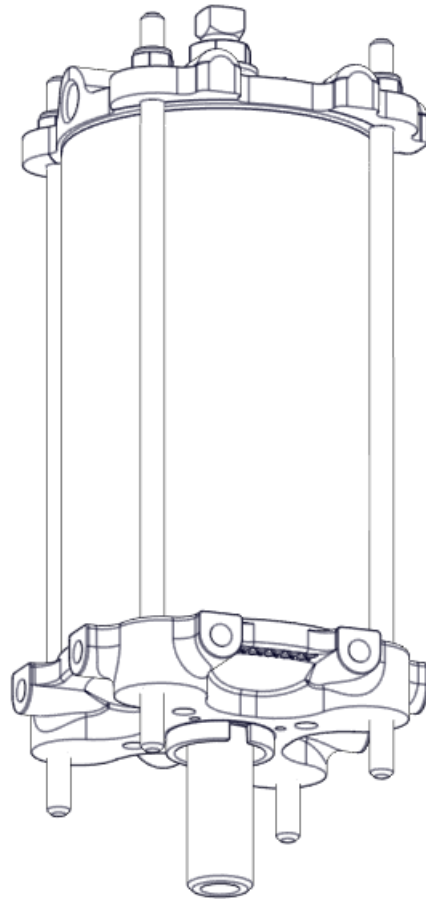




DeZURIK
CYLINDER ACTUATOR FOR KNIFE GATE VALVES



Instruction D11040
March 2020

DeZURIK

Cylinder Actuator for Knife Gate Valves

Instructions

These instructions are intended for personnel who are responsible for the installation, operation and maintenance of cylinder actuators.

Safety Messages

All safety messages in the instructions are flagged with the word Caution, Warning or Danger. These messages 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 if a label has been removed, please contact DeZURIK for replacement.



WARNING!

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

Inspection

Your cylinder actuator has been packaged to provide protection during shipment. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime.

Order parts from your 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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DeZURIK

Cylinder Actuator for Knife Gate Valves

Description

The cylinder used with DeZURIK gate valves is a pneumatic double-acting cylinder that has a recommended supply pressure between 60 and 100 psi. Cylinder pressure not to exceed 100 psi, cylinder can operate at less than 60 psi. Use proper cylinder sizing to determine operating pressure.



WARNING!

This cylinder is a pressure vessel. Pressure in the cylinders can cause personal injury or equipment damage. Release pressure from both ends of the cylinder before servicing.

Lubrication

The cylinder only requires lubrication when reassembling a unit that has been disassembled. When reassembling, lubricate the piston seal (C11), o-rings(C12), piston (C10) grooves and cylinder wall (C13) with Dow Corning No. 44 lubricant, or for cylinders that are for -40°C to -50°C (-40°F to -58°F) environments, lubricate with Dow Corning No. 55 lubricant.

Adjustments

Aligning the Cylinder - See Figure 2 for component identification

To work properly, the piston rod (C14) and gate must be aligned. The mounting holes in the cylinder and yoke are designed to allow for adjustment. Visually check the alignment with the valve in the open and close positions, and adjust as needed.

1. Align the piston rod (C14) and the gate with each other.
2. Check the piston rod (C14) and gate alignment in the valve open and closed positions.
3. Adjust the cylinder position if needed.

Note: Oversized mounting holes in the cylinder and yoke allow for adjustment.

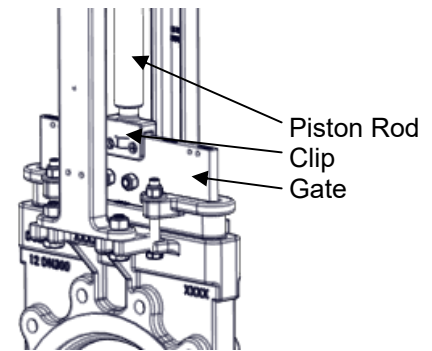


Figure 1: Connection to Valve

Cylinder Support

The unit may be mounted in any position around the pipeline, however it is best to mount the valve with the cylinder in a vertical position. If the valve is installed with the cylinder in a position other than vertical, the customer must provide additional support on size 8 inch and larger valves. This support can be mounted using the tapped holes in the cylinder head (C16), but do not mount the supports on the cylinder tube (C13). See the installation drawing for dimension location of cylinder support.

