



**HR3000 SERIES A
UNIVERSAL HY-RAIL®
GUIDE WHEEL EQUIPMENT
HYDRAULICALLY OPERATED**

93-126



**OPERATOR'S SERVICE
AND PARTS MANUAL**

ISSUED 11 - 2000

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■ **THIS MANUAL CONTAINS VITAL INFORMATION FOR THE SAFE USE AND EFFICIENT OPERATION OF THE VEHICLE EQUIPPED WITH HY-RAIL® GUIDE WHEEL EQUIPMENT. CAREFULLY READ THIS OPERATOR'S MANUAL BEFORE USING THE VEHICLE. FAILURE TO ADHERE TO THE INSTRUCTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.**

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When this manual is received, record the rail pilot unit serial numbers in the spaces provided in the General Information and Parts Sections for future reference, in case the serial number tags ever become unreadable. A Manual must remain with the vehicle. Additional or replacement manuals may be obtained by calling or writing Harsco Track Technologies, Harsco Corporation.

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. Harsco Track Technologies, Harsco Corporation reserves the right to make changes at any time without notice.

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Safety Information



SAFETY IS A CRITICAL FACTOR IN THE DESIGN OF HARSCO TRACK TECHNOLOGIES EQUIPMENT. THE BEST SAFETY PROGRAM STARTS WITH A SAFETY CONSCIOUS OPERATOR. THE SAFETY INFORMATION HIGHLIGHTED IN THIS BULLETIN DESCRIBES SAFE OPERATING PRACTICES FOR THE BENEFIT OF THE WORKERS WHO WILL USE OUR EQUIPMENT IN THEIR DAILY JOBS.

HAZARD SERIOUSNESS

Signal Words: **DANGER**, **WARNING** and **CAUTION** are used to identify levels of hazard seriousness.



DANGER - Immediate hazards which WILL result in sever bodily injury or death.



WARNING - Hazards or unsafe practices which COULD result in severe bodily injury or death.



CAUTION - Hazards or unsafe practices which COULD result in minor bodily injury and / or product or property damage.

Safety Information

1



- **APPLY THE VEHICLE PARKING BRAKE AND STOP THE ENGINE WHEN PERFORMING MAINTENANCE, MAKING ADJUSTMENTS, WORKING UNDER VEHICLE OR GUIDE WHEEL EQUIPMENT OR WHENEVER UNINTENDED MOVEMENT OF THE VEHICLE COULD OCCUR, UNLESS OTHERWISE INSTRUCTED IN THIS MANUAL.**
- **MAKE SURE ALL PERSONS ARE CLEAR OF VEHICLE BEFORE PERFORMING ANY OPERATING FUNCTIONS.**
- **KEEP ALL PARTS OF THE BODY AND LOOSE CLOTHING CLEAR OF ALL MOVING PARTS OF THE VEHICLE OR GUIDE WHEEL EQUIPMENT.**
- **UNDERSTAND EQUIPMENT OPERATION AND BE AWARE OF ALL PINCH POINTS BEFORE OPERATING OR MAKING ADJUSTMENTS TO GUIDE WHEEL EQUIPMENT.**
- **IF A DERAILMENT SHOULD OCCUR WHILE VEHICLE IS OPERATING IN ELECTRIFIED 3RD-RAIL TERRITORY, VEHICLE OR GUIDE WHEEL EQUIPMENT MIGHT BE IN ELECTRICAL CONTACT WITH ELECTRIFIED RAIL. DO NOT ATTEMPT TO EXIT FROM VEHICLE UNTIL ELECTRICAL POWER TO 3RD-RAIL HAS BEEN TURNED OFF.**
- **DO NOT EXCEED 25 MPH (40 km/h) WHEN OPERATING VEHICLE ON TRACK. RAILROAD RULES GOVERNING SPEEDS SHOULD BE OBSERVED AT ALL TIMES. REDUCE SPEED WHEN PROPELLING VEHICLE THROUGH SWITCHES, CROSSINGS, BRANCH LINES AND ANY SPECIAL TRACK WORKS. OPERATING VEHICLE AT UNSAFE SPEEDS COULD RESULT IN DERAILMENT OF VEHICLE.**
- **CHECK AND CORRECT GUIDE WHEEL EQUIPMENT ALIGNMENT PROMPTLY IF MISALIGNMENT IS INDICATED.**

Safety Information

1



- **AT MAXIMUM LOADED GROSS VEHICLE WEIGHT ON TRACK (including driver, passengers, equipment, tools, payload, etc.) DO NOT EXCEED ANY OF THE FOLLOWING:**
 - **VEHICLE'S G.V.W.R. (Gross Vehicle Weight Rating).**
 - **VEHICLE'S FRONT G.A.W.R. (Gross Axle Weight Rating) OR THE FRONT GUIDE WHEEL UNIT RATED LOAD CAPACITY, WHICHEVER IS LOWER.**
 - **VEHICLE'S REAR G.A.W.R. (Gross Axle Weight Rating) OR THE SUM OF THE REAR GUIDE WHEEL UNIT RATED LOAD CAPACITY PLUS (+) VEHICLE'S REAR TIRE/WHEEL RATED LOAD CAPACITY, WHICHEVER IS LOWER.**
 - **COMPONENTS RATED LOAD CAPACITY:**
 - A. **TIRE MANUFACTURER'S RATED LOAD CAPACITY**
 - B. **VEHICLE'S WHEEL RATED LOAD CAPACITY**
 - C. **FRONT GUIDE WHEEL UNIT RATED LOAD CAPACITY:**
13,000 lbs (5,897 kg)
6,500 lbs (2,948 kg) maximum per guide wheel
 - D. **REAR GUIDE WHEEL UNIT RATED LOAD CAPACITY:**
13,000 lbs (5,897 kg)
6,500 lbs (2,948 kg) maximum per guide wheel

FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.



- **OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.**
- **KNOW THE POSITIONS AND FUNCTIONS OF ALL CONTROLS BEFORE ATTEMPTING TO OPERATE VEHICLE.**
- **THIS GUIDE WHEEL EQUIPMENT IS DESIGNED WITH YOUR SAFETY IN MIND. NEVER DISCONNECT AND/OR ATTEMPT TO OVERRIDE SAFETY FEATURES.**

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Note: To help ensure safe operation of this equipment, keep all safety decals clean and legible. Replace safety decals when necessary with new decals, listed in the Parts Section of this manual.

Identification View

FIGURE 1-1
HR3000 SERIES A HY-RAIL®
GUIDE WHEEL EQUIPMENT



Description

1

The FAIRMONT™ HR3000 Series A HY-RAIL® guide wheel equipment can be applied to various cab chassis trucks with single or tandem rear axles and dual wheels. The vehicle's G.V.W.R. (gross vehicle weight rating) and/or G.A.W.R. (gross axle weight rating) must comply with the specified limits listed in the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual. Vehicles should be equipped with bias ply tires. Radial tires are not recommended. For information regarding special applications not listed in the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual, contact Harsco Track Technologies, Harsco Corporation, Fairmont, Minnesota.

The guide wheel units are raised and lowered hydraulically. Hydraulic power may be supplied from the vehicle system or from an optional power pack. The guide wheel units are mounted onto the vehicle frame. When the guide wheels are in the "highway" position, the weight of the guide wheel unit is carried on the vehicle frame, above the springs. Load bearing guide wheels assemblies guide the vehicle during on track operation. The front guide wheel unit utilizes a support carriage, which when placed in the "rail" position, extends under the vehicle's front axle and lifts the front of the vehicle, raising the front tires above the rails. The carriage utilizes the vehicle's suspension to support the vehicle front load when on track. The rear guide wheel unit uses a combination of the guide wheel unit spring suspension and the vehicle suspension to support the vehicle rear load when on track. A steering lock is used during on track operation. The steering lock holds the vehicle's steering wheel in place to ensure alignment of the vehicle's front wheels with the rail.

The vehicle's rear inner dual wheels are used for propulsion on the track. On track braking is provided by the vehicle's rear brakes and the front guide wheel unit's air-actuated tread-type brakes. The rear guide wheel unit may also be equipped with optional air-actuated tread-type brakes. Since the guide wheel unit brakes are air actuated, the vehicle on which the guide wheel equipment is mounted should be equipped with air brakes. If not, an electric / air system is available to provide air for the guide wheel unit brakes.

Vehicle Orientation

Front - rear and left - right are determined from the vehicle operator's seat.

Serial Numbers

1

When this bulletin is received, complete the following record from the serial number tags on the guide wheel units. Always provide these factory serial numbers when calling or writing about the units. The serial number tags are located on the frame assembly of the units.

FIGURE 1-2
FRONT GUIDE WHEEL UNIT SERIAL NUMBER TAG

A rectangular form with rounded corners containing the following text and fields:

- HTT Harsco Track Technologies** logo on the left.
- a harsco company** logo below the main logo.
- Fairmont**™ HY-RAIL® GUIDE WHEEL EQUIPMENT text.
- Labels: SERIAL NUMBER, SYMBOL, MODEL NUMBER.
- Three empty rectangular boxes for entering the serial number, symbol, and model number.
- PATENT NUMBER label above a single empty rectangular box.
- Text: WHEN ORDERING PARTS FOR THIS ACCESSORY ALWAYS GIVE THE FOLLOWING INFORMATION.
- Address: FAIRMONT, MN. 56031 U.S.A.
- Code: 52400K in the bottom right corner.

FIGURE 1-3
REAR GUIDE WHEEL UNIT SERIAL NUMBER TAG

A rectangular form with rounded corners, identical in layout to Figure 1-2, containing the following text and fields:

- HTT Harsco Track Technologies** logo on the left.
- a harsco company** logo below the main logo.
- Fairmont**™ HY-RAIL® GUIDE WHEEL EQUIPMENT text.
- Labels: SERIAL NUMBER, SYMBOL, MODEL NUMBER.
- Three empty rectangular boxes for entering the serial number, symbol, and model number.
- PATENT NUMBER label above a single empty rectangular box.
- Text: WHEN ORDERING PARTS FOR THIS ACCESSORY ALWAYS GIVE THE FOLLOWING INFORMATION.
- Address: FAIRMONT, MN. 56031 U.S.A.
- Code: 52400K in the bottom right corner.

Specifications

1

VEHICLE

See the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual for vehicle specifications. For information regarding special applications not listed in the Harsco Track Technologies Vehicle Specifications Manual, contact Harsco Track Technologies, Harsco Corporation, Fairmont, Minnesota.

GUIDE WHEEL UNITS

Track Gauge	56-1/2 in	(1435 mm)
Guide Wheels - Flange Diameter	14-3/4 in	(375 mm)
- Tread Diameter	12-1/2 in	(318 mm)
Weight - Front Unit	875 lbs	(397 kg)
- Rear Unit	915 lbs	(415 kg)
Maximum Load Capacity - Front Unit *	13,000 lbs	(5,897 kg)
Maximum Load Per Guide Wheel	6,500 lbs	(2,948 kg)
(with vehicle at curb weight)		
Maximum Load Capacity - Rear Unit **	13,000 lbs	(5,897 kg)
Maximum Load Per Guide Wheel	6,500 lbs	(2,948 kg)
(with vehicle at curb weight)		

*Note: * Do not exceed the front GAWR of the vehicle.*

*Note: ** The vehicle's rear inner dual wheels carry the remaining load capacity. Do not exceed the tire manufacturer's and / or the wheel manufacturer's load rating capacity for the rear inner dual wheels when on track.*

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Speedometer



- **WHEN WHEEL/TIRE MODIFICATIONS ARE APPLIED, CHECK AND CHANGE SPEEDOMETER DRIVE RATIO IF NECESSARY. THE SPEEDOMETER DRIVE RATIO WILL INFLUENCE THE OPERATION OF THE VEHICLE'S ANTI-LOCK BRAKE SYSTEMS, ELECTRONICALLY CONTROLLED TRANSMISSION SHIFT TIMING AND SPEEDOMETER DISPLAY OF THE TRUE VEHICLE SPEED. FAILURE TO MAINTAIN CORRECT SPEEDOMETER DRIVE RATIO COULD RESULT IN SEVERE BODILY INJURY.**

2

Some vehicles require special larger diameter wheels and/or wheel spacers to properly space the vehicle tires for on track operation. Use of these wheel modifications may effect the speedometer drive ratio calibration. The speedometer drive ratio will influence the operation of the vehicle's anti-lock brake systems, electronically controlled transmission shift timing and speedometer display of the true vehicle speed. The vehicle speedometer must be re-calibrated when wheel modifications are applied to the vehicle. See the vehicle manufacturer or dealer for speedometer calibration information.

Preparing for Operation

VEHICLE

Be sure the vehicle is in operating condition by checking the following:

- a. Engine oil level.
- b. Radiator fluid level.
- c. Fuel tank level.
- d. Hydraulic reservoir oil level.
- e. Brakes work properly.
- f. Parking brake works properly.
- g. Head, brake and signal lights work properly.
- h. Tires properly inflated to the manufacturer's recommended maximum pressure printed on the sidewall of the tires, or the wheel manufacturer's recommended maximum pressure stamped on the wheel, whichever is lower.
- i. Vehicle wheels: Lug nuts / bolts tightened to the proper torque, inspect vehicle wheels, lug bolts and lug nuts for wear or damage. For vehicle wheel, lug bolt and lug nut inspection information refer to the USER'S GUIDE TO WHEELS AND RIMS produced by THE MAINTENANCE COUNCIL. To obtain this guide, contact:

THE MAINTENANCE COUNCIL
AMERICAN TRUCKING ASSOCIATION
2200 MILL ROAD
ALEXANDRIA, VA. 22314
Phone: (703) 838-1763

- j. Any other normal maintenance requirements.

Preparing for Operation

GUIDE WHEEL EQUIPMENT

Be sure the guide wheel equipment is in operating condition by checking the following:

2

- a. Air and hydraulic hoses and fittings for damage, wear or leaks.
- b. Overall for damaged or worn parts.
- c. Properly lubricated at the recommended operating mileage intervals.
- d. Brakes work properly.
- e. Hydraulic pressure properly adjusted.

Misalignment Indicators



■ **BEFORE OPERATING A VEHICLE WITH NEWLY INSTALLED GUIDE WHEEL EQUIPMENT ON TRACK, VERIFY THAT THE GUIDE WHEEL EQUIPMENT ALIGNMENT PROCEDURE HAS BEEN COMPLETED. CHECK AND CORRECT ALIGNMENT PROMPTLY IF MISALIGNMENT IS INDICATED. MISALIGNMENT OF GUIDE WHEEL EQUIPMENT COULD RESULT IN DERAILMENT OF VEHICLE AND SEVERE BODILY INJURY.**

The following conditions may indicate that minor adjustments to the guide wheel equipment alignment are necessary. If any of these conditions occur during operation, perform the Track Test, see Adjustment Section - Vehicle Track Test and/or complete the Alignment Procedure, see Adjustment Section - Guide Wheel Equipment Alignment Procedure.

1. Excessive flange or tread wear on any of the rail guide wheels.
2. Vehicle pulls noticeably to the left or the right during on track operation.
3. Vibration felt throughout the vehicle at various speeds during on track operation.

Placing Vehicle On Track



- PLACE VEHICLE AUTOMATIC TRANSMISSION IN "PARK" OR MANUAL TRANSMISSION IN "NEUTRAL". APPLY THE PARKING BRAKE.
- UNDERSTAND EQUIPMENT OPERATION AND BE AWARE OF ALL PINCH POINTS BEFORE OPERATING OR MAKING ADJUSTMENTS TO GUIDE WHEEL EQUIPMENT.
- BEFORE PROPELLING VEHICLE ON THE TRACK, MAKE SURE:
 - FRONT AND REAR GUIDE WHEELS ARE LOWERED AND LOCKED IN RAIL POSITION, AND SECURED WITH LOCK PIN.
 - ALL RAIL GUIDE WHEEL FLANGES ARE ENGAGED ON THE INSIDE OF THE RAIL.
 - THE VEHICLE FRONT TIRES ARE RAISED A MINIMUM OF 1-1/2" (38 mm) ABOVE THE RAIL.
 - STEERING WHEEL LOCK IS ENGAGED.
 - OPTIONAL BRAKES: BRAKE CONTROL VALVE IS IN THE "ON" POSITION AND GUIDE WHEEL BRAKE EQUIPMENT IS FUNCTIONAL.

FAILURE TO HEED THESE WARNINGS COULD RESULT IN DERAILMENT OF VEHICLE AND SEVERE BODILY INJURY.



- WHEN USING VEHICLE MECHANICAL PTO HYDRAULIC PUMP TO LOWER GUIDE WHEEL EQUIPMENT, DO NOT EXCEED HYDRAULIC SYSTEM FLOW OF 8 GPM. EXCESSIVE FLOW COULD DAMAGE HYDRAULIC SYSTEM COMPONENTS.
- OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.
- IF THE VEHICLE IS EQUIPPED WITH A STROBE LIGHT (BEACON) AND RAILROAD RULES AND REGULATIONS REQUIRE ITS USE, THE STROBE LIGHT (BEACON) MUST BE ILLUMINATED WHEN PLACING THE VEHICLE ON TRACK AND WHEN OPERATING THE VEHICLE ON TRACK.

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Placing Vehicle On Track

1. Ensure that highway vehicles are not approaching the grade crossing while placing the vehicle on track. To ensure safety, flag the crossing per railroad rules and regulations.
2. At a road crossing, drive the vehicle about 25 feet (7.6 m) past the track. Back the vehicle onto the rails so that the rear vehicle wheels are centered on the rails. On vehicles with dual rear wheels, the inner dual wheels must be centered on the rails. It may be necessary to move the vehicle back and forth several times to get the wheels centered on the rail properly.
3. Place the vehicle automatic transmission in "PARK" or manual transmission in "NEUTRAL". Apply the parking brake.
4. Engage the mechanical PTO hydraulic pump or start the auxiliary hydraulic power source. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to direct hydraulic oil flow to the guide wheel equipment.

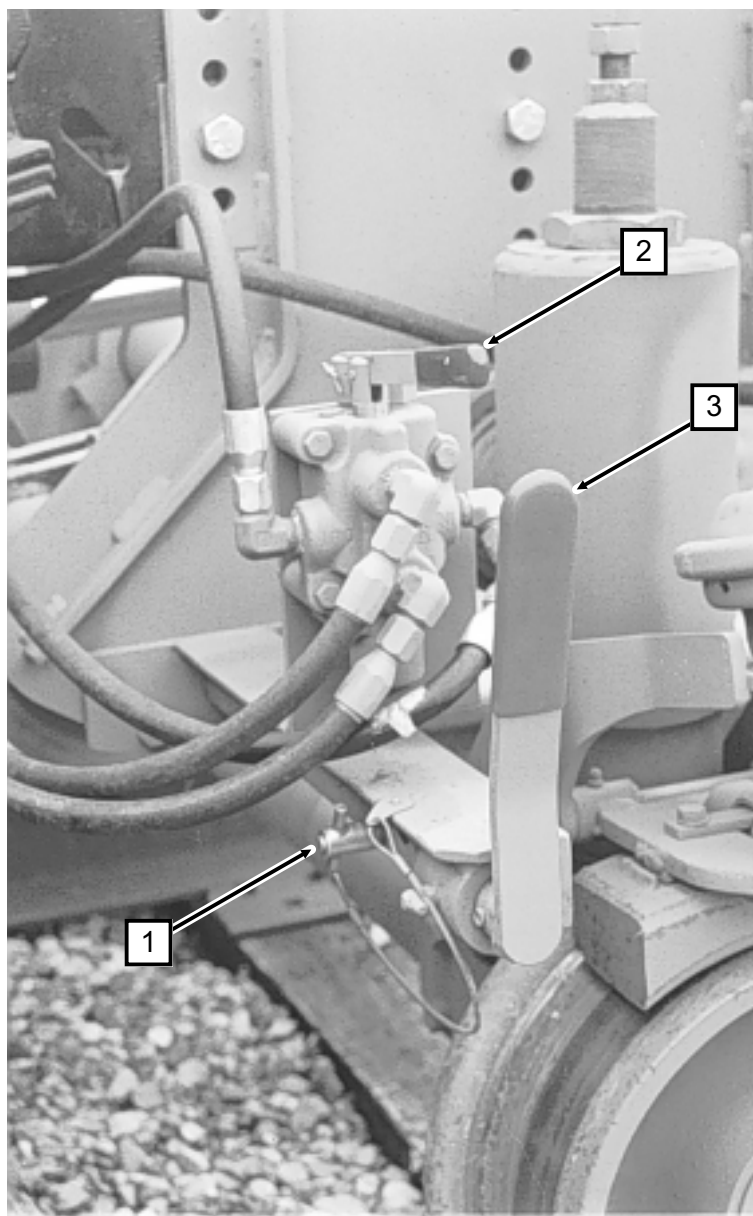
LOWERING REAR GUIDE WHEELS - See Figure 2-1

1. Lower and lock the rear guide wheels first. The rear guide wheels should be lowered first so the front tires of the vehicle can be maneuvered to align the front guide wheels with the rails.
2. Remove lock pin (1). Button in "T" end of lock pin must be pushed in to remove pin.
3. Move the control valve handle (2) slightly to raise the guide wheels. This will release any pressure on the mechanical lock mechanism.
4. Rotate and hold lock handle (3) counter-clockwise to release the lock mechanism.
5. While holding lock handle (3) in the released position, move the control valve handle (2) to lower the guide wheels. As the guide wheels lower, release the lock handle. Continue to lower the guide wheels until they are fully lowered.
6. When the guide wheels are fully lowered, release the control valve handle. Make sure the flanges on both guide wheels are engaged on the inside of the rails.
7. Rotate lock handle (3) back to the locked position. Install lock pin (1). Button in "T" end of lock pin must be pushed in to install pin.
8. On guide wheel units equipped with rail sweeps, lower the rail sweeps to the "rail" position.

Placing Vehicle On Track

LOWERING REAR GUIDE WHEELS - Continued

FIGURE 2-1
REAR GUIDE WHEEL UNIT



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Placing Vehicle On Track

LOWERING FRONT GUIDE WHEELS - See Figure 2-2

2

1. If the vehicle is placed on track where the rails are higher than the adjacent area, it will be necessary to use blocks under the vehicle front wheels that are as high as the rail height. This will allow the undercarriage to engage under the front axle properly.

If the vehicle is placed on track where the top of the rails are level with the surrounding area, such as a road crossing, it will not be necessary to place blocks under the vehicle front wheels.

2. Remove lock pin (1). Move control valve handle (2) to slightly raise the guide wheels. This will release any pressure on the mechanical lock mechanism.
3. Push lock handle (3) towards the vehicle to release the locking mechanism. While holding lock handle (3) in the released position, move control valve handle (2) to lower the guide wheels.
4. As the guide wheels lower, release lock handle (3). The undercarriage will lower and engage under the vehicle front axle, lifting the vehicle front wheels above the top of the rails. Continue to lower the guide wheels until they are fully lowered. Be sure the flanges on both guide wheels are engaged on the inside of the rails. Release the control valve handle (2).
5. Pull lock handle (3) forward to the locked position. Install lock pin (3).
6. Disengage the mechanical PTO hydraulic pump or stop the auxiliary hydraulic power source. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to shut off hydraulic oil flow to the guide wheel equipment.
7. See Figures 2-3 and 2-4. Set the vehicle front wheels straight ahead and secure the steering wheel in that position by engaging the steering lock on the steering column. Steering locks may vary from vehicle to vehicle but will operate similarly.

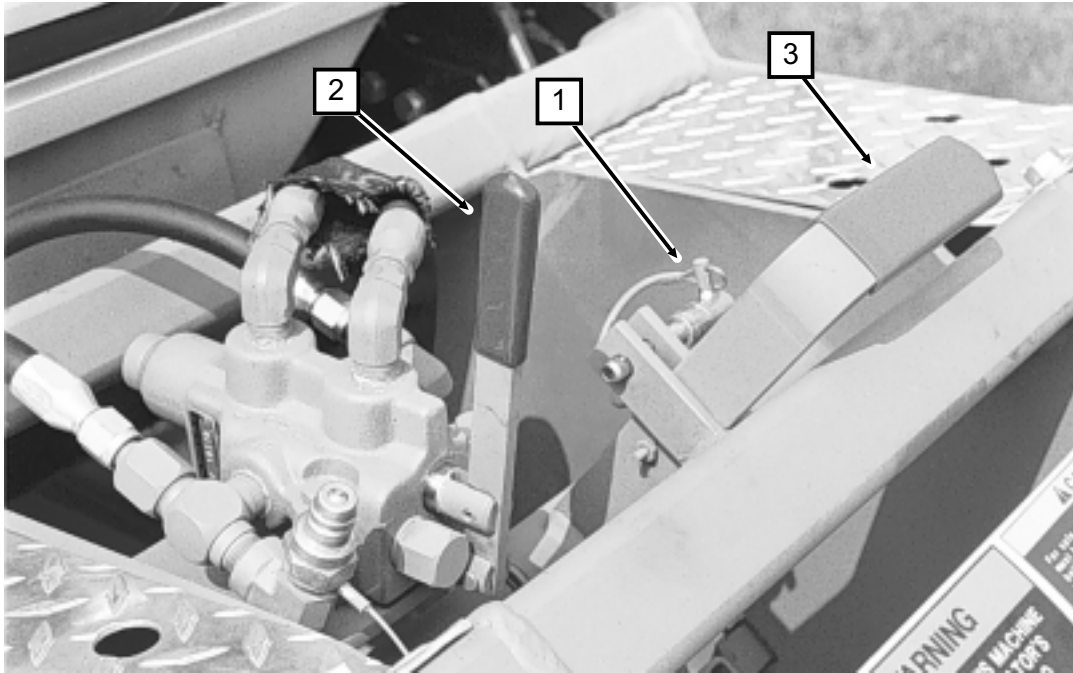
Note: Do not place your hands or any pressure on the steering wheel after the steering lock is engaged.

8. Move the Rail Wheel Brake control valve to the ON position to activate the guide wheel equipment brakes whenever the vehicle is on track. The vehicle brake pedal will actuate the vehicle brakes and the guide wheel equipment brakes simultaneously.

Placing Vehicle On Track

LOWERING FRONT GUIDE WHEELS - Continued

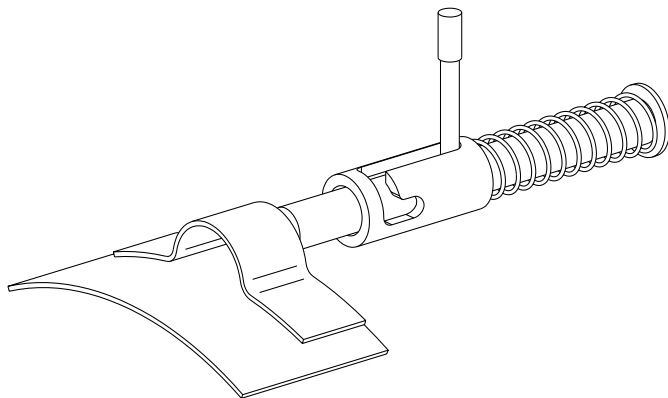
FIGURE 2-2
FRONT GUIDE WHEEL UNIT



2

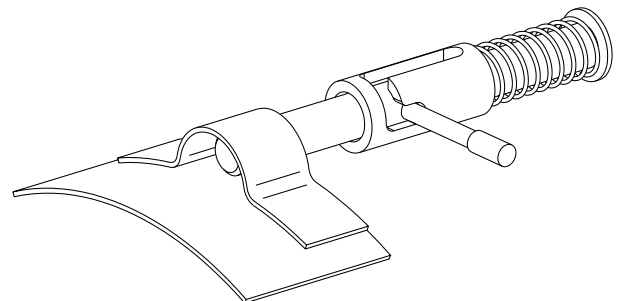
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FIGURE 2-3
STEERING LOCK DISENGAGED



SE99A191A-1

FIGURE 2-4
STEERING LOCK ENGAGED



SE99A192A-1

Guide Wheel Load On Track



- **IMPROPER LOADING OF GUIDE WHEEL EQUIPMENT CAN CAUSE DERAILMENT OF VEHICLE.**
- **ALWAYS CHECK THE GUIDE WHEEL LOAD BEFORE OPERATING THE VEHICLE ON TRACK. NEVER OPERATE THE VEHICLE ON TRACK IF LOAD EXCEEDS THE MAXIMUM RATED LOAD OF THE FRONT AND/OR REAR GUIDE WHEEL UNITS.**
 - **THE MAXIMUM RATED LOAD ON THE FRONT GUIDE WHEEL UNIT IS 13,000 LBS (5,897 kg) OR 6,500 LBS (2,948 kg) MAXIMUM PER GUIDE WHEEL.**
 - **THE MAXIMUM RATED LOAD ON THE REAR GUIDE WHEEL UNIT IS 13,000 LBS (5,897 kg) OR 6,500 LBS (2,948 kg) MAXIMUM PER GUIDE WHEEL.**
- **NEVER OPERATE THE VEHICLE ON TRACK IF CLEARANCE BETWEEN VEHICLE FRONT TIRES AND RAIL IS LESS THAN 1-1/2" (38 mm).**
- **THE REAR GUIDE WHEEL UNIT MUST BE SET TO CARRY APPROXIMATELY 40% OF THE VEHICLE REAR AXLE CURB WEIGHT OR A MINIMUM OF 2,100 LBS (,953 kg).**
- **MISUSE OF THE WHEEL LOAD JACK MAY CAUSE THE GAUGE TO EXPLODE. READ ANSI B40.1 AND APPARATUS INSTALLATION/ OPERATION INSTRUCTIONS BEFORE USE.**

FAILURE TO HEED THESE WARNINGS COULD RESULT IN DERAILMENT OF VEHICLE AND/OR SEVERE BODILY INJURY.



- **APPLY VEHICLE PARKING BRAKE AND STOP VEHICLE ENGINE BEFORE USING WHEEL LOAD JACK.**
- **DO NOT USE THE WHEEL LOAD JACK TO LIFT VEHICLE. EXCESSIVE WEIGHT MAY CAUSE JACK TO FAIL.**
- **REPLACE WHEEL LOAD JACK GAUGE IF LOAD LIMIT DECAL IS MISSING OR UNREADABLE.**

FAILURE TO HEED THESE CAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Whenever the vehicle is loaded or additional load is added to the existing vehicle load on track, check the load on the front guide wheels using the 159510 wheel load jack, and the load on the rear guide wheels by checking the spring cells.

The 159510 wheel load jack is designed to be used to check the guide wheel load on the HR4500 Series A, HR4000 Series A and the HR3000 Series A front guide wheel units. When checking the guide wheel load on the HR3000 Series A, always use the scale on the gauge marked "HR3000".

Guide Wheel Load On Track

CHECKING FRONT GUIDE WHEEL LOAD - See Figures 2-5 and 2-6

1. Position the vehicle on track so the front guide wheel unit axle is located directly over a tie.
2. Apply the parking brake. Stop the engine.
3. Place the wheel load jack under the axle near the front guide wheel.
4. Jack the front guide wheel up until the tread on the guide wheel clears the top of the rail. The gauge reading indicates the load on the guide wheel. The front guide wheel load must not exceed the load limit printed on the wheel load jack gauge. The wheel load jack will not hold the gauge reading for an extended period of time. The gauge readings must be taken as the jack is slowly operated.

Note: An easy way to tell when the guide wheel just clears the top of the rail is to jack the guide wheel up approximately 1/4" (6.4 mm) above the top of the rail. Place a piece of paper between the rail and the guide wheel. Lower the guide wheel onto the paper. Slowly jack the guide wheel up while applying a steady pulling force on the paper until it can be pulled out. Note the gauge reading when the paper can be pulled out.

5. The maximum rated load capacity on the front guide wheel unit is 13,000 lbs (5,897 kg) or 6,500 lbs (2,948 kg) maximum per guide wheel.

If the load on the front guide wheel unit does not exceed the maximum rated load, total or per guide wheel, the load on the front guide wheel unit is acceptable.

If the load on the front guide wheel unit does exceed the maximum load capacity, the load must be redistributed or some of the load removed. Never operate the vehicle on track if the load on the front guide wheel exceeds the maximum load capacity of 13,000 lbs (5,897 kg) or 6,500 lbs (2,948 kg) maximum per guide wheel.

6. Repeat Steps 3 - 5 to check the load on the opposite front guide wheel.
7. When finished checking the front guide wheel load, remove the wheel load jack and store it in the vehicle cab.
8. If the load limit decal is missing or unreadable on the wheel load jack gauge, replace the gauge as an assembly with the decal already installed (order Harsco Track Technologies part no. 159512).

Guide Wheel Load On Track

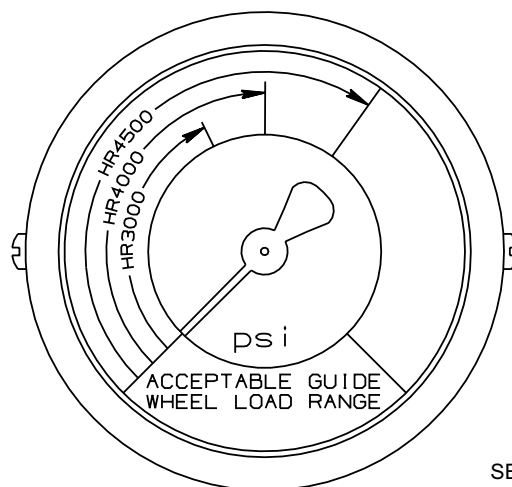
CHECKING FRONT GUIDE WHEEL LOAD

FIGURE 2-5
WHEEL LOAD JACK PLACEMENT UNDER
FRONT GUIDE WHEEL UNIT AXLE



92-267

FIGURE 2-6
WHEEL LOAD JACK GAUGE FACE



SE159512A-1

Guide Wheel Load On Track

CHECKING REAR GUIDE WHEEL LOAD - See Figure 2-7 and Chart 2-8

1. Apply the parking brake. Stop the vehicle's engine.
2. The protrusion of rod (1) on the spring cell is used to determine the load on the rear guide wheels. Measure dimension L on both spring cells. See Chart 2-8 to convert dimension L to the spring cell load.
3. The minimum rated load on the rear guide wheel unit is 40% of the vehicle's rear axle curb weight, or at least 2,100 lbs (953 kg) total or 1,050 lbs (476 kg) per guide wheel.

If the load on the rear guide wheel unit does not meet the minimum rated load, total or per guide wheel, the rear guide wheel unit must be adjusted. See Adjustment Section - Guide Wheel Alignment Procedure. Never operate the vehicle on track if the load on the rear guide wheel unit does not meet the minimum rated load of 2,100 lbs (953 kg) total or 1,050 lbs (476 kg) per guide wheel.

4. The maximum rated load capacity on the rear guide wheel unit is 13,000 lbs (5,897 kg) or 6,500 lbs (2,948 kg) maximum per guide wheel.

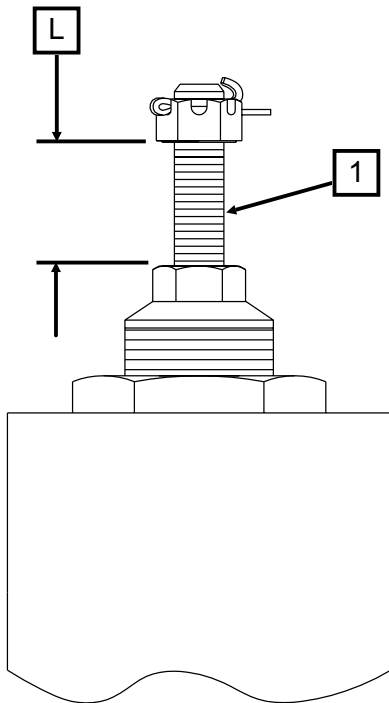
If the load on the rear guide wheel unit does not exceed the maximum rated load, total or per guide wheel, the load on the rear guide wheel unit is acceptable.

If the load on the rear guide wheel unit does exceed the maximum rated load, total or per guide wheel, the vehicle load must be redistributed or some of the load removed. Never operate the vehicle on track if the load on the rear guide wheel unit exceeds the maximum rated load capacity of 13,000 lbs (5,897 kg) or 6,500 lbs (2,948 kg) maximum per guide wheel.

Guide Wheel Load On Track

CHECKING REAR GUIDE WHEEL LOAD

FIGURE 2-7
REAR SPRING CELL



SE90A150A-1

CHART 2-8
REAR GUIDE WHEEL LOAD

DIMENSION L		APPROXIMATE LOAD PER SIDE	
1/2"	(12.7 mm)	1,050 lbs	(476 kg)
3/4"	(19.1 mm)	1,575 lbs	(714 kg)
1"	(25.4 mm)	2,100 lbs	(953 kg)
1-1/4"	(31.8 mm)	2,625 lbs	(1,191 kg)
1-1/2"	(38.1 mm)	3,150 lbs	(1,429 kg)
1-3/4"	(44.5 mm)	3,675 lbs	(1,667 kg)
2"	(50.8 mm)	4,200 lbs	(1,905 kg)
2-1/4"	(57.2 mm)	4,725 lbs	(2,143 kg)
2-1/2"	(63.5 mm)	5,250 lbs	(2,381 kg)
2-3/4"	(69.9 mm)	5,775 lbs	(2,619 kg)
3"	(76.2 mm)	6,300 lbs	(2,858 kg)
* 3-1/4"	(82.6 mm)	6,825 lbs	(3,096 kg)

*** REAR GUIDE WHEEL IS OVERLOADED. REDISTRIBUTE OR REMOVE SOME OF THE LOAD. MAXIMUM LOAD ON REAR GUIDE WHEEL UNIT MUST NOT EXCEED 13,000 LBS (5,897 kg) TOTAL OR 6,500 LBS (2,948 kg) MAXIMUM PER GUIDE WHEEL.**

CHECK VEHICLE FRONT TIRE CLEARANCE ABOVE RAIL

If the vehicle's front tire clearance above the rail is less than 1-1/2" (38 mm) see the Adjustment Section - Vehicle Front Tire Clearance. Never operate the vehicle on track when the front tire clearance above the rail is less than 1-1/2" (38 mm).

Propelling On Track



2

- **IMPROPER LOADING OF HY-RAIL® EQUIPPED VEHICLE CAN CAUSE DERAILMENT OF VEHICLE.**
- **ALWAYS CHECK GUIDE WHEEL LOAD BEFORE OPERATING THE VEHICLE ON TRACK.**
- **NEVER OPERATE VEHICLE ON TRACK IF LOAD EXCEEDS MAXIMUM RATED LOAD ON THE FRONT AND/OR REAR GUIDE WHEEL UNITS.**
- **NEVER OPERATE VEHICLE ON TRACK IF CLEARANCE BETWEEN VEHICLE FRONT TIRE AND RAIL IS LESS THAN 1-1/2" (38 mm).**

FAILURE TO HEED THESE WARNINGS COULD RESULT IN DERAILMENT OF VEHICLE AND/OR SEVERE BODILY INJURY.



- **BEFORE OR WHEN PROPELLING ON TRACK:**
 - **OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.**
 - **OPERATOR MUST LOOK IN ALL DIRECTIONS FOR PERSONS OR OBJECTS ON OR ADJACENT TO THE TRACK.**
 - **DO NOT ACCELERATE SUDDENLY. TRACTION IS REDUCED ON TRACK. SPINNING VEHICLE TIRES COULD DAMAGE THEM.**
 - **DO NOT EXCEED 25 MPH (40 km/h) WHEN OPERATING VEHICLE ON TRACK. RAILROAD RULES GOVERNING SPEEDS SHOULD BE OBSERVED AT ALL TIMES. REDUCE SPEED WHEN PROPELLING VEHICLE THROUGH SWITCHES, ROAD CROSSINGS, BRANCH LINES AND ANY SPECIAL TRACK WORKS. OPERATING VEHICLE AT UNSAFE SPEEDS COULD RESULT IN DERAILMENT OF THE VEHICLE.**
 - **STEERING LOCK MUST BE ENGAGED AT ALL TIMES WHEN OPERATING VEHICLE ON TRACK.**
 - **IF THE VEHICLE IS EQUIPPED WITH A STROBE LIGHT (BEACON) AND RAILROAD RULES AND REGULATIONS REQUIRE ITS USE, THE STROBE LIGHT (BEACON) MUST BE ILLUMINATED WHEN OPERATING THE VEHICLE ON TRACK.**

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Vehicles equipped with the HR3000 Series A HY-RAIL® Guide Wheel Equipment use the vehicle propulsion system to propel on track. Do not accelerate suddenly. Traction is reduced on rail. Spinning the vehicle tires could damage them.

Braking On Track



- PERSONS WHO OPERATE THE VEHICLE MUST BE FAMILIAR WITH TRACK AND WEATHER CONDITIONS THAT MAY AFFECT STOPPING DISTANCE. BE ALERT TO THESE CONDITIONS AND ALLOW ADEQUATE STOPPING DISTANCE.
- BE PREPARED TO BRAKE AT ALL HIGHWAY CROSSINGS. THIS VEHICLE MAY NOT OPERATE TRACK SIGNAL CIRCUITS, AND ONCOMING VEHICLES OR PEDESTRIANS MAY NOT YIELD THE RIGHT OF WAY.
- RAIL WHEEL BRAKE CONTROL VALVE MUST BE IN THE "ON" POSITION WHENEVER VEHICLE IS ON TRACK.

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

The HR3000 Series A HY-RAIL® Guide Wheel Equipment may be equipped with brakes. If the guide wheel units are equipped with brakes, the vehicle uses a combination of the front and/or rear guide wheel unit brakes and the vehicle's rear axle brake system for braking on track. The front and/or rear guide wheel unit brakes will apply simultaneously when the vehicle brakes are applied. Stopping distance is greater on track than on typical road surfaces. Apply the brakes gradually to avoid sliding the vehicle tires and rail guide wheels.

Vehicles Equipped With Crane Or Aerial Lift Device



- WHEN OPERATING CRANE, AERIAL LIFT DEVICE, ETC., WHILE THE VEHICLE'S GUIDE WHEELS ARE ON THE RAILS, DO NOT OVERLOAD THE GUIDE WHEEL EQUIPMENT OR EXCEED THE CAPACITY OF ANY OF THE EQUIPMENT BEING USED.
- THE UNIT SHOULD BE EQUIPPED WITH OUTRIGGERS TO HELP PREVENT ACCIDENTS AND THE POSSIBILITY OF DAMAGE TO THE GUIDE WHEEL EQUIPMENT. WHEN USING THE EQUIPMENT TO TRANSFER ANY LOAD, SET THE OUTRIGGERS ON A STABLE BASE TO PREVENT SETTLING OF THE OUTRIGGERS AND SHIFTING OF THE VEHICLE.
- IF OPERATING CONDITIONS REQUIRE LIFTING A LOAD WITH THE CRANE WHILE ON RAIL, BUT WITHOUT THE OUTRIGGERS BEING USED, THE LOAD APPLIED BY LIFTING WITH THE CRANE MUST NOT OVERLOAD ANY COMPONENT OF THE GUIDE WHEEL EQUIPMENT.
- CAREFULLY READ THE CRANE OR AERIAL LIFT DEVICE OPERATOR'S MANUAL FOR THE SAFE USE AND EFFICIENT OPERATION OF THE EQUIPMENT.

