Chapter 1

VertiGate Installation Instructions

In preparation for the gate installation your installers will need the following:
Forklift to unload pallet. This pallet contains the operator and associated parts and weighs in excess of 400 lbs. Unless it is broken down on the truck, it must be unloaded by forklift. Barrier crate is up to 24' long.

- Cordless drill with Phillips screwdriver bit to disassemble the barrier crate. Do not pry or force apart, as damage to powder coated surfaces may result.
- 12V Battery for each gate - 6' gates require a Marine/RV type battery with wing nut connectors on top. 5' gates require small garden tractor/snowmobile type 12V battery.
- Anti-corrosion spray for battery connections
- 6' flex conduit - same size as AC conduit in gate pad (3/4 to 1")
- Connectors for flex conduit
- Miscellaneous PVC conduit as job requires
- 2 x 4 receptacle box and receptacle for AC outlet. Include cover
- Cutoff grinder (4 1/2" is best) with cutoff wheels (for anchor bolt cutoff)
- 24" Level
- 15/16" open end/box combination wrench
- 8 5/8" NC nuts
- 8 5/8" standard flat washers
- Set of wrenches and standard technicians wiring tools including miscellaneous wiring and hookup supplies.
- Transit, water level or laser level
- 20' string line for single gate, 40' for master/slave
- Set of 12" alligator clip leads (#18 wire)
- Form wood and cement finishing tools
- Small tube of wheel bearing type grease (For retractor option only)

You will be receiving a complete gate system that is built, balanced and tested prior to leaving the factory. It is partially disassembled for shipping requiring only your reassembly on arrival. If your pad is prepared to specification, the entire installation should take only a few hours for two persons to complete the job.

The exact layout and preparation of the mount pad or foundation is very important. There is little room for deviation from the correct alignment and specification. Failure to prepare proper foundation pads and anchors will result in a difficult, time consuming and dangerous installation.

1. Lay out and mark for all digs required.
This includes but is not limited to:

- Operator foundation
- All loop detector home runs
- All cross-driveway conduit runs (IR detector, EVA etc.)
- All entry system conduit runs
- All power system runs (120 VAC or solar)
- Primary/Secondary control cross-driveway runs where required.
- Catch post foundation
- Fence post foundations where fence is supported or immediately adjacent the gate operator and catch post.
- Bollards if required
- Entry and exit gooseneck foundations
- Phone line runs to entry system

2. Dig – Check for local code requirements for depth, especially in freeze areas to be sure foundation goes below the frost line. Forty inches of depth is minimum for average soil in non-frost areas; exceed 40" in light or sandy soil or where soil becomes muddy and would allow movement. The leverage of the barrier and a 90mph wind is very significant so do not scrimp on depth or cement here. Operators 8' or higher, require 48" to 60" minimum depth.

Use a minimum of 3/4" conduit for cross-driveway and control circuits. 1/2" conduit is okay for home runs and phone runs as well as simple 2 conductor runs. Never include AC runs with low voltage DC in the same conduit. Never layout wiring so AC ever enters control box.

3. Make up rebar cage for operator foundation. Be sure rebar is not placed closer than 2" from soil. Support bottom 2" off soil with rocks or cement horses. See Diagrams on pages 4 and 5.

4. Build form for top of pad. It should be high enough to allow drainage and unless a slope has been designed into the gate, level with top of catch post pad. On standard prairie design barriers, a slope of 6" – 8" is okay downslope from the operator and practically unlimited upslope from the operator. These differences will be addressed by limit switch adjustment in later instructions.

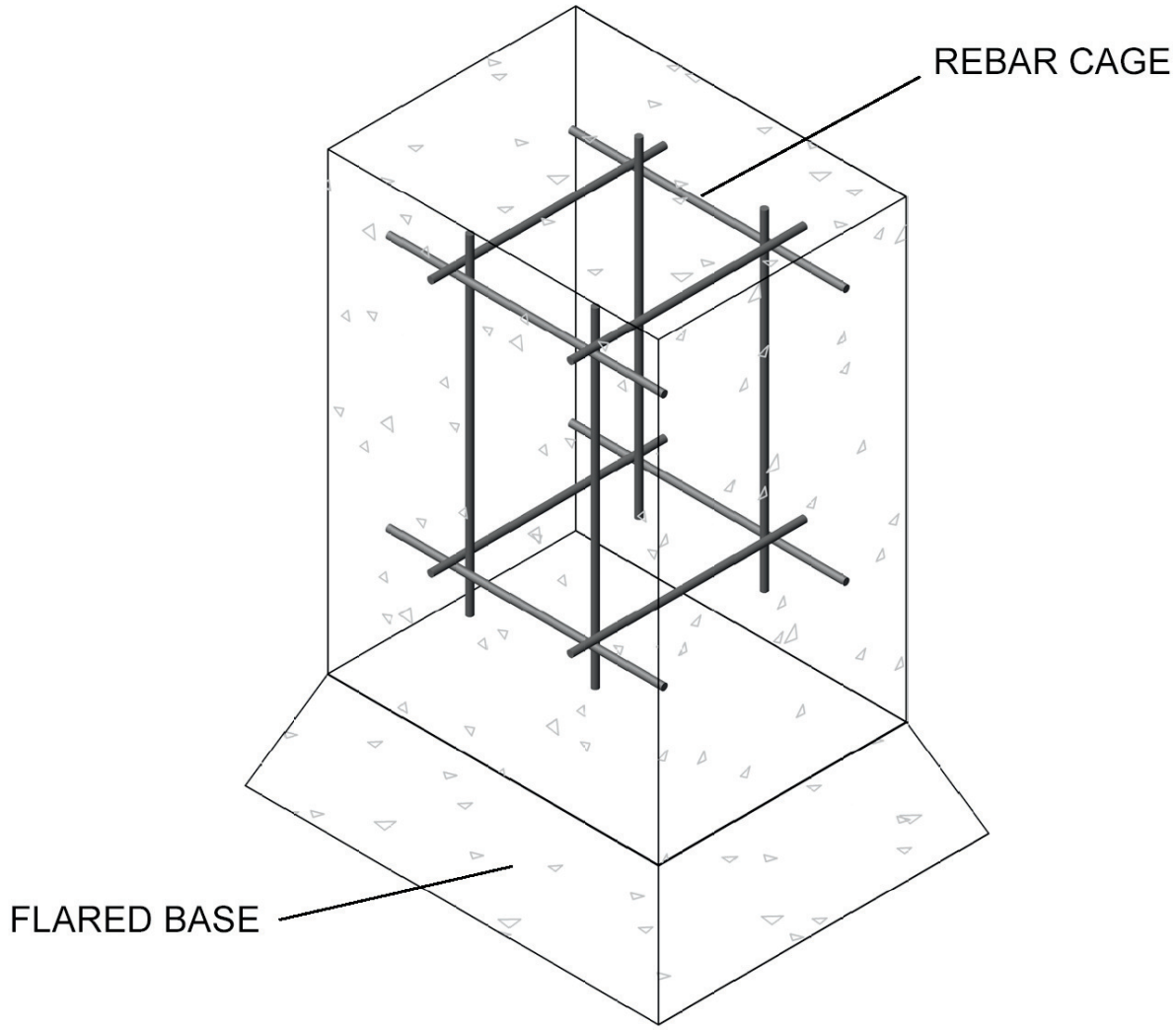
5. Make up operator mount template. Thread nuts onto x 5/8" 12" minimum length J type anchor bolts approximately 3". Place flat washers on top of nut and push through template holes – 4 places. Slide washer down on exposed threads and tighten upper nut to secure. Be sure all four anchor bolts are snug enough to keep them rigid and perpendicular to the template.

