PRATT®

a MUELLER brand

INSTALLATION/MAINTENANCE MANUAL

Pratt Figure 53 Knife Gate Valve

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⚠ WARNING:

1. Read and follow instructions carefully. Proper training and periodic review regarding the use of this equipment is essential to prevent possible serious injury and/or property damage. The instructions contained herein were developed for using this equipment on fittings of Mueller manufacturer only, and may not be applicable for any other use.

2. Do not exceed the pressure ratings of any components or equipment. Exceeding the rated pressure may result in serious injury and/or property damage.

3. Safety goggles and other appropriate protective gear should be used. Failure to do so could result in serious injury.

MUELLER

FIGURE 53 KNIFE GATE VALVE

FUNCTIONAL DESCRIPTION

The Pratt Figure 53 is a bonnetless Knife Gate Valve available in 2”-24” sizes, with a pressure rating of 150 PSI CWP. The body is wafer style with MSS SP-81 face-to-face and ANSI B16.5, Class 150 flange bolting.

The valve has a replaceable natural rubber or optional Neoprene or EPDM seat that provides bi-directional bubble tight shutoff.

Multiple rows of packing are utilized to seal between the gate and body.

Manually actuated Pratt Figure 53 valves are handwheel operated for all sizes with optional bevel gear , pneumatic cylinder operator, hydraulic cylinder operator, and electric motor operators available.

The Pratt Figure 53 is designed, manufactured, and tested to MSS SP-81 standard.

SAFETY MESSAGES

All safety messages in the instructions are flagged with an exclamation symbol and the word “Warning”. These messages indicate procedures that must be followed exactly to avoid equipment damage, physical injury, or death. Safety labels on the product indicate hazards that can cause equipment damage, physical injury, or death.

⚠ 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.

⚠ WARNING:
Read all applicable directions and instructions prior to any maintenance, troubleshooting or installation.

PARTS

Pratt products are designed for long life. The stocking of spare parts is not recommended or required for normal operations. If the need for a replacement part develops, it may be ordered from our After Market / Parts Group.

Please Note: Published part numbers and price lists are not available.

If a need arises, you can contact your Pratt representative or Pratt's After Market / Parts Group directly:

E-Mail: aftermarket@muellerwp.com
Call: (877) 436-7977

Please include valve serial number (if applicable) and description of part requested.

SERVICE

To obtain further information or secure field service, contact your Pratt representative.

Please include the following with your inquiry for service:

- Henry Pratt Order Number
- Henry Pratt Item Number
- Type of Service Requested

FIGURE 53 KNIFE GATE VALVE

SHIPPING

The valve will be in closed position during shipment. Small valves sizes 2”- 6” may be shipped in individual boxes. Larger valves and large quantities will be shipped on pallets or skids all of which will require a forklift for unloading and moving.

UNLOADING & HANDLING

Inspect valves on receipt for damage in shipment and conformance with quantity and description. Carefully unload all valves to the ground without dropping, using a fork truck where applicable. Do not lift valves with slings or chain around operating shaft, actuator, or through port.

Contact your Pratt representative for valve specific lifting points.

STORAGE

MANUALLY OPERATED: Valves should be stored in a clean, dry environment such as a warehouse. If outdoor storage cannot be avoided, cover the valve to protect it from sources of heat or direct sunlight. Provide good ventilation to avoid moisture. Valves can be stored vertically or horizontally with the gate in full-open position. Do not stack valves on top of one another.

CYLINDER OPERATED: Valves should be stored in a clean, dry environment such as a warehouse. If outdoor storage cannot be avoided, cover the valve to protect it from sources of heat or direct sunlight. Provide good ventilation to avoid moisture. Do not stack valves on top of one another.

ELECTRIC MOTOR OPERATED: Valves should be stored in a clean, dry environment such as a warehouse, free from excessive vibration and rapid temperature changes. The recommended storage position is with the valve stem and motor shaft in the horizontal position and the actuator limit switch compartment cover vertically up. The gate should be in full-open position. Do not stack valves on top of one another.

Pratt does not recommend long-term outdoor storage.

PRE-INSTALLATION INSPECTION

Prior to installation, inspect the valve body and components for any damage that may have occurred during shipping or storage. Ensure the internal cavities within the valve body are clean. Inspect the pipeline and mating flanges to ensure the pipe is free of foreign material and that the flanges are clean.

⚠ WARNING:
To avoid personal injury or damage to property from the release of process fluid:

- **Those in charge of handling and maintenance of the valve must be qualified and trained in valve operations.**
- **Use appropriate personal protection equipment (gloves, safety shoes, etc).**
- **Shut off all operating lines to the valve and place a warning sign.**
- **Isolate the valve completely from the process.**
- **Release process pressure.**
- **Drain the process fluid from the valve.**

INSTALLATION

The Pratt Figure 53 Knife Gate Valve is bi-directional, so it is not necessary to determine an upstream or downstream side of the valve as it can be installed either way in the pipeline. The 2” through 16” valves are wafer style so they cannot be used at the end of a pipeline without a downstream flange supporting the downstream side of the valve with all bolts or studs installed. Except for the 2” and 3” sizes, all other sizes require some of the flange bolts or studs to be long enough to pass through both the inlet and outlet mating flanges, the valve, and the flange nuts. Bolts must be installed in all flange hole positions.

INSTALLATION (CONT)

Install the valve to the mating pipe flange using proper size bolts. See chart below for bolt size. Bolt length is not included for all sizes on since different flanges will require different bolt lengths. Contact your Pratt representative for further information.

⚠ **Note that some bolts are through bolts (flange to flange similar to wafer style valves). It is important to choose the proper length of bolt for the bolt holes in the valve's chest. These holes are bottom drilled and tapped and, in some cases, contain less than a bolt diameter of threads. Be careful not to bottom out bolts in the chest during installation. If necessary, use washers to shorten the penetration of the bolt into the chest holes.**

The chart below also provides the recommended bolt torques to be used during installation, however, depending on the type of gaskets being used the required torques may be higher or lower. Use the cross-torque pattern method for tightening the bolts. Mating flanges must be parallel and true with each other and the valve.

