Fixturlaser GO Pro

version 1.0

TRAINING MANUAL

VIBRALIGN

Unit 1

Introduction to Alignment

- Module 1-1: The VibrAlign Story
- Module 1-2: How We Train
- Module 1-3: The Machines We Align
- Module 1-4: Basic Shaft Alignment Concepts
- Module 1-5: Misalignment Forces
- Module 1-6: Media Resources

Module 1-1 The VibrAlign Story

[Objective]

At the end of this module, the student will be able to:

- Understand the VibrAlign mission, values, and why we exist.
- Know his/her instructor's background.

Module 1-1

The VibrAlign Story

[Lesson] The instructor will discuss the following:

- VibrAlign Story
- Realigning America

VIDEO

The VibrAlign Story

VIDEO

Realigning America

Module 1-2 How We Train

[Objective]

At the end of this module, the student will be able to:

- Understand the systematic approach to training.
- Understand why we train.

Module 1-2

How We Train

[Lesson] The instructor will discuss the following:

- How we train
- If shaft alignment is necessary

VIDEO

How We Train

VIDEO

Shaft Alignment Training, is it Necessary?

Module 1-3 The Machines We Align

[Objective]

At the end of this module, the student will be able to:

- Understand the types of machinery that is typically aligned.

Module 1-3

The Machines We Align

[Lesson] The instructor will demonstrate the following:

- Basics in alignment
- The types of machines requiring precision shaft alignment

Module 1-4

Basic Shaft Alignment Concepts

[Objective]

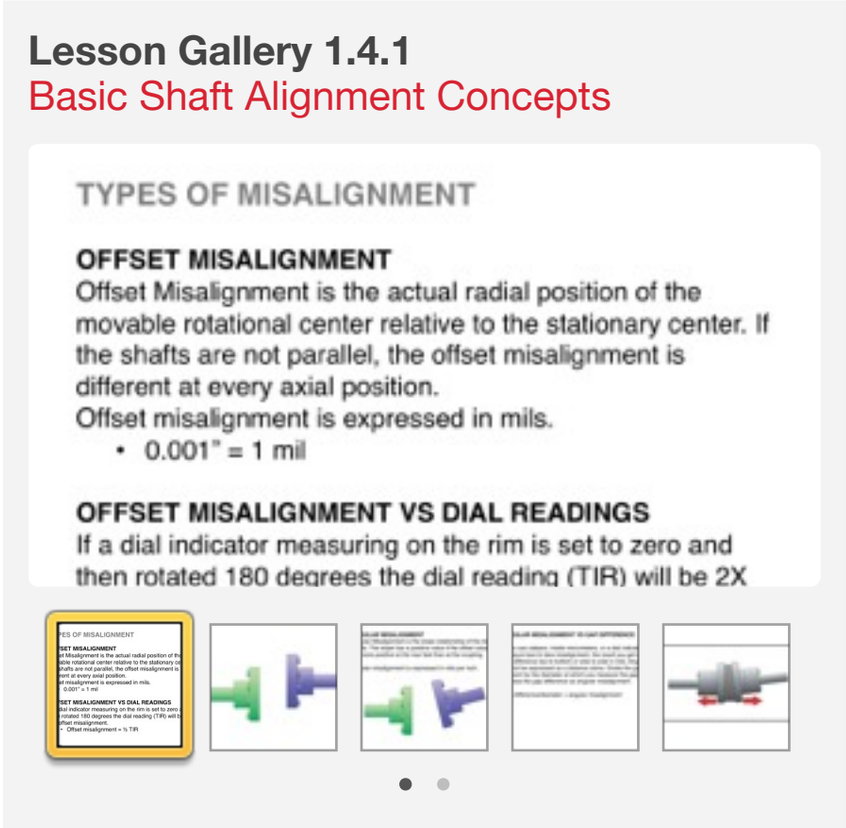
- At the end of this module, the student will be able to:
- Understand the rotational axis.
- Define shaft alignment.
- Be able to explain angular misalignment, gap difference, and offset misalignment.

Module 1-4

Basic Shaft Alignment Concepts

[Lesson] The lesson gallery & videos will be used to demonstrate:

- What is Offset Misalignment and what does it look like?
- What is Angular Misalignment and what does it look like?



VIDEO

Concepts of Shaft Alignment 1, the Basics

VIDEO

Concepts of Shaft Alignment 2, Offset and Angularity

Module 1-5

Misalignment Forces

[Objective]

At the end of this module, the student will be able to:

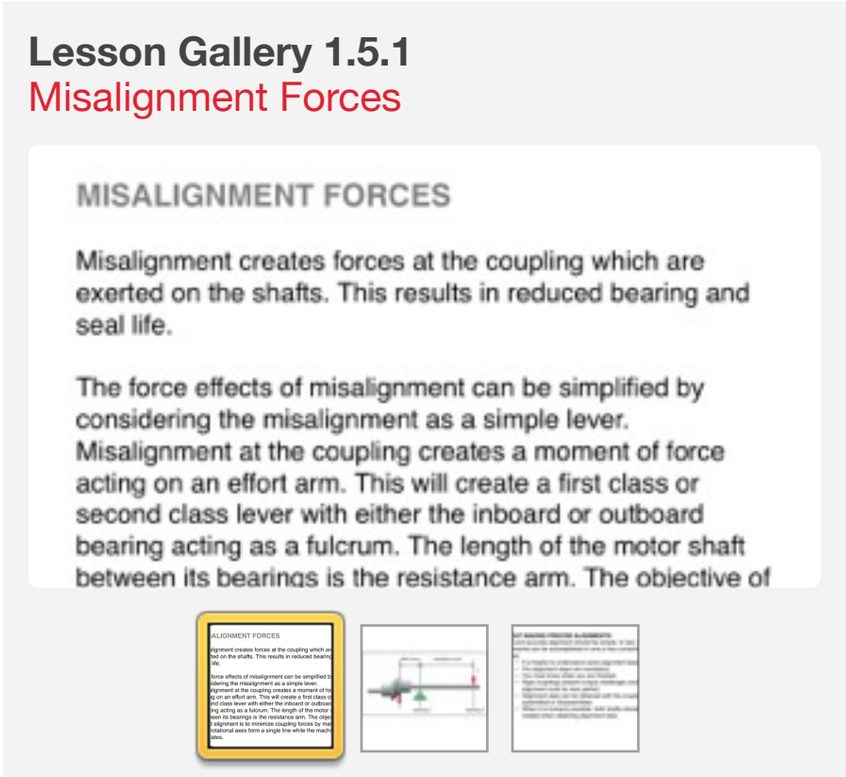
- Understand the importance of precise alignment.
- Understand the effects of Misalignment on couplings, bearings, seals, and machines.

Module 1-5

Misalignment Forces

[Lesson] The instructor will demonstrate the following:

- How misalignment forces cause coupling wear.
- How misalignment forces can cause bearing and seal failure.



Lesson Gallery 1.5.1
Misalignment Forces

MISALIGNMENT FORCES

Misalignment creates forces at the coupling which are exerted on the shafts. This results in reduced bearing and seal life.

The force effects of misalignment can be simplified by considering the misalignment as a simple lever. Misalignment at the coupling creates a moment of force acting on an effort arm. This will create a first class or second class lever with either the inboard or outboard bearing acting as a fulcrum. The length of the motor shaft between its bearings is the resistance arm. The objective of

Module 1-6

Introduction to Alignment Resources

VIDEO

The VibrAlign Story

VIDEO

Realigning America

VIDEO

How We Train

VIDEO

Shaft Alignment Training, is it Necessary?

VIDEO

Concepts of Shaft Alignment 1, the Basics

VIDEO

Concepts of Shaft Alignment 2, Offset and Angularity

Unit 2

Pre-Alignment

- Module 2-1: Rough Alignment
- Module 2-2: Correcting Soft Foot
- Module 2-3: Tightening Sequence
- Module 2-4: Correct Residual Soft Foot
- Module 2-5: Other Pre-alignment Checks Listing
- Module 2-6: Media Resources

Module 2-1 Rough Alignment

[Objective]

At the end of this module, the student will be able to:

- Perform rough alignment of the shafts.

Module 2-1

Rough Alignment

[Lesson] The instructor will demonstrate the following:

- Using straight edge or scale to measure the vertical and horizontal offset misalignment.
- Using the above information to correct the rough misalignment.

VIDEO
Rough Alignment

PHOTO
Roughing In

Activity 2-1

Rough Alignment

1. Measure the vertical gap between the stationary and movable hubs using a straight edge and shims (feeler gauge).
2. Correct the vertical misalignment by adding or removing shims to all four feet of the moveable machine.
3. Using the straight edge, measure and correct the horizontal alignment.

