

Test for Cyclic and Optimization.

Equipment:

Electronic Indicator.
Heavy Duty Magnetic Base.
6" Quartz or 2" True Square.

Purpose:

To fine tune the alignment between the leadscrew and servo motor.

Tolerance:

Straightness 0.00002" (0.5um). Average Cyclic 0.000003" (0.07um).

Method:

(Inverted "V" Slide Cyclic Error Optimization Procedure and Field Motor Replacement Procedure. R.P.I. Specification Number: 8901-527ZZ John Hoogstrate)

1. Align motor shaft to leadscrew as described below:

- a. Adjust the fit of the solid coupling onto the leadscrew shaft and motor shaft by using the center jacking screw. The fits onto the leadscrew and motor shaft should be sliding slip fits with the minimum clearance.

Install the solid coupling onto the leadscrew. Insure that the coupling slides on the leadscrew with the minimum allowable clearance. **DO NOT** tighten the coupling on the leadscrew shaft.

- c. Install the motor onto the motor mounting plate. Carefully slide the motor shaft into the solid coupling and install the (4) motor mounting plate to support angle screws (and / or nuts). Tighten the screws only when the coupling can slide freely back and forth on both the leadscrew and motor shaft. **DO NOT** tighten coupling.

2. Find the high point on the motor shaft as described below:

- a. Remove the rear cover of the motor assembly.
- b. Place an indicator on the coupling side of the motor and rotate the shaft watching the indicator. Once the high spot is found, mark its location on the cover end of the shaft by prik-punching a permanent mark on the end of the shaft. Rotate the motor shaft and position this mark at the 12 O'clock position. Make a mark (with a black marker) on the free end of the leadscrew at the same clock position.

- c. Rotate the coupling (insuring that the motor shaft and lead screw do not turn) on the shaft and lead screw so that the bolt heads are facing up, and tighten the coupling.
3. Trace slide horizontally as per R.P.I. Specification #8901-408ZZ. If the cyclic error does not exceed 3u" then prik-punch a permanent mark in the free end of the lead screw where the black marker mark was. The optimization procedure is now complete. The prik-punched marks serve as the motor / lead screw orientation reference and are to be used when removing the resident motor for replacement by a new motor or reinstallation of the resident motor. If it does exceed 3u" then rotate the lead screw shaft as described below:

- a. Rotate the motor / lead screw until the reference mark that coincides with the high point on the motor shaft is again at the 12 O'clock position.
- b. Loosen the coupling just enough so that the shafts can be turned within the coupling. Holding the motor shaft and coupling stationary, rotate the lead screw 90 degrees either clockwise or counter clockwise. Tighten the coupling in this position.
- c. Retrace the slide.
- d. Continue rotating the lead screw as described above until the cyclic meets the specification. Example: If after the first 90 degree rotation the cyclic improves but still does not meet the requirements, rotate the lead screw another 90 degrees. If at this point the cyclic increases in amplitude, then turn the lead screw back 90 degrees plus half of the original 90 degrees (135 degrees). Using this method the optimum spot can be found without randomly hunting.
- e. Once the cyclic meets the specification, rotate the motor so that the prik-punched mark on the cover end of the motor is located at the 12 O'clock position. Remove any black marker marks from the free end of the lead screw and prik-punch a mark at the 12 O'clock position. This mark, along with the corresponding mark on the motor shaft now serve as the motor / lead screw orientation marks.

4. Z-Axis Field Motor Replacement

- a. Insure that the power to the machine is **OFF**. Air supply to machine to remain ON.
- b. Disconnect all motor wiring.
- c. Rotate coupling so (2) two clamping bolt heads are facing up. Loosen these two screws. Turn the center screw in until the coupling slides freely, with minimum clearance, on both the motor shaft and lead screw.
- d. While holding the motor, remove the four motor attaching bolts, and remove the motor with care.

- e. Loosen the motor mounting plate bolts (4 ea.) and install motor onto this plate insuring that the solid coupling slides freely on the motor shaft as well as the lead screw. Tighten the motor mounting plate bolts (4ea.). Remove the end cover from the motor.
- f. Orient the lead screw so that the prik-punched mark located on the free end is at the 12 O'clock position. While holding the lead screw in this position, turn the motor shaft so the prik-punched mark is in the 12 O'clock position. Insure that the coupling is oriented as stated in step 4c, back off the coupling center screw and tighten the coupling.
- g. Re-install the motor end cover and wire motor to machine.

5. X-Axis Field Motor Replacement

Insure that the power to the machine is **OFF**. Air supply to machine to remain **ON**.

- b. Disconnect all motor wiring.
- c. Rotate coupling so (2) two clamping bolt heads are facing up. Loosen these two screws. Turn the center screw in until the coupling slides freely, with minimum clearance, on both the motor shaft and lead screw.
- d. While holding the motor, remove the four pieces of motor attaching hardware (2-screws, 2-nuts). Remove the motor with care.
- e. Remove the threaded rod from the motor removed from the slide assembly and install in the same locations on the new motor. Install the motor back onto the motor mounting bracket insuring that the coupling slides freely as before. Remove the end cover of the motor.
- f. Orient the lead screw so that the prik-punched mark located on the free end is at the 12 O'clock position. While holding the lead screw in this position, turn the motor shaft so that the prik-punched mark is in the 12 O'clock position. Insure that the coupling is oriented as stated in step 5c, back off the coupling center screw and tighten the coupling.