

SERVICE BULLETIN

Original Issue Date: **11/96**
 Model: **2000 kW**
 Market: **Industrial**
 Subject: **Dual Bearing Generator Installation and Alignment**

Perform the following procedure before operating the generator set to 1) prevent generator failure and 2) affect the warranty coverage.

Align the generator to the engine to ensure proper generator bearing operation and long life. Excessive misalignment causes vibration, noisy operation, coupling wear, and premature bearing failure.

Check and adjust, if necessary, the angular, axial, and parallel alignment of the coupling any time the generator set is moved. Insert dowels into the generator frame through the mounting base to ensure that no movement in the alignment occurs during operation after generator set installation and coupling alignment. Follow the general recommendations provided to ensure correct alignment of the generator to the engine.



Accidental starting. Can cause severe injury or death.

Disconnect battery cables before working on generator set. (Remove negative (-) lead first when disconnecting battery. Reconnect negative (-) lead last when reconnecting battery.)

Disabling generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: 1) Turn the generator set master switch to OFF position. 2) Disconnect power to battery charger. 3) Remove battery cables (remove negative (-) lead first). Reconnect negative (-) lead last when reconnecting battery. Follow these precautions to prevent starting of generator set by an automatic transfer switch or remote start/stop switch.

High voltage test. Hazardous voltage can cause severe injury or death. Follow instructions of test equipment manufacturer when performing high-voltage test on rotor or stator. An improper test procedure can damage equipment or lead to future generator set failures.

NOTICE

Hardware damage! Engine and generator set may use both American Standard and metric hardware. Use the correct size tools to prevent rounding of bolt heads and nuts.