Discussion 2-1

Rough Alignment

1. Why do you perform rough alignment before attempting to precisely align machines?
2. Which direction should you usually rough align first - vertical or horizontal? Why?
3. Should all machines be uncoupled before roughing in?

Module 2-2 Correcting Obvious Soft Foot

[Objective]

At the end of this module, the student will be able to:

- Correct obvious (gross) soft foot.
- Understand the different types of soft foot.

Module 2-2

Correcting Obvious Soft Foot

[Lesson] The instructor will demonstrate the following:

- How to identify and measure Obvious Soft Foot using shims or feeler gauges.
- How to properly correct Obvious Soft Foot using shims.

VIDEO

Elimination of Obvious Soft Foot

Activity 2-2

Correcting Obvious Soft Foot

1. With the bolts loose, use a pry bar, screwdriver, or pliers to look for shim piles that have less resistance than others. This indicates that the weight is not being distributed equally over all four feet.
2. Add shims as needed to make the resistance at each foot feel the same.
3. You may need to pry up on a foot to insert the corrective shim.

Discussion 2-2

Correcting Obvious Soft Foot

1. What are the possible causes of soft foot?
2. Why should you correct soft foot before attempting precision alignment?
3. Why should you rough align before checking for soft foot?

Module 2-3

Tightening Sequence

[Objective]

At the end of this module, the student will be able to:

- Understand the need to maintain a specific bolt tightening sequence.

VIBRALIGN

Module 2-3

Tightening Sequence

[Lesson] The instructor will demonstrate the following:

- Establishing a bolt tightening sequence.
- Taking three passes to achieve full torque.

VIDEO

Bolt Tightening

PHOTO

Bolt Tightening Order

Activity 2-3

Tightening Sequence

In three steps:

1. Tighten bolts, in order, hand tight.
2. Snug bolts, in order, to about 50% of final torque.
3. Tighten bolts, in order, to final torque.

Discussion 2-3 Tightening Sequence

1. Why should you follow a specific sequence when tightening bolts?
2. How can the machine move while the foot bolts are being tightened?
3. Later, when you are making vertical alignment corrections, you may choose to loosen only two bolts at a time. If you follow this practice, what should you do after you finish the vertical corrections?

Module 2-4

Correct Residual Soft Foot

[Objective]

At the end of this module, the student will be able to:

- Detect and correct final soft foot requirements.
- Identify whether an “angular” correction is required.
- Explain how to correct angled foot.

Module 2-4

Correct Residual Soft Foot

[Lesson] The instructor will demonstrate the following:

- Using a .002" (2 mils) shim to detect and correct any final soft foot.

VIDEO

Final Soft Foot Checks

Activity 2-4

Correct Residual Soft Foot

In this procedure you will:

1. Loosen one foot.
2. Measure for any remaining soft foot by checking several places under the foot with a 2-mil shim.
3. Re-tighten hold-down bolt.
4. Repeat process for the remaining three feet, tightening each foot back down after completion.

Discussion 2-4

Correct Residual Soft Foot

1. Why do we check for any residual soft foot by loosening only one bolt at a time?
2. Why are two soft foot checks needed?
3. What benefits are gained by tightening the bolts down in a controlled, repeatable pattern?

Module 2-5 Other Pre-Alignment Checks

[Objective]

At the end of this module, the student will have an understanding of additional pre-alignment checks:

- Check run out.
- Coupling hub separation.
- Pipe stress.

Module 2-5

Other Pre-Alignment Checks

[Lesson] The instructor will discuss the following:

- Obvious safety inspections.
- Performing a visual inspection of the machine.
- Checking for run out on both coupling hubs and shafts.
- Measuring hub separation.
- Using dials to detect excessive pipe stress.

Module 2-6

Pre-Alignment Resources

VIDEO

Rough Alignment

VIDEO

Elimination of Obvious Soft Foot

VIDEO

Bolt Tightening

VIDEO

Final Soft Foot Checks

PHOTO

Roughing In

PHOTO

Bolt Tightening Order

Unit 3

Basic Shaft Alignment

- Module 3-1: Demonstration of precision alignment #1
- Module 3-2: Demonstration of precision alignment #2
- Module 3-3: Student Practice #1
- Module 3-4: Student Practice #2
- Module 3-5: Introduction to Tolerances
- Module 3-6: Student Practice #3
- Module 3-7: Sampling Time

Unit 3

Basic Shaft Alignment

- Module 3-8: Student Practice #4
- Module 3-9: Media Resources

Module 3-1

Demonstration of Precision Alignment #1

[Objective]

At the end of this module, the student will be able to:

- Observe an entire precision alignment process.

Module 3-1

Demonstration of Precision Alignment #1

[Lesson] The instructor will demonstrate the following:

- Setting up the GO Pro.
- Starting the horizontal alignment program.
- Aiming the sensors, orienting their angular positions, and controlling coupling looseness.

BLOG POST

The Importance of Proper Alignment Technique and Being Aware of movement

Module 3-1

Demonstration of Precision Alignment #1

[Lesson cont'd] The instructor will demonstrate the following:

- Entering machine dimensions.
- Measuring misalignment.
- Making a Verti-Zontal Compound Move.
- Remeasuring alignment.
- Saving results.

Lesson Gallery 3.1.1 Measuring and Correcting Using the Fixturlaser GO Pro

Discussion 3-1

Demonstration of Precision Alignment #1

1. Of the four dimensions which do you think are the most important to measure correctly? What is the tolerance of this measurement?
2. At what point do the lasers become visible and begin measurement?

Module 3-2

Demonstration of Precision Alignment #2

[Objective]

At the end of this module, the student will be able to:

- Assist in an entire precision alignment process.

Module 3-2

Demonstration of Precision Alignment #2

[Lesson] The instructor will demonstrate the following:

- Setting up the GO Pro.
- Starting the horizontal alignment program.
- Aiming the lasers.
- Entering machine dimensions.
- Measuring misalignment.

Module 3-2

Demonstration of Precision Alignment #2

[Lesson] The instructor will demonstrate the following:

- Making a Verti-Zontal Compound Move.
- Monitoring for looseness.
- Remeasuring alignment.
- Saving results.

BLOG POST

The Importance of Proper Alignment Technique and Being Aware of movement

Discussion 3-2

Demonstration of Precision Alignment #2

1. How important is it to save the “as found” data?
2. Is it important to aim the lasers perfectly?
3. On the results screen, which group of numbers is most important, those at the coupling, or those at the feet?
4. How do you know if you’ve maintained proper backlash during the measurement process?

Module 3-3

Student Practice #1

[Objective]

At the end of this module, the student will be able to:

- Perform an entire precision alignment process with a tolerance of 1800 RPM.

Module 3-3

Student Practice #1 Lesson

[Lesson]

The instructor will observe and assist you in performing a complete alignment.

Activity 3-3

Student Practice #1

1. Remove the shims from the moveable element.
2. Perform your pre-alignment checks and correction.
3. Perform a precision alignment for an 1800 rpm machine.
4. Re-measure and document the results.

Discussion 3-3

Student Practice #1

1. What do the colors of the coupling icons represent?
2. What is a primary benefit of using the Verti-Zontal process?
3. Did the training simulator move in the manner and direction you expected?

Module 3-4

Student Practice #2

[Objective]

At the end of this module, the student will be able to:

- Perform a 2nd entire precision alignment, with a tolerance of 1800 RPM, using the Verti-Zontal Compound Move process.

Module 3-4

Student Practice #2

[Lesson] The instructor will observe and assist you in the the following:

- Perform an entire precision alignment, with a tolerance of 1800 RPM, using the Verti-Zontal Compound Move process.
- Re-measure and document the results.

Activity 3-4

Student Practice #2

1. Remove the shims from the moveable element.
2. Perform your pre-alignment checks and correction.
3. Perform a precision alignment for an 1800 RPM machine.
4. Re-measure and document the results.

Discussion 3-4

Student Practice #2

1. Does the direction of rotation matter when taking alignment measurements?
2. How important is it to rotate the shafts/sensors a full 180 degrees when taking measurements?
3. How long does the red “measuring icon” appear for during each measurement?

Module 3-5 Introduction to Tolerances

[Objective]

At the end of this module, the student will be able to:

- Understand the reason for alignment tolerances.

Module 3-5

Introduction to Tolerances

[Lesson] The instructor will demonstrate the following:

- Changing the alignment tolerance from an 1800 rpm tolerance to a 3600 rpm tolerance.
- The Zone of Good Alignment.

