



## CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES INSTALLATION AND MAINTENANCE INSTRUCTIONS

Before installation these instructions must be fully read and understood



This instruction manual provides installation, operation and maintenance recommendations for both the Clarkson KGF and Clarkson KGF-HP slurry knife gate valves. The standard KGF is a 300 psi CWP valve with optional pressure ratings up to 450 psi cwp and the KGF-HP is rated to Class 300 (740 psi CWP). Both products are very similar, however, the KGF-HP has a higher pressure rating and critical parts are not interchangeable. The KGF and KGF-HP are identified by the valve tag.

### 1 GENERAL INFORMATION

1. The KGF and KGF-HP are packingless, slurry knife gate valves. All the sealing is accomplished by the elastomeric sleeves in the valve housing. The sleeves also form the wear section for the valve. The gate is removable for inspection or replacement while the valve is in service. Refer to Section 13 for gate removal cautions and instructions.
2. The KGF and KGF-HP are BIDIRECTIONAL (two-way shut-off) product and can be installed without concern over direction of flow. Since they will shut-off equally with in either direction, you will find no arrows or other indicators of a direction of flow or seat side.
3. Clarkson slurry knife gate valves are suitable for on-off service only. They are not to be used in a throttling application.
4. The style, size, pressure rating and material selection are the responsibility of the piping system designer.
5. All valves should be operated within the design pressure and temperature ranges. Under no circumstances should the valves be operated at conditions outside these parameters. Do not exceed 100% of the maximum pressure rating of the valve at any time during its operation. Pressure spikes beyond the valve's pressure rating are solely the responsibility of the user.

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# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 2 INITIAL INSPECTION

1. Examine entire valve and report any damage or discrepancies immediately.
2. Sleeves: visually examine the sleeves interior, looking for chunking, irregularities or other damage. It is not recommended you remove the retainer flanges. Visually examine the retainer flanges surfaces, looking for tears, irregularities or other damage. Check tightness of retainer flange bolting.
3. Operators: standard manual handwheels may be shipped loose for field installation, be sure to fully tighten.
4. Valves are normally shipped with gate in open position, the recommended position for installation. Valves supplied with spring to extend (fail close) cylinder actuators are shipped with the gate in the closed position. The KGF and KGF-HP should be installed with the gate in the open position, exercise caution when applying air to open this valve and ensure that it is locked in the open position when installing in the line.
5. Accessories: if provided, including solenoids, limit switches, etc., are tested for functionality prior to shipment. Examine carefully for damage which may occur during shipment.
6. Refer to lockouts Section 5 for additional cautions on spring cylinders

### 3 INSTALLATION INSTRUCTIONS

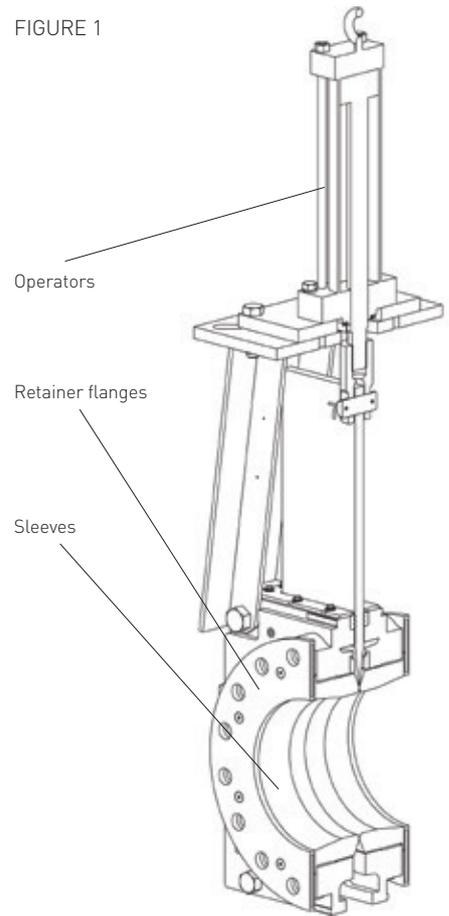
Please take note of the specific installation tags provided with each valve.

1. The KGF and KGF-HP are to be installed with the gate in the fully open position with the sleeves inserted into the housing halves.
2. KGF: standard mating flanges 3" (DN80) through 24" (DN600) match ASME B16.5/300, sizes 30" and larger are per MSS-SP44/300 (see Table 4). Optional drilling to ASME B16.5/150 is available in certain circumstances. Other flange drillings including PN10 or PN16 are available depending on rated pressure of valve.  
KGF-HP: standard mating flanges 3" (DN80) through 24" (DN600) match ASME B16.5/300, sizes 30" and larger are per MSS-SP44/300 (see Table 4). Other flange drillings are available depending on rated pressure of valve.

#### CAUTION

*Valves are normally shipped with gate in open position, the recommended position for installation. Valves supplied with spring to extend (fail close) cylinder actuators are shipped with the gate in the closed position. Gate should be actuated to the open position prior to installation, exercise extreme caution when applying air to open this valve and ensure that gate is locked in the open position for installation. Refer to lockouts section 5 for additional cautions on spring cylinders.*

FIGURE 1



# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

3. Tables 1 and 2 state the maximum flange bolt tightening torques for standard flange patterns. While the KGF and KGF-HP are provided with flange bolt patterns that match ASME B16.5/150 or ASME B16.5/300 flange bolt patterns, they are not designed to handle the same torque requirements as an all-metal Class 150 or Class 300 gate valve. The KGF and KGF-HP are specialty valves with a specified maximum flange torque. Exceeding recommended torque values will reduce overall valve performance and may permanently damage the sleeves and or other components.
4. The KGF and KGF-HP are configured for installation in conventional bolted flange connections. Slip on or weld flanges can be used. The pipeline companion flanges should be raised or flat face type to insure full sleeve support and a continuous, unvarying I.D. If slip-on flanges are used, the pipe should be cut square and welded in position with the pipe end matched evenly with the flange face. Studded flanges are not compatible with these valves. Use of other flange connections should be reviewed and verified by the factory for compatibility prior to installation.
5. The mating line flanges must be properly aligned prior to attempting installation. Never try to make up for misaligned pipe flanges by the line bolting.
6. Optimum performance of the valve sleeves may be achieved if the mating pipe I.D. is no larger than +0.25" (6.5 mm) of the retainer flange I.D. (Refer to Table 4 for retainer flange dimensions.) Oversized mating pipe I.D. may subject retainer flange and sleeve to additional wear.

7. Listed in Table 4 are the fasteners required for installation.
8. Pipe supports and/or expansion joints should be used to minimize pipe loads on valves.
9. The elastomer coated retainer flange functions as the gasket for installation into the pipeline, no additional gaskets are required.
10. Valve is suitable for use in either vertical or horizontal lines. The valve can be installed in any position in vertical or horizontal pipelines. However, valves installed in an orientation with the actuator below horizontal may require flushing to prevent the buildup of solids in the housing and may require additional actuator support.

### Installation notes

- A) All slurry knife gate valves are designed and manufactured to be installed in applications where no more than 1g of force in excess of gravity is applied to the valve in any direction. This 1g force can be an effect of traffic, wind, or earthquake, etc. Valves should not be used in applications that exceed 1g.
- B) If valve stem or topworks protrude into walkways or work areas, valve should be flagged per company safety policy.
- C) All piping systems should contain independent support mechanisms and should not utilize the valve as a sole means of support.
- D) Do not install valve over walkways, electrical or other critical equipment without the use of a splash guard device (refer to section 14) or similar considerations.

FIGURE 2

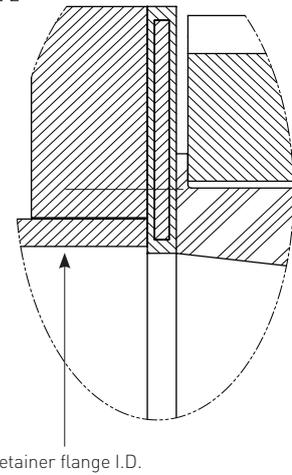


TABLE 1 - MAXIMUM TIGHTENING TORQUE STANDARD CLASS 150 FLANGES

Valve size	ft-lbs	Nm
3	37	50
4	37	50
6	69	64
8	69	64
10	113	153
12	113	153
14	169	229
16	169	229
18	238	324
20	238	324
24	345	467
30	345	467
36	610	827

TABLE 2 - MAXIMUM TIGHTENING TORQUE STANDARD CLASS 300 FLANGES

Valve size	ft-lbs	Nm
3	69	94
4	69	94
6	69	94
8	113	153
10	169	229
12	238	324
14	238	324
16	345	467
18	345	467
20	345	467
24	610	827
30	1000	1355
36	1500	2035

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

**TABLE 3 - BOLTING DIMENSIONS CLASS 150 FLANGES**

Valve size inch/mm	Retainer inlet diameter		Flange diameter		Bolt circle diameter		Bolt holes no.	Bolt size/ thread	Stud length (see note)	
	inch	mm	inch	mm	inch	mm		UNC	inch	mm
3" / 80	2.81	71.4	7½	190.5	6	152.40	4	⅝-11	3	76.2
4" / 100	3.88	98.6	9	228.6	7½	190.50	8	⅝-11	3	76.2
6" / 150	5.81	147.6	11	279.4	9½	241.30	8	¾-10	3	76.2
8" / 200	7.75	196.9	13½	342.9	11¾	298.50	8	¾-10	4	101.6
10" / 250	9.81	249.2	16	406.4	14¼	362.00	12	⅞-9	4	101.6
12" / 300	11.50	292.1	19	482.6	17	431.80	12	⅞-9	4½	114.3
14" / 350	13.25	336.6	21	533.4	18¾	476.30	12	1-8	4½	114.3
16" / 400	14.75	374.7	23½	596.9	21¼	539.80	16	1-8	4½	114.3
18" / 450	16.75	425.5	25	635.0	22¾	577.90	16	1⅛-7	5	127.0
20" / 500	18.50	469.9	27½	698.5	25	635.00	20	1⅛-7	6	152.4
24" / 600	23.00	584.2	32	812.8	29½	749.30	20	1¼-7	6½	165.1
30" / 750	29.00	736.6	38¾	984.3	36	914.40	28	1¼-7	9	228.6
36" / 900	35.00	889.0	46	1168.4	42¾	1085.85	32	1½-6	9	228.6

**NOTES**

- Flange dimensions per ANSI B16.5/150 for 3"-24" and MSS SP44/150 for 30"-36".
- Type B standard washers are not included in stud lengths.
- Mating flange thickness assumed to match ANSI B16.5/150 for 3"-24" and MSS SP44/150 for 30"-36".
- Flange drilled and tapped holes in body over 1" in diameter are normally provided with course threads.
- Stud lengths supplied are minimum for full thread engagement into tapped holes and stud lengths are rounded to nearest 0.5 inch.
- Stud lengths are supplied rather than bolt lengths.
- Bolt hole quantity shown below is per side of valve.

