BMT65/75 - Turret - Piston - Replacement - AD0425

LAST UPDATED: 07/30/2024

BMT65/75 Turret - Piston - Replacement

AD0425

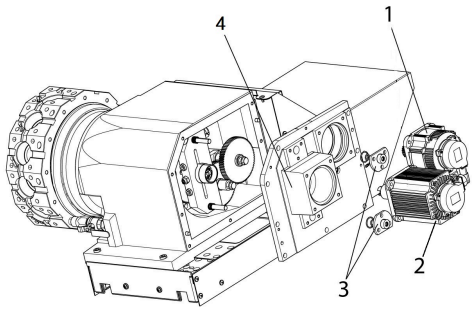
Introduction

This procedure should be referenced when replacing the BMT65/75 Live Tool torque arm, turret piston cover, turret piston, or turret piston seals.

This document and service kit applies to the following part numbers:

- **93-2938** BMT LIVE TOOL TORQUE ARM SVC KIT (Skip steps 6-11).
- **93-2939** BMT TURRET PISTON COVER SVC KIT (Skip steps 9).
- **93-2941** BMT TURRET PISTON SVC KIT (Use entire document).
- **93-3874** BMT65 PISTON SEAL SVC KIT (Use entire document).

BMT65/75 - Turret Piston - Replacement



1

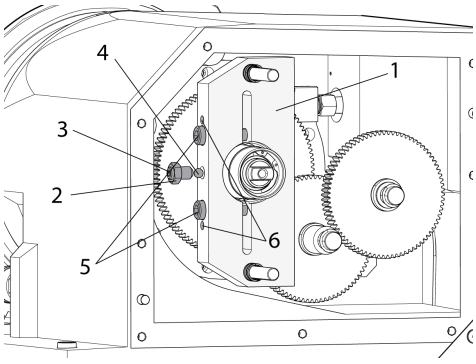
Index the turret to tool number 1.

Turn off the main air supply to the machine.

Remove the following items in this order:

- The turret servo motor [1].
- If machine is equipped with the live tooling, remove the live tooling servo motor [2] and the top and bottom alignment bushings [3].
- The rear turret gearbox cover [4] (lubricant/oil will drain).

NOTE: Before removing the rear cover tape a trash bag under the gearbox to catch the lubricant.



2

If equiped with live tooling, remove the torque arm [1] with a set screw and ball bearing in the following order:

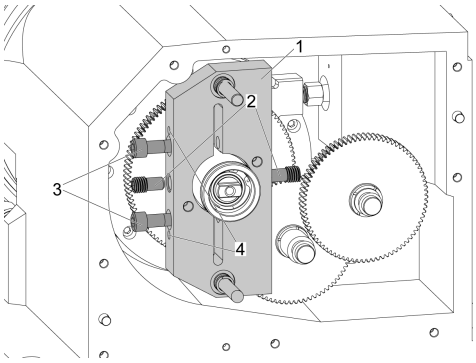
- Loosen the jam nut [2].
- Remove the set screw [3] and steel ball [4].
- Loosen the two clamp bolts [5].

NOTE: If needed, install two 5/16-18 bolts in the jack screw holes [6] next to the clamp bolts. Apply just enough torque to spread the torque arm so it can slide off the torque tube.

NOTE: In the event of a live tool crash the torque arm may be difficult to remove. A pulley puller may be used. If the torque arm still cannot be removed cut it off the torque tube with a grinder. If a grinder was used remove the gears from the turret housing, throughly clean them and the turret housing.

Remove the torque arm.

Remove the snap ring from the torque tube.



3

To remove the torque arm [1] with set screws, remove the following items in this order:

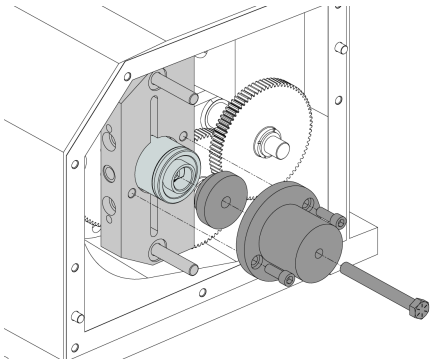
- Remove the set screws [2]
- Loosen the two clamp bolts [3].

