

# HYDRO GATE®

a **MUELLER** brand

## OPERATING INSTRUCTIONS MANUAL

# HG561 Fabricated Slide Gates

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### CAUTION:

This manual describes the recommended procedures for installation, adjustment, operation and maintenance of Hydro Gate gates. When it is used in conjunction with installation drawings that have been supplied by us, this manual will be sufficient for most installations. Proper care and precautions must be taken in handling and storing the gates at the delivery site. For further details on the handling, storing, and installation of a specific project, contact the Hydro Gate headquarters.

*Precise and accurate installation is critical to satisfactory operation. We assume no liability, expressed or implied, for interpretation of the contents of this manual. If you have any questions concerning the interpretation of the contents of this manual or installation procedures in general, you should contact the Hydro Gate facility in Colorado. We expressly disclaim all liability, expressed or implied, for faulty installation of any gate or associated equipment and for any direct, consequential, or incidental damages that may result.*

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### OVERVIEW

The purpose of this Installation, Operation, and Maintenance Manual is to provide information on the correct procedures for installation, adjustment, operation, and maintenance of Hydro Gate HG561 Fabricated Stainless Steel Gates and their component parts.

The gate, lift, and accessories were accurately machined, fabricated, assembled, adjusted, and inspected before leaving the Hydro Gate factory. For best results, read and follow the applicable parts of this Manual carefully, including thorough cleaning and lubrication of moving parts and final wedge adjustment. If the gate will not be installed immediately, consult the long-term storage instructions.

**NOTE: DO NOT disassemble the gate or lift for installation.**

**Note: Installation and/or operation of the gate lift and stem without proper lubrication will void the equipment warranty. Thorough cleaning of the stem and sealing surfaces is required before gate operation. Details are described in the appropriate sections of this Manual.**

#### Spare Parts

We do not recommend the stocking of spare parts. If spare parts are required see "Spare Parts List" (page 14). Replacement parts are readily available for worn or broken parts. Contact us or our Hydro Gate representative in your area.

#### Special Tools

Special tools are not required to operate and/or maintain the

equipment supplied by us on this project.

#### Parts List

Prices for individual parts and/or assemblies may be obtained from Hydro Gate sales at the time that they are needed.

#### Disassembly

We do not recommend the disassembly/reassembly of any of the equipment on this project.

#### Emergencies

Emergency/shutdown procedures do not differ from normal operating procedures for this project. If you should need assistance, please contact the Hydro Gate Field Service Department at 303.288.7873.

### INSTALLATION

#### Safety Precautions

To help ensure your workers' safety, We recommend the personnel responsible for installation, operation, and maintenance of the gates for this project read and study the instructions and precautions in the Installation, Operation, and Maintenance Manual, and follow all directions carefully. The following are major items associated with safe installation, operation, and maintenance of this slide gate.

- DO NOT operate equipment before carefully reviewing the Installation, Operation, and Maintenance Manual.
- Always use proper equipment when lifting or unloading heavy items.
- DO NOT stack equipment too high for storage. Always use heavy wood blocking between equipment. Refer to the storage instructions contained herein for details.
- Adequately support and brace

heavy items during placement of equipment.

- Wear proper personal protective equipment (PPE) and clothing when working on or around gates, (e.g., hard hats, heavy boots, safety glasses, and breathing apparatus, if necessary).
- NEVER place bodily obstructions in the path of moving parts. When operating gates and accessories, stand clear of all moving parts. Serious injury can result from contact with moving parts.
- Use caution when performing operations and maintenance. Watch for loose or damaged parts. **Stop all functions until any damage has been corrected.**
- DO NOT use any mechanical devices other than the factory-supplied equipment to operate the gates for this project.
- DO NOT attempt operational procedures other than set forth in the Installation, Operation and Maintenance Manual.

• Contact your Hydro Gate representative with any questions you may have regarding safety in installing, operating, and handling Hydro Gate products.

#### To Ensure Proper Installation

We recommend that personnel study these instructions and installation drawings and follow the installation directions carefully. This gate is shop adjusted, quality checked, and designed for low leakage. Attention must be given to proper storage, careful handling, and accurate location of embedded items for this gate to operate as designed.

1. Read and follow the Installation instructions and drawings in this Manual.
2. Carefully inspect the gates and accessories when received, before unloading trucks or cars. Report ALL shortages or suspected damage by marking the bill of lading and receiving reports at this time. Latent shortages must be

reported in writing within 30 days of shipment.

**3.** Store gates evenly on planks or timbers. Even large fabrications are subject to permanent warpage if unevenly blocked during storage.

**4.** Support full length of stems and protect threads during storage and handling.

**5.** Accurately locate and brace embedded items during placement of concrete.

**6.** Contact your Hydro Gate representative with questions regarding this gate. We have 100 years combined experience in the water control industry.

**7.** DO NOT disassemble the gates for installation.

**8.** DO NOT allow excess concrete to overlap gate thimble or frame.

**9.** DO NOT Tighten nuts for studs unevenly, or try to pull a gate frame tightly against an uneven wall surface. This, in most cases, will cause excessive leakage.

**10.** DO NOT operate gates with concrete and debris on them.

**11.** DO NOT operate gate stem dry (without grease).

### Gate Mounting

HG561 Fabricated Stainless Steel Gates are most commonly mounted on stud anchor bolts and grout pads; however, they may also be mounted on a fabricated thimble or flange or on machined flanges and thimbles. The gate flange is not machined. A thick layer of hard setting mastic is required between gate and the thimble or pipe flange. Recommended mastic is polyurethane sealant such as Sika-Flex 1A or equivalent. See manufacturer requirements for curing. Fast cure polyurethane sealants, such as Loctite marine grade, are available. They are a good alternative; however, their fast setting property requires quick, well-planned installation and cleanup of hardened material is difficult.

Foam (Polyurethane) gasket may also be used. Consult the Hydro Gate engineering department for additional information.

**NOTE: Mastic is not furnished by us.**

Flanges for gate mounting must be flat (non-warped) within  $\pm 1/16"$ . The gate can function with some twist/warp/non-flat conditions. The larger the gate, the more out-of-plane conditions can be tolerated. Consult factory for extreme limits.

### Mounting the Gate on Concrete Surface with Adhesive Type Stud Anchors

**1.** Use only adhesive-type or epoxy-grouted studs. Mechanical wedge studs are not recommended and gate performance cannot be guaranteed with wedge-type studs. We usually furnish the all-thread studs but does not furnish the adhesive capsules or cartridges.

