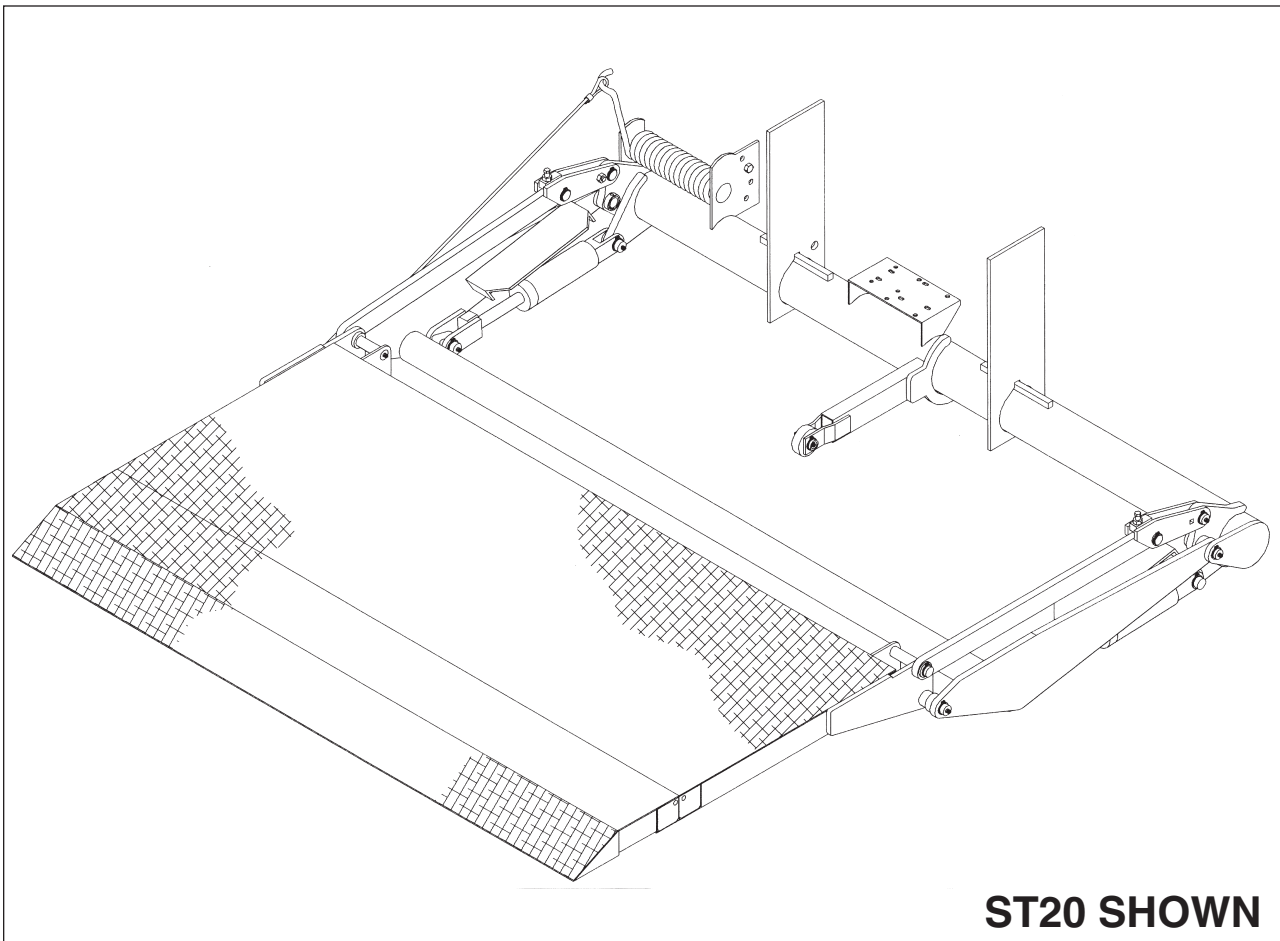


STOW AWAY

Tailgates By **THIEMAN**

ST-20 ST-25 ST-30 OWNERS MANUAL/PARTS LIST



IMPORTANT! KEEP IN VEHICLE!

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



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FOR YOUR RECORDS

Model No. _____ Date Purchased _____

Serial No. _____

Note: Include This Information When Ordering Parts!

PARTS ORDERING PROCEDURE


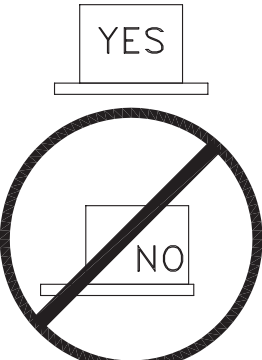
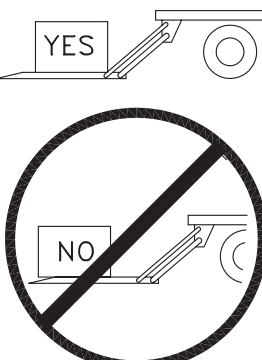
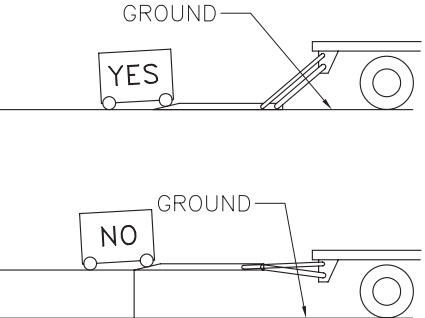
When ordering parts, please include all the information asked for below. If this information is not available, a complete written description or sketch of the required part will help Thieman identify and deliver the needed part to you.

THE FOLLOWING INFORMATION MUST BE INCLUDED:

1. Serial Number – Thieman liftgate serial numbers can be found on the tag located on the right hand trunnion mounting plate.
2. Model Number and Capacity.
3. Platform size and Material – Steel or Aluminum.
4. Part number.
5. Description.
6. Quantity required.

WATER LEVEL LOADING

When a maximum load is to be raised or lowered, this load must be centered on the load bearing platform, both front to back and side to side.

 WARNING		
<p>SIDE TO SIDE</p>  <p>DO NOT OFF CENTER LOAD</p>	<p>FRONT TO BACK</p>  <p>DO NOT OFF CENTER LOAD</p>	<p>GROUND</p>  <p>DO NOT LOAD OR UNLOAD WITH RAMP OFF GROUND</p>

WARNING

The following list of warnings are to be read before operating the ST series liftgate.