FAILURE TO HEED THESE WARNINGS COULD CAUSE DERAILMENT OF THE VEHICLE RESULTING IN SEVERE BODILY INJURY AND/OR DEATH.

Removing Vehicle From Track

2



- PLACE VEHICLE AUTOMATIC TRANSMISSION IN "PARK" OR MANUAL TRANSMISSION IN "NEUTRAL". APPLY THE PARKING BRAKE.

- UNDERSTAND EQUIPMENT OPERATION AND BE AWARE OF ALL PINCH POINTS BEFORE OPERATING OR MAKING ADJUSTMENTS TO GUIDE WHEEL EQUIPMENT.

- BEFORE PROPELLING VEHICLE OFF TRACK, MAKE SURE:

- FRONT AND REAR GUIDE WHEELS ARE RAISED, LOCKED IN THE HIGHWAY POSITION AND SECURED WITH THE LOCK PINS.
- STEERING WHEEL LOCK IS DISENGAGED.

FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.



- WHEN USING VEHICLE MECHANICAL PTO HYDRAULIC PUMP TO RAISE GUIDE WHEEL EQUIPMENT, DO NOT EXCEED HYDRAULIC SYSTEM FLOW OF 8 GPM. EXCESSIVE FLOW COULD DAMAGE HYDRAULIC SYSTEM COMPONENTS.

- OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.

- IF THE VEHICLE IS EQUIPPED WITH A STROBE LIGHT (BEACON) AND RAILROAD RULES AND REGULATIONS REQUIRE ITS USE, THE STROBE LIGHT (BEACON) MUST BE ILLUMINATED WHEN OPERATING AND REMOVING THE VEHICLE FROM TRACK.

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

1. Ensure that highway vehicles are not approaching the grade crossing while removing the vehicle from track. To ensure safety, flag the crossing per railroad rules and regulations.
2. Approach the crossing and stop with the vehicle front wheels on the crossing.
3. Place the vehicle automatic transmission in "PARK" or manual transmission in "NEUTRAL". Apply the parking brake.
4. Move the Rail Wheel Brake control valve to the OFF position, whenever the vehicle is removed from the track for highway use.
5. Engage the mechanical PTO hydraulic pump or start the auxiliary hydraulic power source. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to direct hydraulic oil flow to the guide wheel equipment.

Removing Vehicle From Track

RAISING FRONT GUIDE WHEELS - See Figure 2-2

1. Remove lock pin (1). Move control valve handle (2) to slightly lower the guide wheels. This will release any pressure on the mechanical lock mechanism.
2. Push and hold lock handle (3) towards the vehicle. While holding lock handle (3) in the released position, move control valve handle (2) to raise the guide wheels.
3. When the guide wheels are fully raised, release the control valve handle.
4. Pull lock handle (3) forward to the locked position. Install lock pin (1).

RAISING REAR GUIDE WHEELS - See Figure 2-1

1. Remove lock pin (1). Button in "T" end of lock pin must be pushed in to remove pin.
2. Move control valve handle (2) to slightly lower the guide wheels. This will release any pressure on the mechanical lock mechanism.
3. Rotate and hold lock handle (3) counter-clockwise to release the lock mechanism.
4. While holding lock handle (3) in the released position, move control valve handle (2) to raise the guide wheels.
5. When the guide wheels are fully raised, release the control valve handle.
6. Rotate lock handle (3) to the locked position. Install lock pin (1). Button in "T" end of lock pin must be pushed in to install pin.
7. Disengage the mechanical PTO hydraulic pump or stop the auxiliary hydraulic power source. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to shut off hydraulic oil flow to the guide wheel equipment.
8. See Figures 2-3 and 2-4. Disengage the vehicle steering lock located on the steering column. Steering locks may vary from vehicle to vehicle but will operate similarly.

Highway Operation



2

- THIS MULTIPURPOSE VEHICLE HAS SPECIAL DESIGN AND EQUIPMENT FEATURES FOR OFF-ROAD USE. IT HANDLES DIFFERENTLY FROM AN ORDINARY PASSENGER CAR IN DRIVING CONDITIONS WHICH MAY OCCUR ON STREETS, HIGHWAYS AND OFF-ROAD. WEIGHT AND LOCATION OF AVAILABLE PAYLOAD MAY ALSO AFFECT THE HANDLING OF THIS VEHICLE. DRIVE WITH CARE AND WEAR SAFETY BELTS AT ALL TIMES. READ VEHICLE OWNER'S MANUAL FOR ADDITIONAL PRECAUTIONS.

Towing Trailer / Equipment With Vehicle On Track



- VEHICLE USED FOR TOWING MUST BE RATED BY VEHICLE MANUFACTURER FOR WEIGHT OF TRAILER / EQUIPMENT TO BE TOWED. DO NOT EXCEED VEHICLE MANUFACTURER'S MAXIMUM RATED TOWING CAPACITY.
- TOWING VEHICLE MUST WEIGH AS MUCH OR MORE THAN TRAILER / EQUIPMENT BEING TOWED.
- VEHICLE USED FOR TOWING MUST HAVE AN ADEQUATE BRAKE SYSTEM TO SAFELY DECELERATE AND STOP TOWING VEHICLE AND TRAILER / EQUIPMENT BEING TOWED.
- TOWING TRAILER / EQUIPMENT LENGTHENS STOPPING DISTANCES. ALLOW ADEQUATE DISTANCE FOR STOPPING. ANTICIPATE STOPS SO YOU CAN BRAKE GRADUALLY.
- STOPPING DISTANCE IS GREATER ON TRACK THAN ON TYPICAL ROAD SURFACES. APPLY BRAKES GRADUALLY TO AVOID SLIDING VEHICLE TIRES AND RAIL GUIDE WHEELS.
- TOW TRAILER / EQUIPMENT AT A REASONABLE SPEED (20 MPH MAXIMUM) TAKING INTO ACCOUNT TRACK CONDITIONS, TRACK GRADE, WEATHER, VISIBILITY AND STOPPING DISTANCE TO ASSURE SAFE OPERATION. RAILROAD RULES GOVERNING SPEEDS AND RIGHT OF WAY SHOULD BE OBSERVED AT ALL TIMES.
- TRAILER / EQUIPMENT BEING TOWED MUST BE IN A SAFE, USABLE CONDITION TO BE TOWED.
- MAKE SURE THAT VEHICLE'S:
 - FRONT AND REAR GUIDE WHEELS ARE LOWERED AND LOCKED IN RAIL POSITION.
 - ALL RAIL GUIDE WHEEL FLANGES ARE ENGAGED ON INSIDE OF RAILS.
 - VEHICLE FRONT TIRES MUST BE RAISED A MINIMUM OF 1-1/2" (38 mm) ABOVE RAIL.
 - VEHICLE STEERING WHEEL LOCK ENGAGED WITH FRONT WHEELS STRAIGHT AHEAD.

FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.

Towing Trailer / Equipment With Vehicle On Track



2

- CAREFULLY AND THOROUGHLY PREPARE VEHICLE FOR TOWING, MAKING SURE TO USE THE RIGHT TOWING EQUIPMENT AND TO ATTACH IT PROPERLY.
- TOWING EQUIPMENT (HITCHES, TOW BARS, ETC.) MUST BE ATTACHED TO VEHICLE FRAME. DO NOT MOUNT OR ATTACH TOWING EQUIPMENT TO VEHICLE'S GUIDE WHEEL EQUIPMENT.
- TOWING EQUIPMENT (HITCHES, TOW BARS, ETC.) MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN WEIGHT OF TRAILER / EQUIPMENT BEING TOWED.
- USE A RIGID TYPE TOW BAR WITH SAFETY LOCKING COUPLERS. DO NOT USE CHAIN, WIRE ROPE ETC.
- OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.
- DO NOT ACCELERATE SUDDENLY. TRACTION IS REDUCED ON RAIL, SPINNING VEHICLE TIRES COULD DAMAGE THEM.
- ALWAYS CHOCK TRAILER WHEELS BEFORE UNHOOKING TRAILER FROM TOWING VEHICLE.

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Towing Trailer / Equipment With Vehicle On Track

1. See your vehicle's operators manual for towing information.
2. Use the vehicle manufacturer's recommendations to determine the maximum weight the towing vehicle can tow. Do not exceed vehicle manufacturer's maximum rated towing capacity.
3. The towing vehicle must have an adequate brake system to safely decelerate and stop the towing vehicle and the trailer / equipment being towed. The towing vehicle must weigh as much or more than the trailer / equipment being towed.
4. Make sure that the vehicle's:
 - a. Front and rear guide wheel units are lowered and locked in the rail position.
 - b. All front and rear guide wheel flanges are engaged on the inside of the rails.
 - c. Vehicle front tires must be raised a minimum of 1-1/2" (38 mm) above the rail.
 - d. Vehicle front wheels are set straight ahead and the steering wheel lock is engaged on the steering column.
5. Make sure the towing vehicle and the trailer / equipment are in good working condition (tires, brakes, lights, etc.) and that current maintenance has been performed on the vehicle and trailer / equipment.
6. The towing equipment (hitches, tow bars, etc.) on the towing vehicle must have a rating equal to or greater than the weight of the trailer / equipment being towed.
7. The towing equipment (hitches, tow bars, etc.) must be attached to the towing vehicle frame. Do not mount or attach the towing equipment to the vehicle's guide wheel equipment.
8. Observe and follow all railroad safety rules and regulations.
9. Do not accelerate suddenly. Traction is reduced on rail. Spinning the vehicle tires could damage them.
10. Stopping distance is greater on rail than on typical road surfaces. Apply the vehicle brakes gradually to avoid sliding the vehicle tires and the guide wheel unit rail wheels. Towing trailer / equipment lengthens stopping distances. Allow adequate distance for stopping. Anticipate stops so that you can brake gradually.
11. Tow the trailer / equipment on the track at a reasonable speed (20 MPH maximum) taking into account track conditions, track grade, weather, visibility and stopping distance to assure safe operation. Railroad rules and regulations governing speed limits and right of way should be observed at all times.
12. Always chock the trailer wheels before unhooking the trailer from the towing vehicle.

Towing Trailer / Equipment With Vehicle On Road



2

- VEHICLE USED FOR TOWING MUST BE RATED BY VEHICLE MANUFACTURER FOR WEIGHT OF TRAILER / EQUIPMENT TO BE TOWED. DO NOT EXCEED VEHICLE MANUFACTURER'S MAXIMUM RATED TOWING CAPACITY.
- VEHICLE USED FOR TOWING MUST HAVE AN ADEQUATE BRAKE SYSTEM TO SAFELY DECELERATE AND STOP TOWING VEHICLE AND TRAILER / EQUIPMENT BEING TOWED.
- TOWING TRAILER / EQUIPMENT LENGTHENS STOPPING DISTANCES. ALLOW ADEQUATE DISTANCE FOR STOPPING. ANTICIPATE STOPS SO YOU CAN BRAKE GRADUALLY.
- TOW TRAILER / EQUIPMENT AT A REASONABLE SPEED TAKING INTO ACCOUNT ROAD CONDITIONS, ROAD GRADE, WEATHER, VISIBILITY AND STOPPING DISTANCE TO ASSURE SAFE OPERATION. POSTED SPEED LIMITS SHOULD BE OBSERVED AT ALL TIMES.
- TRAILER / EQUIPMENT BEING TOWED MUST BE IN A SAFE, USABLE CONDITION TO BE TOWED.
- MAKE SURE THAT VEHICLE'S:
 - FRONT AND REAR GUIDE WHEELS ARE RAISED AND LOCKED IN HIGHWAY POSITION.
 - VEHICLE STEERING WHEEL LOCK DISENGAGED.

FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.

Towing Trailer / Equipment With Vehicle On Road



- THIS MULTIPURPOSE VEHICLE HAS SPECIAL DESIGN AND EQUIPMENT FEATURES FOR OFF-ROAD USE. IT HANDLES DIFFERENTLY FROM AN ORDINARY PASSENGER CAR IN DRIVING CONDITIONS WHICH MAY OCCUR ON STREETS, HIGHWAYS AND OFF-ROAD. WEIGHT AND LOCATION OF AVAILABLE PAYLOAD MAY ALSO AFFECT THE HANDLING OF THIS VEHICLE. DRIVE WITH CARE AND WEAR SAFETY BELTS AT ALL TIMES. READ VEHICLE OWNER'S MANUAL FOR ADDITIONAL PRECAUTIONS.
- OBSERVE AND FOLLOW ALL FEDERAL, STATE AND LOCAL DRIVING RULES AND REGULATIONS.
- STATE LAWS MAY REQUIRE TOWING VEHICLE AND TRAILER / EQUIPMENT BEING TOWED TO BE EQUIPPED WITH SPECIAL SAFETY EQUIPMENT (MIRRORS ON BOTH SIDES OF TOWING VEHICLE, TRAILER BRAKES, TRAILER LIGHTS, ETC.).
- CAREFULLY AND THOROUGHLY PREPARE YOUR VEHICLE FOR TOWING, MAKING SURE TO USE THE RIGHT TOWING EQUIPMENT AND TO ATTACH IT PROPERLY.
- TOWING EQUIPMENT (HITCHES, TOW BARS, ETC.) MUST BE ATTACHED TO VEHICLE FRAME. DO NOT MOUNT OR ATTACH TOWING EQUIPMENT TO VEHICLE'S GUIDE WHEEL EQUIPMENT.
- TOWING EQUIPMENT (HITCH, TOW BAR, ETC.) MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN WEIGHT OF TRAILER / EQUIPMENT BEING TOWED.
- ALWAYS CHOCK TRAILER WHEELS BEFORE UNHOOKING TRAILER FROM TOWING VEHICLE.

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Towing Trailer / Equipment With Vehicle On Road

1. See your vehicle's operators manual for towing information.
2. Use the vehicle manufacturer's recommendations to determine the maximum weight the towing vehicle can tow. Do not exceed vehicle manufacturer's maximum rated towing capacity.
3. The towing vehicle must have an adequate brake system to safely decelerate and stop the towing vehicle and the trailer / equipment being towed. Towing trailer / equipment lengthens stopping distances. Allow adequate distance for stopping. Anticipate stops so that you can brake gradually.
4. Make sure that the vehicle's:
 - a. Front and rear guide wheels are raised and locked in the highway position.
 - b. Vehicle steering wheel lock is disengaged on the steering column.
5. Make sure the towing vehicle and the trailer / equipment are in good working condition (tires, brakes, lights, etc.) and that current maintenance has been performed on the vehicle and trailer / equipment.
6. The towing equipment (hitches, tow bars, etc.) on the towing vehicle must have a rating equal to or greater than the weight of the trailer / equipment being towed.
7. The towing equipment (hitches, tow bars, etc.) must be attached to the towing vehicle frame. Do not mount or attach the towing equipment to the vehicle's guide wheel equipment.
8. Observe and follow all federal, state and local driving rules, regulations and laws.
9. State laws may require the towing vehicle and/or the trailer / equipment being towed to be equipped with special safety equipment (mirrors on both sides of the towing vehicle, trailer brakes, trailer lights, etc.).
10. Tow the trailer / equipment on the road at a reasonable speed taking into account road conditions, road grade, weather, visibility and stopping distance to assure safe operation. Always observe posted speed limits.
11. Always chock the trailer wheels before unhooking the trailer from the towing vehicle.

Towing Disabled Vehicle On Track



- TOWING VEHICLE / MACHINE MUST WEIGH AS MUCH OR MORE THAN DISABLED VEHICLE BEING TOWED.
- VEHICLE / MACHINE USED FOR TOWING MUST HAVE AN ADEQUATE BRAKE SYSTEM TO SAFELY DECELERATE AND STOP TOWING VEHICLE / MACHINE AND DISABLED VEHICLE BEING TOWED.
- TOWING DISABLED VEHICLE LENGTHENS STOPPING DISTANCES. ALLOW ADEQUATE DISTANCE FOR STOPPING. ANTICIPATE STOPS SO YOU CAN BRAKE GRADUALLY.
- TOW DISABLED VEHICLE AT A REASONABLE SPEED (10 MPH MAXIMUM) TAKING INTO ACCOUNT TRACK CONDITIONS, TRACK GRADE, WEATHER, VISIBILITY AND STOPPING DISTANCE TO ASSURE SAFE OPERATION. RAILROAD RULES GOVERNING SPEED LIMITS AND RIGHT OF WAY SHOULD BE OBSERVED AT ALL TIMES.
- STOPPING DISTANCE IS GREATER ON TRACK THAN ON TYPICAL ROAD SURFACES. APPLY BRAKES GRADUALLY TO AVOID SLIDING TOWING VEHICLE / MACHINE WHEELS.
- MAKE SURE THAT DISABLED VEHICLE'S:
 - FRONT AND REAR GUIDE WHEELS ARE LOWERED AND LOCKED IN RAIL POSITION.
 - ALL RAIL GUIDE WHEEL FLANGES ARE ENGAGED ON INSIDE OF RAILS.
 - VEHICLE FRONT TIRES MUST BE RAISED A MINIMUM OF 1-1/2" (38 mm) ABOVE RAIL.
 - VEHICLE STEERING WHEEL LOCK ENGAGED WITH FRONT WHEELS STRAIGHT AHEAD.

FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.

Towing Disabled Vehicle On Track



2

- TOW BAR MUST BE ATTACHED TO DISABLED VEHICLE'S FRAME. DO NOT MOUNT OR ATTACH TOW BAR TO DISABLED VEHICLE'S GUIDE WHEEL EQUIPMENT.
- TOW BAR MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN WEIGHT OF DISABLED VEHICLE BEING TOWED.
- USE A RIGID TYPE TOW BAR WITH SAFETY LOCKING COUPLERS. DO NOT USE CHAIN, WIRE ROPE ETC.
- OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.
- DO NOT ACCELERATE SUDDENLY. TRACTION IS REDUCED ON RAIL, SPINNING TOWING VEHICLE / MACHINE WHEELS COULD DAMAGE THEM.
- TOW DISABLED VEHICLE TO NEAREST ROAD CROSSING AND REMOVE FROM TRACK.

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Towing Disabled Vehicle On Track

1. See your vehicle's operators manual for towing information.
2. The towing vehicle / machine must have an adequate brake system to safely decelerate and stop the towing vehicle / machine and the disabled vehicle being towed. The towing vehicle / machine must weigh as much or more than the disabled vehicle towed.
3. Make sure that the disabled vehicle's:
 - a. Front and rear guide wheels are lowered and locked in the rail position.
 - b. All rail guide wheel flanges are engaged on the inside of the rails.
 - c. Vehicle front tires must be raised a minimum of 1-1/2" (38 mm) above the rail.
 - d. Vehicle front wheels are set straight ahead and the steering wheel lock is engaged on the steering column.
4. Make sure the towing vehicle / machine is in good working condition (tires, brakes, lights, etc.) and that current maintenance has been performed on the vehicle / machine.
5. The towing equipment (hitches, tow bars, etc.) on the towing vehicle / machine must have a rating equal to or greater than the weight of the disabled vehicle being towed.
6. The tow bar must be mounted or attached to the disabled vehicle's frame. Do not mount or attach the tow bar to the disabled vehicle's guide wheel equipment. Use a rigid type tow bar with safety locking couplers.
7. Observe and follow all railroad safety rules and regulations.
8. Do not accelerate suddenly. Traction is reduced on rail. Spinning the towing vehicle tires / machine wheels could damage them.
9. Stopping distance is greater on rail than on typical road surfaces. Apply the towing vehicle / machine brakes gradually to avoid sliding the vehicle tires / machine wheels. Towing disabled vehicle lengthens stopping distances. Allow adequate distance for stopping. Anticipate stops so that you can brake gradually.
10. Tow the disabled vehicle on the track at a reasonable speed (10 MPH maximum) taking into account track conditions, track grade, weather, visibility and stopping distance to assure safe operation. Railroad rules and regulations governing speed limits and right of way should be observed at all times.
11. Tow the disabled vehicle to the nearest road crossing and remove the vehicle from the track.

Towing Disabled Vehicle On Road

2



- TOW DISABLED VEHICLE PER VEHICLE MANUFACTURER'S TOWING SPECIFICATIONS LISTED IN YOUR VEHICLE'S OPERATORS MANUAL.
- VEHICLE USED FOR TOWING MUST HAVE AN ADEQUATE BRAKE SYSTEM TO SAFELY DECELERATE AND STOP TOWING VEHICLE AND DISABLED VEHICLE BEING TOWED.
- TOW DISABLED VEHICLE AT A REASONABLE SPEED TAKING INTO ACCOUNT ROAD CONDITIONS, ROAD GRADE, WEATHER, VISIBILITY AND STOPPING DISTANCE TO ASSURE SAFE OPERATION. POSTED SPEED LIMITS SHOULD BE OBSERVED AT ALL TIMES.
- MAKE SURE DISABLED VEHICLE'S:
 - FRONT AND REAR GUIDE WHEELS ARE RAISED AND LOCKED IN HIGHWAY POSITION.
 - VEHICLE STEERING WHEEL LOCK DISENGAGED.

FAILURE TO HEED THESE WARNINGS COULD RESULT IN SEVERE BODILY INJURY.



- TOWING EQUIPMENT (TOW TRUCK, TOW BARS, ETC.) MUST BE ATTACHED TO DISABLED VEHICLE'S FRAME. DO NOT MOUNT OR ATTACH TOWING EQUIPMENT TO DISABLED VEHICLE'S GUIDE WHEEL EQUIPMENT.
- TOWING EQUIPMENT (TOW TRUCK, TOW BARS, ETC.) MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN WEIGHT OF DISABLED VEHICLE BEING TOWED.
- OBSERVE AND FOLLOW ALL FEDERAL, STATE AND LOCAL DRIVING RULES AND REGULATIONS.
- STATE LAWS MAY REQUIRE TOWING VEHICLE AND DISABLED VEHICLE TO BE EQUIPPED WITH SPECIAL SAFETY EQUIPMENT (LIGHTS, ETC.).

FAILURE TO HEED THESE PRECAUTIONS COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.

Towing Disabled Vehicle On Road

1. See your vehicle's operators manual for towing information.
2. The towing vehicle must have an adequate brake system to safely decelerate and stop the towing vehicle and the disabled vehicle being towed.
3. Make sure that the disabled vehicle's:
 - a. Front and rear guide wheels are raised and locked in the highway position.
 - b. Vehicle steering wheel lock is disengaged on the steering column.
4. Make sure the towing vehicle is in good working condition (tires, brakes, lights, etc.) and that current maintenance has been performed on the vehicle.
5. The towing equipment (tow truck, tow bars, etc.) on the towing vehicle must have a rating equal to or greater than the weight of the disabled vehicle being towed.
6. The towing equipment (tow truck, tow bars, etc.) must be mounted or attached to the disabled vehicle's frame. Do not mount or attach the towing equipment to the disabled vehicle's guide wheel equipment.
7. Observe and follow all federal, state and local driving rules, regulations and laws.
8. State laws may require the towing vehicle and disabled vehicle being towed to be equipped with special safety equipment (lights, etc.).
9. Tow the disabled vehicle on the road at a reasonable speed taking into account road conditions, road grade, weather, visibility and stopping distance to assure safe operation. Always observe posted speed limits.

**SECTION 3 - ADJUSTMENTS
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Guide Wheel Equipment Alignment Procedure



- **ENGINE MUST BE RUNNING TO OPERATE MECHANICAL PTO HYDRAULIC PUMP TO RAISE / LOWER GUIDE WHEELS. BEFORE PERFORMING ANY ADJUSTMENTS TO GUIDE WHEEL EQUIPMENT OR VEHICLE, ALWAYS PLACE AUTOMATIC TRANSMISSION IN "PARK" OR MANUAL TRANSMISSION IN "NEUTRAL". APPLY THE PARKING BRAKE. FAILURE TO COMPLY COULD RESULT IN SEVERE BODILY INJURY.**

The Guide Wheel Alignment Procedure must be completed when the guide wheel equipment is applied to the vehicle, or when any of the misalignment indicators occur. See the Operation Section -Misalignment Indicators.

3

VEHICLE CHECK

1. The vehicle must be at curb weight with permanent attachments: spare tire, tool box less tools, utility box, crane, aerial lift boom, etc. and without: passengers, baggage, load, etc.
2. Weigh the entire vehicle and record this weight. Weigh both the front and rear axles of the vehicle separately and record these weights. The weights will be used when calculating the guide wheel load.
3. Permanent attachments to the vehicle such as a tool box, utility box, crane, aerial lift boom, etc. which could cause uneven loading on the guide wheels should be compensated for, by adjusting the vehicle suspension by adding leaf springs, coil springs, torsion bars, etc.
4. Tires must be inflated to the tire manufacturer's recommended maximum pressure printed on the sidewalls of the tires or wheel manufacturer's recommended maximum pressure, stamped on the wheel, whichever is lower.
5. Visually inspect the entire vehicle, especially the guide wheel equipment, for loose or missing bolts, and bent or damaged components. Tighten, repair, or replace as necessary.
6. Verify that the vehicle the guide wheel equipment is to be mounted to is equipped correctly (springs, tires, wheels, etc.). See the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual.

Guide Wheel Equipment Alignment Procedure

VEHICLE CHECK

7. Check the following measurements on the vehicle that the guide wheel equipment is to be mounted on before applying the guide wheel equipment to the vehicle.
 - a. Frame must be square. Diagonal measurements of the frame should be equal within 1/8 inch (3.2 mm).
 - b. Wheelbase (as measured on each side) must be equal within 1/16 inch (1.8 mm).
 - c. Vehicle axles must be square with the frame within 1/64 inch per foot (.4 mm per 304 mm). Harsco Track Technologies, Harsco Corporation recommends that this be checked by a reputable alignment shop.
8. Follow the mounting instructions on the application drawings which are supplied with each Guide Wheel Equipment Group.
9. After mounting the guide wheel equipment to the vehicle, have the front wheels of the vehicle checked for caster, camber, and toe-in as recommended by the vehicle manufacturer.

PLACING VEHICLE ON TRACK

10. Place the vehicle on straight, level, tangent track or an alignment rack constructed for guide wheel equipment alignment. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake.

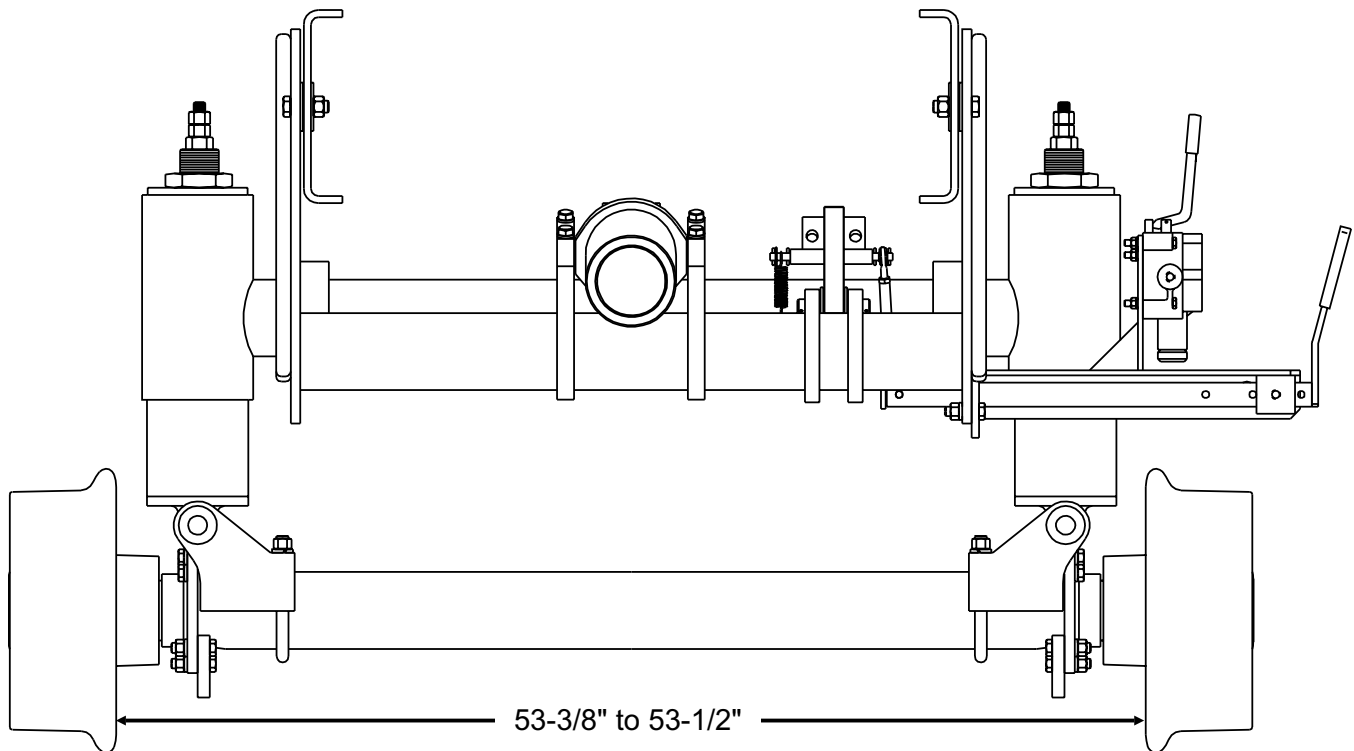
If track or an alignment rack is not available, use 4 x 4 inch lumber on a level floor to simulate track. Space the lumber so it measures 56-1/2 inches (1435 mm) between the inside edges.

Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL TRACK GAUGE - See Figure 3-1

11. Lower and lock both guide wheel units in the "rail" position. See Operation Section - Placing Vehicle On Track. Set the vehicle wheels straight ahead. Secure the vehicle steering wheel using the steering lock.
12. Measure the track gauge of the front and rear guide wheel units. Measure from the back of the left wheel flange, directly below the center line of the wheel spindle, to the same point on the right wheel flange. This dimension must be 53-3/8 to 53-1/2 inches (1356 mm to 1359 mm). The track gauge is preset at the factory and is non-adjustable.

FIGURE 3-1
GUIDE WHEEL TRACK GAUGE



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GUIDE WHEEL LOAD

Front Guide Wheel Load On Track

13. The front guide wheel unit load capacity is non-adjustable. Whenever the vehicle is loaded or additional load is added to the existing vehicle load on track, check the load on the front guide wheels using the 159510 wheel load jack. See Operation Section - Guide Wheel Load On Track.

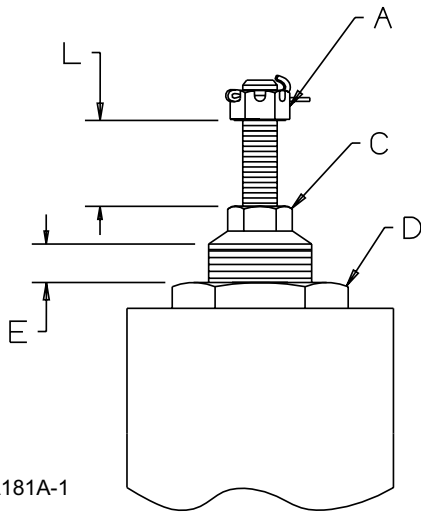
Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL LOAD

Rear Guide Wheel Load On Track - See Figure 3-2 and Chart 3-3

14. The rear guide wheel unit is equipped with two adjustable spring cells. The rear guide wheel unit should be initially adjusted to carry approximately 40% of the vehicle's rear axle curb weight or a minimum of 2,100 lbs (953 kg) with the remainder of the weight being carried by the rear, inner dual tires when the vehicle is on "rail". Whenever the vehicle is loaded or additional load is added to the existing vehicle load on track, check the load on the rear guide wheels. The maximum rated load on the rear guide wheel unit is 13,000 lbs (5,897 kg) or 6,500 lbs (2,948 kg) per guide wheel.
15. The protrusion of the spring cell rods (dimension L) can be used to determine the load on the rear guide wheels. Measure dimension L on both spring cells. See Chart 3-3 to convert dimension (L) to the load on the guide wheel.

FIGURE 3-2
REAR SPRING CELL



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CHART 3-3
REAR GUIDE WHEEL LOAD

DIMENSION L		APPROXIMATE LOAD PER SIDE	
1/2"	(12.7 mm)	1,050 lbs	(476 kg)
3/4"	(19.1 mm)	1,575 lbs	(714 kg)
1"	(25.4 mm)	2,100 lbs	(953 kg)
1-1/4"	(31.8 mm)	2,625 lbs	(1,191 kg)
1-1/2"	(38.1 mm)	3,150 lbs	(1,429 kg)
1-3/4"	(44.5 mm)	3,675 lbs	(1,667 kg)
2"	(50.8 mm)	4,200 lbs	(1,905 kg)
2-1/4"	(57.2 mm)	4,725 lbs	(2,143 kg)
2-1/2"	(63.5 mm)	5,250 lbs	(2,381 kg)
2-3/4"	(69.9 mm)	5,775 lbs	(2,619 kg)
3"	(76.2 mm)	6,300 lbs	(2,858 kg)
* 3-1/4"	(82.6 mm)	6,825 lbs	(3,096 kg)

- * **REAR GUIDE WHEEL IS OVERLOADED. REDISTRIBUTE OR REMOVE SOME OF THE LOAD. MAXIMUM LOAD ON REAR GUIDE WHEEL UNIT MUST NOT EXCEED 13,000 LBS (5,897 kg) OR 6,500 LBS (2,948 kg) MAXIMUM PER GUIDE WHEEL.**

Note: Permanent attachments to the vehicle such as a tool box, utility box, crane, aerial lift boom, etc. which could cause uneven loading on the rear guide wheels should be compensated for, by adjusting the vehicle suspension. Add leaf springs, coil springs, torsion bars, etc. Do not adjust the rear guide wheel unit spring cells to compensate for permanent attachments.

Guide Wheel Equipment Alignment Procedure

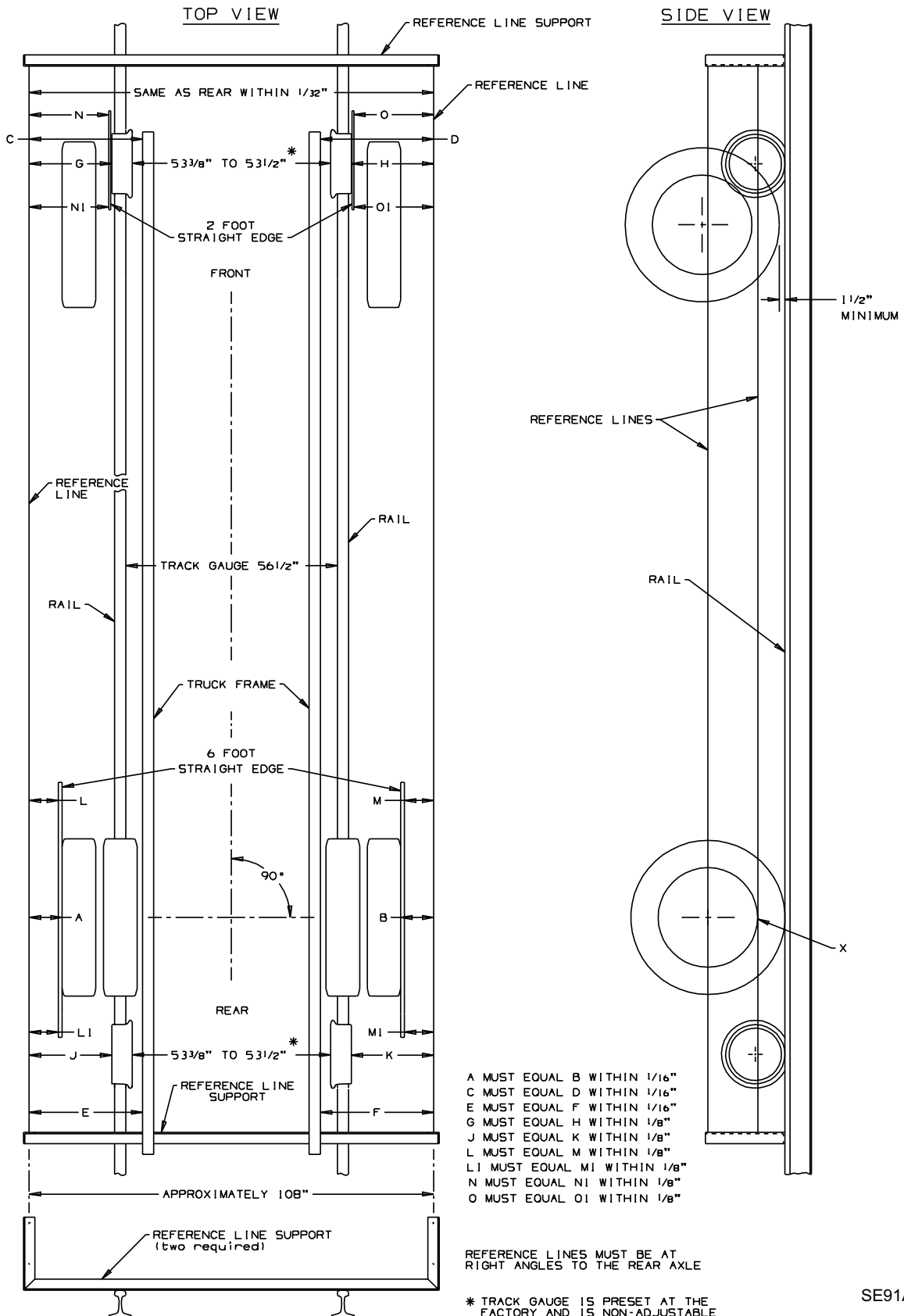
Rear Guide Wheel Load On Track Adjustment - See Figure 3-2 and Chart 3-3

- a. The recommended rear guide wheel unit load setting is approximately 40% of the vehicle rear axle weight or a minimum of 2,100 lbs (953 kg).
- b. To calculate the load setting for each rear spring cell, use the following formula:
$$\text{Vehicle Rear Axle Weight} \times 20\% (0.20) = \text{Spring Cell Load}$$
- c. Convert the calculated spring cell load into dimension (L). See Rear Guide Wheel Load Chart 3-3. If the calculated spring cell load dimension (L) is less than 1/2 inch (12.7 mm), the spring cell must be set to a minimum of 1/2 inch (12.7 mm).
- d. Unlock and raise the guide wheels. Let the guide wheels rest on the rails.
- e. Dimension (E), the length of the large threaded stud extending from the top of the lock nut (D) to the bottom of adjusting nut (C), is preset at the factory to 3/4 inch (19 mm). This allows approximately equal adjustment up or down. If dimension (E) is not initially set to 3/4 inch (19 mm) on both spring cells, loosen lock nut (D). Turn adjusting nut (C) until dimension (E) is set to 3/4 inch (19 mm) on both spring cells. Re-tighten lock nut (D).
- f. Lower and lock the rear guide wheels in the "rail" position.
- g. Measure dimension (L), the distance from the top of adjusting nut (C) to the bottom of nut (A). See Rear Guide Wheel Load Chart 3-3 to convert dimension (L) to the load. The spring cell must be set to the calculated load dimension (L) or the minimum load dimension (L), see Step c.
- h. To adjust the spring cell load, unlock and raise the rear guide wheels. Let the guide wheels rest on the rails. Loosen lock nut (D). Turn adjusting nut (C) clockwise to increase the load on the guide wheel or counter-clockwise to decrease the load on the guide wheel.
- i. Lower and lock the rear guide wheels in the "rail" position. Re-measure dimension (L). See Rear Guide Wheel Load Chart 3-3 to convert dimension (L) to the load on the guide wheel.
- j. Repeat Steps h - i until dimension (L) corresponds to the calculated load or the minimum load on the spring cell, see step c. Tighten lock nut (D). Both spring cells must be set to the same dimension (E) within 1/8 inch (3.2 mm).
- k. If the spring cell cannot be adjusted to the calculated load or the minimum load, the guide wheel unit must be repositioned in a different set of mounting holes.

Guide Wheel Equipment Alignment Procedure

FIGURE 3-4
GUIDE WHEEL EQUIPMENT ALIGNMENT

3



Guide Wheel Equipment Alignment Procedure

STRING LINING SET-UP - See Figure 3-4

The string lining procedure is only a guide to check and make alignment adjustments to the guide wheel equipment. String lining the vehicle and guide wheel equipment will not guarantee that the guide wheel equipped vehicle will track properly. Harsco Track Technologies recommends that all HY-RAIL® equipped vehicles be track tested. The vehicle should be at its normal operating load for track testing. The vehicle should be track tested when:

- a. The guide wheel equipment is installed on the vehicle.
 - b. Any adjustments are made to the guide wheel equipment.
 - c. The load on the vehicle is changed.
 - d. Periodically to ensure that the vehicle is tracking properly.
16. Lower and lock both the front and rear guide wheels in the "rail" position. See Operation Section - Placing Vehicle On Track. Set the vehicle wheels straight ahead. Secure the vehicle steering wheel using the steering lock.
 17. Establish parallel reference lines on each side of the vehicle as shown in Figure 3-4. Parallel reference lines can be established by building two supports or brackets. These can be built out of scrap angle iron or other material. The supports must be high enough so the top reference line is through the center of the rear axle and a few inches longer than the width of the vehicle. Wires or cords stretched between the front and rear supports will be the reference lines. The wires or cords should be spaced approximately 108 inches (2743 mm) apart. The distance between the wires or cords must be equal or within 1/32 inch (.8 mm) at each support.
 18. Clamp the supports to the rail in front of and behind the vehicle. The supports should be at right angles to the rail. Stretch the wires or cords between the supports, so the lower reference line is level with the bottom edge of the rear vehicle wheel rim(s) (point X) and the upper reference line is through the center of the rear axle(s). The reference lines must be level.
 19. Shift the supports on the rail until dimension A equals (=) B and dimension C equals (=) D or within 1/16 inch (1.6 mm). Measurements A and B should be taken from the edge of the rear vehicle rim(s) directly below the axle (point X) to the reference lines. Measurements C and D are taken from the front of the vehicle frame. When shifting the supports, keep them at right angles to the rail so the reference lines stay level and parallel to each other.
 20. Hold a six (6) foot straight edge against the outer edge of the rear, outside tires with the straight edge centered on the tires. Record dimensions L, L1, M and M1 to the upper reference line. Rotate the rear tires 180 degrees and record a second set of dimensions at L, L1, M and M1. Average the two dimensions taken at L, L1, M and M1.

