OWNER'S MANUAL

J1 JOEY TASK SUPPORT VEHICLE

WARNING

Do not operate or service this product unless you have read and fully understand the entire contents of this manual. Failure to do so may result in property damage, bodily injury or death.

BLUE GIANT®

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WARNING

Do not operate this vehicle unless you have been authorized and trained to do so, and have read all warnings and instructions in Operator's Manual and on this vehicle. Read, understand and comply with the information on the vehicle's nameplate at all times.

Do not operate this vehicle until you have performed the daily operation's check list. Verify and inspect tires, horn, battery, controller, lift and hydraulic systems, brakes, steering mechanism and guards. Verify that all emergency controls, personal protection and safety devices are in place and functioning correctly and ensure the vehicle is free of fluid leaks and has no loose or missing parts. Report any problems to the designated authority and do not use the vehicle until they are corrected by a qualified mechanic.

This vehicle must not be modified without the manufacturer's consent. Components critical to the vehicles stability such as batteries shall not be replaced with lighter weight components.

Operate vehicle only from designated platform operating position. Use this vehicle indoors on level surfaces only. Never operate on ramps and slopes or uneven floors. This vehicle is not for use on mezzanines or balcony areas. Before operating, inspect the floor area it will be used on and be certain it will support the vehicle at full capacity and lift height. Identify and avoid holes, drop-offs, bumps and obstructions.

Before and during all vehicle operations ensure that adequate clearance is maintained from overhead obstructions and energized electrical conductors and parts.

Before elevating platform be sure guardrail access gates are in place and lowered. Keep feet on platform floor at all times while using vehicle, never climb onto guard rails or platform shelf. Do not use ladders, planks or other devices to achieve additional height on platform.

When transferring loads to platform or platform shelf, do not exceed capacity ratings on vehicle nameplate. Ensure loads are centered and do not contact any obstructions in the vehicle's vicinity. Do not stabilize the platform by contact with adjacent objects such as racks or shelving. Do not use the platform as a crane.

Take care to prevent electrical cords, hoses or other equipment from entangling in platform. Ensure area surrounding the vehicle is free of personnel and equipment before lowering platform.

Maintain a clear view of the ground while travelling and a safe distance from obstacles in the vehicle or platform's path. Ensure personnel in the vicinity are aware of the vehicle's movement. Travel at a safe speed for the conditions the vehicle is operating in.

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

Enter and exit platform only through raised access gates and with the platform fully lowered and vehicle stopped. When leaving vehicle unattended, remove key to prevent unauthorized use.

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DESCRIPTION

1-1. INTRODUCTION.

This publication describes the 24 volt transistor J1 task support vehicle distributed by Big Lift LLC. Included are planned maintenance instructions, lubrication procedures, corrective maintenance procedures and a complete parts list with part location illustrations.

Users shall comply with all requirements indicated in applicable OSHA standards and the current edition of A.N.S.I. A92.6. By following these requirements and the recommendations contained in this manual, you will receive many years of dependable service from your J1 task support vehicle.

1-2. GENERAL DESCRIPTION.

The self-propelled J1 task support vehicle lifts and transports up to 1,000 pounds capacity including load and operator. The vehicle enables general maintenance work and efficient selection and moving of materials in any area or at any level of the warehouse or storeroom. This vehicle is not for use on mezzanines or balcony areas. The design permits one man to perform all operations of selecting stock, driving vehicle, and replacing the stock at the designated place. The battery-powered vehicle is quiet and allows operation in closed areas without special provisions for ventilation.

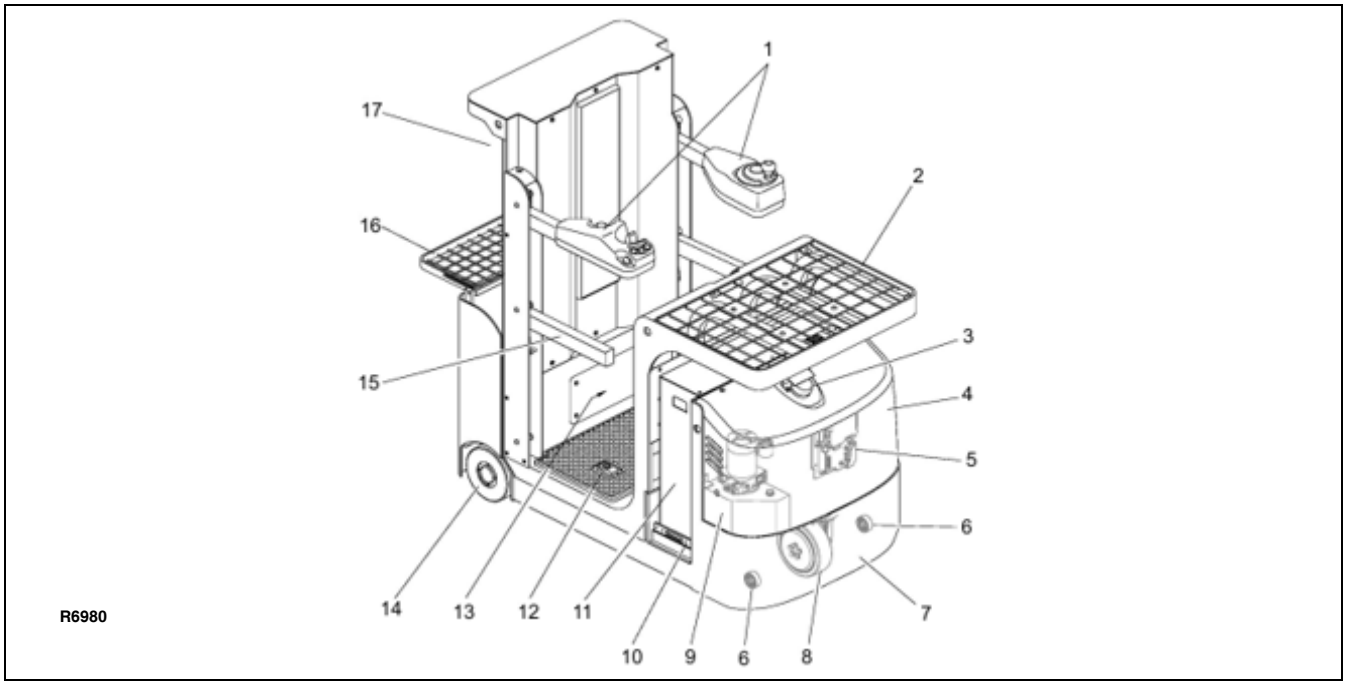


Figure 1-1 J1 Elevating Work Platform

ITEM	COMPONENT
1	Control arms
2	Pick tray
3	Warning light
4	Cover
5	Control panel
6	Casters
7	Frame
8	Drive wheel
9	Hydraulic pump and reservoir

ITEM	COMPONENT
10	Battery baffle
11	Battery
12	“Deadman” footswitch
13	Height-adjustable operator platform
14	Load wheels
15	Guard rail
16	Rear tray for additional capacity and storage
17	Mast

The AC motor propels the vehicle in forward or reverse direction. The vehicle can be driven with the platform raised or lowered; however the speed is restricted.

On demand power steering makes the vehicle highly maneuverable.

The control arms are used to operate the work vehicle and provide operator safety.

The pick tray is used to place and transport merchandise, equipment and tools.

The operator platform contains the "deadman" footswitch which must be depressed for the vehicle to operate.

The folding rear tray provides for transporting up to a 200 pound load.

1-3. NAME PLATE AND WARNING DECAL.

Warning decals are located to the left of the Instrument panel. The name plate is mounted on the right side of the Instrument panel.

If the name plate or warning decals are lost or damaged they MUST be replaced immediately. Have your supervisor or the designated authority contact Big Lift LLC Authorized Dealer for replacement.

The name plate shows the model, serial number, capacity, lift height, vehicle weight and minimum battery weight. See Figure 1-2.

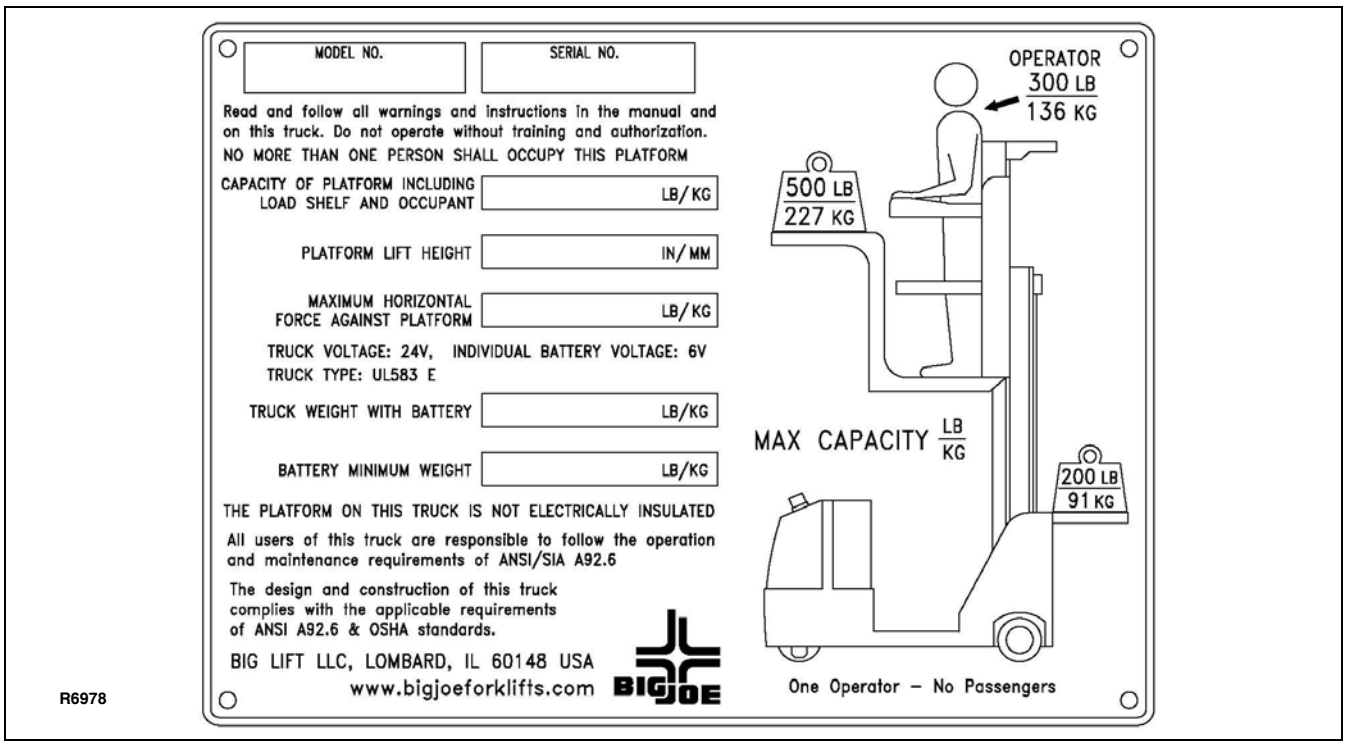


Figure 1-2 J1 Name Plate

SECTION 2
PLANNED MAINTENANCE

2-1. 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 the Operator's Manual, and refers any required servicing to a qualified maintenance technician who performs the planned maintenance and any required servicing.

2-2. MONTHLY AND QUARTERLY CHECKS.

Table 2-1 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 vehicle 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 Lift LLC Service Representative.

2-3. BATTERY CARE.

2-3.1. General

The vehicle may be equipped with maintenance free batteries.

The care and maintenance of the battery is very important to obtain efficient vehicle operation and maximum battery life.

CAUTION: Gases produced by a battery can be explosive. Do not smoke, use an open flame, create an arc or sparks in the vicinity of the battery. Ventilate an enclosed area well when charging.

CAUTION: Batteries contain sulfuric acid which may cause severe burns. Avoid contact with eyes, skin or clothing. In case of contact, flush immediately and thoroughly with clean water. Obtain medical attention when eyes are affected. A baking soda solution (one pound to one gallon of water) applied to spilled acid until bubbling stops, neutralizes the acid for safe handing and disposal.

Table 2-1 Monthly and Quarterly Inspection and Service Chart

VISUAL CHECKS	
INTERVAL	**INSPECTION OR SERVICE**
Monthly	Check electrical brake for proper operation.
Monthly	Inspect wiring for loose connections and damaged insulation.
Monthly	Check wheels for wear and damage.
Monthly	Check "deadman" footswitch for proper operation.
Monthly	Check lift chain tension, lubrication & operation (see paragraph 2-7.)
Quarterly	Check lift cylinder for leakage.
Quarterly	Test electric steering.
Quarterly	Check steering gear for wear and lubricate.
Semi-annually	Inspect for chain wear (See SECTION 7)

2-3.2. Safety Rules

- Wear protective clothing, such as rubber apron, gloves, boots and goggles when performing any maintenance on batteries. Do not allow electrolyte to come in contact with eyes, skin, clothing or floor. If electrolyte comes in contact with eyes, flush immediately and thoroughly with clean water. Obtain medical attention immediately. Should electrolyte be spilled on skin, rinse promptly with clean water and wash with soap. A baking soda solution (one pound to one gallon of water) will neutralize acid spilled on clothing, floor or any other surface. Apply solution until bubbing stops and rinse with clean water.
- Do not bring any type of flame, spark, etc., near the battery. Gas formed while the battery is charging, is highly explosive. This gas remains in cell long after charging has stopped.
- Do not lay metallic or conductive objects on battery. Arcing will result.
- Do not touch non-insulated parts of DC output connector or battery terminals to avoid possible electrical shock.
- Disconnect all AC and DC power connections before servicing battery.
- Do not charge a frozen battery.
- Do not use charger if it has been dropped or otherwise damaged.

2-3.3. Maintenance Personnel

Batteries may only be charged, serviced or replaced by trained personnel. This manual and the manufacturer's instructions concerning batteries and charging stations must be observed when carrying out the work.

2-3.4. Battery Care and Charging

CAUTION: Never smoke or bring open flame near the battery. Gas formed during charging is highly explosive and can cause serious injury.

1. Charge the battery only in areas designated for that use.
2. Battery terminals should be checked and cleaned of corrosion regularly. Good battery terminal contact is essential not only for operation, but also for proper charging of the battery.
3. Make certain battery used meets weight and size requirements of vehicle. NEVER operate vehicle with an undersized battery.

2-3.5. Battery Cleaning

Always keep vent plugs tightly in place when cleaning battery. When properly watered and charged, the battery will remain clean and dry. All that is necessary is to brush or blow off any dust or dirt that may accumulate on them. However, if electrolyte is spilled or overflows from a cell, it should be neutralized with a solution of baking soda and water, brushing the soda solution beneath the connectors and removing grime from the covers. Then rinse the battery with cool water from a low pressure supply to remove the soda and loosen dirt. If batteries stay wet consistently, they may be either overcharged or over filled. This condition should be investigated and corrected.

2-3.6. MAINTENANCE FREE BATTERIES

Some vehicles may be equipped with maintenance free batteries. These batteries are completely sealed, will not require any watering and have a full 80% discharge available.

Sealed Maintenance Free batteries contain a pressure release valve and under normal operating conditions do not require any special ventilation.

CAUTION: Do not try to open this battery or remove the pressure release valve.

Only under severe overcharging, such as connected to an improperly sized charger, will any significant amount of gasses be released from the battery. Also, being a valve regulated battery, it never requires watering.

2-4. 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 vehicle at charging station with platform lowered and turn the key switch OFF.
2. Apply the emergency disconnect switch.
3. Check the condition of the AC cord 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.
4. Disconnect plug (1, Figure 2-1) from the vehicle and connect it to charger's plug (2).
5. Connect cord (3) and charge the battery according to Supplement 374 *.
6. Disconnect the charger cord and insert it in its receptacle on the vehicle.

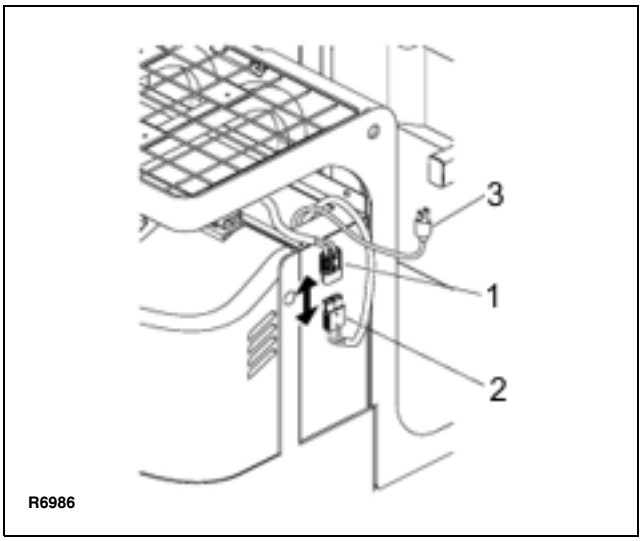


Figure 2-1 Battery Charging

2-5. REPLACING BATTERIES

Replace only with original OEM batteries or batteries approved by an authorized Big Lift LLC dealer. Contact you authorized Big Joe dealer for information on optional batteries and battery chargers.

1. Park vehicle at charging station with platform lowered and turn the key switch OFF.
2. Apply the emergency parking brake.
3. Disconnect the battery from the vehicle and place the battery plug and cable in suck a way that they will not get caught on the vehicle when the battery is removed.
4. Remove baffle (2, Figure 2-2).

WARNING: Take caution when removing the battery pack or optional industrial battery from the vehicle. battery is located on battery rollers. Use of a battery stand is recommenced when removing the battery. Only an authorized Big Joe dealer should be used for battery removal and installation.

5. Pull battery (1) out the side of the vehicle.
6. Install in reverse order.

WARNING: The weight and dimensions of the battery have considerable affect on the operational safety of the vehicle. Battery equipment may only be replaced with the agreement of the manufacturer.

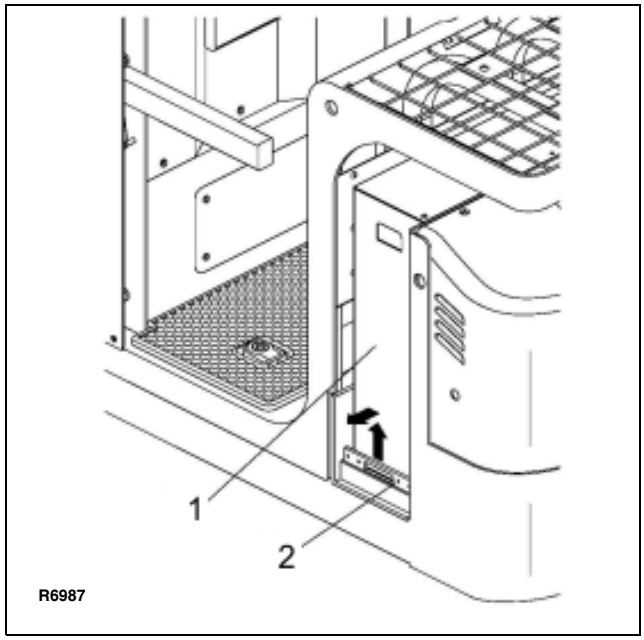


Figure 2-2 Battery Replacement

2-5.1. Battery disposal:

Dispose in accordance with national environmental protection regulations or disposal laws. The manufacturer's disposal instructions must be followed

* Please refer to the Big Joe Support site at www.bigjoesupport.com

2-6. LUBRICATION.

Refer to Table 2-2 for the recommended types of grease and oil. Table 2-3 in conjunction with Figure 2-3 identifies the items requiring lubrication.

Table 2-2 Recommended Lubricants (See Table 2-3 for Application)

No. 1	Grease—Polylub GA352P
No. 2	Hydraulic oil—L-HM46#.

2-7. LIFT CHAIN MAINTENANCE.

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

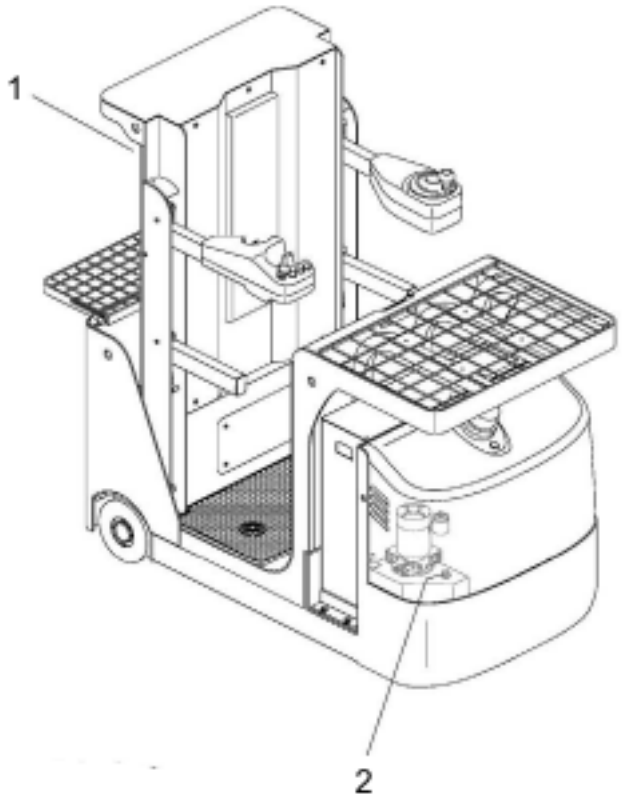


Figure 2-3 Lubrication Diagram

Table 2-3 Lubrication Chart

FIG 3-2 INDEX NO.	LOCATION	METHOD OF APPLICATION	TYPE (Table 3-3)	APPLICATION OF LUBRICANT
1	Mast	Spray	No. 1	Full length of channel where rollers operate.
2	Hydraulic Reservoir	Can	No. 2	With platform fully lowered, fill reservoir with hydraulic oil to level on dip stick.

NOTES

SECTION 3
TROUBLESHOOTING

3-1. GENERAL

Use Table 3-1 as a guide to determine possible causes of trouble. The table is divided into five main categories: vehicle and Hydraulic System Will Not Operate: vehicle Does Not Operate Forward or Reverse: Trouble With Braking: Trouble With Lifting Or Lowering, and Miscellaneous malfunctions.

Table 3-1 Troubleshooting Chart

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
VEHICLE AND HYDRAULIC SYSTEM WILL NOT OPERATE		
	a. Battery connector (12, Figure 11-10) not connected.	Check the battery connector and connect if necessary.
	b. Keyswitch (3, Figure 11-6) “OFF” or defective.	Turn keyswitch “ON” or bypass keyswitch to determine if it is malfunctioning.
	c. Safety guard rail open.	Close safety guard rail.
	d. emergency power disconnect switch (6, Figure 11-6 pressed or defective.	Disengage the emergency power disconnect switch or bypass switch to determine if it is malfunctioning.
	e. "Deadman” footswitch (19, Figure 11-24) not pressed or defective.	Press "deadman" footswitch or bypass pedal to determine if it is malfunctioning.
	f. Battery charge too low.	Check battery charge, charge battery if necessary.
	g. Faulty fuse (12, Figure 11-11).	Test fuses.
VEHICLE DOES NOT OPERATE FORWARD OR REVERSE		
Vehicle does not travel forward or reverse. All other functions operate normally.	a. Check all wiring. A loose connection may be the cause of malfunction.	Tighten all loose connections before further troubleshooting.
	c. Defective controller (4, Figure 11-11).	Check for proper operation and replace if necessary.
	d. Defective travel switch (8, Figure 11-6).	Check and replace switch if defective.
Vehicle travels forward but not in reverse.	Defective travel switch (8, Figure 11-6).	Check and replace switch if defective.
Vehicle travels reverse but not in forward.	Defective travel switch (8, Figure 11-6) in control head.	Check and replace switch if defective.
Vehicle travels forward and in reverse at lower speeds; will not travel at high speed.	a. Defective travel switch (8, Figure 11-6) in control head.	Check and replace switch if defective.
	b. Operator platform raised above 47 inches.	Lower operator platform below 47 inches.

Table 3-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
TROUBLE WITH LIFTING OR LOWERING		
Oil sprays or flows from the top of the lift cylinder.	Defective packing in lift cylinder	Repair lift cylinder.
Squealing sounds when lifting Operator's platform.	a. Oil level too low.	Identify oil leak and fill reservoir.
	b. Dry channels in mast.	Apply grease.
	c. Defective mast or loading frame rollers	Replace rollers.
Forks do not lift to top.	a. Oil level too low.	Add oil to reservoir.
	b. Load larger than capacity.	Refer to I.D.plate for capacity.
Weak, slow or uneven action of hydraulic system.	a. Defective pump or relief valve.	Check pressure. Adjust as necessary.
	b. Worn lift cylinder.	Replace cylinder.
	c. Load larger than capacity.	Refer to I.D.platefor capacity.
	d. Defective lift motor relay.	Replace relay (18, Figure 11-8) on pump motor.
	e. Battery charge low.	Charge battery.
Platform does not lift, pump 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 lift switch (1, Figure 11-6) in control head, as well as the relay (18, Figure 11-8).
Platform does not lift, motor runs.	Defect 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, and relief valve. Repair, or adjust.
Platform lifts, but will not go down.	Defect in hydraulic system	Check lowering control switch (1, Figure 11-6) and lowering solenoid (10, Figure 11-8). Replace as required.
Load will not hold	a. Oil bypassing internally in control valve	Replace valve assembly (Figure 11-8).
	b. Worn lift cylinder or packing.	Repack cylinder.
Platform does 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 need charging.	Change batteries.

Table 3-1 Troubleshooting Chart - Continued

MALFUNCTION	PROBABLE CAUSE	CORRECTIVE ACTION
TROUBLE WITH LIFTING OR LOWERING - Continued		
Forks creep downward under load when in a raised position.	Leak in hydraulic system, lift cylinder or lowering valve.	Check for leaking fitting in hydraulic line and repair as required. Repack lift cylinder or replace valve assembly (Figure 11-8).
TROUBLE WITH STEERING		
	a. Faulty fuse (12, Figure 11-11).	Test fuses.
	b. Check all wiring. A loose connection may be the cause of malfunction.	Tighten all loose connections before further troubleshooting.
	c. Defective potentiometer (20, Figure 11-5).	Check and replace potentiometer if defective.
	d. Defective controller (2, Figure 11-11).	Check for proper operation and replace if necessary.
	e. Defective steering motor (6, Figure 11-4).	Replace if necessary.

3-2. CONTROLLER TROUBLESHOOTING

3-2.1. Zapi Handset

A Zapi Handset is available that is designed specifically for use with the Zapi controller. It serves multiple functions of reading diagnostic data, testing truck operation, setting options, adjustments and parameter changes of the controller. The Zapi Handset is available through your Big Lift LLC dealer. If you require dealer location information, contact Big Lift LLC.

Remove the rubber plug from the CNC connector of the controller Figure 3-1 and plug in the Zapi Handset connector.

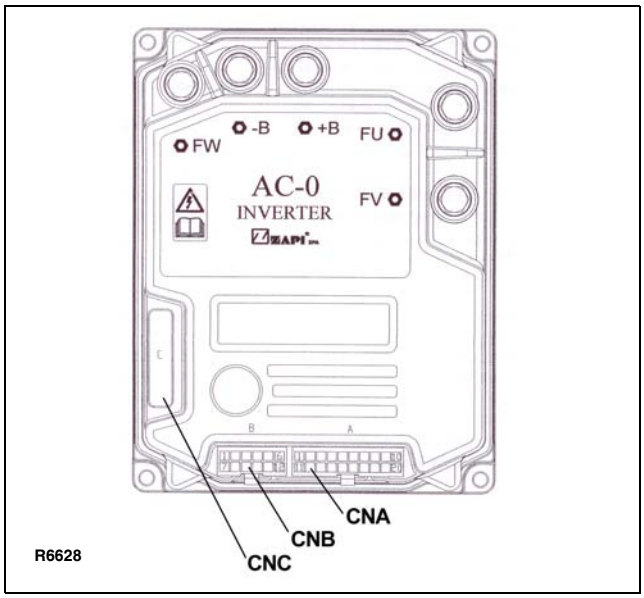


Figure 3-1 Zapi Controller

3-2.2. Fault Detection.

3-2.2.1. General

The microprocessor in the controller records the last five Alarms that have occurred. Items remembered relative to each Alarm are:

- The alarm code
- The times that each alarm occurs consecutively
- The Hour Meter value when the latest event of every alarm occurred

This function permits a deeper diagnosis of problems as the recent history can be revisited.

3-2.2.2. Logbook Access

To view the alarm logbook proceed as follows:

1. Connect the Zapi Handset, refer to paragraph 3-2.1.
2. Press the ENTER button (3, Figure 3-2) to enter the MAIN MENU.
3. Press the ROLL down button (2) or the ROLL up button (1) until ALARMS menu appears on the display.
4. Press the ENTER button (3) to enter the ALARMS menu.
5. Press the ROLL up button (1) to view the alarms. Pressing the ROLL down button (2) returns to the most recent alarm.

   If an alarm has not occurred, the display will show NONE.
6. Press the OUT button (4) to exit the alarms.

   The display will ask: “CLEAR LOGBOOK?” Press the ENTER button (3) for Yes or OUT button (4) for No.
7. Press the OUT button (4) again to return to Opening Zapi Menu.

3-2.3. Testing Truck Operation.

The Zapi Handset can be used to test certain truck operations as follows:

1. Connect the Zapi Handset, refer to paragraph 3-2.1.
2. Press the ENTER button (3, Figure 3-2) to enter the MAIN MENU.
3. Press the ROLL down button (2) or the ROLL up button (1) to find the TESTER display.
4. Press the ENTER button (3) to enter the TESTER function.

   The first switch to be tested is shown on the display.
5. To verify various switch functions, press the ROLL down button (2) or the ROLL up button (1) to locate the switch on the display and then operate that function to verify operation
6. Press the OUT button (6) to exit the tests. The display will show TESTER.
7. Press the OUT button (6) again to return to Opening Zapi Menu.

3-2.4. Factory Settings

Parameter setting are not to be changed from factory settings. To verify the parameter settings proceed as follows and refer to Table 3-2:

1. Connect the Zapi Handset, refer to paragraph 3-2.1.
2. Press the ENTER button (3, Figure 3-2) to enter the MAIN MENU.
3. Press the ROLL down button (1) or the ROLL up button (2) to find the PARAMETER CHANGE display.
4. Press the ENTER button (3) to view the parameters.

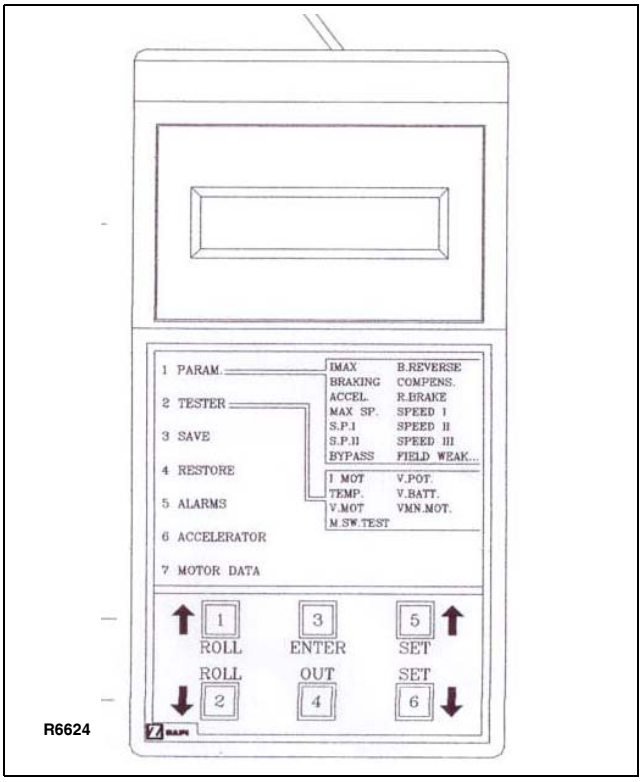


Figure 3-2 Zapi Handset

5. Press the ROLL down button (2) or the ROLL up button (1) to find the parameter to be checked.
6. Press the SET up button (5) or the SET down button (6) until the factory setting is reached.
7. Press the OUT button (4) to exit the parameters. The confirmation request appears.
8. Press ENTER button (3) to accept the changes or press OUT button (6) to refuse the changes.
9. Press the OUT button (6) again to return to Opening Zapi Menu.

Table 3-2 Parameter Adjustments

Parameter	Factory Setting
ACCELER. DELAY	LEVEL = 4
RELEASE BRAKING	LEVEL = 5
INVERS. BRAKING	LEVEL = 7
PEDAL BRAKING	LEVEL = 9
SPEED LIMIT BRK	LEVEL = 2
BRAKE CUTBACK	LEVEL = 5
MAX SPEED FORW	107 Hz
MAX SPEED BACK	107 Hz
CUTBACK SPEED	70%
CUTBACK SPEED 2	50%
CUTBACK SPEED 3	20%
CURVE CUTBACK	60%
DEADMAN BRAKING	7
HS (hard-soft) CUTBACK	100%
FREQUENCY CREEP	1.20 Hz
MAXIMUM CURRENT	9
INCHING SPEED	0 Hz
INCHING TIME	0%
AUXILIARY TIME	0.4

Table 3-3 Troubleshooting Chart (Traction/Lift Controller)

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
1	WRONG CONFIG	This alarm occurs the first time a controller is switched on when the non volatile eeprom memory is not initialized yet. Then it is necessary to specify if the controller is AC-0 or AC-1 type (see AC TYPE 0 in the hidden hardware setting Zapi menu). If the alarm is present, by switching off the key the AC TYPE 0 setting will be automatically turned On (and the controller is specified to be an AC-0). The AC TYPE 0 setting can be changed only when a WRONG CONFIG alarm is present. If it is not present, it is necessary to clear the eeprom memory if the WRONG CONFIG alarm occurs.	The AC TYPE 0 setting must be factory adjusted and so the alarm should never happen. So ask for the assistance of a Big Lift LLC Service Representative when this alarm occurs.
8	WATCH DOG	This alarm occurs when the embedded WATCH DOG protection is not able to either cut off the power stage when not triggered or it is not able to activate the power stage when triggered.	Verify the motor is connected and there is continuity of the three motor phases. If the alarm occurs permanently, replace the controller.
16	AUX OUPUT KO	This alarm occurs when the feedforward PWM generated by the controller to supply the Electromechanical Brake are not matched in between. The diagnosis is made only when the Tiller Switch is active.	Replace the controller because the driver of the Electromechanical Brake has a failure.
13	EEPROM KO	This alarm occurs due to a HW or SW defect of the non-volatile embedded memory supporting the controller regulations.	Try to execute a CLEAR EEPROM operation. This consists of entering ALARMS in the MAIN MENU. Push at the same time the two right side buttons to enter the hidden ZAPI MENU. Roll up and down until the CLEAR EEPROM appears on the handset display. Push the Enter Button two times. Switch the key off and on to check the result. If the alarm occurs permanently, replace the controller.
17	LOGIC FAILURE #3	This alarm occurs when the circuit to limit via HW the current peak in the controller is active.	If is probably a power failure or a logic failure. If the alarm occurs permanently, replace the controller.
18	LOGIC FAILURE #2	This alarm occurs when the circuit, to compensate for the dead times of the sine waves, is failed.	Replace the Controller.

Table 3-3 Troubleshooting Chart (Traction/Lift Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
19	LOGIC FAILURE #1	This alarm signals that an overvoltage/ undervoltage protection operation has occurred.	Normally the overvoltage occurs due to the regenerative braking energy increasing the battery voltage; the under voltage of the logic supply, can be due to a depletion in the key voltage. First, check for the failure mode. Then contact the Big Lift LLC Service Representative to look for a countermeasure. This alarm may occur for a HW failure. Replace the Controller.
30	VMN LOW	Before the main contactor is turned on, the SW turns on the top side Power Mosfets and expects the phase V voltage to increase toward the rail capacitor value. If the phase V does not increase, this alarm occurs. The alarm may occur when the initial diagnosis is overcome, and the main contractor is expected to be closed. Then when the operator tries to move the vehicle, but the +Batt terminal of the controller is lower voltage than the Battery voltage, this alarm occurs (Main Contractor has lost the contact although it is closed).	If the problem occurs before the Main Contactor closes, a power failure occurred (e.g. a bottom side Power Mosfet short circuited or a top side Power Mosfet is broken) or a Logic Failure occurred in the controller. If the problem occurs when the operator turns a moving vehicle, the problem is the Battery positive is not connected to the +Batt terminal of the controller (check the continuity of the main contactor). If the problem occurs permanently, replace the controller.
31	VMN HIGH	Before the main contactor is turned on, the SW turns on the bottom side Power Mosfets and expects the phase V voltage to fall to GND value. If the phase V remains high, this alarm occurs.	There are two possibilities: 1. A motor phase is not connected to the controller or broken. 2. A Power Failure (e.g. a Bottom side Power Mosfet opened) or a Logic Failure occurred in the controller. In this case, replace the controller.
37	CONTACTOR CLOSED	The controller check if the MV contact is closed when the coil isn't driven, trying to discharge the capacitor bank. If they don't discharge, the fault condition is entered.	It is suggested to check the contactor, if it is mechanically stuck or burnt closed.
38	CINTACTOR OPEN	The main contactor coil has been driven by the logic board, but the contactor does not close.	There are two possibilities: 1. The wires to the coil are interrupted or not well connected. 2. The contact of the contactor is defective.

Table 3-3 Troubleshooting Chart (Traction/Lift Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
49	I=0 EVER	This test is carried out when the motor is running, and it verifies that the current feedback sensor is not constantly stuck at 0.	If everything is OK for the motor, the problem could be in the related circuit.
55	PROGRAM LIFT LEVER	The SW continuously matches the potentiometer connected to CNA#18 with the Main Lifting/Lowering pair request (CNB# and CNB#8). When the vehicle TYPE is set 2, the alarm occur in the following conditions: 1. If both the Main Lifting and Main Lowering request are disactive and the potentiometer voltage is higher than 60 mV over either the MIN LIFT or the MIN LOWER setting. 2. If the Main Lifting request is active and the potentiometer voltage is higher than 200 mV over the MAX LIFT setting. 3. If the Main Lowering request is active and the potentiometer voltage is higher than 200 mV over the MAX LOWER setting. 4. If the MIN LIFT setting is higher than the MAX LIFT setting. When the vehicle TYPE is set at 3, the alarm occurs in the following conditions: 1. If the Main Lowering request is higher that the MIN LOWER. 2. If the MIN LOWER setting is higher that the MAX LOWER	Check the Main Lifting/Lowering pair (CNB#8 and CNB#9) and the voltage on the potentiometer connected to CNA#18. (Use the readings LIFTING SWITCH, DESCENT SWITCH and LIFTING CONTROL in the TESTER to facilitate the troubleshooting).
53	STBY I HIGH	This diagnosis is executed only when the main contactor is opened and asked to be closed (e.g. at key on or when the main contactor is opened and a new motion request turn active). Then the outputs of the Current amplifiers must be in a narrow window close to 2.5 Vdc (from 2.26 V to 2.74 V). Otherwise this STBY I HIGH alarm occurs.	If the alarm occurs permanently, replace the controller.

