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PDI SERIES

POWER DRIVE INTERMEDIATE LIFT TRUCK

Serial Number 333375 to 376499

Operation

Maintenance

Repair Parts List

Big Joe Manufacturing Company • Des Plaines, IL 60018

MANUAL NO. 901355
REV. B 0404

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OPERATOR INSTRUCTIONS

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. Keep feet clear of truck.

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 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.

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

PREPARATION FOR USE

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

Remove cardboard banded to forks. Check lift truck for scratches and dents. Check to make sure that the lift chains are 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.

If you did not order an optional charge cord (Figure 12-38 or Figure 12-39) then purchase an extension cord, 16 gauge, 3 wire, UL approved of the type normally used for shop tools, heavier appliances, etc.

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

If you do not obtain the proper results, or if improper operation occurs, refer to troubleshooting in SECTION 4.

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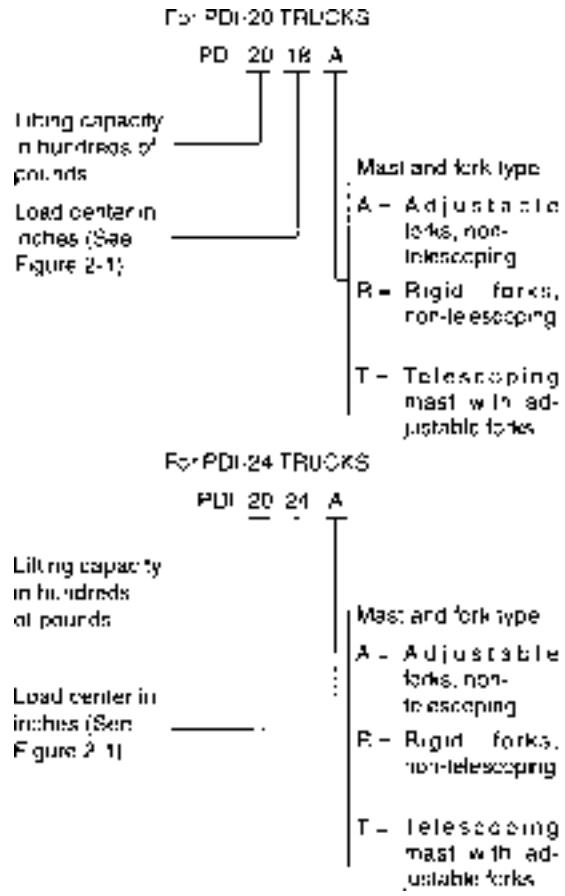
SECTION 1
DESCRIPTION

1-1. INTRODUCTION.

This publication describes the Power Drive Intermediate (PDI) lift truck manufactured by Big Joe Manufacturing Company, Des Plaines, Illinois, 60018. Included are operating instructions, planned maintenance instructions, lubrication procedures, corrective maintenance procedures and a complete parts list with parts location illustrations.

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 lift truck is identified by a model number. The model number shows truck capacity and load center. A typical model number is explained below.



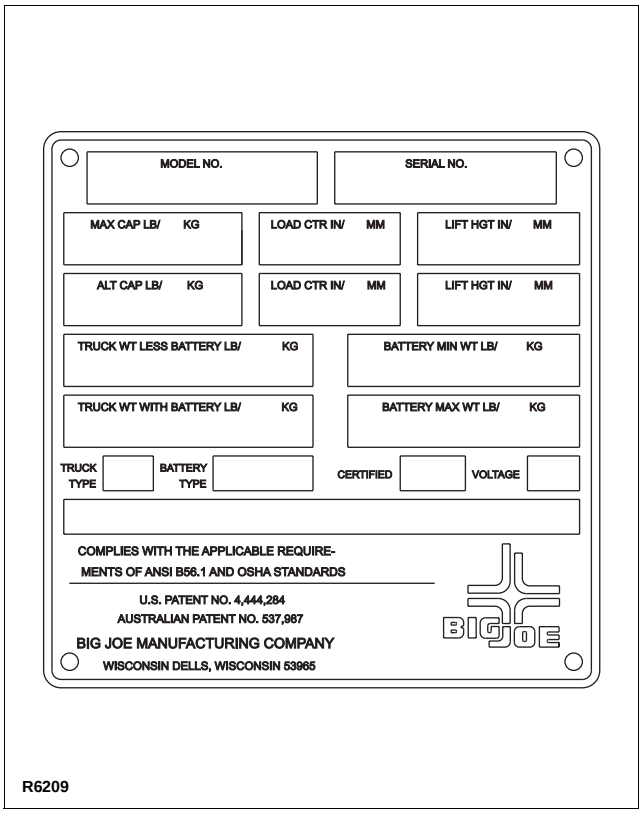


Figure 1-1 Name Plate

The model number will be found on the (Figure 1-1) along with the serial number, lifting capacity, and load center. Figure 1-3 shows the locations of the trucks main components and controls. Figure 1-2 shows the location and identification of the decals. Also listed is the touchup paint used on both the older and new model PDI trucks as well as the location of the trucks serial number and name plate.

1-2. GENERAL DESCRIPTION.

The self-propelled PDI truck, Figure 1-3, lifts and transports payloads up to 2000 pounds on either rigid or adjustable forks.

The forward and reverse motion is controlled by the 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.

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

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

1-3. SAFETY FEATURES.

The PDI 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 within prescribed limits.

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 PDI 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 For Motors
Longer Carriage Forks
Dry Charged Batteries
240 V, 60 Hz, Single Phase Charger
48 inch Load Backrest Extension
Adjustable Straddles
RAMS
Boom w/Hook
Slip-on Platform...smooth or diamond surface
Roller Platform
Work Platform
Transistor Control

The most commonly used options and accessories are described in SECTION 11.

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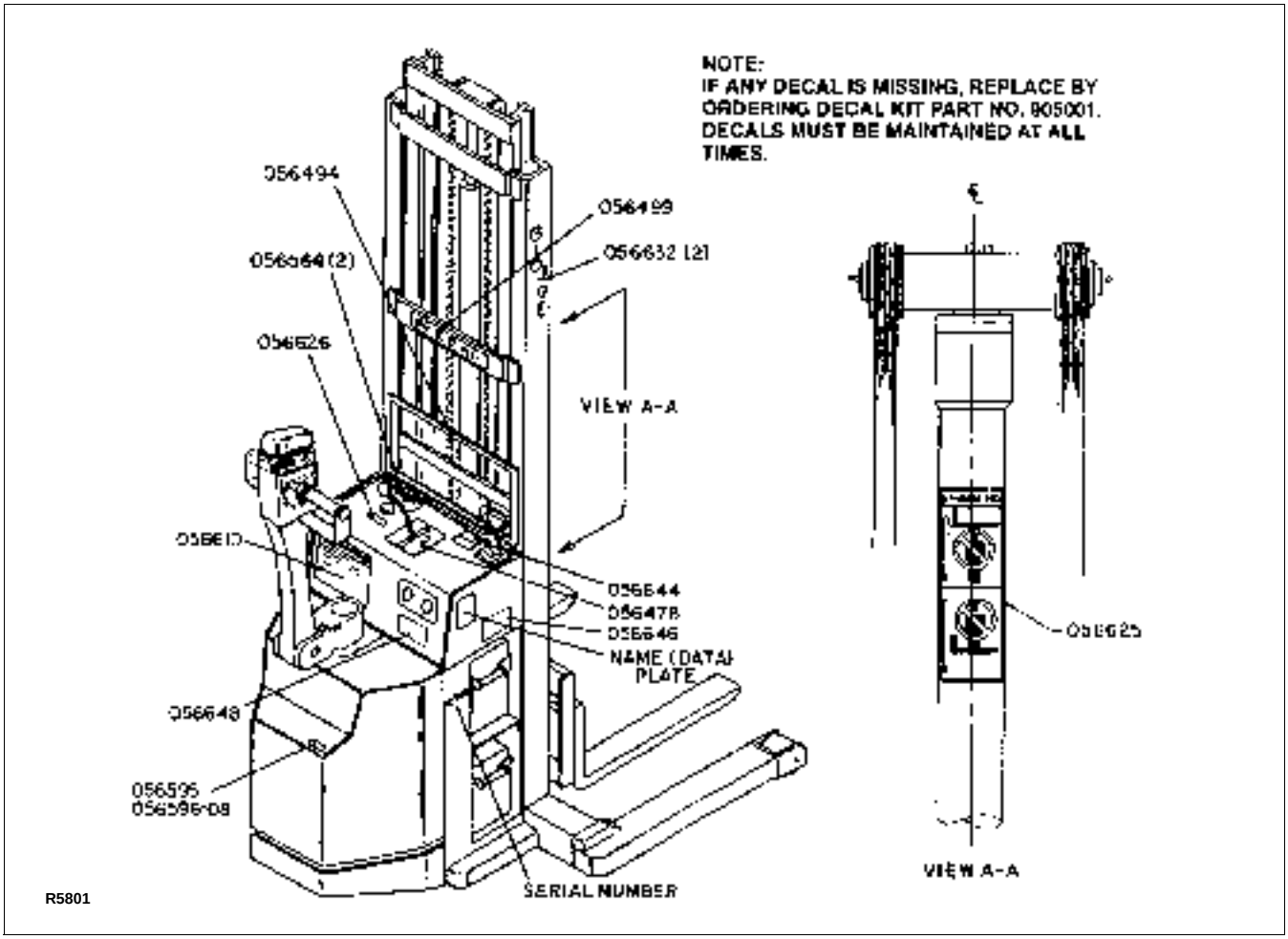

Figure 1-2 Serial Number and Decal Location

TOUCH-UP PAINT	
901201	YELLOW
901202	BLACK

905001 DECAL KIT		
PART NO.	**DESCRIPTION**	**QTY.**
056478	LIFT-LOWER	1
056499	NO RIDING	1
056564	CAUTION	2
056494	CAUTION	2
056610	WARNING	1
056625	WARNING	1
056626	OIL LEVEL	1
056632	BIG JOE (MAST)	2
056644	TRUCK-CHARGE	1
056646	DANGER-BATTERY	1
056648	INSTR-CHARGER	1

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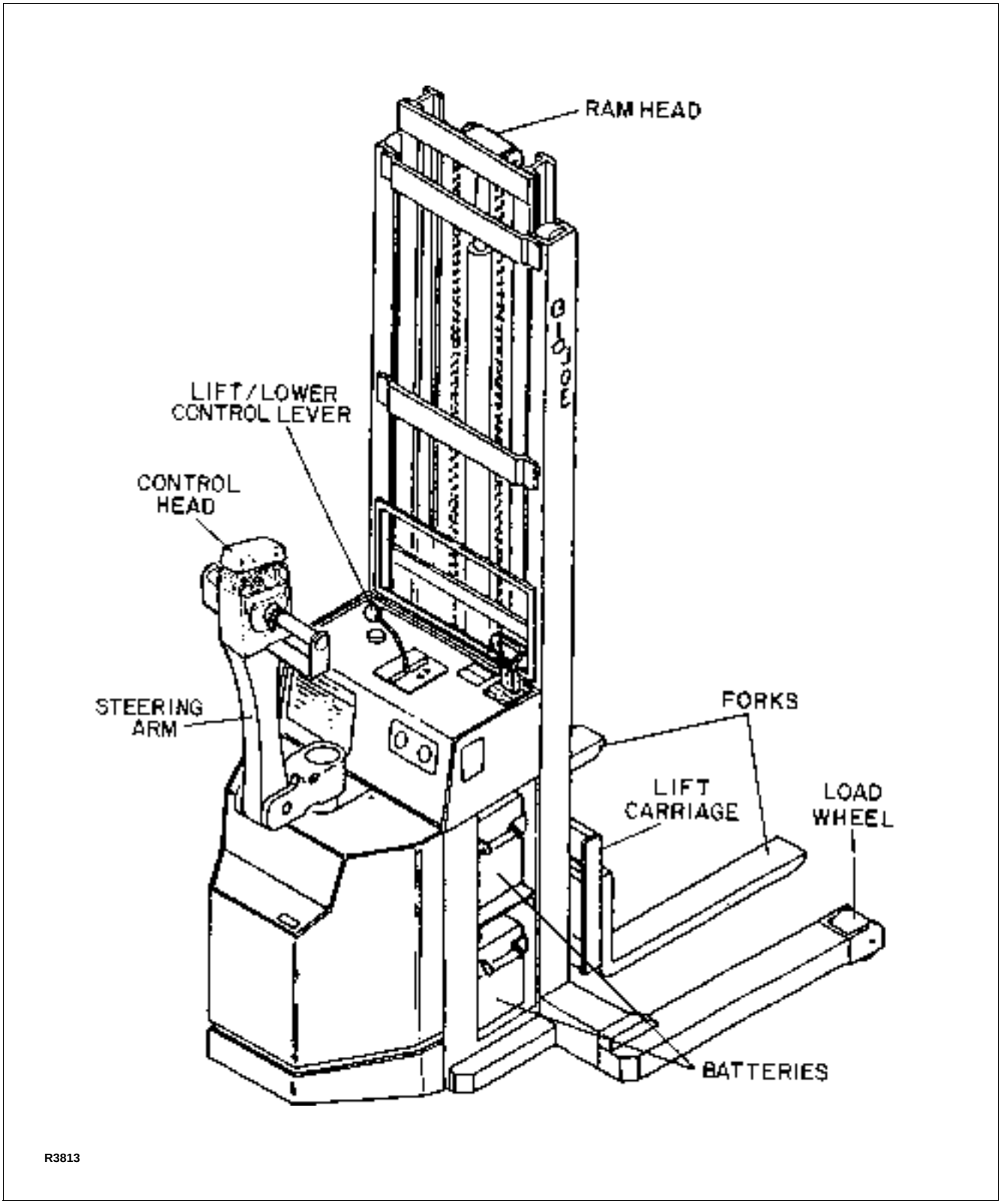

Figure 1-3 PDI Lift Truck

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SECTION 2
OPERATION

1. **SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333375 TO 334630**
2. **SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 334631 TO 376499**
3. **SEE SUPPLEMENT 187 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 333375 TO 338589**
4. **SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 338590 TO 372811**
5. **SEE SUPPLEMENT 349 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 372812 TO 376499**

2-1. GENERAL.

This section gives detailed operating instructions for the PDI lift truck. The instructions are divided into the various phases of operations, such as operating the lift, driving, and stopping. Routine precautions are included for safe operation.

2-2. OPERATING PRECAUTIONS.

WARNING: Improper operation of the lift truck may result in operator injury, or load and/or lift truck damage. Observe the following precautions when operating the PDI lift truck.

1. Do not operate this truck unless you have been trained and authorized to do so. Read all warnings and instructions in this manual and on the lift truck.
2. Do not operate this truck until the periodic inspection or service has been completed.
3. Do not exceed the rated capacity (see name plate). Overloading may result in damage to the hydraulic system and structural components.
4. Do not handle unstable or loosely stacked loads. Use special care when handling long, high, or wide loads to avoid tipping, loss of load, or striking bystanders.
5. 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 limitations.
6. Pick up loads on both forks. Do not pick up loads on only one fork.
7. When traveling, always lower the load as far as possible.
8. When stacking pallets in racks and it is necessary to move the load in the raised position, use caution. Operate truck smoothly.
9. Check for obstructions when raising or lowering the lift carriage.
10. Apply the brake gently except in cases of emergency.

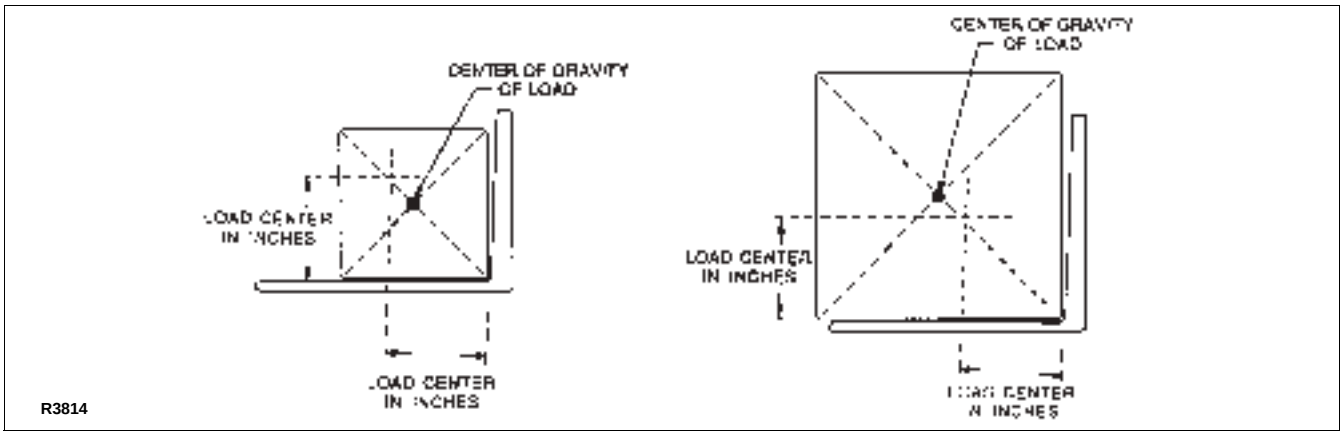

Figure 2-1 Load Center

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11. Observe applicable traffic regulations. Yield right of way to pedestrians. Slow down and sound horn at cross aisles and wherever vision is obstructed.
12. Operate truck only from designated operating position. Never place any part of your body between the mast uprights. Do not carry passengers.
13. Do not allow anyone to stand or pass under load or lifting mechanism.

2-3. BEFORE OPERATION

Table 2-1 covers important inspection points on PDI 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 a 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 condition. 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, secured correctly, functioning properly and free of binding or damage.
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.
Wheels	Check drive wheel for cracks or damage. Move truck to check load and caster 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. Check that dynamic brake (if so equipped) actuates when dynamic brake pushbutton on control handle is pressed.
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.

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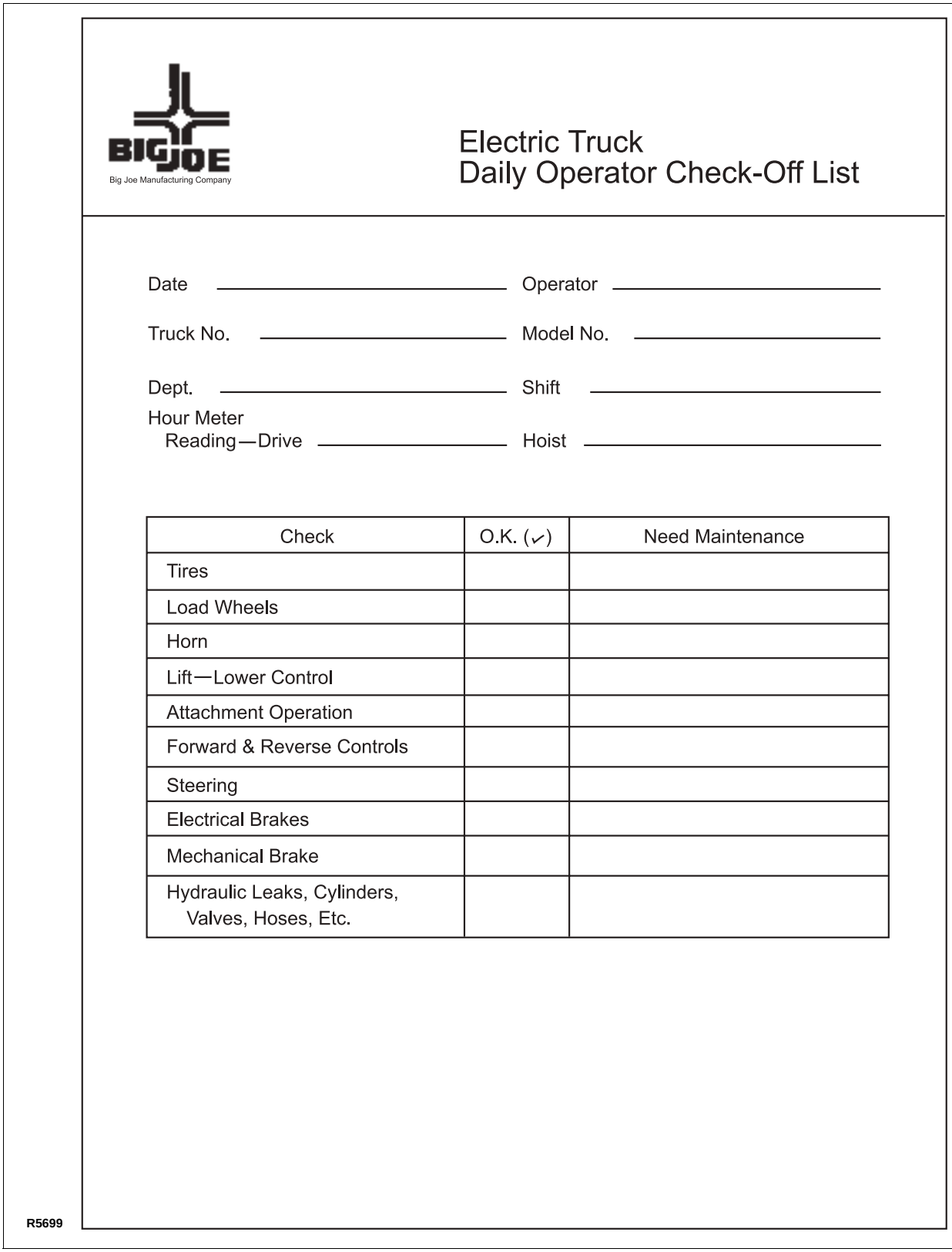

Figure 2-2 Sample of Operator Check List

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2-4. POWER DRIVE CONTROL HANDLE.

2-4.1. Control Handle.

Two triangular shaped speed controls provide for easy thumb actuation. Standard controls include three forward and three reverse speeds, a belly-button reversing switch, and a horn. See Figure 2-3.

2-4.2. Steering Arm Controls.

Lowering the steering arm to the horizontal or raising to the vertical applies the brake (See Figure 2-4). All traction control power is shut off when the brake is engaged. When the steering arm is in the upright position, the brake acts as a parking brake. Deadman braking occurs when the handle is released and spring action raises it to the vertical position.

Optional are Lift and Lower pushbuttons. The Lift and Lower pushbuttons are located behind the belly-button switch guard and can also be operated from either side. Also optional is a Lift and Lower remote control box.

When the lower portion of the triangular speed control knob is pressed forward, contacts are closed for first speed in the forward direction. Pressing the speed control farther closes a contact for second speed and farther, third speed. Pressing the upper portion of the speed control governs the three reverse speeds in the same manner.

When the rotating grips are utilized, forward direction is achieved by rotating the grips downward. Reverse direction is achieved by rotating the grips upward. Further rotation in either direction will actuate second and third speeds in forward or reverse.

2-5. Driving and Stopping Procedures.

The following procedure describes driving and stopping the PDI lift truck. If the lift truck is equipped with a key switch, turn it to the on position.

1. Grasp the grips of the steering arm so that the speed control can be comfortably operated by either the thumbs, or the palms of the hands if rotating grips are being utilized.
2. Lower the steering arm to a comfortable position above horizontal to disengage the brake and to energize the electrical circuits.

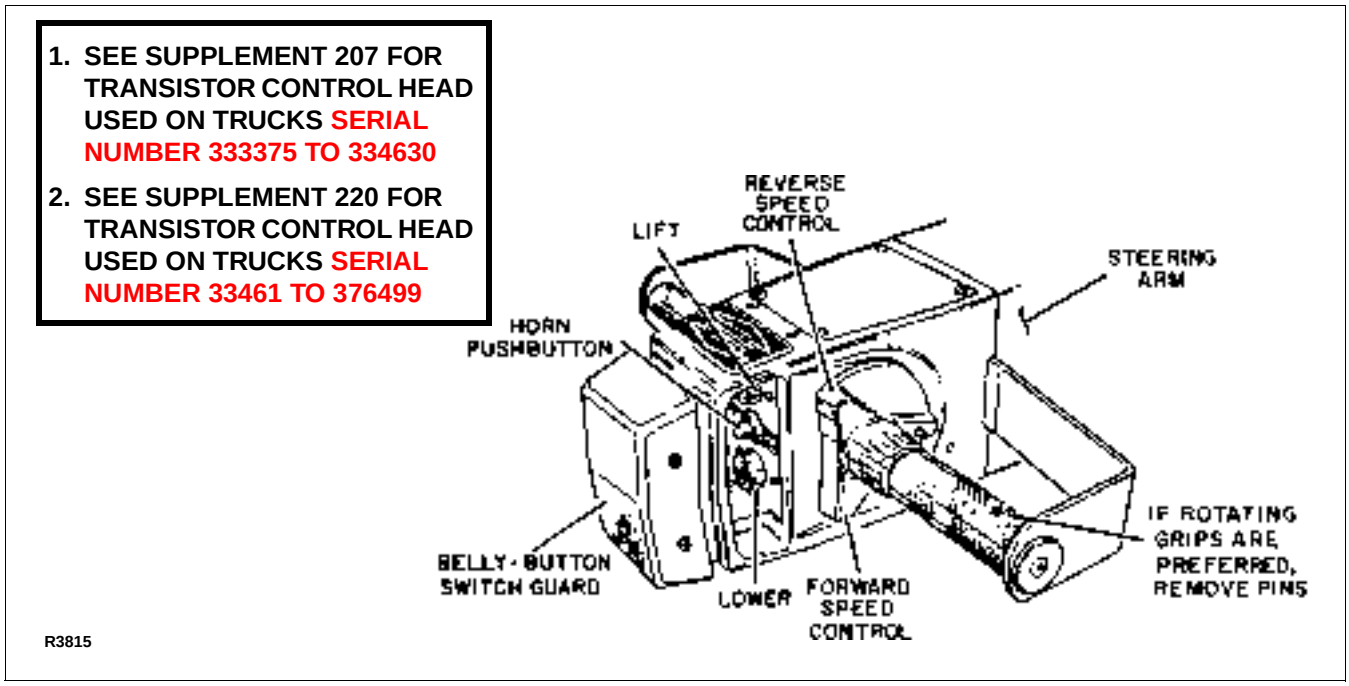

Figure 2-3 Control Handle

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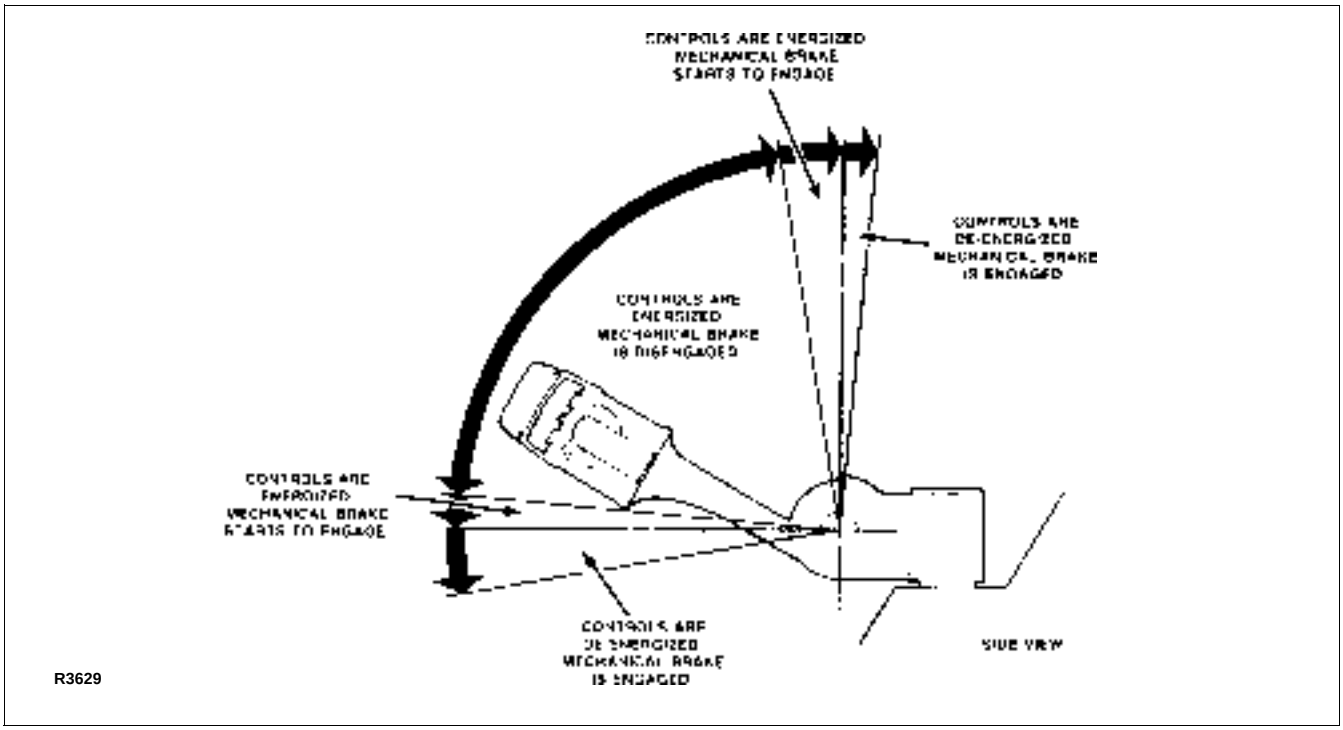

Figure 2-4 Steering Arm Braking Position

3. To move forward, slowly press the lower portion of the speed control or rotate the grips downward. Press the forward speed control or rotate the grips farther to increase speed.
4. To stop, release the speed control and lower the steering arm to the horizontal position. In this position, the brake pads apply light pressure to the brake disc. Lowering the steering arm further increases the braking force.

   The brake may also be applied by raising the steering arm to the upright position.
5. To travel in reverse, lower the steering arm to a comfortable position and slowly press the upper portion of the speed control or rotate the grips upward.

NOTE: Acceleration in reverse is the same as in the forward direction.

2-6. BELLY-BUTTON SWITCH GUARD.

The belly-button switch guard minimizes the possibility of the driver being pinned by the steering arm while driving the lift truck in reverse. If the guard presses against the driver while the lift truck is being driven in reverse, the guard actuates a switch which changes the direction of the lift truck to forward direction in low speed.

2-7. STEERING ARM RETURN SPRING.

The steering arm return spring automatically raises the steering arm to the upright position when the steering arm is released. If the steering arm snaps up abruptly, or does not return fully, the steering arm return spring requires adjustment. Return truck to maintenance group for adjustment.

2-8. LIFT/LOWER CONTROL.

The LIFT/LOWER control, Figure 2-5, is used to lift the forks and to regulate their lowering. The rate of rise is fixed, however, the descent of the forks is infinitely variable. The farther the control lever is moved from neutral position, the faster the forks will descend.

If the optional LIFT and LOWER pushbuttons on the control handle or optional LIFT (UP) and LOWER (DOWN) remote control box are used, the lift carriage raises and descends at a fixed rate of speed.

Proceed as follows to raise and lower the forks. If truck is equipped with a key switch, turn it to the on position.

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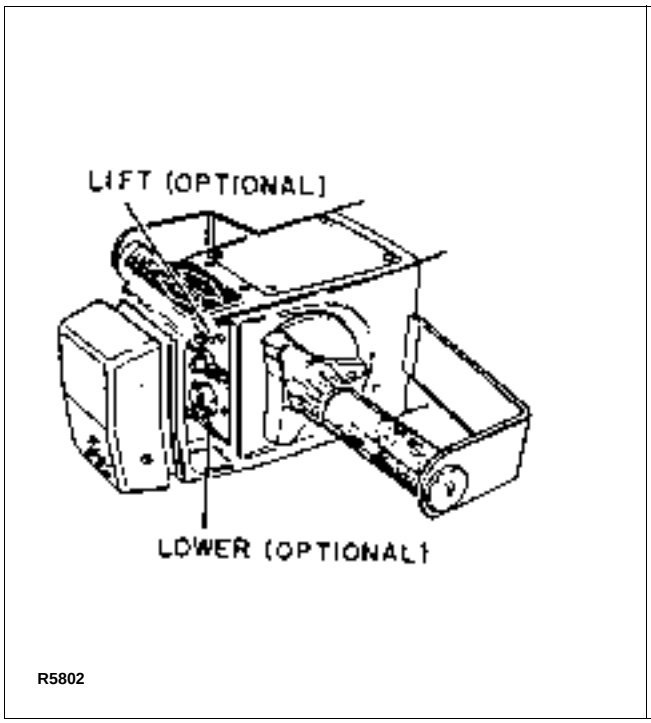

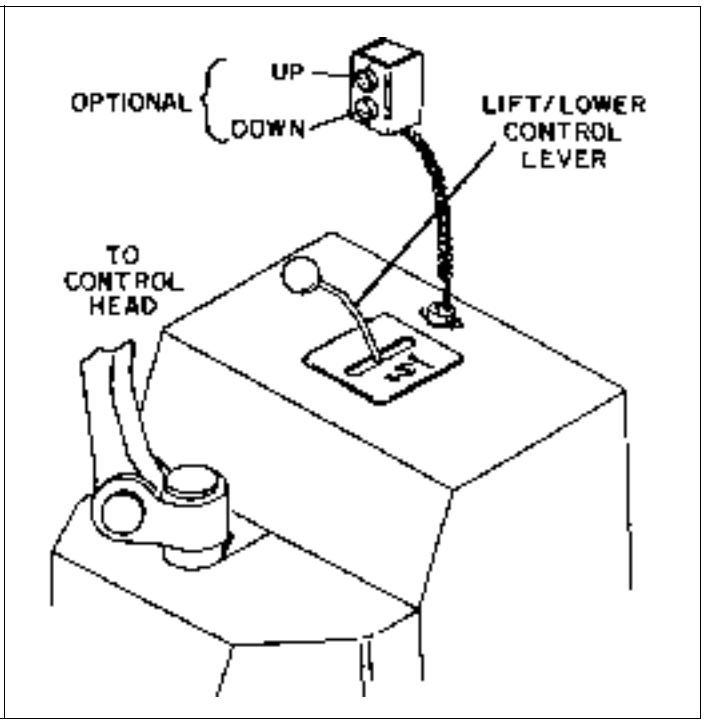

Figure 2-5 Lift/Lower Lever

WARNING: Check the space above the mast and the load to be sure that there is sufficient room for raising the forks. Make sure the load is centered and does not exceed capacity.

1. To raise the forks, pull LIFT control lever toward UP position (toward operator), and hold it until the forks reach the desired height; then return LIFT control lever to its neutral position. If truck is equipped with pushbuttons, push in the LIFT button and hold until lift carriage reaches desired lift height.
2. To lower the forks, push LIFT control lever toward DOWN position (away from operator), and hold it until the forks reach the desired height. Then return LIFT control lever to its neutral position. If truck is equipped with the optional LOWER pushbutton, push in and hold the LOWER button until lift carriage is at the desired height.

2-9. LOADING AND UNLOADING.

1. Move truck to location where load is to be picked up.
2. Adjust forks to maximum practical width.
3. Raise forks to desired height. Move truck into position so forks are within pallet or skid, and the load is centered over the forks and as far back as possible.
4. Raise forks slightly to lift load from rack.
5. Slowly reverse the truck to move load free from rack. When the load is clear, lower the load, leaving enough floor clearance to maneuver truck.
6. Drive to area where load is to be placed.
7. Move truck to align load with its new position. Raise forks to desired height.
8. Lower the load until it rests squarely in place and forks are free.
9. Slowly move the truck straight backward, making sure the forks do not catch on the pallet. Lower the forks when they are clear.

2-10. PARKING.

When finished with moving loads, drive truck to its maintenance or storage area. Disconnect batteries from TRUCK receptacle and connect to CHARGER receptacle. Charge batteries as necessary. Refer to battery care instructions, paragraph 3-3. or 3-4.

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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. WET CELL 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 charger.

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

Table 3-1 Monthly and Quarterly Inspection and Service Chart

VISUAL CHECKS	
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, lubrication & operation (see paragraph 3-6.)
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 pargraph 8-3.)

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3-3.2. Timer Charger Operation.

The batteries must be pulled out of the compartments in order to check the specific gravity.

Truck Serial Number 342392 To 376499, remove screw, washer and retainer bar by each battery.

CAUTION: These batteries are heavy. Use handles on battery when lifting.

Remove batteries from the right side of the truck. The battery connecting cables are sufficiently long to allow batteries to be placed on the floor. It is not necessary to disconnect the battery cables.

When reinstalling the battery be sure battery cable connectors are securely attached to the battery terminals, and cables are routed and secured to the battery as shown in Figure 3-1.

Truck Serial Number 342392 To 376499, reinstall and position battery retainer bar to prevent battery movement in excess of 1/2".

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.

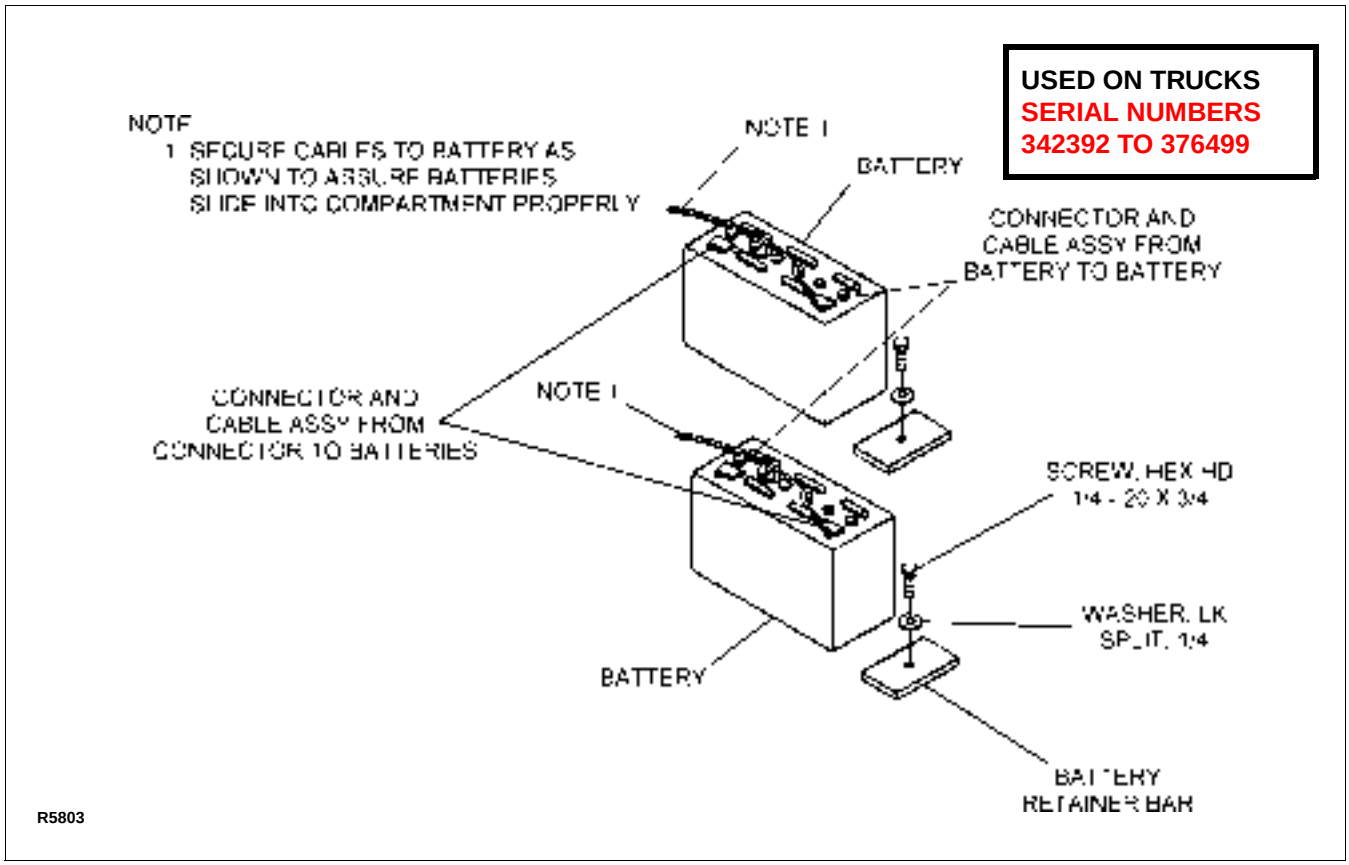

Figure 3-1 Reinstalling the Battery

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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.

3. When using a timer charger, charge battery in accordance with Table 3-2. When using the "smart" charger charge battery as described in paragraph 3-3.3.

NOTE: A fully charged battery has a specific gravity of 1.260 to 1.275.

3-3.3. Smart Charger Operation.

Big Joe "Smart" Chargers incorporate computer logic circuits to provide full automatic recharging and shut off operation for convenient overnight service.

The operation of this charger is completely automatic.

1. Turn key switch off, if equipped.
2. Check battery fluid levels (SEE Supplement Battery Safety and Maintenance Document 245).
3. 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.

Table 3-2 Charger 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

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

4. Charger output will decrease as batteries recharge.
5. **Trucks Serial Numbers 344163 To 376499**: 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.

   Trucks Serial Numbers 333375 to 344163: When charger light is off, charge cycle is complete.
6. Disconnect AC power cord, wind up cord on cord winder.
7. Disconnect DC battery supply from the charger circuit and connect it to the truck.

3-4. GEL CELL BATTERY CARE (OPTIONAL).

3-4.1. General.

These Gel Cell Batteries are maintenance-free. Any attempt to open the battery will void the warranty.

Ultra-deep discharging of brand new batteries should be avoided for at least 15 cycles. To dramatically extend battery life, ultra-deep discharge should be avoided. THe shallower the average discharge, the longer the battery life.

3-4.2. Charging Batteries

Charging requirements will vary depending on depth of discharge and temperature. Follow safety rules when placing a battery on charge.

Proceed as follows:

1. Park truck at charging station with platform lowered and key switch off.
2. Check the condition of the AC cord, the battery connector and battery cables. If there are any cuts in the cable, any exposed wires, loose plugs or connectors, DO NOT attempt to charge the batteries. Contact appropriate personnel for repairs to be made.
3. Disconnect the batteries from the truck and connect batteries to the charger. Make sure connectors are mated properly.
4. Connect the AC cord to the truck and then plug into the 120 VAC power supply.
5. The battery charger is fully automatic and will cycle automatically (depending on amount of charge needed). Charge status can be observed as follows (Refer to Figure 3-2):

   a. The top three LED's indicate charger status. At start of charge the RED (Charge) LED will be ON indicating the batteries are connected and charging. After the batteries charge to approximately 80% the Yellow LED comes ON. After a time (1 hour minimum) the Green LED comes ON indicating battery ready.

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NOTE: The battery charger includes an override timer which terminates the charge if the cycle does not complete after 18 hours of charging. This time-out condition is indicated by the green LED flashing off and on, and it indicates a fault condition which should be investigated. This will occur if the charger cannot raise the battery voltage to the preset voltage limit. Possible causes indicate a battery fault, a charger fault, low AC power supply voltage, or excessive discharge. The override timer can be reset by switching the AC power to the charger off.

b. The lower four red LED's indicate current flow. Normally at start of charge, if the batteries are discharged, all four red LEDs will be on indicating maximum 25A charge current. As the batteries charge the current drops and the LEDs go OFF as the current drops to 20A, 15A, 10A and 5A respectively.

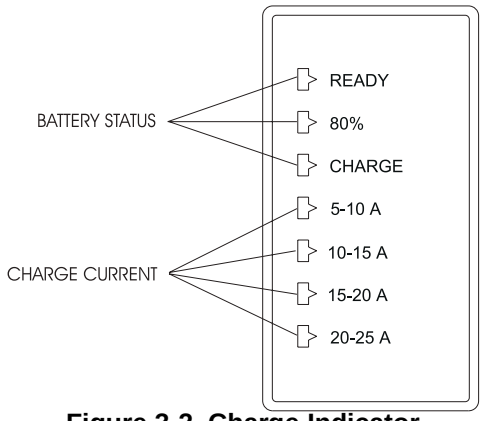
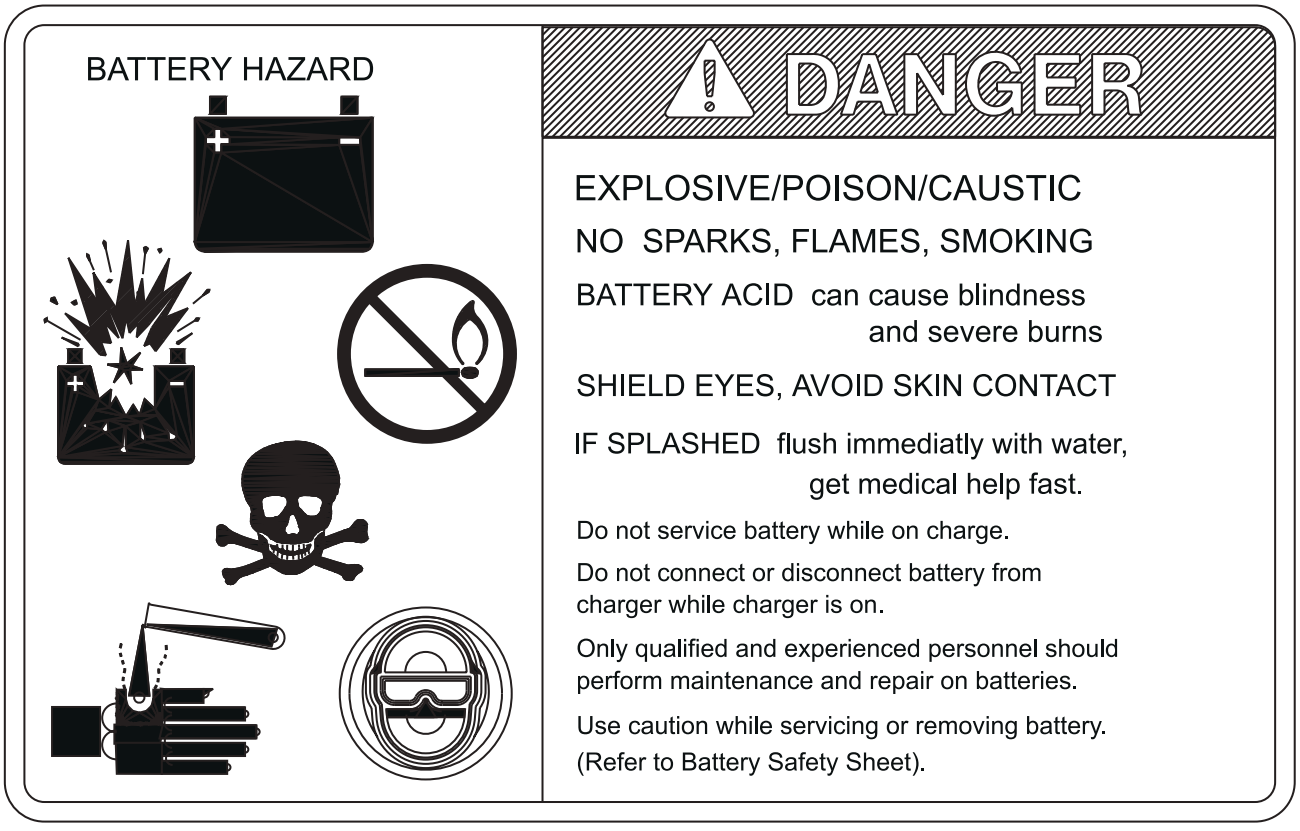


Figure 3-2 Charge Indicator

3-4.3. Removing Batteries from Charger

1. The Green "READY" LED stays on until the charger is unplugged from AC outlet.
2. Disconnect AC plug from the power supply and then remove it from the truck.
3. Disconnect the batteries from the charger and connect the batteries to the truck. Make sure connectors are mated properly.



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3-5. LUBRICATION.

Refer to Table 3-3 for the recommended types of grease and oil. Table 3-4 in conjunction with Figure 3-3 identifies the items requiring lubrication.

3-6. LIFT CHAIN MAINTENANCE

Fully raise and lower lift carriage while observing chains they move over all chain sheaves, Ensure chain is aligned and tracking properly and all links are pivoting freely. With carriage fully lowered, spray or brush on a film of SAE 30 or 40 engine oil.

Table 3-3 Recommended Lubricants (See Table 3-4 for Application)

No. 1	Transmission oil—EP SAE 80W-90 Transmission oil—EP SAE 10W30 (Note)
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 gallon) 900893 (1 quart)
No. 4	SAE 30 or 40 Engine Oil

NOTE: USED ON COLD CONDITIONED TRUCKS

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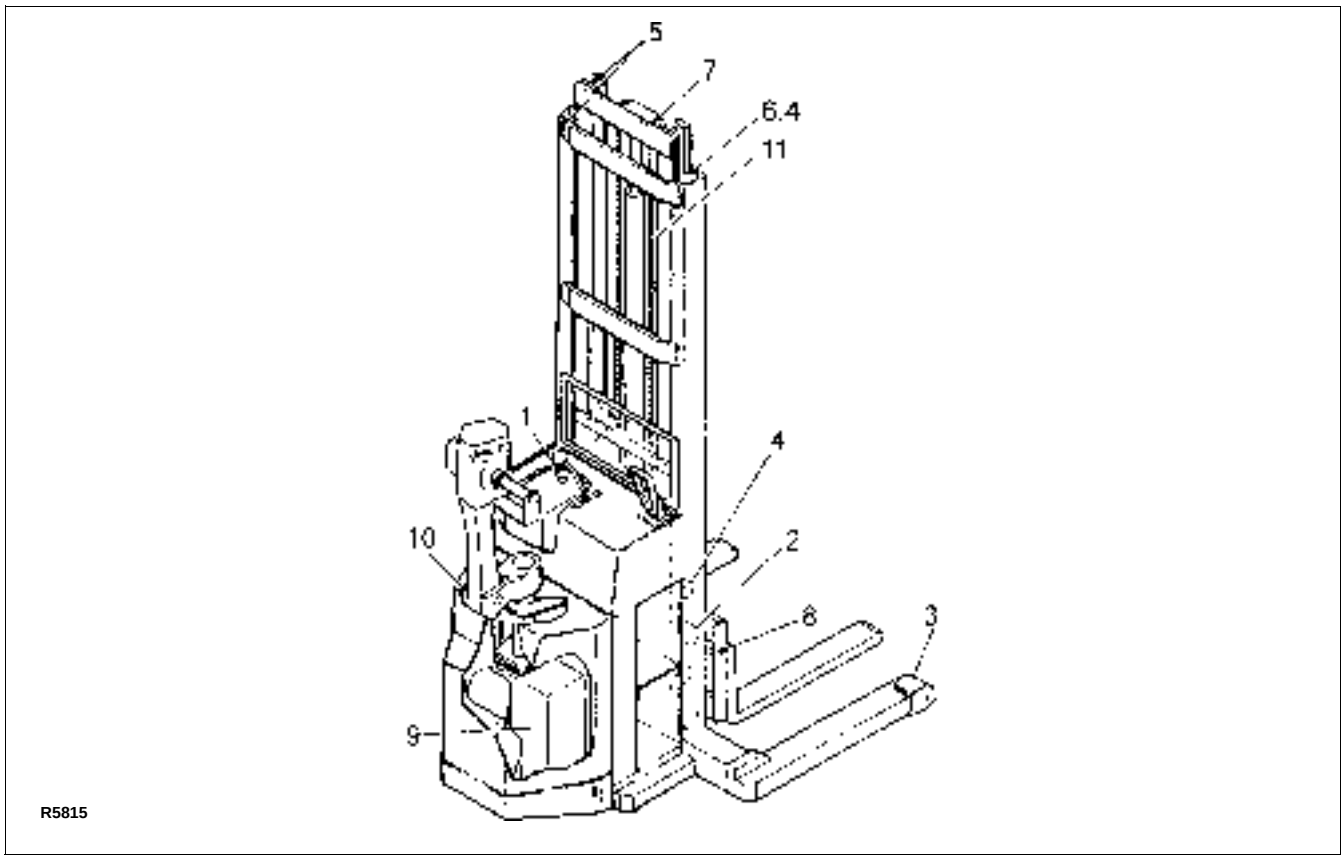

Figure 3-3 Lubrication Diagram

Table 3-4 Lubrication Chart

FIG 3-2 INDEX NO.	LOCATION	METHOD OF APPLICATION	TYPE (Table 3-3)	APPLICATION OF LUBRICANT
1	Hydraulic System Capacity-6 quarts	—	No. 3	With lift carriage fully lowered, fill reservoir with hydraulic oil to "FULL" mark on dip stick.
2	Lift carriage rollers	Gun	No. 2	Pressure lubricate.
3	Load Wheels	Gun	No. 2	Pressure lubricate.
4	Mast rollers	Gun	No. 2	Use point adapter for Female grease fitting.
5	Outer and inner mast	Brush	No. 2	Full length of channel where rollers operate
6	Upper mast roller and bracket (Serial Number 333375 to 338206)	Can	No. 4	1 or 2 drops between bearings and bracket.
7	Ram head sheaves	Gun	No. 2	Pressure lubricate.
8	Fork shaft	Brush	No. 2	Light coating.
9	Transmission Capacity 4 1/2 pints	Can	No. 1	Fill to Hex plug (Fill level plug) level. Remove vent and fill through vent hole.
10	Steering arm elbow	Can	No. 4	1 or 2 drops each time serviced.
11	Lift Chains	Brush or Spray	No. 4	See Paragraph 3-6.

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SECTION 4
TROUBLESHOOTING

1. **SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333375 TO 334630**
2. **SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 334631 TO 376499**
3. **SEE SUPPLEMENT 187 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 333375 TO 338589**
4. **SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 338590 TO 372811**
5. **SEE SUPPLEMENT 349 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 372812 TO 376499**

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 4-6 or Figure 4-7) 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 nor will lift system operate.	a. 120 Amp fuse blown.	Check fuse and replace if defective.
	b. Battery dead or disconnected.	Check battery quick-disconnect plug and check battery voltage.
	c. Keyswitch defective.	Bypass keyswitch to determine if it is malfunctioning.
	d. 15 amp control circuit fuse blown.	Check fuse and replace if defective.
	e. Defective wiring.	Check for open circuit. Repair as required.
TROUBLE WITH TRAVEL	Check all wiring. A loose connection may be the cause of malfunction.	Tighten all loose connections before further troubleshooting.
Truck does not run forward or reverse. Everything else is normal.	a. 15-Amp control circuit fuse blown.	Check fuse and replace if defective.
	b. Defective dead-man brake switch.	Check and replace brake switch if defective.
	c. Forward or Reverse switch in control head broken.	Check and replace switch if defective.
	d. Main wire harness cut.	Replace.
	e. Belly button switch out of adjustment or defective.	Adjust or replace.