**TABLE 4 - BOLTING DIMENSIONS CLASS 300 FLANGES**

Valve size inch/mm	Retainer inlet diameter		Flange diameter		Bolt circle diameter		Bolt holes no.	Bolt size/ thread	Stud length (see note)	
	inch	mm	inch	mm	inch	mm		UNC	inch	mm
3" / 80	2.81	71.4	8¼	209.6	6⅝	168.30	8	¾-10	3½	88.9
4" / 100	3.88	98.6	10	254.0	7⅞	200.00	8	¾-10	3½	88.9
6" / 150	5.83	148.1	12½	317.5	10⅞	269.90	12	¾-10	3½	88.9
8" / 200	7.86	199.6	15	381.0	13	330.20	12	⅞-9	4	101.6
10" / 250	9.80	248.9	17½	444.5	15¼	387.40	16	1-8	4½	114.3
12" / 300	11.50	292.1	20½	520.7	17¾	450.90	16	1⅛-7	5½	139.7
14" / 350	13.30	337.8	23	584.2	20¼	514.40	20	1⅛-7	5½	139.7
16" / 400	14.75	374.7	25½	647.7	22½	571.50	20	1¼-7	6	152.4
18" / 450	17.00	431.8	28	711.2	24¾	628.70	24	1¼-7	6	152.4
20" / 500	18.50	469.9	30½	774.7	27	685.80	24	1¼-7	7	177.8
24" / 600	23.50	596.9	36	914.4	32	812.80	24	1½-6	7½	190.5
30" / 750	29.00	736.6	43	1092.2	39¼	996.95	28	1¾-5	10	254.0
36" / 900	35.00	889.0	50	1270.0	46	1168.40	32	2-4.5	11	279.4

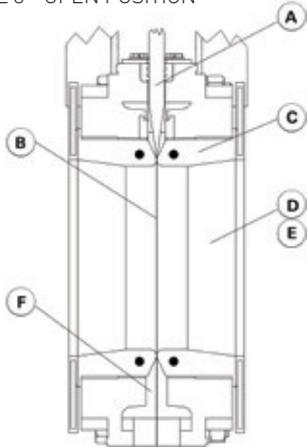
**NOTES**

- Flange dimensions per ANSI B16.5/300 for 3"-24" and MSS SP44/300 for 30"-36".
- Type B standard washers are not included in stud lengths.
- Mating flange thickness assumed to match ANSI B16.5/300 for 3"-24" and MSS SP44/300 for 30"-36".
- Flange drilled and tapped holes in body over 1" in diameter are normally provided with course threads.
- Stud lengths supplied are minimum for full thread engagement into tapped holes and stud lengths are rounded to nearest 0.5 inch.
- Stud lengths are supplied rather than bolt lengths.
- Bolt hole quantity shown below is per side of valve.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

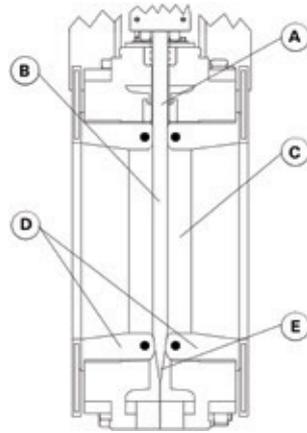
FIGURE 3 - OPEN POSITION



### Open position

- A) Gate positioned above seals, out of flow.
- B) Matching elastomer sleeves seal against each other under a high compression load.
- C) Sleeves act as pressure vessel.
- D) No metal parts in contact with slurry.
- E) Unobstructed port area eliminates turbulence, minimizes pressure drop across valve.
- F) No seat cavity where solids can collect and prevent full gate closure.

FIGURE 4 - CLOSED POSITION



### Closed position

- A) Gate travels through sleeves to provide blind flange shut-off, allowing opportunity for media to expel to atmosphere.
- B) 100% Isolation-bubble tight shut-off results in absolutely zero downstream leakage.
- C) When properly installed and maintained, the KGF is designed to provide man-safe isolation.
- D) Double-seated design provides bidirectional flow and shut-off.
- E) Controlled stroke prevents gate from penetrating too far, minimizing stress on sleeve.

## 4 OPERATION

1. Clarkson slurry knife gate valves are suitable for on-off service only. They are not to be used in a throttling application.
2. To close the valve and provide isolation, the actuator (handwheel, bevel gear, air/hydraulic cylinder or electric motor actuator) moves the metal gate in a linear motion between the elastomeric sleeves to shut off the flow. To open, reverse the operation and the gate moves up and out from between the sleeves, opening the valve port.
3. Matching elastomer sleeves seal against each other under a high compression load when the valve is open, creating the valve pressure vessel. When the valve is closed, the sleeves seal against the gate face, isolating upstream from downstream. See Figures 3 and 4.

It is normal for the KGF and KGF-HP to discharge media during opening and closing cycles. Some additional discharge may continue for a time after completion of the open cycle. This helps prevent any solids from building up between the sleeves that would prevent a tight seal when the valve is fully open or closed. Discharge can be controlled with the use of a splash guard device (refer to section 14).

Depending on the pressure rating, some models of the KGF and KGF-HP include a splash guard device as standard. Do not install valve over walkways, electrical or other critical equipment without the use of a splash guard device or similar considerations.

4. As the gate strokes, a gap is created between the facing sleeves, allowing any media that could potentially clog or jam the valve to be purged out from between the sleeves, and potentially expelled outside the valve housing to atmosphere.
5. The KGF and KGF-HP incorporate a built-in clean-out area at the base of the housing assembly. The clean-out area may be enclosed by a removable splash guard device. Depending on the pressure rating, some models of the KGF and KGF-HP include a splash guard device as standard. This splash guard device will allow controlled drainage of any accumulated solids that may prevent full gate closure. Flush water can be used to improve the drainage efficiency. With the splash guard device in place, any solids, slurry, or flush water ejected from the valve can be handled in a controlled manner. See Section 14 for splash guard device installation instructions.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

- All valves should be operated within the design pressure and temperature ranges. Under no circumstances should the valves be operated at conditions outside these parameters.

**Note:** actuated Clarkson valves have a maximum recommend stroke speed of 1" per second. Exceeding this speed can shorten sleeve life and may void warranty. Speed controls provided by factory will require adjustment in the field to obtain proper stroke speed against actual operating conditions. Refer to Section 14 for additional information on discharge.

- The operator of any valve should have an understanding of the effects of opening/closing the valve with regards to its role in the overall piping system. Operators of valves under pressure should take caution to ensure that the valve is in good operating condition prior to operating it under pressure.
- Certain processes contain hazardous and/or otherwise unstable media. Care should be taken in these circumstances to ensure the operator is aware of the specific health and safety risks associated with that medium.
- When operating the valve stand clear of any moving parts such as the stem and/or gate assembly, use of gloves is suggested when operating manual valves to minimize the risk of injury.
- All manually operated valves are designed for hand input. Do not apply excessive input torque via pipe wrenches, 'cheater bars', or other devices. If a manual handwheel actuated valve is difficult to operate due to torque requirements, it is recommended that the valve be supplied with or converted to a bevel gear, air/hydraulic cylinder or electric motor actuator.
- Electric motor actuated valves should be left in their factory set condition, unless the system operating parameters dictate a change. If changes are necessary, they should be performed in small increments using the lightest/lowest setting possible to achieve the desired performance and then the valve/actuator function inspected. Excess torque and/or thrust in the motor settings may damage or lockup the valve.

- Clarkson KGF and KGF-HP valves are position seated and should never be torque seated. Do not use the motor torque settings to seat the valve.
- Care should be taken to ensure that electrical motors are wired correctly to the power source. Incorrect phasing of 3-phase wiring may cause valve/motor damage.

### 5 LOCKOUTS

Open and closed lockout positions are optional on the KGF and KGF-HP. Optional lockout pins may be supplied by Emerson or customer may use their own suitable pin. (Contact factory for pin specifications.)