⚠ **Do not use the valve to pull together or force apart the two mating pipes.**

VALVE SIZE (IN)	BOLT SIZE (IN)	# OF FLANGE BOLTS	# OF THROUGH BOLTS	BLIND DEPTH (# OF PLACES)	RECOMMENDED TORQUE*(FT-LBS)
2"-3"	5/8-11	4	0	.472" / 12mm (2)	55 +/- 5
4"	5/8-11	8	4	.472" / 12mm (2)	65 +/- 5
6"	3/4-10	8	4	.512" / 13mm (2)	65 +/- 5
8"	3/4-10	8	4	.591" / 15mm (2)	65 +/- 5
10"	7/8-9	12	4	.709" / 18mm (4)	110 +/- 10
12"	7/8-9	12	4	.709" / 18mm (4)	110 +/- 10
14"	1-8	12	4	*CONSULT FACTORY*	135 +/- 10
16"	1-8	16	4	*CONSULT FACTORY*	135 +/- 10
18"	1-1/8-7	16	6	*CONSULT FACTORY*	150 +/- 10
20"	1-1/8-7	20	6	*CONSULT FACTORY*	150 +/- 10
24"	1-1/4-7	20	6	*CONSULT FACTORY*	150 +/- 10

FIGURE 53 KNIFE GATE VALVE

START-UP

After installation, open and close the valve at least once to assure smooth operation.

POST-INSTALLATION ADJUSTMENTS

The packing gland may require adjustment after installation, especially if the valve has been in storage for a long time. This includes assuring packing gland is properly aligned and tightening the packing gland just enough to stop any leaks that may occur.

MAINTENANCE

a. It is recommended that the packing be adjusted as needed. However, based on service and operating conditions, it may be necessary to adjust the packing more or less often.

b. It is recommended that the resilient valve seat be replaced every 10 to 15 years. However, based on service and operating conditions, it may be necessary to replace the seat more or less often.

LUBRICATION

It is recommended to use Mobilgrease GC40 or equal*

a. It is recommended to lubricate the stem and stem nut every three (3) months.

b. It is recommended to lubricate the gear operator once per year.

TROUBLE SHOOTING

LEAKING FROM STEM PACKING

a. Tighten the packing gland bolts/nuts evenly and slowly. Usually, only 1/8 to ¼ turn on the bolts/nuts will stop the leakage. Only tighten bolts/nuts enough to stop the leak.

SEAT LEAKAGE

a. The gate may not be completely closed due to an obstruction between the gate and the seat. Open the gate to ¼ open and then close to fully closed position. Check for seat leakage.

VALVE IS DIFFICULT TO OPERATE

a. Lubricate stem and stem nut. Check for improvement.
b. Loosen packing gland bolts a small amount (not enough to cause a leak around the gate packing). Check for improvement.
c. If the problem persists consult the factory.

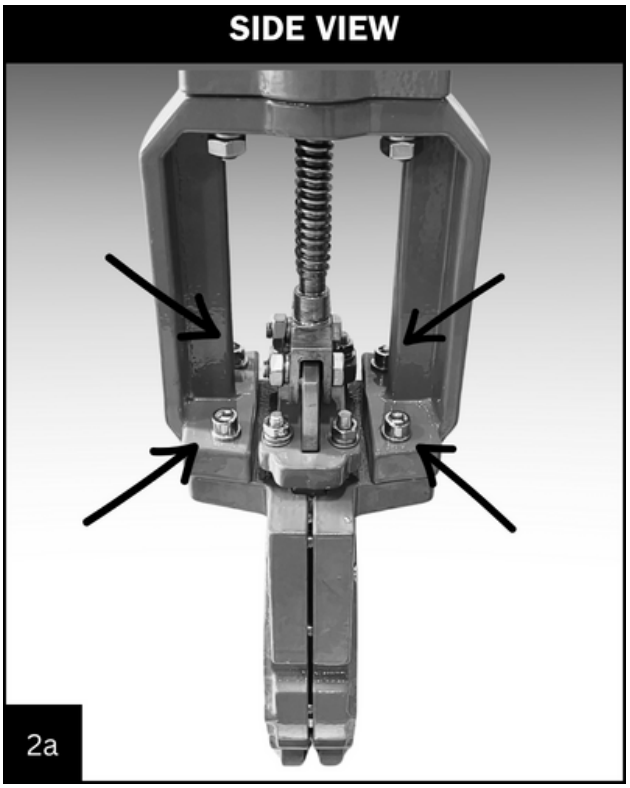
SEAT REPLACEMENT - *DISASSEMBLY*

Disassembly:

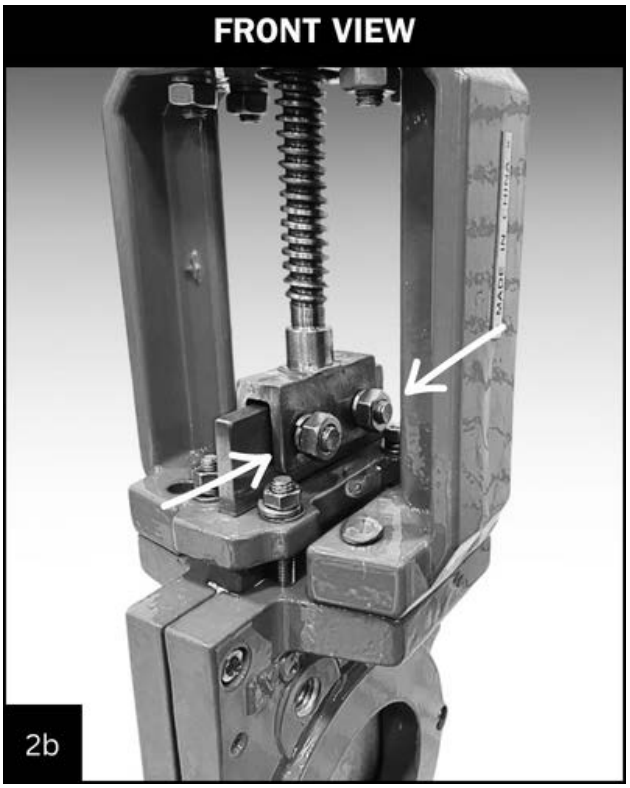
1. Remove valve from installation.

