

**CAR CARRIER
OWNERS MANUAL
331 / 334**

PURCHASED FROM: _____ **DATE** _____

ADDRESS: _____

_____ **PHONE NO.** _____

SERIAL NUMBERS

331: _____

334: _____

TRUCK

YEAR _____ **MAKE** _____ **MODEL** _____

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SAFETY PRECAUTIONS



THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ AND STUDY THE MESSAGE THAT FOLLOWS BEFORE OPERATION. BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.



CAUTION

DO NOT OPERATE YOUR CAR CARRIER UNTIL A COMPLETE INSPECTION HAS BEEN PERFORMED. A DEFECT MAY CAUSE PERSONAL INJURY TO YOURSELF, OR OTHERS. TRACTOR/TRAILER OPERATION SHOULD BE UNDERTAKEN ONLY BY AN OPERATOR TRAINED FOR SAFE HOOK-UP AND OPERATION.



DANGER

KEEP ALL PERSONNEL CLEAR OF FRONT, REAR, AND SIDES OF TOWING VEHICLE AND TRAILER DURING COUPLING, OPERATION, AND UNCOUPLING. FAILURE TO DO SO WILL RESULT IN SERIOUS PERSONAL INJURY OR DEATH.



DANGER

ALWAYS CHECK BEHIND AND UNDER THE TRACTOR AND TRAILER FOR PERSONS OR OBJECTS BEFORE BACKING. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH TO OTHERS, OR DAMAGE TO PROPERTY.



DANGER

FAILURE TO PROPERLY SET AND CHECK PARKING BRAKE, AND CHOCK WHEELS WHEN PARKING AND DURING STORAGE, COULD ALLOW MOVEMENT OF THE TRACTOR/TRAILER RIG RESULTING IN SERIOUS PERSONAL INJURY, DEATH TO INDIVIDUAL(S), OR DAMAGE TO PROPERTY IN IT'S PATH.



DANGER

FEDERAL LAW REQUIRES THE UNDER CARRIAGE TO BE IN THE REAR MOST POSITION DURING TRANSPORT. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY TO OTHERS IN THE EVENT OF AN ACCIDENT TO THE REAR END OF THE TRAILER.

CAUTION

A STICKING SOLENOID VALVE WILL CAUSE IT'S HYDRAULIC COMPONENT TO OPERATE WHEN (1) SWITCHING THE REMOTE POWER SWITCH TO THE "WARM-UP" POSITION; or, (2) WHEN RELEASING THE CONTROL SWITCH FOR THAT COMPONENT. IF THIS SHOULD HAPPEN, IMMEDIATELY SWITCH THE POWER SWITCH TO OFF, AND REPAIR OR REPLACE THE STICKING SOLENOID VALVE.

CAUTION

WHEN LEAVING UNIT UNATTENDED, POSITION ALL CONTROL SWITCHES TO THE OFF POSITION AND SHUT OFF HYDRAULIC PUMP.

DANGER

WHEN CRAWLING UNDER THE SEMITRAILER IS NECESSARY, CHOCK ALL WHEELS OF THE TRAILER AND TRACTOR. WHEN JACKING IS NECESSARY, CHOCK ALL WHEELS, AND SUPPORT THE TRAILER WITH JACK STANDS RATED TO WITHSTAND THE WEIGHT OF THE TRAILER AND LOAD. FAILURE TO TAKE ADEQUATE SAFETY MEASURES MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

DANGER

MAINTENANCE WELDING AND CUTTING OPERATIONS PRODUCE HEAT, TOXIC FUMES, RADIATION, METAL SLAG, AND CARBON PARTICLES. WELDING AND CUTTING GOGGLES WITH THE PROPER TINTED LENSES, GLOVES, APRON OR JACKET, AND WELDERS BOOTS ARE REQUIRED. FAILURE TO USE PROPER SAFETY EQUIPMENT WILL RESULT IN SERIOUS PERSONAL INJURY.

DANGER

ALUMINUM DECKS ARE SLICK WHEN WET. TAKE NECESSARY PRECAUTIONS WHEN WALKING, OR WORKING ON ALUMINUM DECK SURFACES. FAILURE TO TAKE NECESSARY PRECAUTIONS MAY RESULT IN SERIOUS PERSONAL INJURY.

SECTION 1

INTRODUCTION

THIS MANUAL PROVIDES OPERATING PROCEDURES TO HELP YOU OBTAIN EFFICIENT AND DEPENDABLE USE FROM YOUR NEW EQUIPMENT. THIS MANUAL ALSO CONTAINS GENERAL INFORMATION, SPECIFICATIONS, SAFETY PRECAUTIONS, MAINTENANCE, PARTS LISTS AND ILLUSTRATIONS.

READ THIS MANUAL CAREFULLY BEFORE OPERATING THE EQUIPMENT. KEEP IT HANDY FOR FUTURE REFERENCE.

IF AT ANY TIME YOU HAVE ANY QUESTIONS, OR FOR LANDOLL REPLACEMENT PARTS AND SERVICE, CONTACT YOUR LANDOLL DEALER, OR CALL:

LANDOLL CORPORATION
SALES & SERVICE
1700 MAY STREET
MARYSVILLE, KANSAS 66508

OR PHONE:
(785)562-5381
1-800-HAULOLL
(1-800-428- 5655)
FAX NO.: (785) 562-4893

THE LANDOLL MODELS 331, AND 334 CAR CARRIERS ARE A QUALITY PRODUCT DESIGNED TO GIVE YEARS OF TROUBLE FREE PERFORMANCE. BY FOLLOWING EACH SECTION OF THIS MANUAL YOUR SYSTEM WILL PERFORM AS DESIGNED FOR YOU AND YOUR BUSINESS.

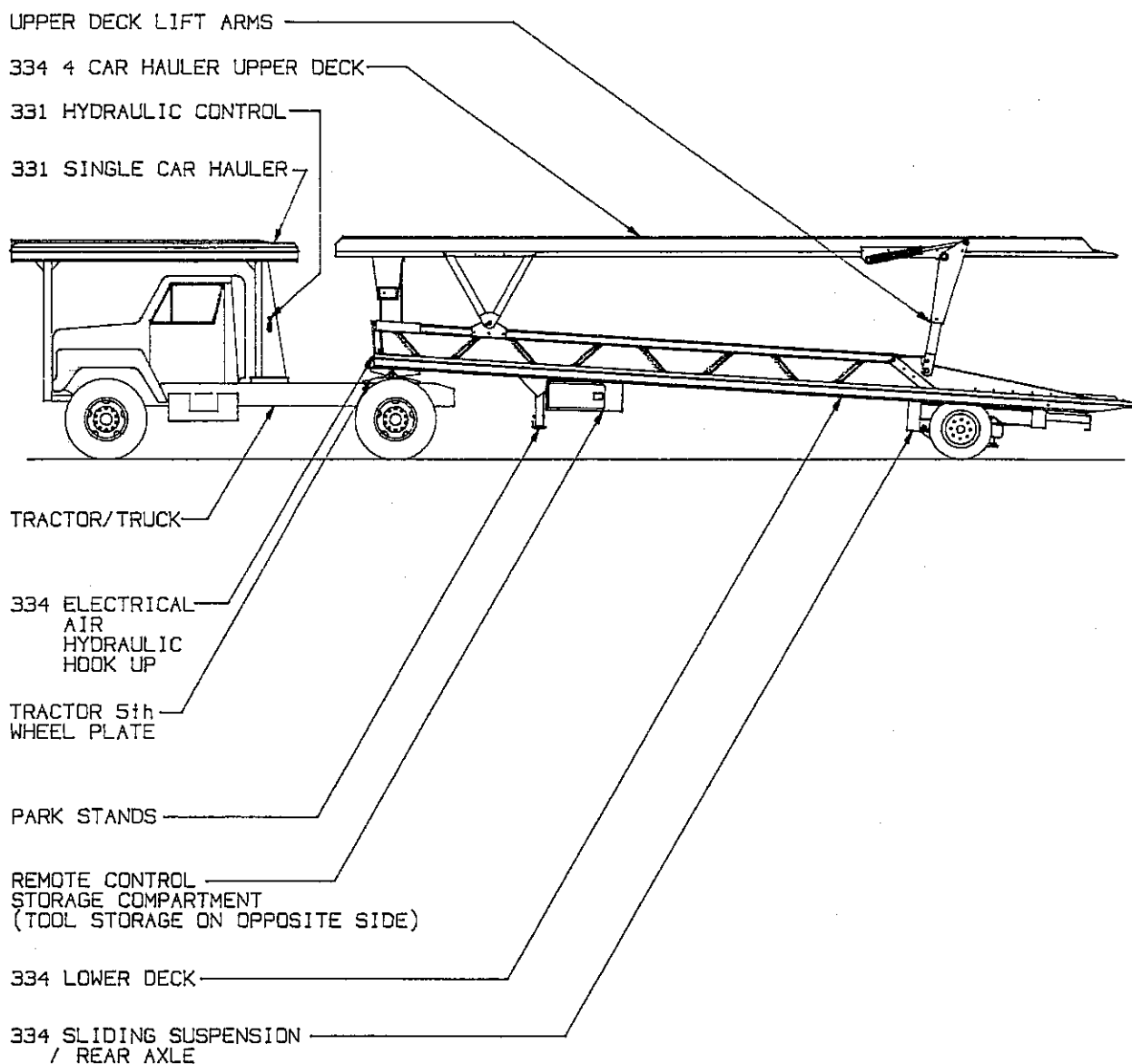
THE 334 CAR CARRIER IS COMPRISED OF 2 DECKS (remote hydraulic controlled upper & lower), SINGLE AXLE, DUAL TIRES, HYDRAULIC AND ELECTRICAL SYSTEMS. THE TRAILER IS DESIGNED TO BE TOWED BY A TRUCK-TRACTOR VEHICLE EQUIPPED WITH A FIFTH WHEEL, AIR BRAKE AND LIGHTING SYSTEM HOOK-UPS. THE TRACTOR MUST ALSO BE CAPABLE OF LOCKING THE TRACTOR BRAKES WITH THE TRAILER BRAKES RELEASED FOR PROPER SUSPENSION OPERATION FOR LOADING AND UNLOADING.

THE 331 CAR CARRIER IS COMPRISED OF A SINGLE HYDRAULIC CONTROLLED SLIDING DECK ON A TUBULAR FRAME. THE 331 CARRIER IS DESIGNED TO FIT ONTO A TRACTOR-TRUCK VEHICLE OVER THE CAB. THE TRUCK-TRACTOR SHOULD HAVE A 152 INCH WHEEL BASE WITH 84 INCHES FROM CAB TO AXLE.

SECTION 2

TERMINOLOGY

The figure below of the 331 and 334 car carriers lists terms which are used throughout this manual. A good knowledge of the following terms will make the study of this manual easier.



TERMINOLOGY
FIGURE 2-1

SECTION 3

STANDARD SPECIFICATIONS

MODEL 331 1 CAR CARRIER

DECK	LENGTH.....	13'-0"
	OUTSIDE WIDTH.....	92 in.
	INSIDE WIDTH.....	84 in.
	CAPACITY.....	1 CAR
WINCH	QUANTITY.....	1
	CAPACITY.....	8,000 lb.
	CABLE LENGTH.....	65 ft.

FRONT OVERHANG..... 36 in.

CONTROLS..... MANUAL & REMOTE HYDRAULIC

MODEL 334 4 CAR CARRIER

OVERALL LENGTH.....	34 ft.
OVERALL WIDTH.....	102 in.
WEIGHT.....	10850 lbs.

UPPER DECK	INSIDE WIDTH.....	87 in.
	DECK HEIGHT (transport pos.).....	96 - 112 in.

LOWER DECK	INSIDE WIDTH.....	94 in.
	DECK HEIGHT (transport pos.).....	28 in.

WINCH	QUANTITY.....	4
	CAPACITY.....	8,000 lb.
	CABLE LENGTH.....	50 ft.

PIN SETTING..... 10 in.

SWING CLEARANCE..... 50 in.

CAPACITY: CARS.....	4
WEIGHT.....	15,000 lbs.
GAWR.....	16,000 lbs.
GVWR.....	26,000 lbs.

LOADING ANGLES:

UPPER DECK.....	18° to 24°
LOWER DECK.....	8° to 14°

CONTROLS..... REMOTE HYDRAULIC

SPECIFIC BOLT TORQUE:








OUTER SPINDLE NUT..... 250-400 lb.ft.
 EQUALIZER BEAM PIVOT BOLT..... 600 lb.ft.
 SHOCK ABSORBER MOUNTING..... 150 lb.ft.
 AXLE U-BOLTS * 680 lb.ft.
 AIR SPRING MOUNTING: 1/2"..... 25 lb.ft.
 3/4"..... 50 lb.ft.

WHEEL LUG NUTS:

CAP NUTS..... 450-500 lb.ft.
 OUTER NUTS..... 450-500 lb.ft.

- * AXLE U-BOLTS MUST BE TIGHTENED EVENLY SO THAT EACH END HAS AN EQUAL AMOUNT OF THREADS SHOWING AFTER TIGHTENED TO TORQUE SPECIFICATIONS.

GENERAL BOLT TORQUE:

GENERAL TORQUE SPECIFICATION TABLE (Revised 2-74)													
USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN													
NOTE: These values apply to fasteners as received from supplier, dry, or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads.													
SAE Grade No		2				5				8 *			
Bolt head identification marks as per grade						  				  			
NOTE: Manufacturing Marks Will Vary		Torque				Torque				Torque			
Bolt Size		Foot Pounds		Newton-Meters		Foot Pounds		Newton-Meters		Foot Pounds		Newton-Meters	
Inches	Millimeters	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.35	5	8	6.8	10.8	9	11	12.2	14.9	12	15	16.3	20.3
5/16	7.94	10	12	13.6	16.3	17	20.5	23.1	27.8	24	29	32.5	39.3
3/8	9.53	20	23	27.1	31.2	35	42	47.5	57.0	45	54	61.0	73.2
7/16	11.11	30	35	40.7	47.4	54	64	73.2	86.8	70	84	94.9	113.9
1/2	12.70	45	52	61.0	70.5	80	95	108.5	130.2	110	132	149.2	179.0
9/16	14.29	65	75	88.1	101.8	110	132	149.2	179.0	180	192	217.0	260.4
5/8	15.88	95	105	128.7	142.3	160	180	203.4	244.1	220	264	298.3	368.0
3/4	19.05	160	185	203.3	260.7	270	324	388.1	439.3	380	458	515.3	618.3
7/8	22.23	180	200	218.8	271.0	400	480	542.4	650.9	600	720	813.6	978.3
1	25.40	280	300	338.8	406.6	680	815	788.5	943.8	900	1080	1220.4	1484.6
1-1/8	28.58					800	880	1084.8	1193.3	1280	1440	1735.7	1962.5
1-1/4	31.75					1120	1240	1818.7	1881.4	1820	2000	2467.9	2712.0
1-3/8	34.93					1460	1680	1978.5	2278.1	2380	2720	3227.3	3688.3
1-1/2	38.10					1940	2200	2630.6	2983.2	3160	3560	4265.0	4827.4

* Thick nuts must be used with Grade 8 bolts

* Thick nuts must be used with Grade 8 bolts

NOTE: When hardware is plated, reduce torque values by 25%.

SECTION 4

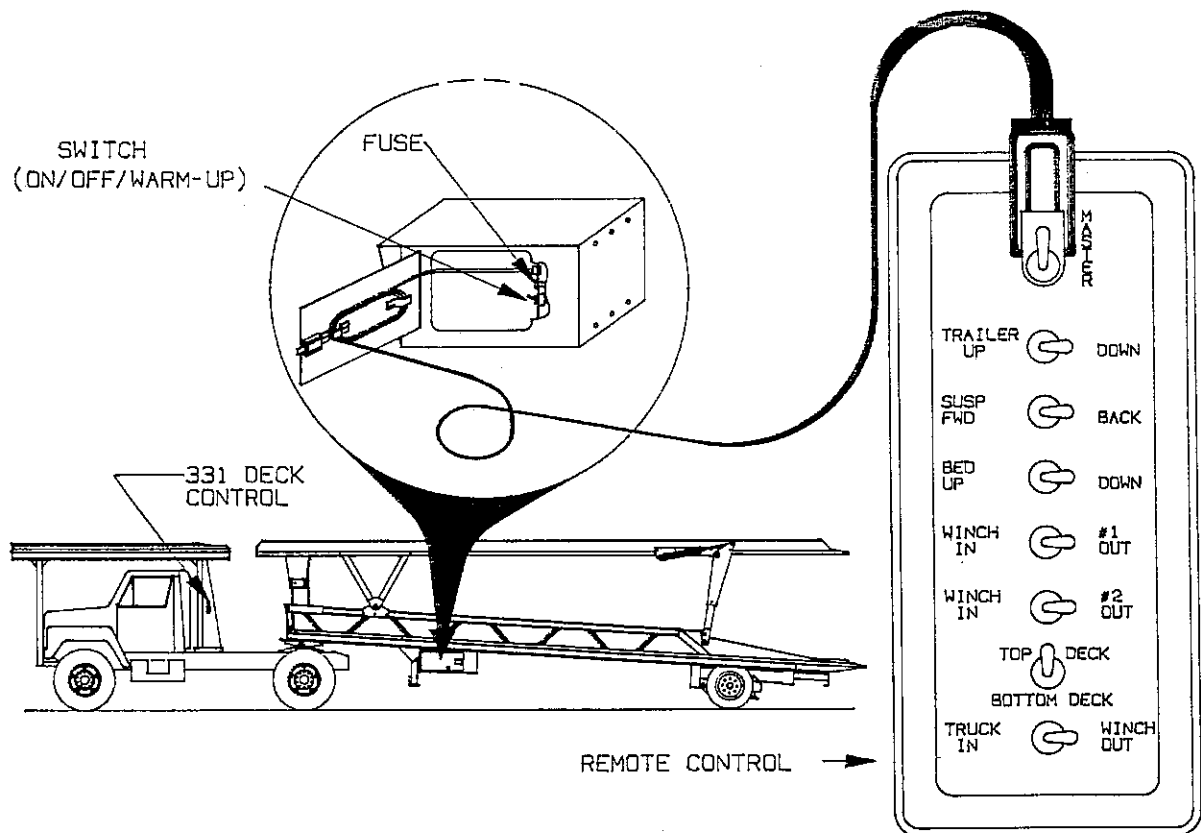
CONTROLS

PREFACE

This section describes the controls used to operate the 334 semitrailer CAR CARRIER and the 331 "OVER THE CAB" CAR CARRIER. DO NOT OPERATE YOUR CAR CARRIER UNTIL UNDERSTANDING OF ALL CONTROLS AND THEIR FUNCTION HAS BEEN ACQUIRED. IMPROPER USAGE MAY CAUSE PERSONAL INJURY, DAMAGE TO YOUR CAR CARRIER, OR TIME CONSUMING DOWN-TIME. Controls are conveniently located and easy to use. A hydraulic pump must be coupled to the trailer hydraulic system and running before any controls will become functional.

334 TRAILER CONTROLS:

All 334 trailer controls are stored within the remote control storage compartment. This compartment is located on the left hand side of the trailer. (See fig. 4-1)



CONTROLS
Figure 4-1

4-1.1 REMOTE POWER SWITCH:

The REMOTE POWER SWITCH is mounted on the partition between the storage compartment and the relay compartment (See fig. 4-1). The switch has 3 positions:

UP: This is the WARM-UP position. The warm-up position is a feature which allows hydraulic oil to circulate through the solenoid valves to prevent sticking, slow, or no operation in cold weather. The remote controls however will not operate any trailer functions with the switch in this position.

MIDDLE: This is the OFF position. The OFF position will not allow any of the remote control switches to operate any function of the trailer.

DOWN: This is the ON position. With the switch in the ON position, the remote control is energized, and may be used to control hydraulic components, such as winches and cylinders, when using the respective control switch.

4-1.2 REMOTE CONTROL MASTER SWITCH:

The REMOTE CONTROL MASTER SWITCH is on the hand held remote control and is labeled "MASTER" on the control placard. With the switch in the OFF position, the remote controls are not functional. To obtain remote control operation the switch must be in the ON position. (See fig. 4-1)

4-1.3 TRAILER UP / DOWN:

This switch is labeled "TRAILER UP/DOWN" on the remote control placard. (See fig. 4-1)

UP: Raises the front of the trailer UP for the purpose of loading and unloading of the trailer.

The CENTER switch position does not operate any component of the trailer.

DOWN: Lowers the front of the trailer to the transport position.

4-1.4 SUSP FWD / BACK:

This switch is labeled "SUSP FWD BACK" on the remote control placard. (See fig. 4-1)

FWD: Moves the rear axle and suspension FORWARD. This allows a lesser degree of slope when loading or unloading.

The CENTER switch position does not operate any component of the trailer.

BACK: Moves the rear axle and suspension BACK to the transport position.

4-1.5 BED UP / DOWN:

This switch is labeled "BED UP DOWN" on the remote control placard. (See fig. 4-1)

UP: RAISES the UPPER DECK to the transport position.

The CENTER switch position does not operate any component of the trailer.

DOWN: LOWERS the UPPER DECK for loading and unloading.

4-1.6 WINCH #1 IN / OUT

This switch is labeled "WINCH #1 IN OUT" on the remote control. (See fig. 4-1)

IN: This switch position will reel in the cable of the front winch of the top or bottom deck. The position of the switch labeled "BOTTOM / TOP DECK" will determine which #1 winch will be controlled.

The CENTER switch position does not operate any component of the trailer.

OUT: Reels the cable of the front winch OUT toward the rear of the trailer. This switch controls the direction of both the top and bottom deck winches. The position of the switch labeled "BOTTOM / TOP DECK" will determine which #1 winch will be controlled.

4-1.7 WINCH #2 IN / OUT

This switch is labeled "WINCH #2 IN OUT" on the remote placard. (See fig. 4-1)

IN: Reels in the cable of the rear winch of the top or bottom deck. The position of the switch labeled "BOTTOM / TOP DECK" determines which #2 winch will be controlled.

The CENTER switch position does not operate any component of the trailer.

OUT: Reels the cable of the rear winch OUT toward the rear of the trailer. This switch controls the direction of both the top and bottom deck winches. The position of the switch labeled "BOTTOM / TOP DECK" determines which #2 winch will be controlled.

4-1.8 TOP DECK / BOTTOM DECK

This switch is labeled "TOP DECK/BOTTOM DECK" on the remote control. (See fig. 4-1)

TOP DECK: This switch position will allow the "WINCH #1 and #2" switches to operate the top deck winches.

The CENTER switch position does not operate any component of the trailer.

BOTTOM DECK: Allows "WINCH #1 and #2" switches to operate the bottom deck winches.

4-1.9 TRUCK WINCH

This switch is labeled "TRUCK WINCH IN OUT" on the control placard. (See fig. 4-1)

IN: Reels IN the winch located on the 331 "OVER THE CAB" deck.

The CENTER switch position does not operate any component of the trailer.

OUT: This switch position will reel OUT the winch located on the 331 "OVER THE CAB" deck.

331 "OVER THE CAB" DECK CONTROLS

"OVER THE CAB" deck controls are divided into 2 control centers; in the 331 rear frame member, (See fig. 4-1) and the 334 trailer remote control (Fig. 4-1).

4-2.1 DECK SLIDE CONTROLS

Deck slide controls are located on the 331 rear frame, left hand side (See fig. 4-1)

BACK: Moving the hydraulic valve handle down will move the deck back to the loading position.

FORWARD: Moving the hydraulic valve handle up will move the deck forward to the transport position.

4-2.2 331 TRUCK WINCH CONTROL

The 331 winch control is located in the 334 trailer remote control. It is labeled "TRUCK WINCH" and it's operation is covered in 4-1.9 "Truck Winch". (Fig. 4-1.9)

I F

SECTION 5

OPERATION

PREFACE

This section describes the proper operating procedures for the 334 and 331 CAR CARRIERS. DO NOT OPERATE YOUR CAR CARRIER UNTIL A COMPLETE INSPECTION HAS BEEN PERFORMED AND A THOROUGH UNDERSTANDING OF THE OPERATING CONTROLS HAS BEEN ACHIEVED. Operation is easy, efficient and dependable. A hydraulic pump must be coupled to the trailer hydraulic system and running before any controls will become functional.

DANGER

KEEP ALL PERSONNEL CLEAR OF FRONT, REAR, AND SIDES OF TOWING VEHICLE AND SEMITRAILER DURING COUPLING, COMPONENT OPERATIONS, AND UNCOUPLING. FAILURE TO STAY CLEAR WILL RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

CAUTION

WHEN LEAVING UNIT UNATTENDED, POSITION ALL CONTROL SWITCHES TO THE OFF POSITION AND SHUT OFF HYDRAULIC PUMP

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5-1 PRE-COUPLING OF TRAILER AND TRACTOR

- .1 Slowly back the tractor/truck (towing vehicle) up to the front end of the semitrailer so the king pin of the semitrailer is centered between the tractor fifth wheel jaws. Stop the towing vehicle just inches ahead of the semitrailer. Set tractor parking brake.
- .2 Check the semitrailer king pin plate height. The king pin plate should be the same height, to slightly lower than the latch area of the fifth wheel plate of the towing vehicle. If the king pin plate needs adjusted, connect the hydraulic service hoses, and raise or lower the king pin plate using the "TRAILER UP DOWN" switch on the remote control as outlined in section 4-1.3.
- .3 Drain all air from the towing vehicle air brake system in accordance with the towing vehicle manufacturer's instructions. Allow full air build-up in the towing vehicle's air system.
- .4 Connect the service and emergency air hoses of the towing vehicle to their respective gladhand on the front of the semitrailer; red emergency line to the gladhand with the "EMERGENCY" tag, and the blue service line to the gladhand with the "SERVICE" tag. Activate the semitrailer air supply valve. Set the parking brakes and chock the trailer wheels. (See fig. 5-3)
- .5 Check the air brake operations of the semitrailer as follows:
 - .1 Apply brakes and inspect brake action on all wheels for prompt application.
 - .2 Release brakes. All brakes should release immediately. Air pressure should discharge quickly from the relay emergency valve.
 - .3 Disconnect the emergency air line from the semitrailer gladhand. Trailer brakes should promptly set.
 - .4 Re-connect the emergency air line to the trailer and activate the trailer air supply valve. Set the parking brake.

IF ANY OF THE ABOVE CHECKS FAIL, LOCATE THE PROBLEM AND REPAIR BEFORE CONTINUING.

5-2 COUPLING OF THE TRACTOR TO THE SEMITRAILER

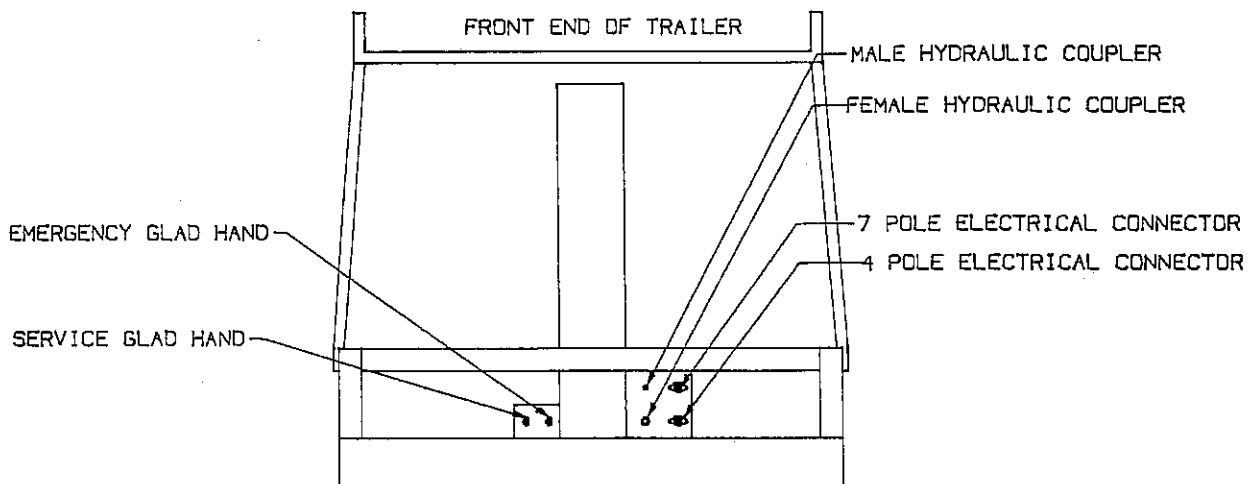


KEEP ALL PERSONNEL CLEAR OF FRONT, REAR, AND SIDES OF TOWING VEHICLE AND SEMITRAILER DURING COUPLING, COMPONENT OPERATIONS, AND UNCOUPLING. FAILURE TO STAY CLEAR WILL RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

- .1 Verify that the trailer wheels are chocked and brakes function.
- .2 Make certain the coupler of the towing vehicle's fifth wheel is open by pulling the latch handle.
- .3 Slowly back the towing vehicle so it's fifth wheel contacts the front of the king pin plate on the semitrailer and slips under it. Continue backing until the fifth wheel coupler locks onto the semitrailer kingpin.
- .4 Verify the vehicle coupling is secure by setting the emergency brakes and attempt to pull the tractor forward. If the tractor disconnects from the trailer, locate source of coupling failure and repair before continuing.
- .5 Set towing vehicle and trailer parking brakes.

5-3 CONNECTING TRACTOR SERVICES TO THE TRAILER

- .1 Connect the towing vehicle 7 pole electrical plug to the electrical receptacle on the front of the semitrailer. (See fig. 5-3) NOTE: The key on the plug and the keyway in the socket must be properly aligned before inserting the plug into the trailer socket.
- .2 Connect the 4 pole electrical cable from the "OVER THE CAB" deck to the semitrailer 4 pole electrical receptacle. (See fig. 5-3) NOTE: The key on the plug and the keyway in the socket must be properly aligned before inserting the plug into the trailer socket.
- .3 Connect the 2 hydraulic hoses from the tractor to the semitrailer's hydraulic couplers. (See fig. 5-3)
- .4 Air Lines: See section 5-1.4.



SERVICE HOOK-UPS
Figure 5-3

5-4 TRACTOR & TRAILER CHECK-OUT

- .1 Raise parking stands. (Raising the front of the trailer may be necessary to raise the trailer's weight off of the park stand. This can be accomplished by hydraulics. See the 334 control section "Trailer Up / Down" for proper operation.) Secure each parking stand in the full up position with park stand retaining pin before transporting. Lower front of trailer to transport position.
- .2 Check the operation of all lights and signals on the semitrailer for proper response to switch positions (stop, right turn, left turn and clearance).
- .3 Check tire inflation, adjust as needed to maintain pressure listed on each tire.
- .4 Check position of suspension and the king pin plate. The suspension must be all the way back and the front of the trailer must be all the way down before transporting.
- .5 Check tractor / trailer rig for air leaks. If air leakage is found, repair the defect before transporting.
- .6 Check the oil in each hub for proper level and freedom from contamination. If hubs are contaminated with water, dirt, or some other foreign material, clean before transporting.
- .7 Check tractor air pressure. Pressure must not fall below 80 PSI, even after activating brakes a couple of times. Set emergency brake and try pulling forward. The trailer wheels must not rotate. If trailer brakes do not apply, DO NOT transport until defect, or defects, are repaired.
- .8 Set parking brake and carefully remove all wheel chocks. If brakes are not properly set, the tractor/trailer may roll when removing wheel chocks.

