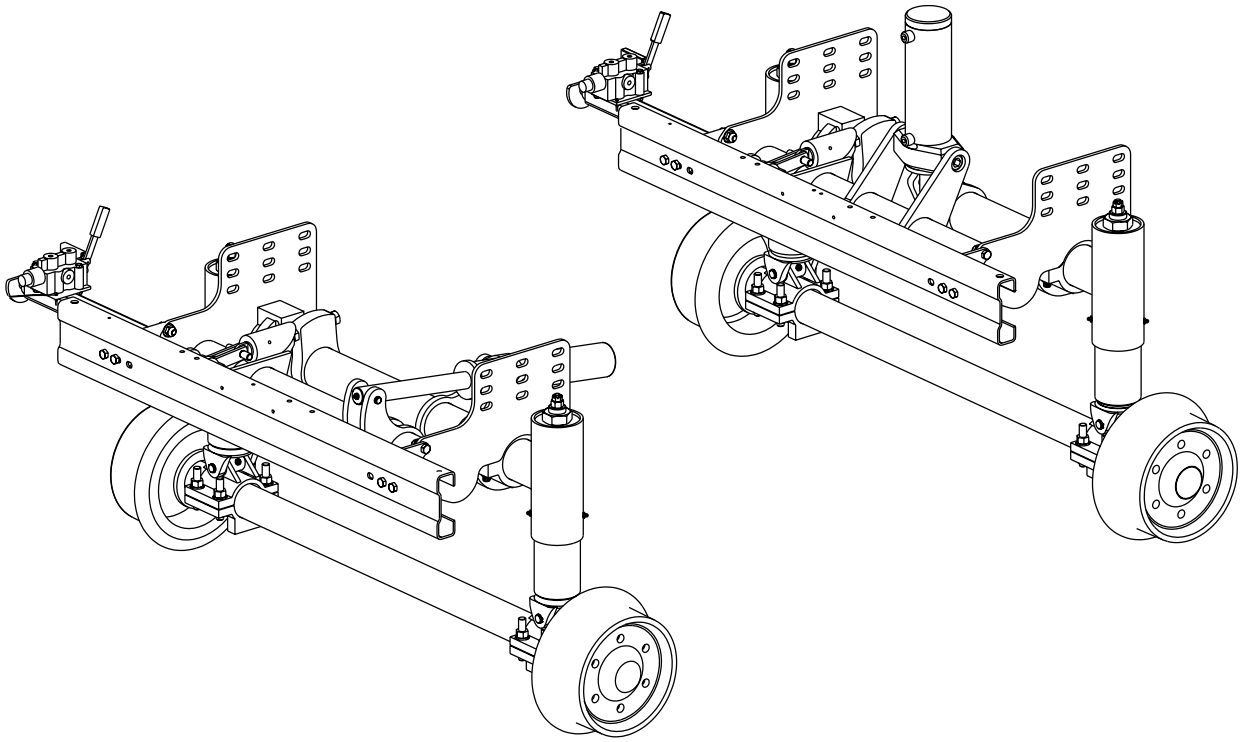
HR2000 SERIES A2
HR2000 SERIES A3

REAR UNIVERSAL HY-RAIL®
GUIDE WHEEL UNITS
HYDRAULICALLY OPERATED



OPERATOR'S SERVICE AND PARTS MANUAL

ISSUED 8 - 2000 BULLETIN 1253A

■ **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.**

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

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

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SECTION 1 - GENERAL INFORMATION
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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 HARSCO TRACK TECHNOLOGIES EQUIPMENT. THE BEST SAFETY PROGRAM STARTS WITH A SAFETY CONSCIOUS OPERATOR. THE SAFETY INFORMATION HIGHLIGHTED IN THIS BULLETIN DESCRIBES SAFE OPERATING PRACTICES FOR THE BENEFIT OF THE WORKERS WHO WILL USE OUR EQUIPMENT IN THEIR DAILY JOBS.

HAZARD SERIOUSNESS

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

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

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

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

Safety Information

- **APPLY THE VEHICLE PARKING BRAKE AND STOP THE ENGINE WHEN PERFORMING MAINTENANCE, MAKING ADJUSTMENTS, WORKING UNDER VEHICLE OR GUIDE WHEEL EQUIPMENT OR WHENEVER UNINTENDED MOVEMENT OF THE VEHICLE COULD OCCUR, UNLESS OTHERWISE INSTRUCTED IN THIS MANUAL.**

- **MAKE SURE ALL PERSONS ARE CLEAR OF VEHICLE BEFORE PERFORMING ANY OPERATING FUNCTIONS.**

- **KEEP ALL PARTS OF THE BODY AND LOOSE CLOTHING CLEAR OF ALL MOVING PARTS OF THE VEHICLE OR GUIDE WHEEL EQUIPMENT.**

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

- **IF A DERAILMENT SHOULD OCCUR WHILE VEHICLE IS OPERATING IN ELECTRIFIED 3RD-RAIL TERRITORY, VEHICLE OR GUIDE WHEEL EQUIPMENT MIGHT BE IN ELECTRICAL CONTACT WITH ELECTRIFIED RAIL. DO NOT ATTEMPT TO EXIT FROM VEHICLE UNTIL ELECTRICAL POWER TO 3RD-RAIL HAS BEEN TURNED OFF.**

- **DO NOT EXCEED 35 MPH (56 km/h) WHEN OPERATING VEHICLE ON TRACK. RAILROAD RULES GOVERNING SPEEDS SHOULD BE OBSERVED AT ALL TIMES. REDUCE SPEED WHEN PROPELLING VEHICLE THROUGH SWITCHES, CROSSINGS, BRANCH LINES AND ANY SPECIAL TRACK WORKS. OPERATING VEHICLE AT UNSAFE SPEEDS COULD RESULT IN DERAILMENT OF VEHICLE.**

- **CHECK AND CORRECT GUIDE WHEEL EQUIPMENT ALIGNMENT PROMPTLY IF MISALIGNMENT IS INDICATED.**

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Safety Information

- **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 THE 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:**
      5,000 lbs (2268 kg).
      2,500 lbs (1134 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 Views

FIGURE 1-1
HR2000 SERIES A2 HY-RAIL® GUIDE WHEEL UNIT

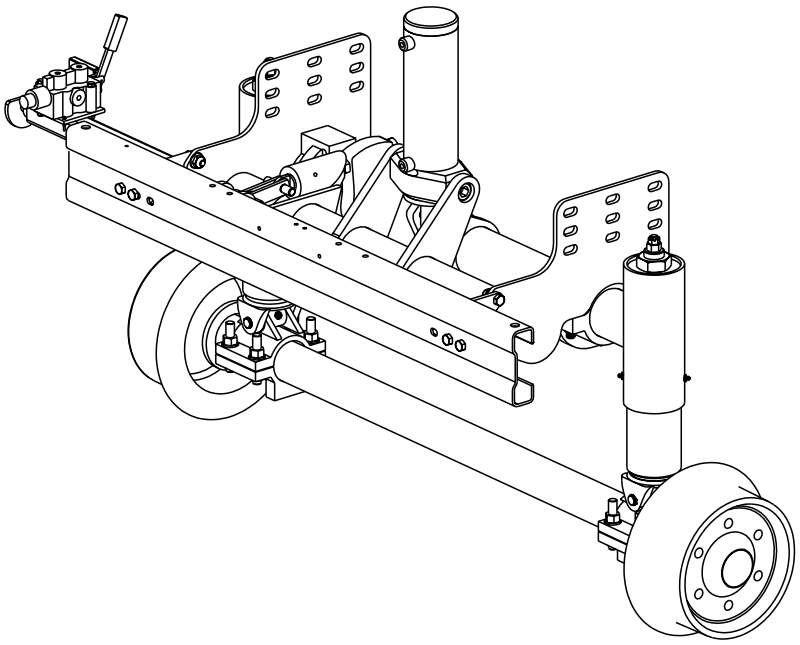

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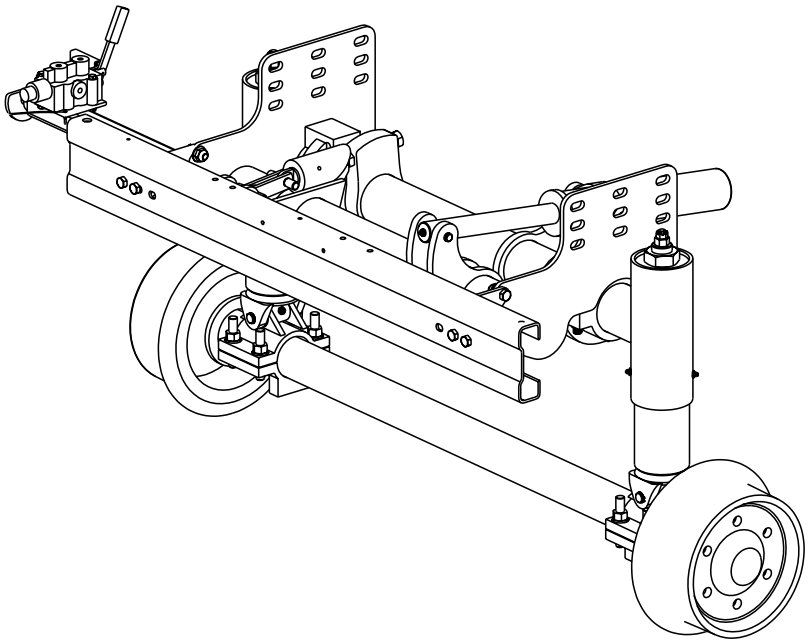
FIGURE 1-2
HR2000 SERIES A3 HY-RAIL® GUIDE WHEEL UNIT



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Description

The FAIRMONT™ HR2000 Series A2 and HR2000 Series A3 HY-RAIL® rear guide wheel equipment can be applied to the rear of various standard utility vehicles, cab chassis and pickup trucks. The vehicles G.V.W.R. (gross vehicle weight rating) and/or G.A.W.R. (gross axle weight rating) must comply with the specified limits listed in the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual. For information regarding special applications not listed in the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual, contact Harsco Track Technologies, Harsco Corporation, Fairmont, Minnesota.

See Figures 1-1 and 1-2. The HR2000 Series A2 Rear Guide Wheel Unit's raise / lower hydraulic cylinder is mounted vertical. The HR2000 Series A3 Rear Guide Wheel Unit's raise / lower hydraulic cylinder is mounted horizontal.

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 on the vehicle frame. When the vehicle is placed in the "rail" position, load bearing guide wheel assemblies guide the vehicle on the track.

The vehicle's rear wheels provide propulsion for on track operation. On track braking is provided by the vehicle's brakes. To provide additional braking force, the rear rail pilot unit may be equipped with optional air actuated tread-type composition brake shoes.

Orientation

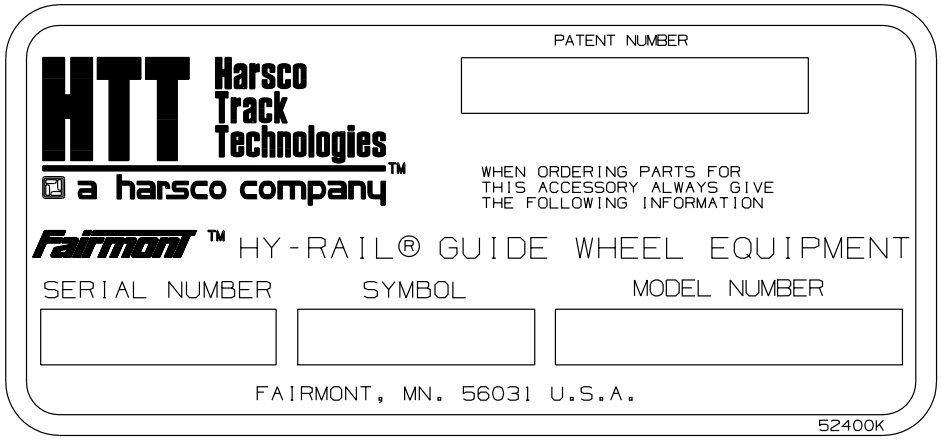
Front - rear and left - right are determined from the vehicle operator's seat.

1

Serial Numbers

When this bulletin is received, complete the following record from the serial number tag located on the 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 assembly of the unit.

FIGURE 1-3
REAR RAIL PILOT UNIT SERIAL NUMBER TAG



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Specifications

VEHICLE

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

RAIL PILOT UNITS

HR2000A2 Rear Rail Pilot Unit - Insulated 166464
(raise / lower hydraulic cylinder mounted vertical)

HR2000A2 Rear Rail Pilot Unit - Non-Insulated 168457
(raise / lower hydraulic cylinder mounted vertical)

HR2000A3 Rear Rail Pilot Unit - Insulated 169314
(raise / lower hydraulic cylinder mounted horizontal)

HR2000A3 Rear Rail Pilot Unit - Non-Insulated 169318
(raise / lower hydraulic cylinder mounted horizontal)

Track Gauge	56-1/2 in	(1435 mm)
Guide Wheels - Flange Diameter	13-1/4 in	(337 mm)
- Tread Diameter	11 in	(280 mm)
Rear Rail Pilot Unit Weight	550 lbs	(249 kg)
Maximum Load Capacity (with vehicle at curb weight)	5,000 lbs	(2268 kg)
Maximum Load Per Guide Wheel (with vehicle at curb weight)	2,750 lbs	(1134 kg)

Note: The vehicle's rear 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 wheels when on track.

SECTION 2 - OPERATION
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Towing

Speedometer

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

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 anti-lock 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:

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

Misalignment Indicators

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

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

1. Excessive flange or tread wear on any of the rail guide wheels.

2. Vehicle pulls noticeably to the left or the right during on track operation.

3. Vibration felt throughout the vehicle at various speeds during on track operation.

Placing Vehicle On Track

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

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

- **BEFORE PROPELLING VEHICLE ON THE TRACK, MAKE SURE:**
  - **FRONT AND REAR 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, THE BRAKE CONTROL VALVE IS IN THE ON POSITION AND GUIDE WHEEL BRAKE EQUIPMENT IS FUNCTIONAL.**

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

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

- **OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.**

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

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

Placing Vehicle On Track

1. Ensure that highway vehicles are not approaching the grade crossing while placing the vehicle on track. To ensure safety, flag the crossing per railroad rules and regulations.

2. At a road crossing, drive the vehicle about 25 feet (7.6 m) past the track. Back the vehicle onto the rails so that the rear vehicle wheels are centered on the rails. On vehicles with dual rear wheels, the inner dual wheels must be centered on the rails. It may be necessary to move the vehicle back and forth several times to get the wheels centered on the rail properly.

3. Place the vehicle automatic transmission in "PARK" or manual transmission in "NEUTRAL". Apply the parking brake.

4. Engage the mechanical PTO hydraulic pump or start the auxiliary hydraulic power source. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to direct hydraulic oil flow to the guide wheel equipment.

LOWERING REAR 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. On guide wheel units equipped with rail sweeps, make sure the rail sweeps are raised to the "highway" position before lowering the guide wheels to the rail. This will ensure that the rail sweeps do not become pinched between the guide wheel and the rail.

3. Remove lock pin (1). Button in "T" end of lock pin must be pushed in to remove pin.

4. Push the control valve handle (2) in to slightly raise the guide wheels. This will release any pressure on the mechanical lock mechanism.

5. Rotate and hold lock handle (3) clockwise if the control valve and lock handle are located on the left side of the vehicle or counter-clockwise if the control valve and lock handle are located on the right side of the vehicle.

6. While holding lock handle (3) in the released position, pull the control valve handle (2) out to lower the guide wheels.

7. When the guide wheels are fully lowered, release the control valve handle. Make sure the flanges on both guide wheels are engaged on the inside of the rails.

8. Rotate lock handle (3) back to the locked position. Install lock pin (1). Button in "T" end of lock pin must be pushed in to install pin.

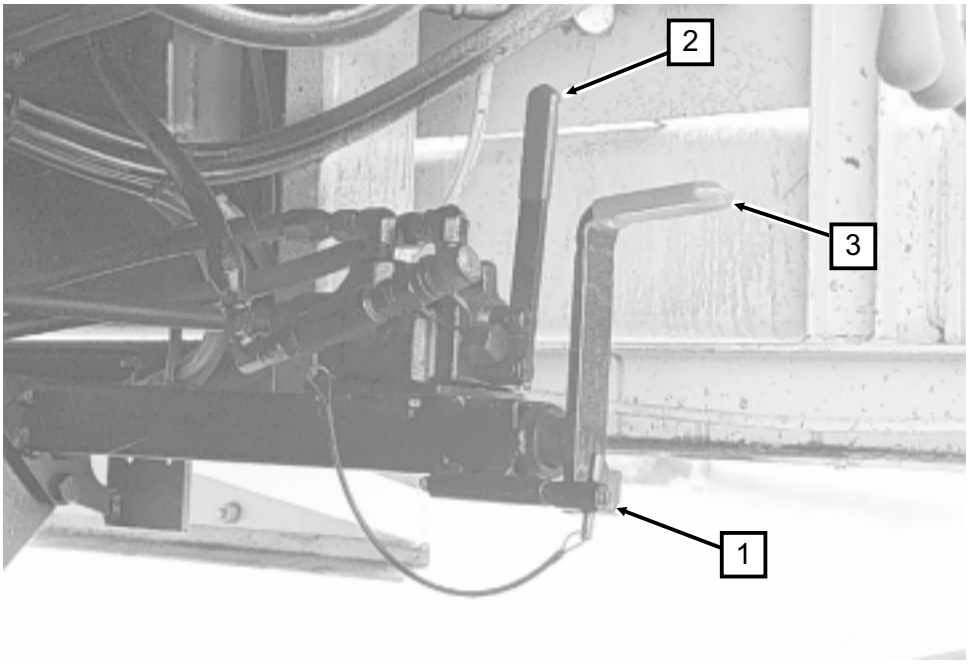
9. On guide wheel units equipped with rail sweeps, lower the rail sweeps to the "rail" position.

Placing Vehicle On Track

10. 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.

11. 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.

FIGURE 2-1
REAR RAIL PILOT UNIT



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Placing Vehicle On Track

12. 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.

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

13. 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 DISENGAGED

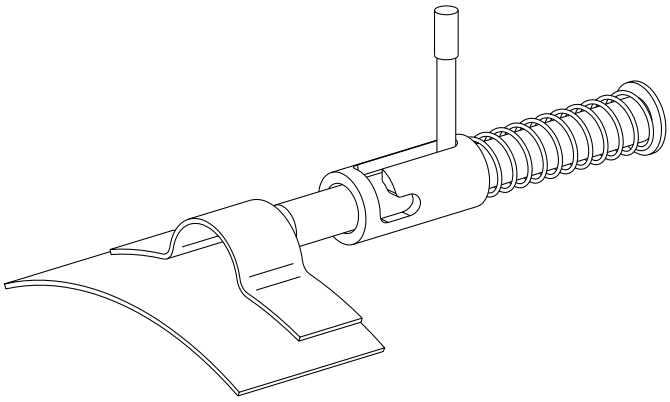

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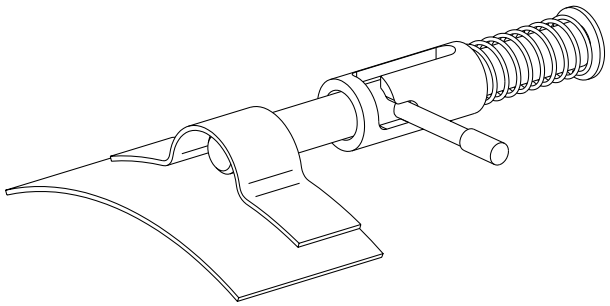
FIGURE 2-3
STEERING LOCK ENGAGED



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Guide Wheel Load On Track

- **IMPROPER LOADING OF GUIDE WHEEL EQUIPMENT CAN CAUSE DERAILMENT OF VEHICLE.**
- **ALWAYS CHECK THE GUIDE WHEEL LOAD BEFORE OPERATING A LOADED VEHICLE ON TRACK.**
- **NEVER OPERATE THE VEHICLE ON TRACK IF LOAD EXCEEDS THE MAXIMUM RATED LOAD OF THE FRONT AND/OR REAR RAIL PILOT UNITS. THE MAXIMUM LOAD ON THE REAR RAIL PILOT UNIT IS 5,000 LBS (2268 kg) OR 2,500 LBS (1134 kg) MAXIMUM PER GUIDE WHEEL.**
- **THE REAR RAIL PILOT UNIT MUST BE SET TO CARRY APPROXIMATELY 50% OF VEHICLE REAR AXLE CURB WEIGHT OR A MINIMUM OF 2500 LBS (1134 kg).**
- **NEVER OPERATE THE VEHICLE ON TRACK IF CLEARANCE BETWEEN VEHICLE FRONT TIRES AND THE 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 5,000 lbs (2268 kg) or 2,500 lbs (1134 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

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 2-5 to convert dimension (L) to the load on the guide wheel.

