

Cantilever Series Mounting Instructions

Ram Promaster (excludes extended) (AE)-
2014-Present

Preparing the Gate

1. **Remove** the platform, mounting kit, and bridge assemblies, which are banded to the main assembly.
Leave the banding that holds the folding cylinder to the main assembly.
2. **Verify** mounting kit, liftgate, and other components (Figure 1 and Table 1).

Table 1: Parts List.

QTY.	PART NO.	DESCRIPTION
1	10484	Main Assembly
1	10587	71" Split Platform Assembly
	11168	52" Split Platform Assembly
1	13522	Mounting Kit-Promaster (AE)
1	13517	Front Channel Assembly-Promaster
1	10589	Bridge Assembly - Right
1	3059	Bridge Assembly - Left
1	13516	Rear Channel Assembly-Promaster
1	10026	Upper Platform Cover
1	10298	Lower Platform Cover

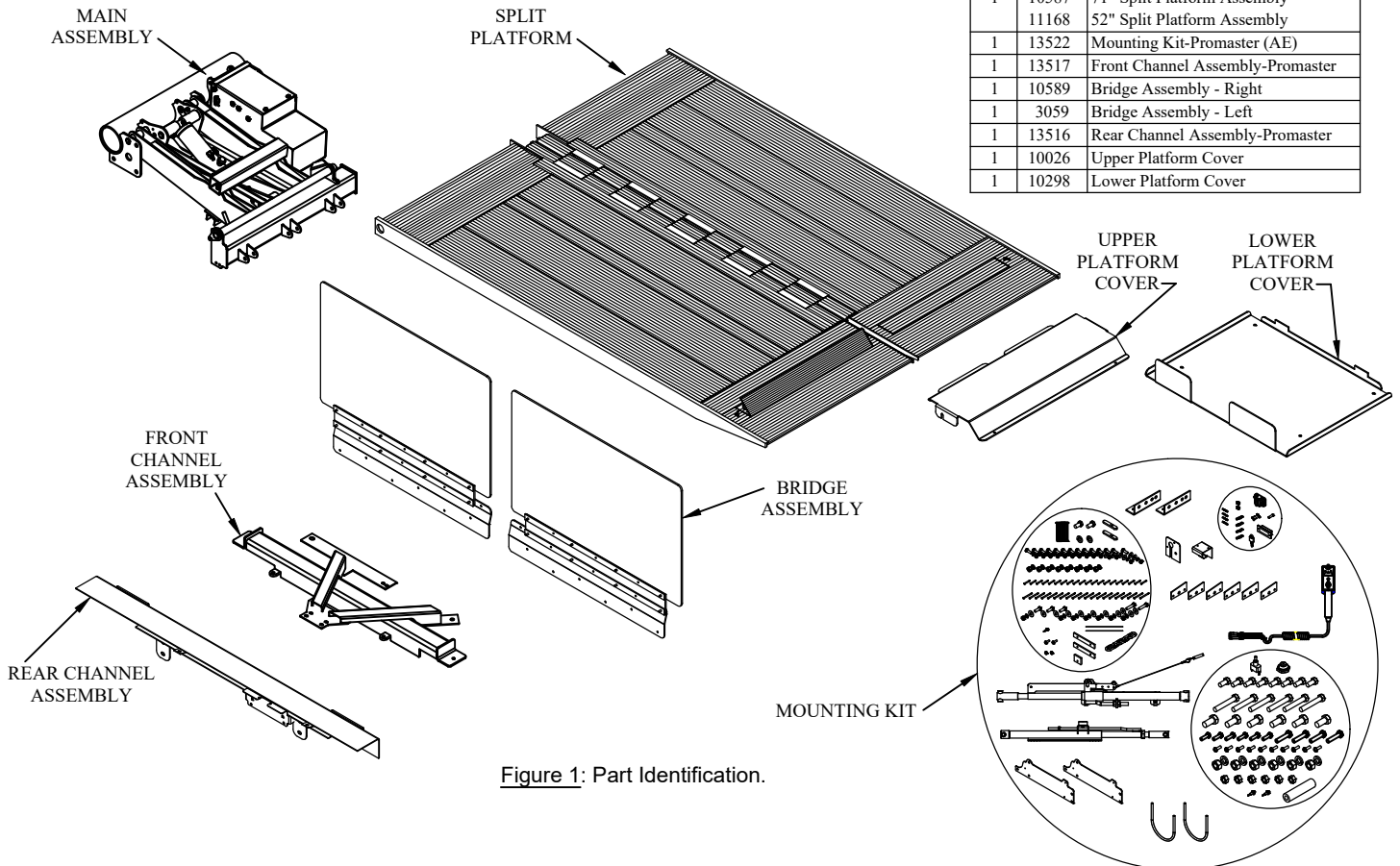


Figure 1: Part Identification.

3. **Remove** the pump box top cover by removing the three (3) screws, and verify that the vent plug is installed (Figure 2).
4. **Unscrew** the solid plastic plug from the pump reservoir and **install** the vent plug provided, if not already installed (Figure 3).
Note: The hydraulic system has already been filled with the proper amount of hydraulic oil so **do not** add any oil at this time.
5. **Install** the 5-link chain on the driver side bracket plate with a 3/8" x 1" bolt, flat washer, lock washer, and nut (Figure 4).
Only the bolt head goes on the inside of the bracket plate.

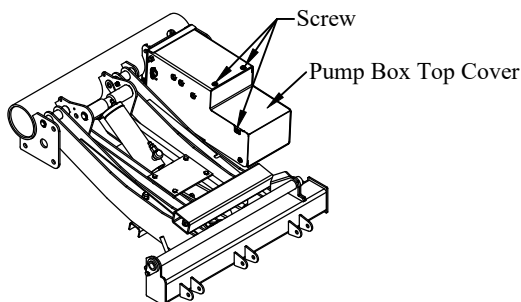


Figure 2: Pump box cover screws.

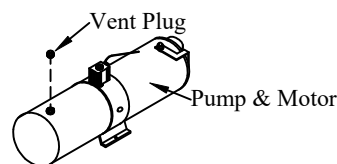


Figure 3: Vent plug installation.

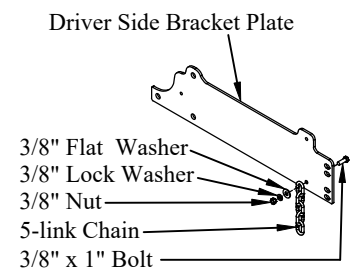


Figure 4: Chain-up feature hardware.