5-5 TOWING THE SEMITRAILER

Driving the towing vehicle with the semitrailer coupled behind requires constant attention to the overall length of the combination. The "hinged-in-the-middle" configuration of the trailer and tractor, load, and weight affect performance. Turning, passing, acceleration, braking, stopping, and back-up require special considerations. When executing steep grades or turning tight curves, the semitrailer must not be allowed to push the towing vehicle, or "jackknifing" of the semitrailer with the towing vehicle may result. Application of the semitrailer brakes to keep the trailer in tow will help prevent this pushing. Braking should begin before descending a hill or attempting a curve, to assure control.

- .1 Make a moving test of the semitrailer brakes at low, and medium speeds before traveling at full speed.
- .2 Monitor the air pressure gauge on the dash of the towing vehicle. Pressure should not fall below 80 PSI at any time.
- .3 The semi trailer wheels track to the inside of the towing vehicle during turns. Thus, turning corners requires a wide swing to prevent "curb hopping", and to allow the semitrailer wheels to clear any obstacle on the inside of the corner.

- .4 Stopping should be done with a gradual and smooth application of brakes. If grabbing occurs, slack off - grabbing brakes are not efficient.

DANGER

ALWAYS CHECK BEHIND AND UNDER THE TRACTOR AND TRAILER FOR PERSONS OR OBJECTS BEFORE BACKING. FAILURE TO DO SO COULD RESULT IN SERIOUS PERSONAL INJURY OR DEATH TO OTHERS, OR DAMAGE TO PROPERTY.

- .5 Backing should be done with care. Tail over-hang, trailer length, and allowable space must be taken into consideration when backing the semitrailer.

5-6 PARKING THE CAR CARRIER

- .1 Position tractor/trailer rig on a level, solid surface.
- .2 Set the PARKING brake, NOT TRAILER HAND BRAKE, and check for proper brake holding.
- .3 Chock wheels.
- .4 Check for any air leaks in lines, relay valve, brake pods, or any other air system component.

DANGER

FAILURE TO PROPERLY SET AND CHECK PARKING BRAKE, AND CHOCK WHEELS WHEN PARKING AND DURING STORAGE, COULD ALLOW MOVEMENT OF THE TRACTOR/TRAILER RIG RESULTING IN SERIOUS PERSONAL INJURY, DEATH TO INDIVIDUAL(S), OR DAMAGE TO PROPERTY IN IT'S PATH.

5-7 UNCOUPLING TRACTOR FROM 334 CAR CARRIER (TRAILER)

- .1 Park the car carrier according to instructions in section 5-6 "PARKING THE CAR CARRIER"
- .2 Hydraulically raise the front of the trailer a few inches.
- .3 Lower the park stands to the ground. Raise only enough to insert pin through both inner and outer legs of stand. Legs must be equal distance from the ground.
- .4 Hydraulically lower the front of the trailer until the park stand feet rest on the ground. Shut hydraulic pump off.

- .5 Disconnect emergency and service air lines and attach them to the tractor gladhand holders.
- .6 Disconnect the 4 and 7 pole cables from the trailer and store with the tractor.
- .7 Disconnect the 2 hydraulic lines from the trailer and store with the tractor.
- .8 Pull the tractor fifth wheel plate latch release lever.
- .9 Attempt to pull the tractor forward. If the tractor uncouples, verify all service lines are disconnected and trailer wheels are chocked. If tractor does not disconnect, repeat steps .8, and .9.
- .10 Pull the tractor away from the trailer.

5-8 COLD WEATHER OPERATION

Cold weather causes lubricants to congeal, insulation and rubber parts to become hard, and fabricated parts may become brittle. These trends may lead to problems found in bearings, electrical systems, air systems, hydraulic systems, and weldments. Moisture attracted by warm parts due to usage can condense, collect and freeze to immobilize equipment. The operator of the tractor/trailer rig must constantly be alert for indications of the effect of cold weather.

- .1 During any stop of an extended period, neither the service or parking brake should be used as they may freeze up. Use wheel chocks to secure the vehicle from moving.
- .2 Check all structural fastenings, air system fittings, gaskets or seals, and bearings for looseness that may develop due to contraction with cold. Do not over-tighten.
- .3 Check tire inflation. Tire inflation will decrease with temperature drop.
- .4 Allow hydraulic systems to warm-up before putting systems into operation. This is accomplished by flipping the remote control power on/off/warm-up switch to the warm-up position and engaging the hydraulic pump. Leave in this mode for a few minutes.
- .5 Periodically check drain holes in the bottom of the relay and storage compartments. They must be open at all times to avoid moisture entrapment.

CAUTION

A STICKING SOLENOID VALVE WILL CAUSE IT'S HYDRAULIC COMPONENT TO OPERATE WHEN (1) SWITCHING THE REMOTE POWER SWITCH TO THE "WARM-UP" POSITION; or, (2) WHEN RELEASING THE CONTROL SWITCH FOR THAT COMPONENT. IF THIS SHOULD HAPPEN, IMMEDIATELY SWITCH THE POWER SWITCH TO OFF, AND REPAIR OR REPLACE THE STICKING SOLENOID VALVE.

5-9 HOT WEATHER OPERATION

Hot weather operation can create certain problems which must be checked. Expansion of parts may result in tightening of bearings, fasteners, and moving parts. Failure of gaskets and seals may also occur.

- .1 The semitrailer should be parked in the shade if possible. Long exposure to the sun will shorten service life of rubber components (ie, tires, light and hose grommets, hoses, etc.) and paint life.
- .2 Check tire pressure early in the day before beginning operations.
- .3 If the area is extremely humid, protect electrical terminals with ignition insulation spray. Coat aluminum exteriors, paint, and bare metal surfaces with an appropriate protective sealer.
- .4 The use of a filter-lubricator in the towing vehicle's air delivery system is recommended.

5-10 PREPARATION FOR LOADING / UNLOADING

- .1 **LOADING AND UNLOADING:** The tractor/trailer rig must be in a straight line.

LOADING: Back the tractor/trailer rig up to the vehicle to be loaded so that the rig is in-line with the vehicle.

UNLOADING: Locate the rear of the tractor/trailer rig at the location the vehicle is to be unloaded.

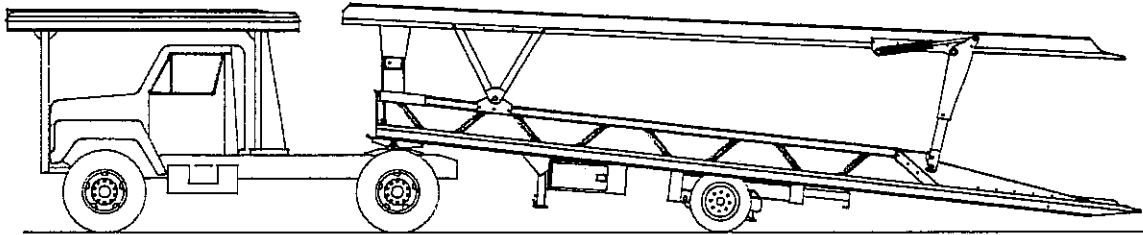
- .2 Set the tractor parking brakes without setting the trailer brakes.
- .3 Engage the hydraulic pump.
- .4 If operation is in cold weather, flip the remote control switch to the "WARM-UP" position and allow the hydraulic system to warm-up to operating temperature.

CAUTION

A STICKING SOLENOID VALVE WILL CAUSE IT'S HYDRAULIC COMPONENT TO OPERATE WHEN (1) SWITCHING THE REMOTE POWER SWITCH TO THE "WARM-UP" POSITION; or, (2) WHEN RELEASING THE CONTROL SWITCH FOR THAT COMPONENT. IF THIS SHOULD HAPPEN, IMMEDIATELY SWITCH THE POWER SWITCH TO OFF, AND REPAIR OR REPLACE THE STICKING SOLENOID VALVE.

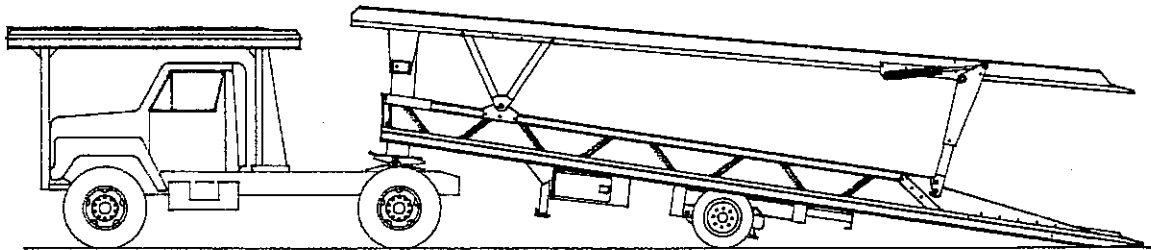
- .5 Switch the remote control power (ON/OFF/WARM-UP) switch to the "ON" position.
- .6 Switch the hand held remote control "MASTER" switch to the "ON" position.

- .7 Slide the suspension forward as far as it will travel using the "SUSPENSION FWD" switch.



SUSPENSION FORWARD
Figure 5-10.7

- .8 Raise the front of the trailer "UP", using the "TRAILER UP / DOWN" switch, until the approach plate of the lower deck rests on the ground.



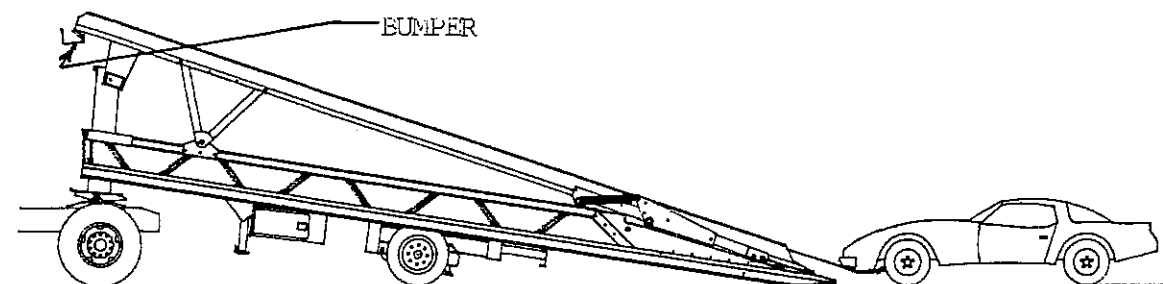
TRAILER FRONT RAISED
Figure 5-10.8

NOTE: IF ADDITIONAL DECK ANGLE IS NEEDED TO UNLOAD A DISABLED VEHICLE, OPERATE STEPS 7 & 8 IN REVERSE ORDER.

5-11 "OVER THE CAB" LOADING

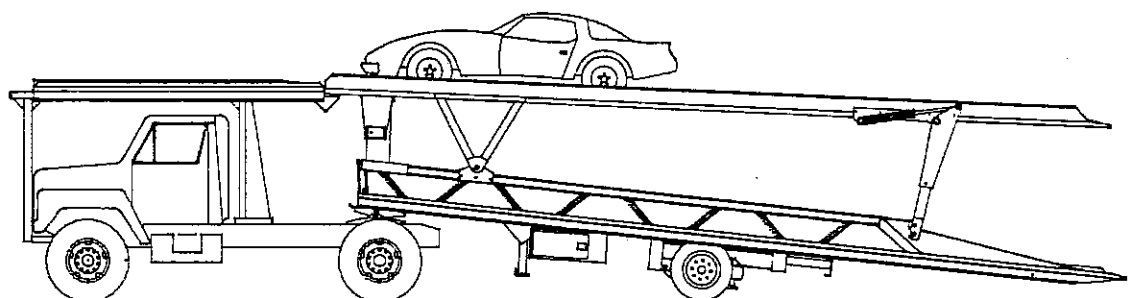
NOTE: THE "OVER THE CAB" DECK CAN NOT BE LOADED IF EITHER THE LOWER OR UPPER TRAILER DECKS HAVE BEEN LOADED FIRST.

- .1 Set the trailer up for loading as detailed in section 5-10 titled "PREPARATION FOR LOADING / UNLOADING".
- .2 Position the trailer upper deck for loading according to section 5-12, "UPPER DECK LOADING".
- .3 Winch vehicle onto the upper deck of the trailer. (See fig. 5-11.3)



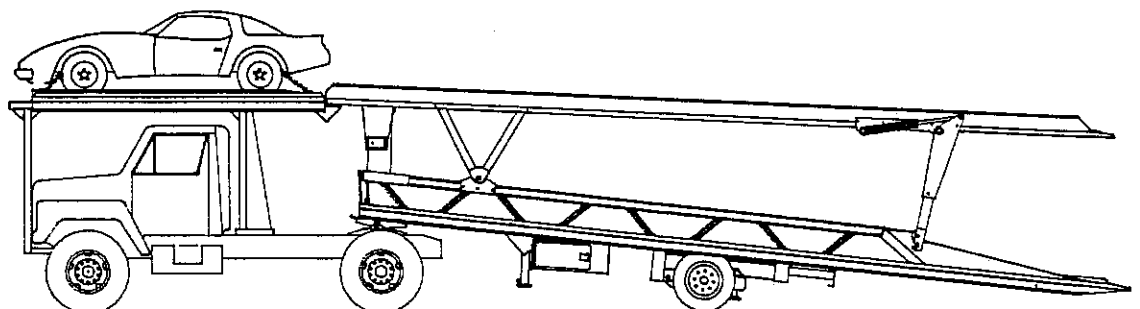
WINCH LOADING
Figure 5-11.3

- .4 Lower the front of the trailer until the upper trailer deck is level with the "OVER THE CAB" deck. (See fig. 5-11.6)
- .5 Lower the deck bumpers located on the front end of the trailer upper deck.
- .6 Hydraulically slide the "OVER THE CAB" deck back to match up with the upper trailer deck. (See fig. 5-11.6)



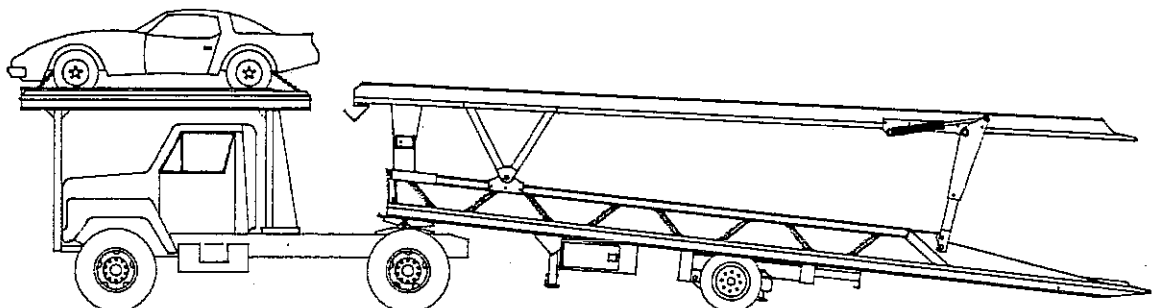
OVER CAB - LOADING
Figure 5-11.6

- .7 Use the "OVER THE CAB" winch to pull the vehicle to be retrieved onto the "OVER THE CAB" deck. (See fig. 5-11.7)



"OVER THE CAB" - LOADED
Figure 5-11.7

- .8 With the vehicle centered on the "OVER THE CAB" deck, chain down securely according to the instructions in 5-14 "SECURING LOADS".
- .9 Slide the "OVER THE CAB" deck forward to the end of it's travel for transport position. (See fig. 5-11.9)

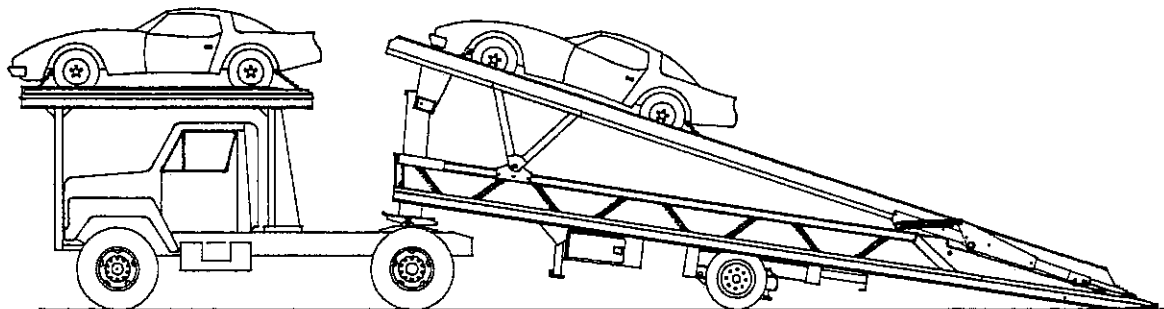


OVER CAB LOADED - TRANSPORT POSITION
Figure 5-11.9

5-12 UPPER DECK LOADING

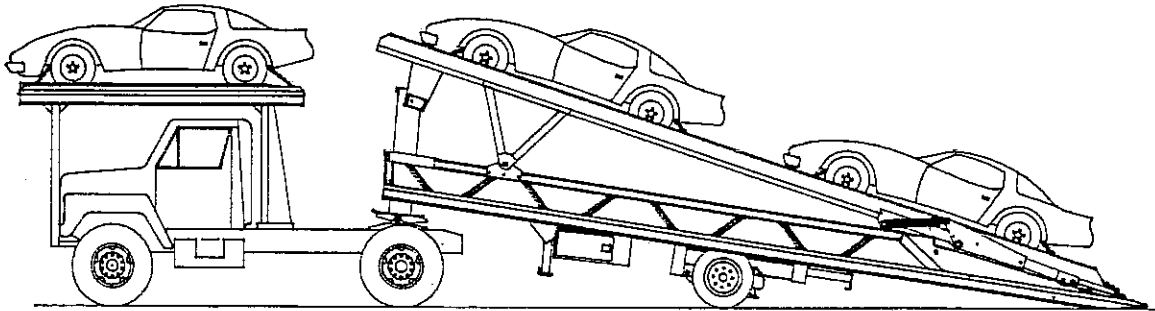
NOTE: THE UPPER DECK CAN NOT BE LOADED IF ANY VEHICLES ARE ON THE LOWER DECK.

- .1 Raise the bumpers located on the front end of the trailer upper deck and pin into place securely.
- .2 Set the trailer up for loading as detailed in section 5-10 titled "PREPARATION FOR LOADING / UNLOADING".
- .3 Lower the upper deck till the rear approach plate rests on the lower deck approach plate. (See fig. 5-12.4)
- .4 Use top deck winch #1 to pull the first vehicle onto the upper deck to position number 1. (See fig. 5-12.4)



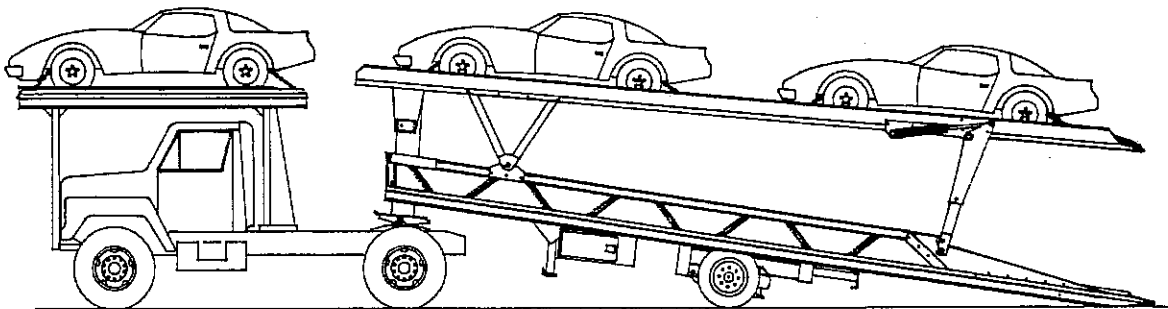
UPPER DECK CAR #1
Figure 5-12.4

- .5. Chain down the first vehicle securely according to the instructions in 5-14 "SECURING LOADS".
- .6 Using top deck #2 winch, pull the second vehicle onto the upper deck. (See fig. 5-12.6)



UPPER DECK CAR #2
Figure 5-12.6

- .7 Chain down the second vehicle securely according to the instructions in 5-14 "SECURING LOADS".
- .8 Raise the rear of the upper deck till the lift arm rollers are at the forward end of the ramp track. (See fig. 5-12.8)

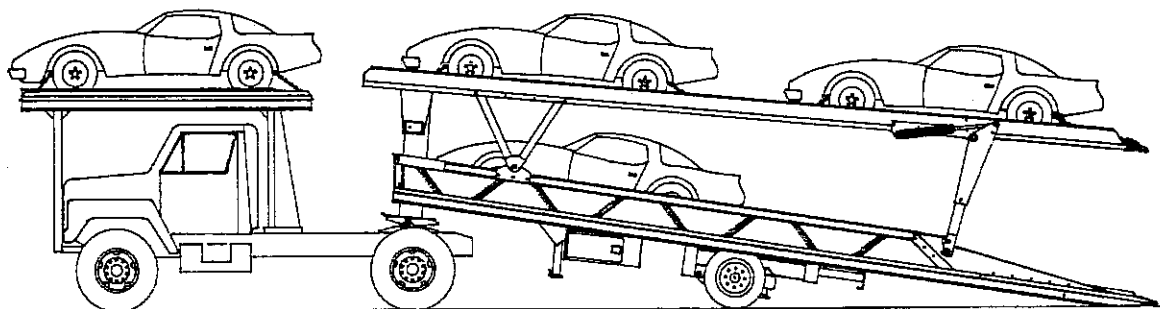


UPPER DECK - LOADED & RAISED
Figure 5-12.8

5-13 LOWER DECK LOADING

NOTE: THE LOWER DECK MUST BE LOADED AFTER THE UPPER DECKS IF THE UPPER DECKS ARE TO BE LOADED.

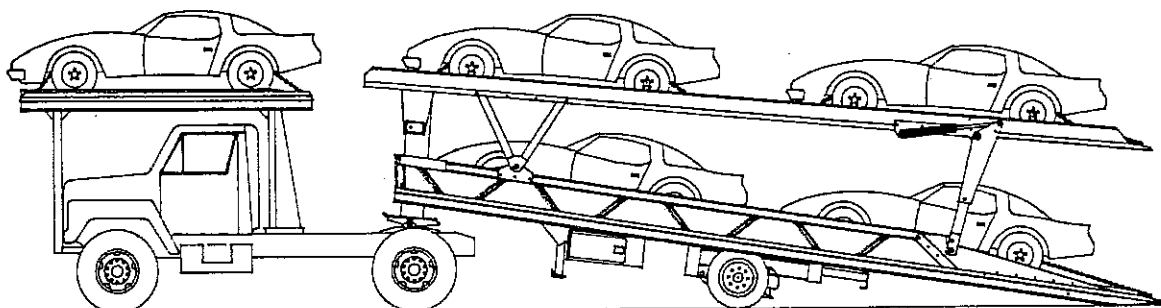
- .1 Set the trailer up as detailed for loading in the section 5-10 titled "PREPARATION FOR LOADING / UNLOADING".
- .2 Use the bottom deck winch #1 to pull the first vehicle onto the lower deck to position 1. (See fig. 5-13.2)



LOWER DECK CAR #1

Figure 5-13.2

- .3 Chain down the first vehicle securely according to the instructions in 5-14 "SECURING LOADS".
- .6 Using the bottom deck #2 winch, pull the second vehicle onto the lower deck.



LOWER DECK CAR #2

Figure 5-13.6

- .7 Chain down the second vehicle securely according to the instructions in 5-14 "SECURING LOADS".

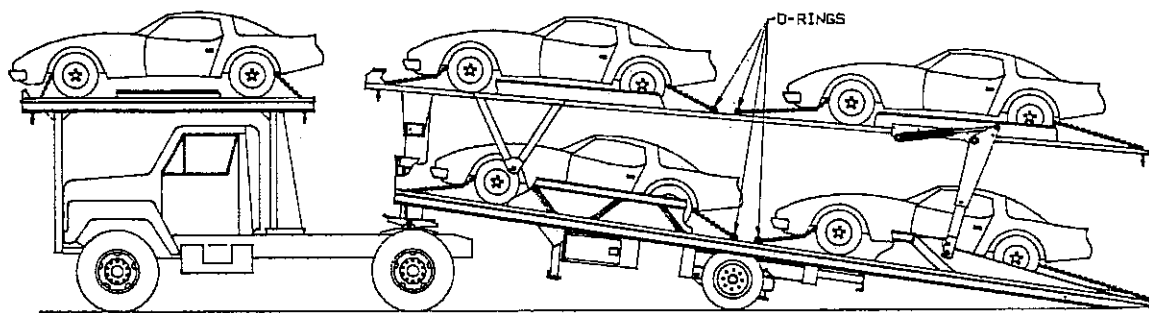
5-14 SECURING LOADS

All vehicles must be securely tied front and rear to the deck it has been positioned onto with 5/16 HI-TEST chain. Key holes are provided in the front and rear of each deck floor to anchor the vehicle to. D-rings are provided in the mid section of each trailer deck for anchoring. (See fig. 5-14.1 & .2)

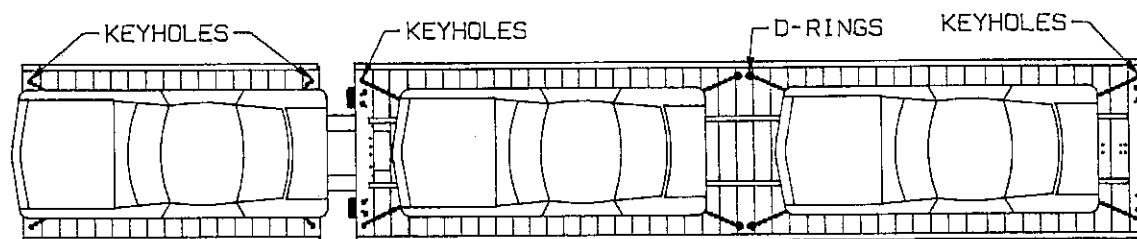
The front of each vehicle must be secured to the load anchor ahead of the vehicle, and the rear of each vehicle must be secured to the load anchor behind the vehicle. (See fig. 5-14.1 & .2) NOTE: DO NOT RELY ON THE WINCH TO SECURE THE LOAD TO THE DECK !

Do not allow any slack in the hold down chains. Slack will allow a vehicle to shift. A shifting load will create sufficient momentum to break HI-TEST chains. Remove chain slack by using chain boomers, or other slack adjusters designed to be used for securing loads.

Always attach additional safety chains.



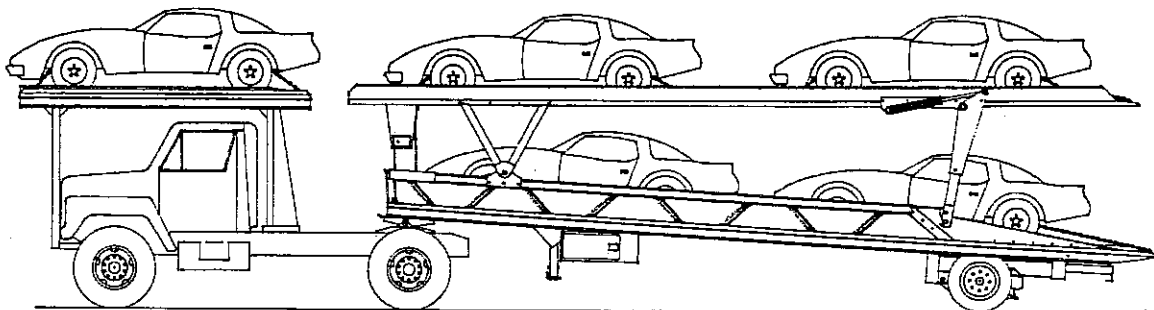
SECURING LOADS - SIDE VIEW
Figure 5-14.1



SECURING LOADS - TOP VIEW
Figure 5-14.2

5-15 PREPARATION FOR TRANSPORT

- .1 With all vehicles securely chained, "OVER THE CAB" deck in the transport position, completely lower the front of the trailer. (See fig. 5-15)
- .2 Slide the rear axle back to the end of it's travel. (See fig. 5-15)
- .3 Switch the remote control "MASTER" switch to the "OFF" position.
- .4 Switch the remote control power "ON/OFF/WARM-UP" switch to the "OFF" position.
- .5 Store the remote control and power cord in the storage compartment.
- .6 Disengage the hydraulic pump.
- .7 Re-activate the trailer brakes.



DECKS LOADED - TRANSPORT POSITION
Figure 5-15

5-16 LOWER DECK UNLOADING

- .1 Set the trailer up as detailed for unloading in section 5-10 titled "PREPARATION FOR LOADING / UNLOADING".
- .2 With the winch securely holding the vehicle in place, remove anchoring chains.
- .3 Reel lower deck #2 winch out to allow the back vehicle to move off of the deck. Unhook the winch cable from the unloaded vehicle and store the cable by attaching to the trailer approach plate and tightening.
- .4 Move the vehicle from behind the trailer, or relocate the trailer to a new area.
- .5 Reel lower deck #1 winch out to allow the back vehicle to slide off of the deck. Unhook the winch cable from the unloaded vehicle and store the cable on the trailer deck.
- .6 Return the trailer to the transport position before changing location, or transporting the tractor/trailer rig.

5-17 UPPER DECK UNLOADING

NOTE: THE LOWER DECK MUST BE EMPTY BEFORE LOWERING UPPER DECK !

- .1 Set the trailer up as detailed for unloading in section 5-10 titled "PREPARATION FOR LOADING / UNLOADING".
- .2 Lower the upper deck until the approach plate is resting on the lower deck.
- .3 With the winch securely holding the vehicle in place, remove anchoring chains.
- .4 Reel upper deck #2 winch out to allow the back vehicle to move off of the deck. Unhook the winch cable from the unloaded vehicle and store the cable by hooking onto the approach plate and tightening.
- .5 Move the unloaded vehicle from behind the trailer, or relocate the trailer to a new area.
- .6 Reel upper deck #1 winch out to allow the back vehicle to move off of the deck. Unhook the winch cable from the unloaded vehicle and store the cable on the trailer deck.
- .7 Return the upper deck and trailer to the transport position before changing location, or transporting the tractor/trailer rig.

5-18 "OVER THE CAB" DECK UNLOADING

- .1 Set the trailer up as detailed for unloading in section 5-10 titled "PREPARATION FOR LOADING / UNLOADING".
- .2 Lower the front of the trailer so that the upper deck is level with the "OVER THE CAB" deck.
- .3 Swing the bumpers located on the upper trailer deck, front end, down.
- .4 Slide the "OVER THE CAB" deck back until it meets the front end of the upper trailer deck.
- .5 With the winch securely holding the vehicle in place, remove anchoring chains.
- .6 Reel the "OVER THE CAB" winch out to allow the vehicle to move off of the "OVER THE CAB" deck, and onto the upper trailer deck.
- .7 Lower the upper deck until the approach plate is resting on the lower deck.
- .8 Reel the "OVER THE CAB" winch out to allow the vehicle to be unloaded from the trailer.

- .9 Disconnect the winch cable from the vehicle and SECURE ON THE "OVER THE CAB" DECK.
- .10 Return the upper deck and trailer to the transport position before changing locations, or transporting the tractor/trailer rig.

SECTION 6

MAINTENANCE AND LUBRICATION

PREFACE:

The Landoll 331 and 334 CAR CARRIERS are designed for years of service with minimal maintenance. The following maintenance, however, is very important for durability and for safe operation. Maintenance is an owner / user responsibility.

MAINTENANCE DANGER PRECAUTIONS

DANGER

FAILURE TO PROPERLY SET AND CHECK PARKING BRAKE, AND CHOCK WHEELS WHEN PARKING AND DURING STORAGE, COULD ALLOW MOVEMENT OF THE TRACTOR/TRAILER RIG RESULTING IN SERIOUS PERSONAL INJURY, DEATH TO INDIVIDUAL(S), OR DAMAGE TO PROPERTY IN IT'S PATH.

