



ITT

Industrial Process

Installation, Operation, and Maintenance Manual

C67 Bi-Directional Knife Gate Valve



Engineered for life

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Introduction and Safety

Safety message levels

Definitions

Safety message level	Indication
 <p>DANGER:</p>	A hazardous situation which, if not avoided, will result in death or serious injury
 <p>WARNING:</p>	A hazardous situation which, if not avoided, could result in death or serious injury
 <p>CAUTION:</p>	A hazardous situation which, if not avoided, could result in minor or moderate injury
 <p>Electrical Hazard:</p>	The possibility of electrical risks if instructions are not followed in a proper manner
NOTICE:	<ul style="list-style-type: none"> • A potential situation which, if not avoided, could result in an undesirable result or state • A practice not related to personal injury

User health and safety

General precautions

This product is designed and manufactured using good workmanship and materials, and meets all applicable industry standards. This product should be used only as recommended by an IIT engineer.



WARNING:

- Misapplication of the valve can result in injury or property damage. Select valves and valve components of the proper materials and make sure that they are consistent with your specific performance requirements. Incorrect application of this product includes but is not limited to:
 - Exceeding the pressure or temperature rating
 - Failing to maintain this product according to the recommendations
 - Using this product to contain or control media that is incompatible with the materials of construction
 - Proper containment or protection from hazardous media must be provided by the end user to protect employees and the environment from valve discharge.

Qualifications and training

The personnel responsible for the assembly, operation, inspection, and maintenance of the valve must be appropriately qualified. The operating company must do the following tasks:

- Define the responsibilities and competency of all personnel handling this equipment.
- Provide instruction and training.
- Ensure that the contents of the operating instructions have been fully understood by the personnel.

Instruction and training can be carried out by either ITT or the reseller of the valve by order of the operating company.

Non-compliance risks

Failure to comply with all safety precautions can result in the following conditions:

- Death or serious injury due to electrical, mechanical, and chemical influences
- Environmental damage due to the leakage of dangerous materials
- Product damage
- Property damage
- Loss of all claims for damages

Operational safety precautions

Be aware of these safety precautions when operating this product:

- Do not leave hot or cold components of the product unsecured against contact if they are a source of danger.
- Do not remove the contact guard for moving parts when the product is in operation. Never operate the product without the contact guard installed.
- Do not hang items from the product. Any accessories must be firmly or permanently attached.
- Do not use the product as a step or hand hold.
- Do not paint over the identification tag, warnings, notices, or other identification marks associated with the product.

Maintenance safety precautions

Be aware of these safety precautions when performing maintenance on this product:

- You must decontaminate the product if it has been exposed to harmful substances such as caustic chemicals.
- You must immediately fit or reactivate all safety and protective equipment upon completion of work.
- You must use the appropriate lock-out procedures to isolate the valve from all power sources before performing maintenance on externally actuated valves.

Use of unauthorized parts

Reconstruction or modification of the product is only permissible after consultation with ITT. Genuine spare parts and accessories authorized by ITT serve to maintain safety. Use of non-genuine ITT parts can annul liability of the manufacturer for the consequences. ITT parts are not to be used in conjunction with products not supplied by ITT as this improper use can annul all liability for the consequences.

Unacceptable modes of operation

The operational reliability of this product is only guaranteed when it is used as designated. The operating limits given on the identification tag and in the data sheet may not be exceeded under any circumstances. If the identification tag is missing or worn, contact ITT for specific instructions.

Transportation and Storage

Handling and unpacking guidelines



CAUTION:

Always observe the applicable standards and regulations regarding the prevention of accidents when handling the product.

Handling guidelines

Follow these guidelines when handling the product to prevent damage:

- Use care when handling the product.
- Leave protective caps and covers on the product until installation.

Unpacking guidelines

Follow these guidelines when unpacking the product:

1. Inspect the package for damaged or missing items upon delivery.
2. Note any damaged or missing items on the receipt and freight bill.
3. If anything is out of order, file a claim with the shipping company.

Lift the valve



WARNING:

Never tamper with the fasteners on the cylinder. Serious injury could result if the nuts on the cylinder tie rods are either tightened or loosened.



CAUTION:

- Personal injury or valve damage could occur if the valve is lifted by any part of the bevel gear assembly. The bevel gear assembly is not designed to support the weight of the valve.
- One person should not attempt to lift cylinder-operated valves larger than 6.00 in. (15.24 cm) or handwheel-operated valves larger than 12.00 in. (30.48 cm).
- Use lifting equipment rated for the weight of the valve assembly.
- Do not lift the valve by the handwheel.

1. Raise the valve into a vertical position.
To lift larger valves, loop a lifting strap around one of the yoke legs.
2. Prepare the valve for lifting:

If your valve is...	Then...
Handwheel-operated	Loop the lifting strap under the yoke. Take care that the lifting strap does not bind or tighten against any part of the handwheel. Refer to the Handwheel-operated valve figure below.
Bevel gear-operated	Loop the lifting strap(s) under the yoke. Refer to the Bevel gear-operated valve figure below.
Cylinder-operated	Attach two lifting eyes to the portion of the cylinder tie rods that extend above the top plate of the cylinder. Tie rod thread designations can be found in the Fabri-Valve GV Cylinder manual. Attach lifting hooks to the lifting eyes. Take care that all chains are free and not bound before you lift the valve. Refer to the Cylinder-operated valve figure below.

