



# Field Services Report

## LASER Alignment of Motor to Pump

### Abstract

WARMAK Inc. (WMK) was commissioned to align a horizontal motor/pump cooling tower unit. The unit is located at ground level in the facility. The coupling was changed from a gear type to a serpentine flex band type. The equipment was aligned to within manufacturer and industry standard tolerances using LASER methods. The nominal speed of equipment is 1200 rpm.

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*1 mil = 0.001 inch*

## Scope

WARMAK Inc. was to provide labor and equipment to align a motor to a pump using LASER methods. The scope was expanded to include assembly of the coupling.

## Background

The unit had been operating and a coupling failure had occurred. The motor was sent out and reworked. The motor was in-place on the base plate when the alignment started.

## Machine Configuration

Motor Hp: 450

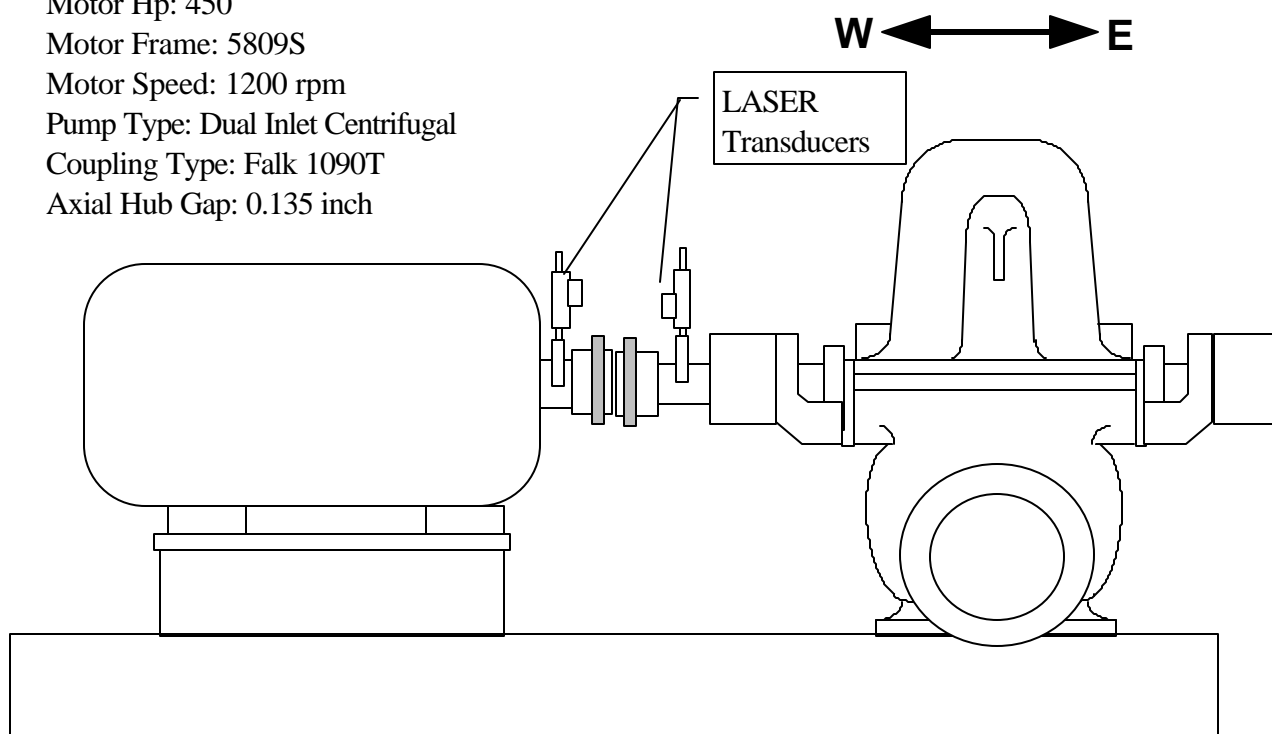
Motor Frame: 5809S

Motor Speed: 1200 rpm

Pump Type: Dual Inlet Centrifugal

Coupling Type: Falk 1090T

Axial Hub Gap: 0.135 inch



## Procedure

The motor was checked for soft foot. Visual observations were made when the motor was positioned on the baseplate. Visible soft foot was corrected then using feeler gage methods. Precession soft foot was measured and corrected using LASER methods.

Rough alignment was performed using straight edge and feeler gage methods.

The LASER transducers were attached to their respective shafts with chain vises.

$$1 \text{ mil} = 0.001 \text{ inch}$$

Corrections were made with slotted shims for vertical misalignment, and jack screws for horizontal misalignment. The axial gap at the hubs was maintained using jack screws.

