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Gate Valve Maintenance & Operation Manual

Type F, FC, FL and FLS Manual Gate Valve

Type FC and FLS Hydraulic Gate Valve



Precautions

This product is designed for use under high pressure conditions, and as such, extreme caution should always be taken when servicing, operating, or testing this equipment.

Never attempt to disassemble a gate valve assembly until all pressure has been released from the body cavity.

Always be sure when pressure testing any product that all air has been purged from the system.

Do not approach any equipment for visual inspection until a suitable pressure stabilization period has been allowed.

Always use suitable personal protective equipment (PPE) when performing any maintenance or testing.

Always use caution when servicing this equipment as the retained fluid may present a hazardous gas.



Introduction

The “F, FL, FC, and FLS” Type gate Valves are full bore-through conduit non-rising stem gate valves. They are designed and manufactured in accordance with American Petroleum Institute API-6A, NACE MR-0175 for H2S Service, and all applicable industry standards at the time of manufacturing.

As with any pressure containing equipment, the Type “F, FL, FC and FLS” Gate Valves are subject to wear and eventual failure. Periodic disassembly and inspection is required and should be left to a qualified technician.

Every precaution has been taken to ensure that the highest quality product has been provided for use.

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I. Scheduled Maintenance

A. Lubrication

1. Recommended body cavity lubricant and stem bearing lubricant.
 - a. For normal operation, use Cameron valve lubricant CI-14 or TF-41 or Heshka equivalent S-3EP2 not affected by water or temperatures ranging from -20° to +250° F.
 - b. For continuous service below 0° F, use a low temperature grease, such as “arctic grease” NS-14, or Heshka equivalent S-3EP2-LT.

Lubrication Weight Chart

Bore Size (in)	Pressure Rating	Lubricant Weight (lb.)
2 1/16	ALL	2.10
2 9/16	To 10,000	3.40
2 9/16	15,000	5.40
3 1/16	To 10,000	5.30
3 1/16	15,000	8.00
4 1/16	To 5,000	10.80
4 1/16	10,000	11.40
5 1/8	5,000	18.20
5 1/8	10,000	20.80



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Cameron Type & Heshka Equivalent Lubricant Selection

Service	Cameron Type	Heshka Equivalent	Operational Properties							Solvent		QUANTITIES (by part number) Available on standard order basis			
			Standard Crude	Low Temp to -75° F	Diesel	High Temp RT to +650° F	With H2S (Sour Crude or Gas)	With Gas Well Condensates	Very High CO2		(Per Pound)	5 lb. Can (Available in 10 LBS. Pail Only)	25 lb. Pail	125 lb. Drum	400 lb. Drum
Standard	CI-14 or TF-41	S-3EP2	E	P	P	P	F	F	P	Mineral Spirits	700149	*700667	700668	700669	700670
Artic	NS-14	S-3EP2-LT	E	E	P	P	F	F	P	Mineral Spirits	700123	*700671	700672	700673	700674
Diesel Resistant	SS-14 or TS-41	GY600	E	P	E	P	G	G	G	Alcohol	700150 713837	*700675 713837-1	700676 713837-2 770676	700677 713837-3 770677	700678 713837-4 770678
High Temperature	HT-14	S-3EP2-M	G	F	P	E	F	F	P	Mineral Spirits	700217	*700679	700680	700681	700682
High Temperature	Moly 101	S-4EP2-M	G	P	P	E	G	F	P	Mineral Spirits	710194	*710194-1	710194-2	710194-3	710194-4
E = Excellent G = Good F = Fair P = Poor * Available in 10 LB Pail Only															

B. Body Cavity Lubrication

• Normal Operating Conditions

We highly recommend lubrication of the gate valves during the assembly process. When the gate valve has been in service for one month, ten (10) operating cycles, **(one cycle equals opening and closing the valve one time)** or if the valve is removed from service. The body cavity should be lubricated as follows:



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1. Remove the grease fitting cap located on the bonnet flange. (Fig 8.1)
2. Using either a bucket type or handheld grease gun. Connect it to the grease fitting.
3. Pump an appropriate amount of lubricant into the body cavity (see the Lubrication Weight Chart).

- **Unusual Temporary Operating Conditions**

If the valve has been subjected to cementing or acidizing through the bore, the following procedure should be performed:

1. Lubricate the valve body prior to placing it into service.
2. Flush the valve with an appropriate neutralizing fluid after it is removed from service.
3. Lubricate the valve cavity.

C. Thrust Bearing Lubrication

Thrust bearings should be lubricated once a month to ensure the valve operates smoothly.

1. Connect the grease gun coupler to the grease fitting on the bearing cap.
2. Pump lubricant into the fitting until grease runs out of the bleed hole on the opposite side of the bearing cap under the O-ring debris barrier seal.

II. Bonnet Grease Fitting Replacement

A. Valves 5,000 psi Working Pressure and Below

1. Backseat the valve.
 - a. Completely close the valve.
 - b. Loosen the bearing cap counterclockwise four (4) complete turns using a 24" pipe wrench or equivalent tool.
 - c. Turn the hand wheel clockwise until the gate firmly contacts the cavity bottom and the stem moves outward contacting the internal backseat shoulder in the bonnet.
 - d. Bump the hand wheel clockwise to establish a seal.

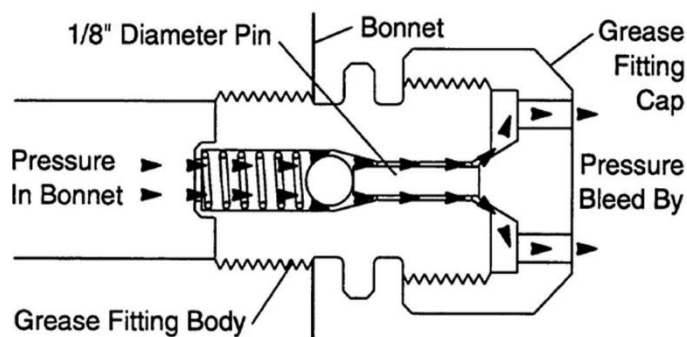


Fig. 8.1

2. Test the effectiveness of the backseat.
 - a. Remove the cap on the grease fitting.
 - b. Trip the ball in the grease fitting check valve by installing the pressure relief tool.
 - c. If pressure escapes quickly, then stops, the backseat is effective. Proceed to step 3.
 - d. If pressure continues to escape, the backseat is ineffective. Repeat step 1. And 2. If the backseat will not seal, then the grease fitting cannot be changed without isolating and removing all pressure from the valve.
3. Remove the grease fitting from the valve bonnet.
4. Install a new grease fitting.

B. Valves 10,000 psi Working Pressure and Above

NOTE: These valves can have a “buried” check valve beneath the bonnet grease fitting.

1. Remove the grease fitting cap.
2. Trip the ball into the grease fitting check valve by installing the pressure relief tool.



3. If pressure escapes quickly, then stops, the buried check valve is holding pressure. The grease fitting can be removed, and a new grease fitting can be installed.
4. If the pressure continues to escape, the buried check valve is leaking. **DO NOT** remove the grease fitting.
 - a. Backseat the valve using the method in the section II. A. Steps 1 & 2.
 - b. Replace the buried check valve using 1/4" Allen wrench.
 - c. Clean the female check valve and grease fitting threads.
 - d. Install a new check valve
 - e. Install a new grease fitting.

III. Stem Shear Pin and Thrust Bearing Replacement

Note: Thrust bearings can be replaced while the valve is under pressure.

A. Removal of Thrust Bearings

1. Loosen the bearing cap using a 24" pipe wrench. After two or three turns the cap should rotate freely by hand.

CAUTION: If the cap does not rotate freely after three turns, the packing gland may be moving outward with the bearing cap. DO NOT remove the cap. Tighten it and contact a qualified technician.

2. If the bearing cap rotates freely, remove it from the bonnet.
3. Use a punch to remove the stem shear pin from the stem adapter, ensuring the adapter is not damaged.
4. Remove the adapter from the stem.
5. Remove both sets of bearings and bearing races from the stem adapter.
6. Discard any pitted or damaged bearings and/or races.
7. Replace the stem adapter if either bearing surface on the adapter shoulder is damaged or corroded. Surfaces should be smooth to the touch.

B. Installation of New Thrust Bearings

1. Remove the bearings from the protective package.
2. Lightly coat the bearings with film of oil or grease.
3. Place each bearing between a pair of cleaned races.
4. Clean the stem adapter.
5. Install one set of bearings and races over the bottom of the adapter and one set over the top of the adapter. The adapter O-ring may be removed temporarily to allow for easier installation of the top bearing and race assembly.
6. Insert the stem adapter over the end of the stem and align the adapter pin hole with the stem hole.



7. Use a punch to drive the stem pin inward. Ensure it does not protrude outside the diameter of the adapter shoulder. **DO NOT** strike the bearings, races or stem adapter with a hammer or punch.
8. Replace the stem adapter O-ring.
9. Inspect the bearing cap to ensure that an extra race is not held inside.
10. Clean the bearing cap and lubricate the threads with never seize or equivalent.
11. Install the cap using a 24" pipe wrench.
12. Rotate the stem adapter counterclockwise until the gate is not touching the body bottom. This will confirm that the stem back-seating shoulder is not contacting the bonnet shoulder.
13. Inject grease through the bearing cap grease fitting with a handheld grease gun until grease passes through the bleed port.

IV. Stem Packing Replacement with Pressure in the Valve

A. Removal of Stem Packing

1. Backseat the valve. (Reference Section II A Steps 1 & 2) – Note: do not change the buried check valve or grease fitting if backseat test was effective.
2. Remove the hand wheel.
3. Remove the bearing cap from the bonnet in a clockwise direction.
4. Using a punch, drive the stem shear pin from the stem adapter without damaging it.
5. Remove the adapter from the stem.
6. Remove both sets of bearings and bearing races from the stem adapter without damaging it.
7. Loosen the packing gland (clockwise direction) with a 24" pipe wrench.
8. Ensure the bonnet-neck external threads are not damaged.
9. Remove the packing gland.
10. Remove the stem packing by pumping grease through the bonnet grease fitting. Pull the packing with a corkscrew (if necessary) taking care not to damage the stem O.D.

B. Installation of New Packing

1. Clean the bonnet packing bore.
2. Inspect the stem, packing bore and packing to ensure surfaces are free of burrs, pits, corrosion, or any other damage.
3. Apply a light coat of grease to the stem, packing bore, inside and outside diameter of the stem packing.
4. Install a new packing over the end of the stem so that the rounded Teflon nose faces up.
5. Push the packing into the packing bore with the packing gland.
6. Remove the packing gland and lubricate the outside diameter of the stem.



7. Install the packing gland with a 24" pipe wrench. Apply never seize to threads. Apply approximately 200 ft-lb of torque, ensuring the bonnet threads are not damaged.
8. Inspect the bearings and bearing races on the stem adapter for corrosion, pits, scores, and cracks. Replace any damaged parts.
9. Lightly coat the bearings with film of oil or grease.
10. Place each bearing between a pair of cleaned races.
11. Clean the stem adapter.
12. Install one set of bearings and races over the bottom of the adapter and another set over the top of the adapter. The adapter O-ring may be temporarily removed to install the top bearing race assembly.
13. Insert the stem adapter over the end of the stem and align the adapter pin hole with the stem hole.
14. Using a punch, drive in the stem pin and ensure it does not protrude over the outside diameter of the adapter shoulder. DO NOT strike the bearings, races or stem adapter with the hammer or punch.
15. Replace the stem adapter O-ring if necessary.
16. Rotate the adapter counterclockwise to lift the gate off the body bottom. This will confirm that the stem back-seating shoulder is not contacting the bonnet shoulder.
17. Inspect the bearing cap to ensure that an extra race is not held inside.
18. Clean the bearing cap and lubricate the threads.
19. Install the bearing cap with a 24" pipe wrench, using approximately 200 ft-lb of torque.
20. Inject grease through the bearing cap grease fitting until excess grease passes through the bleed port.
21. Lubricate the body cavity per part I.