Remove and discard the torque arm.

NOTE: If the set screws are difficult to remove, use a blow torch to apply localized heat to the set screws to soften the loctite.

NOTE: If needed, install two 5/16-18 bolts in the jack screw holes [4] next to the clamp bolts. Apply just enough torque to spread the torque arm so it can slide off the torque tube.

NOTE: In the event of a live tool crash the torque arm may be difficult to remove. **T-0133 BMT TORQUE ARM PULLER** can be used or a pulley puller. If the torque arm still cannot be removed cut it off the torque tube with a grinder. If a grinder was used remove the gears from the turret housing and throughly clean them and the turret housing.



4

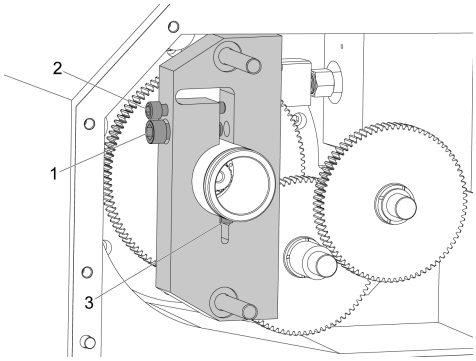
Torque arm with set screws:

T-0133 BMT TORQUE ARM PULLER is used to remove the torque arm from the torque tube.

Install the stop to the torque tube.

Install the puller to the torque arm and install the jack screw to the puller.

Tighten the jack screw to remove the torque arm from the torque tube.



5

To remove the torque arm with the keyway, remove the following items in this order:

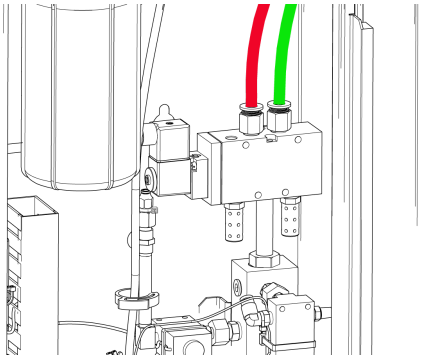
- Remove the clamp screw [1]
- Install a 3/8-16 bolt[2] in the jack screw hole next to the clamp bolt. Apply just enough torque to spread the torque arm so it can slide off the torque tube.

NOTE: In the event of a live tool crash the torque arm may be difficult to remove. A pulley puller may be used. If the torque arm still cannot be removed cut it off the torque tube with a grinder. If a grinder was used remove the gears from the turret housing, throughly clean them and the turret housing.

Remove the torque arm.

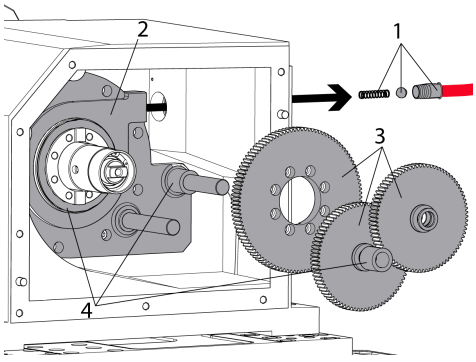
Remove the key[3] from the torque tube.

Remove the snap ring from the torque tube.



6

Unplug the red and green air lines from the turret solenoid in the CALM lube panel.



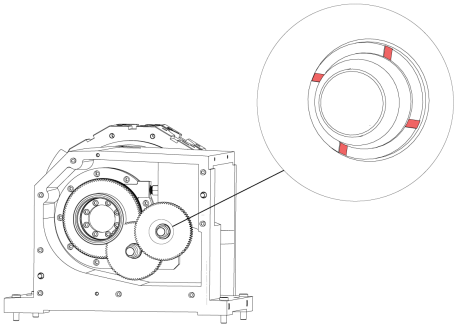
7

Remove the air tube fitting, ball, and spring [1] from the fitting on the piston cover [2].

Remove the drive gears [3], and spacers [4]. The main gear is under spring tension. You will feel this as you remove the bolts.

