

*vibration - thermography - oil analysis - laser alignment - in-situ balancing*

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# **Laser Alignment &** **In-situ Balance** **Report** **customer.**

**day. month. year**

## **Equipment**

The following equipment was used to carry out a Laser Alignment & In-Situ Balance procedure on the Line 2 FA102 Fan Unit at the request of Eric Paine:

Pruftechnic Optalign smart RS	Serial No 54325442
Pruftechnic Laser ALI 3.610	Serial No.08139922
Pruftechnic Rotalign Sensor ALI 3.600	Serial No.02135468
SKF Microlog CMVA60.	Serial No 602995
CMSS6155W Optical Phase Reference:	Serial No 1531662
Accelerometer: Number: 1	Serial No 60-001
Dell Notebook Computer	
SKF @ptitude Vibration Analysis Software.	

## **Technician**

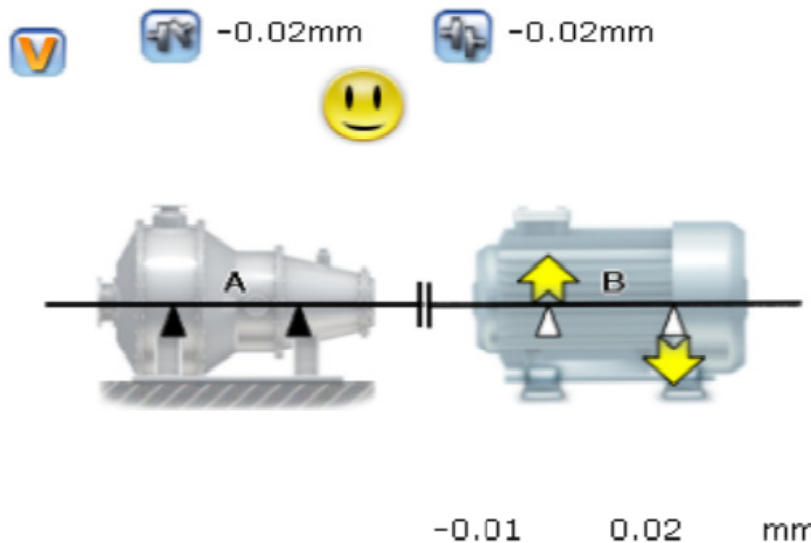
**All quoted velocity amplitudes are mm/s RMS.**

**Laser Alignment Report**

The motor on this unit was replaced mid September 2013. The vibration on the replacement motor was higher than expected possibly due to misalignment. However before starting the alignment it was noted that the coupling set up appeared to be incorrect, the markings on the coupling were 90° out. Following discussions with the site personnel the coupling set up was adjusted using the markings.

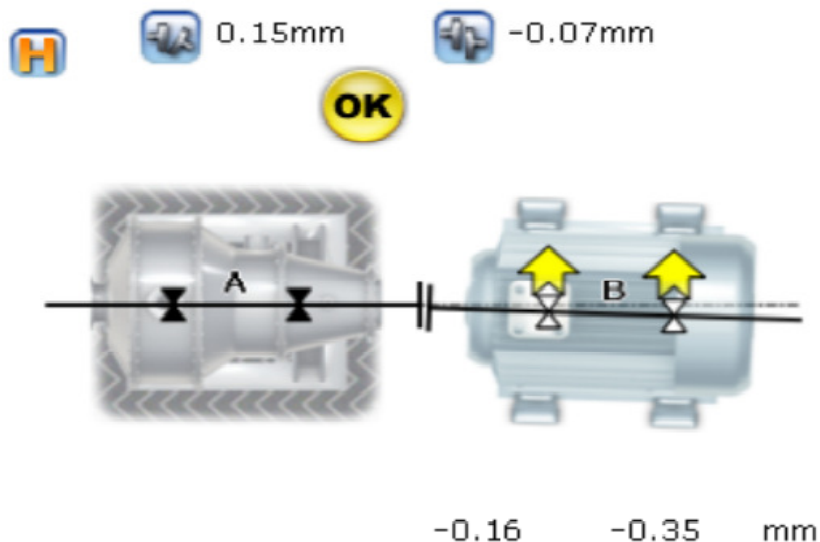
Following the coupling adjustment the laser alignment equipment was set up on the motor and intermediate shaft, and an initial set of data collected. The results showed the vertical alignment was within tolerance, see Fig 1.

**Fig 1**



However the horizontal angular alignment required adjustment, see Fig 2.

