BMT65/75 Turret - Live Tool Drive - Alignment

LAST UPDATED: 07/30/2024

BMT65/75 Turret - Live Tool Drive - Alignment

Introduction

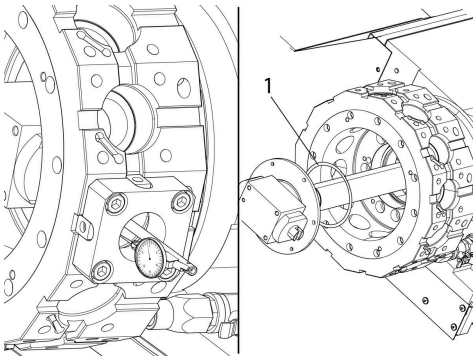
The following service video shows how to align the BMT Turret Live Drive system.

NOTE: This service video is for reference only and does not replace the written procedure.

Required tools:

- Service USB Key
- Dial indicator
- **T-0082** BMT65 ALIGNMENT INDICATOR HOLDER
- **T-0080** BMT65 MASTER ALIGNMENT BLOCK
- **T-0083** BMT65 OUTPUT SHAFT ALIGNMENT TOOL
- **T-0160** BMT75 LT POCKET ALIGNMENT TOOL
- **T-0148** BMT75 LT OUTPUT SHAFT ALIGNMENT TOOL

Live Tool Drive Shim Check



1

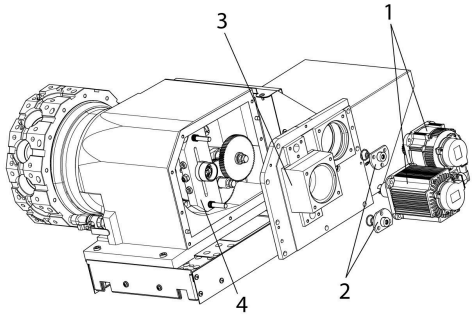
Remove all driven tools from the turret.

Install the T-0080 alignment block on tool #1 and T-0082 indicator base tool on the LT drive shaft.

Check the alignment in the Z axis.

If the indicator reading exceeds .002" then shims [1] will need to be added or removed.

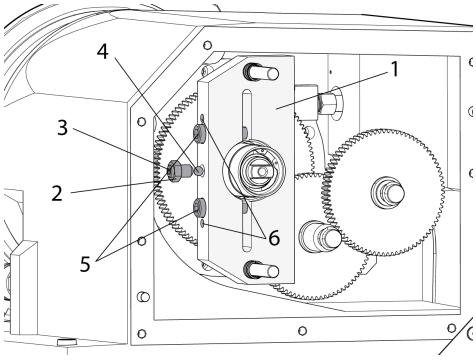
If the alignment in Z is correct proceed to the BMT Live Tooling Drive Alignment section.



2

To adjust the shim size, remove the following items in this order:

- The live tool and turret servo motors [1].
- The top and bottom alignment bushings [2].
- The rear turret gearbox cover [3] (Lubricant/oil will drain, place something under the gearbox to catch the lubricant/oil).



3

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

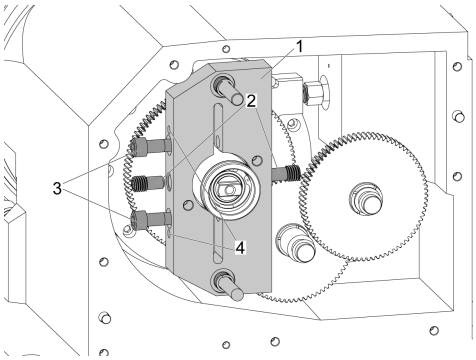
- Loosen the jam nut [2].
- Remove the set screw [3] and steel ball [4].
- Loosen the two clamp bolts [5].

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.



4

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

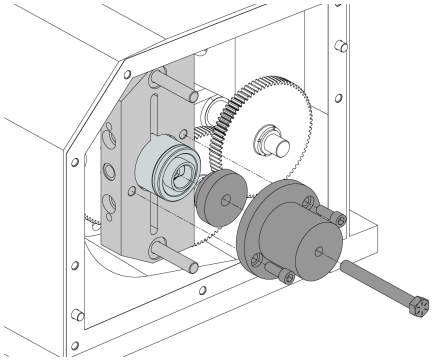
- Remove the set screws [2]
- Loosen the two clamp bolts [3].

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.



