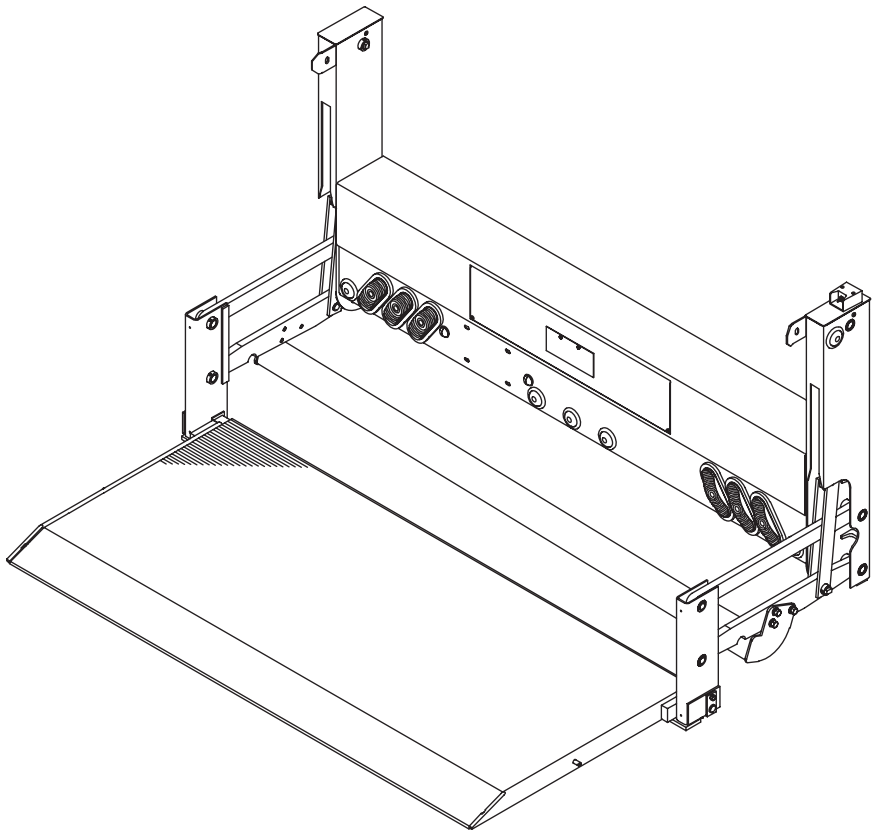
TOPLIFTER

Tailgates By THIEMAN

TT-16/20RM
OWNERS MANUAL/PARTS LIST

SHOWN WITH OPTIONAL ALUMINUM PLATFORM AND LIGHT KIT



⚠ IMPORTANT! KEEP IN VEHICLE!

PLEASE READ AND UNDERSTAND THE CONTENTS OF THIS MANUAL BEFORE OPERATING THE EQUIPMENT.

NTEA THE ASSOCIATION FOR THE WORK TRUCK INDUSTRY MEMBER

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600 East Wayne Street
Celina, Ohio 45822
Phone: 419-586-7727 Fax: 419-586-9724
www.thiemantailgates.com

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FOR YOUR RECORDS

Model No. _____ **Date Purchased** _____

Serial No. _____

NOTE: When Ordering Parts Be Sure To Include This Information!

Your Thieman Tailgate is constructed of top quality material and is warranted to be free from defects in material and workmanship under normal use. With routine maintenance and proper operation this liftgate will provide long lasting service and dependability.

PARTS ORDERING PROCEDURE

When ordering parts, please include all the information asked for below. If this information is not available, a complete written description or sketch of the required part will help Thieman identify and deliver the needed part to you.

THE FOLLOWING INFORMATION MUST BE INCLUDED:

1. Serial Number – Thieman liftgate serial numbers can be found on the tag located on the outside of the curb side post near the bottom.
2. Model Number and Capacity.
3. Platform size and Material – Steel or Aluminum.
4. Part number.
5. Description.
6. Quantity required.

SAFETY INFORMATION

This is the safety alert symbol. This manual uses this symbol combined with the Signal Words below, which together, alert you of potential personal injury hazards. **Obey all safety messages throughout this manual, including those that follow the Signal Words below, to avoid personal injury or death.** Each Signal Word is explained below.

SIGNAL WORDS used in this manual

DANGER

DANGER – Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Related information will follow

WARNING

WARNING – Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Related information will follow

CAUTION

CAUTION – Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Related information will follow

⚠ WARNING

IMPROPER OPERATION OF THIS LIFTGATE MAY RESULT IN SERIOUS PERSONAL INJURY AND/OR DEATH. DO NOT operate this liftgate unless you have been properly instructed and have read and understood the Owner's Manual and all of its warnings, operating instructions and all decals.
The following list of warnings is to be read and understood before operating the TT16 series liftgate. The numbered list begins below and continues on the following pages.

WARNINGS!

1. DO NOT operate this Thieman liftgate without the Owner's Manual for this model present on the vehicle and without all decals present and legible, as guides for proper liftgate operation and maintenance (see the "Decal Maintenance - Inspection and Location of Decals" section of this manual). For replacement Owner's Manuals, decals, etc. call Thieman at 419-586-7727. For the latest manuals and warnings for each liftgate, visit our website at www.thiemantailgates.com. Note: manuals and warnings update regularly.

2. The vehicle must be securely and properly braked on level ground before using the liftgate.

3. All protective covers and guards must be in place before operating the liftgate.

4. Before using liftgate, check for signs of improper maintenance or damage (unusual noises, vibrations, fails to operate freely, missing hardware, cracked welds…etc. See the sections in this manual with "Maintenance" in the title – refer to "Table of Contents" on Page 2). DO NOT use the lift if these are evident. Only an authorized Thieman distributor is qualified to do repairs on the liftgate. DO NOT attempt to do your own repairs or modify this liftgate. Altering this product will void all warranties and may damage the liftgate or even cause serious injury. If any repairs, adjustments, or maintenance not covered in this manual are required, contact your nearest Thieman distributor or call Thieman at 419-586-7727.

5. THIS IS NOT A PERSONNEL LIFT. Because of the pinch point between the platform and the truck, fall hazards, unstable loads, etc., riding the lift may cause severe personal injury or death. ALWAYS stay clear of the liftgate when in operation. Do NOT ride the liftgate.

6. Make certain the areas, in which the platform will open or close, are clear before opening or closing the platform.

7. Use this liftgate ONLY for its intended purpose of loading/unloading cargo between truck bed and ground. It is NOT to be used for anything other than this. The ground is defined as the surface the truck is parked on.

(Warnings continued on following pages)

8. DO NOT use this liftgate to load or unload cargo from any elevated surface such as a dock, sidewalk, raised concrete slab, etc. A truck's suspension WILL squat under load, and may cause loads to become unstable. Also, this effectively changes the "bed height" of the truck, so the liftgate may not function properly on an elevated surface and may bind and damage the liftgate. Additionally, if the ENTIRE liftgate platform is not supported by the elevated surface, this partially supported condition WILL create unintended loads on the liftgate components and MAY LEAD TO A SUDDEN LIFTGATE FAILURE.

9. DO NOT OVERLOAD THE LIFTGATE. Each liftgate has a specific maximum capacity for lifting and lowering. The standard maximum rated capacity of the TT16 series liftgates differs with each model as follows:

TT16-1600 lbs. Maximum Load
TT20-2000 lbs. Maximum Load

WARNING note: Special options can lower the maximum rated capacities below those shown above. Be certain you know what the maximum rated capacity is for your particular liftgate.