#### CAUTION

*If lockout pins are used on automated valves, the open & closed lockout brackets are designed to resist the normal valve operating thrust. In order to assure complete lockout compliance, any double acting air cylinder, hydraulic cylinder or electric motor actuated valve must be placed in a ZERO ENERGY STATE by isolating all potential energy sources including electricity, operator air supply or hydraulic fluids.*

In the case of a single acting spring to close or spring to open cylinder with the spring compressed, the mechanical energy cannot be placed in the ZERO ENERGY STATE. When compressed, the spring will cause unwanted gate movement if inlet air pressure is not maintained on the non-spring side of the actuator. Specific care must be taken to insert or remove lockout pins.

- Spring extended (uncompressed): isolate air supply from cylinder actuator.
- Spring retracted (compressed): maintain air pressure on the non-spring side of the actuator.

*Take great care when inserting and removing the lockout pin. If the gate moves during the insertion or removal process, injury may occur.*

FIGURE 5

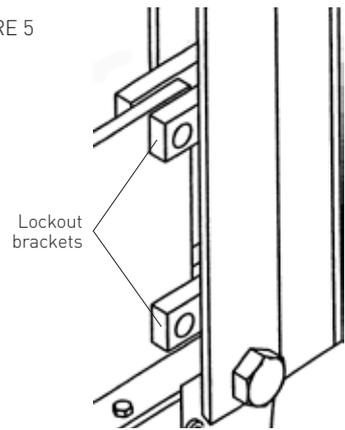
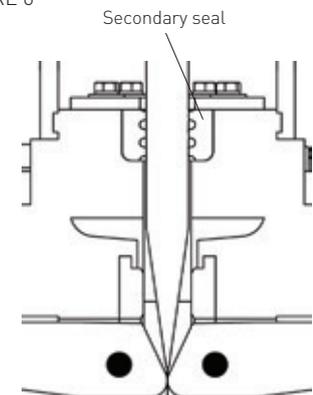


FIGURE 6



# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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### 6 GENERAL MAINTENANCE

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We recommend that all Clarkson products be inspected at least every 60 days. The following points should be examined and corrected as required:

1. Exterior overview: piping system components are subject to certain levels of erosion and corrosion. Periodic inspections should be made as valves/components may wear over time. Regular inspection of the housing assembly and gate should be performed, check for general signs of corrosion, component wear and/or damage caused by process media. Severe applications may require additional inspection types and/or frequency.
2. Valve stems, extension stems, and stem nut: look for excessive corrosion, galling or lack of lubrication. If valve stem requires lubrication, utilize the grease fitting provided and pump standard bearing grease through the yoke hub to lubricate the stem and stem nut assembly. Additional lubrication may be applied directly onto stem or stem threads. (Use material which meets ASTM 4950 GBLB.)
3. If possible stroke the valve through the full open and closed position to make sure it is functioning properly.

**Note:** it is normal for the KGF and KGF-HP valve to discharge media during opening and closing cycles. Some additional discharge may continue for a time after completion of the open cycle.

4. Sleeve lubrication (See below for approved lubrication)
  - A) The KGF and KGF-HP valve has no body or sleeve lubrication fittings. Lubrication is provided to the gate by the secondary seal. When secondary seal is replaced or inspected, it should be lubricated as described in Section 11.
  - B) The gate may also be lubricated by applying lubricant directly onto the exposed gate surface.
  - C) As a minimum, the Clarkson KGF and KGF-HP valves should be lubricated every 100 strokes for 3" through 10" sizes and every 50 strokes for 12" - 36" sizes. An individual application may require more or less frequent lubrication depending on the process and chemistry.
  - D) If a valve cycles very infrequently, less than once per month, lubrication prior to each stroke is recommended.
  - E) Sleeve wear can be minimized if the valve gate is scraped or wiped clean occasionally.

#### NOTE

Failure to use the recommended type of lubricant will considerably reduce the life of both the sleeves and secondary seal. *Under no circumstances should a hydrocarbon-based lubricant be used.* The use of improper lubrication will void any remaining warranty.

### APPROVED SILICON BASED LUBRICANTS

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Dow III - Dow Corning	Complex 821 - NFO
Dow 44 - Dow Corning	Dow 7 - Dow Corning
Rhodorsil 111 - Rhone-Poulenc	Compound G661 - G E
Sil Glyde - AGS Company	

For compatibility of other lubricants, consult Emerson Engineering.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 7 SPARE PARTS

#### Recommended spare parts (see Figure 7)

Valves:

- 2-replacement sleeves
- 1-replacement secondary seal
- x-gate supports (quantity varies with valve size)
- 2-body gaskets

Cylinder operator (if applicable):

- 1-repair kit

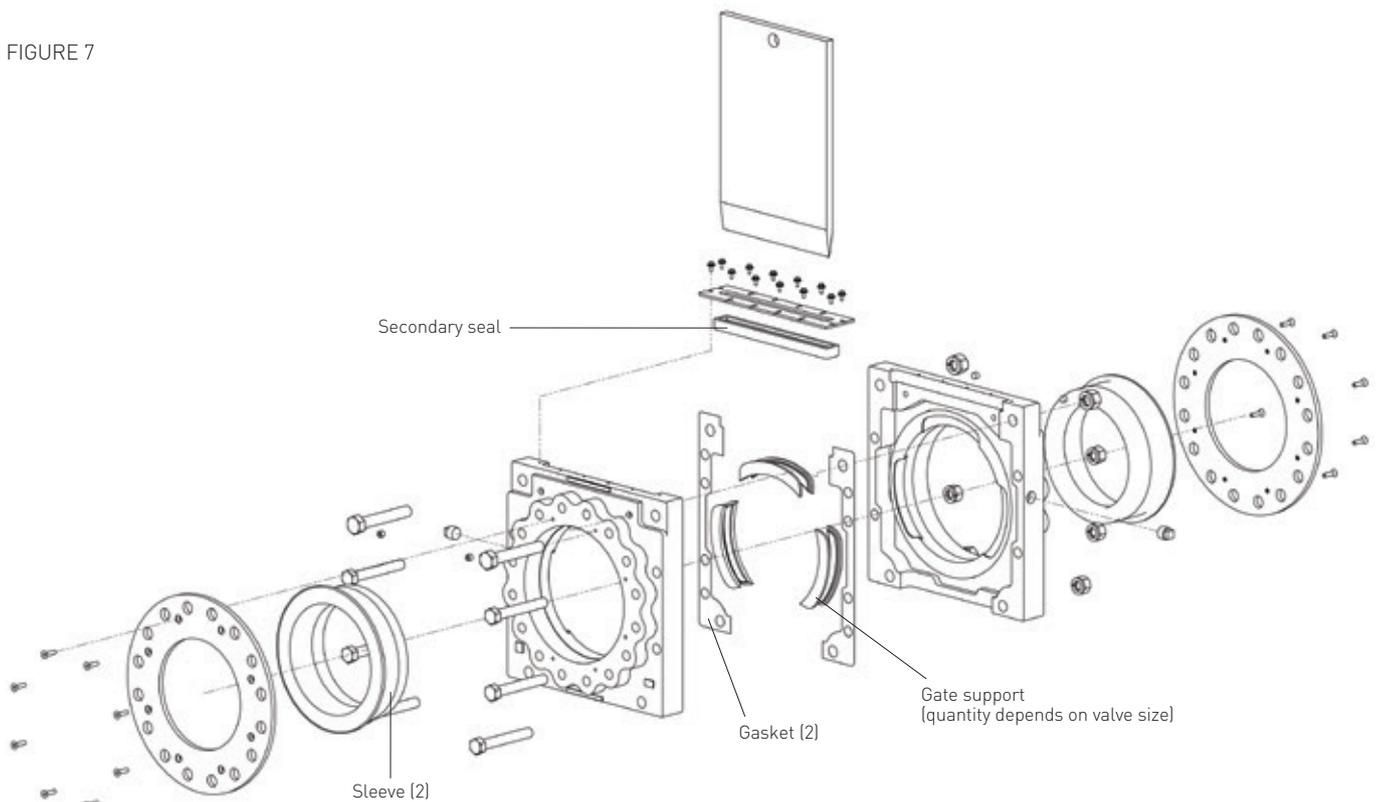
1. When ordering replacement parts for a Clarkson product or cylinder operator, please include valve or cylinder size and complete description including serial number with your request.
2. Additional replacement parts such as handwheels, stem nut assemblies, retainers, frames (yoke), stems and gates are available from factory. Again, please provide complete description with serial number when ordering.
3. Spare sleeve storage: molded elastomer sleeves have a practical recommended shelf-life. Genuine Clarkson sleeves are laser etched on the outside surface with date of manufacture to use in calculating estimated shelf-life.  
Natural Rubber - 2 years; EPDM - 4 years; NBR/HNBR - 4 years  
Contact factory for additional elastomers.

The shelf life listed is guideline data and is not a substitute for examination of cured material at the time of intended use.

To maintain shelf-life, spare sleeves should be stored in accordance with the following.

1. Store at ambient temperature up to 80°F, with 60 - 90% relative humidity away from direct sunlight and at a minimum distance of 15 feet away from electric motors is mandatory.
2. Care must be taken to avoid storage in a stressed condition such as piled too high or on a plain pallet overhanging a sharp edge.
3. First in - first out inventory control should be practiced.
4. The above elastomer shelf life guidelines are for components that are not already installed in a valve.

FIGURE 7



# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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**Note:** Emerson recommends customers always use genuine Clarkson OEM sleeves, secondary seals and other replacement parts to maintain the expected, superior, performance of their KGF and KGF-HP. Genuine Clarkson sleeves and secondary seals from Emerson are easily recognized by the laser etched identifying marks found on the outside surface. These marks include the size, part number, applicable patent number, elastomer batch compound and date of manufacture; all of which allow complete traceability of the part. Clarkson replacement sleeves, secondary seals and other parts from TFC are the only ones authorized for use and offer the best fit and continued performance that non-OEM parts simply cannot give. The use of copycat parts may invalidate any remaining warranty. If valve requires further repair, please contact our office for an estimate of feasibility and cost of repair.