- +Read this Owners Manual and all of the decals on the liftgate **BEFORE** operating the liftgate.
- +All protective covers and guards must be in place before operating the liftgate.
- +**DO NOT** operate the liftgate if you do not have a thorough knowledge and understanding of the operation of the liftgate.
- +**NEVER OVERLOAD THE LIFTGATE.** The maximum rated capacity of the ST series liftgate differs with each model as follows:

ST20 – 2000LBS
ST25 – 2500LBS
ST30 – 3000LBS

- +Never use the liftgate if it makes any unusual noises, has vibrations, or fails to operate freely.
- +Make certain that the area below the platform is clear before and at all times during the operation of the liftgate.
- +Keep hands and feet clear of all pinch points.
- +The platform must be in the closed position and the transit latches engaged properly before transit.
- +Always load as close to the center of the platform and as close to the vehicle as possible. See figure 1.
- +Never operate lift trucks on or over any part of the platform.
- +Load and unload the platform from the rear and not from the side of the platform.
- +Only operate liftgate when vehicle is on level ground and the parking brake is set.
- +Follow the maintenance guide as outlined in this manual.
- +DO NOT attempt any repairs unless you are a qualified and authorized THIEMAN distributor.
- +If any repairs, adjustments, or maintenance not covered in this manual are required, contact your nearest Thieman distributor or the factory.
- +DO NOT ride the liftgate, it is not intended as a personnel lift.
- +This liftgate is intended for the use of loading and unloading cargo only, and is not to be used for anything other than this.
- +DO NOT modify this liftgate. Altering this liftgate may cause serious personal injury or damage to the liftgate and will void all warranties.

OPERATING INSTRUCTIONS

Caution

Be sure to operate liftgate at a safe distance and never improperly load platform as this may cause personal injury or damage to the liftgate.

UNFOLDING OF PLATFORM

1. Lower platform to ground until lift arms contact the ground.
2. Grasp platform handle on bottom side and manually unfold the platform to the ground. The platform extension can now be unfolded to the ground.

RAISING OF PLATFORM

3. Push handle up to raise platform to bed height.

LOWERING OF PLATFORM

4. Push handle down to lower platform to the ground.

CLOSING OF PLATFORM

5. Manually fold platform extension and ramp.
6. Using platform handle, manually fold platform.
7. Raise gate into the stowed position until latches are engaged over pins.

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 platform height relative to bed height. If platform is lower, adjust cylinder with a 13/16 wrench to obtain the necessary height. If platform is not level at bed height, adjust idler arm screws to obtain a level position.
3. Check for apparent damage to the liftgate such as bent or distorted members, any cracked welds which may have resulted from overloading or abuse.
4. Check for excessive wear in the following areas:
 - A. Platform hinge pins and lift arms
 - B. All cylinder pins, bolts, and clevis
 - C. Platform extension pivots
 - D. Linkage pins and clevises
5. Check that the platform pivot pins are in place and retained by their proper retainers.
6. Check that all protective covers and guards are properly in place and secured.
7. Check for oil leaks in these areas:
 - A. Lift cylinder
 - B. Hydraulic hose-replace if it shows signs of wear or cracking.
 - C. Hydraulic fittings-tighten or replace as may be required to stop leakage.
8. Check the oil level in the pump reservoir. With the liftgate in the stowed position the oil should be within 1/2" from the top of the reservoir. See chart below for oil applications.
9. Check that all wiring and battery cable connections are tight and free of corrosion.
10. Lubrication of the ST series liftgate should be as follows for all user conditions:

<u>Area of Tailgate</u>	<u>Type of Lubrication</u>	<u>Frequency</u>
Pivot pins w/ zerk	Grease*	50 cycles
Pump oil change	see chart below	yearly
Control handle pivots	SAE 10 or 20 oil	50 cycles

*See the parts list for location of the grease zerks.

For -40 to 120 F use #0 Grade grease.

For -20 to 200 F use #1 Grade grease.

HYDRAULIC FLUID CHART

Temperature Range	Acceptable Fluids
-75 to 165 F	Exxon Unavis J-26
-20 to 130 F	Dexron III Exxon Superflo ATF Shell Donax TG
-50 to 80 F	Shell Aero Fluid 4 Mobil Aero HFA Exxon Unavis J-13 MIL H-5606

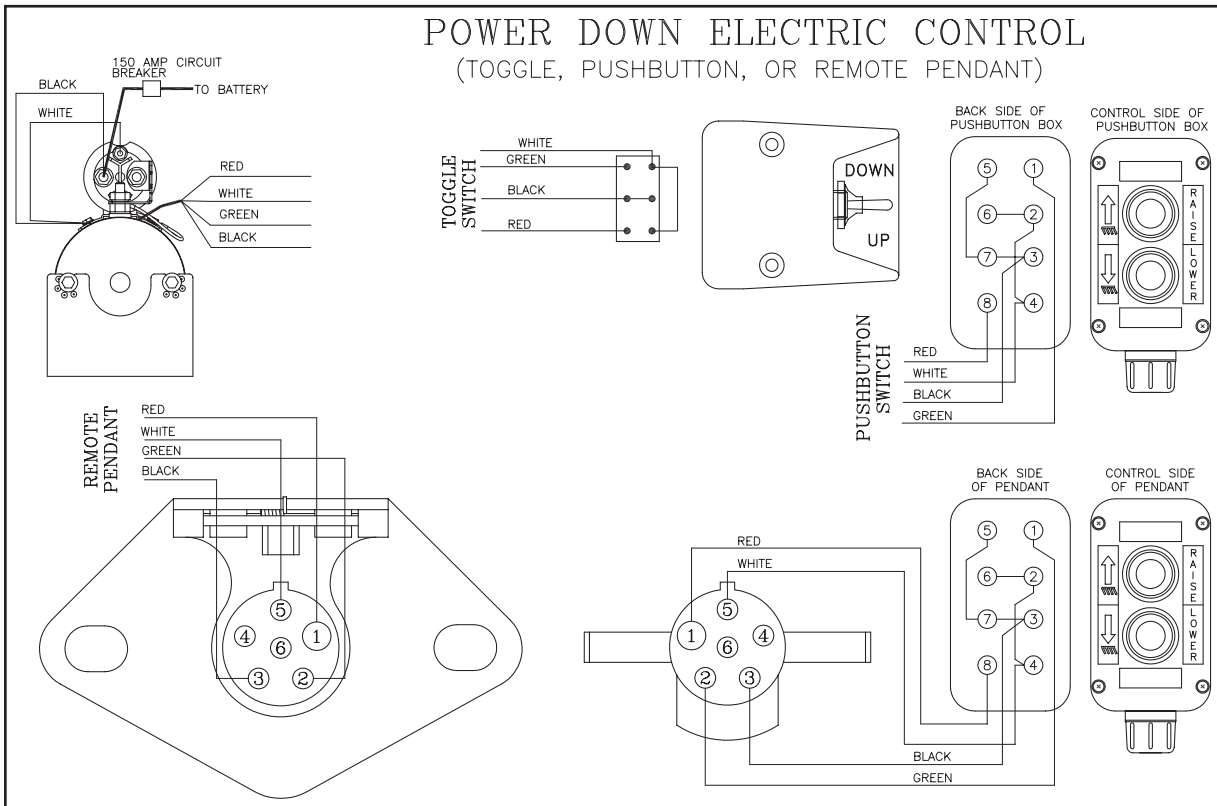
11. Check the pump relief pressure and also the motor amperage at this pressure. These values should be as follows:

<u>Model</u>	<u>Max Amp Draw</u>	<u>Relief Pressure (psi)</u>
ST 20	145	1400
ST 25	165	1850
ST 30	175	2050

