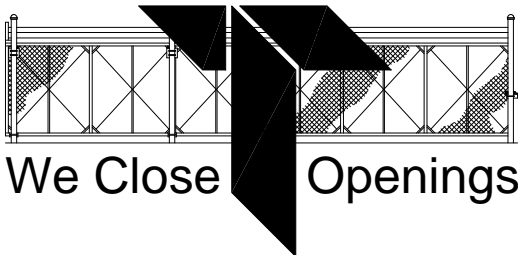
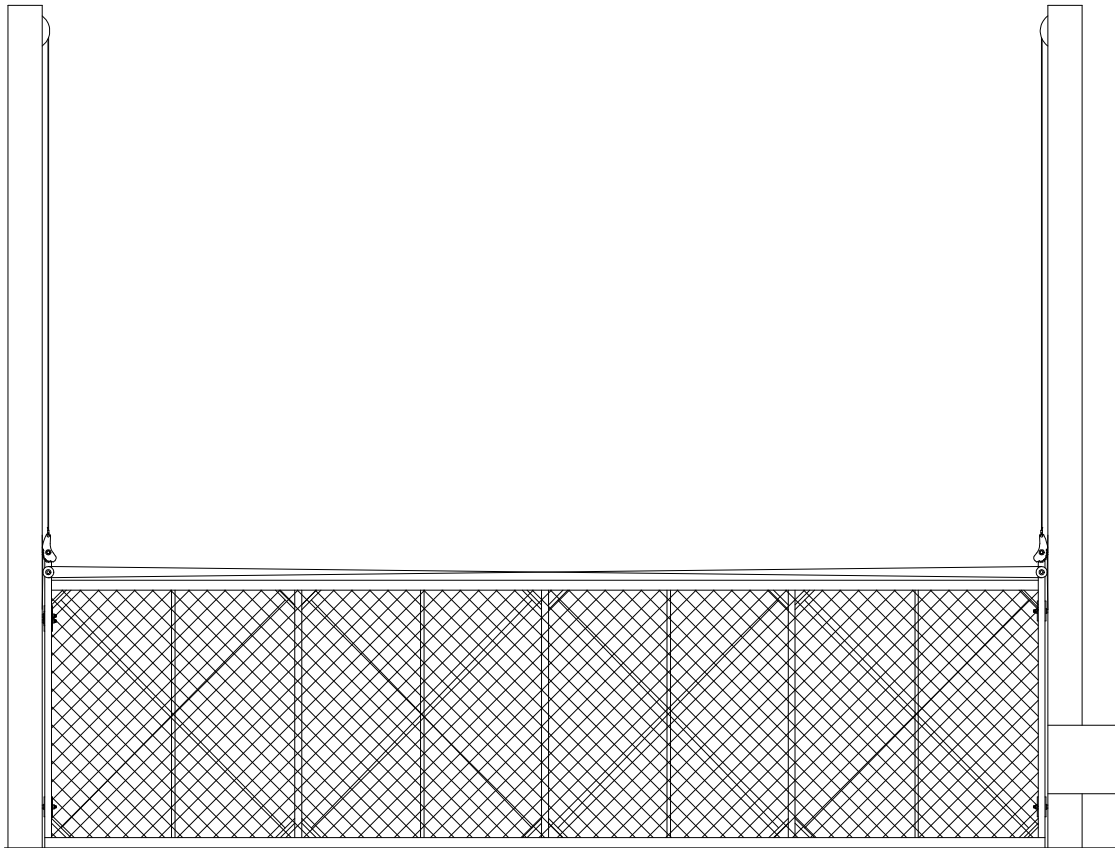


INSTALLATION and OPERATIONS and MAINTENANCE MANUAL

The Tymetal VS Vertical Lift Gate



www.tymetal.com

Tymetal Corp.
678 Wilbur Avenue
Greenwich, New York 12834
Phone: (800) 328-4283
Fax: (518) 692-9404

FORTRESS VERTICAL LIFT GATE OPERATIONS AND MAINTENANCE MANUAL

(TO BE USED IN CONJUNCTION WITH VERTICAL LIFT GATE SHOP DRAWINGS)

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1. Identification

Column Identification

Each column bears a welded ID number welded on the top face of the base plate at the gate opening. Columns are paired by letter (A, B ,C etc) for each opening with the operator column further identified with a "-2" and the idler column identified with a "-1". Every attempt is made to correlate TYM gate number with project gate number.

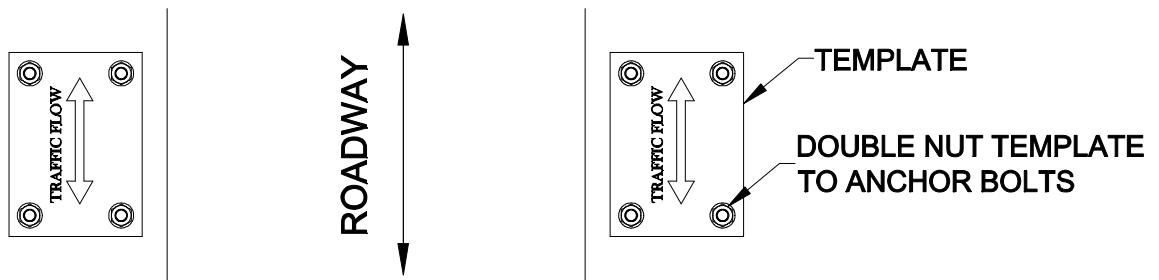
Placement

Columns are designed based on the weight of the gate. Columns must be paired and placed according to design. Please call Tymetal if placement is unclear.

2. Installation:

Location of Support Columns:

- 2.1.1 Refer to submittal drawings and excavate the site for the column foundations. Remove or compact any loose soil in the bottom of the hole. Verify with a penetrometer that the soil density surrounding the foundation has a minimum value of 1500 Pounds/square ft. If this value is not met the foundation supporting the Vertical lift gate will be insufficient. Consult a civil engineer for corrective action.
- 2.1.2 The supplied rebar cage comes pre-tied but the anchor bolts are loose. Construct forms as required to pour the foundations and support the anchor bolts and cages per the submittal drawings. Use 3,500 PSI (min.) concrete. Pay careful attention to grade variance, bolt patterns, etc. ***Tymetal supplies steel templates to align the 1-1/2" diameter anchor bolts correctly*. Be sure to use these.**



- 2.1.3 It is **critical** that top surface of column footings be **at the same elevation** and be **at or above final finished grade**. See diagram 2.1.3. In situations where there is an extreme difference in elevation across the opening, a graded panel will have been designed that is specific to the project and drawings provided will indicate footing elevations.

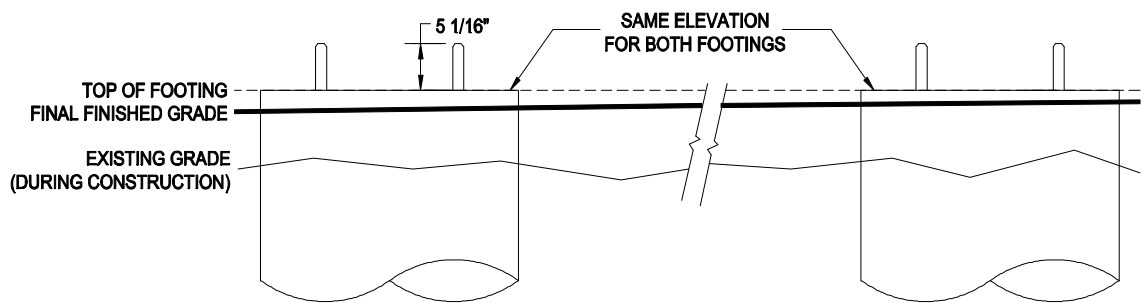


Diagram 2.1.3

After the foundations are complete you will measure the bolt patterns and record the values on the “Vertical Lift Gate Installation Diagram” supplied to you and return this to Tymetal Corp. Tymetal will manufacture the gate panel to the exact width required for the as built opening size.

Preliminary checklist:

Prior to lifting the support columns into position, check the following items:

- ✓ Tighten all socket cap bolts that fasten the track to the beam. (This will require a 3/16” Allen wrench)
- ✓ Inspect the 10” sheaves and idler sprockets for proper alignment and tighten all of the setscrews.
- ✓ Locate and connect the finished end (with a 3/8” eyebolt) of each anti-racking cable to the top of each support column by bolting the eyebolt to the 3” angle welded to the lifting column near the 10” sheaves.
- ✓ Remove any shipping tape or nylon ties from all existing cables.

NOTE: Do Not Remove Counterbalance Basket Shipping Bolts until Step 2.7.2.

NOTE: Failure to follow this instruction will allow the Counterbalance Baskets to fall resulting in personal injury and or equipment damage!!!!!!!!!!

NOTE: Do Not Remove Orange safety chains retaining the counter balance weights until Step 2.8.4.