V. Gate and Seat Replacement (FC STYLE)

A. Gate and Seat Disassembly – Manual Valve

1. Isolate the valve from the line of pressure and release all pressure from the body cavity. Open and close the valve several times to release pressure.
2. Open the valve to ensure the stem is completely within the gate neck.
3. Remove the bonnet nuts.
4. Turn the hand wheel clockwise to raise the bonnet from the body until the bonnet face clears the body.
5. Place bonnet nuts as spacers on each side of the body cavity between the bonnet and body.
6. Turn the hand wheel counterclockwise to pull out the gate.
7. Lift up on the bonnet assembly to remove the gate from the body cavity. If the gate cannot be easily removed, repeat steps 4 through



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- 7.
8. The gate may be removed from the stem with a clockwise rotation.
9. Remove seats, retainer plates and gate guides from the body cavity.
10. Remove body bushings.
11. Clean the body cavity and all parts thoroughly with a suitable solvent, then wipe them clean.

B. Gate and Seat Assembly –Manual Valve

1. Inspect all parts for damage.
 - a. Check the retainer plates to ensure they are not bent, twisted, or distorted. Solid material should not be built up on the ends.
 - b. Check seals for cuts or damage.
 - c. Check sealing surfaces on the gate, body bushings, seats, stem, and valve body. Determine which parts need to be replaced.
 - d. Ensure the body cavity is free of foreign matter.
2. Replace damaged and worn parts with original parts.
3. Clean and lightly lubricate all parts and both body bushing cavities.
4. Install body bushings with new seal rings into the cavities with seal rings against the valve body.
5. Replace seat seal rings and install one seat in each retainer plate. The seal rings will face toward the body bushings and away from the gate and in the same direction as the bevels on the retainer plates.
6. Lightly grease the gate and place between the retainer plate assemblies. This technique is also known as “sandwiching”.
7. With the gate between the retainer plate assemblies, lift the gate and retainer plates by the bore and lower the assembly into the valve body between the body bushings.
8. The retainer plates should not protrude above the top bore of the valve body.
9. Apply never seize on stem threads and screw counterclockwise into gate.
10. Remove the bonnet gasket from the bonnet groove.
11. Clean grooves and sealing surfaces of the body and bonnet.
12. Apply a film of grease or oil to the bonnet gasket and ring groove.
13. Install a new bonnet gasket in the bonnet groove. Install a new stem packing.
14. Install the bonnet over the bonnet studs.
 - a. On valves 5,000 psi working pressure and below, rotate the bonnet so that the bonnet locating pins in the body align with bonnet pin holes.
 - b. On valves 10,000 psi working pressure and above, rotate the bonnet until the grease fitting is 90° from the gate valve bore.
15. Turn the hand wheel counterclockwise to fully thread the stem into the gate and pull the bonnet down over the studs.
16. Hand-tighten the bonnet nuts.
17. Ensure the gate is not touching the valve cavity bottom. Rotate the hand wheel



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- counterclockwise to move the gate away from the bottom.
18. Evenly tighten the bonnet nuts. The raised bonnet on valves 10,000 psi and above will fully contact the body face when bonnet nuts are tight.
 19. Lubricate the stem thrust bearing by pumping grease through the fitting on the bearing cap until grease returns from the bleed hole on the opposite side of the bearing cap under the O-ring trash seal.
 20. Lubricate the body cavity. Remove the grease fitting cap on the bonnet flange outside diameter. Connect a grease pump and inject grease.

C. Gate and Seat Disassembly – Hydraulically Actuated

1. Bleed off the pressure in the valve body.

CAUTION: To prevent risk of injury, ensure there is no pressure in the Valve before it is removed from the line or disassembled.

2. Turn the hand wheel and locking screw (manual override stem) counterclockwise until they stop.
3. Apply 250-300 psi actuator pressure to OPEN port to open the valve.
4. De-pressurize the hydraulic actuator by ensuring hydraulic hoses and valves are open to atmosphere.
5. Remove hydraulic lines from the hydraulic cylinder.
6. Remove the hand wheel.
7. Remove the bonnet nuts.
8. Pull straight up on the bonnet and actuator assembly to remove the gate.
Lightly tapping with a hammer on the outside of the bonnet can help break the bond between the bonnet face and valve body.
9. Place the bonnet and the actuator assembly horizontally in a clean area.
10. Connect the hydraulic hose to the CLOSE port of the actuator and apply 200 – 300 psi to extend the gate and stem.
11. Bleed the actuator to 0 psi.
12. Remove the gate from the stem by rotating the gate clockwise.
13. Remove the seats, guides and retainer plates from the valve body.
14. Remove the body bushings.
15. Thoroughly clean the body cavity and parts.

D. Gate and Seat Assembly – Hydraulically Actuated

1. Inspect the parts for damage.
 - a. Check the retainer plates to ensure they are not bent, twisted or distorted.
Solid material should not be built up on the ends.
 - b. Check the seals for cuts or other damage.



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- c. Check the sealing surfaces on the gate, body bushings, seats, stem and valve body. Determine which parts need to be replaced.
 - d. Ensure the body cavity is free of all foreign matter.
2. Replace damaged or worn parts.
3. Clean and lightly lubricate all parts and body bushing cavity.
4. Install body bushings with new seal rings into the body cavity with seal rings against the valve body.
5. Replace seats seals rings and install one seat in each retainer plate.
Each ring must face toward the body bushing and away from the gate.
6. Place each retainer plate assembly in the valve body with the seal ring touching the body bushing face. The retainer plate must not protrude above the bonnet face. If they do, remove the retainer plates, inspect the valve cavity for foreign matter and reinstall. Beveled edges on the retainer plate must face toward the seat pockets of the valve body.
7. If the balance stem is scratched or damaged, it must be replaced. Use a punch to remove the pin attaching it to the gate.
8. Install a new balance stem on the gate.
 - a. Align the holes in the lower gate neck and lower stem.
 - b. Insert a pin into hole to hold the stem in place.
9. Grease and carefully install the gate between the retainer plate assemblies. Lightly tap on top of the gate, if necessary, without damaging it. The top of the threaded neck should be 1/2" above the bonnet face of the body.
10. Install guides.
11. Pack the body cavity with grease.
12. Remove the bonnet gasket.
13. Clean the gasket sealing surfaces on the body and bonnet.
14. Apply a film of grease or oil to the bonnet gasket and sealing surfaces.
15. Install a new gasket on the valve body sealing surface. Install a new stem packing.
16. Install the bonnet and the actuator assembly on the valve body.
 - a. Lift the bonnet and actuator assembly over the valve body.
 - b. Install the stem into the gate by rotating the bonnet assembly counterclockwise until the stem shoulder stops on top of the gate neck. If necessary, remove the bonnet studs to position the stem.
 - c. Align the bonnet assembly with the valve body.
 - 1) For valves 5,000 psi working pressure and below, rotate the bonnet counterclockwise until the pin holes in the bottom of the bonnet are aligned with pins in the valve body. Next, rotate the bonnet 1/8" counterclockwise, then rotate the stem and bonnet assembly 1/8" clockwise so the stem shoulder is not touching the top of the gate.
 - 2) For valve 10,000 psi working pressure and above, rotate the bonnet counterclockwise until the bolt holes in the bonnet are in alignment with the bonnet studs, or stud holes. Next rotate the bonnet 1/8" clockwise so



the stem shoulder is not touching the top of the gate.

17. Bleed the pressure from the hydraulic close line. Disconnect it from the actuator.
18. Push down on the actuator assembly until the bonnet studs extend through the bonnet flange.
19. Hand –tighten the bonnet nuts onto the bonnet studs.
20. Evenly tighten the bonnet nuts. The bonnet face should contact the valve body.

VI. Gate and Seat Replacement (FLS STYLE)

A. Gate and Seat Disassembly – Manual Valve

1. Isolate the valve from the line of pressure and release all pressure from the body cavity. Open and close the valve several times to release pressure.
2. Open the valve to ensure the stem is completely within the gate neck.
3. Remove the bonnet nuts.
4. Turn the hand wheel clockwise to raise the bonnet from the body until the bonnet face clears the body.
5. Place bonnet nuts as spacers on each side of the body cavity between the bonnet and body.
6. Turn the hand wheel counterclockwise to pull out the gate.
7. Lift up on the bonnet assembly to remove the gate from the body cavity. If the gate cannot be easily removed, repeat steps 4 through
8. The gate may be removed from the stem with a clockwise rotation.
9. Remove seats from the body cavity.
10. Remove retainer plate from bottom of the valve body.
11. Clean the body cavity and all parts thoroughly with a suitable solvent, then wipe them clean.

B. Gate and Seat Assembly – Manual Valve

1. Inspect all parts for damage.
 - a. Check the retainer plate to ensure it is not bent, twisted, or distorted.
 - b. Check seals in seats for damage.
 - c. Check sealing surfaces on the gate, seats, stem, and valve body. Determine which parts need to be replaced.
 - d. Ensure the body cavity is free of foreign matter.
 - e. Remove bonnet gasket and inspect bonnet seal groove for damage.
2. Replace damaged and worn parts with Heshka Oil original replacement parts.
3. Clean and lightly lubricate all parts and both seat cavities.
4. Install retainer plate in the bottom of the body cavity.
5. Seats will be placed into the valve with the seals facing the seat pocket.
6. Lightly grease the gate and slowly lower the gate down between the seats.



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7. The gate should slide down past the seats and in between the retainer plate.
8. Apply never seize on stem threads and screw counterclockwise into gate.
9. Clean grooves and sealing surfaces of the body and bonnet.
10. Apply a film of grease or oil to the bonnet gasket and ring groove.
11. Install a new bonnet gasket in the bonnet groove. Install a new stem packing.
12. Install the bonnet over the bonnet studs.
 - a. On valves 5,000 psi working pressure and below, rotate the bonnet so that the bonnet locating pins in the body align with bonnet pin holes.
 - b. On valves 10,000 psi working pressure and above, rotate the bonnet until the grease fitting is 90° from the gate valve bore.
13. Turn the hand wheel counterclockwise to fully thread the stem into the gate and pull the bonnet down over the studs.
14. Hand-tighten the bonnet nuts.
15. Ensure the gate is not touching the valve cavity bottom. Rotate the hand wheel counterclockwise to move the gate away from the bottom.
16. Evenly tighten the bonnet nuts. The raised bonnet on valves 10,000 psi and above will fully contact the body face when bonnet nuts are tight.
17. Lubricate the stem thrust bearing by pumping grease through the fitting on the bearing cap until grease returns from the bleed hole on the opposite side of the bearing cap under the O-ring trash seal.
18. Lubricate the body cavity. Remove the grease fitting cap on the bonnet flange outside diameter. Connect a grease pump and inject grease.

VII. Hydraulic Piston and Cylinder Assembly – FC Style

A. Disassembly of Hydraulic Piston and cylinder Assembly

1. Bleed off the pressure in the valve body.
2. Turn the Hand wheel and manual locking screw override stem counterclockwise until they stop. This will allow for full piston travel.
3. Apply 250 – 300 psi actuator pressure to the OPEN port to open the valve.
4. Bleed the actuator and hydraulic open and close lines to 0 psi.
5. Remove the hydraulic lines from the valve.
6. Remove the hand wheel from the manual locking screw.
7. Remove the two set screws from the upper cylinder head.
8. Using a pipe wrench, turn the adjusting nut counterclockwise with the locking screw in place and removed the nut from the actuator.
9. Using a box wrench, remove the nuts from the cylinder head.
10. Remove the upper cylinder head by lifting straight up to clear the studs.
11. Using a wrench, turn the cylinder head studs counterclockwise to remove them.
12. Remove the cylinder from the actuator assembly by lifting it straight up. DO NOT damage the inside cylinder surface.
13. Unscrew the set screw and remove the centering pin from the gate stem.



