Touching the Memory Manager icon from the Main Menu starts the Memory Manager. The Memory Manager screen displays a list of all stored measurements in the memory. The measurements are stored in a chronological order with the latest measurement at the first position.

Saving a Measurement

The measurement is stored from the application program. The measurement will automatically be stored labelled with the current date and time. Additional labelling can be entered.

Reviewing a Measurement

To review a stored measurement, just touch it in the list and open the selected measurement by touching the reviewing icon. The appearing screen displays all information about the measurement including date, time and eventually labelling.

Printing a Measurement

Select the measurement to be printed and open it. Then touch the print icon. It is also possible to print out a screen dump of the memory list. Just touch the print icon and the displayed screen will be printed.

Add or Change a Measurement Label

Select the measurement to add or change label on. Touch the label icon. The alphanumerical keypad is displayed. Enter the new label and touch OK. Confirm with OK.

Scroll


You can scroll the list by touching the arrow icons.

Export Function

With the Export function stored measurements can be transferred to a computer. See the chapter Export function.

Memory Full

If the memory is full a message will be displayed when trying to save a new measurement. It is then possible to enter the Memory Manager and erase measurements from the memory to give room for the new measurement. Touch the Memory Manager icon in the Full Memory message. Delete the measurements you want to and touch the exit icon to return to the previous screen. Then it will be possible to save the new measurement.

Delete a Selected Measurement


Select the measurement to delete by touching it. Touch the delete icon. Confirm by touching the delete selected measurement icon in the confirmation box.

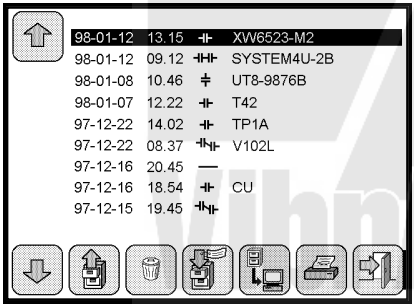
Delete All Stored Measurements


Touch the delete icon and then the delete all measurements icon in the confirmation box. Confirm by touching the same icon an extra time.

Exit

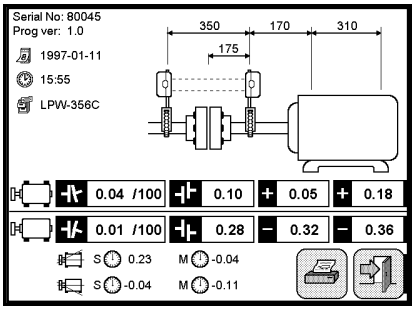
Touch the exit icon to exit from the viewed screen.

REVIEWING A SHAFT ALIGNMENT MEASUREMENT FOR A HORIZONTAL MACHINE



Touch the measurement in the list and then touch the rewieving icon.

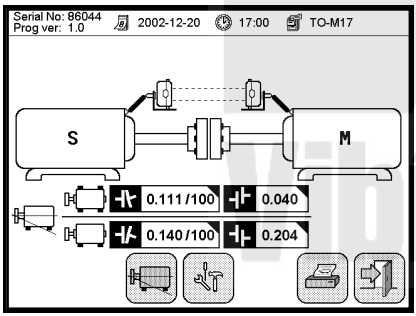
The appearing screen displays all information about the measurement including time and date and eventually any made compensations, i.e. thermal offset.



REVIEWING AN OL2R MEASUREMENT

Touch the measurement in the list and then touch the rewieving icon.

The appearing screen displays the compensation values (thermal offset) that were obtained in the OL2R measurement and time and date etc for the measurement. These compensation values can now be used in a shaft alignment.



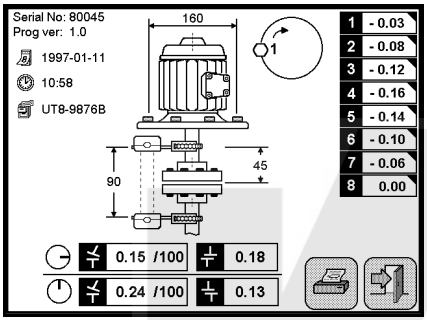
Go to the Shaft Alignment.

Open Application Set-up.

Reviewing a Shaft Alignment Measurement for a Vertical Machine

Touch the measurement in the list and then touch the rewieving icon.

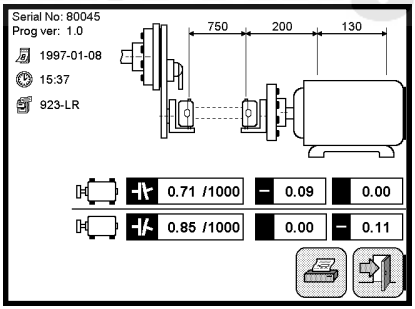
The appearing screen displays all information about the measurement including time and date.



Reviewing a Shaft Alignment Measurement for a Cardan Shaft

Touch the measurement in the list and then touch the rewieving icon.

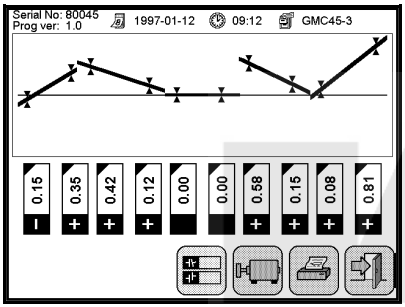
The appearing screen displays all information about the measurement including time and date.



REVIEWING A SHAFT ALIGNMENT MEASUREMENT FOR A MACHINE TRAIN

Touch the measurement in the list and then touch the rewieving icon.

The appearing screen displays all information about the measurement including time and date.



View coupling values.

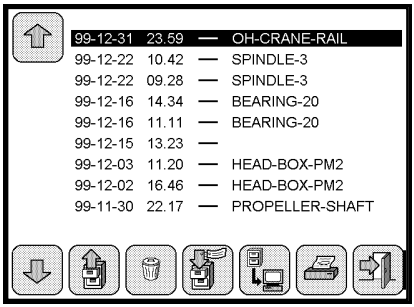
View feet values.

View horizontal result.

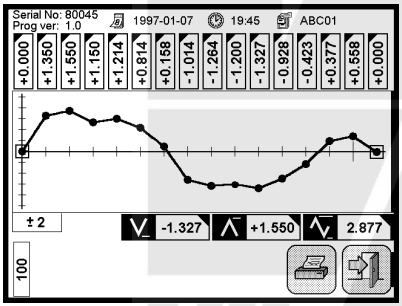
View vertical result.

REVIEWING A BASIC STRAIGHTNESS MEASUREMENT

Touch the measurement in the list and then touch the reviewing icon.



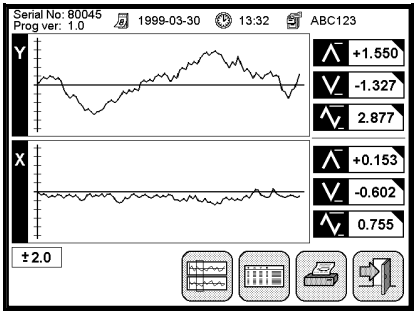
The appearing screen displays all information about the measurement including time and date.



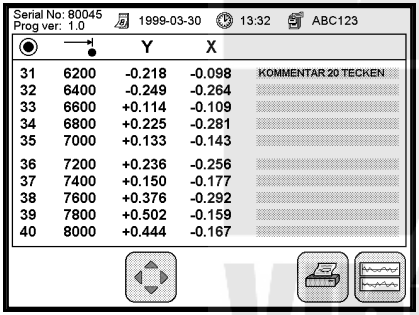
REVIEWING A 2-AXES STRAIGHTNESS MEASUREMENT

Touch the measurement in the list and then touch the reviewing icon.

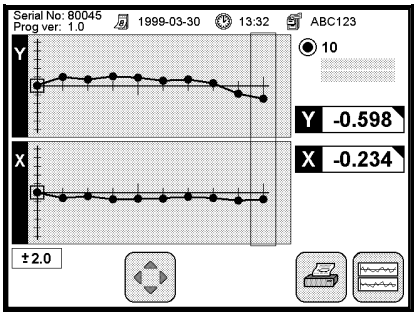
When opening a saved 2-axes straightness measurement you will first get into the summary screen. From there you can then go to the list of measurement points or to the detailed diagram. It is also possible to print a screen dump.



In the list of measurement points you can add/change comments. Use the scroll function to scroll up/down. Touching the print icon will print the whole list.



In the detailed diagram you can change reference points by touching them. (It is not possible to change the reference in straightness with center of measurement object as reference.) Use the scroll function to scroll to the left/right. It is also possible to add/ change comments and print a screen dump.