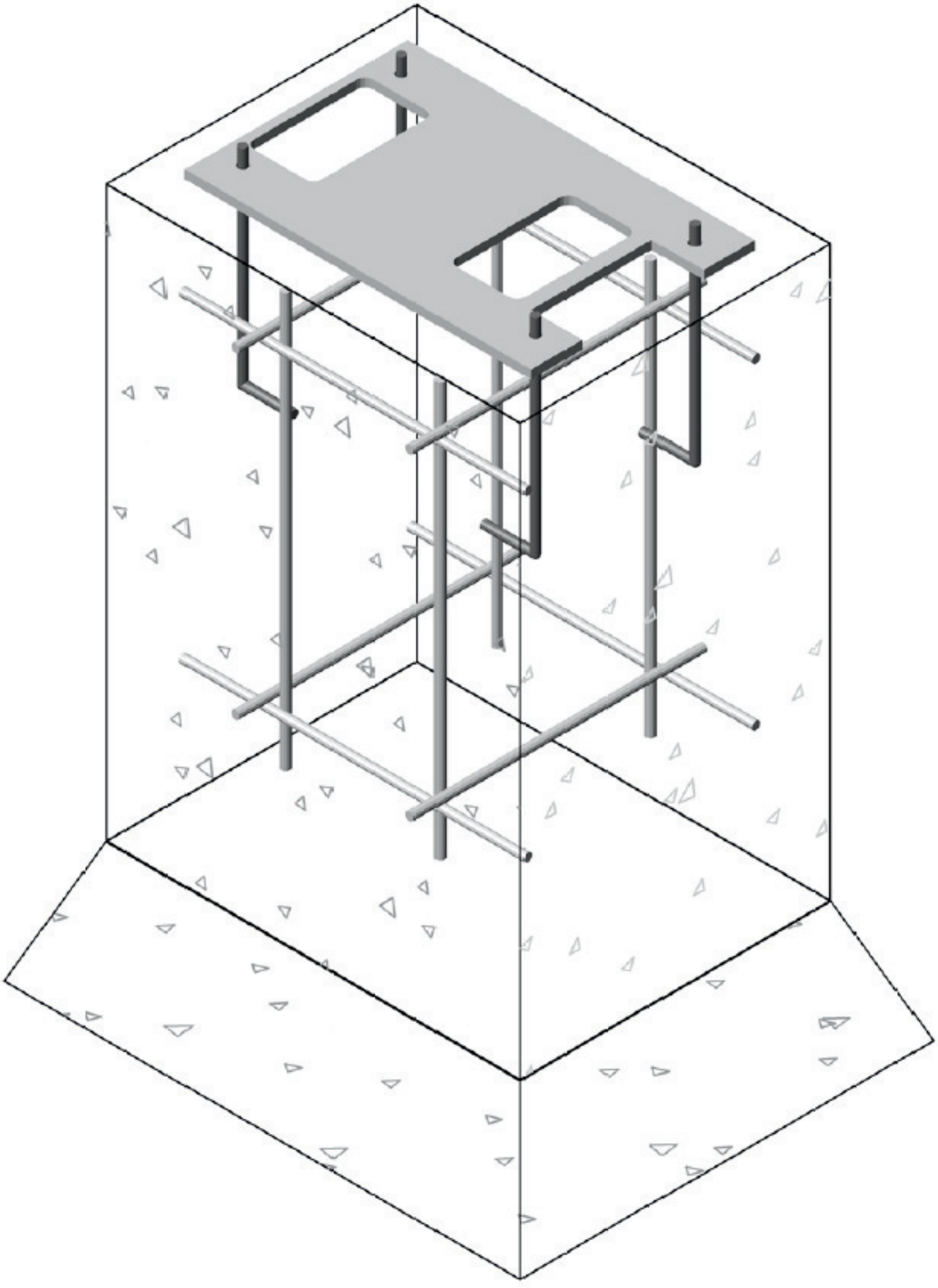
6. Lower rebar cage into foundation hole. Sweep all conduits into hole and line up sweeps so they will extend through the template holes. This is important to allow space for the battery. Check alignment of template with string line at this time to ensure there is no problem when cement is poured. Remove template and cover ends of conduit with duct tape to keep clear of cement. Cover exposed threads of J-bolts to keep clean.

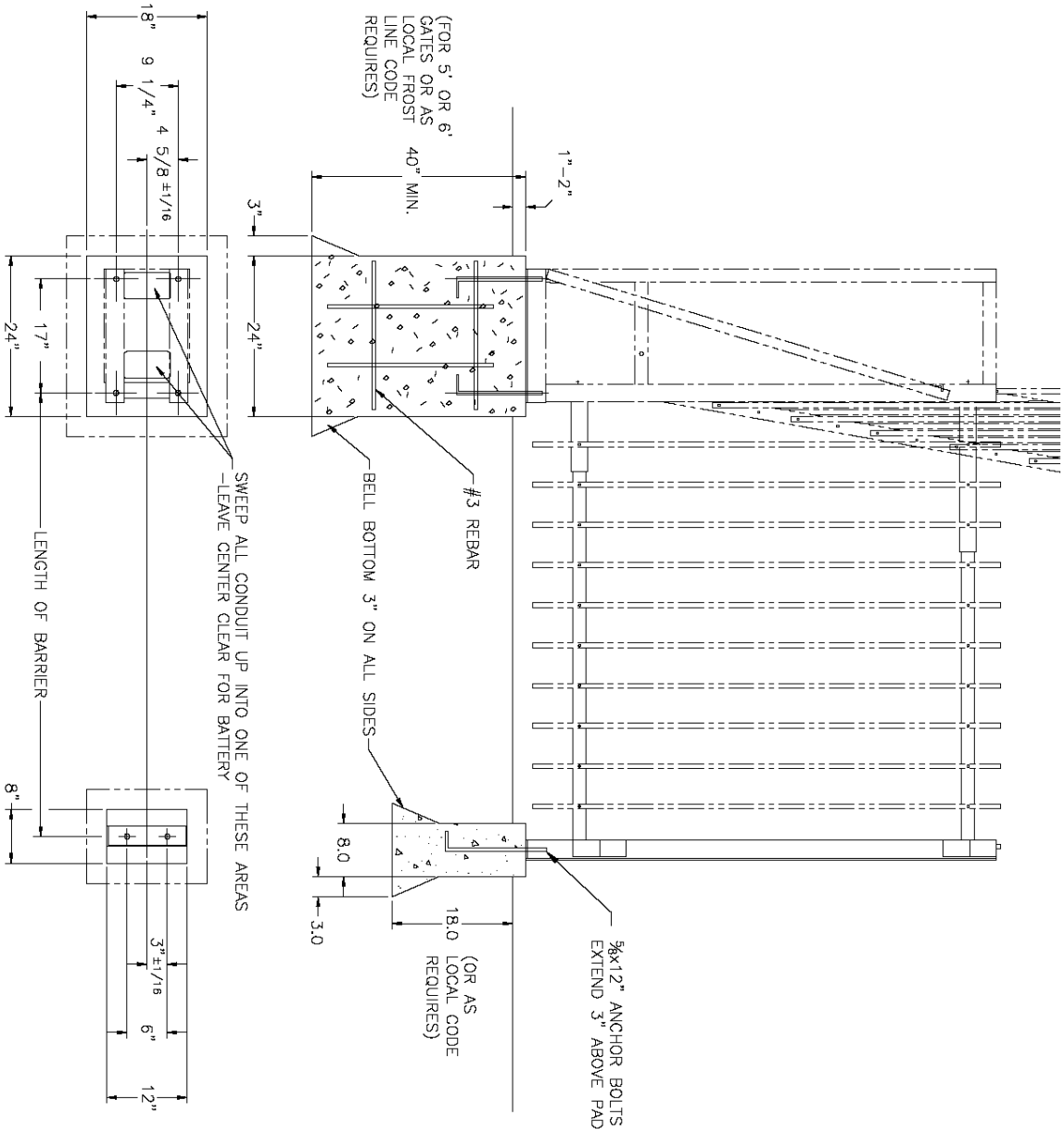
7. Mix and pour cement. Mix a good grade of cement – not fence post grade. Mix as dry as possible and still get a dense pour. Soupy cement is weak. Strike it level across form. Trim edges for finished look.

8. Lower template and anchor bolts into cement. If cement is mixed dry, nuts under template will just touch cement and hold in place. You do not want them to sink into the cement. Use string line to align template and leave in place for at least 24 hours for minimum cure.

9. Repeat the above for the catch post.


REBAR CAGE
FLARED BASE




18"
9 1/4"
4 5/8 ±1/16
24"
17"
LENGTH OF BARRIER
8"
3" ±1/16
6"
12"
SWEEP ALL CONDUIT UP INTO ONE OF THESE AREAS
-LEAVE CENTER CLEAR FOR BATTERY
(FOR 5' OR 6'
GATES OR AS
LOCAL FROST
LINE CODE
REQUIRES)
40" MIN.
1"-2"
3"
24"
#3 REBAR
BELL BOTTOM 3" ON ALL SIDES
8.0
3.0
18.0
(OR AS
LOCAL CODE
REQUIRES)
⅝x12" ANCHOR BOLTS
EXTEND 3" ABOVE PAD

Emergency Vehicle Access (EVA) Operator Pad

If you are installing an EVA gate, the pad and template for the operator are identical to the main gate but reversed to be facing the main operator. You will also need a minimum ¾" conduit, run between the two operators for the IR Beam wires and the emergency firebox control wires.

⚠ **Caution**: The two pads (main operator and EVA operator) must be on the same horizontal plane to maintain a level gate installation and the center line of each template must be in line to allow for proper alignment of the two gates. Since the EVA gate end is the receiver for the main gate, it is critical that this alignment be correct.

1. Carefully measure the distance between the main operator pad and the EVA operator pad. Refer to layout drawing for proper spacing. See Drawing on page 9.

2. Use a transit or other accurate measuring device to set the height for each pad to maintain a level installation.

3. From a horizontal line between the two pad locations at the height of the pads, locate the point in the drive where the main gate and the EVA gate will meet.

4. Measure the height of the horizontal line from the surface of the drive.

⚠ **Caution**: The end post of the EVA gate must rest on the catch post receiver at the drive's surface. This end post of the EVA gate must be custom built from the measurement in #4 for the level installation of the entire gate system. This measurement must be part of the original order, as it cannot be corrected at installation.

EVA Catch Post Receiver Template

Tip:The installation of the EVA catch post receiver can be done after the gates have been installed. This will assure that the gates are adjusted and aligned properly first.

The catch post for an EVA installation is different from the normal vertical channel used for a single VertiGate. It slides into a hinged receiver. When the EVA gate is open,the catch post receiver is laid down flat on the pavement to allow entrance of wide vehicles.

A secure concrete pad set in an asphalt driveway large enough to hold anchors for the two bolts embedded is sufficient.