**IMPORTANT: Adhesive such as Hiti HY200 or HIT-RE 500-SD are not supplied by us due to its stringent storage requirements and limited shelf lifetime.**

**2.** Accurately layout positions of studs or use the gate as a template.

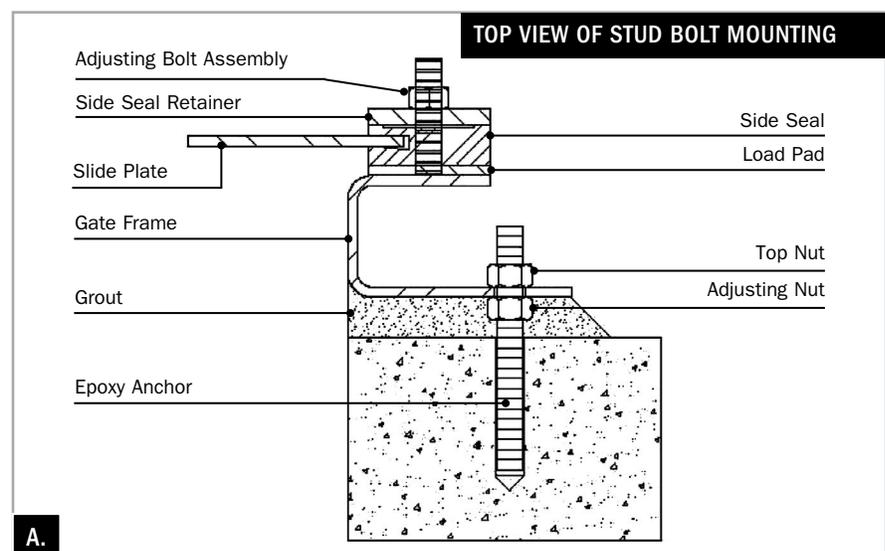
**3.** Drill holes to diameter and depth required for size studs used. If rebar is encountered during drilling

causing an impossible completion of hole, consult the owner's site engineer for instructions on how to proceed; cutting of rebar may not be permitted. In some cases, a new hole (or holes) may be field drilled in the gate frame to compensate for out of position studs. Consult the Hydro Gate engineering department for advice and limitations.

**4.** Blow and brush all holes clean according to adhesive system instructions and place studs with adhesive. Maintain proper projection and alignment and allow sufficient cure time, particularly in cold weather.

**⚠ CAUTION: Because of the dynamic/reversing load on the gates involving unseating or seating loads and the use of front and back nuts for alignment, wedge studs are not satisfactory since they require tension in them at all times to "grip" the concrete. The loss of "tension" in the wedge stud may cause them to fail.**

**5.** Two nuts are provided for each stud bolt (Fig. A). These are for precise plumbing and alignment with a nut on both sides of the gate flange.



**6.** Check the placement and plumbness of pattern of stud bolts. Fit check the gate onto stud bolts. Perform minor bending adjustment to studs, as needed.

**7.** Clean stud bolt threads. Apply anti-galling compound (anti-seize) and run one nut on each stud up to or near the concrete.

**8.** Establish a plumb/vertical plane with back nuts starting with the two upper corner stud bolt back nuts. Leave room for grout and some in/out adjustment from the wall. With plumb line or builder's level and straight edge, bring all other nuts to a vertical plane established by upper corner nuts.

**9.** Being sure flange of gate is clean, place the assembled gate over/on the stud bolts. Run the front nuts on stud bolts until they touch the gate flange.

**10.** Take note of how well the gate frame fits the previously established flat vertical plane of back nuts on studs. Some variation of the free-hanging gate flatness is normal (1/8" in small/medium sized gates; 1/4" in large gates).

**11.** Tighten the front nuts on side studs until frame contacts back nuts. Tighten the frame flange between the two nuts.

**12.** Note that the gate slide should be in tight contact with seals at horizontal frame members. Some curvature or non-flatness of frame member may be required for good seal contact with the slide. Tighten front and back nuts up to the flange while observing that no gap between the slide and horizontal frame seal exists or develops.

**13.** Grouting of gate frames is not recommended until after the lift and stem has been installed and gate has been cycled open/close to ensure smooth operation.

**14.** After operation has been verified, carefully pack the space between the gate and the wall around the opening with "non-

shrink" grout. Alternatively, the space may be formed and slurry grouted with concrete. Grouting behind the frame guide (legs) extensions is not necessary.

**15.** Be sure the frame extension stud bolts are in place and front and back nuts are tight and hold the frame stable.

### Wall Thimble Installation

**1.** Place the wall thimble in the correct position in the forms and block it in this position. The top centerline of the thimble is stamped on its flange face. The bottom centerline is also marked.

**2.** Plumb the front face of the thimble using the marks indicating top and bottom centerline. This face should be plumbed with respect to final location of the gate, stem, and lift. "Plumb" is a relative term, more precisely the thimble gate and operating system consisting of stem, stem guides and lift must be in close co-linear alignment. Alignment tolerance is +/- 1/8" over the travel of gate (gate opening height). True or perfect plumb is primarily for aesthetics and simplification of installation and alignment.

**3.** Studs furnished for attaching the gate may be used in the attachment of the thimble to the forms. If these studs are not used, threaded holes in the thimble must be plugged to prevent concrete from entering them.

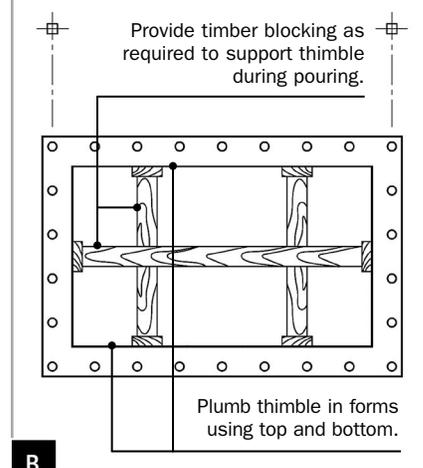
**4.** Use timbers or other bracing material on the inside opening of the thimble while concrete is being poured (Fig. B).

**NOTE: Use extreme care in placing of these supports to prevent warping of the thimble.**

**5.** Pour concrete, being careful not to tilt the thimble from its original position in the forms.

**6.** Remove forms and bracing.

**FRONT AND SIDE VIEW OF THIMBLE SHOWING BRACING**

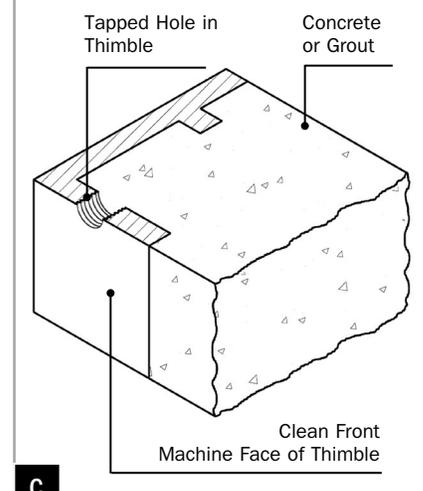


**B.**

### Installation on Thimble or Flange with Machined or Non-machined Face

**1.** Clean face of thimble with scrapers and stainless steel wire brush so no sand, concrete, dirt, or foreign material are present (Fig. C).