Example: $[L \text{ (first dimension)} + L \text{ (second dimension)}] \div 2 = L \text{ (average dimension)}$

Guide Wheel Equipment Alignment Procedure

STRING LINING SET-UP - See Figure 3-4

21. Shift the supports on the rail until dimension L (average) equals (=) M (average) and dimension L1 (average) equals (=) M1 (average) or within 1/8 inch (3.2 mm). When shifting the supports, keep them at right angles to the rail so the reference lines stay level and parallel to each other. The reference lines will be parallel only when the rear axle is straight.
22. After the reference lines have been established, measurements can be taken from these lines to the guide wheels to ensure correct alignment.

Guide Wheel Equipment Alignment Procedure

FRONT GUIDE WHEEL ALIGNMENT - See Figure 3-4

23. Lower and lock the front and rear guide wheels in the "rail" position. Take measurements G and H. Measure from the outer edge of the guide wheel, directly below the center line of the wheel spindle, to the reference lines. Check that dimension G equals (=) dimension H or is within 1/8 inch (3.2 mm). If not, see Adjustment.
24. The front guide wheels must track straight. Hold a two foot long straight edge against the outer edge of the front guide wheel. Take measurements N and N-1 and measurement O and O1. Check that dimension N equals (=) dimension N1 and that dimension O equals (=) dimension O1 or is within 1/8 inch (3.2 mm). If not, see Adjustment.

Guide Wheel Equipment Alignment Procedure

FRONT GUIDE WHEEL ALIGNMENT - See Figures 3-4 And 3-5

Adjustment

- a. Unlock and raise the front guide wheels from the "rail" position. Let the guide wheels rest on the rails.
- b. Block or support the front guide wheel unit support carriage.
- c. To adjust the side to side alignment of the front guide wheel unit, remove the six 5/8 inch cap screws (1) that secure the guide wheel unit axle to the support carriage. Remove the appropriate number of 3/16 inch thick shim(s) (2) from the same side of both support carriage arms (4) and install on the other side of both support carriage arms with the existing shims (3). The number of shims on the same side of both support carriage arms (3) must be the same. Install the six 5/8 inch cap screws (1). Torque the cap screws to 210 ft lbs. (288 N-m).
- d. To adjust the tracking alignment of the front guide wheel unit, loosen the six 5/8 inch cap screws (1). Loosen the 5/8 inch jam nut (5). To move the guide wheel rearward, turn the 5/8 inch adjusting screw (6) clockwise on the appropriate side of the front guide wheel unit axle. To move the guide wheel forward, turn the 5/8 inch adjusting screw (6) counter-clockwise on the appropriate side of the front guide wheel unit axle and pull the axle forward so it is tight against the adjusting screw (6). Tighten the 5/8 inch jam nut (5) securely. Torque the six 5/8 inch cap screws (1) to 210 ft lbs. (288 N-m).

If the front guide wheel unit tracks to the right, move the right guide wheel forward or move the left guide wheel rearward.

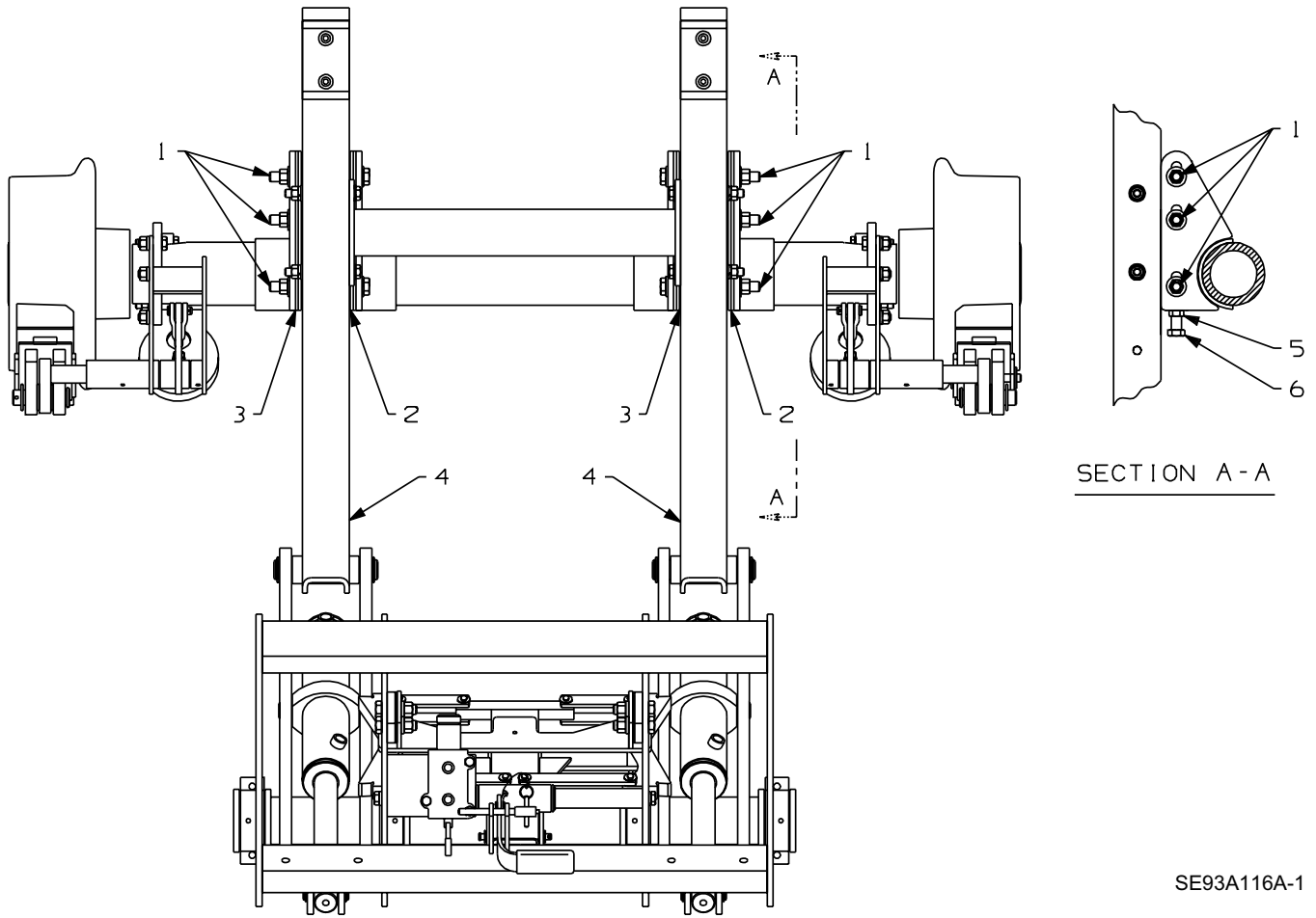
If the front guide wheel unit tracks to the left, move the left guide wheel forward or move the right guide wheel rearward.

- e. Lower and lock the front guide wheels to the "rail" position.
- f. Repeat Steps a - e until the following dimensions are correct:
Dimension G equals (=) H or within 1/8 inch (3.2 mm).
Dimension N equals (=) N1 and dimension O equals (=) O1 or within 1/8 inch (3.2 mm).

Guide Wheel Equipment Alignment Procedure

FRONT GUIDE WHEEL ALIGNMENT

FIGURE 3-5
FRONT GUIDE WHEEL ALIGNMENT



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Guide Wheel Equipment Alignment Procedure

REAR GUIDE WHEEL ALIGNMENT - See Figures 3-4 And Figure 3-6

25. Lower and lock the rear guide wheels in the "rail" position. Take measurements J and K. Measure from the outer edge of the guide wheel, directly below the center line of the wheel spindle, to the reference lines. Check that dimension J equals (=) dimension K or is within 1/8 inch (3.2 mm). If not, see Adjustment.

Adjustment

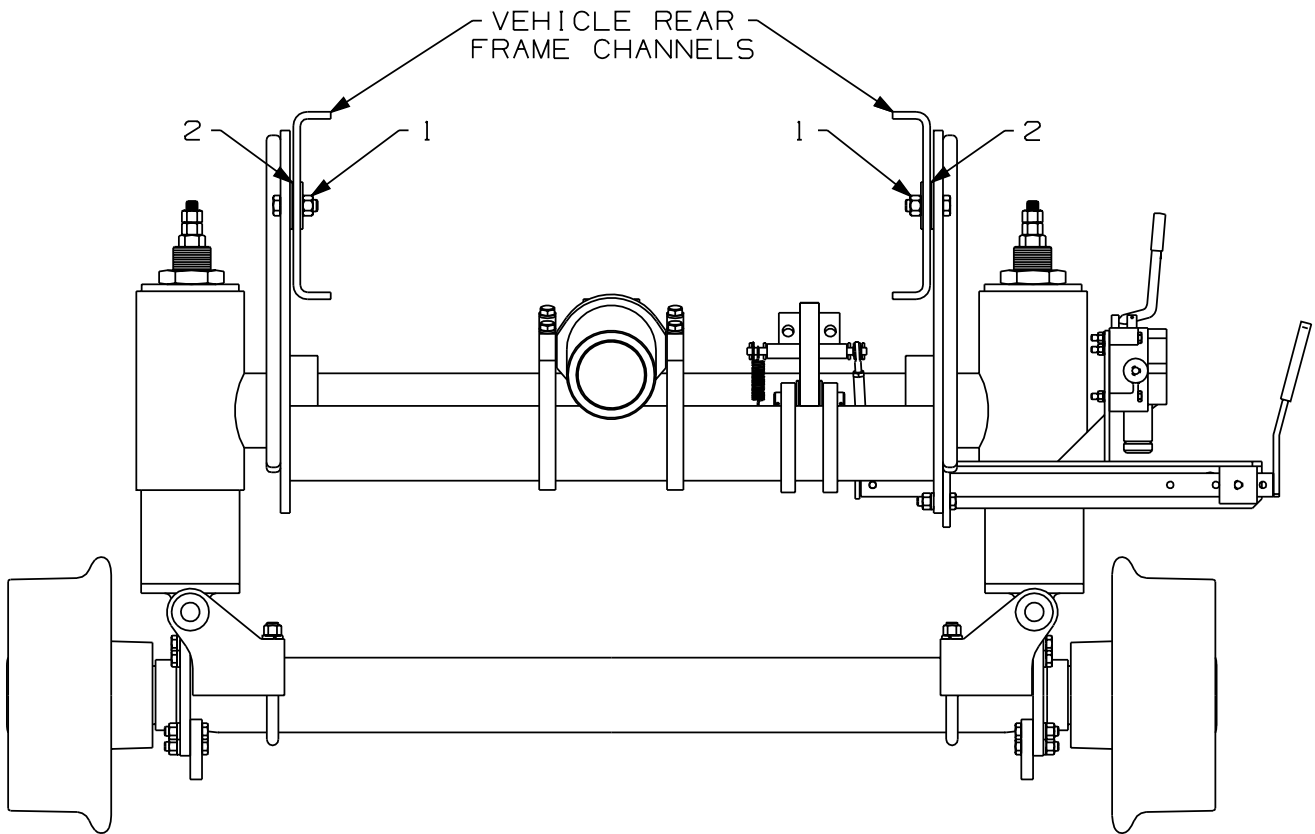
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- a. Unlock and raise the rear guide wheels from the "rail" position. Let the guide wheels rest on the rails.
- b. Block or support the rear guide wheel unit.
- c. Remove the six 5/8 inch cap screws (1) that secure the rear guide wheel unit to the vehicle frame. Remove the appropriate number of 1/16 or 1/8 inch thick shim(s) (2) from one side and install on the other side between the guide wheel unit and the vehicle frame. Install the six 5/8 inch cap screws (1). Torque the cap screws. See Appendices - Bolt Torque Charts.
- d. Lower and lock the rear guide wheels in the "rail" position.
- e. Repeat Steps a - d until dimension J equals (=) K or within 1/8 inch (3.2 mm).

Guide Wheel Equipment Alignment Procedure

REAR GUIDE WHEEL ALIGNMENT

FIGURE 3-6
REAR GUIDE WHEEL ALIGNMENT



Guide Wheel Equipment Alignment Procedure

VEHICLE TRACK TEST



■ **CHECK AND CORRECT ALIGNMENT PROMPTLY IF MISALIGNMENT IS INDICATED. MISALIGNMENT OF GUIDE WHEEL EQUIPMENT COULD RESULT IN DERAILMENT OF THE VEHICLE AND SEVERE BODILY INJURY.**

3

26. Harsco Track Technologies recommends that all HY-RAIL® equipped vehicles be track tested. The vehicle should be at its normal operating load for track testing. The vehicle should be track tested when:
 - a. The guide wheel equipment is installed on the vehicle.
 - b. Any adjustments are made to the guide wheel equipment.
 - c. The load on the vehicle is changed.
 - d. Periodically to ensure that the vehicle is tracking properly.
27. The vehicle must be placed on straight, level, tangent track. See Operation Section - Placing Vehicle On Track.
28. Apply spray paint to the flanges and treads of all guide wheels.
29. Lower and lock the front and rear guide wheels in the "rail" position.
30. Operate the vehicle for a short distance at a normal operating speed.
31. The paint should wear evenly around the flanges and treads of all guide wheels. If the paint is worn evenly on all guide wheels, the vehicle and guide wheel equipment is properly aligned.
32. If the paint wore off the right front guide wheel flange and not off the left front guide wheel flange, the guide wheel unit is "flanging right".
 - a. Unlock and raise the guide wheels. Let the guide wheels rest on the rail. Slightly move the right end of the front axle forward or the left end rearward. See Front Guide Wheel Alignment.
 - b. Repaint the flanges and treads on all guide wheels. Lower and lock the guide wheels the "rail" Position. Operate the vehicle for a short distance at a normal operating speed. If the paint is worn evenly on all guide wheels, the vehicle and guide wheel equipment is properly aligned.
 - c. If the paint continues to wear off the right guide wheel flange and not off the left guide wheel flange, repeat Steps a. & b. If the vehicle unit continues to track improperly, go to Step 34.

Guide Wheel Equipment Alignment Procedure

VEHICLE TRACK TEST

33. If the paint wore off the left guide wheel flange and not off the right guide wheel flange, the guide wheel unit is "flanging left".
 - a. Unlock and raise the guide wheels. Let the guide wheels rest on the rail. Slightly move the left end of the front axle forward or the right end rearward. See Front Guide Wheel Alignment.
 - b. Repaint the flanges and treads on all guide wheels. Lower and lock the guide wheels in the "rail" Position. Operate the vehicle for a short distance at a normal operating speed. If the paint is worn evenly on all guide wheels, the vehicle and guide wheel equipment is properly aligned.
 - c. If the paint continues to wear off the left guide wheel flange and not off the right guide wheel flange, repeat Steps a. & b. If the vehicle continues to track improperly, go to Step 34.
34. Note which guide wheels, flange and/or tread the paint is worn on.
 - a. Repaint the flanges and treads on all guide wheels.
 - b. Operate the vehicle in reverse for a short distance at a normal operating speed.
 - c. Note which guide wheels, flange and/or tread the paint is worn on.

If the paint wore off the right front flange when traveling forward and then off the left rear flange when traveling in reverse or off the left front flange when traveling forward and then off the right rear flange when traveling in reverse, the vehicle is probably not aligned properly. Have the frame checked for proper alignment. See Vehicle Check.

35. Repeat the String Lining and Guide Wheel Alignment Procedure.

Adjustments

VEHICLE FRONT TIRE CLEARANCE - RAIL POSITION - See Figure 3-7

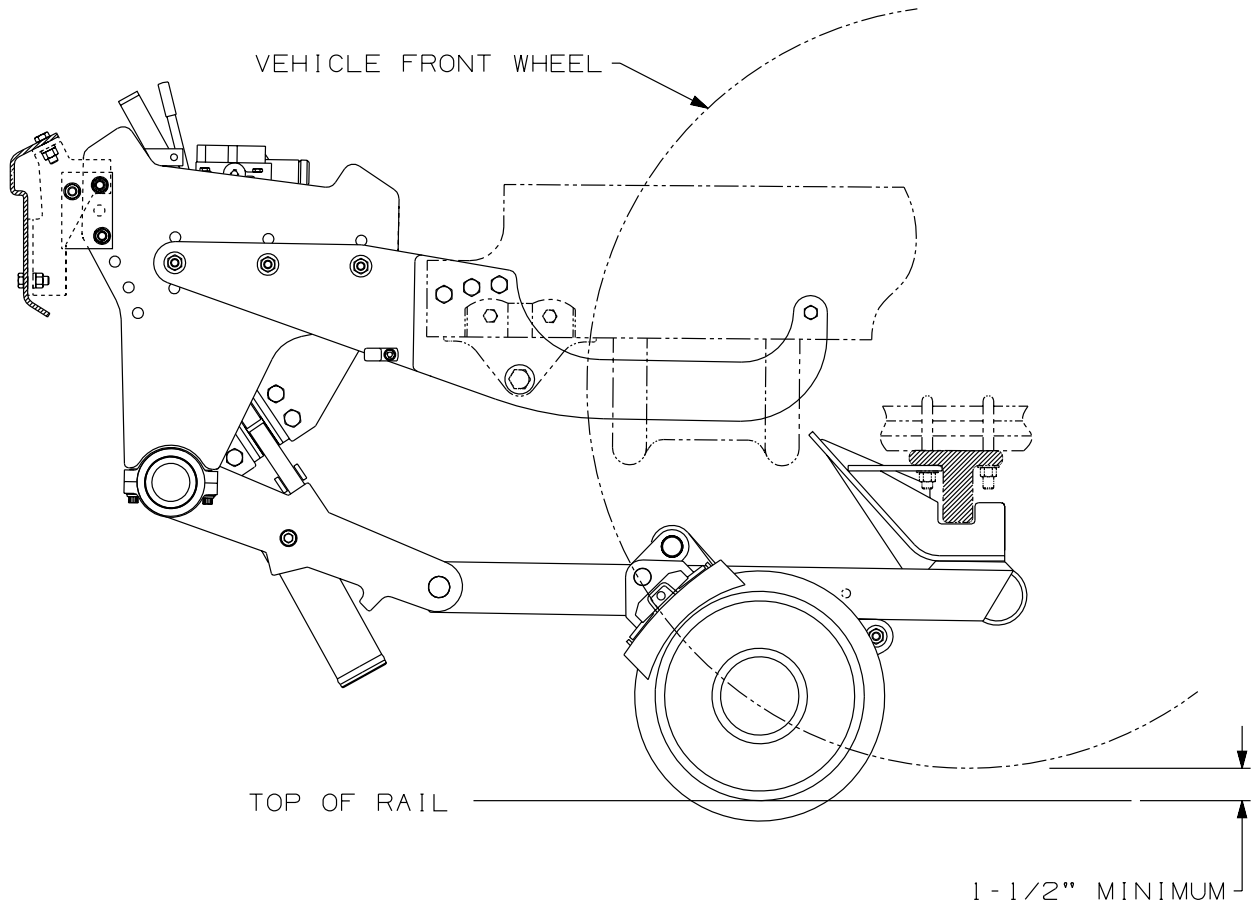
When the front guide wheels are lowered and locked in the "rail" position, the support carriage will raise the vehicle's front tires above the rails. This is necessary to ensure clearance when the vehicle passes through switches, turnouts, crossings, frogs, etc. The front tires must always clear the top of the rails a minimum of 1-1/2 inches (38 mm) whenever the vehicle is on track.

1. Place the vehicle on straight, level track. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Lower and lock the front and rear guide wheel units in the "rail" position.
2. Measure from the bottom of the vehicle tire to the top of the rail. This dimension must be a minimum of 1-1/2 inches (38 mm). If not, contact Harsco Track Technologies, Harsco Corporation, Fairmont, Minnesota for assistance.

Adjustments

VEHICLE FRONT TIRE CLEARANCE - RAIL POSITION

FIGURE 3-7
VEHICLE FRONT TIRE CLEARANCE



Adjustments

CARRIAGE CLEARANCE - HIGHWAY POSITION - See Figure 3-8

The carriage may be adjusted to allow maximum ground clearance when the front guide wheel unit is in the "highway" position.

1. Place the vehicle on solid, level ground. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Raise and lock the front guide wheels in the "highway" position.
2. Check the clearance between the carriage and the vehicle. If additional ground clearance is desired and there is adequate clearance between the carriage and the vehicle, the carriage may be raised. See Adjustment.

3

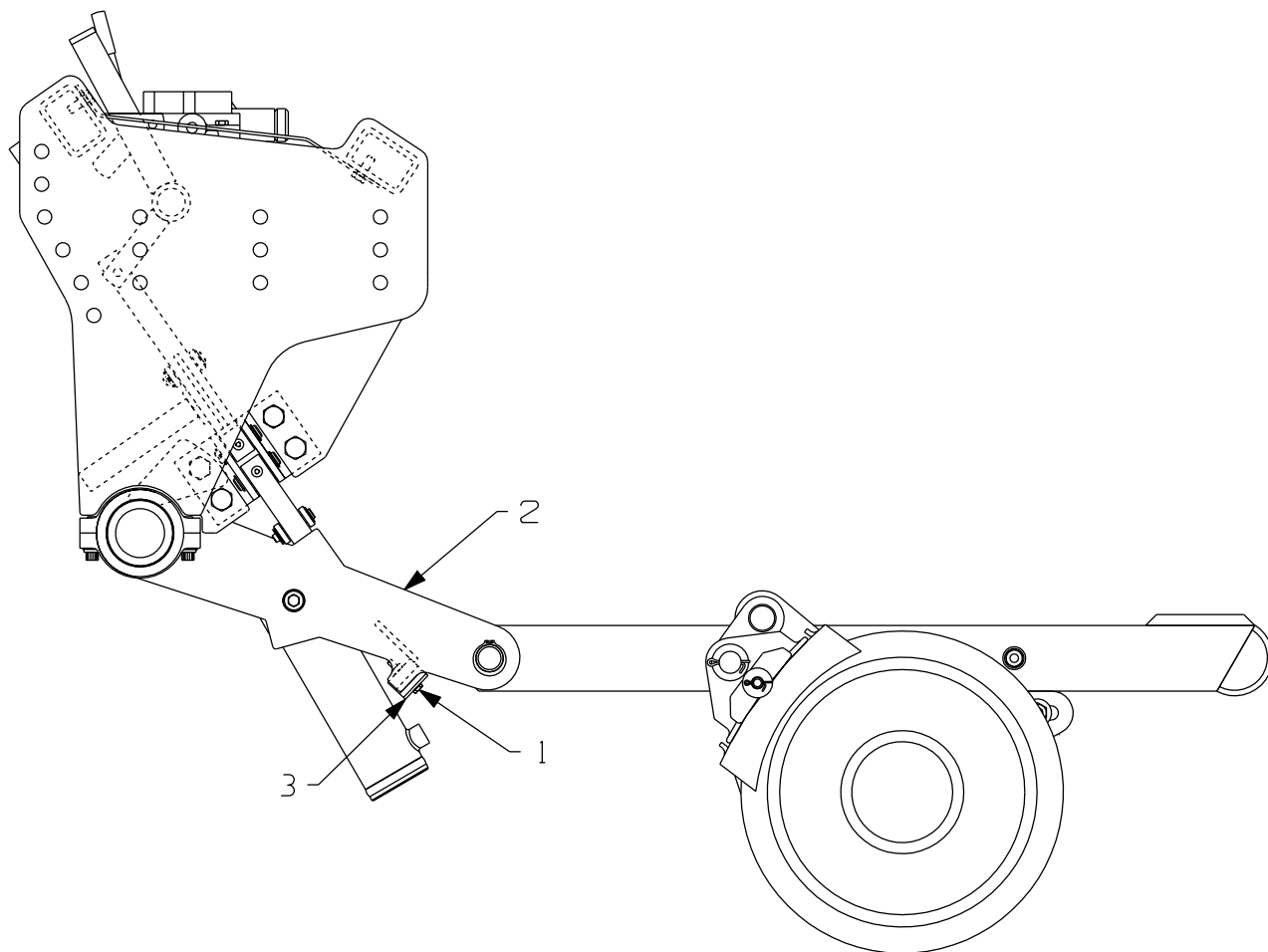
Adjustment - See Figure 3-8

- a. Unlock and lower the front guide wheels. Let the guide wheels rest on the ground.
- b. Loosen and remove the two 1/4 inch cap screws (1) on each front guide wheel unit lift arm (2). Add 1/8 or 1/4 inch shims (3) to any existing shims on the lift arms to raise the carriage support frame (increase ground clearance) or remove 1/8 or 1/4 inch shims (3) to lower the carriage support frame (decrease ground clearance). Secure the shims using the 1/4 inch cap screws (1). Both lift arms must have the same quantity and thickness of shims installed.
- c. Raise and lock the front guide wheels in the "highway" position. Observe the clearance between the carriage support frame and the vehicle.
- d. Repeat Steps a - c until the desired ground clearance is achieved with adequate clearance between the carriage support frame and vehicle.

Adjustments

CARRIAGE CLEARANCE - HIGHWAY POSITION

FIGURE 3-8
CARRIAGE CLEARANCE



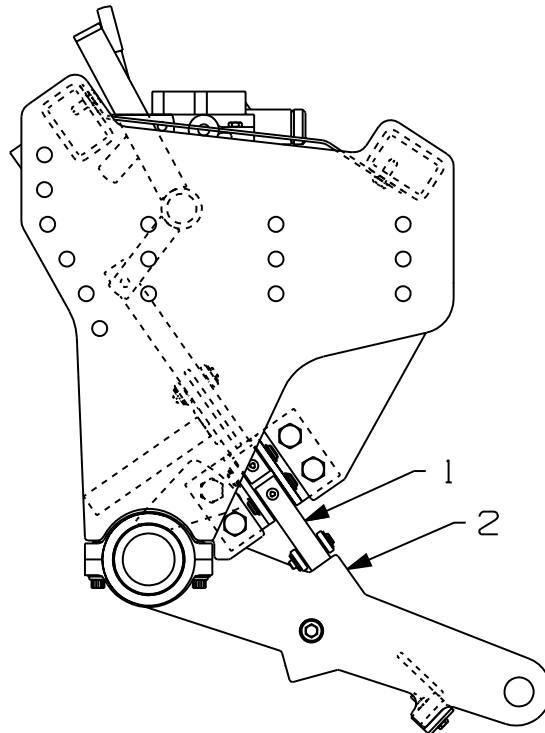
Adjustments

FRONT LOCKING MECHANISM - RAIL POSITION - See Figure 3-9

The mechanical locking mechanism must move freely so it engages when the front guide wheels are lowered to the "rail" position.

1. Place the vehicle on straight, level track. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Lower and lock the front and rear guide wheels in the "rail" position.
2. Inspect the front locking mechanism to insure that the lower "rail" locks (1) are engaging over the lift arms (2). The locking mechanism is non-adjustable. If the locking mechanism is not engaging properly, inspect for worn, damaged or bent components, for foreign material in the locking mechanism, and for adequate lubrication.

FIGURE 3-9
FRONT LOCKING MECHANISM - RAIL POSITION



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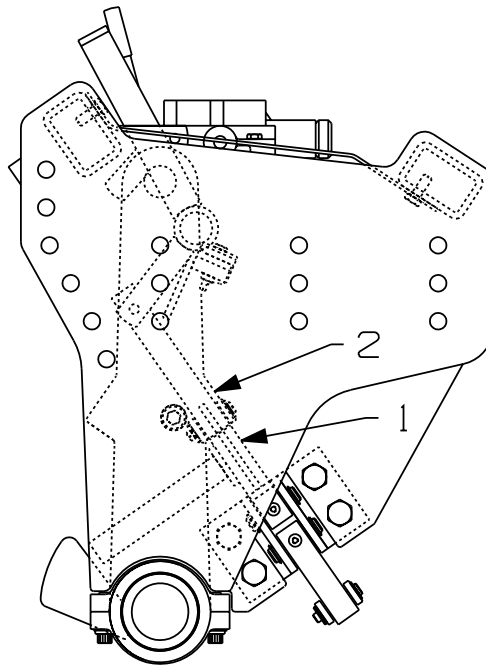
Adjustments

FRONT LOCKING MECHANISM - HIGHWAY POSITION - See Figure 3-10

The mechanical locking mechanism must move freely so it engages when the front guide wheels are raised to the "highway" position.

1. Place the vehicle on solid, level ground. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Raise and lock the front guide wheels in the "highway" position.
2. Inspect the front locking mechanism to insure that the upper "highway" locks (1) are engaging under the lift arms (2). The locking mechanism is non-adjustable. If the locking mechanism is not engaging properly, inspect for worn, damaged or bent components, for foreign material in the locking mechanism, and for adequate lubrication.

FIGURE 3-10
FRONT LOCKING MECHANISM - HIGHWAY POSITION



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Adjustments

REAR LOCKING MECHANISM - RAIL POSITION

The rear guide wheel unit is equipped with two set screws that adjust the rear locking mechanism in the "rail" position. The rear locking mechanism must be adjusted to set the rear guide wheel unit spring cells vertical (perpendicular) to the rail for the spring suspension to work properly.

1. Place the vehicle on straight, level track. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Lower and lock the front and rear guide wheels in the "rail" position.
2. Place a bubble level on the front or rear side of the two spring cells on the rear guide wheel unit. The spring cells must be vertical (perpendicular) to the rail. If the rear spring cells are not vertical (perpendicular) to the rail, see Adjustment - Rail Position.
3. The lock pin must be inserted through the lock handle and the rear guide wheel unit frame to secure the rear locking mechanism. If the lock pin can not be inserted, see Adjustment - Rail Position.

Adjustment - Rail Position - See Figure 3-11

- a. Unlock and raise the rear guide wheels. Let the guide wheels rest on the rails.
- b. To change the vertical setting of the spring cells, adjust the two "rail" set screws (1) on the locking pawl (2) of the rear guide wheel unit. Turn the set screws clockwise to decrease the pivot or counter-clockwise to increase the pivot of the rear guide wheel unit spring cells. Limit the set screws adjustment to one complete revolution before rechecking the setting. Both of the set screws (1) must contact the locking pawl (2).
- c. Lower and lock the rear guide wheels. Recheck the vertical setting of the two spring cells to the rail.
- d. Repeat Steps a - c until the two spring cells are vertical (perpendicular) to the rail.
- e. After adjusting the vertical setting of the rear spring cells, lower and lock the front and rear guide wheel units in the "rail" position. Check the clearance between the locking pawl (2) and locking mechanism (3). There should be 1/16 - 1/8 inch (1.6 - 3.2 mm) clearance.

If the clearance is greater than 1/8 inch (3.2 mm), a shim will have to be welded onto the locking pawl (2) as shown.

If the clearance is less than 1/16 inch (1.6 mm) causing interference between the locking pawl (2) and locking mechanism (3), material will have to be removed from the locking pawl (2). Be sure to maintain the locking pawl profile when removing material.

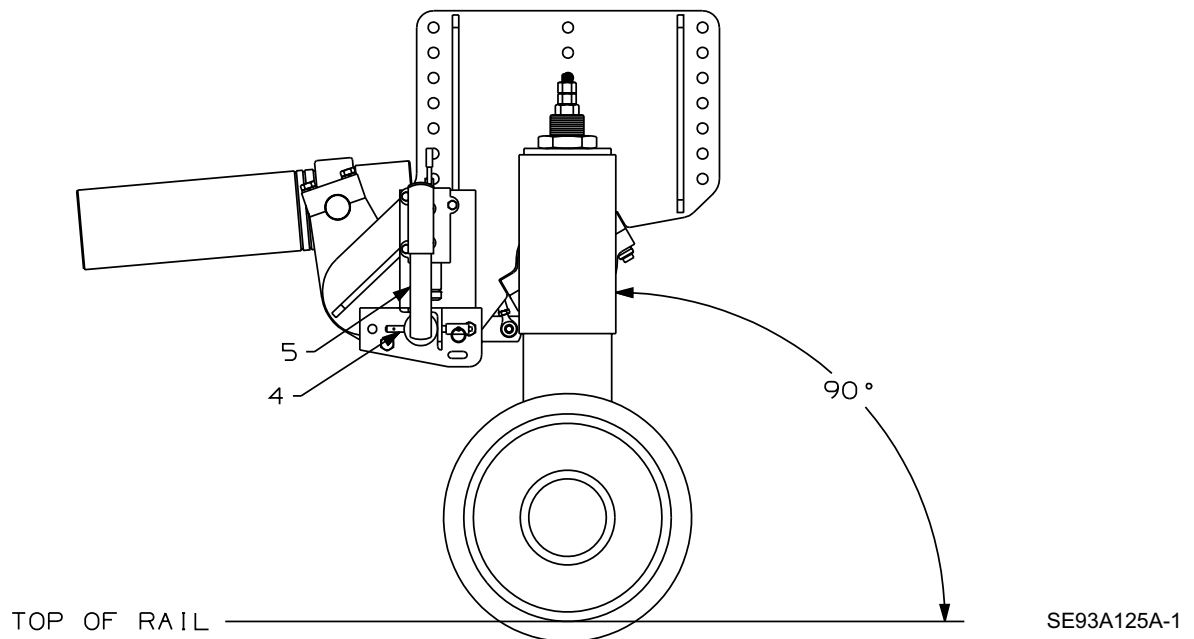
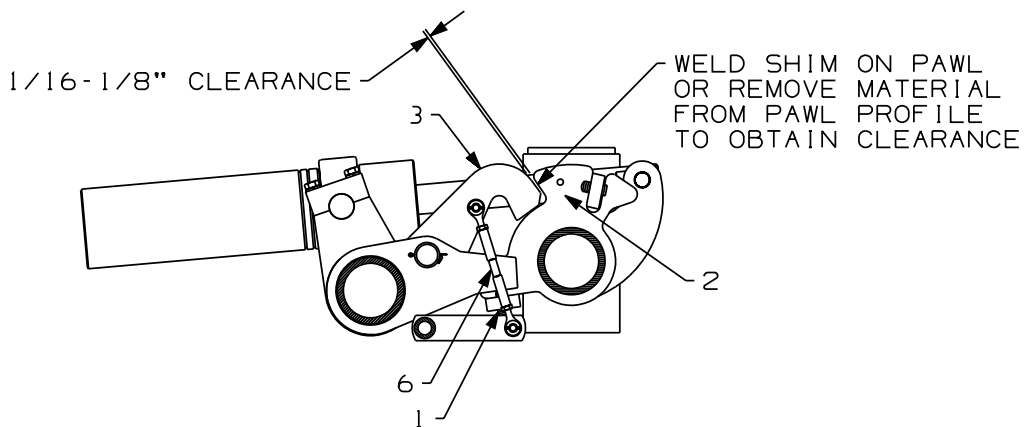
Adjustments

REAR LOCKING MECHANISM - RAIL POSITION

Adjustment - Rail Position - Continued

- f. Lower and lock the rear guide wheels in the "rail" position. The lock pin (4) must be inserted through the lock handle (5) and the rear guide wheel unit frame to secure it. If the lock pin can not be inserted, loosen the two jam nuts on the turnbuckle (6). Adjust the turnbuckle until the lock pin can be inserted. Tighten the jam nuts on the turnbuckle securely.

FIGURE 3-11
REAR LOCKING MECHANISM - RAIL POSITION



Adjustments

REAR LOCKING MECHANISM - HIGHWAY POSITION

The rear guide wheel unit is equipped with two set screws that adjust the rear locking mechanism in the "highway" position. The rear lock mechanism may be adjusted to allow maximum ground clearance of the rear guide wheel unit in the "highway" position.

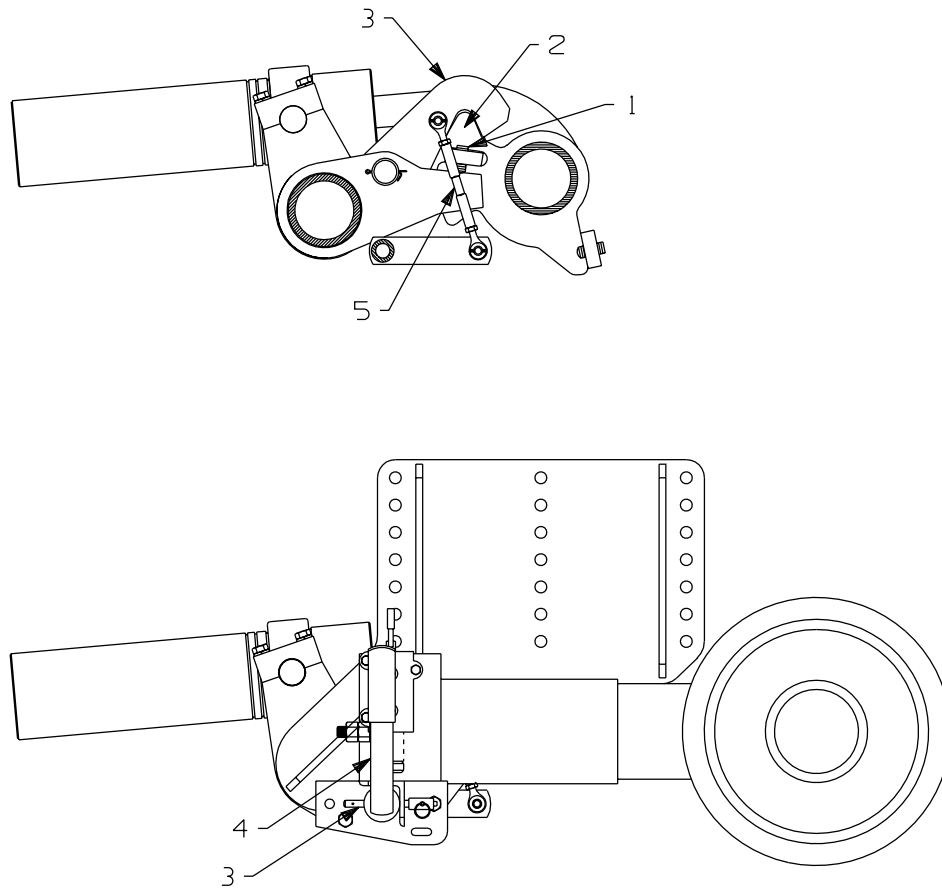
1. Place the vehicle on solid, level ground. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Raise and lock the rear guide wheels in the "highway" position.
2. Observe the clearance between the rear guide wheel unit and the vehicle frame. If additional ground clearance is desired and there is adequate clearance between the rear guide wheel unit and the vehicle, the guide wheel unit spring cells may be raised. See Adjustment- Highway Position.
3. The lock pin must be inserted through the lock handle and the rear guide wheel unit frame to secure the rear locking mechanism. If the lock pin can not be inserted, see Adjustment - Highway Position.

Adjustment - Highway Position - See Figure 3-12

- a. Unlock and lower the rear guide wheels. Let the guide wheels rest on the ground.
- b. Adjust the two "highway" set screws (1) on the locking pawl (2) of the rear guide wheel unit. Turn the set screws clockwise to decrease the pivot of the spring cells or counter-clockwise to increase the pivot of the spring cells. Limit the set screws adjustment to one complete revolution before rechecking the setting. Both of the set screws (1) must contact the locking pawl (2).
- c. Raise and lock the rear guide wheels in the "highway" position. Recheck the clearance between the rear guide wheel spring cells / axle unit and the vehicle.
- d. Repeat Steps a - c until the desired ground clearance is achieved with adequate clearance between the rear guide wheel spring cells / axle and vehicle.
- e. Raise and lock the rear guide wheels in the "highway" position. The lock pin (3) must be inserted through the lock handle (4) and the rear guide wheel unit frame to secure it. If the lock pin can not be inserted, loosen the two jam nuts on the turnbuckle (5). Adjust the turnbuckle until the lock pin can be inserted. Tighten the jam nuts on the turnbuckle securely.

Adjustments

FIGURE 3-12
REAR LOCKING MECHANISM - HIGHWAY POSITION



3

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Adjustments

BRAKE SHOE CLEARANCE - See Figure 3-13

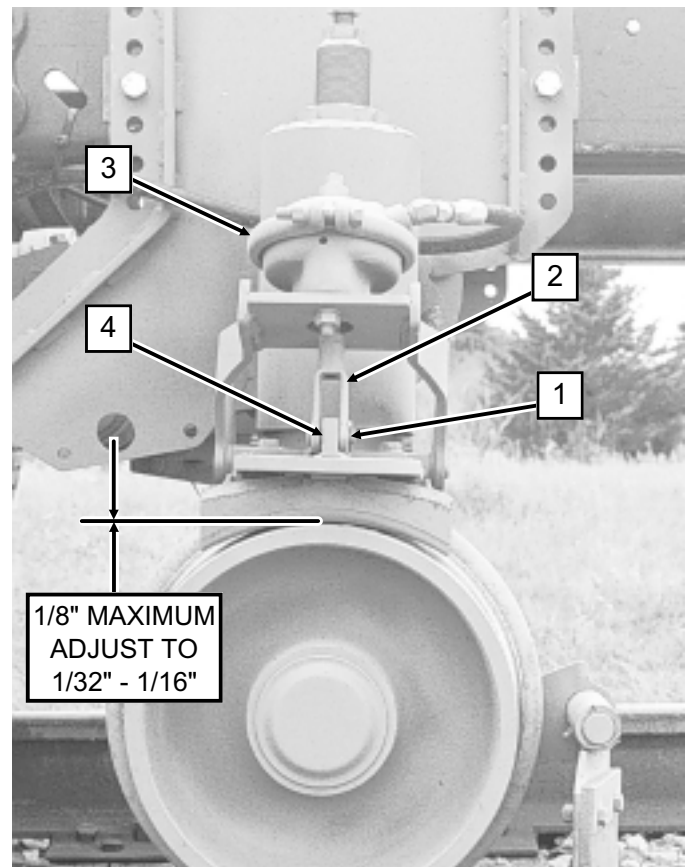
The front and / or rear guide wheel units may be equipped with rail guide wheel brakes.

1. Apply the vehicle parking brake. Be sure the vehicle air brake system is at operating pressure to fully release the guide wheel brakes. Move the rail wheel brake control valve to the On position.
2. Measure the clearance between the brake shoe and the guide wheel tread. The clearance must not exceed 1/8 inch (3.2 mm), or adjustment is required. See Adjustment.
3. Repeat Step 2 to check the brake shoe clearance on all guide wheel brakes.

