Powered Access Ladder

Section 03-07

Komatsu has made every effort to make this manual as accurate as possible based on the information available at the time of publication and printing. Continuous improvement and advancement of product design may cause changes to machines which may not have been included in this publication. Komatsu reserves the right to make changes and improvements at any time. To ensure the most current information, please contact your service center.

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Safety

This publication contains special instructions that pertain to safety, operation, maintenance, and repair of the machine. Listed below are the signal words and symbols that precede these instructions and their meanings:

DANGER

- **The danger label indicates a hazardous situation which, if not avoided, will result in death or serious injury.**

WARNING

- **The warning label indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

CAUTION

- **The caution label, used with the safety alert symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury (includes the safety alert symbol).**

CAUTION

- **The caution label (without safety alert symbol) is used to address practices not related to personal injury – only equipment damage.**

NOTICE

The NOTICE graphic is to indicate areas of importance to the reader that are not related to personal injury or machine damage.

It is ESSENTIAL for operators and maintenance personnel to read and understand all of this publication prior to operating or performing maintenance/repair procedures to the machine.

Safety, Warnings, and Cautions

WARNING

CRUSH HAZARD

- **Crush hazards exist if attempting to transport personnel on the machine. There are no provisions on the machine to accommodate the transportation of any persons other than the operator alone, unless a training seat in the cab is optionally provided. Ladders and catwalks attached to the machine are designed for servicing of the machine while the machine is stopped only. They are NOT designed for transporting riders at any time. Do not transport personnel or allow riders on the machine. A crush hazard is present while riding on any location of the machine other than the cab Operator's seat or training seat (if so equipped), which could result in serious injury or death.**
- **Crush hazards exist if the park brake is not set before operating the ladder. Before raising or lowering the ladder, set the machine park brake. Uncontrolled machine movement could cause a hazardous condition when trying to enter or exit the ladder, which could result in serious injury or death.**

- **Crush hazards exist from leaving the cab without setting the park brakes, which could result in unplanned and uncontrolled movement of the machine. The operator should never leave the cab with the park brake released. Set the park brake before leaving the cab. Leaving the cab without setting the park brake could cause a crush hazard from unexpected machine movement, resulting in property damage, serious injury or death.**
- **Crush hazard exists when placing the ladder in the "DOWN" position. Always lockout the ladder activation valve (or bleed the air system to 0 psi) prior to performing any service operations to the ladder. Failure to do so could cause a crush hazard resulting in serious injury or death.**

STRUCK BY AND CRUSH HAZARDS

- **Struck by or Crush hazards exist if personnel are in the travel area of the ladder when it is being lowered or raised. The ladder lowers and raises rapidly when engaged. Before lowering or raising the ladder, make sure all personnel are clear of the area. Being struck by the ladder or thrown off the machine could result in serious injury or death.**
- **Struck by or Crush hazards exist if personnel are in the travel area of the ladder when it is being lowered by using the back-up bleed down valve. When lowering the ladder, be certain all personnel are a safe distance from the ladder. Lowering the ladder without power by activating the "Back-up Bleed Down Valve" causes the ladder to RAPIDLY lower NON-STOP until reaching ground level. Releasing the "Back-up bleed Down Valve" knob or cable will NOT stop the ladders' rapid decent to ground level. Being struck or crushed by the ladder could result in serious injury or death.**
- **Struck by or Crush hazards exist if the ladder is not de-energized prior to performing maintenance work on it. Place the ladder in the "DOWN" position and use Battery Isolation Switch to de-energize the ladder prior to performing any service operations to the ladder. Failure to de-energize the ladder prior to working on it could cause personnel to be struck by or crushed by the ladder, resulting in serious injury or death.**
- **Struck by or crush hazard exists if personnel are in the travel area of the ladder when it is being lowered by using the back-up bleed down valve. When lowering the ladder, be certain all personnel are a safe distance from the ladder. Lowering the ladder without power by activating the "Back-up Bleed Down Valve" causes the ladder to RAPIDLY lower NON-STOP until reaching ground level. Releasing the "Back-up bleed Down Valve" knob or cable will NOT stop the ladders' rapid decent to ground level. Being struck or crushed by the ladder could result in serious injury or death.**

FALL HAZARD

- **Fall hazard exists due to uncontrolled ladder movement if it is not placed in the full down position before entering or exiting the ladder. Place the ladder in the full DOWN position before entering or exiting the ladder. Serious injury is possible if the ladder is not in the full DOWN and LOCKED position before entering or exiting the machine.**

FALL AND CRUSH HAZARDS

- **Fall hazard or Crush hazards exist if personnel rides the ladder up or down. Never ride the ladder up or down when it is being activated. Being struck by or crushed by the ladder could result in serious injury or death.**
- **Fall hazard or crush hazards exists when operating the ladder or using it to enter or exit the machine. To avoid personal injury and component damage it is essential that all personnel using the ladder be familiar with its operation and all indicators and alarms. Falls and crush hazards are possible if personnel are not familiar with the ladder operation before using it, which could result in serious injury.**

⚠ CAUTION

FALL AND SLIPPING HAZARDS

- **Fall hazards and slipping hazards exist when mounting and dismounting the machine. Ensure the ground conditions are such that slipping or falling does not occur when stepping on or off the ladder. Always ensure firm ground before releasing the ladder when dismounting the machine. Failure to ensure firm ground before mounting or dismounting a machine can cause fall and slipping hazards resulting in injury.**

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Scope of This Publication

POWERED ACCESS LADDER contains information about the operation and maintenance for the access ladder. It is essential that all personnel, that are to use the ladder, receive the following instructions and training before operating the access ladder. Various models are available as explained in the following text.

Mounting and Dismounting the Machine

These guidelines should be followed when mounting and dismounting the machine:

⚠ WARNING

Crush hazards exist if attempting to transport personnel on the machine. There are no provisions on the machine to accommodate the transportation of any persons other than the operator alone, unless a training seat in the cab is optionally provided. Ladders and catwalks attached to the machine are designed for servicing of the machine while the machine is stopped only. They are NOT designed for transporting riders at any time. Do not transport personnel or allow riders on the machine. A crush hazard is present while riding on any location of the machine other than the cab Operator's seat or training seat (if so equipped), which could result in serious injury or death.

a. Always use "three-point support" with the machine, and face the ladder while you enter or leave it. "Three point support" means that three out of four arms and legs are in contact with the machine at all times during mount and dismount.

⚠ CAUTION

Fall hazards and slipping hazards exist when mounting and dismounting the machine. Ensure the ground conditions are such that slipping or falling does not occur when stepping on or off the ladder. Always ensure firm ground before releasing the ladder when dismounting the machine. Failure to ensure firm ground before mounting or dismounting a machine can cause fall and slipping hazards resulting in injury.

b. Clean shoes and wipe hands before attempting to climb on the machine.

c. Look for icy/slick conditions that could make use of a ladder or stairway treacherous.

d. Use handholds, ladders, or steps (as provided) when mounting and dismounting.

e. NEVER attempt to mount or dismount a moving machine.

f. NEVER jump off the machine.

g. NEVER try to climb on or off the machine when carrying tools or supplies. Use a hand line to pull equipment up onto the platform.

h. Observe proper shutdown procedures before dismounting.

i. Follow all local work rules for mounting and dismounting the machine.

Ladder Mounted on Hydraulic Reservoir

A ladder is mounted on the hydraulic reservoir. When using this ladder, refer to instructions in “Mounting and Dismounting the Machine” as previously explained in this document.

Powered Access Ladder

"Power Step Model RL1001 & RL1002"

Some P&H wheel loaders are optionally equipped with a powered access "Power Step Model RL1001" ladder mounted on the left rear of the rear frame.

Safe operation of the ladder depends on adherence to the safety warnings and cautions, and all safety rules required in the users area of operation. Periodic inspection and service must also be performed to the ladder to ensure safe and trouble-free operation.

⚠ WARNING

Struck by or Crush hazards exist if personnel are in the travel area of the ladder when it is being lowered or raised. The ladder lowers and raises rapidly when engaged. Before lowering or raising the ladder, make sure all personnel are clear of the area. Being struck by the ladder or thrown off the machine could result in serious injury or death.

⚠ WARNING

Struck by or Crush hazards exist if personnel are in the travel area of the ladder when it is being lowered by using the back-up bleed down valve. When lowering the ladder, be certain all personnel are a safe distance from the ladder. Lowering the ladder without power by activating the "Back-up Bleed Down Valve" causes the ladder to RAPIDLY lower NON-STOP until reaching ground level. Releasing the "Back-up bleed Down Valve" knob or cable will NOT stop the ladders' rapid decent to ground level. Being struck or crushed by the ladder could result in serious injury or death.

⚠ WARNING

Fall hazard or Crush hazards exist if personnel rides the ladder up or down. Never ride the ladder up or down when it is being activated. Being struck by or crushed by the ladder could result in serious injury or death.

CAUTION

Component damage can result from attempting to ride the ladder up or down during operation. Do not ride the ladder up or down. Riding the ladder will void the manufacturer's warranty and could result in component damage.

⚠ WARNING

Struck by or Crush hazards exist if the ladder is not de-energized prior to performing maintenance work on it. Place the ladder in the "DOWN" position and use Battery Isolation Switch to de-energize the ladder prior to performing any service operations to the ladder. Failure to de-energize the ladder prior to working on it could cause personnel to be struck by or crushed by the ladder, resulting in serious injury or death.

⚠ WARNING

Crush hazards exist if the park brake is not set before operating the ladder. Before raising or lowering the ladder, set the machine park brake. Uncontrolled machine movement could cause a hazardous condition when trying to enter or exit the ladder, which could result in serious injury or death.

⚠ WARNING

Fall hazard exists due to uncontrolled ladder movement if it is not placed in the full down position before entering or exiting the ladder. Place the ladder in the full DOWN position before entering or exiting the ladder. Serious injury is possible if the ladder is not in the full DOWN and LOCKED position before entering or exiting the machine.

⚠ WARNING

Fall hazard or crush hazards exists when operating the ladder or using it to enter or exit the machine. To avoid personal injury and component damage it is essential that all personnel using the ladder be familiar with its operation and all indicators and alarms. Falls and crush hazards are possible if personnel are not familiar with the ladder operation before using it, which could result in serious injury.

⚠ WARNING

Crush hazards exist from leaving the cab without setting the park brakes, which could result in unplanned and uncontrolled movement of the machine. The operator should never leave the cab with the park brake released. Set the park brake before leaving the cab. Leaving the cab without setting the park brake could cause a crush hazard from unexpected machine movement, resulting in property damage, serious injury or death.