Table 3-3 Troubleshooting Chart (Traction/Lift Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
60	CAPACITOR CHARGE	In working condition, a resistance connected between the key and the Rail Capacitors, keeps the Rail Capacitors charged before the Main Contactor closes. When the voltage on the Rail Capacitors (measured on the phase V) is low and does not increase when the main contactor is opened, this alarm occurs.	The possibilities: 1. Another device, connected in parallel with the Rail Capacitors, has a failure. 2. At least a motor phase is not connected to the controller or broken. 3. A Power failure or a Logic Failure occurred in the controller. Replace the controller.
61	HIGH TEMPERATURE	This alarm occurs when the temperature of the base plate is higher than 78°C up to 100°C. At 100°C the current is limited to 0 Amps.	Improve the air cooling of the controller.
65	MOTOR TEMPERAT	This is just a waning with not effect of the vehicle performance. It occurs when the temperature of the motor winding overtakes the MOTOR OVERTEMP setting.	Check the thermal sensor inside the motor (use the MOTOR TEMPERATURE reading in the TESTER menu). If the senor is OK, improve the air cooling of the motor.
67	CAN BUS KO	This alarm occurs if the controller does not receive any message from the CAN Bus line.	1. First check the wiring. 2. If OK, try to disconnect one to one the module connected to the CAN Bus and check if this alarm disappears. 3. Replace the controller.
70	ENCODER ERROR	Two consecutive readings of the encoder speed are too drastic. It is not possible for the encoder to change its speed a lot in a short period. An encoder failure has occurred (e.g. one or two channels of the encoder are corrupted or disconnected.	Check both the electric and the mechanical encoder functionality. Frequently one of the two sensor bearing rings slips inside its seat causing this alarm. Also, the electronic noise on the sensor bearing can be a cause of the alarm.
71	HANDBRAKE	This alarm occurs when the operator tries to travel with the emergency brake active.	Check the emergency brake switch and its wiring to CNA#13 The emergency brake switch must be connected between CAN#13 and GND. When it is closed to GND, the emergency brake is considered active. A failure in the logic is possible too. Replace the controller.
73	THERMIC SENS KO	When the output of he thermal sensor on the base plate is higher than 4.95V or lower than 0.1V, the sensor is assumed defective and this alarm occurs.	It is necessary to replace the controller.

Table 3-3 Troubleshooting Chart (Traction/Lift Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
74	DRIVER SHORTED	This alarm occurs when the voltage on the main contactor is higher than expected. This means that the main contactor coil has a high voltage although it is not supplied.	Replace the controller.
75	CONTACTOR DRIVER	This alarm occurs when the voltage on the main contactor is smaller than expected. The main contactor has a null voltage when supplied.	Check coils of the main contactor (CNA#1) is not short circuited. If not, replace the controller.
76	COIL SHORTED	This alarm occurs when there is an overload on one of the following connections: CNA#1, CNA#3, CNA#4 or CNA#6. Typically the problem is due to a short circuit of one of the coils connected to these outputs. After the overload has been removed, the alarm automatically resets by releasing and then enabling a travel demand.	Check the coils of main contactor (CNA#1), electromechanical brake (CNA#3), pump contactor (CNA#4), and aux valve (CNA#6).
78	VACC NOT OK	A test is made at key-on and after 20 sec that both the travel demands are disactive. This alarm occurs if the ACCELERATOR reading in the TESTER menu is higher than 1.0V (meaning the wiper of the potentiometer is higher than 2Vdc).	Check the mechanical calibration and the functionality of the potentiometer.
80	FORW+BACK	This alarm occurs when both the travel demands (Fwd and Bwd) are active at the same time.	Check the wiring of the Fwd and Bwd travel demand inputs (use the readings in the TESTER to facilitate the troubleshooting). A failure in the logic is possible too. When you verified the travel demand switches are working properly and the wiring is right, replace the controller.
79	INNCORECT START	This is just a warning for an incorrect starting sequence.	The possible reasons for this alarm are (use the readings in the TESTER to facilitate the troubleshooting): 1. A travel demand active at key on 2. The tiller switch active at key on 3. The H&S input active at key on 4. The Quick inversion active at key on A failure in the logic is possible too. When all of the above conditions checked OK, replace the controller.

Table 3-3 Troubleshooting Chart (Traction/Lift Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
86	PEDAL WIRE KO	The SW continuously checks for the connection of the two supply ends of the potentiometer in the accelerator. The test consists of the voltage drop on a sense diode, connected between MPOT (CNB#11) and GND and cascaded with the potentiometer: if the potentiometer gets disconnected on PPOT or NPOT, no current flow in this sense diode and the voltage on the MPOT connection collapses down. When the NPOT voltage is less than 0.3V this alarm occurs. This alarm also occurs when the NPOT voltage is higher than 2 VDC (to detect the condition of a broken sense diode).	Check the voltage on NPOT (CNB#11) and the potentiometer connections.
90	LIFT+LOWER	This alarm occurs when both a lifting request and a lowering request are active at the same time.	If the MDI-PRC is absent, check only the of the main lifting/lowering pair (CNB#8 and CNB#9); if the MDI-PRC is present check the wiring of the aux lift/lowering pair (CNA#14 and CNA#15). (Use the readings in the TESTER to facilitate the troubleshooting). A failure in the logic is also possible. When you have verified the lifting/lowering switches and the wiring is right, replace the controller.
97	INPUT ERROR #1	This alarm occurs when the PLD device has a failure. The PLD device is used for both, the Passive Emergency Cell and a Multiplexer on the main lifting/lowering requests. This Multiplexer exists the lifting and the not lifting level on two distinct addresses. When the lifting and the not lifting outputs have the same logic level, the PLD device has failed and this alarm occurs.	Replace the controller.

Table 3-3 Troubleshooting Chart (Traction/Lift Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
91	LIFT LOW ACTIVE	This is just a warning when a lifting/lowering request is active at key-on.	The possible reasons for this alarm are (use the readings in the TESTER to facilitate the troubleshooting): • When MDI-PRC is absent: at least on between LIFTING SWITCH (CNB#9) or DESCENT SWITCH (CNB#8) active at key on. • When vehicle TYPE is Level=1: at lease one between: LIFTING SWITCH (CNB#9) or DESCENT SWICH (CNB#8), DIGITAL INPUT#1 (CNA#14) or DIGITAL INPUT#2 (CNA#15) active at key on. • When vehicle TYPE is Level=2: at lease one between: LIFTING SWITCH (CNB#9) or DESCENT SWICH (CNB#8) active at key on. • When vehicle TYPE is Level=3: at least one between LIFTING SWITCH (CNB#9) or DECENT SWITCH (CNB#8) active at key-on. A failure in the logic is possible too. When all of he above conditions were checked and nothing was found, replace the controller.
93	WRONG SET BAT.	When the key is turned ON, the controller checks the battery voltage and verifies it is within a window around the nominal value.	Replace the battery.
94	CURRENT SENS KO	This alarm occurs when the procedure for the maximum current set-up is in progress.	The maximum current set-up is factory adjusted and so this alarm should never happen. So ask for the assistance of a Big Lift LLC Service Representative when this alarm occurs.
99	CHECK UP NEEDED	This is just a warning to perform programmed maintenance.	It is just enough to turn the CHECK UP DONE option to level ON after the maintenance is executed.

Table 3-4 Troubleshooting Chart (EPS-AC0 Controller)

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
6	SERIAL ERR #1	Main uC and Slave uC communicate via a local serial interface. This alarm occurs when the slave uC does not receive the communication from the main uC through the serial interface.	Replace the controller.
13	EEPROM KO	This occurs if a test to write and read one location in EEPROM fails. The SW expects to read the written value. It can also occur when the hour counter gives different values between the three redundant location in which it is recorded. It also occurs when the busy bit of the EEPROM does not rise within 12 msec.	Replace the controller.
16	LOGIC FAILUREE #4	This alarm occurs in the rest state if the output of the voltage amplifier of the phase Vw-Vv have a drift larger than ±0.25 V.	Replace the controller.
17	LOGIC FAILURE #3	This alarm occurs in the rest state if the output of the voltage amplifier of phase Vu-Vw have a drift larger than ±0.25 V.	Replace the controller.
18	LOGIC FAILURE #2	This alarm occurs when the real voltage between phases X and V of the motor is different from the desired.	Replace the controller.
19	LOGIC FAILURE #1	This alarm occurs when the real voltage between phases W and U of the motor is different from the desired.	Replace the controller.
32	VMN NOT OK	This alarm occurs in the initial rest state after key on if the output of the motor voltage amplifiers are not in the window from 2.2 to 2.8 Vdc.	Replace the controller.
48	MAIN CONT. OPEN	This alarm occurs only when the setting CAN BUS is PRESENT. Then the EPS-AC0 waits for a via CAN information that the traction controller has closed the main contactor. If this information lacks more than 1.5 secs, this alarm occurs.	Find, on the traction controller, the reason for keeping the main contactor open.
53	STBY I HIGH	This alarm occurs two ways: 1. In the initial rest state after key on, if the outputs of the current amplifiers are not comprised in the window 2.2 to 2.8 Vdc. 2. After the initial diagnosis this alarm occurs when the output of the current amplifiers at rest have a drift larger than ±0.15 V.	Replace the controller.

Table 3-4 Troubleshooting Chart (EPS-AC0 Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
61	HIGH TEMPERATURE	This alarm occurs if the temperature od the controller base plate overtakes 75 degrees.	Improve the cooling of he controller; otherwise replace the controller.
65	MOTOR TEMPERATURE	This alarm occurs only when DIAG MOTOR TEMP is on and the thermal sensor inside the motor measures a temperature higher than 150 degrees. It also occurs when trying to acquire the motor resistance with a temperature in the motor higher than 150 degrees (still with DIAG MOTOR TEMP to ON).	3. Check that the thermal sensor in the motor is working correctly. If it is, improve the cooling of the motor.
70	HIGH CURRECT	This alarm occurs if the circuit to limit via hardware the current in the motor is either always active at key on or repeatedly active when the motor is turning.	Check that the motor is suited to work with the EPS-AC0 (not oversized). Otherwise, replace the controller.
71	POWER FAILURE #3	This alarm occurs when the current in the phase V of the motor is zero and the motor is commanded for moving.	Check that the power fuse is OK. Check the battery positive arrives to the controller. Check the continuity of the wire in the [phase V of the motor. Otherwise replace the controller.
72	POWER FAILURE #2	This alarm occurs when the current in the phase U of the motor is zero and the motor is commanded for moving.	Check that the power is OK. Check the battery positive arrives to the controller. Check the continuity of the wire in the phase U of the motor. Otherwise replace the controller.
73	POWER FAILURE #1	This alarm occurs when the current in the phase W of the motor is zero and the motor is commanded for moving.	Check that the power is OK. Check the battery positive arrives to the controller. Check the continuity of the wire in the phase W of the motor. Otherwise replace the controller.
83	BAD ENCODER SIGN	This alarm occurs in applications with toggle switches when the applied frequency (FREQUENCY) and the motor speed (ENC SPEED) have opposite sign.	Swap in between the two encoder channels (CNB#7 with CNB#8).
84	STEER SEBSOR KO	This alarm occurs if the command potentiometer (CPOC1 on CNA#9 or CPOC2 on CNA#8) changes with a jerk larger than MAX SP SLOPE. This alarm is used to catch a discontinuity in the voltages of the command potentiometer.	Change the twin pot.
85	STEER HAZARD	This is just a warning to inform that the steering controller is limiting the angle in the steering direction. No speed reduction occurs on the traction	

Table 3-4 Troubleshooting Chart (EPS-AC0 Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
218	CLOCK PAL NOT OK	The main uC send an analog signal towards the salve uC to reset the slave uC on demand. When the slave uC detects this analog signal external to a window from 2.2 to 2.8 and not in the range to generate the reset on demand, the slave uC raises this alarm.	Replace the controller.
99	INPUT ERROR #1	This alarm occurs when the voltage on CNA#4 (lower potential terminal of the safety contacts) is higher than 12V.	When the safety contacts are open, the voltage on CNA#4 is expected to be close to 0 Vdc. Only a harness mistake may connect NK1 to a higher than 12 V.
212	MICRO SLAVE #8	This alarm occurs when the encoder counting of the main uC is not matched with the encoder counting of the slave uC.	Replace the controller.
219	STEPER MOTORE MISM	This alarm occurs if the frequency and the amplitude of the voltages from the stepper motor lines are mismatched. In normal condition when the amplitude of the stepper motor lines increase, the frequency of the stepper motor lines must increase too.	Replace the controller.
220	MOTOR LOCKED	This alarm occurs if the current in the steering motor stays close to the maximum current longer than 1 sec.	Search for a mechanical problem locking the motor. To make easier fault detecting, set DEBUG OUTPUT to level 11.
221	MICRO SLAVE #4	This alarm occurs in one of the following: (Open loop application only) If the slave uC detects the stator voltage phasor rotates in the opposite direction respect to the sign of the stepper motor speed. (Closed loop application only) if the slave uC detects the stator voltage phasor rotates in the opposite direction respect to the commanded position.	Replace the controller.

Table 3-4 Troubleshooting Chart (EPS-AC0 Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
222	FB POT LOCKED	In application with a feedback potentiometer, this alarm occurs if the feedback potentiometer (CPOT on CNB#6) does not change (or changes in the opposite direction) its value even if commanded to change. In application with toggle switches with ENCODER CONTROL to off, this alarm occurs if the feedback encoder counting does not change its value even if commanded to change.	In application with the feedback with the feedback potentiometrer, verify the feedback potentiometer is not mechanically loosened. Check there is not a mechanical block of the steered wheel. Be sure the wiper has not reached its own electrical limit because of too much angle of the steered wheel. Besides, this alarm may occur at the installation when the motor rotates in the wrong direction from the command.
223	JERKING FB POT	This alarm occur if the feedback potentiometrer (CPOT on CNB#6) changes with a jerk larger than 0.3 V in 16 msec. This alarm is used to catch a discontinuity in the voltages of the feedback potentiometer.	Change the feedback potentiometer.
225	CURRENT GAIN	This alarm occurs when the parameters to compensate for the gain of the current amplifiers (ADJUSTMENT #03 and ADJUSTMENT #04) have the default values.	Replace the controller.
226	NO SYNC	Every 16 msec, inside the code cycle, the main uC rises and then lowers an input for the slave uC (SYNC). When the slave uC detects no edge for more than 100 msec on this input, this alarm occurs. This is just a watch dog function: when the main uC does not execute the code cycle it does not update the SYNC signal and the slave uC cuts off the steer and traction.	Replace the controller.
227	SLAVE COM. ERROR	Main uC and Slave uC communicate via a local serial interface. This alarm occurs when the main uC does not receive the communication from the slave uC through this serial interface.	Replace the controller.
237	WAITING DATA	This warning occurs only if CAN BUS is PRESENT. At the eps-ac0 asks to the traction controller to send a list of parameters via CAN Bus. From the request until the parameters are correctly relieved, this warning occurs. The steer is not activated yet, and the safety relays remain open when this warning is present.	

Table 3-4 Troubleshooting Chart (EPS-AC0 Controller) - Continued

ERROR	ERROR TEXT	POSSIBLE CAUSE	FAULT CLEARANCE
228	POSITION ERROR	This alarm occurs for an error in the redundant test o the feedback sensors.	Check the potentiometer connected to CNB#6 is working correctly. If toggle switches are connected to CNA#2 and CNA#3, verify that they are working correctly and setting AUX FUNCTION 11 is correct. Also the sensor bearing in the motor (encoder). The sensor bearing has two rings: one connected to the rotor safety; the other is connected to the motor frame. Check these two rings are strictly connected to their structure without slip.
238	EPS NOT ALIGNED	This is a real alarm thaT cut off the traction. It occurs at the initial alignment if the straight-ahead condition is not matched within 6 sec. Throughout this 6 secs delay, the steer is not activated yet, the safety relays are open and the traction is stopped.	
239	WAITING FOR TRAC	At key-on the eps-ac0 needs an assent from the traction controller to close the safety contacts and to turn on operational mode. Until this assent is not relieved, this warning occurs. The steer is not activated yet and the safety relays remain open when this warning is present.	
241	ENCODER ERROR	It occur when ENCODER CONTROL is set ON and the real frequency does not pursuit the commanded frequency.	This condition occurs several times due to either, a mismatch between the Encoder resolution used in the SW and the real encoder resolution, or a wrong connection between th4e two encoder channels. In this latest case exchange in between the two encoder channels.
242	Q LINE SENSOR KO	This alarm occurs when the mean voltage on the Quadrature line of the stepper motor (connection CNA#8) is not null: the voltage on every stepper motor line is a sine wave with null mean voltage.	Check continuity of the stepper motor connections. In particular the resistance between CNA#8 and the minus battery (with the stepper motor at rest) is expected to be very low (close to 30 ohms).
243	D LINE SENSOR KO	This alarm occurs when the mean voltage on the Direct line of the stepper motor (connection CNA#9) is not null: the voltage on every stepper motor line is a sine wave with null mean voltage.	Check continuity of the stepper motor connections. In particular the resistance between CNA#9 and the minus battery (with the stepper motor at rest) is expected to be very low (close to 30 ohms)

245	DATA ACQUISITION	This alarm occurs when acquiring the motor resistance or when adjusting the parameters to compensate for the gain of the current amplifiers (maximum current factory adjusted).	Recycle the key.
244	GAIN EEPROM KO	The parameter to compensate for the gain of the current amplifiers (ADJUSTMENT #03 and ADJUSTMENT #4) are recorded in a non-volatile memory (eeprom) with a redundant handling. In fact every adjustment is recorded in three eeprom locations. If the values in these three locations are different, this alarm occurs.	Replace the controller.
246	MICRO SLAVE KO	In stepper motor application, this alarm occurs if the main uC is detecting a direction of the stepper motor not matched with the one that the slave uC is detecting. In the closed loop application, this alarm occurs if the main uC is detecting a direction of the steering error not matched with the one that the slave uC is detecting. Furthermore, this alarm occurs if the main uC is detecting no steering limitation while the slave uC is detecting a steering limitation.	Replace the controller.
247	CAN BUS KO	This alarm occurs only when the setting CAN BUS is PRESRENT. Then the eps-ac0 must receive the event messages from the traction controller. If these messages lack more than about 1 sec, this alarm occurs.	Check the CAN Bus communication system and analyze the frames from the traction controller to the steer controllers.
248	S.P OUT OF RANGE	This alarm occurs for a fault on the command potentiometer (CPOC1 on CNA#9, CPOC2 on CNA#8). When a single command pot is chosen, the alarm occurs if its wiper (CPOC1) range is from 0.8 Vdc to 4.2 Vdc. When the twin pot is chosen, the alarm occurs if the sum of the two wiper voltages (CPOC1+CPOC2) range is from 4.5 Vdc to 5.5 Vdc.	Check the connections of the potentiometer. This alarm occurs when one connection of the command potentiometer is broken.
249	F.B OUT OF RANGE	This alarm occurs for a fault on the feedback potentiometer (CPOT on CNB#6). It occurs if CPOT exits the range of 0.3 Vdc to 4.7 Vdc.	Check the connections of the feedback potentiometer. This alarm occurs when one connection of the feedback potentiometer is broken.

250	MICRO SLAVE	It occurs when the information on the status bus between the main uC and the slave uC is frozen to the 0xFF value (the slave uC does not update the status bus configuration).	Replace the controller.
251	KM OPEN	This alarm occurs if the slave uC detects the safety contact, of the main uC, is open when expected to be closed.	Replace the controller.
252	KS OPEN	This alarm occurs if the main uC detects the safety contact, of the slave uC, is open when expected to be closed.	Replace the controller.
253	KM CLOSED	This alarm occurs at key on if the slave uC detects the safety contact, of the main uC, is closed prior to being commanded.	This alarm occurs if the connection CNA#5 (K1) is around a voltage of 12 Vdc when switching on the key. In fact, when the safety contacts are open, K1 is expected to be connected to a battery voltage (not 12 V). Search for a harness problem or replace the controller.
254	KS CLOSED	This alarm occurs if the main uC detects the safety contact, of the slave uC to be closed prior to being commanded.	This alarm occurs if the connection CNA#4 (NK1) is around a voltage of 12 Vdc when switching on the key. In fact, when the safety contacts are open to a minus battery voltage (not 12 V). Search for a harness problem or replace the controller.

NOTES

SECTION 4
STEERING SYSTEM

4-1. CONTROL ARM

4-1.1. Steering Control Removal.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove four screws (24, Figure 4-1) and two screws (26). Separate lower cover (23) and upper cover (12).

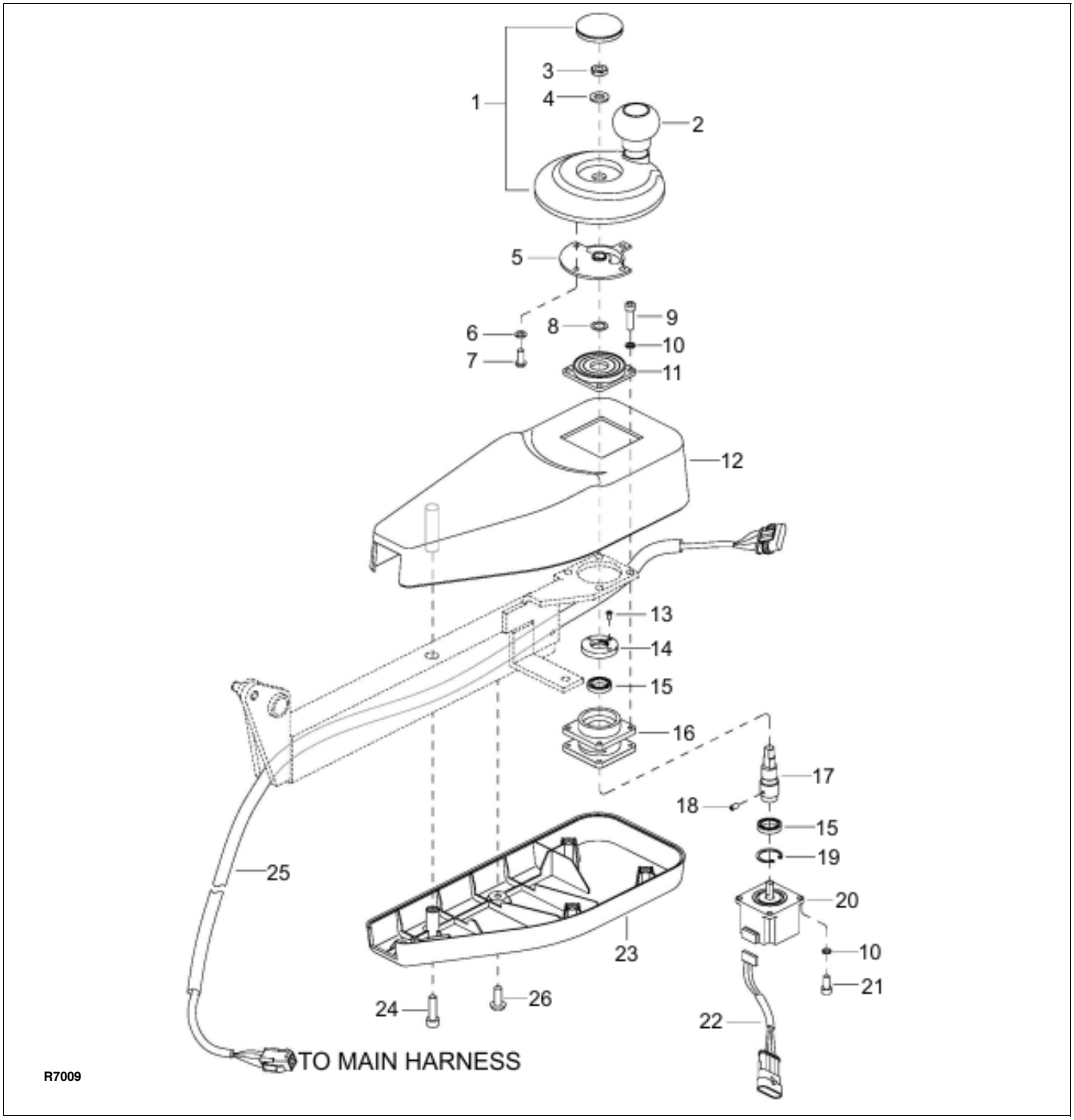


Figure 4-1 Control Arm (Left)

3. Disconnect harness (22) from harness (25) and potentiometer (20).
4. Remove button plug, nut (3), lock washer (4), handle (2) and shims (8).
5. Remove four screws (7), four lock washers (6) and bracket (5) from handle (2).
6. Remove four screws (9), four lock washers (10) and damper (11).
7. Remove potentiometer (20) from control arm.
8. Remove screw (13), nut (14) and upper bearing (15)
9. Remove four screws (21), four lock washers (10) and remove potentiometer (20) from bearing block (16).
10. Loosen screw (18) and remove shaft (17) from potentiometer (20).
11. Remove snap ring (19) and lower bearing (15) from shaft (17).

4-1.2. Steering Control Installation.

1. Install lower bearing (15, Figure 4-1) and snap ring (19) on shaft (17).
2. Install shaft (17) on potentiometer (20) and secure with screw (18).
3. Position potentiometer (20) on bearing block (16) and secure with four screws (21), and four lock washers (10).
4. Install upper bearing (15), nut (14) and screw (13).
5. Position potentiometer (20) on control arm.
6. Install damper (11) and secure with four screws (9) and four lock washers (10).
7. Install bracket (5) on handle (2) and secure with four screws (7) and four lock washers (6).
8. Install shims (8) and handle (2), engaging bracket (5) with damper (11).
9. Secure handle (2) with nut (3) and lock washer (4) and install the button plug.
10. Reconnect harness (22) to harness (25) and potentiometer (20).
11. Install lower cover (23) and upper cover (12) and secure with four screws (24) and two screws (26).
12. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

4-2. COMPARTMENT COVER

4-2.1. Cover Removal.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove two screws (1, Figure 4-2).
3. Carefully lift cover (2) up and off the truck.

4-2.2. Cover Installation.

1. Carefully position cover (2, Figure 4-2) on the truck.
2. Install two screws (1).
3. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

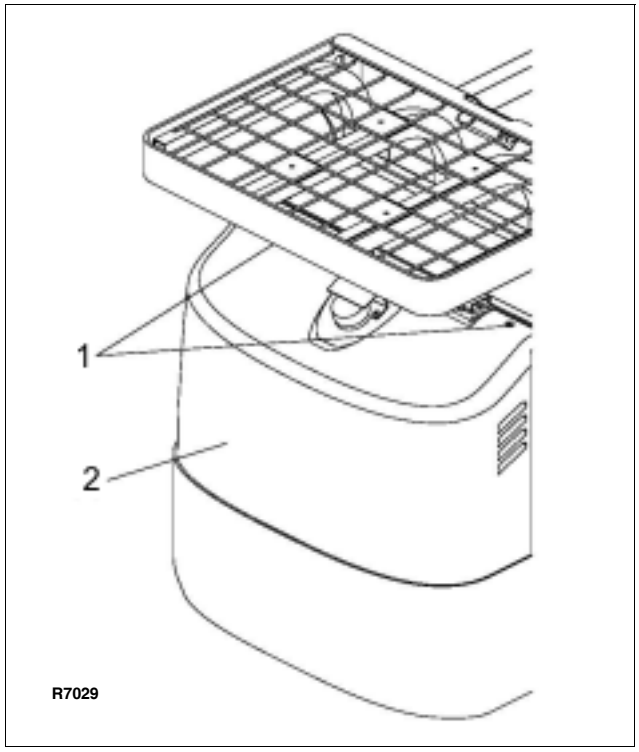


Figure 4-2 Compartment Cover

4-3. STEERING MOTOR

4-3.1. Motor Removal.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.1.

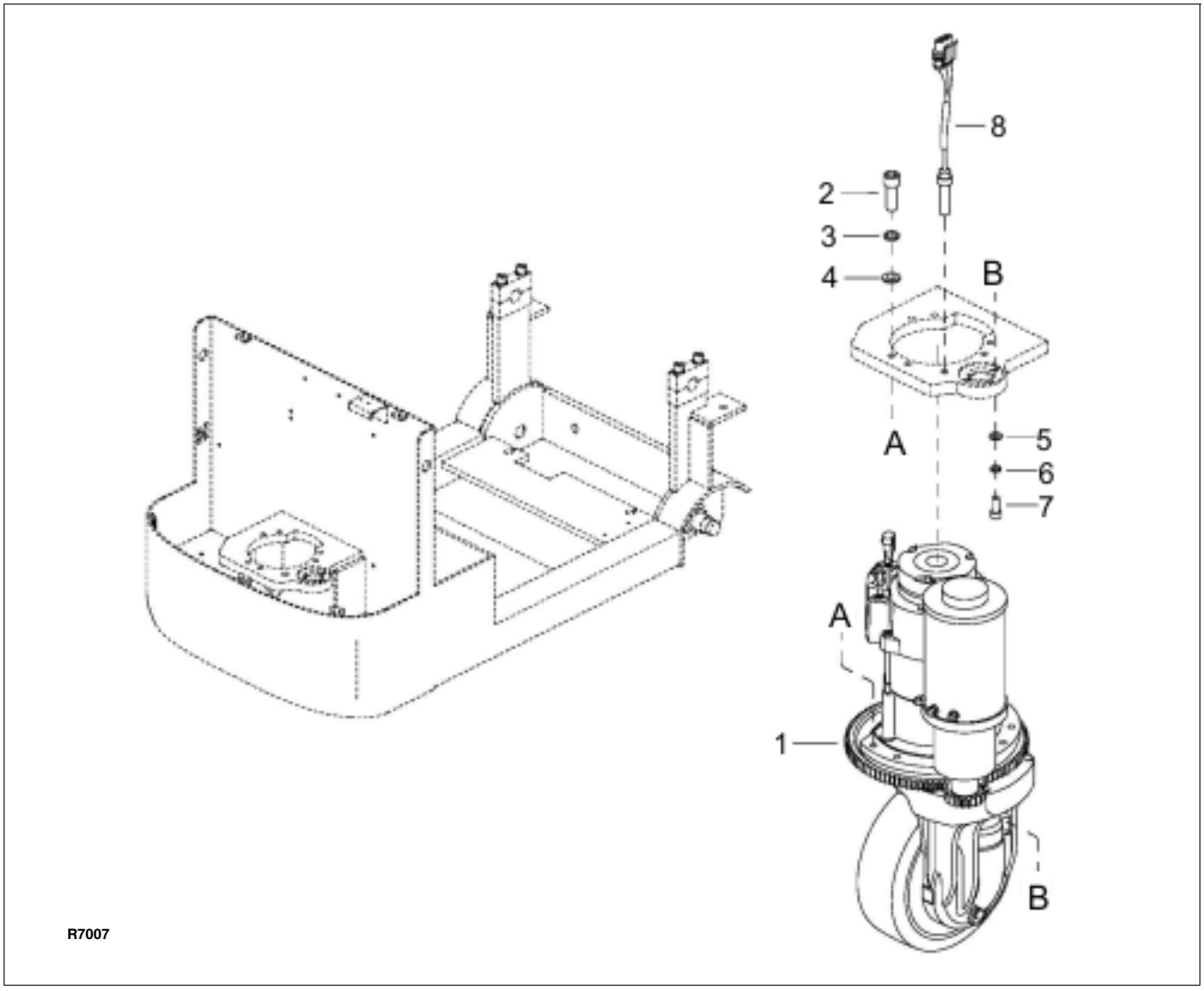


Figure 4-3 Drive System

3. Disconnect harness (1, Figure 11-12) and cables (6, 7 and 8, Figure 11-13) from the steering motor.
4. Remove three screws (7, Figure 4-3) three lock washers (6) and three flat washers (5) from under the vehicle.
5. Remove the steering motor from the top of the vehicle.

4-3.2. Motor Installation.

1. Position the steering motor in the top of the motor compartment.
2. Secure the motor with two screws (7, Figure 4-3) two lock washers (6) and two flat washers (5) from under the vehicle.
3. Reconnect harness (1, Figure 11-12) and cables (6, 7 and 8, Figure 11-13) to the steering motor.
4. Install the compartment cover as described in paragraph 4-2.2.
5. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

NOTES

SECTION 5
BRAKE SERVICING

5-1. BRAKES.

The brake system consists of a drive motor mounted brake. This brake is spring applied and electrically released.

5-1.1. Brake Assembly Replacement

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Block load wheels.
3. Remove the compartment cover as described in paragraph 4-2.1.
4. Disconnect electric brake from harness (1, Figure 11-12).
5. Remove the mounting screws and brake (1, Figure 5-1).
6. Place the new brake into position and secure with the mounting screws.
7. Reconnect electric brake to harness (1, Figure 11-12).
8. Remove load wheel blocks and check operation.
9. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

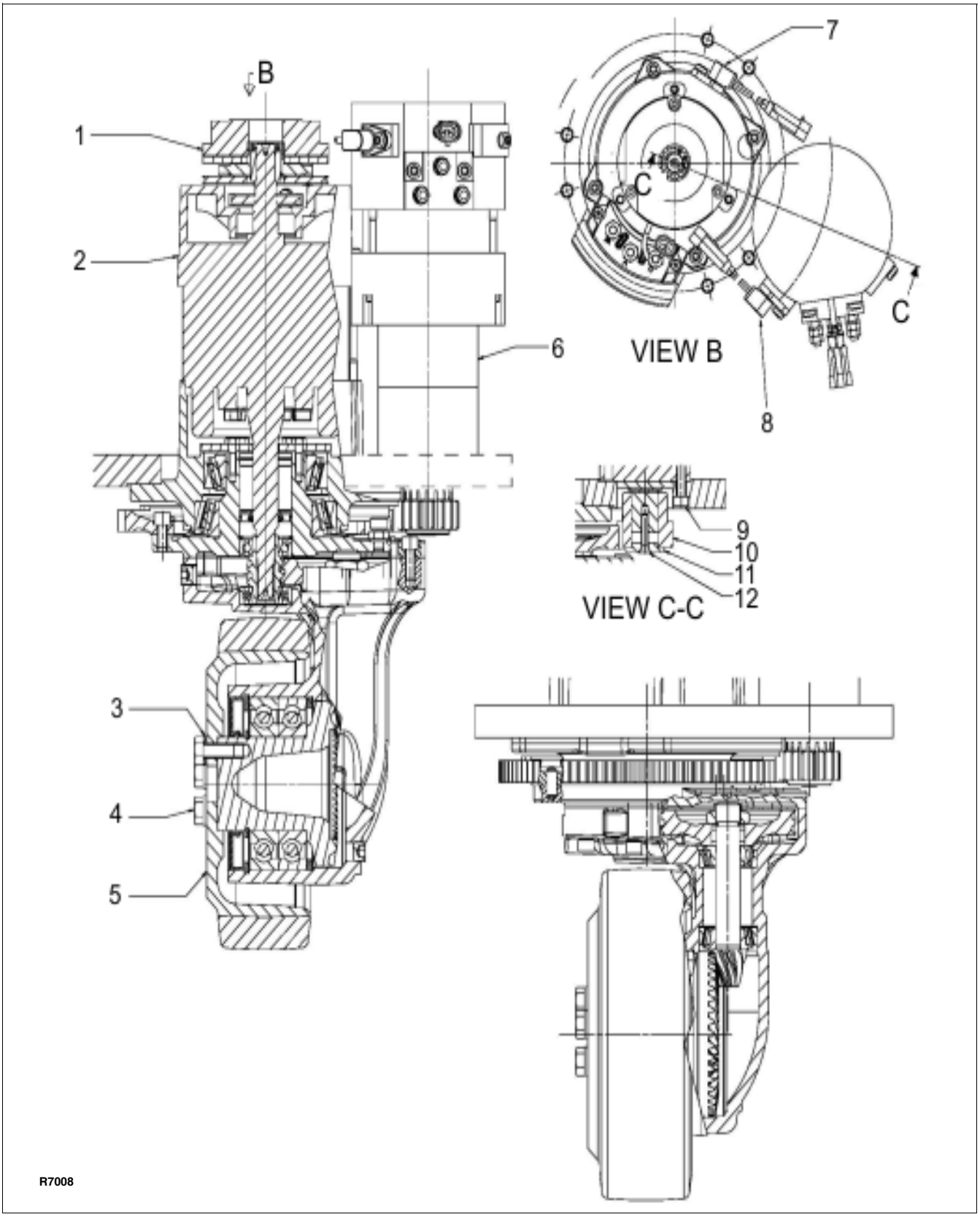


Figure 5-1 Drive Assembly

SECTION 6
TRANSMISSION, DRIVE WHEEL, LOAD WHEEL, CASTERS

6-1. Transmission and Drive Motor.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.1.
3. Remove the steering motor as described in paragraph 4-3.
4. Raise the vehicle off the ground to provide clearance for drive assembly (1, Figure 6-1) out the bottom. Securely block the vehicle to prevent movement.
5. Disconnect electric brake (1, Figure 6-3) from harness (1, Figure 11-12).
6. Disconnect cables (3, 4 and 5, Figure 11-13) from drive motor (2, Figure 6-3).
7. Disconnect encoder (7) from drive motor (2).
8. Support the drive assembly (1, Figure 6-1) and remove six screws (2), six washers (3) and flat washers (4).
9. Lower the drive assembly (1) out the bottom of the vehicle.
10. Install new drive assembly (1) by reversing the steps above.