Adjustment - See Figures 3-13

- a. Remove the cotter pin from pin (1). Remove pin (1) from yoke (2) on brake actuator (3). Loosen the jam nut on the yoke and turn yoke (2) counter-clockwise to adjust the brake shoe closer to the guide wheel tread or clockwise to adjust the brake shoe away from the guide wheel tread. Adjust so the brake shoe is 1/32 - 1/16 inch (.8 - 1.6 mm) away from the guide wheel tread. Install pin (1) through yoke (2) and brake arm (4) and secure using the cotter pin. Tighten the jam nut on yoke (2) securely. Recheck the brake shoe clearance.
- b. Repeat Step a to adjust the brake shoe clearance on all guide wheel brakes.

FIGURE 3-13
BRAKE SHOE CLEARANCE
REAR BRAKE MECHANISM SHOWN



Adjustments

RAIL SWEEP CLEARANCE - See Figure 3-14

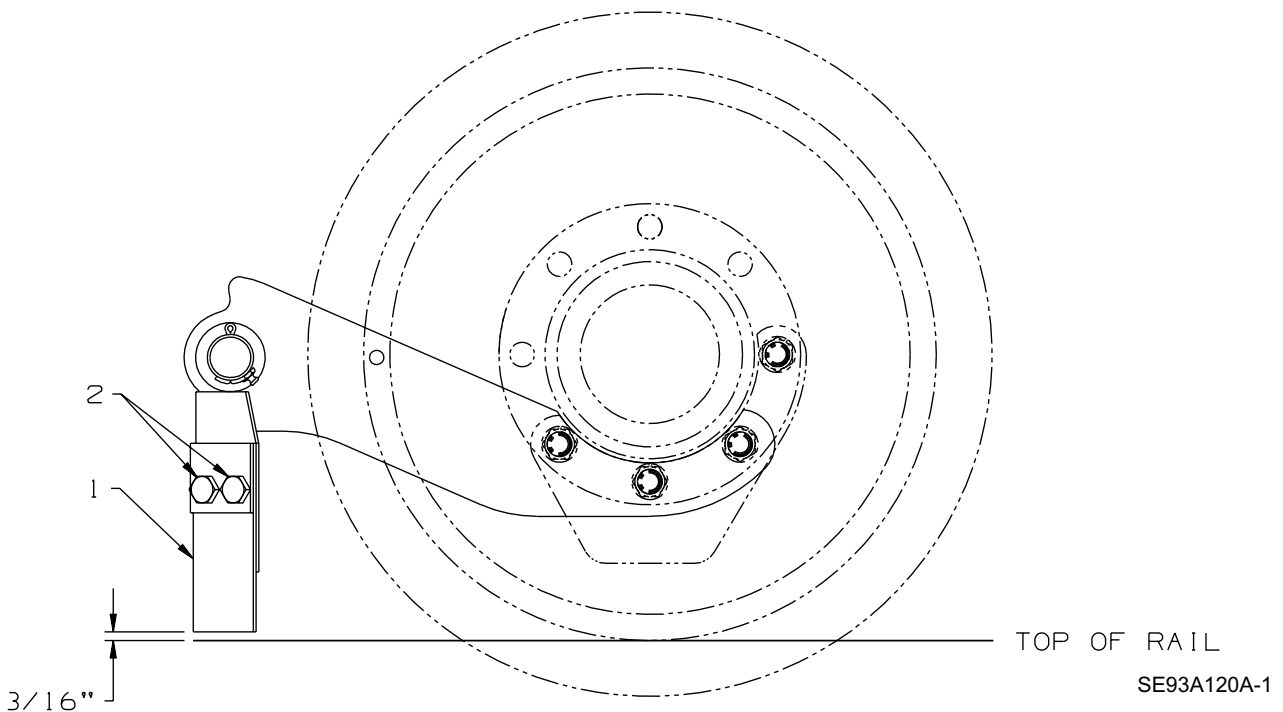
The front and / or rear guide wheel units may be equipped with optional rail sweeps.

1. Place the vehicle on straight, level track. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Lower and lock the front and rear guide wheels in the "rail" position.
2. Lower the rail sweeps to the "rail" position by rotating them down. The rubber rail sweeps should clear the top of the rail by 3/16 inch (4.8 mm). If not, see Adjustment.

Adjustment - See Figure 3-14

- a. Loosen the two cap screws (2). Slide rubber sweep (1) down until it clears the top of the rail by 3/16 inch (4.8 mm). Re-tighten the two cap screws (2).
- b. Repeat Step a to adjust the rail sweep clearance on all guide wheels.
- c. When the rubber sweep is worn so it cannot be adjusted, replace rubber sweep (1).

FIGURE 3-14
RAIL SWEEP CLEARANCE



Adjustments

FRONT GUIDE WHEEL UNIT HYDRAULIC PRESSURE - See Figure 3-15

1. Attach the provided pressure gauge (099137K) to the test port (1) on the front guide wheel unit control valve.
2. Start the vehicle engine. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Engage the mechanical PTO hydraulic pump. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to direct hydraulic oil flow to the guide wheel equipment.
3. Do not release the front guide wheel unit locking mechanism. Push the control valve handle (2) towards the control valve to bottom out the hydraulic cylinder against the locking mechanism. Hold the control valve handle in this position while reading the hydraulic pressure on the gauge. Release the control valve handle.

If the hydraulic pressure indicated is 1800 PSI (124.1 bar), the front guide wheel unit hydraulic pressure is set correctly. Go to Step 4.

If the pressure indicated is not 1800 PSI (124.1 bar), see Adjustment.

4. Disengage the mechanical PTO hydraulic pump. Remove the pressure gauge from the test port (1) on the control valve.

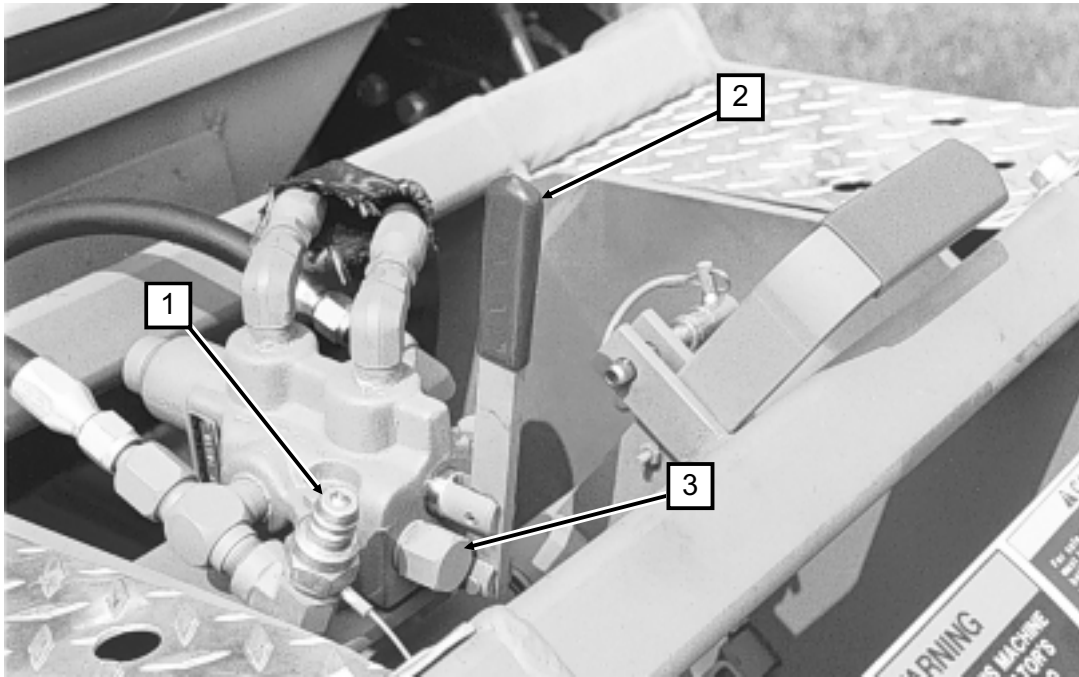
Adjustment - See Figure 3-15

- a. Remove the relief valve cap (3) from the control valve, to expose the adjusting screw.
- b. Do not release the front guide wheel unit locking mechanism. Push the control valve handle (2) towards the control valve to bottom out the hydraulic cylinder against the locking mechanism. Hold the control valve handle in this position while adjusting and reading the hydraulic pressure on the gauge.
- c. Turn the adjusting screw (3) of the control valve clockwise to increase the pressure or counter-clockwise to decrease the pressure. Stop when the pressure gauge remains steady at a constant pressure of 1800 PSI (124.1 bar). Release the control valve handle.
- d. Disengage the mechanical PTO hydraulic pump. Shut off the vehicle engine. Remove the pressure gauge from the test port (1) on the control valve. Install the relief valve cap (3) on the control valve.
- e. If a constant pressure of 1800 PSI (124.1 bar) can not be obtained at the control valve, the flow divider valve may have to be adjusted. See Flow Divider Valve Hydraulic Pressure.

Adjustments

FRONT GUIDE WHEEL UNIT HYDRAULIC PRESSURE

FIGURE 3-15
FRONT GUIDE WHEEL UNIT HYDRAULIC
PRESSURE ADJUSTMENT



3

Adjustments

REAR GUIDE WHEEL UNIT HYDRAULIC PRESSURE - See Figure 3-16

1. Attach the provided pressure gauge (099137K) to the test port (1 - not illustrated) on the rear guide wheel unit control valve.
2. Start the vehicle engine. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Engage the mechanical PTO hydraulic pump. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to direct hydraulic oil flow to the guide wheel equipment.
3. Do not release the rear guide wheel unit locking mechanism. Push the control valve handle (2) towards the control valve to bottom out the hydraulic cylinder against the locking mechanism. Hold the control valve handle in this position while reading the hydraulic pressure on the gauge. Release the control valve handle.

If the hydraulic pressure indicated is 1800 PSI (124.1 bar), the front guide wheel unit hydraulic pressure is set correctly. Go to Step 4.

If the pressure indicated is not 1800 PSI (124.1 bar), see Adjustment.

4. Disengage the mechanical PTO hydraulic pump. Remove the pressure gauge from the test port (1) on the control valve.

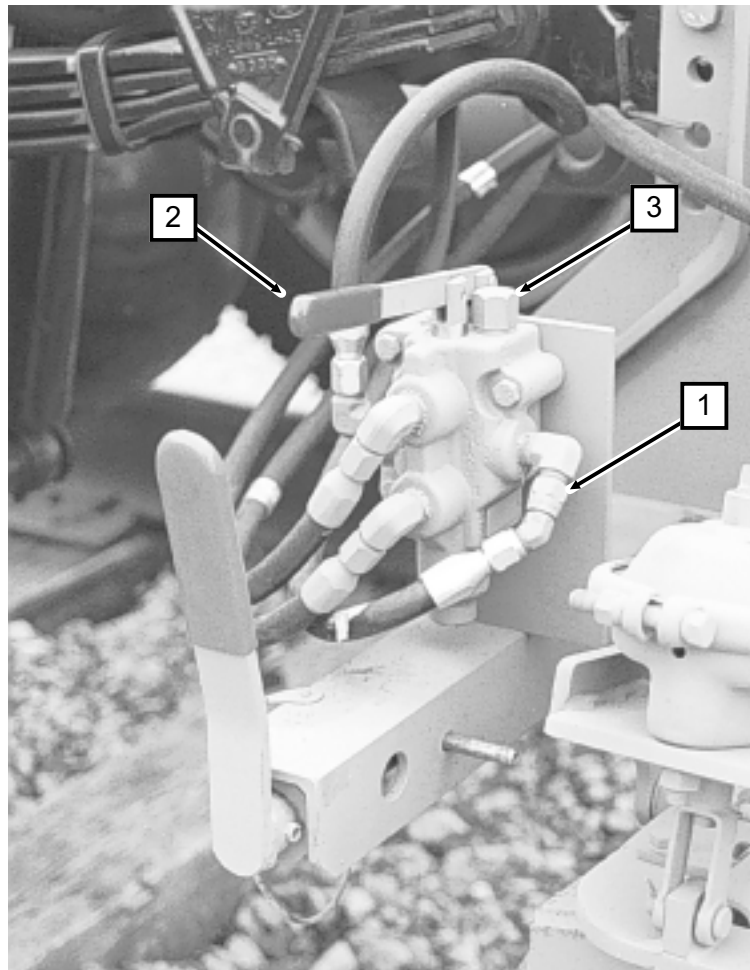
Adjustment - See Figure 3-16

- a. Remove the relief valve cap (3) from the control valve to expose the adjusting screw.
- b. Do not release the rear guide wheel unit locking mechanism. Push the control valve handle (2) towards the control valve to bottom out the hydraulic cylinder against the locking mechanism. Hold the control valve handle in this position while adjusting and reading the hydraulic pressure on the gauge.
- c. Turn the adjusting screw (3) of the control valve clockwise to increase the pressure or counter-clockwise to decrease the pressure. Stop when the pressure gauge remains steady at a constant pressure of 1800 PSI (124.1 bar). Release the control valve handle.
- d. Disengage the mechanical PTO hydraulic pump. Remove the pressure gauge from the test port (1) on the control valve (2). Install the relief valve cap (3) on the control valve (2).
- e. If a constant pressure of 1800 PSI (124.1 bar) can not be obtained at the control valve, the flow divider valve may have to be adjusted. See Flow Divider Valve Hydraulic Pressure.

Adjustments

REAR GUIDE WHEEL UNIT HYDRAULIC PRESSURE - See Figure 3-16

FIGURE 3-16
REAR GUIDE WHEEL UNIT HYDRAULIC
PRESSURE ADJUSTMENT



Adjustments

FLOW DIVIDER VALVE HYDRAULIC PRESSURE - See Figure 3-15

Note: The flow divider valve is preset from the factory to 2500 PSI (172.4 bar).

1. Attach the provided pressure gauge (099137K) to test port (1) on the front guide wheel unit control valve.
2. Remove relief valve cap (3) from the control valve, to expose the adjusting screw.
3. Start the vehicle engine. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Engage the mechanical PTO hydraulic pump. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to direct hydraulic oil flow to the guide wheel equipment.
4. Do not release the front guide wheel unit locking mechanism. Push control valve handle (2) towards the control valve to bottom out the hydraulic cylinder against the locking mechanism. Hold the control valve handle in this position while reading the hydraulic pressure on the gauge.
5. While holding the control valve handle, turn the adjusting screw on the control valve clockwise to increase the pressure. Stop when the pressure gauge remains steady at a constant pressure. This steady pressure is the relief setting of the flow divider valve.

If the hydraulic pressure indicated is 2500 PSI (172.4 bar) and remained steady, the flow divider valve hydraulic relief pressure is set correctly. Go to Step 6.

If the hydraulic pressure indicated is not 2500 PSI (172.4 bar), the flow divider valve hydraulic relief pressure will have to be adjusted. See Flow Divider Valve Hydraulic Pressure Adjustment.

6. While holding the control valve handle, turn the adjusting screw on the control valve counter-clockwise to decrease the pressure. Stop when the pressure gauge remains steady at a constant pressure of 1800 PSI (124.1 bar). Release the control valve handle.
7. Disengage the mechanical PTO hydraulic pump. Remove the pressure gauge from test port (1). Install relief valve cap (3) on the control valve.

Flow Divider Valve Hydraulic Pressure Adjustment



- **DEPRESSURIZE HYDRAULIC SYSTEM BEFORE ATTEMPTING TO ADJUST FLOW DIVIDER VALVE. COMPONENTS AND OIL UNDER PRESSURE COULD CAUSE SEVERE BODILY INJURY.**

Adjustments

Flow Divider Valve Hydraulic Pressure Adjustment - See Chart 3-17 And Figure 3-18

8. Disengage the mechanical PTO hydraulic pump. Stop the vehicle engine. Depressurize the vehicle hydraulic system.
9. Disassemble the flow divider valve by removing the relief cap (1), o-ring (2), relief spring (3), shims (4) and spring guide (5). The relief ball (6), relief seat (7), back-up washer (8) and o-ring (9) in the flow divider valve do not have to be removed.
10. Add or remove different thicknesses of shims (4) between the relief spring (3) and relief guide (5) to obtain the correct pressure setting of 2500 PSI (172.4 bar). See Chart 3-17 for approximate pressure change in relationship to shim thickness. Re-assemble the flow divider valve in reverse order.

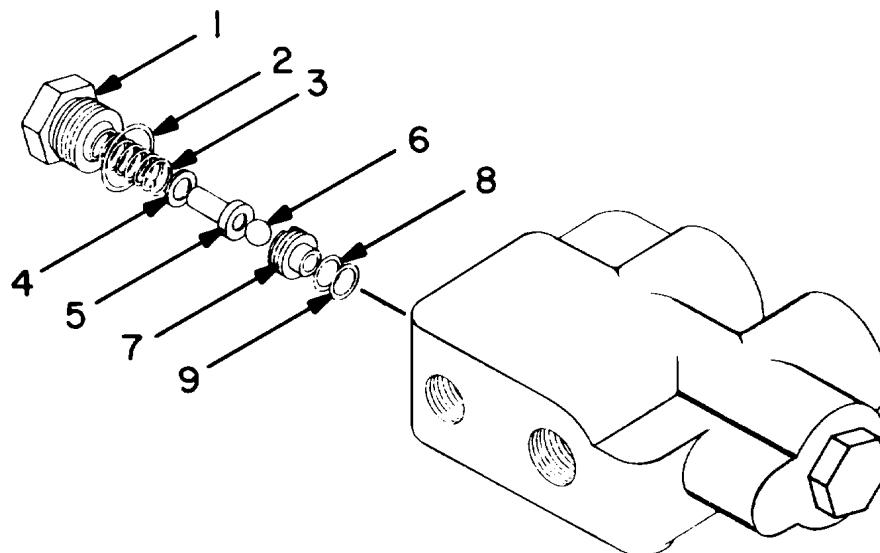
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CHART 3-17
SHIM / PRESSURE CHART

SHIM THICKNESS	APPROXIMATE PRESSURE CHANGE
.010 in.	75 PSI
.021 in.	175 PSI
.042 in.	425 PSI

11. Repeat Steps 3 - 10 until the correct divider valve hydraulic pressure setting is obtained.
12. If the flow divider valve hydraulic pressure can not be adjusted to 2500 PSI (172.4 bar), the problem may be with the hydraulic pump.

FIGURE 3-18
FLOW DIVIDER VALVE



**SECTION 4 - MAINTENANCE
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Maintenance Schedule



- **RE-TORQUE VEHICLE WHEEL LUG NUTS AND GUIDE WHEEL LUG NUTS AFTER THE FIRST 50 MILES OF OPERATION. THEREAFTER TORQUE WHEEL LUG NUTS ACCORDING TO VEHICLE MANUFACTURER'S WHEEL TORQUE SPECIFICATIONS. FAILURE TO COMPLY COULD RESULT IN SEVERE BODILY INJURY.**

DAILY:

1. Inspect the front and rear guide wheel units for damaged, worn or missing parts.
2. Check the mechanical locks and lock pins for ease of operation.
3. The lock pins should never be able to be pulled out unless the button on the "T" end of the pin is pushed in. The button in the lock pin must push in easily and also pop out when released. The locking balls in the end of the pin must work freely so the pin cannot be removed until the button in the lock pin is depressed. If the lock pin does not operate properly, replace the lock pin.
4. Check the hydraulic reservoir to ensure that the oil level is full. If low, fill to the proper level with the correct fluid.
5. When the vehicle is operated on the track, listen for unusual noises. Unusual noises may indicate incorrectly lowered guide wheels, damaged or missing parts, or insufficient lubrication. Pay attention to the quality of the ride. Check the guide wheel equipment alignment if the vehicle crowds one side of the track instead of floating from side to side. See Adjustments - Guide Wheel Equipment Alignment Procedure.

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WEEKLY:

1. Check the guide wheel equipment alignment. See Adjustment Section, Guide Wheel Equipment Alignment Procedure - Vehicle Track Test.
2. Inspect the guide wheel tread and flanges for wear or damage. See Maintenance - Guide Wheel Allowable Wear.
3. Spin each guide wheel by hand, checking for ease of rotation. If the guide wheel does not rotate easily, the guide wheel bearings may be lacking lubrication or may be damaged. Inspect, re-pack or replace the bearings if necessary.
4. Inspect the vehicle wheels, studs, lug nuts and tires for wear, damage, cuts etc.
5. Check the vehicle tires for correct inflation pressure. Operate at the tire manufacturer's recommended maximum pressure printed on the sidewalls of the tires, or the wheel manufacturer's recommended maximum pressure stamped on the wheel, whichever is lower.
6. Check all bolts for tightness. See Appendices - Appendix A, Bolt Torque Requirement Chart.

Maintenance Schedule

At 50 Vehicle Miles (80 Vehicle km):

Torque the vehicle wheel lug nuts and guide wheel lug nuts to the recommended specifications. Thereafter refer to the vehicle manufacturer's wheel torque specifications.

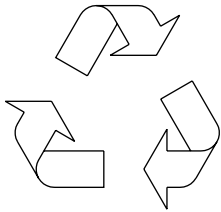
Every 2,000 Track Miles (3200 km):

Lubricate the guide wheel units locations provided with grease fittings. See Guide Wheel Equipment Lubrication.

At 10,000 Track Miles (16000 km):

Re-pack and adjust the guide wheel bearings. See Re-packing Guide Wheel Bearings.

Waste Disposal



Dispose of waste properly. Improper disposal of waste can threaten the environment. The operation and maintenance of Harsco Track Technologies equipment may involve the use of such items as hydraulic oil, engine oil, fuel, coolant, brake fluid, filters, batteries, etc.

Use leak proof containers when draining fluids. Do not pour waste onto the ground, down a drain, or into any water source. Inquire on the proper way to recycle or dispose of waste according to applicable Federal, State and/or local regulations.

Guide Wheel Equipment Lubrication

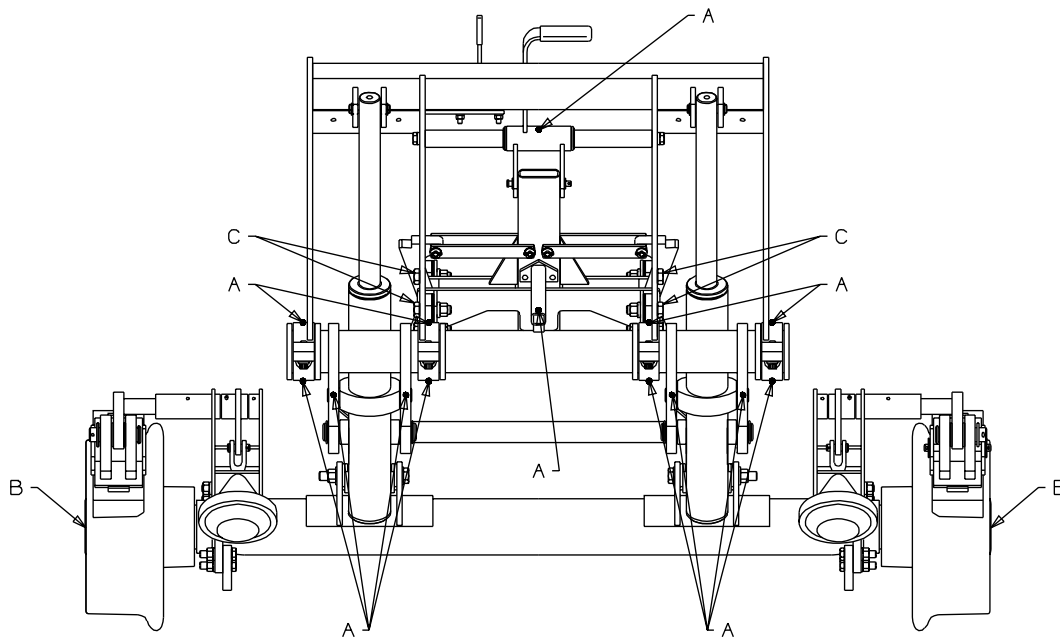
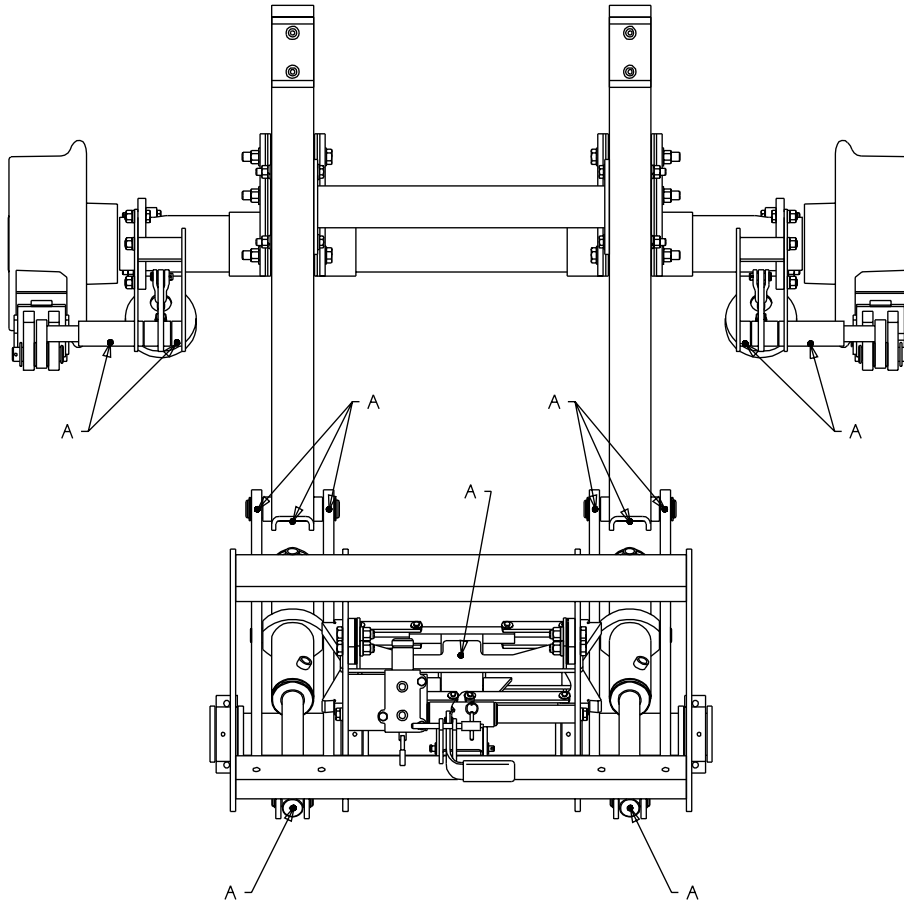
Lubricate the guide wheel equipment every 2000 track miles (maximum) or each time the vehicle is serviced.

FRONT AND REAR GUIDE WHEEL UNIT LUBRICATION - See Figures 4-1 and 4-2

1. Apply the vehicle parking brake. Stop the vehicle engine. Turn the vehicle's ignition switch off.
2. Lubricate grease fittings (A) using Mobil Special Moly, or equivalent.
3. Re-pack the guide wheel bearings (B) every 10,000 track miles (maximum) or at least once every two years (minimum), whichever occurs first. See Re-packing Guide Wheel Bearings.
4. Lubricate pivot points (C) on locking mechanism using a light weight oil or lubricating spray.

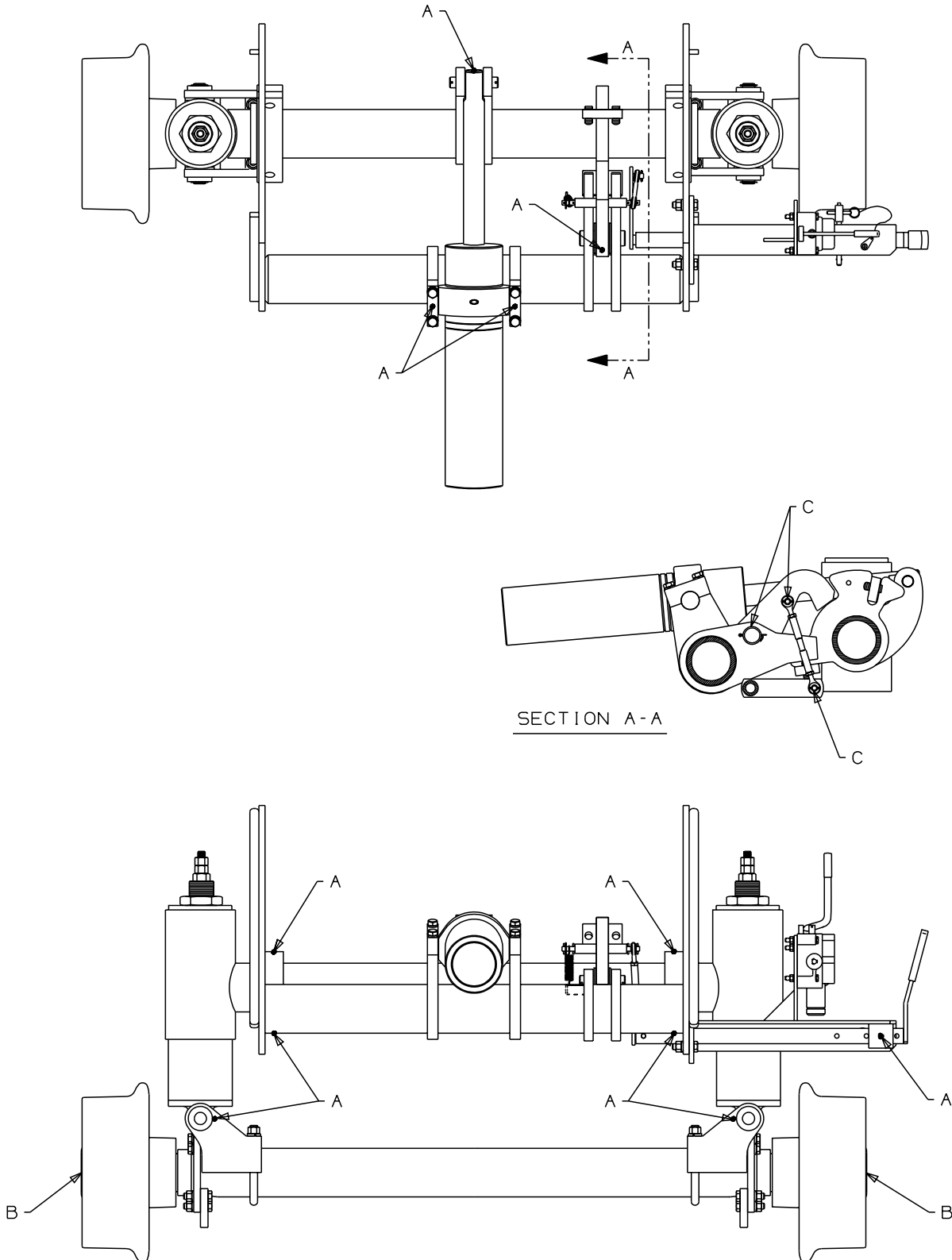
Guide Wheel Equipment Lubrication

FIGURE 4-1
FRONT GUIDE WHEEL UNIT LUBRICATION



Guide Wheel Equipment Lubrication

FIGURE 4-2
REAR GUIDE WHEEL UNIT LUBRICATION



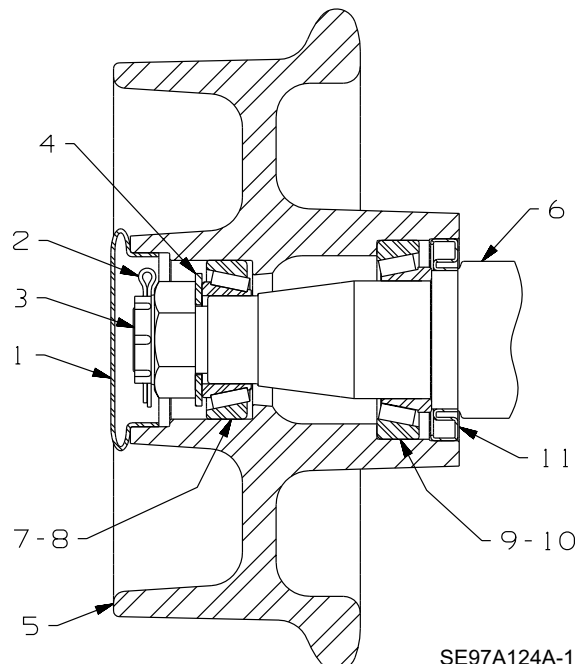
Guide Wheel Equipment Lubrication

RE-PACKING GUIDE WHEEL BEARINGS - See Figure 4-3

Re-pack the guide wheel bearings every 10,000 track miles (maximum) or at least once every two years (minimum), whichever occurs first.

1. Apply the parking brake. Raise and lock the front and rear guide wheel units in the "highway" position. Stop the vehicle engine. Shut off the vehicle ignition switch.
2. Remove the hub cap (1). Remove the 3/16 x 2-1/2 inch cotter pin (2), 1-1/2 inch castle nut (3) and spindle washer (4).
3. Pull the guide wheel (5) from the spindle (6). Remove the outer bearing cone (7) from the guide wheel (5). Remove the grease seal (11) and inner bearing cone (9) from the guide wheel (5).
4. Clean all components of old grease and dirt.
5. Inspect the spindle, bearing cones and cups (7 & 8, 9 & 10) for nicks, gouges and wear. If any of these are evident, replace the component.
6. Measure the guide wheel wear. See Maintenance - Guide Wheels, Allowable Wear.
7. Coat the spindle surface, grease seal surface, both bearing cup surfaces, pack both bearing cones and fill the guide wheel cavity 1/2 full (50 %) using Mobil HP grease, or equivalent.
8. Install the inner bearing cone (9) into the guide wheel (5). Install a new grease seal (11) into the wheel.
9. Slide the guide wheel (5) with the inner bearing (9) and grease seal (11) onto the spindle (6). Install the outer bearing cone (7), spindle washer (4) and 1-1/2 inch castle nut (3) onto the spindle (6).
10. Torque the castle nut (3) to approximately 20 ft lbs. Then loosen the castle nut. This is especially important if new bearing cups have been installed.
11. Torque the castle nut (3) to 7 ft lbs (zero clearance). Then back the castle nut off 1/2 to 1 flat of the nut (.001 - .010 inch clearance). Secure the castle nut using a new cotter pin (2).
12. Install the hub cap (1) onto the guide wheel.

FIGURE 4-3
RE-PACKING GUIDE WHEEL
BEARINGS



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Guide Wheels

ALLOWABLE WEAR - See Figure 4-4



■ **REPLACE ANY GUIDE WHEEL IMMEDIATELY WHICH SHOWS DAMAGE AND/OR HAS WORN MORE THAN THE ALLOWABLE LIMITS. FAILURE TO COMPLY COULD RESULT IN DERAILMENT OF THE VEHICLE, AND SEVERE BODILY INJURY.**

1. Tools needed: Harsco Track Technologies wheel caliper (M019889), or equivalent.
2. Measure the guide wheel flange at Position "A" with the wheel caliper. The minimum allowable flange dimension at Position "A" is 7/8 inch (22.2 mm).

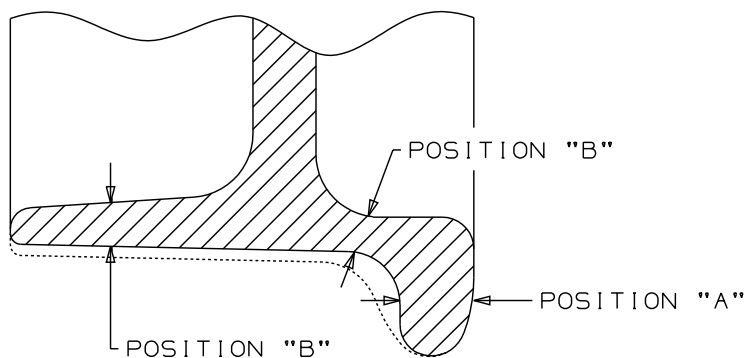
If the guide wheel flange dimension is less than the allowable limit, replace the guide wheel immediately.

3. Measure the guide wheel tread at Position "B" with the wheel caliper. The minimum allowable tread dimension at Position "B" is 1/2 inch (12.7 mm).

If the guide wheel tread dimension is less than the allowable limit, replace the guide wheel immediately.

4. The entire guide wheel must not have any gouges or cracks. If any of these are evident, replace the guide wheel immediately.

FIGURE 4-4
ALLOWABLE GUIDE WHEEL WEAR



Hoses and Fittings



- ALL HOSES AND FITTINGS ON THIS EQUIPMENT MUST COMPLY WITH SAE STANDARD J1273 RECOMMENDED PRACTICE FOR SELECTION, INSTALLATION AND MAINTENANCE OF HOSE AND HOSE ASSEMBLIES. FAILURE TO COMPLY TO THIS STANDARD COULD RESULT IN SEVERE BODILY INJURY.

INSPECTION, MAINTENANCE, REPLACEMENT AND INSTALLATION

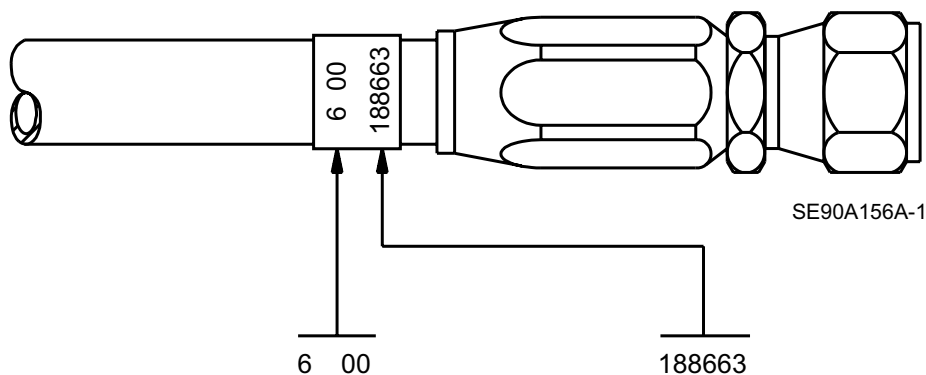
The inspection, maintenance, replacement and installation of hydraulic hose assemblies and fittings on this equipment must conform with SAE Standard J1273. See Appendices Section - Appendix B.

HOSE BAND - See Figure 4-5

4

All Harsco Track Technologies original and replacement hose assemblies manufactured for this equipment at the Harsco Track Technologies, Harsco Corporation Fairmont, Minnesota plant facility are supplied with a hose band displaying the date of manufacture and the Harsco Track Technologies part number. See Figure 4-5 for explanation of the hose band. The hose assembly illustrated in the example was manufactured in June 2000 and is Harsco Track Technologies part number 188663.

FIGURE 4-5
HOSE BAND



	MONTH	YEAR	HARSCO TRACK TECHNOLOGIES PART NUMBER
JANUARY	= 1	LAST TWO	DIGITS OF THE YEAR OF MANUFACTURE
FEBRUARY	= 2	DIGITS OF	
MARCH	= 3	THE YEAR OF	
APRIL	= 4	MANUFACTURE	
MAY	= 5		
JUNE	= 6		
JULY	= 7		
AUGUST	= 8		
SEPTEMBER	= 9		
OCTOBER	= 0		
NOVEMBER	= N		
DECEMBER	= D		

Vehicle Wheels

WHEEL REPLACEMENT



- **USE REPLACEMENT WHEELS AS RECOMMENDED IN THE HARSCO TRACK TECHNOLOGIES HY-RAIL® VEHICLE SPECIFICATIONS MANUAL. FAILURE TO COMPLY COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.**

Use replacement wheel rim(s) as recommended in the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual to ensure correct vehicle wheel spacing and accurate guide wheel load. The wheels and tires should be static balanced or balanced after installation on the vehicle for best results. Torque vehicle wheel lug nuts to recommended specifications.

TIRE REPLACEMENT



- **USE REPLACEMENT TIRES WITH THE SAME ROLLING RADIUS, TREAD WIDTH, PLY RATING, AND LOAD RATING AS RECOMMENDED IN THE HARSCO TRACK TECHNOLOGIES HY-RAIL® VEHICLE SPECIFICATIONS MANUAL. FAILURE TO COMPLY COULD RESULT IN BODILY INJURY AND/OR PROPERTY DAMAGE.**

4

Bias ply tires are the recommended tire for use on vehicles equipped with guide wheel equipment. Radial tires may influence vehicle tracking. Performance of vehicles equipped with radial tires is the responsibility of the end user.

Replacement tires must have the same rolling radius, tread width, ply rating, and load rating as recommended in the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual. Using tires of equal diameter will help keep the speedometer reading and the guide wheel load accurate. Tires must have a minimum 6-1/2 inches of tread width.

Inflate tires to the tire manufacturer's recommended maximum pressure printed on the sidewall of the tire or to the wheel manufacturer's recommended maximum pressure stamped on the wheel, whichever is lower. The wheels and tires should be static balanced or balanced after installation on the vehicle for best results. Torque vehicle wheel lug nuts to recommended specifications.

Bolt Torque Requirements



- **CHECK ALL BOLTS AND NUTS PERIODICALLY. KEEP BOLTS AND NUTS TIGHTENED TO THE TORQUE SPECIFIED IN APPENDICES SECTION - APPENDIX A. IF BOLT REPLACEMENT BECOMES NECESSARY, REPLACE WORN BOLT WITH EQUAL S.A.E. GRADE NUMBER BOLT. FAILURE TO COMPLY COULD RESULT IN BODILY INJURY, AND/OR PROPERTY DAMAGE.**

See Appendices Section - Appendix A, for bolt torque requirements table and grade identification markings used by manufacturers.