NOTICE

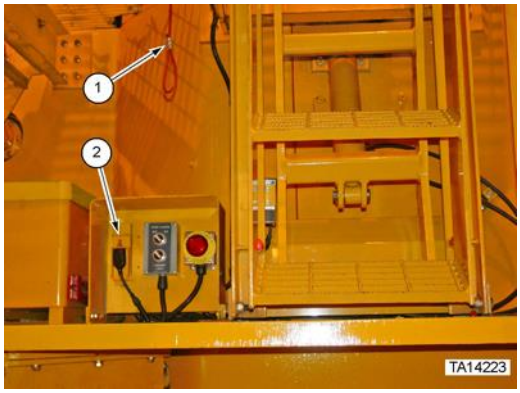
If the park brake is released with the ladder in the DOWN position, an alarm is posted on the touch screen. Tractive power is inhibited until the operator raises the ladder to the full UP and LOCKED position. The park brake must be set again and re-released before the park brakes will release.

Normal Operation

Two switches are provided to raise and lower the ladder. One switch operates the ladder at ground level, the other operates the ladder from an elevated level. A ground-level switch is mounted to the left of the ladder. The elevated-level switch is mounted at the ladder dismount area. Both locations have access to the mechanical safety latch that must be disengaged before raising or lowering the ladder. Access to a "Back-up Bleed Down Valve" used to lower the ladder without power is provided at both ground and elevated levels.

Ground Level Ladder Operation

To raise the ladder from ground location: Move the electrical toggle switch to the UP position and hold it until the ladder reaches the UP position. Refer to illustration “Ground level ladder controls”. The ladder will rise and lock in the UP position. **DO NOT attempt to operate the machine unless you are certain the ladder is LOCKED in the UP position.**



1. Mechanical Safety Latch Cable
2. Ground Level Toggle Switch

Figure 1. Ground level ladder controls

⚠ WARNING

Struck by or Crush hazards exist if personnel are in the travel area of the ladder when it is being lowered or raised. The ladder lowers and raises rapidly when engaged. Before lowering or raising the ladder, make sure all personnel are clear of the area. Being struck by the ladder or thrown off the machine could result in serious injury or death.

To lower the ladder from the ground location: Pull the hanging cable (Refer to illustration Ground level ladder controls to disengage the mechanical safety latch, then move the electrical switch to the DOWN position and hold it until the ladder reaches the DOWN position. The mechanical latch cable can be released once the ladder clears the mechanical latch. The ladder will lower and lock in the DOWN position.

Elevated Level Ladder Operation

To raise the ladder from elevated location: Move the electrical toggle switch to the UP position and hold it until the ladder reaches the UP position. Refer to illustration Elevated level ladder controls. The ladder will rise and lock in the UP position. **DO NOT attempt to operate the machine unless you are certain the ladder is in the UP position.**

1. Elevated Level Toggle Switch (Typical Location)
2. Mechanical Safety Latch Lever
3. Back-Up Bleed Down Valve Cable

Figure 2. Elevated level ladder controls

To lower the ladder from the elevated location: Step on the "Mechanical Latch Activation Lever" to disengage the mechanical safety latch, then move the electrical switch to the DOWN position and hold it until the ladder reaches the DOWN position. Refer to illustration Elevated level ladder controls. The Mechanical Latch Activation Lever can be released once the ladder clears the mechanical latch. The ladder will lower and lock in the DOWN position.

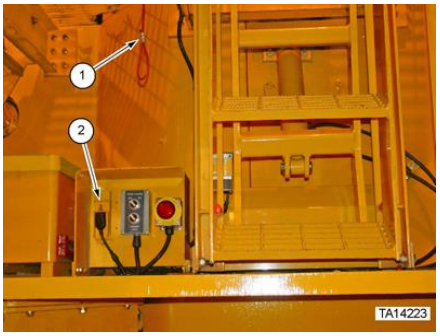
Operating the Ladder without Electrical Power

If loss of electrical power to the ladder occurs, a "Back-up bleed Down Valve" is provided to allow hydraulic fluid release within the system, allowing the ladder to be lowered. The ability to actuate the "Back-up bleed Down Valve" is provided at the ground location (by direct access to the valve) and elevated location (by use of a cable attached to the valve).

⚠ WARNING

Struck by or Crush hazards exist if personnel are in the travel area of the ladder when it is being lowered by using the back-up bleed down valve. When lowering the ladder, be certain all personnel are a safe distance from the ladder. Lowering the ladder without power by activating the "Back-up Bleed Down Valve" causes the ladder to RAPIDLY lower NON-STOP until reaching ground level. Releasing the "Back-up bleed Down Valve" knob or cable will NOT stop the ladders' rapid decent to ground level. Being struck or crushed by the ladder could result in serious injury or death.

To lower the ladder from the ground location without electrical power: Pull the hanging Mechanical Safety Latch Cable to disengage the mechanical safety latch, then pull out the Back-up bleed Down Valve knob. The mechanical latch cable can be released once the ladder clears the mechanical latch. The ladder will lower and lock in the down position. Refer to illustrations “Mechanical safety latch cable (ground location) and Back-up bleed down valve (ground location access)” for details.



1. Mechanical Safety Latch Cable
2. Ground Level Toggle Switch

Figure 3. Mechanical safety latch cable (ground location)

1. Back-Up Bleed Down Valve

Figure 4. Back-up bleed down valve (ground location access)

To lower the ladder from the elevated location without electrical power: Step on the Mechanical Safety Latch Lever to disengage the mechanical safety latch, then pull the Back-up Bleed Down Valve cable (refer to Back-up bleed down valve cable (elevated location access). The Mechanical Latch Activation Lever can be released once the ladder clears the mechanical latch. The ladder will lower and lock in the DOWN position.

1. Elevated Level Toggle Switch
2. Mechanical Safety Latch Lever
3. Back-Up Bleed Down Valve Cable

Figure 5. Back-up bleed down valve cable (elevated location access)

NOTICE

Before operating the ladder in normal mode, once power is restored, the "Back-up bleed Down Valve" must be reset by pushing it in until it reaches its' original position.

⚠ WARNING

Crush hazards exist from leaving the cab without setting the park brakes, which could result in unplanned and uncontrolled movement of the machine. The operator should never leave the cab with the park brake released. Set the park brake before leaving the cab. Leaving the cab without setting the park brake could cause a crush hazard from unexpected machine movement, resulting in property damage, serious injury or death.

Service, Inspection, and Lubrication

Daily Inspections

a. Check for oil leaks.

b. Check for loose or damaged fasteners and parts. Pay particular attention to the bolts that secure the ladder to the machine.

c. Listen for adverse noise conditions during operation.

d. Check for changes in appearance, such as improper alignment, that will affect operation and stability of the ladder.

e. Check safety labels. Replace any that have become illegible, damaged, or removed.

f. Check for cleanliness of stair steps. They should be free of debris and anything that would make the steps slippery, such as oil and grease.

Please refer to the vendor literature for more information.

Weekly Inspections

a. Check condition of switch, hydraulic hoses and fittings.

b. Check electrical wiring and connections.

Please refer to the vendor literature at the end of this section for more information.

Cleaning

a. Clean ladder as required to ensure safe entry and exit of the machine.

NOTICE

When washing the machine DO NOT aim high-pressure water at or near the ladder's control box or bearings.

Please refer to the vendor literature at the end of this section for more information.

Troubleshooting

Should the motor fail to operate, follow all safety procedures required to check the motor ground strap connected to the loader frame. Paint or corrosion can cause a poor connection that can prevent motor operation.

Vendor Literature

Models L1350/L1850/L2350

VL 89 – POWER STEP Operator and Maintenance Access Systems

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POWER STEP

Operator & Maintenance Access Systems

POWER STEP MANUALS

CONTENTS:
INSTALLATION MANUAL
INSPECTION & OPERATING INSTRUCTIONS
PARTS MANUAL
APPLICATION: LeTourneau l1850
Model No. RL1001

READ CAREFULLY BEFORE INSTALLATION AND OPERATION OF THE POWER STEP

POWER STEP INC.
P.O. Box 3005
Duluth, MN 55803
Phone: (218) 525-3758
Fax: (218) 525-1168

POWER STEP INSTALLATION – LeTourneau L1850
Model No. RL1001

INSTALLATION NEEDS

1. Boom truck or fork truck - 1000 lb. capacity.

2. Welding truck.

3. Two personnel - welder and mechanic.

4. 3 1/2 quarts of Dexron II or equivalent hydraulic oil. For cold weather environments, a broad range synthetic oil is recommended.

MOUNTING & ASSEMBLY

1. Remove the existing ladder assembly including power unit and related components. Review Figures 1 through 5 to see where power step components will be mounted. Refer to Figure 2 for assembly item numbers referred to below.