2. Remove yoke & operator assembly:

2a. Remove the 4 - yoke to body bolts.

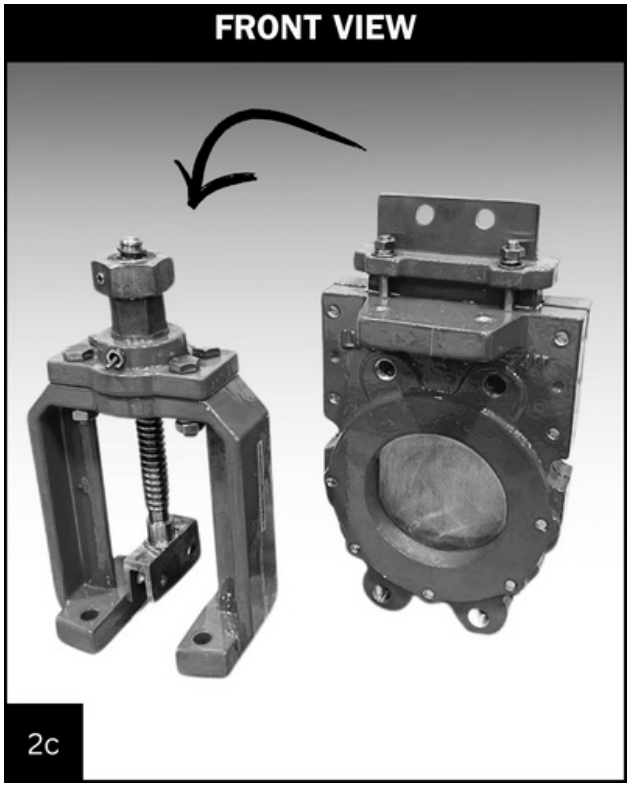


2b. Remove the 2 - gate lifter bolts.



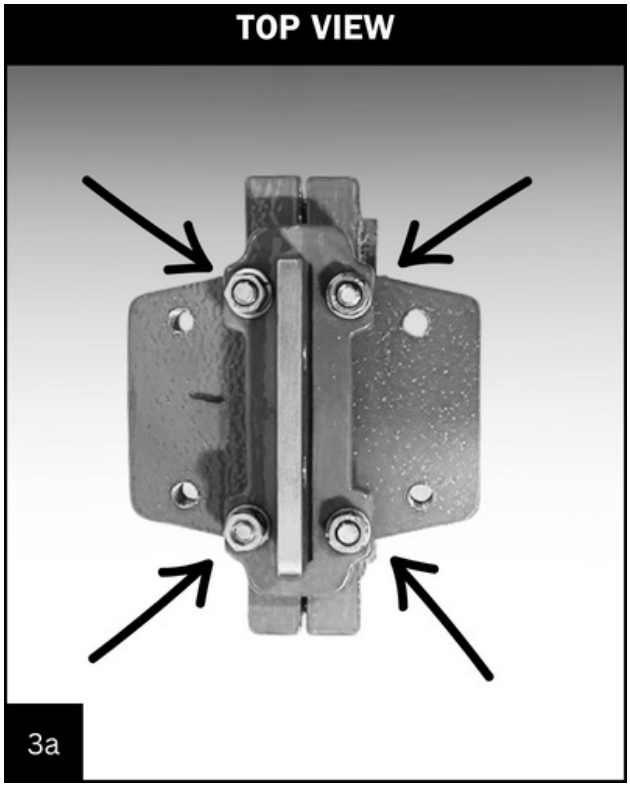
SEAT REPLACEMENT - *DISASSEMBLY* (CONT)

2c. Lift yoke and remove from the valve body.



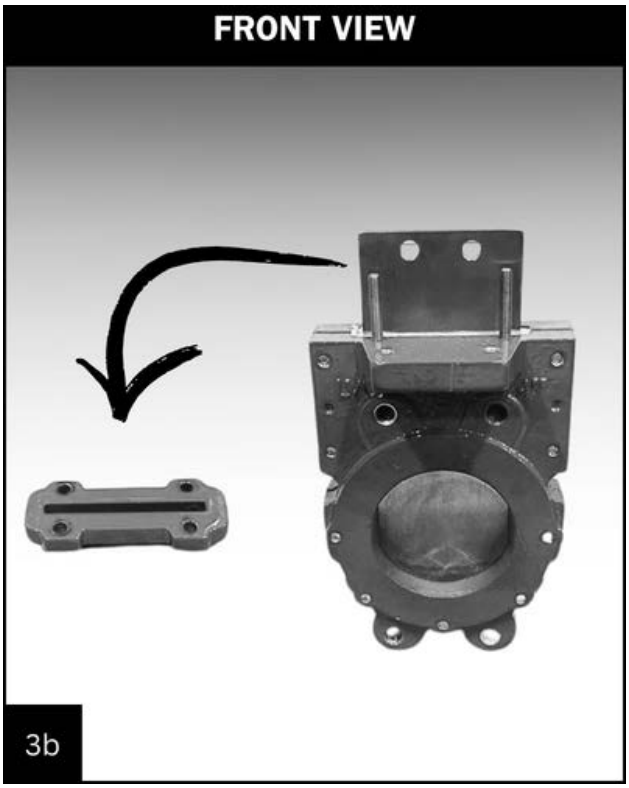
3. Remove the packing gland:

3a. Remove packing gland bolts.



SEAT REPLACEMENT - *DISASSEMBLY* (CONT)

3b. Lift the packing gland and remove it from the valve body.



