



# Field Services Report

## **Alignment of Motor to Starboard Aft Thruster Using LASER Methods**

### Abstract

WARMAK Inc. was commissioned to measure and record the alignment of a 2000 hp electric motor to a thruster gearbox using LASER methods. The fore to aft alignment was 1.5 mils centerline and 0.1 mils/inch angularity. The port to starboard alignment was 0.0 mils centerline and 0.2 mils/inch angularity. The axial distance between the motor hub and the gearbox hub was  $59.73 \pm 0.02$  inches.

### Contents

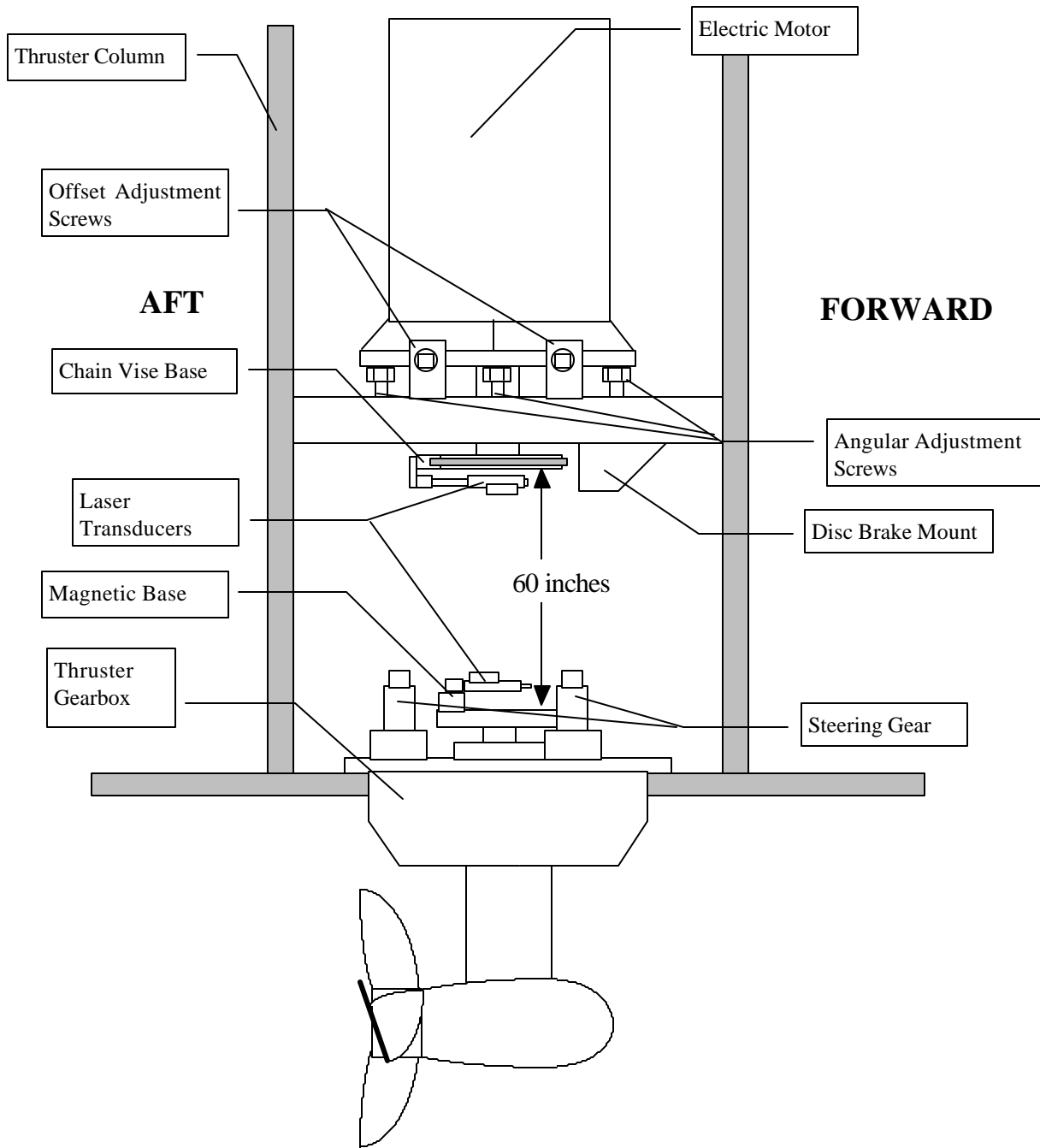
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1 mil = 0.001 inch

## Scope

WARMAK Inc. was to provide labor and equipment necessary to measure and record the alignment of an 2000 hp 720 rpm electric motor to a gearbox using LASER methods.

## Machine Configuration



1 mil = 0.001 inch

## Procedure

Due to the hardware for angular adjustment (*screws*) the procedure was typical for two axis alignment correction and not for poly axis alignment correction as found on standard vertical flange mount hard shim angular adjustment motors.

The movable transducer was fixed to the hub on the motor with a chain vise and fixture. The stationary transducer was fixed to the thruster hub with a magnetic base fixture.