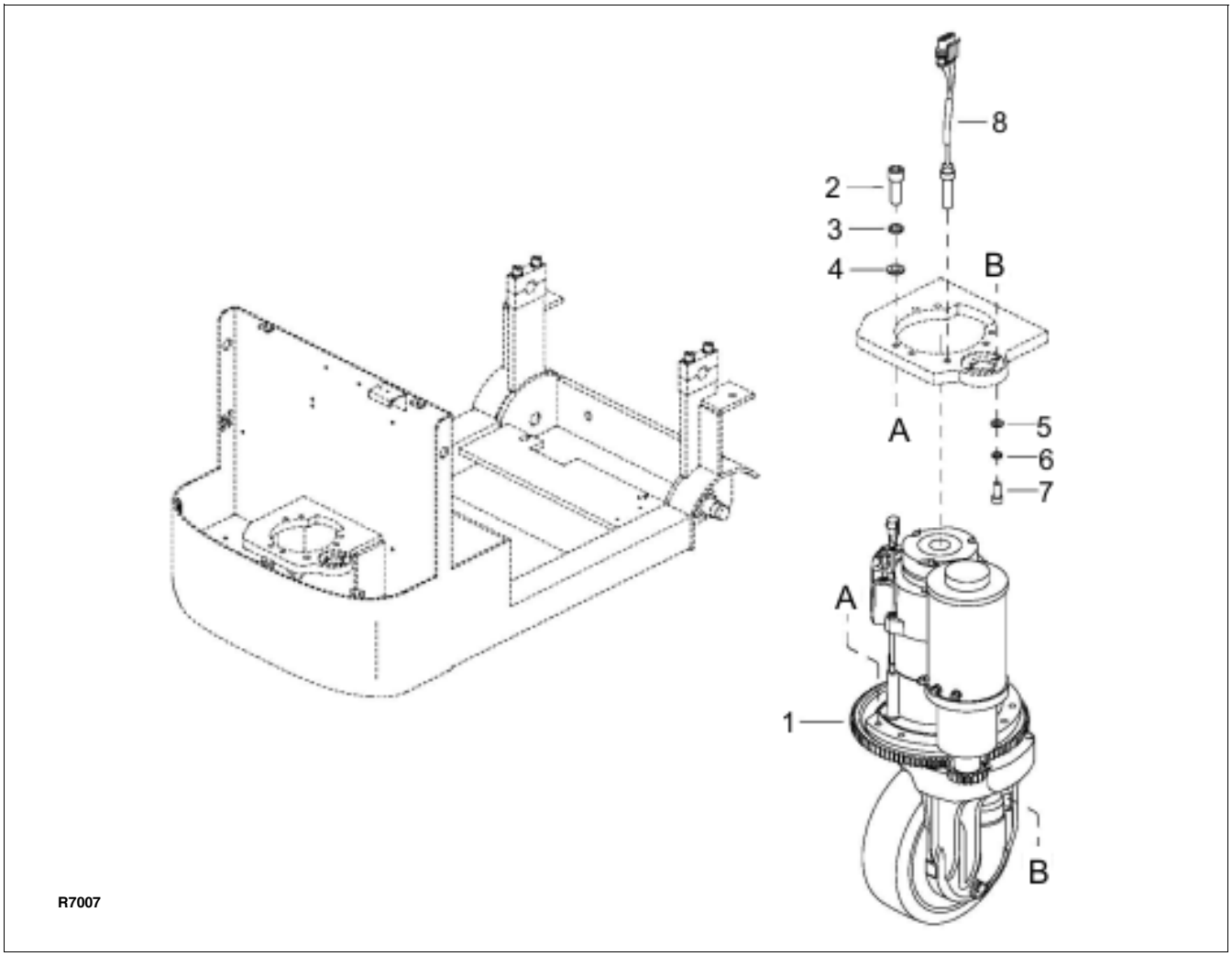


Figure 6-1 Drive System

6-2. Load Wheel.

6-2.1. Removal

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Block the drive wheel to prevent the vehicle from rolling.
3. Jack up the vehicle to raise the load wheels off the floor. Securely block the vehicle in the raised position by positioning supports under both fork tips.
4. Remove four screws (8, Figure 6-2) and cover (7).
5. Remove nut (6), washer (5) and load wheel (3).
6. Remove seal (1) from load wheel (3).
7. Remove bearings (2 and 4) from load wheel (3).
8. Inspect bearings (2 and 4) and replace if necessary.

6-2.2. Installation

1. Pack bearings (2 and 4, Figure 6-2) with grease.
1. Reassemble bearings (2 and 4) in wheel (3).
2. Install seal (1) from load wheel (3).
3. Position load wheel (3) in the axle and install washer (5) and nut (6). Tighten nut (6) until there is a slight drag on load wheel (3). Secure nut (6) with tab on washer (5).
4. Install cover (7) and secure with four screws (8).
5. Remove the blocking from under the vehicle and lower it to the ground.
6. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

6-3. Drive Wheel.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Jack up the vehicle to gain access to the drive wheel; then securely block the vehicle to prevent movement.
3. Remove the five mounting screws (4, Figure 6-3) and five lock washers (3).
4. Remove drive wheel (5).
5. Install new drive wheel in reverse order of removal.

6-4. Caster.

Casters provide additional stability. Installation of the casters is shown in Figure 6-2 and repair parts are shown in Figure 11-2.

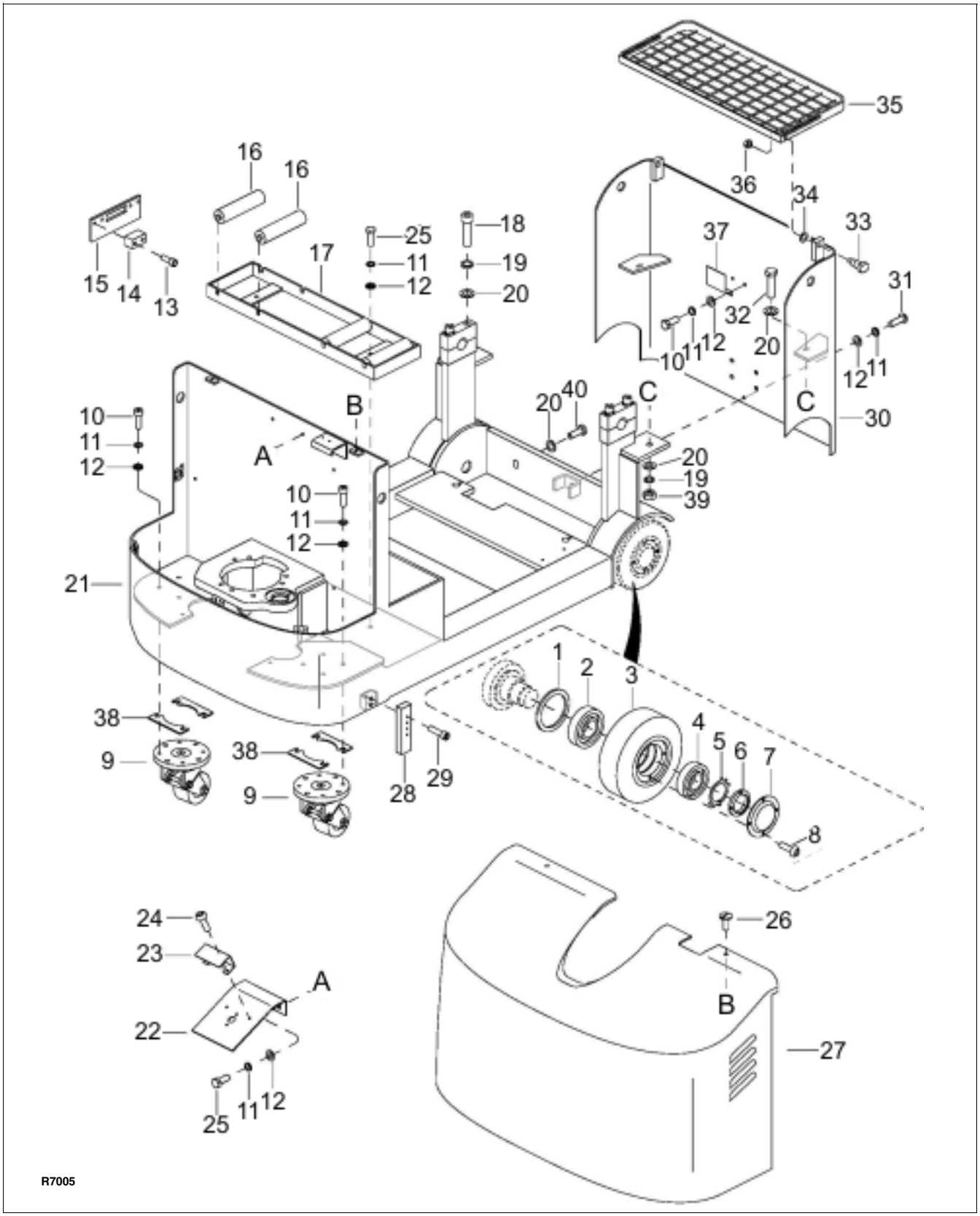


Figure 6-2 Frame

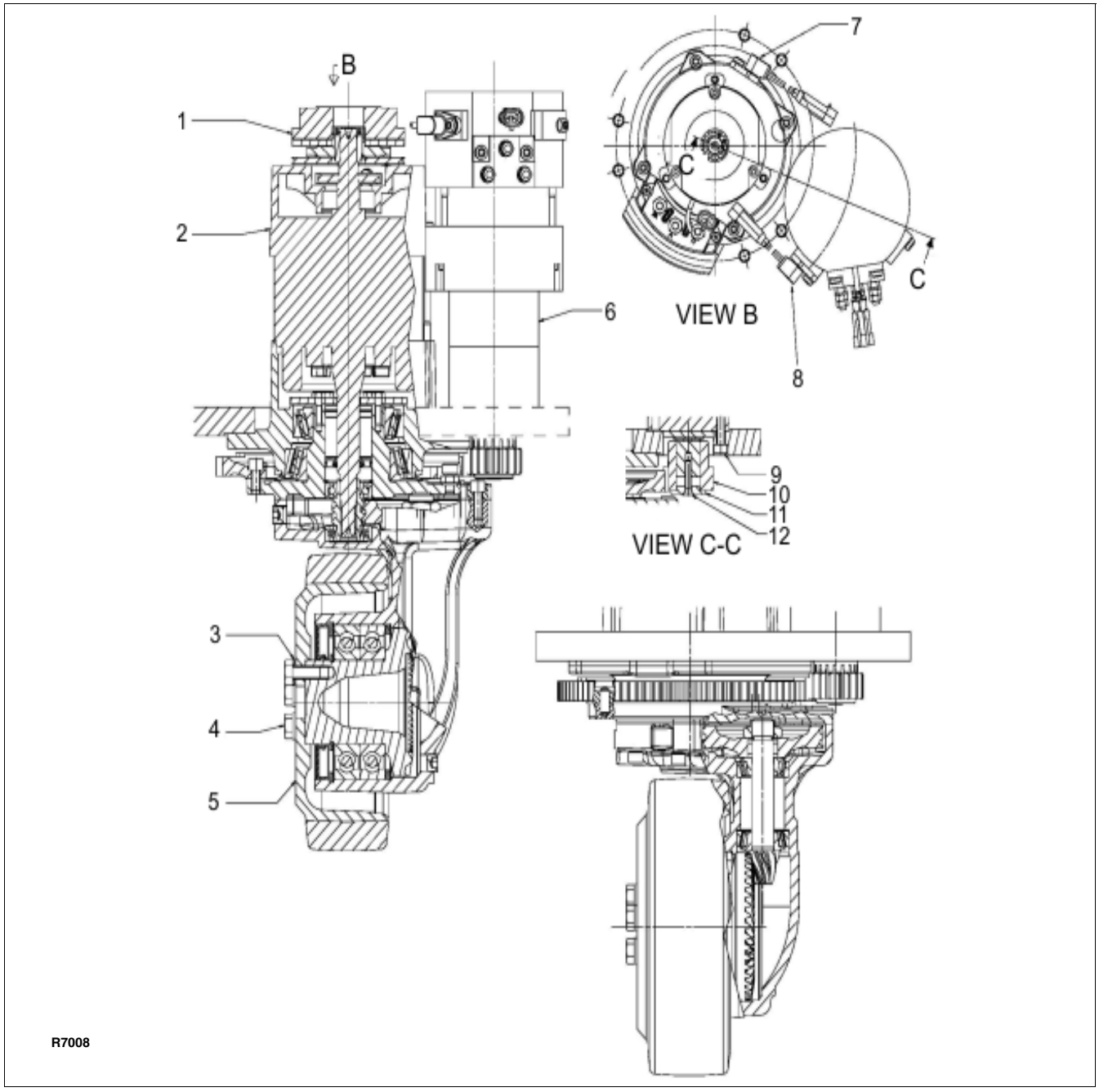


Figure 6-3 Drive Assembly

SECTION 7
ELEVATION SYSTEM SERVICING

7-1. GENERAL.

The elevation system includes the outer mast, inner mast, lift linkage, drag chains, lift chains, lift cylinder and ram head.

7-2. LIFT CHAIN LENGTH ADJUSTMENT.

1. Fully lower the loading frame (11, Figure 7-5).
2. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).

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

3. Loosen jam nut (2, Figure 7-1) to allow for adjustment of middle jam nut.
4. Break the lower jam nut (2) free from the middle jam nut (2).
5. Take up slack in the lift chain with middle jam nut (2).
6. Align anchor (1) so the clevis pin (4) is parallel to the mast.

CAUTION: At least 3 full threads must be present below lower nut (2) after adjustment.

7. Tighten jam nuts securely while maintaining alignment of clevis pin (4).
8. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).
9. Test chain by operating loading frame (11, Figure 7-5). If slack is still apparent, repeat above procedure.

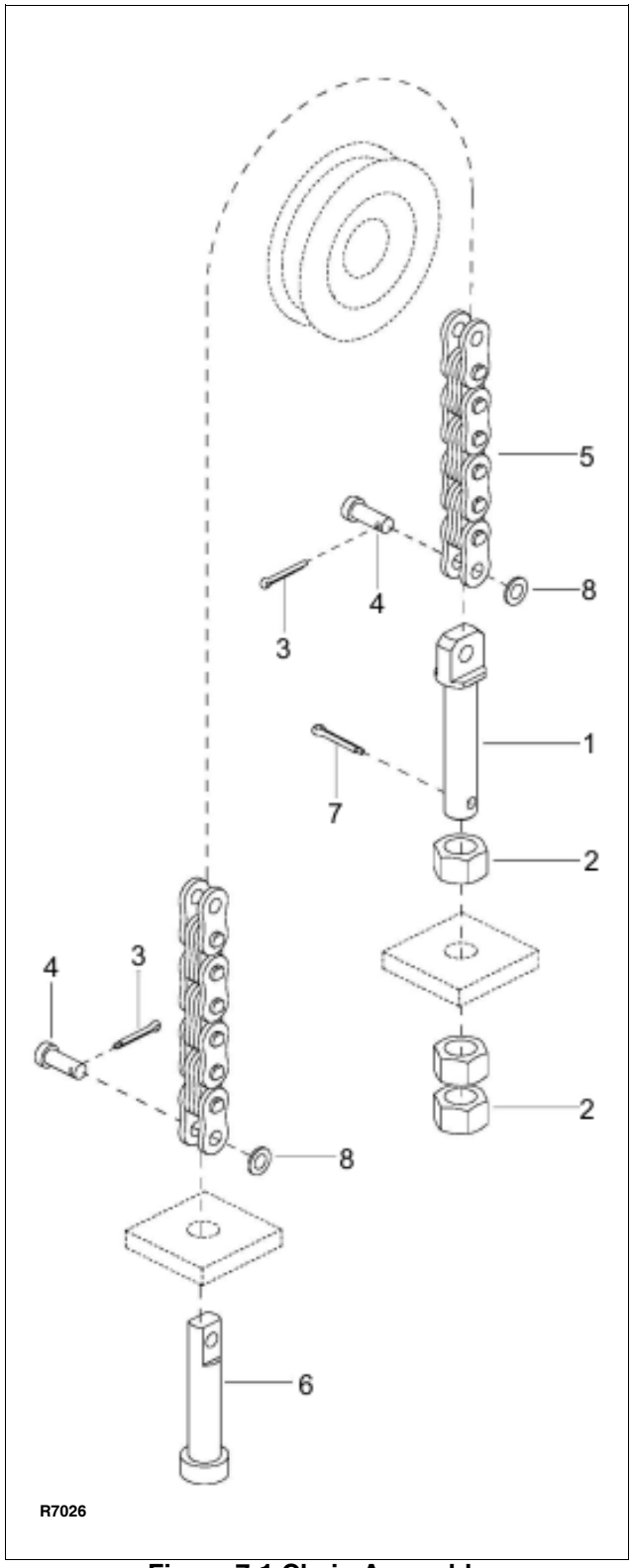


Figure 7-1 Chain Assembly

7-3. LIFT CHAIN WEAR INSPECTION.

The lift chain should be replaced when it is worn enough to increase it's length by 3% or more. On Telecospic vehicles, Both chains should be replaced at the same time. 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 chain. Refer to paragraph 7-4. when installing new chain.

7-4. LIFT CHAIN REPLACEMENT.

7-4.1. Telescopic

1. With the vehicle wheels securely blocked, raise the loading frame (11, Figure 7-5) approximately three feet and position blocks or strong supports under the loading frame.
2. Lower the loading frame onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).

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

4. Remove cotter pin (3, Figure 7-1), flat washer (8), clevis pin (4) and anchor (6) connecting chain (5) to loading frame (11, Figure 7-5).
5. Remove cotter pin (3, Figure 7-1), flat washer (8) and clevis pin (4) connecting chain (5) to adjusting screw (1) at the outer mast (20, Figure 7-2).
6. Remove chain from sheave (13).
7. Position new chain on sheave (13).
8. Secure chain (5, Figure 7-1) to adjusting screw (1) with clevis pin (4), flat washer (8) and cotter pin (3).
9. Connect the opposite end of chain to the loading frame (11, Figure 7-5) with anchor (6), clevis pin (4), washer (8) and cotter pin (3).
10. Adjust the chains according to paragraph 7-2.
11. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

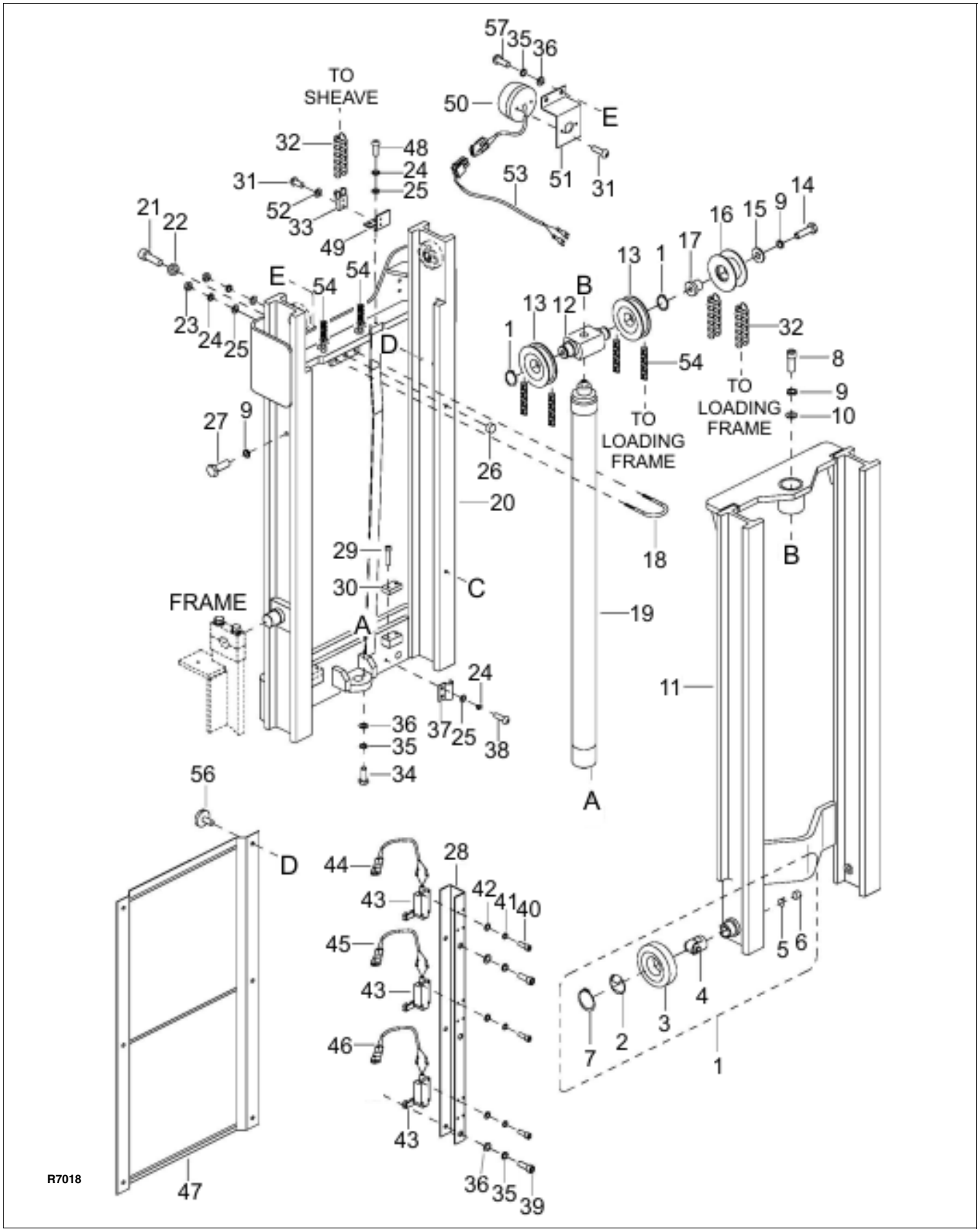


Figure 7-2 Elevation System (Telescopic)

7-4.2. TRIMAST

7-4.2.1.Mast Lifting Chain

1. With the vehicle wheels securely blocked, raise the inner mast (49, Figure 7-3) approximately three feet and position blocks or strong supports under the inner mast (49).
2. Lower inner mast onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).

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

4. Remove cotter pin (3, Figure 7-1), flat washer (8), clevis pin (4) and anchor (6) connecting chain (5) to inner mast (49, Figure 7-3).
5. Remove cotter pin (3, Figure 7-1), flat washer (8) and clevis pin (4) connecting chain (5) to adjusting screw (1) at the outer mast (1, Figure 7-3).
6. Remove chain from sheave (14).
7. Position new chain on sheave (14).
8. Secure chain (5, Figure 7-1) to outer mast (1, Figure 7-3) with adjusting screw (1), clevis pin (4), flat washer (8) and cotter pin (3).
9. Connect the opposite end of chain to the inner mast (49, Figure 7-3) with anchor (6, Figure 7-1), clevis pin (4), washer (8) and cotter pin (3).
10. Adjust the chains according to paragraph 7-2.
11. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

7-4.2.2.Loading Frame Lifting Chain

1. With the vehicle wheels securely blocked, raise the loading frame (49, Figure 7-3) approximately three feet and position blocks or strong supports under loading frame (49).
2. Lower loading frame onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).

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

4. Remove cotter pin (3, Figure 7-1), flat washer (8), clevis pin (4) and anchor (6) connecting chain (5) to lift cylinder (18, Figure 7-3).
5. Remove cotter pin (3, Figure 7-1), flat washer (8) and clevis pin (4) connecting chain (5) to adjusting screw (1) at loading frame (49, Figure 7-3).
6. Remove chain from sheave (17, Figure 7-4).
7. Position new chain on sheave (17).
8. Secure chain (5, Figure 7-1) to loading frame (49, Figure 7-3) with adjusting screw (1, Figure 7-1), clevis pin (4), flat washer (8) and cotter pin (3).
9. Connect the opposite end of chain to the lift cylinder (18, Figure 7-3) with anchor (6, Figure 7-1), clevis pin (4), washer (8) and cotter pin (3).
10. Adjust the chains according to paragraph 7-2.
11. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

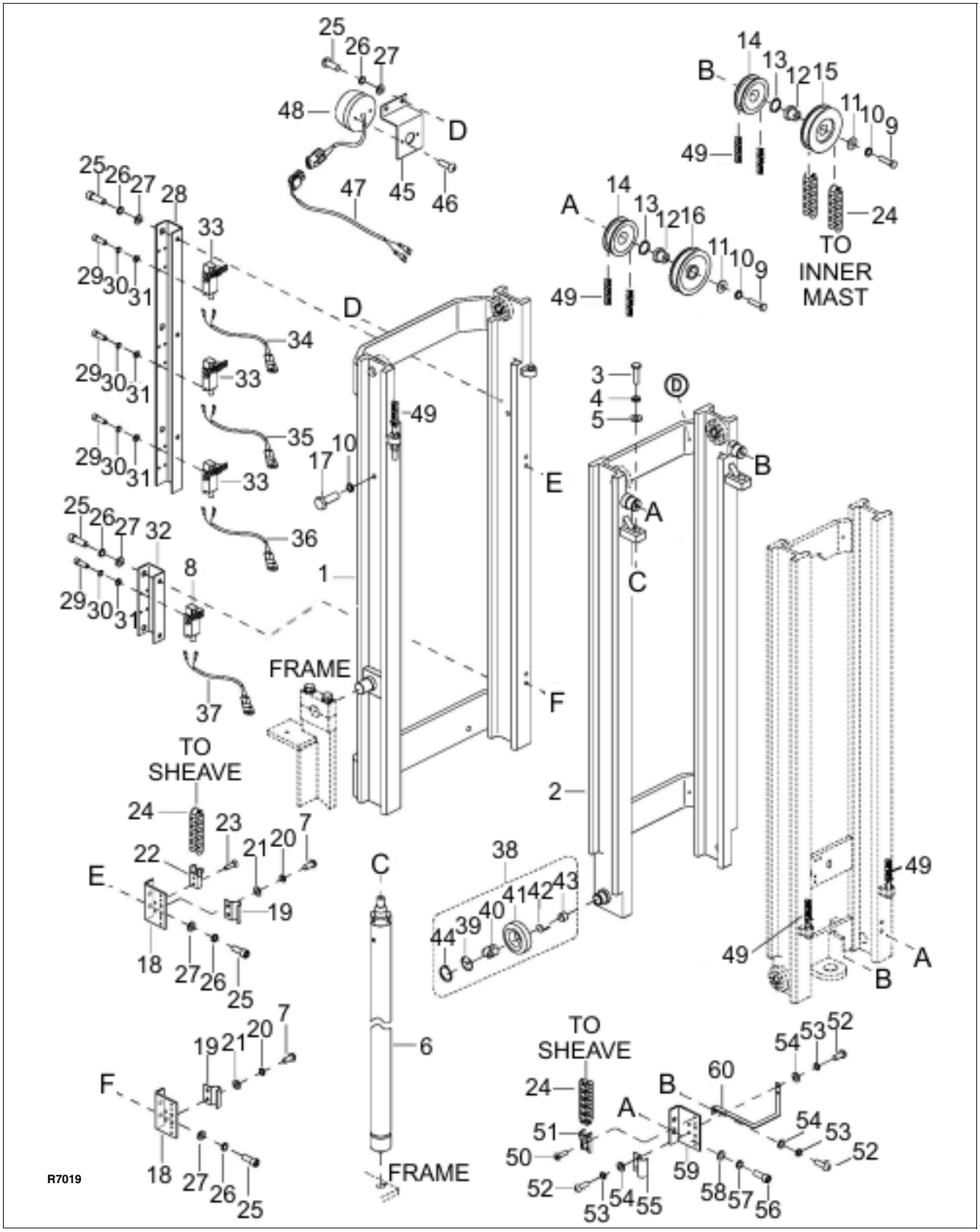


Figure 7-3 Elevation System (TRIMAST - Part 1)

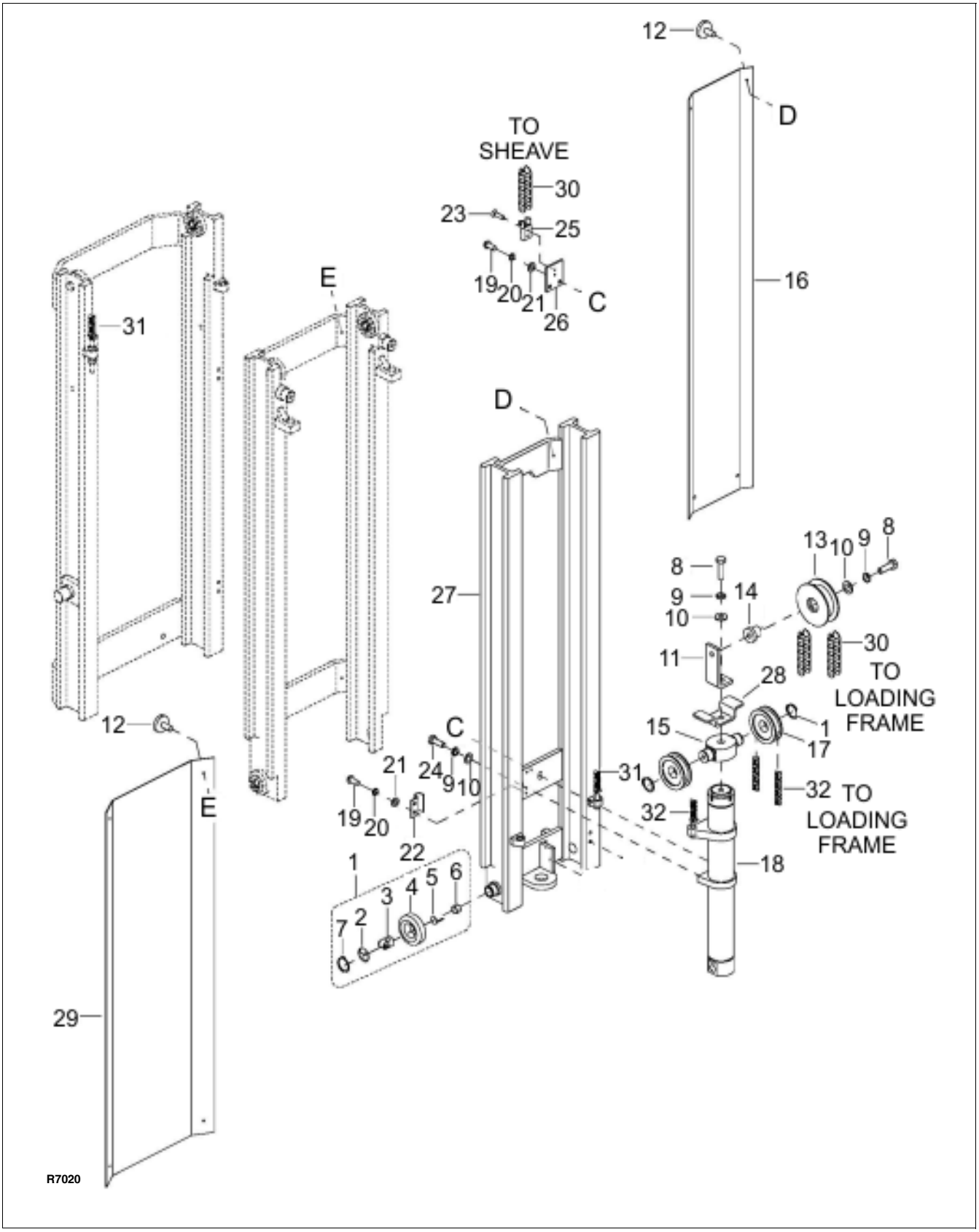


Figure 7-4 Elevation System (TRIMAST - Part 2)

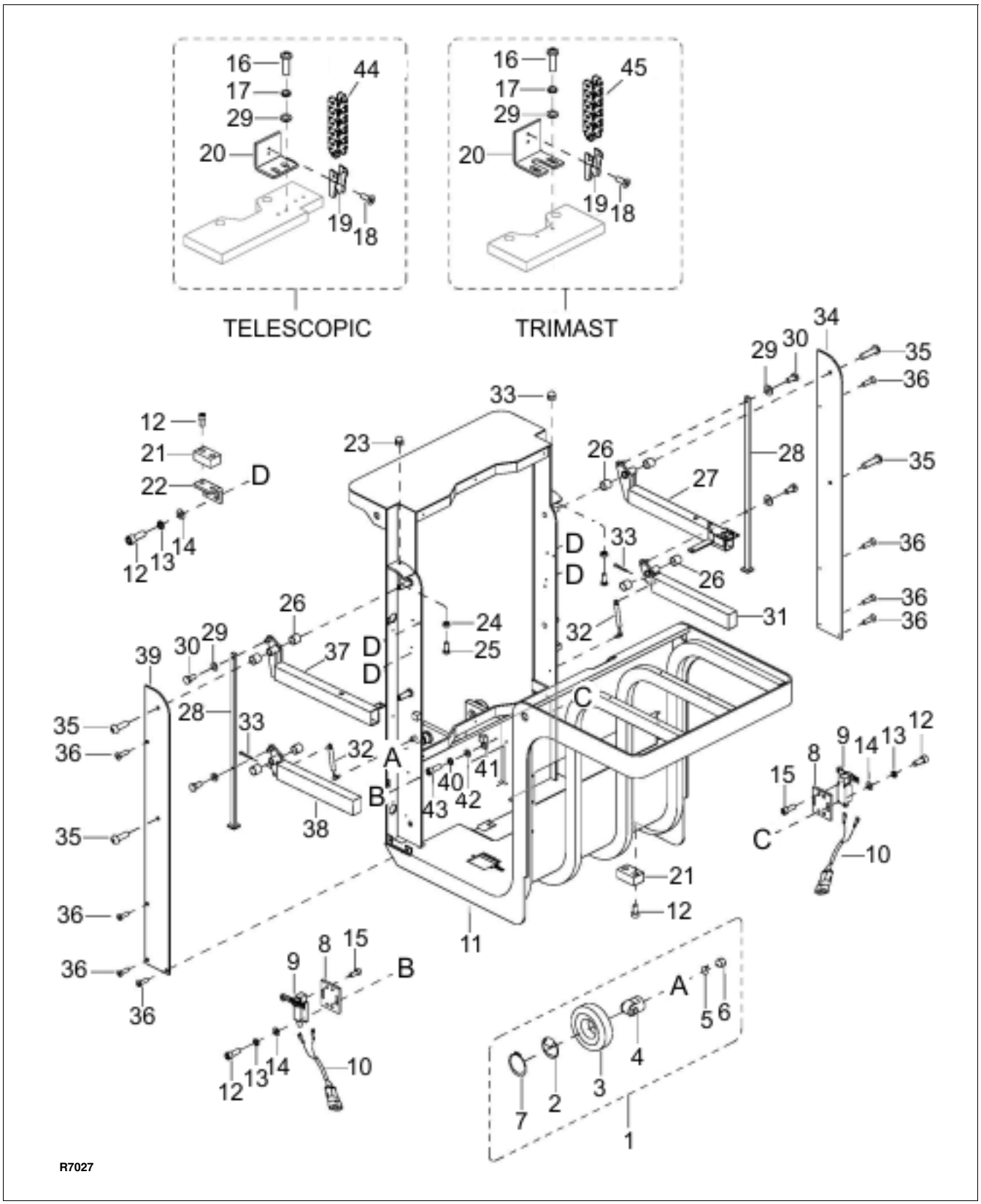


Figure 7-5 Loading Frame Installation

7-5. LIFT CYLINDERS.

NOTE: Removal and repair of lift cylinders are covered in SECTION 8.

SECTION 8
HYDRAULIC SYSTEM SERVICING

8-1. LINES AND FITTINGS

WARNING: When the platform is raised, pressure exists in the hydraulic system lines and fittings. To ensure release of pressure, platform must be fully lowered and the batteries disconnected before performing any maintenance on the hydraulic system.

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

1. Fully lower the platform.
2. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
3. Remove the compartment cover as described in paragraph 4-2.

CAUTION: Hydraulic oil can damage parts. Wipe off any oil immediately. Provide a container under the line or fitting before disconnecting.

4. **Telescopic vehicles**: Refer to Figure 8-1 and Figure 8-2 and remove leaking line or fitting and replace it with a new line or fitting.

   TRIMAST vehicles: Refer to Figure 8-1 and Figure 8-6 and remove leaking line or fitting and replace it with a new line or fitting.
5. Check level of hydraulic oil. If required, add hydraulic oil to bring to proper level. Use hydraulic oil listed in Table 2-2.
6. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).
7. Operate the lift and lower buttons to refill the cylinder and lines with hydraulic oil.
8. Check level of hydraulic oil. If required, add hydraulic oil to bring to proper level. Use hydraulic oil listed in Table 2-2.
9. Install the compartment cover as described in paragraph 4-2.

8-2. HYDRAULIC PUMP, MOTOR, AND RESERVOIR ASSY

The hydraulic pump/motor assembly can be disassembled and repaired. However, a defective pump, valve or motor requires replacement of that component.

WARNING: When the platform is raised, pressure exists in the hydraulic system lines and fittings. To ensure release of pressure, platform must be fully lowered and the batteries disconnected before performing any maintenance on the hydraulic system.

8-2.1. Removal

1. Fully lower the platform.
2. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
3. Remove the compartment cover as described in paragraph 4-2.
4. Tag and disconnect electrical leads from motor and solenoid of pump/motor assembly (1, Figure 8-1).

NOTE: The reservoir and tube will be filled with hydraulic oil. Place a container under the pump assembly to catch any hydraulic oil.

5. Disconnect hose (13) from pump/motor assembly (1).
6. While supporting pump/motor assembly (1), remove four screws (8), four lock washers (9) and four flat washers (7).
7. Remove the pump/motor assembly (1).

8-2.2. Disassembly and Reassembly

1. Remove the hydraulic pump/motor assembly as described in paragraph 8-2.1.
2. Refer to Figure 11-8 for disassembly and reassembly.

