



# X SERIES™

LASER SHAFT  
ALIGNMENT

[www.hamarlaser.com](http://www.hamarlaser.com)

# X-660

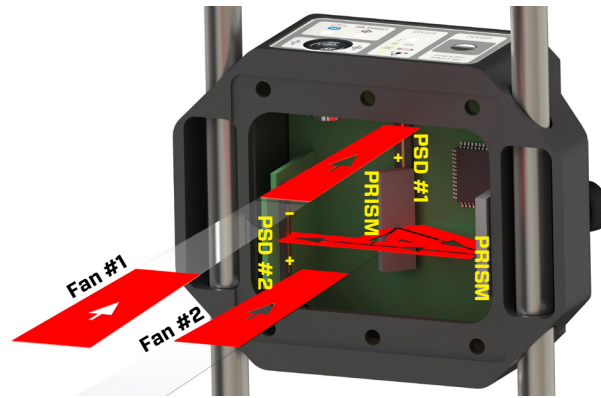
3-AXIS  
ALIGNMENT TOOL



Unidirectional Dual-Fan™  
Technology

- **Build Your Own™ App Selector**
- **5 Year Unconditional Warranty**
- **Ultra Accuracy for Faster Alignments**
- **10" Rugged PC Tablets**
- **Measurement Error <0.75%**
- **No Pre-Alignment**
- **Operating Temp. -15°C to 60°C**
- **Duo-View™ Automatic Move Screen**
- **Upgrade Anytime to Advanced Apps**

# What sets the X-660 System apart from the competition?



## Dual-Fan™ detector technology

Provides highly accurate, simultaneous measurement of offset and angle, using two 0.25-degree laser fans and 2 PSD sensors, offering full angular measuring range over the entire operating range between laser and target.

### Here's how it works:

1. Fan #1 blinks on and hits PSD measuring the center offsets.
2. Fan #1 blinks off for ambient light correction.
3. Fan #2 blinks on and bounces off of 2 prisms and hits a second PSD that is in the same plane as the first. The difference between the 2 PSD's divided by beam path length produces the angle.
4. Fan #2 blinks off for a second ambient light correction.

## The world's most advanced shaft alignment technology

For over 50 years, we have been providing highly accurate alignment systems to many different industries and applications. We started in the machine tool industry where tolerances are high and applications are difficult, and then 30 years ago we developed the world's first 4-axis shaft alignment system. All of that experience and knowledge has gone into the design of the X-660 Wireless 3-axis Shaft Alignment System, resulting in the most accurate and yet easy-to-use tool in its class.

## Advanced Unidirectional Dual-Fan™ Technology

This innovative technology provides an amazing  $\pm 8^\circ$  of angular range. Utilizing 2 unidirectional laser fans (2 laser fans, 1 direction), it solves the rough-in (pre-alignment) problem with "cross-fire" lasers (2 lasers, 2 directions) and makes aligning machines amazingly fast and easy, especially on long-distance applications. The result? More jobs done in less time and happier managers!

## No rough-in/pre-alignment needed

All "cross-fire" laser alignment systems require a rough-in (pre-alignment) of the machine before the system be able to take data. With Dual-Fan™ technology's 2 unidirectional laser fans and 20 mm sensors, you don't need to rough-in the motor to get it to take data. You get the same measuring range from 2 in. to 15 ft. (50 mm to 4.5 m), unlike the "cross-fire" kits that have virtually no measuring range beyond 5 ft. (1.5 m). So just slap on the brackets, laser and target and get to work!

## Fixed angular measuring resolution

With "cross-fire" laser technology, the angular resolution varies with distance. Ironically, it's the close coupled applications that cause the most problems for angular accuracy for these systems. With our Dual-Fan™ technology, you get the same high angular resolution at 2 in. (50 mm) between heads as you get at 15 ft. (4.5 m), and our angular resolution is 4x higher than the highest angular spec.