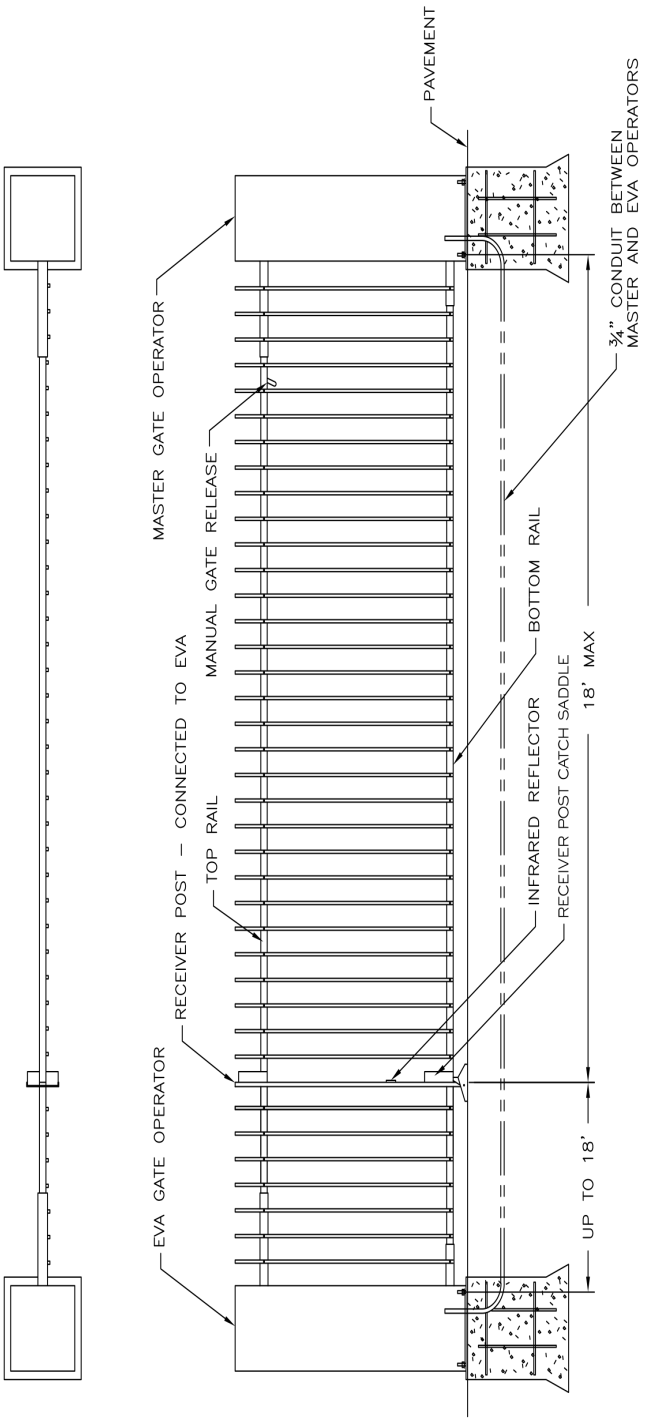
In a concrete driveway, simply set the anchors in the existing driveway and bolt down the catch post receiver.

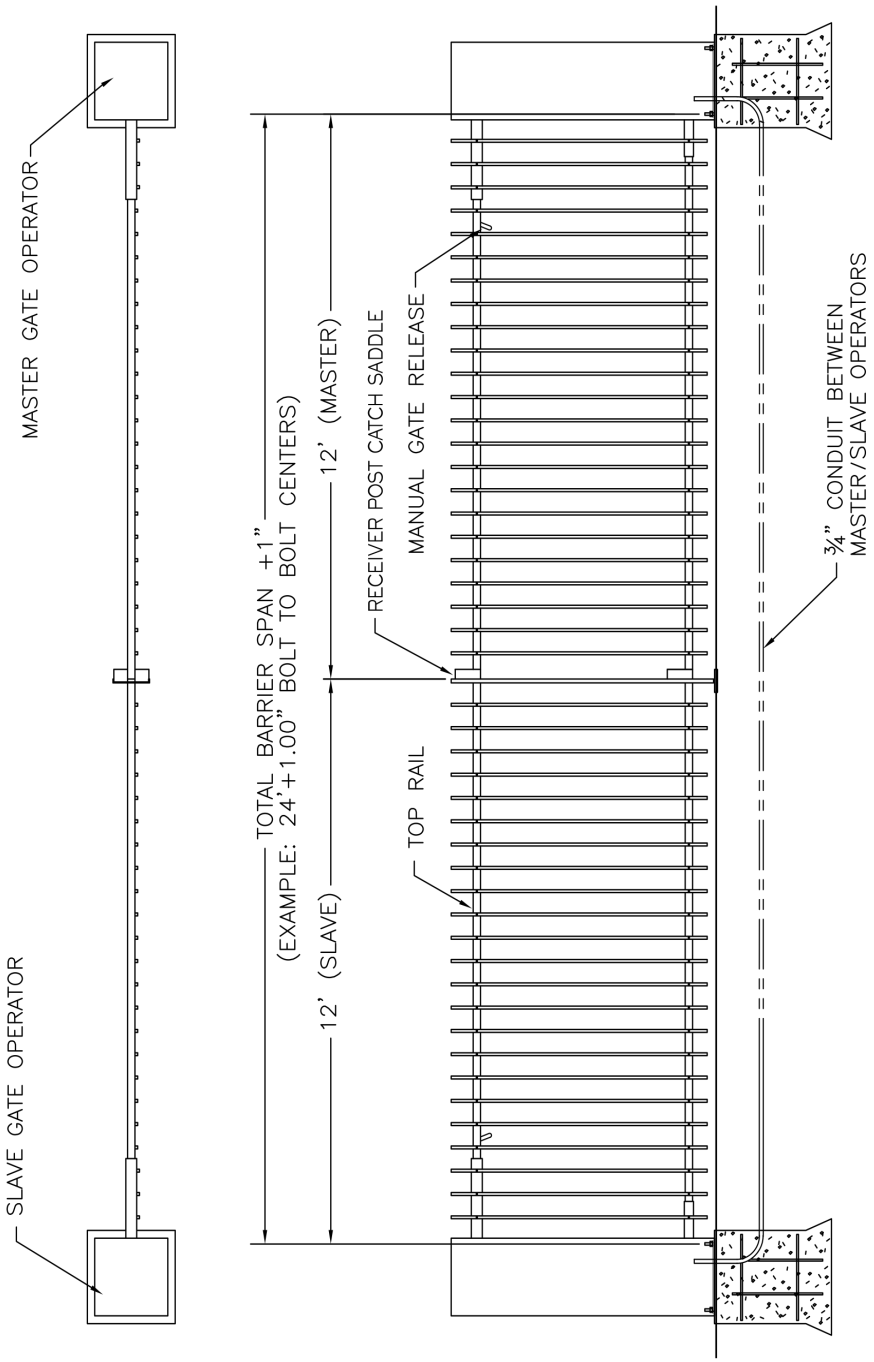
1. Two anchor bolts or lead anchors must be installed using the catch post receiver as a template. Hold the receiver snug on the catch post to mark for the holes or bolts.

2. Locate the catch post on the bolts so that it closes toward the EVA operator.

3. Secure the catch post receiver with the appropriate lock nuts and washers.

4. The catch post receiver pad does not require a rebar cage unless it is over 18"deep.


PAVEMENT
¾" CONDUIT BETWEEN MASTER AND EVA OPERATORS
MASTER GATE OPERATOR
MANUAL GATE RELEASE
BOTTOM RAIL
INFRARED REFLECTOR
RECEIVER POST CATCH SADDLE
18' MAX
UP TO 18'
EVA GATE OPERATOR
RECEIVER POST – CONNECTED TO EVA
TOP RAIL


MASTER GATE OPERATOR
SLAVE GATE OPERATOR
TOTAL BARRIER SPAN +1"
(EXAMPLE: 24'+1.00" BOLT TO BOLT CENTERS)
12' (MASTER)
12' (SLAVE)
RECEIVER POST CATCH SADDLE
MANUAL GATE RELEASE
TOP RAIL
¾" CONDUIT BETWEEN
MASTER/SLAVE OPERATORS

Chapter 2

VertiGate Installation Preparation

1. Carefully unpack the pallet holding the operator and verify that all parts were delivered according to the packing slip.

2. Shortages must be reported immediately.

3. All damage must be reported immediately to the shipping company and to VertiGate.

4. Keep all components protected from the weather during construction.

Note: In the parts box included with the operator are wiring harnesses that should reach a control box placed WITHIN A 10' WIRE RUN from the operator.

These include:

2 wires from the actuator motor (power leads), red and black
2 wires for the battery connection, blue and white
3 wire cable for the limit switch connection: white, black, and green.

Each wire is connected to its corresponding piece of equipment or has a connector to fit the connectors on the equipment. The opposite end of each wire is plain and should be stripped for connection on the main control board. These connections are explained in the following pages.

Pull Wiring

1. All wiring from the system controller, keypads, loops and the 120 VAC or solar power line should be pulled before installation of the operator. Also, if an EVA or secondary gate is being installed and/or separate IR transmitter and receiver are being used, pull the wires from the EVA operator, secondary gate or catch post at this time. From the end of the conduit, leave at least 24" of AC power cable and 10' of loop detector and/or other signal wires to reach the control box.