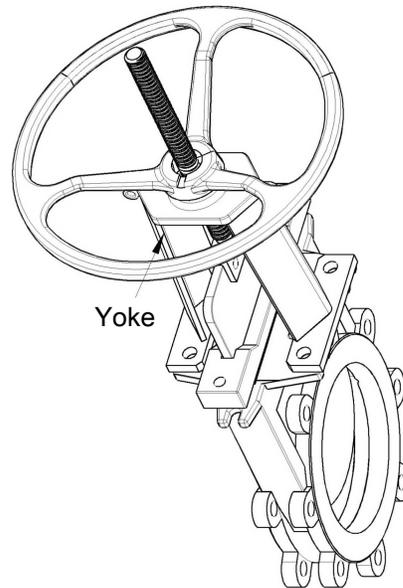


Figure 1: Handwheel-operated valve

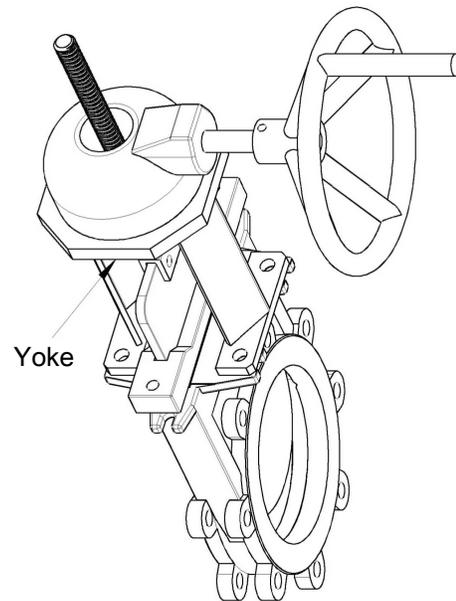


Figure 2: Bevel gear-operated valve

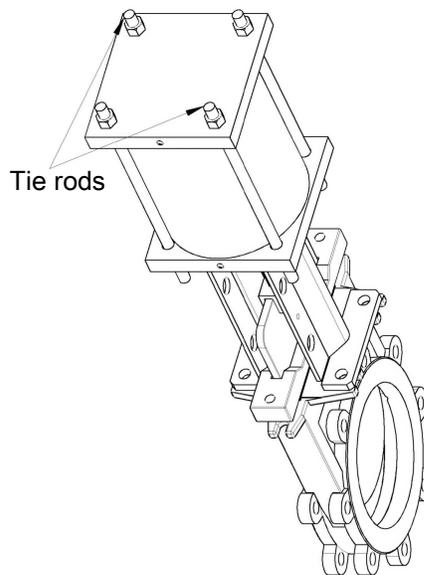


Figure 3: Cylinder-operated valve

3. Slowly take up the slack in the lifting straps to ensure that the straps are clear and not binding against the valve or valve top-works.



WARNING:

Do not adjust or remove the cylinder nuts. Cylinder failure may result from improperly tightened fasteners.

Storage, disposal, and return requirements

Storage

The package is designed to protect the valve only during shipping. If you are not installing the valve immediately after delivery, then you must store it according to these requirements.

This table describes requirements for short-term and long-term valve storage.

Table 1: Storage period

Storage period	Requirements
Less than 6 months	<ul style="list-style-type: none"> • Do not expose the valve to direct sunlight. • Do not expose the valve to weather conditions. • Do not expose the valve to temperature extremes. • Do not stack the valves on top of each other. • Make sure the gate is in the full-open position.
More than 6 months	<ul style="list-style-type: none"> • Store in accordance with the short-term action items. • Store in accordance with ITT's Long Term Storage Procedure. Contact ITT to obtain this procedure.

Disposal

Dispose of this product and associated components in compliance with federal, state, and local regulations.

Return

Ensure these requirements are met before you return a product to ITT:

- Contact ITT for specific instructions on how to return the product.
- Clean the valve of all hazardous material.
- Complete a Material Safety Data Sheet or Process Data Sheet for any process fluid that could remain on the valve.
- Obtain a Return Material Authorization from the factory.

Product Description

General Description

Design Overview

The valve features a unique, patented (U.S. Patent #5, 154,397), perimeter seal that provides bi-directional shutoff. Designed to overcome the problems experienced with existing perimeter seal designs, the relief greatly reduces seal compression set. The shape of the seal eliminates leakage due to seat rollover, eliminates seal pullout due to fluid velocity, and eliminates grooves that collect material and prevent the valve from properly closing.

Contact ITT to request a maintenance manual for another manufacturer's actuator, limit switch, positioner, controller, or other accessory.

Features

This valve has the following features:

- The seal is retained in the valve body by its trapezoidal shape.
- A relief has been cast into the valve body behind the seal.

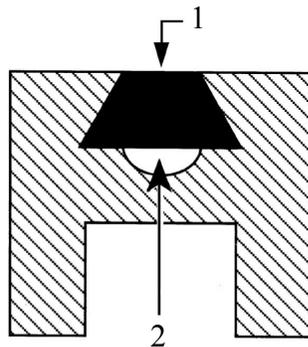


Figure 4: Valve open

1. Seat flush
2. Relief

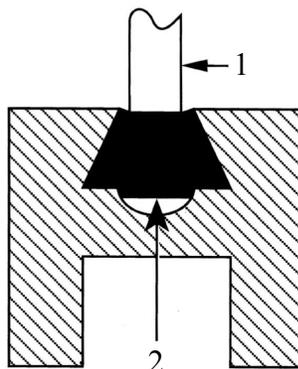


Figure 5: Valve closed

1. Gate
2. Seat pushed into relief

Installation

Preinstallation

Precautions



WARNING:

- Air cylinders, when provided, are sized for a specified input pressure. Excessive pressure could result in serious personal injury or may cause damage to the valve and cylinder. Air regulators and air filters are available from your ITT distributor.
- Always wear protective clothing and equipment to safeguard the eyes, face, hands, skin, and lungs from the particular fluid in the line.