## Remote tech support

Utilizing the power of Windows, our tech support department can log on remotely to the tablet, via WiFi and the Internet, and troubleshoot many problems. We can usually resolve most issues with an online session, keeping you productive and potentially saving a lot of money on costly returns for repairs.

## Duo-View™ automatic realtime move screen

Our Duo-View™ realtime move screen and 3-axis target allow you to view a live alignment screen for both alignment planes (4 axes) on the same screen. To switch views, just rotate the shafts to a clock position and the view is automatically switched, and the non-live axis is grayed out so there is no confusion!



## Ultra accuracy means 2x faster alignments

High-resolution PSD technology and 60-point sensor linearization reduce the target error rate to  $<0.75\%$ , which is up to 5x higher than our competitors' entry-level lasers and gives you the confidence that when the displays turn green, the motor is aligned as accurately as possible. Higher accuracy also means better repeatability and more accurate shim calculations so you don't have to keep doing the alignment over and over again. *Shim Once, Move Once™!*

## Build Your Own™ app selector

Pick only the apps you want with your X-660, using our Build Your Own™ app selector to customize your apps to meet your individual needs. We recommend a set of apps and you can check on/off the app and the price estimate and license are updated to reflect your choices!

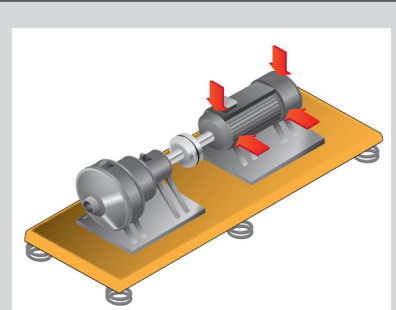
## Easy-Guide™ navigation with onboard manual and training videos

Our Couple6 software features our Easy-Guide™ navigation with its easy-to-follow, high-quality screens, leading users through each stage of the alignment. And if you forget how to do something, the manual and training videos are built right into the software! With software this easy to use, a lot of customers start using the X-660 kit right out of the box!

## 5-year unconditional warranty & low cost of ownership

With no hidden warranty fees like other systems, our 5 Year Unconditional Warranty is really that: no conditions! As long as you don't damage it by abuse, then if something goes wrong, we replace or fix it. That's it. We also don't charge any software maintenance fees. Software updates are free for the life of the product!

Research shows 50% of all machine downtime is the result of poor alignments



Duo-View™ live move screen shows live motor graphics of both alignment planes.

The X-660 offers familiar rugged IP65 10" tablet PC's to run our Couple6 software that are easy to replace if lost or damaged.



**Bluetooth LED** – Green means that the Target is connected to the computer. Blinking yellow means data is being transmitted.

**On Target LED** – Red means laser is blocked, green means laser is on target.

**Battery LED** – Green means ok, yellow means charge.

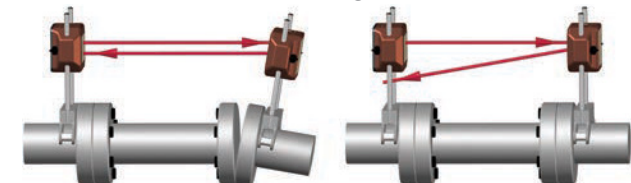
**Power/USB port** – Target can be used while plugged in. Also used for data backup cable.



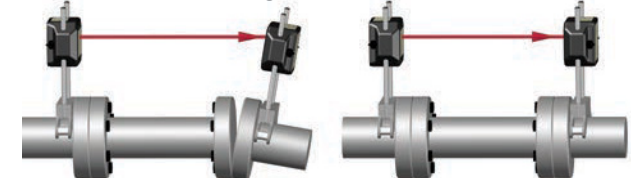
## Why Unidirectional Dual-Fan™ technology is best for long-distance applications

Alignments over long distances are particularly challenging when working with a 2-laser, "cross-fire" shaft system because it's very sensitive to small angular moves in the motor. For example, a tiny angular movement of just .0005 in/in (0.05 mm/100 mm) at 10 feet (3.1 m) will cause the laser beam to move in offset by 0.060" (1.52 mm)! This makes aligning the motor's offset value very difficult to do, especially for the horizontal axis. With our Dual-Fan™, unidirectional laser technology, however, angular moves to motor do not move the laser beam at all and therefore do not affect the offset values! This means aligning the motor is amazingly easy, especially over long distances.

