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Page 1 of 15

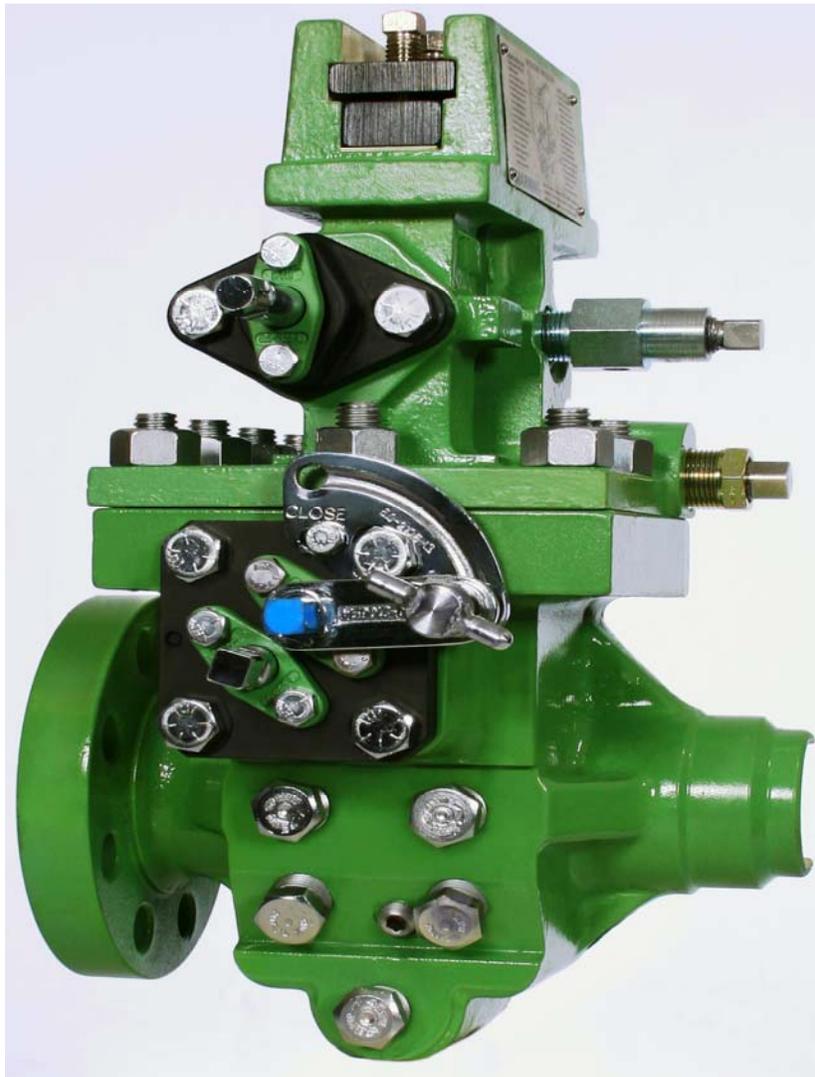
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Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal



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DANGER

**SERIOUS PERSONAL INJURY OR
DEATH OCCURRENCE WARNING**

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is a pressure containing device. Failure to follow the Sure Shot[®] Dual Chamber Fitting shaft reversal instructions during shaft reversal procedure could result in serious injury or death.

***Safety Note:** All internal pressure must be removed from the Sure Shot[®] Dual Chamber Orifice Fitting prior to beginning the below procedure. Sure Shot[®] Dual Chamber Orifice Fittings installed in service should be blown down to atmospheric pressure per your company standard procedure. Sure Shot[®] Dual Chamber Orifice Fittings that are undergoing hydrostatic test pressure must have all internal pressure removed prior to beginning the below procedure.*

**READ THE INSTRUCTIONS FOR SURE SHOT[®] ORIFICE FITTING SHAFT
REVERSAL IN ITS ENTIRETY PRIOR TO BEGINNING THE PROCEDURE
OBSERVE ALL NOTES AND WARNINGS CONTAINED IN THIS
INSTRUCTION PROCEDURE**

NOTICE

TMC_o, Inc. (The Measurement Company), shall not be liable for technical or editorial errors in this procedure. TMC_o, Inc. shall not be liable for any damages, including, but not limited to, personal injury, property damage, loss of production, loss of profits, etc.