4. Unbolt the body in a cross-torque pattern and separate the body halves.

4a. Starting at the top left bolt, unbolt the valve body in a cross-torque pattern.

⚠ ***Bolts 5-9 will be longer than bolts 1-4.***

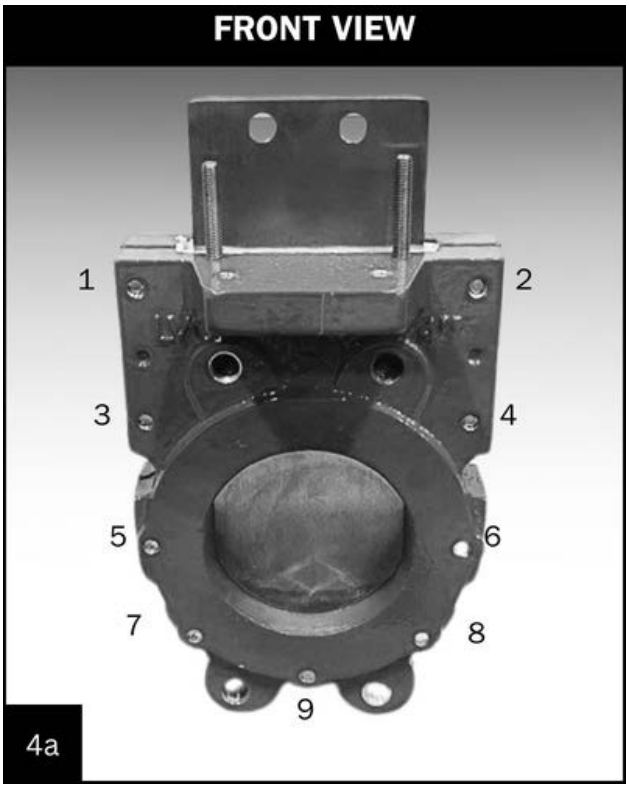
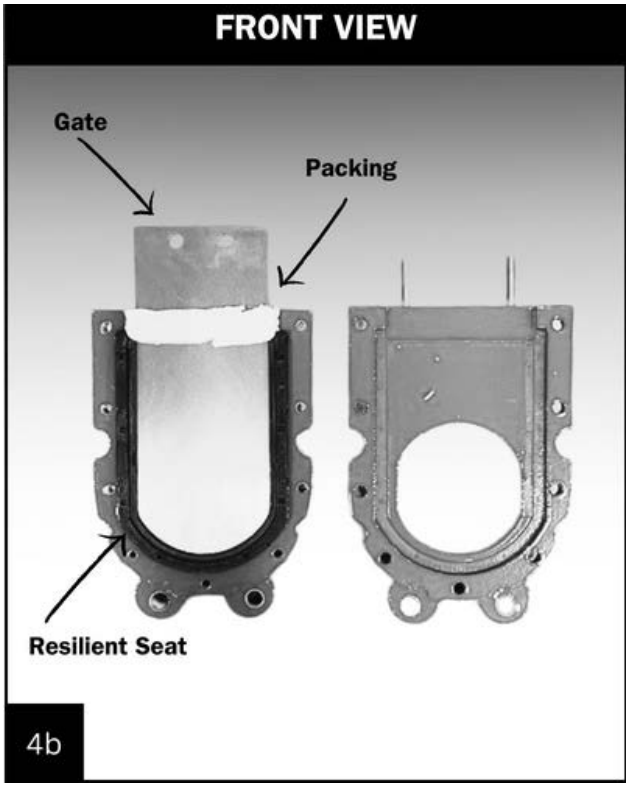


FIGURE 53 KNIFE GATE VALVE

SEAT REPLACEMENT - *DISASSEMBLY* (CONT)

4b. Separate valve body halves.



5. Remove gate.

6. Remove old resilient seat.

7. Clean all parts thoroughly.

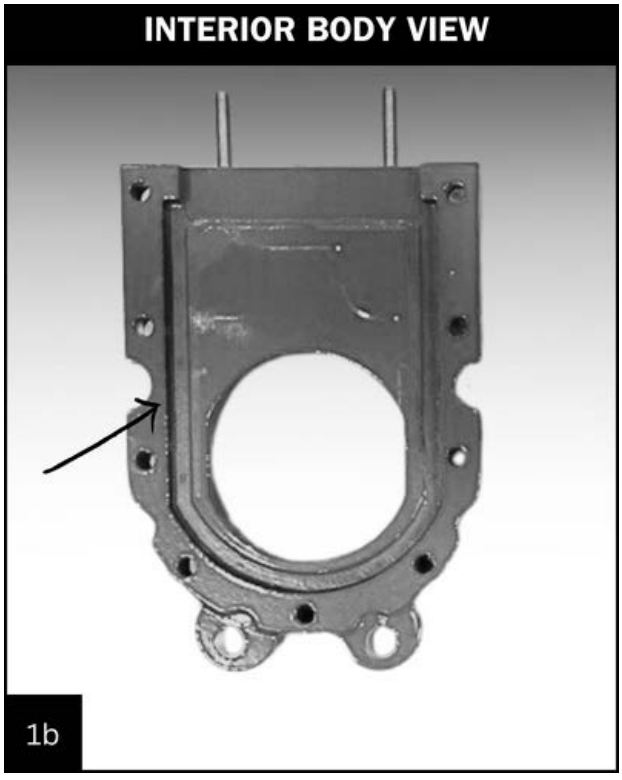
SEAT REPLACEMENT - RE*ASSEMBLY*

Reassembly:

1. Install new resilient seat:

1a. Apply a thin coating of general-purpose silicone sealer to one side of the new resilient seat.

1b. Place seat on body flange silicone side down.



⚠ ***Be sure to install seat evenly using bolt holes to align.***

SEAT REPLACEMENT - RE*ASSEMBLY* (CONTD)

1c. Apply silicone sealant to the other side of the resilient seat.