Note: At some point, an outlet for the 120 V power to the battery charger must be installed. It is suggested that you mount the operator, and then install the outlet box on the high voltage conduit at the same time the main control box is installed.

2. Coil the wire and tie the coils tightly so that they are not damaged when the operator is installed.

⚠ **Caution**: Damage to the insulation of the loop detector leads can result in false signals.

VertiGate Operator Installation

1. Remove the template from the anchor bolts.

2. Use an accurate level and level the lower leveling nuts.

Note: These nuts allow the raising or lowering of the operator and the catch post to obtain the proper level.

1. Do not cut off any excess thread until the final level position is established. Should you cut threads prematurely and additional height is required, remove the operator and install extension nuts and threaded rod to create the additional height.

2.Place washers on the nuts and prepare to install the operator.

Operator Placement – (2 person job)

Danger: Do NOT attempt this step alone. The operator is heavy and placing it is awkward. Use two people minimum to set the operator on the mounting bolts.

1. Carefully lift the operator (2 person job) and set it on the anchor bolts.

2.The operator should rest on the leveling nuts, 1" to 2" above the pad.

⚠ **Caution**: Keep all wiring out of the way and safe from damage.

Final Leveling

1. Adjust the leveling nuts to eliminate any rocking.

2. Use a level to verify that the front channel of the operator is plumb and level on all planes.

3. When leveling is complete, install the top washers and nuts on the anchor bolts, finger tight.

Barrier Installation – (2 person job)

1. Pull the free end of the latch cable from the end of the barrier and let idangle.

2. Place the lift arm socket in down position to insert the barrier rail.

3. Loosen the 5/16" lock bolt on top of the lift arm to allow insertion of the rail.

4. Place the barrier in position to insert the upper rail into the operator lift arm socket.

5. Lift the upper rail, allowing the barrier to unfold. Protect the pickets from being damaged during this operation by placing wood or carpeting under the unfolding picket bottoms.

6. Direct the end of the latch cable through the lift arm socket, and over the axle.

7. Slide the upper rail into the lift arm socket all the way to the axle. The picket bolt-holes in the lift arm should line up with the holes in the rail. A slight misalignment is normal and will not affect installation unless it prevents passage of picket bolts.

8. Snug the 5/16" lock bolt on the top of the lift arm.

9. Swing the lower rail far enough to clear the lower socket.

10. Insert and slide the lower rail into the lower socket to the axle, aligning the picket bolt holes.

11. Tighten the lock bolt on the underside of the lower socket.

Latch Cable Connection

1. Feed the latch cable through the latch spring (7/8" dia. X 4")

2. Feed the cable through the cable hole in the latch pawl.

3. With the latch pawl in a "latched" position on the lift arm, slide the latch spring over the guide pin on the top side of the lift arm tube.

4. Pull the cable tight and fit the other end of the spring over the corner of the latch pawl and into the retainer groove of the pawl.

5. Pull the cable snug while moving the latch handle to properly seat the handle in the rail enclosure.

6. Tighten the Allen screw in the bottom of the latch pawl.

⚠ **CAUTION: Over tightening the setscrew will cut the cable.**

Counterbalance Spring Installation

⚠ **CAUTION:** This operation is dangerous! Make sure there are no distractions and no people or pets in the area. Clear all tools and debris that may trip installers. Work slowly and carefully so fingers don't get pinched. **This operation requires at least two people.**

1. Place a 6' length of 3/8" rope over the operator.

2. Disengage the latch. Hold it disengaged as you begin to walk the barrier up.

3. Starting at the outer end of the barrier, lift and walk it up into an open position.

4. While one person holds the barrier in the open position, wrap a tie strap around the folded barrier and secure strap properly. This will hold the barrier folded in the open position.

5. Hang the outer springs on the spring hanger bearings.

6. Lower the spring loop over the 3/4" threaded rod projecting from the operator support brace.

TIP: If the loop needs to be stretched down to install, use a short length of 3/4" EMT electrical conduit through the spring loop, fitted over the tip of the threaded rod.

a. Push the other end of the EMT down and slide the spring onto the threaded rod.

b. Install the 3/4" nuts, tightening until flush with the end of the threaded rod

c. Locate the springs so they clear the actuator and the operator's diagonal braces by sliding them to the proper location on the threaded rod.

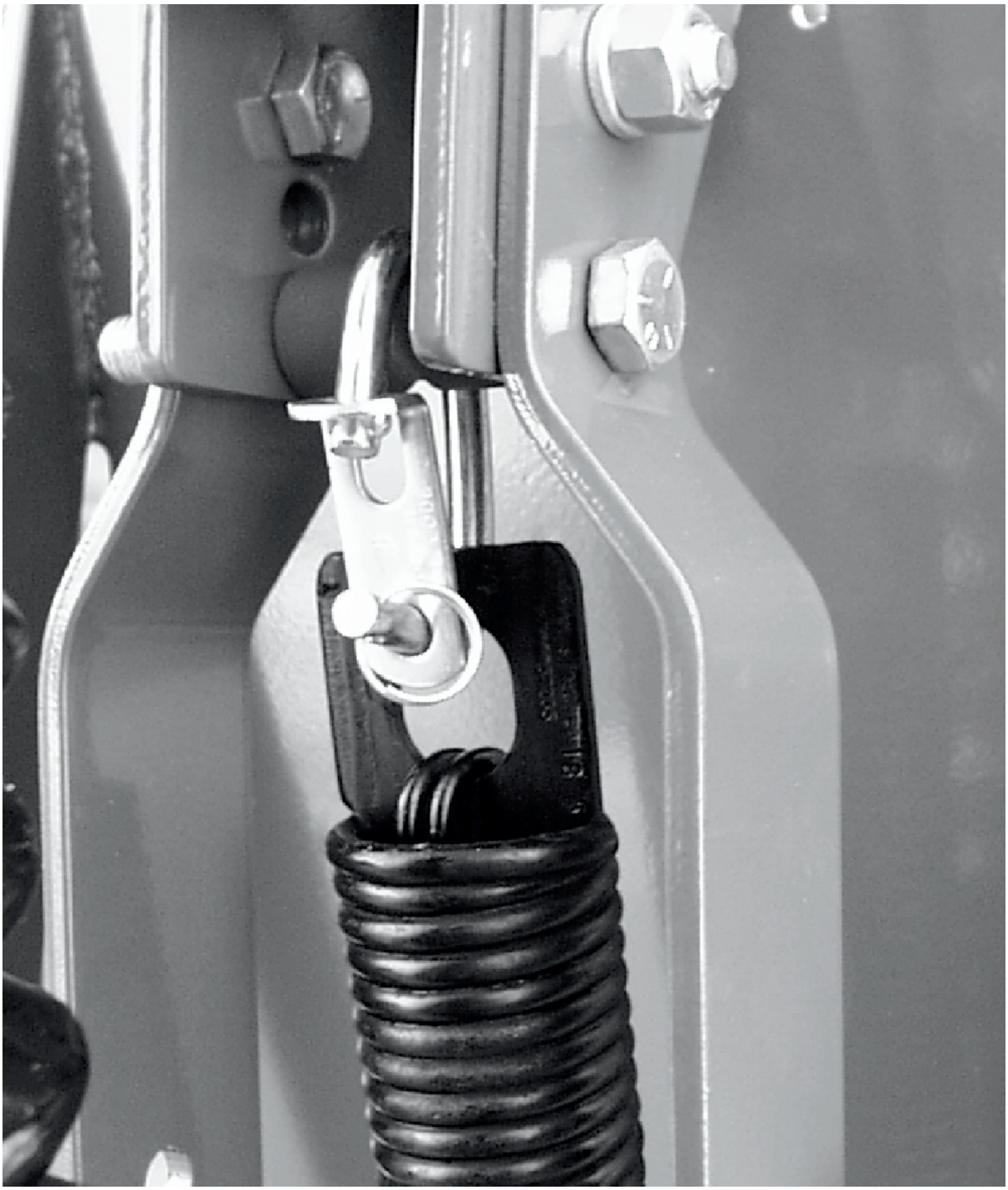
7. If included with the operator, hang center springs using a "C" clip hanger on the lift arm spring axle bushing. Face the C forward. See photo page 16.

8. Hook the lower end of the spring on the eyebolt and an additional "C" clip hanger if needed. See Photo page 17.

9. Snug the eyebolt to eliminate slack in the spring.

10. Cinch the double nuts to lock the eyebolt.

11. Untie the rope holding the barrier open.



Install Filigree or Gate Decoration (Optional)

Note: Any decorative options you have purchased for your gate may now be installed. Follow the instructions included with the decoration.

1. Unlatch the barrier and manually open the gate.

⚠ **DANGER**: Do not leave the barrier manually open during windy weather. It may blow closed resulting in gate damage or personal injury. If gate must be left manually open, carefully tie it up!

2. The barrier should come to rest, balanced approximately half open, and remain neutral when raised 2/3 to 3/4 open. It should then open independently and remain in the open position and hold itself open.

3. If balance needs correction, usually an adjustment of the center spring is all that is necessary. If more is needed, the center spring may have to be changed with one of a different strength. They are readily available at general hardware stores or garage door dealers as well as through VertiGate. Only the larger outer springs must come from VertiGate.

