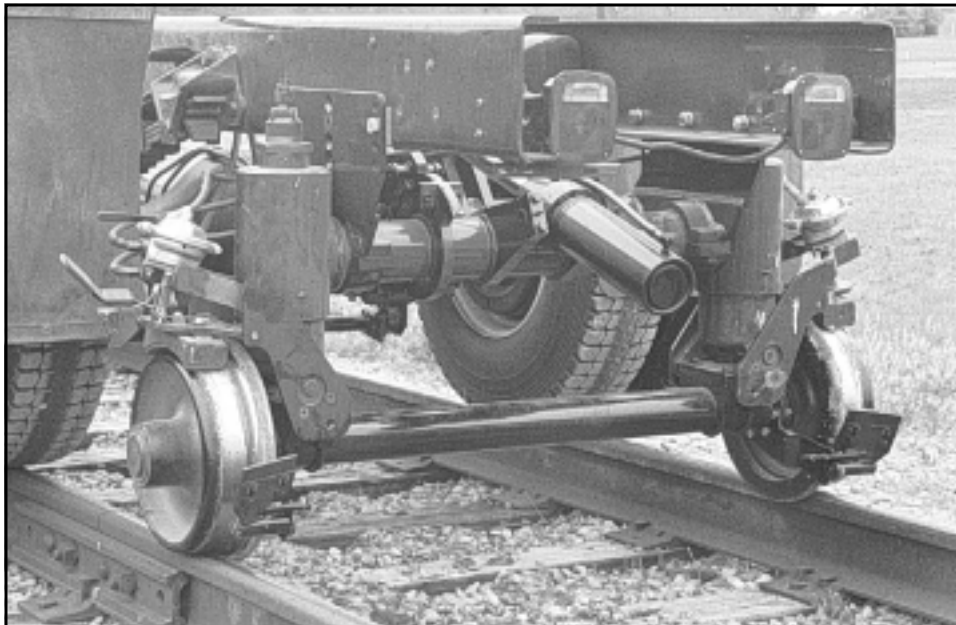


# ***Fairmont*** ***Tamper***<sup>®</sup>

 a harsco company

**HR4000 SERIES A2  
REAR UNIVERSAL HY-RAIL<sup>®</sup>  
GUIDE WHEEL UNIT  
HYDRAULICALLY OPERATED**



99-209

## **OPERATOR'S SERVICE AND PARTS MANUAL**

ISSUED 6 - 99

BULLETIN 1269

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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.**

FAIRMONT TAMPER® is the brand name and registered trademark of products manufactured by Fairmont Tamper, Harsco Corporation.

HY-RAIL® is a registered trademark of Fairmont Tamper, Harsco Corporation.

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 Fairmont Tamper, Harsco Corporation.

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

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## Safety Information



**THIS SYMBOL MEANS: ATTENTION! BECOME ALERT!  
YOUR SAFETY IS INVOLVED.**

SAFETY IS A CRITICAL FACTOR IN THE DESIGN OF FAIRMONT TAMPER® 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 severe 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 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 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 RAIL (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 FRONT RAIL PILOT UNIT RATED LOAD CAPACITY, WHICHEVER IS LOWER.**
- **VEHICLE'S REAR G.A.W.R. (Gross Axle Weight Rating) OR THE SUM OF REAR RAIL PILOT 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. **REAR GUIDE WHEEL UNIT RATED LOAD CAPACITY:**  
20,000 lbs (9072 kg) or 10,000 lbs (4536 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.**

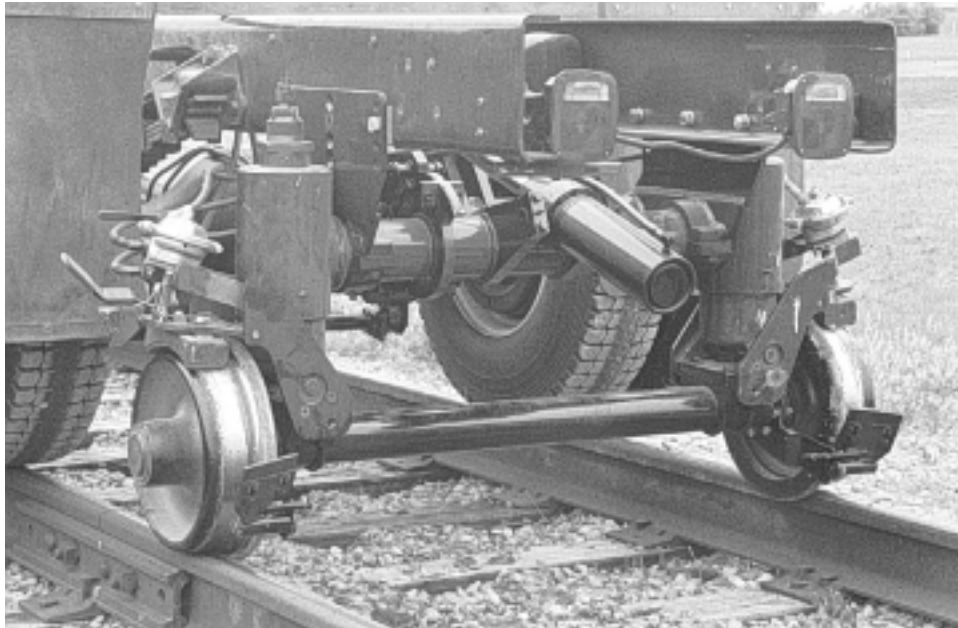
■ **THIS GUIDE WHEEL EQUIPMENT IS DESIGNED WITH YOUR SAFETY IN MIND. NEVER DISCONNECT AND/OR ATTEMPT TO OVERRIDE SAFETY FEATURES.**

**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  
HR4000 SERIES A2 REAR HY-RAIL® GUIDE WHEEL UNIT



98-190

## Description

The HR4000 Series A2 Rear HY-RAIL® guide wheel unit can be applied to the rear of various cab chassis trucks with single or tandem rear axles and dual wheels. The vehicle's gross vehicle weight rating (G.V.W.R.) and/or gross axle weight rating (G.A.W.R.) must comply with the specified limits listed in Fairmont Tamper's HY-RAIL® Vehicle Specifications Manual. Vehicles should be equipped with bias ply tires. Radial tires are not recommended. Special vehicle wheels or spacers may be required to modify the tread width of the vehicle's rear wheels.

The rail pilot unit is raised and lowered hydraulically. Hydraulic power may be supplied from the vehicle system or from an optional power pack. The rail pilot unit is mounted to the vehicle frame. Load bearing guide wheels assemblies guide the vehicle during on track operation. The rail pilot unit uses a combination of the pilot unit spring suspension and the vehicle suspension to support the rear end load when on track.

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, the front rail pilot unit brake system and the rear rail pilot unit brake system, if so equipped. Since the rail pilot unit brakes are air actuated, the vehicle on which the rail pilot unit is mounted should be equipped with air brakes. If not, an electric air compressor is available to provide air for the rail pilot unit's brakes.

1

### Orientation

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

### Serial Numbers

When this bulletin is received, fill in the spaces provided below using the information from the serial number tags on the rear rail pilot unit. Always provide these factory serial numbers when calling or writing about the unit. The serial number tag is located on the frame mounting assembly.

FIGURE 1-2  
REAR RAIL PILOT UNIT SERIAL NUMBER TAG

*Fairmont*  
*Tamper*<sup>®</sup>

■ a harsco company

WHEN ORDERING PARTS FOR THIS ACCESSORY ALWAYS GIVE THE FOLLOWING INFORMATION

PATENT NUMBER

HY-RAIL<sup>®</sup> GUIDE SERIAL NUMBER

WHEEL EQUIPMENT SYMBOL

FAIRMONT TAMPER, HARSCO CORPORATION  
FAIRMONT, MN. 56031 U.S.A.

SE052400KA-1

**Specifications**



**VEHICLE**

See Fairmont Tamper's HY-RAIL® Vehicle Specifications Manual, or contact Fairmont Tamper, Harsco Corporation, Fairmont, Minnesota for vehicle specifications.

**GUIDE WHEEL EQUIPMENT**

Rear Rail Pilot Unit, Insulated - With Side Shift . . . . .	157712
Rear Rail Pilot Unit, Non-insulated - With Side Shift . . . . .	158145
Rear Rail Pilot Unit, Insulated - Without Side Shift. . . . .	161282
Rear Rail Pilot Unit, Non-insulated - Without Side Shift. . . . .	162127
Track Gauge . . . . .	56-1/2 in (1,435 mm)
Guide Wheels - Flange Diameter . . . . .	18 in (457 mm)
- Tread Diameter . . . . .	16 in (406 mm)
Rear Rail Pilot Unit Weight - With Side Shift . . . . .	1500 lbs (680 kg)
Rear Rail Pilot Unit Weight - Without Side Shift. . . . .	1186 lbs (538 kg)
Maximum Rail Pilot Unit Load Capacity . . . . .	20,000 lbs (9,072 kg)
(with vehicle at curb weight)	
Maximum Load Per Guide Wheel. . . . .	10,000 lbs (4,536 kg)
(with vehicle at curb weight)	

*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 ANTILOCK 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 affect the speedometer drive ratio calibration. The speedometer drive ratio will influence the operation of the vehicle's antilock brake systems, electronically controlled transmission shift timing and speedometer display of the true vehicle speed. 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 - 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 RAIL PILOT UNITS ARE LOWERED AND LOCKED IN RAIL POSITION, AND SECURED WITH LOCK PIN.
  - ALL RAIL GUIDE WHEEL FLANGES ARE ENGAGED ON INSIDE RAIL.
  - IF APPLICABLE, THE VEHICLE FRONT TIRES ARE RAISED A MINIMUM OF 1-1/2" (38 mm) ABOVE THE RAIL AND LOCKED.
  - STEERING WHEEL LOCK IS ENGAGED.
  - IF SO EQUIPPED, BRAKE CONTROL VALVE IS IN 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

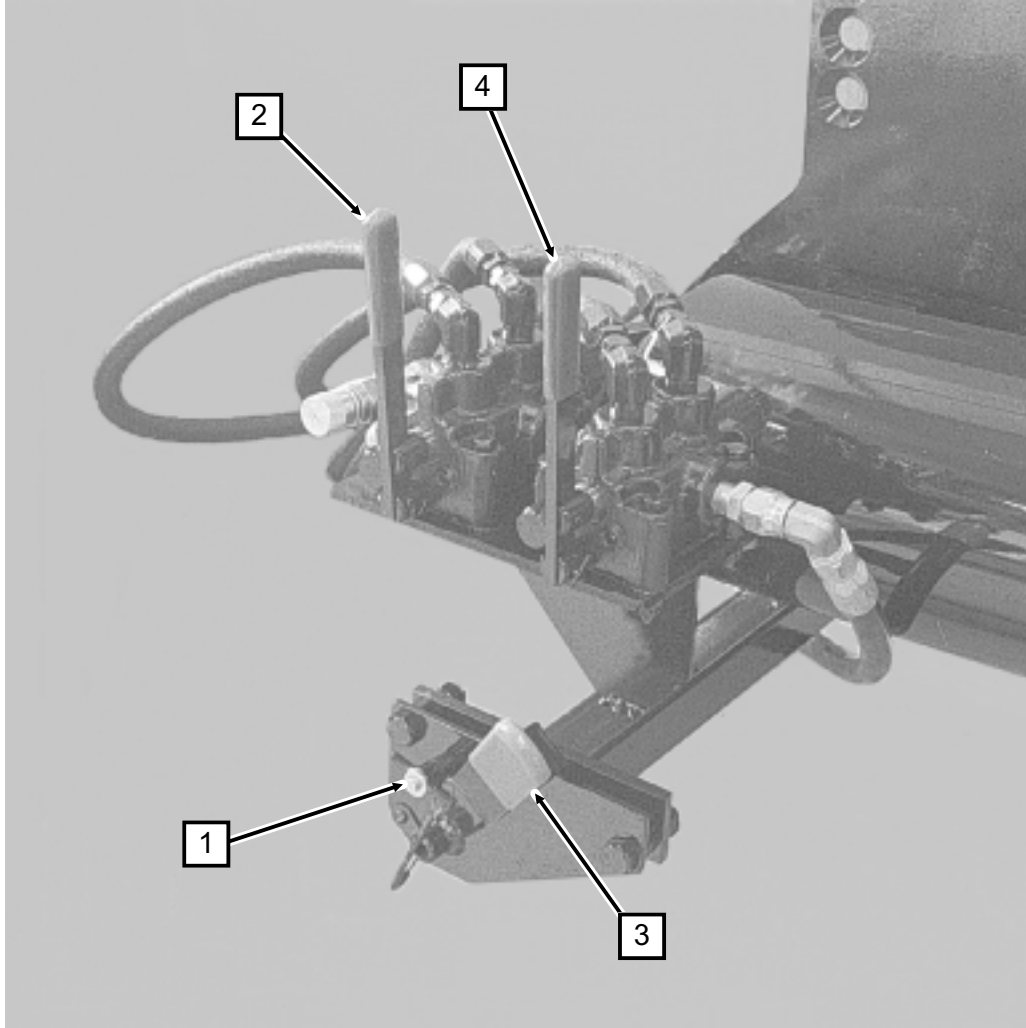
1. Ensure that highway vehicles are not approaching the grade crossing while placing the vehicle on track. To ensure safety, flag the crossing per railroad rules and regulations.
2. At a road crossing, drive the vehicle about 25 feet (7.6 m) past the track. Back the vehicle onto the rails so that the 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.

### LOWER REAR RAIL PILOT UNIT - 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 rail pilot unit with the rails.
2. Remove lock pin (1). Button in "T" end of the pin must be pressed in to remove the pin.
3. Raise the rail pilot unit slightly by pulling control valve handle (2) out to release pressure on the mechanical lock mechanism.
4. Rotate and hold lock handle (3) counter-clockwise to release the locking mechanism. While holding lock handle (3) in a released position, push control valve handle (2) in to lower the rail pilot unit.
5. If the rail pilot unit is equipped with side shift, the guide wheel axle can be shifted to align the guide wheels with the rail. Push control valve handle (4) in to shift the guide wheels to the right. Pull control valve handle (4) out to shift the guide wheels to the left. After shifting the guide wheels to align with the rail, continue to lower the guide wheels.
6. As the guide wheels lower, release lock handle (3). Continue to lower the guide wheels until the wheel flanges are engaged on the inside of the rail and the lock is engaged. Release control valve handle (2). The side shift self-centering mechanism will bring the vehicle into alignment with the rails.
7. Install lock pin (1) through the hole in the rail pilot unit frame to secure the mechanical lock.

## Placing Vehicle On Track

FIGURE 2-1  
REAR RAIL PILOT UNIT



2

99-215

8. Lower the front rail pilot unit. See the Operator's Service And Parts Manual provided with the front rail pilot unit for the procedure to lower the front rail pilot unit.
9. 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.

## Placing Vehicle On Track

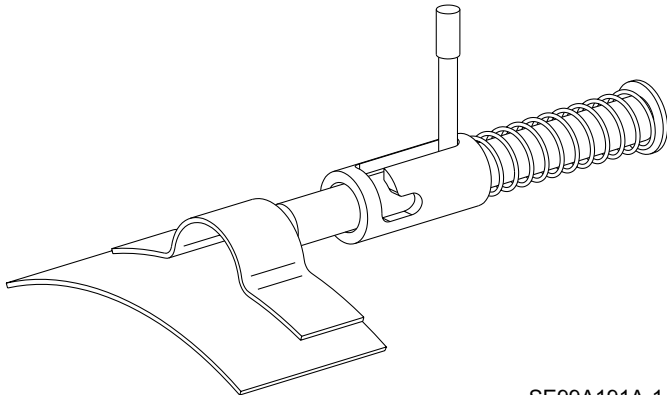
10. See Figures 2-2 and 2-3. Set the vehicle front wheels straight ahead and secure the steering wheel in that position by engaging the steering lock on the steering column. Steering locks may vary from vehicle to vehicle but will operate similarly.

2

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

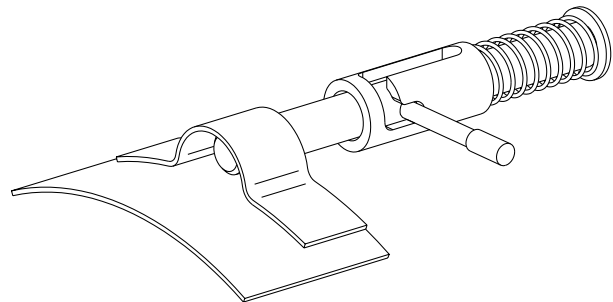
11. If so equipped, move the Rail Wheel Brake control valve to the ON position to activate the guide wheel equipment brakes whenever the vehicle is on track. The vehicle brake pedal will actuate the vehicle brakes and the guide wheel equipment brakes simultaneously.

FIGURE 2-2  
STEERING LOCK IN UNLOCKED POSITION



SE99A191A-1

FIGURE 2-3  
STEERING LOCK IN LOCKED POSITION



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 OR REAR RAIL PILOT UNITS. THE MAXIMUM RATED LOAD ON THE REAR RAIL PILOT UNIT IS 12,000 LBS (9,072 kg) OR 10,000 LBS (4,536 kg) MAXIMUM PER GUIDE WHEEL.**
- **THE REAR RAIL PILOT UNIT MUST BE SET TO CARRY APPROXIMATELY 33% OF THE VEHICLE REAR AXLE CURB WEIGHT OR A MINIMUM OF 3,650 LBS (1,656 kg).**
- **NEVER OPERATE THE VEHICLE ON TRACK IF CLEARANCE BETWEEN VEHICLE FRONT TIRES 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.**

Whenever the vehicle is loaded or additional load is added to the existing vehicle load on track, check the load on the rear rail pilot unit guide wheels. The maximum load on the rear rail pilot unit is 20,000 lbs (9,072 kg) or 10,000 lbs (4,536 kg) maximum per guide wheel. Also, check the load on the front rail pilot unit. See the Operator's Service And Parts Manual provided with the front rail pilot unit for information on checking the load on the front rail pilot unit.

## Guide Wheel Load On Track

### CHECKING REAR GUIDE WHEEL LOAD - See Figure 2-4 and Chart 2-5

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 capacity of the rear rail pilot unit is 33% of the vehicle's rear axle curb weight, or at least 3,650 lbs (1656 kg) total or 1,825 lbs (828 kg) per guide wheel.

If the measured rear guide wheel load does not meet the minimum rated load capacity of the rear rail pilot unit, total or per guide wheel, the rear rail pilot unit load must be re-adjusted. See Adjustments - Guide Wheel Alignment Procedure. Never operate the vehicle on track if the measured load on the rear rail pilot unit does not meet the minimum rated load capacity of 3,650 lbs (1656 kg) total or 1,825 lbs (828 kg) per guide wheel.

4. The maximum rated load capacity of the rear rail pilot unit is 20,000 lbs (9,072 kg) or 10,000 lbs (4,536 kg) maximum per guide wheel.

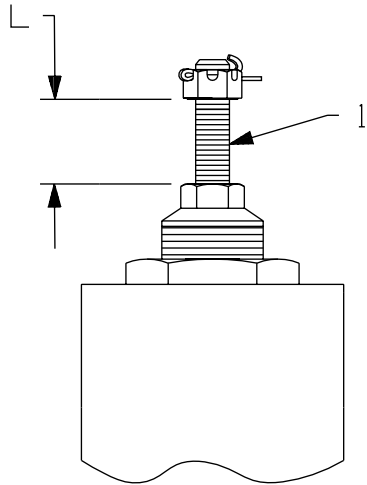
If the measured rear guide wheel load does not exceed the maximum rated load capacity of the rear rail pilot unit, total or per guide wheel, the load on the rear guide wheel is acceptable.

If the measured rear guide wheel load does exceed the maximum rated load capacity of the rear rail pilot unit, 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 measured load on the rear rail pilot unit exceeds the maximum rated load capacity of 20,000 lbs (9,072 kg) or 10,000 lbs (4,536 kg) maximum per guide wheel.

**Guide Wheel Load On Track**

**CHECKING REAR GUIDE WHEEL LOAD**

FIGURE 2-4  
REAR SPRING CELL



SE90A150A-1

CHART 2-5  
REAR GUIDE WHEEL LOAD

DIMENSION L		APPROXIMATE LOAD PER SIDE	
1/2"	(12.7 mm)	1,640 lbs	(744 kg)
3/4"	(19.1 mm)	2,380 lbs	(1080 kg)
1"	(25.4 mm)	3,110 lbs	(1,411 kg)
1-1/4"	(31.8 mm)	3,840 lbs	(1,742 kg)
1-1/2"	(38.1 mm)	4,580 lbs	(2,077 kg)
1-3/4"	(44.5 mm)	5,310 lbs	(2,409 kg)
2"	(50.8 mm)	6,050 lbs	(2,744 kg)
2-1/4"	(57.2 mm)	6,750 lbs	(3,062 kg)
2-1/2"	(63.5 mm)	7,510 lbs	(3,407 kg)
2-3/4"	(69.9 mm)	8,250 lbs	(3,742 kg)
3"	(76.2 mm)	8,980 lbs	(4,073 kg)
3-1/4"	(82.6 mm)	9,710 lbs	(4,404 kg)
* 3-1/2"	(88.9 mm)	10,400 lbs	(4,717 kg)

\* **REAR GUIDE WHEEL IS OVERLOADED. REDISTRIBUTE OR REMOVE SOME OF THE LOAD. MAXIMUM LOAD ON REAR RAIL PILOT UNIT MUST NOT EXCEED 20,000 LBS (9,072 kg) OR 10,000 LBS (4,536 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 in the Operator's Service And Parts Manual for the front rail pilot unit. 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 THE 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 OF FRONT AND/OR REAR RAIL PILOT 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 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 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 HR4000 Series A2 HY-RAIL® Guide Wheel Equipment use the vehicle propulsion system to propel on track. Do not accelerate suddenly. Traction is reduced on track. 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.**
- **IF SO EQUIPPED, RAIL WHEEL BRAKE CONTROL VALVE MUST BE IN THE ON POSITION WHENEVER THE VEHICLE IS ON TRACK.**

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

Vehicles equipped with the HR4000 Series A2 HY-RAIL® Guide Wheel Equipment use a combination of the vehicle's rear brakes and optional front or rear rail pilot unit brakes for braking on track. The rail pilot 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 RAIL PILOT UNITS ARE RAISED, LOCKED IN HIGHWAY POSITION, AND SECURED WITH LOCK PIN.
- 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 THE VEHICLE ON TRACK AND WHEN REMOVING THE VEHICLE FROM THE 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 the 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. If so equipped, 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

6. Raise the front rail pilot unit. See The Operator's Service And Parts Manual provided with the front rail pilot unit for the procedure to raise the front rail pilot unit.