2-laser, "cross-fire" Technology (2 lasers, 2 directions)



Dual-Fan™ Technology (2 lasers, 1 direction)





# X-660 Couple6 Software for Tablets and PCs with Easy-Guide™ Navigation

## Build Your Own™ Features

We designed our Couple6 software to have maximum application flexibility since we know that no 2 techs are the same!

So we created our Build Your Own™ software app selector that allows you to choose the shaft-alignment applications that best fit your needs.

Below is what we recommend for the X-660 package. You can swap out recommended apps for optional apps to best fit your needs.

[Click here to choose your apps!](#)

### Couple6 Included Apps

- Data Quality Analyzer
- Flip It™
- Machine Templates
- Printed Reports
- Recommended Tolerances with 2 levels

### Couple6 Recommended Apps\*

- Auto Clock™
- Digital Signature Capture (reporting)
- Horizontal/Vertical Machines
- Save Data/Database Management
- Soft Foot Check
- Templates
- Thermal Growth Calculator (@feet)
- User-Defined Tolerances

\* Recommended apps can be exchanged for optional apps.

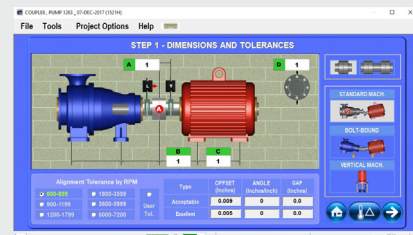
### Optional Software Apps

- Auto Sweep™
- Arc Mode™
- Bolt Bound™
- Data Recorder (Timed/Manual)
- Machine Image Capture (reporting)
- Machine Train-3 Module
- Machine Train-10 Module
- Point Mode
- Repeatability/History
- Spacer Shaft - 7 Formats
- Straightness Data Recorder
- Thermal Growth (@coupling)
- Vertical Machines – Live Move



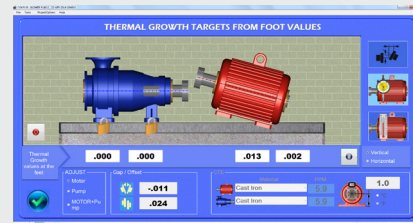
### Project Menu

Start new projects, manage old alignment projects, review saved files and create project templates. Creates a unique machine folder that stores all the alignments in one place for easy historical analysis.



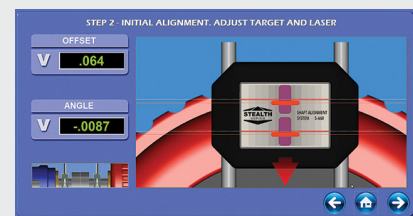
### Step 1 - Machine type, Dimensions & Tolerances

Select machine and coupling type, enter dimensions and select tolerances. Can also enter user-defined tolerances.



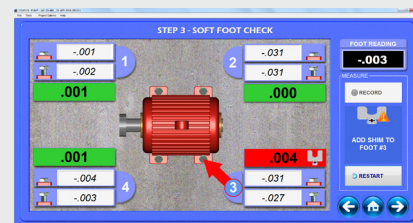
### Step 1 - Thermal Growth Modeling

Enter thermal growth values at the coupling or the feet to offset the alignment, and the motor graphics will update to show the effects. Or enter temperature changes at the feet, select the material and Couple6 will calculate the alignment effect at the coupling. Can also be used for alignment modeling before the job starts.