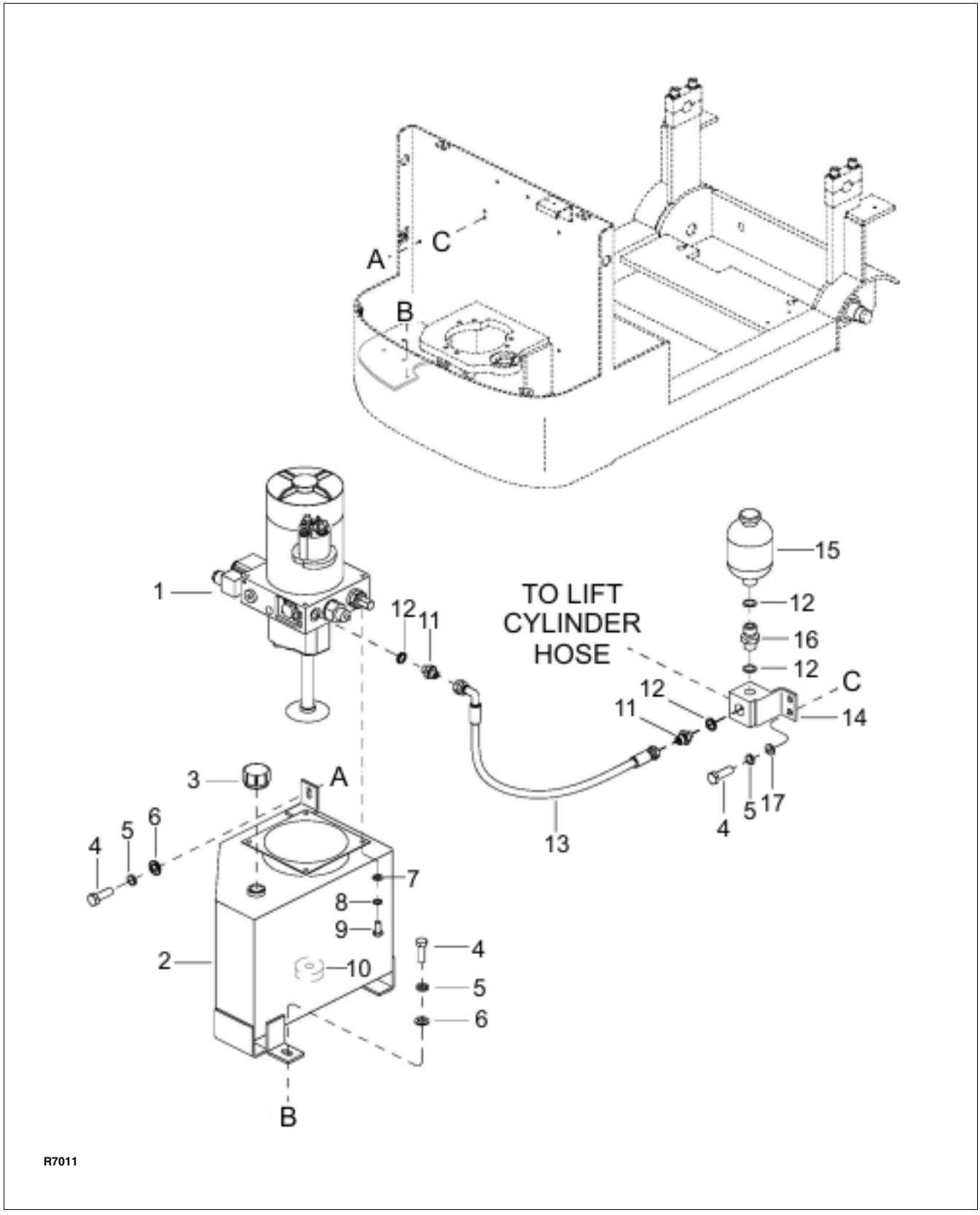


Figure 8-1 Hydraulic System

8-2.3. Installation

1. Position pump/motor assembly (1, Figure 8-1) on reservoir (2) and install four screws (8), four lock washers (9) and four flat washers (7).
2. Reconnect hose (13) to pump/motor assembly (1).
3. Connect electrical leads to motor and solenoid of pump/motor assembly (1).
4. Fill the hydraulic reservoir. Use hydraulic oil listed in Table 2-2.
5. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).
6. Operate the lift and lower buttons to refill the cylinder and lines with hydraulic oil.
7. Check level of hydraulic oil. If required, add hydraulic oil to bring to proper level. Use hydraulic oil listed in Table 2-2.
8. Install the compartment cover as described in paragraph 4-2.

8-3. Lift Cylinder (Telescopic)

8-3.1. Removal

1. With the lift vehicle wheels securely blocked, raise the platform approximately three feet and position blocks or strong supports under inner frame (11, Figure 8-3).
2. Lower platform onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
4. Remove the compartment cover as described in paragraph 4-2.

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

CAUTION: Hydraulic oil can damage parts. Wipe off any oil immediately. Provide a container under the line or fitting before disconnecting.

5. Remove the lift chain as described in paragraph 7-4.
6. Remove screw (8, Figure 8-3), lock washer (9), and flat washer (10).
7. Remove bolt (6, Figure 8-2), two washers (5), relief valve (4) and disconnect the hose (3) from the bottom of lift cylinder.
8. Manually push the cylinder rod down as far as possible and remove ram head (12, Figure 8-3) from cylinder (19).

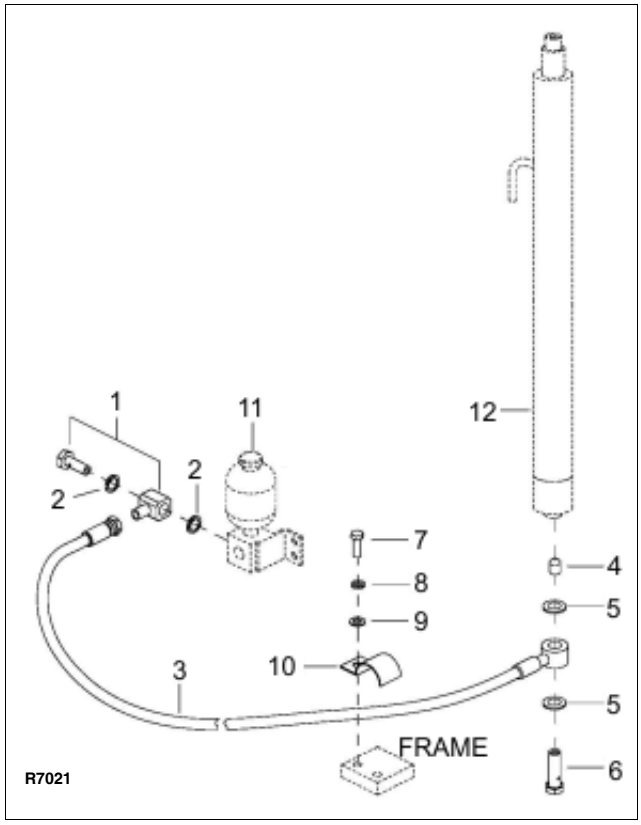


Figure 8-2 Hydraulic Lift (Telescopic)

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

9. Remove two nuts (23), two lock washers (24), two flat washers (25) and U bolt (18).
10. Raise lift cylinder assembly (19) up and out of vehicle.

8-3.2. Repair

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

1. Secure the lift cylinder in a vise, clamping lightly at the base of the cylinder.
2. Remove gland nut (7, Figure 8-4).
3. Remove wiper ring (8) and O-ring (9) from gland nut (7).
4. Pull out piston rod (1).
5. Remove bearing (5) and bushing (4).
6. Remove piston (2) and O-ring (3) from rod (1).
7. Remove guide ring (10) and seal (11) from piston (2).

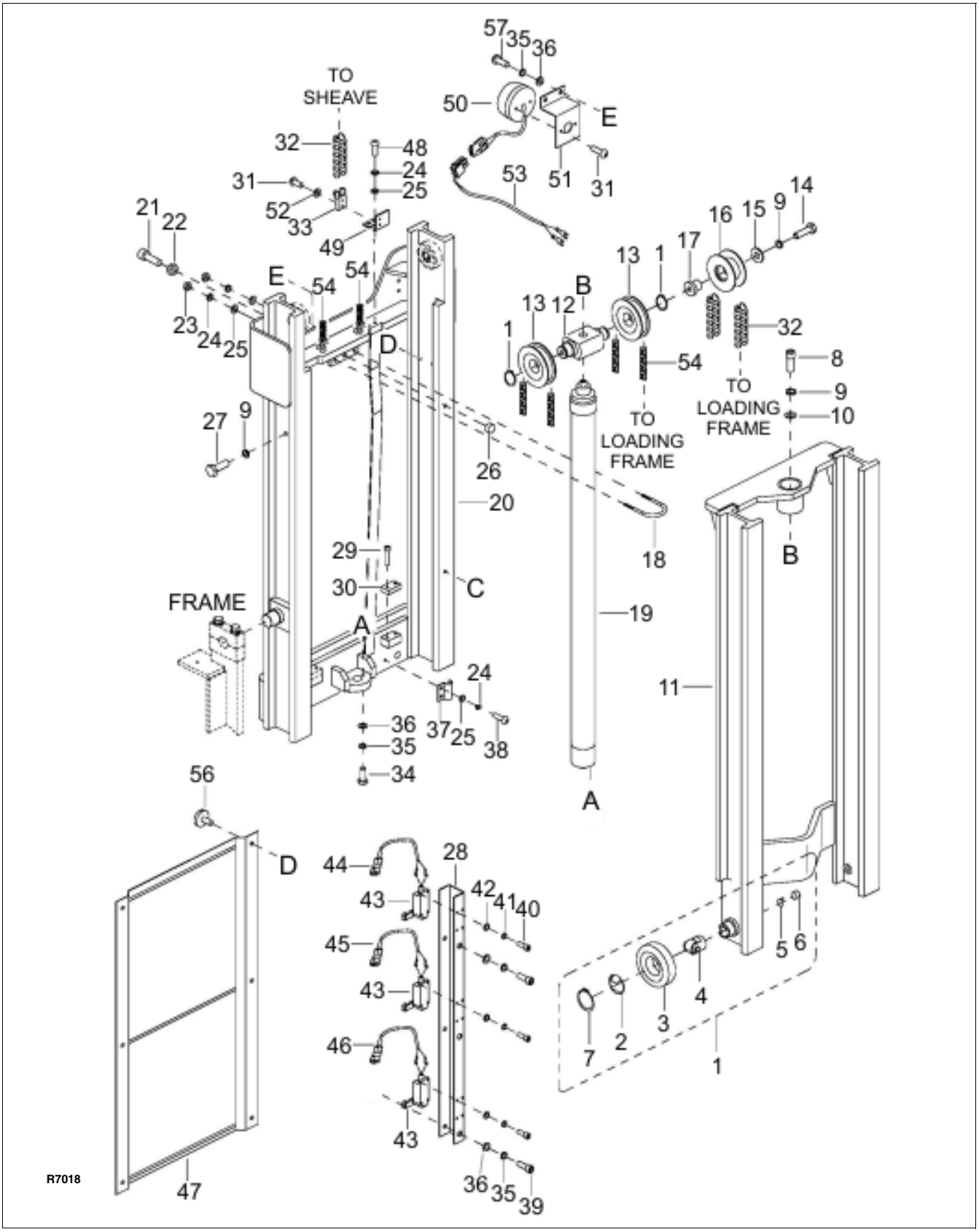


Figure 8-3 Elevation System (Telescopic)

8. Coat all parts with hydraulic oil (Table 2-2).
9. Install guide ring (10) and new seal (11) on piston (2).
10. Install new O-ring (3) on rod (1).
11. Install piston (2) on rod (1).
12. Install bearing (5) and bushing (4).
13. Insert rod (1) in cylinder tube (6).
14. Install wiper ring (8) and O-ring (9) on gland nut (7).
15. Install gland nut (7) in cylinder tube (6).

8-3.3. Installation

1. Position the cylinder in the mast.
2. Install U bolt (18, Figure 8-3) and secure with two nuts (23), two lock washers (24), two flat washers (25).
3. Install ram head (12) on top of cylinder (19).
4. Lift inner mast (11) and remove the remove the blocking.
5. Lower inner mast (11) onto cylinder (19) and secure with screw (8), lock washer (9) and flat washer (10).
6. Install the lift chain as described in paragraph 7-4.
7. Install relief valve (4, Figure 8-2) and reconnect hose (3) with two washers (5) and bolt (6) to the bottom of lift cylinder.
8. Fill the hydraulic reservoir. Use hydraulic oil listed in Table 2-2.
9. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).
10. Operate the lift and lower buttons to refill the cylinder and lines with hydraulic oil.
11. Check level of hydraulic oil. If required, add hydraulic oil to bring to proper level. Use hydraulic oil listed in Table 2-2.
12. Adjust the chains according to paragraph 7-2.
13. Install the compartment cover as described in paragraph 4-2.

8-4. Lift Cylinder (TRIMAST Full Free Lift)

8-4.1. Removal

1. With the vehicle wheels securely blocked, raise the platform approximately three feet and position blocks or strong supports under loading frame (11, Figure 11-23).

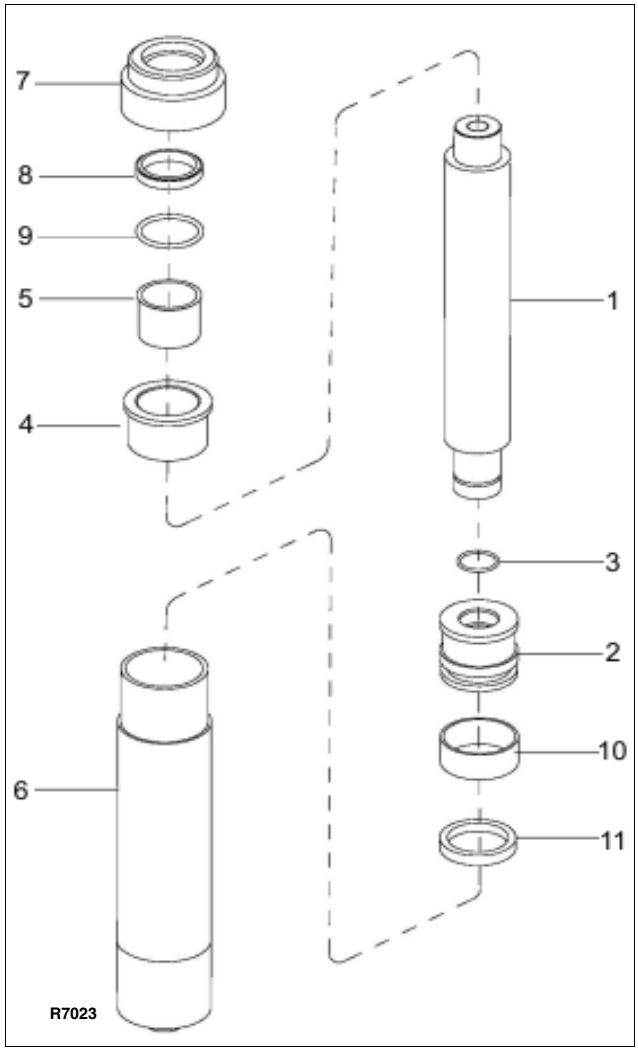


Figure 8-4 Lift Cylinder (Telescopic)

2. Lower loading frame onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
4. Remove the compartment cover as described in paragraph 4-2.

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

CAUTION: Hydraulic oil can damage parts. Wipe off any oil immediately. Provide a container under the line or fitting before disconnecting.

5. Remove the lift chain as described in paragraph 7-4.
6. Remove bolt (12, Figure 8-8), lock washer (9), flat washer (10), sheave (13) and bushing (14).

7. Remove screw (8), lock washer (9), flat washer (10), angle (11), bracket (34) and header (15) from cylinder (18).
8. Disconnect the hose (13, Figure 8-6) from tube (14).
9. Remove screw (16), lock washer (17), flat washer (18) and disconnect tube (14) from connector (15).
10. Remove connector (15), two washers (5) and relief valve (6) from cylinder (25).

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

11. Remove two bolts (30, Figure 8-8), two lock washers (9), two flat washers (10).
12. Raise lift cylinder assembly (18) up and out of vehicle.

8-4.2. Repair

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

1. Secure the lift cylinder in a vise, clamping lightly at the base of the cylinder.
2. Remove gland nut (4, Figure 8-5).
3. Remove wiper ring (1), backup ring (2), packing (3) and O-ring (5) from gland nut (4).
4. Pull out piston rod (6).
5. Remove screw (9) and piston (7) from rod (6).
6. Remove ring (8) from piston (7).
7. Coat all parts with hydraulic oil (Table 2-2).
8. Install ring (8) on piston (7).
9. Install piston (7) on rod (6) and secure with screw (9).
10. Insert rod (7) in cylinder tube (10).
11. Install wiper ring (1), backup ring (2), packing (3) and O-ring (5) on gland nut (4).
12. Install gland nut (4) in cylinder tube (10).

8-4.3. Installation

1. Position the cylinder (18, Figure 8-8) in the mast (33).
2. Install two bolts (30), two lock washers (9), and two flat washers (10).
3. Install relief valve (6, Figure 8-6), two washers (5) and connector on cylinder (25).

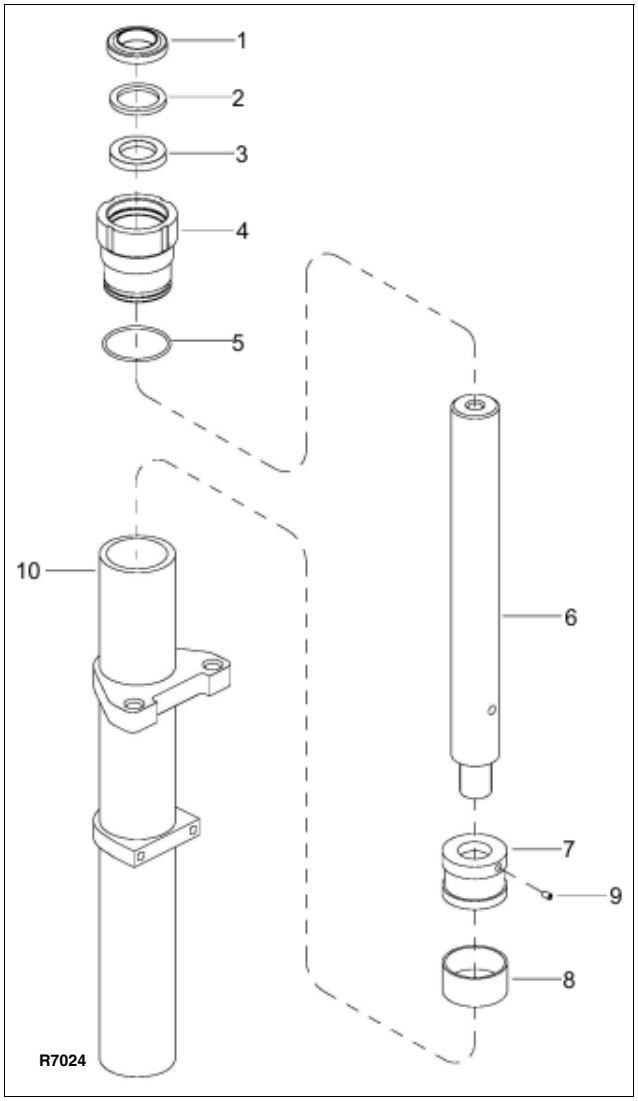


Figure 8-5 Lift Cylinder (TRIMAST Full Free Lift)

4. Reconnect tube (14, Figure 8-8) to connector (15) and secure the tube with screw (16), lock washer (17) and flat washer (18).
5. Position header (15), bracket (34) and angle (11) on top of cylinder (18) and secure with screw (8), lock washer (9) and flat washer (10).
6. Install bushing (14), sheave (13) on angle (11) and secure with bolt (12), lock washer (9) and flat washer (10).
7. Install lift chains as described in paragraph 7-4.
8. Lift inner mast (11) and remove the blocking.
9. Fill the hydraulic reservoir. Use hydraulic oil listed in Table 2-2.
10. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

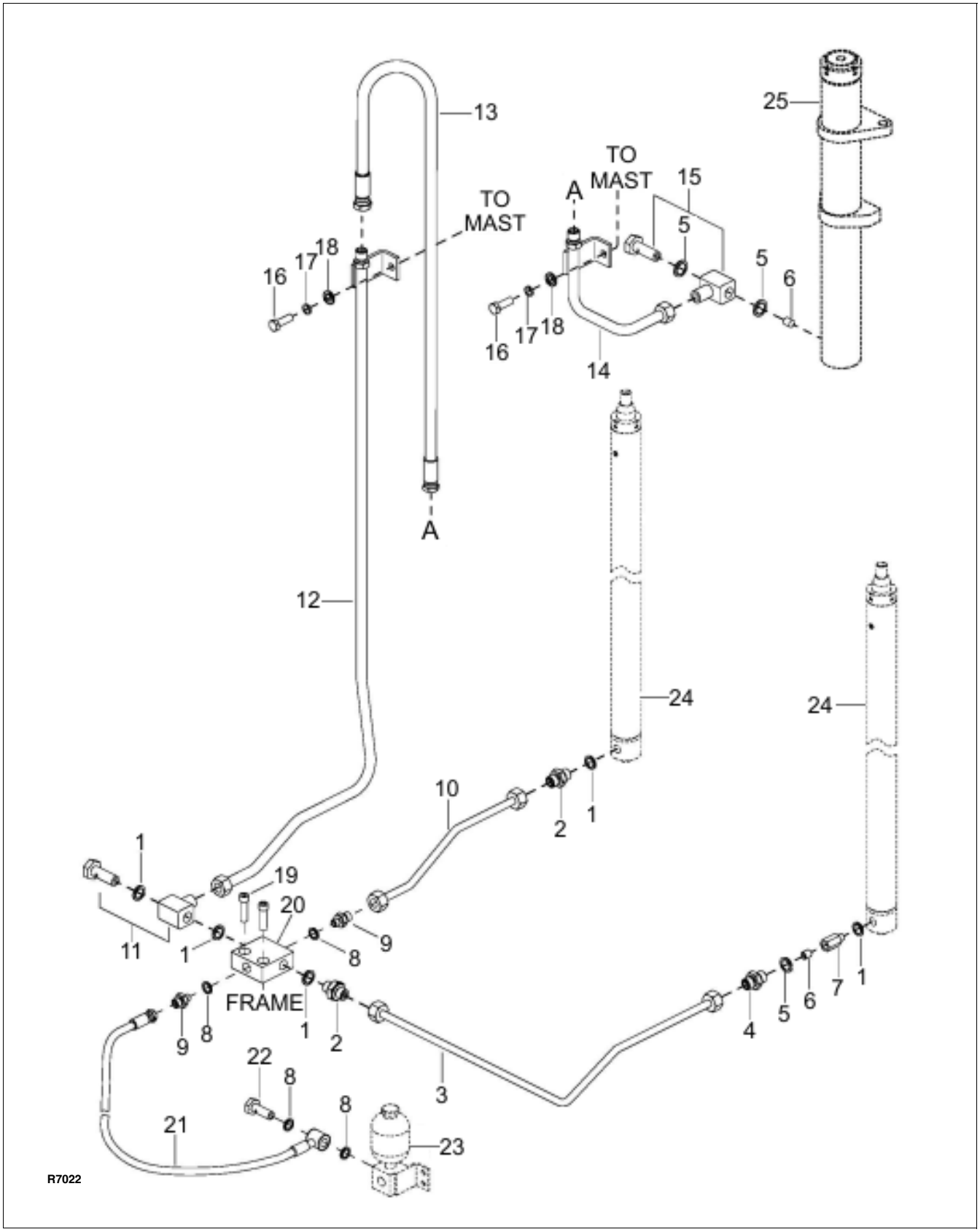


Figure 8-6 Hydraulic Lift (TRIMAST)

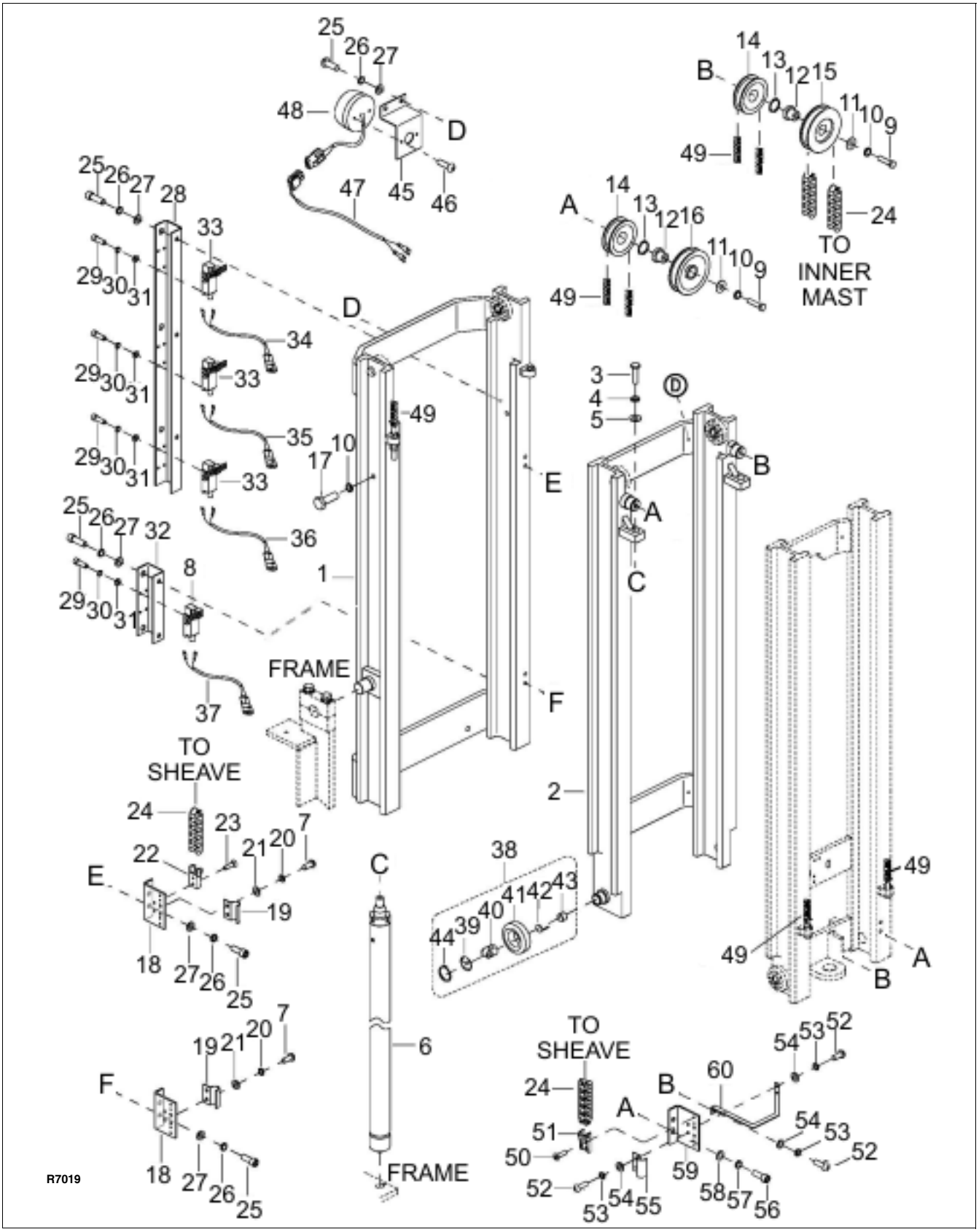
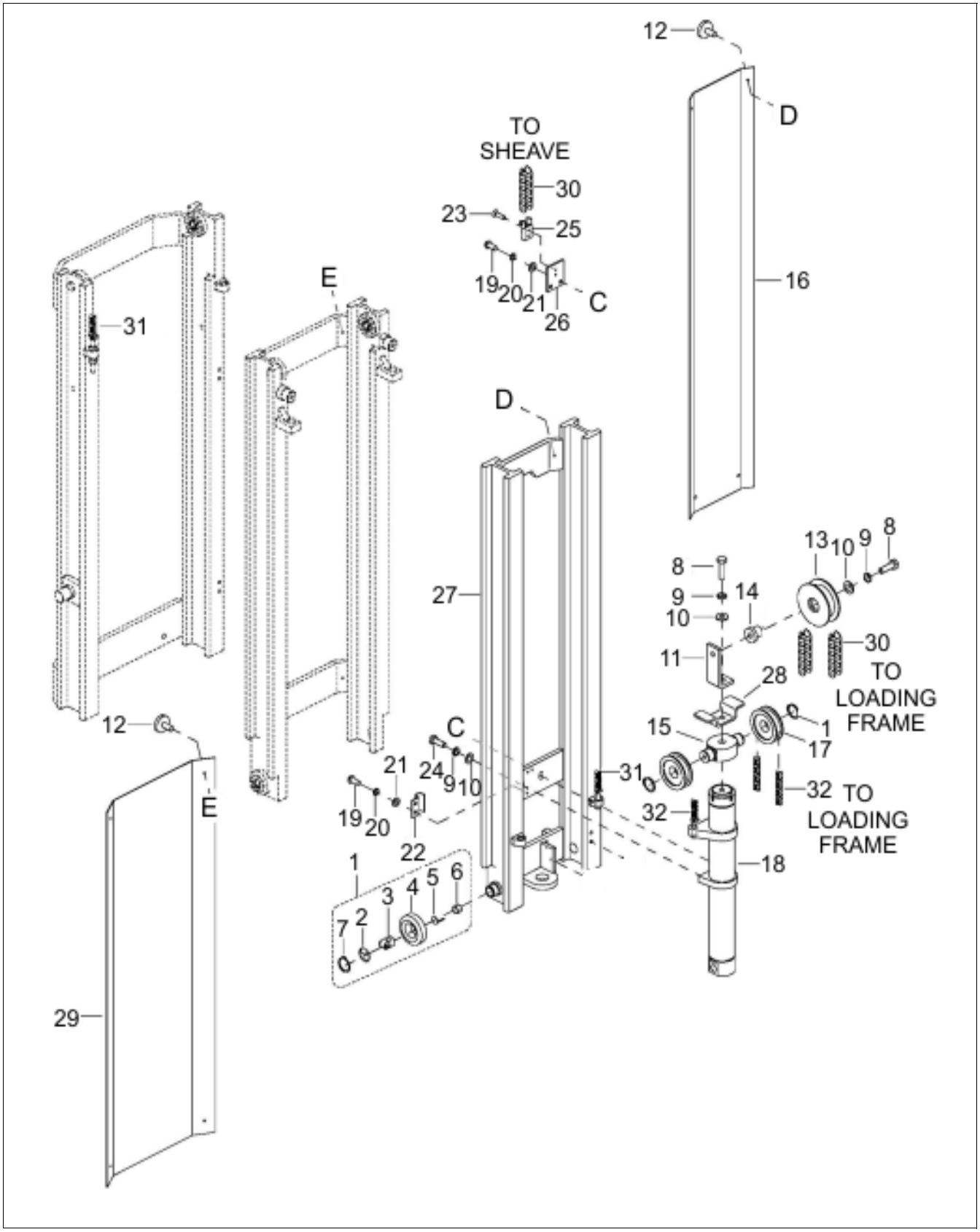


Figure 8-7 Elevation System (TRIMAST - Part 1)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11. Operate the lift and lower buttons to refill the cylinder and lines with hydraulic oil.
12. Check level of hydraulic oil. If required, add hydraulic oil to bring to proper level. Use hydraulic oil listed in Table 2-2.
13. Adjust the chains according to paragraph 7-2.
14. Install the compartment cover as described in paragraph 4-2.

8-5. Lift Cylinder (TRIMAST Secondary)

8-5.1. Removal

1. With the vehicle wheels securely blocked, raise the platform approximately three feet and position blocks or strong supports under middle mast (2, Figure 8-7).
2. Lower mast onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
4. Remove the compartment cover as described in paragraph 4-2.

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

CAUTION: Hydraulic oil can damage parts. Wipe off any oil immediately. Provide a container under the line or fitting before disconnecting.

5. Remove the lift chain as described in paragraph 7-4.
6. Disconnect the tube (3 or 10, Figure 8-6) from the cylinder being removed.
7. Remove connector (2) and washer (1); or connector (4), washer (5), relief valve (6), connector (7) and washer (1) from the cylinder being removed.

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

8. Remove two bolts (3, Figure 8-7), two lock washers (4) and two flat washers (5).
9. Raise lift cylinder assembly (6) up and out of vehicle.

8-5.2. Repair

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

1. Secure the lift cylinder in a vise, clamping lightly at the base of the cylinder.
2. Remove screw (11, Figure 8-9) and washer (12).
3. Remove gland nut (3).
4. Remove wiper ring (1), packing (2) and O-rings (4 and 13) from gland nut (3).
5. Pull out piston rod (5).
6. Remove buffer rod (14), ring (8), snap ring (7) and bushing (6) from piston rod (5).
7. Coat all parts with hydraulic oil (Table 2-2).
8. Install buffer rod (14), ring (8), snap ring (7) and bushing (6) on piston rod (5).
9. Insert rod (5) in cylinder tube (9).
10. Install wiper ring (1), packing (2) and O-rings (4 and 13) on gland nut (3).
11. Install gland nut (3) in cylinder tube (9).

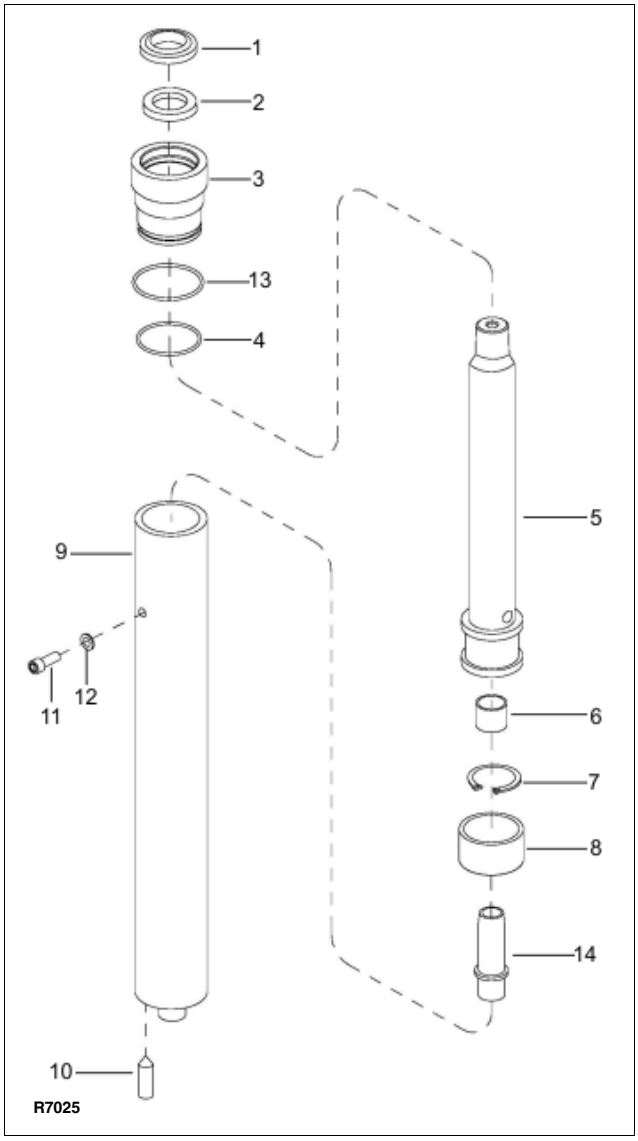

Figure 8-9 Lift Cylinder (TRIMAST Secondary)

8-5.3. Installation

1. Position the cylinder (6, Figure 8-7) on the frame.
2. Lift middle mast (2) and remove the blocking.
3. Install two bolts (3), two lock washers (4), and two flat washers (5).
4. Install connector (2) and washer (1); or connector (4), washer (5), relief valve (6), connector (7) and washer (1) two washers (5) and connector on cylinder (25).
5. Reconnect tube (3 or 10).
6. Install lift chains as described in paragraph 7-4.
7. Fill the hydraulic reservoir. Use hydraulic oil listed in Table 2-2.
8. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).
9. Operate the lift and lower buttons to refill the cylinder and lines with hydraulic oil.
10. Check level of hydraulic oil. If required, add hydraulic oil to bring to proper level. Use hydraulic oil listed in Table 2-2.
11. Adjust the chains according to paragraph 7-2.
12. Install the compartment cover as described in paragraph 4-2.

NOTES

SECTION 9
ELECTRICAL COMPONENTS

9-1. ELECTRICAL CONTROL PANEL

9-1.1. Maintenance

NOTE: Erratic operation of the vehicle may be caused by defective controller components. Before removing the electrical panel, perform troubleshooting procedures per SECTION 3, to determine corrective action to be taken.

There are no user-serviceable parts inside the controller. No attempt should be made to open the controller. Opening the controller may damage it and will void the warranty.

The controller is programmed at the factory specifically for the vehicle model on which it is equipped. It is important to replace the controller with the correct preprogrammed unit to assure proper performance settings intended for that particular vehicle. See Figure 11-11 for the preprogrammed controller number.

It is recommended that the controller exterior be cleaned periodically, and if a hand held programmer is available, this periodic cleaning provides a good opportunity to check the controller's diagnostic history file. It is also recommended that the controller's fault detection circuitry be checked whenever the vehicle is serviced.

9-1.2. Cleaning

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.
3. Remove any dirt or corrosion from the bus bar area. The controller should be wiped clean with a moist rag. Allow it to dry before reconnecting the battery.

9-1.3. Panel Removal.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.
3. Tag and disconnect all electrical cables and harness from control panel (5, Figure 9-1).
4. Remove four screws (1), four lock washers (2), four flat washers (3) and panel (5).

9-1.4. Panel disassembly.

Refer to Figure 11-11 for the location and identity of the major replacement components mounted on the panel and remove defective parts.

9-1.5. Panel Installation.