Cantilever Series Mounting Instructions

Preparing the Gate (continued)

6. **Install** the fold up stop on the rod on the main assembly (Figure 5).
7. **Install** the platform plates on the platform with the provided 5/16" x 1" bolts, lock washers, and nuts. The wide end goes toward the platform hinge. Note the location of the two (2) flat washers in place of lock washers (Figure 6).
8. **Install** the bracket plates on the main assembly using six (6) 5/8" x 1-1/4" bolts, lock washers, and nuts. The bolt head and lock washer should be on the outside (Figure 7).
9. **Install** rear mounting angles with four (4) 1/2" x 1-1/4" bolts, lock washers, and nuts. Position the rear mounting angles using the bottom set of holes and slots.

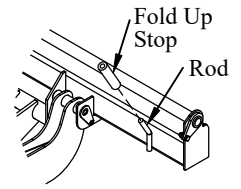


Figure 5: Platform stop location.

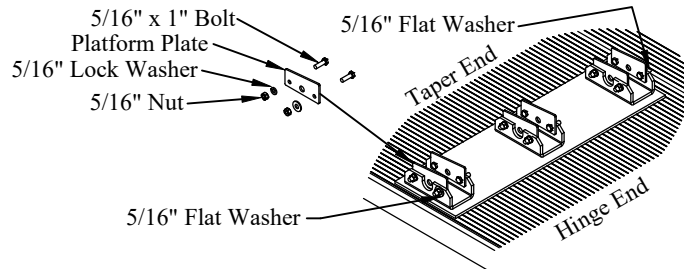


Figure 6: Platform plate location.

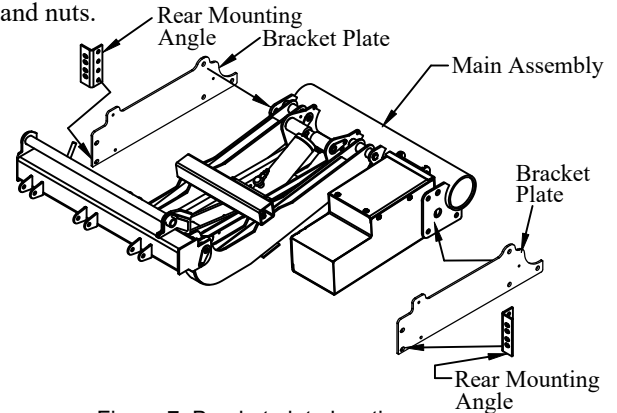


Figure 7: Bracket plate locations.

Preparing the Truck

1. **Support** the rear bumper and hitch to keep them from falling while removing the mounting bolts.
2. **Remove** the hitch, if equipped.
3. **Remove** the rear bumper, which consists of a steel structure and plastic cover. Save the bolts and plastic cover for later use.
4. **Remove** the spare tire using the tools supplied with the vehicle. The spare tire will have to be stored in another location after gate installation.
5. **Remove** the spare tire crank mechanism and center spare tire guide. Save the bolts for later use.
6. **Remove** the exhaust heat shield. The exhaust may need to be modified.
7. **Remove** the rear most section of exhaust. This piece may be reinstalled later.

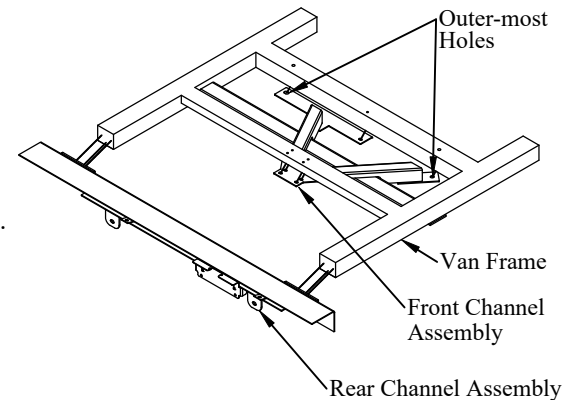


Figure 8: Front and rear channel assembly locations.

Note: The hitch, spare tire, and exhaust heat shield cannot be remounted after the liftgate is installed. The plastic cover for the bumper will be reused.

8. **Install** the rear channel assembly on the rear of the van frame (Figure 8). Use the two (2) supplied 3/8" bolts, flat washers, lock washers, and nuts in the bottom holes. Use the four (4) vehicle bumper (or supplied M10) bolts on the top holes.
9. **Install** the front channel assembly on the van frame (Figure 8). Use the vehicle spare tire mechanism (or supplied M8) bolts in all but the outer-most holes.
10. **Install** the two (2) supplied 14M x 1.5 x 30mm bolts and lock washers in the front channel assembly outer-most holes (Figure 8). If the vehicle cross member is not threaded, complete steps 11-15 for each hole.
11. **Bend** the supplied fish wire as shown (Figure 9).
12. **Insert** the fish wire through the small hole in the threaded bar (Figure 9).
13. **Insert** the supplied threaded bar, with fish wire, into the unthreaded hole in the cross member (Figure 10).

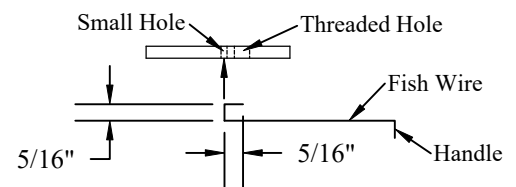


Figure 9: Fish wire dimensions.

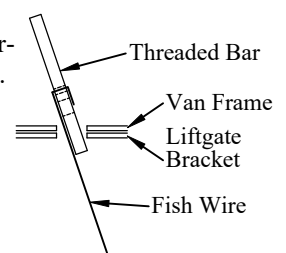


Figure 10: Threaded bar.

Cantilever Series Mounting Instructions

Preparing the Truck (continued)

14. **Position** the threaded bar so that the 3/8-16 hole is visible through the hole in the bracket (Figure 11).
15. **Fasten** the front channel assembly to the frame using one (1) supplied 3/8 bolt and washer (Figure 10).

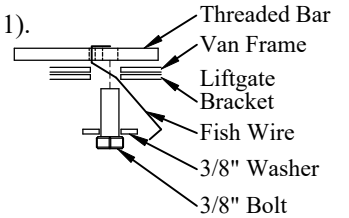


Figure 11: Threaded bar.

Installing the Main Assembly

1. **Securely Position** the main assembly onto a lifting device, pallet, or other structure so that it cannot tip or fall. It must be supported by the bracket plates, not the lift arms.
2. **Position** the main assembly under the van. Make sure there are no wires or hoses in a position where they may be pinched.
3. **Raise** the main assembly into position below the van frame. Do not lift by the lift arms, otherwise the brackets may not reach. The exhaust may need to be modified.
4. **Attach** the 3/8" U-bolts to the front channel assembly with the supplied four (4) flat washers, lock washers and nuts.
5. **Attach** the rear mounting angles to the rear channel assembly with the supplied four (4) 1/2" x 1-1/4" bolts, lock washers, and nuts (Figure 12).
6. **Remove** the lifting device, pallet, or other structure from the main assembly.
7. **Reinstall** the exhaust, if possible. The exhaust or hangers may need to be modified.