Cylinder Stroke Adjustment

The adjusting set screw (C21) in the cylinder acts as the cylinder stroke adjustment. Adjust this adjusting screw (C21) so that the actuator does not pull the gate off the seat ring when the valve is fully opened.

To adjust the closed position:

1. Close the valve.
2. Turn the clip into the piston rod (C14) until the cylinder has a minimum of 1/16" stroke remaining and tighten jam nut.
3. Open the valve and adjust the adjusting screw (C21) until the gate is clear of the flow port but fully on the seat ring. Tighten Jam nut (C22).

Drawing

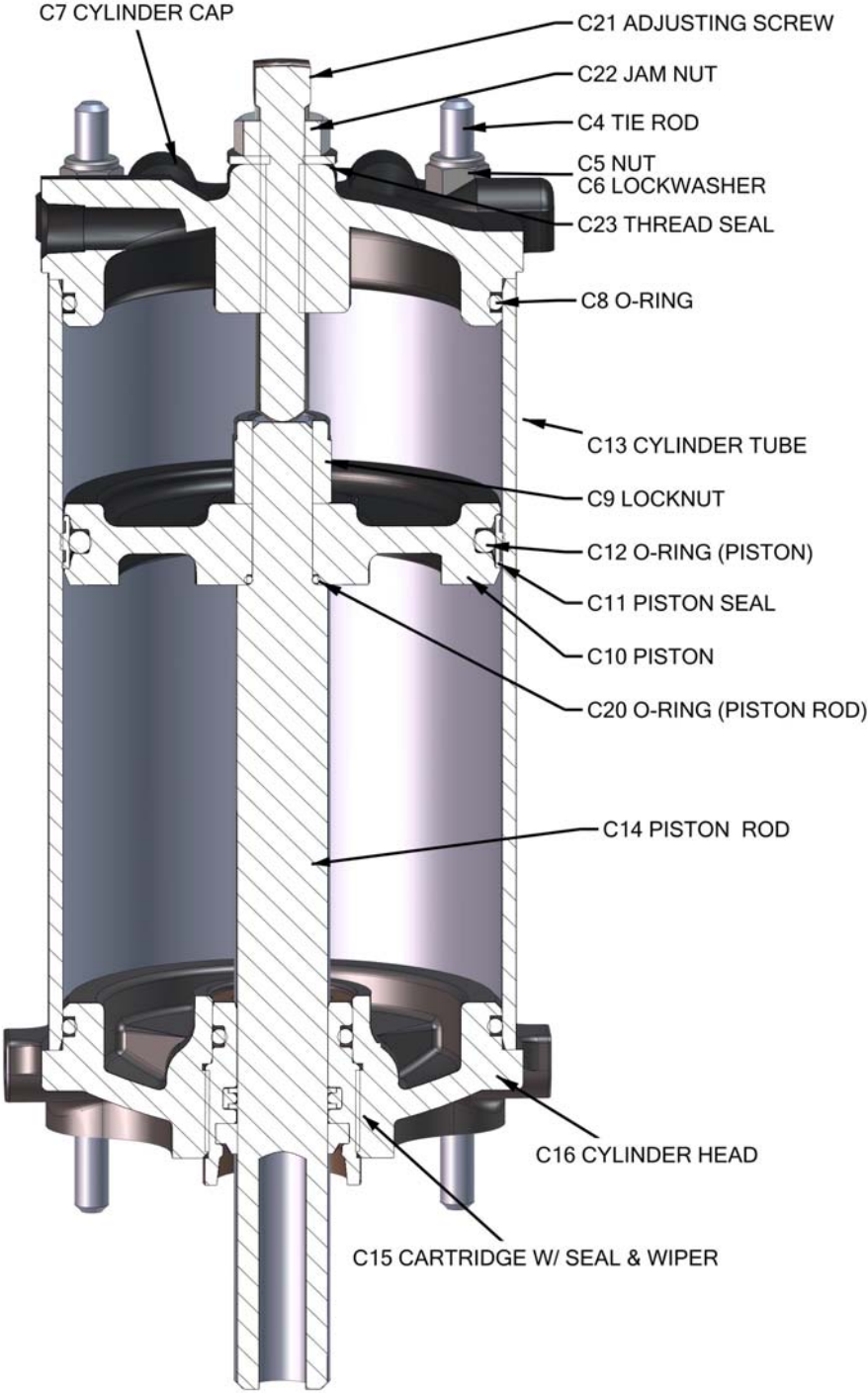


Figure 2: Component Identification

Cartridge Rebuild

To repair a cylinder actuator with the rod seal and wiper damaged by outside contaminants on the piston rod (C14) during the retracting stroke.



