Fixturlaser EVO
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
[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
[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
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.
[Lesson] The instructor will demonstrate the following:

- Basics in alignment
- The machines that get aligned
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.
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?
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.
[Lesson] The instructor will demonstrate the following:

- How misalignment forces cause coupling wear.
- How misalignment forces can cause bearing and seal failure.
Module 1-6

Introduction to Alignment Resources

The VibrAlign Story
Realigning America
How We Train
Shaft Alignment Training, is it Necessary?
Concepts of Shaft Alignment 1, the Basics

Concepts of Shaft Alignment 2, Offset and Angularity
Unit 2

Pre-Alignment

• Module 2-1: Rough Alignment
• Module 2-2: Obvious Soft Foot
• Module 2-3: Tightening Sequence
• Module 2-4: Final Soft Foot Checks
• 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.
[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.
Activity 2-1  Rough Alignment

1. Measure the vertical gap between the stationary and movable hubs using a straight edge and shims as a 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.
1. Why do you perform rough alignment before attempting to precisely align machines?

2. Which direction should you typically rough align first - vertical or horizontal?

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 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.
**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.
1. What are some 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.
Module 2-3

Tightening Sequence

[Lesson] The instructor will demonstrate the following:

- Establishing a bolt tightening sequence.
- Taking three passes to achieve full torque.
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.
1. Why should you follow a specific sequence when tightening bolts?

2. What benefits are gained by tightening the bolts down in a controlled, repeatable pattern?
[Objective]

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

- Detect and correct final soft foot.
- Identify whether an “angular” correction is required.
- Explain how to correct angled foot.
- Control and minimize the effects of any remaining residual soft foot.
Module 2-4 Final Soft Foot Corrections

[Lesson] The instructor will demonstrate the following:

- Using a .002” (2 mils) shim to detect and correct any final 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.
Fixturlaser EVO

Discussion 2-4

Final Soft Foot Corrections

1. Why do we check for Final 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 Listing

[Objective]

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

- Check run out.
- Check for proper coupling hub separation.
- Measurement for pipe stress.
Module 2-5

Other Pre-Alignment Checks Listing

[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

Rough Alignment
Elimination of Obvious Soft Foot
Bolt Tightening
Final Soft Foot Checks
Roughing In

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: Using 3600 RPM Tolerances
Unit 3

Basic Shaft Alignment

• Module 3-7: Student Practice #3- Uncoupled Alignment
• Module 3-8: Sampling Time
• Module 3-9: Vibration Filtering
• Module 3-10: Basic Shaft Alignment 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.
Demonstration of Precision Alignment #1

[Lesson] The instructor will demonstrate the following:

- Setting up the EVO.
- Starting the horizontal alignment program.
- Aiming the lasers.
- Entering machine dimensions.
Module 3-1

Demonstration of Precision Alignment #1

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

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

Lesson Gallery 3.1.1 Measuring and Correcting Using the Fixturlaser EVO

TIP: The larger the angle over which the three points are measured, the fewer moves and repeat measurements will have to be made. Minimum angle readings are 45°.
1. Of the four dimensions which do you think are the most important to measure correctly?

2. True or false, the sensors should be mounted as closely together as possible.

3. At what point do the lasers become visible and begin measurement?
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.
[Lesson] The instructor will demonstrate the following:

- Setting up the EVO.
- Starting the horizontal alignment program.
- Aiming the lasers.
- Entering machine dimensions.
- Measuring misalignment.
Demonstration of Precision Alignment #2

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

- Making a Verti-Zontal Compound Move.
- Monitoring for coupling looseness.
- Remeasuring alignment.
- Saving results.
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 using the with a tolerance of 1800 rpm.
[Lesson] The instructor will observe and assist you in performing a complete alignment.
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.
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 alignment demonstrator 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 an entire precision alignment process with a tolerance of 1800 rpm using the Tri-Point Method.
Module 3-4

Student Practice #2

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

- Perform a precision alignment for a 1800 rpm machine using the Tri-Point Method.

- Re-measure and document the results.
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 using the Tri-Point method.