**SECTION 5 - TROUBLESHOOTING
TABLE OF CONTENTS**

Troubleshooting Guide Wheel Equipment

TROUBLESHOOTING CHART 5 - 2

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Hydraulic pump not delivering oil.	<p>Mechanical PTO not engaged or control valve not shifted to direct oil flow to guide wheel equipment.</p> <p>Hydraulic reservoir oil level low.</p> <p>Oil restricted to pump intake.</p> <p>Components bent, broken, worn, etc.</p>	<p>Engage mechanical PTO. Shift control valve to direct oil flow to guide wheel equipment.</p> <p>Fill reservoir to full level with recommended hydraulic oil.</p> <p>Check all strainers and filters for dirt and sludge. Clean and replace if necessary.</p> <p>Replace components.</p>
Guide wheels do not lower or raise.	<p>Mechanical lock engaged.</p> <p>Hydraulic pump not operating.</p> <p>Hydraulic reservoir oil level low.</p> <p>Components bent, broken, worn, etc.</p> <p>Lack of lubrication.</p>	<p>Disengage lock. See Operation - Placing Vehicle On Track or Removing Vehicle From Track.</p> <p>Start hydraulic pump.</p> <p>Fill reservoir to full level with recommended hydraulic oil.</p> <p>Replace components.</p> <p>Lubricate front and rear guide wheel units. See Maintenance - Guide Wheel Equipment Lubrication.</p>

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
<p>Guide wheels are difficult to lower or raise.</p>	<p>Vehicle over-loaded.</p>	<p>Remove excess load from vehicle.</p>
	<p>Guide wheel load adjusted incorrectly.</p>	<p>Re-adjust. See Adjustments - Guide Wheel Equipment Alignment Procedure.</p>
	<p>Components bent, broken, worn, etc.</p>	<p>Replace components.</p>
	<p>Lack of lubrication.</p>	<p>Lubricate front and rear guide wheel units. See Maintenance - Guide Wheel Equipment Lubrication.</p>
	<p>Control valve hydraulic relief pressure set incorrectly.</p>	<p>Check and adjust if necessary. See Adjustments - Hydraulic Pressure Adjustments.</p>
	<p>Flow divider valve hydraulic relief pressure set incorrectly.</p>	<p>Check and adjust if necessary. See Adjustments - Hydraulic Pressure Adjustments.</p>
	<p>Lock pin cannot be inserted when guide wheels are in "rail" or "highway" position.</p>	<p>Foreign material (mud, slush, dirt, etc.) in locking mechanism.</p>
<p>Locking mechanism adjusted incorrectly.</p>		<p>Re-adjust. See Adjustments - Locking Mechanism.</p>
<p>Lack of lubrication.</p>		<p>Lubricate front and rear locking mechanism. See Maintenance - Guide Wheel Equipment Lubrication.</p>
<p>Components bent, broken, worn, etc.</p>		<p>Replace components.</p>

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
<p>Vehicle front tires clear rail less than 1-1/2" (38 mm) when vehicle is on track and loaded.</p>	<p>Vehicle overloaded.</p> <p>Front support carriage not lifting front axle high enough.</p> <p>Front guide wheel unit not positioned in proper holes of mounting brackets.</p>	<p>Redistribute or remove some of the load.</p> <p>See Adjustments - Vehicle Front Wheel Clearance - Rail Position.</p> <p>Mount front guide wheel unit in correct mounting holes. See application drawings supplied with guide wheel equipment group.</p>
<p>Vehicle pulls noticeably to the left or right when on track.</p>	<p>Vehicle loaded heavy on one side.</p> <p>Guide wheel units, vehicle rear axle(s), etc. not aligned with vehicle frame.</p> <p>Incorrect or worn vehicle rear tire.</p> <p>Vehicle rear tires under inflated.</p> <p>Guide wheel brake shoes dragging.</p>	<p>Move load to center of vehicle.</p> <p>Check alignment. See Adjustments - Guide Wheel Equipment Alignment Procedure.</p> <p>Check for correct rear tire. Replace if necessary. Replace worn rear tire.</p> <p>Check pressure. Inflate if low.</p> <p>Do not exceed tire manufacturer's recommended maximum pressure printed on the sidewalls, or wheel manufacturer's recommended maximum pressure stamped on the wheel, whichever is lower.</p> <p>Re-adjust brake shoes. See Adjustments - Brakes.</p>

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Vehicle derails.	Guide wheel units, vehicle rear axle(s), etc. not aligned with vehicle frame.	Check alignment. See Adjustments - Guide Wheel Equipment Alignment Procedure.
Vibration felt in the vehicle when traveling on track.	Guide wheel units mounting fasteners loose.	Tighten all bolts to recommended torque.
	Guide wheel bearings worn.	Replace bearings, wheel or axle.
	Guide wheels worn.	Check guide wheel wear. See Maintenance - Guide Wheels, Allowable Wear.
	Vehicle rear rim bent.	Replace. See Parts - Vehicle Applications.
	Vehicle rear tires out of balance.	Balance tires.
Vehicle load on optional wheel load jack exceeds front guide wheel unit maximum rated load.	Vehicle overloaded.	Redistribute or remove some of the load.
	Rear guide wheel unit not initially set to carry approximately 40% of vehicle rear axle curb weight or 2,100 lbs (953 kg) minimum.	Re-adjust. See Adjustments - Guide Wheel Equipment Alignment Procedure.
	Vehicle rear spring broken.	Repair or replace spring.

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Vehicle load on rear spring cells exceed rear guide wheel unit maximum rated load.	Vehicle overloaded.	Redistribute or remove some of the load.
	Vehicle rear tires under inflated.	Check pressure. Inflate if low. Do not exceed tire manufacturer's recommended maximum pressure printed on the sidewalls, or wheel manufacturer's recommended maximum pressure stamped on the wheel, whichever is lower.
Vibration felt in the vehicle when traveling on highway.	Guide wheel units mounting fasteners loose.	Tighten all bolts to recommended torque.
	Guide wheels not locked in "highway" position.	STOP IMMEDIATELY. Make sure guide wheels are locked in "highway" position.
	Vehicle rim bent.	Replace. See Parts - Vehicle Applications.
	Vehicle tires out of balance.	Balance tires.

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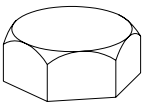
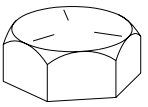
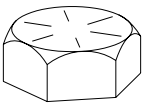
SERVICE DATA NO. SD 795 - 181698 BRAKE PIN SERVICE GROUP
SERVICE DATA NO. SD 845 - 188415 VALVE LEVER SERVICE GROUP

Appendix A

**FIGURE 6-1
STANDARD BOLT TORQUE REQUIREMENTS TABLE
STANDARD TYPE FASTENERS**

The torque values listed below are for standard-type fasteners only. The torque values listed are based on wet (lubricated) and dry conditions. The torque values for 1/4 and 5/16 inch size fasteners are listed in in-lbs torque only. The torque values for all other size fasteners are listed in ft-lbs torque with metric equivalents in parentheses. Use lower grade torque values if bolt and nut have different SAE grades. Manufacturer's SAE grade markings may vary.

STANDARD MARKINGS AND TORQUE SPECIFICATIONS

SAE Grade	1 or 2				5				8			
Fastener Standard SAE Grade Markings												
Fastener Body Size Inch Thrd	Wet Torque		Dry Torque		Wet Torque		Dry Torque		Wet Torque		Dry Torque	
	in-lb	in-lb	in-lb	in-lb	in-lb	in-lb	in-lb	in-lb	in-lb	in-lb	in-lb	in-lb
1/4 - 20	49	65			75	100			107	142		
1/4 - 28	56	74			86	114			122	162		
5/16 - 18	103	137			157	208			220	293		
5/16 - 24	113	150			173	230			244	325		
Fastener Body Size Inch Thrd	Wet Torque	kg-m	ft-lb	Dry Torque	kg-m	ft-lb	Dry Torque	kg-m	ft-lb	Dry Torque	kg-m	ft-lb
3/8 - 16	15	(2.1)	20	(2.8)	23	(3.2)	31	(4.2)	32	(4.4)	43	(5.9)
3/8 - 24	17	(2.4)	23	(3.1)	26	(3.6)	35	(4.8)	37	(5.1)	49	(6.8)
7/16 - 14	24	(3.3)	32	(4.4)	37	(5.1)	49	(6.8)	52	(7.2)	69	(9.6)
7/16 - 20	27	(3.7)	36	(5.0)	42	(5.8)	56	(7.7)	58	(8.0)	77	(10.7)
1/2 - 13	39	(5.4)	52	(7.2)	57	(7.9)	76	(10.5)	80	(11.0)	106	(14.7)
1/2 - 20	41	(5.7)	55	(7.5)	64	(8.9)	85	(11.8)	90	(12.4)	120	(16.5)
9/16 - 12	53	(7.3)	71	(9.7)	82	(11.3)	109	(15.1)	115	(15.9)	153	(21.1)
9/16 - 18	59	(8.2)	78	(10.8)	91	(12.6)	121	(16.7)	129	(17.8)	172	(23.7)
5/8 - 11	73	(10.0)	97	(13.4)	113	(15.6)	150	(20.8)	160	(22.1)	213	(29.4)
5/8 - 18	83	(11.5)	110	(15.2)	128	(17.7)	170	(23.5)	180	(24.9)	239	(33.1)
3/4 - 10	129	(17.8)	172	(23.7)	200	(27.7)	266	(36.8)	282	(39.0)	375	(51.8)
3/4 - 16	144	(19.9)	192	(26.5)	223	(30.8)	297	(41.0)	315	(43.6)	419	(57.9)
7/8 - 9	124	(17.1)	165	(22.8)	323	(44.7)	430	(59.4)	454	(62.8)	604	(83.5)
7/8 - 14	138	(19.1)	184	(25.4)	355	(49.1)	472	(65.3)	501	(69.3)	666	(92.1)
1 - 8	188	(26.0)	250	(34.6)	483	(66.8)	642	(88.9)	681	(94.2)	906	(125.2)
1 - 14	210	(29.0)	279	(38.6)	541	(74.8)	720	(99.5)	764	(106.0)	1,016	(140.5)
1-1/8 - 7	266	(36.8)	354	(48.9)	596	(82.4)	793	(109.6)	966	(134.0)	1,285	(177.6)
1-1/8 - 12	297	(41.1)	395	(54.6)	668	(92.4)	888	(122.8)	1,083	(150.0)	1,440	(199.1)
1-1/4 - 7	375	(51.9)	499	(69.0)	841	(116.0)	1,119	(154.6)	1,363	(189.0)	1,813	(250.6)
1-1/4 - 12	415	(57.4)	552	(76.3)	930	(129.0)	1,237	(171.0)	1,509	(209.0)	2,007	(277.5)
1-3/8 - 6	492	(68.0)	654	(90.5)	1,102	(152.0)	1,466	(202.6)	1,787	(247.0)	2,377	(328.6)
1-3/8 - 12	560	(77.4)	745	(103.0)	1,255	(174.0)	1,670	(230.8)	2,034	(281.0)	2,705	(374.0)
1-1/2 - 6	653	(90.3)	868	(120.1)	1,463	(202.0)	1,946	(269.0)	2,371	(328.0)	3,153	(436.0)
1-1/2 - 12	734	(102.0)	976	(135.0)	1,645	(228.0)	2,188	(302.5)	2,668	(369.0)	3,548	(490.6)

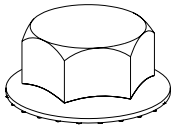
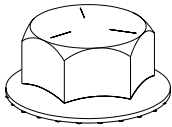
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Appendix A

**FIGURE 6-2
STANDARD BOLT TORQUE REQUIREMENTS TABLE
SERRATED TYPE FLANGE FASTENERS**

The torque values listed below are for serrated-type flange fasteners only. The torque values listed are based on wet (lubricated) and dry conditions. The torque values for all size fasteners are listed in ft-lbs torque with metric equivalents in parentheses. Use lower grade torque values if bolt and nut have different SAE grades. Manufacturer's SAE grade markings may vary.

STANDARD MARKINGS AND TORQUE SPECIFICATIONS

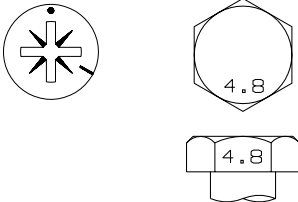
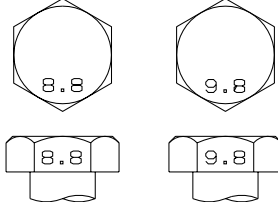
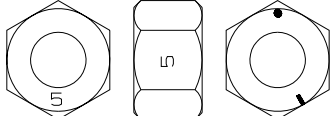
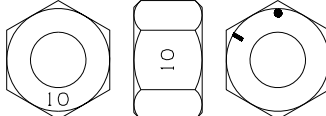
SAE Grade	1 or 2				5			
Fastener Standard SAE Grade Markings								
Fastener Body Size Inch Thrd	Torque				Torque			
	Wet ft-lb	(kg-m)	Dry ft-lb	(kg-m)	Wet ft-lb	(kg-m)	Dry ft-lb	(kg-m)
1/4 - 20	8	(1.1)	11	(1.5)	11	(1.5)	15	(2.1)
1/4 - 28	9	(1.2)	12	(1.7)	12	(1.7)	16	(2.2)
5/16 - 18	13	(1.8)	17	(2.4)	20	(2.8)	27	(3.7)
5/16 - 24	13	(1.8)	17	(2.4)	32	(4.4)	43	(5.9)
3/8 - 16	23	(3.2)	31	(4.3)	40	(5.5)	53	(7.3)
3/8 - 24	25	(3.5)	33	(4.6)	43	(5.9)	57	(7.9)
7/16 - 14	38	(5.3)	51	(7.1)	55	(7.6)	73	(10.1)
7/16 - 20	40	(5.5)	53	(7.5)	60	(8.3)	80	(11.1)
1/2 - 13	60	(8.3)	80	(11.1)	95	(13.1)	127	(17.6)
1/2 - 20	65	(9.0)	87	(12.0)	100	(13.8)	133	(18.4)
9/16 - 12	78	(10.8)	104	(14.4)	140	(19.4)	187	(25.9)
9/16 - 18	85	(11.8)	113	(15.6)	150	(20.7)	200	(27.7)
5/8 - 11	125	(17.3)	167	(23.1)	190	(26.3)	253	(35.0)
5/8 - 18	135	(18.7)	180	(24.9)	220	(30.4)	293	(40.5)
3/4 - 10	225	(31.1)	300	(41.2)	350	(48.4)	467	(64.6)
3/4 - 16	250	(34.6)	333	(46.1)	400	(55.3)	533	(73.7)
7/8 - 9	350	(48.4)	467	(64.6)	550	(76.1)	733	(101.4)
7/8 - 14	375	(51.9)	500	(69.2)	600	(83.0)	800	(110.6)
1 - 8	480	(66.4)	640	(88.5)	750	(103.7)	1,000	(138.3)
1 - 14	500	(69.2)	666	(92.1)	800	(110.6)	1,066	(147.4)

Appendix A

**FIGURE 6-3
BOLT TORQUE REQUIREMENTS TABLE
METRIC TYPE FASTENERS**

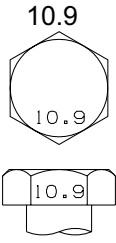
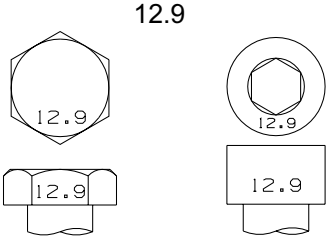
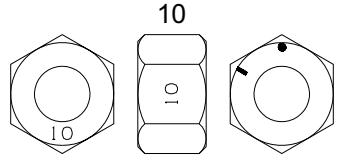
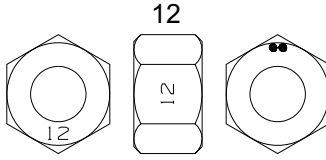
Do not use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically. Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original. Make sure fastener's threads are clean and that thread engagement is properly started. This will help prevent them from failing when tightening.

* Lubricated means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. Dry means plain or zinc plated without any lubrication.

Property Class and Head Markings	<p>4.8</p> 				<p>8.8 9.8</p> 			
Property Class and Head Markings	<p>5</p> 				<p>10</p> 			
Size	Class 4.8				Class 8.8 or 9.8			
	* Lubricated		* Dry		* Lubricated		* Dry	
	N - m	lb - ft	N - m	lb - ft	N - m	lb - ft	N - m	lb - ft
M 6	4.8	3.5	6	4.5	9	6.5	11	8.5
M 8	12	8.5	15	11	22	16	28	20
M10	23	17	29	21	43	32	55	40
M12	40	29	50	37	75	55	95	70
M14	63	47	80	60	120	88	150	110
M16	100	73	125	92	190	140	240	175
M18	135	100	175	125	260	195	330	250
M20	190	140	240	180	375	275	475	350
M22	260	190	330	250	510	375	650	475
M24	330	250	425	310	650	475	825	600
M27	490	360	625	450	950	700	1200	875
M30	675	490	850	625	1300	950	1650	1200
M33	900	675	1150	850	1750	1300	2200	1650
M36	1150	850	1450	1075	2250	1650	2850	2100

Appendix A

FIGURE 6-4
BOLT TORQUE REQUIREMENTS TABLE
METRIC TYPE FASTENERS

Property Class and Head Markings								
Property Class and Head Markings								
Size	Class 10.9				Class 12.9			
	* Lubricated		* Dry		* Lubricated		* Dry	
	N - m	lb - ft	N - m	lb - ft	N - m	lb - ft	N - m	lb - ft
M 6	13	9.5	17	12	15	11.5	19	14.5
M 8	32	24	40	30	37	28	47	35
M10	63	47	80	60	75	55	95	70
M12	110	80	140	105	130	95	165	120
M14	175	130	225	165	205	150	260	190
M16	275	200	350	255	320	240	400	300
M18	375	275	475	350	440	325	560	410
M20	530	400	675	500	625	460	800	580
M22	725	540	925	675	850	625	1075	800
M24	925	675	1150	850	1075	800	1350	1000
M27	1350	1000	1700	1250	1600	1150	2000	1500
M30	1850	1350	2300	1700	2150	1600	2700	2000
M33	2500	1850	3150	2350	2900	2150	3700	2750
M36	3200	2350	4050	3000	3750	2750	4750	3500

Appendix A

FIGURE 6-5
INCH TO MILLIMETER CONVERSION TABLE
1 INCH = 25.4 MILLIMETERS

FRACTIONS	DECIMALS	MILLIMETERS	FRACTIONS	DECIMALS	MILLIMETERS	
	1/64	.016	0.397	33/64	.516	13.097
1/32	.031	0.794	17/32	.531	13.494	
	3/64	.047	1.191	35/64	.547	13.891
1/16	.063	1.588	9/16	.563	14.288	
	5/64	.078	1.984	37/64	.578	14.684
3/32	.094	2.381	19/32	.594	15.081	
	7/64	.109	2.778	39/64	.609	15.478
1/8	.125	3.175	5/8	.625	15.875	
	9/64	.141	3.572	41/64	.641	16.272
5/32	.156	3.969	21/32	.656	16.669	
	11/64	.172	4.366	43/64	.672	17.066
3/16	.188	4.763	11/16	.688	17.463	
	13/64	.203	5.159	45/64	.703	17.859
7/32	.219	5.556	23/32	.719	18.256	
	15/64	.234	5.953	47/64	.734	18.653
1/4	.250	6.350	3/4	.750	19.050	
	17/64	.266	6.747	49/64	.766	19.447
9/32	.281	7.144	25/32	.781	19.844	
	19/64	.297	7.541	51/64	.797	20.241
5/16	.313	7.938	13/16	.813	20.638	
	21/64	.328	8.334	53/64	.828	21.034
11/32	.344	8.731	27/32	.844	21.431	
	23/64	.359	9.128	55/64	.859	21.828
3/8	.375	9.525	7/8	.875	22.225	
	25/64	.391	9.922	57/64	.891	22.622
13/32	.406	10.319	29/32	.906	23.019	
	27/64	.422	10.716	59/64	.922	23.416
7/16	.438	11.113	15/16	.938	23.813	
	29/64	.453	11.509	61/64	.953	24.209
15/32	.469	11.906	31/32	.969	24.606	
	31/64	.484	12.303	63/64	.984	25.003
1/2	.500	12.700	1	1.000	25.400	

FIGURE 6-6
FEET TO METERS CONVERSION TABLE
1 FOOT = 0.3048 METER

FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS	FEET	METERS
100	30.480	10	3.048	1	0.305	0.1	0.030	0.01	0.003
200	60.960	20	6.096	2	0.610	0.2	0.061	0.02	0.006
300	91.440	30	9.144	3	0.914	0.3	0.091	0.03	0.009
400	121.920	40	12.192	4	1.219	0.4	0.122	0.04	0.012
500	152.400	50	15.240	5	1.524	0.5	0.152	0.05	0.015
600	182.880	60	18.288	6	1.829	0.6	0.183	0.06	0.018
700	213.360	70	21.336	7	2.134	0.7	0.213	0.07	0.021
800	243.840	80	24.384	8	2.438	0.8	0.244	0.08	0.024
900	274.320	90	27.432	9	2.743	0.9	0.274	0.09	0.027
1,000	304.800	100	30.480	10	3.048	1.0	0.305	0.10	0.030

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Appendix A

FIGURE 6-7
POUNDS TO KILOGRAMS CONVERSION TABLE
1 POUND = 0.4536 KILOGRAM

LB	KG	LB	KG	LB	KG	LB	KG	LB	KG
1,000	453.59	100	45.36	10	4.54	1	0.45	0.1	0.05
2,000	907.18	200	90.72	20	9.07	2	0.91	0.2	0.09
3,000	1,360.78	300	136.08	30	13.61	3	1.36	0.3	0.14
4,000	1,814.37	400	181.44	40	18.14	4	1.81	0.4	0.18
5,000	2,267.96	500	226.80	50	22.68	5	2.27	0.5	0.23
6,000	2,721.55	600	272.16	60	27.22	6	2.72	0.6	0.27
7,000	3,175.15	700	317.51	70	31.75	7	3.18	0.7	0.32
8,000	3,628.74	800	362.87	80	36.29	8	3.63	0.8	0.36
9,000	4,082.33	900	408.23	90	40.82	9	4.08	0.9	0.41
10,000	4,535.92	1,000	453.59	100	45.36	10	4.54	1.0	0.45

FIGURE 6-8
POUNDS PER SQUARE INCH TO BAR CONVERSION TABLE
1 PSI = 0.06895 BAR

PSI	BAR	PSI	BAR	PSI	BAR	PSI	BAR
1,000	68.95	100	6.90	10	0.69	1	0.07
2,000	137.90	200	13.79	20	1.38	2	0.14
3,000	206.84	300	20.68	30	2.07	3	0.21
4,000	275.80	400	27.58	40	2.76	4	0.28
5,000	344.70	500	34.47	50	3.45	5	0.35
6,000	413.64	600	41.36	60	4.14	6	0.41
7,000	482.58	700	48.26	70	4.83	7	0.48
8,000	551.52	800	55.15	80	5.52	8	0.55
9,000	620.46	900	62.05	90	6.21	9	0.62
10,000	689.48	1,000	68.95	100	6.90	10	0.69

FIGURE 6-9
POUNDS PER SQUARE INCH TO
KILOPASCALS CONVERSION TABLE
1 PSI = 6.895 kPa

PSI	kPa	PSI	kPa
10	68.95	1	6.90
20	137.90	2	13.79
30	206.84	3	20.68
40	275.80	4	27.58
50	344.70	5	34.47
60	413.64	6	41.36
70	482.58	7	48.26
80	551.52	8	55.15
90	620.46	9	62.05
100	689.48	10	68.95

Appendix A

FIGURE 6-10
FAHRENHEIT TO CELSIUS (Centigrade) CONVERSION TABLE
(DEGREES F - 32°) ÷ 1.8 = DEGREES C

deg F	deg C	deg F	deg C	deg F	deg C	deg F	deg C
1	-17.2	51	10.6	101	38.3	151	66.1
2	-16.7	52	11.1	102	38.9	152	66.7
3	-16.1	53	11.7	103	39.4	153	67.2
4	-15.6	54	12.2	104	40.0	154	67.8
5	-15.0	55	12.8	105	40.6	155	68.3
6	-14.4	56	13.3	106	41.1	156	68.9
7	-13.9	57	13.9	107	41.7	157	69.4
8	-13.3	58	14.4	108	42.2	158	70.0
9	-12.8	59	15.0	109	42.8	159	70.6
10	-12.2	60	15.6	110	43.3	160	71.1
11	-11.7	61	16.1	111	43.9	161	71.7
12	-11.1	62	16.7	112	44.4	162	72.2
13	-10.6	63	17.2	113	45.0	163	72.8
14	-10.0	64	17.8	114	45.6	164	73.3
15	-9.4	65	18.3	115	46.1	165	73.9
16	-8.9	66	18.9	116	46.7	166	74.4
17	-8.3	67	19.4	117	47.2	167	75.0
18	-7.8	68	20.0	118	47.8	168	75.6
19	-7.2	69	20.6	119	48.3	169	76.1
20	-6.7	70	21.1	120	48.9	170	76.7
21	-6.1	71	21.7	121	49.4	171	77.2
22	-5.6	72	22.2	122	50.0	172	77.8
23	-5.0	73	22.8	123	50.6	173	78.3
24	-4.4	74	23.3	124	51.1	174	78.9
25	-3.9	75	23.9	125	51.7	175	79.4
26	-3.3	76	24.4	126	52.2	176	80.0
27	-2.8	77	25.0	127	52.8	177	80.6
28	-2.2	78	25.6	128	53.3	178	81.1
29	-1.7	79	26.1	129	53.9	179	81.7
30	-1.1	80	26.7	130	54.4	180	82.2
31	-0.6	81	27.2	131	55.0	181	82.8
32	0.0	82	27.8	132	55.6	182	83.3
33	0.6	83	28.3	133	56.1	183	83.9
34	1.1	84	28.9	134	56.7	184	84.4
35	1.7	85	29.4	135	57.2	185	85.0
36	2.2	86	30.0	136	57.8	186	85.6
37	2.7	87	30.6	137	58.3	187	86.1
38	3.3	88	31.1	138	58.9	188	86.7
39	3.9	89	31.7	139	59.4	189	87.2
40	4.4	90	32.2	140	60.0	190	87.8
41	5.0	91	32.8	141	60.6	191	88.3
42	5.6	92	33.3	142	61.1	192	88.9
43	6.1	93	33.9	143	61.7	193	89.4
44	6.7	94	34.4	144	62.2	194	90.0
45	7.2	95	35.0	145	62.8	195	90.6
46	7.8	96	35.6	146	63.3	196	91.1
47	8.3	97	36.1	147	63.9	197	91.7
48	8.9	98	36.7	148	64.4	198	92.2
49	9.4	99	37.2	149	65.0	199	92.8
50	10.0	100	37.8	150	65.6	200	93.3

Appendix A

FIGURE 6-11
MILES PER HOUR TO KILOMETERS
PER HOUR CONVERSION TABLE
1 MPH = 1.609 KM/H

MPH	KM/H	MPH	KM/H	MPH	KM/H
10	16.09	1	1.61	0.1	0.16
20	32.19	2	3.22	0.2	0.32
30	48.28	3	4.83	0.3	0.48
40	64.37	4	6.44	0.4	0.64
50	80.47	5	8.05	0.5	0.80
60	96.56	6	9.66	0.6	0.97
70	112.65	7	11.27	0.7	1.13
80	128.75	8	12.87	0.8	1.29
90	144.84	9	14.48	0.9	1.45
100	160.93	10	16.09	1.0	1.61

FIGURE 6-12
U.S. GALLONS TO LITERS CONVERSION TABLE
1 U.S. GALLON = 3.785 LITERS

GAL	LITER	GAL	LITER	GAL	LITER	GAL	LITER
100	378.54	10	37.85	1	3.79	0.1	0.38
200	757.08	20	75.71	2	7.57	0.2	0.76
300	1,135.62	30	113.56	3	11.36	0.3	1.14
400	1,514.16	40	151.42	4	15.14	0.4	1.51
500	1,892.71	50	189.27	5	18.93	0.5	1.89
600	2,271.25	60	227.12	6	22.71	0.6	2.27
700	2,649.79	70	264.98	7	26.50	0.7	2.65
800	3,028.33	80	302.83	8	30.28	0.8	3.03
900	3,406.87	90	340.69	9	34.07	0.9	3.41
1,000	3,785.41	100	378.54	10	37.85	1.0	3.79

Appendix B

DISCLAIMER

HARSCO TRACK TECHNOLOGIES, HARSCO CORPORATION RECOMMENDS THAT ALL HOSE, HOSE ASSEMBLIES AND/OR FITTINGS REPLACED BY THE CUSTOMER SHOULD BE EQUAL TO OR EXCEED THE CURRENT SPECIFICATIONS OF THE ORIGINAL EQUIPMENT SUPPLIED BY HARSCO TRACK TECHNOLOGIES, HARSCO CORPORATION. HARSCO TRACK TECHNOLOGIES, HARSCO CORPORATION WILL NOT BE LIABLE FOR ANY CLAIMS OF PERSONAL INJURY RESULTING FROM THE USE OF HOSE, HOSE ASSEMBLIES AND/OR FITTINGS THAT DO NOT MEET CURRENT ORIGINAL EQUIPMENT SPECIFICATIONS. THE CUSTOMER IS ADVISED TO COMPLY WITH SAE J1273 NOVEMBER 1991, SELECTION, INSTALLATION, AND MAINTENANCE OF HOSE AND HOSE ASSEMBLIES.

SAE J1273 - NOVEMBER 1991*

SELECTION, INSTALLATION AND MAINTENANCE OF HOSE AND HOSE ASSEMBLIES

1. **SCOPE** - Hose (also includes hose assemblies) has a finite life and there are a number of factors which will reduce its life.

This SAE recommended practice is intended as a guide to assist system designers and/or users in the selection, installation, and maintenance of hose. The designers and users must make a systematic review of each application and then select, install, and maintain the hose to fulfill the requirements of the application. The following are general guidelines and are not necessarily a complete list.

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- **IMPROPER SELECTION, INSTALLATION, OR MAINTENANCE MAY RESULT IN PREMATURE FAILURES, BODILY INJURY, OR PROPERTY DAMAGE.**

2. **REFERENCES**

- 2.1 **Applicable Documents** - The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

- 2.1.1 **SAE Publications** - Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

J516 - Hydraulic Hose Fittings

J517 - Hydraulic Hose

3. **SELECTION** - The following is a list of factors which must be considered before final hose selection can be made.

- 3.1 **Pressure** - After determining the system pressure, hose selection must be made so that the recommended maximum operating pressure is equal to or greater than the system pressure. Surge pressures higher than the maximum operating pressure will shorten hose life and must be taken into account by the hydraulic designer.

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- 3.2 Suction** - Hoses used for suction applications must be selected to insure the hose will withstand the negative pressure of the system.
- 3.3 Temperature** - Care must be taken to insure that fluid and ambient temperatures, both static and transient, do not exceed the limitations of the hose. Special care must be taken when routing near hot manifolds.
- 3.4 Fluid Compatibility** - Hose selection must assure compatibility of the hose tube, cover, and fittings with the fluid used. Additional caution must be observed in hose selection for gaseous applications.
- 3.5 Size** - Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage to the hose due to heat generation or excessive turbulence.
- 3.6 Routing** - Attention must be given to optimum routing to minimize inherent problems.
- 3.7 Environment** - Care must be taken to insure that the hose and fittings are either compatible with or protected from the environment to which they are exposed. Environmental conditions such as ultraviolet light, ozone, salt water, chemicals, and air pollutants can cause degradation and premature failure, and, therefore, must be considered.
- 3.8 Mechanical Loads** - External forces can significantly reduce hose life. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type fittings or adapters may be required to insure no twist is put into the hose. Unusual applications may require special testing prior to hose selection.
- 3.9 Abrasion** - While a hose is designed with a reasonable level of abrasion resistance, care must be taken to protect the hose from excessive abrasion which can result in erosion, snagging and cutting of the hose cover. Exposure of the reinforcement will significantly accelerate hose failure.
- 3.10 Proper End Fitting** - Care must be taken to insure proper compatibility exists between the hose and coupling selected based on the manufacturer's recommendations substantiated by testing to industry standards such as SAE J517. End fitting components from one manufacturer are usually not compatible with end fitting components supplied by another manufacturer (i.e., using a hose fitting nipple from one manufacturer with a hose socket from another manufacturer). It is the responsibility of the fabricator to consult the manufacturer's written instructions or the manufacturer directly for proper end fitting componentry.

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- 3.11 Length** - When establishing proper hose length, motion absorption, hose length changes due to pressure, as well as hose and machine tolerances must be considered.
- 3.12 Specifications and Standards** - When selecting hose, government, industry, and manufacturer's specifications and recommendations must be reviewed as applicable.
- 3.13 Hose Cleanliness** - Hose components vary in cleanliness levels. Care must be taken to insure that the assemblies selected have an adequate level of cleanliness for the application.
- 3.14 Electrical Conductivity** - Certain applications require that the hose be non-conductive to prevent electrical current flow. Other applications require the hose to be sufficiently conductive to drain off static electricity. Hose and fittings must be chosen with these needs in mind.
- 4. INSTALLATION** - After selection of proper hose, the following factors must be considered by the installer.
- 4.1 Pre-Installation Inspection** - Prior to installation, a careful examination of the hose must be performed. All components must be checked for correct style, size, and length. In addition, the hose must be examined for cleanliness, I.D. obstructions, blisters, loose cover, or any other visible defects.
- 4.2 Follow Manufacturers' Assembly Instructions** - Hose assemblies may be fabricated by the manufacturer, an agent for or customer of the manufacturer, or by the user. Fabrication of permanently attached fittings to hydraulic hose requires specialized assembly equipment. Field-attachable fittings (screw style and segment clamp style) can usually be assembled without specialized equipment although many manufacturers provide equipment to assist in this operation. SAE J517 hose from one manufacturer is not compatible with SAE J516 fittings supplied by another manufacturer. It is the responsibility of the fabricator to consult the manufacturer's written assembly instructions or the manufacturers directly before intermixing hose and fittings from two manufacturers. Similarly, assembly equipment from one manufacturer is usually not interchangeable with that of another manufacturer. It is the responsibility of the fabricator to consult the manufacturer's written instructions or the manufacturer directly for proper assembly equipment. Always follow the manufacturer's instructions for proper preparation and fabrication of hose assemblies.
- 4.3 Minimum Bend Radius** - Installation at less than minimum bend radius may significantly reduce hose life. Particular attention must be given to preclude sharp bending at the hose / fitting juncture.
- 4.4 Twist Angle and Orientation** - Hose installations must be such that relative motion of machine components produces bending of the hose rather than twisting.

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- 4.5 Securement** - In many applications, it may be necessary to restrain, protect, or guide the hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.
- 4.6 Proper Connection of Ports** - Proper physical installation of the hose requires a correctly installed port connection while insuring that no twist or torque is put into the hose.
- 4.7 Avoid External Damage** - Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage, or damage to sealing surfaces are corrected or eliminated.
- 4.8 System Check Out** - After completing the installation, all air entrapment must be eliminated and the system pressurized to the maximum system pressure and checked for proper function and freedom from leaks.

Note: Avoid potential hazardous areas while testing.

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5. MAINTENANCE - Even with proper selection and installation, hose life may be significantly reduced without a continuing maintenance program. Frequency should be determined by the severity of the application and risk potential. A maintenance program should include the following as a minimum.

5.1 Hose Storage - Hose products in storage can be affected adversely by temperature, humidity, ozone, sunlight, oils, solvents, corrosive liquids and fumes, insects, rodents and radioactive materials. Storage areas should be relatively cool and dark and free of dust, dirt, dampness, and mildew.

5.2 Visual Inspection - Any of the following conditions requires replacement of the hose:

- a. Leaks at fitting or in hose (leaking fluid is a fire hazard)
- b. Damaged, cut, or abraded cover (any reinforcement exposed)
- c. Kinked, crushed, flattened, or twisted hose
- d. Hard, stiff, heat cracked, or charred hose
- e. Blistered, soft degraded, or loose cover
- f. Cracked, damaged, or badly corroded fittings
- g. Fitting slippage on hose

5.3 Visual Inspection - The following items must be tightened, repaired, or replaced as required:

- a. Leaking port conditions
- b. Clamps, guards, shields
- c. Remove excessive dirt buildup
- d. System fluid level, fluid type, and any air entrapment

5.4 Functional Test - Operate the system at maximum operating pressure and check for possible malfunctions and freedom from leaks.

Note: Avoid potential hazardous areas while testing.

5.5 Replacement Intervals - Specific replacement intervals must be considered based on previous service life, government or industry recommendations, or when failures could result in unacceptable down time, damage, or injury risk.

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Serial Numbers

When this bulletin is received, fill in the spaces provided below using the information from the serial number tags on both the front and rear guide wheel units. Always provide these factory serial numbers when calling or writing about the units. The serial number tags are located on the mounting frame on both units.

FRONT GUIDE WHEEL UNIT SERIAL NUMBER TAG

HTT Harsco Track Technologies a harsco company™		PATENT NUMBER <input type="text"/>
WHEN ORDERING PARTS FOR THIS ACCESSORY ALWAYS GIVE THE FOLLOWING INFORMATION		
Fairmont ™ HY-RAIL® GUIDE WHEEL EQUIPMENT		
SERIAL NUMBER	SYMBOL	MODEL NUMBER
<input type="text"/>	<input type="text"/>	<input type="text"/>
FAIRMONT, MN. 56031 U.S.A.		
52400K		

REAR GUIDE WHEEL UNIT SERIAL NUMBER TAG

HTT Harsco Track Technologies a harsco company™		PATENT NUMBER <input type="text"/>
WHEN ORDERING PARTS FOR THIS ACCESSORY ALWAYS GIVE THE FOLLOWING INFORMATION		
Fairmont ™ HY-RAIL® GUIDE WHEEL EQUIPMENT		
SERIAL NUMBER	SYMBOL	MODEL NUMBER
<input type="text"/>	<input type="text"/>	<input type="text"/>
FAIRMONT, MN. 56031 U.S.A.		
52400K		

Instructions For Ordering Parts

1. See Section 8 for the Vehicle Application charts.
2. Find the chart for the make, model and year of the vehicle that the unit is mounted on.
3. Each application consists of required groups, optional groups required and accessory group options. These are the group numbers that were supplied with, or that were available for the unit.
4. Locate the appropriate group numbers in the Parts Section to find the individual parts required.
5. Front - rear and left - right are determined from the operator's position.
6. Assemblies: Items listed in CAPITALS are assemblies which include all parts listed immediately following and with the part description indented to the right. When assemblies can be used, always order them to save work of fitting separate parts.
7. For convenience in ordering, parts are listed by item number, part number, description, and quantity in each assembly or group. If in doubt as to any part wanted, send full description, sketch, or send the old part with the order.
8. To insure prompt and correct shipment of parts on orders, always give:
 1. Quantity of each part wanted.
 2. Part number of each part as shown in this book. Include any prefix and suffix letters.
 3. Description of each part as shown in this book.
 4. Factory serial numbers from the serial number tag.
 5. Purchase order number (if required).
 6. Preferred method of shipment.
9. All parts are shipped F.O.B. factory, transportation charges to be paid by customer. Terms to be determined by the Credit Department.

Limited Warranty

HARSCO TRACK TECHNOLOGIES™ products are designed to give high quality service and are manufactured from high grade material, by competent workmen under careful supervision. Harsco Track Technologies, Harsco Corporation warrants products of its manufacture to be free of defects in material and workmanship, under normal use and service for a period of six (6) months from date of delivery to the original user. The obligation of Harsco Track Technologies, Harsco Corporation under this warranty is limited to repairing or replacing at its factories, or other location designated by it, any part or parts thereof which are returned within 30 days of the date when failure occurs or defect is noted, with transportation charges prepaid, and which upon examination appears to the satisfaction of Harsco Track Technologies, Harsco Corporation to have been defective. Such free repair or replacement does not include transportation charges, or the cost of installing the new part or any other expense incident thereto. Harsco Track Technologies, Harsco Corporation will not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products, nor will Harsco Track Technologies, Harsco Corporation be liable for special, incidental or consequential damages.

Ordinary wear and tear, and damage from abuse, misuse, neglect or alteration are not covered by this warranty. Harsco Track Technologies, Harsco Corporation assumes no liability for expenses incurred or repairs made outside its factories except by written consent. This warranty is null and void if instructions and operating procedures are not followed.

Equipment or parts not manufactured by this company, but which are furnished in connection with HARSCO TRACK TECHNOLOGIES™ products, are covered directly by the warranty of the manufacturer supplying them. However, Harsco Track Technologies, Harsco Corporation will assist in obtaining adjustment on such equipment or parts when necessary.