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Table 4-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Truck runs forward, but not in reverse.	Defective speed control switch in control head 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, contactor is defective.
Truck runs in reverse, but not in 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 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. Defective second and/or third speed solenoids or contactors.	Check coils for continuity. Replace as required.
	b. Limit switch on mast defective or out of adjustment.	Adjust or replace.
	c. Defective time delay.	Replace.
Truck runs forward and in reverse at second or 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 for continuity and replace as required.
TROUBLE WITH BRAKING		
Mechanical brake grabs when steering arm is in operating position.	Brake linkage over adjusted.	Ajust brake.
TROUBLE WITH LIFTING OR LOWERING		Check hydraulic oil level. Before further troubleshooting, fill hydraulic reservoir so that oil is to "FULL" mark on dip stick. Tighten all electrical connections.
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.	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.

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Table 4-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Oil splashes out of vent when lowering forks.	Oil level too high.	Drain, then refill reservoir to "FULL" mark on dip stick.
Squealing sounds when lifting forks.	a. Oil level too low.	Add oil to reservoir.
	b. Dry channels in mast.	Apply grease.
	c. Defective mast or carriage bearing.	Replace bearing.
Forks do not lift to top. Pump motor runs.	a. Oil level too low.	Add oil to reservoir.
	b. Load larger than capacity.	Refer to nameplate on side of mast for maximum load capacity.
	c. Batteries are dead.	Recharge.
Oil leaks out of lift control valve release cam.	Defective O-ring in lift control valve body.	Replace O-ring on release cam shaft.
Lift control does not return to neutral.	a. Broken return spring.	Replace return spring.
	b. Foreign particles.	Clean system and valve.
	c. Misalignment of valve clamp.	Adjust as required.
Weak, slow or uneven action of hydraulic system.	a. Defective pump.	Check pressure.
	b. Defective lift cylinder.	Clean system and valve.
	c. Load larger than capacity.	Refer to name plate on side of mast for maximum load capacity.
	d. Dirt or foreign particles lodged between check ball and seat on lift control valve.	Disassemble, clean and reassemble valve.
	e. Defective lift control valve.	Adjust, repair or replace.
	f. Valve body scored inside.	Replace valve.
	g. Battery specific gravity low.	Charge battery.
Forks do not lift, motor does not run.	a. Battery is dead or disconnected.	Check and recharge if required.
	b. Defective wiring.	Check and repair as required.
	c. Defect in electrical system for operating pump motor.	Check pump motor switch on lift control valve, as well as the solenoid relays. Repair or replace.
Forks do not lift, motor runs.	Defective in hydraulic system.	Check the oil level in the reservoir and the oil lines to the lift cylinder, and repair as required. If normal, check the hydraulic pump, oil filter, and lift control valve. Repair or replace.
Forks lift, but will not go down.	Control valve in open position or defect in hydraulic system.	Check the lowering control valve as well as the flow control valve, and look for obstruction in the hydraulic line. Repair or adjust as required.

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Table 4-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
Load will not hold.	a. Oil bypassing internally between check ball and control valve body.	Disassemble, clean, and reassemble. Replace worn parts as required.
	b. Worn lift cylinder packing.	Replace cylinder packing.
Forks creep downward under load when in a raised position.	Leak in hydraulic system, packing, or valve.	Examine the lift control valve and internal check valve for obstructions preventing ball from closing completely to block oil. Look for leaking fittings in the hydraulic line. Check pump and suction line for leakage back into the reservoir. Repair or replace as required.
MISCELLANEOUS		
Steering arm does not return to the upright position.	a. Return spring improperly adjusted.	Readjust spring tension.
	b. Binding brake linkage or electrical cable.	Check and free the binding item.
	c. Broken spring	Replace.
Truck moves forward when arm is pulled down.	a. Belly-button switch defective.	Check for short, and repair or replace as necessary.
	b. Short in control head.	Check wiring and repair as required.
	c. Short in wiring harness through pivot tube.	Replace.
Steering arm jerks excessively when starting or stopping the truck.	a. Worn steering arm pivot bushings.	Replace bushings.
	b. Drive wheel tire worn.	Replace drive wheel.
Drive motor is jerky.	Motor commulator worn.	Replace motor.

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4-2. SMART CHARGER 004978 TROUBLESHOOTING (Trucks Serial Number 344163 To 376499)

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. Three 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 or 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 4-1 for a complete schematic of the charger. Figure 4-2 provides information of connecting the jumper when necessary. Figure 4-3 is a logic flow troubleshooting guide.

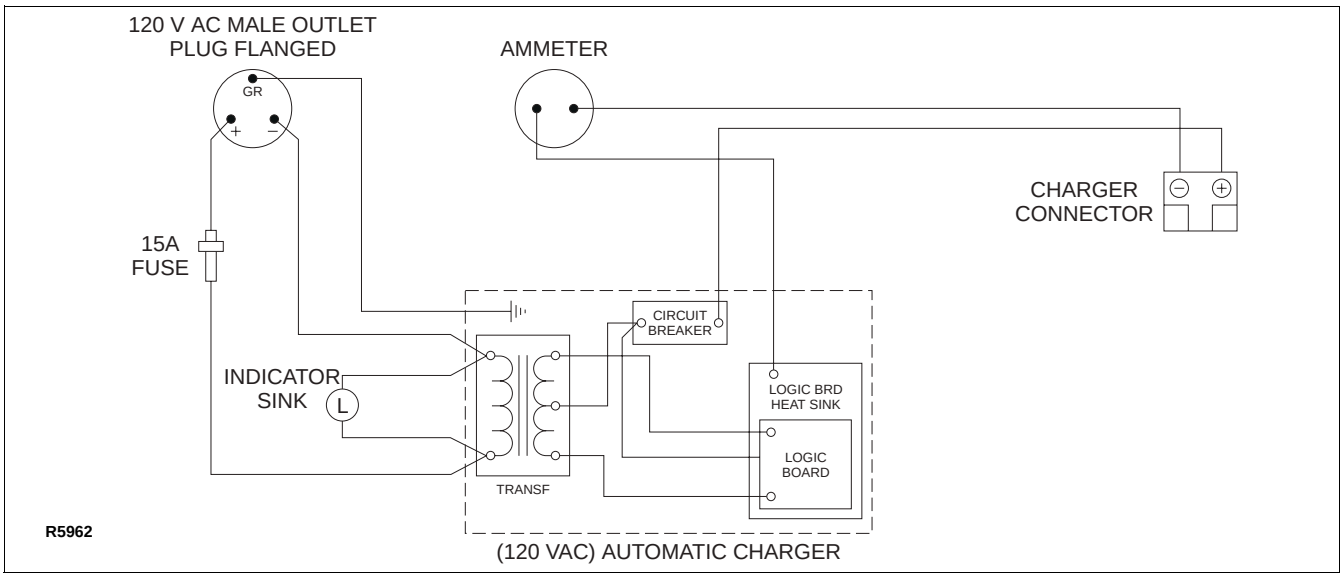

Figure 4-1 Battery Charger Schematic

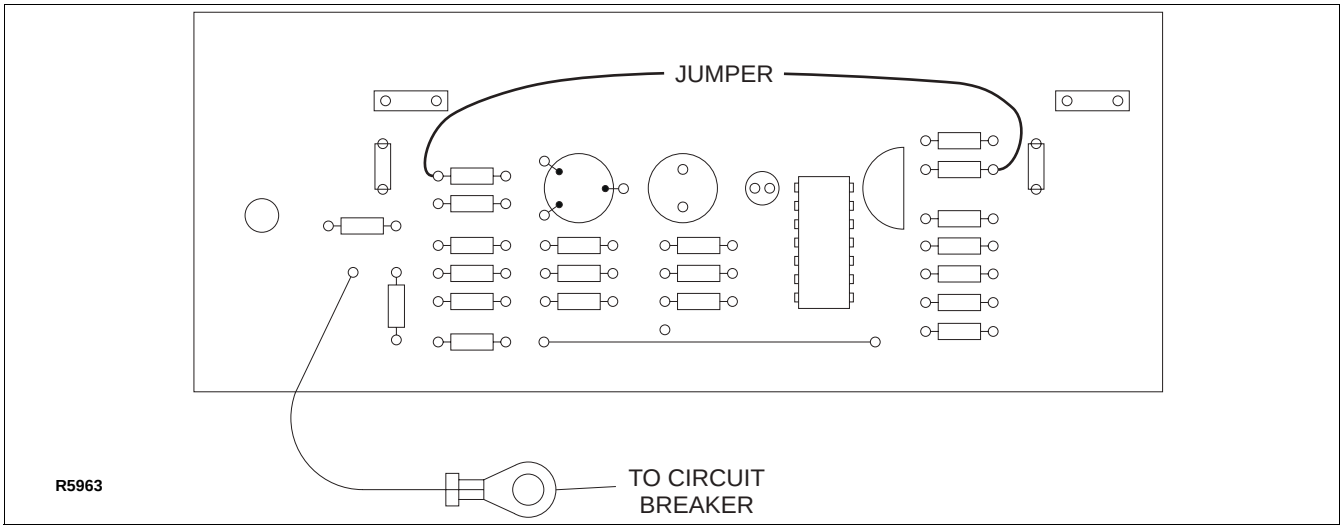

Figure 4-2 Logic Board Jumper Position

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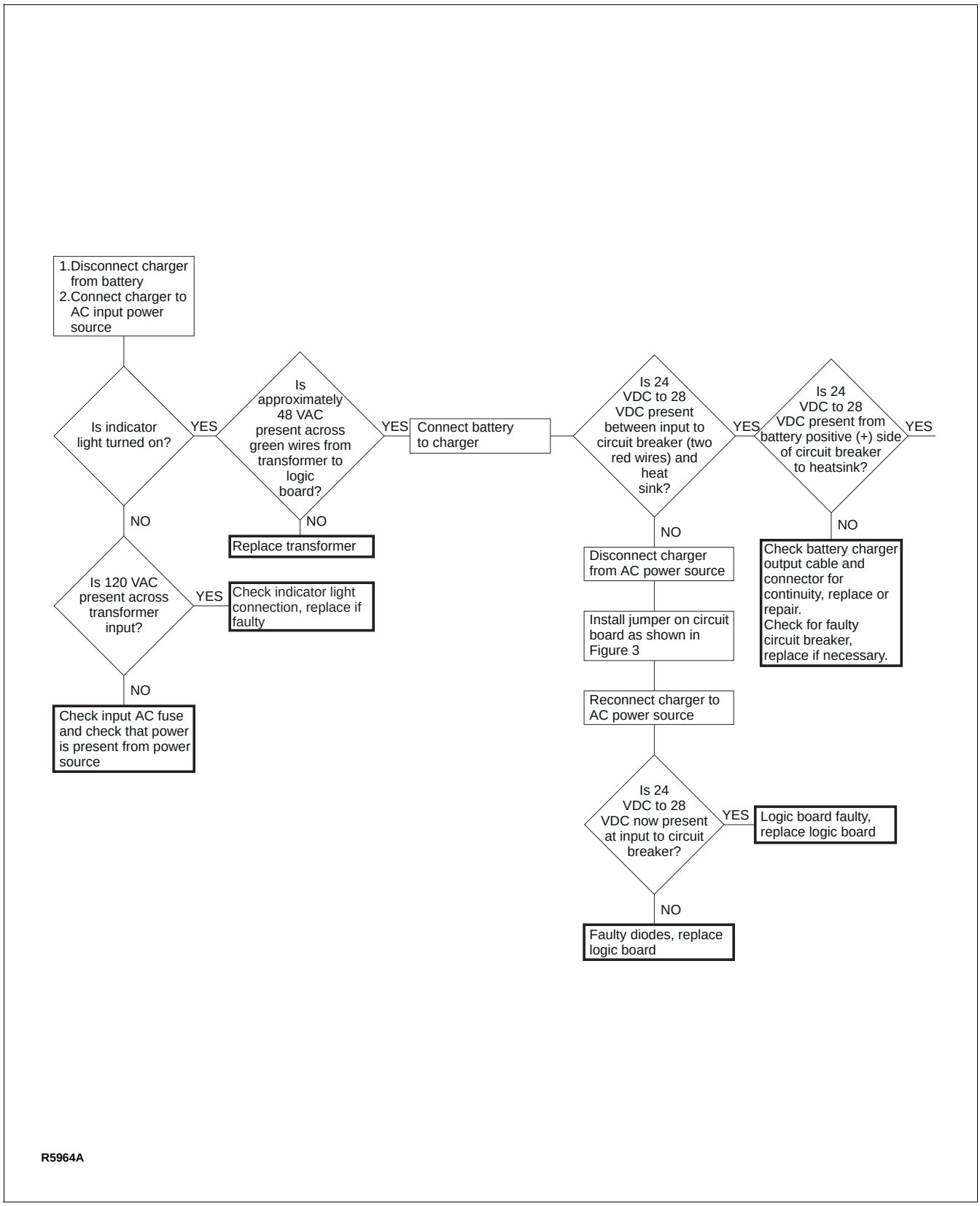

Figure 4-3 Logic Flow Diagram (Sheet 1)

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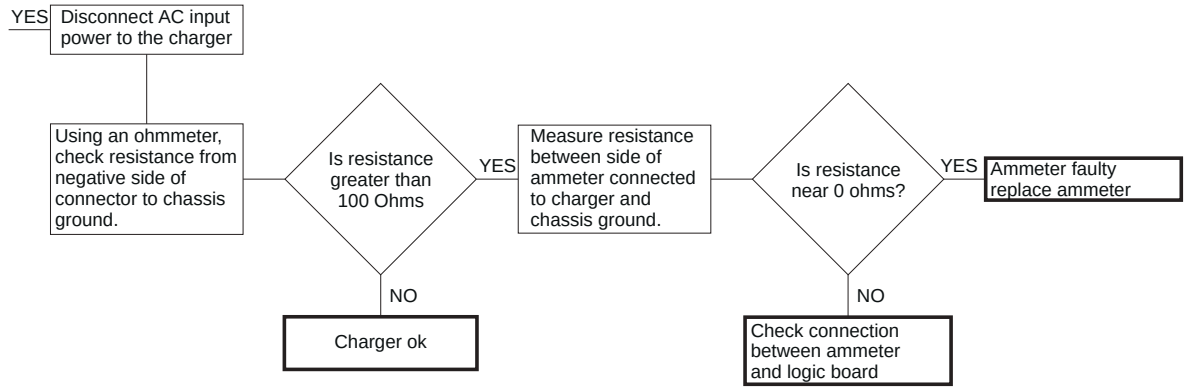

Figure 4-3 Logic Flow Diagram (Sheet 2)

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4-3. OPTIONAL GEL CELL BATTERY CHARGER 004987 TROUBLESHOOTING (Trucks Serial Number 344163 To 376499)

Refer to Figure 4-5 for part identification. Be sure the batteries are connected to the charger and the AC cord is connected to 120 VAC power supply.

4-3.1. Dip Switch Setting (Figure 4-4)

The DIP switches on the Printed Circuit Board (PCB) must be set for Gel Cell Batteries. Check that switch 1 is ON and switch 2 is OFF.

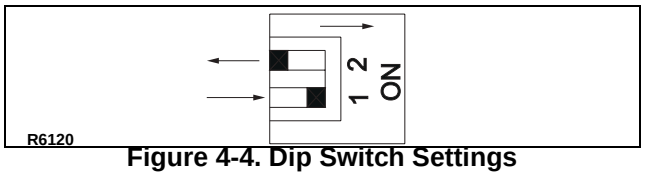

Figure 4-4. Dip Switch Settings

4-3.2. Thermistor

There is a temperature sensing thermistor plugged into a 2-pin socket marked THERM on the PCB. Check that this is firmly connected or the battery voltage control will not work properly.

4-3.3. Circuit Breaker Testing

Using a multimeter set to measure 120 VAC, check each side of the circuit breaker to ground. If 120 VAC was not indicated on both sides, replace the circuit breaker.

4-3.4. Power Transformer Testing

The two 0.250” tabs are the primary side of the transformer and five #10 screw lugs are the secondary side. Test the Transformer as follows:

1. Using a multimeter set to measure at least 120 VAC, verify that AC Power supply 120V 60Hz input is present at the transformer primary terminals. If 120 VAC was not indicated, check the circuit breaker and wiring.
2. Using a multimeter set to measure at least 50 VAC, verify the transformer secondary terminals as follows:
   a. Verify 25 VAC from blue wire to each white wire.
   b. Verify 50 VAC from the white wire to white wire.
   c. If these voltages were not indicated, replace the transformer.

4-3.5. Circuit Board Testing

The circuit board has a built in diagnostic test at power-up.

1. Switch the AC supply OFF and then ON, watching the 3 upper LEDs on the PCB. The 3 LEDs should light briefly in sequence Green-Yellow-Red when power is applied. This indicates the transformer is OK and that power is getting to the PCB.
2. If the battery DC is connected to the charger correctly, the Red LED should come ON immediately after this test sequence.
3. If the Green-Yellow-Red LED test sequence does not show at power-up, or if it cycles constantly Green-Yellow-Red, the PCB assembly should be replaced.
4. If the Red or Yellow charging LED does not stay ON after the test sequence, check that the batteries are connected to the charger.
5. Using a multimeter set to measure at least 30 VDC, verify DC Voltage from Black to Red wire is as follows:
   a. If the Red charging LED is on and the Yellow charging LED is off, voltage from black to red wire should be at least 24 VDC.
   b. If the Red and Yellow charging LEDs are on, voltage should be 29 ±1 VDC.
   c. If there is no Voltage, check the wiring and connections from the charger to the battery terminals. Battery Voltage must be correct polarity and more than 1 Volt to commence charging.

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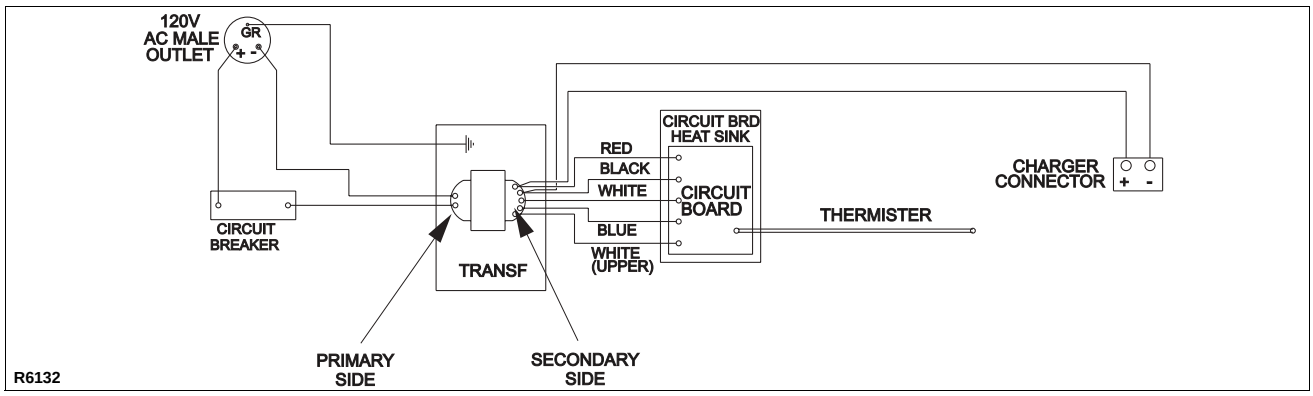

Figure 4-5. Battery Charger Wiring Diagram

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USED ON TRUCKS
SERIAL NUMBERS
333375 TO 364407

1. **SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS**
   SERIAL NUMBER 333375 TO 338589
2. **SEE SUPPLEMENT 233 FOR TRANSISTOR TRUCKS**
   SERIAL NUMBER 338590 TO 364407

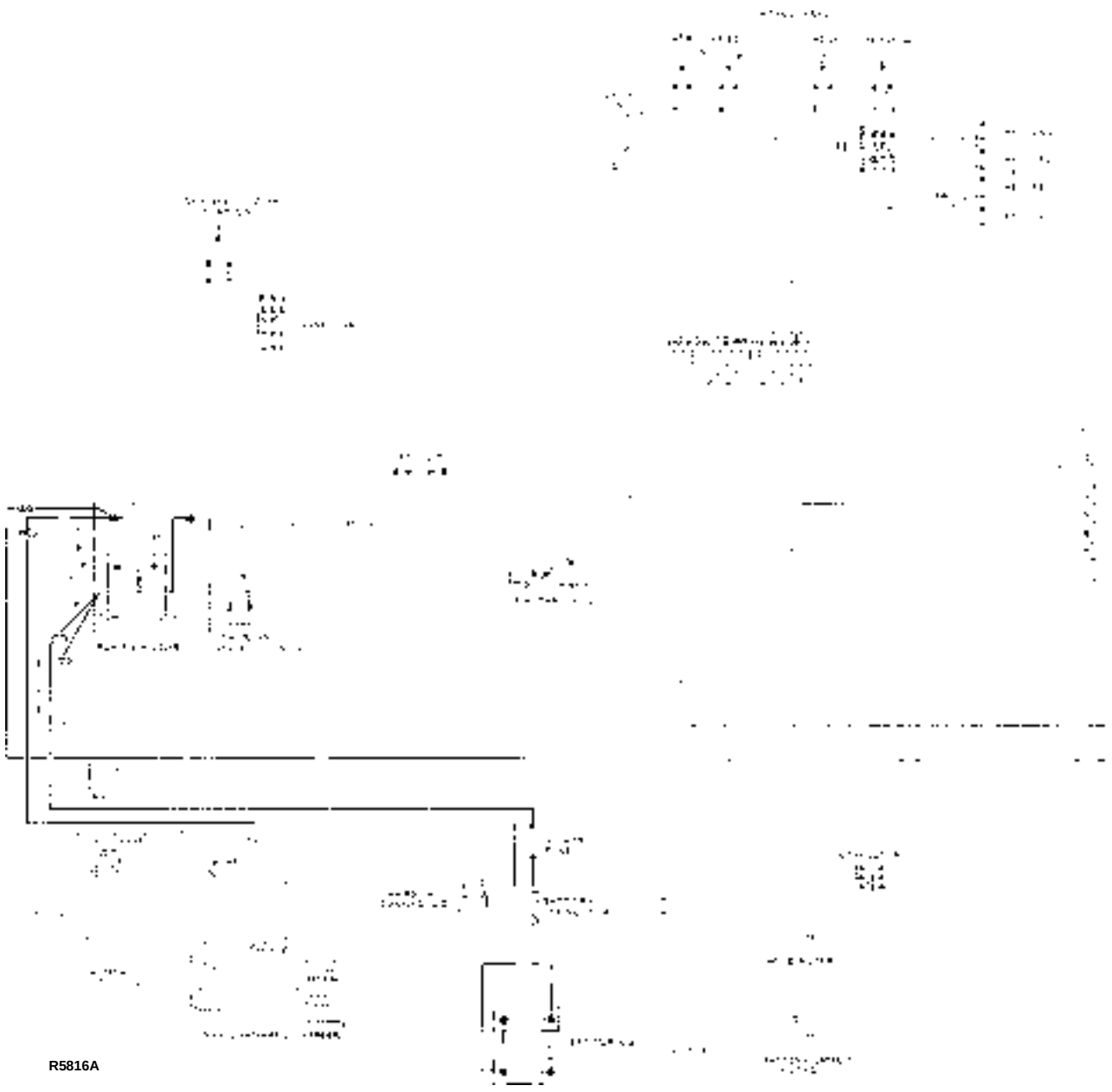

Figure 4-6 Wiring Diagram (Sheet 1)

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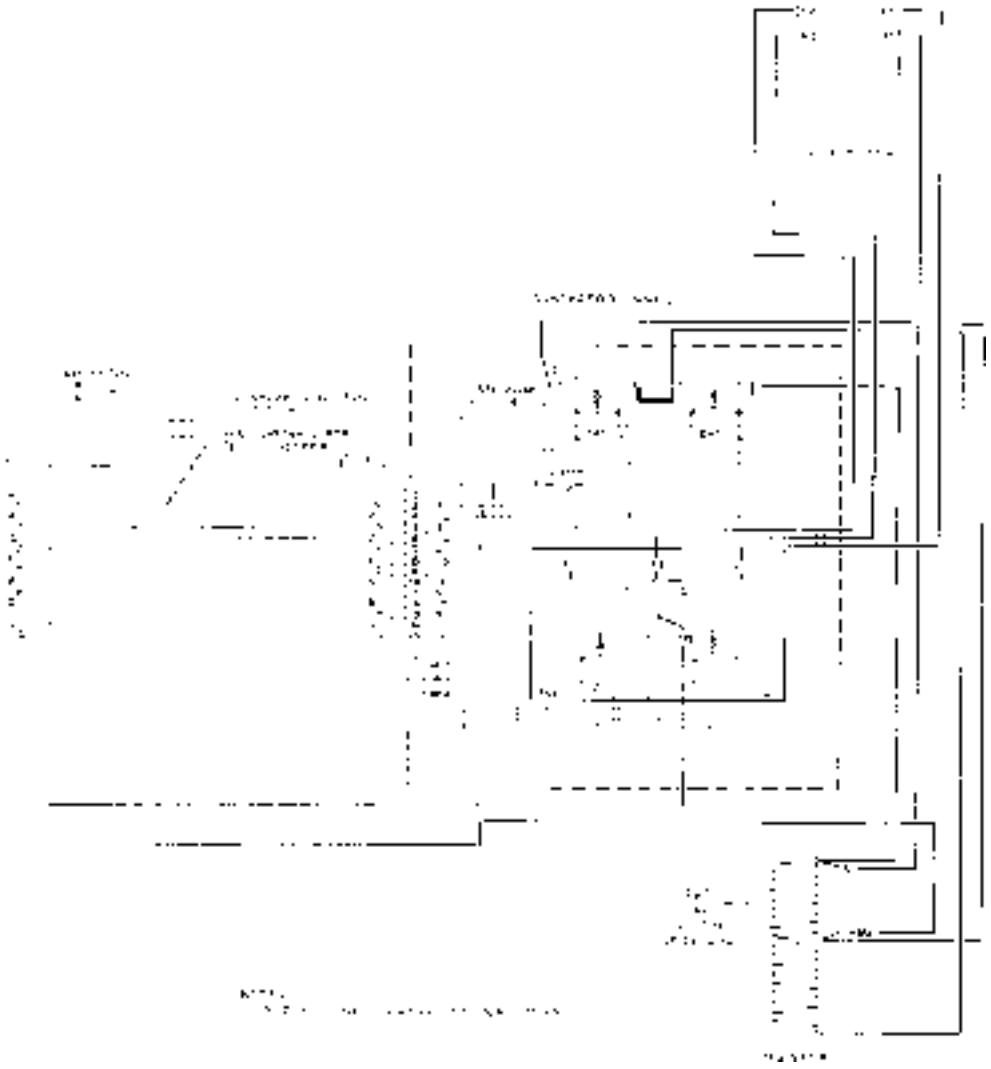
1. SEE SUPPLEMENT 187 FOR TRANSISTOR TRUCKS SERIAL NUMBER 333375 TO 338589
2. SEE SUPPLEMENT 233 FOR TRANSISTOR TRUCKS SERIAL NUMBER 338590 TO 364407

USED ON TRUCKS SERIAL NUMBERS 333375 TO 364407



R5816B

Figure 4-6 Wiring Diagram (Sheet 2)

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USED ON TRUCKS
SERIAL NUMBERS
364408 TO 376499

1. **SEE SUPPLEMENT 233 FOR TRANSISTOR TRUCKS**
   SERIAL NUMBER 364408 TO 372811
2. **SEE SUPPLEMENT 349 FOR TRANSISTOR TRUCKS**
   SERIAL NUMBER 372812 TO 376499

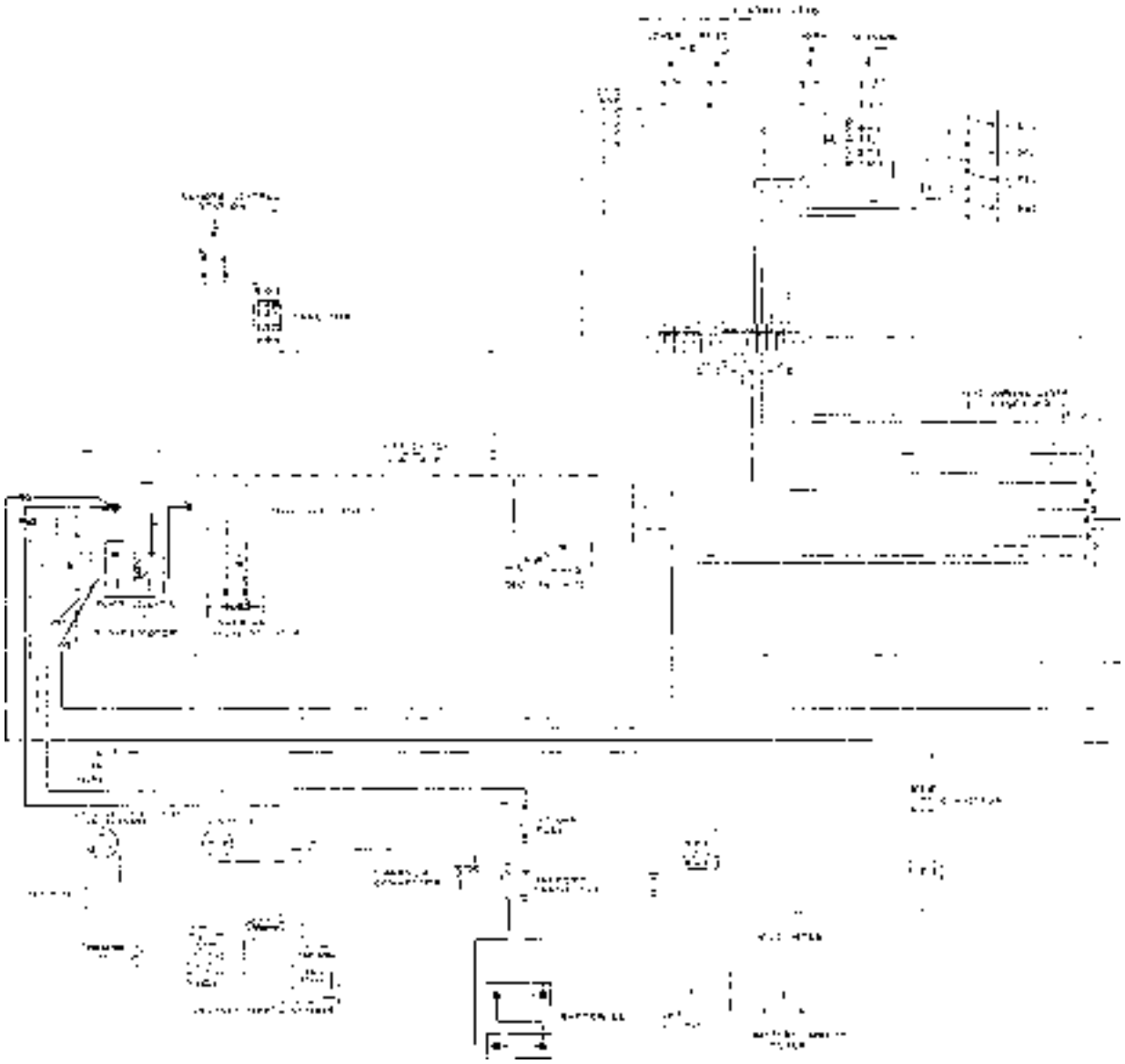

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Figure 4-7 Wiring Diagram (Sheet 1)

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1. SEE SUPPLEMENT 233 FOR TRANSISTOR TRUCKS SERIAL NUMBER 364408 TO 372811
2. SEE SUPPLEMENT 349 FOR TRANSISTOR TRUCKS SERIAL NUMBER 372812 TO 376499

USED ON TRUCKS SERIAL NUMBERS 364408 TO 376499

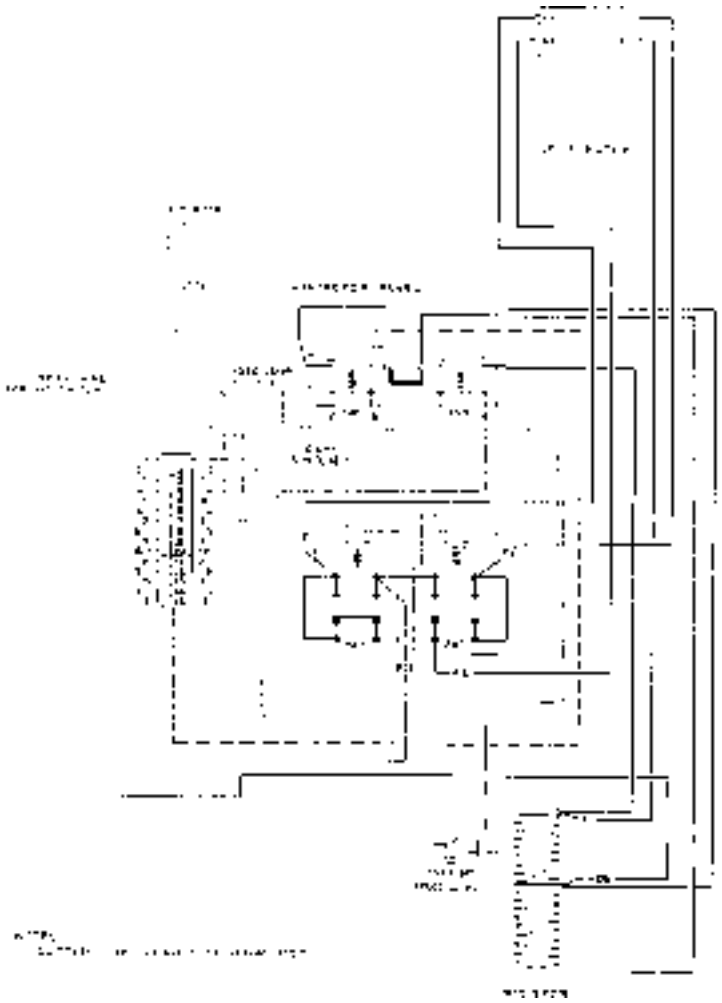

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Figure 4-7 Wiring Diagram (Sheet 2)

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NOTES

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SECTION 5
STEERING ARM AND CONTROL HEADS SERVICING

1. **SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333375 TO 334630**
2. **SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 33461 TO 376499**

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.

Speed controls are located on the inner hand grips, with optional twist grip speed control provided. The control head provides three speed progressive speed control selection.

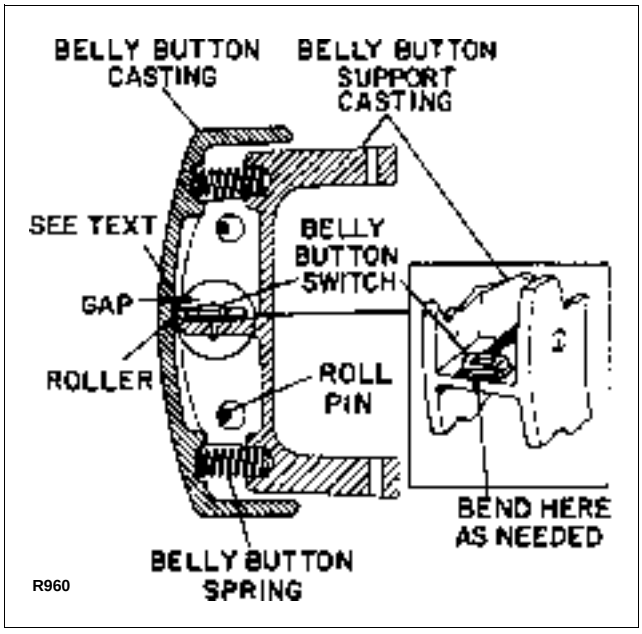

Figure 5-1 Belly-Button Switch Adjustment

5-2. 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.

Figure 5-2 is an electrical schematic diagram of the cold conditioning circuit. Location of electrical parts in the control head and resistor wiring of cold conditioning equipment is illustrated in Figure 5-3.

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.

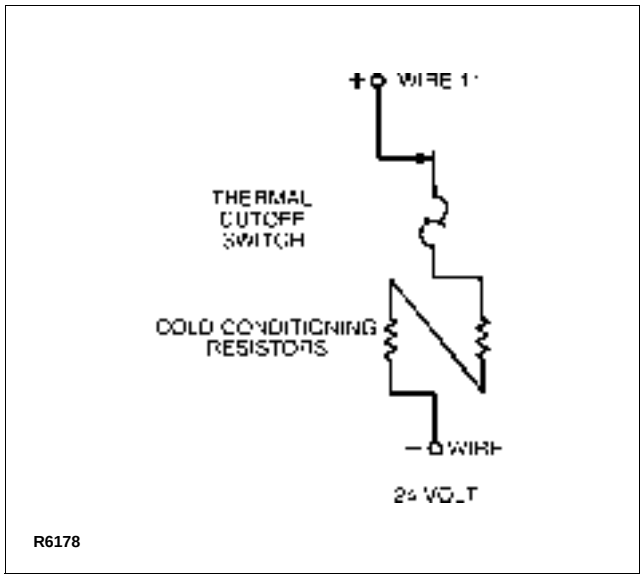

Figure 5-2 Schematic of Cold Conditioning Circuit

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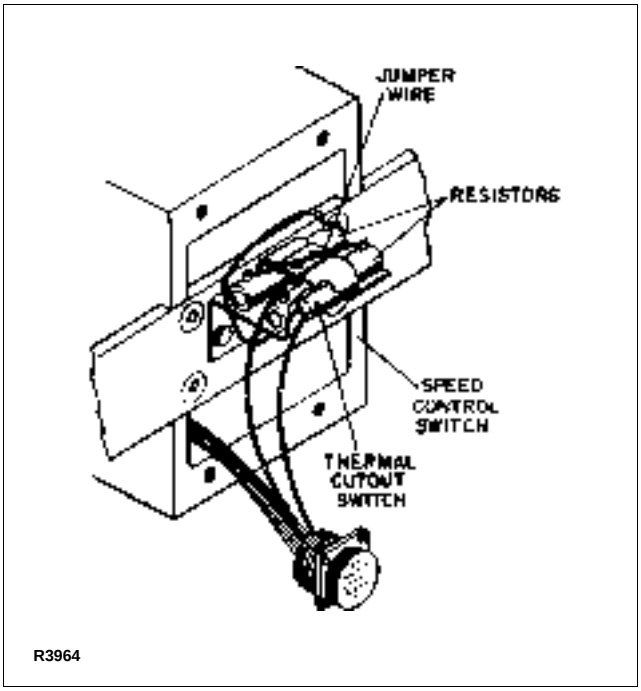

Figure 5-3 Location of Resistors and Thermal Cutout Switch

5-3. BELLY-BUTTON SWITCH ADJUSTMENT.

NOTE: Adjust the actuator gap of the belly-button switch according to the following procedure. Refer to Figure 5-1 and Figure 5-4.

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 5-4) 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.

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.

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1. SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333375 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 33461 TO 376499

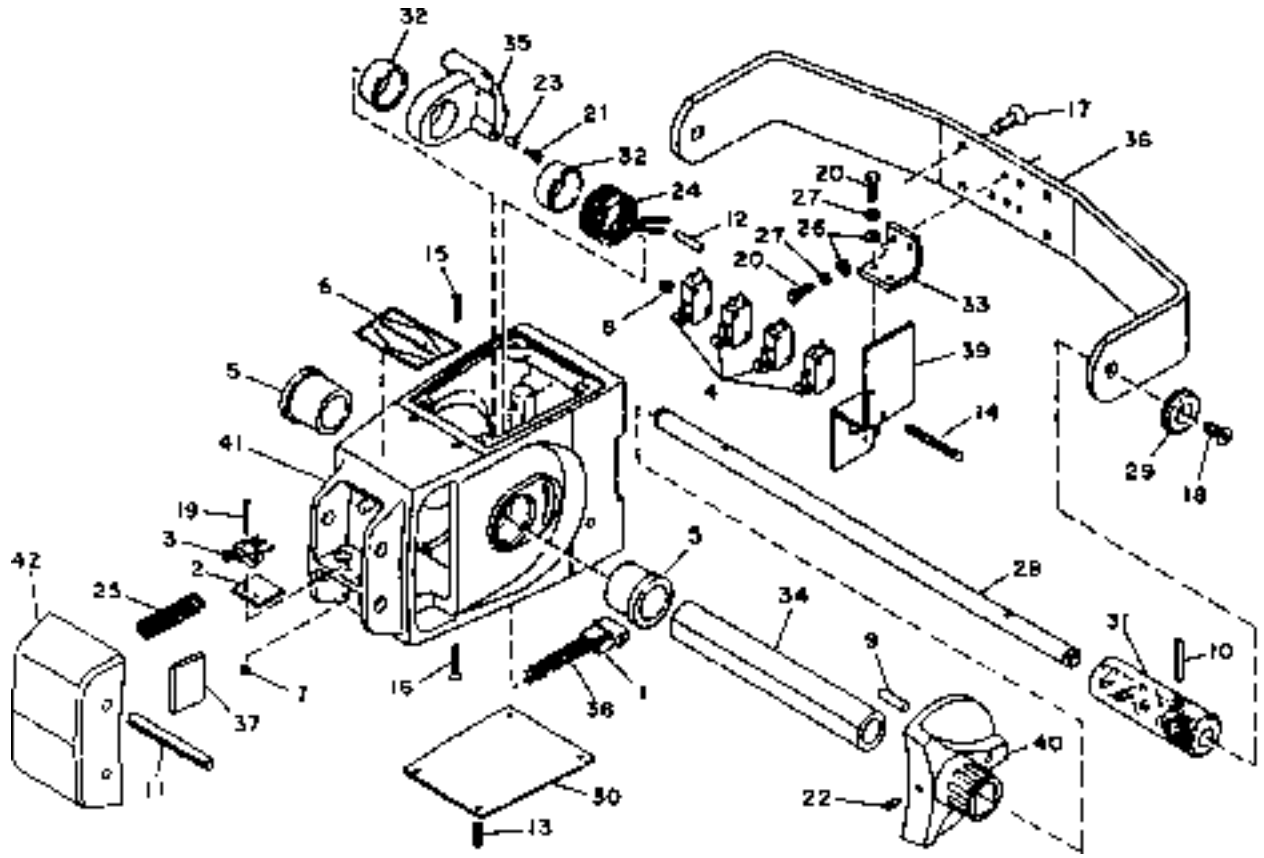

Figure 5-4 Control Head Assembly

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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.

5-4. CONTROL HEAD SWITCH REPLACEMENT.

NOTE: Refer to paragraph 5-5. for speed control switch replacement.

NOTE: For access to belly-button switch, see paragraph 5-3. For access to other switches on the control head, the top cover (15, 16, or 17, Figure 5-5) 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 5-4) by performing step 2. in paragraph 5-3.
3. Remove top cover (15, 16, or 17, Figure 5-5) of control head by removing four screws (14).
4. Remove switch plate (18, Figure 5-5) by removing four screws (15 and 16, Figure 5-4) on top and bottom of control handle (41, Figure 5-4).
5. Replace belly-button switch (3, Figure 5-4), speed control switch (4, Figure 5-4), horn switch (4, Figure 5-5), or lift and lower switches (3, Figure 5-5).

NOTE: If the belly-button switch is replaced, adjust it in accordance with paragraph 5-3. before using truck.

6. Replace switch plate (18, Figure 5-5) and secure with four screws (15 and 16, Figure 5-4) on top and bottom of control handle (41, Figure 5-4).
7. Replace top cover (15, 16, or 17, Figure 5-5) of control head, and secure with four screws (14).
8. Reconnect battery.

5-5. SPEED CONTROL SWITCH RETURN SPRING REPLACEMENT.

NOTE: Refer to Figure 5-4, Figure 5-5 and Figure 5-6 for the following procedure.

1. Disconnect battery.
2. Remove four screws (24, Figure 5-6) securing control head to steering arm.
3. Disconnect connector (23).
4. Remove four screws (14, Figure 5-5) securing top cover (15) to control head.
5. Disconnect speed control switches (4, Figure 5-4).
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).

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1. SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333375 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 33461 TO 376499

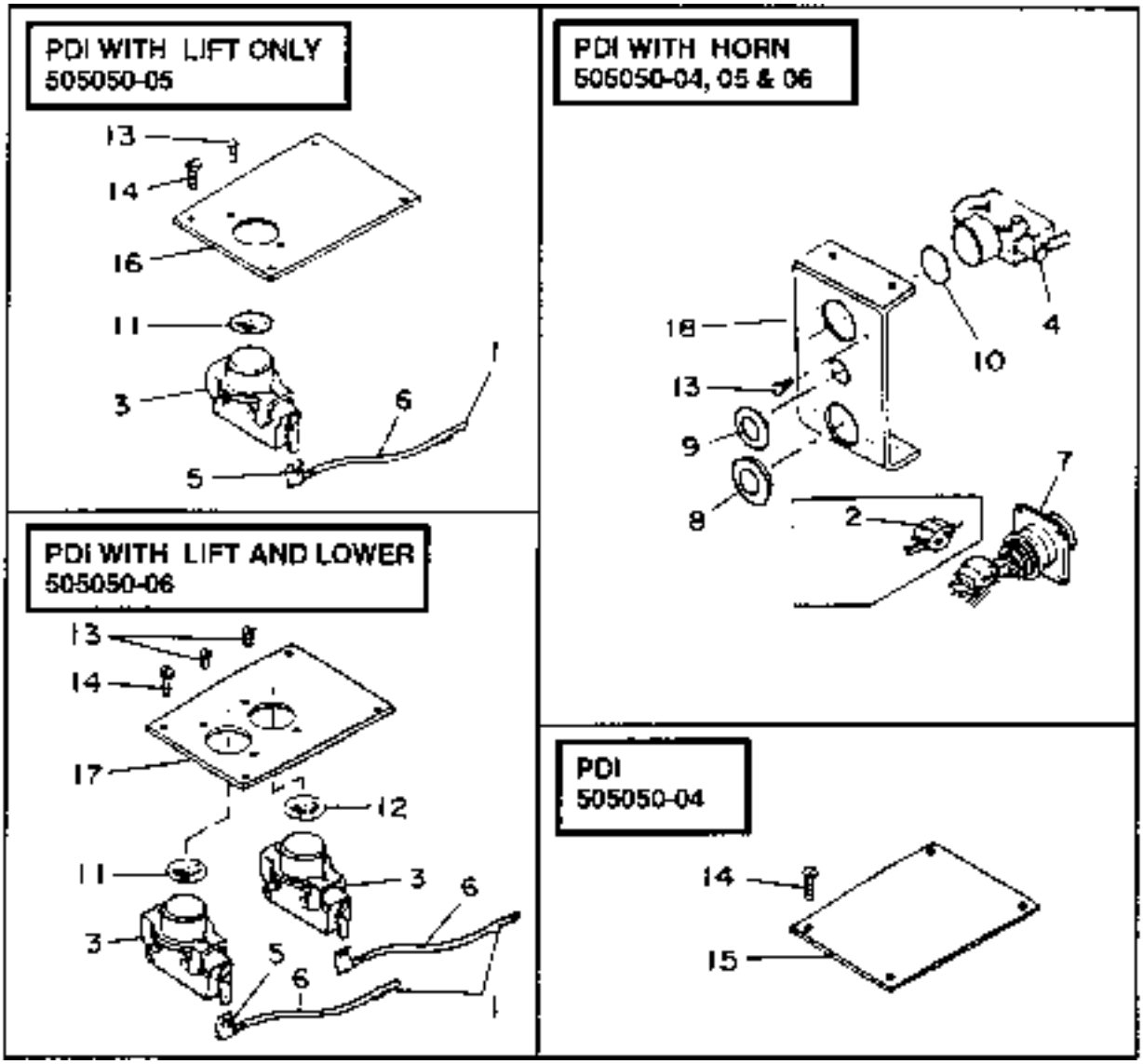

Figure 5-5 Push Button Switches

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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 spirol pin (12) and remove return spring.
15. Place new return spring in position, engage with spirol 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 5-5) with four screws (14).
22. Reconnect connector (23, Figure 5-6).
23. Install control head onto steering arm with four socket head screws (24, Figure 5-6).
24. Reconnect battery.

5-6. 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 5-6 and proceed as follows to adjust the steering arm return spring tension.

NOTE: Refer to Figure 5-6 for the following procedure.

1. Disconnect the battery.
2. Hold the steering arm (12, Figure 5-6) 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 (13). The spring tube (2) will rotate counterclockwise when screw is loosened.
4. With a pair of vise grip pliers, grip the flat surfaces of the spring tube assembly (2) and rotate clockwise 180 degrees.
5. Hold spring tube assembly in rotated position and tighten screw (13) 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.

5-7. STEERING ARM RETURN SPRING REPLACEMENT.

NOTE: Refer to Figure 5-6 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, Figure 5-6) 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 (2) 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 (13).

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 (2), and slowly pull it free from the steering arm, pivot cap and tube clamp (10).

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

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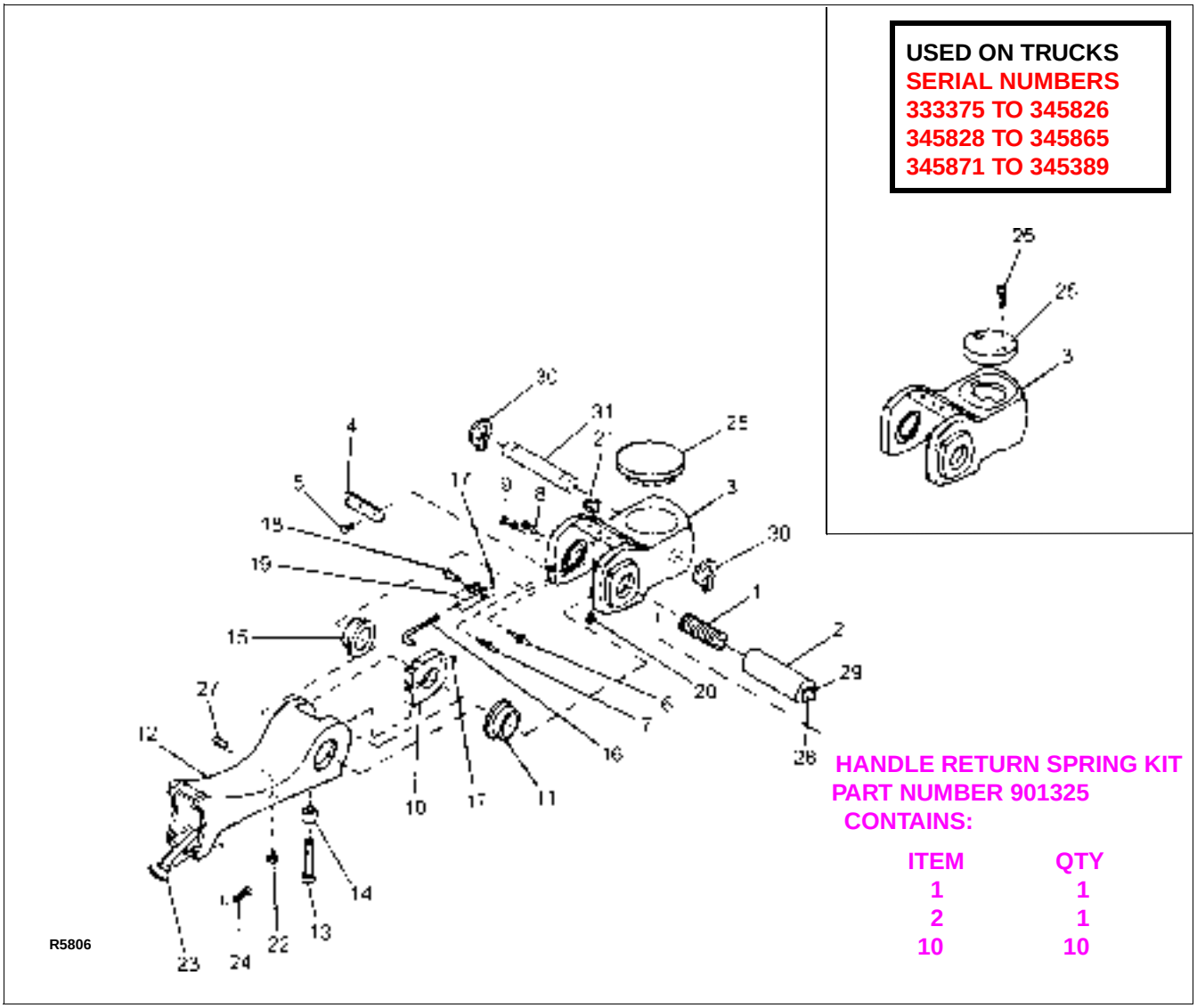

Figure 5-6 Steering Arm and Electrical Cable

7. Remove steering arm return spring (1) from spring tube assembly (2). If spring is severely jammed and will not come loose, punch and drive the 1/4-inch diameter roll pin (29) 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 (1) 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 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 (13).
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 5-6.
15. Reconnect battery.

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5-8. PIVOT TUBE FLANGED BUSHING REPLACEMENT.

NOTE: Replacement of the flanged bushings requires the removal of the steering arm and pivot cap, transmission, and pivot tube assembly.

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

NOTE: A chain hoist is required for this procedure.

1. Disconnect battery.
2. Block load wheels securely.
3. Disconnect connector (9, 5-9.).
4. Disconnect the wires to the dead man switch.
5. Disconnect the wire to the horn.
6. Disconnect the four cables connected to the drive motor.
7. Disconnect brake rod from brake lever by removing cotter pin.
8. **Trucks Serial Number 333375 to 345826, 345828 to 345865, 345871 to 345389**, remove two socket head screws (26, Figure 5-6) securing pivot cap cover (25).
9. Remove pivot cap cover (25).
10. Remove pivot cap with electrical control cable, brake rod, steering arm and control head from pivot tube assembly.
11. Remove cotter pin (5, Figure 5-7) from pin (6), then remove pin (6) from upper spacer (7) on pivot tube.