BLOG POST
Who Decides Shaft Alignment Tolerances?

BLOG POST
Tolerances vs. Coupling Tolerances

ARTICLE
Don't Look at Your Feet

PHOTO
The Zone of Good Alignment

Activity 3-5

Introduction to Tolerances

1. Remove the shims from the moveable element.
2. Perform your pre-alignment checks and correction.
3. Use the GO Pro to select 3600 rpm tolerance and enter the machine dimensions.
4. Leave the GO Pro on and in the shaft alignment application.

Discussion 3-5

Introduction to Tolerances

1. Why are alignment tolerances specified?
2. Do you know your company's alignment tolerances?
3. Why is alignment to zero impractical?

Module 3-6

Student Practice #3

[Objective]

At the end of this module, the student will be able to:

- Measure the "as found" alignment data from the roughing in process and save the data.
- Perform an entire precision alignment process with a tolerance of 3600 rpm.
- Save the final "as left" alignment data.

Module 3-6

Student Practice #3

[Lesson] The instructor will observe and assist in performing a 3600 rpm alignment.

BLOG POST

Who Decides Shaft Alignment Tolerances?

BLOG POST

Tolerances vs. Coupling Tolerances

ARTICLE

Don't Look at Your Feet

PHOTO

The Zone of Good Alignment

Activity 3-6

Student Practice #3

1. Complete the alignment, using a tolerance of 3600 rpm.
2. Re-measure and document the “as left” data.

Discussion 3-6

Student Practice #3

1. What are some challenges of aligning to a 3600 rpm tolerance?
2. Are shim stack thicknesses more critical at 3600 rpm?
3. What would be the importance of saving both the “as found” and “as left” data?
4. How can the Zone of Good Alignment be used to determine acceptable foot values?

Module 3-7 Sampling Time

[Objective]

At the end of this module, the student will be able to:

- Understand and utilize the Sampling Time of the Fixturlaser GO Pro.

Module 3-7

Sampling Time

[Lesson] The instructor will demonstrate the following:

- Increase the Sampling Time to compensate for high vibration environments.

BLOG POST

Is Vibration Interfering With Your Precision Shaft Alignment?

BLOG POST

Non-repeatability, A Little movement Can Cause A Lot of Headaches

Activity 3-7

Sampling Time

1. Enter the settings screen and change to the long sampling time.
2. Exit settings and take a measurement noting the length of time the red measuring icon appears on the screen.
3. Return to settings and change back to the normal sampling time.

Discussion 3-7

Sampling Time

1. What is the reason for extending the Sampling Time?

Module 3-8

Student Practice #4

[Objective]

At the end of this module, the student will be able to:

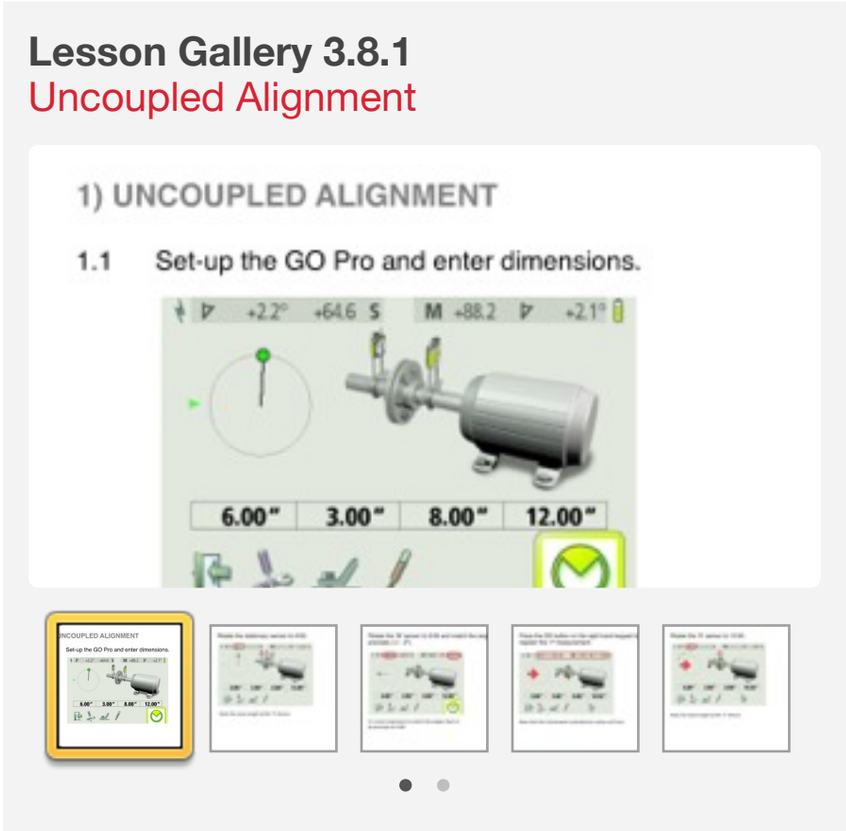
- Complete a precision alignment of an uncoupled machine.
- Have a better understanding of the inclinometer values on the GO Pro, and how they can be utilized.

Module 3-8

Student Practice #4

[Lesson] The instructor will demonstrate the following:

- Performing an uncoupled precision alignment.



BLOG POST

Aligning Uncoupled Machines

Activity 3-8

Student Practice #4

1. Remove the shims from the moveable element.
2. Perform the pre-alignment steps.
3. Leave the coupling insert out.
4. Measure misalignment and save the “as found” data.
5. Complete the alignment, using a tolerance of 1800 rpm.
6. Re-measure and document the “as left” data.

Discussion 3-8

Student Practice #4

1. When would it be preferable to perform an uncoupled alignment?
2. Should the alignment values change once the coupling is assembled?
3. How close should the inclinometer values be kept when performing an uncoupled alignment?

Module 3-9

Basic Shaft Alignment Resources

BLOG POST

The Importance of Proper Alignment Technique and Being Aware of movement

BLOG POST

How to Minimize the Effects of Backlash When Measuring Misalignment

BLOG POST

Aligning Uncoupled Machines

BLOG POST

Tolerances vs. Coupling Tolerances

ARTICLE

Don't Look at Your Feet

BLOG POST

Shaft Alignment With A Fluid Coupling

BLOG POST

Choosing the Best Way to Mount the Sensors of Your Laser Alignment Tool

BLOG POST

From the Mailbag: Mounting to Coupling Hubs

BLOG POST

Flexible Couplings and Flexible Shafts

BLOG POST

Who Decides Shaft Alignment Tolerances?

PHOTO

The Zone of Good Alignment

BLOG POST

Is Vibration Interfering With Your Precision Shaft Alignment?

BLOG POST

Non-repeatability, A Little movement Can Cause A Lot of Headaches

Unit 4

Alignment Problems and Solutions

- Module 4-1: Backlash and Looseness
- Module 4-2: Soft Foot Revisited (including angled foot)
- Module 4-3: Media Resources

Module 4-1

Backlash and Looseness

[Objective]

At the end of this module, the student will be able to:

- Identify issues associated with coupling backlash and system looseness.

Module 4-1

Backlash and Looseness

[Lesson] The instructor will demonstrate the following:

- How backlash and looseness affect readings
- How to identify and control backlash and looseness
- Methods to control backlash

BLOG POST

How To Minimize the Effects of Coupling Backlash When Measuring Misalignment

BLOG POST

Troubleshooting Looseness During Shaft Alignment.

Activity 4-1

Backlash and Looseness

1. Mount the sensors as you would in a normal alignment
2. Start up the GO Pro, and select horizontal alignment.
3. Select 1800 RPM.
4. Enter dimensions and follow through to the alignment screen, stop.
5. At this point, take note of the inclinometer readings at the top of the GO Pro display screen.

Activity 4-1

Backlash and Looseness

5. Rotate the movable shaft back and fourth causing backlash in the coupling.
6. Take note of the inclinometer readings and how they change.
7. Take note of any warnings that may be displayed on the screen.

Discussion 4-1 Backlash and Looseness

1. When the shafts are rotated, how did the inclinometer readings change?
2. When backlash was introduced into the coupling, were there any warnings displayed on the screen?
3. How would you correct the warning situation?
4. What are some methods for preventing backlash?