3. The maximum rated load on the rear rail pilot unit is 5,000 lbs (2268 kg) or 2,500 lbs (1134 kg) maximum per guide wheel. The rear rail pilot unit spring cells are adjustable. See the Adjustment Section - Guide Wheel Load for the adjustment procedure. If the load exceeds the maximum rated load capacity of the rear rail pilot unit or the maximum rated load capacity of either guide wheel, the load must be redistributed or some of the load removed. Never operate the vehicle on track if the load on the rear rail pilot unit exceeds the maximum rated load capacity.

FIGURE 2-4
REAR SPRING CELL

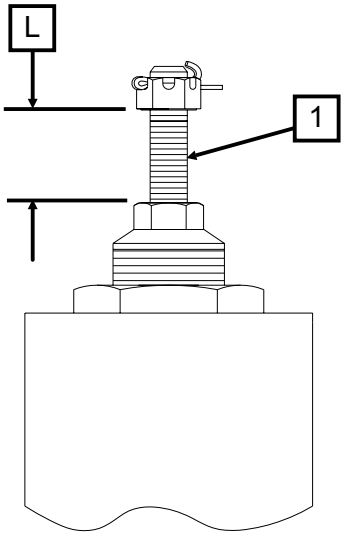

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CHART 2-5
REAR GUIDE WHEEL LOAD

DIMENSION (L)		APPROXIMATE LOAD PER SIDE	
1/4"	(6.4 mm)	275 lbs	(125 kg)
1/2"	(12.7 mm)	400 lbs	(181 kg)
3/4"	(19.0 mm)	525 lbs	(238 kg)
1"	(25.4 mm)	650 lbs	(295 kg)
1-1/4"	(31.8 mm)	775 lbs	(352 kg)
1-1/2"	(38.1 mm)	945 lbs	(429 kg)
1-3/4"	(44.5 mm)	1155 lbs	(524 kg)
2"	(50.8 mm)	1370 lbs	(621 kg)
2-1/4"	(57.2 mm)	1581 lbs	(717 kg)
2-1/2"	(63.5 mm)	1795 lbs	(814 kg)
2-3/4"	(69.9 mm)	2005 lbs	(909 kg)
3"	(76.2 mm)	2220 lbs	(1007 kg)
3-1/4"	(82.6 mm)	2430 lbs	(1102 kg)
*** 3-1/2"**	**(88.9 mm)**	**2645 lbs**	**(1200 kg)**

*** REAR GUIDE WHEEL IS OVERLOADED. REDISTRIBUTE OR REMOVE SOME OF THE LOAD. MAXIMUM LOAD ON REAR RAIL PILOT UNIT MUST NOT EXCEED 5,000 LBS (2268 kg) OR 2,500 LBS (1134 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

- **IMPROPER LOADING OF HY-RAIL® EQUIPPED VEHICLE CAN CAUSE DERAILMENT OF VEHICLE.**

- **ALWAYS CHECK GUIDE WHEEL LOAD BEFORE OPERATING THE VEHICLE ON TRACK.**

- **NEVER OPERATE VEHICLE ON TRACK IF LOAD EXCEEDS MAXIMUM RATED LOAD 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 35 MPH (56 km/h) WHEN OPERATING VEHICLE ON TRACK. RAILROAD RULES GOVERNING SPEEDS SHOULD BE OBSERVED AT ALL TIMES. REDUCE SPEED WHEN PROPELLING VEHICLE THROUGH SWITCHES, ROAD CROSSINGS, BRANCH LINES AND ANY SPECIAL TRACK WORKS. OPERATING VEHICLE AT UNSAFE SPEEDS COULD RESULT IN DERAILMENT OF THE VEHICLE.**
  - **STEERING LOCK MUST BE ENGAGED AT ALL TIMES WHEN OPERATING VEHICLE ON TRACK.**
  - **IF THE VEHICLE IS EQUIPPED WITH A STROBE LIGHT (BEACON) AND RAILROAD RULES AND REGULATIONS REQUIRE ITS USE, THE STROBE LIGHT (BEACON) MUST BE ILLUMINATED WHEN OPERATING THE VEHICLE ON TRACK.**

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

Vehicles equipped with the HR2000 Series A HY-RAIL® Guide Wheel Equipment use the vehicle propulsion system to propel on track. Do not accelerate suddenly. Traction is reduced on rail. Spinning the vehicle tires could damage them.

Braking On Track

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

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

The HR2000 Series A HY-RAIL® Guide Wheel Equipment may be equipped with brakes. If the rail pilot unit is equipped with brakes, the vehicle uses a combination of the front and/or rear rail pilot unit brakes and the vehicle's brake system for braking on track. The front and/or rear 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

- **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 THE HIGHWAY POSITION, AND SECURED WITH THE LOCK PINS.**
  - **STEERING WHEEL LOCK IS DISENGAGED.**

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

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

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

1. Ensure that highway vehicles are not approaching the grade crossing while removing the vehicle from 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.

RAISING REAR RAIL PILOT UNIT - See Figure 2-1

1. Remove lock pin (1).

2. Push the control valve handle (2) in to slightly raise the guide wheels. This will release any pressure on the mechanical lock mechanism.

3. Rotate and hold lock handle (3) clockwise if the control valve and lock handle are located on the left side of the vehicle or counter-clockwise if the control valve and lock handle are located on the right side of the vehicle.

4. While holding lock handle (3) in the released position, pull the control valve handle (2) out to raise the guide wheels.

5. When the guide wheels are fully raised, release the control valve handle.

6. Rotate lock handle (3) back to the locked position. Install lock pin (1).

7. Stop the auxiliary hydraulic power source or disengage the mechanical PTO hydraulic pump. If the vehicle is equipped with an auxiliary control valve, place the valve in the proper position to shut off hydraulic oil flow to the guide wheel equipment.

8. See Figures 2-2 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

- **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 INSIDE OF RAILS.**
  - **IF APPLICABLE, FRONT TIRES MUST BE RAISED A MINIMUM OF 1-1/2" (38 mm) ABOVE THE RAIL AND LOCKED.**
  - **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

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. If applicable, front tires are raised a minimum of 1-1/2" (38 mm) above the rail and locked.
   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.**
  - **IF SO EQUIPPED, FRONT AXLE LOCKS MUST BE FULLY DISENGAGED FROM VEHICLE FRONT AXLE.**
  - **VEHICLE STEERING WHEEL LOCK DISENGAGED.**

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

Towing Trailer / Equipment With Vehicle On Road

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

- **OBSERVE AND FOLLOW ALL FEDERAL, STATE AND LOCAL DRIVING RULES AND REGULATIONS.**

- **STATE LAWS MAY REQUIRE TOWING VEHICLE AND TRAILER / EQUIPMENT BEING TOWED TO BE EQUIPPED WITH SPECIAL SAFETY EQUIPMENT (MIRRORS ON BOTH SIDES OF TOWING VEHICLE, TRAILER BRAKES, TRAILER LIGHTS, ETC.).**

- **CAREFULLY AND THOROUGHLY PREPARE YOUR VEHICLE FOR TOWING, MAKING SURE TO USE THE RIGHT TOWING EQUIPMENT AND TO ATTACH IT PROPERLY.**

- **TOWING EQUIPMENT (HITCHES, TOW BARS, ETC.) MUST BE ATTACHED TO VEHICLE FRAME. DO NOT MOUNT OR ATTACH TOWING EQUIPMENT TO VEHICLE'S GUIDE WHEEL EQUIPMENT.**

- **TOWING EQUIPMENT (HITCH, TOW BAR, ETC.) MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN WEIGHT OF TRAILER / EQUIPMENT BEING TOWED.**

- **ALWAYS CHOCK TRAILER WHEELS BEFORE UNHOOKING TRAILER FROM TOWING VEHICLE.**

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

Towing Trailer / Equipment With Vehicle On Road

1. See your vehicle's operators manual for towing information.

2. Use the vehicle manufacturer's recommendations to determine the maximum weight the towing vehicle can tow. Do not exceed vehicle manufacturer's maximum rated towing capacity.

3. The towing vehicle must have an adequate brake system to safely decelerate and stop the towing vehicle and the trailer / equipment being towed. Towing trailer / equipment lengthens stopping distances. Allow adequate distance for stopping. Anticipate stops so that you can brake gradually.

4. Make sure that the vehicle's:
   a. Front and rear rail pilot units are raised and locked in the highway position.
   b. If so equipped, front axle locks must be fully disengaged from the vehicle front axle.
   c. Vehicle steering wheel lock is disengaged on the steering column.

5. Make sure the towing vehicle and the trailer / equipment are in good working condition (tires, brakes, lights, etc.) and that current maintenance has been performed on the vehicle and trailer / equipment.

6. The towing equipment (hitches, tow bars, etc.) on the towing vehicle must have a rating equal to or greater than the weight of the trailer / equipment being towed.

7. The towing equipment (hitches, tow bars, etc.) must be attached to the towing vehicle frame. Do not mount or attach the towing equipment to the vehicle's guide wheel equipment.

8. Observe and follow all federal, state and local driving rules, regulations and laws.

9. State laws may require the towing vehicle and/or the trailer / equipment being towed to be equipped with special safety equipment (mirrors on both sides of the towing vehicle, trailer brakes, trailer lights, etc.).

10. Tow the trailer / equipment on the road at a reasonable speed taking into account road conditions, road grade, weather, visibility and stopping distance to assure safe operation. Always observe posted speed limits.

11. Always chock the trailer wheels before unhooking the trailer from the towing vehicle.

Towing Disabled Vehicle On Track

- **TOWING VEHICLE / MACHINE MUST WEIGH AS MUCH OR MORE THAN DISABLED VEHICLE BEING TOWED.**

- **VEHICLE / MACHINE USED FOR TOWING MUST HAVE AN ADEQUATE BRAKE SYSTEM TO SAFELY DECELERATE AND STOP TOWING VEHICLE / MACHINE AND DISABLED VEHICLE BEING TOWED.**

- **TOWING DISABLED VEHICLE LENGTHENS STOPPING DISTANCES. ALLOW ADEQUATE DISTANCE FOR STOPPING. ANTICIPATE STOPS SO YOU CAN BRAKE GRADUALLY.**

- **TOW DISABLED VEHICLE AT A REASONABLE SPEED (10 MPH MAXIMUM) TAKING INTO ACCOUNT TRACK CONDITIONS, TRACK GRADE, WEATHER, VISIBILITY AND STOPPING DISTANCE TO ASSURE SAFE OPERATION. RAILROAD RULES GOVERNING SPEED LIMITS AND RIGHT OF WAY SHOULD BE OBSERVED AT ALL TIMES.**

- **STOPPING DISTANCE IS GREATER ON TRACK THAN ON TYPICAL ROAD SURFACES. APPLY BRAKES GRADUALLY TO AVOID SLIDING TOWING VEHICLE / MACHINE WHEELS.**

- **MAKE SURE THAT DISABLED VEHICLE'S:**
  - **FRONT AND REAR RAIL PILOT UNITS ARE LOWERED AND LOCKED IN RAIL POSITION.**
  - **ALL RAIL GUIDE WHEEL FLANGES ARE ENGAGED ON INSIDE OF RAILS.**
  - **IF APPLICABLE, FRONT TIRES ARE RAISED A MINIMUM OF 1-1/2" (38 mm) ABOVE RAIL AND LOCKED.**
  - **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

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. If applicable, front tires are raised a minimum of 1-1/2" (38 mm) above the rail and locked.
   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.**
  - **IF SO EQUIPPED, FRONT AXLE LOCKS MUST BE FULLY DISENGAGED FROM VEHICLE FRONT AXLE.**
  - **VEHICLE STEERING WHEEL LOCK DISENGAGED.**

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

- **TOWING EQUIPMENT (TOW TRUCK, TOW BARS, ETC.) MUST BE ATTACHED TO DISABLED VEHICLE'S FRAME. DO NOT MOUNT OR ATTACH TOWING EQUIPMENT TO DISABLED VEHICLE'S GUIDE WHEEL EQUIPMENT.**

- **TOWING EQUIPMENT (TOW TRUCK, TOW BARS, ETC.) MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN WEIGHT OF DISABLED VEHICLE BEING TOWED.**

- **OBSERVE AND FOLLOW ALL FEDERAL, STATE AND LOCAL DRIVING RULES AND REGULATIONS.**

- **STATE LAWS MAY REQUIRE TOWING VEHICLE AND DISABLED VEHICLE TO BE EQUIPPED WITH SPECIAL SAFETY EQUIPMENT (LIGHTS, ETC.).**

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

Towing Disabled Vehicle On Road

1. See your vehicle's operators manual for towing information.

2. The towing vehicle must have an adequate brake system to safely decelerate and stop the towing vehicle and the disabled vehicle being towed.

3. Make sure that the disabled vehicle's:
   a. Front and rear rail pilot units are raised and locked in the highway position.
   b. If so equipped, front axle locks are fully disengaged from the vehicle front axle.
   c. 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
TABLE OF CONTENTS

Guide Wheel Equipment Alignment Procedure

Adjustments

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.**

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

  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 Section - Misalignment Indicators.

See the Operator's Service And Parts Manual provided with the front rail pilot unit for the proper alignment procedure for the front rail pilot unit.

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 being mounted on is equipped correctly (springs, tires, wheels, etc.). See the Harsco Track Technologies HY-RAIL® Vehicle Specifications Manual.

Guide Wheel Equipment Alignment Procedure

VEHICLE CHECK

7. Check the following measurements on the vehicle that the guide wheel equipment is to be mounted on before applying the guide wheel equipment to the vehicle.

   a. Frame must be square. Diagonal measurements of the frame should be equal within 1/8 inch (3.2 mm).

   b. Wheelbase (as measured on each side) must be equal within 1/16 inch (1.8 mm).

   c. Vehicle axles must be square with the frame within 1/64 inch per foot (.4 mm per 304 mm). Harsco Track Technologies, Harsco Corporation recommends that this be checked by a reputable alignment shop.

8. Follow the mounting instructions on the application drawings which are supplied with each Guide Wheel Equipment Group.

9. After mounting the guide wheel equipment to the vehicle, have the front wheels of the vehicle checked for caster, camber, and toe-in as recommended by the vehicle manufacturer.

PLACING VEHICLE ON TRACK

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

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

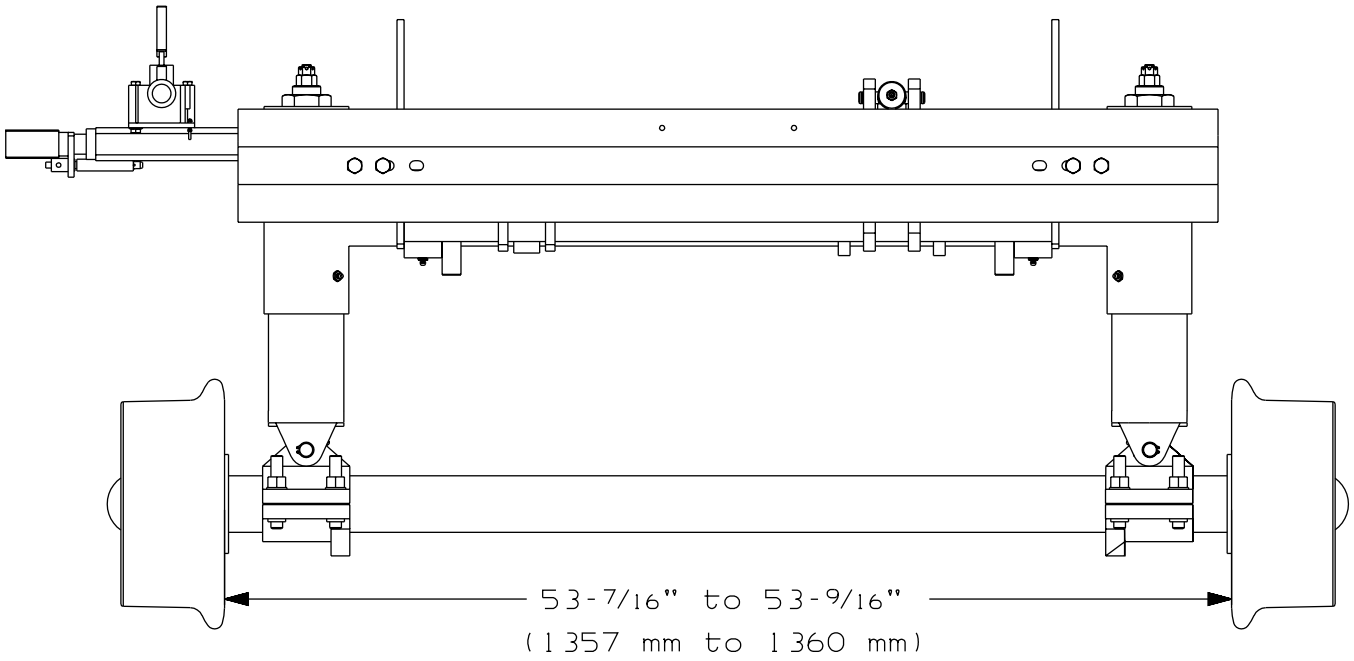
11. Lower and lock both rail pilot units in the "rail" position. See Operation Section - Placing Vehicle On Track. Set the vehicle wheels straight ahead. Secure the vehicle steering wheel using the steering lock.

Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL TRACK GAUGE - See Figure 3-1

12. Measure the track gauge of the rear rail pilot unit. 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 53-7/16 to 53-9/16 inches (1357 mm to 1360 mm). The rear rail pilot unit track gauge is preset at the factory and is non-adjustable.

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

13. The rear rail pilot unit is equipped with two adjustable spring cells. The rear rail pilot unit is initially adjusted to carry approximately 1/2 of the vehicle's rear axle curb weight or a minimum of 1550 lbs (703 kg). The remainder of the weight is carried by the inner dual wheels 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 5,000 lbs (2268 kg) or 2,500 lbs (1134 kg) maximum per guide wheel.

14. See Figure 3-2. 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 3-3 to convert dimension (L) to the load on the guide wheel.

FIGURE 3-2
REAR SPRING CELL

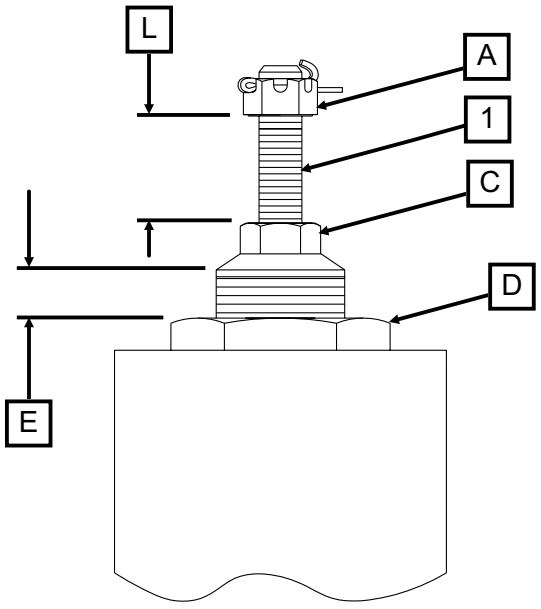

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CHART 3-3
REAR GUIDE WHEEL LOAD

DIMENSION (L)		APPROXIMATE LOAD PER SIDE	
1/4"	(6.4 mm)	275 lbs	(125 kg)
1/2"	(12.7 mm)	400 lbs	(181 kg)
3/4"	(19.0 mm)	525 lbs	(238 kg)
1"	(25.4 mm)	650 lbs	(295 kg)
1-1/4"	(31.8 mm)	775 lbs	(352 kg)
1-1/2"	(38.1 mm)	945 lbs	(429 kg)
1-3/4"	(44.5 mm)	1155 lbs	(524 kg)
2"	(50.8 mm)	1370 lbs	(621 kg)
2-1/4"	(57.2 mm)	1581 lbs	(717 kg)
2-1/2"	(63.5 mm)	1795 lbs	(814 kg)
2-3/4"	(69.9 mm)	2005 lbs	(909 kg)
3"	(76.2 mm)	2220 lbs	(1007 kg)
3-1/4"	(82.6 mm)	2430 lbs	(1102 kg)
*** 3-1/2"**	**(88.9 mm)**	**2645 lbs**	**(1200 kg)**

* **REAR GUIDE WHEEL IS OVERLOADED. REDISTRIBUTE OR REMOVE SOME OF THE LOAD. MAXIMUM LOAD ON REAR RAIL PILOT UNIT MUST NOT EXCEED 5,000 LBS (2268 kg) OR 2,500 LBS (1134 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 modifying the vehicle suspension by adding 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

GUIDE WHEEL LOAD

Adjusting Rear Guide Wheel Load - See Figure 3-2 and Chart 3-3

a. The recommended rear rail pilot unit load setting is approximately 1/2 of the vehicle rear axle weight or 1550 lbs (703 kg) minimum.

b. To calculate the load setting for each rear spring cell, use the following formula:

   Vehicle Rear Axle Weight x 25 % (0.25) = Spring Cell Load

c. Convert the calculated spring cell load into dimension (L). See Rear Guide Wheel Load Chart 3-4. If the calculated spring cell load (dimension L) is less than 1 inch (25.4 mm), the spring cell (dimension L) must be set to a minimum of 1 inch (25.4 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 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 necessary. 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 castle 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 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.