WARNING!

This cylinder is a pressure-containing vessel! Removing any parts while under pressure could cause personal injury or equipment damage. Release the pressure from both ends of the cylinder before attempting disassembly or repair.

See Figure 3. The rod seal (C15C) and wiper (C15B) are installed in the cartridge, along with an o-ring (C15D).

Disassembling the Cartridge

1. Shut off the air supply
2. Remove the cylinder cartridge (C15) by unscrewing it from the head (C16) with a spanner wrench.
3. Once cartridge is threaded free from the head, slide cartridge all the way down the piston rod and off.
4. Remove the wiper (C15B), rod seal (C15C) and o-ring (C15D) from the cartridge (C15A).

Reassembling the Cartridge

1. Clean the cartridge (C15A) grooves and lubricate with Dow Corning Number 44 lubricant, or Dow Corning Number 55 in cylinders for -40°C to -50°C service.
2. Insert the rod seal (C15C) into its groove, making sure it lies flat in the groove. Insert the PTFE backing rings as shown in Figure 3. NOTE: The backing rings are cut with a bevel; make sure the beveled ends of the rings ends meet but do not overlap.
3. Insert wiper (C15B) into its groove.
4. Place o-ring (C15D) into its outer groove.
5. Carefully slide assembled cartridge, in proper orientation, onto piston rod (C14) and screw cartridge into the cylinder head (C16).
6. Mount cylinder onto valve and perform cylinder stroke adjustment as needed.

Cartridge Assembly Replacement



WARNING!

This cylinder is a pressure-containing vessel! Removing any parts while under pressure could cause personal injury or equipment damage. Release the pressure from both ends of the cylinder before attempting disassembly or repair.

To replace the cylinder cartridge assembly shut off the air supply.

1. Remove the cylinder cartridge (C15) by unscrewing it from the head (C16) with a spanner wrench.
2. Once cartridge is threaded free from the head, slide cartridge all the way down the piston rod and off.
3. Replace it with a new cylinder cartridge (C15).