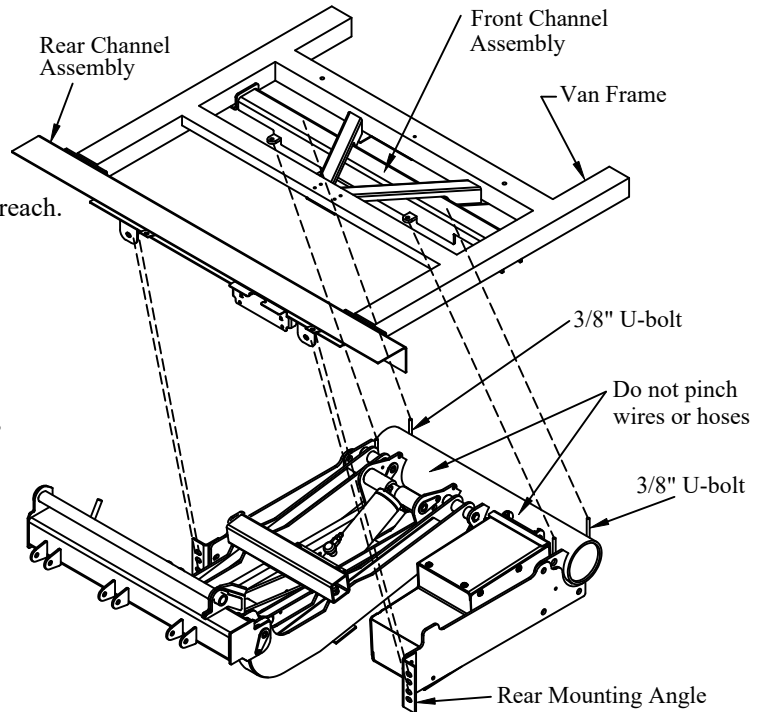


Figure 12: Main assembly position on frame.

Routing the Power Cables

Note: Any time a hole is drilled in the vehicle, apply rust preventative to the bare metal.

1. **Install** the circuit breaker onto provided aluminum bracket (Figure 13).
2. **Position** the circuit breaker and bracket in the battery box, leaving enough room for the power cables to be installed and so that the circuit breaker can easily be reset.
3. **Check** for obstructions before drilling in the next steps.
4. **Drill** the provided #12 self-drilling screw through the bottom of the battery box, into the bracket.
5. **Drill** a hole in the bottom of the battery box, avoiding the battery, to run the power cables through.
6. **Route** the power cables along the frame to the battery. Follow the *Tommy Gate Recommended Electrical Wiring Guidelines*. Provide at least 12" of extra cable near the pump box for later service.
7. **Pull** the excess cable beyond the battery.
8. **Separate** the positive(+) and negative(-) leads.
9. **Cut** the positive(+) lead to the length required to reach the auxiliary (AUX) terminal of the circuit breaker.
10. **Cut** the remaining pos.(+) lead long enough to reach from the circuit breaker battery (BAT) terminal to the pos.(+) battery terminal.

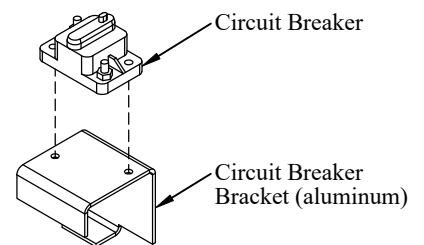


Figure 13: Circuit breaker bracket.

Cantilever Series Mounting Instructions

Routing the Power Cables (continued)

11. **Cut** the negative(-) lead to the length required to reach the negative battery terminal.

IMPORTANT: The pump and motor unit for this lift can require up to 180 amps of electrical power at 12 volts D.C.
Be sure that the negative(-) ground lead is connected to the negative(-) terminal of the vehicle battery.

12. **Install** the copper lugs on all required ends.
13. **Connect** the circuit breaker and battery as outlined in the *Tommy Gate Recommended Electrical Wiring Guidelines* and wiring diagram (Figure 16).

Installing the Pendant Control

Note: Any time a hole is drilled in the vehicle, apply rust preventative to the bare metal.

Note: The driver side rear door cannot be opened unless the liftgate is partially lowered.

1. **Locate** an existing hole in the passenger, rear door pillar to mount the toggle switch and pendant control female connector.
Make sure there is enough depth inside the door pillar for the toggle switch and female connector.
The pendant control female connector should face forward, not inward.
2. **Check** for obstructions before drilling in the next step.
3. **Drill** a 1-1/4" hole in the van floor near the rear door pillar where the mounting bracket will be located.
Alternatively, this hole may be drilled through the rear of the van, under the plastic bumper.
4. **Connect** the control cable to the pump box via the amp connector (if it is not hard wired)
5. **Disconnect** the wires from the female connector if needed to route the control cable in the next steps.
6. **Route** the control cable from the pump box to the mounting bracket through the drilled 1-1/4" hole. Provide at least 12" of extra cable near the pump box for later service. Follow the *Tommy Gate Electrical Guidelines*.
7. **Reconnect** the female connector wires if previously disconnected (Figure 15).
8. **Install** the fold/unfold toggle in the 1/2" hole in the mounting bracket.
9. **Position** the mounting bracket over the hole in the door pillar (Figure 14). Female Connector
Make sure that the 1/2" and 1-1/4" holes are not obstructed by the door pillar.
10. **Mark** the two (2) small holes to be drilled in the door pillar using the mounting bracket as a guide.
11. **Check** for obstructions before drilling in the next step.
12. **Drill** two (2) 13/64" holes in the locations previously marked.
13. **Route** the two-conductor wire from the liftgate to the toggle switch through the drilled 1-1/4" hole. Provide at least 12" of extra wire near the pump box for later service. Follow the *Tommy Gate Electrical Guidelines*.

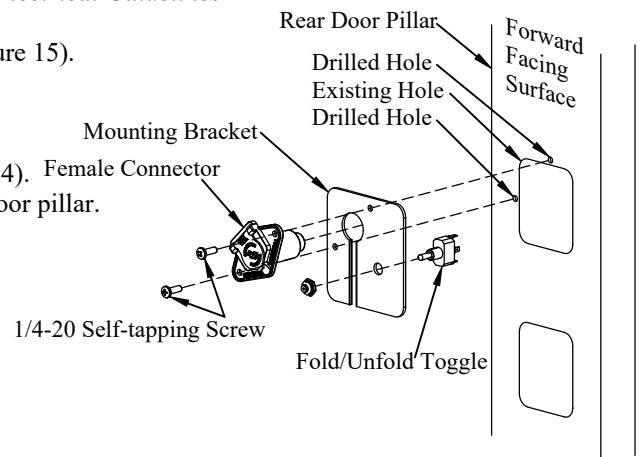
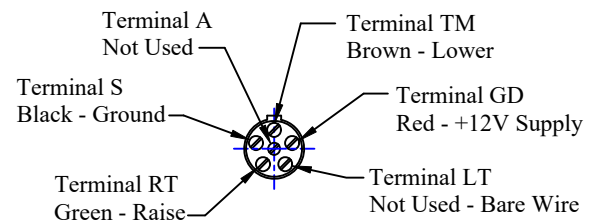


Figure 14: Pendant control female connector location.