14. Remove the piston lock nut with a counterclockwise rotation.
15. Remove the piston with a counterclockwise rotation.
16. Remove the lower cylinder head with a counterclockwise rotation.
17. Remove the packing gland with a counterclockwise rotation.
18. The stem packing can be pushed out by injecting grease into the grease fitting on the bonnet flange. If the stem packing is removed with a sharp object, do not scratch the stem or packing seal area of the bonnet.

B. Assembly of Hydraulic Actuator.

1. Clean all parts for inspection.
2. Inspect all parts for damage or wear, including sealing surfaces for scratches and seals for cuts.
3. Replace damaged or worn parts with new parts.
4. Replace the stem packing by applying a light coat of oil to the stem and stem packing, then push the packing onto the stem past the bonnet threads with the rounded end of the packing facing the valve body.
5. Tap the top of the stem with a rubber hammer until the balance stem seats in the bottom of the valve cavity and the stem movement stops. DO NOT damage the top of the stem.
6. Rotate the stem counterclockwise until it contacts the top of the gate and rotation stops, then turn the stem 1/8 of a turn clockwise.
7. Keep the stem from turning while performing steps 8 through 17.
8. Apply a light film of oil on the stem.
9. Install O-rings on the packing gland.
10. Install the packing gland using clockwise rotation, applying 100 – 150 ft-lb of torque to the seat retainer.
11. Apply a light film of oil to the outside surface of the packing gland and the inside diameter of the lower cylinder head.
12. Install the lower cylinder head on the bonnet with a clockwise rotation, applying 150 – 200 ft-lb of torque to seat the cylinder head.
13. Install the O-ring on the outside diameter of the lower cylinder head.
14. Install the O-ring on the outside diameter of the piston.
15. Install the piston onto the stem with clockwise rotation until the piston contact the top of the packing gland, and then rotate the piston ¼ turn clockwise to lift the gate or balance stem off the bottom of the valve cavity.
16. Install the piston lock nut on the stem with a clockwise rotation, applying 50-100 ft-lb of torque to seat the lock nut.
17. If the stem turned during assembly, remove the piston and repeat steps 6 through 16.
18. Install the centering pin on top of the stem.
19. Install the set screw in the centering pin and tighten with a clockwise



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- rotation to lock the centering pin in place. Keep the piston from rotating.
20. Apply a light film of oil on the inside diameter of the cylinder.
Install the cylinder onto the lower cylinder head. Keep the piston from rotating.
 21. Install the cylinder head studs into the lower cylinder head with a clockwise rotation. The stud bottom should be flush with the cylinder flange bottom.
 22. Install the upper cylinder head over the cylinder head studs.
 23. Install the cylinder head nuts on the cylinder head studs with a clockwise rotation, applying 100 – 150 ft-lb torque.
 24. Install the O-ring on the outside diameter of the adjusting nut.
 25. Apply a light film of oil on the outside diameter of the adjusting nut and inside of the upper cylinder head.
 26. Install the adjusting nut and align the gate and seat assembly.
 - a. Valves with manual locking screws or override stem.
 - 1) Install the adjusting nut into the upper cylinder head with eight clockwise rotations.
 - 2) Install the adjusting nut set screws into the upper cylinder head (Do not tighten the set screws).
 - 3) Turn the locking screw counterclockwise until the rotation stops.
 - 4) Connect the hydraulic lines to the actuator.
 - 5) Apply no more than 300 psi hydraulic pressure to the Open port until the piston moves out and stops.
 - 6) Maintain pressure and turn the locking screw clockwise into the adjusting nut until it contacts the piston / centering pin.
 - 7) Reduce the hydraulic opening pressure to 0 psi.
 - 8) Turn the locking screw clockwise until the bore is aligned with the body bore.
 - 9) Turn the locking screw counterclockwise until it is fully retracted.
 - 10) Turn the adjusting nut clockwise until it contacts the piston.
 - 11) Tighten the set screws to lock the adjusting nut in place.
 - b. Valves without manual locking screw.
 - 1) Install the adjusting nut into the cylinder head by rotating it clockwise until it stops.
 - 2) Install the adjusting nut set screws. Do not tighten them.
 - 3) Connect the hydraulic lines to the actuator.
 - 4) Apply up to 300 psi hydraulic pressure to the open port until the piston moves out and stops.
 - 5) Ensure the gate bore is aligned with the body bore.
 - 6) If bores align, proceed to step 8.
 - 7) If the bores do not align, reduce actuator pressure to 0 psi. Turn the adjusting nut ¼ turn counterclockwise and re-apply 300 psi hydraulic pressure to the OPEN port. If the bores align, proceed to step 8. If they do not repeat step 7.
 - 8) Tighten the set screws to lock the adjusting nut in place.



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VII. Troubleshooting - ALL GATE VALVES

Problem	Cause	Solution
Fluid leaks past the gate and seat assembly	Gate or seats are damaged.	Replace the gate and seat assembly
	Hand wheel is not backed off.	Back hand wheel off 1/4 turn
Fluid leaks around the valve stem.	Stem packing is worn	Replace the stem packing.
Fluid leaks at the bonnet flange	Bonnet seal ring is damaged.	Replace the bonnet seal ring
	Loose bonnet nuts.	Retighten
	Bonnet or body ring groove is damaged	Have the valve repaired by a qualified person
Fluid leaks at the bonnet flange	Check valve inside the grease fitting is leaking.	Replace grease fitting.
Hand wheel is hard to turn	Thrust bearings have lost lubricant.	Lubricate the thrust bearings
	Thrust bearings are corroded.	Replace Thrust bearings
	Gate and stem threads have lost lubricant	Lubricate the gate and stem through the bonnet grease fitting.
	Stem shear pin is sheared.	Replace the stem shear pin.
Hand wheel turns but valve does not open or close.	Stem shear pin is sheared.	Replace the stem shear pin.



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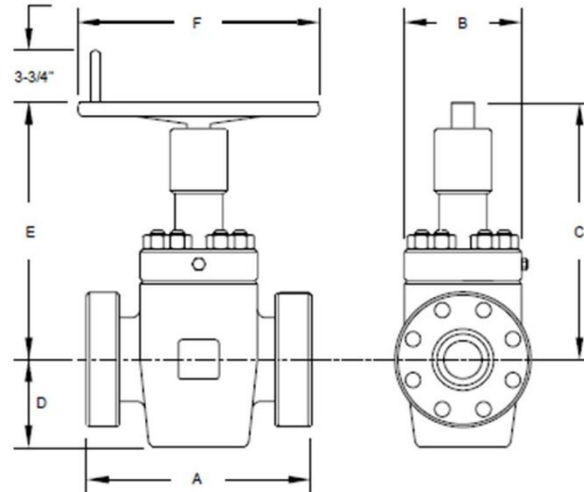
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Dimensional Data



Dimensional Data -2000 psi WP

Item	Description	2-1/16"	2-9/16"	3-1/8"	4-1/8"	6-1/8"
A	End-to-End, Flanged (Ring Joint)	11-5/8"	13-1/8"	14-1/8"	17-1/8"	22-1/8"
B	Extreme Width of Body	6-1/8"	7-1/8"	7-3/4"	9-3/4"	12-3/8"
C	Center of Port to Top of Stem Adapter	13"	33-13/16"	16-13/16"	18-7/16"	22-3/4"
D	Center of Port to Top of Body	5-1/4"	6"	7-1/8"	9-1/8"	12-7/8"
E	Center of Port to Top of Handwheel Rim	15-3/8"	16-1/8"	19-1/16"	20-11/16"	24"
F	Handwheel OD	14"	14"	14"	14"	18-1/2"
	Weight (Flanged)	160 lb.	200 lb.	240 lb.	350 lb.	800 lb.

Dimensional Data -3000 psi WP

Item	Description	2-1/16"	2-9/16"	3-1/8"	4-1/8"	5-1/8"	6-1/8"
A	End to End Threaded	10-5/8"	12-3/8"	13-5/8"	-	-	-
A	End-to-End, Flanged (Ring Joint)	14-5/8"	16-5/8"	17-1/8"	20-1/8"	24-1/8"	24-1/8"
B	Extreme Width of Body	6-3/4"	7-5/8"	7-1/2"	10-1/2"	21"	12-3/4"
C	Center of Port to Top of Stem Adapter	13"	33-13/16"	16-13/16"	18-7/16"	21-5/16"	22-3/4"
D	Center of Port to Top of Body	5-5/8"	6-1/2"	7-3/8"	9-1/8"	11-3/8"	12-7/8"
E	Center of Port to Top of Handwheel Rim	15-3/8"	16-1/8"	19-1/16"	20-11/16"	22-9/16"	24"
F	Handwheel OD	14"	14"	14"	18-1/2"	24"	24"
	Weight (Flanged)	180 lb.	249 lb.	282 lb.	450 lb.	750 lb.	1000 lb.



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Dimensional Data -5000 psi WP

Item	Description	2-1/16"	2-9/16"	3-1/8"	4-1/8"	5-1/8"	6-1/8"
A	End to End, Threaded	10-5/8"	12-3/8"	13-5/8"	-	-	-
A	End-to-End, Flanged (Ring Joint)	14-5/8"	16-5/8"	18-5/8"	21-5/8"	28-5/8"	29"
A	End-to-End, Butt Weld	-	-	-	21-1/2"	-	-
B	Extreme Width of Body	7"	8-3/8"	9-1/4"	10-13/16"	21-3/4"	14-1/8"
C	Center of Port to Top of Stem Adapter	15-1/8"	15-15/16"	16-13/16"	18-7/16"	21-5/16"	22-3/4"
D	Center of Port to Top of Body	5-5/8"	6-1/2"	7-3/8"	9-1/8"	11-3/8"	12-7/8"
E	Center of Port to Top of Handwheel Rim	17-3/8"	18-1/8"	19-1/16"	20-11/16"	23-9/16"	24"
F	Handwheel OD	14"	14"	18-1/2"	18-1/2"	24"	24"
	Weight (Flanged)	182 lb.	255 lb.	360 lb.	545 lb.	800 lb.	1160 lb.

Dimensional Data -10000 psi WP

Item	Description	1-13/16"	2-1/16"	2-9/16"	3-1/16"	4-1/16"	5-1/8"
A	End-to-End, Flanged (Ring Joint)	18-1/4"	20-1/2"	22-1/4"	24-3/8"	26-3/8"	29"
B	Extreme Width of Body	9-1/16"	9-3/8"	9-13/16"	10-1/4"	12-13/16"	23-1/2"
C	Center of Port to Top of Stem Adapter	15-1/8"	15-1/8"	15-13/16"	16-7/8"	19-11/16"	23-7/8"
D	Center of Port to Top of Body	5-3/4"	5-7/8"	6-13/16"	8-1/16"	10-1/16"	13-1/8"
E	Center of Port to Top of Handwheel Rim	17-3/8"	17-3/4"	18-1/8"	18-1/16"	20-15/16"	25-1/4"
F	Handwheel OD	14"	18-1/2"	18-1/2"	24"	24"	24"
	Weight	270 lb.	275 lb.	485 lb.	680 lb.	1057 lb.	2100 lb.

Dimensional Data -15000 psi WP

Item	Description	1-13/16"	2-1/16"	2-9/16"	3-1/16"
A	End-to-End, Flanged (Ring Joint)	18"	19"	21"	23-9/16"
B	Extreme Width of Body	9-7/8"	9-7/8"	11-1/2"	13-9/16"
C	Center of Port to Top of Stem Adapter	15-1/8"	15-1/8"	17-3/16"	20-15/16"
D	Center of Port to Top of Body	5-7/8"	6-1/8"	7-5/16"	9-1/4"
E	Center of Port to Top of Handwheel Rim	17-3/8"	17-3/4"	19-9/16"	22-3/16"
F	Handwheel OD	18-1/2"	18-1/2"	18-1/2"	24"
	Weight	275 lb.	350 lb.	800 lb.	1065 lb.