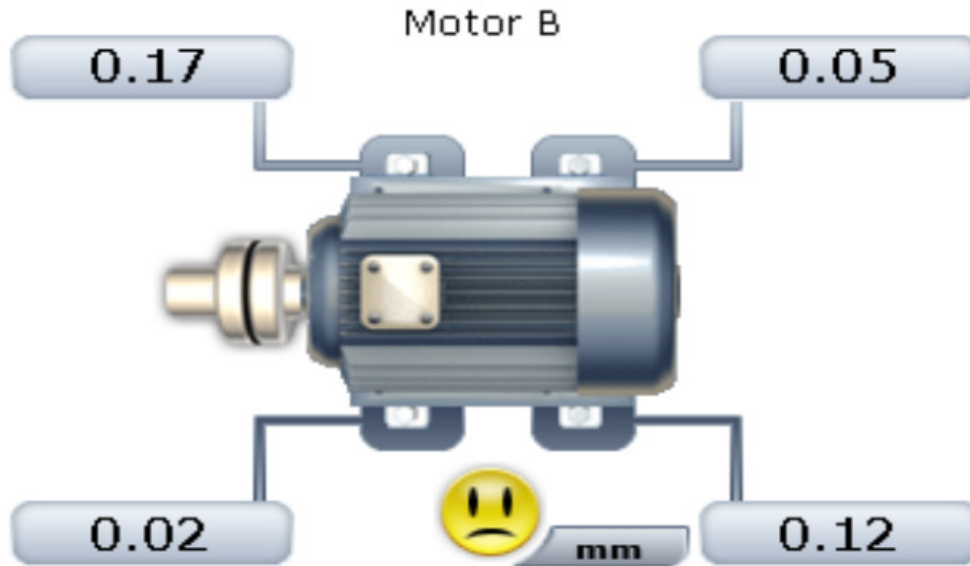
**Fig 2**



**Laser Alignment Report**

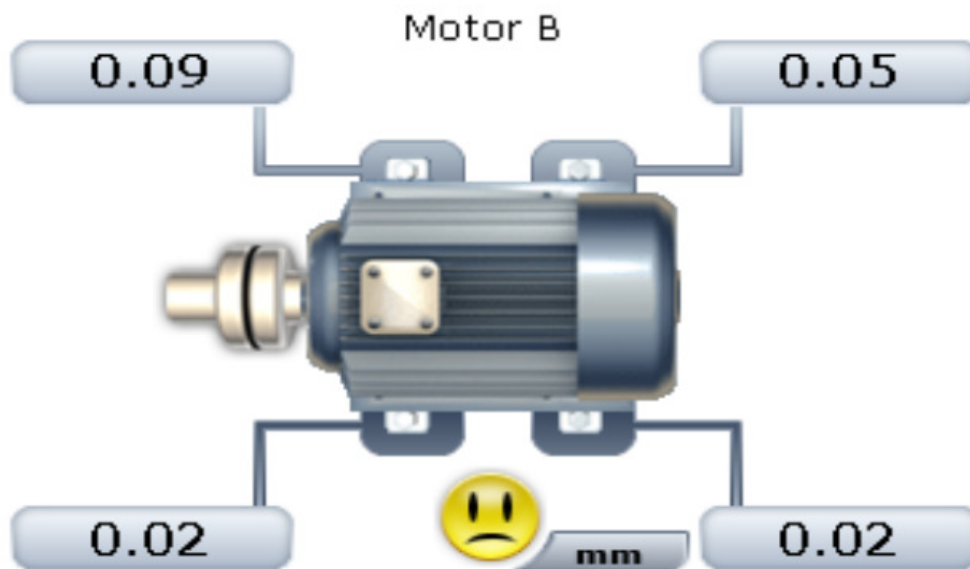
Before making any adjustments the motor was checked for soft foot, see Fig 3.