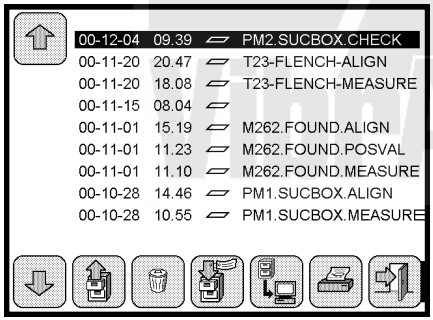


Tip: Print the summary screen first and then the list to get a good documentation.

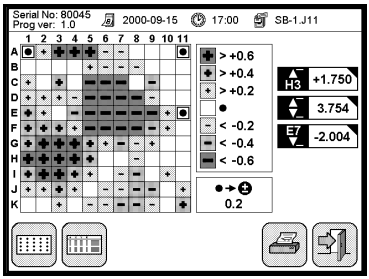
Note: Made changes will not be saved when you exit from the measurement.

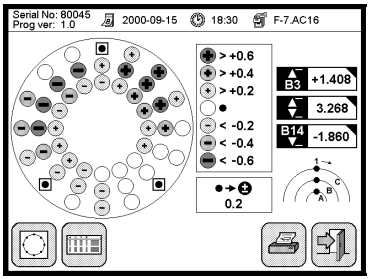
REVIEWING A FLATNESS MEASUREMENT

Touch the measurement in the list and then touch the reviewing icon.

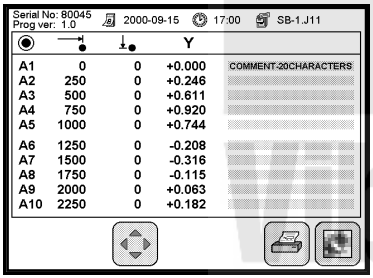


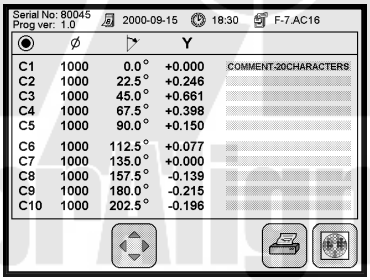
When opening a saved Flatness measurement you will first get into the summary screen. From there you can then go to the list of measurement points or to the detailed screen. It is also possible to print a screen dump.



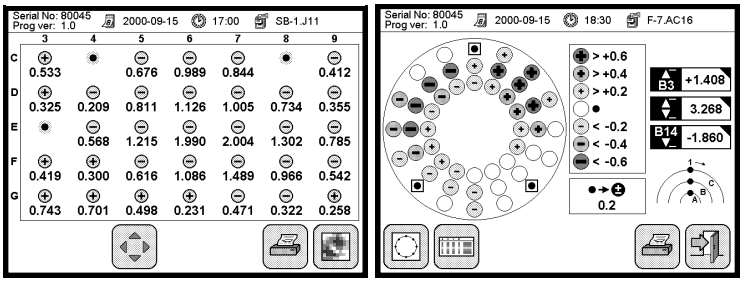


In the list of measurement points you can add/change comments. Use the arrow icons to scroll. Touching the print icon will print the whole list.





In the detailed diagram you can change reference points and add/change comments by touching the measurement points. Use the arrow-icons to scroll. It is also possible to print a screen dump.

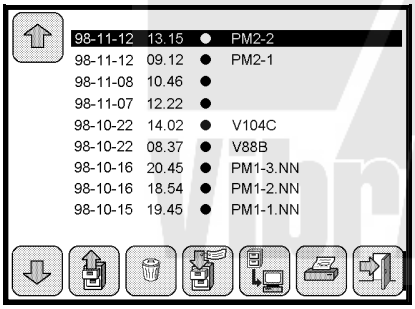


Tip: Print the summary screen first and then the list to get a good documentation.

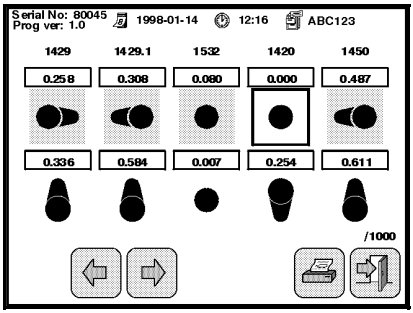
Note: Made changes will not be saved when you exit from the measurement.

REVIEWING A ROLL PARALLELISM MEASUREMENT

Touch the measurement in the list and then touch the reviewing icon.



When opening a saved roll parallelism measurement you will get into the summary screen. In the summary screen you can change reference. Use the arrow icons to scroll to the left/right. It is also possible to print a screen dump.



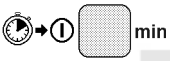
Note: Made changes will not be saved when you exit from the measurement.

SYSTEM SET-UP

The System Set-up menu includes settings that are common for all applications. The version number of the program is also found at the top of this screen.

Displayed measurement unit

Select between metric and imperial units.

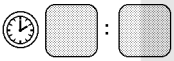


Auto off time

Select between 1 and 98 minutes. When 99 minutes is selected the auto-off function is disabled. Auto-off function is also disabled when using external power.

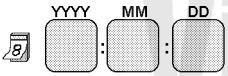
Printer selection

Currently only System printer.



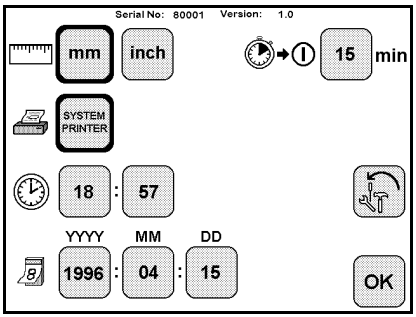
Current time

Sets the system clock.



Current date

Sets the date. Display format will change according to selected measurement unit.



Factory settings

Resets all selections to factory settings, also in the Application Set-ups.

General factory settings

Measurement unit: mm

Auto off time: 15 min

Printer: System printer

Resolution: 0.01

Sampling time: 3 sec

Screen filter: 0

Factory settings in shaft alignment

Measurement method: Clock method

Factory settings in geometrical measurements

Straightness method: Standard straightness

Straightness diagram: YX

Flatness plane: Rectangular

Flatness tolerance: 0

Factory settings in roll alignment

Result display: /1000

Tolerance: 0.1

Measurement registering: Detector

OK

Confirmation

Confirms made selections and returns to the Main Menu.

VibrAlign

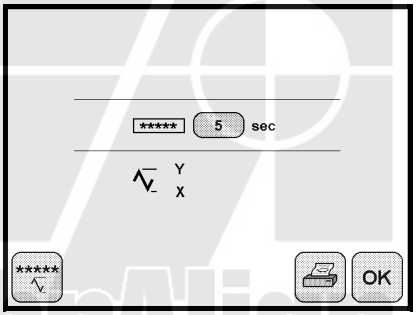
REPEATABILITY TEST

Before starting the measurement it is recomendable to perform a repeatability test to set the correct sampling time. With 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.

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.

Do the Repeatability Test at the position far from the transmitter.

Open the Repeatability test function by touching its icon in the Application Set-up.

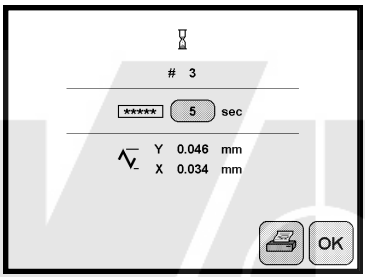


PROCEDURE

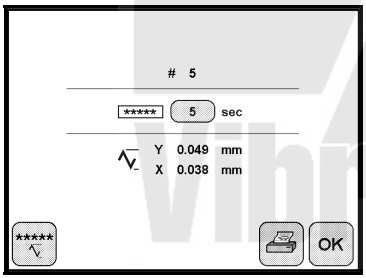
Select sampling time.

Start analysing.

Touch the Repeatability test icon



During the test an hour-glass is shown. The number of readings are also counted up.



When the test is ready the hour-glass disappears and that 5 readings are taken is shown. The result is shown as the difference between highest and lowest value. (When using a one-axis receiver there will be no X-value.)

If you are satisfied with the result press OK to confirm selected sampling time. If not select new sampling time and repeat the procedure, step 2 & 3.

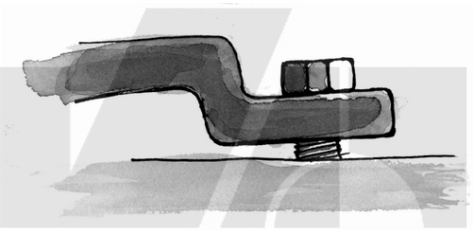
A screen dump can be printed by touching the print icon.

Exit by touching the exit icon.