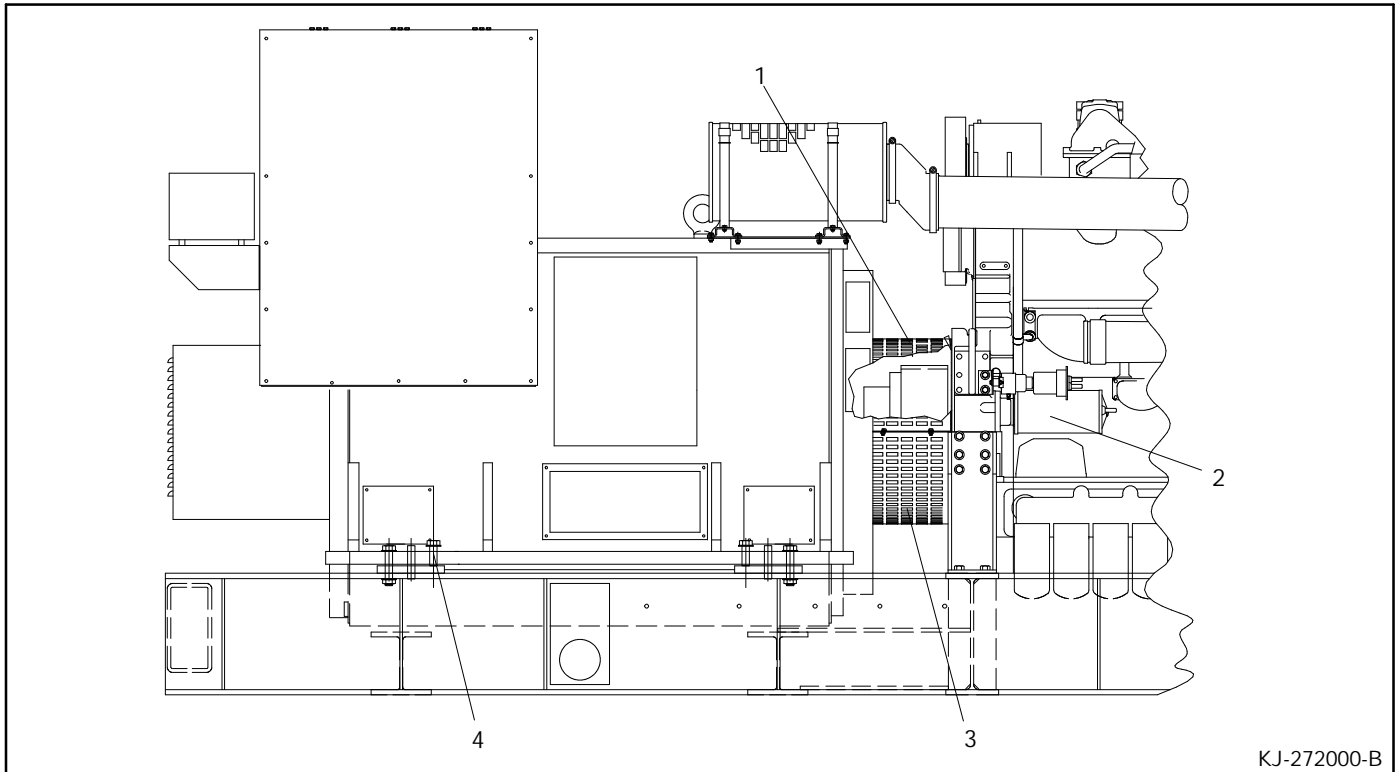
Required Tools

- D 1/2" wrench (coupling guard)
- D 3/4" wrench (coupling guard)
- D 1 1/8" wrench (positioning blocks and bolts)
- D 1 1/2" socket or wrench (jackscrews)
- D 1 5/8" wrench (mounting nut)
- D 1 11/16" socket or wrench (mounting bolt)
- D Torque wrench and/or torque multiplier capable of 782 ft. lbs. (1060 Nm)
- D Straight edge (to measure axial gap)
- D 12" ruler graduated in 1/32" (to measure axial gap)
- D 2 dial indicators (measure parallel and angular alignment)
- D Magnetic bases, posts, and clamps for indicators (to measure parallel and angular alignment)
- D Mirror with extended handle to read indicator in tight spots (to measure parallel and angular alignment)
- D Detroit Diesel engine tool #J22582 (engine barring tool)
- D Drill
- D Reamer

Routing	Service Manager	Sales Manager	Parts Manager	Technician No. 1	Technician No. 2	Technician No. 3	Return This to
Initial Here							

Alignment Procedure

1. Place the generator set master switch in the OFF position.
2. Disconnect the generator set engine starting battery(ies), negative (-) lead first.
3. Locate and level the generator and engine on the mounting pad. Install spring isolators using location shown in dimension drawing. See generator set installation manual for more information on mounting and vibration isolation.
4. Remove both the top and bottom coupling guards. See Figure 1.
5. Remove right side starter motor from engine. See Figure 1.
6. Mount Detroit Diesel engine tool #J22582 where the starter motor was removed.



1. Top half coupling guard
2. Right side starter motor

3. Bottom half coupling guard
4. Screw jack

Figure 1. 2000 kW Assembly Drawing

7. The coupling has three basic dimensions of alignment— angular, axial, and parallel alignment. Misalignment of any one or more of the above can cause coupling misalignment. See Figure 2. See Figure 3 and Figure 4 for maximum allowable shaft misalignment values.

