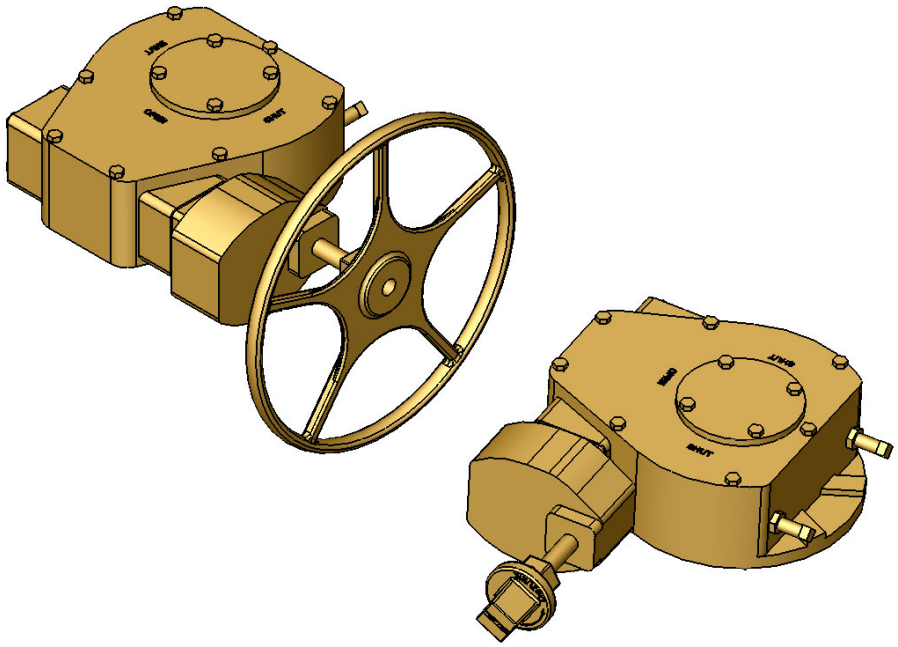
DeZURIK

APCO | WILLAMETTE

DeZURIK MG-SERIES MANUAL ACTUATOR

USED ON PEC ECCENTRIC PLUG VALVES



Instruction D10481

June 2011

Instructions

These instructions provide information about MG-Series Manual Actuators. They are for use by personnel who are responsible for installation, operation and maintenance of MG-Series Manual Actuators.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the word Caution, Warning or Danger. These messages indicate procedures that must be followed exactly to avoid equipment damage, personal injury or death. Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with the assumption of pipeline material within the valve.

Inspection

Your MG-Series Manual Actuator has been packaged to provide protection during shipment; however, it can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Order parts from your local DeZURIK sales representative, or directly from DeZURIK When ordering parts, please include the 7-digit part number and 4-digit revision number (example: **9999999R000**) located on the data plate attached to the valve assembly. Also include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

DeZURIK Service

DeZURIK service personnel are available to install, maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services.

For more information, contact your local DeZURIK sales representative or visit our website at www.dezurik.com.

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Description

The MG-Series Manual Actuator is a quarter-turn gear actuator. The actuator is available in three sizes, the MG-MJ50, the MG-ML60 and the MG-MP50 with a choice of handwheel, chainwheel, or 2" (50 mm) wrenching square. Each actuator has adjustable open and closed position stops, and may be mounted on the valve in any of four mounting positions, depending upon valve size.

Operation

Rotating the operator (handwheel, chainwheel or 2” wrenching square) clockwise closes the valve. Counterclockwise rotation of the operator opens the valve. To actuate the valve from full open to full closed (or vice-versa), the MG-MJ50 requires 62.5 revolutions, the MG-ML60 requires 180 revolutions and the Size MG-MP50 requires 450 revolutions of the operator.

Lubrication, Maintenance and Spare Parts

The MG-Series Manual Actuator has been lubricated at the factory and under normal operating conditions requires no routine lubrication or maintenance. If the actuator has excessive wear or has been damaged, it is recommended that the actuator be replaced.

Contact the factory for spare parts and assembly information. Please include the 7-digit part number and 4-digit revision number (example: **9999999R000**) located on the data plate attached to the valve assembly.