DANGER

WHEN JACKING UP OF THE SEMITRAILER IS NECESSARY, OR WHEN CRAWLING UNDER THE SEMITRAILER IS NECESSARY, CHOCK ALL WHEELS OF THE TRAILER AND TRACTOR. SUPPORT THE TRAILER WITH JACK STANDS SUFFICIENT TO WITHSTAND THE LOAD OF THE TRAILER AND IT'S LOAD. FAILURE TO TAKE ADEQUATE SAFETY MEASURES COULD RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

DANGER

MAINTENANCE WELDING AND CUTTING OPERATIONS PRODUCE HEAT, TOXIC FUMES, RADIATION, METAL SLAG, AND CARBON PARTICLES. WELDING AND CUTTING GOGGLES WITH THE PROPER TINTED LENSES, GLOVES, APRON OR JACKET, AND WELDERS BOOTS ARE REQUIRED. FAILURE TO USE PROPER SAFETY EQUIPMENT WILL RESULT IN SERIOUS PERSONAL INJURY.

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6-1 INSPECTION

Inspect the towing vehicle, each deck, and the trailer suspension periodically for damage or evidence of pending failure. Damaged or broken parts should be repaired or replaced immediately. Never operate a machine which is known to be defective or is operating improperly. The cause of any binding or hydraulic leakage should be determined immediately and the problem promptly corrected.

6-2 SLIDING SURFACES

Sliding surfaces are to be cleaned periodically with solvent or mineral spirits. Cleaning every 6 months is recommended for clean operating conditions. Severe working conditions will require maintenance more often. Sliding on dirty wear surfaces will cause shortened life of the slide wear strips or blocks. These strips and blocks are impregnated with a special lubricant - Thus they are self lubricating and **MUST NOT BE LUBRICATED**. If chatter or squeal occurs, use silicone dry spray only.

6-3 HYDRAULIC SYSTEM

Check the hydraulic oil level weekly, or after any leakage. Use AMOCO RYKON MV or equivalent hydraulic oil.

- .1 Check the hydraulic oil level with the tractor/trailer in the transportation position. Dis-engage the hydraulic pump. Proper oil level is at the bottom of the filler tube strainer. Filling to the top will result in overflow when any of the cylinders are retracted.
- .2 If a cylinder or valve leaks, disassemble the component and ascertain the cause of the leak. Any time a cylinder or valve is opened up, or whenever any seal replacement is necessary, it is advisable to clean all components and replace all seals. Seal kits are available from your Landoll dealer.

6-4 WINCH CABLES

Inspect the winch cable prior to, and after each and every usage. If frayed wires, nicks, kinks, worn spots, breaks, or any other sign of deterioration or damage is found, immediate replacement is mandatory before further usage.

Inspect the winch mechanism thoroughly each week to insure safe, efficient operation.

6-5 ELECTRICAL SYSTEM

Maintenance of the electrical system consists of inspection, and minor servicing. Any wire, connection, or electrical component showing signs of corrosion, wear, breakage, or unraveling must be serviced.

- .1 **Frayed or unraveling wire** must have the defective section removed and replaced with wire of the same color and gauge. Seal all connections and insulate.
- .2 **Corroded terminals** must have the corrosion removed, source of corrosion neutralized, terminal resealed, protected, and insulated.
- .3 **Fuse or circuit breaker burn-out or "blow-out"** usually indicates an electrical short-circuit, although a fuse may occasionally fail from vibration. Insert a second fuse or reset the breaker. If this fuse immediately burns out or the breaker trips, locate the cause of the electrical short and repair.

- .4 Lights with a repeated lamp burn-out usually indicates a loose connection, either at the lamp socket, the system ground, or a malfunctioning voltage regulator. Locate the source of the problem and repair. System grounds must be grounded to bare metal surfaces. Paint, grease, wax, and other coatings act as insulators. Replacement lamps must be equivalent to the factory installed lamp.

6-6 ALUMINUM - CARE AND CLEANING

To retain the original appearance of all types of aluminum finishes, it is important to keep the finish clean and free of any dirt accumulation. For periodic routine cleaning, LANDOLL recommends washing with water containing any mild, non abrasive soap or detergent such as those recommended for automotive finishes, or any of the numerous non-etching, non abrasive aluminum cleaners which are available at; grocery, department, hardware, and automotive stores. To apply these cleaners, use a soft cloth or sponge. Follow the cleaning by thoroughly rinsing the surface with clear water and drying with a chamois or cloth to prevent spotting or streaking. The surface must be kept clean, to protect the finish from minor scratches or abrasions, and to facilitate later cleaning. A coat of non-abrasive liquid or paste wax, such as those recommended for the care of automotive finishes, should be applied to the clean dry surface.

Wax coatings should normally be replenished every three to six months. The exact life of the wax coating is dependent on the degree and severity of exposure to weather between waxing. To get the longest life from wax coatings, excessive grime and soil should not be allowed to accumulate, and the waxed surface should be washed as often as needed with clear, cool water and dried with a chamois or cloth. A protective wax coating is particularly important for preservation of the finish in seaboard localities and in industrial areas where the finish is exposed to industrial fall out.

6-7 GENERAL AIR BRAKE SYSTEM MAINTENANCE

A daily general inspection will reveal the most common problems found in the air brake system. This inspection should include:

- .1 Checking air lines for cracking or kinks.
- .2 Linkage pins, keepers and other fastening hardware for excessive wear, corrosion, and for being secure.
- .3 Brake linings.
- .4 Air reservoir for moisture.

NOTE: COMPLETELY DRAINING THE AIR RESERVOIR WILL RELEASE THE TRAILER BRAKES.



WHEN CRAWLING UNDER THE SEMITRAILER IS NECESSARY, CHOCK ALL WHEELS OF THE TRAILER AND TRACTOR. WHEN JACKING IS NECESSARY, CHOCK ALL WHEELS, AND SUPPORT THE TRAILER WITH JACK STANDS SUFFICIENT TO WITHSTAND THE WEIGHT OF THE TRAILER AND LOAD. FAILURE TO TAKE ADEQUATE SAFETY MEASURES MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

6-8 AIR BRAKE CHAMBERS

Repair or replace faulty units. Check the condensation holes on the underside of the brake chambers to make sure they are open. The brake chambers should be disassembled and cleaned at 50,000 miles or yearly. The diaphragm and any marginal parts must be replaced. When replacing the diaphragm or hardware, replace the corresponding parts for the other chamber on the same axle. This will aid in even brake application and releasing. Examine yoke pin for wear and replace if necessary.

6-9 RELAY / EMERGENCY VALVE

Every 3600 operating hours or 100,000 miles or yearly, the Relay Emergency Valve should be disassembled, cleaned, and lubricated with DOW CORNING 33 GREASE, or equivalent. Worn, damaged, and rubber parts must be replaced. Listed below is the procedure for testing the relay valve.

SET-UP: Check the air pressure gauge in the tractor with a known-accurate test gauge before starting these tests. Connect tractor air lines to the trailer. Chock wheels of both tractor and trailer to prevent rolling.

TESTING:

- .1 Drain all air from the tractor and trailer air systems at the reservoirs.
- .2 Start tractor and allow pressure to build up to full charge. Make several full service brake applications. All semitrailer brakes should set and release promptly and evenly.
- .3 Allow air pressure to build up to 90 to 100 psi with the brakes released. Shut off tractor engine and monitor air pressure for two (2) minutes. A maximum of 6 psi pressure drop is allowed in two minutes. If more than 6 psi drop is experienced, apply soap suds to the exhaust port of the relay valve. A one (1) inch bubble in 5 seconds is maximum allowable leakage. No leakage is allowed at pipe plugs or fittings.
- .4 Start the tractor and allow pressure to build up to full charge. Make several full service brake applications. All semitrailer brakes should set and release promptly and evenly. Allow pressure to stabilize at 90 to 100 psi. Shut tractor engine off. Apply and hold a full service brake application for two (2) minutes. A maximum of eight (8) psi drop is allowed in two (2) minutes. If more than 8 psi drop in 2 minutes is experienced, allow pressure to stabilize at 90 to 100 psi and apply soap suds to the relay valve cover and exhaust port with the service brake applied. This detects body O-ring and exhaust valve leakage. A maximum of a one (1) inch bubble in three (3) seconds is allowed. Release the service brake.
- .5 Start the tractor and allow pressure to build up to full charge. Make several full service brake applications. All semitrailer brakes should set and release promptly and evenly. Allow pressure to stabilize at 90 to 100 psi. Shut tractor engine off. Apply emergency trailer brakes. Disconnect the emergency line at the trailer. Trailer brakes should immediately set. Apply soap suds to the trailer emergency gladhand port. NO leakage is allowed. A leak at the emergency gladhand indicates a leaking check valve or piston O-rings in the

relay valve. Disconnect the service line at the trailer and apply soap suds to the trailer service line gladhand. NO leakage is allowed. A leak indicates leaking relay valve piston O-rings.

- .6 Connect tractor emergency and service lines to the trailer. Start tractor engine and allow air pressure to build up. Activate tractor protection valve to charge trailer brake air supply as soon as possible. Trailer brakes should release at a maximum of 65 psi trailer emergency line pressure.

IF ANY OF THE ABOVE TESTS FAIL, REPAIR OR REPLACE THE DEFECTIVE PART(S) BEFORE TRANSPORTING OR USING THE TRAILER.

6-10 BRAKE ASSEMBLY

Lubricate slack adjusters, cam shaft bearings, brake shoe pivot pins and rollers yearly with gun grease. Inspect and adjust brake assembly every 2,000 miles or monthly, whichever comes first. Examine brake linings visually to locate the lining showing the greatest amount of wear. If lining thickness is 3/8 inch or less, remove the wheel and drum and replace linings. DO NOT allow linings to wear thin enough so the lining rivets contact the drum. Refer to parts section for brake assembly parts identification. The following is the recommended procedure for brake lining replacement:

DISASSEMBLY:

- .1 Jack up the trailer wheel which needs brake lining service.



WHEN CRAWLING UNDER THE SEMITRAILER IS NECESSARY, CHOCK ALL WHEELS OF THE TRAILER AND TRACTOR. WHEN JACKING IS NECESSARY, CHOCK ALL WHEELS, AND SUPPORT THE TRAILER WITH JACK STANDS SUFFICIENT TO WITHSTAND THE WEIGHT OF THE TRAILER AND LOAD. FAILURE TO TAKE ADEQUATE SAFETY MEASURES MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

- .2 Remove trailer wheel/tire assembly and set aside.
- .3 Back off the slack adjuster to completely release the brake.
- .4 Remove hub cap, spindle nuts and lock washer, hub and brake drum assembly. Be careful to protect the bearings from dirt and other foreign material.
- .5 Remove brake retract spring.
- .6 Remove lock rings and washers from anchor pins.
- .7 Remove anchor pin locks.

- .8 Remove anchor pins and brake shoe assemblies.
- .9 Remove slack adjuster lock ring and washer.
- .10 Remove slack adjuster.
- .11 Remove cam shaft lock ring and spacer washer, located toward inside of spider boss.
- .12 Remove camshaft.
- .13 Remove camshaft washer, located under camshaft head.
- .14 Remove roller shaft lock ring (in case of the cast shoe, remove roller shaft set screw, and roller assembly), roller shaft, anchor pin bushings from shoes, spider seals and bushings and camshaft seals.
- .15 Clean all parts and spider with brake cleaner such as CRC brand "BRAKLEEN 05089". Inspect all parts and replace any part which shows any sign of wear, fracture, distortion, or discoloration due to excessive heat.

ASSEMBLY:

- .16 Install new anchor pin bushings, spider and camshaft seals and bushings if necessary.
- .17 Install cam roller assemblies.
- .18 Place camshaft washer under cam head, position cam through spider, install spacer washer and lock ring, position camshaft through camshaft bracket, and install slack adjuster washer and locking ring.
- .19 Set new brake shoes into position and insert anchor pins with recessed slot in line with anchor pin lock holes.
- .20 Secure anchor pins with locking pins.
- .21 Install washers and lock ring where necessary.
- .22 Install brake shoe retract spring.
- .23 Install slack adjuster and connect to brake chamber push rod. The incident angle at rest between the slack adjuster and push rod should be approximately 95°.
- .24 Clean and inspect bearings.
- .25 Replace hub oil seal.
- .26 Install hub and adjust wheel bearings as outlined in section 6-14 "WHEEL BEARING LUBRICATION and ADJUSTMENT" steps 3 through 10.

6-11 BRAKE ADJUSTMENT

Slack adjusters provide the means for routine brake adjustment to compensate for lining wear. Inspect and adjust slack adjusters weekly or at 2,000 mile intervals.



WHEN CRAWLING UNDER THE SEMITRAILER IS NECESSARY, CHOCK ALL WHEELS OF THE TRAILER AND TRACTOR. WHEN JACKING IS NECESSARY, CHOCK ALL WHEELS, AND SUPPORT THE TRAILER WITH JACK STANDS SUFFICIENT TO WITHSTAND THE WEIGHT OF THE TRAILER AND LOAD. FAILURE TO TAKE ADEQUATE SAFETY MEASURES MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

CHECKING:

- .1 Release brakes.
- .2 Measure the distance from the face of the brake air chamber to the center of the slack adjuster linkage pin.
- .3 Apply brakes.
- .4 Repeat step 2.
- .5 Subtract the two distances to find the air chamber push rod travel. The total travel of the brake push rod must be less than 1-3/4" (one and three fourths inches) to meet Federal "IN-SERVICE" criteria. It is advisable to adjust all brakes on the same axle to within 1/2 inch of each other to prevent unbalanced braking.

ADJUSTING:

- .1 Release brakes.
- .2 Place a wrench of the proper size on the slack adjuster adjusting nut, and push in on the adjusting sleeve.
- .3 Adjust by rotating the adjusting nut the proper direction to achieve the proper brake lining to drum clearance.
- .4 Remeasure air chamber push rod travel from release to full brake application. If the adjustment is not within the "IN-SERVICE" criteria, readjust. If the adjustment has brought the travel to within specifications, proceed to next step.
- .5 Remove wrench from slack adjuster. Check locking sleeve to verify that it has sprung back out and is locking the adjusting nut. If it did not snap back out, the adjuster will have to be rotated slightly.

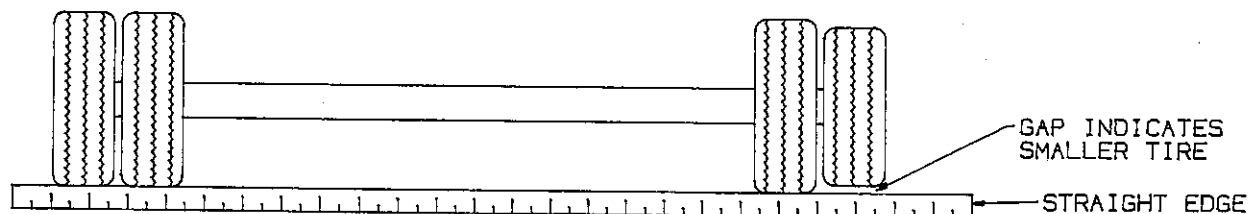
6-12 TIRE INFLATION

Tire inflation will produce the tire and ground contact characteristics. Tire inflation should be checked daily while the tire is cold, and during road stops. Checking the tire pressures while tires are hot will give an increased pressure. Adjusting tire air pressure to the specified amount while tires are hot will produce improper tire to road contact and thus abnormal wear. Do not exceed cold inflation pressure listed on the tire. Exceeding cold inflation pressures will result in damaged tire bodies, rims and wheels. Replace all valve stem caps when pressure checking/adjusting has been completed. Remove any foreign objects from between duals.

6-13 TIRE MATCHING

Both tires on the same spindle must be the same size in order to properly distribute the load and braking forces between them. Tire size can be checked by two methods: endless tape, or with a straight edge or string the same length or longer than the trailer tracking width. The straight edge or string method can not be used if tires and wheel assemblies are not mounted on the axle. In both methods, the tire must be mounted on a rim and properly inflated. If there is a difference in size, and is within the allowable difference, the smaller tire should be mounted to the inside position of the duals.

- .1 Endless tape method: Measure around each tire on the tread surface. Maximum allowable difference between the two mating tires of a dual is $\frac{3}{4}$ of an inch.
- .2 Straight edge or string method: Jack trailer up until the wheels are off of the ground. Hold a straight edge against the tires of both ends of an axle. A gap at one tire indicates a smaller tire. A maximum of $\frac{1}{8}$ inch gap is allowed (See Fig.6-13.2).



TIRE MATCHING

Figure 6-13.2

6-14 WHEEL BEARING LUBRICATION and ADJUSTMENT

Oil level must be checked daily and maintained between the "ADD" and "FULL" lines on the hub cap window. Check for cracked windows, missing filler plugs, and for oil leaks. Add hub oil through the "POP-IN" filler plug located in the center of the hub windows. Re-install the "POP-IN" plugs after filling each hub. Adjust wheel bearings and change oil every 50,000 miles or with each brake lining replacement, whichever occurs first.

ADJUSTMENT:

- .1 With a drain pan under the hub cap, remove the hub cap assembly allowing oil to drain.

- .2 Lift the wheel off of the ground.
- .3 Adjust slack adjuster to eliminate brake drag during tire/wheel rotation.
- .4 Remove the outside spindle nut and locking washer.
- .5 Rotate the tire by hand and tighten the inner nut until there is a slight bind. Back off the inner spindle nut 1/3 turn to allow free rotation of wheel.
- .6 Install spindle locking washer. Align inner nut locking peg with the nearest washer hole.
- .7 Install outer spindle nut and torque to 250 min - 400 max lb/ft.
- .8 Install hub cap and fill with oil to the full mark. Use 90 EP gear oil.
- .9 Adjust brakes according to 6-11 "BRAKE ADJUSTMENT".
- .10 Check hub oil level after the wheel has set in one position for a few minutes to allow oil to work into bearings.

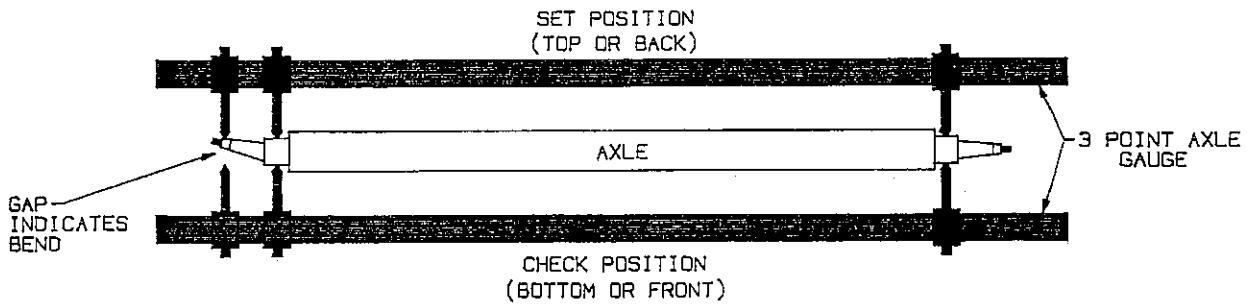
6-15 SUSPENSION AND WHEELS

Visually examine the suspension for broken or missing parts. Check brackets, shocks, equalizing beams, air bags, and frame members. Check wheel nut torque after the first 50 miles or 5 hours of service. Check torque periodically thereafter. Torque at same intervals after each change of tires or rims. The inner and outer wheel nut torque is 450 to 500 ft. lbs. Wheel and brake drums should be carefully inspected for cracks every 2000 miles. Replace all defective parts.

6-16 WHEEL ALIGNMENT

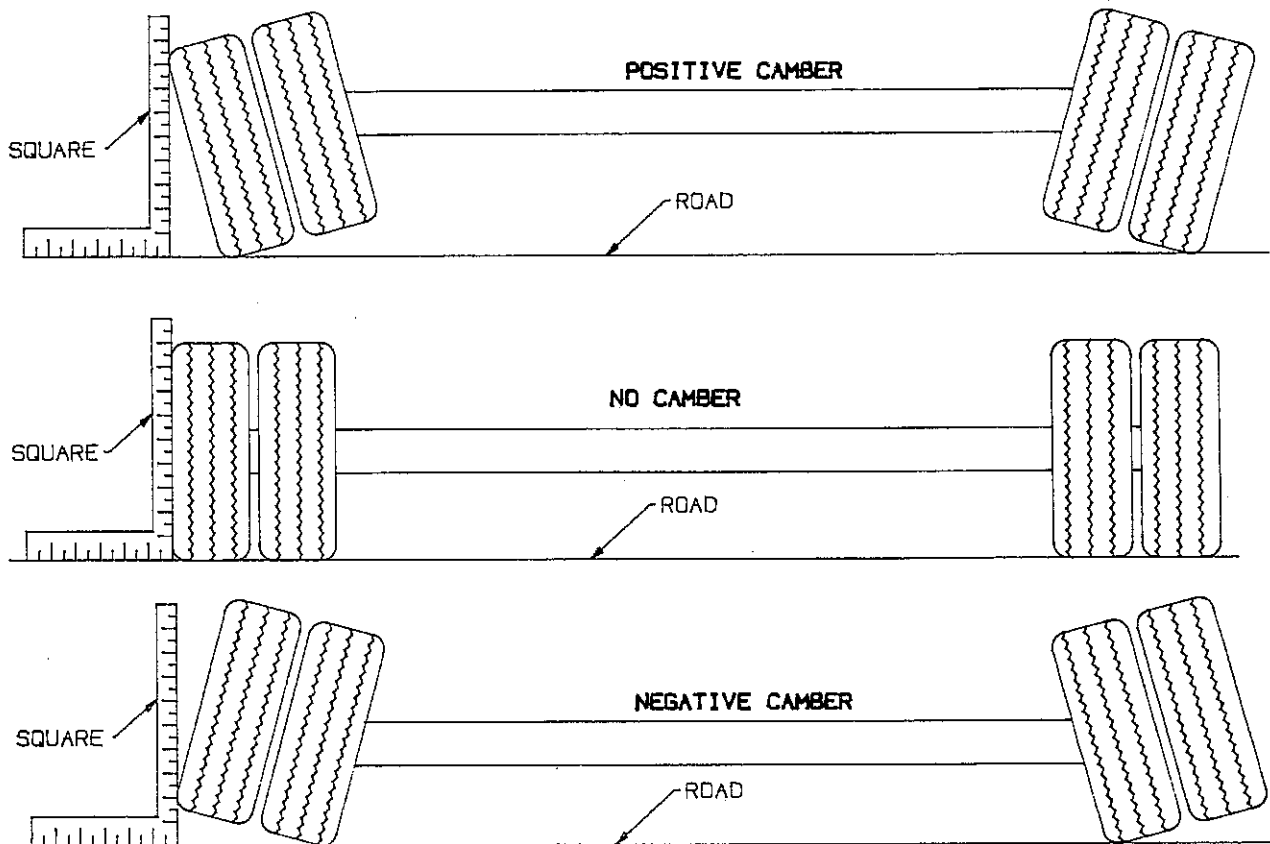
When trailer tires show signs of scuffing, feather-edging or uneven wear, examine the semitrailer for damaged suspension (frame, shocks, linkage, etc), axle, wheel bearings, and wheels. Proper WHEEL alignment, and wheel bearing adjustment is essential for proper tire wear. The simplest form of checking wheel alignment "toe" is by running the trailer over a "SCUFF GAUGE". A scuff gauge reading of 16 feet or less per mile is considered satisfactory. If a scuff gauge is not readily available, or edge wear on one side of a tire is occurring signifying positive or negative camber, alignment can be checked as follows:

- .1 Jack trailer up so that the tires are off of the ground.
- .2 Support the trailer on jack stands with sufficient capacity to support the total weight of the trailer and any load which it may be carrying.
- .3 Remove wheel, hub, and bearing assemblies.
- .4 Place a 3 point axle gauge against the front side of the axle, and adjust each axle gauge point to the axle. (Double point end against the inner and outer wheel bearing surfaces of the spindle being checked and the other point on the inner bearing surface on the other spindle)(See Fig. 6-16.4).



AXLE CHECK
Figure 6-16.4

- .5 Move the axle gauge and place against the back side of the axle. If either of the points of double point end fails to touch the axle surface, a bent spindle is evident. A point gap of .015 (15 thousandths) of an inch or more is considered excessive tire "toe" and the axle must be replaced(See Fig. 6-16.4).
- .6 Follow the same procedures as in steps 4 and 5 except place the axle gauge above and below the axle. If gauge point gap is found, the axle has positive or negative camber. The car carrier axle has no camber from the factory, thus if it is found to have positive or negative camber, axle replacement is necessary(See Fig. 6-16.6 for examples of camber).



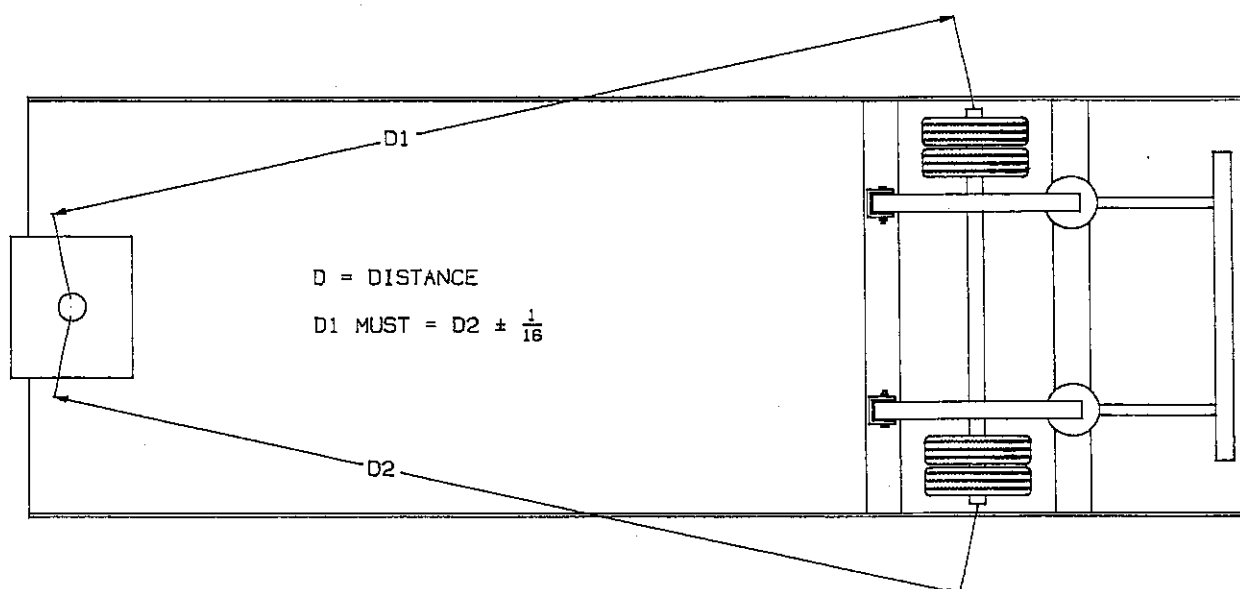
CAMBER IDENTIFICATION
Figure 6-16.6

6-17 AXLE ALIGNMENT

Proper axle to king pin alignment is necessary to obtain straight tracking. If axle alignment is off, "dog-tracking" will occur. Check alignment manually or by using a trailer alignment machine. In either case, a thorough inspection of the complete suspension must be performed and all defects corrected before aligning.

MANUAL ALIGNMENT PROCEDURES:

- .1 Position trailer on a firm and level surface. Eliminate any suspension binding due to sharp turns or unusual maneuvers.
- .2 Verify suspension is slid as far back as possible (transport position).
- .3 Lower park stands and detach tractor from the trailer.
- .4 Suspend a plumb bob at axle height from the center of the king pin.
- .5 Measure from the plumb bob to the center point on one end of the axle. Record this measurement. (See fig. 6-17)
- .6 Measure to the other end of the axle in the same manner as in step 5. Record this measurement. (See fig. 6-17)
- .7 The two measurements must be within 1/16 inch of each other for proper axle alignment. (See fig. 6-17) If alignment change is necessary, the welded washer located on the front of the left hand equalizing beam will have to be cut loose. Loosen the bolt and align axle to obtain equal measurements from side to side. Torque bolt to value listed in "SPECIFICATIONS" section. Reweld the flat washer to the suspension FOLLOWING THE WELDING SAFETY PRECAUTION found on page 6-1.
- .8 Wire brush burned or peeling paint. Prime and paint to prevent rusting.



AXLE ALIGNMENT
Figure 6-17

6-18 FRAME AND DECKS

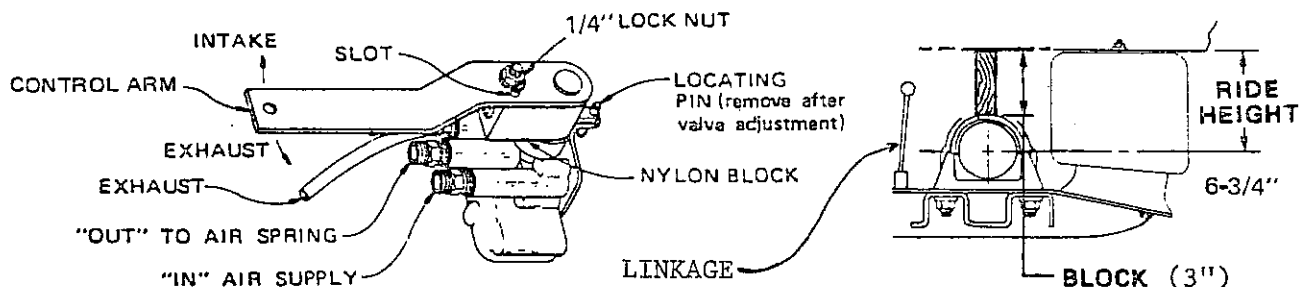
The trailer should be thoroughly checked daily for cracks or material fatigue. Cracks will normally show best under loaded conditions. If any cracks or breaks are found, return the trailer immediately to any Landoll authorized service center for repair.

6-19 AIR RIDE; OPERATION AND ADJUSTMENT

Trailer air pressure must be maintained above 65 PSI before operating. This enables the "PROTECTION VALVE" to maintain safe air brake pressure during suspension system air loss. If suspension air loss should occur, completely deflate suspension and temporarily operate on the air springs internal rubber bumpers. Carefully proceed to the nearest trailer service facility. To deflate the air suspension, remove the link assemblies from the height control valve control arm and axle bracket. Then rotate the control arm to a vertical down (exhaust) position. (See fig. 6-19)

Below is the ADJUSTMENT PROCEDURE for adjusting air ride height:

- .1 Before adjusting, vehicle must be empty with the king pin at operating height.
- .2 Disconnect linkage at lower bracket, push control arms to "UP" position, and raise vehicle. Position 3 inch spacer blocks between the frame and axle caps or a jack stand between the trailer frame and ground. Lower the vehicle by deflating all air from system. Recheck for proper ride height. (See fig. 6-19)
- .3 Move valve control arms to a 450 "DOWN" position for duration of 10 - 15 seconds. Return the control arms slowly to the center position and insert wood locating pins into the nylon block and bracket on the height control valves. Then loosen the 1/4" lock nut located on the nylon blocks. This will allow the control arms to oscillate approximately $\pm 1"$. Reconnect the linkage to the lower brackets.
- .4 Re-tighten the 1/4" lock nuts at the nylon blocks to 30 to 40 in.lbs. Complete this operation on both valves.
- .5 REMOVE the wood locating pins that were inserted in Step 3 and raise vehicle to remove spacer blocks or jack stands. The height control valves may be used as an improvised jack, whereas the linkage must be disconnected at the lower bracket. Then push control arms to an "UP" position to raise vehicle and remove spacers. Completely exhaust system and reconnect linkage. The suspension system will return to and maintain the proper ride height.