NOTE: Should questions or issues arise during the Sure Shot[®] Dual Chamber Orifice Fitting Shaft Reversal Procedure contact TMC_o, Inc. for assistance. Contact information is as follows:

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Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

EQUIPMENT AND TOOLS REQUIRED FOR SHAFT REVERSAL PROCEDURE

- TMCo, Inc. Instruction for Dual Chamber Orifice Fitting Shaft Reversal
- TMCo, Inc. supplied operating wrench “crank handle”
- 3/4” Box End Wrench
- 7/16” Box End Wrench
- 1/2” Box End Wrench
- Rubber Mallet
- Flat Screw Driver
- Snap Ring Pliers



Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

Step #1 INSURE ALL PRESSURE IS REMOVED FROM ORIFICE FITTING

Open both the equalizer valve and the bleed valve to insure that no pressure remains trapped in the TMC_o, Inc. Dual chamber orifice fitting. **(Figure 1-1)**

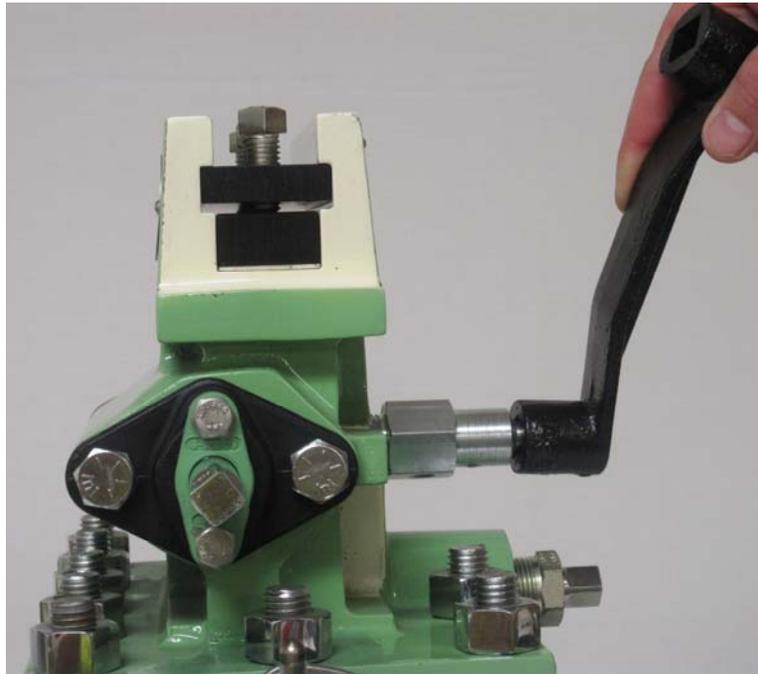


Figure 1-1

Step #2 REMOVE ORIFICE PLATE CARRIER FROM ORIFICE FITTING

1. Prior to removing the clamping bar unlock the eccentric plug and rotate to open position with operating wrench.**(Figure 2-1)**
2. Loosen clamping bar screws with TMC_o, Inc. supplied operating wrench.**(Figure 2-2)**



Figure 2-1



Figure 2-2

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

3. Place operating wrench on lower gear shaft and turn gear shaft until carrier engages upper gear shaft. **(Figure 2-3)**
4. Place operating wrench on upper gear shaft and turn until carrier reaches top of fitting and comes into contact with sealing bar to assist breaking gasket loose and provide additional safety check to make sure no pressure is contained in the orifice fitting. **(Figure 2-4)**
5. After the top gasket is free from top chamber; remove clamping bar, slide bar and gasket from the fitting. **(Figure 2-5)**
6. Place TMC_o, Inc. supplied operating wrench on top gear shaft and rotate until carrier is removed for the upper chamber of the fitting. **(Figure 2-6)**



Figure 2-3



Figure 2-4

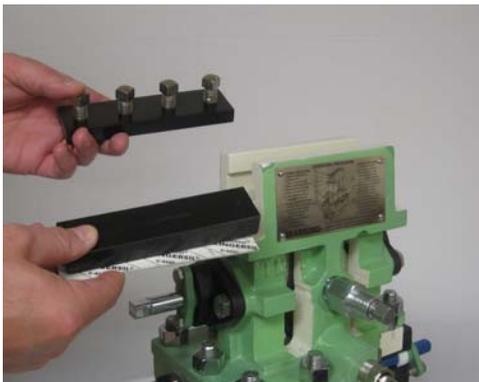


Figure 2-5



Figure 2-6

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

Step #3 SURE SHOT DUAL CHAMBER TOP GEAR SHAFT REVERSAL

1. Remove all Bolts on upper end caps with 3/4" box end wrench. **(Figure 3-1)**
2. Carefully remove upper end caps, gear shaft and O-rings from upper chamber. **(Figure 3-2)** *Note: Be careful that the O-ring does not fall out of the O-ring groove or damage O-ring during upper gear shaft reversal. Replace any damaged O-rings.*
3. Rotate end cap and shaft to opposite side of upper chamber. **(Figure 3-3)** *Note: Make sure O-rings are in both end cap O-ring grooves before tightening 3/4" Bolts on both upper chamber end caps.*
4. Install end cap bolts and tighten using 3/4" box end wrench (Approximately 20 ft. lbs) **(Figure 3-4)**



