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).

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. 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. Turn off Target Air Blower and apply configuration control lock.
d. Remove the two air lines from the rotary air union (1)

e. Disconnect the rotation motor power cable (2). Disconnect the rotation motor thermocouple (3). Remove the rotation motor with mounting plate (4). Clean the old grease off the gear and set the assembly aside.

f. Disconnect the resolver power cable (5) and remove the resolver (6) with mounting plate (*be careful to not lose the spacer blocks, they are not permanently attached to the mounting plate*). Clean the old grease off the gear and set the resolver aside.

g. Using a *thin* 1-3/8” wrench and a 1-1/2” wrench, apply apposing forces to remove the rotary air union (7) from the target shaft (*be careful not to lose the seal washer*). Test that it rotates freely. Service if necessary.

h. Using a dynamic torque wrench with a 1-1/2” socket on the inner shaft lock ((8055.110-MB-413917) (8)) check the torque required to rotate the Target 360 degrees in both directions and record. Torque should be between 100 to 150 lb-in. Be sure to position the rotation shaft collar so that all 3 set screws are accessible to be loosened in step l.
i. Loosen the three inner shaft lock (8055.110-MB-413917) half-dog set screws (8) far enough to dis-engage them from the inner shaft holes. This is verified by looking down the center of the inner shaft with a flashlight. Loosen the lock using two wrenches and applying apposing forces. Remove the lock and shimming washers. Be sure to position the rotation shaft collar so that all 3 set screws are accessible to be loosened in step l.

j. Attach the middle shaft clamping fixture (tool no. 10906) to the middle shaft against the top of the module and torque the four bolts to 20 lb-ft. Clean shaft and clamping fixture with alcohol prior to installation.

k. Loosen the four bolts (10) that secure the bearing block (F10094618). Unthread them approximately ¼”.

l. Loosen the three set screws (9) securing the rotating shaft collar (8055.110-MB-413313)

m. Using ACNET controls, lower the Y position approximately 1/8” (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 (tool no. 10906). 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 may cause damage! Location 1 option; raise the middle shaft and target using the alcove movable table.

n. Remove the retaining ring (11).

o. Remove the rotating shaft collar (9) (8055.110-MB-413313).

p. Remove the four bolts from the bearing block then slide it and the combination bearing off the middle shaft. Remove the combination bearing from the bearing block. Clean the bearing block. Inspect the combination bearing. If necessary, repack the combination with snubber grease. Replace the combination bearing if it is worn or damaged.

q. 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.

r. Re-install the bearing block (10) and combination bearing leaving the four bolts loose.

s. Re-install the rotating shaft collar (9), leave the set screws loose.

t. Install a new retaining ring (11).
u. Using ACNET controls, raise the “Y” position (F9 on a Console, F5 on a PC, the D:TGTY value should decrease) such that the weight of the target and/or middle shaft is fully supported by the retaining ring (11). Return the target to its original “Y” position recorded in step a.

v. Remove the middle shaft clamping fixture (tool no. 10906).

w. Torque the three rotating shaft collar (8055.110-MB-413313) set screws to 96 lb-in.

x. Torque the four bearing block (10) screws to 72 lb-in.

y. Install the inner shaft lock (8) and shimming washers. Tighten the locking collar using two wrenches applying apposing forces. Tighten the inner shaft lock half-dog set screws (8) far enough to engage them in the inner shaft holes. This is verified by looking down the center of the inner shaft with a flashlight. Adjust the shimming washer package thickness as necessary to have the locking collar tight on the shaft when the half-dog set screws engage with the holes in the inner shaft.

z. Using a dynamic torque wrench, check the torque required to rotate the Target 360 degrees in both directions and record. Torque should be around 125 to 150 lb-in.

aa. Add a light coat of snubber grease to the motor, rotating shaft and encoder gears.

bb. Install the rotation motor leaving the four bolts loose. Adjust the gear tooth backlash to be slightly loose (~.010”). Tighten the four mounting plate bolts. Test the gear backlash at 90 degree intervals to ensure that it remains slightly loose (~.010”).

c. Install the resolver (6). Adjust gear tooth backlash to be slightly loose (~.020”). Tighten the four bolts. Test the gear backlash at 90 degree intervals to ensure that it remains slightly loose (~.020”).

d. Install the air union (7) with seal washer and tighten using two wrenches applying apposing forces. Be careful not to apply any force to the rotation motor!

e. Attach the two air hoses (1).

ff. Reconnect motor power cable (2) and the resolver power cable (5).

gg. Secure all wires and hoses against getting pinched during Target motions.

hh. Turn on rotation motor power and verify that it is operating properly.

ii. Turn on target air blower.

jj. Install blocks.

kk. Remove LOTO.