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Product Improvement Liability Disclaimer

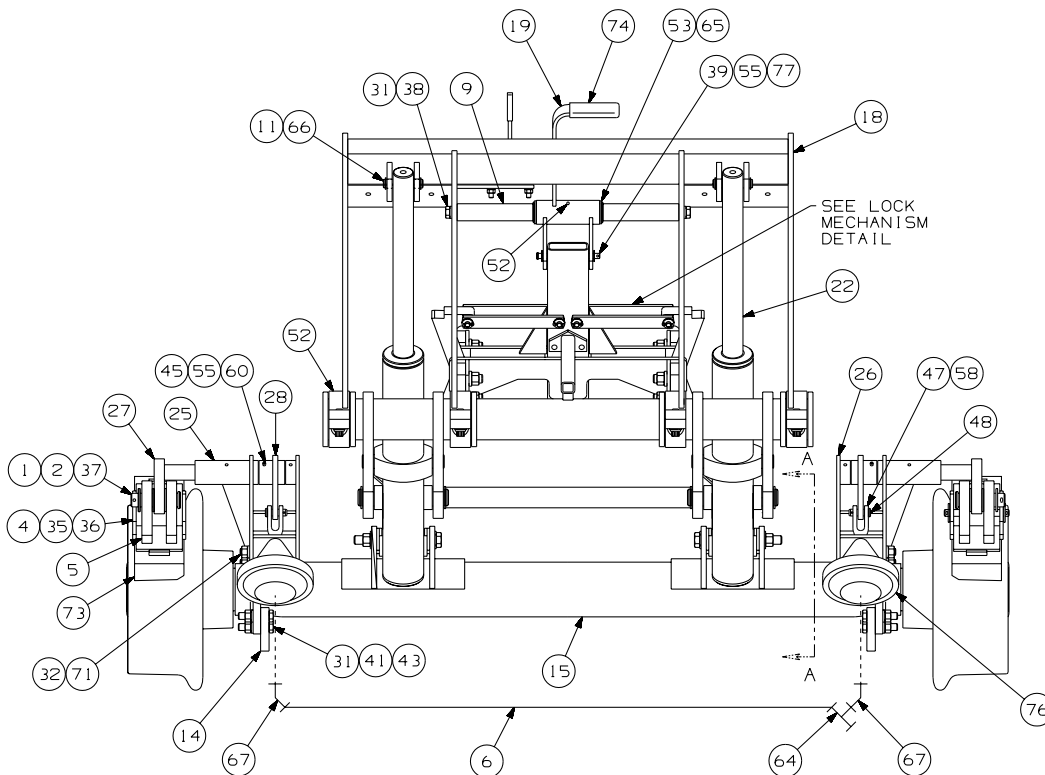
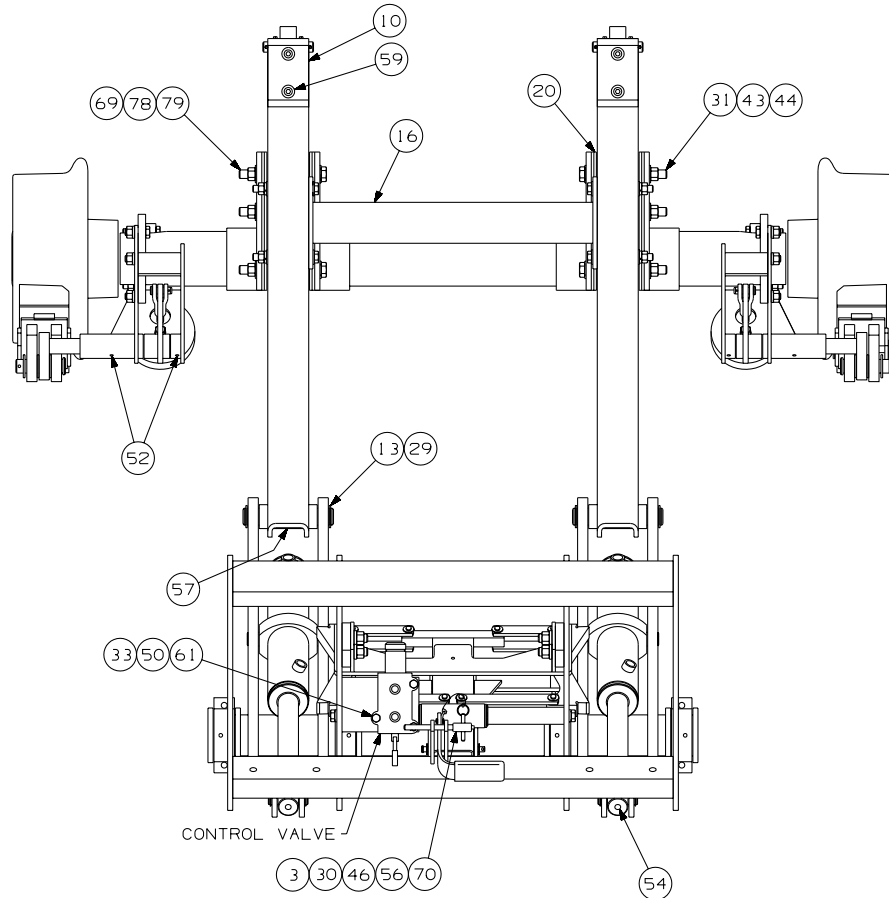
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Hazardous Material Disclaimer

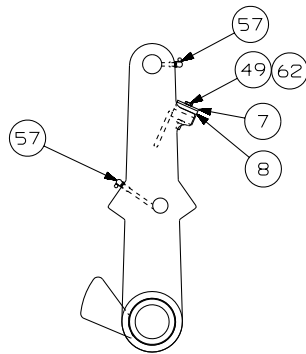
THE PARTS/ASSEMBLIES THAT ARE USED IN THIS PRODUCT ARE CLASSIFIED AS "ARTICLES" ACCORDING TO 29 CFR 1910.1200 (C). THEY ARE FORMED TO A SPECIFIC SHAPE OR DESIGN DURING MANUFACTURE, HAVE END USE FUNCTION DEPENDENT UPON THEIR SHAPE OR DESIGN, AND DO NOT RELEASE ANY HAZARDOUS CHEMICAL UNDER NORMAL CONDITIONS OF USE. ACCORDINGLY, WE ARE NOT REQUIRED TO SUPPLY MATERIAL SAFETY DATA SHEETS (MSDS) OR TO LABEL SHIPPING CONTAINERS FOR "ARTICLES". HOWEVER, LUBRICANTS, LIQUIDS, GASEOUS CHEMICALS AND SOLIDS USED IN OPERATION OR MAINTENANCE OF THE PRODUCT MAY REQUIRE THAT USER'S TAKE OCCUPATIONAL PROTECTIVE MEASURES. MSDS SHEETS FOR SUCH MATERIALS WILL BE SUPPLIED TO YOUR PURCHASING MANAGER/SAFETY DIRECTOR TO BE USED IN YOUR EMPLOYEE SAFETY TRAINING EDUCATION AND ENVIRONMENTAL HEALTH TRAINING.

FRONT GUIDE WHEEL UNIT - INSULATED WITH BRAKES - 170780
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITH BRAKES - 170782

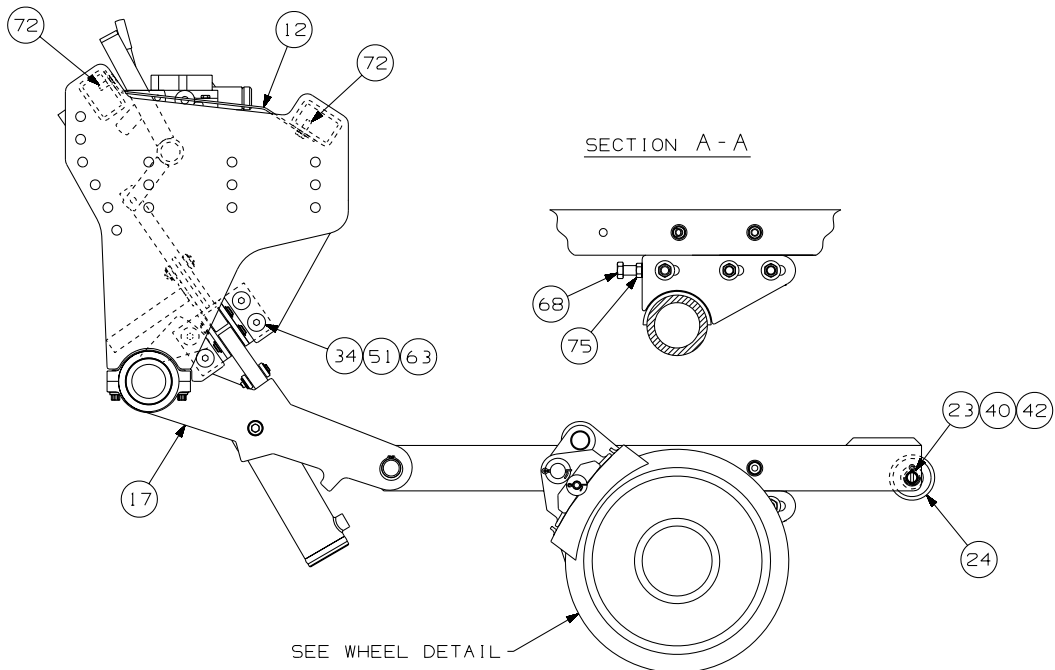


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FRONT GUIDE WHEEL UNIT - INSULATED WITH BRAKES - 170780
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITH BRAKES - 170782



LIFT ARM DETAIL



SEE WHEEL DETAIL

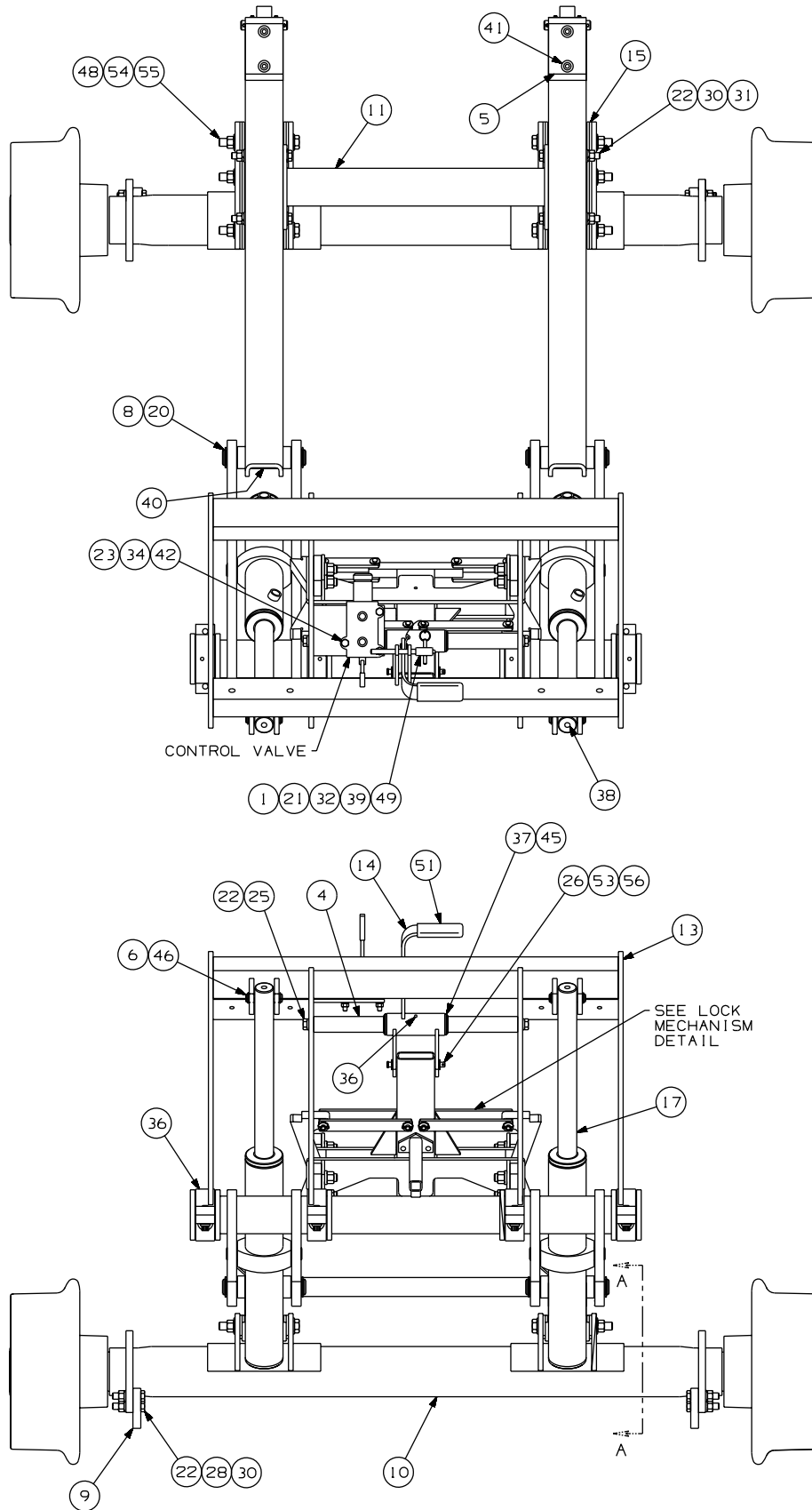
FRONT GUIDE WHEEL UNIT - INSULATED WITH BRAKES - 170780
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITH BRAKES - 170782

ITEM	PART NO	DESCRIPTION	QTY
1	065824	Washer.....	6
2	070238	Pin	2
3	081645K	Lockpin & Lanyard	1
4	126846	Pin	2
5	136922K	Brake Shoe Holder.....	2
6	188665	Hose, 5/16 x 40" Swivel 9/16 F JIC Both Ends	1
7	159937	Shim, .250".....	4
8	159938	Shim, .125".....	2
9	161290	Rod	1
10	161296	Pad	2
11	161311	Pin	2
12	161312	Guard	2
13	161313	Pin	2
14	161315	Plate	2
15	161336K	Axle	1
16	161339	Cross Brace	1
17	161423	Cross Tube.....	1
18	161433	FRAME ASSEMBLY	1
18a	F021082	Cap Screw, 1/2-13 x 1-1/2" Counter Bore Hd	2
18b	F001075	SAE Lock Washer, 1/2"	2
19	161438	Lock Lever	1
20	162095	Shim, 3/16".....	8
21	162107	Shim, .062".....	12
22	162128K	HYDRAULIC CYLINDER	2
22a	188619	Seal Kit	1
23	163150	Pin	2
24	163152	Roller	2
25	170783	Brake Bracket, Right	1
26	170784	Brake Bracket, Left.....	1
27	170785	Pin	2
28	170786	Lever	2
29	700843015	Retaining Ring	4
30	F001050	Wrought Washer, #10	1
31	F001075	SAE Lock Washer, 1/2"	12
32	F001095	Cap Screw, 1/2-13 x 1-3/4" GR 5 Hex Hd	6
33	F001100	Lock Washer, 5/16"	3
34	F001103	SAE Lock Washer, 5/8"	8
35	F001104	Cotter Pin, 1/8 x 1"	4
36	F001267	Wrought Washer, 1/2	4
37	F001324	Cotter Pin, 3/16 x 1-1/2"	2
38	F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	2
39	F001966	Cotter Pin, 1/8 x 1/2"	1
40	F001094	Cotter Pin, 3/16 x 1-1/4"	4

FRONT GUIDE WHEEL UNIT - INSULATED WITH BRAKES - 170780
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITH BRAKES - 170782

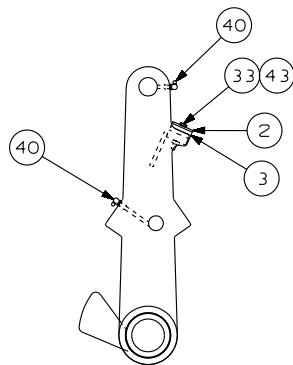
ITEM	PART NO	DESCRIPTION	QTY
41	F002753	Cap Screw, 1/2-13 x 2-1/4" GR 5 Hex Hd	6
42	F002929	SAE Washer, 3/4"	16
43	F003598	Hex Nut, 1/2"-13 GR 5	10
44	F004229	Cap Screw, 1/2-13 x 4-1/2" GR 5 Hex Hd	4
45	F004600	Elastic Stop Nut, 3/8"-16	2
46	F005273	Hex Nut, #8	1
47	F005459	Yoke	2
48	F005460	Yoke Pin.	2
49	F006471	Cap Screw, 1/4-20 x 1-3/4" GR 5 Hex Hd	4
50	F007021	Hex Nut, 5/16"-18.	3
51	F007023	Hex Nut, 5/8-11" GR 5	8
52	F008014	Grease Fitting.	13
53	F008711	Washer.	2
54	F009420	Grease Fitting, 45° 1/4 M NPT.	2
55	F009681	SAE Washer, 3/8"	4
56	F009720	Machine Screw, #8-32 x 3/4" Rd Hd	1
57	F010722	Grease Fitting, 90° 1/4"-28.	10
58	F011013	Hex Jam Nut, 1/2"-20 GR 2	2
59	F011562	Cap Screw, 3/8-16 x 3/4" Flat Soc Hd	4
60	F013321	Cap Screw, 3/8-16 x 3-1/4 Soc Hd.	2
61	F013428	Cap Screw, 5/16-18 x 2-1/2" GR 5 Hex Hd	3
62	F013588	Elastic Stop Nut, 1/4"-20	4
63	F013640	Cap Screw, 5/8-11 x 2-1/4" Hex Flt Hd	8
64	F015626	Tee, 9/16 M JIC x 9/16 M JIC x 9/16 F STR	1
65	F016475	Retaining Ring	2
66	F016611	Snap Ring	4
67	F018562	45° Elbow, 9/16 M JIC x 3/8 M NPT.	2
68	F019501	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	2
69	F020919	Washer.	12
70	F021956	Lock Washer, #8	1
71	F022037	Hex Flg Nut, 1/2"-13.	6
72	F022070	Cap Screw, 5/16-18 x 1" GR 5 Hex Flg Hd	8
73	F022274	Brake Shoe	2
74	F022846	Handle Grip	1
75	F023297	Hex Half Nut, 5/8"-11 GR 5	2
76	F025058	Brake Actuator	2
77	F025334	Pin	1
78	F025425	Hex Lock Nut, 5/8"-11	6
79	F025499	Cap Screw, 5/8-11 x 6" GR 8 Hex Hd	6

FRONT GUIDE WHEEL UNIT - INSULATED WITHOUT BRAKES - 164533
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITHOUT BRAKES - 164534

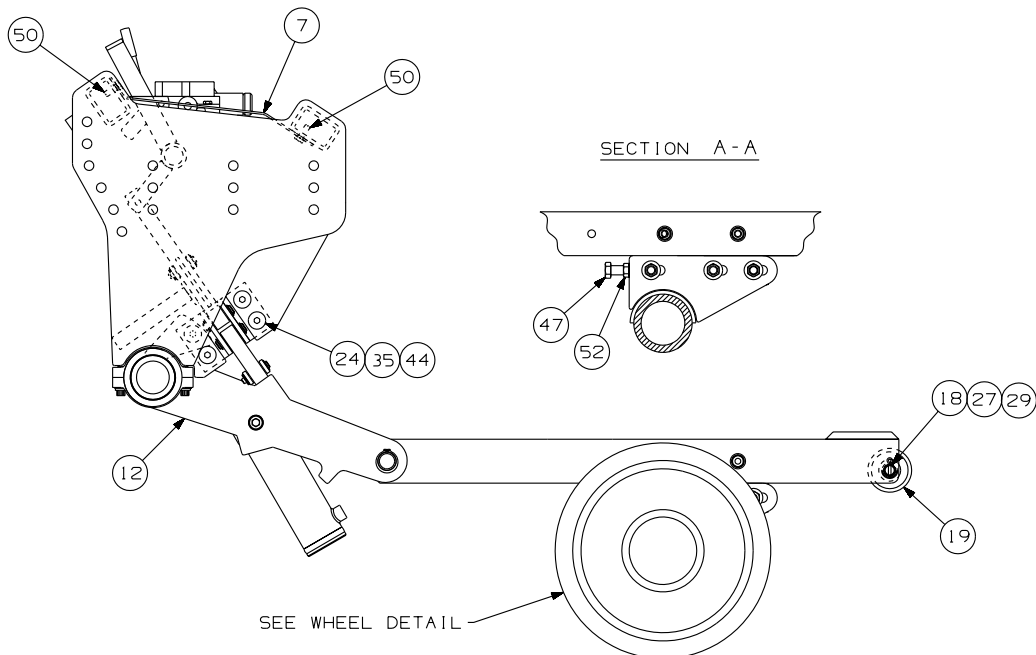


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FRONT GUIDE WHEEL UNIT - INSULATED WITHOUT BRAKES - 164533
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITHOUT BRAKES - 164534



LIFT ARM DETAIL



SEE WHEEL DETAIL

SE164533A-2

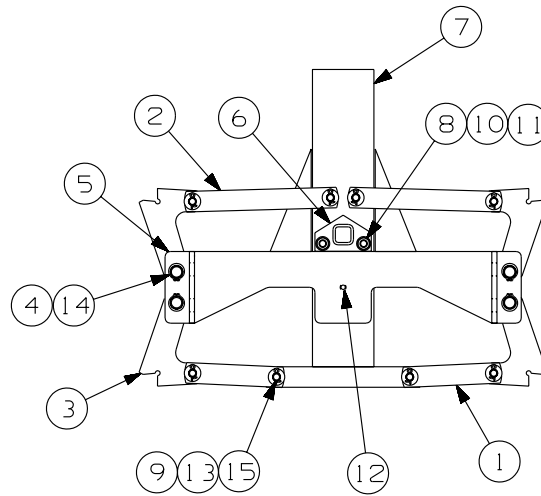
FRONT GUIDE WHEEL UNIT - INSULATED WITHOUT BRAKES - 164533
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITHOUT BRAKES - 164534

ITEM	PART NO	DESCRIPTION	QTY
1	081645K	Lockpin & Lanyard	1
2	159937	Shim, .250"	4
3	159938	Shim, .125"	2
4	161290	Rod	1
5	161296	Pad	2
6	161311	Pin	2
7	161312	Guard	2
8	161313	Pin	2
9	161315	Plate	2
10	161336K	Axle	1
11	161339	Cross Brace	1
12	161423	Cross Tube.	1
13	161433	FRAME ASSEMBLY	1
13a	F021082	Cap Screw, 1/2-13 x 1-1/2" Counter Bore Hd	2
13b	F001075	SAE Lock Washer, 1/2"	2
14	161438	Lock Lever	1
15	162095	Shim, 3/16"	8
16	162107	Shim, .062"	12
17	162128K	HYDRAULIC CYLINDER	2
17a	188619	Seal Kit	1
18	163150	Pin	2
19	163152	Roller	2
20	700843015	Retaining Ring	4
21	F001050	Wrought Washer, #10	1
22	F001075	SAE Lock Washer, 1/2"	12
23	F001100	Lock Washer, 5/16"	3
24	F001103	SAE Lock Washer, 5/8"	8
25	F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	2
26	F001966	Cotter Pin, 1/8 x 1/2"	1
27	F001094	Cotter Pin, 3/16 x 1-1/4"	4
28	F002753	Cap Screw, 1/2-13 x 2-1/4" GR 5 Hex Hd	6
29	F002929	SAE Washer, 3/4"	16
30	F003598	Hex Nut, 1/2"-13 GR 5	10
31	F004229	Cap Screw, 1/2-13 x 4-1/2" GR 5 Hex Hd	4
32	F005273	Hex Nut, #8	1
33	F006471	Cap Screw, 1/4-20 x 1-3/4" GR 5 Hex Hd	4
34	F007021	Hex Nut, 5/16"-18.	3
35	F007023	Hex Nut, 5/8-11" GR 5	8
36	F008014	Grease Fitting.	13
37	F008711	Washer.	2
38	F009420	Grease Fitting, 45° 1/4 M NPT.	2
39	F009720	Machine Screw, #8-32 x 3/4" Rd Hd	1
40	F010722	Grease Fitting, 90° 1/4"-28.	10

FRONT GUIDE WHEEL UNIT - INSULATED WITHOUT BRAKES - 164533
FRONT GUIDE WHEEL UNIT - NON-INSULATED WITHOUT BRAKES - 164534

ITEM	PART NO	DESCRIPTION	QTY
41	F011562	Cap Screw, 3/8-16 x 3/4" Flat Soc Hd	4
42	F013428	Cap Screw, 5/16-18 x 2-1/2" GR 5 Hex Hd	3
43	F013588	Elastic Stop Nut, 1/4"-20	4
44	F013640	Cap Screw, 5/8-11 x 2-1/4" Hex Flt Hd	8
45	F016475	Retaining Ring	2
46	F016611	Snap Ring	4
47	F019501	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	2
48	F020919	Washer.	12
49	F021956	Lock Washer, #8	1
50	F022070	Cap Screw, 5/16-18 x 1" GR 5 Hex Flg Hd	8
51	F022846	Handle Grip	1
52	F023297	Hex Half Nut, 5/8"-11 GR 5	2
53	F025334	Pin	1
54	F025425	Hex Lock Nut, 5/8"-11	6
55	F025499	Cap Screw, 5/8-11 x 6" GR 8 Hex Hd	6
56	F009681	SAE Washer, 3/8"	2

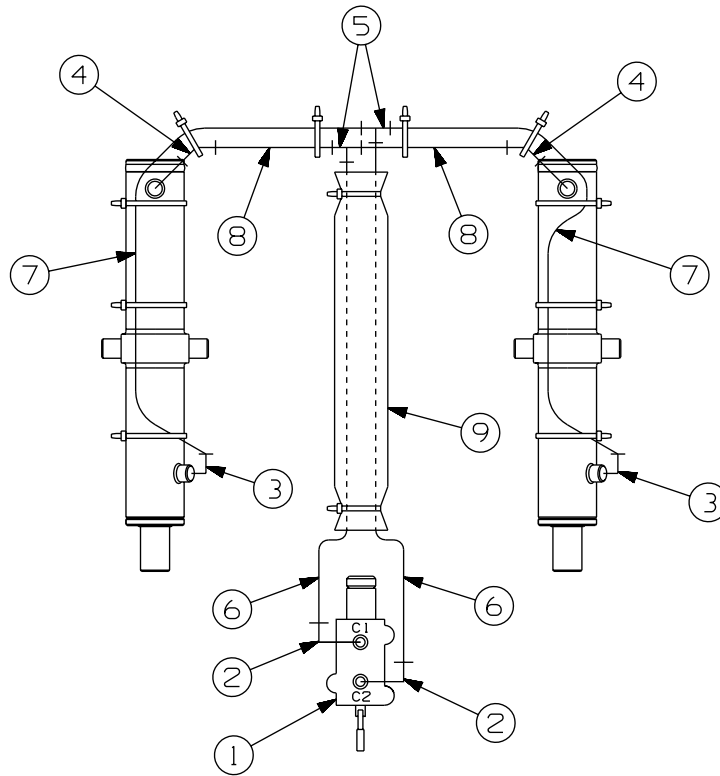
FRONT GUIDE WHEEL UNIT LOCK MECHANISM DETAIL



SE170780A-3

ITEM	PART NO	DESCRIPTION	QTY
1	161276	Bar	4
2	161277	Bar	4
3	161291	Plate	4
4	161310	Pin	4
5	161430	Lock Bracket Assembly	1
6	161436	Lock Slide	1
7	161437	Lock Bar Assembly	1
8	F001025	SAE Lock Washer, 3/8"	2
9	F001966	Cotter Pin, 1/8 x 1/2"	8
10	F001885	Cap Screw, 3/8-16 x 1-3/4" GR 5 Hex Hd	2
11	F007020	Hex Nut, 3/8"-16 GR 5	2
12	F008014	Grease Fitting	2
13	F009681	SAE Washer, 3/8"	24
14	F016611	Snap Ring	8
15	F025333	Pin	8

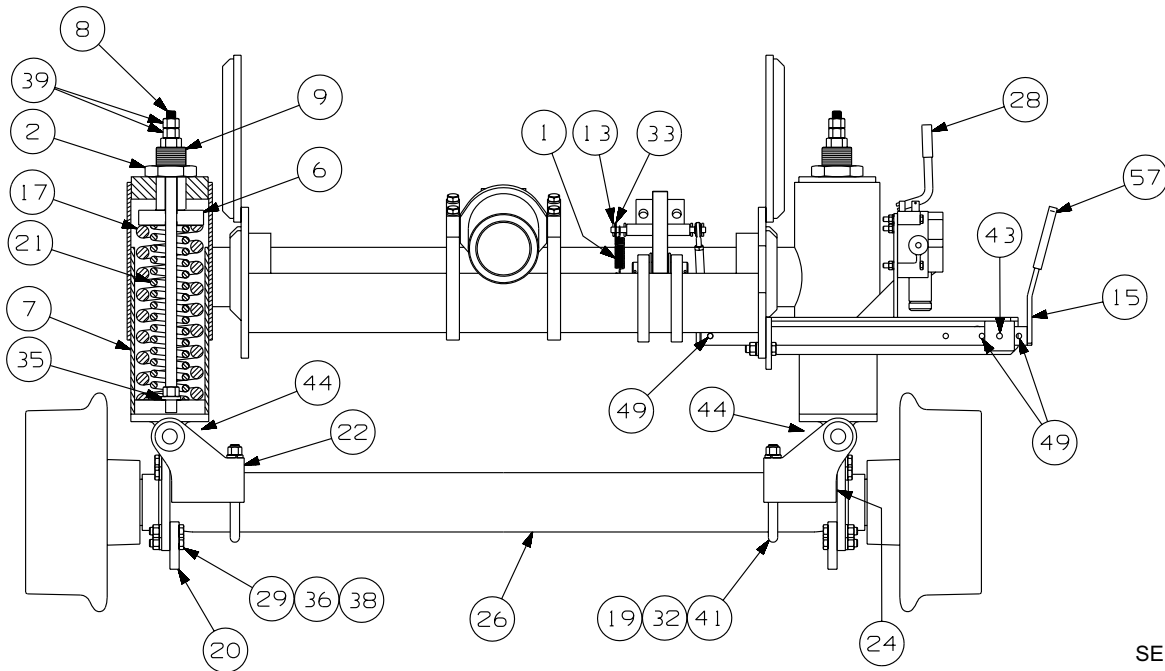
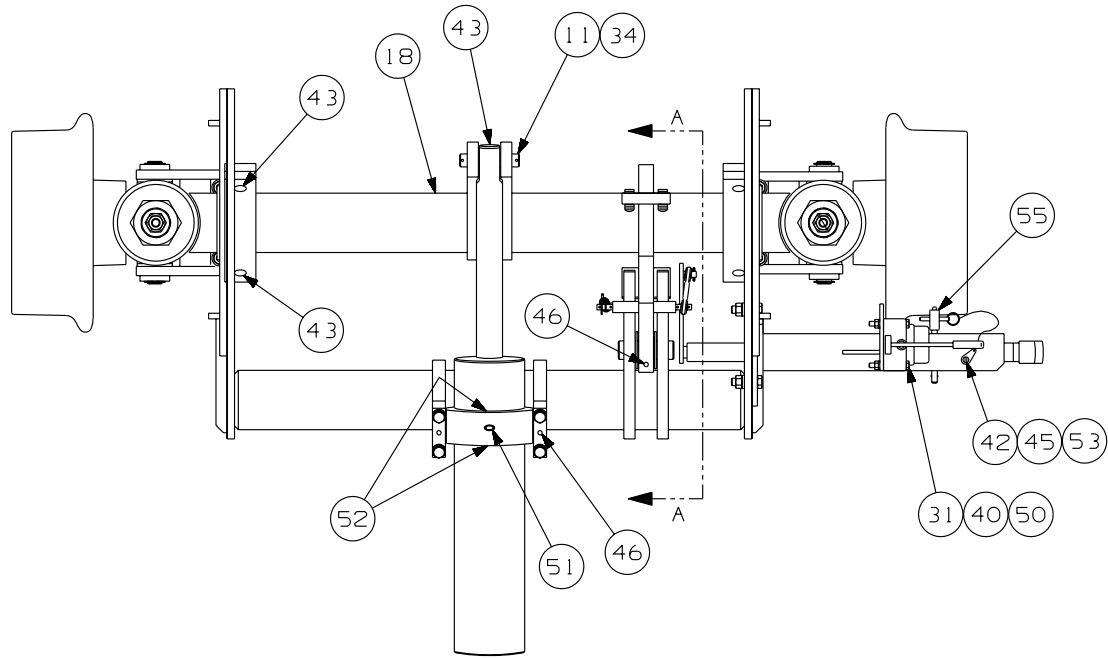
FRONT GUIDE WHEEL UNIT HYDRAULIC PIPING



SE170780A-4

ITEM	PART NO	DESCRIPTION	QTY
1	F018510	Control Valve	1
2	F012055	90° Elbow, 9/16-18JICX3/8NPTF.	2
3	F013327	90° Elbow, 9/16-18JICX9/16-18STR	2
4	F013020	45° Elbow, 9/16-18JICX9/16-18STR	2
5	F011260	Tee, 9/16-18JICX9/16-18JICX9/16-18JIC	2
6	068720	Hose, 5/16 x 35-1/2" Swivel 9/16 F JIC Both Ends	2
7	188658	Hose, 5/16 x 29" Swivel 9/16 F JIC Both Ends	2
8	188663	Hose, 5/16 x 14" Swivel 9/16 F JIC Both Ends	2
9	F021877	Sleeve.	35"

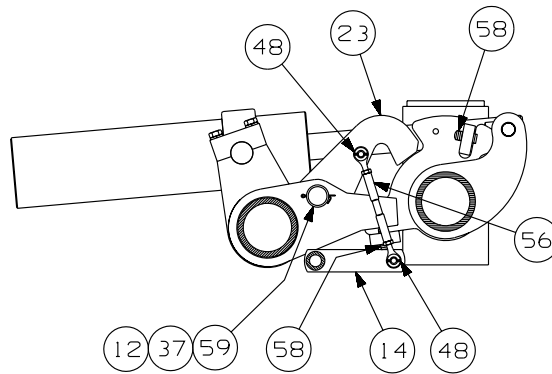
REAR GUIDE WHEEL UNIT - INSULATED - 161638
REAR GUIDE WHEEL UNIT - NON-INSULATED - 162318



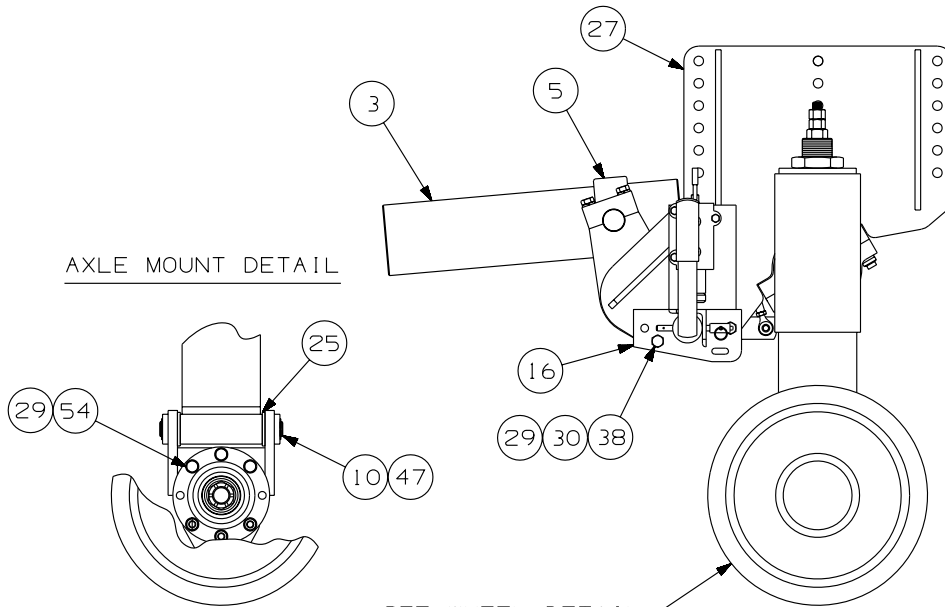
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REAR GUIDE WHEEL UNIT - INSULATED - 161638
REAR GUIDE WHEEL UNIT - NON-INSULATED - 162318

SECTION A-A



AXLE MOUNT DETAIL



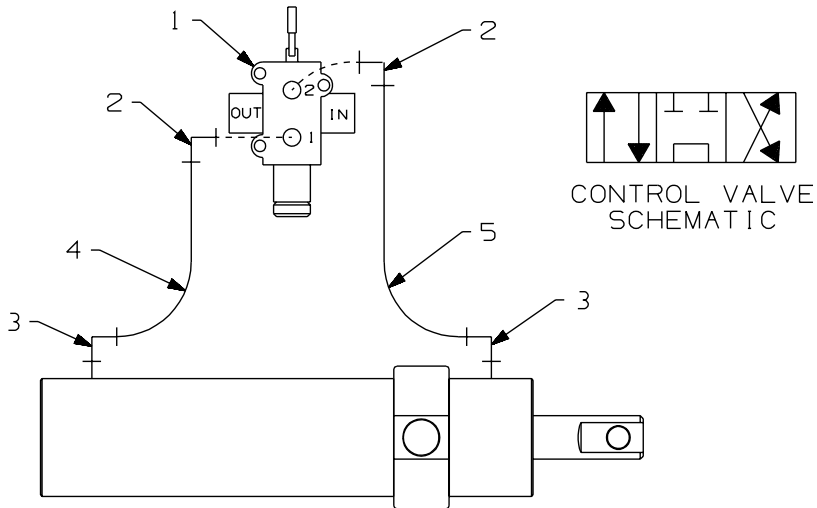
REAR GUIDE WHEEL UNIT - INSULATED - 161638
REAR GUIDE WHEEL UNIT - NON-INSULATED - 162318

ITEM	PART NO	DESCRIPTION	QTY
1	072909	Spring	1
2	082699	Nut	2
3	099394K	HYDRAULIC CYLINDER	1
4	188632	Seal Kit	1
5	099402K	Cylinder Mounting	1
6	100707	Washer.	2
7	100709K	Housing Assembly	2
8	100715	Rod	2
9	100718	Spring Adjustment	2
10	100728	Pin	2
11	105030	Pin	1
12	126839	Lock Pin	1
13	135280	Pin	1
14	135281	Lever	1
15	135283	Lever	1
16	135285	Lever Support.	1
17	135293	Spring	2
18	159506	Cross Tube.	1
19	161288	U-Bolt	2
20	161315	Plate	2
21	161648	Spring	2
22	161857	Axle Mount.	2
23	161858	Lock	1
24	161890	Shim, .060".	4
25	162028	Washer.	4
26	174338	AXLE ASSEMBLY	1
26a	F025249	Hex Slotted Nut, 1-1/2"-12	2
26b	F003150	Cotter Pin, 3/16 x 2-1/2"	2
27	187250	FRAME MOUNT ASSEMBLY	1
27a	F013816	Cap Screw, 5/8-11 x 2-1/4" Counter Bore Hd.	4
27b	F001103	SAE Lock Washer, 5/8"	4
27c	F003095	Cap Screw, 1/2-13 x 2-3/4" Hex Hd	4
27d	F001075	SAE Lock Washer, 1/2"	4
28	188374	Control Valve	1
29	F001075	SAE Lock Washer, 1/2"	14
30	F001095	Cap Screw, 1/2-13 x 1-3/4" GR 5 Hex Hd	2
31	F001100	SAE Lock Washer, 5/16"	3
32	F001103	SAE Lock Washer, 5/8"	4
33	F001115	Wrought Washer, 3/8"	1
34	F001182	Cotter Pin, 1/8 x 1-1/4".	2
35	F001354	SAE Lock Washer, 3/4"	2
36	F001442	Cap Screw, 1/2-13 x 2" GR 5 Hex Hd	6
37	F002547	Cotter Pin, 1/8 x 2"	2

REAR GUIDE WHEEL UNIT - INSULATED - 161638
REAR GUIDE WHEEL UNIT - NON-INSULATED - 162318

ITEM	PART NO	DESCRIPTION	QTY
38	F003598	Hex Nut, 1/2"-13 GR 5	8
39	F005170	Hex Nut, 3/4"-16 GR5	4
40	F007021	Hex Nut, 5/16"-18 GR5	3
41	F007023	Hex Nut, 5/8"-11 GR 5	4
42	F007413	SAE Lock Washer, #6	1
43	F009217	Grease Fitting, 90° 1/8 M NPT	6
44	F009420	Grease Fitting, 45° 1/8 M NPT	2
45	F010193	Hex Nut, #4-40 GR 2	1
46	F010722	Grease Fitting, 90° 1/4 M NPT	3
47	F011450	Snap Ring	4
48	F011953	Spring Pin, 1/8 x 7/8"	5
49	F011954	Spring Pin, 3/8" x 1-1/2"	3
50	F013428	Cap Screw, 5/16-18 x 2-1/2" GR 5 Hex Hd	3
51	F014224	Set Screw, 3/8-16 x 3/8" Locking Cup Point Soc Hd	1
52	F016485	Retaining Ring.	2
53	F017061	Machine Screw, #4-40 x 1" Slotted Rd Hd.	1
54	F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	6
55	F022104	Lockpin & Lanyard	1
56	F022845	Rod Linkage	1
57	F022846	Handle Grip	1
58	F023879	Set Screw, 5/8-11 x 1-1/2" Oval Point Soc Hd.	4
59	M004458	Washer.	3

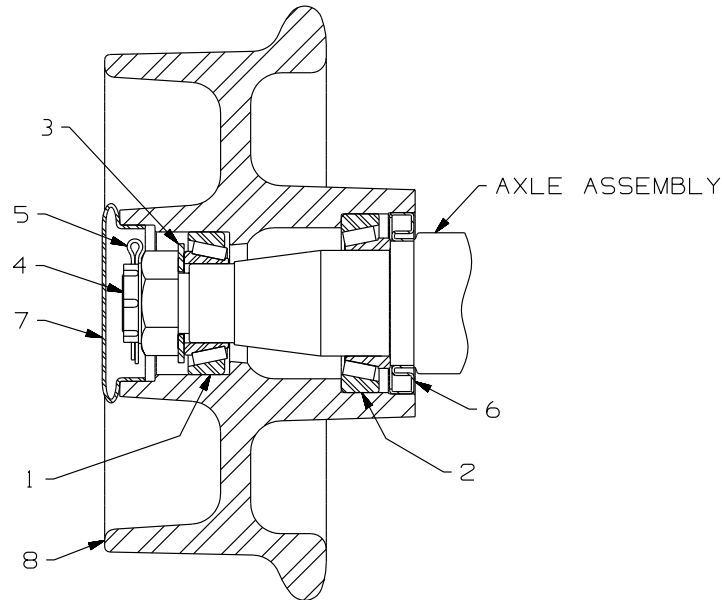
REAR GUIDE WHEEL UNIT HYDRAULIC PIPING



SE161638A-3

ITEM	PART NO	DESCRIPTION	QTY
1	F018510	Control Valve	1
2	F012055	90° Elbow, 9/16 M JIC x 3/8 M NPT.	2
3	F010988	90° Elbow, 9/16 M JIC x 1/4 M NPT.	2
4	188665	Hose, 5/16 x 40" Swivel 9/16 F JIC Both Ends	1
5	188667	Hose, 5/16 x 45" Swivel 9/16 F JIC Both Ends	1

GUIDE WHEEL ASSEMBLY



SE179194A-4

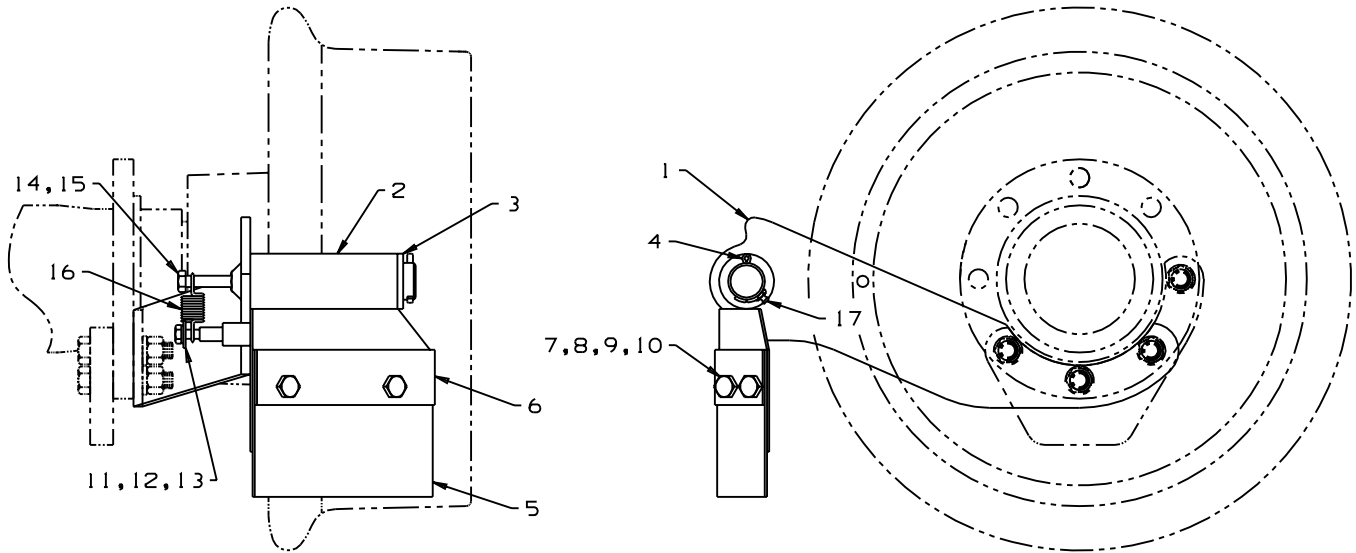
Note: Quantities listed are for one wheel only.