4. Balance adjustments may also be made by exchanging steel and aluminum pickets to add or subtract weight at the outer end of the barrier. Be sure you don't lose or misplace washers, as they are required for proper operation of the barrier. They must all be snug, not tight when exchange is complete.

5. Operator main bearings allow side to side adjustment if vertical correction is necessary. Allen setscrews are used on all bearings. Tighten all setscrews when complete.

Final Picket Installation

The gap left between the operator and the first picket on the barrier is filled with the three pickets shipped unassembled, with the barrier.

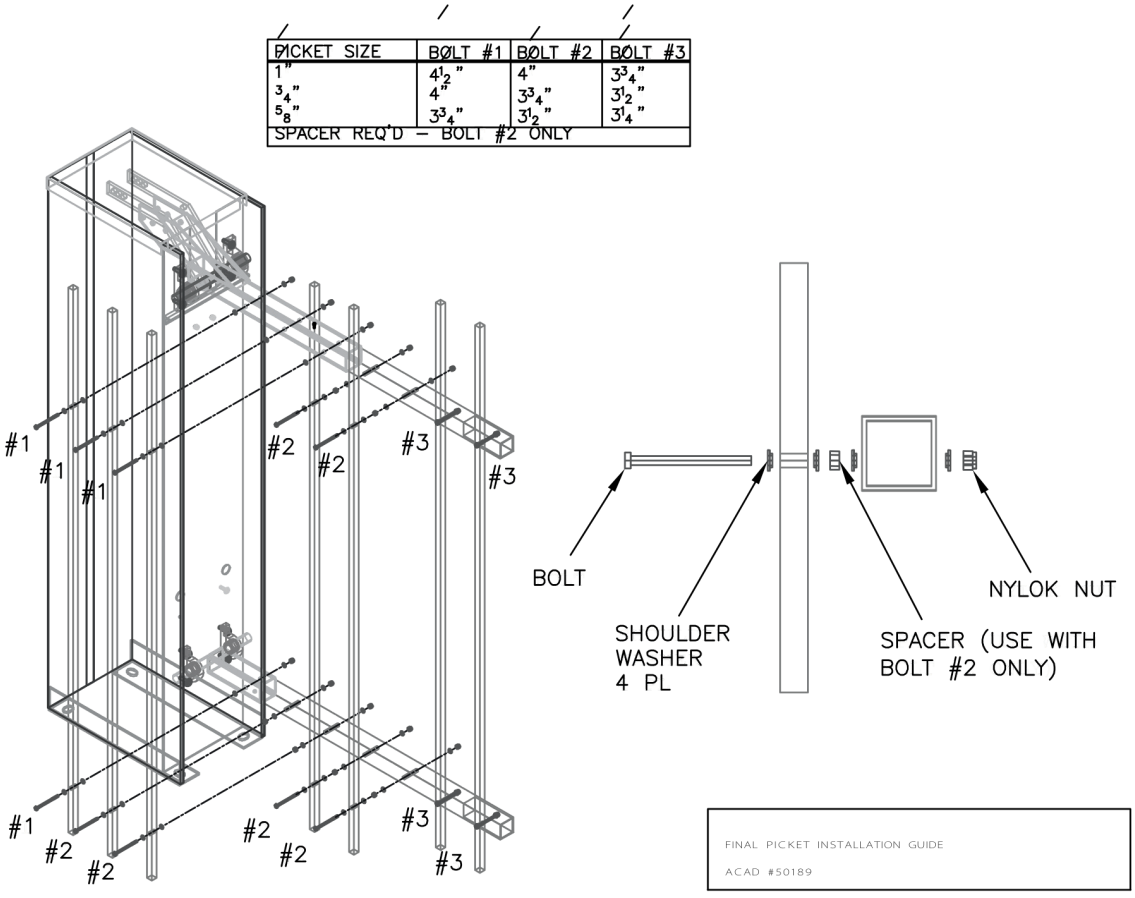
Assemble these three pickets as shown in the drawing on page 19.

TIP: It may be necessary to lift the barrier to remove tension on the lower rail when installing the picket bolts.

⚠ **Caution:** It is important to assemble with the spacers as shown or damage will result when the gate is opened. These spacers allow clearance between the picket and the lower socket and lift arm.

⚠ **Caution:** Be sure to guide the upper picket axle bolts UNDER the latch cable or the cable will bind when the gate is manually opened.

⚠ **Caution:** The nuts on the pickets should be snug enough to provide resistance when the bolt is turned by using light torque on a wrench, or medium torque using a 7/16" nut driver. DO NOT OVER TIGHTEN! Over tightening will compress the nylon bearing washers excessively and shorten their service life.



Catch Post Installation

1. The catch post should be installed at this time. Set the catch post on leveling nuts and washers. Establish proper level by using a level on the rail of the barrier.
2. If the barrier does not line up with the catch post, slightly loosen mount nuts on the operator and move operator until barrier centers on the catch post. Manually open and close the barrier several times to be sure it is settled in position. Tighten the nuts on the operator and catch post.
3. If you find that the barrier is too long, cut the excess length from the barrier rails and file smooth.

⚠ **Caution: Should there be more than 6" or one picket removed, the barrier balance will be affected. This imbalance must be corrected for smooth gate operation.**

4. When the barrier and catch post are properly centered, insert the 2" plastic plugs into the ends of the upper and lower rails and glue with silicone or equivalent adhesive. This is especially important in areas with cold climates so that ice won't build up inside the rails causing weight and balance problems.

Note: Dry pack the gap under the operator and the catch post with stiff concrete and allow to cure. Make sure the catch post is plumb and level. Be sure to allow for drainage under the operator.

EVA Gate Installation

The Eva gate operator is the same housing as the main gate operator and uses the same template. The pads for the main operator and the EVA operator face each other. Proper spacing and alignment of the two pads is critical. Follow the instructions in Chapter 1 for pad placement and installation of minimum ¾" conduit between the two operators. Use the installation instructions for the operator and barrier to install the EVA barrier as noted below.

Note: The drawing on page 16 shows the relationship of the two operators to each other, the receiver yokes and the EVA catch post receiver.

1. Follow the instructions on page 12 - Operator Installation.

2. Use a string line to align the two operators correctly.

3. Follow the instructions on page 6, barrier installation, omitting the latch cable portion, as the EVA does not have a latch in the upper rail.

4. Follow instructions 1, 3, and 4 to secure the barrier in the up position.

5. The counter balance spring is mounted on the top with a "C" clip hanger.

6. Lower the spring loop slides over the 3/4" threaded rod projecting from the operator support brace, when included.

7. Untie the rope holding the EVA barrier open.

8. Connect the emergency box cable and the IR transmitter to the operator.

9. If the closed position needs adjustment, move the lock shoe up or down and re-tighten.

EVA Catch Post Installation

The EVA catch post receiver is mounted with two bolts, if these bolts (or lead anchors) were set when the catch post receiver pad was poured. See Chapter 1. Secure the catch post receiver with lock washers and nuts. If lead anchors were set, use lag screws with lock washers.

Primary/Secondary

Primary/Secondary requires pulling the motor and control wires across the driveway and hookup per wiring diagram. Power wire (motor conductors) must be twisted to avoid cross-talk noise problems with the control wires. There must be a minimum of 5 twists per foot.

Assemble and align per standard gate instructions.

Adjust limit switches as follows:
Open – per standard instructions
Closed – Adjust so both gates are horizontally aligned.

Adjust speed to the gate design requirements as follows:

1. Primary/Secondary <u>without</u> center saddles – adjust speed as close to simultaneous as possible. There will be some disparity.

2. Primary/Secondary <u>with</u> center saddles – adjust so that the side with saddles opens slightly slower and closes slightly before side without saddles to avoid collision with saddles.

Chapter 3

Wiring and Adjusting the Operator

Before You Start

⚠ **Caution:** Read through the entire chapter before proceeding. Do not attempt to connect the battery and put the gate into operation until all preliminary tests have been completed according to these instructions.

⚠ **Caution:** It is critically important that you conform to the order of hookup described herein. Failure to do so could result in damage to the electronics and is not covered by the warranty. Do not install electronics in wet weather as moisture can cause damage to circuitry and moisture in control box will result in degradation of components. Static electricity will destroy components – ground yourself by grasping a grounded metal object before handling any electronics!

The following instructions will detail electrical connections for both the operator housing and the control box.

1. Open the parts box to find:
   a. One multi-conductor cable (3) for the actuator limit switch wiring with faston connectors with color-coded shrink tube collars that match the shrink tube collars on the actuator leads. Wire colors may vary as cables are upgraded but the shrink tube collars will always indicate the correct connections. Keep this in mind when you cut and strip the free end before installing in the appropriate board connectors, as there is no collar on that end.

   b. One pair of red and black wires also with shrink tube collars. These will not fit into the limit switch connectors as the ends are reversed. They connect to the motor and carry the power.

   c. One pair of blue and white wires with loop connectors on one end. They also are designated as plus (+) and minus (-) to indicate battery polarity. Each also has a small red and black collar to help identify polarity and eliminate mistakes at battery hookup. White is plus or positive terminal; blue is minus or negative terminal.

   d. Two transmitters for the mounted radio receiver.

e. Loop detector modules (if ordered).

f. One laminated wiring diagram which must stay with the gate for future reference by service personnel.

g. Any additional electronic parts ordered.

h. **A limit switch adjustment tool that must stay in the control box.**

⚠ **Caution**: Before you open the control box you must ground yourself by grasping a well-grounded metal surface to dissipate any static charge. Damage caused by static discharge is NOT covered by warranty and could be very expensive.