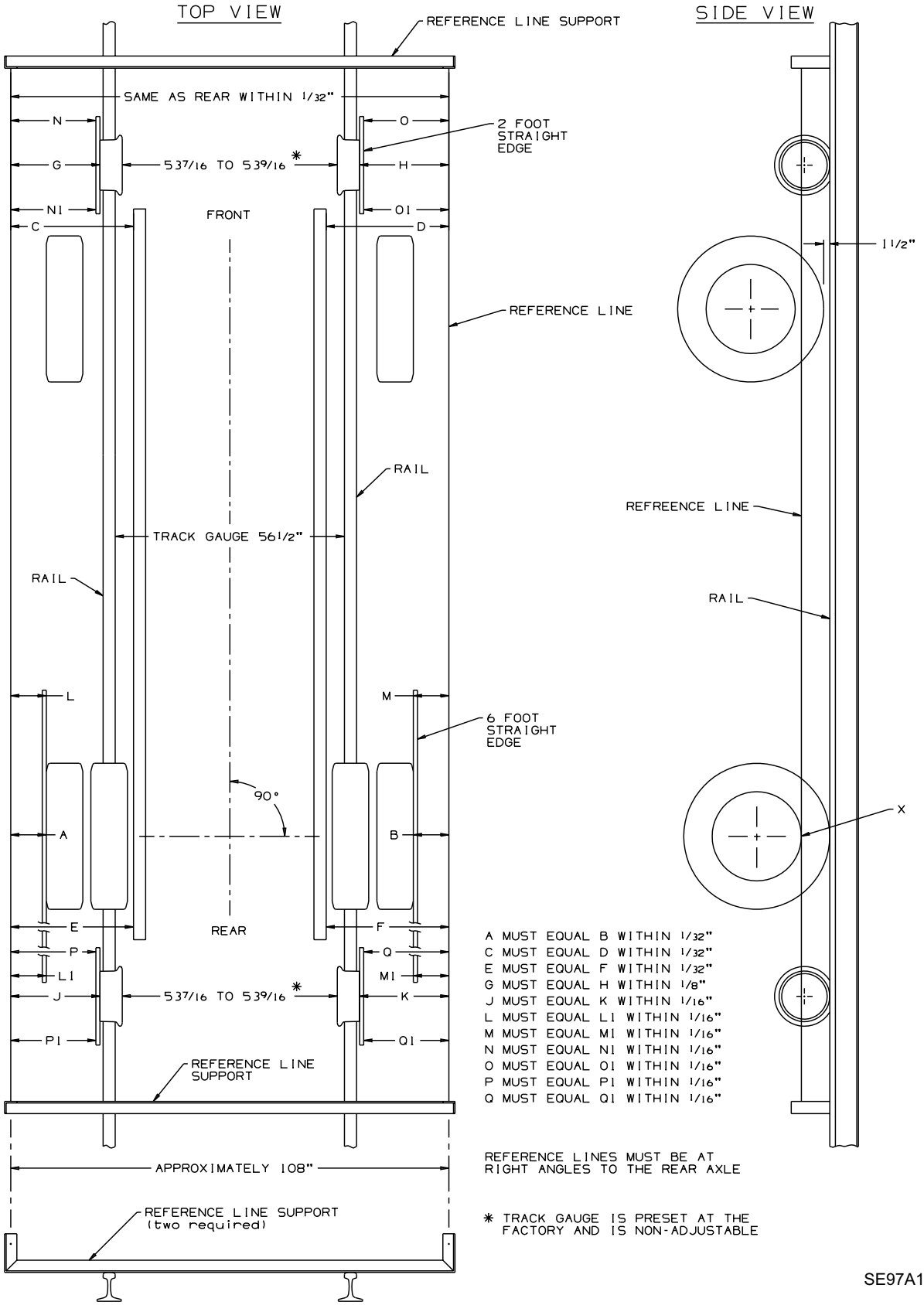
i. Lower and lock the rear rail pilot unit in the "rail" position. Re-measure dimension (L). See Rear Guide Wheel Load Chart 3-3 to convert dimension (L) to the load on the guide wheel.

j. Repeat Steps h and i until dimension (L) corresponds to the calculated load or 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



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Guide Wheel Equipment Alignment Procedure

STRING LINING SET-UP - See Figure 3-4

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

a. The guide wheel equipment is installed on the vehicle.
b. Any adjustments are made to the guide wheel equipment.
c. The load on the vehicle is changed.
d. Periodically to ensure that the vehicle is tracking properly.

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 reference lines are in line with the bottom edge of the vehicle's rear rims (point X) 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 reference line is level with the bottom edge of the rear vehicle wheel rim(s) (point X). 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 1/32 inch (.8 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 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)] ÷ 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 1/16 inch (1.6 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 help ensure correct alignment.

22. Take measurements G and H on the front rail pilot unit, J and K on the rear rail pilot unit. Measure from the outer edge of the guide wheels, directly below the center line of the wheel spindle, to the reference lines. Measurements G, H, J, & K must all be equal or within 1/16 inch (1.6 mm). If not, see Adjustment.

Adjustment - See Figures 3-4 and 3-5

a. Unlock the front or rear rail pilot unit from the "rail" position. Let the guide wheels rest on the rails.

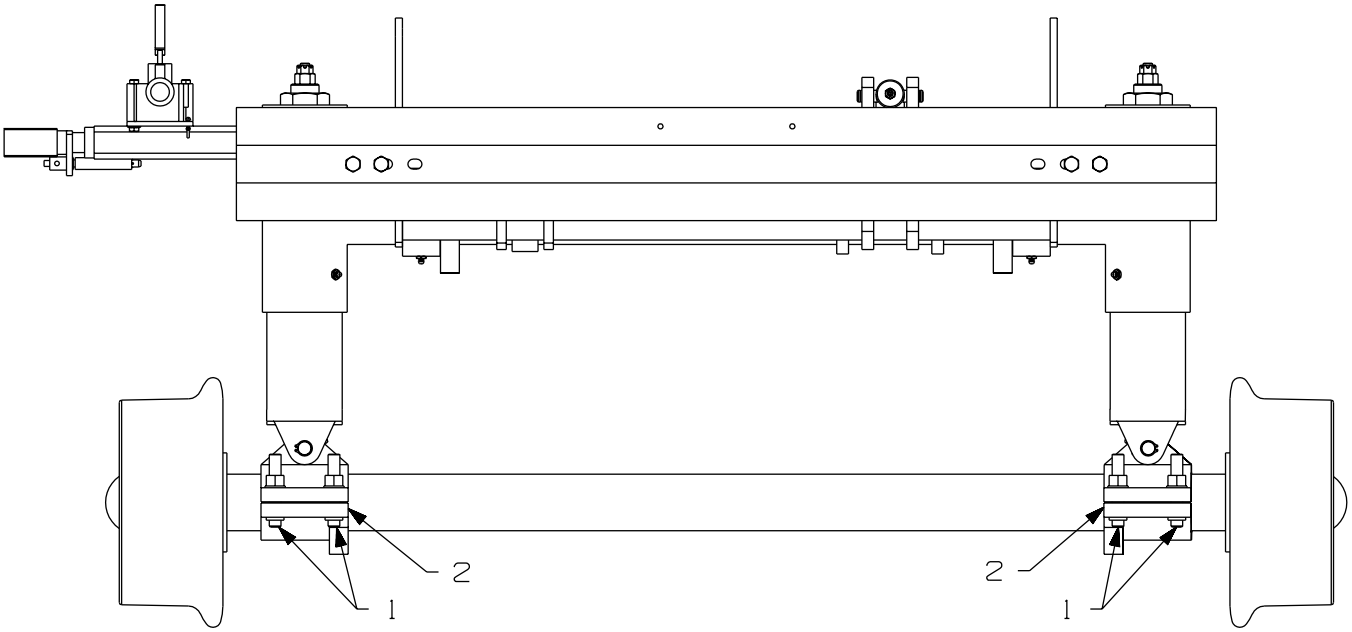
b. Loosen the eight 5/8 inch socket head cap screws (1) that secure the axle in the axle clamps (2). Shift the axle and guide wheels until measurements G, H, J and K are equal. Re-tighten and torque the eight cap screws (1) to 213 ft. lbs.

c. Lower and lock the rail pilot unit in the "rail" position. Recheck measurements G, H, J and K. Repeat the adjustment procedure until measurements G, H, J, & K are equal or within 1/16 inch (1.6 mm).

Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL ALIGNMENT - Continued

FIGURE 3-5
RAIL PILOT UNIT ALIGNMENT



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Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL ALIGNMENT - See Figures 3-4 and 3-6

23. Hold a two foot long straight edge against the outer edge of the guide wheel. Check the dimensions N and N1, O and O1, P and P1, and Q and Q1 as shown in Figure 3-6. These dimensions must be equal or within 1/16 inch (1.6 mm). If not, see Adjustment.

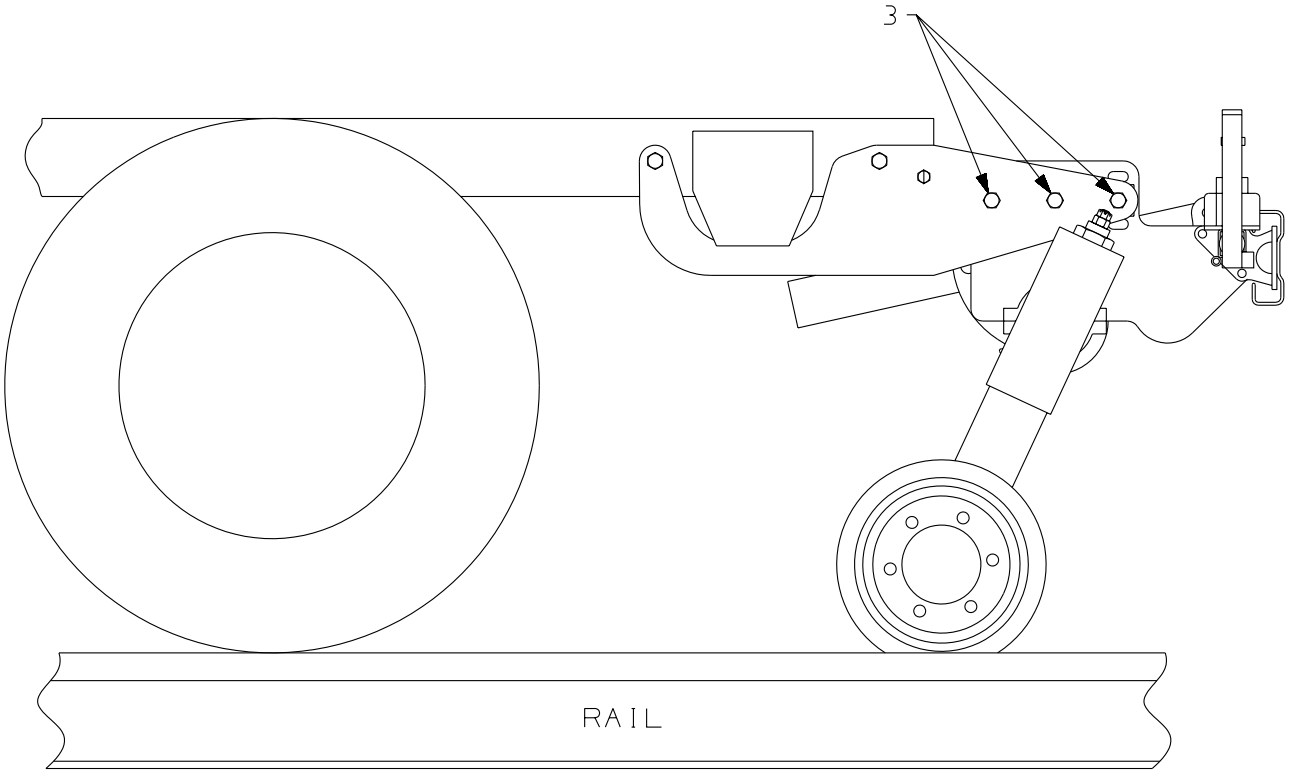
Adjustment - See Figures 3-4 and 3-6

a. Unlock the front or rear rail pilot unit from the "rail" position. Let the guide wheels rest on the rails.

b. Loosen the six cap screws and nuts (3). Shift the rail pilot unit until the dimensions are equal or within 1/16 inch (1.6 mm). Re-tighten and torque the six cap screws and nuts (3) to the torque specifications shown in the Appendices Section of this manual.

c. Lower and lock the rail pilot unit in the "rail" position. Recheck measurements N and N1, O and O1, P and P1, and Q and Q1. Repeat the adjustment procedure until the measurements are equal or within 1/16 inch (1.6 mm).

FIGURE 3-6
RAIL PILOT UNIT ALIGNMENT



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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.**

24. Harsco Track Technologies recommends that all HY-RAIL® equipped vehicles be track tested. The vehicle should be at its normal operating load for track testing. The vehicle should be track tested when:
    a. The guide wheel equipment is installed on the vehicle.
    b. Any adjustments are made to the guide wheel equipment.
    c. The load on the vehicle is changed.
    d. Periodically to ensure that the vehicle is tracking properly.

25. The vehicle must be placed on straight, level, tangent track. See Operation Section - Placing Vehicle On Track.

26. Apply spray paint to the flanges and treads of all guide wheels.

27. Lower and lock both rail pilot units in the "rail" position.

28. Operate the vehicle for a short distance at a normal operating speed.

29. 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.

30. If the paint wore off the right rear guide wheel flange and not off the left rear guide wheel flange, the guide wheel unit is "flanging right".

    a. Unlock and lower the rear of the vehicle from the "rail" position. Let the guide wheels rest on the rail. Support the guide wheel unit. Loosen the mounting bolts and slightly move the right side of the guide wheel unit forward or the left side of the guide wheel unit slightly rearward. Torque the mounting bolts to the torque specifications shown in the Appendices Section of this manual.

    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 rear guide wheel flange and not off the left rear guide wheel flange, repeat Steps a. & b. If the guide wheel unit is adjusted to the limit of the mounting hole slots, go to Step 33.

Guide Wheel Equipment Alignment Procedure

VEHICLE TRACK TEST

31. If the paint wore off the left rear guide wheel flange and not off the right rear guide wheel flange, the guide wheel unit is "flanging left".

    a. Unlock and lower the rear of the vehicle from the "rail" position. Let the guide wheels rest on the rail. Support the guide wheel unit. Loosen the mounting bolts and slightly move the left side of the guide wheel unit forward or the right side of the guide wheel unit slightly rearward. Torque the mounting bolts to the torque specifications shown in the Appendices Section of this manual.

    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 rear guide wheel flange and not off the right rear guide wheel flange, repeat Steps a. & b. If the guide wheel unit is adjusted to the limit of the mounting hole slots, go to Step 33.

Guide Wheel Equipment Alignment Procedure

VEHICLE TRACK TEST - Continued

32. 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.

33. If the vehicle continues to track improperly, repeat the String Lining and Guide Wheel Alignment Procedure.

Adjustments

GUIDE WHEEL UNIT STOP ADJUSTMENT - RAIL POSITION

1. The vehicle must be on level track. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Lower and lock both rail pilot units in the "rail" position. See Operation Section - Placing Vehicle On Track.

2. The rear rail pilot unit spring cell suspension tubes must be perpendicular (90 degrees or as close as possible to 90 degrees) to the rail when the vehicle is in the "rail" position. Proper adjustment of the spring cell tubes will allow the spring cell suspension to operate correctly. A bubble level placed against the front or rear of the spring cell suspension tube can be used to check this. If the spring cell suspension tubes are not perpendicular (90 degrees) to the rail, see Adjustment.

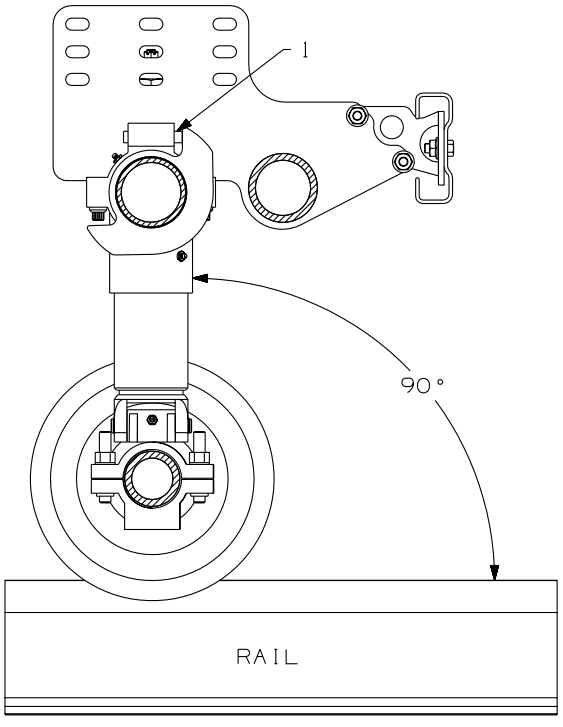
Adjustment - See Figure 3-7

3. Determine the approximate amount of adjustment required. Unlock and raise the rail pilot unit from the "rail" position. Let the guide wheels rest on the rails.

4. Turn adjusting screw (1) clockwise or counter-clockwise as needed. Lower and lock the rail pilot unit in the "rail" position.

5. Using the bubble level, re-check the spring cell suspension tube to rail position (90 degrees). If necessary, repeat Steps 3 and 4 until the rail pilot unit spring cell suspension tubes are perpendicular (90 degrees or as close as possible to 90 degrees) to the rail.

FIGURE 3-7
STOP ADJUSTMENT - RAIL POSITION



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Adjustments

GUIDE WHEEL UNIT STOP ADJUSTMENT - HIGHWAY POSITION

1. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake.

2. To allow for ground clearance, the rear rail pilot unit's spring cell suspension tubes should be adjusted to approximately parallel to the ground surface. If adjustment to the position of the rail pilot unit when in the "highway" position is desired, see Adjustment.

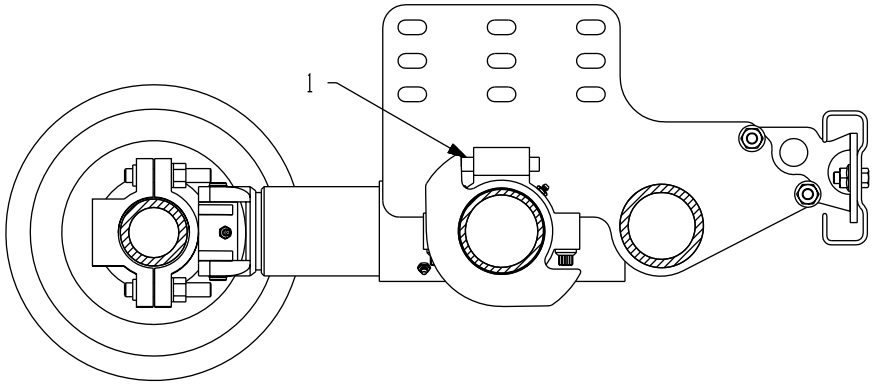
Adjustment - See Figure 3-8

3. Determine the approximate amount of adjustment required. Unlock and lower the rail pilot unit from the "highway" position. Let the guide wheels rest on the ground.

4. Turn adjusting screw (1) clockwise or counter-clockwise as needed. Raise and lock the rail pilot unit in the "highway" position.

5. Re-check the guide wheel to ground surface clearance. Repeat Steps 3 and 4 until the desired guide wheel to ground surface clearance is achieved.

FIGURE 3-8
STOP ADJUSTMENT - HIGHWAY POSITION



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Adjustments

LOCK ADJUSTMENT - RAIL POSITION

1. *Note: The vehicle must be on level track.* Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Lower and lock both rail pilot units in the "rail" position. See Operation Section - Placing Vehicle On Track.

2. Before adjusting the locking mechanism, make sure the spring cell suspension tubes are perpendicular (90 degrees or as close as possible to 90 degrees) to the rail.

3. The locking mechanism must be fully engaged so the "T" lock pin can be inserted to secure the lock lever in the "locked" position. Also, with the lock lever fully engaged, lock bar (1) must be tight against the head of stop bolt (2). If not, see Adjustment.