ITEM	PART NO	DESCRIPTION	QTY
1	159508	Bearing Cup & Cone, Outside	1
2	159507	Bearing Cup & Cone, Inside.	1
3	F025049	Washer.	1
4	F025249	Hex Slotted Nut, 1-1/2"-12 (part of axle assembly)	1
5	F003150	Cotter Pin, 3/16 x 2-1/2" (part of axle assembly)	1
6	F025057	Grease Seal	1
7	F025011	Grease Cap	1
8	175662	Wheel (used with current insulated or non-insulated axle 174338).	1
	161458	Wheel, Insulated (used with earlier style non-insulated axle 159455).	1
	161459	Wheel, Non-Insulated (used with earlier style non-insulated axle 159455).	1

STEERING LOCK GROUPS

individual steering lock components are not available as repair parts. Steering lock groups are sold as complete replacement groups only. See vehicle application charts to find the correct steering lock group applicable to your make, model and year of vehicle. Refer to the application blueprint supplied with the steering lock group for the correct mounting of the steering lock.

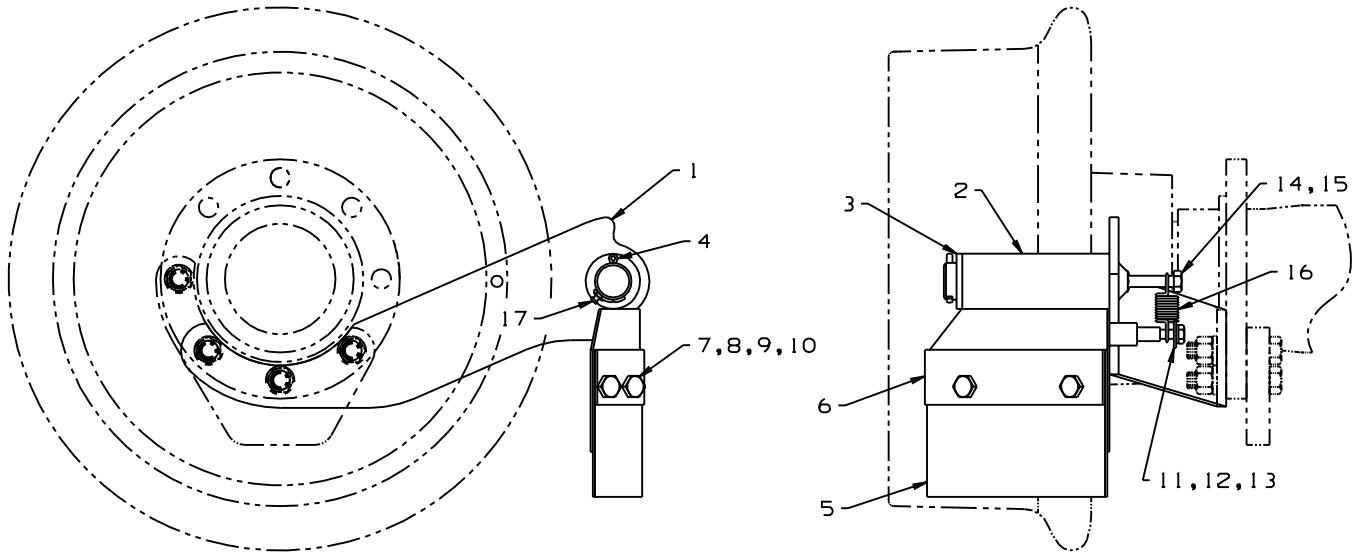
RAIL SWEEP GROUP - LEFT FRONT / RIGHT REAR - 161875



SE.161891A-1

ITEM	PART NO	DESCRIPTION	QTY
	161891	RAIL SWEEP ASSEMBLY.....	1
1	162019	Bracket	1
2	108505	Rail Sweep Plate	1
3	179117	Washer	1
4	F003141	Cotter Pin, 1/8 x 1-1/2".....	1
5	108509K	Rail Sweep	1
6	108510	Bracket	1
7	F001125	Cap Screw, 3/8-16 x 1-1/4" Hex Hd	2
8	F001115	Wrought Washer, 3/8"	2
9	F001025	SAE Lock Washer, 3/8"	2
10	F007020	Hex Nut, 3/8"-16	2
11	F002355	Cap Screw, 1/4-20 x 3/4" Hex Hd.....	1
12	F001106	Wrought Washer, 1/4"	1
13	F009535	SAE Lock Washer, 1/4"	1
14	F007021	Hex Nut, 5/16"-18	1
15	F001113	Cap Screw, 5/16-18 x 1-1/4" Hex Hd	1
16	072909	Spring	1
17	F008014	Grease Fitting, Straight 1/4 M NPT.....	1

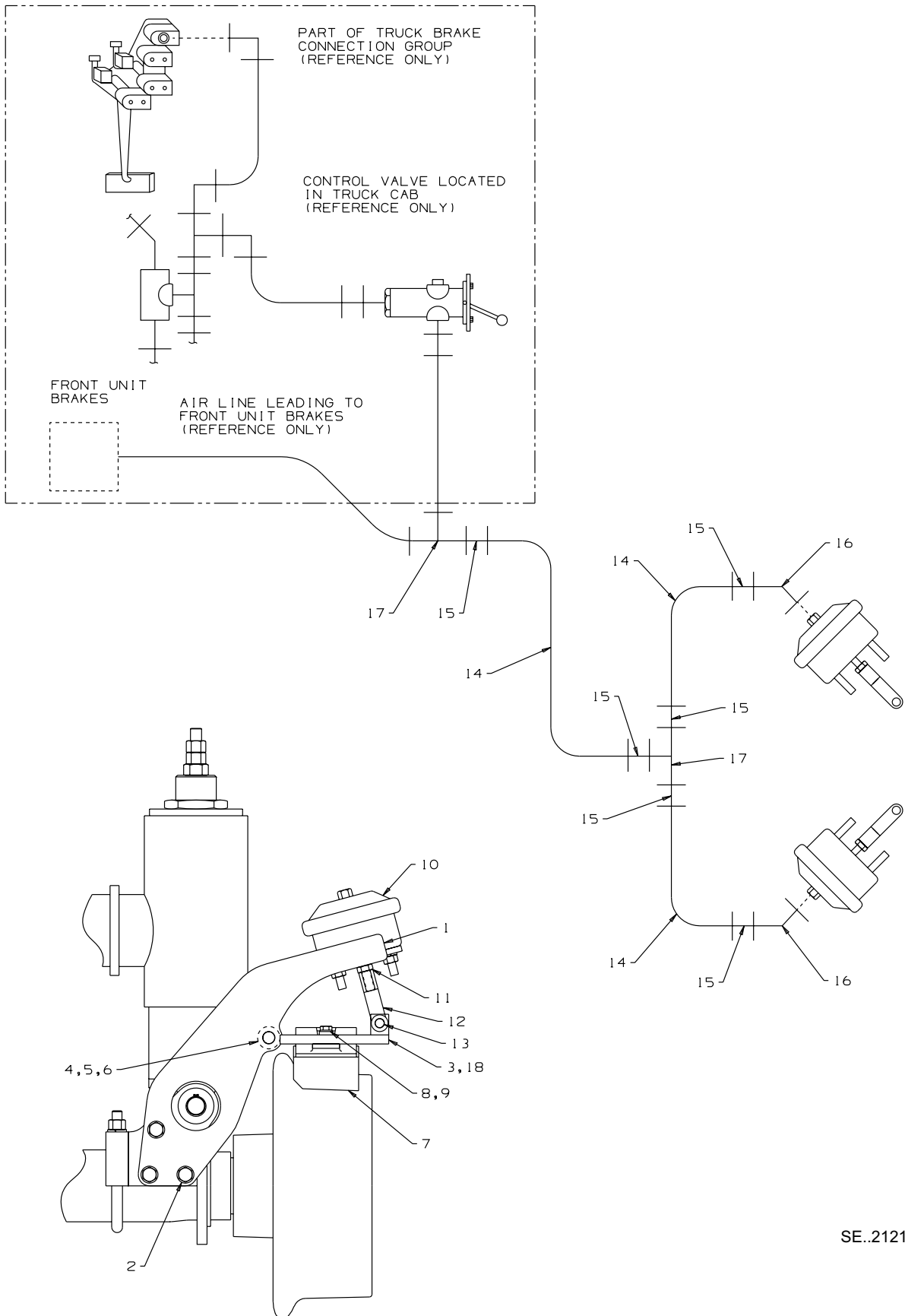
RAIL SWEEP GROUP - RIGHT FRONT / LEFT REAR - 161875



SE.161892A-1

ITEM	PART NO	DESCRIPTION	QTY
	161892	RAIL SWEEP ASSEMBLY.....	1
1	162020	Bracket	1
2	108513	Rail Sweep Plate	1
3	179117	Washer	1
4	F003141	Cotter Pin, 1/8 x 1-1/2".....	1
5	108509K	Rail Sweep	1
6	108510	Bracket	1
7	F001125	Cap Screw, 3/8-16 x 1-1/4" Hex Hd	2
8	F001115	Wrought Washer, 3/8"	2
9	F001025	SAE Lock Washer, 3/8"	2
10	F007020	Hex Nut, 3/8"-16	2
11	F002355	Cap Screw, 1/4-20 x 3/4" Hex Hd.....	1
12	F001106	Wrought Washer, 1/4"	1
13	F009535	SAE Lock Washer, 1/4"	1
14	F007021	Hex Nut, 5/16"-18	1
15	F001113	Cap Screw, 5/16-18 x 1-1/4" Hex Hd	1
16	072909	Spring	1
17	F008014	Grease Fitting, Straight 1/4 M NPT.....	1

REAR BRAKES AND CONNECTION - 161896

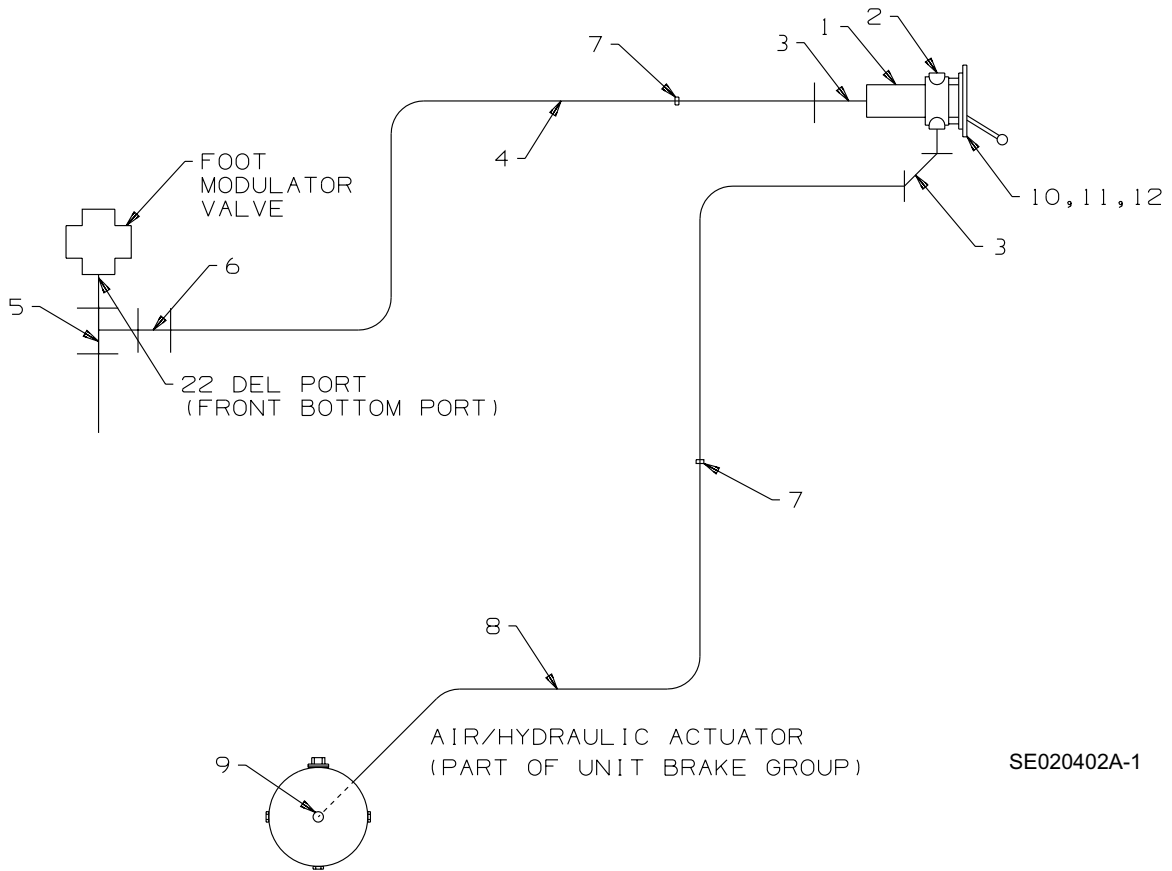


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REAR BRAKES AND CONNECTION - 161896

ITEM	PART NO	DESCRIPTION	QTY
1	162049	Bracket.	2
2	F023226	Cap Screw, 1/2-13 x 1" Hex Flg Hd	12
3	162052	Plate	2
4	162050	Pin	2
5	M033847	Washer.	4
6	F001182	Cotter Pin, 1/8 x 1-1/4"	4
7	F022274	Brake Shoe	2
8	157694	Link	2
9	F023416	Cap Screw, 3/8-16 x 3/4" Hex Flg Hd	4
10	F025058	Actuator	2
11	F011013	Hex Jam Nut, 1/2"-20.	2
12	F005459	Adjustable Yoke	2
13	F005460	Yoke Pin.	2
14	F010693	Hose, 5/16" I.D..	300"
15	F018064	Hose Fitting, Swivel 9/16 M JIC	6
16	F018562	45° Elbow, 9/16 M JIC x 3/8 M NPT.	2
17	F011260	Tee, 9/16 M JIC x 9/16 M JIC x 9/16 M JIC	2
18	F008014	Grease Fitting, Straight 1/4 M NPT	4

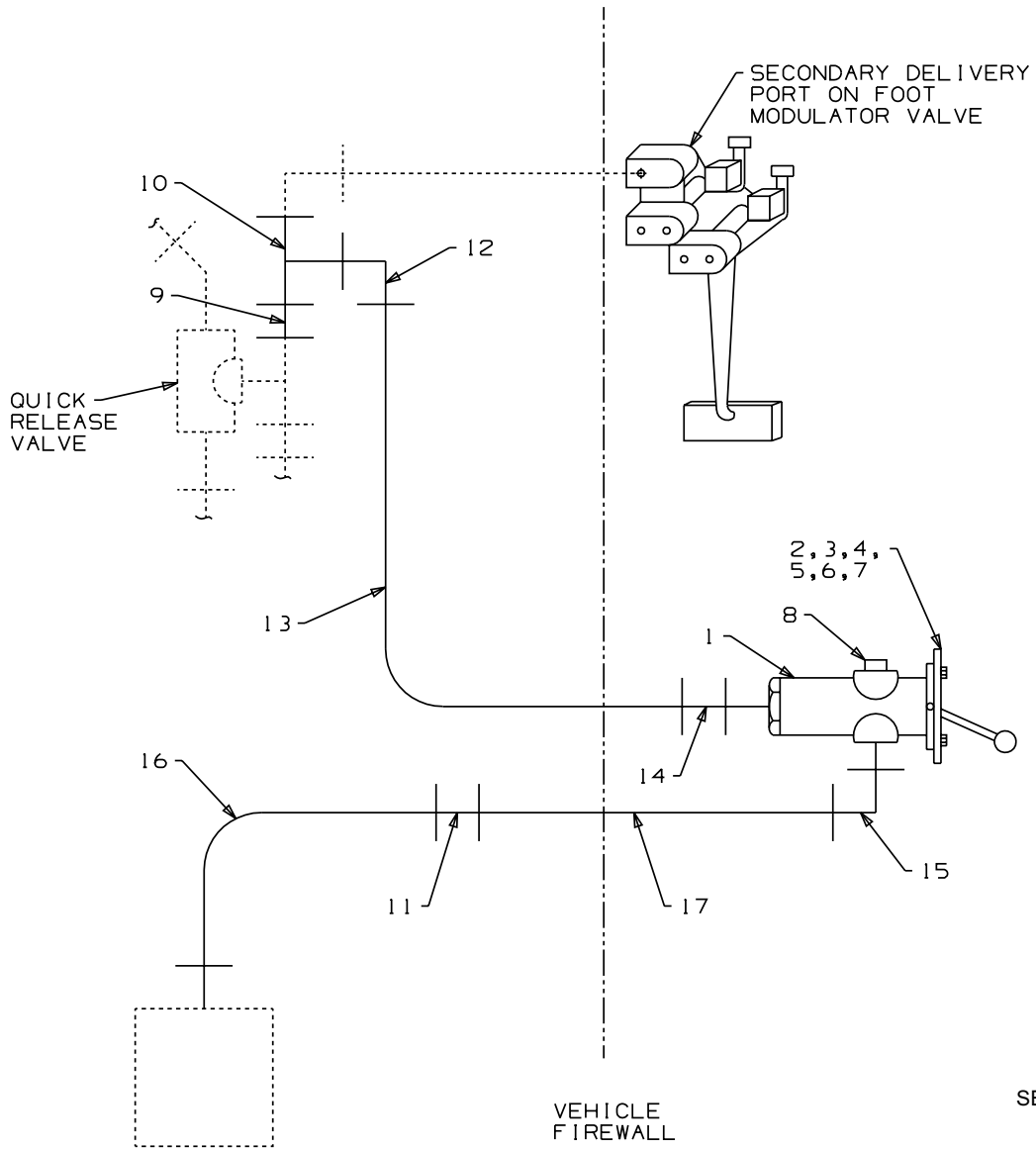
TRUCK BRAKE CONNECTION - 154057



TRUCK BRAKE CONNECTION - 154057

ITEM	PART NO	DESCRIPTION	QTY
1	F019332	Air Control Valve	1
2	F010989	Pipe Plug, 1/4 M NPT.	1
3	F011117	45° Elbow, 9/16 M JIC x 1/4 M NPT.	2
4	F018904	Hose, 5/16 x 48" Swivel 9/16 F JIC Both Ends	1
5	F013684	Tee, 3/8 M NPT x 3/8 F NPT x 3/8 F NPT	1
6	F012056	Adapter, 9/16 M JIC x 3/8 M NPT	1
7	F012587	Grommet	2
8	154058	HOSE GROUP.	1
8a	F010693	Hose, 5/16" I.D.	180"
8b	F011392	Swivel Hose Fitting, 9/16 F JIC.	2
9	F010988	90° Elbow, 9/16 M JIC x 1/4 M NPT.	1
10	122583	Instruction Plate, Rail Wheel.	1
11	F009591	Machine Screw, #10-24 x 3/4" Rd Hd	2
12	120457	Decal, Rail Brake Operation.	1
13	120453	Bracket.	1

TRUCK BRAKE CONNECTION - 162094

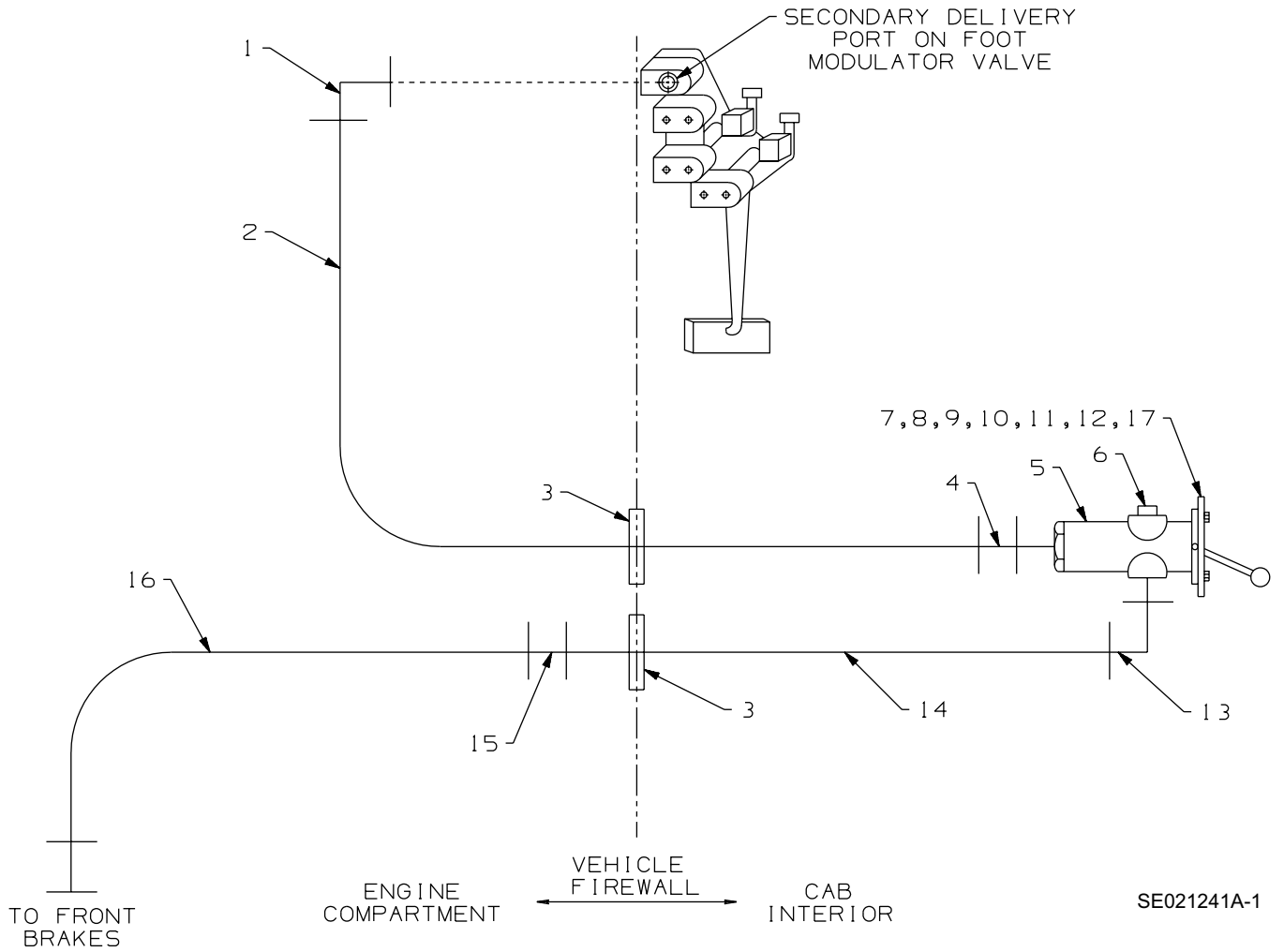


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TRUCK BRAKE CONNECTION - 162094

ITEM	PART NO	DESCRIPTION	QTY
1	F019332	Air Control Valve	1
2	120453	Sheet	1
3	F001113	Cap Screw, 5/16-18 x 1-1/4" Hex Hd	2
4	F001100	SAE Lock Washer, 5/16"	2
5	F007021	Hex Nut, 5/16"-18.	2
6	122583	Instruction Plate, Rail Wheel.....	1
7	F009591	Machine Screw, #10-24 x 3/4" Rd Hd	2
8	F010989	Pipe Plug, 1/4 M NPT.	1
9	F011604	Hex Nipple, 3/8 M NPT x 3/8 M NPT	1
10	F013459	Tee, 3/8 F NPT x 3/8 F NPT x 3/8 F NPT	1
11	F011152	Adapter, 9/16 M JIC x 9/16 M JIC	1
12	F012055	90° Elbow, 9/16 M JIC x 3/8 M NPT.	1
13	F018904	Hose, 5/16 x 48" Swivel 9/16 F JIC Both Ends	1
14	F010994	Adapter, 9/16 M JIC x 1/4 M NPT	1
15	F010988	90° Elbow, 9/16 M JIC x 1/4 M NPT.	1
16	075540	Hose, 5/16 x 76" Swivel 9/16 F JIC Both Ends	1
17	079235	Hose, 5/16 x 51" Swivel 9/16 F JIC Both Ends	1
18	120457	Decal, Rail Brake Operation...(not shown).....	1

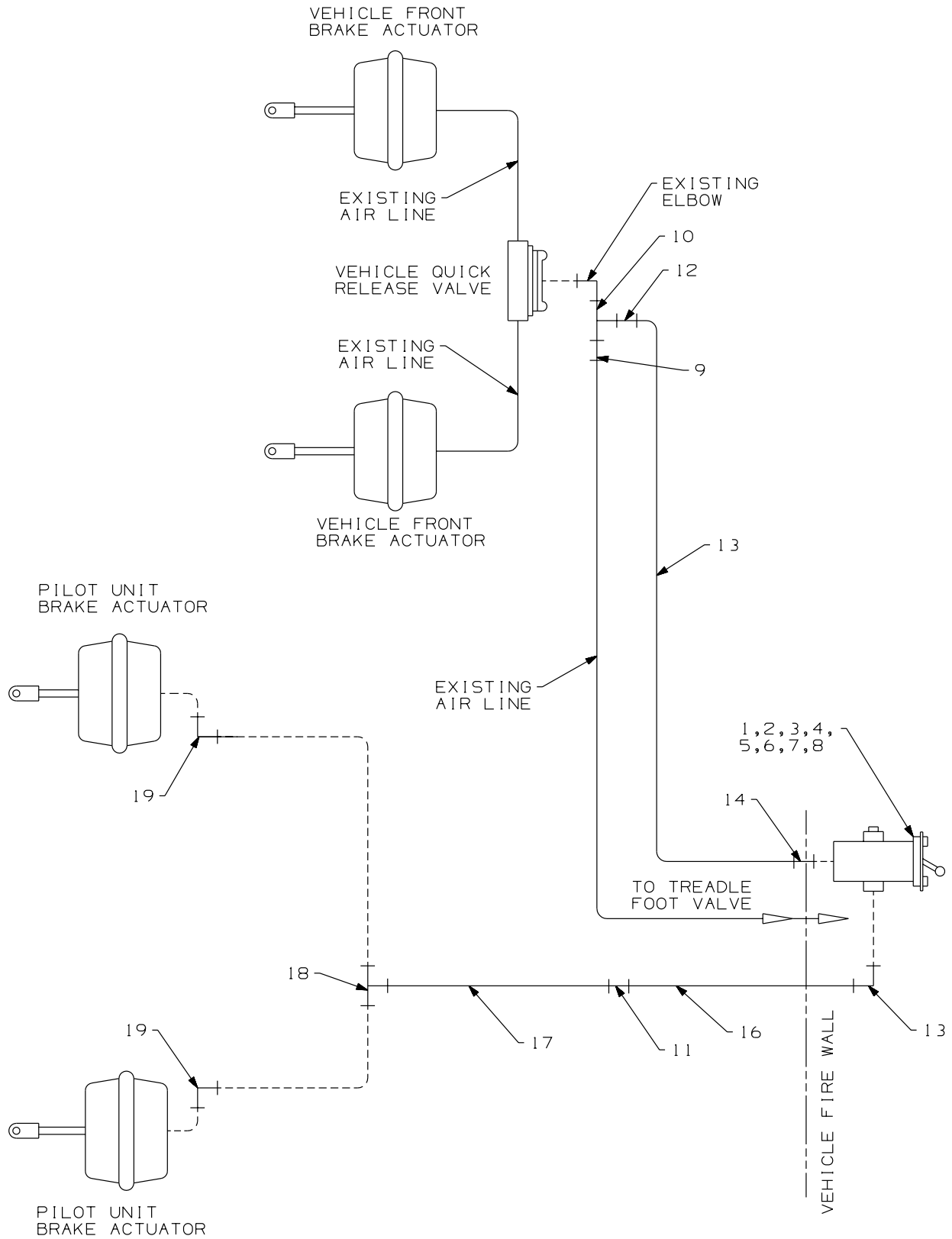
TRUCK BRAKE CONNECTION - 162114



TRUCK BRAKE CONNECTION - 162114

ITEM	PART NO	DESCRIPTION	QTY
1	F012055	90° Elbow, 9/16 M JIC x 3/8 M NPT.	1
2	F018904	Hose, 5/16 x 48" Swivel 9/16 F JIC Both Ends	1
3	F012587	Grommet	2
4	F010994	Adapter, 9/16 M JIC x 1/4 M NPT	1
5	F019332	Air Control Valve	1
6	F010989	Pipe Plug, 1/4 M NPT.	1
7	120453	Bracket.	1
8	F001113	Cap Screw, 5/16-18 x 1-1/4" Hex Hd	2
9	F001100	SAE Lock Washer, 5/16"	2
10	F007021	Hex Nut, 5/16"-18.	2
11	122583	Instruction Plate, Rail Wheel.....	1
12	F009591	Machine Screw, #10-24 x 3/4" Rd Hd	2
13	F010988	90° Elbow, 9/16 M JIC x 1/4 M NPT.	1
14	079235	Hose, 5/16 x 51" Swivel 9/16 F JIC Both Ends	1
15	F011152	Adapter, 9/16 M JIC x 9/16 M JIC	1
16	075540	Hose, 5/16 x 76" Swivel 9/16 F JIC Both Ends	1
17	120457	Decal, Rail Brake Operation...	1

TRUCK BRAKE CONNECTION - 179161

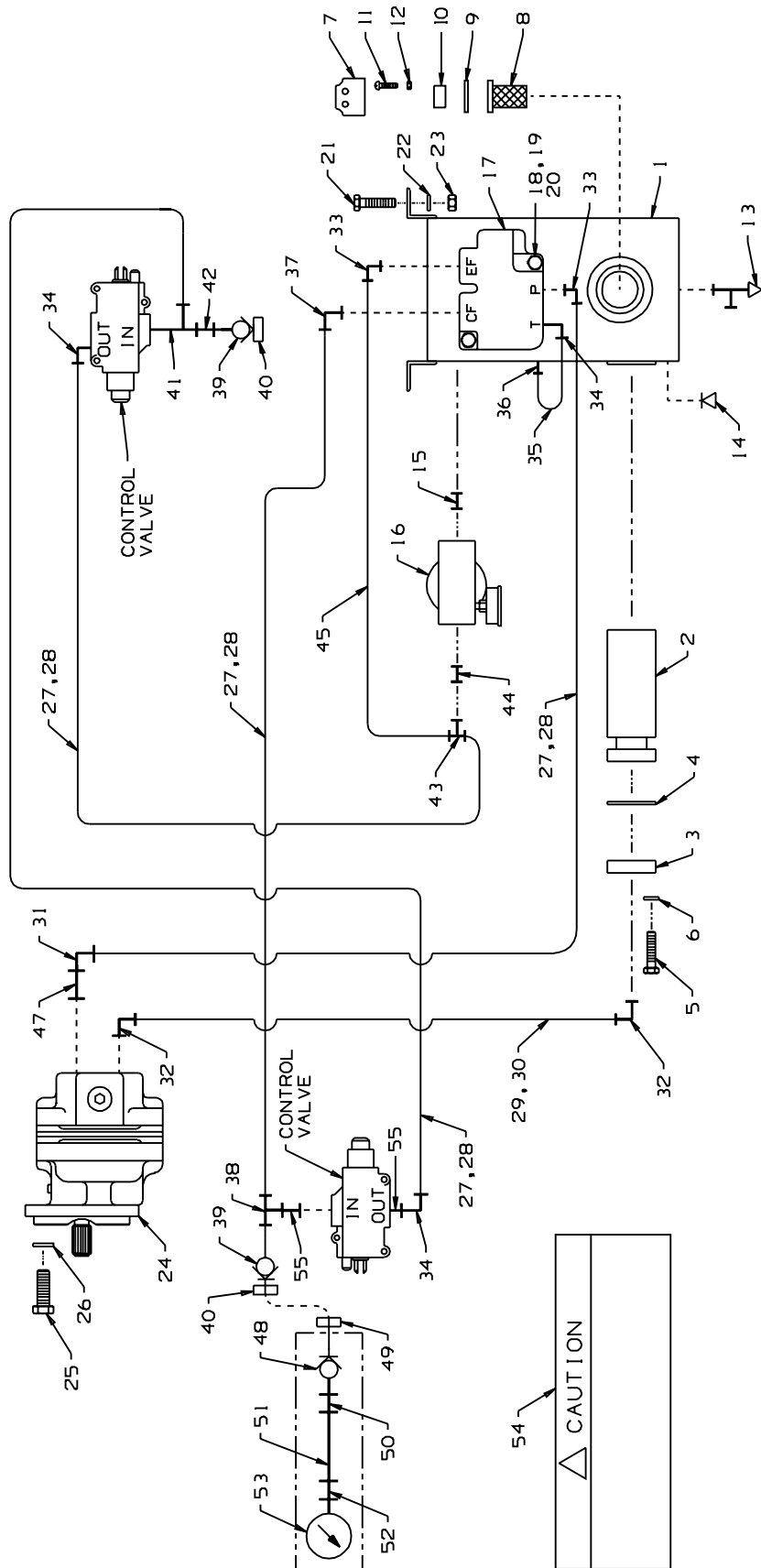


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TRUCK BRAKE CONNECTION - 179161

ITEM	PART NO	DESCRIPTION	QTY
1	F019332	Control Valve	1
2	120453	Bracket (control valve mounting)	1
3	F001113	Cap Screw, 5/16-18 x 1-1/4" Hex Hd	2
4	F001100	SAE Lock Washer, 5/16"	2
5	F007021	Hex Nut, 5/16"-18.	2
6	122583	Instruction Plate - Rail Wheel Brakes ON/OFF	1
7	F009591	Machine Screw, #10-24 x 3/4" Rd Hd	2
8	F010989	Pipe Plug, 1/4 M NPT.	1
9	F011604	Hex Nipple, 3/8 M NPT x 3/8 M NPT	1
10	F013459	Tee, 3/8 F NPT x 3/8 F NPT x 3/8 F NPT	1
11	F011152	Adapter, 9/16 M JIC x 9/16-M JIC	1
12	F012056	Adapter, 9/16 M JIC x 3/8 M NPT	1
13	160117	Hose, 5/16 x 104" Swivel 9/16 F JIC Both Ends	1
14	F010994	Adapter, 9/16 M JIC x 1/4 M NPT	1
15	F010988	90° Elbow, 9/16 M JIC x 1/4 M NPT.	1
16	079235	Hose, 5/16 x 52" Swivel 9/16 F JIC Both Ends	1
17	075540	Hose, 5/16 x 78" Swivel 9/16 F JIC Both Ends	1
18	F015626	Tee, 9/16 M JIC x 9/16 M JIC x 9/16 F STR	1
19	F012055	90° Elbow, 9/16 M JIC x 3/8 M NPT.	2

HYDRAULIC POWER PACK - FULL - 137926



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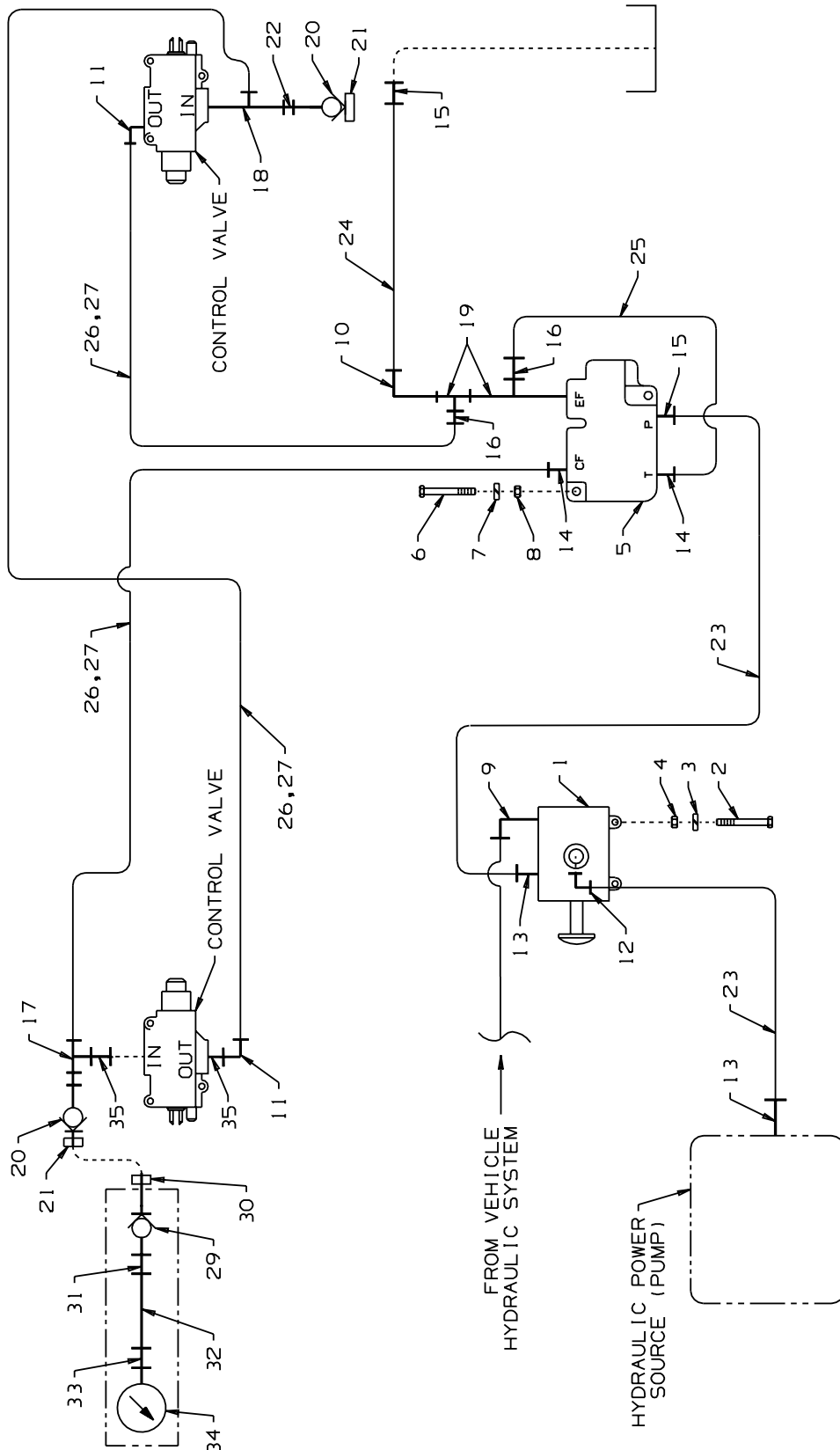
HYDRAULIC POWER PACK - FULL - 137926

ITEM	PART NO	DESCRIPTION	QTY
	137926	HYDRAULIC POWER PACK -FULL	1
	129136	HYDRAULIC RESERVOIR ASSEMBLY	1
1	099444	Reservoir Only	1
2	F014155	Filter	1
3	082205	Filter Flange	1
4	077997	Flange Gasket	1
5	F001125	Cap Screw, 3/8-16 x 1-1/4" Hex Hd	4
6	F001025	SAE Lock Washer, 3/8"	4
7	F022655	FILLER CAP	1
8	F010465	Filler Screen	1
9	056780	Filler Flange Gasket	2
10	F010466	Filler Flange	1
11	F009723	Machine Screw, 10-24 x 3/8" Rd Hd	6
12	F009541	SAE Lock Washer, #10	6
13	F010181	Drain Valve, 1/8 M NPT	2
14	F012702	Pipe Plug, 3/8 M NPT Magnetic	1
15	F001328	Pipe Nipple, 3/4 M NPT x 1-3/8"	1
16	F015452	FILTER - RETURN	1
16a	F015453	Replacement Filter Element	1
17	120993	VALVE, FLOW DIVIDER	1
17a	F019415	Pressure Relief Washers (set of four)	1
18	F009663	Cap Screw, 5/16-18 x 2" Hex Hd	2
19	F007021	Hex Nut, 5/16"-18	2
20	F001100	SAE Lock Washer, 5/16"	2
21	F001125	Cap Screw, 3/8-16 x 1-1/4" Hex Hd	4
22	F001025	SAE Lock Washer, 3/8"	4
23	F007020	Hex Nut, 3/8"-16	4
24	F023330	Hydraulic Pump	1
25	F003136	Cap Screw, 1/2-13 x 1" Hex Hd	2
26	F001075	SAE Lock Washer, 1/2"	2
	140344	HOSE GROUP	1
27	F009947	Hose, 13/32 x 960" (cut to length)	1
28	F020713	Hose Fitting, Swivel 3/4 F JIC (install on hose F009947)	8
29	F010298	Hose, 1-1/8 x 75" (cut to length)	1
30	F014307	Hose Fitting, Swivel 1-5/8 F JIC (install on hose F010298)	2
31	F013243	90° Elbow, 3/4 M NPT x 3/4 M JIC	1
32	F021260	90° Elbow, 1 M NPT x 1-5/8 M JIC	2
33	F012054	90° Elbow, 1/2 M NPT x 3/4 M JIC	2
34	F011114	90° Elbow, 3/8 M NPT x 3/4 M JIC	3
35	067736	Hose, 13/32 x 17" Swivel 3/4 F JIC Both Ends	1
36	F011170	Adapter, 3/8 M NPT x 3/4 M JIC	1
37	F012704	90° Elbow, 3/4 M JIC x 3/8 M NPT	1