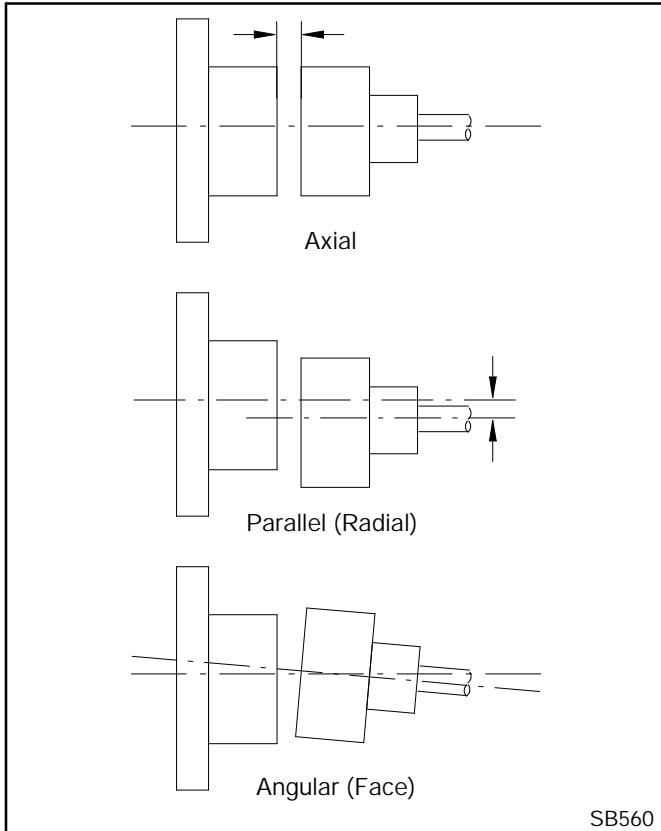
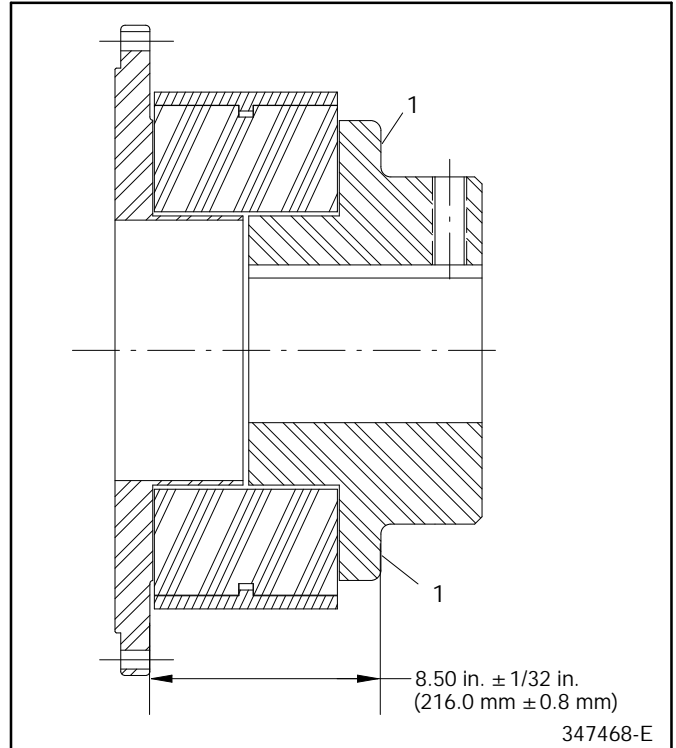


Figure 2. Alignment Types

<p>Parallel TIR*</p>	<p>Angular TIR*</p>
0.005 in. (0.13 mm)	0.0006 in./in. radius to measurement point
*TIR— Total Indicator Runout	

Figure 3. Maximum Allowable Shaft Misalignment

8. Inspect axial alignment. Use a graduated ruler or inside caliper and straight edge to measure axial alignment. See Figure 4. Keep straight edge away from the inside radius.



1. Straight edge location

Figure 4. Axial Alignment Measurement

NOTE

Remove or reposition the following items on the generator set to provide better access to the coupling:

- Fuel filter mounting
- Fuel line mounting
- DDEC interface module located on the skid

NOTE

If flexible coupling requires replacement, mark the engine-mounted coupling and the alternator-mounted coupling so that the set is recoupled exactly as it was uncoupled.

9. Inspect angular and parallel alignment. See Section 7 S10.5.2 Alignment Measurement in the Baylor Company^R Instruction and Service Manual and Figure 5 for alignment information. Make copies of Figure 7, Additional Alignment Worksheet as necessary.

Take measurements at 90° increments and return coupling to initial position to check that indicators are at zero. If indicators are not at zero, reset indicators and repeat Alignment Measurement in the Baylor Company^R Instruction and Service Manual.

NOTE

Make parallel and angular alignment measurements at the same time from the same position, if possible. If measurements are not made at the same time, mark the coupling and take measurements from the same position (degrees) for each measurement.