2. Open the control box and unplug the receiver from the board. With a nut driver, remove the four board mounting nuts. Place the board in a static free, dry and safe area during the box mounting operation.

3. **Locate the control box within 10 feet of the operator as close to eye level as possible.** (You do not want to lie in the mud to adjust the controls!) Attach mounting brackets to back of box. Do not mount box on the operator sheet metal as vibration causes problems.

4. Using an appropriate hole saw, drill conduit holes in box bottom. Bottom connections avoid leakage problems. Drill conduit entry holes in operator back or wherever appropriate for wiring to be the shortest run.

5. Mount control box and connect conduit. Flex conduit and appropriate fittings work best for this application.

6. Pull all wiring and connect all but the battery cables per the laminated wiring diagram. Cut and dress wiring neatly to facilitate service that may be required by others.

High Voltage Power Box, Battery and Trickle Charger Installation

After installing the control box, install the 120 VAC power outlet box, the trickle charger and the battery. The 12 VDC battery is placed at the opposite end of the enclosure from the conduit. On 5' operators, the battery is mounted on the battery shelf and should be secured with the cable ties provided.

1. Trim or extend the high voltage conduit as needed and mount a PVC outlet box to the conduit with the appropriate coupling.
2. Connect the wires to a circuit protected 120 VAC receptacle for a 3 pronged grounded plug.
3. Mount the trickle charger to the operator frame so that the cord may be plugged into the outlet.
4. Connect the chargers red output wire to the positive terminal of the battery and the black wire to the negative terminal of the battery.
5. Plug the 3 pronged power cord into the outlet box.

Pulling Cables to the Control Box

If a separate emitter/receiver IR is used, pull an 18/2 wire from the catch post to the operator. If an EVA is installed, use two 18/2 wires from the EVA operator. Group the red and black motor power cables, the blue and white battery cables, the multi-conductor limit switch cable, the tach cable, the secondary gate wires, the keypad and loop wires, plus a length of 18/3 for the IR Beam, and the 18/2 from the Emergency Switch, if an EVA is being installed. Mark all wires on the control box end so they can be identified after pulling. Pull these from the operator through the flex conduit to the control box with the bare end of the wires going into the control box. Any wires that are not long enough should be extended with the same size and color of stranded wire. Loop wires must be soldered or solidly crimped and insulated with silicon RTV or equivalent. In any case do not use wire nuts on any low voltage connections. Leave ample wire extending into the control box to allow for installation of components and wire routing. Carefully replace the control board in the control box with the hex nuts and tighten firmly.

Connecting the Wiring Harness in the Operator

This section deals with wiring connections inside the operator housing. First, check the connections of the battery charger wires to the battery. Next connect the white wire with the battery terminal lug to the positive battery terminal. Tighten securely. Do not connect the blue wire with the battery terminal lug to the positive battery terminal. This connection will be done after the board connections are completed, for safety reasons.

⚠️ **Caution**: Tighten securely. One of the most common problems of intermittent function is loose or corroded battery connection. Spray battery terminals with anti corrosion coating.

1. The black wire bundle coming from the actuator holds 5 wires.

2. Separate these into a red and black pair for power and a white, brown and green set for the limit switch signals.

3.Take the 3-conductor limit switch cable that was pulled into the control box and connect the faston connectors to the limit switch wires from the actuator. Connect white-to-white, green-to-green and transparent collar to transparent collar.

4. Connect the faston connector for the positive (+), motor power. Connect the red/white-striped wire from the motor to the red wire that was pulled into the control box.

Leave the black/white-striped wire from the motor and the black wire that was pulled into the control box disconnected at this time.

Connecting the IR Emitter and Receiver Wires

The IR Emitter (transmitter is mounted on the catch post or in the EVA operator, if installed. The receiver is mounted in the main gate operator. See Page 26 for instructions on pulling 18-guage wire from the catch post or EVA operator to the main operator.

1. If a catch post is installed with the gate, mount the IR Emitter (using the mounting kit included) to the catch post.

2. The IR Emitter cable has two leads, brown and blue

3. The IR Receiver cable in the operator has four leads, brown, blue, white and black. Clip the black lead.

4. Assuming that the three wires of the 3-conductor pulled to the control box are red, black and white, connect the extension of the brown lead from the Emitter +10- 30VDC, at the catch post or EVA operator, to the brown lead from the IR Receiver, a +10-30VDC, and the red wire of the cable pulled to the Control Box.

5. Connect the extension of the blue lead from the Emitter, DC Common, at the catch post or EVA operator, to the blue lead from the IR Receiver, DC Common, and the black wire of the cable pulled to the Control Box.

6. The white lead from the IR Receiver, Sink, 150mA, is connected to the white wire of the cable pulled to the Control Box.

⚠ **Caution**: The final connection to the control board MUST reflect:
Brown to +12 VDC
White to N.O.
Blue to COM on the IR Connector.

TIP: After final wiring, use the IR Receiver flash frequency to properly align the Emitter and Receiver. The frequency of the flash is the highest when the alignment is correct. This is located on the top of the combination Emitter/Receiver and in the back of the separate IR Receiver. It will require a mirror to see into the tiny window.

TIP: Reflector for combination IR beam should be located as close to the edge of the catch post as possible. Adjust emitter/receiver accordingly. When the led indicates maximum frequency, drill through the catch post and mount the reflector using included screws.

Connecting the EVA Emergency Switch Wires

The Emergency Access box on the EVA operator is shown open to reveal the switch that opens the main operator when the box is opened. The red and black wires shown, lead into the EVA operator and through the conduit to the main operator.

1. The Emergency Access Box is mounted on the operator before it ships.

2. Use a length of 18/2 wire to extend the switch terminals through the conduit to the main operator and to the control box.

   Note: The PULL handle connects to the red vertical bar inside the operator. When pulled, the latch on the pivot arm is released from the vertical bar allowing the tension spring to raise the EVA gate.

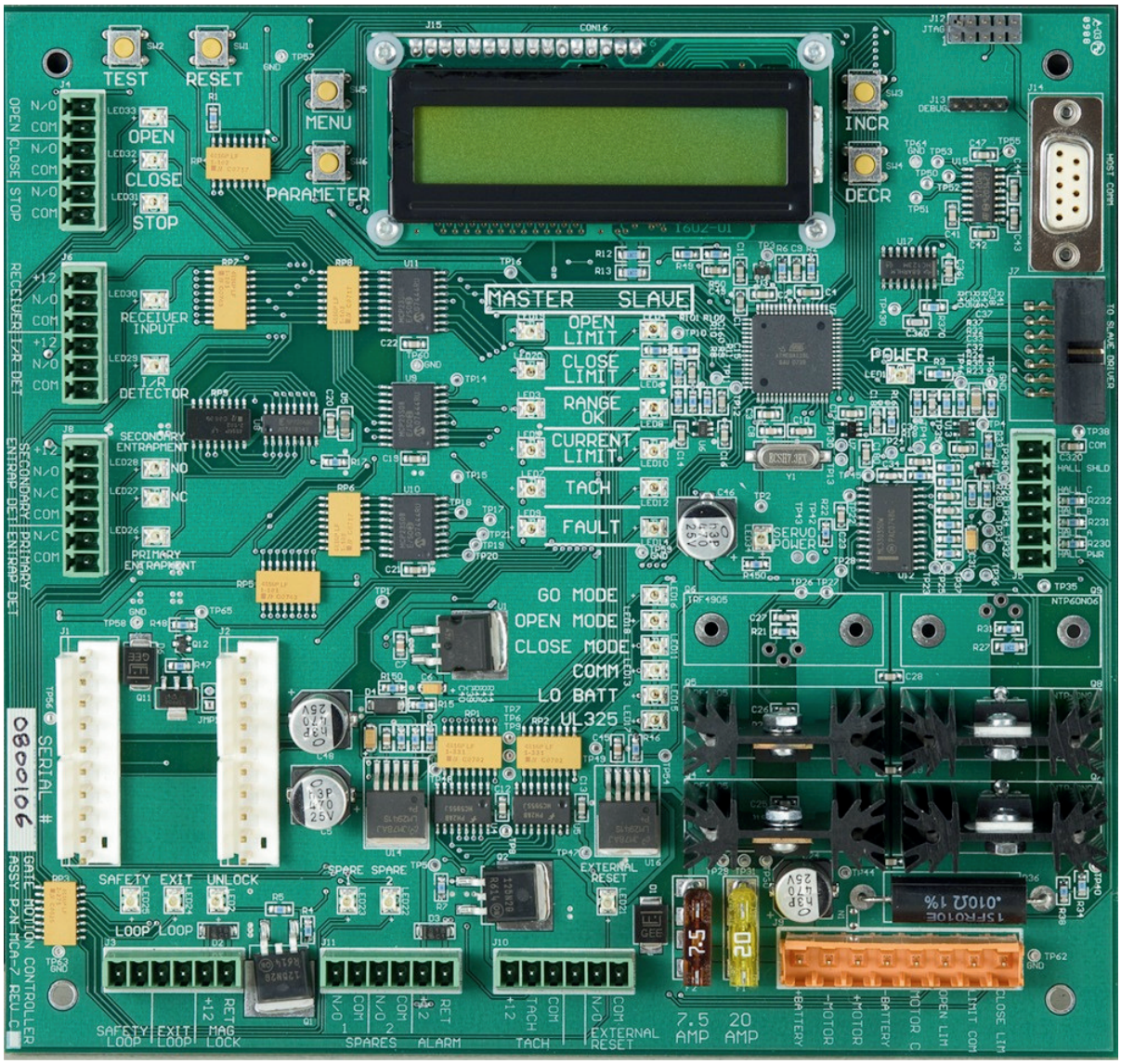
Wiring the Main Control Board

This section will cover the step-by-step instructions for wiring of the main control board. Each connection will be shown in schematic form and photographically to simplify the process.