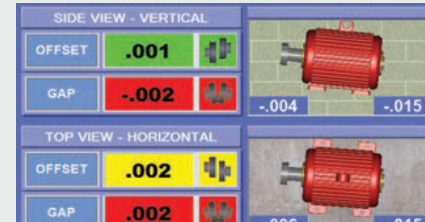
### Step 2 - Laser Setup Screen

Provides live, 2-axis, raw alignment data to initialize the system and maximize measurement range. On-screen graphics show you which direction to move the laser and target during the setup. Can also be used for new-motor pre-alignment.



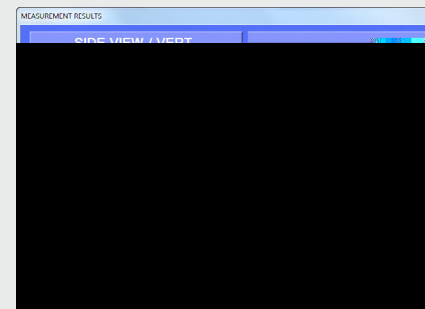
### Step 3 - Soft Foot Check

On-screen, easy-to-follow procedure for checking Soft Foot, a common problem that can cause many alignment problems. Automatically selects the "problem" foot and calculates the shim to fix it.



### Step 4 - Measure Misalignment - Auto Clock™ Mode

A standard feature, making coupled alignment amazingly easy. Built-in accelerometer detects shaft rotation and automatically selects the clock location to record up to 8 data points. More data points mean better accuracy and quicker alignments.



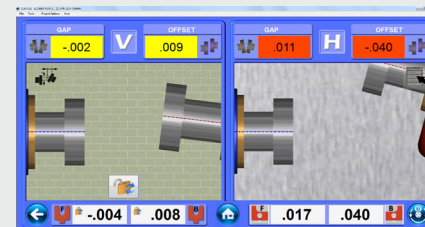
### Step 4 - Measurement Results

Click on a set of alignment data to display color-code alignment results. Red means out of tolerance, yellow means "good" and green indicates "excellent". Foot values are also displayed.



### Step 5 - Duo-View™ Automatic Move Screen

Alignment values update as you adjust the motor in real time. To switch views, rotate the shafts to a clock position and the view switches without any buttons to push. The non-live axis is grayed out to avoid confusion!



### Step 5 - Coupling View

For those users accustomed to gap/offset indicator methods, the Step 5 Realtime Move Screen can be switched to Coupling View to show the alignment directly at the coupling.



### On-Board Manuals and Training Videos

Our manual is built right into Couple6 software, so if you have a question, simply click "Help" from the menu, and the software will show the correct page of the manual for that screen. We also loaded our training videos on the tablet, so if you forgot something just click and watch!

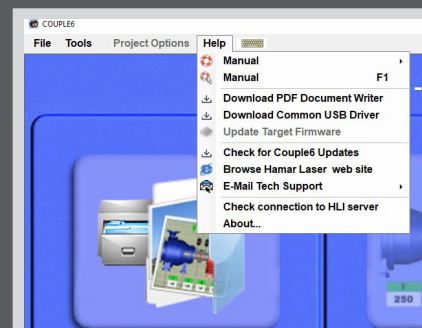
Did you know that nearly 50% of the price of our competitor's lasers comes from the display box?

## Alignment Report (print or email)



To print, simply plug your tablet into a printer. To email, print report to a PDF and attach to your email. It's that easy.

## Free Updates



We constantly improve our software and provide free updates. Just click on "Check for Updates" and Couple6 does the work for you.

