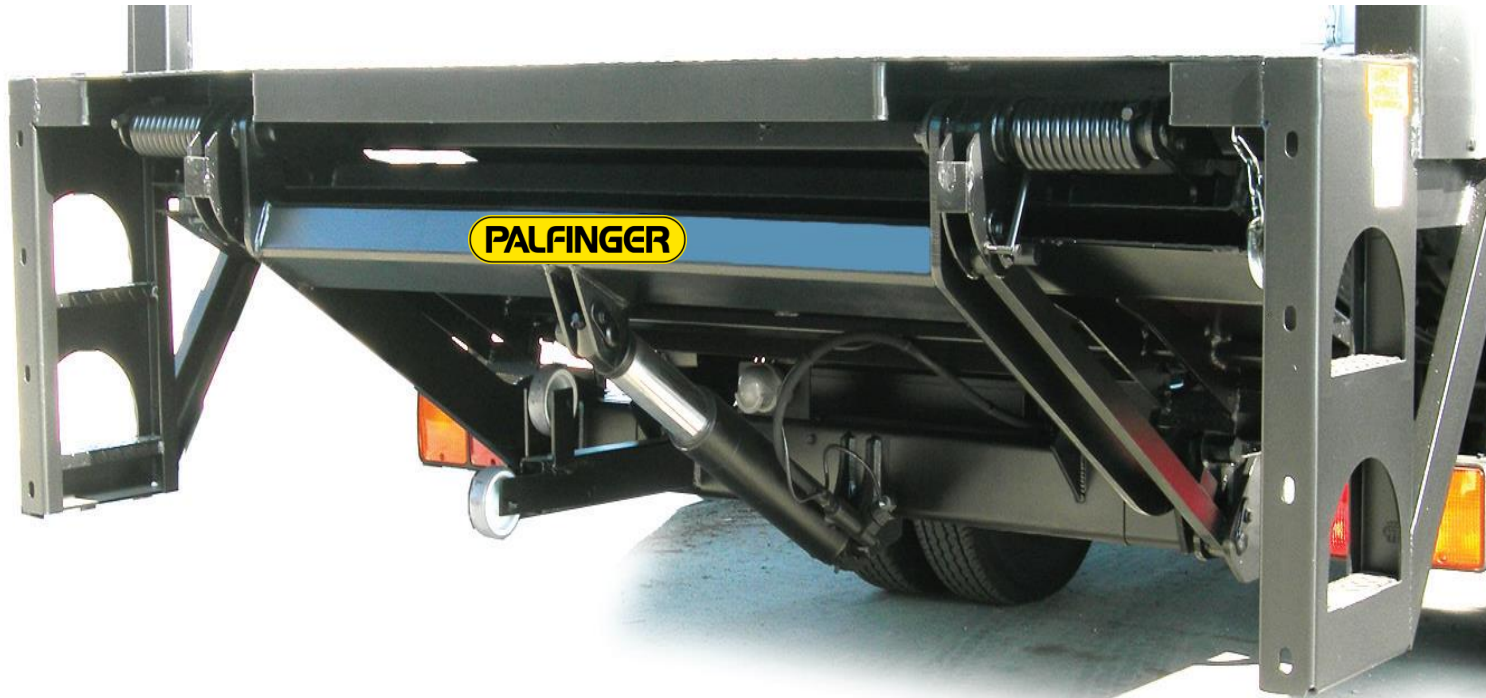




Model PLR Liftgate

Single & Dual Cylinder, Gravity & Power Down Training, Troubleshooting & Maintenance





ALL MODELS OF PALFINGER LIFTGATES

Installation, Operator(Owner) and Parts Manuals are available for download or viewing on our website at <https://www.palfinger.com/en-US/usa/products/lift-gates>.

Additionally, troubleshooting guides, hydraulic and electrical schematics are available for download and/or viewing.

Diagrams of decal placement are in the Installation and Operator Manuals. Decals are furnished at no cost to our customers.

REPLACE MISSING AND/OR DEFACED DECALS!

All Models of Liftgate Operator Manuals have diagrams of pivot points needing Lubrication in the Preventive Maintenance Section.



Liftgates

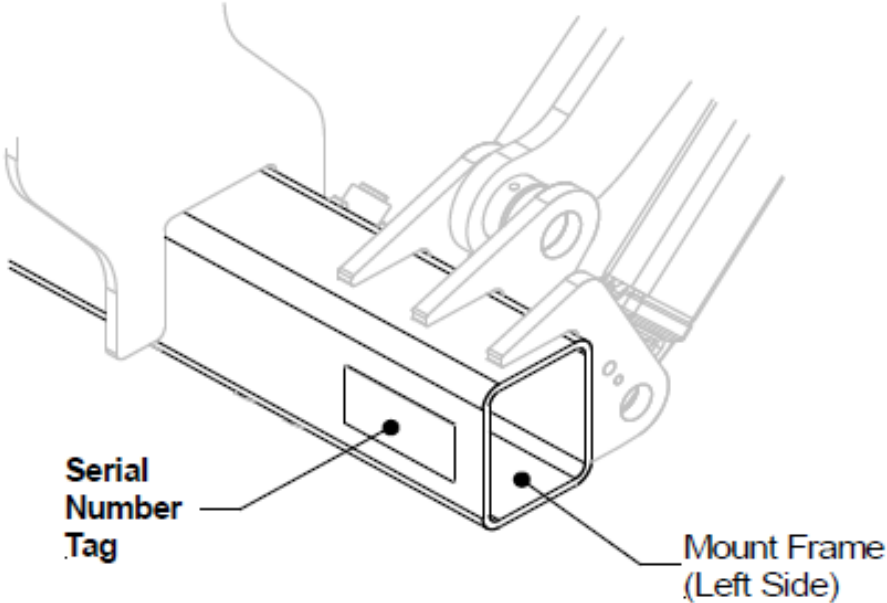
ILT Serial Number Location

Serial Number Tag

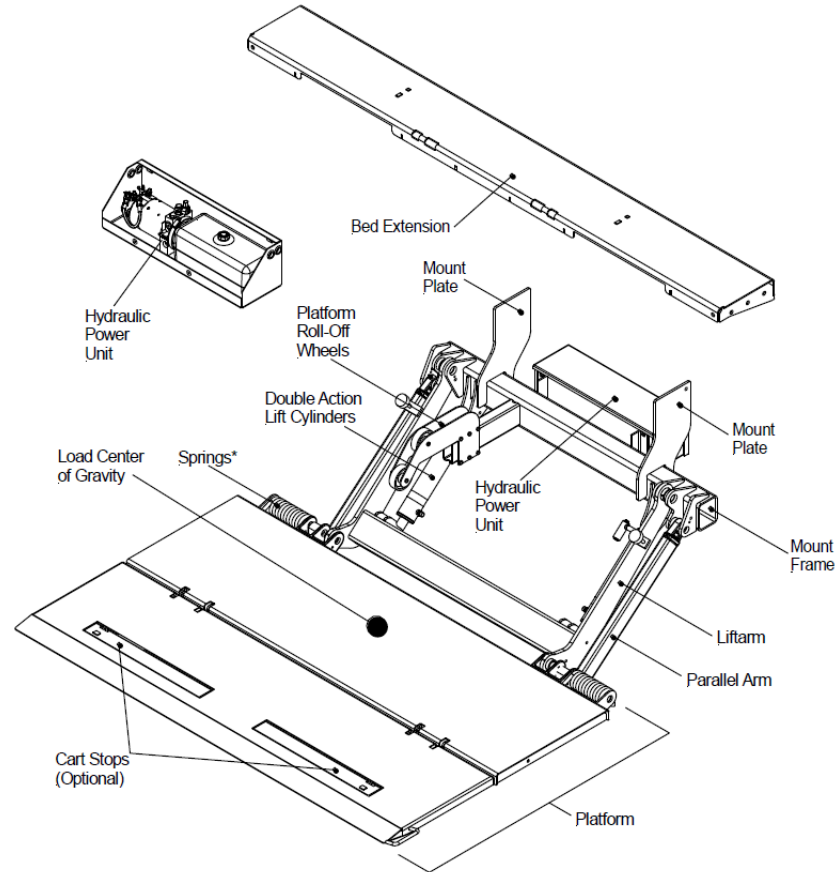
PALFINGER		
(888) 774-5844		CERRITOS, CA. TRENTON, N.J.
Model	Serial No.	Date
<input type="text"/>	<input type="text"/>	<input type="text"/>

OR

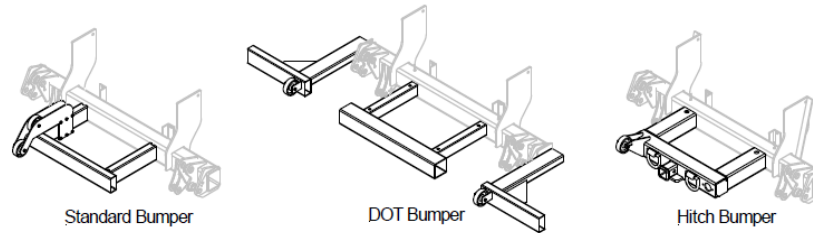
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PLR ML695-VL-A 0123456789	



PLR D SERIES LIFTGATE COMPONENTS DUAL CYLINDER

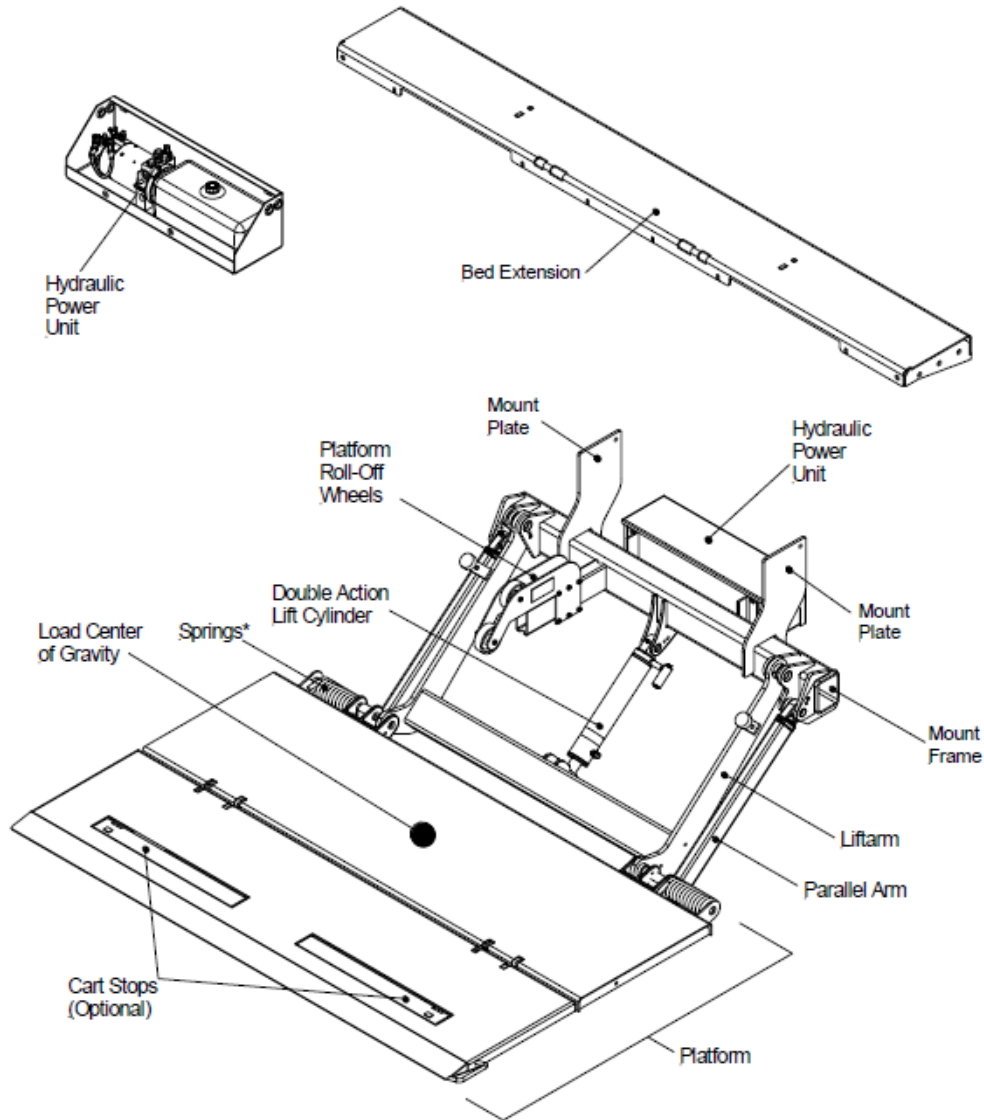


PLR Liftgate Optional Configurations



*No spring installed on left side for 42" and 48" aluminum platforms only.