VibrAlign

SOFTCHECK™

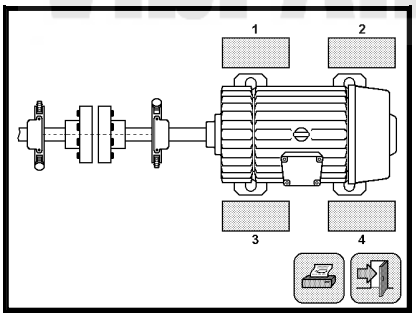
A soft foot condition needs to be corrected before any alignment takes place. If not, the measurement result will be of no value. It is more or less impossible to establish if there is a soft foot condition without using some kind of measurement tool. The Fixturlaser Alignment Systems built-in Softcheck TM program checks each foot and displays the result in mm or mils. The Softcheck TM program is entered from the Application Set-up in the Application program. The measurements A, B and C have to be set before checking soft foot.



Start the Softcheck TM by touching its icon in the Application Set-up.

PROCEDURE

Check that all feet bolts are firmly tightened
.

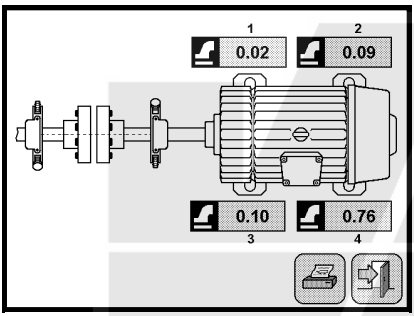


Select a bolt of your choice by touching its icon.

Loosen the bolt fully and then tighten it firmly. Preferably with a dynamometric wrench. The measurement value is registered by touching OK.

Continue with the rest of the bolts. Re-measurements can be done at any time by touching the icon at the requested bolt again.

Do the necessary corrections and then check each foot again. (The values are showing approximately how much shims that are needed to eliminate the soft foot.)



A screen dump can be printed by touching the print icon.

Exit by touching the exit icon.

THERMAL OFFSET

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 several applications the driven machine is either hotter, i.e. a pump for hot liquid, or cooler than the driving machine. The machine manufacturers define the thermal growth of the machines differently, but in most cases you will find it as a factor of deliberately misalignment expressed in parallel offset and angular error.

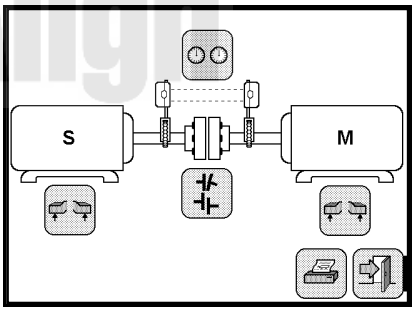
In the Fixturlaser Alignment Systems you can pre-set thermal offset values from the shaft alignment program before starting your alignment work. Accepted values are feet values, clock values and parallel offset/angular error.

Entered values are target values. Target values mean that these are the values where the machine should be positioned when not running (cold condition) to get a correct alignment when the machine is running (hot condition).

Start the Thermal Offset program by touching its icon in the Application Set-up.

PROCEDURE

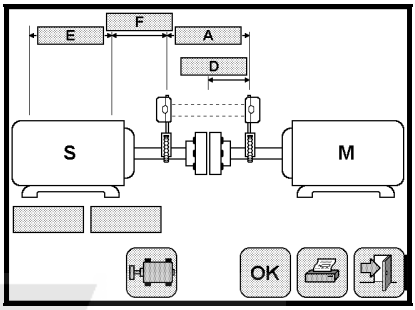
Select one of three ways to express the offset values: feet values, predicted dial indicator values or parallel/angular error.



Feet values

Touch the feet icon at the Stationary or the Movable machine.

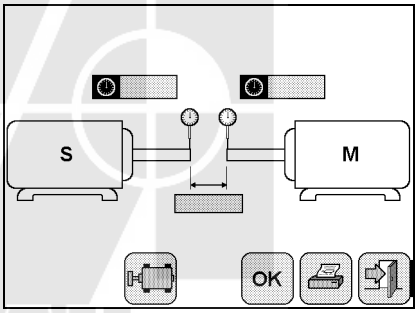
Touch the foot value boxes. Enter the foot values in mm or mils according to the pre-set unit. Enter also required distances.



Predicted dial indicator values

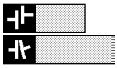
Touch the dial indicator icon.

Touch the dial indicator value boxes and enter the values in mm or mils according to the pre-set unit. Enter the distance between shaft ends (DBSE).

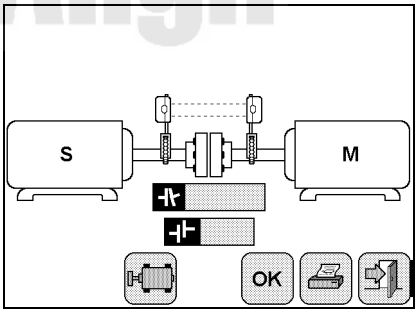


Parallel/angular error

Touch the misalignment icon.



Touch the value boxes and enter the angular error in mm/100 mm and the parallel error in mm, or mils/inch and mils, according to the pre-set unit.



If required you can change to the horisontal view for entering of compensation values.

Touch OK. The entered values are now pre-set and the shaft alignment can be performed with adjustments towards zero-values.

A screen dump can be printed by touchin the print icon.

If you do not want to pre-set entered values, exit by touching the exit icon.

Note: The use of compensation values is indicated in the alignment program as a small icon in the upper right corner.

VibrAlign

STATIC FEET SELECTION

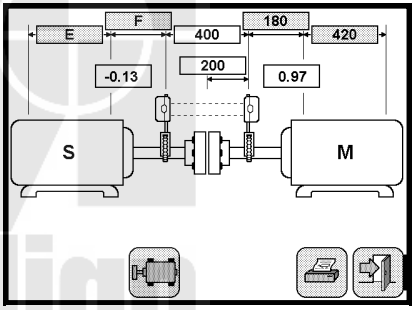
In some cases the machine that is displayed as the moveable machine is not move- able, or just some of the feet of the moveable machine are not adjustable. In order to perform a proper alignment in these cases the Static Feet Selection program will be helpful. In this program you can freely select which feet to be adjustable or locked. The horizontal shaft alignment has to be accomplished before starting the program.

Start the Static feet selection program by touching its icon in the Application Set-up.

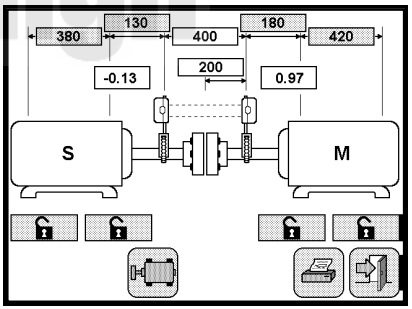
PROCEDURE

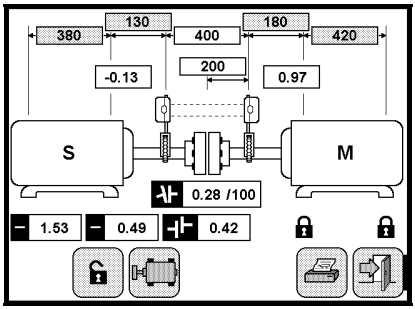
E
F

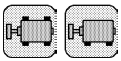
Enter the E and F dimensions.



Locking symbols for each foot are now displayed. Touch the two feet you want to lock. The feet values are displayed at the unlocked feet as live values.







Switch to horizontal/vertical view if necessary by touching the switch view icons.

Different feet to lock can be selected by first unlocking the locked feet.

A screen dump can be printed by touching the print icon.

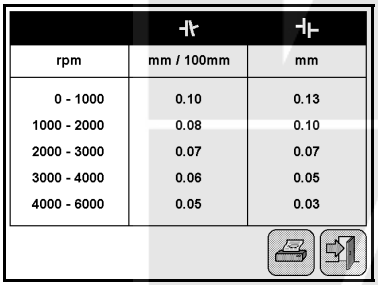
Exit by touching the exit icon.

Note: If the measurement is going to be saved after adjustment is made in the Static Feet Selection-mode, the measurement has to be re-made before saving.

TOLERANCE TABLE

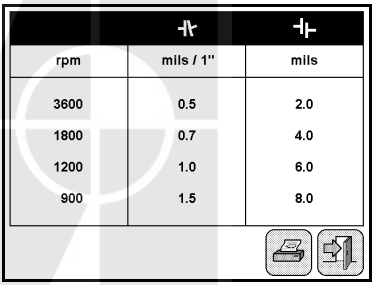
Alignment tolerances depend to a large extent on the speed of rotation of the shafts. Machine alignment should be carried out to within the manufacturer's tolerances. The table below can be helpful if no limits are specified. The suggested tolerances can be used as a starting point for developing in-house tolerances when the machinery manufacturer's recommended tolerances are not available. The tolerances are the maximum allowable deviation from desired values, whether zero or targeted offset for thermal growth.