10. NEVER off-center the load on the platform, from side to side or away from truck as this may overload the liftgate. The center of weight of the load should NEVER be placed beyond the center of the platform load surface, away from truck. Loads should be placed close to platform edge nearest truck. See figure 1.

11. NEVER allow any part of the load to extend beyond the edges of the platform's flat load surface. Overhanging objects increase the risks of tipping loads due to unstable loading or snagging these objects on surroundings and THESE OBJECTS COULD ALSO STRIKE OR CRUSH OPERATORS OR BYSTANDERS.

12. NEVER step on or place loads on, the ramp portion of any liftgate platform (includes all ramp styles), unless the platform is lowered completely to the ground and the entire platform and ramp are supported by the ground.

13. NEVER lift or lower unstable loads. NEVER attempt to grab or retain a load that is tipping, falling, or rolling off the platform, as you may fall with, and be crushed by, the load.

14. NEVER operate liftgate if platform load surface is slippery.

15. Make certain the areas above and below the liftgate platform and other moving liftgate parts, are clear before, and at all times during, operation of the liftgate. Do NOT allow anyone under a raised liftgate platform, where accidental or intended lowering could crush them. Do NOT allow anyone to stand around the platform where a falling load could land on them.

(Warnings continued on following pages)

16. When loading/unloading platform at ground level, load/unload the platform from the rear (ramp tip end). NEVER load/unload from the left or right sides of platform. Position loads on platform at ground level, considering how they can be later unloaded into truck most safely. For example, position loads on platform at ground, so loads are as near truck as possible, with any load handles within near reach of someone standing on the truck bed, once load is raised for unloading.

17. When moving cargo between truck bed and raised liftgate platform, make sure platform is level with truck floor. Keep your body entirely on truck bed when possible (avoid standing on liftgate platform when possible). For example, push loads from truck bed to liftgate platform. Avoid pulling loads from truck bed to liftgate platform, as this may place your body near the edges of the platform and increases your risk of falls and being crushed by the load. If it is necessary to temporarily stand on the liftgate platform, to safely position your load, keep yourself as close to the truck as possible and away from the outer edges of the platform, while following all other warnings in this manual.

18. Never operate lift trucks on or over any part of the platform.

19. Follow all sections in this manual with “Maintenance” in the title – refer to “Table of Contents” on Page 2.

20. NEVER move vehicle unless platform is properly stowed and power is off. An open liftgate on a moving vehicle poses a serious traffic hazard.

21. ALWAYS stow liftgate in transit position when not in use. Liftgates left in their open positions, may create hazards for people and vehicles passing nearby.

22. Take care to retain cargo during transit. Liftgates are not designed to retain objects on the truck. Improperly retained objects may fall from the vehicle and pose serious traffic hazards and larger objects could shift and damage the liftgate or truck

23. Any time the vehicle is washed, this liftgate MUST be inspected to MAKE SURE all parts are properly lubricated and have the appropriate protectants. Failure to replace lubricants and protectants after washing the vehicle, may lead to improper operation of the liftgate, accelerated corrosion, and possible component failure.

24. NEVER operate the liftgate, while using a cell phone or while distracted. Safe liftgate operation, requires your full attention.

⚠ WARNING

An improperly positioned load can overload the liftgate and result in sudden liftgate failure and/or increased risks to personnel of being hit or crushed by loads. **IMPROPERLY POSITIONED LOADS MAY RESULT IN SERIOUS PERSONAL INJURY AND/OR DEATH.** Always position loads properly on the liftgate platform. Follow information below on how to position loads properly.

POSITION LOADS PROPERLY ON PLATFORM

NEVER off-center the load on the platform, from side to side or away from truck as this may overload the liftgate. The center of weight of the load should NEVER be placed beyond the center of the platform load surface, away from truck. Loads should be placed close to the platform edge nearest truck. If a load is not uniformly distributed, then the heaviest portion should be closest to the edge of the platform nearest the truck. NEVER allow any part of the load to extend beyond the edges of the platform's flat load surface. NEVER allow any part of the load to extend over or on, the tapered ramp portion of the platform unless the platform is lowered completely to the ground and the ramp is supported by the ground.

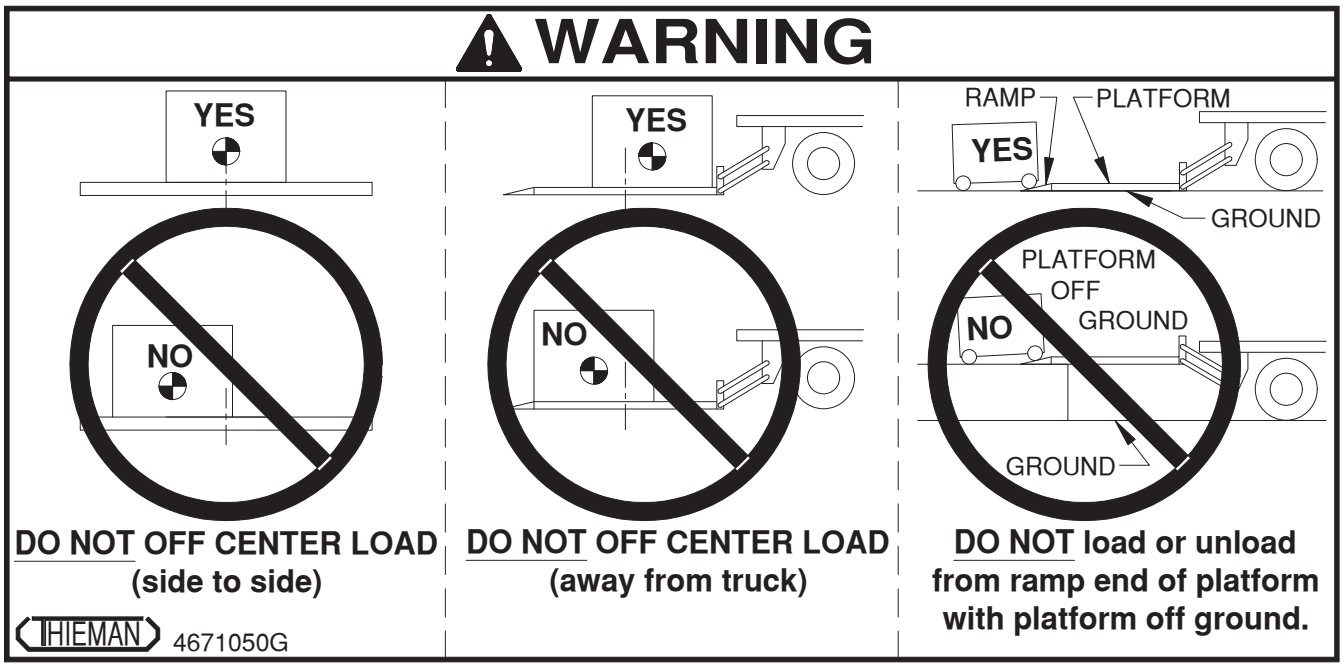


FIG. 1

DO NOT OVERHEAT THE HYDRAULIC PUMP

Exceeding the duty cycle of the hydraulic pump, can overheat many components, including the gear pump, the hydraulic motor, the motor start solenoid, valve coils, etc., and significantly shorten the expected life of these components. In extreme cases, immediate damage to the pump or related components may occur. Refer to the Thermal data below.