**FRONT CROSS SECTION OF "F" WALL THIMBLE - TYPICAL INSTALLATION**



**C.**

**2.** Check for plumb, flatness, and warp with builder's level or straight edges. Flatness should be within +/- 1/16". If not, consult the Hydro Gate engineering department or field service department for recommendations.

**3.** Install mounting studs in thimble/flange face.

4. Fit check the gate onto the thimble to be certain the gate sits well on its face without obstruction from surrounding concrete.

5. Apply heavy layer of hard-setting mastic so entire contact face of frame flange will be covered. A layer 1/16" to 1/8" thick is usually sufficient. Excessive thickness results in more cleanup; too thin may result in flange leaks. Recommended mastic is polyurethane sealant such as "Sika-Flex 1A", "Bostik 920 marine grade polyurethane", "Devcon Flexane 80 trowelable grade putty", or equivalent. Asphalt (tar) mastic may be used in lieu of polyurethane except in potable water.

**NOTE: See manufacture instructions for proper cure times before submerging. Fast cure polyurethane sealants such as "Bostik 920 Fast Set" or "ADC0 Fast Cure" are available. These are a good alternative, however, their fast setting property requires quick, well-planned installation and cleanup of hardened material. Rubber gaskets may be used for thimble mounting in conjunction with sealants consult the Hydro Gate engineering department for additional information.**

**NOTE: Mastic is not supplied by us.**

6. Mount the gate over studs, install nuts and tighten. Anti-seize compound is recommended. See Torque Table for approximate bolt nut tightening. Precise torque tightening is not required.

7. Check the squeeze-out of mastic on the inside and outside of the flange and clean off excess. No squeeze-out indicates insufficient mastic and likelihood of future leak.

8. Allow sufficient cure time of mastic before applying water pressure to the gate. (see manufacturer instructions).

**TABLE 1. Torque for Tightening Nuts or Hex Bolts Used for Assembly**

CAP SCREW DIAMETER	TORQUE TO BE APPLIED (lbs-ft)
3/8"	20
1/2"	45
5/8"	75
3/4"	125
7/8"	200
1"	300
1-1/8"	450
1-1/4"	500
1-1/2"	600

### Installation Of Flush Bottom Closure Gates

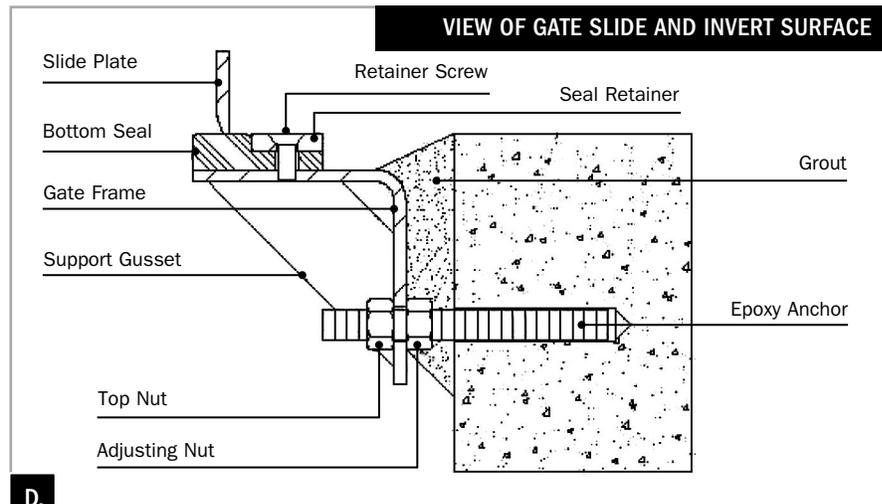
Gates that are to be installed with bottom frame members embedded in the concrete are furnished with

a rubber seal attached to the invert of the gate frame (Fig. D). The top surface of the rubber seal is installed at the same elevation as the invert of the gate opening. Refer to the Hydro Gate installation drawing.

1. Form a recess for the bottom of the gate in the original pour of concrete. The dimensions of this recess are shown on the installation drawing.

2. After the forms are stripped, install the gate as shown for other types of installations in this Manual.

3. After installation is completed, non-shrink grout in around seals and frame. Ensure the flush bottom seal is free and clear of any foreign material.



### Installation of Gate Stem and Guides

**1.** Install the stud bolts for the lift and stem guides as shown on the installation drawings. Check for proper alignment of the lift, stem guides, and gate. The lift stem and gate stem block must be in vertical alignment within 1/8" per each 10 feet of distance.

**2.** Provide opening with adequate clearance in the lift platform for the gate stem as noted on the installation drawing.

**3.** Install stem guide brackets on studs, but DO NOT tighten nuts. Leave them loose so the bracket can be moved for later alignment. Loosen all assembly bolts holding the collars to the bracket. Stem guide collars are 2-piece construction.

**4.** When more than one gate is to be installed, stems may be of different diameters or lengths. Stems are marked and/or tagged for each installation. Separate the stems per individual gate installation.

**Note: Exercise care when handling and installing threaded stems; nicks or burrs will damage lift nut threads.**

**5.** Insert the stem block into the gate slide pocket, if applicable.

**6.** Stems may be in more than one piece to facilitate shipment and installation. If two or more pieces are furnished, they must be installed in their proper order from bottom to top to place splices in correct location so they will not interfere with the stem guides when the gate is opened or closed. Measure the stem section lengths and install.

**7.** Lower the bottom section of the stem into place through the hole of the gate slide and thread it all the way into the block and align the keyways (Fig. E) or insert stem connection bolt(s).

**Note: Immediately insert the key to lock the bottom section of the stem to the block. (The key is omitted on non rising stem gates.)**

**8.** Place all of the succeeding stem sections. Double-check the installation drawings to ensure that the stem guide collars are in the correct locations. Join together with splices as provided (Fig. F).

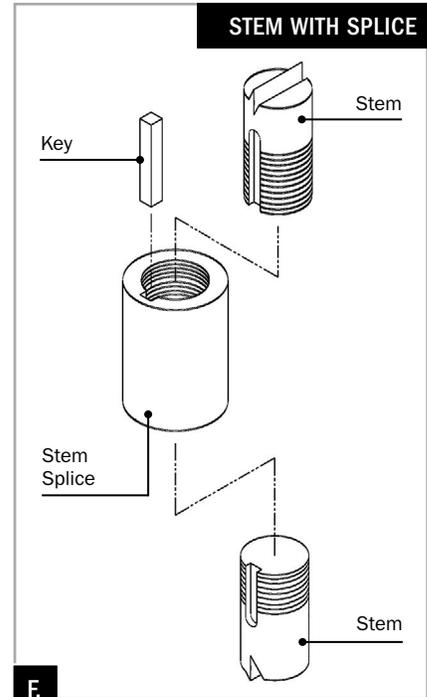
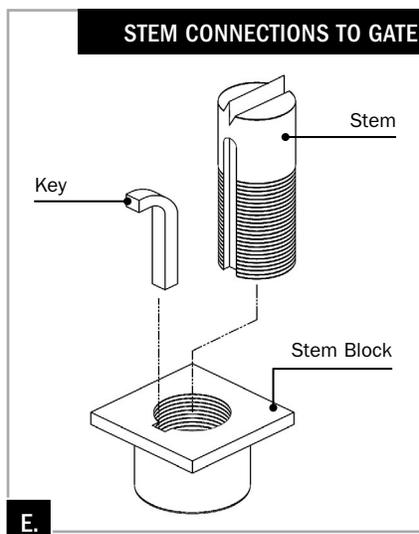
**Note: Insert all bolts or keys in each stem splice immediately after sections are installed and aligned to prevent one section disconnecting from another when the gate is operated.**

**9.** Immediately before lowering the lift over the threaded portion of the stem, thoroughly clean off all foreign material.