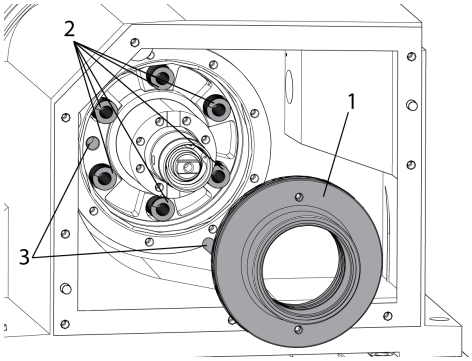
Caution: The main drive gear bolted to the turret shaft prevents the turret and turret shaft assembly from being removed. Use caution not to pull on the turret while the gear is off or it may come out of the housing.

Remove the piston cover [2]. The cover has a low spring tension against it, you will feel this as the bolts are removed.



8

If your idler gears do not have the four machined grooves in the face (highlighted in red), then replace both of them with the updated part number 20-6645A.



9

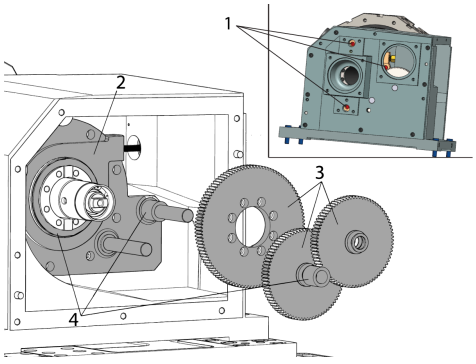
Thread (2) 5/16-18 bolts into the piston to pull on and remove the piston [1].

If the piston was leaking, replace the existing quad ring and O-ring with the ones from the **93-3874** kit. Apply **99-1792** grease to the rings.

Inspect piston, thrush washers, and springs [2] for damage. Replace if needed from the **93-2941** kit. If any part is verified as usable, clean and re-grease it, using the **99-1792** grease in the **93-3874** kit, before reinstalling.

Clean the bore and apply a light layer of grease in the bore, on the shaft, and the piston seals (if not already re-greased).

Install the piston. Align the pin [3] on the back side of the piston with the hole in the casting.



10

Install the piston cover [2], but leave the bolts just loose enough for the cover to be adjusted within its mounting holes. The piston cover is under spring tension. You will feel tension as you tighten the bolts on the cover.

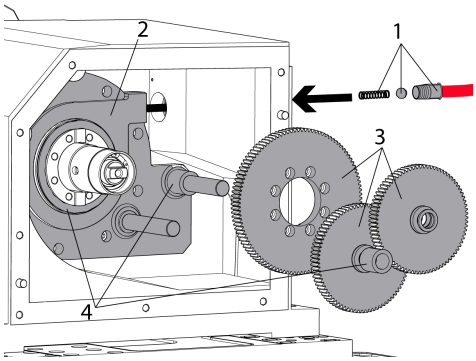
Install the gear spacers [4] and gears [3]. The turret shaft is under spring tension. You will feel tension as you tighten the bolts on the gear.

Install the back cover and tighten the bolts. Now tighten the three piston cover bolts you can reach [1].

Unclamp the turret. Spin the gears inside the gearbox and verify that they do not bind.

If they do, clamp the turret and remove the back cover and gears. Loosen the bolts on the piston cover and re-align it.

Repeat step until the gears spin freely. Remove the back cover and gears so there is access to the remaining piston cover bolts.



11

Tighten all remaining bolts on the piston cover [2].

Check for and remove any raised edges or burrs found in the internal diameter of the two smaller gears. If you must remove material, make sure the debris is thoroughly cleaned.

Apply a coat of Mobil CM-P Moly grease to the internal bores of the two smaller gears before installing. Make sure to fill the grease cavities machined into the internal diameter of the gears. These are highlighted in red in the cutaway photo below.

Install the gear spacers [4] and gears [3].

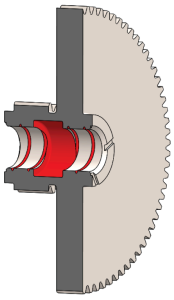
Install the spring, ball, and air tube [1].