NOTICE:

- Weld any flanges or pipelines before you install the valves. If this is impossible, protect the valve from excessive heat.
- Remove all weld slag, rods, debris, and tools from the pipeline before valves are installed or cycled.
- Always use studs in tapped holes to ensure full thread engagement of flange fasteners.
- Do not over-tighten a machine bolt that has bottomed out. Valve damage may result, preventing proper operation.
- Always use appropriate fasteners for the service, in compliance with applicable piping codes and standards.

Recommended fasteners

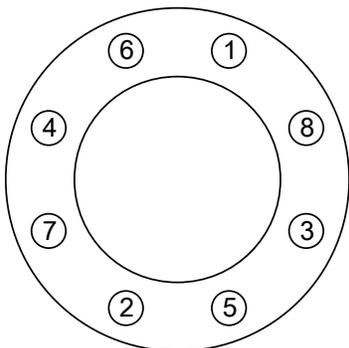
Mating flange gaskets are required.

Valve size (in.)	Valve size (DN)	Fastener diameter and thread	Total number of fasteners	Number of tapped holes in valve chest	Minimum stud length, in. (mm)
2	50	5/8 – 11 UNC	8	4	3.25 (82.5)
3	80	5/8 – 11 UNC	8	4	3.75 (95.3)
4	100	5/8 – 11 UNC	16	4	3.75 (95.3)
6	150	3/4 – 10 UNC	16	4	3.75 (95.3)
8	200	3/4 – 10 UNC	16	4	4.25 (108)
10	250	7/8 – 9 UNC	24	8	4.75 (120.7)
12	300	7/8 – 9 UNC	24	8	4.75 (120.7)
14	350	1–8 UNC	24	8	5.25 (133.4)
16	400	1–8 UNC	32	12	5.5 (140)
18	450	1 1/8 – 7 UNC	32	12	6 (152.4)
20	500	1 1/8 – 7 UNC	40	16	6.25 (158.8)
24	600	1 1/4 – 7 UNC	40	16	7 (177.8)
30	750	1 1/4 – 7 UNC	56	20	8 (203.2)
36	900	1 1/2 – 6 UNC	64	24	9 (228.6)

Install the valve

Determine the required torque necessary to tighten the fasteners by considering the type of gasket, line pressure, bolt material, and lubrication.

1. If you install a valve with an actuator in a horizontal position, then you may need to support the actuator. Consult ITT for technical advice.
2. Bolt the valve to the mating flange using the proper size fasteners.
See the Recommended fasteners table in this section.
ITT recommends you use studs to ensure the full thread engagement of tapped holes.
 - a) Lubricate stainless steel fasteners to prevent galling.
 - b) Adjust fastener length to adjust for mating flange thickness, gaskets, and support rings.
3. Tighten the flange bolts in an alternating sequence.
Torques are listed in the Recommended Fasteners table in [Preinstallation](#) (page 8)



4. Prepare the valve for hydrotesting:

If your valve is ...	Then ...
Handwheel-operated or Bevel gear-operated	Requires no further action
Air Cylinder-operated	Connect control air supply to the air cylinder (standard configured valve required pressure is 60–100 psi)
Hydraulic Cylinder-operated	Connect control hydraulic supply to the hydraulic cylinder (standard configured valve required pressure is 600–1000 psi)
Electric-operated	Connect electric supply according to manufacturers instructions

5. Hydrotest the system.
6. If the valve is leaking, then Adjust the packing.
For more information, see Adjust the packing in the Maintenance section.

Install the chest liner (if provided)

1. Remove the entire valve (including topworks) from the pipeline.
2. Secure the valve in the vertical position to a fixture, workbench, or table that is anchored to the floor.
Do not block valve port when anchoring valve. An overhead hoist is helpful especially on larger size valves.
3. Stroke the valve to the open position.
4. Remove the yoke, topworks, and packing gland from the valve:
 - a) Remove the yoke fasteners and gate clamp fasteners.
 - b) Lift off the yoke and topworks.
 - c) Remove gland fasteners and packing gland.
5. Lift out the gate, clean it, and smooth out any marred or rough surfaces with a scotch-brite pad.
The gate should be free of grooves and scratches.
6. Remove the old packing and clean the packing chamber.
7. Install the chest liners with the chest liner edge catching on the packing ledge in the body.
8. Insert the gate between the chest liners by pushing the gate as far down as possible by hand.
9. Reinstall the topworks.
Do not fasten the gate clamp to the gate.

10. Push the gate into the seat with the topworks.
11. Retract the actuator to the open position while leaving the gate in the closed position.
12. Repack the valve.
For more information, see Repack the stuffing box in this section.
13. Compress the seal.

If the valve is ...	Then ...
Handwheel actuated	<ol style="list-style-type: none"> 1. Reconnect the gate clamp back to the gate by using the gate clamp fasteners. 2. Adjust the stroke limiter to the correct seal compression at the bottom of the port.
Cylinder actuated	<ol style="list-style-type: none"> 1. Insert the gate clamp bolts through the gate clamp to secure the gate into place. 2. Close the valve and check the seal compression at the bottom of the port. 3. Adjust the seal compression by screwing the gate clamp in or out of the cylinder rod until the seal compression is correct. 4. Install the gate clamp nuts on the bolts and tighten.