Module 4-2

Soft Foot Revisited

[Objective]

At the end of this module, the student will be able to:

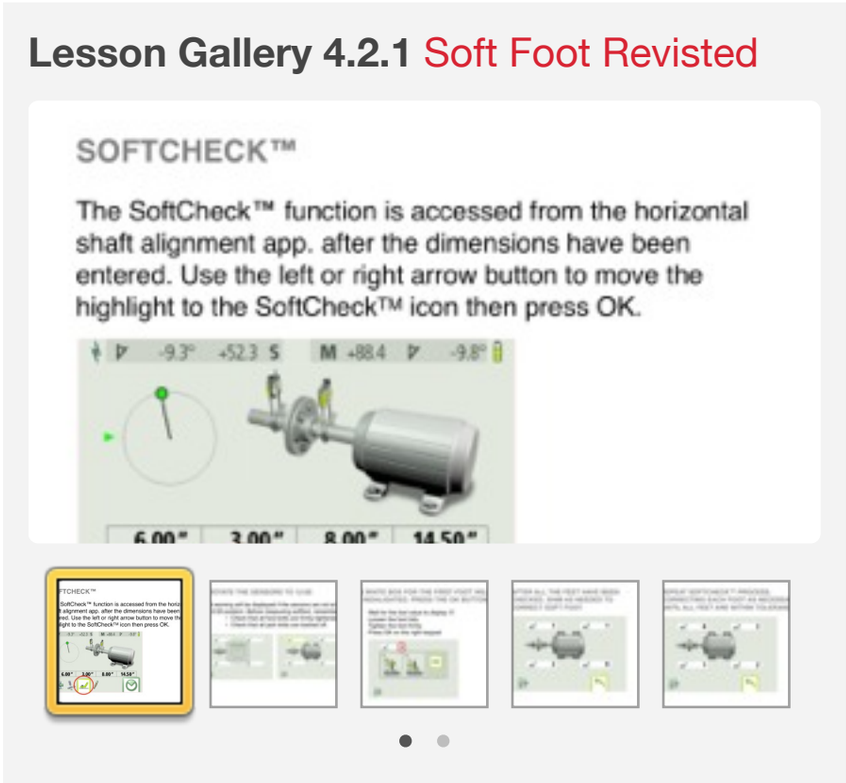
- Measure and correct soft foot using the Fixturlaser GO Pro.

Module 4-2

Soft Foot Revisited

[Lesson] The instructor will demonstrate using the GO Pro Soft Foot App.

Lesson Gallery 4.2.1 Soft Foot Revisted



VIDEO

Pre-alignment Steps for Shaft Alignment

BLOG POST

"Mic" Your Shims

BLOG POST

Small Details Make A Big Difference in Shaft Alignment

BLOG POST

Defining Level vs. Flat

Activity 4-2

Soft Foot Revisited

1. Using the process demonstrated, measure and correct soft foot on your demonstrator using the GO Pro Softfoot application.

Discussion 4-2 Soft Foot Revisited

1. What do the numbers represent?
2. How could all four feet be soft?
3. What would be the reason that adding a shim would cause little or no change when re-measured?
4. How could you resolve this problem?
5. What effect does “angled” softfoot have on the alignment?

Module 4-3

Alignment Problems and Solutions

Resources

BLOG POST

How To Minimize the Effects of Coupling Backlash When Measuring Misalignment

BLOG POST

Troubleshooting Looseness During Shaft Alignment.

VIDEO

Pre-alignment Steps for Shaft Alignment

BLOG POST

“Mic” Your Shims

BLOG POST

Small Details Make A Big Difference in Shaft Alignment

BLOG POST

Defining Level vs. Flat

Unit 5

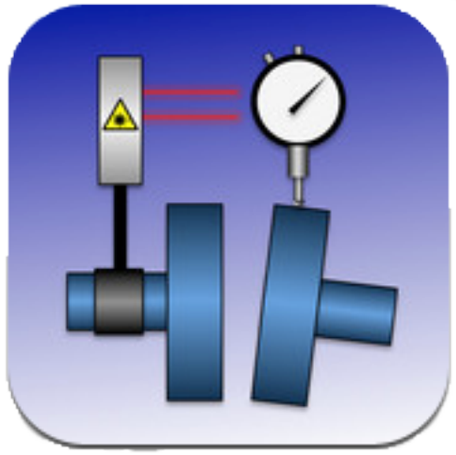
VibrAlign Resources

- Module 5-1: Mobile Applications
- Module 5-2: The Alignment Blog
- Module 5-3: VibrAlign YouTube Channel
- Module 5-4: Realigning America
- Module 5-5: The Alignment Resource Center
- Module 5-6: T-mail Training Newsletter
- Module 5-7: Training Website