Figure 3-1



Figure 3-2

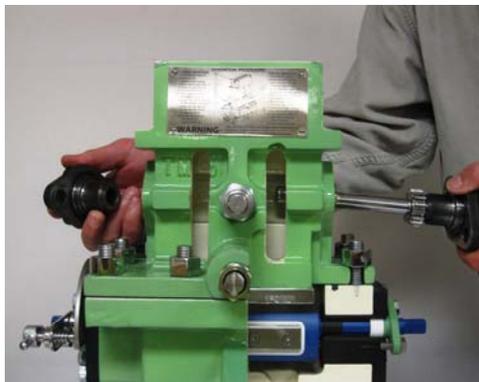


Figure 3-3

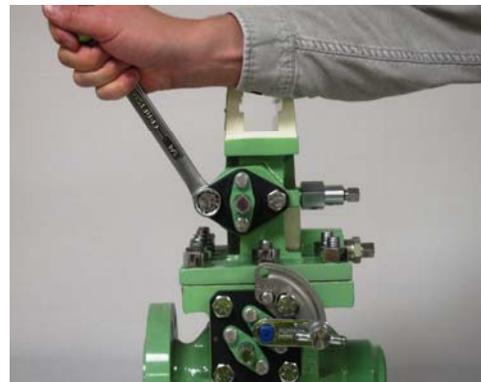


Figure 3-4

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

Step #4 SURE SHOT DUAL CHAMBER LOWER GEAR SHAFT REVERSAL

1. Using snap ring pliers to remove retainer ring located in front of the locking arm assembly on eccentric plug shaft. **(Figure 4-1)**
2. Remove spring loaded button by sliding locking arm assembly off eccentric plug shaft. **(Figure 4-2)**
3. Using 1/2" box end wrench, loosen gland follower bolts on lower gear shaft and both sides of eccentric plug shaft. **(Figure 4-3)**
4. Use 3/4" box end wrench to remove all lower end cap bolts from lower end caps. **(Figure 4-4)**