4. Re-measure and document the results.
1. Is it required to use clock positions for measurements when using the EVO?

2. Why does it only require three measurements?
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.
1. Remove the shims from the moveable element.
2. Perform your pre-alignment checks and correction.
3. Use the EVO to select 3600 rpm tolerance and enter the machine dimensions.
4. Leave the EVO 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?
Prac #3: Using 3600 RPM Tolerances

[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.
Prac #3: Using 3600 RPM Tolerances

[Lesson] The instructor will observe and assist in performing a 3600 rpm alignment.
1. Complete the alignment, using a tolerance of 3600 rpm.
2. Re-measure and document the “as left” data.
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?
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 EVO, and how they can be utilized.
Practice #4: Uncoupled Alignment

[Lesson] The instructor will demonstrate the following:

- Performing an uncoupled precision alignment.
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.
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?
[Objective]

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

- Understand and utilize the Sampling Time and Screen Filtering functions of the Fixturlaser EVO.
Module 3-8

Sampling Time

[Lesson] The instructor will demonstrate the following:

- Changing the Sampling Time to 5 seconds
1. How can increasing the sampling time improve repeatability?

2. How would you best determine when the sampling time should be increased?
Module 3-9

Vibration Filtering

[Objective]

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

- Understand the use of the Screen Filter, and when to utilize it.
[Lesson] The instructor will demonstrate the following:

- Use of the Screen Filter.
1. What is the purpose of the Screen Filter?

2. What is the best method of determining the influences of external vibration on alignment data?

3. Should the Screen Filter be used for every alignment? Why or why not?

4. Explain the difference in the Screen Filter and the Sampling Time.
The Importance of Proper Alignment Technique and Being Aware of movement

How to Minimize the Effects of Backlash When Measuring Misalignment

Aligning Uncoupled Machines

Shaft Alignment With A Fluid Coupling

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

From the Mailbag: Mounting to Coupling Hubs

Flexible Couplings and Flexible Shafts

Who Decides Shaft Alignment Tolerances?

Tolerances vs. Coupling Tolerances

Non-repeatability, A Little movement Can Cause A Lot of Headaches
Module 3-10

Basic Shaft Alignment Resources

- Is Vibration Interfering With Your Precision Shaft Alignment?
- Don’t Look at Your Feet
- The Zone of Good Alignment
Alignment Problems and Solutions

- Module 4-1: When Things Go Wrong—looseness, backlash
- Module 4-2: Soft Foot Revisited (including angled foot)
- Module 4-3: Student Practice #6: Solving Base Bound/Bolt Bound Issues
- Module 4-4: Media Resources
[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
Activity 4-1  Backlash and Looseness

1. Mount the sensors as you would in a normal alignment.
2. Start up the EVO, and select horizontal alignment.
3. Select 1800 RPM and follow through to the alignment screen, stop.
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 EVO display screen.
6. Rotate the movable shaft back and fourth causing backlash in the coupling.

7. Take note of the inclinometer readings and how they change.

8. Take note of any warnings that may be displayed on the screen.
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 EVO.
Module 4-2

Soft Foot Revisited

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

Lesson Gallery 4.2.1 Softfoot Revisited

1) SOFTCHECK™
The SoftCheck™ program can be accessed from the horizontal shaft alignment app once the measurement dimensions have been entered.

1.1 From the measurements screen, select the Soft Check™ icon.

Pre-alignment Steps for Shaft Alignment

“Mic” Your Shims

Small Details Make A Big Difference in Shaft Alignment

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 EVO Soft Foot App.
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

Base Bound/Bolt Bound Issues

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

- Discuss alternative solutions to limited movement of machines in both vertical and horizontal planes.
- Determine solutions for dealing with Base Bound/Bolt Bound issues and correct.
[Lesson] The instructor will demonstrate the following:

- What Base Bound/Bolt Bound conditions are
- Alternative moving methods
1. Instructor will set the alignment demonstrator up in a Base Bound or Bolt Bound Condition.

2. Students will perform initial alignment measurements.

3. Instructor will guide students through alternative solutions.
1. What are some methods in which a Bolt Bound condition is traditionally solved?

2. Can a stationary machine sometimes be moved slightly?
Alignment Problems and Solutions

Resources

Module 4-4

How To Minimize the Effects of Coupling Backlash When Measuring Misalignment

Troubleshooting Looseness During Shaft Alignment

Pre-alignment Steps for Shaft Alignment

“Mic” Your Shims

Small Details Make A Big Difference in Shaft Alignment

Base-Bound/Bolt-Bound Math

Is it okay to undercut bolts?