PLR S SERIES LIFTGATE COMPONENTS SINGLE CYLINDER

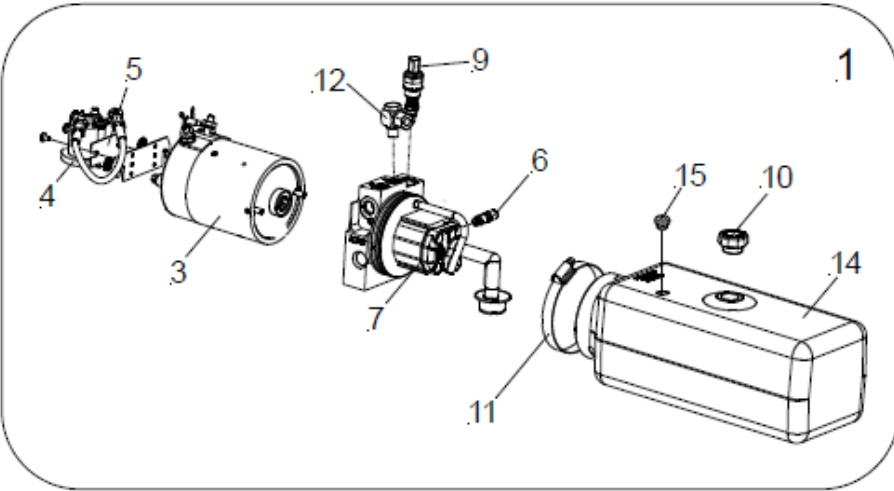


*No spring installed on left side for 42" and 48" aluminum platforms only.

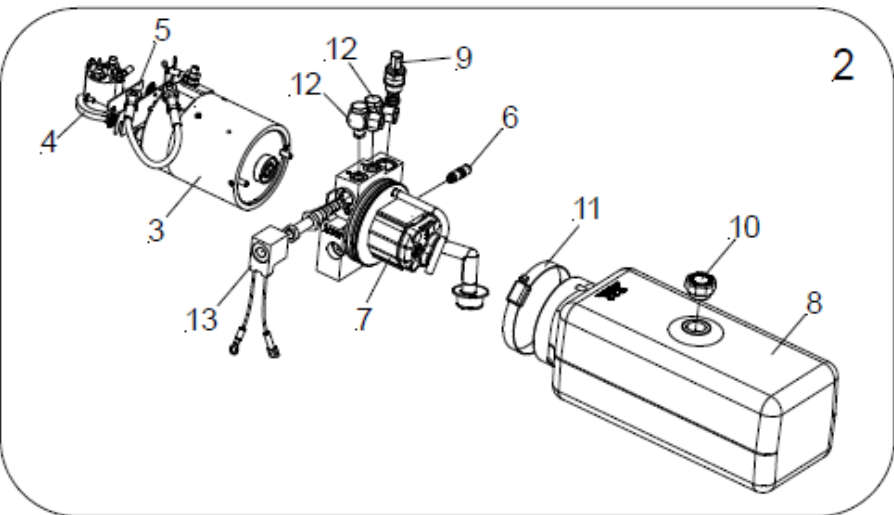
Hydraulic Power Unit



Hydraulic Power Unit Gravity Down



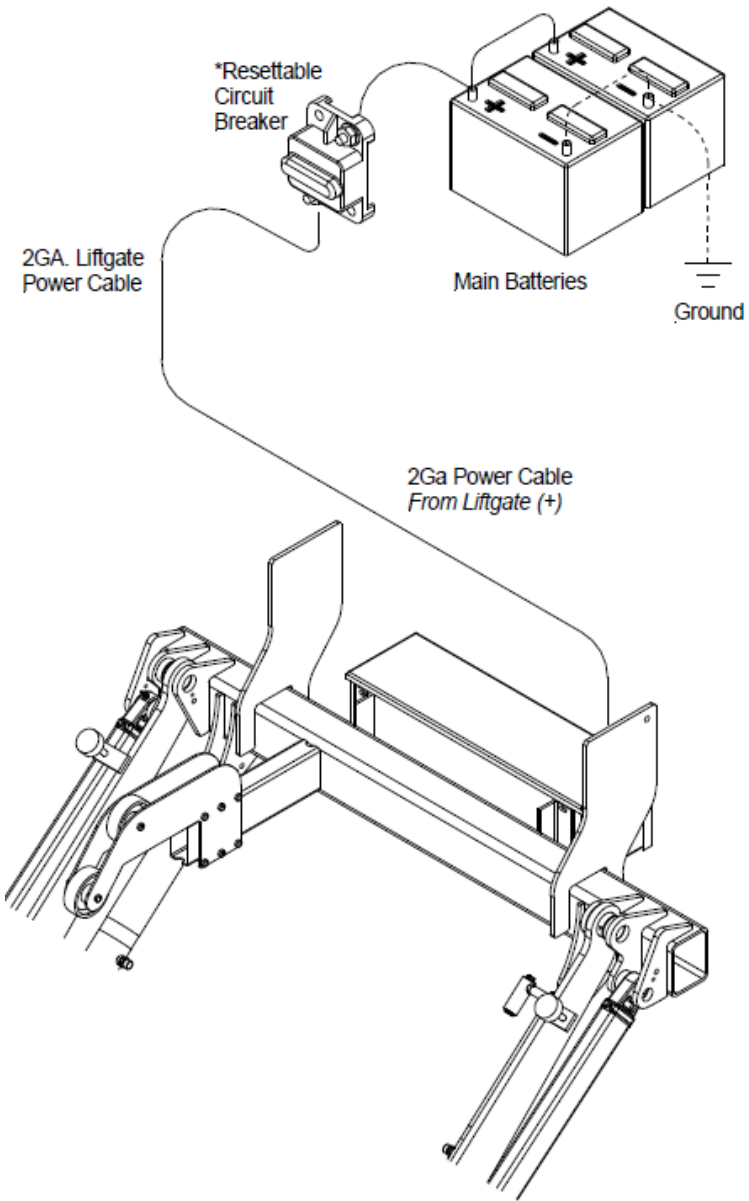
Hydraulic Power Unit Power Down



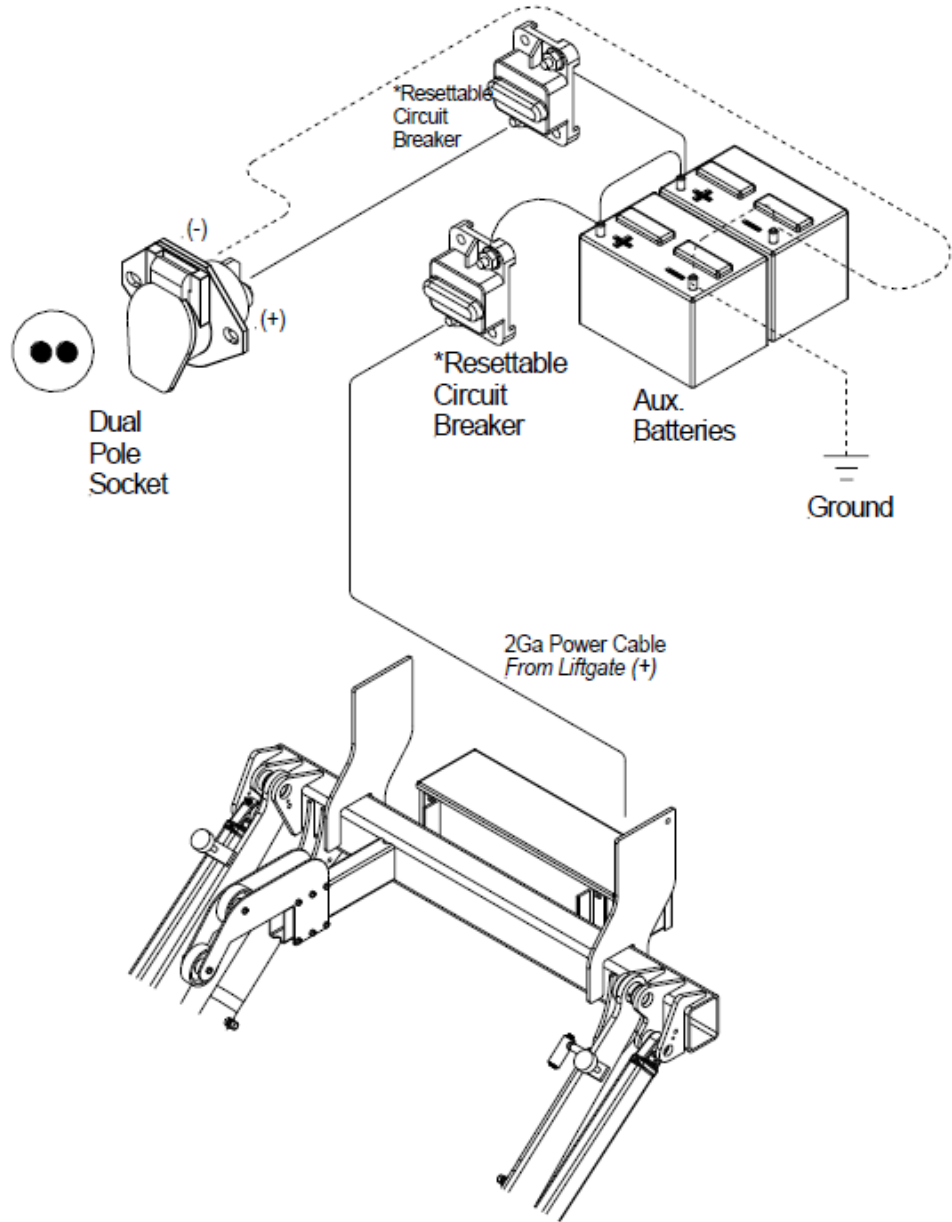
8 - HYDRAULIC POWER UNIT	
NO.	DESCRIPTION
1	Hydraulic Power Unit, Gravity Down, 2850 PSI, Single Cylinder Hydraulic Power Unit, Gravity Down, 2200 PSI, Twin Cylinder
2	Hydraulic Power Unit, Power Down, 2850 PSI, Single Cylinder Hydraulic Power Unit, Power Down, 2200 PSI, Twin Cylinder
3	Motor, 12 Volt
4	Motor Solenoid
5	Brackets For Solenoid
6	Check Valve Pilot
7	Pump
8	Oil Reservoir, Plastic, No Grommet Hole, 5.5"x6"x15"
9	Relief Valve
10	Breather Cap
11	Clamp For Oil Reservoir
12	Fitting, 90° Elbow (Qty 2 For Power Down Units)
13	Valve Cartridge Assy, 10VDC 4W
14	Oil Reservoir, Plastic, w/Grommet Hole, 5.5"x6"x15"
15	Grommet, Rubber, ¼" Tube



Liftgates



Wiring Diagram – Truck



Wiring Diagram – Dual Pole - Trailer



Basic Battery Conditions and Testing

Proper voltage is key to proper liftgate operation.

State of Charge –vs- Voltage

State of Charge Open Circuit Voltage

100%	12.70V
90%	12.60V
80%	12.50V
70%	12.35V
60%	12.25V
50%	12.10V
40%	11.95V
30%	11.85V
20%	11.70V
10%	11.55V

Charge
Before
Testing

BEFORE YOU START TROUBLESHOOTING

CHECK BATTERY VOLTAGE

10-10 TEST

USING A MULTIMETER SET ON DC VOLTAGE:

OPEN LIFTGATE AND RAISE TO BED LEVEL.
ATTACH NEGATIVE VOLTMETER LEAD TO NEGATIVE
POST ON MOTOR.
ATTACH POSITIVE VOLTMETER LEAD TO POSITIVE
POST ON MOTOR.
ACTIVATE RAISE SWITCH TO DEADHEAD MOTOR.

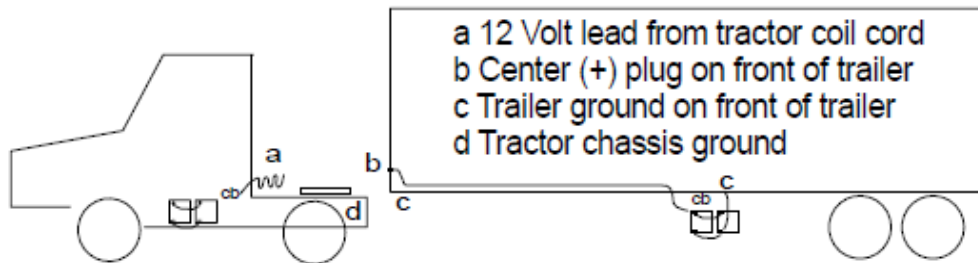
KEEP SWITCH ACTIVATED FOR 10 SECONDS.
VOLTMETER SHOULD READ 10 VOLTS OR MORE
AFTER 10 SECONDS.

If you have less than 8 volts, batteries are low.
CHARGE BATTERIES AND RETEST.

IF RESULTS ARE SAME:

Do batteries need to be replaced?
Do you have clean, corrosion free connections?
Is circuit grounded properly?

TRACTOR AND TRAILER CROSS TEST ON ENTIRE CHARGE SYSTEM



Testing of full system using a battery load tester:

Tractor Test:

1. Ground battery load tester on tractor chassis point (d)
 Hook up positive load tester cable on positive pole of single pole plug at end of tractor coil cord (a)
 Run load test- This will test entire circuit on tractor including ground from batteries to tractor chassis

Trailer Test:

2. Ground battery load tester on trailer chassis (c)
 Hook up positive cable on positive pole of single pole plug receptacle on trailer (b)
 Run load test - This will test entire circuit on trailer including ground between trailer batteries and trailer chassis.

Tractor and Trailer charging system Test

3. Ground battery load tester on tractor chassis (d)
 Hook up positive cable on positive pole of single pole plug receptacle on trailer (b)
 Run load test- This will test entire circuit on tractor - trailer including ground between tractor and trailer and circuit breaker on trailer.

A simple low amp voltage test at the front of the trailer or at the tractor will not show insufficient connections or ground problems

Does Fifth Wheel have a ground strap to the tractor chassis?