1d. Place the second flange on the seat, line up holes using body bolts and take up finger tight.

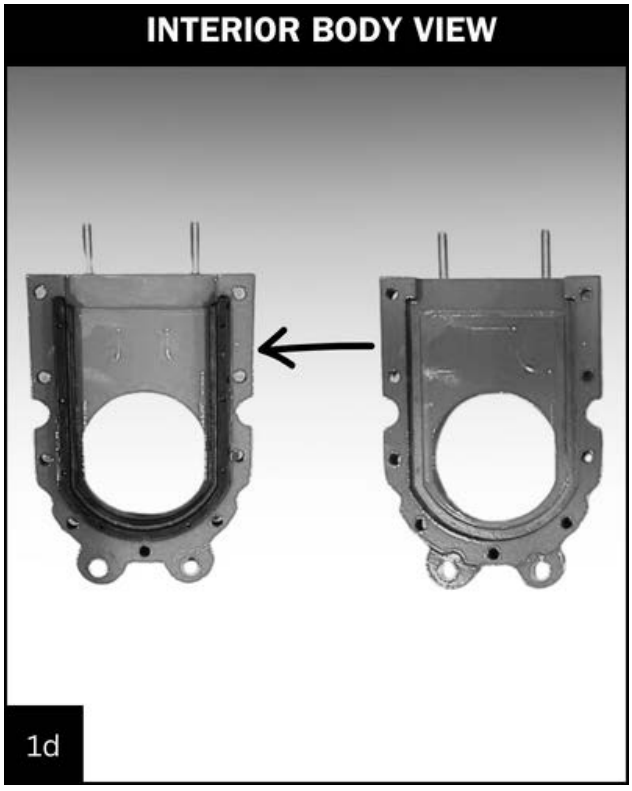


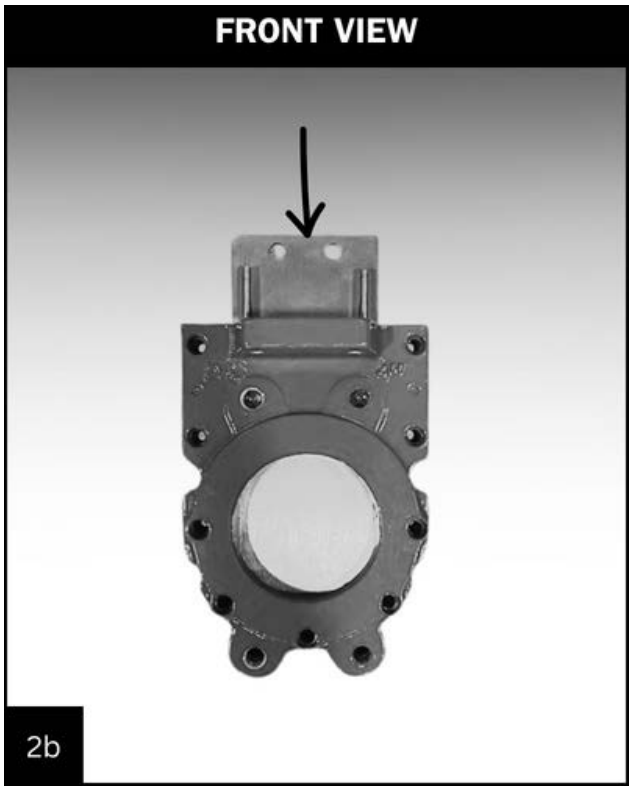
FIGURE 53 KNIFE GATE VALVE

SEAT REPLACEMENT - RE*ASSEMBLY* (CONTD)

2. Install Gate:

2a. Lubricate edge of gate and seating surface of resilient seat.

2b. Insert gate into valve body and push to full closed position.

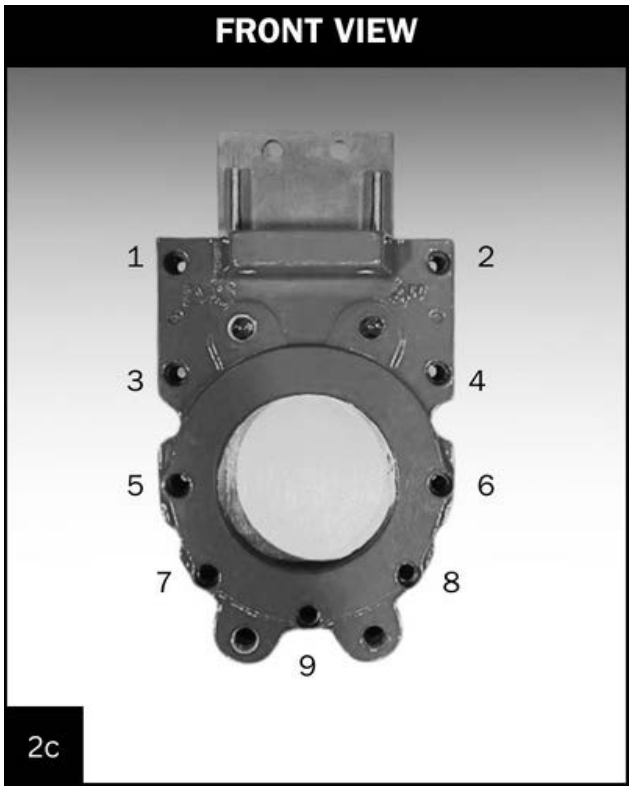


SEAT REPLACEMENT - REASSEMBLY (CONTD)

2c. Tighten body bolts in a cross-torque pattern, only enough to achieve a seal between body flanges and the resilient seat.