14. **Connect** the wires to the toggle switch (Figure 16).
15. **Position** the female connector in the mounting bracket.
16. **Install** the supplied two (2) 1/4-20 self-tapping screws, through the female connector, through the mounting bracket, and into the door pillar.
17. **Secure** any loose or excess wires to the main lift assembly away from moving parts.
18. **Connect** the pendant control to the female connector.



Note: This is a front (terminal end) view, not a rear (wire end) view.

Figure 15: Female connector wiring.

Cantilever Series Mounting Instructions

!!! PLEASE READ AND FOLLOW ALL DIRECTIONS BEFORE PROCEEDING !!!



NOTE !!! IF GATES ARE NOT WIRED IN ACCORDANCE WITH THIS DIAGRAM YOUR WARRANTY WILL BE VOID.



WELDING NOTE !!! DISCONNECT ALL BATTERY CABLES. ALWAYS DISCONNECT THE GROUND CABLE FIRST. ATTACH THE WELDING GROUND TO THE VEHICLE RATHER THAN THE LIFTGATE.

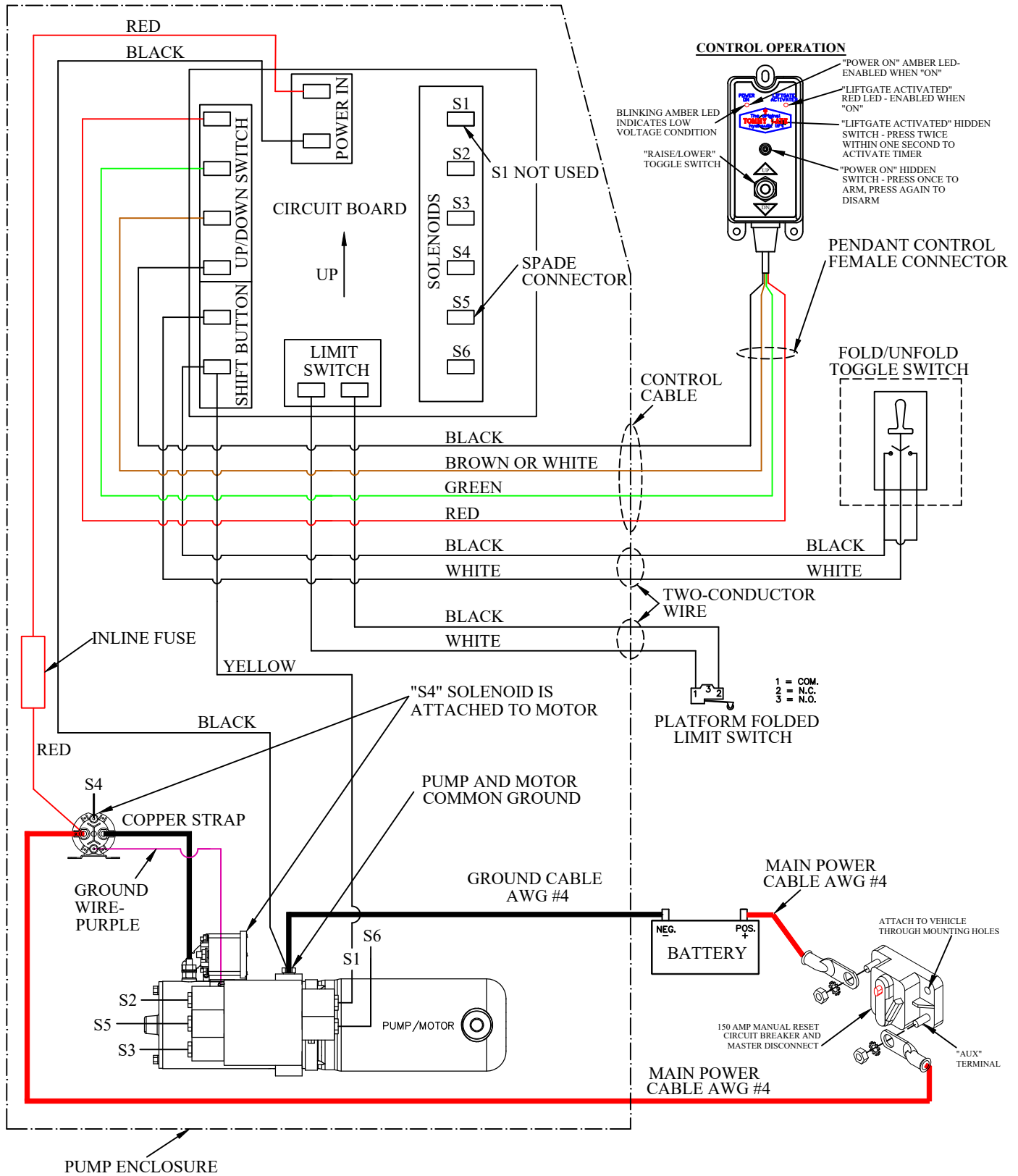
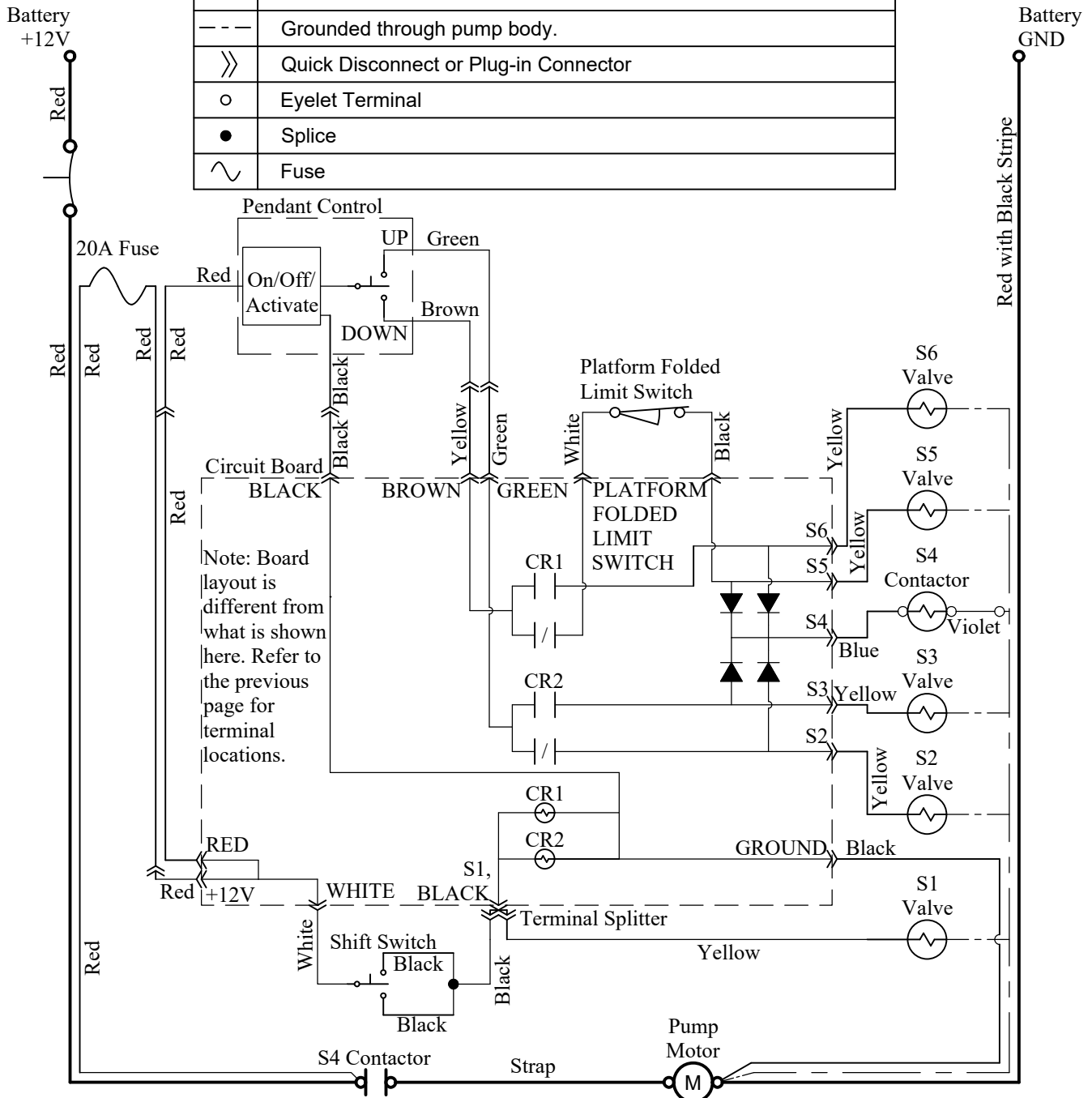