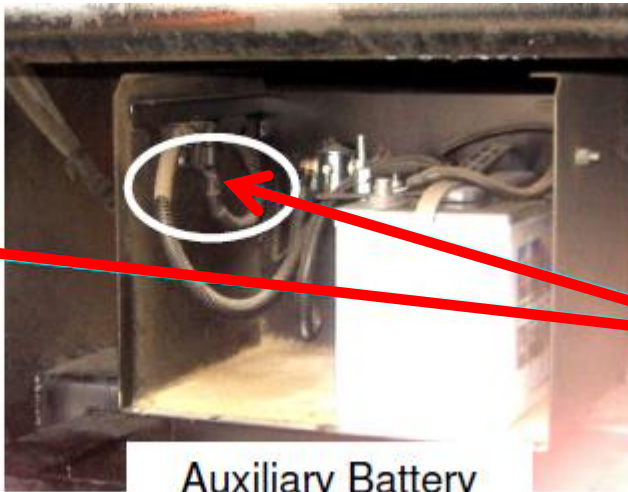
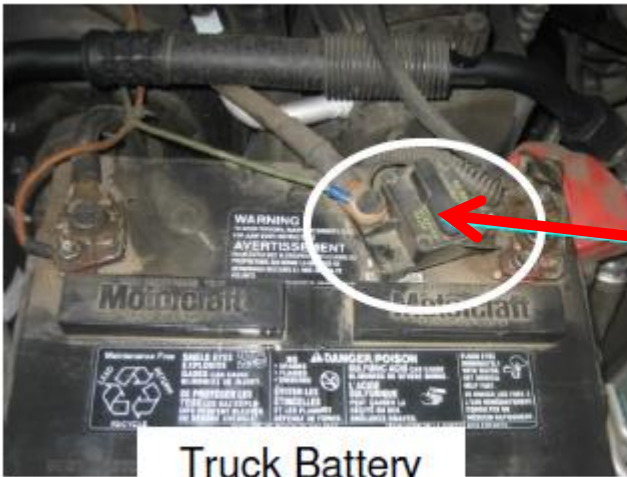
Make sure King Pin Plate is grounded to side rail.



PLR Electrical Components

NOTE: Always use a digital voltmeter when checking voltage to determine if you have sufficient power to operate the liftgate.

The liftgate should have a 150A Resettable Circuit Breaker and a 15A ATC Fuse in the electrical circuit set up. These were installed at the liftgate was mounted.



Location of circuit breaker



⚠ DO NOT use higher amperage fuse. ⚠

Check fuse by removing cap.



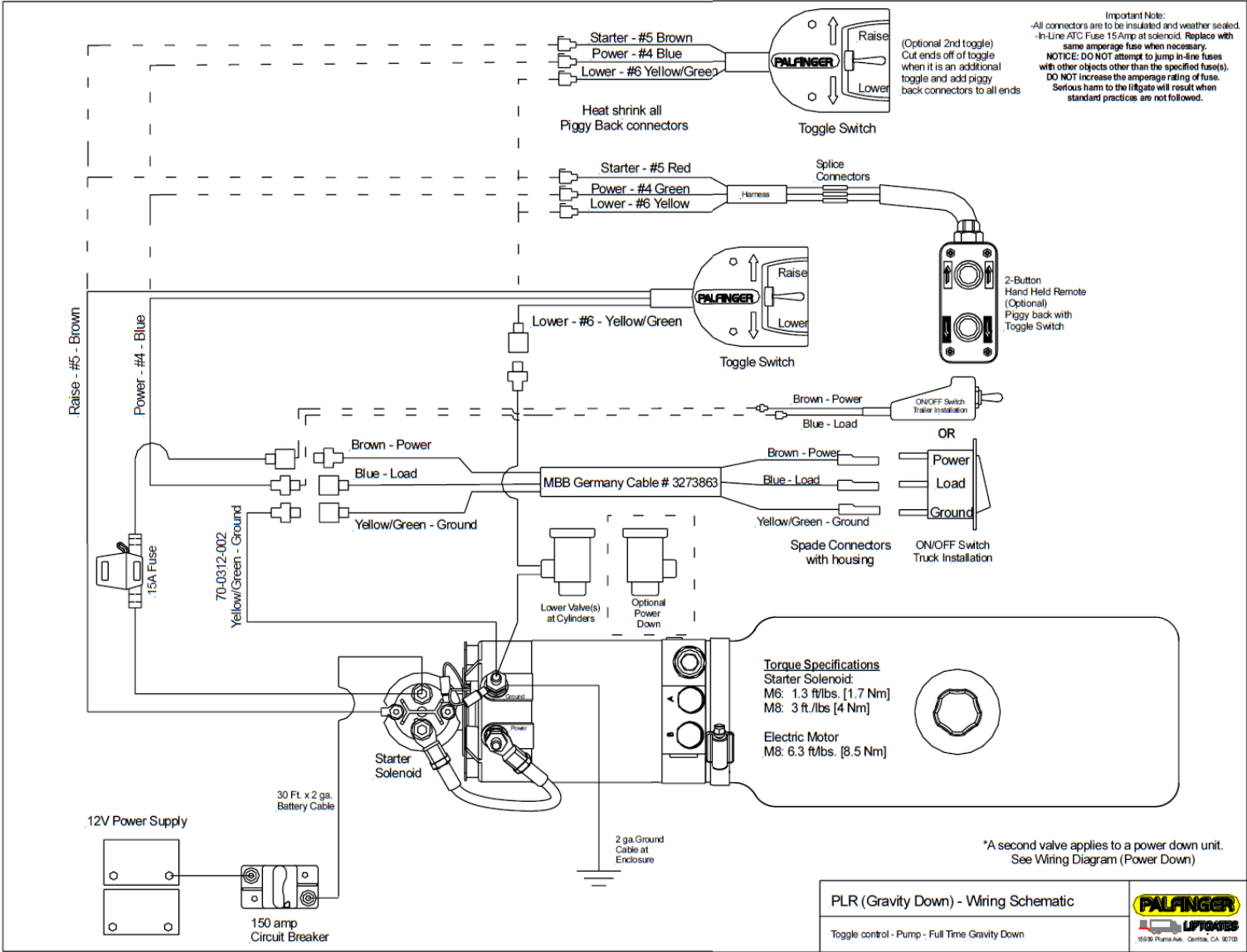
Replace with 15A ATC fuse (BLUE) if metal bridge is broken.

Cab Cut Off Switch

Located in cab of truck. Must be on for liftgate to operate.