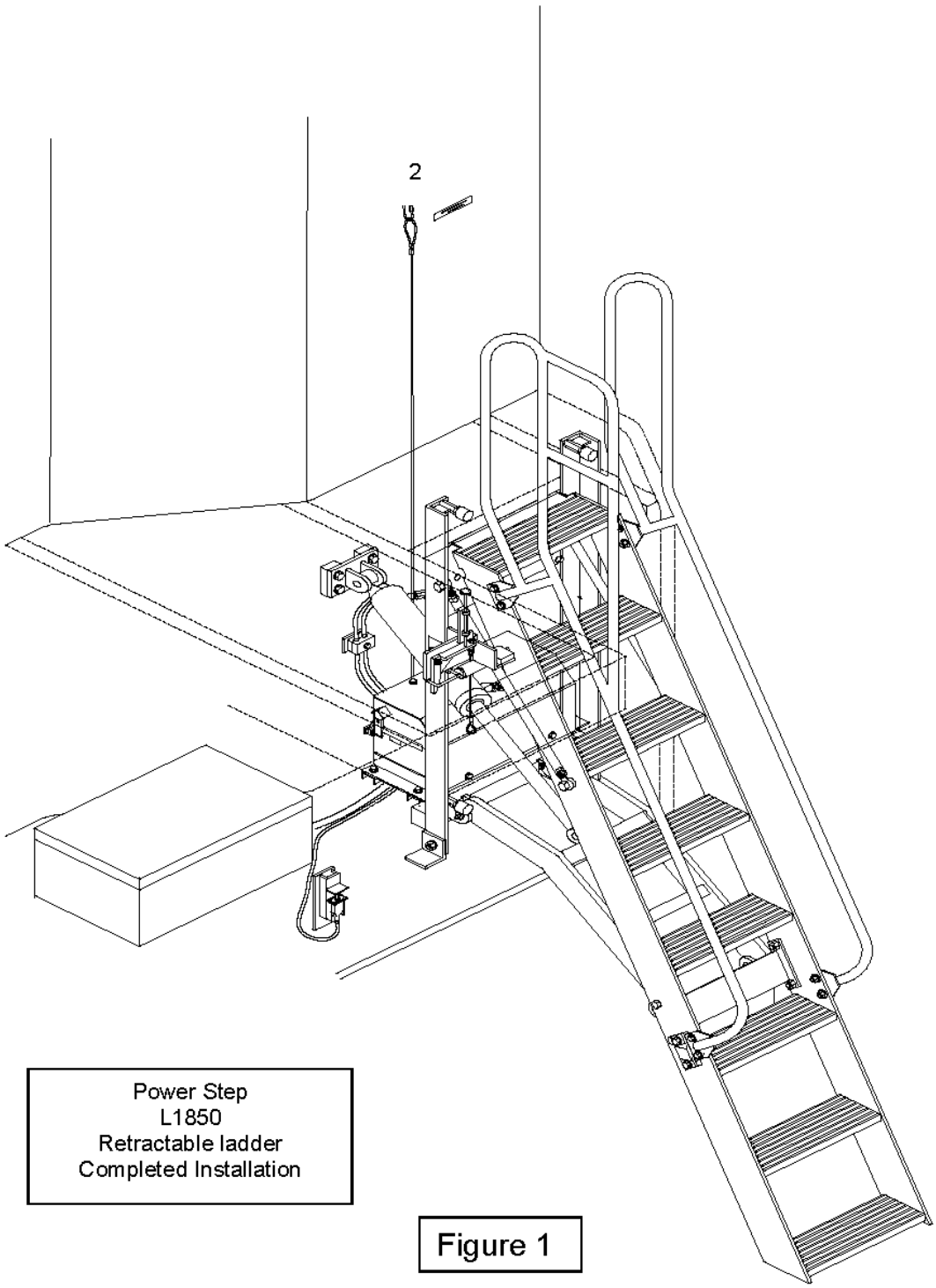
2. Lift ladder assembly (1) into place on existing mounting pins. Strap ladder against mounting bracket stops tightly to make assembly easier to handle (as shown in figure 3). Install 5/8 –11 x 1 ½ bolts (2) in mounting bracket.

3. Level assembly with machine and check for plumb with side of machine. Install lower mounting angles at bottom of mounting bracket legs using 5/8 –11 x 2 bolts, washers, and locknuts. Make angles flush with floor. Tack, then weld angles to floor. Tighten all mounting bolts.

4. Attach cylinder (10), to cylinder mounting block (11), using cylinder pin and cotter pin. Attach rod end of cylinder to ladder lift frame using pin and cotter pin. Extend cylinder rod approximately 3/4" from the fully closed position. There should be about ¼" clearace between the cylinder cap and lift frame (Figure 5). Place rear cylinder mount blocks up against back wall. Grind spot clean for welding. With cylinder properly aligned, tack blocks, check cylinder clearance, then weld to frame wall.