Table 2: Gate clamp seal compression

Size Range (in)	Size Range (DN)	Seal Compression
2-4	50-100	1/16"
6-24	150-600	3/16"
30	750	1/8"
36	900	3/16"

Maintenance

Precautions



WARNING:

- All procedures must be performed by qualified personnel.
- When the process fluid is hazardous, thermal (hot or cold), or corrosive, take extra precautions. Employ the appropriate safety devices and be prepared to control a process media leak.
- Always wear protective clothing and equipment to safeguard the eyes, face, hands, skin, and lungs from the particular fluid in the line.



CAUTION:

- Disconnect electrical, pneumatic, and hydraulic power before servicing actuator or automation components.

NOTICE:

Make sure that travel limits are set for both open and closed positions on electrically operated valves.

Inspection

Inspection area	What to look for	Action if problem is found
External valve parts	Excessive wear or corrosion	<ul style="list-style-type: none"> • Replace the affected parts • Contact ITT to obtain replacement parts or for specific instructions

Lubrication requirements

Lubrication schedule

The stem and stem nut of the knife gate valve are lubricated at the factory before shipment.

Lubricate the stem and stem nut periodically to prevent wear and to minimize operating forces.

Acceptable lubricants

Brand	Lubricant type
Chevron	Industrial Grease-Medium
Fel-Pro	C5-A Compound
Moly	XL 47-F2-75
Texaco	Molytex Grease #2

Adjust the packing

The packing may require some adjusting after the line pressure is up to normal.

1. Stroke the valve a few times.
2. Tighten the packing gland bolts just enough to stop the leakage.

Over tightening the packing may cause undue pressure against the gate making the valve difficult to operate and causing packing wear.

Repack the stuffing box



CAUTION:

Do not repack the valve under pressure.

1. Disconnect the actuation by removing the stem assembly bolts.
2. Raise the stem.
3. Remove the packing gland nuts and the packing gland.
4. Remove the old packing and clean the packing chamber.

If the valve is ...	Then ...
< 6" without a chest liners	<ol style="list-style-type: none"> 1. Remove the old packing. 2. Clean the packing chamber.
< 6" with a chest liners	<ol style="list-style-type: none"> 1. Remove the old packing. 2. Remove and inspect the chest liner. 3. If the chest liner is damaged, then replace the chest liner. 4. If the chest liner is not damaged, then clean and reuse the chest liner.
≥ 6" with a packing support bar	<ol style="list-style-type: none"> 1. Remove the old packing. 2. Remove and inspect the packing support bar. 3. If the packing support bar is damaged, then replace the packing support bar. 4. If the packing support bar is not damaged, then clean and reuse the packing support bar. 5. Clean the packing chamber.
≥ 6" with a chest liner	<ol style="list-style-type: none"> 1. Remove the old packing. 2. Remove and inspect the chest liner. 3. If the chest liner is damaged, then replace the chest liner. 4. If the chest liner is not damaged, then clean and reuse the chest liner. 5. Clean the packing chamber.

5. Install the new packing:
 - a) Cut the packing to the packing length for the valve size, cutting the ends square.
See packing length in the Packing dimensions table
 - b) Wrap the ends of the packing with TFE tape to prevent fraying.
 - c) Install the packing in the stuffing box along each side of the gate.
6. Replace the packing gland and packing gland nuts:
 - a) Ensure that the gate is centered and against the valve body seat.
 - b) Replace the packing gland.

NOTICE:

Position the packing gland so it is centered on the gate, but not touching the gate. Improper installation may result in premature packing failure.

- c) Replace the packing gland nuts and tighten them so that the packing gland sets the packing.

NOTICE:

Do not tighten the packing gland nuts completely. Overtightening may result in premature packing failure.

7. Lower the stem and reconnect it to the gate.

8. Pressurize the valve to the working pressure and tighten the packing gland nuts evenly from side to side until the leakage stops.

Do not over tighten.

Packing dimensions

Valve size (in)	Valve size (DN)	Number of rows per side	Packing size (in)	Packing size (cm)	Packing length (in)	Packing length (cm)
2	50	3 ¹	1/4	.635	2 1/4	5.715
3	75	3 ¹	1/4	.635	3 1/4	8.255
4	100	3 ¹	1/4	.635	4 1/4	10.795
6	150	3	3/8	.953	6 5/8	16.828
8	200	3	3/8	.953	8 5/8	21.908
10	250	3	3/8	.953	10 5/8	26.988
12	300	3	3/8	.953	12 5/8	32.068
14	350	3	1/2	1.270	14	35.560
16	400	3	1/2	1.270	16	40.640
18	450	3	1/2	1.270	18	45.720
20	500	3	1/2	1.270	20	50.800
24	600	3	1/2	1.270	24	60.960
30	750	3	1/2	1.270	31	78.740
36	900	3	3/4	1.905	37	93.980

Replace the seal



CAUTION:

Always secure the valve to a fixture, workbench, or table that is anchored to the floor. An overhead hoist is helpful for large valves.

NOTICE:

Failure to properly adjust to the closed position may cause leakage, damage, or premature failure of the seal.

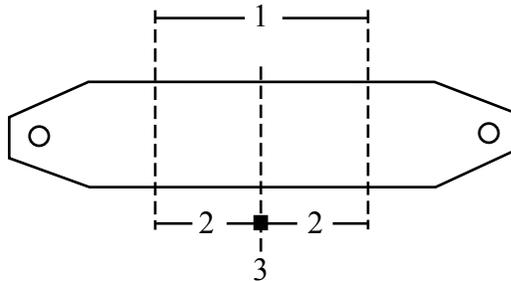
1. Remove the valve and topworks from the pipeline and secure it in the vertical position.
2. Open the valve fully.
3. Remove the yoke, topworks, and packing gland from the valve:
 - a) Remove the yoke fasteners and gate clamp fasteners.
 - b) Lift off the yoke and topworks.
 - c) Remove gland fasteners and packing gland.
4. Lift out the gate, clean it, and smooth out any marred or rough surfaces with a scotch-brite pad. The gate should be free of grooves and scratches.
5. If the valve has set screws that retain the seal from each face of the valve, then loosen the set screws.
6. Remove the seal:

This is best done by using lockable pliers that can be locked to the seal.