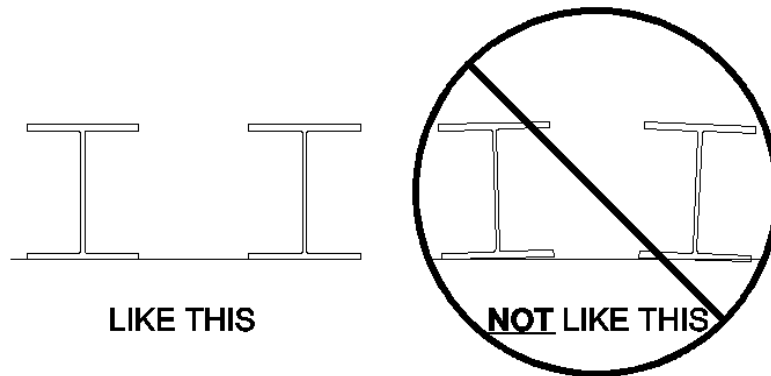
NOTE: Failure to follow this instruction may allow the Counterbalance Baskets to fall resulting in personal injury and or equipment damage!!!!!!!!!!

Install the Columns:

- 2.3.1 Install the leveling nuts onto the anchor bolts. If a transit is available pre-set the height of the leveling nuts before setting the columns; this will limit the adjustments necessary after the columns are set. Install washers after leveling nuts.
- 2.3.2 Carefully lift the support columns into place over the previously embedded anchor bolts. **Be sure the column with the motor box attached to it is in**

the correct location. Tymetal suggests that you use an experienced erector to lift and place the columns.

- 2.3.3 Assure that flanges of both columns are rotated to be in the same vertical plane. Improper rotation can cause issues with anti-racking pulley relationships with the gate face.



- 2.3.4 Plumb and level both columns accordingly. The columns must be plumb within $\frac{1}{2}$ " or better with vertical and the base plate bottoms must be within $\frac{1}{4}$ " elevation with each other. We suggest using a precision instrument such as a sight level or transit to set the columns. Plumb of the columns should be verified with a plumb bob and string. The base plates have been slotted to allow rotation of the columns so that proper alignment may be achieved.
- 2.3.5 Tighten the anchor setting nuts to approximately 250 ft./lbs. of torque.
- 2.3.6 Fill the void between the lifting column base and the top of the footing with non-shrinking grout as required. See Diagram 2.3.6.

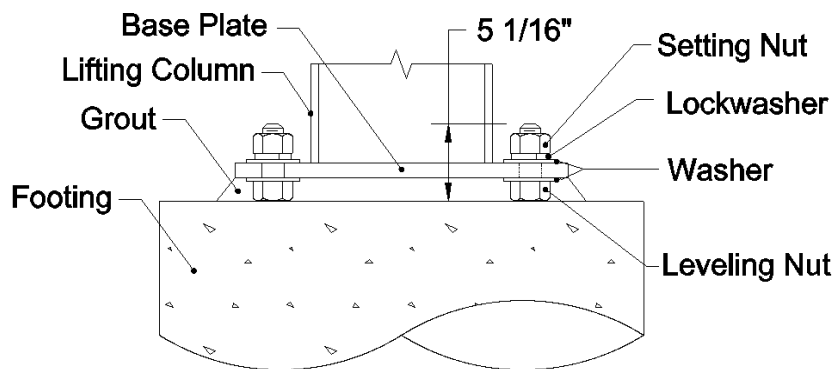


Diagram 2.3.6
Install the Gate Panel:

- 2.4.1 Without removing the gate frame mounting tube from the truck assemblies, loosen the nuts on each truck bolt to allow for approximately one and one-half ($1\frac{1}{2}$) inch of lateral movement in each lifting tube. See Diagram 2.4.1.

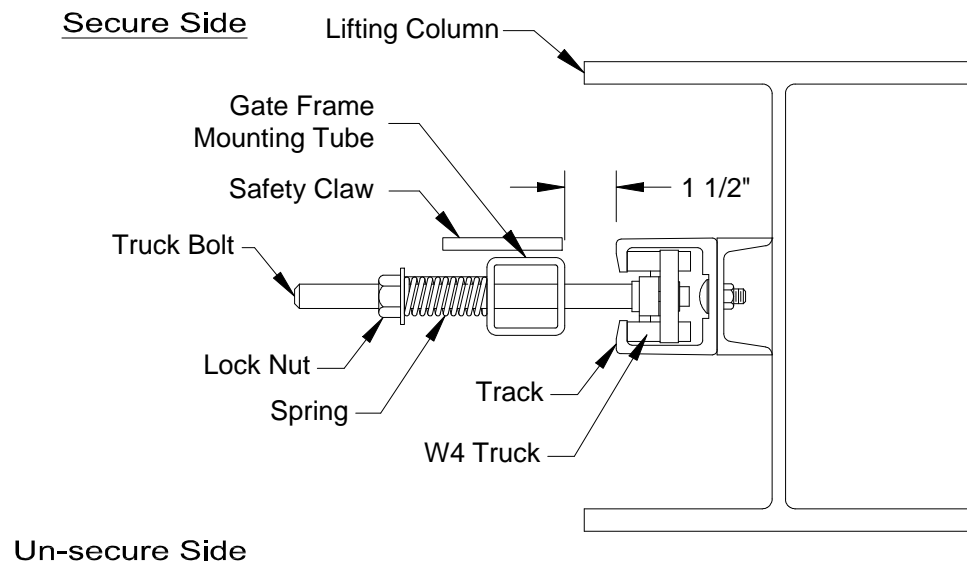


Diagram 2.4.1

2.4.2 Position the gate panel in the center of the opening.

2.4.3 Align each gate frame mounting tube with its respective end of the gate frame and clamp into position. See Diagram 2.4.3.

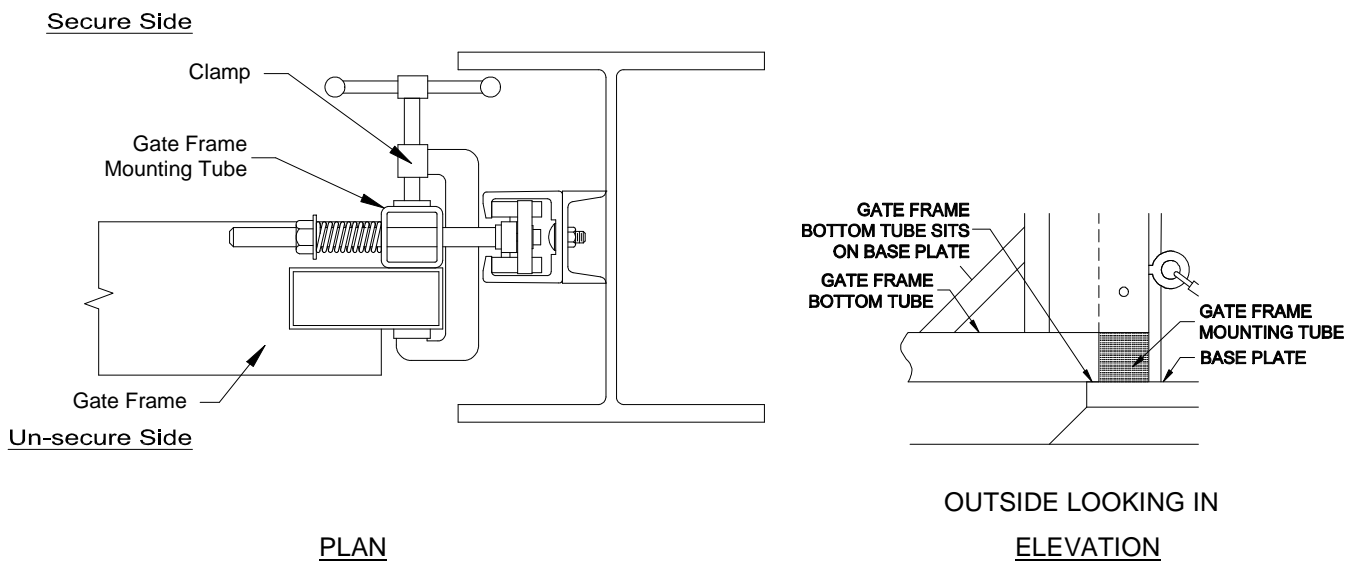
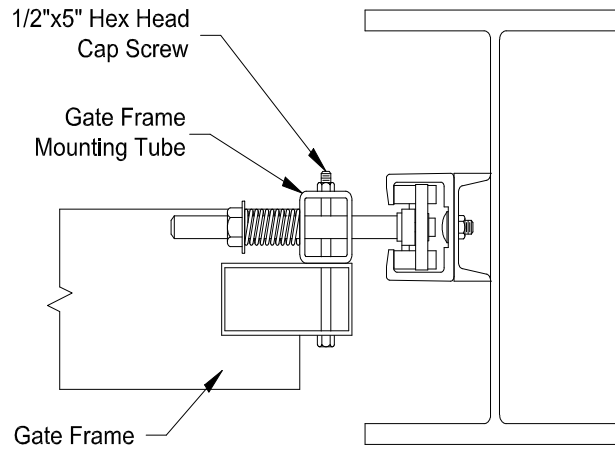


Diagram 2.4.3

2.4.4 Using the pre-drilled holes in each gate frame mounting tube as guides, drill the required 1/2" holes through the gate frame.