4. Carefully lower ladder to the full down position. Remove lifting sling.

5. Install right and left railings (3 and 4) using ½-13 x 1 ½ bolts, flat washers and nuts.



Power Step
L1850
Retractable ladder
Completed Installation

Figure 1

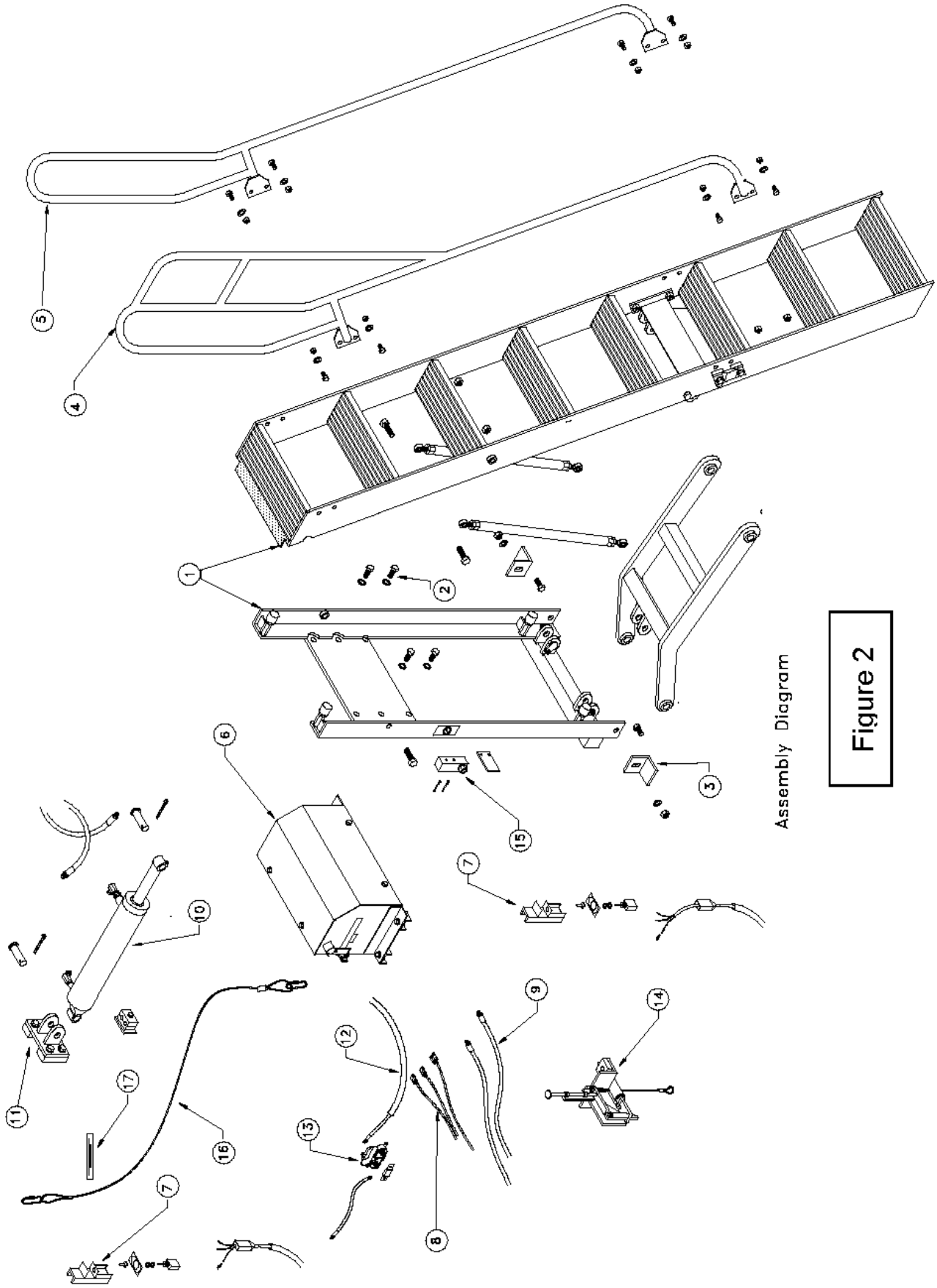


Figure 2

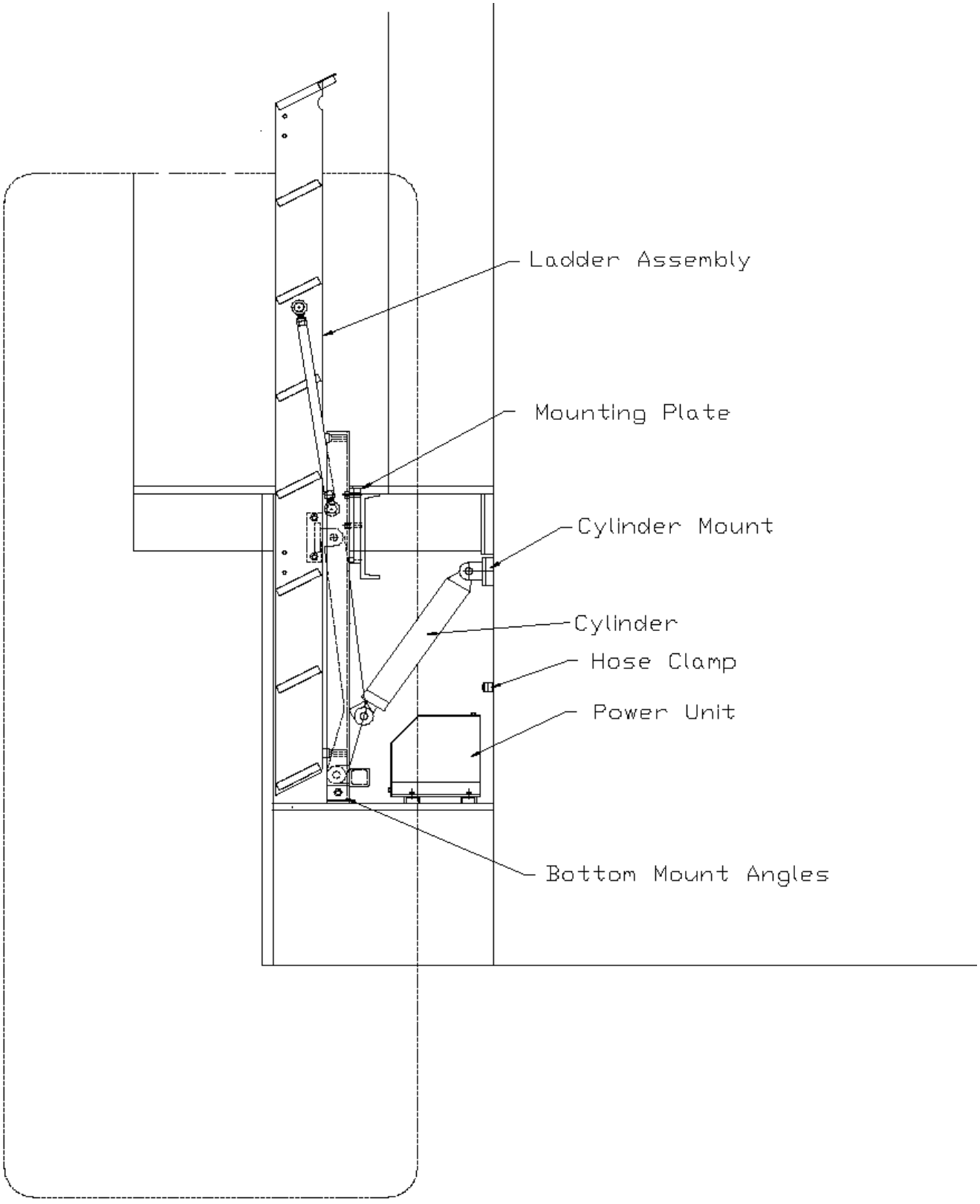


Figure 3

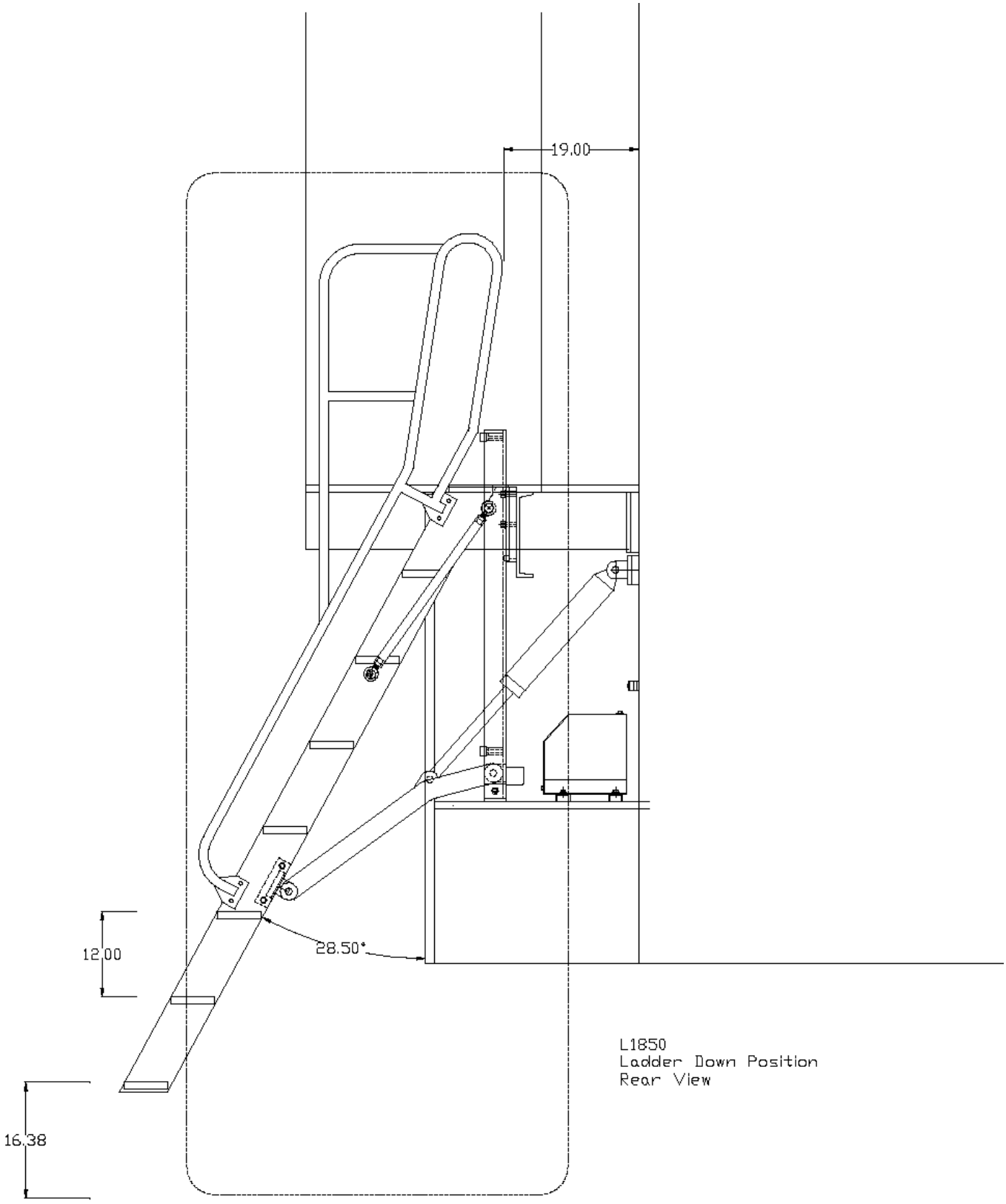


Figure 4

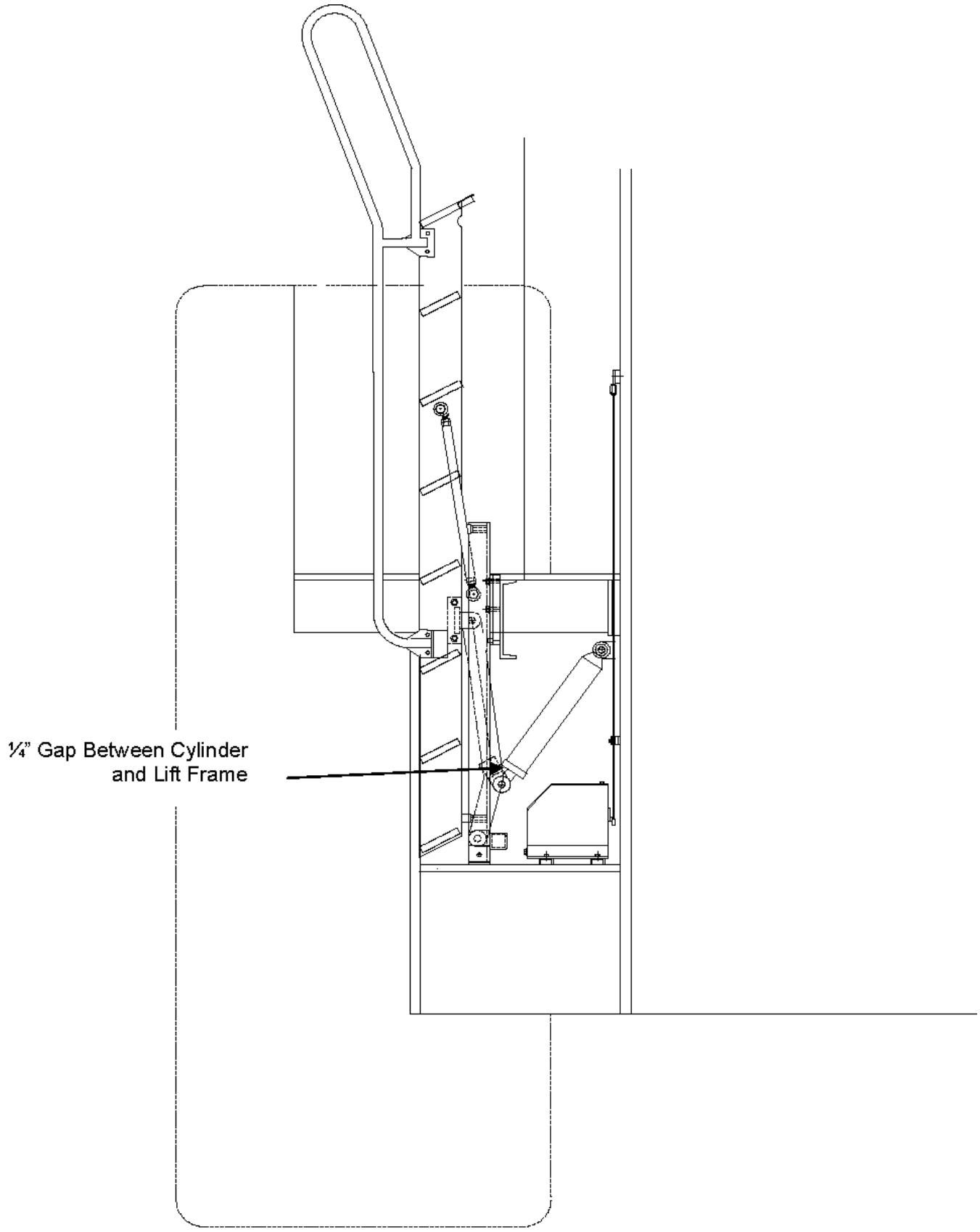


Figure 5

6. Set power unit into position behind ladder assembly, centered, with approximately 2" clearance between box and back wall. Weld mounting clips to floor.

7. Mount switch brackets (7). Mount one on upper rail upright (figure 10). Mount the other on the lower bumper plate near the batter box. Mount in protected locations where they will not be inadvertently actuated.

8. Open motor enclosure. Route the three wire harness connectors (8) under the enclosure and connect to control box connectors in the power unit (figure 6). Route the two 16/3 (3 wire connector) control wires to the two switch bracket locations. Tighten and clamp wires, then cut to length at switch brackets. Install switches as shown in Figure 7. Tie control wire to rail upright. Install clamps where necessary.

9. Route hydraulic hoses (9) between the power unit and cylinder. Connect hoses. For proper operation, the rod end of the cylinder hose is connected to the nearest fitting on the power unit (Figure 6).

