



USING A STROBOSCOPE TO MEASURE RPM

The primary use for a stroboscope is to stop motion for diagnostic inspection purposes. However, the stroboscope can be used to measure speed. In order to do this, several factors need to be considered. First, the object being measured should be visible for all 360° of rotation (e.g. The end of a shaft). Second, the object should have some unique part on it, like a bolt, keyway or imperfection to use as a reference point. If the object being viewed is perfectly symmetrical, then the user needs to mark the object with a piece of tape or paint in a single location only, to be used as a reference point.

If the speed of rotation is within the range of the stroboscope, start at the highest flash rate and adjust the flash rate down. At some point you will stop the motion with only a single image of the object in view. Note that at a flash rate twice the actual speed of the image you will see two images. As you approach the correct speed, you may see three, four or more images at harmonics of the actual speed. The first SINGLE image you see is the true speed. To confirm the true speed, note the reading and adjust the stroboscope to exactly half this reading, or just press the $\div 2$ button. You should again see a single image (which may be phase shifted with respect to the first image seen).

For example, when viewing a shaft with a single keyway, you will see one stationary image of the keyway at the actual speed and at 1/2, 1/3, 1/4, etc. of the actual speed. You will see 2 images of the key way at 2 times the actual speed, 3 key way at 3 times, etc. The FPM equals the shafts Revolutions Per Minute (RPM) at the highest flash rate that gives only one stationary image of the keyway.

Example: object rotating at 3000 RPM



Stopped Image
Flash Rate (FPM)



1/3 times
1000



1/2 times
1500



1 times
3000



2 times
6000



3 times
9000



4 times
12000

Actual RPM

In instances when you can shut down the device and install a piece of reflective tape then an optical tachometer is easy to use for RPM measurement. Stroboscopes must be used when you can't shut down the device. The human eye is not easily tricked into seeing a stopped image by a stroboscope when the flash rate is slower than 300 FPM. Therefore, stroboscopes are just about impossible to use below 300 FPM for inspection or to measure RPM.