Semi-Annual Inspection

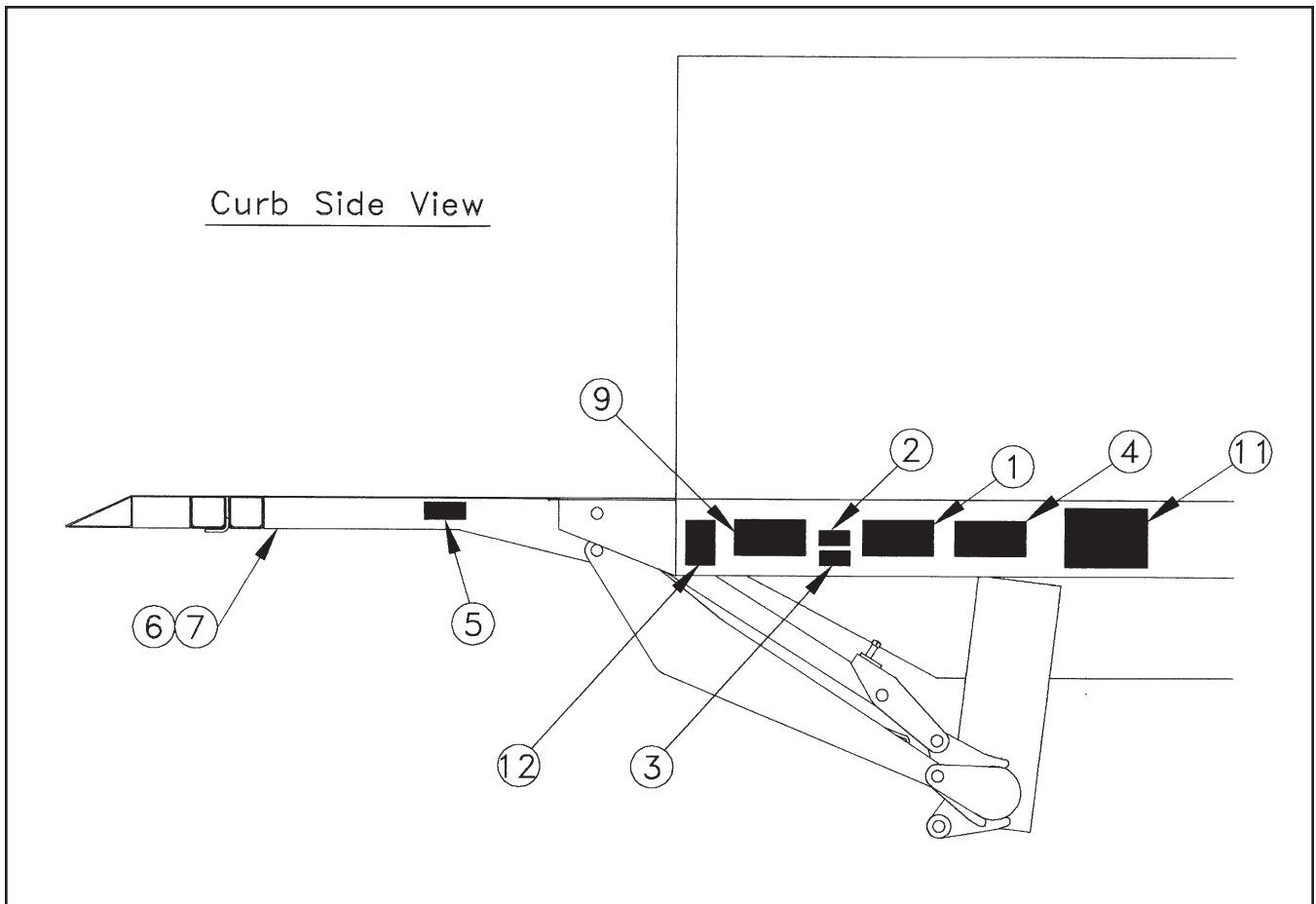
1. Perform the procedures outlined in the Monthly Inspection and Maintenance.
2. Inspect pump motor by:
 - A. Disconnecting battery cable
 - B. Remove motor end cover
 - C. Examine the armature brushes for wear. (Brushes should be replaced if they are less than 1/8" long).
 - D. Clean all residue out from inside of the motor housing.
 - E. Apply several drops of light weight machine oil to the armature shaft bearing in the motor end cover and reassemble the motor end cover.
3. If the hydraulic oil in the reservoir is dirty:
 - A. Unfold platform and lower platform to the ground. Raise platform to bed height so cylinders are fully retracted. Support the platform in this position with a lift truck or crane.
 - 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 inside reservoir. Remount reservoir when completed.
 - D. Replace the oil as outlined in Section 9 under Monthly Maintenance and Inspection.