Open the Tolerance Table by touching its icon in the Application Set-up.



rpm	mm / 100mm	mm
0 - 1000	0.10	0.13
1000 - 2000	0.08	0.10
2000 - 3000	0.07	0.07
3000 - 4000	0.06	0.05
4000 - 6000	0.05	0.03

Tolerance table - metric



rpm	mils / 1"	mils
3600	0.5	2.0
1800	0.7	4.0
1200	1.0	6.0
900	1.5	8.0

Tolerance table - imperial

A screen dump can be printed by touching the print icon.

Exit by touching the exit icon.

VibrAlign

EXPORT FUNCTION

With the Export function it is possible to transfer stored measurements to a computer. The description below covers how to export using the program Hyper terminal in Windows.

SET-UP HYPER TERMINAL

Start new connection according to your Windows manual.

Enter name, example Fixturlaser, and choose any icon.

Connection

Connect using: COM 1 (the port where cable is connected).

Port settings

Bits per second: 9600
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None

Select file, properties.

Emulation: ANSI
Backscroll buffer lines: 500 (or optional)

Select file and save.

TRANSFER PROCEDURE

Connect the display unit to the COM-port on a computer with a serial null-modem cable.

Open the Hyper terminal in the computer, example Fixturlaser.ht.

Select transfer, capture text and start.

Touch the Export icon in the Memory manager in the display unit. Wait until the stored measurements are transferred.

Select transfer, capture text and stop, followed by disconnect under call.

The measurements are now available as a text file in the computer, example capture.txt.

OPEN TEXTFILE IN WORD

Open text file, example capture.txt.

OPEN TEXTFILE IN EXCEL

Open text file, example capture.txt.

Text import wizard step 1 Original data type: Delimited fields Start import at row: 1 File origin: Windows (ANSI)

Text import wizard step 2 Delimiters: Tab, Semicolon, Comma, Space and Other: Colon (:). Mark “Treat insecutive delimiters as one” Text qualifier: “

Text import wizard step 3 Column data format: General

Note: Point is used as decimal delimitation.

FIXTURLASER® DU30

DISPLAY UNIT
PART NO: 1-0622

Display unit with touch screen.

Technical specification

Display type	6” EL monochrome VGA
Housing material	PP covered with Dryflex™
Environmental temperature	0°C to +50°C
Power supply	4 x LR 20 alkaline batteries (6 Volts) or external power unit (optional).
Operating time	24 hours (in cycles of 50% operation and 50% sleep mode.
Communication port	RS-232 (9-pin D-sub connector)
Dimensions	226x184x55 mm
Weight	980 g (without batteries)

VibrAlign

SYSTEM PRINTER

POWER ON

When turning the power on, the printer performs internal tests and initialisations. When the tests are completed the printing head moves, the red indicator lights up and the printer is ready for use.

RED INDICATOR

The indicator informs on the state of the printer.

Constant light	Printer ready
Flashing slow, short lightning	Memory full, wait to launch the next printing
Flashing slow, short extinction	Loading batteries
Flashing high	Print head blocked. Turn the printer off, remove the paper and replace it correctly.

BUTTON

The round button on the top of the printer has three functions.

Printing of DIP switch settings and description

Turn the power on while pressing the button to get a print out of the use and current position of the DIP switches.

Hex dump mode

When the printer is starting up, press the button to launch hex dump mode. To disengage, press the switch again.

Paper feed

When the printer is on, keep the button down to advance the paper.

CONFIGURATION DIP SWITCHES

Your printer has 8 switches located in the bottom of the paper chamber. You can print the DIP switch settings as indicated using the button. To change the DIP switches position use a pen or something comparable.

IMPORTANT: Whenever changing the DIP switches turn the printer off, change the DIP switches and then turn the printer on.

The DIP switches should have the following configuration when the printer is used together with the Fixturlaser platform.

1 2 3 4 5 6 7 8

1 1 0 0 0 1 0 0

BATTERIES OPTION

When the printer is fully charged, its constant printing time is about 60 minutes. In order to improve the batteries life lenght, it is recommended to charge the printer after this printing time. The printer can be charged while it is off. (In this case the indicator does not light.)

CHARACTERISTICS

Printer

Printing system	Thermal dot matrix
Method	Optimized bidirectional
Paper feed	Friction
Line height	12 dots
Format	40, 80, 2 x 40 columns
Character table	IBM, set 2 (229 forms)

Matrix	8 x 8 and 12 x 8
Buffer memory	32KB
Interface	Serial RS232C. 1200, 2400, 4800, 9600 bauds.

Paper roll

Type	Thermal black printing
Width	112 mm
Diameter	41.5 mm

Power requirements

Adaptor	12 V to 15 V DC - 400 mA (min)

Reliability

General	5000 hours
Printing head	5 x 105 lines

Operating conditions

Temperature	5 to 35 oC
Humidity	20 to 70%

Dimensions and weight

Dimensions	165 x 135 x 50 mm
Weight	560 gram with a 20 m paper roll

DIN PLUG

1 RXD	Data reception
2 DTR	Printer ready
3 GND	Ground

4 CTS	Reserved
5 TXD	Data transmission
6 Option	Power

REPLACEMENT OF PAPER ROLL

FIXTURLASER TD-M 10 & TD-S 10

TRANSMITTER/DETECTOR
TD-M 10
PART NO: 1-0620

Unit with laser transmitter of diode type and detector.

Technical specification

Laser class	Class 2
Measuring distance	Up to 7 meters (23 feet)
Detector area	10x10 mm
Light stabilization	No interference from ambient light
Inclinometer accuracy	± 1°
Environmental temperature	0°C to +50°C
Power supply	Powered from Fixturlaser DU
Dimensions	94x72x41 mm
Weight	320 g

TRANSMITTER/DETECTOR
TD-S 10
PART NO: 1-0621

Unit with laser transmitter of diode type and detector.

Technical specification

Laser class	Class 2
Measuring distance	Up to 7 meters (23 feet)
Detector area	10x10 mm
Light stabilization	No interference from ambient light
Environmental temperature	0°C to +50°C
Power supply	Powered from Fixturlaser DU
Dimensions	94x72x41 mm
Weight	300 g

FIXTURLASER TD-M 100 & TD-S 100

TRANSMITTER/DETECTOR
TD-M 100
PART NO: 1-0201

Unit with laser transmitter of diode type, 1-axis detector and inclinometer.

Technical specification

Laser class	Class 2
Measuring distance	Up to 20 meters (66 feet)
Detector area	20x20 mm
Light stabilization	No interference from ambient light
Inclinometer accuracy	± 1°
Housing material	Die-cast aluminium
Environmental temperature	0°C to +50°C
Power supply	Powered from Fixturlaser DU
Dimensions	94x72x41 mm
Weight	320 g

TRANSMITTER/DETECTOR
TD-S 100
PART NO: 1-0202

Unit with laser transmitter of diode type and 1-axis detector.

Technical specification

Laser class	Class 2
Measuring distance	Up to 20 meters (66 feet)
Detector area	20x20 mm
Light stabilization	No interference from ambient light
Housing material	Die-cast aluminium
Environmental temperature	0°C to +50°C
Power supply	Powered from Fixturlaser DU
Dimensions	94x72x41 mm
Weight	300 g

FIXTURLASER T110

LASER TRANSMITTER
PART NO: 1-0390

Battery charged laser transmitter of diode type with built-in micrometer screws for adjustment of the laser beam in horizontal and vertical level.

Technical Specification

Laser class	Class 2
Measuring distance	Up to 50 meters (164 feet)
Environmental temperature	0°C - +50°C
Power supply	2 batteries type LR6
Warming up time	10 min
Operating time	15 hours
Housing dimensions	60x60x140 mm
Weight	1100 g

VibrAlign

FIXTURLASER T111

LASER TRANSMITTER
PART NO: 1-0285

Laser transmitter of diode type with built-in micrometer screws for adjustment of the laser beam in horizontal and vertical level. The T111 is powered by the supplied AC-adapter (110/230 Volts).