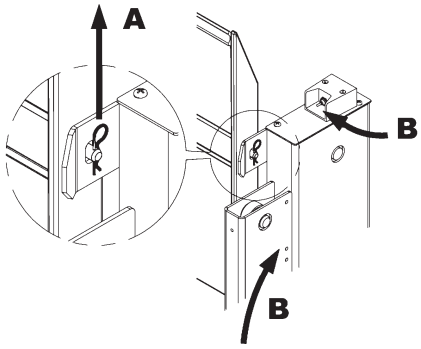
THERMAL DATA: To avoid overheating the motor do not operate this unit for more than 5 cycles/ 10 minutes with the maximum load. The motor then must be allowed to completely cool down to ambient temperature before cycling the lift again. This unit also has a 10% duty cycle, which means the liftgate can be cycled no more than 2 cycles/10 minutes constantly with the maximum load.

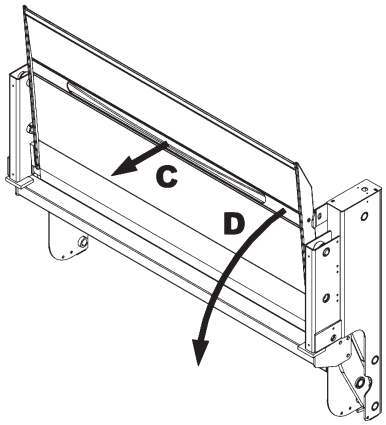
⚠ WARNING

IMPROPER OPERATION OF THIS LIFTGATE MAY RESULT IN SERIOUS PERSONAL INJURY AND/OR DEATH. DO NOT operate this liftgate unless you have been properly instructed and have read and understood the Owner's Manual and all of its warnings, operating instructions and all decals.

OPERATING INSTRUCTIONS

1. UNLATCH AND UNFOLD
   A. Remove hairpin from curbside lock pin.
   B. Raise liftgate completely by pushing switch to UP position until lock pins are fully raised off the locking tab slots.

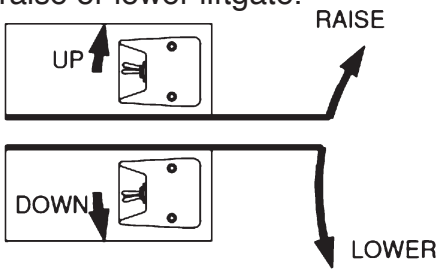


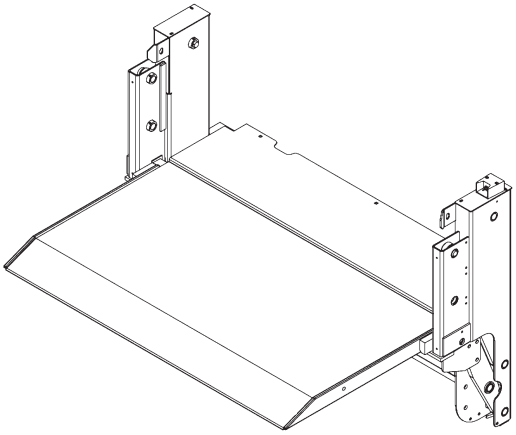


   C. Disengage lock pins by pulling outward on locking cable with one hand while holding platform upright with the other hand. With cable pulled, partially unfold platform with one hand, enough to clear locking tab slots.
   D. Release cable and unfold platform to the horizontal position using both hands.

2. RAISE OR LOWER

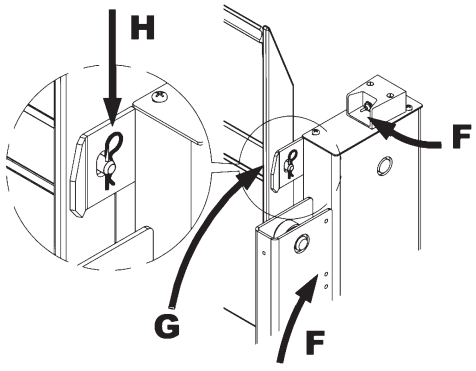
   E. Use toggle switch or other supplied control to raise or lower liftgate.





3. STORE FOR TRANSIT

   F. Push switch to UP position until Liftgate is fully raised.
   G. Fold platform manually to the vertical position using both hands, until both lock pins engage securely in the locking tab slots.
   H. Slide safety hairpin through hole in curbside lock pin and outside of curbside locking tab, to secure liftgate for transit.



⚠ WARNING

IMPROPER MAINTENANCE OF THIS LIFTGATE MAY RESULT IN SERIOUS PERSONAL INJURY AND/OR DEATH. Never use a liftgate, that has not been properly maintained. Follow all maintenance outlined in this manual, beginning with “Maintenance Guide” thru and including “Decal Maintenance - Inspection and Location of Decals”.

MAINTENANCE GUIDE

The following inspection and maintenance operations should be performed at the recommended intervals or anytime the liftgate shows signs of abuse, and improper or abnormal operation.

MONTHLY INSPECTION AND MAINTENANCE

Operate the liftgate throughout its entire operational cycle and check the following:

1. Check that there are no unusual noises or vibrations.
2. Check that the platform is level when raised to bed height.
3. Check for apparent damage to the liftgate such as bent or distorted members, any cracked welds, etc., which may have resulted from overloading or abuse.

4. Check for any excessive wear in the following pivot areas (Note: For bushed pivots, if the gap between pin and bushing exceeds 1/32 of an inch, the bushing should be replaced. For pivots without bushings, replace worn components if gap between pin and pivot exceeds 1/32 of an inch. Refer to parts breakdowns in this manual):
   A. Platform hinge pins, pivot plates, pins and bushings.
   B. All cylinder pins and bushings.
   C. All pins joining liftarm or idler arms to frame or pivot support.
   D. Stow pins.

5. Check that ALL pins, bolts, hardware, etc. are in place and retained by their proper retainers. The lift arm and the idler arm pins are secured by spring pins. The street side platform pivot pin (adjusting bracket) and the curb side pin weld are bolted to the pivot supports with 3/8 bolts.
6. Check support cable for excessive wear and check that the locknuts on either end of the support cable are secure and pulling the cable tight between the pivot supports.
7. Check that all protective covers and guards are properly in place and secured.
8. Check finish of steel parts, if in poor condition, then repair finish if possible. Any rusted parts should be replaced.
9. Check condition of non-painted parts, replace if corrosion exists. Eck from Vannay.com should be used to prevent corrosion between dissimilar metals. Do not use Never Seez or similar anti-seize products which contain abrasives that may harm the bushings.
10. Check for oil leaks in these areas:
    A. Lift cylinders
    B. Hydraulic hoses - replace if they show signs of wear or cracking.
    C. Hydraulic fittings - tighten or replace as may be required to stop leakage.
11. Check that all wiring and battery cable connections are tight and free of corrosion.

12. Check the oil level in the hydraulic reservoir. Release the safety latches and lower the platform to the ground. The oil should be within 1/2 inch from the top of the reservoir. See chart below for oil applications.