 - a) Using a pry bar, pry the seal from the body at the 6 o'clock position of the valve.

¹ If the valve has chest liners, subtract 1 row of packing per side

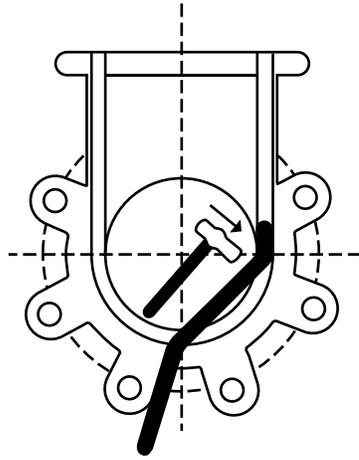
- b) Cut the seal at the 3 and 9 o'clock position.
 - c) Seize a portion of the seal at the top of the valve.
 - d) Connect a chain to one end under the pliers on the rubber.
 - e) Secure the other end of the chain to the hoist.
 - f) Pull the seal out the top of the valve.
7. Clean and inspect the body interior for any damage or abnormalities. Smooth out any sharp edges that may cut the seal.
 8. Mark the seal at the centerline and both ends of the length in body.



1. Length in body
2. From centerline to top of chest
3. Centerline

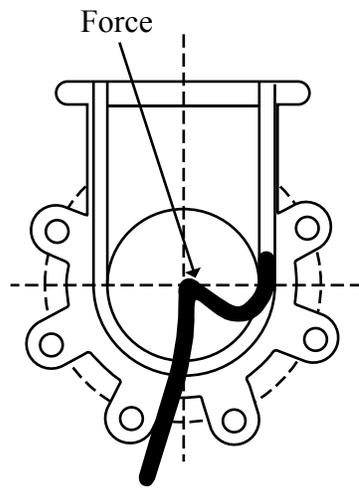
Valve size (in.)	Valve size (DN)	Length in body (in.)	Length in body (cm)	From centerline to top of chest (in.)	From centerline to top of chest (cm)
2	50	11.8	29.97	5.9	14.99
3	75	14.9	37.85	7.4	18.80
4	100	18.0	45.72	9.0	22.86
6	150	26.2	66.55	13.1	33.27
8	200	32.9	83.57	16.4	41.66
10	250	40.1	101.85	20.0	50.80
12	300	47.6	120.90	23.8	60.45
14	350	54.0	137.16	27.0	68.58
16	400	61.0	154.94	30.5	77.47
18	450	68.1	172.97	34.0	86.36
20	500	74.9	190.25	37.4	95.00
24	600	89.1	226.31	44.5	113.03
30	750	110.9	281.69	55.4	140.72
36	900	135.6	344.42	67.8	172.21

9. Replace the seal:
 - a) Saturate the body seal groove and both ends of the seal with liquid soap or any good water-soluble lubricant that will not harm the seal or process.
 - b) Starting inside the port at the 3 o'clock center line position, place one end of the seal into the seal groove with a rubber mallet.

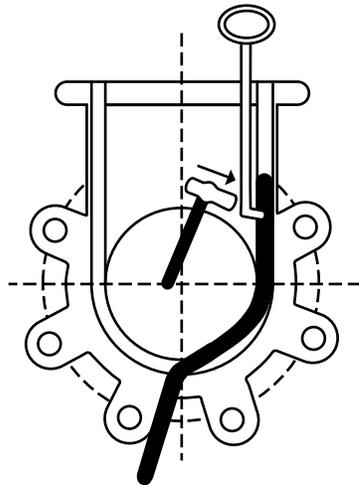


Indentations are cast inside the port for guidance.

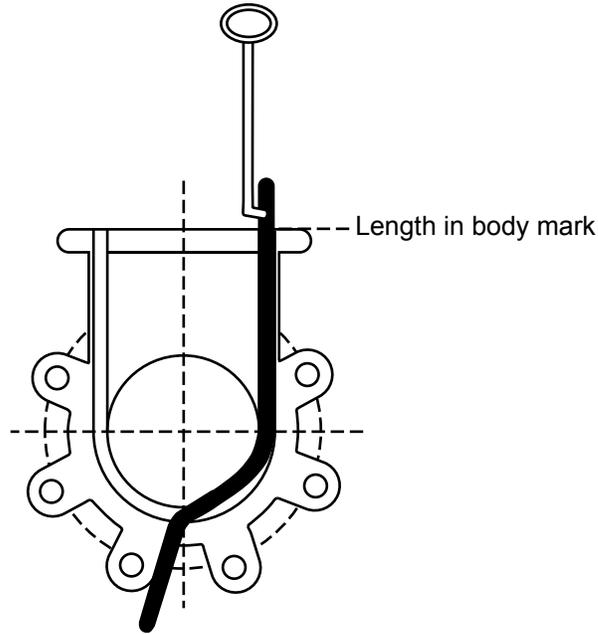
- c) Force the seal into the groove.



