



Vertical Right-Angle Gearboxes

For Firmware ver. 2.04

Introduction & Overview

This technote describes how to align a right-angle gearbox connected through a vertical shaft (usually a spacer shaft) to a stationary machine. In these cases, the gearbox is the Machine To Be Moved. Nevertheless, install the laser on the gearbox shaft. The gearbox feet are visualized as being the bolt circle where angular misalignment is corrected by shimming.

Choose vertical machine alignment, select a square flange/square bolt pattern and edit the dimensions as needed. Clock positions are determined by looking towards the laser. Since the gearbox is *below* the stationary machine, take readings and obtain *negative* shimming corrections for the feet. These are the shimming values to be *added* to the feet. Offset corrections are performed only after angularity has been corrected, in the opposite directions to those indicated.

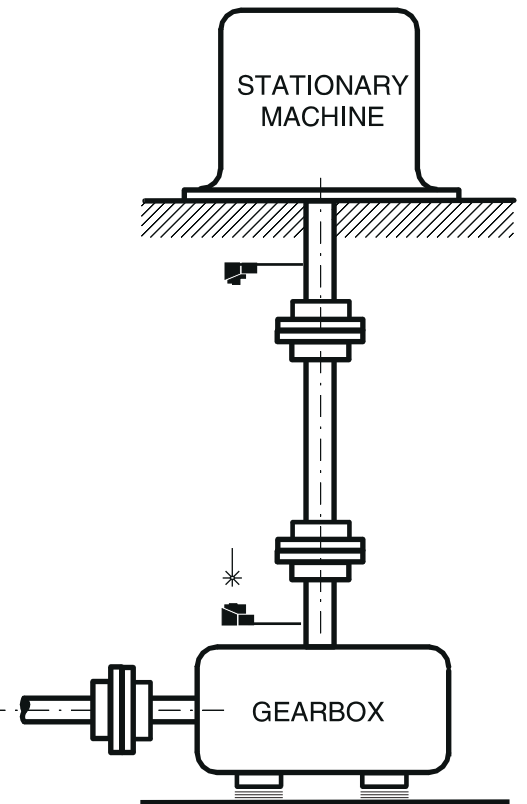


Figure A

Procedure

- 1) Install Receiver on the shaft of the Stationary Machine. Mount Laser on the gearbox shaft.
- 2) Turn ROTALIGN on. **ON OFF**
- 3) Select Vertical Machine Alignment **+**. (If they appear, press **SAVE** or **NO SAVE** as necessary, then application changes).
- 4) Press **NEW MACH**. (If **NEW MACH** key is not available, press **NORMAL ORDER** first, then **NEW MACH**).
- 5) Press **ESC** to *not* save the current file, or **OK** to save.
- 6) Press **CIRCLE SQUARE** twice to obtain a square flange with square bolt pattern.
- 7) Press **NUMBER BOLTS** and key in the number of feet (or shimming locations) for the gearbox. Press **ENTER**.
- 8) Press **OPTION**.
- 9) Key in the Y-axis (12 to 6 o'clock) dimension of the gearbox (distance from foot 1 to foot 4 (see Figure B)) and press **ENTER**.

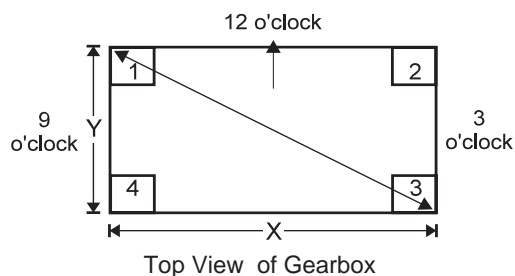


Figure B

- 10) Key in the X-axis (3 to 9 o'clock) dimension of the gearbox (distance from foot 4 to foot 3 (see Figure B)) and press **ENTER**.
- 11) Key in the dimension from outside corner of one foot to outside corner of the foot diagonally across from it.

- 12) Key in distance from the coupling center (center of spacer shaft) to the Receiver and press **ENTER**.
- 13) If the gearbox shaft is in the center of the gearbox, proceed directly to step 14. If not, press **ADJUST CENTER** and continue with steps 13a through 13c before step 14.