HYDRAULIC FLUID CHART	
Temperature Range	Acceptable Fluids
-45° F to 155° F	Mobil Univis HVI-26
0° F to 140° F	Dexron VI (or Dexron III) Mobil 1 Synthetic ATF Shell Spirax S6 ATF X
-55° F to 100° F	AeroShell Fluid 41 Mobil Aero HF Exxon Univis HVI-13 MIL-PRF-5606J

13. Lubrication of the TT series liftgate should be as follows for all user conditions:

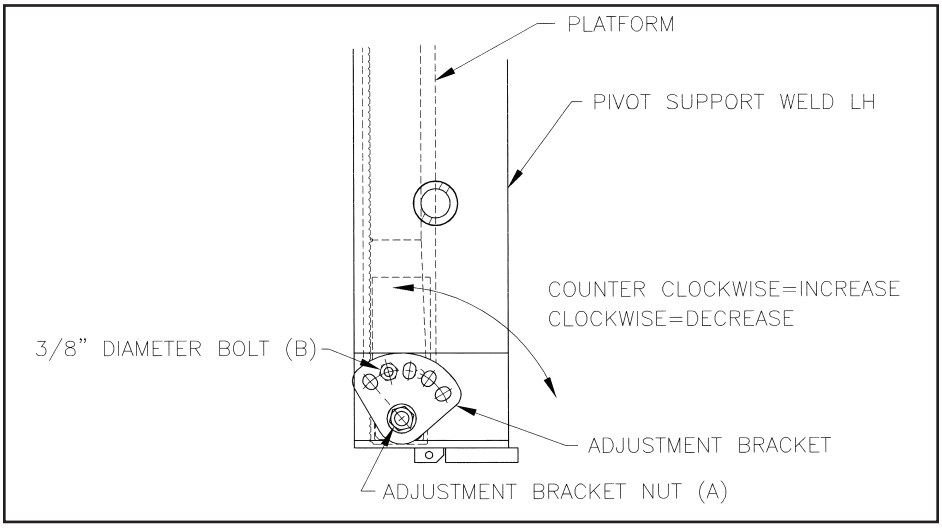
Area of Tailgate	Type of Lubrication	Frequency
Extension Pivot	SAE 10 to SAE 20 oil	50 cycles
Pump Oil Change	See Chart Above	Yearly

NOTE: The pivot points on the TT have special bushings which do not require lubrication.

14. Check the pump relief pressure and also the motor amperage at this pressure. These values should be as follows:

Model	Max Amp Draw	Relief Pressure (psi)
TT16/20	165	2300

15. Torsion Bar Adjustment:
    A. Place platform in the stowed (vertical) position.
    B. Turn the adjustment bracket nut(A) clockwise to relieve tension on 3/8" diameter bolt (B) and remove it from the bracket.
    C. To increase tension, rotate the bracket counterclockwise until desired tension is reached. Line up the hole in the bracket to a hole in the pivot support and replace bolt (B).



SEMI-ANNUAL INSPECTION

1. Perform the procedures outlined in the “Monthly Inspection and Maintenance.”

2. Repaint original painted components as necessary to prevent rust and corrosion from reducing structural integrity of original components.

3. Inspect pump motor by:
   A. Disconnecting battery cable
   B. Remove motor end cover
   C. Examine the armature brushes for wear. (Brushes should be replaced if they are less than 1/8” long.)
   D. Clean all residue out from inside of the motor housing.
   E. Apply several drops of light weight machine oil to the armature shaft bearing in the motor cover end and reassemble the motor end cover.

4. If the hydraulic oil in the reservoir is dirty:
   A. Lower the platform completely to the ground.
   B. Drain the oil from the hydraulic system and flush the entire system.
   C. Remove reservoir from pump and clean suction line filter. Also, clean out any contaminants from reservoir. Remount reservoir when completed.
   D. Replace the oil as outlined in Section 12 under Monthly Inspection and Maintenance.

DECAL MAINTENANCE - INSPECTION AND LOCATION OF DECALS

⚠ WARNING

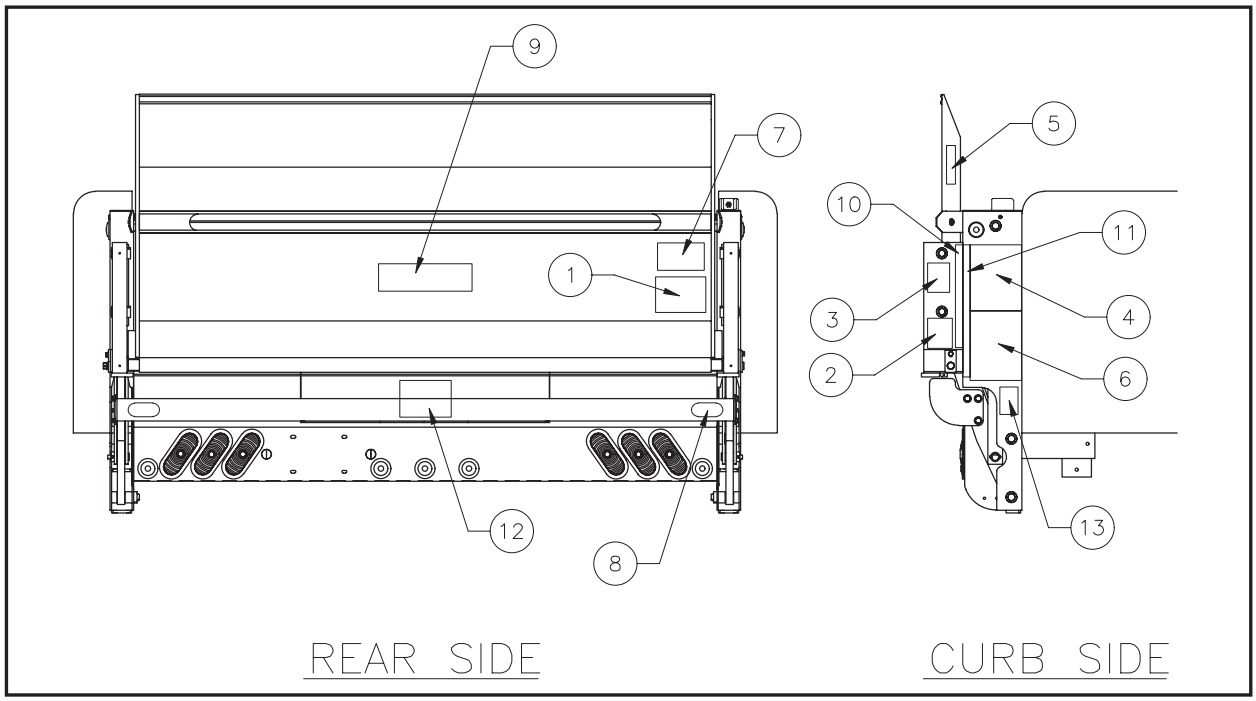
IMPROPER OPERATION OF THIS LIFTGATE MAY RESULT IN SERIOUS PERSONAL INJURY AND/OR DEATH. Liftgate decals provide important information, which is vital for proper and safe operation of the liftgate. Replace any decals which are missing or which are not fully legible.

DO NOT operate liftgate unless all decals are legible and are properly located.