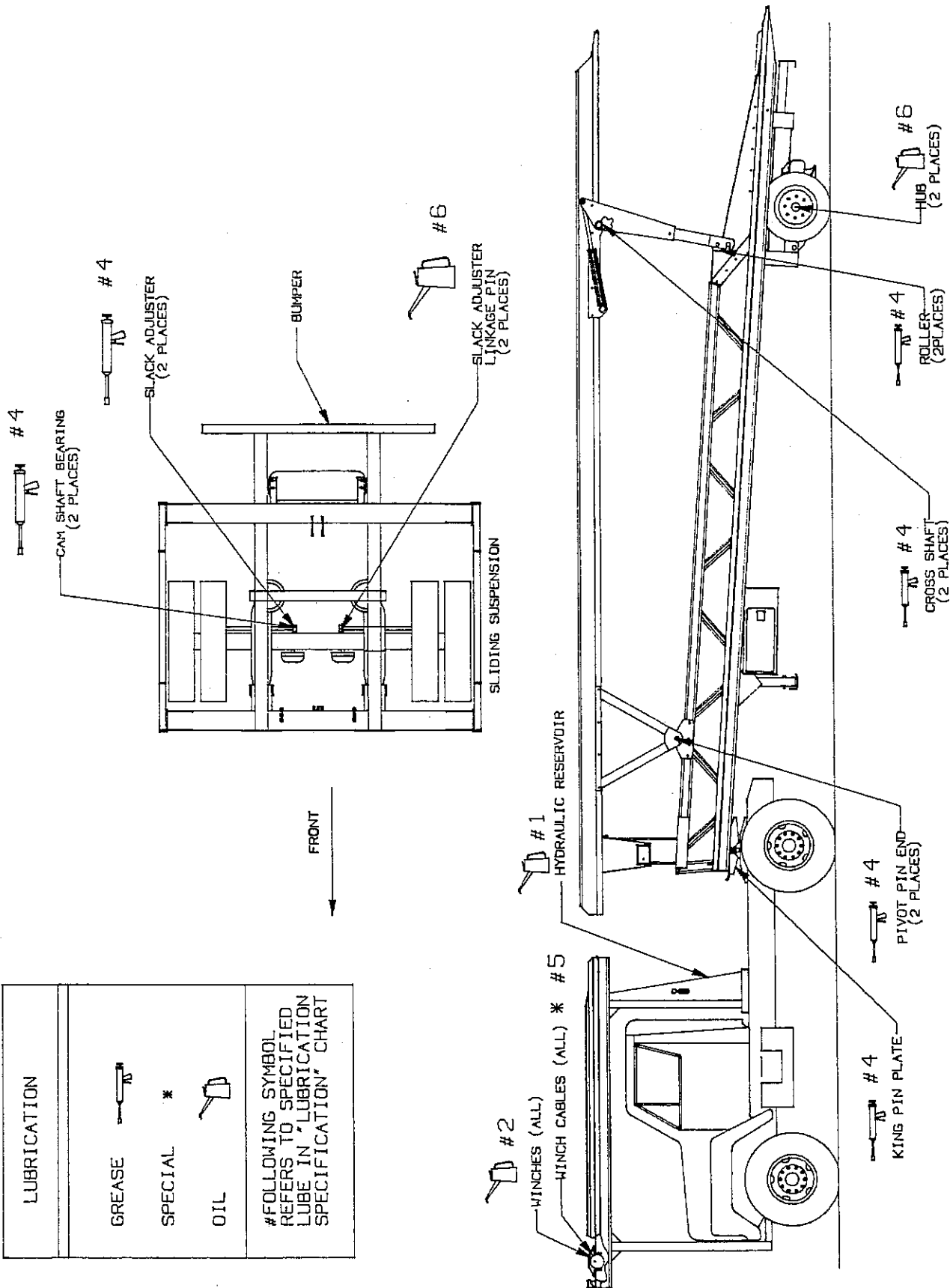


HEIGHT CONTROL VALVE

Figure 6-19

LUBRICATION POINTS

LUBRICATION	
GREASE	
SPECIAL	*
OIL	
#FOLLOWING SYMBOL REFERS TO SPECIFIED LUBE IN "LUBRICATION SPECIFICATION" CHART	



MAINTENANCE SCHEDULE

I=INSPECT R=REPLACE T=TIGHTEN / TORQUE/ADJ L=LUBRICATE C=CLEAN

NORMAL OPERATING SERVICE INTERVALS - PERFORM AT THE TIME SHOWN SHORTEN SERVICE INTERVALS WHEN OPERATING IN SEVERE OR DIRTY CONDITIONS								
SERVICE ITEM:	TIME INTERVAL:----- MILES	1st 5 HRS ----- 50	WEEKLY ----- 500	MONTHLY ----- 2,000	6 MONTHS ----- 12,000	YEARLY ----- 25,000	L U B E #	N O T E S
HYDRAULICS								
OIL		I	I			R	1*	
FILTER		R			R			
WINCH GEAR CASE LUBE		I		I		R	2*	
HOSES		I		I				
ELECTRICAL								
LIGHTS		I	I					
WIRING & CONNECTIONS		I		I				
MISCELLANEOUS								
FASTENERS		I, T		I				a
PIVOT PIN, CROSS SHAFT & ROLLER			I	I, L			4*	
PLASTIC WEAR STRIPS		I		I	C		3*	b
KING PIN & PLATE		I		C, I, L			4*	
WINCH CABLE ASSEMBLIES		I		I, L			5*	c
BRAKE AIR SYSTEM		I	I	I				
BRAKE ADJUSTMENT & WEAR		I		I, T				d
BRAKE SLACK ADJUSTER & CAM SHAFT ASSEMBLIES		I	I			L	4*	
HUB OIL		I	I, L			R	6*	
WHEEL BEARINGS		I			I, T		6*	e
TIRE INFLATION & WEAR		I	I					f
WHEEL LUG-NUTS		I, T	I	I, T				g

- * FOR RECOMMENDED LUBRICANT, SEE LUBE SPECIFICATION CHART
- (a) SEE BOLT TORQUE CHART IN THE SPECIFICATIONS SECTION FOR CORRECT TIGHTENING TORQUE
- (b) PLASTIC WEAR STRIPS ARE SELF LUBRICATING. IF CHATTER OR SQUEALING OCCURS USE DRY SILICONE SPRAY ONLY.
- (c) INSPECT PRIOR TO AND AFTER EACH USE
- (d) SEE SECTIONS 8-7 THROUGH 8-11 FOR SERVICE PROCEDURES
- (e) SEE SECTIONS 8-14 FOR SERVICE PROCEDURE
- (f) SEE SERIAL NUMBER PLATE ON THE FRONT OF THE TRAILER FOR PROPER INFLATION
- (g) SEE WHEEL TORQUE SPECIFICATION DECAL ON THE SIDE OF THE TRAILER

LUBRICATION SPECIFICATION CHART

LUBE #	SEASON	BRAND & PRODUCT (weight and/or type)			
		AMOCO	EXXON	PHILLIPS	TEXACO
1	SUMMER	Amoco RYCON MV	EXXON HDX Plus 10W	Mangus Oil 150	Rando HD-AZ
	WINTER	Amoco RYCON MV	Exxon HDX Plus 10W	Mangus Oil 150	Rando HD-AZ
2	SUMMER	Amoco Multi-Purpose 140	Gear Oil GX 85-140	Worm Gear Oil SAE 140 #93301	Maropa SAE 140 #5
	WINTER	Amoco Multi-Purpose 90	Gear Oil GX 85-140	Worm Gear Oil SAE 90 #93321	Maropa SAE 90 #3
3	SUMMER & WINTER	USE DRY SILICONE SPRAY, ONLY IF ADDITIONAL LUBRICATION IS NECESSARY			
4	SUMMER	Amoco Lit-Multi-Purpose Grease	Rondex Multi-Purpose Grease	Phil Lube M.W. Grease	Marfax All Prupose
	WINTER	Amoco Lit-Multi-Purpose Grease	Rondex Multi-Purpose Grease	Phil Lube M.W. Grease	Marfax All Prupose
5	SUMMER & WINTER	USE ANY CABLE LUBE OR CABLE GREASE			
6	SUMMER	Amoco Multi-Purpose 90	Gear Oil GTX 85-140	Phil Lube All Purpose Gear SAE 90 #90501	Multi-Gear EP 80W90
	WINTER	Amoco Multi-Purpose 90	Gear Oil GTX 85-140	Phil Lube All Purpose Gear SAE 90 #90501	Multi-Gear EP 80W90

SECTION 7
TROUBLE SHOOTING

PARAGRAPH	TITLE	PAGE NO.
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7-2	ELECTRICAL.....	7-5
7-3	TIRES - WHEELS - SUSPENSION.....	7-6
7-4	BRAKES.....	7-8
7-5	BRAKE DRUMS.....	7-12

7-1 HYDRAULIC SYSTEM

Most hydraulic system failures follow the same pattern: a gradual or sudden loss of pressure or flow with a resulting loss of cylinder or motor power. Any one of the system's components may be at fault. By following step-by-step procedures, the trouble can be located in a short time.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
SYSTEM INOPERATIVE	-Not enough oil in system	Fill, check for leaks
	-Wrong oil in system	Change oil, see specifications.
	-Filter dirty or clogged	Drain oil and replace filter.
	-Oil line restrictions	Oil lines dirty or collapsed. Clean or replace as necessary.
	-Air leaks in pump suction line	Repair or replace as necessary.
	-Worn or dirty pump	Clean, repair or replace. Check for contaminated oil. Drain and flush.
	-Badly worn components	Examine for internal leakage. Replace faulty components. Check for cause of wear.
	-Leakage	Check all components, and relief valve for proper settings.
	-Excessive load	Check unit specifications for load limits.
	-Slipping or broken pump drive	Repair or replace belts, & couplings. Check for alignment or tension.
	-Safety solenoid valve	No elec. current to switch with remote control operational switch activated. Valve sticking.
SYSTEM OPERATES ERRATICALLY	-Air in the system	Check suction side of system for leaks. Repair.
	-Cold oil	Allow ample warm-up time. Use proper weight oil for operating temperature.
	-Dirty or damaged components	Clean or repair as needed.
	-Restriction in filters or lines	Clean and/or replace filter or lines.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
SYSTEM OPERATES SLOWLY	-Oil viscosity too high, or "cold oil"	Allow oil to warm up before operating.
	-Low pump drive speed	Increase engine speed (check pump owners manual for specifications).
	-Low oil level	Check reservoir and add oil as necessary.
	-Air in system	Check suction side for leaks. Repair.
	-Badly worn pump, valves, cylinders, etc.	Repair or replace faulty component(s) as necessary.
	-Restrictions in lines or filter	Clean and/or replace filter or lines.
	-Improper adjustments	Check orifices, relief valves, etc. Adjust as necessary.
	-Oil leaks	Tighten fittings. Replace seals, gaskets and damaged lines.
SYSTEM OPERATES TOO FAST	-Wrong size or incorrectly adjusted restrictor	Replace or adjust as necessary.
	-Engine running too fast	Reduce engine speed.
OVER HEATING OF OIL IN SYSTEM	-Oil passing thru relief valve for excessive time	Return control valve to neutral when not in use.
	-Incorrect, low, dirty oil	Use recommended oil. Fill reservoir with clean oil.
		Replace filter.
	-Engine running too fast	Reduce engine speed.
	-Excessive component internal leakage	Repair or replace component as necessary.
	-Restriction in filters or lines	Clean and/or replace filter or lines.
	-Insufficient heat radiation	Clean dirt and mud from reservoir and components.
	-Malfunctioning component	Repair or replace.
FOAMING OF OIL	-Incorrect, low, dirty oil	Replace, clean or add oil as needed.
	-Air leaks	Check suction line and component seals for suction leaks. Replace.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
NOISY PUMP	-Low, incorrect, foamy oil	Replace, clean, or add oil as needed.
	-Suction line plugged	Clean out obstruction or replace line. Flush system, replace filter.
LEAKY PUMP	-Damaged or worn shaft seal	Replace. Check for misalignment.
	-Loose or broken parts	Tighten or replace.
CYLINDERS OR WINCH MOVE WITH CONTROL VALVE IN NEUTRAL	-Leaking cylinder seals or fittings	Replace worn seals or fittings.
	-Solenoid valve not centering when released	Check linkage. Check for spool binding. Repair.
	-Solenoid valve worn, leaking internally	Repair or replace as necessary.
SOLENOID VALVE STICKY, BINDING	-Mounting bolts too tight	Loosen as necessary.
	-Solenoids weak	Replace weak solenoid..
	-Valve damaged	Repair or replace.
CONTROL VALVE LEAKS	-Seals damaged or worn	Replace.
CYLINDER LEAKS	-Seals worn or damaged	Replace.
	-Rod damaged	Replace.
	-Barrel damaged	Replace.
UPPER DECK LIFT CYLINDERS DO NOT FUNCTION, OR CREEPS WITH PTO DISENGAGED	-Leaking fittings or cylinder seals	Tighten loose fittings. Replace worn seals or fittings.
	-Piloted check valve or O-ring leak	Replace defective component.

7-2 ELECTRICAL

Most electrical system problems show up as a burned out light, fuse, or inoperative electrical component. Wiring, grounds, or components may be at fault. Locate the symptom in this section that best identifies your electrical problem. Check out each possible problem under that symptom. If the problem can not be located, see an automotive electrical specialist.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
NO LIGHTS	-Fuse blown	Replace fuse.
	-Connection at plug-in	Tighten connection.
	-Broken or corroded wires	Replace.
	-Ground wire loose	Clean and tighten ground.
LIGHTS FLICKERING	-Wires shorted, or loose.	Locate, insulate, replace, or tighten.
LIGHTS DIM	-Voltage difference between trailer & tractor	Match bulbs with tractor voltage.
LIGHTS BRIGHT & BURN OUT	-voltage difference between trailer & tractor	Match bulbs with tractor voltage.
FUSE BLOW-OUT or CIRCUIT BREAKER TRIPPING	-Vibration	Replace fuse and try all accessories. If fuse blows right away, locate short.
	-Short circuit	Locate bare wire contacting ground.
LAMP BULB BURN OUT	-Vibration	Locate source of vibration and repair.
	-Loose connection	Check lamp sockets.
	-Intermittent short	Check ground connections.
	-Improper voltage	Locate short and repair. Check voltage regulator output.
REMOTE CONTROL	-Does not operate	Blown fuse or wire broke. Defective switch.
	-Operates 1 way only	Bad ground. Wire broken.
		Defective switch.
	-Operates wrong direction	Wired wrong, see schematic. Reverse solenoid wires.

7-3 TIRES - WHEELS - SUSPENSION

Most tire, wheel, and suspension related problems are due to excessive loads, extreme conditions, and improper maintenance. Tire, wheel, and suspension problems can be easily detected and solved by checking the following guide.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
VIBRATIONS WHILE DRIVING	-Tires / Wheels	Tire inflation - inflate to proper PSI. Tires cupped, or have flat spots - replace. Wheels loose or bent-tighten or replace. Incorrect mounting-remount. Mud in wheels-clean out. Tire(s) out of balance-balance tires. Brakes dragging - locate cause.
RAPID TIRE WEAR/ DETERIORATION	-Center tread wear -Shoulder tread wear - both shoulders. -Shoulder tread wear - one shoulder -Overall tread wear -Tire flat spots	Over inflation - deflate to correct inflation. Under inflation- increase inflation to correct PSI. Axle damage- straighten or replace. Overloading, check tire load rating. High speeds - adjust speed according to road and load conditions. Incorrect dual matching-properly match duals. Quick stops. Grabbing brakes - adjust. Worn or loose wheel bearings - adjust or replace as needed. Out of balance wheel and tire - balance.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
	-Uneven wear	Undercarriage bushings worn - replace. Worn or loose wheel bearings - adjust or replace as needed. Out of balance tires - balance.
RIM FAILURE	-Cracking	Tire over inflation - inflate tire to proper PSI. High speed - adjust speed to load and road conditions. High speed cornering - slow cornering down. Over loading - check rim rating. * IN ALL THE ABOVE, REPLACE RIM IMMEDIATELY !
	-Bending or warping	Hitting curbs, or potholes especially with excessive speed or load - replace rim. Improper tightening sequence - replace rim and follow proper tightening sequence.
	-Broken studs	Over tightening - use correct torque when mounting.
DECK, SUSPENSION	-chatters or squeals when sliding	Rough slide channels, smooth up. Lubricate with DRY SILICONE ONLY
	-Rapid wear	Rough spots on slide surfaces - smooth up. Greased with heavy grease - remove grease and lube with DRY SILICONE ONLY .
TRAILER STEERS OR "DOG TRACKS" TO ONE SIDE	-Tracks to one side only	Axle alignment - realign.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
RIDE HEIGHT	-Tracks to either side	Broken, or bent springs or equalizers - replace defective parts.
	-Too high	Axle to control valve linkage adjustment. Height control valve internal leak.
	-Too low	Axle to control valve linkage adjustment. Height control valve filter plugged. Pressure protection valve filter plugged. System air pressure low. (65 psi minimum required) Air supply lines restricted or plugged.
	-Uneven from side to side	Linkage adjustment. Exhaust port plugged. Height control valve internal leak. Supply line to one height control valve pinched, restricted, or plugged.

7-4 BRAKES

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
NO BRAKES, OR INTERMITTENT BRAKES	-Brake air system improperly connected	Reconnect hand valves properly.
	-Relay emergency valve contains water or oil	Clean valve.
	-Tractor protection valve.	Repair, or replace.
	-Restricted tubing or hose line.	Locate and remove restriction.
	-Broken line	Locate leak and repair.
	-Tractor air system failure.	Troubleshoot tractor air system and repair.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
SINGLE BRAKE DRAGGING, OR LOCKED	-Broken component within: Retract spring Brake roller Shoe Lining bolts Anchor pin Spider	Replace broken part.
	-Flat spot on Cam roller or cam shaft.	Replace and lubricate.
	-Improper adjustment.	Adjust slack adjusters.
	-Spider bushing or cam bracket bushing binding.	Lubricate or replace bushing.
	-Improper lubrication.	Lubricate.
	-Worn brake shoe bushing.	Replace.
	-Brake drum distortion.	Repair or replace.
	-Broken brake chamber spring.	Replace.
	-Brake chamber push rod binding.	Realign brake chamber bracket.
	-Air brake line loose or broken.	Tighten or repair.
UNEVEN BRAKES	-See "single brake dragging, or locked".	
	-Restriction in hose.	Locate and remove.
	-Needs relining.	Reline brakes.
	-Grease on linings.	Reline brakes.
	-Broken slack adjuster.	Replace.
	-Leaking brake chamber diaphragm.	Replace diaphragm.
BRAKES APPLY TOO SLOWLY	-Brakes need adjusting or lubricating.	Adjust or lubricate as needed.
	-Low air pressure in brake system (below 80 PSI).	Check tractor air system.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
BRAKES RELEASE TOO SLOWLY	-Restricted tubing / hose.	Blow clear or replace.
	-Defective relay valve.	Clean or replace.
	-Brakes need adjusting or lubricated.	Adjust or lubricate as needed.
	-Brake rigging binding.	Align brakes or replace bent parts.
	-Exhaust port of relay valve restricted or plugged.	Clean Valve.
ALL BRAKES DO NOT RELEASE	-Air system improperly connected to tractor.	Tighten or change connections.
	-Brake valve on tractor applied.	Release brake.
	-Relay emergency valve in emergency position.	Check line pressure and check valve.
	-Restricted tubing.	Blow clear or replace.
	-Tractor protection valve malfunction.	Trouble shoot tractor system.
	-Parking brakes locked.	Check air system.
INSUFFICIENT BRAKES	-Brakes need adjusting.	Adjust brakes.
	-Brakes need lubricating.	Lubricate brakes.
	-Brakes need relining.	Reline brakes.
	-Low air pressure.	Troubleshoot air supply.
	-Defective emergency relay valve.	Repair or replace.
	-Brakes overheated.	Stop and allow to cool. Locate cause of overheating.
BRAKES GRABBING	-Grease on brake lining.	Reline brakes.
	-Brakes rigging binding.	Locate bent or maladjusted components.

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
EXCESSIVE LEAKAGE WITH BRAKES RELEASED	-Defective brake valve on tractor.	Repair or replace.
	-Defective emergency relay	Repair or replace.
	-Relay emergency valve leaking.	Repair or replace.
	-Leaking tubing or hose.	Replace.
EXCESSIVE LEAKAGE WITH BRAKES APPLIED	-Relay emergency valve leaking.	Repair or replace.
	-Leaking brake diaphragm.	Replace diaphragm.
	-Leaking tubing or hose.	Replace.
EXCESSIVE LEAKAGE W/ EMER SYSTEM ONLY APPLIED - NO LEAKAGE W/ NORMAL BRAKING	-Defective relay emergency valve.	Clean and repair, or replace.
EXCESSIVE WATER PRESENT IN BRAKE SYSTEM	-Reservoir not drained often enough.	Drain reservoir daily.
EXCESSIVE OIL PRESENT IN BRAKE SYSTEM	-Compressor on tractor passing excessive oil.	Repair compressor.
BRAKE WILL NOT APPLY PROPERLY	-Flat spot on cam roller or camshaft.	Replace and lubricate.
BRAKES WILL NOT APPLY WHEN EMERGENCY LINE IS DISCONNECTED	-Initial air pressure too low.	Build up air system pressure and allow to stabilize. Recheck.
	-Relay valve	Sticking - repair/replace
	-Air line leak	Replace.
	-Brake pod leak	Repair or replace.

7-5 BRAKE DRUMS

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
EXCESSIVE FADE OR LOSS OF BRAKES	<p>-Fade results from heat that affects:</p> <p>(1) Linings which gradually loose their coefficient of friction as temperature rises.</p> <p>(2) Drums which expand when they become overheated past the point of maximum shoe travel. Linings no longer contact the drum and braking power is lost.</p>	<p>Recommend checks for:</p> <p>An unbalanced brake system that distributes brake loads unevenly.</p> <p>Defective brake parts, ie; dragging shoes.</p> <p>Out of round, distorted, heat spotted, blue, or over machined drums.</p> <p>Operating conditions or loads that create severe or excessive brake applications.</p>
PULLING BRAKES, SWERVES TO SIDE	<p>-Pulling to either side is caused by unequal braking. Pulling also results from improper functioning of other components of the brake system.</p>	<p>When pulling occurs, check for:</p> <p>An unbalanced braking system.</p> <p>Worn or damaged brake parts.</p> <p>Worn or damaged braking surface on drums.</p> <p>Drums of different diameter.</p> <p>Foreign matter in the drums.</p>
ROUGH BRAKING ACTION, NOISY OR CHATTERING	<p>-Any of the following may be the cause and may be identified by a simple inspection of the drums:</p> <p>Heat spotted drums, grease spotted drums, blue drums, scored drums, excessive wear at rivet holes or edges, polished drums, out of round drums, unbalanced drums, worn /damaged brake parts, foreign matter.</p>	<p>Pull drums and inspect or causes listed.</p>

SYMPTOM	PROBLEM	CHECK POINT / REMEDY
UNBALANCED DRUMS PULSATING RIDE, VIBRATIONS	-May be one or any combination of the following:	
	Out of round tires, wheels, drum, or hub.	Replace defective component.
	Out of balance tires, wheels drum or hub.	Balance component causing problem.

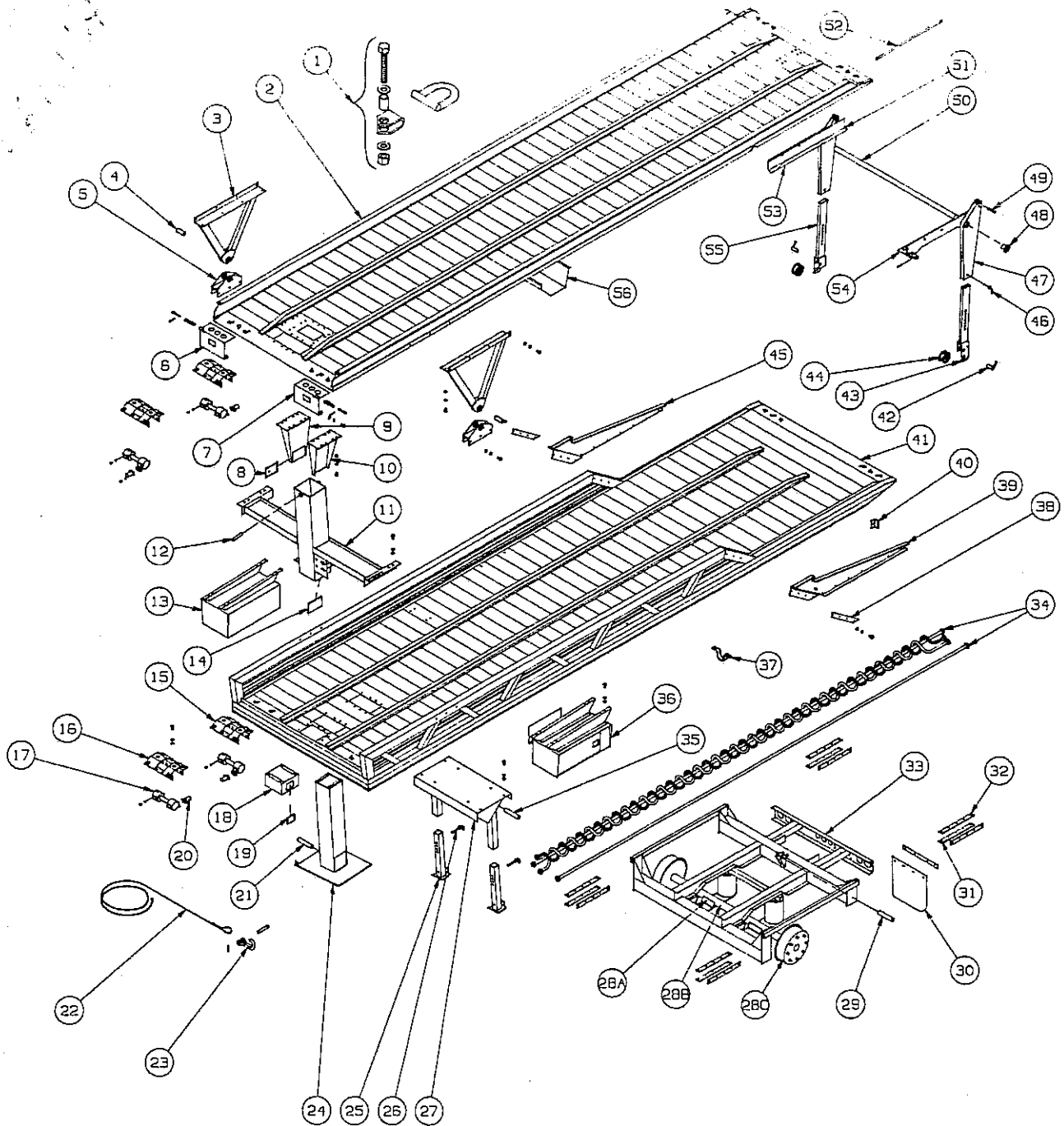
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SECTION 8

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334 UPPER AND LOWER DECKS



334 UPPER AND LOWER DECKS

ITEM	PART NUMBER	QTY *	DESCRIPTION
1	B5-793-001	8	D-RING ASSEMBLY, BUNDLE
	3-793-010020	8	D-RING
	RRT159X1.375	8	SPACER
	3-793-010018	8	SWIVEL
	5/8-11HFLN	8	NUT, GRB LOCK
	5/8-11X3-1/2CS	8	BOLT
	5/8FW	16	WASHER, FLAT
2	3-080-010125	1	BED WELDMENT UPPER
3	3-372-010003	2	HINGE BRACKET
	3/8-16X1-1/4CS	8	CAP SCREW, GR5 HEX HEAD
	3/8-16X1HHCS	8	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	16	NUT, GRB LOCK
4	3-557-010175	2	PIVOT PIN
	3/8-16X1HHCS	2	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	2	NUT, GRB LOCK
	5010	2	ZERK FITTING, 1/4 SAE
5	3-372-010002	2	HINGE
	3/8-16X5HHCS	6	CAP SCREW, GR5 HEX HEAD
	3/8FW	6	WASHER, FLAT
	3/8-16HFLN	6	NUT, GRB LOCK
6	3-741-010008	1	BUMPER ASSEMBLY, UPPER DECK FRONT RH
	CO-975-74-2000	1	SPRING
	0600-375-04000	1	ROLL PIN
	3-557-010186	1	PIN
	3-741-010006	1	BUMPER
	5/8-11X2-1/2CS	2	CAP SCREW, GR5 HEX HEAD
	5/8-11HFLN	2	NUT, GRB LOCK
7	3-741-010007	1	BUMPER ASSEMBLY, UPPER DECK FRONT LH
	CO-975-74-2000	1	SPRING
	0600-375-04000	1	ROLL PIN
	3-557-010186	1	PIN
	3-741-010001	1	BUMPER
	5/8-11X2-1/2CS	2	CAP SCREW, GR5 HEX HEAD
	5/8-11HFLN	2	NUT, GRB LOCK
8	3-334-010007	2	GLIDE

* If 2 quantities are listed with a comma (,) between them, the first amount is for a 4 WINCH trailer and the second is for a 2 WINCH trailer.