### 8 STORAGE

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The following are the factory's recommendations for storage procedures to retain maximum product integrity during long term storage of 1 to 5 years.

1. Valves are normally shipped with gate in open position, the recommended position for storage. During storage, the gate should always be in the open position. Storage should be in an area out of direct sunlight, away from heat, ozone and extreme weather conditions. Freezing is not considered detrimental as long as the valve is kept dry. High voltage rectifiers and other ozone generating equipment and sources should not be near the storage area.

#### CAUTION

*Valves supplied with spring to extend (fail close) cylinder actuators are shipped with the gate in the closed position. DO NOT store a KGF and KGF-HP with a spring to extend (fail close) in the open position. This would put the spring in a compressed, fully energized position. For storage, it is recommended the valve sleeves be removed from the valve housing and stored separately from the valve. Reinsert sleeves prior to installation.*

2. The preferred storage location is a clean, dry protected warehouse. If valves are to be stored outside, precautions should be taken to keep valves clean and dry. Standard packaging materials provided in valve shipment cannot be considered sufficient for outdoor storage.

3. If outdoor storage is required, the equipment should be totally covered with a heavy, light colored, plastic covering. It is essential that the plastic be opaque to eliminate sunlight, and light colored to minimize heat buildup. The covering should be spread in a manner that allows underside ventilation. To insure proper ventilation the equipment should be elevated 2" - 4" above the ground.
4. Manual actuated valves may be stored in the vertical or horizontal position. For air or hydraulic actuated valves, the preferred orientation for optimum protection is with the valve fully opened and the cylinder in the vertical position. This position gives the best support to the cylinder rod and helps reduce the chance of a 'flat spot' developing on the cylinder seals. An acceptable alternate position for valves with cylinder diameters of less than 6" is with the cylinder in the horizontal position. Motor actuated valves should be oriented in the direction as preferred by the actuator manufacturer.
5. Valves with cylinder and motor actuators should be stored in accordance with actuator manufacturer's recommendations. Access ports or panels should be secured to prevent unauthorized entry and prevent contamination.
6. Where auxiliary equipment is included, such as limit switches, solenoid valves, etc., care must be taken to avoid moisture and condensation conditions on the equipment.
7. Storage inspection: visual inspection shall be performed on a semiannual basis and results recorded. Inspection as a minimum shall include reviewing the following:
  - Packaging
  - Flange covers
  - Dryness
  - Cleanliness
8. Maintenance shall consist of correcting deficiencies noted during inspection. All maintenance shall be recorded. Contact factory prior to performing any maintenance if valve is still covered under warranty.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 9 SLEEVE REPLACEMENT

#### Inspection of components

1. Verify that for each valve there are two (2) sleeves, two (2) retainer flanges (if required), retainer flange bolts and nuts (if required). Refer to the Clarkson certified parts list for the appropriate valve size to determine the quantity of retainer flange nuts and bolts required.
2. Visually inspect each sleeve and retainer flange for damage to surfaces resulting from shipping or post-shipping handling. The sealing surfaces (nose) must be free of depressions, slits or gouges.

#### NOTE

Certified Clarkson elastomer parts from Emerson are laser-etched with part number, date of manufacture, the Clarkson brand name and other appropriate information to assure you have a genuine Clarkson part. The use of non-OEM parts will void any remaining warranty.

#### Disassembly

1. Before working on the KGF and KGF-HP valve, verify that the valve is in the open position. If it is not, move it to the open position.

#### CAUTION

Assure line is not pressurized before removing valve. Valve assembly and parts may be heavy, use proper lifting and support techniques. See Section 17, Lifting.

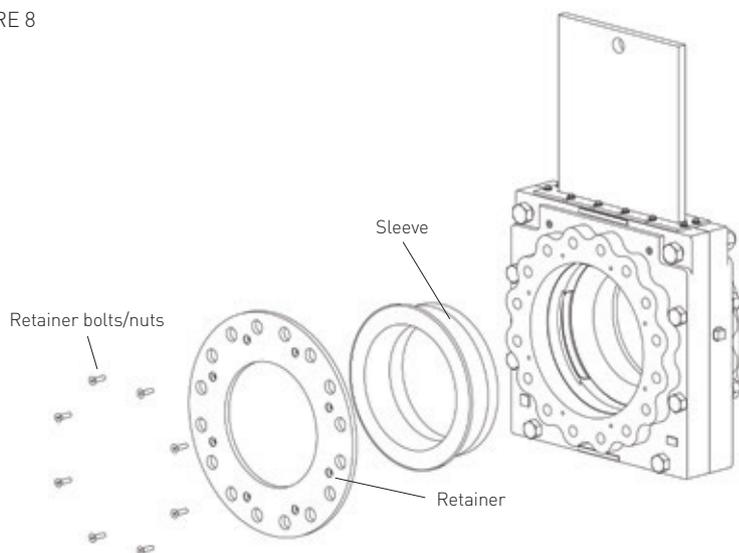
2. Remove the valve from the piping.
3. Visually inspect and verify that the sleeve bore is clear of all debris, scale and elastomer residue.

4. Remove the retainer flange bolts taking caution to prevent retainer flanges from falling free if in vertical position. Remove the retainer flanges from the valve.
5. For valves with segmented retainer flanges, loosen retainer bolts and pull each individual segment straight up away from the valve, do not remove more than one section at a time.
6. Remove the two elastomer sleeves by simply pulling each sleeve out of the housing assembly. (Sometimes a putty knife, large screwdriver or pry bar is necessary to pry the retainer flange away from the sleeve and the sleeve from the valve flange.)
7. Install the retainer bolts. Only tighten sufficiently to allow installation of the next bolt. Continue this until all bolts are installed.
8. Once all bolts are in place, tighten the retainer flange bolts using a cross pattern until there is a 0" to 1/8" gap between the retainer flange and the housing. Do not cycle valve with only one sleeve in place.

#### Installation

1. It is recommended to replace the gate supports whenever new sleeves are installed, refer to section 10; Gate support replacement prior to reinstalling sleeves.
2. Lay valve down in a horizontal position, on a flat surface. (While it is possible to install valve sleeves with assembly in vertical position, this may make it more difficult to properly align the retainer flanges and sleeves, especially on larger valves.)
3. Check the bore diameter for unusual or excessive wear. If found, valve housing may require replacement.
4. Lubricate the O.D. of the seal end of the sleeve.
5. Install the sleeve, being careful to center the flange end in the bore of the housing.
6. Place a retainer flange on the top of the sleeve. Align the retainer flange bolt holes with the matching holes in the round flange. Align the I.D. of the sleeve and retainer flange.

FIGURE 8



# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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9. Turn the valve over so the installed sleeve is on the flat surface.
10. Apply a silicone base lubricant to the sealing-nose radius of the installed sleeve. Also apply it to the second sleeve sealing nose and O.D. of seal end.
11. Install the second sleeve, following steps 1 through 5.
12. Install second retainer per following steps, depending on valve size.
- 13A. Smaller valves:
  - a. Place second retainer flange on the top of the sleeve. Align the retainer flange bolt holes with the matching holes in the round flange. Align the I.D. of the sleeve and retainer flange.
  - b. Check the sleeve bores for concentricity; using a straight edge, check the sleeve position in four (4) places, 90 degrees apart in relation to the installed sleeve bore I.D. Adjust as required to make the sleeve concentric with the other sleeve.
  - c. Install the retainer bolts, do not fully tighten. Only tighten sufficiently to allow installation of the next bolt. Continue this until all bolts are installed.
  - d. Once all bolts are in place and concentricity has been checked, tighten the retainer flange bolts using a cross pattern until there is a 0" to 1/8" gap between the retainer flange and the housing.
- 13B. Larger valves (see paragraph 13C for alternate method):
  - a. Place second retainer flange on the top of the sleeve. Align the retainer flange bolt holes with the matching holes in the round flange. Align the I.D. of the sleeve and retainer flange.
  - b. Check the sleeve bores for concentricity; using a straight edge, check the sleeve position in four (4) places, 90 degrees apart in relation to the installed sleeve bore I.D. Adjust as required to make the sleeve concentric with the other sleeve.
  - c. Using two or more C-clamps, pull down the second retainer flange.
  - d. Install the retainer bolts, do not fully tighten. Only tighten sufficiently to allow installation of the next bolt. Continue this until all bolts are installed.
  - e. Once all bolts are in place and concentricity has been checked, tighten the retainer flange bolts using a cross pattern until there is a 0" to 1/8" gap between the retainer flange and the housing.
  - f. Remove C-clamps.
- 13C. Larger valves, alternate method.
  - a. Install threaded studs (at least one or two studs per 90 deg of bolt circle) into the drilled and tapped flange bolt holes.
  - b. Studs should be of sufficient length to fully engage in valve body and extend beyond the stack up of the uncompressed sleeve and retainer flange, plus nut height.
  - c. Place second retainer flange on the top of the sleeve, over the installed flange studs while aligning the retainer flange bolt holes with the matching holes in the round flange. Align the I.D. of the sleeve and retainer flange.
  - d. Check the sleeve bores for concentricity; using a straight edge, check the sleeve position in four (4) places, 90 degrees apart in relation to the installed sleeve bore I.D. Adjust as required to make the sleeve concentric with the other sleeve.
  - e. Place a nut/washer on each installed flange stud and using an alternating, cross flange pattern, draw the retainer flange toward the valve body.
  - f. Install the retainer bolts, do not fully tighten. Only tighten sufficiently to allow installation of the next bolt. Continue this until all bolts are installed.
  - g. Once all bolts are in place and concentricity has been checked, tighten the retainer flange bolts using a cross pattern until there is a 0" to 1/8" gap between the retainer flange and the housing.
  - h. Remove installed flange studs and nuts.
14. The valve is now ready for installation. Keep gate in the open position until valve is installed.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 10 GATE SUPPORT REPLACEMENT

It is recommended to replace the gate supports whenever new sleeves are installed. The valve body assembly does not have to be disassembled to remove and replace the gate supports.