LIST OF DECALS AND LOCATIONS

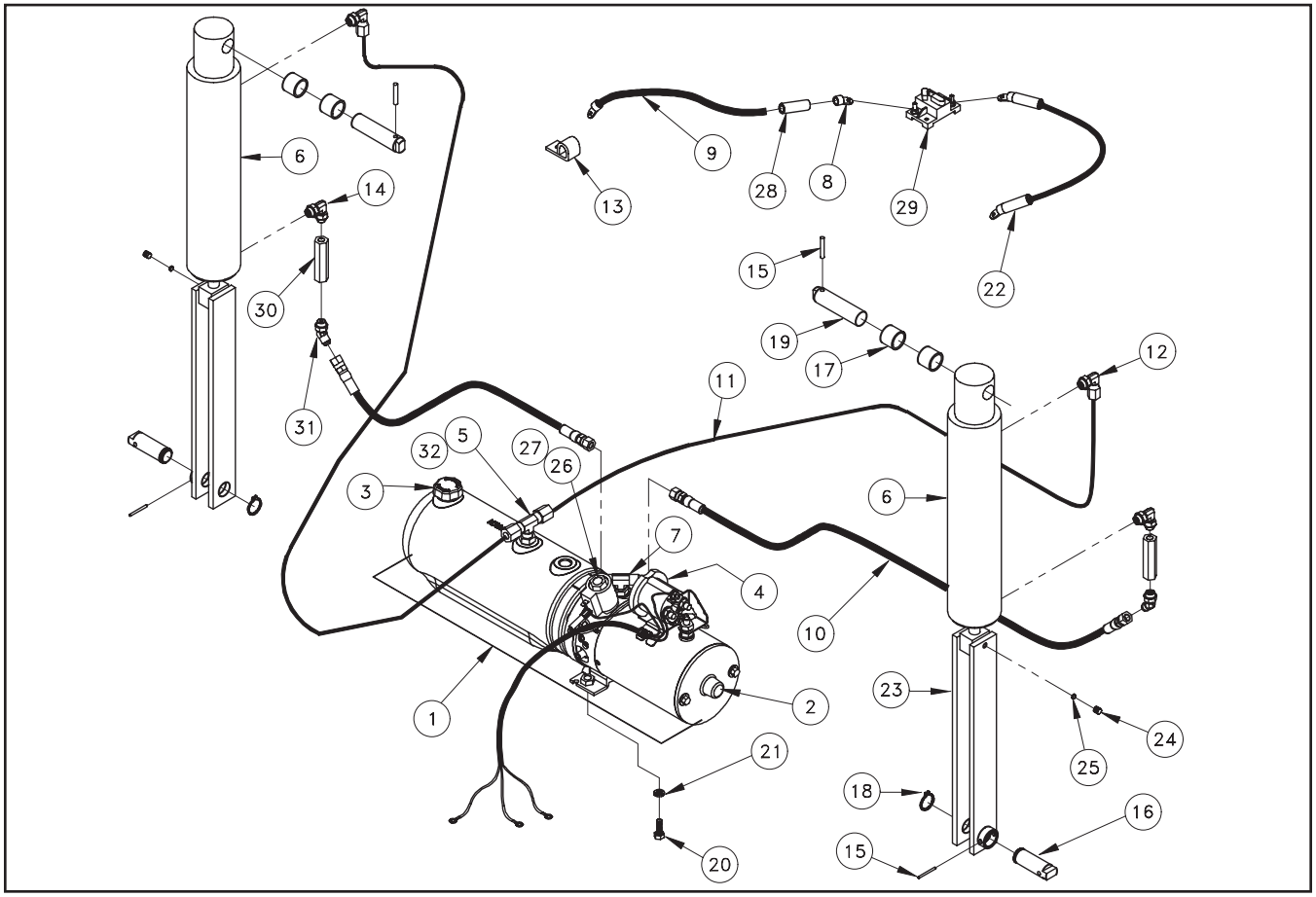
Inspect all of the decals listed below to be certain that they are in the proper location and they are legible. All decals must be in place and legible or all warranties are void!

Item	Part Name	Part Number
1	Warning Decal-Off Center	4671050
2	PTO Decal	4650140
2	Fast Idle Decal	4650150
3	Danger Decal-No Riding	4609
4	Operating Decal	4650870
5	Capacity Decal-1600#	4650750
5	Capacity Decal-2000#	4650100
6	Warning Decal	4650530
7	Caution Decal-Working Area	4650770
8	Reflector (2)	5705
9	Thieman Nameplate	4650801
10	Hazard Marking Tape-Pivot	5760-002
11	Hazard Marking Tape-Frame	5760-003
12	Wiring Decal	4612
13	Warning Decal-High Pressure	4620