Rough alignment was performed using visual observation and the cross hairs on the transducer window cover. The motor was approximately 3/8 inch misaligned to the gearbox.

The transducers were aligned and zeroed. Both shafts were rotated 180 degrees and a measurement was recorded.

The shafts were rotated - 90 degrees and a measurement was recorded.

A correction was performed and the measurements were repeated until satisfactory alignment was achieved.

The hold down bolts near the four angular adjustment screws were lightly tightened and the three horizontal adjustment screws were lightly tightened against the case. The remaining hold down bolts were hand tightened to provide a seal for the foundation (*Chock Fast*).

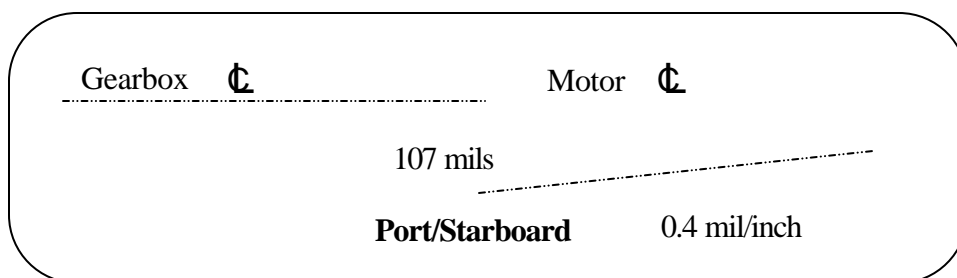
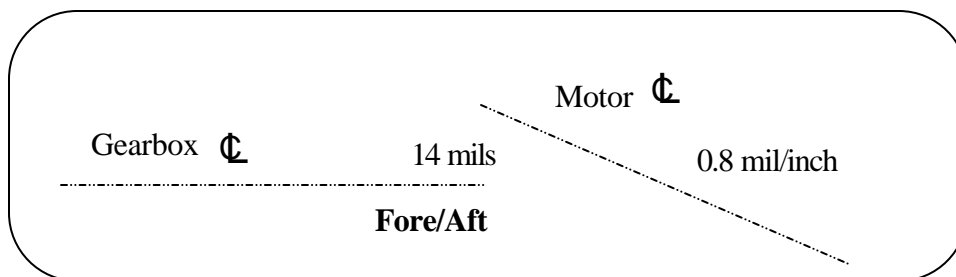
Axial distances were measured with a steel tape measure at several locations around the perimeter between both hubs. A drawing was provided with the axial distance required.

A final set of measurements were recorded by WARMAK personnel and observed by ships company representatives. The measurements were printed from the screen of the alignment computer.

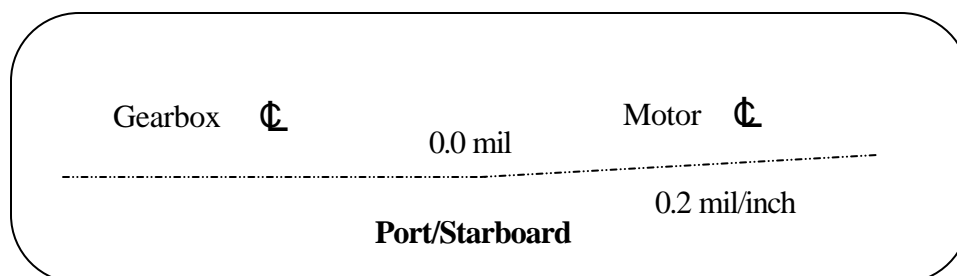
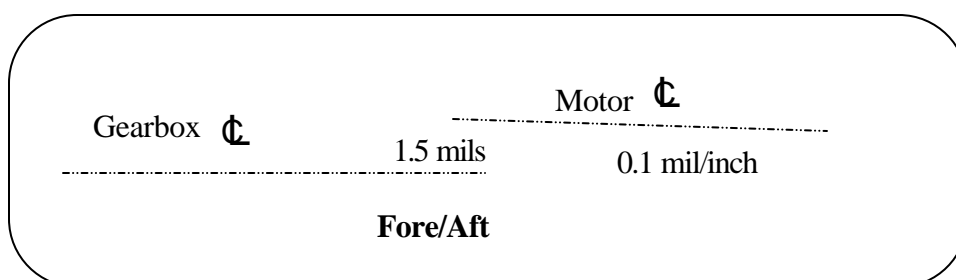
## Results

***All Measurements are in Mills Unless Noted.  
The measurements are referenced from the motor hub centerline to the  
output gearbox hub centerline. The raw field data is located in the  
appendix and represents a position midway between the coupling hubs .***

## Alignment Measurements



**After Rough Alignment of the Motor to Gearbox**



**Final Alignment of the Motor to Gearbox**

1 mil = 0.001 inch

## Appendix A (Equipment Used)

**Combi LASER Alignment System with Alignment Program**

**Special Vertical Alignment Fixtures**

**DX 486-150 MHz Desk Top PC for Reporting**

**Assorted Hand Tools**