5

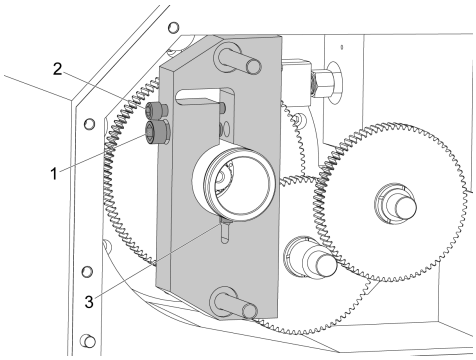
Torque arm with set screws:

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.



6

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

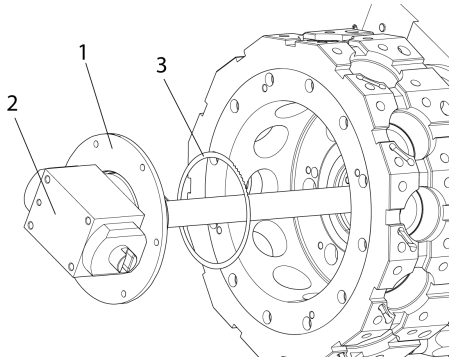
- Remove the clamp screw [1]
- Install a 3/8-16 bolt[2] in the jack screw hole next to the clamp bolt. Apply just enough torque to spread the torque arm so it can slide off the torque tube.

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.



7

Remove the indicator base from the live tool drive.

Remove the (6) bolts from the retaining ring [1] and slide the live tooling drive [2] out of the turret.

Clean the bore and add or remove shims [3] as needed.

Note: Shim part numbers are 59-1563 through 59-1567.

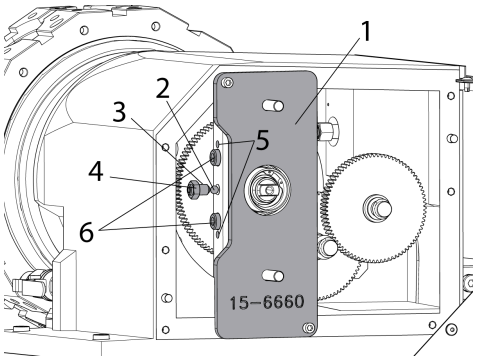
Re-install the drive [2] and torque the (6) mounting bolts for the retaining ring [1].

Torque arm with set screw and ball bearing:

Install the snap ring on the torque tube and install the torque arm with springs. Install the steel ball and set screw with light torque to align the two pieces. Back off the set screw 1/8th of a turn to prevent binding in the next step.

Torque arm with set screws:

Install the torque arm with springs. Install the set screws with light torque to align the two pieces.



8

Torque arm with set screw and ball bearing:

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

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

Tighten the two clamp bolts [6] with 10 ft-lb of torque.

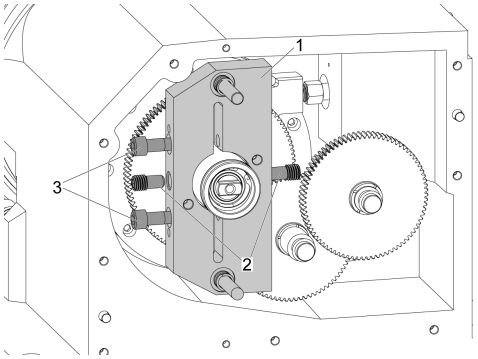
Tighten the set screw [3] with Loctite (blue 242) to 10 ft-lb of torque. Lock the jam nut [4] with 35 ft-lb of torque.

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

Install the mag base tool on the drive and check the shim alignment. If needed repeat these steps to adjust the shim size.

If the alignment is correct remove the T-0081 preload tool [1]. Apply a thin layer of liquid grease to the torque arm pins and install the gearbox cover plate.

Install the alignment bushings.



9

Torque arm with set screws:

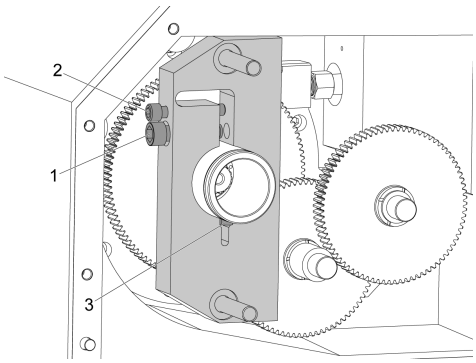
Tighten the set screws [2] with Blue Loctite and torque to 30 ft-lbs.