PLR Electrical Schematic Gravity Down



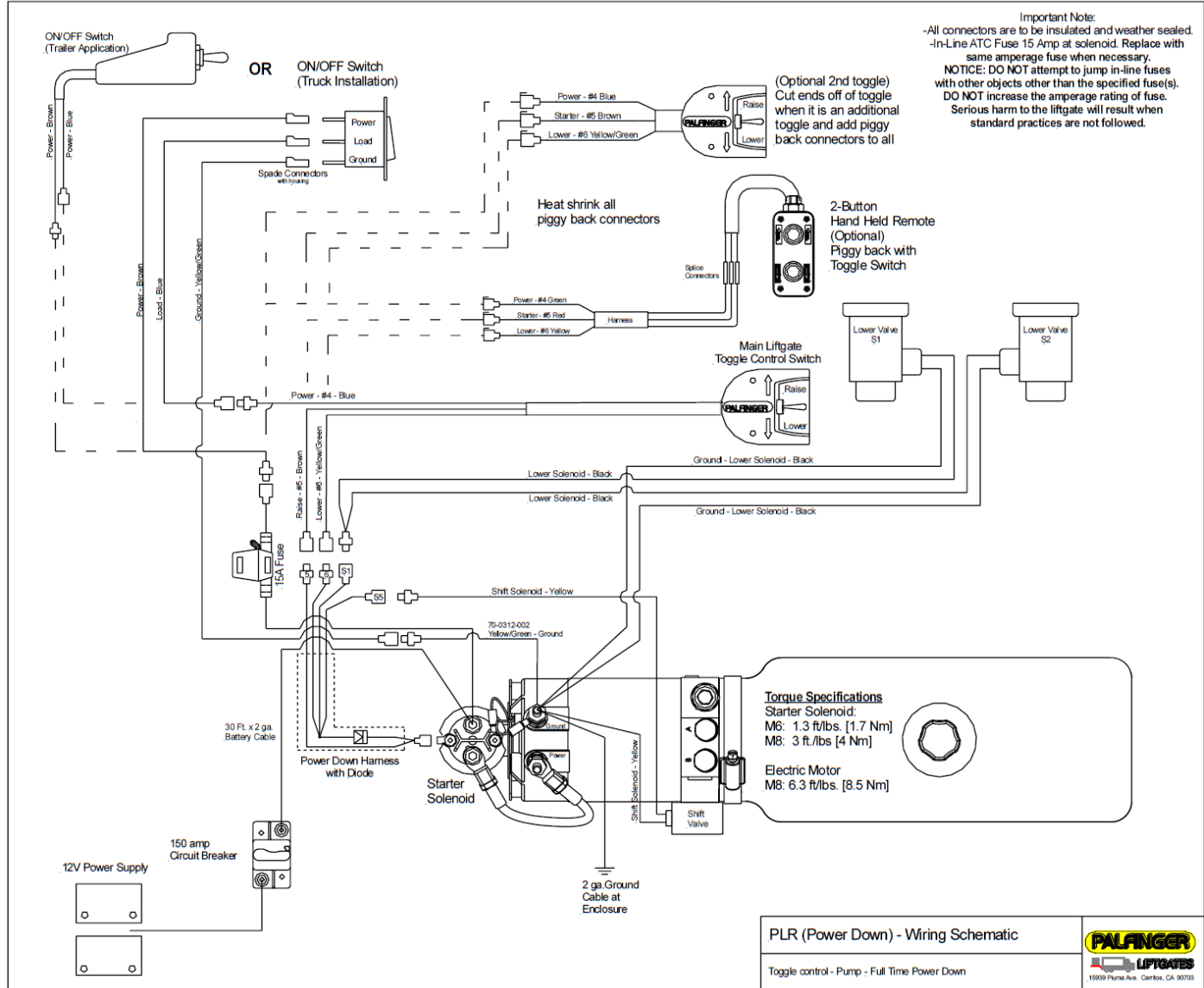
PLR (Gravity Down) - Wiring Schematic

Toggle control - Pump - Full Time Gravity Down

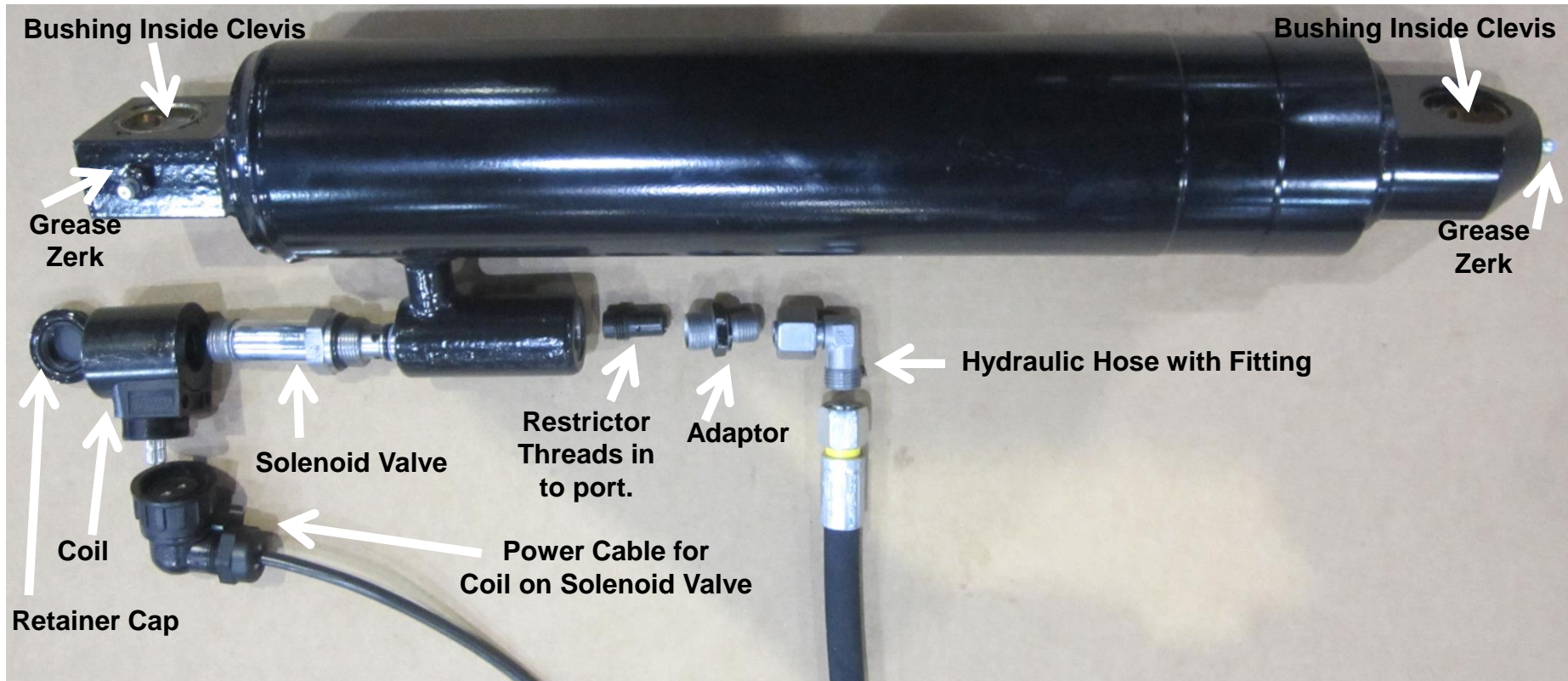


15530 Pluma Ave. Centra, CA 90708

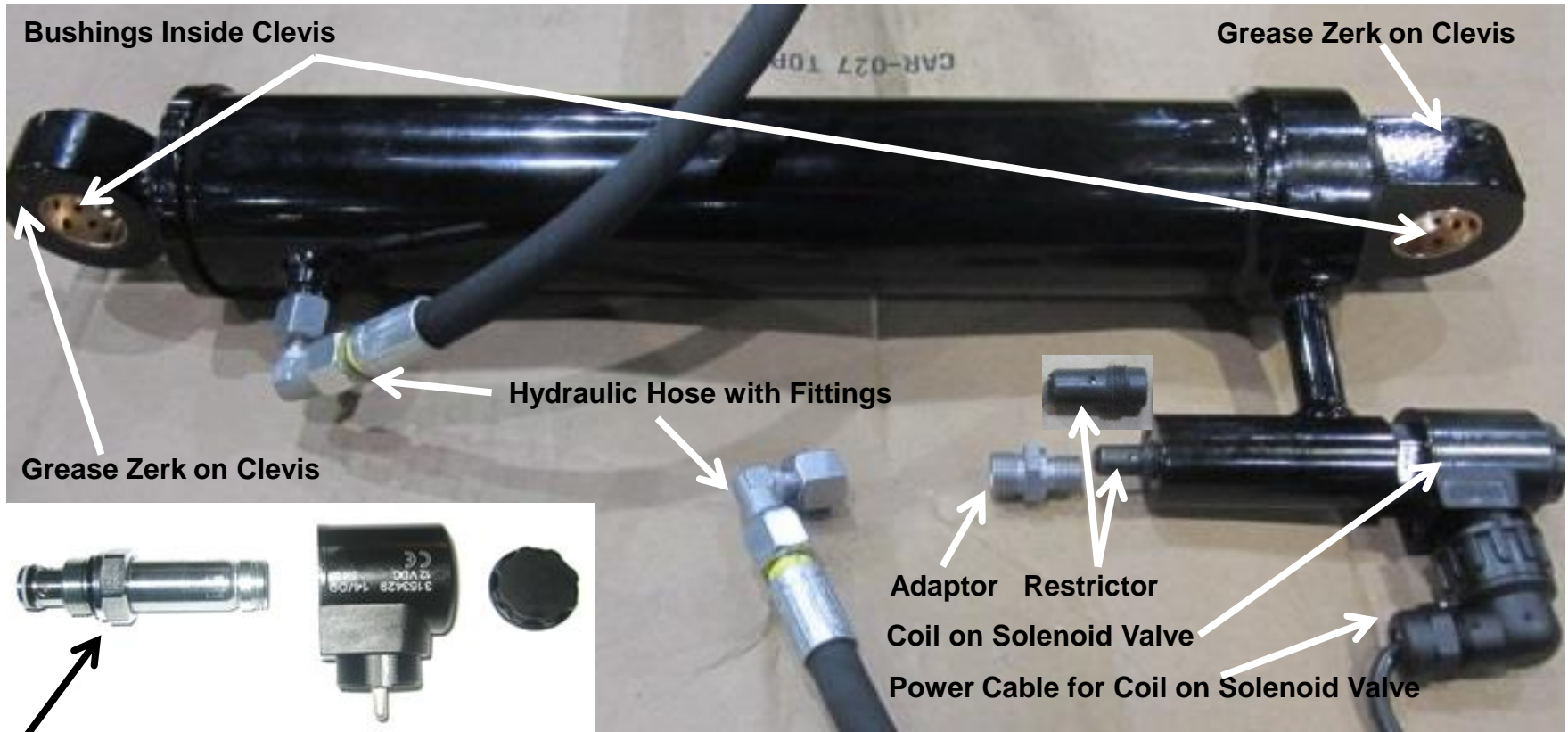
PLR Electrical Schematic Power Down



PLR Gravity Down Cylinder Components



PLR Power Down Cylinder Components

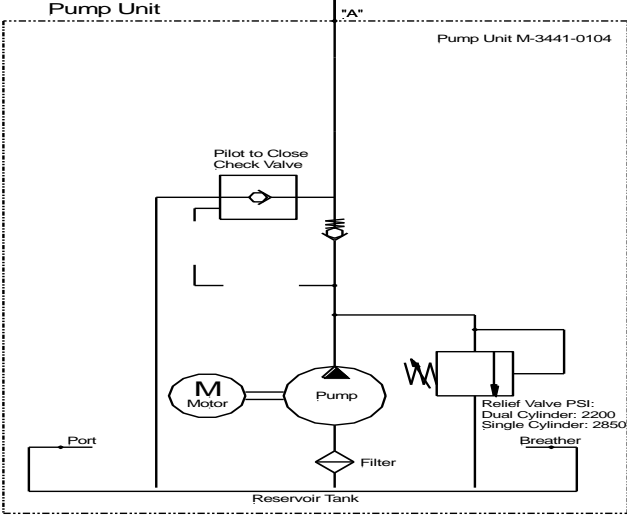
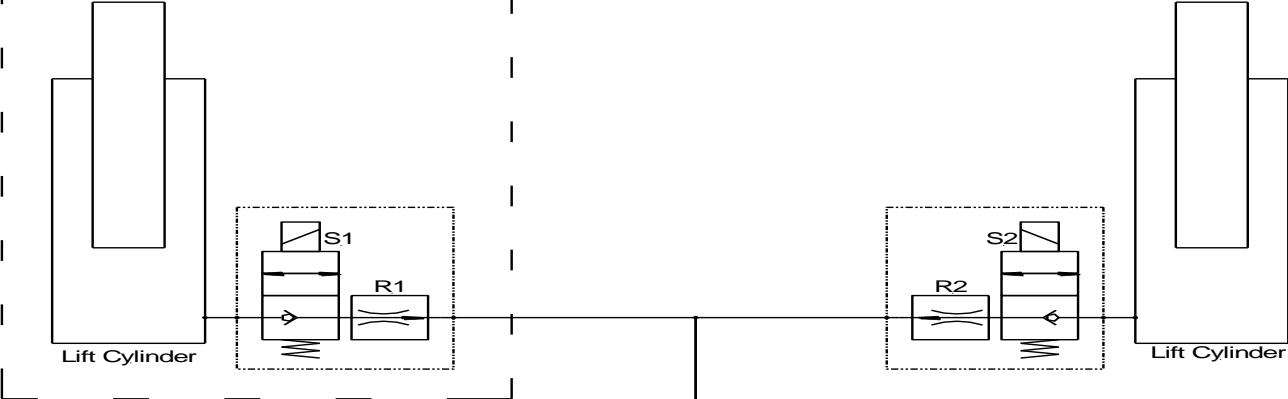


Solenoid Valve Removed from Port - with Coil and Retainer Cap

PLR Gravity Down-Hydraulic Schematic

S1 & S2 - Release Valve for Lowering
 R1 & R2 - Flow Restrictor for limiting lower speed.
 Raise = M
 Lower = S1+S2

Dual Cylinder Option



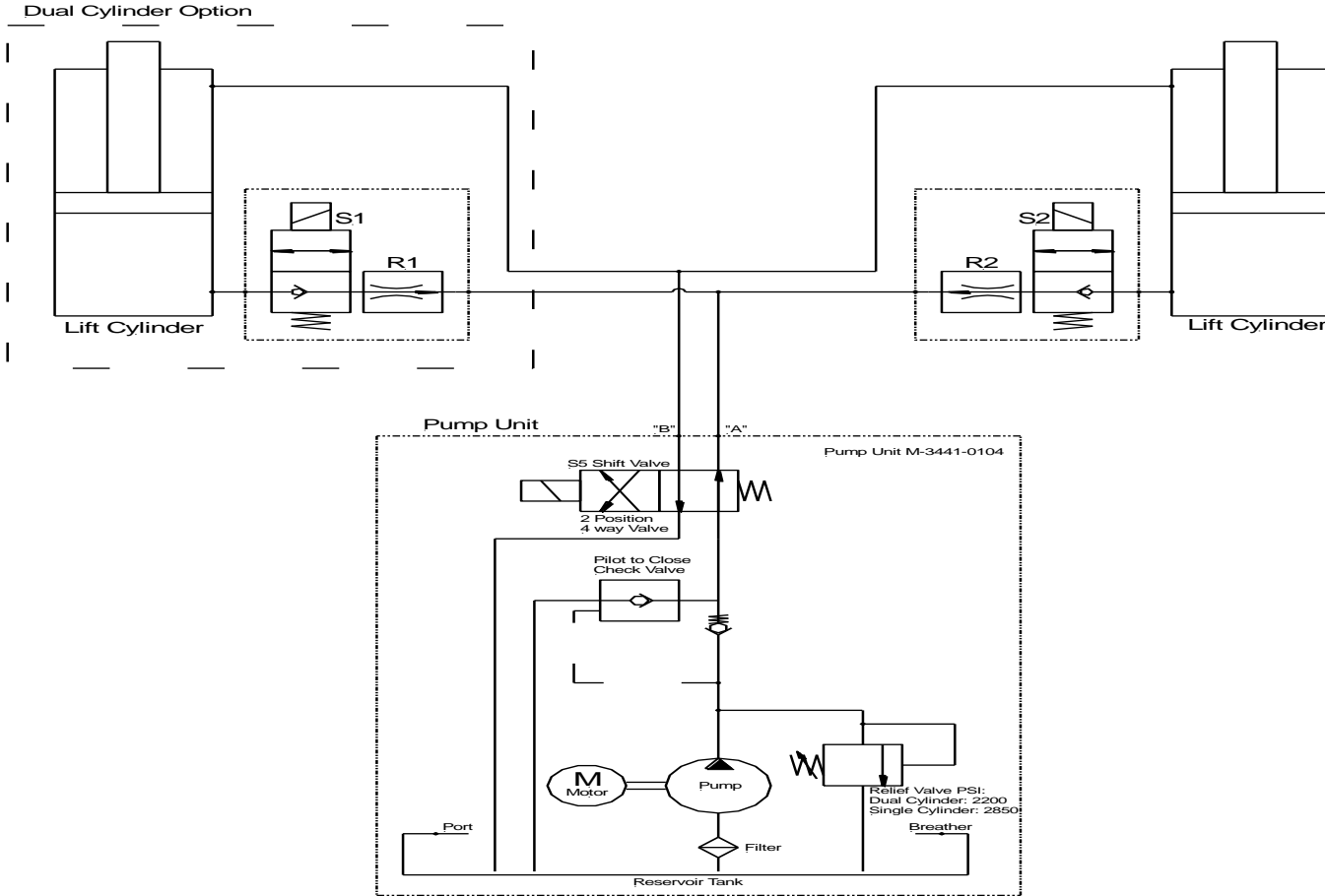
PLR Gravity Down
 USA Hydraulic Schematic
 Discontinued on liftgate S/N: PT-10598



PLR Power Down-Hydraulic Schematic

S1 & S2 - Release Valve for Lowering
 R1 & R2 - Flow Restrictor for limiting lower speed.
 S5 - Shift Valve is activated upon LOWER function only.
 Pilot to close check valve is NOT used on Power Down.