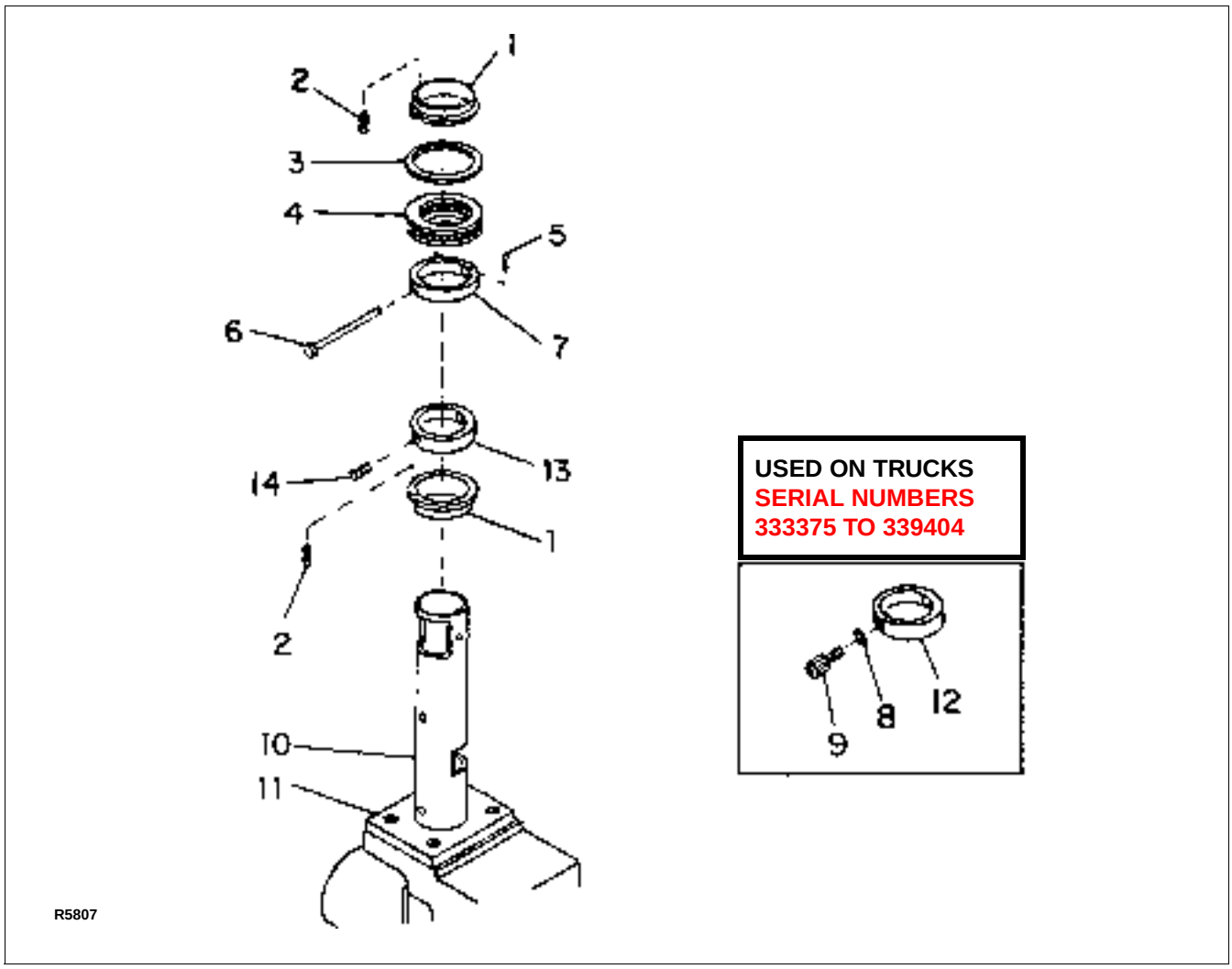

Figure 5-7 Pivot Tube Assembly

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12. Remove lower spacer mounting hardware as follows:
    a. **Truck Serial Number 339404 To 376499**, remove set screw (14) from lower spacer (13) on pivot tube.
    b. **Truck Serial Number 333375 to 339404**, remove socket head screw (9) and lockwasher (8) from lower spacer (12) on pivot tube.
13. Using jacks or another lift truck, raise truck frame around drive wheel enough to provide clearance for access to four socket head screws securing pivot tube to transmission.
14. Remove the four socket head screws (11) securing the pivot tube (10) to the transmission.
15. Position a chain hoist above the pivot tube.
16. Connect chain to pivot tube as follows:
    a. **Trucks Serial Number 333375 to 345826, 345828 to 345865, 345871 to 345389**, using the two pivot cap cover screws (26, Figure 5-6) as a means of attachment for the chain, install the two screws onto the pivot tube with the chain attached.
    b. **Trucks Serial Number 345827, 345866 to 345870, 345390 To 376499**, use tool kit part number 907151. Position spacer, Figure 5-8, inside the pivot tube. Insert the pin through the support tube and secure with the cotter pin. Attach chain hoist to the spacer.

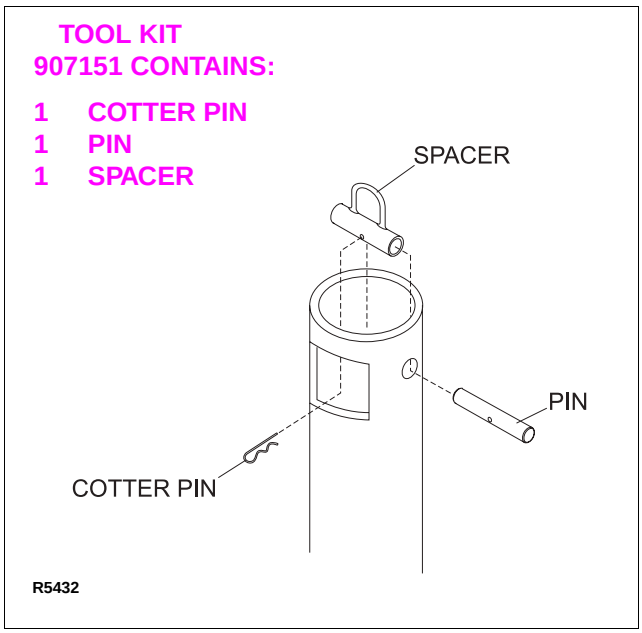

Figure 5-8 Pivot Tube Removal Tool

17. Alternately raise the truck frame and then the pivot tube several more inches, until enough clearance is provided to lift out the transmission assembly with the drive wheel and motor and brake assembly.

WARNING: The following step requires two people as heavy lifting is involved.

18. Lift out the transmission assembly with the drive wheel and motor and brake assembly.
19. Slowly lower the pivot tube through the upper and lower pivot tube housing until the top of the pivot tube is half way between the upper and lower pivot tube housing.
20. Block the pivot tube in position.
21. Remove the hoist chain and the two pivot cap cover screws or pivot tube tool as applicable.
22. Remove the upper bushing (1, Figure 5-7), spacer (3), bearing (4), and upper spacer (7).
23. Remove lower spacer (12 or 13) and lower bushing (1).
24. Inspect the bearing (4) for wear. If worn, replace with new bearing.
25. Discard the two old bushings (1).

NOTE: When installing the new bushings with spacers and bearings, refer to Figure 5-7 to be sure they are positioned on pivot tube in the proper order.

26. Place new bushing (1), spacer (12 or 13), spacer (7), bearing (4), spacer (3), and bushing (1) around pivot tube (10). Do not install lower bushing (1) onto lower pivot tube housing at this point.
27. Connect hoist chain to pivot tube as described in Step 16.
28. Slowly raise the pivot tube, being careful to check for alignment with the upper pivot tube housing, until enough clearance exists to install the transmission assembly with drive wheel and motor and brake assembly.
29. Remove the blocks from under the pivot tube.
30. Position the transmission assembly (with drive wheel and motor and brake assembly) in place for installation.
31. Alternately lower the pivot tube and truck frame until the pivot tube mounting base contacts the transmission while leaving access for the mounting screws.

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32. Align the mounting screw holes, and install the pivot tube onto the transmission with the four socket head screws (11).
33. Lower the truck frame fully and remove the lifting device.
34. Position the upper and lower bushings (1) on the upper and lower pivot tube housing with the roll pin holes aligned with the bushing roll pin cutouts.
35. Position the bearing (4) and upper spacer (7) beneath the upper bushing (1) with the spacer pin hole aligned with the pivot tube pin hole.
36. Install the pin (6) through the spacer (7) and pivot tube (10).
37. Install the cotter pin (5) onto the pin (6).
38. Position the lower spacer (12 or 13) against the lower bushing (1).
39. Install lower spacer mounting hardware as follows:
    a. **Truck Serial Number 339404 To 376499,** install set screw (14) and torque to 15 ft-lbs.
    b. **Truck Serial Number 333375 to 339404,** align screw hole of lower spacer (12) with hole in pivot tube. Install the washer (8) and socket head screw (9) through the spacer (12) and pivot tube (10).
40. Remove the hoist chain and the two pivot cap cover screws or pivot tube tool applicable.

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

41. Reinstall pivot cap and steering arm onto pivot tube, being careful not to damage electrical control cable and brake rod. (See Figure 5-9).
42. Reconnect the connector (9, Figure 5-9).
43. Reconnect the wires to the dead man switch.
44. Reconnect the wire to the horn.
45. Reconnect the brake rod to the brake lever with cotter pin.
46. Reinstall the pivot cap cover.
47. Reconnect the four motor cables.
48. Reconnect battery.
49. Remove the blocks from the load wheels.
50. Check truck for proper operation before returning to service.

5-9. ELECTRICAL CONTROL CABLE REPLACEMENT.

NOTE: Refer to Figure 5-9 while performing the following procedure.

1. Disconnect 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 5-9) 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 (3).
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 connector (9) on 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 wires connected to the pin numbers 3 and 8 on the connector (9) are wires that go to the dead-man switch. The wire connected to pin 7 goes to the horn.

10. Remove base access cover.
11. Disconnect connector (9) from contactor panel.
12. Disconnect cable wire numbers 3 and 8 from the dead-man switch.
13. Disconnect cable wire number 7 from the horn.

NOTE: When performing step 14., be sure to leave enough cable exposed through pivot cap cover opening to loop around spring tube assembly and reach through steering arm to control head.

14. Draw new cable into pivot tube (10) by pulling old cable out through the base access opening.
15. Untape connector (8) end of old cable from connector (9) end of new cable.

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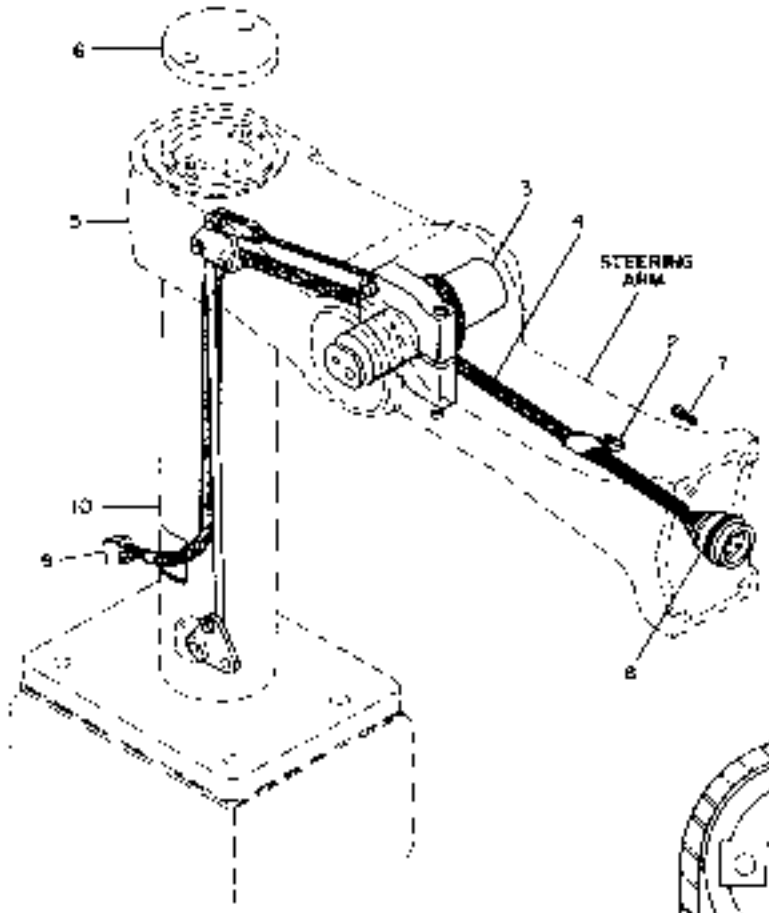

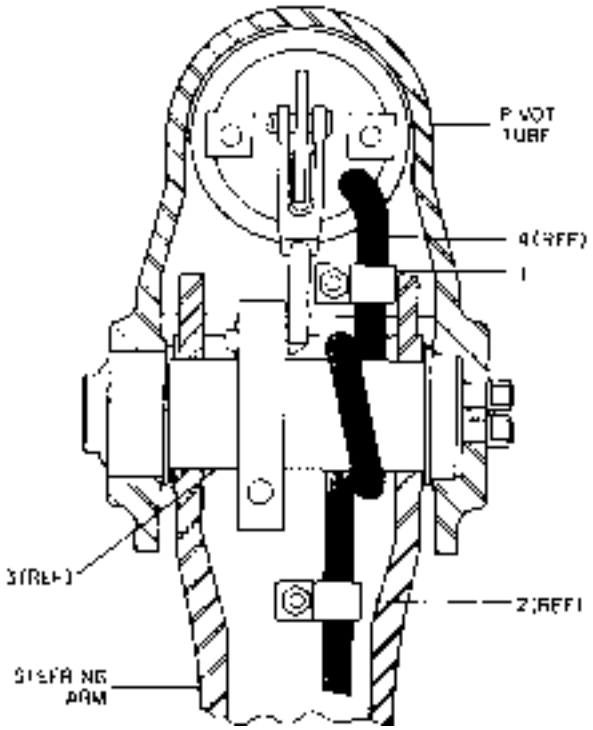

1 CABLE CLAMP
2 CABLE CLAMP
3 SPRING TUBE ASSEMBLY
4 ELECTRICAL CONTROL CABLE
(HARNESS PN 023129)
5 PIVOT CAP
6 PIVOT CAP COVER
7 ACCESS COVER
8 FEMALE CONNECTOR
(PLUG PN 005650,
PINS PN 005642)
9 MALE CONNECTOR
(PLUG PN 005652,
PINS PN 005626)
10 PIVOT TUBE
11 TRANSMISSION HOUSING

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Figure 5-9 Electrical Control Cable Replacement

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16. Connect the new cable connector (9) to the connector on the contactor panel.
17. Route and connect cable wire numbers 3 and 8 to the dead man switch.
18. Route and connect cable wire number 7 to the horn switch.
19. Wipe off excess grease or silicone spray from exposed parts of the cable.
20. Route connector (8) end of cable under spring tube assembly (3) and out the opening at the elbow.
21. 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.

22. Loop cable around spring tube assembly (3) as illustrated and push connector (8) end of cable through steering arm.
23. 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.

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

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SECTION 6
BRAKE SERVICING

6-1. ADJUSTMENT

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

NOTE: Refer to Figure 6-1, Figure 6-2 and Figure 6-3 for the following procedure.

1. Disconnect battery connections.
2. Jack up the truck so the drive wheel is off the ground; then securely block the truck to prevent slipping.
3. Remove service cover.
4. Secure steering arm assembly in a position that is in either lightly shaded area shown in Figure 6-1.

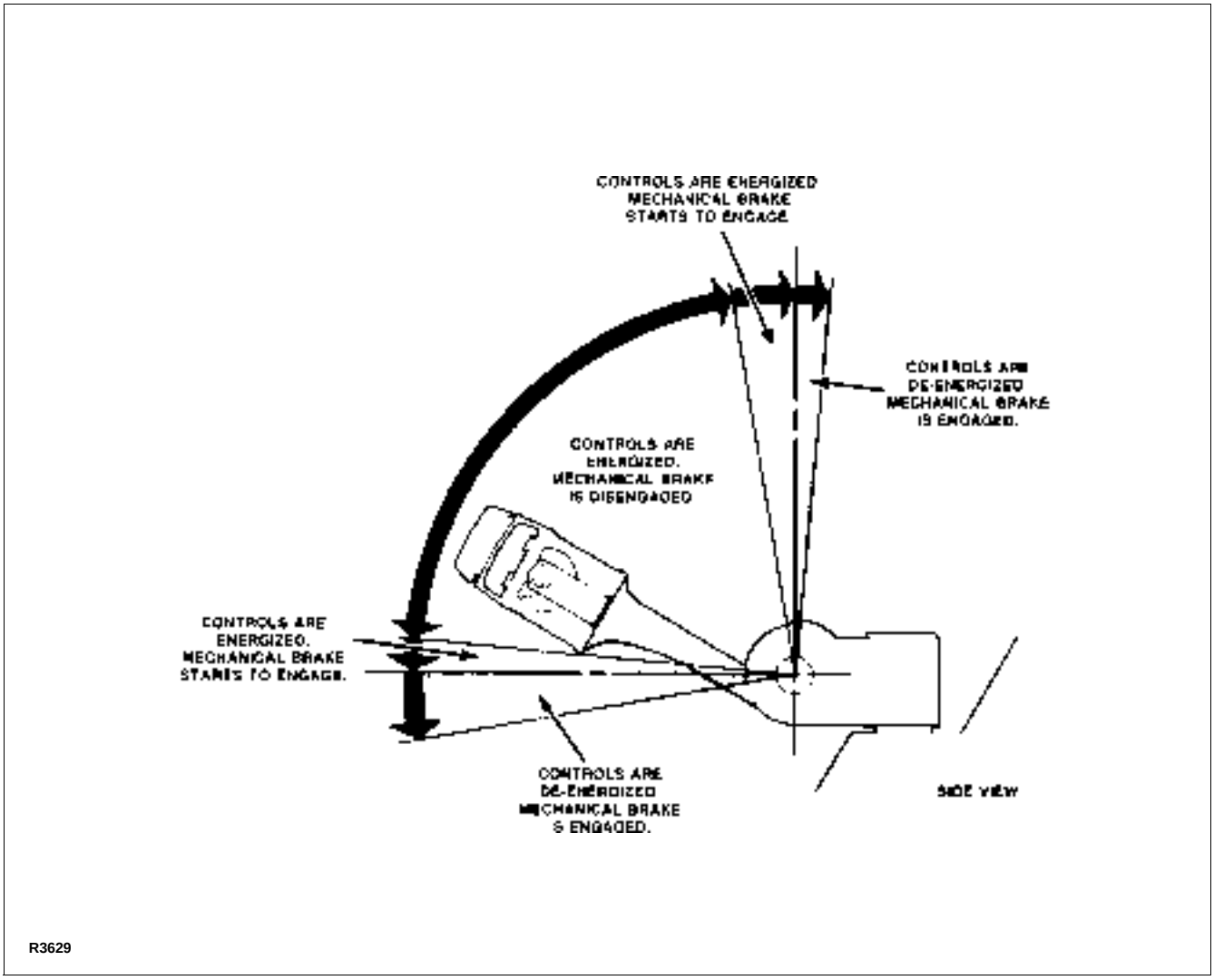

Figure 6-1 Brake Engage/Disengage

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5. Remove the cotter pin (4, Figure 6-2), then slide the rod (2) into the brake lever (3) far enough to pull the link pin (1) out of the lever (5).

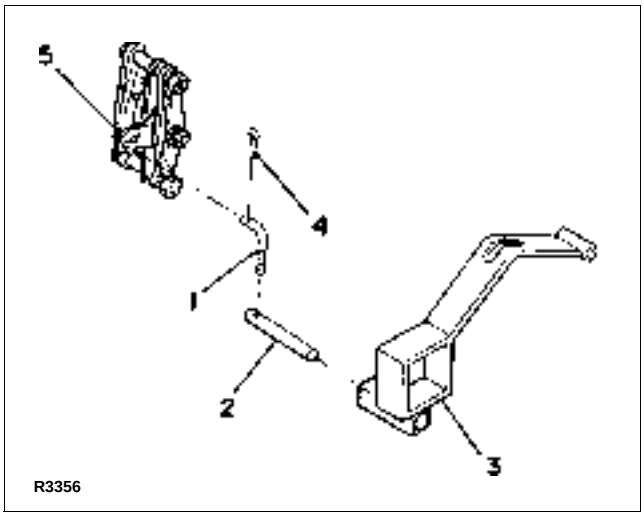

Figure 6-2 Adjustment

6. Turn the link pin (1) to make the adjustment.
7. Slide the link pin (1) back into the lever (5), but do not insert the cotter pin (4) at this time.
8. Spin the drive wheel by hand to check brake adjustment. If there is no drag, go to step 9. If there is noticeable drag, go to step 11.
9. Disconnect the link pin (1).
10. Repeat steps 6. through 8. until adjustment is correct providing noticeable drag.
11. Install the cotter pin (4).
12. Secure the steering arm in drive position and spin the drive wheel to make sure there is no drag. If there is any drag, carefully readjust only enough to eliminate drag in the drive position.
13. Remove the restrictions from the steering arm and let the arm return to the upright position.
14. Check that the brake lever has activated the dead-man brake switch and removed power from the control circuits. If the switch is not activated, go to step 15. If it is activated, go to step 17.
15. Adjust the position of the dead-man switch by loosening the screws attaching the switch to bracket (8, Figure 6-3), then sliding the switch up or down in the adjustment slots, and tightening the screws.
16. Make sure that applying the brake activates the switch but does not fully depress the switch plunger. If necessary, repeat steps 14. and 15. until the switch is properly positioned.
17. Lower the truck and install the service cover.
18. Reconnect battery connections.

6-2. REPLACEMENT OF DISC BRAKE PARTS

NOTE: Refer to Figure 6-3 for the following procedure.

1. Disconnect battery connections.
2. Block the wheels to prevent the truck from rolling.
3. Secure the steering arm down from its park position so that the brake is disengaged.
4. Remove service cover.
5. Remove the cotter pin (2, Figure 6-3) from the link pin (17).
6. Slide the rod (16) with link pin (17) far enough into the brake lever (15) to pull the link pin out of the lever (29).
7. Remove two screws (10) and lockwasher (9).
8. Remove complete disc brake pad assembly (18) from plate, tapping lightly with a hammer if necessary.

NOTE: Complete assembly can be replaced. Order part number 052821.

9. If complete brake assembly is to be replaced proceed with step 18. If brake assembly is to be disassembled proceed with step 10.
10. Hold assembly (18) together, then remove the two nuts (19) and lock washers (31).
11. Remove the bolts (20), springs (22), spacers (21), and brake pad (23).
12. Remove the C-ring (24), washer (25), spring (26), bracket (28), lever (29), and washer (30) from the brake pad (27).
13. Discard the springs (22 and 26) and brake pads (23 and 27). Replace them with new parts.

NOTE: For brake disc replacement refer to SECTION 7, Transmission.

14. Assemble the washer (30), lever (29), bracket (28), spring (26), washer (25), and C-ring (24) to the brake pad (27).
15. Assemble the brake pad (23), spacers (21), and springs (22) to the two bolts (20).

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16. Align the bolt holes in the bracket (28) and brake pad (27), then slip the bolts (20) through the holes in brake pad (27), mounting block (11) and bracket (28) and hold the assembled parts together.
17. Assemble the lock washers (31) and nuts (19) to the bolts. (20).
18. Install the assembled brake (18) to mounting plate with two screws (10) and lockwashers (9). Tap assembly lightly with hammer, if necessary to clear mounting plate opening.
19. Slide the link pin (17) into the lever (29) and secure the link pin with the cotter pin (2).
20. Adjust the brake as described in paragraph 6-1.
21. Install the service cover.
22. Remove the restrictions from the steering arm.
23. Reconnect battery connections.

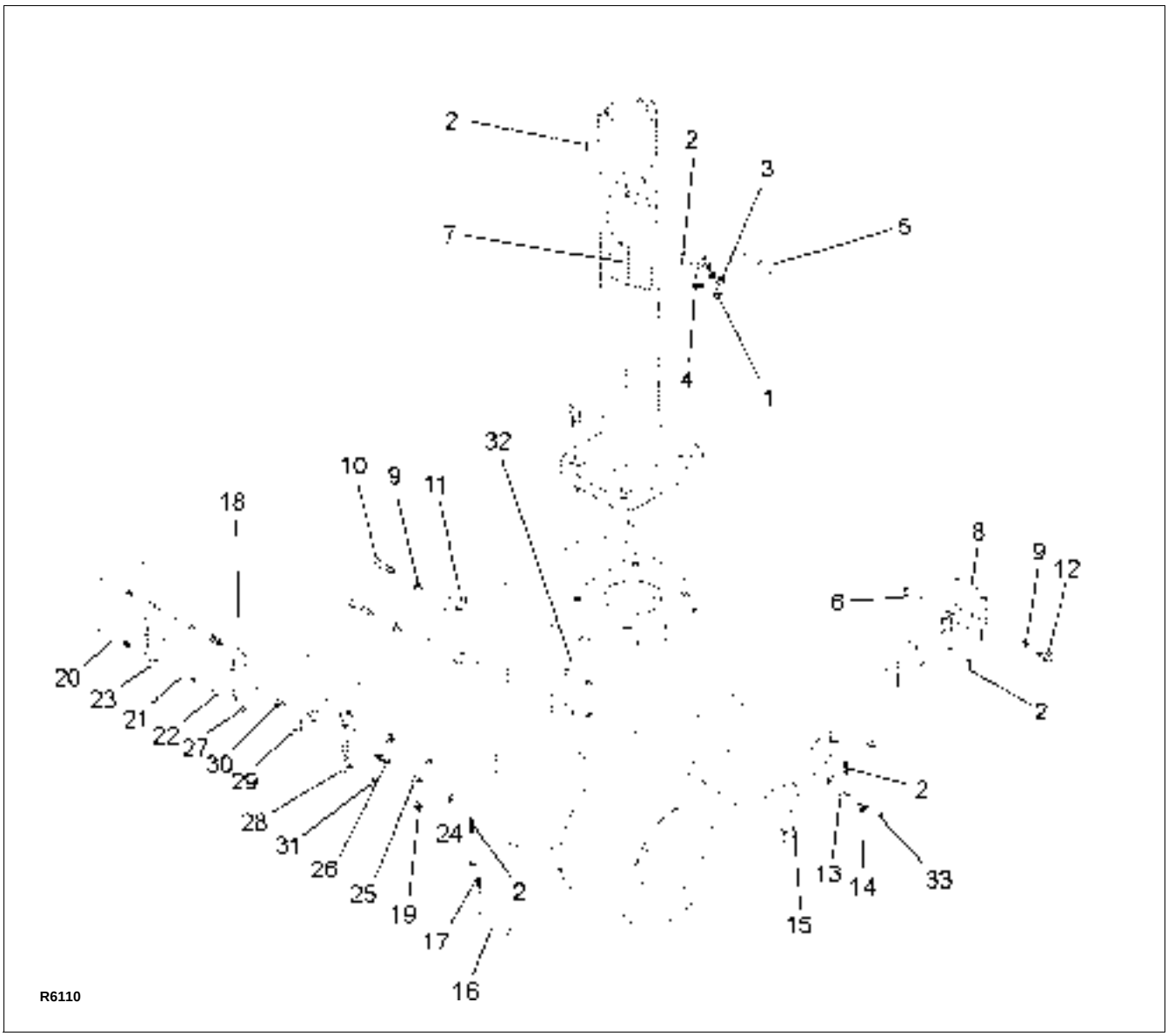

Figure 6-3 Parts Replacement

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SECTION 7
TRANSMISSION, DRIVE WHEEL, ADJUSTABLE STRADDLE, AND LOAD WHEEL SERVICING

Completing the initial disassembly procedure provides access to any transmission parts requiring replacement. Be sure to observe the notes.

7-1. INITIAL DISASSEMBLY

NOTE: Refer to Figure 7-1 for the following procedure.

1. Disconnect battery.
2. Securely block load wheels.
3. Remove service cover.

NOTE: Transmission holds 4-1/2 pints of transmission oil.

4. Remove magnetic drain plug (19, Figure 7-1) and drain transmission oil into a suitable container.
5. Turn steering arm to gain access to cover (43).
6. Remove fourteen screws (45) and lock washers (46) securing cover (43), then remove cover.
7. Remove and discard gasket (42).
8. Remove thrust washer (29), gear (28), and key (51).

NOTE: When reassembling, be sure to replace the gasket and reinstall the magnetic drain plug before refilling the transmission with transmission oil. Transmission holds 1-1/2 quarts oil.

7-2. DRIVE AXLE AND WHEEL REMOVAL.

NOTE: Refer to Figure 7-1 for the following procedure.

1. Perform initial disassembly procedure (paragraph 7-1.).
2. Raise the rear of the truck using jacks or other suitable means so that drive wheel is off the floor.
3. Remove snap ring (41), gear (40), and key (39), then pull out shaft (33) and wheel (17). Washers (34 and 35), bearings (37), spacer (38), and seal (36) will fall free.
4. To remove wheel (17) from shaft (33), remove five bolts (18).

NOTE: During reassembly, inspect parts for wear and replace as required. Be sure that washers (34 and 35), seal (36), bearings (37) and spacer (38) are reinstalled in proper sequence as shown in Figure 7-1.

7-3. REMOVAL OF MOTOR AND BRAKE ASSEMBLY INCLUDING DRIVE GEAR.

1. Perform steps 1. through 4. of initial disassembly (paragraph 7-1.).

NOTE: To remove brake pad assembly refer to SECTION 6, Brake Servicing.

2. Make sure the four cables to the drive motor (1, Figure 7-1) are properly labeled A1, A2, F1, and F2; then disconnect the cables from the drive motor.
3. Remove the four bolts (2, Figure 7-1) and lock washers (3) that secure the motor mounting plate (4) to the transmission housing (49).
4. Tap motor mounting plate loose and remove mounting plate with motor (1), disc assembly (7), bearing (8), O-ring (9), and gear (53) as a single unit.
5. To remove motor bearing housing (10), remove two hex head screws (15) securing motor bearing housing to transmission housing (49).
6. Remove motor bearing housing along with O-ring (11) and seal (12).

NOTE: During reassembly, inspect parts for wear and replace as required. Be sure that dowel pins (13) in motor mounting (4) plate are aligned with corresponding holes in transmission housing (49).

7-4. REMOVAL OF BRAKE DISC ASSEMBLY.

1. Remove the motor and brake assembly, including drive gear, as outlined in paragraph 7-3.
2. To remove gear (53, Figure 7-1) from armature shaft of motor (1), remove roll pin (54), then slide gear off of armature shaft.
3. Remove O-ring (9) and bearing (8) from armature shaft of motor (1).
4. Remove key (6) from armature shaft.

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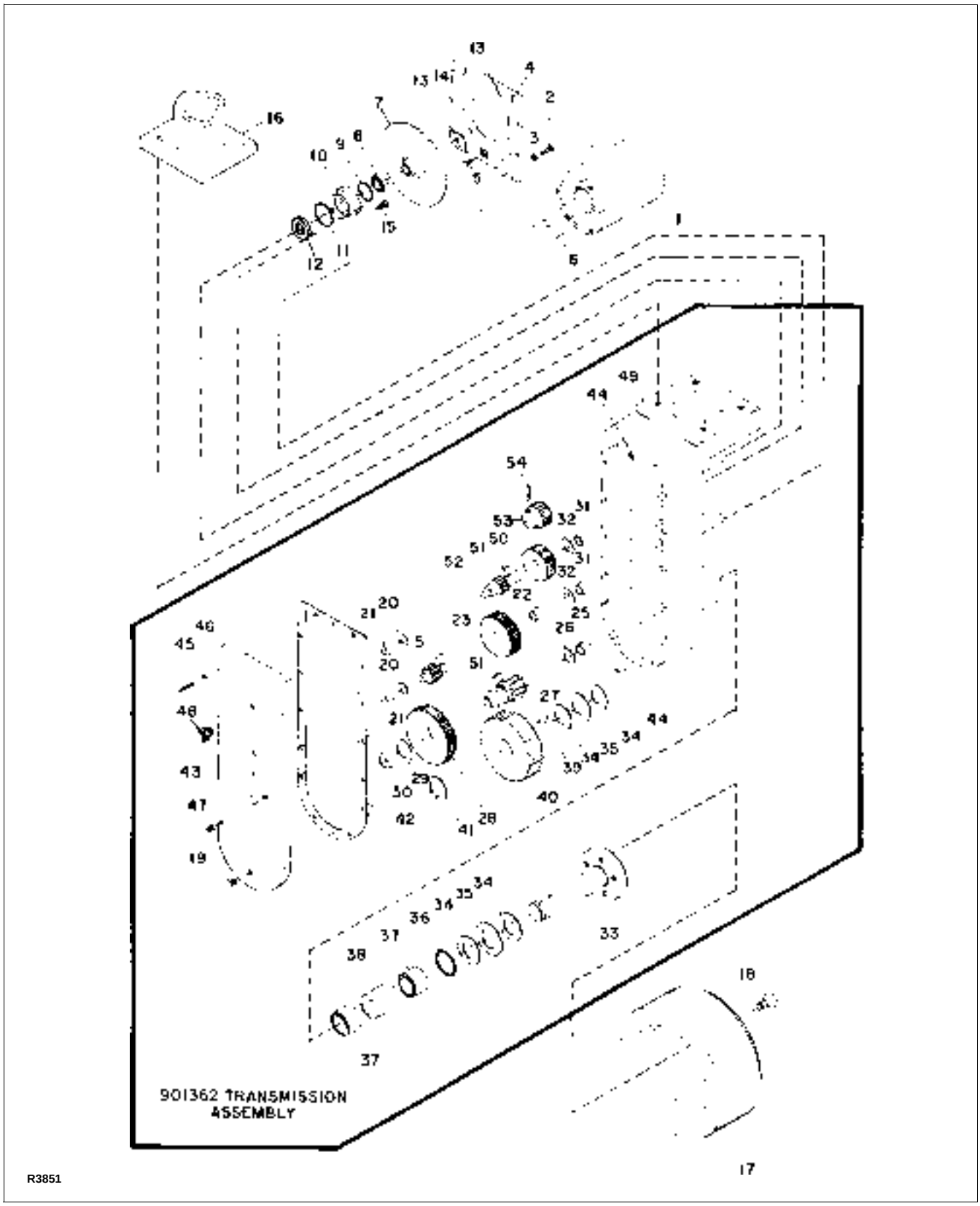

Figure 7-1 Transmission

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5. Remove disc assembly (7) from armature shaft of motor.

NOTE: During reassembly, inspect parts for wear and replace as required. Be sure bearing (8), O-rings (9 and 11) and seal (12) are reinstalled in proper sequence as shown in Figure 7-1.

7-5. ADJUSTABLE STRADDLE LIFT TRUCKS.

Parts on the adjustable straddle lift trucks are identical to the fixed straddle except for the removable straddle and the attaching hardware as shown in Figure 7-2. Perform the following procedure to adjust the straddles to a desired width.

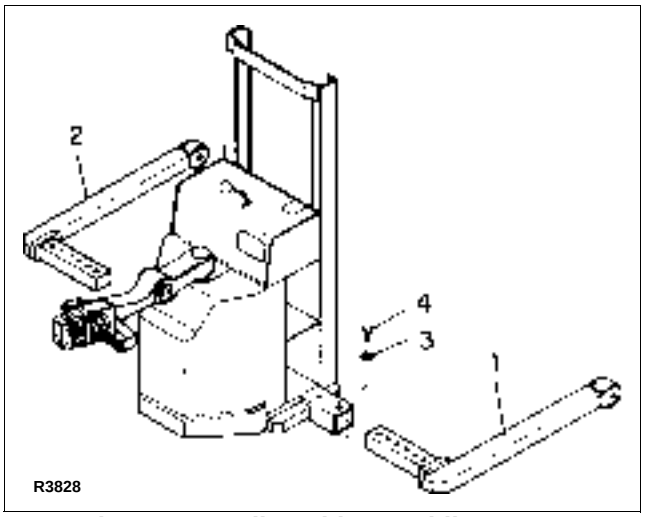

Figure 7-2 Adjustable Straddle Frame

1. Set brake in locked position.

CAUTION: Do not raise truck higher than necessary for load wheels to clear floor when performing next step or truck can flip over.

2. Raise one side of frame just enough for the straddle load wheel to clear the ground.
3. Remove two bolts (4, Figure 7-2) and two washers (3) from raised side of lift truck.
4. Slide straddle to dimension desired.

NOTE: Minimum spread of straddle legs is 38 inches and maximum spread is 50 inches.

5. Lubricate and reinstall two washers (3) and two bolts (4).

NOTE: Retighten bolts to 200 ft.-lbs.

CAUTION: All bolts must engage straddles and both straddles must be adjusted with equal number of holes exposed on each side.

6. Lower straddle to the floor and raise the other side just enough to clear straddle load wheels from the floor.
7. Repeat steps 3. through 5.
8. Lower truck straddle to the floor.
9. Recheck that both straddles are adjusted with equal number of holes exposed on each side.

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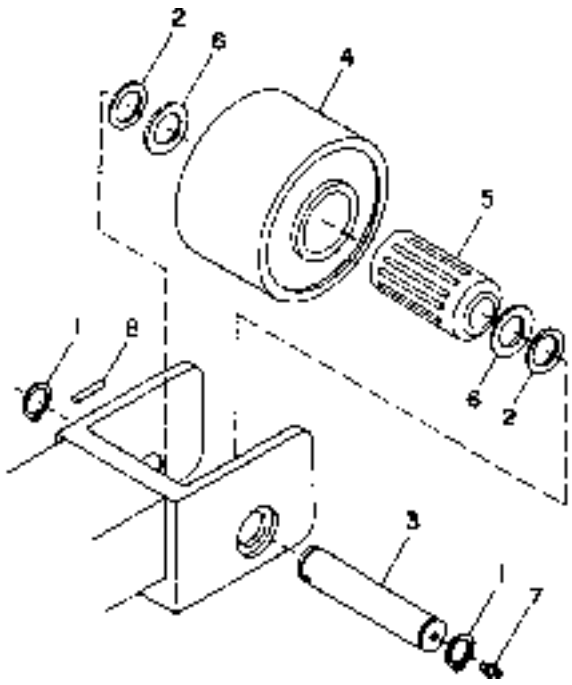
7-6. LOAD WHEELS.

NOTE: Refer to Figure 7-3 for the following procedure.

1. Block the caster wheels and remaining load wheel securely, and set the brakes.
2. Raise front end of lift truck with a jack or another lift truck. Place strong supports under straddle leg immediately in back of wheel housing so that the load wheel being replaced is held approximately one inch from the floor.
3. Remove the two snap rings (1, Figure 7-3) securing the load wheel axle (3).
4. Remove roll pin (8), then remove axle. Load wheel (4) will drop free, along with two spacers (2), one on each side, which position wheel on axle.
5. Remove bearing (5) and two retaining washers (6).
6. Clean and check bearing for defects. Replace bearing if defective.
7. Lubricate bearing.
8. Reinstall bearing (5) with two retaining washers (6) and two spacers (2) into load wheel (4).
9. Position load wheel (4) in straddle leg with axle holes aligned.
10. Install axle (3) through straddle leg and load wheel.
11. Install roll pin (8) through roll pin hole in axle.
12. Install snap rings (1) on both end of axle.
13. Lubricate axle through grease fitting (7).
14. Remove supports from under straddle leg, lower front end of lift truck, remove wheel blocks, and release brakes.



LOAD WHEEL AND AXLE KIT
PART NUMBER 901326
CONTAINS:

ITEM	QTY
1	2
2	2
3	2
7	1
8	1

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Figure 7-3 Load Wheels

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SECTION 8
ELEVATION SYSTEM SERVICING

8-1. GENERAL.

The elevation system includes the outer mast, inner mast (telescopic and full free lift models), lift carriage, lift chains, lift cylinder, and ram head.

8-2. LIFT CHAIN LENGTH ADJUSTMENT.

8-2.1. Telescopic and Non-Telescopic.

1. Lower carriage (34, Figure 8-1, Figure 8-2 or 25, Figure 8-3) fully, then disconnect battery.

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

2. Loosen top jam nuts (18, Figure 8-1, Figure 8-2 or 19, Figure 8-3) on adjusting bolts (17, Figure 8-1, Figure 8-2 or 18, Figure 8-3).
3. Take up slack in both lift chains with hex nut (20, Figure 8-1, Figure 8-2 or 21, Figure 8-3) on the adjusting bolt. Strive for equal tension on chains.
4. Align adjusting bolts so each clevis pin is parallel to ram head (25, Figure 8-1, Figure 8-2 or 5, Figure 8-3).

CAUTION: At least 3 full threads must be present below hex nut (20, Figure 8-1, Figure 8-2 and 21, Figure 8-3) after completion of adjustment.

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.

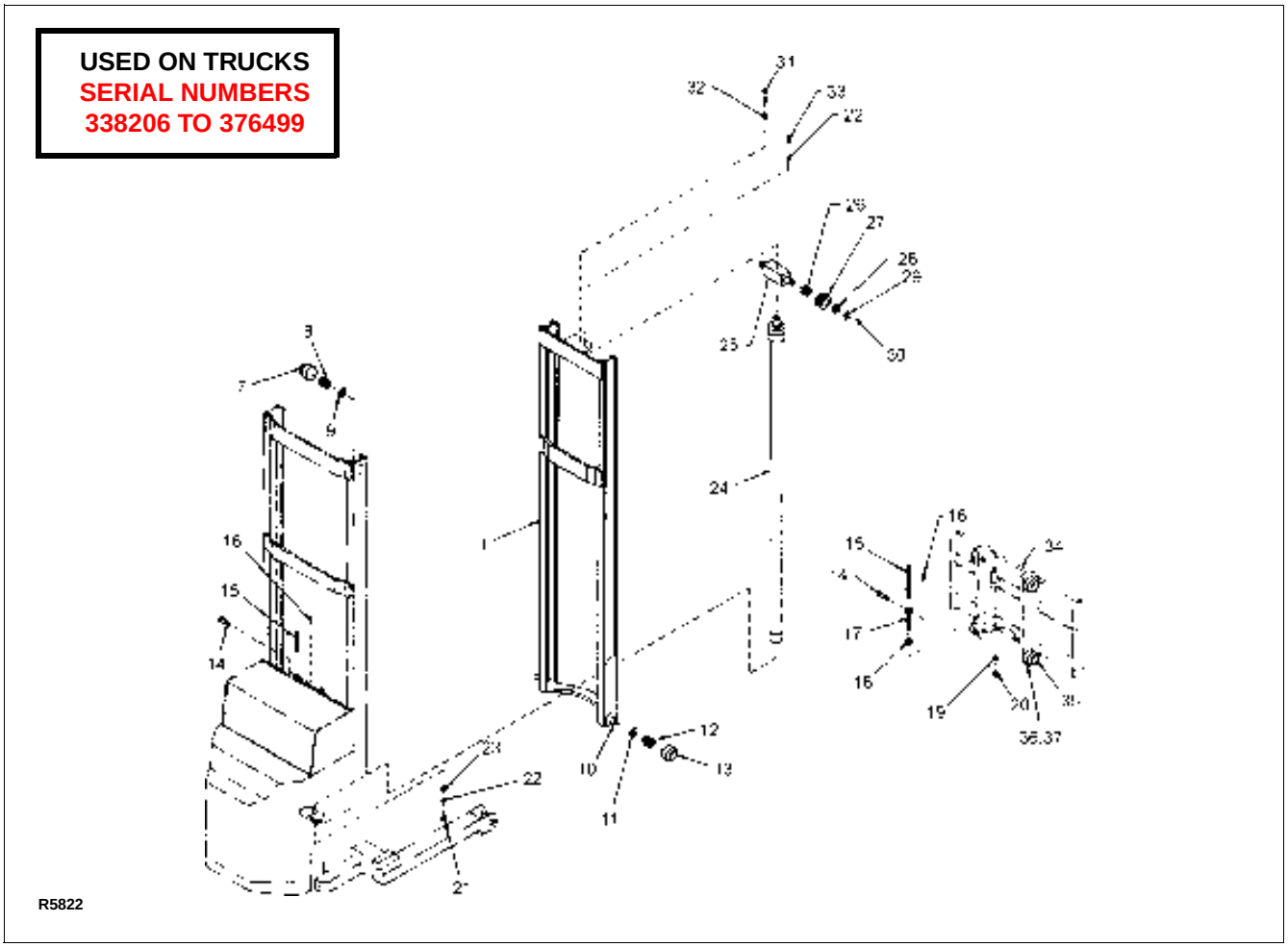

Figure 8-1 Elevation System (Telescopic)

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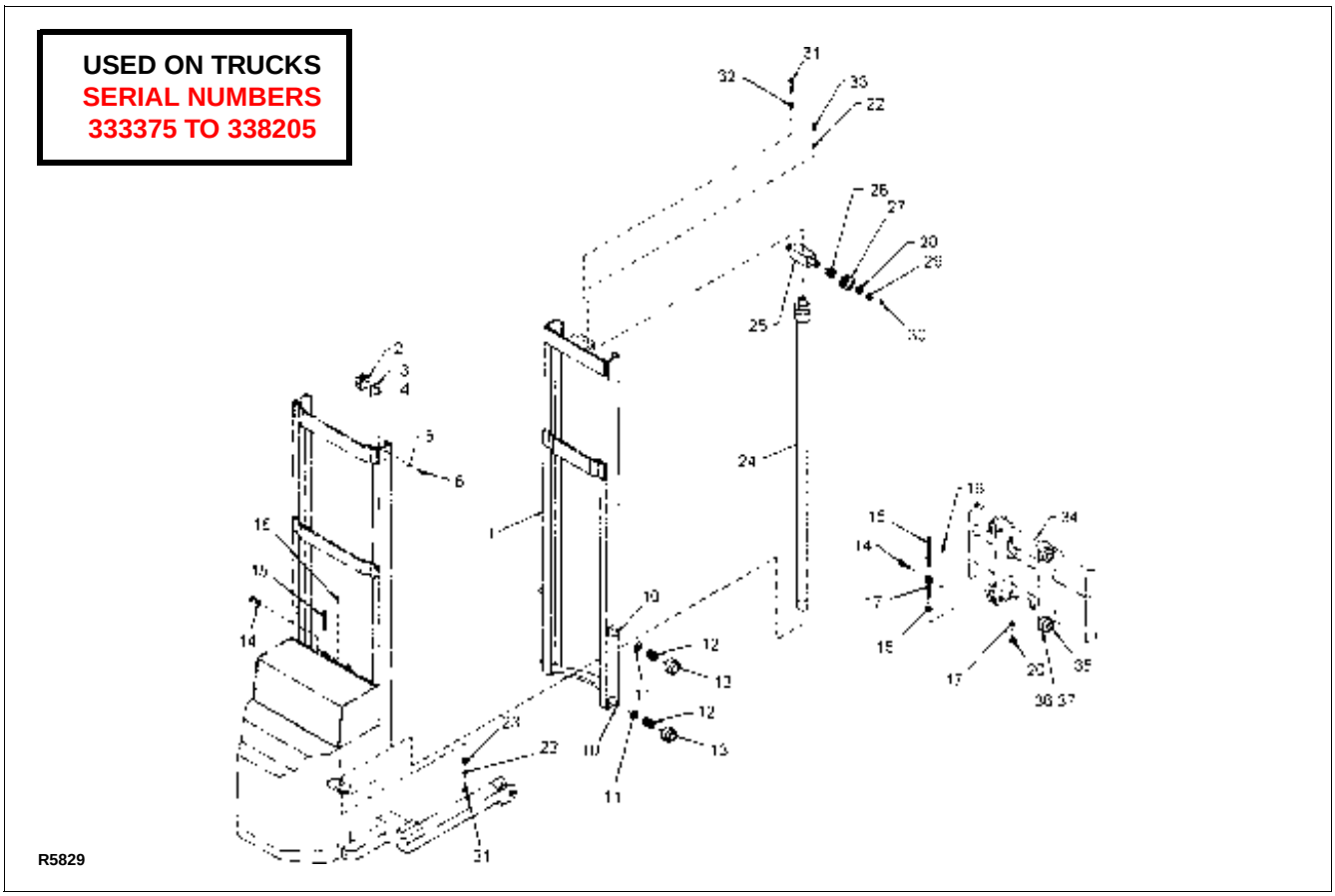

Figure 8-2 Elevation System (Telescopic)

8-2.2. Full Free Lift.

1. Lower carriage (31, Figure 8-4) fully, then disconnect battery.

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

2. Loosen top jam nuts (28) on adjusting bolts (27).
3. Take up slack in both lift chains with hex nut (30) on the adjusting bolt. Strive for equal tension on chains.

CAUTION: At least 3 full threads must be present below hex nut (30) after completion of adjustment.

4. Align adjusting bolts so each clevis pin is parallel to sheave (24).
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.

8-3. LIFT CHAIN WEAR INSPECTION

Both lift chains should be replace 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 over the chain sheaves, isolate a vertical portion 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 8-4. when installing new chain.

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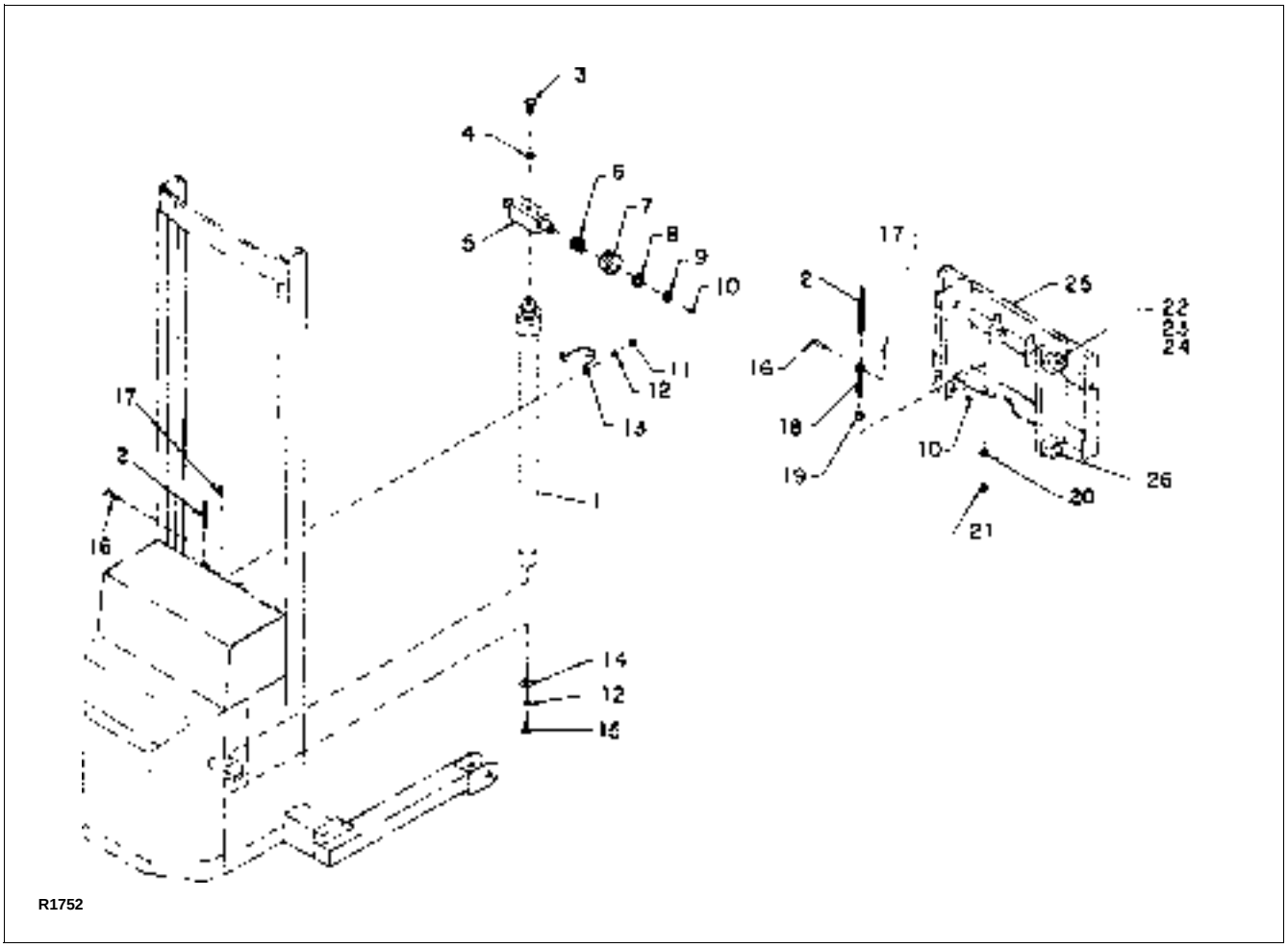

Figure 8-3 Elevation System (Non-Telescopic)

8-4. LIFT CHAIN REPLACEMENT.

8-4.1. Telescopic and Non-Telescopic.

1. Place a solid block on floor under the vertical members nearest the center of the lift carriage.
2. Lower 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 (16, Figure 8-1, Figure 8-2 or 17, Figure 8-3) and clevis pin (14, Figure 8-1, Figure 8-2 or 16, Figure 8-3) from end of chain connected to mast cross brace.
4. Remove cotter pin (16, Figure 8-1, Figure 8-2 or 17, Figure 8-3) and clevis pin (14, Figure 8-1, Figure 8-2 or 16, Figure 8-3) from chain adjusting bolt (17, Figure 8-1, Figure 8-2 or 18, Figure 8-3).
5. Remove chain from ram head assembly (25, Figure 8-1, Figure 8-2 or 5, Figure 8-3) and lay aside for repair.
6. Position new chain in place on ram head assembly.
7. Install cotter pin and clevis pin on chain adjusting bolt.
8. Connect end of chain to mast cross brace with cotter pin and clevis pin.
9. Adjust chain according to paragraph 8-2.