### RAISE REAR RAIL PILOT UNIT - See Figure 2-1

1. Remove the lock pin (1).
2. Push the control valve handle (2) in to release pressure on the mechanical lock mechanism.
3. Rotate and hold lock handle (3) counter-clockwise to release the locking mechanism. While holding the lock handle (3), pull the control valve handle (2) out to raise the rail pilot unit.
4. As the rail pilot raises, release the lock handle (3). Continue to raise the rail pilot unit until it is in the "highway" position and the lock is engaged. Release control valve handle (2).
5. Install the lock pin (1) through the hole in the rail pilot unit frame to secure the mechanical lock.
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 2-2 and 2-3. Disengage the vehicle steering lock located on the steering column. Steering locks may vary from vehicle to vehicle but will operate similarly.

## Highway Operation



■ **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



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.
- 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 RAIL PILOT UNITS ARE LOWERED AND LOCKED IN RAIL POSITION.
  - ALL RAIL GUIDE WHEEL FLANGES ARE ENGAGED ON THE INSIDE OF THE RAILS.
  - VEHICLE FRONT TIRES MUST BE RAISED A MINIMUM OF 1-1/2" (38 mm) ABOVE THE 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



■ 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

2

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



- 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 RAIL PILOT UNITS 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



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.

■ 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 rail pilot units 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



2

- 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 RAIL PILOT UNITS 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 THE 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



- 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

2

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 rail pilot units 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



- 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 RAIL PILOT UNITS ARE RAISED AND LOCKED IN HIGHWAY POSITION.
- VEHICLE STEERING WHEEL LOCK IS DISENGAGED ON THE STEERING COLUMN.

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.
2. Make sure that the disabled vehicle's:
  - a. Front and rear rail pilot units 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 RAIL PILOT UNITS. 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 Operation -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. 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 Fairmont Tamper 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). Fairmont Tamper, 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.

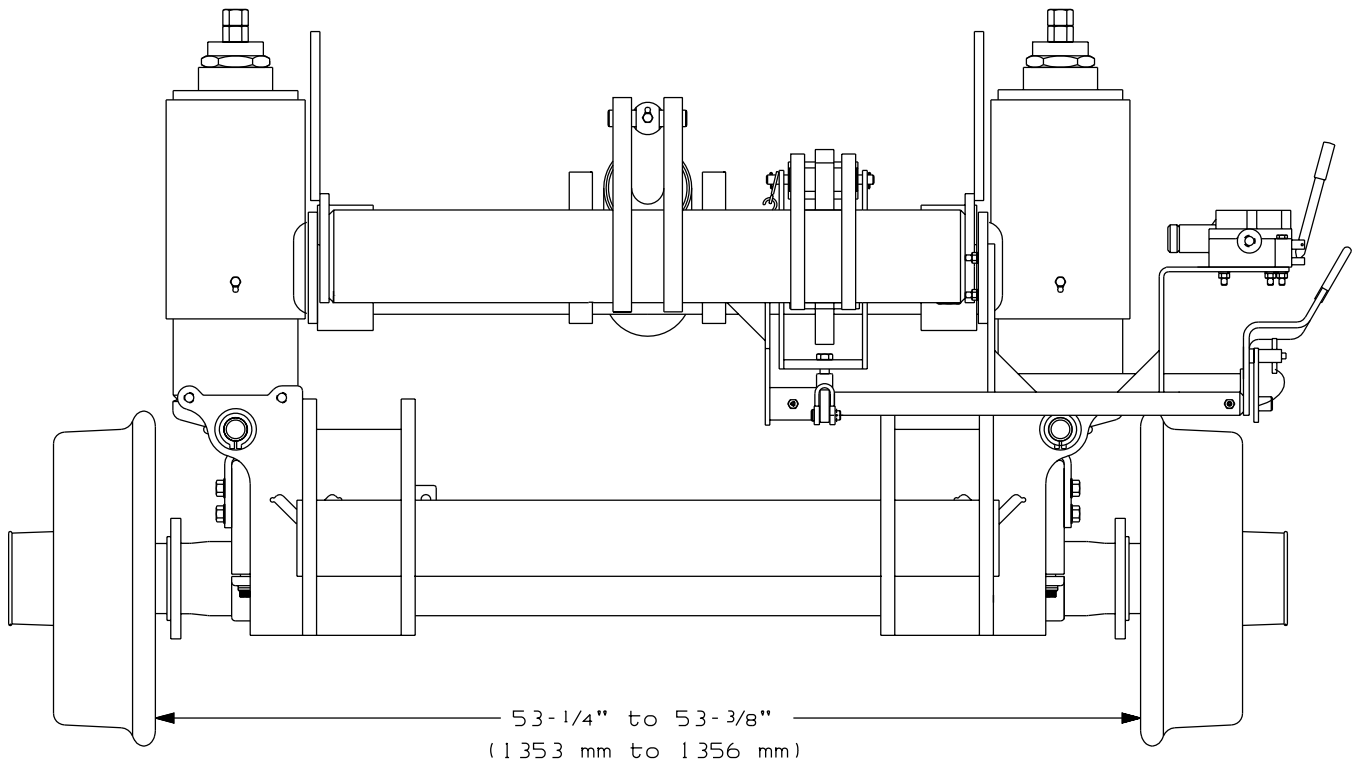
## Guide Wheel Equipment Alignment Procedure

### GUIDE WHEEL TRACK GAUGE - See Figure 3-1

11. Lower and lock both rail pilot 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 rail pilot 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 rail pilot unit track gauge is preset at the factory and is non-adjustable.

3

FIGURE 3-1  
GUIDE WHEEL TRACK GAUGE



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## Guide Wheel Equipment Alignment Procedure

### GUIDE WHEEL LOAD

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

13. The rear rail pilot unit is equipped with two adjustable spring cells. The rear rail pilot unit should be initially adjusted to carry approximately 33% of the vehicle's rear axle curb weight or a minimum of 3,650 lbs (1,656 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 rail pilot unit guide wheels. The maximum rated load on the rear rail pilot unit is 20,000 lbs (9,072 kg) or 10,000 lbs (4,536 kg) per guide wheel.
14. 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

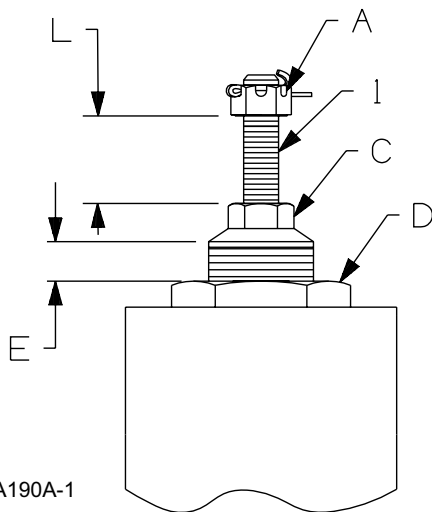


CHART 3-3  
REAR GUIDE WHEEL LOAD

DIMENSION L		APPROXIMATE LOAD PER SIDE	
1/2"	(12.7 mm)	1,640 lbs	(744 kg)
3/4"	(19.1 mm)	2,380 lbs	(1080 kg)
1"	(25.4 mm)	3,110 lbs	(1,411 kg)
1-1/4"	(31.8 mm)	3,840 lbs	(1,742 kg)
1-1/2"	(38.1 mm)	4,580 lbs	(2,077 kg)
1-3/4"	(44.5 mm)	5,310 lbs	(2,409 kg)
2"	(50.8 mm)	6,050 lbs	(2,744 kg)
2-1/4"	(57.2 mm)	6,750 lbs	(3,062 kg)
2-1/2"	(63.5 mm)	7,510 lbs	(3,407 kg)
2-3/4"	(69.9 mm)	8,250 lbs	(3,742 kg)
3"	(76.2 mm)	8,980 lbs	(4,073 kg)
3-1/4"	(82.6 mm)	9,710 lbs	(4,404 kg)
* 3-1/2"	(88.9 mm)	10,400 lbs	(4,717 kg)

\* **REAR GUIDE WHEEL IS OVERLOADED. REDISTRIBUTE OR REMOVE SOME OF THE LOAD. MAXIMUM LOAD ON REAR RAIL PILOT UNIT MUST NOT EXCEED 20,000 LBS (9,072 kg) OR 10,000 LBS (4,536 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 rail pilot unit spring cells to compensate for permanent attachments.*

## Guide Wheel Equipment Alignment Procedure

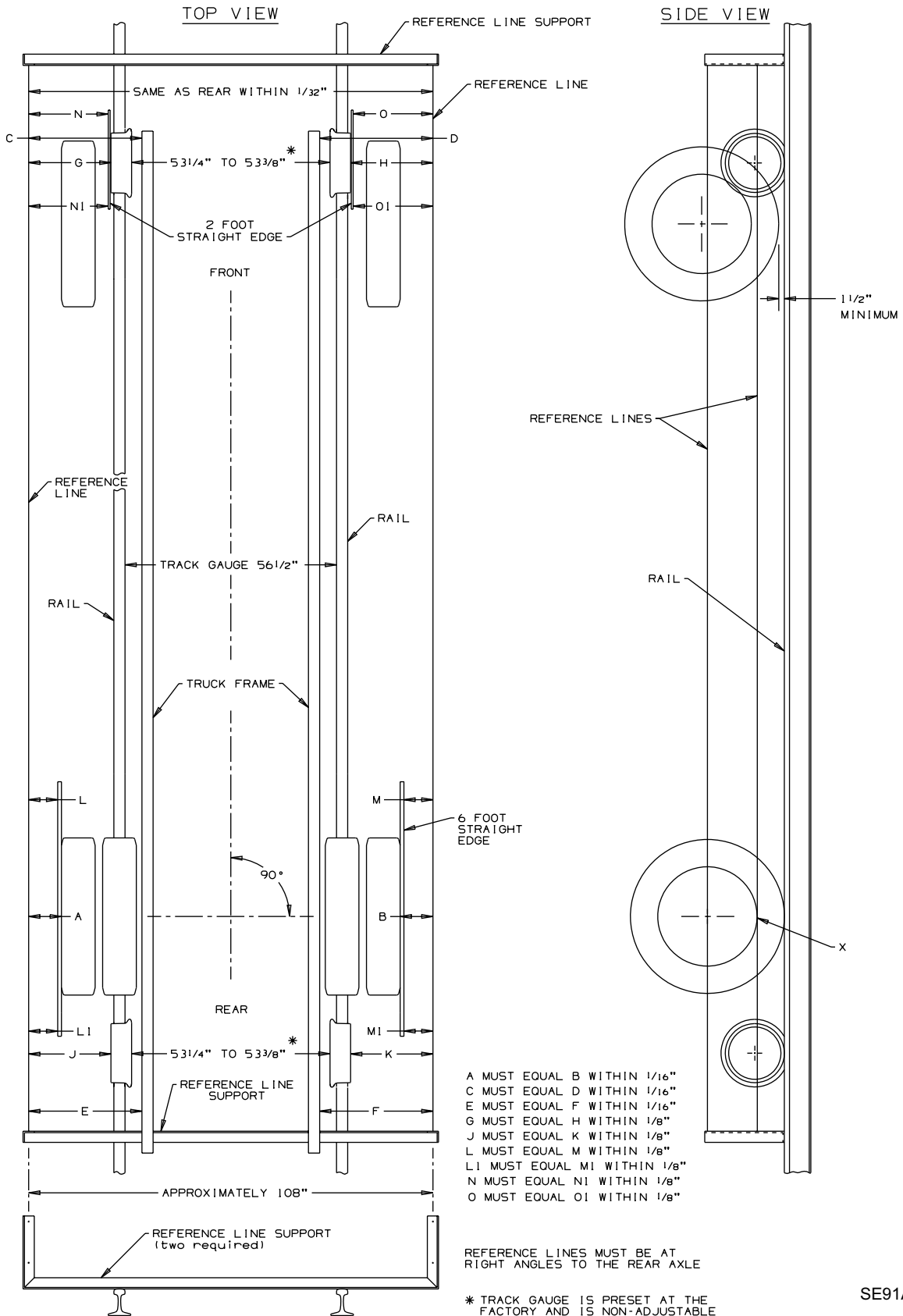
### Rear Guide Wheel Load On Track Adjustment - See Figure 3-2 and Chart 3-3

- a. The recommended rear rail pilot unit load setting is approximately 33% of the vehicle rear axle weight or a minimum of 3,650 lbs (1,656 kg).
- b. To calculate the load setting for each rear spring cell, use the following formula:  
$$\text{Vehicle Rear Axle Weight} \times 17\% (0.17) = \text{Spring Cell Load}$$
- 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 rear rail pilot unit. 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 rail pilot unit 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 rail pilot unit. 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 rail pilot unit 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 rear rail pilot 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. Fairmont Tamper 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.
15. Lower and lock both rail pilot 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.
  16. 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.
  17. 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.
  18. 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.
  19. 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:  $L [(first\ dimension) + L (second\ dimension)] \div 2 = L (average\ dimension).$

## Guide Wheel Equipment Alignment Procedure

### STRING LINING SET-UP - See Figure 3-4

20. 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.
21. After the reference lines have been established, measurements can be taken from these lines to the guide wheels to ensure correct alignment.

3

## Guide Wheel Equipment Alignment Procedure

### REAR GUIDE WHEEL ALIGNMENT - See Figure 3-4

22. Lower and lock the rear rail pilot units 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.

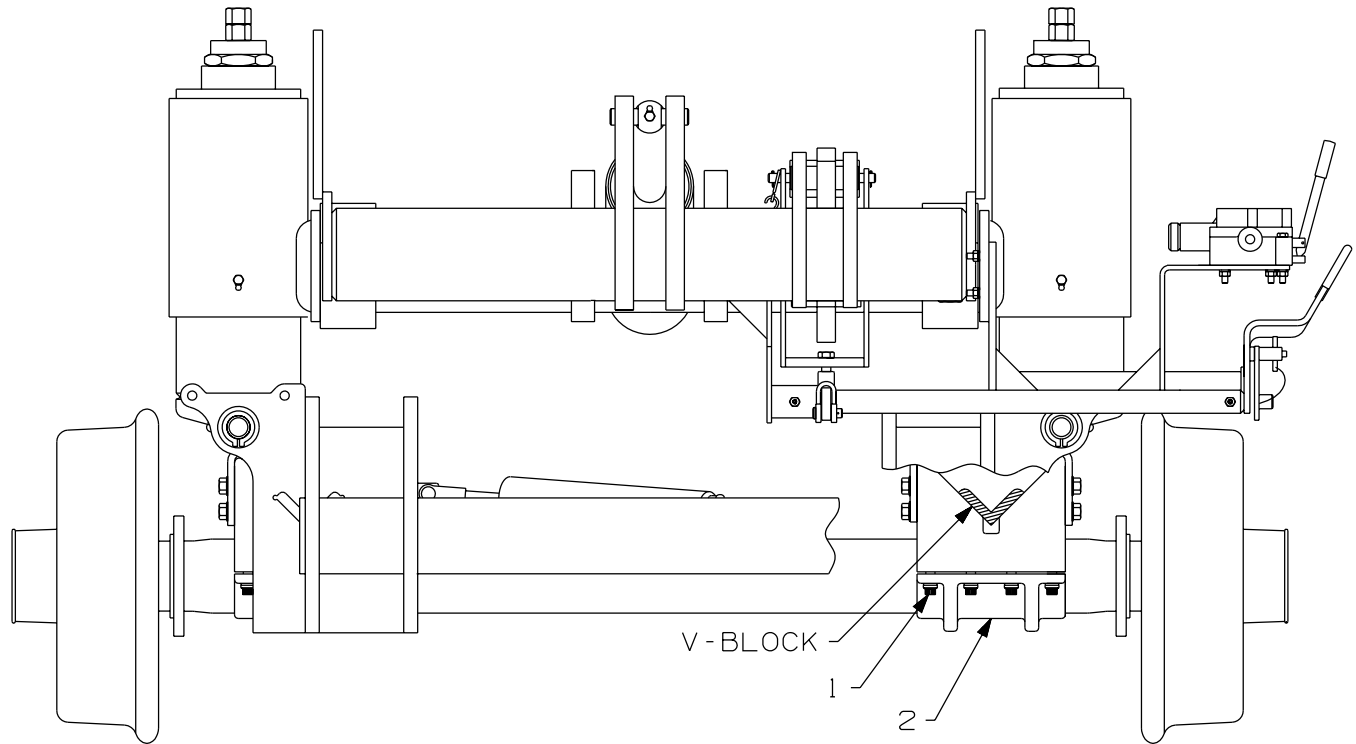
### Adjustment - See Figure 3-5

- a. Unlock and raise the rail pilot unit from the "rail" position. Let the guide wheels rest on the rails. If the unit is equipped with side shift, the self centering v-blocks must remain fully seated in the v-block housing.
- b. Loosen the 12 cap screws (1) on the axle clamps (2). Shift the axle and guide wheels until dimension J equals (=) dimension K or is within 1/8 inch (3.2 mm). If so equipped, make sure the self centering v-blocks are fully seated in the v-block housing. Torque the cap screws. See Appendices - Bolt Torque Charts.
- d. Lower and lock the rail pilot in the "rail" position.
- e. Repeat Steps a - d until dimension J equals (=) dimension K or is within 1/8 inch (3.2 mm).

## Guide Wheel Equipment Alignment Procedure

### REAR GUIDE WHEEL ALIGNMENT

FIGURE 3-5  
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

23. Fairmont Tamper 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.
24. The vehicle must be placed on straight, level, tangent track. See Operation Section - Placing Vehicle On Track.
25. Apply spray paint to the flanges and treads of all guide wheels.
26. Lower and lock both rail pilot units in the “rail” position.
27. Operate the vehicle for a short distance at a normal operating speed.
28. 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.
29. 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 rail pilot unit. Let the guide wheels rest on the rail. Slightly move the right end of the front axle forward or the left end rearward. See the Front Guide Wheel Alignment procedure for the guide wheel unit applied to the front of the vehicle.
  - b. Repaint the flanges and treads on all guide wheels. Lower and lock the guide wheel unit 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 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 31.

## Guide Wheel Equipment Alignment Procedure

### VEHICLE TRACK TEST

30. 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 rail pilot unit. Let the guide wheels rest on the rail. Slightly move the left end of the front axle forward or the right end rearward. See the Front Guide Wheel Alignment procedure for the guide wheel unit applied to the front of the vehicle.
  - b. Repaint the flanges and treads on all guide wheels. Lower and lock the guide wheel unit 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 31.
  
31. 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.

## Adjustments

### REAR UNIT LOCK MECHANISM

The rear locking mechanism should move freely so it engages when the guide wheels are raised or lowered. Periodically inspect this area for wear. When the vehicle is operated in mud or slush, foreign material may get into the locking mechanism, preventing the lock from operating properly. Remove any foreign material, being careful not to damage the lock mechanism.

1. When the rear rail pilot unit is in the "rail" position, the spring cells should be vertical (perpendicular) to the rail for the spring suspension to work properly.
2. Place the vehicle on straight, level track. Place the vehicle's automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Lower and lock the front and rear rail pilot units in the "rail" position.
3. Place a bubble level on the front or rear side of either spring cell. The spring cells should be vertical (perpendicular) to the rail. If not, adjustment is necessary.

#### Adjustment - Rail Position - See Figure 3-6

4. Unlock and raise the rear rail pilot unit, let the guide wheels rest on the rail.
5. Turn set screws (A) counter-clockwise to move the bottom of the spring cell rearward or clockwise to move the bottom of the spring cell forward. Adjust both set screws equally.
6. Lower the rail pilot unit to the "rail" position. Re-check the pilot unit spring cells to see if they are vertical (perpendicular) to the rail. If not, repeat Steps 4 and 5 until the spring cells are vertical (perpendicular) to the rail.
7. After adjusting the spring cells to the vertical position, check the operation of lock pawl (B). Check the clearance between locking pawl (B) and lock arm (C). There should be approximately 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 locking pawl (B) at point (D).

If the clearance is less than 1/16 inch (1.6 mm) or if locking pawl (B) will not fully engage into lock arm (C), material will have to be removed from the locking pawl at point (D). Be sure to maintain the locking pawl profile when grinding material from the locking pawl.

#### Adjustment - Highway Position - See Figure 3-6

8. When the rear rail pilot unit is raised, locking pawl (B) must securely hold the rail unit in the "highway" position. Set screws (E) must be adjusted to help keep the pilot unit from bouncing when traveling on the highway.