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

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

Install the mag base tool on the drive and check the shim alignment. If needed repeat these steps to adjust the shim size.

If the alignment is correct remove the gearbox cover plate. Apply a thin layer of liquid grease to the torque arm pins and install the gearbox cover plate.



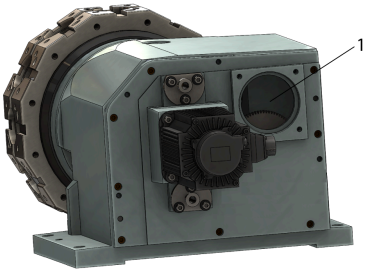
10

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.

Apply a thin layer of liquid grease to the torque arm pins and install the springs, rear turret gearbox cover and alignment bushings.

Install the mag base tool on the drive and check the shim alignment. If needed repeat the shim adjustment steps.



11

Install the live tool motor.

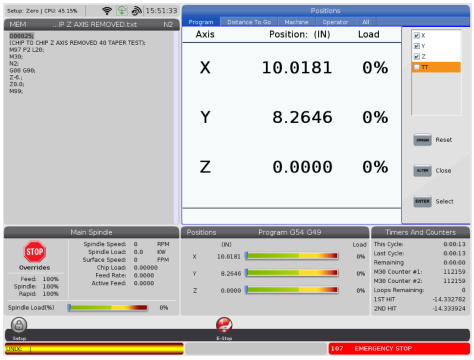
Refill the liquid grease through the turret indexer motor mounting hole [1].

- 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

Tool Drive Spindle Orientation Offset



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.

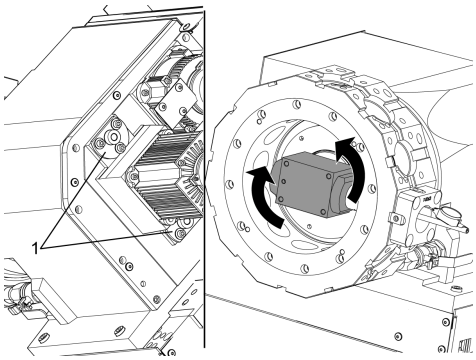
In MDI command an M43 to unclamp the turret. Handle jog the TT axis until pocket 1 is in position, visually align the coolant nozzle. Press ESTOP and verify the turret is fully seated.

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

Change parameter 9.019 to TRUE.

For CHC Machines follow the procedure below.

ST - TURRET - GRID OFFSET/TOOL CHANGE OFFSET - PARAMETER 128/212



2

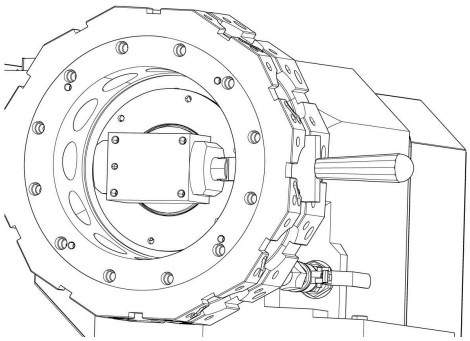
With the indicator base installed, T-0082, loosen the (6) bolts on the top and bottom alignment bushings [1].

Rotate the drive until the 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 / T-0160 alignment block and indicator base.



3

Insert the T-0083 / T-0148 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 / T-0148 into the vertical slots on the turret to verify that the output shaft is properly aligned.

For Next Generation Control:

- Insert USB Service Key
- Press **[ALARMS]** key, type "**DEBUG**" and press **[ENTER]** to enter debug mode.
- Go to parameter **32.085 LT-Axis Spindle Orient Offset (SI Units)**
- Type **"0"** then press **[ENTER]** to set the rotation of the LT-axis back to origin
- Press **[Current Commands]** key, go to **"Live Tooling Spindle"** then press **[ENTER]**
- Go to **"Live Tooling Orient"** then press **[F2]** to zero the spindle axis
- Insert the T-0083 / T-0148 output shaft alignment tool into the pocket and align the axis
- Go back to **32.085 LT-Axis Spindle Orient Offset (SI Units)** in parameters and type **[LT]** then press **[F3]** to set offset
- Remove alignment tool and move output shaft out of alignment then repeat the **"Live Tooling Orient"** step to verify that the axis returns to the set alignment
- Reinsert tool T-0065 / T-0148 into the vertical slots on the turret to verify that the output shaft is properly aligned.