Technical Specification

Laser class	Class 2
Measuring distance	Up to 50 meters (164 feet)
Environmental temperature	0°C - +50°C
Power supply	AC-adapter 110/230 Volts
Warming up time	10 min
Housing dimensions	60x60x140 mm
Weight	1030 g

VibrAlign

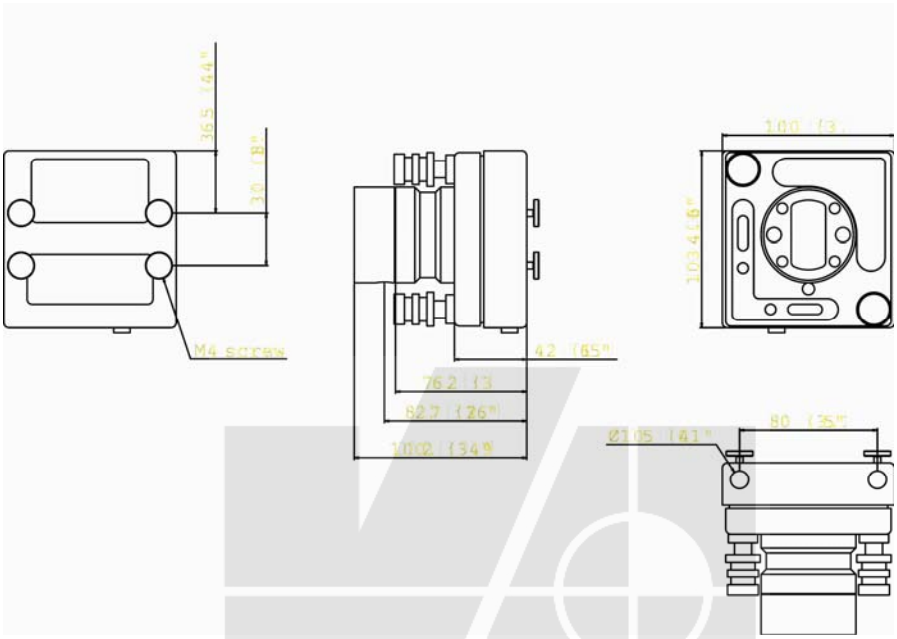
FIXTURLASER T210

LASER TRANSMITTER
PART NO: 1-0391

Battery charged laser transmitter of diode type. The laser transmitter has a built-in angular prism in a turret allowing creation of a 360° laser plane. Laser beam levelling can be made in the X and Y coordinates as well as parallel adjustments. The turret can easily be detached giving a laser beam perpendicular to the X-Y plane.

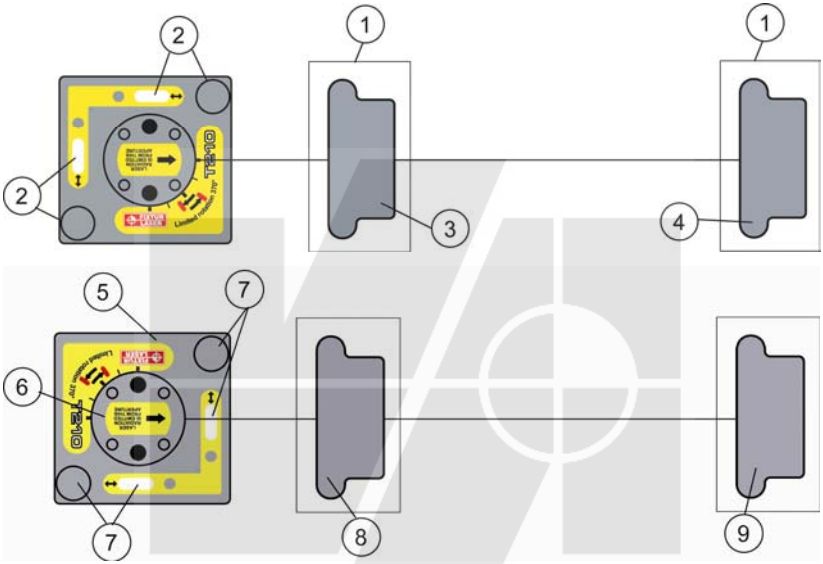
Technical specification

Laser class	Class 2
Measuring distance	Up to 20 meters (66 feet)
Laser sweep flatness	±0,02mm/m
Angular prism accuracy	±0,02 mm/m
Spirit level resolution	0,3 mm/m
Environmental temperature	0°C to +50°C
Power supply	2 x LR6 (3 Volts)
Warming up time	10 min
Operating time	15 hours
Dimensions	100x103x100 mm
Weight	1030 g


365 (44"
30 (1"
M4 screw
42 (65"
762 (3
807 (76"
1002 (34"
100 (3.
103 (4"
Ø105 (41"
80 (35"

CALIBRATION OF THE SPIRIT LEVELS

Position the T210 on a table with flat surface which is in level within 0,2 mm/m in both directions. Mark two positions for the receiver at a distance of 1 metre minimum from each other.



Min 1 metre between the detector positions.

Zero the levels with the micrometre screws.

Zero the value on the screen.

Read and note the displayed value.

Turn the T210 180°.

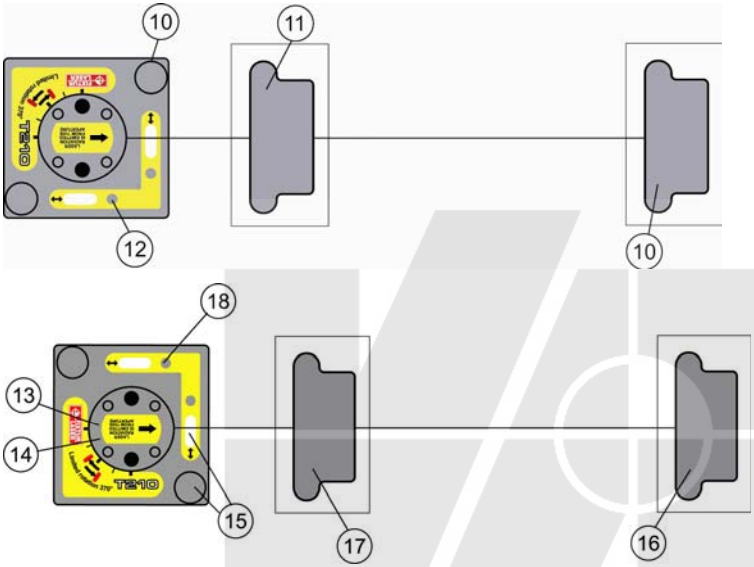
Turn the turret as shown.

Zero the levels with the micrometer screws.

Zero the value on the screen.

Read and note the displayed value.

The value at 9 should be the same (within 0,2 mm/m) as at 4 if the level for this axis is correctly adjusted. Any difference is divided by two and then added to the lowest of these values, which results in the value R.



Adjust to the R value using the micrometer screws.

Check the zeroing, zero again and re-adjust to R if necessary.

Zero the level with the tool.

Turn the T210 90°.

Turn the turret as shown.

Zero the level with the micrometer screws.

Adjust to the R value using the micrometer screws.

Check the zeroing.

Zero the level with the tool.

FIXTURLASER T220

LASER TRANSMITTER
PART NO: 1-0289

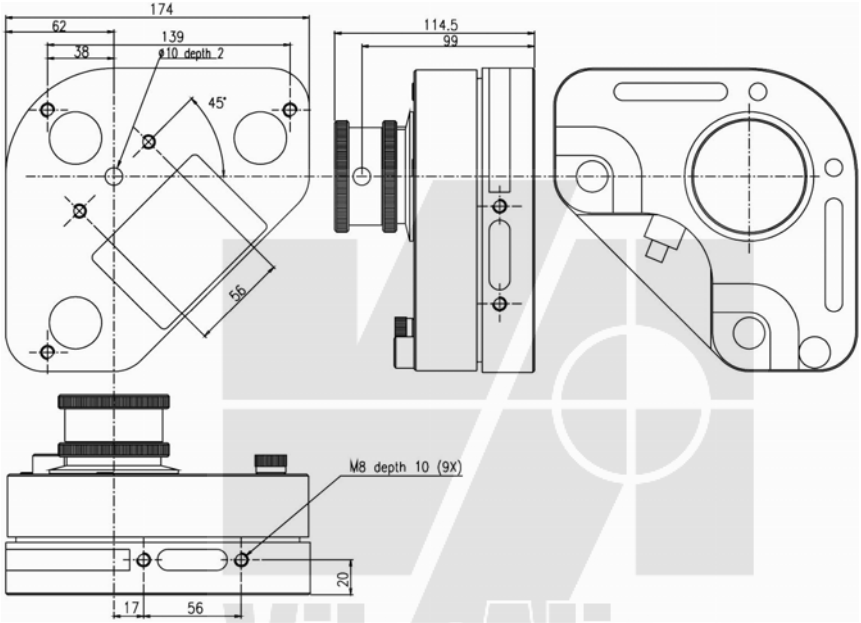
Battery charged laser transmitter of diode type with built-in spirit levels and an angular prism. Equipped with micrometer screws for adjustment of the laser beam in horizontal and vertical level. The optical head can be rotated 360° and thereby projecting a reference plane with the laser beam.