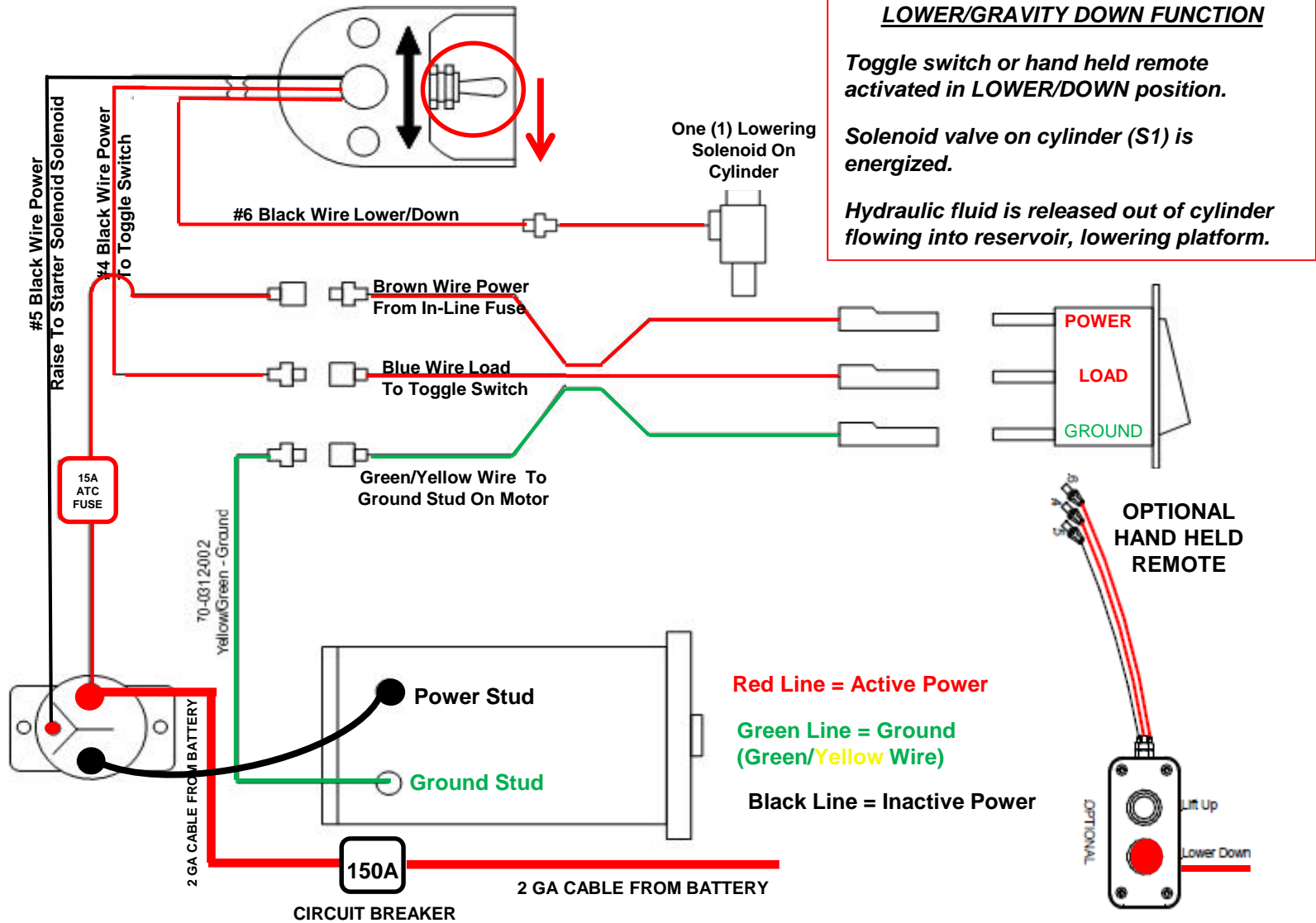
Raise = M
 Power Down = M + S1&2 + S5



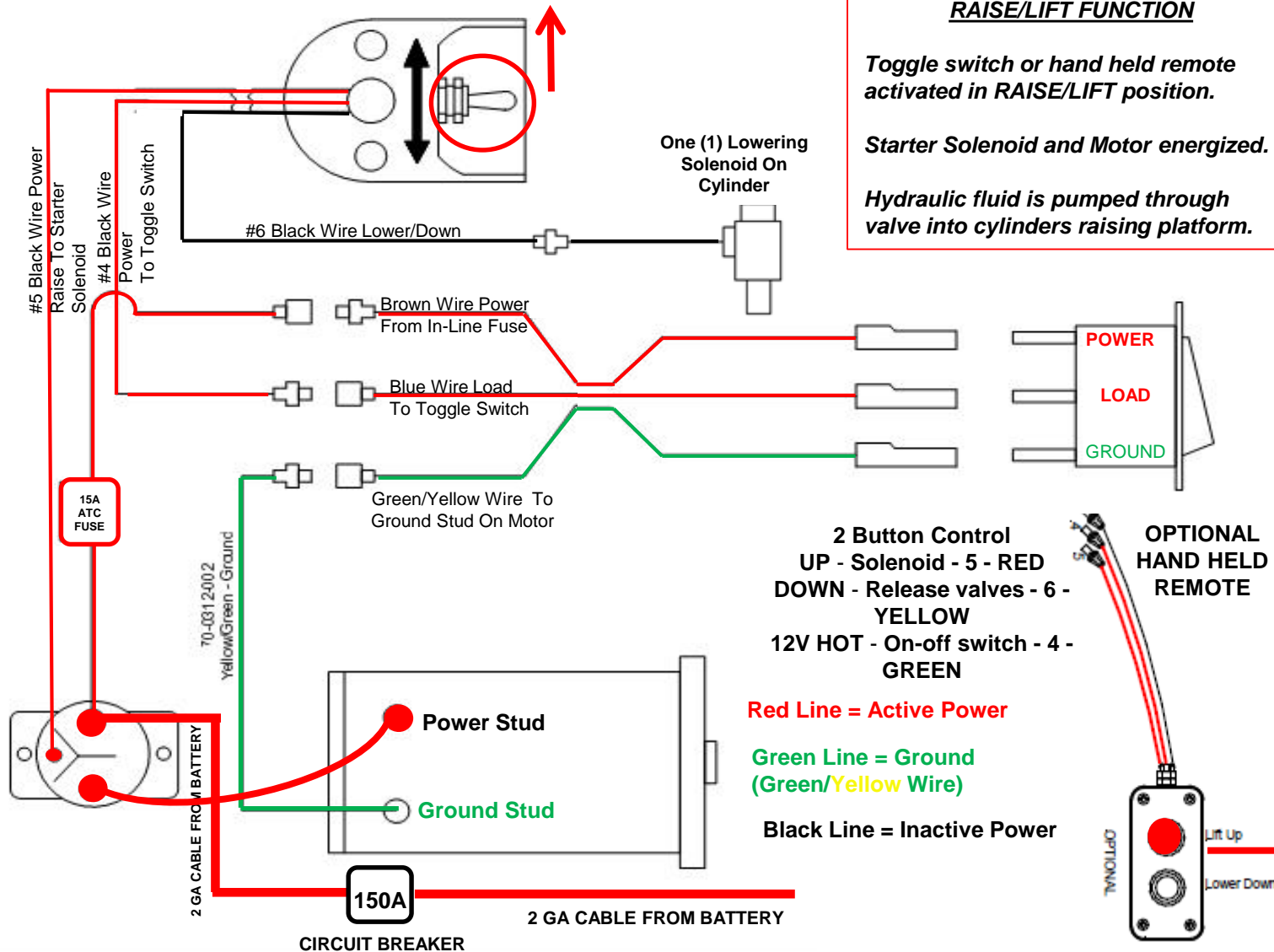
MBB Toggle Control; Full time Power Down ONLY

PLR Power Down
 USA Hydraulic Schematic
 Discontinued on liftgate S/N: PT-10598

PLR Electric Schematic LOWER/GRAVITY DOWN Function



PLR Electric Schematic RAISE/LIFT Function



RAISE/LIFT FUNCTION

Toggle switch or hand held remote activated in RAISE/LIFT position.

Starter Solenoid and Motor energized.

Hydraulic fluid is pumped through valve into cylinders raising platform.

2 Button Control
 UP - Solenoid - 5 - RED
 DOWN - Release valves - 6 - YELLOW

12V HOT - On-off switch - 4 - GREEN

OPTIONAL HAND HELD REMOTE

Red Line = Active Power

Green Line = Ground (Green/Yellow Wire)

Black Line = Inactive Power

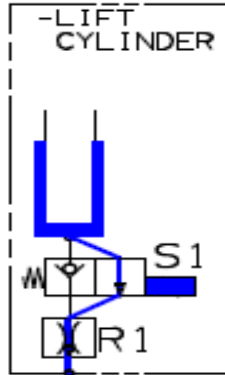
PLR Hydraulic Schematics for RAISE/LIFT and Lower/Gravity Down Functions

LOWER/GRAVITY DOWN FUNCTION

Toggle switch or hand held remote activated in LOWER/DOWN position.

Solenoid valve on cylinders (S1) are energized.

Hydraulic fluid is released out of cylinder flowing into reservoir, lowering platform.

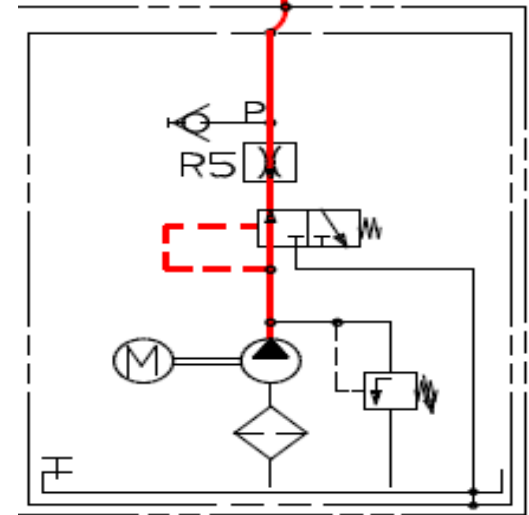
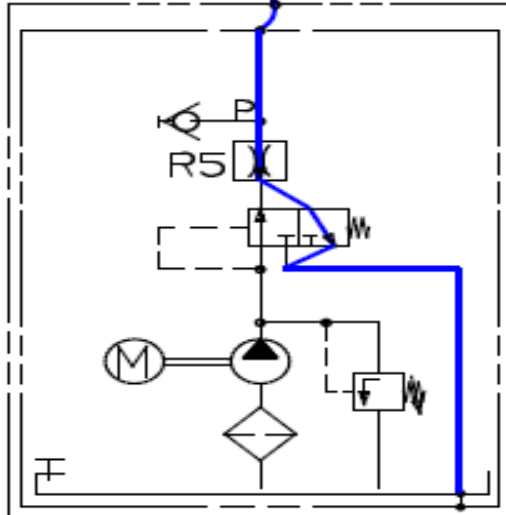
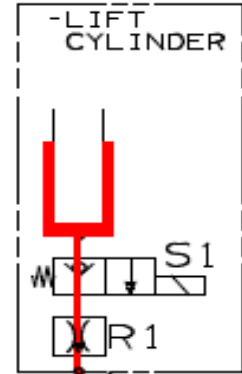


RAISE/LIFT FUNCTION

Toggle switch or hand held remote activated in RAISE/LIFT position.

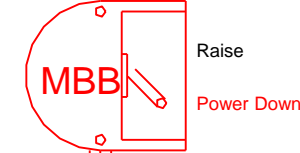
Starter Solenoid and Motor energized.

Hydraulic fluid is pumped through Valve into cylinders raising platform.