**Fig 3**



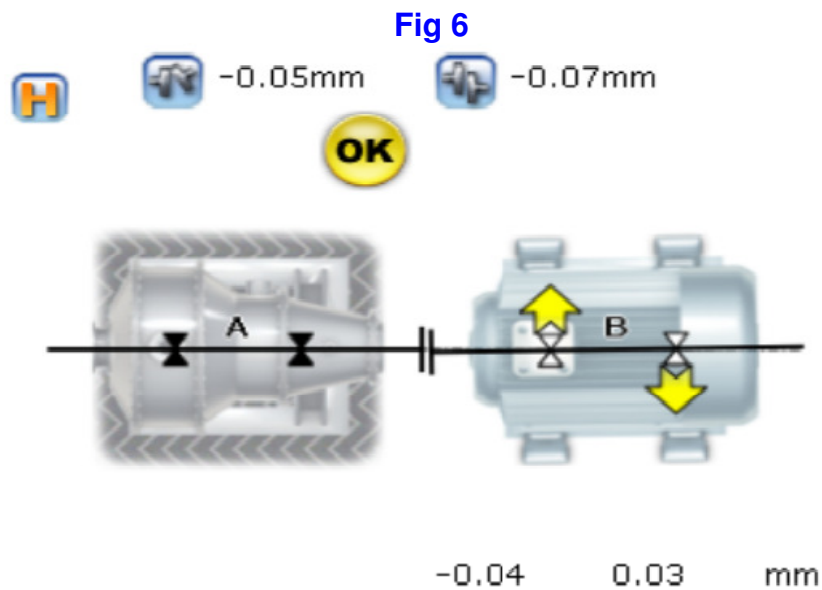
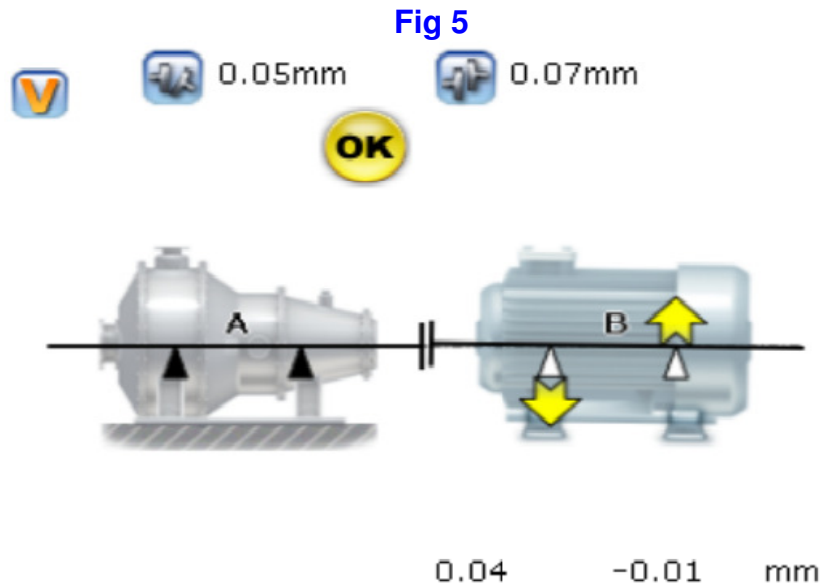
The soft foot required adjustment to the north west drive end foot of 0.10mm and the south east non drive end foot of 0.05mm. Once the adjustments had been made the soft foot was re-checked and was in a best as attainable condition, see Fig 4.

**Fig 4**



**Laser Alignment Report**

With the soft foot at a best as attainable condition, the angular horizontal alignment was adjusted and a further set of results recorded, see Fig 5 & 6.



With the alignment in tolerance and the coupling re-set to the markings, the unit was run up to full speed, 50Hz, to check the vibration levels, see table below.

<b>Fan Shaft 1 x Fan Shaft rpm (1334rpm) Vibration levels. 13.30</b>				
Fan Shaft DE H	Fan Shaft DE V	Fan Shaft Imp H	Fan Shaft Imp V	Fan Shaft Axial
3.7mm/s	2.9mm/s	6.2mm/s	4.8mm/s	6.4mm/s

Although the vibration on the unit had reduced with the unit running at full speed, 50Hz, historically the unit runs between 38-43Hz and at these speeds the fan shaft vibration increases to 9mm/s and above. Therefore although the fan shaft vibration had reduced a decision was made to trim balance the impellor.

**In-Situ Balance Report**

**Single Plane Balance Data**

The fan shaft Impellor End Horizontal bearing position was selected as the Balancing Reference Point.

**Reference Run. 13.35**

Speed                    1334 rpm  
1x Magnitude        6.4mm/s  
Phase                    127°

**Trial Run #1.14.30**

150 grams was added at 0°  
Speed                    1334 rpm  
1x Magnitude        25mm/s  
Phase                    62°

Resultant was 41 grams @ 259° against rotation from trial weight 0. 44 gram weight was added at 259°.

**Trim Run #1. 15.15**

Speed                    1334 rpm  
1x Magnitude        3.7mm/s  
Phase                    97°

Resultant was 71 grams @ 330° against rotation. 73 gram weight was added at 330°.

**Trim Run #2. 16.15**

Speed                    1334 rpm  
1x Magnitude        1.1mm/s  
Phase                    275°

Resultant was 64 grams @ 3° against rotation from trial weight.

With the weight & location established and the vibration reduced to an acceptable level, a permanent weight was manufactured and welded to the impellor.

With the balance completed the unit was run up to full speed, 50Hz, to check the vibration levels, see table below.

<b>Fan Shaft 1 x Fan Shaft rpm (1334rpm) Vibration levels. 17.36</b>				
<b>Fan Shaft DE H</b>	<b>Fan Shaft DE V</b>	<b>Fan Shaft Imp H</b>	<b>Fan Shaft Imp V</b>	<b>Fan Shaft Axial</b>
<b>0.2mm/s</b>	<b>1.0mm/s</b>	<b>0.5mm/s</b>	<b>1.1mm/s</b>	<b>1.7mm/s</b>