ITEM	PART NUMBER	QTY *	DESCRIPTION
9	3-117-010004	1	BRACE WELDMENT, RH
	1/2-13X3HHCS	8	CAP SCREW, GR5 HEX HEAD
	1/2FW	8	WASHER, FLAT
	1/2-13HFLN	8	NUT, GRB LOCK
10	3-117-010003	1	BRACE WELDMENT, LH
	1/2-13X3HHCS	8	CAP SCREW, GR5 HEX HEAD
	1/2FW	8	FLAT WASHER
	1/2-13HFLN	8	NUT, GRB LOCK
11	3-401-010005	1	TILT HOUSING WELDMENT
	1/2-13X6HHCS	8	CAP SCREW, GR5 HEX HEAD
	1/2-13X1-1/2CS	6	CAP SCREW, GR5 HEX HEAD
	1/2FW	14	WASHER, FLAT
	1/2-13HFLN	8	HEX LOCK NUT, GRB
12	3-557-010184	1	PIN
	3/16X2-1/4	2	PIN, COTTER
13	3-808-010004	1	TOOL BOX (WITHOUT LATCH)
	BSL-6-4	4	RIVET
	1-DSL LATCH	1	LATCH
	3/8-16X3CB	8	BOLT, GR5 CARRIAGE
	3/8-16HFLN	8	NUT, GRB LOCK
14	RPRB9999X5X7P	4	WEAR PLATE
15	3-482-010005	3 , 1	WINCH MOUNT
	1/2-13X1-3/4CB	12, 4	BOLT, GR5 CARRIAGE
	1/2-13X2HHCS	12, 4	CAP SCREW, GR5 HEX HEAD
	1/2FW	24, 8	WASHER, FLAT
	1/2-13HFLN	24, 8	NUT, GRB LOCK
16	3-482-010023	1	WINCH MOUNT, LOWER DECK-FRONT
	1/2-13X1-3/4CB	4	BOLT, GR5 CARRIAGE
	1/2-13X2HHCS	4	CAP SCREW, GR5 HEX HEAD
	1/2FW	8	WASHER, FLAT
	1/2-13HFLN	8	NUT, GRB LOCK
17	3-873-010073	4 , 2	WINCH (see page 8-32 for winch parts)
	3/8-16X1HHCS	32, 8	CAP SCREW, GR5 HEX HEAD
	3/8FW	4	WASHER, FLAT
	3/8SLW	32, 8	WASHER, SPLIT LOCK
18	3-165-010001	1	CAGE, WEAR PLATE
	3/8-16X1-1/4CS	4	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	4	NUT, GRB LOCK

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ITEM	PART NUMBER	QTY *	DESCRIPTION
19	RPRB9999X3PX5P	4, 4	WEAR PLATE
20	3-481-010003	4, 2	MOTOR, HYDRAULIC WINCH (see page 8-24 for parts)
	1/2-13X1-1/2CS	8, 4	CAP SCREW, GR5 HEX HEAD
	1/2-13HFLN	8, 4	NUT, GRB LOCK
21	3-557-010185	1	PIN, TILT CYLINDER LOWER
22	3-155-010002	4, 2	CABLE, WINCH
23	3-382-010005	4, 2	HOOK, WINCH CABLE
24	3-401-010003	1	TUBE & KING PIN ASSEMBLY
25	3-725-010007	2	LEG, PARK STAND
26	346SL	2	PIN, PARK STAND
27	3-120-010149	1	BRACKET, LOWER DECK CARRIER
	1/2-13X3CB	8	BOLT, GR5 CARRIAGE
	1/2-13HFLN	8	NUT, GRB LOCK
28 A	3-762-010264	1	AIR RIDE SUSPENSION (PART OF SUSPENSION WELDMENT)
B	3-042-010005	1	AXLE and BRAKE ASSEMBLY (see page 8-14 for parts)
C	SEE PAGE 8-15	2	HUB, DRUM, & WHEEL ASSEMBLY (see p.8-11 for parts)
29	3-557-010032	1	PIN, SUSPENSION CYLINDER - REAR
	3/16X2-1/4	2	PIN, COTTER
30	3-485-010001	2	MUD FLAP
	3-762-010017	2	CLAMP, FOR MUD FLAP
	3/8FW	8	WASHER, FLAT
	3/8-16HFLN	8	NUT, GRB LOCK
31	3-311-012719	4	WEAR BLOCK, BOTTOM
	5/16-18X1-1/4	8	SCREW, HEX SOCKET FLAT HEAD
32	3-334-010009	8	WEAR BLOCK, TOP AND SIDE
	1/4-20UNCX3/4	24	SCREW, SLOTTED FLAT HEAD 80 DEG
33	3-762-010409	1	SUSPENSION WELDMENT WITH OUT AXLE
34	3-642-010033	2	ROD, HOSE SUPPORT
	5/8-11HFLN	4	NUT, HEX LOCK
	RRP304X4	**	SPACER, 4 INCH
	RRP304X2	**	SPACER, 2 INCH

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** Use as needed

ITEM	PART NUMBER	QTY *	DESCRIPTION
35	3-557-010182	1	PIN, SUSPENSION CYLINDER FRONT
	3/16X2-1/4	2	PIN, COTTER
36	3-279-010002	1	ENCLOSURE, ELECTRICAL (BOX ONLY)
	BSL-6-4	4	RIVET
	1-DSL LATCH	1	LATCH
	3-222-010004	1	COVER, VALVE / STORAGE COMPARTMENT
	1-343-010002	10	GROMMETS
	1/4-20X3/4HHCS	5	CAP SCREW, GR5 HEX HEAD
	3-565-010037	1	COVER, RELAY COMPARTMENT
	238-9942	60in	TAPE, INSULATING
	1/4-20X3/4HHCS	6	CAP SCREW, GR5 HEX HEAD
37	2-078-010001	1	SUPPORT, SUSPENSION CYLINDER
	5/8-11X2CS-5	2	CAP SCREW, GR5 HEX HEAD
	5/8-11HFLN	2	NUT, GRB LOCK
38	3-565-010033	2	PLATE, RAMP TRACK MOUNTING
39	3-619-010131	1	TRACK WELDMENT, LH RAMP
	3/8-16X1-1/4CS	7	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	7	NUT, GRB LOCK
40	3-741-010009	2	STOP, SAFETY
	5/8-11X1-1/2CS	2	CAP SCREW, GR5 HEX HEAD
	5/8-11HFLN	2	NUT, GRB LOCK
41	3-080-010113	1	BED WELDMENT, LOWER
42	3-557-010187	2	PIN, ROLLER
	3/8-16X1-1/4CS	2	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	2	NUT, GRB LOCK
43	3-311-013565	1	LEG, LH LIFT
44	3-645-010011	2	ROLLER & BEARING ASSEMBLY
	3-073-010002	4	BEARING
	3-645-010008	2	ROLLER WELDMENT
	5010	2	ZERK FITTING 1/4 SAE
45	3-619-010132	1	TRACK WELDMENT, RH RAMP
	3/8-16X1-1/4CS	7	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	7	NUT, GRB LOCK
46	2-557-010010	2	PIN, LIFT ARM ADJUSTING
	7637	1	PIN, 3/16 X 1-1/4 LYNCH

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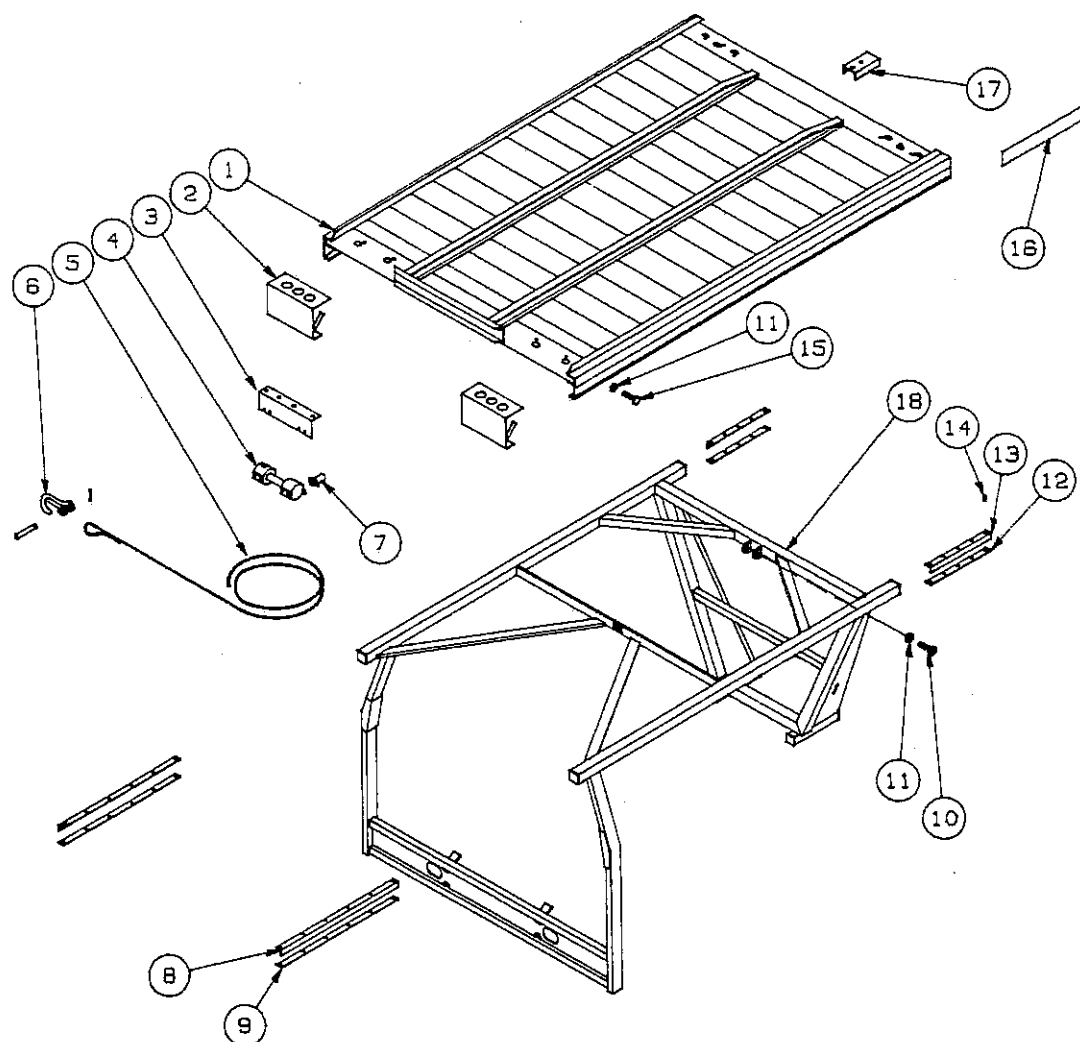
ITEM	PART NUMBER	QTY *	DESCRIPTION
47	3-027-010002	1	ARM, LH PIVOT
	3/8-16X1-1/4CS	7	CAP SCREW, GR5 HEX HEAD
	3/8-16X1-1/2CS	5	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	12	NUT, GRB LOCK
48	3-150-010024	2	BUSHING, SHAFT TO ARM LOCKING with BOLTS
	1/2-13X2-3/4CS	6	CAP SCREW, GR5 HEX HEAD
49	3-557-010220	1	PIN, L.H. PIVOT ARM CYLINDER
	3-557-010221	1	PIN, R.H. PIVOT ARM CYLINDER
	3/8-16X1-1/4CS	2	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	2	NUT, GRB LOCK
	5010	2	ZERK FITTING 1/4 SAE
50	3-672-010063	1	SHAFT, PIVOT ARM
	RKS7999X3.375	2	KEY
51	3-027-010003	1	ARM, RH PIVOT
	3/8-16X1-1/4CS	7	CAP SCREW, GR5 HEX HEAD
	3/8-16X1-1/2CS	5	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	12	NUT, GRB LOCK
52	3-311-014671	4	STRIP, ELECTRICAL WIRE CONCEALING - 48"
	3-311-014622	4	STRIP, ELECTRICAL WIRE CONCEALING - 144"
53	3-482-010016	1	MOUNT, RH PIVOT
	3-073-010004	1	BEARING
	5010	1	ZERK FITTING, 1/4 SAE
	3/16X2-1/4	1	PIN, COTTER
54	3-482-010017	1	MOUNT, LH PIVOT
	3-073-010004	1	BEARING
	5010	1	ZERK FITTING, 1/4 SAE
	3/16X2-1/4	1	PIN, COTTER
55	3-311-013566	1	LEG, RH LIFT
56	3-348-010009	1	GUARD, VALVE
	3/16X3/4RHD STV	6	BOLT, ROUND HEAD STOVE
	110-0240	6	WASHER, #10 SPLIT LOCK
	3/16-24HFN	6	HEX NUT

NOT SHOWN:

3-222-010009 0, 2 COVER, WINCH HOLE (FOR SPOT CUT FOR SECOND WINCH)

* If 2 quantities are listed with a comma (,) between them, the first amount is for a 4 WINCH trailer and the second is for a 2 WINCH trailer.

331 "OVER THE CAB"
DECK AND FRAME ASSEMBLY



331 "OVER THE CAB"

DECK AND FRAME ASSEMBLY

ITEM	PART NUMBER	QTY	DESCRIPTION
1	3-080-010126	1	BED WELDMENT, OVER CAB
2	3-741-010004	2	STOP WELDMENT, RIGID
	5/8-11X1-1/2CS	4	CAP SCREW, GR5 HEX HEAD
	5/8-11HFLN	4	NUT, GRB LOCK
3	3-015-010002	1	MOUNT, WINCH
	1/2-13X1-3/4	4	BOLT, GR5 CARRIAGE
	1/2FW	4	WASHER, FLAT
	1/2-13HFLN	4	NUT, GRB LOCK
4	3-873-010073	1	WINCH (see page 8-23 for parts breakdown)
	3/8-16X3/4HHCS	2	CAP SCREW, GR5 HEX HEAD
	3/8-16X1HHCS	4	CAP SCREW, GR5 HEX HEAD
	3/8SLW	6	WASHER, SPLIT LOCK
5	3-155-010005	1	CABLE
6	3-382-010005	1	HOOK (FOR WINCH CABLE)
7	3-481-010003	1	MOTOR, WINCH (see page 8-24 for parts breakdown)
	1/2-13X1-1/2CS	2	CAP SCREW, GR5 HEX HEAD
	1/2-13HFLN	2	NUT, GRB LOCK
8	3-334-010003	2	GLIDE ANGLE, LONG
9	3-334-010001	2	GLIDE STRIP, LONG
10	1-8X7 C 5	1	CAP SCREW, GR5 HEX HEAD
11	1-8HFLN	2	NUT, GRB LOCK
12	3-334-010002	2	GLIDE STRIP, SHORT
13	3-334-010004	2	GLIDE ANGLE, SHORT
14	1/4-20UNCX3/4	44	SCREW, FLAT SLOTTED HEAD - 80°, 1/4-20 X 3/4
15	1-8X4 C S	1	CAP SCREW, GR5 HEX HEAD
16	3-080-010139	2	COVER, WIRE CONCEALING
17	3-741-010015	1	STOP, SAFETY
	3/8-16X2-1/2CS	2	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	2	NUT, GRB LOCK
18	ITEM 18 REQUIRES A DIFFERENT PART NUMBER FOR EACH MAKE OF TRUCK - - - SEE NEXT PAGE FOR DETAILS.		

ITEM	PART NUMBER	QTY	DESCRIPTION
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18 INTERNATIONAL HARVESTER FRAME AND MOUNTING KIT

3-311-013608	1	FRAME WELDMENT - OVER CAB
3-311-013619	4	ANCHOR FRAME MOUNTING
1/2-13X2HHCS	4	CAP SCREW, GR5 HEX HEAD
1/2-13HFLN	4	NUT, GRB LOCK

GMC 7000 FRAME AND MOUNTING KIT

3-311-013608	1	FRAME WELDMENT - OVER CAB
3-311-013619	4	ANCHOR FRAME MOUNTING
1/2-13X2HHCS	4	CAP SCREW, GR5 HEX HEAD
1/2-13HFLN	4	NUT, GRB LOCK
B3-120-006	1	MOUNTING KIT BUNDLE
3-482-010054	2	MOUNT, BUMPER FOR GMC
1/2-20X1-1/2CS8	8	CAP SCREW, <u>GRADE 8</u> HEX HEAD
1/2FW	8	WASHER, FLAT
1/2SLW	4	WASHER, SPLIT LOCK
1/2-20 ESNA	4	NUT, GRB LOCK

GMC BRIGADIER FRAME AND MOUNTING KIT

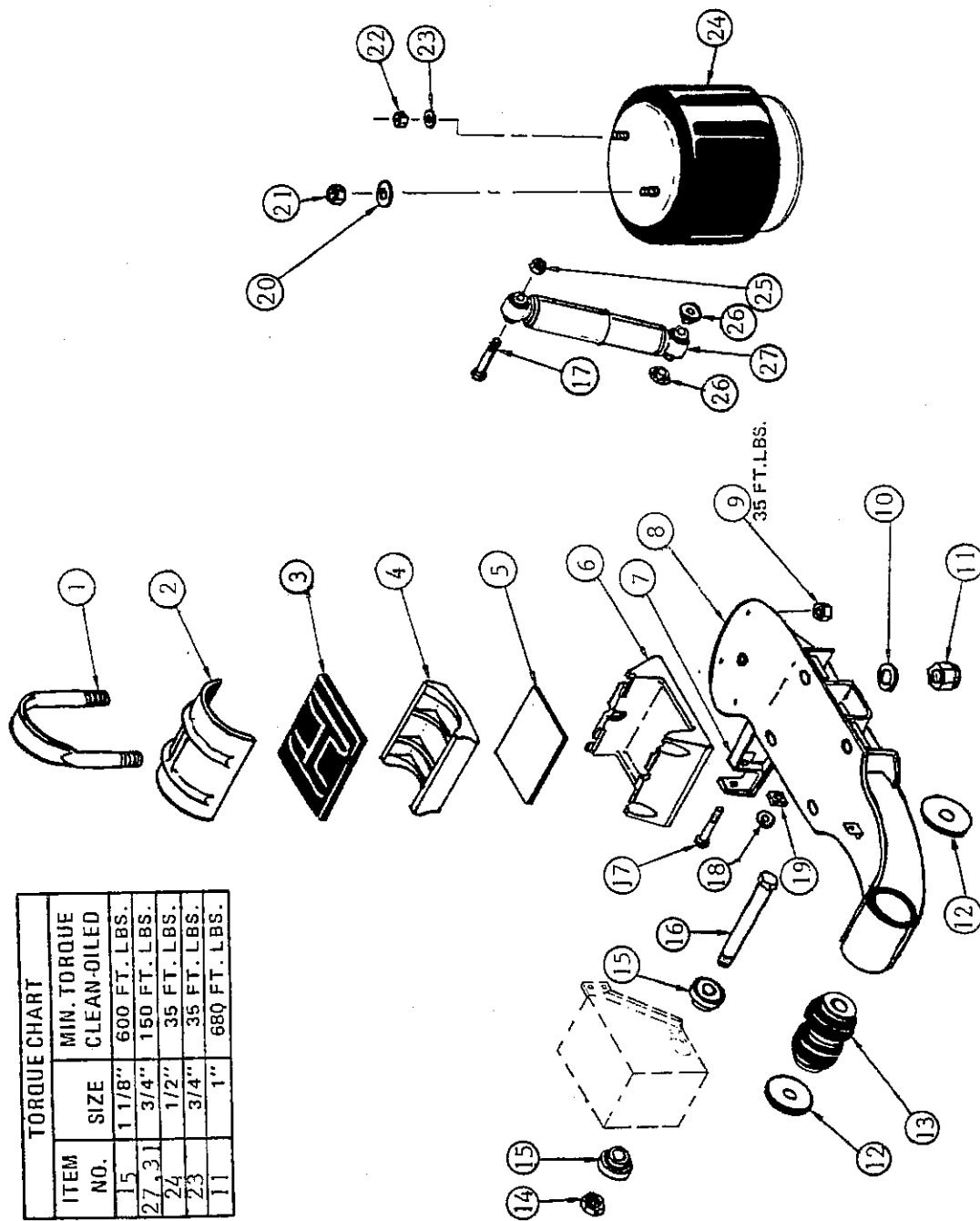
3-311-014243	1	FRAME WELDMENT - OVER CAB
1/2-13HFLN	4	NUT, GRB LOCK
1/2-13X2HHCS	4	CAP SCREW, GR5 HEX HEAD
1/2-20 ESNA	6	NUT, GRB LOCK
3-482-010056	2	MOUNT, BUMPER EXTENSION WELDMENT
1/2-20X1-1/2CS8	6	CAP SCREW, <u>GRADE 8</u> HEX HEAD
1/2FW	4	WASHER, FLAT
1/2-20 ESNA	6	NUT, GRB LOCK

FORD FRAME AND MOUNTING KIT

3-311-014097	1	FRAME WELDMENT - OVER CAB
3-311-013619	4	ANCHOR, FRAME MOUNTING
1/2-13X2HHCS	4	CAP SCREW, GR5 HEX HEAD
1/2-13HFLN	4	NUT, GRB LOCK

SUSPENSION

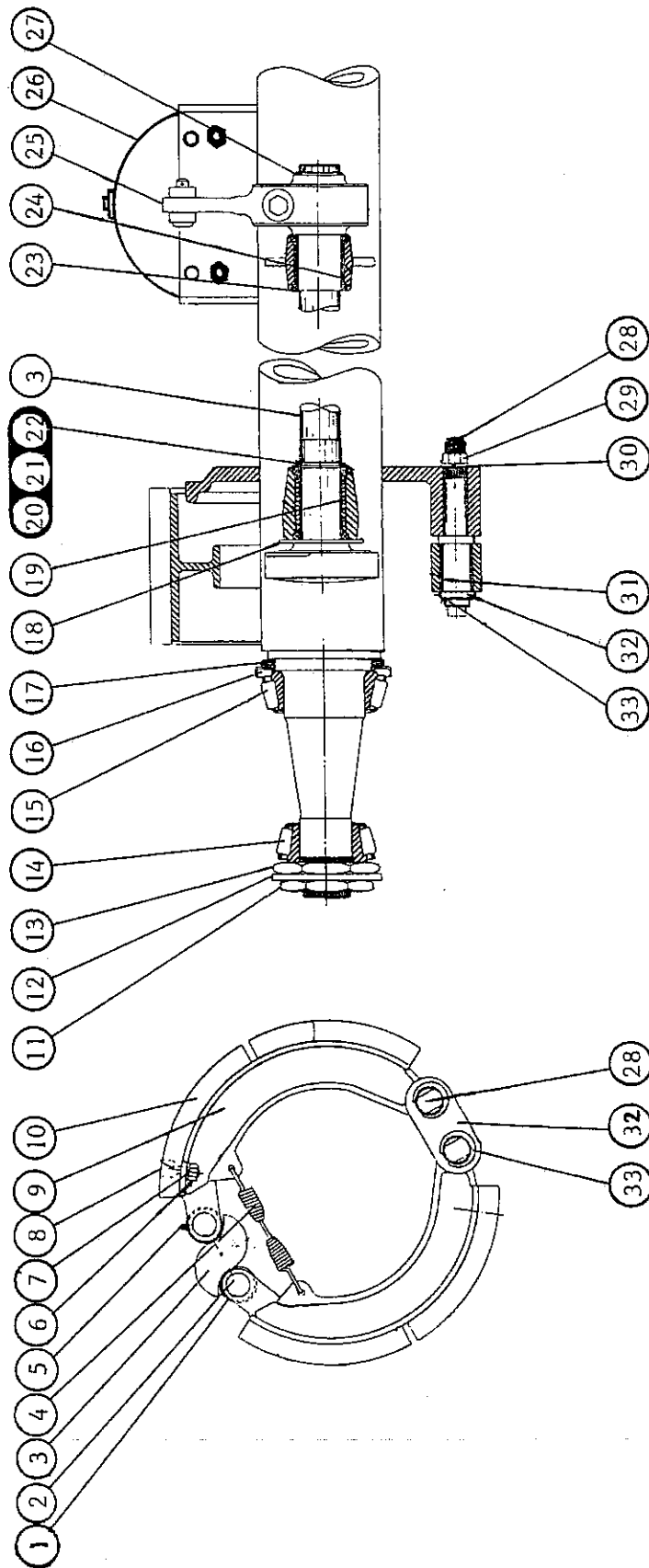
TORQUE CHART		
ITEM NO.	SIZE	MIN. TORQUE CLEAN-OILED
15	1 1/8"	600 FT. LBS.
27, 31	3/4"	150 FT. LBS.
24	1/2"	35 FT. LBS.
23	3/4"	35 FT. LBS.
11	1"	680 FT. LBS.



SUSPENSION

ITEM	PART NUMBER	QTY	DESCRIPTION
1	900 41 878	4	U-BOLT
2	900 10 032	2	CAP, AXLE
3	900 28 047	2	WRAPPER
4	900 01 082	2	ADAPTER
5	900 28 075	2	PAD
6	900 01 006	2	BEAM SEAT
7	905 19 425	2	BRACKET, LOWER SHOCK
8	905 15 857	1	EQUALIZING BEAM, L.H. (INCLUDES 6 & 13)
	905 15 858	1	EQUALIZING BEAM, R.H. (INCLUDES 6 & 13)
9	3/4-10HFLN	4	NUT, GRB LOCK
10	1FW	8	WASHER, FLAT
11	1-8HFLN	8	NUT, GRB LOCK
12	900 36 140	4	SPACER
13	900 08 139	2	BUSHING
14	934 00 506	2	LOCK NUT 1-1/8 X 7
15	900 08 141	4	BUSHING, ALIGNMENT
16	932 01 046	2	HEX HEAD CAP SCREW, 1-1/8 X 7 X 10" GR5
17	930 03 595	4	HEX HEAD CAP SCREW, 3/4-10 X 3-1/2 GR5
8	3/4SLW	2	WASHER, SPLIT LOCK
19	934 00 367	2	NUT, 3/4-10 SQUARE
20	3/4SLW	2	WASHER, SPLIT LOCK
21	3/4-16HFN	2	NUT, GRB LOCK
22	1/2-13HFLN	2	NUT, GRB LOCK
23	1/2SLW	2	WASHER, SPLIT LOCK
24	905 57 023	2	AIR SPRING ASSEMBLY
25	3/4-10HFLN	4	NUT, GRB LOCK
26	905 08 004	8	BUSHING (4 PER SHOCK ABSORBER)
27	900 44 162	2	SHOCK ABSORBER

AXLE AND BRAKES



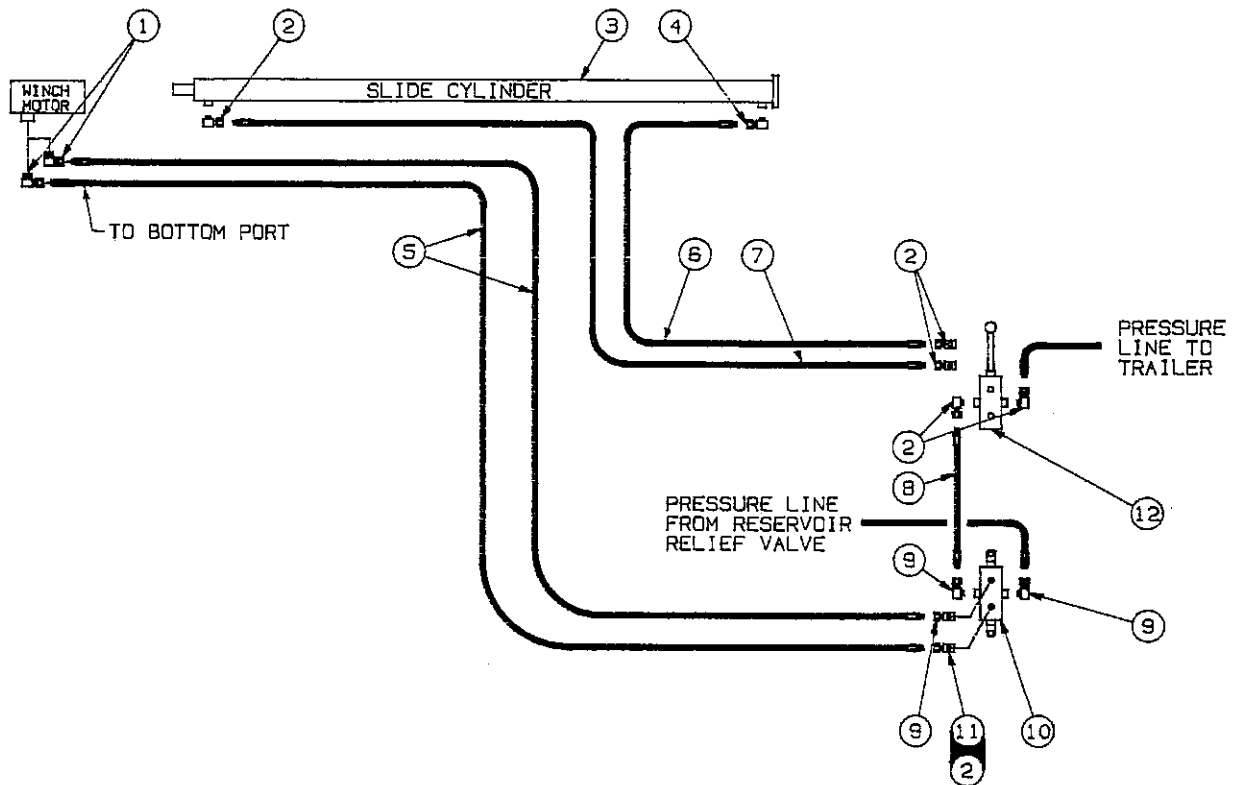
AXLE AND BRAKES
3-042-010005

ITEM	PART NUMBER	QTY	DESCRIPTION
1	M10HD104	4	ROLLER, BRAKE SHOE
2	M10SS100	4	SHAFT, ROLLER
3	M12WK100-3	1	SHAFT, RH BRAKE CAM
	M12WK101-3	1	SHAFT, LH BRAKE CAM
4	M10WJ101	2	SPRING, BRAKE RETRACT
5	500539-3	4	SET SCREW, ROLLER SHAFT
6	500371-3	32	NUT, LINING BOLT
7	500356-11	32	WASHER, SPLIT LOCK
8	M10HM106	32	BOLT, BRAKE LINING
9	M12WS102	4	BRAKE SHOE
10	M12WL104	8	BRAKE LINING
11	M10HN102	2	NUT, OUTER SPINDLE
12	M10HN100	2	WASHER, SPINDLE NUT LOCK
13	M10HN101	2	NUT, INNER SPINDLE
14	212049 (TIMKEN)	2	BEARING CONE, OUTER
15	663 (TIMKEN)	2	BEARING CONE, INNER
16	M10HH109X	2	OIL RETAINER ASSY.
17	M10HS102	2	AXLE RING
18	M10HN108	2	WASHER, BRAKE CAM
19	M10WJ149	2	BUSHING, BRAKE SPIDER
20	M16HH100	4	SEAL, SPIDER GREASE
21	M10HS100	2	WASHER, CAM
22	38038	2	LOCK RING, CAM
23	M10HH100	4	SEALS, O-RING GREASE
24	M10WJ100	2	BUSHING, W/GREASE FITTING
25	M12WR101	2	SLACK ADJUSTER- CURVED
26	3-128-010009	2	AIR CHAMBER
27	38038	2	LOCK RING, CAM
28	M10HP103	4	PIN, BRAKE ANCHOR
29	500381-8	4	NUT, BRAKE ANCHOR
30	500358-17	4	WASHER, SPLIT LOCK
31	M10WJ102	4	BUSHING, BRAKE SHOE
32	M10HR101	2	LINK, ANCHOR PIN
33	M10HR147	4	LOCK RING, ANCHOR PIN

334 HYDRAULIC
SCHEMATIC AND PARTS CONT.

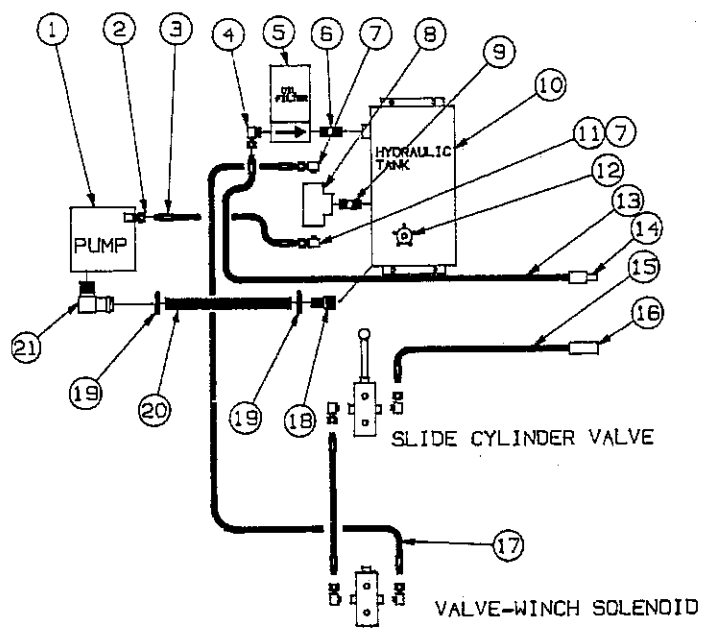
ITEM	PART NUMBER	QTY	DESCRIPTION
29	3-846-010019	1	VALVE, 4 SPOOL
	6003093	1	SEAL KIT
	6002792	8	SOLENOID COIL
	3-846-010020	1	VALVE, 3 SPOOL
	6003092	1	SEAL KIT
	6002792	6	SOLENOID COIL
30	1-397-010134	1	HOSE ASSEMBLY
31	6-397-010005	1	HOSE ASSEMBLY
32	1-397-010140	1	HOSE ASSEMBLY
33	1-397-010136	1	HOSE ASSEMBLY
34	3-299-010018	8	NUT
35	3-299-010019	8	FERRULE
36	RRT182X240	2	TUBE
37	3/8-16HFLN	19	NUT, HEX LOCK
38	3-181-010007	14	PLATE
39A	3-181-010008	2	CLAMP (3 HOSE)
B	2-181-010001	17	CLAMP (2 HOSE)
40	3/8-16X1-3/4CS	14	CAP SCREW, GR5 HEX HEAD
41	3-299-010016	2	TEE
42	RRT182X66	2	TUBE
43	1-397-010137	4	HOSE ASSEMBLY
44	1/8 PIPE PLUG HS	4	PIPE PLUG, HEX SOCKET
45	1-397-010142	2	HOSE ASSEMBLY
46	3-242-010090	2	CYLINDER, UPPER DECK LIFT (see page 8-27 for parts)