POWER DOWN

Main Liftgate
Toggle Control Switch

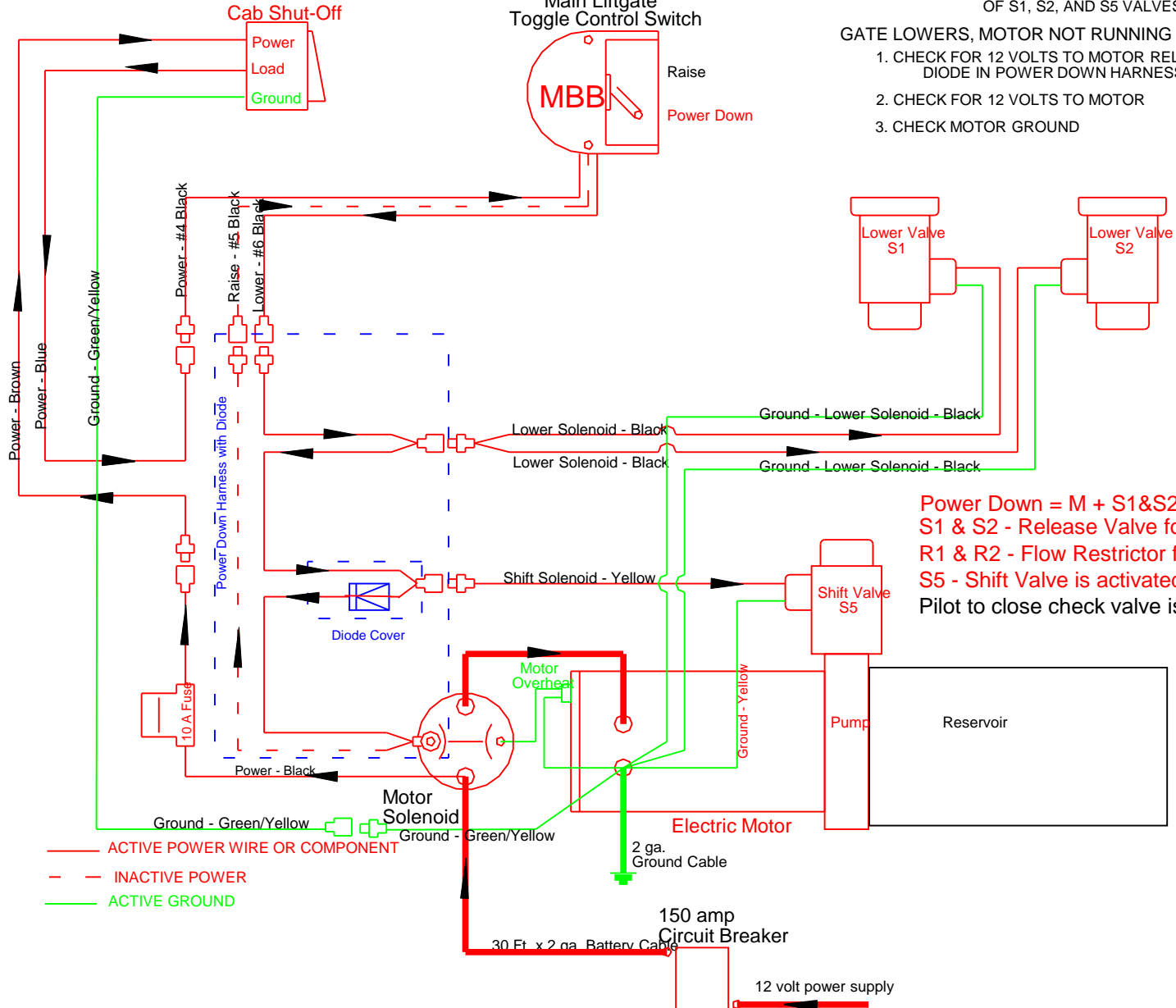


MOTOR RUNS, GATE WON'T LOWER

1. CHECK FOR POWER, GROUND AND PROPER OPERATION OF S1, S2, AND S5 VALVES

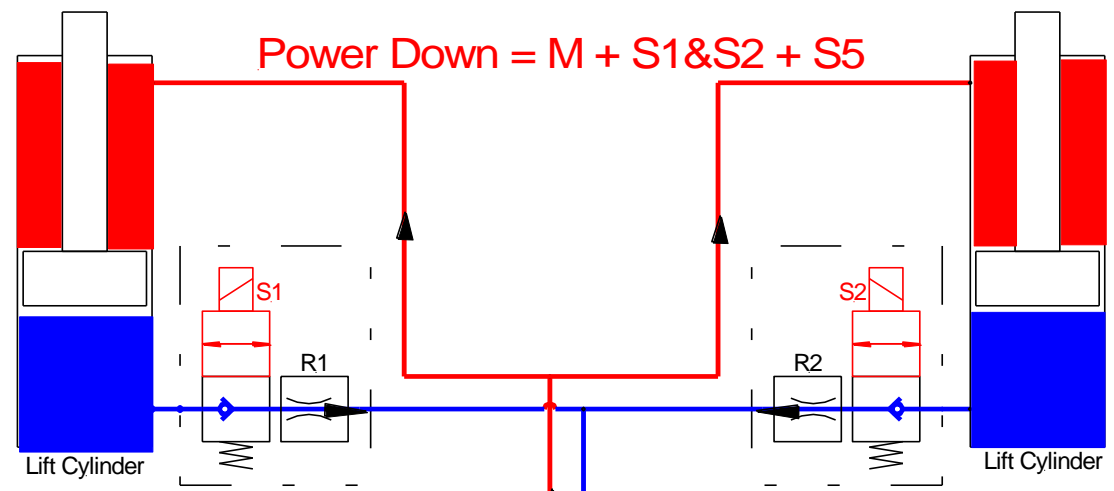
GATE LOWERS, MOTOR NOT RUNNING

1. CHECK FOR 12 VOLTS TO MOTOR RELAY FROM DIODE IN POWER DOWN HARNESS
2. CHECK FOR 12 VOLTS TO MOTOR
3. CHECK MOTOR GROUND



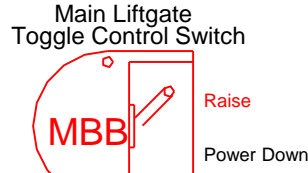
Power Down = M + S1&S2 + S5
 S1 & S2 - Release Valve for Lowering
 R1 & R2 - Flow Restrictor for limiting lower speed.
 S5 - Shift Valve is activated upon LOWER function only.
 Pilot to close check valve is NOT used on full time PD.

- ACTIVE POWER WIRE OR COMPONENT
- - - INACTIVE POWER
- ACTIVE GROUND



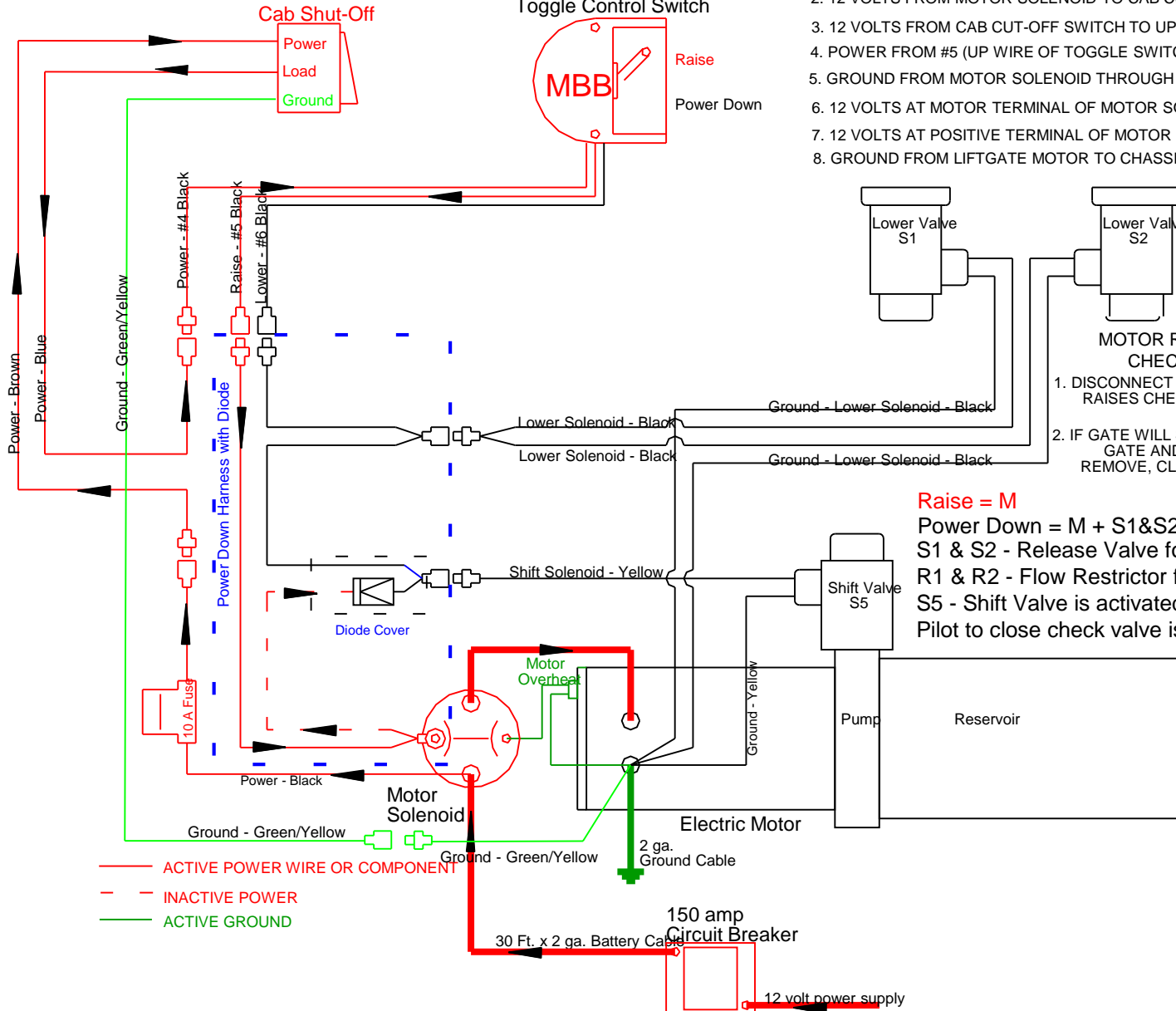
Power Down = M + S1&2 + S5
 S1 & S2 - Release Valve for Lowering
 R1 & R2 - Flow Restrictor for limiting lower speed.
 S5 - Shift Valve is activated upon LOWER function only.
 Pilot to close check valve is NOT used on full time PD.
 Raise = M

RAISE



MOTOR WON'T RUN WITH SWITCH IN UP POSITION
CHECK THE FOLLOWING:

1. 12 VOLTS FROM 150 AMP CIRCUIT BREAKER AT BATTERY TO MOTOR SOLENOID
2. 12 VOLTS FROM MOTOR SOLENOID TO CAB CUT-OFF SWITCH
3. 12 VOLTS FROM CAB CUT-OFF SWITCH TO UP-DOWN TOGGLE SWITCH
4. POWER FROM #5 (UP WIRE OF TOGGLE SWITCH TO MOTOR SOLENOID
5. GROUND FROM MOTOR SOLENOID THROUGH MOTOR OVERHEAT SENSOR
6. 12 VOLTS AT MOTOR TERMINAL OF MOTOR SOLENOID
7. 12 VOLTS AT POSITIVE TERMINAL OF MOTOR
8. GROUND FROM LIFTGATE MOTOR TO CHASSIS/BATTERY



MOTOR RUNS, GATE WON'T RAISE
CHECK THE FOLLOWING:

1. DISCONNECT POWER TO SHIFT VALVE, IF GATE RAISES CHECK DIODE IN POWER DOWN HARNESS
2. IF GATE WILL STILL NOT BUILD PRESSURE, LOWER GATE AND TILT IT DOWN, POWER GATE OFF, REMOVE, CLEAN AND/OR REPLACE SHIFT VALVE

Raise = M

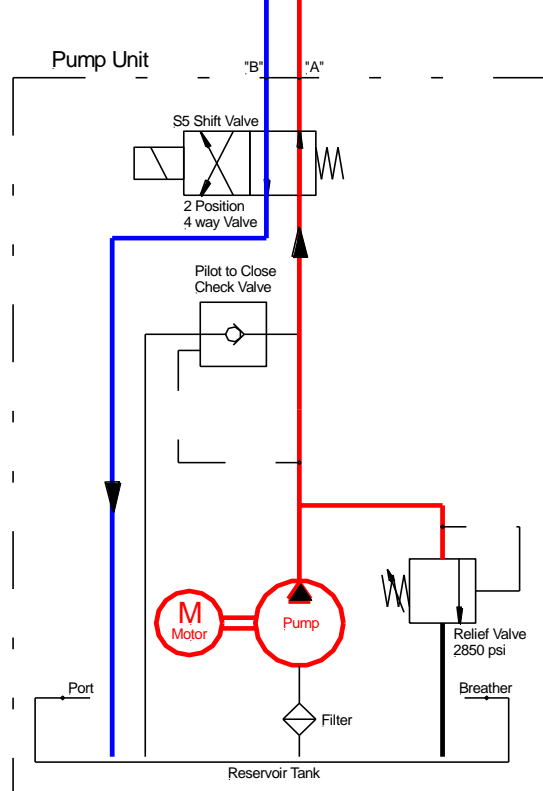
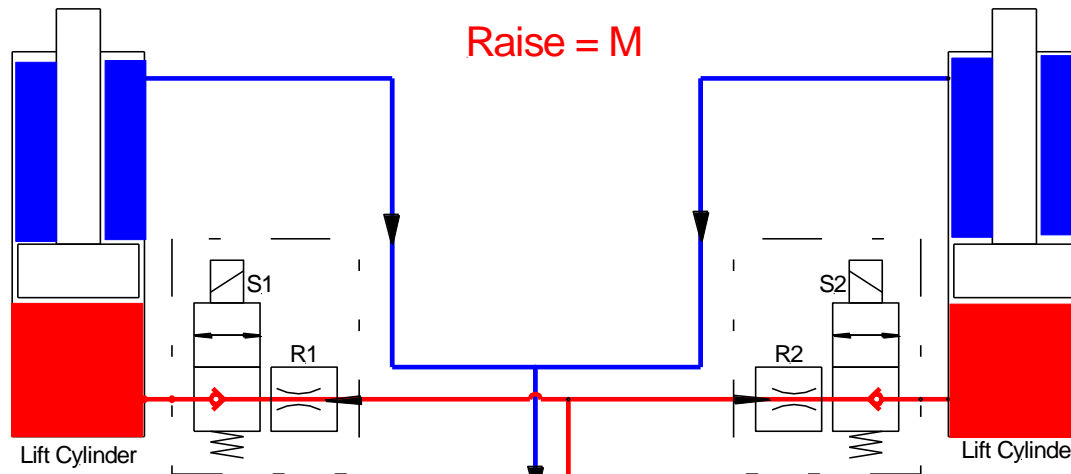
Power Down = M + S1&S2 + S5

S1 & S2 - Release Valve for Lowering

R1 & R2 - Flow Restrictor for limiting lower speed.

S5 - Shift Valve is activated upon LOWER function only.
Pilot to close check valve is NOT used on full time PD.

- ACTIVE POWER WIRE OR COMPONENT
- - - INACTIVE POWER
- ACTIVE GROUND



Power Down = M + S1&S2 + S5
 S1 & S2 - Release Valve for Lowering
 R1 & R2 - Flow Restrictor for limiting lower speed.
 S5 - Shift Valve is activated upon LOWER function only.
 Pilot to close check valve is NOT used on full time PD.

Power Cable to Release Valve Coil Test

Check for broken power wire in release valve cable:

- Unplug connector at valve.
- Set multimeter to read DC voltage.
- Put positive lead of multimeter in plug.
- Put negative lead of multimeter in other hole of plug.
- Activate down function on gate.
- Preferred reading should be 10V or higher.



Check for broken wire in release valve cable:

- Set multimeter to OHM function.
- Place a test lead of the multimeter at each end of the wire.
- If there is resistance in the wire, then the continuity test is positive and will show a value on the multimeter.
- If the amount of resistance shows zero (0), then the wire is broken.

Release Valve Coil Test

If one or both release valves on lift cylinders are not opening up, low voltage may be the cause. A *minimum* of **9V** is necessary to properly energize each of the release valve coils.

If the minimum voltage is present at both coils, the coil may not be generating the magnetism needed to open the release valve.

How to check coils for resistance

Multimeter set OHM function.
Place test leads on coil nodes.

- Reading shows 5.5 to 7.0 Ω → Coil is good
- Reading shows 0 Ω → Coil is shorted out
- Reading shows Overload → Coil is destroyed by burn or physical damage



First Inspection, Lift Gate Condition

- 1) Damage to lift gate : Broken or Missing Parts .
- 2) Battery connections clean and tight , No corrosion.
- 3) Lift gate wiring clean and tight , No damage , No corrosion.
- 4) Burnt fuse , Tripped circuit breaker.
- 5) Pins greased , Hydraulic oil tank full.