Reconnect the red and green air lines on the turret clamp solenoid.

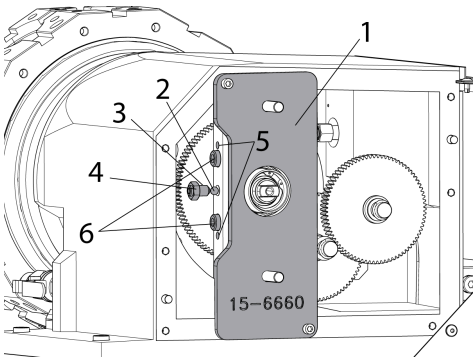
If equiped with live tooling, skip to Step 12 now.

Install the rear turret gearbox cover.

Fill the gearbox with liquid grease. See Step 15 for fill instructions.



Cutaway of an idler gear.



12

To replace the torque arm [1] with a set screw and ball bearing:

Install the snap ring and place the torque arm with springs on the torque tube.

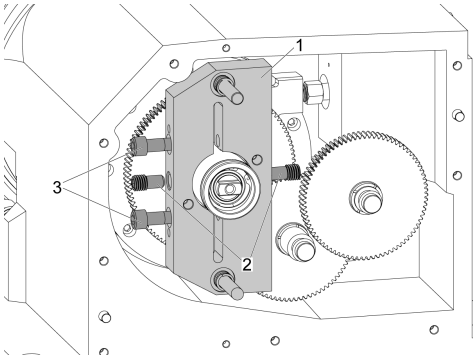
Install the T-0081 preload tool [1] on the turret housing.

Remove the jack screws from the threaded holes [5] if used.

Tighten the set screw [3] with Loctite (blue 242) to 10 ft-lb of torque. Lock the jam nut [4] with 35 ft-lb of torque.

Install the two clamp bolts [6] with 80 ft-lb of torque.

Install the rear turret gearbox cover and alignment bushings.



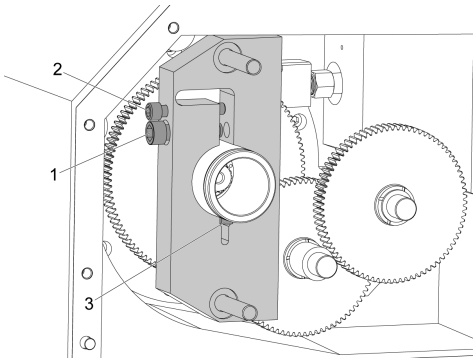
13

To replace the torque arm [1] with set screws:

Tighten the set screws [2] with Blue Loctite and torque to 30 ft-lbs.

Install the two clamp bolts [3] with 80 ft-lb of torque.

Install the springs, rear turret gearbox cover and alignment bushings.



14

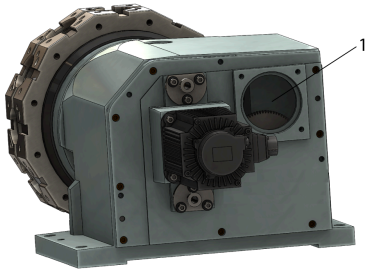
To replace the torque arm with the keyway:

- Install the snap ring on the torque tube.
- Install the key[3] to the torque tube.
- Install a 3/8-16 bolt[2] in the jack screw hole next to the clamp bolt. Apply just enough torque to spread the torque arm so it can slide on the torque tube.
- Seat the torque arm against the snap ring.
- Install the clamp screw[1], torque to 80 ft-lbs.
- Remove the jack screw.

Install the springs, rear turret gearbox cover and alignment bushings.

Follow the alignment procedure.

ALIGNMENT PROCEDURE



15

Install the live tool motor.

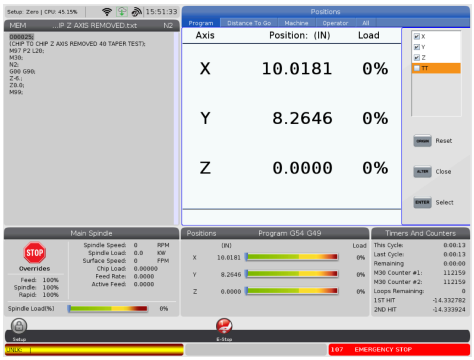
Refill the liquid grease through the turret indexer motor mounting hole [1].