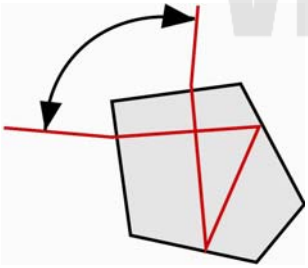
Attachments and brackets for this product: Universal bracket (2-0201), Angular bracket (2-0202).

Technical specification

Laser class	Class 2
Measuring distance	Up to 50 meters (164 feet)
Beam deviation from levels	<0,02 mm/m
Laser sweep flatness	±0,02 mm
Angular prism accuracy	±0,02 mm/m
Spirit level resolution	0,02 mm/m
Tilt adjustment from level	±15 mm/m
Environmental temperature	0°C to +50°C
Power supply	4 batteries type LR6
Warming up time	10 min
Operating time	20 hours

Dimensions	175 x 175 x 115 mm
Weight	3500 g





The built-in angular prism works as shown at left. The incoming laser beam is deflected 90° ±0,02 mm/meter also if the beam hits the prism obliquely.

Turret with built-in angular prism.

Laser apertures.

Horizontal spirit levels with adjustment screws.

Protractor with 15° increment.

Vertical spirit levels with adjustment screws.

Knob for rotating of optical head.

4 batteries LR6. Pull the ends together and pull out the cassette.

Laser On/Off switch.

LED indicating laser transmitter activity.

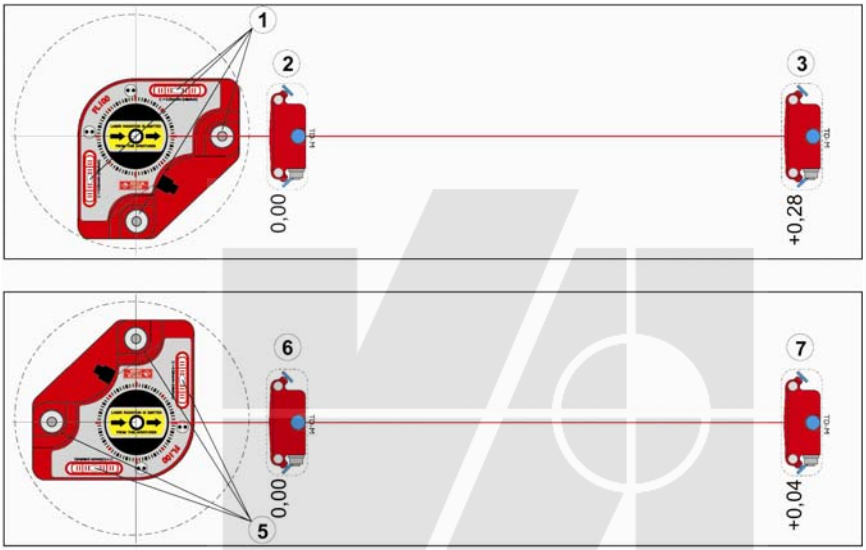
Levelling, coarse adjustment. With lock ring.

Levelling, fine adjustment.

Direction selector for laser beam. Vertical or horizontal mode by turning ring.

CALIBRATION OF THE SPIRIT LEVELS

Position the T220 on a table with flat surface which is in level within 0,02 mm/m in both directions. Mark two positions for the detector unit at a distance of 1 metre minimum from each other.



Zero the levels with the micrometre screws.

Zero the value on the screen.

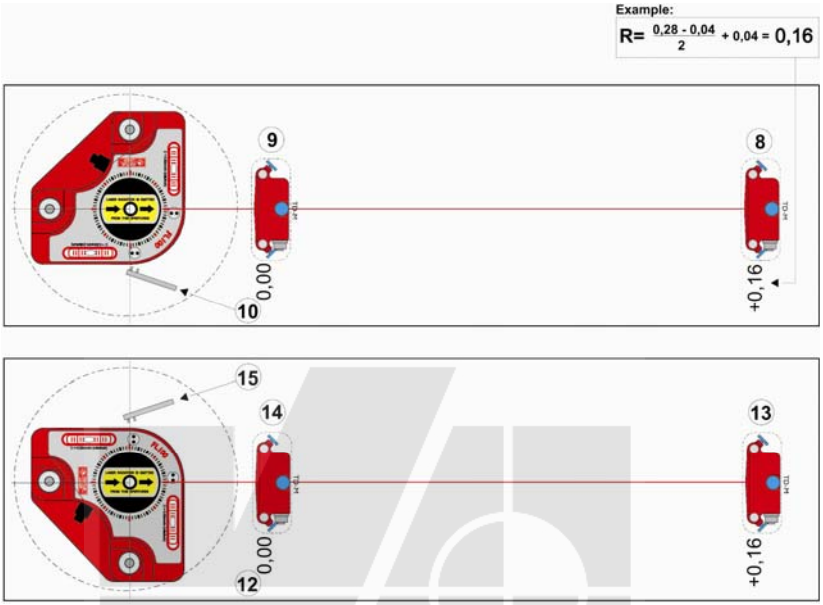
Read and note the displayed value.

Turn the T220 180° and turn the turret as shown below.

Zero the levels with the micrometer screws.

Zero the value on the screen.

Read and note the displayed value.



Adjust to the R value using the micrometer screws.

Check the zeroing, zero again and re-adjust to R if necessary.

Zero the level with the tool.

Turn the T220 90° and turn the turret as shown below.

Zero the level with the micrometer screws.

Adjust to the R value using the micrometer screws.

Check the zeroing.

Zero the level with the tool.

The value at 7 should be the same (within 0,02 mm/m) as at 3 if the level for this axis is correctly adjusted. Any difference is divided by two and then added to the lowest of these vales, which results in the value R.

VibrAlign

FIXTURLASER R210

RECEIVER
PART NO: 1-0258

Receiver with 2-axes detector.

Technical specification

Measuring distance	20 mm to 20 m
Detector area	20x20 mm
Measurement accuracy	± 1% ±0.003 mm
Light stabilization	No interference from ambient light
Housing material	Precision machined aluminium
Environmental temperature	0°C to +50°C
Power supply	Powered from Fixturlaser DU
Dimensions	105x50x50 mm
Weight	220 g

VibrAlign

FIXTURLASER R221

RECEIVER
PART NO: 1-0649

Receiver with 2-axes detector and inclinometer.

Technical specification

Measuring distance	20 mm to 20 m
Detector area	20x20 mm
Measurement accuracy	± 1% ±0.003 mm
Light stabilization	No interference from ambient light
Inclinometer accuracy	± 1°
Housing material	Precision machined aluminium
Environmental temperature	0°C to +50°C
Power supply	Powered from Fixturlaser DU
Dimensions	93x85x55 mm
Weight	330 g

VibrAlign

FIXTURLASER AP200

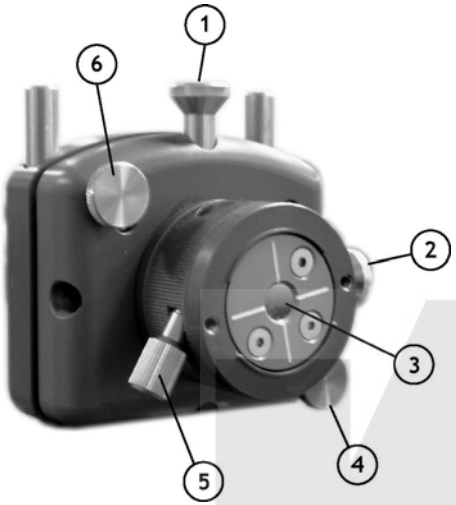
ANGULAR PRISM
PART NO: 1-0243

The angular prism is used for measurement of perpendicularity and parallelism together with a laser transmitter, detector and a displayunit. The angular prism is deflecting the laser beam 90° within ±0,02 mm/meter. A built-in tilt and coordination table makes it easy to adjust the angular prism to the right position. The angular prism is manufactured in hard anodized aluminum. The prism, which is a precision made 5 sided glass body, deflects the laser beam 90° even if the laser beam hits the prism obliquely. With the two screws on top the underlying mirror is uncovered, which is helpful to use when adjusting the angular prism and the laser transmitter to the right positions before measuring. Adjustment screws are for movement sideways in two directions and for rotation of the turret.