VIBRALIGN

Module 5-1

Mobile Apps: iOS and Android



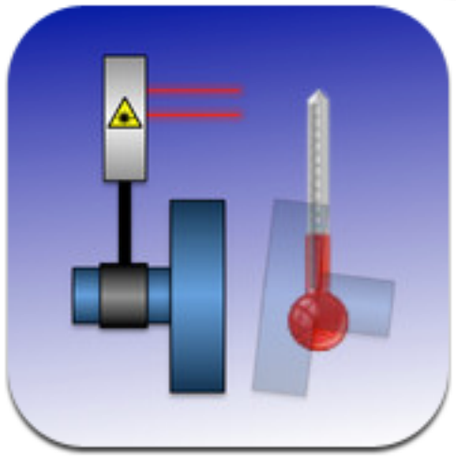
Gallery 5.1 Laser-Dials App

Gallery 5.2 Therm Align App

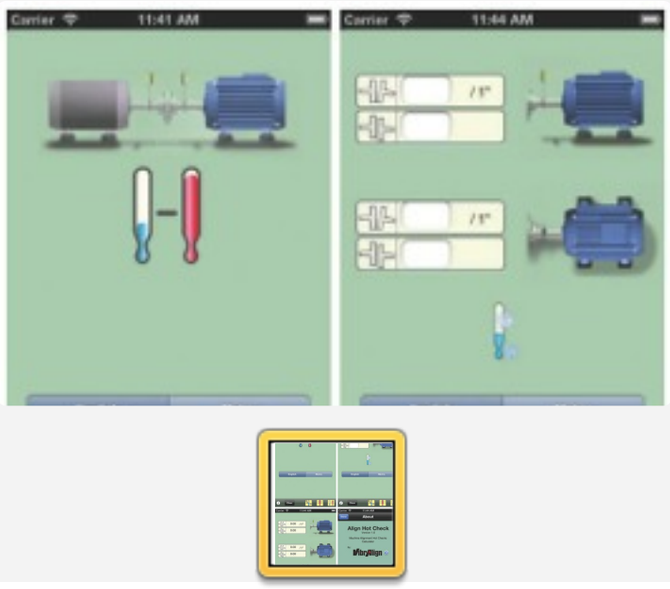
Gallery 5.3 Align Terms App

Module 5-1

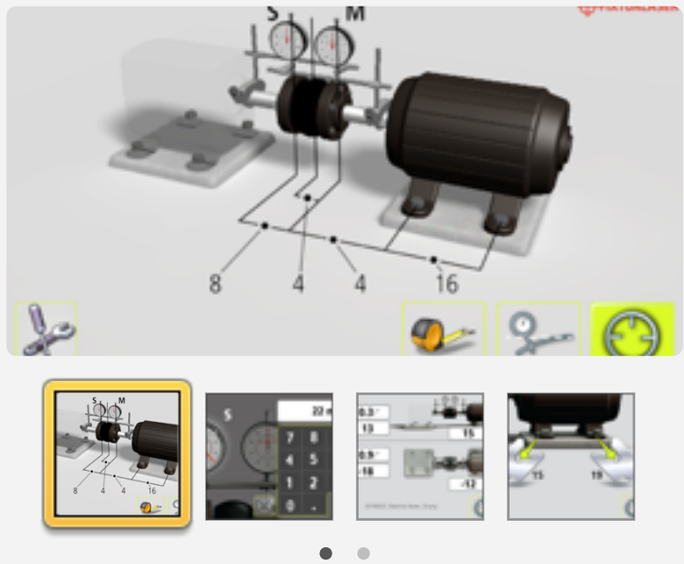
Mobile Apps: iOS and Android



Gallery 5.4 Align Hot Check



Gallery 5.5 Fixturlaser Dials



Module 5-2

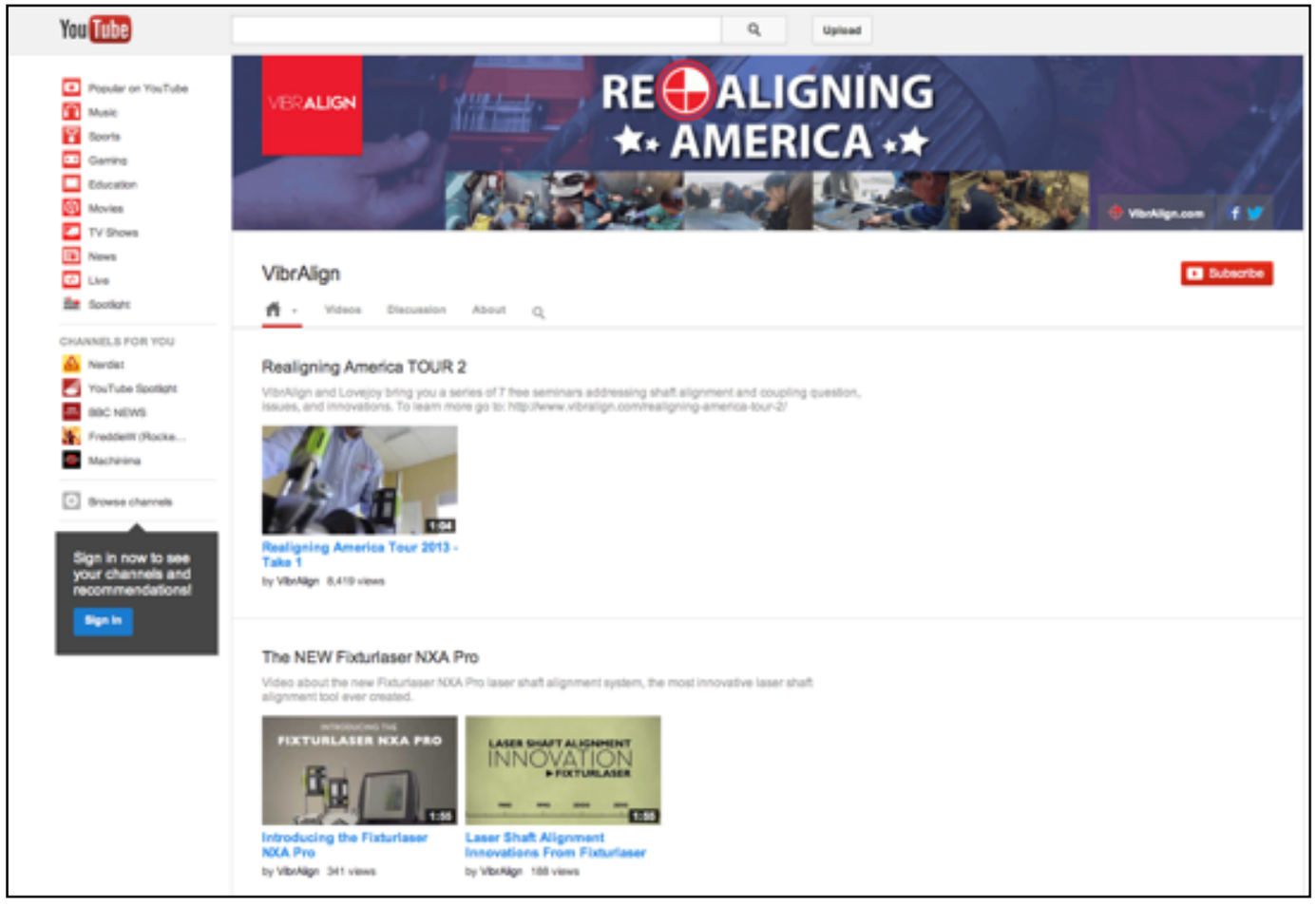
The Alignment Blog

Our goal here is to provide informative, relevant articles on the challenges of aligning industrial equipment. We'll talk about gathering meaningful alignment data, making the difficult moves, common pitfalls, etc. We'll present real-world situations with data we've collected in the field and hopefully get some good discussions going. This will also be another place to keep up with innovations and product releases from Fixturlaser.

VIBRALIGN

Module 5-3

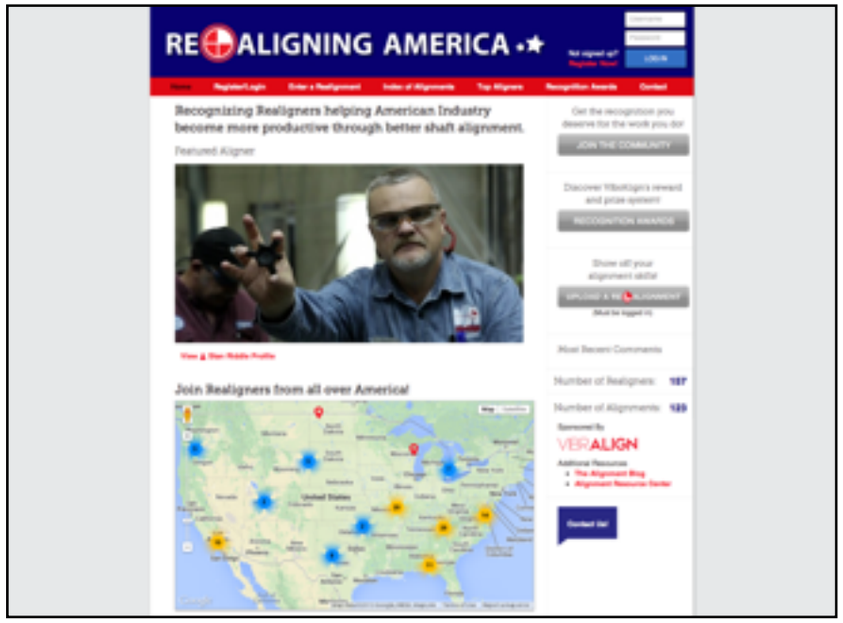
VibrAlign YouTube Channel



http://www.youtube.com/user/VibrAlign

Module 5-4

Realigning America



Realigning America signifies a nationwide community of aligners that can provide a sense of support and camaraderie among colleagues. Through Realigning America, your work is made public to the world. This exposure offers a gateway for aligner prominence and notability within the community of Realigning America. Posted alignments instantly create a learning environment that fosters collaboration and education.

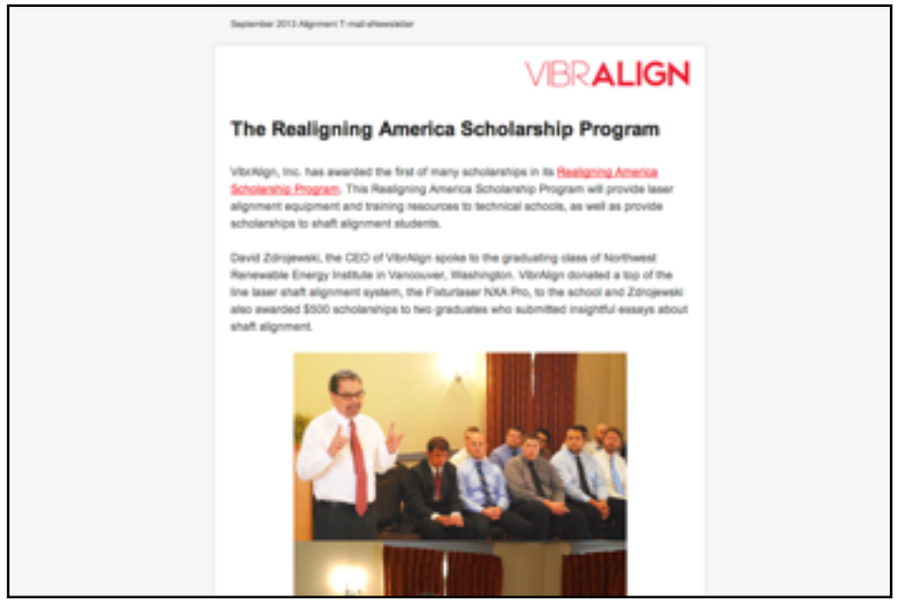
Module 5-5

The Alignment Resource Center

All of the VibrAlign collection of alignment materials is now being collected and made available on the Alignment Resource Center. The site not only provides access to articles and videos about alignment, it also provides access to all the posts from The Alignment Blog. All the content is organized and searchable.