⚠ ***Do not over tighten – usually less than 1/16" compression of the seat rubber is required.***

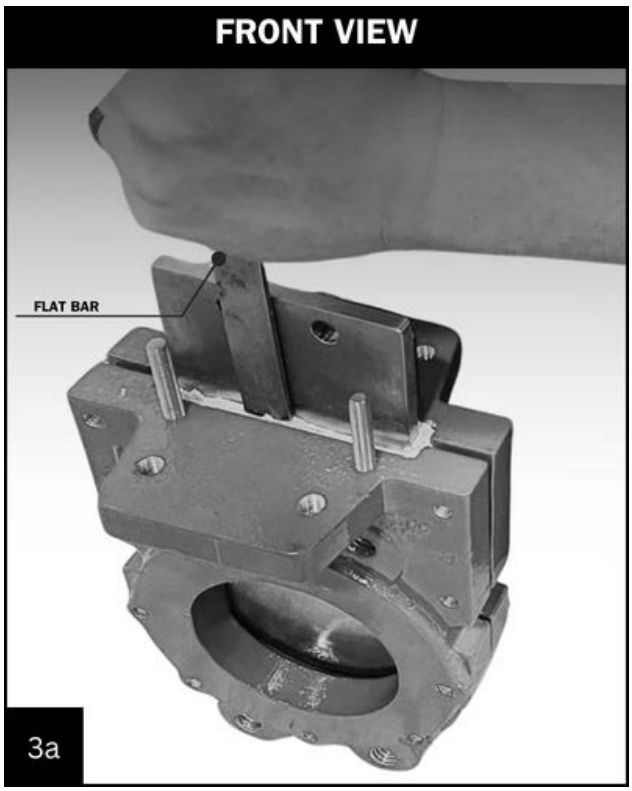
⚠ ***Note bolts 5-9 will be longer than bolts 1-4.***



3. Reinstall Packing & Packing gland:

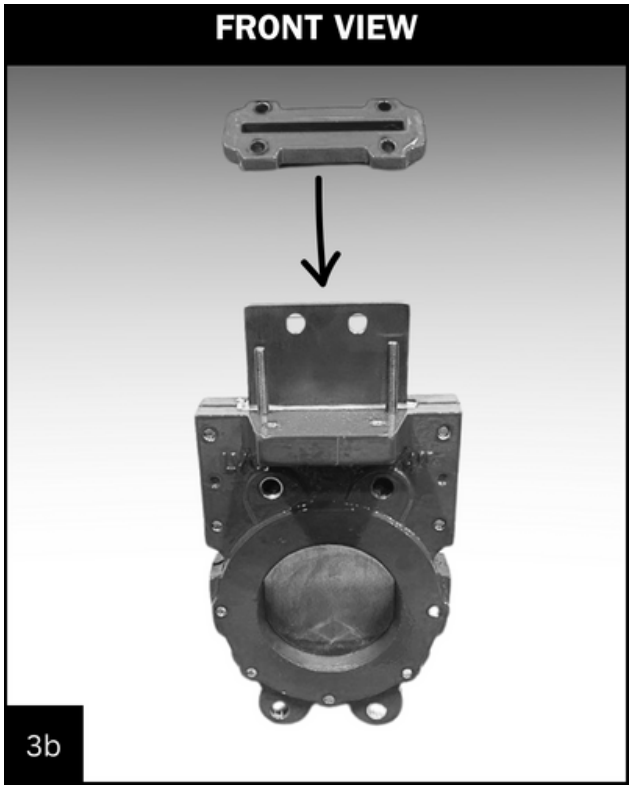
3a. Insert new packing using flat bar and hammer

⚠ ***Packing joints should be located 180° apart***



SEAT REPLACEMENT - RE*ASSEMBLY* (CONTD)

3b. Place packing gland, align holes and tighten packing gland bolts.



⚠ ***When stacking bolts & washers, place split lock washer on the bolt first and the flat washer second.***