**10.** Lubricate stem threads with recommended lubricants. Do not leave lubricated stem exposed to contamination before completing the installation.

### Lift Installation and Adjustment of Stem Guides

**1.** Clean the threaded section of the stem, removing all foreign material, and lubricate with recommended lubricant as described in the "Gate Stem and Guide" section of this Manual.



**Note: Operation of the gate assembly without proper lubrication of the stem will void the equipment warranty.**

**2.** Raise the lift and lower it over the previously installed and lubricated threaded stem section. When starting threaded stem into the bottom of lift nut, care must be taken to avoid damage to the threads. Rough handling may result in damage to the bottom edge of the threaded lift nut and prevent the stem from being threaded into the lift nut freely. Hold the lift to prevent its rotation. Turn the handwheel or crank to lower the pedestal onto its stud bolts.

**Note: When all parts are cleaned, the threaded lift nut will turn onto the threaded stem with very little effort.**

**3.** Using shims, double nuts on studs, or other leveling devices under the lift, align the centerline of the lift nut until parallel with the stem centerline. Vertical alignment of gate stem and the gate slide stem block must be within 1/8" per 10 feet of distance. Tighten nuts on the studs uniformly.

**4.** The crank should turn freely for two or three turns in each direction until the clearance between the top or bottom of the stem block in the gate slide is taken up. If any binding occurs during operation of the lift with the slight vertical movement of the gate slide, the stem alignment should be checked. Slight misalignment will cause undue wear to the threaded lift nut. When binding is not caused by misalignment, recheck to be certain all threads on the stem and in lift nut are clean.

**5.** Place the two-piece stem guide collars around the stem above each bracket. Place the bolts through the projection of the bracket and the ends of the collars. DO NOT tighten the bolts.

**6.** Grout under the lift (if required). After the grout has set, tighten the stud bolts uniformly.

**Note: Before opening the gate, clean all grout, stones or other foreign material from the top of the gate (or bottom in the case of a downward opening gate), and ensure gate stem and lift are properly lubricated.**

**7.** Turn the lift crank or handwheel to open the gate, until the gate slide has moved at least 2". The stem is now in tension. Check the stem to be certain it is straight. Tighten the nuts on the studs through the stem guide brackets, center the stem guide collars around the stem, and tighten the assembly bolts holding the collars in position on the brackets.

**8.** Move the gate to its fully opened position and check the position of the stems. If the stem is being deflected by the collars, a stem alignment problem exists and must be corrected, indicating the gate may not be plumb. Consult us for ways to correct or compensate for this condition.

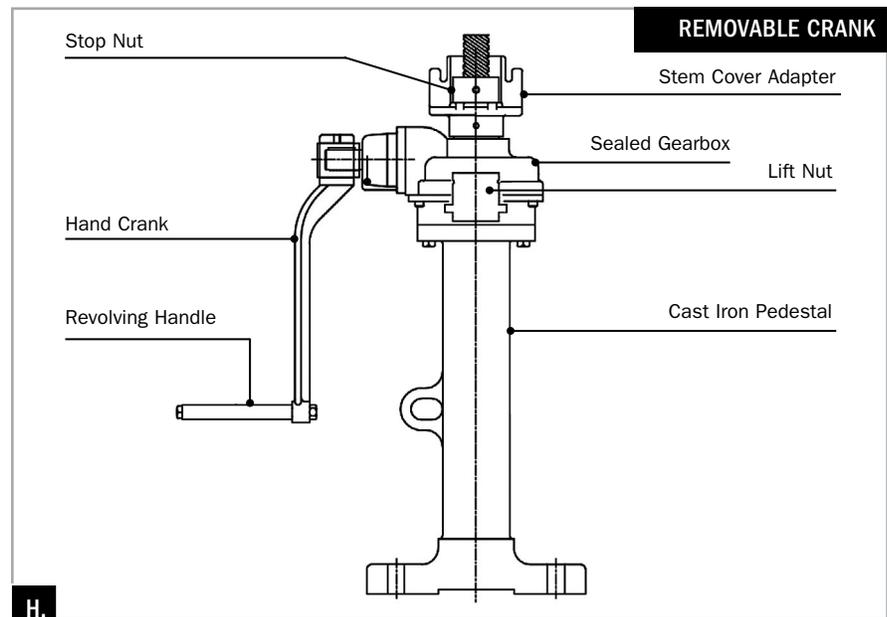
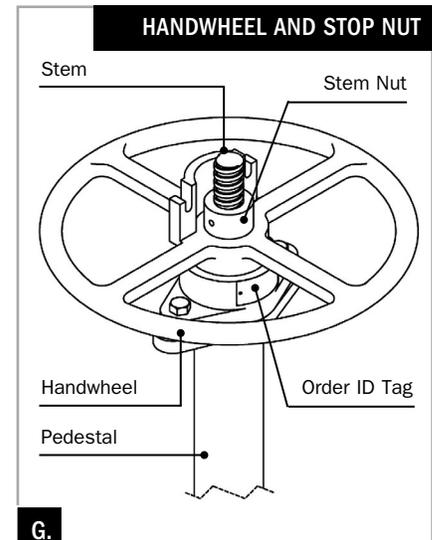
**9.** Lower the gate to fully closed position. Run the stop nut down on top of the projecting threaded stem until it contacts the top of the lift nut or stem cover holder. Back the nut up until 1/16" to 1/8" gap appears between the lift and the stop nut to allow complete gate closure as sliding and bearing surfaces wear in.

**10.** Tighten the setscrews through

the stop nut to hold it in place (Fig. G & H).