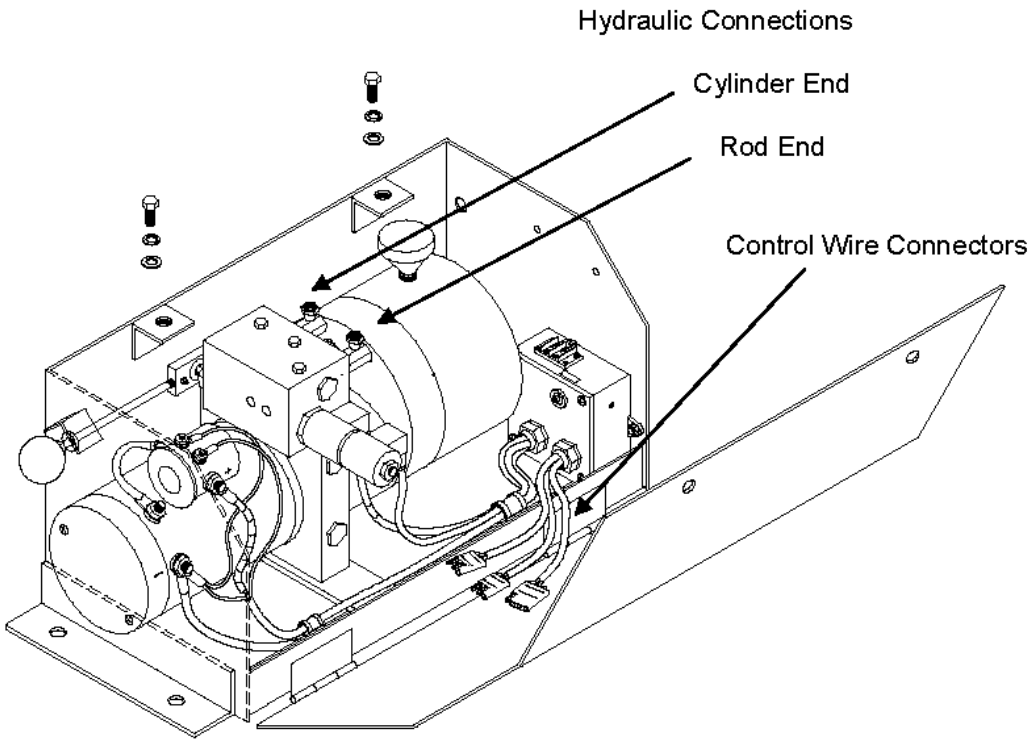


Figure 6

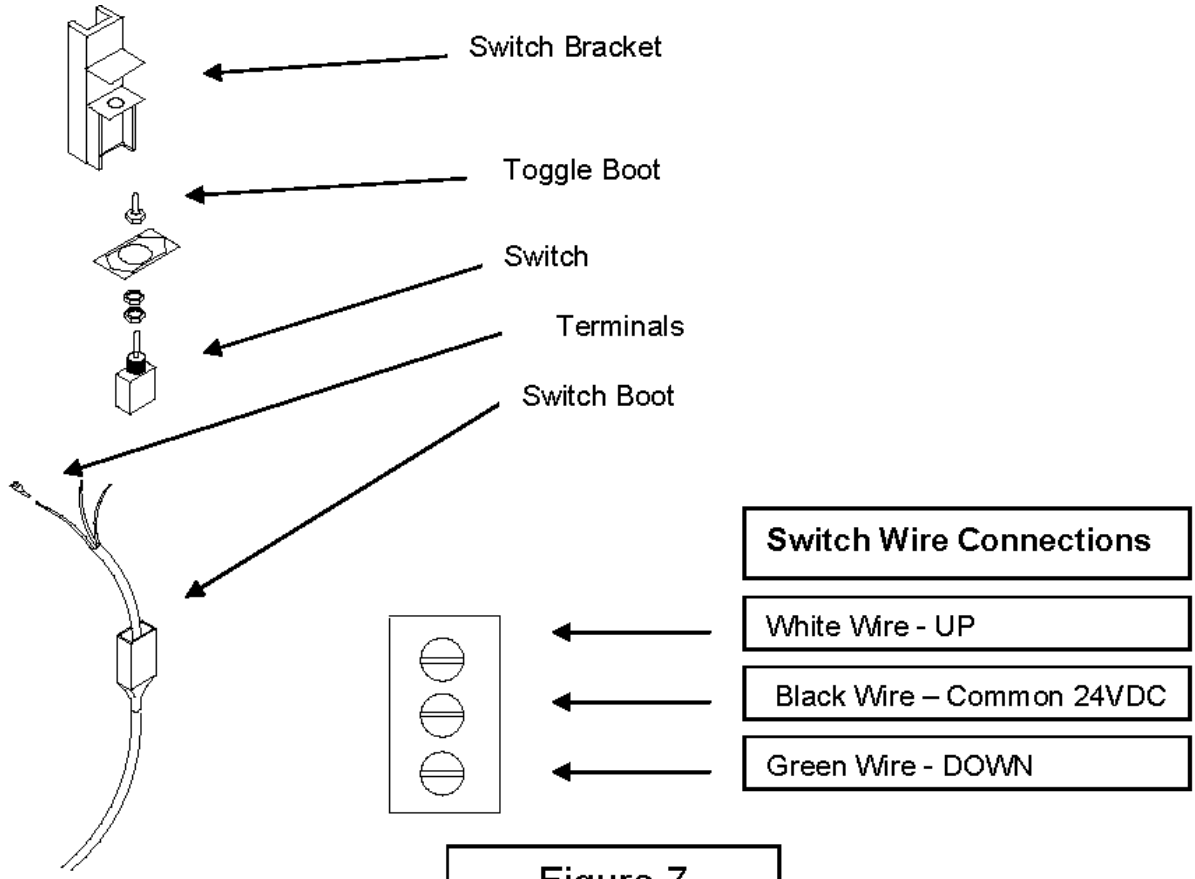


Figure 7

10. Attach end of battery cable (12) to power unit as shown in Figure 8.

11. Route the positive +24VDC battery cable from the power unit to the battery. Install the flexible conduit under the battery box opening. Install the fuse holder (13) inside the battery box (figure 9). Use the short cable to connect the fuse to the battery. Fill power unit with hydraulic fluid.

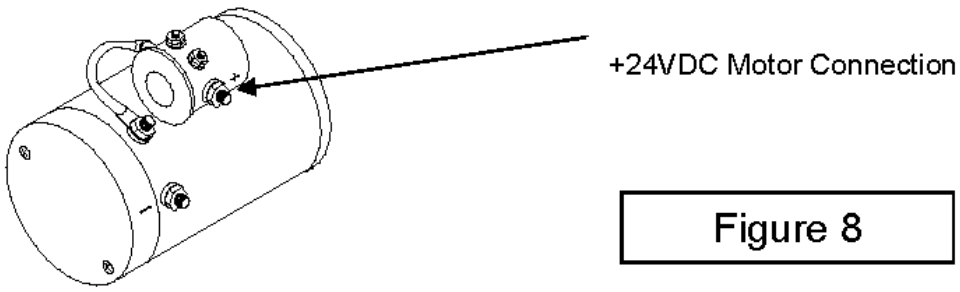


Figure 8

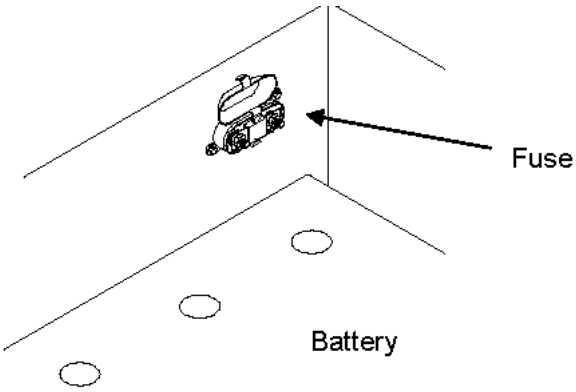


Figure 9

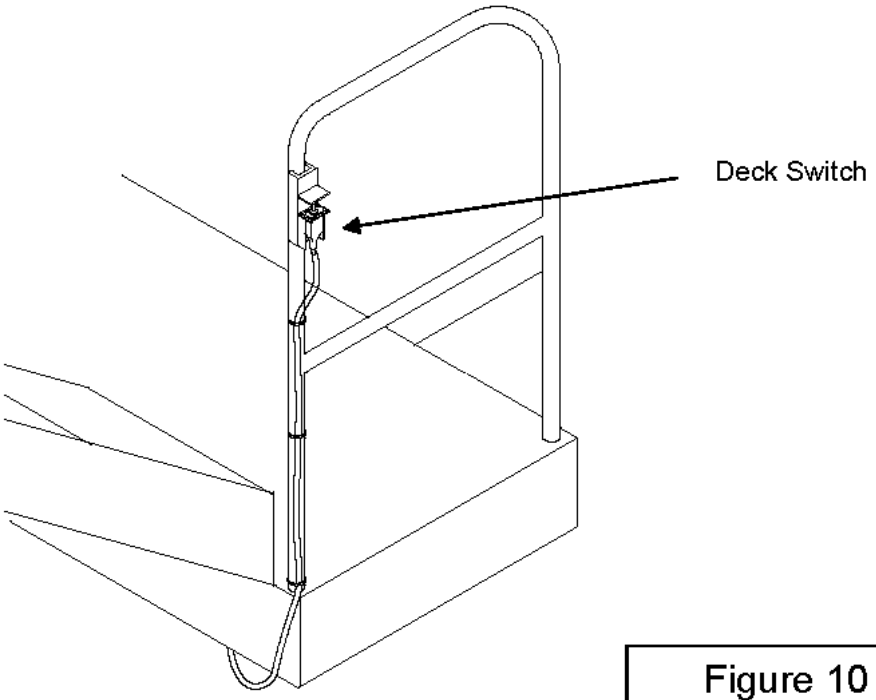


Figure 10

RUNNING AND ADJUSTMENT

1. Using one of the control switches, run step into the "up" position. Cycle several times to remove any possible air from the system. Adjust side turnbuckles if necessary for alignment and smooth operation.

2. Run ladder to the upper stop. Position the latch release assembly (14) under side channel so latch plate slides past and depresses pin during operation. Tack latch release assembly blocks in place on channel. Notch floor bars to allow release pedal to extend through floor. Test latch release by operating ladder, then weld blocks.

3. With ladder fully latched, mount limit switch and limit switch bracket (13) on the rear of the ladder bracket upright angle. Route the 16/2 (4 wire connector) wire to limit switch. Connect white to common and black to NC as shown in wiring diagram. The limit switch should be within ¼" (6 mm) of the step when in the "UP" position for proper sensing. Refer to wiring diagram. When in the up position, the outer green wire terminal in the control box will provide a ground signal to the machine (figure 11).

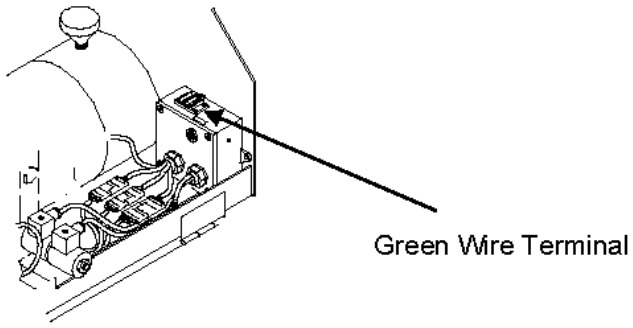


Figure 11

4. Connect valve release cable (16) to release lever on back of power unit. Run cable vertically along wall so it is accessible at the upper deck level. With cable semi loose in position, weld link to upper wall. Put label on wall near upper cable. Test cable for proper operation, then reset valve knob.