Figure 16: Wiring diagram.

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Ladder Logic/Wiring Diagram

Legend	
	Circuit Breaker
	Toggle Switch
	Limit Switch
	Relay/Contactor - Normally Open Contacts
	Relay/Contactor - Normally Closed Contacts
	Motor
	Solenoid/Relay/Contactor - Coil
	Battery Cable
	Wire
	Grounded through pump body.
	Quick Disconnect or Plug-in Connector
	Eyelet Terminal
	Splice
	Fuse



Cantilever Series Mounting Instructions

Installing the Platform

CAUTION: Keep all foreign objects (body parts, tools, load weights, etc.) away from the liftgate main assembly and away from pinch points at all times when operating the liftgate.

1. **Install** the support arms on the main assembly, using a 1/2"x3-3/4" GR 8 bolt and lock nut, do not tighten. The threaded end of the support arm goes toward the main assembly (Figure 17).
2. **Install** the folding cylinder on the main assembly, using a 1/2"x3-3/4" GR 8 bolt and lock nut, do not tighten. The threaded end of the cylinder goes toward the main assembly (Figure 17).
3. **Remove** the hinge tube from the main assembly. Save the 5/16" screw, lock washer, and nut, they will be reused.
4. **Install** the limit switch bracket on the passenger side support arm with two (2) #12 self-threading screws. See Figure 18 for bracket shipping location. Make sure that the limit switch is not in the pushed position (Figure 18).
5. **Position** the platform on the main assembly. The limit switch wire goes under the platform.
6. **Support** the platform near the taper end to keep it from falling.
7. **Insert** the hinge tube through the platform and main assembly from the driver side.
8. **Install** the 5/16" screw, lock washer, and nut in the hinge tube keeper.

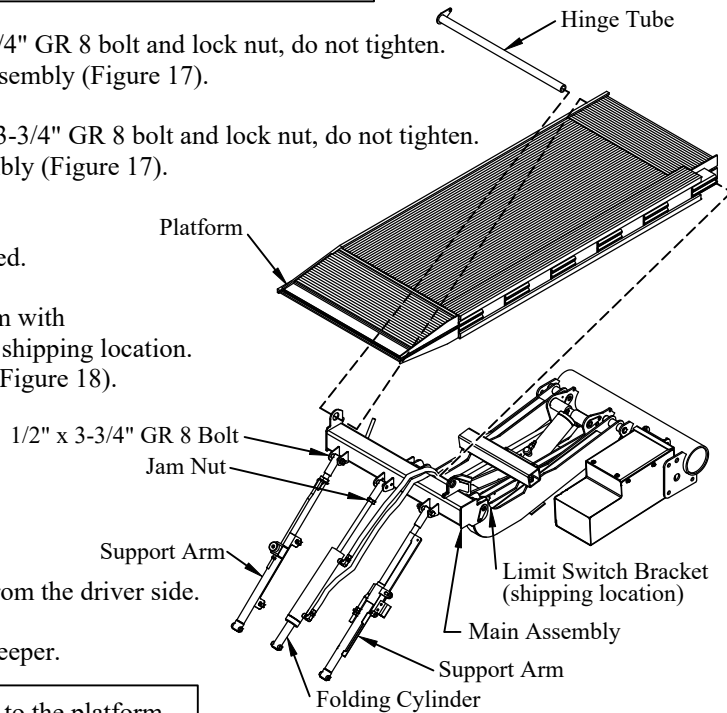


Figure 17: Platform parts location.

CAUTION: Do not operate the folding cylinder until it is bolted to the platform.

9. **Raise or Lower** the lift until the folding cylinder can be bolted to the platform. The lift will lower only if the limit switch is not pushed.
10. **Attach** the folding cylinder to the platform, using a 1/2" x 3-3/4" GR 8 bolt and lock nut, do not tighten.
11. **Fold** the platform up partially, using the hydraulic fold function. Make sure the platform is folded in half before using the hydraulic fold function.
12. **Attach** the support arms to the platform, using 1/2" x 3-3/4" GR 8 bolts and lock nuts, do not tighten.
13. **Lower** the lift to the ground.
14. **Verify** that all mounting bolts and bracket bolts have been installed.
15. **Tighten** all liftgate mounting bolts, bracket bolts, and U-bolts.