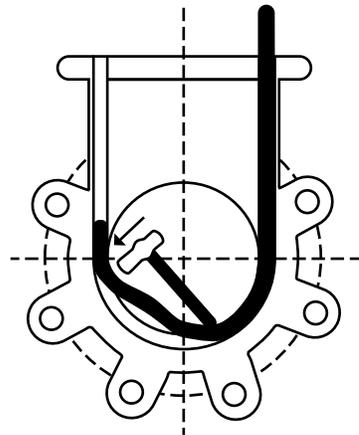
- d) Place a hooked rod down through the chest opening, grab the seal by the hole, and secure the hooked rod into the seal hole with a rubber mallet.



- e) Pull the seal up the groove inside the chest, applying constant pressure until the first mark on the seal is in line with the top of the chest.

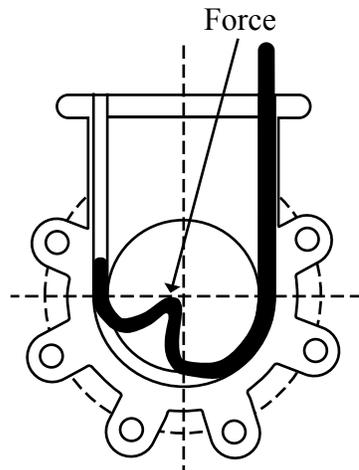


- f) Starting inside the port at the 9 o'clock center line position, place the other end of the seal into the seal groove with a rubber mallet.

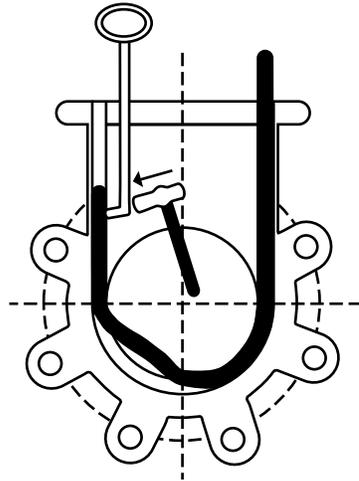


Indentations are cast inside the port for guidance.

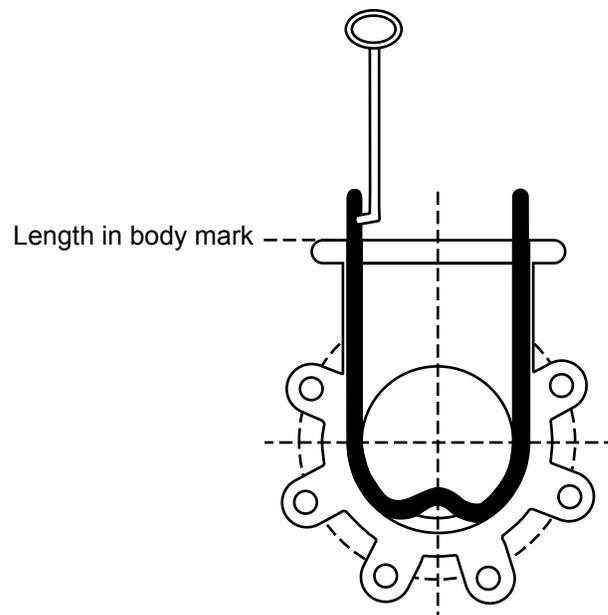
- g) Force the seal into the groove.



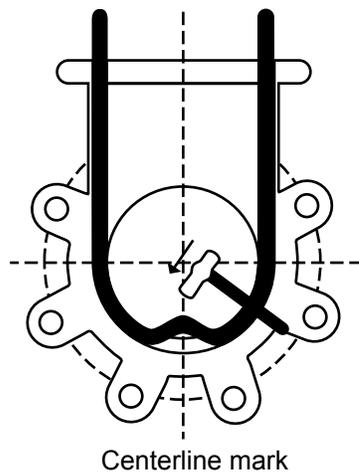
- h) Place a hooked rod down through the chest opening, grab the seal by the hole, and secure the hooked rod into the seal hole with a rubber mallet.



- i) Pull the seal up the groove inside the chest, applying constant pressure until the last mark on the seal is in line with the top of the chest.



- j) Work the seal into the bottom of the body with pliers and a rubber mallet.



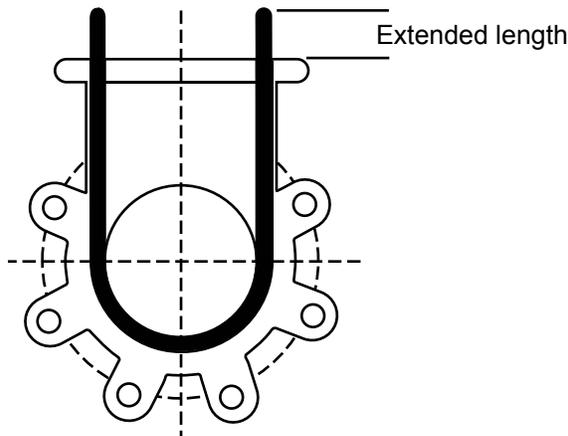
The centerline point marked on the seal should be at the center of the body.

10. Reinstall the gate without fastening the gate clamp to the gate.

- a) Lubricate the perimeter of the gate with DOW 111 silicone grease.
- b) Push the gate into the valve by hand.
- 11. Reinstall the topworks.
- 12. Push the gate into the seat with the topworks.
- 13. Stroke the gate into the seat, over stroking slightly to seat the seal into the bottom groove.

If the valve is ...	Then ...
Handwheel actuated	Loosen the stroke adjuster and turn the handwheel to close the valve
Cylinder actuated	Turning the gate clamp perpendicular to the gate

- 14. Cut each end of the seal off to the required extended length.