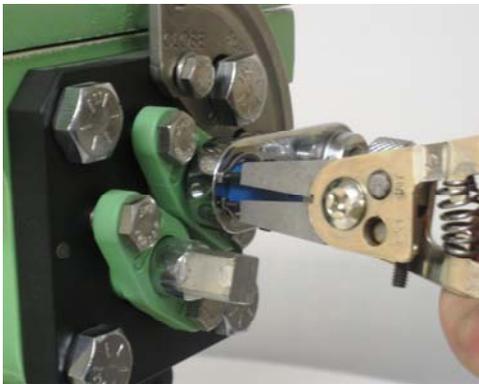


Figure 4-1

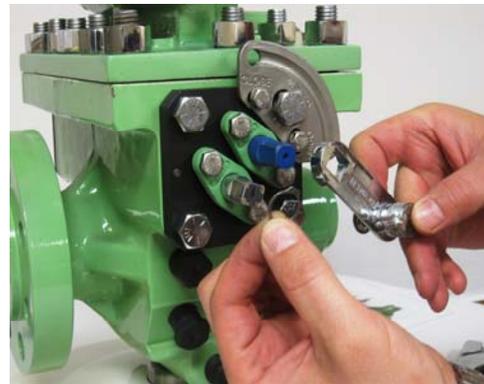


Figure 4-2

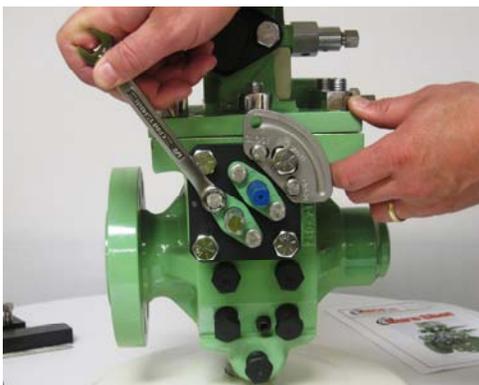


Figure 4-3



Figure 4-4

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

5. Using 7/16" box end wrench remove bolts that hold orientation plate to lower chamber end cap. **(Figure 4-5)** *Note: The shaft orientation is marked on the orientation plate "LH and RH", when reinstalled the opposite side will be facing outward.*
6. Using a rubber mallet slightly tap eccentric plug shaft to free the lower chamber end caps from the lower chamber body. **(Figure 4-6)**
7. Remove both lower chamber end caps from Sure Shot dual chamber lower chamber body. **(Figure 4-7)**
8. Remove lower chamber gear shaft spacers from lower chamber gear shaft. **(Figure 4-8)** *Note: This will prevent the spacers from falling into the lower chamber during the removal of the lower chamber gear shaft.*



Figure 4-5



Figure 4-6

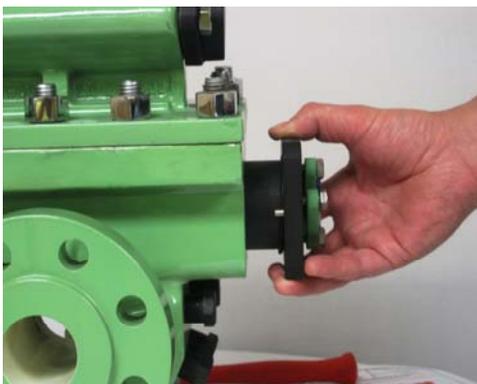


Figure 4-7

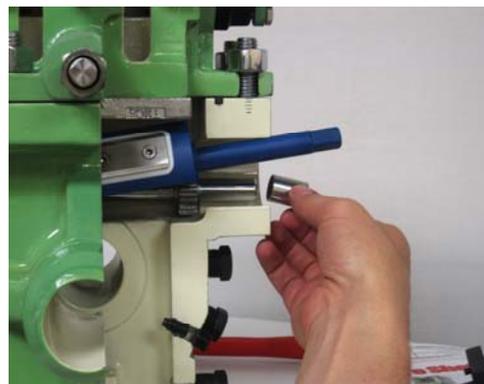


Figure 4-8

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

9. Maneuver the eccentric plug pushing it slightly in the upstream direction to provide clearance for the removal of the lower chamber gear shaft. Remove lower chamber gear shaft by sliding it out of the lower chamber end cap hole. **(Figure 4-9)** *Note: It is not necessary to remove the eccentric plug from the lower chamber during the shaft reversal procedure. Sure Shot Dual chamber orifice fittings have through shaft extensions on both sides of the fitting making it un-necessary to remove the eccentric plug during the gear shaft reversal procedure.*
10. Rotate the lower chamber gear shaft 180 degrees and reinsert into lower chamber short end first. **(Figure 4-10)** *Note: Hold the eccentric plug to the upstream of the fitting to provide clearance for the reinsertion of the lower chamber gear shaft.*
11. Reinstall lower chamber gear shaft spacers onto lower chamber gear shaft. **(Figure 4-11)**
12. Install lower chamber blind end cap on opposite end of orifice fitting lower chamber. **(Figure 4-12)** *Note: It may be necessary to position lower chamber gear shaft from the now through side so that it properly seats in the blind bearing hole.*