**11.** Install the stem cover, indicator, etc., as required.

**12.** Check to see if the gate slide is making full contact across the bottom invert seal.



### Installation of Tandem Stems

Some gates have wide openings with relatively short gate heights. When the installation drawings show tandem lifts, install each lift in accordance with the preceding steps 1 – 5. After each lift has been installed and each stem is connected to the gate slide at the bottom and the lift at the top, proceed as follows:

1. Turn the input shaft of each lift in the direction to open the gate until each stem makes firm contact with the top of its connection on the gate slide.
2. Place a level on the top of the gate slide and move one stem or the other of the gate up or down until the slide is completely level.
3. A tandem interconnecting shaft is furnished to connect the two lifts and cause them to act in unison for raising or lowering the gate. Loosen the fasteners on one of the jaws of the flexible coupling and slide it toward the center of the shaft until the shaft can be connected between the two lifts. Complete the connection and retighten all fasteners.
4. Move the gate slide up and down by turning the input shaft of one lift. Ensure the gate is installed with its top level and that the gate is moving freely.

5. Complete the installation of any stem guides, lubricate the stem, adjust the stop nuts, etc, as described in the preceding steps 1 – 9 in the section entitled Lift Installation and Adjustment of Stem Guides for gates not self-contained.

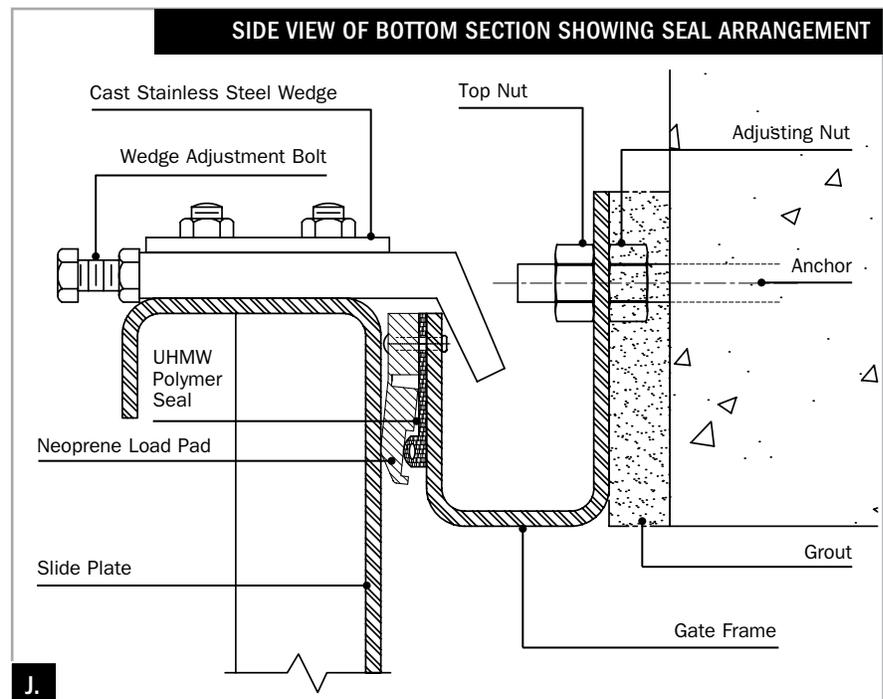
### Gate Adjustment

This gate is equipped with low-friction polyethylene (UHMWPE) seats and guides. The seats rest on a neoprene (rubber) pad for cushioned gasketing to the frame. Sealing at the side is accomplished by pinching the seal lips against the slide plate using the compression of the rubber gasket pad. Top horizontal member seal (and also bottom, if seals are 4-sided) are loaded by the compression pad and assisted with ensured hook-type wedges on medium and larger width gates (Fig. A & J).

This gate has been factory adjusted. However, if the shake-proof nuts have been loosened, readjustment may be required.

### Visual Tightness of the Seat against the Side

No light should be visible through the seat or measurable gaps between the slide plate and the seat. A .004" gauge may be used to check the seat gap as a starting point; however, the best test and proof of performance is an unseating hydrostatic test. This gate is required to comply with AWWA C561 leakage specifications.



### OPERATION

#### General Operation Information

HG561 Fabricated Stainless Steel Gates are used to control flow of or retain a volume of water, effluent, or other fluids. Typical applications include industrial water treatment facilities, municipal water treatment facilities, irrigation, dams, flood control, and many other applications that require tight, low leakage closing.

The simplicity of a slide gate makes it a popular choice when designing flow controls. From the basic hand-cranked manual model to the microprocessor-controlled, fully integrated electric slide gate, actuation consists of the basic open or closed, or modulating operation.

Depending on size, most slide gates can operate without error in diverse conditions. Some extenuating circumstances may include large amounts of ice or other solids that will obstruct the travel path of the gate. In most cases, when the obstruction is removed, normal operation can be resumed without adjustment to the gate.

#### Slide Gate Operation Procedures

The following sections cover the general operating procedures associated with two manual-operation systems (handwheel and handcrank). Read and follow the operating procedures for the applicable system. If you have any questions concerning safe operation of this HG561 Fabricated Stainless Steel Slide Gate, contact us immediately.

#### H2B Series Actuator (Manual Handwheel)

**OPENING** – To open this slide gate observe the direction of rotation noted on the handwheel. Turn in the direction of opening until the desired gate position has been achieved. Observe the relative position of the top of the stem in relation to the Mylar decal on the stem cover (if equipped.) When the top of the stem is equal to the OPEN or 100% indicator the gate is considered to be FULL open and should not be opened further.

**⚠ CAUTION: DO NOT over-open the gate. Serious damage to the gate stem and sealing surfaces can result.**

**CLOSING** – To close this slide gate turn the handwheel in the direction opposite of the “Open” indicator until the stop nut on the stem is 1/8" to 1/16" from the top of the lift (see installation instructions). When the top of the stem is equal in height to the bottom/ zero height indicator, the gate is considered to be FULL CLOSED and should not be closed further. Should the gate or stop nut require adjustment, refer to the appropriate section of the Installation, Operation, and Maintenance Manual or call us before any adjustments are made.

**⚠ CAUTION: DO NOT attempt to adjust the position of the stop nut to achieve additional closing stem travel without understanding the function of the stem, stop nut and gate closing system. Serious damage to the gate stem and sealing surfaces can result.**

#### Manual Hand-Crank

**OPENING** – To open this gate observe the direction of rotation noted on the lift housing. Crank in the direction of opening. If the gate has been closed for an extended period the gate may be difficult to “unseat.” If several attempts at turning the wheel to crack the gate open have no result, apply heavy pressure and wait for a period of time. Allow the pressure in the stem to unseat the gate. Continue to turn the handcrank until the desired gate position has been achieved.

**⚠ CAUTION: DO NOT over-open the gate. Serious damage to the gate stem guides and gate can result. Do not use excessive force.**

**CLOSING** – To close this gate turn the crank in the direction opposite of the Open indicator until the stop nut on the stem is 1/8" to 1/16" from the top of the lift (see installation instructions). After the gate has been closed as noted on the indicator, the gate is considered to be FULL CLOSED. Then reverse the rotation of the crank and relieve the pressure on the stem and lift. Should the gate or actuator require adjustment, refer to the appropriate section of the Installation, Operation, and Maintenance Manual or call us before any adjustments are made.

