Manual Price $35.00

PDCM SERIES

POWER DRIVE COUNTERBALANCED LIFT TRUCK

Serial Number 333032 and Higher

Operation

Maintenance

Repair Parts List

Big Joe Manufacturing Company • Des Plaines, IL 60018

MANUAL NO. 904160
REV B 7/11/06

WARNING

Do not operate this truck unless you have been trained and authorized to do so, and have read all warnings and instructions in operator's manual and on this truck.

Do not operate this truck until you have checked its condition. Give special attention to tires, horn, lights, battery, controller, lift system (including forks or attachments, chains, cables and limit switches), brakes, steering mechanism, guards and safety devices.

Operate truck only from designated operating position. Never place any part of your body into the mast structure or between the mast and the truck. Do not carry passengers.

Observe applicable traffic regulations. Yield right of way to pedestrians. Slow down and sound horn at cross aisles and wherever vision is obstructed.

Start, stop, travel, steer and brake smoothly. Slow down for turns and on uneven or slippery surfaces that could cause truck to slide or overturn. Use special care when traveling without load as the risk of overturn may be greater.

Travel with lifting mechanism as low as possible. Always look in direction of travel. Keep a clear view, and when load interferes with visibility, travel with load or lifting mechanism trailing.

Use special care when operating on ramps—travel slowly, and do not angle or turn. Travel with lifting mechanism downhill.

Do not overload truck. Check capacity plate for load weight and load center information.

When using forks, space forks as far apart as load will permit. Before lifting, be sure load is centered, forks are completely under load, and load is as far back as possible against load backrest.

Do not handle unstable or loosely stacked loads. Use special care when handling long, high or wide loads to avoid losing the load, striking bystanders, or tipping the truck.

Do not handle loads which are higher than the load backrest or load backrest extension unless load is secured so that no part of it could fall backward.

Elevate forks of other lifting mechanism only to pick up or stack a load. Watch out for obstructions, especially overhead.

Do not lift personnel except on a securely attached specially designed work platform. **Use extreme care when lifting personnel.** Make sure mast is vertical, place truck controls in neutral and apply brakes. Lift and lower smoothly. Remain in operating position or immediate vicinity as long as personnel are on the work platform. Never transport personnel on forks or work platform.

Do not allow anyone to stand or pass under load or lifting mechanism.

When leaving truck, neutralize travel control, fully lower lifting mechanism and set brake. When leaving truck unattended, also shut off power.

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WARNING

Do not operate this truck unless you have been trained and authorized to do so and have read all warnings and instructions in operator's manual and on this truck.

Do not operate this truck until you have checked its condition. Give special attention to tires, horn, battery, controller, lift system, (including forks or attachments, chains, cables and limit switches), brakes, steering mechanism, guards and safety devices.

Operate truck only from designated operating position. Never place any part of your body into mast structure or between the mast and the truck. Do not carry passengers.

Observe applicable traffic regulations. Yield right of way to pedestrians. Slow down and sound horn at cross aisles and wherever vision is obstructed.

Start, stop, travel, steer and brake smoothly. Slow down for turns and on uneven or slippery surfaces that could cause truck to slide or overturn. Use special care when traveling without load as the risk of overturn may be greater.

Travel with lifting mechanism as low as possible. Always look in direction of travel. Keep a clear view, and when load interferes with visibility, travel with load or lifting mechanism trailing, except when traveling downhill.

Use special care when operating on ramps-travel slowly, and do not angle or turn. Travel with lifting mechanism or load downhill.

Do not overload truck. Check capacity plate for load weight and load center information.

When using forks, space forks as far apart as load will permit. Before lifting, be sure load is centered, forks are completely under load, and load is as far back as possible against load backrest.

Do not handle unstable or loosely stacked loads. Use special care when handling long, high or wide loads to avoid losing the load, striking bystanders, or tipping the truck.

Do not handle loads which are higher than the load backrest or load backrest extension unless load is secured so that no part of it could fall backward.

Elevate forks or other lifting mechanism only to pick up or stack a load. Watch out for obstructions, especially overhead.

Do not lift personnel except on a securely attached specially designed Work Platform. Use extreme care when lifting personnel. Make sure mast is vertical, place truck controls in neutral and apply brakes. Lift and lower smoothly. Remain in operating position or immediate vicinity as long as personnel are on the Work Platform. Never transport personnel on forks or Work Platform.

Do not allow anyone to stand or pass under load or lifting mechanism.

PREPARATION FOR USE

Upon receipt, visually inspect lift truck. If any damage is found, report it to the carrier and to your Big Joe dealer immediately.

Remove cardboard banded to truck. Check lift truck for scratches and dents. Check to make sure that the lift chain is free of slack. Inspect for oil leaks and loose wiring connections. Make certain that all accessories and attachments that were ordered are supplied.

Before the lift truck is moved, the battery must be checked, recharged if necessary and connected. Refer to “Battery Care” in SECTION 3 for battery checking instructions.

Refer to SECTION 2 for operating instructions to test the brakes and lift control.

SECTION 1
DESCRIPTION

1-1. INTRODUCTION.

This publication describes the PDCM Series of lift trucks manufactured by the Big Joe Manufacturing Company, Des Plaines, Illinois,60018.

The PDCM Series trucks are available in several design variations and with miscellaneous options. It is important to know the features of your truck in order to use this manual effectively.

Users shall comply with all requirements indicated in applicable OSHA Standards and current edition of A.N.S.I. B56.1 Part II. By following these requirements and the recommendations contained in this manual, you will receive many years of dependable service from your Big Joe Lift Truck.

The name plate (see Figure 1-1) is the key to identifying many of the features of your PDCM truck. It provides information such as:

Model number

Serial number

Maximum capacity, load center and maximum lift height

Alternate capacity, load center and maximum lift height <~>(if applicable)

Minimum weight of battery

Battery voltage

The model number of a lift truck in this series consists of the letters PDCM, followed by the digits "60", "106", "130", or "154". These numbers are the lift height, in inches, to the top of the forks.

The PDCM-60 model uses a non-telescopic mast, while the PDCM-106, PDCM 130 and PDCM 154 have telescopic masts.

A built-in battery charger recharges the truck's two 12-volt, 200 AH batteries.

1-2. GENERAL DESCRIPTION.

The forward and reverse motion is controlled by a speed controller switch in the control head. Stopping and turning is controlled by the steering arm. Lift and Lower is controlled by either a lever mounted on the chassis, optional pushbutton controls located on the steering arm, or a control box attached by a coiled cord.

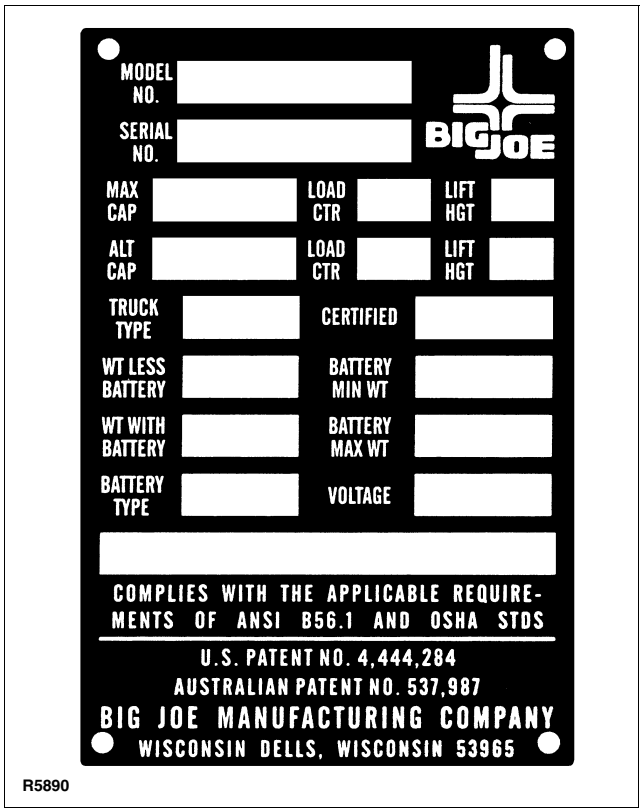


Figure 1-1 Name Plate

The battery-powered lift truck is quite and without exhaust fumes.

The reversible DC motor propels the lift truck in forward and reverse direction throughout the available speed range. The PDCM lift truck can be driven with forks raised or lowered; however, the speed is restricted when the forks are raised above a preset limit.

A belly-button reversing safety switch on the control head (at the extreme end of the steering arm) helps prevent the operator from becoming pinned between the lift truck and an immovable object.

The mechanical brake is engaged whenever the steering arm is in the sector between shaded area below horizontal or between vertical (see Figure 2-6).

1-3. SAFETY FEATURES.

The PDCM is designed and engineered to provide maximum safety for operator and payload. Some of the safety features incorporated into the design are:

Dead-man brake to apply mechanical brake and cut off drive power when the steering arm is released.

Belly-button switch to reverse truck should the operator accidentally pin himself against a wall or obstruction when backing up.

High speed limit switch to restrict speed when lift carriage is raised above the preset limit.

All control functions automatically return to "OFF" when released.

Externally accessible quick-disconnect battery plug within operator's reach.

Separately fused control circuits and power circuits.

Readily accessible HORN button.

Lift carriage backrest to help stabilize the load.

Pressure compensated flow control valve regulates maximum lowering speed.

High visibility color scheme of truck provides visual alert of trucks presence.

1-4. OPTIONS AND ACCESSORIES.

Big Joe offers many options and accessories for the PDCM lift truck such as

Key switch

Remote Lift/Lower Control in Control Arm or Remote Control Box Attached by a Coiled Cord or both

Wider Lift Carriage

Cold Conditioning

Battery Capacity Indicator with or without Lift Lockout

Hour Meter

Longer Forks

Dry Charged Batteries

240 V, 60 Hz Single Phase Charger

48 inch Load Backrest Extension

Rams

Boom w/Hook

Drum Toter

Drum Tilter

Slip-on Platform...smooth or diamond surface

Roller Platform

Work Platform

SECTION 2
OPERATION

1. SEE SUPPLEMENT 207 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 334630.

2. SEE SUPPLEMENT 220 FOR TRANSISTOR TRUCKS SERIAL NUMBER 334631 AND HIGHER.

2-1. GENERAL.

The following paragraphs describe the control and various procedures involved in the proper operation of the lift truck.

Safe operation is the responsibility of the operator.

2-2. OPERATING PRECAUTIONS.

WARNING: Improper use of the lift truck may result in operator injury, or load and /or lift truck damage. Observe the following precaution when operating the PDCM lift truck.

1. Do not operate this lift truck until you have checked its condition. Give special attention to wheels, battery, lift system (including forks or attachments, chain, cables and limit switches), brakes, steering mechanism, guards and safety devices.
2. Operate truck only from designated operating position. Never place any part of your body into the mast structure or between the mast and the truck. Do not carry passengers. Keep feet clear of truck.
3. Observe applicable traffic regulations. Yield right of way to pedestrians. Slow down and sound horn at cross aisles and wherever vision is obstructed.
4. Start, stop, travel and steer smoothly. Slow down for turns and on uneven or slippery surfaces that could cause truck to slide or overturn. Use special care when traveling without load as the risk of overturn may be greater.
5. Travel with lifting mechanism as low as possible. Always look in direction of travel. Keep a clear view, and when load interferes with visibility, travel with load or lifting mechanism trailing except when traveling downhill.
6. Use special care when operating on ramps - travel slowly and do not angle or turn. Travel with lifting mechanism or load downhill.
7. Do not overload truck. Check capacity plate for load weight and load center information.
8. Space forks as far apart as load will permit. Before lifting, be sure load is centered, forks are completely under load, and load is as far back as possible against load backrest.
9. Do not handle unstable or loosely stacked loads. Use special care when handling long, high or wide loads to avoid losing the load, striking bystanders, or tipping the truck.
10. Center and carry the load as far back as possible toward the lift carriage back rest. Do not pick up loads on the tips of forks. The center-of-gravity of the load must not exceed the load center listed on the name plate. See Figure 2-1 for load center information.

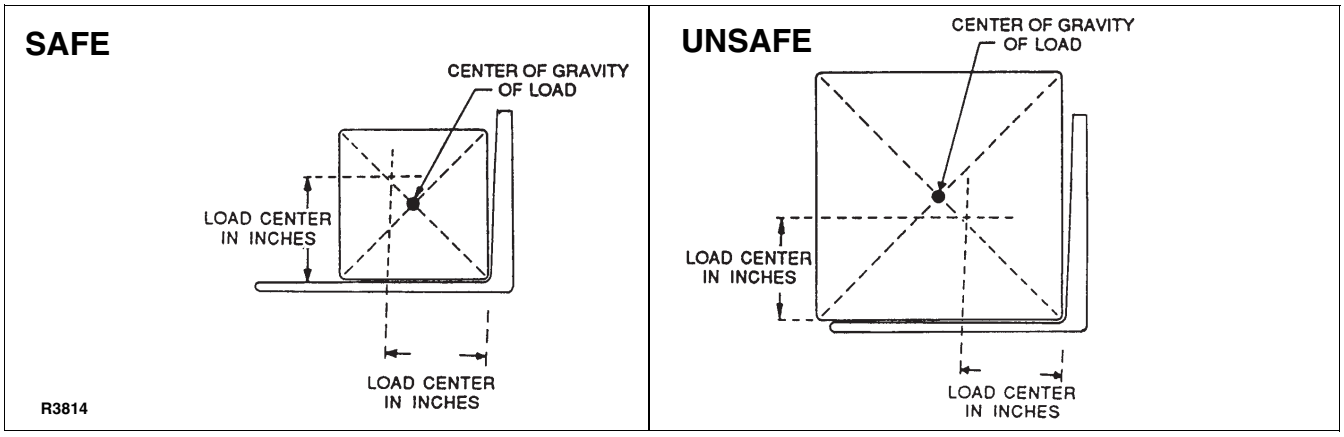


Figure 2-1 Load Center

11. Do not handle loads which are higher than the load backrest or load backrest extension unless load is secured so that no part of it could fall backward.
12. Elevate forks or other lifting mechanism only to pick up or stack a load. Watch out for obstructions, especially overhead.
13. Do not allow anyone to stand or pass under load or lifting mechanism.
14. Be certain that the lifting mechanism is operating properly and smoothly throughout its entire lift height, both empty and loaded, and that all lift limit devices and latches, if provided, are functional before placing truck in service.
15. When leaving truck unattended, fully lower lifting mechanism and set brake.

2-3. BEFORE OPERATION.

Table 2-1 covers important inspection points on the PDCM lift truck which should be checked prior to operation. Depending on use, some trucks may require additional checks.

Figure 2-2 shows a sample format for an Operator Checklist which can be modified as necessary to fit your operation.

WARNING: Periodic maintenance of this truck by a QUALIFIED TECHNICIAN is required.

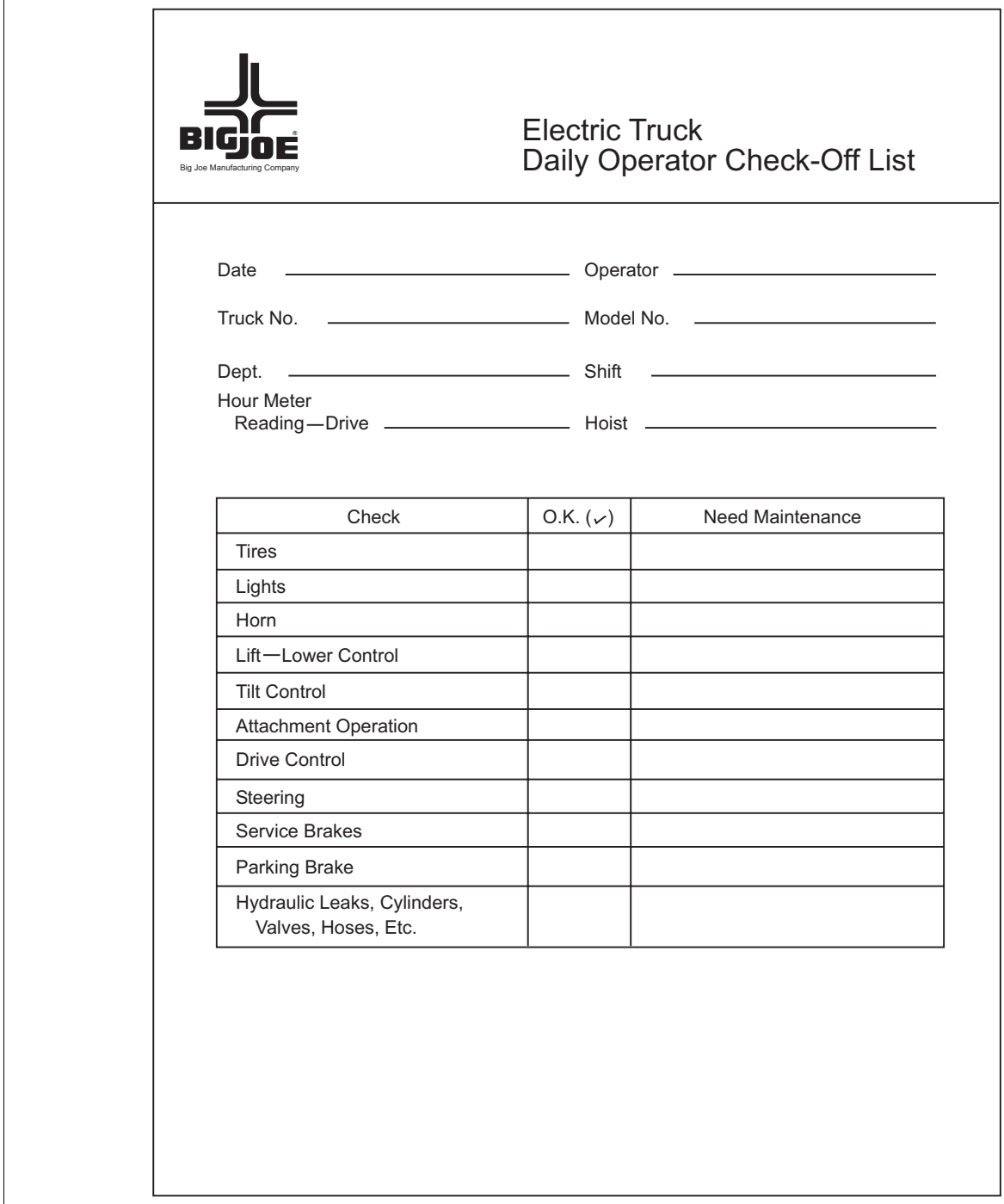
CAUTION A QUALIFIED SERVICE TECHNICIAN should check the truck monthly for proper lubrication, proper fluid levels, brake maintenance, motor maintenance and other areas specified in the SECTION 3.

WARNING: If the truck is found to be unsafe and in need of repair, or contributes to an unsafe condition, report it immediately to the designated authority. Do not operate it until it has been restored to a safe operating conditions. Do not make any unauthorized repairs or adjustments. All service must be performed by a qualified maintenance technician.

Table 2-1 Operator Checks

ITEM	PROCEDURE
Transmission and hydraulic systems.	Check for signs of fluid leakage.
Forks	Check for cracks and damage; and, that they are properly secured
Chains, cables and hoses	Check that they are in place, properly secured and not damaged or binding.
Guards and load backrest	Check that safety guards are in place, properly secured and not damaged.
Safety signs	Check that warning labels, nameplate, etc., are in good condition and legible.
Horn	Check that horn sounds when operated.
Steering	Check for binding or looseness in steering arm when steering.
Travel controls	Check that speed controls on control handle operate in all speed ranges in forward and reverse and that belly button switch functions.

ITEM	PROCEDURE
Wheels	Check drive wheel for cracks or damage. Move truck to check load wheels for freedom of rotation.
Hydraulic controls	Check operation of lift and lower to their maximum positions.
Brakes	Check that brakes actuate when steering arm is raised to upright position, and when lowered to horizontal position.
Deadman/ Parking brake	Check that steering arm raises to upright position when released and brake applies.
Battery disconnect	Check that battery can be disconnected and reconnected. Check for connector damage.
Battery charge	Check that battery capacity meter (if equipped) is on “F”.
High speed limit switch	Allow for enough space to operate truck in high speed. Elevate forks approximately two feet, then test drive truck to check if high speed is cut out.



Big Joe Manufacturing Company

Electric Truck
Daily Operator Check-Off List

Date _____ Operator _____

Truck No. _____ Model No. _____

Dept. _____ Shift _____

Hour Meter
Reading—Drive _____ Hoist _____

Check	O.K. (✓)	Need Maintenance
Tires		
Lights		
Horn		
Lift—Lower Control		
Tilt Control		
Attachment Operation		
Drive Control		
Steering		
Service Brakes		
Parking Brake		
Hydraulic Leaks, Cylinders, Valves, Hoses, Etc.		

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Figure 2-2 Sample of Operator Check List

2-4. INSTUMENTS AND CONTROLS.

2-4.1. Steering Arm and Control Head.

The steering arm and control handle (See Figure 2-3) provide controls for steering, forward and reverse speed control, braking, and horn. Control handles on some models have pushbuttons for raising and lowering the forks (See Figure 2-4). Table 2-2 lists optional control handles. Control handles on all models have a "belly-button" reversing switch which reverses the direction of the truck upon contact with the operator.

Table 2-2 Control Handles

1. **SEE SUPPLEMENT 207 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 334630.**
2. **SEE SUPPLEMENT 220 FOR TRANSISTOR TRUCKS SERIAL NUMBER 334631 AND HIGHER.**

Type	Part Numbers
Standard	505050-04
Remote Lift in Handle	505050-05
Remote Lift and Lower in Handle	505050-06

1. **SEE SUPPLEMENT 207 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 334630**
2. **SEE SUPPLEMENT 220 FOR TRANSISTOR TRUCKS SERIAL NUMBER 334631 AND HIGHER**

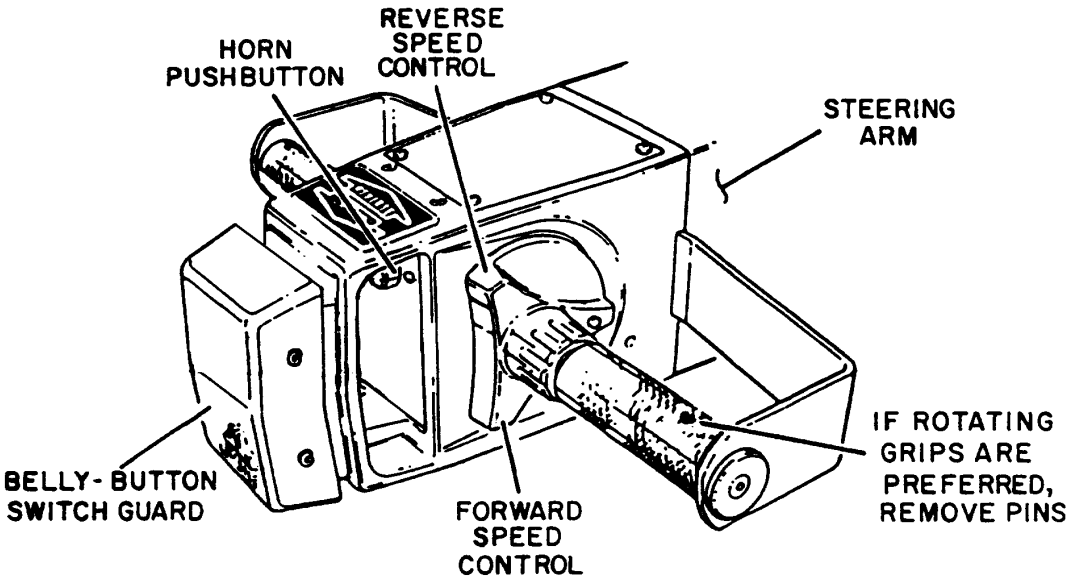


Figure 2-3 Control Handle

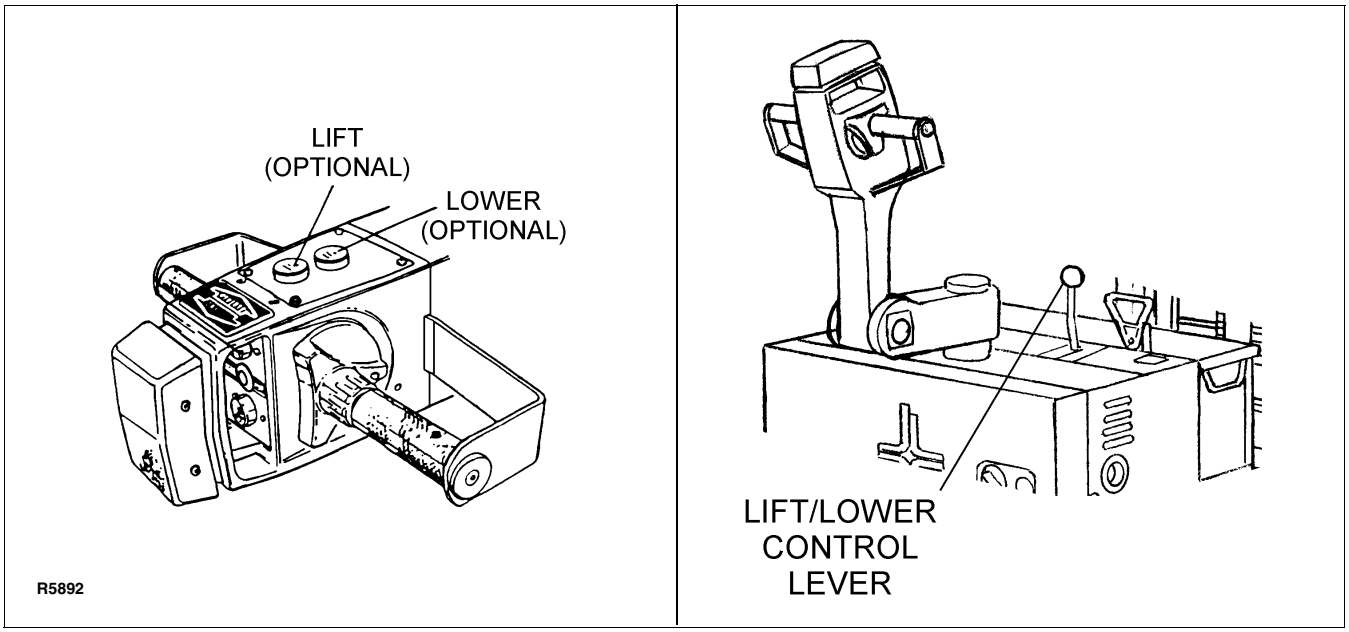


Figure 2-4 Lift/Lower Control

2-4.2. Lift/Lower Control.

All models come standard with a lift/lower control lever mounted near the steering arm. See Figure 2-4.

2-4.3. Battery Disconnect.

A battery disconnect is mounted near the steering arm. Pulling the disconnect removes all power from truck circuits in the event of an emergency.

2-4.4. Optional Features.

The optional remote lift/lower control (if equipped) allows the operator to raise and lower the forks while standing away from the control handle. See Figure 2-5.

Other options are the battery capacity indicator, hour meter and keyswitch, which mount on the panel near the control handle. The battery capacity indicator monitors the battery discharge rate to indicate the remaining battery capacity. The hour meter records the accumulated hours that electrical energy is being drawn from the battery to run the pump and drive motors. The keyswitch provides added security to the truck, preventing unauthorized personnel from operating the machine.

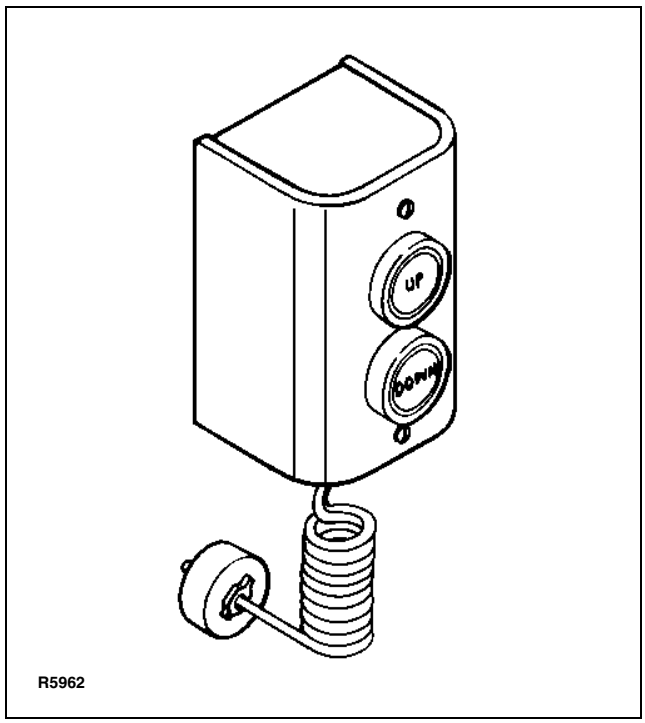


Figure 2-5 Optional Remote Lift/Lower Control

2-5. OPERATION.

2-5.1. Forward and Reverse Travel and Speed Control.

All directional and speed controls are located on the control handle. See Figure 2-3.

Forward and reverse are controlled by rotating the speed control lever as shown. The lever is spring loaded to return to neutral when released. Further rotation in either direction will progress the truck from slow to maximum travel speed.

To change directions or to stop the truck, rotate the speed control lever in the opposite direction. The truck will come to a stop and then, unless the controls are returned to center neutral position, accelerate in the opposite direction.

2-5.2. Steering.

Moving the control handle (which connects to the steering arm) right or left will turn the truck right or left. When maneuvering around corners, make square turns and be sure there is adequate clearance.

2-5.3. Stopping.

Stop the truck as gradually as possible. Unnecessary rapid stopping could be hazardous. Load could become unstable.

There are three possible ways to top the truck:

1. Plugging: This electrical braking function consists of rotating the speed control lever in the opposite direction of travel and then releasing it when the truck stops. Plugging is a convenient way to stop the truck during normal operation. If the control is not released, the truck will accelerate in the opposite direction.
2. Steering arm in horizontal position (See Figure 2-6): Lowering the steering arm to the horizontal position applies brake pad pressure to the brake disc. Lowering the steering arm below the horizontal position increases the braking force and de-energizes the controls.
3. Steering arm in vertical position (See Figure 2-6): Raising the steering arm to near vertical position applies brake pad pressure to the brake disc. Further vertical positioning increases the braking force and de-energizes the controls. This position serves as a parking brake. As a safety precaution, the steering arm is spring loaded to return to the vertical position in the event the driver releases the control handle during operation. This is known as deadman braking.

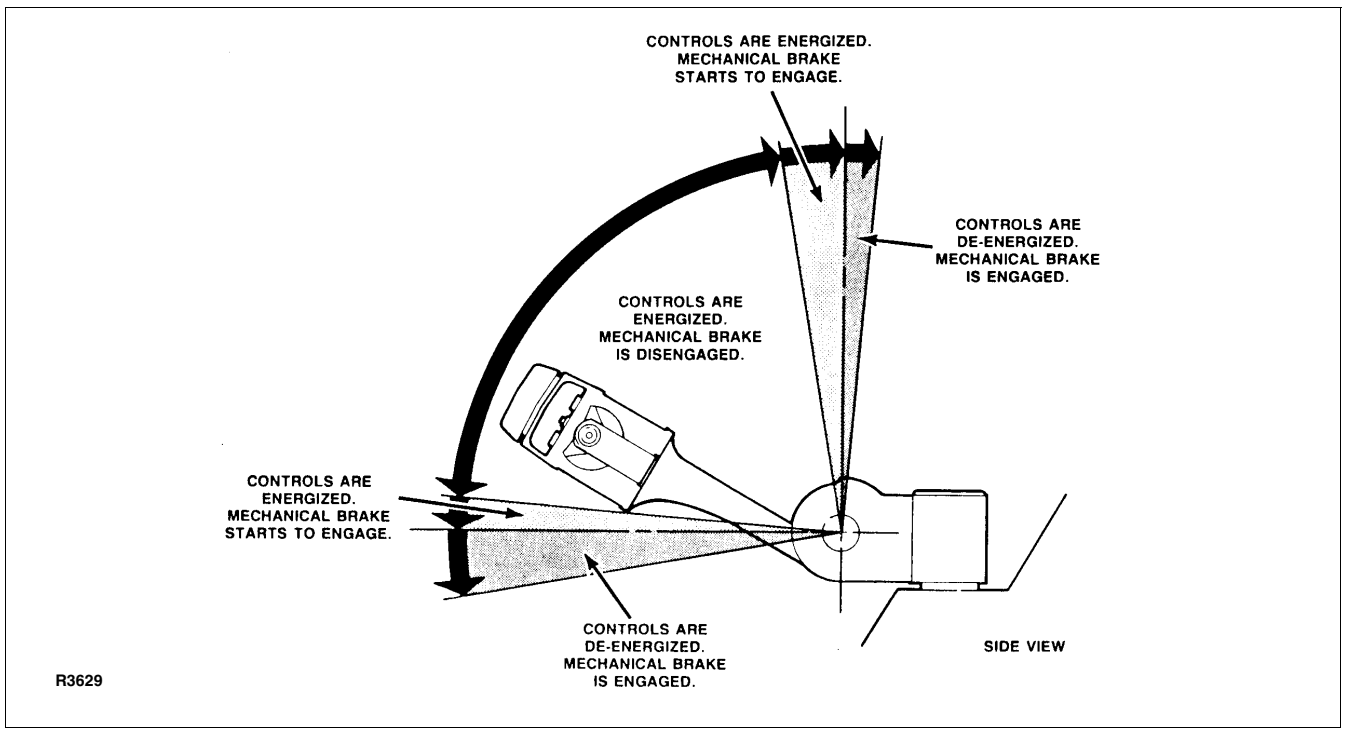


Figure 2-6Steering Arm Braking Position

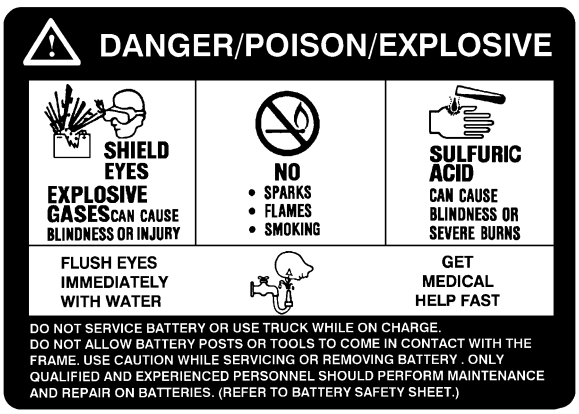
2-5.4. Parking.

When parking the truck, do not obstruct traffic lanes or aisles.

1. Park the truck in its designated parking area.
2. Raise the steering arm until vertical to apply the parking brake.
3. Fully lower the forks.
4. Turn key switch (if so equipped) to off position. Remove key for added security.
5. Pull out battery disconnect.

2-5.5. Battery Charging.

Refer to Document 245 for battery safety and maintenance.



NOTE: Battery charging instructions are contained in SECTION 3.

2-5.6. Load Handling.

WARNING: Handle only loads arranged for stability, and always use caution. Raise and lower the load smoothly to prevent the load from falling.

WARNING: Always be sure the load and load center are within the capacity of the truck. If in doubt, check the nameplate.

1. Approach the load slowly.
2. Stop the truck when the forks are just in front of the load.
3. Adjust the forks to the maximum practical width to support the load to be lifted.
4. Raise or lower the forks until they are properly aligned with the pallet openings.
5. Move the truck slowly into position so that the forks are centered about the load.
6. Make sure the load is against the backrest and then raise the forks until the pallet clears the rack.
7. Move the truck away from the rack until the load clears the rack and then lower the forks.
8. Lead the truck by the control handle with the load trailing except when in confined areas. Ramps should be traveled with operator uphill of truck when empty, or operator downhill of truck when load is on forks.
9. Always look in the direction of travel. Move slowly and check clearances when approaching obstructions.
10. Do not make sudden starts and stops. Operate truck smoothly and gradually.
11. Travel slowly and squarely around corners. Remember that the trailing load wheels do not follow the turn path of the drive wheel. Instead they tend to cut the corner.
12. Line up the truck with the unloading area.
13. Stop the truck and raise or lower the forks until the pallet is in position with the unloading area.
14. Check the load alignment with surrounding objects.
15. Be careful not to damage or move adjacent loads and objects.
16. Slowly move into position.
17. Lower the forks until the load is resting on its own. Be sure there is no downward force of the forks on the rack or floor.
18. Move the truck back until the forks are clear of the pallet.
19. If forks are elevated, lower to travel position.

2-5.7. Moving a Disabled Truck.

Do not attempt to move a disabled truck. Notify your supervisor or proper authority.

NOTES

SECTION 3
PLANNED MAINTENANCE

3-1. GENERAL.

Planned maintenance consists of periodic visual and operational checks, parts inspection, lubrication, and scheduled maintenance designed to prevent or discover malfunctions and defective parts. The operator performs the checks in SECTION 2 and refers any required servicing to a qualified maintenance technician who performs the scheduled maintenance and any required servicing.

3-2. MONTHLY AND QUARTERLY CHECKS.

Table 3-1 Is a monthly and quarterly inspection and service chart based on normal usage of equipment eight hours per day, five days per week. If the lift truck is used in excess of forty hours per week, the frequency of inspection and service should be increased accordingly. These procedures must be performed by a qualified service technician or your Big Joe service representative.

3-3. BATTERY CARE.

3-3.1. General.

The life of the battery can be extended by giving it proper care. Perform a daily check of the battery whether or not the equipment is in daily use. DO NOT overcharge the battery or battery life will be shortened. DO NOT allow battery to become completely discharged (specific gravity 1.150 or less). This will also greatly shorten battery life.

CAUTION: Observe and adhere to battery safety and maintenance supplement (Document 245) and battery warning decal when servicing battery.

Table 3-1 Monthly and Quarterly Inspection and Service Chart.

INTERVAL	INSPECTION OR SERVICE
Monthly	Check condition of drive motor commutator, brushes and springs
Monthly	Check condition of pump motor commutator, brushes and springs
Monthly	Check mechanical brake for proper operation
Monthly	Check load wheels for wear
Monthly	Check drive wheel for wear
Monthly	Inspect wiring for loose connections and damaged insulation
Monthly	Inspect contactor tips for excessive pitting and wear
Monthly	Check deadman brake switch for proper operation
Monthly	Check lift chain tension
Monthly	Lubricate unit (See Table 3-4)
Quarterly	Check lift cylinder wiper ring and packing for leakage
Quarterly	Check for excessive jerking of steering arm when stopping or starting
Semi-annually	Replace hydraulic filter assembly
Semi-annually	Inspect for chain wear (See SECTION 8)

3-3.2. Battery Servicing.

The batteries are accessed by opening the top cover of the battery compartment.

Use the following procedure:

1. Obtain a battery hydrometer.

NOTE: These can be obtained from a local hardware store or automotive shop.

2. Use the hydrometer to check specific gravity of each cell.

NOTE: Battery specific gravity readings should agree within 0.025 from cell to cell. If variation is greater, the battery may have to be repaired or replaced.

CAUTION: Be sure that no cell plates are exposed (not covered by fluid) before charging. Add distilled water sufficient to just cover top of cell plates.

CAUTION: Use distilled water, impurities in tap water will damage battery plates.

After charging, check water level in each cell. Water level must cover plates but not be higher than the base of the battery filler neck.

NOTE: A fully charged battery has a specific gravity of 1.260 to 1.285.

3-3.3. Charger Operation.

Big Joe timer chargers incorporate a multiple hour timer to control the charge cycle. Big Joe "Smart" Chargers incorporate computer logic circuits to provide fully automatic recharging and shut off operation for convenient overnight service. They are completely automatic.

CAUTION: Do not use truck while charger is plugged in.

Use the following procedure for all built-in chargers.

1. Turn key switch off, if equipped.
2. Plug AC cord into proper AC power source. Disconnect DC battery supply from the truck and connect it to the charger circuit. After a short delay the charger will start.
3. When using a timer charger, charge battery in accordance with Table 3-2, then proceed to step 7. When using a "Smart" charger, proceed to step 4.

Table 3-2 Charge Time for Battery Charging.

SPECIFIC GRAVITY	CHARGE TIME 15 AMP CHARGER 150 AH BATTERIES
1.250	2
1.240	4
1.220	5
1.200	8
1.180	10
1.160	12
1.140	14

4. When AC line plug and battery connector are connector are connected to charger, after a short delay charger will start.
5. Charger output will decrease as batteries recharge.
6. **Trucks Serial Numbers 333032 to 344490:** When charger light is off, charge cycle is complete.

   Truck Serial Numbers 344491 and Higher: When ammeter reads near 0, charge cycle is complete. The ammeter needle may cycle momentarily to a higher reading and fall back to near 0. The red charger light stays on until the charger is unplugged from AC outlet.
7. Disconnect AC power cord, wind up cord on cord winder.
8. Disconnect DC battery supply from the charger circuit and connect it to the truck.

3-4. LUBRICATION

Refer to Table 3-3 for recommended types of grease and oil. Table 3-4 in conjunction with Figure 3-1 identifies the items that require lubricant.

Table 3-3 Recommended Lubricants and Oils.

No. 1	Transmission oil—EP SAE 80W-90 Transmission oil—EP SAE 10W-30 (Note) Transmission oil capacity is 3 pints.
No. 2	Grease—Lithium base, general purpose.
No. 3	Hydraulic oil-Heavy duty with a viscosity of 150 SUS (in temperatures below 32°F use 100 SUS) foam suppressing agent and rust and oxidation inhibitors Big Joe Part No. 900855 (1 galleon) 900893 (1 quart) 055784 (Note)

NOTE: USED ON COLD CONDITIONED TRUCKS

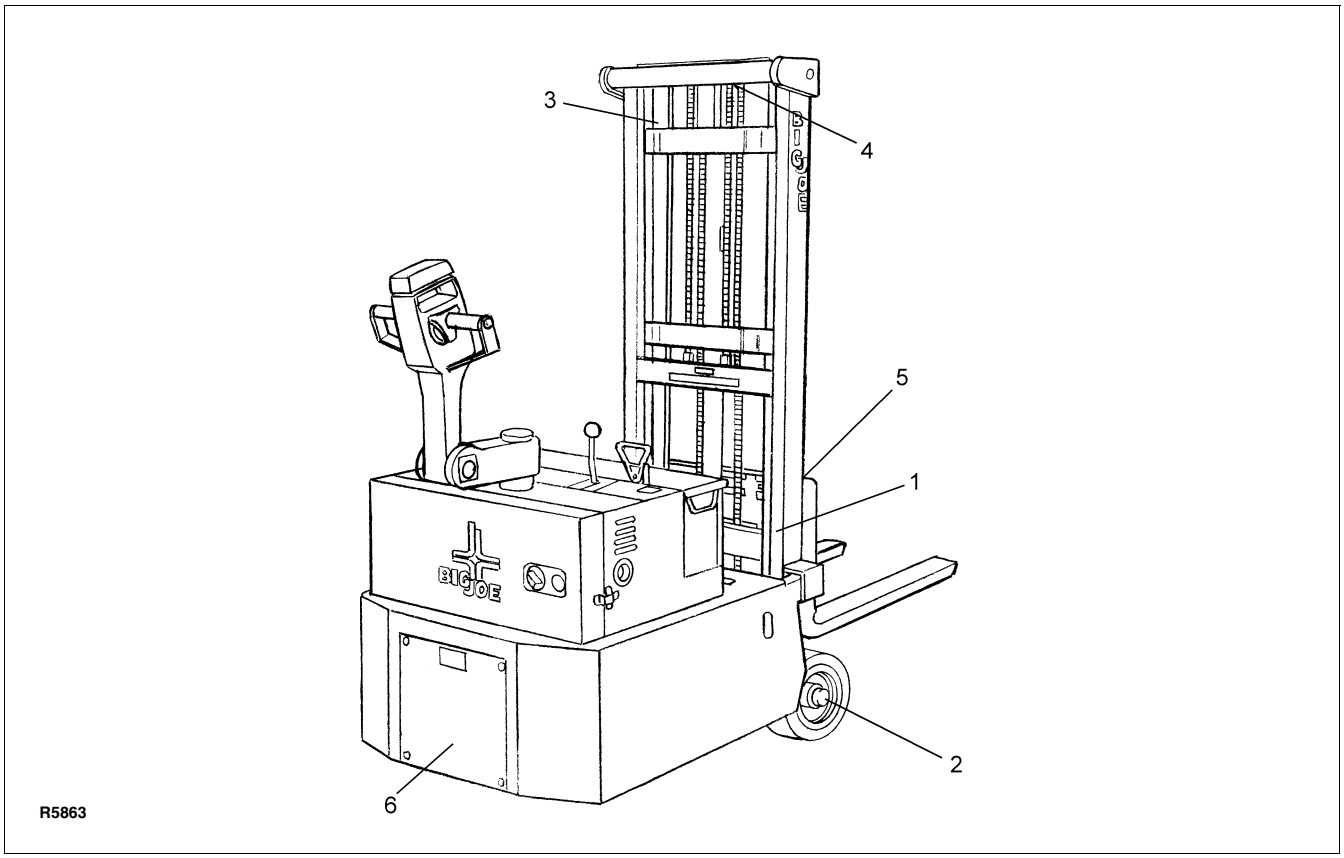


Figure 3-1 Lubrication Diagram

Table 3-4 Lubrication Chart

FIG 3-1 INDEX NO.	LOCATION	METHOD OF APPLICATION	TYPE (Table 3-3)	APPLICATION OF LUBRICANT
1	Lift carriage rollers	Gun	No. 2	Pressure lubricate.
2	Load Wheels	Gun	No. 2	Repack.
3	Outer and inner mast	Brush	No. 2	Full length of channel where rollers operate.
4	Ram head sheaves	Gun	No. 2	Pressure lubricate.
5	Fork shaft	Brush	No. 2	Light coating
6	Transmission	Can	No. 1	Fill to plug level.

NOTES

SECTION 4
TROUBLESHOOTING

4-1. GENERAL

Table 4-1 serves as a guide to determine possible causes of trouble. The table is divided into five main categories: Truck Dead: Trouble With Travel: Trouble With Braking: Trouble With Lifting Or Lowering, and Miscellaneous malfunctions. Refer to electrical wiring diagram (Figure 4-1 or Figure 4-2) as a supplement to the troubleshooting chart or when tracing an electrical circuit.

Table 4-1 Troubleshooting Chart

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
TRUCK DEAD		
Truck will not run forward or in reverse nor will lift system operate.	a. 15 Amp control circuit fuse blown.	Check fuse and replace if defective.
	b. 300 Amp fuse blown.	Check fuse and replace if defective.
	c. Battery dead or disconnected.	Check battery quick-disconnect plug and check battery. See Section 3.
	d. Defective keyswitch.	Check and replace if required.
	e. Defective wiring.	Check for open circuit. Repair as required.
TROUBLE WITH TRAVEL		
Truck does not run forward or reverse. Everything else is normal.	Check all wiring. A loosen connection may be the cause of malfunction.	Tighten all loose connections before further troubleshooting.
	a. 15 Amp control circuit fuse blown.	Check fuse and replace if defective.
	b. Defective dead-man brake switch.	Check and replace if required.
	c. Defective contactor	Check and replace if required.
	d. Main wire harness cut.	Replace.
Truck runs forward but not in reverse.	a. Defective speed control switch or defective contactor.	Check for positive DC voltage at number 1-wire on reverse contactor. If not present when steering arm is in operating position and speed control is in reverse speed, control switch is defective. If voltage is present, contactors defective.
	b. Belly button switch out of adjustment or broken.	Adjust and/or replace. See paragraph 5-2.

Table 4-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
TROUBLE WITH TRAVEL (CONT.)		
Truck runs in reverse but nor forward.	Defective speed control switch or defective contactor	Check for positive DC voltage at number 2-wire on forward contactor. If not present when steering arm is in operating position and speed control is in forward position, travel speed control switch is defective. If voltage is present, contactor is defective.
Truck runs forward and in reverse at slow speed; will not run at higher speeds.	a. High speed cutout switch out of adjustment or defective.	Adjust switch as required. Check and replace if required.
	b. Defective second and/or third speed contactors.	Check coils for continuity. Check contacts for excessive wear. (A black appearance where tips make contact is normal). Repair or replace as required.
Truck runs forward and in reverse in third speed only. Truck does not move when control is in first speed position. Everything else is normal.	Defective or open speed control resistor.	Check for clean, tight connections. Check resistor or continuity and replace or repair as required.
Truck runs at second or third speed when control is in the first speed position. Everything else is normal.	a. Contract stuck closed.	Replace contact tips.
	b. Damaged speed control switch.	Check speed control switch in handle.
Truck moves forward in low speed when arm is ulled down.	a. Belly-button safety switch out of adjustment or broken.	Repair or replace as necessary.
	b. Short in control head.	Check wiring and repair as required.
TROUBLE WITH BRAKING		
Mechanical brake does not stop truck properly.	a. Brake linkage in need of adjustment.	Adjust mechanical brake (see SECTION 6).
	b. Brake pads worn.	Replace pads and readjust mechanical brake.
Mechanical brake grabs when steering arm is in operating position.	Brake linkage over adjusted	Adjust mechanical brake (see SECTION 6).

Table 4-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
TROUBLE WITH LIFTING OR LOWERING	Oil level low.	Check hydraulic oil level. Fill hydraulic reservoir so that oil shows full on dipstick with lift carriage fully lowered. (approximately 2 inches from top of reservoir) before further troubleshooting. Tighten all electrical connections.
Lift carriage does not rise	a. Defect in electrical system.	Check switch on throttle valve. Replace if defective.
	b. Defect in electrical system for operating pump motor.	If pump motor does not run when LIFT control is in UP position defect is in pump solenoids, or pump motor. Check for positive DC voltage at pump motor to locate defect. Repair or replace defective part.
	c. Defect in hydraulic system.	Check for pinched hoses. Check pump for proper operation. Replace if necessary.
Lift carriage does not lower, everything else is normal.	Defect in hydraulic system.	Check the flow control valve and look for obstruction in the hydraulic line. Check throttle valve for proper action. Repair as required.
Forks creep downward under load or when unit is not in use, everything else is normal	Leak in cylinder packing, pump or control valve.	Inspect the control valve, pump and cylinder packing. Repair or replace as required.
Oil sprays or flows from the top of the lift cylinder.	Defective packing in lift cylinder or too much oil in reservoir.	Overhaul lift cylinder and install new packing, seal, and wiper ring.
Oil foaming from vent cap on hydraulic reservoir.	a. Leak in suction line between the pump and the reservoir or oil too high.	Check oil filter. Replace if necessary. Tighten fittings. Inspect line and replace if necessary.
	b. Oil level low.	Check and fill to proper level.
	c. Wrong type of oil used	Drain and replace with correct oil. See Table 3-3.
Oil splashes out of vent when lowering forks.	Oil level too high.	Drain, then refill reservoir when forks are in their lowest position.

Table 4-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
TROUBLE WITH LIFTING OR LOWERING (CONT.)		
Squealing sounds when forks are raised.	a. Oil level too low.	Add oil to reservoir.
	b. Dry channels in mast.	Apply grease.
	c. Defective bearing.	Replace bearing.
Forks does not lift to top.	Oil level too low.	Add oil to reservoir.
Control does not return to neutral.	a. Broken spring	Replace spring
	b. Pin and ball out of adjustment	Disassemble, clean and reassemble. Replace worn parts.
No motion slow or jerky action of hydraulic system.	a. Load heavier than capacity.	Refer to data plate on side of mast for maximum lift capacity.
	b. Defective pump.	Check output pressure.
	c. Oil level low.	Check and fill to proper level.
	d. Defective lift cylinder.	Rebuild or replace.
MISCELLANEOUS		
Steering arm does not return to the upright position.	a. Return spring improperly adjusted.	Readjust torque on spring (see SECTION 5).
	b. Broken spring.	Replace.
	c. Binding brake linkage or electrical cable.	Check and free the binding item.
Steering arm jerks excessively when starting or stopping the truck.	a. Worn pivot tube bushings.	Replace upper and lower pivot tube bushings.
	b. Drive tire worn or mounted incorrectly.	Repair or replace.