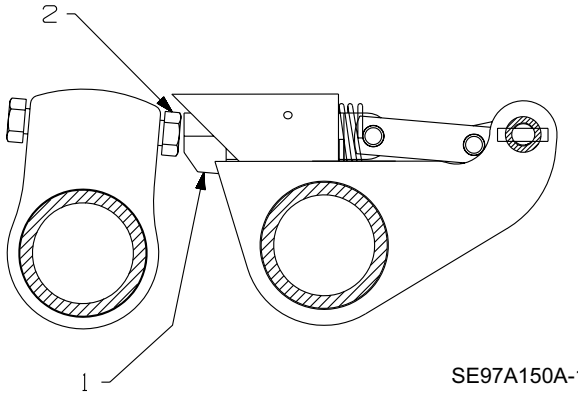
Adjustment - See Figure 3-9

4. Determine the approximate amount of adjustment required. Unlock and raise the rail pilot unit from the "rail" position. Let the guide wheels rest on the rails.

5. Adjust stop bolt (2) so it will be tight against lock bar (1) and the "T" lock pin can also be inserted to secure the lock lever in the "locked" position. Lower and lock the rail pilot unit in the "rail" position.

6. Re-check the lock engagement. If necessary, repeat Steps 4 and 5 until the lock mechanism is adjusted correctly.

FIGURE 3-9
LOCK ADJUSTMENT - RAIL POSITION



Adjustments

LOCK ADJUSTMENT - HIGHWAY POSITION

1. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake.

2. Before adjusting the locking mechanism, make sure the guide wheel unit is fully raised to the desired position. See Guide Wheel Unit Stop Adjustment - Highway Position.

3. The locking mechanism must be fully engaged so the "T" lock pin can be inserted to secure the lock lever in the "locked" position. Also, with the lock lever fully engaged, lock bar (1) must be tight against the head of stop bolt (2). If not, see Adjustment.

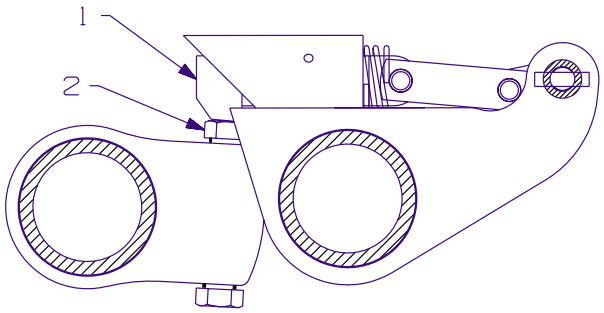
Adjustment - See Figure 3-10

4. Determine the approximate amount of adjustment required. Unlock and lower the rail pilot unit from the "highway" position. Let the guide wheels rest on the rails.

5. Adjust stop bolt (2) so it will be tight against lock bar (1) and the "T" lock pin can also be inserted to secure the lock lever in the "locked" position. Raise and lock the rail pilot unit in the "highway" position.

6. Re-check the lock engagement. If necessary, repeat Steps 4 and 5 until the lock mechanism is adjusted correctly.

FIGURE 3-10
LOCK ADJUSTMENT
HIGHWAY POSITION



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Adjustments

BRAKE SHOE CLEARANCE

1. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Be sure the vehicle air brake system or the optional Electrical / Air Brake Group is at operating pressure to fully release the guide wheel brakes. Move the rail wheel brake control valve to the On position.

2. Measure the clearance between the brake shoe and the guide wheel tread. The clearance must not exceed 1/8 inch (3.2 mm), or adjustment is required. See Adjustment.

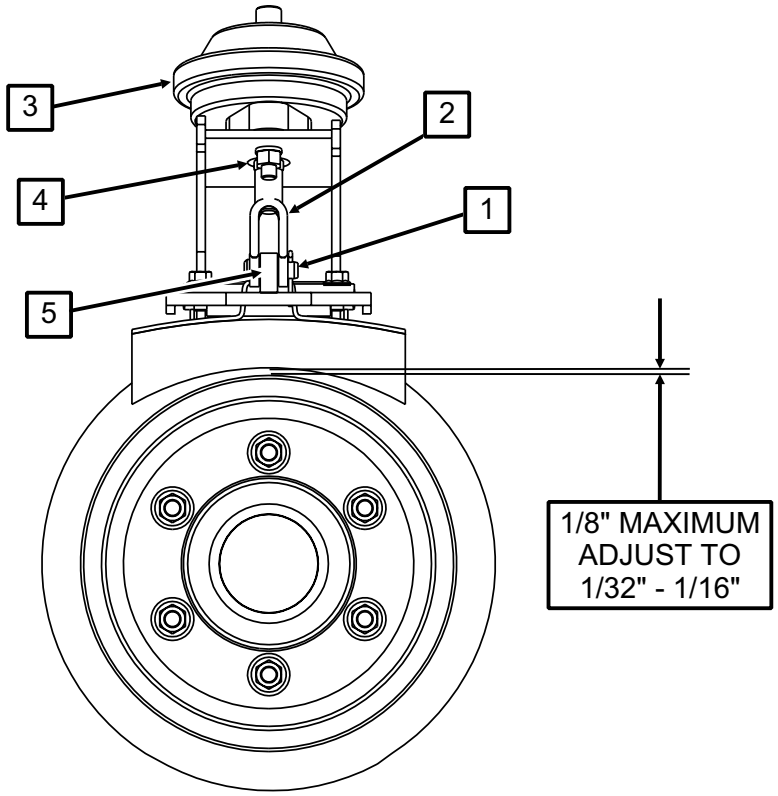
3. Repeat Step 2 to check the brake shoe clearance on the other guide wheel brake.

Adjustment - See Figure 3-11

4. Remove the cotter pin from the pin (1). Remove the pin (1) from the yoke (2) on the brake actuator (3). Loosen jam nut (4) and turn yoke (2) counter-clockwise to adjust the brake shoe closer to the guide wheel tread or clockwise to adjust the brake shoe away from the guide wheel tread. Adjust so the brake shoe is 1/32 - 1/16 inch (.8 - 1.6 mm) away from the guide wheel tread. Install the pin (1) through the yoke (2) and brake arm (5) and secure using the cotter pin. Tighten jam nut (4) securely. Recheck the brake shoe clearance.

5. Repeat the procedure to adjust the brake shoe clearance on the other guide wheel brake.

FIGURE 3-11
BRAKE SHOE CLEARANCE



Adjustments

BRAKE AIR PRESSURE REGULATOR VALVE - See Figure 3-12

Vehicles that are not equipped with an air brake system from the vehicle manufacturer must be equipped with an auxiliary air system such as Harsco Track Technologies 163987 Electric Air Brake System. Any air supply system that is used must have an air regulator valve installed in the air system to regulate the air pressure to the rail guide wheel brakes.

1. Place the vehicle on track. Apply the vehicle's parking brake. Place the vehicle's automatic transmission in "Park" or manual transmission in "Neutral". Leave the vehicle's engine operating. Activate the rail guide wheel air brake system by moving the toggle switch to the ON position. Be sure the air brake system is at operating pressure.

2. Initially adjust the air regulator valve (1) until 25 PSI (172 kPa) is indicated on the air pressure gauge (2). To adjust the regulator valve, loosen jam nut (3). Turn the adjusting handle (4) clockwise to increase pressure or counter-clockwise to decrease pressure. After this initial adjustment, tighten the jam nut securely.

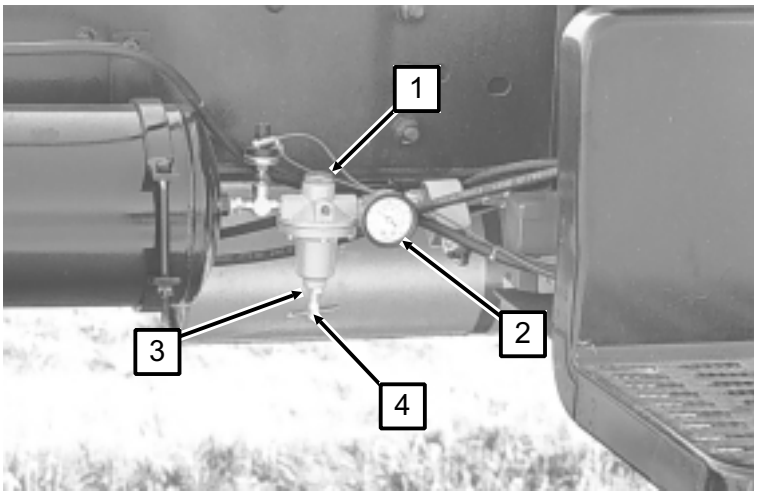
3. Be sure the test track is clear of all rail traffic before testing the brakes. Follow all railroad rules and regulations. Release the vehicle's parking brakes. Propel the vehicle forward and then apply the vehicle's brakes. The vehicle must stop in the shortest possible stopping distance without the rail guide wheels locking up and sliding on the rail.

   a. If the rail guide wheels lock up and slide on the rail when the vehicle's brakes are applied, adjust the regulator valve to a lower air pressure setting. Repeat Step 3.

   b. If the rail guide wheels do not stop the vehicle in the shortest possible stopping distance, adjust the regulator valve to a higher air pressure setting. Repeat Step 3.

Note: Many factors will determine the shortest possible stopping distance for a vehicle on track; such as vehicle weight, rear tire tread wear, vehicle speed, single or tandem rear axles, whether the front and/or rear rail pilot units are equipped with guide wheel brakes, rail conditions, etc.

FIGURE 3-12
BRAKE SYSTEM AIR PRESSURE REGULATOR AND GAUGE



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Adjustments

RAIL SWEEP CLEARANCE - 154522 AND 168480 RAIL SWEEP GROUPS

The rear rail pilot unit may be equipped with the 154522 or 168480 Rail Sweep Group.

1. Place the vehicle on straight, level track. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake. Lower and lock the front and rear rail pilot units in the "rail" position.

2. Lower the rail sweeps to the rail by rotating them down. The rubber rail sweeps should clear the top of the rail by 1/8 inch (3.2 mm). If not, see Adjustment.

Adjustment - See Figure 3-13

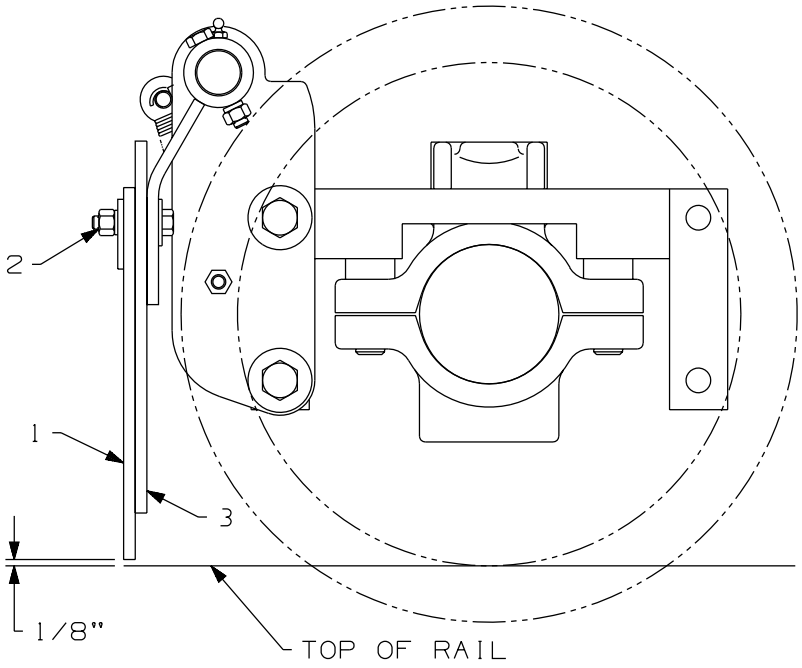
3. Loosen the two cap screws (2). Slide the rubber sweep (1) down until it clears the top of the rail by 1/8 inch (3.2 mm). Re-tighten the two cap screws.

4. If the rubber sweep cannot be lowered because the cap screws are in the bottom of the slots in the mounting plate, remove the two cap screws. Relocate the cap screws in the next upper set of holes in the rubber sweep. Adjust the sweep.

5. If the rubber sweep (1) is in the last, upper set of holes, move the second sweep (3) to the front and sweep (1) to the rear as a stiffener. Adjust the sweep.

6. When both sweeps are worn so neither can be adjusted, replace both sweeps.

FIGURE 3-13
RAIL SWEEP CLEARANCE



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Adjustments

HYDRAULIC PRESSURE ADJUSTMENTS

Checking Guide Wheel Unit Control Valve Relief Pressure - See Figure 3-14

Note: Hydraulic pressure settings are preset at the factory and should not be changed unless an operation malfunction indicates an incorrect pressure setting. It is very important that any pressure gauge being used is accurate and sized properly. Hydraulic pressure checks and adjustments must be with the pump at no flow. An incorrectly adjusted pressure setting could cause system damage.

1. Place the vehicle automatic transmission in "Park" or manual transmission in "Neutral". Apply the vehicle parking brake.

2. The relief pressure at the rear rail pilot unit control valve must be set at 2000 PSI ± 50 PSI (137.9 bar ± 3.45 bar). The relief pressure is checked at the test port connected to the "IN" port of the control valve.

3. Remove the dust cap from the test port. Attach a pressure gauge to test port (1) on the control valve.

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.

5. Do not release the locking mechanism. Shift the control valve to "bottom" the hydraulic cylinder out against the locking mechanism. Hold the control valve handle in this position to obtain a pressure reading on the pressure gauge.

    a. If the pressure indicated on the pressure gauge is 2000 PSI ± 50 PSI (137.9 bar ± 3.45 bar), the relief pressure is set correctly. 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.

    b. If the pressure indicated on the pressure gauge is not 2000 PSI ± 50 PSI (137.9 bar ± 3.45 bar), see Adjustment.

Adjustments

HYDRAULIC PRESSURE ADJUSTMENTS

Adjustment - See Figure 3-14

6. Remove cap (2) from the control valve, exposing the adjusting screw.

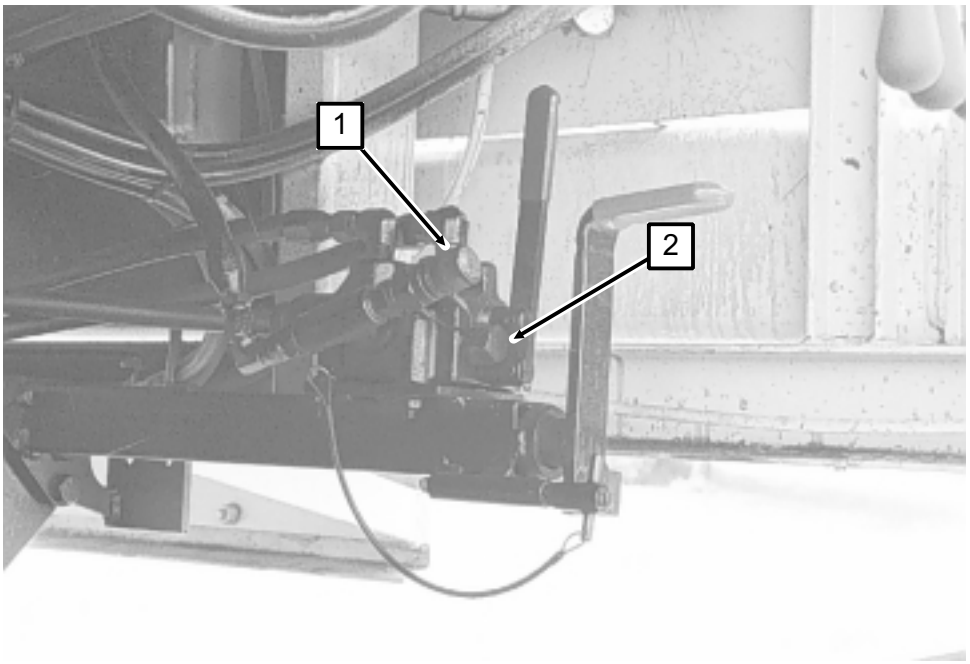
7. Do not release the locking mechanism. Shift the control valve to "bottom" the hydraulic cylinder out against the locking mechanism. Hold the control valve handle in this position while adjusting the pressure.

8. Turn the adjusting screw clockwise to increase the pressure setting or counter-clockwise to decrease the pressure setting. Stop when the pressure gauge remains steady at 2000 PSI ± 50 PSI (137.9 bar ± 3.45 bar).

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.

10. Install cap (2) on the control valve. Remove the pressure gauge from the test port. Install the dust cap on the test port.

FIGURE 3-14
RAIL PILOT UNIT CONTROL VALVE



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SECTION 4 - MAINTENANCE
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Maintenance Schedule

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

DAILY:

1. Inspect the front and rear 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 the correct fluid.

5. When the vehicle is operated on the track, listen for unusual noises. Unusual noises may indicate incorrectly lowered guide wheels, damaged or missing parts, or insufficient lubrication. Pay attention to the quality of the ride. Check the guide wheel equipment alignment if the vehicle crowds one side of the track instead of floating from side to side. See Adjustments - Guide Wheel Equipment Alignment Procedure.

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 lacking lubrication or may be damaged. Inspect, re-pack or replace the bearings if necessary.

4. Inspect the vehicle wheels, studs, lug nuts and tires for wear, damage, cuts, etc.

5. Check the vehicle tires for correct inflation pressure. Operate at the tire manufacturer's recommended maximum pressure printed on the sidewalls of the tires, or the wheel manufacturer's recommended maximum pressure stamped on the wheel, whichever is lower.

6. Check all bolts for tightness. See Appendices - Appendix A, Bolt Torque Requirement Chart.

Maintenance Schedule

At 50 Vehicle Miles (80 Vehicle km):

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

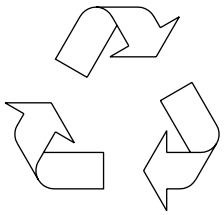
At 2000 Track Miles (3200 km):

Lubricate the rail pilot unit locations provided with grease fittings. See Guide Wheel Equipment Lubrication.

At 10,000 Track Miles (16000 km):

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

Waste Disposal



Dispose of waste properly. Improper disposal of waste can threaten the environment. The operation and maintenance of Harsco Track Technologies equipment may involve the use 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.

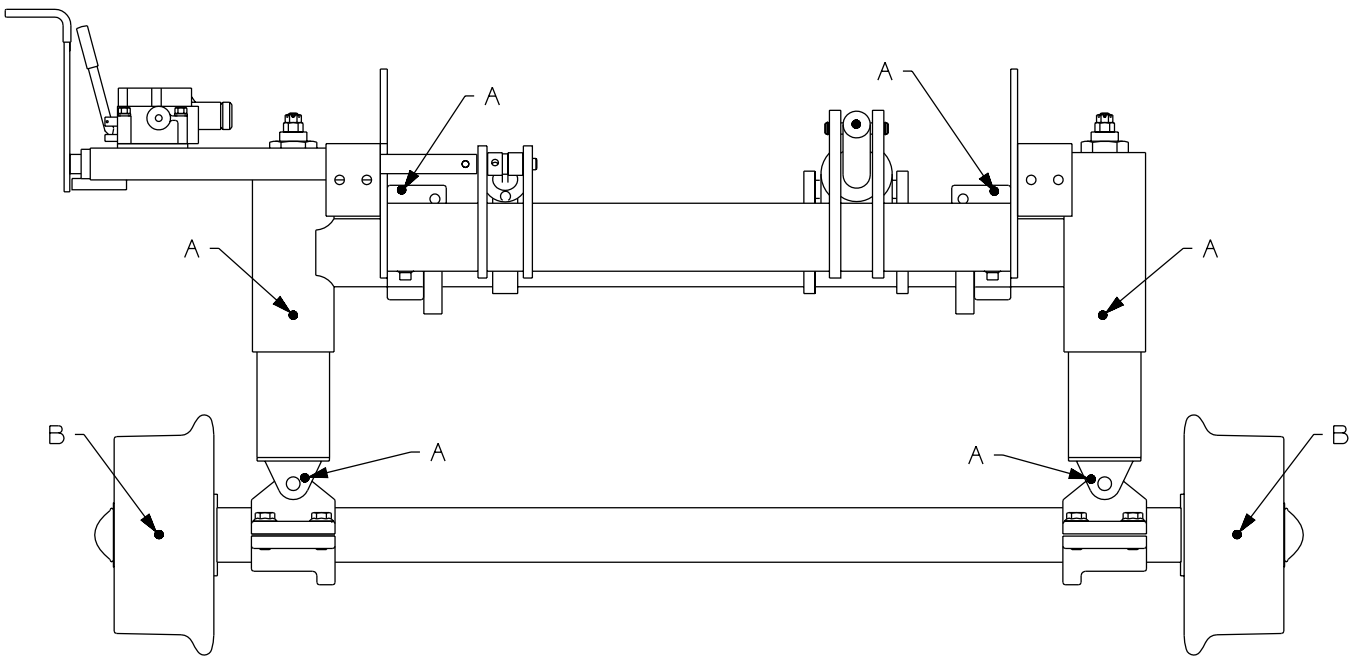
REAR RAIL PILOT UNIT LUBRICATION - See Figure 4-1

1. Apply the vehicle parking brake. Stop the vehicle engine. Turn the vehicle's ignition switch off.

2. Lubricate grease fittings (A) using Mobil Special Moly, or equivalent.

3. Re-pack the guide wheel bearings (B) every 10,000 track miles (maximum) or at least once every two years (minimum), whichever occurs first. See Re-packing Guide Wheel Bearings.