**⚠ CAUTION: DO NOT attempt to adjust the position of the stop nut to achieve additional closing stem travel. Serious damage to the gate stem guide and gate can result.**

**NOTE: For electrically or hydraulically operated gates please refer to manufacturer Operation and Maintenance Manuals.**

### MAINTENANCE AND LUBRICATION

#### General Information

Occasional adjustment and lubrication of Hydro Gate slide gate components will be required. The frequency will depend upon how often the gate is used, location, and operating conditions. Periodic inspection, adjusting, and cleaning are recommended as conditions at the site permit.

#### Lift and Stem Maintenance

Maintenance of the threaded operating portion of the gate stem is critical and should be performed as frequently as the operating environment requires.

**IMPORTANT: Failure to maintain stem thread lubrication causes operating difficulties and premature failure of the lift nut and stem threads.**

Recommended inspection frequency and procedures are listed on the maintenance schedule:

- Initial inspection at the time of installation and again at the date of commissioning.

A “cycle” of gate operation is operation of the gate slide from closed to open to closed position. At each inspection, verify the following items:

- Inspect the stem threads and lift nut threads for wear and verify the trueness and dimension of the thread form. See wear checking procedure.
- Check the amount and condition (diary and day) of lubricant remaining and add if necessary.

- Relubricate if necessary – threads should be cleaned and relubricated with fresh lubricant.

More severe conditions or operating modes require a slightly different schedule of inspection and service. For example: Modulating gates with electric motor operators may make position changes several times a day but seldom go full stroke. There is a portion of the stem that gets a lot of use. These stems should be inspected at least weekly. The lubricant on the stem threads should be monitored closely. As the lubricant is depleted and becomes contaminated, it should be cleaned and replenished.

When excess dried grease or other foreign material is carried into the threads of the lift nut, extremely hard operation will result. If serious binding occurs, the only way to correct it is to remove the threaded stem from the lift nut and clean the thread interior. If this foreign material is not cleaned from the interior threads of the lift nut, heavy pulls on the handcrank or seizure will result.

Stem threads may be cleaned with solvent, rags, and brushes. Run the gate open. While in the process of opening (running the stem out above the lift nut), clean off the old grease. Inspect the threads for roughness. If the threads are rough, they may be filed and polished. Be careful to keep filings and grit out of the lift nut. Rough stem threads accelerate the wear of the lift nut threads.

Relubricate stem threads by brushing or smearing grease

onto/into the threads as the gate is closing (the stem is going into the lift). This puts fresh lubricant into the lift nut and carries out the old contaminated grease. It is recommended that the contaminated grease be cleaned from the stem as it exits underneath the lift where the stem is accessible from below. Replenish grease on the underside stem.

The recommended stem thread lubricant is Schaeffer’s 238 ultra-supreme.

Recommended for potable water is a vegetable-based lubricant, Shaeffer’s (XXXXXX).

Lifts may be furnished with a stem lubricator Zerk Fitting which is located in the “stem cover adapter” to facilitate lubrication of stem threads with pressure greasing equipment. To be effective, lubricant should be injected while the stem is moving through the lift.

Manual crank lifts have sealed thrust bearing and do not require lubrication.

Exercise of infrequently operated lifts and gates is recommended. A Semi-annual (every 6 months) exercise will ensure the gate is operable when needed and the lubrication condition will be maintained.

# HG561 FABRICATED SLIDE GATE

## Maintenance

Removal of the stem nuts for thread inspection or check with the wear checking procedure of frequently modulated gates is recommended.

Replacement or spare nuts can be ordered from us. Spare parts are usually not needed or recommended, because they are readily available on short notice

from us. In those cases where equipment operation or downtime is critical and the gate is operated extremely often, a spare lift nut may be pertinent to have on hand.

**TABLE 2. Maintenance Schedule and Lubrication Summary –HG561 Fabricated Slide Gates and Manual Lifts**

Activity	Frequency	Lubricant
General Cleaning and Inspection	As often as conditions require or permit, or every 6 months.	N/A
Stem Thread and Lift Nut Wafer Inspection	Initial inspection after 10 cycles. Subsequent inspection after 25 cycles. Operational inspection after each 50 cycles, or every 6 months.	N/A
Stem Thread Lubricant and Cleaning Inspection	Every 3 months, quarterly, or 6 months. Clean grease if dried or contains foreign material every 6 months. More frequent intervals required for modulating duty.	Schaeffer's 238 Ultra-Supreme

### Lubrication Equivalents

We consider any of the following greases/lubricants to be acceptable:

- Fiske Brothers “Lubriplate” No. 630 AAA or AA
- Sta-Lube “Sta-Lube” No. 3121
- Conoco “All Purpose Superlube”
- Texaco “Multi Fak Heavy Duty” No. 2
- Shell Gadus Grease (formerly known as Alvania)
- Mobil “Mobilux EP2”
- BP Energrease LS 2

We recommend the following pipe thread sealants with Teflon:

- La-Co Slic-Tite Paste
- Dayton Pipe Thread Sealant with Teflon
- McMaster-Carr Pipe Thread Sealant with Teflon
- Any other commercially available pipe thread sealants containing Teflon

For potable water treatment plants, we recommends using a vegetable-based lubricant such as:

- Lubriplate Super FML-2
- Rocol Foodlube Multi-Paste (European product)
- Petro-Canada Purity-FG

### LEAKAGE

The most frequent cause of excess leakage through a newly installed gate is improper installation and/or failure to make final adjustments to the gate before operation. When you encounter this problem, first verify that the Hydro Gate installation instructions have been carefully followed and that final adjustments and greasing have been accomplished. If not, then follow step-by-step the adjustment procedures as outlined in the appropriate instructions.

Another important check is to ensure the gates were not disassembled for installation. The outside of our installation booklet states, "DO NOT DISASSEMBLE GATE FOR INSTALLATION". This is repeated in the text of this Installation, Operation, and Maintenance manual at several critical locations. Occasionally, we still find that gates are disassembled for easier handling, painting, etc. When it is absolutely necessary to partially disassemble a gate or remove the slide to facilitate installation, use extreme care in handling the parts, particularly the frame. As pointed out above and in our installation instructions, the amount of leakage through the gate is highly dependent upon the quality of the installation.

**⚠ CAUTION: Without the slide in place, the frame is very fragile. We cannot be responsible for performance problems caused by rough handling and damage to gate parts.**

AWWA C561 standard for fabricated slide gates for seating and unseating head is 0.1 gallons per minute per foot of sealing perimeter. A correctly installed and adjusted HG561 Fabricated Stainless Steel Gate are designed to meet or exceed the allowable AWWA leakage rate.

#### Troubleshooting Tips

Most fabricated slide gates depend on water pressure with a slight deflection of the gate slide to seal. Proper installation and cleaning of seating faces are still necessary for the gate to be as watertight as possible.