- a) Specify the location of the gearbox shaft by editing the X-axis and Y-axis position of the shaft within the gearbox. Begin by selecting the step size with which you will "move" the shaft. Moving the shaft is accomplished by pressing the arrow keys. Each press of an arrow key moves the shaft in that direction by the step size selected. Depending upon the size of the gearbox dimensions entered earlier in steps 9 through 11, up to four step sizes may be available to you:
 - *X-Large* moves the position of the shaft in increments of 100".
 - *Large* moves the shaft by 10".
 - *Medium* moves the shaft by 1".
 - *Small* moves the shaft by 0.1".

Press **STEP SIZE** as needed.

- b) Press **←**, **↑**, **↓**, **→** as needed to move the shaft. Note the X and Y axis coordinates shown on the screen.
- c) Press **OK**.

- 14) Select as the 12 o'clock position the side of the gearbox that is away from where you stand (see Figure B). This is also Position 1 for the purpose of taking readings. Make sure this position is accessible to the Laser and Receiver, as you will need it later for the Move Function when making offset corrections. Clock positions are determined by looking toward the Laser from the Receiver.

Step 9 Tip:

Press **EDIT** to see a status line description of the dimension required. Use the **→** key to move between dimensions as needed.

Step 11 Note:

This is the "flange diameter". Note that if the Y and X dimensions have already been entered, the ROTALIGN calculates this for you automatically. If different, measure and enter the correct distance.

Step 21 Note:

Alternatively, to remove shims, press **+/-** until only positive (+) shimming corrections are displayed. Remove shims as indicated. To minimize shimming corrections press **+/-** until both positive and negative results are displayed (+-). Add shims where negative corrections are called for, and remove shims where positive corrections are called for.

Step 24:

If "CENTERED" fails to appear, press **MY**, then **XY VIEW**. Readjust Laser until beam is "CENTERED", press **←→**, then **MOVE**.

- 15) Rotate shafts until Laser and Receiver are located at one of the eight numbered measuring positions (See Figure C).

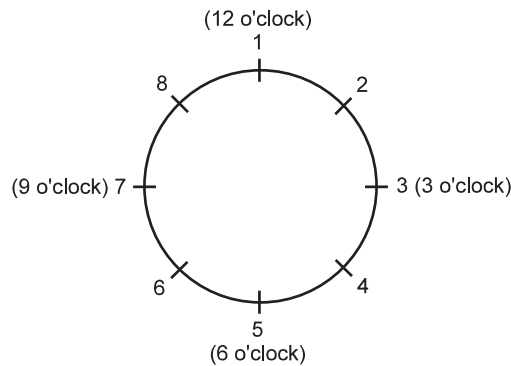


Figure C

- 16) Press **MY** and adjust Laser until beam is "centered".
- 17) Press the number key corresponding to the position of the Laser and Receiver to take that reading.
- 18) Rotate shafts to another of the 8 positions and repeat step 17. Take readings in at least three different positions.
- 19) Alignment results will automatically appear. From left to right across the screen they are:

- Angularity in the 3 to 9 o'clock direction (from position 3 to position 7), in millirads (mils per inch). Positive means the gap is open at 3 o'clock.
- Offset in the 3 to 9 o'clock direction, in mils. Positive means the gearbox is offset towards 9 o'clock.
- Angularity in the 12 to 6 o'clock direction (from position 1 to position 5), in millirads (mils per inch). Positive means the gap is open at 12 o'clock.
- Offset in the 12 to 6 o'clock direction, in mils. Positive means the gearbox is offset towards 6 o'clock.

Compare the results with allowable misalignment tolerances. If alignment is required, press **←→**.

- 20) Always correct angular misalignment first. Do this by shimming the feet of the gearbox. Press **+/-** until the shimming corrections table displays only *negative* corrections.

- 21) Add shims to the feet of the gearbox as indicated in the shimming corrections table. (Ignore the negative signs). The feet are numbered in the table according to the sketch on the screen. See Figure B for the corresponding feet of the gearbox.

- 22) Repeat steps 16 to 19 to retake readings. If angularity is not in tolerance repeat steps 20 and 21. Once angularity is in tolerance proceed to correct offset as follows. *Do not go on to step 23 until all angularity results are in tolerance!*

- 23) Rotate shafts until Laser and Receiver are at position 1 (12 o'clock).

- 24) Press **MOVE**.

- 25) Press **START**. Move the gearbox in the opposite directions to those indicated by the correction arrows on the screen. Move gearbox until offset values are within tolerance.

- 26) Press **STOP**.

- 27) Repeat steps 16 through 19. **▣**