ELECTRICAL PICTORIAL



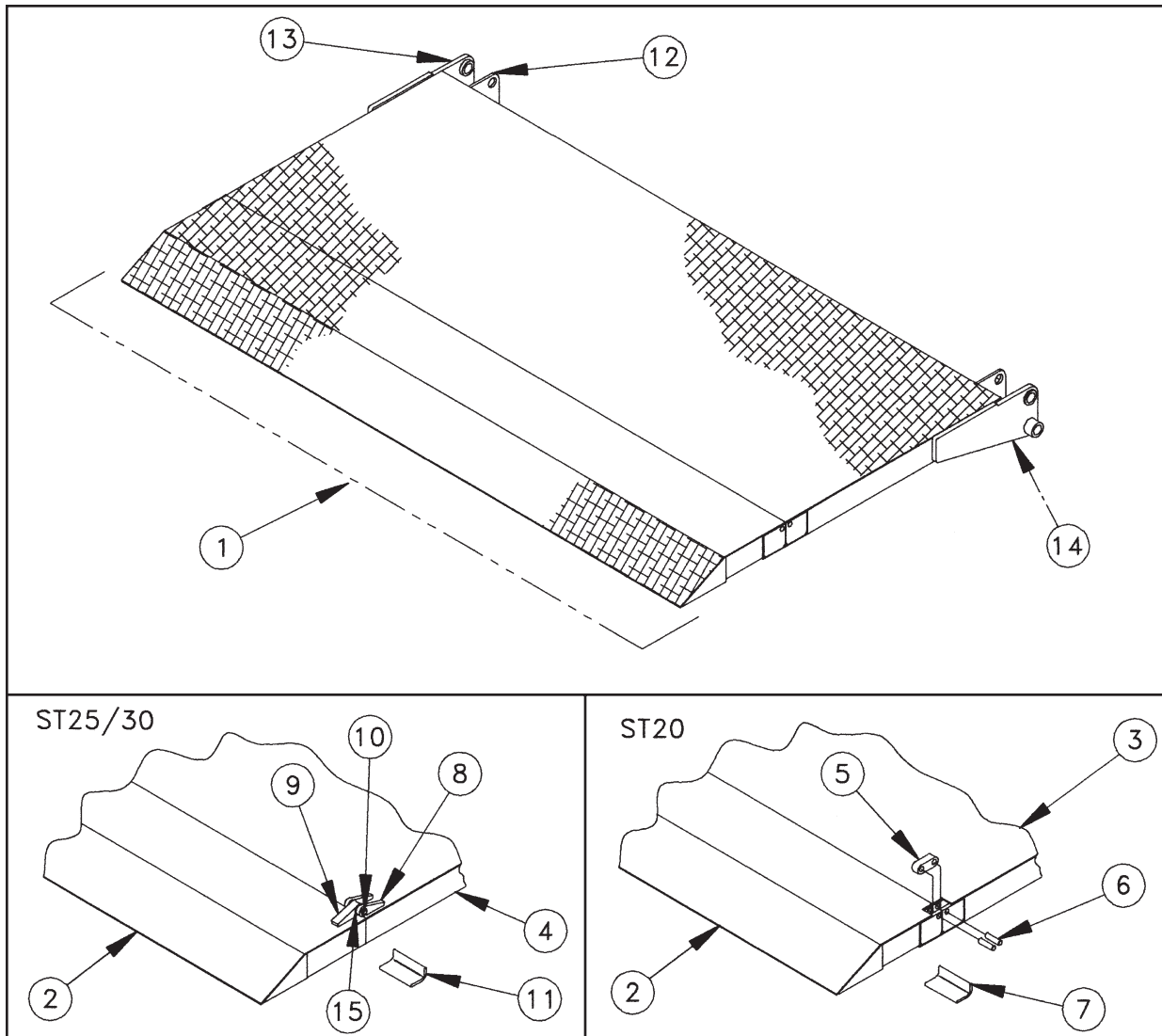
INSPECTION AND LOCATION OF DECALS

Item	Part Name	Part Number
1	Warning Decal-off center	4671050
2	Fast Idle Decal	4650150
2	PTO Decal	4650140
3	Danger Decal-no riding	4609
4	Operating Decal	4650030
5	Capacity Decal-2000#	4650100
5	Capacity Decal-2500#	4650110
5	Capacity Decal-3000#	4650120
6	Warning Decal-pinch point	4604
7	Handle decal	4605
8	Thieman Nameplate	4650800
9	Urgent Warning Decal	4650530
10	Reflector (3)	5705
11	Wiring Decal - Power Down	4614
12	Warning Decal - High Pressure	4620



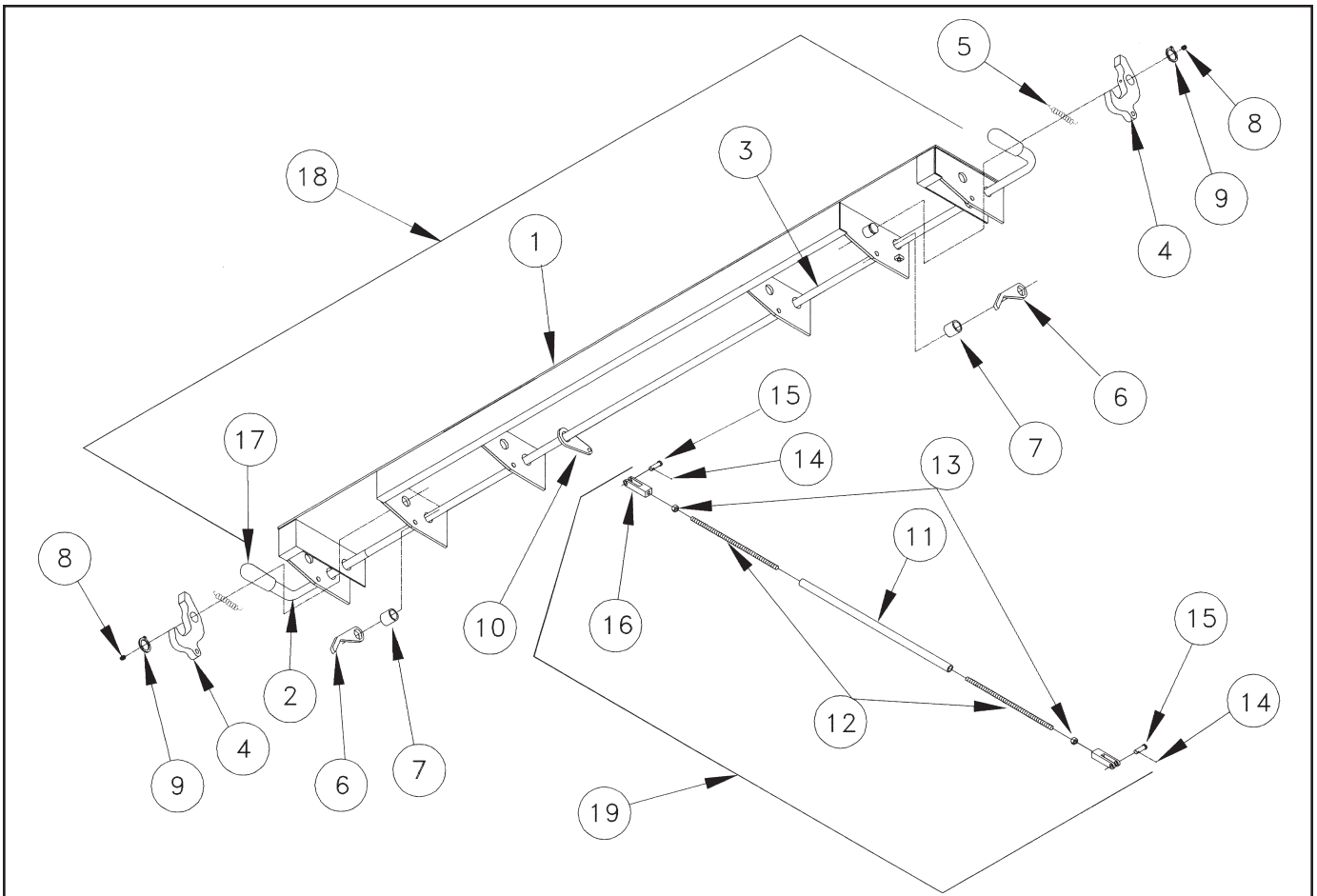
PLATFORM ASSEMBLY

Item	Part Number	Description	Qty./Model	
			ST20	ST25/30
1	3400330	Platform Asm 7236	1	
1	3400270	Platform Asm 7236 Alum		1
2	3103070	Extension	1	
2	3102640	Extension		1
3	3103080	Main Section	1	
4	3400260	Main Section		1
5	2901320	Connecting Link	2	
6	5001550	Hinge Pin	4	
7	2318380	Extension Support	4	
8	5450090	Hinge Lug		4
9	5450091	Hinge Pivot		2
10	5056	Pin Asm		2
11	5400000	Extension Support		4
12	2901340	Platform Pivot Bracket	2	
13	3103761	Platform Hinge LH		1
14	3103762	Platform Hinge RH		1
15	8107-011	Washer .62		2