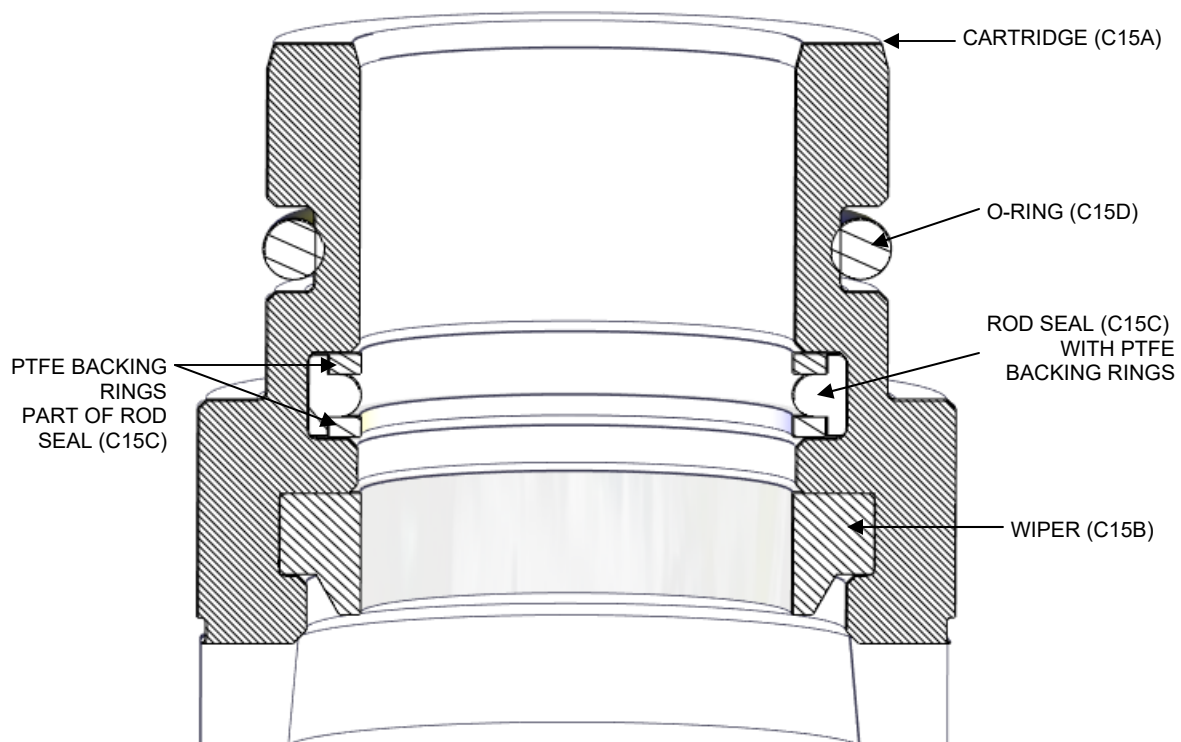


Figure 3: Cartridge Assembly (C15)

Disassembling the Cylinder



WARNING!

This cylinder is a pressure-containing vessel! Removing any parts while under pressure could cause personal injury or equipment damage. Release the pressure from both ends of the cylinder before attempting disassembly or repair.

1. Shut off the air/fluid supply to the cylinder and relieve pipeline and cylinder pressure.
2. Disconnect the air supply lines.

Note: When flexible tubing is used, only one swivel connector is used on each piece of tubing. The swivel connector is located on the end of the tubing attached to the cylinder port.

3. Remove the nuts (C5) and washers (C6) from the tie-rods (C4).
4. Remove the cylinder cap (C7) and remove the o-ring seal (C8) from the cylinder cap (C7).

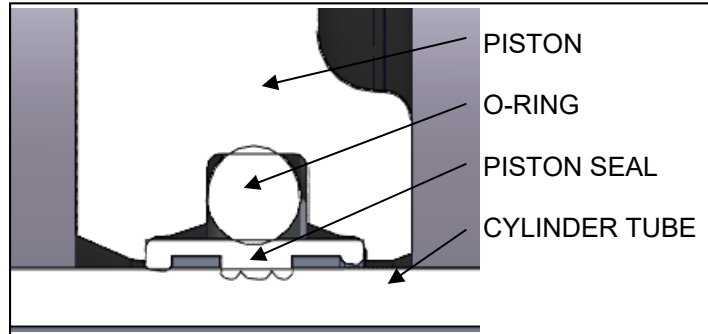


Figure 4—Piston Seal Detail

5. Remove the cylinder tube (C13), piston seal (C11) and o-ring (C12). Clean the parts and the grooves in the piston (C10). See Figure 4.

Note: Rotating the cylinder tube (C13) while pulling makes it easier to get it off the piston (C10).

6. Remove the piston rod (C14) assembly and remove the o-ring (C8) from the cylinder head (C16).

Note: Cylinders for - 40°C to - 50°C (-40°F to -58°F) service applications do not have a piston seal (C11). These cylinders have a larger o-ring (C12) in the piston (C10).

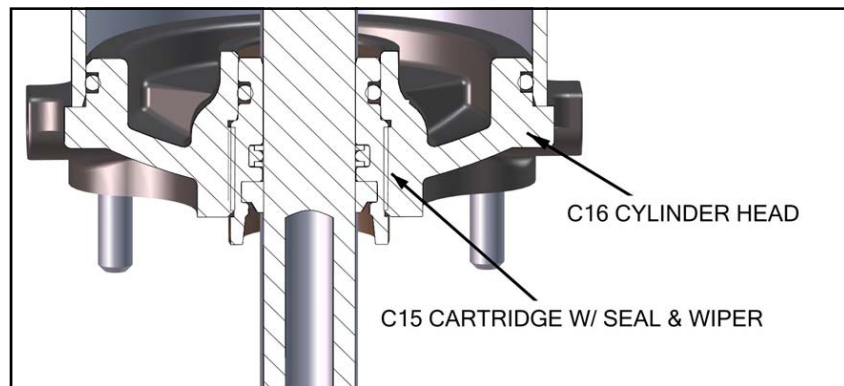


Figure 5—Rod Seal Detail

7. Remove cylinder seal cartridge assembly (C15). Use a spanner wrench to unscrew the cartridge assembly (C15) out of the cylinder head (C16). See Fig 5.
8. Clean all parts thoroughly. Replace damaged parts.