10. Go to step 18 if measurements meet specifications. Go to next step if measurements do not meet specifications.

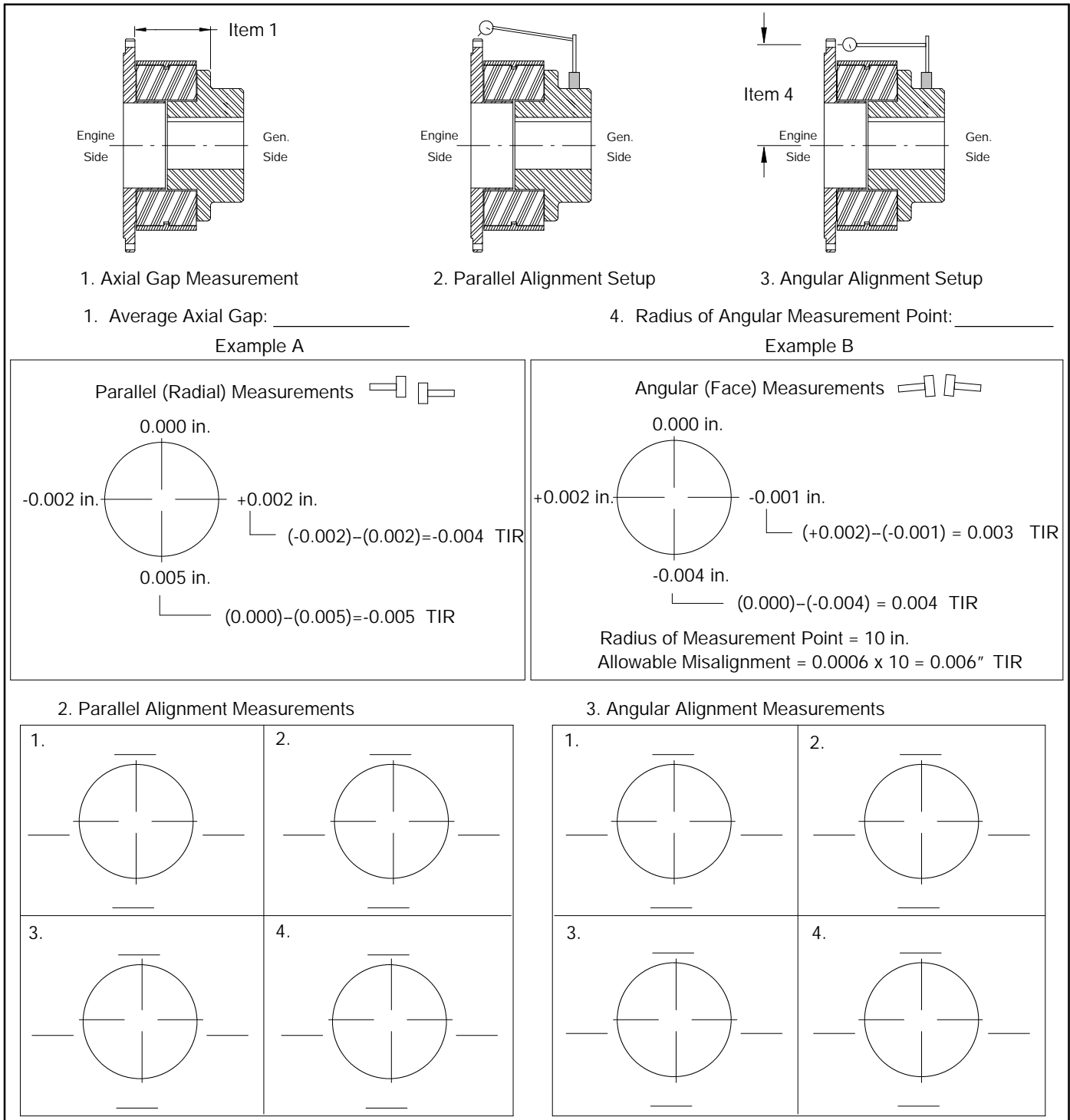


Figure 5. Alignment Worksheet

NOTE

The factory ships the adjustment block bolts, shims, and dowel pins loose with the generator set.