Actuator Eyebolts

The MG-Series Manual Actuator may be fitted with eyebolts.

WARNING!

Do not lift the valve and actuator assembly using the eyebolts on the actuator.

Eyebolts are to be used for lifting the actuator only.

Stop Adjustments

The open and closed position stops prevent the valve plug from rotating beyond the optimum open and shutoff positions.

If the actuator is factory-mounted on the valve, the stops are preset, and do not require further adjustment. If the actuator is not factory mounted on the valve, or if the actuator has been removed, the stops will require adjustment as described below; also refer to the Valve Instructions for specific closed-position requirements for the valve.

Valves can be mounted with Direct or Reverse pressure.

Direct Pressure - When the higher pressure is at the end opposite the seat. See Figure 1.

Reverse Pressure - When the higher pressure is at the seat end of the valve. See Figure 1

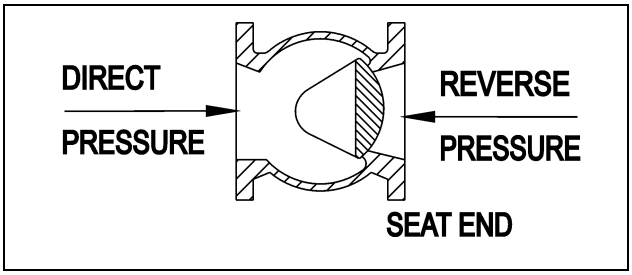


Figure 1 – Pressure Direction

Adjusting the Closed Position Stop

Refer to Figure 3 for stop identification.

WARNING!

Adjusting stops with flow in the pipeline can allow the valve to close causing personal injury and damaging the flow system.

Shut down the flow and relieve pipeline pressure before making stop adjustments.

1. Discontinue flow and relieve pipeline pressure.
2. Loosen the nut on the closed position screw, and back out the screw about two turns.
3. Turn the handwheel, chainwheel or 2” wrenching square operator until the specified actuator input torque from Table A is reached.
4. While maintaining the torque on the operator, turn the closed position screw clockwise until resistance is felt from the screw contacting the gear.
5. Prevent the screw from turning and tighten the nut against the housing.
6. Pipeline flow may now be restored.
7. Check for leakage and re-adjust closed position stop using steps 1 – 7 if required.

Adjusting Stops *(Continued)*

Adjusting Open Position Stop

Refer to Figure 3 for stop identification.

WARNING!

Adjusting stops with flow in the pipeline can allow the valve to close causing personal injury and damaging the flow system.

Shut down the flow and relieve pipeline pressure before making stop adjustments.

1. Discontinue flow and relieve pipeline pressure.
2. To visually determine when the valve is in the open position, remove actuator indicator.
3. Loosen the nut on the open position screw, and back out the screw about two turns.
4. Turn the handwheel, chainwheel or 2” wrenching square operator so the drive key or plug face indicator/plug alignment is parallel to the valve flanges.

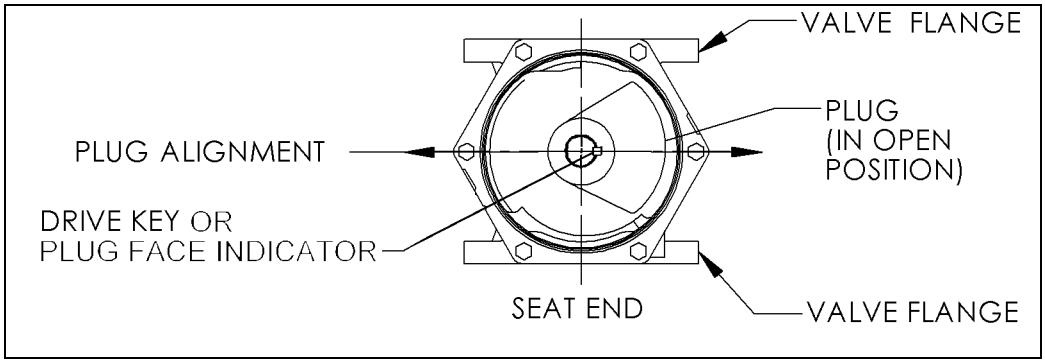


Figure 2 – Valve Open Position

5. Turn the open position screw clockwise until resistance is felt from the screw contacting the gear.
6. Prevent the screw from turning, and tighten the nut against housing.
7. Replace actuator indicator.
8. Pipeline flow may now be restored.