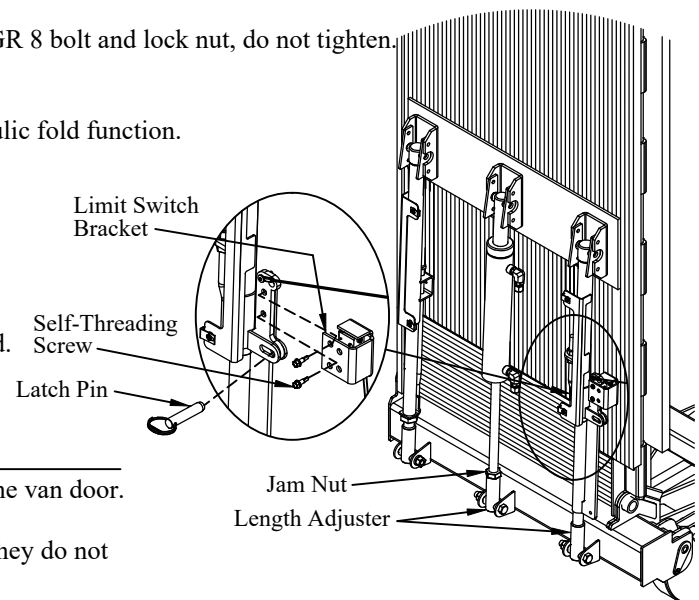


Figure 18: Platform latch and adjustment.

Adjusting the Platform

1. **Verify** that the platform folds to a vertical position without hitting the van door.
2. **Loosen** the 3/8" nuts on the driver side support arm (Figure 20) so they do not contact the stop bracket when the platform is folded.
3. **Support** the platform to keep it from falling or hitting the van in the next steps (Figure 18).
4. **Adjust** the folding cylinder for closed/vertical position, if needed.
 - a. **Loosen** the jam nut (cylinder only).
 - b. **Remove** the 1/2" x 3-3/4" bolt and nut.
 - c. **Rotate** the length adjuster: "in" to close less or "out" to close more.
 - d. **Reinstall** the 1/2" x 3-3/4" bolt and nut.

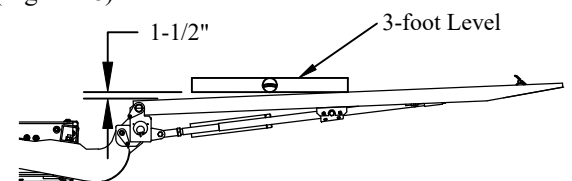


Figure 19: Platform position.

5. **Unfold** the platform completely.

Cantilever Series Mounting Instructions

Adjusting the Platform (continued)

6. **Adjust** the passenger side support arm so that the platform is 1-1/2" from level over a 3-foot length (Figure 19). Adjustment similar to folding cylinder.
7. **Adjust** the driver side support arm so that both support arms carry the platform load equally. Adjustment similar to folding cylinder.
8. **Fold** the platform to the vertical position.
9. **Tighten** the lower 3/8" nut on the driver side support arm until it contacts the stop bracket (Figure 20).
10. **Unfold** the platform partially.
11. **Tighten** the lower 3/8" nut on the driver side support arm an additional half turn.
12. **Tighten** the second 3/8" nut on the driver side support arm against the lower 3/8" nut.
13. **Loosen** the adjustment nuts on the passenger side support arm (Figure 20).
14. **Fold** the platform to the vertical position.
15. **Align** the latch slots/holes on the passenger side support arm.
16. **Insert** the latch pin into the aligned slots/holes on the passenger side support arm.
17. **Tighten** the adjustment nuts on the passenger side support arm.
18. **Verify** that all bolts have been re-installed and the cylinder jam nut is tight.

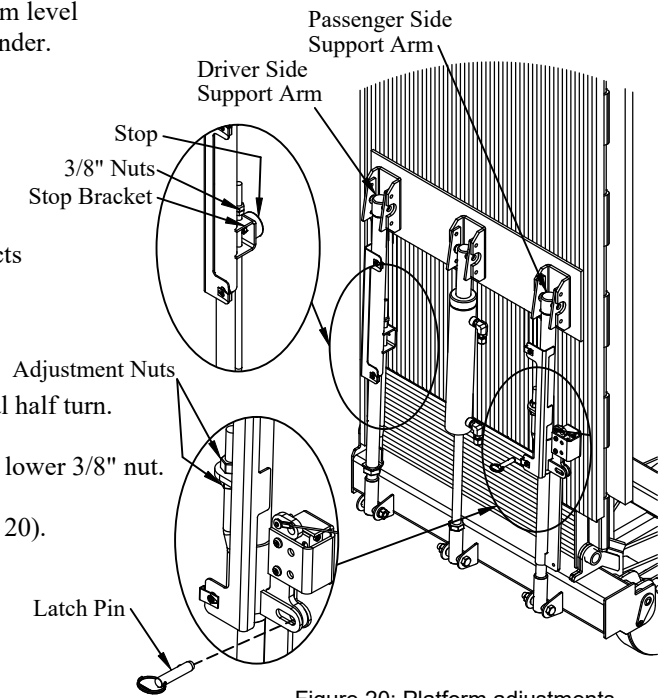
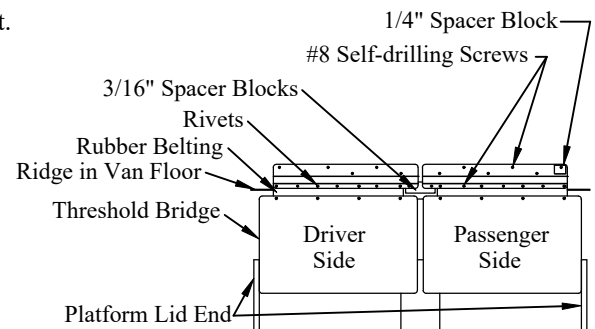


Figure 20: Platform adjustments.