⚠️ **Caution**: Remove each plug before connecting any wires into the plug. Leave the 8- pin connector unplugged until instructed to plug it into the control board. This connector holds the power wires. Be careful to observe polarity and color codes. Using the supplied screwdriver, gently but firmly make sure all connections are secure. Do not over tighten. Loose connections will cause intermittent operation. If power wires are connected improperly severe damage may result and this damage is not covered by warranty.

Do not install connectors until all connections are made and double-checked.

⚠️ **Caution**: **BE CAREFUL TO OBSERVE POLARITY AND COLOR CODES**


TEST
RESET
MENU
PARAMETER
INCR
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OPEN
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STOP
MASTER SLAVE
OPEN LIMIT
CLOSE LIMIT
RANGE OK
CURRENT LIMIT
TACH
FAULT
POWER
GO MODE
OPEN MODE
CLOSE MODE
COMM
LO BATT
UL325
RECEIVER INPUT
I/R DETECTOR
SECONDARY ENTRAPMENT
PRIMARY ENTRAPMENT
SERIAL #
SAFETY EXIT LOOP
SAFETY EXIT LOOP
MAG LOCK
SPARES
ALARM
TACH
EXTERNAL RESET
7.5 AMP
20 AMP
MOTOR
BATTERY
OPEN LIM
CLOSE LIM

Connectors

⚠ **Caution:** All wiring connectors should be unplugged from the board before connecting any wires to the connector. Connecting wires while the plug is connected can destroy the board, which is not covered by warranty.

⚠ **Caution**: If the battery polarity is backwards or if the motor is back-fed, the board will be damaged and the warranty voided. Take your time and watch the color codes on the wiring diagram. Also, observe the markings on the battery wires.

J-9 – Power Connector
This is the power – motor – limit switch connector and must be correctly wired.

Note: The pins, numbered from left to right are:
1-Battery Input Pos (WHITE)
2-Motor Output Neg (BLACK)
3-Motor Output Pos (RED)
4-Battery Input Neg (BLUE)
5-Motor Phase C (optional)
6-Open Limit N/O (BLACK)
7-Limit Switch Com (GREEN)
8-Limit Switch N/O (WHITE)

1. Connect the white wire from the battery's positive terminal to pin 1, far left on J-9

2. Connect the black/white wire from the motor to pin 2 of J-9.

3. Connect the red/white wire from the motor to pin 3 of J-9

4. Connect the blue wire from the battery's negative terminal to pin 4 of J-9.

5. Pin 5 used for special applications – normally left open.

6. Connect the black wire from the brown limit switch 3-conductor wire from the actuator to pin 6 of J-9.

7. Connect the green wire from the limit switch 3-conductor from the actuator to pin 7 of J-9.

8. Connect the white wire from the limit switch 3-conductor wire from the actuator to pin 8 of J-9

J-4 – Gate Control Connector

⚠ **Caution:** All inputs are dry contact. NO power inputs are to be used. Power inputs will damage the board if connected. Damage to the board caused by connecting powered inputs will void the warranty. Take care to avoid short circuiting the 12VDC outputs to adjacent pins as this will damage the board.

1.These are the Go Open, Go Close, Stop controls that are triggered from the system Controller, Keypads, Emergency Entry Switches or Guard Shack.

2.The Open input is the entry control and uses pins 1 and 2 of J-4.

3. If an EVA gate is installed, connect the two leads from the Fire Emergency Box switch to pins 1 and 2 of J-4. Polarity is not important, as this is a dry contact to return power to the gate operator board.

J-6–Receiver and IR Beam Connector

1. The Radio Receiver input is pre-wired at the factory in pins 1 – 3 of J-6.

2. Any dry contact receiver rated at 12 VDC can be interfaced.

3. The IR Detector input connects on pins 4 – 6 on J-6.

4. Connect the brown wire (+12 VDC) to pin 4, the white wire (N/O) to pin 5, the blue and yellow wires (COM) to pin 6 of J-6.

TIP: Two beam sets may be connected in parallel.

Separate Emitter/Receiver systems are wired as follows:

Brown wire in +12 VDC
Blue wire in COM
White wire in N/O

J-8 – Entrapment Detector Connection

1. The entrapment detector connections are used for UL325 required gate applications.They are used when these options are ordered with the gate.

2. Pins 1 –4 are used for proximity detection devices or other detectors and provide connections for Normally Open or Normally Closed device types.

3. Pins 5 and 6 are used to connect a Normally Closed primary entrapment device, i.e. beams, kickout switch, edge detector.

4. The J-8 plug comes pre-wired for a default setting with two jumper wires from pin 3 to pin 4 for the Secondary Entrapment/Proximity Detector input and from pin 5 to pin 6 for the Primary Entrapment Detector input.

⚠ **Caution:** The gate will short cycle and go into alarm fail mode if this connector is left off. You must then push the Reset button to get the gate to function with these jumper connections or other device installed.

J-3 Loop Connector and Mag Lock

The loops are connected to J-3.

⚠ **Caution:** The safety loops MUST be wired in series, where one end of each of the loops is connected together. The other end of each loop is connected to J-3. If more than two loops are involved, the additional loops are connected in parallel. This effectively makes one loop containing all of the smaller loops.

1. Safety loops are connected to pins 1 and 2 of J-3.

2. If there is a free exit loop, it is connected in pins 3 and 4 of J-3.

3. Pins 5 and 6 of J-3 are for controlling a solenoid latch or Mag lock. They can also operate an external relay to control warning lights, etc. Max output is 6amps @ 12 VDC.

TIP: It is suggested that installers download the Loop Installation file from www.renoae.com. It is very detailed and provides some information that installers may not be aware of.

Installing the Loop Detector

1. The board has two loop detector plugs.

2. The plug on the left is for Safety Loops and the plug on the right is for a Free Exit Loop. One loop detector is needed for Safety Loops and one for a Free Exit Loop, when present.

3. The pins on these sockets are numbered from top to bottom, numbers 1 – 10.

4. For normal operation, set the loop detector's (H-1-12-F) slide switches to:
   1 – OFF
   2 - ON
   3 – ON
   4 – ON
   5 – 8 – OFF

5. Carefully install the loop detector (Model H-1-12-F) with the label to the left and the 2 LED's at the top.

⚠ **Caution**: The control board mounting does not support the board around the loop detector plugs. To install the detectors, you MUST support the board with your fingers under the left edge to prevent flexing and cracking the traces while pushing the detector on to the plug pins. Gentle rocking of the detector may be required to fully seat it on the socket pins. Insure that the pins on the socket are aligned correctly with the holes on the detector and the lock edge on the left aligns with the lock pins (plastic) on the left of the socket.

J-11 Connector

This connector contains 2 spare positions, which are not used unless indicated in special instructions. It also contains, in positions 5 and 6, an output for an external annunciator per UL325 requirements. This would normally be a 100DB piezo electric annunciator mounted, either through the control box or the operator front channel.

J-10 Connector

This connector contains both the tachometer connections and the external reset for restarting the gate when it goes into fault per UL325 requirements.
Connect the tachometer cable from the actuator as follows

   1 – 12V to Red Wire
   2 – Tach signal to Black Wire
   3 – COM to shield
   4 – Not Used

Connect the external reset – a dry contact NO pushbutton to 5 and 6

J-5 Connector

This connector is used only for brushless DC motor applications and is otherwise left blank.

J-7 Connector
This connector is for the ribbon connector that attaches the secondary board for primary/secondary applications.

J-12, J13, J14 Connectors
These connectors are not for field use.

LED's – Light Emitting Diodes

LED's, the indicator lights on the control board, indicate the status of each corresponding function. All inputs, control functions and outputs have a corresponding LED. Problems can be diagnosed and adjustments made by observing and understanding the LED's functions.

Input LED's
Each input has a corresponding LED that lights when the input is triggered. They are:

Open – When lit a signal to open the gate is being received on the open input.
Close – When lit, a signal to close the gate is being received on the close input.
Stop – When lit a signal to stop the gate is being received on the stop input.
Receiver Input - When lit a signal from the Radio Receiver (remote control) is being received on the receiver input.
IR Detect – Lights when any safety input is received; including the safety loops.

Note: The IR Detect LED, also signals loop presence. Check IR, loops and loop detector when this is lit and the gate holds open.

Control LED's
Each control system has a corresponding LED that lights when the control is triggered. The left row is for the primary gate, the right row is for a secondary gate, if installed.

Open Limit – When lit, the gate is open fully and the Open Limit switch is closed. (Does not light if manually opened.)