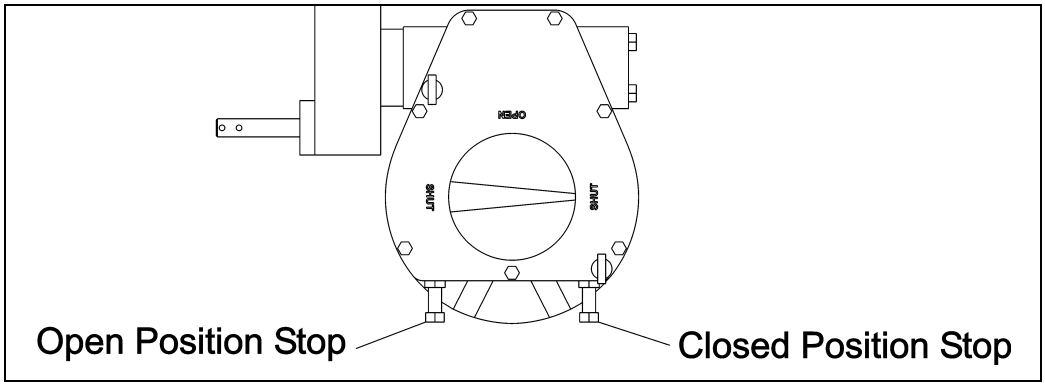


Figure 3 – Valve Open Position

Adjusting Stops *(Continued)*

Table A: Valve Closing Torques for Stop Adjustments

Valve Size	Actuator Size	Actuator Input Torque (ft-lbs)						
		Direct Pressure	Reverse Pressure Drop (psi)					
			25	50	75	100	125	150
24	MG-MJ50	31	39	51	65	77	90	103
30	MG-MJ50	33	42	56	70	92	111	N/A
30	MG-ML60	16	19	26	33	43	52	60
36	MG-ML60	37	46	65	83	101	N/A	
36	MG-MP50	15	19	26	34	41	49	56
36.5/42	MG-ML60	40	50	91	N/A			
36.5/42	MG-MP50	16	20	37	54	70	86	N/A
42.5 - 54	MG-ML60	67	84	N/A				
42.5 - 54	MG-MP50	27	34	62	89	N/A		

Removing Actuator

Refer to Figure 4 for component identification.

WARNING!

Flow in the pipeline with the actuator removed can slam the valve closed causing personal injury and damaging the flow system. Shut down the flow in the pipeline before removing the actuator from the valve.

1. Discontinue flow, relieve pipeline pressure and close valve.

WARNING!

When Eccentric Plug valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, there is a chance that gravity will cause the plug to swing to a lower position in the valve body when the actuator is removed.

To avoid this hazard, rotate the plug to the lowest position before removing the actuator.

2. Close the valve or rotate the plug to the lowest position in the valve body.
3. Remove the adaptor plate mounting screws (P2) and lockwashers (P3).
4. Remove the actuator/adaptor plate (P1) assembly from the valve.