2.4.5 Secure the gate frame to each gate frame mounting tube using the 1/2" x 5" hex head cap screws provided. See Diagram 2.4.5.

Secure Side



Un-Secure Side

Diagram 2.4.5

- 2.4.6 Draw each truck assembly up against the track member until all four (4) wheels just make contact with the inside.
- 2.4.7 If not already done, attach the required gate filler and/or any signage that may be required for the gate.

Install the Anti-racking Cables:

- 2.5.1 One cable should be hanging down from the top of each lifting column. If not, refer to section 2.2. **The gate frame must be in the down position to install the anti-racking cables.**
- 2.5.2 Locate one of the turnbuckles in the hardware box provided.
- 2.5.3 Remove one of the eyebolts on the turnbuckle
- 2.5.4 Locate the 3" angle at the base of the column and place the threaded side of the eyebolt up through the hole from the bottom.
- 2.5.5 Reconnect the eyebolt to the turnbuckle body. DO NOT thread the eyebolt completely into the turnbuckle body.

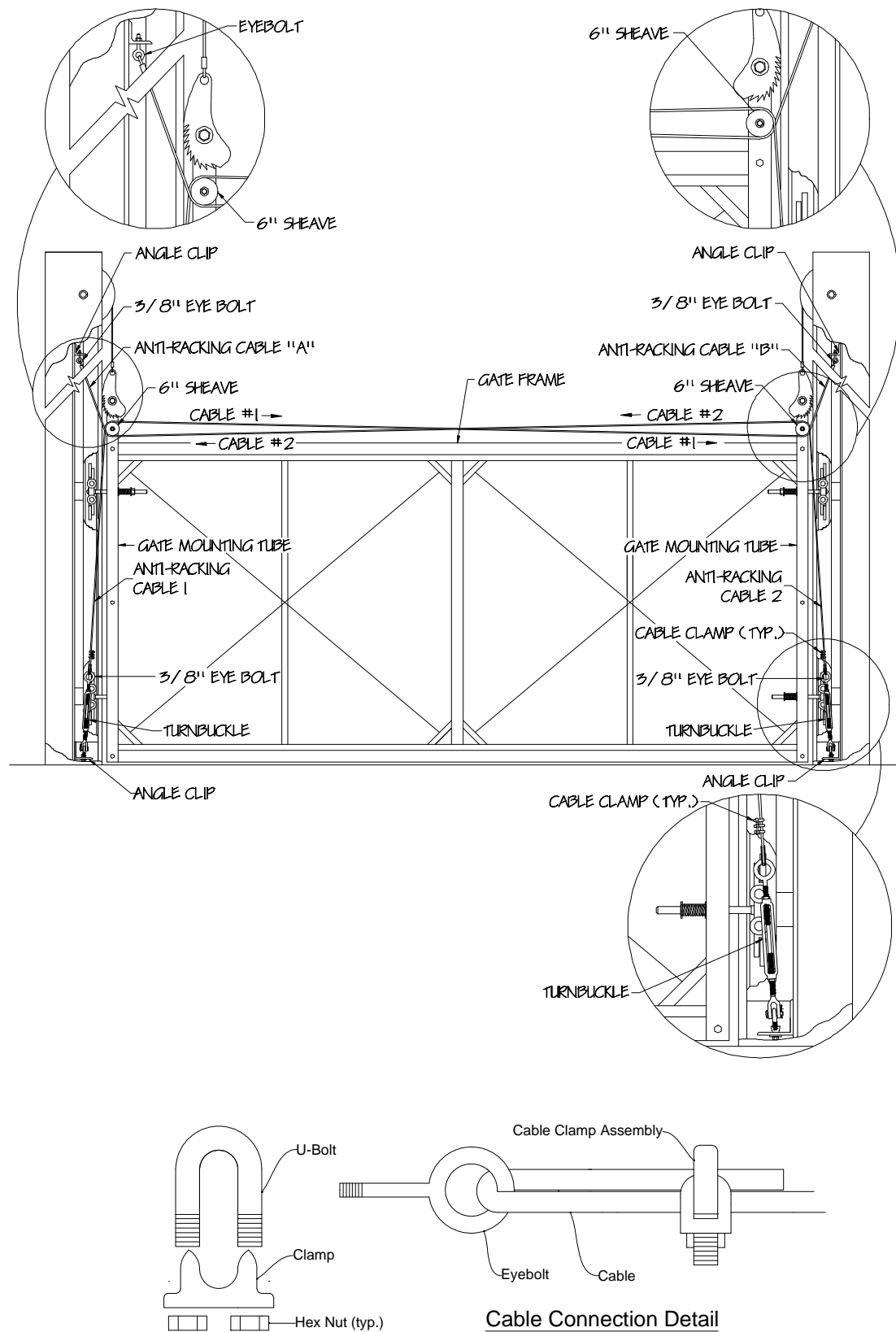


Diagram 5

- 2.5.6 Select one side to start. Run the cable under the inside 6" sheave on that side.
- 2.5.7 Continue running the cable across the gate frame and over the inside 6" sheave on the opposite side.
- 2.5.8 Run the cable through the upper eyebolt of the turnbuckle.
- 2.5.9 Pull the cable as tight as possible by hand, clamp the cables together using the cable clamps provided.
- 2.5.10 Repeat steps 2.5.6 through 2.5.9 for the opposite cable using the outside 6" sheaves.
- 2.5.11 Once both cables have been installed, tighten both turnbuckles to remove any cable sag – **DO NOT OVERTIGHTEN** (this will cause difficulty in manual cranking and cause bending of anti-racking cable pulley stud).

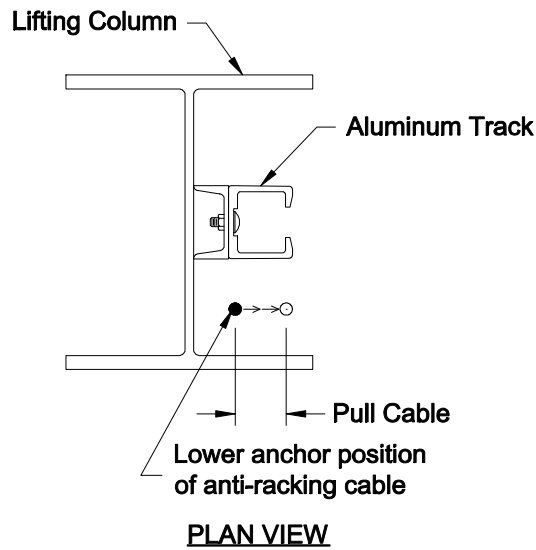


NOTE: The tension on both cables should be equal and should deflect approximately ½" when pressure is applied with thumb. See photo above and Diagram 5.

Anti-Racking Cable Adjustment Verification Procedure

- 2.6.1 Note: Anti-racking cables should be snug but not tight. After approximate correct snugness is achieved, verify by the following method:
 - With the GATE FULL DOWN, stand beside the gate
 - Grab anti-racking cable with one hand at chest elevation
 - Pull cable toward the roadway to be even with the edge of the aluminum track closest to the road – watch for any gate panel movement
- ✓ If the gate panel does not move – cables could POSSIBLY be slightly tighter
- ✓ If gate panel moves – cables are slightly too tight – loosen as needed to achieve NO MOVEMENT
- 2.6.2 Observe the crossing point of both anti-racking cables. This crossing should occur at the approximate center of the gate (left to right).
- 2.6.3 Observe the crossing point as the gate travels upward and downward. You will likely see the crossing point wander to the left in one direction of

movement and to the right in the other direction. EXTREME WANDER may be indicative of an issue with the gate or cable adjustment.



Set the Counterbalance Weights

2.7.1 Prior to continuing, make the following checks:

- ✓ Be certain that all items that are going to be mounted to the gate frame (fabric, signs, etc.) are attached.
- ✓ Verify that all bolted connections between the gate frame and lifting tubes are secure.
- ✓ Verify that all bolted connections between the lifting tubes and lifting cables are secure.
- ✓ Verify that all bolted connections between the lifting cables and the counterbalance weights are secure.
- ✓ Verify that all bolted connections between the drive chain and the counterbalance weights are secure.

2.7.2 Locate the counterbalance weights in each column and remove the shipping bolts from each weight. Each weight is pre-loaded to approximately 80% of the total gate weight.

NOTE: A crane or other lifting device may be required to lift the weights enough to remove bolts.

2.7.3 Additional weights are provided to complete the counterweights. These weights are 1" x 3" x 9" blocks of steel and weigh 10 lbs. each. They will be located in a drum or on a pallet provided to you. Place the additional weights horizontally into the counterweight baskets evenly to both sides until the gate and the counterweights are balanced.

Fine-tune the Gate:

2.8.1 Open the motor box and unfold the crank handle.

2.8.2 Crank the gate panel up and down to check counter balance; the gate will move only about 1'. The counterweights are still held by the orange safety chains. Gate movement should be smooth and quiet with equal force in both directions.

2.8.3 If it is not, and the gate is binding, check the following and make any necessary adjustments:

- ✓ Check the truck assemblies. Be sure that they have not been over tightened.
- ✓ Check all sprockets and chains proper alignment and tension.
- ✓ Gate should not creep up or down when manual cranking ceases, otherwise indicates that gate is not properly counterbalanced.