## Adjustments

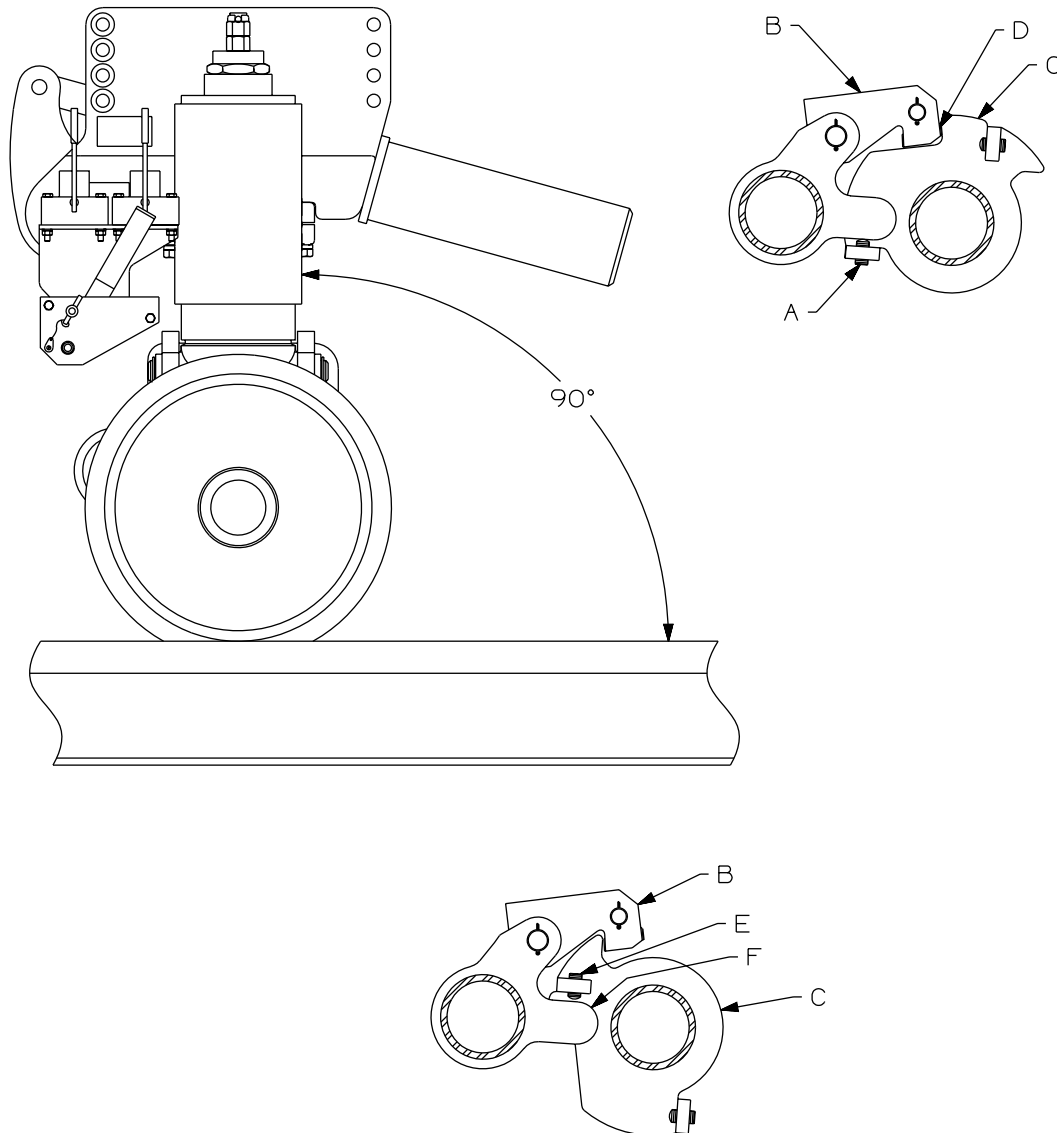
### REAR UNIT LOCK MECHANISM

#### Adjustment - Highway Position - continued

9. With the rail pilot unit in the "highway" position, check the clearance between set screws (E) and arm (F). If there is excessive clearance, turn set screws (E) clockwise. Adjust both set screws equally.
10. After adjustment, check the operation of the lock. Locking pawl (B) must fully engage locking arm (C). If not, re-adjust set screws (E).

3

FIGURE 3-6  
REAR UNIT LOCK ADJUSTMENT



## Adjustments

### **BRAKE SHOE CLEARANCE** - See Figure 3-7

The rear rail pilot unit may be equipped with guide wheel brakes.

1. Apply the parking brake. Be sure the vehicle air brake system is at operating pressure to fully release the guide wheel brakes. If so equipped, 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 the other guide wheel.

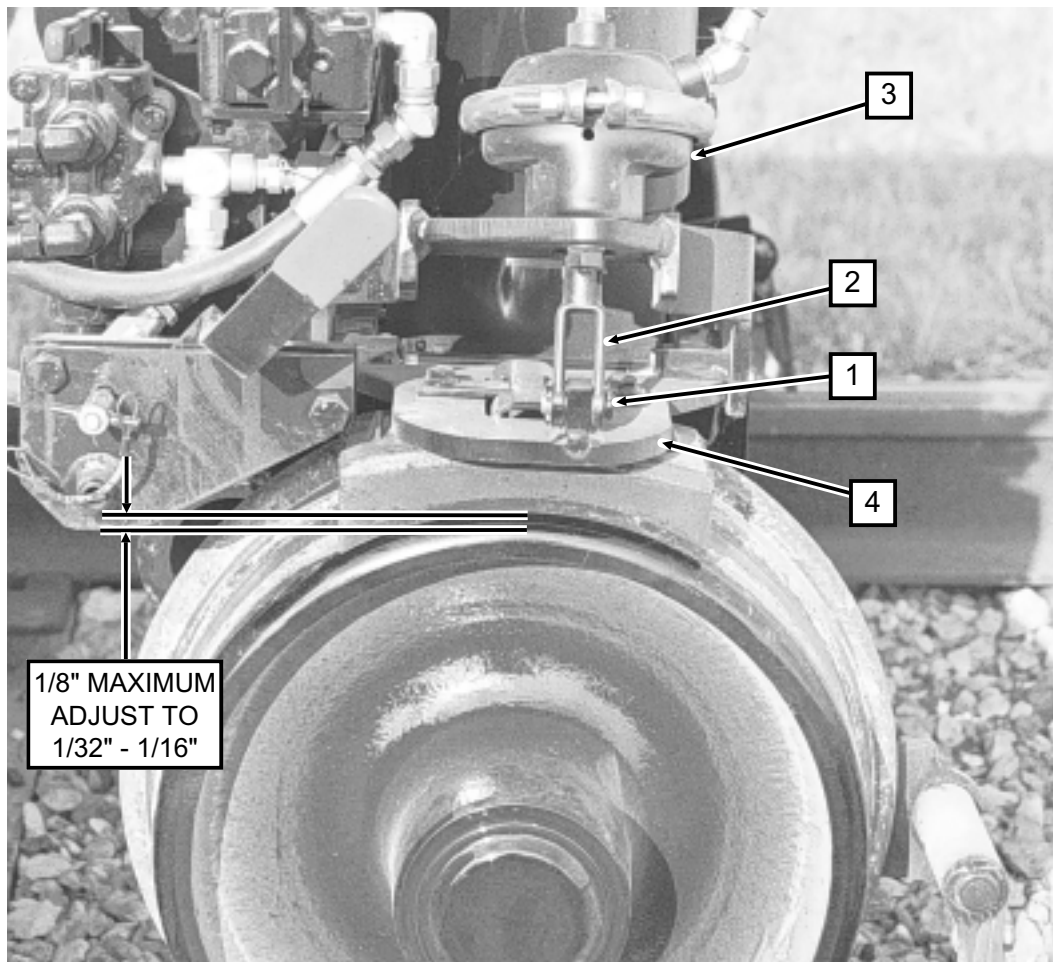
### **Rear Brake Shoe Adjustment** - See Figures 3-7

4. Remove the cotter pin from the pin (1). Remove the pin (1) from the yoke (2) on the brake actuator (3). Loosen the jam nut on yoke (2). 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.
5. Adjust so the brake shoe is 1/32 - 1/16 inch (.8 - 1.6 mm) away from the guide wheel tread. Install the pin (1) through the yoke (2) and brake arm (4) and secure using the cotter pin. Tighten the jam nut on the yoke (3) securely. Recheck the brake shoe clearance and adjust, if necessary.
6. Repeat Steps 4 and 5 to adjust the brake shoe clearance on the other rear guide wheel.

## Adjustments

### BRAKE SHOE CLEARANCE

FIGURE 3-7  
REAR UNIT BRAKE



## Adjustments

### RAIL SWEEP CLEARANCE - See Figure 3-8

The rear rail pilot unit may be equipped with the rail sweeps.

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 rail pilot units 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.

3

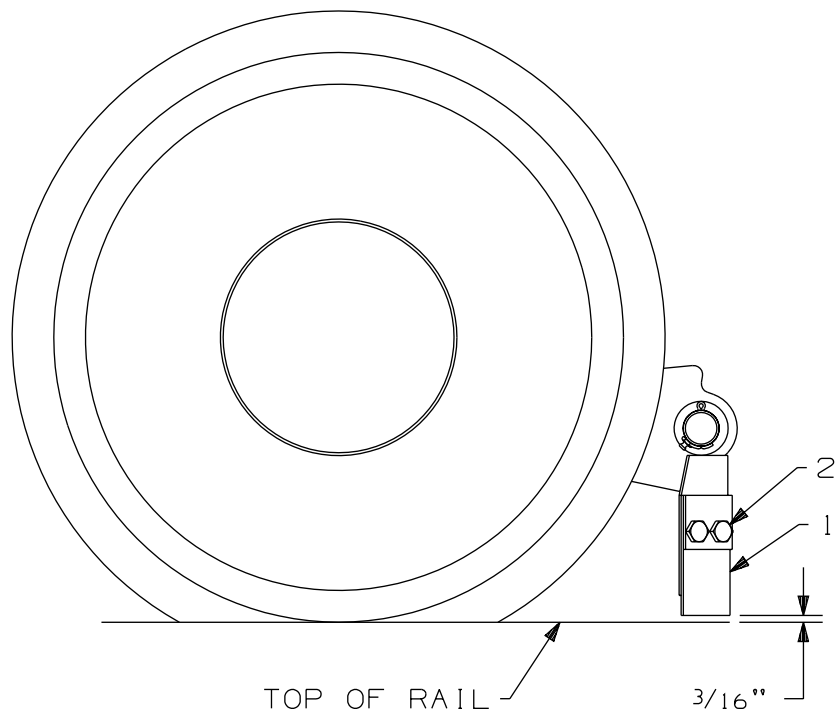
### Adjustment - See Figure 3-8

3. Loosen the two cap screws (2). Slide the 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).
4. Repeat Step a to adjust the rail sweep clearance on the other guide wheels.
5. When the rubber sweep is worn so it cannot be adjusted, replace the rubber sweep (1).

**Adjustments**

**RAIL SWEEP CLEARANCE**

FIGURE 3-8  
RAIL SWEEP CLEARANCE



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## Adjustments

### REAR RAIL PILOT UNIT HYDRAULIC PRESSURE - See Figure 3-9

1. Attach the provided pressure gauge (099137K) to test port (1) on the rear rail pilot unit control valve.
2. Start the vehicle engine. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. 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.
3. Do not release the rail pilot 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. Release the control valve handle.

If the hydraulic pressure indicated is 1800 PSI (124 bar), the rail pilot unit hydraulic pressure is set correctly. Disengage the mechanical PTO hydraulic pump or stop the auxiliary hydraulic power source. Remove the pressure gauge from test port (1).

If the pressure indicated is not 1800 PSI (124 bar), go to Adjustment.

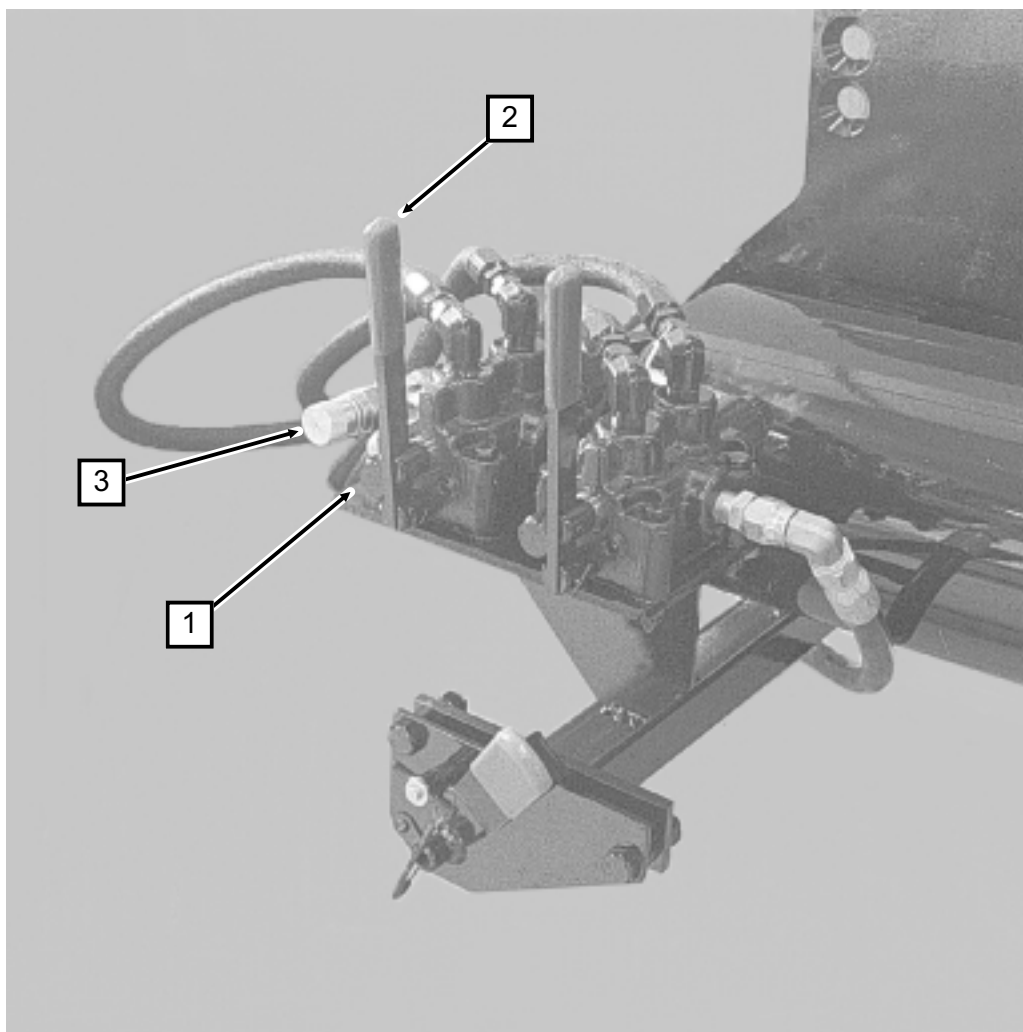
### Adjustment - See Figure 3-9

4. Remove the relief valve cap (3) from the control valve to expose the adjusting screw.
5. Do not release the rear rail pilot 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.
6. Turn the adjusting screw 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 bar). Release the control valve handle.
7. Disengage the mechanical PTO hydraulic pump or stop the auxiliary hydraulic power source. Remove the pressure gauge from test port (1). Install the relief valve cap (3).
8. If a constant pressure of 1800 PSI (124 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 RAIL PILOT UNIT HYDRAULIC PRESSURE

FIGURE 3-9  
REAR RAIL PILOT UNIT HYDRAULIC  
PRESSURE ADJUSTMENT



## Adjustments

### FLOW DIVIDER VALVE HYDRAULIC PRESSURE - See Figure 3-9

*Note: The flow divider valve is preset from the factory to 2500 PSI (172 bar).*

1. Attach the provided pressure gauge (099137K) to the test port (1) on the rear rail pilot unit control valve.
2. Remove the 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 parking brake. 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.
4. Do not release the rear rail pilot 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.
5. While holding the control valve handle, turn the adjusting screw 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 bar) and remained steady, the flow divider valve hydraulic relief pressure is set correctly.

If the hydraulic pressure indicated is not 2500 PSI (172 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 of the control valve counter-clockwise to decrease the pressure. Stop when the pressure gauge remains steady at a constant pressure of 1800 PSI (124 bar). Release the control valve handle.
7. Disengage the mechanical PTO hydraulic pump or stop the auxiliary hydraulic power source. Remove the pressure gauge from the test port (1). Install the relief valve cap (3).

### Flow Divider Valve Hydraulic Pressure Adjustment



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

## Adjustments

### Flow Divider Valve Hydraulic Pressure Adjustment - See Chart 3-10 and Figure 3-11

8. Disengage the mechanical PTO hydraulic pump or stop the auxiliary hydraulic power source. 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 bar). See Chart 3-10 for approximate pressure change in relationship to shim thickness. Re-assemble the flow divider valve in reverse order.

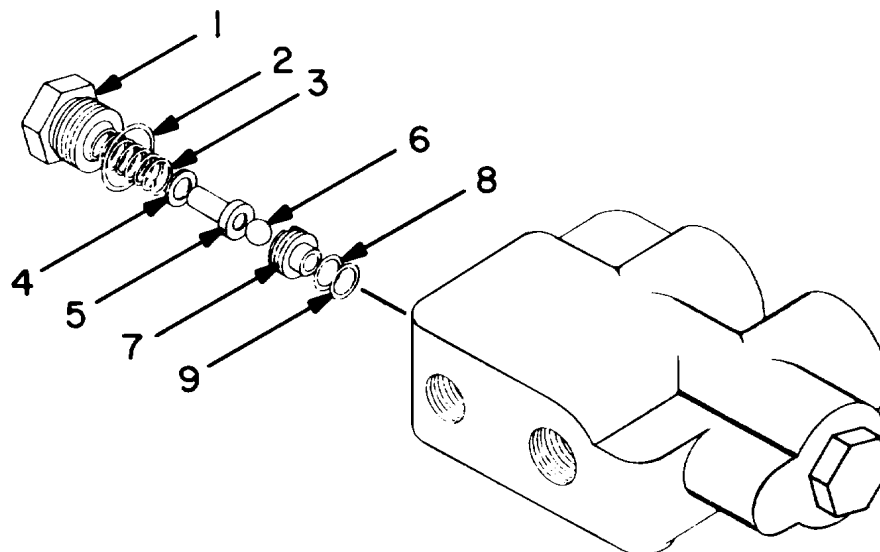
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CHART 3-10  
SHIM / PRESSURE CHART

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 3-11  
FLOW DIVIDER VALVE





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## Maintenance Schedule



■ **RE-TORQUE VEHICLE WHEEL LUG NUTS AFTER 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 rail pilot 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 hydraulic oil.
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 - 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 damaged. Replace the bearings if necessary.
4. Inspect the vehicle tires for wear, damage, cuts, etc. 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.
5. Check all bolts for tightness. See Appendices - Appendix A, Bolt Torque Requirement Chart.

## Maintenance Schedule

### 50 VEHICLE MILES

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

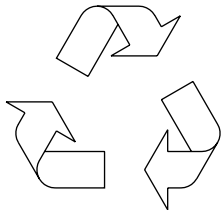
### 2000 TRACK MILES:

Lubricate the rail pilot unit locations provided with grease fittings. Lubricate the pivot points on locking mechanism using a light weight oil or lubricating spray. See Guide Wheel Equipment Lubrication.

### 10,000 TRACK MILES

Repack and adjust the guide wheel bearings. See Guide Wheel Equipment Lubrication - Repacking Guide Wheel Bearings.

## Waste Disposal



Dispose of waste properly. Improper disposal of waste can threaten the environment. The operation and maintenance of Fairmont Tamper equipment may involve the use and disposal 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.

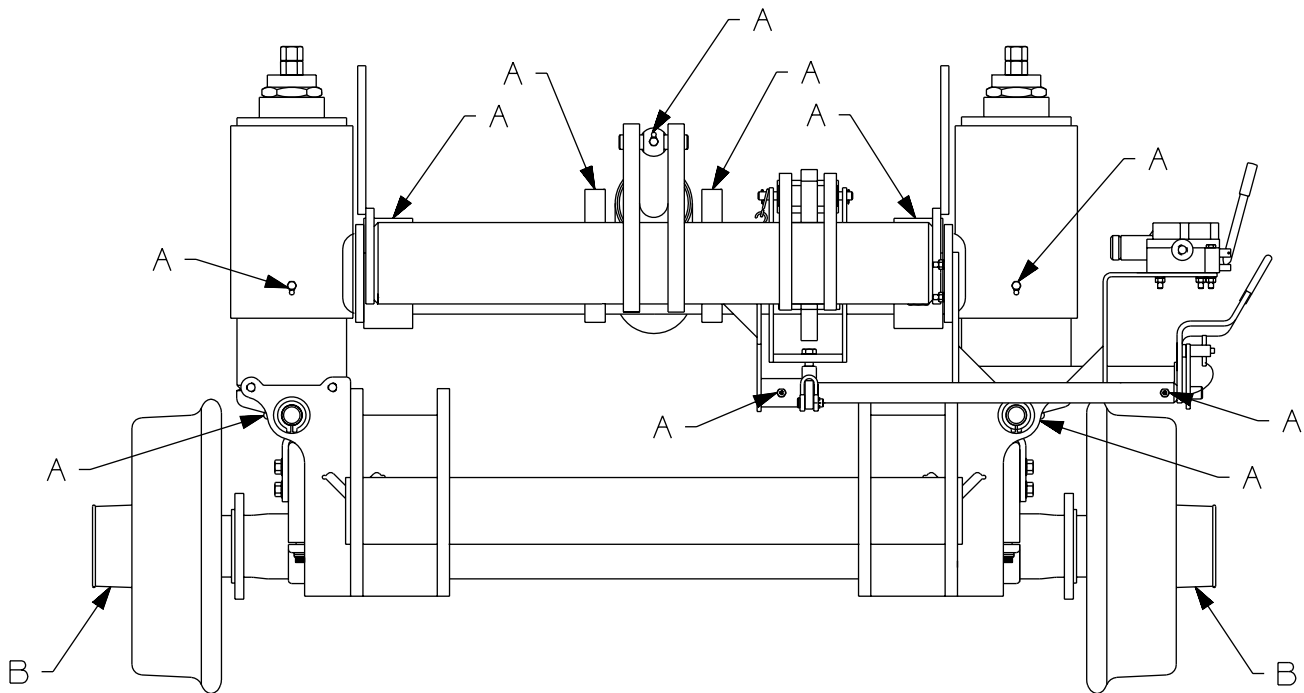
## Guide Wheel Equipment Lubrication

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

### REAR RAIL PILOT UNIT LUBRICATION - See Figure 4-1

1. Apply the parking brake. Stop the vehicle engine. Shut off the vehicle's ignition switch.
2. Lubricate all grease fittings (A) using Mobil Special Moly, or equivalent.
3. Repack the guide wheel bearings (B) every 10,000 track miles (maximum) or at least once every two years (minimum), whichever occurs first. See Repacking Guide Wheel Bearings.