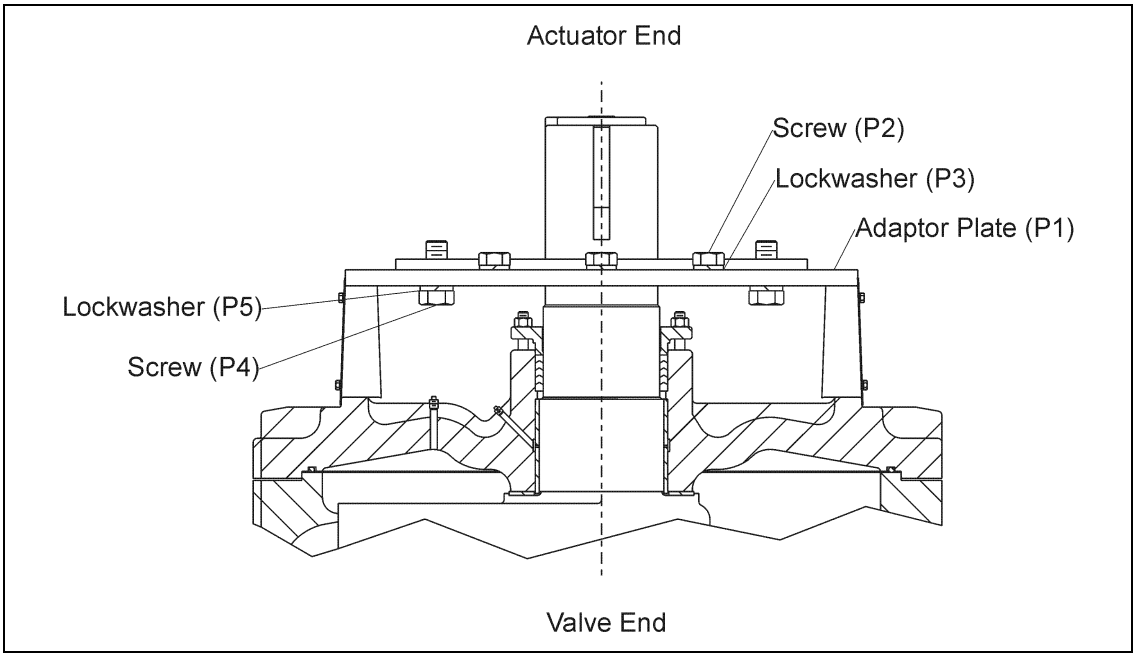


Figure 4 – Connecting Parts Identification

Installing Actuator

Refer to Figure 4 for component identification.

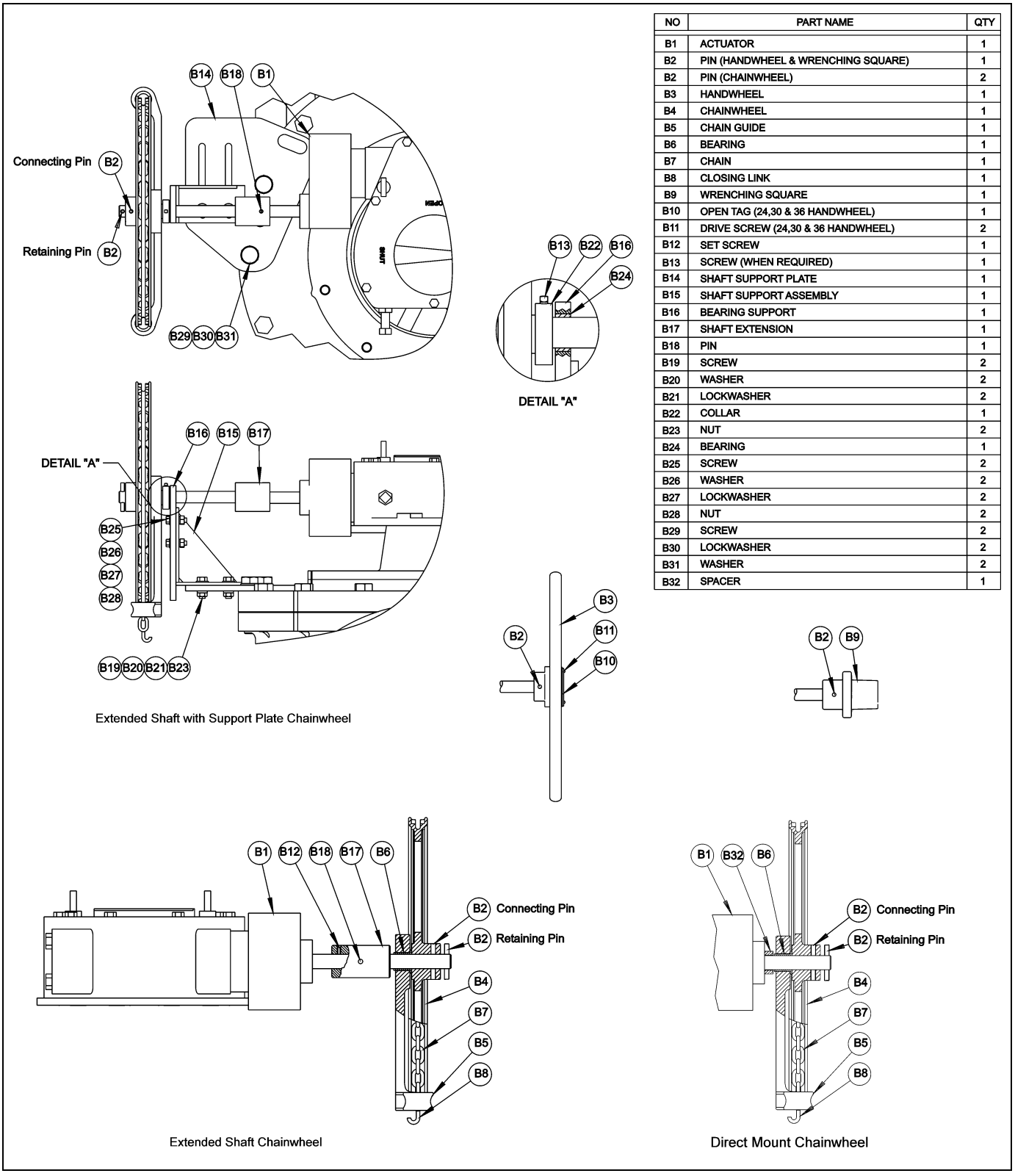
1. Place the valve in the position it was in when the actuator was removed. Normally this will be so the plug is in the lowest position in the valve body.
2. **Buried Service (MGB) actuators only:** Before reassembly, remove old sealant from all mating mounting surfaces. Apply a thin bead of silicone sealant DOW RTV-732 (1055515) to the adaptor (P1) and the actuator housing mounting surface.
3. Slide the actuator/adaptor plate assembly onto the plug stem making sure the key(s) are in the keyways.
4. Mount the adaptor plate (P1) to the valve bonnet with mounting screws (P2) and lockwashers (P3). Tighten screws.
5. Check the closed position stop setting and readjust if necessary as described in the STOP ADJUSTMENT Section of this Instruction.
6. Pipeline flow may now be restored.