NOTES

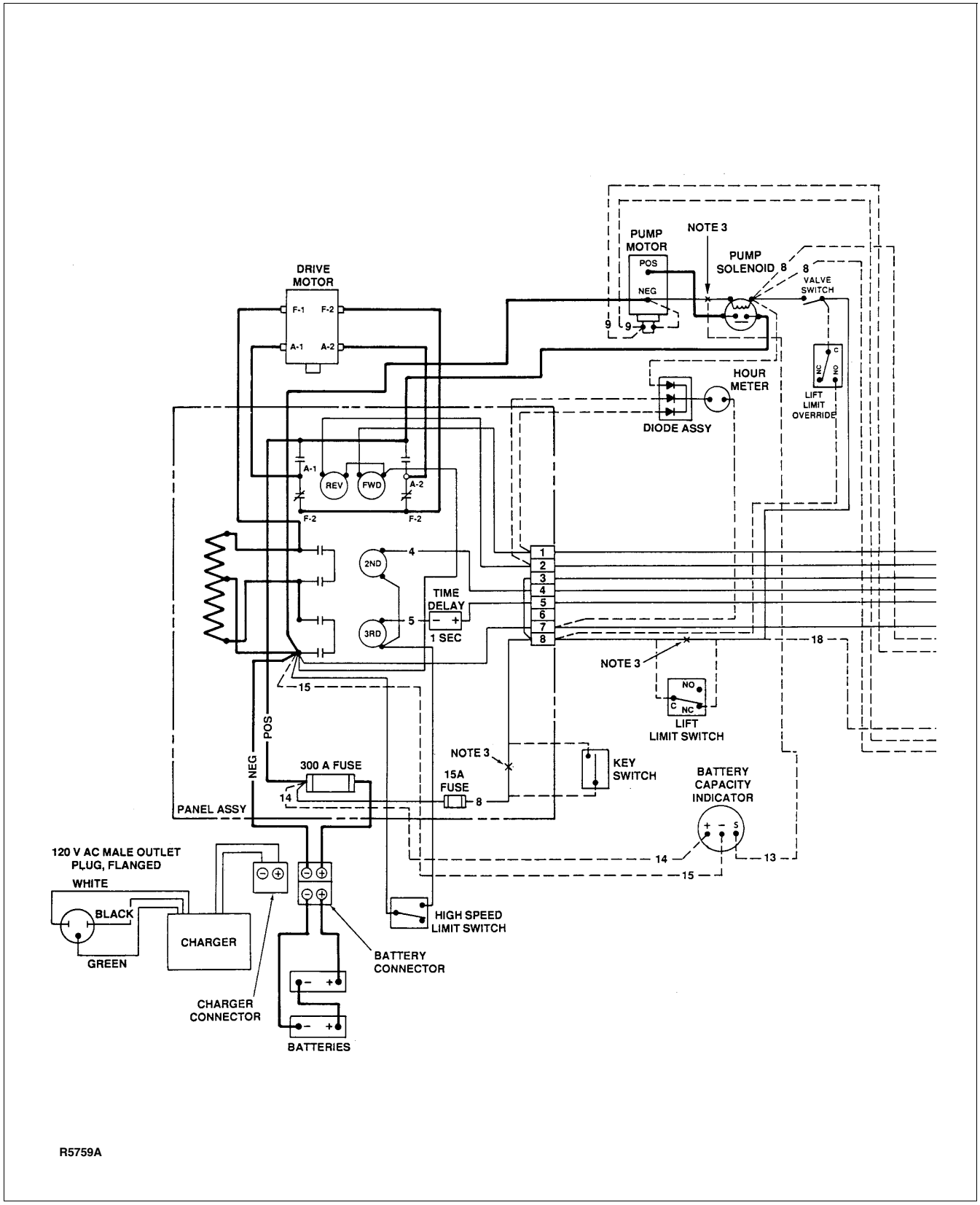


Figure 4-1 Wiring Diagram (Sheet 1)

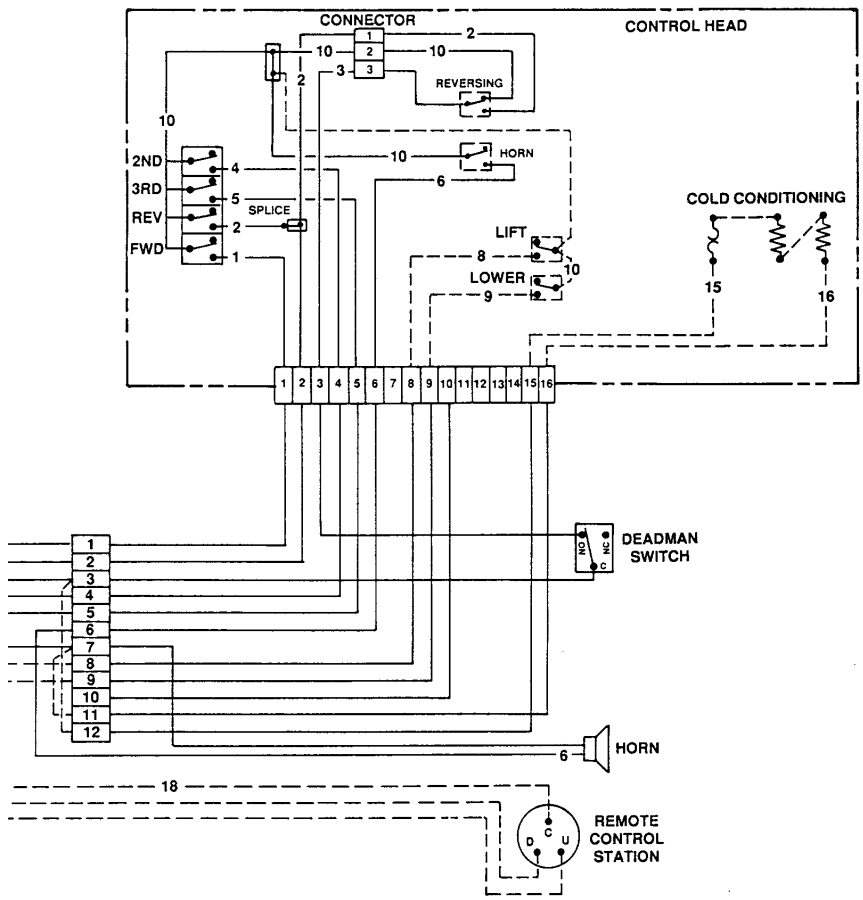
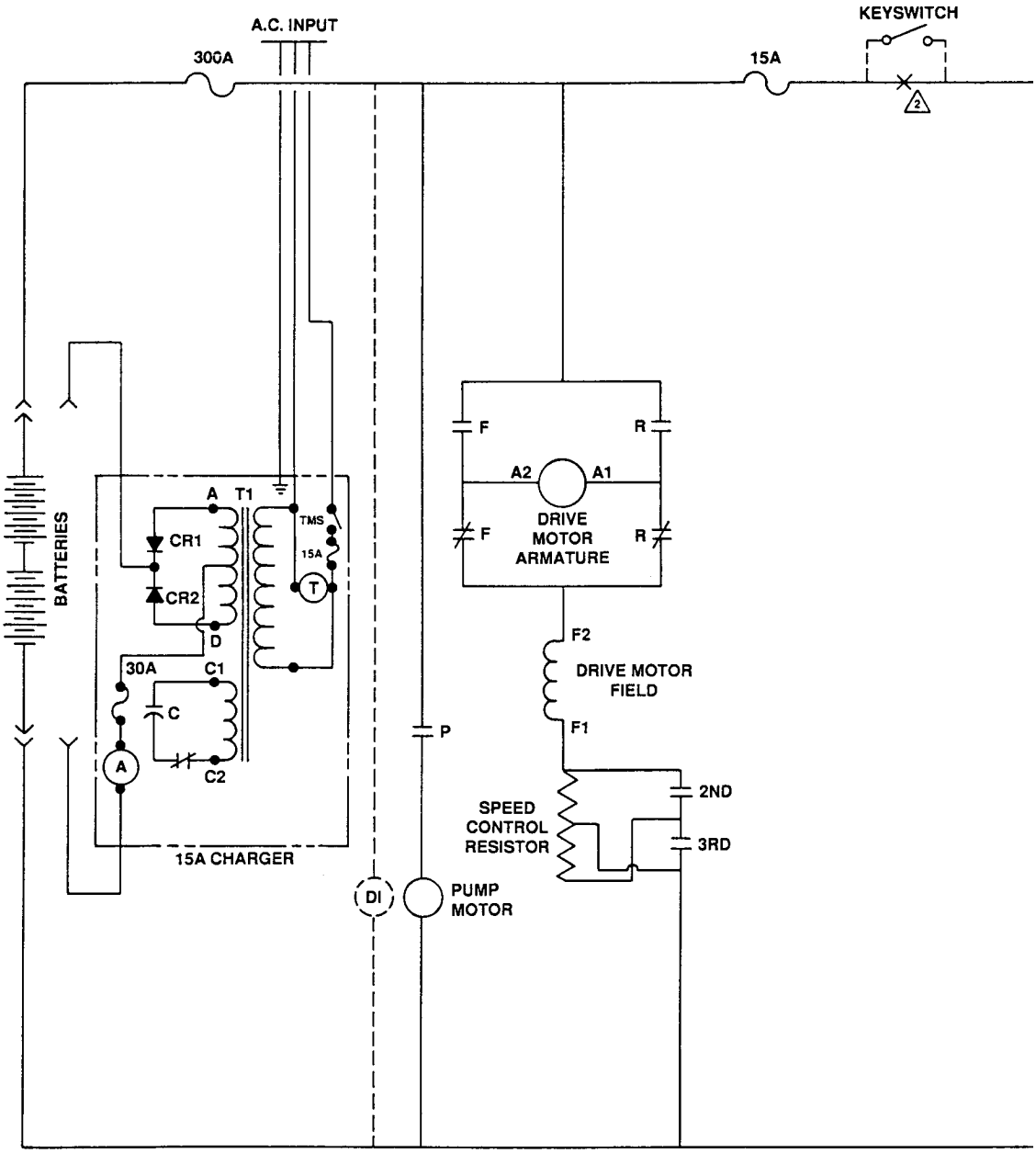


Figure 4-1 Wiring Diagram (Sheet 2)



NOTES

1. SYMBOLS:
   - F = FORWARD CONTACTOR
   - R = REVERSE CONTACTOR
   - P = PUMP SOLENOID
   - 2ND = SECOND SPEED CONTACTOR
   - 3RD = THIRD SPEED CONTACTOR
   - L = LOWERING SOLENOID (OPT)
   - DI = DISCHARGE INDICATOR (OPT)
   - HM = HOUR METER (OPT)
   - A = AMMETER
   - T = TIMER

R4499A 2. OPTIONAL CIRCUITS DASHED. "X" DENOTES CONNECTION BROKEN WITH OPT. CIRCUIT.

Figure 4-2 Wiring Schematic (Sheet 1)

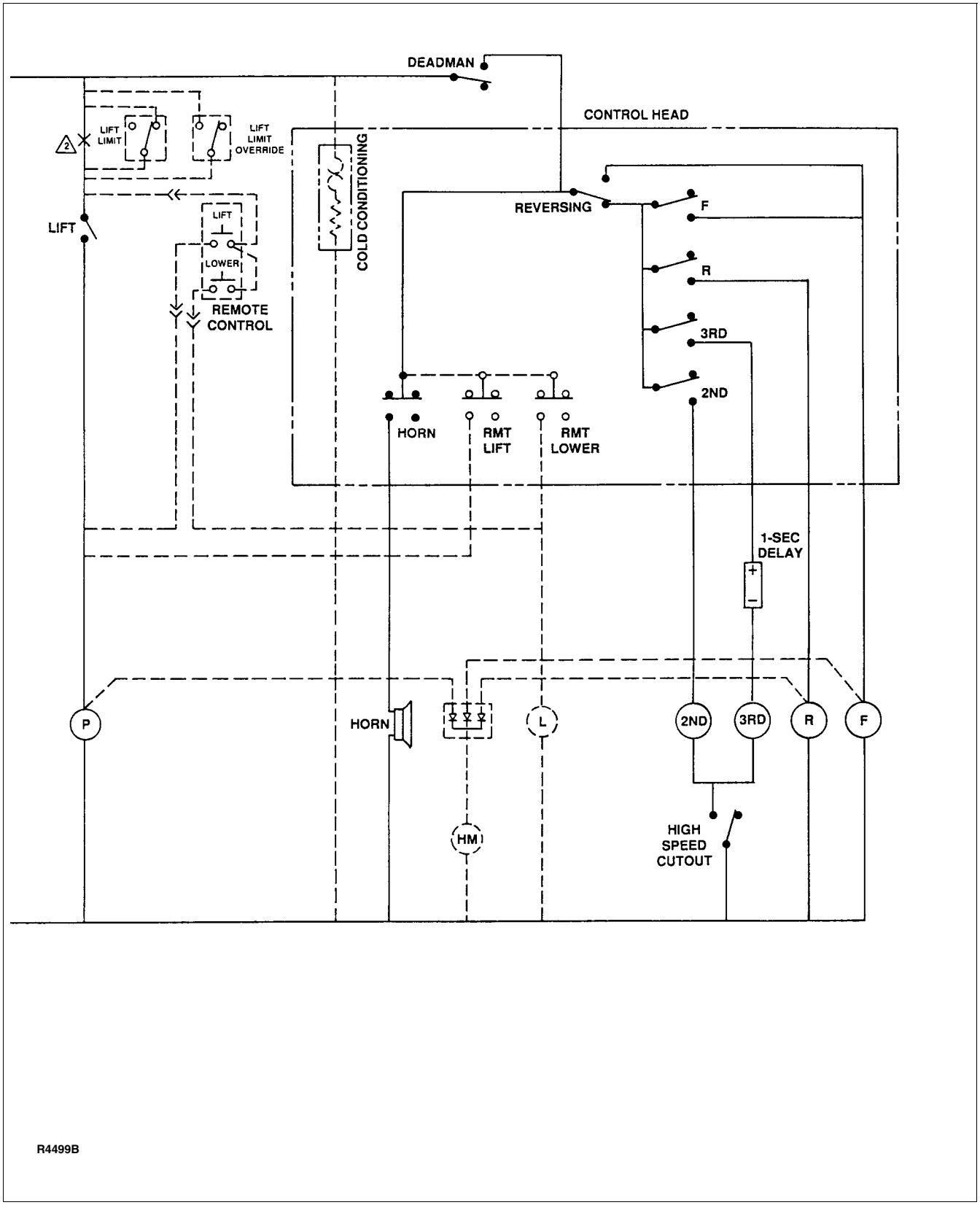


Figure 4-2 Wiring Schematic (Sheet 2)

NOTES

SECTION 5
STEERING ARM AND CONTROL HEAD SERVICING

1. **SEE SUPPLEMENT 207 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 334630.**
2. **SEE SUPPLEMENT 220 FOR TRANSISTOR TRUCKS SERIAL NUMBER 334631 AND HIGHER.**

5-1. GENERAL.

The following procedures cover adjustments, replacement, and repair of the steering arm, control head, and related assemblies and components. The procedures are independent of each other unless specifically referenced.

5-2. BELLY-BUTTON SWITCH ADJUSTMENT.

NOTE: Adjust the actuator gap of the belly-button switch according to the following procedure. Refer to Figure 5-1.

NOTE: All electrical connections should be tagged with identifying labels before disconnecting.

1. Disconnect battery.

CAUTION: While removing the belly-button casting, two springs (needed for reassembly) will fall free.

2. Being careful to catch and retain the belly-button springs (25, Figure 5-2) that may fall from the control head (41) as the belly-button casting (42) is removed, drive out the roll pins (11) that secure the belly-button casting.

CAUTION: A misaligned switch may actuate (click) early or late in travel, or fail to operate.

WARNING: Test switch in an open area to avoid being accidentally pinned.

3. Bend actuator lever of belly-button switch (figure 5-1) to adjust gap so that switch clicks half way through travel of casting.
4. Reinstall casting, making certain all parts are back in place.
5. Check operation of the belly-button switch by pressing the belly-button casting while listening for the “click” that indicates that the switch has actuated.

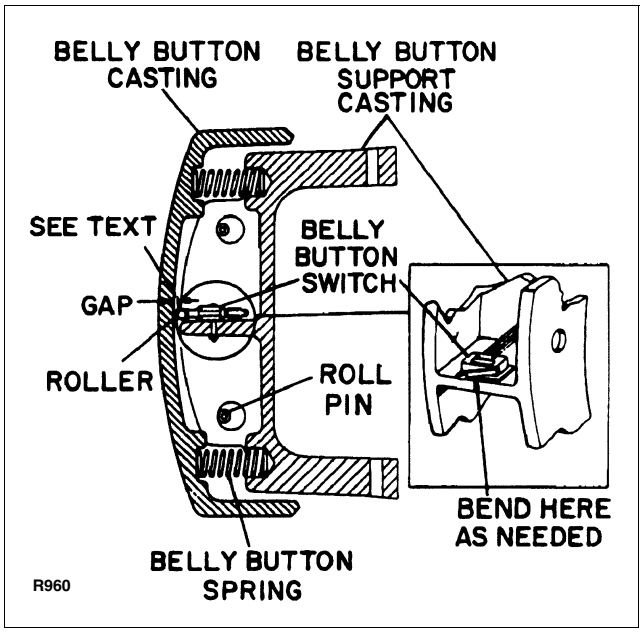


Figure 5-1 Belly-Button Switch Adjustment

NOTE: The click should be heard when the belly-button casting has moved about 50 per cent of its normal travel distance. If the click is heard at the beginning of travel, the switch may actuate at inappropriate times. If the click is heard near the end of travel, the switch could be unreliable and may not actuate in some instances.

6. Repeat steps 2. through 5. until pressing the belly-button casting actuates the switch properly.
7. Reconnect battery and electrical connections.

WARNING: Testing of belly-button switch in operation should be limited to areas clear of obstacles against which an operator could be pinned. Use first speed, reverse.

5-3. CONTROL HEAD SWITCH REPLACEMENT.

NOTE: For access to belly-button switch, see paragraph 5-2. For access to other switches on control head, the top cover (15, 16, or 17, Figure 5-3) and/or switch plate (18) must be removed.

NOTE: All electrical connections should be tagged with identifying labels before disconnecting.

1. Disconnect battery.
2. If necessary to gain access to defective belly-button switch, remove belly-button casting (42, Figure 5-2) by performing step 2 in paragraph 5-2.
3. Remove top cover (15, 16, or 17, Figure 5-3) by removing four screws (14).
4. Remove switch plate (18) by removing four screws (15 and 16, Figure 5-2) on top and bottom of control handle (41).
5. Replace belly-button switch (3), horn switch (4, Figure 5-3), lift and lower switches (3) or speed control switches (4, Figure 5-2).

NOTE: If the belly-button switch is replaced, adjust it in accordance with paragraph 5-2. before using truck.

6. Replace switch plate (18, Figure 5-3) and secure with four screws (15 and 16, Figure 5-2) on top and bottom of control handle (41).
7. Replace top cover (15, 16, or 17, Figure 5-3), and secure with four screws (14).
8. Reconnect battery.

1. SEE SUPPLEMENT 207 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 334630

2. SEE SUPPLEMENT 220 FOR TRANSISTOR TRUCKS SERIAL NUMBER 334631 AND HIGHER

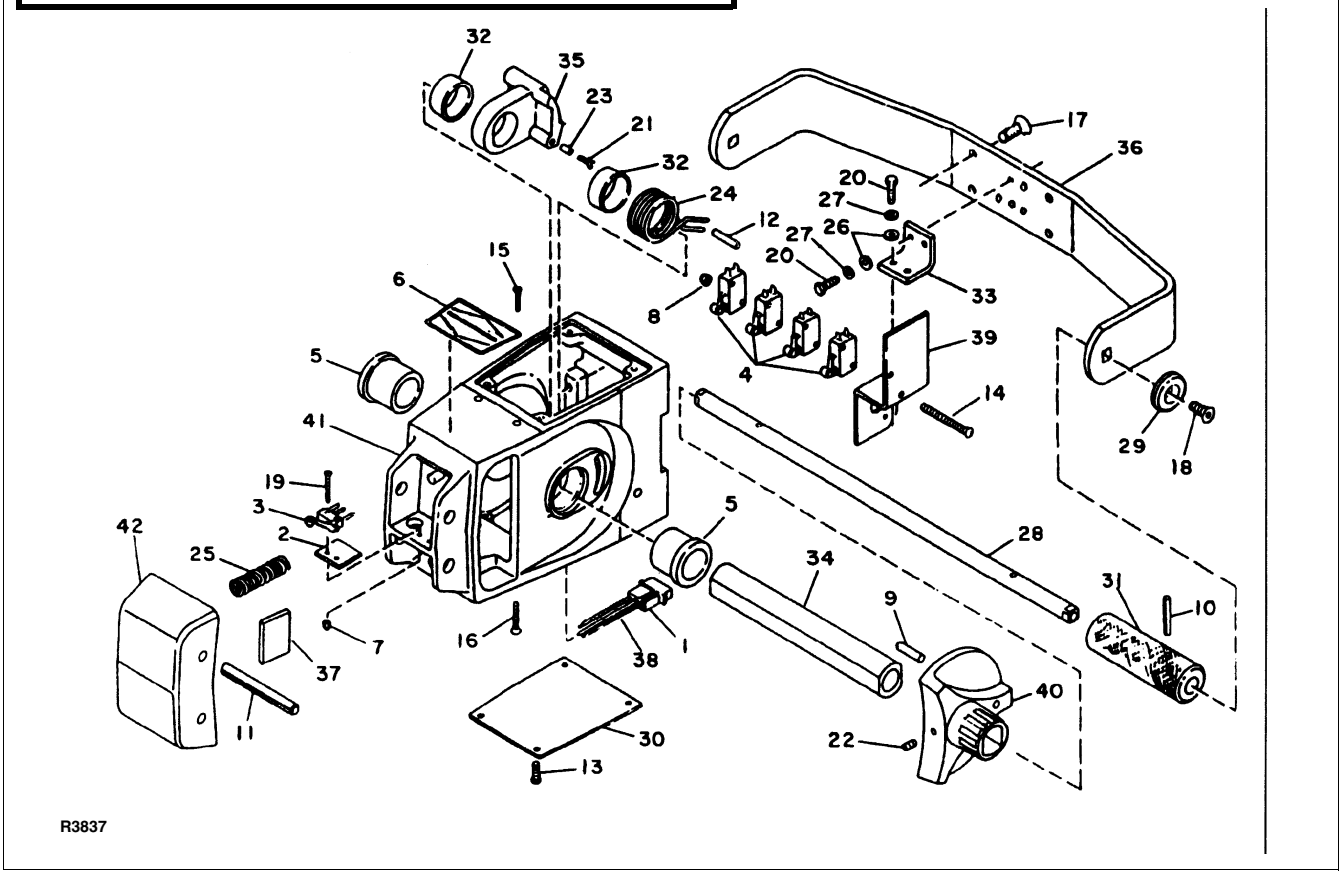
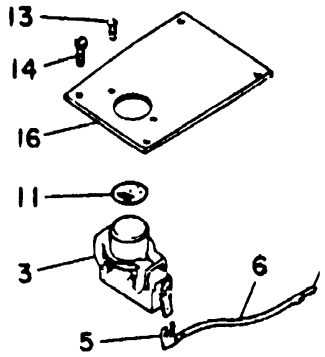


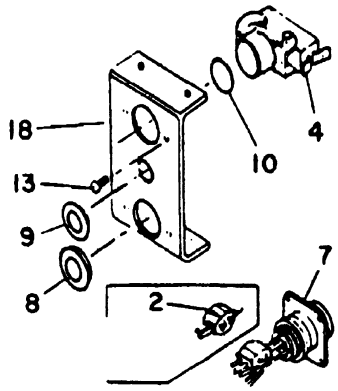
Figure 5-2 Control Head Assembly

1. SEE SUPPLEMENT 207 FOR TRANSISTOR TRUCKS
   SERIAL NUMBER 333032 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR TRUCKS
   SERIAL NUMBER 334631 AND HIGHER

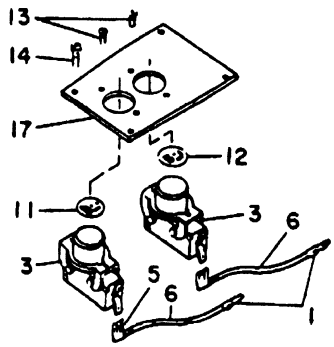
PDCM WITH LIFT ONLY
505050-05 (OPTION)



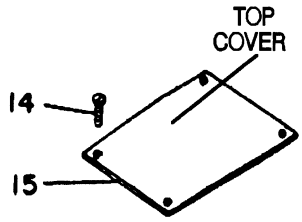
PDCM HORN
505050-04, 05 & 06



PDCM WITH LIFT LOWER
505050-06 (OPTION)



PDCM WITHOUT REMOTE AND LOWER
505050-04 (STD)



R4481

Figure 5-3 Push Button Switches

5-4. SPEED CONTROL SWITCH RETURN SPRING REPLACEMENT.

1. Disconnect battery.
2. Remove four screws (17, Figure 5-4) securing control head to steering arm.
3. Disconnect connector (25).
4. Remove four screws (14, Figure 5-3) securing top cover (15) to control head.
5. Disconnect speed control switches (4, Figure 5-2).
6. Remove four screws (17) securing handle guard (36) to control head.
7. Remove two socket head screws (18) and caps (29) from handle guard (36).
8. Remove handle guard with two brackets (33 and 39) and speed control switches (4) attached.
9. Remove roll pin (10) from right hand handle grip (31).
10. Remove right hand handle grip from shaft (28).
11. Remove set screw (22) from right hand control lever (40.)
12. Remove right hand control lever from tube (34).
13. Observing through top cover opening, slide shaft (28) with tube (34) out left hand side of control head just enough to clear return spring (24).
14. Disengage return spring from spiral pin (12) and remove return spring.
15. Place new return spring in position, engage with spiral pin, and slide shaft (28) with tube (34) back through return spring and out right hand side of control head.
16. Install right hand control lever (40) onto tube (34), and secure with set screw (22).
17. Install right hand handle grip (31) onto shaft (28), align roll pin hole in handle grip with roll pin hole in shaft, and install roll pin.
18. Install handle guard (36), with two brackets (33 and 39) and switches (4) attached, and secure with two caps (29) and screws (18).
19. Install four screws (17) through handle guard and into control head.
20. Reconnect speed control switches (4).
21. Install top cover (15, Figure 5-3) with four screws (14).
22. Reconnect connector (25, Figure 5-4).
23. Install control head onto steering arm with four socket head screws (17).
24. Reconnect battery.

5-5. STEERING ARM RETURN SPRING ADJUSTMENT.

The tension on the steering arm return spring should allow the steering arm to return gently to the upright position. Excessive tension on the steering arm return spring will cause the steering arm to snap up and may cause damage to the electrical cable, brake linkage, or the spring itself. If the steering arm does not return fully, check for binding in the brake linkage or wiring harness before making any adjustments. If they do not bind, refer to Figure 5-4 and proceed as follows to adjust the steering arm return spring tension.

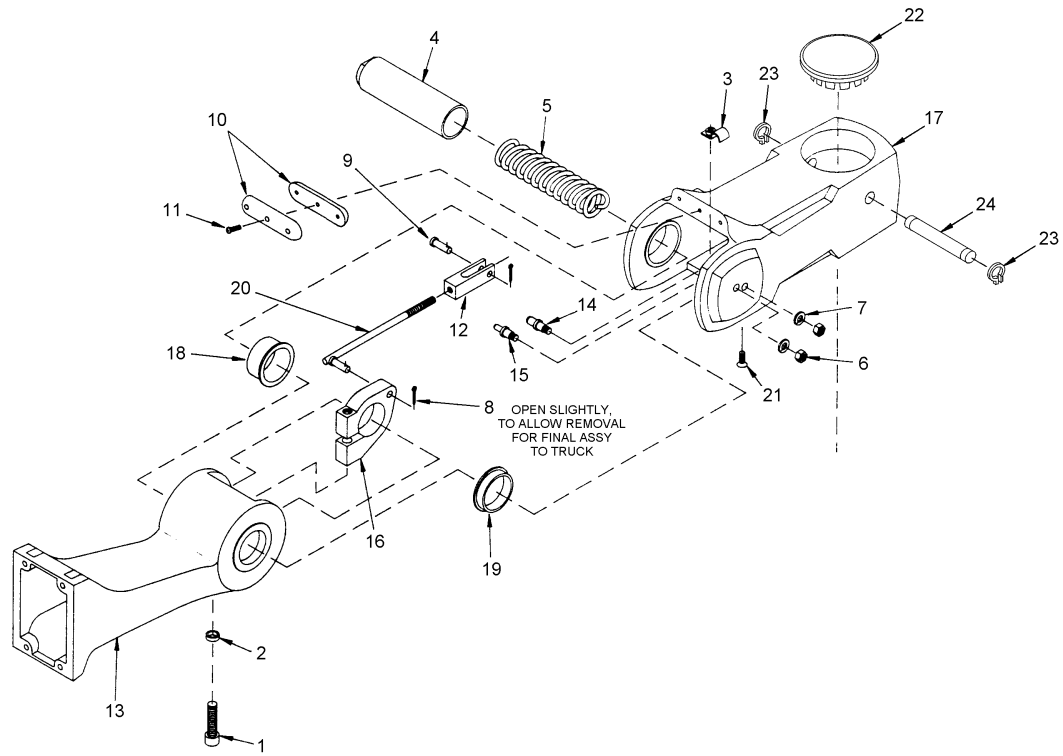
NOTE: Refer to Figure 5-4 for the following procedure.

1. Disconnect the battery.
2. Hold the steering arm (12) in the upright position and make sure the arm cannot fall.
3. Insert a 5/16 allen wrench through hole in bottom of steering arm and loosen screw (15). The spring tube (1) will rotate counterclockwise when screw is loosened.
4. With a pair of vise grip pliers, grip the flat surfaces of the spring tube assembly (1) and rotate clockwise 180 degrees.
5. Hold spring tube assembly in rotated position and tighten screw (15) to secure.
6. Check the spring action by lowering the steering arm and returning it to the upright position two or three times.
7. If necessary, repeat steps 2. through 6., increasing or decreasing amount of rotation of the spring tube assembly until steering arm returns gently to full upright position.
8. Reconnect battery.

1. SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333032 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 334631 AND HIGHER

HANDLE RETURN SPRING KIT 901325 CONTAINS:

ITEM	QTY
4	1
5	1
6	2
7	2
14	1
15	1



USED ON TRUCKS SERIAL NUMBERS 333032 TO 346023

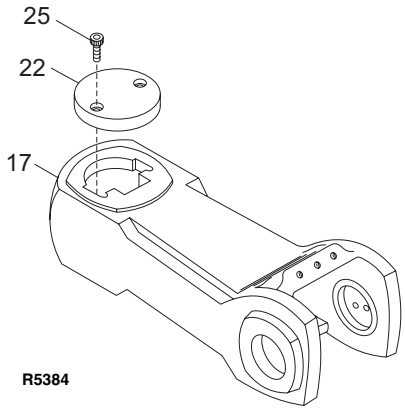


Figure 5-4 Steering Arm and Pivot Cap

5-6. STEERING ARM RETURN SPRING REPLACEMENT.

NOTE: Refer to Figure 5-4 for the following procedure.

NOTE: The steering arm return spring is replaced while the steering arm is in the upright position.

1. Disconnect battery.

NOTE: The steering arm has a tendency to fall downward when the tension on the return spring is released.

2. Hold steering arm (12) in upright position and make sure the arm cannot fall.
3. With a piece of chalk or crayon, draw a straight line from center of spring tube assembly (1) into pivot cap (3), marking radial position of tube, to facilitate reinstallation.
4. Insert a 5/16 allen wrench through hole in bottom of steering arm and loosen screw (15).

CAUTION: Unless properly supported, steering arm will drop out of pivot cap when spring tube is removed.

5. Put a block under steering arm at pivot cap.
6. With a pair of vise-grip pliers, grip the flat surfaces of spring tube assembly (1), and slowly pull it free from the steering arm, pivot cap and tube clamp (10),

NOTE: Steering arm return spring (2) will remain inside the spring tube assembly (1).

7. Remove steering arm return spring (2) from spring tube assembly (1). If spring is severely jammed and will not come loose, punch and drive the 1/4-inch diameter roll pin (14) into the tube. Save pin for reuse. Remove the spring. Tap roll pin back into place.
8. Lubricate the ends and outer surface of the new steering arm return spring (2) with a lithium base general purpose grease.
9. Insert spring into spring tube assembly and press in, making sure that one spring loop eye fits over the 3/8-inch roll pin at the closed end of the spring tube assembly.
10. Slide spring tube assembly into pivot cap (3) and steering arm (12) through the tube clamp (10) and through loop of electrical cable.
11. Align radial position of spring tube assembly in accordance with line drawn in step 3. Slowly rotate spring tube assembly a few degrees each way until the steering arm return spring snaps into place over spring pins (6 and 7) then tighten screw (15).
12. Apply engine lubricating oil (No. 2) to the steering arm elbow.
13. Remove block from under steering arm.
14. Adjust tension on steering arm return spring as explained in paragraph 5-5.
15. Reconnect battery.

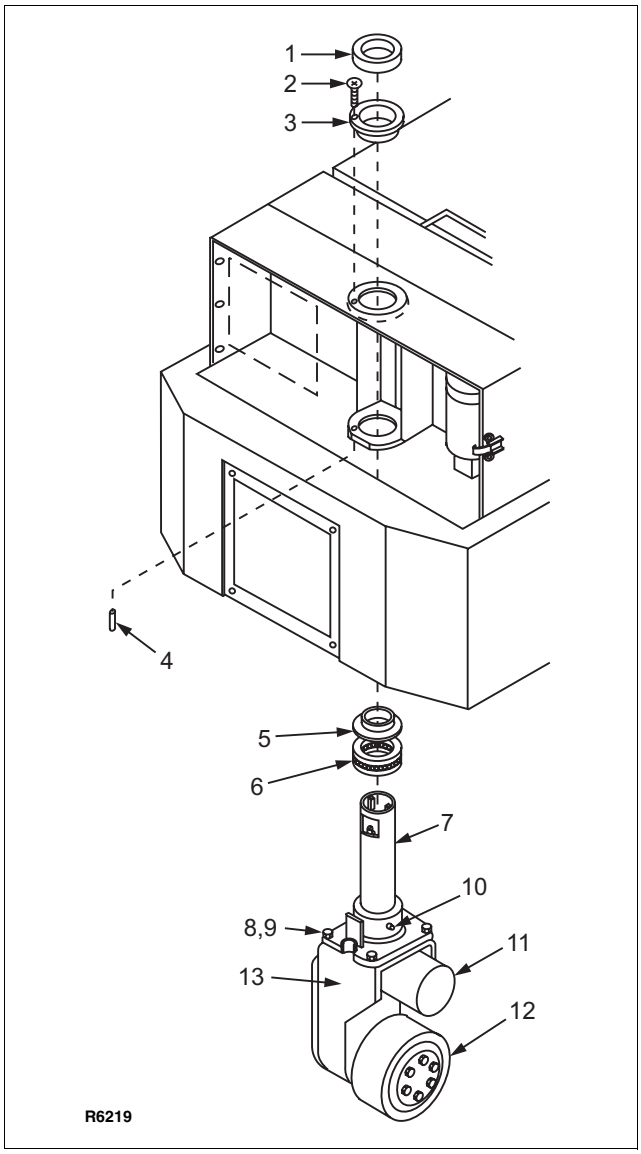


Figure 5-5 Pivot Tube Bushings

5-7. PIVOT TUBE REPLACEMENT.

NOTE: All electrical connections and cabling should be tagged with identifying labels before disconnecting.

NOTE: A chain hoist is required for this procedure, it should be in position above the pivot tube before disassembly.

1. Remove the transmission as described in Section 7.
2. Position a support under pivot tube (7, Figure 5-5).
3. **Trucks Serial Number 333032 to 346023:** remove two socket head screws (22, Figure 5-4).
4. Remove pivot cap cover (21).
5. Remove electrical control cable, steering arm and control head from pivot tube assembly.
6. Remove pivot cap (3) and spacer (1, Figure 5-5).
7. Position a chain hoist above the pivot tube.
8. Connect chain to pivot tube as follows:
   a. **Trucks Serial Number 333032 to 346023**: use the two pivot cap cover screws (22, Figure 5-4) as a means of attachment for the chain hoist. Secure the chain hoist to the pivot tube.
   b. **Trucks Serial Number 346024 and Higher**:use **tool kit part number 907151**. Position spacer, Figure 5-6, inside the pivot tube. Insert the pin through the support tube and secure with the cotter pin. Attach chain hoist to the spacer.
9. Remove the support from under the pivot tube and remove the pivot tube from the bottom of the truck.
10. Disconnect the chain from the pivot tube and remove bushing(s), and thrust bearing (6).
11. Remove three screws (2) securing bushing (3).
12. Remove bushing (3).
13. Inspect the bearing (6) for wear. If worn, replace with new bearing.
14. Discard the two old bushings (3 and 5).

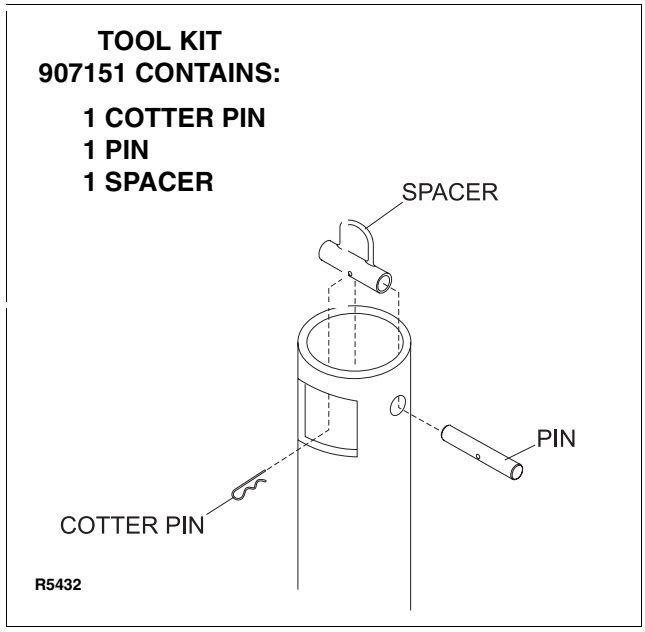


Figure 5-6Pivot Tube Removal Tool

NOTE: When installing the new parts, refer to Figure 5-5 to be sure they are positioned on the pivot tube in the proper order.

15. Install bushing (3) with screws (2).
16. Install bearing (6) and bushing (5) on pivot tube (2).
17. Route support chain through pivot weldment.
18. Attach hoist chain to pivot tube as described in step 8.
19. Install the pivot tube (7) through the bottom of the truck and position a support under pivot tube.
20. Remove hoist chain and the two pivot cap cover screws or pivot tube tool as applicable.
21. Install spacer (1) on pivot tube (7).

CAUTION: Be sure to observe cable routing and positioning when reinstalling electrical control cable to prevent cable damage.

22. Reinstall steering arm onto pivot tube, being careful not to damage electrical control cable while routing it through the pivot tube. (See Figure 5-7).
23. Install pivot cap cover.
24. Install the transmission as described in SECTION 7.

5-8. ELECTRICAL CONTROL CABLE REPLACEMENT.

NOTE: Refer to Figure 5-7 while performing the following procedure.

1. Disconnect the battery.

NOTE: When removing control head in the following step, be sure to hold it in place until cable is disconnected.

2. Remove four screws (7, Figure 5-7) that secure control head to steering arm.
3. Disconnect connector (8), and set aside control head.
4. Use Amp Extraction Tool **Part Number 900750** to push out and disconnect wire pins from connector (8).
5. Remove cable clamps (1,2) and loosen loop of cable that surrounds the spring tube assembly.
6. Remove pivot cap cover (6).
7. Pull disconnected end of old cable through steering arm and pivot cap, then up through pivot cap cover opening.
8. Tape the disconnected end of the old cable to the bottom of the new cable.
9. Grease the new cable with a lithium-base grease or silicone spray.

NOTE: The dead-man switch is on the brake linkage. The wire connected to pin number 3 on terminal board (9) is a wire that comes from the dead-man switch. Cable wire number 3 from is connected to the other lead on the dead-man switch.

10. Remove base access cover, and disconnect terminal end of old cable from transmission terminal board (9) and cable wire number 3 from deadman switch lead. Disconnect wire #7 from the horn.
11. Draw new cable into pivot tube by pulling old cable out through the base access opening.

NOTE: The cable leads are numbered consecutively.

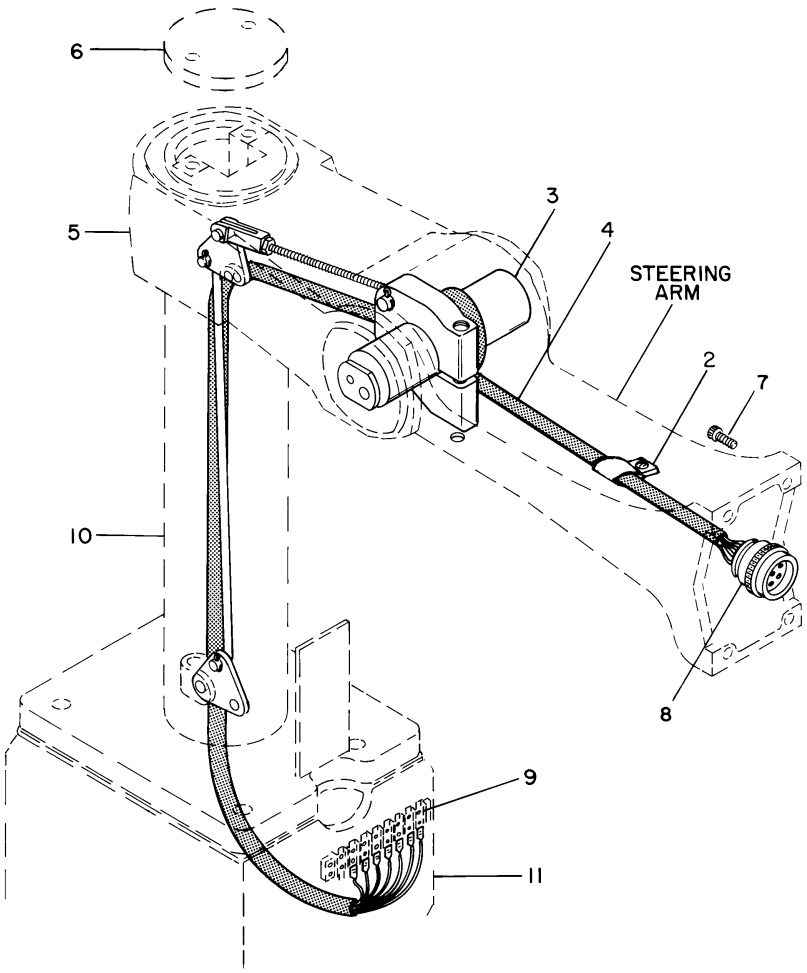
12. Untape the old cable from the new cable and connect the new cable terminals sequentially, starting with pin 1 on the transmission terminal board (9).
13. Cut the terminal off of cable wire number 3 and connect this wire to the wire from the deadman switch.
14. Check that the other wire from the deadman switch is connected to terminal 3.
15. Route and connect cable wire number 7 to the horn switch.
16. Wipe off excess grease or silicone spray from exposed parts of the cable.
17. Route connector (8) end of cable under spring tube assembly (3) and out the opening at the elbow.
18. Eliminate cable slack in pivot tube (10); then secure cable with cable clamp (1).

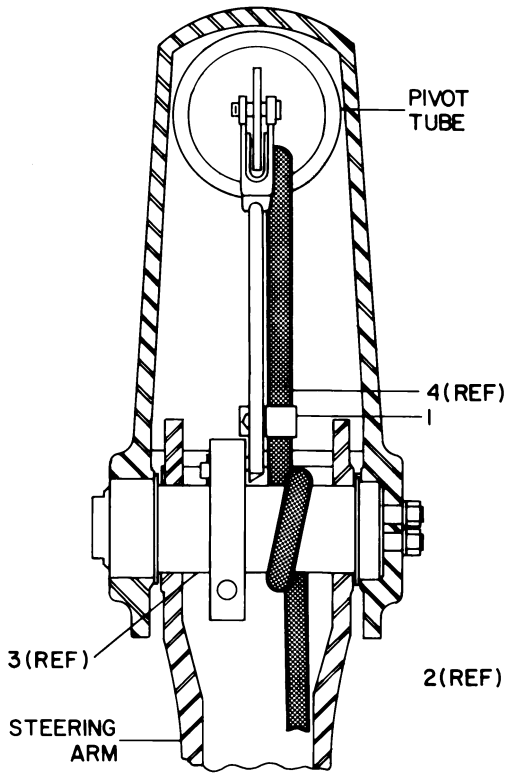
CAUTION: Improper cable loop adjustment while performing the following step will damage the cable. If too tight, the cable will tear when the steering arm is in the up position. If too loose, the cable will buckle or be pinched when the steering arm is in the down position.

19. Loop cable around spring tube assembly (3) as illustrated and push connector (8) end of cable through steering arm.
20. Secure cable with cable clamp (2).

NOTE: Although a new connector (8) is supplied with the new cable, it is not attached. The new connector (8) must be attached to the wire connector pins of the new cable. Each wire is numbered and must be connected to its corresponding pin receptacle number in the connector.

21. Plug the wire pins into their corresponding receptacles in the connector (8).
22. Position the control head close enough to the steering arm to reach the connector (8).
23. Reconnect the connector (8) to the corresponding connector in the control head.
24. Secure the control head to the steering arm with the four screws (7).
25. Reconnect the battery.





1. CABLE CLAMP
2. CABLE CLAMP
3. SPRING TUBE ASSEMBLY
4. ELECTRICAL CONTROL CABLE
5. PIVOT CAP
6. PIVOT CAP COVER
7. SCREW
8. MALE CONNECTOR
9. TERMINAL BOARD
10. PIVOT TUBE
11. TRANSMISSION HOUSING

R962/R5860

Figure 5-7 Electrical Control Cable Replacement

5-9. STEERING ARM AND PIVOT CAP REPLACEMENT.

1. Disconnect battery.
2. Remove and retain pivot cap cover (21, Figure 5-4).
3. Remove the complete control head assembly by removing the four socket head screws that secure it to the steering arm, and disconnect exposed connectors.

NOTE: When removing the cable clamp it may fall into the steering arm; if this happens it will fall out after further disassembly. Be sure to retain cable clamp for reuse.

4. Remove screw and cable clamp from the steering arm.
5. Remove cotter pin (20) and rod (19) to release the brake linkage.
6. Hold steering arm securely to prevent it from falling out while performing step 7.

WARNING: When screw (15) is loosened, steering arm is free to fall.

7. Remove screw (15) with 5/16-inch Allen wrench and slowly pull spring tube assembly (1) from steering arm.
8. Remove steering arm.
9. Extract other cotter pin to release clevis and brake rod.
10. Remove cable clamp (23) from pivot cap (3).
11. Pull loose end of cable up and let it extend through pivot cap cover opening.
12. Remove the pivot cap (3).

NOTE: Electrical control cable replacement is covered in Paragraph 5-8.

13. Installation of the pivot cap and steering arm is the reverse of removal. However, when installing the electrical cable refer to paragraph 5-8. and when installing the brake rod, refer to Figure 5-8 and proceed as follows:

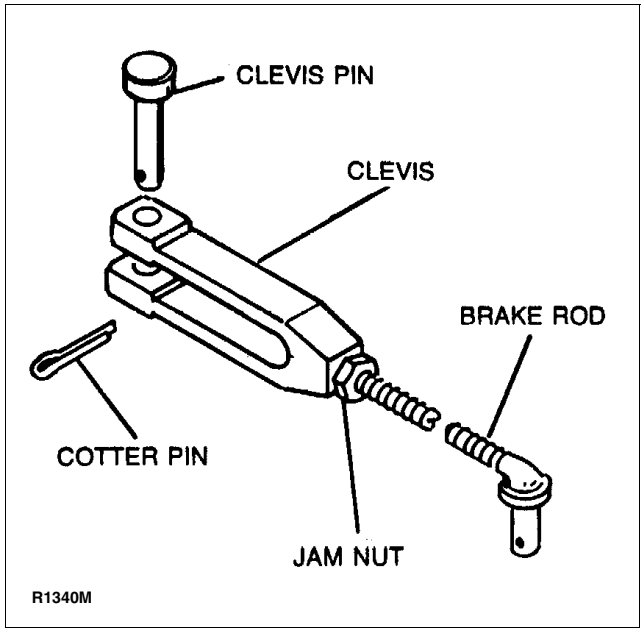


Figure 5-8 Brake Rod Assembly

   a. Thread brake rod into clevis so that approximately one-third of the thread is engaged in clevis.
   b. Insert clevis pin in clevis.
   c. With brake rod and clevis positioned so the clevis pin will not fall out, (as shown in figure 5-8) slide them into pivot cap from pivot cap opening.
   d. Insert a pair of long-nose pliers through pivot cap opening and grasp the clevis pin. With other hand, turn brake arm to its correct position. Carefully pull clevis pin far enough to slide clevis onto upper pivot plate.
   e. Install clevis pin and secure with cotter pin.

14. Apply engine lubrication oil No. 20 with a can to steering arm elbow. Apply Lithium base general purpose grease with a gun or brush to the pivot tube bushings, as required, for smooth steering performance.

SECTION 6
BRAKE SERVICING

6-1. GENERAL.

There are two different brake systems; one is used on truck **Serial Numbers 333032 to 333755**, and the other is used on trucks **Serial Numbers 333756 and Higher**. The adjustment and parts replacement procedures for these two systems are different and are described separately.

6-2. ADJUSTMENT.

If the mechanical brake does not begin to hold when the steering arm is raised or lowered into lightly shaded area in Figure 6-1, proceed as follows:

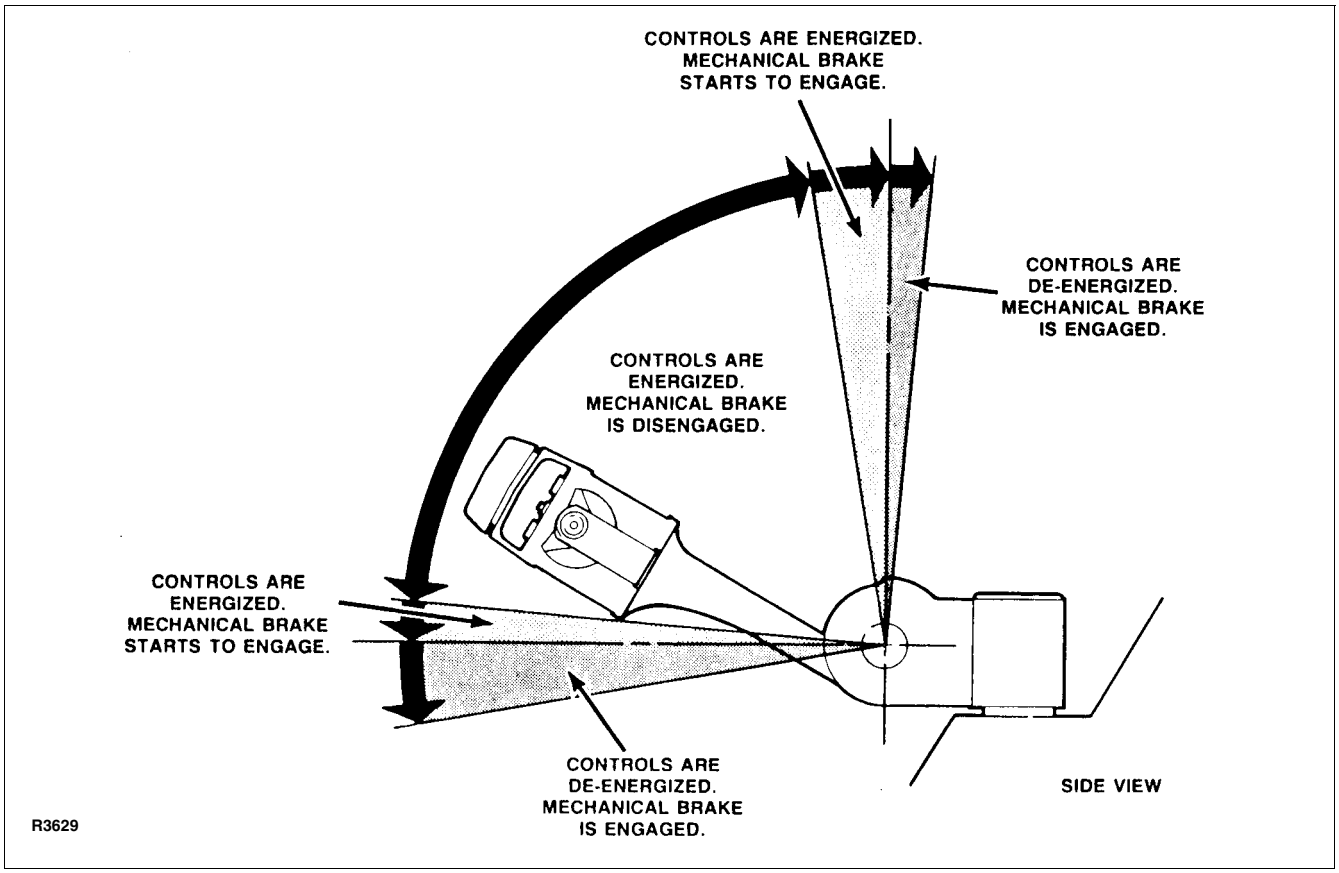


Figure 6-1 Brake Engage/Disengage

6-2.1. Adjustment For Truck Serial Numbers 333032 To 333755.