Valve size (in.)	Valve size (DN)	Extended length (in.)	Extended length (cm)
2	50	1.250	3.175
3	80	1.250	3.175
4	100	1.250	3.175
6	150	1.812	4.602
8	200	1.875	4.763
10	250	1.875	4.763
12	300	1.875	4.763
14	350	2.125	5.398
16	400	2.250	5.715
18	450	2.250	5.715
20	500	2.250	5.715
24	600	2.250	5.715
30	750	3.000	7.620
36	900	4.000	10.160

- 15. Leave the gate in the closed position and retract the actuator to the open position.
- 16. Repack the valve.
For more information, see Repack the stuffing box in this section.
- 17. Set the stroke.
For more information, see Set the stroke in this section.
- 18. If the valve has a set screws, then:
 - a) Apply Loctite 22MS threadlocker to the threads.
 - b) Install the set screws in the designated holes for each face.
 - c) Screw in the set screws until they make contact with the seat and then turn another 1/2 turn.
- 19. After the valve is installed and pressurized to operating pressure, adjust the packing for tight shutoff.

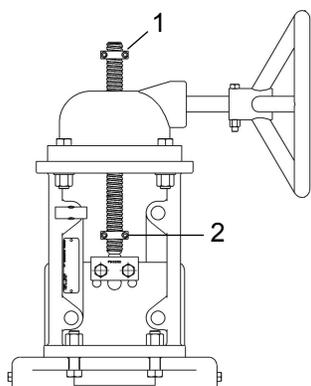
See Adjust the packing in this section.

Set the stroke

NOTICE:

- Do not over-compress the seal.
- Always adjust the closed position properly. Improper adjustment may cause leakage, damage, or premature failure of the seal.

1. Is the valve handwheel-actuated?
 - If no: Proceed to step 2.
 - If yes: No adjustment is necessary. The stroke is set at the factory.
2. Is the valve bevel gear-actuated?
 - If no: Proceed to step 3.
 - If yes: Follow the steps below:
 - a) Loosen the two bolts in the top stop nut (1).

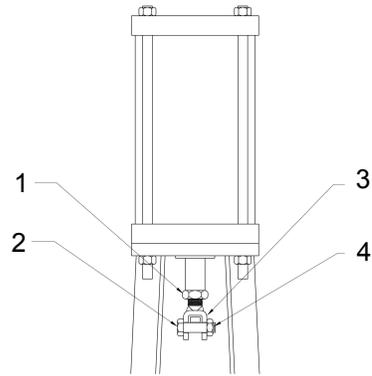


1. Top stop nut
2. Bottom stop nut

- b) Close the valve until a 0.005 in. (0.013 cm) shim or piece of paper can not move between the gate and the seal freely.
- c) Adjust the top stop nut until it stops against the bevel gear actuator.
- d) Open the valve until the top stop nut can be viewed above the bevel gear actuator.
- e) Move the stop nut up by the adjustment distance for the valve size.

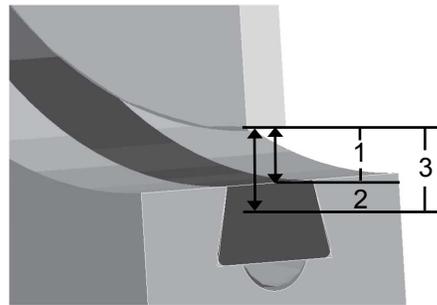
Valve size	Adjustment distance
2–4 in. (50–100 DN)	0.06 in. (1.5 mm)
6–36 in. (150–900 DN)	0.19 in. (4.8 mm)

- f) Tighten the two bolts in the top stop nut to lock it in place.
3. Is the valve cylinder-actuated?
 - If no: Consult the factory for instructions on other actuation.
 - If yes: Follow the steps below:
 - a) Loosen the gate clamp jam nut (1).



1. Jam nut
2. Gate clamp bolt
3. Gate clamp
4. Gate clamp nut

- b) Remove the gate clamp nuts (4) and bolts (2).
- c) Screw the gate clamp (3) fully into the cylinder rod.
- d) Reattach the gate to the gate clamp and close the valve.
- e) Measure the distance from the tip of the gate to the top of the seal at the bottom of the port.



1. Tip of the gate to the top of the seal
2. Adjustment distance
3. Gate clamp adjustment distance

- f) Add this measurement to the adjustment distance for the valve size listed in the table.

Valve size	Adjustment distance
2–4 in. (50–100 DN)	0.06 in. (1.5 mm)
6–36 in. (150–900 DN)	0.19 in. (4.8 mm)

This sum is the gate clamp adjustment distance.

- g) Remove the gate clamp nuts and bolts and raise the cylinder.
- h) Lower the gate clamp by unscrewing the gate clamp from the cylinder rod by the gate clamp adjustment distance calculated above.
- i) Reattach the gate and tighten the gate clamp nuts and bolts.
- j) Tighten the gate clamp jam nut against the cylinder rod.
- k) Close the valve.
- l) Visually inspect the seal.
 - If the gate tip is engaged in the seat, then follow the step below.
 - If the gate tip is not engaged in the seat, then repeat the steps above.
4. If the valve has a lockout pin, then follow the steps below:
 - a) Close the valve.
 - b) Check the lockout pin.

If the valve is ...	Then ...
2–4 in. (50–100 DN)	Does the lockout pin pass through the gate clamp?
6 in. (DN 150) and above	Does the lockout pin pass over the top of the gate?

- If yes: Procedure is complete.
- If no: Consult the factory.