**The above items are not Warranty related and fall under Maintenance.
Trouble Shooting begins after 1 thru 6 are checked and corrected.**

**Customer need to be advised of corrective actions needed .
Before any Warranty work is performed**

See Page 8 for fuse and circuit breaker locations

TROUBLESHOOTING SECTION

BEFORE DOING 10 -10 TEST :

- 1. SHUT OFF TRUCK ENGINE.**
- 2. UNHOOK CHARGE COIL FROM TRACTOR .**
- 3. SHUT OFF BATTERY CHARGER .**
- 4. DISCONNECT ANY OUTSIDE BATTERY SOURCE.**

CONFIRMING BATTERY VOLTAGE WITH 10 -10 TEST :

USING A MULTIMETER , SET ON DC VOLTAGE .

ATTACH VOLT METER NEGATIVE , TO NEGATIVE POST ON MOTOR

ATTACH VOLT METER POSITIVE , TO POSITIVE POST ON MOTOR

USING THE LIFT SWITCH RAISE THE PLATFORM TO BED LEVEL

KEEPING THE SWITCH ACTIVATED , DEADHEAD THE MOTOR

KEEP SWITCH ACTIVATED FOR TEN (10) SECONDS AND OBSERVE THE MULTIMETER READING

TEN (10) VOLTS FOR TEN (10) SECONDS IS THE DESIRED RESULT

IF READING IS LESS THAN EIGHT (8) VOLTS THE BATTERIES ARE LOW AND NEED TO BE CHARGED

RETEST AFTER CHARGING

REPLACE BATTERIES AND CHECK ALL CONNECTIONS AND GROUNDS IF YOU CANNOT GET 10 -10

NOTE - WHILE DOING THE 10-10 TEST , OTHER LIFT GATE MOVEMENTS WILL INDICATE A HYDRAULIC PROBLEM

LIFT GATE NOT WORKING

HEAR SOLENOIDS CLICKING

1. CHECK CIRCUIT BREAKER AT BATTERIES
2. GO TO : MOTOR NOT RUNNING

HEAR NO SOLENOIDS CLICKING

1. CHECK FUSES AT POWER PACK
2. CHECK FOR BAD SWITCHES
3. CHECK FOR BAD MOTOR SOLENOID
BAD SOLENOID VALVE

MOTOR NOT RUNNING

1. JUMP ACROSS LARGE POSTS ON MOTOR SOLENOID
IF MOTOR RUNS , TEST FOR INCOMING SIGNAL ON SMALL TERMINAL
AND GROUND ON OTHER SMALL TERMINAL
TEST THERMO SWITCH IN MOTOR FOR CONTINUITY
SIGNALS GOOD , REPLACE MOTOR SOLENOID
2. JUMP ACROSS LARGE POSTS ON MOTOR SOLENOID
IF MOTOR DOES NOT RUN , JUMP MOTOR DIRECT WITH
JUMPER CABLES FROM SEPARATE GOOD BATTERY
 - 2.a. MOTOR NOT RUNNING , TAP ON MOTOR , MOTOR RUNS , BRUSHES ARE
BAD
 - 2.b. MOTOR RUNS , CHECK MOTOR GROUND AND POWER TO MOTOR
SOLENOID



LIFT GATE NOT LIFTING

MOTOR NOT RUNNING : Go to section in this manual on Motor Not Running

LIFT GATE NOT LOWERING

S-1 & S-2 VALVES ON LIFT CYLINDERS NOT OPENING (IF POWER DOWN CHECK S5 VALVE OPENING AND MOTOR RUNNING)

LIFT GATE NOT LIFTING LOAD

FIRST, ADD 12 VOLT POWER SUPPLY DIRECT TO BATTERIES

SECOND, MOVE 12 VOLT POWER SUPPLY DIRECT TO MOTOR SOLENOID AND GROUND ON MOTOR

ADJUST PSI TO 3000 PSI , 3400 PSI ON ILK/ ILQ 2200

CHANGE HYDRAULIC FLUID TO FLUID ISO 32

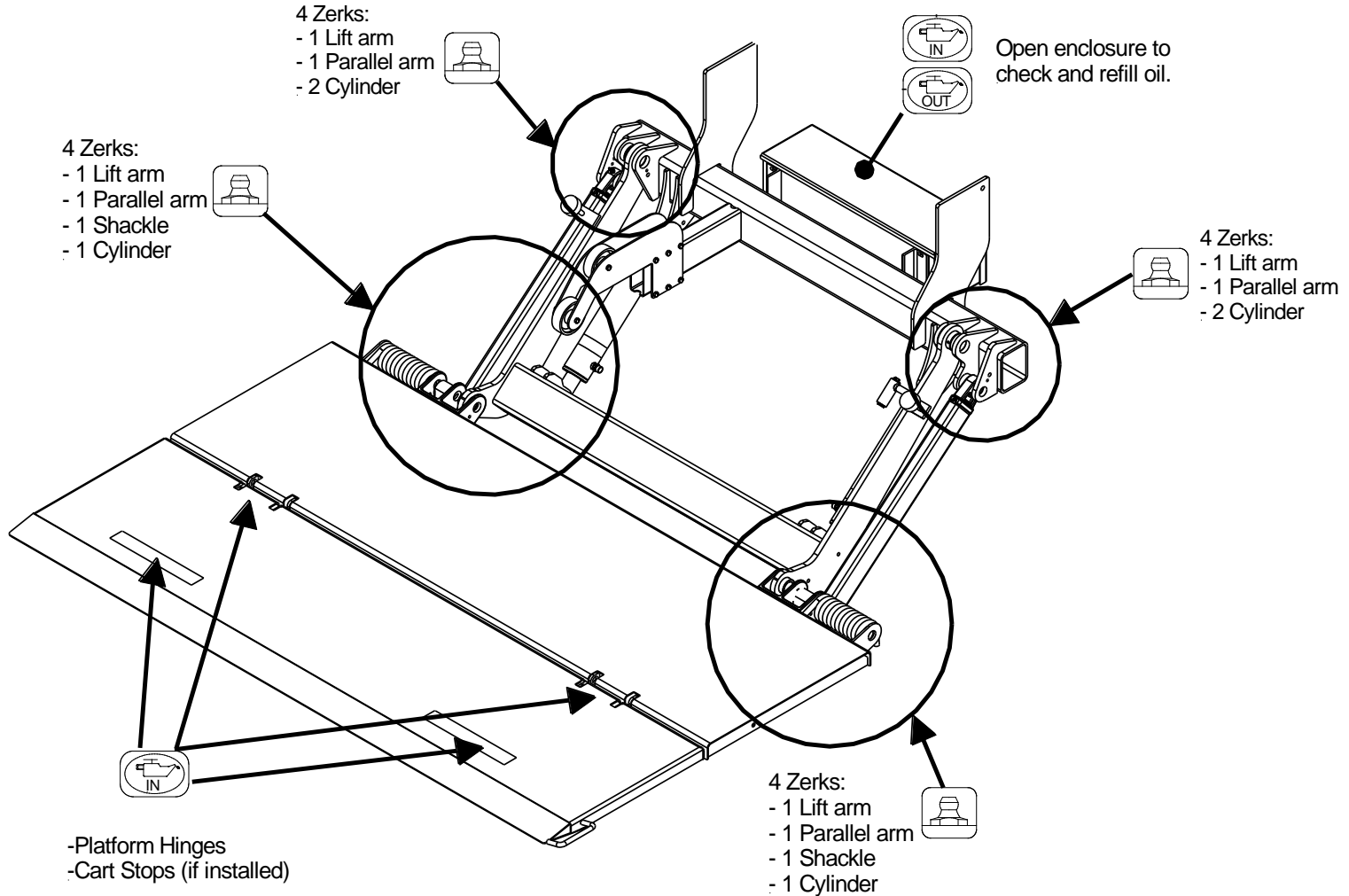
Maintenance and Care

The following inspection and maintenance should be performed at the recommended intervals depending on operation and amount of cycles or at the time when the unit shows any signs of damage or abuse. Remember that the secret to a long life of your PALFINGER Liftgates is to maintain it through preventive care.

* Recommended bases for inspection and maintenance	Depending on use	Daily	Monthly	Quarterly
Cleaning	X			
General lubrication of pins and bushings				X
Oil level inspection				X
Oil change	X			
Check hydraulic hoses and pipes for leaks				X
Check controls and connections				X
Check pins and pin retaining bolts			X	
Check batteries and connections				X
Check warning labels and other safety equipment for effectiveness and visibility		X		
Visual check for loose or missing parts and un-usual noise during operation		X		
Check lock bolts and pins for tightness				X
Check complete function of gate		X		
Check mounting brackets of lift gate to frame for cracks or damage visually		X		

PLR Dual Cylinder - Lubrication

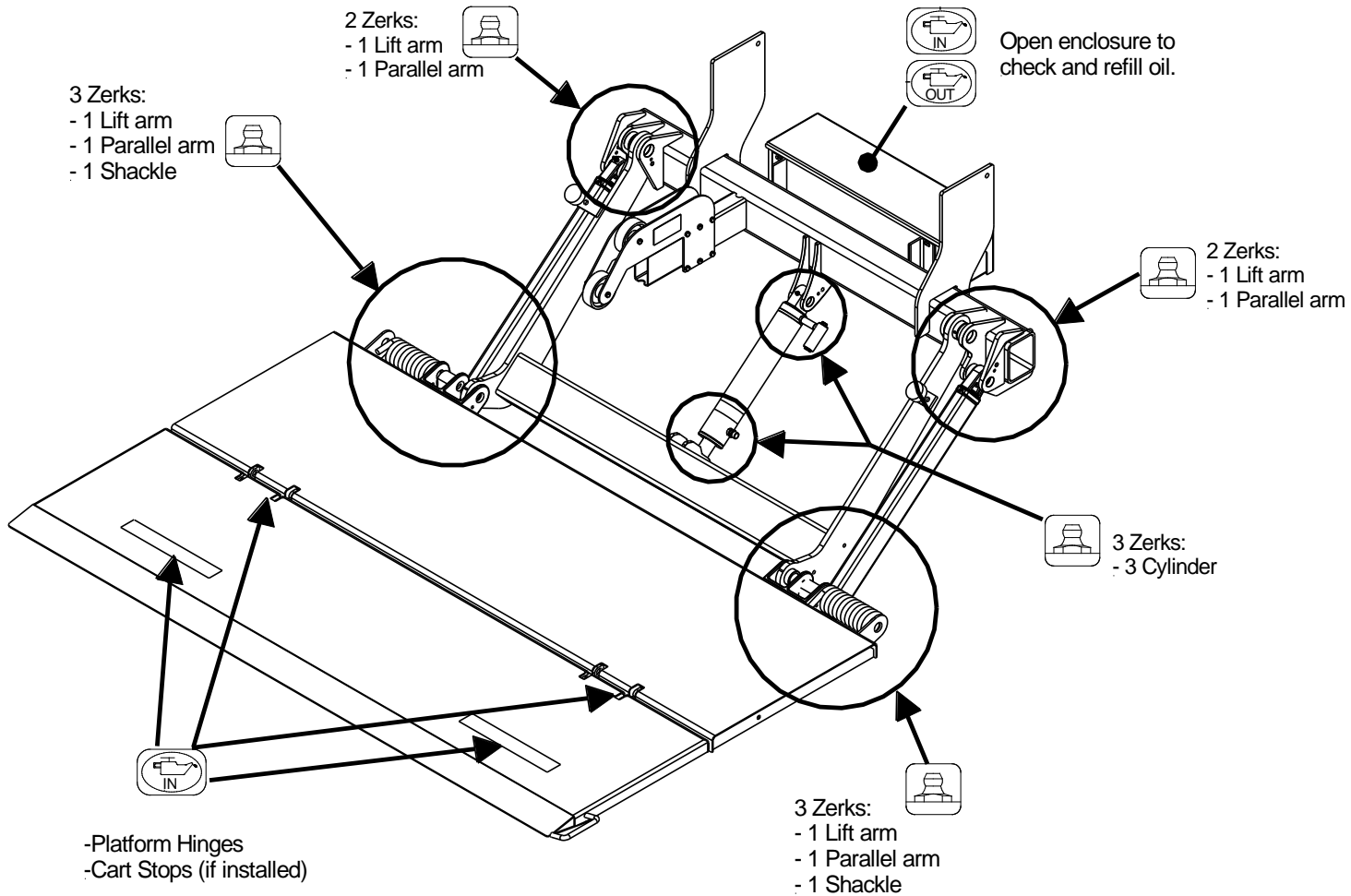
1. Lower the platform to the ground.
2. Remove red protector caps from each zerk. Lubricate, grease, and oil per diagram below.
3. Cycle platform up and down several times. Lubricate and grease all points again.
4. Wipe any excess grease and cap all zerks.



PLR Single Cylinder - Lubrication



1. Lower the platform to the ground.
2. Remove red protector caps from each zerk. Lubricate, grease, and oil per diagram below.
3. Cycle platform up and down several times. Lubricate and grease all points again.
4. Wipe any excess grease and cap all zerks.