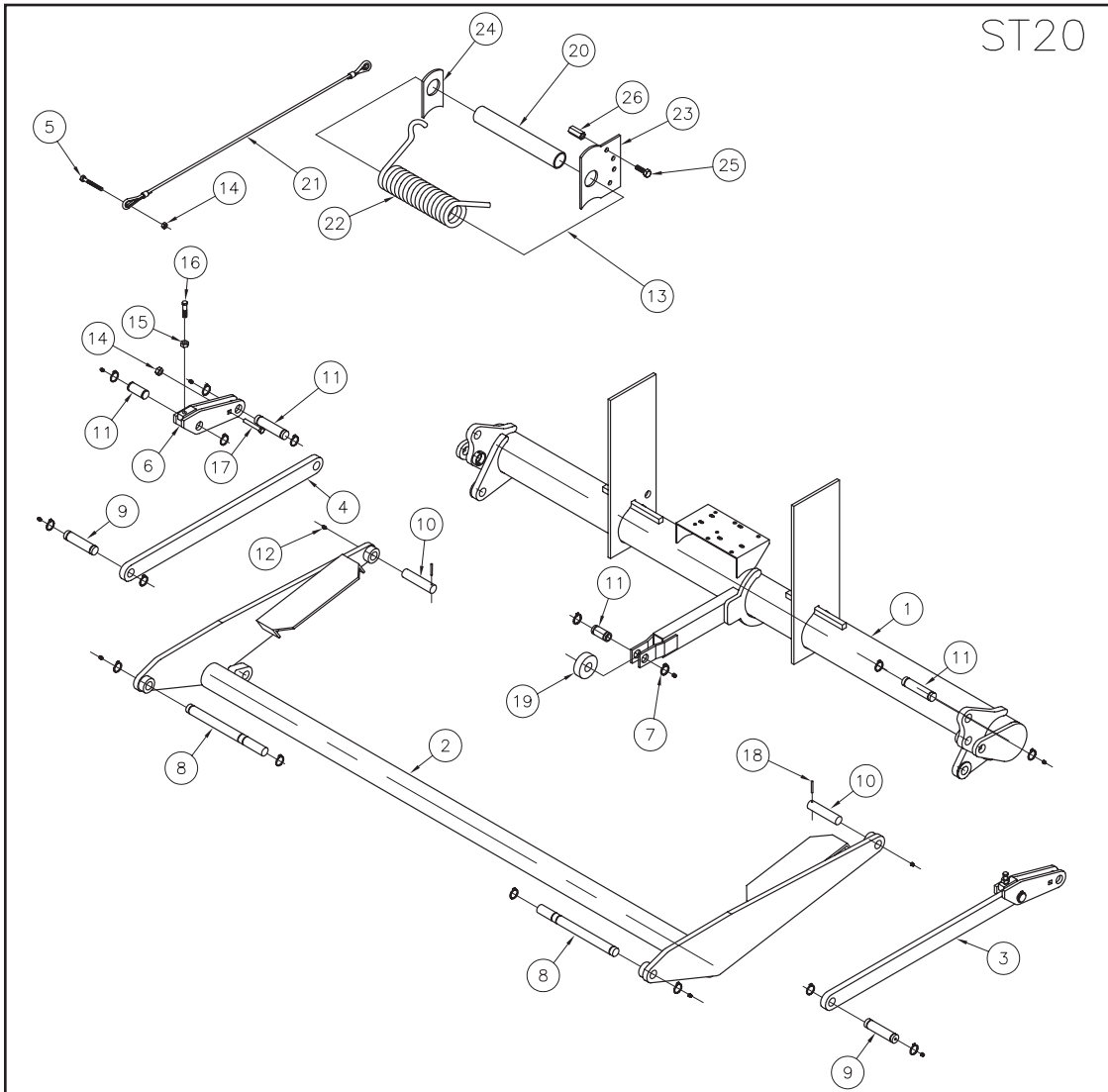
SPACER ASSEMBLY

Item	Part Number	Description	Qty
1	3102460	Spacer Weld	1
2	3017031	Shaft Female	1
3	3017023	Shaft Male	1
4	3162	Latch-ST25/30	2
4	3163	Latch-ST20	2
5	5101100	Latch Spring	2
6	2901070	Latch Lever	2
7	2408005	Spacer	2
8	8271291	Zerk	2
9	5781008	Retaining Ring	2
10	2901170	Lever	1
11	2402000	Pipe	1
12	5002210	Linkage Rod	2
13	8124925	Jam Nut .38	2
14	8137185	Cotter Pin	2
15	8138078	Clevis Pin	2
16	8144243	Clevis	2
17	5701043	Handle Grip	2
18	3500030	ST20 Spacer Asm-Items 1-10,17	1
18	3500040	ST 25/30 Spacer Asm-Items 1-10,17	1
19	3107030	Clevis Rod Asm-Items 11-16	1



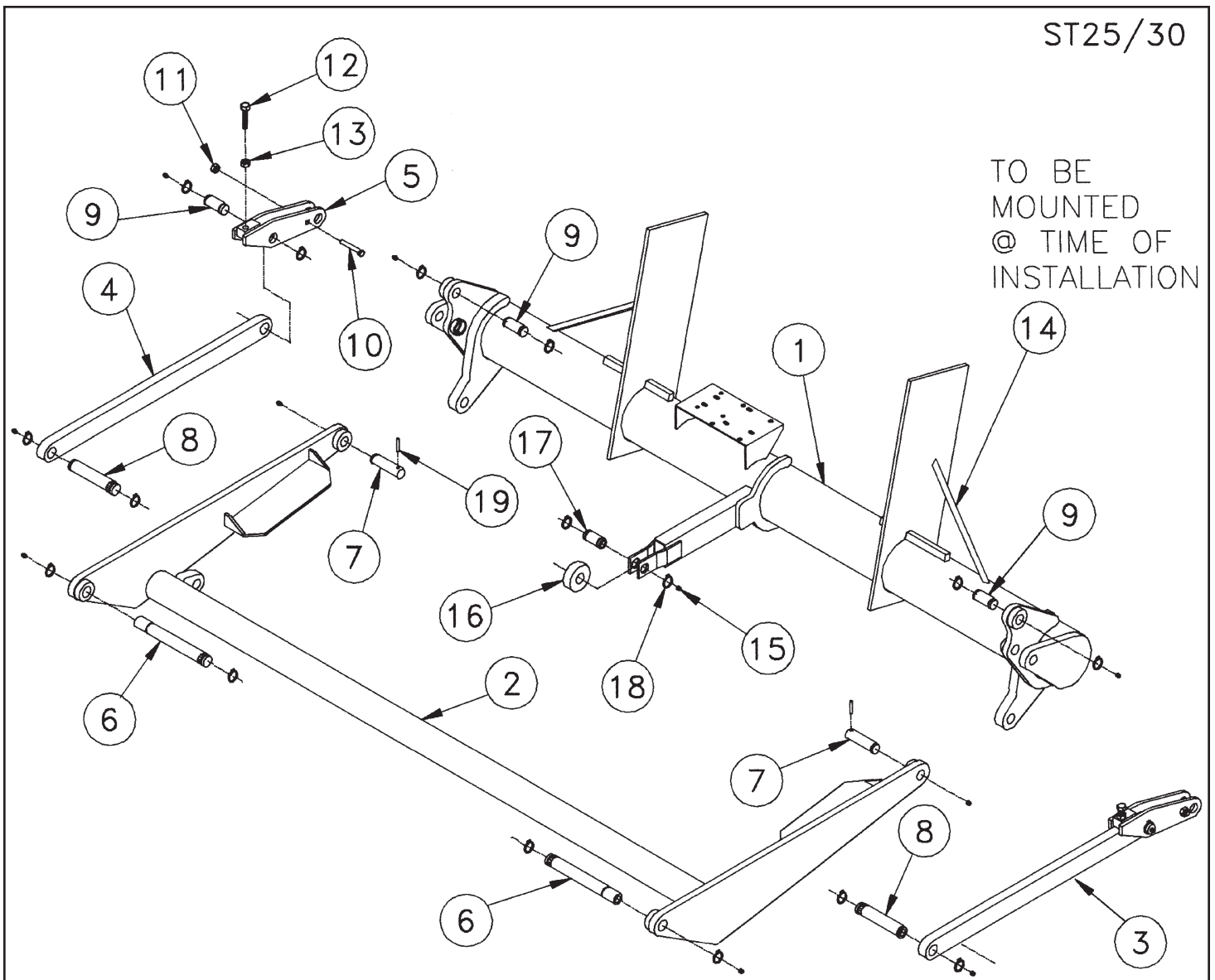
TRUNNION, LIFT ARMS, AND IDLER ARMS-ST20