1. Position panel (5, Figure 9-1) and secure with four screws (1), four lock washers (2), four flat washers (3).
2. Connect all electrical cables and harness to the control panel as noted during removal.
3. Install compartment covers as described in paragraph 4-2.
4. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

9-2. HORN REPLACEMENT.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.
3. Tag and disconnect harness (1, Figure 11-12) from horn (4, Figure 9-1).
4. Remove screw (6), lock washer (2), flat washer (3) and horn (4).
5. Install horn (4) and secure with screw (6), lock washer (2), flat washer (3).
6. Reconnect harness (1, Figure 11-12) to horn (4, Figure 9-1).
7. Install compartment covers as described in paragraph 4-2.
8. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

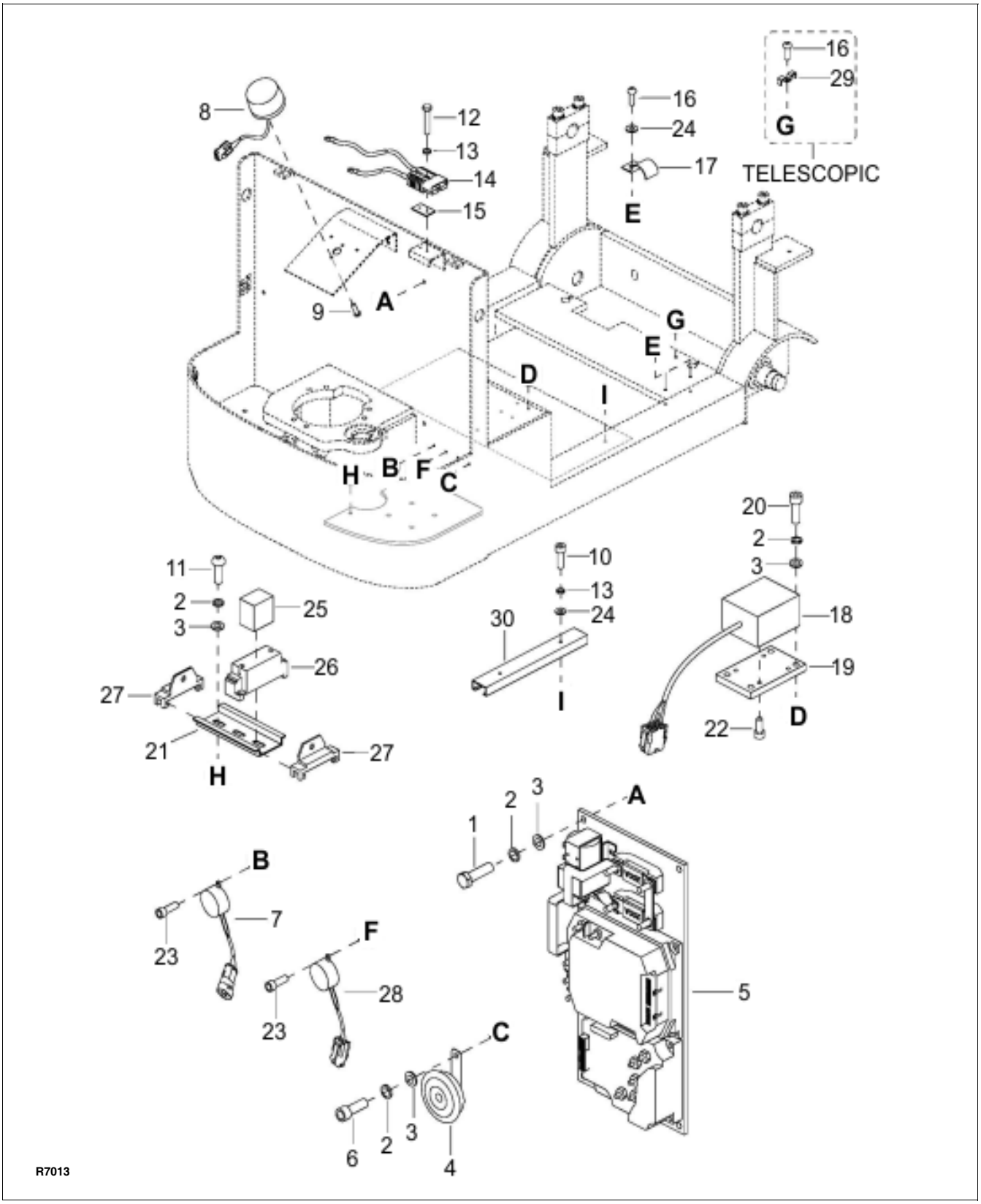

Figure 9-1 Electrical System

9-3. LOWERING BUZZER REPLACEMENT.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.
3. Tag and disconnect harness (1, Figure 11-12) from buzzer (7, Figure 9-1).
4. Remove screw (23) and buzzer (7).
5. Install new buzzer (7) and secure with screw (23).
6. Reconnect harness (1, Figure 11-12) to buzzer (7, Figure 9-1).
7. Install compartment covers as described in paragraph 4-2.
8. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

9-4. LEVEL SENSOR BUZZER REPLACEMENT.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.
3. Tag and disconnect harness (1, Figure 11-12) from buzzer (28, Figure 9-1).
4. Remove screw (23) and buzzer (28).
5. Install new buzzer (28) and secure with screw (23).
6. Reconnect harness (1, Figure 11-12) to buzzer (28, Figure 9-1).
7. Install compartment covers as described in paragraph 4-2.
8. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

9-5. LEVEL SENSOR REPLACEMENT.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the battery as described in paragraph 2-5.
3. Tag and disconnect harness (1, Figure 11-12) from sensor (18, Figure 9-1).
4. Remove four screws (20), four lock washers (13) and four flat washers (28).
5. Remove mounting plate (19) with sensor (18).
6. Remove four screws (22) and separate sensor (18) from mounting plate (19).
7. Position new sensor (18) on mounting plate (19) and secure with four screws (22).
8. Install mounting plate (19) with sensor (18) and secure with four screws (20), four lock washers (13) and four flat washers (28).
9. Reconnect harness (1, Figure 11-12) to sensor (18, Figure 9-1).
10. Install the battery as described in paragraph 2-5.
11. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

9-6. WARNING LIGHT REPLACEMENT.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the compartment cover as described in paragraph 4-2.
3. Tag and disconnect harness (1, Figure 11-12) from light (8, Figure 9-1).
4. Remove two screws (9) and light (8).
5. Install new light (8) and secure with two screws (9).
6. Reconnect harness (1, Figure 11-12) to light (8, Figure 9-1).
7. Install compartment covers as described in paragraph 4-2.
8. Disengage the emergency power disconnect switch (6, Figure 11-6) and turn on key switch (3).

9-7. BATTERY REPLACEMENT.

Replace the battery as described in paragraph 2-5.

9-8. BATTERY CHARGER.

9-8.1. Removal.

1. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
2. Remove the battery as described in paragraph 2-5.
3. Remove four screws (13, Figure 9-2), four lock washers (14), three screws (1) and three lock washers (9) and remove cover (4).
4. Disconnect cable (18) from changer (17).
5. Remove two screws (16) and two lock washers (2) and free the charger connector from battery tray (15).
6. Remove two screws (6) two lock washers (7), two flat washers (8) and charger (17).

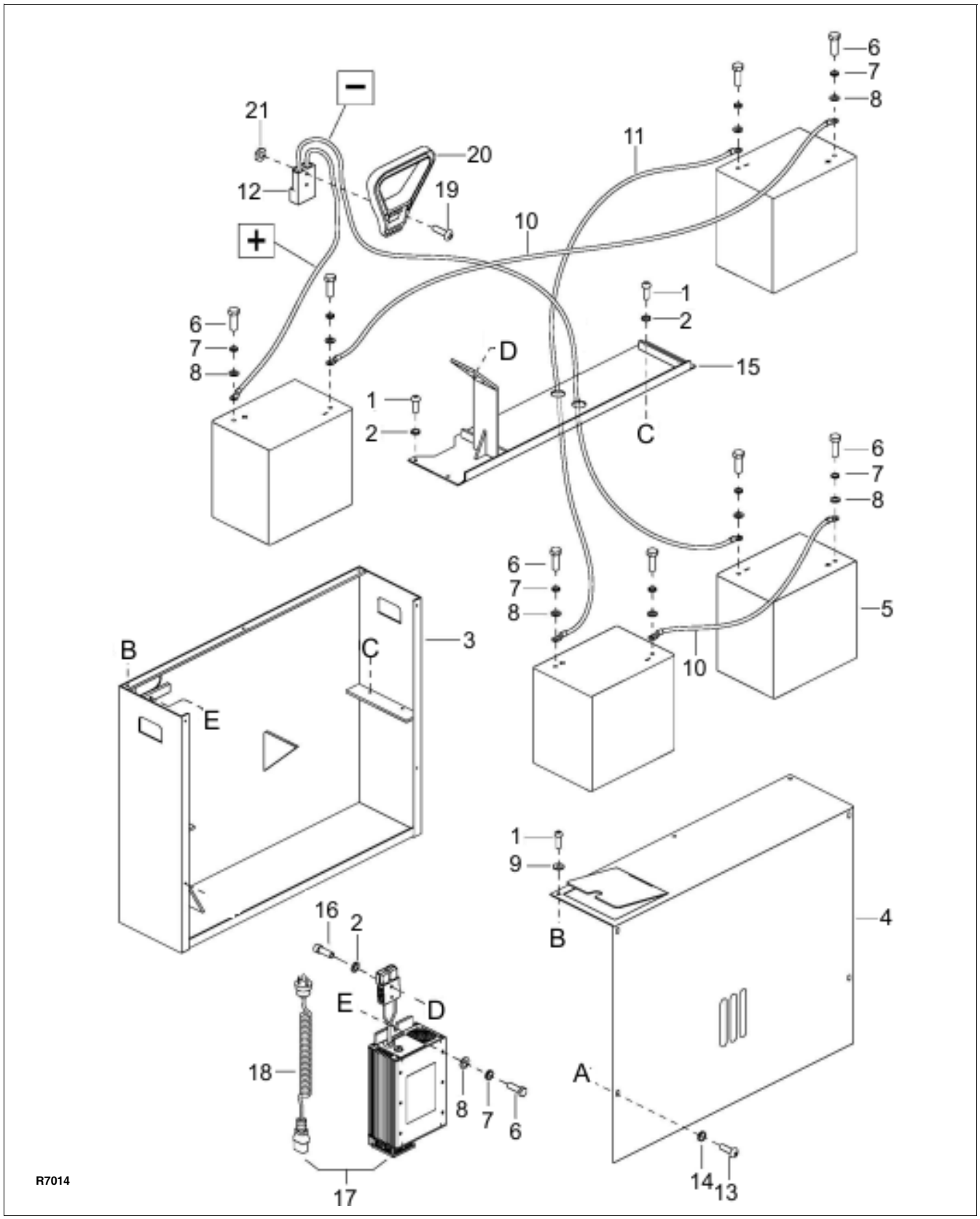

Figure 9-2 Battery Assembly

9-8.2. Installation.

1. Position new charger (17, Figure 9-2) in frame (3) and secure with two screws (6) two lock washers (6), two flat washers (8).
2. Position charger connector on battery tray (15) and secure with two screws (16) and two lock washers (2).
3. Reconnect cable (18) to changer (17).
4. Install cover (4) and secure with four screws (13), four lock washers (14), three screws (1) and three lock washers (9).
5. Install the battery as described in paragraph 2-5.

9-9. LOADING FRAME CABLE REPLACEMENT.

9-9.1. Telescopic

1. With the lift vehicle wheels securely blocked, raise the loading frame approximately three feet and position blocks or strong supports under inner frame (11, Figure 9-3).
2. Lower loading frame onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
4. Disconnect harness (3, Figure 11-12) from harness (1).
5. Disconnect harness (3, Figure 11-12) from harness (25, Figure 11-5).
6. Disconnect harness (3, Figure 11-12) from harness (11, Figure 11-6).
7. Disconnect harness (3, Figure 11-12) from harness (13, Figure 9-7).
8. Disconnect harness (3, Figure 11-12) from harness (18, Figure 9-7).
9. Remove two screws (18, Figure 9-6) and disconnect mount (19) from bracket (20).
10. Disconnect protective chain (44) from mount (19).
11. Remove two screws (38, Figure 9-3), two lock washers (24), two flat washers (25) and clamp (37).
12. Remove two screws (31), two lock washers (52) and disconnect mount (33) from bracket (49).
13. Disconnect protective chain (32) from mount (33).
14. Lift harness with protective chain (32) from sheave (16).
15. Remove harness from the protective chain.
16. Install new harness by reversing the steps above.

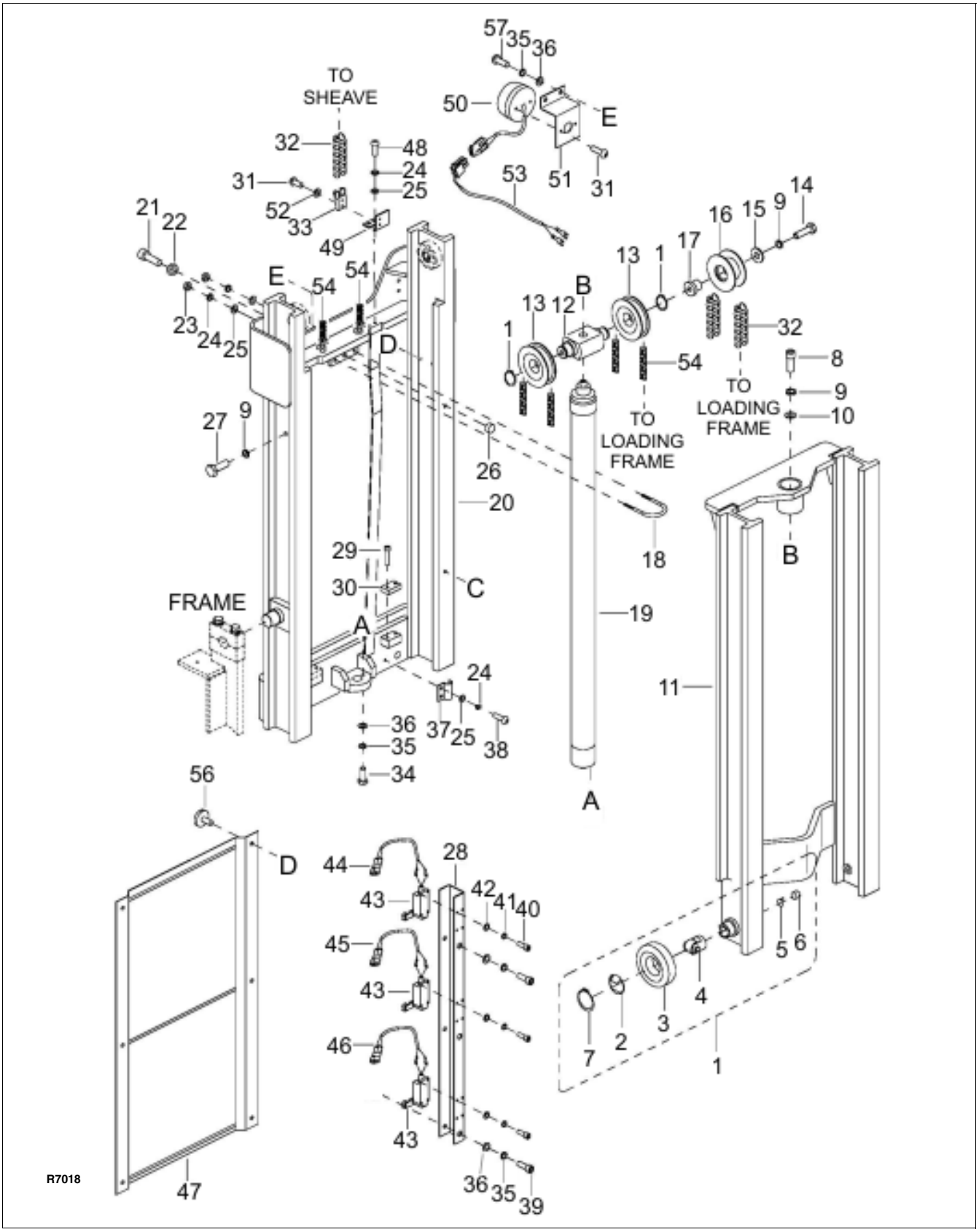

Figure 9-3 Elevation System (Telescopic)

9-9.2. TRIMAST

NOTE: The TRIMAST version uses two protective chains on harness (3, Figure 11-12).

1. With the lift vehicle wheels securely blocked, raise the loading frame approximately three feet and position blocks or strong supports under loading frame (11, Figure 9-6).
2. Lower loading frame onto the support. Check that arrangement is secure before proceeding.
3. Engage the emergency power disconnect switch (6, Figure 11-6) and turn off key switch (3).
4. Disconnect harness (3, Figure 11-12) from harness (1).
5. Disconnect harness (3, Figure 11-12) from harness (25, Figure 11-5).
6. Disconnect harness (3, Figure 11-12) from harness (11, Figure 11-6).
7. Disconnect harness (3, Figure 11-12) from harness (13, Figure 9-7).
8. Disconnect harness (3, Figure 11-12) from harness (18, Figure 9-7).
9. Remove two screws (18, Figure 11-6) and disconnect mount (19) from bracket (20).
10. Disconnect protective chain (45) from mount (19).
11. Remove two screws (23, Figure 9-5) and disconnect mount (25) from bracket (26).
12. Disconnect protective chain (30) from mount (25).
13. Lift harness with protective chain (30) from sheave (13).
14. Remove harness from the protective chain (30).
15. Remove the ties securing the harness to bracket (60).
16. Remove two screws (52, Figure 9-4), two lock washers (53), two flat washers (54) and clamp (55).
17. Remove two screws (50) and disconnect mount (51) from bracket (59).
18. Disconnect protective chain (24) from mount (51).
19. Remove the two clamps (19) from brackets (18) by removing screws (7), lock washers (20), flat washers (21).
20. Remove two screws (23) and disconnect mount (22) from bracket (18).
21. Disconnect protective chain (24) from mount (22).
22. Lift harness with protective chain (24) from sheave (15).
23. Remove harness from the protective chain.
24. Install new harness by reversing the steps above.

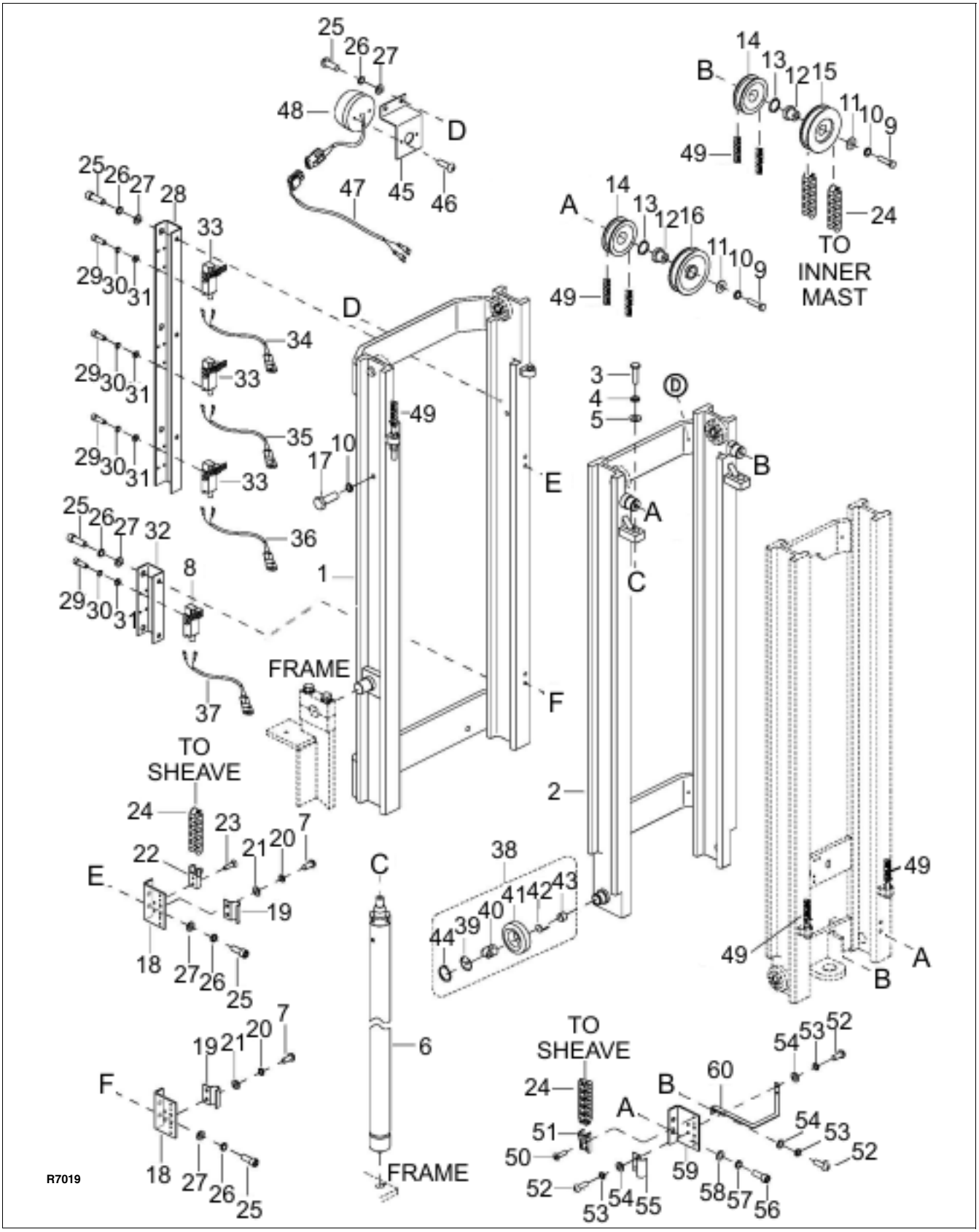

Figure 9-4 Elevation System (TRIMAST - Part 1)

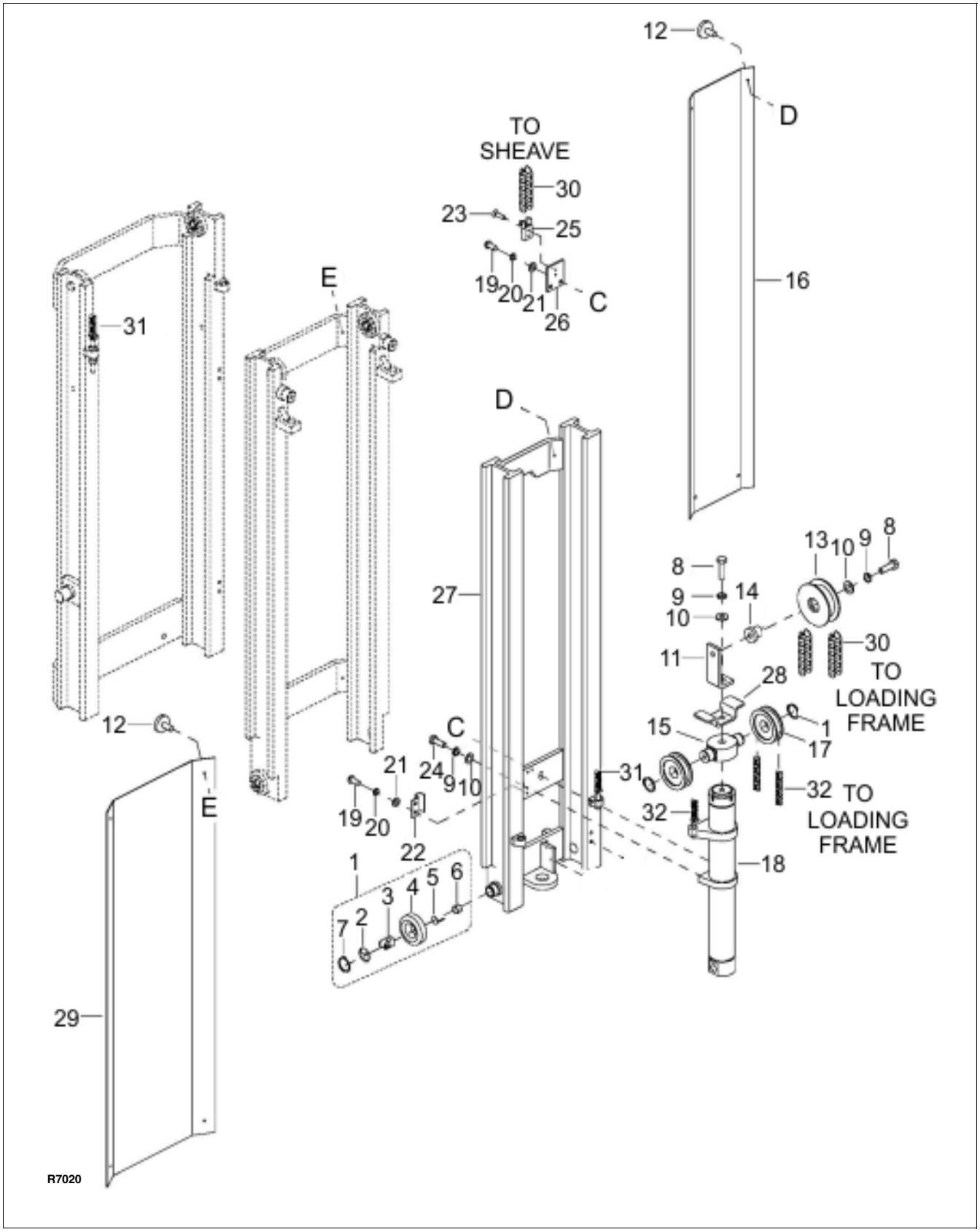

Figure 9-5 Elevation System (TRIMAST - Part 2)

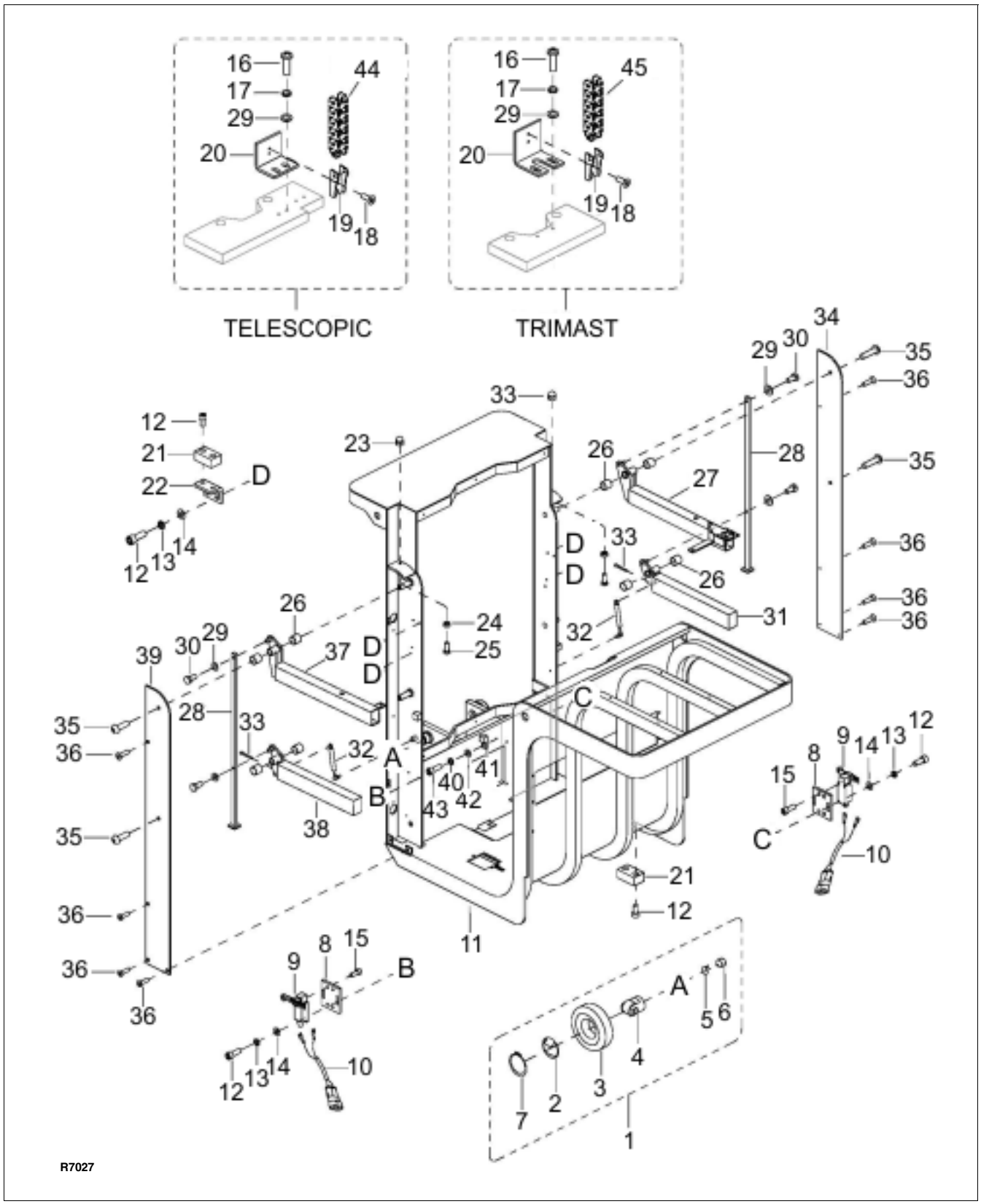

Figure 9-6 Loading Frame Installation

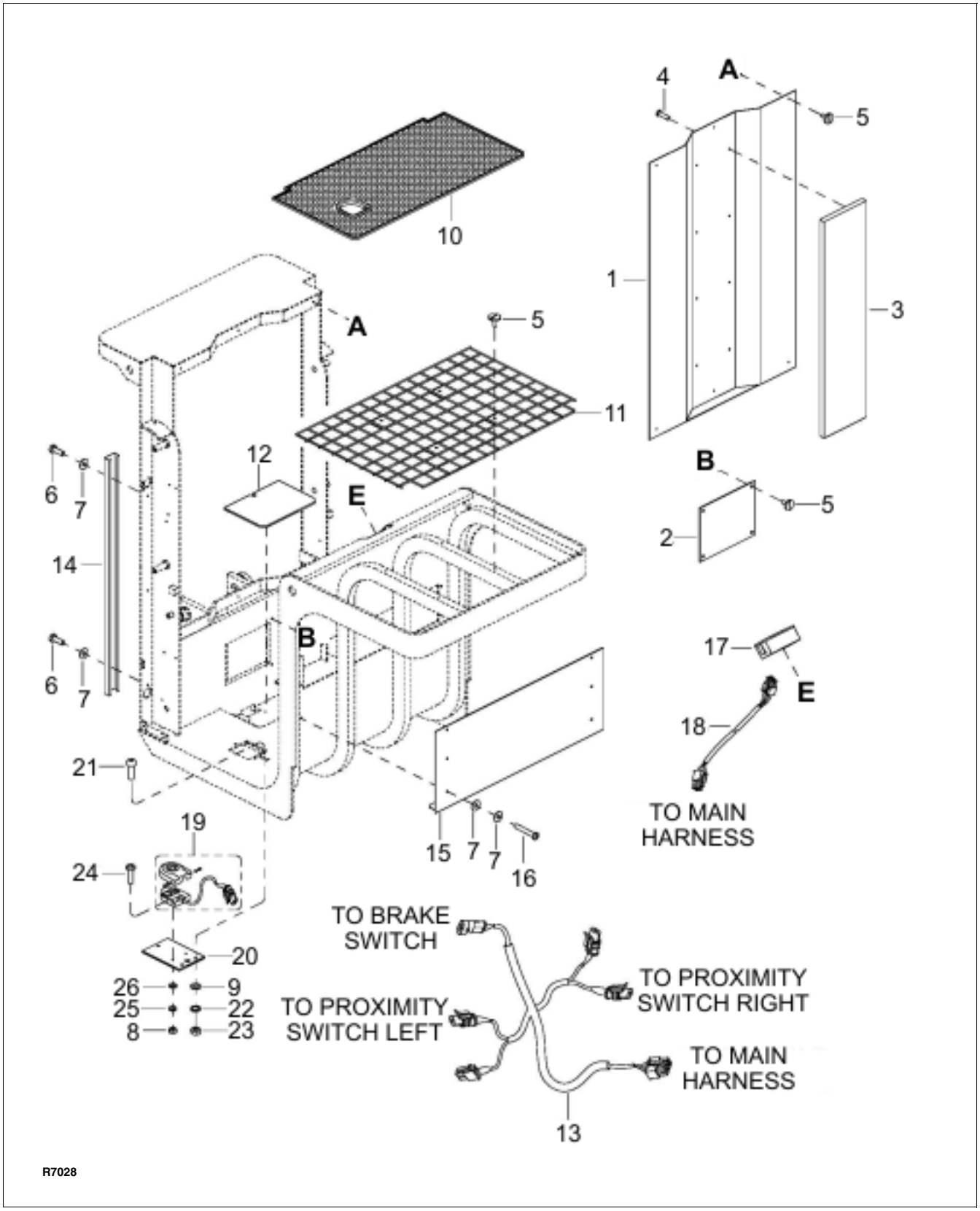

Figure 9-7 Loading Frame Assembly

NOTES

SECTION 10
OPTIONAL EQUIPMENT

10-1. INDUSTRIAL BATTERY

Contact you authorized Big Joe dealer for information on optional batteries and battery chargers.

NOTES

SECTION 11
ILLUSTRATED PARTS BREAKDOWN

Following is an illustrated parts breakdown of assemblies and parts associated with the J1 task support vehicle.

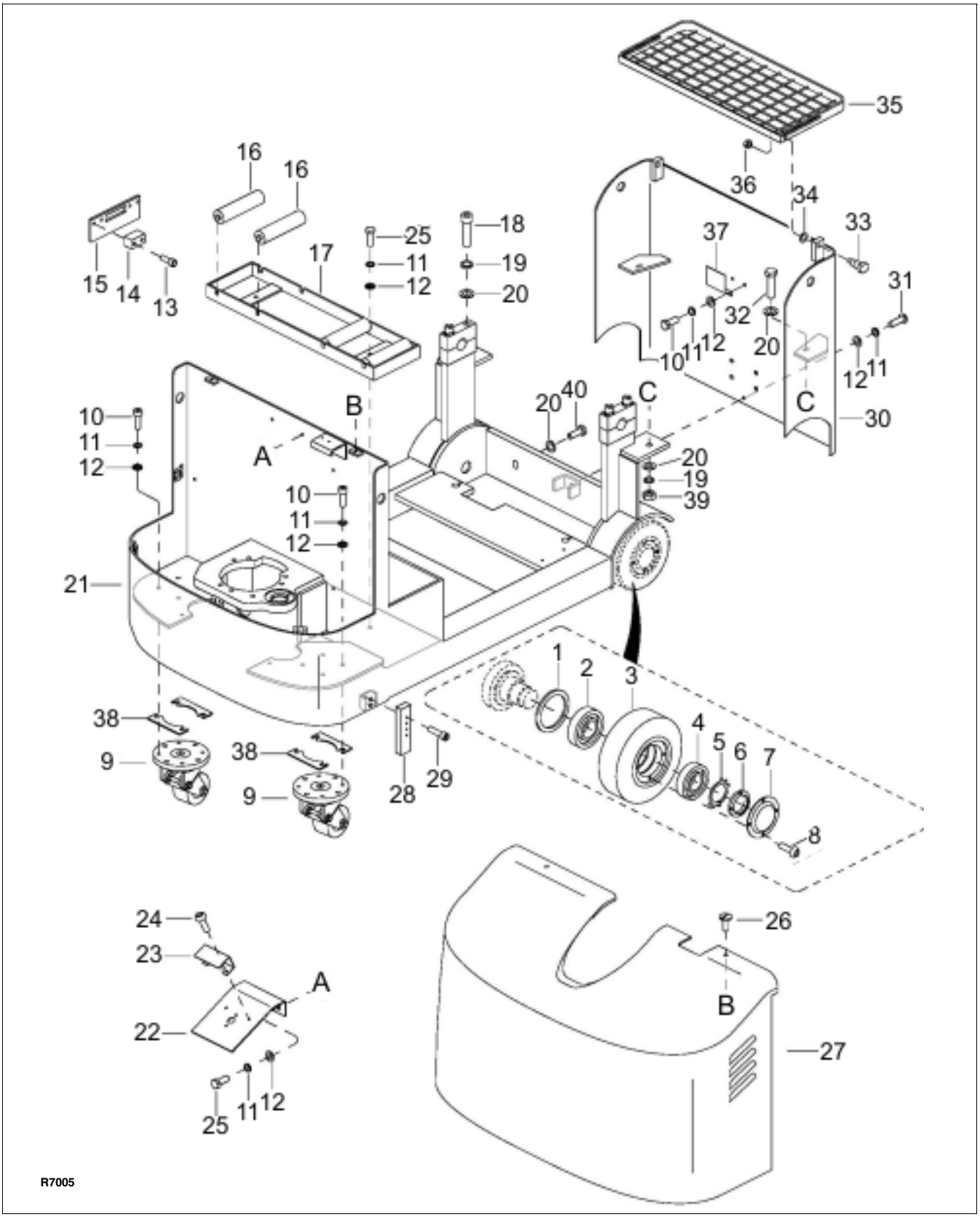

Figure 11-1 Frame

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	0000-000877-00	SEAL, 60 X 85 X 8	2
2	0000-000745-00	BEARING, 33209	2
3	CK11-140001-10	WHEEL	2
4	0000-000744-00	BEARING, 33208	2
5	0000-000928-00	WASHER, CHECK, M36	2
6	0000-000927-00	NUT, M36 X 1.5	2
7	CK11-100005-00	COVER	2
8	0000-000021-00	SCREW, M6 X 12	8
9	—	CASTER ASSEMBLY (FIGURE 11-2)	2
10	0000-000322-00	SCREW, M8 X 25	10
11	0000-000159-00	WASHER, LOCK, M8	15
12	0000-000176-00	WASHER, FLAT, M8	19
13	0000-000109-00	SCREW, M8 X 16	6
14	2125-600005-00	BUFFER BLOCK	2
15	CK10-140001-00	BAFFLE	1
16	2125-102200-0A	ROLLER ASSEMBLY	4
17	2125-102100-00	SIDEWAY FRAME ASSY	1
18	0000-000432-00	SCREW, M16 X 80	4
19	0000-000191-00	WASHER, LOCK, M16	6
20	0000-000220-00	WASHER, FLAT, M16	10

INDEX NO.	PART NO.	PART NAME	NO. REQD.
21	CK10-110000-00	FRAME	1
22	CK10-100001-00	BOARD	1
23	CK10-100004-00	COVER	1
24	0000-000179-00	SCREW, M6 X 10	2
25	0000-000321-00	BOLT, M8 X 20	2
26	0000-000185-00	SCREW, M8 X 16	2
27	CK10-100005-00	COVER	1
28	CK10-100002-00	NYLON ROD	2
29	0000-000006-00	SCREW, M6 X 30	4
30	CK10-120000-00	COVER	1
31	0000-000700-00	SCREW, M8 X 16	1
32	0000-000466-00	BOLT, M16 X 50	2
33	CK10-100003-00	SCREW	2
34	0000-000222-00	WASHER, FLAT, M12	2
35	CK10-130000-00	TRAY	1
36	0000-000740-00	NUT, M8	2
37	CK10-100006-00	CLAMP PLATE	1
38	2130-140004-00	SHIM	AR
39	0000-000232-00	NUT, M16	2
40	0000-000996-00	BOLT, M16 X 40	2