2.8.4 If the gate hand cranks smoothly with equal force you may now remove the orange safety chains.

2.8.5 Repeat manual cranking over full gate travel.

Install the Column Access Covers:

2.9.1 The column access covers are shipped separately from the columns to avoid damage and are color-coded and numbered to fit each of the two columns.

2.9.2 Using ¼-20 security screws and 5/32" security bit provided, secure each cover in its assigned location.

Connect Main Power to System

2.10.1 The electrical entrance into the motor box shall be made through the bottom of the motor box and shall be continuous to the disconnect switch with seal tight conduit. Be sure to account for the adjustment of the motor mount.

Adjust Open and Closed Limit Switches

2.11.1 The open and close limit switches are located in the limit assembly box. To access and expose limit nuts, remove the control panel cover. The open and closed adjustment direction is labeled on the spring loaded limit lock plate. To adjust gate travel, depress the spring-loaded plate and rotate limit nuts either toward or away from the limit switches. Moving the nut toward the limit switch decreases gate travel, and moving the nut away from the limit switch increases gate travel. **HINT:** The close limit should activate when the gate frame is approximately 2" to 3" away from seating in the locking column. The open limit should activate approximately 6" prior to the gate reaching the fully open position. See Diagram 2.11.1.

- ① Depress the limit nut locking plate
- ② Rotate the limit nut as required to attain the proper adjustment
- ③ **CAUTION:** Be sure that the limit nut locking plate is securely engaged in the limit nut slot after adjustment.

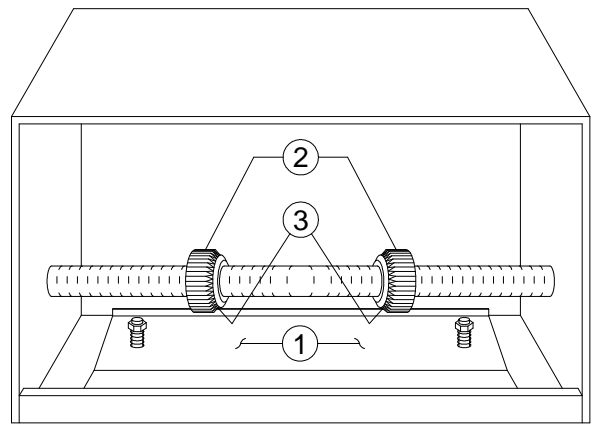


Diagram 2.11.1

Clutch Adjustment

NOTES: The clutch assembly is shipped at its minimum pressure setting from the factory. It will have to be tightened prior to engaging the unit for its first run. The determination of the desired clutch pressure/gate resistance is the sole responsibility of the owner.

If the clutch appears to be slipping, inspect the unit thoroughly to insure that there are no obvious mechanical issues that may be causing the gate to bind during travel.

2.12.1 Unfold the crank handle and make sure that the spacer located between the crank handle and conical washers turns freely. If this does not happen, correct as follows:

- ✓ Loosen the pressure bolt located at the end of the crank handle (See Diagram 0) and using a hammer, gently tap the crank handle towards the gear box until the spacer rotates freely.
- ✓ Tighten the pressure bolt.

If the gate frame weight is 2500 pounds or less:

Unfold the crank handle. There are two Allen head bolts located on the handle. One bolt has a spring on it; the other has a locking nut. The bolt with the locking nut is the adjustment for the clutch. See Diagram 0.

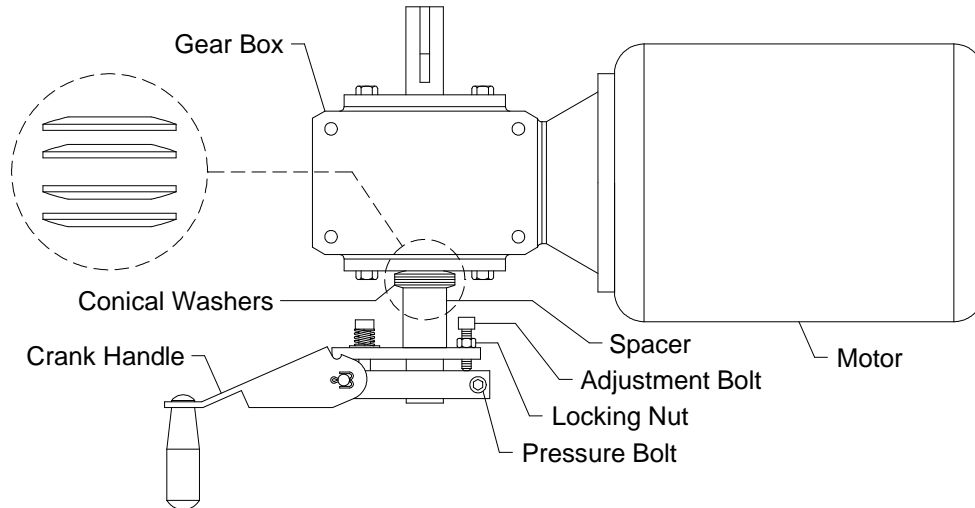


Diagram 0

To TIGHTEN the clutch: loosen the locking nut and tighten the adjustment bolt.

To LOOSEN the clutch: loosen the locking nut and loosen the adjustment bolt.

After each adjustment, fold the crank handle back in and test the gate resistance.

Repeat steps as necessary until the desired resistance is achieved.

If the gate frame weight is greater than 2500 pounds:

- ✓ Unfold the crank handle, loosen the pressure bolt completely and remove the crank handle from its shaft. See Diagram 0.
- ✓ Remove the spacer.
- ✓ Remove the conical washers
- ✓ Reconfigure the washers so that they are nested within each other and in the same direction and replace on the shaft. See Diagram 0.

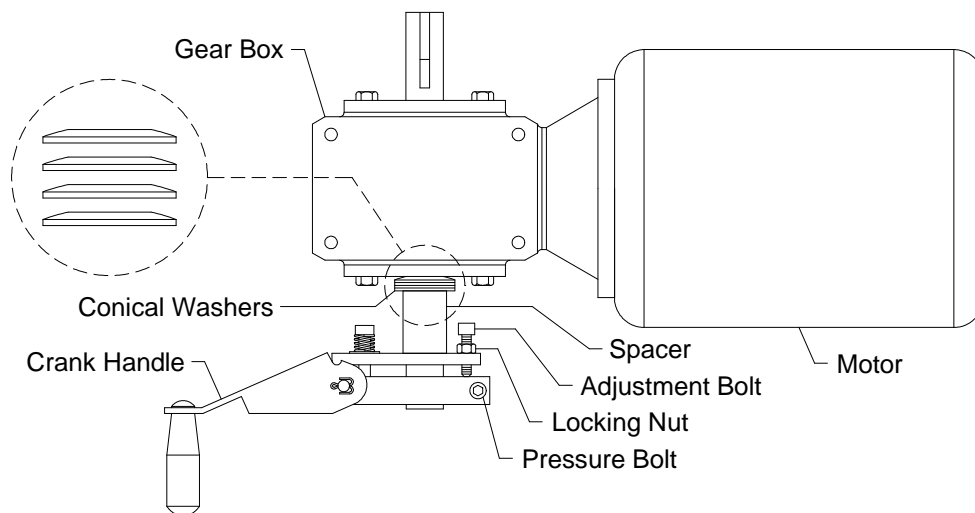


Diagram 0

- ✓ Replace the spacer
- ✓ Replace the crank handle and tighten the pressure bolt.
- ✓ Make sure the spacer spins freely as described in step 2.12.1.
- ✓ Unfold the crank handle. There are two Allen head bolts located on the handle. One bolt has a spring on it; the other has a locking nut. The bolt with the locking nut is the adjustment for the clutch. See Diagram 0.

To TIGHTEN the clutch: loosen the locking nut and tighten the adjustment bolt.

To LOOSEN the clutch: loosen the locking nut and loosen the adjustment bolt.

- ✓ After each adjustment, fold the crank handle back in and test the gate resistance.
- ✓ Repeat steps above as necessary until the desired resistance is achieved.