#### Excessive Localized Leakage

Check by opening the gate slide to its FULL UP position. Use thin wire, string, or straight edge to check the gate frame. Stretch the wire along each side. If there is significant (1/32" or more) variation in the seating face, excess leakage will result in those locations where warpage has occurred. Also, stretch the wire corner-to-corner across the opening. If the strings do not touch at the center, then one corner, or the other, has been pulled back considerably from the plane. To repair this faulty installation, it is necessary to loosen bolts, push the frame out as required and align it before tightening or regrouting.

#### Dirty Seating Faces

Excess leakage can also be caused by foreign material on seating faces of the gate frame or slide. Check for drops of paint, cement runs on seating faces, or other construction grime. To correct, remove foreign material from the perimeter of the seating faces on both slide and frame, and reseat the gate.

#### Excessive Leakage near Top of Slide

If leakage occurs primarily at the top near the stem, there is probably excess compression in the stem, which is pulling the gate slide from its frame. Check by turning the handwheel or handcrank in the direction to open the gate. When excess pressure on the stem is removed, the slide will spring back into position. Reset the top nut, and refer to

Electrical Actuator Operating and Maintenance Manual to adjust torque and limit switches as needed.

#### Excessive Leakage near Top of Slide, Frame Not Warped

If leakage occurs primarily at the top and the slide is not warped or pushed out of position, then ensure the top frame member is not pulled against the concrete. This is most likely on gates wide enough for expansion studs in the top frame member. To correct misalignment, loosen the bolts into the cinch studs and shim behind the top frame member to push it away from the concrete. Use a straight edge or thin wire stretched along the upper frame member to set the member straight. Check seal contact or fit with the slide before regrouting. This space may also be packed with polyurethane sealant or epoxy grout.

#### Leakage across Bottom of Flush Bottom Gates

If a sheet of water is coming from the bottom of the gate, the gate is not completely closed. To completely close the gate, the stop nut or limit switch may need to be reset. When properly closed, the slide will be embedded approximately 1/16" into the flush bottom seal and a .005" gauge will not fit between the flush bottom seal and the bottom of the slide. Use of a flashlight or a trouble light on the opposite side will also indicate if good contact is being made.

#### Excessive Leakage through Seats Top and Sides

This indicates that either the cover bar or hook wedges are too loose or the gate has damaged seats. For the loose fitting components simply re-tighten and for the damaged seats attempt blending localized damage; tighten adjustment nuts and wedges;

replace seats and carefully fit and seal the joints.

## **Stem Bends when Gate Is Closed (Hand-Operated Lifts)**

1. Ensure stem guide collars are properly located to hold the stem in alignment. Bolts on collars must be tightened so the collar is not slipping on the guide bracket.
2. Ensure stem guides are all located properly. If the spacing exceeds that shown on the installation drawing, the stems may be deflecting before the gates are tightly closed.
3. If stem guides are correctly located and collars are tight, then the load being applied to the stem by the lift is in excess of that needed to close the gate, or the load recommended for a particular stem size. Reset the stop nut to prevent an excess load from being applied to the stem after the gate is closed.

## **Excess Force Is Required on Handwheel or Crank**

1. Ensure the stem is lubricated as recommended.
2. If a simple application of lubricant does not appear to solve the problem, check for foreign material jammed in the nut threads by either disassembly or working back and forth with generous application of penetrating oil and grease.
3. If the stem is properly greased and the lift nut does not appear to be dirty or binding, ensure the stem, stem guides, and lift are in proper alignment. On most installations, the stem will be installed in the vertical position. A carpenter's level can be used to verify that it is in vertical plane in both directions. Check for binding through individual stem guides. Check the pedestal to ensure it is vertical in both directions and the

stem threads are straight through the lift nut.

4. In locations where the stem is not installed vertically, such as on the face of a dam, alignment can be checked using a thin wire stretched tightly between the top of the slide and the bottom of the lift. Realign by adjusting the stem guides and/or shimming one side of the lift as required.
5. Check the frame guide grooves: Remove any foreign material, loosen if necessary, reposition, or replace if rolled over, torn, or wadded up.

## **STORAGE**

### **Long-Term Storage Instructions for HG561 Fabricated Gates, Lifts, Stems and Accessories**

1. Gate assemblies shall be stored horizontally and flat, with the back side (flange side) down. The storage area must be flat, graded, comprised of compacted soil, concrete, or asphalt.
2. Place timber, minimum 4" x 4", to provide substantially complete perimeter support under the gate frame assembly. Longitudinal timbers, spaced a maximum of 4', may also be used.
3. Stacking of gates is permissible. The stacked height should not exceed 3/4 of the bottom gate's width or height. Stack gates of different sizes in a pyramid fashion. DO NOT stack large gate on top of smaller gates.
4. Stacked gates should be separated with timber. The separating timbers should form

a flat and level base for the gate above.

5. Wall thimbles may be stored similar to above. They may be stored with machined flange face up or down. Substantial level blocking is essential. Uneven support of gate assemblies and thimbles causes the gate or thimble to warp and voids the manufacturer's warranty.
6. Store the lift assemblies either upright with plastic plugs/caps in place to keep dirt out of the nut threads or leave in original shipping cartons. DO NOT store the lifts directly on the ground.
7. Stems and stem covers should be stored horizontally on timbers spaced 4 to 8 feet apart. Protective sleeves should be left on all stem threads and stem covers.
8. Miscellaneous accessories and hardware should be stored off the ground.

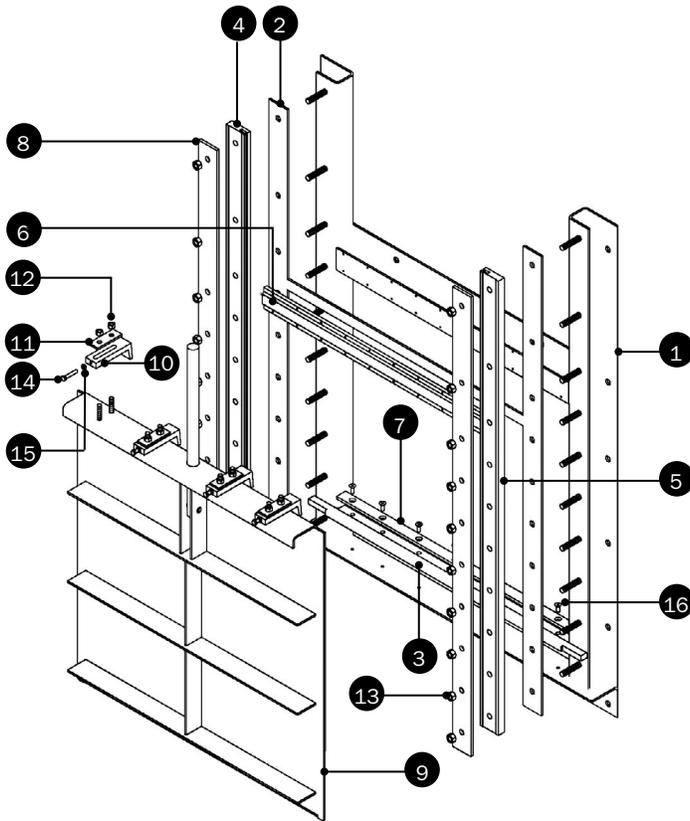
9. Bronze stem blocks, wedges, lift nuts, and stainless steel accessories are targets for theft and resale as scrap. Report all shortages at once and note on shipping papers. We cannot be held responsible for theft and loss of equipment stored on the job site.