1. Disconnect the battery.
2. Jack up the truck so the drive wheel is off the ground, then securely block the truck to prevent slipping.
3. Remove base access cover.
4. Secure steering arm assembly in a position that is in either of the lighter shaded areas.
5. Spin drive wheel by hand and position weldment tube (1, Figure 6-2) by adjusting nuts (2) until you feel a noticeable drag.

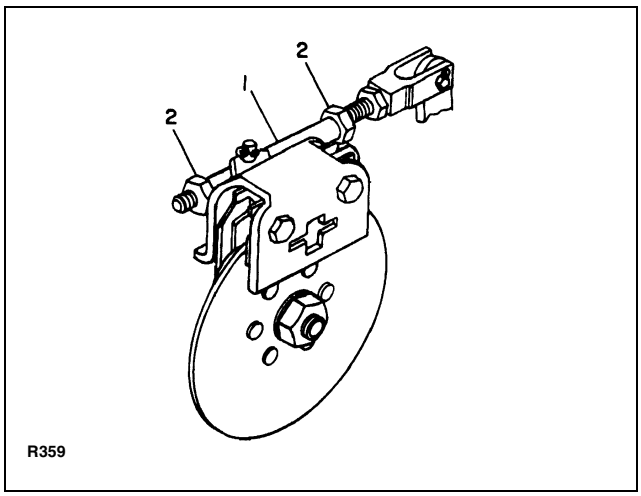


Figure 6-2 Adjustment For Truck Serial Numbers 333032 to 333755

6. Tighten nuts (2) without changing position of weldment tube (1).
7. Resecure the steering arm in drive position and spin drive wheel to be sure there is no drag; readjust if necessary.
8. Remove restrictions from steering arm.
9. Lower the truck and reinstall base access cover.
10. Reconnect battery.
11. In an area free of obstructions, accelerate the truck and apply brake. Check for proper operation in both forward and reverse direction. Make additional adjustments if necessary.

6-2.2. Adjustment For Truck Serial Numbers 333756 And Higher.

1. Disconnect the battery.
2. Jack up the truck so the drive wheel is off the ground, then securely block the truck to prevent slipping.
3. Remove base access cover.
4. Secure steering arm assembly in a position that is in either lightly shaded area shown in Figure 6-1.
5. Remove the cotter pin (1, Figure 6-3) and pin (2) to disconnect the clevis (3) from the lever assembly.
6. Loosen the lock nut (4).
7. Turn the clevis (3) to adjust the brake.

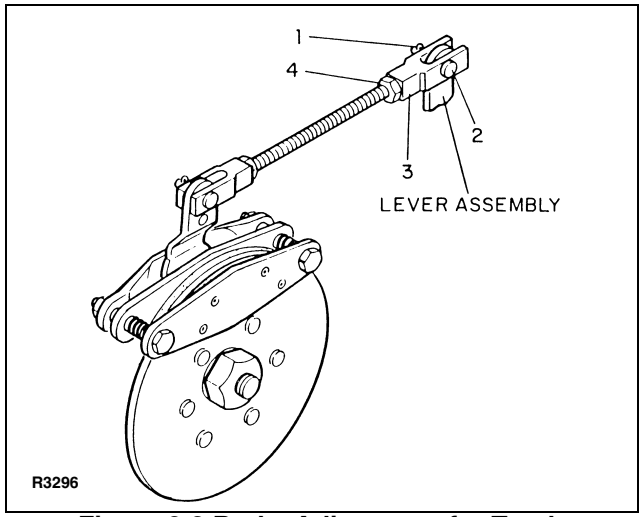


Figure 6-3 Brake Adjustment for Truck Serial Numbers 333756 and Higher.

8. Connect the clevis (3) to the lever assembly with pin (2), but do not insert the cotter pin (1) at this time.
9. Turn the brake disc by hand to check brake adjustment. If there is noticeable drag, go to step 12. If the is no drag, go to step 10.
10. Disconnect the clevis (3).
11. Repeat steps 7. through 9. until adjustment is correct.
12. Secure the steering arm in drive position and turn the brake disc to make sure there is no drag. If there is any drag, carefully readjust only enough to eliminate drag in the drive position.
13. Tighten the lock nut (4) and secure the pin (2) with the cotter pin (1).
14. Remove restrictions from the steering arm.
15. Lower the truck and install the base access cover.
16. Connect the battery.
17. In an area free of obstructions, accelerate the truck and apply brake. Check for proper operation in both forward and reverse direction. Make additional adjustments if necessary.

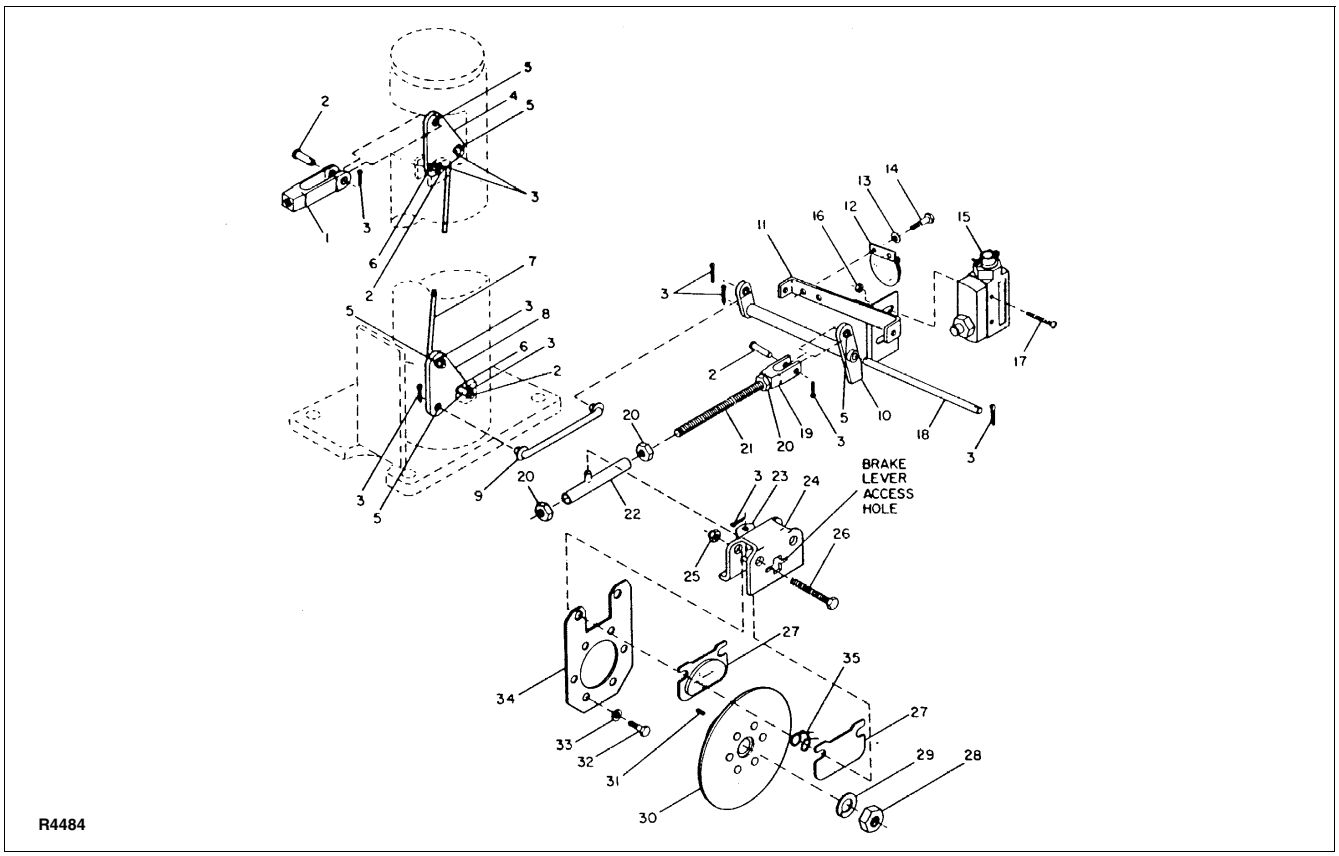


Figure 6-4 Brake Linkage for Truck Serial Number 333032 to 333755

6-3. REPLACEMENT OF DISC BRAKE PARTS.

6-3.1. Parts Replacement For Truck Serial Numbers 333032 To 333755.

1. Block the wheels to prevent the truck from rolling.
2. Remove base access cover.
3. Position steering arm to left as far as possible and secure the steering arm down from its park position so that the mechanical brake is disengaged.
4. Remove two bolts (26, Figure 6-2) and nuts (25) to release brake pads (27).
5. If brake pads don't fall free, slide brake pads out from end of clamp (24).
6. Insert replacement brake pads in clamp assembly, one pad on each side of disc (30) with linings toward the disc; check that pin in brake lever (23) is in proper slot with two bolts (26) and nuts (25).
7. Release steering arm.

6-3.2. Parts Replacement For Truck Serial Numbers 333756 and Higher.

1. Disconnect the battery.
2. Block the wheels to prevent truck from rolling.
3. Remove base access cover.
4. Position the steering arm to the left as far as possible and secure the steering arm down from its park position, so the mechanical brake is disengaged.
5. Remove the cotter pin (2, Figure 6-5) and pin (7), then swing the clevis (13) up out of the way.
6. Remove the two nuts (28) and lock washers (29).
7. Carefully pull the bolts (30) just enough to clear the mounting plate weldment (17) while you hold together remaining parts of the disc brake assembly (27), then remove the assembly.
8. Remove the bolts (30), spacers (31), springs (32), and brake pad (33).

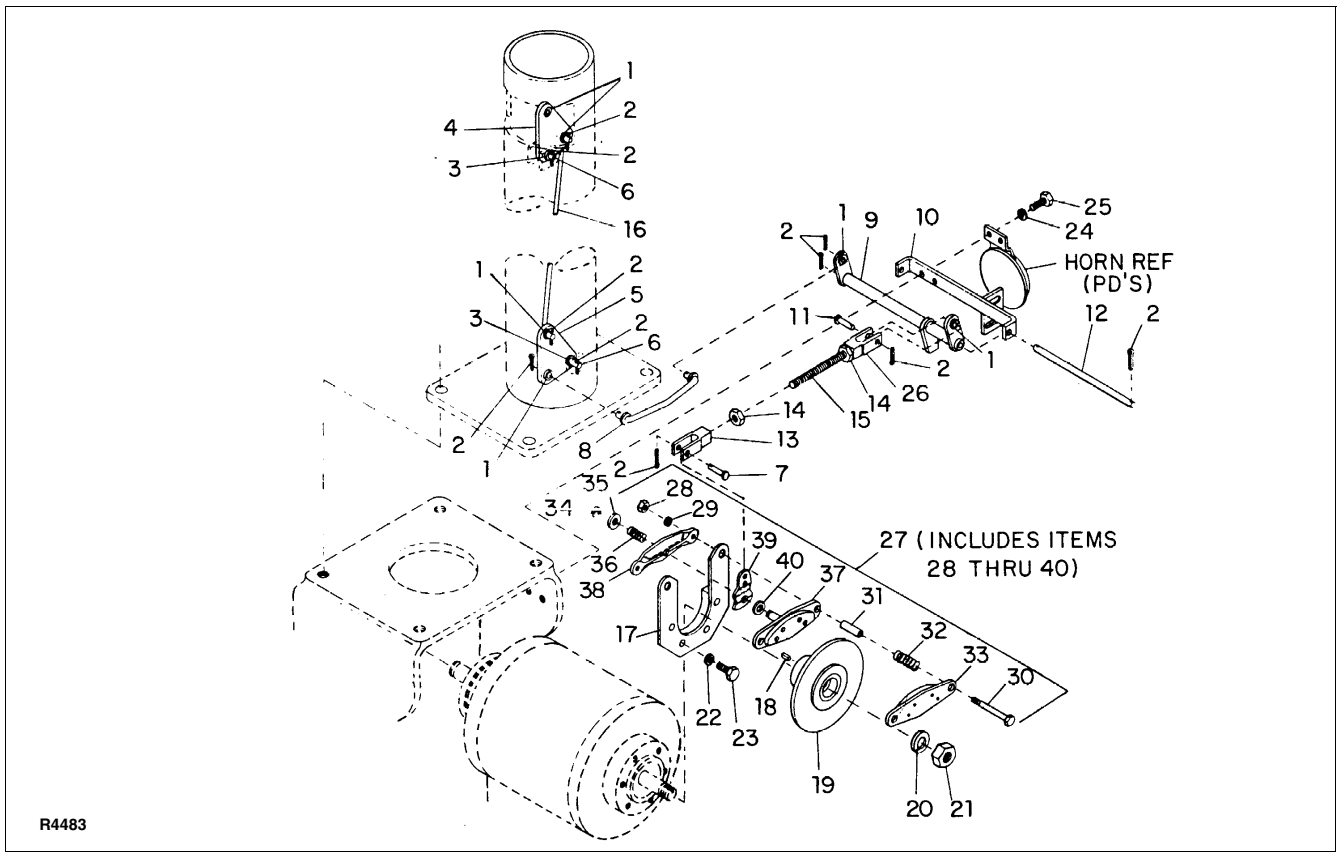


Figure 6-5 Brake Linkage for Truck Serial Number 333756 and Higher

9. Remove the retaining ring (34), washer (35), spring (36), bracket (38), lever (39), and washer (40) from the brake pad (37).
10. Discard the springs (32 and 36) and brake pads (33 and 37). Replace them with new parts.
11. Assemble the washer (40), lever (39), bracket (38), spring (36), washer (35) and retaining ring (34) to the brake pad (37).
12. Assemble the brake pad (33), springs (32), and spacers (31) to the two bolts (30).
13. Slip the parts assembled in step 11 onto the mounting plate weldment (17) and hold them so the bolt holes are aligned.
14. Insert the bolts (30) through pad (37) and bracket (17), so the threaded portion of the bolts passes completely through.
15. Assemble the two lock washers (29) and nuts (28) to the bolts (30).
16. Engage the clevis (13) with the lever (39), then insert the pin (7) and secure it with the cotter pin (2).
17. Remove the restrictions from the steering arm.
18. Adjust brake as described in paragraph 6-2.2.
19. Install the base access cover.
20. Connect the battery.

6-4. BRAKE LEVER REPLACEMENT (For Trucks With Serial Number 333032 To 333755).

1. Block the wheels to prevent the truck from rolling.
2. Remove base access cover.
3. Position steering arm to the left as far as possible and secure the steering arm down from its park position so that the mechanical brake is disengaged.

NOTE: The brake lever has a pin that fits into one of two slots on the inside of the clamp assembly.

4. Check position of lever inside the clamp assembly so that you will be sure to place brake lever pin in correct slot during reassembly.
5. Release brake lever (23, Figure 6-4) from weldment tube (22) by removing cotter pin (3) from weldment stub.

NOTE: The brake pads may fall free during the next step.

6. Remove two bolts (26) and nuts (25) to release brake clamp (24) from mounting plate (34).
7. If brake pads did not fall free, slide the brake pads (27) out from end of clamp and slide the brake lever (23) out through the brake lever access hole located on the opposite side of the clamp.
8. Check that replacement brake lever has pin tightly secured.
9. Slide brake lever (23) in through the brake lever access hole located on the opposite side of the clamp and align the brake lever so that the pin is in the proper pin slot.
10. Slide clamp (24) on mounting plate (34) so that mounting plate is at lever side of clamp, reinstall brake pads (27), one pad on each side of disc (30) with linings toward disc, and check that pin in lever is in proper slot of the clamp.
11. Secure clamp to mounting plate with two bolts (26) and nuts (25).
12. Slide brake lever hole over weldment tube stub and secure with cotter pin.
13. Adjust brake as explained in paragraph 6-2.1.

NOTES

SECTION 7
TRANSMISSION SERVICING

7-1. TRANSMISSION REPLACEMENT.

Transmission 501720 is the standard transmission and is illustrated in Figure 7-1.

To remove and disassemble the transmission (complete with drive wheel) proceed as follows:

1. Disconnect battery
2. Securely block load wheels. Remove base access cover.
3. If the cable leads connected to the terminal board mounted on the transmission are not clearly labeled, label them from right to left beginning with 1 and then disconnect the cable leads from the terminal board.
4. Make sure the four cables to the drive motor are properly labeled A1, A2, F1, and F2 and then disconnect the cables from the drive motor.
5. Disconnect the mechanical brake by removing clevis pin that secures the rod clevis to the lower lever assembly.
6. Remove the reservoir drain plug and drain transmission oil
7. Rotate the drive assembly to remove the two screws (24) and washers (18) which secure the motor to the transmission housing.
8. Again rotate the drive assembly and pull the motor out through the access opening.
9. Disconnect brake rod from lower lever assembly.
10. Remove the four screws and washers that secure the transmission to the pivot tube assembly.
11. Remove the transmission and drive wheel from the truck by raising the rear of the lift truck with jacks or other suitable means and sliding the assembly out from under the truck.
12. Remove the four hex head cap screws (22) and lock washers (23), bearing cover (21) and gasket (20).
13. Remove bearing spacer (15).
14. Remove seven screws (19), two screws (25), and lock washers (18); pry off transmission cover (17) and pull off cover gasket(16).
15. Remove ball bearing (14) and pinion spacer (13).
16. Remove intermediate gear (12) and square key (10).
17. Remove spur pinion (11).
18. Remove locknut (8) and lock washer (7).
19. Remove drive wheel and axle shaft (1) to free gear (6), roller bearing cones (3) and cups (4), and oil seal (2).
20. Remove ball bearing (9).
21. Refer to the disassembly instructions as a guide, and reverse the individual procedures of steps 20. through 1. to reassemble and reinstall the transmission.

NOTE: Transmission oil capacity is 3 pints.

22. Fill the transmission to plug level with No. 80 automotive transmission oil.

7-2. DRIVE WHEEL REPLACEMENT.

1. Disconnect
2. Securely block the load wheels to prevent the truck from moving.
3. Remove base access cover.
4. Use a jack to raise the rear of the lift truck so that the drive wheel clears the ground.
5. Lower the truck on blocks, making certain the drive wheel is still clear of the ground.
6. Remove the five retaining screws (36, Figure 7-1) and lock washers (35) that secure the drive wheel (34) to the axle shaft (1) and then pry off the wheel.
7. Reverse the above procedure to install new drive wheel.

7-3. LOAD WHEEL REPLACEMENT.

1. Unload the truck and block the drive wheel.
2. Raise the lift carriage approximately three feet.
3. Disconnect battery.
4. Raise the front end of the lift truck with a jack or another lift truck and place supporting boards or steel bars under the body, so that when the front is lowered it will remain about 6 inches off the floor and the load wheel will not touch the floor.
5. Lower the lift truck onto the support.
6. Remove dust cap (10, Figure 7-2).
7. Remove nut (9) and washer (8).
8. Slide load wheel hub (4) off of spindle.

9. Remove grease seal (1) and bearings (2 and 7).
10. Clean and check bearings and grease seal for defects.
11. Apply a lithium base general purpose grease to bearing and insert into wheel hub.
12. Insert grease seal (1) into wheel hub and pack inside of wheel hub with grease.
13. Install wheel on spindle, then reinstall washer (8) and nut (9).

NOTE: Tighten the nut (9) until load wheel cannot be turned by hand. Then gradually loosen the nut until the load wheel can be turned with one hand freely, but not loose enough to permit noticeable bearing end play.

14. Wipe away excess grease from exposed areas and reinstall dust cap (10).

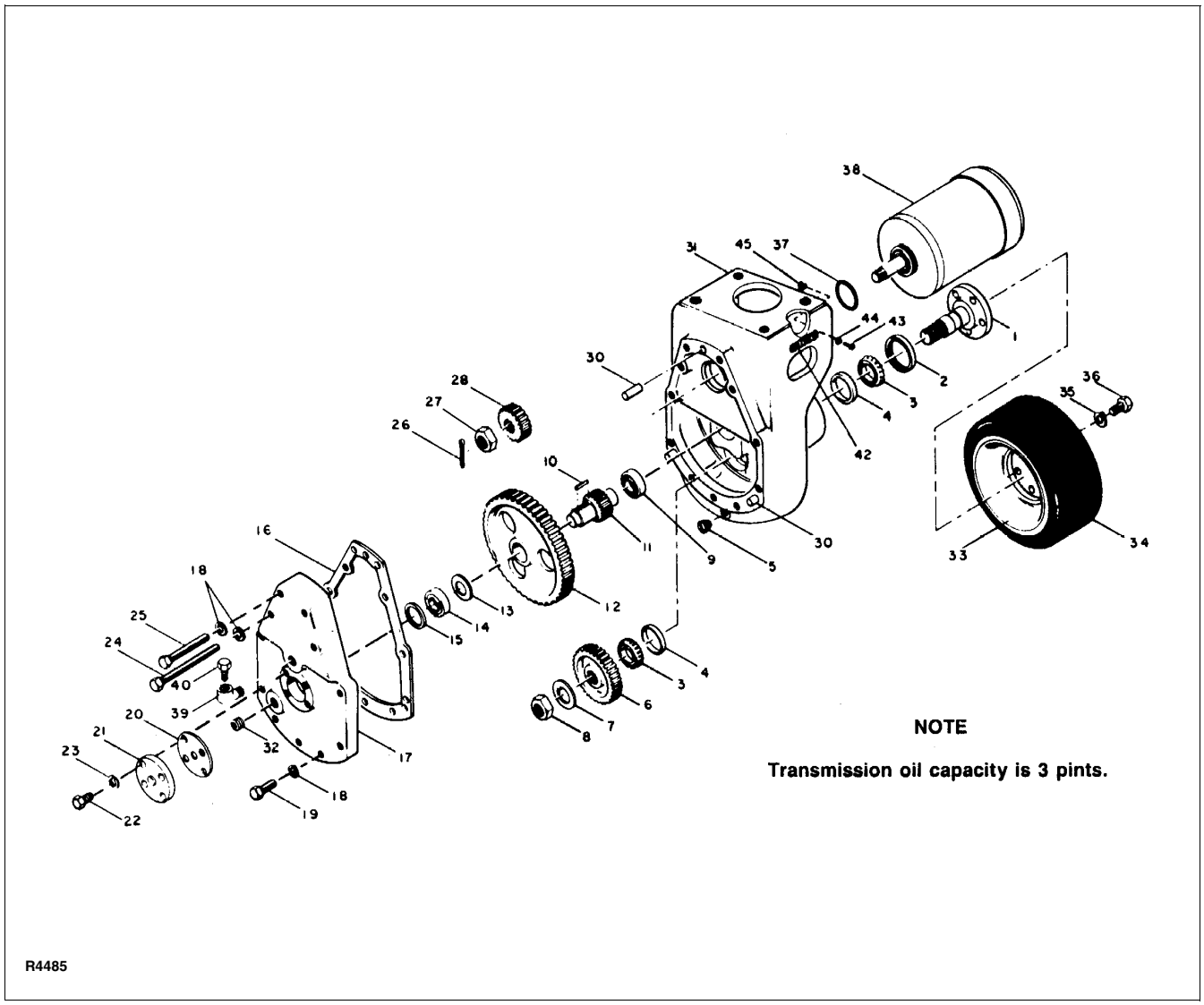


Figure 7-1 Transmission

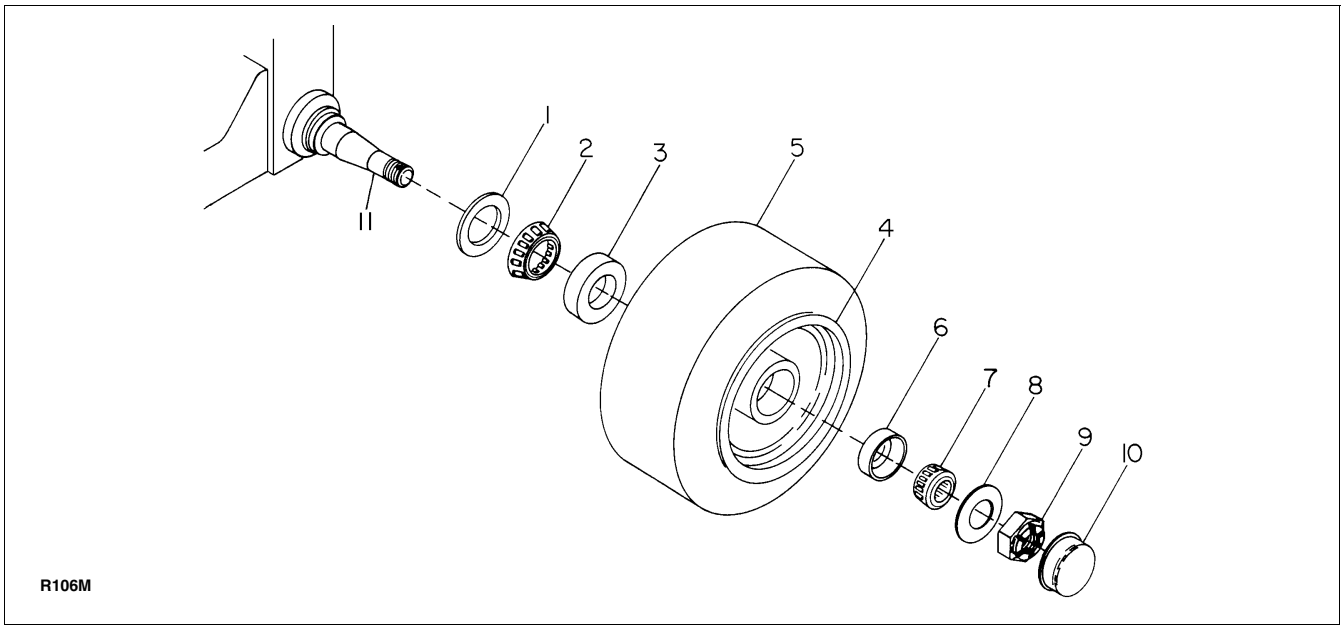


Figure 7-2 Load Wheels

NOTES

SECTION 8
ELEVATION SYSTEM SERVICING

8-1. GENERAL.

The elevation system includes the mast, lift chains, lift cylinder and ram head.

8-2. RAM HEAD REMOVAL.

The ram head may be replaced as an assembly complete with sheaves; or any part in the assembly may be replaced.

1. Lower the lift carriage fully.
2. Disconnect batteries.
3. Remove ram head on nontelescopic models.
   a. Block carriage and release hydraulic pressure. Ram head will drop down to create slack in chain. Lift chains off ram head sheaves and lay aside.
   b. Remove screw (7, Figure 8-1), lockwasher (8) and ram head (9).
4. Remove ram head on telescopic models.
   a. Block carriage and release hydraulic pressure. Ram head will drop down to create slack in chain. Lift chains off ram head sheaves and lay aside.
   b. Remove clamp bar (13, Figure 8-2) and wear spacers (20) to free ram head from inner mast.
   c. Remove screw (21), lockwasher (22) and ram head.
   d. The ram head can now be repaired or replaced as required.

NOTE: When replacing chain sheaves lubricate with a general purpose lithium base grease.

5. Reinstall ram head by reversing removal procedure.
6. Adjust lift chain according to paragraph 8-4.

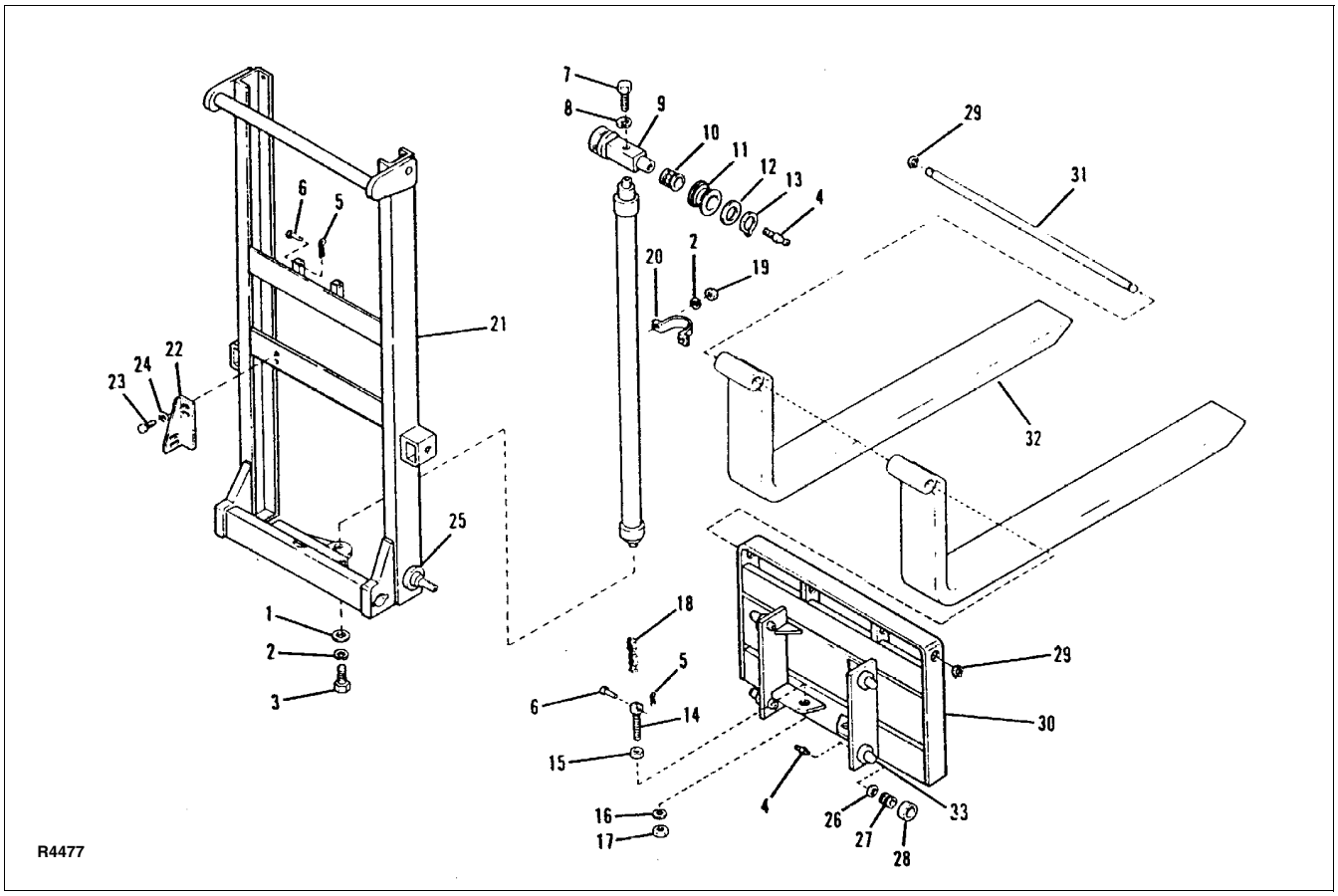


Figure 8-1 Elevation System (Non-Telescopic)

8-3. YOKE SHEAVE REPLACEMENT (FULL FREE LIFT).

WARNING: Make certain power is disconnected before attempting to remove yoke sheave.

1. Lower the lift carriage fully.
2. Disconnect batteries.
3. Slacken the lift chains by loosening nut (21, Figure 8-3) below adjusting bolt (19) on the lift carriage.
4. Lift the lift chains off sheaves (18) and lay on the mast support.
5. Remove snap ring (15) and slide pin (16) our of sheave (17). Sheave (17), bearing (2), and thrust washers (1) will fall free.
6. Yoke sheave (14) can now be removed by removing screws (17).
7. Reinstall yoke sheave in reverse order of removal.
8. Adjust lift chain according to paragraph 8-4.

8-4. LIFT CHAIN ADJUSTMENT.

8-4.1. Telescopic and Non-Telescopic.

If there is slack in any chain, that chain should be adjusted. Chains should be equally taut.

1. Fully lower lift carriage.
2. Disconnect batteries.
3. Adjust lift chain on nontelescopic models.
   a. Loosen nut (15, Figure 8-1) on chain adjusting bolt (14) on the lift carriage.
   b. Take up slack by tightening nut (17).
   c. Secure adjustment by tightening nut (15).
4. Adjust lift chain on telescopic models.
   a. Loosen nut (29, Figure 8-2) on chain adjusting bolt (28) on the lift carriage.
   b. Take up slack by tightening nut (31).
   c. Secure adjustment by tightening nut (29).

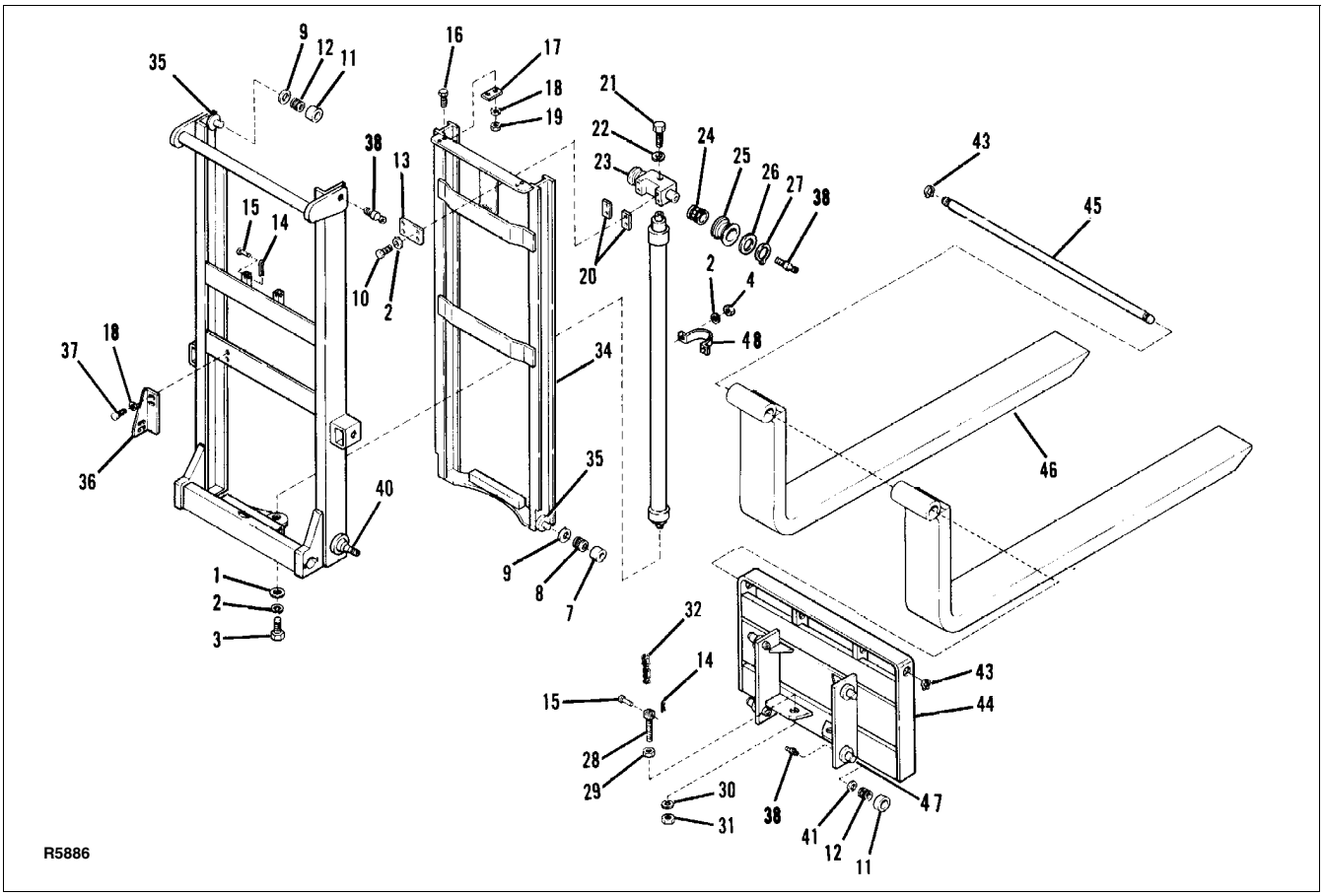


Figure 8-2 Elevation System (Telescopic)

8-4.2. Full Free Lift

1. Lower carriage (32, Figure 8-3) fully, then disconnect battery.

WARNING: Before attempting any adjustment, make certain power is disconnected.

2. Loosen top jam nuts (23) on adjusting bolts (19).
3. Take up slack in both lift chains with hex nuts (21) on hte adjusting bolt. Strive for equal tension on chains.

CAUTION: At least 3 full threads must be present below hex nut (21) after completion of adjustment.

4. Align jam nuts securely while maintaining alignment of adjusting bolts.
5. Tighten jam nuts securely while maintaining alignment of adjusting bolts.
6. Reconnect battery.
7. Test chain by operating carriage. If slack is still apparent, repeat above procedure.

8-5. LIFT CHAIN INSPECTION

Both chains should be replaced when either chain is worn enough to increase it's length by 3% or more. To make this determination proceed as follows.

Using a section of chain that sees the most frequent operation of the chain sheaves, isolate a vertical protion under tension from the weight of carriage and forks.

Measure the distance between pin centers on 20 vertical links. If the section measures 12.88" or more, the chain should be replaced.

New chain anchor pins should be installed when chains are replaced. Never replace a partial section of chain and never repair a damaged chain. Refer to paragraph 8-6. when installing new chain.

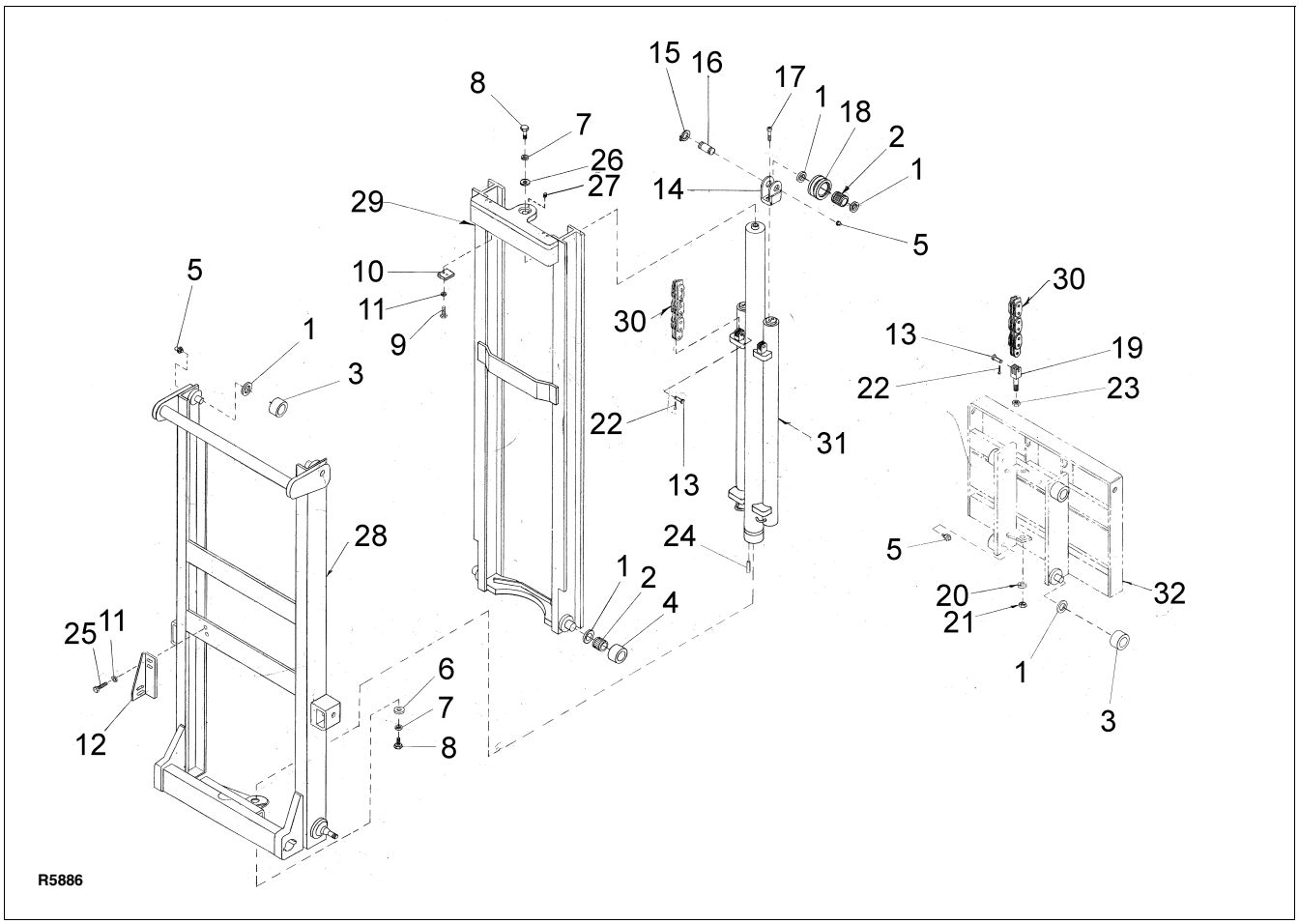


Figure 8-3 Elevation System (FFL)

8-6. LIFT CHAIN REPLACEMENT.

8-6.1. Telescopic and Non-Telescopic.

1. Place a solid block on floor under the vertical members nearest the center of the lift carriage.
2. Lower lift carriage until it is supported by the block and the load chains are slack, then disconnect battery.

WARNING: Before attempting any actual replacement, make certain power is disconnected.

3. Remove the cotter pin and clevis pin from end of chain connected to mast cross brace.
4. Remove cotter pin and clevis pin from chain adjusting bolt on the lift carriage.
5. Remove chain from sheave on the ram head and lay aside for repair.
6. Position new chain in place on sheave.
7. Connect end of chain to adjusting bolt with the clevis pin and cotter pin.
8. Connect end of chain to mast cross brace with clevis pin and cotter pin.
9. Adjust chain according to paragraph 8-4.

8-6.2. Full Free Lift.

1. Place a solid block on floor under the vertical members nearest the center of the lift carriage.
2. Lower carriage until ist is supported by the block and the lift chains are clack, then disconnect the battery.

WARNING: Before attempting anyu actual replacement, make certain power is disconnected.

3. Remove cotter pin (22, Figure 8-3) and clevis pin (13) from end of chain connected to lift cylinder (31).
4. Remove cotter pin (22) and clevis pin (13) from chain adjusting bolt (19).
5. Remove chain from sheave (18).
6. Position new chain in place on sheave (18).
7. Install clevis pin (13) and cotter pin (22) on chain adjusting bolt (19).
8. Connect end of chain to lift cylinder (31) with clevis pin (13) and cotter pin (22).
9. Adjust chain according to paragraph 8-4.

8-7. LIFT CYLINDER REMOVAL.

8-7.1. Telescopic and Non-Telescopic.

1. Fully lower the lift carriage.

WARNING: Before disconnecting any hydraulic lines, make certain the system is not under pressure. See paragraph 9-1.

2. Disconnect battery.
3. Disconnect overflow hose from top of lift cylinder.
4. Remove hose retainers from lift cylinder.
5. Disconnect flow control valve hydraulic line at bottom of lift cylinder.
6. Remove lift cylinder clamp (nontelescopic, item 20, Figure 8-1) (telescopic, item 48, Figure 8-2).
7. Block carriage and release hydraulic pressure. Ram head will drop down to create slack in chain. Lift chains off ram head sheaves and lay aside.

CAUTION: Hold lift cylinder securely during final steps of removal.

8. Remove screw and washer from bottom of lift cylinder.
9. Remove clamp bar (13, Figure 8-2).and wear spacers (20) to release lift cylinder from inner mast (telescopic only).
10. Lift the cylinder up and out of the truck.
11. Remove ram head from lift cylinder by removing screw(s) and lock washer(s).

NOTE: Disassembly of lift cylinder is covered in SECTION 9.

12. Reinstall lift cylinder in reverse order of removal.
13. Adjust lift chain according to paragraph 8-4.

8-7.2. Full Free Lift.

1. Fully lower the lift carriage.
2. Disconnect the battery.

WARNING: Before disconnecting any hydraulic line, be sure the system is not under pressure.

3. Disconnect the hose at the bottom of the lift cylinder.
4. Remove flow contgrol valve and elbows at the bottom of the lift cylinder.
5. Using another lift truck or suitable jack, raise lift carriage far enough to remove chains from

around sheaves (18). Lay chains aside and lower lift carriage.

6. Remove screw (8), lock waser (7), and flat washer (26) securing the top of lift cylinder (31) to the inner mast (29).
7. Remove screw (8), lock washer (7), and flat washer (6) securing the bottom of lift sylinder (31) to the outer mast (28).

WARNING: Lift cylinder must be supported during the next step.

8. Support lift cylinder and using another lift truck or suitable jack, raise inner mast (29) far enough to clear top of lift cylinder.
9. Lift cylinder up and out of truck.
10. Remove the yoke sheaves as described in paragraph 8-3.

NOTE: Disassembly of lift cylinder is covered in SECTION 9.

11. Reinstall lift cylinder in reverse order of removal.
12. Adjust chain according to paragraph 8-2.

8-8. MAST REMOVAL.

1. Remove the lift carriage as described in paragraph 8-9.

WARNING: Block the drive wheel securely so it cannot move.

2. Raise front end of lift truck with jacks or another lift truck and place support blocks under truck body to hold it approximately 6 inches off floor.
3. Lower lift truck onto the block support and remove both load wheels as described in SECTION 7.
4. Secure mast with a hoist or similar device.
5. Drive out roll pin (68, Figure 8-4) that secures pin (67) to mast.
6. Insert a 5/16-18 x 1 bolt into threaded hole in pin (67). Extract pin by pulling on bolt.

WARNING: Before disconnecting any hydraulic lines, make certain the system is not under pressure. Refer to paragraph 9-1.

7. Disconnect the hydraulic hoses from the lift cylinder.
8. Remove external retainer rings (13), mast support shaft (12), standard washers (10) and round washers (9).
9. Lift the mast from chassis frame together as a unit.
10. Installation of new or modified mast is performed in the reverse order of removal.
11. Lubricate the newly installed mast as described in SECTION 3.

8-9. LIFT CARRIAGE REPLACEMENT.

1. Place a solid block on floor under the vertical members nearest the center of the lift truck.
2. Lower lift carriage until it is supported by the block and the load chains are slack, then disconnect battery.

WARNING: Before attempting any actual replacement, make certain power is disconnected.

3. Remove cotter pin and clevis pin securing chain to lift carriage.
4. **Telescopic**: remove stop blocks (17, Figure 8-2) on top of mast.

   Full Free Lift: remove stop blocks (10, Figure 8-3) on top of mast.
5. Secure a hoist or similar device to the lift carriage.
6. Remove lift carriage from mast.
7. Installation of new or modified lift carriage is performed in the reverse order of removal.
8. Adjust chain according to paragraph 8-4.

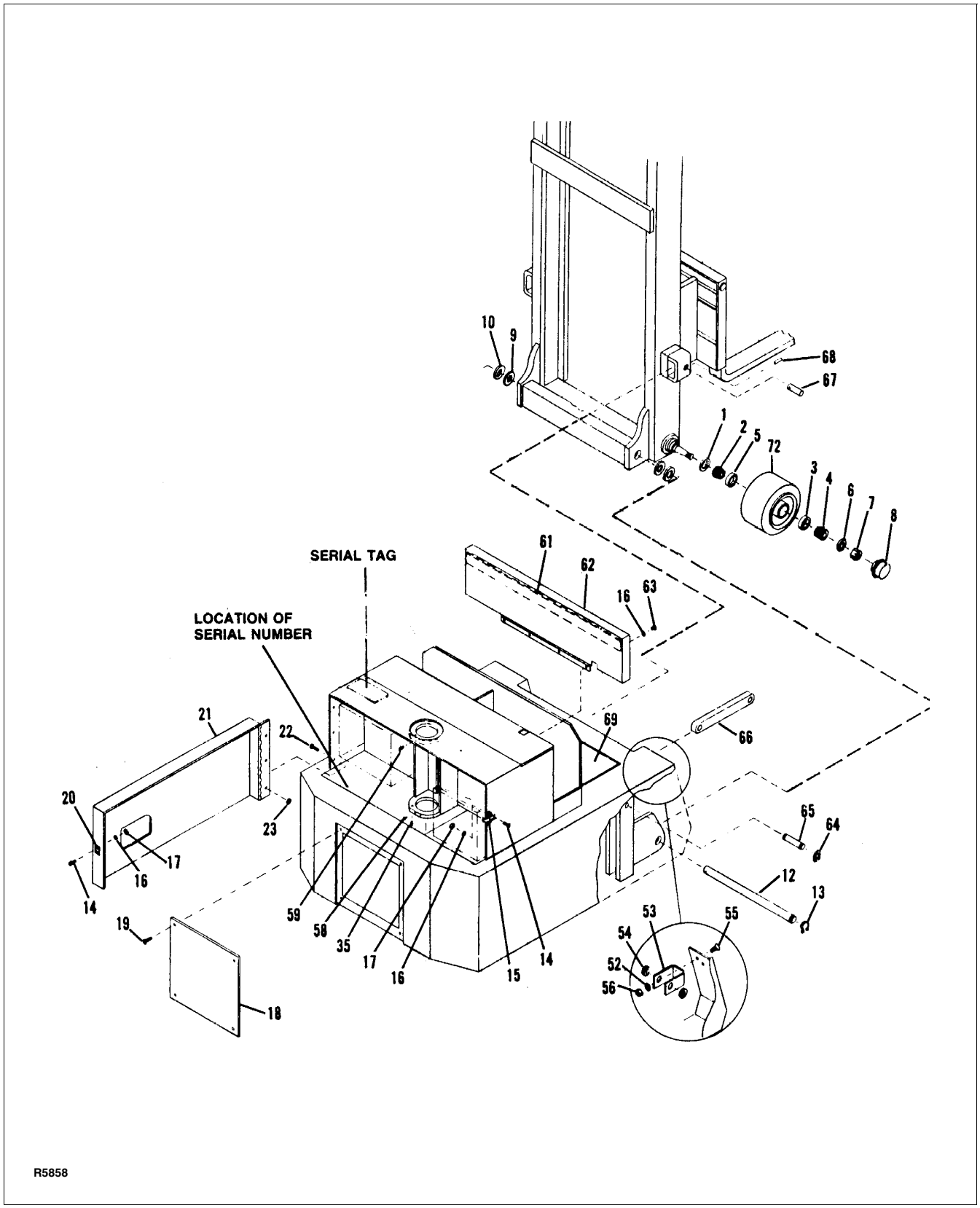


Figure 8-4 Base & Frame

SECTION 9
HYDRAULIC SYSTEM SERVICING

9-1. RELIEVING SYSTEM PRESSURE.

WARNING: Hydraulic system pressure must be relieved before removing hydraulic system components. Use the following procedure to relieve system pressure:

1. Fully lower the lift carriage unless the procedure for a component directs differently.
2. Disconnect battery.

CAUTION: Spilled hydraulic oil causes a slippery work environment. Use rags and a suitable container to catch any dripping oil when the hydraulic lines are disconnected. Wipe off any spilled oil immediately.

3. Obtain a suitable container to catch any oil that may escape when opening a line.
4. Open the low pressure line at any convenient connection near the component that is to be repaired or replaced.

9-2. FLOW CONTROL VALVE REPLACEMENT.

NOTE: Refer to Figure 9-1 or Figure 9-2 for the following procedure.

1. With the lift truck wheels securely blocked and with the brake set, raise forks approximately three feet from floor.
2. **Telescopic and Full Free Lift:** Position blocks or strong supports under the inner mast while hydraulic system is under repair.

   Non Telescopic: Position blocks or strong supports under the lift carriage while hydraulic system is under repair.
3. Lower inner mast or lift carriage onto supports. Check that the arrangement is secure before proceeding.
4. Disconnect battery.

NOTE: A small amount of hydraulic oil will drain from the system when the hydraulic line is disconnected. Use rags or suitable container to catch the draining oil.

