

## 7.1 INSPECTION AND REPAIR OF THE MODULE ROTATION ASSEMBLY

This section is optional but recommended and can occur with the module in three different locations:

1. Alcove. Target attached or target not attached.
2. Hot storage rack. Target not attached. Requires inner shaft removal.
3. Vault. Target attached. The weight of the target is supported using the middle shaft clamping fixture (tool no. 10906).
4. The steps below are for preventative target rotation maintenance performed on the operational target in the vault. Some steps may already have already been performed if maintenance is being performed in location 1 or 2.
5. FOLLOW ALL LOTO AND CONFIGURATION CONTROL PROCEDURES IN STEP 5.1!
  - a. Record Target's "Y" position from ACNET.
  - b. Turn off target rotation at the power supply in controls rack.
  - c. Remove the airlines and rotary air union from the middle target shaft.
  - d. Disengage the resolver from the middle shaft gear by loosening one of the two bolts, removing the other bolt, then rotating the resolver out of the way. Or remove and set aside. Clean the old grease off the gears.
  - e. Disconnect the rotation motor power cable. Remove the rotation motor/mounting plate. Clean the old grease off the gears.
  - f. Using a dynamic torque wrench, check the torque required to rotate the Target 360 degrees in both directions and record. Torque should be around 100 to 125 lb-in.
  - g. Attach the middle shaft clamping fixture (tool no. 10906), positioning it as low as possible on the shaft and tighten bolts securely. Optional for location 1.
  - h. Loosen the four bolts that secure the bearing block (8055.110-MC-413311). Unthread them approximately ¼".
  - i. Loosen the three set screws securing the rotating shaft collar (8055.110-MB-413313)
  - j. Using ACNET controls, lower the Y position (F8 on a Console, F4 on a PC, the D:TGTY value should increase) such that the weight of the target and/or middle shaft is fully supported by the middle shaft clamping fixture. You will observe the retaining ring being raised above the rotating shaft collar. Be careful not to move more than the looseness of the four bolts in step "H". Doing so will cause damage! Location 1 option; raise the middle shaft and target using the alcove movable table.
  - k. Remove the retaining ring.

- l. Remove the rotating shaft collar (8055.110-MB-413313). Be careful that the thrust washers and ceramic ball bearings do not come up with it.
- m. Remove the thrust bearing assembly (be careful not to drop the ceramic ball bearings, they are not secured within the races.) Clean in alcohol then inspect for wear or damage. Replace if necessary. Lubricate with motor oil.
- n. Remove the four bolts from the bearing block then slide it off the middle shaft. Remove the Reali-Slim bearing from the bearing block. Clean the bearing block. Inspect the Reali-Slim bearing. Clean the Reali-Slim bearing with alcohol and lubricate with motor oil and snubber grease. Replace the Reali-Slim bearing if it is worn or damaged.
- o. If the middle shaft needs to be replaced (move module to hot storage rack):
  1. Remove Target.
  2. Attach an I-bolt to the middle shaft. Support the weight of the shaft with the crane.
  3. Remove the middle shaft clamping fixture.
  4. Remove middle shaft from module and bag-- approximate weight is 33 pounds.
  5. Attach an I-bolt to new middle shaft and install into module using crane.
  6. Attach the middle shaft clamping fixture. Remove crane and I-bolt.
- p. Re-install the bearing block leaving the bolts loose.
- q. Re- install the Reali-Slim bearing into the bearing block (dust cover up).
- r. Re-install the thrust bearing.
- s. Re-install the rotating shaft collar, leave the set screws loose.
- t. Install a new retaining ring.
- u. Using ACNET controls, raise the "Y" position (F9 on a Console, F5 on a PC, the D:TGTY value should decrease) by ~1/8" such that the weight of the target and/or middle shaft is fully supported by the retaining ring. Return the target to its original "Y" position recorded in step a.
- v. Remove the middle shaft clamping fixture.
- w. Center the rotating shaft collar on the shaft using the set screws.
- x. Tighten the four bearing block screws.
- y. Using a dynamic torque wrench, check the torque required to rotate the Target 360 degrees in both directions and record. Torque should be around 100 to 125 lb-in. If there is excessive torque fluctuation or runout additional adjustment of the rotating shaft collar may be required.

- z. Add a light coating of snubber grease to the motor gear, rotating shaft gear and encoder gear.
- aa. Install the rotation motor leaving the four bolts loose. Adjust gear tooth engagement to be slightly loose ( $\sim .005''$ ). Tighten the four bolts.
- bb. Install the encoder. Adjust gear tooth engagement to be slightly loose ( $\sim .005''$ ). Tighten the four bolts.
- cc. Install the air union and tighten.
- dd. Attach the two air hoses.
- ee. Reconnect motor power cable.
- ff. Secure all wires and hoses against getting pinched during Target motions.
- gg. Turn on rotation motor power and verify that it is operating properly.
- hh. Turn on target air blower.
- ii. Turn on RAW water systems.
- jj. Install blocks.
- kk. Remove LOTO.