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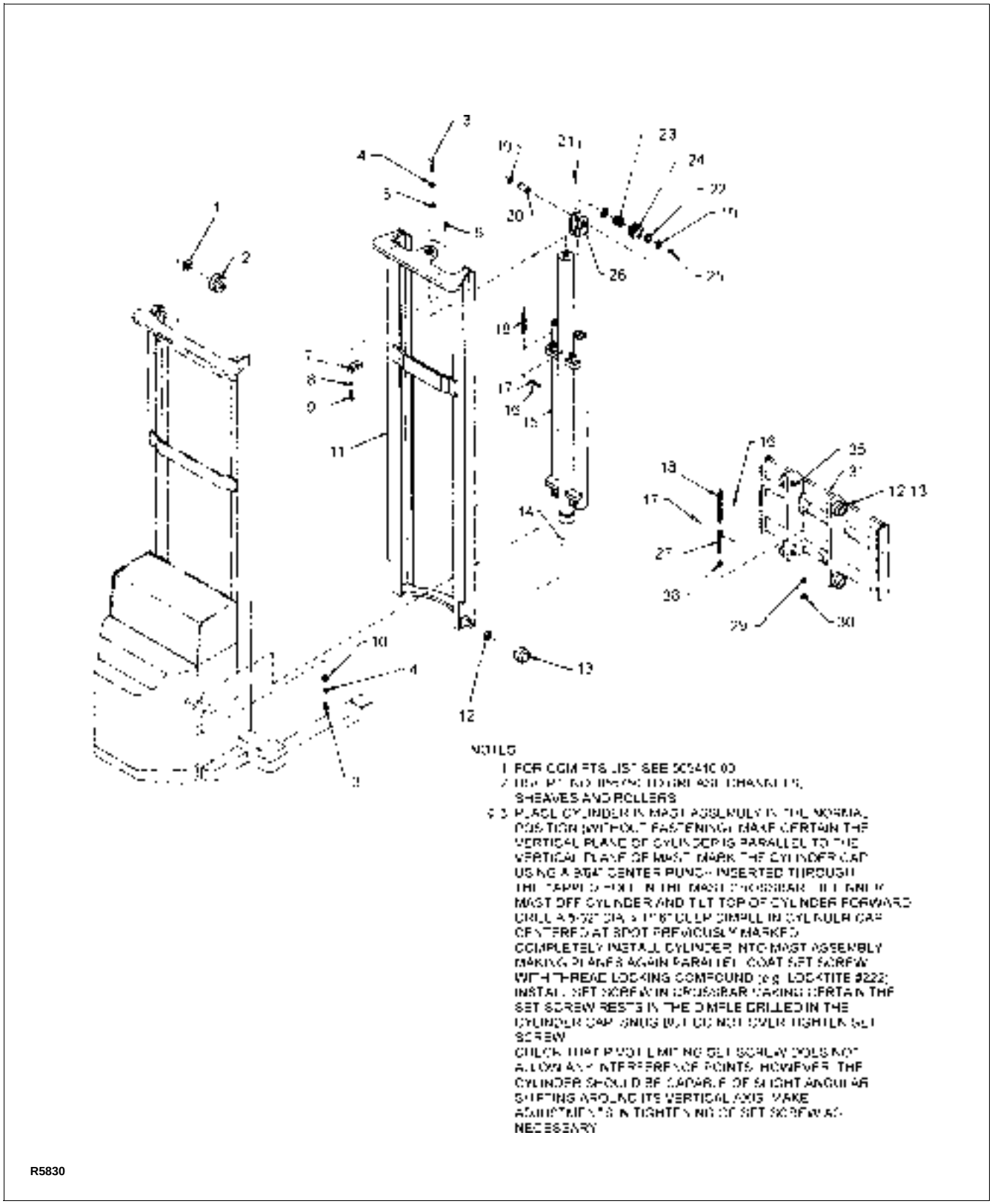

Figure 8-4 Elevation System (Full Free Lift)

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8-4.2. 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 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 (16, Figure 8-4) and clevis pin (17) from end of chain connected to lift cylinder.
4. Remove cotter pin (16) and clevis pin (17) from chain adjusting bolt (27).
5. Remove chain from sheave (24) and lay aside for repair.
6. Position new chain in place on sheave (24).
7. Install clevis pin (17) and cotter pin (16) on chain adjusting bolt (27).
8. Connect end of chain to lift cylinder (15) with clevis pin (17) and cotter pin (16).
9. Adjust chain according to paragraph 8-2.

8-5. LIFT CYLINDER REMOVAL.

8-5.1. Non-Telescopic.

NOTE: Refer to Figure 8-3 for the following procedure.

1. With the brake set and the lift truck wheels securely blocked, raise forks approximately three feet from floor and position blocks or strong supports under lift carriage (25, Figure 8-3).
2. Lower lift carriage fully onto support.
3. Disconnect battery.
4. Hold lift control lever forward and, at the same time, manually push lift cylinder ram (5) down as far as possible.
5. Remove overflow tubing retainers along the side of the lift cylinder assembly (1).

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

6. Disconnect hose assembly from bottom of lift cylinder and overflow tubing from top of lift cylinder.
7. Lift chains clear of sheaves (7) and lay chains aside.
8. Remove cap screw and lock washer (3 and 4) and lift ram head (5) from lift cylinder (1).
9. Remove screw (15), lock washer (12) and plain washer (14) from base of cylinder (1).

WARNING: Support lift cylinder before performing step 10. to prevent cylinder from falling.

10. Remove nuts (11) and lock washers (12) that secure clamp (13) and remove clamp.
11. Raise lift cylinder assembly up and out of truck.

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

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

8-5.2. Telescopic.

NOTE: Refer to Figure 8-1 or Figure 8-2 for the following procedure.

1. With the lift truck wheels securely blocked and with brake set, raise forks approximately three feet from floor and position blocks or strong supports under inner mast (1, Figure 8-1 or Figure 8-2).
2. Lower inner mast onto support. Check that arrangement is secure before proceeding.
3. Disconnect battery.
4. Remove two cap screws (33), two lock washers (22) one cap screw (31) and one lock washer (32) that join the top of the inner mast (1) to the ram head (25).
5. Hold lift control lever forward and, at the same time, manually push the ram down as far as possible. The chains will become slack and need not be removed.
6. Remove overflow tubing retainers alongside of the lift cylinder assembly (24).

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

7. Disconnect hose assembly from bottom of lift cylinder. Disconnect overflow tubing from top of lift cylinder (24).
8. Lift chains clear of sheaves (27) and lay them aside.
9. Remove screw (21), lock washer (22) and plain washer (23) from underside of cylinder.

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WARNING: Support lift cylinder before performing the following steps to prevent cylinder from falling.

10. Tilt lift cylinder (24) and ram head (25) forward from their position in the lift truck.
11. Lift ram head from lift cylinder.
12. Raise lift cylinder assembly up and out of truck.

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

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

8-5.3. Full Free Lift.

NOTE: Refer to Figure 8-4 for the following procedure.

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

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

3. Disconnect hose at the bottom of the lift cylinder.
4. Remove connector, flow control valve, elbows and nipple 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 (24). Lay chains aside and lower lift carriage.
6. Remove screw (3), lock washer (7), and flat washer (8) securing the top of lift cylinder (15) to the inner mast (11).
7. Remove screw (3), lock washer (4), and flat washer (10) securing the bottom of lift cylinder (15) to the outer mast.

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 (11) 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 8-7.

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.

8-6. RAM HEAD REMOVAL.

WARNING: Make certain power is disconnected before attempting to remove ram head.

8-6.1. Non-Telescopic.

NOTE: Refer to Figure 8-3 for the following procedure.

1. With the brake set and the lift truck wheels securely blocked, lower the lift carriage fully, then disconnect battery.
2. Slacken the lift chains by loosening the nut (19, Figure 8-3) below the chain adjusting bolt (18). Then lift chains off sheaves and lay them on mast support.
3. Remove cap screw (3) and lockwasher (4) and lift ram head assembly (5) from lift cylinder (1).

8-6.2. Telescopic.

NOTE: Refer to Figure 8-1 or Figure 8-2 for the following procedure.

1. With the lift truck wheels securely blocked and with brake set, raise forks approximately three feet from floor and position blocks or strong supports under inner mast (1, Figure 8-1 or Figure 8-2).
2. Lower inner mast onto support. Check that arrangement is secure before proceeding.
3. Disconnect battery.
4. Remove two cap screws (33), two lock washers (22) one cap screw (31) and one lock washer (32) that join the top of the inner mast (1) to the ram head (25).
5. Hold lift control lever forward and, at the same time, manually push the ram down as far as possible. The chains will become slack.
6. Lift ram head (25) from lift cylinder (24).

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8-7. YOKE SHEAVE REPLACEMENT (FULL FREE LIFT).

WARNING: Make certain power is disconnected before attempting to remove ram head.

1. Lower the lift carriage fully.
2. Disconnect the battery.
3. Slacken the lift chains by loosening nut (30, Figure 8-4) below adjusting bolt (27) on the lift carriage.
4. Lift the lift chains off sheaves (24) and lay on the mast support.
5. Remove snap ring (19) and slide pin (20) out of sheave (24). Sheave (24), bearing (23), and thrust washers (22) will fall free.
6. Yoke sheave (26) can now be removed by removing screws (21).
7. Reinstall yoke sheave in reverse order of removal.
8. Adjust lift chains as described in paragraph 8-2.

8-8. LUBRICATION OF MAST.

NOTE: Refer to Figure 8-1, Figure 8-2 and Figure 8-3.

Fully lower lift carriage, then apply a (Lithium base) general purpose grease, using a lubrication gun, to the following components:

1. Grease fittings (10, Figure 8-3) on lift carriage rollers (22) and sheaves (7).
2. Grease fittings (30, Figure 8-1 or Figure 8-2) on sheaves (20).

Using a brush, apply the same Lithium base general purpose lubricant to the full length of the mast channel where the rollers ride. Upon completion, operate the mast to allow lubricant to spread evenly.

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

NOTE: A schematic diagram of the hydraulic system is shown in Figure 9-1.

9-2. FLOW CONTROL VALVE REPLACEMENT.

NOTE: Figure 9-2 and Figure 9-3 show the relationship of all components in the hydraulic system. Refer to these figures for the following procedure.

1. With the lift truck wheels securely blocked and with the brake set, raise forks approximately three feet from floor. Position blocks or strong supports under the inner mast (on telescopic model) or under lift carriage (on non telescopic model) while hydraulic system is under repair.
2. Lower inner mast or lift carriage onto supports. Check that the arrangement is secure before proceeding.
3. Disconnect battery.

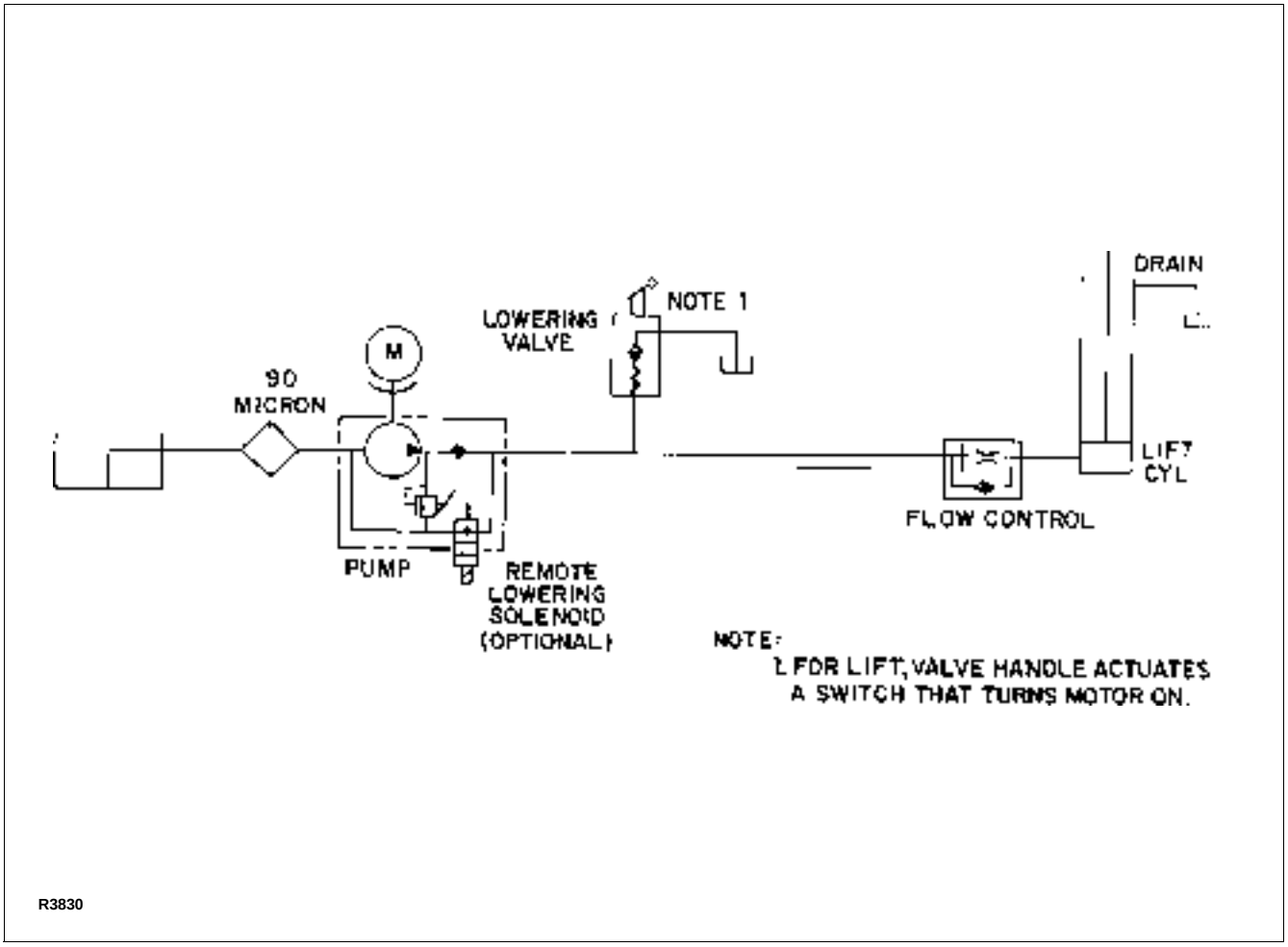

Figure 9-1 Hydraulic System Schematic

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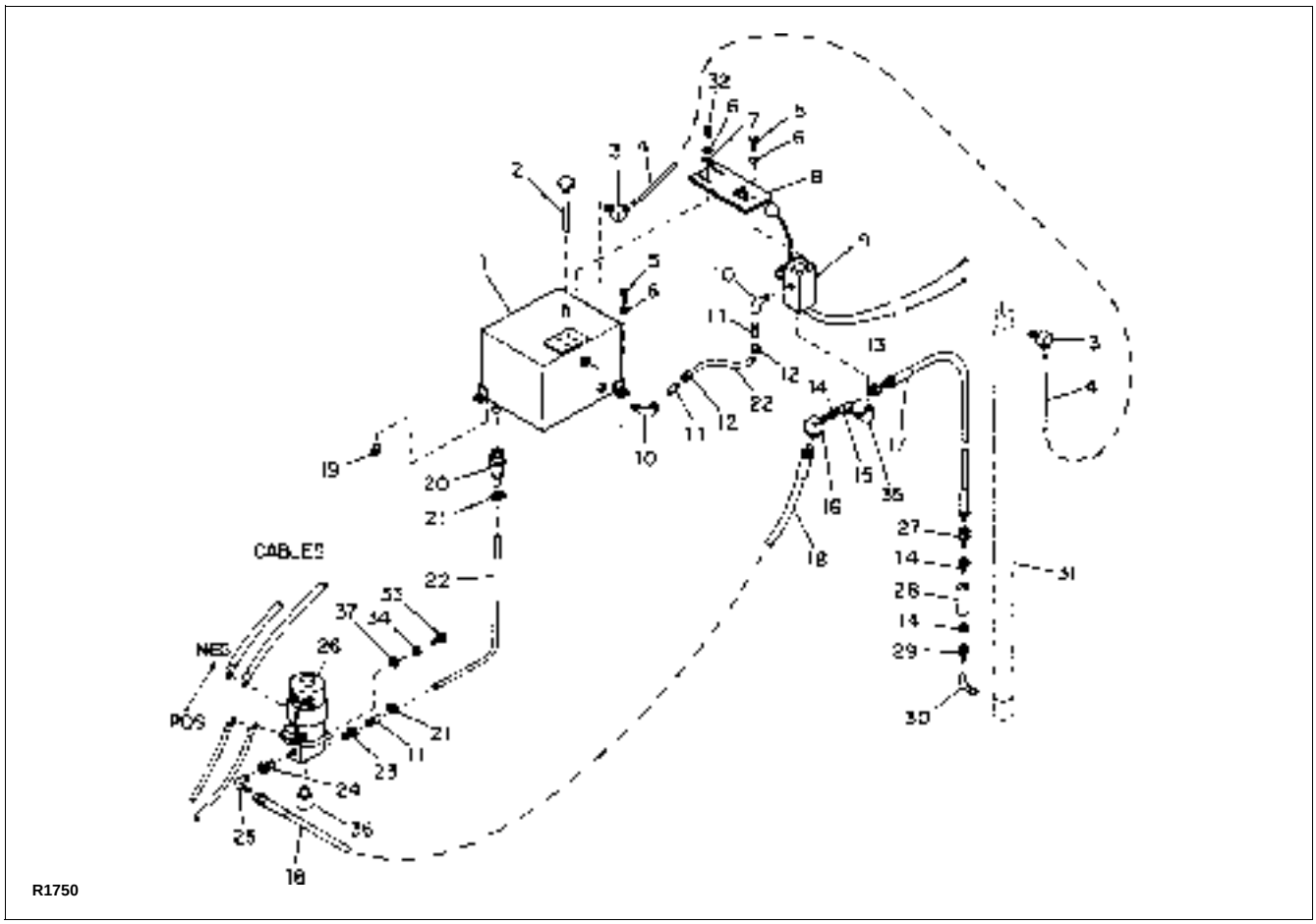

Figure 9-2 Hydraulic System (Telescopic and Non-Telescopic)

4. On telescopic models remove the two cap screws and two lock washers securing the top of the inner mast to the ram head.
5. Hold lift control forward, and at the same time manually push the ram of the lift cylinder down as far as possible. The chains will become slack and need not be removed.

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.

6. Disconnect hose (17, Figure 9-2 or 19, Figure 9-3) and connector (27, Figure 9-2 or 33, Figure 9-3) from flow control valve (28, Figure 9-2 or 31, Figure 9-3).
7. Remove flow control valve.
8. Install new flow control valve (28, Figure 9-2 or 31, Figure 9-3) with direction arrow on flow control valve pointing toward lift cylinder.
9. Reconnect hose (17, Figure 9-2 or 19, Figure 9-3).
10. On telescopic models resecure ram head with the two cap screws and lock washers.
11. Reconnect battery.
12. Check oil level on dip stick. If low, fill to ``FULL'' mark on dip stick with Big Joe hydraulic oil part number 900855.
13. Raise forks, then remove supports.
14. Check for leaks.

9-3. SUCTION LINE FILTER REPLACEMENT.

NOTE: Refer to Figure 9-2 or Figure 9-3 for the following procedure.

1. Lower lift carriage fully to insure that all pressure is relieved from hydraulic system.
2. Remove reservoir drain plug (19, Figure 9-2 or 21, Figure 9-3), and drain oil into suitable container.

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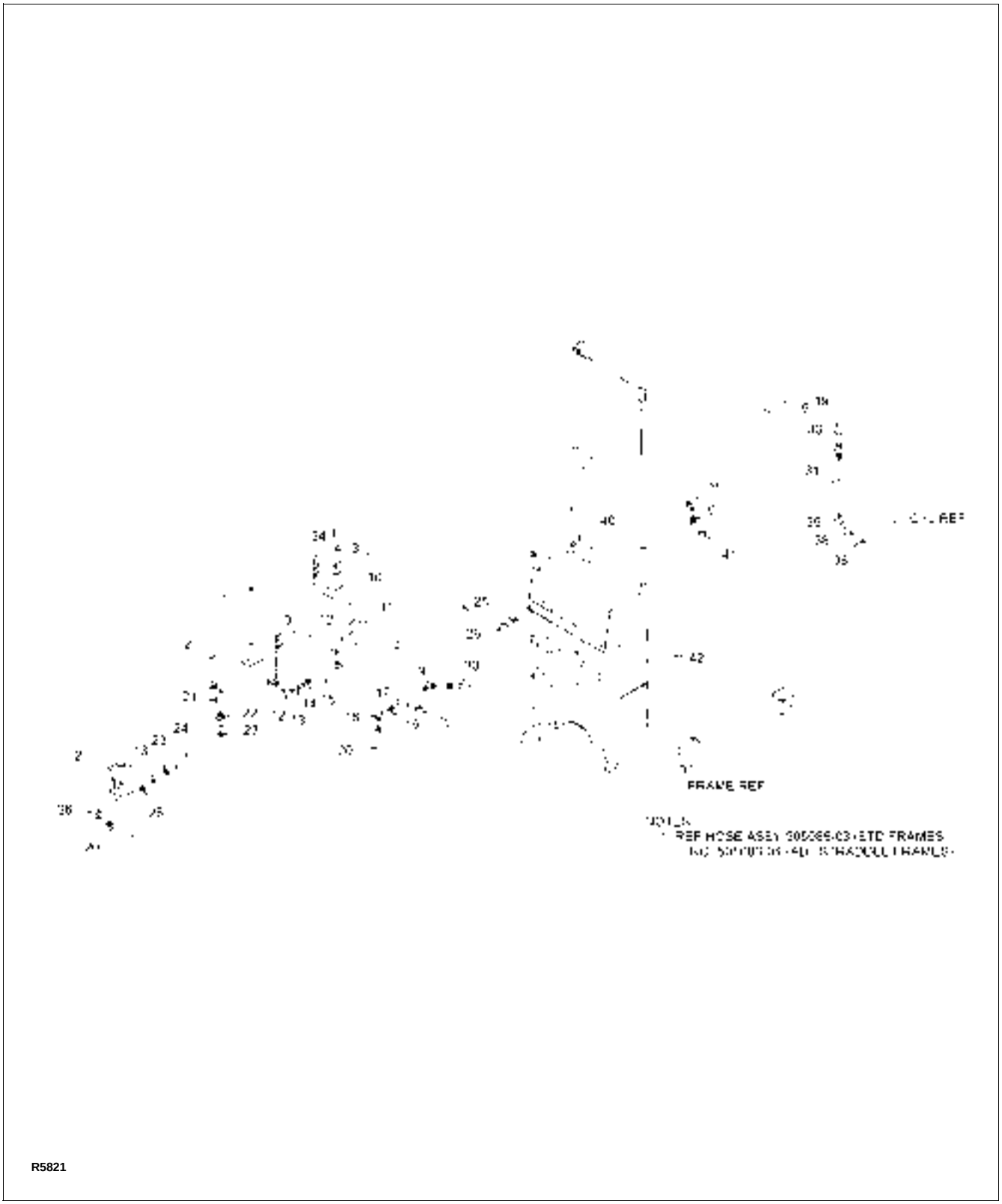

Figure 9-3 Hydraulic System (Full Free Lift)

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3. Remove clamp (21, Figure 9-2 or 23, Figure 9-3) and tubing (22, Figure 9-2 or 24, Figure 9-3) from filter (20, Figure 9-2 or 22, Figure 9-3).
4. Unscrew filter from reservoir.
5. Install new filter on reservoir.
6. Install tubing (22, Figure 9-2 or 24, Figure 9-3) and clamp (21, Figure 9-2 or 23, Figure 9-3) onto new filter.
7. Clean the drain plug (19, Figure 9-2 or 21, Figure 9-3) thoroughly.
8. Re-install the drain plug.

NOTE: Refill only with Big Joe hydraulic oil part number 900855 and only while carriage is fully lowered. Refill until oil is to the ``FULL'' mark on the dip stick. Reservoir holds about 1-1/2 gallons of oil.

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

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 1-1/2 gallons 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.

NOTE: Refer to Figure 9-4, Figure 9-5 and Figure 9-6 for the following procedure.

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 9-5 or Figure 9-6) 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, Figure 9-5 or Figure 9-6) 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 9-4).

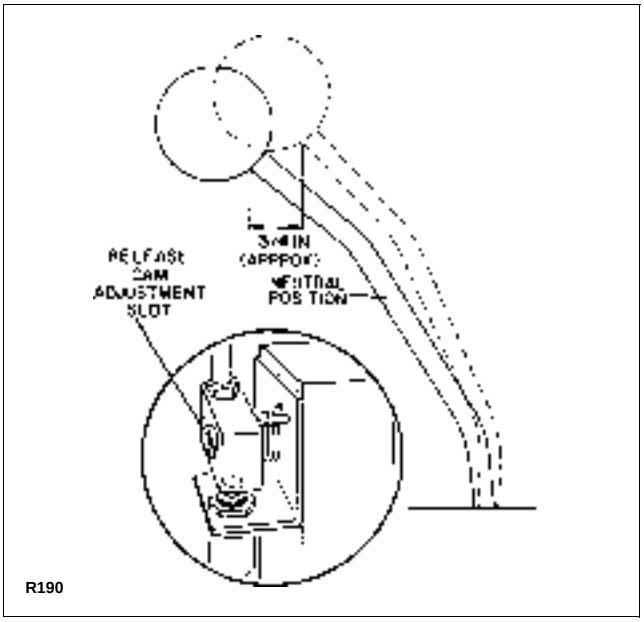

Figure 9-4 Lift/Lower Control Valve Adjustment

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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 9-5 or Figure 9-6) 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).

9-5.2. Disassembly.

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

NOTE: Refer to Figure 9-2, Figure 9-3, Figure 9-5 and Figure 9-6 for the following procedure.

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 9-5 or Figure 9-6) and lay aside.

NOTE: Disconnecting of wires is not necessary.

5. Disconnect tubing (22, Figure 9-2 or 15, Figure 9-3) from lift/lower control valve (9, Figure 9-2 or 11, Figure 9-3).
6. Disconnect hose assemblies (17 and 18, Figure 9-2 or 20 and 30 Figure 9-3).
7. Remove lift/lower control valve (9, Figure 9-2 or 11, Figure 9-3) complete with hydraulic fittings (10 and 35, Figure 9-2 or 12 and 35, Figure 9-3) by removing the four screws (5, Figure 9-2 or 3, Figure 9-3) and lock washers (6, Figure 9-2 or 2, Figure 9-3) securing the valve to the mounting bracket (8, Figure 9-2 or 10, Figure 9-3).
8. Remove hydraulic fittings.
9. Loosen lower nut (9, Figure 9-5 or Figure 9-6) 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).

NOTE: Install new parts as required during reassembly of the lift control valve.

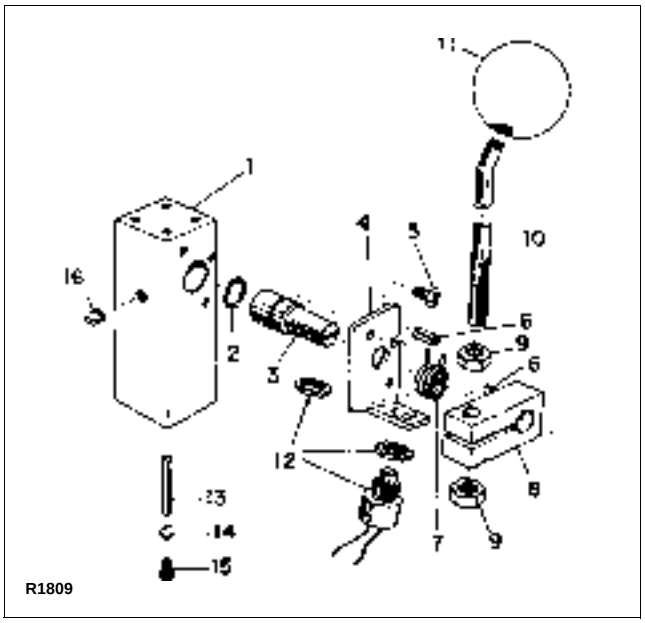

Figure 9-5 Lift/Lower Control Valve (Standard)

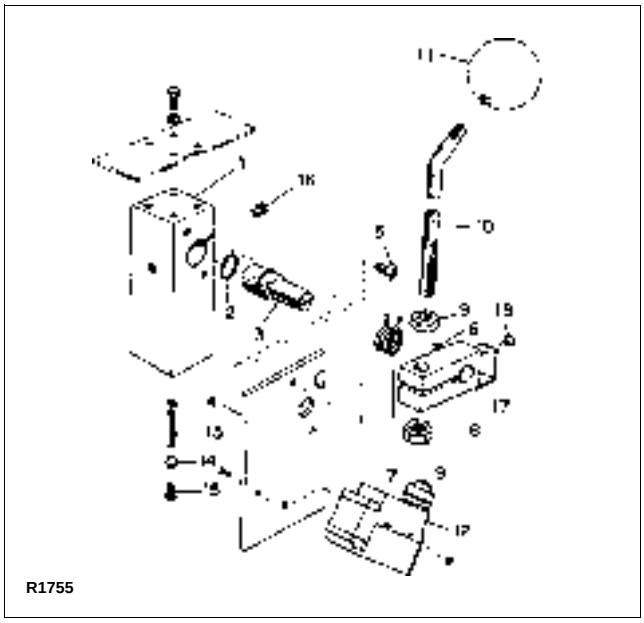

Figure 9-6 Lift/Lower Control Valve (Cold Conditioning)

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13. To reassemble, install O-ring (2, Figure 9-5 or Figure 9-6) 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 (10 and 35, Figure 9-2 or 12 and 35, Figure 9-3) onto control valve (9, Figure 9-2 or 11, Figure 9-3).
18. Install lift/lower control valve (9, Figure 9-2 or 11, Figure 9-3) onto mounting bracket (8, Figure 9-2 or 10, Figure 9-3) with four lock washers (6, Figure 9-2 or 2, Figure 9-3) and four screws (5, Figure 9-2 or 3, Figure 9-3).
19. Reconnect hose assemblies (17 and 18, Figure 9-2 or 20 and 30, Figure 9-3) to hydraulic fitting (35, figure 9-2 or 17, Figure 9-3).
20. Reconnect tubing (22, Figure 9-2 or 15, Figure 9-3) to control valve.
21. Install pump motor switch (12, Figure 9-5 or Figure 9-6) onto switch bracket (4).
22. Reconnect battery.

9-5.3. Pump Motor Switch Adjustment.

When the release cam (3, Figure 9-5 or Figure 9-6) 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, Electrical Components Servicing.

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.

NOTE: See Figure 9-2 or Figure 9-3 for the following procedure.

1. Disconnect battery.
2. Drain hydraulic oil from reservoir into suitable container.
3. Label, then disconnect wires from solenoid.
4. Label, then disconnect tubing (22, Figure 9-2 or 24, Figure 9-3) and hose (18, Figure 9-2 or 20, Figure 9-3) from the pump (26, Figure 9-2 or 27, Figure 9-3).
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. The pressure relief valve should rarely need adjustment. 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.

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9-7. LIFT CYLINDER REPAIR.

9-7.1. Non-Telescopic.

NOTE: Removal procedures are covered in SECTION 8.

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 9-7) 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. Remove nut (11)
6. **Cylinders equipped with piston (8),** pull off washers (10 and 13), packing assembly (9), piston (8) and O-ring (7).

   Cylinders equipped with piston (14), pull off piston (14) and O-ring (7). Remove seal (15) from piston (14).

NOTE: Cylinders equipped with piston (8), install retrofit kit 907124.

NOTE: Cylinders equipped with piston (14), install packing kit 907123.

7. Install new O-ring (7), piston (14), new seal (15), and nut (11) onto 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 with new wiper ring (2).
12. Remove lift cylinder assembly from vise.

9-7.2. Telescopic.

NOTE: Removal procedures are covered in SECTION 8.

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 9-8) 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. Remove nut (11).
6. **Cylinders equipped with piston (8),** pull off washers (10 and 13), packing assembly (9), piston (8) and O-ring (7).

   Cylinders equipped with piston (14), pull off piston (14) and O-ring (7). Remove seal (15) from piston (14).

NOTE: Cylinders equipped with piston (8 or 16), install retrofit kit 907139.

NOTE: Cylinders equipped with piston (14), install packing kit 907138.

7. Coat seal (15) and piston (14) liberally with petroleum jelly. Install new seal (15) on piston (14).
8. Install new O-ring (7), piston (14), and nut (11) onto cylinder ram (5).
9. 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.

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

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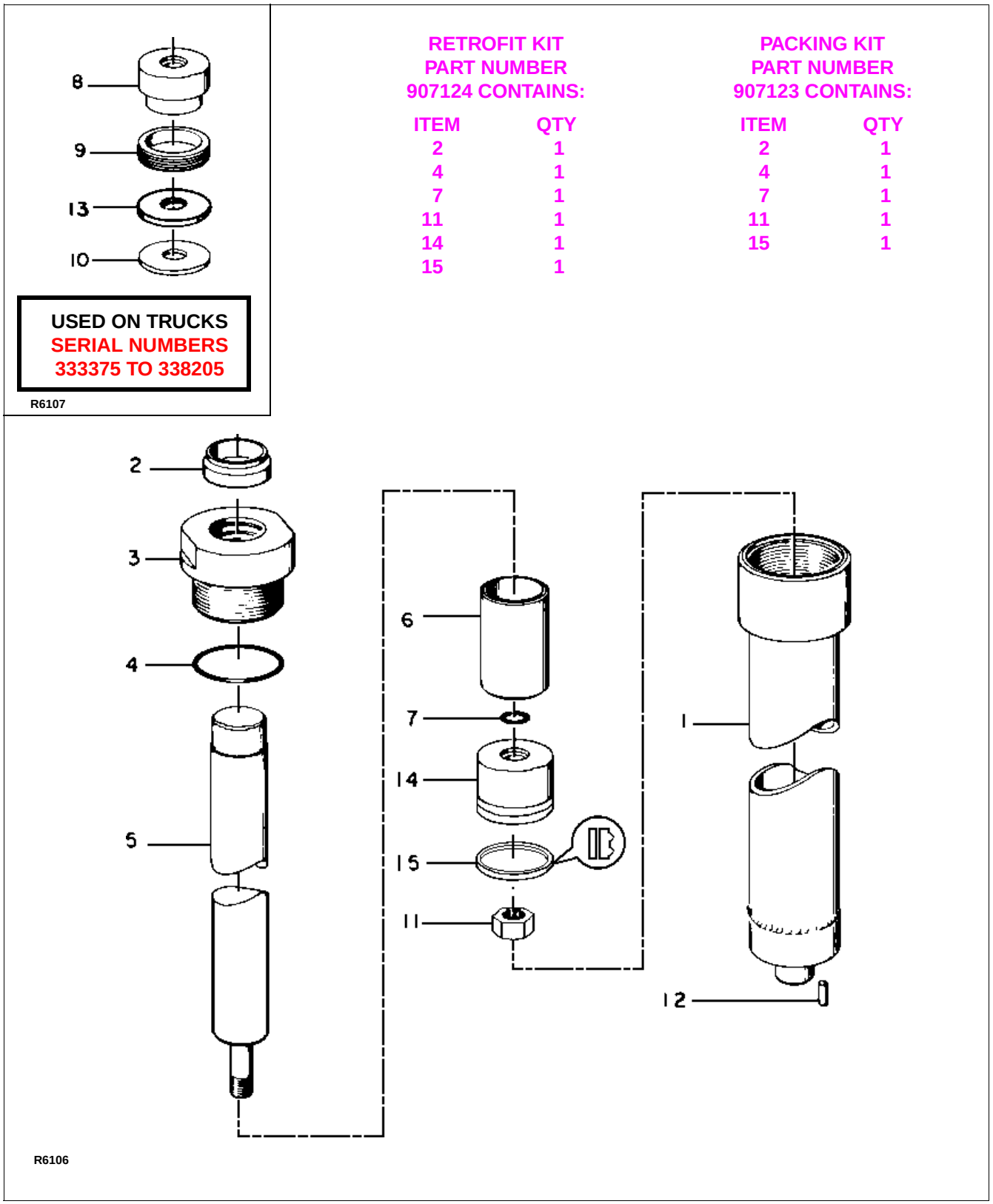

Figure 9-7 Lift Cylinder (Non-Telescopic)

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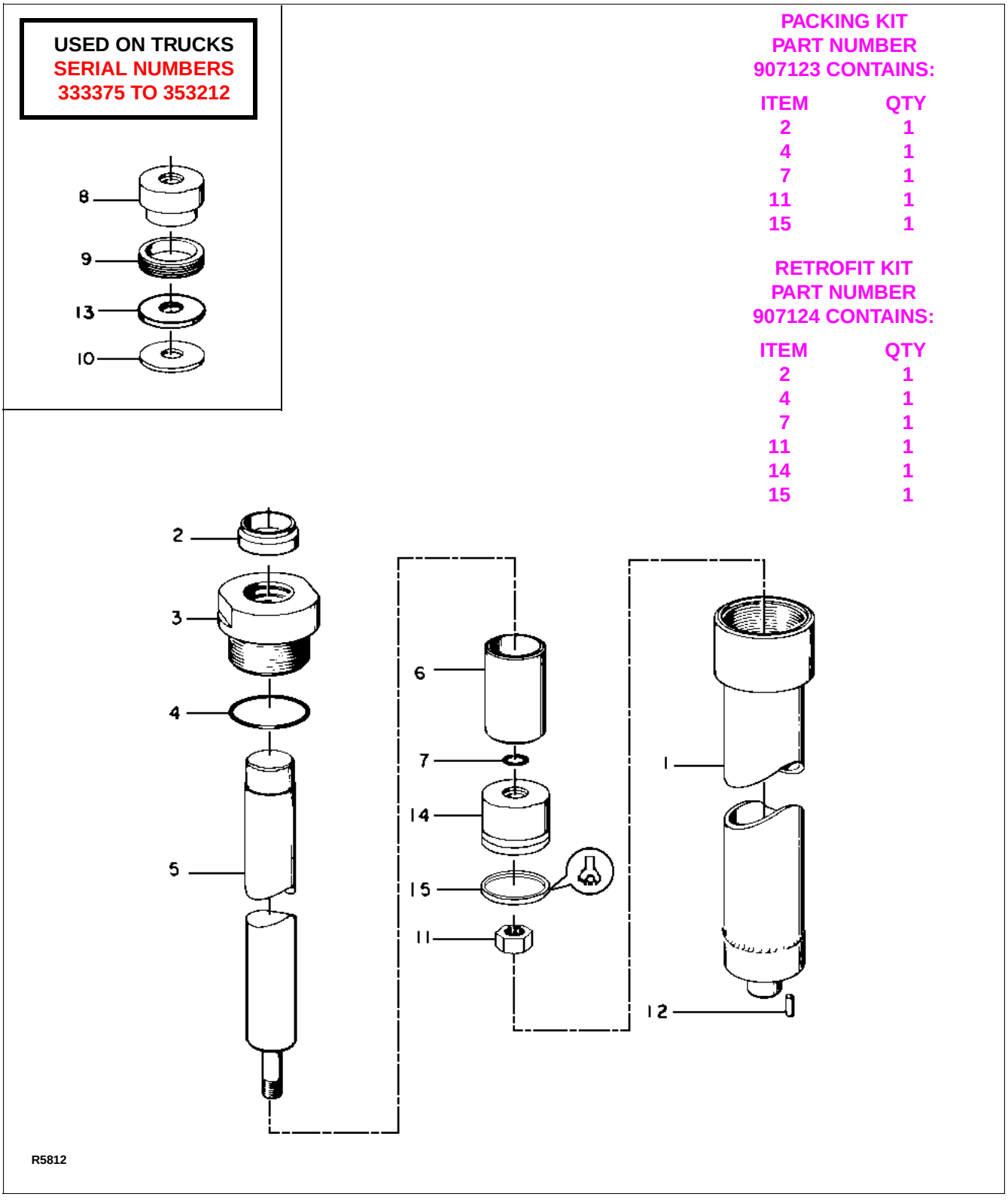

Figure 9-8 Lift Cylinder (Telescopic)

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9-7.3. Full Free Lift.

NOTE: Removal procedures are covered in SECTION 8.

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 weldment (1, Figure 9-9) 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 free. 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 Flexloc 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 (24).
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 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) out of cylinder tube.
   c. A little more pulling will release the halves of the wear ring.
   d. Catch these pieces for reuse if in good conditions.
   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 Flexloc 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 9-9 (inset).

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(4) Coat rings and seals with hydraulic fluid during replacement.

(5) Assembly FFL outer cylinder(s) by reversing the disassembly procedure. For ease of assembly, when assembling threaded parts, apply a coating of white lead replacement to the threads.

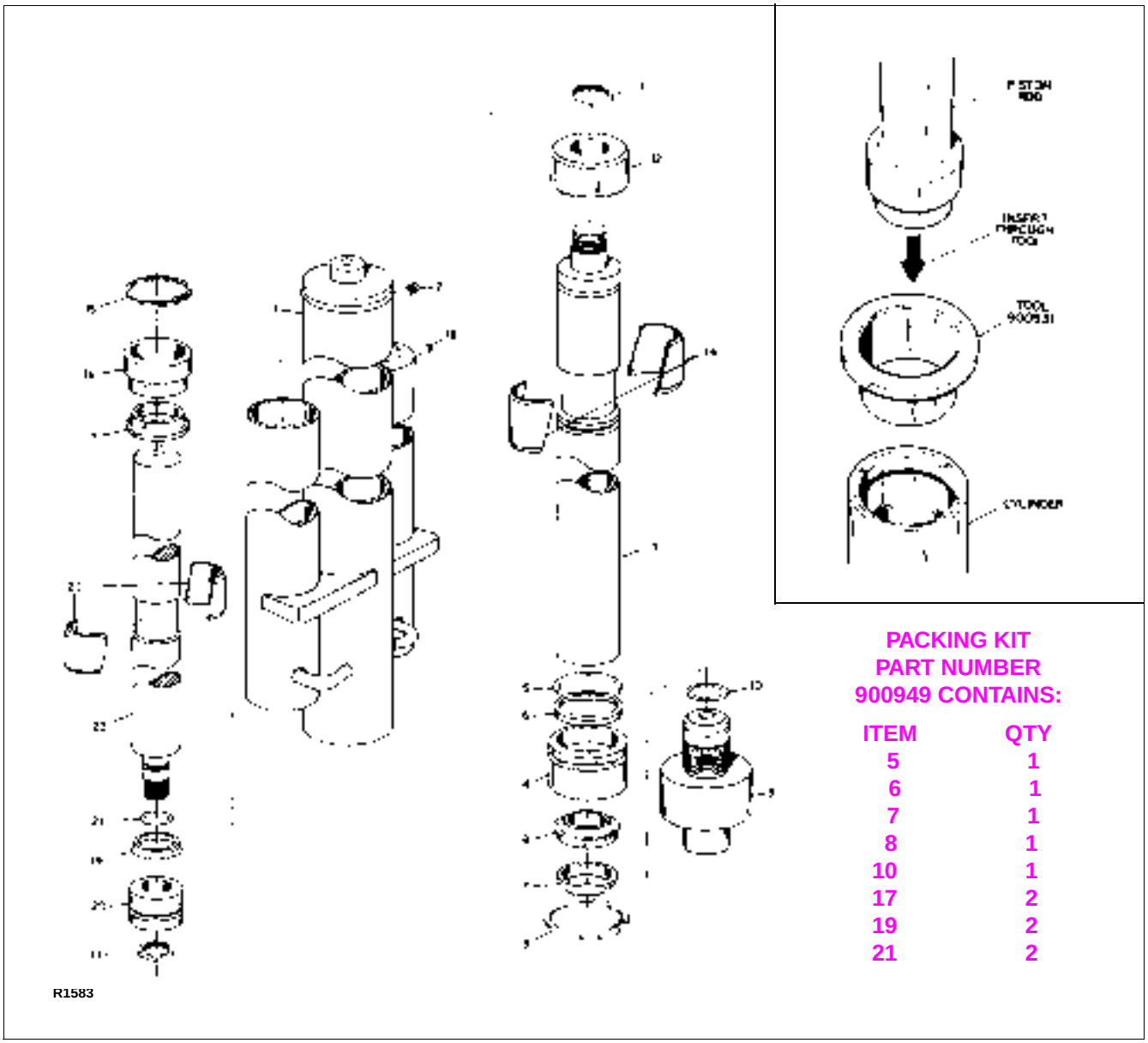

Figure 9-9 Lift Cylinder (Full Free LIft)

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SECTION 10
ELECTRICAL COMPONENTS

10-1.ELECTRICAL CONTROL PANELS.

1. **SEE SUPPLEMENT 187 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 333375 TO 338589**
2. **SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 338590 TO 372811**
3. **SEE SUPPLEMENT 349 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 372812 TO 376499**

10-2.CONTROL PANEL SERVICING.

Truck Serial Number 333375 to 364407:
Figure 10-1 identifies parts associated with the complete electrical control panel assembly.

Truck Serial Number 364408 To 376499:
Figure 10-2 identifies parts associated with the complete electrical control panel assembly.

11. Secure moving contact (8) to armature (9) with spring (6) and spring stud (7).

USED ON TRUCKS SERIAL NUMBERS 333375 TO 364407

1. **SEE SUPPLEMENT 187 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 333375 TO 338589**
2. **SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 338590 TO 364407**

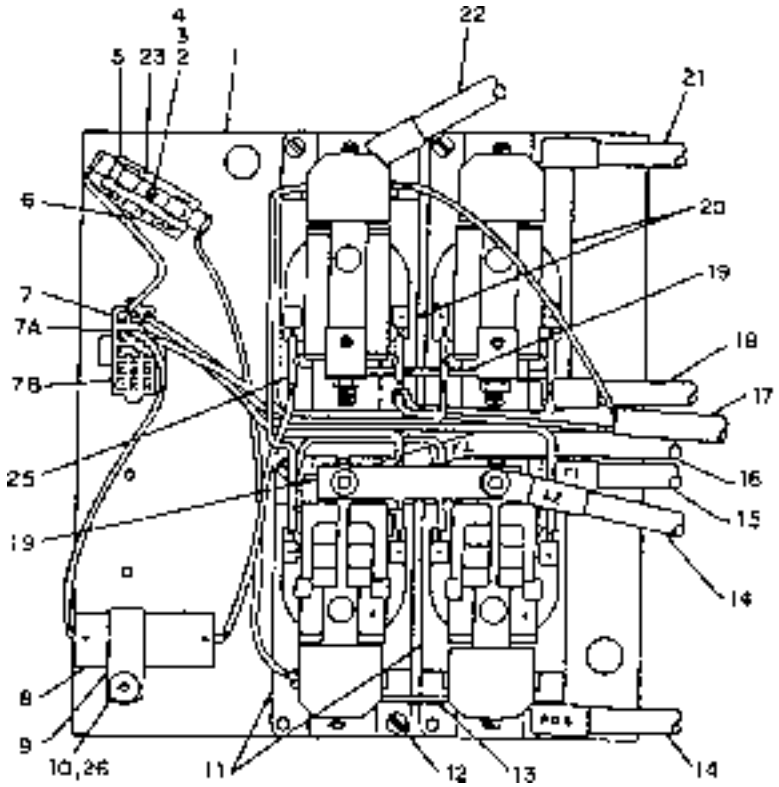

Figure 10-1 Electrical Control Panel

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1. SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 364408 TO 372811
2. SEE SUPPLEMENT 349 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 372812 TO 376499

USED ON TRUCKS SERIAL NUMBERS 364408 TO 376499

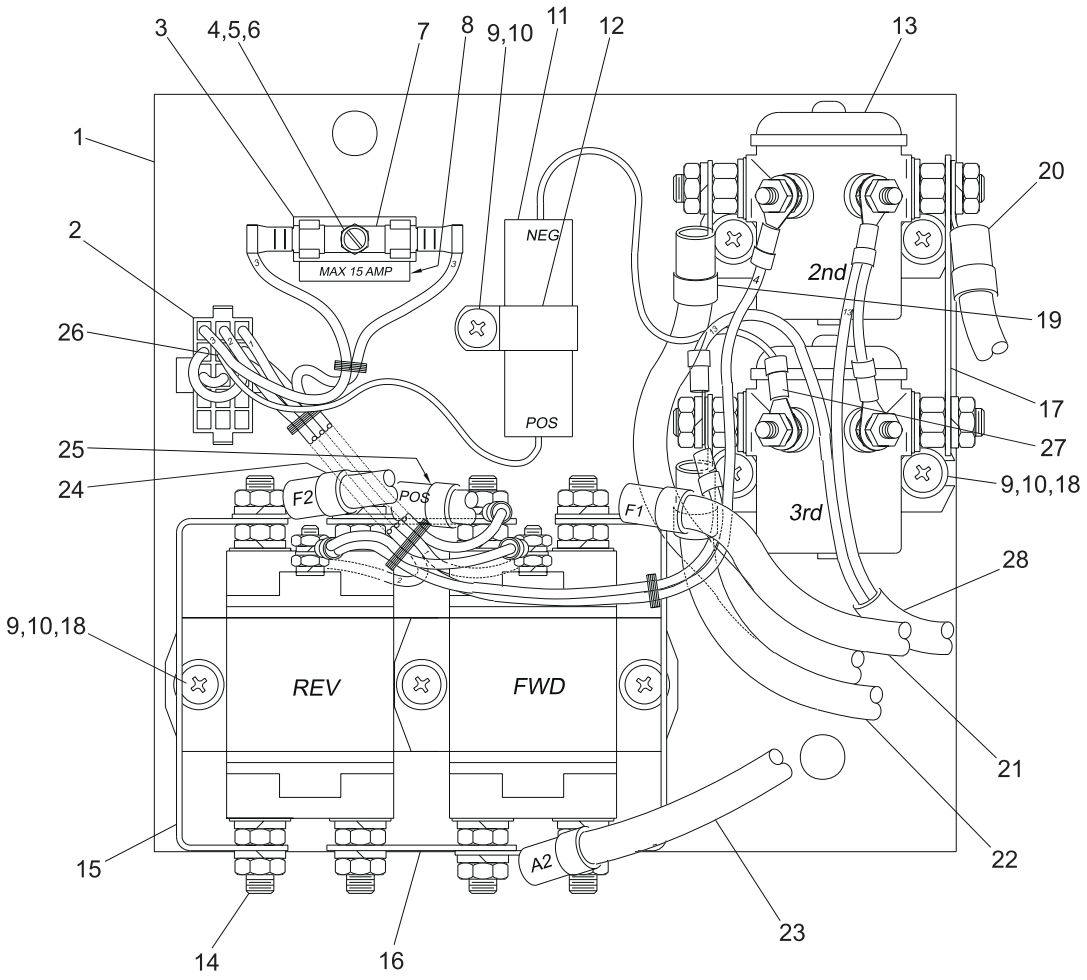

Figure 10-2 Electrical Control Panel

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10-3.Contactor Servicing. Serial Number 333375 to 364407.

NOTE: One contactor tip kit **part number 900531-02** contains the number of contacts required to service all contactors on a truck. Contactor tip kit **part number 900531-09** contains contacts for the forward-reverse contactor. Contactor tip kit **part number 900531-08** contains contacts for the 2nd and 3rd speed contactors.

10-3.1.2nd and 3rd Speed Contactor Disassembly. (Refer to Figure 10-3) Serial Number 333375 to 364407

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 10 mm 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.

10-3.2.2nd and 3rd Speed Contactor Reassembly. (Refer to Figure 10-3) Serial Number 333375 to 364407

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.
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 10 mm 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.

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USED ON TRUCKS SERIAL NUMBERS 333375 TO 364407

CONTACTOR TIP KIT PART NUMBER 900531-08 CONTAINS:

ITEM	QTY
3	1
5	1
8	1
12	1

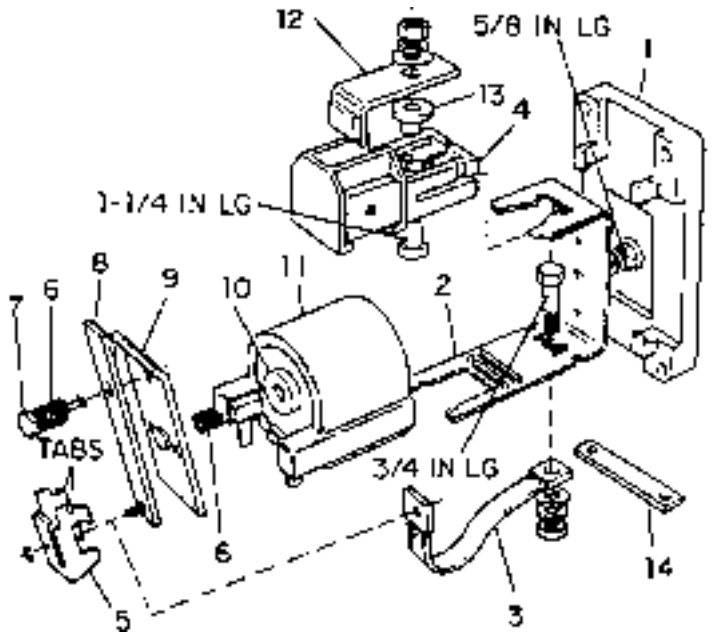

Figure 10-3 Contactor (2nd and 3rd Speed) Part Number 005659

10-3.3. Forward-Reverse Contactor Disassembly. (Refer to Figure 10-4) Serial Number 333375 to 364407

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 (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) by removing 3/4 inch long hex head screw and flat washer.

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USED ON TRUCKS SERIAL NUMBERS 333375 TO 364407

CONTACTOR TIP KIT PART NUMBER 900531-09 CONTAINS:

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

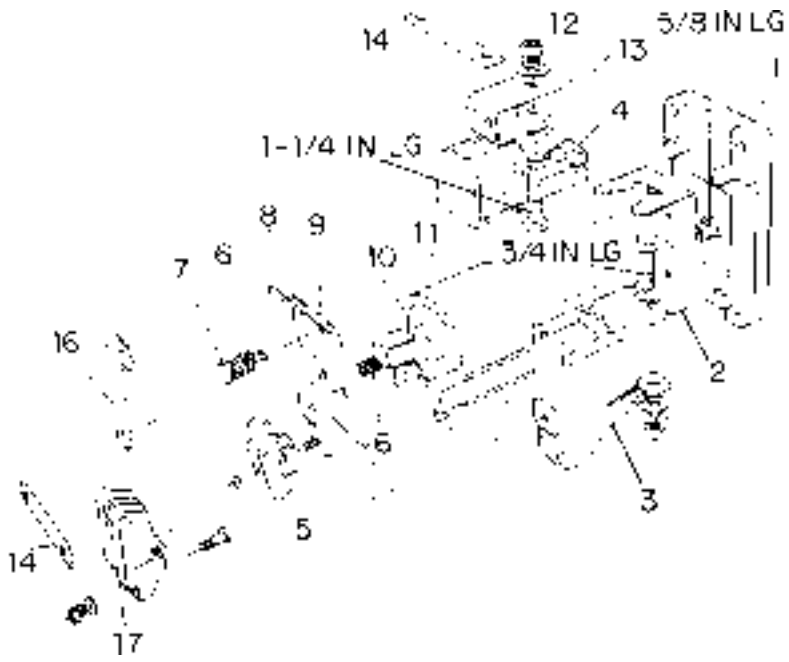

Figure 10-4 Contactor (Forward-Reverse) Part Number 005657

10-3.4. Forward-Reverse Contactor Reassembly. (Refer to Figure 10-4) Serial Number 333375 to 364407

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 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 10 mm 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 10 mm 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 the two tabs on retainer (5) into the 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).

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10-4.PUMP MOTORS.

Refer to applicable Figure 12-29, Figure 12-30, Figure 12-31 and Figure 12-32 for motor disassembly. Pumps are replaceable but not repairable. When replacing pump be sure to install the gasket between pump and motor.

10-5.DRIVE MOTORS.

Refer to Figure 12-8 and Figure 12-9 for motor disassembly.

10-6.BATTERY CHARGER.

The PDI battery charger is mounted in the upper right side of the truck as shown in Figure 12-38 and Figure 12-39. Different chargers have been used on the PDI. Table 10-1 lists the different battery chargers.