3. Electrical (Including Electrical Start-up)

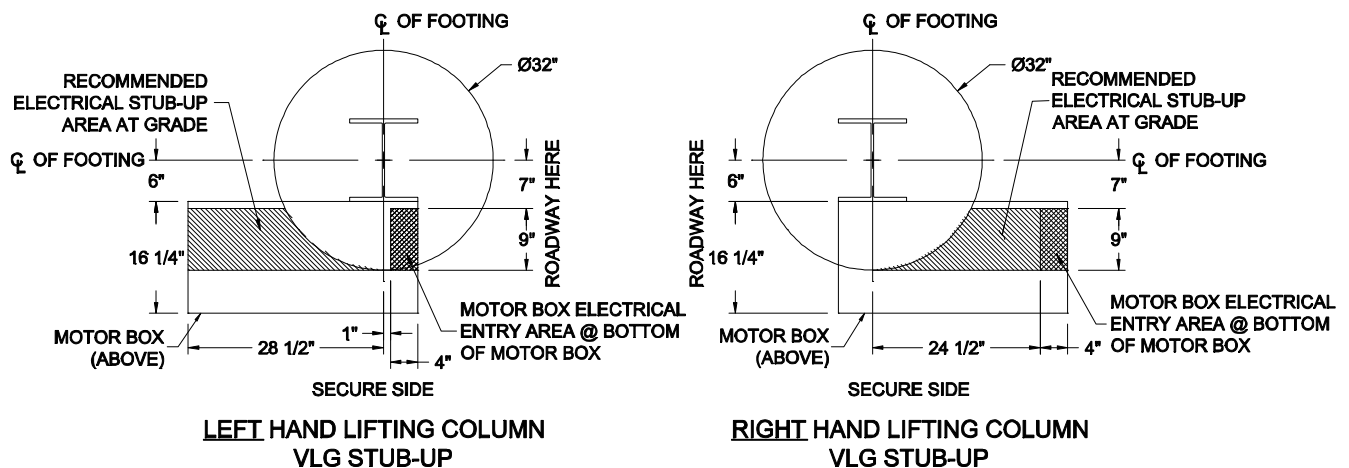
NOTE: a qualified electrician shall perform all electrical work.

Before Beginning:

- ✓ DO NOT hook up the control and status wiring at this time.
- ✓ Make sure all electrical enclosures are closed.
- ✓ Make sure the gate cranks back and forth freely.
- ✓ Turn the power switch on the gate operator controller to the **OFF** position and **LOCK OUT MAIN POWER**.

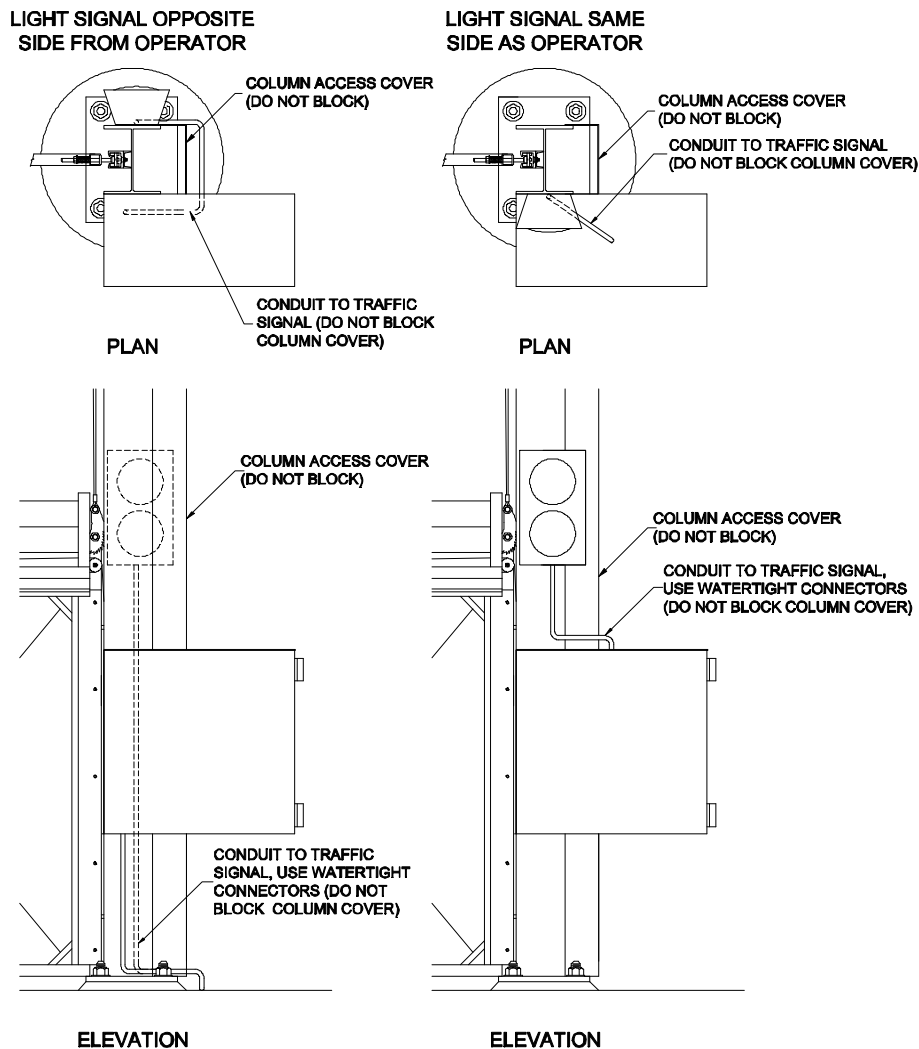
Electrical Stub-up Location

NOTE: Only ONE of the diagrams below will apply to the installation. Handing is determined from a position facing the motor box side of the unit. If you are not certain of any aspect of the electrical requirements call Tymetal customer service at 1-800-328-4283.



Traffic Signal Conduit Location

NOTE: It is critical that column access covers are not blocked.

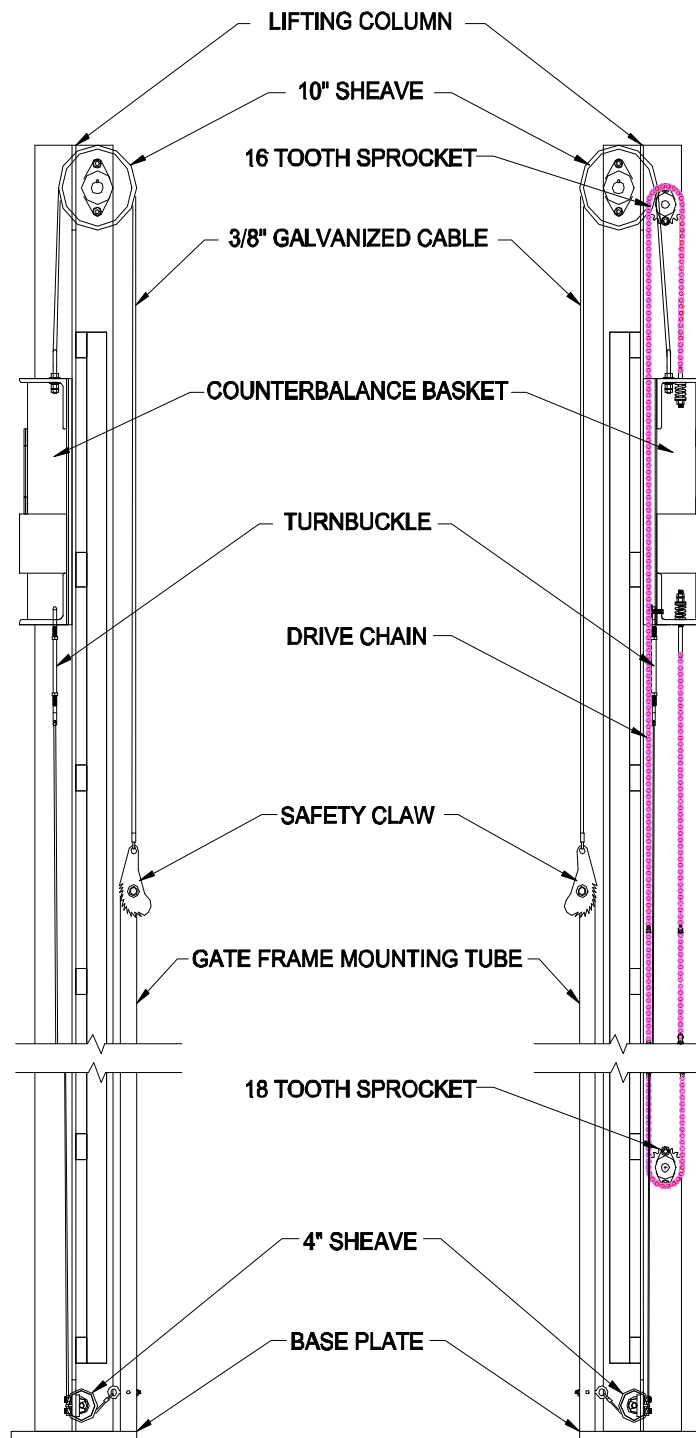


CHECKLIST of REQUIREMENTS

- ✓ Motor Power Wiring
 - Motor wiring must be sized in accordance with the National Electrical Code for horsepower and length of run from power source to gate operator control box to assure adequate power to operate the equipment. The standard VS motor is 1 hp requiring 208vac, 3Ø, 6 amps. Also available in [230v 3Ø, 5.2 amp] [208v 1Ø, 11 amp] and [230v 1Ø 9.5 amp] [460v 3ph 2.6 amp].
- ✓ Control Power Wiring (OPEN, CLOSE, STOP)
 - Controller is supplied standard with 5vdc control that is operational for up 2500 feet with 20ga stranded wire and up to 5000 feet with 18 gauge stranded wire. In any case, wire should be properly sized as per NEC standards. Long Distance Module is not required.