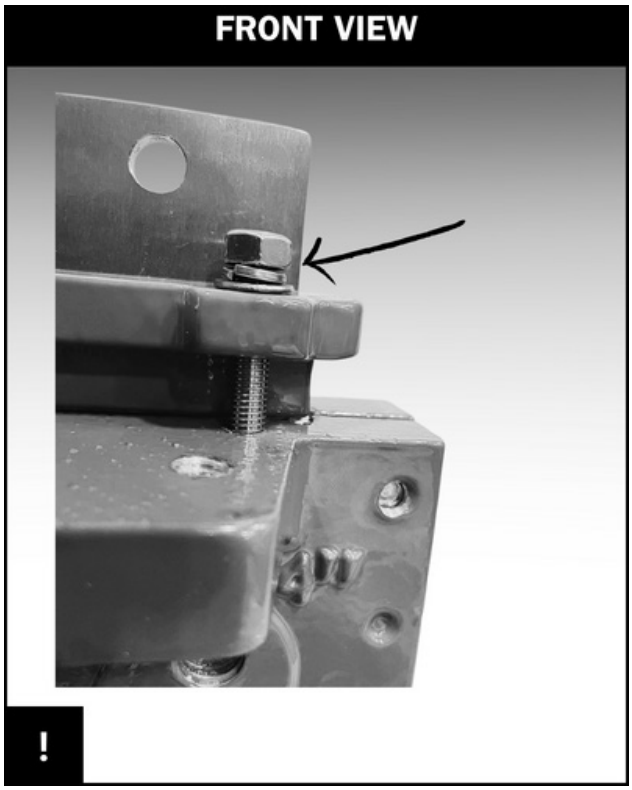


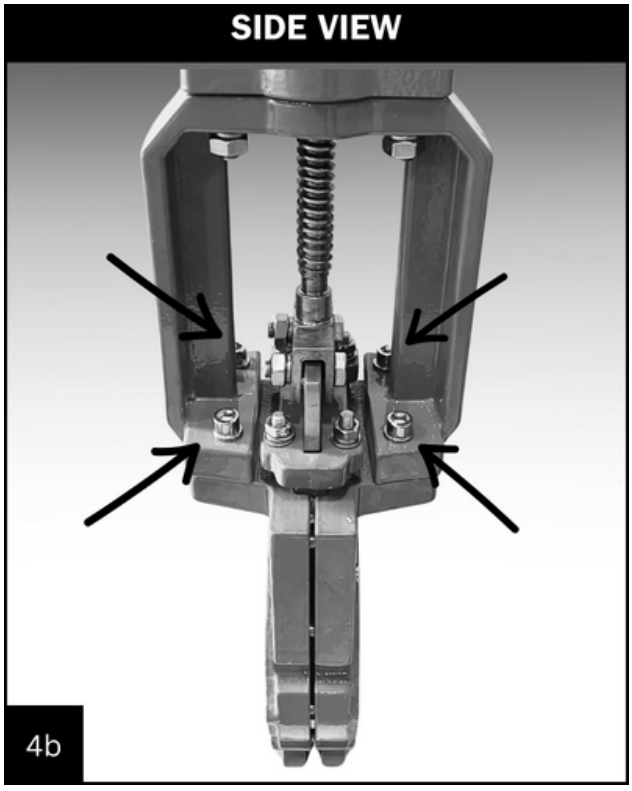
FIGURE 53 KNIFE GATE VALVE

SEAT REPLACEMENT - RE*ASSEMBLY* (CONTD)

4. Reinstall yoke

4a. Place yoke on to body

4b. Tighten 4 – yoke to body bolts.



5. Reinstall operator and cycle valve.

⚠ ***Ensure the resilient seat has been lubricated.***

⚠ ***Do not install valve or tighten flange bolts when valve is in the open position.***

PACKING REPLACEMENT - *DISASSEMBLY*

1.Disassembly:

⚠ **Ensure there is no line pressure or head on the valve.**

1a.Raise gate to fully open position.

1b. Remove packing gland bolts.

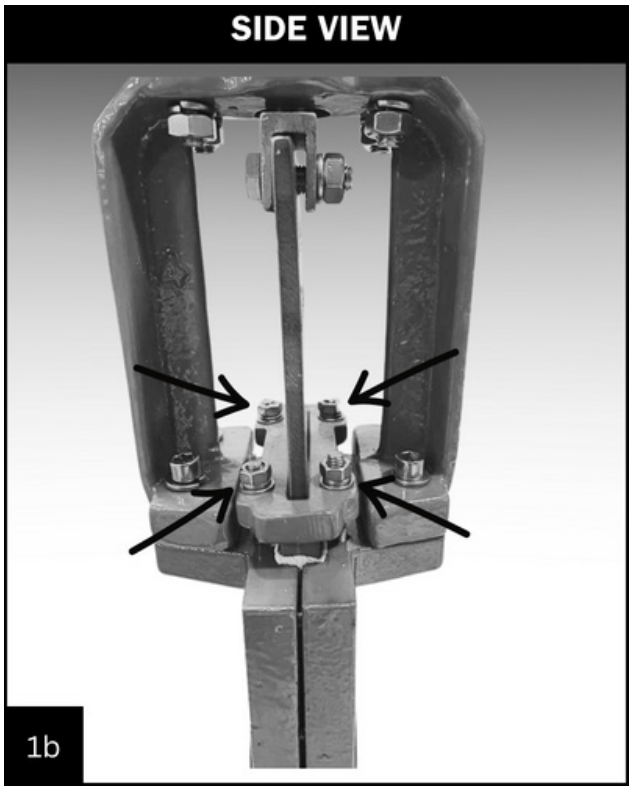
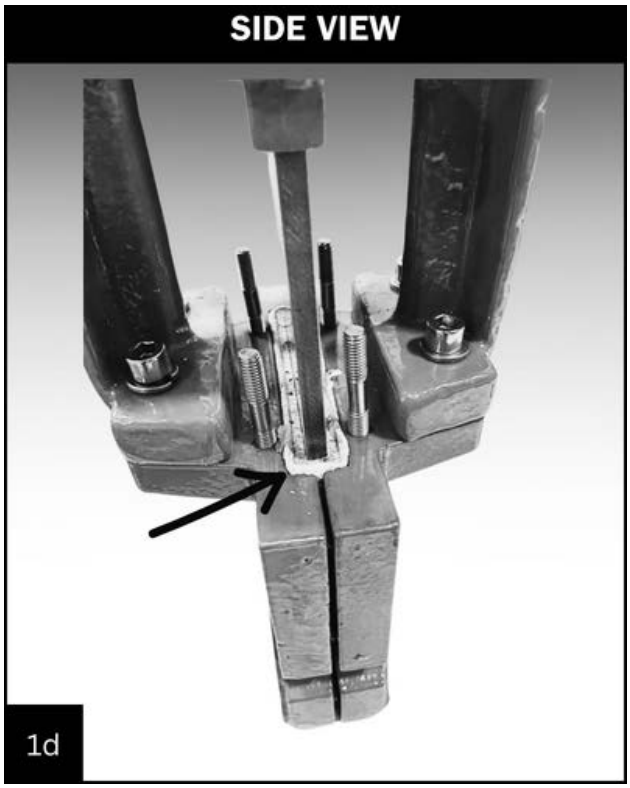


FIGURE 53 KNIFE GATE VALVE

PACKING REPLACEMENT - *DISASSEMBLY (CONTD)*

1c. Raise the packing gland to the top of the gate and secure it to the yoke or top of the gate using a cable or zip tie.

1d. Using a packing hook or screwdriver to remove all the old packing.