FIGURE 4-1  
REAR RAIL PILOT UNIT LUBRICATION DIAGRAM



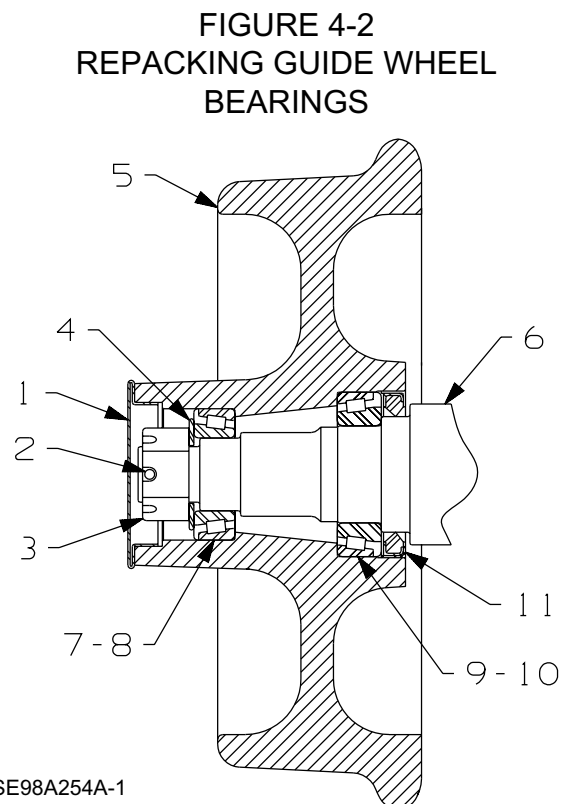
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## Guide Wheel Equipment Lubrication

### REPACKING GUIDE WHEEL BEARINGS - See Figure 4-2

Repack 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 rail pilot units in the "highway" position. Stop the vehicle engine. Shut off the vehicle ignition switch.
2. Remove the hub cap (1). Remove cotter pin (2), castle nut (3) and spindle washer (4).
3. Pull the guide wheel (5) from spindle (6). Remove the outer bearing cone (7) from guide the wheel (5). Remove 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 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 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 (0.001 - 0.010 inch clearance). Secure the castle nut using a new cotter pin (2).
12. Install the hub cap (1) onto the guide wheel.



## Guide Wheels

ALLOWABLE WEAR - See Figure 4-3



■ **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: Fairmont Tamper 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).

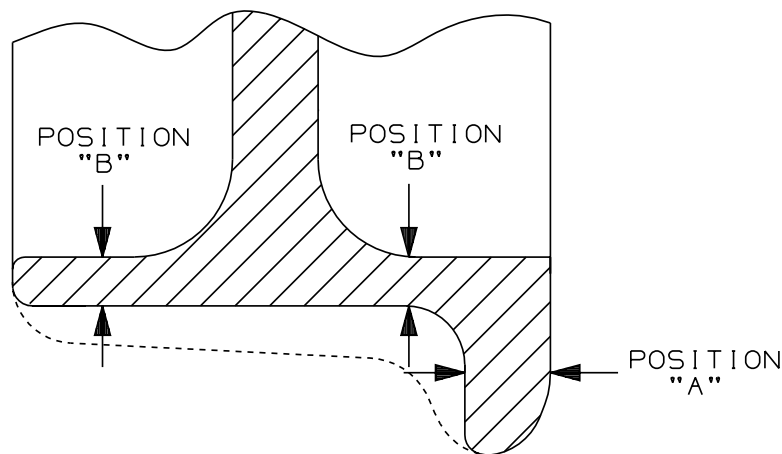
If the guide wheel flange dimension is less than the allowable limit, replace the guide wheel immediately.

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 4-3  
ALLOWABLE GUIDE WHEEL WEAR



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## Hoses and Fittings



- ALL HOSES AND FITTINGS REPLACED 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

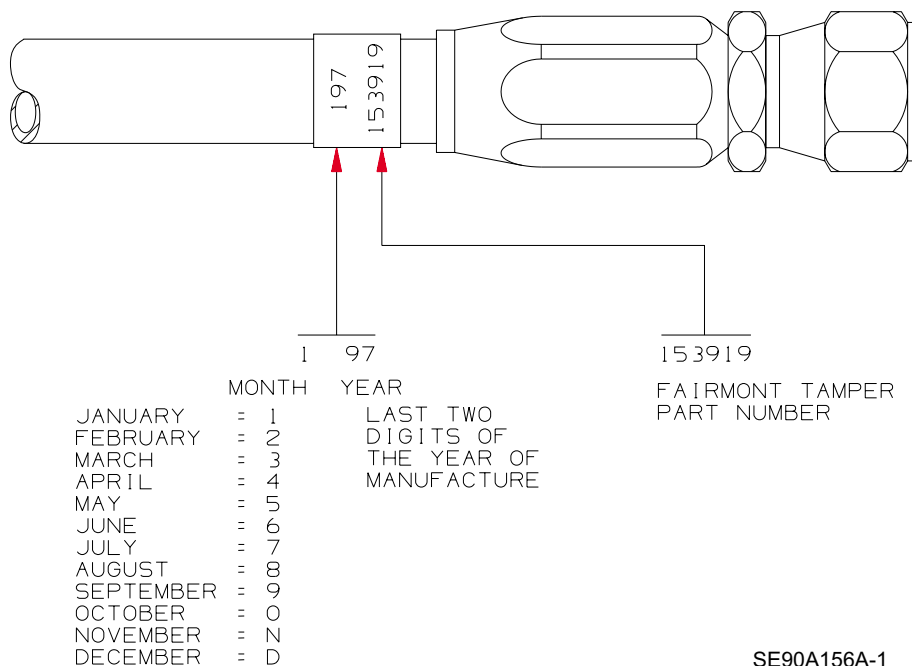
1. The inspection, maintenance, replacement and installation of air and hydraulic hose assemblies and fittings on this equipment must conform with SAE Standard J1273. See Appendices Section - Appendix B.
2. Inspect all air and hydraulic hoses, fittings and components on the machine daily or every 10 operating hours for damage, wear leaks, etc. If any of these conditions are evident, repair or replace the component as necessary.

4

### HOSE BAND - See Figure 4-4

1. All Fairmont Tamper original and replacement hose assemblies supplied from the Fairmont Tamper, Harsco Corporation Fairmont, Minnesota facility have a hose band displaying the date of manufacture and the Fairmont Tamper part number. See Figure 4-4 for explanation of the hose band.
2. The hose assembly illustrated in the example was manufactured in January 1997 and is Fairmont Tamper part number 153919.

FIGURE 4-4  
HOSE BAND



## Vehicle Wheels

### WHEEL RIM REPLACEMENT



- **USE REPLACEMENT WHEEL RIM(S) AS RECOMMENDED IN THE FAIRMONT TAMPER 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 Fairmont Tamper HY-RAIL® Vehicle Specifications Manual to ensure correct vehicle wheel spacing and accurate guide wheel load. The rims and tires should be balanced after installation on the vehicle. Torque vehicle wheel lug nuts to recommended specifications. See the decal attached to the vehicle wheel for the recommended wheel bolt torque specifications.

### TIRE REPLACEMENT

4



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

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 Fairmont Tamper 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 balanced after installation on the vehicle. Torque vehicle wheel lug nuts to recommended specifications. See the decal attached to the vehicle wheel for the recommended wheel bolt torque 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 POSSIBLE BODILY INJURY, AND/OR PROPERTY DAMAGE.**

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

## **Locking Mechanism**

The locking mechanism should move freely so it can be engaged and disengaged easily when the rail pilot units are raised or lowered. Periodically inspect this area for lubrication and wear. When the vehicle is operated in mud or slush, foreign material may get into the locking mechanism, preventing the lock from operating correctly. Remove this foreign material, being careful not to damage the locking mechanism.

The lock handle is secured in the “rail” or “highway” position by a lock pin inserted through the locking mechanism frame. 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 it.



**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.	Mechanical PTO not engaged or control valve not shifted to direct oil flow to guide wheel equipment.	Engage mechanical PTO. Shift control valve to direct oil flow to guide wheel equipment.
	Hydraulic reservoir oil level low.	Fill reservoir to full level with recommended hydraulic oil.
	Oil restricted to pump intake.	Check all strainers and filters for dirt and sludge. Clean and replace if necessary.
	Components bent, broken, worn, etc.	Replace components.
Rail pilot unit does not lower or raise.	Mechanical lock engaged.	Disengage lock. See Operation - Placing Vehicle On Track or Removing Vehicle From Track.
	Hydraulic pump not operating.	Start hydraulic pump.
	Hydraulic reservoir oil level low.	Fill reservoir to full level with recommended hydraulic oil.
	Components bent, broken, worn, etc.	Replace components.
	Lack of lubrication.	Lubricate rail pilot unit. See Maintenance - Guide Wheel Equipment Lubrication.

**Troubleshooting Guide Wheel Equipment**

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

**Troubleshooting Guide Wheel Equipment**

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Vehicle pulls noticeably to the left or right when on track.	Vehicle loaded heavy on one side.	Move load to center of vehicle.
	Rail pilot units, vehicle rear axle(s), etc. not aligned with vehicle frame.	Check alignment. See Adjustments - Guide Wheel Equipment Alignment Procedure.
	Incorrect or worn vehicle rear tire.	Check for correct rear tire. Replace if necessary. Replace worn rear tire.
	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 track.	Guide wheel brake shoes dragging.	Re-adjust brake shoes. See Adjustments - Brakes.
	Rail pilot 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.

**Troubleshooting Guide Wheel Equipment**

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
<p>Vehicle load on rear spring cells exceed rear rail pilot unit maximum rated load.</p>	<p>Vehicle overloaded.</p> <p>Rear rail pilot unit not initially set to carry approximately 33% of vehicle rear axle curb weight or 3,650 lbs (1,665 kg) minimum.</p>	<p>Redistribute or remove some of the load.</p> <p>Re-adjust. See Adjustments - Guide Wheel Equipment Alignment Procedure.</p>
	<p>Vehicle rear tires under inflated.</p>	<p>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.</p>
	<p>Vehicle rear spring broken.</p>	<p>Repair or replace spring.</p>
<p>Vibration felt in the vehicle when traveling on highway.</p>	<p>Rail pilot units mounting fasteners loose.</p>	<p>Tighten all bolts to recommended torque.</p>
	<p>Rail pilot units not locked in "highway" position.</p>	<p>STOP IMMEDIATELY. Make sure both rail pilot units are locked in "highway" position.</p>
	<p>Vehicle rim bent.</p>	<p>Replace. See Parts - Vehicle Applications.</p>
	<p>Vehicle tires out of balance.</p>	<p>Balance tires.</p>



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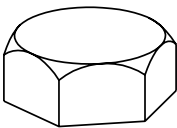
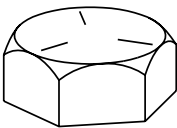
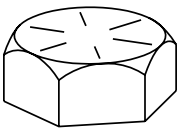
**Appendix B - SAE J1273**

SAE J1273 - NOVEMBER 1991  
SELECTION, INSTALLATION AND MAINTENANCE  
OF HOSE AND HOSE ASSEMBLIES . . . . . 6 - 10

**Appendix A**

**FIGURE 6-1  
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 inch-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.

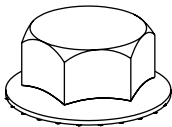
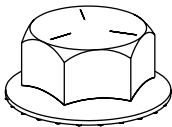
SAE Grade	1 or 2				5				8			
Fastener Standard SAE Grade Markings												
Fastener Body Size Inch Thrd	Torque				Torque				Torque			
	Wet in-lb		Dry in-lb		Wet in-lb		Dry in-lb		Wet in-lb		Dry in-lb	
1/4 - 20	49		65		75		100		107		142	
1/4 - 28	56		74		86		114		122		162	
5/16 - 18	103		137		157		208		220		293	
5/16 - 24	113		150		173		230		244		325	
Fastener Body Size Inch Thrd	Torque				Torque				Torque			
	Wet ft-lb	(kg-m)	Dry ft-lb	(kg-m)	Wet ft-lb	(kg-m)	Dry ft-lb	(kg-m)	Wet ft-lb	(kg-m)	Dry ft-lb	(kg-m)
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)

**6**

**Appendix A**

FIGURE 6-2  
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.

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  
METRIC BOLT AND CAP SCREW TORQUE VALUES**

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.

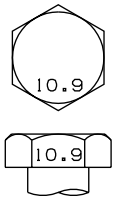
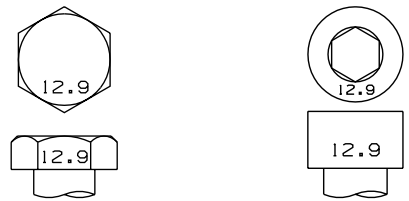
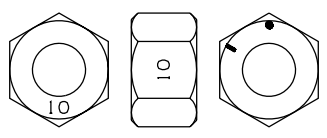
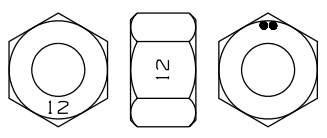
\* Lubricated means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. Dry means plain or zinc plated without any lubrication.

Property Class and Head Markings	4.8				8.8		9.8	
Property Class and Nut Markings	5				10			
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

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**Appendix A**

**FIGURE 6-4  
METRIC BOLT AND CAP SCREW TORQUE VALUES**

Property Class and Head Markings	<p style="text-align: center;">10.9</p> 				<p style="text-align: center;">12.9</p> 			
Property Class and Nut Markings	<p style="text-align: center;">10</p> 				<p style="text-align: center;">12</p> 			
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		33/64	.516
1/32	.031	0.397	17/32	.531	13.097
	3/64	0.794		35/64	.547
1/16	.047	1.191	9/16	.563	13.891
	5/64	1.588		37/64	.578
3/32	.078	1.984	19/32	.594	14.288
	7/64	2.381		39/64	.609
1/8	.109	2.778	5/8	.625	14.684
	9/64	3.175		41/64	.641
5/32	.141	3.572	21/32	.656	15.081
	11/64	3.969		43/64	.672
3/16	.156	4.366	11/16	.688	15.478
	13/64	4.763		45/64	.703
7/32	.188	5.159	23/32	.719	16.272
	15/64	5.556		47/64	.734
1/4	.219	5.953	3/4	.750	16.669
	17/64	6.350		49/64	.766
9/32	.250	6.747	25/32	.781	17.066
	19/64	7.144		51/64	.797
5/16	.281	7.541	13/16	.813	17.463
	21/64	7.938		53/64	.828
11/32	.313	8.334	27/32	.844	17.859
	23/64	8.731		55/64	.859
3/8	.344	9.128	7/8	.875	18.256
	25/64	9.525		57/64	.891
13/32	.375	9.922	29/32	.906	18.653
	27/64	10.319		59/64	.922
7/16	.406	10.716	15/16	.938	19.050
	29/64	11.113		61/64	.953
15/32	.422	11.509	31/32	.969	19.447
	31/64	11.906		63/64	.984
1/2	.438	12.303	1	1.000	20.241
	.453	12.700			20.638
	.469				21.034
	.484				21.431
	.500				21.828
					22.225
					22.622
					23.019
					23.416
					23.813
					24.209
					24.606
					25.003
					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

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**  
**°F MINUS 32, DIVIDED BY 1.8 EQUALS °C**

°F	°C	°F	°C	°F	°C	°F	°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

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

FAIRMONT TAMPER, 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 FAIRMONT TAMPER, HARSCO CORPORATION. FAIRMONT TAMPER, 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.

## Appendix B

- 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.
- 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.

## Appendix B

- 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.

## Appendix B

- 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.*

## Appendix B

- 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:
- Leaks at fitting or in hose (leaking fluid is a fire hazard)
  - Damaged, cut, or abraded cover (any reinforcement exposed)
  - Kinked, crushed, flattened, or twisted hose
  - Hard, stiff, heat cracked, or charred hose
  - Blistered, soft degraded, or loose cover
  - Cracked, damaged, or badly corroded fittings
  - Fitting slippage on hose
- 5.3 Visual Inspection** - The following items must be tightened, repaired, or replaced as required:
- Leaking port conditions
  - Clamps, guards, shields
  - Remove excessive dirt buildup
  - 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 tag on the rear rail pilot unit. Always provide these factory serial numbers when calling or writing about the unit. The serial number tag is located on the frame mounting assembly.

REAR RAIL PILOT UNIT  
SERIAL NUMBER TAG

The image shows a rectangular serial number tag with rounded corners. On the left side, the word "Fairmont" is written in a stylized, italicized font above the word "Tamper", which is also in a stylized, italicized font. Below "Tamper" is a small square logo followed by the text "a harsco company". To the right of the logo, there is a box labeled "PATENT NUMBER". Below the logo, there are two boxes: one labeled "HY-RAIL® GUIDE WHEEL EQUIPMENT SERIAL NUMBER" and another labeled "SYMBOL". At the bottom of the tag, the text "FAIRMONT TAMPER, HARSCO CORPORATION FAIRMONT, MN. 56031 U.S.A." is printed. In the bottom right corner of the tag, the code "SE052400KA-1" is printed.

## Instructions For Ordering Parts

1. Turn to the rear of the Parts Section and locate 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 a full description, sketch, or send the old part with the order.
8. To insure prompt and correct shipment of parts on orders, always give:
  - a. Quantity of each part wanted.
  - b. Part number of each part as shown in this book. Include any prefix and suffix letters.
  - c. Description of each part as shown in this book.
  - e. Factory serial numbers from the serial number tag on the rail pilot unit.
  - f. Purchase order number (if required).
  - g. 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

FAIRMONT TAMPER® products are designed to give high quality service and are manufactured from high grade material, by competent workmen under careful supervision. Fairmont Tamper, 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 Fairmont Tamper, 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 Fairmont Tamper, 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 there to. Fairmont Tamper, Harsco Corporation will not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products, nor will Fairmont Tamper, 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. Fairmont Tamper, 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 FAIRMONT TAMPER® products, are covered directly by the warranty of the manufacturer supplying them. However, Fairmont Tamper, Harsco Corporation will assist in obtaining adjustment on such equipment or parts when necessary.

*THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND OF ANY OTHER OBLIGATION OR LIABILITY OF FAIRMONT TAMPER, HARSCO CORPORATION.*

## Product Improvement Liability Disclaimer

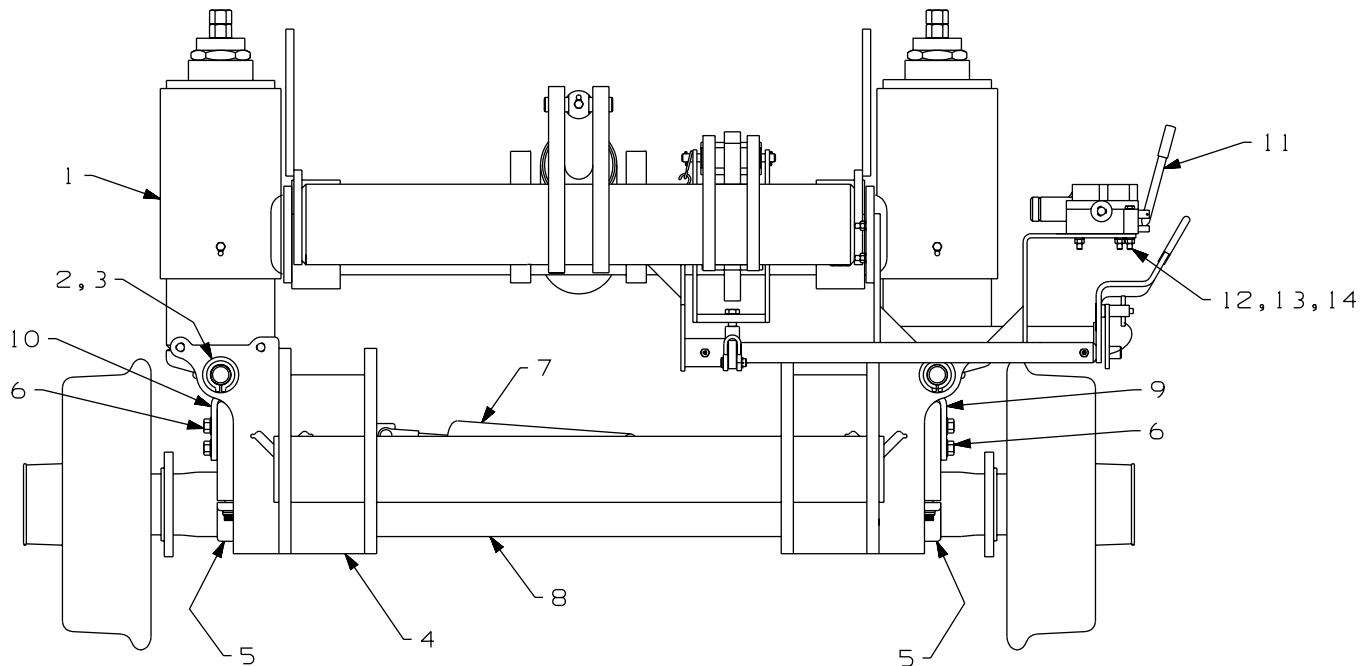
FAIRMONT TAMPER, HARSCO CORPORATION RESERVES THE RIGHT TO MAKE ANY CHANGES IN OR IMPROVEMENTS ON ITS PRODUCTS WITHOUT INCURRING ANY LIABILITY OR OBLIGATION WHATEVER AND WITHOUT BEING REQUIRED TO MAKE ANY CORRESPONDING CHANGES OR IMPROVEMENTS IN PRODUCTS PREVIOUSLY MANUFACTURED OR SOLD.