## Couple6 Interactive Tour



Scan here to take an interactive tour of Couple6 on [www.hamarlaser.com](http://www.hamarlaser.com)



# Advanced Couple6 Apps

## Display Options

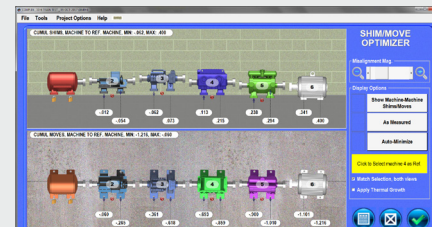
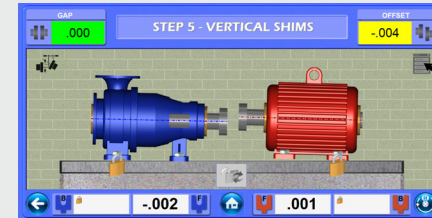


X-660 offers familiar rugged, IP65 industrial tablets with 10" touchscreen that run Couple6 and other HLI programs.



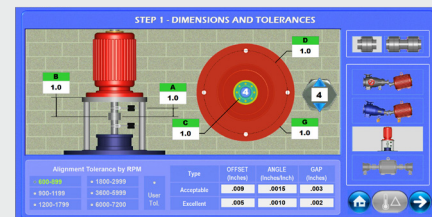
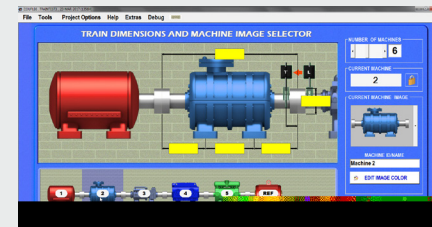
### Bolt Bound™

A powerful tool for solving a common problem. Lock/unlock different combinations of the motor and pump feet to see how it affects the alignment solution. The graphics and shim values automatically update with each selection making it easy to find the best solution.



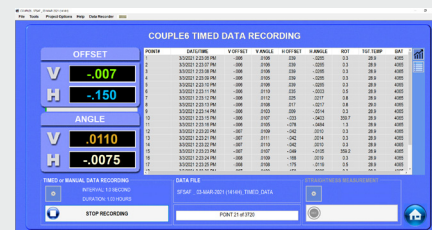
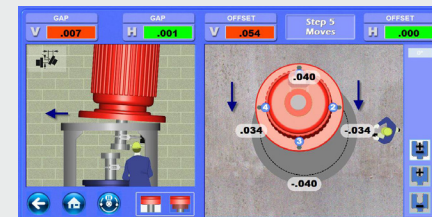
### Machine Train Program

Take data on up to 10 machines and the Train Module will calculate the shims/moves that minimizes the moves. Select on any machine to update the shim/moves of other components.



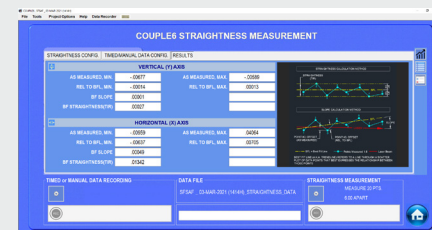
### Vertical Motor Program

The industry's only vertical alignment display with live graphical displays of the motor's alignment along with shim values for all bolt-hole locations.



### Data Recorder App

Has 3 measuring modes: Flatness, Straightness, Timed/Relative Recording. Use for straightness, pipe strain, thermal growth measurements, etc.



# More Advanced Apps

## Auto Sweep™ Simply the Best Data-Taking Method. Period.

Start rotating the shafts and the built-in accelerometer detects the movement, automatically collecting hundreds of data points. Stop rotating the shafts and Couple6 starts calculating the misalignment. More data means more accurate alignment data and less rework.

## 4 Data-Taking Apps

Included in the X-660 App List is Auto-Clock™, data-taking mode, a very easy method for taking data. Optional Apps include Arc Mode™, Auto Sweep™ and Point Mode.