NOTE: Refer to paragraph 4-2. for troubleshooting of battery charger 004978 used of trucks **Serial Number 344163 To 376499**

Table 10-1 Battery Chargers

CHARGER PART NO.	VOLTAGE	TYPE	EXPLODED VIEW	SCHEMATIC	SERIAL NUMBER EFFECTIVITY.
004978	120	Smart	Figure 12-37	Figure 10-7	**344163 TO 376499**
004987	120	Smart	Figure 12-38	—	**344163 TO 376499**
004976-01 *	120	Smart	Figure 12-40	Figure 10-6	**333375 TO 344162**
004967-01 **	120	Timer	Figure 12-41	Figure 10-5	**333375 TO 344162**
004980	240	Smart	Figure 12-37	—	**344163 TO 376499**
004967-02	240	Timer	Figure 12-41	Figure 10-5	**333375 TO 344162**

* Optional Charger

** Standard Charger

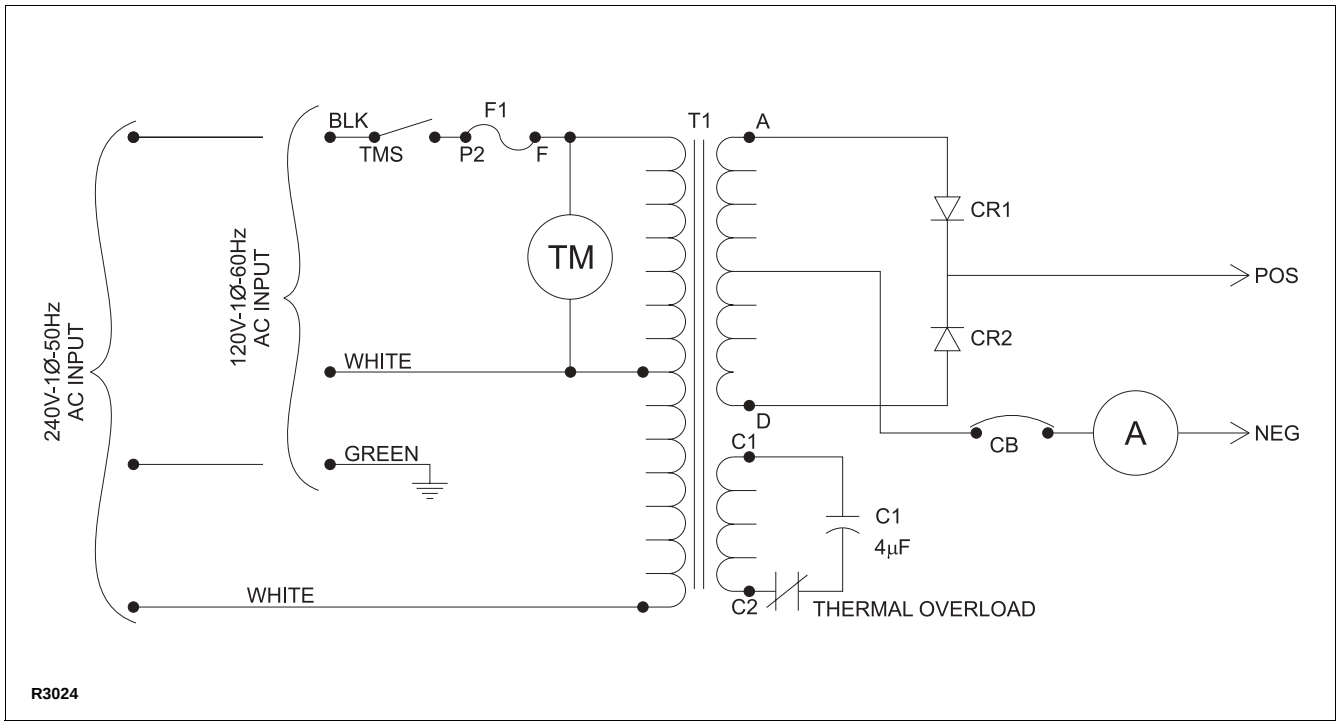

Figure 10-5 Battery Charger 004967-01 and 004967-02 Schematic

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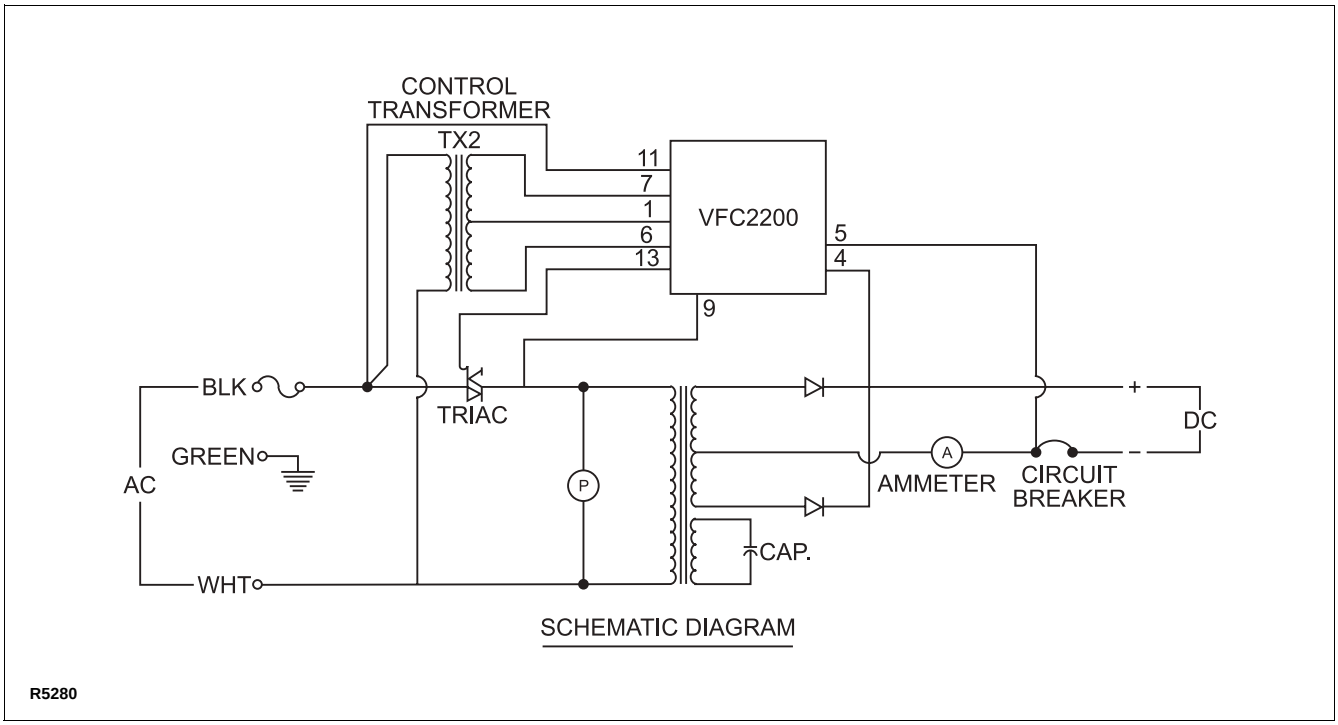

Figure 10-6 Battery Charger 004976-01 Schematic

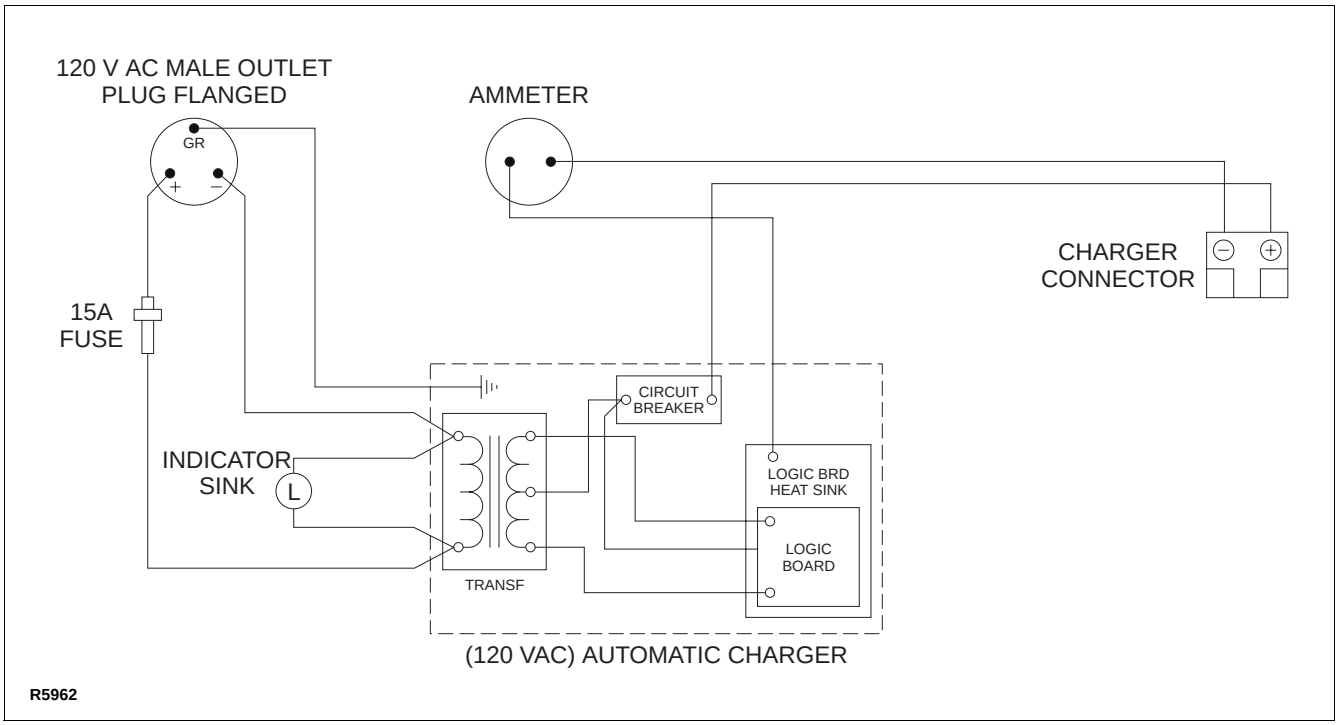

Figure 10-7 Battery Charger 004978 Schematic

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10-7.BATTERIES.

NOTE: Batteries are removed from the right side of the truck (see Figure 10-8). When installing a new battery, be sure handles are securely fastened to battery, battery cables are securely attached to battery terminals, and cables are routed and secured to the battery as shown in Figure 10-8.

CAUTION: Failure to properly route and wrap battery cables can damage cables and make battery installation difficult.

1. Turn key to off, and remove from key switch.

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

2. **Truck Serial Number 342392 To 376499**, remove screw (32), washer (31) and retainer bar (30).
3. Remove batteries from the right side of the truck. The battery connecting cables are sufficiently long to allow batteries to be placed on the floor.
4. Disconnect cable connectors (8 and 17) from battery terminals.
5. **Trucks Serial Number 333375 to 342391**, remove battery handles as follows:
   a. **Truck Serial Number 334289 to 342391**, remove two nuts (22), two lockwashers (21), two bolts (18) and two handle rods (20).
   b. **Truck Serial Number 333375 to 334288**, remove four screws (25) and four lockwashers (24) securing two battery handles (19) to two handle rods (23).
6. **Trucks Serial Number 333375 to 342391**, install the two battery handles and two handle rods on the new battery.
7. Install two cable connectors (8 and 17) on terminals of new battery, and slide battery back into compartment, being careful not to damage cables.
8. **Trucks Serial Number 347282 To 376499**, reinstall and position retainer bar (30) to prevent battery movement in excess of 1/2".

10-8.FUSE.

1. Remove two screws (1, Figure 10-8), two lockwashers (2), and four brass washers (3) securing the two cables (9, 12), fuse (4), and two standoff insulators (5).
2. Install two standoff insulators (5), new fuse (4) and two cables (9, 12), four brass washers (3) (two behind fuse and two in front of two cables), two lockwashers (2), and two screws (1).

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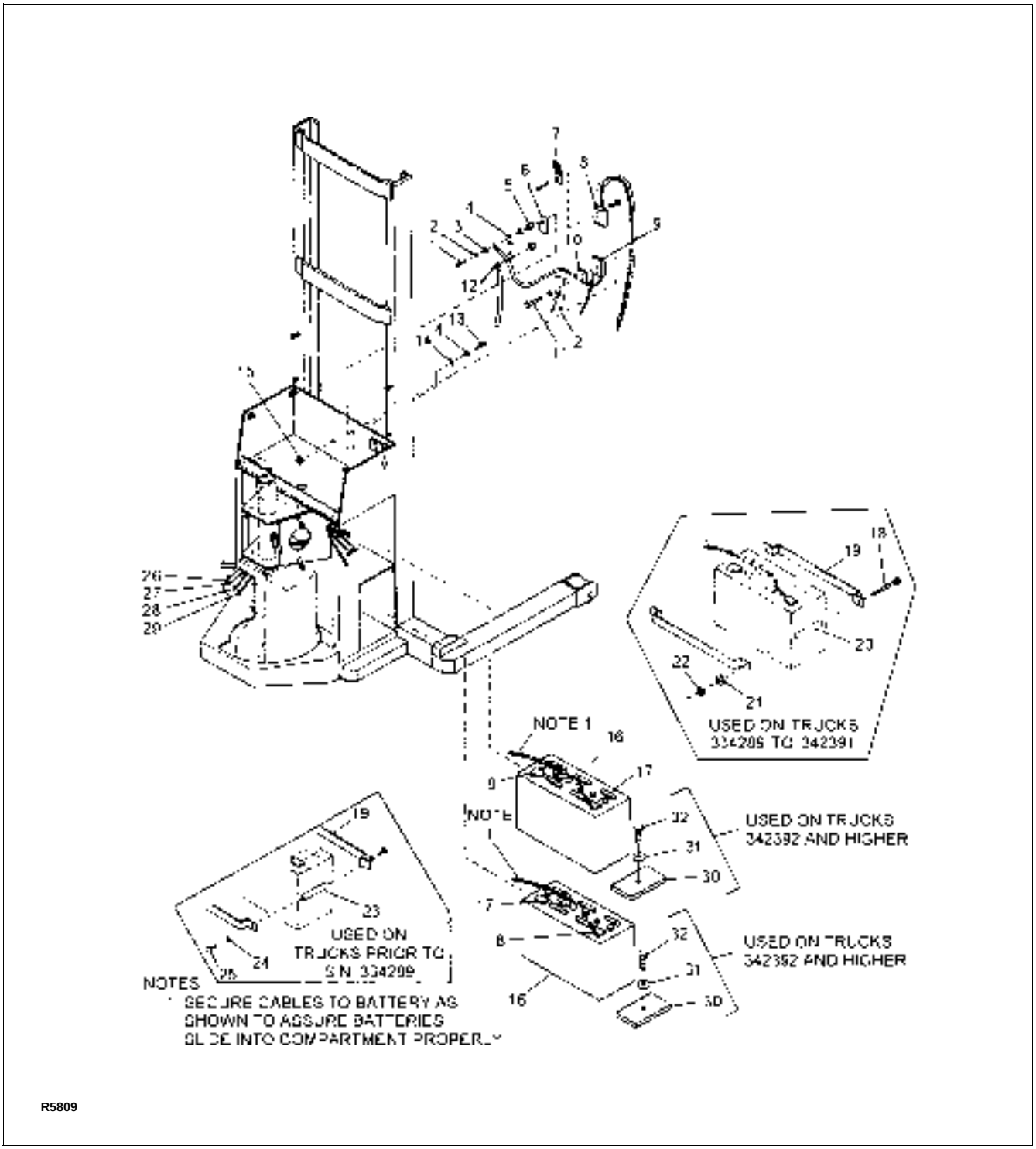

Figure 10-8 Base, Frame and Electrical Components

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10-9.HIGH SPEED LIMIT SWITCH.

1. Disconnect wiring from high speed limit switch (5, Figure 10-9), then remove nut (4), lockwasher (3), and washer (2) securing switch mounting bracket (1) to frame.
2. Remove high speed limit switch from bracket, and install new switch onto bracket.

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

3. Position bracket with new switch in place on frame, and secure with washer (2), lockwasher (3), and nut (4).
4. Reconnect wiring to switch.

10-10.HORN.

1. Disconnect wiring from horn (19, Figure 10-9), then remove nut (4), lockwasher (3) and washer (2) securing horn.
2. Remove horn.
3. Position new horn in place, reinstall nut, lockwasher and flat washer, then reconnect wiring.

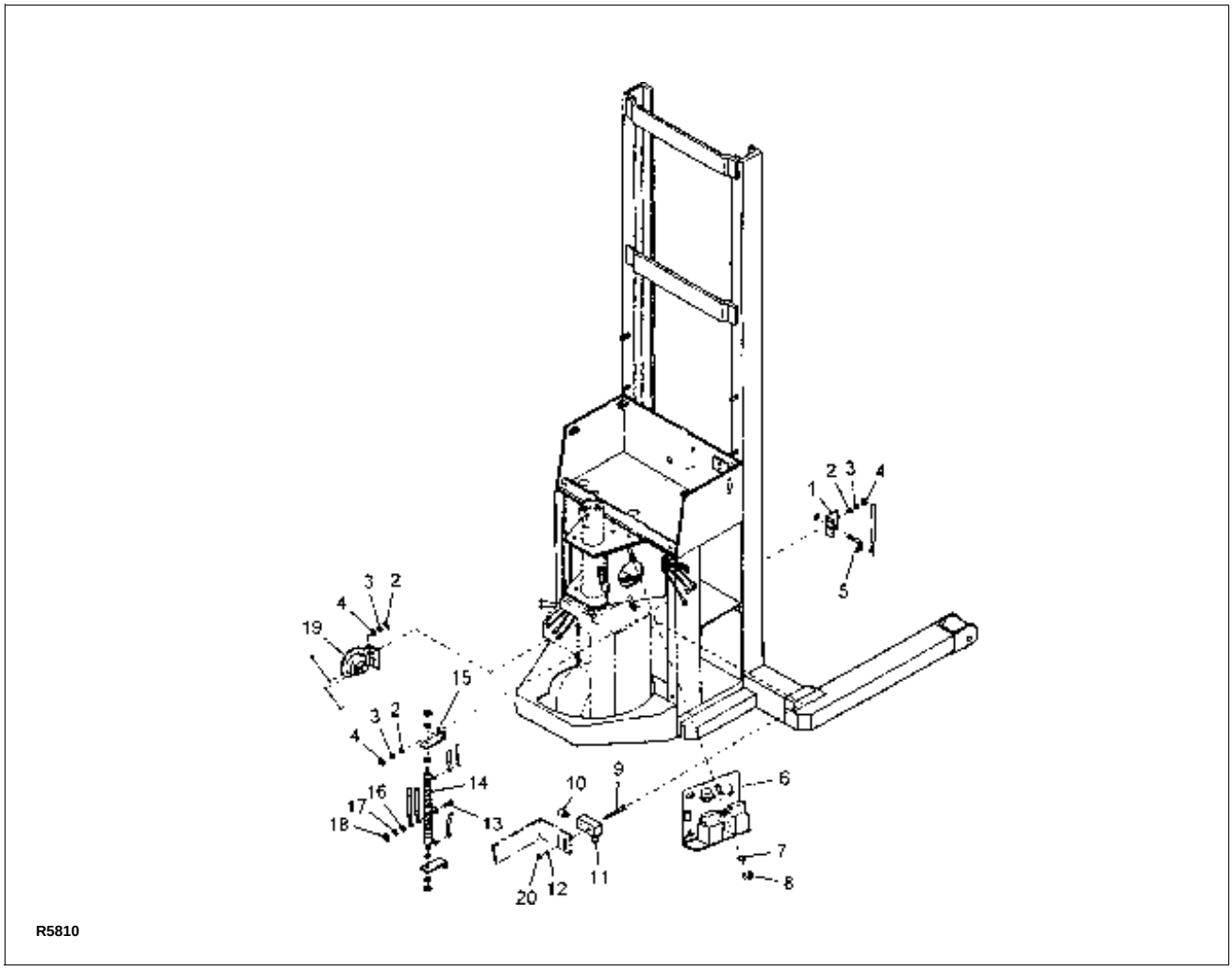

Figure 10-9 Electrical Components

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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 12-42 and the schematic diagram Figure 4-6 or Figure 4-7.

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 12-43 for replacement parts and to the schematic diagram, Figure 4-6 or Figure 4-7, for wiring information.

11-3.BATTERY CAPACITY INDICATOR.

Refer to Figure 12-44 and Figure 12-45 for the battery capacity indicator replacement parts. Figure 12-44 and Figure 12-45 include both the indicator with and without the lift lockout feature.

11-4.REMOTE CONTROL.

Figure 12-46 identifies the part 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 12-46 for reference. Refer to subparagraph 11-5.1. 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 parts list item number for Figure 12-46.

11-5.1. PUSHBUTTON BOX REMOTE CONTROL

1. Add solenoid to pump.
2. Connect a piece of wire (1, Figure 12-46, Frame A) from lowering solenoid (2) to negative side of pump motor.
3. Connect wire 8 from pump motor solenoid to terminal 3 on connector (3).
4. Connect wire 9 from remaining terminal on lowering solenoid (2) to terminal 2 on remote connector (3).
5. Connect wire from remote connector (14) terminal 1 to deadman switch terminal 3.

11-5.2. CONTROL HEAD LIFT/LOWER

1. Add solenoid to pump.
2. Connect a piece of wire (1, Figure 12-46, Frame B) from lowering solenoid (2) to negative side of pump motor.
3. Connect wire 8 from pump motor solenoid to terminal 11 of connector on panel.
4. Connect wire 9 from lowering solenoid (2) to terminal 13 of connector on panel.
5. Connect a jumper between terminals 10 and 11 on back side connector on panel.
6. Connect a jumper between terminals 12 and 13 on back side of connector on panel.

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SECTION 12
ILLUSTRATED PARTS BREAKDOWN

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

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SEE Figure 12-2
FOR SWITCHES

SEE Figure 12-3
FOR COLD CONDITIONING

1. SEE SUPPLEMENT 207 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 333375 TO 334630
2. SEE SUPPLEMENT 220 FOR TRANSISTOR CONTROL HEAD USED ON TRUCKS SERIAL NUMBER 33463 TO 376499

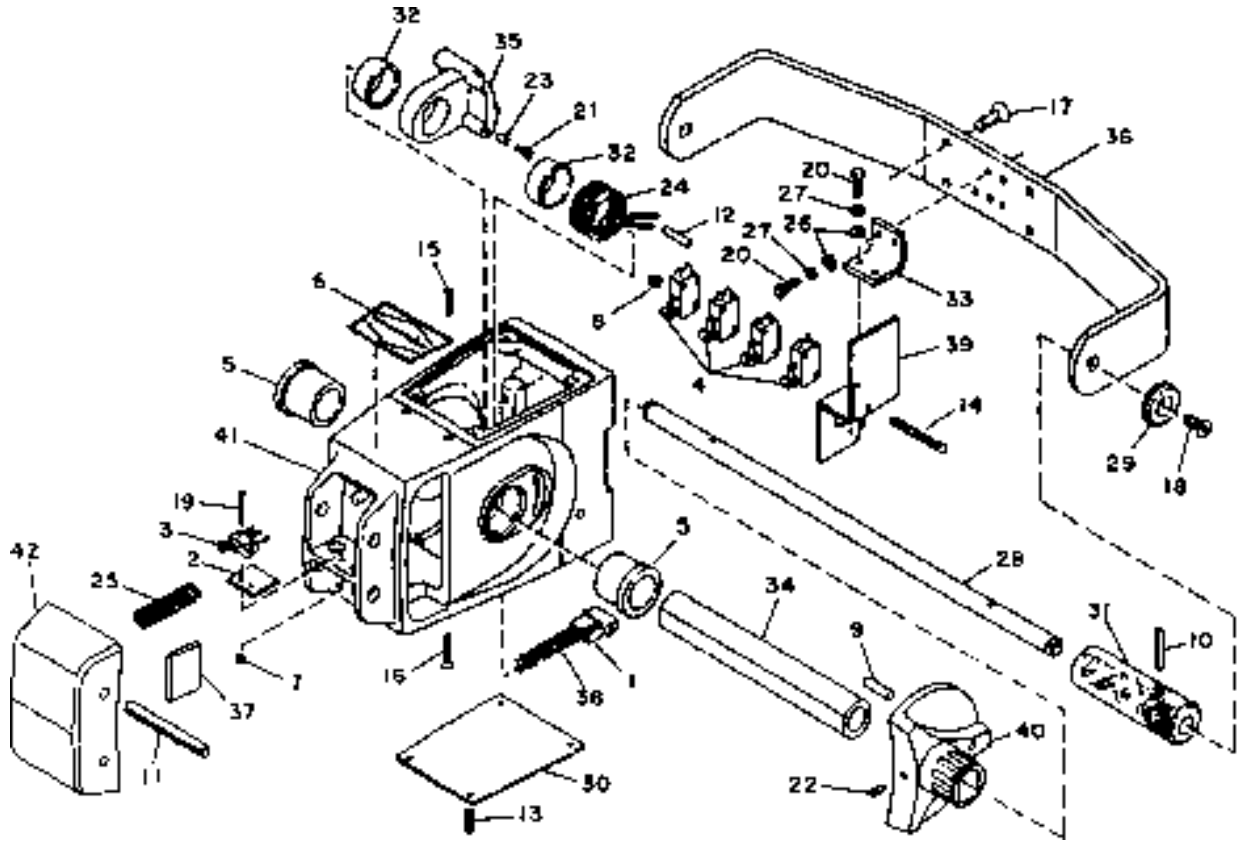

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Figure 12-1 Control Head Assembly

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	505050-04	CONTROL HEAD STANDARD	
—	505050-05	CONTROL HEAD REMOTE LIFT IN HANDLE	1
—	505050-06	CONTROL HEAD REMOTE 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, 1/8 X 1-1/4	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, 6-32 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	HEX HD. 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	403358	TUBE	2
32	402836	SPACER	2
33	402837	BRACKET	1
34	402839	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 BRACKET	1
40	800272	CONTROL LEVER	2
41	800273	CONTROL HANDLE	1
42	800274	COVER	1

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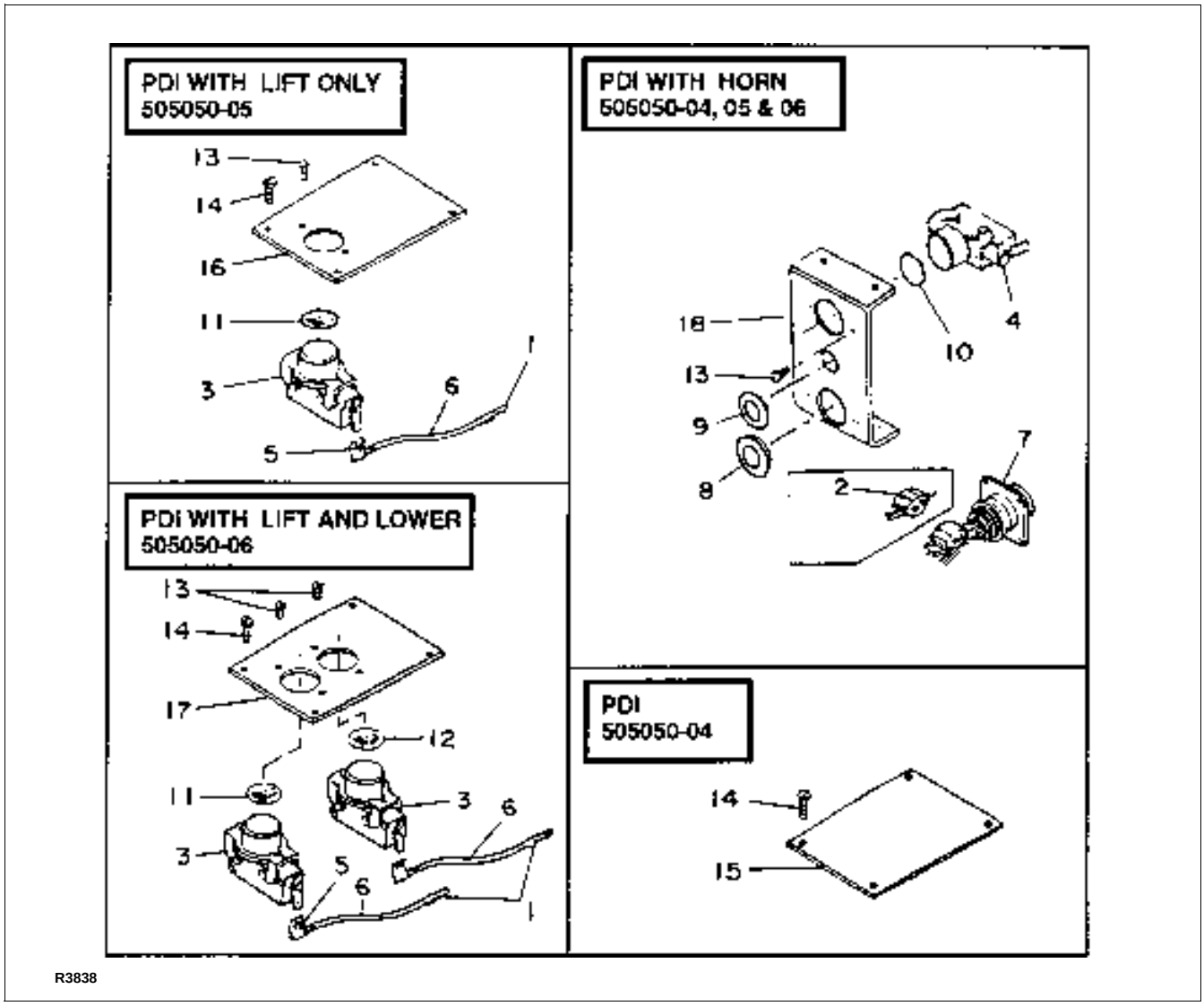

Figure 12-2 Push Button Switches, Control Head

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	A/R
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	A/R
14	067416	PAN HD. SCREW 6-32 X 1/2	4
15	402830	TOP COVER	1
16	402831	TOP COVER	1
17	402832	TOP COVER	1
18	402842	SWITCH PLATE	1

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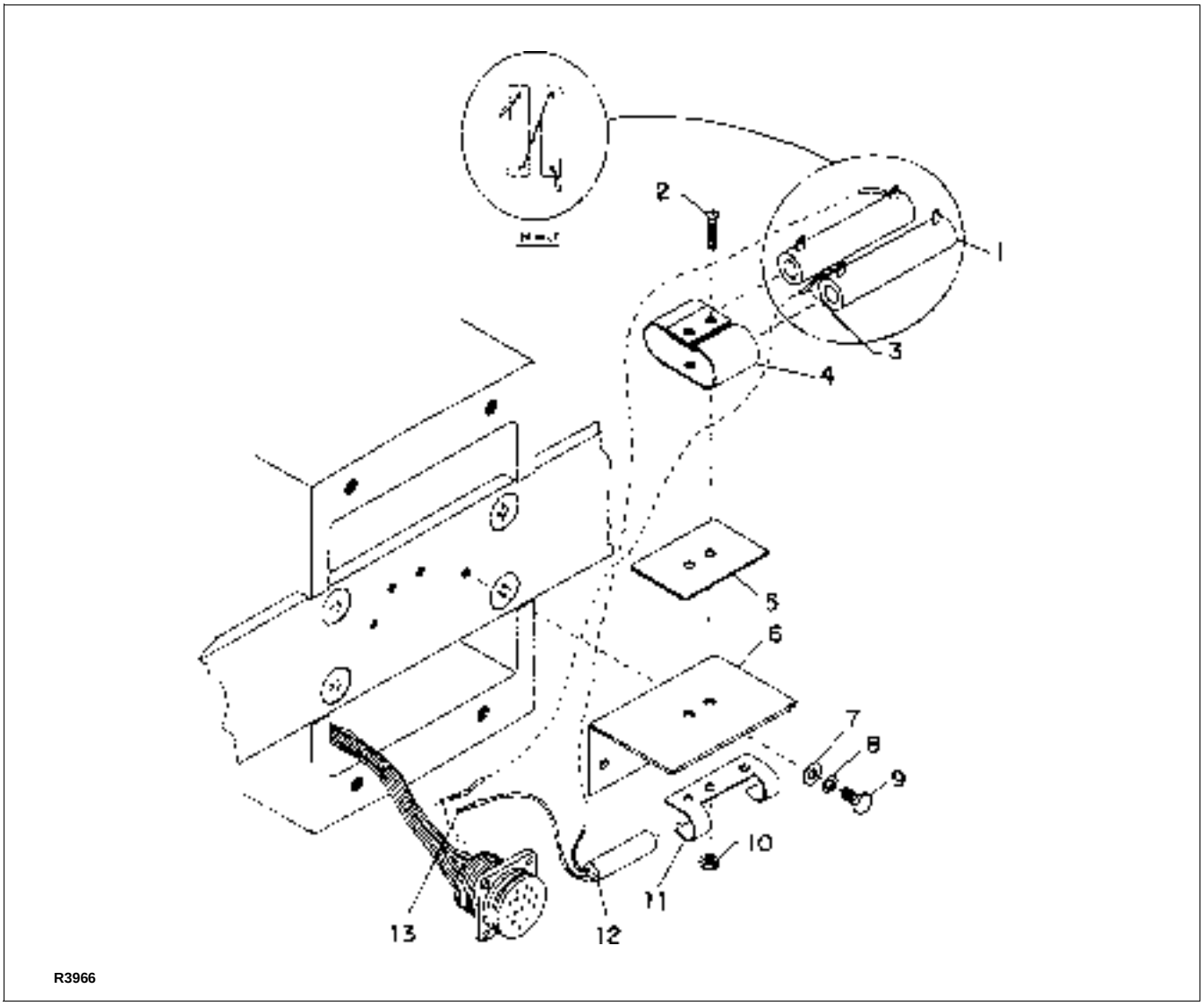

Figure 12-3 Cold Conditioning, Control Head

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	018909	RESISTORS	2
2	068186	SCREW	2
3	023014	WIRE	A/R
4	400544	BRACKET, RESISTOR	1
5	018214	INSULATOR, SWITCH	1
6	402829	BRACKET	1
7	077007	WASHER, FLAT	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	077204	LOCKWASHER	2
9	072400-01	SCREW	2
10	059632	NUT, HEX, 5-40	2
11	400044	BRACKET THERMAL CUTOUT	1
12	020736	THERMAL CUTOUT SWITCH	1
13	005643	CONTACT PIN	2

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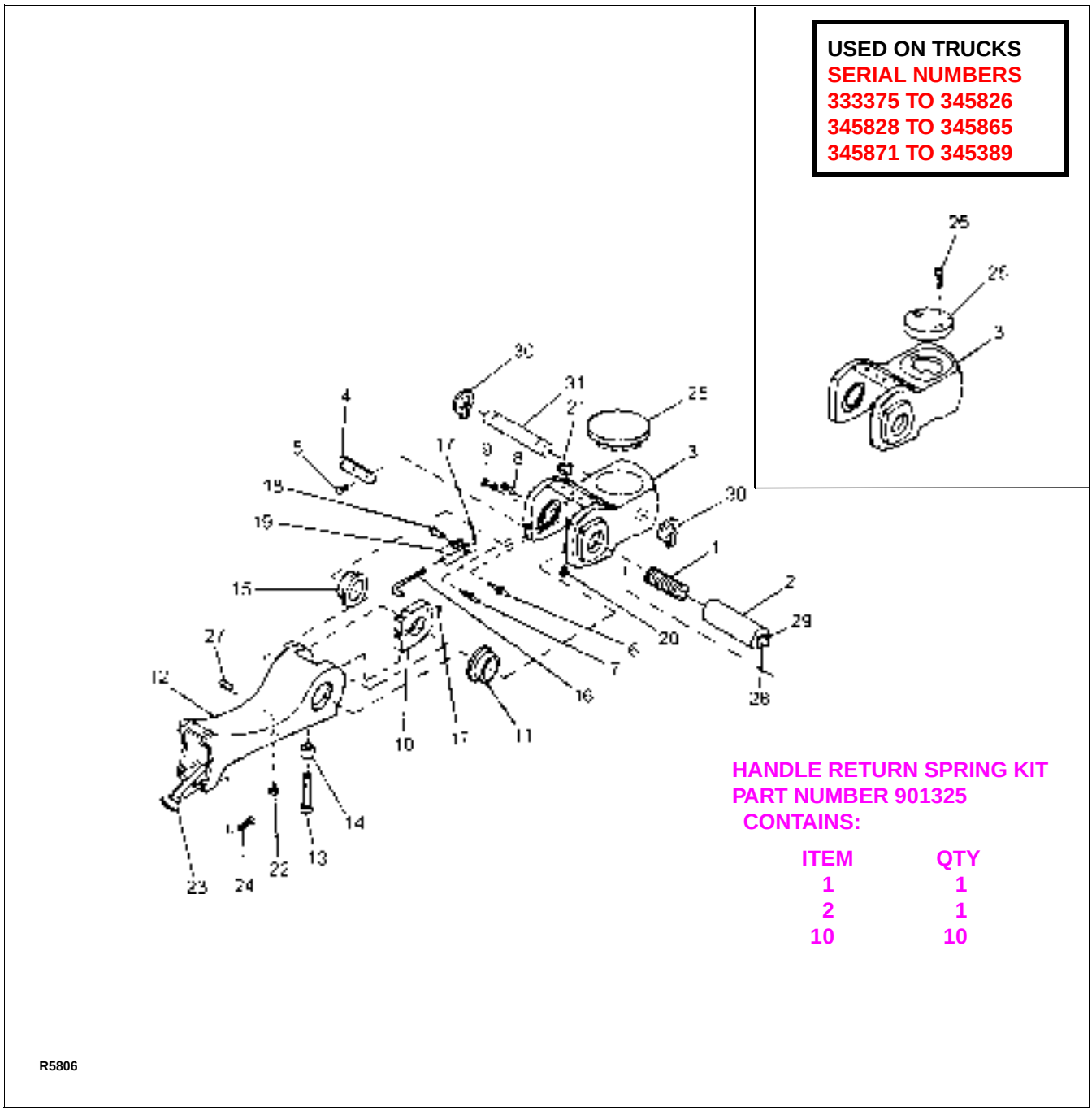

Figure 12-4 Steering Arm and Electrical Cable

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	505765-02*	CONTROL ARM ASSY	1
1	075060**	. SPRING, RETURN	1
2	501371**	. SPRING TUBE	1
3	402455*	. PIVOT CAP	1
3	800064***	. PIVOT CAP	1
4	052876	. BUMPER	2
5	071377	. SCREW, PAN HD, 10-32 X 3/4	3
6	285302**	. SPRING PIN	1
7	285303**	. SPRING PIN	1
8	077210**	. WASHER, LOCK, SPLIT, 5/16	2
9	059426**	. NUT, HEX 5/16-18	2
10	800204	. TUBE CLAMP	1
11	052922	. FLANGED BEARING	1
12	800275	. STEERING ARM	1
13	065569	. SCREW, SOCKET HD, 7/16-14 X 2-1/4	1
14	401127	. SPACER	1
15	052925	. FLANGED BUSHING	1
16	501396	. BRAKE ROD	1
17	060417	. COTTER PIN, 3/32 X 3/4	2
18	060300	. CLEVIS PIN	1
19	056200	. CLEVIS	1
20	063478	. SCREW, HEX CAP, 1/4-20 X 3/4	1
21	504364	. CLAMP ASSY	1
22	069478	SCREW, FLAT HD, 1/4-20 X 3/4	1
23	023129	CONTROL CABLE	1
—	005640	. SCREW TYPE CONNECTOR	1
—	005642	. SOCKETS FOR P/N 055640	12
—	005452	. SQUARE SOCKET PLUG	1
—	005626	. PINS FOR P/N 005452	
24	065481	SCREW, SOCKET HD, 1/4-20 X 1	4
25	402459*	PIVOT CAP COVER	1
25	191045***	PIVOT CAP COVER	1
26	065603***	SCREW, SOCKET HD, 3/8-16 X 3/4	2
27	504364	CABLE CLAMP AND NUT ASSEMBLY	2
28	061050**	ROLL PIN, 3/8 X 1-1/4	1
29	061006**	ROLL PIN, 1/4 X 1-1/4	1
30	061716*	SNAP RING	2
31	402452*	PIN	1

* **USED ON TRUCKS SERIAL NUMBER 345827, 345866 TO 345870, 345390 TO 376499**

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

*** **USED ON TRUCKS SERIAL NUMBER 333375 TO 345826, 345828 TO 345865, 345871 TO 345389**

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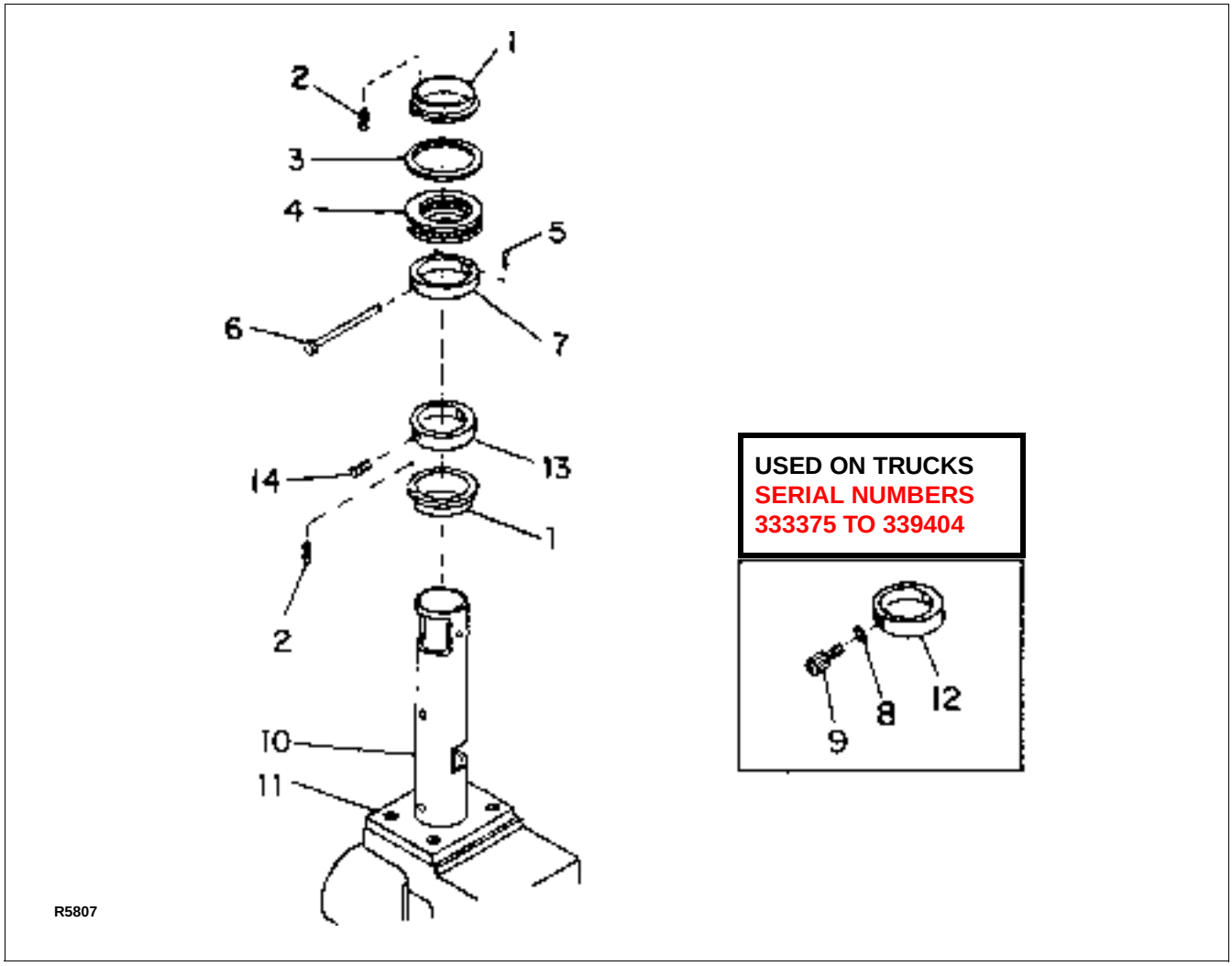

Figure 12-5 Pivot Tube Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	053108	BUSHING	2
2	061000	ROLL PIN	2
3	401695	SPACER	1
4	051146	BEARING	1
5	060417	COTTER PIN	1
6	800005	PIN	1
7	283902	SPACER	1
8	077211*	WASHER, LOCK, SPLIT, 3/8	1
9	065605*	SCREW, SOCKET HD, 3/8-16 X 1	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
10	505683-01***	PIVOT TUBE WELDMENT (SEE NOTE 1)	1
10	504574**	PIVOT TUBE WELDMENT (SEE NOTE 2)	1
11	069710	SCREW	4
12	283902*	LOWER SPACER	1
13	283906	LOWER COLLAR	1
14	073492	SETSCREW	1

NOTE 1:TOOL KIT PART NUMBER 907151 REQUIRED FOR REMOVAL AND INSTALLATION OF PIVOT TUBE WELDMENT PART NUMBER 505683-01.

NOTE 2:ORDER PIVOT TUBE KIT PART NUMBER 903275.

* **USED ON TRUCKS SERIAL NUMBER 333375 TO 339404**

** **USED ON TRUCKS SERIAL NUMBER 333375 TO 345826, 345828 TO 345865, 345871 TO 345389.**

*** **USED ON TRUCKS SERIAL NUMBER 345827, 345866 TO 345870, 345390 TO 376499.**

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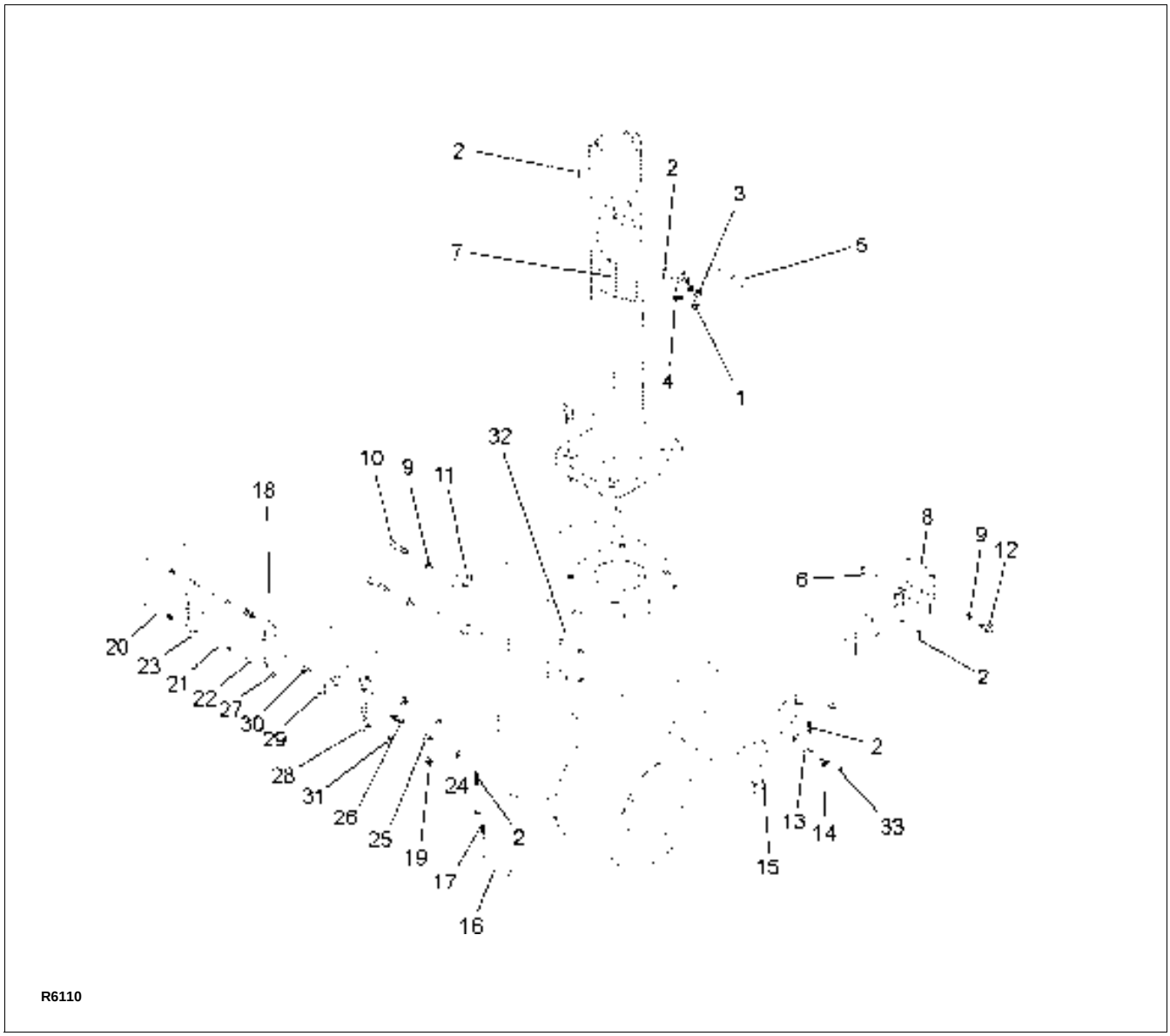

Figure 12-6 Brake and Linkage

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	053109	LOCK BUSHING	2
2	060417	COTTER PIN, 3/32 X 3/4	5
3	053106	FLANGED BUSHING	1
4	111104	UPPER PIVOT PLATE	1
5	060320	CLEVIS PIN	1
6	060321	CLEVIS PIN	1
7	504573	BRAKE ROD WELDMENT	1
8	503523	BRACKET	1
9	077209	LOCK WASHER, SPLIT, 1/4	5
10	063482	SCREW	2
11	403182	MOUNTING BLOCK	2
12	063477	SCREW, CAP, HEX HD, 1/4-20 X 5/8	3
13	400804	PIN	1
14	077011*	WASHER, FLAT, 5/16	1
15	505232	BRAKE LEVER	1
16	403179	ROD	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
17	800188	LINK PIN	1
18	052821	DISC BRAKE PAD ASSEMBLY	1
19	059421	. NUT	2
20	901189	. BOLT	2
21	901190	. SPACER	2
22	901191	. SPRING	2
23	901188	. BRAKE PAD	1
24	901198	. C-RING	1
25	901197	. WASHER	1
26	901196	. SPRING	1
27	901192	. BRAKE PAD WITH PIN	1
28	901195	. BRAKE	1
29	901194	. LEVER	1
30	901193	. WASHER	1
31	077209	. LOCK WASHER, SPLIT, 1/4	2
32	505256	DISC ASSEMBLY	1
33	403378*	SPACER	1

*** SPACER, ITEM 33, USED IN PLACE OF TWO WASHERS, ITEM 14.**

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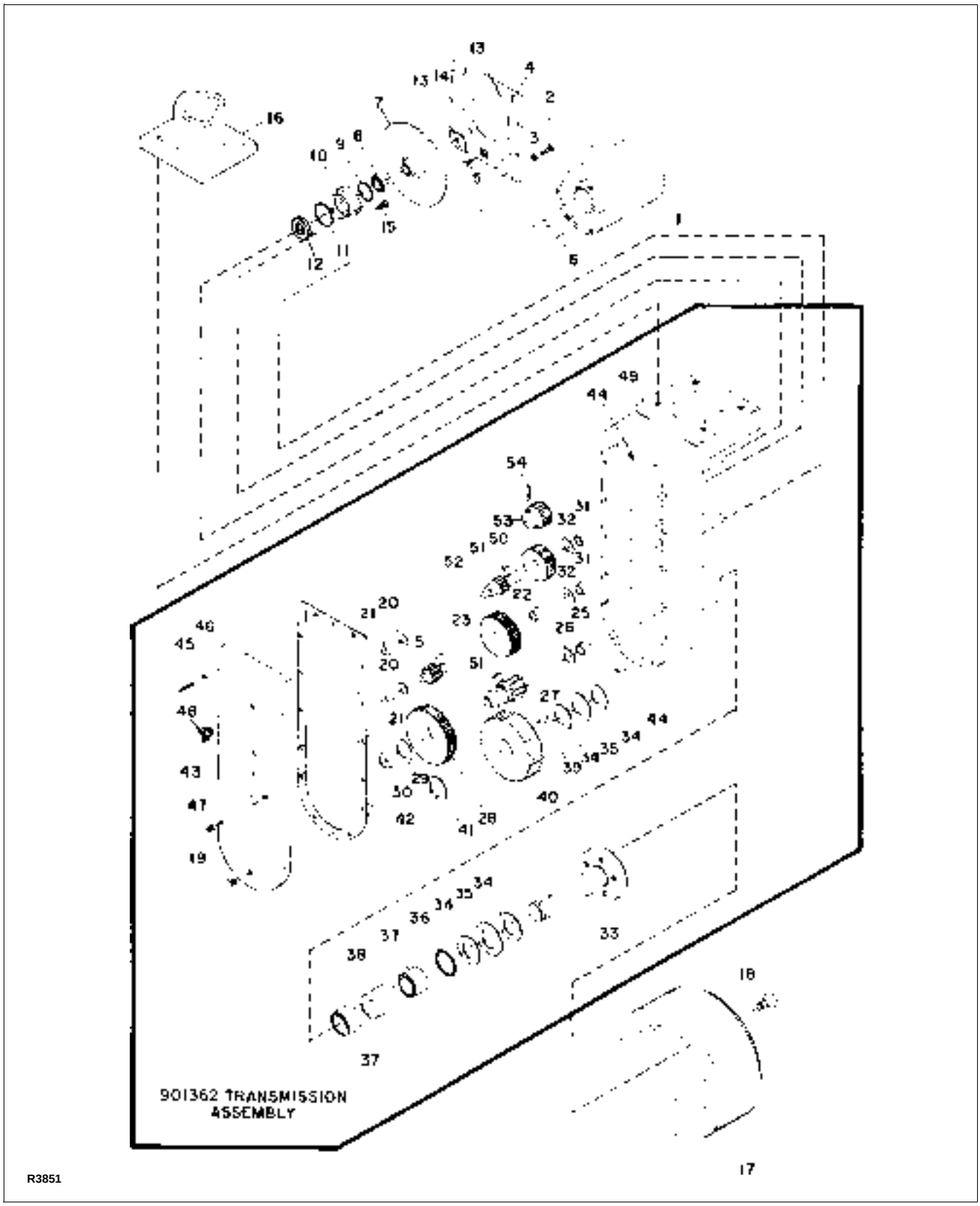

