Spacer Shaft Alignment

Introduction

The purpose of this technote is to provide a procedure to perform spacer shaft alignment using the MASTERLIGN® shaft alignment system. An example of this application would be two machines that are coupled with a long spacer shaft, like a gearbox and a fan in a cooling tower.

Overview

The basic idea is to perform the alignment by taking a “single shot” set of readings (i.e., bridging across both couplings in a single setup as shown in Figure 1 below) and then change the laser to coupling distances in the dimensions screen to get the offset conditions of the spacer shaft.

Procedure

A) SETUP

1) Set up the MASTERLIGN® bracket and laser on the stationary machine shaft or solid coupling hub.

2) Set up the MASTERLIGN® bracket and prism on the movable machine shaft or solid coupling hub.

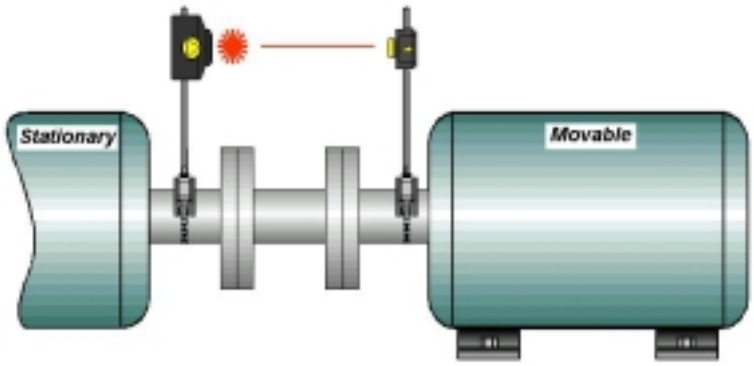

Figure 1 – Sensor and Prism Mounted on the Machines

B) Turn on your MASTERLIGN® and enter dimensions according to the screen diagram shown in Figure 2:

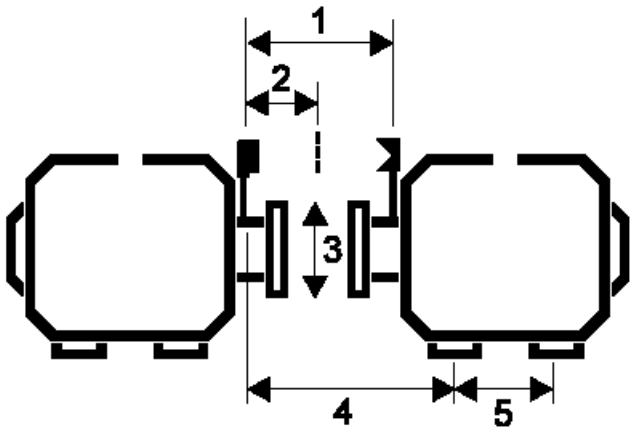

Figure 2

1. Laser to prism.
2. Laser to the near coupling center, closest to the stationary machine.
3. Working diameter (enter any value— not relevant in this application).
4. Laser to front foot.
5. Front foot to back foot.

Note: The above order of dimension entry assumes that your results default is set to display coupling results at the first press of the results key (not foot corrections). If your MASTERLIGN® is set to display foot corrections first, you may change the default with function F74, or simply press the  *key twice at step D1 and once at step D5.*

C) TAKE MEASUREMENTS

1) Press the  key:
2) Take readings with your preferred measure mode (continuous sweep or static mode). Use the F6 Range Extension function if necessary.

D) RESULTS

1) Press the  key.
2) Record the vertical and horizontal offsets displayed in the coupling results screen. These offsets will be for the coupling located closest to the stationary machine. Ignore the angularities (gap results) as they will not be used for this application.
3) Press the  key.

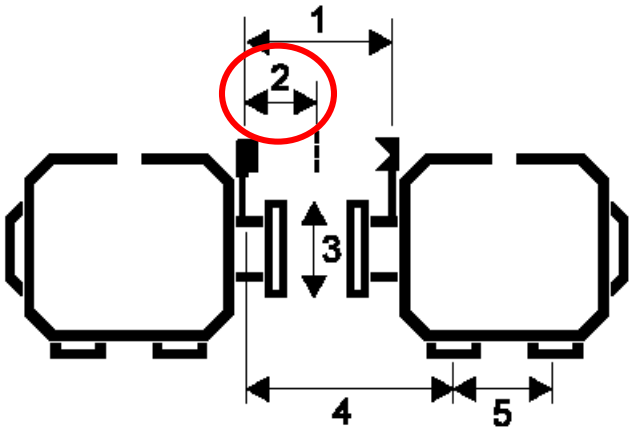

Figure 3

4) Change dimension 2 (laser to coupling center distance) to the distance from the laser to the far coupling center, closest to the movable machine.

5) Now, press the  key twice:

6) Record the new vertical and horizontal offsets that are displayed. These offsets will be for the coupling located closest to the movable machine. Again, ignore the angularities (gap results), as they will not be used for this application.

E) Understanding the results

You now have vertical and horizontal offset results for both couplings of the spacer shaft. To check if you are in tolerance for the speed of operation, refer to the tolerance table and equation below:

RPM	SPACER SHAFT TOLERANCES (mils of offset per inch of spacer length)	
	Excellent	Acceptable
600	1.8	3.0
900	1.2	2.0
1200	0.9	1.5
1800	0.6	1.0
3600	0.3	0.5
7200	0.15	0.25

Maximum projected offset at either coupling = Tolerance value × Spacer Shaft Length

Example: A machine has a 3600 RPM operating speed. Therefore, the *excellent* tolerance permits 0.3 mils of offsert per inch of spacer length. It has a spacer shaft length of 40 inches. The maximum permissible offset for an excellent alignment at either coupling would be 0.3 mils/inch × 40 inches = ±12.0 mils at each coupling.

If your alignment results fall outside of your permissible tolerance, you must perform alignment corrections by shimming and moving the movable machine.

F) FOOT CORRECTIONS

1) To get correction results for the feet, press the  key again. Press the right arrow key or the enter key to toggle through the vertical and horizontal move corrections.

***Note**: Foot corrections will not be affected by the changes in Dimension 2.*