11. Install the eight adjustment bolts into the four adjustment blocks on the generator set skid. See Figure 6. Keep the eight adjustment screws loose so they do not affect *soft foot* measurements. *Soft foot* exists when the generator does not rest flat on its base and only three of the four mounting points support the generator.
12. Check the alternator for *soft foot* condition. See S10.5.1 Initial Considerations in the Baylor Company[®] Instruction and Service Manual.

If no *soft foot* exists go to step 13. If *soft foot* needs correction perform steps a-d.

 - a. Tighten the eight alignment bolts to 100 ft. lbs. (136 Nm) against the alternator to prevent it from moving.
 - b. Loosen the four alternator mounting bolts.
 - c. Shim alternator for *soft foot* using jack screws and supplied shims.
 - d. Tighten the alternator mounting bolts.
13. Check the angular, axial, and parallel alignments. See Figure 6. Use the jack screws and shims to adjust the height of the alternator. Use the adjustment bolts to adjust the horizontal position of

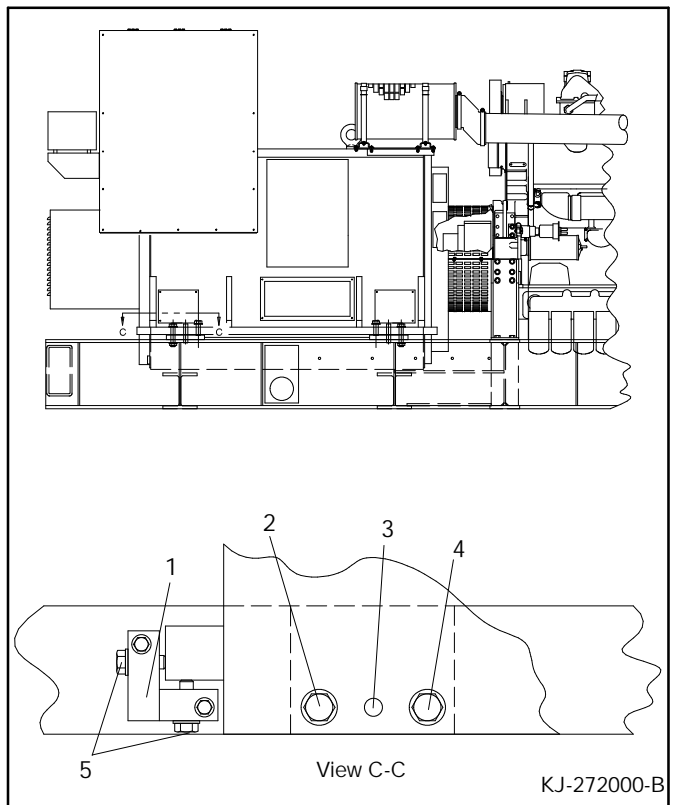
the alternator. Loosen the opposing adjustment bolt prior to tightening an adjustment bolt.

NOTE

Replace all damaged hardware. Do not reuse crushed, cupped, or otherwise distorted washers or shims.

- a. Loosen the alternator mounting bolts.
 - b. Make adjustments to the horizontal plane.
 - c. Tighten alternator mounting bolts.
 - d. Reinspect alignment.
 - e. Loosen alternator mounting bolts.
 - f. Make adjustments to the vertical plane.
 - g. Tighten alternator mounting bolts.
 - h. Reinspect alignment.
14. Verify that alignment meets specifications.
 15. Tighten all adjustment blocks to 100 ft. lbs. (136 Nm) to prevent movement during torquing.
 16. Torque mounting bolts to 300 ft. lbs. (406.8 Nm) in a clockwise bolt pattern sequence. Then torque mounting bolts to 782 ft. lbs. (1060 Nm) $\pm 10\%$ in a clockwise bolt pattern sequence.
 17. Recheck all alignment measurements after torquing. Repeat alignment procedure if measurements do not meet specifications.