Item	Part Number	Description	Qty
1	3102531	Trunnion Asm	1
2	31049	Lift Arm Weld	1
3	3186-002	Idler Arm Asm RH	1
3	3186-001	Idler Arm Asm LH	1
4	2105-002	Idler Arm Weld	2
5	8454908	Screw .38 x 2.75	1
6	31044-003	IA Yoke Asm	2
7	5781008	Retaining Ring	18
8	5001901	Pin-LA to Platform	2
9	5001891	Pin-IA to Platform	2
10	5022	Pin-LA to Trunnion	2
11	5031	Pin-IA to Trunnion	5
12	8271291	Zerk	11
13	3102520	Closing Spring Asm 21-24, 27	1
14	9413534	Locknut .38	3
15	8120238	Jam Nut	2
16	8100-001	Screw .50 x 2.25	2
17	8126419	Screw .38 x 2.00	2
18	5708-001	Spring Pin	2
19	5701330	Roller	1
20	2414000	Pipe	1
21	3801000	Cable Asm	1
22	5101140	Closing Spring	1
23	2901120	Adjusting Bracket	1
24	2901060	Anchor Bracket	1
25	8100-014	Screw .50 x 1.50	1
26	5701080	Coupling Nut	1



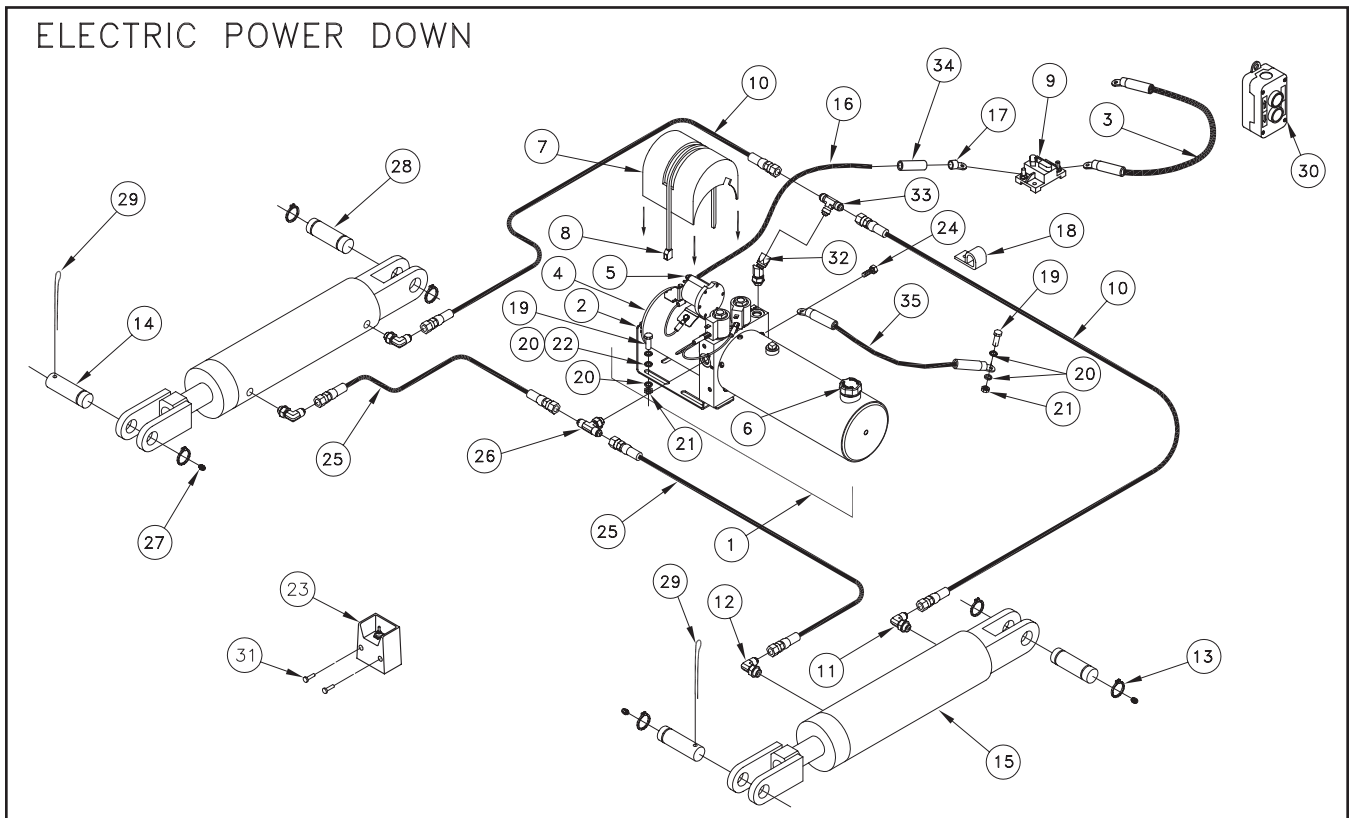
TRUNNION, LIFT ARMS, AND IDLER ARMS-ST25/30