5. Disconnect hose and elbow (30) from flow control valve (31).
6. Remove flow control valve.
7. Install new flow control valve so regulated flow is going out of lift cylinder.
8. Reconnect elbow (30) and hose.
9. Reconnect battery.
10. Raise forks, remove supports and then fully lower the forks.
11. Check oil level on dip stick. If low, fill to ``FULL'' mark on dip stick with Big Joe hydraulic oil **part number 900855**.
12. Check for leaks.

9-3. SUMP PUMP FILTER REPLACEMENT.

To replace the hydraulic sump filter proceed as follows:

WARNING: Before disconnecting any hydraulic lines, make certain the system is not under pressure. See paragraph 9-1.

1. Lower the lift carriage fully. Disconnect battery.
2. Remove reservoir drain plug (18, Figure 9-1 or Figure 9-2) and drain hydraulic oil.
3. **Truck Serial Number 333032 TO 356092:** Remove two nuts (10) and clamp (12).
4. Remove filter assembly (13).
5. Install new filter (13).
6. **Truck Serial Number 333032 TO 356092:** Install clamp (12) and nuts (10).
7. Fill with 14 quarts of oil:

   Big Joe qt. 900893

   Big Joe gal. 900855

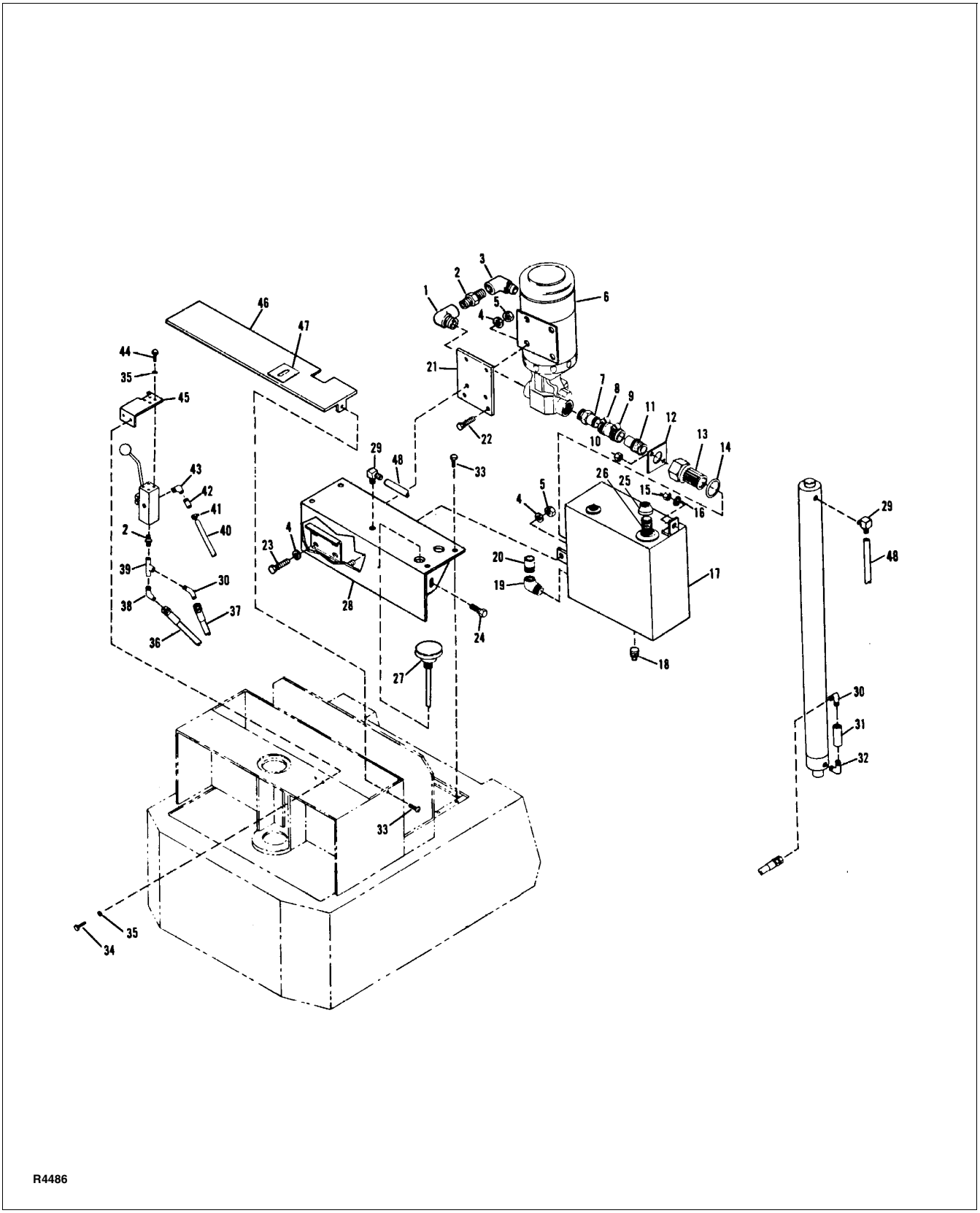


Figure 9-1 Hydraulic System (Non Telescopic and Telescopic)

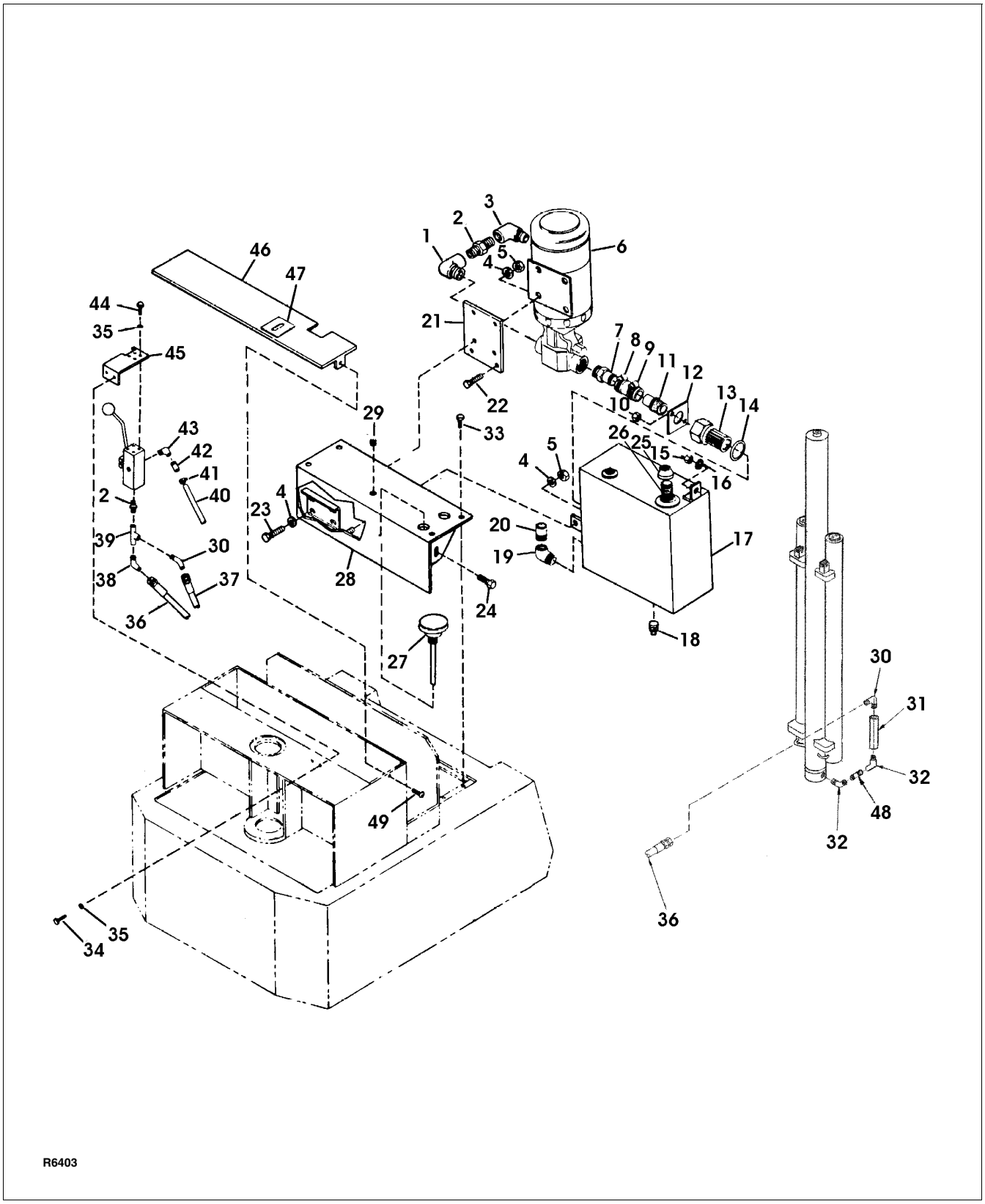


Figure 9-2 Hydraulic System (Full Free Lift)

9-4. LINE OR FITTING REPLACEMENT.

WARNING: Lift carriage must be fully lowered before performing maintenance on the hydraulic system.

NOTE: Leaking hydraulic fittings can sometimes be remedied by simply tightening the fitting. If this does not remedy the leak, the fitting or line must be replaced.

1. Lower lift carriage fully.

CAUTION: Hydraulic oil can dissolve the battery case. Wipe off any spilled oil immediately.

2. Remove the reservoir drain plug and drain the hydraulic oil into a suitable container.
3. Remove the leaking line or fitting and replace it with a new one.
4. Clean the drain plug thoroughly.
5. Re-install the drain plug.

NOTE: Refill only with Big Joe hydraulic oil **part number 900855** and only while the carriage is fully lowered. Refill until oil is to the ``FULL'' mark on the dip stick. Reservoir holds about 14 quarts of oil.

6. Remove the reservoir vent cap, fill the reservoir to the ``FULL'' mark on the dip stick, and replace the vent cap.

9-5. LIFT/LOWER CONTROL VALVE.

9-5.1. Adjustment.

NOTE: The lift/lower control valve is properly adjusted, inspected, and checked thoroughly before leaving the factory. The valve should rarely need readjusting; but if adjustment is necessary, the following procedure should be used to set the valve for lowering and the hydraulic pump switch for lifting.

1. Raise lift carriage part way with a moderate load on the forks to build up pressure in the hydraulic system.

CAUTION: Prevent lift control valve clamp (8, Figure 9-4 or Figure 9-5) from slipping off the release cam (3), or the handle return spring (7) will slip by the roll pins (6).

2. Loosen upper nut (9) on lift control valve clamp (8).
3. Using the point where the lift control knob and handle come together as a reference point, push handle forward 3/4 inch from neutral position (see Figure 9-3).
4. With a screwdriver in slot of release cam, rotate 1/8 turn clockwise. This is to make sure check ball is seated in valve seat.
5. With a screwdriver in slot of release cam, rotate counterclockwise until a definite resistance is felt. (Resistance is felt as the pin resting on check ball pushes against the hydraulic pressure in system.) At this point release cam action has moved pin (13, Figure 9-4 or Figure 9-5) down against check ball (14). Rotation of release cam beyond this point pushes ball away from valve seat and opens system, allowing lift carriage to descend.
6. Tighten upper nut (9).

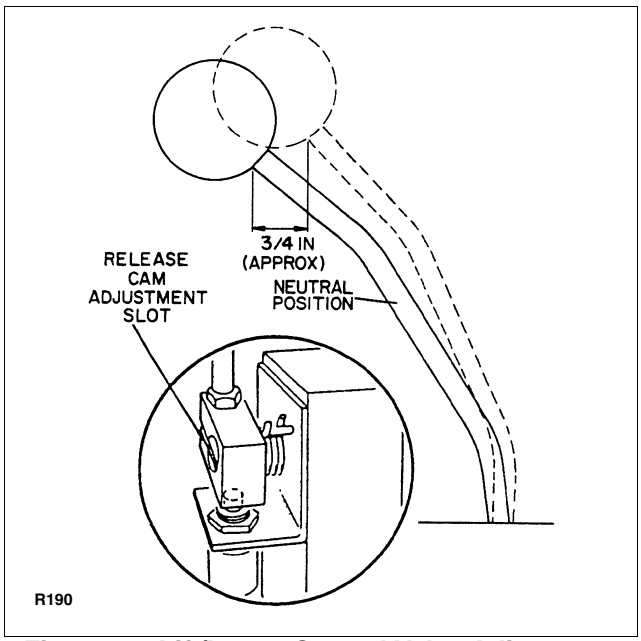


Figure 9-3 Lift/Lower Control Valve Adjustment

9-5.2. Disassembly.

WARNING: Before disconnecting any hydraulic line, be sure the system is not under pressure.

1. Lower lift carriage fully.
2. Disconnect battery.
3. Hold lift/lower control forward and, at the same time, manually push the ram of the lift cylinder down as far as possible.
4. Remove pump motor switch (12, Figure 9-4 or Figure 9-5) and lay aside.

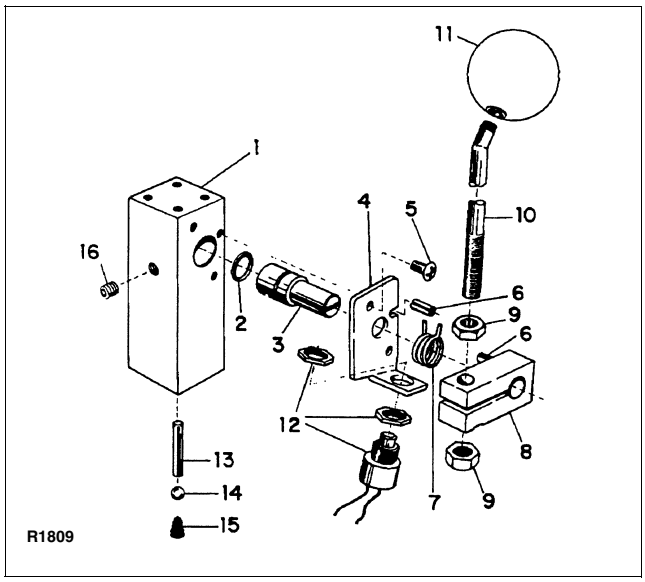


Figure 9-4 Lift/Lower Control Valve (Standard)

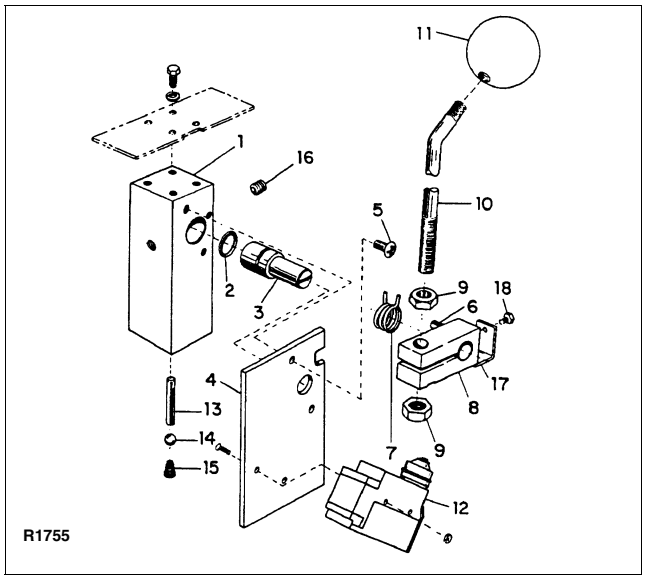


Figure 9-5 Lift/Lower Control Valve (Cold Conditioning)

N**OTE:** Disconnecting of wires is not necessary.

5. Disconnect tubing (40, Figure 9-1 or Figure 9-2) from lift/lower control valve.
6. Disconnect hose assemblies (36 and 37).
7. Remove lift/lower control valve complete with hydraulic fittings by removing the four screws (44) and lock washers (35) securing the valve to the mounting bracket (45).
8. Remove hydraulic fittings.
9. Loosen lower nut (9, Figure 9-4 or Figure 9-5) securing lift control handle (10) to valve clamp (8) and slide handle with clamp from release cam (3).
10. Remove handle return spring (7).
11. Remove two screws (5) securing switch bracket (4) to valve body (1), then remove switch bracket.
12. The release cam (3) and O-ring (2) can now be pulled from the valve body (1).

N**OTE:** Install new parts as required during reassembly of the lift control valve.

13. To reassemble, install O-ring (2) and release cam (3) onto valve body (1).
14. Install switch bracket (4) onto valve body (1) with two screws (5).
15. Install handle return spring (7) onto release cam (3).
16. Install valve clamp (8) with handle (10) onto release cam (3) and tighten lower nut (9).
17. Install hydraulic fittings onto control valve.
18. Install lift/lower control valve onto mounting bracket (45, Figure 9-1 or Figure 9-2) with four lock washers (35) and four screws (44).
19. Reconnect hose assemblies (36 and 37).
20. Reconnect tubing to control valve.
21. Install pump motor switch (12, Figure 9-4 or Figure 9-5) onto switch bracket (4).
22. Reconnect battery.
23. See paragraphs 9-5.1. and 9-5.3. for valve adjustments.

9-5.3. Pump Motor Switch Adjustment.

When the release cam (3, Figure 9-4 or Figure 9-5) is properly set, it may be necessary to readjust the hydraulic pump motor switch (12). For proper switch action and precise control of the lift carriage, a clearance of approximately 0.010 inch should be maintained between the switch actuator button and the lift control valve clamp (8).

1. To adjust the pump motor switch for proper clearance, loosen the two nuts holding the switch in the switch bracket.
2. Raise or lower the position of the switch by turning the upper nut.
3. When there is a 0.010 inch clearance between the switch actuator button and lift control valve clamp, tighten the lower nut against the bracket to lock the switch in place.

9-6. HYDRAULIC PUMP AND MOTOR ASSEMBLY.

A defective hydraulic pump must be replaced as a complete unit, but the pump motor can be repaired (see SECTION 10).

9-6.1. Pump and Motor Assembly Removal.

WARNING: Before disconnecting any hydraulic lines, make sure the forks are lowered completely and the system is not under pressure.

1. Disconnect battery.
2. Drain hydraulic oil from reservoir into suitable container.
3. Label, then disconnect wires from solenoid.
4. Disconnect hose fittings (1 and 7, Figure 9-1 or Figure 9-2) from the pump (6).
5. Remove the pump and motor assembly by removing the two hex head screws securing the assembly, then lift the assembly from the mounting bracket.
6. To separate the pump from the motor, remove the four hex head screws and four lock washers that connect the pump to the motor end housing.

NOTE: When reassembling the pump to the motor, always use a new gasket.

9-6.2. Hydraulic Pressure Adjustment.

WARNING: Improper setting of the hydraulic pump pressure by an unauthorized person can damage the hydraulic system and void your warranty.

NOTE: The hydraulic pump is factory set to lift a load at the rated capacity of the truck. If the truck fails to lift a load that is within the truck capacity rating, adjust as follows:

1. Remove the cap nut from the hydraulic pump.
2. Insert a screwdriver blade in the screw slot.

CAUTION: Do not set pressure any higher than that required to lift a load of the rated capacity of the truck.

3. Turn the screwdriver clockwise to increase hydraulic pressure; counterclockwise to decrease pressure.
4. Install the cap nut on the hydraulic pump.

9-7. LIFT CYLINDER REPAIR.

9-7.1. Non Telescopic and Telescopic

CAUTION: To prevent cylinder damage, use proper pipe clamp vise. The cylinder will be distorted if the vise is tightened too much.

1. Secure lift cylinder assembly in a vise and remove gland nut (3, Figure 9-6) with wiper ring (2) and O-ring (4).
2. Pull out cylinder ram (5).
3. Remove lift cylinder tube (1) from vise.

CAUTION: To prevent damaging the finish on the ram, use proper pipe clamp vise with non-marring jaws.

4. Secure ram (5) in vise.
5. **Trucks Serial Number 333032 to 351487:** Remove nut (11) and pull off washers (10 and 13), packing assembly (9), piston (8) and O-ring (7).

   Trucks Serial Number 351488 and Higher: Remove nut (11) and pull off piston (14) and O-ring (7). Remove PSP seal (15) from piston (14).

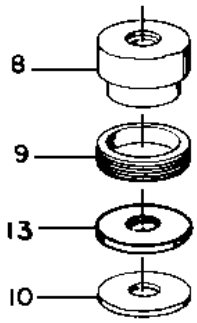
NOTE: **Trucks Serial Number 333032 to 351487:** install **Retrofit Kit 900122.**

NOTE: **Trucks Serial Number 351488 and Higher:** install **Retrofit Kit 900121.**

6. Install new PSP seal (15) on piston (14).
7. Install new seal (7), piston (14) and nut (11) on cylinder ram (5).
8. Remove cylinder ram (5) from vise.

CAUTION: To prevent cylinder damage, use proper pipe clamp vise. The cylinder will be distorted if the vise is tightened too much.

9. Secure lift cylinder tube (1) in vise.
10. Install cylinder ram (5) into cylinder tube (1).
11. Install new O-ring (4), and gland nut (3) with new wiper ring (2).
12. Remove lift cylinder assembly from vise.



ON TRUCKS SERIAL NUMBERS
333032 TO 351487
ORDER RETROFIT KIT 907122

R6107

RETROFIT KIT 907122 CONTAINS:

ITEM	QTY
2	1
4	1
7	1
11	1
14	1
15	1

PACKING KIT 907121 CONTAINS:

ITEM	QTY
2	1
4	1
7	1
11	1
15	1

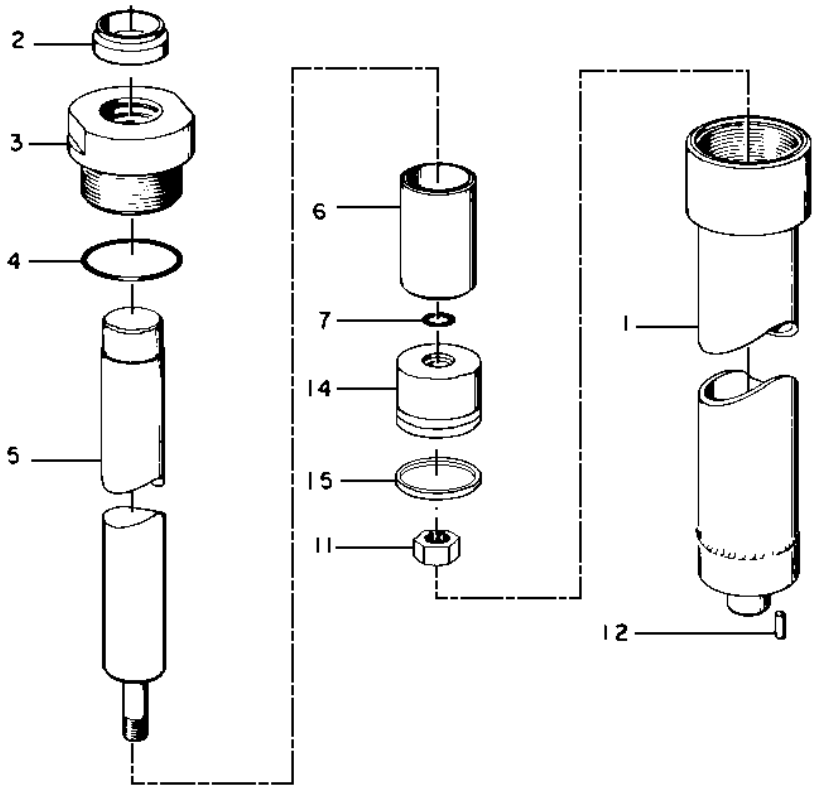


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Figure 9-6 Lift Cylinder (Non Telescopic and Telescopic)

9-7.2. Full Free Lift

Refer to Figure 9-7 and disassemble the FFL lift cylinder as follows:

CAUTION: Use proper pipe clamp-type vise to grip the central cylinder of the cylinder assembly. The cylinder will be distorted if too much force is applied.

1. Secure FFL cylinder weldment (1) in vise and remove the snap ring retainer (3) and square head pipe plug (2).
2. Pull outward on the cylinder base (9) until wear ring (14) contacts the cylinder base. Continued pulling will bring the cylinder head (4) out of the tube.
3. Use a strap wrench to hold the cylinder rod (13) and unscrew cylinder base (9) from cylinder rod. Remove cylinder head (4) from cylinder rod.

CAUTION: As cylinder rod (13) is pulled out of cylinder tube, catch the two halves of wear ring (14) which will be freed and may fall and be damaged.

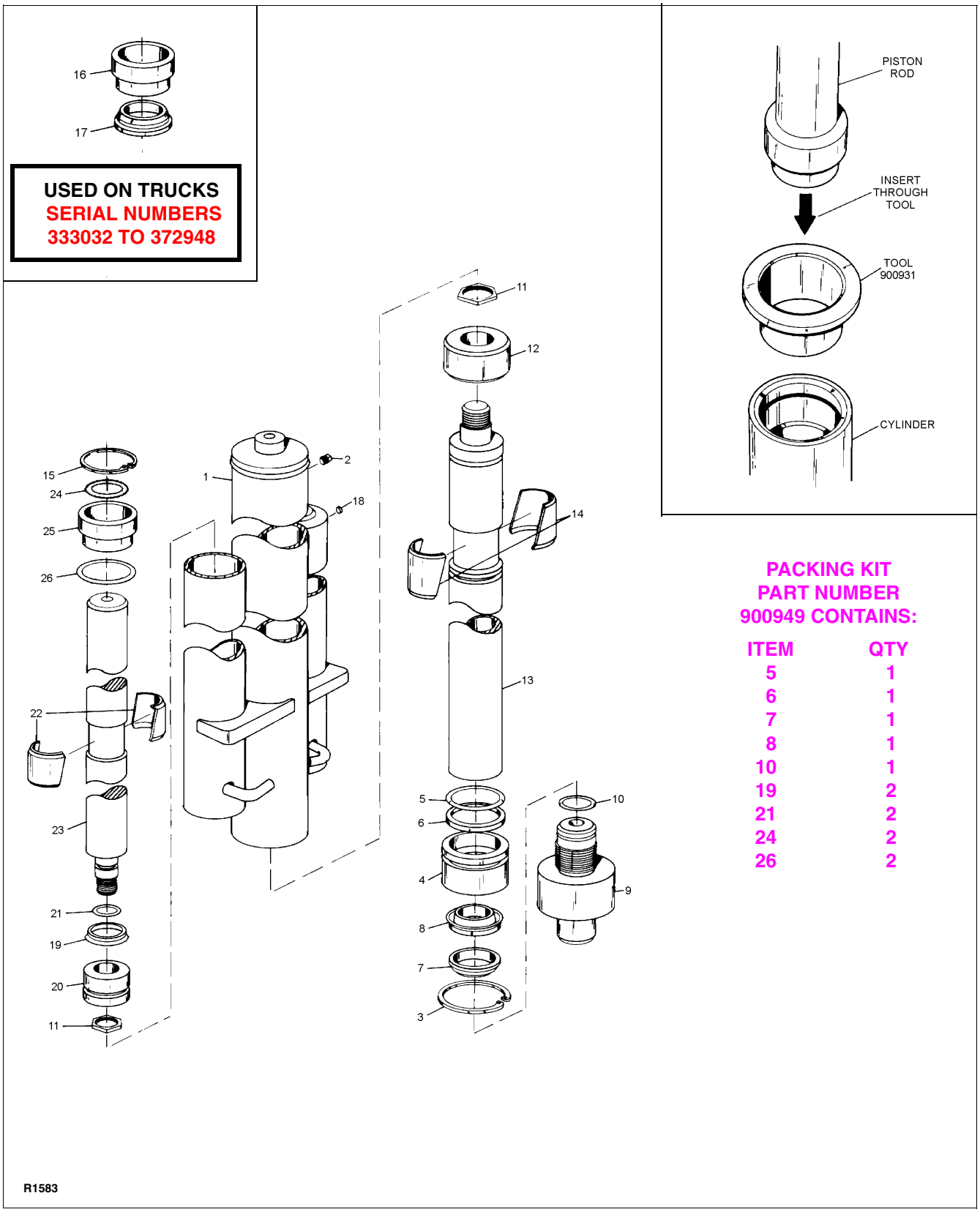
4. The cylinder rod (13) may now be pulled out of the tube. Support it carefully and catch the two halves of the wear ring (14) as they are freed. Continue to pull on the cylinder rod until the piston (12) is out of the tube.
5. If piston is worn or damaged hold the cylinder rod (13) with a strap wrench and take off Flexlock lock nut (11). Pull piston free of the rod.
6. Examine bore of center cylinder tube of the cylinder assembly (1), and surfaces of the cylinder rod (13), piston (12), and wear ring halves (14). Replace all unsatisfactory parts and proceed with the following steps:
   a. Remove hydraulic cylinder wiper ring (7) and U-cup rod seal (8) from inside of cylinder head (4), and O-ring (5) and back-up ring (6) from outside of cylinder head.
   b. Clean and dry all parts.
   c. Discard all used O-rings and seals and replace them with new ones during reassembly.
   d. Coat all new O-rings and seals with hydraulic fluid during reassembly.
7. Assemble FFL center cylinder by reversing the disassembly procedure. For ease of assembly when assembling threaded, parts, apply a coating of white lead replacement to the threads, except for the threads of the cylinder base (9) which are to be coated with Loctite 222 adhesive.
8. If either or both of the outer cylinders of FFL cylinder assembly must be repaired, proceed as follows:

CAUTION: As cylinder rod of either outer cylinder is pulled out of cylinder tube, the two halves of the wear ring (22) may fall free and be damaged hitting the floor. Be sure to catch these pieces.

   a. Remove snap ring retainer (15).
   b. Pull outward on the cylinder rod (23) until wear ring (22) pushes cylinder head (16 or 25) out of cylinder tube.
   c. A little more pulling will release the halves of the wear ring.
   d. Catch these pieces for raceway if in good condition.
   e. Carefully support cylinder rod (23) and pull it outward to free it and piston (20) from the tube. If the piston is worn or damaged, or to replace O-ring (21), hold the rod with a strap wrench and remove Flexlock lock nut (11) and pull piston free of rod.
   f. Examine bore of cylinder tube being repaired, surface of cylinder rod (23) and wear ring halves (22) for scoring, scratching, or other damage.
   g. Replace all unsatisfactory parts and proceed with the following steps:
      (1) Remove and discard O-ring (21) and U-cup seal (19).
      (2) Clean all parts and replace all O-rings and seals during reassembly.

CAUTION: Reassembly of the lift cylinder requires the use of special tool, **Part Number 900931**, to prevent damage to cylinder packing.

      (3) Insert special tool, **Part Number 900931**, into the end of the cylinder, as shown in Figure 9-7 (Inset).
      (4) Coat rings and seals with hydraulic fluid during replacement.
      (5) Assemble FFL outer cylinder(s) by reversing the disassembly procedure. For ease of assembly, when assembling threaded parts, apply a coating of while lead replacement to the threads.



PACKING KIT PART NUMBER 900949 CONTAINS:

ITEM	QTY
5	1
6	1
7	1
8	1
10	1
19	2
21	2
24	2
26	2

Figure 9-7 Lift Cylinder (Full Free Lift)

NOTES

SECTION 10
ELECTRICAL COMPONENTS

1. **SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 T0 335475 AND HIGHER.**
2. **SEE SUPPLEMENT 229 FOR TRANSISTOR TRUCKS SERIAL NUMBER 335476 AND HIGHER.**

10-1.CONTACTOR SERVICING.

NOTE: One Contactor tip kit **part number 900531-02** contains the number of contacts required to service all contactors on a truck.

10-1.1.2nd and 3rd Speed Contactor Disassembly (Refer to Figure 10-1).

NOTE: Order contactor tip kit **part number 900531-08**. One kit repairs one 2nd or 3rd speed contactor.

1. Remove spring stud (7) and spring (6).
2. Remove nut holding armature plate retainer (5) and remove retainer by squeezing in on tabs and lifting up.
3. Slide braid assembly (3) off contact (8) and remove contact (8) and armature plate (9) and spring (6).
4. Use a 10mm wrench to remove nut and flat washer holding front contact (12) and remove contact.

NOTE: If only contacts are to be replaced, no further disassembly is required. Proceed to step 5. to replace coil.

5. Remove spacer (13).
6. Squeeze sides of front molding (4) and pull forward to disengage from base molding (1). Remove base molding and remove front molding from frame (2).
7. Coil can now be removed from frame (2) by removing 3/4 inch long hex head screw and flat washer.

10-1.2.2nd and 3rd Speed Contactor Reassembly

1. Place 1-1/4 inch long hex head bolt through bottom of front molding (4) and slide molding onto frame (2).
2. Attach coil (11) to frame (2) with flatwasher and 5/8 inch long hex head bolt. Be sure braid assembly (3) has been attached to frame (2) with 3/4 inch bolt, flat washer, lock washer and nut. Use 10mm wrench on nut.

1. **SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 335475**
2. **SEE SUPPLEMENT 229 FOR TRANSISTOR TRUCKS SERIAL NUMBER 335476 AND HIGHER**

CONTACTOR TIP KIT PART NUMBER 901531-08 CONTAINS:

ITEM	QTY
3	1
5	1
8	1
12	1

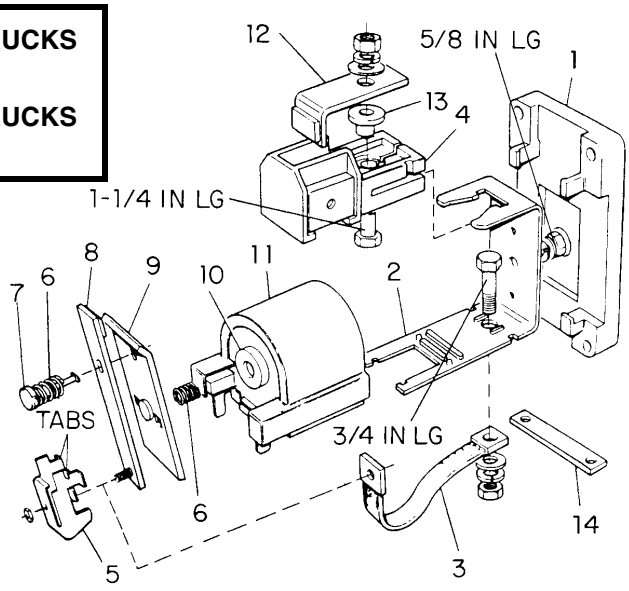


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Figure 10-1 Contactor (2nd & 3rd Speed)

3. Attach frame (2) to base molding (1) by engaging slots at bottom of frame (2) behind flanges near lower edge of base molding (1).
4. Snap slots of top of front molding (4) into flanges of base (1). Coil assembly should now securely attach to base (1).
5. Install spacer (13) in front molding (4) and install front contact (12) secure with washer, lock washer and hex nut. Use 10mm wrench on nut.
6. Place contactor on work surface with base molding down. Place spring (6) on center of pole piece (10).
7. Position armature plate (9) against frame (2).
8. Place moving contact assembly (8) on armature plate then attach braid assembly (3) to contact stud.
9. Place retainer (5) over contact stud and slip the two tabs on retainer (5) into the two slots in armature plate (9). Secure with hex nut.
10. Secure moving contact (8) to armature (9) with spring (6) and spring stud (7).

10-1.3. Forward - Reverse Contactor Disassembly. (Refer to Figure 10-2)

NOTE: Order contactor tip kit **part number 900531-09**. One kit repairs one contactor. Kit includes items (3,5,8,12 and 16).

1. Remove spring stud (7) and spring (6).
2. Remove nut bolt and washer securing bus bar (14), (if used) to back contact (16).
3. Slide back contact (16) up as far as possible then squeeze sides of rear molding (17) together and lift off frame (2). Separate two sides of rear molding and remove back contact (16).
4. Remove nut holding armature plate retainer (5) and remove retainer by squeezing in on tabs and lifting up.
5. Slide braid assembly (3) off contact (8) and remove contact (8) and armature plate (9) and spring (6).
6. Use a 10 mm wrench to remove nut holding front contact (12) and remove contact.

NOTE: If only contacts are to be replaced, no further disassembly is required. Proceed to step 7. to replace coil.

7. Remove spacer (13).
8. Squeeze sides of front molding (4) and pull forward to disengage from base molding (1). Remove base molding and remove front molding from frame (2).
9. Coil can now be removed from frame (2) be removing 3/4 inch long hex head screw and flat washer.

1. SEE SUPPLEMENT 229 FOR TRANSISTOR TRUCKS SERIAL NUMBER 335476 AND HIGHER

2. SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 335476

CONTACTOR TIP KIT PART NUMBER 901531-08 CONTAINS:

ITEM	QTY
3	1
5	1
8	1
12	1

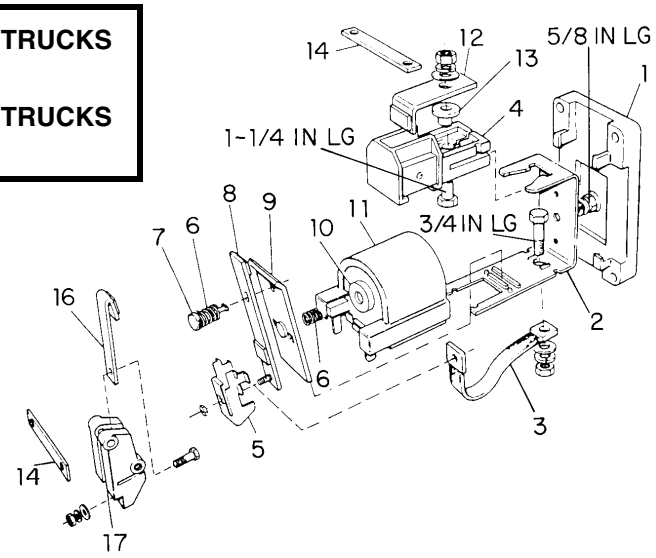

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Figure 10-2 Contactor (Forward - Reverse)

10-1.4. Forward - Reverse Contactor Reassembly.

1. Place 1-1/4 inch long hex head bolt through bottom of front molding (4, Figure 10-2) and slide molding onto frame (2).
2. Attach coil (11) to frame (2) with flat washer and 5/8 inch long hex head bolt. Be sure braid assembly (3) has been attached to frame (2) with 3/4 inch bolt, lock washer, flat washer and nut. Use 10mm wrench on nut.
3. Attach frame (2) to base molding (1) by engaging slots of bottom of frame (2) behind flanges near lower edge of base molding (1).
4. Snap slots at top of front molding (4) into flanges of base (1). Coil assembly should now be securely attached to base (1).
5. Install spacer (13) in front molding (4) and install front contact (12) secure with washer, lock washer and hex nut. Use a 10mm wrench on nut.
6. Place contactor on work surface with base molding down. Place spring (6) on center of pole piece (10).
7. Position armature plate (9) against frame (2).
8. Place moving contact assembly (8) on armature plate then attach braid assembly (3) to contact stud.
9. Place retainer (5) on contact stud and slip two tabs on retainer (5) into two slots in armature plate (9). Secure with hex nut.
10. Place two parts of back molding (17) together and slide contact (16) into slot in molding.
11. Squeeze back molding together and place grooves in back molding on frame (2). Push molding all the way down.
12. Release back molding and press back contact (16) down into position. Armature will need to be pressed down to position back contact.
13. Reattach bus bar (14) (if used) to back contact (16) using hex nut and washers.
14. Secure moving contact (8) to armature (9) with spring (6) and spring stud (7).

10-2. PUMP MOTORS.

Two different pump motor assemblies have been used on the PDCM truck as shown in the following chart.

Refer to applicable Figure 12-23, Figure 12-22 and Figure 12-21 for motor disassembly. Pumps are replaceable, but not repairable. When replacing pump be sure to install the gasket between pump and motor.

10-3. DRIVE MOTORS.

Refer to Figure 12-26, Figure 12-25, or Figure 12-24 for motor disassembly.

10-4. BATTERY CHARGER

The PDCM battery charger is mounted in the upper right side of the truck. Different chargers have been used on the PDCM. Table 10-2 lists the different battery chargers.

Table 10-1 PDCM Pump and Motor Assembly/Pump Motor Cross Reference

PUMP & MOTOR ASSEMBLY PART NO.	PUMP PART NO.	MOTOR PART NO.	FIGURE NO.	SERIAL NUMBER EFFECTIVITY
016911	901896-01	905046	Figure 12-21	ALL TRUCKS **332032 TO 342130**
016935	900896-01	901547	Figure 12-22	ALL TRUCKS **342131 TO 361004, EXCEPT 360721, 360769, 360770, 360802, 360877, 360889, 360929, 360930, 360959, 360960, 360961, AND 361000**
06940-01	906004	906007	Figure 12-23	ALL TRUCKS **360721, 360769, 360770, 360802, 360877, 360889, 360929, 360930, 360959, 360960, 360961, 361000, 361005 AND HIGHER**

Table 10-2 Battery Chargers

CHARGER PART NO.	VOLTAGE	EXPLODED TYPE	VIEW	SCHEMATIC	SERIAL NUMBER EFFECTIVITY
00976-01*	120	Smart	Figure 12-33	Figure 10-3	333032 TO 344490
004967-01**	120	Timer	Figure 12-32	Figure 10-4	333032 TO 344490
004967-02*	240	Timer	Figure 12-32	Figure 10-4	333032 TO 344490
004978**	120	Smart	Figure 12-34	Figure 10-5	344491 AND HIGHER
004980*	240	Smart	Figure 12-34		344491 AND HIGHER

* OPTIONAL CHARGER
** STANDARD CHARGER

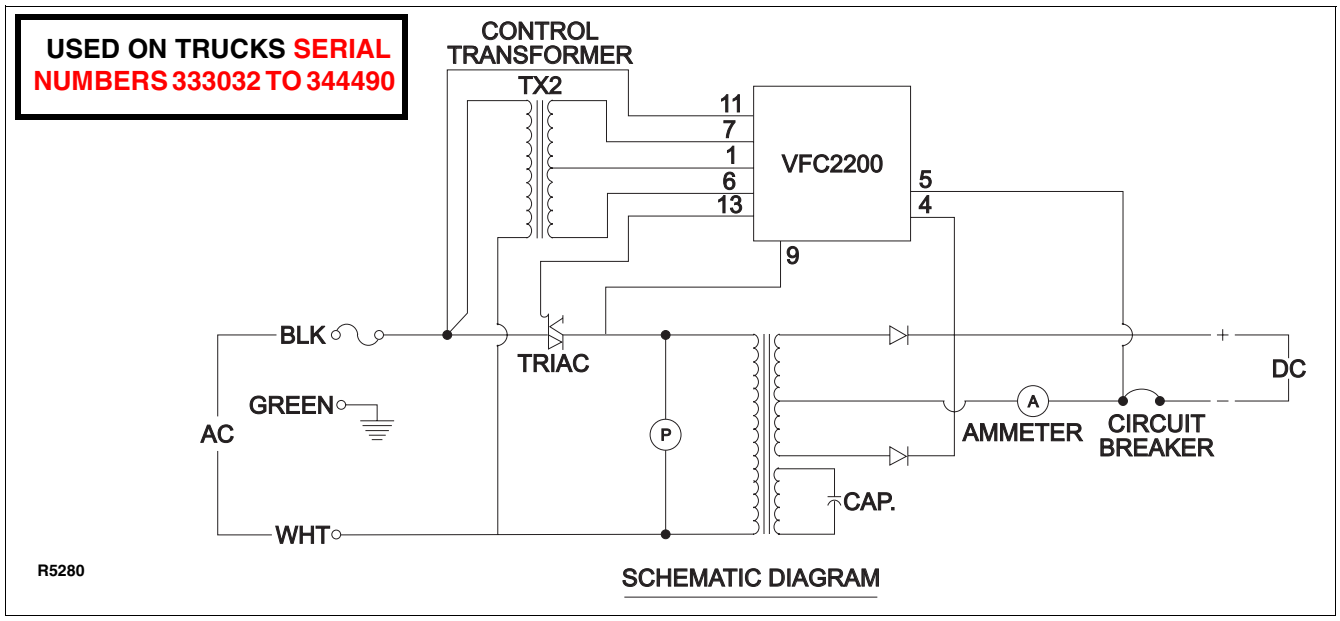


Figure 10-3 Optional 120V Smart Battery Charger 004976-01

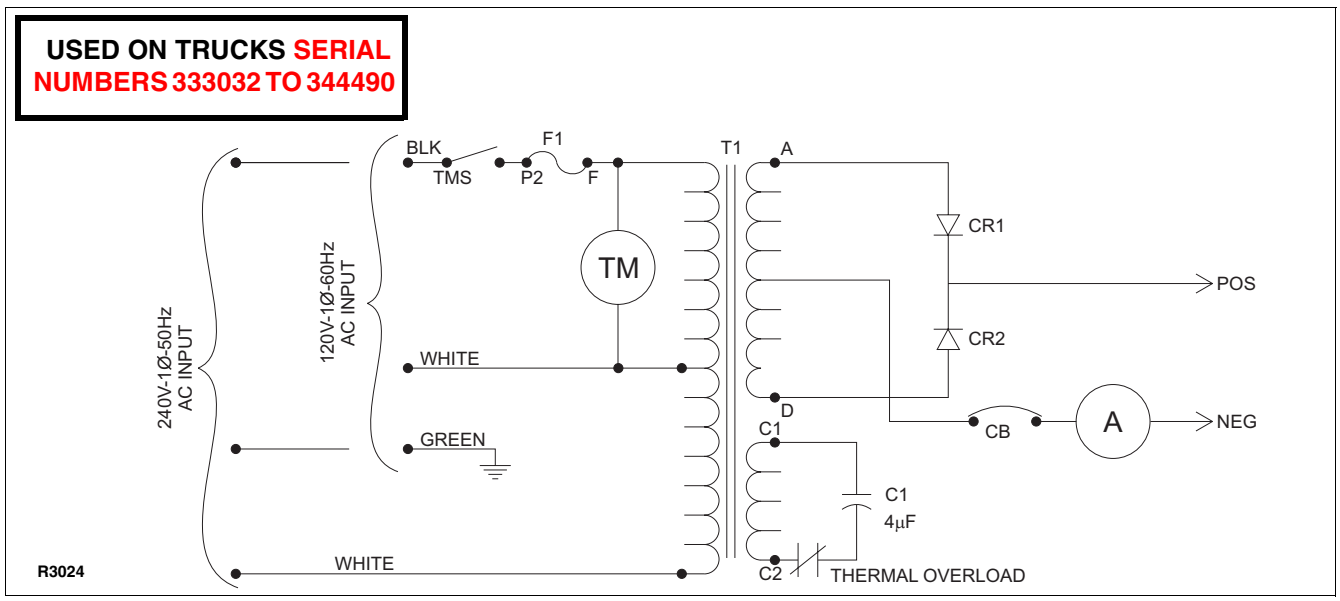


Figure 10-4Standard Timer Battery Charger 004967-01 and 004967-02

10-4.1. Troubleshooting 004978 Battery Charger

The logic flow troubleshooting diagram provides a simplified means of isolating the probable cause for a problem by performing steps to obtain a "Yes" or "No" answer. These types of blocks are used. Rectangular boxes with a regular border provide procedural information. Rectangular boxes with bold borders identify a probable fault. Diamond shaped boxes ask a question to obtain a yes of no answer. By following the yes and no lines the problem is identified.

CAUTION: Do not ever change the setting on the potentiometer on the printed circuit board. This is factory set to limit maximum output voltage. Incorrect setting of this potentiometer can cause damage to the charger or batteries.

WARNING: A jumper is used on the printed circuit logic board for part of the test. This jumper must be installed with the charger disconnected from the AC power input.

Refer to Figure 10-5 for a complete schematic of the charger. Figure 10-6 provides information of connecting the jumper when necessary. Figure 10-7 is a logic flow troubleshooting guide.