331 HYDRAULIC SCHEMATIC AND PARTS



ITEM	PART NUMBER	QTY	DESCRIPTION
1	1-007-010017	2	ADAPTER, 90°
2	2047-8-8S	7	FITTING, 90°
3	3-242-010091	1	CYLINDER, 331 DECK SLIDE (see page 8-28 for parts)
4	1-299-010028	1	RESTRICTOR, 90°
5	3-397-010024	2	HOSE ASSEMBLY
6	6-397-010005	1	HOSE ASSEMBLY
7	1-397-010059	1	HOSE ASSEMBLY
8	1-397-010028	1	HOSE ASSEMBLY
9	1-007-010007	3	ADAPTER, 90°
10	3-846-010009	1	VALVE, SOLENOID
	6003090	1	SEAL KIT
	6002792	2	SOLENOID COIL
11	2066-8-8S	1	ADAPTER
12	BA11AD00AO	1	VALVE, SINGLE SPOOL (see page 8-29 for parts)

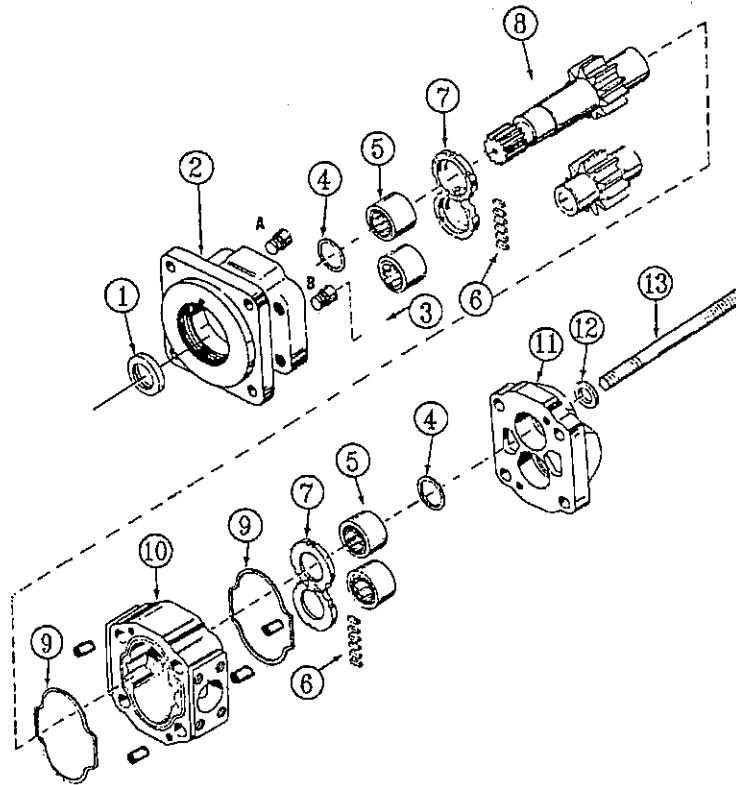
WET KIT



ITEM	PART NUMBER	QTY	DESCRIPTION
1	3-591-010001	1	PUMP, HYDRAULIC (see page 8-21 for parts listing)
2	1-007-010009	1	FITTING
3	6-397-010005	1	HOSE ASSEMBLY
4	2047-12-12S	1	FITTING, 90°
5	1-295-010001	1	FILTER AND BASE ASSEMBLY
	1-295-010002		HYDRAULIC FILTER
6	1-1/4X2 PN	1	NIPPLE
7	1-007-010013	2	FITTING, 90°
8	125130	1	VALVE, PRESSURE RELIEF (see page 8-30 for parts)
9	3/4NIPPLE	1	NIPPLE
10	3-786-010005	1	RESERVOIR
	1-1/4 PIPE PLUG	1	PLUG
	805-2	8	CUSHION MOUNTS (FOR 331 FRAME MOUNTING ONLY)
	3/8-16X1-3/4CS	4	CAP SCREW, GR5 HEX HEAD
	3/8-16HFLN	4	CAP SCREW, GR5 HEX HEAD
	3-120-010103	2	CLAMP PLATE (FOR TRACTOR FRAME MOUNTING ONLY)
11	2047-8-8S	1	FITTING, 90°
12	3-162-010001	1	FILLER, BREATHER, STRAINER ASSEMBLY
13	1-397-010075	1	HOSE ASSEMBLY
14	S21F-6	1	COUPLER, MALE
15	3-397-010011	1	HOSE ASSEMBLY
16	4050-4	1	COUPLER, FEMALE
17	2-397-010002	1	HOSE ASSEMBLY
18	3-561-010001	1	ADAPTER
19	6828	2	CLAMP, HOSE
20	3-399-010001048	1	HOSE, PUMP SUCTION
21	1-007-010006	1	FITTING, 90°

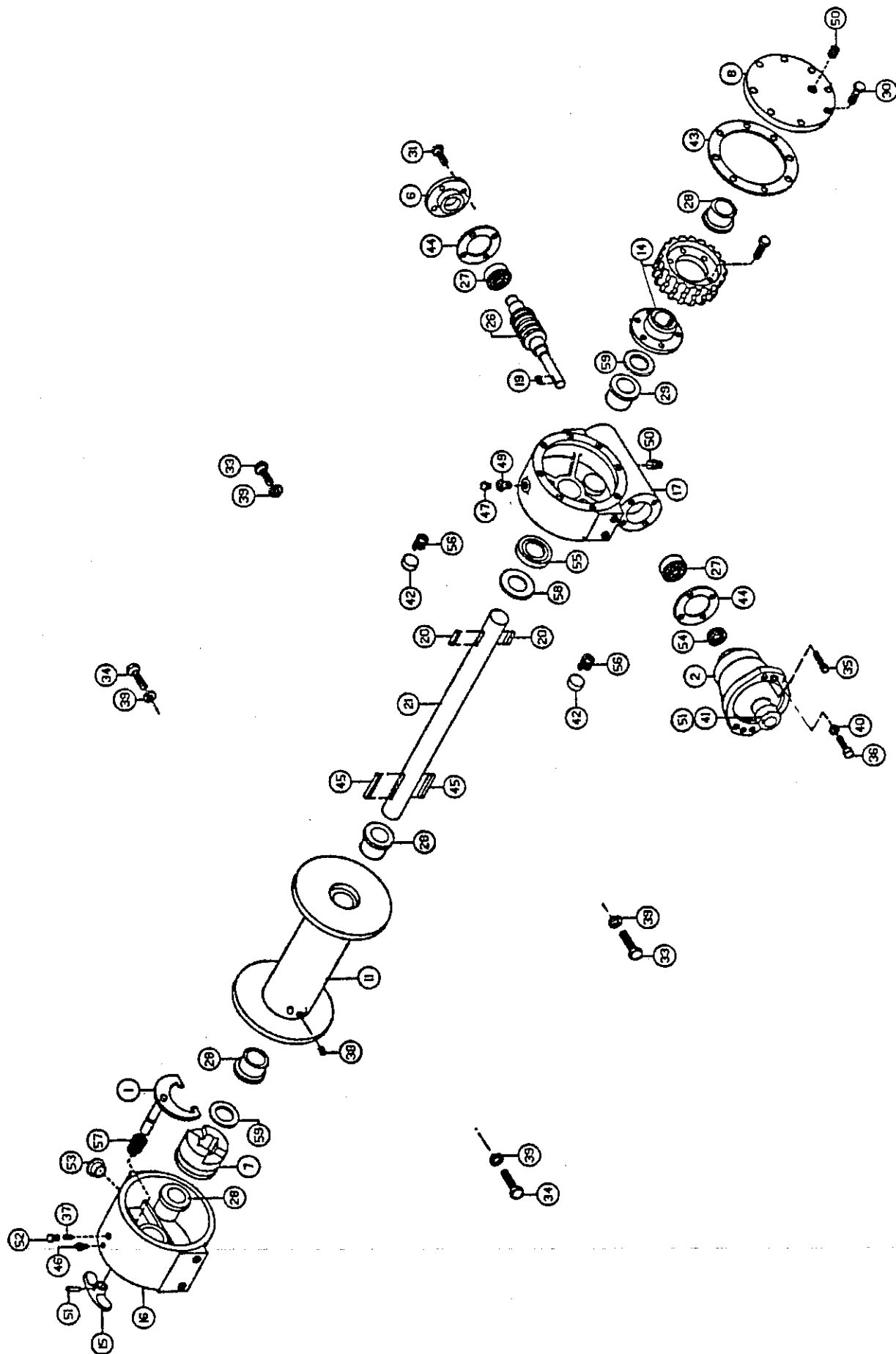
HYDRAULIC PUMP

3-591-010001



ITEM	PART NUMBER	QTY	DESCRIPTION
1	X73-37-16	1	SHAFT SEAL
2	EB 1685-3	1	SHAFT END COVER
3	M 1391 K	2	CHECK
4	LB 1669-1	2	RING SEAL
5	Y 1032	4	ROLLER BEARING
6	BA 3026-2	1	POCKET SEAL STRIP
7	AA 1058	2	THRUST PLATE
8	BD 1135M-3-17	1	SHAFT & GEAR SET
9	UB 3006-242	2	HOUSING GASKET
10	RA 1688-17-64	1	HOUSING
11	XA 1603	1	PORT END
12	X 144-3	1	WASHER
13	X2-25	1	STUD

WORM GEAR WINCH PARTS LIST



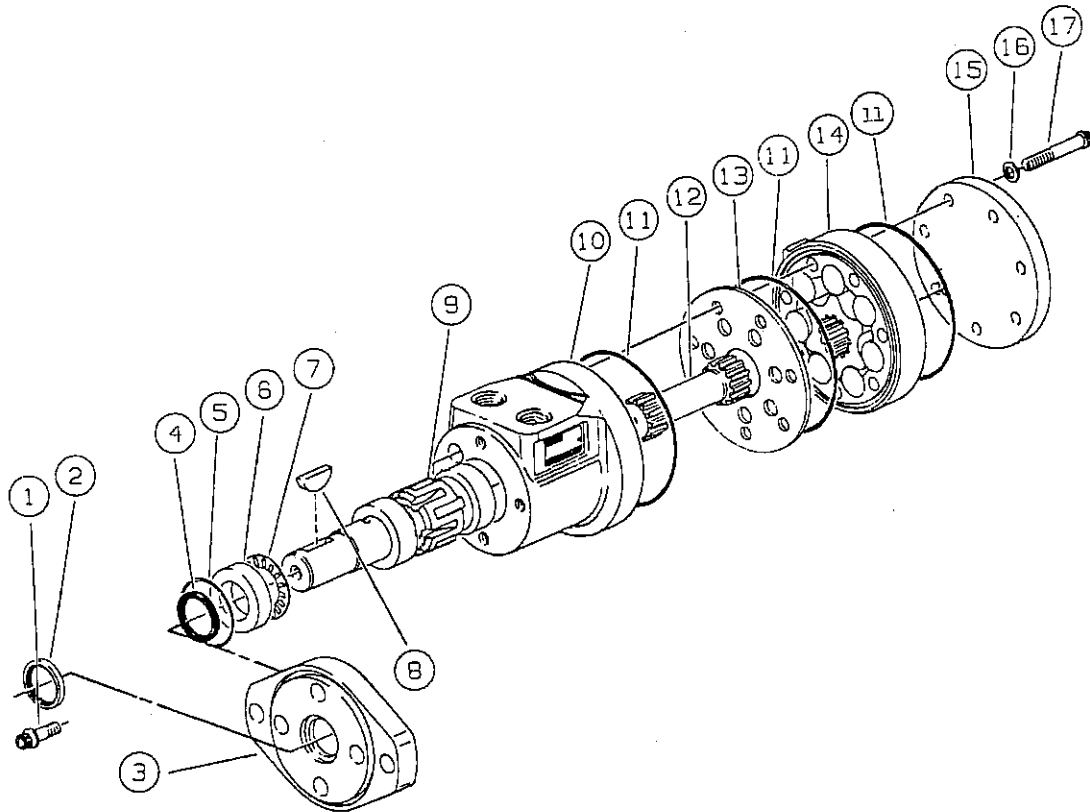
3-873-010073

WINCH REPLACEMENT PARTS

ITEM	PART NUMBER	QTY	DESCRIPTION
1	276028	1	SHIFTER ASSY
2	300039	1	ADAPTER
6	316083	1	BEARING CAP
7	324137	1	JAW CLUTCH
8	328105	1	COVER
11	332007	1	DRUM - "Y"
14	250503	1	GEAR/HUB ASSEMBLY
15	336010	1	HANDLE
16	338208	1	HOUSING - CLUTCH
17	338237	1	HOUSING - GEAR
19	342029	1	KEY
20	342075	2	KEY
21	357443	1	SHAFT - DRUM - Y
26	368017	1	WORM R.H. 46:1
27	402002	2	BEARING - BALL
28	410002	4	BUSHING
29	412045	1	BUSHING
30	1/4-20UNCX3/4	8	CAPSCREW
31	414045	4	CAPSCREW, 1/4-20NCx7/8 LG. HEX HEAD GR.5
33	3/8-16X1-3/4CS	2	CAPSCREW
34	3/8-16X1-3/4CS	2	CAPSCREW
35	414842	4	CAPSCREW, 1/4-20NCx1-3/4 LG. SOCKET HEAD
36	1/2-13X1HHCS	2	CAPSCREW
37	416030	1	SETSCREW, 1/4-20NCx3/8 SOCKET HEADLESS
38	416057	1	SETSCREW, 3/8-16NCx3/8 SOCKET HEADLESS
39	3/8SLW	4	WASHER, SPLIT LOCK
40	1/2SLW	2	WASHER, SPLIT LOCK
41	431007	1	COUPLING
42	438014	2	DISC-BRAKE
43	442001	1	GASKET, COVER
44	442002	2	GASKET, GEAR HOUSING
45	450006	2	KEY-BARTH
46	456001	1	FITTING, LUBE
47	456008	1	FITTING, RELIEF
49	468002	1	REDUCER
50	468011	2	PIPE PLUG
51	470033	2	PIN, SPIRAL
52	472012	1	PLUG, RUBBER
53	472013	1	PLUG, PLASTIC
54	486009	1	SEAL, WORM SHAFT
55	486017	1	SEAL, DRUM SHAFT
56	494002	2	SPRING, DISC BRAKE
57	494053	1	SPRING, SHIFTER
58	518014	1	WASHER, THRUST
59	518015	2	WASHER, THRUST

WINCH MOTOR

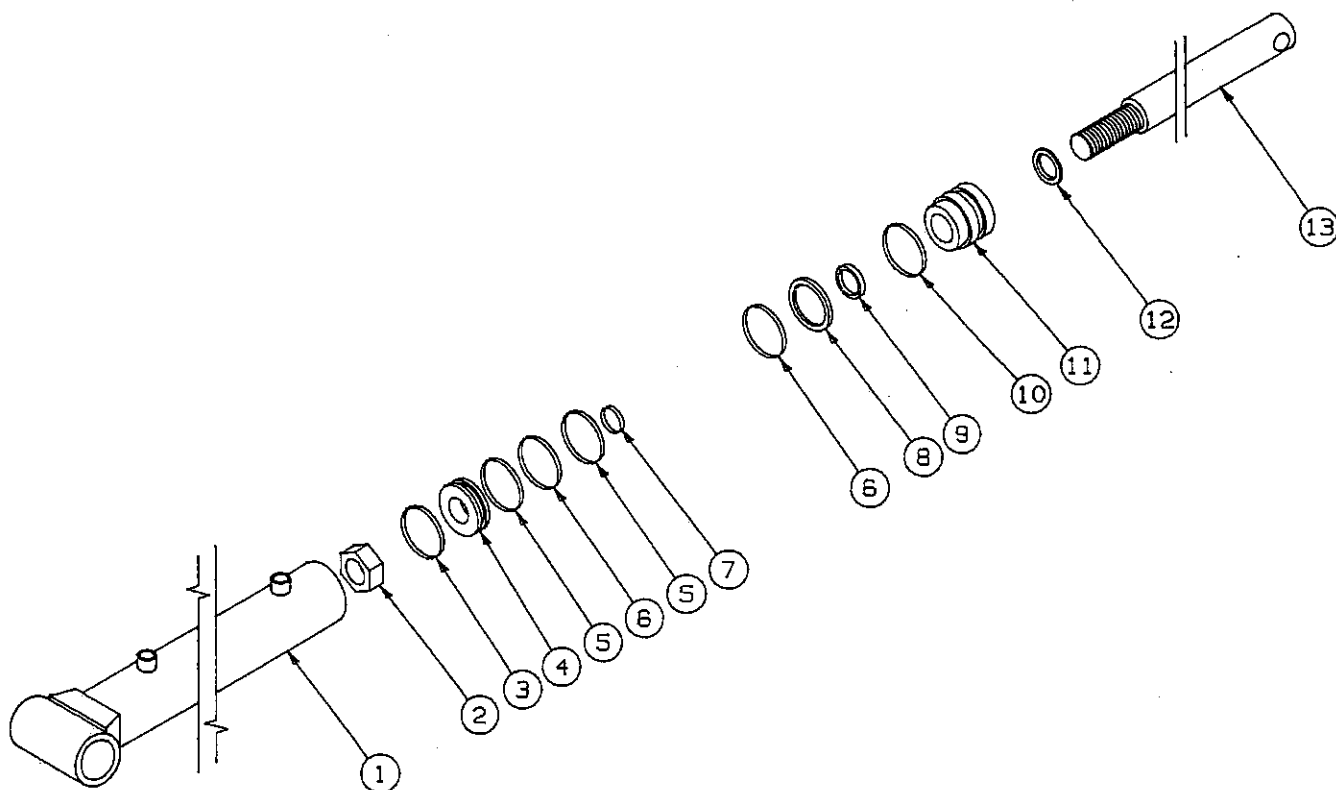
3-481-010003



ITEM	PART NUMBER	QTY	DESCRIPTION
1	5777	4	SCREW, CAP (12 PT DR. 5/16-24 UNF X 7/8)
2	* 9121-2	1	SEAL, DUST
3	* 7463	1	FLANGE, MOUNTING (2 BOLT)
4	* 9057-1	1	SEAL, SHAFT PRESSURE
5	* 9091-1	1	SEAL
6	7462	1	RACE, THRUST BEARING
7	7537	1	BEARING, THRUST, NEEDLE
8	14193	1	KEY, WOODRUFF
9	7360-1	1	SHAFT, STRAIGHT
10	8631-1	1	HOUSING, 7/8 ST. THREAD SAE O-RING BOSS PORTS
11	* 9086-1	3	SEAL
12	602	1	DRIVE
13	8636	1	PLATE, SPACER
14	8632-2	1	GEROLER
15	21774-1	1	CAP, END
16	* 6049	7	WASHER SEAL
17	5389-1	7	SCREW, CAP 12 PT. DR. 5/16-24 UNF
	* 60533	1	SEAL KIT - (contains parts marked *)

TILT CYLINDER

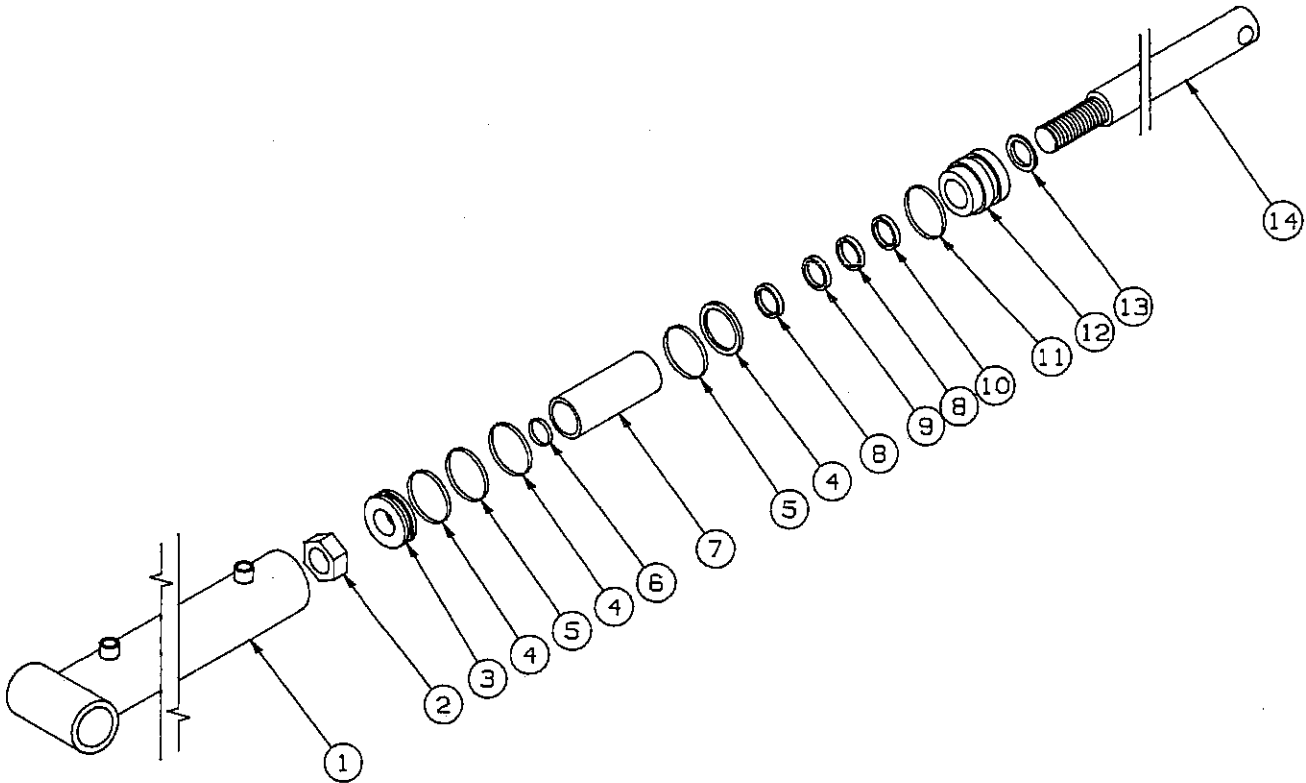
3-242-010092



ITEM	PART NUMBER	QTY	DESCRIPTION
1	NOT AVAILABLE	--	BUTT AND TUBE ASSEMBLY
2	220000212	1	NUT, 1-1/4 - 12 LOCK
3 *	240004008	1	RING, PISTON
4	071900048	1	PISTON
5 *	240034342	2	WASHER, B/U
6 *	240000342	2	O-RING
7 *	240000026	1	O-RING
8 *	240005342	1	WASHER, B/U
9 *	240020009	1	U-CUP
10 *	230007400	1	RETAINER, SQUARE WIRE
11	081900295	1	GLAND
12 *	250001329	1	WIPER
13	011100550	1	ROD, PISTON
	PMCK-AD-460	1	PACKING KIT (Includes items marked *)

SUSPENSION SLIDE CYLINDER

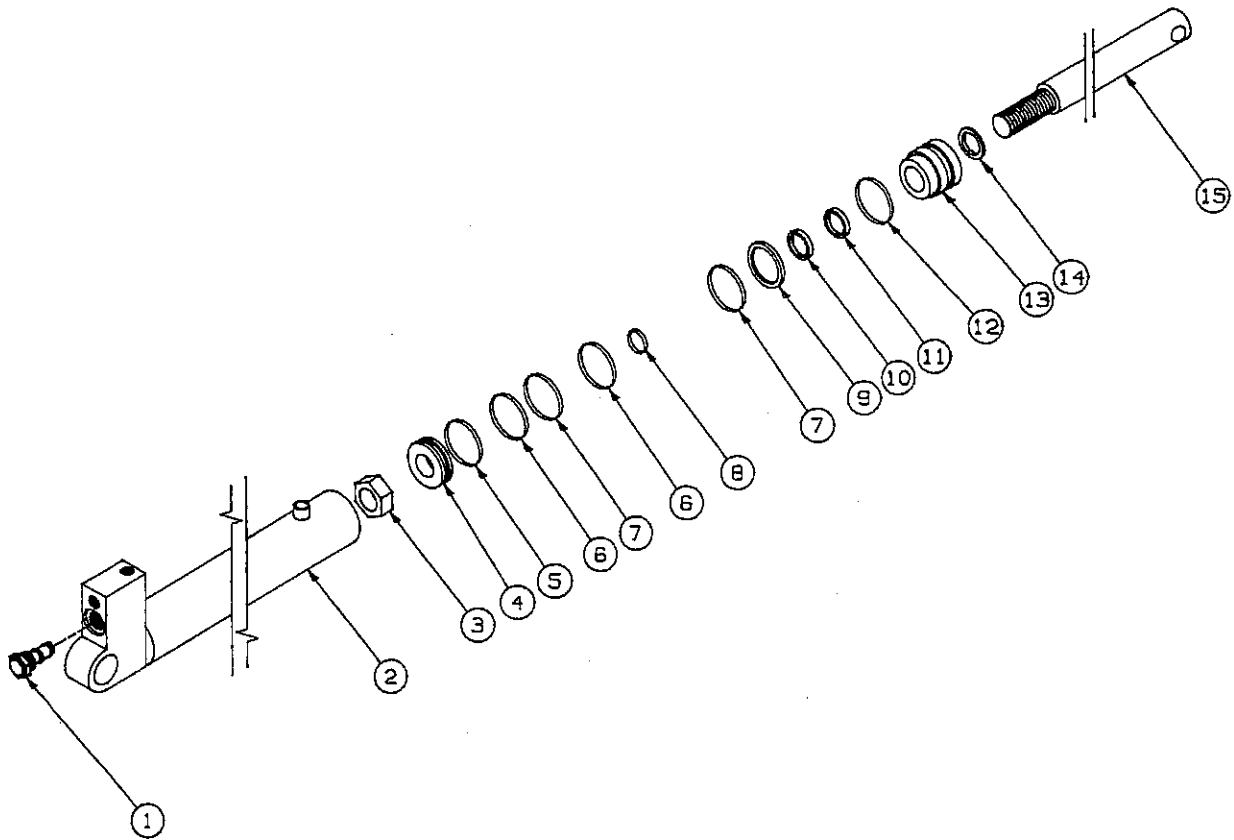
3-242-010102



ITEM	PART NUMBER	QTY	DESCRIPTION
1	NOT AVAILABLE	-	BUTT AND TUBE ASSEMBLY
2	220000212	1	NUT, 1-1/4 - 12 LOCK
3	071900195	1	PISTON
4	* 240005342	3	WASHER, B/U
5	* 240000342	2	O-RING
6	* 240000026	1	O-RING
7	211300024	1	SPACER
8	* 240005333	2	WASHER, B/U
9	* 240000333	1	O-RING
10	* 240020015	1	U-CUP
11	* 230007400	1	RING, SQUARE RETAINER
12	081900277	1	GLAND
13	* 250002213	1	WIPER
14	011300179	1	ROD, PISTON
<hr/>			
*	PMCK-AD-461	1	PACKING KIT (Includes items marked *)

LEG LIFT CYLINDERS

3-242-010090

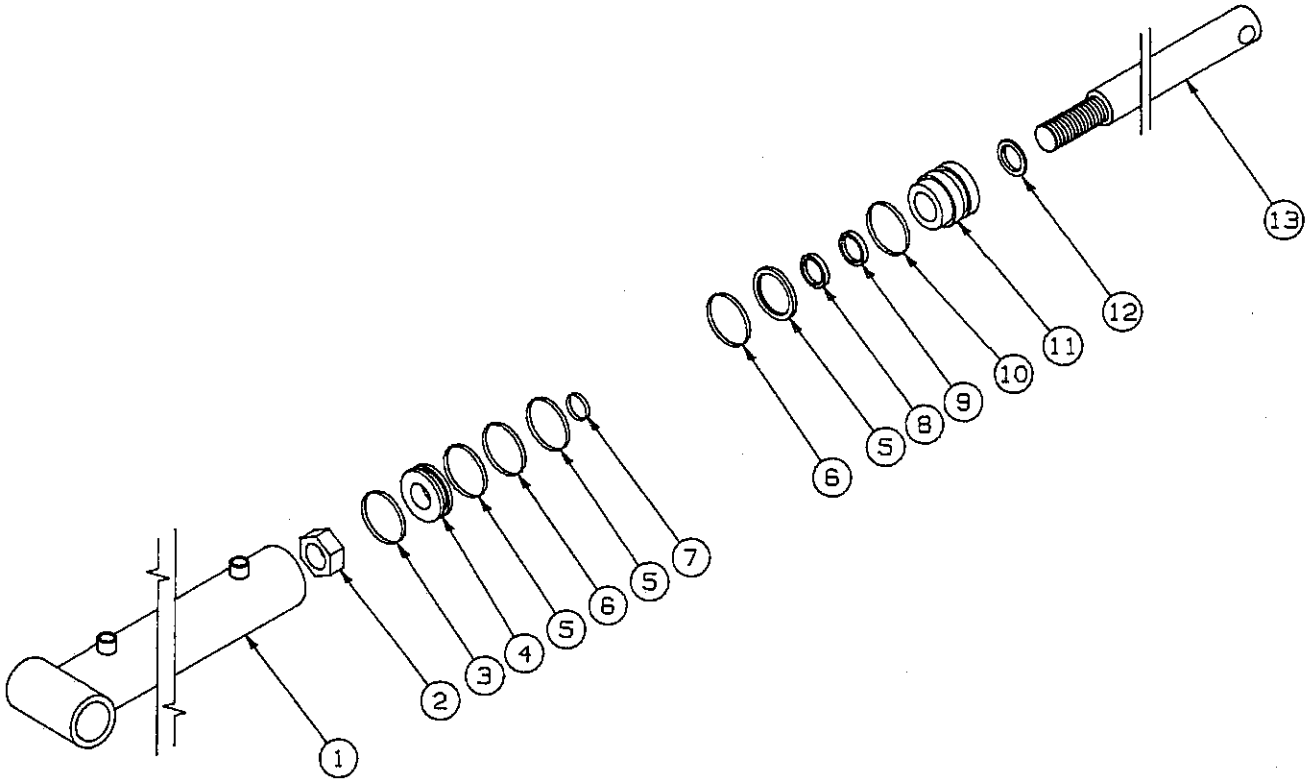


ITEM	PART NUMBER	QTY	DESCRIPTION
1	3-846-010021	1	CARTRIDGE, PILOTED CHECK VALVE
2	NOT AVAILABLE	-	TUBE AND BUTT ASSEMBLY
3	220000210	1	NUT, 1-14 LOCK
4	071700016	1	PISTON
5	* 240004007	1	RING, PISTON
6	* 240034338	2	WASHER, LEATHER B/U
7	* 240000338	2	O-RING
8	* 240000022	1	O-RING
9	* 240061338	1	WASHER, B/U
10	* 240000222	1	O-RING
11	* 240005222	1	WASHER, B/U
12	* 230001350	1	RING, SNAP
13	081700009	1	GLAND
14	* 250001222	1	WIPER
15	010800062	1	ROD