Reassembling the Cylinder

1. Clean bore of cylinder head (C16) and lubricate with Dow Corning Number 44 lubricant, or Dow Corning Number 55 on cylinders used in - 40°C to - 50°C (-40°F to -58°F) service.
2. Lubricate the o-ring (C8) and place it on the cylinder head (C16).

Reassembling the Cylinder continued

3. Clean and thread in cylinder cartridge assembly (C15) in to the cylinder head (C16).
4. Carefully install the piston rod (C14).
5. Lubricate the piston seal (C11), o-ring (C12) and cylinder groove with Dow Corning Number 44 lubricant and place the o-ring (C12) and seal (C11) on the piston (C10). For cylinders for - 40°C to -50°C (-40°F to -58°F) service applications, a piston seal (C11) is not used and Dow Corning No. 55 lubricant should be applied.
6. Carefully slide the cylinder tube (C13) over the piston (C10). The piston seal (C11) must be well lubricated. Start the cylinder tube (C13) at a 45° angle and rotate it into position onto the piston (C10). See Figure 6.
7. Lubricate the o-ring (C8) and place it on the cylinder cap (C7).
8. Place the cylinder cap (C7) on the cylinder tube (C13) and place the washers (C6) and nuts (C5) on the tie-rods (C4). Tighten the nuts (C5) to the torque listed in Table A.

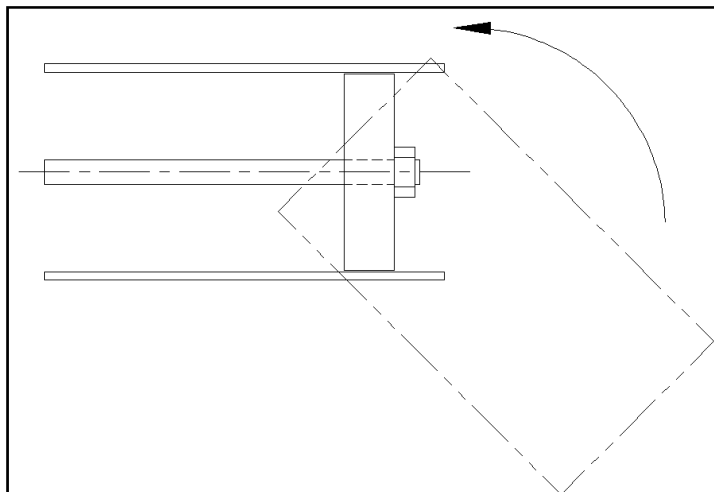


Figure 6—Assembling Cylinder

Table A: Tie-rod Nut Torques

| Cylinder Size | Torque | |
|---------------|----------|----|
| | Lbs. Ft. | Nm |
| C4 | 12 | 16 |
| C6-C8 | 16 | 22 |
| C10-C14 | 20 | 27 |

Troubleshooting

| | | | |
|---------------------------------|--|---|--|
| External Leakage | Cartridge leak | Worn or damaged piston rod or cartridge | Replace piston rod if surface is rough |
| | | | Replace piston rod and rebuild or replace cartridge if worn |
| | Cylinder tube seal leak | Loose tie rods | Tighten tie rod nuts to recommended torque as per bore size. See table A |
| | | | Excessive pressure |
| | | Damaged O-rings | Replace o-rings and retorque tie rods. See table A |
| Internal Leakage | Piston seal leakage | Piston seal wear | Replace seal o-ring as required |
| | | Cylinder drifts | Pressurize one side of the cylinder piston and disconnect air/fluid line at opposite port. If no leakage, find cause of cylinder drift in other component parts in the circuit |
| Cylinder Fails to Move the Load | Pressure is too low. | Check pressure at cylinder, make sure it is to circuit requirements | |
| | Piston seal leakage | Cycle cylinder by operating the valve, watch air/fluid flow at valve exhaust ports at end of cylinder stroke. | Replace piston seals if flow is excessive |
| | Cylinder is undersized for the load | Replace cylinder with one of a larger bore size | |
| | Piston rod broken | Contact DeZURIK | |
| Erratic or Chatter Operation | Load misalignment, excessive friction at cartridge or piston | Correct alignment of cylinder to load | |
| | Load requirements are too closely sized to cylinder | Install larger cylinder | |
| | Static and kinetic friction | Install speed control valves to provide back pressure for controlling stroke | |

Guarantee

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Sales and Service

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