7

## 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.

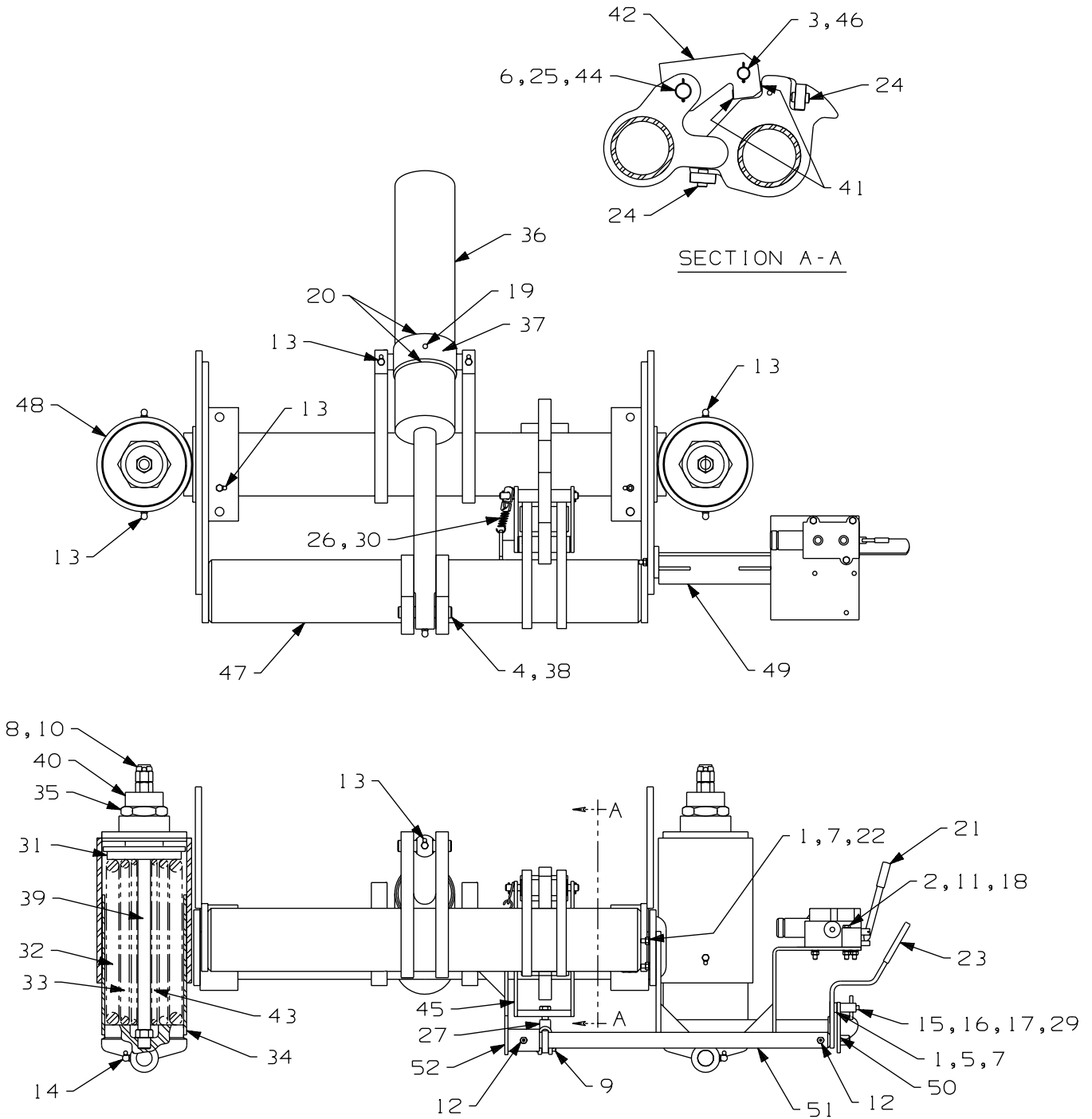
**157712 REAR RAIL PILOT UNIT - INSULATED, WITH SIDE SHIFT**  
**158145 REAR RAIL PILOT UNIT - NON-INSULATED, WITH SIDE SHIFT**



SE157712A-1

ITEM	PART NO	DESCRIPTION	QTY
1	157292	Upper Frame Assembly (see separate breakdown)	1
2	157241	Pin	2
3	700843015	Retaining Ring	4
4	157692	Lower Frame	1
5	157680	Axle Clamp	2
6	F022036	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd.	8
7	F021264	Hydraulic Cylinder	1
8	174351	AXLE ASSEMBLY	1
8a	F025249	Hex Slotted Nut, 1-1/2"-12	2
8b	F003150	Cotter Pin, 3/16 x 2-1/2"	2
9	157681	Strap	1
10	157689	Strap	1
11	F019081	Control Valve	1
12	F013428	Cap Screw 5/16-18 x 2-1/2" GR 5 Hex Hd.	3
13	F001100	SAE Lock Washer, 5/16"	3
14	F007021	Hex Nut, 5/16"-18 GR 5	3

157292 UPPER FRAME ASSEMBLY - SIDE SHIFT UNITS



7

**157292 UPPER FRAME ASSEMBLY - SIDE SHIFT UNITS**

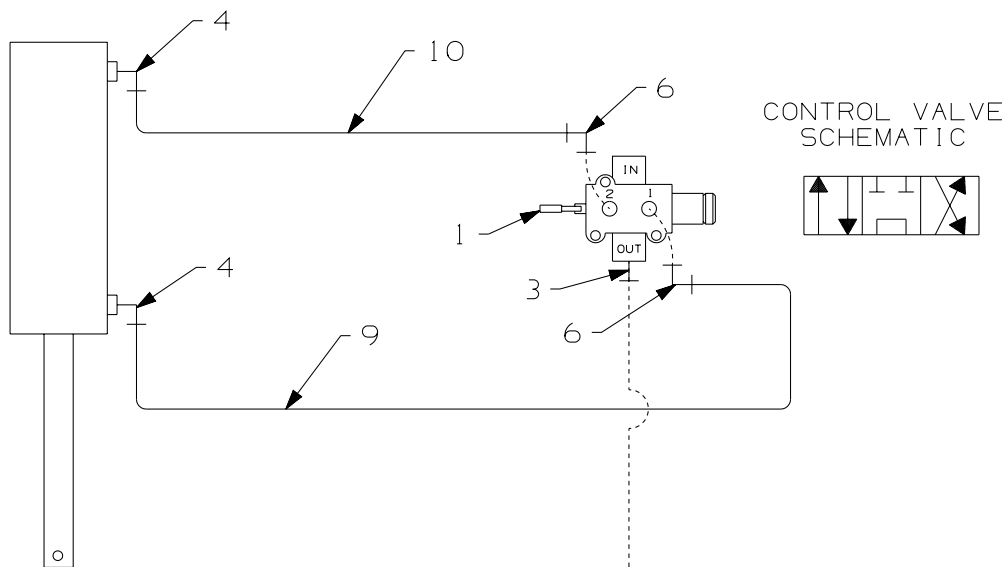
ITEM	PART NO	DESCRIPTION	QTY
	159940	UPPER FRAME ASSEMBLY . . . . .	1
1	F001075	Lock Washer, 1/2" . . . . .	4
2	F001100	SAE Lock Washer, 5/16" . . . . .	3
3	F001104	Cotter Pin, 1/8 x 1" . . . . .	2
4	F001182	Cotter Pin, 1/8 x 1-1/4" . . . . .	2
5	F001442	Cap Screw, 1/2-13 x 2" GR 5 Hex Hd. . . . .	2
6	F002547	Cotter Pin, 1/8 x 2" . . . . .	2
7	F003598	Hex Nut, 1/2"-13 . . . . .	4
8	F004344	Cotter Pin, 3/16 x 2" . . . . .	2
9	F005460	Yoke Pin . . . . .	1
10	F006657	Hex Castle Nut, 1"-14 . . . . .	4
11	F007021	Hex Nut, 5/16"-18 . . . . .	3
12	F008014	Grease Fitting . . . . .	2
13	F009217	Grease Fitting . . . . .	14
14	F009420	Grease Fitting . . . . .	4
15	F009541	Lock Washer, #10 . . . . .	1
16	F009542	Hex Nut, #10-24 . . . . .	1
17	F009591	Machine Screw, #10-24 x 3/4" Rd Hd. . . . .	1
18	F013428	Cap Screw, 5/16-18 x 2-1/2" GR 5 Hex Hd . . . . .	3
19	F014224	Set Screw, 3/8-16 x 3/8" Locking Cup Point . . . . .	1
20	F016485	Retaining Ring . . . . .	2
21	F018510	Control Valve . . . . .	1
22	F019634	Cap Screw, 1/2-13 x 1-3/4" Soc Hd . . . . .	2
23	F022846	Handle Grip . . . . .	1
24	F023736	Set Screw, 3/4-10 x 1-1/2" Oval Point . . . . .	4
25	M004458	Washer . . . . .	8
26	M010612	Spring . . . . .	1
27	M033360K1	Rod End . . . . .	1
28	069859	Tube . . . . .	2
29	081645K	Lock Pin And Lanyard . . . . .	1
30	089216	Link . . . . .	1
31	099369	Washer . . . . .	2
32	099370	Spring . . . . .	2
33	099371	Spring . . . . .	2
34	099373	Housing . . . . .	2
35	099378	Nut . . . . .	2
36	099394	Hydraulic Cylinder (see separate breakdown) . . . . .	1
37	099402K	Cylinder Mounting . . . . .	1
38	105030	Pin . . . . .	1
39	111065	Rod . . . . .	2
40	111067	Adjusting Stud . . . . .	2
41	113535	Bar (weld on) . . . . .	4
42	136276	Lock . . . . .	1
43	140109	Spring . . . . .	2

**157292 UPPER FRAME ASSEMBLY - SIDE SHIFT UNITS**

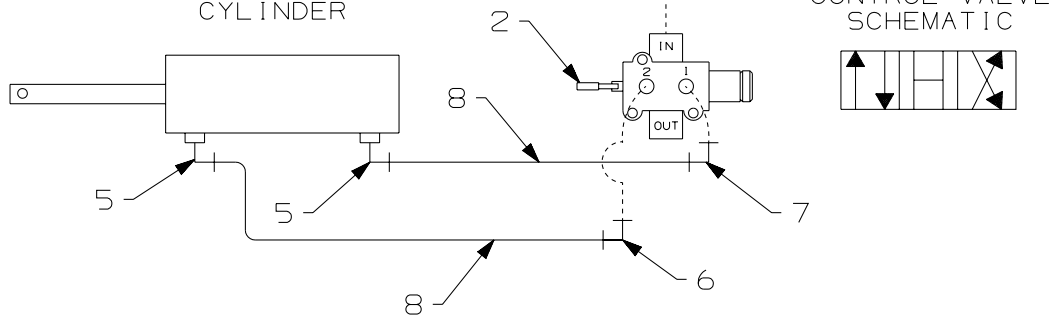
ITEM	PART NO	DESCRIPTION	QTY
44	140157	Lock Pin . . . . .	1
45	140175	Yoke . . . . .	1
46	140176	Pin . . . . .	1
47	157293	FRAME MOUNTING UNIT . . . . .	1
47a	F001354	SAE Lock Washer, 3/4" . . . . .	2
47b	F006382	Cap Screw, 3/4-10 x 2-1/2" GR 5 Hex Hd. . . . .	2
48	157295	CROSS TUBE . . . . .	1
48a	F003095	Cap Screw, 1/2-13 x 2-3/4" GR 5 Hex Hd. . . . .	2
48b	F001075	Lock Washer, 1/2" . . . . .	2
49	157707K	Bracket . . . . .	1
50	158676	Bracket . . . . .	1
51	158679	Handle . . . . .	1
52	159016	Bracket . . . . .	1

**HYDRAULIC PIPING**  
**157712 REAR RAIL PILOT UNIT - INSULATED, WITH SIDE SHIFT**  
**158145 REAR RAIL PILOT UNIT - NON-INSULATED, WITH SIDE SHIFT**

RAISE/LOWER  
CYLINDER



SIDE SHIFT  
CYLINDER

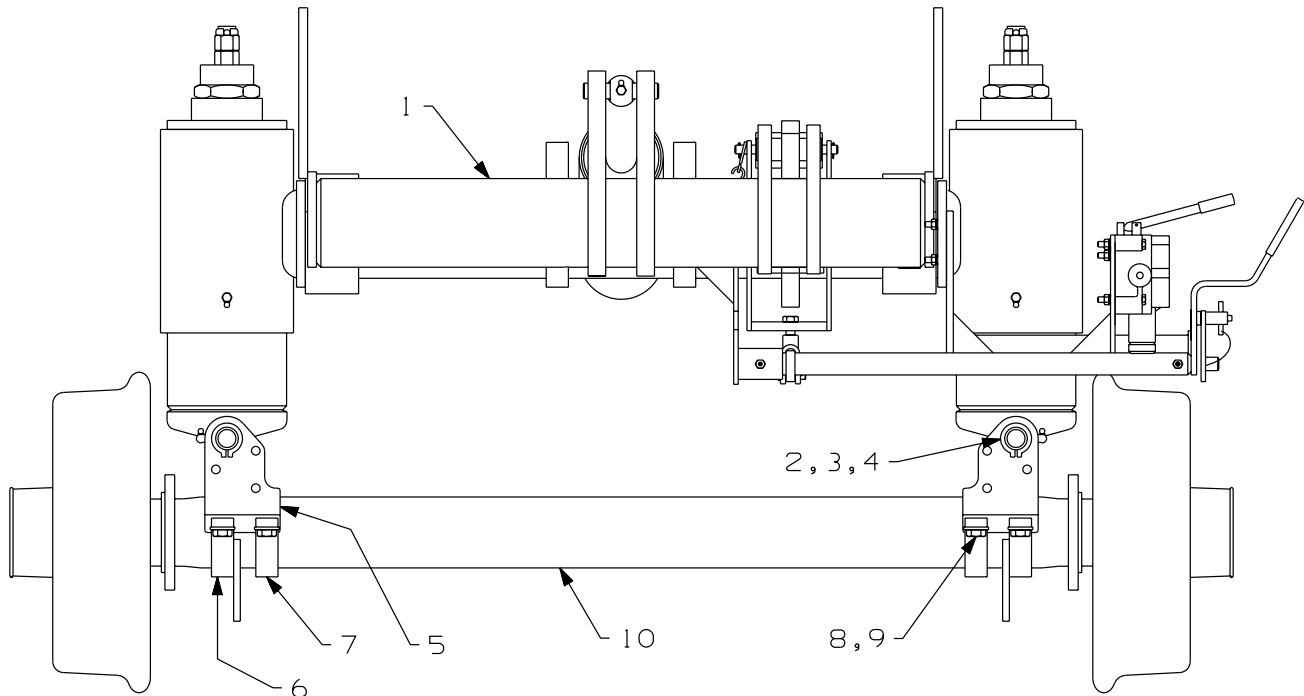


SE157712A-3

ITEM	PART NO	DESCRIPTION	QTY
1	F018510	Control Valve . . . . .	1
2	F019081	Control Valve . . . . .	1
3	F011604	Adapter, 3/8 M NPT x 3/8 M NPT . . . . .	1
4	F010987	90° Elbow, 9/16 M JIC x 1/4 M NPT. . . . .	2
5	F010988	90° Elbow, 9/16 M JIC x 1/4 M NPT. . . . .	2
6	F012055	90° Elbow, 9/16 M JIC x 3/8 M NPT. . . . .	3
7	108888	90° Elbow, 9/16 M JIC x 3/8 M NPT Restricted .062" . . . . .	1
8	075540	Hose, 5/16 x 78" Swivel 9/16 F JIC Both Ends . . . . .	2
9	079235	Hose, 5/16 x 52" Swivel 9/16 F JIC Both Ends . . . . .	1
10	162936	Hose, 5/16 x 76" Swivel 9/16 F JIC Both Ends . . . . .	1



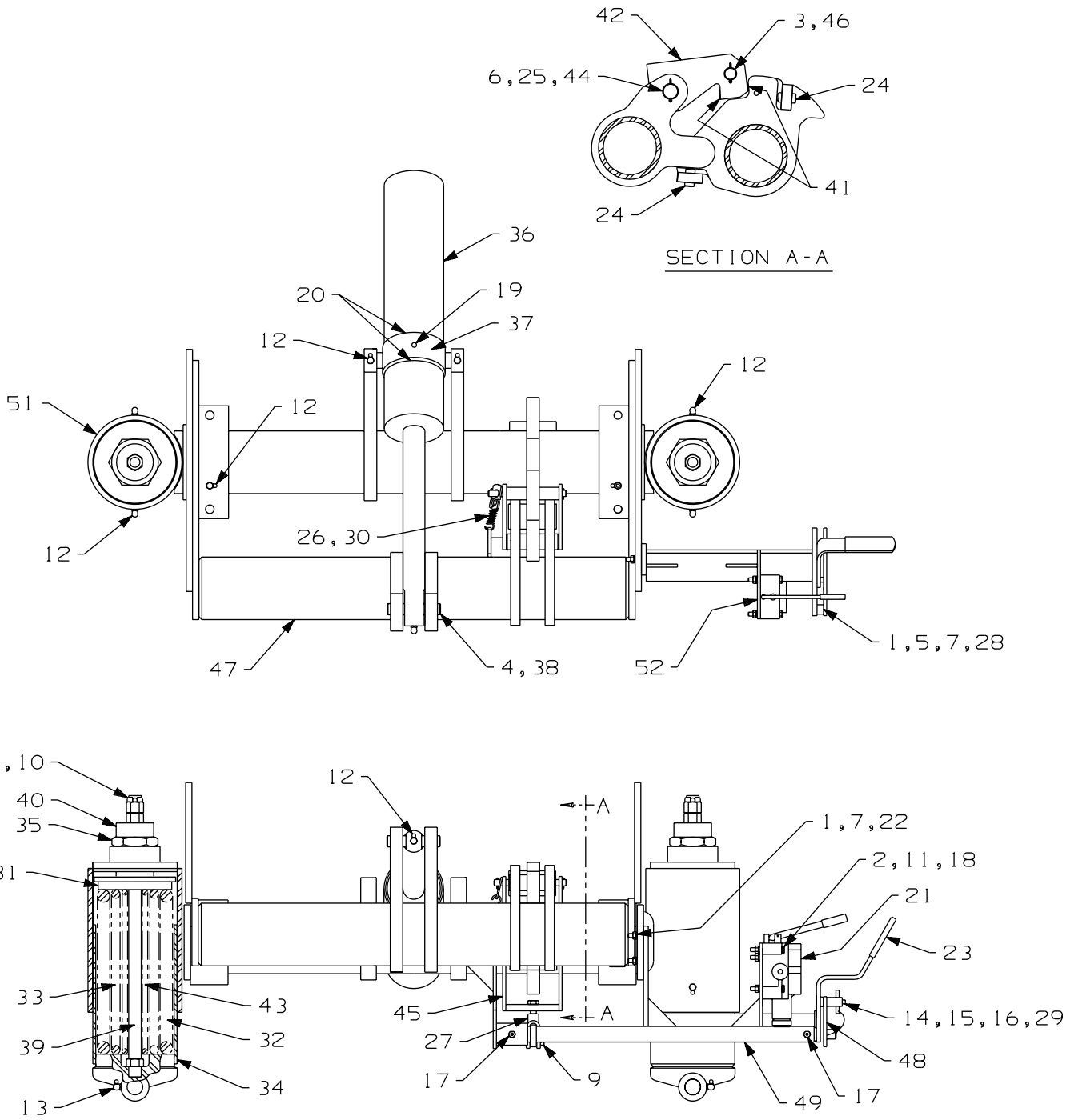
**161282 REAR RAIL PILOT UNIT - INSULATED, WITHOUT SIDE SHIFT**  
**162127 REAR RAIL PILOT UNIT - NON-INSULATED, WITHOUT SIDE SHIFT**



SE161282A-1

ITEM	PART NO	DESCRIPTION	QTY
1	159940	Upper Frame Assembly (see separate breakdown) . . . . .	1
2	157241	Pin . . . . .	2
3	F008711	Wrought Washer . . . . .	8
4	700843015	Retaining Ring . . . . .	4
5	161287	Axle Clamp . . . . .	2
6	164512	Strap . . . . .	2
7	163999	Strap . . . . .	2
8	F001103	SAE Lock Washer, 5/8" . . . . .	8
9	F019501	Cap Screw, 5/8-11 x 1-3/4" Hex Hd . . . . .	8
10	174351	AXLE ASSEMBLY . . . . .	1
11	F025249	Hex Slotted Nut, 1-1/2"-12 . . . . .	2
12	F003150	Cotter Pin, 3/16 x 2-1/2" . . . . .	2