Figure 12-7 Transmission

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	—	DRIVE MOTOR (FIGURE 12-8)	REF
2	063557	BOLT, 5/16-18 X 1-1/4	4
3	077210	WASHER, SPLIT, 5/16	4
4	403181	MOTOR PLATE	1
5	065453	SCREW, CAP SOC HD, 10-32 X 1	3
6	057906	KEY	1
7	—	DISC ASSY	REF
8	051200	BEARING	1
9	042132	O-RING, 1.3-IN. DIA.	1
10	400683	MOTOR BEARING HOUSING	1
11	042131	O-RING, 1.6-IN. DIA.	1
12	073517	SEAL	1
13	060609	PIN	2
14	077208	LOCK WASHER, 3/16	3
15	063495	HEX HD SCREW, 1/4-20 X 1/2	2
16	—	PIVOT TUBE AND PLATE ASSY (Figure 12-5)	REF
17	502674	WHEEL AND HUB ASSY	1
18	052764	BOLT	5
—	901362	TRANSMISSION ASSEMBLY	1
19	026302	. PLUG, DRAIN	1
20	051206	. BEARING-NEEDLE THRUST	2
21	051202	. BEARING	2
22	306808	. SPACER	1
23	057240	. GEAR	2
24	057258	. GEAR AND SHAFT	1
25	051216	. BEARING	1
26	051208	. BEARING-NEEDLE THRUST	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
27	057256	. GEAR AND SHAFT	1
28	057241	. GEAR	1
29	053031	. THRUST BEARING	1
30	051204	. BEARING	1
31	051203	. BEARING	2
32	051207	. BEARING-NEEDLE THRUST	2
33	050711	. SHAFT	1
34	051217	. THRUST BEARING	4
35	053028	. THRUST BEARING	2
36	073516	. SEAL	1
37	051215	. BEARING	2
38	074707	. SPACER	1
39	057908	. KEY	1
40	057242	. GEAR	1
41	061731	. SNAP RING, EXT, 1-3/8	1
42	036115	. GASKET	1
43	800184	. COVER	1
44	060609	. PIN	2
45	063482	. SCREW, 1/4-20 X 1-1/4	14
46	077209	. LOCK WASHER, 1/4	14
47	026310	. PLUG, FILL LEVEL	1
48	076702	. VENT, TRANSMISSION	1
49	800176	. TRANSMISSION HOUSING	1
50	057238	. GEAR	1
51	057909	. KEY	3
52	057257	. GEAR AND SHAFT	1
53	057237	. GEAR	3
54	060974	. ROLL PIN	1

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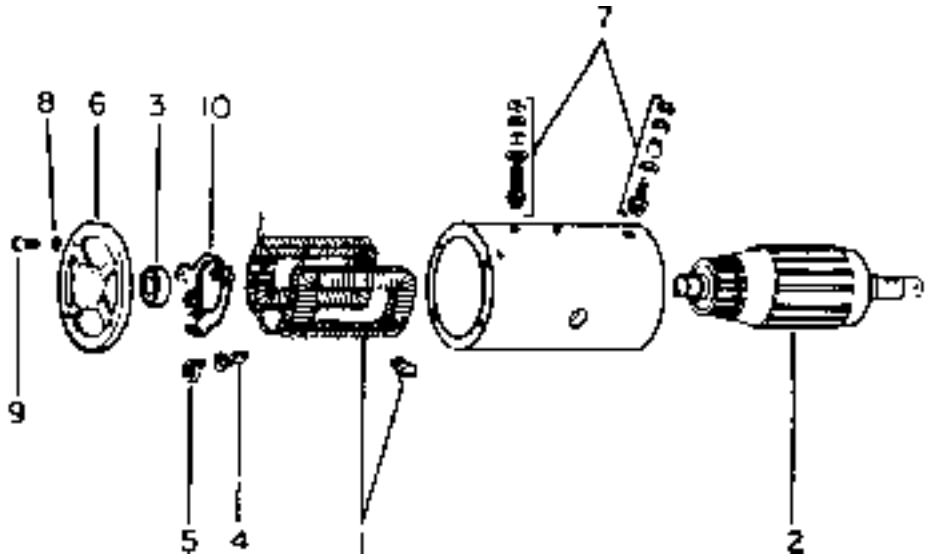

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Figure 12-8 Drive Motor 016046

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016046*	DRIVE MOTOR	1
1	901264	. FIELD COIL SET	1
2	901265	. ARMATURE	1
3	901266	. COMMUTATOR END BEARING	1
4	900450	. BRUSH SET	1
5	900451	. BRUSH SPRING SET	1
6	901267	. COMMUTATOR END HD	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
7	901268	. TERMINAL KIT	1
8	—	. LOCK WASHER, 1/4	4
9	—	. FILLISTER HD SCREW, 10-33 X 3/4	4
10	901269	. BRUSH HOLDER	1
11	—	. POLE SHOE SCREW 3/8-16 X 1/2 FL. HD	2

*** FOR REPLACEMENT OF COMPLETE DRIVE MOTOR ASSEMBLY 016046 ORDER DRIVE MOTOR 016052.**

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371794 TO 376499

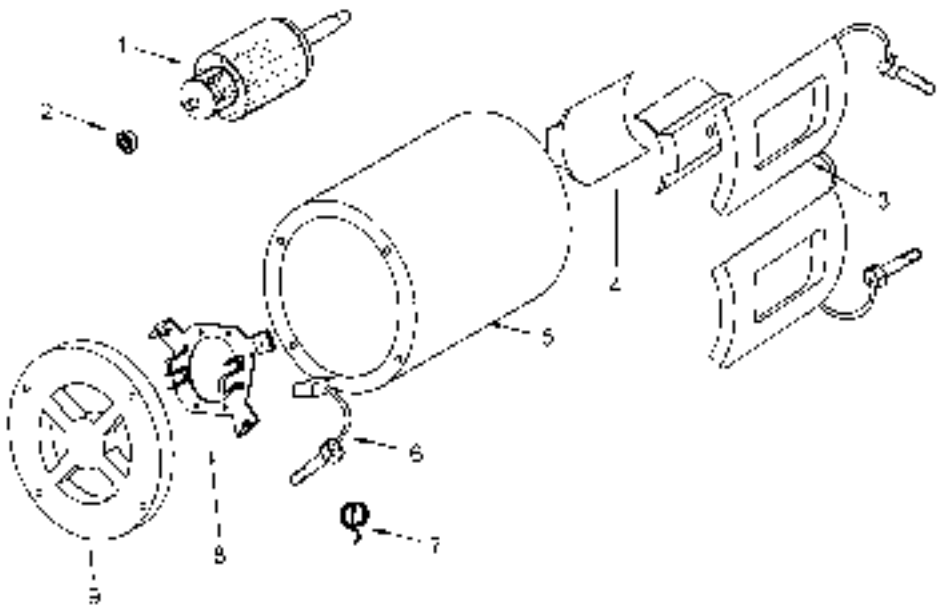

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Figure 12-9 Drive Motor 016052

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016052	DRIVE MOTOR ASSY	1
1	907176	. ARMATURE	1
2	901265	. BEARING, COMMUTATOR END	1
3	901266	. FIELD COILS	1
4	900450	. POLE SHOES	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
5	900451	. FIELD RING	1
6	901267	. BRUSH SET	1
7	901268	. SPRING SET	1
8	901179	. BRUSH HOLDER	1
9	907180	. HEAD, COMMUTATOR	1

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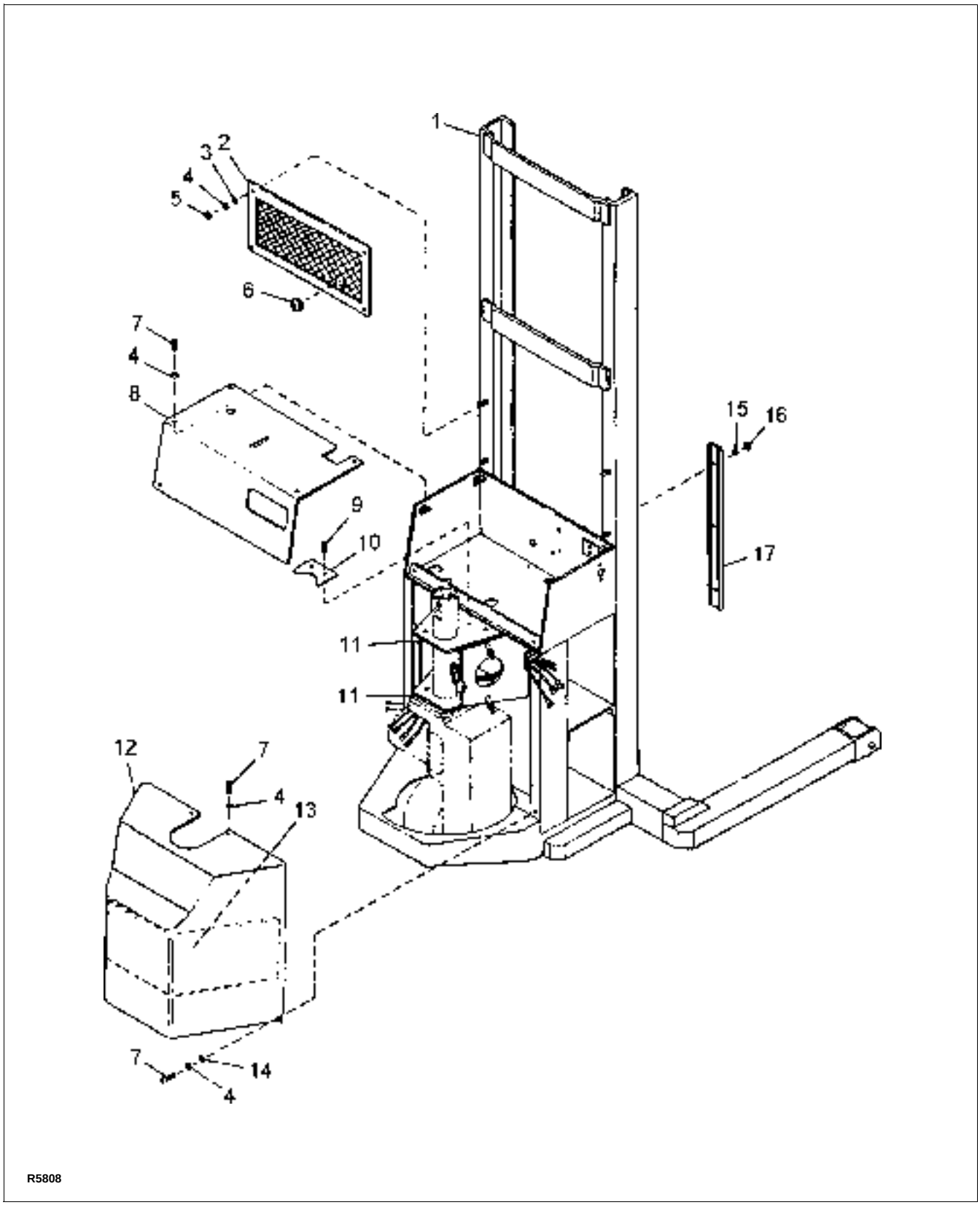

Figure 12-10 Base and Frame

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	—	BASE AND FRAME	1
2	504579	SCREEN	1
3	077030	WASHER, FLAT NO. 10	4
4	077209	WASHER, SPLIT, LOCK, 1/4	9
5	059421	NUT, HEX, 1/4-20	4
6	057511	GROMMET	1
7	070476	SCREW, RD HD, 1/4-20 X 1/2	9
8	402261	COVER	1
9	068190	SCREW, RD HD, 4-40 X 3/8	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
10	402236	SPACER	1
11	025713	GREASE FITTING	2
12	504570	COVER	1
13	060106	SOUNDPROOF PAD	1
14	077031	WASHER, FLAT	2
15	077207	WASHER EXT TOOTH NO. 10	3
16	059416	NUT, HEX, 10-32	3
17	402258	CHANNEL	1

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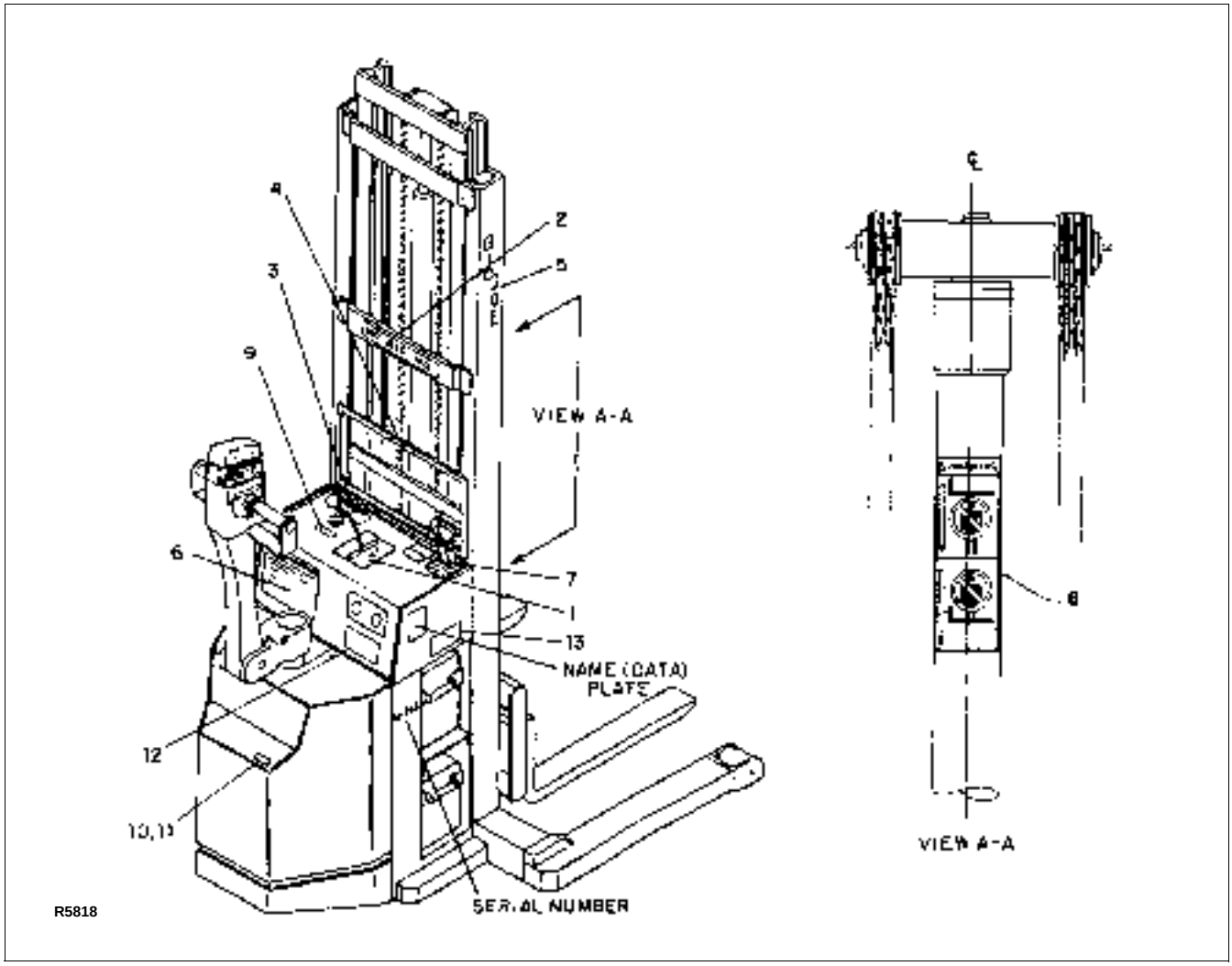

Figure 12-11 Decal Location

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	056478	LIFT-LOWER DECAL	1
2	056499	NO RIDING DECAL	1
3	056564	CAUTION DECAL	2
4	056494	CAUTION DECAL	2
5	056632	SMALL MAST DECAL	2
6	056610	WARNING DECAL	1
7	056644	TRUCK-CHARGE DECAL	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	056625	WARNING DECAL	1
9	056626	OIL LEVEL	1
10	056595	CASTING LOGO	1
11	056596-08	INSERT PDI	1
12	056646	INSTR-CHARGER	1
13	056648	DANGER-BATTERY	1

DECAL KIT PART NUMBER 905001 CONSISTS OF ITEMS 1-9

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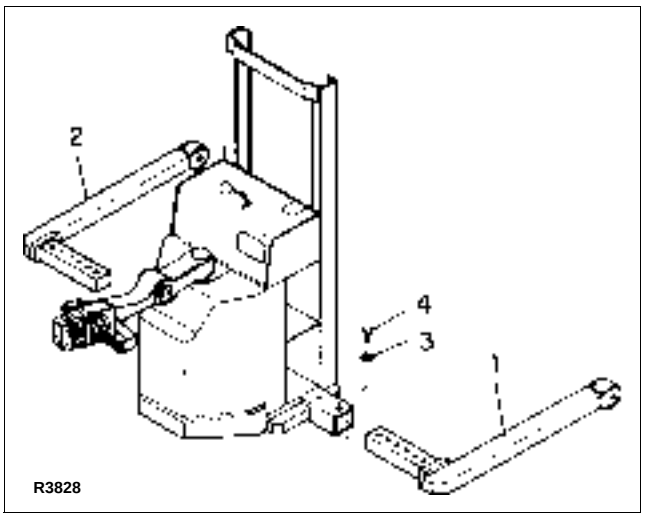

Figure 12-12 Adjustable Straddle Frame

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	504696-01*	RIGHT HAND STRADDLE	1
1	505347-01**	RIGHT HAND STRADDLE (PDI 2024)	1
1	505347-02**	RIGHT HAND STRADDLE (PDI 2018)	1
1	505788-01***	RIGHT HAND STRADDLE (PDI 2024)	1
1	505788-02***	RIGHT HAND STRADDLE (PDI 2018)	1
2	504697-01*	LEFT HAND STRADDLE	1
2	505348-01**	LEFT HAND STRADDLE (PDI 2024)	1
2	505348-02**	LEFT HAND STRADDLE (PDI 2018)	1
2	505789-01***	LEFT HAND STRADDLE (PDI 2024)	1
2	505789-02***	LEFT HAND STRADDLE (PDI 2018)	1
3	077217	WASHER	4
4	063869	HEX HEAD BOLTS	4
4	063870***	HEX HEAD BOLTS	4

* USED ON TRUCKS SERIAL NUMBER 333375 TO 338205

** USED ON TRUCKS SERIAL NUMBER 338206 TO 353701

*** USED ON TRUCKS SERIAL NUMBER 353702 TO 376499

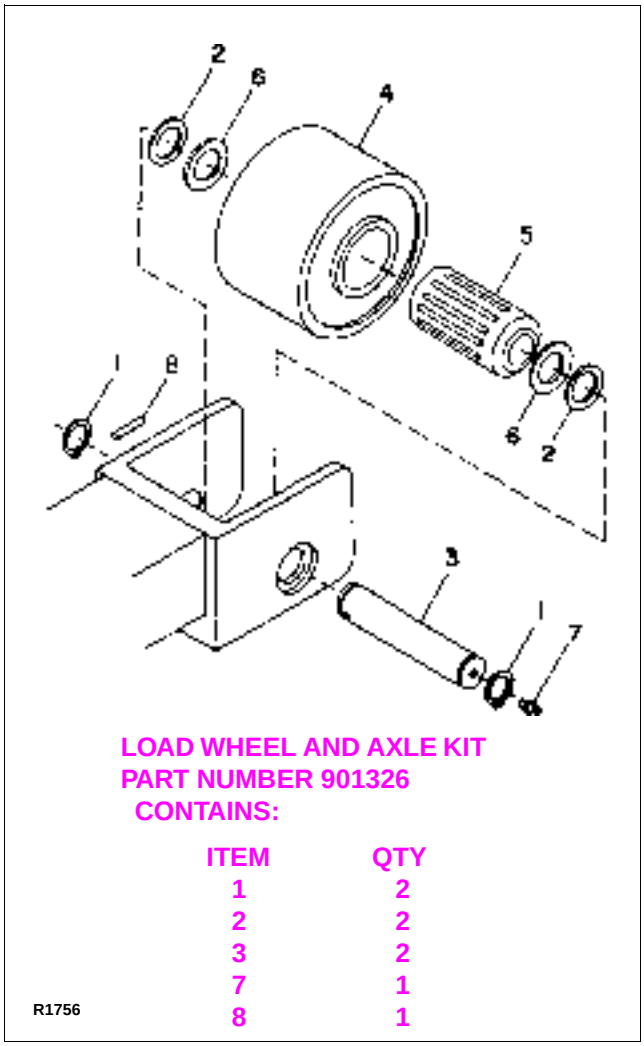

Figure 12-13 Load Wheels

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	—	WHEEL AND AXLE ASSY	2
1	061725*	. SNAP RING	2
2	077033*	. SPACER WASHER	2
3	270306*	. AXLE	1
—	078409*	. LOAD WHEEL ASSY (STD) (4 IN. DIAMETER)	1
4	—	. . LOAD WHEEL, POLY	1
5	051128	. . ROLLER BEARING	1
—	078256	. LOAD WHEEL ASSY. (OPTIONAL) (3 IN. DIAMETER)	
6	077038	. RETAINING WASHER	2
7	025713*	. GREASE FITTING	1
8	060974*	. PIN, ROLL	1

* INCLUDED IN LOAD WHEEL AND AXLE KIT PART NUMBER 901326 (1 KIT PROVIDES FOR 1 LOAD WHEEL)

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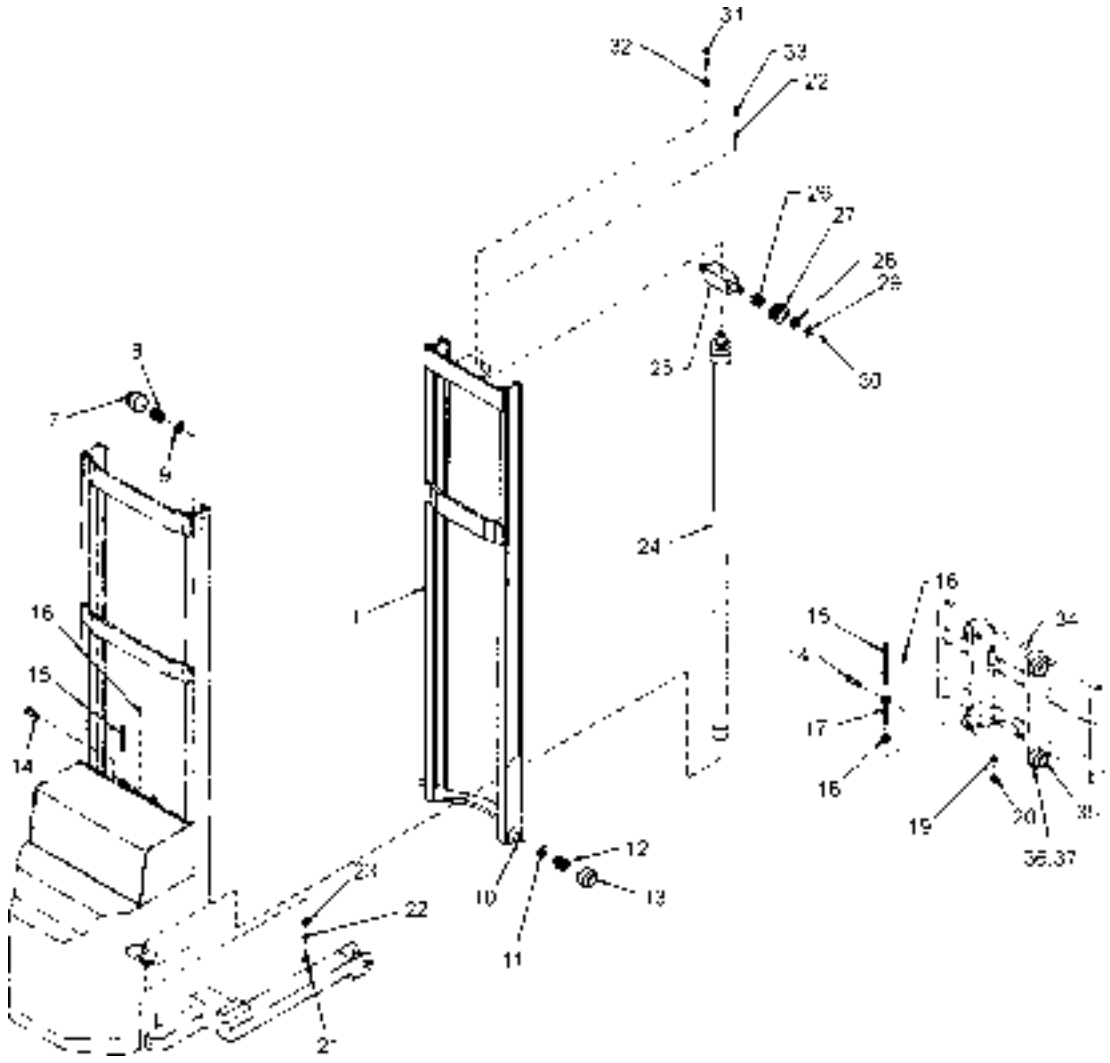

Figure 12-14 Elevation System (Telescopic)

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	VAR	INNER MAST	1
2	—	NOT USED	
3	—	NOT USED	
4	—	NOT USED	
5	—	NOT USED	
6	—	NOT USED	
—	901366	ROLLER ASSEMBLY	2
7	062326	. ROLLER	2
8	051102	. BEARING	2
9	053000	SHIM	A/R
9	053001	SHIM	A/R
9	053002	SHIM	A/R
9	053003	SHIM	A/R
10	074805	SPINDLE	2
11	053000	SHIM	A/R
11	053001	SHIM	A/R
11	053002	SHIM	A/R
11	053003	SHIM	A/R
—	901365	ROLLER ASSEMBLY	2
12	051102	. BEARING	2
13	062325	. ROLLER	2
14	402055	CHAIN PIN	4
15	402034	CHAIN (96 IN. LIFT - 7.7 FT) (108 IN. LIFT - 8.7 FT) (120 IN. LIFT - 9.7 FT) (132 IN. LIFT - 10.7 FT) (144 IN. LIFT - 11.7 FT)	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
16	060402	COTTER PIN	4
17	402051	ADJUSTING BOLT	2
18	059545	JAM NUT	2
19	077215	WASHER, LOCK	2
20	059445	NUT, HEX	2
21	063603	HEX HD CAP SCREW	1
22	077211	WASHER, LOCK	3
23	077076	WASHER, FLAT	1
24	—	LIFT CYLINDER (Figure 12-22)	REF
25	057756	RAM HEAD	1
26	051120	BEARING	2
27	074251	SHEAVE	2
28	077022	WASHER	2
29	061727	SNAP RING	2
30	025712	GREASE FITTING	2
31	063715	HEX HD CAP SCREW	1
32	077213	WASHER, LOCK	1
33	064607	HEX HD CAP SCREW	2
34	—	LIFT CARRIAGE (Figure 12-18)	REF
35	—	SPINDLE (Figure 12-18)	4
36	053000	SHIM	A/R
36	053001	SHIM	A/R
36	053002	SHIM	A/R
36	053003	SHIM	A/R
37	901366	ROLLER ASSEMBLY	6
—	062326	. ROLLER	6
—	051102	. BEARING	6

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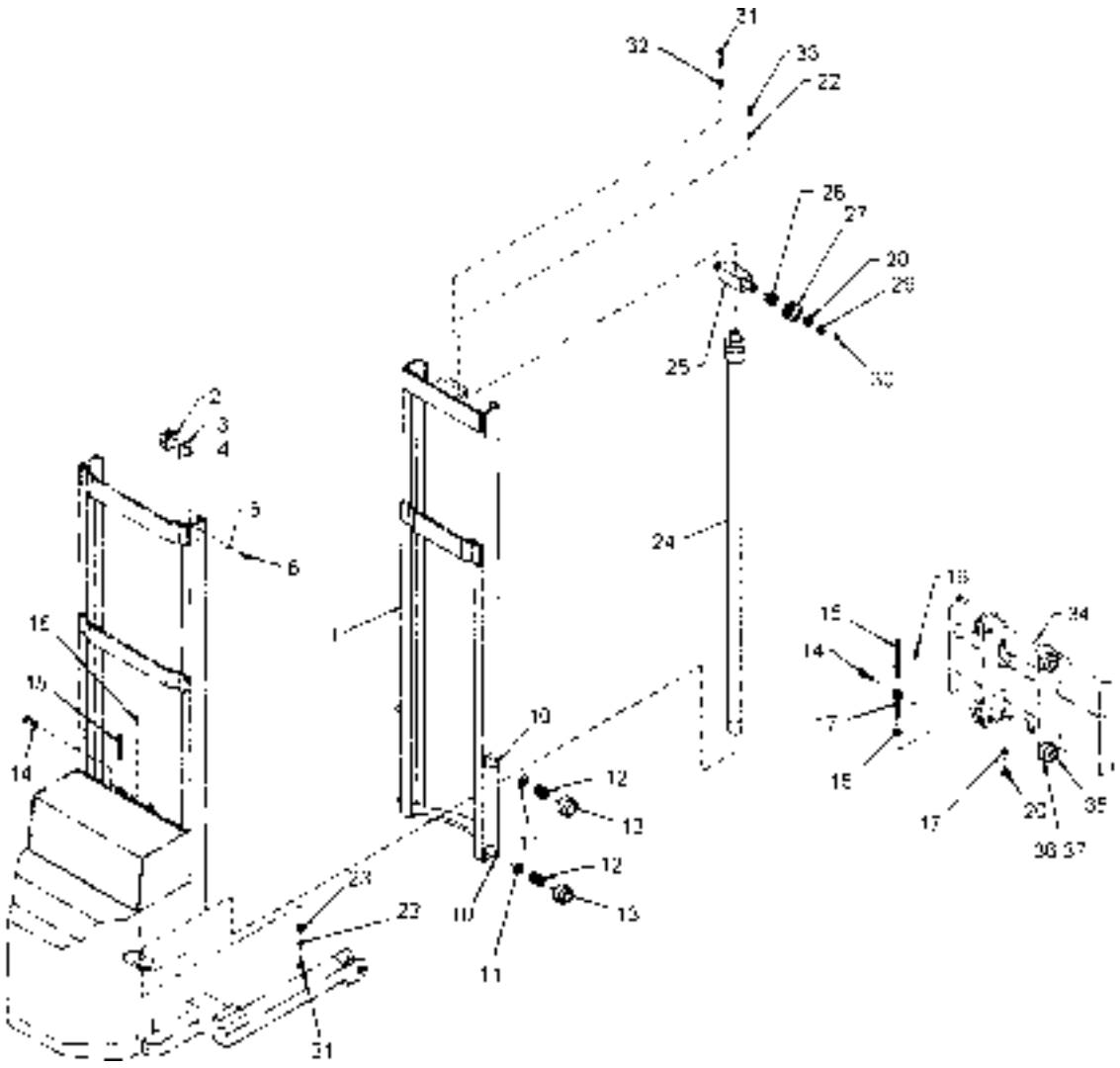
SERIAL NUMBERS
333375 TO 338205



R5829

Figure 12-15 Elevation System (Telescopic)

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	VAR	INNER MAST	1
2	501297	ROLLER BEARING AND HOUSING	2
3	100021	SHIM	2
4	245736	SHIM	2
5	077410	WASHER, LOCK, 3/8	4
6	064605	HEX HD CAP SCREW, 3/8-16 X 1	4
7	—	NOT USED	
8	—	NOT USED	
9	—	NOT USED	
10	074805	SPINDLE	4
11	053000	SHIM	A/R
11	053001	SHIM	A/R
11	053002	SHIM	A/R
11	053003	SHIM	A/R
—	500170	ROLLER ASSEMBLY	8
12	051102	. BEARING	8
13	062300	. ROLLER	8
14	402055	CHAIN PIN	4
15	402034	CHAIN (96 IN. LIFT - 7.7 FT) (108 IN. LIFT - 8.7 FT) (120 IN. LIFT - 9.7 FT) (132 IN. LIFT - 10.7 FT) (144 IN. LIFT - 11.7 FT)	2
16	060402	COTTER PIN	4
17	402051	ADJUSTING BOLT	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
18	059545	JAM NUT	2
19	077215	WASHER, LOCK	2
20	059445	NUT, HEX	2
21	063603	HEX HD CAP SCREW	1
22	077211	WASHER, LOCK	3
23	077076	WASHER, FLAT	1
24	—	LIFT CYLINDER (Figure 12-22)	REF
25	057756	RAM HEAD	1
26	051120	BEARING	2
27	074251	SHEAVE	2
28	077022	WASHER	2
29	061727	SNAP RING	2
30	025712	GREASE FITTING	2
31	063715	HEX HD CAP SCREW	1
32	077213	WASHER, LOCK	1
33	064607	HEX HD CAP SCREW	2
34	—	LIFT CARRIAGE (Figure 12-18)	REF
35	—	SPINDLE (Figure 12-18)	4
36	053000	SHIM	A/R
36	053001	SHIM	A/R
36	053002	SHIM	A/R
36	053003	SHIM	A/R
37	500170	ROLLER ASSEMBLY	8
—	051102	. BEARING	8
—	062300	. ROLLER	8

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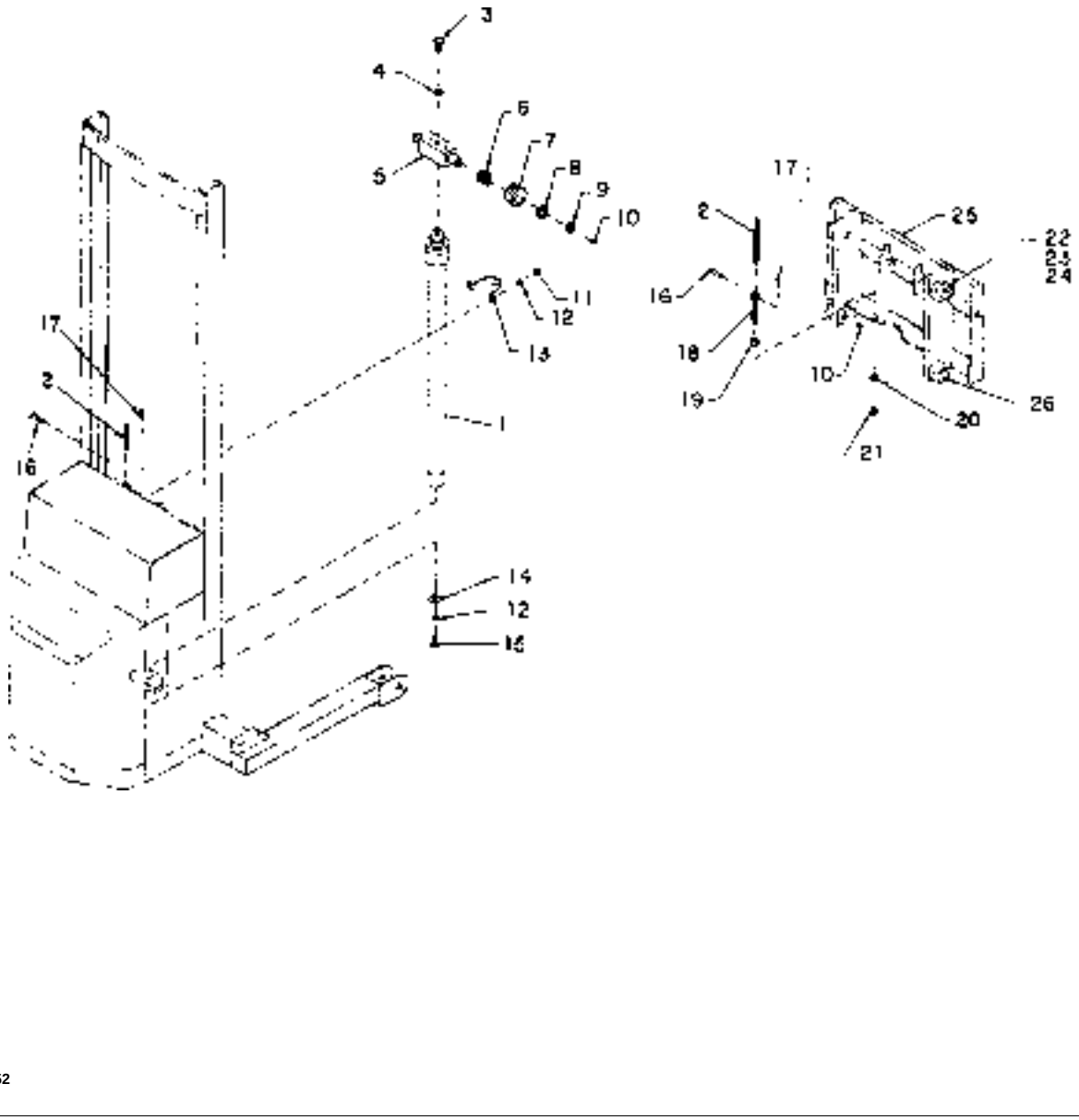

Figure 12-16 Elevation System (Non-Telescopic)

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	—	LIFT CYLINDER (Figure 12-21)	REF
2	402034	CHAIN (60 IN. LIFT - 3.86 FT) (72 IN. LIFT - 4.86 FT) (84 IN. LIFT - 5.86 FT)	2
3	064709	HEX HD CAP SCREW	1
4	077213	WASHER, LOCK	1
5	057756	RAM HEAD	1
6	051120	BEARING	2
7	074251	SHEAVE	2
8	077022	WASHER	2
9	061727	SNAP RING	2
10	025712	GREASE FITTING	2
11	059429	NUT, HEX	2
12	077211	WASHER, LOCK	1
13	101071	CLAMP	1
14	077076	WASHER, LOCK	1
15	063603	HEX HD CAP SCREW	1
16	402055	CHAIN PIN	4
17	060402	COTTER PIN	4
18	402051	ADJUSTING BOLT	2
19	059545	JAM NUT	2
20	077215	WASHER, LOCK	2
21	059445	NUT, HEX	2
—	500170*	ROLLER ASSEMBLY	4
22	062300*	. ROLLER	4
23	051102*	. BEARING	4
—	901365**	ROLLER ASSEMBLY	4
22	062325**	. ROLLER	4
23	051102**	. BEARING	4
24	053000	SHIM	A/R
24	053001	SHIM	A/R
24	053002	SHIM	A/R
24	053003	SHIM	A/R
25	—	LIFT CARRIAGE (Figure 12-18)	REF
26	500512*	SPINDLE	4
26	074805**	SPINDLE	4

A/R - AS REQUIRED

*** USED ON TRUCKS SERIAL NUMBER 333375 TO 338206**

**** USED ON TRUCKS SERIAL NUMBER 338206 TO 376499**

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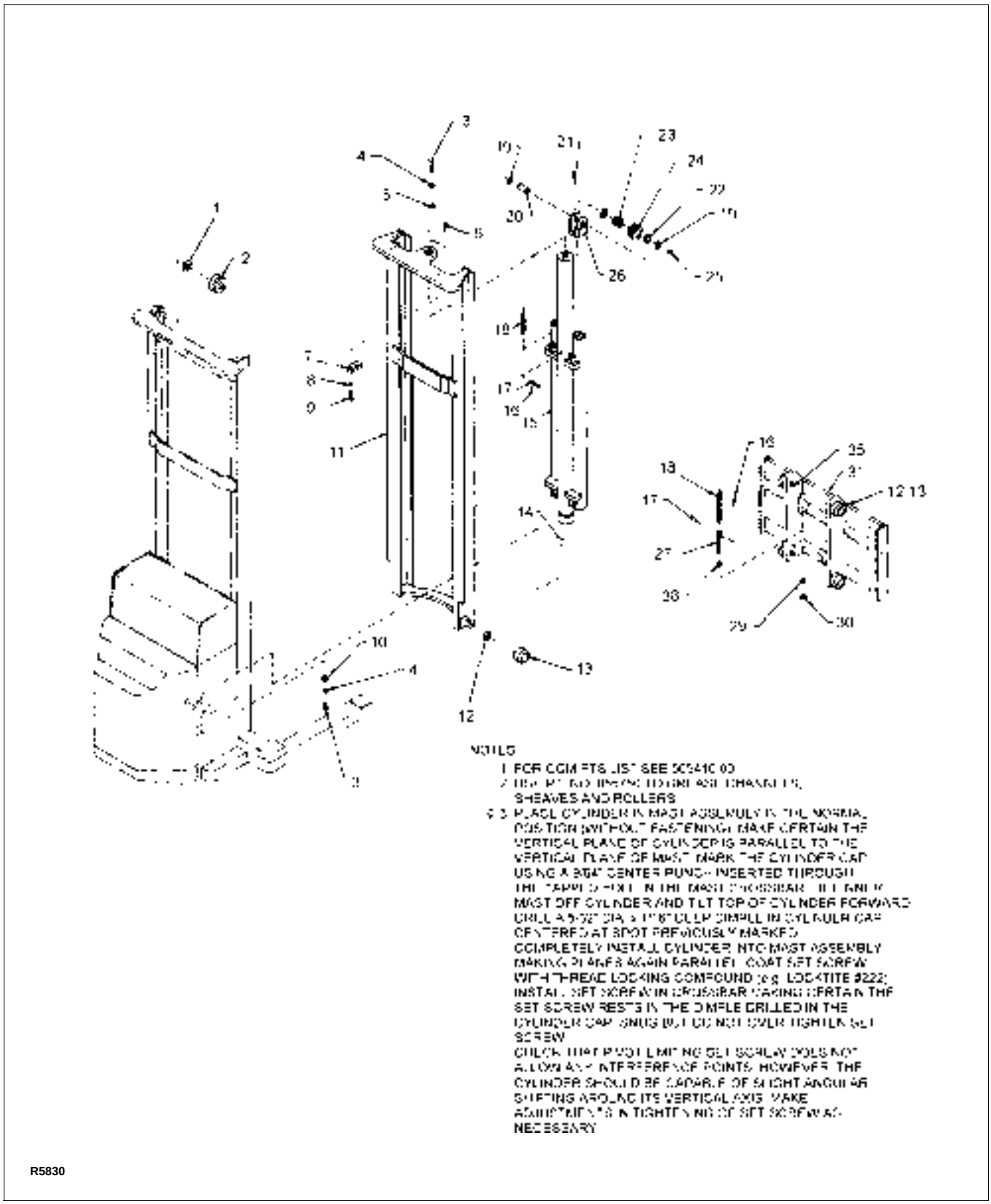

Figure 12-17 Elevation System (Full Free Lift)

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	053000	SHIM	A/R
1	053001	SHIM	A/R
1	053002	SHIM	A/R
1	053003	SHIM	A/R
2	901366	ROLLER ASSEMBLY	6
—	062326	. ROLLER	6
—	051102	. BEARING	6
3	063603*	HEX HD CAP SCREW, 3/8-16 X 3/4	2
3	064605**	HEX HD CAP SCREW, 3/8-16 X 1	2
4	077211	WASHER, LOCK	2
5	800297**	WASHER	1
6	073460**	SCREW, SET, #10-24 X 1/4	1
7	403339	STOP BLOCK	2
8	077209	WASHER, LOCK, 1/4	4
9	063482	SCREW, 1/4-20 X 1-1/4	4
10	077076	WASHER, FLAT	1
11	VAR	INNER MAST	1
12	053000	SHIM	A/R
12	053001	SHIM	A/R
12	053002	SHIM	A/R
12	053003	SHIM	A/R

INDEX NO.	PART NO.	PART NAME	NO. REQD.
13	901365	ROLLER ASSEMBLY	2
—	051102	. BEARING	2
—	062325	. ROLLER	2
14	061023	ROLL PIN, 5/16 X 3/4	1
15	—	LIFT CYLINDER (Figure 12-23)	REF
16	060402	COTTER PIN	4
17	402055	CHAIN PIN	4
18	402034	CHAIN (106 IN. LIFT - 7.5 FT) (130 IN. LIFT - 8.5 FT)	2
19	061729	SNAP RING	2
20	401639	PIN, SHEAVE	2
21	065555	SOCKET HD CAP SCREW	4
22	053012	WASHER, THRUST, 3/32	4
23	051145	BEARING, ROLLER	2
24	289205	SHEAVE	2
25	025712	GREASE FITTING	6
26	800246	YOKE, SHEAVE	2
27	402051	ADJUSTING BOLT	2
28	059545	JAM NUT	2
29	077215	WASHER, LOCK	2
30	059445	NUT, HEX	2
31	—	LIFT CARRIAGE (Figure 12-18)	REF

A/R - AS REQUIRED

* **USED ON TRUCKS SERIAL NUMBER 333375 TO 351329**

** **USED ON TRUCKS SERIAL NUMBER 351330 TO 376499**

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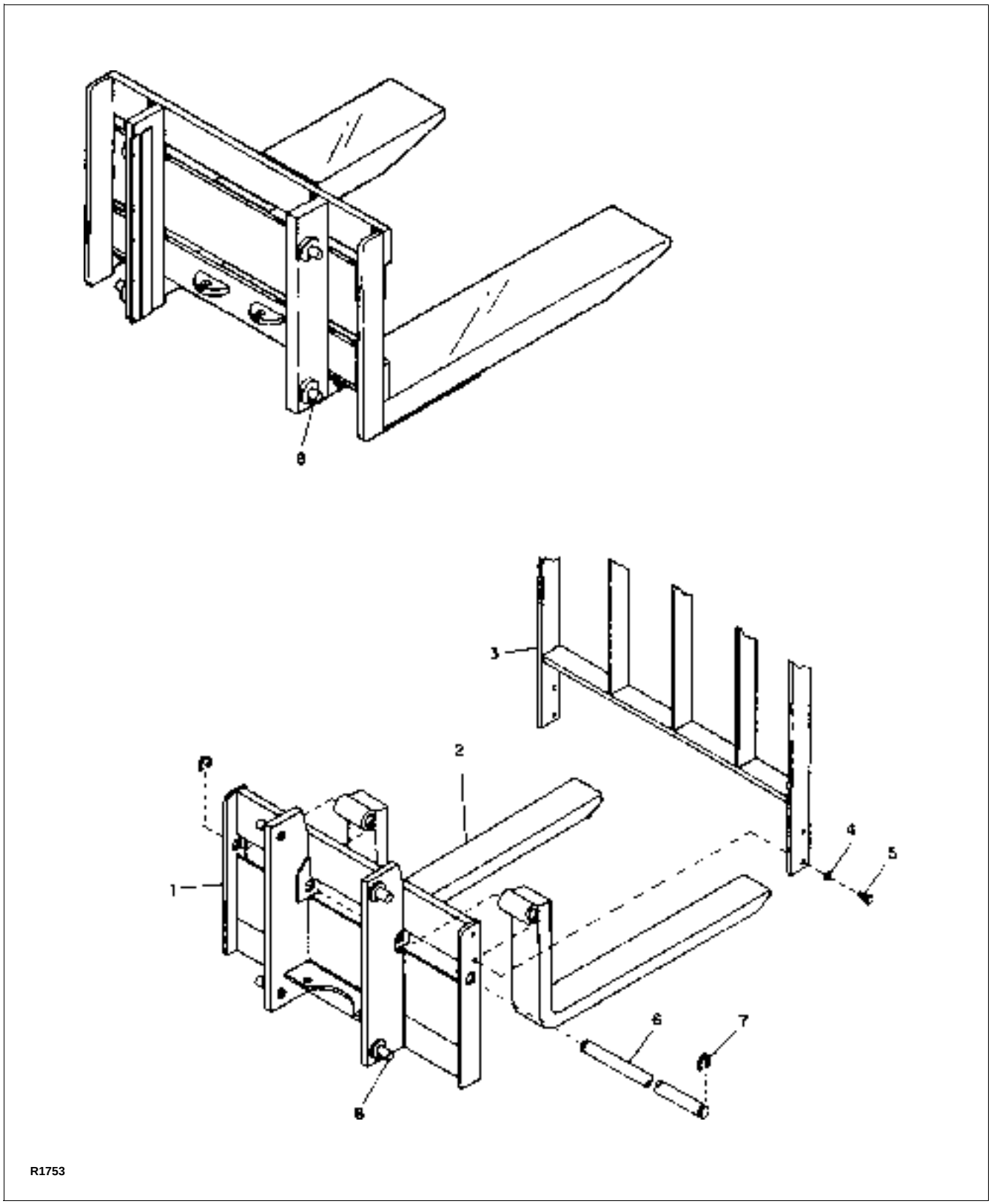

Figure 12-18 Lift Carriage and Forks

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	SEE CHART 1	LIFT CARRIAGE, RIGID FORK,	1
1	SEE CHART 2	LIFT CARRIAGE, ADJUSTABLE FORK	1
2	SEE CHART 3	FORKS PDI-2018	2
2	SEE CHART 4	FORKS PDI-2024 ONLY	2
3	504605-01	BACK REST (OPTIONAL)	1
4	077213	WASHER, LOCK, SPLIT, 1/2	4
5	063705	SCREW, HEX CAP, 1/2-13 X 1	4

INDEX NO.	PART NO.	PART NAME	NO. REQD.
6	296401	SHAFT, 24 IN WIDE CARRIAGE 1 INCH RING	1
6	276605	SHAFT, 24 IN WIDE CARRIAGE FOR 1-1/4 INCH RINGS (TELE-SCOPIC AND ALL PDI 2018-2024)	1
6	276611	SHAFT, 36 IN WIDE CARRIAGE FOR 1-1/4 INCH RINGS	1
7	061725	SNAP RING, 24 INCH CARRIAGE SHAFT (USED ON 296401)	2
7	061729	SNAP RING, 36 INCH CARRIAGE SHAFT (USED ON 276605)	2
8	500512*	SPINDLE	4
8	074805**	SPINDLE	4

* **USED ON TRUCKS SERIAL NUMBER 333375 TO 338206**

** **USED ON TRUCKS SERIAL NUMBER 338206 TO 376499**

CHART 1 RIGID LIFT CARRIAGE (26" WIDE)

	PDI-2018			PDI-2024	
FORK LENGTH	26	30	36	30	36
PART NO.	504590-01	504590-02	504590-03	504628-01	504628-02

CHART 2 ADJUSTABLE FORK LIFT CARRIAGE

	PDI-2018					PDI-2024					
CARRIAGE WIDTH	24			36		24			36		
	NON-TEL	TEL	FFL	NON-TEL	TEL	NON-TEL	TEL	FFL	NON-TEL	TEL S/N 333375 TO 338205	TEL S/N 338206 TO 376499
PART NO.	504589-01	504589-02	504589-09	504589-03	504589-04	504589-05	504589-06	504589-10	504589-07	504589-08	504589-04

CHART 3 PDI-2018 ADJUSTABLE FORKS (3" WIDE)

CARRIAGE WIDTH	24				36			
FORK LENGTH	30	36	42	48	30	36	42	48
FORK PART NO. FOR RIGID FRAME TRUCK (STD.)	503612	503613	503614	503615	500763	501413	501882	501883
FORK PART NO. FOR ADJUSTABLE STRADDLE TRUCK (OPTIONAL) FOR TRUCKS SERIAL NUMBER 338206 to 376499	504832-01	504832-02	504832-03	504834-04	504834-01	504834-02	504834-03	504834-04
FORK PART NO. FOR ADJUSTABLE STRADDLE TRUCK (OPTIONAL) FOR TRUCKS SERIAL NUMBER 333375 TO 338206	503612	503613	503614	503615	500763	501413	501882	501883

CHART 4 PDI-2024 ADJUSTABLE FORKS (4" WIDE)

FORK LENGTH	30	36	42	48
FORK PART NO. FOR RIGID FRAME TRUCK (STD.) FOR TRUCKS SERIAL NUMBER 333375 TO 376499	057122-01	057122-02	057122-03	057122-04
FORK PART NO. FOR ADJ. STRADDLE TRUCK (OPT.) FOR TRUCKS SERIAL NUMBER 333375 TO 338206	057122-01	057122-02	057122-03	057122-04
FORK PART NO. FOR ADJUSTABLE STRADDLE TRUCK (OPTIONAL) SERIAL NUMBER 338206 TO 376499	057120-01	057120-02	057120-03	057120-04

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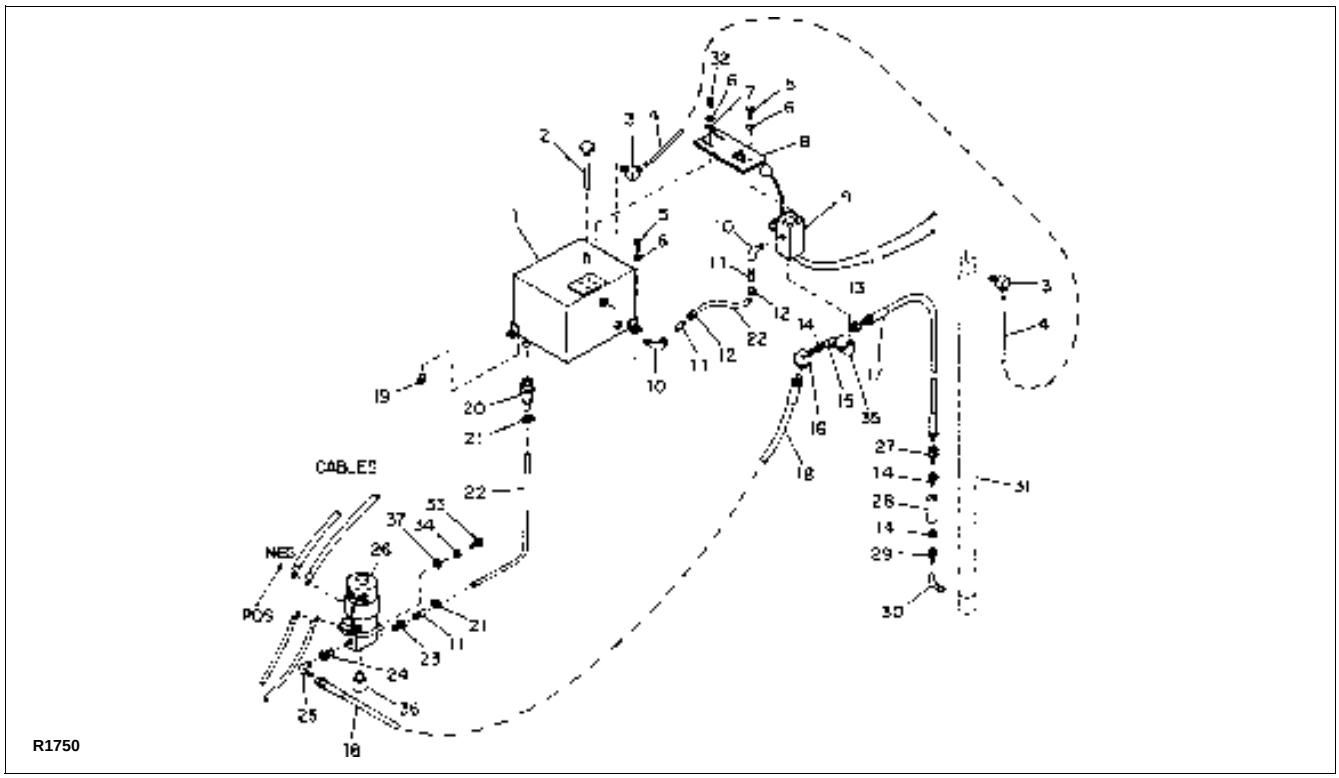