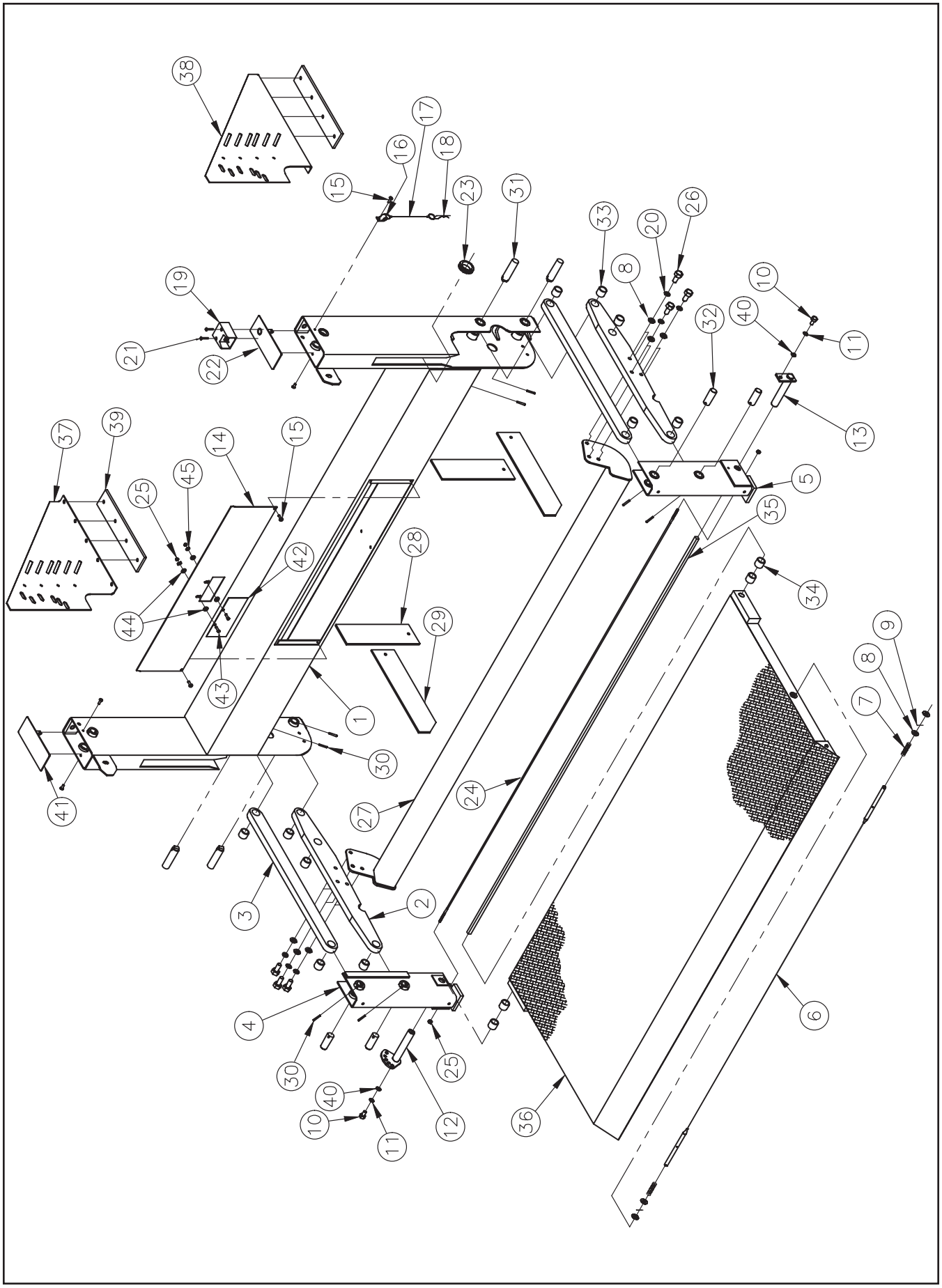
PUMP & CYLINDER ASSEMBLY

Item	Part Number	Description	Platform Width	
			80" Wide	86" Wide
1	4400871	Pump Asm-Items 2-5	1	1
2	4423520	Motor 8111	1	1
3	4420409	Breather	1	1
4	4468	Solenoid	1	1
5	4918-001	Tee BT-BT-MPT	1	1
6	4292	Cylinder Asm	2	2
7	4932-001	Branch Tee MJ-MJ-MAORB	1	1
8	4350	Battery Lug	1	1
9	4301240	Battery Cable #2 x 33'	1	1
10	4951-019	Hose 51.00	2	
10	4951-020	Hose 60.00		2
11	4921-007	Tube 68.00	2	
11	4921-008	Tube 72.00		2
12	4933-001	Tube Elbow BT-MAORB	2	2
13	5701260	Cable Retainer	16	16
14	4936-001	Elbow MAORB-MAORB	2	2
15	5702371	Spring Pin	4	4
16	5061	Pin	2	2
17	5504-001	Bushing	4	4
18	5781008	Retaining Ring	2	2
19	5059	Pin	2	2
20	8180122	Screw .38 x 1	2	2
21	8106-010	Internal Tooth Lockwasher .38	2	2
22	4318-001	Battery Cable #2 x 2'	1	1
23	31297	Clevis Weld	2	2
24	8108-005	Screw .38 x .38 Set	2	2
25	4220240	Nylon Insert	2	2
26	4445	Valve Asm	1	1
27	4452	Valve Coil	1	1
28	4319-002	Heat Shrink	1	1
29	4301770	Circuit Breaker	1	1
30	4948-004	Flow Control .75 GPM FAORB	2	2
31	4940-001	Elbow 45° MJ-MAORB	2	2
32	4918	Reducer	1	1



UNDERCARRIAGE & PLATFORM ASSEMBLY

Item	Part Number	Description	Platform Width	
			80” Wide	86” Wide
1	31295-001	Frame Weld w/Lights	1	
1	31295-003	Frame Weld w/Lights		1
1	31295-002	Frame Weld w/out Lights	1	
1	31295-004	Frame Weld w/out Lights		1
2	31355	Lift Arm Asm	2	2
3	31291	Idler Arm Asm	2	2
4	31301-001	Pivot Support Weld LH	1	1
4	31483	Pivot Support Weld LH-TT20	1	1
5	31300-001	Pivot Support Weld RH	1	1
5	31482	Pivot Support Weld RH-TT20	1	1
6	31357-004	Cable Asm	1	
6	31357-005	Cable Asm		1
7	5101160	Spring	2	2
8	8120396	Flatwasher .50	10	10
9	8121222	Cotter Pin	2	2
10	8180120	Screw .38 x .75	2	2
11	8120382	Lockwasher .38	2	2
12	31003	Adjustment Bracket	1	1
13	31283	Pin Weld	1	1
14	27280	Power Unit Cover	1	1
15	8449646	Screw .25 x .62	6	6
16	5702230	Cable Retainer	1	1
17	3801008	Latch Cable	1	1
18	5700022	Hairpin	1	1
19	31446	Toggle Switch Asm	1	1
20	8120384	Lockwasher .50	6	6
21	8111-005	Screw #10 x .75	2	2
22	31298-002	Post Cover RH	1	1
23	5701200	Grommet	2	2
24	3801-004	Support Cable	1	
24	3801-005	Support Cable		1
25	8103-022	Locknut .25	4	4
26	8100-014	Screw .50 x 1.50	6	6
27	31816-005	Brace Weld	1	1
27	31816-006	Brace Weld		2
28	23049-002	Frame Plate	2	2
29	23049-003	Frame Plate	2	2
30	5702371	Spring Pin	8	8
31	5059	Pin	4	4
32	5060	Pin	4	4
33	5504-001	Bushing-LA & IA	10	10
34	5504-001	Bushing-Steel Platform	4	4
34	5504-012	Bushing- Aluminum Platform	4	4
35	5101-012	Torsion Bar-Steel Platform	1	
35	5101-013	Torsion Bar-Steel Platform		1
35	5107-001	Torsion Bar- Aluminum Platform	1	
35	5107-002	Torsion Bar- Aluminum Platform		1
36	3426-001	Platform-Steel Expanded Metal	1	
36	3426-002	Platform-Steel Expanded Metal		1
36	3427-001	Platform-Steel Deckplate	1	
36	3427-002	Platform-Steel Deckplate		1
36	3431-001	Platform-Extruded Aluminum	1	
36	3431-002	Platform-Extruded Aluminum		1
37	27091-001	Post Support-LH	1	1
38	27091-002	Post Support-RH	1	1
39	23048	Backer Plate	2	2
40	8120388	Post Flatwasher .38	8	8
41	31298-001	Post Cover LH	1	1
42	27279	Camera Cut Out Cover Plate	1	1
43	8109-012	.25 Screw x .75	2	2
44	5794-001	Rubber Washer	4	4
45	8120386	Flatwasher .25	2	2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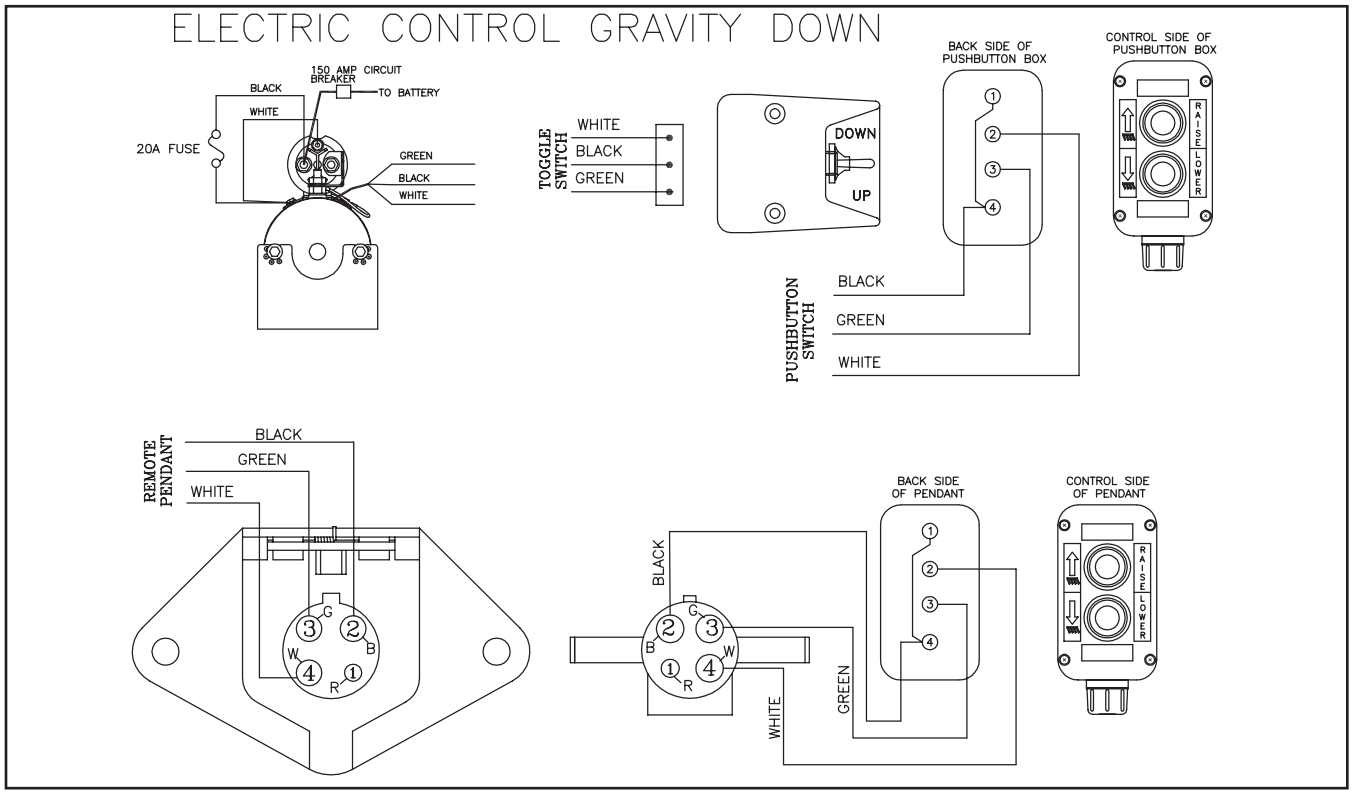
ELECTRICAL PICTORIAL