Close Limit – When lit, the gate is closed and the Closed Limit switch is closed.
Low Battery – Lights and triggers an alarm when the battery drops to a present limit setting.

Current Limit – Lights when current exceeds friction and/or mass setting. Increase friction and/or mass setting until the gate cycles without activating the LED.

Status LED's

As functions of the control board changes, the Status LED's indicate what should be happening. Diagnosing problems is simplified by understanding these LED's.

Power – Board has power.
Open Mode – Gate is ready to open.
Close Mode – Gate is ready to close.
Go Mode – Motor is powered, open or close.
UL325 – Indicates entrapment or current limit fault.

Note: The Open Mode and Close Mode LED's light when the opposite action has been completed. The operation mode switches upon reaching a limit switch and/or termination of the run timer. At this point the appropriate Mode LED will light.

Output LED

The Servo Power LED light indicates power sent to start the motor in a specific mode – Open or Close.

COM LED - indicates a communication fault with the secondary board.
Fault LED - is not used at this time.

Adjusting the Limit Switches

Limit switch adjustment is extremely important. If not done properly, the gate may not open or may operate intermittently. If adjusted properly, you can expect smooth, continuous operation.

TIP: Always turn the adjustment screw 1/8 turn at a time until the gate gently settles into the saddles of the catch post. The gate should never slam into the saddles and the motor should never continue to run after the gate has reached the end limit point. This could damage the limit switches and/or the motor. Use the speed adjustments and the limit switch adjustments to reach proper smooth operation of the gate.

⚠ **Caution**: The gate must not be moving when the limit switch is being adjusted. Only adjust the limit switches when the gate is at rest in the Open or Closed position.

Turn off Automatic close function for limit switch adjustment. If not the actuator may start up and be damaged by stripping the limit switch assembly. This is not covered under warranty.

1. Both the open and closed limit switches are contained in the actuator gearbox housing. They are accessed and adjusted through a recessed slot in a depression on the back, under the power and limit switch cable fitting facing the rear of the operator.

⚠ **Caution**: a rubber plug that must be replaced upon completion of the adjustment protects the slot. Adjust with the adjustment tool provided to avoid damage to the slots.

2. The Open Limit switch is on the left, facing the back of the motor. Turning the screw clockwise causes the gate to open more. Turning the screw counterclockwise causes the gate to open less.

3. The Close Limit switch is on the right, facing the back of the actuator. Turning the screw clockwise causes the gate to close deeper into the catch saddles. Turning the screw counterclockwise causes the gate to close less, leaving it higher in the catch saddle.

4. Remove the rubber plug protecting the limit switch adjusting screws.

5. Use the special limit switch adjustment tool shipped with the operator for adjusting these screws.

6. Use the transmitter and receiver or the Test button on the control board to cycle the gate. Observe the fully open position on the shock absorber.

7. Adjust the upper limit switch 1/8 turn at a time, until the upper lift arm almost touches the shock absorber. See photo on page 36.

⚠ **Caution:** Observe the limit switch LED's when adjusting the limit switches. The LED's must be lit when the barrier reaches each limit. Otherwise, excessive heating of the driver FETs will prematurely destroy the board.

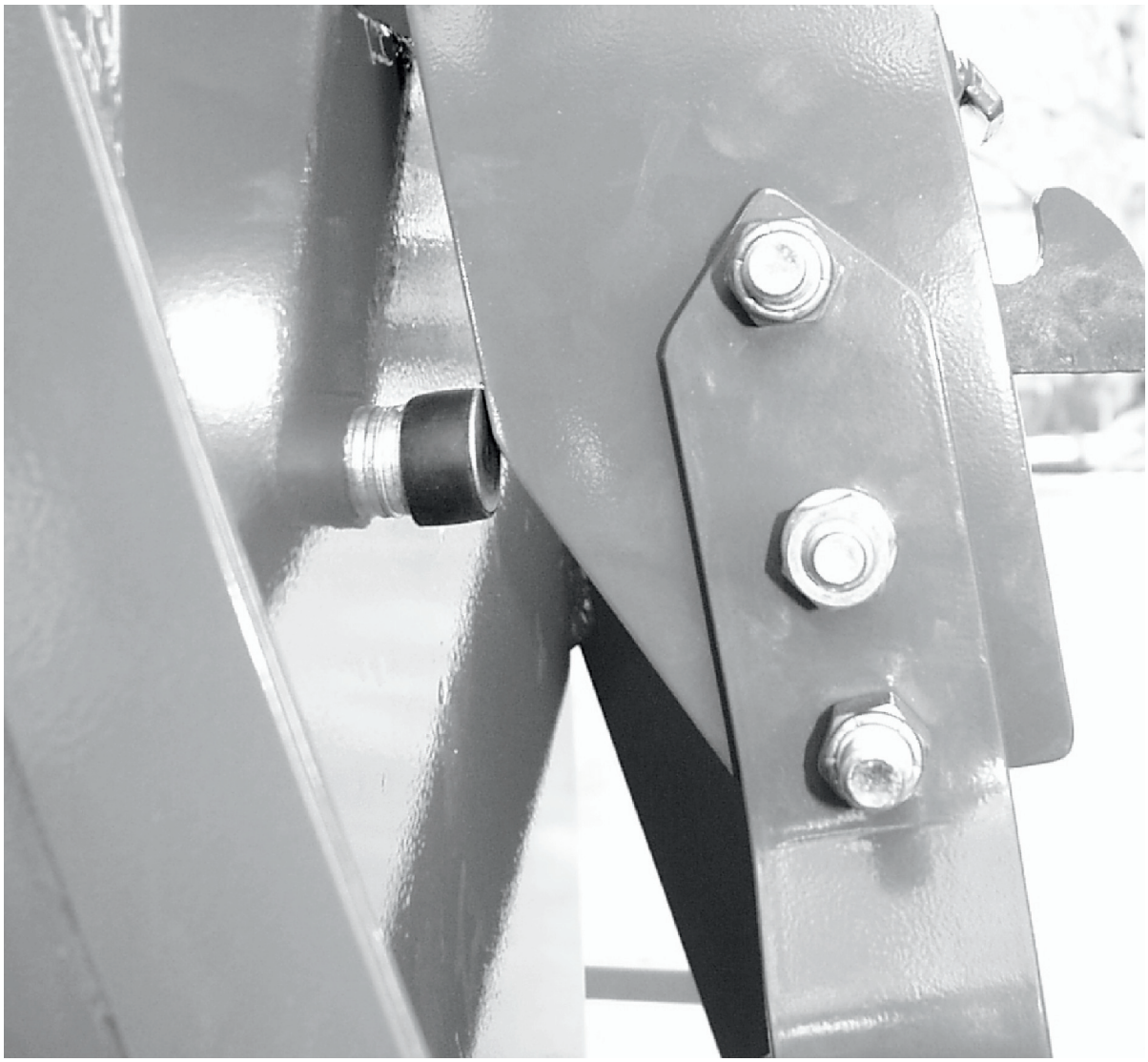
8. Use the Test button on the control board to cycle the gate again and observe the fully closed position in the catch saddle of the catch post or EVA gate end. Use the test button to stop the motor and reverse the gate if it fails to light the closed LED. Re-adjust until it does.

9. Adjust the lower limit switch 1/8 of a turn at a time and retest until the gate settles gently into the saddles.

10. Reinstall the rubber plug. Leaving this plug out will allow moisture to accumulate in the actuator that can corrode the switches or freeze in cold weather.

⚠ **Caution**: The lift arm should never be driven into the shock absorber or the barrier into the receiver by the actuator. The mechanical brake in the actuator will bind, preventing the gate from opening or closing.

To complete the control installation, refer to MCA-7 Installation Instruction Manual.



Sheet Metal Installation

1. Fit the left and right hand sides on the operator frame.

2. The panels are shaped to fit over the top and front edges of the operator frame with the "L" portion overlapping on the back of the frame.

3. Cut and drill the back portions of the cover, where necessary, to fit around any conduit etc.

4. Fit the top over both sides.

5. Drill a clearance hole for a 1/4" drill point (Tek) sheet metal screw through the sheet metal cover at a convenient spot to hold the cover in place.

6. Make sure a part of the operator frame is backing the hole, allowing it to accept the screw.

7. Two screws on the back of the operator should hold both sides. If not, locate the holes where convenient and accessible.

8. In high wind or high crime areas, install screws to secure the top, again where convenient – usually one in front and one in back will suffice.

Final Adjustment and Maintenance

One-Week Checkup:

After at least 50 cycles, the gate will establish a "set", that is:

Hinge point bolts will have seated themselves.
A slight arc in the barrier rails will have been established.
Any loosening or improper adjustment will be apparent.

At this time:
1. Snug all bolts – just snug, not tight. Friction at each hinge point will dampen any surging of the barrier.

⚠ **Caution:** Excessively tight bolts will result in excessive resistance and cause the current limit sensor to stop the gate, especially in an open position.

2. Readjust the closed limit switch to prevent the gate from jamming into the catch saddle so tightly that the gate either reverses and opens by itself or stops with such pressure that the manual latch is difficult to open. The barrier should just settle into the saddle and stop. Check that the limit LED is lit when the gate gently closes.

3. Tighten and adjust anything else which seems loose including the eyebolt on the center spring, base nuts, latch cable etc.

TIP: Adjustment to the gate on a regular basis will keep it running properly.