Figure 4-9



Figure 4-10



Figure 4-11

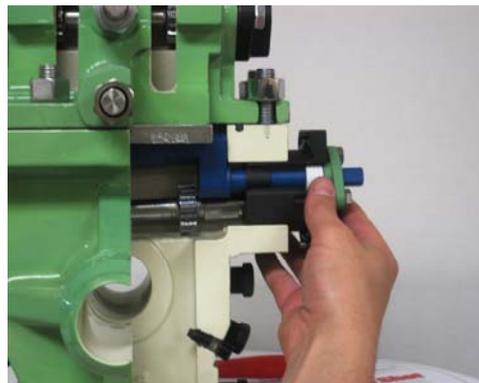


Figure 4-12

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

13. Reinstall lower chamber through end cap on what was previously the blind cap side of the orifice fitting. **(Figure 4-13)** *Note: Insure that the O-rings are in the O-ring grooves and the locating dowel pins align properly with the dowel pin holes.*
14. Install orientation plate in the proper position on the lower chamber through end cap. Hand tighten (2) bolts that hold the orientation plate to the end cap. **(Figure 4-14)** *Note: The shaft orientation is marked on the orientation plate “LH and RH”, when reinstalled the opposite side will be facing outward.*
15. Hand tighten all end cap bolts that affix the lower chamber end caps to the lower chamber body. Using 3/4” box end wrench tighten all end cap bolts with the exception of the one that goes through the orientation plate. (Approximately 20ft. lbs.) **(Figure 4-15)**
16. Install locking arm assembly on eccentric plug shaft. Press the locking arm assembly back against the packing gland to expose groove for retaining ring. Reinstall O.D. snap ring to hold locking arm assembly on the eccentric plug shaft **(Figure 4-16)**. *Note: Using the operating wrench rotate the eccentric plug in the upstream direction to the open position to insure that the locking arm is properly orientated during installation.*

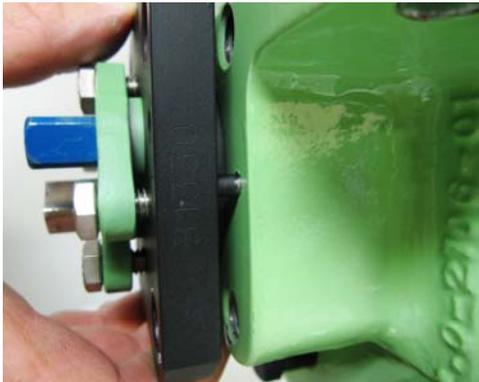


Figure 4-13



Figure 4-14



Figure 4-15



Figure 4-16

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

Step #5 ADJUSTMENT OF THE ORIENTATION PLATE

1. Rotate the eccentric plug to the closed position until the locking pin drops in the hole of the orientation plate. **(Figure 5-1)** *Note: It may be necessary to rotate the orientation plate to allow the pin to drop into the orientation plate.*
2. Continue to rotate the eccentric plug closed until compressive load is achieved on sealing element. *Note: Parallel relationship between the square of the eccentric plug and mating flanges of the upper and lower chamber bodies indicate nominal sealing position. (Figure 5-2) When viewed through the upper chamber the screws holding the Teflon sealing element retainer should be centered in the opening. (Figure 5-3)*
Safety Note: Never look into the upper chamber or place any part of the body over the upper chamber when the orifice fitting is in a pressurized state.
3. Once sealing position has been achieved, tighten the bolts holding the orientation plate using 7/16" box end wrench. Tighten remaining end cap bolt using 3/4" box end wrench. (Approximately 20ft. lbs.) **(Figure 5-4)**



Figure 5-1



Figure 5-2



Figure 5-3

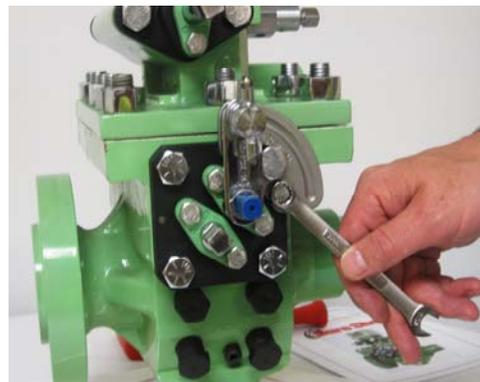


Figure 5-4

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

Step #6 REINSTALLATION OF ORIFICE PLATE CARRIER

1. Place TMC Co, Inc. supplied operating wrench on eccentric plug shaft, pull locking spring safety device from hole in orientation plate rotate eccentric plug to the open position. **(Figure 6-1)**
2. Place carrier in top of upper chamber, rotate upper chamber gear shaft in reverse direction to properly align gears with racks in the orifice plate carrier. Rotate the gear shaft in the opposite direction to lower carrier into upper chamber. **Note: Stop with the top of the carrier at the top of the upper chamber. Parallel relation between the top of the carrier and top of upper chamber indicate that the carrier is properly aligned. If parallel relationship does not exist between top of carrier operate gear shaft in reverse direction and repeat alignment procedure until parallelism is achieved.** Once orifice plate carrier is parallel with upper chamber continue to rotate upper chamber gear shaft until orifice plate carrier engages lower gear shaft. **(Figure 6-2)**
3. Move operating wrench to lower chamber gear shaft and continue to rotate until carrier reaches stopping point on 3 pin alignment points in lower chamber. **(Figure 6-3)**
4. Place operating wrench on eccentric plug shaft and rotate the eccentric plug to a closed position with the locking pin dropping into the hole in the orientation plate. Note: The closure of the eccentric plug indicates that the orifice plate carrier is resting properly on the 3 pin alignment feature in the lower chamber of the orifice fittings. **(Figure 6-4)**