- ✓ Wiring to remote push button station
 - 4 conductors OPEN-STOP-CLOSE function
 - 3 conductors Status Indication Wiring
- ✓ Gearbox Heater Power (115vac)
 - 100w 240v cabinet heater and 20w 240v gearbox heaters are powered from the internal circuitry on all 208/230v single and 3 phase models. 460v model utilizes a 100w 115v cabinet heater and 20w 115v gearbox heater and requires a SEPARATE 115v POWER SOURCE or 200va 460v/115v transformer supplied by others.
- ✓ Traffic Light Power (115vac)
 - Traffic lights require a separate 115vac power source supplied by others.
- ✓ Photo eye Connection
 - CLOSE direction photo eye serves a primary entrapment protection device for UL Class III (momentary contact pushbutton control) and is required to be connected as per VS Electrical Installation Manual drawing EV101-4 (Double Close Photo Eye) to move the gate.
 - UL Class IV operation (constant pressure pushbutton control) does not require the use of the photo eye

4. Cable and Chain Routing



**CABLE ROUTING
NON-DRIVE SIDE COLUMN**

**CABLE AND CHAIN
ROUTING
DRIVE SIDE COLUMN**

5. Spare Parts

TYM-FI-011 Rev19
JDE #: 23579

Operator Parts

Quantity:	Part No.:	Description:
1	19397	Motor – 1HP 208v 3Ph
1	28344	Gear Box includes Bellville washers and spacer
1	15243	Qt. Synthetic Gear Oil
1	3201	Crank Handle (clutch adjuster)
AR	2311	#60 Chain (ft)
4	3198	#60 Master Link
1	18492	Bushing, Taperlock for 18T sprocket
1	18491	Sprocket-Taperlock 60-18
2	3613	Limit Switch DPDT (was 19401; OBSOLETE 10/2011)
4	19398	Limit Nut
1	19408	Relay, Overload 230 1ph, 208/230 3ph
1	19403	Relay, Overload 208 1ph
2	19407	Relay, Motor OPEN/CLOSE-solid state
1	19409	Transformer
1	18612	Circuit Board-VS
1	19406	Disconnect Switch 30 amp
1	19410	Relay, Solenoid
1	16535	Thermostat
1	23308	Heater, Gear Box Immersion
1	19411	Heater, Strip

Vertical Lift Gate Parts

Quantity:	Part No.:	Description:
2	15240	Sprocket 60BS21
24.....	15248	3/16" Cable Clamp
8	15243	3/16" Cable Thimble
1	15251	Crank Handle (clutch adjuster)
4	15252	3/8" Cable Thimble
4	20978	2-pc Shaft Collar-1-1/2"
1	16868	Sprocket-Taperlock 60-24
1	17108	Bushing-Taperlock 1" bore for 24T
1	18491	Sprocket-Taperlock 60-18
1	36912	Sprocket-Top Idler Taperlock 60-16
2	18492	Bushing-Taperlock 1" bore for 18T
2	22554	Sheave 10" x 1 1/2" bore
4	3513	Bearing, Flanged 1-1/2" dia 2 hole
4	33971	Sheave 6" for anti-racking cables-requires #3504
6	3504	Bearing for #3311 Sheave 4" & 6" Sheave
2	3703	Eyebolt 3/8"
2	3935	Turnbuckle 3/8"
1	6360	Shaft 1" dia x 16 lower
2	7162	3/8" Cable Clamp
AR	8768	3/16" Cable
90.....	5266	Security Screws 1/4-20
4	14656	W4 Truck-long Bolt
2	3279	Adjuster Spring
4	14749	Safety Claw
2	8312	Safety Claw Spring
2	23273	Spacer 2 1/4
2.....	3311	Sheave 4"

6. Recommended Maintenance

Frequency of Maintenance:

*****Daily: Gate panel must be kept free of accumulations of snow, ice, or other debris exceeding 50-75 lbs. to prevent downward creeping of the panel and excessive gate operator & manual cranking forces*****

<u>Number of Cycles per Day:</u>	<u>Scheduled Maintenance</u>
Less than 25	Every Six (6) Months
26 to 50	Every Three (3) Months
51 to 100	Every One (1) Month
More than 100	Every One (1) Week

Schedule of Maintenance:

Inspect all cables, lifting and anti-racking, if any cable is found to be kinked or frayed, replace the cable immediately.

Check the tension of each anti-racking cable and adjust as necessary so that the tension on each cable is equal.

Inspect each truck assembly for wear.

Inspect the inside of each track member for any unusual wear and check to be sure that all the bolts holding the track to the column are secure (Hint: Aluminum shavings at the base of the track are an indicator that there is a problem)

Using standard multi-purpose grease, locate and grease the four (4) flange bearings located on the lifting columns.

Check lubricant in the gearbox and add as needed to maintain the proper level. Use a high-grade multi-purpose gear lubricant, SHC634 Mobil Synthetic or equal.

Check the alignment of each sprocket in relation to its corresponding chain and make any necessary adjustments.

Check adjustment of the primary drive chain. If the chain is loose, any necessary adjustments may be made by loosening the motor mount bolts and moving the motor unit until the chain is tight.

Check adjustment of the secondary drive chain. If the chain is loose, any necessary adjustments can be made by raising the gate to the open position, removing lower column covers and tightening the corresponding bolt on the counterweight basket.

Lubricate drive chain with any commercial grade roller chain lubricant.

-DO NOT USE GREASE-

Check limit adjustment. Refer to Section 2.10

Check clutch adjustment. Refer to Section 2.11.

7. Technical Support

Requesting Service:

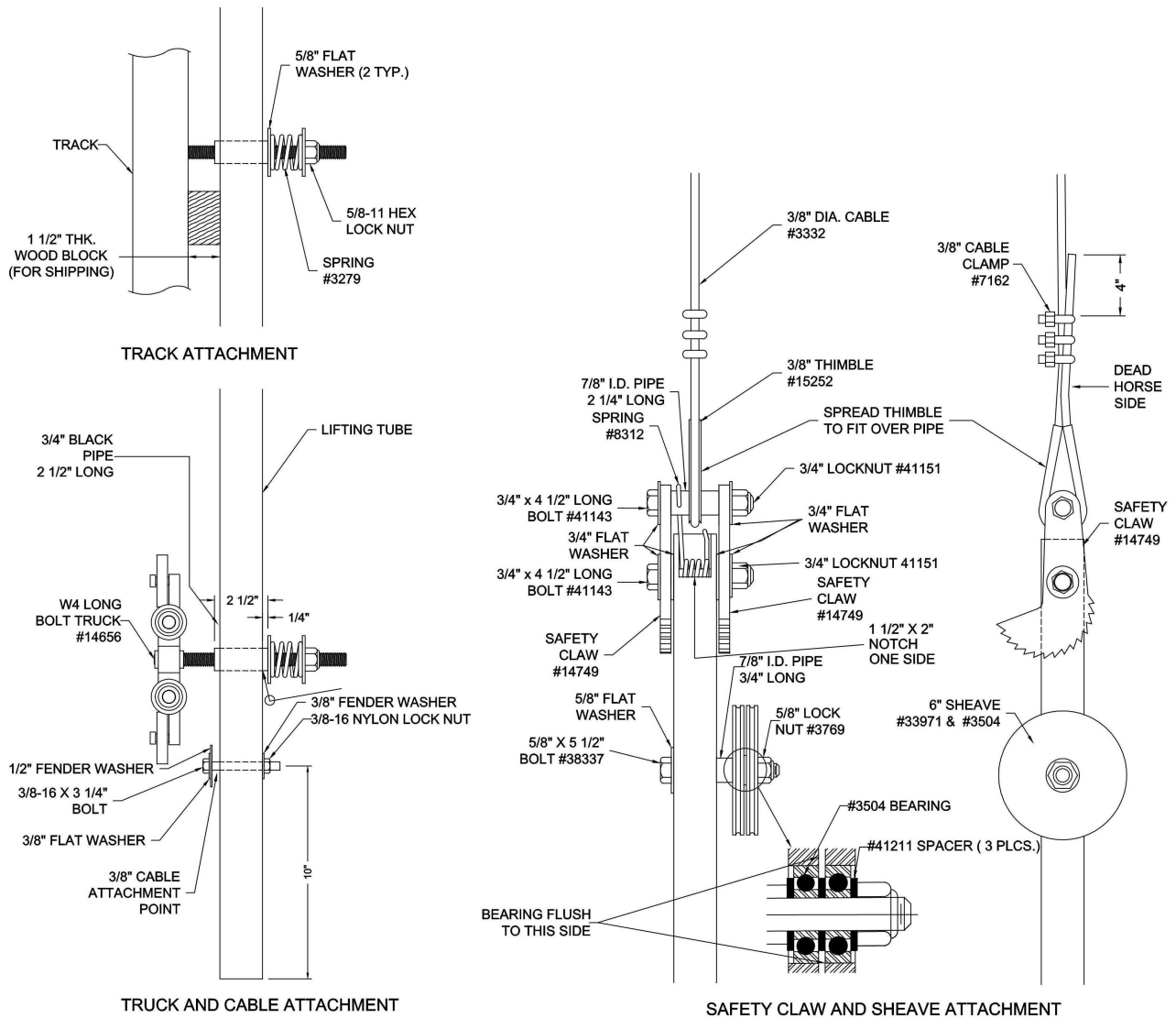
During the normal course of business, questions may arise from field personnel with regard to a particular Tymetal Vertical Lift Gate System. When general questions arise, call **1-800-328-4283**. Business hours are 7:00am to 5:00pm EST, Monday through Friday.