Troubleshooting

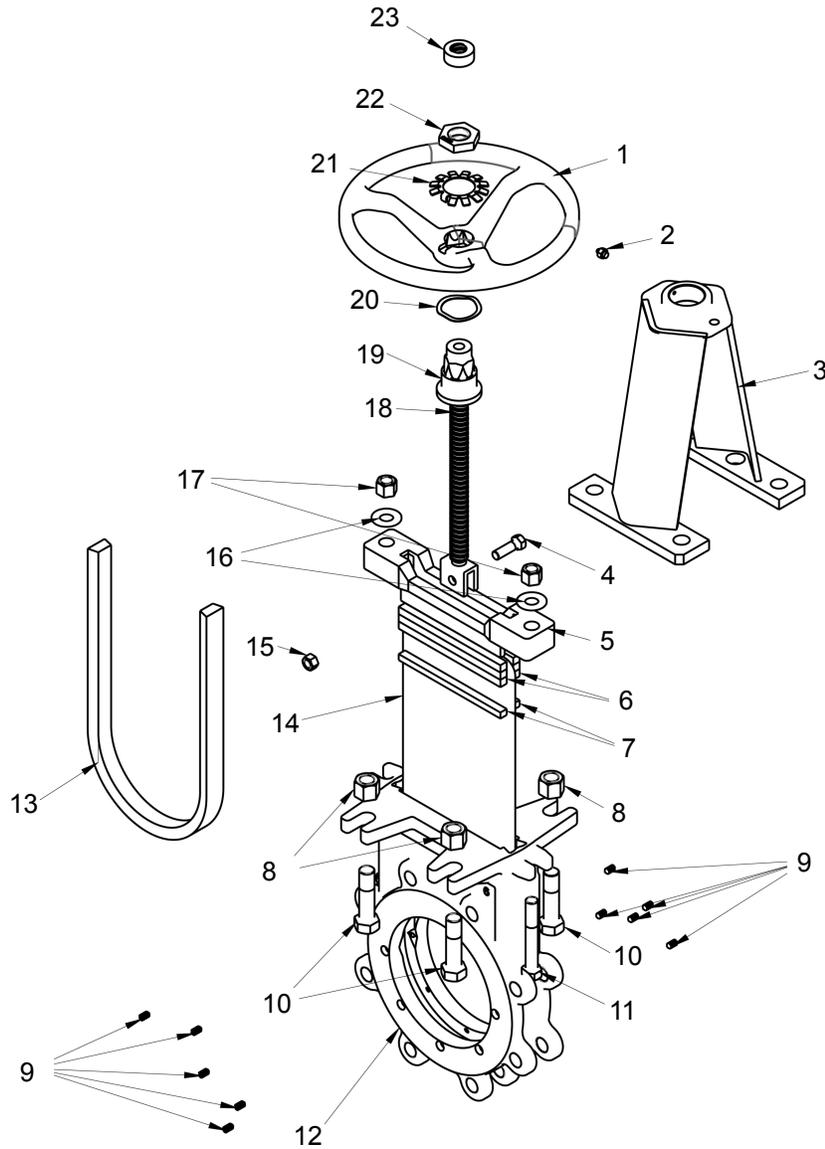
Knife gate valve operation troubleshooting

Symptom	Cause	Remedy
There is seepage past the packing upon installation.	<ul style="list-style-type: none"> • The valve may have been subject to wide temperature variations during shipment. • There is normal packing wear. 	Adjust the packing by tightening the packing screws.
The fully-closed valve is leaking past the seat.	The seat or gate is damaged.	Replace the seat or gate with a genuine ITT replacement.
The fully-closed valve is leaking past the seat.	The seal is not compressed correctly.	Set the stroke.
Excessive force is required to open and close the valve.	The valve is not lubricated properly.	See Lubrication requirements in the Maintenance section.
Excessive force is required to open and close the valve.	There is misalignment between stem and gate.	<ol style="list-style-type: none"> 1. Loosen the actuator and yoke. 2. Check the alignment. 3. Retighten the hardware.
Excessive force is required to open and close the valve.	The packing is too tight.	Consult the factory.

Parts Listings and Cross-Sectional Drawings

Drawing and parts list

Exploded view



Parts list

Item	Description	Material	
		S Series	R Series
1	Handwheel	Ductile iron	
2	Grease fitting	Mild steel plated	
3	Yoke assembly	Stainless steel	Carbon steel

Item	Description	Material	
		S Series	R Series
4	Stem assembly bolt	Stainless steel	Mild steel plated
5	Packing gland	Stainless steel or ductile iron	
6	Packing	PTFE/graphite, acrylic/PTFE	
7	Packing support bars	Brass, PTFE FDA or GR TFE	
8	Yoke nuts	Stainless steel	Mild steel plated
9	Seal retention screws	Stainless steel	
10	Yoke bolts	Stainless steel	Mild steel plated
11	Packing gland bolts	Stainless steel	Mild steel plated
12	Body	Stainless steel	Stainless steel or carbon steel
13	U-seal	EPDM or selection from catalog	
14	Gate	Stainless steel	
15	Stem assembly nut	Stainless steel	Mild steel plated
16	Packing gland washers	Stainless steel	Mild steel plated
17	Packing gland nuts	Stainless steel	Mild steel plated
18	Stem assembly	Stainless steel	Stainless steel/carbon steel
19	Stem nut	Brass	
20	Wave spring	Stainless steel	
21	Retaining washer	Stainless steel	
22	Retaining nut	Stainless steel	Plated steel
23	Stop nut	Stainless steel	Carbon steel



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