PACKING REPLACEMENT - *REASSEMBLY*

2. Reassembly:

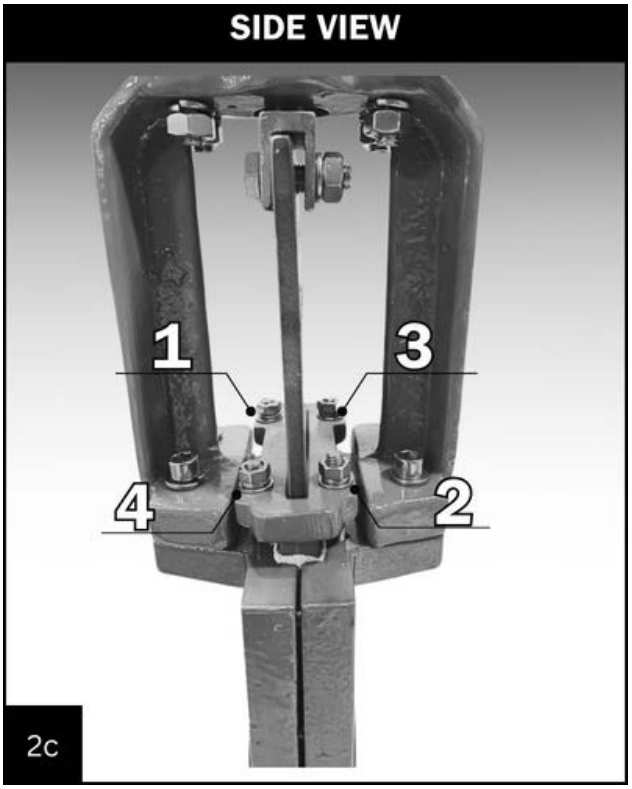
2a. Carefully clean the packing box.

2b. Using a Pratt pre-cut packing kit, insert packing one row at a time into packing box. Tap each row of packing down into place using a flat bar tool.

⚠ **Packing joints should be located 180° apart.**

***Contact your Pratt representative for ordering of Pratt pre-cut packing kit.**

2c. Pull packing gland down and tighten nuts and bolts using cross torque method.



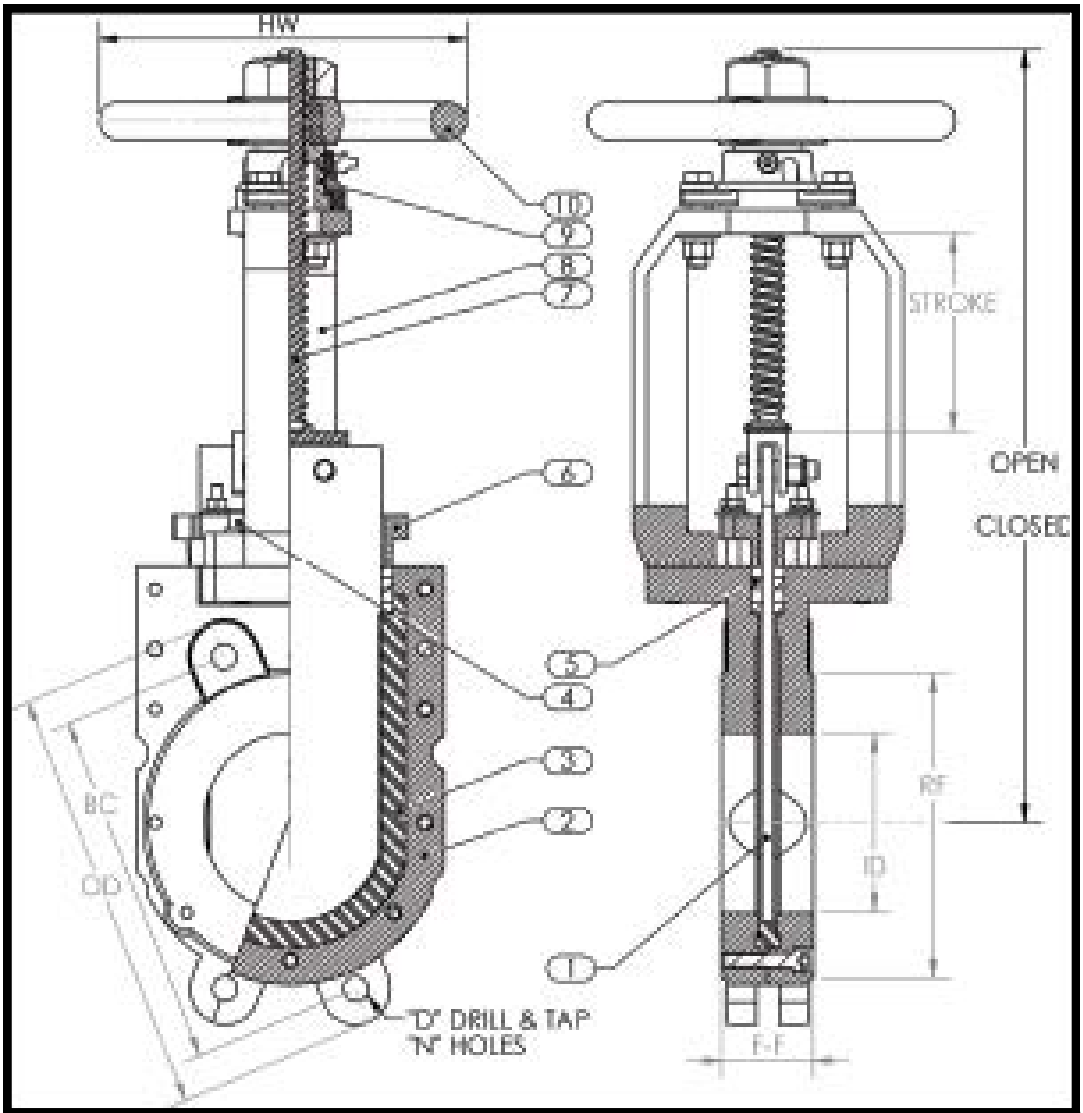
⚠ **When stacking bolts & washers, place split lock washer on the bolt first and the flat washer second.**

2d. Bring valve up to working pressure and tighten the packing gland just enough to stop any leaks or drips.

⚠ **Over tightening of the gland will result in reduced packing life.**

FIGURE 53 KNIFE GATE VALVE

PARTS LIST



PART#	PART	MATERIAL
1	GATE	SS
2	BODY	DI
3	SEAT	NATURAL RUBBER
4	BOLTS	SS
5	PACKING	TLSP
6	PACKING GLAND	DI
7	STEM	SS
8	YOKE	DI
9	STEM NUT	BRONZE
10	HANDWHEEL	DI

F24101 06/2024