HYDRAULIC POWER PACK - FULL - 137926

ITEM	PART NO	DESCRIPTION	QTY
38	F013605	Tee, 3/4 M JIC x 3/8 M NPT x 3/8 M NPT	1
39	F015303K	Nose Piece, 3/8 F NPT	2
40	F015077	Dust Cap.	2
41	F014722	Tee, 3/8 F NPT x 3/4 M JIC x 3/8 M NPT	1
42	F011604	Adapter, 3/8 M NPT x 3/8 M NPT	1
43	F013629	Tee, 3/4 M JIC x 3/4 M JIC x 3/8 M NPT	1
44	F012024	Reducer Bushing, 3/4 M NPT x 3/8 F NPT	1
45	067736	Hose, 13/32 x 17" Swivel 3/4 F JIC Both Ends	1
47	F011617	Reducer Bushing, 1 M NPT x 3/4 F NPT	1
	099137K	PRESSURE GAUGE ASSEMBLY	1
48	F015110K	Body, 3/8 F NPT	1
49	F015111	Dust Cap	1
50	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	1
51	171878	Hose, 3/8 x 14" Swivel 9/16 F JIC Both Ends	1
52	F011109	Adapter, 9/16 M JIC x 1/4 F NPT	1
53	F011432K	Pressure Gauge, 1/4 M NPT	1
54	137941	Decal, Caution -Recommended....	1
55	F015103	Adapter, 3/8 F NPT x 3/4 M STR (used on vertical units only)	2

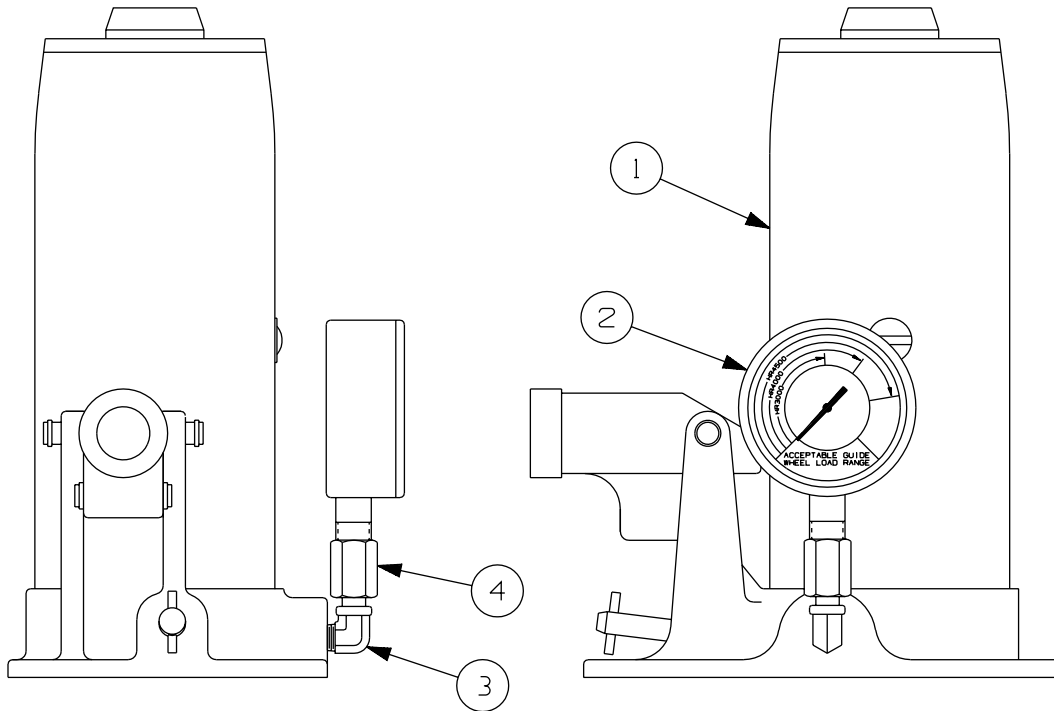
HYDRAULIC POWER PACK - ABBREVIATED - 137927



HYDRAULIC POWER PACK - ABBREVIATED - 137927

ITEM	PART NO	DESCRIPTION	QTY
	137927	HYDRAULIC POWER PACK -ABBREVIATED	1
1	F016490	Selector Valve.	1
2	F002760	Cap Screw, 3/8-16 x 2-1/4" Hex Hd	2
3	F001025	SAE Lock Washer, 3/8"	2
4	F009670	Hex Grip Nut, 3/8"-16.	2
5	120993	VALVE, FLOW DIVIDER	1
	F019415	Pressure Relief Washers (set of four)	1
6	F009663	Cap Screw, 5/16-18 x 2" Hex Hd	2
7	F001100	SAE Lock Washer, 5/16"	2
8	F007021	Hex Nut, 5/16"-18	2
9	F012010	90° Elbow Street, 3/4 F NPT x 3/4 M NPT	1
10	F010584	90° Elbow, 1-1/16 M JIC x 1/2 M NPT	1
11	F011114	90° Elbow, 3/4 M JIC x 3/8 M NPT	2
12	F010586	90° Elbow, 1-1/16 M JIC x 3/4 M NPT	1
13	F010581	Adapter, 1-1/16 M JIC x 3/4 M NPT	2
14	F011170	Adapter, 3/4 M JIC x 3/8 M NPT	2
15	F013210	Adapter, 1-1/16 M JIC x 1/2 M NPT	2
16	F012027	Adapter, 3/4 M JIC x 1/2 M NPT	2
17	F013605	Tee, 3/4 M JIC x 3/8 M NPT x 3/8 M NPT	1
18	F014722	Tee, 3/8 F NPT x 3/4 M JIC x 3/8 M NPT	1
19	F010692	Tee, 1/2 F NPT x 1/2 M NPT x 1/2 F NPT	2
20	F015303K	Nose Piece, 3/8 F NPT	2
21	F015077	Dust Cap.	2
22	F011604	Adapter, 3/8 M NPT x 3/8 M NPT	1
23	071692	Hose, 5/16 x 48" Swivel 1-1/16 F JIC Both Ends	2
24	111100	Hose, 3/4 x 28" Swivel 1-1/16 F JIC Both Ends	1
25	071867	Hose, 1/2 x 19-3/4" Swivel 3/4 F JIC Both Ends.	1
	140345	HOSE GROUP	1
26	F009947	Hose, 13/32 x 960" (cut to length).	1
27	F020713	Hose Fitting, Swivel 3/4 F JIC (install on hose F009947)	6
	099137K	PRESSURE GAUGE ASSEMBLY.	1
29	F015110K	Body, 3/8 F NPT.	1
30	F015111	Dust Cap	1
31	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	1
32	171878	Hose, 3/8 x 14" Swivel 9/16 F JIC Both Ends	1
33	F011109	Adapter, 9/16 M JIC x 1/4 F NPT	1
34	F011432K	Pressure Gauge, 1/4 M NPT.	1
35	F015103	Adapter, 3/8 F NPT x 3/4 M STR (used on vertical units only).	2

WHEEL LOAD JACK GROUP - 159510



PART NO	DESCRIPTION	QTY
159510	WHEEL LOAD JACK GROUP	1
1 F025272	Hydraulic Jack	1
2 159512	Gauge Assembly with Decals	1
3 146353	90° Elbow, 1/8 M NPT x 1/8 F NPT	1
4 F023088	Adapter, 1/8 M NPT x 1/4 F NPT	1

DECAL SERVICE GROUP - 161874

PART NO	DESCRIPTION	QTY
161874	DECAL SERVICE GROUP	1
F018082	Decal, Safety Instructions - Lock Front Wheels.....	1
F018084	Decal, HY-RAIL® Operation	3
140220	Decal, Warning - Do Not Operate... ..	3
155007	Decal, HY-RAIL® Vehicle Completed By... ..	1
161894	Decal, HY-RAIL® Operating Instructions	1
163998	Decal, Warning - Lock Mechanism Must Be... ..	1

SIGHT ROD WITH EXTENSION GROUP - 164574

PART NO	DESCRIPTION	QTY
164574	SIGHT ROD WITH EXTENSION GROUP	1
130195	Sight Rod Kit (contains 2 sight rods)	1
135809	Extension Rod	2
161855	Bar	2
F022036	Cap Screw, 1/2-13 1-1/4" Hex Flg Hd.	2
F022037	Hex Flg Nut, 1/2"-13	2

MOUNTING BRACKET GROUP - 164518

PART NO	DESCRIPTION	QTY
164518	MOUNTING BRACKET GROUP	1

Front Unit Mounting Parts

164537	Side Bar, Left	1
164536	Side Bar, Right	1
F020460	Cap Screw, 5/8-11 x 2" GR 8 Hex Hd.	1
F009425	SAE Washer, 5/8"	2
F025425	Hex Lock Nut, 5/8"-11.	9
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F018861	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F025425	Hex Lock Nut, 5/8"-11.	13
164519	Skid Plate	1
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	4
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
700566325	Cap Screw, 5/8-11 x 3-1/4" Hex Hd	8
167849	Spacer (use as required)	2
F024797	Cap Screw, 3/8-16 x 2-1/2" Flt Soc Hd.	4
021447	Front Unit Application Drawing	

Rear Unit Mounting Parts

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F006875	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
021448	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 167867

PART NO	DESCRIPTION	QTY
167867	MOUNTING BRACKET GROUP	1

Front Unit Mounting Parts

168299	Side Bar, Right	1
168272	Side Bar, Left	1
F023743	Cap Screw, 5/8-11 x 5-1/2" Hex Hd	2
700566325	Cap Screw, 5/8-11 x 3-1/4" GR 8 Hex Hd	6
F019503	Hex Nut, 5/8"-11	8
F001103	SAE Lock Washer, 5/8"	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F005191	Cap Screw, 5/8-11 x 2-1/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
167845	Skid Plate	1
167852	Bumper Bracket, Left	1
167853	Bumper Bracket, Right	1
F020460	Cap Screw, 5/8-11 x 2" Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
167856	Bumper Bracket, Left	1
167857	Bumper Bracket, Right	1
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021615	Front Unit Application Drawing	

Rear Unit Mounting Parts

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F006875	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
021616	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 168245

PART NO	DESCRIPTION	QTY
168245	MOUNTING BRACKET GROUP	1

Front Unit Mounting Parts

168246	Side Bar, Left	1
168247	Side Bar, Right	1
F006875	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	8
F009425	SAE Washer, 5/8"	8
F025425	Hex Lock Nut, 5/8"-11	8
F003772	Cap Screw, 3/4-10 x 2-3/4" Hex Hd	2
F002929	SAE Washer, 3/4"	2
700666075	Hex Lock Nut, 3/4"-10	2
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F005191	Cap Screw, 5/8-11 x 2-1/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
168252	Skid Plate	1
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
158188	Bumper Bracket	2
F005551	Cap Screw, 3/4-10 x 1-1/2" Hex Hd	4
F021926	Hex Flg Nut, 3/4"-10	4
021601	Front Unit Application Drawing	

Rear Unit Mounting Parts

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F006875	Cap Screw, 5/8-11 x 4" GR 5 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
021602	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 168636

PART NO	DESCRIPTION	QTY
168636	MOUNTING BRACKET GROUP	1
Front Unit Mounting Parts		
168246	Side Bar, Left	1
168247	Side Bar, Right	1
F002480	Cap Screw, 5/8-11 x 4" GR 5 Hex Hd.	8
F009425	SAE Washer, 5/8"	8
F025425	Hex Lock Nut, 5/8"-11.	8
F016250	Cap Screw, 3/4-10 x 4" GR 5 Hex Hd.	2
F002929	SAE Washer, 3/4"	2
700666075	Hex Lock Nut, 3/4"-10.	2
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F005191	Cap Screw, 5/8-11 x 2-1/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
168637	Skid Plate	1
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
158188	Bumper Bracket	2
F005551	Cap Screw, 3/4-10 x 1-1/2" Hex Hd	4
F021926	Hex Flg Nut, 3/4"-10	4
021692	Front Unit Application Drawing	
Rear Unit Mounting Parts		
100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F006875	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
021602	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 168648

PART NO	DESCRIPTION	QTY
168648	MOUNTING BRACKET GROUP	1

Front Unit Mounting Parts

164537	Side Bar, Left	1
164536	Side Bar, Right	1
F023012	Hardened Washer	4
F001304	Cap Screw, 5/8-11 x 2" Hex Hd	1
F009425	SAE Washer, 5/8"	2
F025425	Hex Lock Nut, 5/8"-11	9
700566325	Cap Screw, 5/8-11 x 3-1/4" GR 8 Hex Hd	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F005191	Cap Screw, 5/8-11 x 2-1/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
168649	Skid Plate	1
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	4
F021924	Hex Flg Nut, 5/8"-11	4
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
167849	Bar	2
F024797	Cap Screw, 3/8-16 x 2-1/2" Flt Soc Hd	4
021694	Front Unit Application Drawing	

Rear Unit Mounting Parts

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F006875	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
021448	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 169579

PART NO	DESCRIPTION	QTY
169579	MOUNTING BRACKET GROUP	1
Front Unit Mounting Parts		
171720	Side Bar, Right	1
171719	Side Bar, Left	1
F005454	Cap Screw, 5/8-11 x 5-1/2" Hex Hd	8
F001103	SAE Lock Washer, 5/8"	8
F017188	Hex Elastic Stop Nut, 5/8"-11	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
161869	Skid Plate	1
F005191	Cap Screw, 5/8-11 x 2-1/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021805	Front Unit Application Drawing	
Rear Unit Mounting Parts		
100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021179	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 169585

PART NO	DESCRIPTION	QTY
169585	MOUNTING BRACKET GROUP	1
Front Unit Mounting Parts		
171720	Side Bar, Right	1
171719	Side Bar, Left	1
F005454	Cap Screw, 5/8-11 x 5-1/2" Hex Hd	8
F001103	SAE Lock Washer, 5/8"	8
F017188	Hex Elastic Stop Nut, 5/8"-11	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
161869	Skid Plate	1
F005191	Cap Screw, 5/8-11 x 2-1/4" Hex Hd	6
F009425	SAE Washer, 5/8"	6
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021805	Front Unit Application Drawing	
Rear Unit Mounting Parts		
100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021179	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 169590

PART NO	DESCRIPTION	QTY
169590	MOUNTING BRACKET GROUP	1
Front Unit Mounting Parts		
169580	Side Bar, Right	1
169582	Side Bar Left	1
F005454	Cap Screw, 5/8-11 x 5-1/2" Hex Hd	8
F001103	SAE Lock Washer, 5/8"	8
F025425	Hex Elastic Stop Nut, 5/8"-11	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F009425	Washer, 5/8"	6
F018861	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
163822	Skid Plate	1
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021806	Front Unit Application Drawing	
Rear Unit Mounting Parts		
100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021321	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 169591

PART NO	DESCRIPTION	QTY
169591	MOUNTING BRACKET GROUP	1

Front Unit Mounting Parts

169580	Side Bar, Right	1
169582	Side Bar Left	1
F005454	Cap Screw, 5/8-11 x 5-1/2" Hex Hd	8
F001103	SAE Lock Washer, 5/8"	8
F025425	Hex Elastic Stop Nut, 5/8"-11	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F009425	Washer, 5/8"	6
F018861	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
163822	Skid Plate	1
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021806	Front Unit Application Drawing	

Rear Unit Mounting Parts

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021321	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 169613

PART NO	DESCRIPTION	QTY
169613	MOUNTING BRACKET GROUP	1
Front Unit Mounting Parts		
169580	Side Bar, Right	1
169582	Side Bar Left	1
F023743	Cap Screw, 5/8-11 x 5-1/2" GR 8 Hex Hd	8
F009425	SAE Washer, 5/8"	8
F025425	Hex Elastic Stop Nut, 5/8"-11	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F018861	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
164555	Skid Plate	1
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021808	Front Unit Application Drawing	
Rear Unit Mounting Parts		
100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021457	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 169615

PART NO	DESCRIPTION	QTY
169615	MOUNTING BRACKET GROUP	1

Front Unit Mounting Parts

169580	Side Bar, Right	1
169582	Side Bar Left	1
F023743	Cap Screw, 5/8-11 x 5-1/2" GR 8 Hex Hd	8
F009425	SAE Washer, 5/8"	8
F025425	Hex Elastic Stop Nut, 5/8"-11	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F018861	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
164555	Skid Plate	1
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021808	Front Unit Application Drawing	

Rear Unit Mounting Parts

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021457	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 175235 - FRONT PARTS ONLY

PART NO	DESCRIPTION	QTY
175235	MOUNTING BRACKET GROUP	1
Front Unit Mounting Parts		
169580	Side Bar, Right	1
169582	Side Bar Left	1
F023743	Cap Screw, 5/8-11 x 5-1/2" GR 8 Hex Hd	8
F009425	SAE Washer, 5/8"	8
F025425	Hex Elastic Stop Nut, 5/8"-11	8
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F018861	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
163822	Skid Plate	1
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
021806	Front Unit Application Drawing	

MOUNTING BRACKET GROUP - 175264

PART NO	DESCRIPTION	QTY
175264	MOUNTING BRACKET GROUP	1

Front Unit Mounting Parts

175232	Side Bar, Right	1
175231	Side Bar Left	1
700566225	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	13
F017188	Hex Elastic Stop Nut, 5/8"-11	13
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
175246	Skid Plate	1
F020671	Cap Screw, 7/8-9 x 5" GR 8 Hex Hd	2
F023224	Hex Elastic Stop Nut, 7/8"-9	2
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
F018861	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
162029	Plate	2
F005192	Cap Screw, 5/8-11 x 1-3/4" Hex Hd	6
F025425	Hex Elastic Stop Nut, 5/8"-11	6
022288	Front Unit Application Drawing	

Rear Unit Mounting Parts

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
022289	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 177948

PART NO	DESCRIPTION	QTY
177948	MOUNTING BRACKET GROUP	1
Front Unit Mounting Parts		
176724	Side Bar, Right	1
176732	Side Bar Left	1
F022822	Cap Screw, 5/8-11 x 4-1/2" GR 8 Hex Hd	8
F009425	SAE Washer, 5/8"	8
F025425	Hex Elastic Stop Nut, 5/8"-11	8
700568400	Cap Screw, 3/4-10 x 4" GR 8 Hex Hd	2
F002929	SAE Washer, 3/4"	2
700666075	Hex Lock Nut, 3/4"-10	2
111245	Shim, .125" (use as required)	2
111246	Shim, .059" (use as required)	2
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
168637	Skid Plate	1
F019670	Clip	1
F023255	Cap Screw, 3/8-16 x 1" Hex Flg Hd	1
F023225	Hex Flg Nut, 3/8"-16	1
158188	Bumper Bracket	2
F005551	Cap Screw, 3/4-10 x 1-1/2" GR 5 Hex Hd	4
F021926	Hex Flg Nut, 3/4"-10	4
F006875	Cap Screw, 5/8-11 x 2-3/4" GR 5 Hex Hd	6
F009425	SAE Washer, 5/8"	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
022462	Front Unit Application Drawing	
Rear Unit Mounting Parts		
100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" GR 8 Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021602	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 179544 - REAR PARTS ONLY

PART NO	DESCRIPTION	QTY
179544	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
023069	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 180014 - REAR PARTS ONLY

PART NO	DESCRIPTION	QTY
180014	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021616	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 181455 - REAR PARTS ONLY

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PART NO	DESCRIPTION	QTY
181455	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
023069	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 181480 - REAR PARTS ONLY

PART NO	DESCRIPTION	QTY
181480	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021616	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 184159 - REAR PARTS ONLY

PART NO	DESCRIPTION	QTY
181659	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
023069	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 184348 - REAR PARTS ONLY

PART NO	DESCRIPTION	QTY
184348	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021448	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 184359 - REAR PARTS ONLY

PART NO	DESCRIPTION	QTY
181659	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
021616	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 184516 - REAR PARTS ONLY

PART NO	DESCRIPTION	QTY
184516	MOUNTING BRACKET GROUP	1

Parts For Rear Mounting Brackets

100838	Shim, .125" (use as required)	2
100839	Shim, .059" (use as required)	2
F019502	Cap Screw, 5/8-11 x 2-3/4" Hex Hd	6
F023012	Hardened Washer, 5/8"	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
023069	Rear Unit Application Drawing	

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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	168648	164518
Undercarriage Parts	161337	161337
Steering Lock	155079	155079
Application Drawing - Front	021694	021447
Application Drawing - Rear	021448	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1997 CHEV/GMC C6H042 / C7H042 8,100 GAWR FRONT AXLE HR3000A1	1997 CHEV/GMC C7H042 12,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	168648	164518
Undercarriage Parts	161337	161337
Steering Lock	155079	155079
Application Drawing - Front	021694	021447
Application Drawing - Rear	021448	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 CHEV/GMC
C6H042 / C7H042
8,100 GAWR
FRONT AXLE
HR3000A1

1998 CHEV/GMC
C6H042 / C7H042
8,100 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units

Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____

Rear Guide Wheel Units

Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	168648	184348
Undercarriage Parts	161337	_____
Steering Lock	155079	155079
Application Drawing - Front	021694	_____
Application Drawing - Rear	021448	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 CHEV/GMC C7H042 12,000 GAWR FRONT AXLE HR3000A1	1998 CHEV/GMC C7H042 12,000 GAWR FRONT AXLE HR3000A1 FRONT HR3000B1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	_____
Non-Insulated	162318	_____
Mounting Brackets	164518	164518
Undercarriage Parts	161337	161337
Steering Lock	155079	155079
Application Drawing - Front	021447	021447
Application Drawing - Rear	021448	_____

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	_____
* Rear Unit Brakes	161896	_____
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 CHEV/GMC
C7H042
12,000 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units	
Insulated With Brakes	_____
Insulated Without Brakes.	_____
Non-Insulated With Brakes	_____
Non-Insulated Without Brakes.	_____
Rear Guide Wheel Units	
Insulated	161638
Non-Insulated	162318
Mounting Brackets	184348
Undercarriage Parts.	_____
Steering Lock.	155079
Application Drawing - Front	_____
Application Drawing - Rear	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____
* Rail Sweeps - Rear	161875
* Rear Unit Brakes	161896
Truck Brake Connection.	154057
Hydraulic Power Pack - Full.	137926
Hydraulic Power Pack - Abbreviated	137927
Wheel Load Jack	_____
Sight Rod Kit And Extension	164574

* Recommended Safety Option

1999 CHEV/GMC
C6H042 / C7H042
8,100 GAWR
FRONT AXLE
HR3000A1

1999 CHEV/GMC
C6H042 / C7H042
8,100 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units

Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____

Rear Guide Wheel Units

Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	168648	184348
Undercarriage Parts	161337	_____
Steering Lock	155079	155079
Application Drawing - Front	021694	_____
Application Drawing - Rear	021448	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 CHEV/GMC C7H042 12,000 GAWR FRONT AXLE HR3000A1	1999 CHEV/GMC C7H042 12,000 GAWR FRONT AXLE HR3000A1 FRONT HR3000B1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	_____
Non-Insulated	162318	_____
Mounting Brackets	164518	164518
Undercarriage Parts	161337	161337
Steering Lock	155079	155079
Application Drawing - Front	021447	021447
Application Drawing - Rear	021448	_____

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	_____
* Rear Unit Brakes	161896	_____
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 CHEV/GMC
C7H042
12,000 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units	
Insulated With Brakes	_____
Insulated Without Brakes	_____
Non-Insulated With Brakes	_____
Non-Insulated Without Brakes	_____
Rear Guide Wheel Units	
Insulated	161638
Non-Insulated	162318
Mounting Brackets	184348
Undercarriage Parts	_____
Steering Lock	155079
Application Drawing - Front	_____
Application Drawing - Rear	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____
* Rail Sweeps - Rear	161875
* Rear Unit Brakes	161896
Truck Brake Connection	154057
Hydraulic Power Pack - Full	137926
Hydraulic Power Pack - Abbreviated	137927
Wheel Load Jack	_____
Sight Rod Kit And Extension	164574
* Recommended Safety Option	

2000 CHEV/GMC
C6H042 / C7H042
8,100 GAWR
FRONT AXLE
HR3000A1

2000 CHEV/GMC
C6H042 / C7H042
8,100 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units

Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____

Rear Guide Wheel Units

Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	168648	184348
Undercarriage Parts	161337	_____
Steering Lock	155079	155079
Application Drawing - Front	021694	_____
Application Drawing - Rear	021448	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

2000 CHEV/GMC C7H042 12,000 GAWR FRONT AXLE HR3000A1	2000 CHEV/GMC C7H042 12,000 GAWR FRONT AXLE HR3000A1 FRONT HR3000B1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	_____
Non-Insulated	162318	_____
Mounting Brackets	164518	164518
Undercarriage Parts	161337	161337
Steering Lock	155079	155079
Application Drawing - Front	021447	021447
Application Drawing - Rear	021448	_____

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	_____
* Rear Unit Brakes	161896	_____
Truck Brake Connection	154057	154057
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

2000 CHEV/GMC
C7H042
12,000 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units	
Insulated With Brakes	_____
Insulated Without Brakes	_____
Non-Insulated With Brakes	_____
Non-Insulated Without Brakes	_____
Rear Guide Wheel Units	
Insulated	161638
Non-Insulated	162318
Mounting Brackets	184348
Undercarriage Parts	_____
Steering Lock	155079
Application Drawing - Front	_____
Application Drawing - Rear	021448

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____
* Rail Sweeps - Rear	161875
* Rear Unit Brakes	161896
Truck Brake Connection	154057
Hydraulic Power Pack - Full	137926
Hydraulic Power Pack - Abbreviated	137927
Wheel Load Jack	_____
Sight Rod Kit And Extension	164574

* Recommended Safety Option

1996 FORD	1996 FORD
F700 / F800	F700 / F800
9,000 GAWR	10,000 GAWR
FRONT AXLE	FRONT AXLE
HR3000A1	HR3000A1

REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets - With Front Brakes	169579	169590
Mounting Brackets - Without Front Brakes	169585	169591
Undercarriage Parts	161337	161337
Steering Lock	156009	156009
Application Drawing - Front	021805	021806
Application Drawing - Rear	021179	021321

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1996 FORD F700 / F800 12,000 GAWR FRONT AXLE HR3000A1	1996 FORD LN-7000 9,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	_____	167867
Mounting Brackets - With Front Brakes	169613	169590
Mounting Brackets - Without Front Brakes	169615	169591
Undercarriage Parts	161337	161337
Steering Lock	156009	154390
Application Drawing - Front	021808	021615
Application Drawing - Rear	021457	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1996 FORD
LN-8000
12,000 GAWR
FRONT AXLE
HR3000A1

REQUIRED GROUPS

Front Guide Wheel Units

Insulated With Brakes	170780
Insulated Without Brakes	164533
Non-Insulated With Brakes	170782
Non-Insulated Without Brakes	164534

Rear Guide Wheel Units

Insulated	161638
Non-Insulated	162318
Mounting Brackets	167867
Undercarriage Parts	161337
Steering Lock	154390
Application Drawing - Front	021615
Application Drawing - Rear	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875
* Rail Sweeps - Rear	161875
* Rear Unit Brakes	161896
Truck Brake Connection	162094
Hydraulic Power Pack - Full	137926
Hydraulic Power Pack - Abbreviated	137927
Wheel Load Jack	159510
Sight Rod Kit And Extension	164574

* Recommended Safety Option

1997 FORD	1997 FORD
F700 / F800	F700 / F800
9,000 GAWR	10,000 GAWR
FRONT AXLE	FRONT AXLE
HR3000A1	HR3000A1

REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets - With Front Brakes	169579	169590
Mounting Brackets - Without Front Brakes	169585	169591
Undercarriage Parts	161337	161337
Steering Lock	156009	156009
Application Drawing - Front	021805	021806
Application Drawing - Rear	021179	021321

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1997 FORD	1997 FORD
F700 / F800	F700 / F800
10,000 GAWR	12,000 GAWR
FRONT AXLE	FRONT AXLE
HR3000A1 FRONT	HR3000A1
HR3000B1 REAR	

REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	_____	161638
Non-Insulated	_____	162318
Mounting Brackets - With Front Brakes	175235	169613
Mounting Brackets - Without Front Brakes	_____	169615
Undercarriage Parts	161337	161337
Steering Lock	156009	156009
Application Drawing - Front	021806	021808
Application Drawing - Rear	_____	021457

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	_____	161875
* Rear Unit Brakes	_____	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1997 FORD LN-7000 9,000 GAWR FRONT AXLE HR3000A1	1997 FORD LN-8000 12,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	167867	167867
Undercarriage Parts	161337	161337
Steering Lock	154390	154390
Application Drawing - Front	021615	021615
Application Drawing - Rear	021616	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 FORD
F800
9,000 GAWR
FRONT AXLE
HR3000A1

1998 FORD
F800
9,000 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units

Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____

Rear Guide Wheel Units

Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets - With Front Brakes	169579	184359
Mounting Brackets - Without Front Brakes	169585	_____
Undercarriage Parts	161337	_____
Steering Lock	156009	156009
Application Drawing - Front	021805	_____
Application Drawing - Rear	021179	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 FORD F800 10,000 GAWR FRONT AXLE HR3000A1	1998 FORD F800 10,000 GAWR FRONT AXLE HR3000A1 FRONT HR3000B1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	_____
Non-Insulated	162318	_____
Mounting Brackets - With Front Brakes	169590	175235
Mounting Brackets - Without Front Brakes	169591	_____
Undercarriage Parts	161337	161337
Steering Lock	156009	156009
Application Drawing - Front	021806	021806
Application Drawing - Rear	021321	_____

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	_____
* Rear Unit Brakes	161896	_____
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 FORD F800 12,000 GAWR FRONT AXLE HR3000A1	1998 FORD F800 12,000 GAWR FRONT AXLE HR3000A1 FRONT HR3000B1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	_____
Non-Insulated	162318	_____
Mounting Brackets - With Front Brakes	169613	169613
Mounting Brackets - Without Front Brakes	169615	_____
Undercarriage Parts	161337	161337
Steering Lock	156009	156009
Application Drawing - Front	021808	021808
Application Drawing - Rear	021457	_____

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	_____
* Rear Unit Brakes	161896	_____
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 FORD F800 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR	1998 FORD L-8501 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	_____	_____
Insulated Without Brakes	_____	_____
Non-Insulated With Brakes	_____	_____
Non-Insulated Without Brakes	_____	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	181480	180014
Undercarriage Parts	_____	_____
Steering Lock	156009	179140
Application Drawing - Front	_____	_____
Application Drawing - Rear	021616	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	179161
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	_____	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 FORD LN-7000 9,000 GAWR FRONT AXLE HR3000A1	1998 FORD LN-8000 12,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	167867	167867
Undercarriage Parts	161337	161337
Steering Lock	154390	154390
Application Drawing - Front	021615	021615
Application Drawing - Rear	021616	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 FORD F800 9,000 GAWR FRONT AXLE HR3000A1	1999 FORD F800 9,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets - With Front Brakes	169579	184359
Mounting Brackets - Without Front Brakes	169585	_____
Undercarriage Parts	161337	_____
Steering Lock	156009	156009
Application Drawing - Front	021805	_____
Application Drawing - Rear	021179	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 FORD F800 10,000 GAWR FRONT AXLE HR3000A1	1999 FORD F800 10,000 GAWR FRONT AXLE HR3000A1 FRONT HR3000B1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	_____
Non-Insulated	162318	_____
Mounting Brackets - With Front Brakes	169590	175235
Mounting Brackets - Without Front Brakes	169591	_____
Undercarriage Parts	161337	161337
Steering Lock	156009	156009
Application Drawing - Front	021806	021806
Application Drawing - Rear	021321	_____

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	_____
* Rear Unit Brakes	161896	_____
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 FORD F800 12,000 GAWR FRONT AXLE HR3000A1	1999 FORD F800 12,000 GAWR FRONT AXLE HR3000A1 FRONT HR3000B1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	_____
Non-Insulated	162318	_____
Mounting Brackets - With Front Brakes	169613	169613
Mounting Brackets - Without Front Brakes	169615	_____
Undercarriage Parts	161337	161337
Steering Lock	156009	156009
Application Drawing - Front	021808	021806
Application Drawing - Rear	021457	_____

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	_____
* Rear Unit Brakes	161896	_____
Truck Brake Connection	162094	162094
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 FORD
F800
12,000 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units	
Insulated With Brakes	_____
Insulated Without Brakes	_____
Non-Insulated With Brakes	_____
Non-Insulated Without Brakes	_____
Rear Guide Wheel Units	
Insulated	161638
Non-Insulated	162318
Mounting Brackets	181480
Undercarriage Parts	_____
Steering Lock	156009
Application Drawing - Front	_____
Application Drawing - Rear	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____
* Rail Sweeps - Rear	161875
* Rear Unit Brakes	161896
Truck Brake Connection	162094
Hydraulic Power Pack - Full	137926
Hydraulic Power Pack - Abbreviated	137927
Wheel Load Jack	_____
Sight Rod Kit And Extension	164574
* Recommended Safety Option	

1997 FREIGHTLINER
FL60
9,000 GAWR
FRONT AXLE
HR3000A1

REQUIRED GROUPS

Front Guide Wheel Units	
Insulated With Brakes	170780
Insulated Without Brakes	164533
Non-Insulated With Brakes	170782
Non-Insulated Without Brakes	164534
Rear Guide Wheel Units	
Insulated	161638
Non-Insulated	162318
Mounting Brackets	175264
Undercarriage Parts	175265
Steering Lock	168053
Application Drawing - Front	022288
Application Drawing - Rear	022289

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875
* Rail Sweeps - Rear	161875
* Rear Unit Brakes	161896
Truck Brake Connection	162114
Hydraulic Power Pack - Full	137926
Hydraulic Power Pack - Abbreviated	137927
Wheel Load Jack	159510
Sight Rod Kit And Extension	164574

* Recommended Safety Option

1998 FREIGHTLINER FL60 9,000 GAWR FRONT AXLE HR3000A1	1998 FREIGHTLINER FL70 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	175264	184159
Undercarriage Parts	175265	_____
Steering Lock	168053	168053
Application Drawing - Front	022288	_____
Application Drawing - Rear	022289	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 FREIGHTLINER FL60 9,000 GAWR FRONT AXLE HR3000A1	1999 FREIGHTLINER FL70 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	175264	184159
Undercarriage Parts	175265	_____
Steering Lock	168053	168053
Application Drawing - Front	022288	_____
Application Drawing - Rear	022289	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

2000 FREIGHTLINER FL60 9,000 GAWR FRONT AXLE HR3000A1	2000 FREIGHTLINER FL70 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	175264	184159
Undercarriage Parts	175265	_____
Steering Lock	168053	168053
Application Drawing - Front	022288	_____
Application Drawing - Rear	022289	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1996 INTERNATIONAL 4700 8,000 GAWR FRONT AXLE HR3000A1	1996 INTERNATIONAL 4700 10,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	168636	168245
Undercarriage Parts	161337	161337
Steering Lock	154512	154512
Application Drawing - Front	021692	021601
Application Drawing - Rear	021602	021602

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1997 INTERNATIONAL 4700 8,000 GAWR FRONT AXLE HR3000A1	1997 INTERNATIONAL 4700 10,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	170780
Insulated Without Brakes	164533	164533
Non-Insulated With Brakes	170782	170782
Non-Insulated Without Brakes	164534	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	177948	168245
Undercarriage Parts	161337	161337
Steering Lock	154512	154512
Application Drawing - Front	022462	021601
Application Drawing - Rear	021602	021602

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1997 INTERNATIONAL
4900
13,000 GAWR
FRONT AXLE
HR3000A1

REQUIRED GROUPS

Front Guide Wheel Units
Insulated With Brakes 170780
Insulated Without Brakes 164533
Non-Insulated With Brakes 170782
Non-Insulated Without Brakes 164534
Rear Guide Wheel Units
Insulated 161638
Non-Insulated 162318
Mounting Brackets 168245
Undercarriage Parts 161337
Steering Lock 154512
Application Drawing - Front 021601
Application Drawing - Rear 021602

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front 161875
* Rail Sweeps - Rear 161875
* Rear Unit Brakes 161896
Truck Brake Connection 162114
Hydraulic Power Pack - Full 137926
Hydraulic Power Pack - Abbreviated 137927
Wheel Load Jack 159510
Sight Rod Kit And Extension 164574

* Recommended Safety Option

1998 INTERNATIONAL 4700 8,000 GAWR FRONT AXLE HR3000A1	1998 INTERNATIONAL 4700 9,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	177948	184516
Undercarriage Parts	161337	_____
Steering Lock	154512	154512
Application Drawing - Front	022462	_____
Application Drawing - Rear	021602	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1998 INTERNATIONAL 4700 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR	1998 INTERNATIONAL 4900 12,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	_____	170780
Insulated Without Brakes	_____	164533
Non-Insulated With Brakes	_____	170782
Non-Insulated Without Brakes	_____	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	184516	168245
Undercarriage Parts	_____	161337
Steering Lock	154512	154512
Application Drawing - Front	_____	021601
Application Drawing - Rear	022327	021602

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	_____	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 INTERNATIONAL 4700 8,000 GAWR FRONT AXLE HR3000A1	1999 INTERNATIONAL 4700 9,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	177948	184516
Undercarriage Parts	161337	_____
Steering Lock	186205	185205
Application Drawing - Front	022462	_____
Application Drawing - Rear	021602	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 INTERNATIONAL 4700 10,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR	1999 INTERNATIONAL 4700 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	_____	_____
Insulated Without Brakes	_____	_____
Non-Insulated With Brakes	_____	_____
Non-Insulated Without Brakes	_____	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	179544	181455
Undercarriage Parts	_____	_____
Steering Lock	186205	186205
Application Drawing - Front	_____	_____
Application Drawing - Rear	023069	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	_____	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 INTERNATIONAL 4700 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR	1999 INTERNATIONAL 4900 12,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	_____	170780
Insulated Without Brakes	_____	164533
Non-Insulated With Brakes	_____	170782
Non-Insulated Without Brakes	_____	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	184516	168245
Undercarriage Parts	_____	161337
Steering Lock	186205	186205
Application Drawing - Front	_____	021601
Application Drawing - Rear	023069	021602

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	_____	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

2000 INTERNATIONAL 4700 8,000 GAWR FRONT AXLE HR3000A1	2000 INTERNATIONAL 4700 9,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	177948	184516
Undercarriage Parts	161337	_____
Steering Lock	186205	185205
Application Drawing - Front	022462	_____
Application Drawing - Rear	021602	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

2000 INTERNATIONAL 4700 10,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR	2000 INTERNATIONAL 4700 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	_____	_____
Insulated Without Brakes	_____	_____
Non-Insulated With Brakes	_____	_____
Non-Insulated Without Brakes	_____	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	179544	181455
Undercarriage Parts	_____	_____
Steering Lock	186205	186205
Application Drawing - Front	_____	_____
Application Drawing - Rear	023069	023069

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	_____	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

2000 INTERNATIONAL 4700 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR	2000 INTERNATIONAL 4900 12,000 GAWR FRONT AXLE HR3000A1
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	_____	170780
Insulated Without Brakes	_____	164533
Non-Insulated With Brakes	_____	170782
Non-Insulated Without Brakes	_____	164534
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	184516	168245
Undercarriage Parts	_____	161337
Steering Lock	186205	186205
Application Drawing - Front	_____	021601
Application Drawing - Rear	023069	021602

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	_____	161875
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162114	162114
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	_____	159510
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 STERLING L-7501 9,000 GAWR FRONT AXLE HR3000A1	1999 STERLING L-7501 12,000 GAWR FRONT AXLE HR3000V1 FRONT HR3000A1 REAR
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REQUIRED GROUPS

Front Guide Wheel Units		
Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____
Rear Guide Wheel Units		
Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	167867	180014
Undercarriage Parts	161337	_____
Steering Lock	154390	179140
Application Drawing - Front	021615	_____
Application Drawing - Rear	021616	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	179161
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

1999 STERLING
L-7501
12,000 GAWR
FRONT AXLE
HR3000A1

REQUIRED GROUPS

Front Guide Wheel Units	
Insulated With Brakes	170780
Insulated Without Brakes	164533
Non-Insulated With Brakes	170782
Non-Insulated Without Brakes	164534
Rear Guide Wheel Units	
Insulated	161638
Non-Insulated	162318
Mounting Brackets	167867
Undercarriage Parts	161337
Steering Lock	154390
Application Drawing - Front	021615
Application Drawing - Rear	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875
* Rail Sweeps - Rear	161875
* Rear Unit Brakes	161896
Truck Brake Connection	162094
Hydraulic Power Pack - Full	137926
Hydraulic Power Pack - Abbreviated	137927
Wheel Load Jack	159510
Sight Rod Kit And Extension	164574

* Recommended Safety Option

2000 STERLING
L-7501
9,000 GAWR
FRONT AXLE
HR3000A1

2000 STERLING
L-7501
12,000 GAWR
FRONT AXLE
HR3000V1 FRONT
HR3000A1 REAR

REQUIRED GROUPS

Front Guide Wheel Units

Insulated With Brakes	170780	_____
Insulated Without Brakes	164533	_____
Non-Insulated With Brakes	170782	_____
Non-Insulated Without Brakes	164534	_____

Rear Guide Wheel Units

Insulated	161638	161638
Non-Insulated	162318	162318
Mounting Brackets	167867	180014
Undercarriage Parts	161337	_____
Steering Lock	154390	179140
Application Drawing - Front	021615	_____
Application Drawing - Rear	021616	021616

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front	161875	_____
* Rail Sweeps - Rear	161875	161875
* Rear Unit Brakes	161896	161896
Truck Brake Connection	162094	179161
Hydraulic Power Pack - Full	137926	137926
Hydraulic Power Pack - Abbreviated	137927	137927
Wheel Load Jack	159510	_____
Sight Rod Kit And Extension	164574	164574

* Recommended Safety Option

2000 STERLING
L-7501
12,000 GAWR
FRONT AXLE
HR3000A1

REQUIRED GROUPS

Front Guide Wheel Units	
Insulated With Brakes	170780
Insulated Without Brakes	164533
Non-Insulated With Brakes	170782
Non-Insulated Without Brakes	164534
Rear Guide Wheel Units	
Insulated	161638
Non-Insulated	162318
Mounting Brackets	167867
Undercarriage Parts	161337
Steering Lock	154390
Application Drawing - Front	021615
Application Drawing - Rear	021616

ACCESSORY GROUP OPTIONS

- * Rail Sweeps - Front 161875
- * Rail Sweeps - Rear 161875
- * Rear Unit Brakes 161896
- Truck Brake Connection. 162094
- Hydraulic Power Pack - Full 137926
- Hydraulic Power Pack - Abbreviated 137927
- Wheel Load Jack 159510
- Sight Rod Kit And Extension 164574

- * Recommended Safety Option

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