Module 5-6

T-mail Training Newsletter



VIBRALIGN

The Realigning America Scholarship Program

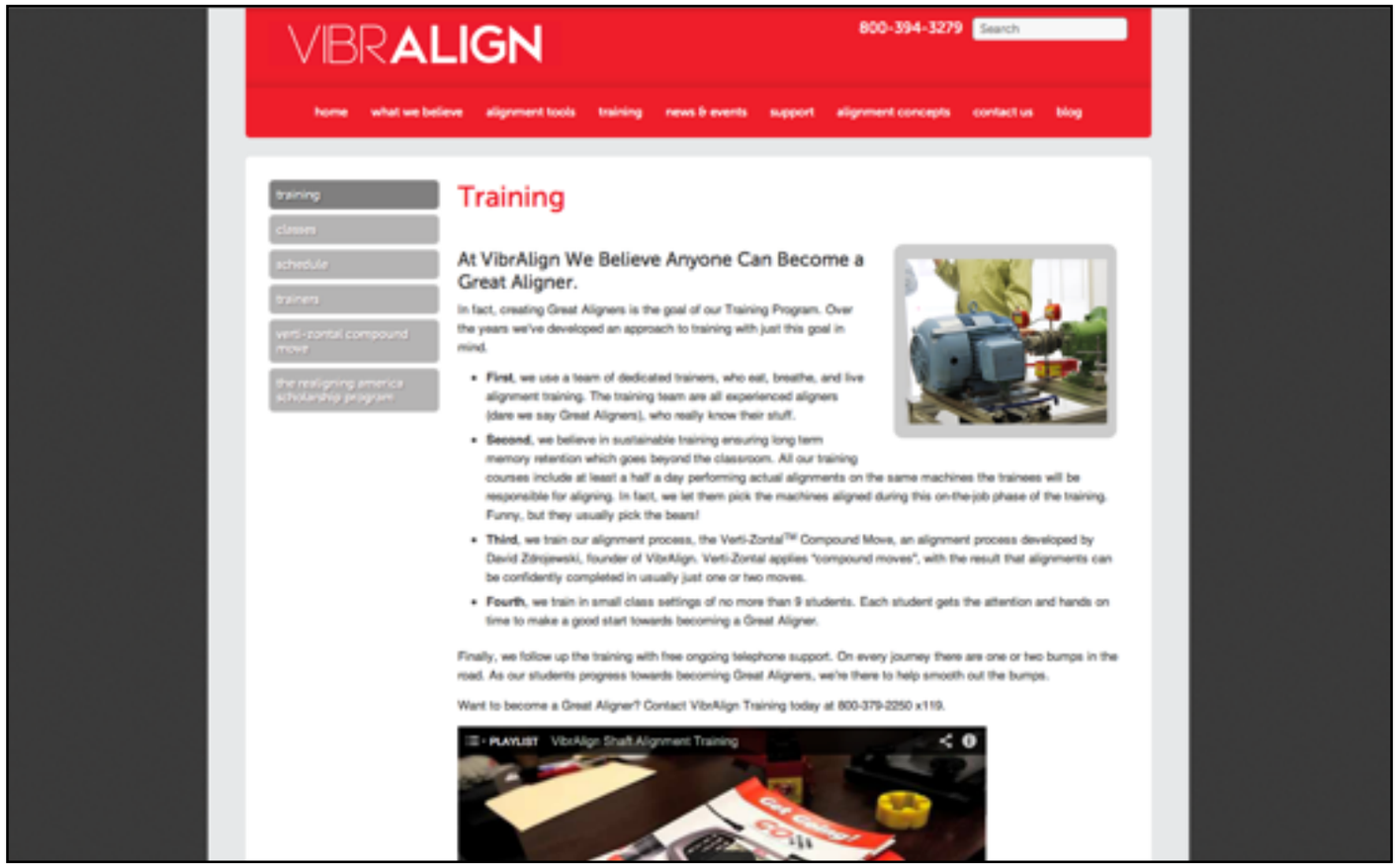
VibrAlign, Inc. has awarded the first of many scholarships in its Realigning America Scholarship Program. This Realigning America Scholarship Program will provide laser alignment equipment and training resources to technical schools, as well as provide scholarships to shaft alignment students.

David Zdrojewski, the CEO of VibrAlign spoke to the graduating class of Northwest Renewable Energy Institute in Vancouver, Washington. VibrAlign donated a top of the line laser shaft alignment system, the Fixturlaser NXA Pro, to the school and Zdrojewski also awarded $500 scholarships to two graduates who submitted insightful essays about shaft alignment.

The eNewsletter features advice from VibrAlign's alignment experts, and articles on technical topics, as well as answers to questions from T-Mail subscribers and VibrAlign customers. T-Mail will also keep subscribers up to date on product updates, new software including apps, training classes, and relevant content available through other publications such as VibrAlign's blog and website.

Module 5-7

Training Website



http://www.vibralign.com/Training

Unit 6

Global Settings & File Management

- Module 6-1: Operating Modes
- Module 6-2: Power Supply
- Module 6-3: Global Settings
- Module 6-4: Bluetooth Pairing
- Module 6-5: File Management
- Module 6-6: GO Pro Care and Handling
- Module 6-7: Media Resources

Module 6-1

GO Pro Operating Modes

[Objective]

At the end of this module, the student will be able to:

- Understand using the various operating modes of the GO Pro, including ON, Off, Auto-Off and Resume.

VIBRALIGN

Module 6-1

GO Pro Operating Modes

[Lesson] The instructor will demonstrate the following:

- The operating modes of the Fixturlaser GO Pro.
- Turning the GO Pro On and Off.
- Auto-Off: if no button is pressed within 60 minutes the Display Unit will turn off automatically.

Module 6-1

GO Pro Operating Modes

[Lesson Cont'd] The instructor will demonstrate the following:

- Resume Function: If the system is turned off due to low battery or auto-off, the resume function will save the data. You will be prompted to resume your alignment or exit.

Resume Function

Discussion 6-1 GO Pro Operating Modes

1. Can I put the GO Pro into “Sleep” mode?
2. I press and release the Red Button to turn on the GO Pro Display Unit and nothing happens. What do i do?

Module 6-2

GO Pro Power Supply

[Objective]

At the end of this module, the student will be able to:

- Understand the GO Pro power supply.

VIBRALIGN

Module 6-2

GO Pro Power Supply

[Lesson] The instructor will demonstrate the following:

- Battery life and maintenance.
- Low battery indicator.

Battery Life

Discussion 6-2

GO Pro Power Supply

1. Do I lose alignment information if the GO Pro Display Unit shuts downs due to a low battery?

Module 6-3

Global Settings

[Objective]

At the end of this module, the student will be able to:

- Set up and modify the various global utility parameters in the GO Pro Display Unit.

Module 6-3

Global Settings

[Lesson] The instructor will demonstrate changing Global Settings.

Lesson Gallery 6.3.1 Global Settings

GLOBAL SETTINGS

1. From the main menu, select the Global Settings icon then press OK.

Discussion 6-3

Global Settings

1. When would you change battery type setting?

Module 6-4 Bluetooth Pairing

[Objective]

At the end of this module, the student will be able to:

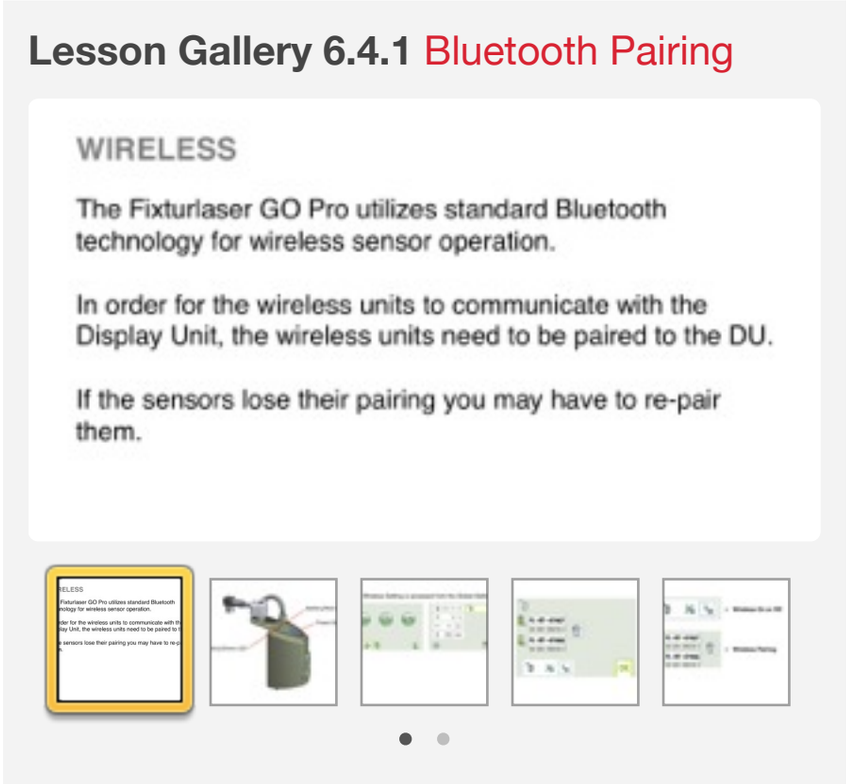
- Know how and when to re-pair the Bluetooth Transmitters.