* -PMCK-5500 1 - SEAL KIT (Includes items marked *)

331 BED SLIDE CYLINDER

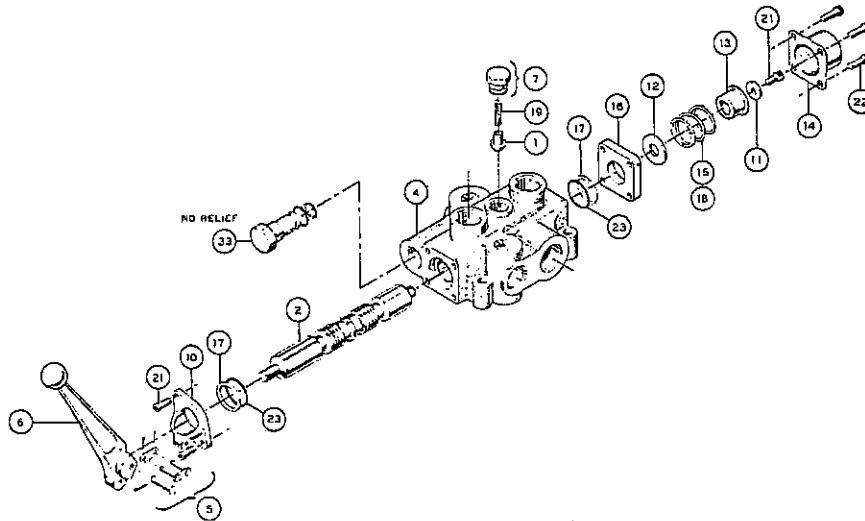
3-242-010091



ITEM	PART NUMBER	QTY	DESCRIPTION
1	061500057	1	BUTT AND TUBE ASSEMBLY
2	220000210	1	NUT, 1-14 LOCK
3	* 240004006	1	RING, PISTON
4	071500021	1	PISTON
5	* 240005334	3	WASHER, B/U
6	* 240000336	2	O-RING
7	* 240000022	1	O-RING
8	* 240000222	1	O-RING
9	* 240005222	1	WASHER, B/U
10	* 230001300	1	RING, SNAP
11	081500032	1	GLAND
12	* 250001222	1	WIPER
13	010800053	1	ROD, PISTON
	* PMCK-8300	1	SEAL KIT (Includes items marked *)

SINGLE SPOOL (MANUAL) VALVE BA11AD00AO

REPLACEMENT PARTS

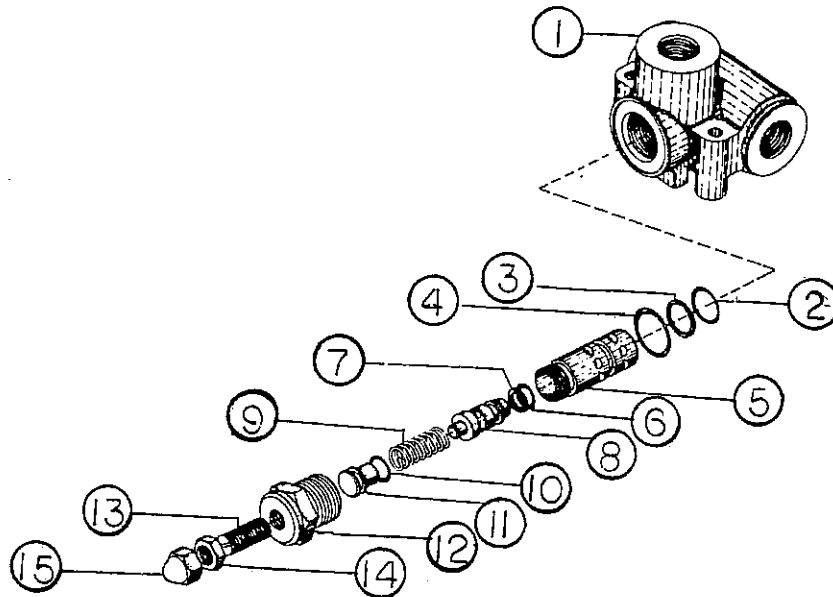


ITEM	PART NUMBER	QTY	DESCRIPTION
1	1V0081	1	POPPET, LOAD CHECK
2	* IV0090	1	SPOOL, 4-WAY
4	* 1V0101	1	HOUSING, VALVE
5	1V1701	1	PIN KIT
6	1V1703	1	HANDLE, (unmodified)
7	1V1725	1	PLUG, LOAD CHECK
10	4Z4306	1	BRACKET, HANDLE
11	1A0290	1	WASHER, CENTERING SPRING
12	1A0291	1	WASHER, STOP
13	1A0292	1	COLLAR, STOP
14	1A0294	1	CAP, END
16	1A0709	1	SPACER, END
17	1A0711	2	WASHER, O-RING SPOOL
18	1A0744	1	SPRING, CENTERING
19	1A0757	1	SPRING, LOAD CHECK
21	2A0079-404	3	CAP SCREW (Torque to 7 - 11 ft. lbs.)
22	2A0079-406	4	CAP SCREW (Torque to 7 - 11 ft. lbs.)
23	2A0283-7214	2	SEAL, SPOOL
26	2A0354-121	1	PLUG, CONVERSION ASSEMBLY
	2V0008	1	SEAL KIT FOR THE 1 SPOOL VALVE

* SOLD AS MATCHED SET ONLY

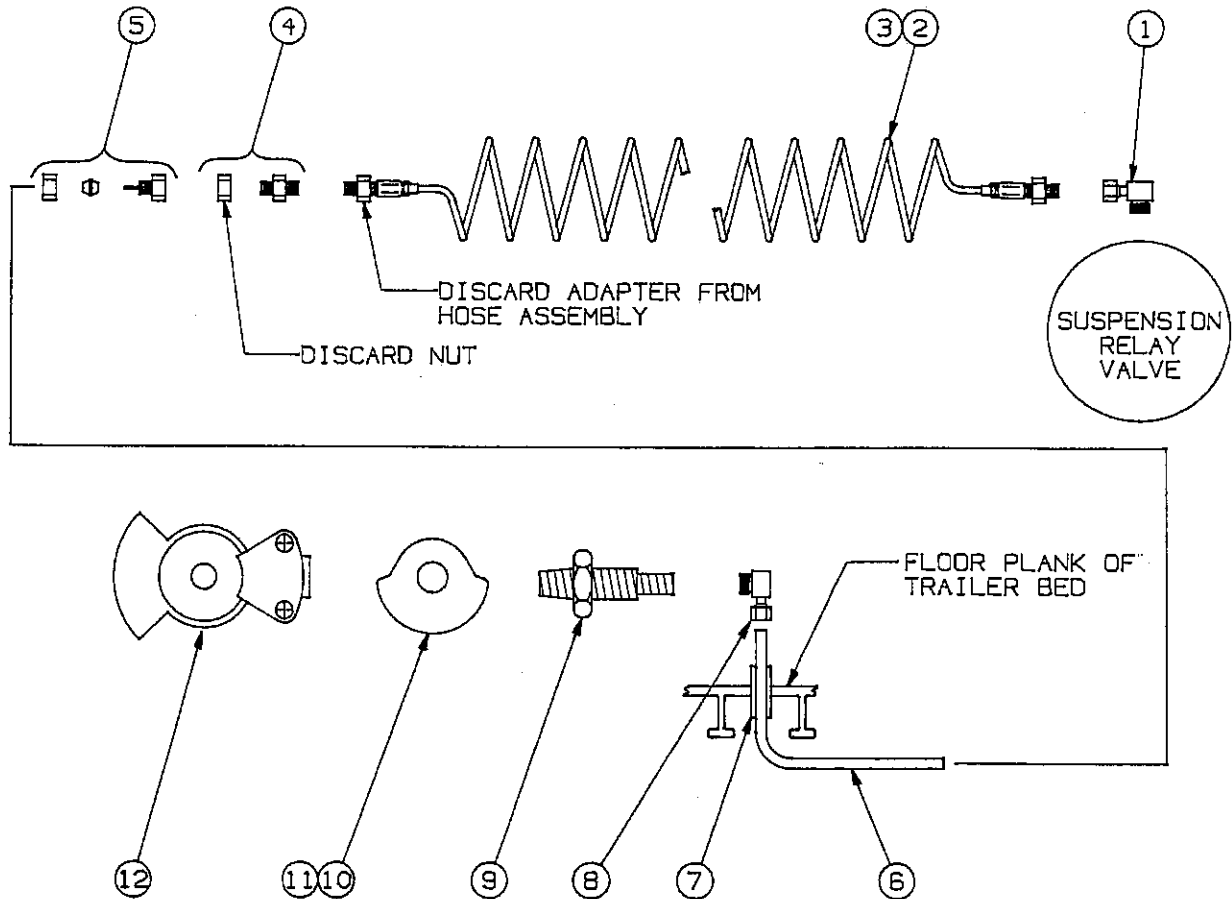
PRESSURE RELIEF VALVE

125130



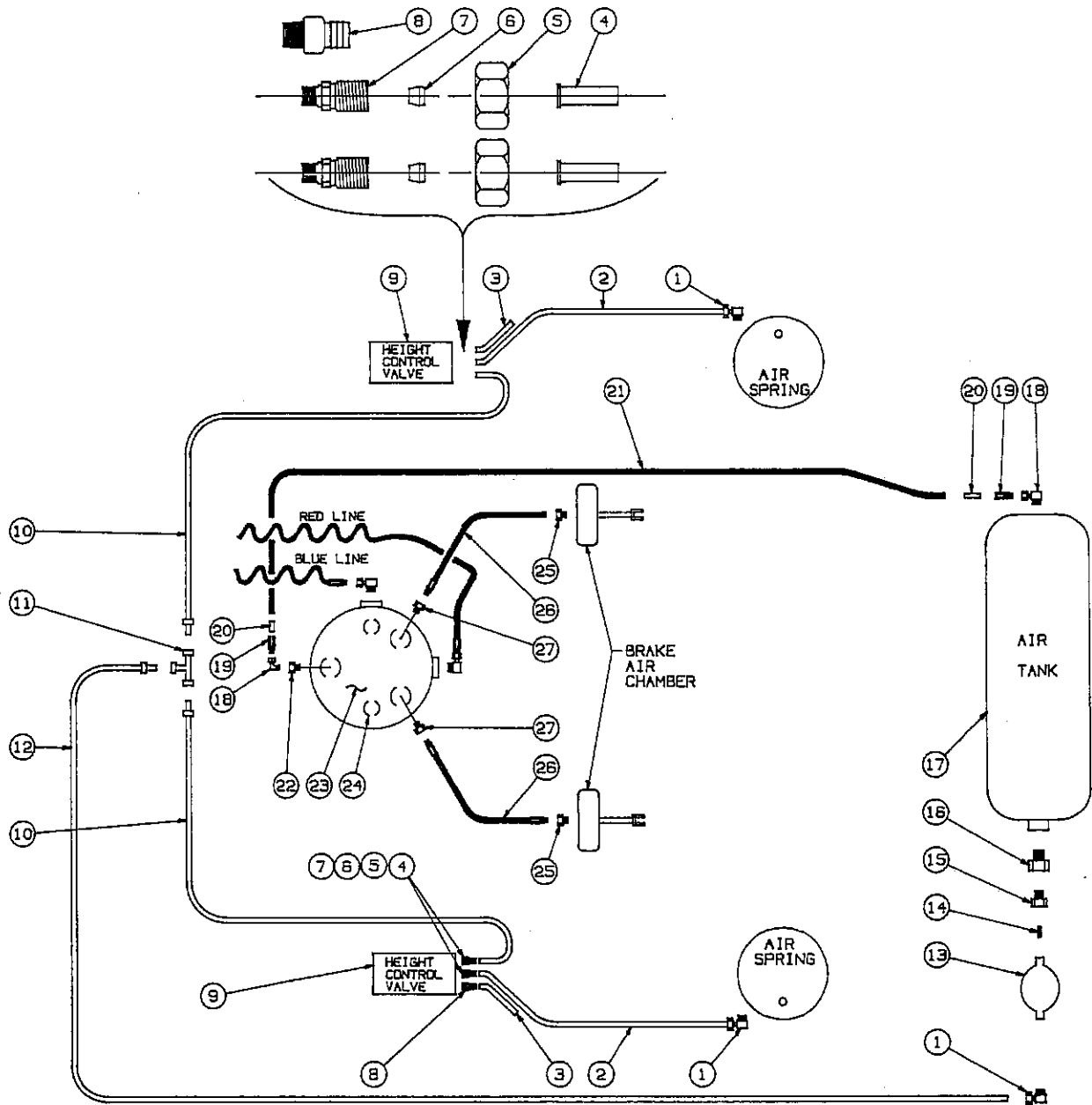
Item	Part No.	Des.	Qty.
1	1R0024	Housing	1
2	2A0283-7015	O-Ring, Lower Body	1
3	2A0010-015	Back Up Seal, Lower Body	1
4	2A0283-9910	O-Ring, Plug	1
5	1R0019	Relief Lower Body	1
6	2A0283-7011	O-Ring, Poppet	1
7	2A0007-011	Back Up Seal, Poppet	1
8	1R0020	Relief Poppet	1
9	2A9048-7	Spring (1500-300 PSI)	1
10	1A0171	Piston O-Ring	1
11	1R0013	Relief Piston	1
12	1R0018	Relief Upper Body	1
13	1R0015	Adjustment Screw	1
14	1A0569	Lock Nut	1
15	1A0570	Acorn Nut	1

AIR LINE PLUMBING SERVICE AND EMERGENCY



ITEM	PART NUMBER	QTY	DESCRIPTION
1	2047-6-6S	2	ELBOW
2	3-384-010001	1	HOSE, RED COILED
3	3-384-010002	1	HOSE, BLUE COILED
4	HO-168-8X6	2	FITTING
5	1466X6X6	2	FITTING
6	62P6	10' EA	TUBING
7	104-0507	7"	PROTECTOR, TUBING
	6828	2	CLAMP, HOSE
8	1469X6	2	ELBOW
9	55B61	2	FITTING, BULKHEAD
10	55B61-6	1	TAG, EMERGENCY LINE IDENTIFICATION
11	55B62-7	1	TAG, SERVICE LINE IDENTIFICATION
12	55B11	2	CONNECTOR, GLADHAND

SUSPENSION AIR SYSTEM

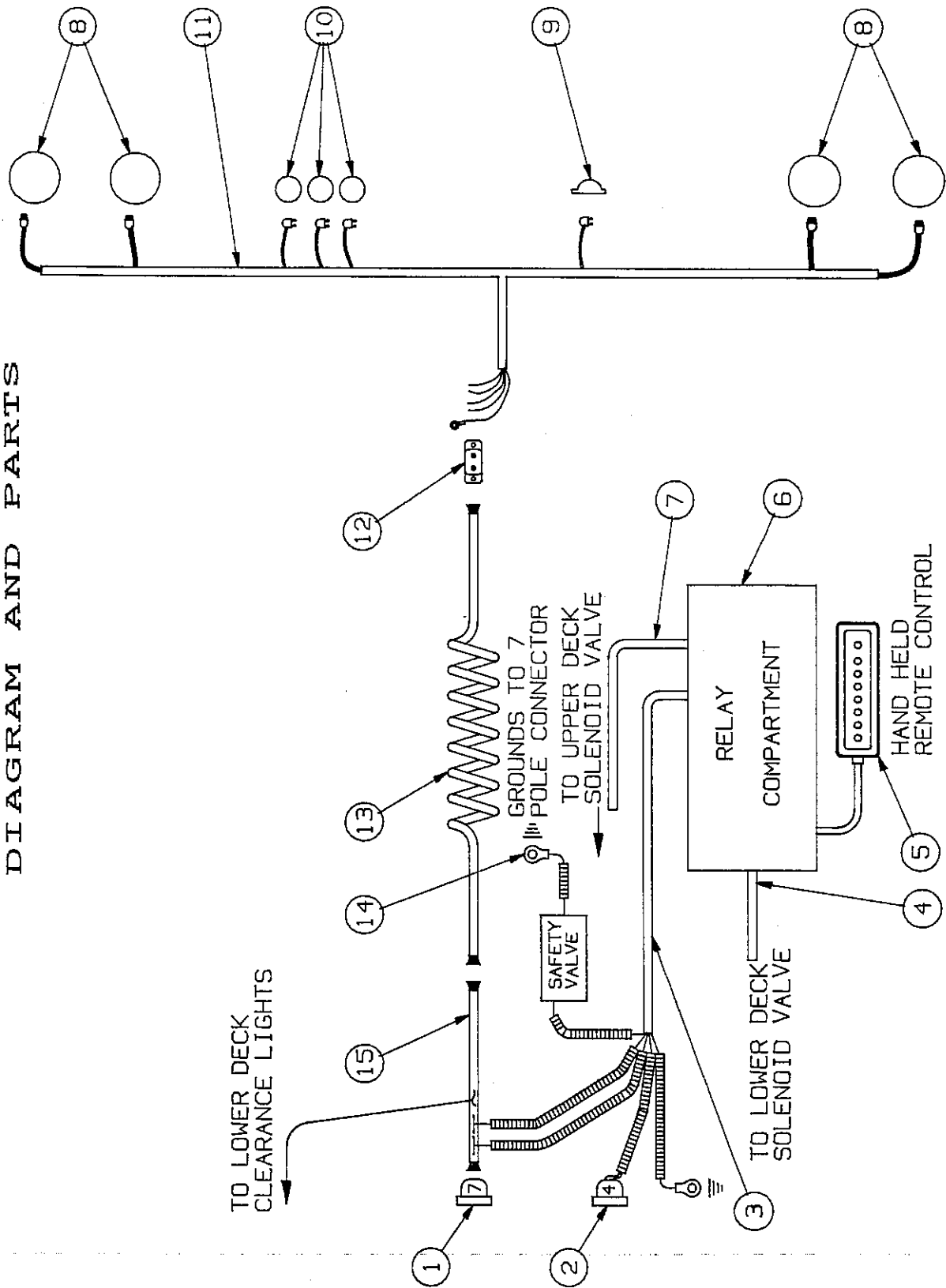


SUSPENSION AIR SYSTEM

SCHEMATIC AND PARTS

ITEM	PART NUMBER	QTY	DESCRIPTION
1	900154172	3	FITTING
2	62P4	54"	TUBING
3	62P4	6"	TUBING
4	93800014	4	INSERT
5	93800140	4	NUT
6	93800062	4	SLEEVE
7	90554059	4	FILTER, HEIGHT CONTROL VALVE
8	93800139	2	FITTING, EXHAUST
9	90054113	2	VALVE, HEIGHT CONTROL
10	62P4	38"	TUBING
11	1464X4	1	TEE
12	62P4	94"	TUBING
13	90554107	1	VALVE, PRESSURE PROTECTION
	SRK-143	1	FILTER, PRESSURE PROTECTION
14	1/4NIPPLE	1	NIPPLE
15	3/8X1/4BUSH	1	BUSHING
16	1/2X3/8BUSH	1	BUSHING
17	3-780-010002	1	RESERVOIR
	56D4	1	DRAIN COCK
	805-2	8	BUSHING, STEP
	3/8-16X1-3/4	4	CAP SCREW, GR5 HEX HEAD
	3/8FW	8	WASHER, FLAT
	3/8HFLN	4	NUT, GRB LOCK
18	2047-8-8S	2	ELBOW
19	H0168-8X8	1	ADAPTER
20	H0159-8BP	1	INSERT
21	62P8	92"	TUBING
22	2045-8-8S	1	ADAPTER
23	90W101	1	VALVE, RELAY
	3/8HFLN	3	NUT, GRB LOCK
24	1/4PIPE PLUG	2	PLUG
25	55C21	2	ADAPTER
26	54A6X2505	18"	HOSE, BRAKE
27	55C31	2	ADAPTER

ELECTRICAL DIAGRAM AND PARTS



ELECTRICAL
DIAGRAM AND PARTS

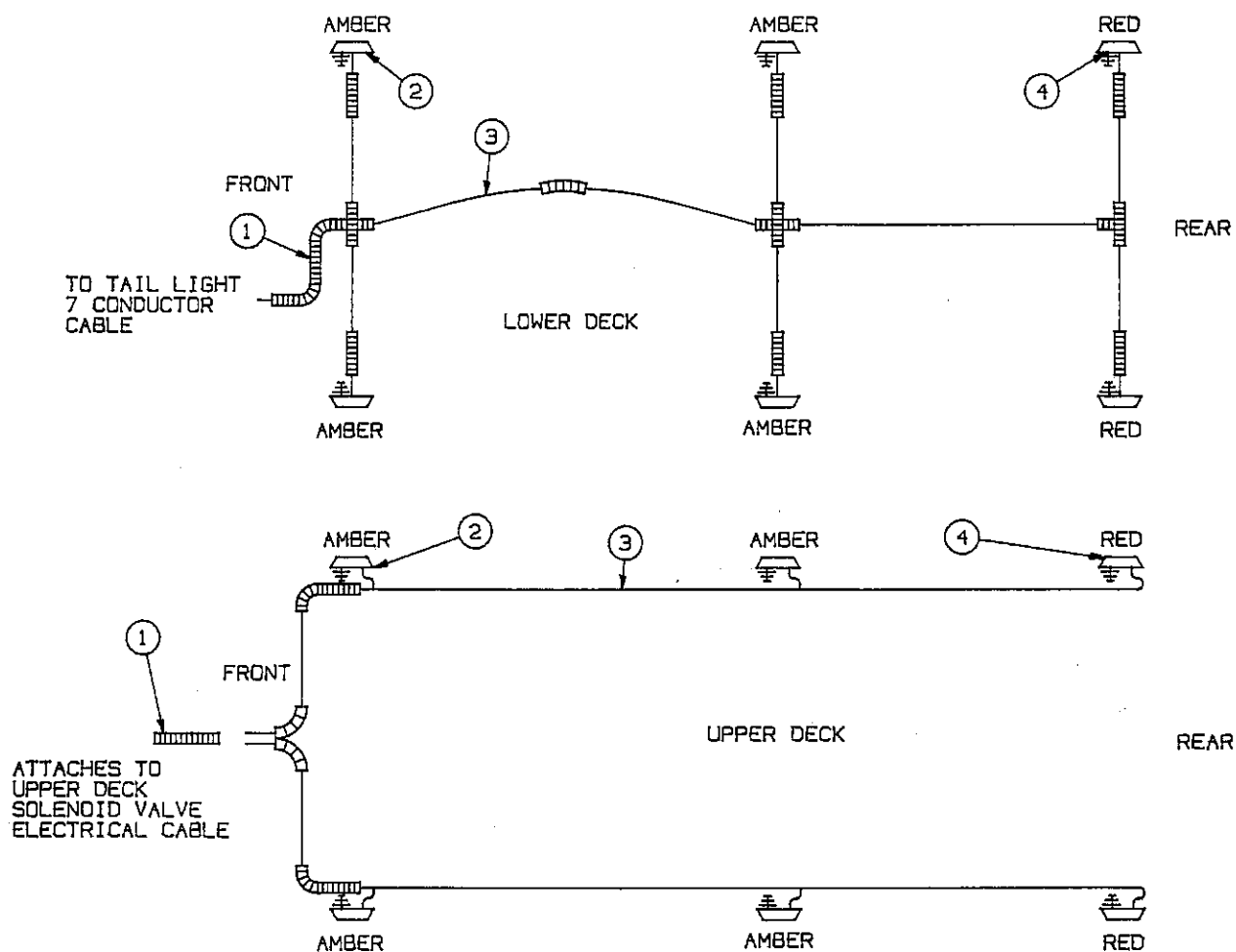
ITEM	PART NUMBER	QTY*	DESCRIPTION
1	595-7	1	SOCKET, 7 PIN
	3/8-16X1-1/4CS	2	CAP SCREW, GR5 HEX HEAD
	3/8-16HFN	2	NUT, GRB LOCK
2	3-272-010003	1	SOCKET, 4 PIN
	3/8-16X1-1/4CS	2	CAP SCREW, GR5 HEX HEAD
	3/8-16HFN	2	NUT, GRB LOCK
3	3-156-010012	1	HARNESS, RELAY TO SERVICE ELECTRICAL SOCKETS
	106-0086	1	CONNECTOR, BOX CABLE ENTRY
4	3-156-010011	1	HARNESS, LOWER SOLENOID VALVE BANK
5	3-279-010008	1	PANEL AND CORD ASSEMBLY, REMOTE CONTROL
6	3-279-010003	1,0	PANEL ASSY., POWER CONTROL: INCLUDES ALL WIRING, RELAYS, EXTERNAL MULTI CONDUCTOR CABLES, REMOTE CONTROL BOX AND CABLE, AND 3 SPOOL SOLENOID VALVE.
	3-279-010009	0,1	PANEL ASSY., POWER CONTROL: INCLUDES ALL WIRING, RELAYS, EXTERNAL MULTI CONDUCTOR CABLES, REMOTE CONTROL BOX AND CABLE, AND 2 SPOOL SOLENOID VALVE.
7	3-156-010013	1	HARNESS, UPPER SOLENOID VALVE
	106-0179	1	CONNECTOR, BOX CABLE ENTRY
8	3-446-010008	4	LAMP, STOP - TURN - TAIL
	40700	4	GROMMET
9	15009	1	LAMP, LICENSE
10	10205R	3	LAMP, RED REFLECTOR
	10404	3	GROMMET
11	3-368-010024	1	HARNESS, TAIL LIGHT
12	750-029	1	JUNCTION BLOCK
	5/16-18X3/4HHCS	2	CAP SCREW, GR5 HEX HEAD
13	3-156-010001	1	CABLE, COILED ELECTRICAL
	31003	7	TERMINAL, RING
14	D01-412	1	TERMINAL, RING
15	3-156-010009156	1	CABLE, MULTI CONDUCTOR
NOT SHOWN:			
	3-201-010001	**	CONDUIT, FLEX
	3-272-010021	**	CONNECTORS, SPLICE WITH SEALANT, 16 - 14 ga
	3-272-010022	**	CONNECTORS, SPLICE WITH SEALANT, 12 - 10 ga
	3-272-010018	**	HEAT SHRINK WITH SEALANT

* If a comma appears in the quantity column, the number prior to the comma is for a 4 winch car carrier, and the number behind the comma is for a 2 winch.

** Use as needed.

ELECTRICAL

334 CLEARANCE LIGHTING



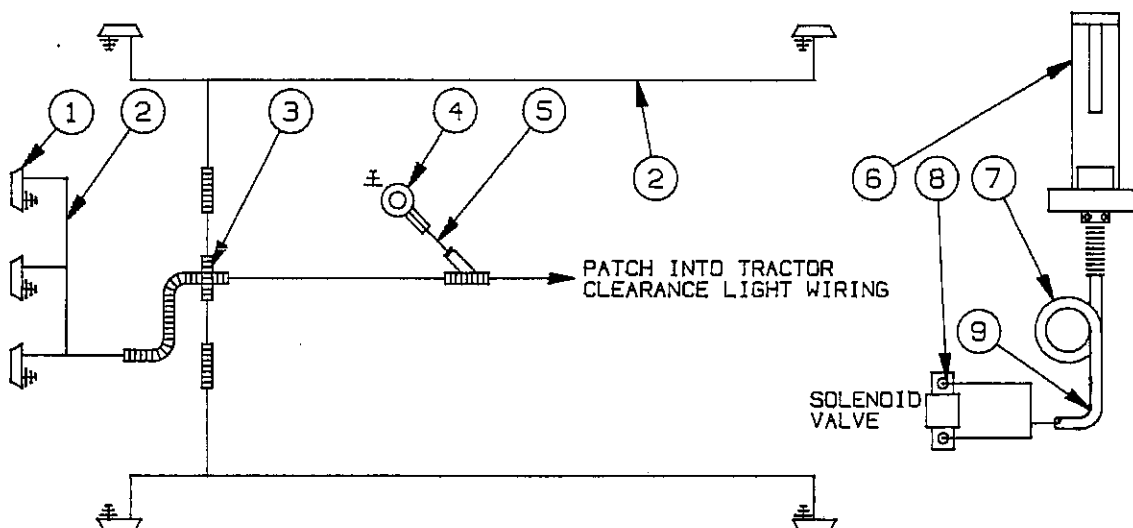
ITEM	PART NUMBER	QTY	DESCRIPTION
1	3-201-010001...	*	CONDUIT, 5/16 FLEX
2	3-446-010006	10	LIGHT, YELLOW CLEARANCE
	10-32X1-1/2MS	20	SCREW, SLOTTED ROUND HEAD MACHINE
	110-0240	20	WASHER, #10 SPLIT LOCK
	110-9845	20	NUT, #10-32 HEX
3	1-879-010005	*	WIRE, 14 AWG BROWN
4	3-446-010007	4	LIGHT, RED CLEARANCE
	10-32X1-1/2MS	8	SCREW, #10-32 X 1-1/2 SLOTTED ROUND HEAD MACHINE
	110-0240	8	WASHER, #10 SPLIT LOCK
	110-9845	8	NUT, #10-32 HEX

NOT SHOWN:

C42-401	*	SPLICE, 16 - 14 GA BUTT
C01-416	*	TERMINAL 3/8 DIA X 16 - 14 GA RING
3-828-010002	*	TUBING, SHRINK-TO-FIT
	*	USE AS NEEDED

ELECTRICAL

331 CLEARANCE LIGHTING AND REMOTE WINCH CONTROL



ITEM	PART NUMBER	QTY*	DESCRIPTION
1	3-446-010006	7	LIGHT, CLEARANCE, YELLOW
	10-32X1-1/2MS	14	SCREW, MACHINE SLOTTED ROUND HEAD
	110-0240	14	WASHER, #10 SPLIT LOCK
	110-9845	14	NUT, #10-32 HEX
2	1-879-010005	47 FT.	WIRE, 14AWG BROWN
3	3-201-010001	*	CONDUIT, FLEX
4	31003	1	TERMINAL, RING
5	1-879-010008	10 FT.	WIRE, 14AWG BLUE
6	3-272-010010	1	CONNECTOR, 4 POLE MALE
7	3-156-010002	1	CABLE, COILED
8	C29-1104X	2	CONNECTOR, INSULATED FEMALE SPADE
9	3-156-010007300	1	CABLE
NOT SHOWN:	105-0211	*	TY-WRAP
	3-272-010018	*	HEAT SHRINK W/SEALANT
	3-272-010021	*	CONNECTOR, SPLICE W/SEALANT, 16-14 GA.