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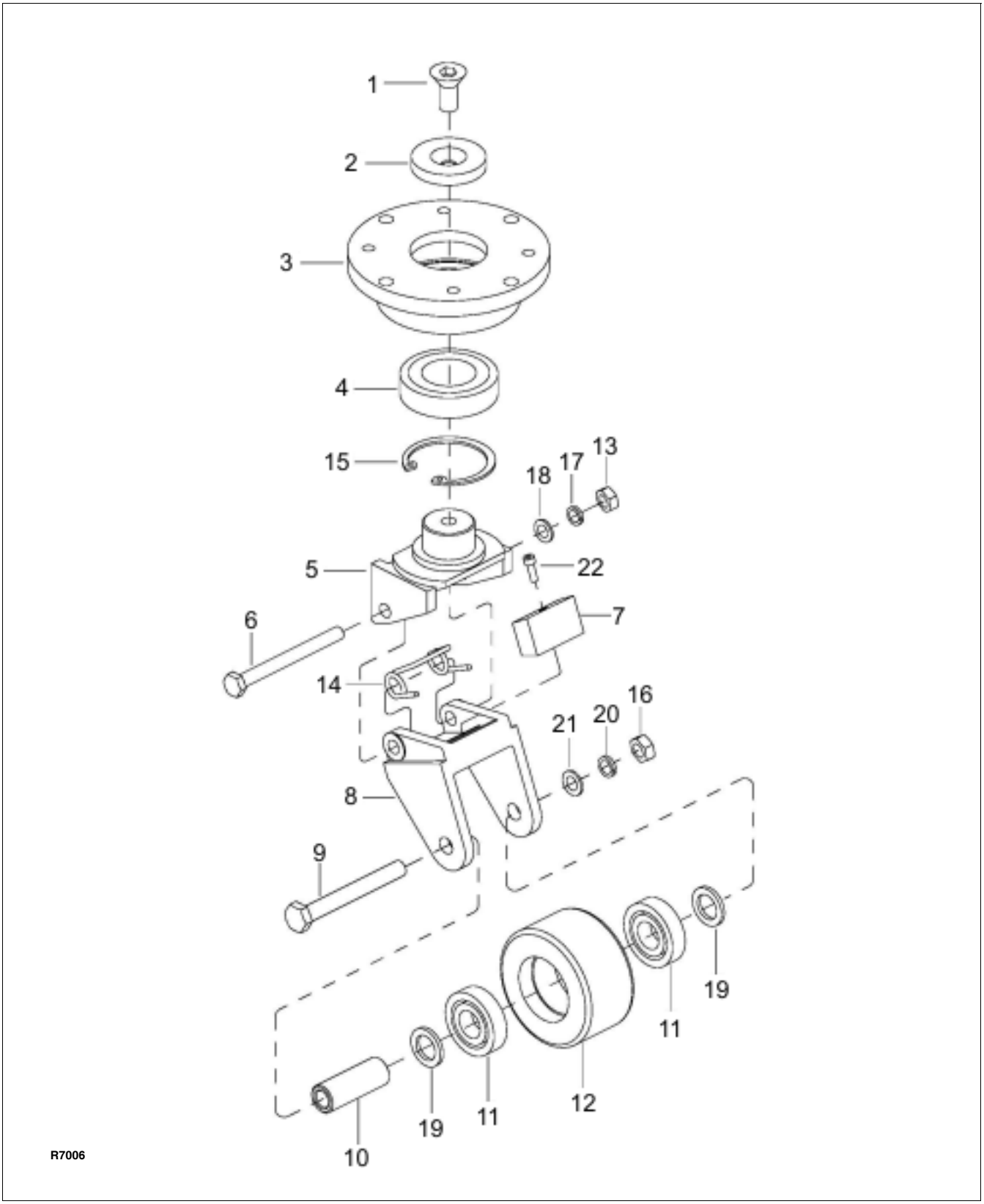

Figure 11-2 Caster Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	1118-140000-00	CASTER ASSEMBLY	2
1	0000-000985-00	• SCREW, M10 X 20	1
2	1118-140003-00	• PLATE	1
3	1118-140001-00	• SUPPORT	1
4	0000-000986-00	• BEARING, 6307	1
5	1118-140002-00	• SUPPORT	1
6	0000-000168-00	• BOLT, M10 X 90	1
7	1120-140003-00	• RUBBER BLOCK	1
8	1120-142000-00	• WHEEL BRACKET	1
9	0000-000495-00	• BOLT, M12 X 85	1
10	1120-143001-00	• SHAFT	1
11	0000-000020-00	• BEARING, 6204	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
12	1120-143003-00	• WHEEL	1
13	0000-000054-00	• NUT, M10	1
14	1120-140004-00	• SPRING	1
15	0000-000987-00	• SNAP RING	1
16	0000-000165-00	• NUT, M12	1
17	0000-000063-00	• WASHER, LOCK, M10	1
18	0000-000007-00	• WASHER, FLAT, M10	1
19	0000-000435-00	• WASHER, FLAT, M20	2
20	0000-000060-00	• WASHER, LOCK, M12	1
21	0000-000373-00	• WASHER, FLAT, M12	1
22	0000-000004-00	• SCREW, M5 X 12	1

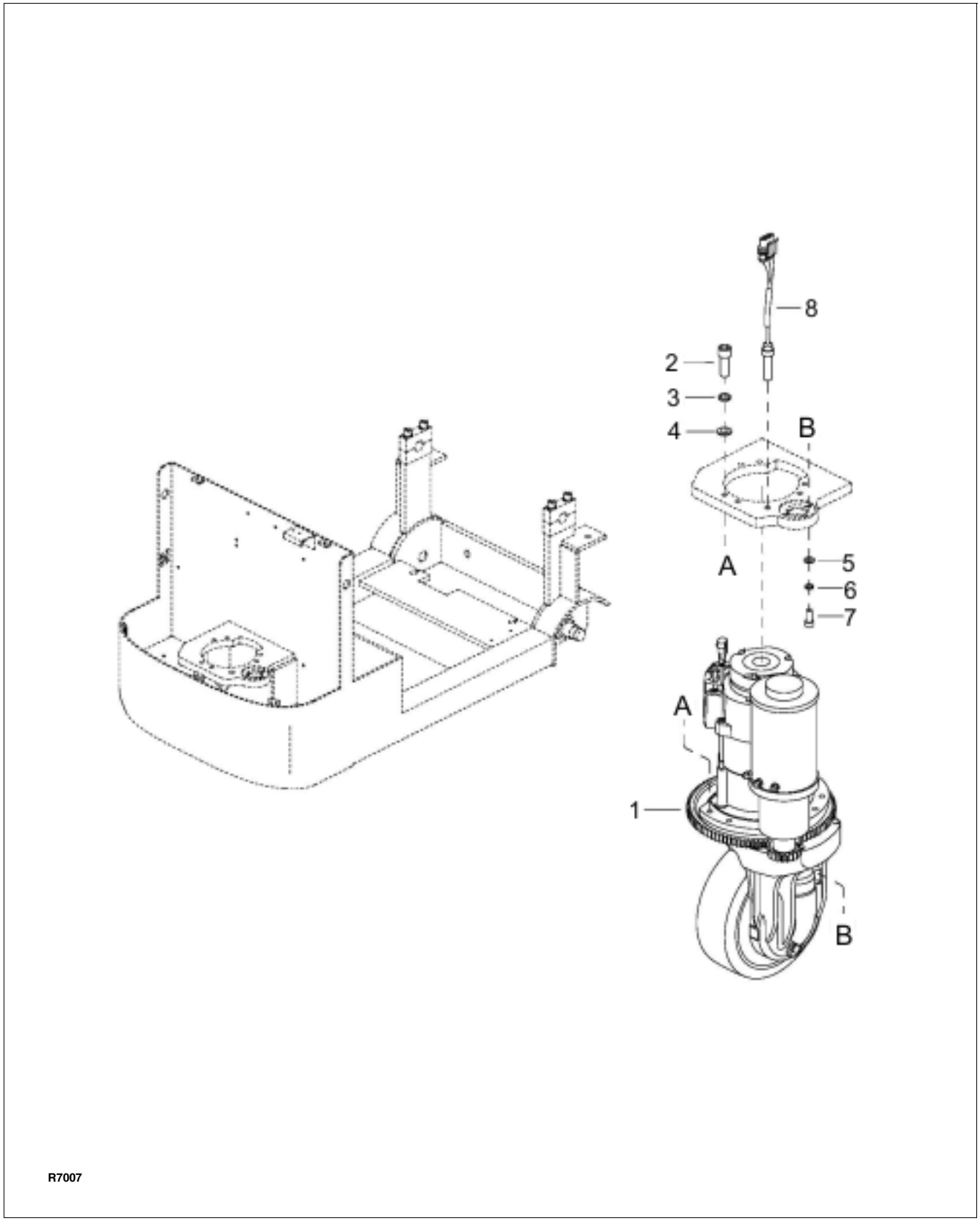

Figure 11-3 Drive System

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	—	DRIVE ASSEMBLY (FIGURE 11-4)	REF
2	0000-000922-00	SCREW, M10 X 35	6
3	0000-000063-00	WASHER, LOCK, M10	6
4	0000-000007-00	WASHER, FLAT, M10	6

INDEX NO.	PART NO.	PART NAME	NO. REQD.
5	0000-000176-00	WASHER, FLAT, M8	3
6	0000-000159-00	WASHER, LOCK, M8	3
7	0000-000322-00	SCREW, M8 X 25	3
8	3316-700003-00	SWITCH ASSEMBLY	1

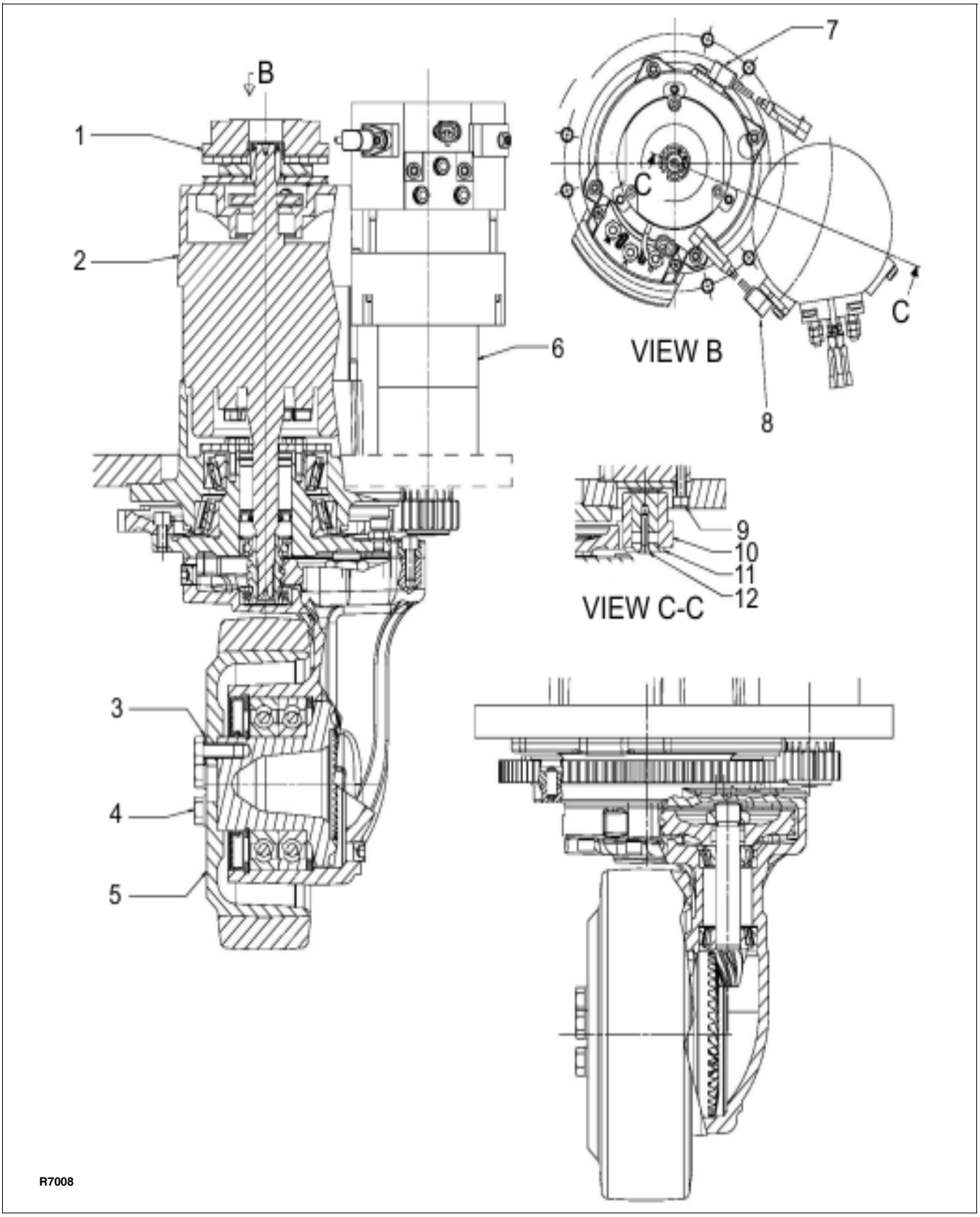

Figure 11-4 Drive Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	CK11-210000-00	DRIVE ASSEMBLYY	1
1	CK11-210037-00	• BRAKE	1
2	CK11-210036-00	• DRIVE MOTOR	1
3	0000-000063-00	• WASHER, LOCK, M10	5
4	0000-000251-00	• BOLT, M10 X 25	5
5	CK11-210033-00	• DRIVE WHEEL	1
6	CK11-210039-00	• STEERING MOTOR	1
7	CK11-210041-00	• ENCODER, DRIVE MOTOR	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	CK11-210042-00	• ENCODER, STEERING MOTOR	1
9	0000-000322-00	• SCREW, M8 X 25	3
10	CK11-210038-00	• MOTOR GEAR	1
11	CK11-210040-00	• SNAP RING	1
12	0000-000697-00	• SCREW, M6 X 30	1

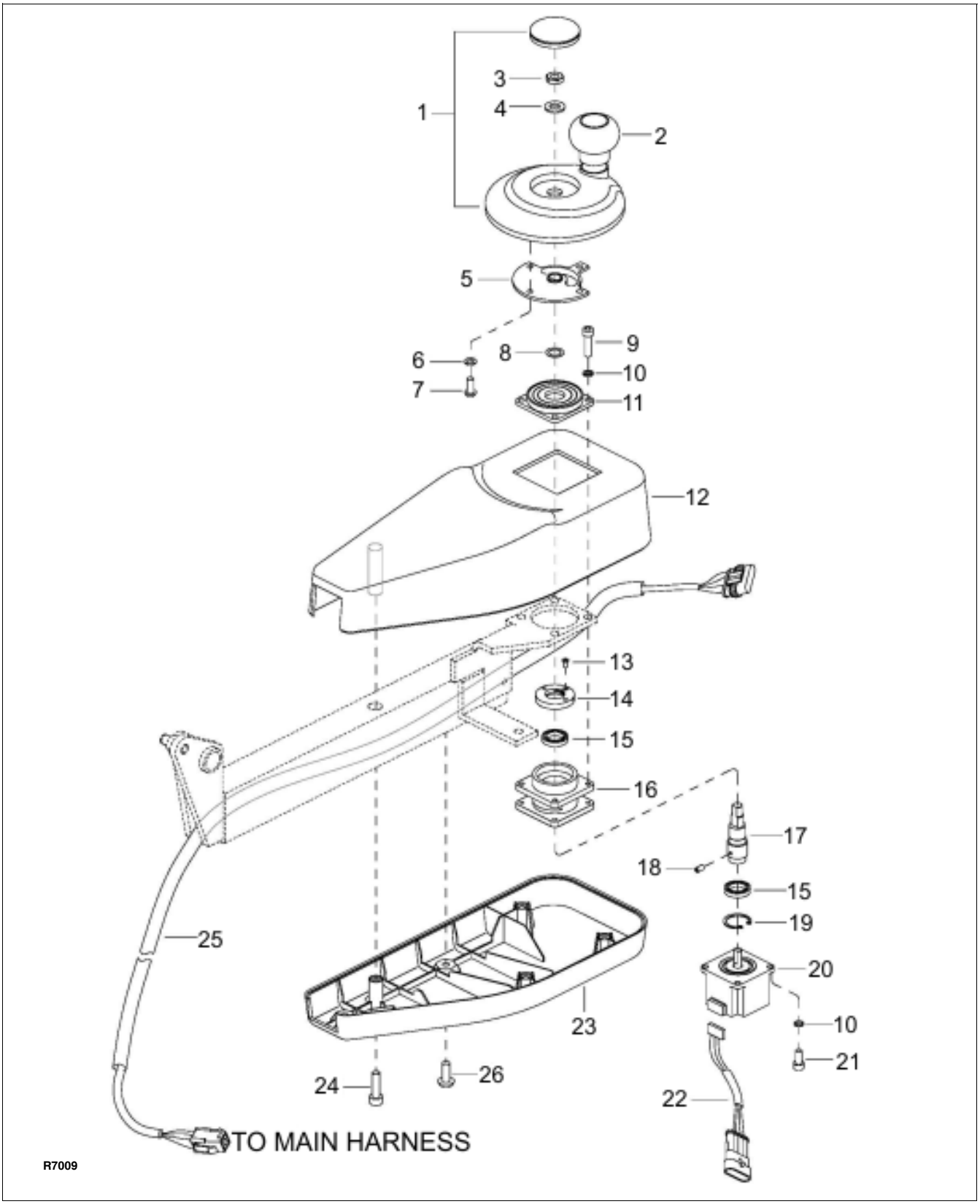

Figure 11-5 Control Arm (Left)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	CK11-310002-00	STEERING WHEEL	1
2	CK11-311000-00	• HANDLE BALL	1
3	0000-000951-00	• NUT, M10 X 1.5	1
4	0000-000063-00	• WASHER, LOCK, M10	1
5	3316-311202-00	BRACKET	1
6	0000-000702-00	WASHER, FLAT, M4	4
7	0000-000646-00	SCREW, M4 X 10	4
8	3316-311204-00	SHIM	AR
9	0000-000035-00	BOLT, M5 X 20	4
10	0000-000206-00	WASHER, LOCK, M5	8
11	3316-311203-00	DAMPER	1
12	CK10-310003-00	UPPER COVER	1
13	0000-000939-00	SCREW, M3 X 6	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
14	3316-311205-00	NUT	1
15	0000-000937-00	BEARING, 61803	2
16	3316-311206-00	BEARING BLOCK	1
17	3316-311201-00	SHAFT	1
18	0000-000416-00	SCREW, M4 X 8	1
19	0000-000941-00	SNAP RING	1
20	CK11-560002-00	POTENTIOMETER	1
21	0000-000004-00	SCREW, M5 X 12	4
22	CK11-520007-00	HARNESS, MOTOR	1
23	CK10-310004-00	LOWER COVER	1
24	0000-000661-00	SCREW, M5 X 20	4
25	CK10-520002-00	HARNESS	1
26	0000-000001-00	SCREW, M6 X 20	2

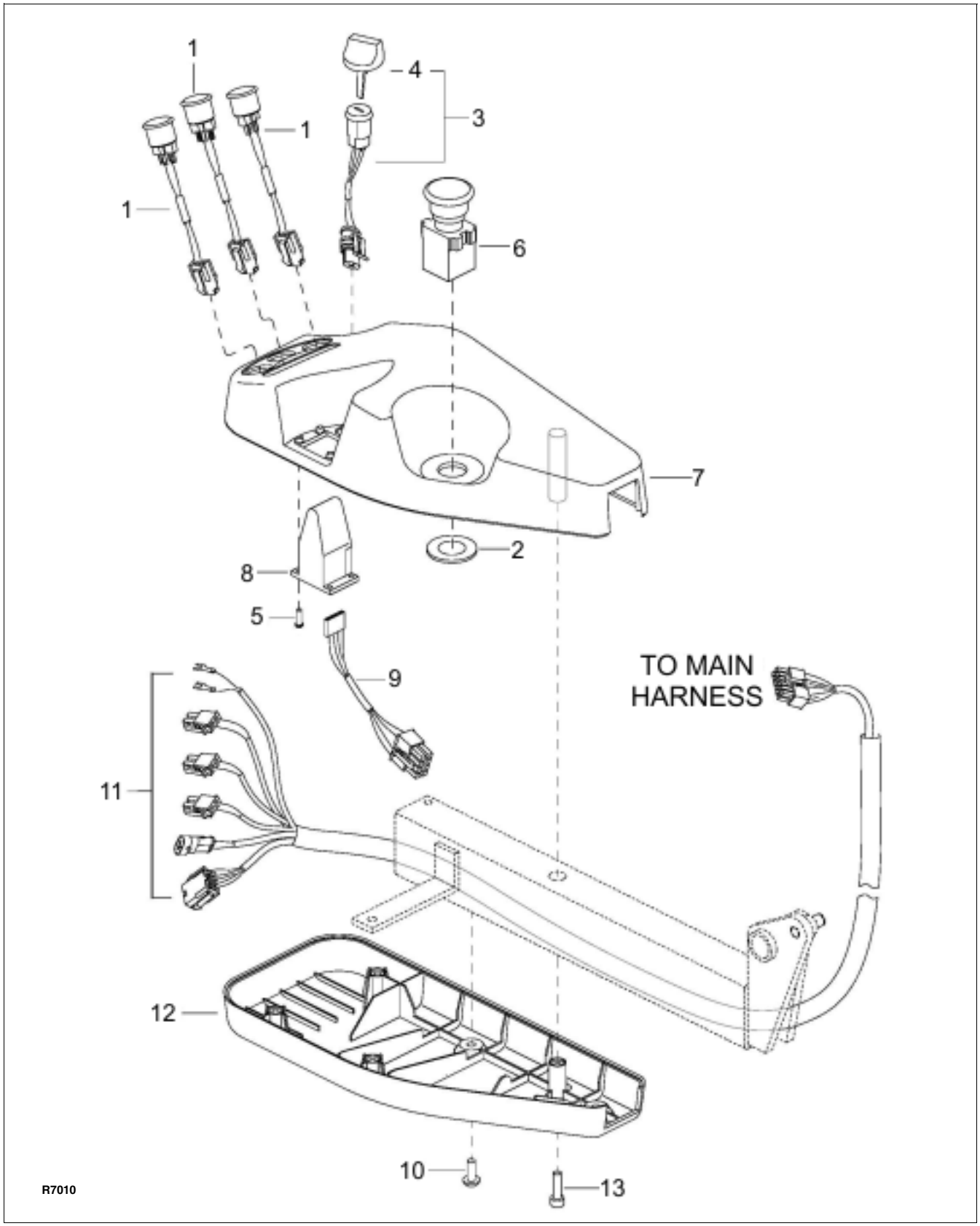

Figure 11-6 Control Arm (Right)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	CK11-520012-00	BOTTON	3
2	0000-001002-00	WASHER, FLAT, M22	1
3	CK11-520009-00	SWITCH, KEY	1
4	1115-500016-00	KEY	2
5	0000-000998-00	SCREW, M3 X 8	4
6	3218-604000-00	EMERGENCY POWER DIS-CONNECT SWITCH	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
7	CK10-320001-00	UPPER COVER	1
8	CK11-560003-00	TRAVEL SWITCH	1
9	CK11-520008-00	HARNESS, SWITCH	1
10	0000-000001-00	SCREW, M6 X 20	2
11	CK10-520003-00	HARNESS	1
12	CK10-320002-00	LOWER COVER	1
13	0000-000661-00	SCREW, M5 X 20	4

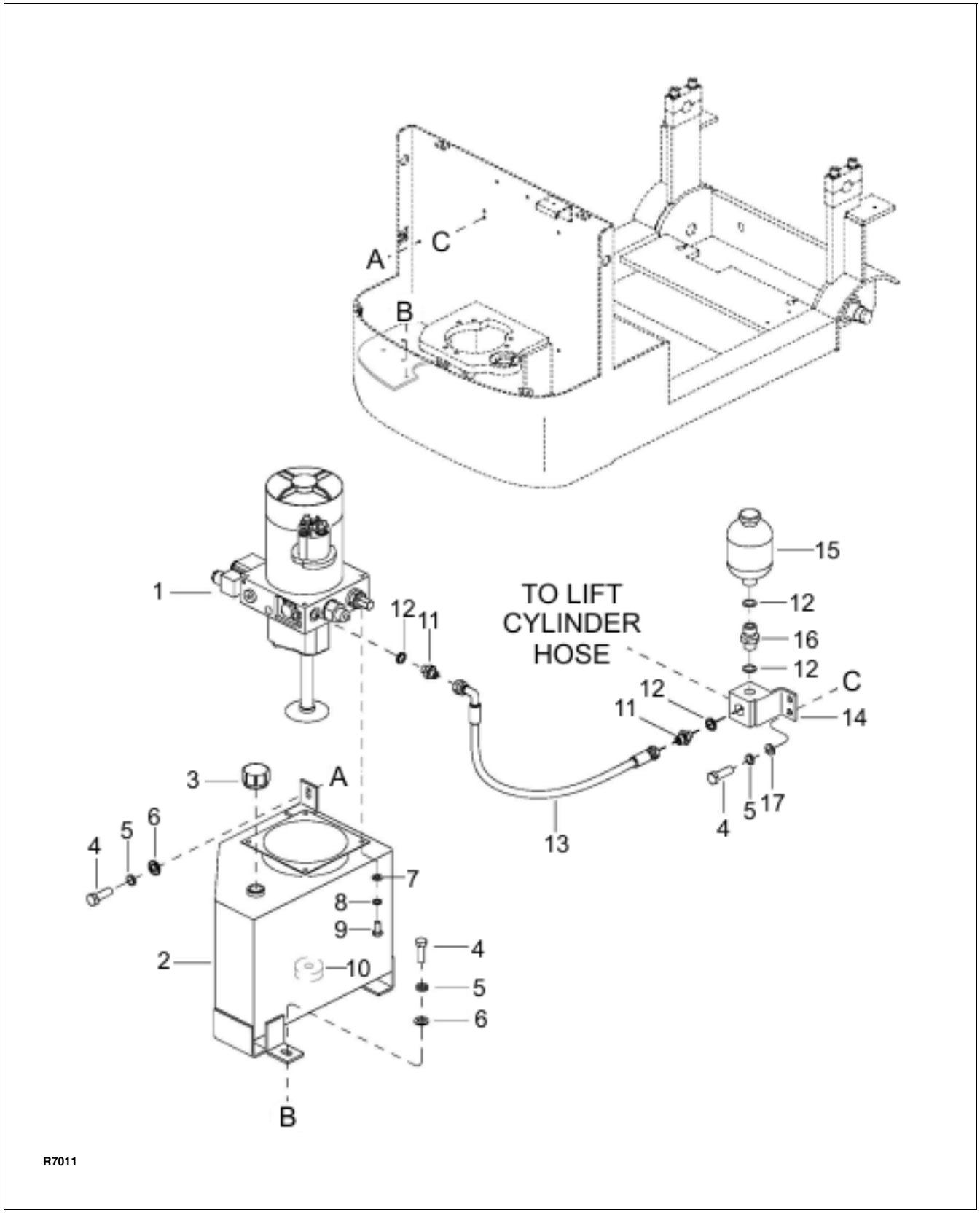

Figure 11-7 Hydraulic System

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	—	HYDRAULIC PUMP ASSEMBLY (FIGURE 11-8)	1
2	CK11-131000-00	RESERVOIR	1
3	2125-423000-00	BREATHER	1
4	0000-000433-00	SCREW, M8 X 12	4
5	0000-000159-00	WASHER, LOCK, M8	4
6	000-00014-00	WASHER, FLAT, M8	2
7	0000-000380-00	WASHER, FLAT, M6	4
8	0000-000056-00	WASHER, LOCK, M6	4
9	0000-000620-00	BOLT, M6 X 16	4

INDEX NO.	PART NO.	PART NAME	NO. REQD.
10	2125-420001-00	MAGNET	1
11	2702-141600-00	CONNECTOR, G1/4-M16 X 1.5	2
12	0000-000044-00	WASHER, M14	4
13	CK10-480000-30	TUBE	1
14	2112-440000-10	MANIFOLD	1
15	CK11-450000-00	ACCUMULATOR	1
16	2701-141400-00	CONNECTOR, M14 X 1.5-M14 X 1.5	1
17	0000-000176-00	WASHER, FLAT, M8	2

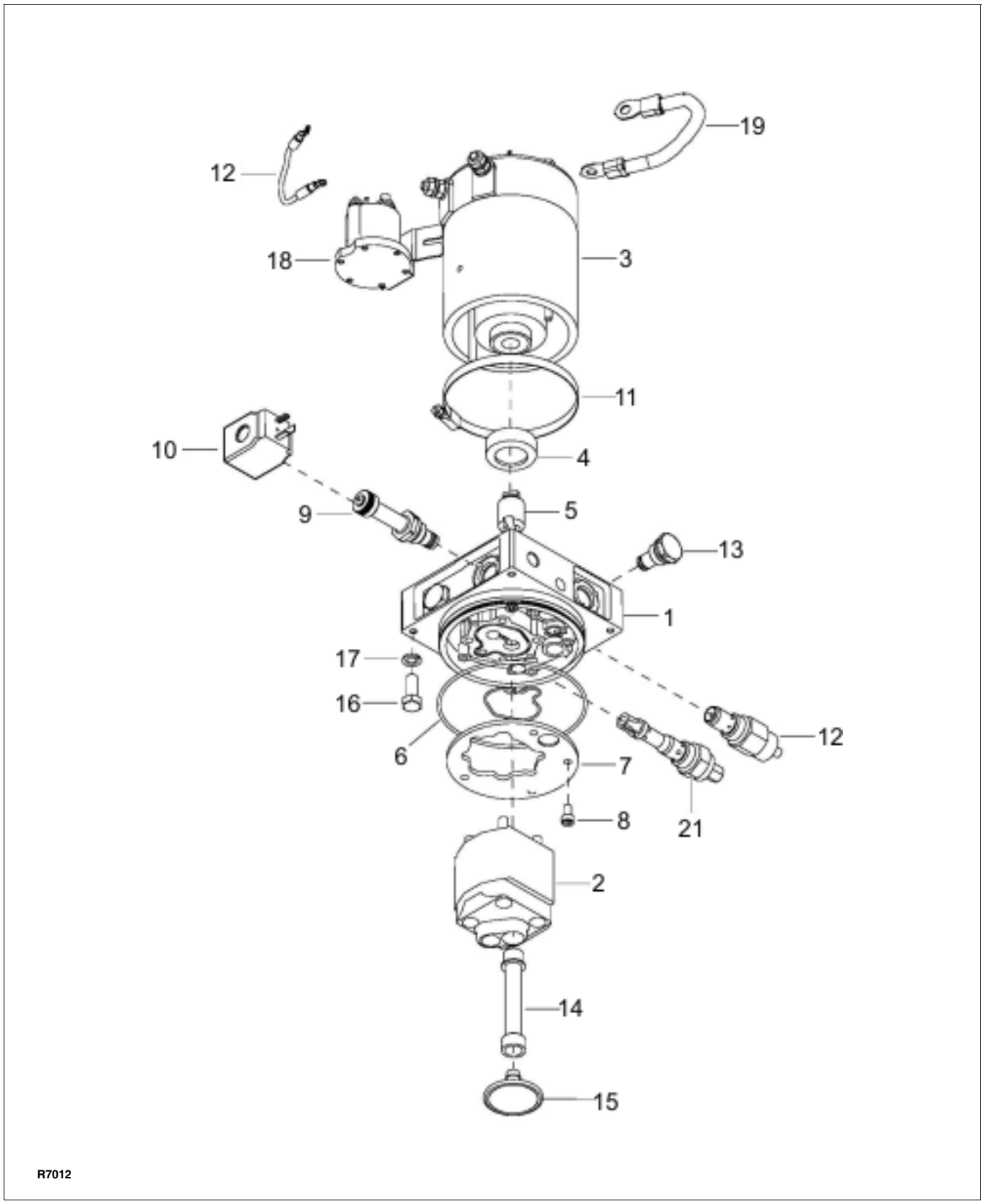

Figure 11-8 Hydraulic Pump Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	CK10-490000-30	HYDRAULIC PUMP ASSEMBLY	1
1	CK11-410001-00	• ADAPTER	1
2	CK10-490001-30	• PUMP	1
3	CK11-410003-00	• MOTOR	1
4	CK11-410004-00	• BUSHING	1
5	CK11-410005-00	• COUPLING	1
6	CK11-410006-00	• SEAL KIT	1
7	CK11-410007-00	• FILTER SCREEN	1
8	0000-000077-00	• SCREW, M6 X 12	4
9	CK10-490002-30	• RELEASE VALVE	1
10	CK11-410009-00	• SOLENOID VALVE	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
11	CK11-410010-00	• CLAMP	1
12	CK10-490003-30	• VALVE	1
13	CK11-410012-00	• VALVE, CAVITY PLUG	1
14	CK11-410013-00	• TUBE	2
15	CK11-410014-00	• STRAINER	1
16	0000-000620-00	• BOLT, M6 X 16	4
17	0000-000056-00	• WASHER, LOCK, M6	4
18	CK11-410015-00	• RELAY	1
19	CK11-410016-00	• CABLE	1
20	CK11-410017-00	• WIRE	1
21	CK10-490004-30	RELIEF VALVE	1

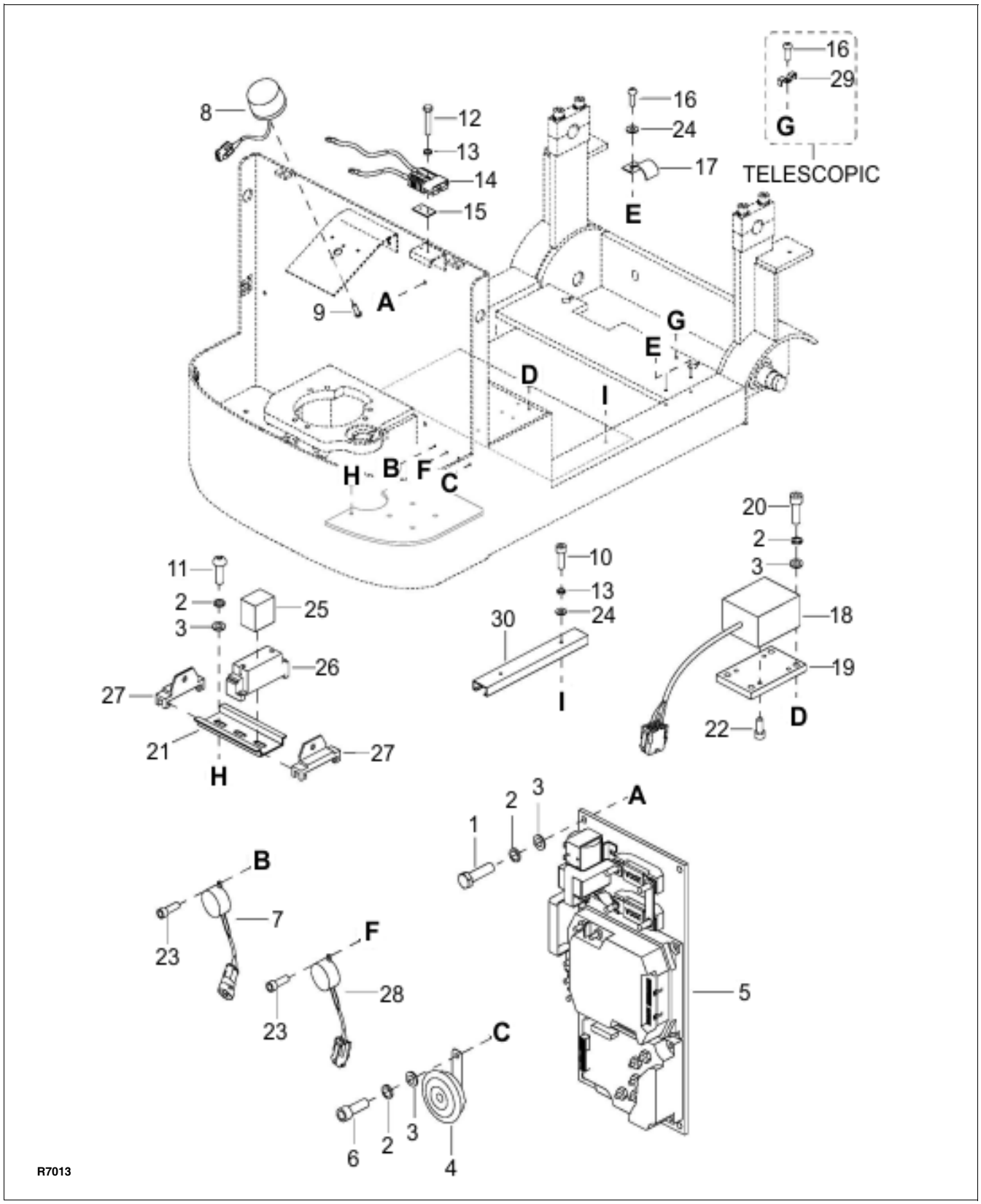

Figure 11-9 Electrical System

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	**0000-000255-00**	BOLT, M8 X 20	4
2	0000-000159-00	WASHER, LOCL, M8	10
3	0000-000194-00	WASHER, FLAT, M8	10
4	1120-500003-00	HORN	1
5	—	CONTROL PANEL (FIGURE 11-11)	REF
6	0000-000118-00	SCREW, M8 X 10	1
7	CK11-520011-00	BUZZER, LOWERING	1
8	CK10-520015-00	WARNING LIGHT	1
9	0000-000998-00	SCREW, M3 X 8	2
10	0000-000384-00	SCREW, M6 X 40	2
11	0000-000700-00	SCREW, M8 X 16	1
12	0000-000276-00	BOLT, M6 X 45	2
13	0000-000056-00	WASHER, LOCK, M6	4
14	CK10-531100-00	CONNECTOR, BATTERY	1
15	1120-112008-00	PLATE	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
16	0000-00179-00	SCREW, M6 X 10	3
17	CK10-510033-00	CLAMP	2
18	CK10-520009-00	LEVEL SENSOR	1
19	CK10-510016-00	MOUNTING PLATE	1
20	0000-000321-00	SCREW, M8 X 20	4
21	CK11-510009-00	MOUNTING BRACKET	1
22	0000-000609-00	SCREW, M4 X 10	4
23	0000-000088-00	SCREW, M4 X 8	2
24	0000-000123-00	WASHER, FLAT, M6	4
25	2110-500005-00	RELAY	1
26	2110-500004-00	RELAY SET	1
27	2110-500003-00	RELAY SET CLIP	2
28	1115-520015-00	BUZZER, LEVEL SENSOR	1
29	1220-100002-00	CLAMP	1
30	CK10-510032-00	WIRE GUARD	1

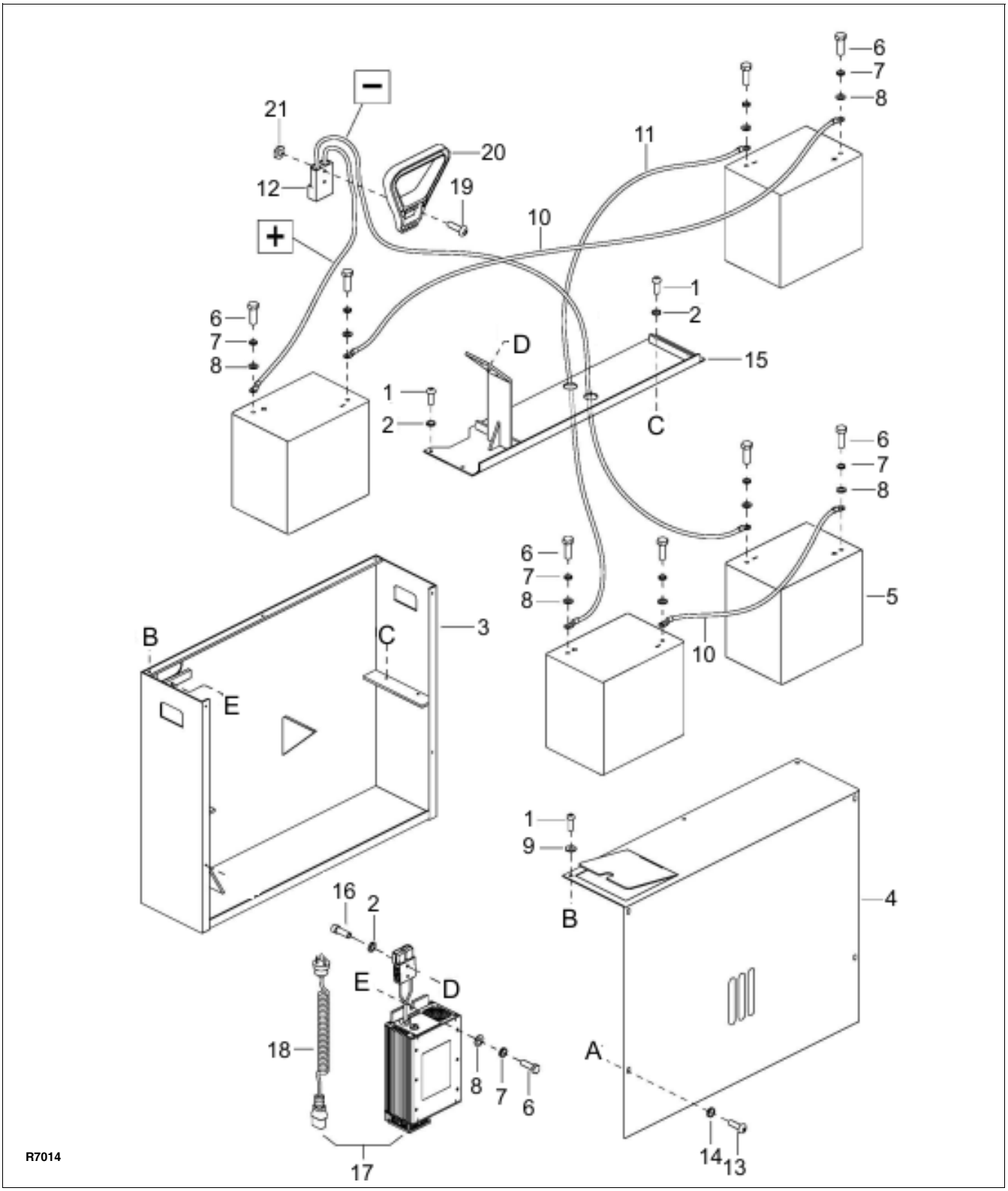

Figure 11-10 Battery Assembly

NOTE: Contact your authorized Big Joe dealer for information on optional batteries and charges.