Module 6-4

Bluetooth Pairing

[Lesson] The instructor will demonstrate the following:

- Un-Pairing and re-pairing the Bluetooth transmitters.



Discussion 6-4 Bluetooth Pairing

1. Can you use cables with the GO Pro instead of the Bluetooth Transmitters?
2. What image (icon) should you see in the upper left corner of the main (opening) screen of the GO Pro display unit when using the Bluetooth Transmitters?

VIBRALIGN

Module 6-5

File Management

[Objective]

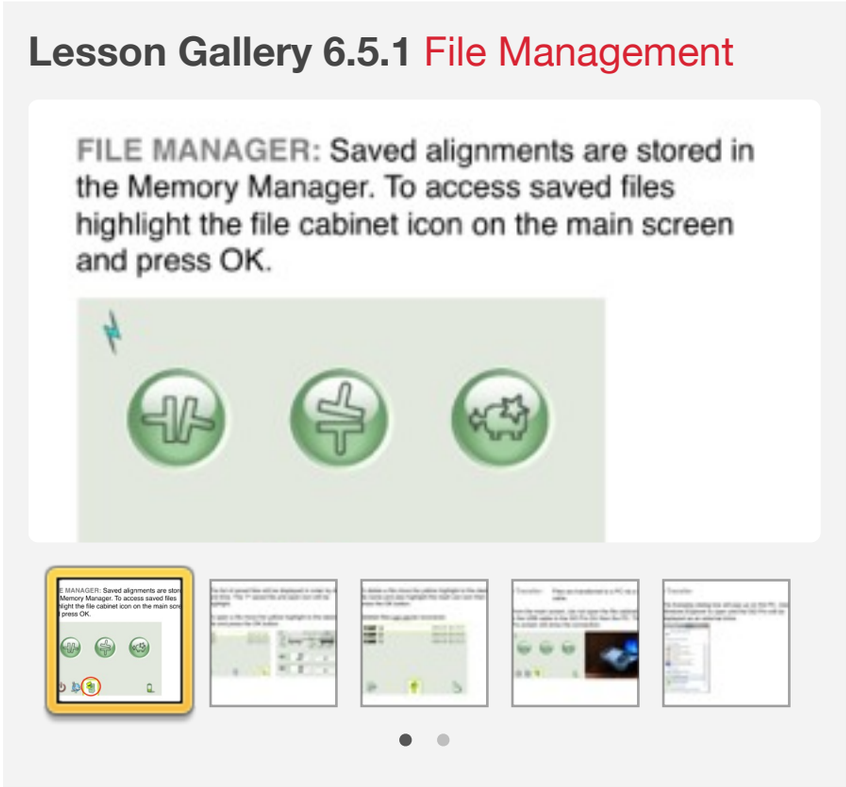
At the end of this module, the student will be able to:

- View and/or delete saved alignment files.
- Copy alignment data from the GO Pro Display Unit to a PC.

Module 6-5

File Management

[Lesson] The instructor will demonstrate File Management.



Activity 6-5

File Management

1. Students will view saved alignment files in the GO Pro Display Unit.

Discussion 6-5 File Management

1. What would be a good way to organize saved alignment files for your facility?
2. Can a file or folder be moved back into the GO Pro from a PC.
3. Is a special program needed to transfer files from the GO Pro onto a PC?

Module 6-6

Care and Handling

[Objective]

At the end of this module, the student will be able to:

- Understand the proper care, handling and cleaning of the Fixturlaser GO Pro Alignment System.

VIBRALIGN

Module 6-6

Care and Handling

[Lesson] The instructor will discuss the following:

- GO Pro Storage case.
- GO Pro DU, M & S Sensors IP54 & IP65 rating.
- Temperature and Humidity working range.
- Proper cleaning of display unit screen, detector and laser "windows" using a soft cloth or Q-tip not paper products. Use Alcohol only.

Discussion 6-6

Care and Handling

1. Can I clean my GO Pro with an ammonia based cleaner?
2. Do I need to protect the GO Pro Display Unit and Sensors from rain?
3. What should I use to clean the laser and detector openings on the sensors, paper towels or a Q-tip?

Module 6-7

Global Settings & File Management

Resources

Unit 7

Advanced Shaft Alignment

- Module 7-1: Thermal Growth & Dynamic Movement
- Module 7-2: Entering Thermal Targets at the Feet
- Module 7-3: Entering Thermal Targets at the Coupling
- Module 7-4: Student Practice #7 using Thermal Targets

Module 7-1 Thermal Growth & Dynamic Movement

[Objective]

At the end of this module, the student will be able to:

- Explain why some machines are intentionally misaligned.
- Discuss the difference between thermal growth and thermal targets.
- Define Dynamic Movement.

Module 7-1

Thermal Growth & Dynamic Movement

[Lesson] The instructor will demonstrate the following:

- Causes of thermal growth.
- How thermal growth affects alignment values.
- Necessity of accurate thermal growth targets.

BLOG POST
Shaft Alignment Thermal Growth Targets- When You Don't Know

BLOG POST
Checking Your Thermal Targets

BLOG POST
How Does Calculating Your Own Alignment Targets Work?

BLOG POST
Thermal Growth: What's So Hot About It?

BLOG POST
Thermal Growth Compensation- Growth Versus Targets

BLOG POST
Should Thermal Growth Affect Angular Misalignment?

Discussion 7-1

Thermal Growth & Dynamic Movement

1. What are targets?
2. Can thermal changes affect both elements?
3. Can you have both vertical and horizontal changes?
4. What is the most common cause of dynamic movement?

Module 7-2

Entering Thermal Targets at the Feet

[Objective]

At the end of this module, the student will be able to:

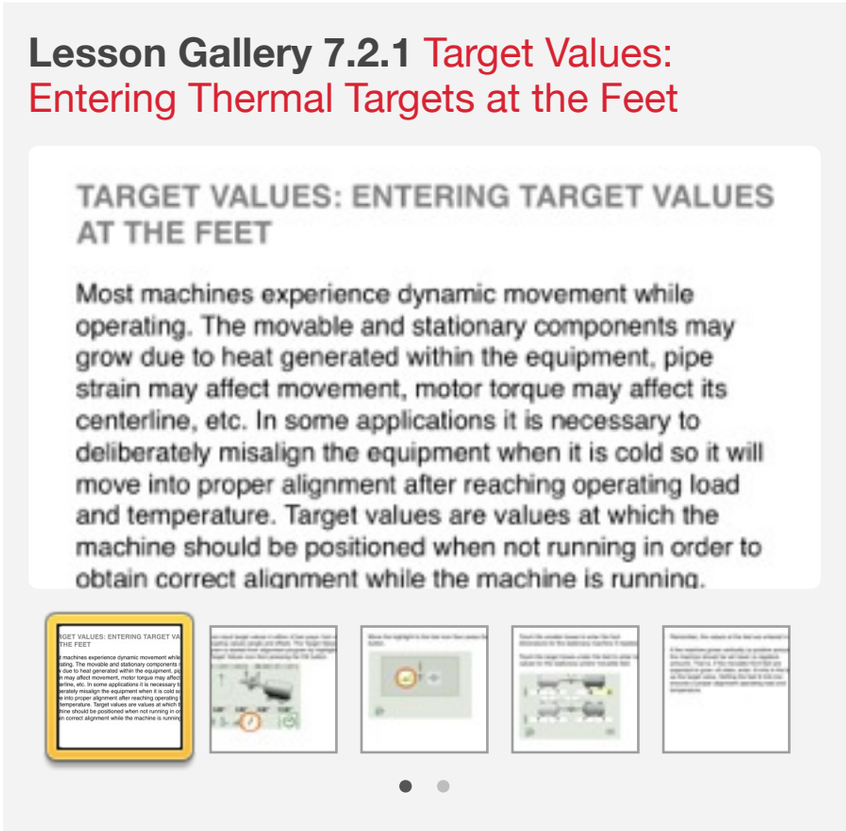
- Enter thermal targets at the feet of the moveable and/or stationary machine(s).

Module 7-2

Entering Thermal Targets at the Feet

[Lesson] The instructor will demonstrate the following:

- Select the Thermal Targets icon.
- Choose the foot icon.
- Define and enter targets.
- Return to shaft alignment.