LIGHT ASSEMBLY-OPTIONAL

Item	Part Number	Description	Platform Width	
			80” Wide	86” Wide
1	27125-003	Light Plate	1	
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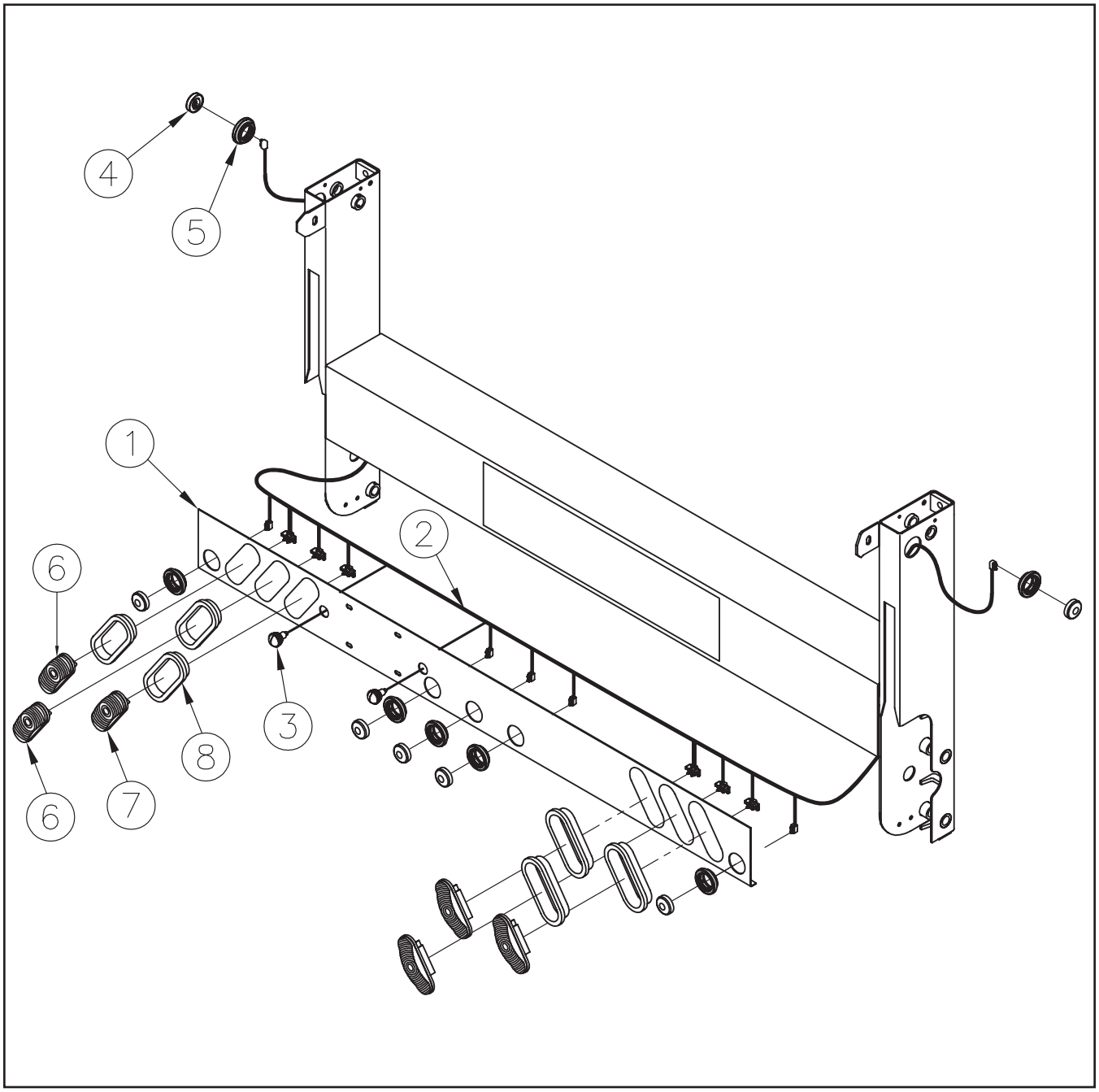
2	4395	Wiring Harness	1	1
3	4300550	License Plate Light	2	2
4	43021	Clearance Light - LED	7	7
5	4330	Grommet	7	7
6	43004	Stop/Tail Lamp - LED	4	4
7	43087	Back-up Lamp - LED	2	2
8	4301370	Grommet	6	6



TROUBLESHOOTING GUIDE
TT16/20ET

Test Equipment: 1. 0-5000 psi pressure gauge
2. DC voltmeter/ohm meter
3. DC amp meter
4. standard mechanics tools

Note: Please refer to the electrical diagrams and hose connection drawings in the liftgate's owner's manual when troubleshooting. This guide is only for standard Thieman liftgates. Special liftgates with options other than those in the owner's manual will require special diagrams for troubleshooting. Read and understand this entire guide completely before doing any troubleshooting. Certain listed problems may be related to other problems listed so a comprehensive knowledge is required before proceeding.

1. Problem - Pump motor will not run in the raise mode	
Cause	**Correction**
a. Tripped circuit breaker	Reset the circuit breaker located within 2ft of the liftgate supply battery(ies).
b. Blown 20A fuse	Replace 20A fuse (s). Each control cord should have a 20A in-line fuse on the black wire, where it connects to the 2ga. battery cable at the motor start solenoid.
c. Improper battery cable connection or improper ground connection	The "at rest" voltage for the batteries without the engine running and under no load should be at least 12.5V, and this voltage should be seen on the heavy 2ga. battery cable, where it connects to the large terminal of the motor start solenoid. The minimum voltage between the motor stud and ground is 10V at maximum conditions, with pump motor, batteries, and cables under max. load. If the voltage is dropping below 10V under max. load, bad connections may be acting like resistors and causing larger voltage drops than expected. Check voltage drops with system under load at different locations between the liftgate and battery source, to locate bad connections along the battery cable. Trace ground cable connections also to locate improper connection(s) along the ground path. Make sure the ground cable is installed going from the 5/16 tapped hole in the aluminum pump base marked GND to the liftgate mounting plate (scrape paint to bare metal for good ground). The ground cable from the batteries to the frame must be a heavy 2ga. cable that is connected to bare metal on the frame. Replace any damaged cables and repair any bad connections
d. Defective or undercharged battery(ies)	If proper voltage is not present, load test batteries and replace any defective batteries. The battery(ies) on the vehicle should be that which has a minimum 180-amp reserve capacity.
e. Defective or improperly wired raise switch	Check voltage on the black wire of the control cord near the switch. If no voltage is present the black wire from the motor start solenoid is loose or broken and needs repaired. If voltage is present then check for voltage at the white wire on the switch with the switch in the "UP" position. If no voltage is present, replace the switch.
f. Defective or improperly wired solenoid start switch	Check for voltage on the white wire at the motor start solenoid when the switch is activated "UP". If no voltage exists the white wire is loose or broken between the switch and the motor start solenoid. Check that the purple ground wire on the start solenoid is connected properly and there are no bad connections. If there is voltage on the white wire and the coil does not energize or if there is no voltage on the motor side of the solenoid or a large voltage drop present across the large terminals of the motor start solenoid then replace the motor start solenoid.
g. Defective pump motor	With the switch activated in the "UP" position and the motor start solenoid activated, check for voltage (10V minimum) at the motor terminal. If proper voltage is present and the motor is not running, double check the motor ground (see correction c. above.). If the motor has proper voltage and good ground and does not run, replace the motor.