1. Remove sleeves from valves (refer to Section 9, Sleeve replacement).
2. Remove old gate supports from housings. (A small pry-bar, flat screw driver or similar tool may be required to pry the gate supports out).
3. Inspect the gate support pockets to assure they are clean and free of debris; clean debris from pockets as necessary.
4. All supplied gate supports are the same dimensions per valve size and can be installed in any pocket.
5. Gate supports have a specific orientation and must be installed with the wider area up against the body half, the narrower area against the gate.
6. The use of adhesives is not required; supports are press fit into body housing.
7. Install new gate supports; slipping them into the pocket from the valve body I.D. toward the O.D. Use a rubber mallet to tap the gate support into the pocket until it flushes with the I.D. of the housing, taking care not to damage the support.

#### CAUTION

*This procedure may be performed with the valve in an active pipeline. If it is suspected that either one or both of the elastomer sleeves have failed, or if any continual weeping or discharge from valve housing is apparent, isolate the pipeline valve and or remove the valve from the line or before secondary seal removal. Use of personal protective equipment, tag out or other plant standard safety procedures must be followed. Procedure MUST NOT be done with valve in closed position. If valve is removed for this service, assure line is not pressurized before removing valve. Valve assembly and parts may be heavy, use proper lifting and support techniques, refer to Lifting, Section 17.*

### 11 SECONDARY SEAL REPLACEMENT

#### Disassembly

1. Open the valve, so the gate is in the fully raised position.
2. For ease of reassembly, using a permanent marker, draw a line on the gate face along the top of the secondary retainer plate. If marking gate is not an option, make note of the dimension from top of valve housing to top of gate in full open position.
3. Remove the cotter pin from the clevis pin and remove the clevis pin from the gate. It may be necessary to actuate the valve down slightly in order to relieve pressure on the clevis pin to facilitate removal.
4. Actuator assembly removal:  
**Smaller valves (valves with one bolt used on frame leg):** remove the frame to housing bolts of one side except for the lowest bolt on the opposite side of the frame. This bolt will act as a pivot point for the frame / actuator assembly. While supporting the actuator assembly, pivot the frame / actuator assembly away from the valve. Continue to provide support while actuator is in this position.  
**Larger valves (valves with more than one bolt used on frame leg):** remove the frame to housing bolts. Lift the frame and actuator assembly off the housing assembly to allow secondary seal and gate removal.
5. Loosen the secondary seal retainer plate bolts.
6. Remove the gate by lifting it out of the secondary seal.
7. Remove all fasteners and lockwashers that retain the secondary seal retainer plate in position.
8. Remove the secondary seal retainer plate by lifting it up.
9. Remove the secondary seal by inserting a flat blade screwdriver midway along the outside of the seal, between the seal and the valve housing. Pry the seal up and remove.
10. Inspect the gate for sharp edges or excessive damage. Refer to 'Gate replacement' section if gate requires replacement.

FIGURE 9

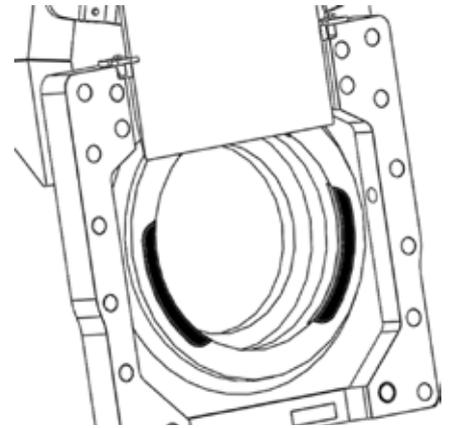


Illustration does not show the guides at 12:00 position under the gate.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### Reassembly

1. If valve has been removed from pipe, lift valve to vertical position, refer to Lifting, Section 17.
2. Using DOW III or approved alternate, completely fill all internal cavities of the new secondary seal.
3. Paying attention to the top and bottom of the secondary seal, insert the new lubricated secondary seal into the valve housing assembly. (The bottom of the seal has radiused edges.)
4. Place the secondary seal retainer plate into position.
5. Replace and hand tighten all the retainer plate fasteners and lockwashers.
6. Apply a small amount of recommended lubricant to the two tapered faces of the 'sharp end' of the gate.
7. Press the gate firmly through the secondary seal into the valve housing assembly until the mark drawn on the gate reaches the top of the retainer plate or gate reaches previously recorded dimension.
8. Fully tighten all the retainer plate fasteners.
9. Reinstall the actuator / frame assembly with the housing / frame fasteners loosely.
10. Reconnect the gate to the actuator. (In order to facilitate installation and future removal, a coating or anti-seize compound should be applied to the outside of the clevis pin over the yoke contact area.)
11. 'Stretch' the frame / actuator assembly with respect to the housing by pulling (not lifting) the frame / actuator assembly to its maximum movement away from the housing assembly (holding housing in place if valve is removed from pipeline). Tighten the frame / housing bolts and verify the tightness of the actuator to frame bolts.
12. Cycle valve to full open position and check the gate position.
13. Rattle the gate. It should be mostly disengaged from the sleeves. The outboard edges of the gate should be free and the center still partially engaged in between the sleeves.
14. Cycle gate full closed and full open.
15. Inspect gate for pieces of rubber. If significant amount of rubber is present, a sharp edge(s) on the gate may be causing seal damage or the gate is extending too far on the up stroke. The ends of the gate should be free and the center still engaged. If the sleeve / gate is misaligned, loosen the frame actuator bolts and/or adjust the yoke until the proper position, open and closed, is obtained.
16. If out of pipeline, reinstall the valve, refer to Lifting, Section 17.

### 12 DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

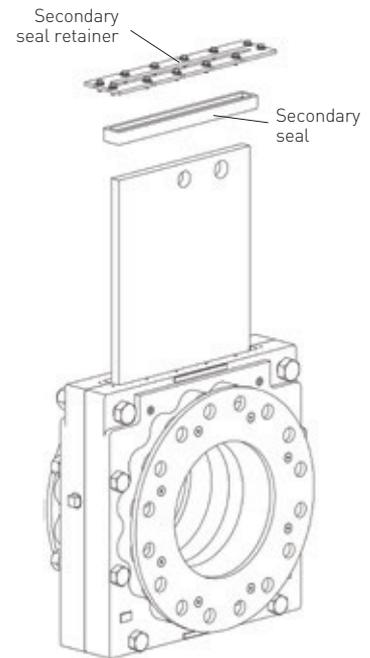
#### CAUTION

*Valve assembly and parts may be heavy, use proper lifting and support techniques, refer to Lifting, Section 17. Use of personal protective equipment and other plant standard safety procedures must be followed.*

#### Disassembly

1. Before working on the KGF and KGF-HP valve, verify that the valve is in the open position. If it is not, move it to the open position.
2. Remove the valve from the piping.
3. For ease of reassembly, using a permanent marker, draw a line on the gate face along the top of the secondary retainer plate. If marking gate is not an option, make note of the dimension from top of valve housing to top of gate in full open position.
4. Visually inspect and verify that the sleeve bore is clear of all debris, scale and elastomer residue.
5. Remove the retainer flange bolts taking caution to prevent retainer flanges from falling free if in vertical position. Remove the retainer flanges from the valve.
6. For valves with purge control assemblies, remove assembly from valve body.
7. Remove the two elastomer sleeves by simply pulling each sleeve out of the housing assembly. (Sometimes a putty knife, large screwdriver or pry bar is necessary to pry the retainer flange away from the sleeve and the sleeve from the valve flange.)