FIGURE 4-1
REAR RAIL PILOT UNIT LUBRICATION



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Guide Wheel Equipment Lubrication

RE-PACKING GUIDE WHEEL BEARINGS - See Figure 4-2

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

1. Apply the vehicle 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 the 1/8 x 1-1/4 inch cotter pin (2), 1 inch castle nut (3) and spindle washer (4).

3. Pull the guide wheel (5) from the spindle (6). Remove the outer bearing cone (7) from the guide wheel (5). Remove the grease seal (11) and inner bearing cone (9) from the guide wheel (5).

4. Clean all components of old grease and dirt.

5. Inspect the spindle, bearing cones and cups (7 & 8, 9 & 10) for nicks, gouges and wear. If any of these are evident, replace the component.

6. Measure the guide wheel wear. See Maintenance - Guide Wheels, Allowable Wear.

7. Coat the spindle surface, grease seal surface, both bearing cup surfaces, pack both bearing cones and fill the guide wheel cavity 1/2 full (50 %) using Mobil HP grease, or equivalent.

8. Install the inner bearing cone (9) into the guide wheel (5). Install a new grease seal (11) into the wheel.

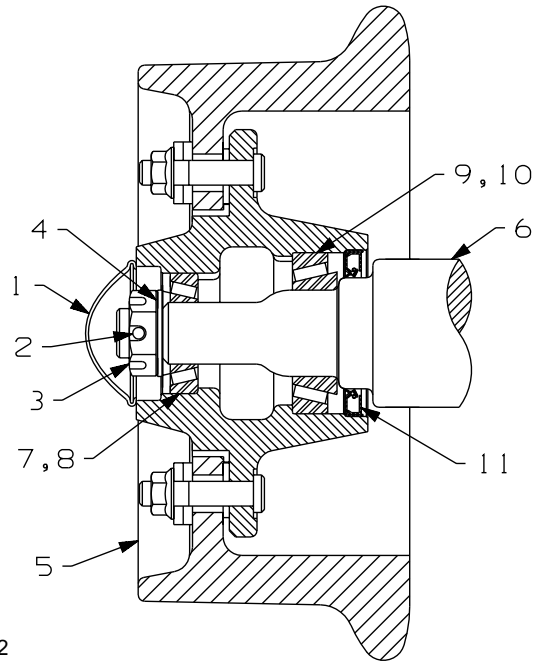
9. Slide the guide wheel (5) with the inner bearing (9) and grease seal (11) onto the spindle (6). Install the outer bearing cone (7), spindle washer (4) and 1 inch castle nut (3) onto the spindle (6).

10. Torque the castle nut (3) to approximately 20 ft lbs. Then loosen the castle nut. This is especially important if new bearing cups have been installed.

11. Torque the castle nut (3) to 7 ft lbs (zero clearance). Then back the castle nut off 1/2 to 1 flat of the nut (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.

FIGURE 4-2
RE-PACKING GUIDE WHEEL BEARINGS



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Guide Wheels Revised 10-2007

ALLOWABLE WEAR - See Figure 4-3

WARNING

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

1. Tools needed: Harsco Track Technologies wheel caliper (M019889), or equivalent.

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

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

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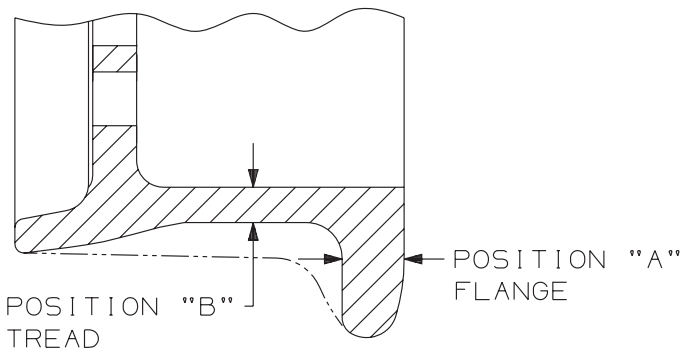
3. Measure the guide wheel tread at Position "B" with the wheel caliper. The minimum allowable tread dimension at Position "B" is 5/16 inch (8 mm).

   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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WARNING

■ **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.

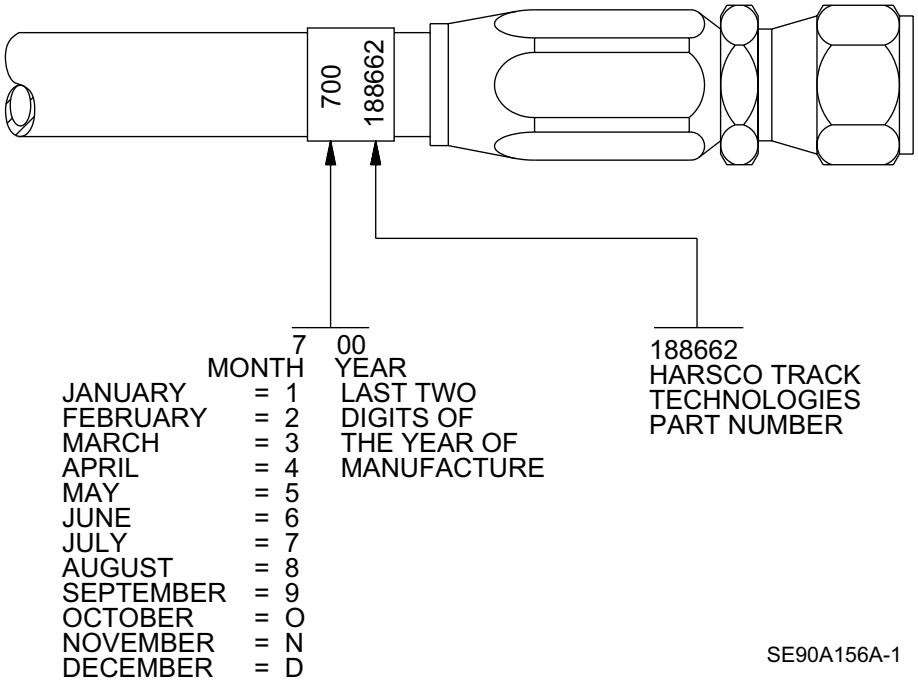
2. Inspect all air and hydraulic hoses, fittings and components on the machine daily or every 10 operating hours for damage, wear leaks, etc. If any of these conditions are evident, repair or replace the component as necessary.

HOSE BAND - See Figure 4-4

1. All Harsco Track Technologies original and replacement hose assemblies supplied from the Harsco Track Technologies, Harsco Corporation Fairmont, Minnesota facility have a hose band displaying the date of manufacture and the Harsco Track Technologies part number. See Figure 4-4 for explanation of the hose band.

2. The hose assembly illustrated in the example was manufactured in July 2000 and is Harsco Track Technologies part number 188662.

FIGURE 4-4
HOSE BAND



Vehicle Wheels

WHEEL REPLACEMENT

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

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

TIRE REPLACEMENT

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

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

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

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

Bolt Torque Requirements

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

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

SECTION 5 - TROUBLESHOOTING
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Troubleshooting Guide Wheel Equipment

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.
	Switch for auxiliary electric powered hydraulic pump in OFF position.	Move switch to ON position.
	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 mechanical lock. See Operation Section - 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 front and rear rail pilot units. See Maintenance Section - Lubrication.

Troubleshooting Guide Wheel Equipment

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

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, etc. not aligned with vehicle frame.	Check alignment. See Adjustment Section - 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.
	Guide wheel brake shoes dragging.	Re-adjust brake shoes. See Adjustment Section - Brake Shoe Clearance.
Vehicle load on rear spring cells exceeds rear rail pilot unit maximum rated load capacity.	Vehicle overloaded.	Redistribute or remove some of the load.
	Rear guide wheel unit not initially set to carry approximately 1/2 of vehicle rear axle curb weight.	Re-adjust. See Guide Wheel Equipment Alignment Procedure.
	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.

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Vibration felt in the vehicle when traveling on track.	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 Section - Guide Wheels, Allowable Wear.
	Vehicle rear rim bent.	Replace. See Parts Section - Vehicle Applications.
	Vehicle rear tires out of balance.	Balance tires.
Vibration felt in the vehicle when traveling on highway.	Rail pilot units mounting fasteners loose.	Tighten all bolts to recommended torque.
	Rail pilot units not locked in "highway" position.	STOP IMMEDIATELY. Make sure both rail pilot units are locked in "highway" position.
	Vehicle rim bent.	Replace. See Parts Section - Vehicle Applications.
	Vehicle tires out of balance.	Balance tires.

SECTION 6 - APPENDICES
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Appendix A - Conversion Tables

Appendix B - SAE J1273

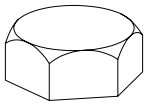
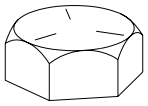
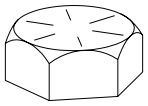
Appendix C - Service Data Sheets

Appendix A

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

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

STANDARD MARKINGS AND TORQUE SPECIFICATIONS

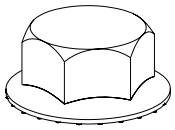
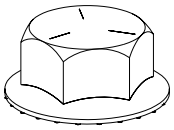
SAE Grade	**1 or 2**				**5**				**8**			
Fastener Standard SAE Grade Markings												
Fastener Body Size	**Torque Wet**		**Dry**		**Torque Wet**		**Dry**		**Torque Wet**		**Dry**	
Inch Thrd	in-lb		in-lb		in-lb		in-lb		in-lb		in-lb	
1/4 - 20	49		65		75		100		107		142	
1/4 - 28	56		74		86		114		122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

Appendix A

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

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

STANDARD MARKINGS AND TORQUE SPECIFICATIONS

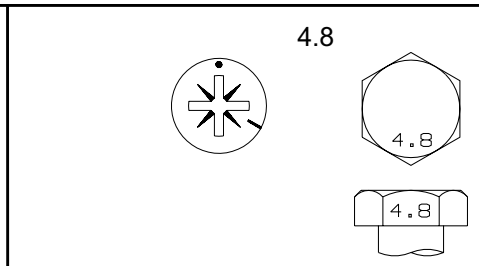
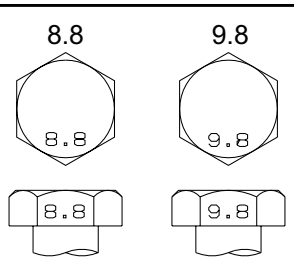
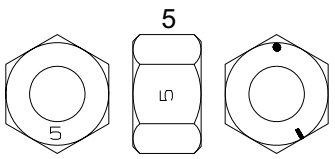
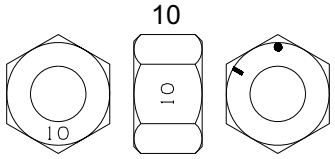
SAE Grade	**1 or 2**				**5**			
Fastener Standard SAE Grade Markings								
Fastener Body Size	**Torque Wet**		**Dry**		**Torque Wet**		**Dry**	
Inch Thrd	ft-lb	(kg-m)	ft-lb	(kg-m)	ft-lb	(kg-m)	ft-lb	(kg-m)
1/4 - 20	8	(1.1)	11	(1.5)	11	(1.5)	15	(2.1)
1/4 - 28	9	(1.2)	12	(1.7)	12	(1.7)	16	(2.2)
5/16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

Appendix A

FIGURE 6-3
BOLT TORQUE REQUIREMENTS TABLE
METRIC TYPE FASTENERS

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

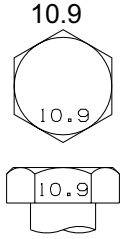
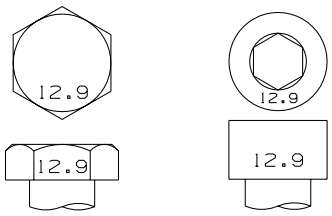
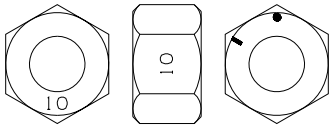
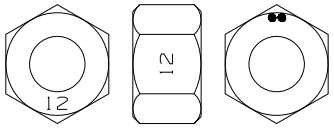
* Lubricated means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. Dry means plain or zinc plated without any lubrication.

Property Class and Head Markings		
Property Class and Head Markings		

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

Appendix A

FIGURE 6-4
BOLT TORQUE REQUIREMENTS TABLE
METRIC TYPE FASTENERS

Property Class and Head Markings	10.9 	12.9 
Property Class and Head Markings	10 	12 

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

Appendix A

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

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

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

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

Appendix A

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

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

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

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

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

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

Appendix A

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

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

Appendix A

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

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

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

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

Appendix B

DISCLAIMER

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

SAE J1273 - NOVEMBER 1991*
SELECTION, INSTALLATION AND MAINTENANCE OF HOSE AND HOSE ASSEMBLIES

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

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

- **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.

Appendix B

3.11 Length - When establishing proper hose length, motion absorption, hose length changes due to pressure, as well as hose and machine tolerances must be considered.

3.12 Specifications and Standards - When selecting hose, government, industry, and manufacturer's specifications and recommendations must be reviewed as applicable.

3.13 Hose Cleanliness - Hose components vary in cleanliness levels. Care must be taken to insure that the assemblies selected have an adequate level of cleanliness for the application.

3.14 Electrical Conductivity - Certain applications require that the hose be non-conductive to prevent electrical current flow. Other applications require the hose to be sufficiently conductive to drain off static electricity. Hose and fittings must be chosen with these needs in mind.

4. INSTALLATION - After selection of proper hose, the following factors must be considered by the installer.

4.1 Pre-Installation Inspection - Prior to installation, a careful examination of the hose must be performed. All components must be checked for correct style, size, and length. In addition, the hose must be examined for cleanliness, I.D. obstructions, blisters, loose cover, or any other visible defects.

4.2 Follow Manufacturers' Assembly Instructions - Hose assemblies may be fabricated by the manufacturer, an agent for or customer of the manufacturer, or by the user. Fabrication of permanently attached fittings to hydraulic hose requires specialized assembly equipment. Field-attachable fittings (screw style and segment clamp style) can usually be assembled without specialized equipment although many manufacturers provide equipment to assist in this operation.
SAE J517 hose from one manufacturer is not compatible with SAE J516 fittings supplied by another manufacturer. It is the responsibility of the fabricator to consult the manufacturer's written assembly instructions or the manufacturers directly before intermixing hose and fittings from two manufacturers. Similarly, assembly equipment from one manufacturer is usually not interchangeable with that of another manufacturer. It is the responsibility of the fabricator to consult the manufacturer's written instructions or the manufacturer directly for proper assembly equipment. Always follow the manufacturer's instructions for proper preparation and fabrication of hose assemblies.

4.3 Minimum Bend Radius - Installation at less than minimum bend radius may significantly reduce hose life. Particular attention must be given to preclude sharp bending at the hose / fitting juncture.

4.4 Twist Angle and Orientation - Hose installations must be such that relative motion of machine components produces bending of the hose rather than twisting.

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:

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

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

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

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

Note: Avoid potential hazardous areas while testing.

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

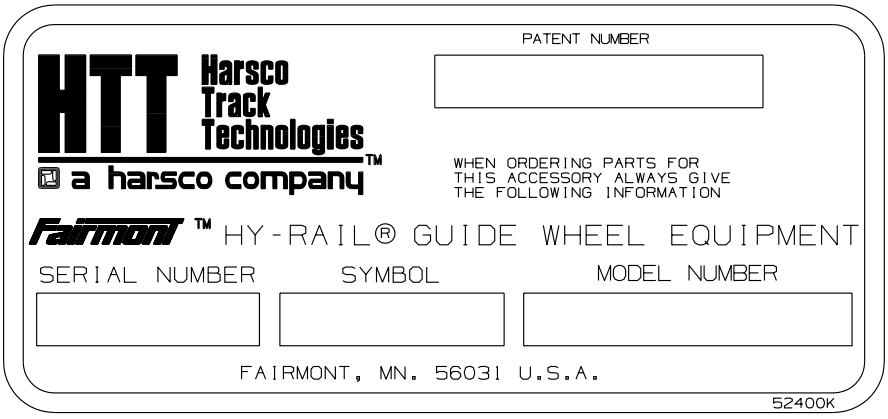
SECTION 7 - PARTS
TABLE OF CONTENTS

TABLE OF CONTENTS

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 mounting frame of the unit.

REAR RAIL PILOT UNIT SERIAL NUMBER



7

Instructions For Ordering Parts

1. See Section 8 for the Vehicle Application charts.

2. Find the chart for the make, model and year of the vehicle that the unit is mounted on.

3. Each application consists of required groups, optional groups required and accessory group options. These are the group numbers that were supplied with, or that were available for the unit.

4. Locate the appropriate group numbers in the Parts Section to find the individual parts required.

5. Front - rear and left - right are determined from the operator's position.

6. Assemblies: Items listed in CAPITALS are assemblies which include all parts listed immediately following and with the part description indented to the right. When assemblies can be used, always order them to save work of fitting separate parts.

7. For convenience in ordering, parts are listed by item number, part number, description, and quantity in each assembly or group. If in doubt as to any part wanted, send full description, sketch, or send the old part with the order.

8. To insure prompt and correct shipment of parts on orders, always give:

    1. Quantity of each part wanted.
    2. Part number of each part as shown in this book. Include any prefix and suffix letters.
    3. Description of each part as shown in this book.
    4. Factory serial numbers from the serial number tag.
    5. Purchase order number (if required).
    6. Preferred method of shipment.

9. All parts are shipped F.O.B. factory, transportation charges to be paid by customer. Terms to be determined by the Credit Department.

Limited Warranty

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

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

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

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 HARSCO TRACK TECHNOLOGIES, HARSCO CORPORATION.

Product Improvement Liability Disclaimer

HARSCO TRACK TECHNOLOGIES, 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.

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.