10. Inside dry storage is the best for all equipment. Covering equipment stored outside with tarpaulins is recommended to minimize degradation of paint from rain and sunlight, until finish paint is applied. Uncovered outdoor storage may result in staining of painted surfaces from rain and sunlight.

**NOTE: The Hydro Gate standard warranty applies to this order, and can be found at [www.hydrogate.com/support](http://www.hydrogate.com/support).**

# HG561 FABRICATED SLIDE GATE

Parts



## PARTS LIST

ID	DESCRIPTION	MATERIAL	QTY.
1	Frame Weldment	Stainless Steel	1
2	Load Pad	Neoprene	1
3	Bottom Seal	Neoprene	1
4	Left-Side Seal	UHMW	1
5	Right-Side Seal	UHMW	1
6	Top Seal	UHMW	1
7	Bottom Seal Retainer	Stainless Steel	1
8	Side Seal Retainer	Stainless Steel	2
9	Side Weldment	Stainless Steel	1
10	Top Wedge	-	4
11	Top Washer Plate	-	4
12	1/2" Locking Hex Nut	Stainless Steel	8
13	5/8" Locking Hex Nut	Stainless Steel	20
14	3/8" x 2" Hex Bolt	Stainless Steel	4
15	3/8" Jam Nut	Stainless Steel	4
16	3/8" x 1-1/4" F/H Screw	Stainless Steel	7

## SPARE PARTS

### How To Order Replacement Or Spare Parts

Parts may be ordered from your local Hydro Gate representative or direct from us.

Please have the following information:

1. Hydro Gate sales information found on the blue anodized tag located on the gate lift or pedestal.
2. The item and/or tag number must be relayed to us.
3. Description of replacement part(s).

**IMPORTANT: Check size of parts before attempting to store them.**

**Spare parts should be stored in clean, dry and protected warehouse until ready for installation.**

### SPARE PARTS LIST

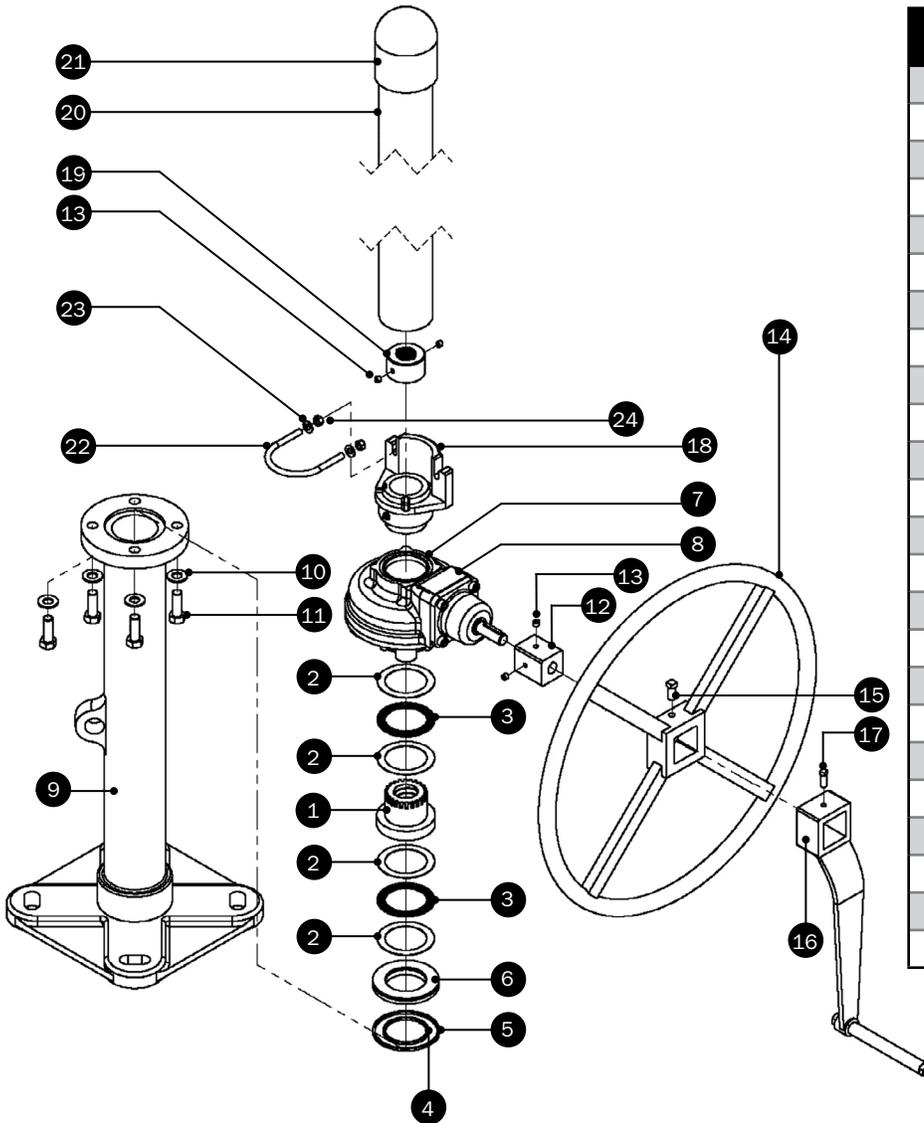
1	Stop Nut
2	Stop Collar
3	Lift Nuts
4	Stem Cover
5	Thrust Bearing for Gate Lift



# HG561 FABRICATED SLIDE GATE

Parts - Manual Lift Type IB

## PARTS LIST



ID	DESCRIPTION	QTY.
1	Lift Nut	1
2	Thrust Washer / Race	4
3	Thrust Bearing	2
4	O-Ring	1
5	O-Ring	1
6	Spigot Ring	1
7	IB Gearbox	1
8	ID Tag	1
9	Pedestal	1
10	5/8" Flat Washer	4
11	#11 -5/8" Hex Nut	4
12	AWWA 2" Square Crank Adapter	1
13	#16 - 3/8" x 3/8" Set Screw	4
14	24"Ø or 30"Ø Handwheel	1
15	Square Head Set Screw	1
16	AWWA 2" Square Crank Nut - 15"	1
17	Square Head Set Screw	1
18	Stem Cover Adapter with Zerk	1
19	Stem Nut	1
20	Stem Cover	1
21	Stem Cap Cover	1
22	3/8"Ø U-Bolt	1
23	3/8"Ø Washer	2
24	#16 - 3/8" Hex Nut	2

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