## It's the little things that make software great

Couple6 offers lots of extra features that make your life easier: popup keypad with extra-large keys, target and tablet battery indicator, Bluetooth® signal strength indicator, popup warning for low battery and lost data connection, ambient-light detector bar, no-button auto-start data taking, screen capture feature, and a comprehensive preferences screen to customize the displays. It also automatically detects the language setting on the tablet and then displays the matching language.

## Measurement Noise Filter

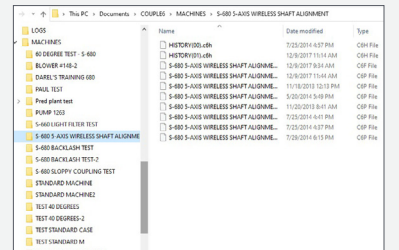
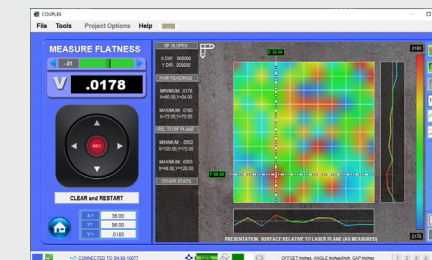
Variable data averaging allows the user to choose the amount of data filtering to reduce the effects of poor measuring environments.

## Dynamic Database Management

When you create a new machine in Couple6 software, it automatically creates a folder on your tablet and then saves each new alignment file for that machine in the folder. This allows you to keep a history of alignment for each machine so you can go back and easily collect historical data for trending purposes. Each file is time and date stamped so you can save multiple copies on the same date if needed.

## Geometry Add-Ons - Flatness, Straightness, Bore Alignment, etc.

Add the A-987 Rotating Mag Base Fixture and Data Recorder Apps and the L-780 Laser and T-1280 Target can be used to measure flatness & straightness of surfaces or machine axes. For high accuracy flatness apps, add the L-750 Scanning Leveling Laser and A-1519-2.4BT Scanning Target. Bore alignment kits are also available along with software that runs on the tablet for most bore applications.



Couple6 controls data integrity by automatically saving alignment data with each click

## Included Hardware

A-970 Aluminum Shaft Brackets

## Optional Hardware

A-970A Chain Bracket Upgrade

A-970OF Offset Brackets

A-970C-1 Extra Chain Set 1" to 12" (25 to 305 mm) Diam

A-980B Small-Shaft Adapter

A-982 Magnetic Brackets

T-1280B Narrow-Band Light Filter

“ I have been very impressed with the S-660 [X-660] from the very start... The real test for me was after saving some data and packing up the laser system. Then, I reinstalled it and took another set of readings. Everything was still showing as an excellent alignment (there was only one reading that changed by about one 1 mil). The S-660 [X-660] proved how repeatable it was and so easy to use. ”

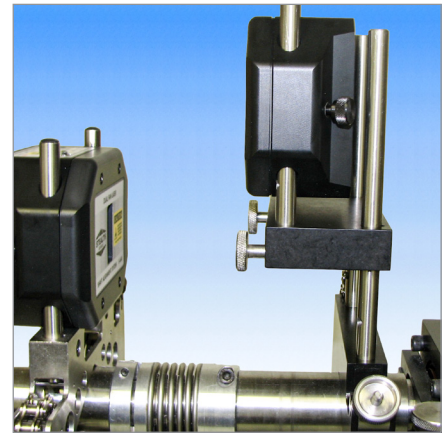
Rob Zochert  
Service Forman - Streimer Sheet Metal Works