## Results

*All measurements are referenced to a point 1/2 the distance between the LASER transducers and at the centerline of the shafts.*

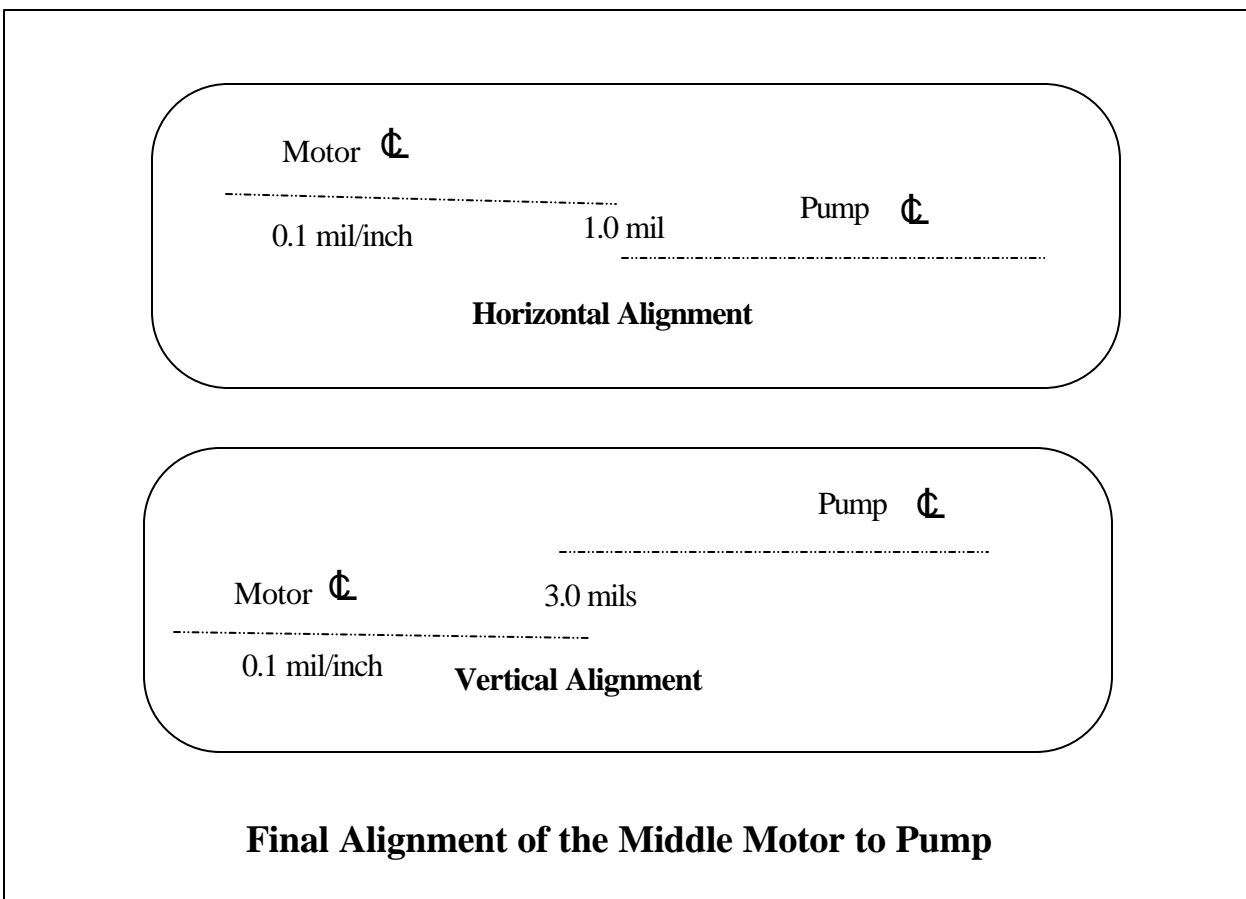
Angular soft foot of 0.005 inch was measured at the north west foot a 0.010 inch shim was cut in half transversely. The soft foot was reduced to less than 0.002 inch.

Vertical corrections were to remove 0.010 inch from both rear feet and add 0.005 inch to both front feet.

Horizontal corrections were made using the active display from the LASER.

Axial gap was measured using thickness gage methods. Final axial gap was 0.135 inch.

The motor was set 0.003 inch below the pump to accommodate thermal growth of the motor in relation to the pump.



*1 mil = 0.001 inch*

## Appendix A (Equipment Used)

Combi LASER Alignment System

4X4 Stainless Slotted Shims

Assorted Hand tools

**INDUSTRY STANDARD  
ALIGNMENT TOLERANCES  
for close coupled machines**

DESCRIPTION	RPM	EXCELLENT	ACCEPTABLE
SOFT FOOT (MILS)	ALL	2	3
PARALLEL OFFSET (MILS)	600 900 <b>1200</b> 1800 3600	5.0 4.0 <b>3.0</b> 2.0 1.0	10.0 8.0 <b>6.0</b> 4.0 2.0
ANGULAR MISALIGNMENT (MILS/INCH)	600 900 <b>1200</b> 1800 3600	1.5 1.0 <b>0.7</b> 0.5 0.3	2.5 1.5 <b>1.0</b> 0.7 0.5

*1 mil = 0.001 inch*