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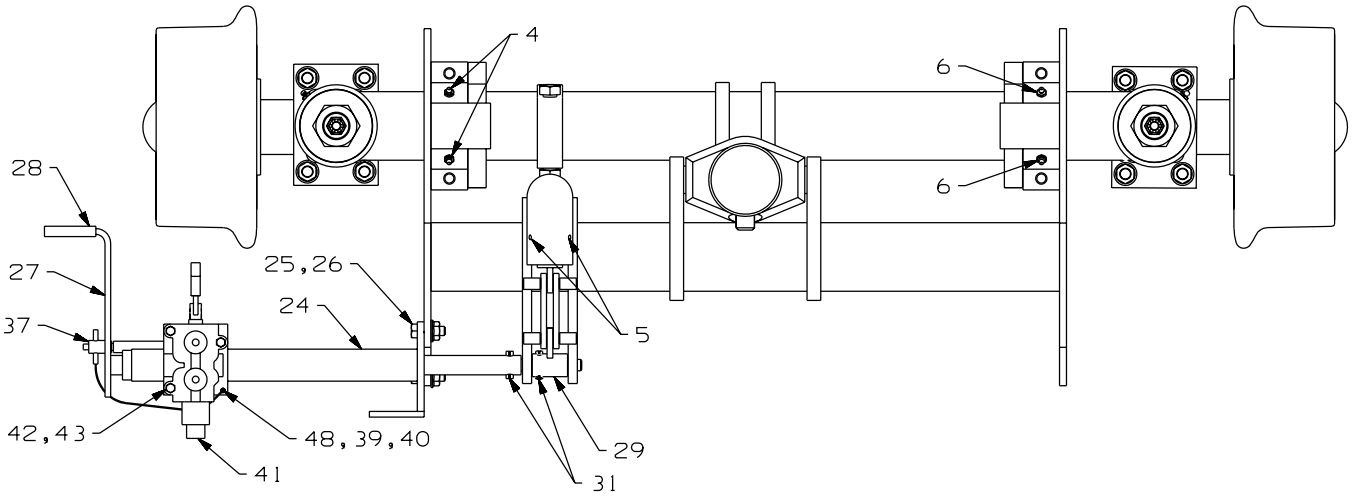
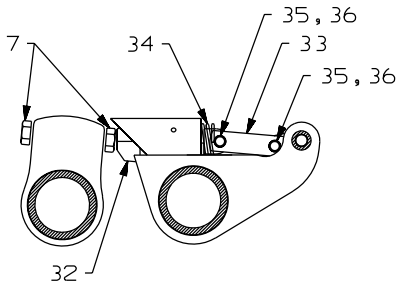
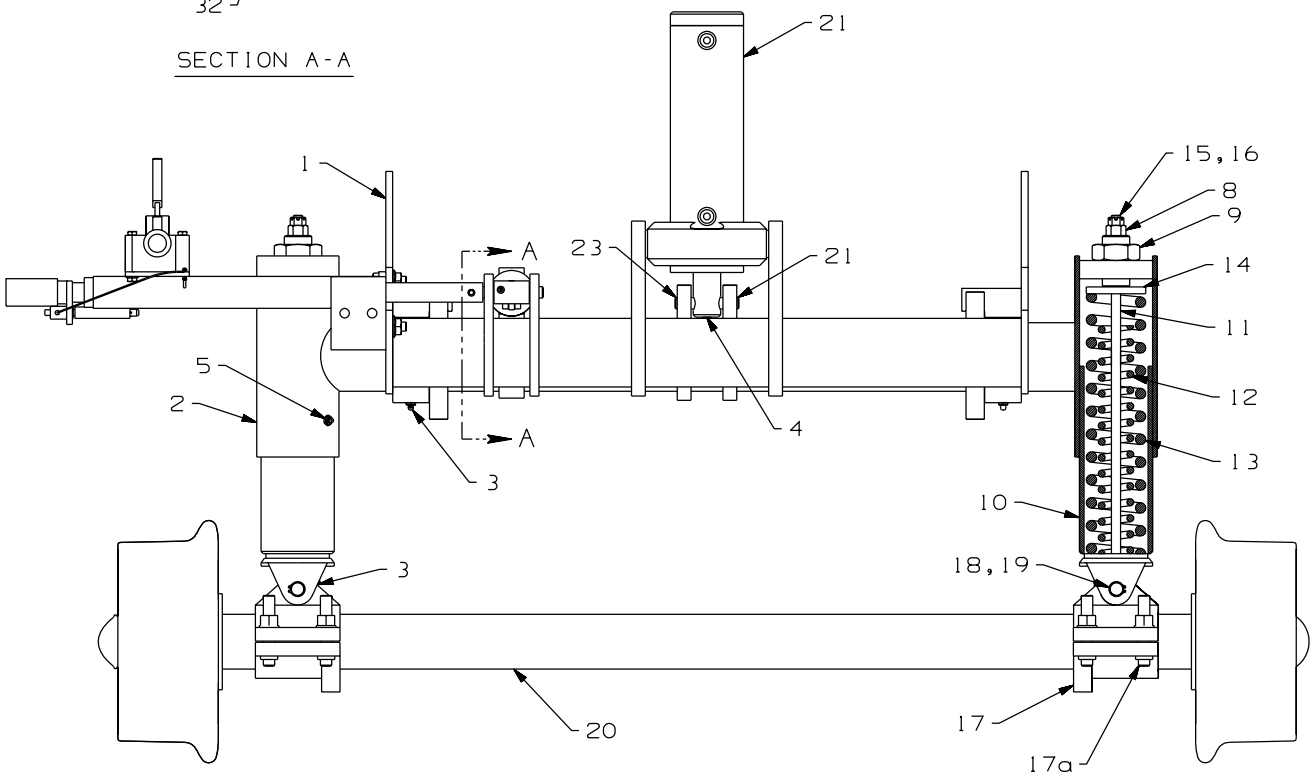
REAR RAIL PILOT UNIT - 168457 - NON INSULATED - HR2000A2





SECTION A-A



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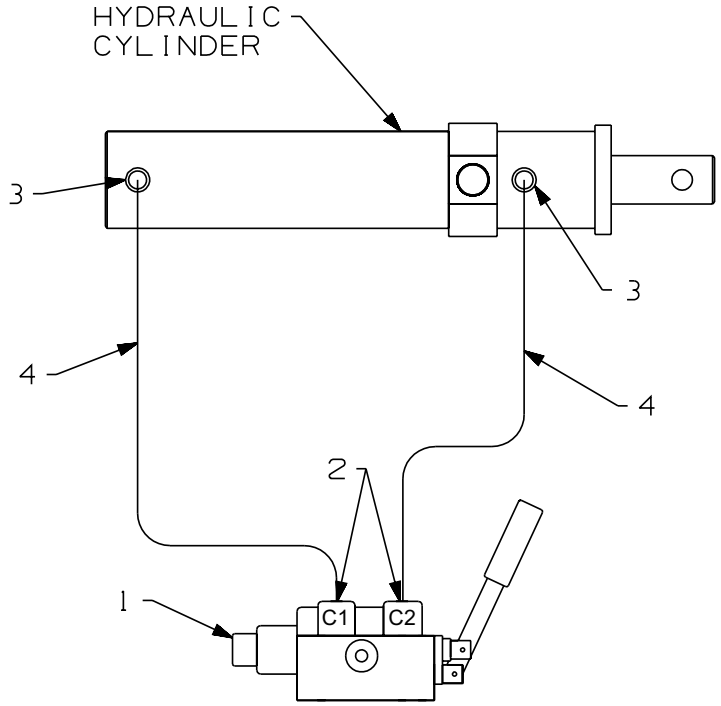
REAR RAIL PILOT UNIT - 166464 - INSULATED - HR2000A2
REAR RAIL PILOT UNIT - 168457 - NON INSULATED - HR2000A2

ITEM	PART NO	DESCRIPTION	QTY
1	166465	Mounting Frame	1
2	166466	Cross Tube	1
3	F004252	Grease Fitting, 1/8 M NPT Straight	4
4	F009420	Grease Fitting, 1/8 M NPT 45°	5
5	F009217	Grease Fitting, 1/8 M NPT 90°	6
6	F023879	Set Screw, 5/8-11 x 1-1/2" Oval Point	4
7	700568125	Cap Screw, 3/4-10 x 1-1/4" GR 8 Hex Hd	2
8	140771	Adjusting Stud	2
9	F024361	Hex Jam Nut, 1-1/2"-12	2
10	153735	Spring Housing	2
11	140191	Rod	2
12	140128	Spring	2
13	140129	Spring	2
14	140789	Washer	2
15	F002545	Hex Slotted Nut, 1/2"-13	2
16	F001182	Cotter Pin, 1/8 x 1-1/4"	2
17	168481	AXLE CLAMP ASSEMBLY	2
17a	171088	Cap Screw, 5/8-11 x 3" Soc Hd	4
18	116242	Pin	2
19	F018844	Retaining Ring	4
20	140178	Axle	1
21K	F025909	Hydraulic Cylinder	1
22	168668	Pin	1
23	F011054	Retaining Ring	2
24	153711	Lock Handle Bracket	1
25	F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	2
26	F022037	Hex Flg Nut, 1/2"-13	2
27	168233	Lock Lever	1
28	F022846	Handle Grip	1
29	153708K	Toggle Link	1
30	168236	Pin	1
31	F011954	Spring Pin, 3/8 x 1-1/2"	2
32	140162	Lock Pin	1
33	153703	Link	2
34	F025817	Spring, Compression	1
35	153706	Pin	2
36	F009288K	Retaining Ring	4
37	F022104	Lock Pin And Lanyard	1
38	F017061	Machine Screw, #4-40 x 1" Rd Hd	1
39	F022981	Lock Washer, #4	1
40	F010193	Hex Nut, #4-40	1
41	F018510	Control Valve	1

REAR RAIL PILOT UNIT - 166464 - INSULATED - HR2000A2
REAR RAIL PILOT UNIT - 168457 - NON INSULATED - HR2000A2

ITEM	PART NO	DESCRIPTION	QTY
42	F013428	Cap Screw, 5/16-18 x 2-1/2" GR 5 Hex Hd	3
43	F040088	Hex Flg Nut, 5/16"-18	3

HYDRAULIC PIPING - 166464 REAR RAIL PILOT UNIT
HYDRAULIC PIPING - 168457 REAR RAIL PILOT UNIT



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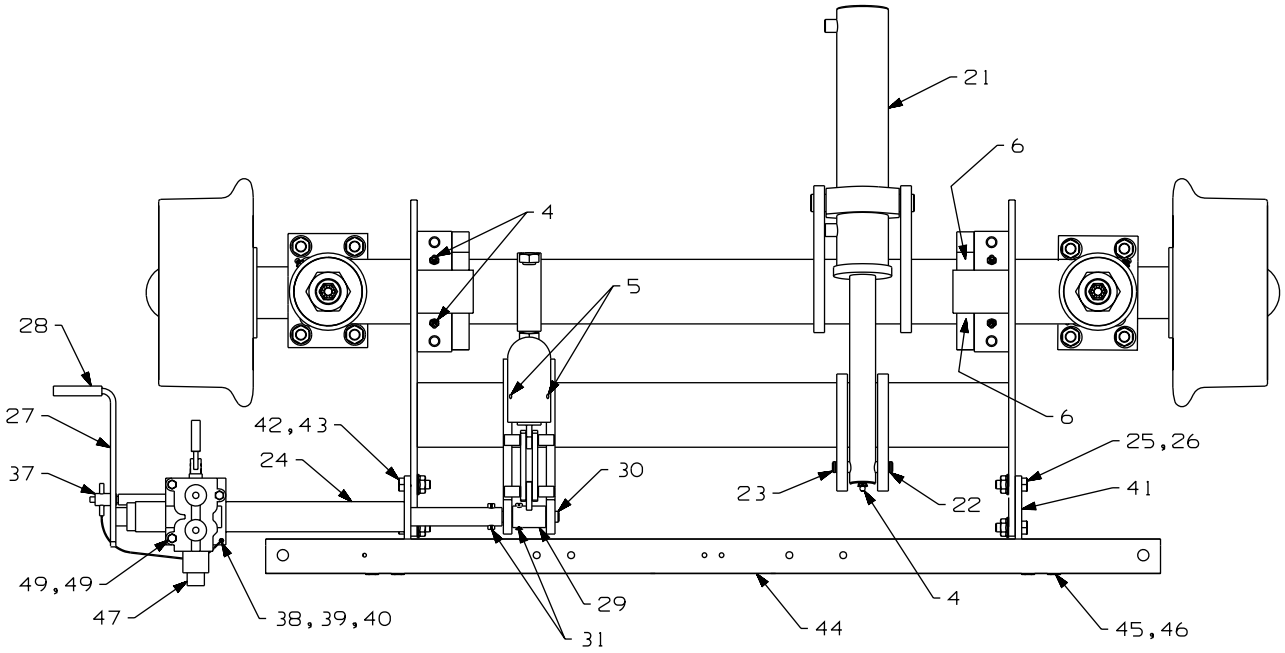
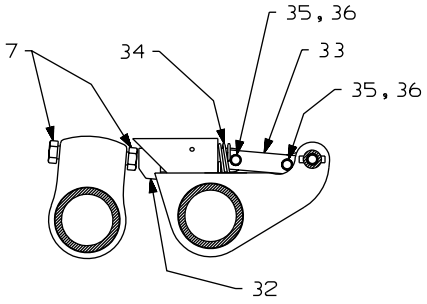
ITEM	PART NO	DESCRIPTION	QTY
1	F018510	Control Valve	1
2	F012055	90° Elbow, 9/16 M JIC x 3/8 M NPT	2
3	F013327	90° Elbow, 9/16 M JIC x 9/16 M STR	2
4	188665	Hose, 5/16 x 40" Swivel 9/16 F JIC Both Ends	2

REAR RAIL PILOT UNIT - 169314 - INSULATED - HR2000A3
REAR RAIL PILOT UNIT - 169318 - NON INSULATED - HR2000A3





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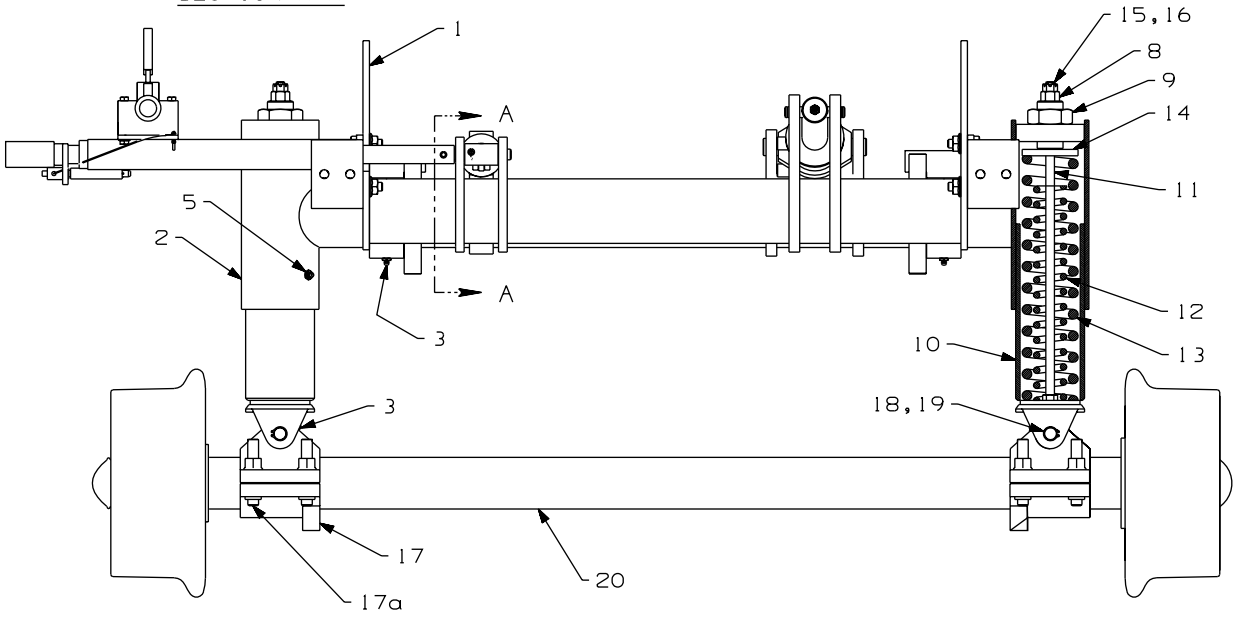

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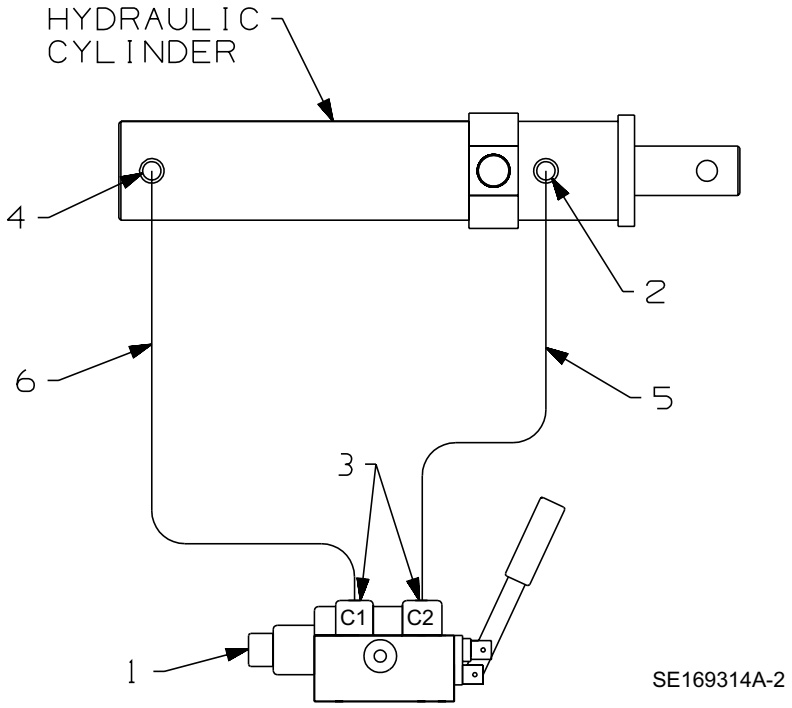
REAR RAIL PILOT UNIT - 169314 - INSULATED - HR2000A3
REAR RAIL PILOT UNIT - 169318 - NON INSULATED - HR2000A3

ITEM	PART NO	DESCRIPTION	QTY
1	169315	Mounting Frame	1
2	169316	Cross Tube	1
3	F004252	Grease Fitting, 1/8 M NPT Straight	4
4	F009420	Grease Fitting, 1/8 M NPT 45°	5
5	F009217	Grease Fitting, 1/8 M NPT 90°	6
6	F023879	Set Screw, 5/8-11 x 1-1/2" Oval Point	4
7	700568125	Cap Screw, 3/4-10 x1-1/4" GR 8 Hex Hd	2
8	140771	Adjusting Stud	2
9	F024361	Hex Jam Nut, 1-1/2"-12	2
10	153735	Spring Housing	2
11	140191	Adjusting Rod	2
12	140128	Spring	2
13	140129	Spring	2
14	140789	Washer	2
15	F002545	Hex Slotted Nut, 1/2"-13	2
16	F001182	Cotter Pin, 1/8 x 1-1/4"	2
17	168481	AXLE CLAMP ASSEMBLY	2
17a	171088	Cap Screw, 5/8-11 x 3" Soc Hd	4
18	116242	Pin	2
19	F018844	Retaining Ring	4
20	140178	Axle	1
21	153733K	Hydraulic Cylinder	1
22	153705	Pin	1
23	F009288K	Retaining Ring	2
24	153711	Lock Handle Bracket	1
25	F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	2
26	F022037	Hex Flg Nut, 1/2"-13	2
27	168233	Lock Lever	1
28	F022846	Handle Grip	1
29	153708K	Toggle Link	1
30	168236	Pin	1
31	F011954	Spring Pin, 3/8 x 1-1/2"	2
32	140162	Lock Pin	1
33	153703	Link	2
34	F025817	Spring, Compression	1
35	153706	Pin	2
36	F009288K	Retaining Ring	4
37	F022104	Lock Pin And Lanyard	1
38	F017061	Machine Screw, #4-40 x 1" Rd Hd	1
39	F022981	Lock Washer, #4	1
40	F010193	Hex Nut, #4-40	1
41	153712	Bracket	1

REAR RAIL PILOT UNIT - 169314 - INSULATED - HR2000A3
REAR RAIL PILOT UNIT - 169318 - NON INSULATED - HR2000A3

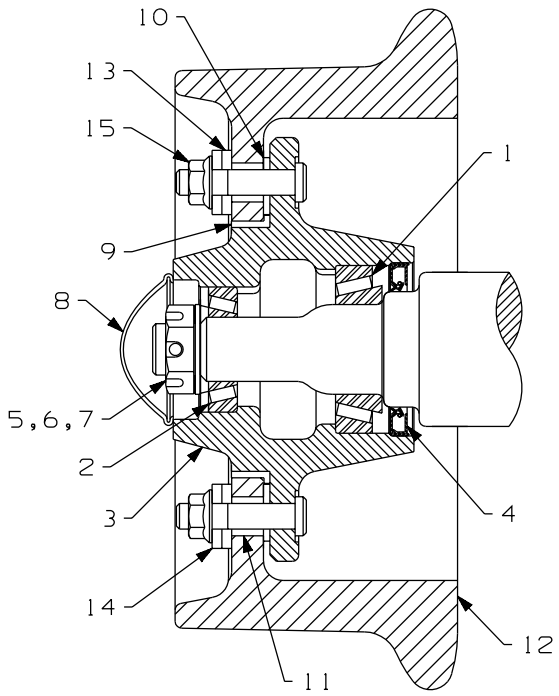
ITEM	PART NO	DESCRIPTION	QTY
42	F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	2
43	F022037	Hex Flg Nut, 1/2"-13	2
44	140790	Bumper	1
45	F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	4
46	F022037	Hex Flg Nut, 1/2"-13	4
47	F018510	Control Valve	1
48	F013428	Cap Screw, 5/16-18 x 2-1/2" GR 5 Hex Hd	3
49	F040088	Hex Flg Nut, 5/16"-18	3

HYDRAULIC PIPING - 169314 REAR RAIL PILOT UNIT
HYDRAULIC PIPING - 169318 REAR RAIL PILOT UNIT



ITEM	PART NO	DESCRIPTION	QTY
1	F018510	Control Valve	1
2	F013326	Adapter, 9/16 M JIC x 9/16 M STR	1
3	F012055	90° Elbow, 9/16 M JIC x 3/8 M NPT	2
4	F013020	45° Elbow, 9/16 M JIC x 9/16 M STR	1
5	188668	Hose, 5/16 x 48" Swivel 9/16 F JIC Both Ends	1
6	188662	Hose, 5/16 x 56" Swivel 9/16 F JIC Both Ends	1

INSULATED GUIDE WHEEL - INSULATED UNITS



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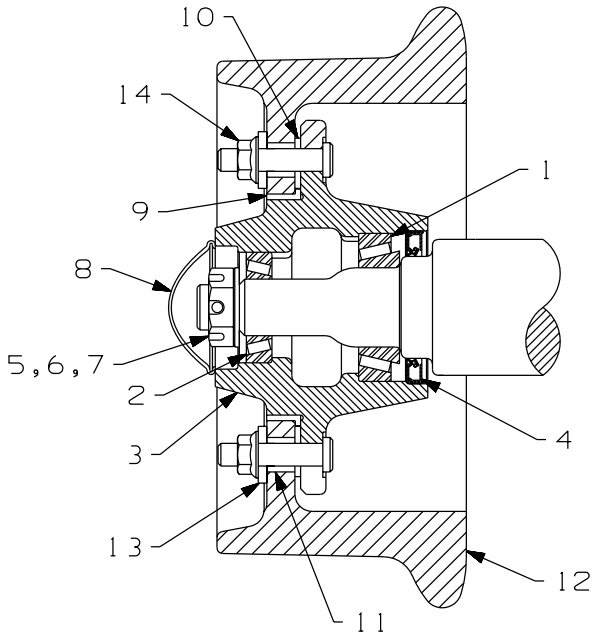
Note: Quantities Listed Are For One Wheel Only.