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SERVICE CONDITIONS	Trim	Body	Bonnet	Gate	Seat	Stem	BSR
General / Non-Corrosive	AA	A487 4D/4130	4130	4130	4130	4130	1018
General / Slightly Corrosive	BB	A487 4D/4130	4130	410 SST	410 SST	17-4 SST	316 SST
General, Moderately Corrosive, CO2	CC	CA6NM / 410 SST	410 SST	410 SST	410 SST	17-4 SST	316 SST
Sour, Non-Corrosive	DD-NL	A487 4D/4130	4130	4130	4130	4130	1018 ZINC
Sour, Non-Corrosive	DD-0.5	A487 4D/4130	4130	4130	4130	17-4 SST	1018 ZINC
Sour, Slightly Corrosive	EE-0.5	A487 4D/4130	4130	410 SST	410SST	17-4 SST	316 SST
Sour Highly Corrosive, MOD Abrasive, CO2	EE-1.5	A487 4D/4130	4130	410 SST	410SST	410 SST	316 SST
Sour Highly Corrosive, CO2, High Abrasive	EE-NL	A487 4D/4130	4130	410 SST	410SST	Inconel 718	316 SST
Sour, Moderately Corrosive, H2S	FF-0.5	CA6NM / 410 SST	410 SST	410 SST	410SST	17-4 SST	316 SST
Sour, Highly Corrosive, CO2 and H2S	FF-1.5	CA6NM / 410 SST	410 SST	410 SST	410SST	410 SST	316 SST
Sour, Highly Corrosive, CO2 and H2S	FF-NL	CA6NM / 410 SST	410 SST	410 SST	410SST	Inconel 718	316 SST
High Corrosion Extreme Service	HH-NL	4130 w/625 Inlay	4130 w/625 Inlay	Inconel 718	Inconel 718	Inconel 718	316 SST



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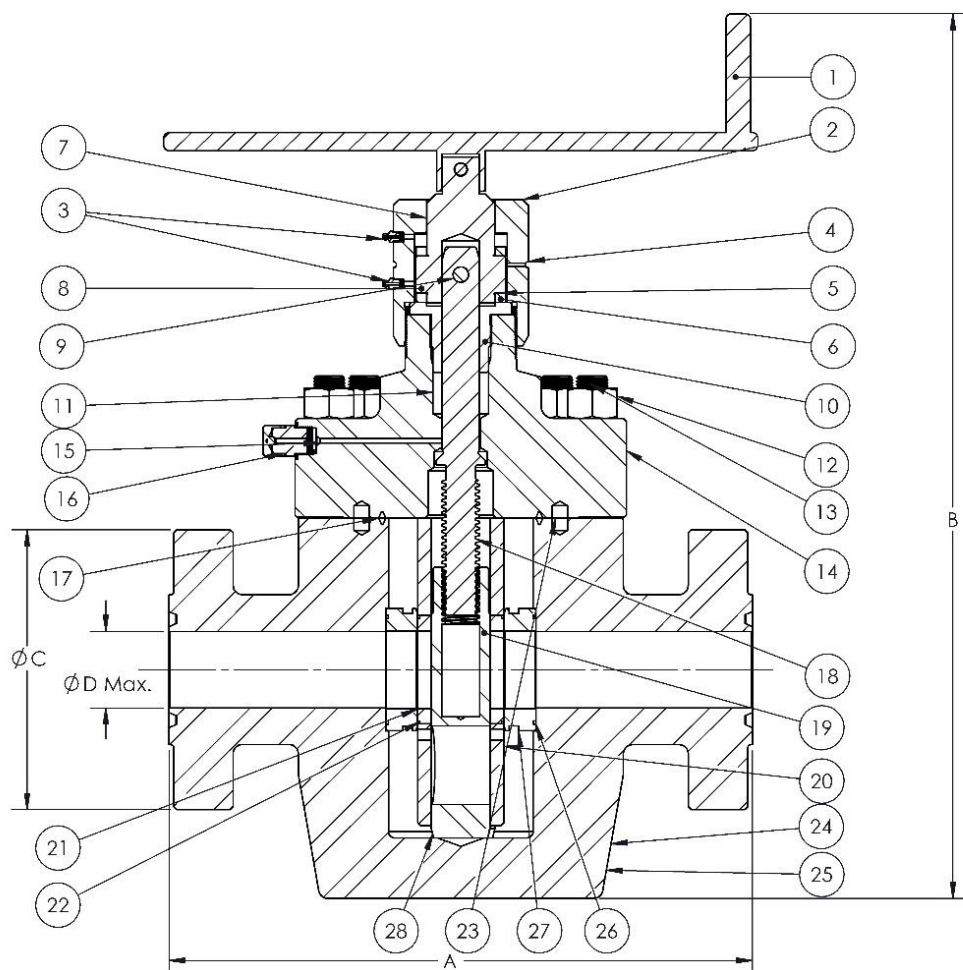
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PARTS DIAGRAM TYPE “FC” MANUAL GATE VALVE



Item No.	Description	Qty.
1	Handwheel	1
2	Bearing Cap	1
3	Bearing Cap Grease Fitting	2
4	O-Ring	1
5	Bearing Race	4
6	Thrust Bearing	2
7	O-Ring	1
8	Stem Adapter	1
9	Stem Pin	1
10	Packing Gland Nut	1
11	Stem Packing	1
12	Hex Nut	12*
13	Stud	12*
14	Bonnet	1
15	Check Valve	1
16	Vented Cap Bonnet Grease Fitting	1
17	Bonnet Gasket	1
18	Stem	1
19	Gate	1
20	Retainer Plate	2
21	Seat Ring	2
22	Seat Ring	2
23	Bonnet Locating Pin	2
24	Body GV	1
25	Nameplate	1
26	Seal (Body Bushing)	2
27	Body Bushing	2
28	Gate Guide	2

* 3-1/16"-15ksi Gate Valve



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Item	Qty	Description	1-13/16" 10M SUPER TRIM	1-13/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-14	HNDWHL-14
2	1	BEARING CAP	H19106-01	H19106-01
3	2	Grease fitting Bearing cap	H005929-05-THRD	H005929-05-THRD
4	1	O-RING Bearing cap	OR-340	OR-340
5	4	BEARING RACE	H019108-01	H019108-01
6	2	THRUST BEARING	H005931-09	H005931-09
7	1	O-RING (stem adapter)	OR-222	OR-222
8	1	STEM ADAPTER	H630301-01	H630301-01
9	1	STEM PIN	H021812-14	H021812-14
10	1	PACKING GLAND	H140143-01-05-10	H140143-01-05-10
11	1	STEM PACKING	H686598-01	H686598-01
12	8	NUT (bonnet)	REQUEST	REQUEST
13	8	STUD (bonnet)	REQUEST	REQUEST
14	1	BONNET	H140050-01-70-03	HBON61015
15	1	CHECK VALVE	-	H678627-01-99
16	1	GREASE FITTING	H5929-55	HHP12S9-F0
17	1	BONNET GASKET	H140170-01-01-04	H140170-01-01-04
18	1	STEM	H140150-01-71-03	H140150-01-71-03
19	1	GATE	H140110-01-74-03	H140110-01-74-03
20	2	RETAINER PLATE	H611404-09	H611404-09
21	2	SEAT RING	H611527-01	H611527-01
22	2	SEAL RING	H610500-49	H610500-49
23	2	BONNET LOCATING PIN	-	-
24	1	BODY	HBOD61010	HBOD61015
25	1	NAME PLATE	H2013400-76	H2013400-76
26	2	SEAL (body bushing)	H610500-49	H610500-49
27	2	BODY BUSHING	H44649-01	H44649-01
28	2	GATE GUIDE	H44646-01	H44646-01

** Gate and Seat Assy. (Includes #19, #20, #21, & #22)*



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Heshka Oil Type "F & FC" Manual Gate Valve

Item	Qty	Description	2-1/16" 5M SUPER TRIM	2-1/16" 10M SUPER TRIM	2-1/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-14	HNDWHL-14	HNDWHL-18
2	1	BEARING CAP	H19106-01	H19106-01	H19106-01
3	2	Grease fitting (bearing cap)	H005929-05-THRD	H005929-05-THRD	H005929-05-THRD
4	1	O-RING (bearing cap)	OR-340	OR-340	OR-340
5	4	BEARING RACE	H019108-01	H019108-01	H019108-01
6	2	THRUST BEARING	H005931-09	H005931-09	H005931-09
7	1	O-RING (stem adapter)	OR-222	OR-222	OR-222
8	1	STEM ADAPTER	H630301-01	H630301-01	H630301-01
9	1	STEM PIN	H021812-14	H021812-14	H021812-14
10	1	PACKING GLAND	H140143-01-05-10	H140142-01-04-10	H140143-01-05-10
11	1	STEM PACKING	H686598-01	H686598-01	H686598-01 + H2013133-01
12	8	NUT (bonnet)	REQUEST	REQUEST	REQUEST
13	8	STUD (bonnet)	REQUEST	REQUEST	REQUEST
14	1	BONNET	H140053-01-70-03	H140054-01-70-03	HBON62015
15	1	CHECK VALVE	-	H678627-01-99	H678627-01-99
16	1	GREASE FITTING	H5929-55	H5929-55	HHP12S9-F0
17	1	BONNET GASKET	H140171-01-01-04	H140170-02-01-04	H140170-02-01-04
18	1	STEM	H140150-01-71-03	H140150-01-71-03	H140150-01-71-03
19	1	GATE	H2012060-01-74-03	H2012060-01-74-03	H2012060-01-74-03
20	2	RETAINER PLATE	H611404-01	H611404-01	H611404-01
21	2	SEAT RING	H44844-06	H44844-06	H44844-06
22	2	SEAL RING	H610500-23	H610500-23	H610500-23
23	2	BONNET LOCATING PIN	H021813-06	-	-
24	1	BODY	HBOD62005	HBOD62010	HBOD62015
25	1	NAME PLATE	H2013400-76	H2013400-76	H2013400-76
26	2	SEAL (body bushing)	H610500-23	H610500-23	H610500-23
27	2	BODY BUSHING	H630691-01	H630691-01	H630691-01
28	2	GATE GUIDE	H694811-01	H694811-01	H694811-01

* Gate and Seat Assy. (Includes #19, #20, #21, & #22)



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Heshka Oil Type "F & FC" Manual Gate Valve

Item	Qty	Description	2-9/16" 5M SUPER TRIM	2-9/16" 10M SUPERTRIM	2-9/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-14	HNDWHL-18	HNDWHL-18
2	1	BEARING CAP	H19106-01	H19106-01	H19312-01
3	2	Grease fitting bearing cap	H005929-05-THRD	H005929-05-THRD	H005929-05-THRD
4	1	O-RING bearing cap	OR-340	OR-340	OR-340
5	4	BEARING RACE	H019108-01	H019108-01	H019310-01
6	2	THRUST BEARING	H005931-09	H005931-09	H005931-10
7	1	O-RING (stem adapter)	OR-222	OR-222	OR-222
8	1	STEM ADAPTER	H630301-01	H630301-01	H239036-01
9	1	STEM PIN	H021812-14	H021812-14	H021812-15
10	1	PACKING GLAND	H140143-01-05-10	H140143-01-05-10	H140143-01-05-10
11	1	STEM PACKING	H686598-01	H686598-01	H686598-02
12	8	NUT (bonnet)	REQUEST	REQUEST	REQUEST
13	8	STUD (bonnet)	REQUEST	REQUEST	REQUEST
14	1	BONNET	H140057-01-70-03	H140058-01-70-03	HBON62115
15	1	CHECK VALVE	-	H678627-01-99	H678627-01-99
16	1	GREASE FITTING	H5929-55	H5929-55	HHP12S9-F0
17	1	BONNET GASKET	H140171-02-01-04	H140170-03-01-04	H140170-06-01-04
18	1	STEM	H140150-02-71-03	H140150-02-71-03	H38228-03-99
19	1	GATE	H23786-01	H23786-01	H23426-02
20	2	RETAINER PLATE	H611404-11	H611404-11	H611404-07
21	2	SEAT RING	H44839-06	H44839-06	H44922-06
22	2	SEAL RING	H610500-33	H610500-33	H610500-52
23	2	BONNET LOCATING PIN	H021813-06	-	-
24	1	BODY	HBOD62105	HBOD62110	HBOD62115
25	1	NAME PLATE	H2013400-76	H2013400-76	H2013400-76
26	2	SEAL (body bushing)	610500-33	610500-33	610500-52
27	2	BODY BUSHING	H630597-01	H630597-01	H630501-01
28	2	GATE GUIDE	H235041-01	H235041-01	H44641-01