Changing Actuator Mounting Position

In most valve/actuator combinations, the actuator can be mounted in 90º increments around the valve shaft. There are some valve/actuator combinations that do not allow the 90º and 270º mounting positions. Refer to the Installation drawing for available mounting positions.

To move the actuator mounting position in 90º increments from its present position, follow these steps.

1. Remove the actuator from the valve as described in the REMOVING ACTUATOR section of this Instruction.
2. Rotate the actuator to the desired position.
3. Install the actuator on the valve as described in the INSTALLING ACTUATOR section of this Instruction.



NO	PART NAME	QTY
B1	ACTUATOR	1
B2	PIN (HANDWHEEL & WRENCHING SQUARE)	1
B2	PIN (CHAINWHEEL)	2
B3	HANDWHEEL	1
B4	CHAINWHEEL	1
B5	CHAIN GUIDE	1
B6	BEARING	1
B7	CHAIN	1
B8	CLOSING LINK	1
B9	WRENCHING SQUARE	1
B10	OPEN TAG (24,30 & 36 HANDWHEEL)	1
B11	DRIVE SCREW (24,30 & 36 HANDWHEEL)	2
B12	SET SCREW	1
B13	SCREW (WHEN REQUIRED)	1
B14	SHAFT SUPPORT PLATE	1
B15	SHAFT SUPPORT ASSEMBLY	1
B16	BEARING SUPPORT	1
B17	SHAFT EXTENSION	1
B18	PIN	1
B19	SCREW	2
B20	WASHER	2
B21	LOCKWASHER	2
B22	COLLAR	1
B23	NUT	2
B24	BEARING	1
B25	SCREW	2
B26	WASHER	2
B27	LOCKWASHER	2
B28	NUT	2
B29	SCREW	2
B30	LOCKWASHER	2
B31	WASHER	2
B32	SPACER	1

Figure 5 – Operator Component Identification

Replacing Handwheel or Wrenching Square with Chainwheel

Refer to Figure 5 for component identification.