ITEM	PART NO	DESCRIPTION	QTY
1	154745	Bearing Cup & Cone, Inside	1
2	157622	Bearing Cup & Cone, Outside	1
3	153739	HUB ASSEMBLY	1
3a	120884	Stud Bolt, 1/2-20 x 2-5/16"	6
4	F024339	Grease Seal	1
5	F023271	Axle Washer	1
6	F023270	Hex Slotted Nut, 1"	1
7	F001182	Cotter Pin, 1/8 x 1-1/4"	1
8	F023272	Dust Cap	1
9	108585	Insulating Flange	1
10	108586	Insulating Washer	1
11	100765	Insulating Bushing	6
12	140104	Guide Wheel	1
13	090177	Insulating Washer	6
14	072897	Washer, 33/64"	6
15	F021281	Hex Flg Nut, 1/2"-20	6

NON INSULATED GUIDE WHEEL - NON INSULATED UNITS



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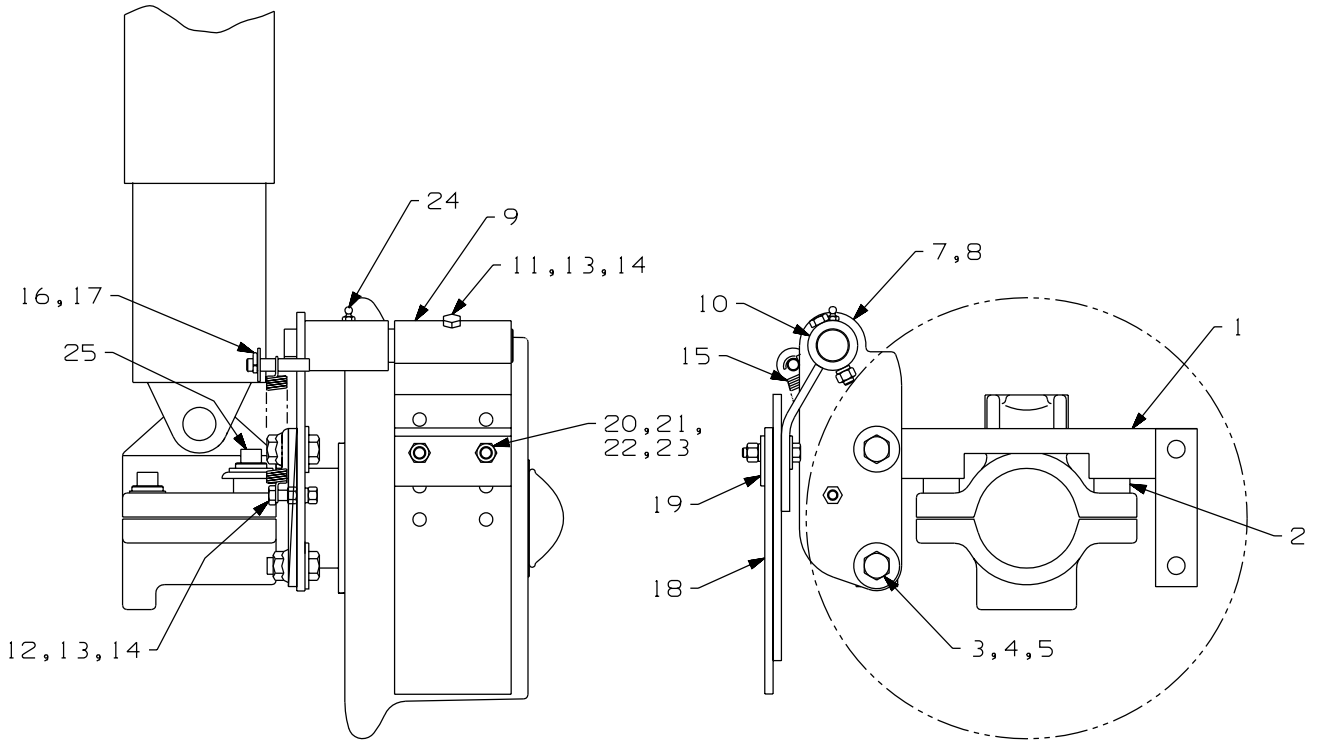
Note: Quantities Listed Are For One Wheel Only.

ITEM	PART NO	DESCRIPTION	QTY
1	154745	Bearing Cup And Cone, Inside	1
2	157622	Bearing Cup And Cone, Outside	1
3	153739	HUB ASSEMBLY	1
3a	120884	Stud Bolt, 1/2-20 x 2-5/16"	6
4	F024339	Grease Seal	1
5	F023271	Axle Washer	1
6	F023270	Hex Slotted Nut, 1"	1
7	F001182	Cotter Pin, 1/8 x 1-1/4"	1
8	F023272	Dust Cap	1
9	108585	Insulating Flange	1
10	108586	Insulating Washer	1
11	100765	Insulating Bushing	6
12	140104	Guide Wheel	1
13	072897	Washer, 33/64"	6
14	F021281	Hex Flg Nut, 1/2"-20	6

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.

RAIL SWEEP GROUP - 154522

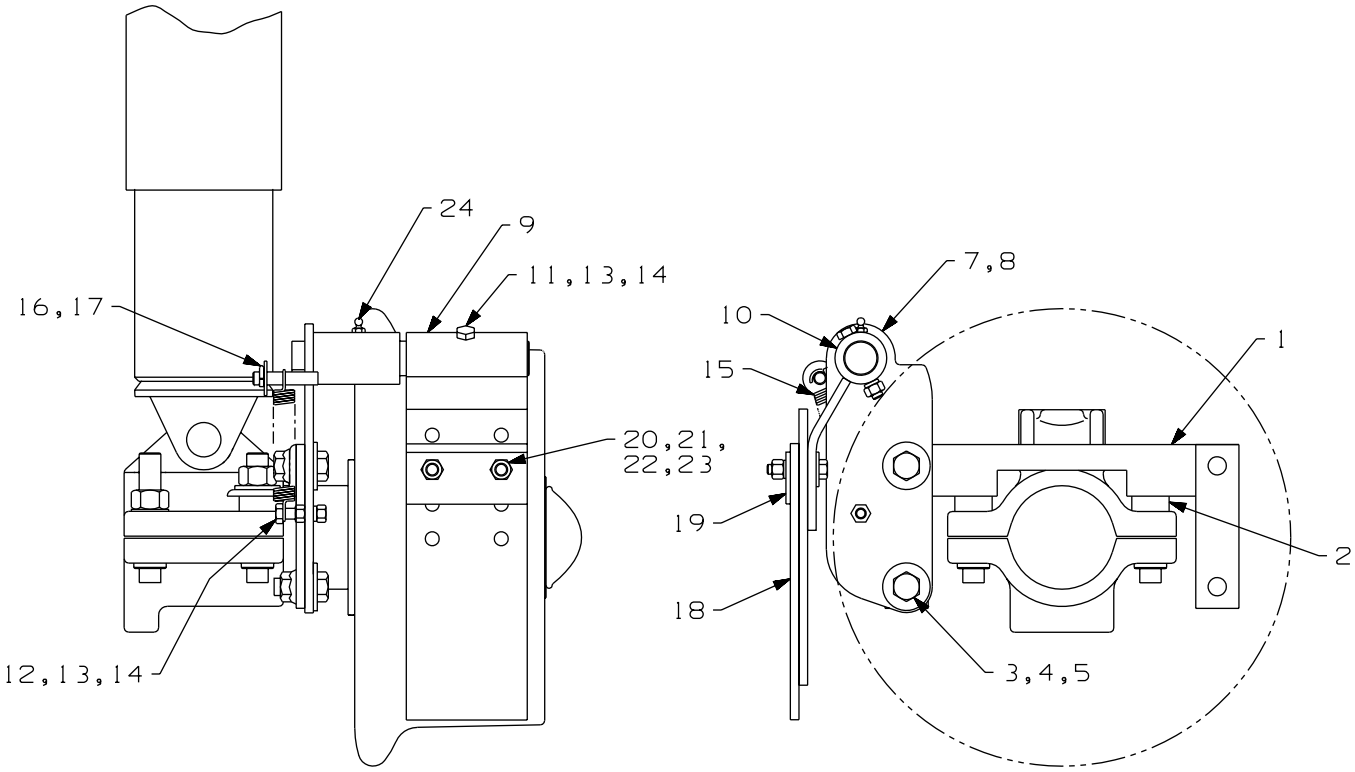


SE020456A-1

RAIL SWEEP GROUP - 154522

ITEM	PART NO	DESCRIPTION	QTY
1	154518	Rail Sweep Bracket	2
2	154521	Spacer	4
3	F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	4
4	F001267	Wrought Washer, 1/2"	4
5	F022037	Hex Flg Nut, 1/2"-13	4
6	159099	Decal, Rear Rail Sweeps... (not illustrated)	1
	138421	RAIL SWEEP, LEFT FRONT OR RIGHT REAR	1
	138422	RAIL SWEEP, RIGHT FRONT OR LEFT REAR	1
7	138417	Rail Sweep Bracket, Left Front or Right Rear	1
8	138420	Rail Sweep Bracket, Right Front or Left Rear	1
9	138428	Swivel Bracket	2
10	118573	Shaft	2
11	F009663	Cap Screw, 5/16-18 x 2" GR 5 Hex Hd	2
12	F001113	Cap Screw, 5/16-18 x 1-1/4" GR 5 Hex Hd	2
13	F001100	SAE Lock Washer, 5/16"	4
14	F007021	Hex Nut, 5/16"	6
15	072909	Spring	2
16	F001115	Wrought Washer, 3/8"	2
17	F001030	Cotter Pin, 1/8 x 3/4"	2
18	118580	Rubber Sweep	4
19	118581	Plate	2
20	F001024	Cap Screw, 3/8-16 x 1-1/2" GR 5 Hex Hd	4
21	F007020	Hex Nut, 3/8"-16	4
22	F001115	Wrought Washer, 3/8"	4
23	F001025	SAE Lock Washer, 3/8"	4
24	F008014	Grease Fitting	2
25	F013816	Cap Screw, 5/8-11 x 2-1/4" Counter Bore	4

RAIL SWEEP GROUP - 168480



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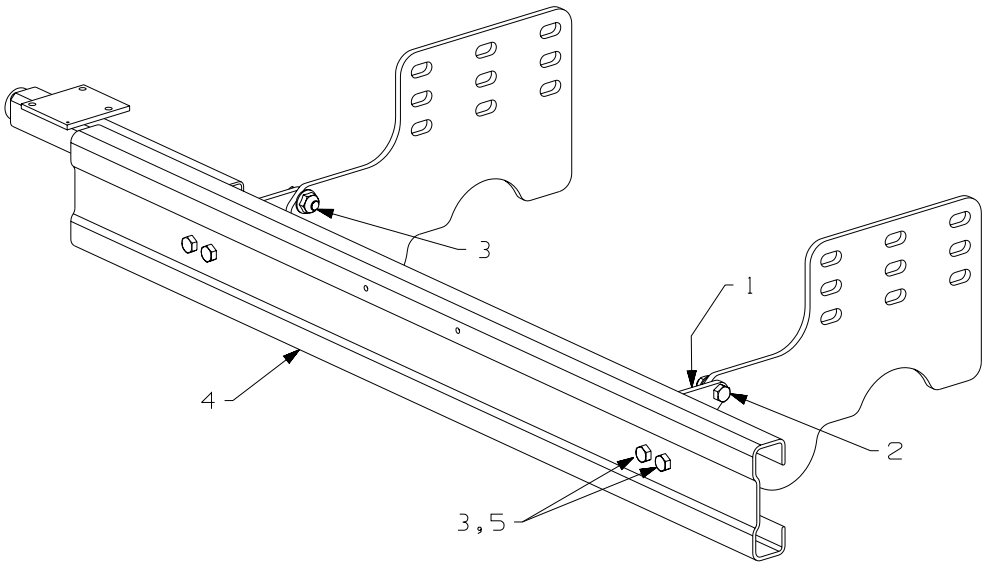
RAIL SWEEP GROUP - 168480

ITEM	PART NO	DESCRIPTION	QTY
1	154518	Rail Sweep Bracket	2
2	154521	Spacer	4
3	F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	4
4	F001267	Wrought Washer, 1/2"	4
5	F022037	Hex Flg Nut, 1/2"-13	4
6	159099	Decal, Rear Rail Sweeps... (not illustrated)	1
	138421	RAIL SWEEP, LEFT FRONT OR RIGHT REAR	1
	138422	RAIL SWEEP, RIGHT FRONT OR LEFT REAR	1
7	138417	Rail Sweep Bracket, Left Front or Right Rear	1
8	138420	Rail Sweep Bracket, Right Front or Left Rear	1
9	138428	Swivel Bracket	2
10	118573	Shaft	2
11	F009663	Cap Screw, 5/16-18 x 2" GR 5 Hex Hd	2
12	F001113	Cap Screw, 5/16-18 x 1-1/4" GR 5 Hex Hd	2
13	F001100	SAE Lock Washer, 5/16"	4
14	F007021	Hex Nut, 5/16"	6
15	072909	Spring	2
16	F001115	Wrought Washer, 3/8"	2
17	F001030	Cotter Pin, 1/8 x 3/4"	2
18	118580	Rubber Sweep	4
19	118581	Plate	2
20	F001024	Cap Screw, 3/8-16 x 1-1/2" GR 5 Hex Hd	4
21	F007020	Hex Nut, 3/8"-16	4
22	F001115	Wrought Washer, 3/8"	4
23	F001025	SAE Lock Washer, 3/8"	4
24	F008014	Grease Fitting	2

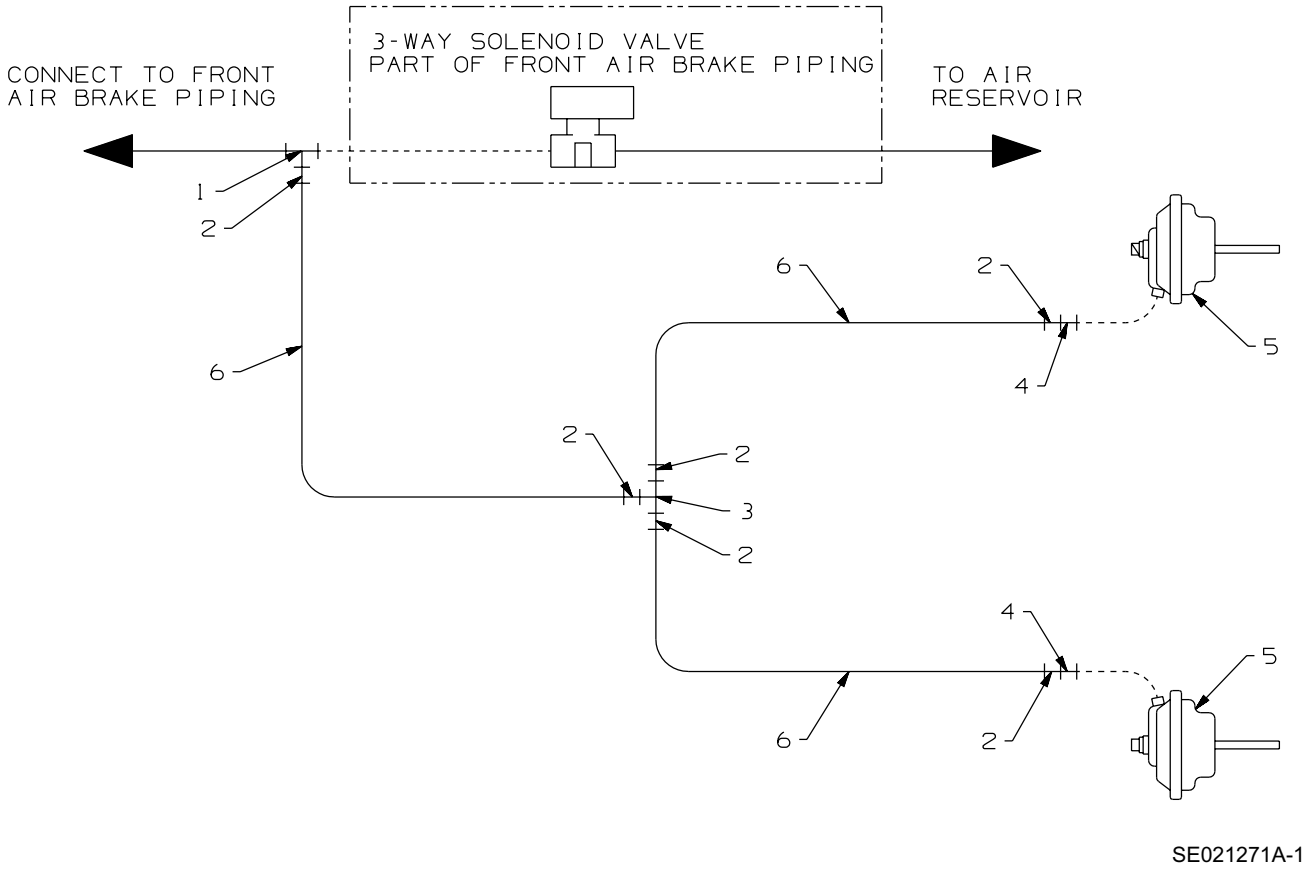
REAR BUMPER GROUP - 168682



SE021721A-1

ITEM	PART NO	DESCRIPTION	QTY
1	153712	Bracket	1
2	F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	2
3	F022037	Hex Flg Nut, 1/2"-13	6
4	137172	Bumper	1
5	F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	4

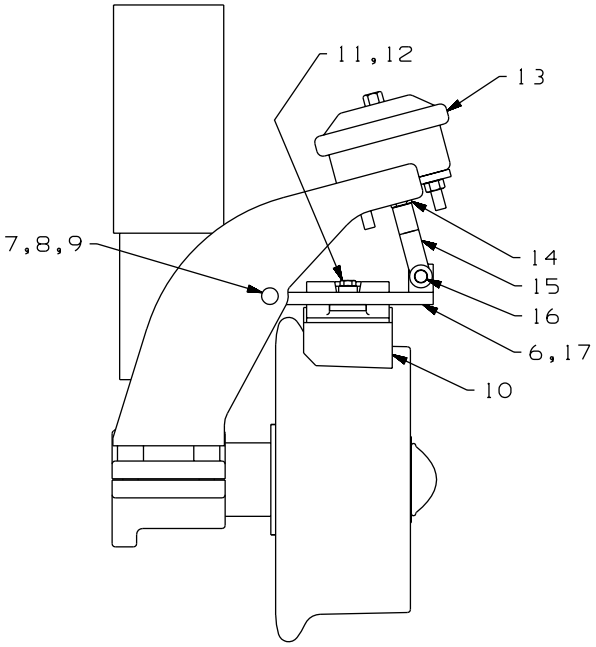
REAR BRAKE CONNECTION GROUP - 163991

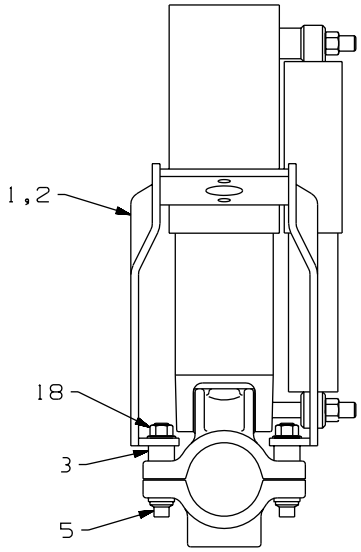


SE021271A-1

ITEM	PART NO	DESCRIPTION	QTY
1	F022304	Tee, 7/16 M JIC x 1/4 M NPT x 7/16 M JIC	1
2	F012507	Swivel Hose Fitting, 7/16 F JIC	6
3	F014241	Tee, 7/16 M JIC x 7/16 M JIC x 7/16 M JIC	1
4	F024046	Adapter, 7/16 M JIC x 3/8 M NPT	2
5	F025058	Actuator (reference)	2
6	F012222	Hose, 1/4" I.D. (use as required)	240"