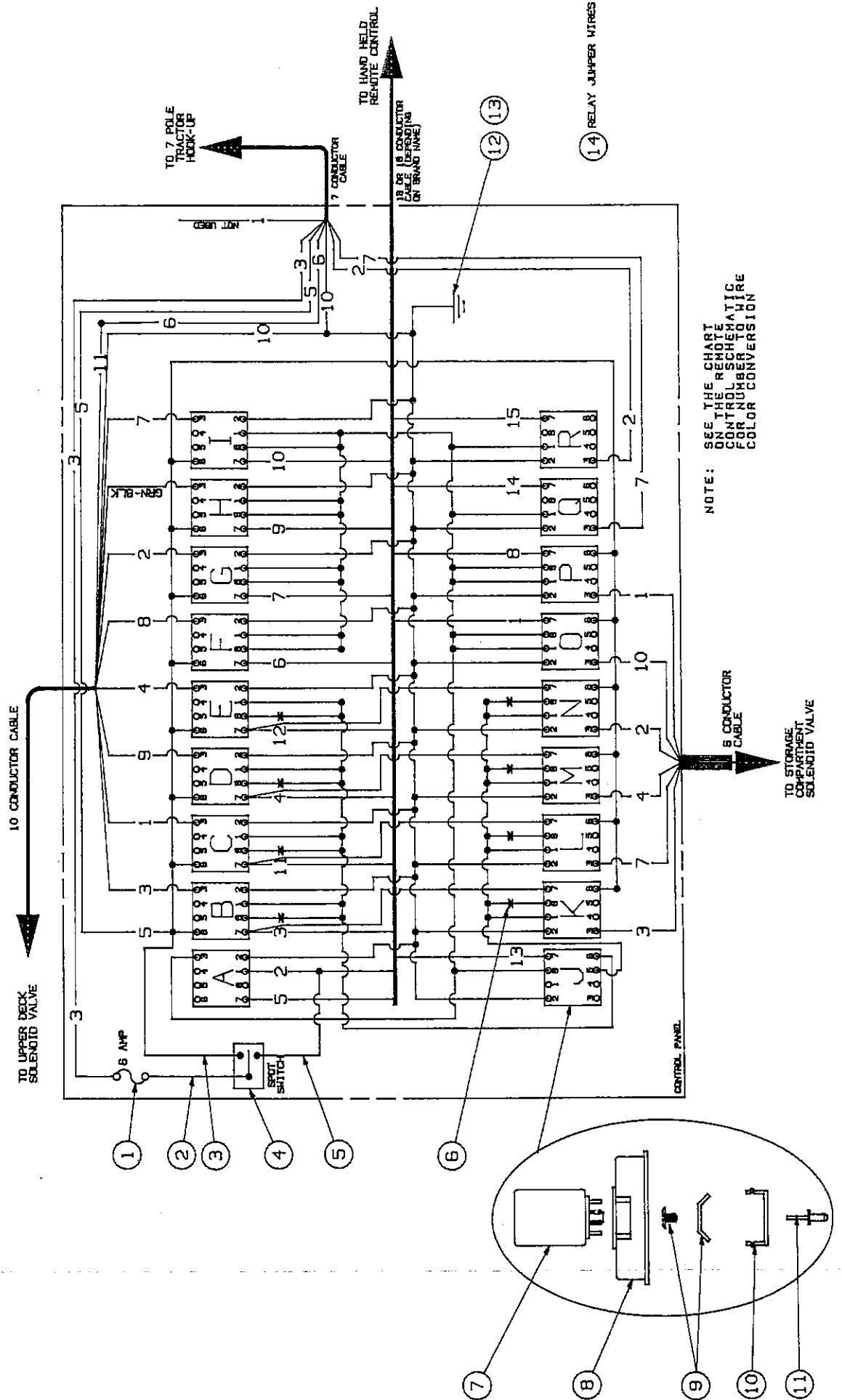
* = AS NEEDED

RELAY COMPARTMENT

DIAGRAM

6	5	4	3
7	8	1	2

NUMERICAL ORDER
OF EACH RELAY



RELAY COMPARTMENT

PARTS LIST

ITEM	PART NUMBER	QTY	DESCRIPTION
1	3-318-010004	1	FUSE HOLDER
	3-318-010007	1	FUSE, AGC 6
2	3-879-010059	1	WIRE WITH RING TERMINAL
3	3-879-010062	1	WIRE WITH RING TERMINAL
4	3-765-010006	1	SWITCH
5	3-879-010060	1	WIRE WITH RING TERMINAL
6	238-6832	8	DIODE
7	1-624-010002	8	RELAY
8	514-2056-1	8	SOCKET, RELAY
9	514-2056-4	16	CLIP, RELAY MOUNTING
10	514-2057-3	2	TRACK, RELAY MOUNTING
11	107-0816	16	RIVET, RELAY TRACK MOUNTING
12	239-3646-4	1	TERMINAL, RING
13	118-7477	1	SCREW, SELF TAPPING HEX HEAD 1/4-14 X 1/2
14	RELAY JUMPER WIRES:		
	3-879-010055	26	14AWG BLUE, 4-1/2"
	3-879-010056	6	14AWG BLUE, 3-1/2"
	3-879-010057	4	14AWG BLUE, 12"
	3-879-010058	1	14AWG BLUE, 1'-10"
	3-879-010063	4	14AWG BLUE, 6"
	3-879-010061	18	14AWG WHITE, 4-1/2"

RELAY JUMPER WIRE ROUTING - PER RELAY

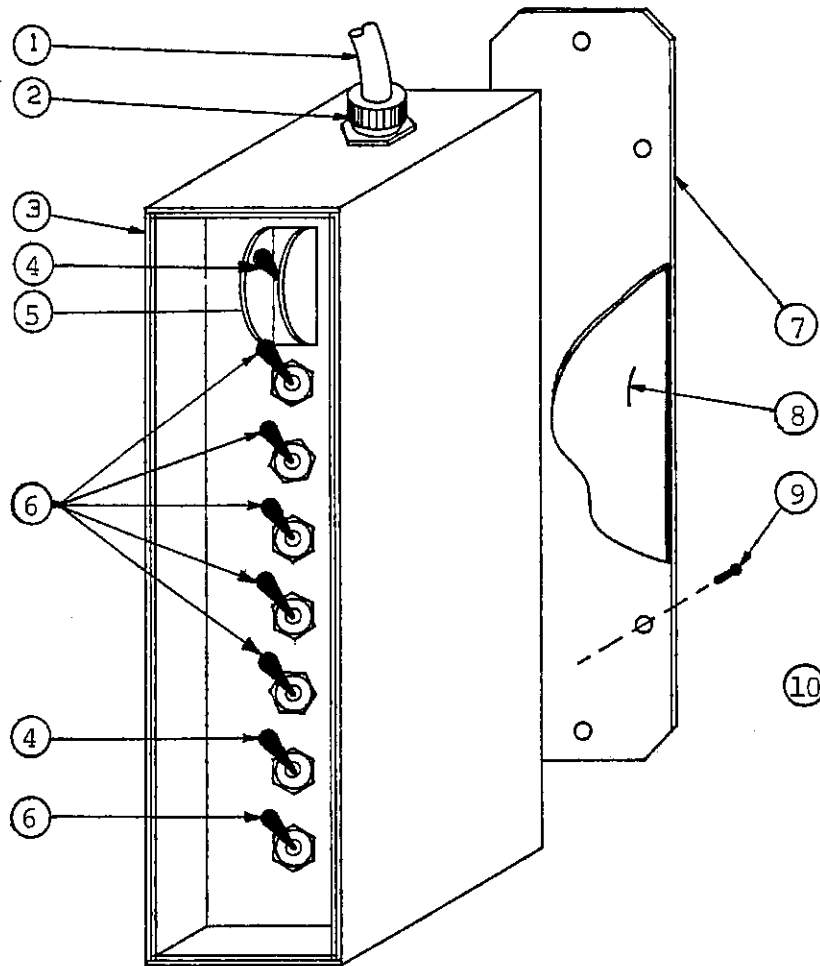
RELAY	FROM		WIRE NUMBER	LENGTH /	COLOR	TO	
	TERM #					RELAY	TERM #
A	2		3-879-010061	4-1/2"	WHT	J	2
	2		3-879-010061	4-1/2"	WHT	B	2
	3		3-879-010057	12"	BLUE	J	8
B	1		3-879-010055	4-1/2"	BLUE	C	1
	1		3-879-010057	12"	BLUE	J	6
	2		3-879-010061	4-1/2"	WHT	C	2
	2		3-879-010061	4-1/2"	WHT	A	2
	6		3-879-010055	4-1/2"	BLUE	C	6
	7		3-879-010063	6"	BLUE	K	7
C	1		3-879-010055	4-1/2"	BLUE	B	1
	1		3-879-010055	4-1/2"	BLUE	D	1
	2		3-879-010061	4-1/2"	WHT	B	2
	2		3-879-010061	4-1/2"	WHT	D	2
	6		3-879-010055	4-1/2"	BLUE	B	6
	6		3-879-010055	4-1/2"	BLUE	D	6
	7		3-879-010063	6"	BLUE	L	7
D	1		3-879-010055	4-1/2"	BLUE	C	1
	1		3-879-010055	4-1/2"	BLUE	E	1
	2		3-879-010061	4-1/2"	WHT	C	2
	2		3-879-010061	4-1/2"	WHT	E	2
	6		3-879-010055	4-1/2"	BLUE	C	6
	6		3-879-010055	4-1/2"	BLUE	E	6
	7		3-879-010063	6"	BLUE	M	7
E	1		3-879-010055	4-1/2"	BLUE	D	1
	2		3-879-010061	4-1/2"	WHT	D	2
	2		3-879-010061	4-1/2"	WHT	F	2
	6		3-879-010055	4-1/2"	BLUE	D	6
	6		3-879-010055	4-1/2"	BLUE	F	6
	7		3-879-010063	6"	BLUE	N	7
F	1		3-879-010056	3-1/2"	BLUE	F	8
	1		3-879-010055	4-1/2"	BLUE	G	1
	2		3-879-010061	4-1/2"	WHT	E	2
	2		3-879-010061	4-1/2"	WHT	G	2
	6		3-879-010055	4-1/2"	BLUE	E	6
	6		3-879-010055	4-1/2"	BLUE	G	6
	8		3-879-010056	3-1/2"	BLUE	F	1

RELAY	FROM TERM #	WIRE NUMBER	LENGTH /	COLOR	RELAY	TO TERM #
G	1	3-879-010056	3-1/2"	BLUE	G	8
	1	3-879-010055	4-1/2"	BLUE	F	1
	1	3-879-010055	4-1/2"	BLUE	H	1
	2	3-879-010061	4-1/2"	WHT	F	2
	2	3-879-010061	4-1/2"	WHT	H	2
	6	3-879-010055	4-1/2"	BLUE	F	6
	6	3-879-010055	4-1/2"	BLUE	H	6
	8	3-879-010056	3-1/2"	BLUE	G	1
H	1	3-879-010056	3-1/2"	BLUE	H	8
	1	3-879-010055	4-1/2"	BLUE	G	1
	1	3-879-010055	4-1/2"	BLUE	I	1
	2	3-879-010061	4-1/2"	WHT	G	2
	2	3-879-010061	4-1/2"	WHT	I	2
	6	3-879-010055	4-1/2"	BLUE	G	6
	6	3-879-010055	4-1/2"	BLUE	I	6
	8	3-879-010056	3-1/2"	BLUE	H	1
I	1	3-879-010056	3-1/2"	BLUE	I	8
	1	3-879-010055	4-1/2"	BLUE	H	1
	1	3-879-010055	4-1/2"	BLUE	R	1
	2	3-879-010061	4-1/2"	WHT	H	2
	6	3-879-010055	4-1/2"	BLUE	H	6
	6	3-879-010058	1'-10"	BLUE	P	6
	8	3-879-010056	3-1/2"	BLUE	I	1
J	2	3-879-010061	4-1/2"	WHT	A	2
	2	3-879-010061	4-1/2"	WHT	K	2
	5	3-879-010057	12"	BLUE	K	1
	6	3-879-010057	12"	BLUE	B	1
	8	3-879-010057	12"	BLUE	O	1
K	1	3-879-010057	12"	BLUE	J	5
	1	3-879-010055	4-1/2"	BLUE	L	1
	2	3-879-010061	4-1/2"	WHT	J	2
	2	3-879-010061	4-1/2"	WHT	L	2
	6	3-879-010055	4-1/2"	BLUE	L	1
	7	3-879-010063	6"	BLUE	B	7
L	1	3-879-010055	4-1/2"	BLUE	K	1
	1	3-879-010055	4-1/2"	BLUE	M	1
	2	3-879-010061	4-1/2"	WHT	K	2
	2	3-879-010061	4-1/2"	WHT	M	2
	6	3-879-010055	4-1/2"	BLUE	K	6
	6	3-879-010055	4-1/2"	BLUE	M	6
	7	3-879-010063	6"	BLUE	C	7

RELAY	FROM TERM #	WIRE NUMBER	LENGTH / COLOR	TO RELAY	TERM #
M	1	3-879-010055	4-1/2" BLUE	L	1
	1	3-879-010055	4-1/2" BLUE	N	1
	2	3-879-010061	4-1/2" WHT	L	2
	2	3-879-010061	4-1/2" WHT	N	2
	6	3-879-010055	4-1/2" BLUE	L	6
	6	3-879-010055	4-1/2" BLUE	N	6
	7	3-879-010063	6" BLUE	D	7
N	1	3-879-010055	4-1/2" BLUE	M	1
	2	3-879-010061	4-1/2" WHT	M	2
	2	3-879-010061	4-1/2" WHT	O	2
	6	3-879-010055	4-1/2" BLUE	M	6
	6	3-879-010055	4-1/2" BLUE	O	6
	7	3-879-010063	6" BLUE	E	7
O	1	3-879-010056	3-1/2" BLUE	O	8
	1	3-879-010057	12" BLUE	J	8
	1	3-879-010055	4-1/2" BLUE	P	1
	2	3-879-010061	4-1/2" WHT	N	2
	2	3-879-010061	4-1/2" WHT	P	2
	6	3-879-010055	4-1/2" BLUE	N	6
	6	3-879-010055	4-1/2" BLUE	P	6
	8	3-879-010056	3-1/2" BLUE	O	1
P	1	3-879-010056	3-1/2" BLUE	P	8
	1	3-879-010055	4-1/2" BLUE	O	1
	1	3-879-010055	4-1/2" BLUE	Q	1
	2	3-879-010061	4-1/2" WHT	O	2
	2	3-879-010061	4-1/2" WHT	Q	2
	6	3-879-010055	4-1/2" BLUE	O	6
	6	3-879-010058	1'-10" BLUE	I	6
	8	3-879-010056	3-1/2" BLUE	P	1
Q	1	3-879-010055	4-1/2" BLUE	P	1
	1	3-879-010055	4-1/2" BLUE	R	1
	2	3-879-010061	4-1/2" WHT	P	2
	2	3-879-010061	4-1/2" WHT	R	2
R	1	3-879-010055	4-1/2" BLUE	Q	1
	1	3-879-010055	4-1/2" BLUE	I	1
	2	3-879-010055	4-1/2" BLUE	Q	2
	2	3-879-010061	4-1/2" WHT	GROUND	

REMOTE HAND CONTROL

PARTS LIST

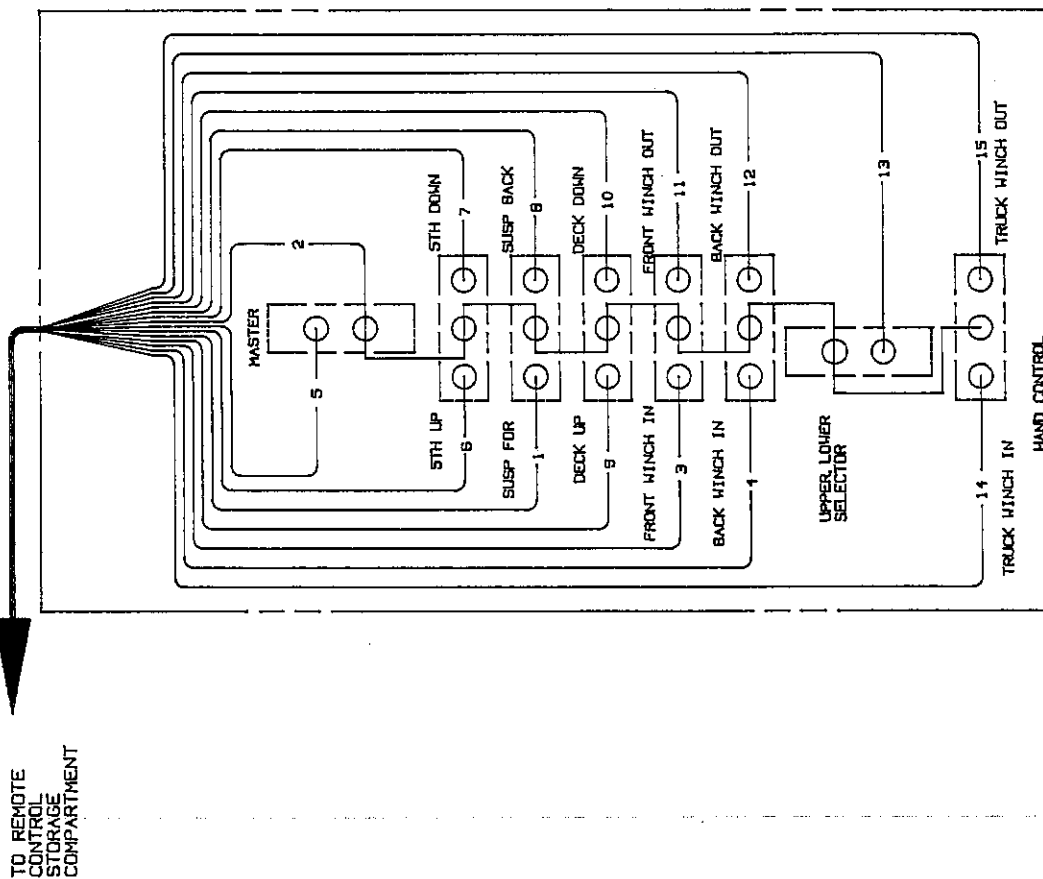


ITEM	PART NUMBER	QTY	DESCRIPTION
1	3-156-010010	1	CABLE, MULTI CONDUCTOR W/ TERMINALS
2	106-0078	1	CONNECTOR, BOX ENTRY
3	3-279-010004	1	ENCLOSURE WELDMENT
4	239-3327	2	SWITCH
5	237-5752-1	1	GUARD, SWITCH
6	238-1579	6	SWITCH
7	3-279-010007	1	PLATE, BACK
8	238-9942	.03ft.	TAPE, INSULATING
9	118-7477	6	SCREW, SELF TAPPING HEX HEAD, 1/4-14 X 1/2

NOT SHOWN:

10 3-879-010064 7 JUMPER, 16AWG RED, W/ FORK TERMINALS

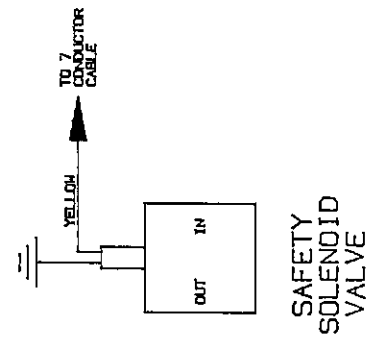
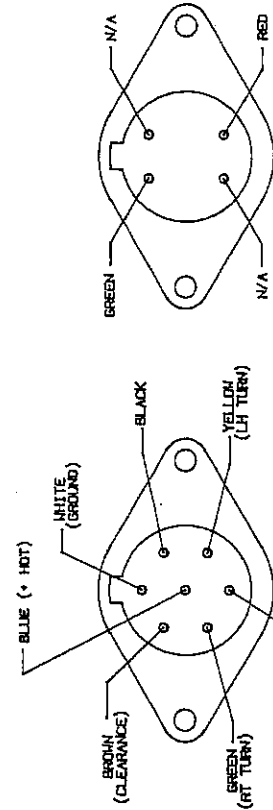
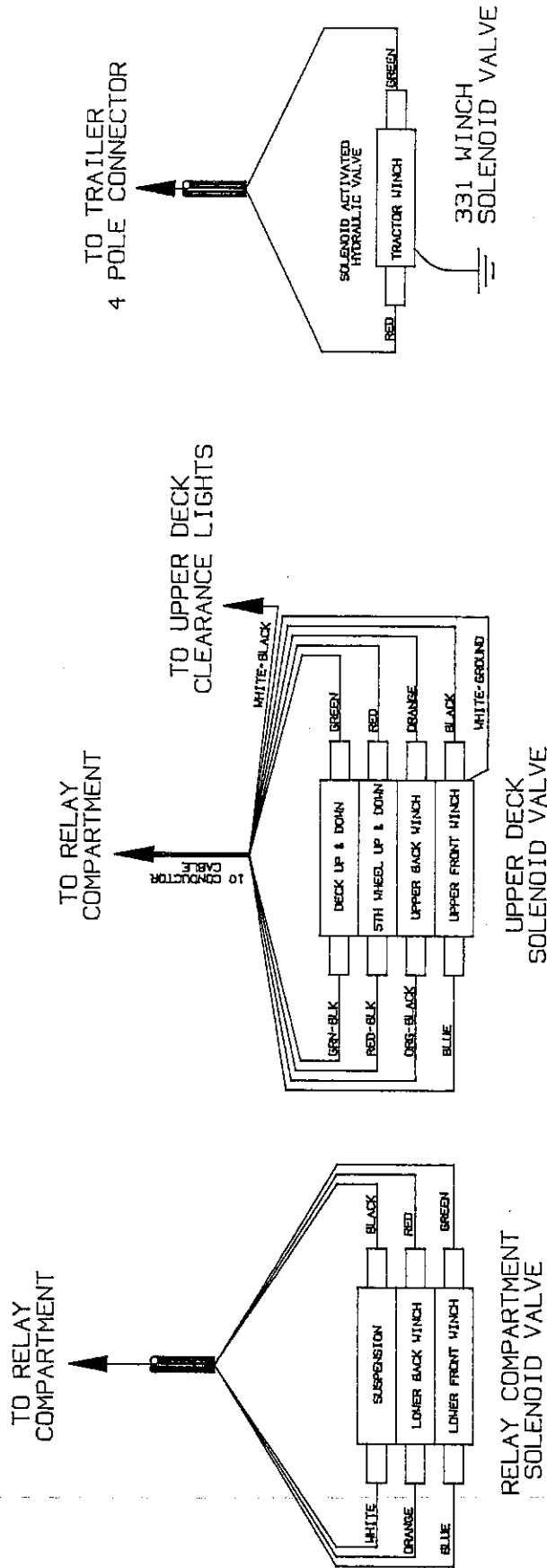
ELECTRICAL SCHEMATIC HAND REMOTE CONTROL



POLAR / SOLAR		
CONDUCTOR NUMBER	BASE COLOR	TRACER COLOR
1	BLACK	---
2	RED	---
3	BLUE	---
4	ORANGE	---
5	YELLOW	---
6	BROWN	---
7	RED	---
8	BLUE	BLACK
9	ORANGE	BLACK
10	YELLOW	BLACK
11	BROWN	BLACK
12	BLACK	RED
13	BLUE	RED
14	ORANGE	RED
15	YELLOW	RED
16	BROWN	RED

BRAND REX		
CONDUCTOR NUMBER	BASE COLOR	TRACER COLOR
1	BLACK	---
2	RED	---
3	BLUE	---
4	ORANGE	---
5	YELLOW	---
6	BROWN	---
7	GREEN	---
8	GRAY	---
9	VIOLET	---
10	WHITE	---
11	WHITE	BLACK
12	WHITE	VIOLET
13	WHITE	BLUE
14	WHITE	GREEN
15	WHITE	BROWN
16	WHITE	RED
17	WHITE	YELLOW
18	WHITE	ORANGE

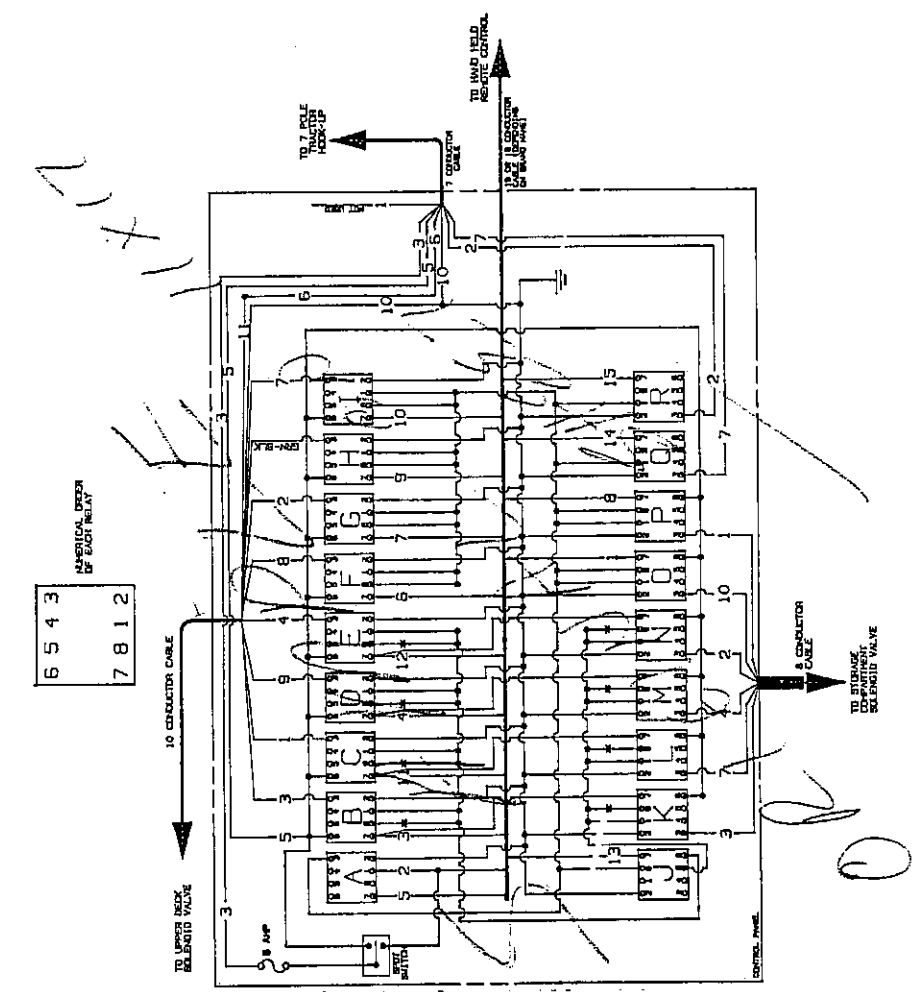
ELECTRICAL SCHEMATIC COMPONENTS



6-979

ELECTRICAL SCHEMATIC RELAY COMPARTMENT

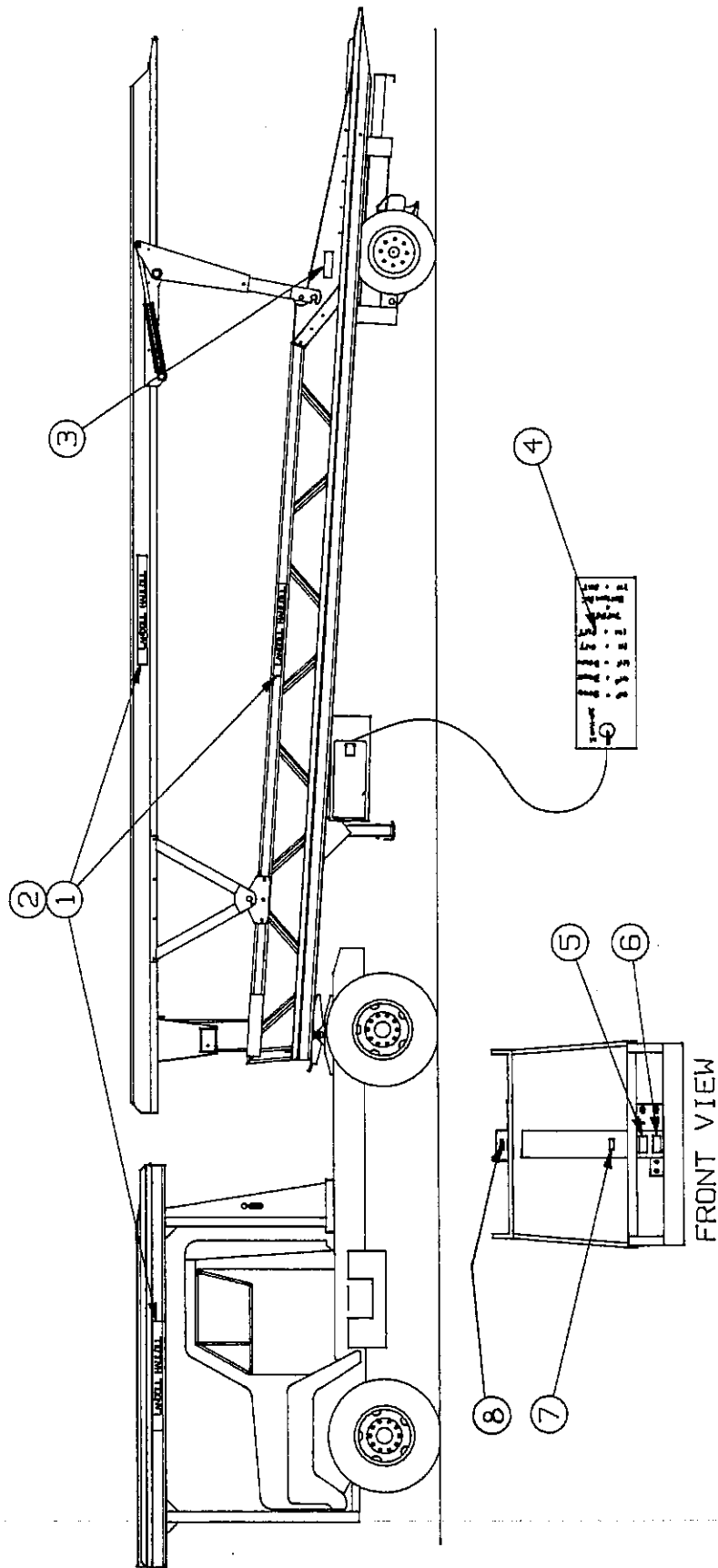
RELAY	FUNCTION
A	MASTER MASTER
B	UPPER FRONT WINCH-IN
C	UPPER FRONT WINCH-OUT
D	UPPER BACK WINCH-IN
E	UPPER BACK WINCH-OUT
F	5TH WHEEL UP
G	5TH WHEEL DOWN
H	TOP DECK, UP
I	TOP DECK, DOWN
J	UPPER/LOWER WINCH
K	LOWER FRONT WINCH-IN
L	LOWER FRONT WINCH-OUT
M	LOWER BACK WINCH-IN
N	LOWER BACK WINCH-OUT
O	SUSPENSION FORWARD
P	SUSPENSION BACK
Q	TRACTOR WINCH-IN
R	TRACTOR WINCH-OUT



WIRE #	WIRE COLOR	POLAR/ SQR
1	BLACK	BLACK
2	RED	RED
3	BLUE	BLUE
4	ORANGE	ORANGE
5	YELLOW	YELLOW
6	BROWN	BROWN
7	GREEN	RED
8	GRAY	BLACK
9	VIOLET	BLUE
10	WHITE	BLACK
11	WHITE	ORANGE
12	WHITE	BLACK
13	WHITE	RED
14	WHITE	BLUE
15	WHITE	ORANGE
16	WHITE	RED
17	WHITE	YELLOW
18	WHITE	ORANGE

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DECAL PLACEMENT



DECAL
PARTS LISTING

ITEM	PART NUMBER	QTY	DESCRIPTION
1	1-573-010003	6	DECAL, LANDOLL
2	1-573-010004	6	DECAL, HAULOLL
3	3-573-010080	2	DECAL, WHEEL TORQUE
4	3-573-010102	1	PLACARD, REMOTE CONTROL
5	3-573-010060	1	DECAL, PHONE NUMBERS FOR PARTS/SERVICE
6	1-573-010055	1	DECAL, PATENT PENDING
7	NOT REPLACEABLE	1	PLACARD, SERIAL NUMBER
8	3-573-010013	1	DECAL, LANDOLL

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