FIGURE 10



# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

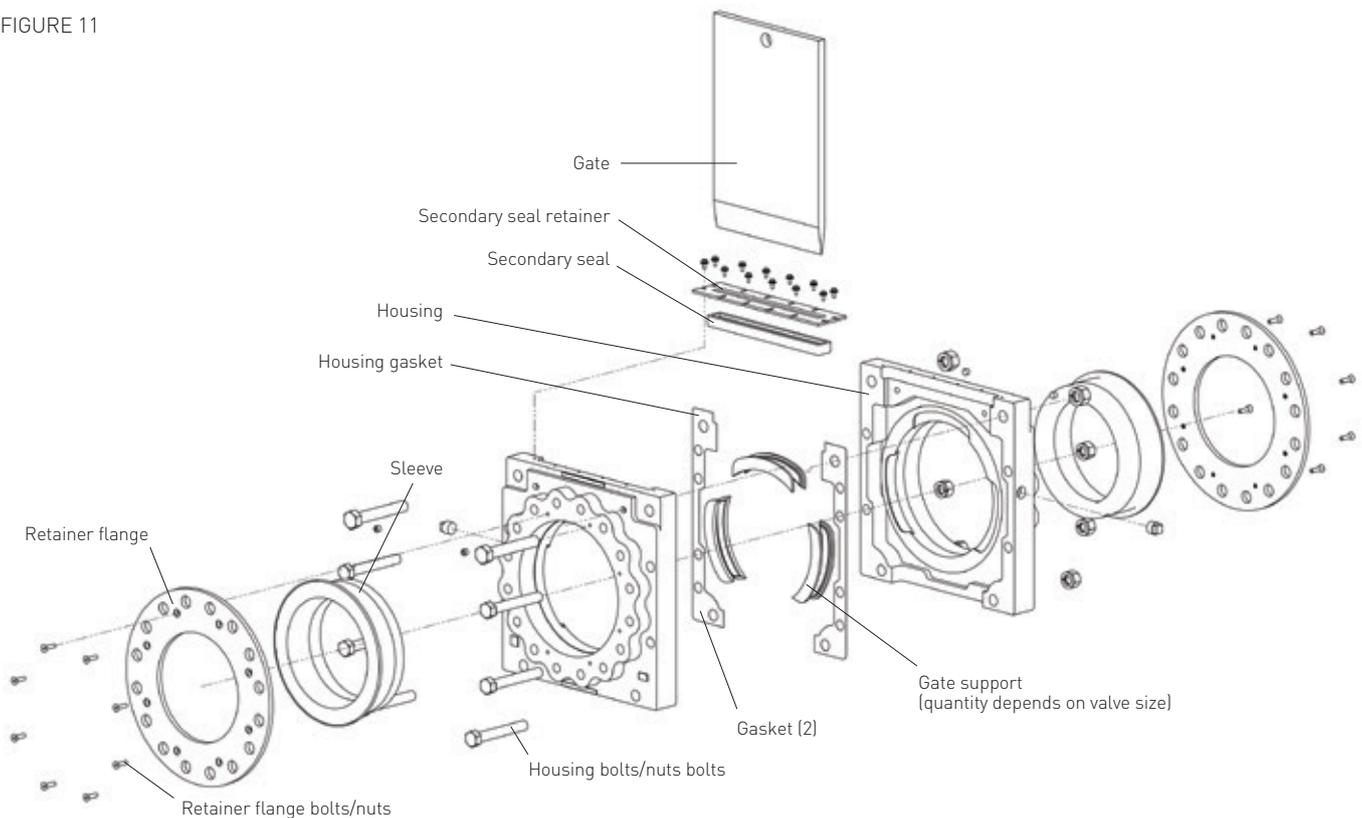
## INSTALLATION AND MAINTENANCE INSTRUCTIONS

8. Remove the cotter pin from the clevis pin and remove the clevis pin from the gate. It may be necessary to actuate the valve down slightly in order to relieve pressure on the clevis pin to facilitate removal.
9. Remove the actuator/frame subassembly at one time by removing the frame bolts that fasten the frames to the housing and pulling it away from the housing assembly.
10. Loosen the secondary seal retainer plate bolts.
11. Remove the gate by lifting it out of the secondary seal.
12. Remove all fasteners and lockwashers that retain the secondary seal retainer plate in position.
13. Remove the secondary seal retainer plate by lifting it up.
14. Remove the secondary seal by inserting a flat blade screwdriver midway along the outside of the seal, between the seal and the valve housing. Pry the seal up and remove.
15. Remove housing bolts, and pull halves apart.
16. Remove old housing gaskets (two).

### Visual inspection of parts prior to reassembly

1. Check and ensure all housing interior surfaces and drain ports are free and clear of hardened slurry or other obstructions. Clean as required.
2. Inspect the valve housing ensuring that the bores at the center of the valve are aligned with each other. Replace if there are signs of excessive or unusual wear.
3. Inspect gate supports for wear, mushrooming, chemical attack, etc. Replace if in doubt; supports should be replaced as a set and are recommended for replacement if sleeves are replaced.
4. Examine exterior housing surfaces for buildup of hardened slurry or other contamination, clean as required.
5. Examine sleeves for signs of wear, cracking, chunking, deep cuts, severe abrasion or chemical attack (softening or gumming). *Replace if in doubt; sleeves must be replaced as a set.*
6. Examine secondary seal for signs of wear or cracking, severe abrasion or chemical attack (softening or gumming). Replace if in doubt.

FIGURE 11



# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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7. Inspect the gate for sharp edges or excessive damage. Some scoring will occur in normal use. If the gate has been bent beyond  $\frac{1}{16}$ " permanent deflection at the center, straighten or replace. If straightening is performed, use considerable care to minimize marks on gate surface. Scores or other distress marks may be cleaned up with a belt sander. Machining the gate surface is not recommended. Light scale buildup may be removed with a putty knife or gasket scraper. Inspect the gate for wear and roughness. Use a disc grinder or belt sander to remove rough surfaces. Take particular care on the leading and beveled edge to remove burrs and other sharp edges.
8. Examine frame for signs of corrosion, damage or other potential problems.
9. Check all bolting hardware for thread integrity, signs of corrosion, straightness, etc. Replace as required.
10. For valves with purge control assemblies, examine major components, look for signs of corrosion and material build-up. Clean any visible build-up, replace if necessary. Examine gasket and replace if necessary.
11. Examine actuator assembly.
  - A) **Manual valves:** check stem for corrosion, straightness, etc. Look for signs of wear on brass stem nut.
  - B) **Air or hydraulic:** check for seal leaks around cylinder rod seal, heads and caps. Examine cylinder rod for signs of corrosion, straightness, etc. Service per manufacturer's instructions.
  - C) **Electric motor:** service per manufacturer's instructions.
6. Install new sleeves and retainer flanges (if used) per instruction in Section 'Sleeve replacement'.
7. Lift the valve assembly to vertical position. Refer to Lifting, Section 17.
8. Using DOW III or approved alternate, completely fill all internal cavities of the new secondary seal.
9. Paying attention to the top and bottom of the secondary seal, insert the new lubricated secondary seal into the valve housing assembly. (The bottom of the seal has radiused edges.)
10. Place the secondary seal retainer plate into position.
11. Replace and hand tighten all the retainer plate fasteners and lockwashers.
12. Apply a small amount of recommended lubricant to the two tapered faces of the 'sharp end' of the gate.
13. Press the gate firmly through the secondary seal into the valve housing assembly until the mark drawn on the gate reaches the top of the retainer plate or gate reaches previously recorded dimension.
14. Fully tighten all the retainer fasteners.
15. Reinstall the actuator / frame assembly with the housing / frame fasteners loosely.
16. Reconnect the gate to the actuator. (In order to facilitate installation and future removal, a coating or anti-seize compound should be applied to the outside of the clevis pin over the yoke contact area.)
17. 'Stretch' the frame / actuator assembly with respect to the housing by pulling (not lifting) the frame / actuator assembly to its maximum movement away from the housing assembly (holding housing in place if valve is removed from pipeline). Tighten the frame / housing bolts and verify the tightness of the actuator to frame bolts.
18. Cycle valve to full open position and check the gate position.
19. Rattle the gate. It should be mostly disengaged from the sleeves. The outboard edges of the gate should be free and the center still partially engaged in between the sleeves.
20. Cycle gate full closed and full open.
21. Inspect gate for pieces of rubber. If significant amount of rubber is present, a sharp edge(s) on the gate may be causing seal damage or the gate is extending too far on the up stroke. The ends of the gate should be free and the center still engaged. If the sleeve / gate is misaligned, loosen the frame actuator bolts and/or adjust the yoke until the proper position, open and closed, is obtained.
22. Reinstall the valve, refer to Section 17 Lifting.

### Reassembly

1. Lay the first housing half face down on a suitable flat surface.
2. Replace gate supports if required, refer to Section 10 Gate support replacement; supports should be replaced as a set and are recommended for replacement if sleeves are replaced.
3. Carefully lay two new housing gaskets on face of housings. Gaskets may be held in place with a small amount of silicone lubricant placed between gasket and housing.
4. Take second housing and place into position on the first housing, and properly align bolt holes making gaskets remain in place.
5. Insert most of the housing bolts, leaving out the top bolts that are used to hold the actuator assembly to the housing and loosely tighten. Tap the edges of the housings to align the internal sleeve bores to within  $\frac{1}{16}$ ", at the same time maintaining bolt hole alignment in the square flanges.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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### 13 FIELD REPLACEMENT OF GATES

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#### Disassembly

##### CAUTION

*This procedure may be performed with the valve in an active pipeline. If it is suspected that either one or both of the elastomer sleeves or secondary seal have failed, or if any continual weeping or discharge from valve housing is apparent, isolate the pipeline valve and or remove the valve from the line before gate removal. Use of personal protective equipment, tag out or other plant standard safety procedures must be followed. Procedure MUST NOT be done with valve in closed position. If valve is removed for this service, assure line is not pressurized before removing valve. Valve assembly and parts may be heavy, use proper lifting and support techniques, refer to Lifting, Section 17.*

1. Open the valve, so the gate is in the fully raised position.
2. Remove the cotter pin and clevis pin from the gate. It may be necessary to actuate the valve down slightly in order to relieve pressure on the clevis pin to facilitate removal.
3. Actuator assembly removal:  
**Smaller valves (valves with one bolt used on frame leg):** remove the frame to housing bolts of one side except for the lowest bolt on the opposite side of the frame. This bolt will act as a pivot point for the frame / actuator assembly. Pivot the frame / actuator assembly away from the valve and temporarily support.  
**Larger valves (valves with more than one bolt used on frame leg):** remove the frame to housing bolts. Lift the frame and actuator assembly off the housing assembly to allow gate removal.
4. Loosen the secondary seal retainer plate bolts.
5. Remove the gate by lifting it out of the secondary seal.