Take a Step Back During Your Shaft Alignment

What if You Had to Leave a Machine Slightly Misaligned?
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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.
Module 5-3

VibrAlign YouTube Channel

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

Module 5-7

Training Website

http://www.vibralign.com/Training
Operating Modes, Measurement Units, & File Management

• Module 6-1: Screen Flip
• Module 6-2: Power Supply and Charging
• Module 6-3: Measurement Units
• Module 6-4: Bluetooth Pairing
• Module 6-5: File Management
• Module 6-6: EVO Care and Handling
Module 6.1  

Screen Flip™

[Objective]

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

- Understand the Screen Flip function and how to utilize it.
[Lesson] The instructor will demonstrate the Screen Flip function.
1. Student rotates EVO screen using Screen Flip function.
1. What are the benefits of using the Screen Flip Function of the EVO?
[Objective]

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

- Understand the charging functions of the EVO.
Module 6-2  

Power Supply and Charging

[Lesson] The instructor will demonstrate the following:

- Battery life and maintenance.
- Low battery indicator.
- Charging cycle and indicator.
- How to charge the display unit and Bluetooth transmitters.
1. Should I ever remove the charging cables from the EVO case?

2. Can I check the charge level of the batteries while the EVO is turned off?
[Objective]

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

- Change measurement units between Imperial and Metric Settings.
[Lesson] The instructor will demonstrate the following:

- Changing between Imperial and Metric units.
1. From the alignment report, how can I easily tell if the EVO is set up to measure in inches or millimeters?
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
Lesson] The instructor will demonstrate the following:

- Un-pairing and re-pairing the Bluetooth transmitters.
- When the pairing process would be necessary.
Discussion 6-4

Bluetooth Pairing

1. Is there typically any reason to un-pair the Bluetooth transmitters?
[Objective]

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

- Copy alignment data from the EVO Display Unit to a PC.
- View alignment data from within the EVO memory.
[Lesson] The instructor will demonstrate the following:

- Connecting the EVO to a PC.
- Transferring alignment data into a PC.
- Opening an existing alignment in the EVO memory.
1. What would be a good way to organize folders for your facility?

2. Can a file or folder be moved back into the EVO from a PC.

3. Is a special program needed to transfer files and folders from the EVO onto a PC?
[Objective]

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

- Understand the proper care, handling and cleaning of the Fixturlaser EVO Pro Alignment System.
[Lesson] The instructor will discuss the following:

- EVO Storage case.
- EVO display unit, M & S Sensors IP65 rating.
- Touch screen durability.
- 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 EVO with an ammonia based cleaner?

2. Do I need to protect the EVO 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?
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
Advanced Shaft Alignment

- Module 7-5: Vertical Alignment
- Module 7-6: Machine Defined Data
- Module 7-7: Media Resources*
[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.
[Lesson] The instructor will demonstrate the following:

- Causes of thermal growth.
- How thermal growth affects.
- Necessity of accurate thermal growth targets.
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).
[Lesson] The instructor will demonstrate the following:

- Select the Thermal Targets icon.
- Choose the foot icon.

Lesson Gallery 7.2.1 Thermal Growth

**TARGET VALUES**

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

Machine manufacturers define the thermal expansion of machines differently, but in most cases you will find it as a factor of deliberate misalignment expressed in offset and angular coupling values.
1. Student enters 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 Enter 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.
1. Students re-measure new alignment results, then input thermal offset targets at the coupling of +.5 mils per inch angularity, and an offset of +3 mils.
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?
[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 of -8 mils for the front and rear feet of the movable machine.
Fixturlaser EVO

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 EVO 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 EVO Shim Screen shows to remove 28 mils from the front feet. How much shim do you remove?
Module 7-5  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 feet.
Module 7-5  Vertical Alignment

[Lesson] The instructor will demonstrate & discuss the following:

- The Vertical Alignment icon.
- Differences in C-face and four footed motors.
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 7-6  
Machine Defined Data

[Objective]

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

- Understand the Machine Defined Data function of the EVO.
- Discuss possible uses of the function.
Module 7-6 Machine Defined Data

[Lesson] The instructor will demonstrate the following:

- How to save Machine Defined Data
Module 7-6  **MACHINE DEFINED DATA**

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

- How to recall Machine Defined Data
1. You have 10 identical motor-pump configurations. Could a Machine Defined Data template be used?

2. If the 10 machines above were not identical, could a Machine Defined Data template be used? Why or why not?
Module 7-7

Advanced Shaft Alignment Resources

- Shaft Alignment Thermal Growth Targets - When You Don't Know
- Checking Your Thermal Targets
- How Does Calculating Your Own Alignment Targets Work?
- Thermal Growth: What's So Hot About It?
- Thermal Growth Compensation - Growth Versus Targets
- Should Thermal Growth Affect Angular Misalignment?
- Calculating Foot Targets
- Measuring Thermal growth with XA Pro and OL2R
- Machine Train Shaft Alignment - To Move or Not to Move
- A Vertical Shaft Alignment Process
- Dial Indicator Alignment Concepts

Advanced Shaft Alignment Resources

- BLOG POST
- VIDEO