Technical specification

Accuracy in deflection	90° ±0,02 mm/m
Tilt adjustment from level	±50 mm/m
Parallel adjustment in X and Y	±2,5 mm
Dimensions	88x97x129 mm
Weight	980 g

ANGULAR PRISM WHEN THE PRISM TURRET IS REMOVED

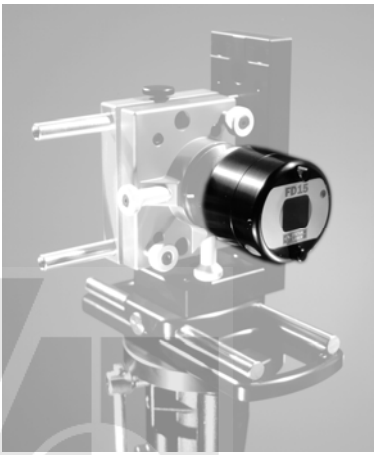


1. Y-adjustment (slide).
2. X-adjustment (slide).
3. Mirror.
4. Angular adjustment (tilt).
5. Rotation of prism turret.
6. Angular adjustment (tilt).

THE ELEVATION ERROR

FIXTURLASER FD15

POSITIONING DETECTOR
PART NO: 1-0244



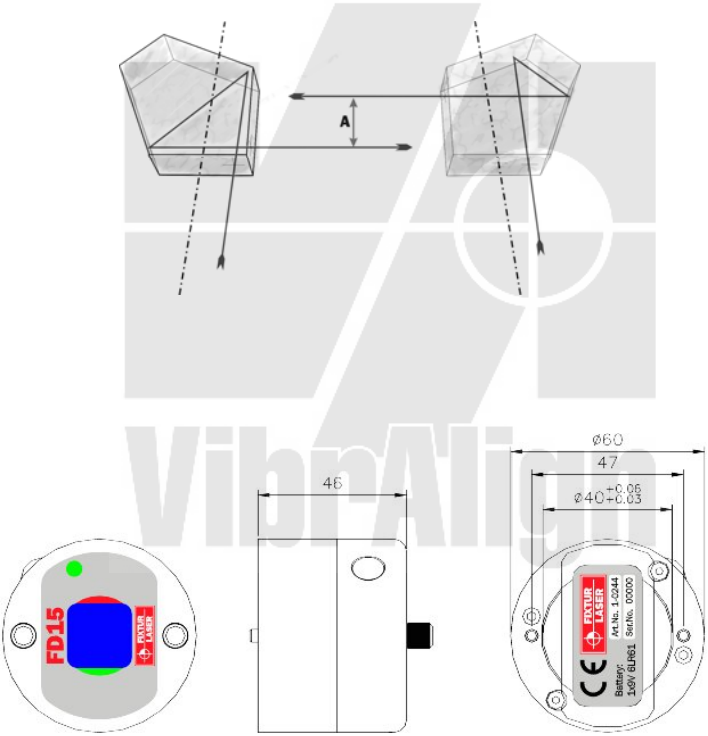
Battery powered detector for mounting on the Angular prism. The detector indicates the position of the Angular prism related to the laser beam. A led on the detector emitts a red or green light depending on where to move the prism. Flashing green light indicates that the detector is turned on.

Technical specification

Housing material	Aluminium
Environmental temperature	0°C to +50°C
Power supply	9V battery, 6 LR61
Operating time	42 hours

THE ELEVATION ERROR

When using an angular prism, the built in prism deflects the beam 90° unregarding the angle of incidence, whitin certain limits. The elevation error occurs when you rotate the prism. In the picture below, the prism is rotated 180° around the blue dotted line, where you reach the maximum error (measure A). The closer to the centre of rotation you are able to aim the beam, the smaller elevation error. With the FD15 you are able to aim within ±0,05 mm (2 mils) eliminating the effects of the elevation error.



DELTA FIXTURE™

SYSTEM DESCRIPTION

The Delta Fixture™ equipment is a flexible standard system for measurements on inside diameters. Together with the Fixturlaser Geo equipment, it is a very powerful measuring tool making the user able to perform accurate and advanced measurements by simple and quick handling.

The fixtures is manufactured in anodized aluminum and consists of two center hubs and two sets of arms for diameters within 150-550 mm. The fixture is positioned by two guiding shafts in axial direction, and with spirit level, in horizontal direction. An excenter mounted on one of the arms clamps the fixtures to the bearing journal. By sliding the arms in different positions, the fixture is easy to reset for a new diameter.

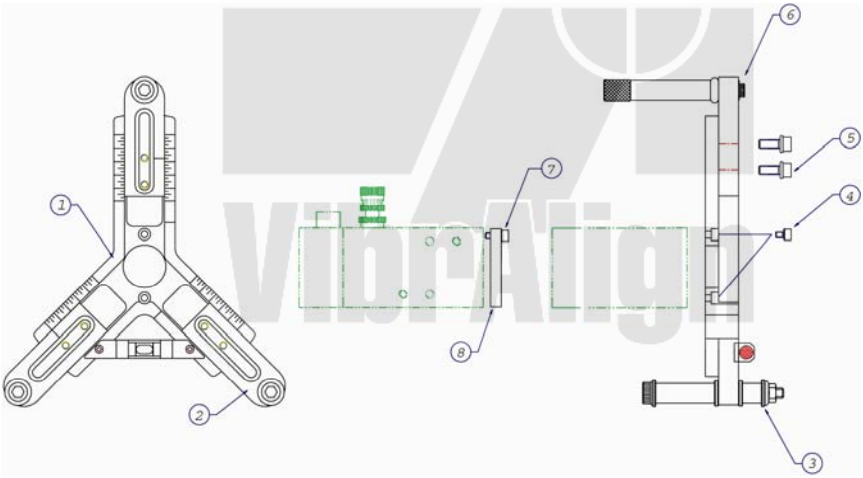
The Delta Fixture™ equipment is designed for mounting both R210 receiver and T110/T111 laser transmitter. The fixture with the laser transmitter could be placed inside the reference diameter with guiding shafts, or on the outside with magnet bases on the fixture. In this way the user have different solutions for different types of applications.The complete Delta Fixture™ is delivered in one rugged case, making it a portable system helping the user to perform a professional measuring result.

GENERAL REMARKS

When using Delta FixtureTM equipment for straightness measurements it is necessary to know the variations in diameter, and the roundness of the measured bearing journals, to make the eventually necessary compensations of the measuring result. Measurements performed on split bearings has to be preceded by check and elimination of offset between bearing caps.

ASSEMBLY

One fixture consists of different parts that has to be assembled before the measurement procedure can start. In the carrying case you will find 4 hubs and 12 sets of arms with different lengths. Each set consists of 3 identical arms. Before assembling you will have to determine the lentgh of arm necessary for your specific application. Start with mounting the detector or the transmitter to the hub and then mount the arms. It is absolutely necessary to use two screws on each arm to prevent the arm from sliding in the hub during measurement. Continue to assembly the two contact rollers on each of the arms. The excenter is mounted on the third arm. Adjust the arm lengths identically on each arm and tighten the screws firmly. The length of the arm with the excenter is fine tuned. Position the fixture in the bearing journal and adjust the arm to a length where rotation of the excenter is just barely possible using the force of one hand. Note! Use no tools. It is of absolute necessity that the same clamping force is used in every single measuring point.



1. Hub
2. Screws for adjustable arm
3. Adjustable arm
4. Screw for bracing level
5. Contact roll
6. Screws for transmitter attachment
7. Screws for receiver attachment
8. Bracket for transmitter

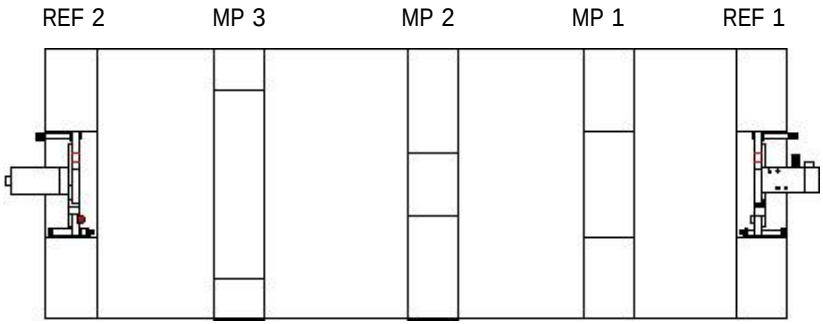
CENTRELINE MEASUREMENT

Definition of centreline measurement

Centerline measurements is performed by determination of the measurement object's diameter center in relation to a reference line. The position of the diameter center is obtained by halving the difference between two measurement values registered diametrical opposed on the measurement object.

Mounting on a flange with magnetic bases. Follow the procedure from step 1.

Mounting on journal. Follow the procedure from step 7.