- If machine is equipped with the live tooling, fill the turret gearbox with 2 quarts of **93-1933A**.
- If machine is not equipped with the live tooling, fill the turret gearbox with 3 quarts of the **93-1933A**.

Install and enable the live tool and turret servo motors.

Note : It is reccomended to use a funnel to avoid spillage over other components

BMT65/75 Live Tooling Drive Alignment



1

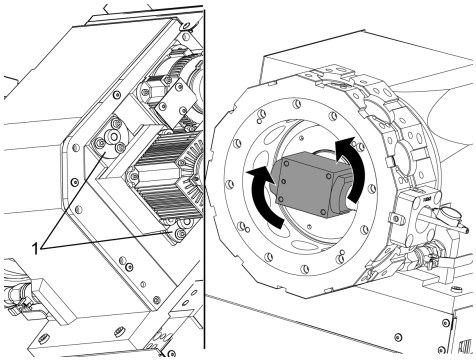
Change **parameter 9.019** to FALSE. Make the axis visible on the display page by pressing **[ALTER]** then select the TT axis and press **[ENTER]**.

Remove any tooling that may be in the way and zero return the TT axis, ignore any alarms. Press **[DIAGNOSTICS]** to get to the FACTORY parameters tab. Type TT and press **[F4]** to set the grid offset. Zero Return the TT axis.

In MDI command an M43 to unclamp the turret. Handle jog the TT axis until pocket 1 is in position, visually aligh the coolant nozzle. Press **[EMERGENCY STOP]** and verify the turret is fully seated.

Press **[DIAGNOSTICS]** to get back to parameters. Type TT and press **[F2]** to set the tool change offset.

Change **parameter 9.019** to TRUE.



2

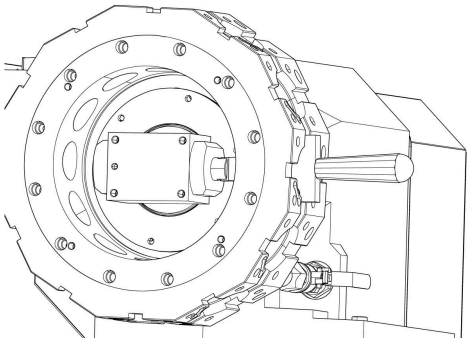
With the indicator base installed, T-0082, loosen the (6) bolts on the top and bottom alignment bushings [1].

Rotate the drive until the total indicated runout (T.I.R.) is less than .002".

Tighten the (6) bolts on the top and bottom alignment bushings [1] to lock the drive in position.

Verify the T.I.R. remains less than .002".

Remove the T-0080 and T-0082 alignment block and indicator base.



3

Insert the T-0083 output shaft alignment tool into the pocket.

Check the drive dog alignment with the tool in the vertical position.

For Classic Haas Control: Adjust **parameter 487** TT Tool Change Offset to correct the alignment.

- Press **[ALARMS]** key, type "**DEBUG**" and press **[ENTER]** to enter debug mode.
- Switch to the position screen.
- Press **[F4]** to activate the raw data box.

- Highlight the "**VAR**" tab and press **[ENTER]**.
- Highlight the "**AXES**" tab and press **[ENTER]**.
- Flip the sign (if negative, make positive; if positive, make negative) on the TT-axis "PRIME ENC" position value and enter this value into PAR 487.
- Press **[ZERO RETURN]**, then **[ALL]**.
- Reinsert tool T-0065 into the vertical slots on the turret to verify that the output shaft is properly aligned.

For Next Generation Control: Go to **parameter 10.082** LT_AXIS SPINDL ORIENT OFSET, type LT and press **[F3]** to set the live tooling orient.

Verification

Clamp, unclamp, and rotate the turret to verify that the machine is running correctly.

Repeat any necessary steps of the procedure if error occurs.