Installing the Threshold Bridge

1. **Lower** the platform until the rear doors can be opened.
2. **Open** the rear doors of the van.
3. **Raise** the platform to the top of its travel.
4. **Position** the driver side threshold bridge across the threshold (Figure 21).
Align the aluminum strip on the bridge with the ridge in the van floor.
Align the left side of the bridge with the inside of the platform lid end.
5. **Position** two (2) 3/16" thick spacer blocks under the threshold bridge (Figure 21).
6. **Pre-Drill** partially through thick floors (not sheet metal) with 3/16" drill bit to aid self-drilling screws in next step.
Do not drill through the sheet metal floor.
7. **Attach** the driver side threshold bridge to the van floor using the supplied ten (10) #8 x 1-1/4" or 2" self-drilling screws.
8. **Position** the passenger side threshold bridge across the threshold (Figure 21).
Align the aluminum strip on the bridge with the ridge in the van floor
Align the right side of the bridge with the inside of the platform lid end.
The threshold bridges will not be centered in the van opening.
9. **Position** the 1/4" thick spacer block under the passenger threshold bridge (Figure 21).
10. **Pre-Drill** partially through thick floors (not sheet metal) with 3/16" drill bit to aid self-drilling screws in next step.
Do not drill through the sheet metal floor.
11. **Attach** the passenger threshold bridge to the van floor using the supplied ten (10) #8 x 1-1/4" or 2" self-drilling screws.



Note: Threshold Bridges are not centered in van.

Figure 21: Threshold bridge location.

Cantilever Series Mounting Instructions

Finishing the Liftgate Installation

1. **Install** the two (2) square plastic insert nuts into the square holes on the license plate assembly (Figure 22).
2. **Install** the license plate using the two (2) 1/4-20 self-tapping screws provided (Figure 22).
3. **Install** the license plate light into the holes provided (Figure 22).
4. **Connect** the license plate light to the vehicle's wiring following the *Tommy Gate Recommended Electrical Wiring Guidelines*.

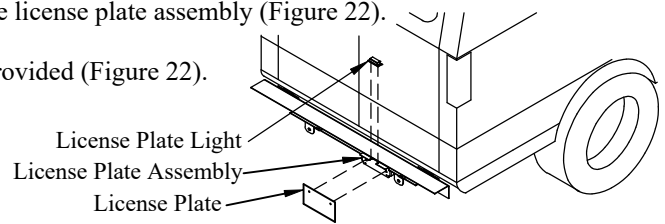


Figure 22: License plate & light location.

Note: Additional wire may need to be spliced into the license plate light circuit to reach the connection point.
Note: All electrical splices should be heat shrunk for corrosion protection.

5. **Install** the "Do's and Do Not's" decal in a highly visible area in the vehicle cab. This decal is with the Owner's / Operator's Manual.
6. **Pull** any excess fold cylinder hose toward the underside of the van. Do this with the platform in the raised and stored position. Make sure the hose will not get pulled, pinched, or kinked during operation.
7. **Install** the upper aluminum cover on the lower 5/16" support arm bolts. 5/16" flat washers should have been installed previously (Figure 23).

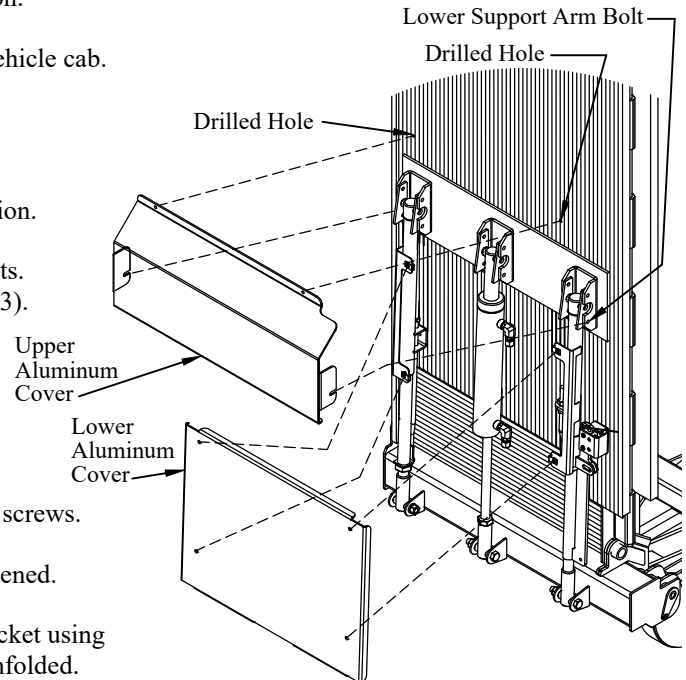


Figure 23: Aluminum cover installation.

8. **Drill** two (2) 13/64" holes in the platform, using the holes in the aluminum cover as a guide.
9. **Install** two (2) 1/4-20 self-tapping screws in the drilled holes.
10. **Install** the lower aluminum cover using four (4) 1/4-20 self-tapping screws.
11. **Verify** that all mounting bolts and nuts have been installed and tightened.
12. **Secure** the limit switch wire to the support arm and limit switch bracket using two (2) plastic zip ties. This should be done with the platform unfolded.
13. **Adhere** decal (PN 10476) to the exterior bottom right corner of the driver side rear door (Figure 24).
14. **Apply** sealant to the 1-1/4" hole that was drilled for the control wires.
15. **Install** the vehicle bumper cover on the rear of the van (Figure 25). Use the previously removed screws along the top and ends (six locations). Use the supplied 5/16" bolts, flat washers, lock washers, and nuts on the bottom side (two locations).

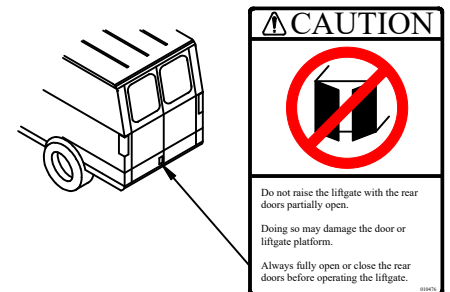
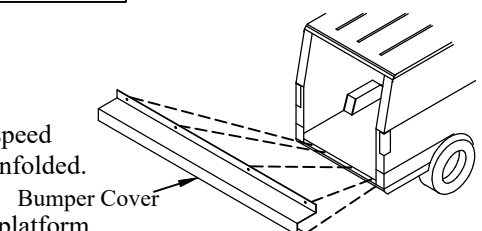


Figure 24: Caution decal location.

Testing the Operation of the Liftgate

CAUTION: Keep all foreign objects (body parts, tools, load weights, etc.) away from the liftgate main assembly and away from pinch points at all times when operating the liftgate.

1. **Check** operation of the safety control for proper lift operation. Be sure the control shuts off automatically after 90 seconds of not being used.
2. **Raise** and **Lower** the unloaded platform on a flat surface looking for proper operating speed and alignment with the ground. The lift should not lower until the gate is partially unfolded.
3. **Load** the platform with the rated capacity and **Measure** the time necessary to raise the platform. The platform should be fully raised within 15 seconds.
4. **Examine** the platform for any downward creep.



Note: Van doors not shown.

Figure 25: Bumper cover location.