2. Problem – Liftgate will not raise or raises slowly with a load and the pump motor running. The raise speed of the TT16/20 from ground on a 50" bed height while empty at 70° F is approximately 20-22 seconds.	
Cause	**Correction**
a. Low hydraulic fluid	Make sure the reservoir has the proper amount of fluid. The hydraulic fluid should be within ½" of the top of the reservoir with the liftgate in the lowered position. Fill with Dexron III automatic transmission fluid or other acceptable fluid (see Hydraulic Fluid Chart in "Maintenance Guide" section of this manual). Low fluid levels can introduce air, which will compress, especially when loaded and can make the liftgate feel "spongy". It can also make the gate raise at varying and alternating speeds (i.e. slower as the air is compressed, then suddenly quicker as the air expands in a repeating pattern).
b. Cold Weather	Refer to Hydraulic Fluid Chart in "Maintenance Guide" section of this manual, for alternative oils to use for cold weather conditions
c. Overload condition	The power unit on the TT16/20 is equipped with a lifting relief valve to prevent overloading of the liftgate while attempting to raise a load. See relief setting in "Maintenance Guide" section of this manual. Do NOT overload the liftgate.
d. Low voltage and/or bad ground	If the voltage reaching the motor drops below 10V under max. load conditions, this low voltage can cause the liftgate to slow. If voltages get low enough or ground is inadequate, the liftgate may not raise at all (see Problem 1) and will not be able to develop the rated relief pressure. Low voltages can cause motor start solenoids to overheat and internally weld the contacts closed, which can lead to motor overheating and pump failure. DO NOT run the liftgate under low voltage/and or bad ground conditions.
e. Improperly adjusted or defective main relief valve	See section "c" above for relief valve setting. Lower the gate completely to the ground to relieve all pressure from the hydraulic system and remove all loads from the platform. Plumb a pressure gauge into the high-pressure circuit of the liftgate (the high-pressure hoses connected to the port on the pump). Engage the "UP" switch until the liftgate is fully raised. Keep the "UP" switch engaged until the pump bypasses through the relief valve and note the pressure on the gauge at this time. If the rated relief pressure is not present during relief, adjust the high-pressure relief valve setting as necessary. If the relief pressure is not attainable, the relief valve must be cleaned and/or replaced or the pump is defective. See part k below.
f. Lift cylinders are bypassing, **liftgate is drifting down too quickly**	If the liftgate will not raise with a load on the platform, or raises slowly or only partially when empty, one or both of the cylinders may be bypassing. Bypassing cylinder(s) will cause increased hydraulic drift in the liftgate. The TT16/20 liftgate's maximum allowable drift is .38 inch/hr. (the platform can lower .38 inch/hr). To check for bypassing cylinders, do the following: Lower the gate to the ground and remove the pump cover. Disconnect the low-pressure plastic return lines from the T-fitting in the reservoir. Drain any fluid from these return lines. Put the loose ends of the return lines in a drip pan. Press the "UP" switch until both cylinders are fully retracted. Press the "UP" switch for 15 to 20 seconds and watch for a steady stream of fluid coming out of one of the disconnected return lines. Replace or rebuild any cylinders with fluid coming out of the return line, as this indicates fluid bypassing the piston seals on the cylinder. Reconnect rebuilt or replaced cylinders and hoses as before.
g. Broken hydraulic line	Broken or punctured hydraulic lines and fittings must be replaced with care to avoid injury from high pressure oil streams.
h. Clogged or disconnected suction line	With the liftgate at the ground, disconnect the power unit and remove the reservoir. Check to see if the suction tube is clogged or has fallen out of the pump base. Clean the screen or reattach the suction tube as required.
i. Defective pump	If all else fails, the power unit MAY be defective. If the liftgate is older, the pump may be worn out and unable to pump fluid at pressure with the correct flow rate. Feel free to contact Thieman for further consultation.

3. Problem – Liftgate will not lower	
Cause	**Correction**
a. Defective or improperly wired lower switch	Check voltage on the black wire of the control cord near the switch. If no voltage is present, the black wire from the motor start solenoid is loose or broken and needs repaired. If voltage is present, then check for voltage at the green wire on the switch with the switch in the "DOWN" position. If no voltage is present, replace the switch.
b. Defective lowering solenoid coil or valve	With the "DOWN" switch engaged, check for voltage on the green wire on the lower solenoid valve coil terminal. If no voltage is present, the green wire from the "DOWN" switch is loose or broken and needs replaced. Check for proper ground at the purple wire on the lowering solenoid coil. Repair or replace ground as required. If there is voltage (minimum of 9.5 volts) and proper ground at the lowering coil, and the valve is not opening to allow the gate to lower, either the lower coil is bad or the entire lower coil/valve assembly is bad. To check to see if the coil is defective, remove the green and purple wires from the spade terminals on the lower coil and check the resistance between these spade terminals (3.6 - 4.4 Ohm is acceptable). Note: Low resistance can cause the 20-amp fuse to blow (see Problem 1, part b) and high resistance will lower the coils magnetic force and may not shift the valve. If proper resistance does not exist, replace the defective coil, otherwise replace the defective lower coil/valve assembly.
c. Clogged or defective hydraulic lines, fittings or flow controls	Remove any obstruction in the hoses, fittings, and flow controls or replace any hose, fitting or flow control which does not allow fluid to flow through freely.

4. Problem – Oil or foamy oil/air mixture flowing from reservoir breather	
Cause	**Correction**
a. Air is present in the system	This can occur if air enters the system if the fluid level is low, see problem 2, part a, or if the suction tube is disconnected, see problem 2, part f. Also, air may enter through fittings which are not tightened properly, so check for any leaks around fittings or hoses. Once the source of the air is determined, the cylinders must be bled of all air. Most air can be removed from the system by lowering the gate to the ground to relieve all pressure from the cylinders, unpinning the cylinders, and cycling them back and forth several times from fully extended to fully retracted and allowing the pump to bypass through the relief valves for a few seconds in each direction.
b. Reservoir was overfilled or filled with liftgate in wrong position.	See the **MONTHLY INSPECTION AND MAINTENANCE** in the "Maintenance Guide" section of this manual to find out what position the liftgate should be in when checking the reservoir level and how full the reservoir should be in that position.

5. Problem – Platform difficult to unfold to horizontal position OR platform hard to fold up from horizontal position	
Cause	**Correction**
a. Torsion bar broke	TT16/20 liftgates are equipped with a torsion bar to assist unfolding and folding the platform. If the platform suddenly becomes heavier to fold and unfold, the torsion bar is likely broken. Replace the torsion bar if broken.
b. Platform pivot pins are seizing up in platform pivots	Check that the platform pivot pins turn freely in the platform pivots. Any tightness in these pivots will result in additional force required when folding or unfolding the platform. If the platform gradually became harder to fold and unfold, it is likely due to stiffness in the pivots. Replace worn bushings or corroded pins as necessary.

If you have any questions or problems that are not covered in this guide please call Thieman's Engineering Department at 1 800-524-5210.

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