159940 UPPER FRAME ASSEMBLY - NON SIDE SHIFT UNITS



7

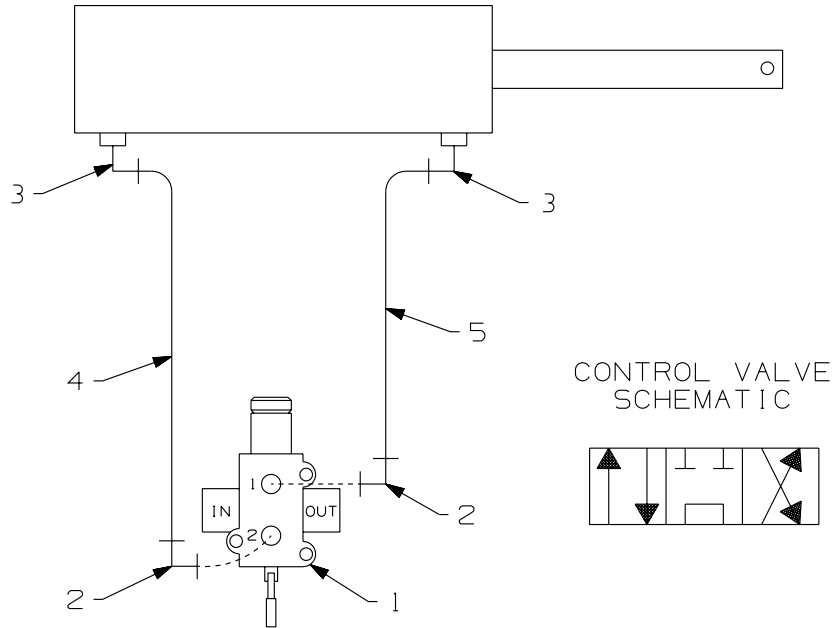
**159940 UPPER FRAME ASSEMBLY - NON SIDE SHIFT UNITS**

ITEM	PART NO	DESCRIPTION	QTY
	159940	UPPER FRAME ASSEMBLY . . . . .	1
1	F001075	Lock Washer, 1/2" . . . . .	4
2	F001100	SAE Lock Washer, 5/16" . . . . .	3
3	F001104	Cotter Pin, 1/8 x 1" . . . . .	2
4	F001182	Cotter Pin, 1/8 x 1-1/4" . . . . .	2
5	F001442	Cap Screw, 1/2-13 x 2" GR 5 Hex Hd. . . . .	2
6	F002547	Cotter Pin, 1/8 x 2" . . . . .	2
7	F003598	Hex Nut, 1/2"-13 . . . . .	4
8	F004344	Cotter Pin, 3/16 x 2" . . . . .	2
9	F005460	Yoke Pin . . . . .	1
10	F006657	Hex Castle Nut, 1"-14 . . . . .	4
11	F007021	Hex Nut, 5/16"-18 . . . . .	3
12	F009217	Grease Fitting . . . . .	14
13	F009420	Grease Fitting . . . . .	4
14	F009541	Lock Washer, #10. . . . .	1
15	F009542	Hex Nut, #10-24 . . . . .	1
16	F009591	Machine Screw, #10-24 x 3/4" Rd Hd. . . . .	1
17	F010722	Grease Fitting . . . . .	2
18	F013428	Cap Screw, 5/16-18 x 2-1/2" GR 5 Hex Hd . . . . .	3
19	F014224	Set Screw, 3/8-16 x 3/8" Locking Cup Point . . . . .	1
20	F016485	Retaining Ring . . . . .	2
21	F018510	Control Valve . . . . .	1
22	F019634	Cap Screw, 1/2-13 x 1-3/4" Soc Hd . . . . .	2
23	F022846	Handle Grip. . . . .	1
24	F023736	Set Screw, 3/4-10 x 1-1/2" Oval Point . . . . .	4
25	M004458	Washer . . . . .	8
26	M010612	Spring . . . . .	1
27	M033360K1	Rod End . . . . .	1
28	069859	Tube . . . . .	2
29	081645K	Lock Pin And Lanyard. . . . .	1
30	089216	Link . . . . .	1
31	099369	Washer . . . . .	2
32	099370	Spring . . . . .	2
33	099371	Spring . . . . .	2
34	099373	Housing. . . . .	2
35	099378	Nut . . . . .	2
36	099394	Hydraulic Cylinder (see separate breakdown) . . . . .	1
37	099402K	Cylinder Mounting. . . . .	1
38	105030	Pin . . . . .	1
39	111065	Rod . . . . .	2
40	111067	Adjusting Stud. . . . .	2
41	113535	Bar . . . . .	4
42	136276	Lock . . . . .	1
43	140109	Spring . . . . .	2

**159940 UPPER FRAME ASSEMBLY - NON SIDE SHIFT UNITS**

ITEM	PART NO	DESCRIPTION	QTY
44	140157	Lock Pin . . . . .	1
45	140175	Yoke . . . . .	1
46	140176	Pin . . . . .	1
47	157293	FRAME MOUNTING UNIT . . . . .	1
47a	F001354	SAE Lock Washer, 3/4" . . . . .	2
47b	F006382	Cap Screw, 3/4-10 x 2-1/2" Hex Hd . . . . .	2
48	158676	Bracket . . . . .	1
49	158679	Handle . . . . .	1
50	159016	Bracket . . . . .	1
51	159870	CROSS TUBE . . . . .	1
51a	F003095	Cap Screw, 1/2-13 x 2-3/4" Hex Hd . . . . .	2
51b	F001075	Lock Washer, 1/2" . . . . .	2
52	161303	Bracket . . . . .	1

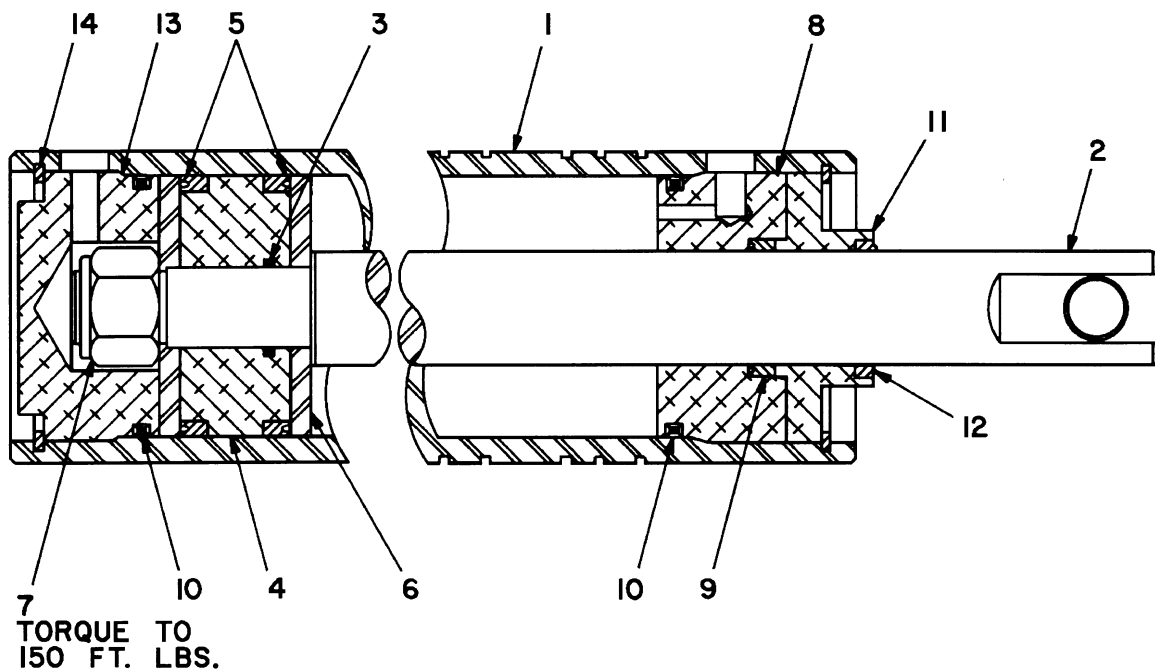
**HYDRAULIC PIPING**  
**161282 REAR RAIL PILOT UNIT - INSULATED, WITHOUT SIDE SHIFT**  
**162127 REAR RAIL PILOT UNIT - NON-INSULATED, WITHOUT SIDE SHIFT**



SE168798A-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	F010987	90° Elbow, 9/16 M JIC x 1/4 M NPT. ....	2
4	162936	Hose, 5/16 x 76" Swivel 9/16 F JIC Both Ends .....	1
5	079235	Hose, 5/16 x 52" Swivel 9/16 F JIC Both Ends .....	1

099394 LIFT CYLINDER

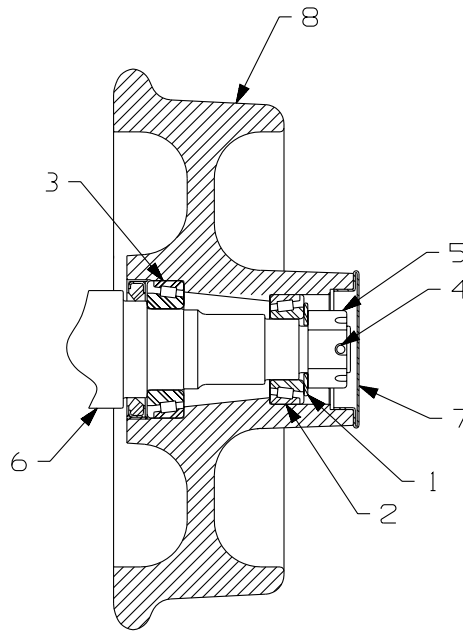


SE099394A-1

ITEM	PART NO	DESCRIPTION	QTY
	099394	CYLINDER ASSEMBLY.....	1
1	099395	Cylinder Tube.....	1
2	099396	Piston Rod.....	1
* 3	F014157K	Quad Ring, 1-1/4 x 1-1/2 x 1/8" -80.....	1
4	099397K	Piston.....	1
* 5	F014602	U-Cup Packing.....	2
6	099398	Washer, Piston.....	2
7	F014603	Hex Elastic Stop Nut, 1-1/8"-12.....	1
8	099399K	Packing Gland.....	1
* 9	F014843K	U-Cup Packing.....	1
* 10	F013330	Quad-Ring, 3-5/8 x 4 x 3/16" -70.....	2
11	099400K	Back-Up Ring.....	1
* 12	F015113	Rod Wiper.....	1
13	099401K	Cylinder Cap.....	1
14	F016484	Retaining Ring, 4-1/8" Internal.....	2
* 137576		Packing Kit (includes items marked with an asterisk *).....	1

7

**GUIDE WHEEL ASSEMBLY**



SE157712A-2

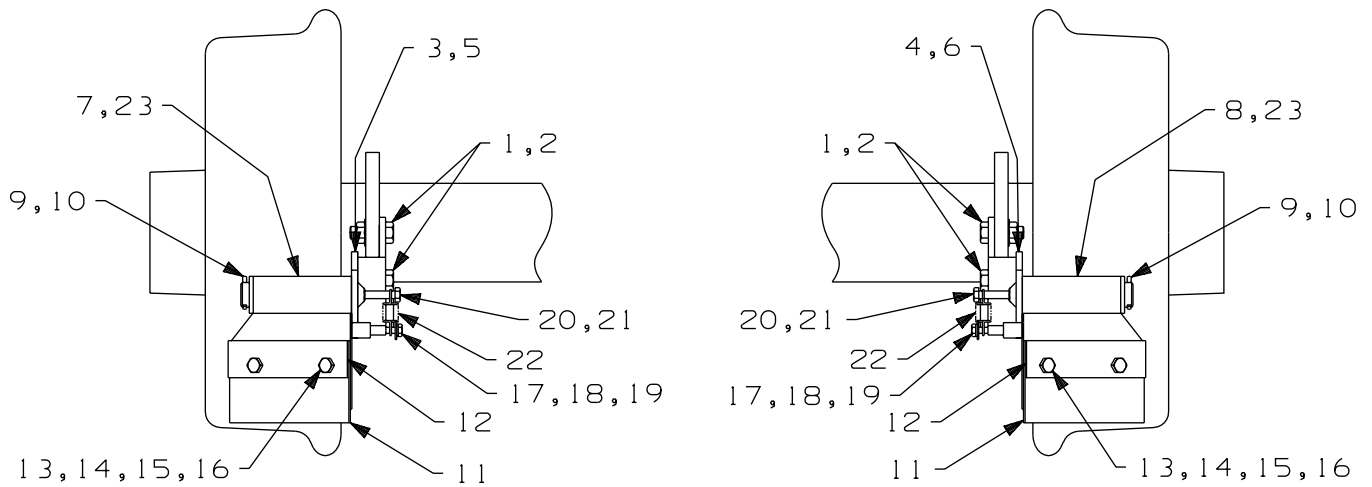
*Note: Quantities listed are for one wheel only.*

ITEM	PART NO	DESCRIPTION	QTY
1	F025049	Washer.....	1
2	159508	Bearing Cup And Cone, Outside.....	1
3	159507	Bearing Cup And Cone, Inside.....	1
4	F003150	Cotter Pin, 3/16 x 2-1/2".....	1
5	F025249	Hex Slotted Nut, 1-1/2"-12.....	1
6	F025057	Grease Seal.....	1
7	F025011	Grease Cap.....	1
8	175661	Wheel.....	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.

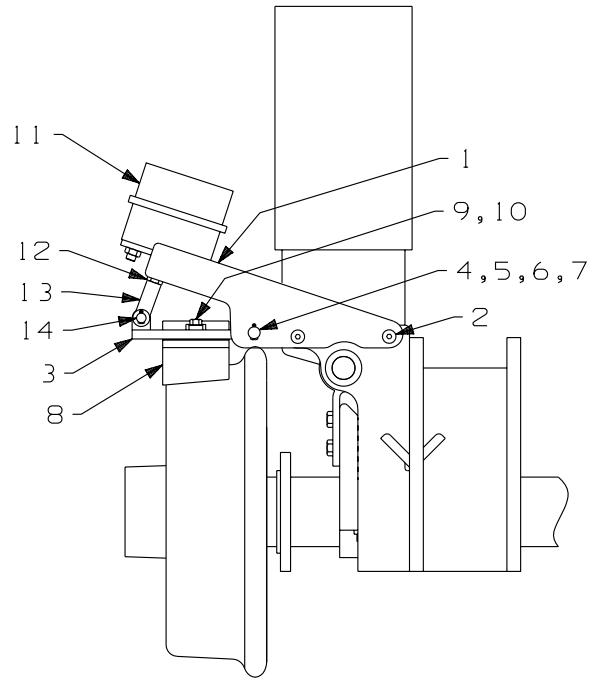
**158663 RAIL SWEEP - REAR**



SE020948A-1

ITEM	PART NO	DESCRIPTION	QTY
1	F001095	Cap Screw, 1/2-13 x 1-3/4" GR 5 Hex Hd . . . . .	4
2	F022037	Hex Nut, 1/2"-13 GR 5 . . . . .	4
3	158383	RAIL SWEEP ASSEMBLY, LEFT REAR. . . . .	1
4	158384	RAIL SWEEP ASSEMBLY, RIGHT REAR. . . . .	1
5	158653	Mounting Bracket Left Rear . . . . .	1
6	158654	Mounting Bracket Right Rear . . . . .	1
7	108505	Rail Sweep Plate, Left Rear . . . . .	1
8	108515	Rail Sweep Plate, Right Rear . . . . .	1
9	179117	Washer . . . . .	2
10	F003141	Cotter Pin, 1/8 x 1-1/2" . . . . .	2
11	108509K	Rail Sweep . . . . .	2
12	108510	Bracket . . . . .	2
13	F001125	Cap Screw, 3/8-16 x 1-1/4" GR 5 Hex Hd . . . . .	4
14	F001115	Wrought Washer, 3/8". . . . .	4
15	F001025	SAE Lock Washer, 3/8" . . . . .	4
16	F007020	Hex Nut, 3/8"-16 . . . . .	4
17	F002355	Cap Screw, 1/4-20 x 3/4" GR 5 Hex Hd. . . . .	2
18	F001106	Wrought Washer, 1/4". . . . .	2
19	F009535	Lock Washer, 1/4". . . . .	2
20	F007021	Hex Nut, 5/16"-18 GR 5 . . . . .	2
21	F001113	Cap Screw, 5/16-18 x 1-1/4" GR 5 Hex Hd . . . . .	2
22	072909	Spring . . . . .	2
23	F008014	Grease Fitting . . . . .	2

158185 REAR UNIT BRAKES - WITH SIDE SHIFT

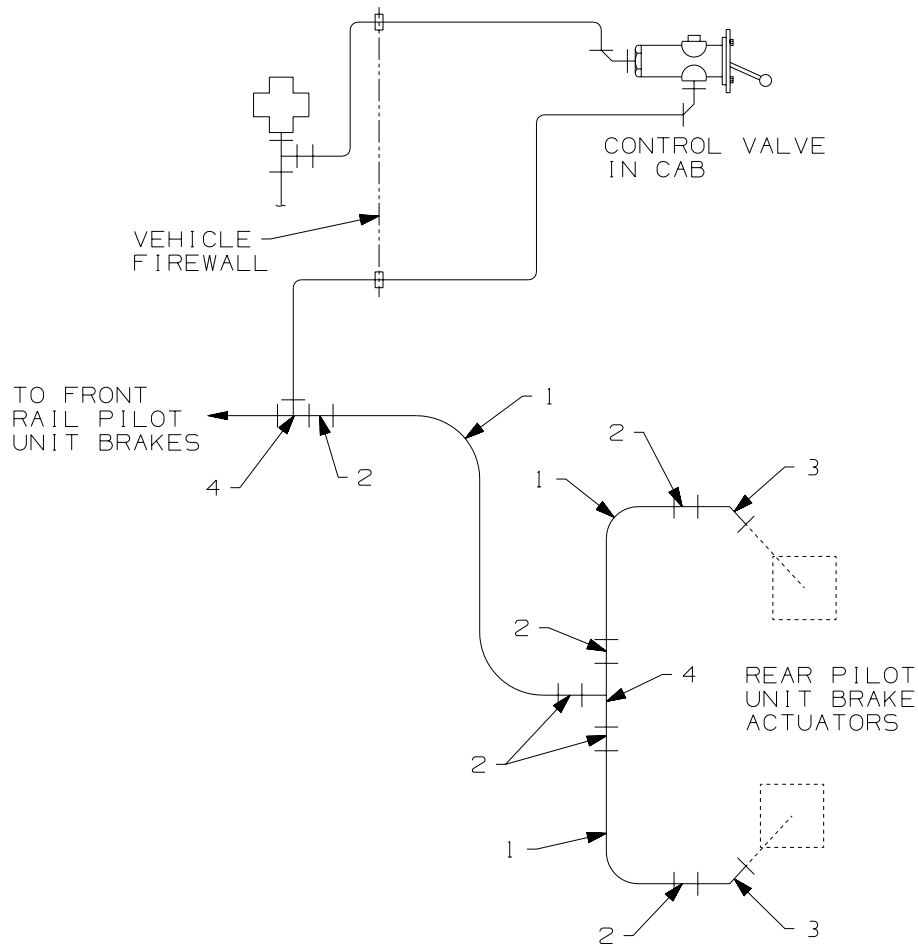


SE020912A-1

ITEM	PART NO	DESCRIPTION	QTY
1	157702	Bracket . . . . .	2
2	F019634	Cap Screw, 1/2-13 x 1-3/4" Soc Hd . . . . .	8
3	157701	Plate . . . . .	2
4	157698	Pin . . . . .	2
5	M033847	Washer. . . . .	4
6	F001182	Cotter Pin, 1/8 x 1-1/4" . . . . .	4
7	F008014	Grease Fitting. . . . .	4
8	F022274	Brake Shoe . . . . .	2
9	157694	Link . . . . .	2
10	F023416	Cap Screw, 3/8-16 x 3/4" Hex Flg Hd . . . . .	4
11	F025058	Actuator . . . . .	2
12	F011013	Hex Jam Nut, 1/2"-20 . . . . .	2
13	F005459	Yoke End . . . . .	2
14	F005460	Yoke Pin With Cotter Pin . . . . .	2