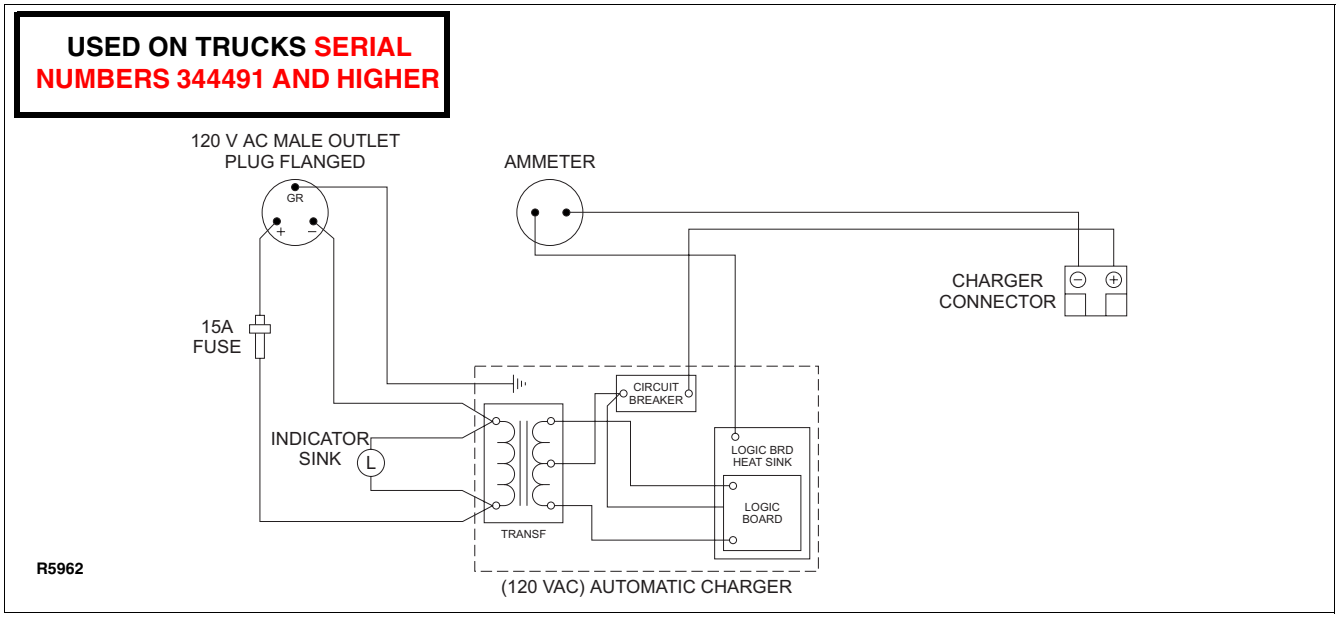


Figure 10-5 120V Smart Battery Charger 004978

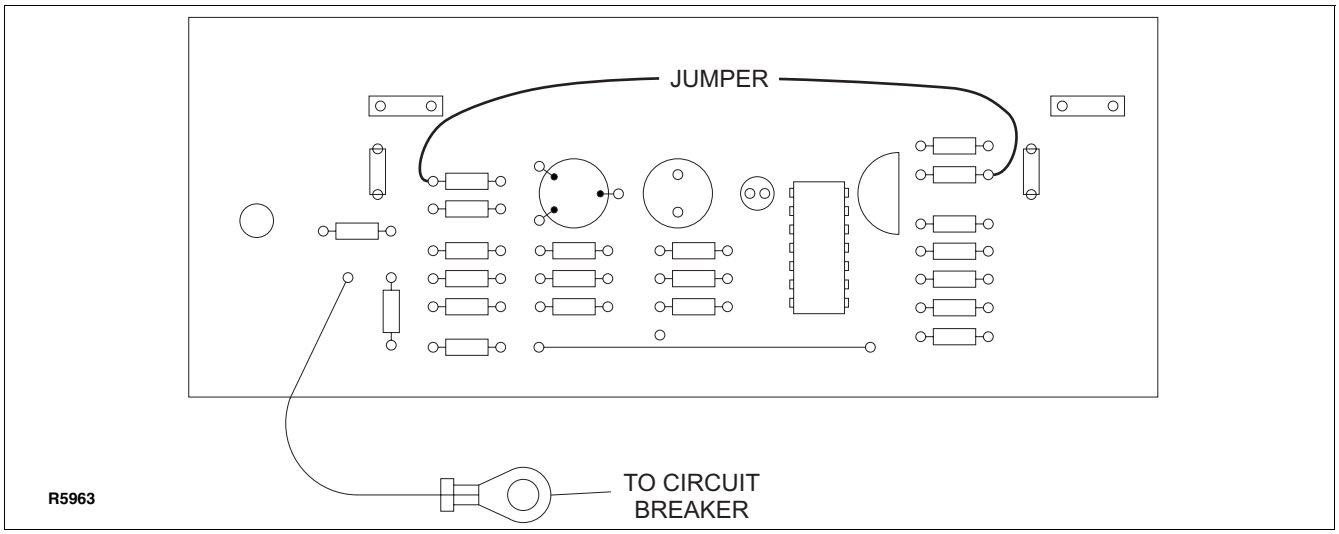


Figure 10-6 Logic Board Jumper Position

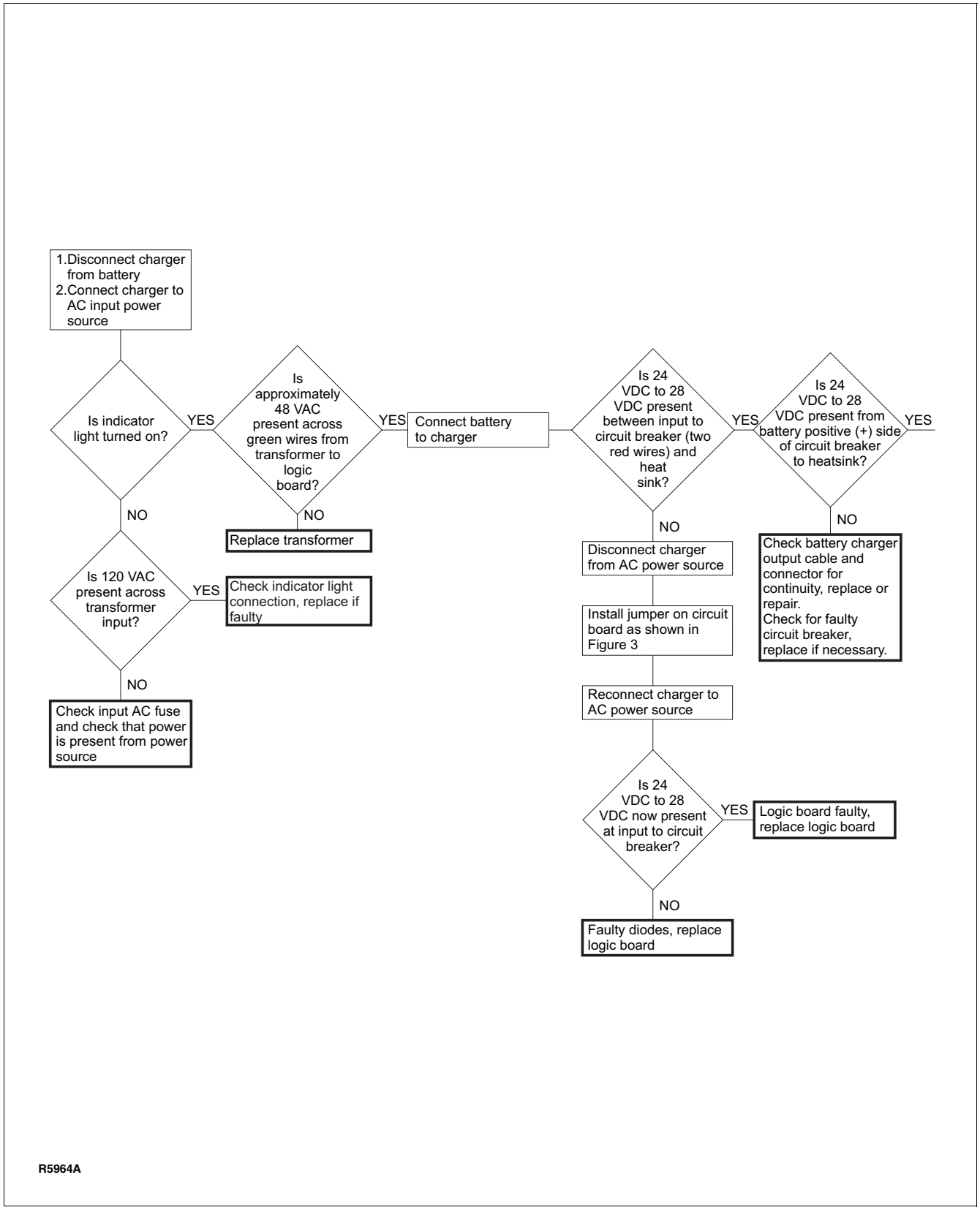


Figure 10-7 Logic Flow Diagram

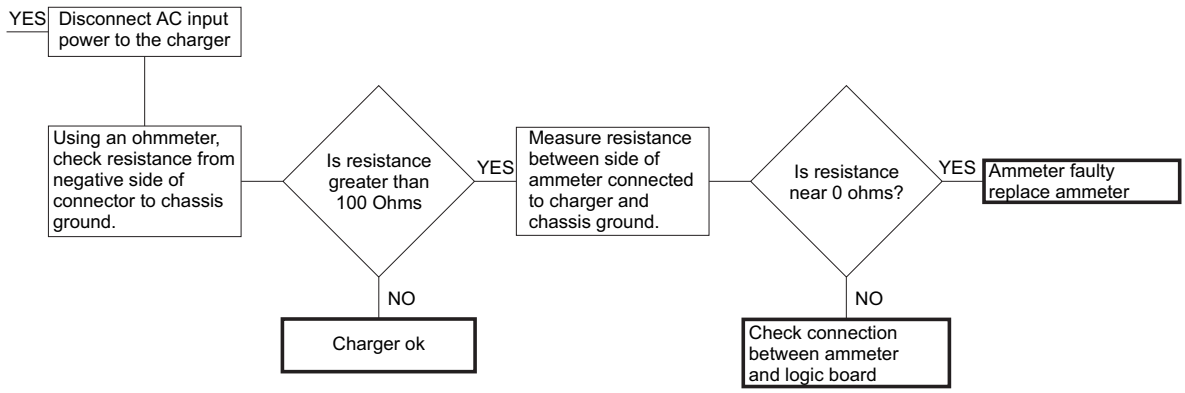


Figure 10-7 Logic Flow Diagram (Continued)

10-5.BATTERIES.

1. Turn key off, and remove from key switch

NOTE: Batteries are heavy. Use care when lifting out of battery compartment.

2. Disconnect the battery quick disconnect.
3. Lift the battery out of the battery compartment.
4. Lower the new battery in the battery compartment.
5. Reconnect the battery quick disconnect.

10-6.HIGH SPEED LIMIT SWITCH

1. Remove the two screws, two lockwashers, and two washers securing switch mounting bracket to frame.
2. Remove high speed limit switch from bracket, and then disconnect wiring from the switch.
3. Connect the wiring to the new switch and install the switch onto the bracket.

NOTE: Bracket must be positioned so that switch is operated when lift carriage is down.

4. Position bracket with new switch in place on frame, and secure with two washers, two lockwashers and two screws.

SECTION 11
OPTIONAL EQUIPMENT

11-1. KEYSWITCH.

Those trucks which have a keyswitch installed will have the wiring modified. The modification is shown in Figure 12-37 and the wiring diagram Figure 4-1 or Figure 4-2.

11-2. HOUR METER.

The hour meter is attached to the motor circuits to indicate actual usage of the drive and lift function. Refer to Figure 12-38 for replacement parts and to the wiring diagram, Figure 4-1 or Figure 4-2, for wiring information.

11-3. BATTERY CAPACITY INDICATOR.

Refer to Figure 12-39 or Figure 12-40 for the battery capacity indicator replacement parts. These figures includes both the indicator with and without the lift lockout feature.

11-4. REMOTE CONTROL.

Figure 12-36 identifies the parts required for the optional lift and lower remote control. Included are wiring details for both the control head pushbutton switches and the umbilical connected control box.

11-5. REMOTE CONTROL INSTALLATION.

Refer to wiring diagrams shown in Figure 12-35 for reference. Refer to subparagraph 11-5.1. below for installation of pushbutton box remote control. Refer to subparagraph 11-5.2. for lift/lower controls in the control head. Numbers in parenthesis are quantities of part number required.

11-5.1. Pushbutton Box Remote Control.

1. Add lowering solenoid to pump.
2. Mount female socket plug receptacle in frame.
3. Wire components per diagram in Figure 12-35.

11-5.2. Control Head Lift/Lower.

1. Add lowering solenoid to pump.
2. Wire components per diagram in Figure 12-35.

11-6. COLD-CONDITIONING.

The cold-conditioning version of the truck differs from the standard model where necessary to improve performance in cold temperatures. Heating resistors are provided for the control head switches, and cold-resistant versions of other switches and the hydraulic hoses are used. Special cold-temperature lubricants are also necessary for this application.

Location of electrical parts in the control head and resistor wiring of cold-conditioning equipment is illustrated in Figure 11-2.

Refer to paragraphs 9-5. for procedures concerning Lift/Lower Control Valve.

CAUTION: Cold-conditioning heating resistors consume power when energized, whether truck is used or not. To avoid power waste, disconnect battery of cold-conditioned truck when lengthy storage periods at temperatures low enough to energize cold-conditioning equipment are planned.

Cold-conditioning equipment requires no regular maintenance and does not affect any lift truck maintenance procedure except lubrication where the low temperature lubricants must be used. When adding grease or oil to the cold-conditioned truck, the following lubricant is recommended.

Heavy duty hydraulic oil with viscosity of 100 SUS (Big Joe part no. 055784)

EP SAE 10W30 transmission oil (055790)

Additional cold-conditioning components are shown in Figure 12-16 and Figure 12-19.

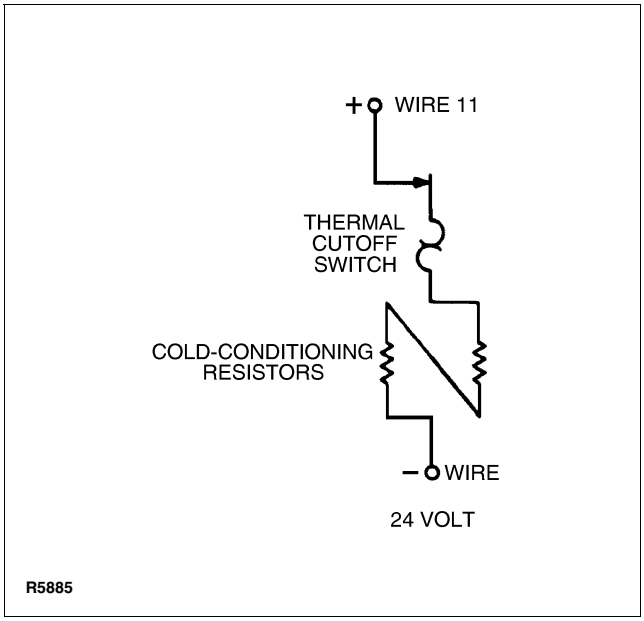


Figure 11-1 Schematic Dia. of Cold Cond. Circuit

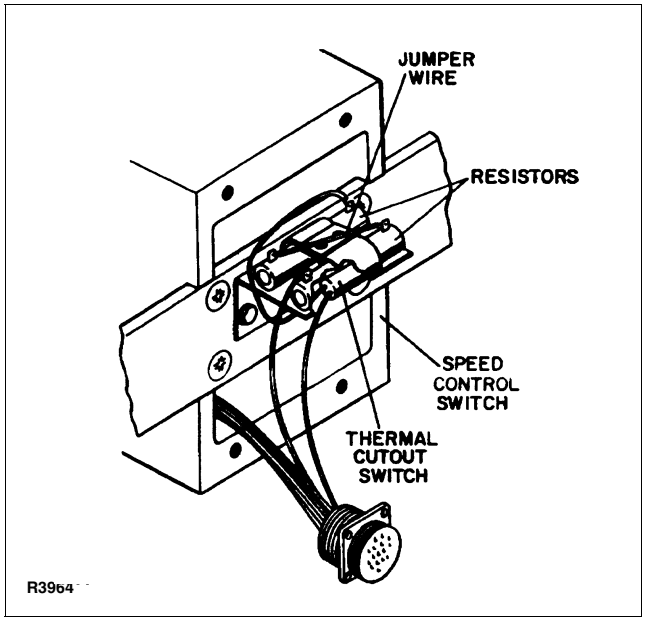


Figure 11-2 Location of Resistors and Thermal Cutout Switch

SECTION 12
ILLUSTRATED PARTS BREAKDOWN

Following is an illustrated parts breakdown of assemblies and parts associated with the PDCM Lift Truck.

SEE FIGURE 12-2
FOR SWITCHS

1. SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333032 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 334631 AND HIGHER

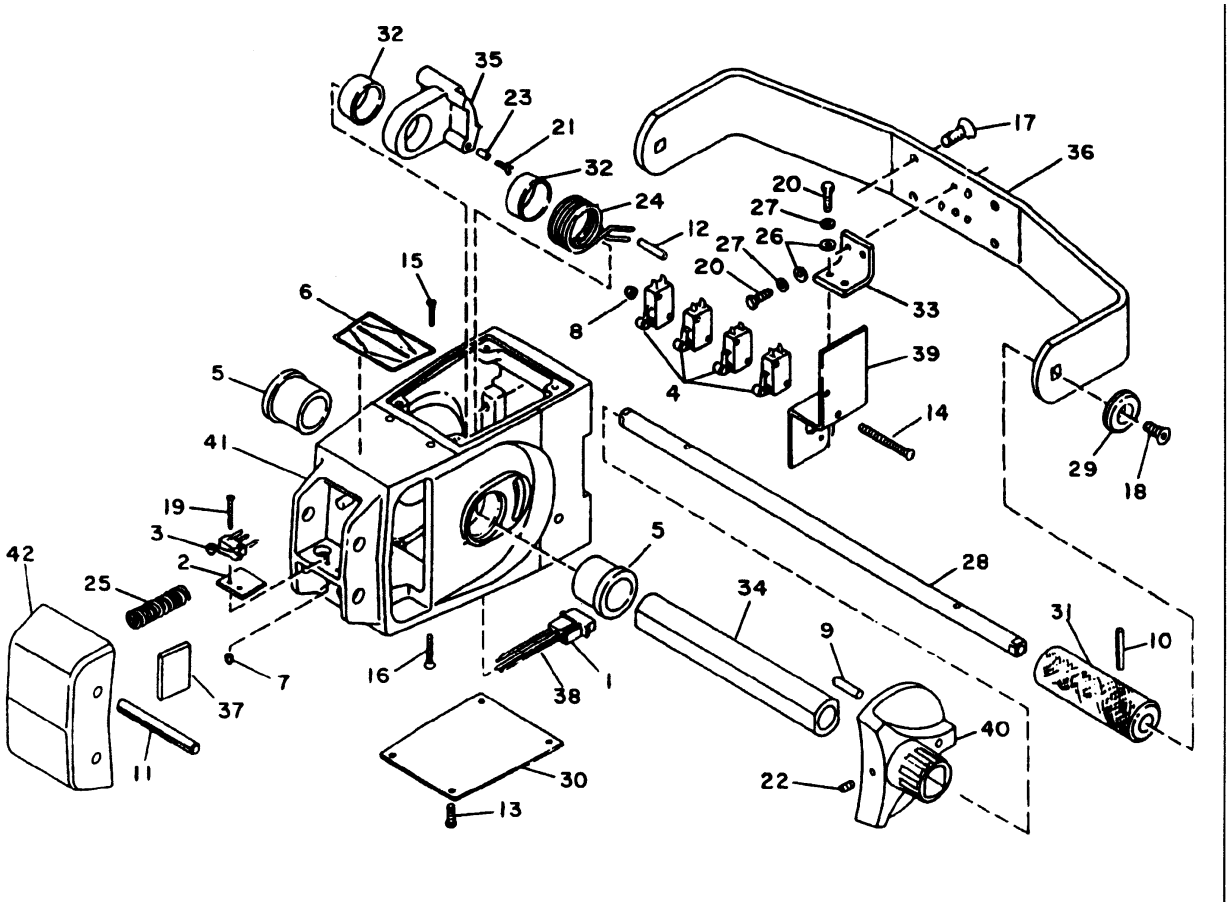


Figure 12-1 Control Head Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	505050-04	CONTROL HEAD (STANDARD)	1
—	505050-05	CONTROL HEAD (LIFT IN HANDLE)	1
—	505050-06	CONTROL HEAD (LIFT/LOWER IN HANDLE)	1
1	005647	. CONNECTOR	1
2	018202	. SWITCH INSULATOR	1
3	020669	. MICRO SWITCH	1
4	020775	. MICRO SWITCH	4
5	052956	. FLANGED BEARING	2
6	056617	. FORWARD-REVERSE DECAL	1
7	059633	. HEX LOCKNUT, 2-56	2
8	059634	. HEX LOCKNUT, 4-40	2
9	060579	. DOWEL PIN, 1/4 X 15/16	2
10	060942	. ROLL PIN, 1/4 X 15/16	2
11	061016	. ROLL PIN, 1/4 X 3	2
12	061200-01	. SPIROL PIN, 3/16 X 1	1
13	067416	. PAN HD SCREW, 6-2 X 1/2	4
14	068189	. RD HD SCREW, 4-40 X 1-7/8	2
15	069462	. SLOTTED FLAT HD SCREW, 6-32 X 3/4	2
16	069463	. SLOTTED FLAT HD SCREW, 6-32 X 1	2
17	069478	. PHILLIPS FLAT HD SCREW, 1/4-20 X 3/4	4
18	069715	. SOCKET FLAT HD SCREW, 1/4-20 X 3/4	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
19	070486	. ROUND HD SLOTTED MACHINE SCREW	2
20	072400-01	. HEXHD SLOTTED SCREW, 6-32 X 1/2	4
21	072415	. PAN HD SCREW, THREAD CUTTING	1
22	073461	. SOCKET SET SCREW	2
23	074711	. SPACER	1
24	075088	. RETURN SPRING	1
25	075510	. COMPRESSION SPRING	2
26	077007	. WASHER	4
27	077204	. SPLIT LOCK WASHER #6	4
28	402827	. SHAFT	1
29	402828	. CAP	2
30	402830	. BOTTOM ACCESS COVER	1
31	402834	. TUBE	2
32	402836	. SPACER	2
33	402837	. BRACKET	1
34	403358	. TUBE	1
35	402840	. CAM	1
36	402841	. HANDLE GUARD	1
37	402843	. PAD	2
38	504538-01	. SWITCH WIRE ASSEMBLY	3
39	505052	. SWITCH WIRE ASSEMBLY	1
40	800272	. CONTROL LEVER	2
41	800273	. CONTROL HANDLE	1
42	800274	. COVER	1

1. SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333032 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 334631 AND HIGHER

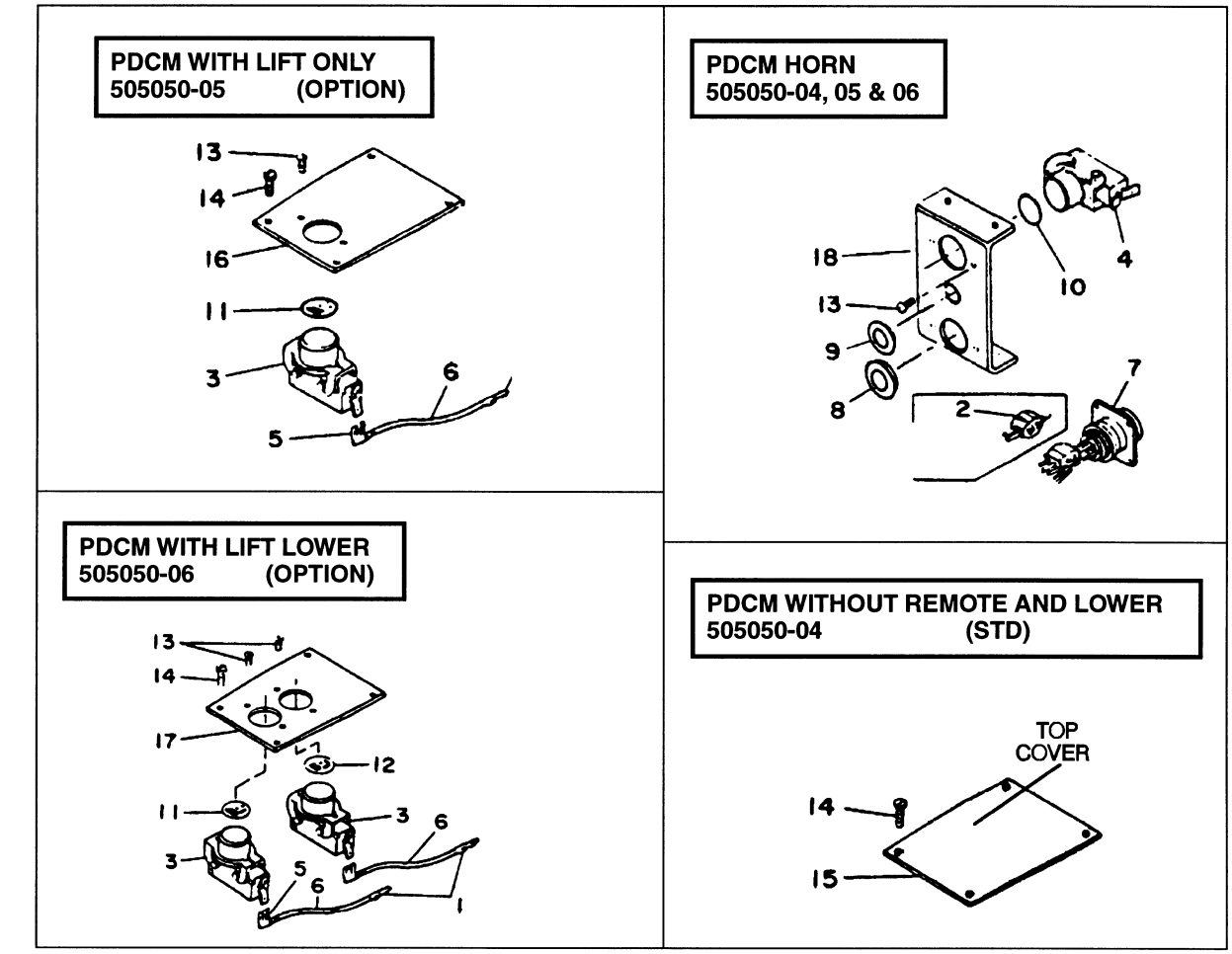


Figure 12-2 Push Button Switches, Control Head

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	005643	CONTACT PIN	2 MAX
2	005649	CONNECTOR	1
3	020697	PUSHBUTTON SWITCH	2 MAX
4	020698	PUSHBUTTON SWITCH	1
5	021208	TERMINAL	4 MAX
6	023014	WIRE	AR
7	023170	WIRE HARNESS ASSEMBLY	1
8	053215-02	HOLE PLUG	1
9	053215-03	HOLE PLUG	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
10	056619-01	HORN DECAL	1
11	056619-03	LIFT DECAL	1
12	056619-04	LOWER DECAL	1
13	067415	PAN HD, SCREW 6-32 X 1/4	AR
14	067416	PAN HD, SCREW 5-32 X 1/2	4
15	402830	TOP COVER	1
16	402831	TOP COVER	1
17	402832	TOP COVER	1
18	402842	SWITCH PLATE	1

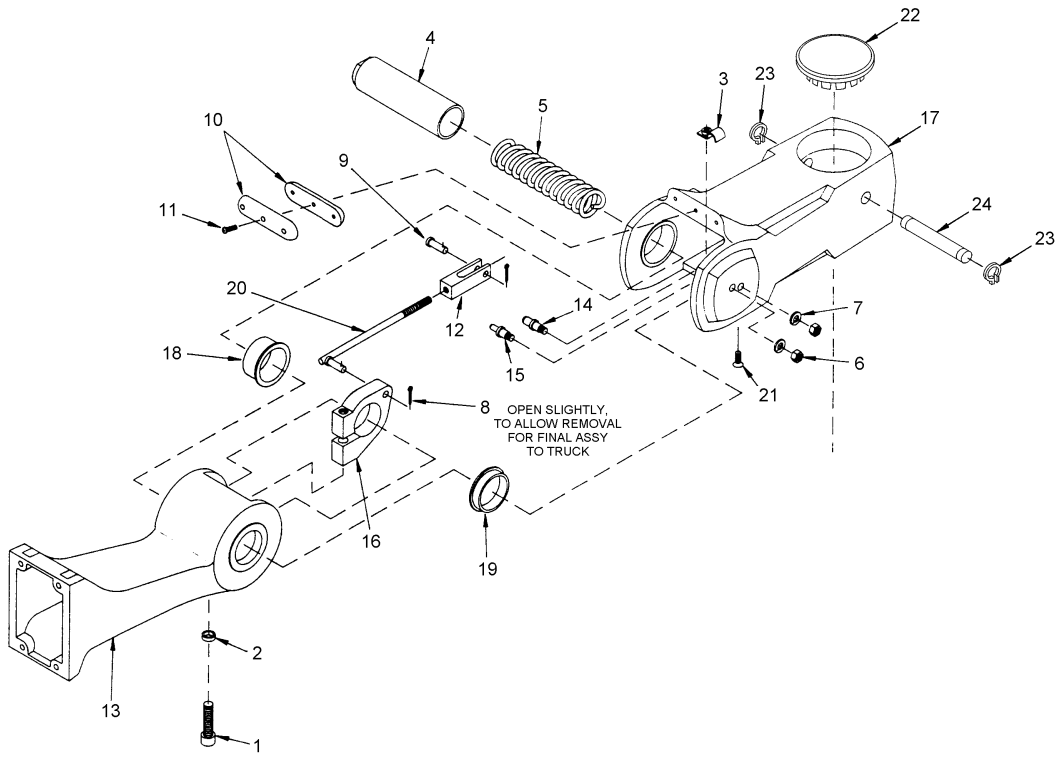
A/R - AS REQUIRED

NOTES

1. SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333032 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 334631 AND HIGHER

HANDLE RETURN SPRING KIT 901325 CONTAINS:

ITEM	QTY
4	1
5	1
6	2
7	2
14	1
15	1



USED ON TRUCKS SERIAL NUMBERS 333032 TO 346023

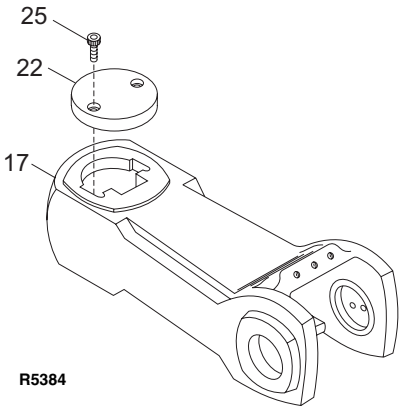


Figure 12-3 Steering Arm

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	505765-01	CONTROL ARM ASSY	1
1	065569	. SCREW, 7/16-14 X 2-1/4	1
2	401127	. SPACER	1
3	504364	. CLAMP ASSY	1
4	501371 *	. HOUSING SPRING	1
5	075060 *	. SPRING	1
6	059426 *	. NUT, HEX, 5/16-18	2
7	077210 *	. WASHER, LOCK, SPLIT, 5/16	2
8	060417	. PIN, COTTER	2
9	060300	. PIN, CLEVIS	1
10	052876	. BUMPER	2
11	071377	. SCREW, 10-32 X 3/4	3
12	056200	. CLEVIS	1
13	800275	. HANDLE	1
14	285302 *	. PIN SPRING	1
15	285303 *	. PIN SPRING	1
16	800204	. CLAMP	1
17	800206 **	. ARM PIVOT	2
17	402363 ***	. ARM PIVOT	2
18	052925	. . BEARING FLANGED	1
19	052922	. . BEARING FLANGED	
20	501673	. ROD, BRAKE	1
21	069478	. SCREW, HEX CAP, 1/4-20 X 3/4	1
22	191045 **	COVER, PIVOT CAP	1
22	402459 ***	COVER, PIVOT CAP	1
23	061716 ***	SNAP RING	2
24	402452 ***	PIN	1
25	065603 **	SCREW-SOC, 3/8-16 X 3/4	2

*** HANDLE RETURN SPRING KIT PART NUMBER 901325**

**** USED ON TRUCKS SERIAL NUMBER 333032 TO 346023**

***** USED ON TRUCKS SERIAL NUMBER 346024 AND HIGHER**

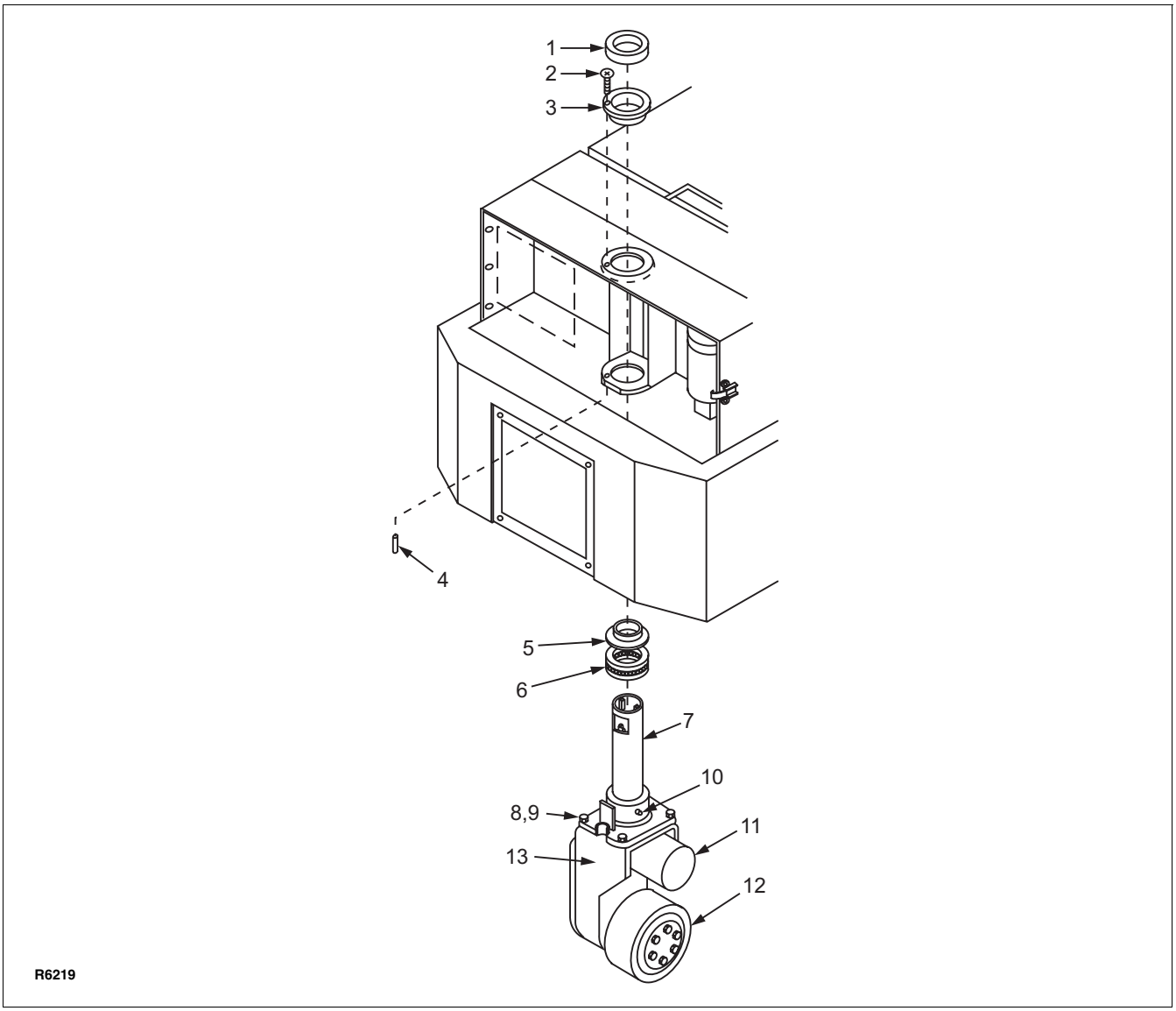


Figure 12-4 Pivot Tube Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	283901	SPACER	1
2	065538	SCREW, 5/16-18 X 5/8	3
3	053107	BUSHING, UPPER	1
4	061002	ROLL PIN, 1/4 X 3/4	1
5	053108	BUSHING, LOWER	1
6	051146	BEARING, THRUST	1
7	503904-01 *	PIVOT TUBE WELDMENT	1
7	505681-01 **	PIVOT TUBE WELDMENT	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	063713	SCREW, HEX HEAD	4
9	077412	LOCKWASHER EXTERNAL	4
10	025712	FITTING, GREASE	1
11	—	DRIVE MOTOR (FIGURE 12-26, FIGURE 12-25, FIGURE 12-24)	REF
12	—	DRVIE WHEEL (FIGURE 12-7)	REF
13	—	TRANSMISSION (FIGURE 12-7)	REF

* **USED ON TRUCKS SERIAL NUMBER 333032 TO 346023**

** **USED ON TRUCKS SERIAL NUMBER 346024 AND HIGHER**

NOTES

USED ON TRUCKS SERIAL NUMBERS 333032 TO 333755

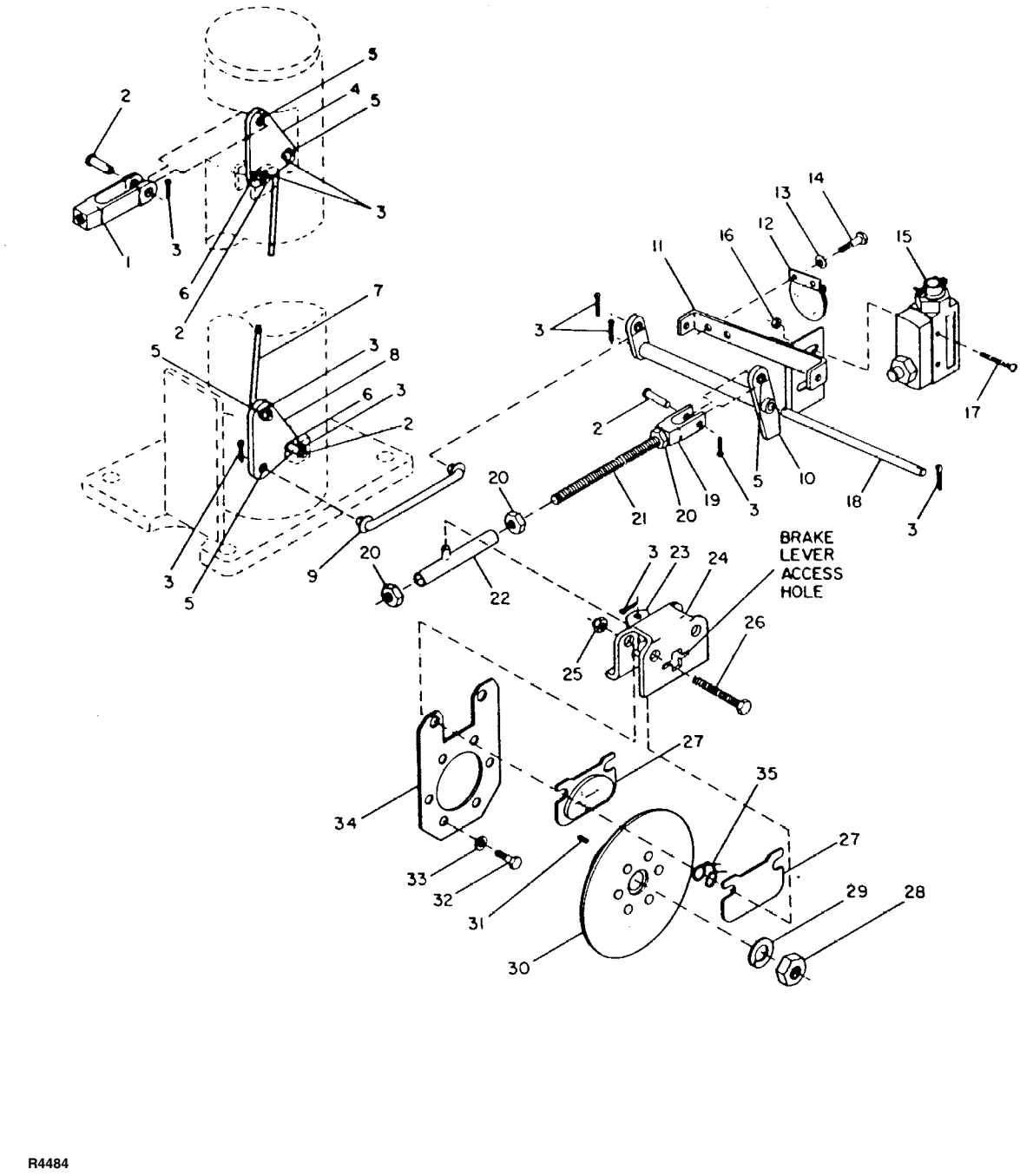


Figure 12-5 Brake and Linkage for Truck Serial Numbers 333032 to 333755

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	056200	CLEVIS	1
2	060300	CLEVIS PIN, 5/16 X 15/16	4
3	060417	COTTER PIN, 3/32 X 3/4	11
4	111104	UPPER PIVOT PLATE	1
5	053109	LOCK BUSHING	6
6	053106	FLANGED BUSHING	2
7	500201	TUBE BRAKE ROD	1
8	111105	LOWER PIVOT PLATE	1
9	500202	BRAKE ROD	1
10	500424	LOWER LOEVER ASSEMBLY	1
—	053109	. LOCK BUSHING	REF
11	500197	MOUNTING BRACKET ASSEMBLY	1
12	—	HORN (FIGURE 12-19)	REF
13	077211	LOCKWASHWER, 3/8	2
14	063405	HEX HEAD CAP SCREW, 3/8-16 X 1	2
15	—	DEAD-MAN SWITCH (FIGURE 12-19)	REF
16	059412	HEX NUT, 6-32	2
17	068336	ROUND HEAD SCREW, 6-32 X 1-1/2	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
18	258107	PIVOT PIN	1
19	800119	CLEVIS	1
20	059427	HEX NUT, 5/16-24	3
21	258121	ROD	1
22	502814	WELDMENT TUBE	1
—	052857	BRAKE ASSEMBLY	1
23	052860	BRAKE LEVER WITH PIN	1
24	052863	CLAMP	1
25	052862	HEX NUT	2
26	052861	HEX HEAD BOLT	2
27	052859	BRAKE PAD	2
28	059645	LOCKNUT, 5/8-18	1
29	077215	OLOCK WASHER, 5-8	1
30	503083	DISC ASSEMBLY	1
31	057903	KEY, 1/4 X 1/4 X 1	1
32	063552	HEX HEAD CAP SCREW, 5/16-18 X 5/8	6
33	077210	LOCK WASHER, 5/16	6
34	111706	MOUNTING PLATE	1
35	075070	SPRING	2

USED ON TRUCKS SERIAL NUMBERS 333756 AND HIGHER

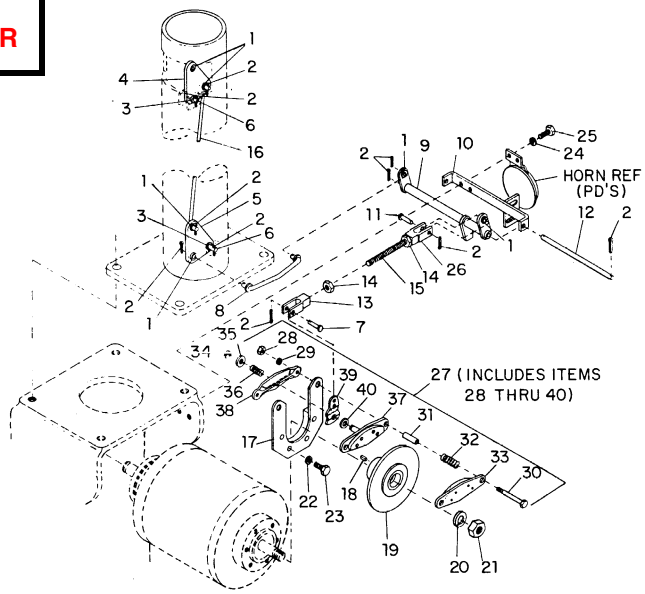


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Figure 12-6 Brake and Linkage for Truck Serial Numbers 333756 and Higher

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	053109	LOCK BUSHING	6
2	060417	COTTER PIN, 3/32 X 3/4	10
3	053106	FLANGED BUSHING	2
4	111104	UPPER PIVOT PLATE	1
5	111105	LOWER PIVOT PLATE	1
6	060320	CLEVIS PIN	2
7	606218	CLEVIS PIN, 1/4 X 1	1
8	500202	BRAKE ROD	1
9	505206	LEVER ASSEMBLY	1
10	505199	BRACKET	1
11	060310	CLEVIS PIN	1
12	258127	PIN	1
13	800284	CLEVIS	1
14	059427	NUT, 5/16-24	2
15	258126	ROD, THREADED	1
16	500201	TUBE BRAKE ROD (PDS)	1
17	505208 *	MOUNTING PLATE	1
17	505215 **	MOUNTING PLATE	1
18	057903	KEY, 1/4 X 1/4 X 1	1
19	505207 *	DISC ASSEMBLY	1
19	505214 **	DISC ASSEMBLY	1
21	059645	LOCKNUT, 5/8-18	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
22	077210	LOCKWASHER, 5/16	3
23	063560	SCREW, CAP, HEX HEAD, 5/16-18 X 1-1/4	3
24	077211	LOCKWASHER, 3/8	2
25	064605	SCREW	2
26	800119	CLEVIS	1
27	052821	DISC BRAKE CALIPER ASSEMBLY	1
28	059421	NUT-HEX, 1/4-20	2
29	077209	LOCKWASHER	2
30	901189	BOLT	2
31	901190	SPACER	2
32	901191	SPRING	2Q
33	901188	BRAKE PAD	1
34	901198	O-RING	1
35	901197	WASHER	1
36	901196	SPRING	1
37	901192	BRAKE PAD WITH PIN	1
38	901195	BRACKET	1
39	901194	LEVER	1
40	901193	WASHER	1

* **USED WITH DRIVE MOTOR 016050**

** **USED WITH DRIVE MOTOR 016040**

NOTES

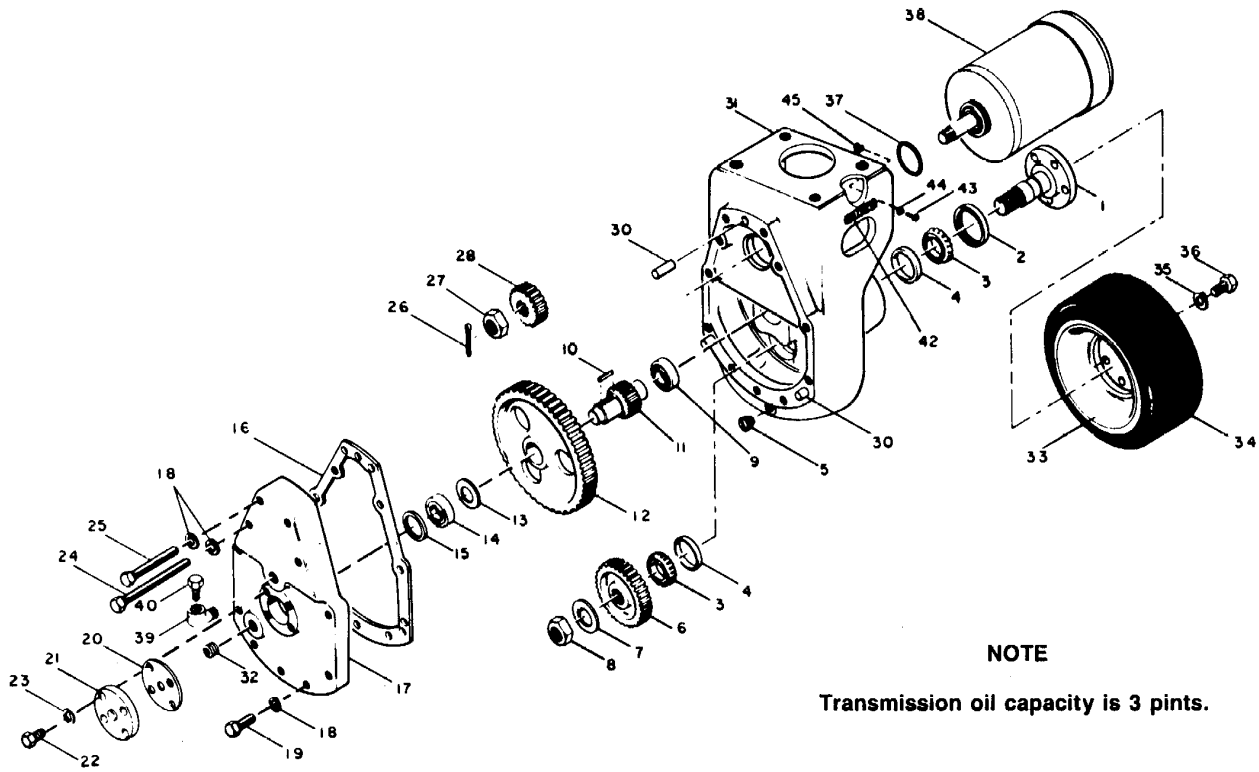


Figure 12-7 Standard Transmission Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	501720	TRANSMISSION ASSEMBLYY	
1	050700	. AXLE SHAFT	1
2	073504	. OIL SEAL	1
3	051112	. ROLLER BEARING CONE	2
4	051111	. ROLLER BEARING CUP	2
5	026302	. DRAIN PLUG	1
6	057210	. SPUR GEAR	1
7	077600	. LOCK WASHER	1
8	059680	. LOCKNUT	1
9	051126	. BALL BEARING	1
10	057902	. SQUARE KEY, 5/16 X 1-3/8	1
11	057211	. SPUR PINION	1
12	057233	. INTERMEDIATE GEAR	1
13	074701	. PINION SPACER	1
14	051125	. BALL BEARING	1
15	074706	. BEARING SPACER	1
16	036105	. COVER GASKET	1
17	800073	. TRANSMISSION COVER	1
18	077211	. SPLIT LOCK WASHER, 3/8	11
19	064611	. HEX HEAD CAP SCREW, 3/8-16 X 1-3/4	7
20	036106	. BEARING COVER GASKET	1
21	051159	. BEARING COVER	1
22	063555	. HEX HEAD CAP SCREW, 5/16-18 X 1	4
23	077210	. LOCK WASHER, 5/16 .	4

INDEX NO.	PART NO.	PART NAME	NO. REQD.
24	064620	. HEX HEAD CAP SCREW, 3/8-16 X 3-3/4	2
25	064615	. HEX HEAD CAP SCREW, 3/8-16 X 2-1/4	2
26	060428	. COTTER PIN	1
27	059745	. HEX NUT, 5/8-18	1
28	057234	. MOTOR PINION SPUR	1
30	060585	. DOWEL PIN	2
31	800072	. TRANSMISSION HOUSING	1
32	026310	. FILL PLUG	1
—	500935	DRIVE WHEEL ASSEMBLY	1
33	800035	. HUB	1
34	079160	. POLYURETHANE WHEEL, 10-1/2 IN. DIA.	1
35	077215	LOCK WASHER, 5/8	5
36	064828	HEX HEAD CAP SCREW, 5/8-18 X 1	5
37	042114	O-RING	1
38	—	MOTOR DRIVE (FIGURE 12-26, FIGURE 12-25 OR FIGURE 12-24)	REF
39	026707	STREET ELBOW, 3/8	1
40	076701	VENT	1
42	021226	TERMINAL BLOCK	1
43	068185	SCREW, 5-40 X 1-3/8	4
44	077203	LOCK WASHER	4
45	059410	HEX NUT	4

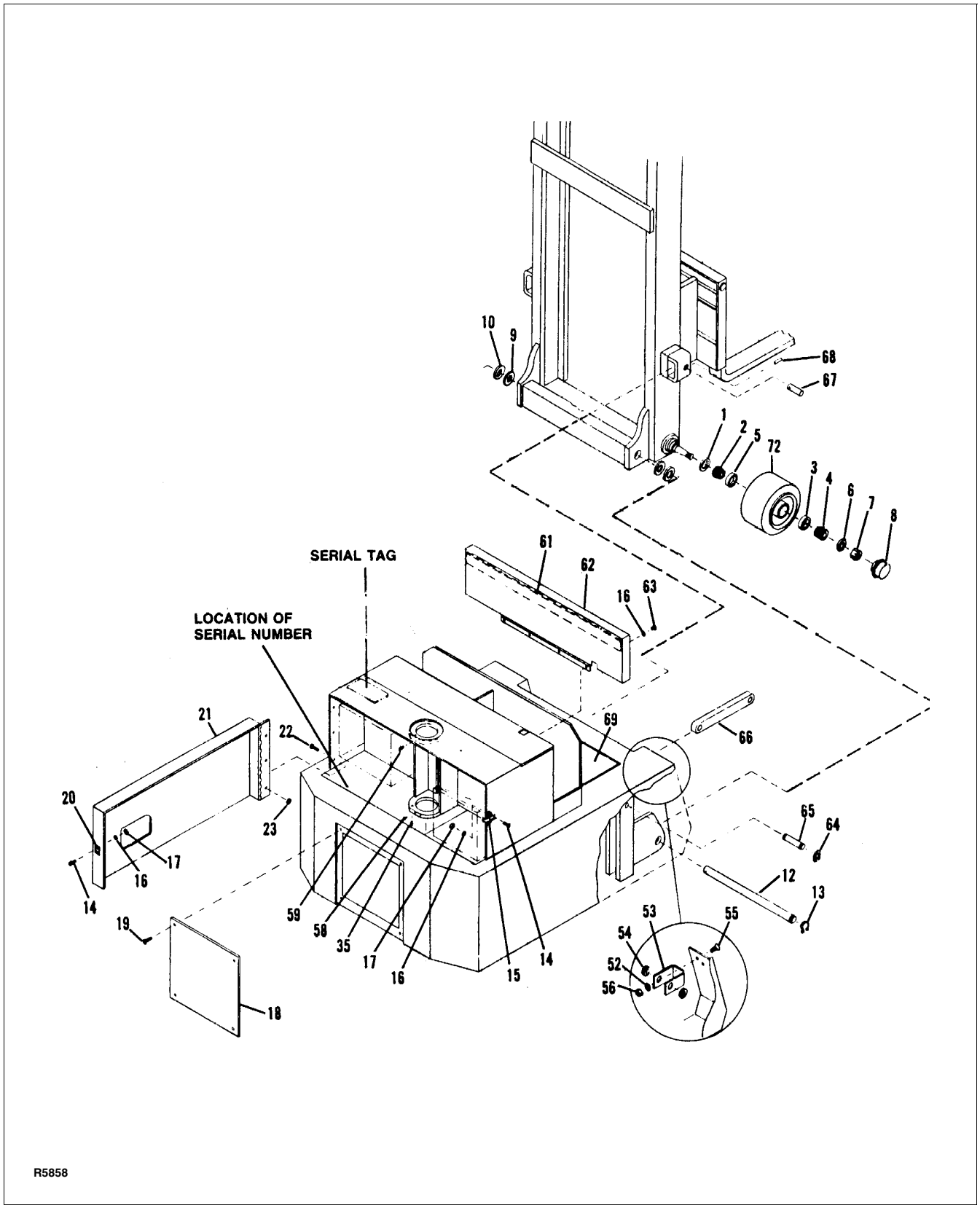


Figure 12-8 Base & Frame

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	073507	SEAL, GREASE	2
2	051141	CONE, BEARING	2
3	051144	CUP, BEARING	2
4	051143	CONE, BEARING	2
5	051142	CUP, BEARING	2
6	077082	WAHSER	2
7	059128	NUT, LOCK, FLEX, 3/4-16	2
8	053400	CAP, DUST	2
9	077074	WASHER, 14 GA	2
10	077029	WASHER, 11 GA	2
11	—	NOT USED	1
12	400309	SHAFT	1
13	061729	RING, SNAP, 1-1/4	2
14	071376	SCREW, TRUSS HEAD, 10-32 X 1/2	4
15	058100	LATCH, DOOR	1
16	077208	WASHER, LOCK, #10	8
17	059416	NUT, HEX, #10-32	4
18	400468	DOOR, ACCESS	1
19	069602	SCREW, FL, 3/8-16 X 5/8	4
20	055500	CATCH, FASTENER	1
21	504797	DOOR WELDMENT	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
22	065538	SCREW, 5-16-18 X 5/8	3
23	059628	NUT, LOCK, 5-16-18	3
35	061002	WASHER	2
52	077056	WASHER	2
53	401691	BRACKET, HOSE	1
54	057511	GROMMET, RUBBER	2
55	069712	SCREW, FL, 3/8-16 X 3/4	2
56	059629	NUT, LOCK, 3/8-16	2
58	025713	GREASE FITTING	1
59	025715	GREASE FITTING	1
61	402458	PAD	1
62	504716	COVER WELDMENT	1
63	071379	SCREW, 10-32 X 1/4	4
64	061725	SNAP RING	4
65	296601	SHAFT	2
66	402533	BAR, MAST SUPPORT	2
67	296602	SHAFT	2
68	060976	ROLL PIN	2
72	503389	POLY WHEEL & HUB	2
—	079163	. WHEEL ONLY	1
—	800202	. HUB ONLY	1