Figure 6-1

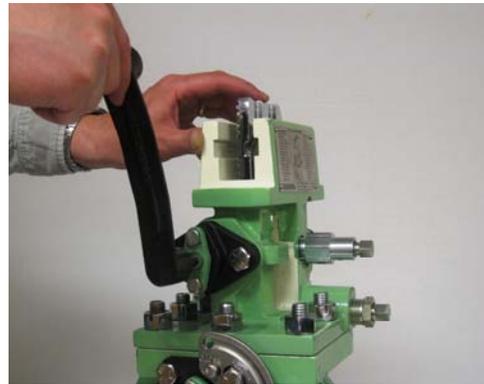


Figure 6-2

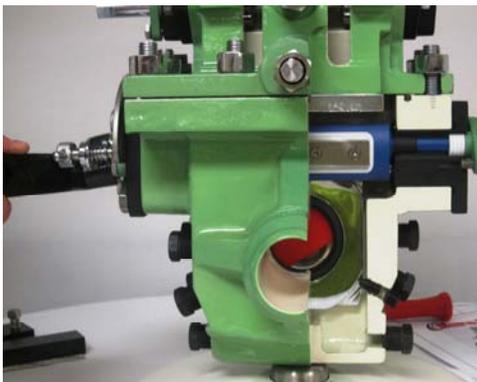


Figure 6-3



Figure 6-4

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

Step #7 PREPERATION FOR REPRESSUREIZATION

1. Place sealing bar gasket and sealing bar back on top of the upper chamber of the orifice fitting. **(Figure 7-1)**
2. Slide clamping bar back in “T slot” of the upper chamber. **(Figure 7-2)**
3. Tighten clamping bar screws using the TMC_o, Inc. supplied operating wrench. **(Figure 7-3)**
4. Close the bleed valve located on the upper chamber by rotating in a clockwise direction with the operating wrench. Close the equalizer valve by rotating in a clockwise direction using the operating wrench. **(Figure 7-4)**
5. Evenly tighten packing gland follower bolts. **(Figure 7-5)**

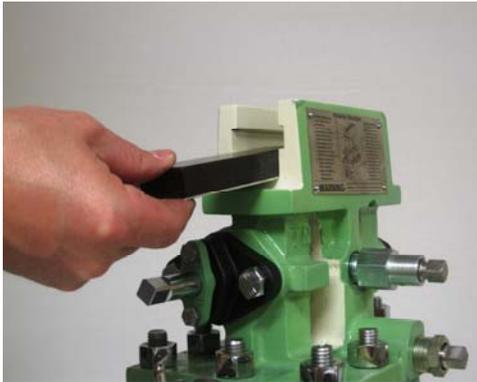


Figure 7-1



Figure 7-2



Figure 7-3



Figure 7-4

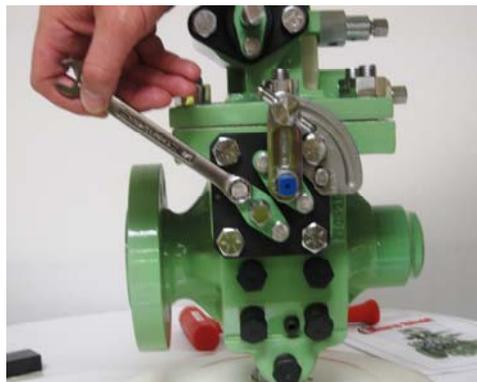


Figure 7-5

Title: Instruction for Dual Chamber Orifice Fitting Shaft Reversal

Step #8 RE-PRESSUREIZATION OF DUAL CHAMBER ORIFICE FITTING



SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

1. Follow your companies re-pressurizing procedure to return orifice fitting to service.
2. Should leakage occur around any of the shafts slightly and evenly tighten the gland follower bolts using 1/2” box end wrench. (Figure 7-5)

NOTE: Should questions or issues arise during the Sure Shot[®] Dual Chamber Orifice Fitting Shaft Reversal Procedure contact TMC_o, Inc. for assistance.

TMC_o, Inc.
Customer Service
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Commonly used replacement parts for this procedure

Description	Part #	Quantity per Unit
Upper Chamber O-ring	35222300	2
Lower Chamber O-ring	35222900	2
O.D. Snap Ring	34000090	1
PTFE Packing Rings	35000100	16

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