** Gate and Seat Assy. (Includes #19, #20, #21, & #22)*



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Item	Qty	Description	3-1/8" 5M SUPER TRIM	3-1/16" 10M SUPER TRIM	3-1/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-18	HNDWHL-18	HNDWHL-24
2	1	BEARING CAP	H19106-01	H19106-01	H678472-01
3	2	Grease fitting bearing	H005929-05-THRD	H005929-05-THRD	H005929-05-THRD
4	1	O-RING bearing cap	OR-340	OR-340	OR-354
5	4	BEARING RACE	H19108-01	H19108-01	H019310-01
6	2	THRUST BEARING	H005931-09	H005931-09	H005931-10
7	1	O-RING stem adapter	OR-222	OR-222	OR-224
8	1	STEM ADAPTER	H239036-01	H239036-01	H678474-01
9	1	STEM PIN	H021812-14	H021812-14	H021812-60
10	1	PACKING GLAND	H140143-01-05-10	H140143-01-05-10	H677509-02
11	1	STEM PACKING	H686598-01	H686598-01	H686598-12
12	8	NUT (bonnet)	REQUEST	REQUEST	REQUEST
13	8	STUD (bonnet)	REQUEST	REQUEST	REQUEST
14	1	BONNET	H140062-01-70-03	HBON63110	HBON63115
15	1	CHECK VALVE	-	H678627-01-99	H678627-01-99
16	1	GREASE FITTING	H5929-55	H5929-55	HHP12S9-F0
17	1	BONNET GASKET	H140171-03-01-04	H140170-04-01-04	H140170-07-01-04
18	1	STEM	H140150-03-71-03	H140150-03-71-03	H688590-01-99
19	1	GATE	H23791-01	H23791-01	H678253-01
20	2	RETAINER PLATE	H611404-03	H611404-03	H611404-15
21	2	SEAT RING	H44783-06	H44783-06	H678353-01
22	2	SEAL RING	H610500-50	H610500-50	H610500-55
23	2	BONNET LOCATING PIN	H21814-05	-	-
24	1	BODY	HBOD63005	HBOD63110	HBOD63115
25	1	NAME PLATE	H2013400-76	H2013400-76	H2013400-76
26	2	SEAL (body bushing)	H610500-50	H610500-50	H610500-55
27	2	BODY BUSHING	H630690-01	H630469-03	H630471-02
28	2	GATE GUIDE	H694482-01	H694482-01	H44640-01

** Gate and Seat Assy. (Includes #19, #20, #21, & #22)*



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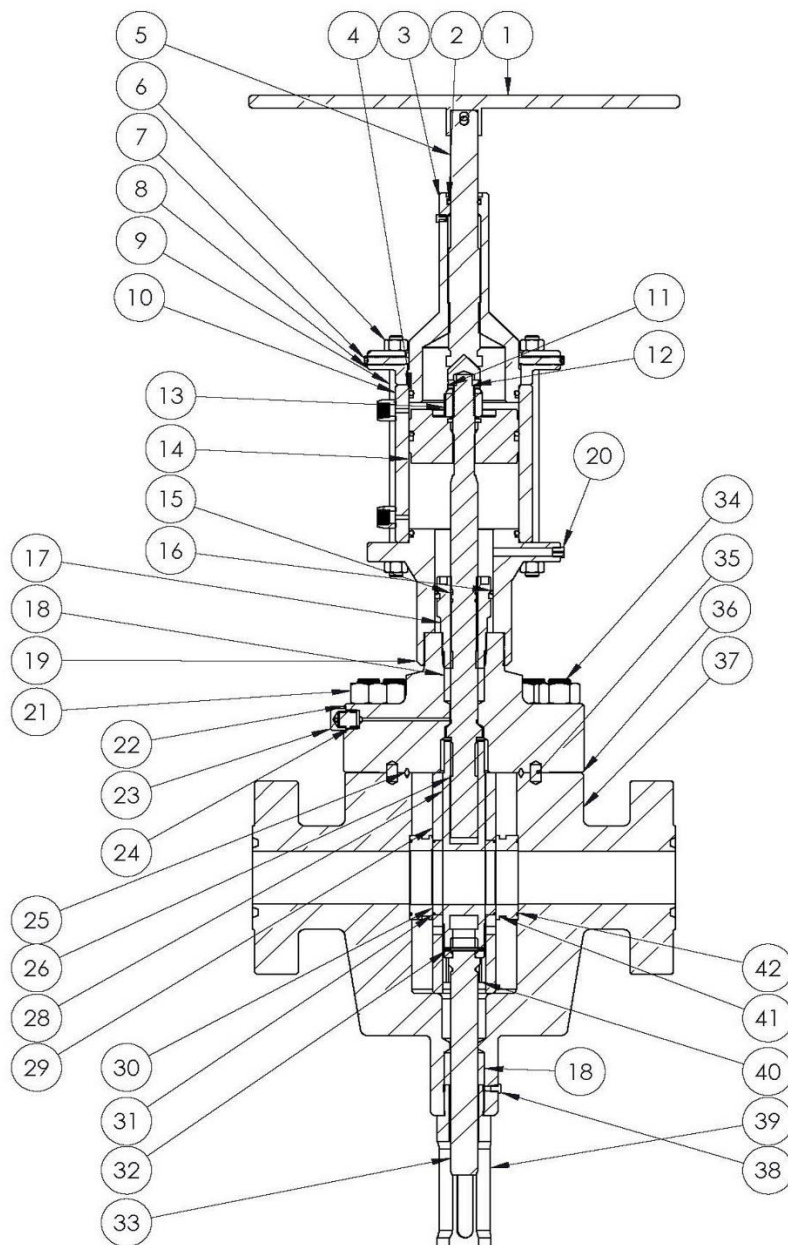
Heshka Oil Type "F & FC" Manual Gate Valve

Item	Qty	Description	4-1/16" 5M SUPER TRIM	4-1/16" 10M SUPERTRIM	4-1/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-18	HNDWHL-24	HNDWHL-24
2	1	BEARING CAP	H19106-01	H19312-01	REQUEST
3	2	Grease fitting bearing cap	H005929-05-THRD	H005929-05-THRD	H005929-05-THRD
4	1	O-RING bearing cap	OR-340	OR-340	OR-354
5	4	BEARING RACE	H019108-01	H019310-01	H019310-02
6	2	THRUST BEARING	H005931-09	H005931-10	H005931-22
7	1	O-RING stem adapter	OR-222	OR-224	OR-230
8	1	STEM ADAPTER	H630301-01	H239036-01	H681112-01
9	1	STEM PIN	H021812-14	H021812-15	H021813-34
10	1	PACKING GLAND	H140143-01-05-10	H140142-01-04-10	H690164
11	1	STEM PACKING	H686598-01	H686598-02	H686598-12 + Backup
12	8	NUT (bonnet)	REQUEST	REQUEST	REQUEST
13	8	STUD (bonnet)	REQUEST	REQUEST	REQUEST
14	1	BONNET	HBON64005	H140068-01-70-03	HBON64015
15	1	CHECK VALVE	-	H678627-01-99	H678627-01-99
16	1	GREASE FITTING	H5929-55	H5929-55	HHP12S9-F0
17	1	BONNET GASKET	H140171-04-01-04	H140170-05-01-04	H19141-15
18	1	STEM	H140150-04-71-03	H140151-01-71-03	H682564-01-99
19	1	GATE	H23248-01	H23249-01	682255-05
20	2	RETAINER PLATE	H611404-05	H611404-17	H682257-01
21	2	SEAT RING	H610482-03	H610978-02	H611535-02
22	2	SEAL RING	H610500-47	H610500-47	H610500-58
23	2	BONNET LOCATING PIN	H21813-06	-	-
24	1	BODY	HBOD64005	HBOD64010	HBOD64015
25	1	NAME PLATE	H2013400-76	H2013400-76	H2013400-76
26	2	SEAL (body bushing)	H610500-47	H610500-47	H610500-58
27	2	BODY BUSHING	H630472-02	H610774-02	H630706-02
28	2	GATE GUIDE	H694816-01	H694406-01	H611045-01

** Gate and Seat Assy. (Includes #19, #20, #21, & #22)*



PARTS DIAGRAM TYPE “FC” HYDRAULIC GATE VALVE



Item#	Description	Quantity
1	Handwheel	1
2	O-Ring	1
3	Adjusting Nut	1
4	O-Ring	3
5	Locking Screw	1
6	Cylinder Head Nut	12
7	Set Screw	2
8	Cylinder Head	1
9	Cylinder Head Stud	6
10	Cylinder	1
11	Centering Pin	1
12	Set Screw	1
13	Piston Locknut	1
14	Piston	1
15	O-Ring	2
16	O-Ring	1
17	Packing Gland	1
18	Stem Packing	2
19	Lower Cylinder Head	1
20	Relief Valve	1
21	Bonnet Nut	8
22	Bonnet	1
23	Grease Fitting	1
24	Check Valve	1
25	Bonnet Gasket	1
26	Operating Stem	1
27	Gate & Seat Assembly	*
28*	Gate	1
29*	Retainer Plate	2
30*	Seat Ring	2
31*	Seal Ring	2
32	Pin	1
33	Lower Stem	1
34	Bonnet Stud	8
35	Bonnet Locating Pin	2
36	Body	1
37	Name Plate	1
38	Pipe Plug	1
39	Stem Protector	1
40	Gate Guide	2
41	Body Bushing	2
42	Body Bushing Seal	2



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Heshka Oil Type "F & FC" Hydraulic Gate Valve