POWER STEP - MAINTENANCE INSTRUCTIONS - L1850

LUBRICATION:

Following installation, lubricate all components prior to use. Recommended lubrication frequency thereafter:

Lift Arm Pins- Grease Biweekly
Cylinder Pins-Grease Biweekly
Lock Pin-Grease or oil as necessary

INSPECTION AND MAINTENANCE:

OBSERVE AND CHECK THE FOLLOWING PRIOR TO USE AND DURING MAINTENANCE -

1. Ladder pivot and cylinder pins securely in place and not worn.
2. Hydraulic system for leakage.
3. Handrails in working order.
4. Step latch functional.
5. Mounting bolts in place and tight.
6. Stair treads in place and tight.
7. Check for other physical damage to components.

Check hydraulic fluid level if any leakage has occurred. Fill with Dexron II or equivalent ATF hydraulic oil.

CAUTION:

When maintaining hydraulic system, always check to see that restricted orifice fittings at the cylinder are in place before operation. If replacement is needed, refer to parts list for proper size and part number. Maintenance of the hydraulic system should be performed **ONLY** with the platform in the lowered position. Hydraulic system pressure relief valve within power unit is factory preset at 2000 psi. The 4-way valve package pressure relief is set at 600 psi. This is the system operating pressure.

WARNING - DANGER:

Forcibly raising the power step ladder by means other than under its own hydraulic power (crane, winch, etc.) will create excessive pressure in the cylinder and possibly cause pressure to be stored in the cylinder in the latched position, or caused air to enter the hydraulic system, through the cylinder. This practice will defeat the inherent safety features of the hydraulic system and create a dangerous situation for personnel. This practice should be avoided, if at all possible, to maintain safe operation of, or potential damage to the ladder. In those instances where this cannot be avoided, please follow the guidelines listed below to put the power step back into service. If the ladder has been raised by alternate means, and is in the latched position, THE LADDER SHOULD BE PROPERLY CHAINED AND TAGGED AND **MUST NOT BE USED BY PERSONNEL** UNTIL IT HAS BEEN LOWERERED BY ALTERNATE MEANS AND ALL AIR HAS BEEN PURGED FROM THE HYDRAULIC SYSTEM. The following procedure should be followed in resetting the system:

1) Securely attach hoist or crane to raised ladder.
2) Pull valve release knob on power unit.
3) Lower ladder gently to fully down position.
4) Reset knob on power unit to the closed position.
5) Test system.

Power Step, Inc.
L1850 Powered Retractable Ladder

Inspection & Operating Instructions

INSPECTION:

OBSERVE AND CHECK THE FOLLOWING PRIOR TO USE AND DURING MAINTENANCE -

1. Ladder pivot and cylinder pins securely in place and not worn.
2. Hydraulic system for leakage.
3. Handrails in working order.
4. Step latch functional.
5. Mounting bolts in place and tight.
6. Stair treads in place and tight.
7. Check for other physical damage to components.

OPERATING PROCEDURES:

To Lower Ladder -

1. Release latch by actuating lever with hand or foot.
2. Move switch to the "down" position. Hold until ladder has fully descended to the stop position.
3. If the ladder has settled onto the latch, raise to upper stop before releasing latch.

To Raise Ladder -

Move switch to the "up" position. Hold until ladder contacts the upper stop. The ladder will latch automatically. Leave pressure on stop.

Loss of Battery Power -
Back-up Bleed-down Valve Use

If electrical power has been lost to the ladder, it can lowered by using the manual bleed-down valve located on the end of the power unit enclosure.

1. To lower, release latch, then pull valve release knob.
2. From the top deck level, release latch, then pull release cord by wall.
3. If step has settled on latch, manually pull step towards you, then release latch. Step will bleed down under gravity.
4. Power must be restored and valve must be reset to the closed position (push in knob) prior to raising the ladder.

PRECAUTIONS:

1. Communicate with machine operator prior to boarding a running machine.
2. When operating, make sure area of ladder motion is clear of personnel and obstructions.

3. Keep ladder and deck clear of debris and other tripping hazards.
4. Keep clear of moving parts during operation.
5. Always run ladder to the full “down” position before use.
6. Never attempt to operate while someone is on or in the way of the ladder.
7. Use handrails at all times.
8. Secure ladder in latched position prior to moving machine.
9. Always face ladder when going up or down.

POWER STEP

PARTS MANUAL
LeTourneau L1850
Model No. TS7401

POWER STEP INC.
P.O. Box 3005
Duluth, MN 55803
Phone: (218) 525-3758
Fax: (218) 525-1168

2/3/06

POWER STEP

PARTS LIST

Powered Ladder - L1850

Model No. RL1001

FIGURE 1

Master Parts List

ITEM NO.	DESCRIPTION	QUANTITY
1	Ladder	1
2	Ladder Bracket	1
3	Lift Frame	1
4	Power Unit Module	1
5	Mounting Block	4
6	Lift Plate	1
7	Left Rail, with fill rail	1
7	Left Rail, without fill rail	1
8	Right Rail	1
9	Lower Mount Angle	2
10	Bolt, 5/8 - 11 x 2 , Grd. 8	2
11	Nut, Lock, 5/8, Grd. 8	2
12	Washer, Flat 5/8	2
13	Stop Bumper	4
14	Nut, Jam 5/8	4
15	Bolt, 5/8 - 11 x 1 1/2, Grd. 8	12
16	Washer, Lock 5/8	8
17	Turnbuckle Tube	2
18	Rod End, 3/4 -16 RH	1
19	Nut, Jam 3/4 - 16 RH	1
20	Nut, Jam 3/4 -16 LH	1
21	Rod End, 3/4 - 16 LH	1
22	Bolt, 3/4 - 16 x 2 1/2 Grd. 8	4
23	Nut, Lock 3/4-16 Grd. 8	4
24	Bearing, Journal 1"	4
25	Pin, Pivot	4
26	Snap Ring 1"	4
27	Grease Zerk, 1/8 NPT Straight	3
28	Bolt, 3/8 - 24 x 1 1/4 Grd. 8	4
29	Washer, 3/8 Flat	8
30	Nut, Lock 3/8 - 24 Grd. 8	4
31	Bolt, 1/2 -13 x 1 1/2, Grd. 8	8
32	Washer, 1/2" Flat	8
33	Nut, Lock, 1/2 -13, Grd. 8	8
34	Bolt, 1/2 -13 x 1, Grd. 8	4
35	Washer, 1/2 Lock	4
36	Latch Plate	1
37	Bolt, 3/8 - 16 x 1, Grd. 8	6

38	Washer, 3/8 Lock	4
39	Grease Zerk, 1/8 NPT 90 Deg.	2
40	Cylinder	1
41	Pin, Cylinder	2
42	Pin, Cotter 3/16 x 2	2
43	Zerk, Grease, 1/4-28	2
44	Union Adapter 90 deg. 1/4, .078" Orifice	1
45	Reducer, 3/8 x 1/4	1
46	Union Adapter 90 deg. 1/4, .094" Orifice	1
47	Rear Cylinder Mount	1
48	Mounting Block	2
49	Hose, 65"	2
50	Valve Lever Assy.	1
51	Bolt, 1/4-20 x 1, Grd. 8	2
52	Nut, Nylock, 1/4 - 20	3
53	Latch Bracket	1
54	Nut, 3/8 Nylock	1
55	Spring	1
56	Bearing, 3/8	1
57	Washer, 5/16 Flat	1
58	Nut, 5/16 Nylock	1
59	Latch Pull	1
60	Latch Pin	1
61	Latch Push Rod	1
62	Pin, Cotter 1/8 x 1	1
63	Latch Lever	1
64	Mounting Block	2
65	Link	2
66	Pull Cable	1
67	Label - Pull Cable	1
68	Switch, Limit, Proximity	1
69	Bracket, Limit Switch	1
70	Wire, Lower Switch	1
71	Wire, Upper Switch	1
72	Wire, Limit Switch	1
73	Switch	2
74	Decal, Switch	2
75	Boot, Toggle	2
76	Switch Bracket	2
77	Connector, Fork	6
78	Wire Loom,	1
79	Boot, Switch	2
80	Decal, Caution	1
81	Fuse Holder	1
82	Fuse, 250 A	1
83	Cable, Battery 8'	1
84	Cable, Battery 30"	1

85	Conduit, 1/2", 7'	1
86	Cable Lug	1
87	Wire, Machine Control, 16/2, 25'	1
88	Hose Clamp, Double	1
89	Wire Tie - 6 inch	10
90	Wire Tie - 12 inch	5

FIGURE 2

Power Unit Module

Complete Assembly Part No. 80108

ITEM NO.	DESCRIPTION	QUANTITY
1	Power Unit Assy.	1
2	Enclosure	1
3	Control Box Assy.	1
4	Valve Package	1
5	Adapter, Female Swivel 1/4, 90 Deg.	2
6	Bolt, 3/8-16 x 1, Grd. 8	2
7	Washer, 3/8 Lock	4
8	Washer, 3/8 Flat	2
9	Bolt, 3/8-16 x 3/4, Grd. 8	2
10	Bolt, 1/4-20 x 3/4, Grd. 8	2
11	Nut, Nylock, 1/4 - 20	4
12	Washer, 1/4 Flat	2
13	Cable, Ground	1
14	Clamp, Wire, 3/4	1
15	Clamp, Wire, 3/8	1
16	Nut, Nylock 3/8 - 16, Low Profile	2
17	Knob, 1/4	1
18	Rod, Valve Release	1
19	Slide, Valve Release	1
20	Grommet	1
21	Pin, Cotter	1
22	Label	1
23	Label	1

FIGURE 3

Power Unit Components

Complete Assembly Part No. 80012

ITEM NO.	DESCRIPTION	QUANTITY
1	Solenoid Assy.	1
2	Motor 24V	1
3	Cavity Plug	1
4	Check Valve	1
5	O-Ring	1
6	Coupling	1
7	Pump O-Ring Kit	1

8	Inlet Plumbing Kit	1
9	Filter	1
10	Pump Assy.	1
11	Pump Housing Bolt	2
12	Reservoir	1
13	Reservoir Screw	4
14	Breather	1
15	Relief Valve Assy.	1
16	Plug	1

FIGURE 4

Control Box Components

Complete Assembly Part No. 75021

ITEM NO.	DESCRIPTION	QUANTITY
1	Box, Cover & Screws	1
2	Alarm	1
3	Relay	1
4	Breaker, 10A	1
5	Strain Relief	2
6	Terminal Strip	1
7	Screw	2
8	Nut	3
9	Screw	1
10	Connector	2