#### Visual inspection of parts prior to reassembly

1. Examine secondary seal for signs of wear or cracking, severe abrasion or chemical attack (softening or gumming). Replace if in doubt.
2. Inspect the gate for sharp edges or excessive damage. Some scoring will occur in normal use.  
If the gate has been bent beyond  $\frac{1}{16}$ " permanent deflection at the center, straighten or replace.

If straightening is performed, use considerable care to minimize marks on gate surface. Scores or other distress marks may be cleaned up with a belt sander. Machining the gate surface is not recommended. Light scale buildup may be removed with a putty knife or gasket scraper. Inspect the gate for wear and roughness. Use a disc grinder or belt sander to remove rough surfaces. Take particular care on the leading and beveled edge to remove burrs and other sharp edges.

#### Reassembly

1. Apply a small amount of recommended lubricant to the two tapered faces of the 'sharp end' of the gate.
2. Press the gate firmly through the secondary seal into the valve housing assembly until the gate beveled edge reaches the sleeve bore I.D.
3. Fully tighten all the retainer fasteners.
4. Reinstall the actuator / frame assembly with the housing / frame fasteners loosely.
5. Reconnect the gate to the actuator. (In order to facilitate installation and future removal, a coating or anti-seize compound should be applied to the outside of the clevis pin over the yoke contact area.)
6. 'Stretch' the frame / actuator assembly with respect to the housing by pulling (not lifting) the frame / actuator assembly to its maximum movement away from the housing assembly (holding housing in place if valve is removed from pipeline). Tighten the frame / housing bolts and verify the tightness of the actuator to frame bolts.
7. Cycle valve to full open position and check the gate position
8. Rattle the gate. It should be mostly disengaged from the sleeves. The outboard edges of the gate should be free and the center still partially engaged in between the sleeves.
9. Cycle gate full closed and full open.
10. Inspect gate for pieces of rubber. If significant amount of rubber is present, a sharp edge(s) on the gate may be causing seal damage or the gate is extending too far on the up stroke. The ends of the gate should be free and the center still engaged. If the sleeve / gate is misaligned, loosen the frame actuator bolts and/or adjust the yoke until the proper position, open and closed, is obtained.
11. If out of pipeline, reinstall the valve, refer to Lifting, Section 17.

# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 14 BODY FLUSHING AND DISCHARGE MANAGEMENT

It is normal for the KGF and KGF-HP to discharge media during opening and closing cycles. This helps prevent any solids from building up between the sleeves that would prevent a tight seal when the valve is fully open or closed.

Discharge can be managed (not contained) with the use of a splash guard device such as a bucket or plate. Splash guard devices are optional on 300 psi rated KGF valves. KGF valves rated above 300 psi are to be provided with either a splash guard plate or splash guard bucket. KGF-HP valves are to be provided with splash guard buckets.

These splash guard devices can be connected to a customer supplied piping system to provide a means of carrying the discharge away, to a permanent drain or other collection point. Any additional piping system must not be capped or otherwise prevented to flow freely as this may cause eventual clogging of valve.

The use of body flush ports will assist in purging body housing of build-up. Splash guard devices are recommended if valve body is flushed.

General recommendations for discharge control:

- Take care to avoid splash of discharge onto personnel at all times.
- Wear appropriate personal protective equipment as required.
- When operating a manual valve, beware of and avoid the splash of the discharge.
- Do not install valve over walkways, electrical or other critical equipment without the use of a splash guard device or similar considerations.
- Do not cap or close-off both ends of the splash guard device. This can result in valve failure.
- One end of splash guard device be used as a flush inlet. On the splash guard bucket, the small port is intended as a flush inlet.
- Additional drain piping may be attached to the splash guard device to direct discharge to collection or drain point. Use of non-collapsible, rigid, pipe is recommended. Using a hose or other collapsible type of pipe extensions is not recommended.
- Keep pipe extensions clear of build-up by regular flushing or cleaning.

FIGURE 12

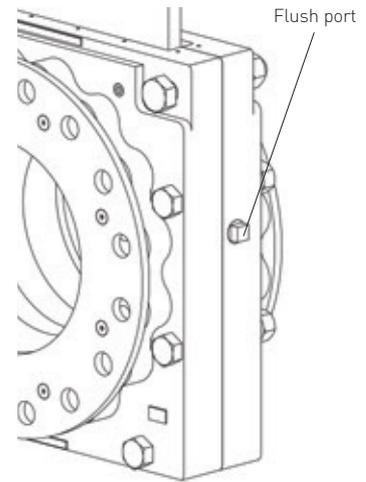


FIGURE 13

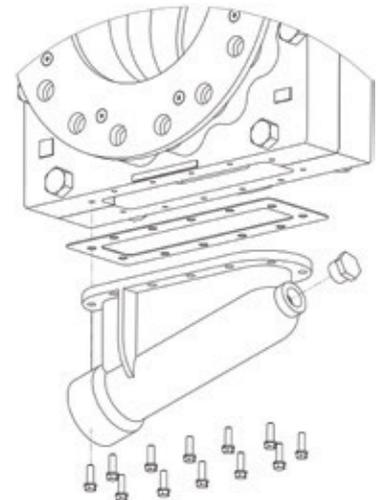
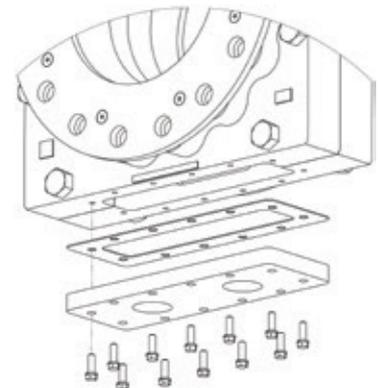


FIGURE 14



# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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### 15 INSTALLATION INSTRUCTIONS FOR SPLASH GUARD BUCKET

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1. Verify that the proper number of mounting bolts, washers, nuts, along with the guard, end plug, and gasket material are present.
2. Clean the flat machined surface of the splash guard bucket so that there is no dirt, grit, grease, or other debris present.
3. Clean mating surface of body housing so that there is no dirt, grit, grease, or other debris present.
4. Remove the adhesive backing from the gasket material and apply to the splash guard bucket on the machined flat mating surface (adhesive back strip). If a cut sheet gasket is used, it should be attached to the splash guard bucket with an RTV type adhesive compound to hold it during installation. Attach gasket material to the flat surface along the edge of the machined slot.
5. If small pipe port is not to be used as a flush, install pipe plug.
6. Position the bucket and loosely fit the fasteners.
7. Verify the position of the gasket material and the bottom of the housing and tighten the installed fasteners.
8. Connect drain piping (if used) to the large NPT port as required.

### 16 INSTALLATION INSTRUCTIONS FOR SPLASH GUARD PLATE

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1. Verify that the proper number of mounting bolts, washers, nuts, along with the plate and gasket material are present.
2. Clean the flat machined surface of the splash guard plate so that there is no dirt, grit, grease, or other debris present.
3. Clean mating surface of body housing so that there is no dirt, grit, grease, or other debris present.
4. Remove the adhesive backing from the gasket material and apply to the splash guard plate on the machined flat mating surface (adhesive back strip). If a cut sheet gasket is used, it should be attached to the splash guard plate with an RTV type adhesive compound to hold it during installation. Attach gasket material to the flat surface along the edge of the machined slot.
5. Position the bucket and loosely fit the fasteners.

6. Verify the position of the gasket material and the bottom of the housing and tighten the installed fasteners.
7. Connect drain piping (if used) to NPT port as required. If desired, one NPT port may be used to flush and one to drain. If both NPT ports are to be used as drains, make sure they do not clog and are cleaned of build-up regularly.

### 17 LIFTING

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#### CAUTION

*Valve assembly and parts may be heavy, use proper lifting and support techniques. DO NOT attempt to lift valve together with any adjoining pipe or other equipment. DO NOT attempt to lift valve if full of media. Lifting techniques may vary depending on valve size/weight. Small Clarkson KGF and KGF-HP air and or hydraulic actuated valves may be equipped with eyebolts. DO NOT use these eyebolts to lift any size valve.*

For shipment, large KGF and KGF-HP valves are normally palletized in the flat or horizontal position with the bore oriented vertically, flange faces down on pallet. The palletized valves are loaded on to trucks with a forklift. It is recommended unloading should also be done with a forklift.