Ordering Spare or Replacement Parts:

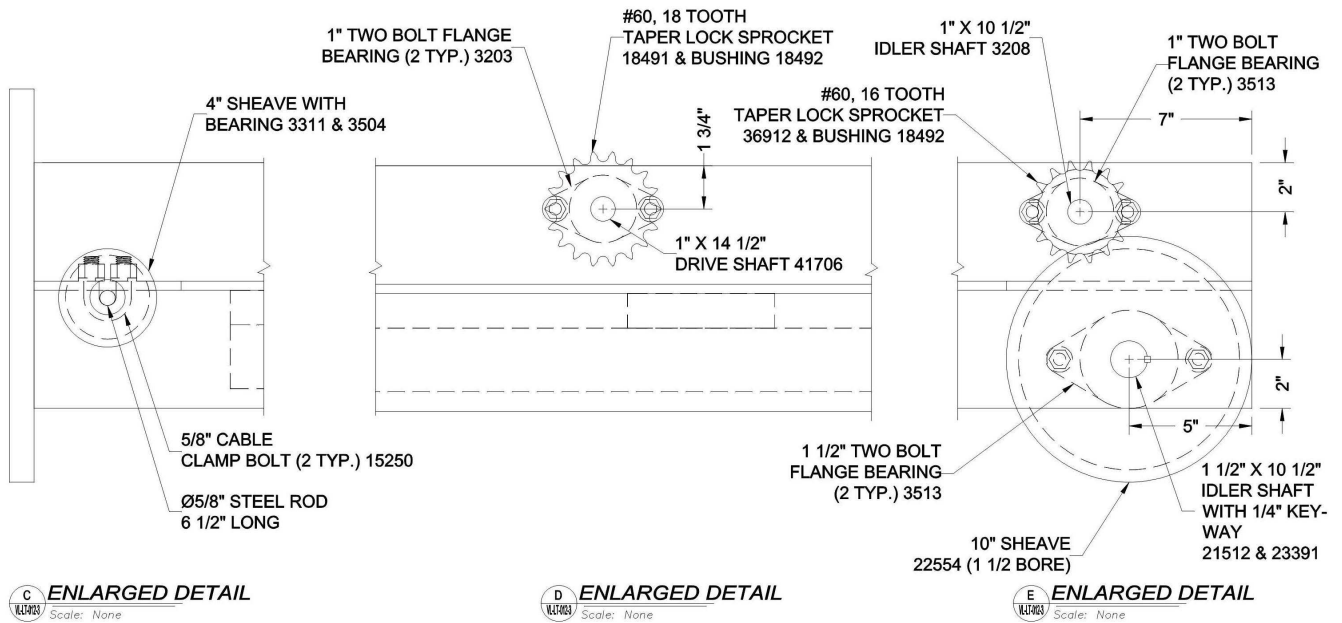
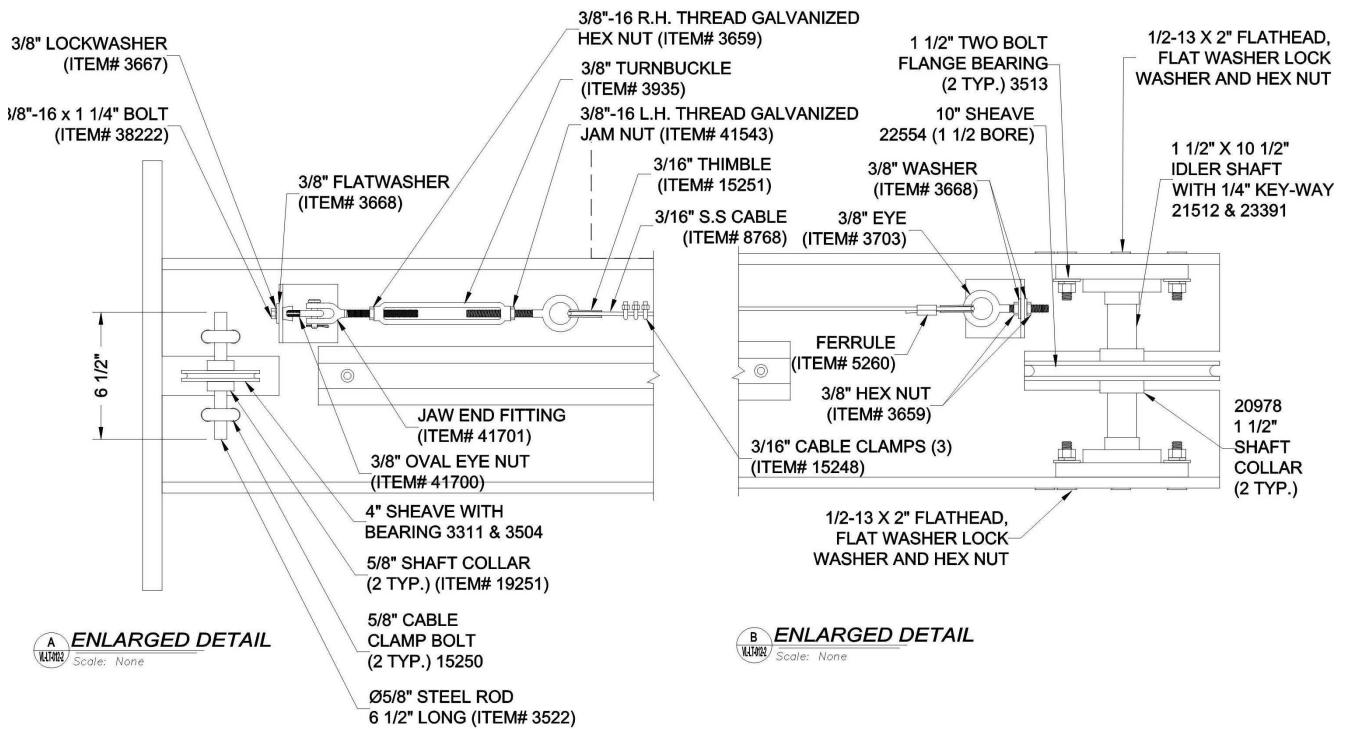
If the need arises Tymetal has the capability of delivering spare parts via next day air in the event of an emergency, minimizing down time and inconvenience to the facility. Refer to Section 5 for a list of Tymetal's suggested spare parts. To order spare or replacement parts, call **1-800-328-4283**. Business hours are 7:00am to 5:00pm EST, Monday through Friday.