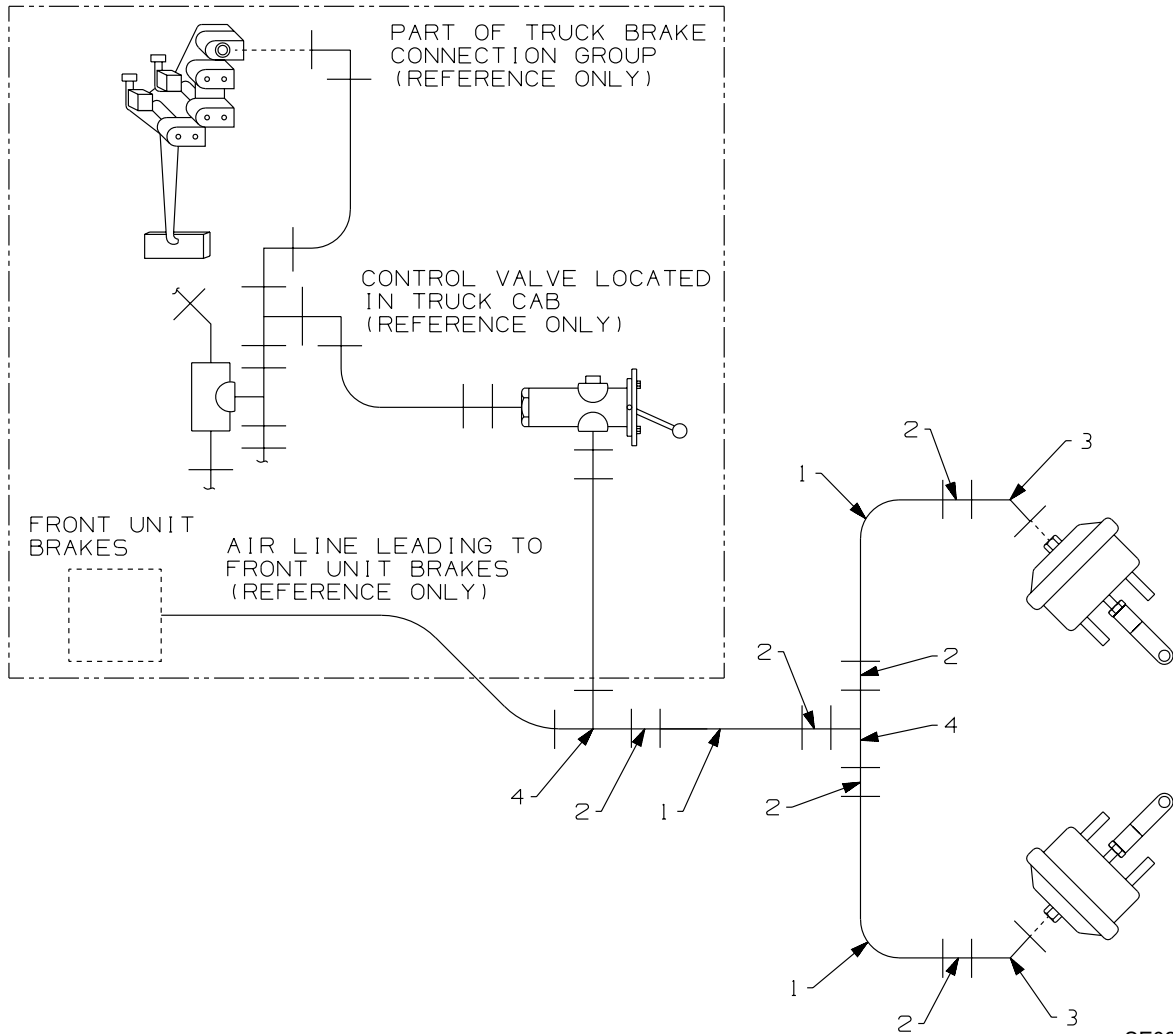
**162131 REAR BRAKE CONNECTION**



SE021240A-1

ITEM	PART NO	DESCRIPTION	QTY
1	F010693	Hose, 5/16" I.D. ....	360"
2	F018064	Swivel Hose Fitting, 9/16 F JIC ....	6
3	F018562	45° Elbow, 9/16 M JIC x 3/8 M NPT. ....	2
4	F011260	Tee, 9/16 M JIC x 9/16 M JIC x 9/16 M JIC. ....	2

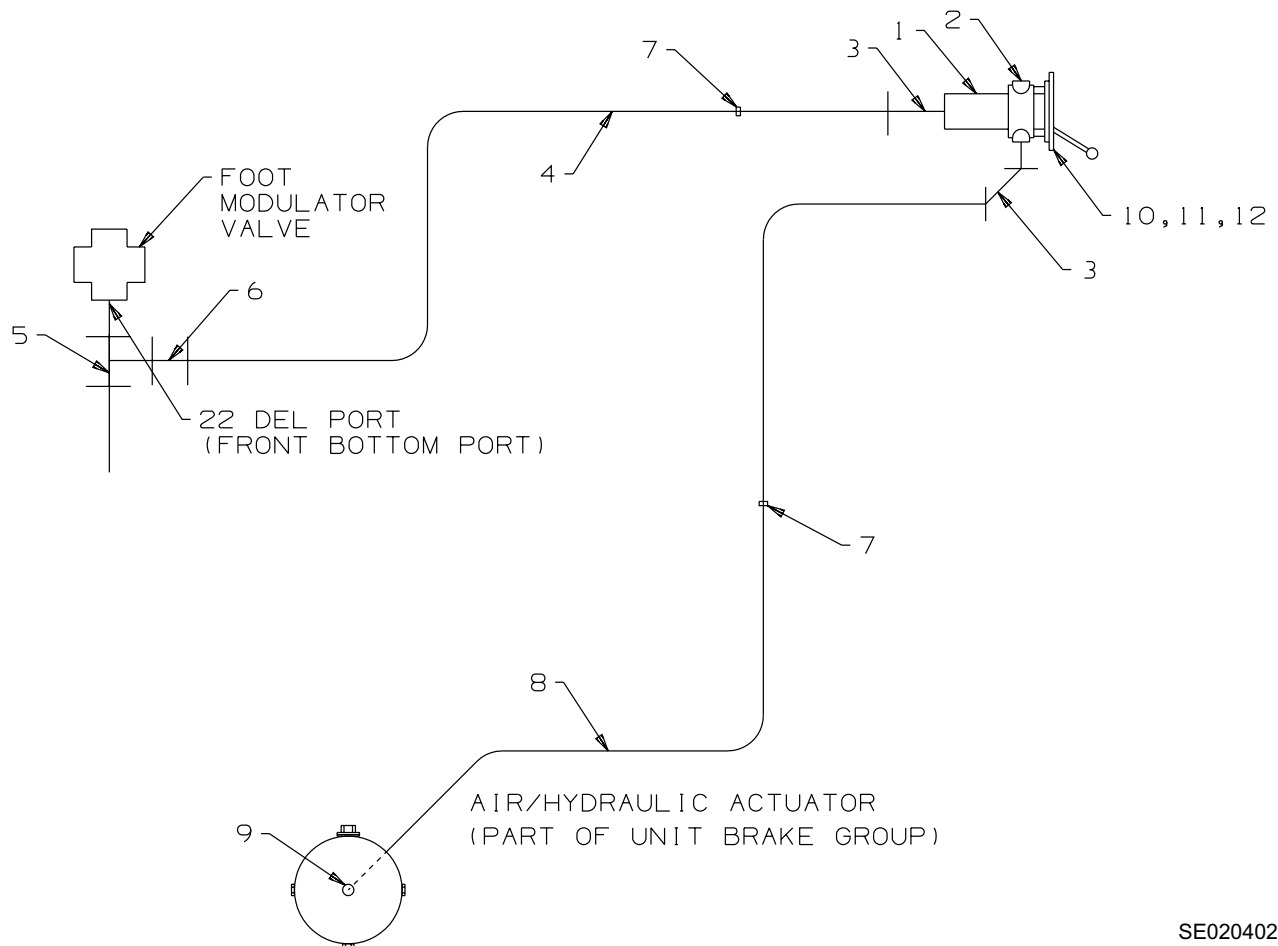
**161896 REAR BRAKE CONNECTION**



7

ITEM	PART NO	DESCRIPTION	QTY
1	F010693	Hose, 5/16" I.D. ....	360"
2	F018064	Swivel Hose Fitting, 9/16 F JIC ....	6
3	F018562	45° Elbow, 9/16 M JIC x 3/8 M NPT. ....	2
4	F011260	Tee, 9/16 M JIC x 9/16 M JIC x 9/16 M JIC. ....	2

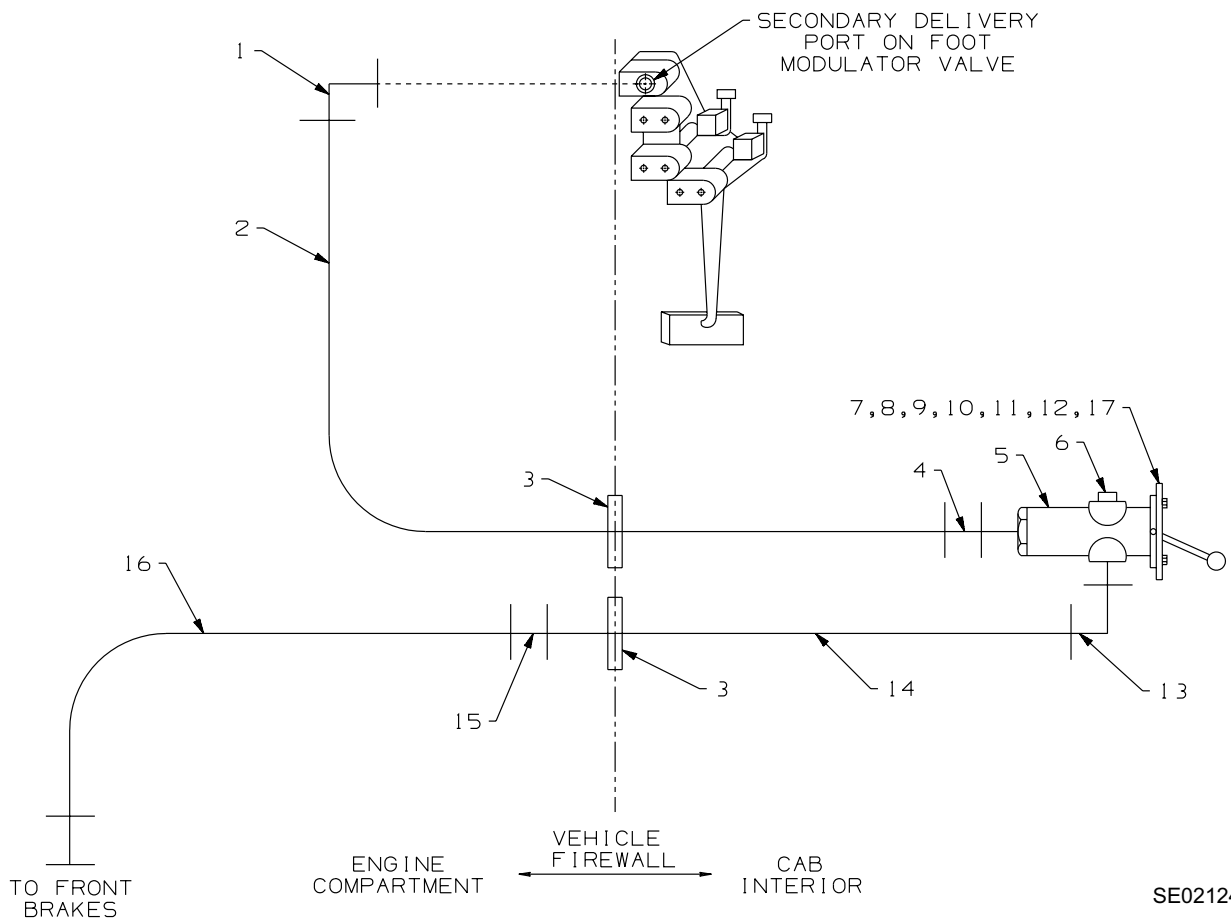
**154057 TRUCK BRAKE CONNECTION**



SE020402A-1

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

162114 TRUCK BRAKE CONNECTION

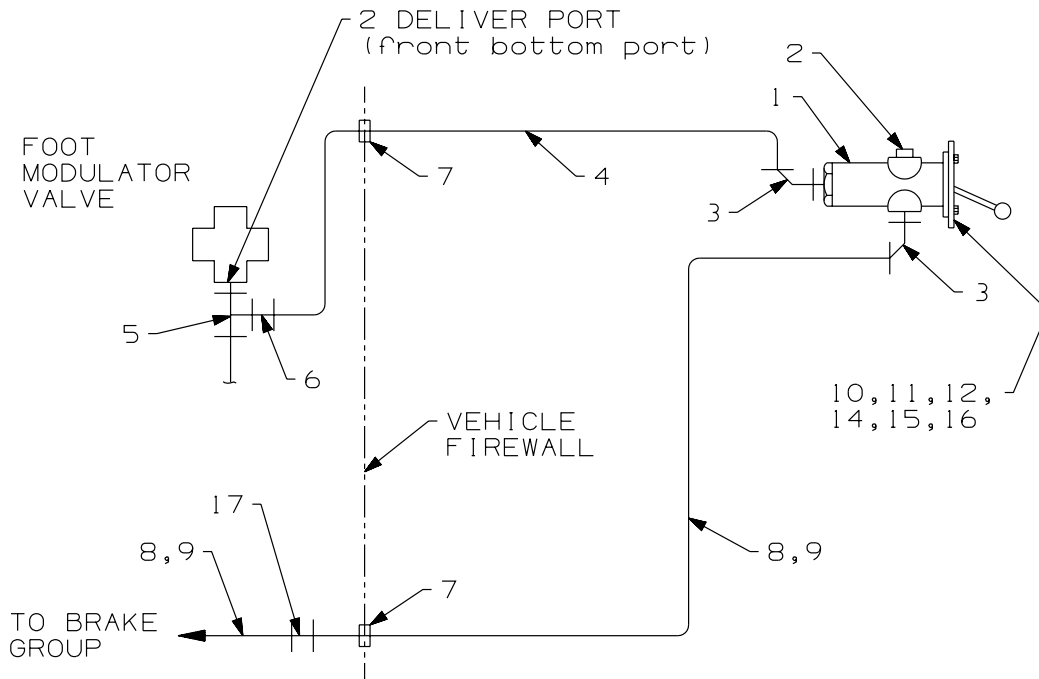


SE021241A-1

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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 (control valve mounting) . . . . .	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

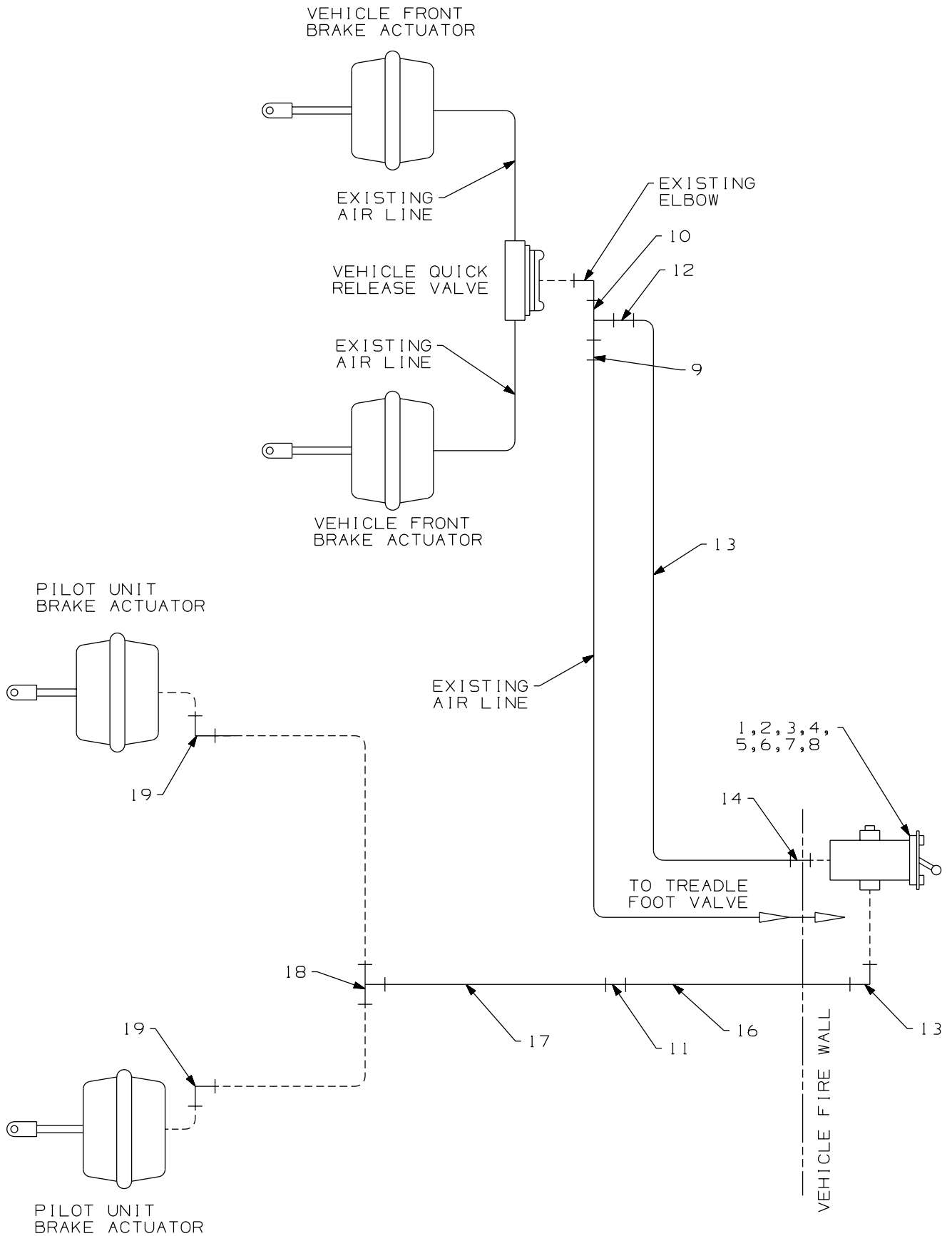
**162130 TRUCK BRAKE CONNECTION**



SE021238A-1

ITEM	PART NO	DESCRIPTION	QTY
1	F019332	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
	154058	HOSE GROUP. . . . .	1
8	F010693	Hose, 5/16" I.D. . . . .	180"
9	F011392	Swivel Hose Fitting, 9/16 F JIC. . . . .	4
10	120453	Bracket (control valve mounting) . . . . .	1
11	122583	Instruction Plate - Rail Wheel Brakes ON/OFF . . . . .	1
12	F009591	Machine Screw, #10-24 x 3/4" Rd Hd . . . . .	2
13	120457	Decal, Rail Brake Operation... . . . .	1
14	F001113	Cap Screw, 5/16-18 x 1-1/4" Hex Hd . . . . .	2
15	F001100	SAE Lock Washer, 5/16" . . . . .	2
16	F007021	Hex Nut, 5/16"-18. . . . .	2
17	F011152	Adapter, 9/16 M JIC x 9/16-M JIC . . . . .	1

179161 TRUCK BRAKE CONNECTION

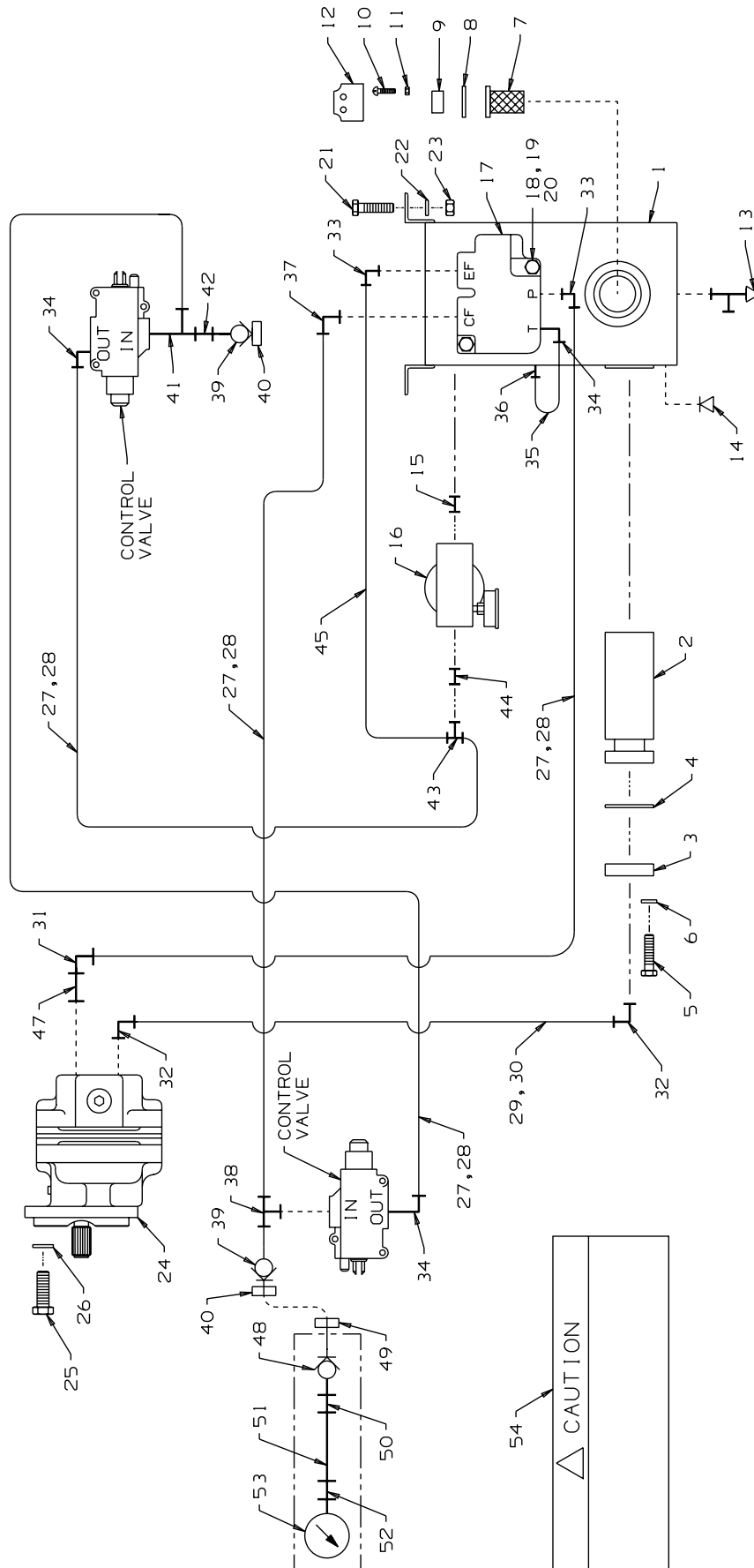


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**179161 TRUCK BRAKE CONNECTION**

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

137926 HYDRAULIC POWER PACK - FULL



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**137926 HYDRAULIC POWER PACK - FULL**