Cantilever Series Mounting Instructions

Testing the Operation of the Liftgate (continued)

5. **Time** the lowering operation with the platform still loaded. The platform should be fully lowered and tilted within 10 seconds.
6. **Remove** the load from the platform and
Examine the liftgate and vehicle for any problems such as hydraulic oil leaks, loose wiring, etc..
7. **Adjust** the rear of the liftgate to the highest position possible using the alternate holes in the brackets (Figure 26).
8. **Reinstall** the pump cover.
9. **Fold** the platform in half.
10. **Raise and Fold** the platform using the hydraulic fold function.
11. **Insert** the latch pin into the storage hole (Figure 27).
12. **Insert** the locking pin through the hole in the passenger side support arm (Figure 27).
13. **Lock** the padlock through the hole in the locking pin (Figure 27).
14. **Place** Owner's / Operator's Manual and padlock keys in the vehicle.

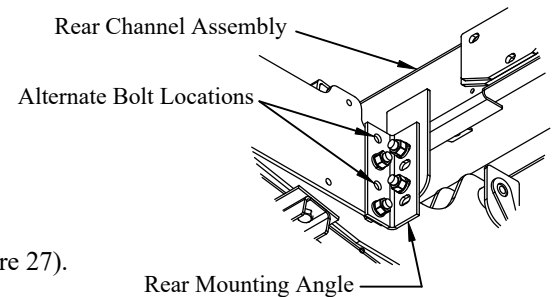


Figure 26: Liftgate adjustment.

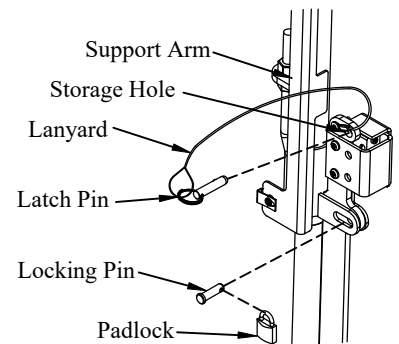


Figure 27: Platform lock.

Painting the Liftgate (if needed)

Your Tommy Gate has been primed with a gray polyurethane and painted with a black semi-gloss polyurethane topcoat to protect it from the environment. No additional paint is required unless shipping or installation damage or outdoor storage exposure has deteriorated the Tommy Gate paint. **Tommy Gate will not be responsible for shipping or installation damage or outdoor storage exposure that has marred or otherwise deteriorated the Tommy Gate paint.**

If you need to refinish the liftgate you should do the following:

1. **Remove** any dirt, oil, grease, salt, or other contamination by washing with a mild detergent solution.
2. **Rinse** thoroughly with fresh water and allow to dry.
3. Lightly **Scuff Sand** the Tommy Gate topcoat.
4. **Sand** and **Spot Prime** any area of the Tommy Gate paint that shows signs of damage or deterioration.
5. **Mask** off all safety decals, cylinder shafts and vents before painting.

WARNING: Paint over spray on the cylinder shaft(s) or vent(s) will damage the cylinder seals and void warranty.

6. After proper cleaning and surface preparation, **Apply** desired finish coat per paint manufacturer's recommendations.
7. **Remove** the masking from the safety decals and cylinders.
8. **Check** to ensure that all decals are clean and legible. Additional decals are available from the factory, if needed.



WIRE ROUTING

- (1) When routing wires, avoid heat (above 200°F), abrasion, vibration, metal edges, screws, and trim fasteners. If such routings are not possible, protective devices must be used. If wires must cross a metal edge, the edge should be covered with a protective shield and the wiring fastened within 3 inches on each side of the edge.
- (2) Grommets must be used where wires pass through holes in sheet metal, castings, and / or frame rails. Do not bend wires in a radius smaller than 10 times the wire diameter.
- (3) Routing wires into areas exposed to wheel wash should be avoided. If this cannot be avoided protective shields are required to protect the wires from stones, ice, salt and water damage. Provide a drip loop to prevent moisture from being conducted into switches, relays, circuit breakers, and fuses.
- (4) Wires should be supported every 18 inches with plastic zip ties or rubber-lined clips.
- (5) Wires must be routed to clear moving parts by at least 3 inches unless positively fastened or protected by a conduit. If wiring must be routed between two members where relative motion can occur, the wiring should be secured to each member, with enough wire slack to allow flexing without damage to the wire.
- (6) Maintain at least a 6 inch clearance from exhaust system components. If this is not possible, high temperature insulation and heat shields are required. Existing OEM heat shields, insulation, and wire shielding must be maintained.
- (7) Do not route or attach electrical wires to fuel lines. Route electrical wires at least 1-1/2 inches away from the engine.

BATTERY, WIRE, TERMINALS, AND CONNECTORS

- (1) Wire attachments at the battery must be protected from tension loads so there is no undue strain on the battery terminals. Wires should be routed down rather than horizontally from the terminals with no sharp bends adjacent to the connections.
- (2) Battery power for your Tommy Gate should come directly from the battery through the supplied circuit breaker or fuse. The circuit breaker or fuse should be installed as close to the battery as possible.
- (3) Do not splice battery cables. If splicing is necessary, the most durable splice joint will be bare metal barrel crimped, flow-soldered and covered with adhesive lined heat shrink tubing. Strip the wire ends making sure that individual conductor strands are not damaged. Use only rosin core solder, proper crimping tools, and wire with a gauge at least equivalent to the circuit being lengthened. Do not use electrical tape.
- (4) Battery cable terminals will be bare metal barrel crimped or flow-soldered and covered with adhesive lined heat shrink tubing.
- (5) Use wire connectors with locking features such as positive locking, inertia locking, bolt together, and soft mold-over with locking external retainers.

GENERAL

- (1) All frame contact areas must be wire brushed to bare metal, free of paint, dirt, and grease. Frame connections must be made using hardened flat washers under the bolt head and lock nuts. Corrosion preventive grease or compound is to be applied to the terminal area of the frame connection.
- (2) Frame cross members are not recommended as part of the ground return.
- (3) All circuit breakers and fuses should be located in one easily serviceable location with a means provided for identification of circuit function and current rating. Do not put circuit breakers or fuses in the vehicle cab.
- (4) Before welding to the chassis disconnect the battery. Also disconnect the power train, engine, valve, and transmission control modules.
- (5) Do not alter vehicle ignition, starting, and / or charging systems. Do not reroute engine compartment wiring.
- (6) Full copper circuitry and standardized polarity grounds are recommended.
- (7) Never increase the rating of a factory installed fuse or circuit breaker.
- (8) Disconnect the battery negative (ground) wire prior to any vehicle modification.

Following the above guidelines will provide you with years of trouble free service. Failing to incorporate the above guidelines will result in a voided warranty. Non-compliance with the guidelines above may result in a failure of electrical components, shutdown of engines, loss of backup brake systems, and the possibility of fire.