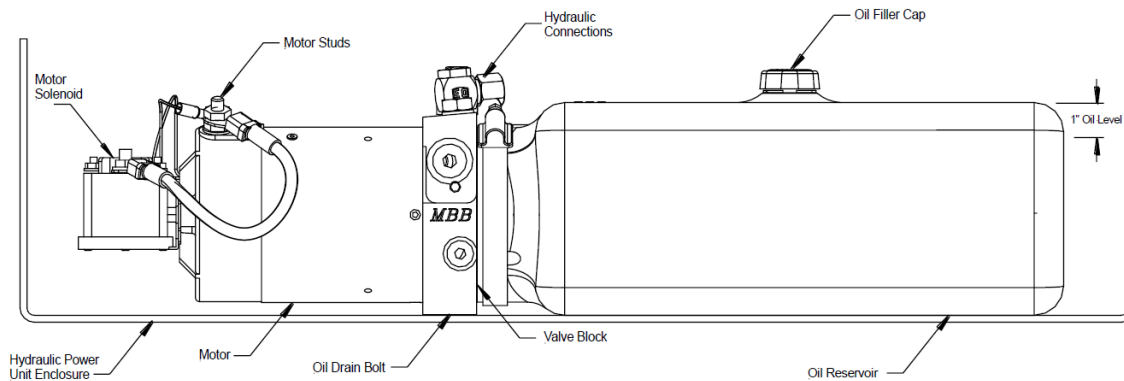
Checking and changing oil

To check fluid:

1. To begin, lower gate to ground and tilt platform down.
2. Open the rubber cover on the curb side of the mount tube and remove the lock bolt on the power pack tray. Pull the power pack tray out until the oil filler cap can be accessed.
3. The level of the oil should be between 1.0" to 1.5" from the top of the oil reservoir when the platform is tilted down at ground level. If fluid is required, use a recommended fluid from the 8.3.1 fluids table.

To change fluid:

4. Unscrew the oil drainage bolt and let the fluid drain out of the reservoir into an approved container. When reservoir is empty fill the reservoir up between 1.0"-1.5" from the top of the reservoir.. Change oil at least once a year, preferable in the fall before the weather gets cold. The operation of the liftgate will accumulate condensation and some dirt which can interfere with the liftgates



Bleeding Hydraulic System

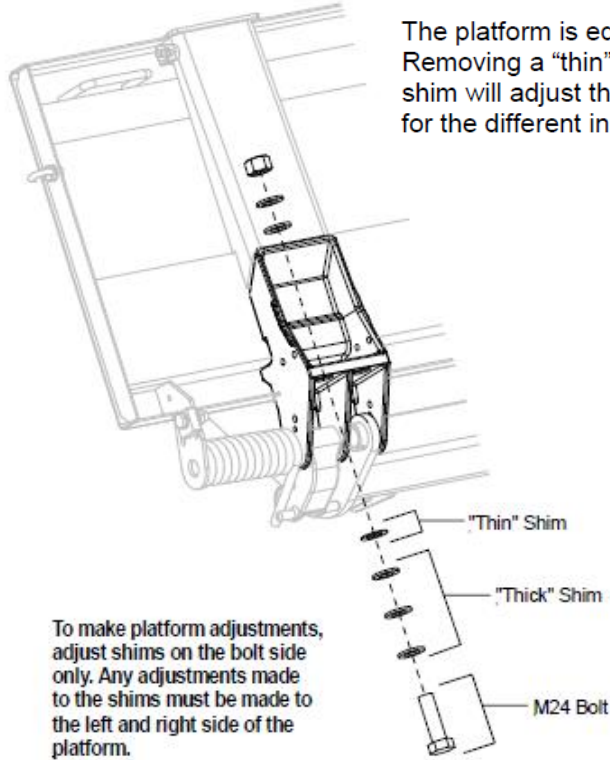
All Palfinger Liftgates have Vented caps on Reservoir and will Push air in Hydraulic System back to Reservoir and out vented cap by just running the liftgate through normal cycles and keeping Hydraulic fluid at the proper level in Reservoir during this process.

Recommended Hydraulic Fluids

TEMP. RANGE	BRAND	
-10 TO 150 F	EXXON	UNIVIS J26
	MOBIL OIL	DTE 13M
	CHEVRON	AW MV32
	ROSEMEAD	MV 150 (32)
-50 TO 150 F	MOBIL	DTE 13M
	SHELL	AERO FLUID 4
EXTREME COLD TEMPERATURE:	USE MILITARY SPEC:	MIL H5606

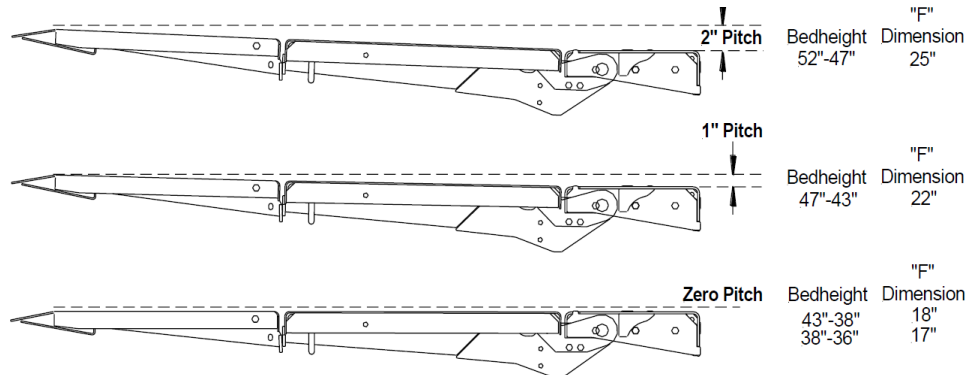
PREVENTIVE MAINTENANCE

Adjusting Pitch on Platform



The platform is equipped with a combination of “shims” (washers) installed on the stop bolts. Removing a “thin” shim will adjust the platform pitch by approximately 5/8”, and removing a “thick” shim will adjust the pitch by approximately 1-1/4”. Making these adjustments will assist in making up for the different installation variables.

To make platform adjustments, adjust shims on the bolt side only. Any adjustments made to the shims must be made to the left and right side of the platform.



PREVENTIVE MAINTENANCE

Adjusting Platform Springs

Fig.37. Secure the cam with the bolt and nut. Torque the bolts to 100 ft-lbs, **Fig.38.** Repeat the process for the curb side cam. Make sure driver side and curb side cams are installed in the same tension setting.

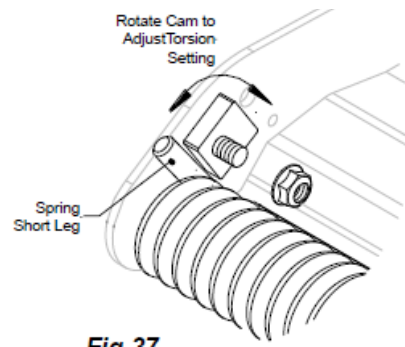


Fig.37

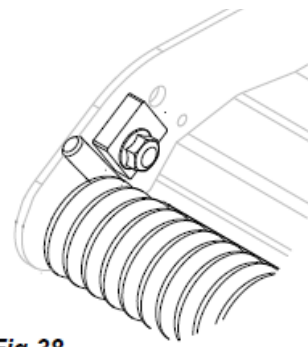
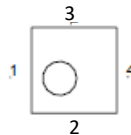


Fig.38



Tension Settings:
1 = Low Tension
4 = High Tension

4 different torsion settings are possible after adjusting the cam.

Torsion Settings for Aluminum and Steel Platforms:

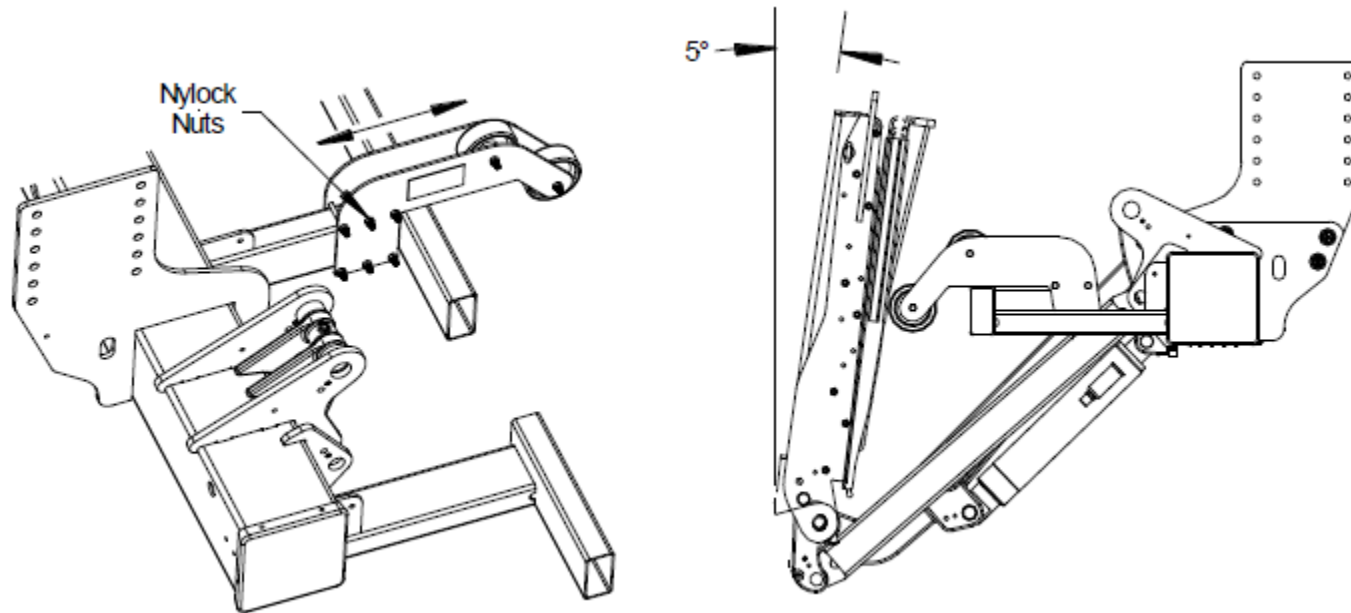
Aluminum: Setting 2

Steel: Setting 4

PREVENTIVE MAINTENANCE

Adjusting Sliding Wheel

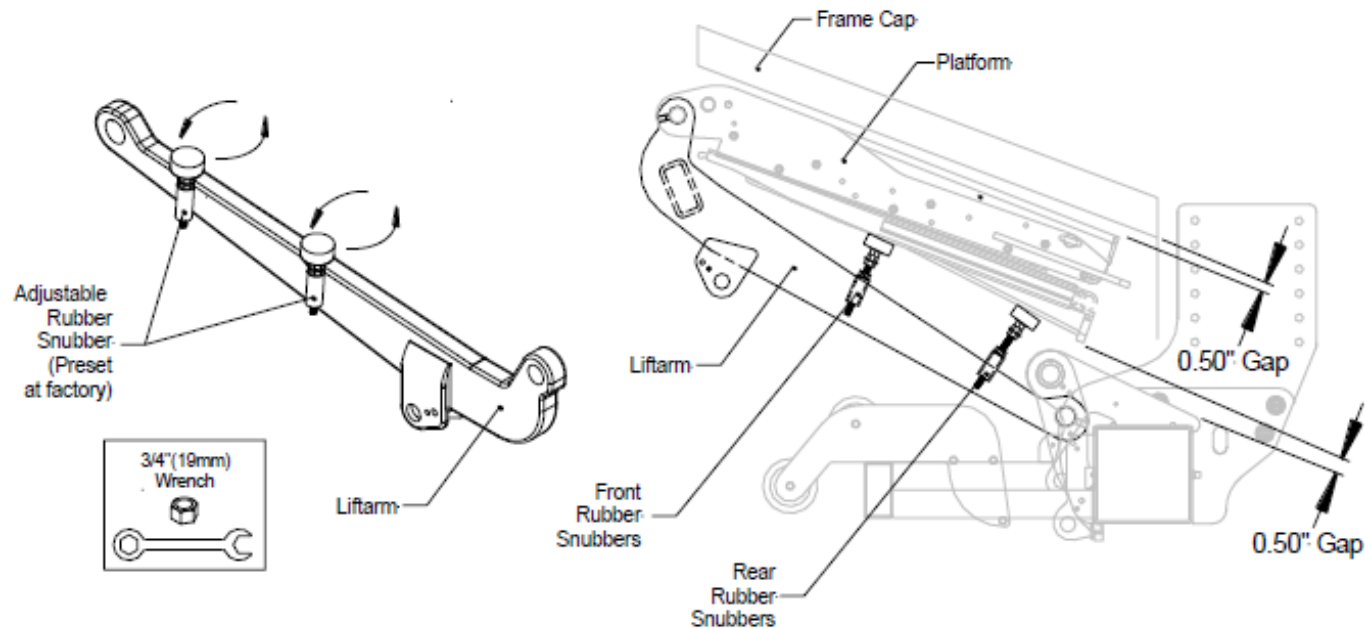
Adjust Sliding Wheel: Loosen the nylock nuts to adjust the sliding wheel bracket, back or forward, so the platform is 5 degrees in from vertical when resting against the wheel. Tighten all lock nuts when finished.



PREVENTIVE MAINTENANCE

Adjusting Rubber Snubbers

Adjustable Rubber Snubber: Adjust (4) rubber snubbers up to force platform against frame caps to hold platform from bouncing while vehicle is moving. Make sure there is a 1/2" gap between the frame cap and the platform. Adjust the Rear rubber snubber first and the Front second. Also make sure the rubber snubbers are adjusted so that the gate does not rub on other components during the opening and closing sequences.



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