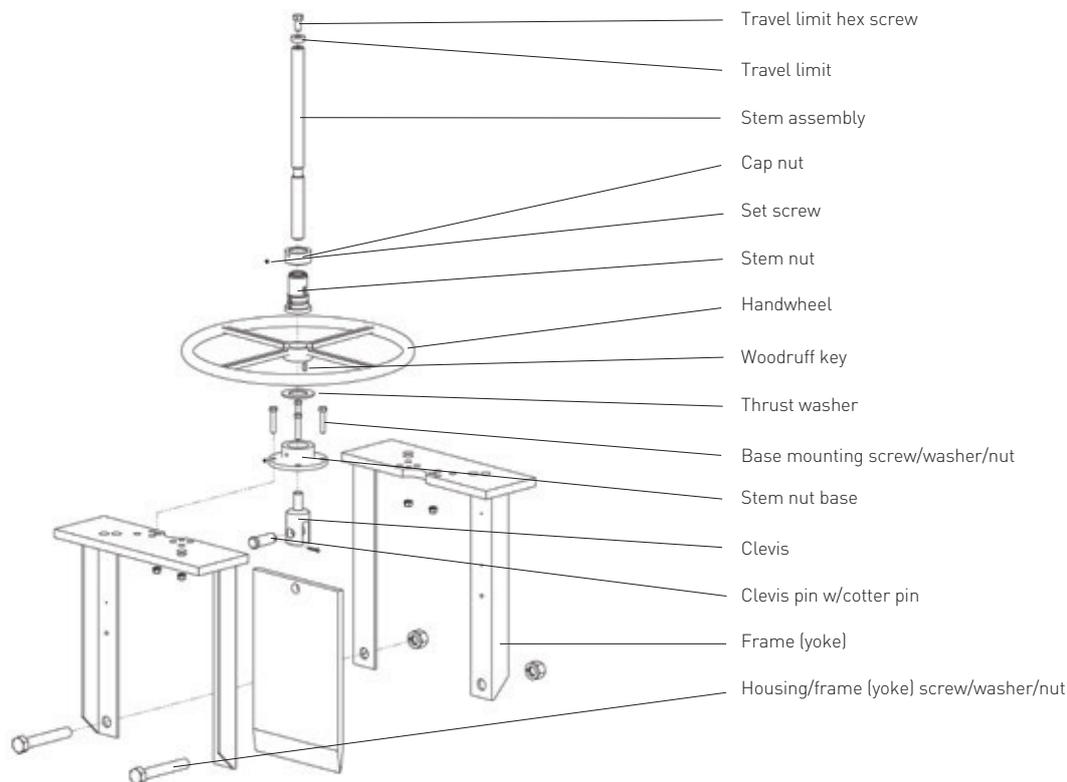
A crane can be used; however the weight must be supported by the pallet and not the valve. Small Clarkson KGF and KGF-HP air and or hydraulic actuated valves may be equipped with eyebolts. DO NOT use these eyebolts to lift any size valve. Insert a properly rated strap and or lifting hook through eye of eyebolt and lift, taking care as center of gravity shifts. Do not drag the base of the valve during lifting as this can peel the rubber from the retaining flanges. All valves can be lifted using the frame (yoke) assembly as the lift point. DO NOT USE LOCKOUT BRACKETS TO LIFT VALVE. Insert properly rated straps under the frame top plate, one for each leg, and lift, taking care as center of gravity shifts. Do not drag the base of the valve during lifting as this can peel the rubber from the retaining flanges.

For larger valves, all lifting should be done with chains. Shackles and straps, regardless of their weight ratings should never be used. Take care to not drag the base of the valve during lifting as this can peel the rubber from the sleeve retaining flanges.

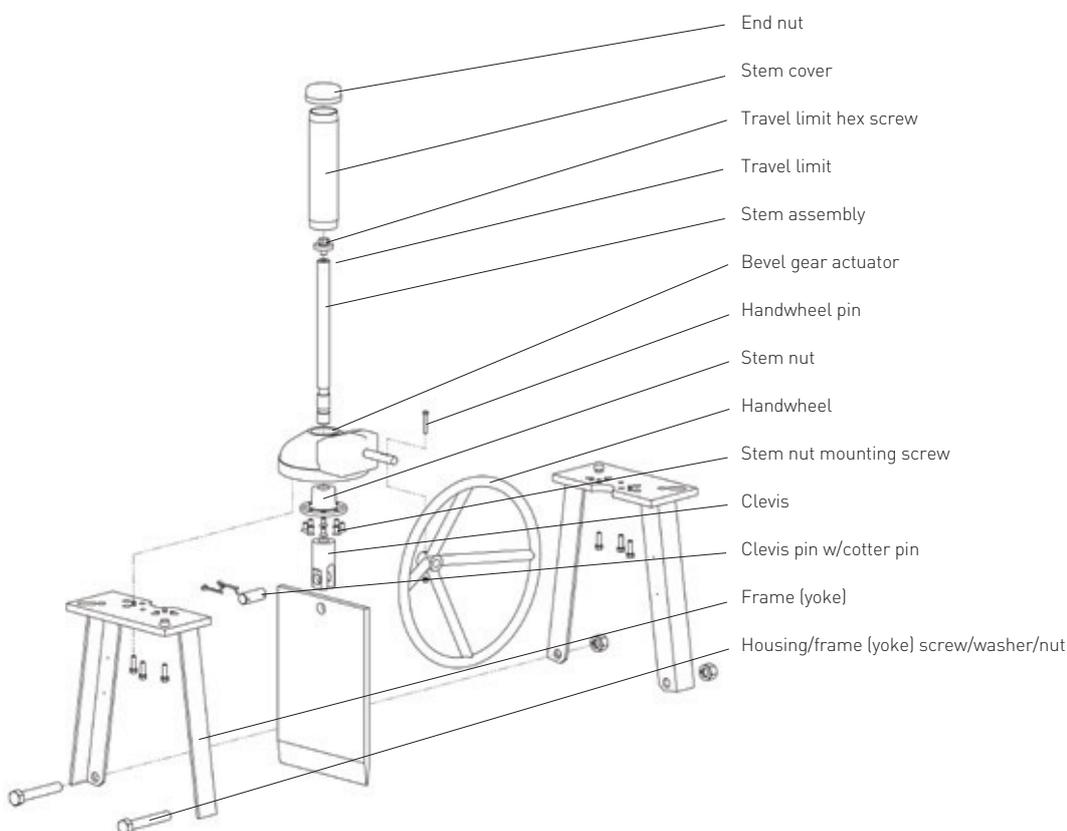
# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 18 MANUAL HANDWHEEL ACTUATOR ASSEMBLY - MH



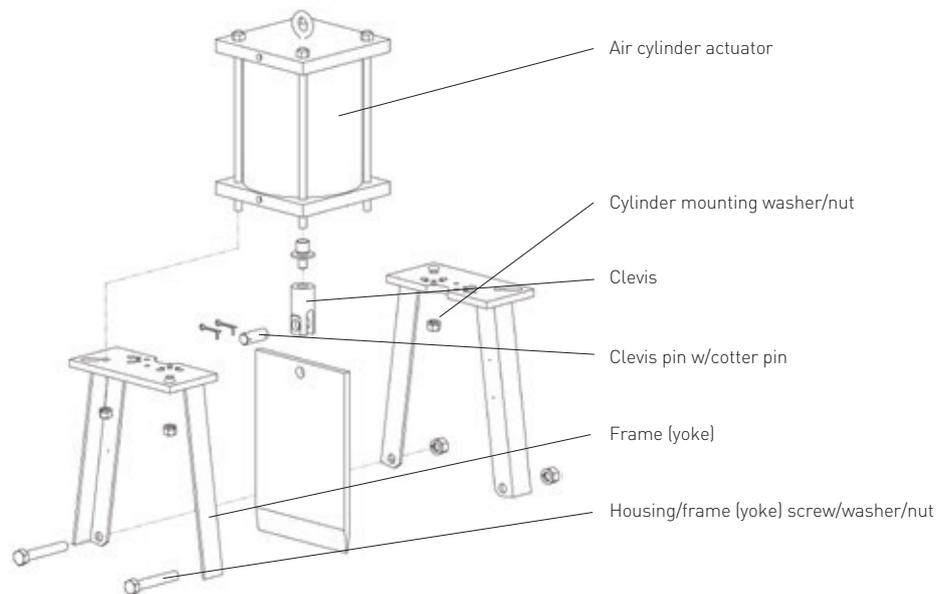
### 19 BEVEL GEAR ACTUATOR ASSEMBLY - BG



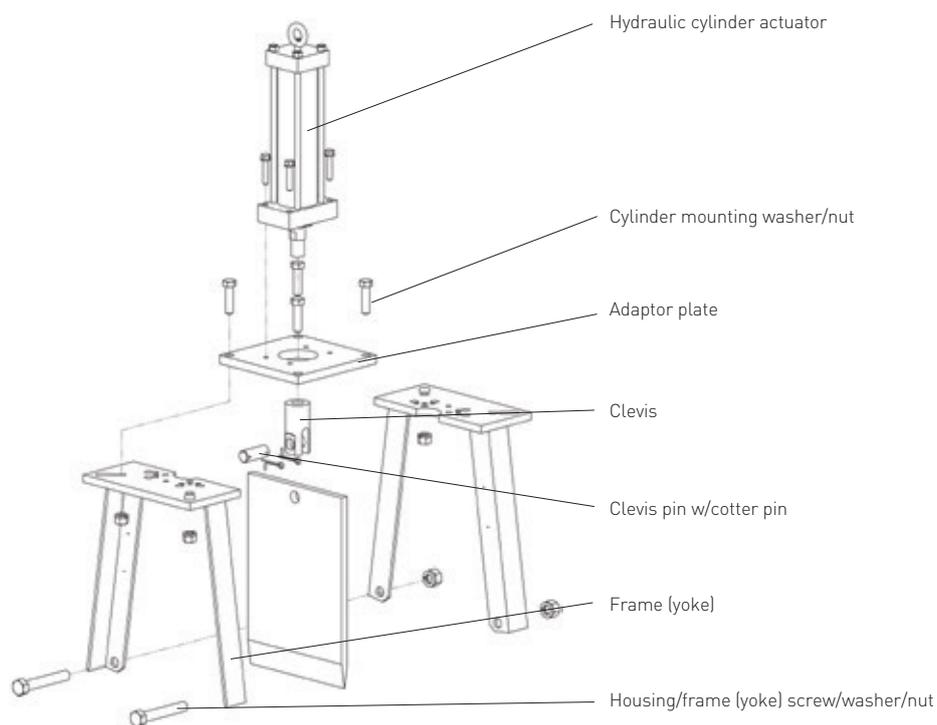
# CLARKSON SERIES KGF AND KGF-HP SLURRY VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### 20 AIR CYLINDER ACTUATOR ASSEMBLY - AC



### 21 HYDRAULIC CYLINDER ACTUATOR ASSEMBLY - HC



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