Item	Qty	Description	2-1/16" 5M H2S TRIM	2-1/16" 10M	2-1/16" 15M	3-1/8" 5M H2S TRIM	3-1/16" 10M	3-1/16" 15M H2S TRIM
1	1	HANDWHEEL	HNDWHL-14	HNDWHL-14	HNDWHL-18	HNDWHL-18	HNDWHL-18	HNDWHL-24
2	1	O-RING	OR222-H	OR222-H	OR222-H	OR222-H	OR222-H	OR325-H
3	1	ADJUSTING NUT	H22936-01	H22936-01	H22936-01	H22948-01	22946-01	H689724-01
4	3	O-RING	OR344-H	OR344-H	OR344-H	OR344-H	OR344-H	OR434-H
5	1	LOCKING SCREW	H18597-01	H18597-01	H18597-01	H18597-03	H18597-03	H18597-06
6	6	CYLINDER HEAD NUT	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST
7	2	SET SCREW	H5940-06	H5940-06	H5940-06	H5940-06	H5940-06	H38710-03
8	1	BLIND CYLINDER HEAD	H22939-01	H22939-01	H22939-01	H22939-01	H22945-01	H690173-01
9	6	CYLINDER HEAD STUD	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST
10	1	CYLINDER	H20459-04	H20459-04	H20459-04	H20459-14	H20459-08	H20459-31
11	1	CENTERING PIN	H18596-01	H18596-01	H18596-01	H18596-01	H18596-01	H18598-01
12	1	SET SCREW	H5940-01-01-04	H5940-01-01-04	H5940-01-04	H5940-01-01-04	H5940-01-01-04	H5940-01-01-04
13	1	PISTON LOCKNUT	H5953-05	H5953-05	H5953-05	H5953-05	H5953-05	H5953-06
14	1	PISTON	H20582-01	H20582-01	H20582-01	H20582-01	H20946-01	H20828-01
15	2	O-RING	OR214-H	OR214-H	OR214-H	OR214-H	OR214-H	OR218-H
16	1	O-RING	OR333-H	OR333-H	OR333-H	OR333-H	OR333-H	OR336-H
17	1	PACKING GLAND	H20454-02	H20454-02	H20454-02	H20943-02	H20943-02	H689722-02
18	2	STEM PACKING	H686598-01	H686598-01	H686598-01	H686598-01	H686598-01	H686598-12
19	1	LOWER CYLINDER	H20583-01	H20583-01	H20583-01	H20583-01	H20938-01	-
20	1	RELIEF VALVE	H5929-10	H5929-10	H5929-10	H5929-10	H5929-10	H5929-10
21	8	BONNET NUT	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST
22	1	BONNET	H140053-01-70-03	H140054-01-70-03	HBON62015	H140062-01-70-03	HBON63110	HBON63115
23	1	GREASE FITTING	H5929-55	H5929-55	HHP12S9-F0	H5929-55	H5929-55	HHP12S9-F0
24		CHECK VALVE	-	H678627-01-99	H678627-01-99	-	H678627-01-99	H678627-01-99
25	1	BONNET GASKET	H140171-01-01-04	H140170-02-01-04	H140170-02-01-04	H140171-03-01-04	H140170-04-01-04	H140170-07-01-04
26	1	OPERATING STEM	H34272-01	H34272-01	H34272-01	H34272-02-99	H34272-04	H689720-02-99
27	*	GATE & SEAT ASSY.	H21436-02-04	H21436-02-04	H21436-02-04	H21436-03-04	H21436-03-04	H21436-03-15
*28	1	GATE	H29786-01	H29786-01	H29786-01	H29399-01	H29399-01	H689719-05
*29	2	RETAINER PLATE	H611404-01	H611404-01	H611404-01	H611404-03	H611404-03	H611404-15
*30	2	SEAT RING	H44844-06	H44844-06	H44844-06	H44783-06	H44783-06	H678353-01
*31	2	SEAL RING	H610500-23	H610500-23	H610500-23	H610500-50	H610500-50	H610500-55
32	1	PIN	H21812-52	H21812-52	H21812-52	H21812-52	H21812-52	H21812-52
33	1	LOWER STEM	H34271-02	H34271-02	H34271-02	H34271-03	H34271-03	H610929-04
34	8	BONNET STUD	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST	REQUEST
35	2	BONNET LOCATING	H021813-06	-	-	H021814-05	-	-
36	1	BODY	-	-	HBOD62015-	HBOD63005-	-	-
37	1	NAME PLATE	H2013400-76	H2013400-76	H2013400-76	H2013400-76	H2013400-76	H2013400-76
38	1	PIPE PLUG	H5930-01	H5930-01	H5930-01	H5930-01	H5930-01	H5930-01
39	1	STEM PROTECTOR	H20460-02	H20460-02	H20460-02	H20953-01	H20953-01	H689716-02
40	2	GATE GUIDE	H694811-01	H694811-01	H694811-01	H694482-01	H694482-01	H44640-01
41	2	BODY BUSHING	H630691-01	H630691-01	H630691-01	H630690-01	H630469-03	H630471-02
42	2	BODY BUSHUNG SEAL	H610500-23	H610500-23	H610500-23	H610500-50	H610500-50	H610500-55

* 27 Gate and Seat Assy. (Includes #28, #29, #30, & #31)



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Heshka Oil Type "F & FC" Hydraulic Gate Valve					
Item	Qty	Description	4-1/16" 5M H2S TRIM	4-1/16" 10M H2S TRIM	4-1/16" 15M H2S TRIM
1	1	HANDWHEEL	HNDWHL-18	HNDWHL-24	HNDWHL-24
2	1	O-RING	OR222-H	OR222-H	OR325-H
3	1	ADJUSTING NUT	H22938-01	H22850-01	REQUEST
4	3	O-RING	OR344-H	OR434-H	OR443-H
5	1	LOCKING SCREW	H18597-04	H18597-04	H18597-07
6	6	CYLINDER HEAD NUT	H5926-08	H5926-10	REQUEST
7	2	SET SCREW	H5940-06	H5940-06	REQUEST
8	1	BLIND CYLINDER HEAD	H22939-01	H22410-01	REQUEST
9	6	CYLINDER HEAD STUD	REQUEST	REQUEST	REQUEST
10	1	CYLINDER	H20459-03	H20459-07	REQUEST
11	1	CENTERING PIN	18596-01	18598-01	18598-01
12	1	SET SCREW	H5940-01-01-04	H5940-01-01-04	REQUEST
13	1	PISTON LOCKNUT	H5953-05	H5953-06	REQUEST
14	1	PISTON	H20582-01	H20828-01	REQUEST
15	2	O-RING	OR214-H	OR218-H	OR325-H
16	1	O-RING	OR333-H	OR337-H	OR337-H
17	1	PACKING GLAND	H20454-02	H20827-02	REQUEST
18	2	STEM PACKING	H686598-01	H686598-02	H686598-12
19	1	LOWER CYLINDER HEAD	H20583-01	H20553-01	REQUEST
20	1	RELIEF VALVE	H5929-10	H5929-10	H5929-10
21	8	BONNET NUT	H5926-23	H12955-35	H5926-28-10
22	1	BONNET	HBON64005	H140068-01-70-03	HBON64015
23	1	GREASE FITTING	H5929-55	H5929-55	HHP12S9-F0
24		CHECK VALVE	-	H678627-01-99	-
25	1	BONNET GASKET	H140171-04-01-04	H140170-05-01-04	H19141-15
26	1	STEM	H34272-03	H38638-01	H44613-02-99
27	*	GATE & SEAT ASSY.	H21436-04-07	REQUEST	REQUEST
*28	1	GATE	H679632-01	H34273-01	H44618-01
*29	2	RETAINER PLATE	H611404-05	H611404-17	H682257-01
*30	2	SEAT RING	H610482-03	H610978-02	H611535-02
*31	2	SEAL RING	H610500-47	H610500-47	H610500-58
32	1	PIN	H21812-52	H21810-80	-
33	1	LOWER STEM	H34271-01	H28360-03	H44603-02-99
34	8	BONNET STUD	REQUEST	REQUEST	REQUEST
35	2	BONNET LOCATING PIN	H021814-05	-	-
36	1	BODY	-	HBOD64010-HYD	-
37	1	NAME PLATE	H2013400-76	H2013400-76	H2013400-76
38	1	PIPE PLUG	H5930-01	H5930-01	-
39	1	STEM PROTECTOR	H20461-01	H20849-02	H44615-01
40	2	GATE GUIDE	H694816-01	H694406-01	H611045-01
41	2	BODY BUSHING	H630472-02	H610774-02	H630706-02
42	2	BODY BUSHUNG SEAL	H610500-47	H610500-47	H610500-58
* 27 Gate and Seat Assy. (Includes #28, #29, #30, & #31)					



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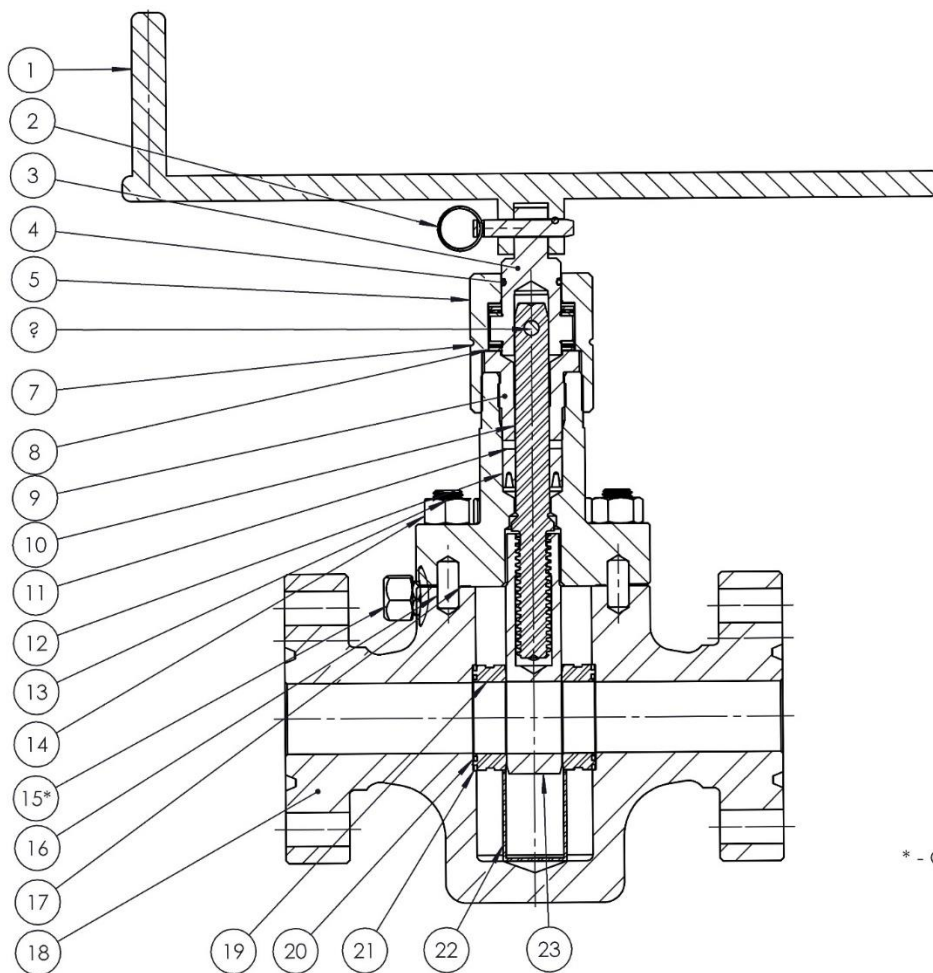
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PARTS DIAGRAM TYPE FL OR FLS MANUAL GATE VALVE



Item #	Description
1	Handwheel
2	Handwheel Retainer Pin
3	Stem Adapter
4	O-Ring
5	Bearing Cap
6	Stem Retainer Pin
7	Grease Fitting
8	Bearing Set
9	Packing Gland
10	Stem
11	Backup Ring
12	Stem Packing
13	Stud
14	Hex Nut
15*	Grease Injection Fitting
16	Dowell Pin
17	Bonnet Gasket
18	Body
19	Seat
20	Seal Ring, I.D.
21	Seal Ring O.D.
22	Retainer Plate
23	Gate

* - Grease Injection Fitting Shown 90° Out Of Position



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Heshka Oil Type "FLS" Manual Gate Valve