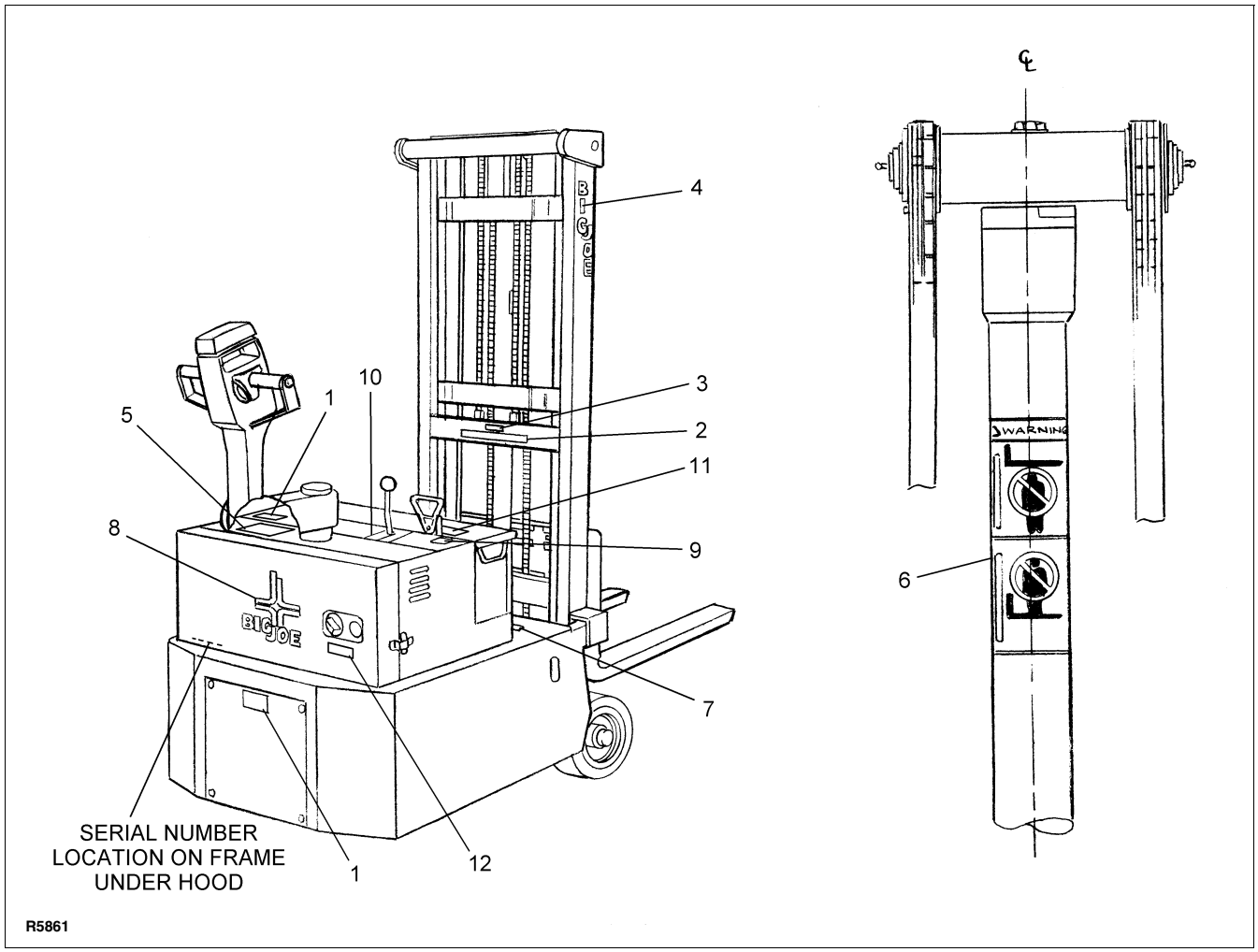


Figure 12-9 Decal Location

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	901036	DECAL KIT	1
1	056564	. CAUTION DECAL	2
2	056499	. NO RIDING DECAL	1
3	056494	. CAUTION DECAL	1
4	056633	. SMALL MAST DECAL	2
5	056592	. WARNING DECAL	1
6	056625	WARINGIN DECAL	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
7	056626	OIL LEVEL	1
8	056631	BIG JOE DECAL	1
9	056611	TRUCK/CHARGER	1
10	056478	LIFT/LOWER	1
—	901201	YELLOW, TOUCH UP PAINT	
—	901202	BLACK, TOUCH UP PAINT	

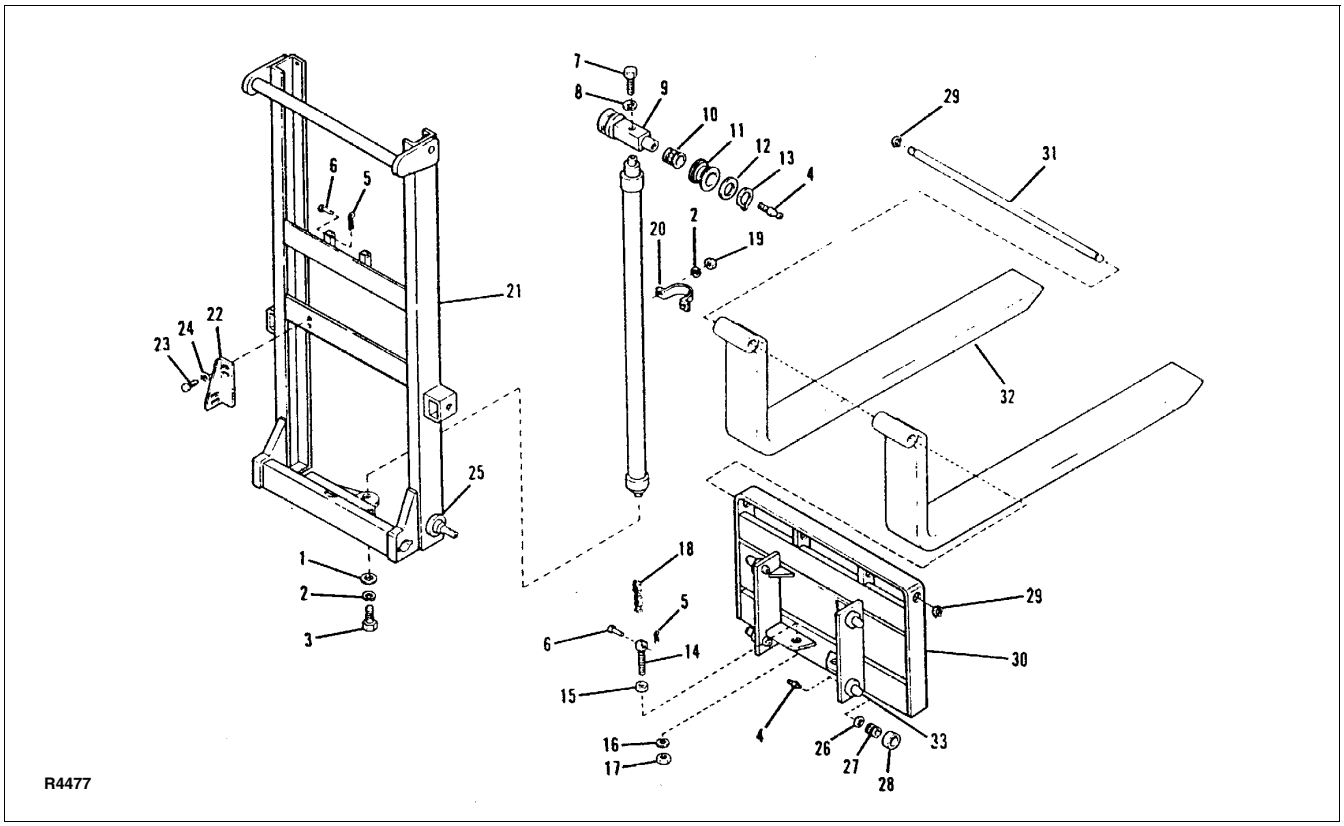


Figure 12-10 Elevation System (Non-Telescopic)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	077076	FLAT WASHER, 1-1/2 X 13/32 X 7	1
2	077211	SPLIT LOCK WASHER, 3/8	3
3	064605	HEX HEAD CAP SCREW, HEAT TREATED	1
4	025712	GREASE ZERK	6
5	060402	COTTER PIN	4
6	402055	CLEVIS PIN	4
7	063709	HEX HEAD CAP SCREW	1
8	077213	SPLIT LOCK WASHER, 1/2	1
—	500242	RAM HEAD ASSEMBLY	1
9	057756	. RAM HEAD	1
10	051120	. BEARING	2
11	074251	. SHEAVE	2
12	077022	. FLAT WASHER	2
13	061727	. RETAINING RING	2
14	402051	ADJUSTING BOLT	2
15	059545	SPLIT LOCK WASHER, 5/8	2
16	077215	SPLIT LOCK WASHER, 5/8	2
17	059445	HEX NUT, 5/8-18	2
18	402034	LIFT CHAIN, 3.36 FT	2
19	059429	HEX NUT, 3/8-16	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
20	101072	CYLINDER CLAMP	1
21	503427-01	MAST WELDMENT	1
22	402322	BRACKET	1
23	063478	SCREW	2
24	077209	WASHER	2
25	074810	SPINDLE	2
26	053012	WASHER, THRUST, 3/32”	1
26	053013	WASHER, THRUST, 1/8”	1
26	053014	WASHER, THRUST, 5/32”	1
26	053015	WASHER, THRUST, 3/16”	1
—	500166	ROLLER ASSEMBLY	4
27	051145	. BEARINGS, ROLLER	4
28	243401	. ROLLER	4
29	061729	SNAP RING	4
30	504539-07	24” OD CARRIAGE (STD)	1
31	276605	SHAFT	1
32	057119-02	FORKS, 36”	1
32	057119-03	FORKS, 42”	1
32	057119-04	FORKS, 48”	1
33	500126	SPINDLE	4

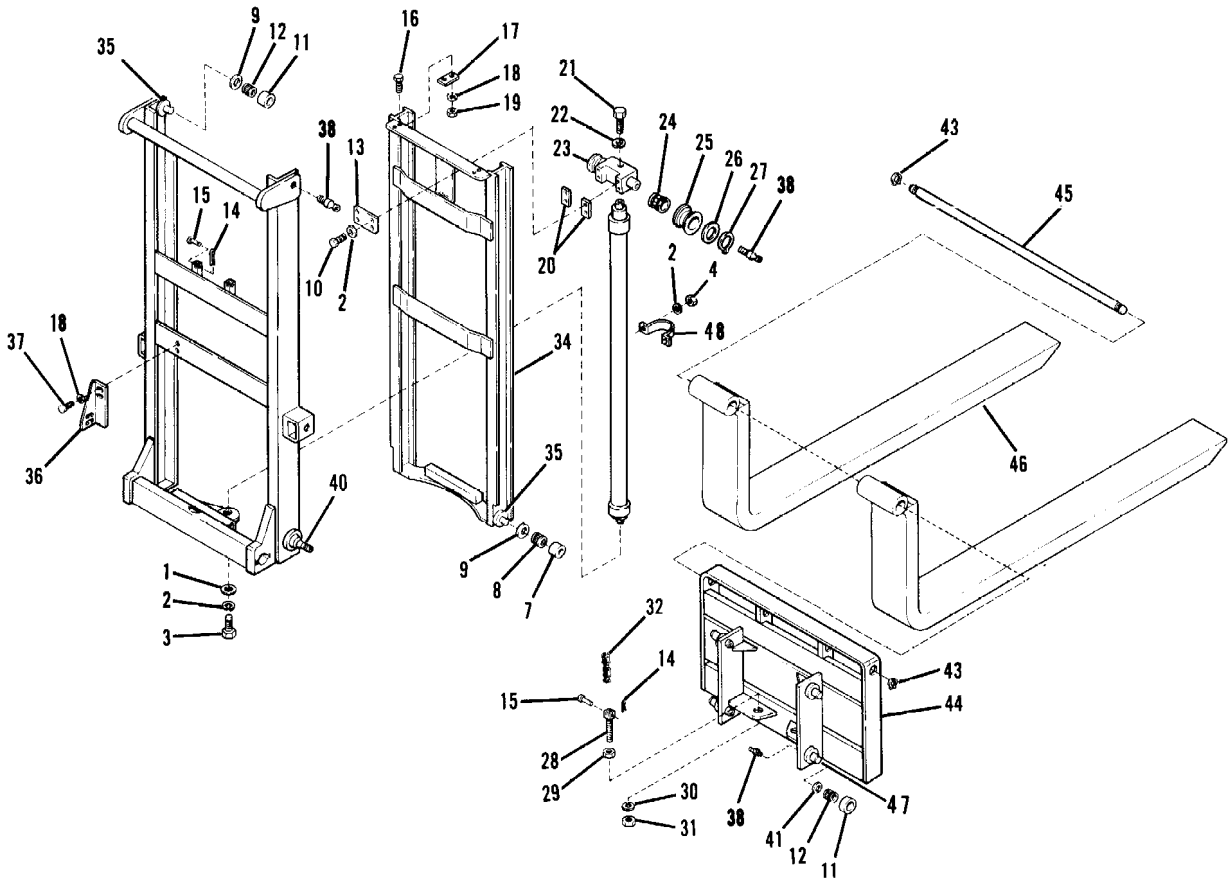


Figure 12-11 Elevation System (Telescopic)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	077076	FLAT WASHER, 1-1/2 X 13/32 X 7	1
2	077211	SPILT LOCK WASHER, 3/8	7
3	064605	HEX HEAD CAP SCREW, HEAT TREATED	1
4	059429	HEX NUT, 3/8-16	1
5	—	NOT USED	
6	—	NOT USED	
—	500166	ROLLER ASSEMBLY	2
7	243401	. ROLLER	2
8	051145	. BEARING ROLLER	8
9	053012	THRUST WASHER, 1-1/4 X 3/32 THK	AR
9	053013	THRUST WASHER, 1-1/4 X 1/8 THK	AR
9	053014	THRUST WASHER, 1-1/4 X 5/32 THK	AR
9	053015	THRUST WASHER, 1-1/4 X 3/16 THK	AR
10	064607	HEX HEAD CAP SCREW, 3/8-16 X 1-1/4	4
—	500167	ROLLER ASSEMBLY	4
11	401046	. ROLLER	1
12	051145	. BEARING, ROLLER	2
13	239520	CLAMP BAR	1
14	060402	COTTER PIN	4
15	402055	CLEVIS PIN	4
16	069483	FLAT HEAD SCREW	4
17	191089	STOP BLOCK	2
18	077209	SPLIT LOCK WASHER, 1/4	4
19	059421	HEX NUT	4
20	100016	SPACER	2
21	064709	HEX HEAD CAP SCREW	1
22	077213	SPLIT LOCK WASHER, 1/2	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	501368	RAM HEAD ASSEMBLY	1
23	501290	. RAM HEAD	1
24	051120	. BEARING	2
25	074251	. SHEAVE	2
26	077022	. FLAT WASHER	2
27	061727	. RETAINING RING	2
28	402051	ADJUSTING BOLT	2
29	059545	JAM NUT, 5/8-18	2
30	077215	SPLIT LOCK WASHER, 5/8	2
31	059445	HEX NUT, 5/8-18	2
32	402034	CHAIN 106” 6.21 FT.	2
32	402034	CHAIN 130” 8.38 FT.	2
33	VAR	OUTER MAST	1
34	VAR	INNER MAST	1
35	236001	SPINDLE	4
36	402322	BRACKET	1
37	063478	SCREW	2
38	025712	GREASE FITTING	8
39	101072	CYLINDER CLAMP	1
40	074810	SPINDLE	2
41	053012	WASHER, THRUST, 3/32”	1
41	053013	WASHER, THRUST, 1/8”	1
41	053014	WASHER, THRUST, 5/32”	1
41	053015	WASHER, THRUST, 3/16”	1
43	061729	SNAP RING	2
44	504539-08	24” OD CARRIAGE	1
45	276605	SHAFT	1
46	057119-02	FORKS, 36”	1
46	057119-03	FORKS, 42”	1
46	057119-04	FORKS, 48”	1
47	500126	SPINDLE	4
48	101072	CYLINDER CLAMP	1

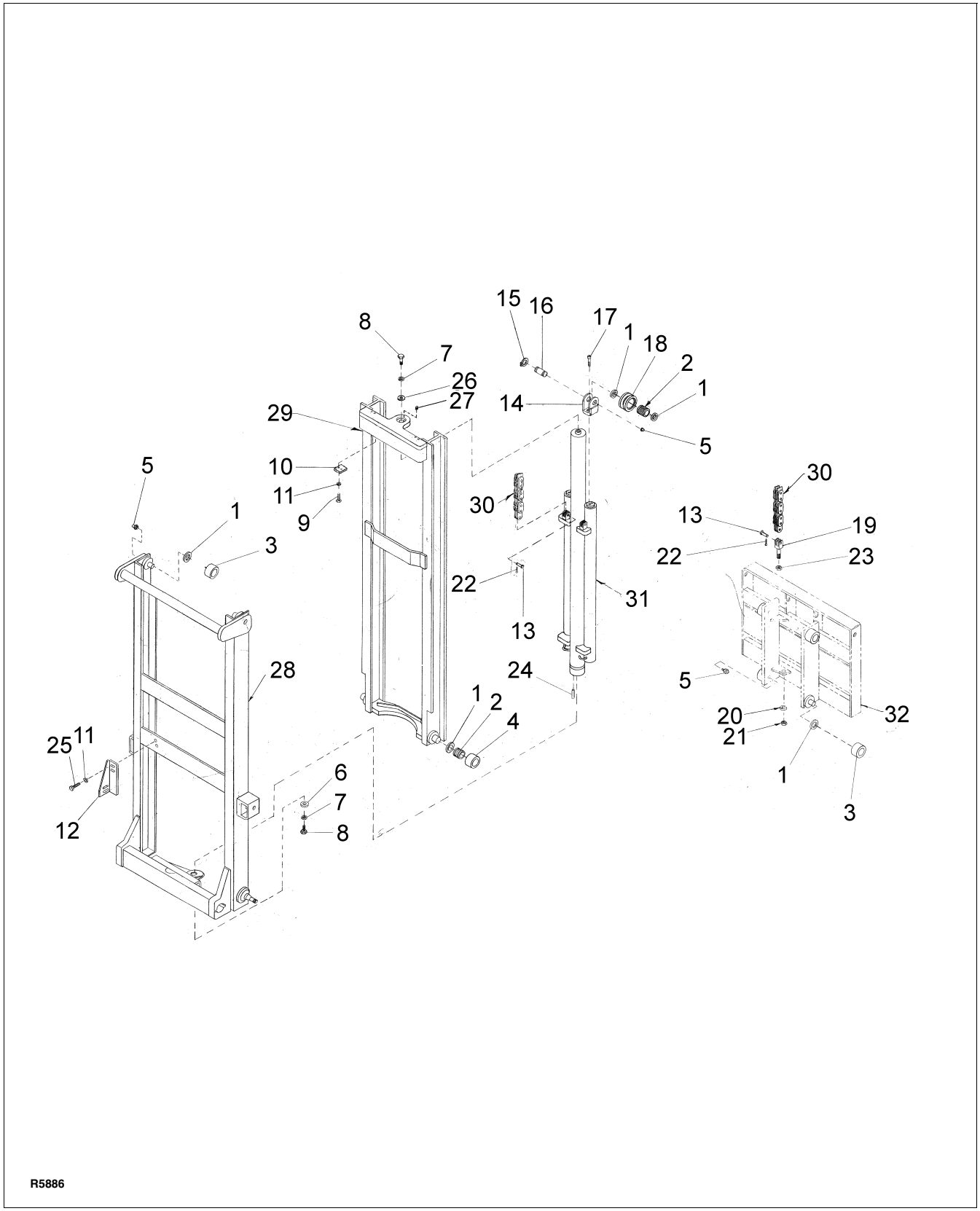


Figure 12-12 Elevation System (FFL)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	053012	THRUST WASHER, 1-1/4 X 3/32 THK	AR
1	053013	THRUST WASHER, 1-1/4 X 1/8 THK	AR
1	053014	THRUST WASHER, 1-1/4 X 5/32 THK	AR
1	053015	THRUST WASHER, 1-1/4 X 3/16 THK	AR
2	051145	BEARING, ROLLER	2
3	500167	ROLLER ASSEMBLY	6
—	401046	. ROLLER	1
—	051145	. BEARING, ROLLER	2
4	500166	ROLLER ASSEMBLY	2
—	243401	. ROLLER	1
—	051145	. BEARING, ROLLER	2
5	025712	GREASE FITTING	8
6	077076	FLAT WASHER, 1-1/2 X 13/32 X 7	1
7	077211	SPILT LOCK WASHER, 3/8	2
8	063603	HEX HEAD CAP SCREW, 3/8-16 X 3/4	2
9	063481	HEX HEAD CAP SCREW, 1/4-20 X 1-1/2	4
10	11670	STOP BLOCK	2
11	077209	SPILT LOCK WASHER, 1/4	6

INDEX NO.	PART NO.	PART NAME	NO. REQD.
12	402322	BRACKET, SWITCH	1
13	402055	CLEVIS PIN	4
14	800246	YOKE, SHEAVE	2
15	061729	SNAP RING	4
16	401639	PIN, SHEAVE	2
17	065555	CAP SCREW, 5/16-18	4
18	289205	SHEAVE, HEAVY DUTY	2
19	402051	ADJUSTING BOLT	2
20	077215	SPLIT LOCK WASHER, 3/4	2
21	059445	HEX NUT, 3/4-16	2
22	060402	COTTER PIN	4
23	059545	JAM NUT, 3/4-16	2
24	061023	PIN, ROLL, 5/16 X 3/4	1
25	063478	SCREW	2
26	800297	WASHER	1
27	073460	SET SCREW	1
28	VAR	OUTER MAST	1
29	VAR	INNER MAST	1
30	402034	CHAIN 106” 7.50 FT.	2
30	402034	CHAIN 103” 8.50 FT.	2
31	—	CYLINDER (FIGURE 12-18)	1
32	11657	LIFT CARRIAGE	1

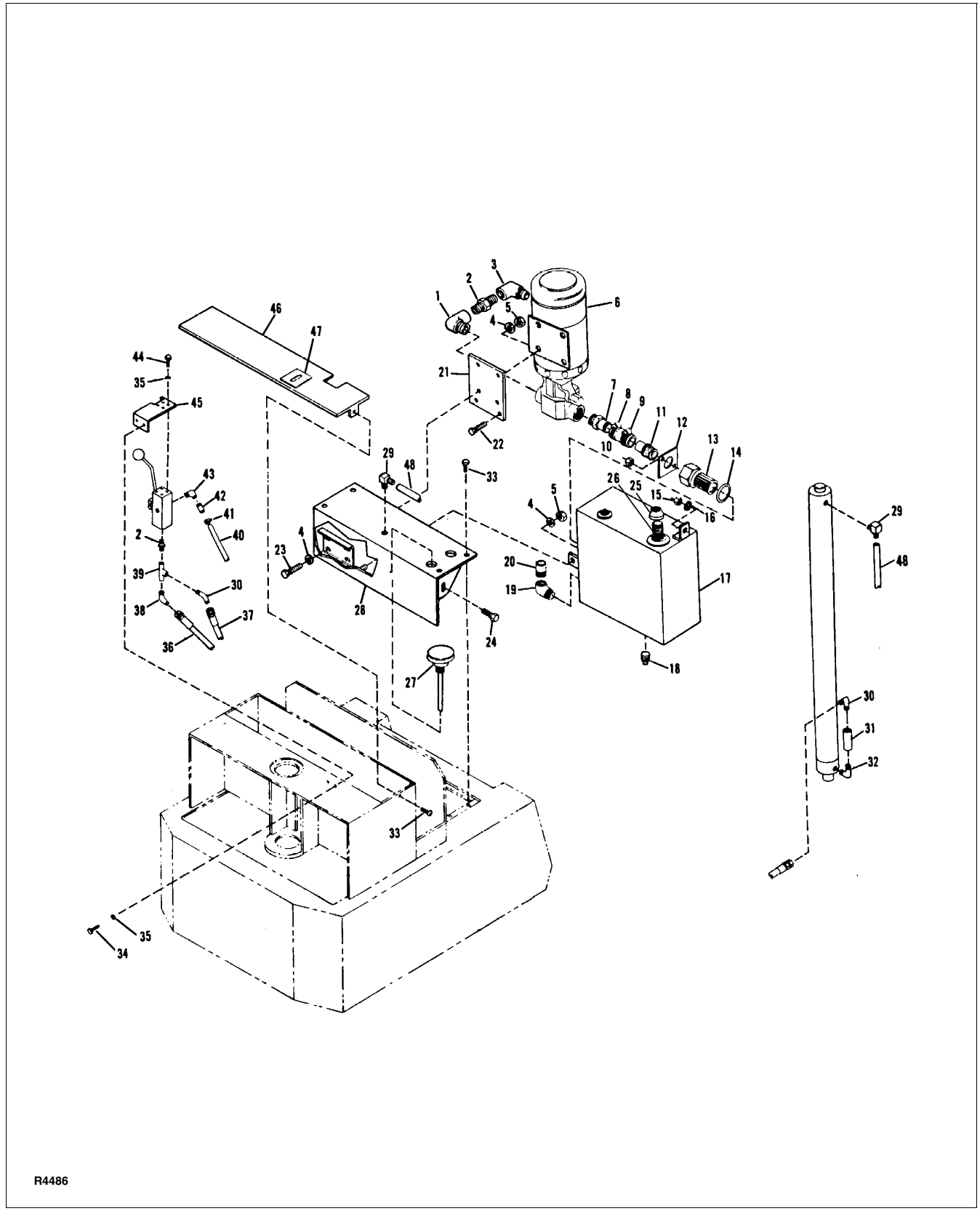


Figure 12-13 Hydraulic System (Non Telescopic and Telescopic)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	025128	ADAPTER, 90° ELBOW	1
2	026109	NIPPLE, HOSE, 3/8	2
3	025542	FEMALE, ELBOW 90°	1
4	077211	LOCK WASHER, SPLIT, 3/8	7
5	059429	NUT, HEX, 3/8-16	4
6	—	PUMP MOTOR (FIGURE 12-23, FIGURE 12-22 OR FIGURE 12-21)	1
7	025132	ADAPTER, HOSE, 3/4 X 3/4	1
8	056105	HOSE CLAMP, SCREW TYPE	2
9	318200	HOSE, 3/4" NEOPRRENE SUCTION	2"
10	059628 *	CENTER LOCK NUT, 5/16-18	2
11	800145	NIPPLE, MACHINED	1
12	400754 *	PLATE, HOLD DOWN	1
13	035108 *	SUMP FILTER	1
13	035114 **	SUMP FILTER	1
14	042130 *	O-RING, 1-1/2 ID X 1-7/8 OD	1
15	059421	NUT, HEX, 1/4-20	1
16	077209	WASHER, LOCK, SPLIT, 1/4	1
17	503390 *	HYDRAULIC RESERVOIR	1
17	505831 **	HYDRAULIC RESERVOIR	1
18	026302	PLUG, SQ. HD., MAGN. 3/8	1
19	026707	STREET ELBOW, 3/8 NPT	1
20	026128	NIPPLE, HOSE, 3/8	1
21	402537	PLATE, PUMP, MTG.	1
22	064605	HEX HEAD CAP SCREW	2
23	063602	HEX HEAD CAP SCREW, 3/8-16 X 5/8	4

INDEX NO.	PART NO.	PART NAME	NO. REQD.
24	063478	HEX HEAD CAP SCREW	1
25	026512	REDUCER, THREAD	1
26	026146	NIPPLE, 3/4-14 X 3	1
27	503518	DIPSTICK ASSEMBLY	1
28	503533	PANEL WELDMENT, HYDRAULIC	1
29	025501	ELBOW, 90°, 3/4 NPT X TUBE	2
30	025525	ELBOW, 90°, 3/8	2
31	047110	VALVE, FLOW REG, 3.5	1
32	025538	ELBOW, ADAPTER, 90°, 9/16 TO 1/4	1
33	065538	HEX SOCKET BUTTON HD CAP SCREW	7
34	063477	HEX HEAD CAP SCREW	2
35	077209	WASHER, LOCK, SPLIT, 1/4	6
36	504312-02	HOSE ASSY, HYDRAULIC, 3/8	1
37	504312-05	HOSE ASSY, HYDRAULIC, 3/8	1
38	025543	ELBOW, MALE, 90°	1
39	027107	3/8 HEAVY DUTY TEE	1
40	308900	HOSE, LP, RUBBER, 0.906 X 0.625	6 FT
41	056110	CLAMP, HOSE, SCREW TYPE	2
42	026128	NIPPLE, HOSE, 3/8	1
43	026707	STREET ELBOW, 3/8 NPT, 90°	
44	070476	SCREW, PH RD HD, 1/4-20 X 1/2	4
45	402538	BRACKET, VALVE, MTG	1
46	504814	WELDMENT, HYDRAULIC COVER	1
47	056478	DECAL, UP/DOWN	1
48	282500	TUBING, VINYL, 11/4" OD	6 FT

*** USED ON TRUCKS SERIAL NUMBER 333032 TO 356092**

**** USED ON TRUCKS SERIAL NUMBER 356093 AND HIGHER**

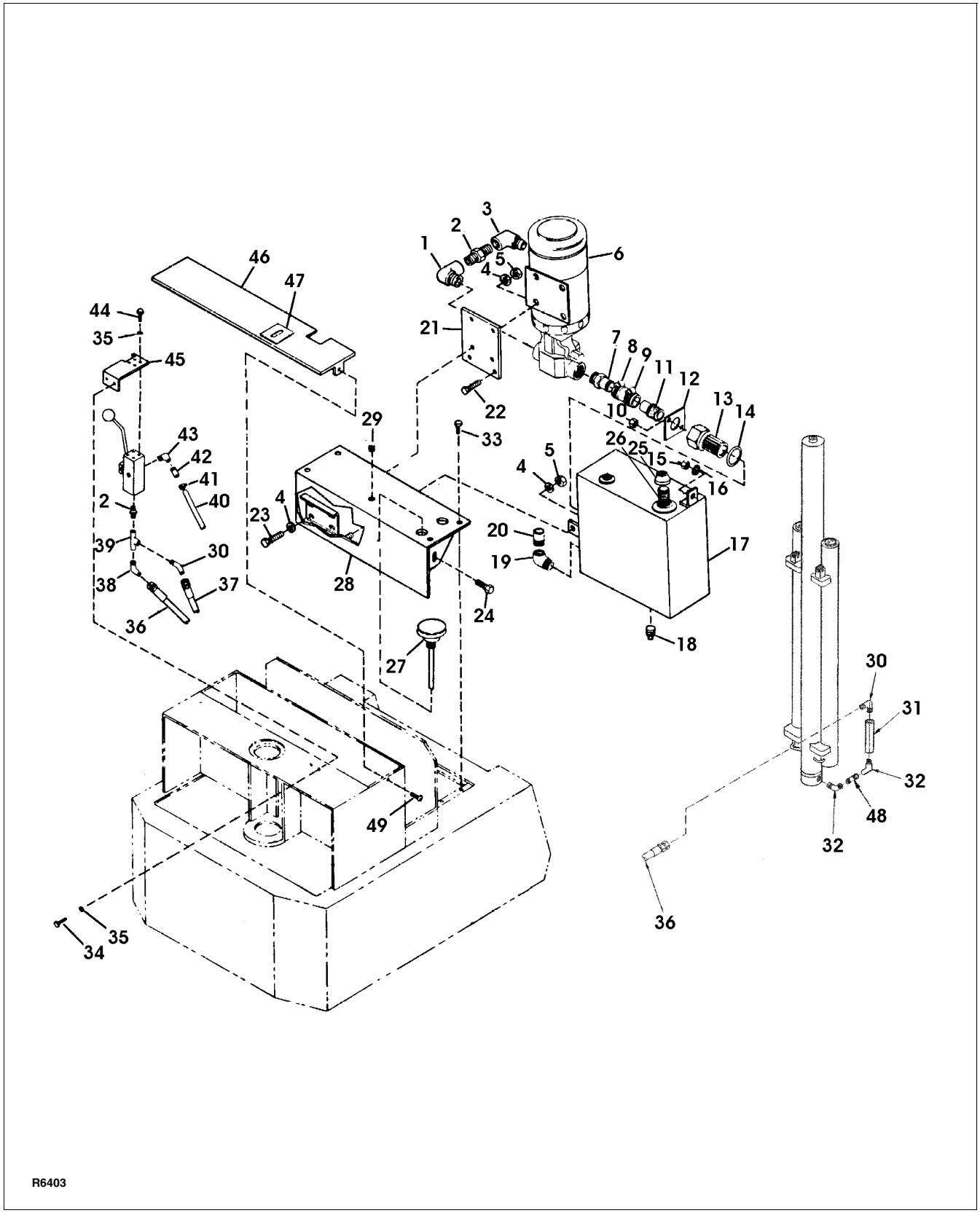


Figure 12-14 Hydraulic System (Full Free Lilt)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	025128	ADAPTER, 90° ELBOW	1
2	026109	NIPPLE, HOSE, 3/8	2
3	025542	FEMALE, ELBOW 90°	1
4	077211	LOCK WASHER, SPLIT, 3/8	7
5	059429	NUT, HEX, 3/8-16	4
6	—	PUMP MOTOR (FIGURE 12-23, FIGURE 12-22 OR FIGURE 12-21)	1
7	025132	ADAPTER, HOSE, 3/4 X 3/4	1
8	056105	HOSE CLAMP, SCREW TYPE	2
9	318200	HOSE, 3/4" NEOPRRENE SUCTION	2"
10	059628 *	CENTER LOCK NUT, 5/16-18	2
11	800145	NIPPLE, MACHINED	1
12	400754 *	PLATE, HOLD DOWN	1
13	035108 *	SUMP FILTER	1
13	035114 **	SUMP FILTER	1
14	042130 *	O-RING, 1-1/2 ID X 1-7/8 OD	1
15	059421	NUT, HEX, 1/4-20	1
16	077209	WASHER, LOCK, SPLIT, 1/4	1
17	503390 *	HYDRAULIC RESERVOIR	1
17	505831 **	HYDRAULIC RESERVOIR	1
18	026302	PLUG, SQ. HD., MAGN. 3/8	1
19	026707	STREET ELBOW, 3/8 NPT	1
20	026128	NIPPLE, HOSE, 3/8	1
21	402537	PLATE, PUMP, MTG.	1
22	064605	HEX HEAD CAP SCREW	2
23	063603	HEX HEAD CAP SCREW	4
24	063478	HEX HEAD CAP SCREW	1
25	026512	REDUCER, THREAD	1
26	026146	NIPPLE, 3/4-14 X 3	1
27	503518	DIPSTICK ASSEMBLY	1
28	503533	PANEL WELDMENT, HYDRAULIC	1
29	026303	PLUG	1
30	025525	ELBOW, 90°, 3/8	2
31	047110	VALVE, FLOW REG, 3.5	1
32	026711	ELBOW	2
33	065528	HEX SOCKET BUTTON HD CAP SCREW	5
34	063477	HEX HEAD CAP SCREW	2
35	077209	WASHER, LOCK, SPLIT, 1/4	6
36	504312-02	HOSE ASSY, HYDRAULIC, 3/8	1
37	504312-05	HOSE ASSY, HYDRAULIC, 3/8	1
38	025543	ELBOW, MALE, 90°	1
39	027107	3/8 HEAVY DUTY TEE	1
40	308900	HOSE, LP, RUBBER, 0.906 X 0.625	6 FT
41	056110	CLAMP, HOSE, SCREW TYPE	2
42	026128	NIPPLE, HOSE, 3/8	1
43	026707	STREET ELBOW, 3/8 NPT, 90°	
44	070476	SCREW, PH RD HD, 1/4-20 X 1/2	4
45	402538	BRACKET, VALVE, MTG	1
46	504814	WELDMENT, HYDRAULIC COVER	1
47	056478	DECAL, UP/DOWN	1
48	026116	NIPPLE	1
49	065536	SCREW, SOC BUT HD, 5/16-18 X 3/8	2

* **USED ON TRUCKS SERIAL NUMBER 333032 TO 356092**

** **USED ON TRUCKS SERIAL NUMBER 356093 AND HIGHER**

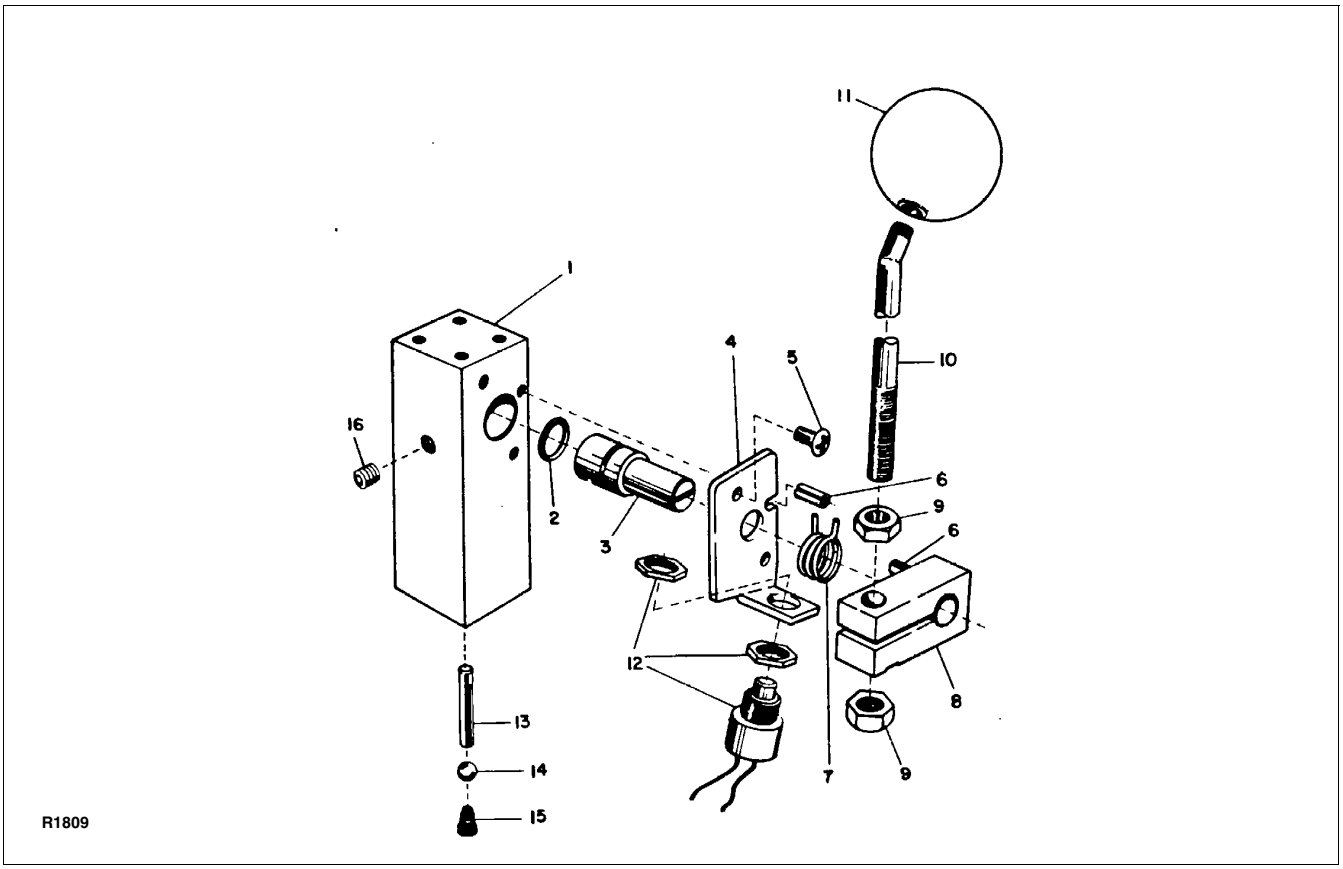


Figure 12-15 Lift Control Valve (Standard)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	504216-08	LIFT CONTROL VALVE ASSY	REF
1	240501	. VALVE BODY	1
2	042104	. O-RING	1
3	304611	. RELEASE CAM	1
4	052803	. SWITCH CAM	1
5	070475	. PHILLIPS ROUND HD SCREW, 1/4-20 X 3/8	2
6	060937	. ROLL PIN, 1/8 X 5/8	2
7	075015	. HANDLE RETURN SPRING	1
8	257401	. LIFT CONTROL VALVE CLAMP	1
9	059259	. JAM NUT, 3/8-24	2
10	057701	. HANDLE	1
11	057952	. KNOB	1
12	504815	. PUMP MOTOR SWITCH W/NUTS	1
13	060608 *	. PIN, 5/32 X 1-1/4	1
14	051404 *	. CHECK BALL	1
15	075052 *	. COMPRESSION SPRING	1
16	006303	. PLUG, 3/8	1

* **900132 BALL CHECK KIT, INCLUDES 13, 14, 15**

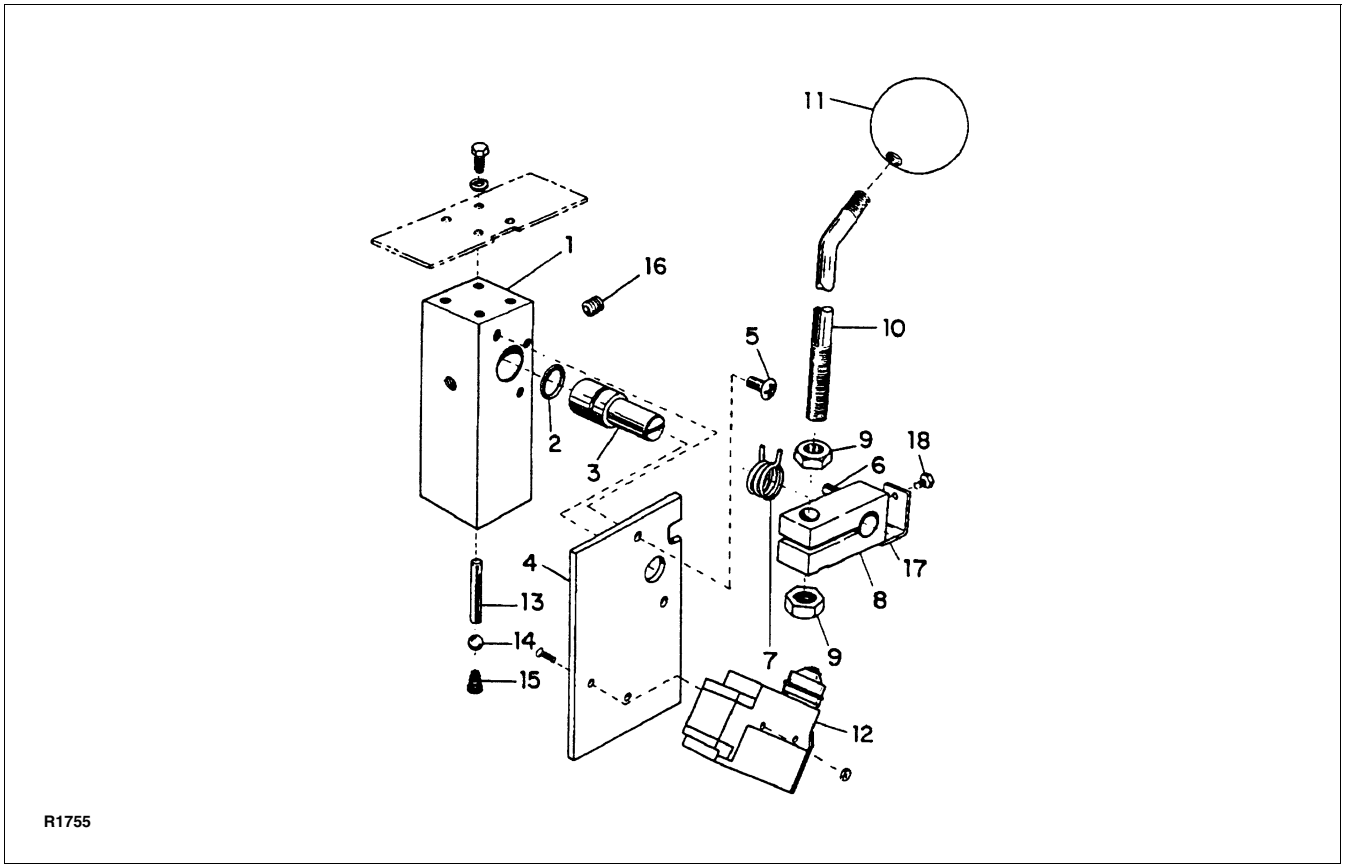


Figure 12-16 Lift Control Valve (Cold Conditioning)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	240501	VALVE BODY	1
2	042104	O-RING	1
3	304611	RELEASE CAM	1
4	400045	SWITCH BRACKET	1
5	070475	PHILLIPS ROUND HD SCREW, 1/4-20 X 3/8	2
6	060937	ROLL PIN, 1/8 X 5/8	2
7	075015	HANDLE RETURN SPRING	1
8	400097	LIFT CONTROL VALVE CLAMP	1
9	059259	JAM NUT, 3/8-24	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
10	057701	HANDLE	1
11	057952	KNOB	1
12	504365	PUMP MOTOR SWITCH W/NUTS	1
13	060608 *	PIN, 5/32 X 1-1/4	1
14	051404 *	CHECK BALL	1
15	075052 *	COMPRESSION SPRING	1
16	006303	PLUG, 3/8	1
17	400051	BRACKET	1
18	065476	SCREW, SOCKET HD, 1/4-20 X 1/2	1

*** 900132 BALL CHECK KIT, INCLUDES 13, 14, 15**

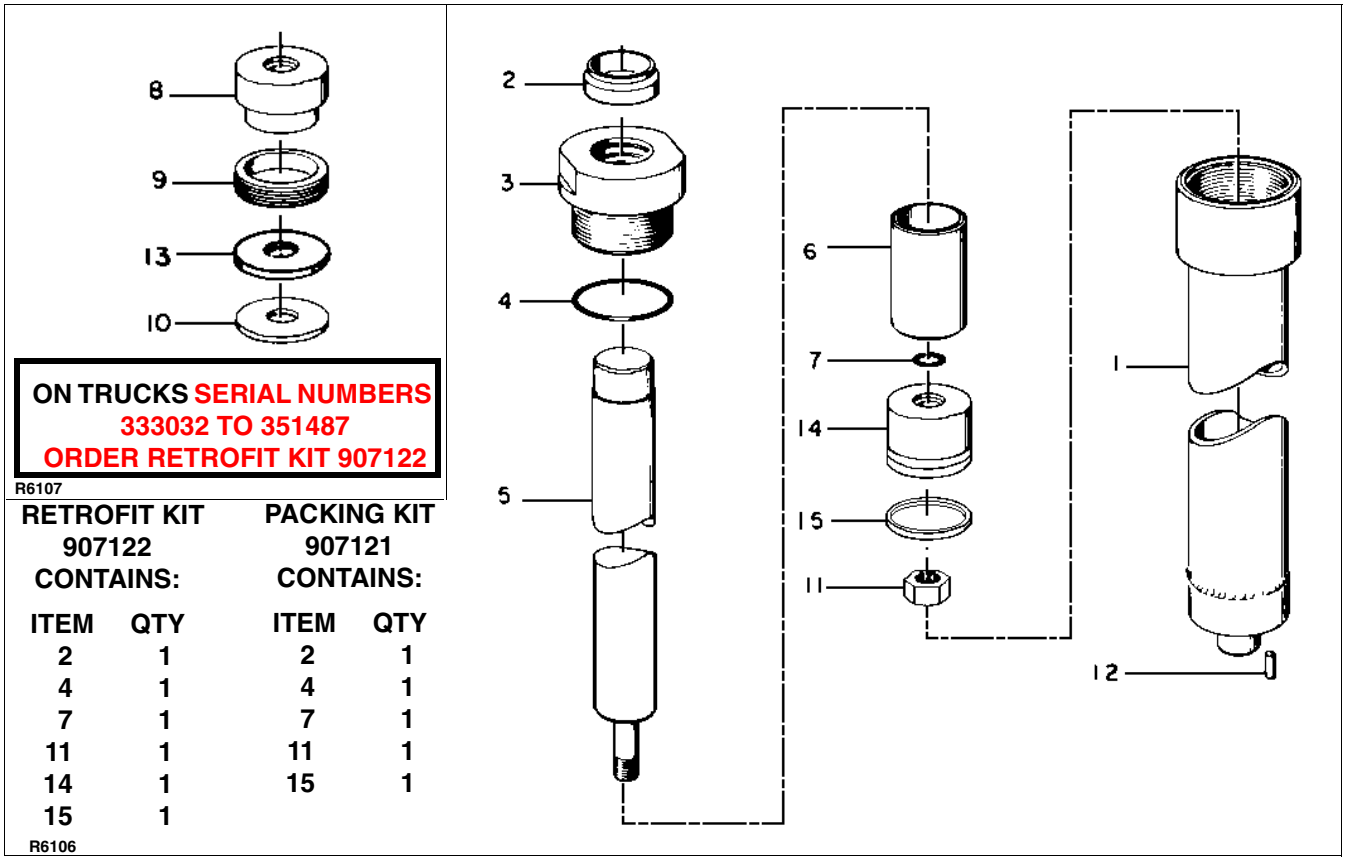


Figure 12-17. Lift Cylinder Assembly (Non Telescopic and Telescopic)

TRUCK MODELS		NONTELESCOPIC	TELESCOPIC			NO. REQD.
LIFTING HEIGHT (INCHES)		60	106	130	154	
INDEX NO.	PART NAME	PART NO.	PART NO.	PART NO.	PART NO.	
—	HYD. LIFT CYLINDER ASSY	503568-09	503568-05	503568-07	503568-11	1
1	. TUBE ASSY	—	—	—	—	1
2	. WIPER RING	049509 *	049509 *	049509 *	049509 *	1
3	. GLAND NUT	800024	800024	800024	800024	1
4	. TOP O-RING	042113 *	042113 *	042113 *	042113 *	1
5	. RAM ROD	—	—	—	—	1
6	. RAM STOP	300501	300509	300509	300509	1
7	. BOTTOM O-RING	042105 *	042105 *	042105 *	042105 *	1
8	. PISTON	— **	— **	— **	— **	1
9	. PACKING ASSY	— **	— **	— **	— **	1
10	. FLAT WASHER	077005 **	077005 **	077005 **	077005 **	1
11	. JAM NUT, 3/4-16	800293 *	800293 *	800293 *	800293 *	1
12	. ROLL PIN, 5/16 X 3/4	061023	061023	061023	061023	1
13	. FLAT WASHER	— **	— **	— **	— **	1
14	. PISTON	403864	403864	403864	403864	1
15 *	. PSP SEAL	042205-02	042205-02	042205-02	042205-02	1

* 900121 PACKING KIT INCLUDES 2, 4, 7, 11 AND 15.

** CYLINDERS EQUIPPED WITH PISTON, ITEM 8, ORDER RETROFIT KIT 907122.
907122 RETROFIT KIT INCLUDES ITEMS 2, 4, 7, 11, 14 AND 15.