# Specifications

<b>Laser/Target Unit Size</b>	4.2 x 3.3 x 1.94 in. (107 x 84 x 49 mm)
<b>Housing Material</b>	Impact resistant plastic
<b>Detector Type &amp; Size</b>	1-axis PSD 20x1 mm (qty 2) provides 2 continuously updating alignment axes (or 1 alignment plane).
<b>Ambient Light Protection</b>	Via blinking-laser algorithm embedded in all Hamar Laser targets
<b>Target Measurement Resolution</b>	Offset: .00004 in. (0.001 mm) Angular: .00016 in/ft (0.014 mm/m)
<b>Target Measurement Error</b>	Offset: <0.75% Angular: <1.5%
<b>Angular Sensor Range</b>	± 8° (± .136 in/in or 13.6 mm/100 mm). For values > 4°, use only for rough alignment.
<b>Laser Type</b>	650 nm Dual-Fan laser with 0.25° fan angle <0.9mW
<b>Communication between Target &amp; Data Analyzer</b>	Wireless Bluetooth® Class 2 - 2.4 ghz
<b>Wireless Range</b>	Up to 33 ft. (10 m)
<b>Ruggedized Display Platform</b>	Industrial tablet with 10 in. (254 mm) touchscreen. MILSPEC 810G/IP65 R-1342T3-301XC: Standard R-1342T3-301XI: High Performance
<b>Rotation Sensor (3rd axis)</b>	Accelerometer Resolution: 0.1° Accuracy: ±1°. Measurement accuracy not affected by rotation sensor accuracy.
<b>Environmental</b>	IP67 (laser & target). IP65 (R-1342T3-301XC or R-1342T3-301XI).
<b>Bracket Set</b>	Covers .79 in. (20.0 mm) to 6 in. (152.4 mm) diameter shafts. Comes with 6 in. (152.4 mm) posts
<b>Application Range</b>	15 ft. (4.5 m) between laser and target
<b>Operating/Storage Temperature</b>	Laser/Target: 5°F to 140°F (-15°C to 60°C) R-1342T3-301XC: AC Mode: -4°F to 113°F (-20°C to 45°C) Battery Mode: 32°F to 113°F (0°C to 45°C) R-1342T3-301XI: AC Mode: -4°F to 140°F (-20°C to 60°C) Battery Mode: 32°F to 113°F (0°C to 45°C)
<b>Battery Life Target</b>	15 hours continuous use with Bluetooth® — 16 hours with data communications cable. Target can be plugged into power source during use Battery status indicator for both T-1280 Target and tablet.
<b>Battery Life Laser</b>	150+ hours continuous use. Blinking LED indicates low battery status
<b>Battery Life Tablet</b>	R-1342T3-301XC: 5 hours, normal use R-1342T3-301XI: 8 hours, normal use
<b>AC Battery Charger (Laser and Target)</b>	110V to 240V with U.S. and international adapters. Charging cable also works as a backup cable



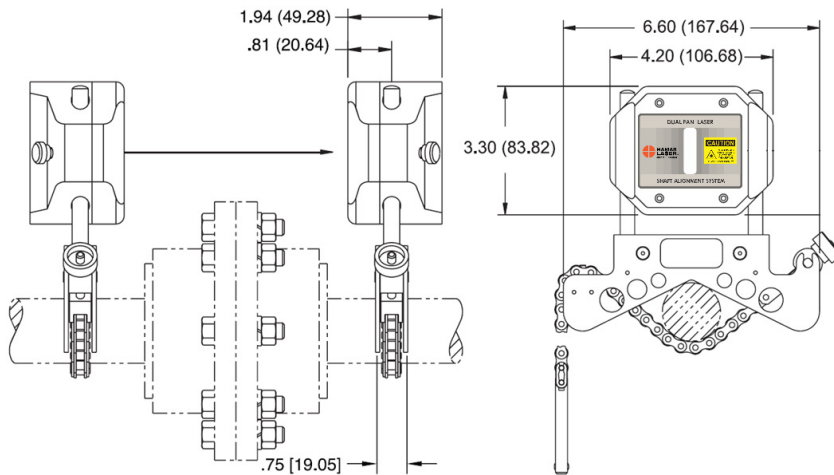
A-970 Bracket set



A-970OF Offset Bracket



A-982 Magnetic Bracket



**NO WORRIES  
5-YEAR  
MANUFACTURER'S  
WARRANTY**



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