BLOG POST

Calculating Foot Targets

Activity 7-2

Entering Thermal Targets at the Feet

1. Student enters thermal targets at the feet.

Discussion 7-2 Entering Thermal Targets at the Feet

1. When would you enter the Thermal Growth Target Values at the feet?
2. Can Thermal Growth Targets be entered for both the moveable and stationary machines?
3. Where do your thermal growth targets come from?
4. Should thermal growth targets be used if the machine you are aligning is hot?

Module 7-3

Entering Thermal Targets at the Coupling

[Objective]

At the end of this module, the student will be able to:

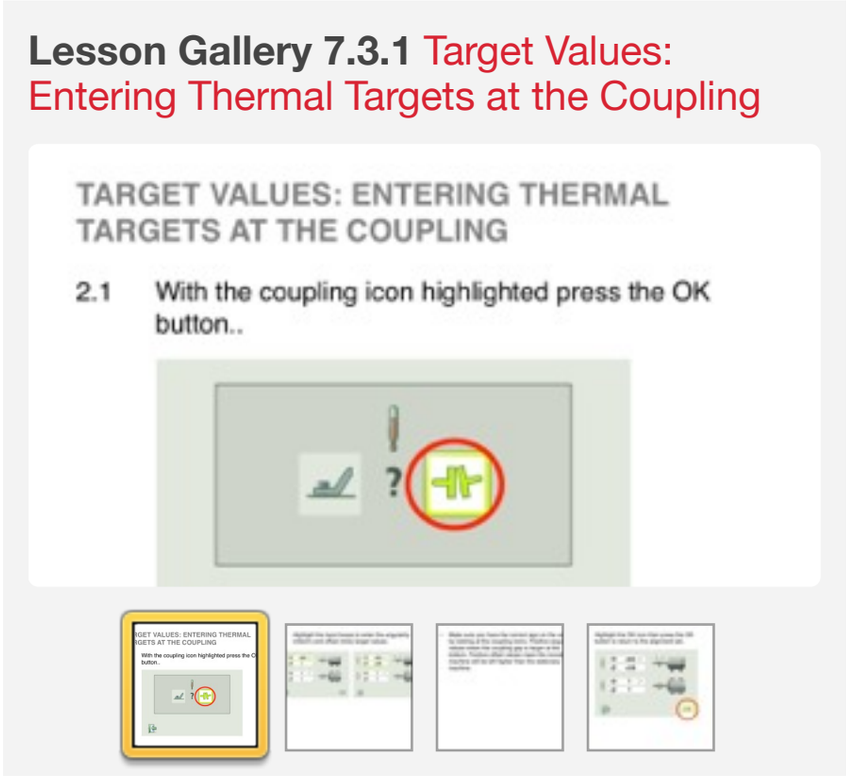
- Enter thermal targets at the coupling for the movable machine.

Module 7-3

Entering Thermal Targets at the Coupling

[Lesson] The instructor will demonstrate the following:

- Select the Thermal Targets icon.
- Choose the coupling icon.
- Define and enter targets.
- Return to the shaft alignment.



Activity 7-3

Entering Thermal Targets at the Coupling

1. Students enters Thermal Target at the coupling.

Discussion 7-3 Entering Thermal Targets at the Coupling

1. Where do I get these targets?
2. Why would you use foot targets vs. coupling targets?
3. How do I use the positive and negative values?
4. Can I store these targets?

Module 7-4

Practice #7: Using Thermal Targets

[Objective]

At the end of this module, the student will be able to:

- Perform the entire precision alignment process with a tolerance of 1800 RPM and to Thermal Targets for the front and rear feet of the movable machine.

Module 7-4

Practice #7: Using Thermal Targets

[Lesson] The instructor will observe & assist in the following:

- Remove the shims from the moveable element.
- Perform your pre-alignment checks and corrections.
- Enter Thermal Target Foot Values of -8.0 mils for the front and rear feet of the movable machine.
- Perform a precision alignment for an 1800 rpm machine.
- Re-measure and document the results.

Discussion 7-4

Practice #7: Using Thermal Targets

1. What icon should you see on the GO Pro DU screen when performing an alignment with Thermal Targets.
2. You have entered a Thermal Target of -8.0 mils for the front feet of the movable machine. The GO Pro Shim Screen shows to remove 28 mils from the front feet. How much shim do you remove?

Module 7-5

Advanced Shaft Alignment Resources

BLOG POST

Shaft Alignment Thermal Growth Targets- When You Don't Know

BLOG POST

Checking Your Thermal Targets

BLOG POST

How Does Calculating Your Own Alignment Targets Work?

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Thermal Growth: What's So Hot About It?

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BLOG POST

Should Thermal Growth Affect Angular Misalignment?

BLOG POST

Calculating Foot Targets

BLOG POST

Measuring Thermal growth with XA Pro and OL2R

BLOG POST

Machine Train Shaft Alignment- To Move or Not to Move

Unit 8

Appendix

- Module 8-1: Clock Mode
- Module 8-2: Vertical Alignment
- Module 8-3: Media Resources

Module 8-1 Clock Method

[Objective]

At the end of this module, the student will be able to:

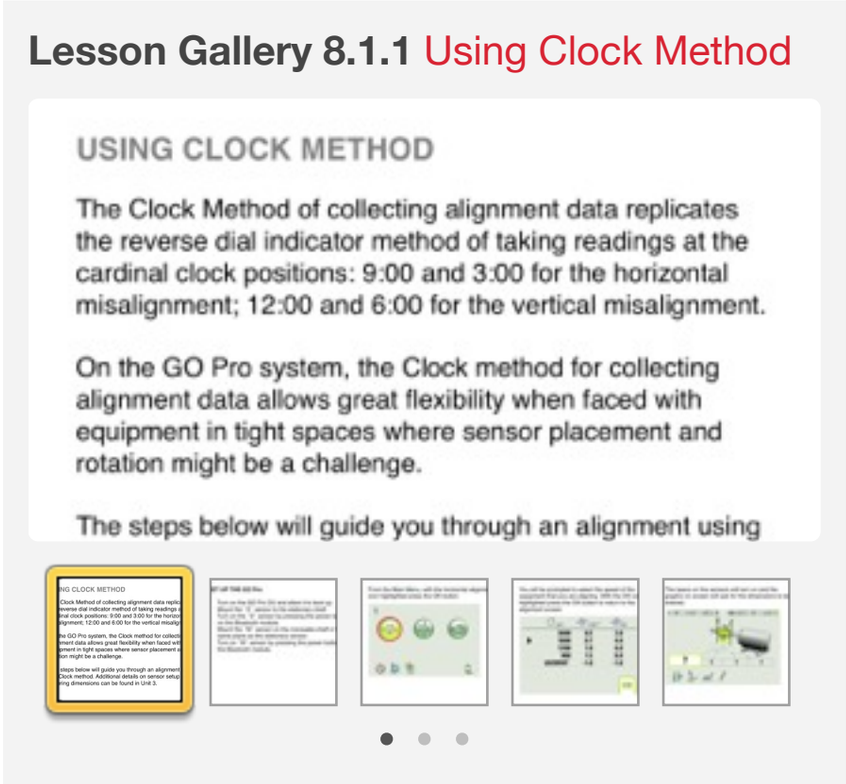
- Determine when to use clock method. (Disabled inclinometers)
- Turning off inclinometers.
- Understand the differences between Tripoint and Clock measuring methods.

Module 8-1

Clock Method

[Lesson] The instructor will demonstrate the following:

- How to change the GO Pro into clock method.
- Discuss when to perform measurements in clock method.



VIDEO

Dial Indicator Alignment Concepts

Discussion 8-1

Clock Method

1. What are the major differences between Clock Method and Tri-Point Methods?
2. Explain True Position.
3. When would you use the Clock Method as opposed to Tri-point?

Module 8-2

Vertical Alignment

[Objective]

At the end of this module, the student will be able to:

- Identify when to use the vertical alignment application.
- Understand the differences in vertical alignment of C-face motors, and vertically-oriented motors with four fee.

Module 8-2

Vertical Alignment

[Lesson]

The instructor will demonstrate & discuss the following:

- The Vertical Alignment icon.
- Differences in C-face and four footed motors.

BLOG POST

A Vertical Shaft Alignment Process

Discussion 8-2 Vertical Alignment

1. What are the major differences in the dimensions needed to perform a vertical alignment?
2. How could you perform a vertical alignment on a machine with four motor feet?
3. If you have a horizontally-mounted C-face motor, which measurement method should you use – horizontal or vertical?

Module 8-3

Appendix Resources

VIDEO

Dial Indicator Alignment Concepts

BLOG POST

A Vertical Shaft Alignment Process

Fixturlaser GO Pro Training Manual

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