Direct Mount Chainwheels

1. Support the actuator shaft with a solid surface, drive out the handwheel or wrenching square pin (B2), and remove the handwheel (B3) or wrenching square (B9) from the actuator shaft.
2. Slide the spacer (B32) onto the actuator shaft.
3. Assemble the bearing (B6) and chain guide (B5) and slide the assembly onto the actuator shaft.
4. Slide the chainwheel (B4) onto the actuator shaft.
5. Align the second pin hole in the actuator shaft and the pin hole in the chainwheel hub. Support the hub of the chainwheel with a solid surface and connecting pin (B2) into position. See Figure 5 for location of connecting pin.

   WARNING!

   The connecting pin securing the chainwheel hub to the actuator shaft could potentially shear allowing the chainwheel to disengage from the actuator shaft and cause personal injury or equipment damage.

   A retaining pin at the end of the actuator shaft must be in-place to insure the chainwheel can not disengage from the actuator shaft.

6. Support the hub of the chainwheel with a solid surface and drive the retaining pin (B2) into the remaining pin hole at the end of the actuator shaft. See Figure 5 for location of retaining pin.
7. Feed the chain (B7) over the chainwheel (B4) and through both openings in the chain guide (B5).
8. Connect the ends of the chain (B7) with closing link (B8).

Extended Shaft Chainwheels

1. Support the actuator shaft with a solid surface, drive out the handwheel or wrenching square pin (B2), and remove the handwheel (B3) or wrenching square (B9) from the actuator shaft.
2. Place the shaft extension (B17) on the actuator shaft, and align the pin holes. Support the shaft extension on a solid surface, and drive the pin (B18) into position.
3. Turn the set screw (B12) into the threaded hole in the shaft extension (B17), and tighten the set screw to 7 ± 1 foot pounds (9 ± 1 Nm).
4. Assemble the bearing (B6), chain guide (B5) and the chainwheel (B4) onto the actuator shaft.
5. Align the connecting pin hole in the actuator shaft and the pin hole in the chainwheel hub. Support the hub of the chainwheel with a solid surface and drive the connecting pin (B2) into position. See Figure 5 for location of connecting pin.

   Note: The chainwheel hub pin hole may need to be drilled out to a 5/16” diameter hole before starting Step 5.

Replacing Handwheel or Wrenching Square with Chainwheel *(Continued)*

WARNING!

The connecting pin securing the chainwheel hub to the actuator shaft could potentially shear allowing the chainwheel to disengage from the actuator shaft and cause personal injury or equipment damage.

A retaining pin at the end of the actuator shaft must be in-place to insure the chainwheel can not disengage from the actuator shaft.

6. Support the hub of the chainwheel with a solid surface and drive the retaining pin (B2) into the remaining pin hole at the end of the actuator shaft. See Figure 5 for location of retaining pin.
7. Feed the chain (B7) over the chainwheel (B4) and through both openings in the chain guide (B5).
8. Connect the ends of the chain (B7) with closing link (B8).

Extended Shaft with Support Plate Chainwheels

1. Support the actuator shaft with a solid surface, drive out the handwheel or wrenching square pin (B2), and remove the handwheel (B3) or wrenching square (B9) from the actuator shaft.
2. Place the shaft extension (B17) on the actuator shaft, and align the pin holes. Support the shaft extension on a solid surface, and drive the pin (B18) into position.

   Note: The chainwheel hub pin hole may need to be drilled out to a 5/16” diameter hole before starting Step 2.

WARNING!

The valve is a pressure vessel. Pressure must be completely released before removing the bonnet screws.

3. Remove only the two bonnet screws directly below the actuator shaft.
4. Align the two thru holes or slots in the shaft support plate (B14) with the valve bonnet holes and hand tighten the washer (B31), lockwasher (B30) and screw (B29).
5. Place the shaft support assembly (B15) on the shaft support plate (B14) and hand tighten the washer (B20), lockwasher (B21), screw (B19) and nut (B23).
6. Slide the bearing support (B16) onto the shaft extension (B17) and against the shaft support assembly (B15). Hand tighten the washer (B26), lockwasher (B27), screw (B25) and nut (B28).
7. Slide the collar (B22) onto the shaft extension (B17) hand tighten the set screw (B13).
8. Assemble the bearing (B6), chain guide (B5) and the chainwheel (B4) onto the shaft extension (B17).
9. Align the second pin hole in the shaft extension (B17) and the pin hole in the chainwheel hub. Support the hub of the chainwheel with a solid surface and drive the connecting pin (B2) into position. See Figure 5 for location of connecting pin.