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	0000-000618-00	BOLT, M6 X 12	7
2	0000-000056-00	WASHER, LOCK, M6	6
3	CK11-121000-00	BATTERY FRAME	1
4	CK11-123000-00	BATTERY COVER	1
5	1145-553006-20	BATTERY	4
6	0000-000242-00	BOLT, M8 X 16	10
7	0000-000159-00	WASHER, LOCK, M8	10
8	0000-000176-00	WASHER, FLAT, M8	10
9	0000-000123-00	WASHER, FLAT, M6	3
10	CK11-532001-00	M1 CABLE	2
11	CK11-532002-00	M2 CABLE	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
12	CK11-532100-00	CONNECTOR, BATTERY	1
13	0000-000381-00	SCREW, M5 X 10	4
14	0000-000206-00	WASHER, LOCK, M5	4
15	CK11-122000-00	BATTERY TRAY	1
16	0000-000006-00	SCREW, M6 X 30	2
17	1120-560000-00	CHARGER	1
18	1115-500006-20	CABLE, CHARGER	1
19	0000-000102-00	SCREW, M6 X 45	2
20	2125-560001-00	HANDLE	1
21	0000-000166-00	NUT, M6	2

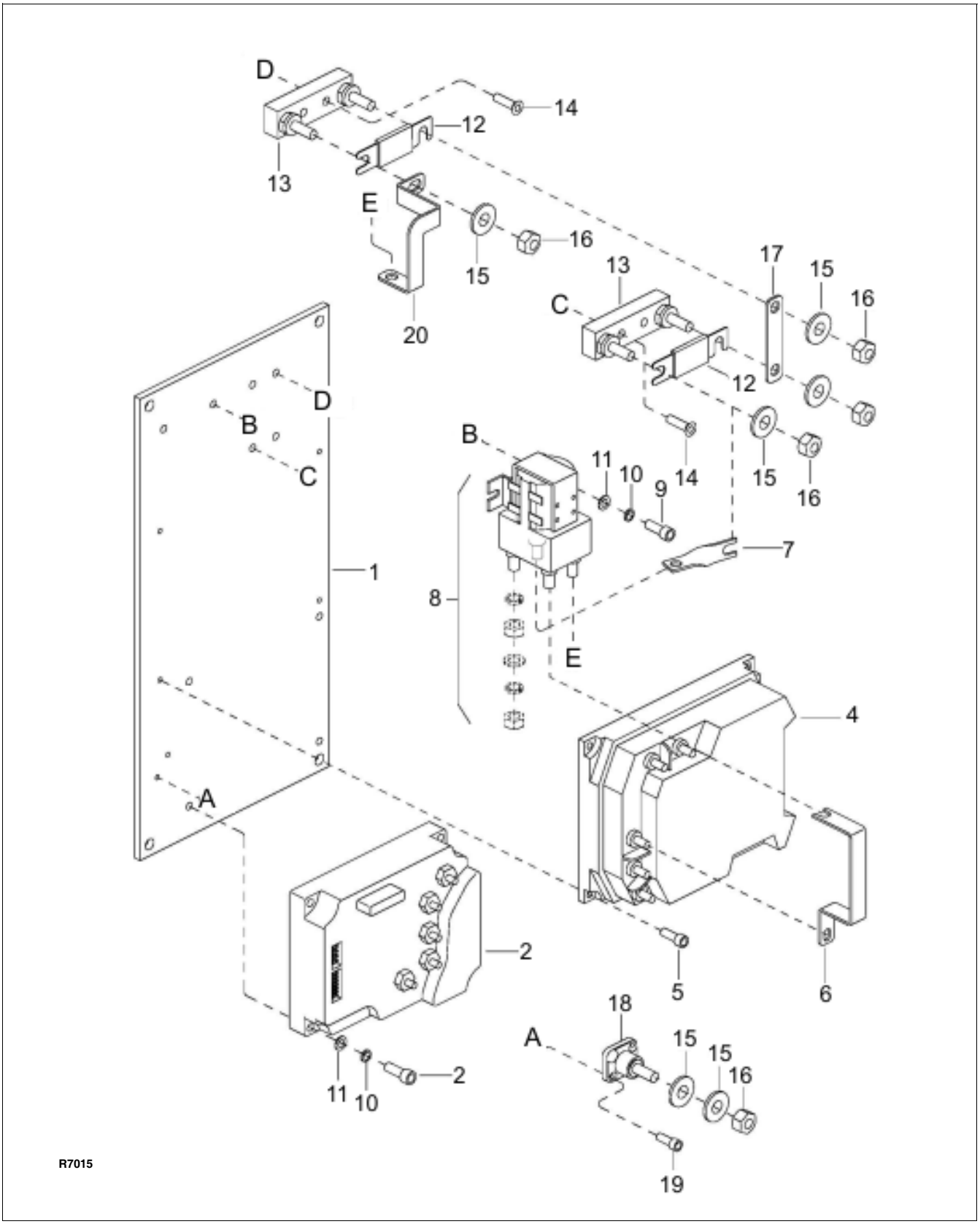

Figure 11-11 Control Panel

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	CK10-510001-00	PANEL	1
2	1280-560002-00	EPS CONTROLLER	1
3	0000-000032-00	SCREW, M6 X 25	4
4	CK11-560004-00	CONTROLLER, ACO-SSL150A	1
5	0000-000004-00	SCREW, M5 X 12	4
6	CK11-510002-00	BUS BAR	1
7	1120-530006-00	BUS BAR	1
8	CK10-560001-00	CONTACTOR	1
9	0000-000077-00	SCREW, M6 X 12	2
10	0000-000056-00	WASHER, LOCK, M6	6

INDEX NO.	PART NO.	PART NAME	NO. REQD.
11	0000-000380-00	WASHER, FLAT, M6	6
12	1120-540002-00	FUSE, 200A	2
13	1120-540001-00-B	FUSE HOLDER	2
14	0000-000074-00	SCREW, M6 X 20	4
15	0000-000210-00	WASHER, FLAT, M8	6
16	0000-000196-00	NUT, M8	5
17	2322-510003-00	BUS BAR	1
18	1220-500005-00	TERMINAL	1
19	0000-000088-00	SCREW, M4 X 8	2
20	CK10-510002-00	BUS BAR	1

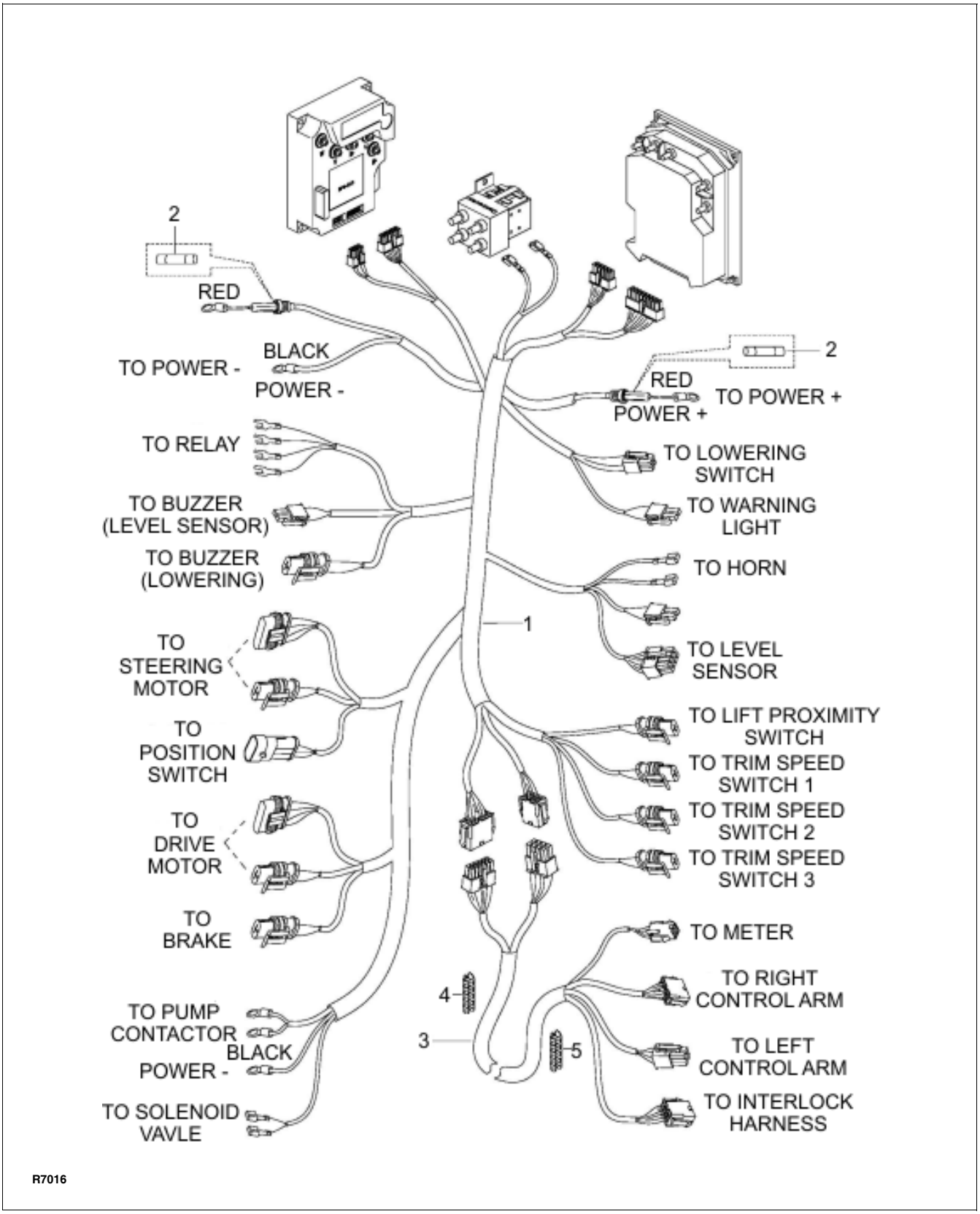

Figure 11-12 Wiring Harness

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	CK10-520001-00	MAIN HARNESS	1
2	1120-500010-00	FUSE, 10A	2
3	CK10-520010-00	HARNRESS (TELESCOPIC)	1
3	CK10-520010-30	HARNRESS (TRIMAST)	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
4	—	CABLE PROTECTIVE CHAIN (TRIMAST) (FIGURE 11-16)	REF
5	—	CABLE PROTECTIVE CHAIN (TRIMAST) (FIGURE 11-15)	REF

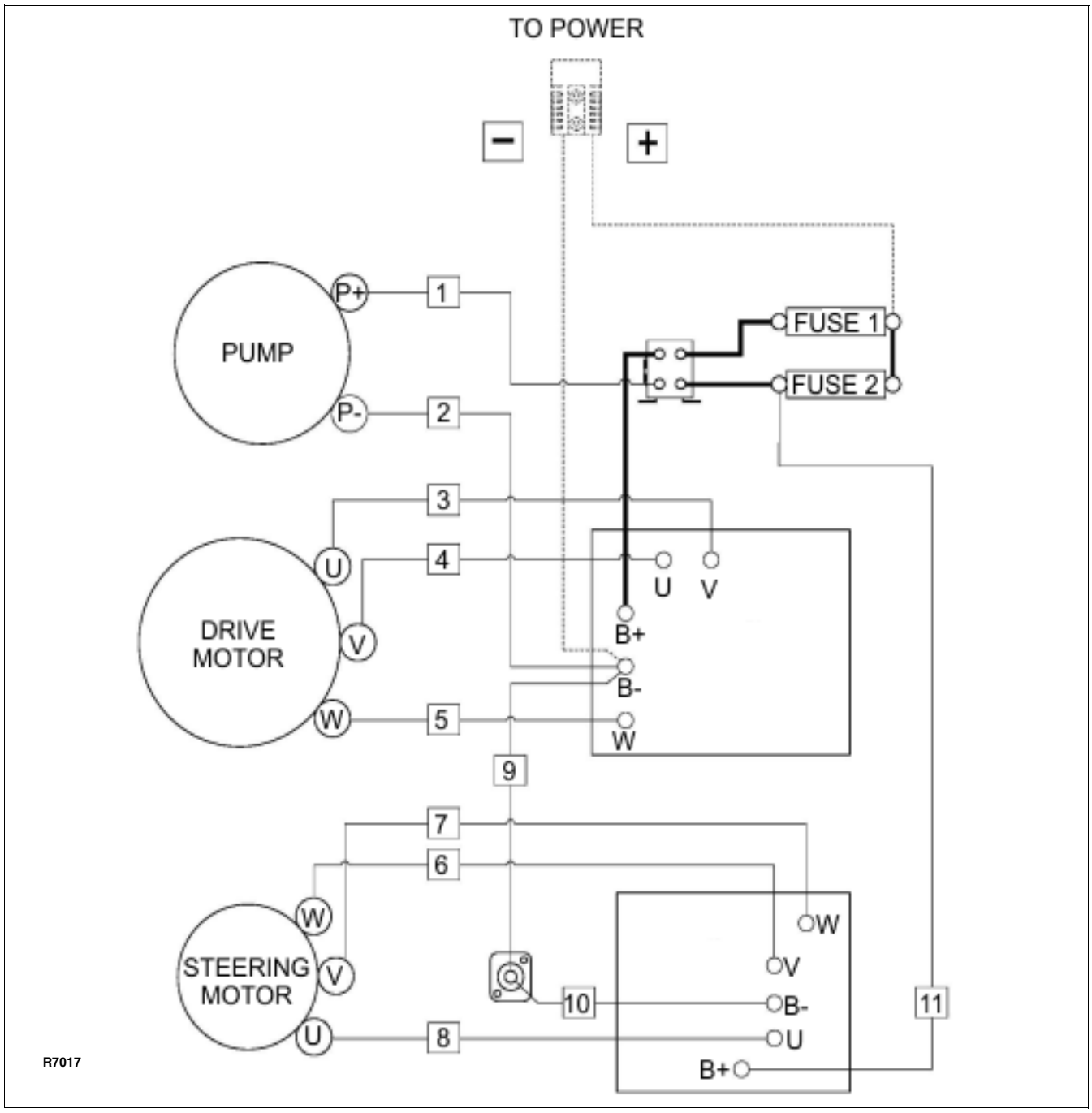

Figure 11-13 Wiring Cables

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	CK10-531009-00	CABLE, PUMP P+	1
2	CK10-531010-00	CABLE, PUMP P-	1
3	CK10-531001-00	CABLE, DRIVE MOTOR U	1
4	CK10-531002-00	CABLE, DRIVE MOTOR V	1
5	CK10-531003-00	CABLE, DRIVE MOTOR W	1
6	CK10-531006-00	CABLE, STEER MOTOR W	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
7	CK10-531005-00	CABLE, STEER MOTOR V	1
8	CK10-531004-00	CABLE, STEER MOTOR U	1
9	CK10-531013-00	CABLE, ACO -	1
10	CK10-531007-00	CABLE, EPS-ACO -	1
11	CK10-531008-00	CABLE, EPS-ACP +	1

NOTES

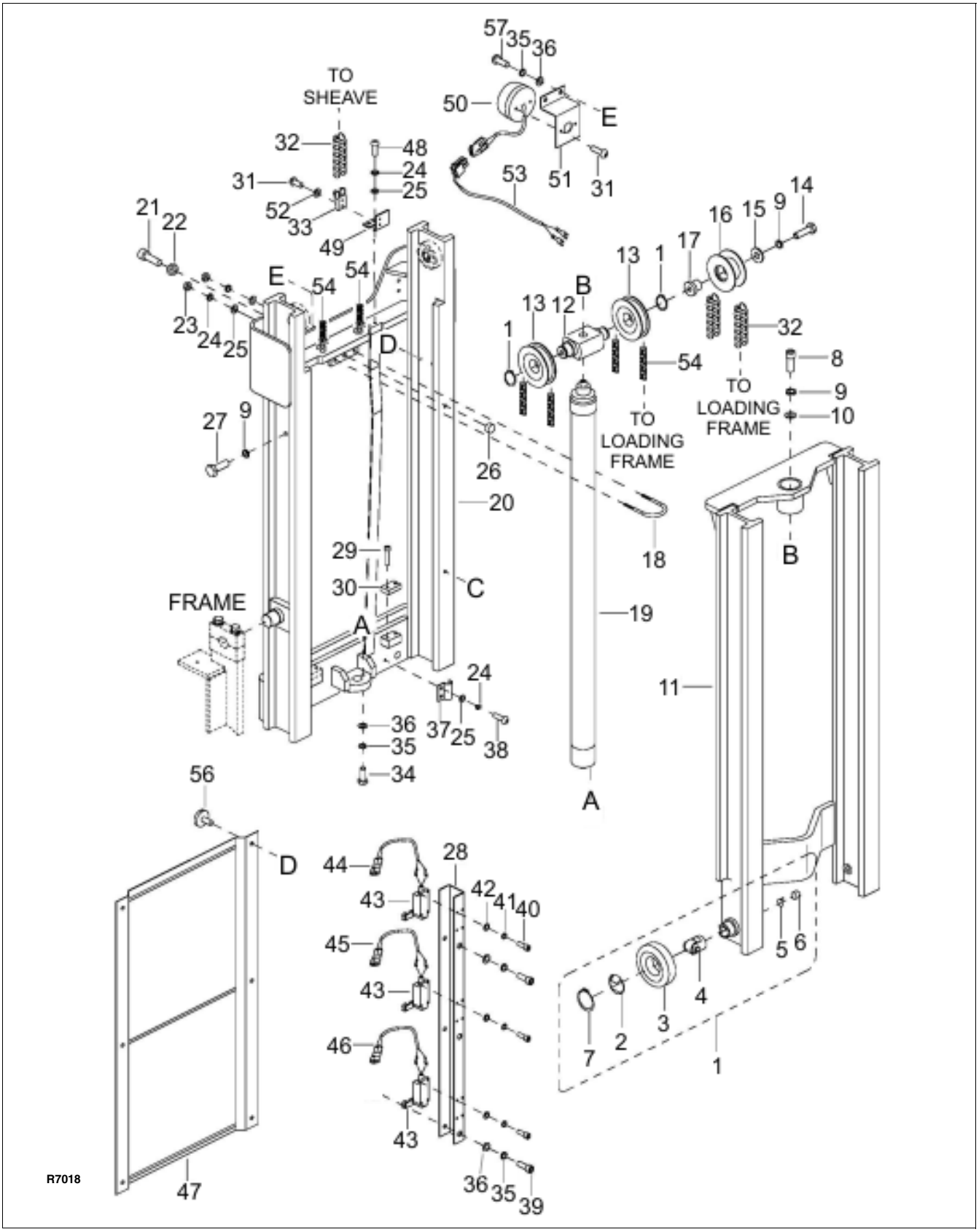

Figure 11-14 Elevation System (Telescopic)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	2125-612000-00	ROLLER ASSEMBLY	4
2	2125-612005-00	• DUST SEAL	4
3	2125-612001-00	• ROLLER	4
4	2125-612002-00	• ASSIS ROLLER	4
5	2125-612007-00	• SNAP RING	4
6	2125-612004-00	• SCREW	4
7	0000-000183-00	• RETAINING RING, M35	6
8	0000-000184-00	SCREW, M12 X 60	1
9	0000-000060-00	WASHER, LOCK, M12	4
10	0000-000373-00	WASHER, FLAT, M12	3
11	CK10-620000-00	INNER MAST	1
12	CK11-600002-00	HEADER	1
13	2125-600002-00	SHEAVE	2
14	0000-000613-00	BOLT, M12 X 50	1
15	0000-000438-00	WASHER, FLAT, M12	1
16	CK10-600001-00	SHEAVE	1
17	2125-600003-30	BUSHING	1
18	2125-650000-00	U BOLT	1
19	—	LIFT CYLINDER (FIGURE 11-19)	REF
20	CK10-610000-00	OUTER MAST	1
21	0000-000285-00	SCREW, M12 X 35	3
22	0000-000630-00	NUT, M12	1
23	0000-000108-00	NUT, M6	2
24	0000-000056-00	WASHER, LOCL, M6	5
25	0000-000380-00	WASHER, FLAT, M6	5
26	2125-650002-00	BUSHING	1
27	2108-100006-00	SCREW, M6 X 10	6

INDEX NO.	PART NO.	PART NAME	NO. REQD.
28	CK10-510013-00	MOUNTING BRACKET	1
29	0000-000739-00	SCREW, M6 X 20	4
30	2125-600005-00	BUFFER	2
31	0000-000998-00	SCREW, M3 X 8	4
32	CK10-510003-00	CABLE PROTECTIVE CHAIN	1
33	CK10-510005-00	MOUNTING BRACKET	1
34	0000-000279-00	BOLT, M8 X 35	1
35	0000-000159-00	WASHER, LOCK, M8	5
36	0000-000176-00	WASHER, FLAT, M8	5
37	CK10-510015-00	CLAMP	1
38	0000-000179-00	SCREW, M6 X 10	1
39	0000-000109-00	SCREW, M8 X 16	4
40	0000-000004-00	SCREW, M5 X 12	12
41	0000-000206-00	WASHER, LOCK, M5	12
42	0000-000390-00	WASHER, FLAT, M5	12
43	2125-500003-00	SPEED LIMIT SWITCH	3
44	CK10-520004-00	SWITCH HARNESS I	1
45	CK10-520007-00	SWITCH HARNESS III	1
46	CK10-520006-00	SWITCH HARNESS II	1
47	CK10-640000-00	PLATE	1
48	0000-000179-00	SCREW, M6 X 10	2
49	CK10-510030-00	MOUNTING PLATE	1
50	CK10-520015-00	WARNING LAMP	1
51	CK10-510019-00	MOUNTING BRACKET	1
52	0000-000999-00	WASHER, FLAT, M3	2
53	CK10-520014-00	LAMP HARNESS	1
54	—	CHAIN, LIFTING MAST (FIGURE 11-22)	REF

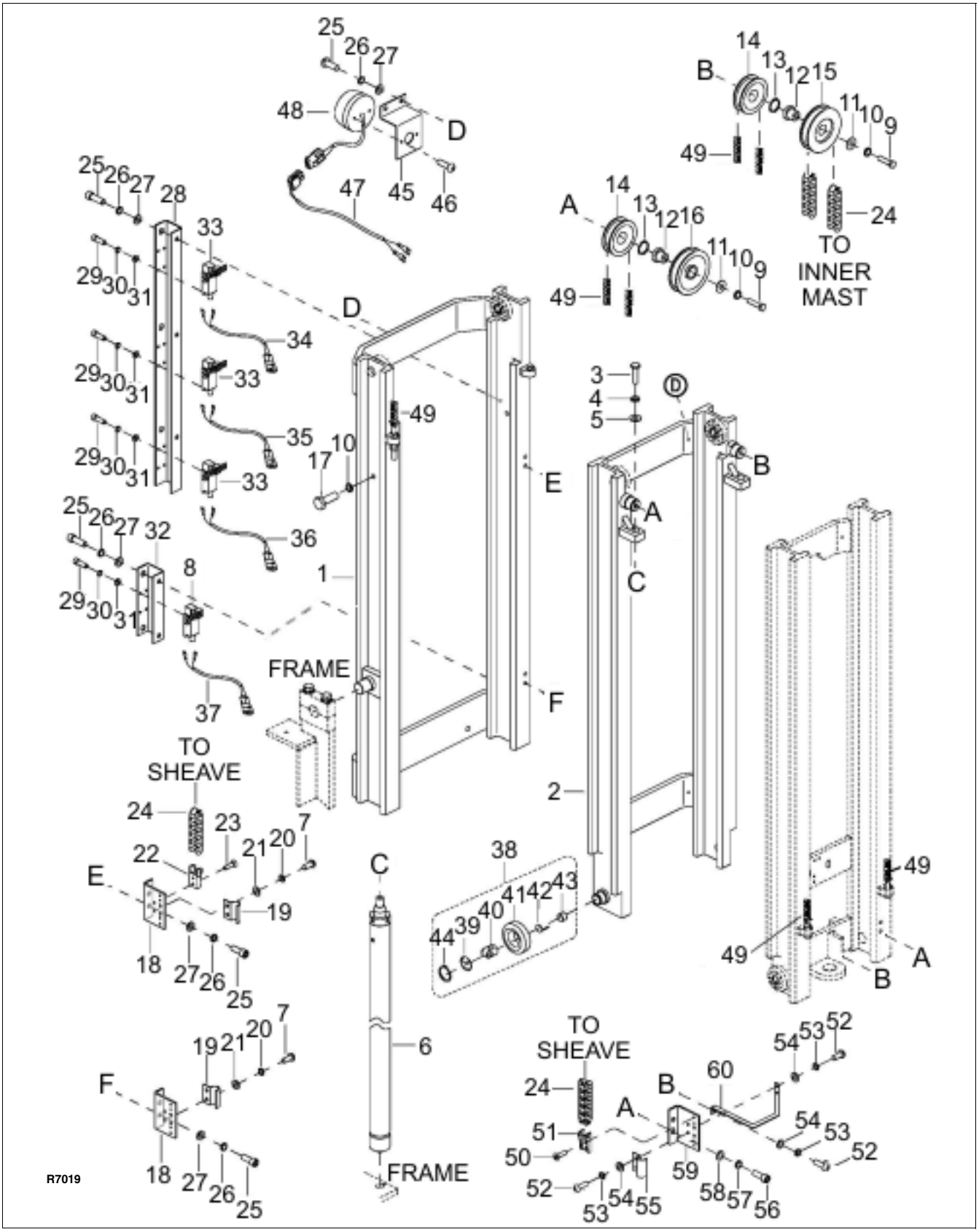

Figure 11-15 Elevation System (TRIMAST - Part 1)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	CK10-610000-30	OUTER MAST	1
2	CK10-620000-30	MIDDLE MAST	1
3	0000-000731-00	BOLT, M10 X 25	2
4	0000-000063-00	WASHER, LOCK, M10	2
5	0000-000175-00	WASHER, FLAT, M10	2
6	—	LIFT CYLINDER (FIGURE 11-21)	REF
7	0000-000179-00	SCREW, M6 X 10	3
8	2125-500002-30	PROXIMITY SWITCH	1
9	0000-000613-00	BOLT, M12 X 50	2
10	0000-000060-00	WASHER, LOCK, M12	4
11	0000-000438-00	WASHER, FLAT, M12	2
12	2125-600003-30	BUSHING	2
13	0000-000183-00	RETAINING RING, M35	2
14	2214-600001-00	SHEAVE	1
15	CK10-600001-30	SHEAVE	1
16	2125-600002-30	SHEAVE	1
17	0000-000285-00	BOLT, M12 X 35	2
18	CK10-510014-00	CHAIN MOUNTING PLATE	2
19	CK10-510015-00	CLAMP	2
20	0000-000056-00	WASHER, LOCK, M	3
21	0000-000380-00	WASHER, FLAT, M6	3
22	CK10-510005-00	CHAIN MOUNT	1
23	0000-000416-00	SCREW, M4 X 8	2
24	CK10-510003-00	CABLE PROTECTIVE CHAIN	1
25	0000-000109-00	SCREW, M8 X 16	10
26	0000-000159-00	WASHER, LOCK, M8	10
27	0000-000176-00	WASHER, FLAT, M8	10
28	CK10-510013-00	MOUNTING BRACKET	1
29	0000-000117-00	SCREW, M5 X 10	16
30	0000-000206-00	WASHER, LOCK, M5	16

INDEX NO.	PART NO.	PART NAME	NO. REQD.
31	0000-000390-00	WASHER, FLAT, M5	16
32	CK10-510018-00	MOUNTING BRACKET	1
33	2125-500003-00	SPEED LIMIT SWITCH	3
34	CK10-520004-00	SWITCH HARNESS	1
35	CK10-520007-00	SWITCH HARNESS III	1
36	CK10-520006-00	SWITCH HARNESS II	1
37	CK10-520005-00	SWITCH HARNESS I	1
38	2125-612000-00	ROLLER ASSEMBLY	6
39	2125-612005-00	• DUST SEAL	6
40	2125-612002-00	• ASSIS ROLLER	6
41	2125-612001-00	• MAIN ROLLER	6
42	2125-612007-00	• SNAP RING	6
43	2125-612004-00	• SCREW	6
44	0000-000183-00	• RETAINING RING, M35	6
45	CK10-510019-00	MOUNTING BRACKET	1
46	0000-000998-00	SCREW, M3 X 8	2
47	CK10-520014-00	LAMP HARNESS	1
48	CK10-520015-00	WARNING LAMP	1
49	—	CHAIN, LIFTING MAST (FIGURE 11-22)	REF
50	0000-000416-00	SCREW, M4 X 8	2
51	CK10-510004-00	CHAIN MOUNT	1
52	0000-000179-00	SCREW, M6 X 10	3
53	0000-000056-00	WASHER, LOCK, M6	3
54	0000-000380-00	WASHER, FLAT, M6	3
55	CK10-510015-00	CLAMP	1
56	0000-000109-00	SCREW, M8 X 16	2
57	0000-000159-00	WASHER, LOCK, M8	2
58	0000-000176-00	WASHER, FLAT, M8	2
59	CK10-510014-00	MOUNTING BRACKET	1
60	CK10-510010-00	BRACKET	1

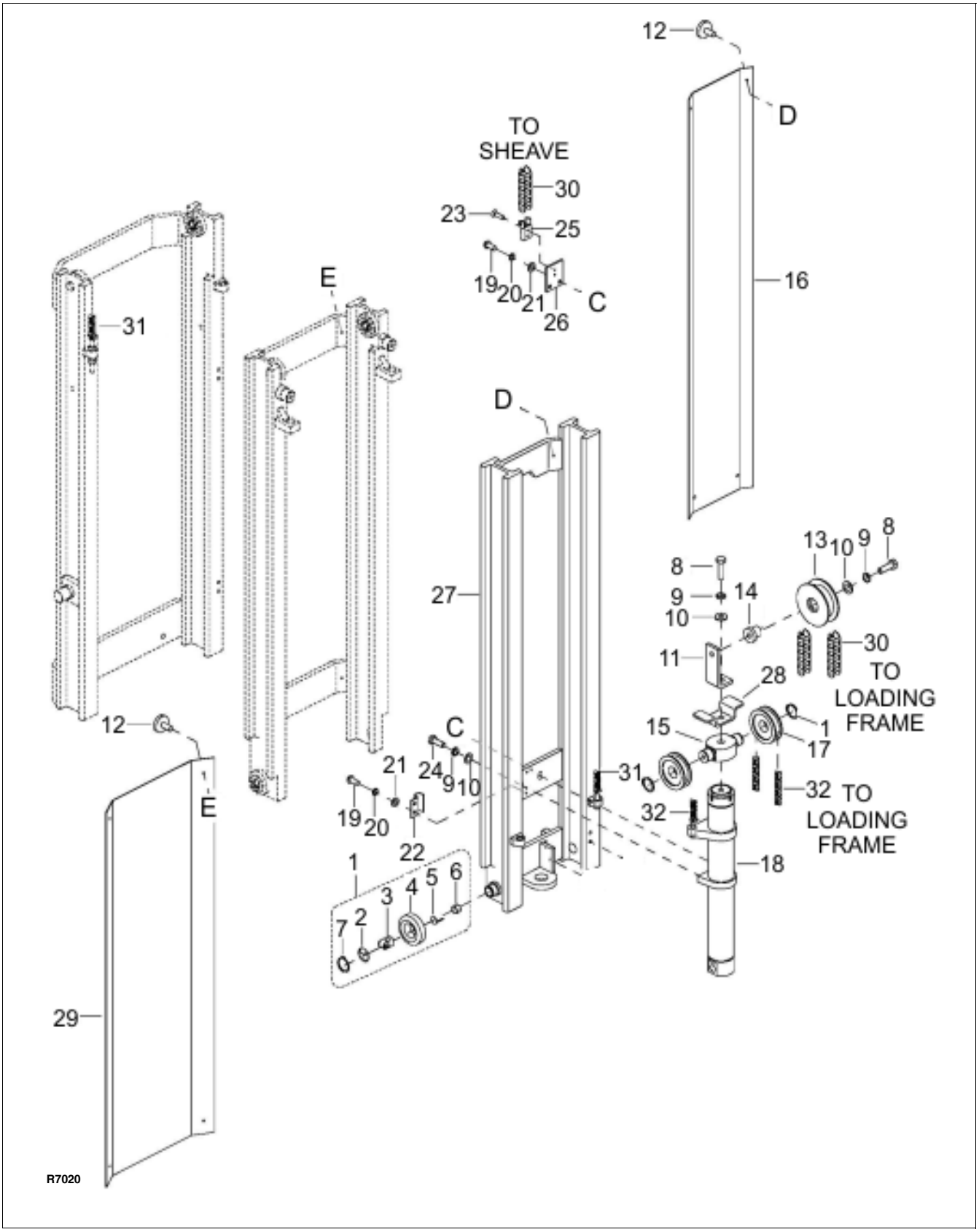

Figure 11-16 Elevation System (TRIMAST - Part 2)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	2125-612000-00	ROLLER ASSEMBLY	2
2	2125-612005-00	• DUST SEAL	2
3	2125-612002-00	• ASSIST ROLLER	2
4	2125-612001-00	• MAIN ROLLER	2
5	2125-612007-00	• SNAP RING	2
6	2125-612004-00	• SCREW	2
7	0000-000183-00	• RETAINER RING, M35	4
8	0000-000613-00	BOLT, M12 X 50	2
9	0000-000060-0	WASHER, LOCK, M12	1
10	0000-000438-00	WASHER, FLAT, M12	4
11	CK10-600004-00	FIXED ANGLE	1
12	2108-100006-00	SCREW, M6 X 10	8
13	CK10-600005-30	SHEAVE	1
14	2125-600003-30	BUSHING	1
15	2125-600001-30	HEADER	1
16	CK10-600003-30	PLATE	1
17	2214-600001-00	SHEAVE	2
18	—	LIFT CYLINDER (FIGURE 11-20)	REF

INDEX NO.	PART NO.	PART NAME	NO. REQD.
19	0000-000179-00	SCREW, M6 X 10	4
20	0000-000056-00	WASHER, LOCK, M6	4
21	0000-000380-00	WASHER, FLAT, M6	4
22	CK10-510015-00	CLAMP	2
23	0000-000416-00	SCREW, M4 X 8	4
24	0000-000285-00	BOLT, M12 X 35	2
25	CK10-510005-00	CHAIN MOUNT	1
26	CK10-510011-00	MOUNTING PLATE	1
27	CK10-630000-30	INNER MAST	1
28	2125-600007-00	BRACKET	1
29	CK10-600002-30	PLATE	1
30	CK10-510003-00	CABLE PROTECTIVE CHAIN	1
31	—	CHAIN, LIFTING MAST (FIGURE 11-15)	REF
32	—	CHAIN, LOADING FRAME, (FIGURE 11-22)	REF