Procedure

Setup of T110/T111 with magnet bases

1. Position the Delta Fixture™ equipment with the laser transmitter close to the reference diameter (REF. 1). Position the transmitter as close as possible to the center.
2. Position the fixture with the detector in the reference diameter (REF. 1). Align with the spirit level and clamp it with the brace level.
3. Zero the measuring values on the displaybox with the adjustment knobs.
4. Turn the fixture with the detector 180º, read and halve the values on the display box.
5. Move the fixture with the T110/T111 by deactivating two of the three magnet bases and very carefully sliding the fixture until the values on the display box are within ± 0.3 mm.

Measuring

Read more in the Advanced Straightness Measurement chapter.

6. Move the fixture with the detector to the first bearing journal and position it up-side-down. Align with the spirit level and clamp it with the brace level. Zero the values on the displaybox.

7. Rotate the fixture 180° and clamp it. Read and halve the measurement values. Press the register icon to register the measurement point. Enter distance between measurement points on keypad.

8. Continue with the following bearing journals. Press OK when all measurement points are registred. This will take you to the summary screen.

Evaluation of result and alignment

Read more in the Advanced Straightness Measurement chapter.

9. View result presentation on summary screen. Go to detailed diagram to select references.

10. In the detailed diagram you can select reference points by touching them.You can select any two points to be references. If you just want one reference point, touch the same point twice. To delete all references, touch three times at the same point.

11. Note: set screen filter to 0 when aligning.
    Position the receiver at the measurement point that should be aligned. Delta fixture is placed in the bottom. Do not rotate. Press alignment icon to go to measurement point alignment screen. Align the selected measurement point to zero. Press OK to confirm adjusted values.

STRAIGHTNESS MEASUREMENT

Definition of straightness measurement

Straightness measurement is performed with two zero points on the measurement object. An imaginary line running between the zero points constitutes the reference. As the measurement is performed the result is given as the proportion between each measurement point and the reference line.

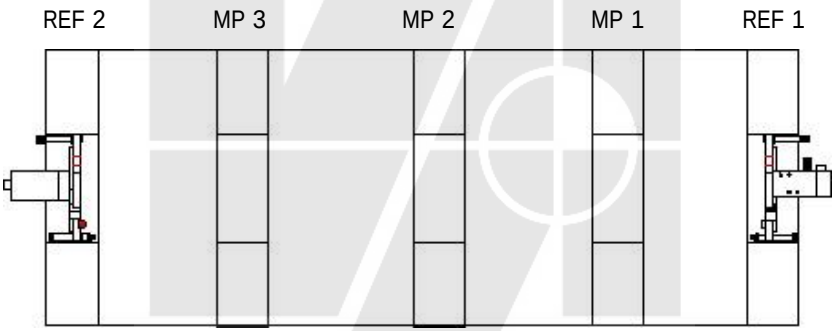
Requirements

To perform a straightness measurement it is necessary to fulfill the following requirements

1. The bearing journals to be measured must have identical nominal diameter.
2. No parts on the fixture can be moved or adjusted during the measurement.
3. No compensation will be done to small variations in diameters on the measured bearing journal.
4. Bearing journal roundness and diameter must be checked carefully for eventual compensation of the measuring result.

Mounting on a flange with magnetic bases. Follow the procedure from step 1.

Mounting on journal. Follow the procedure from step 7.



Procedure

Setup of T110/T111 with magnet bases

1. Position the Delta FixtureTM equipment with the laser transmitter close to the reference diameter (REF. 1). Position the transmitter as close as possible to the center.
2. Position the fixture with the detector in the reference diameter (REF. 1) . Align with the spirit level and clamp it with the brace level.
3. Zero the measuring values on the displaybox with the adjustment knobs.

4. Turn the fixture with the detector 180º, , read and halve the values on the display box.
5. Move the fixture with the T110/T111 by deactivating two of the three magnet bases and very carefully sliding the fixture until the values on the display box are within ± 0.3 mm.

Measuring

Read more in the Advanced Straightness Measurement chapter.

6. Move the fixture with the detector to the first bearing journal and position it up-side-down . Align with the spirit level and clamp it with the brace level. Zero the values on the displaybox.
7. Rotate the fixture 180° and clamp it. Read and halve the measurement values.Press the register icon to register the measurement point. Enter distance between measurement points on keypad.
8. Continue with the following bearing journals.Press OK when all measurement points are registered. This will take you to the summary screen.

Evaluation of result and alignment

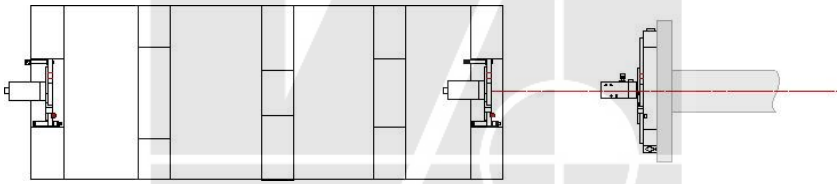
Read more in the Advanced Straightness Measurement chapter.

9. View result presentation on summary screen. Go to detailed diagram to select references.
10. In the detailed diagram you can select reference points by touching them.You can select any two points to be references. If you just want one reference point, touch the same point twice. To delete all references, touch three times at the same point.
11. Note: Set screen filter to 0 when aligning.
    Position the receiver at the measurement point that should be aligned. Delta fixture is placed in the bottom. Do not rotate. Press alignment icon to go to measurement point alignment screen. Align the selected measurement point to zero. Press OK to confirm adjusted values.

OFFSET MEASUREMENT TO ROTATION LINE

Definition of offset measurements

In applications where the reference is positioned apart from the measurement object, the zeroing procedure requires a few more steps to ensure the level of accuracy. (An example here can be a gearbox as a reference measuring bearing journal positions on a propeller shaft installation.) When determining the offset of the bearing journals in relation to the reference, it is of importance that the laser beam describes a prolongination of the reference centreline.



Setup and zeroing

Mount the fixture with T110/T111 close to the rotational centre of the reference object.

Position the detector as close as possible to the T111. Zero the value on the display box. (Electrical zeroing).

Rotate the fixture with the T110/T111 180°. Read and halve the value displayed.

Adjust the laser transmitter until the displayed values are within 0±0,02.

Move the detector to a position on the measurement object as far as possible away from the T110/T111. Ensure that the laser beam hits the detector surface.

Eliminate the angular error by rotating the laser transmitter 180° and

adjust the laser beam with the adjustment screws on the T110/T111 until the displayed values are 0.

Repeat the steps 2-6 until the laser beam is centered during rotation.

Measuring

Read more in the Advanced Straightness Measurement chapter.

Move the fixture with the detector to the first bearing journal and position it up-side-down . Align with the spirit level and clamp it with the brace level. Zero the values on the displaybox.

Zero the measuring values on the displaybox.

Rotate the fixture 180° and clamp it. Read and halve the measurement values. Press the register icon to register the measurement point. Enter distance between measurement points on keypad.

Continue with the following bearing journals. Press OK when all measurement points are registered. This will take you to the summary screen.

Evaluation of result and alignment

Read more in the Advanced Straightness Measurement chapter.

12. View result presentation on summary screen. Go to detailed diagram to select references.
13. In the detailed diagram you can select reference points by touching them. Since you are not using any reference points in this measurement -delete all references by touching three times at the same point.
14. Note: set screen filter to 0 when aligning.
    Position the receiver at the measurement point that should be aligned. Delta fixture is placed in the bottom. Do not rotate. Press alignment icon to go to measurement point alignment screen. Align the selected measurement point to zero. Press OK to confirm adjusted values.

WARNING LABELS

TD-M unit, rear

TD-M unit, front

TD-S unit, rear

TD-S unit, front

TD-units, inside

T110 & T111

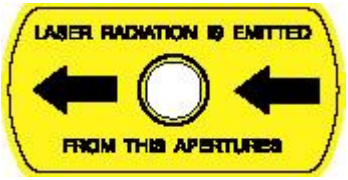
T210, rear

T210, front when no prism

T210, front of prism

T220, underneath

T220, at prism



T220, around prism

VibrAlign

WARRANTY REGISTRATION CARD

Product	Serial no.	Product	Serial no.
DU	#		#
TD-M	#		#
TD-S	#		#
T-	#		#
R-	#		#

Company	
Address	
City	
Zip Code	
Country	
Phone	
Fax	
User name(s)	

Industry

- ☐ Pulp & Paper
- ☐ Petroleum
- ☐ Chemical
- ☐ Power production
- ☐ Shipping/Marine
- ☐ Machine tool
- ☐ Maintenance & Service
- ☐ Other.....

Purchased from	
Date of purchase	

VibrAlign

NE PAS AFFRANCHIR

NO STAMP REQUIRED

REPLY PAID / REPONSE PAYEE
SWEDEN / SUEDE

FIXTURLASER AB

SE-431 20 MÖLNDAL

SWEDEN