FIGURE 5

Valve Package Components

Complete Assembly Part No. 65006

ITEM NO.	DESCRIPTION	QUANTITY
1	Valve Body	1
2	4-Way Cartridge Valve	1
3	Relief Valve (600 PSI)	1
4	Release Valve	1
5	O-Ring	2
6	Bolt, 1/4 - 20 x 3	3
7	Washer, Lock 1/4"	3

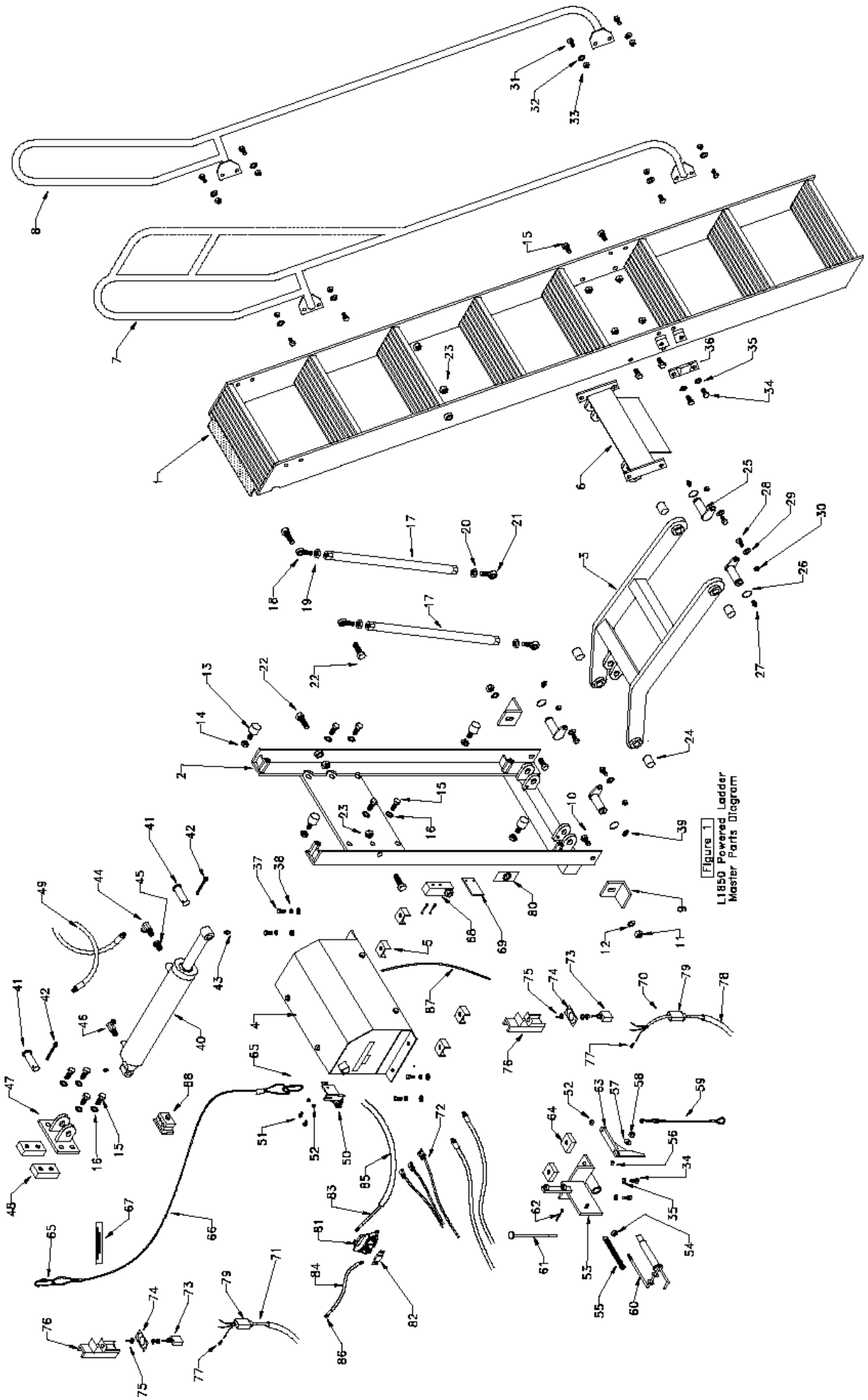


Figure 1
L1850 Powered Ladder
Master Parts Diagram

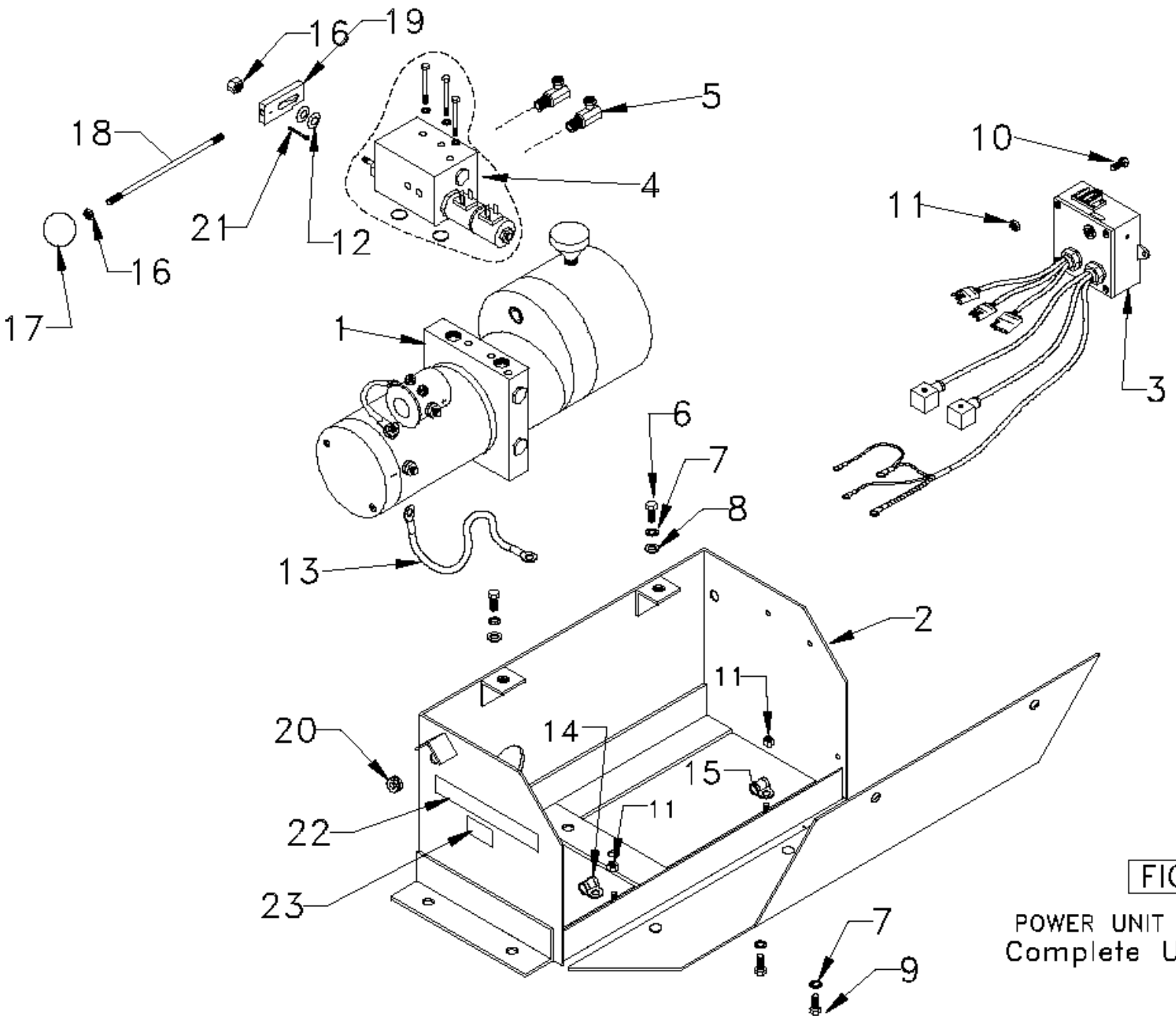


FIGURE 2

POWER UNIT MODULE COMPONENTS
Complete Unit Part No. 80108

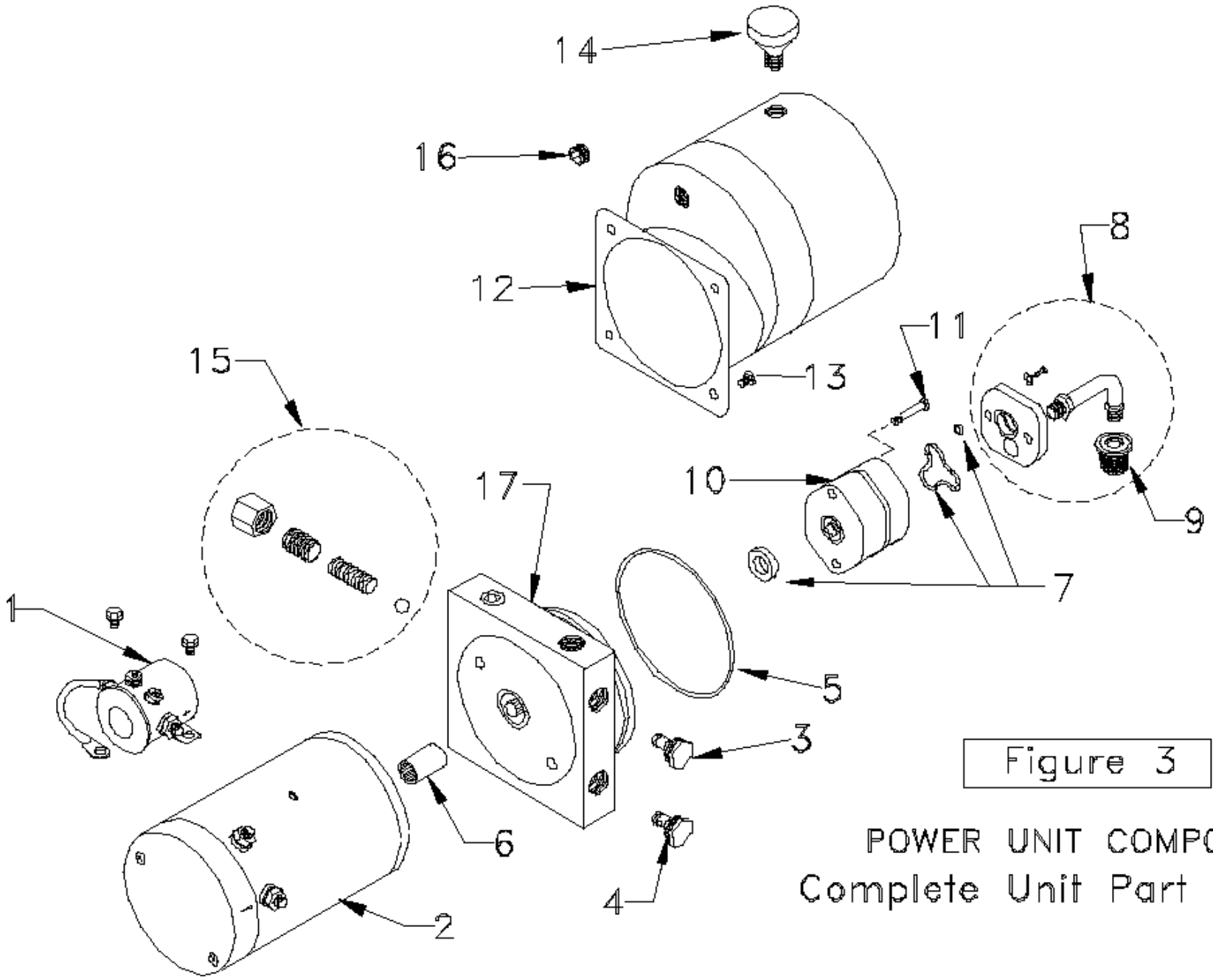


Figure 3

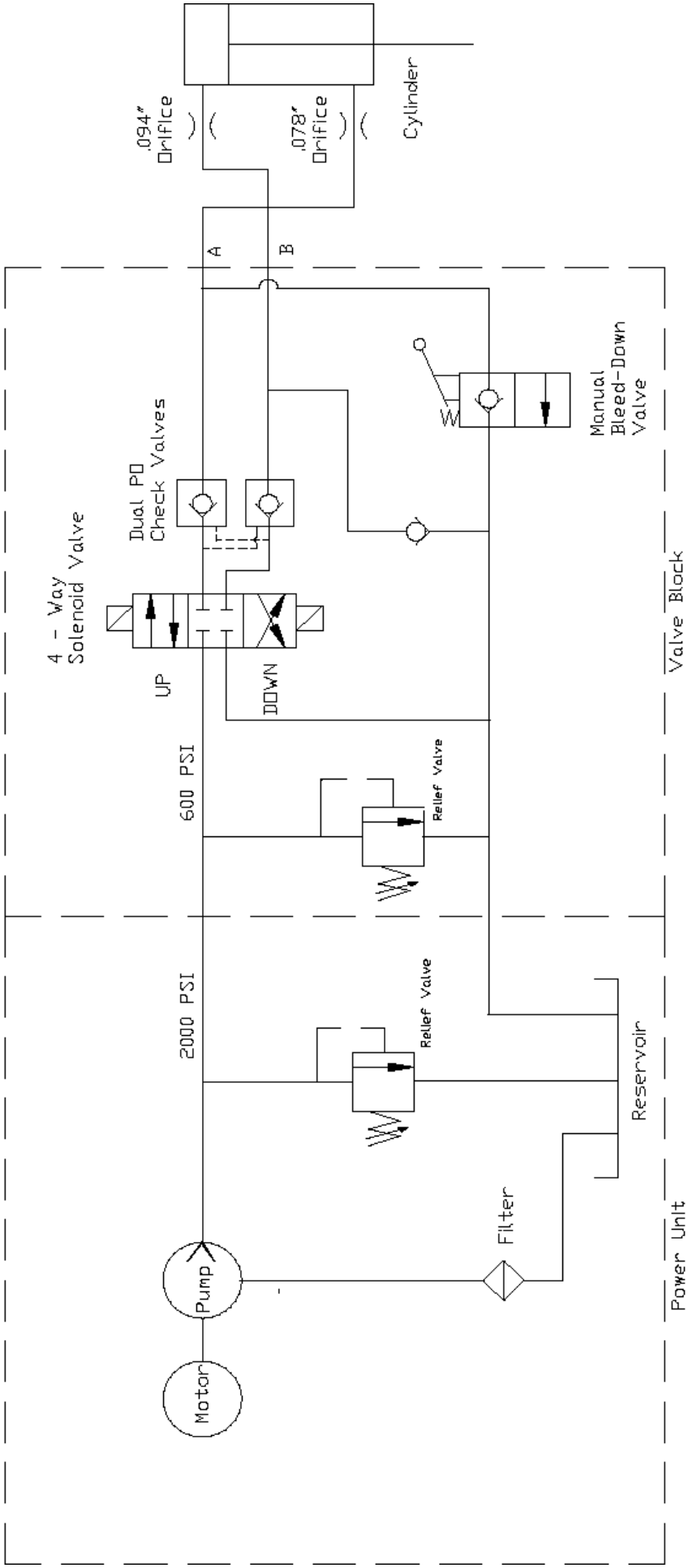
POWER UNIT COMPONENTS
Complete Unit Part No. 80012

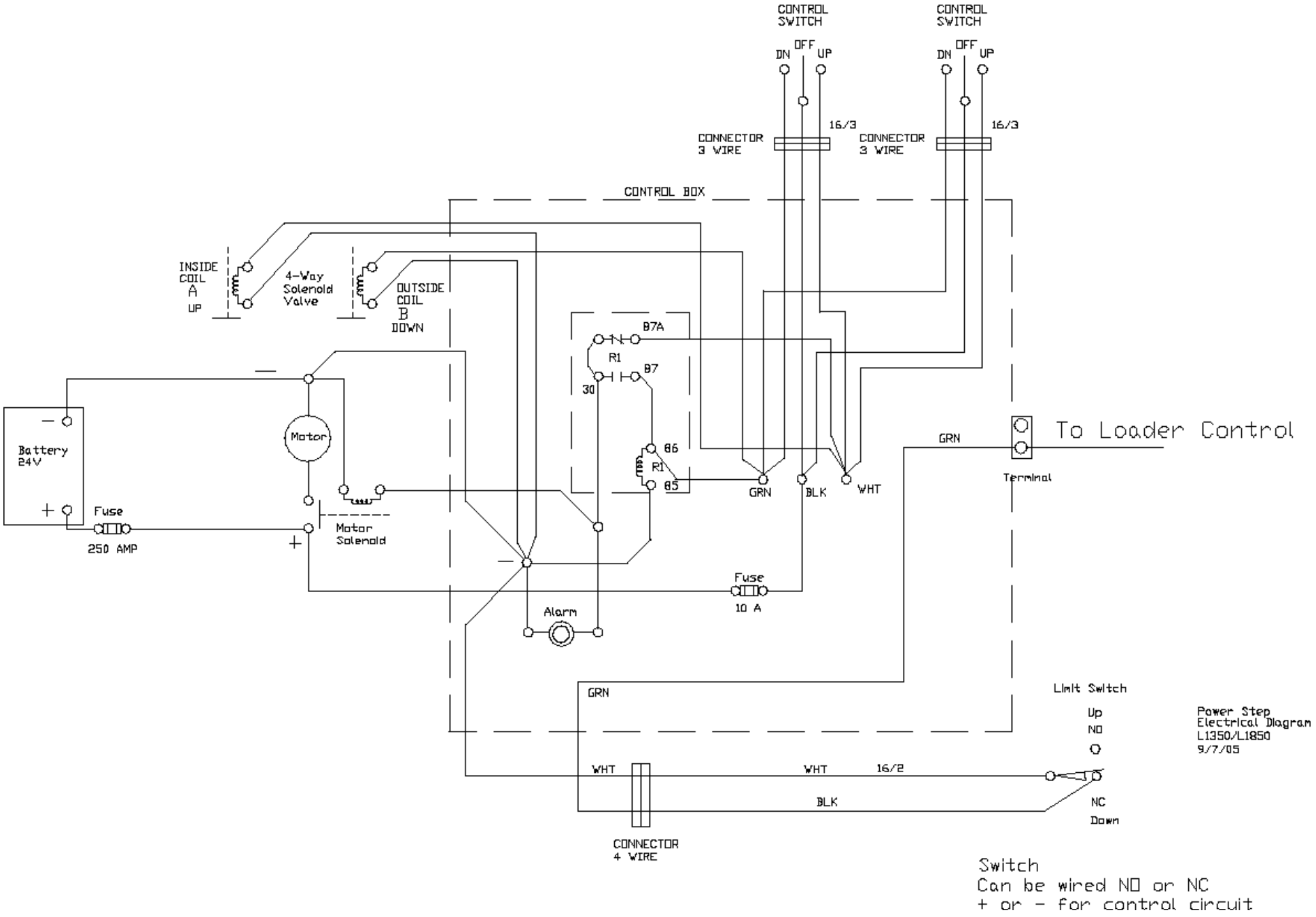
Figure 4

CONTROL BOX COMPONENTS
Complete Unit Part No. 75021

Figure 5

VALVE PACKAGE COMPONENTS
Complete Unit Part No. 65006


Power Step
L1850 Retractable Ladder
Hydraulic Diagram
9/7/05
Cylinder
.094" Orifice
.078" Orifice
A
B
Manual Bleed-Down Valve
Dual PO Check Valves
4 - Way Solenoid Valve
UP
DOWN
Valve Block
600 PSI
Relief Valve
2000 PSI
Relief Valve
Reservoir
Filter
Pump
Motor
Power Unit


CONTROL SWITCH
DN OFF UP
CONTROL SWITCH
DN OFF UP
CONNECTOR 3 WIRE
16/3
CONNECTOR 3 WIRE
16/3
CONTROL BOX
INSIDE COIL A UP
4-Way Solenoid Valve
OUTSIDE COIL B DOWN
B7A
R1
B7
30
86
R1
85
GRN
BLK
WHT
To Loader Control
GRN
Terminal
Battery 24V
Motor
Fuse
250 AMP
Motor Solenoid
Fuse
10 A
Alarm
GRN
Limit Switch
Up
NO
WHT
WHT
16/2
BLK
NC
Down
CONNECTOR 4 WIRE
Power Step
Electrical Diagram
L1350/L1850
9/7/05
Switch
Can be wired NO or NC
+ or - for control circuit