   Note: The chainwheel hub pin hole may need to be drilled out to a 5/16” diameter hole before starting Step 9.

Replacing Handwheel or Wrenching Square with Chainwheel *(Continued)*

WARNING!

The connecting pin securing the chainwheel hub to the actuator shaft could potentially shear allowing the chainwheel to disengage from the actuator shaft and cause personal injury or equipment damage.

A retaining pin at the end of the actuator shaft must be in-place to insure the chainwheel can not disengage from the actuator shaft.

10. Support the hub of the chainwheel with a solid surface and drive the retaining pin (B2) into the remaining pin hole at the end of the actuator shaft. See Figure 5 for location of retaining pin.
11. Slide the collar (B22) next to the chain guide (B5) leaving approximately a .12 [3.2mm] gap and tighten set screw (B13).
12. Make any required adjustments to the bearing support (B16), shaft support assembly (B15) and shaft support plate (B14) and tighten the screws (B29), (B19) and (B25).
13. Feed the chain (B7) over the chainwheel (B4) and through both openings in the chain guide (B5).
14. Connect the ends of the chain (B7) with closing link (B8).

Replacing Chainwheel with Handwheel or Wrenching Square

Refer to Figure 5 for component identification.

Direct Mount Chainwheels

1. Support the chainwheel hub with a solid surface and drive out the two pins (B2).
2. Remove the chainwheel (B4), chain guide (B5)/bearing (B6) assembly and spacer (B32) from the actuator shaft.
3. Slide the handwheel (B3) or wrenching square (B9) onto the actuator shaft. Align the pin hole in the handwheel or wrenching square with the second pin hole in the actuator shaft. Support the actuator shaft with a solid surface and drive the pin (B2) into position.

   Note: The handwheel hub pin hole may need to be drilled out to a 5/16” diameter hole before starting Step 3.

Extended Shaft Chainwheels

1. Loosen the set screw (B12).
2. Support the actuator shaft with a solid surface and drive out the pin (B18).
3. Remove the chainwheel assembly from the actuator shaft.
4. Slide the handwheel (B3) or wrenching square (B9) onto the actuator shaft. Align the pin hole in the handwheel or wrenching square with the second pin hole in the actuator shaft. Support the actuator shaft with a solid surface and drive the pin (B2) into position.

   Note: The handwheel hub pin hole may need to be drilled out to a 5/16” diameter hole before starting Step 4.

Replacing Chainwheel with Handwheel or Wrenching Square *(Continued)*

Extended Shaft with Support Plate Chainwheels

1. Support the actuator shaft with a solid surface and drive out the pin (B18).
2. Remove the screws (B29), washers (B30) and lockwashers (B31) from the shaft support plate (B14).
3. Remove the chainwheel and support assembly from the actuator shaft.
4. Replace the screws (B29), washers (B30) and lockwashers (B31) in the valve bonnet holes.

   Note: Shorter replacement screws (B29) are required for step 4. Contact the factory for the correct screw length.
5. Slide the handwheel (B3) or wrenching square (B9) onto the actuator shaft. Align the pin hole in the handwheel or wrenching square with the second pin hole in the actuator shaft. Support the actuator shaft with a solid surface and drive the pin (B2) into position.

   Note: The handwheel hub pin hole may need to be drilled out to a 5/16” diameter hole before starting Step 5.

Troubleshooting

Condition	Possible Cause	Corrective Action
Actuator closes to wrong position.	Closed position stop is set incorrectly.	Adjust closed position stop. See STOP ADJUSTMENTS section.
Actuator opens to wrong position.	Open position stop is set incorrectly.	Adjust open position stop. See STOP ADJUSTMENTS section.
Actuator will not fully operate valve.	Pipeline obstruction in valve is preventing closure.	Remove obstruction.
High operating torque.	Misalignment of adaptor.	Check valve-adaptor- actuator alignment and adjust.
	Misalignment of ENK extension.	Check valve-extension-actuator alignment and adjust.
	Bent actuator input shaft.	Replace actuator.