Figure 12-19 Hydraulic System (Telescopic and Non-Telescopic)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	504575	RESERVOIR	1
2	504578	BREATHER & DIPSTICK	1
3	025501	ELBOW	2
4	282500	TUBING	A/R
5	070476	SCREW, HEX 1/4-20 1/2	6
6	077209	WASHER, LOCK, 1/4	12
7	077031	WASHER, FLAT	4
8	402259	BRACKET	1
9	—	LIFT CONTROL VALVE ASSY (Figure 12-24 AND Figure 12-25)	REF
10	026701	ELBOW, 1/4	2
11	026131	NIPPLE, 1/4	3
12	056118	CLAMP, NOSE	2
13	025134	COUPLING, 3/8 PIPE TO 1/4 SWIVEL	1
14	026500	REDUCER	4
15	027107	TEE	1
16	025303	ELBOW, 45° SWIVEL	1
17	504591-01	HOSE ASSY	1
18	504592-01	HOSE ASSY	1
19	026302	PLUG, MAGNETIC	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
20	035107	FILTER ASSY	1
21	056110	CLAMP	2
22	290000	TUBING	A/R
23	025113	ADAPTER	1
24	025124	ADAPTER	1
25	025524	ELBOW, 90°	1
26	—	PUMP & MOTOR (Figure 12-29, Figure 12-30 AND Figure 12-31)	REF
27	025313	CONNECTOR	1
28	047110	VALVE, FLOW CONTROL	1
29	026110	NIPPLE	1
30	026708	ELBOW	1
31	—	LIFT CYLINDER (Figure 12-21 AND Figure 12-22)	REF
32	065476	SCREW, HEX 1/4-20 1/2	4
33	064605	SCREW HEX CAP, 3/8-16	2
34	077211	WASHER, LOCK, SPLIT, 3/8	2
35	025538	ELBOW, 90°, 3/8	1
36	048133	SOLENOID VALVE, LOWERING (OPTIONAL)	1
37	077011	WASHER, FLAT	2

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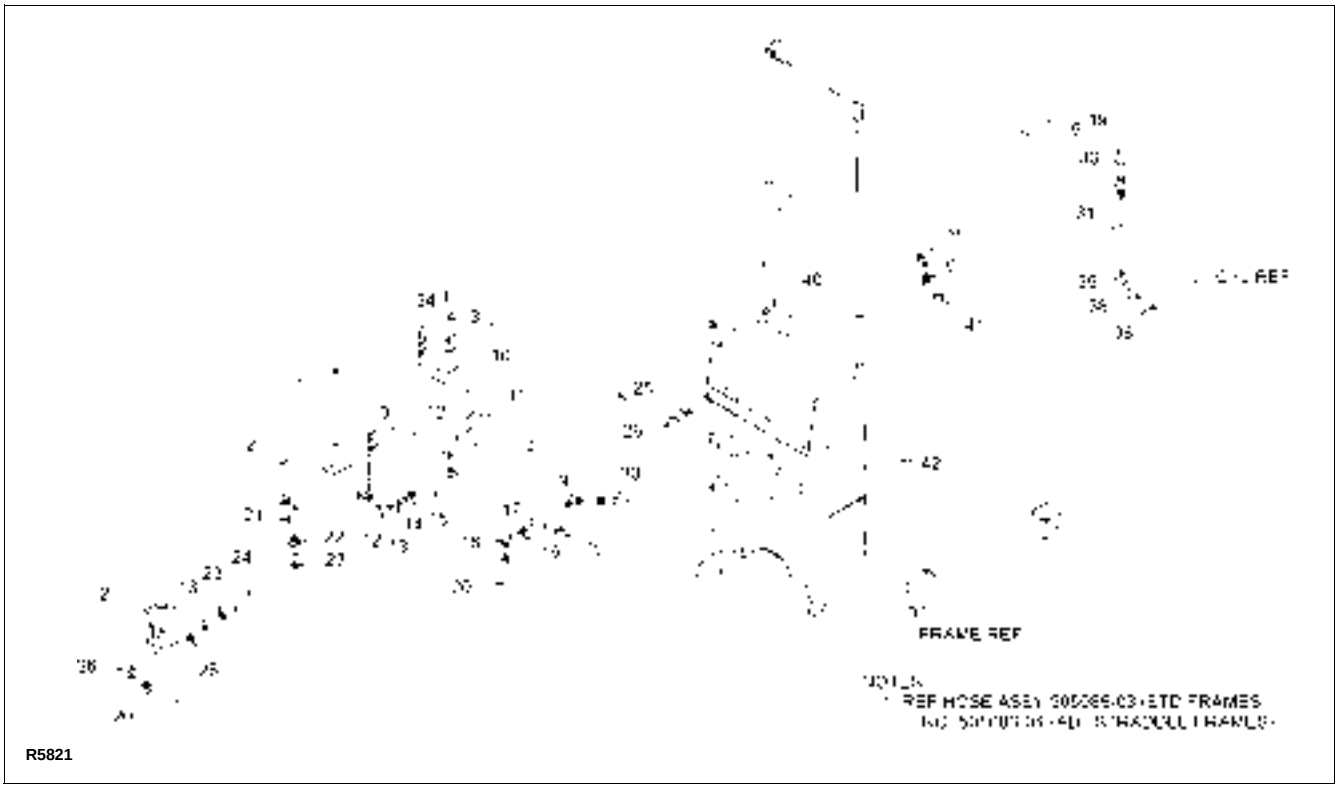

Figure 12-20 Hydraulic System (Full Free Lift)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	077209	WASHER, LOCK, 1/4	10
2	505433	RESERVOIR	1
3	070476	SCREW, HEX 1/4-20 1/2	6
4	077031	WASHER, FLAT	4
5	077211	WASHER, LOCK, SPLIT, 3/8	2
6	026917	FITTING, HOSE, 3/8 JIC SWVL	2
7	505097	BREATHER & DIPSTICK	1
9	025516	ELBOW	1
10	402259	BRACKET	1
11	—	LIFT CONTROL VALVE ASSY (Figure 12-24 AND Figure 12-25)	REF
12	026701	ELBOW, 1/4	2
13	026131	NIPPLE, 1/4	3
14	056118	CLAMP, NOSE	2
15	290000	TUBING	A/R
16	026500	REDUCER	1
17	027107	TEE	1
18	025116	ELBOW	1
19	282900	TUBING	A/R
20	504592-01	HOSE ASSY	1
21	026302	PLUG, MAGNETIC	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
22	035106	FILTER ASSEMBLY	1
23	056110	CLAMP	2
24	290000	TUBING	A/R
25	025113	ADAPTER	1
26	025536	ELBOW	1
27	—	PUMP & MOTOR (Figure 12-29, Figure 12-30 AND Figure 12-31)	REF
28	064605	SCREW HEX CAP, 3/8-16	2
29	077011	WASHER, FLAT	2
30	504199-13	HOSE ASSY	1
31	047123	FLOW CONTROL VALVE	1
33	026912	CONNECTOR	1
34	065476	SCREW, HEX 1/4-20 1/2	4
35	025538	ELBOW, 90°, 3/8	1
36	026711	ELBOW, 45°, 3/8	1
38	026322	NIPPLE	1
39	025525	ELBOW, 90°, 3/8	1
40	025544	ELBOW, 45°, 3/8	1
41	502474	CLAMP AND NUT ASSEMBLY	1
42	069477	SCREW, PH, FL HD, 1/4-20 X 1/2	1

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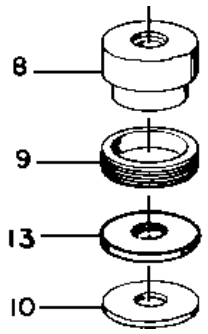


USED ON TRUCKS
SERIAL NUMBERS
333375 TO 338205

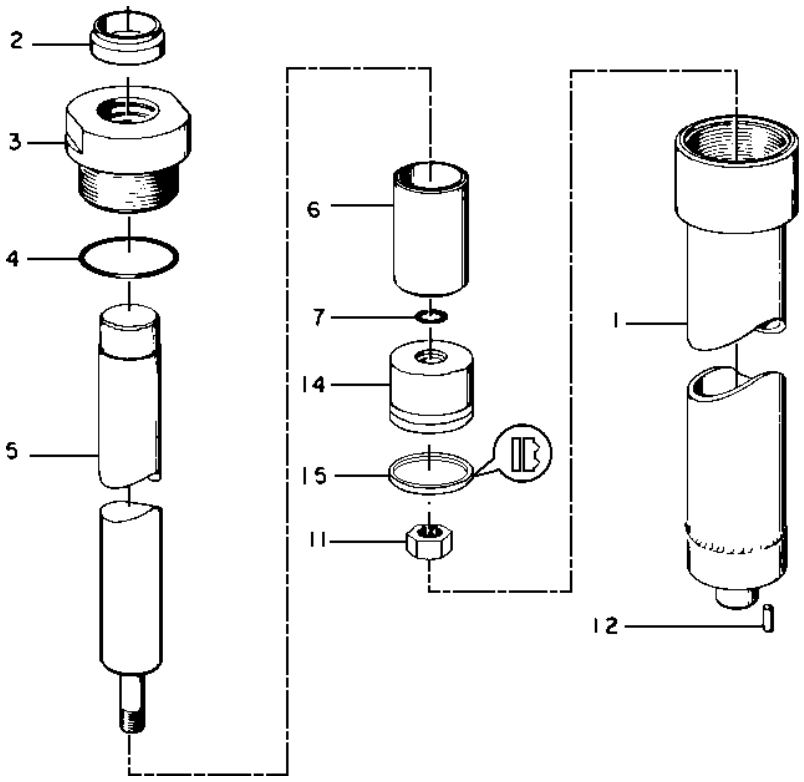
R6107

RETROFIT KIT PART NUMBER 907124 CONTAINS:

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

PACKING KIT PART NUMBER 907123 CONTAINS:

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



R6106

Figure 12-21 Lift Cylinder (Non-Telescopic)

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LIFTING HEIGHT (INCHES)		60	72	84	QTY
INDEX NO.	PART NAME	PART NO.	PART NO.	PART NO.	
—	HYD. LIFT CYLINDER ASSY	500773	500774	500775	1
1	. TUBE	—	—	—	1
2*	. WIPER RING	049508	049508	409508	1
3	. GLAND NUT	800023	800023	800023	1
4*	. TOP O-RING	042122	042122	042122	1
5	. RAM	—	—	—	1
6	. RAM STOP	296001	296001	296001	1
7*	. BOTTOM O-RING	042105	042105	042105	1
8**	. PISTON	045101	045101	045101	1
9*	. PACKING ASSY	043106	043106	043106	1
10	. FLAT WASHER	077004	077004	077004	1
11	. JAM NUT, 3/4-16	800293	800293	800293	1
12	. ROLL PIN, 5/16 X 3/4 LG.	061023	061023	061023	1
13	. WASHER	077093	077093	077093	1
14	. PISTON	403863	403863	403863	1
15	. PSP SEAL	042205-01	042205-01	042205-01	1

*** 907123 PACKING KIT INCLUDES ITEMS 2, 4, 7, 11 AND 15.**
907124 RETROFIT KIT INCLUDES ITEMS 2 , 4, 7, 11, 14 AND 15.

** **CYLINDERS EQUIPPED WITH PISTON, ITEM 8, ORDER RETROFIT KIT 907124.**

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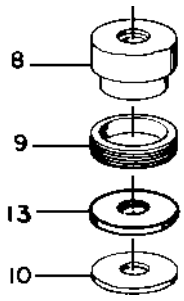
USED ON TRUCKS
SERIAL NUMBERS
333375 TO 353212

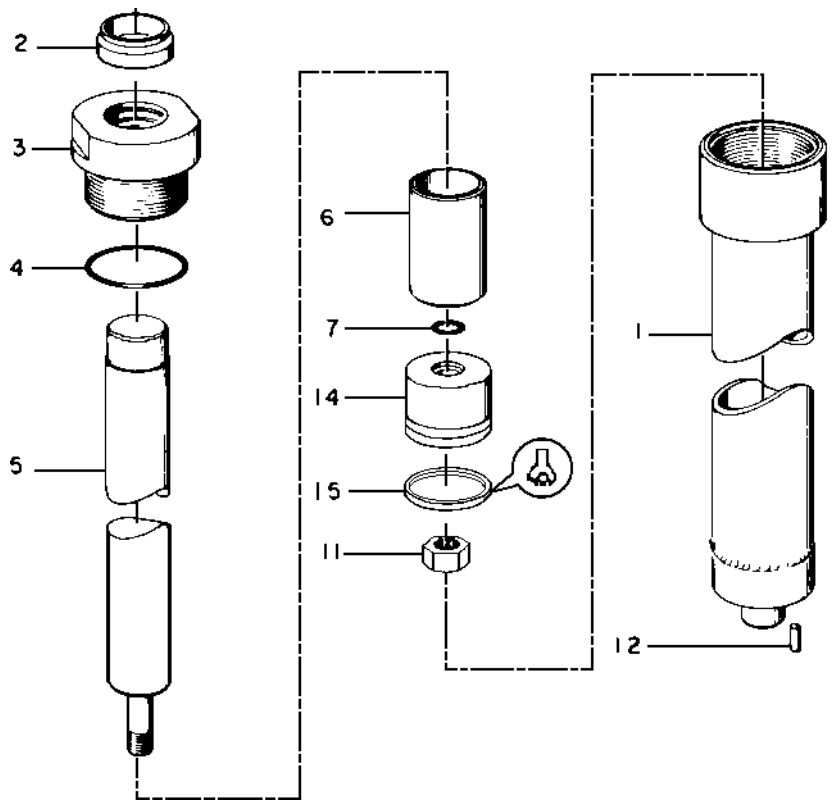


PACKING KIT
PART NUMBER
907138 CONTAINS:

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

RETROFIT KIT
PART NUMBER
907139 CONTAINS:

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



R5812

Figure 12-22 Lift Cylinder (Telescopic)

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LIFT HEIGHT (INCHES)		96	108	120	132	144	QTY
INDEX NO.	PART NAME	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	
—	HYD. LIFT CYLINDER ASSY	503600	503601	503602	503603	503604	1
1	. TUBE	503605	503606	503607	503608	503609	1
2*	. WIPER RING	049508	049508	049508	049508	049508	1
3	. GLAND NUT	800023	800023	800023	800023	800023	1
4*	. TOP O-RING	042122	042122	042122	042122	042122	1
5	. RAM	274604	274605	274606	274607	274608	1
6	. RAM STOP	400860	400860	400860	400860	400860	1
7*	. BOTTOM O-RING	042105	042105	042105	042105	042105	1
8**	. PISTON	045101	045101	045101	045101	045101	1
9**	. PACKING ASSY	043106	043106	043106	043106	043106	1
10**	. FLAT WASHER	077004	077004	077004	077004	077004	1
11*	. JAM NUT, 3/4-16	800293	800293	800293	800293	800293	1
12	. ROLL PIN, 5/16 X 3/4 LG.	061023	061023	061023	061023		
13**	. WASHER	077093	077093	077093	077093	077093	1
14*	. PISTON	403717	403717	403717	403717	403717	1
15*	. U CUP SEAL 1-1/2 X 2 X 3/8	043130	043130	043130	043130	043130	1

*** 907138 PACKING KIT INCLUDES ITEMS 2, 4, 7, 11 AND 15**
907139 PACKING KIT INCLUDES ITEMS 2, 4, 7, 11, 14 AND 15

**** CYLINDERS EQUIPPED WITH PISTON, ITEM 8, ORDER RETROFIT KIT 907139.**

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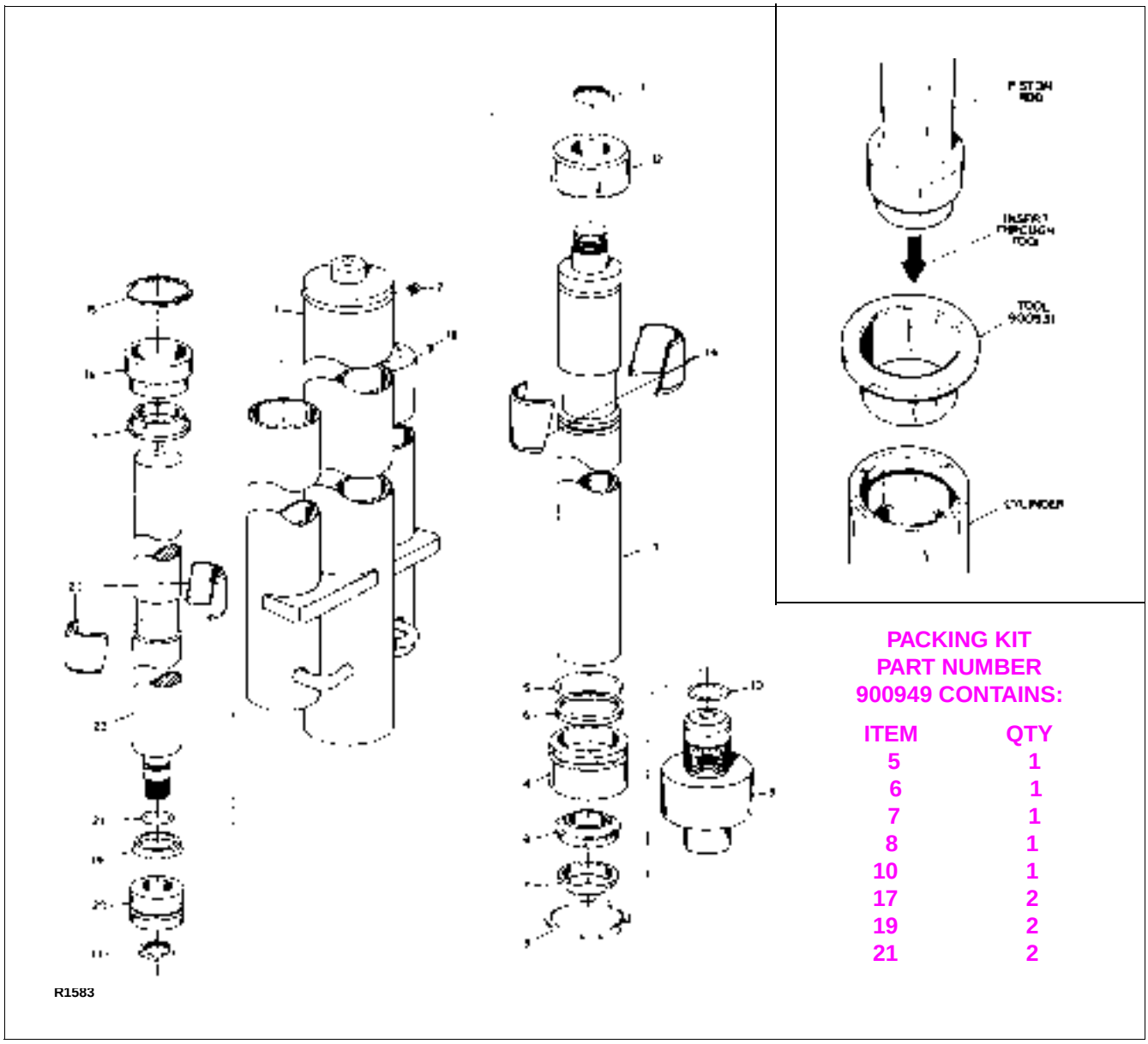

Figure 12-23 Lift Cylinders (Full Free Lift)

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	503996-01	FFL CYLINDER ASSEMBLY 106 IN. LIFT HEIGHT	1
—	503996-02	FFL CYLINDER ASSEMBLY 130 IN. LIFT HEIGHT	1
1	503995-01	. FFL CYLINDER WELDMENT 106 IN. LIFT HEIGHT	1
1	503995-02	. FFL CYLINDER WELDMENT 130 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	401642	. 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, 130 LIFT HT	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**

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

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BALL CHECK KIT
PART NUMBER
900132 CONTAINS:

ITEM	QTY
13	1
14	1
15	1

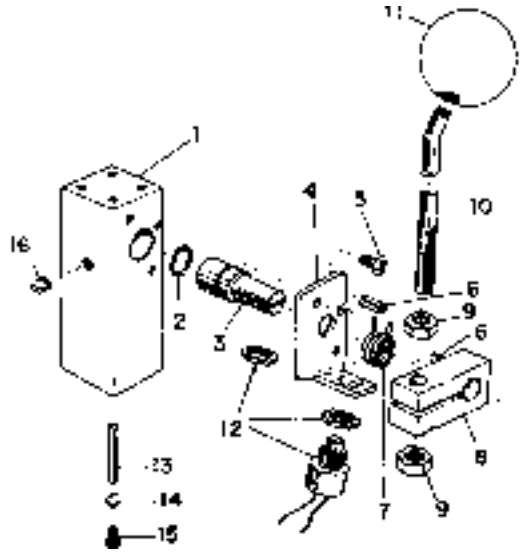

Figure 12-24 Lift Control Valve (Standard)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	504216-07	LIFT CONTROL VALVE ASSY	1
1	240501	. VALVE BODY	1
2	042104	. O-RING	1
3	304611	. RELEASE CAM	1
4	052803	. 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	257401	. LIFT CONTROL VALVE CLAMP	1
9	059529	. JAM NUT, 3/8-24	2
10	057702	. HANDLE	1
11	057952	. KNOB	1
12	504594	. 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	026310	. PLUG, 3/8	1

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

BALL CHECK KIT
PART NUMBER
900132 CONTAINS:

ITEM	QTY
13	1
14	1
15	1

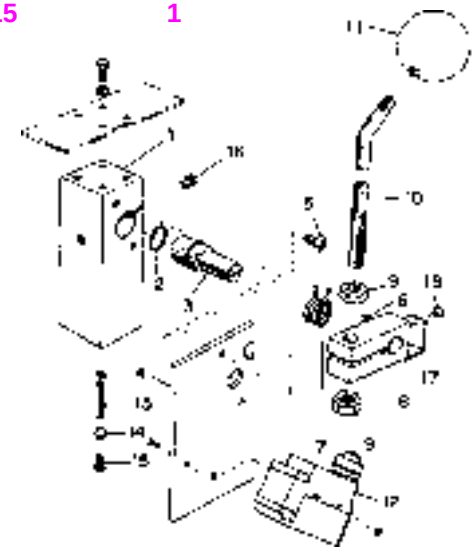

Figure 12-25 Lift Control Valve (Cold Conditioning)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	503209-02	LIFT CONTROL VALVE ASSY	1
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	059529	. JAM NUT, 3/8-24	2
10	057701	. HANDLE	1
11	057952	. KNOB	1
12	020690	. 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	026310	. 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

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NOTES

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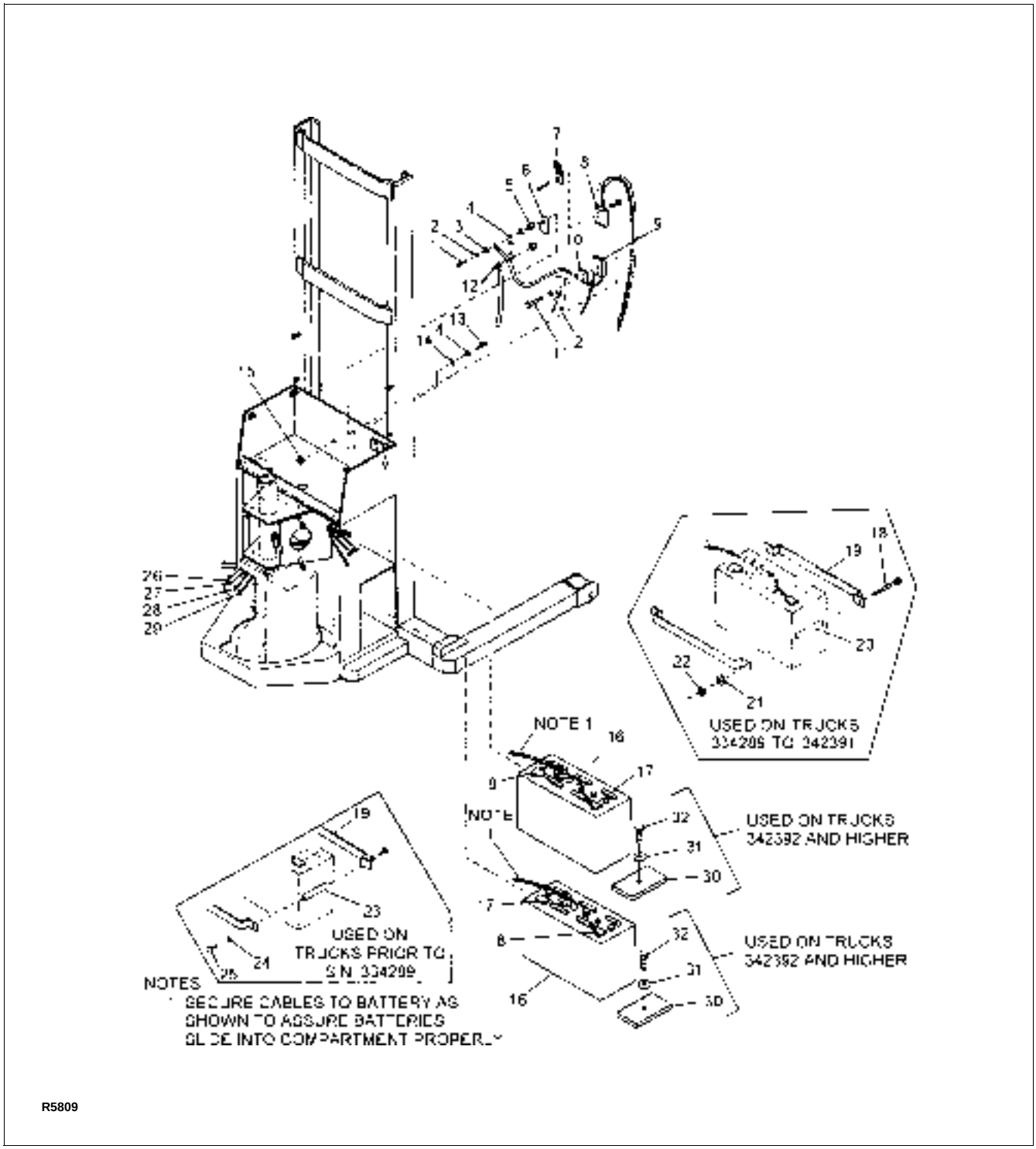

Figure 12-26 Batteries

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	070488	SCREW, RD HD, 1/4-20 X 3/8	2
2	077209	WASHER, SPLIT, LOCK, 1/4	5
3	077105	WASHER, FLAT BRASS	4
4	008918	FUSE, 120 AMP	1
5	010614	STANDOFF-INSULATOR	1
6	056562	DECAL	1
7	005450	HANDLE	1
8	504608†	CONNECTOR AND CABLE ASSY FROM CONNECTOR TO BATTERIES	1
9	504610	CONNECTOR AND CABLE ASSY	1
10	402264	SPACER	1
11	063486	SCREW, HEX HD, 1/4-20 X 2-1/4	2
12	504611-07	CABLE 6 AWG	A/R
13	070476	SCREW, RD HD, 1/4-20 X 1/2	1
14	077031	WASHER, FLAT	1
15	057508	GROMMET	1
16	003128**	BATTERY, 150 A.H. DRY	2
16	003192*	BATTERY, 150 A.H. DRY	2
16	003216	BATTERY, OPTIONAL GEL CELL	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
17	504609†	CONNECTOR AND CABLE ASSY FROM BATTERY TO BATTERY	1
18	063566***	BOLT, 5/16-18 X 5-1/2	2
19	402262***	HANDLE	4
20	403288***	ROD HANDLE	2
21	077210***	LOCK WASHER	2
22	059426***	NUT, HEX, 5/16-18	2
23	402257††	ROD-HANDLE	4
24	077210††	WASHER, LOCK, SPLIT, 5/16	4
25	063553††	SCREW, HEX HD, 5/16-18 X 3/4	4
26	504611-05	CABLE ASSY, MOTOR F1	1
27	504611-01	CABLE ASSY, MOTOR F2	1
28	504611-05	CABLE ASSY, MOTOR A1	1
29	504611-06	CABLE ASSY, MOTOR A2	1
30	403614	BATTERY RETAINER BAR	2
31	077209	LOCKWASHER, 1/4	2
32	063478	SCREW, HEX HD, 1/4-20 X 3/4	2

A/R - AS REQUIRED

† **PART NUMBER FOR BOOTS USE ON CABLE ARE AS FOLLOWS: 005964-01 RED BOOT 005964-02B BLACK BOOT**

†† **USED ON TRUCKS SERIAL NUMBER 333375 TO 334289 NOW OBSOLETE. ORDER KIT PART NUMBER 901333**

* **USED ON TRUCKS SERIAL NUMBER 342392 TO 376499**

** **USED ON TRUCKS SERIAL NUMBER 333375 TO 342391**

*** **USED ON TRUCKS SERIAL NUMBER 334289 TO 342391**

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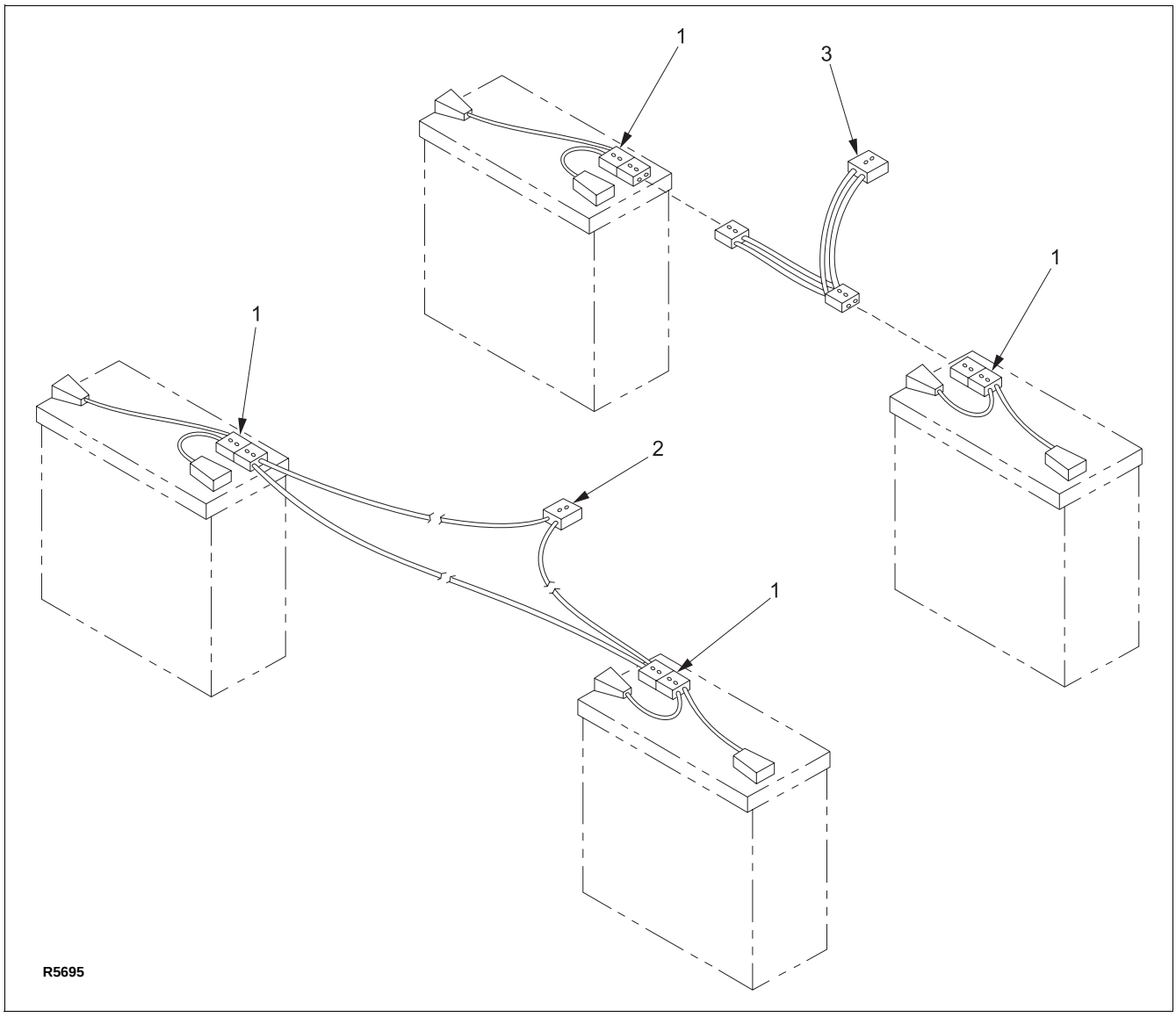

Figure 12-27 Quick Disconnect Cable Installation

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	505632	QUICK DISCONNECT CABLE KIT	
1	505630	CONNECTOR ASSEMBLY BATTERY	4
2	505631	CONNECTOR ASSEMBLY BATTERY	1
3	505649	CORD ASSY-CHARGING, EXTERNAL	1

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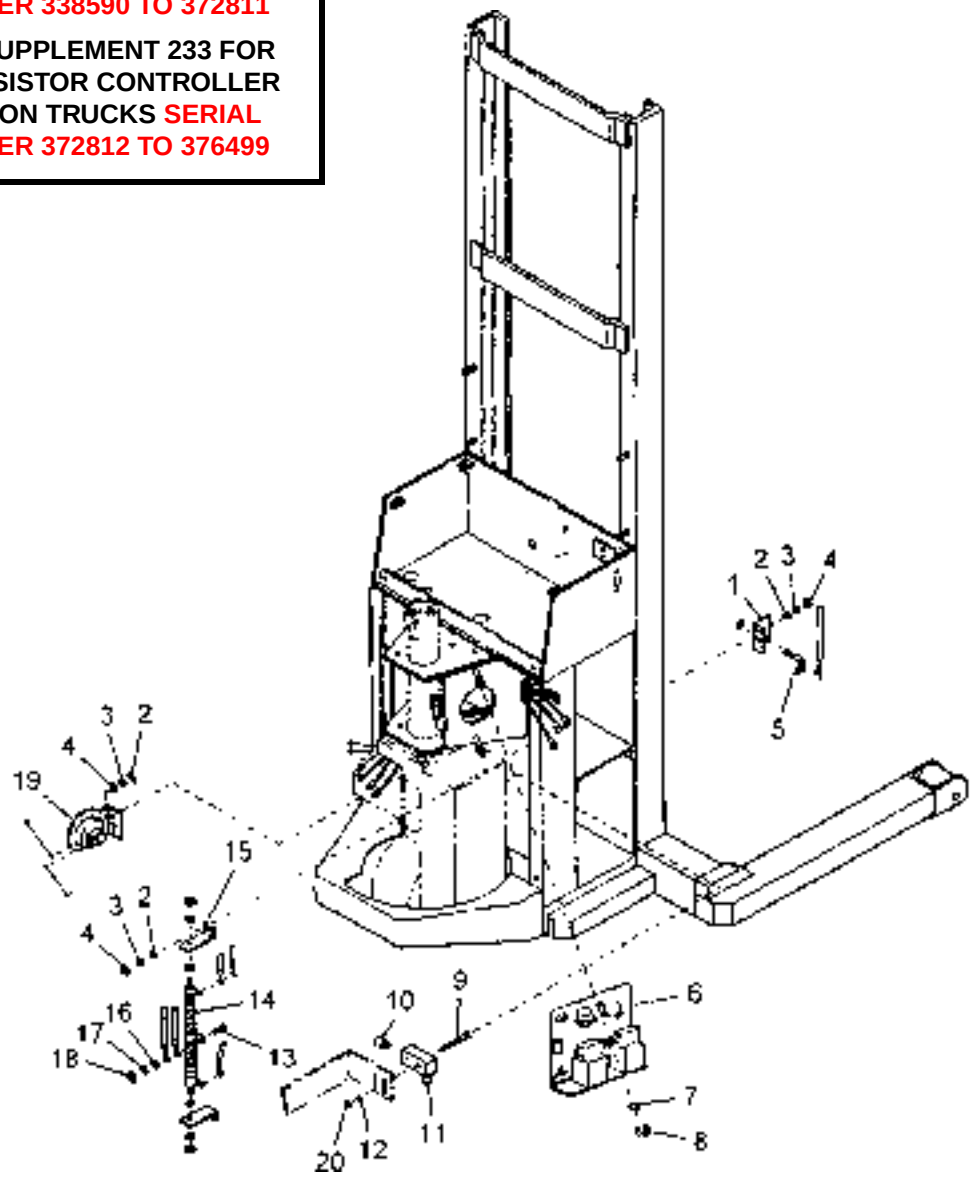
1. SEE SUPPLEMENT 187 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 333375 TO 338589
2. SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 338590 TO 372811
3. SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 372812 TO 376499



R5810

Figure 12-28 Electrical Components

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INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	402255	BRACKET	1
2	077030	WASHER, FLAT NO. 10	4
3	077207	LOCK WASHER NO. 10	6
4	059416	NUT, HEX, 10-32	6
5	020673	SWITCH, HIGH SPEED LIMIT	1
6	—	CONTACTOR PANEL (Figure 12-33 AND Figure 12-34)	REF
7	077211	WASHER, LOCK, SPLIT, 3/8	2
8	059429	NUT, HEX, 3/8-16	2
9	068238	SCREW, RD HD, 6-32 1-3/4	2
10	005405	STRAIN RELIEF	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
11	020729	SWITCH	1
12	077204	WASHER, LOCK NO. 6	2
13	068179	SCREW, RD, 5-40 X 5/8	3
14	018911	RESISTOR	1
15	402256	BRACKET	2
16	077007	WASHER, 5/32 I.D. X 5/16 O.D., 20 GAUGE	3
17	077203	WASHER, LOCK, SPLIT, NO. 5	3
18	059410	NUT, HEX, 5-40	3
19	009602	HORN	1
20	059412	NUT, HEX, 6-62	2

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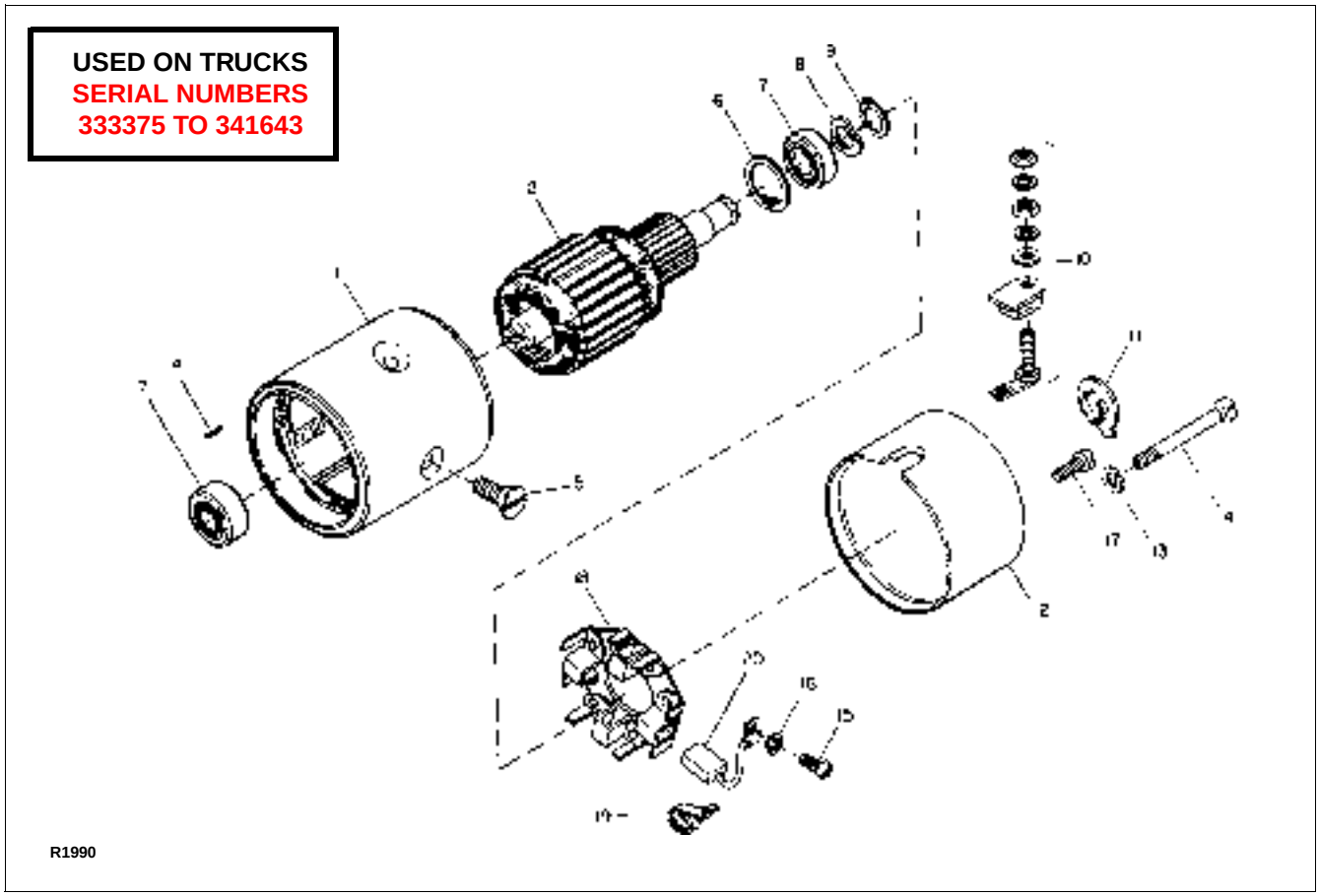

Figure 12-29 Hydraulic Pump and Motor 905046

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016911	PUMP AND MOTOR ASSEMBLY	1
—	900896-01	. PUMP	1
—	905046	. MOTOR	1
1	905047	. . 24-VOLT FIELD COIL	1
2	905048	. . ARMATURE	1
3	905049	. . BEARING	1
4	900885	. . DRIVE END HOUSING	1
5	905041	. . FLAT-HEAD SCREW	4
6	905052	. . RETAINER	1
7	905054	. . BEARING	1
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	. . FILLISTER HEAD SCREW	2
15	905039	. . FILLISTER HEAD SCREW	2
16	905040	. . SPRING LOCK WASHER	4
17	905041	. . FILLISTER HEAD SCREW	4
18	905042	. . BRUSH HOLDER	1
19	905043	. . SPIRAL SPRING	2
20	905044	. . CARBON BRUSH SET	1
21	905045	. . PIN	1

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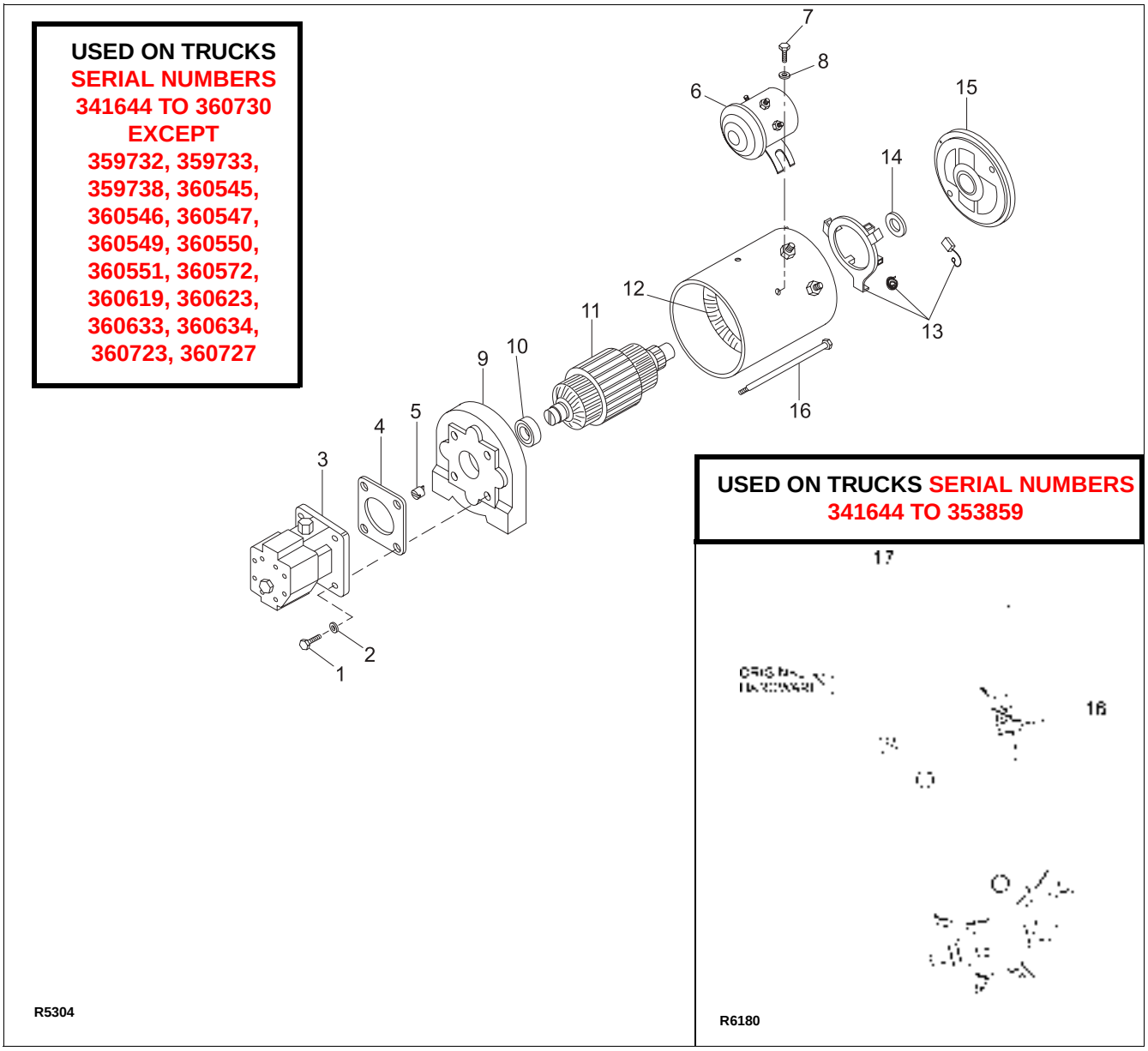

Figure 12-30 Hydraulic Pump and Motor Assembly 016935

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, COMPLETE	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

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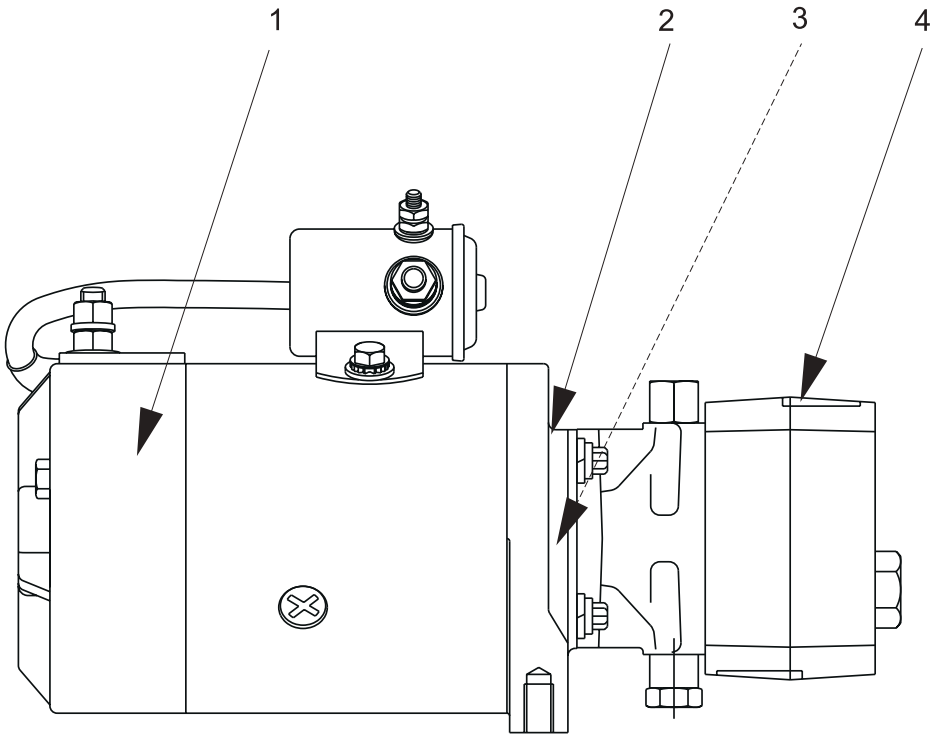
USED ON TRUCKS SERIAL NUMBERS 367402, 367404, 367406, 367408, 367409, 367410, 367411, 367412, 367413, 367414, 367416, 367417, 367418, 367419, 367432, 367463, 367464, 368852, 368853, 368855, 368878, 368900, 368930, 368931, 368933, 368934, 368935, 368956, 370267, 370281, 370282, 370285, 370292, 370305, 370306, 370307, 370313, 370318, 370358, AND 37036



R6094

Figure 12-31 Hydraulic Pump and Motor Assembly 016942

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016942*	PUMP AND MOTOR ASSY	REF
1	901623	. MOTOR ASSY	1
—	901624	. . BRUSH ASSEMBLY	1
2	036107	. GASKET	1
3	056353	. COUPLING	1
4	900896-01	. PUMP, COMPLETE	1

* **FOR COMPLETE PUMP AND MOTOR ASSY ORDER 016940**

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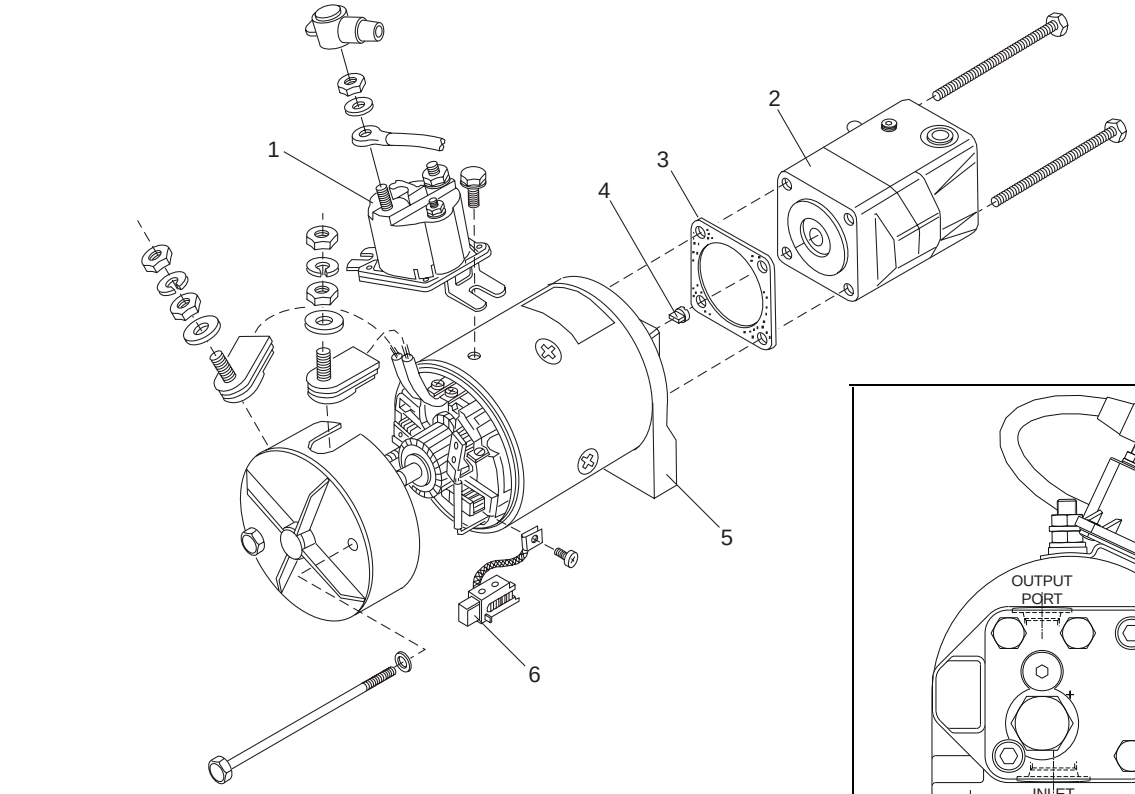
USED ON TRUCKS SERIAL NUMBERS
359732, 359733, 359738, 360545, 360546, 360547, 360549, 360550, 360551, 360572, 360619, 360623, 360633, 360634, 360723, 360727, 360730 TO 376499
EXCEPT
367402, 367404, 367406, 367408, 367409, 367410, 367411, 367412, 367413, 367414, 367416, 367417, 367418, 367419, 367432, 367463, 367464, 368852, 368853, 368855, 368878, 368900, 368930, 368931, 368933, 368934, 368935, 368956, 370267, 370281, 370282, 370285, 370292, 370305, 370306, 370307, 370313, 370318, 370358, AND 37036



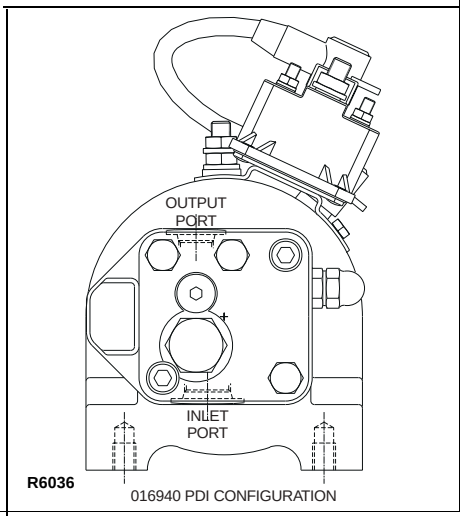


Figure 12-32 Hydraulic Pump and Motor Assembly 016940

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	016940	PUMP AND MOTOR ASSY	REF
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

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USED ON TRUCKS SERIAL NUMBERS 333375 TO 364407

1. **SEE SUPPLEMENT 187 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 333375 TO 338589**
2. **SEE SUPPLEMENT 233 FOR TRANSISTOR CONTROLLER USED ON TRUCKS SERIAL NUMBER 338590 TO 364407**

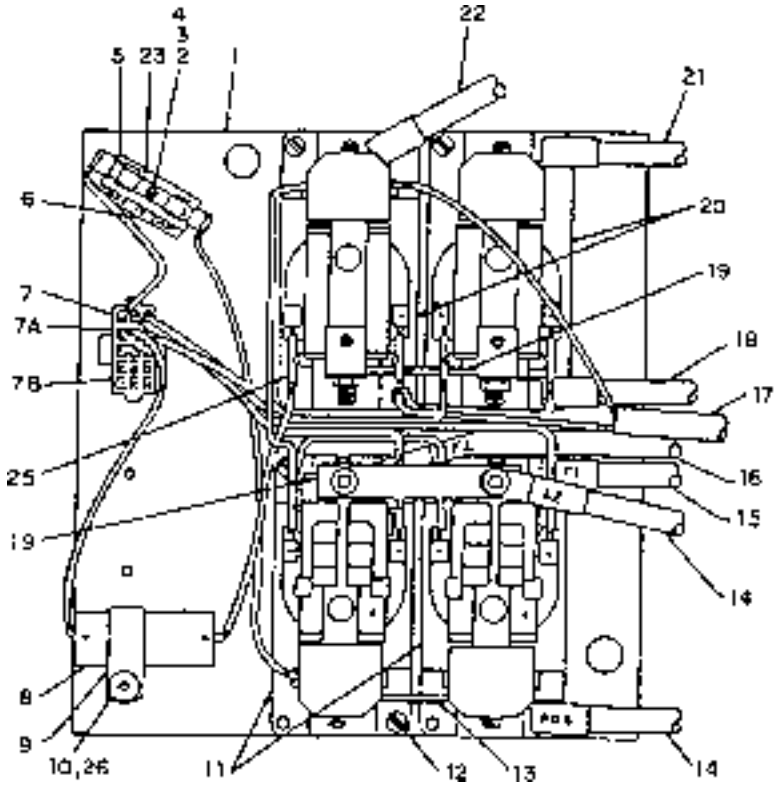

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Figure 12-33 Electrical Control Panel

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	504662	PANEL ASSEMBLY	1
1	504660	BASE PLATE	1
2	068179	SCREW, RD HD, #5-40 X 5/8	1
3	059410	NUT, HEX, #5-40	1
4	077203	WASHER, LOCK, SPLIT #5	1
5	008904	FUSEHOLDER FOR 008910 (15 AMP FUSE)	1
6	056504	DECAL, FUSE 15A	1
7	023133	WIRE HARNESS ASSY	1
7A	005627	. CONTACT, AMP	1
7B	005453	. SQUARE CONNECTOR (PART OF 023133 WIRE HARNESS)	1
8	021712-01	24V 1 SECOND TIME DELAY	1
9	056121	CLAMP, SINGLE	1
10	071376	SCREW, TRUSS, #10-32 X 1/2	1
11	†	CONTACTOR FORWARD/ REVERSE 24V (Figure 12-36)	REF

INDEX NO.	PART NO.	PART NAME	NO. REQD.
12	070491	SCREW, RD HD 8-32 X 1	8
13	077205	WASHER LOCK SPLIT 8	8
14	504611-06	CABLE ASSY-6AWG, 3/8-1/4 RING	2
15	504611-05	CABLE ASSY-6AWG, 3/8-1/4 RING	1
16	504611-01	CABLE ASSY-6AWG, 3/8-1/4 RING	1
17	504661	CABLE ASSY	1
18	504611-08	CABLE ASSY	1
19	401181	BUSSBAR	3
20	††	CONTACTOR 2ND AND 3RD SPEED 24V (Figure 12-35)	REF
21	504611-09	CABLE ASSY	1
22	504611-10	CABLE ASSY	1
23	008910	15 AMP FUSE	1
25	021204	TERMINAL-SLIDE CLIP 1/4	1
26	077207	WASHER, LOCK, SPLIT #10	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.