NOTES

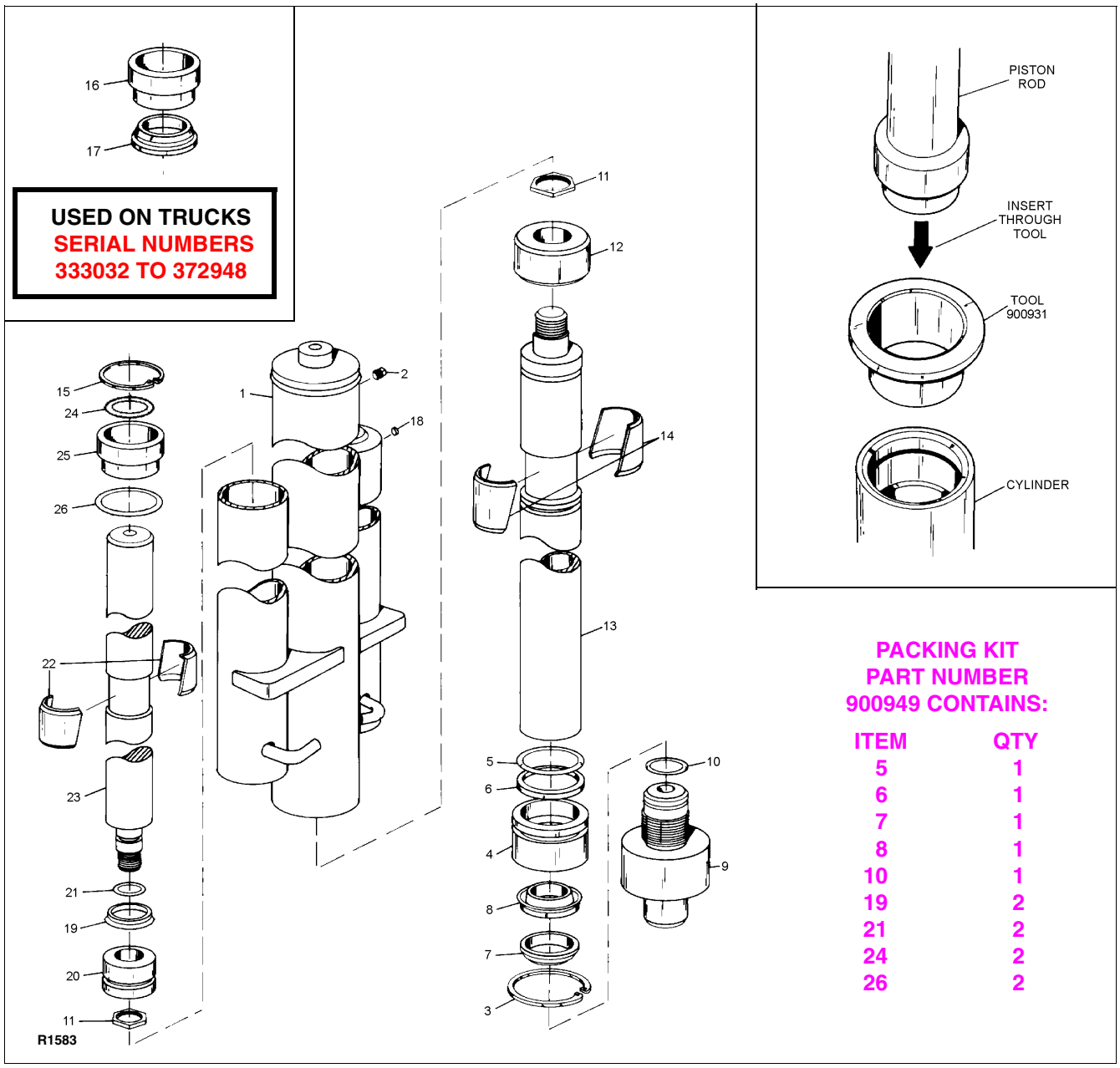


Figure 12-18 Lift Cylinders (Full Free Lift)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	503996-01	FFL CYLINDER ASSEMBLY 106 IN. LIFT HEIGHT	1
—	503996-02	FFL CYLINDER ASSEMBLY 103 IN. LIFT HEIGHT	1
1	503995-01	. FFL CYLINDER WELDMENT 106 IN. LIFT HEIGHT	1
1	503995-02	. FFL CYLINDER WELDMENT 103 IN. LIFT HEIGHT	1
2	026308	. SQUARE HD PLUG, 1/4 NPT	1
3	061825	. SNAP RING RETAINER	1
4	401645	. CYLINDER HEAD, 2.50 DIA.	1
5	042150 †	. "O" RING	1
6	042151 †	. BACK-UP RING	1
7	049517-02 †	. HYDRAULIC CYLINDER WIPER RING	1
8	043132 †	. "U" CUP ROD SEAL	1
9	401652	. CYLINDER BASE, 2.50 DIA	1
10	042149 †	. "O" RING	1
11	059128	. FLEXLOC LOCK NUT	3
12	401647	. PISTON, 2.5 DIA.	1
13	503992-01	. CYLINDER ROD, 106 LIFT HT	1
13	503992-02	. CYLINDER ROD, 130 LIFT HT	1
14	401641	. WEAR RING	1
15	061824	. SNAP RING RETAINER	2
16	401584*	. CYLINDER HEAD, 2.00 DIA.	2
17	049517-01 *†	. CYLINDER HD WIPER RING	2
18	029103	. BREATHER PLUG	2
19	043130 †	. "U" CUP SEAL	2
20	401384	. PISTON, 2.00 DIA.	2
21	042136 †	. "O" RING	2
22	401646	. WEAR RING	2
23	401642-01	. CYLINDER ROD, 106 LIFT HT	2
23	401642-02	. CYLINDER ROD, 103 LIFT HT	2
24	043136 **†	. SEAL	2
25	404174 **	. GLAND	2
26	043152 **†	. O-RING	2
—	055706	LOCTITE 222 ADHESIVE	A/R
—	900893	HYDRAULIC OIL (QUART)	AR
—	900855	HYDRAULIC OIL (GALLON)	AR

A/R - AS REQUIRED

† **INCLUDED IN PACKING KIT PART NUMBER 900949**

* **USED ON TRUCKS SERIAL NUMBER 341649 TO 372947**

** **USED ON TRUCKS SERIAL NUMBER 372948 AND HIGHER**

SPECIFY TRUCK MODEL NUMBER, LIFT HEIGHT, AND SERIAL NUMBER WHEN ORDERING LIFT CYLINDER PARTS.

1. SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS
   SERIAL NUMBER 333032 TO 335475
2. SEE SUPPLEMENT 229 FOR TRANSISTOR TRUCKS
   SERIAL NUMBER 335476 AND HIGHER

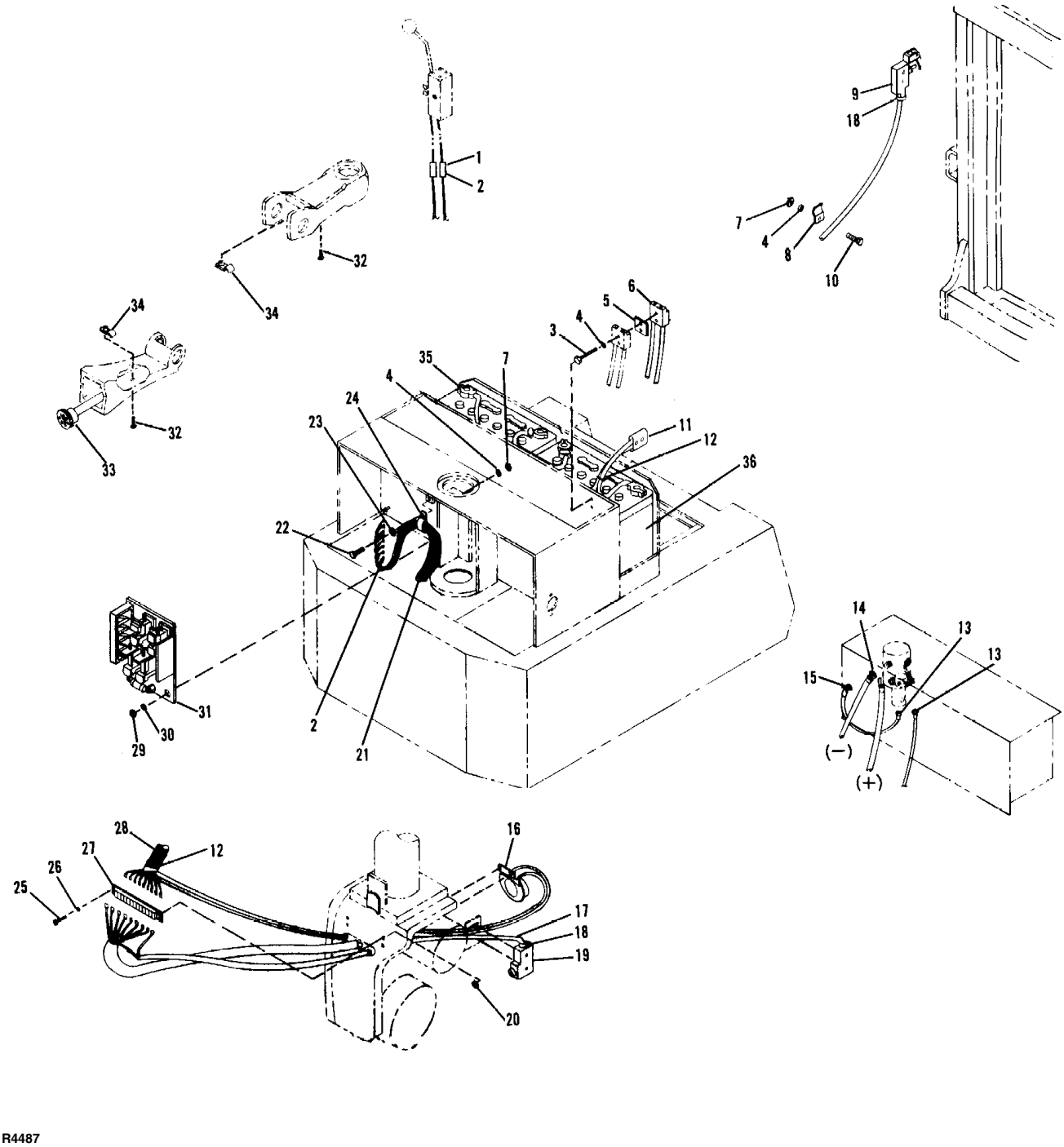


Figure 12-19 Electrical Installation

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	005422	CONNECTOR, INLINE INSULATED	2
2	021204	TERMINAL, SLIDE CLIP, 1/4	8
3	063486	HEX HEAD CAP SCREW	2
4	077209	WASHER, LOCK, SPLIT, 1/4	4
5	402264	SPACER	1
6	005401	GRAY ANDERSON CONNECTOR	1
7	059421	NUT, HEX, 1/4-20	2
8	800257	CLAMP, HALF	1
9	020703	SWITCH, LIMIT (STANDARD)	1
9	020689	SWITCH, LIMIT (COLD CONDITIONING)	1
10	063480	HEX HEAD CAP SCREW	1
11	505935	CONNECTOR ASSEMBLY, BATTERY	1
12	056113	WIRE HARNESS CLAMP, BLACK NYLON	9
13	021203	TERMINAL	2
14	023018	WIRE, BLACK, #16 STRANDED	AR
15	021207	TERMINAL, RING, 5/16	1
16	800083	HORN, 24 V, MOD.	1
17	023117	WIRE ASSEMBLY, DEADMAN	1
18	055405	STRAIN RELIEF (STANDARD)	2
18	019910	STRAIN RELIEF (COLD CONDITIONING)	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
19	020729	DEADMAN SWITCH (STANDARD)	1
19	020690	DEADMAN SWITCH (COLD CONDITIONING)	1
20	059410	NUT, HEX, 5-40, ZINC	4
21	023025	WIRE HARNESS ASSEMBLY	1
22	063478	HEX HEAD CAP SCREW	1
23	077030	WASHER	1
24	056135	CLAMP, LOOPP, CUSHIONED	1
25	068185	SCREW, SLOTTED, ROUND HEAD	4
26	077203	WAHSER, LOCK, SPLIT, #5	4
27	021724	BOARD, TERMINAL, SPADE, 12	1
28	076200	TUBING, ZIPPER	1
29	059429	NUT, HEX, 3/8-16	4
30	077211	WASHER, LOCK, SPLIT, 3/8	4
31	—	PANEL ASSEMBLY, CONTACTOR, 24V (FIGURE 12-29)	REF
32	069478	MACH. SCREW, PHILLIPS, FLAT HEAD	2
33	023083	WIRE HARNESS	1
34	504364	CLLINCH NUT & CLAMP ASSEMBLY	2
35	505936	CABLE ASSEMBLY, BATTERY	1
36	003149	BATTERY, 200AH DRY CHARGED	2

A/R - AS REQUIRED

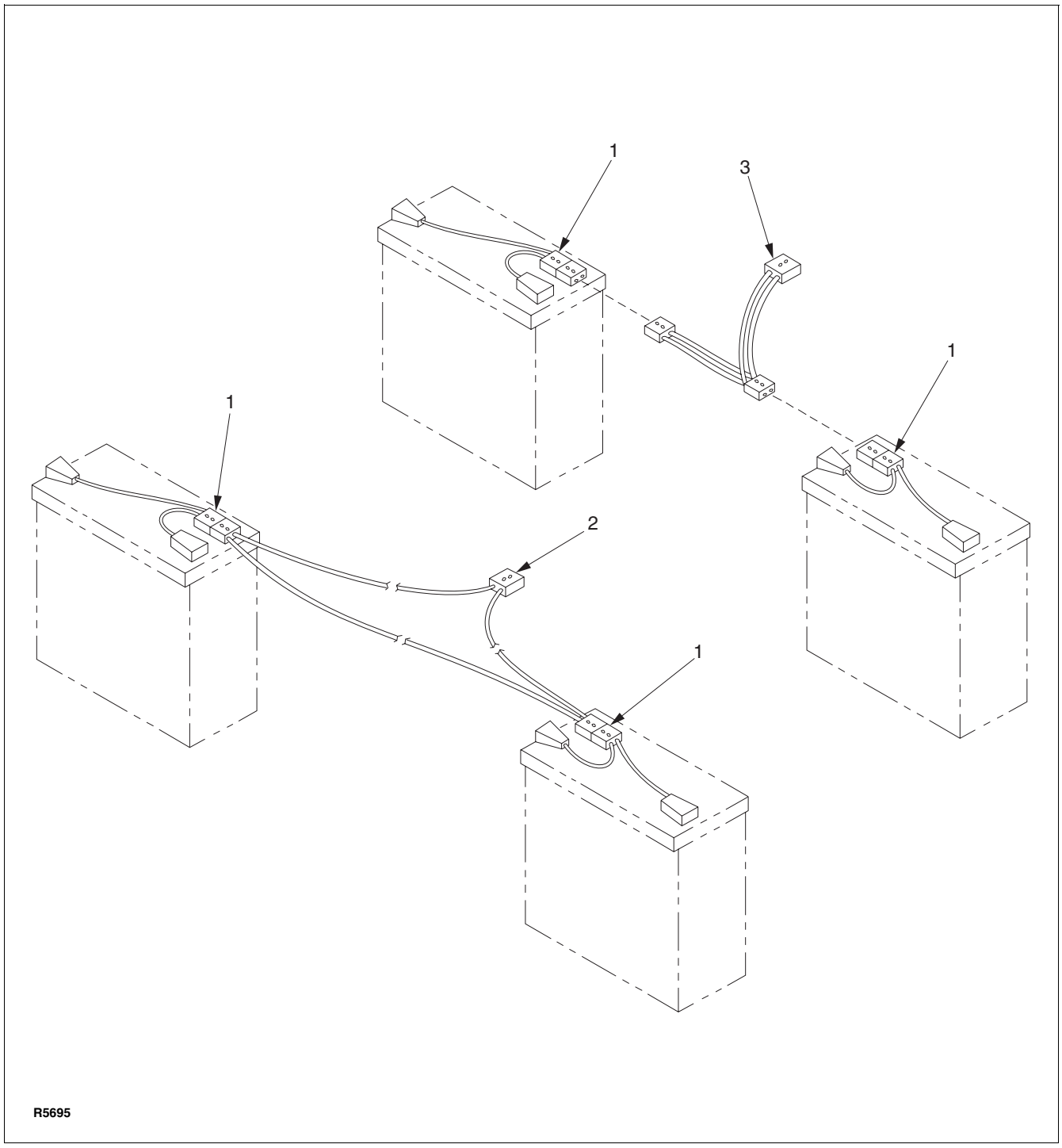


Figure 12-20 Optional Quick Disconnect Cable Installation

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	505623	QUICK DISCONNEDT CABLE KIT	1
1	505937	CONNECTOR ASSEMBLY	4
2	505938	CONNECTOR ASSEMBLY	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
3	506649	CORD ASSY, CHARGING, EXTERNAL	1

NOTES

USED ON TRUCKS SERIAL NUMBERS 333032 TO 342130

MOTOR TUNE-UP KIT PART NUMBER 901333 CONTAINS:

ITEM	QTY
7	2
19	4
20	1

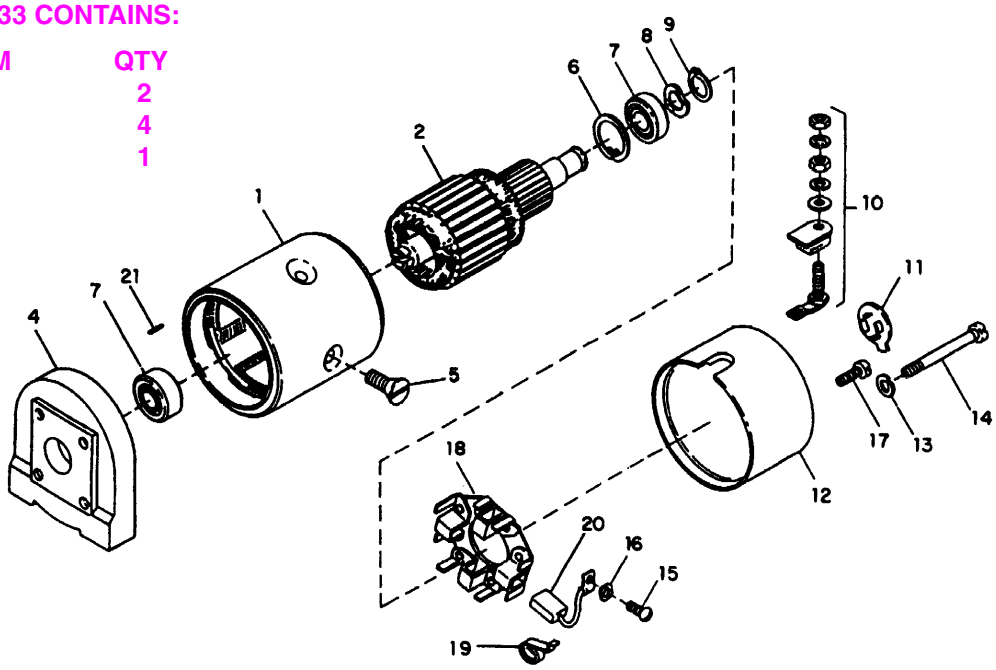


Figure 12-21 Hydraulic Pump And Motor 016911

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016911	PUMP AND MOTOR ASSY	1
—	900896-01	. PUMP	1
—	905046	. MOTOR	1
1	905047	. . 24 VOLT FIELD COIL	1
2	905048	. . ARMATURE	1
3	905049	. . BEARIING	1
4	900885	. . DRIVE END HOUSING	1
5	905041	. . FLAT HEAD SCREW	4
6	905052	. . RETAINER	1
7	905054	. . BEARING	2
8	905030	. . SPRING WASHER	1
9	905031	. . RETAINER	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
10	905032	. . STUD PACKAGE	1
11	905033	. . PROTECTIVE CAP	1
12	905034	. . COMMUTATOR END SHIELD	1
13	905037	. . RETAINER	1
14	905038	. . RILLISTER HEAD SCREW	2
15	905039	. . FILLISTER HEAD SCREW	1
16	905040	. . SPRING LOCK WASHER	4
17	905041	. . FILLISTER HEAD SCREW	4
18	905042	. . BRUSH HOLDER	1
19	905043	. . SPIRAL SPRING	4
20	905044	. . CARBON BRUSH SET	1
21	905045	. . PIN	1

USED ON TRUCKS SERIAL NUMBERS 342131 TO 361004 EXCEPT 360721, 360769, 360770, 360802, 360877, 360889, 360929, 360930, 360959, 360960, 360961 AND 361000

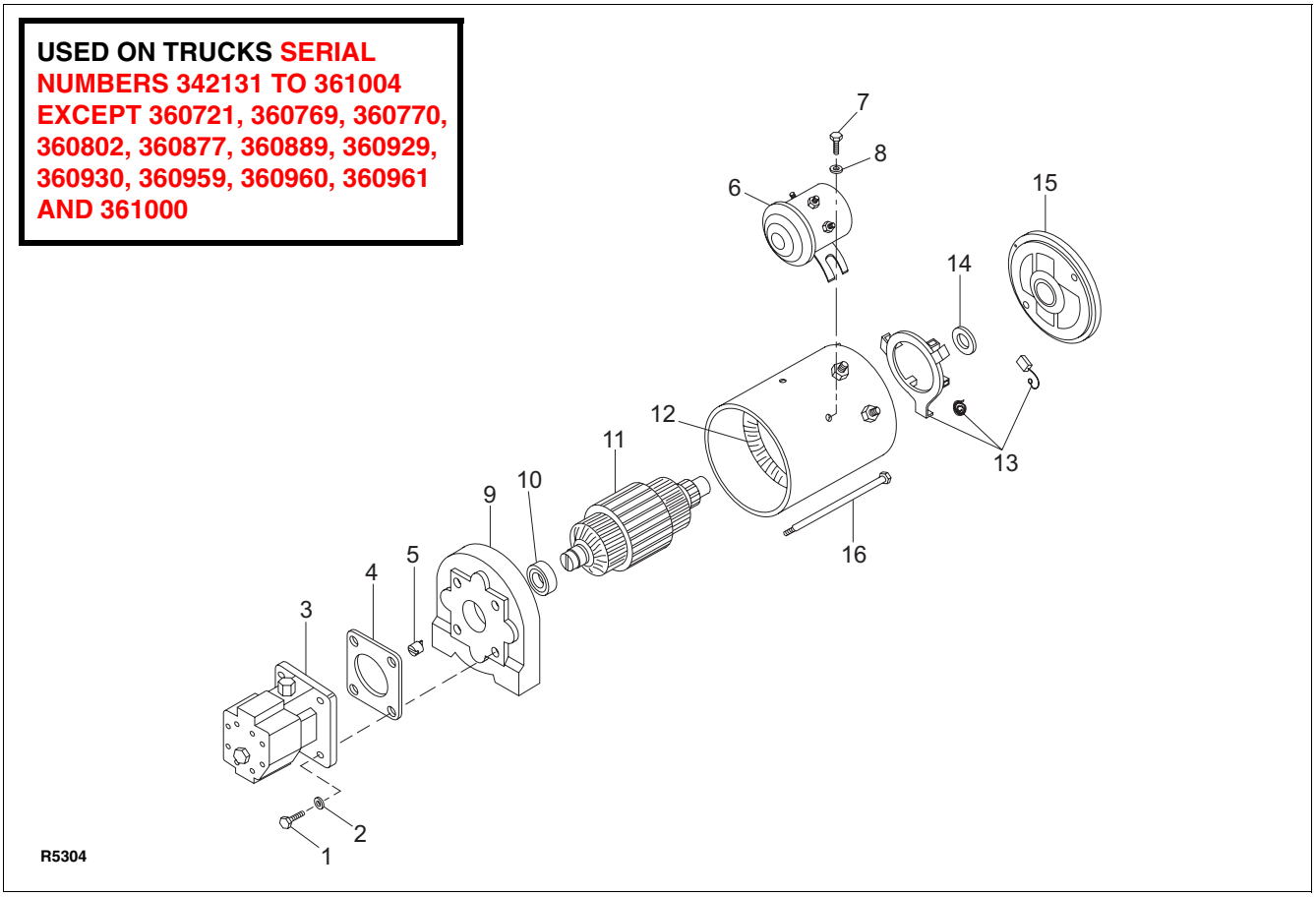
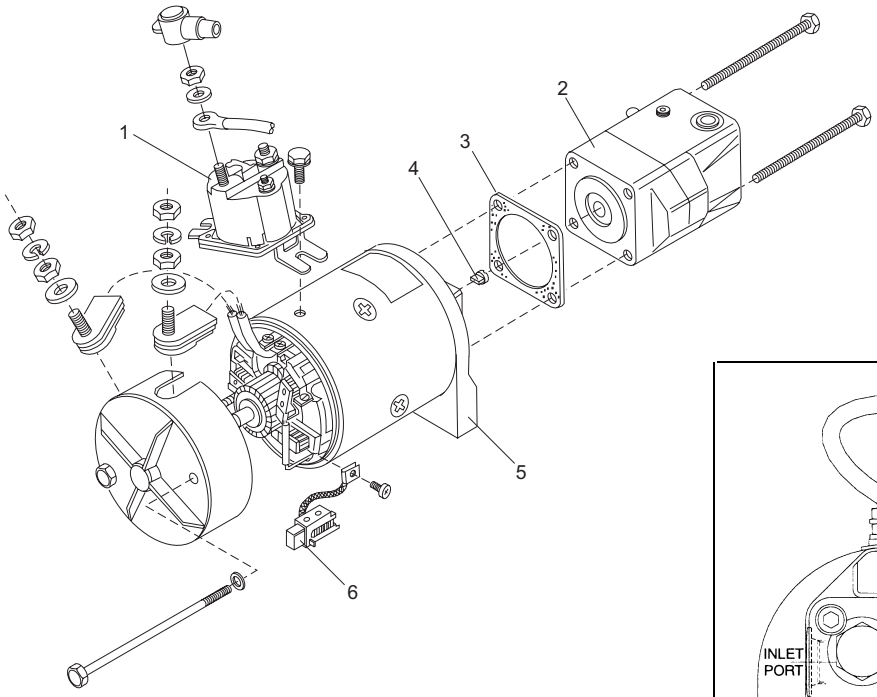


Figure 12-22 Hydraulic Pump And Motor 016935

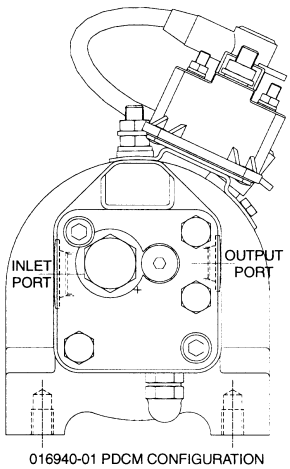
INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016935	PUMP AND MOTOR ASSY	1
1	—	. SCREW	4
2	—	. LOCK WASHER	4
3	900896-01	. PUMP	1
4	036107	. GASKET	1
5	056353	. COUPLING	1
6	020715	. SOLENOID	1
7	—	. SCREW	2
8	—	. LOCK WASHER	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	901547	. MOTOR ASSY	1
9	—	. . DRIVE END HOUSING	1
10	901602	. . BALL BEARING	1
11	—	. . ARMATURE	1
12	—	. . FIELD COIL	1
13	901600	. . BRUSH AND HOLDER KIT	1
14	—	. . THRUST WASHER PACKAGE	1
15	901601	. . COMMUTATOR END HEAD WITH NEEDLE BEARING	1
16	—	. . THRU BOLT	2

USED ON TRUCKS SERIAL NUMBERS 360721, 360769, 360770, 360802, 360877, 360889, 360929, 360930, 360959, 360960, 360961, 361000, 361005 AND HIGHER



R6025



016940-01 PDCM CONFIGURATION

R6037

Figure 12-23 Hydraulic Pump And Motor 016940

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016940-01	PUMP AND MOTOR ASSY	1
1	906003	. SOLENOID	1
2	906004	. PUMP, COMPLETE	1
3	906005	. GASKET	1
4	906006	. COUPLING	1
5	906007	. MOTOR ASSY	1
6	906008	. . BRUSH AND HOLDER KIT	1

USED ON TRUCKS SERIAL NUMBER 333032 TO 333679, AND 358074, 358089, 358113, 358132, 358148, 358149, 358157, 358158, 358159, 358160, 358351, 358360,358361, 358362, 358364, 358365, 358392, 358393, 358413, 358428, 358433, 358444, 358445, 358446, 358892

MOTOR TUNE-UP KIT PART NUMBER 901373 CONTAINS:

ITEM	QTY
3	1
6	1
11	1
121	

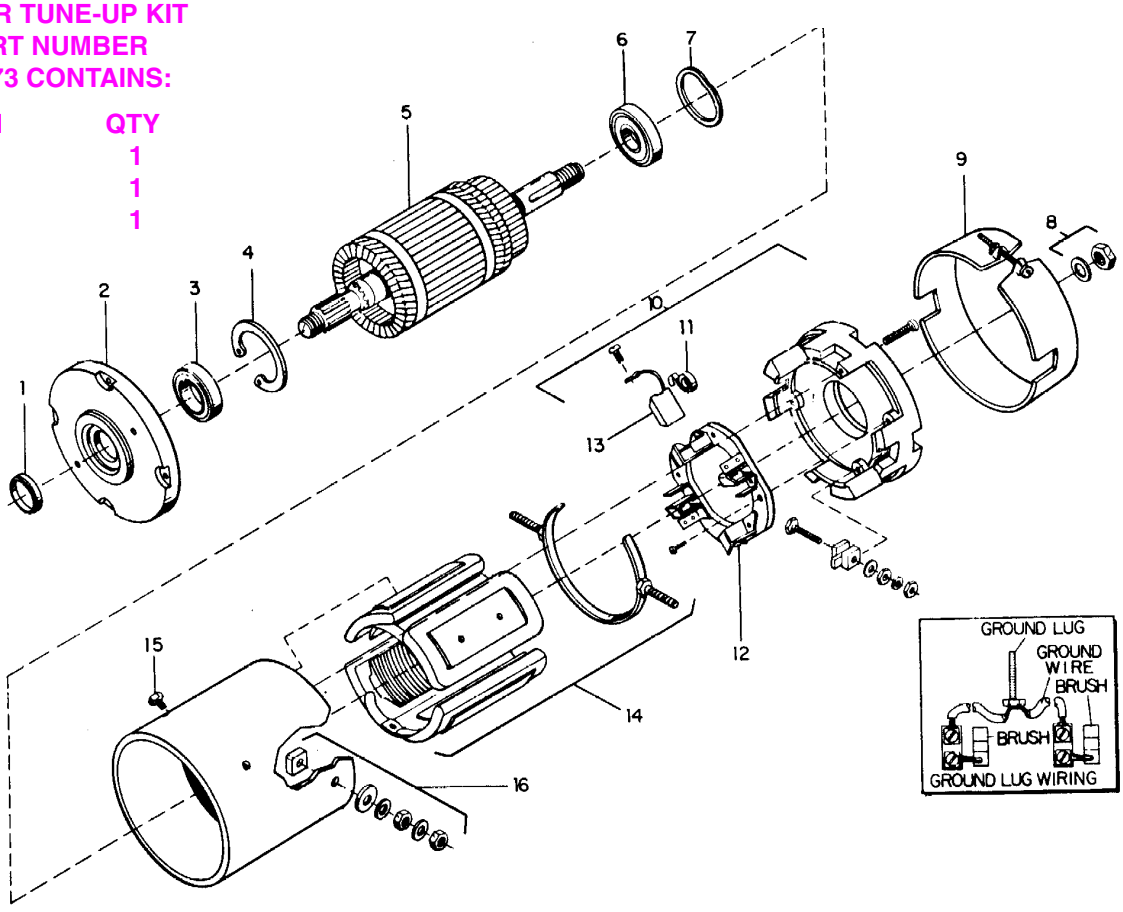


Figure 12-24 Drive Motor 016040

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016040	DRIVE MOTOR	1
1	900778	. DRIVE END SHAFT SEAL	1
2	901119	. DRIVE END HEAD ASSEMBLY	1
3	901055	. SEALED BALL BEARING	1
4	—	. RETAINER	1
5	901111	. ARMATURE	1
6	901113	. SEALED BALL BEARING	1
7	901158	. COMMUTATOR END BEARING SPRING WASHER	1
8	901120	ARMATURE NUT AND WASHER PACKAGE	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
9	901112	. COVER BAND	1
10	901114	. COMMUTATOR END HEAD ASSEMBLY	1
11	901118	. BRUSH SPRING SET	1
12	901116	. BRUSH PLATE ASSEMBLY	1
13	901117	. BRUSH SET	1
14	901115	. FIELD COIL PACKAGE	1
15	901056	. POLE SHOE SCREW PACKAGE	1
16	901121	. TERMINAL STUD & LEAD PACKAGE	1

USED ON TRUCKS SERIAL NUMBERS 333680 TO 345054

MOTOR TUNE-UP KIT PART NUMBER 901373 CONTAINS:

ITEM	QTY
4	1
7	1
11	1
12	1

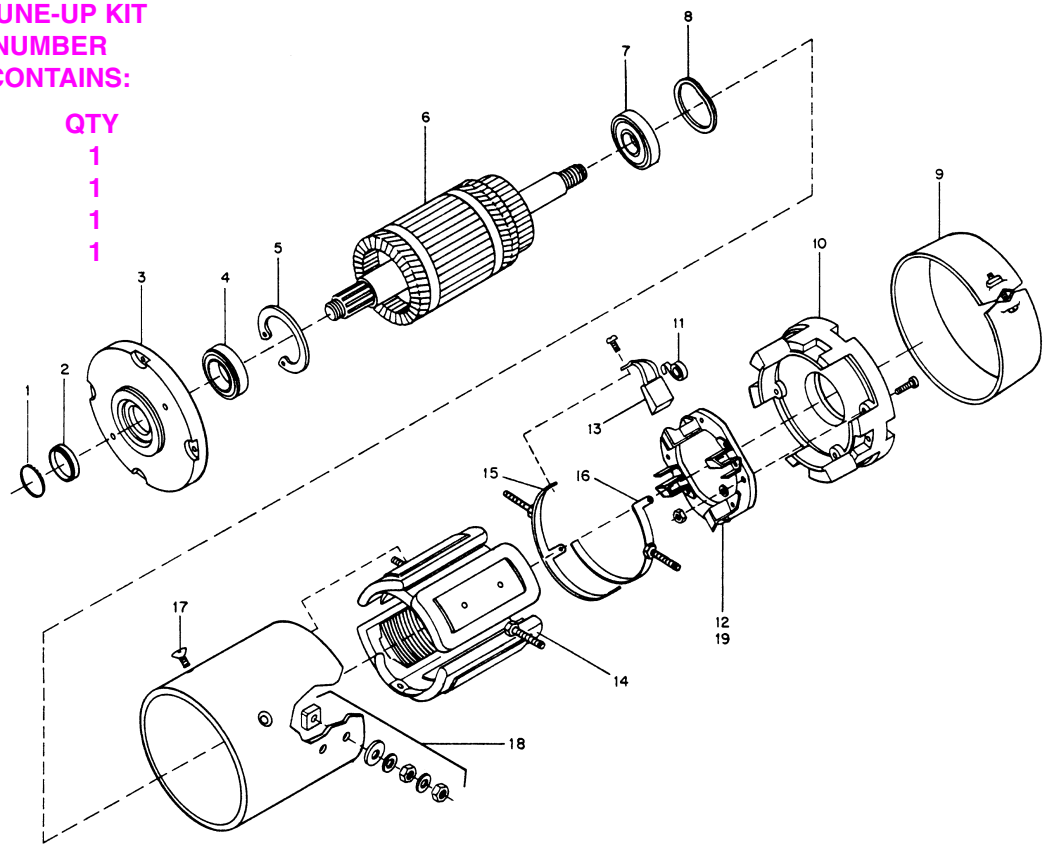


Figure 12-25 Drive Motor 016045

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016045	DRIVE MOTOR	1
1	901238	. SPACER, DRIVE END	1
2	901239	. SEAL, SHAFT, DRIVE END	1
3	901240	. HEAD ASSEMBLY, DRIVE END	1
4	901241	. . BEARING, BALL, SEALED	1
5	901242	. . RETAINER, BEARING	1
6	901259	. ARMATURE	1
7	901244	. BEARING, BALL, SEALED COMMUTATOR END	1
8	901245	. WASHER, SPRING, COMMUTATOR END BEARING	1
9	901246	. BAND, COVER	1
10	901247	. HEAD ASSEMBLY, COMMUTATOR END	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
11	900136	. SPRING, BRUSH	1
12	901248	. BRUSH HOLDER	1
13	900787	. BRUSH	1
14	901254	. FIELD COIL SET	1
15	901250	. CONNECTOR AND STUD ASSEMBLY A2	1
16	901251	. CONNECTOR AND STUD ASSEMBLY A1	8
17	901253	. POLE SHOE, SCREW, FL HD, 5/16 X 7/8	2
18	901252	. TERMINAL KIT (HARDWARE INCLUDED)	2
19	901257	. SPACER, BRUSH HOLDER	4

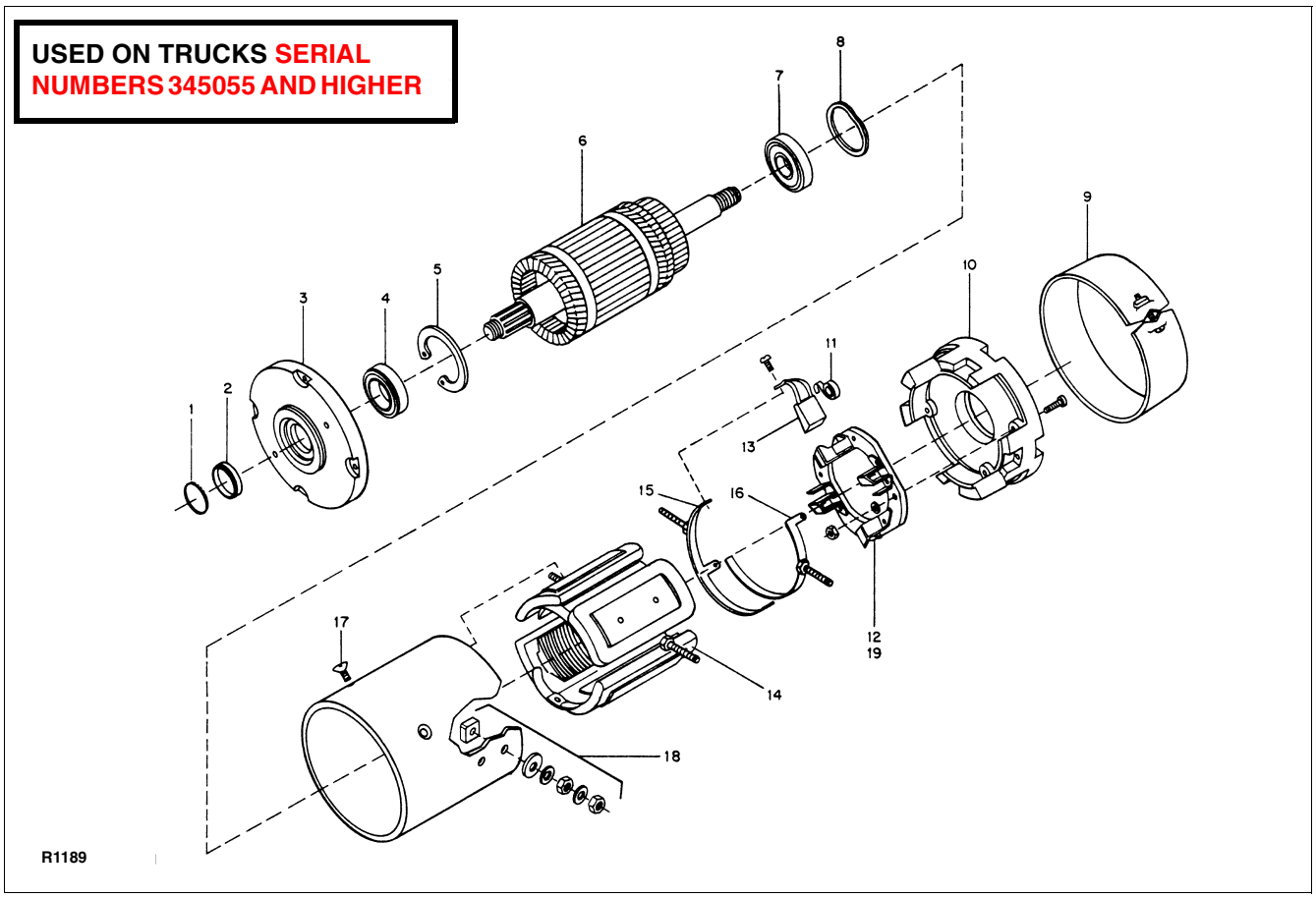


Figure 12-26 Drive Motor 016050

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016050	DRIVE MOTOR	1
1	901238	. SPACER, DRIVE END	1
2	901239	. SEAL, SHAFT, DRIVE END	1
3	901240	. HEAD ASSEMBLY, DRIVE END	1
4	901241	. . BEARING, BALL, SEALED	1
5	901242	. . RETAINER, BEARING	1
6	901593	. ARMATURE	1
7	901244	. BEARING, BALL, SEALED COMMUTATOR END	1
8	901245	. WASHER, SPRING, COMMUTATOR END BEARING	1
9	901246	. BAND, COVER	1
10	901247	. HEAD ASSEMBLY, COMMUTATOR END	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
11	900136	. SPRING, BRUSH	1
12	901594	. BRUSH HOLDER	1
13	901595	. BRUSH	1
14	901596	. FIELD COIL SET	1
15	901250	. CONNECTOR AND STUD ASSEMBLY A2	1
16	901251	. CONNECTOR AND STUD ASSEMBLY A1	8
17	901253	. POLE SHOE, SCREW, FL HD, 5/16 X 7/8	2
18	901252	. TERMINAL KIT (HARDWARE INCLUDED)	2
19	901257	. SPACER, BRUSH HOLDER	4

1. SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 335475
2. SEE SUPPLEMENT 229 FOR TRANSISTOR TRUCKS SERIAL NUMBER 335476 AND HIGHER

USED ON TRUCKS SERIAL NUMBERS 333032 TO 356895

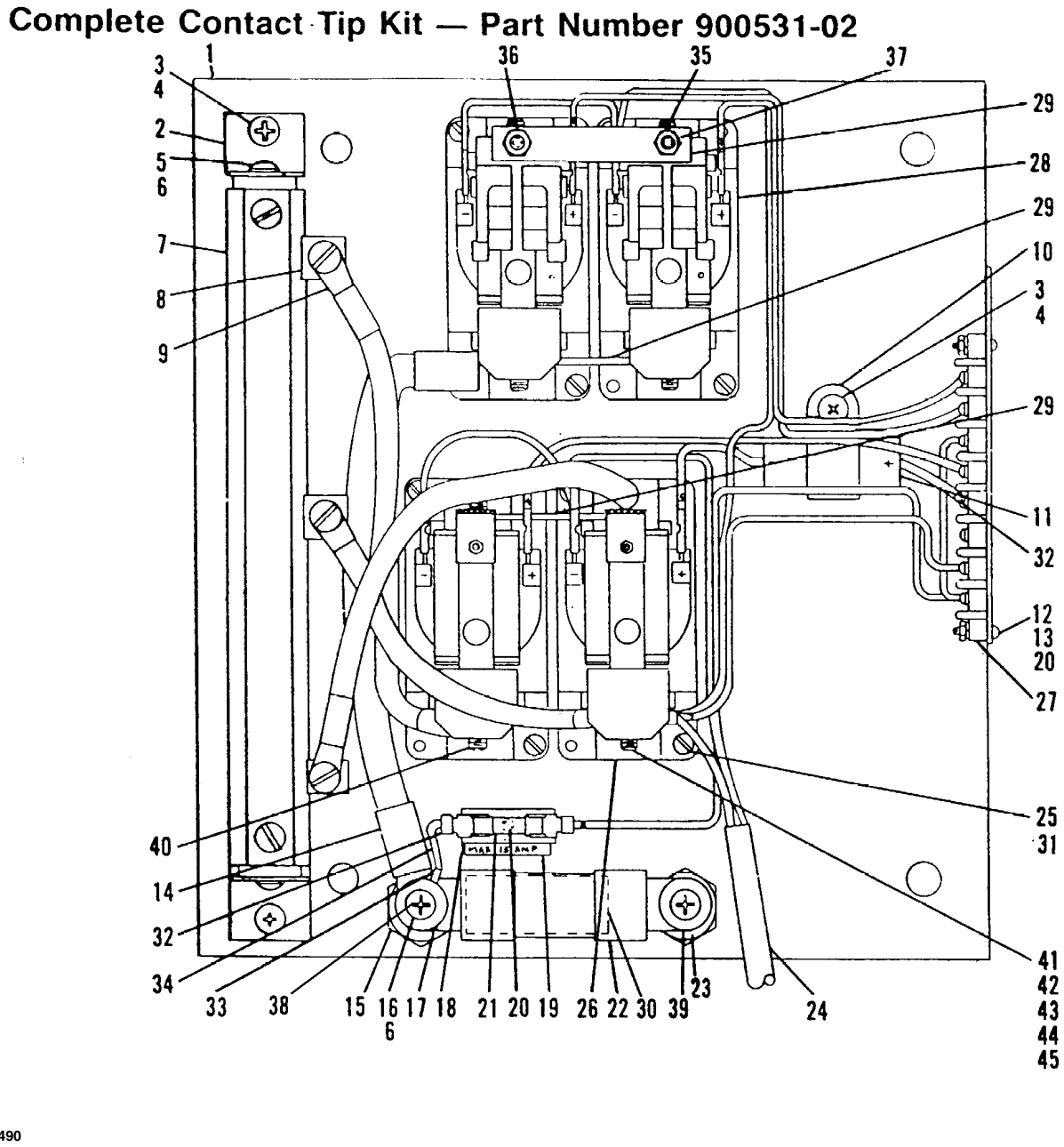


Figure 12-27 Control Panel Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	504795	CONTACTOR PANEL ASSEMBLY, 24V	1
1	504638	. PANEL	2
2	250716	. BRACKET	2
3	071376	. SCREW, 10-32 X 1/2	3
4	077208	. LOCK WASHER, #12	3
5	070475	. SCREW, 1/4-20 X 3/8	4
6	077209	. LOCK WASHER, 1/4	9
7	—	. RESISTOR, 24V (FIGURE 12-28)	1
8	021221	. TERMINAL	3
9	503774	. CABLE ASSEMBLY	3
10	056121	. CLAMP	1
11	021712-01	. TIME DELAY, 1 SECOND	1
12	077203	. LOCK WASHER, #5	3
13	059410	. NUT, HEX, 5-40	3
14	504639	. CABLE ASSEMBLY	1
15	010614	. STANDOFF	2
16	070489	. SCREW	2
17	077105	. WASHER	4
18	008904	. FUSEHOLDER	1
19	056504	. DECAL	1
20	068179	. SCREW, 5-40	3
21	008910	. FUSE, 15 AMP	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
22	008906	. FUSE, 300 AMP	1
23	070488	. SCREW	2
24	023149	. WIRE HARNESS	1
25	070491	. SCREW	8
26	—	. CONTACTOR (FIGURE 12-30)	REF
27	021226	. TERMINAL, BLOCK	1
28	—	. CONTACTOR (FIGURE 12-31)	REF
29	401181	. BUS BAR	3
30	056507	. FUSE DECAL	1
31	077205	. LOCKWASHER, #8	8
32	021204	. TERMINAL	6
33	021206	. TERMINAL, RING	1
34	023018	. WIRE, #16	AR
35	503965-37	CABLE ASSEMBLY - A2	1
36	503965-36	CABLE ASSEMBLY - A1	1
37	503965-42	CABLE ASSEMBLY - F2	1
38	503965-47	CABLE TO SOLENOID POSITIVE	1
39	504277-15	CABLE TO BATTERY POSITIVE	1
40	503965-38	CABLE ASSEMBLY - F1	1
41	503965-72	CABLE TO SOLENOID NEGATIVE	2
42	504277-03	CABLE TO BATTERY NEGATIVE	1
43	070490	SCREW, BRASS, 1/4-20 X 3/4	1
44	070490	SCREW, BRASS, 1/4-20 X 3/4	1
45	059421	NUT, HEX, 1/4-20	1

A/R - AS REQUIRED

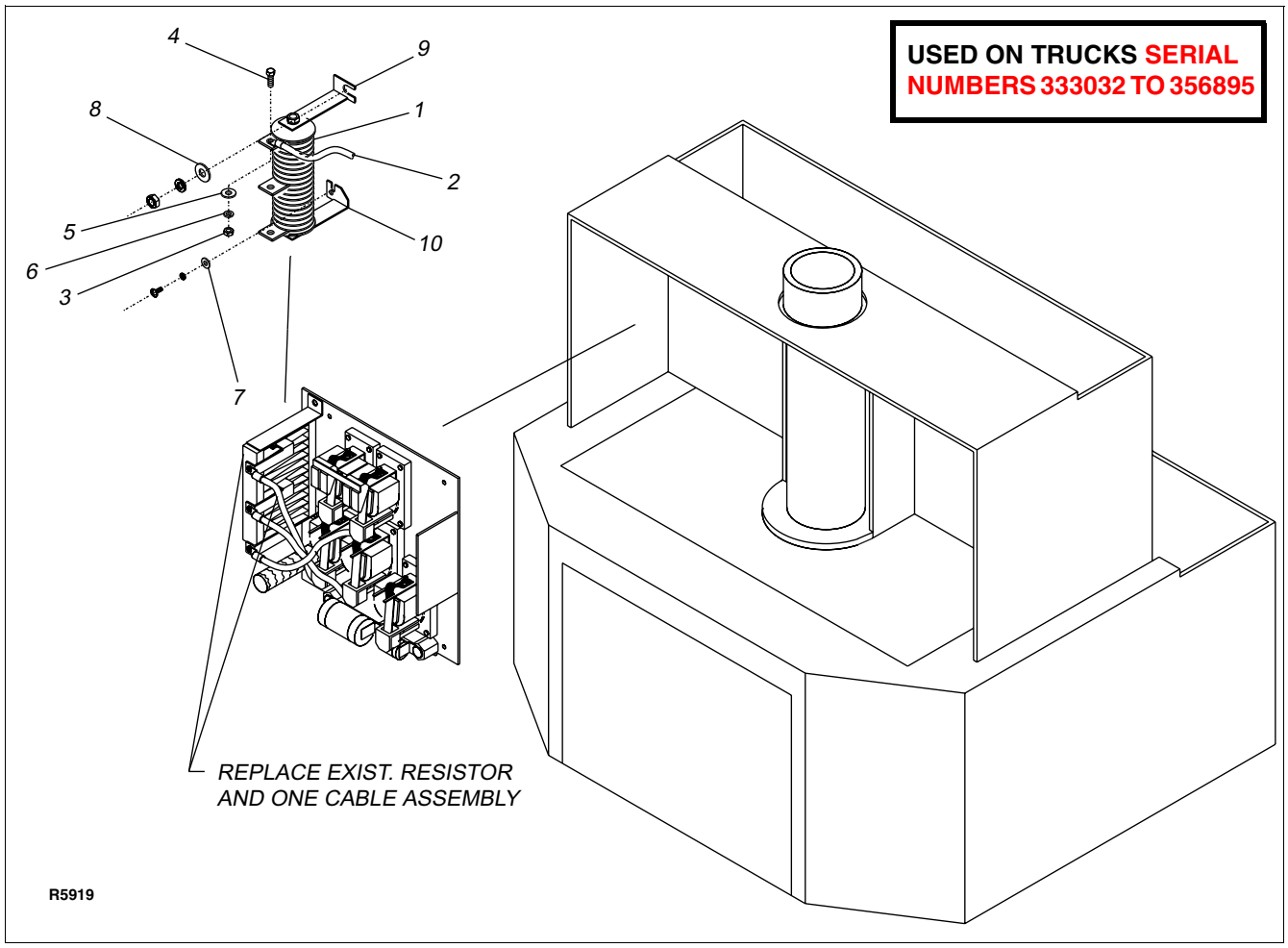


Figure 12-28 Speed Resistor Retrofit

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	903303	RETROFIT, 24 VOLT	
1	018920	. RESISTOR, 24 VOLT	1
2	505858	. CABLE ASSEMBLY	1
3	059421	. NUT	3
4	063478	. SCREW	3
5	077031	. WASHER, FLAT	3

INDEX NO.	PART NO.	PART NAME	NO. REQD.
6	077209	. WASHER, LOCK	3
7	077030	. WASHER, FLAT	1
8	077056	. WASHER, FLAT	1
9	21427	. UPPER FOOT	1
10	21428	. LOWER FOOT	1

NOTES

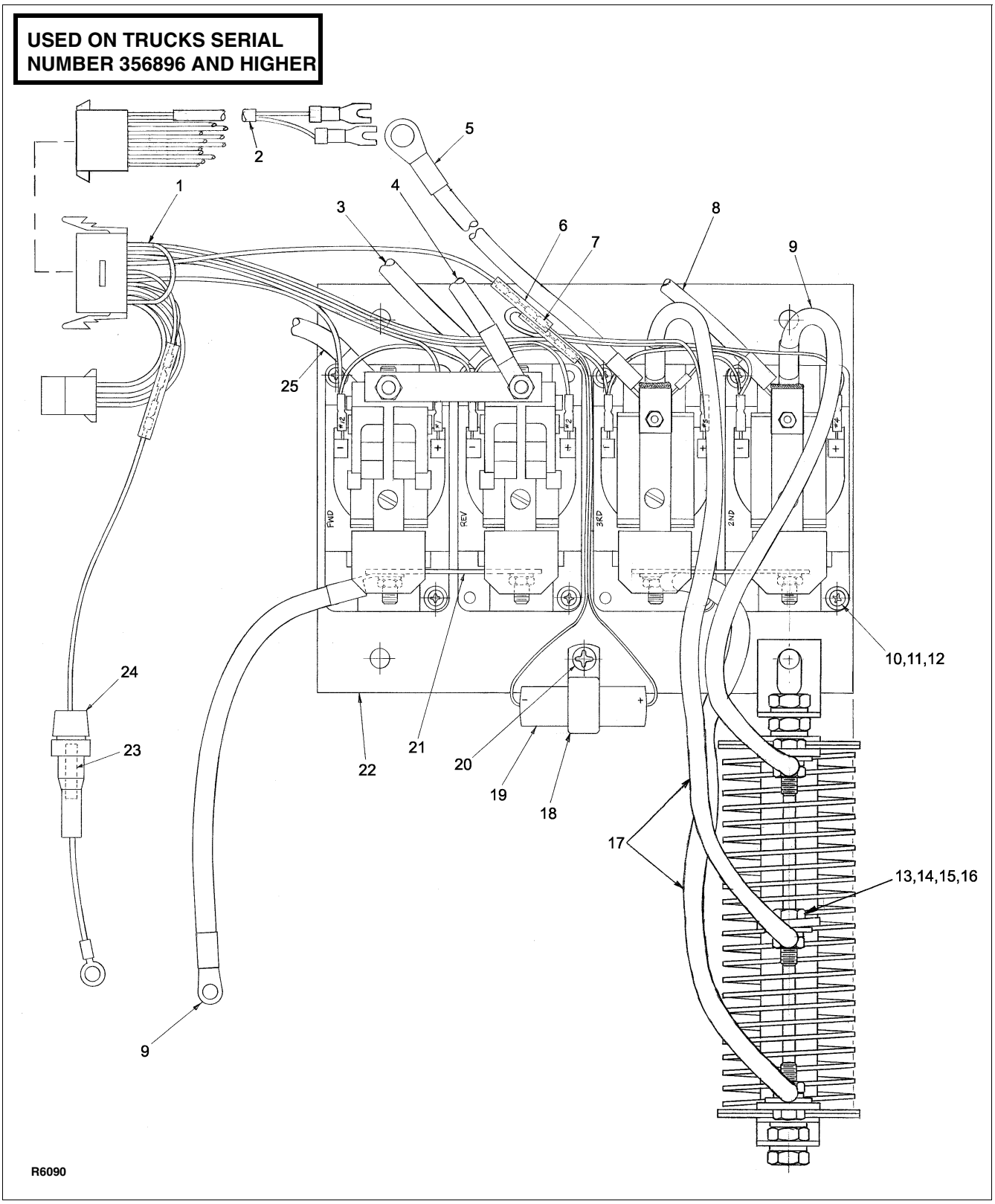


Figure 12-29 Contactor Panel Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	023221	HARNESS ASSY	1
2	023219	CABLE ASSY, DEADMAN	1
3	505181-08	CABLE ASSY	1
4	505181-55	CABLE ASSY	1
5	505181-59	CABLE ASSY	5
6	005422	CONNECTOR, INLINE, INSUL	3
7	021718	TERMINAL, SLIP ON, 1/4 INSUL	2
8	505181-56	CABLE ASSY	1
9	505181-17	CABLE ASSY	2
10	070491	SCREW	8
11	077205	LOCK WASHER, #8	8
12	077032	WASHER, 3/16 X 1/2 X 13 GA	8
13	059421	NUT	3

INDEX NO.	PART NO.	PART NAME	NO. REQD.
14	063487	SCREW, HEX HD SOC, 1/4-20 X 3/4	3
15	077031	WASHER, FLAT	3
16	077209	WASHER, LOCK	3
17	505181-19	CABLE ASSY	2
18	056121	C;AMP	1
19	021712-01	TIME DELAY, 1 SECOND	1
20	071379	SCREW, PHILIPS, TRUSS HEAD	1
21	401181	BUS BAR	3
22	403386	PANEL, RESISTOR	1
23	008910	FUSE, 15 AMP	1
24	505117	HOLDER ASSY, FUSE	1
25	505181-57	CABLE ASSY	1

1. SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 335475
2. SEE SUPPLEMENT 229 FOR TRANSISTOR TRUCKS SERIAL NUMBER 335476 AND HIGHER

CONTACTOR TIP KIT PART NUMBER 901531-08 CONTAINS:

ITEM	QTY
3	1
5	1
8	1
12	1

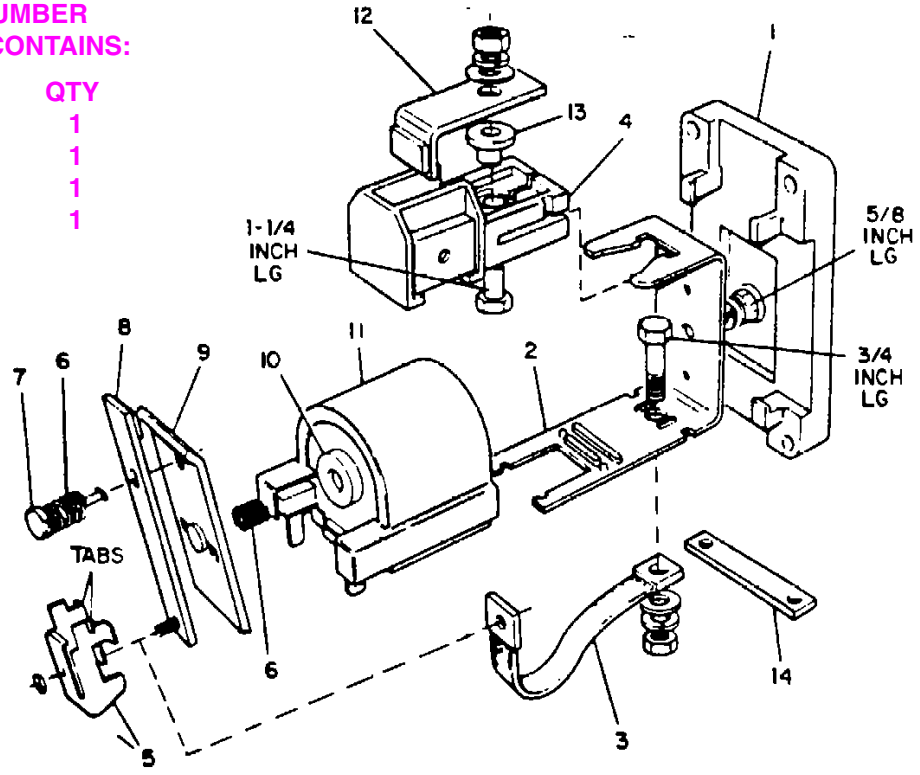


Figure 12-30 Contactor (2nd and 3rd)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	005659	CONTACTOR SINGLE POLE 100 AMP	2
1	905010	. BASE MOLDING	1
2	905024	. MAGNET FRAME	1
3	905013 *	. BRAIS ASSEMBLY	1
4	905025	. FRONT MOLDING WITH BLOWOUT	1
5	905015 *	. ARMATURE PLATE RETAINER	2
6	905016	. COMPRESSION SPRING	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
7	905017	. SPRING STUD	1
8	905018 *	. MOVING CONTACT ASSEMBLY	1
9	905019	. ARMATURE PLATE	1
10	905020	. POLE PIECE	1
11	905028	. COIL ASSEMBLY, 24 VOLTS	1
12	905022 *	. FRONT CONTACT	1
13	905023	. SPACER	1
14	401181	. BUSBAR (NOT PART OF CONTACTOR)	1

NOTE: FOR A COMPLETE SET OF CONTACTOR TIPS FOR ALL CONTACTORS ORDER PART NUMBER 900531-02.