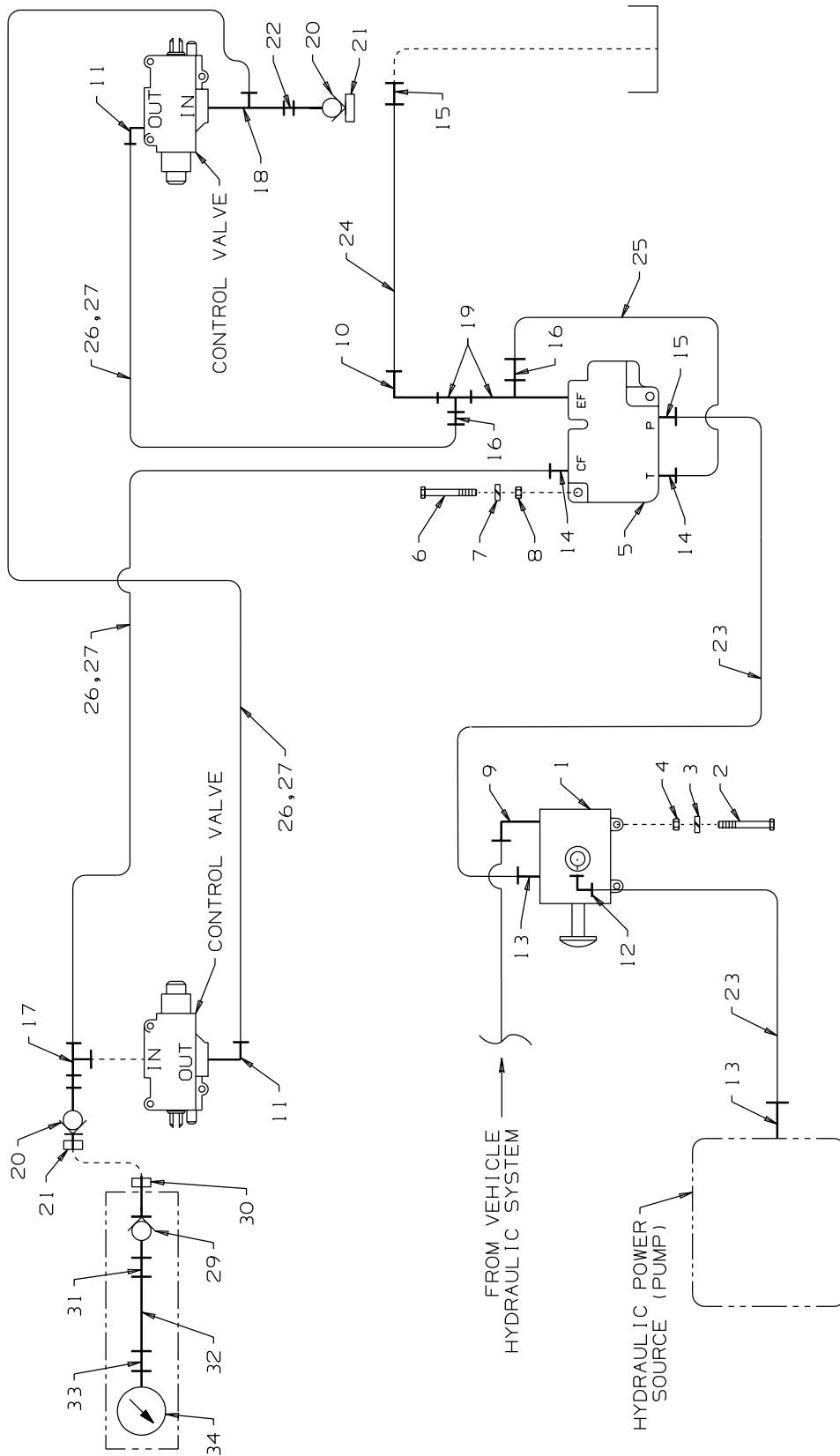
ITEM	PART NO	DESCRIPTION	QTY
	137926	HYDRAULIC POWER PACK -FULL.....	1
	129136	HYDRAULIC RESERVOIR ASSEMBLY .....	1
1	099444	Reservoir Only.....	1
2	F014155	Filter .....	1
3	082205	Filter Flange .....	1
4	077997	Flange Gasket.....	1
5	F001125	Cap Screw, 3/8-16 x 1-1/4" Hex Hd .....	4
6	F001025	SAE Lock Washer, 3/8" .....	4
7	F010465	Filler Screen .....	1
8	056780	Filler Flange Gasket .....	2
9	F010466	Filler Flange.....	1
10	F009723	Machine Screw, 10-24 x 3/8" Rd Hd .....	6
11	F009541	SAE Lock Washer, #10 .....	6
12	083570	FILLER CAP .....	1
12a	F014151	Replacement Filter Element .....	1
12b	082174	Replacement Gasket .....	1
13	F010181	Drain Valve, 1/8 M.....	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	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 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

**137926 HYDRAULIC POWER PACK - FULL**

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 NPS . . . . .	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 NPS . . . . .	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



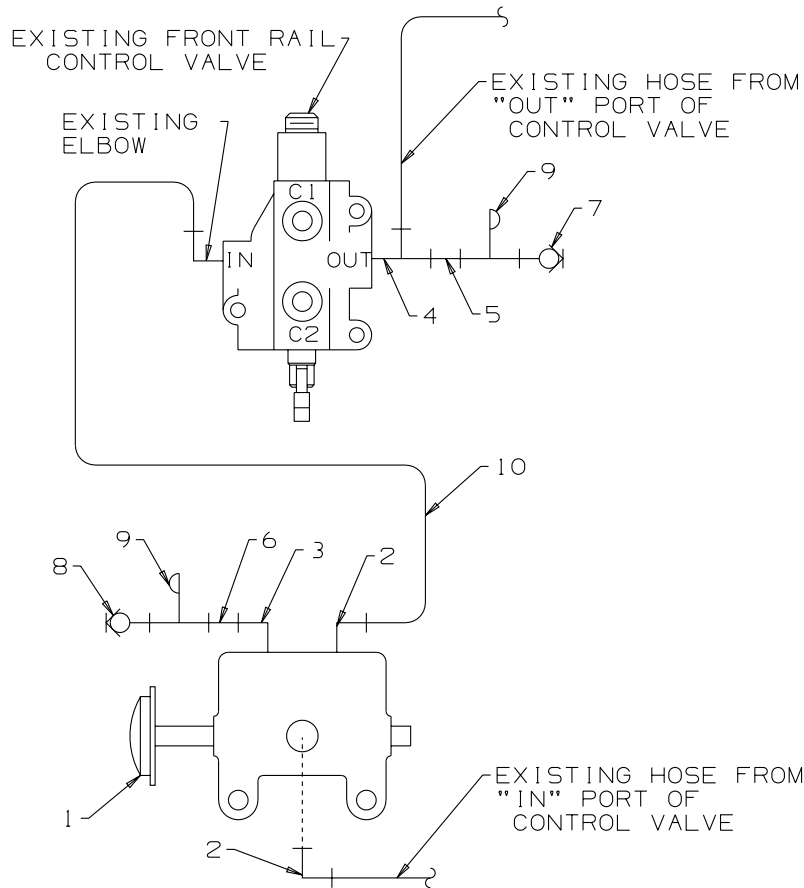
137927 HYDRAULIC POWER PACK - ABBREVIATED



**137927 HYDRAULIC POWER PACK - ABBREVIATED**

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 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 x 1/2 M NPT	2
16	F012027	Adapter, 3/4 M 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 x 1/2 M NPT x 1/2 F NPT	2
20	F015303K	Nose Piece, 3/8 F NPS	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	1
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 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 NPS	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

**132285 HYDRAULIC TOOL CONNECTION GROUP**



SE018954A-1

ITEM	PART NO	DESCRIPTION	QTY
	132285	HYDRAULIC TOOL CONNECTION GROUP	1
1	F016490	Control Valve	1
2	F013243	90° Elbow, 3/4 M JIC x 3/4 M NPT	2
3	F012010	90° Elbow Street, 3/4 F NPT x 3/4 M NPT	1
4	F014722	Tee, 3/4 M JIC x 3/8 M NPT x 3/8 M NPT	1
5	F011604	Adapter, 3/8 M NPT x 3/8 M NPT	1
6	F011753	Adapter, 3/4 M x 1/2 M NPT	1
7	F020195K	Coupler Body, 3/8 F NPT	1
8	F020197K	Nose Piece, 1/2 M	1
9	F021406	Dust Cap	2
10	081411	Hose, 13/32 x 12-3/4" Swivel 3/4 F JIC Both Ends	1
	132284	Mounting Bar (not illustrated)	1
	F010701	Cap Screw, 5/16-18 x 4-1/2" Hex Hd (not illustrated)	1
	F013428	Cap Screw, 5/16-18 x 2-1/2" Hex Hd (not illustrated)	1
	F009546	SAE Lock Washer, 5/16" (not illustrated)	2
	F009547	Hex Nut, 5/16"-18 (not illustrated)	2

**156020 STROBE LIGHT GROUP**

PART NO	DESCRIPTION	QTY
156020	STROBE LIGHT GROUP.....	1
F024799	Strobe Light .....	1
F014868	Switch .....	1
F040160	Wire, 16 ga.....	120"
F040576	Wire, 16 ga.....	120"
F009863	Butt Connector .....	2
F024813	Fuse, 1 amp .....	1
F017476	Fused Line Connector .....	1
F024812	Screw, #8 x 1/2" Self Tap .....	3

**164574 SIGHT ROD WITH EXTENSION GROUP**

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 Hd .....	2
F022037	Hex Nut, 1/2"-13 .....	2

**157310 DECAL SERVICE GROUP - INSULATED UNITS**

PART NO	DESCRIPTION	QTY
157310	DECAL SERVICE GROUP .....	1
F018082	Decal, Safety Instructions - Lock Front Wheels.....	1
F018084	Decal, HY-RAIL® Operation .....	3
F018977	Decal, Safety Instructions - Wheel Nut... ..	1
140220	Decal, Warning - Do Not Operate... ..	3
155007	Decal, HY-RAIL® Vehicle Completed By... ..	1
138115	Decal, Caution - For Safe Operation... ..	3
157230	Decal, Safety Instructions - Do Not Overload... ..	1
157309	Decal, HY-RAIL® Operating Instructions .....	1

**159483 DECAL SERVICE GROUP - NON-INSULATED UNITS**

PART NO	DESCRIPTION	QTY
159483	DECAL SERVICE GROUP .....	1
F018082	Decal, Safety Instructions - Lock Front Wheels.....	1
F018084	Decal, HY-RAIL® Operation .....	3
F018977	Decal, Safety Instructions - Wheel Nut... ..	1
140220	Decal, Warning - Do Not Operate... ..	3
155007	Decal, HY-RAIL® Vehicle Completed By... ..	1
138115	Decal, Caution - For Safe Operation... ..	3
157230	Decal, Safety Instructions - Do Not Overload... ..	1
157309	Decal, HY-RAIL® Operating Instructions .....	1
159457	Decal, Warning - Non-Insulated.....	1

**179139 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
179139	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
021465	Rear Unit Application Drawing	

**179543 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
179543	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
022398	Rear Unit Application Drawing	

**179544 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
179544	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
022398	Rear Unit Application Drawing	

**179948 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
179948	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
021465	Rear Unit Application Drawing	

**181752 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
181752	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
021234	Rear Unit Application Drawing	

**181755 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
181755	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
021234	Rear Unit Application Drawing	

**184159 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
184159	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
023000	Rear Unit Application Drawing	

**184170 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
184170	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
022985	Rear Unit Application Drawing	

**187243 MOUNTING BRACKET GROUP**

Rear Unit Mounting Parts Only

PART NO	DESCRIPTION	QTY
187243	MOUNTING BRACKET GROUP .....	1

Parts For Rear Unit Mounting

154391	Shim, .025" (use as required) .....	4
154392	Shim, .060" (use as required) .....	4
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd .....	2
F021137	Hardened Washer .....	6
F013633	Hex Lock Nut, 3/4"-10 .....	6
F018833	Cap Screw, 3/4-10 x 2-1/2" Flt Hd .....	4
021234	Rear Unit Application Drawing	

**VEHICLE APPLICATIONS - 1998**

1998 CHEV / GMC  
C7H042  
14,600 GAWR  
FRONT AXLE  
HR4000V1 FRONT  
HR4000A2 REAR

**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____
Rear Rail Pilot Unit - Insulated	
With Side Shift . . . . .	157712
Rear Rail Pilot Unit - Insulated	
Without Side Shift . . . . .	161282
Rear Rail Pilot Unit - Non-Insulated	
With Side Shift . . . . .	158145
Rear Rail Pilot Unit - Non-Insulated	
Without Side Shift . . . . .	162127
Mounting Brackets . . . . .	184170
Undercarriage Parts . . . . .	_____
Steering Lock Group . . . . .	155079
Application Drawing - Front . . . . .	_____
Application Drawing - Rear . . . . .	022985

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____
* Rail Sweeps - Rear . . . . .	158663
Power Pack Group - Full . . . . .	137926
Power Pack Group - Abbreviated. . . . .	137927
* Rear Unit Brakes	
With Side Shift . . . . .	158185
Without Side Shift . . . . .	161300
Truck Brake Connection. . . . .	154057
Hydraulic Tool Connection - 5 GPM. . . . .	132285
Wheel Load Jack . . . . .	_____
Sight Rod With Extension . . . . .	164574
* Roof Mount Strobe Light . . . . .	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1998**

1998 FORD LT-8501 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR With Front Frame Extension	1998 FORD LT-8501 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR Without Front Frame Extension
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	179139	179948
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	179140	179140
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	021465	021465

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	179161	179161
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1998**

1998 FREIGHTLINER FL80 14,600 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR	1998 FREIGHTLINER FL80 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR
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REQUIRED GROUPS

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	184159	184159
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	168053	168053
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	023000	023000

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162114	162114
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1998**

1998 NAVISTAR 4900 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR With Front Frame Extension	1998 NAVISTAR 4900 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR Without Front Frame Extension
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	179543	179544
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	154512	154512
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	022398	022398

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162114	162114
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1998**

1998 VOLVO WHITE GMC WG64 18,800 GAWR FRONT AXLE HR4500A1 FRONT HR4000A2 REAR 24" Extension	1998 VOLVO WHITE GMC WG64 18,800 GAWR FRONT AXLE HR4500A1 FRONT HR4000A2 REAR Sidebars
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REQUIRED GROUPS

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	181752	181755
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	153744	153744
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	021234	021234

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162130	162130
Rear Brake Connection . . . . .	162131	162131
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1998**

1998 VOLVO WHITE GMC WG64 20,000 GAWR FRONT AXLE HR4500A1 FRONT HR4000A2 REAR 24" Extension	1998 VOLVO WHITE GMC WG64 20,000 GAWR FRONT AXLE HR4500A1 FRONT HR4000A2 REAR Sidebars
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	181752	181755
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	153744	153744
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	021234	021234

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162130	162130
Rear Brake Connection . . . . .	162131	162131
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1999 CHEV / GMC  
C7H042  
14,600 GAWR  
FRONT AXLE  
HR4000V1 FRONT  
HR4000A2 REAR

**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____
Rear Rail Pilot Unit - Insulated	
With Side Shift . . . . .	157712
Rear Rail Pilot Unit - Insulated	
Without Side Shift . . . . .	161282
Rear Rail Pilot Unit - Non-Insulated	
With Side Shift . . . . .	158145
Rear Rail Pilot Unit - Non-Insulated	
Without Side Shift . . . . .	162127
Mounting Brackets . . . . .	184170
Undercarriage Parts . . . . .	_____
Steering Lock Group . . . . .	155079
Application Drawing - Front . . . . .	_____
Application Drawing - Rear . . . . .	022985

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____
* Rail Sweeps - Rear . . . . .	158663
Power Pack Group - Full . . . . .	137926
Power Pack Group - Abbreviated. . . . .	137927
* Rear Unit Brakes	
With Side Shift . . . . .	158185
Without Side Shift . . . . .	161300
Truck Brake Connection. . . . .	154057
Hydraulic Tool Connection - 5 GPM. . . . .	132285
Wheel Load Jack . . . . .	_____
Sight Rod With Extension . . . . .	164574
* Roof Mount Strobe Light . . . . .	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1999 FREIGHTLINER FL80 14,600 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR	1999 FREIGHTLINER FL80 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	184159	184159
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	168053	168053
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	023000	023000

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162114	162114
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1999 NAVISTAR  
 2674  
 16,000 GAWR  
 FRONT AXLE  
 HR4000V1 FRONT  
 HR4000A2 REAR

**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____
Rear Rail Pilot Unit - Insulated	
With Side Shift . . . . .	157712
Rear Rail Pilot Unit - Insulated	
Without Side Shift . . . . .	161282
Rear Rail Pilot Unit - Non-Insulated	
With Side Shift . . . . .	158145
Rear Rail Pilot Unit - Non-Insulated	
Without Side Shift . . . . .	162127
Mounting Brackets . . . . .	179543
Undercarriage Parts . . . . .	_____
Steering Lock Group . . . . .	186205
Application Drawing - Front . . . . .	_____
Application Drawing - Rear . . . . .	023191

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____
* Rail Sweeps - Rear . . . . .	158663
Power Pack Group - Full . . . . .	137926
Power Pack Group - Abbreviated. . . . .	137927
* Rear Unit Brakes	
With Side Shift . . . . .	158185
Without Side Shift . . . . .	161300
Truck Brake Connection. . . . .	162114
Hydraulic Tool Connection - 5 GPM. . . . .	132285
Wheel Load Jack . . . . .	_____
Sight Rod With Extension . . . . .	164574
* Roof Mount Strobe Light . . . . .	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1999 NAVISTAR 4900 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR With Front Frame Extension	1999 NAVISTAR 4900 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR Frame Extension
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	179543	179544
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	186205	186205
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	022398	022398

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162114	162114
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1999 STERLING LT-7501 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR With Front Frame Extension	1999 STERLING LT-7501 16,000 GAWR FRONT AXLE HR4000V1 FRONT HR4000A2 REAR Without Front Frame Extension
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	179139	179948
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	179140	179140
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	021465	021465

**ACCESSORY GROUP OPTIONS**

<b>7</b>	* Rail Sweeps - Front . . . . .	_____	_____
	* Rail Sweeps - Rear . . . . .	158663	158663
	Power Pack Group - Full . . . . .	137926	137926
	Power Pack Group - Abbreviated. . . . .	137927	137927
	* Rear Unit Brakes		
	With Side Shift . . . . .	158185	158185
	Without Side Shift . . . . .	161300	161300
	Truck Brake Connection. . . . .	179161	179161
	Rear Brake Connection . . . . .	_____	161896
	Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
	Wheel Load Jack . . . . .	_____	_____
	Sight Rod With Extension . . . . .	164574	164574
	* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1999 VOLVO  
WHITE GMC WG64  
12,000 GAWR  
FRONT AXLE  
HR3000V1 FRONT  
HR4000A2 REAR

**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____
Rear Rail Pilot Unit - Insulated	
With Side Shift . . . . .	157712
Rear Rail Pilot Unit - Insulated	
Without Side Shift . . . . .	161282
Rear Rail Pilot Unit - Non-Insulated	
With Side Shift . . . . .	158145
Rear Rail Pilot Unit - Non-Insulated	
Without Side Shift . . . . .	162127
Mounting Brackets . . . . .	187243
Undercarriage Parts . . . . .	_____
Steering Lock Group . . . . .	153744
Application Drawing - Front . . . . .	_____
Application Drawing - Rear . . . . .	021234

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____
* Rail Sweeps - Rear . . . . .	158663
Power Pack Group - Full . . . . .	137926
Power Pack Group - Abbreviated. . . . .	137927
* Rear Unit Brakes	
With Side Shift . . . . .	158185
Without Side Shift . . . . .	161300
Truck Brake Connection. . . . .	162130
Rear Brake Connection . . . . .	162131
Hydraulic Tool Connection - 5 GPM. . . . .	132285
Wheel Load Jack . . . . .	_____
Sight Rod With Extension . . . . .	164574
* Roof Mount Strobe Light . . . . .	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1999 VOLVO WHITE GMC WG64 18,800 GAWR FRONT AXLE HR4500A1 FRONT HR4000A2 REAR 24" Extension	1999 VOLVO WHITE GMC WG64 18,800 GAWR FRONT AXLE HR4500A1 FRONT HR4000A2 REAR Sidebars
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	181752	181755
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	153744	153744
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	021234	021234

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162130	162130
Rear Brake Connection . . . . .	162131	162131
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option

**VEHICLE APPLICATIONS - 1999**

1998 VOLVO WHITE GMC WG64 20,000 FRONT AXLE HR4500A1 FRONT HR4000A2 REAR 24" Extension	1998 VOLVO WHITE GMC WG64 20,000 GAWR FRONT AXLE HR4500A1 FRONT HR4000A2 REAR Sidebars
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**REQUIRED GROUPS**

Front Rail Pilot Unit - Insulated . . . . .	_____	_____
Front Rail Pilot Unit - Non-Insulated. . . . .	_____	_____
Rear Rail Pilot Unit - Insulated		
With Side Shift . . . . .	157712	157712
Rear Rail Pilot Unit - Insulated		
Without Side Shift . . . . .	161282	161282
Rear Rail Pilot Unit - Non-Insulated		
With Side Shift . . . . .	158145	158145
Rear Rail Pilot Unit - Non-Insulated		
Without Side Shift . . . . .	162127	162127
Mounting Brackets . . . . .	181752	181755
Undercarriage Parts . . . . .	_____	_____
Steering Lock Group . . . . .	153744	153744
Application Drawing - Front . . . . .	_____	_____
Application Drawing - Rear . . . . .	021234	021234

**ACCESSORY GROUP OPTIONS**

* Rail Sweeps - Front . . . . .	_____	_____
* Rail Sweeps - Rear . . . . .	158663	158663
Power Pack Group - Full . . . . .	137926	137926
Power Pack Group - Abbreviated. . . . .	137927	137927
* Rear Unit Brakes		
With Side Shift . . . . .	158185	158185
Without Side Shift . . . . .	161300	161300
Truck Brake Connection. . . . .	162130	162130
Rear Brake Connection . . . . .	162131	162131
Hydraulic Tool Connection - 5 GPM. . . . .	132285	132285
Wheel Load Jack . . . . .	_____	_____
Sight Rod With Extension . . . . .	164574	164574
* Roof Mount Strobe Light . . . . .	156020	156020

\* Recommended Safety Option



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