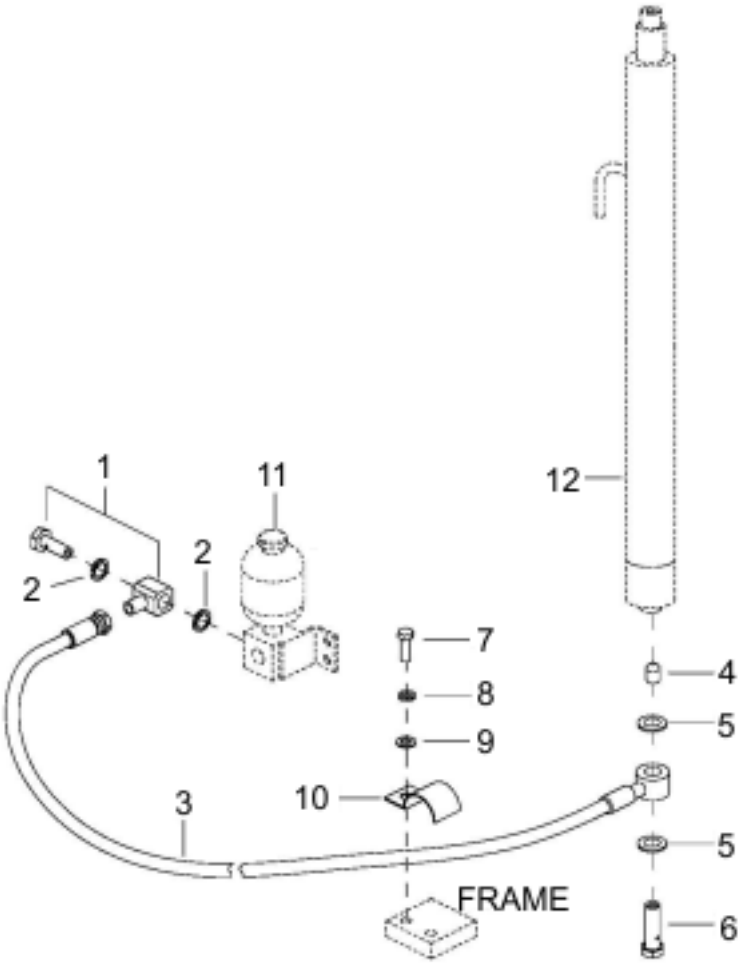

Figure 11-17 Hydraulic Lift (Telescopic)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	2707-141400-00	CONNECTOR	1
2	0000-000044-00	SEAL, M14	2
3	CK10-420000-00	HOSE	1
4	CK10-401000-00	RELIEF VALVE	1
5	0000-000634-00	WASHER, M18	2
6	2402-383500-00	BOLT, G3/8 X 35	1
7	0000-000433-00	SCREW, M8 X 12	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	0000-000159-00	WASHER, M8	1
9	0000-000194-00	WASHER, FLAT, M8	1
10	3316-610001-10	CLAMP	1
11	—	ACCUMULATOR (FIGURE 11-7)	REF
12	—	LIFT CYLINDER (FIGURE 11-19)	REF

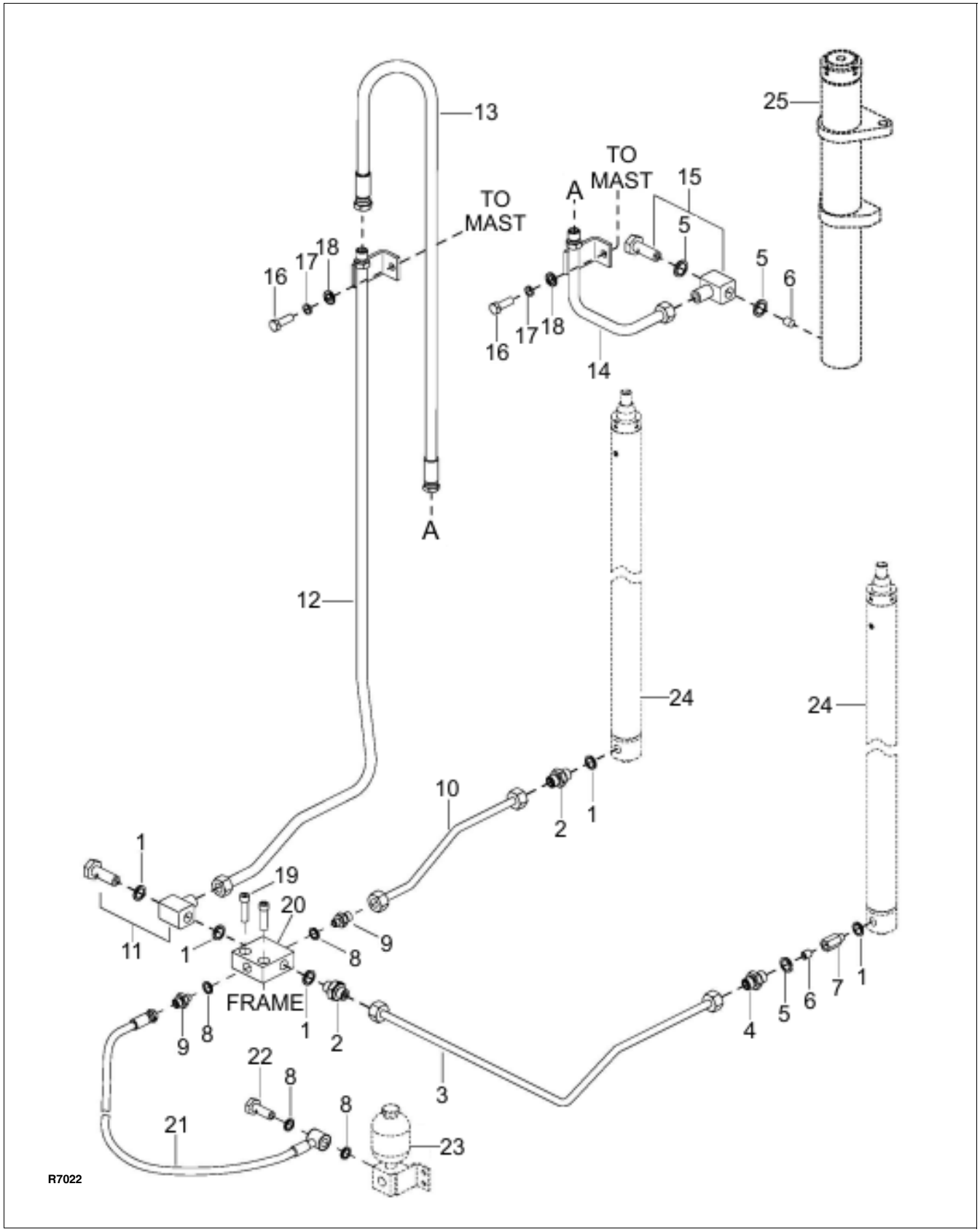

Figure 11-18 Hydraulic Lift (TRIMAST)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	0000-000069-00	WASHER, M16	5
2	2701-161600-00	CONNECTOR, M16 X 1.5-M16 X 1.5	2
3	CK10-430000-00	TUBE	1
4	2702-381600-00	CONNECTOR, G3/8-M16 X 1.5	1
5	0000-000634-00	WASHER, M18	2
6	CK10-401000-00	RELIEF VALVE	2
7	CK10-400001-30	CONNECTOR, M16 X 1.5-G3/8	1
8	0000-000044-00	WASHER, M14	4
9	2702-141600-00	CONNECTOR, G1/4-M16 X 1.5	2
10	CK10-440000-30	TUBE	1
11	2706-162000-00	CONNECTOR, M16 X 1.5-M20 X 1.5	1
12	CK10-460000-30	TUBE	1
13	2125-440000-3A	HOSE	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
14	CK10-450000-30	TUBE	1
15	2707-382000-00	CONNECTOR, G3/8-M20 X 1.5	1
16	0000-000242-00	BOLT, M8 X 16	2
17	0000-000159-00	WASHER, LOCK, M8	2
18	0000-000176-00	WASHER, FLAT, M8	2
19	0000-000154-00	SCREW, M8 X 35	2
20	2125-400002-3A	MANIFOLD	1
21	CK10-470000-30	TUBE	1
22	2402-143000-00	BOLT, G1/4 X 30	1
23	—	ACCUMULATOR (FIGURE 11-7)	REF
24	—	LIFT CYLINDER, SECONDARY (FIGURE 11-21)	REF
25	—	LIFT CYLINDER, FULL FREE LIFT (FIGURE 11-20)	REF

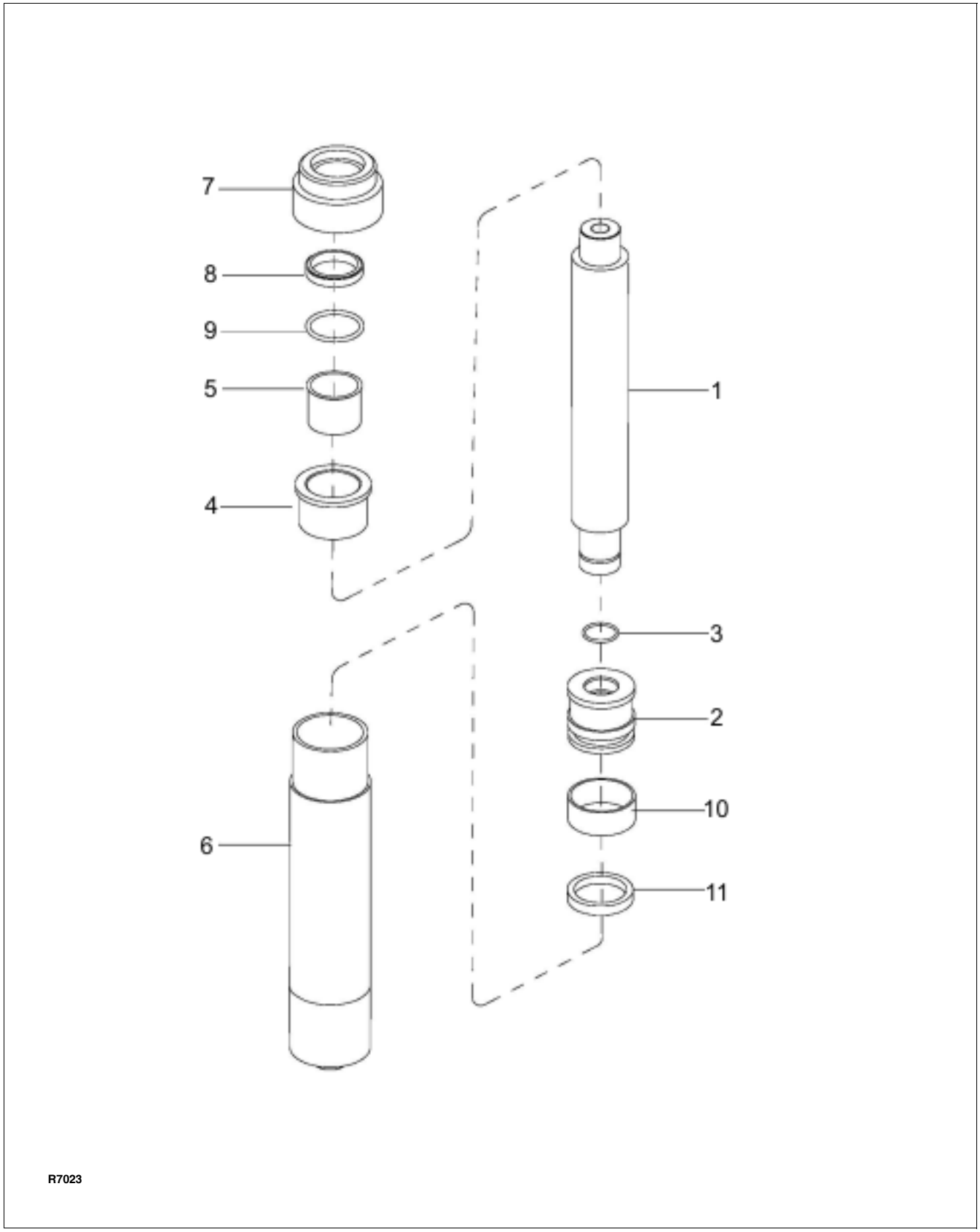

Figure 11-19 Lift Cylinder (Telescopic)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	CK10-410000-00	LIFT CYLINDER ASSEMBLY	1
1	2125-410001-00	• PISTON ROD	1
2	2125-410002-00	• PISTON	1
3	2125-410003-00	• O-RING	1
4	2125-410006-00	• BUSHING	1
5	0000-000711-00	• BEARING, 3530	1
6	CK10-411000-00	• CYLINDER BODY	1
7	2125-410004-00	• GLANG NUT	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
8	0000-000084-00	• WIPER RING, 35 X 43 X 5-6.5	1
9	0000-000370-00	• O-RING, 40 X 3.1	1
10	2125-410005-00	• RING, BACKUP, 50 X 20 X 2.5	1
11	0000-000512-00	• ROD PACKING, 40 X 50 X 6	1
—	2125-ZZG-2A	SEAL KIT (INCLUDES ITEM 8,9,11)	1

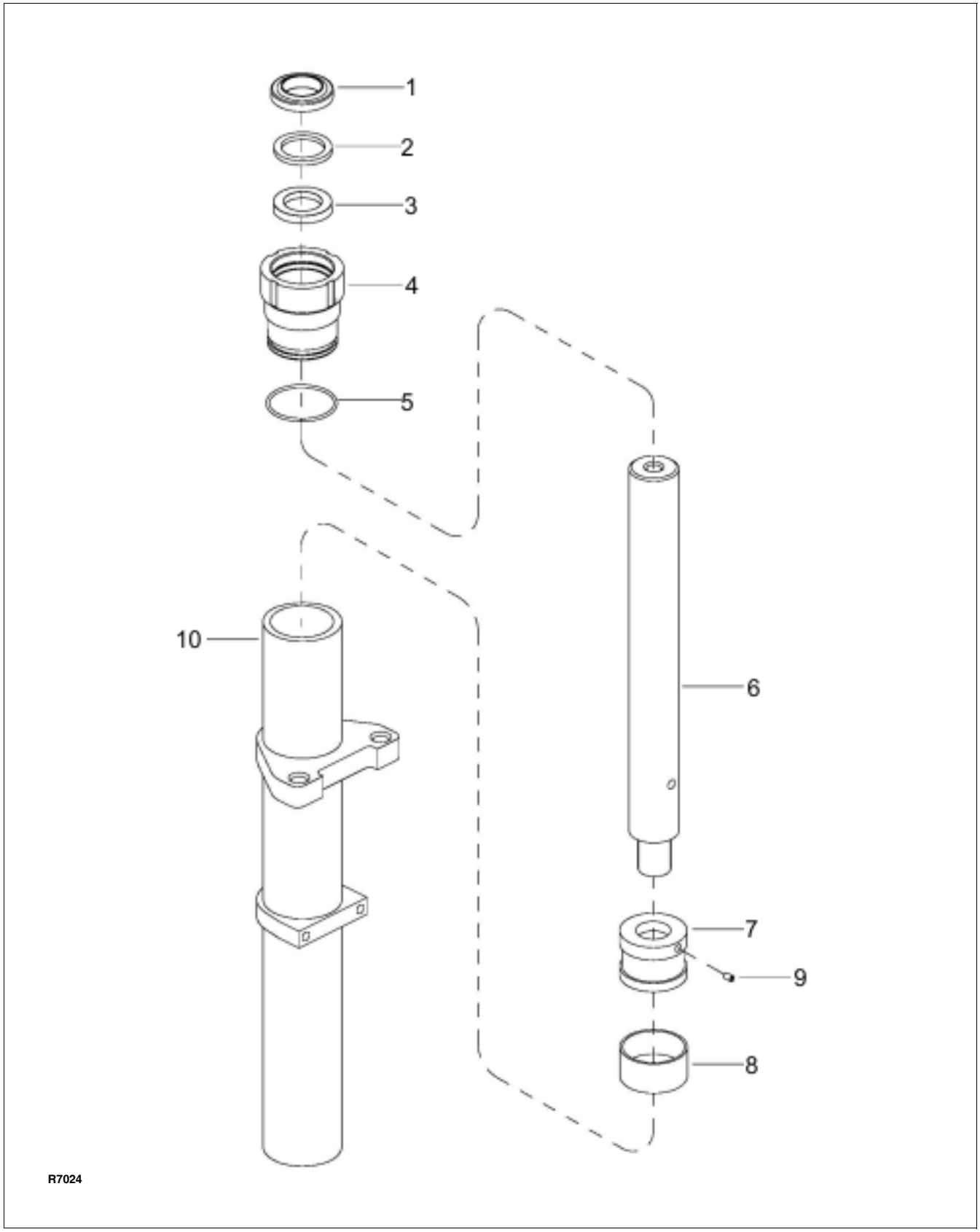

Figure 11-20 Lift Cylinder, Full Free Lift (TRIMAST)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	CK10-420000-30	LIFT CYLINDER, FULL FREE LIFT	1
1	0000-000045-00	• WIPER RING, 55 X 63 X 5-6.5	1
2	0000-000684-00	• BACK UP RING, 55 X 65 X 3	1
3	0000-000046-00	• PACKING	1
4	2125-420002-30	• GLAND NUT	1
5	0000-000685-00	• O-RING, 65 X 3.1	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
6	CK10-420001-30	• PISTON ROD	1
7	CK10-420002-30	• PISTON	1
8	2125-420003-30	• RING, BACK, 70 X 65 X 25	1
9	0000-000994-00	• SCREW, M8 X 10	1
10	CK10-421000-30	• CYLINDER BODY	1
—	2125-ZZG-3A	SEAL KIT (INCLUDES ITEM 1,3,5)	1

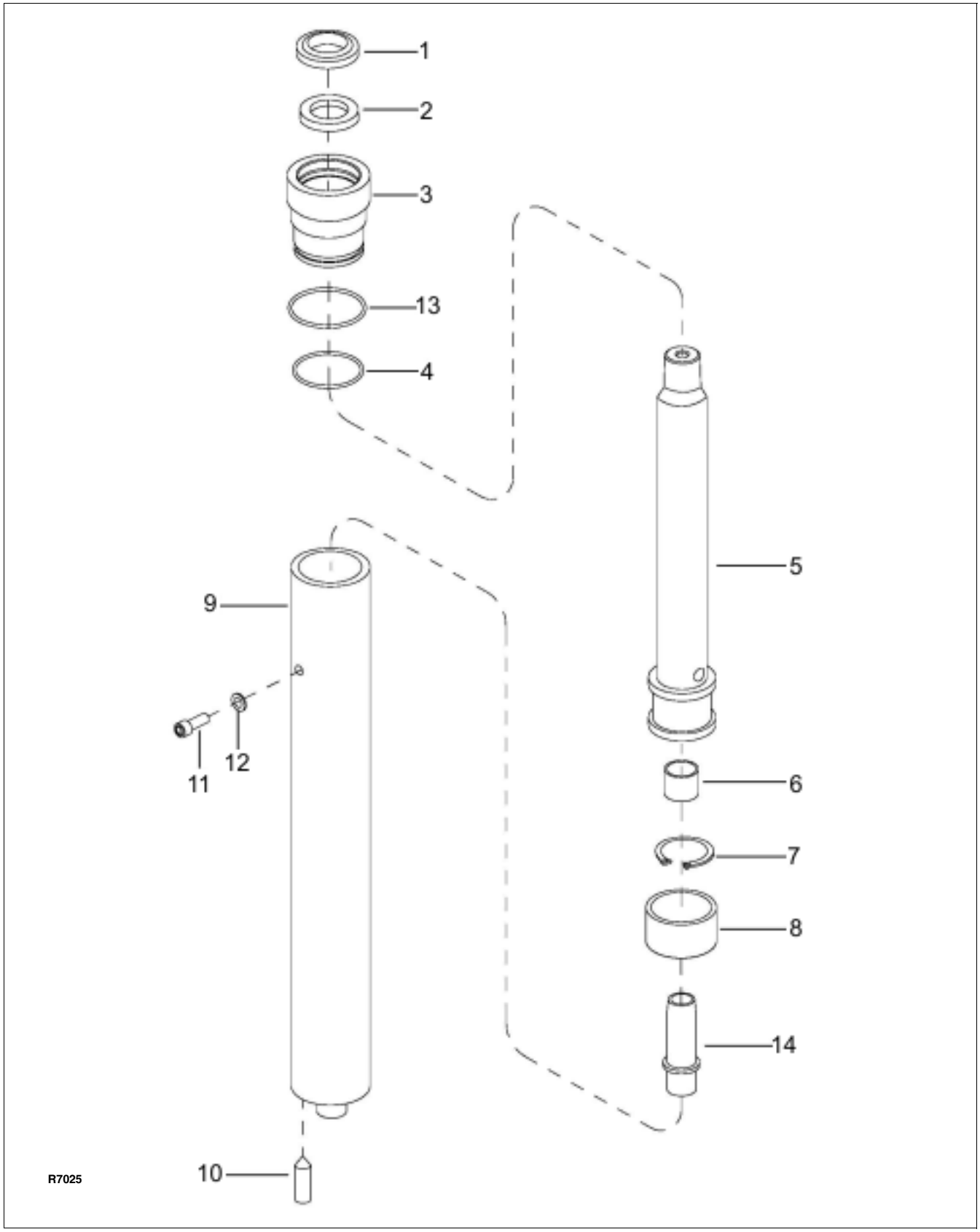

Figure 11-21 Lift Cylinder, Secondary (TRIMAST)

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	CK10-410000-30	LIFT CYLINDER, FULL FREE LIFT	1
1	0000-000084-00	• WIPER RING, 35 X 43 X 5-6.5	1
2	0000-000085-00	• PACKING 35 X 45 X 6	1
3	2125-410004-30	• GLAND NUT	1
4	0000-000519-00	• O-RING, 48 X 3.1	1
5	CK10-410001-30	• PISTON ROD	1
6	2125-410005-30	• BUSHING	1
7	0000-000520-00	• SNAP RING	1
8	2125-420002-30	• RING	1
9	CK10-411000-30	• CYLINDER BODY	1
10	2125-410006-30	• PIN	1
11	0000-000010-00	• SCREW, M5 X 6	1
12	2125-410003030	• WASHER	1
13	0000-000609-00	• O-RING, 52.5 X 3.1	1
14	CK10-411003-00	• BUFFER ROD	1
—	2125-ZBG-3A	SEAL KIT (INCLUDES ITEM 1,2,4,13)	1

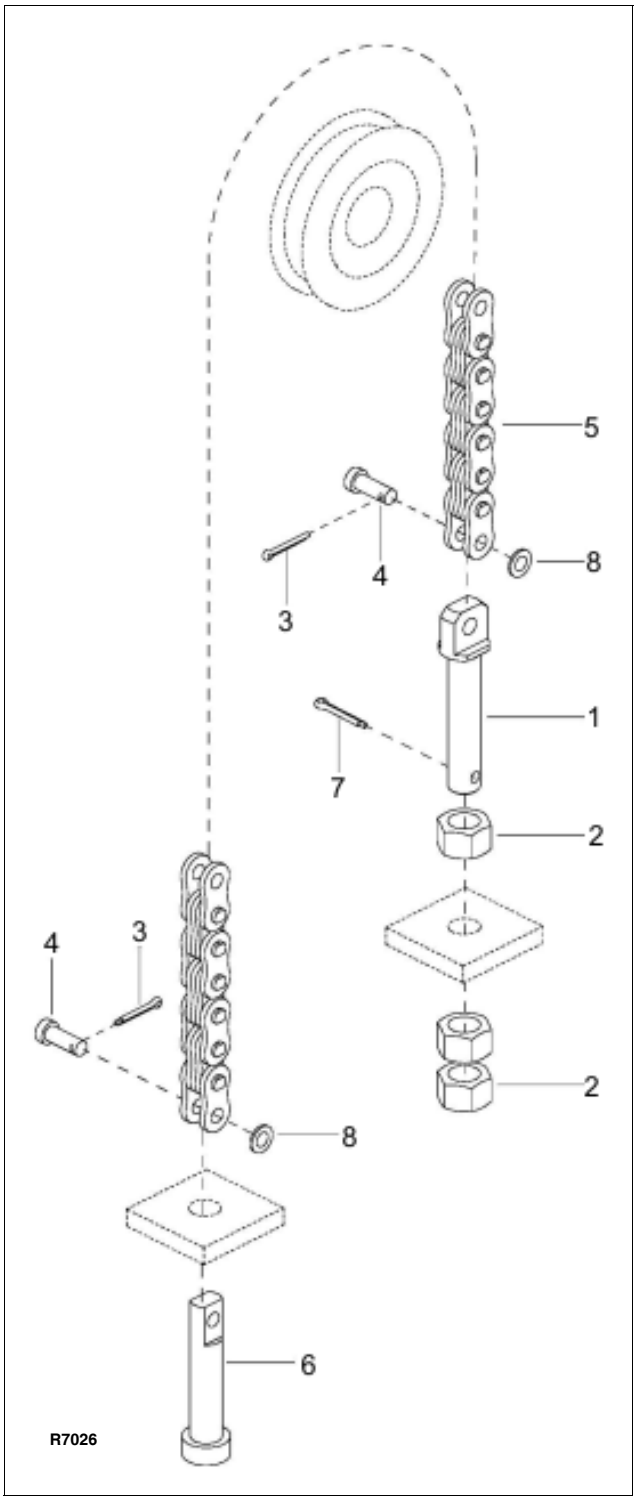

Figure 11-22 Chain Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	2125-640001-00	ADJUSTING BOLT	1
2	0000-000187-00	NUT, M16 X 1.5	3
3	0000-000188-00	COTTER PIN, M3.2 X 20	2
4	21250640002-00	PIN	2
5	CK10-630000-00	CHAIN, 75 LINKS (TELESCOPIC)	1
5	CK10-650000-30	CHAIN, 71 LINKS (TRIMAST) (LIFTING MAST)	1
5	CK10-660000-30	CHAIN, 43 LINKS (TRIMAST) (LOADING FRAME)	1
6	2125-640003-00	CHAIN ANCHOR	1
7	0000-000686-00	COTTER PIN, M3.2 X 32	1
8	0000-000176-00	WASHER, FLAT, M8	2

NOTES

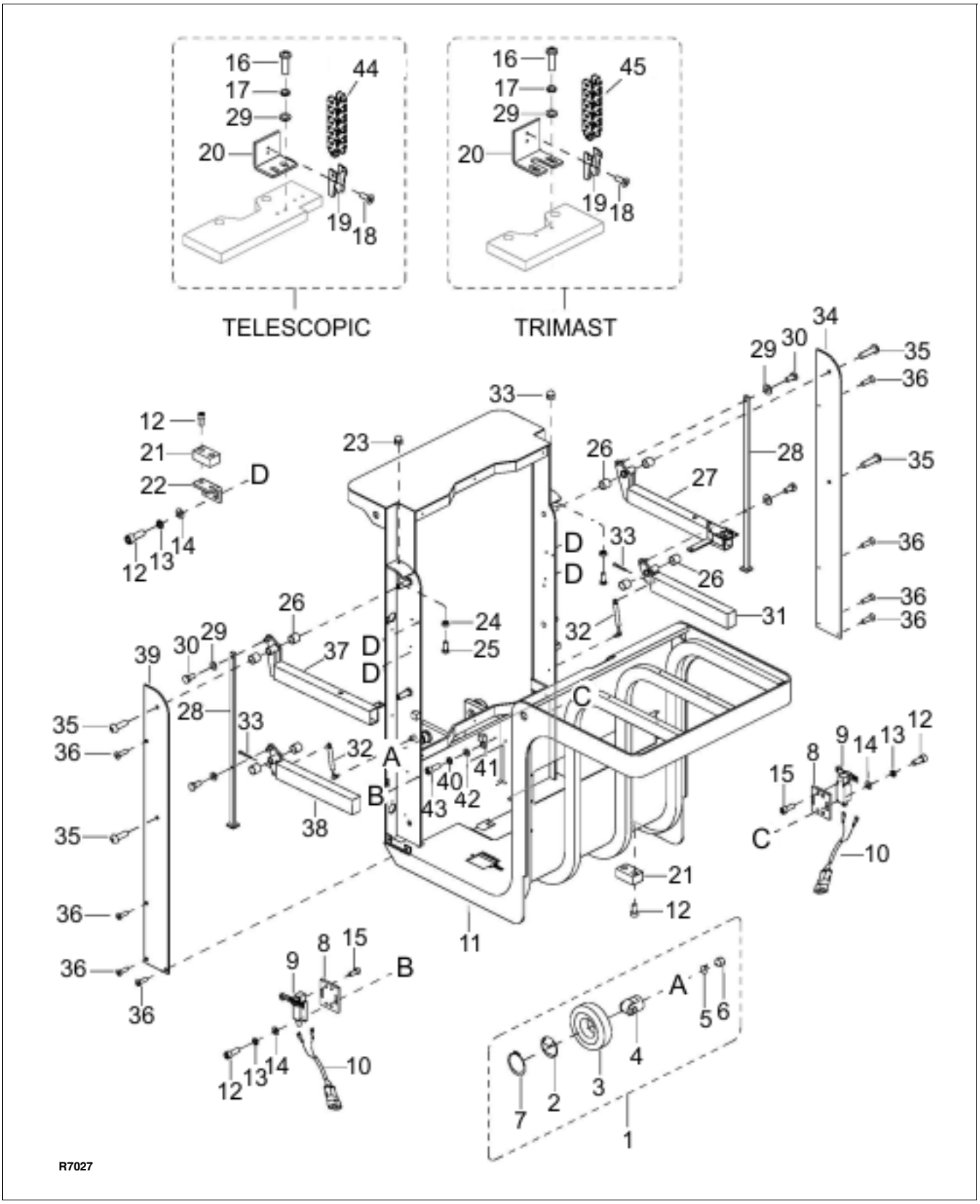

Figure 11-23 Loading Frame Installation

INDEX NO.	PART NO.	PART NAME	NO. REQD.
1	2125-612000-00	ROLLER ASSEMBLY	4
2	2125-612005-00	• DUST SEAL	4
3	2125-612001-00	• MAIN ROLLER	4
4	2125-612002-00	• ASSIST ROLLER	4
5	2125-612007-00	• SNAP RING	4
6	2125-612004-00	• SCREW	4
7	0000-000183-00	• RETAINER RING, M35	4
8	CK10-510020-00	MOUNTING PLATE	2
9	2125-500003-00	PROXIMITY SWITCH	2
10	CK10-520013-00	SWITCH HARNESS	2
11	—	LOADING FRAME (FIGURE 11-24)	REF
12	0000-000109-00	SCREW, M8 X 16	28
13	0000-000159-00	WASHER, LOCK, M8	12
14	0000-000176-00	WASHER, FLAT, M8	12
15	0000-000004-00	SCREW, M5 X 12	8
16	0000-000618-00	SCREW, M6 X 12	2
17	0000-000056-00	WASHER, LOCK, M6	2
18	0000-000416-00	SCREW, M4 X 8	2
19	CK10-510004-00	CHAIN MOUNT	1
20	CK10-510031-00	MOUNTING BRACKET (TELESCOPIC)	1
20	CK10-510012-00	MOUNTING BRACKET (TRIMAST)	1
21	2125-6000005-00	BUFFER BLOCK	8
22	CK10-7000006-00	MOUNTING BRACKET	4
23	0000-000866-00	NUT, M12	2

INDEX NO.	PART NO.	PART NAME	NO. REQD.
24	0000-000165-00	NUT, M12	2
25	0000-000623-00	BOLT, M12 X 30	2
26	CK11-700006-00	BUSHING, COB	8
27	CK10-730000-00	LEFT ARMREST	1
28	CK10-790000-00	SUPPORT ROD	2
29	0000-000380-00	WASHER, FLAT, M6	8
30	0000-000264-00	BOLY, M6 X 12	4
31	CK10-750000-00	LEFT GATE	1
32	CK11-700007-00	GAS SPRING	2
33	0000-000296-00	COTTER PIN, M2 X 20	2
34	CK10-700001-00	COVER, LEFT	1
35	0000-000655-00	SCREW, M10 X 25	6
36	0000-000090-00	SCREW, M6 X 12	4
37	CK10-740000-00	RIGHT ARMREST	1
38	CK10-760000-00	RIGHT GATE	1
39	CK10-700002-00	COVER, RIGHT	1
40	0000-000060-00	WASHER, LOCK, M12	1
41	CK10-700008-00	PROXIMITY BLOCK	1
42	0000-000222-00	WASHER, FLAT, M12	1
43	0000-000285-00	SCRREW, M12 X 35	1
44	—	CABLE PROTECTIVE CHAIN (FROM OUTER MAST) (FIGURE 11-14)	REF
45	—	CABLE PROTECTIVE CHAIN (FROM INNER MAST) (FIGURE 11-16)	REF

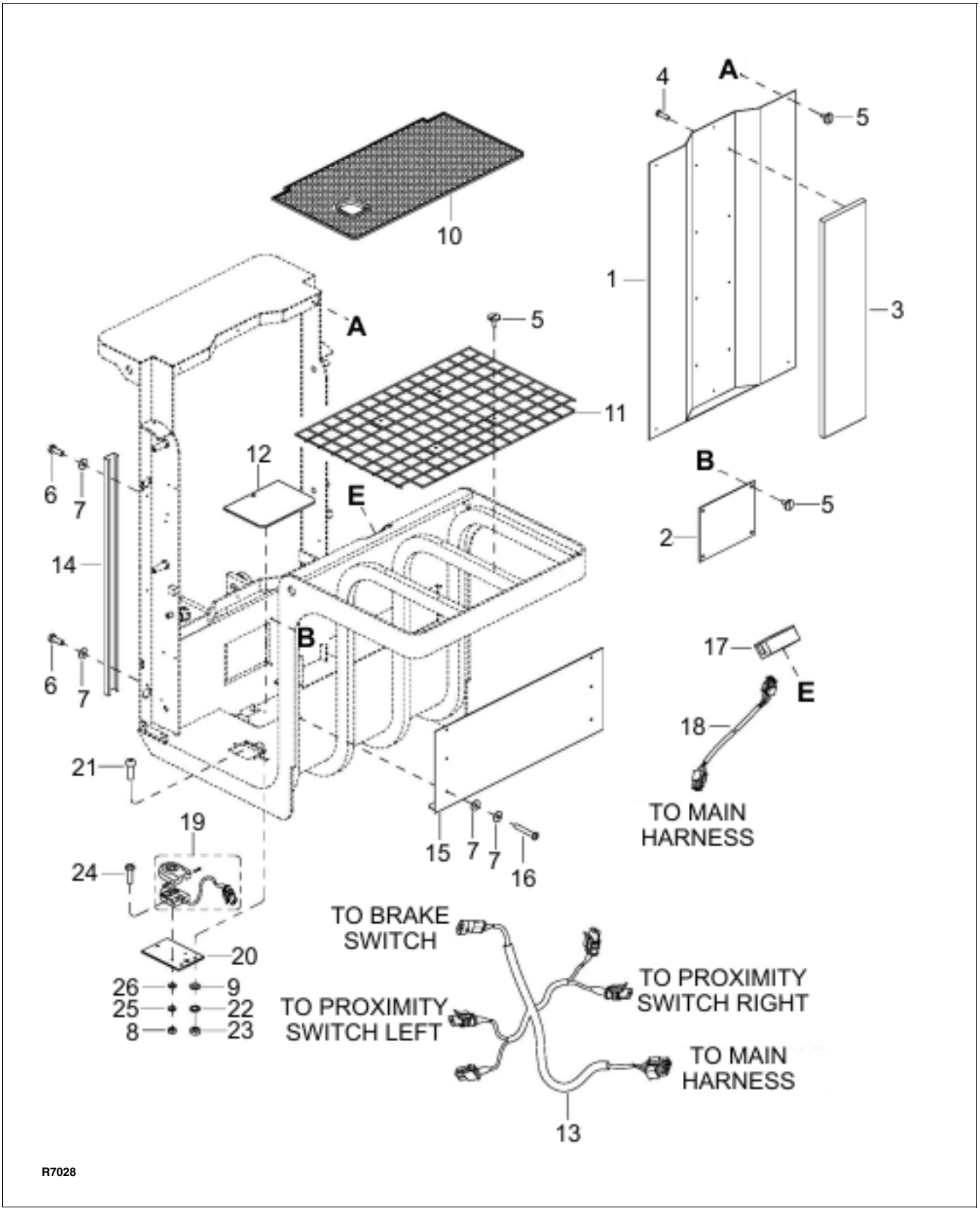

Figure 11-24 Loading Frame Assembly

INDEX NO.	PART NO.	PART NAME	NO. REQD.
—	CK10-710000-00	LOADING FRAME (TELESCOPIC)	1
—	CK10-710000-30	LOADING FRAME (TRIMAST)	1
1	CK10-770000-00	PLATE	1
2	CK10-700005-00	COVER	1
3	4230-100004-00	CUSHION	1
4	0000-000646-00	SCREW, M4 X 10	8
5	2108-100006-00	SCREW, M6 X 10	14
6	0000-000275-00	BOLT, M6 X 30	4
7	0000-000123-00	WASHER, FLAT, M6	16
8	0000-000924-00	NUT, M3	2
9	0000-000380-00	WASHER, FLAT, M6	3
10	CK10-700004-00	FLOOR MAT	1
11	CK10-720000-00	PICK TRAY	1
12	CK10-700003-00	COVER	1

INDEX NO.	PART NO.	PART NAME	NO. REQD.
13	CK11-520004-00	HARNESS	1
14	CK11-700003-00	CHANNEL, WIRE	2
15	CK10-700007-00	COVER	1
16	0000-000993-00	SCREW, M6 X 55	6
17	CK11-560001-00	INSTRUMENT PANEL	1
18	CK10-520008-00	HARNESS, INSTRUMENT PANEL	1
19	CK10-520012-00	“DEADMAN” FOOTSWITCH	1
20	CK10-510017-00	PEDAL MOUNTING PLATE	1
21	0000-000498-00	SCREW, M6 X 20	3
22	0000-000056-00	WASHER, LOCK, M6	3
23	0000-000166-00	NUT, M6	3
24	0000-000037-00	SCREW, M3 X 12	2
25	0000-000995-00	WASHER, LOCK, M3	2
26	0000-000991-00	WASHER, FLAT, M3	2

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