Item	Qty	Description	2-1/16" 5M SUPER TRIM	2-1/16" 10M SUPERTRIM	2-1/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-14	HNDWHL-18	HNDWHL-18
2	1	Grease fitting bearing cap	H005929-05	H005929-05	H005929-05
3	1	BEARING CAP	H630302-01	H630302-01	H630302-01
4	1	O-RING bearing cap	OR340-H	OR340-H	OR340-H
5	4	BEARING RACE	H019108-01	H019108-01	H019108-01
6	2	THRUST BEARING	H005931-09	H005931-09	H005931-09
7	1	O-RING stem adapter	OR222-H	OR222-H	OR222-H
8	1	STEM ADAPTER	H630301-01	H630301-01	H630301-01
9	1	STEM PIN	H021812-14	H021812-14	H021812-14
10	1	PACKING GLAND	H140143-01-05-10	H140143-01-05-10	H140143-01-05-10
11	1	STEM PACKING	H2012992-01-01	H2012992-01-01	H2012992-01-01
12	1	PACKING BACK-UP	-	-	H2013133-01
13	8	NUT (Bonnet)	REQUEST	REQUEST	REQUEST
14	8	STUD (Bonnet)	REQUEST	REQUEST	REQUEST
15	1	BONNET	H140053-01-70-03	H140054-01-70-03	H140677-01-70-03
16	1	GREASE INJECTION FITTING	H5929-55	H5929-55	H712806
17	1	BONNET GASKET	H140171-01-01-04	H140170-02-01-04	H140170-12-01-04
18	1	STEM	H140150-01-71-03	H140150-01-71-03	H140150-01-71-03
19	1	GATE	H2012060-01-74-03	H2012060-01-74-03	H140676-01-74-03
20	2	SEAT	H140137-01-72-03	H140137-01-72-03	H140675-01-72-03
21*	2	SEAL RING (OD)	H140146-03-01-03	H140146-03-01-03	H140146-06-01-03
22*	2	SEAL RING (ID) FLS ONLY	H140398-02-01-03	H140398-02-01-03	H140398-02-01-03
23	1	RETAINER PLATE	H631764-01	H631764-01	H330270-01
24	1	DOWEL PIN	H021813-06	-	-
25	1	BODY	H140157-01-70-03	H140162-01-70-03	H140649-01-70-03
26	1	NAMEPLATE	H2013400-76	H2013400-76	H2013400-76

**Item 21 and 22 are listed as virgin peak with Teflon option available.*



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Heshka Oil Type "FLS" Manual Gate Valve

Item	Qty	Description	2-9/16" 5M SUPER TRIM	2-9/16" 10M SUPERTRIM	2-9/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-14	HNDWHL-18	HNDWHL-18
2	2	Grease fitting bearing cap	H005929-05	H005929-05	H005929-05
3	1	BEARING CAP	H630302-01	H630302-01	H239035-01
4	1	O-RING bearing cap	OR340	OR340	OR343
5	4	BEARING RACE	H019108-01	H019108-01	H019310-01
6	2	THRUST BEARING	H005931-09	H005931-09	H005931-10
7	1	O-RING stem adapter	OR222-HS8	OR222-HS8	OR222-HS8
8	1	STEM ADAPTER	H630301-01	H630301-01	H239036-01
9	1	STEM PIN	H021812-14	H021812-14	H021812-15
10	1	PACKING GLAND	H140143-01-05-10	H140143-01-05-10	H140142-01-04-10
11	1	STEM PACKING	H2012992-01-01	H2012992-01-01	H2012992-03-01
12	1	PACKING BACK-UP	-	H2013133-01	H2013133-03
13	8	NUT (Bonnet)	REQUEST	REQUEST	REQUEST
14	8	STUD (Bonnet)	REQUEST	REQUEST	REQUEST
15	1	BONNET	H140057-01-70-03	H140058-01-70-03	H140059-01-70-03
16	1	GREASE INJECTION FITTING	H5929-55	H5929-55	H712806
17	1	BONNET GASKET	H140171-02-01-04	H140170-03-01-04	H140170-06-01-04
18	1	STEM	H140150-02-71-03	H140150-02-71-03	H140151-03-71-03
19	1	GATE	H23786-01	H23786-01	H23426-02
20	2	SEAT	H140331-01-72-03	H140331-01-72-03	H140389-01-72-03
21	2	SEAL RING (OD)	H140399-08-01-03	H140399-08-01-03	H140399-11-01-03
22	2	SEAL RING (ID) FLS ONLY	H140398-08-01-03	H140398-08-01-03	H140399-08-01-03
23	1	RETAINER PLATE	H630253-01	H630253-01	H654014-01
24	1	DOWEL PIN	H021813-06	-	-
25	1	BODY	H140335-01-70-03	H140332-01-70-03	H140390-01-70-03
26	1	NAMEPLATE	H2013400-76	H2013400-76	H2013400-76

**Item 21 and 22 are listed as virgin peak with Teflon option available.*



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Heshka Oil Type "FLS" Manual Gate Valve

Item	Qty	Description	3-1/8" 5M SUPER TRIM	3-1/16" 10M SUPERTRIM	3-1/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-18	HNDWHL-18	HNDWHL-24
2	2	Grease fitting bearing cap	H005929-05	H005929-05	H005929-05
3	1	BEARING CAP	H630302-01	H239035-01	H239035-01
4	1	O-RING bearing cap	OR340-H	OR340-H	OR340-H
5	4	BEARING RACE	H019108-01	H019310-01	H019310-01
6	2	THRUST BEARING	H005931-09	H005931-10	H005931-10
7	1	O-RING stem adapter	OR222-H	OR224-H	OR224-H
8	1	STEM ADAPTER	H630301-01	H239036-01	H239036-01
9	1	STEM PIN	H021812-14	H021812-15	H021812-15
10	1	PACKING GLAND	H140143-01-05-10	H140142-01-04-10	H140142-01-04-10
11	1	STEM PACKING	H2012992-01-01	H2012992-03-01	H2012992-03-01
12	1	PACKING BACK-UP	-	H2013133-03	H2013133-03
13	8	NUT (Bonnet)	REQUEST	REQUEST	REQUEST
14	8	STUD (Bonnet)	REQUEST	REQUEST	REQUEST
15	1	BONNET	H140062-01-70-03	H140268-01-70-03	H140345-01-70-03
16	1	GREASE INJECTION FITTING	H5929-55	H5929-55	H712806
17	1	BONNET GASKET	H140171-03-01-04	H140170-04-01-04	H140170-07-01-04
18	1	STEM	H140150-03-71-03	H140151-10-71-03	H140360-01-71-03
19	1	GATE	H140192-01-74-03	H140259-01-74-03	H140342-01-74-03
20	2	SEAT	H140139-01-72-03	H140254-01-72-03	H140255-01-72-03
21	2	SEAL RING (OD)	H140399-04-01-03	H140399-04-01-03	H140399-07-01-03
22	2	SEAL RING (ID) FLS ONLY	H140398-04-01-03	H140398-04-01-03	H140398-04-01-03
23	1	RETAINER PLATE	H631999-01	H631999-01	H630859-01
24	1	DOWEL PIN	H21814-05	-	-
25	1	BODY	H140341-01-70-03	H140008-01-70-03	H140309-01-70-03
26	1	NAMEPLATE	H2013400-76	H2013400-76	H2013400-76

**Item 21 and 22 are listed as virgin peak with Teflon option available.*



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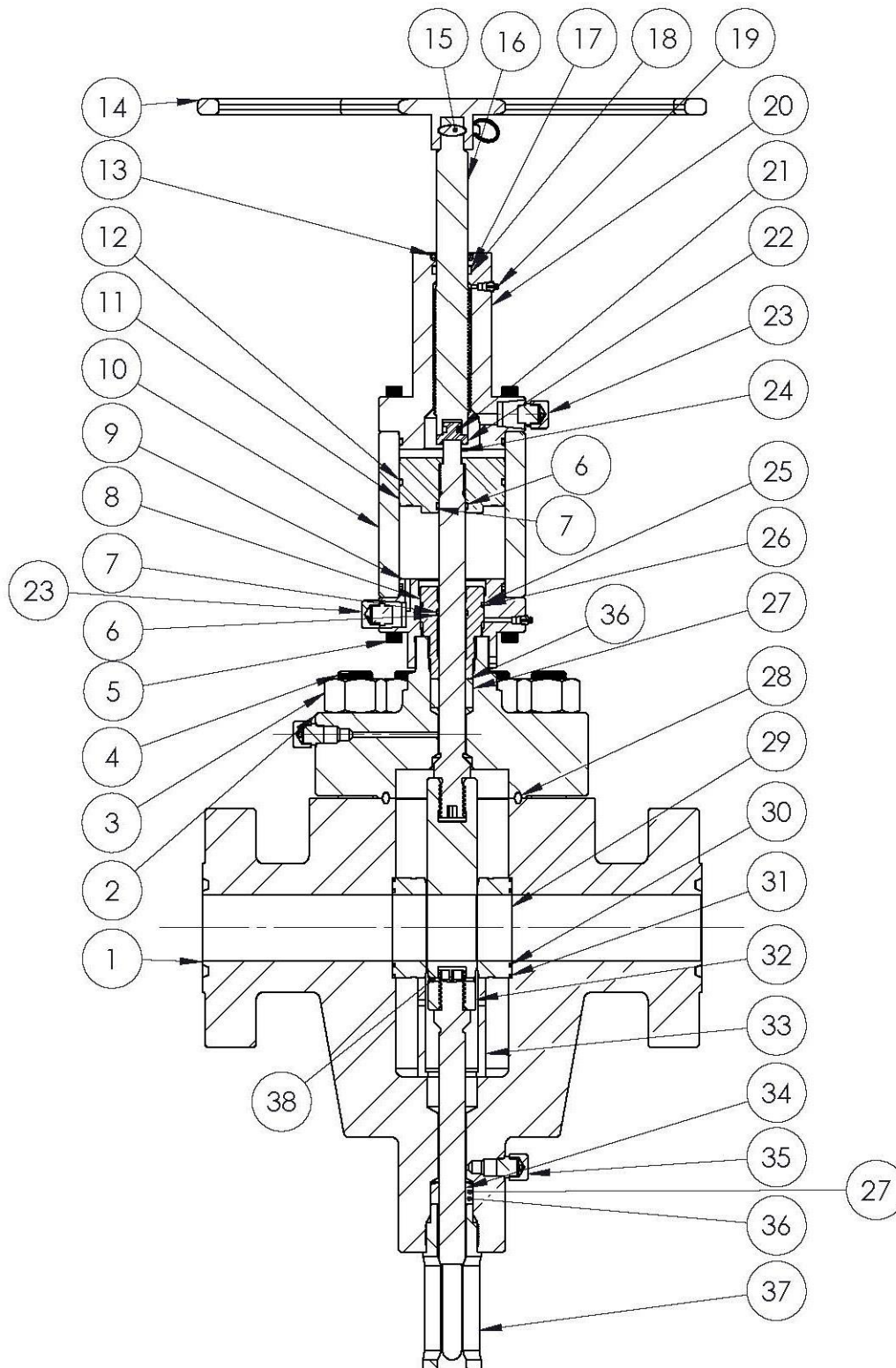
Heshka Oil Type "FLS" Manual Gate Valve