* **FOR SECOND AND THIRD SPEED CONTACTOR TIP KIT ORDER PART NUMBER 900531-08. ONE KIT REPAIRS ONE CONTACTOR.**

1. SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333032 TO 335475
2. SEE SUPPLEMENT 229 FOR TRANSISTOR TRUCKS SERIAL NUMBER 335476 AND HIGHER

CONTACTOR TIP KIT PART NUMBER 901531-09 CONTAINS:

ITEM	QTY
3	1
5	1
8	1
12	1
16	1

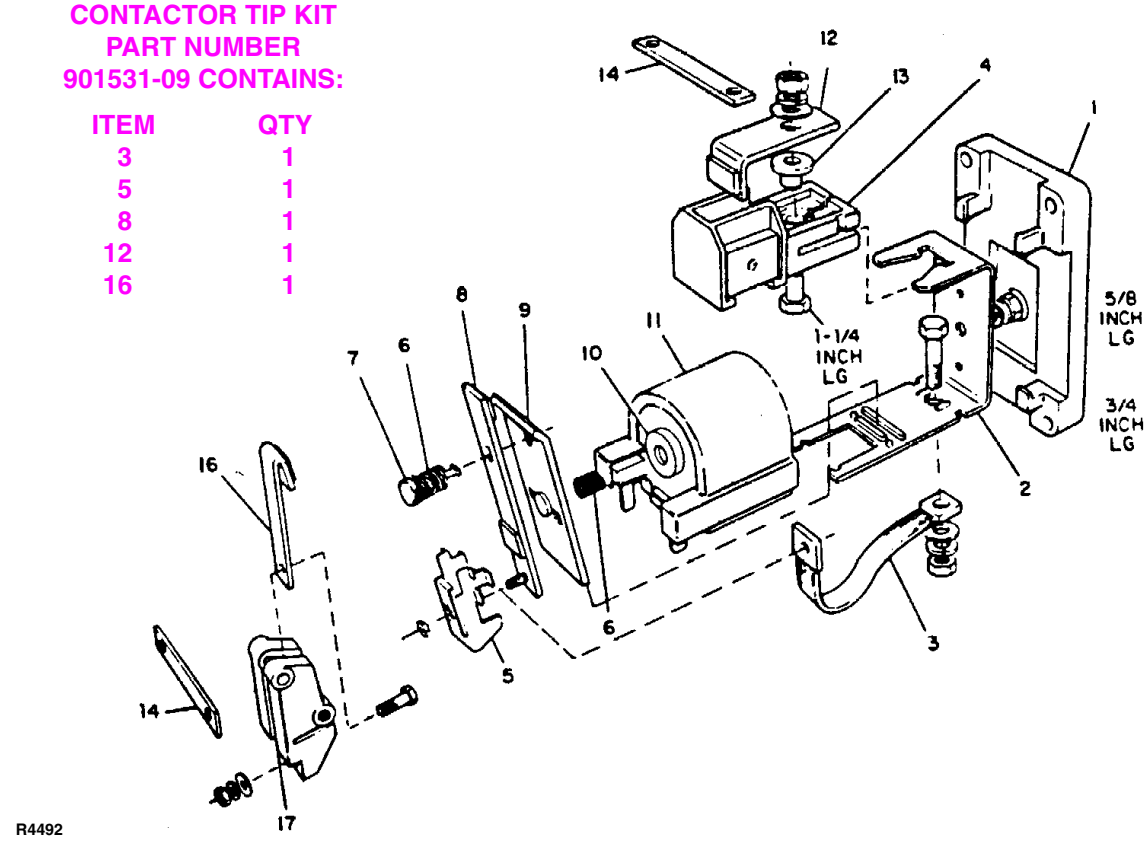


Figure 12-31 Contactor (Forward or Reverse)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	005657	CONTACTOR DOUBLE POLE 100 AMP	2
1	905010	. BASE MOLDING	1
2	905024	. MAGNET FRAME	1
3	905013 *	. BRAIS ASSEMBLY	1
4	905025	. FRONT MOLDING WITH BLOWOUT	1
5	905015 *	. ARMATURE PLATE RETAINER	2
6	905016	. COMPRESSION SPRING	1
7	905017	. SPRING STUD	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	905029 *	. MOVING CONTACT ASSEMBLY	1
9	905019	. ARMATURE PLATE	1
10	905020	. POLE PIECE	1
11	905028	. COIL ASSEMBLY, 24 VOLTS	1
12	905022 *	. FRONT CONTACT	1
13	905023	. SPACER	1
14	401181	. BUSBAR (NOT PART OF CONTACTOR)	1
16	905026 *	. BACK CONTACT	1
17	905027	. REAR MOLDING	1

NOTE: FOR A COMPLETE SET OF CONTACTOR TIPS FOR ALL CONTACTORS ORDER PART NUMBER 900531-02.

* **FOR FORWARD/REVERSE CONTACTOR TIP KIT ORDER PART NUMBER 900531-09. ONE KIT REPAIRS ONE CONTACTOR.**

USED ON TRUCKS SERIAL NUMBERS 333032 TO 344490

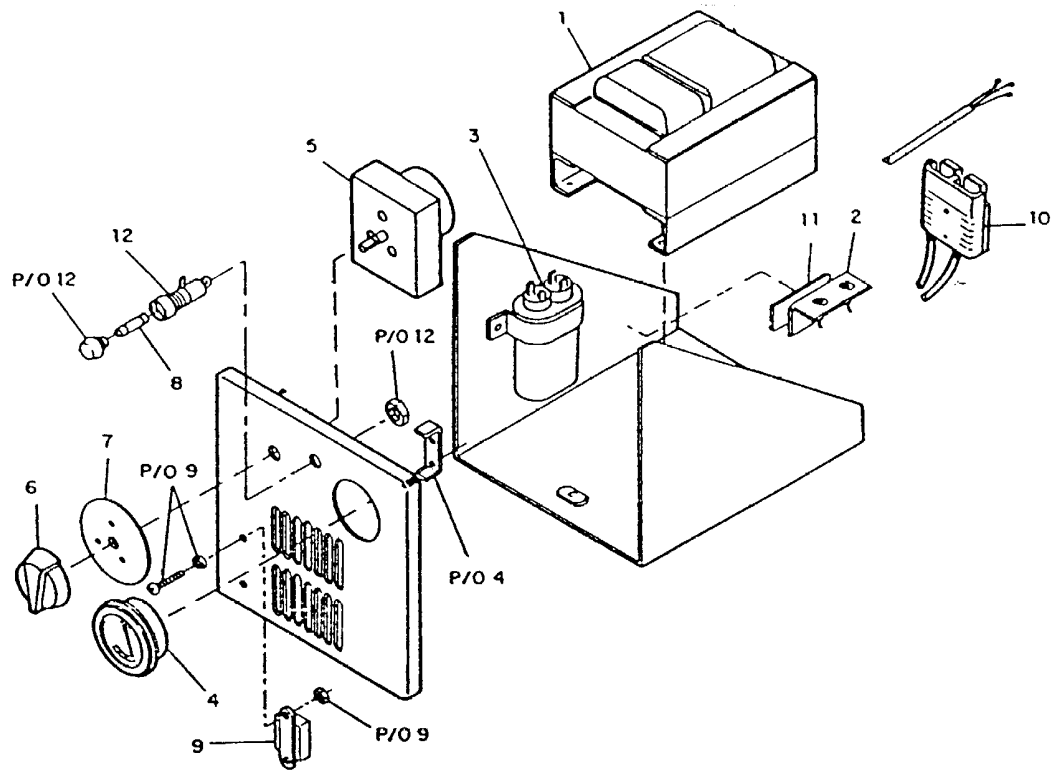


Figure 12-32 Standard Timer Battery Charger 004967-01 and 004967-02

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	004967-01	BATTERY CHARGER, 120V, 60HZ	REF
1	901023	. TRANSFORMER, 60 HZ	1
2	901027	. DIODE/HEAT SINK ASSEMBLY	1
3	900385	. CAPACITOR	1
4	900462	. AMMETER	1
5	900375	. TIMER, 60HZ	1
6	900376	. TIMER KNOB	1
7	900475	. TIMER DIAL PLATE	1
8	901030	. AC FUSE AGC15	1
9	901022	. CIRCUIT BREAKER	1
10	005401	. BATTERY CONNECTOR	1
11	900463	. INSULATOR, HEATSINK	1
12	907058	. FUSE HOLDER	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	004967-02	BATTERY CHARGER, 240V, 50HZ	REF
1	901024	. TRANSFORMER, 50HZ	1
2	901027	. DIODE/HEAT SINK ASSEMBLY	1
3	900385	. CAPACITOR	1
4	900462	. AMMETER	1
5	900755	. TIMER, 50HZ	1
6	900376	. TIMER KNOB	1
7	900475	. TIMER DIAL PLATE	1
8	901030	. AC FUSE AGC15	1
9	901022	. CIRCUIT BREAKER	1
10	005401	. BATTERY CONNECTOR	1
11	900463	. INSULATOR, HEATSINK	1
12	907058	. FUSE HOLDER	1

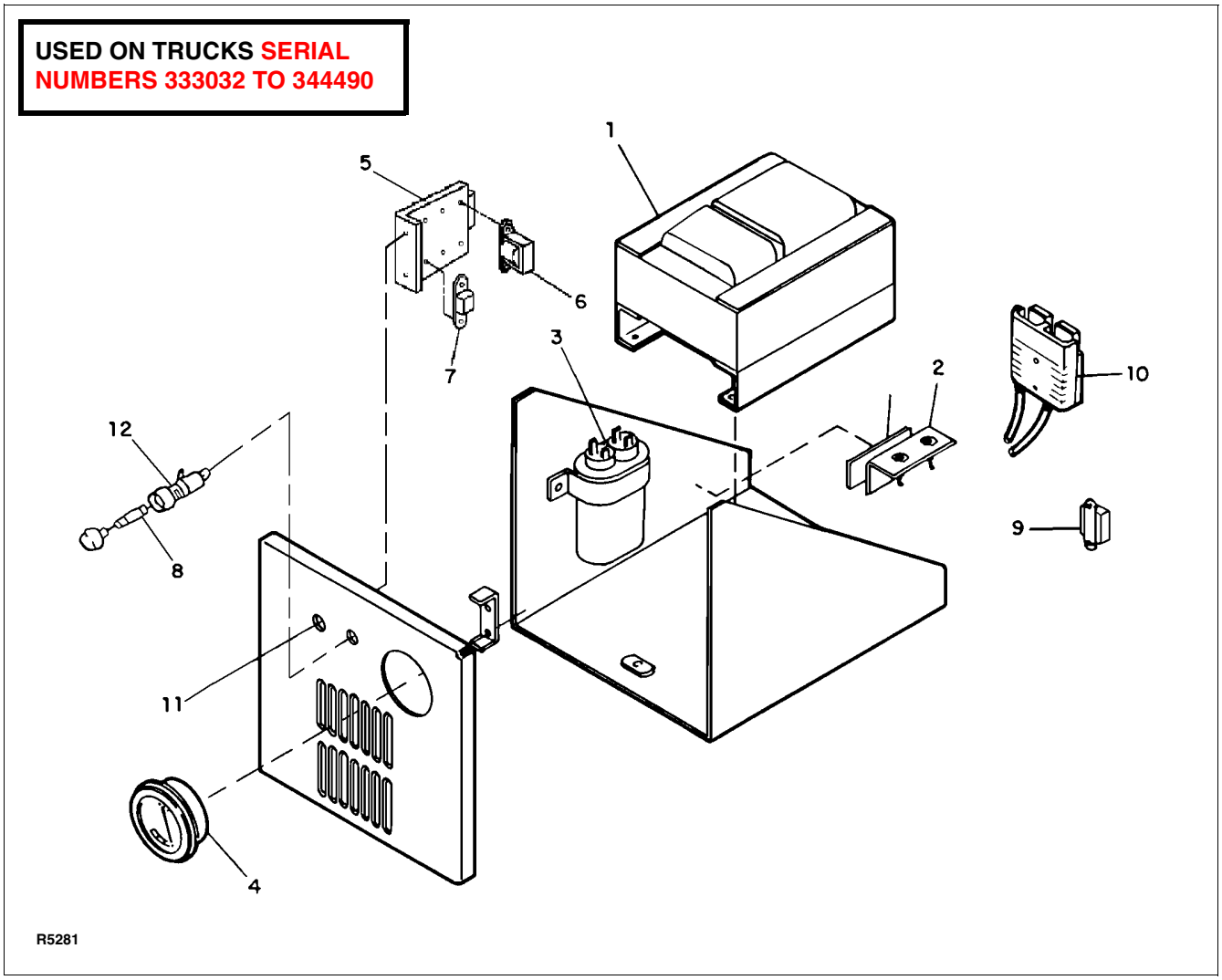


Figure 12-33 Optional 120V Smart Battery Charger 004976-01

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	004976-01	SMART BATTERY CHARGER	REF
1	901023	. TRANSFORMER	1
2	901027	. DIODE/HEAT SINK ASSEMBLY	1
3	900385	. CAPACITOR	1
4	900462	. AMMETER	1
5	907112	. CONTROL CARD (CIRCUIT BOARD)	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
6	907078	. TRANSFORMER (CONTROL CARD)	1
7	907077	. TRIAC (CONTROL CARD)	1
8	900847	. FUSE AGC10	1
9	901022	. CIRCUIT BREAKER	1
10	005401	. BATTERY CONNECTOR	1
11	900379	. PILOT LIGHT	1
12	907058	. FUSE HOLDER	1

USED ON TRUCKS SERIAL NUMBERS 344491 AND HIGHER

SEE SUPPLEMENT 335 FOR ADDITIONAL INFORMATION ON CHARGER 004978

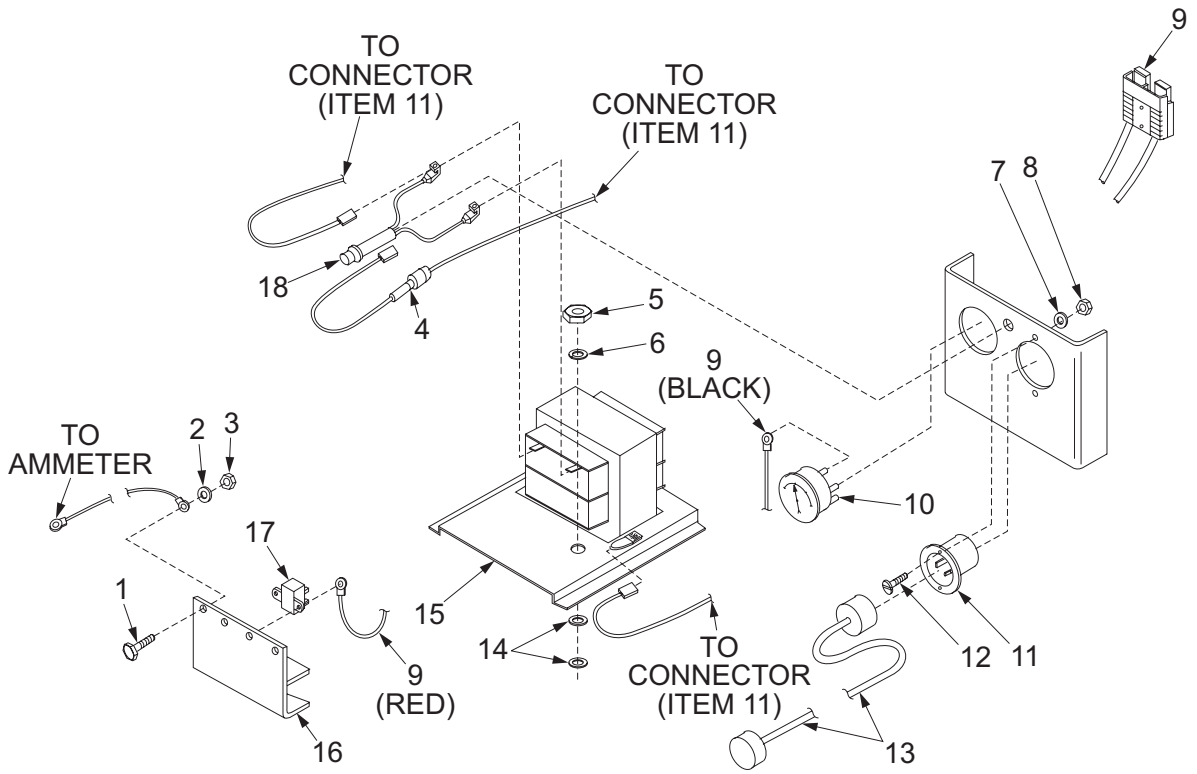


Figure 12-34 Smart Battery Charger Installation

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	065476	SCREW, HEX-HD, 1/4-20 X 1/2	1
2	077209	WASHER, LOCK, 1/4 SPLIT	1
3	059421	NUT, HEX, 1/4-20	1
4	008910	FUSE, 15 AMP	1
5	059429	NUT, HEX, 3/8-16	1
6	077211	WASHER, LOCK, 3/8 SPLIT	1
7	077204	WASHER, LOCK, SPLIT	2
8	059412	NUT, HEX, 6-32	2
9	505640	CONNECTOR ASSEMBLY	1
10	015609	AMMETER	1
11	005454	CONNECTOR, INLET FLANGE, 120 VAC	1
11	005455	CONNECTOR, INLET FLANGE, 240 VAC	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
12	068230	SCREW, MACHINE	2
13	005810	CORD, CHARGER, 120 VAC	1
13	504599	CORD, CHARGER, 240 VAC	1
14	077064	WASHER, FLAT	2
15	004978	CHARGER, 120 VAC	1
15	004980	CHARGER, 240 VAC	1
16	901603	. CIRCUIT BOARD WITH HEAT SINK	1
17	901604	. CIRCUIT BREAKER	1
18	—	. INDICATOR LIGHT (PART OF ITEM 15)	1

NOTES

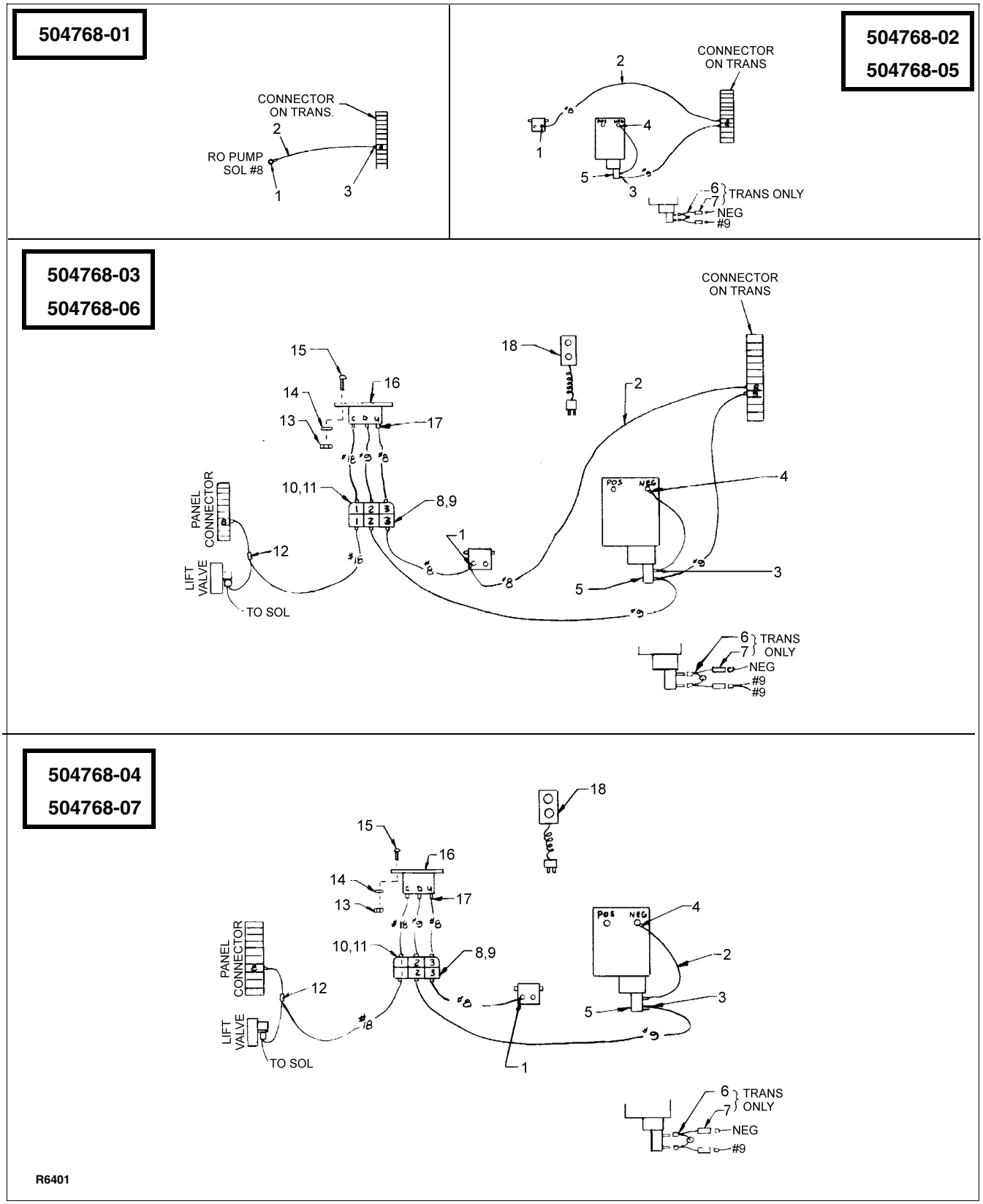


Figure 12-35 Remote Control Installation and Wiring

INDEX NO.	PART NAME	LIFT IN HEAD ONLY PART NO. & NO. REQD.	LIFT & LOWER IN HEAD (RES) PART NO. & NO. REQD.	LIFT & LOWER IN HEAD (TRANS) PART NO. & NO. REQD.	LIFT & LOWER BOX (RES) PART NO. & NO. REQD.	LIFT & LOWER BOX (TRANS) PART NO. & NO. REQD.	LIFT & LOWER IN HEAD & BOX (RES) PART NO. & NO. REQD.	LIFT & LOWER IN HEAD & BOX (TRANS) PART NO. & NO. REQD.
—	REMOTE CONTROL INSTALLATION	504768-01	504768-02	504768-05	504768-03	504768-06	504768-04	504768-07
1	. TERMINAL, RING, 3/16	021203 (1)	021203 (1)	021203 (1)	021203 (2)	021203 (2)	021203 (1)	021203 (1)
2	. WIRE, 16GA BLACK	023018 (A/R)	023018 (A/R)	023018 (A/R)	023018 (A/R)	023018 (A/R)	023018 (A/R)	023018 (A/R)
3	. TERMINAL, SLIP ON, 1/4 INSUL	021718 (1)	021718 (4)	021718 (4)	021718 (6)	021718 (6)	021718 (4)	021718 (4)
4	. TERMINAL, RING, 5/16	—	021207 (1)	021207 (1)	021207 (1)	021207 (1)	021207 (1)	021207 (1)
5	. LOWERING SOLENOID	—	048133 (1)	048133 (1)	048133 (1)	048133 (1)	048133 (1)	048133 (1)
6	. SPIKE SUPPRESSOR	—	—	504116 (1)	—	504116 (1)	—	504116 (1)
7	. CONNECTOR, INLINE, INSUL	—	—	005422 (2)	—	005422 (2)	—	005422 (2)
8	. HOUSING, PIN, 3 WIRE	—	—	—	005647 (1)	005647 (1)	005647 (1)	005647 (1)
9	. CONTACT, PIN	—	—	—	005626 (3)	005626 (3)	005626 (3)	005626 (3)
10	. HOUSING, SOCKET, 3 WIRE	—	—	—	005648 (1)	005648 (1)	005648 (1)	005648 (1)
11	. CONTACT, SOCKET	—	—	—	005627 (3)	005627 (3)	005627 (3)	005627 (3)
12	. TERMINAL, SLIP ON, 1/4	—	—	—	021204 (1)	021204 (1)	021204 (1)	021204 (1)
13	. HEX NUT (SEE FIGURE 12-36)	—	—	—	REF	REF	REF	REF
14	. LOCK WASHER (SEE FIGURE 12-36)	—	—	—	REF	REF	REF	REF
15	. SCREW (SEE FIGURE 12-36)	—	—	—	REF	REF	REF	REF
16	. RECEPTACLE (SEE FIGURE 12-36)	—	—	—	REF	REF	REF	REF
17	. (SEE FIGURE 12-36)	—	—	—	REF	REF	REF	REF
18	. CONTROL ASSEMBLY (SEE FIGURE 12-36)	—	—	—	REF	REF	REF	REF

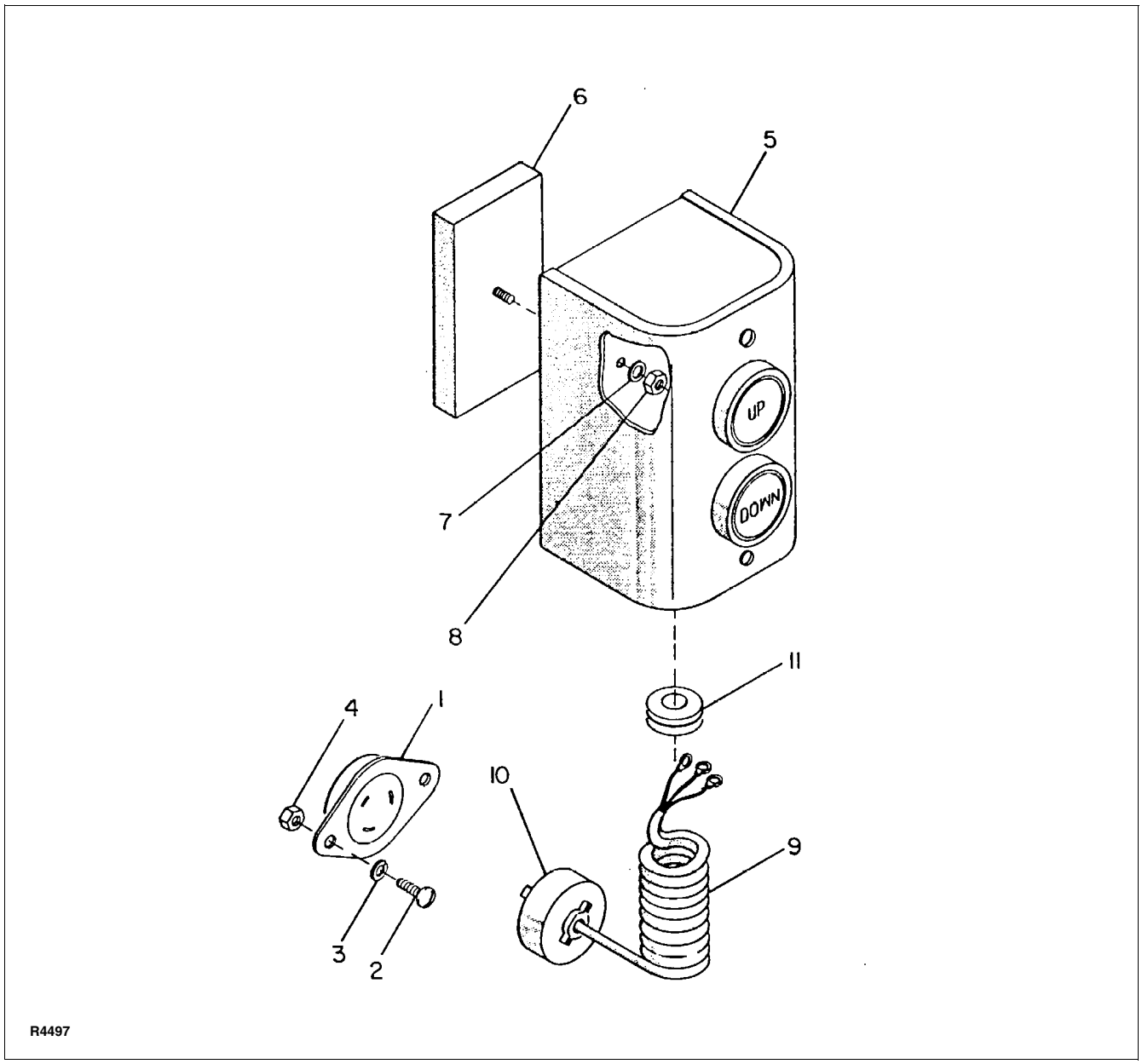


Figure 12-36 Remote Control

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	017800	RECEPTACLE, FEMALE	1
2	068177	SCREW, 5-40 X 3/8	2
3	077203	LOCK WASHER, #5	2
4	059410	HEX NUT, 5-40	2
—	501736	CONTROL STATION ASSEMBLY	1
5	800130	. CONTROL BOX	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
6	058501	. MAGNET	1
7	077209	. LOCK WASHER, 1/4 SPRING	1
8	059421	. HEX NUT, 1/4-20	1
9	314003	. COIL CORD, 3 FEET	1
10	017801	. MALE PLUG	1
11	052905	. STRAIN RELIEF	1

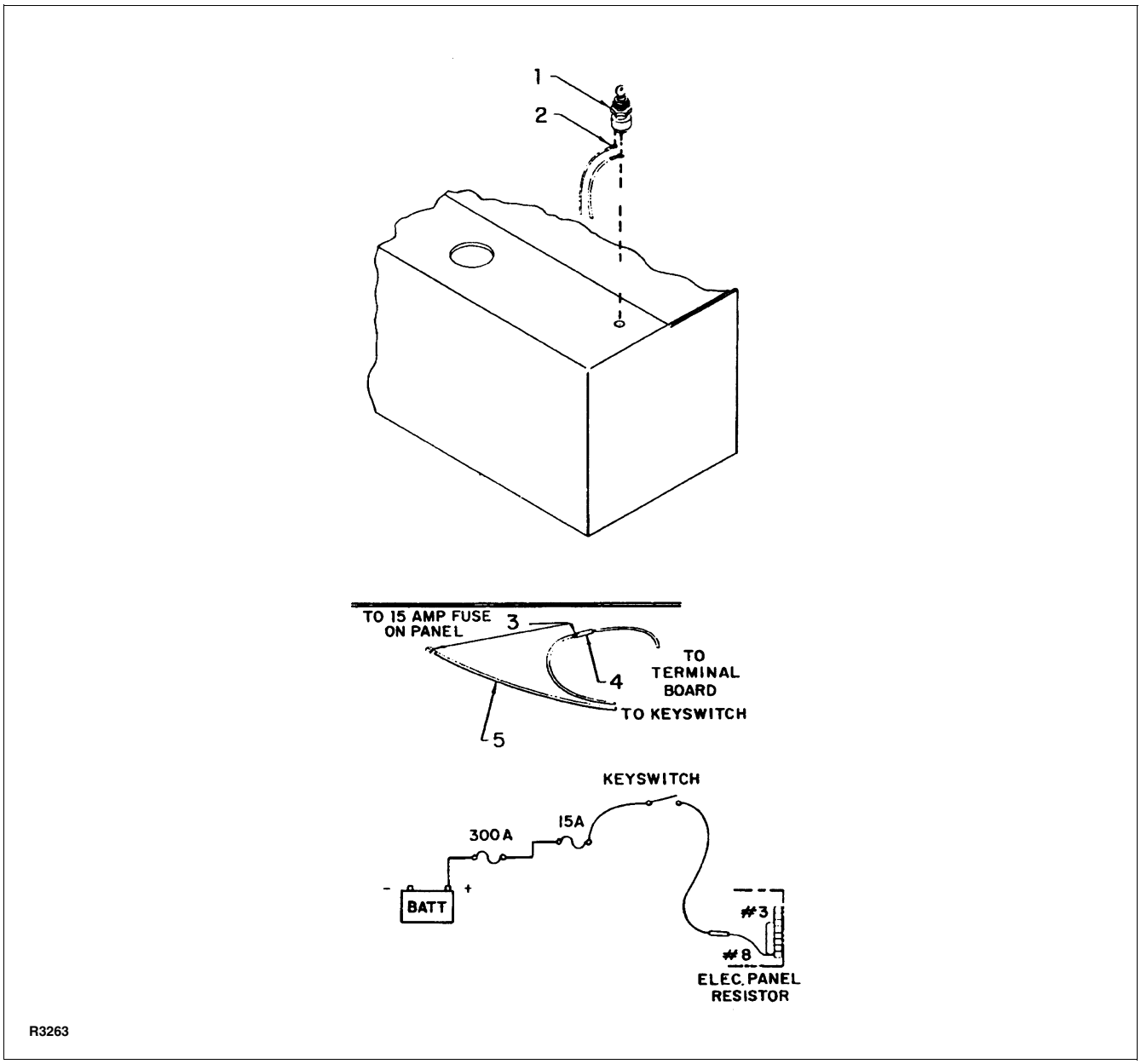


Figure 12-37 Keyswitch

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	020725	SWITCH, KEY	1
2	021203	TERMINAL, RING	2
3	021204	TERMINAL, QUICK DISCONNECT, FEMALE	2
4	005422	CONNECOTR, IN-LINE INSU-LATED	2
5	023014	WIRE	AR

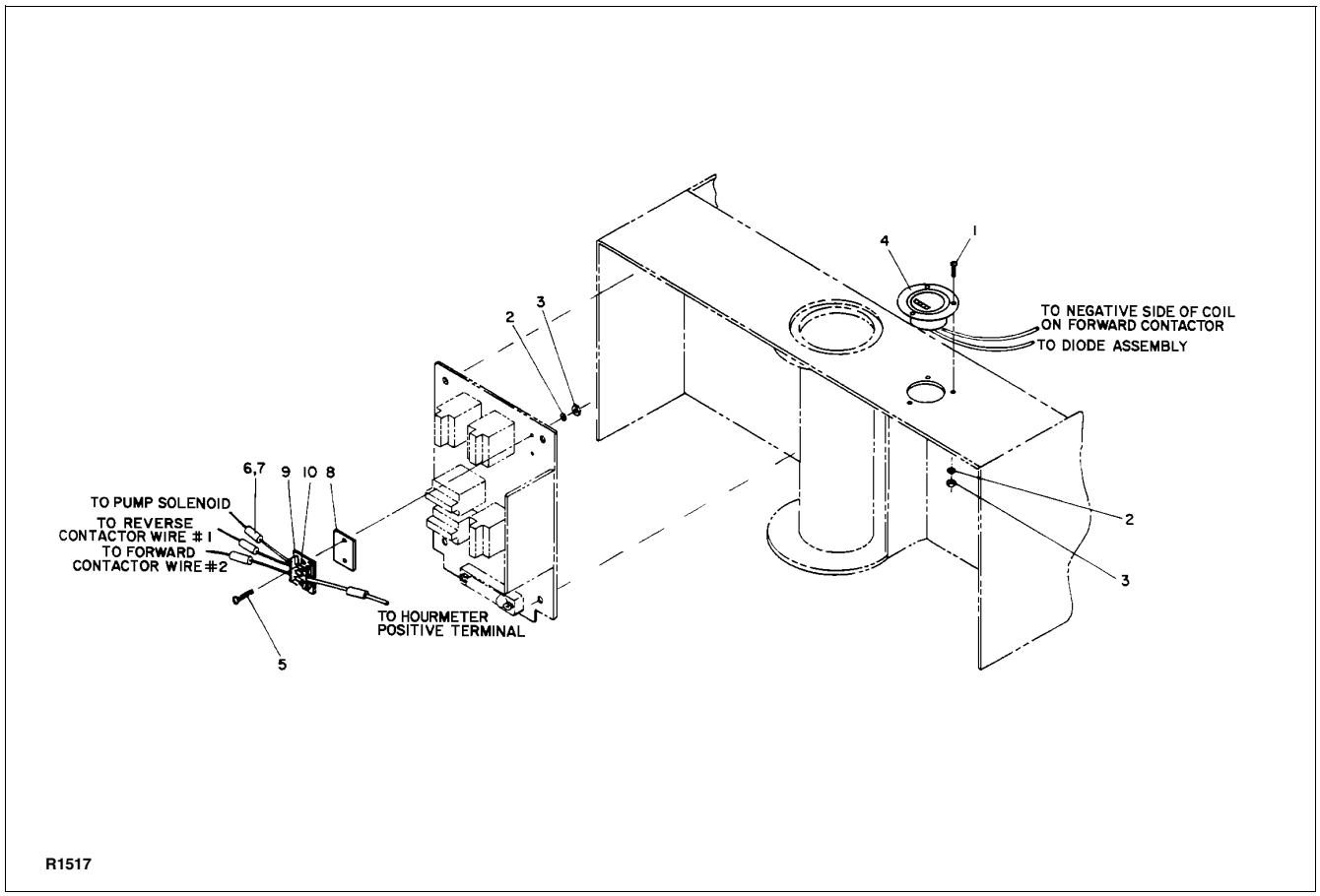


Figure 12-38 Hour Meter

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	504189	HOURMETER	Q
1	068179	SCREW, RD HD, 5-40 X 5/8	3
2	077203	WASHER, LOCK, SPLIT, #5	5
3	059410	NUT, HEX	5
4	015604	HOUR METER	1
5	068177	SCREW, RD HD, 5-40 X 3/8	2
6	005422	CONNECTOR, IN-LINE INSULATED	4
7	021204	TERMINAL, SLIP CLIP 1/4	4
8	010610	PAD, INSULATING DIODE	1
9	005987	DIODE ASSEMBLY	1
10	005976	. DIODE	3
—	010606	. MOUNTING PANEL	1
—	023018	. WIRE, BLACK, #16 STRAINDED	AR

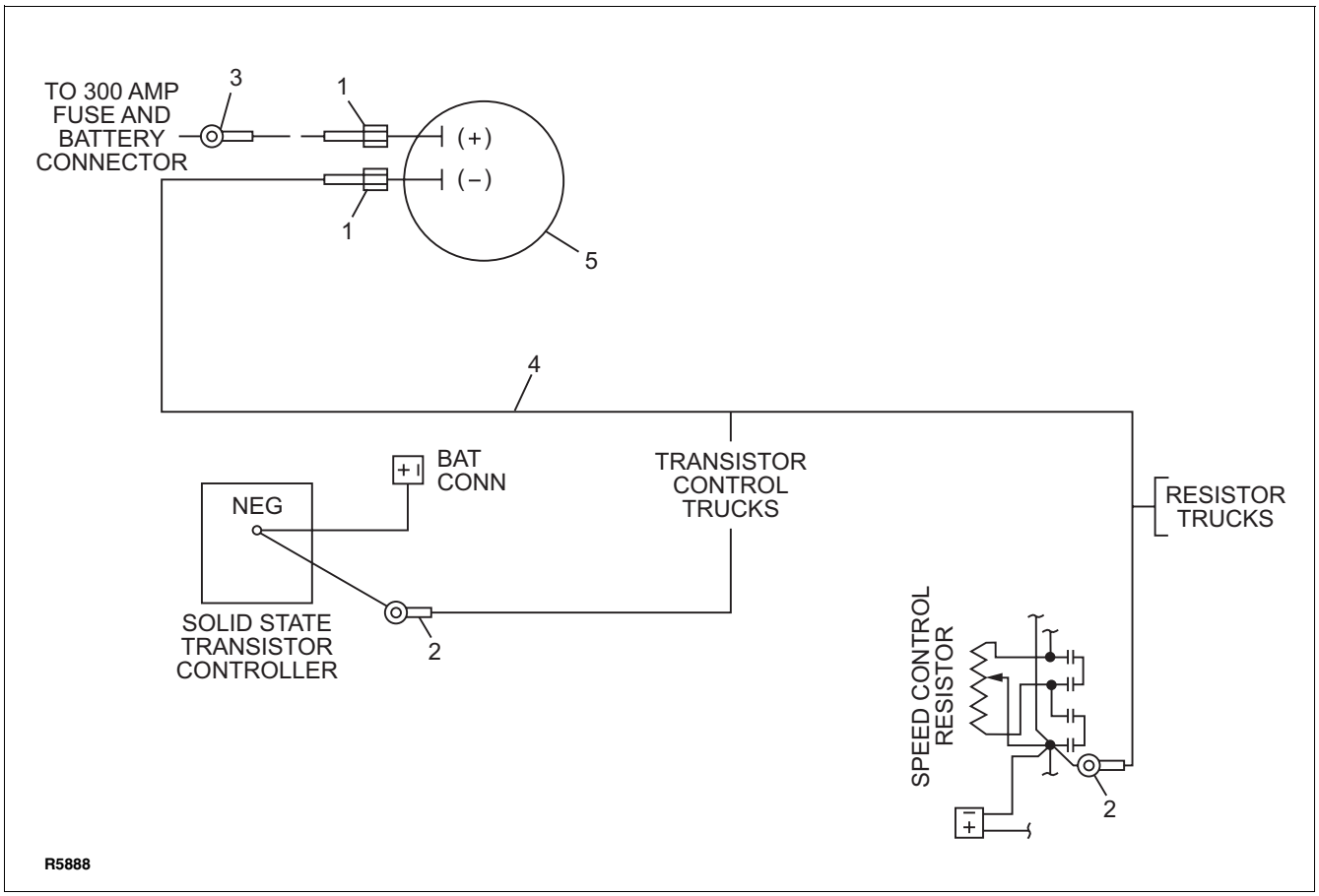


Figure 12-39 Battery Capacitor Indicator Wiring Diagram Systems Without Lockout

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	021718	CONNECTOR	2
2	021206	TERMINAL	1
3	021207	TERMINAL	1
4	023014	WIRE	AR
5	010617-02	INDICATOR, BAT CAPACITY	1
6	021207	TERMINAL	1

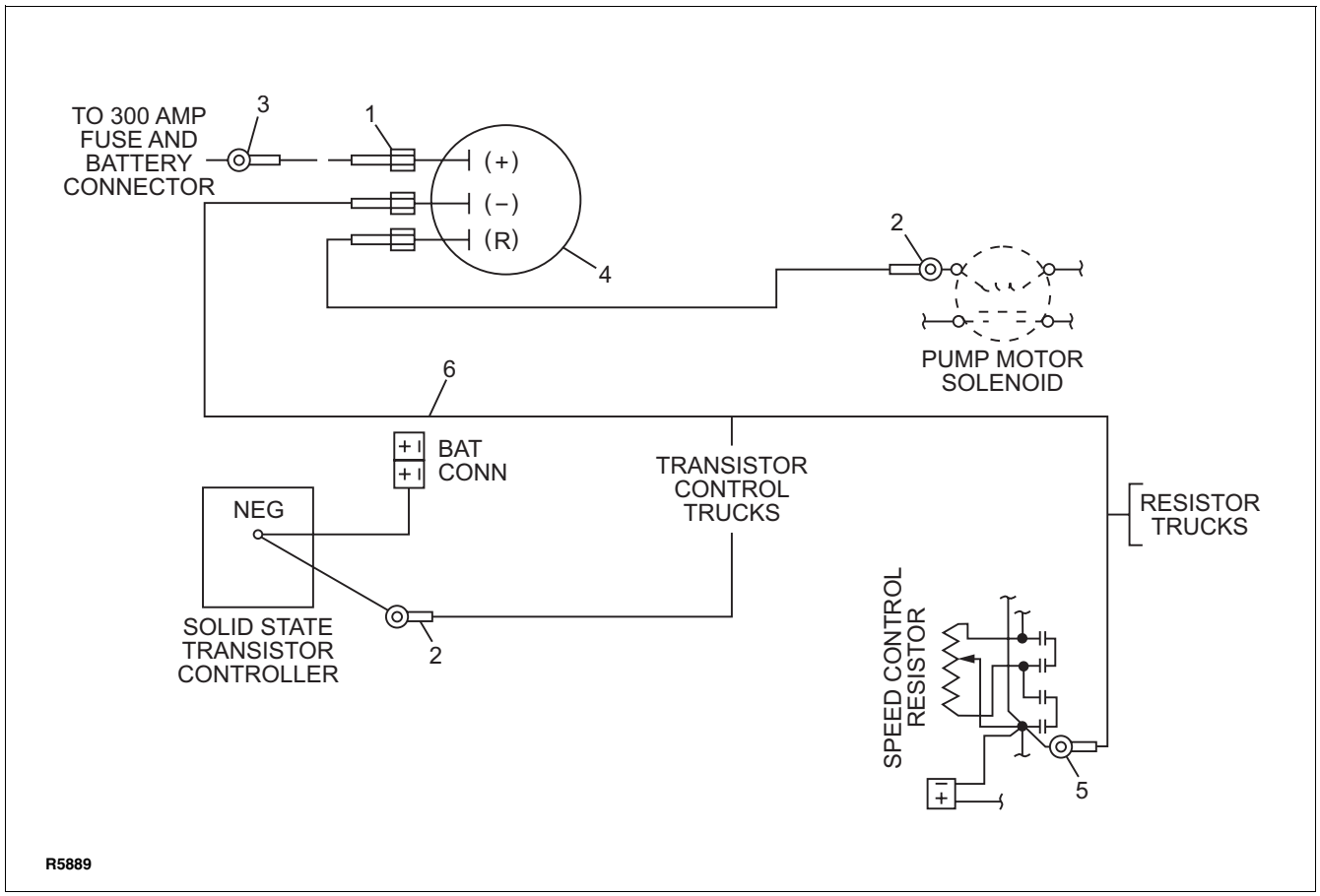


Figure 12-40 Battery Capacitor Indicator Wiring Diagram Systems With Lockout

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	021718	CONNECTOR	2
2	021203	TERMINAL	1
3	021207	TERMINAL	1
4	010618-02	INDICATOR, BAT CAPACITY	1
5	021206	TERMINAL	1
6	023014	WIRE	AR

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