18. Record the final alignment measurements for reference purposes.
19. Remove Detroit Diesel engine tool #J22582 from the starter mounting location.
20. Reinstall engine starter motor.
21. Reposition or reinstall any items moved during the alignment procedure.
22. Reinstall the top and bottom coupling guards. See Figure 1.
23. Select opposite corner dowel pin mounting locations. See Figure 6.
24. Drill and ream the existing 0.875 in. (22.22 mm) hole in the skid to 0.996-0.997 in. (25.30-25.32 mm).
25. Drive in the supplied dowel pins using a brass drift and sledge hammer within 0.50-0.63 in. (12.70-15.87 mm) from the alternator base.
26. Check that the generator set master switch is in the OFF position.
27. Reconnect generator set engine starting battery(ies), negative (-) lead last.



1. Adjustment blocks (4)
2. Alternator mounting bolts (4)
3. Dowel location (4)
4. Jack screws (4)
5. Adjustment block bolts (8)

Figure 6. Generator Adjustment Layout

Electrical Test/Long Term Storage

See Section 4.4, Winding Insulation of the Baylor Company^R Instruction and Service Manual for

information on Winding Insulation and see Section 6, Specifications for information regarding space heaters.

Parallel Alignment Measurements

Angular Alignment Measurements

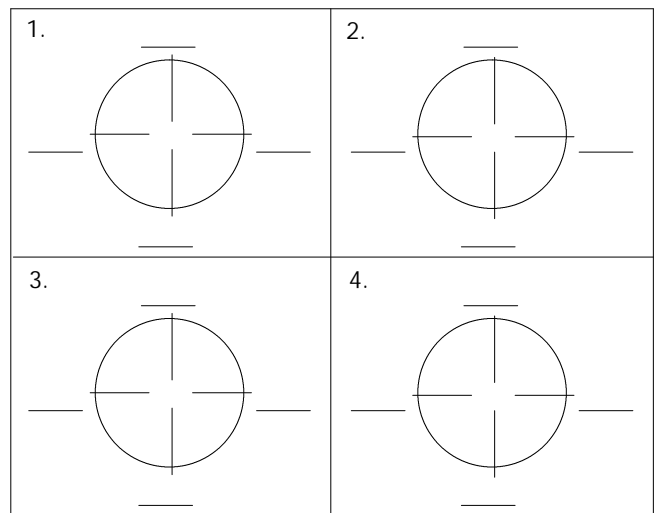
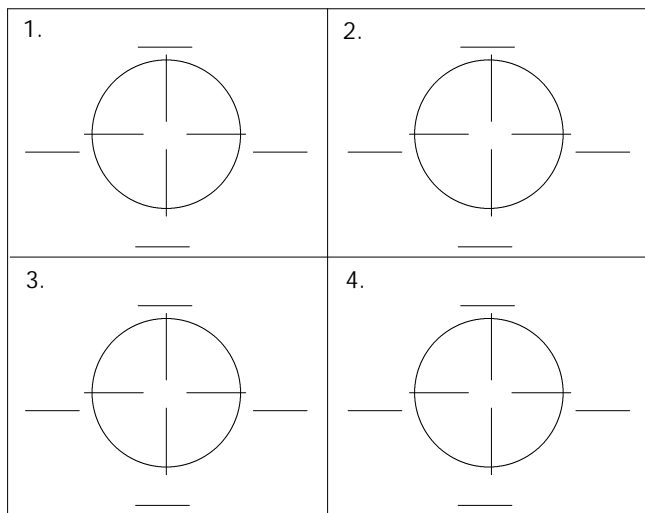
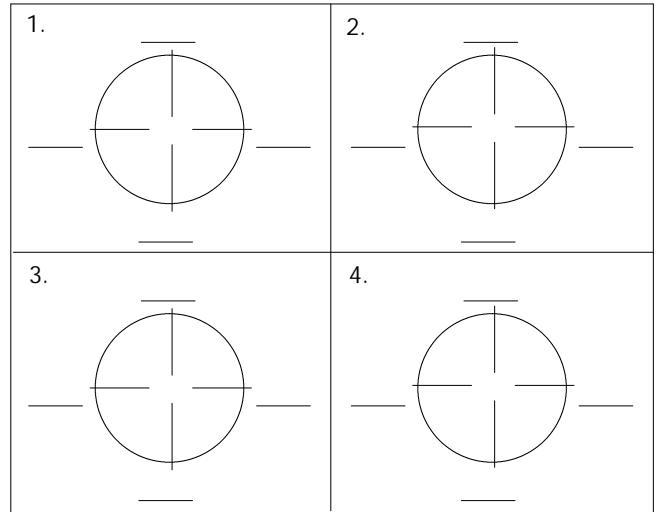
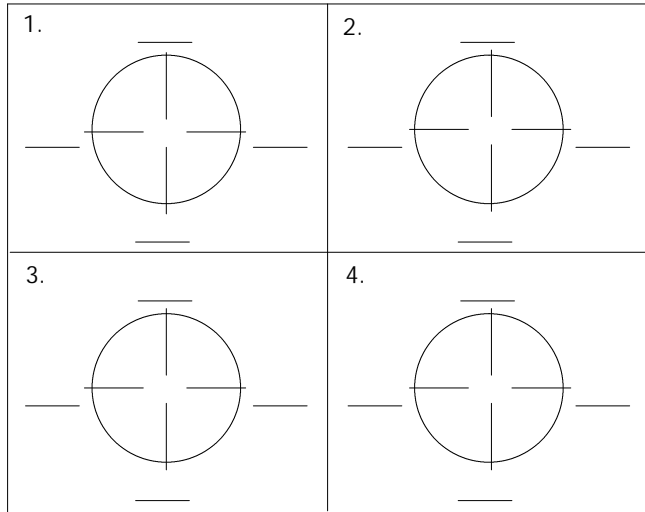
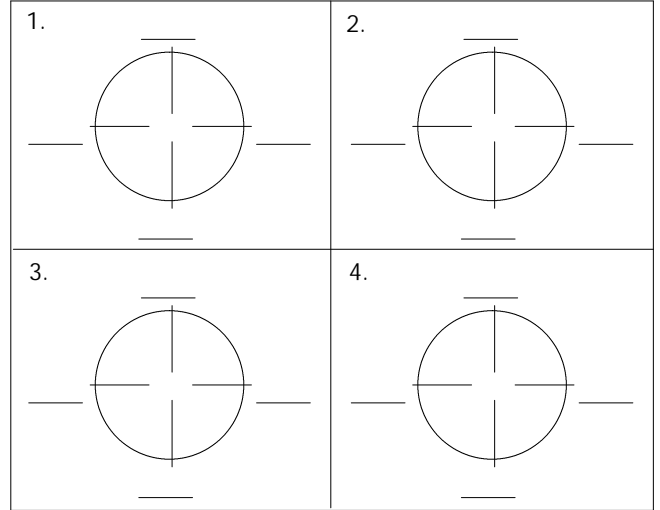
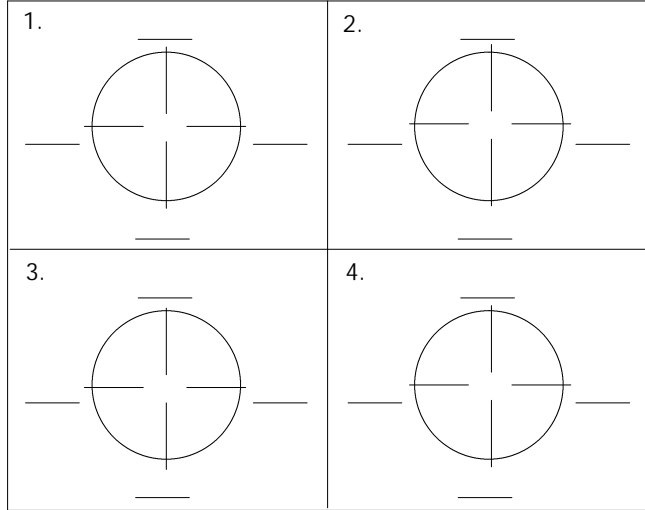


Figure 7. Additional Alignment Worksheet
(Photocopy as necessary)