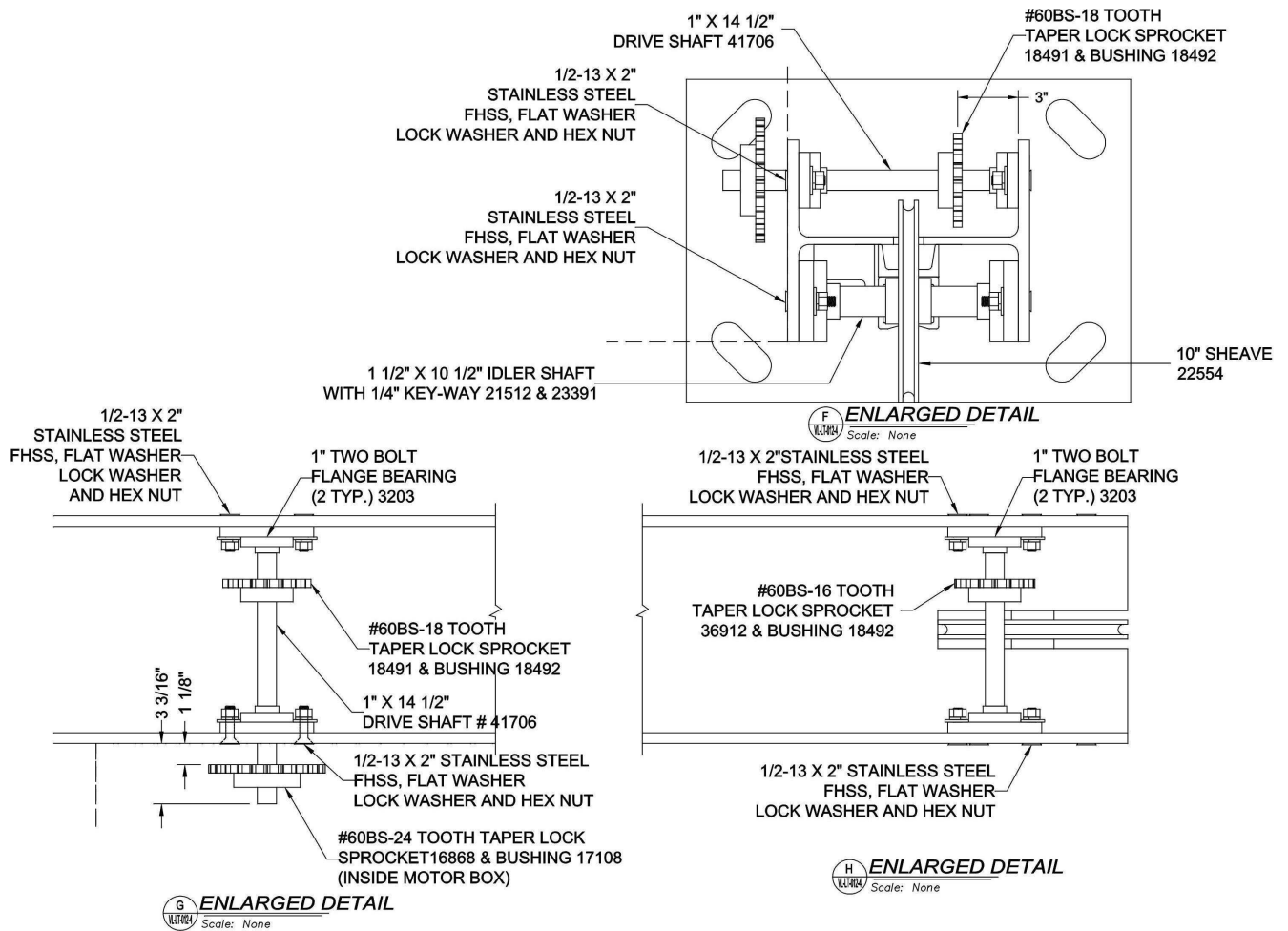
8. Addendum

Lifting Tube Assembly

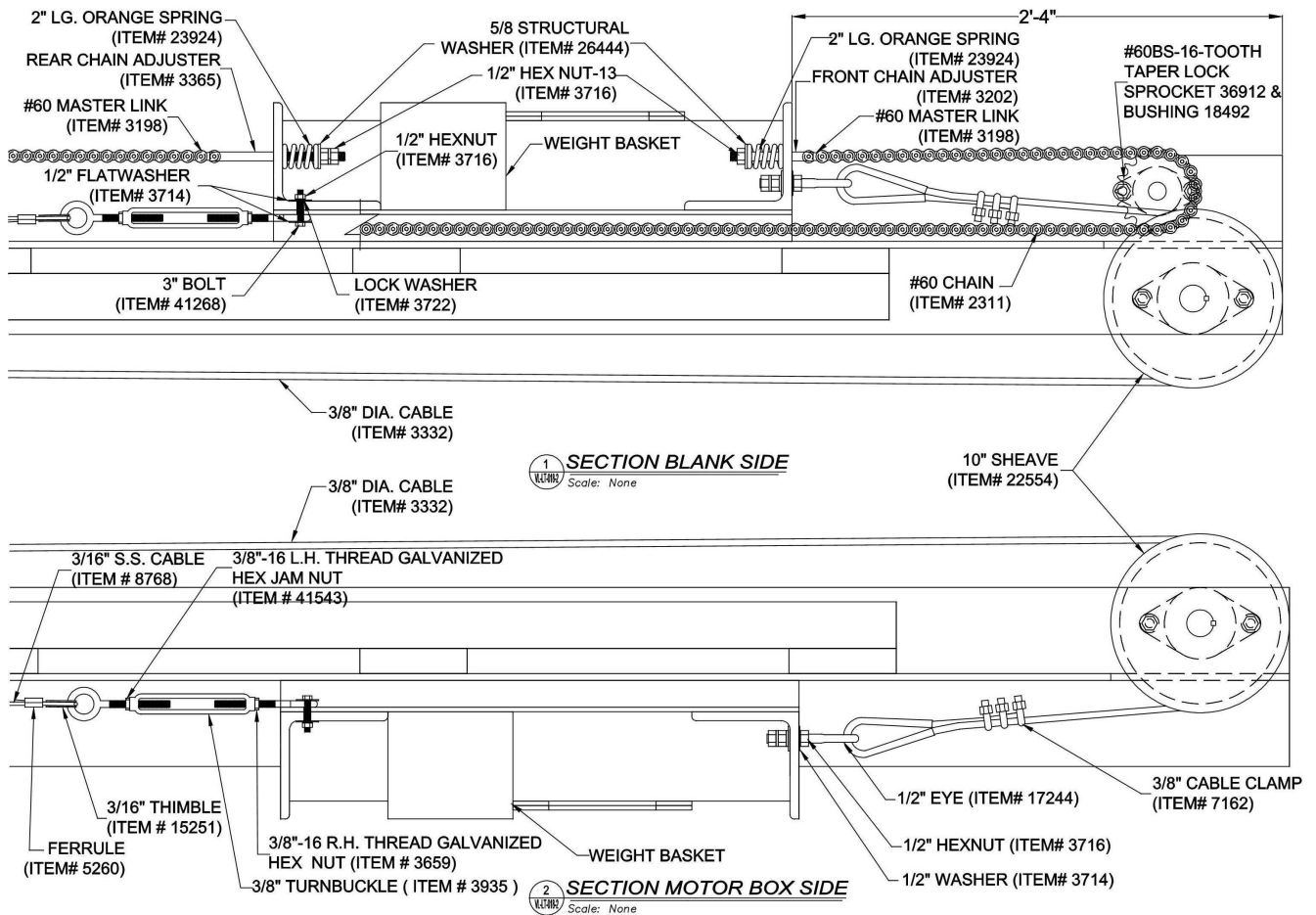


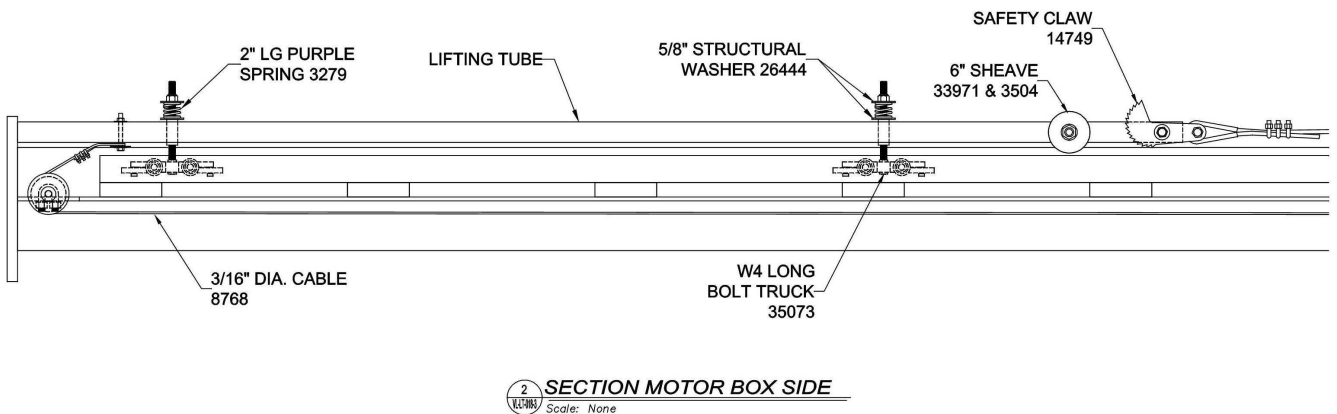
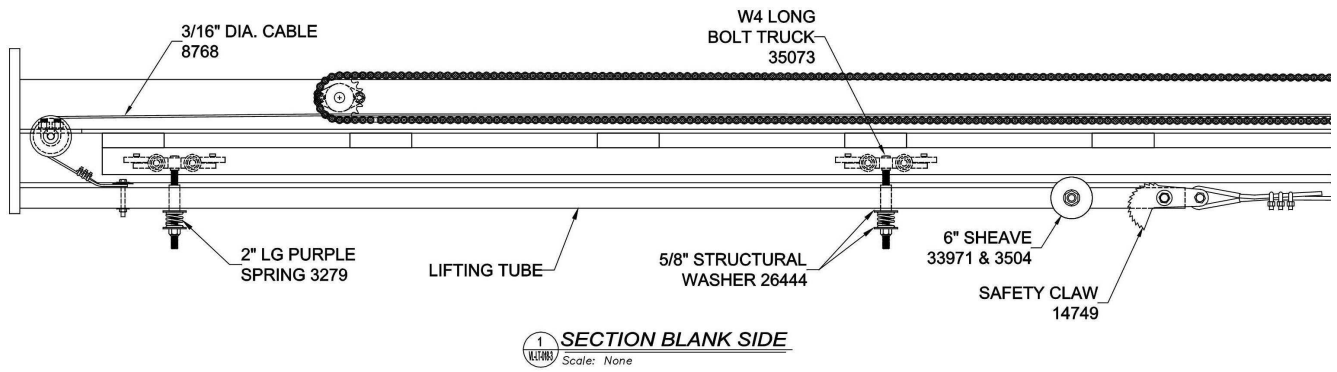
Sprockets, Pulleys and Shafts





Chain and Cable





Rev11 2/17/2010	added Sprocket Top Drive 16T to parts list
Rev13 5/9/2011	added 3,500 PSI. min. concrete
Rev15 4/20/12	footing elevation, electrical stub up location, anti-racking cable tightness
Rev16 1/2013	added sect. 3.3 traffic lights, corrected turnbuckle views, added sect. 8, added 2.6 anti-racking cable adjustment verification