Item	Part Number	Description	Qty
1	3102610	Trunnion Asm	1
2	3102621	Lift Arm Weld	1
3	3107501	Idler Arm Asm RH	1
3	3107502	Idler Arm Asm LH	1
4	2101800	Idler Arm	2
5	3104810	IA Yoke Asm	2
6	5001681	Pin Asm-LA to Platform	2
7	5022	Pin Asm-LA to Trunnion	2
8	5001671	Pin-Asm-IA to Platform	2
9	5001291	Pin Asm	4
10	5793100	Screw .38 x 2.50	2
11	9413534	Locknut .38	2
12	5792003	Screw .62 x 2.25	2
13	8124847	Jam Nut .62	2
14	2019140	Angle Brace (ST30 only)	2
15	8271291	Zerk	11
16	5701330	Roller	1
17	5031	Pin	1
18	5781008	Retaining Ring	18
19	5708-001	Spring Pin	2



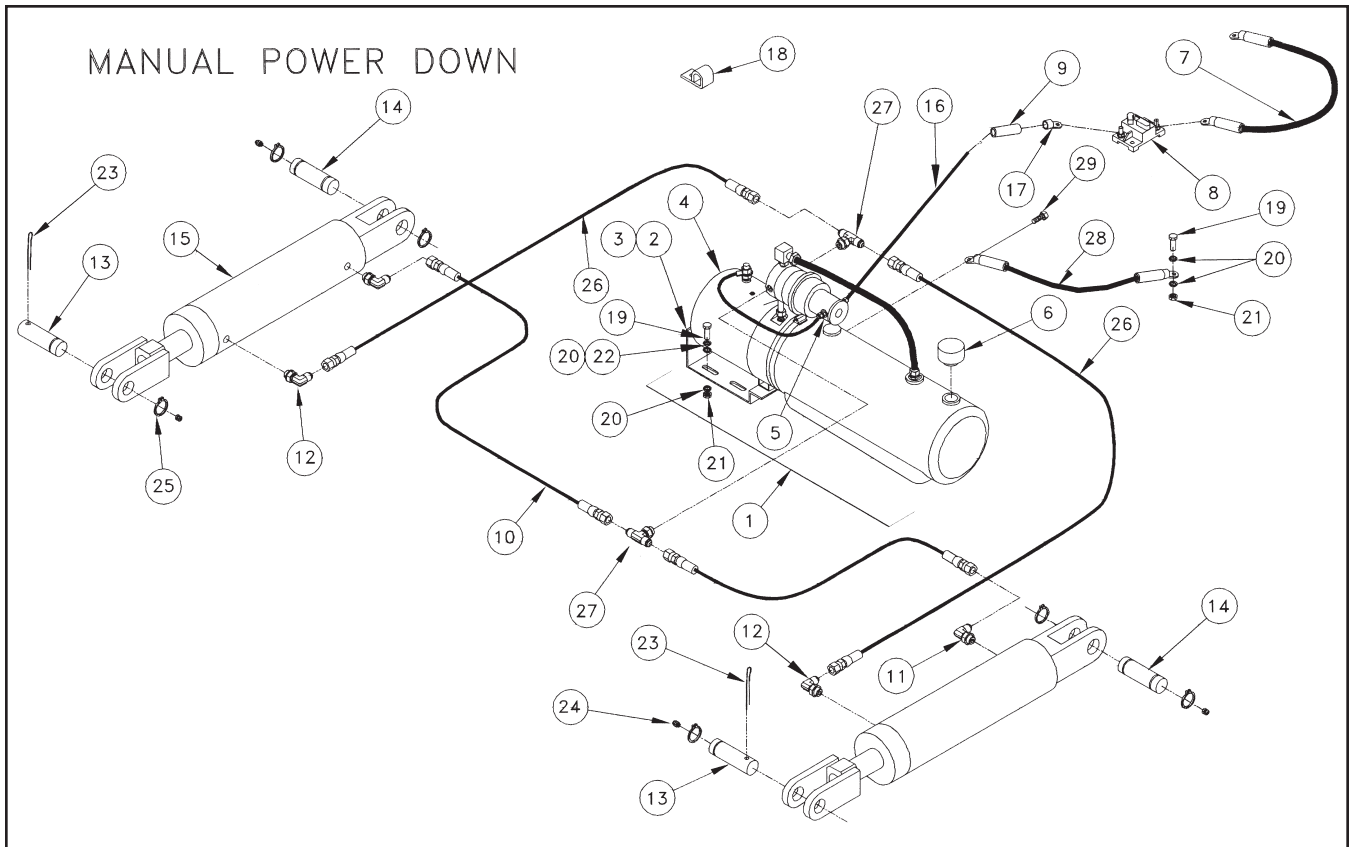
PUMP ASSEMBLY-ELECTRIC CONTROL POWER DOWN

Item	Part Number	Description	Qty
1	4404	EST Pump Asm-incl 2 to 6	1
2	4421420	Pump bracket	1
3	4318-001	Battery Cable #2 x 2'	1
4	4423520	Motor 8111	1
5	4468	Solenoid	1
6	4420409	Breather cap	1
7	5704	Cover	1
8	5700100	Strap	1
9	4301770	Circuit Breaker	1
10	4951-015	Hose 51.00	2
11	4931-001	Restrictor Elbow MJ-MAORB	2
12	4930-001	Elbow MJ-MAORB	2
13	5781008	Retaining ring	6
14	5001581	Pin	2
15	4297	Cylinder 3 x 6-ST20	2
15	42001	Cylinder 3 x 8-ST25/30	2
16	4300030	Battery cable #2 x 25'	1
17	4350	Cable lug	1
18	5701260	Cable retainer	4
19	8180126	Screw .38-16 x 1.50	5
20	8106-010	Internal Tooth Lockwasher .38	10
21	8120377	Nut .38	5
22	8120388	Flatwasher .38	4
23	31445	Toggle Switch Asm	1
24	8104-006	Screw .31 x 1	1
25	4951-016	Hose 63.00	2
26	4932-001	Branch Tee MJ-MJ-MAORB	1
27	8271291	Zerk	4
28	5001841	Pin Asm	2
29	8137243	Cotter Pin	2
30	4422860	Pushbutton Control	1
31	8111-005	Screw #10 x .75	2
32	4938-001	45° Elbow MAORB-FJS	1
33	4953-001	Branch Tee MJ-MJ-MJ	1
34	4319-002	Heat Shrink	1
35	4318-002	Ground Cable #2 x 2'	1



PUMP ASSEMBLY-MANUAL POWER DOWN

Item	Part Number	Description	Qty
1	4400241	Pump Asm-incl 2 to 6	1
2	4421420	Pump bracket	1
3	4421350	Mounting bracket	1
4	4423520	Motor 8111	1
5	4322	Canister Switch	1
6	4420409	Breather cap	1
7	4318-001	Battery Cable #2 x 2'	1
8	4301770	Circuit breaker	1
9	4319-002	Heat Shrink	1
10	4951-015	Hose 51.00	2
11	4931-001	Restrictor Elbow MJ-MAORB	2
12	4930-001	Elbow MJ-MAORB	2
13	5001581	Pin Asm	2
14	5001841	Pin Asm	2
15	4297	Cylinder 3 x 6-ST20	2
15	42001	Cylinder 3 x 8-ST25/30	2
16	4300030	Battery cable #2 x 25'	1
17	4350	Cable lug	1
18	5701260	Cable retainer	4
19	8180126	Screw .38-16 x 1.50	5
20	8106-010	Internal Tooth Lockwasher .38	10
21	8120377	Nut .38	5
22	8120388	Flatwasher .38	4
23	8137243	Cotter Pin	2
24	8271291	Zerk	4
25	5781008	Retaining Ring	6
26	4951-016	Hose 63"	2
27	4932-002	Branch Tee MJ-MJ-MAORB	2
28	4318-002	Ground Cable #2 x 2'	1
29	8104-006	Screw .31 x 1	1