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

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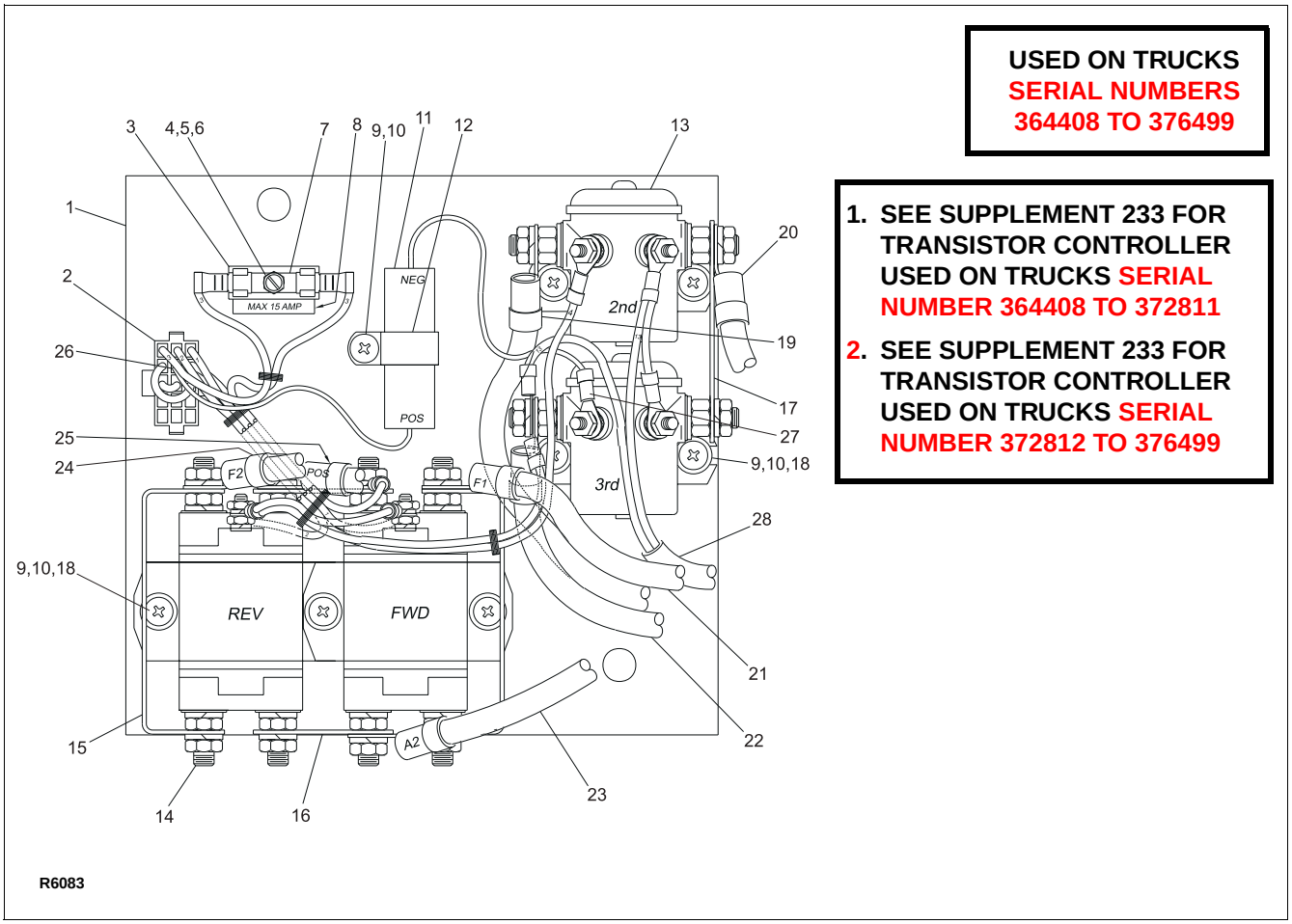

Figure 12-34 Electrical Control Panel

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	505867	PANEL ASSEMBLY	
1	505869	. BASE PLATE	1
2	023250	. HARNESS ASSEMBLY	1
3	008904	. FUSE HOLDER	1
4	068179	. SCREW, RD HD, #5-40 X 5/8	1
5	077203	. WASHER, LOCK, SPLIT #5	1
6	059410	. NUT, HEX, #5-40	1
7	008910	. 15 AMP FUSE	1
8	056504	. DECAL, FUSE 15A	1
9	071376	. SCREW, TRUSS, #10-32 X 1/2	8
10	077207	. WASHER, LOCK, SPLIT #10	8
11	021712-01	. 24V 1 SECOND TIME DELAY	1
12	056121	. CLAMP, SINGLE	1
13	055668	. SOLENOID-CONTACTOR, 24V SPEED	2
14	005667	. SOLENOID-CONTACTOR, 24V DIRECTIONAL	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
15	403548	. BUSS BAR	2
16	403549	. BUSS BAR	2
17	403828	. BUSS BAR	1
18	077030	. WASHER	7
19	504611-18	. CABLE ASSY, 6AWG	1
20	504611-04	. CABLE ASSY, 6AWG	1
21	504611-37	. CABLE ASSY, 6AWG, F1	1
22	504611-24	. CABLE ASSY, 6AWG	1
23	504611-38	. CABLE ASSY, 6AWG, A2	1
24	504611-39	. CABLE ASSY, 6AWG, F2	1
25	504611-29	. CABLE ASSY, 6AWG, POS	1
26	005627	. SQUARE CONNECTOR	1
27	021203	. TERMINAL RING, 8-10 STUD	1
28	505872	. CABLE ASSY, HIGH SPEED CUTOUT SWITCH	1

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BALL CHECK KIT
PART NUMBER
900531-08
CONTAINS:

ITEM	QTY
3	1
5	1
8	1
12	1

USED ON TRUCKS
SERIAL NUMBERS
333375 TO 364407

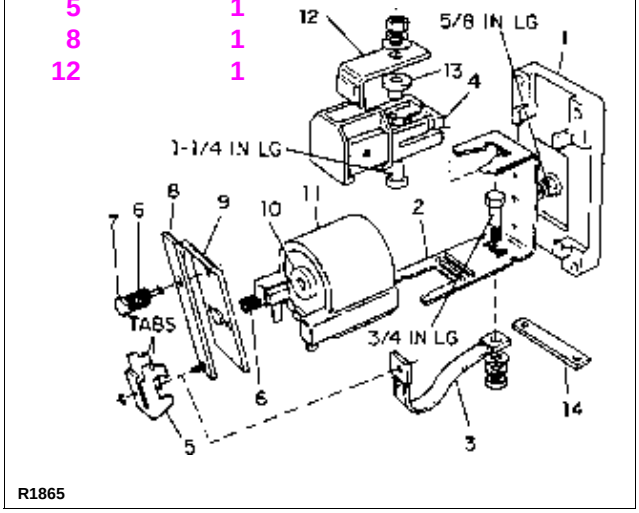

Figure 12-35 Contactor (2nd and 3rd Speed)

BALL CHECK KIT
PART NUMBER
900531-09
CONTAINS:

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

USED ON TRUCKS
SERIAL NUMBERS
333375 TO 364407

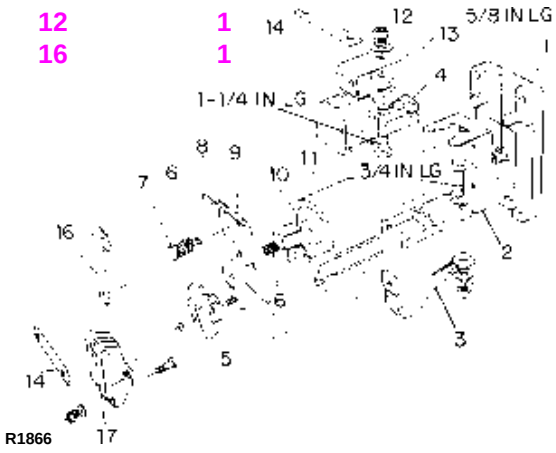

Figure 12-36 Contactor (Forward/Reverse)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	005659	CONTACTOR 2ND AND 3RD SPEED, 100 AMP	1
1	905010	. BASE MOULDING	1
2	905024	. MAGNET FRAME	1
3	905013††	. BRAID ASSEMBLY	1
4	905025	. FRONT MOLDING WITH BLOWOUT	1
5	905015††	. ARMATURE PLATE RETAINER	1
6	905016	. COMPRESSION SPRING	2
7	905017	. SPRING STUD	1
8	905029††	. MOVING CONTACT ASSEMBLY	1
9	905019	. ARMATURE PLATE	1
10	905020	. POLE PIECE	1
11	905028	. COIL ASSEMBLY, 24 VOLT	1
12	905022††	. FRONT CONTACT	1
13	905023	. SPACER	1
14	401181	. BUS BAR (NOT PART OF CONTACTOR)	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	005657	CONTACTOR FORWARD/ REVERSE, 100 AMP	1
1	905010	. BASE MOULDING	1
2	905024	. MAGNET FRAME	1
3	905013†	. BRAID ASSEMBLY	1
4	905025	. FRONT MOLDING WITH BLOW-OUT	1
5	905015†	. ARMATURE PLATE RETAINER	1
6	905016	. COMPRESSION SPRING	2
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 VOLT	1
12	905022†	. FRONT CONTACT	1
13	905023	. SPACER	1
14	401181	. BUS BAR (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.
†† FOR SECOND AND THIRD SPEED CONTACTOR TIP KIT ORDER PART NUMBER 900531-08. ONE KIT REPAIRS ONE CONTACTOR.

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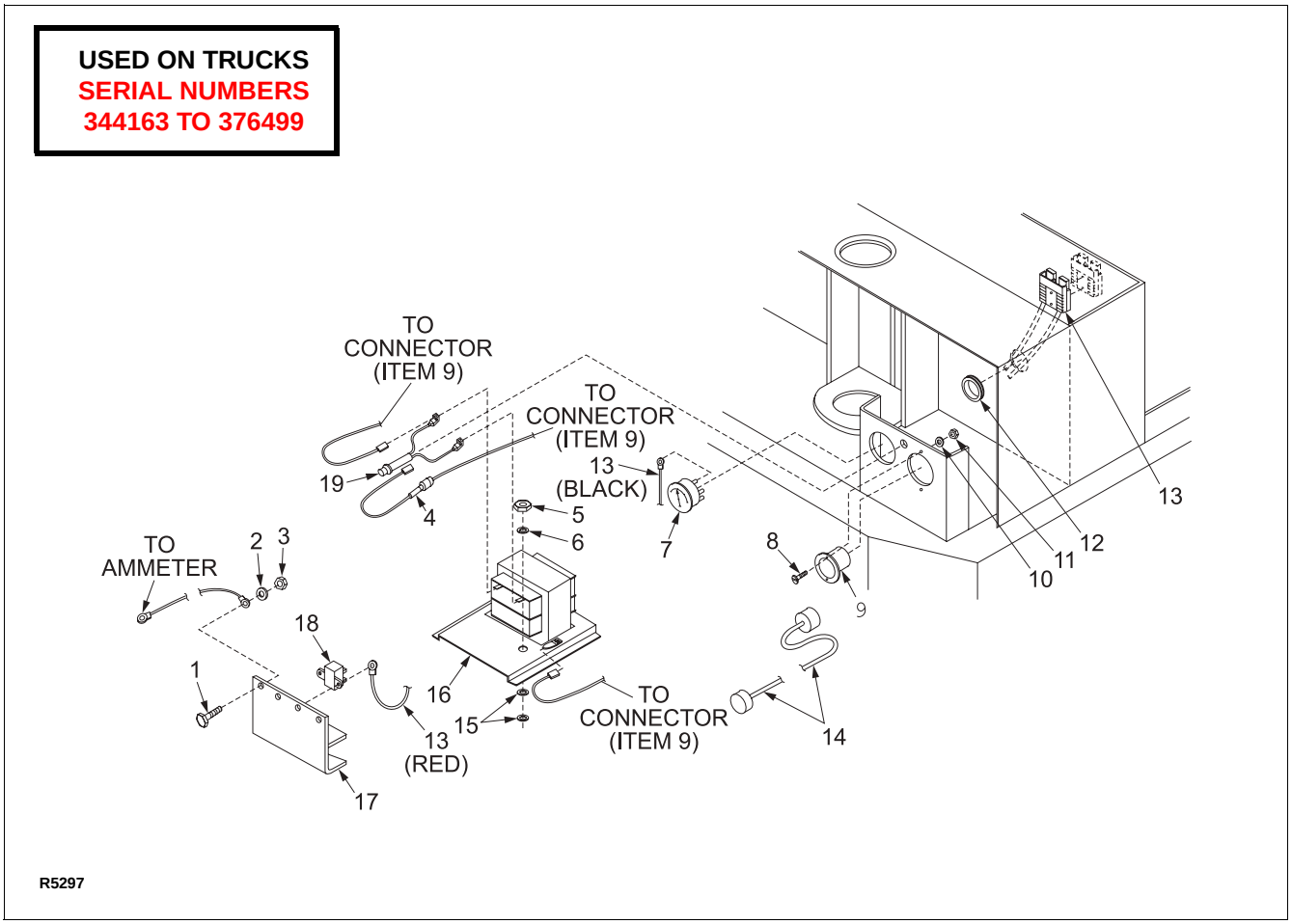

Figure 12-37 "Smart" Battery Charger Installation

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	065476	SCREW, HEX HD	1
2	077209	WASHER, LOCK, 1/4 split	1
3	059421	NUT, HEX	1
4	008910	FUSE, 15 Amp	1
5	059429	NUT, HEX, 3/8-16	1
6	077211	WASHER, LOCK, 3/8 split	1
7	015609	AMMETER	1
8	068230	SCREW, MACHINE	2
9	005454	CONNECTOR, INLET FLANGE, 120 VAC	1
9	005455	CONNECTOR, INLET FLANGE, 240 VAC	1
10	077204	WASHER, LOCK, SPLIT	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
11	059412	NUT, HEX, 6-32	2
12	057515	GROMMET	1
13	505640	CONNECTOR ASSEMBLY	1
14	005810	CORD, CHARGER, 120 VAC	1
14	504599	CORD, CHARGER, 240 VAC	1
15	077064	WASHER, FLAT	2
16	004978	CHARGER, 120 VAC	1
16	004980	CHARGER, 240 VAC	1
17	901603	. CIRCUIT BOARD WITH HEAT SINK	1
18	901604	. CIRCUIT BREAKER	1
19	—	. INDICATOR LIGHT (PART OF ITEM 16)	1

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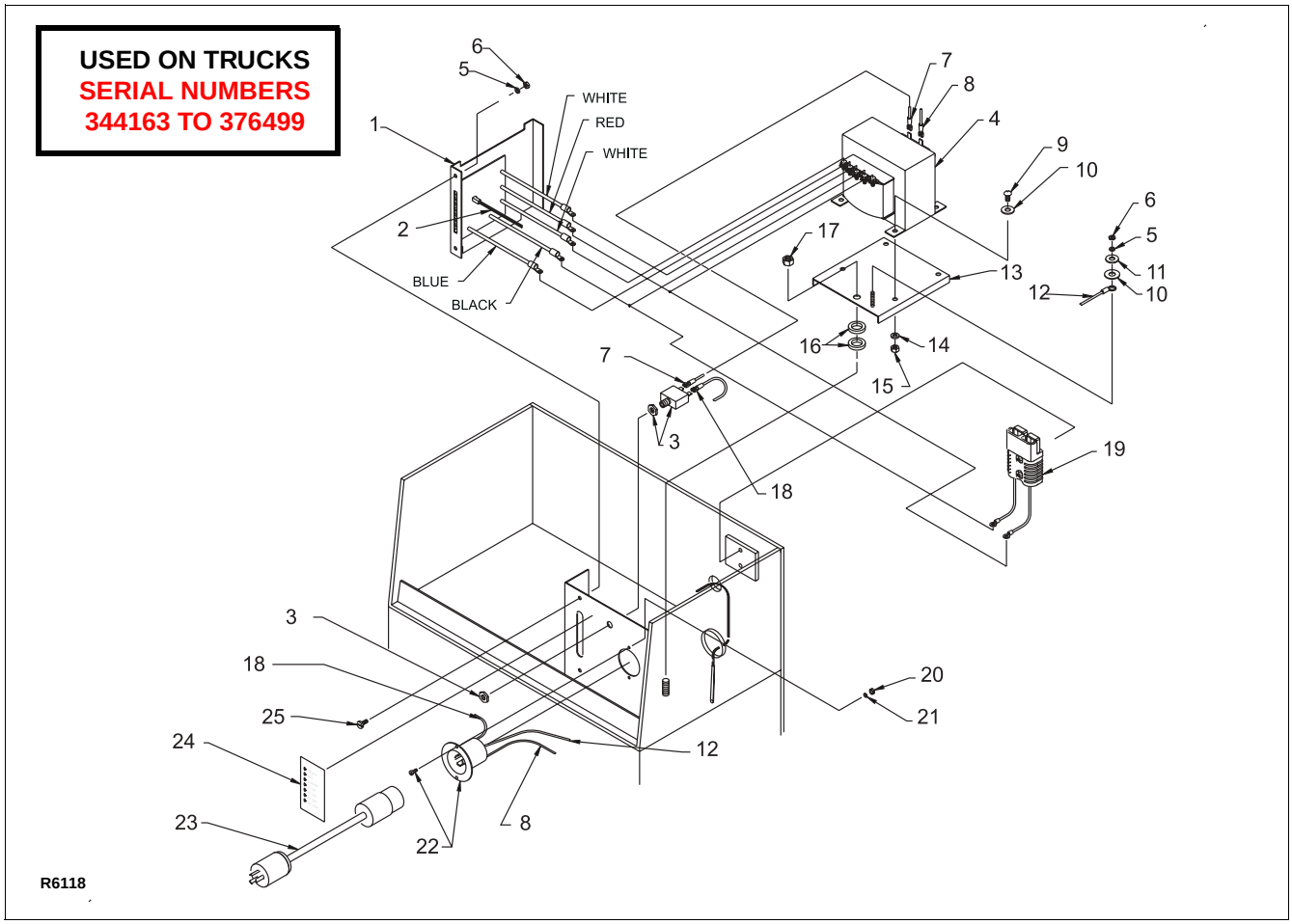

Figure 12-38 Gel Cell Battery Charger

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	004987	CHARGER KIT-24V, 25 AMP	1
1	904075	. PCB ASSY WITH HEATSINK	1
2	904074	. . THERMISTOR	1
3	003403	. CIRCUIT BREAKER-AUTO RESET	1
4	904076	. TRANSFORMER	1
5	077208	WASHER-LOCK, SPLIT, #12	3
6	059416	NUT-HEX, 10-32	3
7	023238-25	WIRE ASSEMBLY	1
8	505676-03	WIRE ASSEMBLY	1
9	070476	SCREW-PH RD HD, 1/4-20 X 1/2	4
10	077031	WASHER, 5/16 X 3/4 X 16 GA	5
11	077032	WASHER, 3/16 X 1/2 X 13 GA	1
12	023238-27	WIRE ASEMBLY	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
13	505992	BRACKET, CHARGER	1
14	077209	WASHER-LOCK, SPLIT, 1/4	4
15	077421	NUT-HEX, 1/4-20	4
16	077064	WASHER, 0.641 X 1.062 X 7 GA	2
17	059429	NUT-HEX, 3/8-16	1
18	026238-26	WIRE ASEMBLY	1
19	506178	CONNECTOR ASSY - CHARGER	1
20	059412	NUT-HEX, 6-32	2
21	077204	WASHER - LOCK, SPLIT, #6	2
22	005461	CONNECTOR - INLET FLANGED	1
23	505853	CORD ASSY - EXTENSION, 120 V	1
24	056681	DECAL - CHARGER, LED	1
25	071376	SCREW - PH TR HD, 10-32 X 1/2	2

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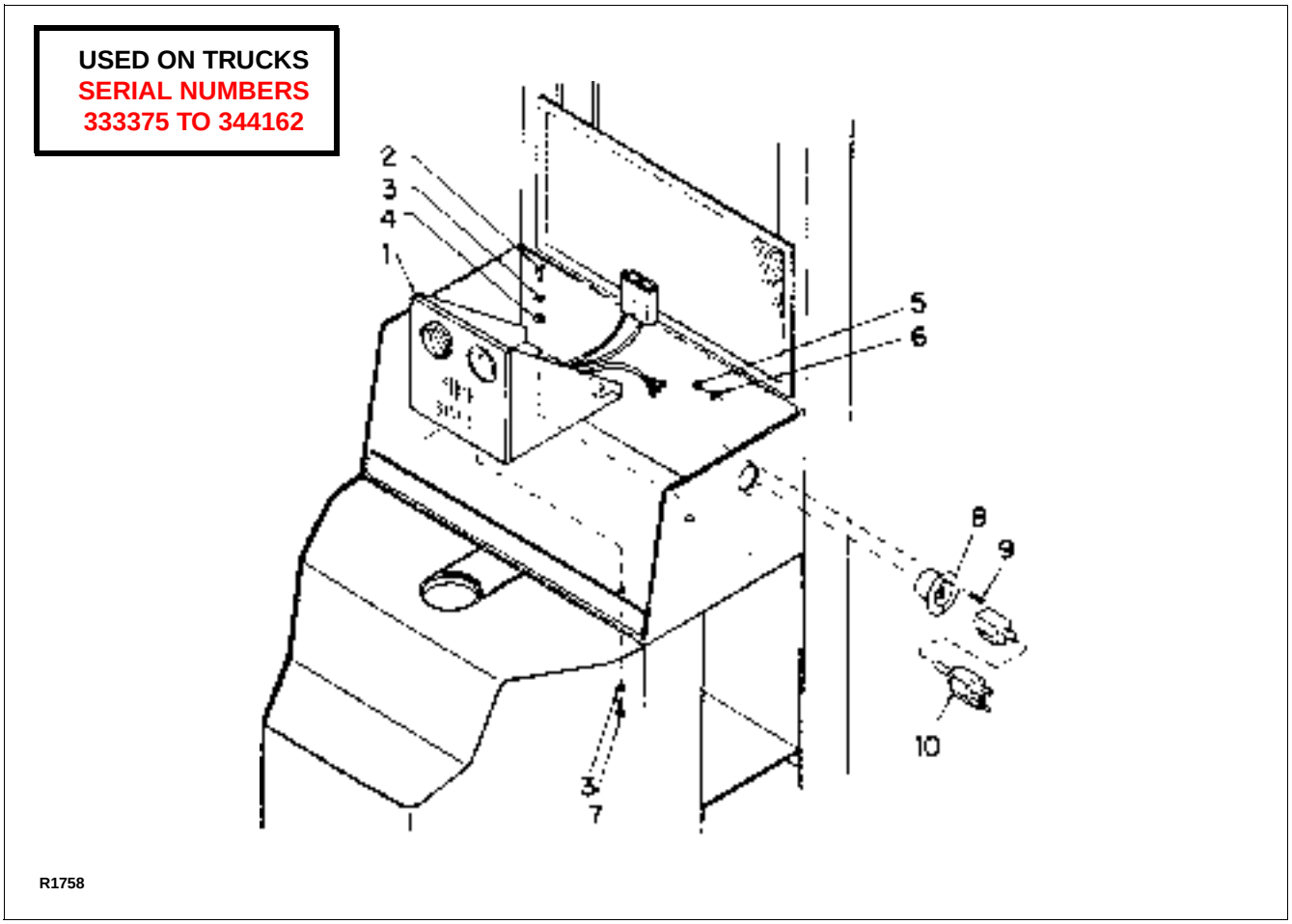

Figure 12-39 Battery Charger Mounting

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	—	BATTERY CHARGER (Figure 12-40 AND Figure 12-41)	REF
2	065476	SCREW, HEX HD, 1/4-20 X 1/2	2
3	077209	WASHER, LOCK, 1/4 SPLIT	3
4	077031	WASHER, FLAT, 1/4	2
5	059412	NUT, HEX, ZINC AND YELLOW, 6-32	2
6	077204	WASHER, LOCK, SPLIT, NO. 6	2
7	068230	SCREW, HEX HEAD, 1/4-20 X 5/8	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	005454	CONNECTOR, INLET FLANGE, 120 VAC	1
8	005455	CONNECTOR, INLET FLANGE, 240 VAC (OPTIONAL)	1
9	068231	SCREW, RD HEAD, 6-32 X 1/2	2
10	005810	CORD, CHARGER, 120 VAC 1 PHASE (OPTIONAL)	1
10	504599	CORD, CHARGER, 240 VAC 50 HZ, 1 PHASE (OPTIONAL)	1

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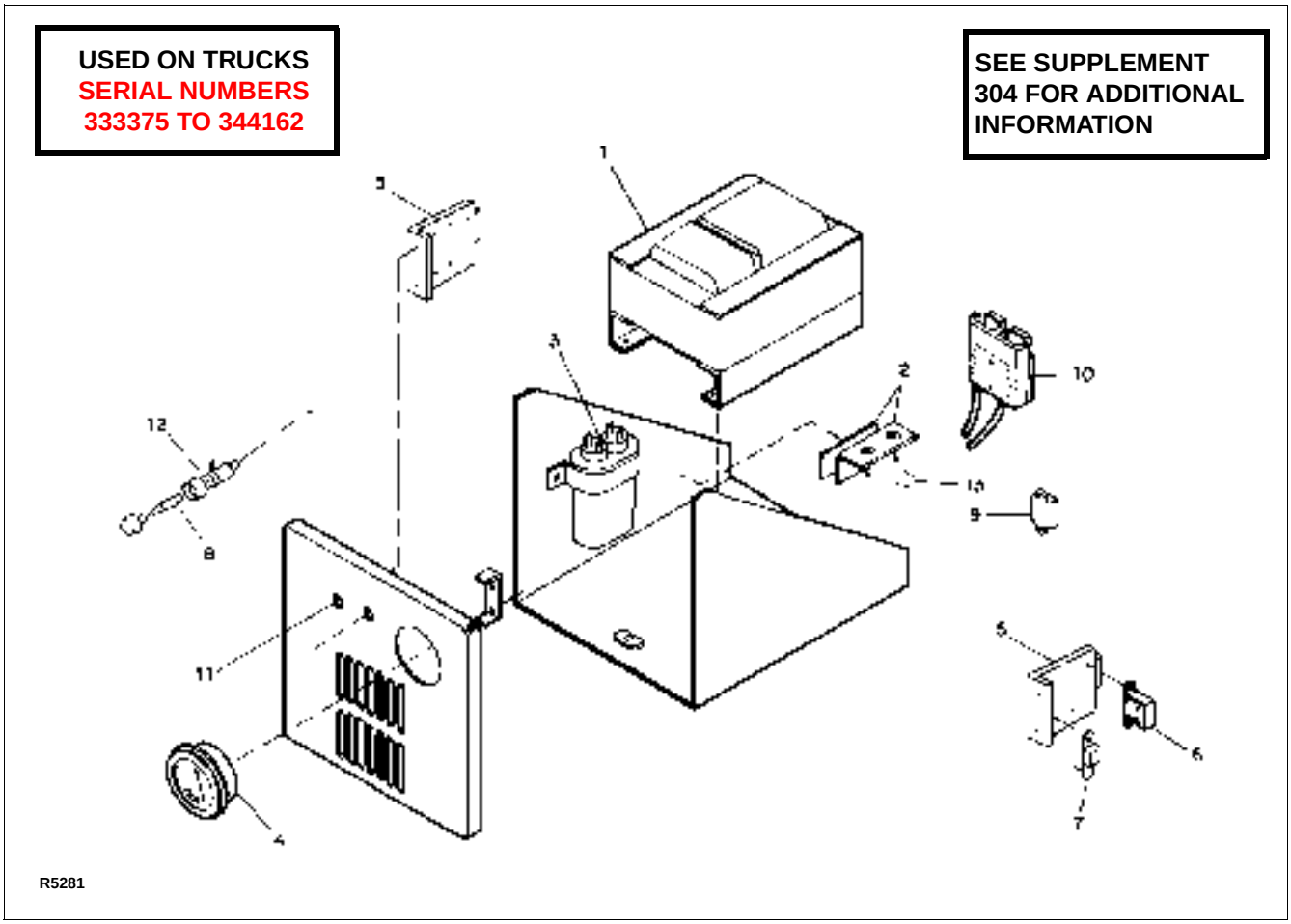

Figure 12-40 Optional "Smart" Charger 004976-01
(Replaces Timer Charger 004967-01)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	004976-01	"SMART" CHARGER	1
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
6	907078	. TRANSFORMER (CONTROL CARD)	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
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

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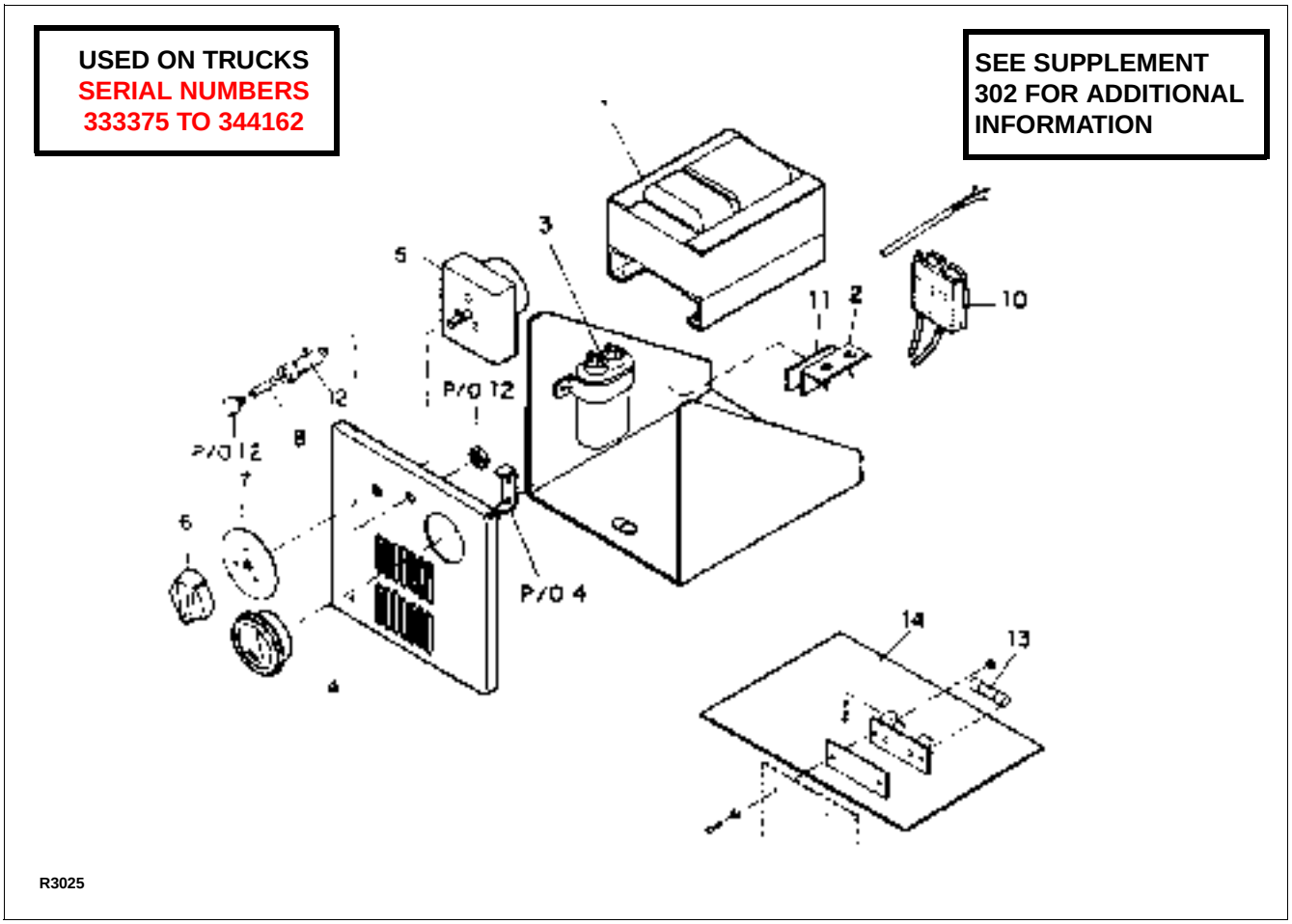

Figure 12-41 Standard Timer Battery Charger 004967-01 and 004967-02

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	004967-01	BATTERY CHARGER, 120 V, 60 HZ (STANDARD)	1
1	901023	. TRANSFORMER, 60 HZ	1
2	901027	. RECTIFIER WITH HEAT SINK	1
3	900385	. CAPACITOR	1
4	900462	. AMMETER WITH CLAMP	1
5	900375	. TIMER, 60 HZ	1
6	900376	. TIMER KNOB	1
7	900475	. TIMER DIAL PLATE	1
8	901030	. AC FUSE, AGC15	1
9	—	. NOT USED	
10	005401	. DC PLUG	1
11	900463	. INSULATOR, HEAT SINK	1
12	907058	. FUSE HOLDER	1
13	900464	. FUSE	1
14	901203	. FUSE HOLDER	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	004967-02	BATTERY CHARGER, 240 V, 50 HZ (OPTIONAL)	1
1	901024	. TRANSFORMER, 50 HZ	1
2	901027	. RECTIFIER WITH HEAT SINK	1
3	900385	. CAPACITOR	1
4	900462	. AMMETER WITH CLAMP	1
5	900749	. TIMER, 50 HZ	1
6	900376	. TIMER KNOB	1
7	900475	. TIMER DIAL PLATE	1
8	901030	. AC FUSE, AGC15	1
9	—	. NOT USED	
10	005401	. DC PLUG	1
11	900463	. INSULATOR, HEAT SINK	1
12	907058	. FUSE HOLDER	1
13	900464	. FUSE	1
14	901203	. FUSE HOLDER	1

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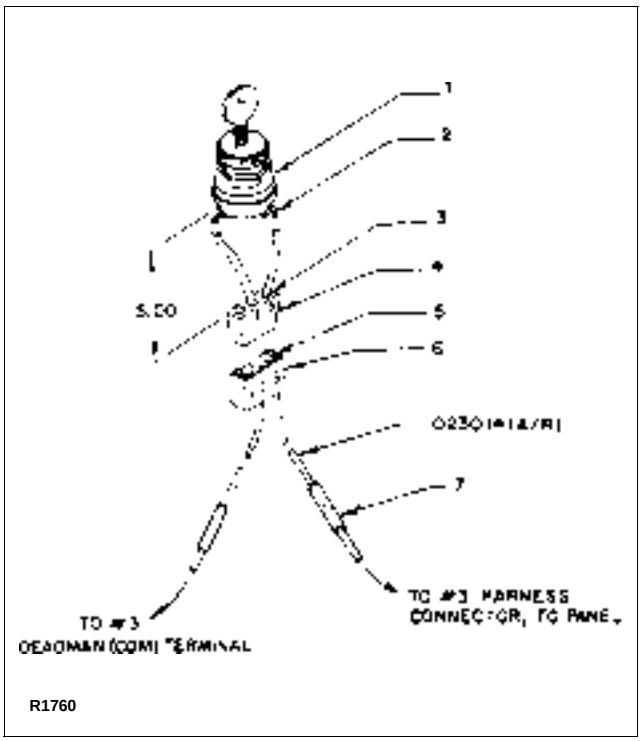

Figure 12-42 Optional Keyswitch

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	020725	SWITCH, KEY	1
2	021203	TERMINAL, RING NO. 10	2
3	005627	CONTACT	2
4	005648	HOUSING, SOCKET, FREE HANGING	1
5	005626	CONTACT, MALE	2
6	005647	CONNECTOR	1
7	005433	CONNECTOR, IN-LINE	2

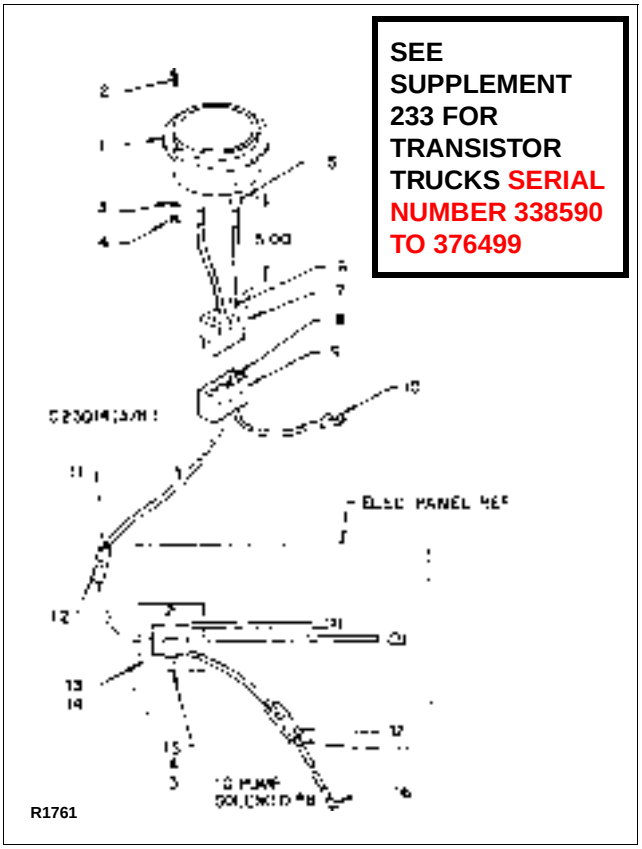

Figure 12-43 Optional Hour Meter

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	015604	HOUR METER	1
2	068179	SCREW, RD HD, 5-40 X 5/8	3
3	077203	WASHER, LOCK, SPLIT NO. 5	5
4	059410	NUT, HEX, 5-40	5
5	021718	TERMINAL, SLIP ON, 1/4 INSULATED	2
6	005627	CONTACT	2
7	005648	HOUSING, SOCKET, FREE HANGING	1
8	005626	CONTACT, MALE	2
9	005647	CONNECTOR	1
10	021207	TERMINAL, RING, 5/16	1
11	021204	TERMINAL, QUICK CONNECT, FEMALE	2
12	005422	CONNECTOR, IN-LINE INSULATED	2
13	005992	DIODE ASSEMBLY	1
14	010610	PAD, INSULATING DIODE	1
15	068177	SCREW, RD HD, 5-40 X 3/8	2
16	021203	TERMINAL, RING NO. 10	1

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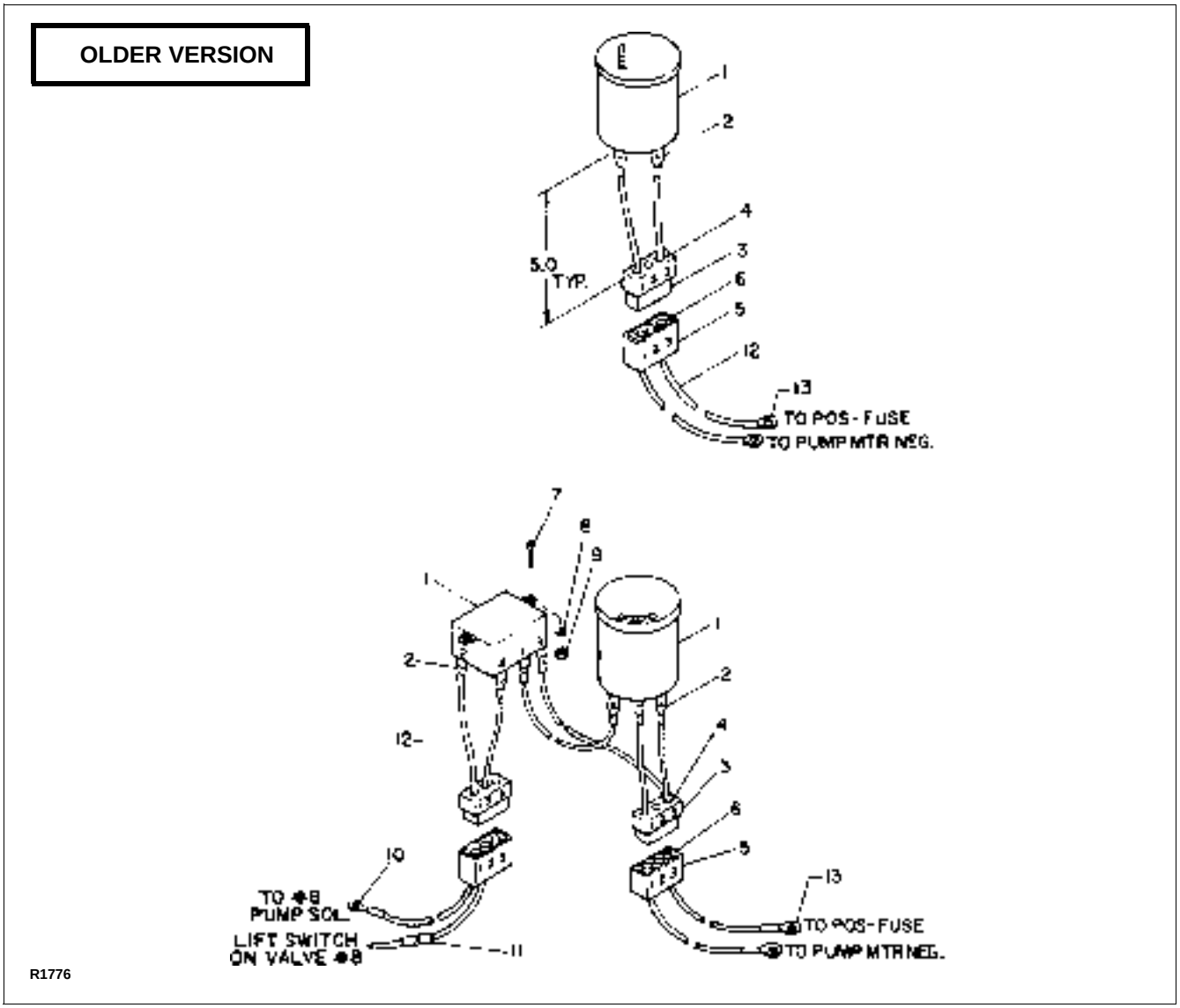

Figure 12-44 Optional Battery Capacitor Indicator

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	010619-02	METER, BATTERY CAPACITY, 24 V W/O LIFT LOCKOUT	1
1	010624-02	METER, BATTERY CAPACITY, 24 V W/LIFT LOCKOUT	1
2	021718	TERMINAL, SLIP ON, 1/4 INSULATED	2 OR 7
3	005648	HOUSING, SOCKET, FREE HANGING	1*
4	005627	CONTACT AMP	2*
5	005647	CONNECTOR	1*
6	005626	CONTACTS, MALE	2*
7	068177	SCREW, RD HD, 5-40 X 3/8	2
8	077203	WASHER, LOCK, SPLIT, NO. 5	2
9	059410	NUT, HEX 5-40	2
10	021203	TERMINAL, RING, NO. 10	1
11	005433	CONNECTOR, SPLICE, INLINE	1
12	023014	WIRE, 18 GAUGE, STRANDED	A/R
13	021207	TERMINAL, RING, 5/16	2

A/R - AS REQUIRED

*** DOUBLE QUANTITIES FOR SYSTEM WITH LIFT LOCKOUT**

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NEWER VERSION

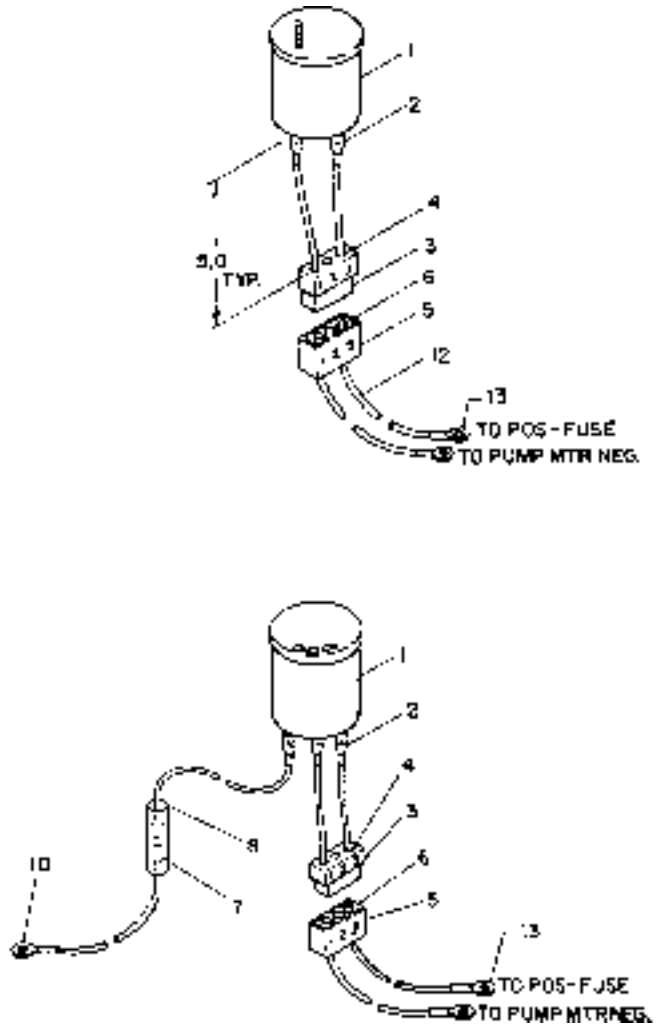

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Figure 12-45 Optional Battery Capacitor Indicator

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	010617-02	METER, BATTERY CAPACITY, 24 V W/O LIFT LOCKOUT	1
1	010618-02	METER, BATTERY CAPACITY, 24 V W/LIFT LOCKOUT	1
2	021718	TERMINAL, SLIP ON, 1/4 INSULATED	2 OR 3
3	005648	HOUSING, SOCKET, FREE HANGING	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
4	005627	CONTACT AMP	2
5	005647	CONNECTOR	1
6	005626	CONTACTS, MALE	2
7	021204	TERMINAL, FEMALE	2
8	005422	CONNECTOR, INLINE	1
10	021203	TERMINAL, RING, NO. 10	1
12	023014	WIRE, 18 GAUGE, STRANDED	A/R
13	021207	TERMINAL, RING, 5/16	2

A/R - AS REQUIRED

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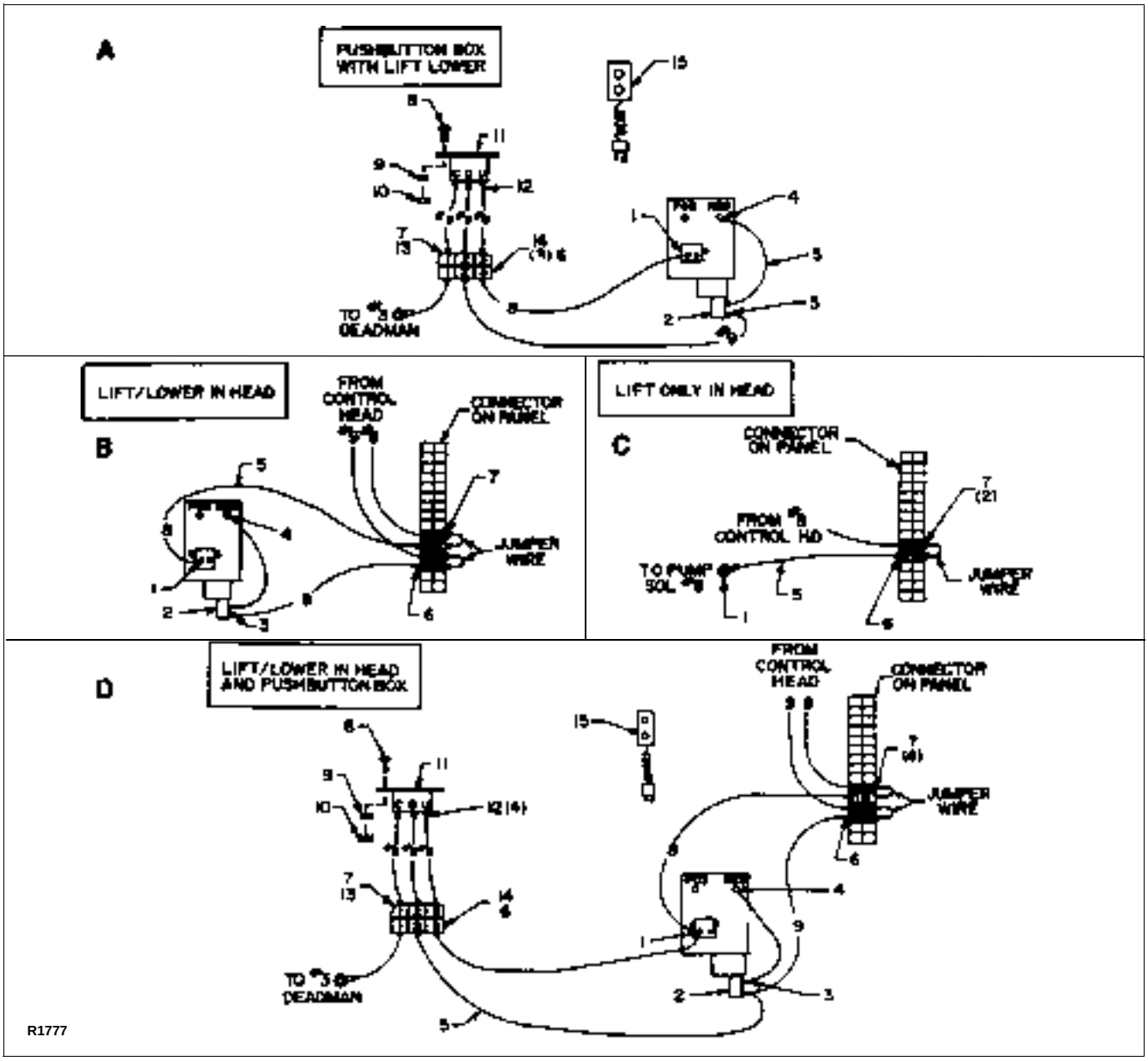

Figure 12-46 Optional Remote Control Installation

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	021203	TERMINAL, RING 8-10 STUD	1
2	048133	SOLENOID, 24 V	1
3	021718	TERMINAL, SLIP ON, 1/4 INSULATED	1
4	021207	TERMINAL, RING, 5/16	1
5	023014	WIRE, 18 GAUGE STRANDED	A/R
6	005626	CONTACTS, MALE	1
7	005627	CONTACTS, AMP	4
8	068177	SCREW, RD HD, 5-40 X 3/8	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
9	077203	WASHER, LOCK, SPLIT, NO. 5	2
10	059410	NUT, HEX 5-40	2
11	017800	PLUG, FEMALE, FLUSH MOUNT	1
12	021236	TERMINAL, RING, NO. 6	4
13	005648	HOUSING SOCKET, FREE HANGING	1
14	005647	CONNECTOR	1
15	501736	REMOTE ASSEMBLY PUSHBUTTON	1

A/R - AS REQUIRED

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