Item	Qty	Description	4-1/16" 5M SUPER TRIM	4-1/16" 10M SUPERTRIM	4-1/16" 15M SUPER TRIM
1	1	HAND WHEEL	HNDWHL-18	HNDWHL-24	HNDWHL-24
2	2	Grease fitting bearing cap	H005929-05	H005929-05	H005929-05
3	1	BEARING CAP	H630302-01	H239035-01	REQUEST
4	1	O-RING bearing cap	OR340	OR343	REQUEST
5	4	BEARING RACE	H019108-01	H019310-01	REQUEST
6	2	THRUST BEARING	H005931-09	H005931-10	REQUEST
7	1	O-RING stem adapter	OR222	OR224	REQUEST
8	1	STEM ADAPTER	H630301-01	H239036-01	REQUEST
9	1	STEM PIN	H021812-14	H021812-15	REQUEST
10	1	PACKING GLAND	H140143-01-05-10	H140142-01-04-10	REQUEST
11	1	STEM PACKING	H2012992-01-01	H2012992-03-01	REQUEST
12	1	PACKING BACK-UP	-	H2013133-03	H2013133-05
13	8	NUT (Bonnet)	REQUEST	REQUEST	REQUEST
14	8	STUD (Bonnet)	REQUEST	REQUEST	REQUEST
15	1	BONNET	H140518-01-70-03	H140068-01-70-03	H2012244-01-70-03
16	1	GREASE INJECTION FITTING	H5929-55	H5929-55	H712806
17	1	BONNET GASKET	H140171-04-01-04	H140170-05-01-04	H140170-10-03-04
18	1	STEM	H140150-04-71-03	H140151-01-71-03	H2102246-71-03
19	1	GATE	H140116-01-74-03	H140131-01-74-03	H2012245-74-03
20	2	SEAT	H140136-01-72-03	H140130-01-72-03	H330097-72-03
21	2	SEAL RING (OD)	H140146-01-01-03	H140146-02-01-03	H2147124-06-03
22	2	SEAL RING (ID)	H140147-01-01-03	H140147-01-01-03	H140147-01-01-03
23	1	RETAINER PLATE	H631591-01	H631908-01	REQUEST
24	1	DOWEL PIN	H21813-06	-	-
25	1	BODY	H140863-01-70-03	H140128-01-70-03	H2012243-01-70-03
26	1	NAMEPLATE	H2013400-76	H2013400-76	H2013400-76

**Item 21 and 22 are listed as virgin peak with Teflon option available.*



PARTS DIAGRAM TYPE FL OR FLS HYDRAULIC GATE VALVE





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Heshka Oil Type "FLS" Hydraulic Gate Valve

Item	Qty	Description	2-1/16" 5M SUPER TRIM	2-1/16" 10M SUPERTRIM	2-1/16" 15M SUPER TRIM
1	1	BODY	HBOD82005-HYD		HBOD82015-HYD
2	2	BONNET			HBON82015-HYD
3	8	STUD	REQUEST	REQUEST	REQUEST
4	8	NUT	REQUEST	REQUEST	REQUEST
5	16	CAP SCREW	SOCCAP-12-13-234OAL	SOCCAP-12-13-234OAL	SOCCAP-12-13-234OAL
6	3	BACK UP RING	ORN8-90-218	ORN8-90-218	ORN8-90-218
7	2	O-RING	OR218-H	OR218-H	OR218-H
8	1	PACKING GLAND	H2245541-01-10	H2245541-01-10	H2245541-01-10
9	1	LOWER HEAD FLANGE	H2245540-01-01	H2245540-01-01	H2245540-01-01
10	1	HYDRAULIC CYLINDER	H2245538-01-11	H2245538-01-11	H2245538-01-11
11	1	PISTON	H2245539-01-10	H2245539-01-10	H2245539-01-10
12	3	FOUR LOBES RING	H2245543-01	H2245543-01	H2245543-01
13	1	ROD SEAL	H006854-47	H006854-47	H006854-47
14	1	HANDWHEEL			HNDWHL-18-12
15	1	QUICK RELEASE PIN	H687950-77-31-20	H687950-77-31-20	H687950-77-31-20
16	1	LOCKING SCREW	H2245534-01-10	H2245534-01-10	H2245534-01-10
17	1	O-RING	OR325-H	OR325-H	OR325-H
18	1	BACK UP RING	ORN8-90-325	ORN8-90-325	ORN8-90-325
19	2	RELIEF VALVE	H5929-10	H5929-10	H5929-10
20	1	UPPER CYLINDER HEAD	H2245537-01-01	H2245537-01-01	H2245528-03-23
21	2	SET SCREW	-	-	-
22	1	CENTERING PIN	H2245536-01	H2245536-01	H2245536-01
23	2	ADAPTER PLUG	H5930-05-10	H5930-05-10	H5930-05-10
24	1	OPERATING STEM	H2245528-02-23	H2245528-02-23	H2245528-03-23
25	1	O-RING	OR232-H	OR232-H	OR232-H
26	1	BACK UP RING	ORN8-90-232	ORN8-90-232	ORN8-90-232
27	2	STEM PACKING	H2012992-01-01	H2012992-01-01	H2012992-01-01
28	1	BONNET GASKET	H140171-01-01-04	H140170-02-01-04	H140170-12-01-04
29	2	SEAT	H140137-01-72-03	H140137-01-72-03	H140675-01-72-03
30	2	ID FACE SEAL	H140398-02-01-03	H140398-02-01-03	H140398-02-01-03
31	2	OD FACE SEAL	H140146-03-01-03	H140146-03-01-03	H140146-06-01-03
32	1	GATE	H2245529-02-23	H2245529-02-23	H2245529-03-23
33	1	RETAINER PLATE			H06042021-001
34	1	LOWER BALANCE STEM	H2245530-02-23	H2245530-02-23	H2245530-03-23
35	2	GREASE INJECTION	H5929-55	H5929-55	H712806
36	2	PACKING BACK UP	-	H2013133-01	H2013133-01
37	1	STEM PROTECTOR	H08232021-002	H08232021-002	H08232021-002
38	2	ROLL PIN	HGA1561750G2ZN	HGA1561750G2ZN	HGA1561750G2ZN



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Heshka Oil Type "FLS" Hydraulic Gate Valve

Item	Qty	Description	3-1/8" 5M SUPER TRIM	3-1/16" 10M SUPERTRIM	3-1/16" 15M SUPER TRIM
1	1	BODY	HBOD83005-HYD		HBOD83115-HYD
2	2	BONNET			HBON83115-HYD
3	8	STUD	REQUEST	REQUEST	REQUEST
4	8	NUT	REQUEST	REQUEST	REQUEST
5	16	CAP SCREW	SOCCAP-12-13-234OAL	SOCCAP-12-13-234OAL	SOCCAP-12-13-234OAL
6	3	BACK UP RING	ORN8-90-218	ORN8-90-218	ORN8-90-218
7	2	O-RING	OR218-H	OR218-H	OR218-H
8	1	PACKING GLAND	H2245541-01-10	H2245541-01-10	H2245541-01-10
9	1	LOWER HEAD FLANGE	H2245540-01-01	H2245540-01-01	H2245540-01-01
10	1	HYDRAULIC CYLINDER	H2245538-06-11	H2245538-06-11	H2245538-07-11
11	1	PISTON	H2245539-01-10	H2245539-01-10	H2245539-01-10
12	3	FOUR LOBES RING	H2245543-01	H2245543-01	H2245543-01
13	1	ROD SEAL	H006854-47	H006854-47	H006854-47
14	1	HANDWHEEL			HNDWHL-18-12
15	1	QUICK RELEASE PIN	H687950-77-31-20	H687950-77-31-20	H687950-77-31-20
16	1	LOCKING SCREW	H2245534-01-10	H2245534-01-10	H2245534-01-10
17	1	O-RING	OR325-H	OR325-H	OR325-H
18	1	BACK UP RING	ORN8-90-325	ORN8-90-325	ORN8-90-325
19	2	RELIEF VALVE	H5929-10	H5929-10	H5929-10
20	1	UPPER CYLINDER HEAD	H2245537-01-01	H2245537-01-01	H2245528-03-23
21	2	SET SCREW	-	-	-
22	1	CENTERING PIN	H2245536-01	H2245536-01	H2245536-01
23	2	ADAPTER PLUG	H5930-05-10	H5930-05-10	H5930-05-10
24	1	OPERATING STEM		H2245528-06-23	H2245528-07-13
25	1	O-RING	OR232-H	OR232-H	OR232-H
26	1	BACK UP RING	ORN8-90-232	ORN8-90-232	ORN8-90-232
27	2	STEM PACKING	H2012992-01-01	H2012992-03-01	H2012992-03-01
28	1	BONNET GASKET	H140171-03-01-04	H140170-04-01-04	H140170-07-01-04
29	2	SEAT	H140139-01-72-03	H140254-01-72-03	H140255-01-72-03
30	2	ID FACE SEAL	H140398-04-01-03	H140398-04-01-03	H140398-04-01-03
31	2	OD FACE SEAL	H140399-04-01-03	H140399-04-01-03	H140399-07-01-03
32	1	GATE	H162339-01-74-03	H2245529-06-23	H2012640-74-03
33	1	RETAINER PLATE		H08192021-001	H2245533-07-10
34	1	LOWER BALANCE STEM	H2245530-02-23	H2245530-06-23	H2245530-07-23
35	2	GREASE INJECTION	H5929-55	H5929-55	H712806
36	2	PACKING BACK UP	-	H2013133-03	H2013133-03
37	1	STEM PROTECTOR	H08232021-002		H2245532-04
38	2	ROLL PIN	HGA1561750G2ZN	HGA1561750G2ZN	HGA1561750G2ZN



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Item	Qty	Description	4-1/8" 5M SUPER TRIM	4-1/16" 10M SUPERTRIM	4-1/16" 15M SUPER TRIM
1	1	BODY		HBOD84010-HYD	
2	2	BONNET		HBON84010-HYD	
3	8	STUD	REQUEST	REQUEST	REQUEST
4	8	NUT	REQUEST	REQUEST	REQUEST
5	16	CAP SCREW	SOCCAP-12-13-234OAL	SOCCAP-12-13-234OAL	SOCCAP-12-13-234OAL
6	3	BACK UP RING	ORN8-90-218	ORN8-90-218	ORN8-90-218
7	2	O-RING	OR218-H	OR218-H	OR218-H
8	1	PACKING GLAND	H2245541-01-10	H2245541-01-10	
9	1	LOWER HEAD FLANGE	H2245540-01-01	H2245540-01-01	
10	1	HYDRAULIC CYLINDER	H2245538-09-11	H2245538-09-11	H2245538-01-11
11	1	PISTON	H2245539-01-10	H2245539-01-10	H2245539-01-10
12	3	FOUR LOBES RING	H2245543-01	H2245543-01	H2245543-01
13	1	ROD SEAL	H006854-47	H006854-47	H006854-47
14	1	HANDWHEEL			
15	1	QUICK RELEASE PIN	H687950-77-31-20	H687950-77-31-20	H687950-77-31-20
16	1	LOCKING SCREW	H2245534-01-10	H2245534-01-10	H2245534-01-10
17	1	O-RING	OR325-H	OR325-H	OR325-H
18	1	BACK UP RING	ORN8-90-325	ORN8-90-325	ORN8-90-325
19	2	RELIEF VALVE	H5929-10	H5929-10	H5929-10
20	1	UPPER CYLINDER HEAD	H2245537-01-01	H2245537-01-01	
21	2	SET SCREW	-	-	-
22	1	CENTERING PIN	H2245536-01	H2245536-01	H2245536-01
23	2	ADAPTER PLUG	H5930-05-10	H5930-05-10	H5930-05-10
24	1	OPERATING STEM	H2245528-06-23	H2245528-10-13	
25	1	O-RING	OR232-H	OR232-H	OR232-H
26	1	BACK UP RING	ORN8-90-232	ORN8-90-232	ORN8-90-232
27	2	STEM PACKING	H2012992-01-01	H2012992-03-01	
28	1	BONNET GASKET	H140171-03-01-04	H140170-04-01-04	
29	2	SEAT	H140136-01-72-03	H140130-01-72-03	
30	2	ID FACE SEAL	H140147-01-01-03	H140147-01-01-03	
31	2	OD FACE SEAL	H140146-01-01-03	H140146-02-01-03	
32	1	GATE	H2245529-09-23	H2245529-10-23	
33	1	RETAINER PLATE		H08192021-001	
34	1	LOWER BALANCE STEM	H2245530-07-23	H2245530-07-23	
35	2	GREASE INJECTION	H5929-55	H5929-55	H712806
36	2	PACKING BACK UP	-	H2013133-03	
37	1	STEM PROTECTOR	H08232021-002		
38	2	ROLL PIN	HGA1561750G2ZN	HGA1561750G2ZN	HGA1561750G2ZN