TROUBLESHOOTING GUIDE ST20/25/30ES

- 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 owners 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 or lower mode

- Causes -
- a. Tripped circuit breaker
 - b. Defective or undercharged battery(ies)
 - c. Improper battery cable connection or improper ground connection
 - d. Bent, broken, or improperly adjusted linkage rod
 - e. Defective start switch
 - f. Defective pump motor

- Corrections -
- a. Reset the circuit breaker located within 2ft of the liftgate supply battery(ies).
 - b. The "at rest" voltage for the batteries without the engine running and under no load should be at least 12.5V. The minimum voltage between the motor stud and ground is 9V at maximum load conditions. If proper voltage is not present, charge or replace the batteries. The battery(ies) on the vehicle should be that which has a minimum 150 amp reserve capacity.
 - c. Trace battery and ground cable connections to locate improper connection(s). Make sure the ground cable is installed going from the aluminum pump base to bare metal on the truck frame. Make sure the ground cable from the batteries to the frame is a heavy 2ga. cable and that it too is connected to bare metal on the frame. Make sure there is 12.5V present at the large terminal on the motor start solenoid where the 2ga. cable from the batteries is connected. Replace any damaged cables and repair any bad connections.
 - d. Check that the cam on the pump which engages the motor start switch is fully depressing the button on the switch. If not, repair or replace the linkage rod and pins. If these items are not damaged or worn out then the rod may need readjusted.
 - e. Check for voltage on the motor stud when the switch is activated. If no voltage exists the motor start switch will need to be replaced.
 - f. With the control lever activated in the "RAISE" or "LOWER" position and the motor start switch is activated, check for voltage at the motor terminal. If voltage is present and the motor is not running, replace the motor.

2. Problem - Liftgate will not raise to bed with a load and the pump motor running

- Causes -
- a. Low hydraulic fluid
 - b. Cylinders are plumbed incorrectly to pump
 - c. Overload condition
 - d. Improperly adjusted or defective main relief valve
 - e. Lift cylinders are bypassing, liftgate is drifting down

- Corrections -
- f. Broken hydraulic line
 - g. Clogged or disconnected suction line
 - h. Defective pump
 - a. Make sure the reservoir has the proper amount of fluid. Either check for the fluid line through the plastic reservoir or for metal reservoirs remove the breather cap and check the fluid line through the fill hole. The hydraulic fluid should be within 1/2" of the top of the reservoir with the liftgate in the stored position. Fill with Dexron III automatic transmission fluid.
 - b. Check that the cylinders and pump are plumbed together according to the drawings in the owners manual. The B port on the rotary valve (B is stamped on the rotary valve by this port) is the high pressure port and should connect to the butt end of the cylinders. The other port on the cylinders are the low pressure lowering ports and should be plumbed to the A port on the pump (A is stamped on the rotary valve by this port).
 - c. The power unit on the ST20/25/30 is equipped with a lifting relief valve to prevent overloading of the liftgate. The relief setting should be as follows:
 - ST20-1400 psi
 - ST25-1850psi
 - ST30-2050 psi
 - d. See section "c" above for relief valve setting. Plumb a pressure gauge into the high pressure circuit of the liftgate (those hoses connected to the B port on the pump). Remove all loads from the liftgate's platform. Engage the "RAISE" lever until the liftgate is fully raised. Keep the "RAISE" lever 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 i below.
 - e. If the liftgate will not raise with a load on the platform but empty is raising slowly or only partially, one or both of the cylinders may be bypassing. To check for bypassing cylinders do the following. Lower the gate to the ground to relieve all pressure from the cylinders. Disconnect both cylinders from the liftarm. Press the "RAISE" lever until both cylinders are fully extended. Disconnect the low pressure hoses from the power unit at the swivel fitting at the A port at the pump. Plug the newly opened end(s) of the swivel fitting. Put the loose ends of the disconnected hoses in a container to catch any oil, which comes out during this test. Press the "RAISE" lever for 15 to 20 seconds and watch for a steady stream of fluid coming out of one of the disconnected hose ends into the container. If no steady stream of oil is present reconnect all hoses and press the "LOWER" lever until both cylinders are fully retracted. Disconnect the high pressure hoses from the power unit at the swivel fitting at the B port at the pump. Plug the newly opened end(s) of the swivel fitting. Put the loose ends of the disconnected hoses in a container to catch any oil, which comes out during this test. Press the "LOWER" lever for 15 to 20 seconds and watch for a steady stream of fluid coming out of one of the disconnected hose ends into the container. Replace or rebuild any cylinder with fluid coming out of its disconnected hose end, as this

indicates fluid is bypassing the piston seals on the cylinder. Reconnect rebuilt or replaced cylinders and hoses as before.

- f. Broken or punctured hydraulic lines and fittings must be replaced with care to avoid injury from high pressure oil streams.
- g. 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.
- h. If all else fails replace the power unit, it is probably worn out.

3. Problem - Liftgate will not lower with the pump motor running

Causes -

- a. Bent, broken, or improperly adjusted linkage rod
- b. Clogged or defective hydraulic lines, fittings or flow controls

Corrections -

- a. See section 1d.
- b. Remove any obstruction in the hoses, fittings or flow controls or replace any hose, fitting or flow control, which does not allow fluid to flow through freely.

4. Problem - Liftgate raises slowly - The raise speed of the ST20/25/30 on a 54" bed height while empty at 70° F is approximately 9-12 seconds. The raise speed loaded for the same conditions is approximately 18-24 seconds.

Causes -

- a. Overload condition
- b. Cold weather
- c. Partially blocked suction screen
- d. Lift cylinders are bypassing
- e. Improperly adjusted or defective raise relief valve
- f. Low voltage and/or bad ground
- g. Worn out pump

Corrections -

- a. See section 2a
- b. Refer to Owner's Manual for alternative oils to use for cold weather conditions.
- c. Remove reservoir and clean or replace suction screen as necessary.
- d. See section 2e
- e. See section 2d
- f. The minimum voltage between the motor stud and ground is 9.5 volts at maximum load conditions. See section 1b and 1c.
- g. After all other corrections are performed it will be necessary to replace the pump.

5. Problem - Foamy oil flowing from reservoir breather

Causes -

- a. Air is present in the system

Corrections -

- a. This can occur if the motor is not running as the liftgate is lowered. See problem 1, part e and f. Also air can enter the system if the fluid level is low, see problem 2, part a, or if the suction tube is disconnected, see problem 2, part g. 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.

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.