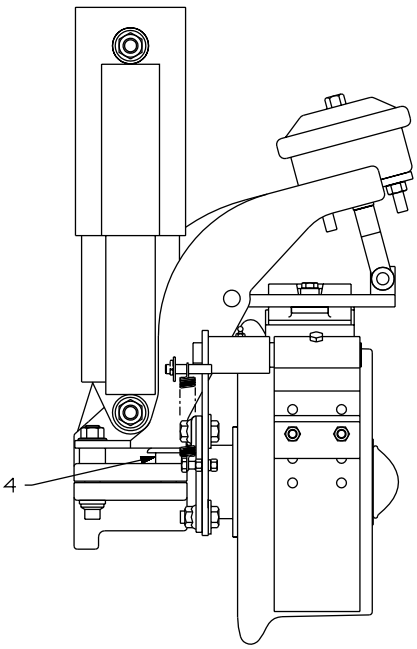
FRONT OR REAR UNIT BRAKE GROUP - 163990

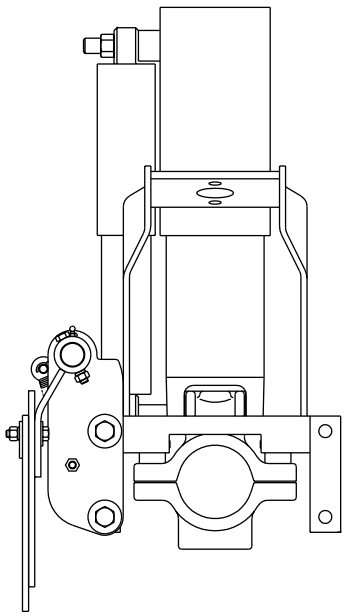




BRAKES AND GUIDE WHEEL NOT SHOWN IN THIS VIEW FOR CLARITY

BRAKE APPLICATION WITHOUT RAIL SWEEPS APPLIED





BRAKES AND GUIDE WHEEL NOT SHOWN IN THIS VIEW FOR CLARITY

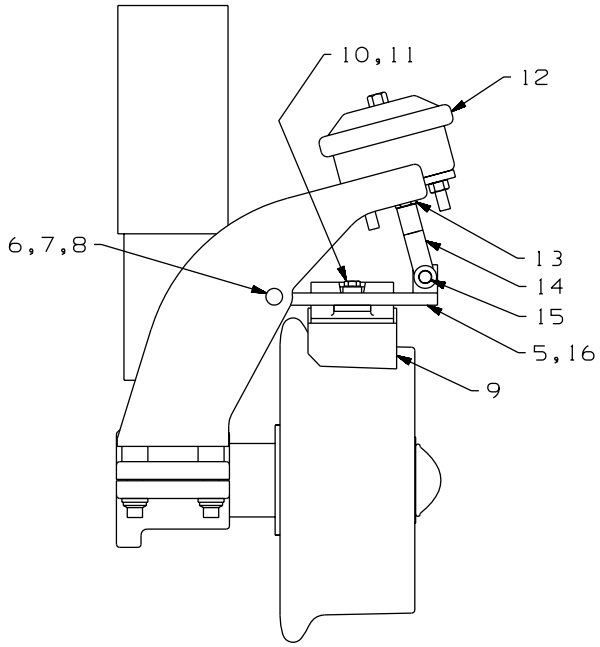
BRAKE APPLICATION WITH RAIL SWEEP APPLIED

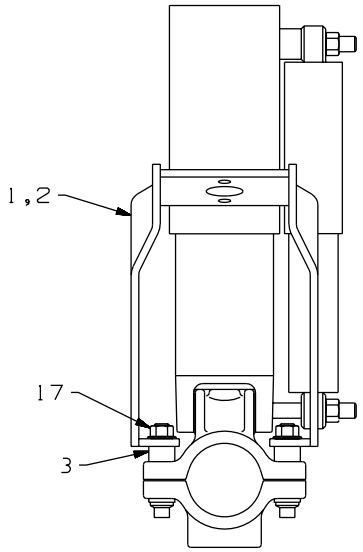
7

FRONT OR REAR UNIT BRAKE GROUP - 163990

ITEM	PART NO	DESCRIPTION	QTY
1	162429	Bracket	1
2	162426	Bracket	1
3	162327	Spacer	8
4	154521	Spacer (part of rail sweep group)	4
5	F025504	Cap Screw, 5/8-11 x 2-3/4" Counter Bore	8
6	162052	Plate	2
7	162050	Pin	2
8	M033847	Washer	4
9	F001182	Cotter Pin, 1/8 x 1-1/4"	4
10	F022274	Brake Shoe	2
11	157694	Link	2
12	F023416	Cap Screw, 3/8-16 x 3/4" GR 5 Hex Flg Hd	4
13	F025058	Actuator	2
14	F011013	Hex Jam Nut, 1/2"-20	2
15	F005459	Yoke End	2
16	F005460	Yoke Pin With Cotter Pins	2
17	F008014	Grease Fitting	4
18	F021924	Hex Flg Nut, 5/8"-11	4

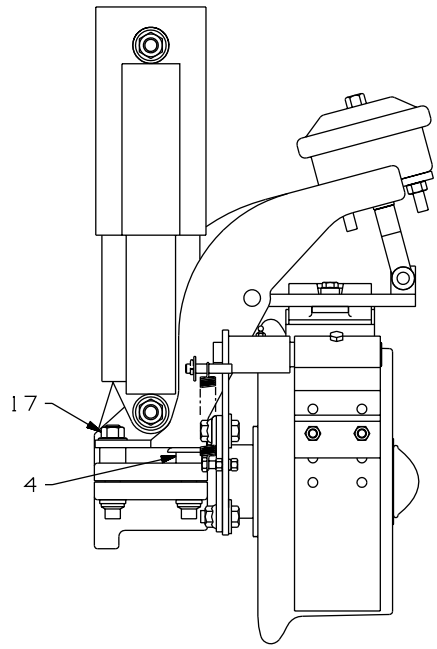
FRONT OR REAR UNIT BRAKE GROUP - 168477

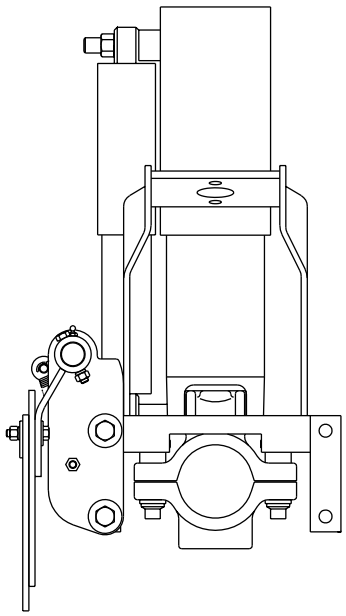




BRAKES AND GUIDE WHEEL NOT SHOWN IN THIS VIEW FOR CLARITY

BRAKE APPLICATION WITHOUT RAIL SWEEPS APPLIED





BRAKES AND GUIDE WHEEL NOT SHOWN IN THIS VIEW FOR CLARITY

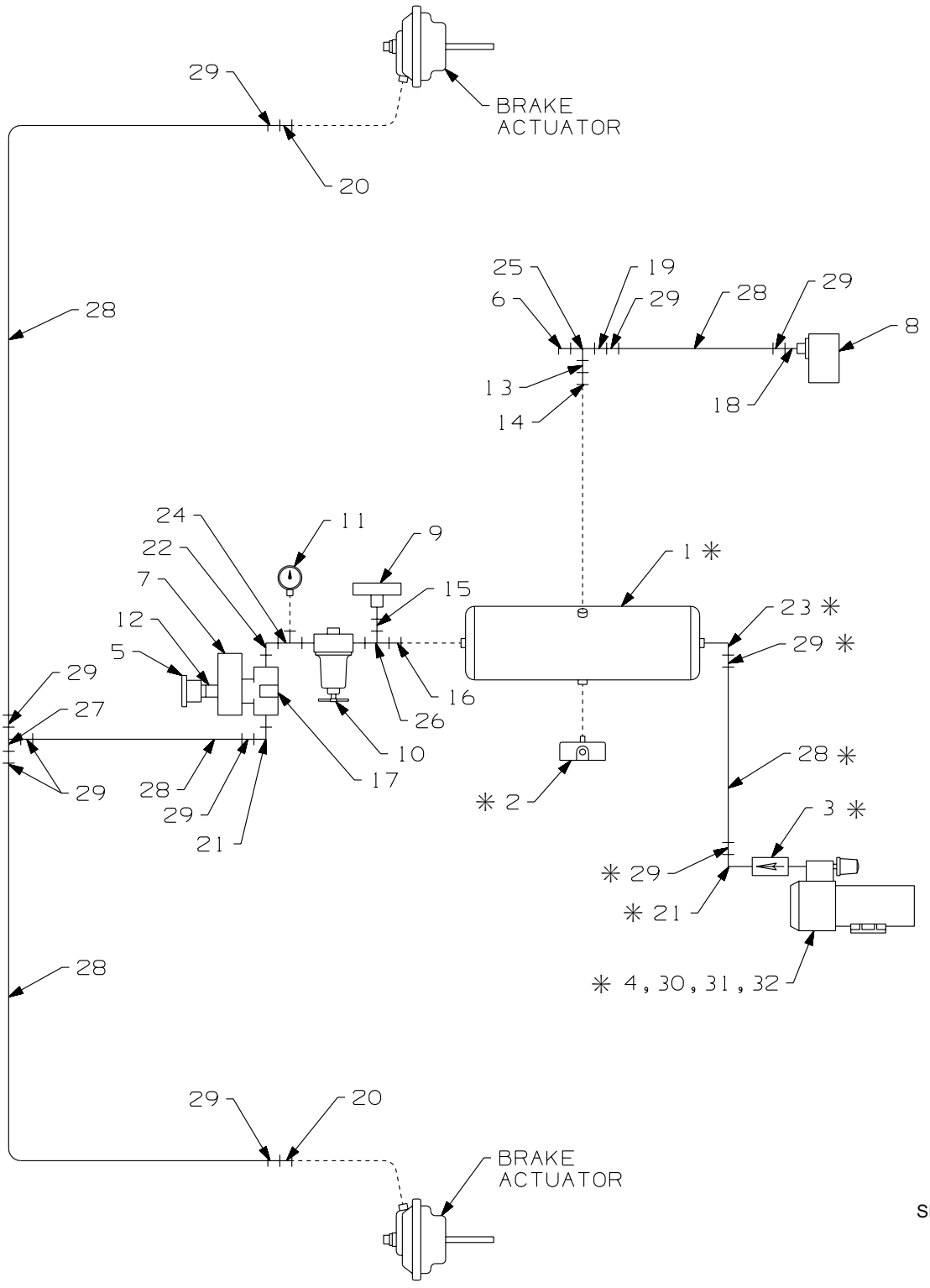
BRAKE APPLICATION WITH RAIL SWEEP APPLIED

7

FRONT OR REAR UNIT BRAKE GROUP - 168477

ITEM	PART NO	DESCRIPTION	QTY
1	162429	Bracket	1
2	162426	Bracket	1
3	162327	Spacer	8
4	154521	Spacer (part of rail sweep group)	4
5	162052	Plate	2
6	162050	Pin	2
7	M033847	Washer	4
8	F001182	Cotter Pin, 1/8 x 1-1/4"	4
9	F022274	Brake Shoe	2
10	157694	Link	2
11	F023416	Cap Screw, 3/8-16 x 3/4" GR 5 Hex Flg Hd	4
12	F025058	Actuator	2
13	F011013	Hex Jam Nut, 1/2"-20	2
14	F005459	Yoke End	2
15	F005460	Yoke Pin With Cotter Pins	2
16	F008014	Grease Fitting	4
17	F021924	Hex Flg Nut, 5/8"-11	4

ELECTRIC/AIR BRAKE SYSTEM GROUP - 163987 - FULL
ELECTRIC/AIR BRAKE SYSTEM GROUP - 163988 - ABBREVIATED
BRAKE SYSTEM AIR PIPING



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✳ ITEMS NOT INCLUDED IN THE 163988 ELECTRIC/AIR BRAKE SYSTEM GROUP - ABBREVIATED

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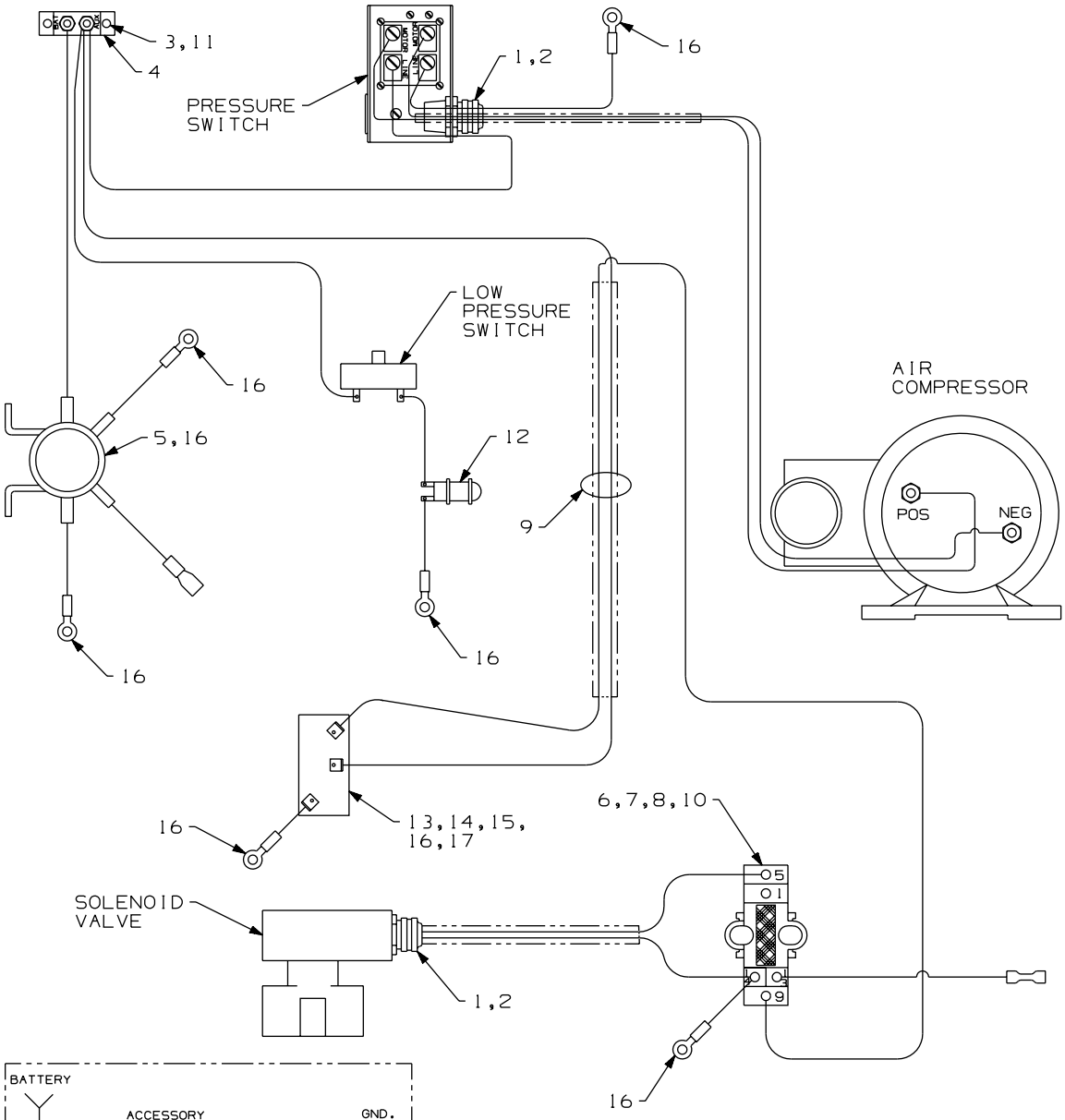
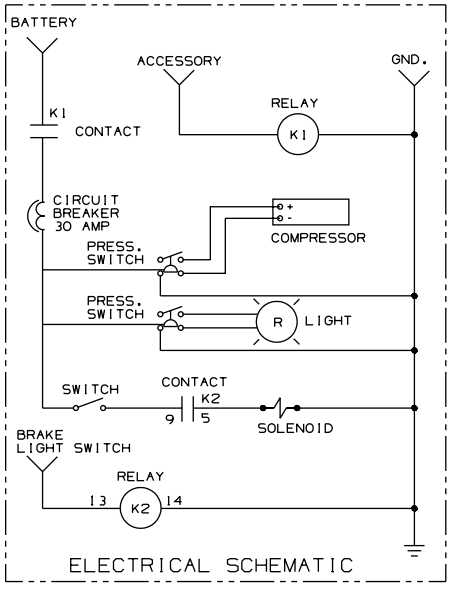
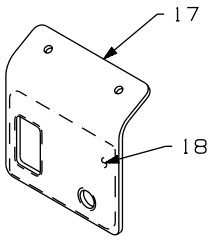
ELECTRIC/AIR BRAKE SYSTEM GROUP - 163987 - FULL
ELECTRIC/AIR BRAKE SYSTEM GROUP - 163988 - ABBREVIATED
BRAKE SYSTEM AIR PIPING

ITEM	PART NO	DESCRIPTION	QTY
1	F009910	Air Reservoir	1
1a	F022776	Reservoir Mounting Bracket	2
1b	F040088	Hex Flg Nut, 5/16"-18	4
1c	F023415	Cap Screw, 5/16-18 x 1-1/2" GR 5 Hex Flg Hd	4
2	F021131	Moisture Ejection Valve	1
3	F015447	Check Valve	1
4	F025423	Air Compressor	1
5	F025816	Vent	1
6	F010144	Safety Valve	1
7	F025025	Solenoid Valve	1
8	F019402	Pressure Switch	1
8a	157631	Pressure Switch Mounting Angle	1
9	F025055	Low Pressure Switch	1
10	F018668	Regulator	1
11	F019924	Pressure Gauge	1
12	F001737	Coupling, 1/8 F NPT x 1/8 F NPT	1
13	F023936	Coupling, 1/4 F NPT x 1/4 F NPT	1
14	F013373	Hex Nipple, 1/4 M NPT x 3/8 M NPT	1
15	F004386	Bushing, 1/4 M NPT x 1/8 F NPT	1
16	F008844	Bushing, 3/8 M NPT x 1/4 F NPT	1
17	F011132	Plug, 1/8 M NPT	1
18	F023041	Adapter, 7/16 M JIC x 1/4 M NPT	1
19	F023087	Adapter, 9/16 F JIC x 7/16 M JIC	1
20	F024046	Adapter, 7/16 M JIC x 3/8 M NPT	2
21	F011937	90° Elbow, 7/16 M JIC x 1/4 M NPT	2
22	F013685	90° Elbow, 1/4 M NPT x 1/4 M NPT	1
23	F015104	90° Elbow, 7/16 M JIC x 3/8 M NPT	1
24	F010680	Tee, 1/4 M NPT x 1/4 F NPT x 1/4 F NPT	1
25	F011241	Tee, 9/16 M JIC x 1/4 F NPT x 1/4 M NPT	1
26	F015809	Tee, 1/4 M NPT x 1/4 M NPT x 1/4 F NPT	1
27	F014241	Tee, 7/16 M JIC x 7/16 M JIC x 7/16 M JIC	1
28	F012222	Hose, 1/4" I.D.	600"
29	F012507	Swivel Hose Fitting, 7/16 F JIC	10
30	161888	Cover, Air Compressor	1
31	F023255	Cap Screw, 3/8-16 x 1" GR 5 Hex Flg Hd	4
32	F023225	Hex Flg Nut, 3/8"-16 GR 5	4

ELECTRIC/AIR BRAKE SYSTEM GROUP - 163987 - FULL
ELECTRIC/AIR BRAKE SYSTEM GROUP - 163988 - ABBREVIATED
BRAKE SYSTEM ELECTRICAL WIRING







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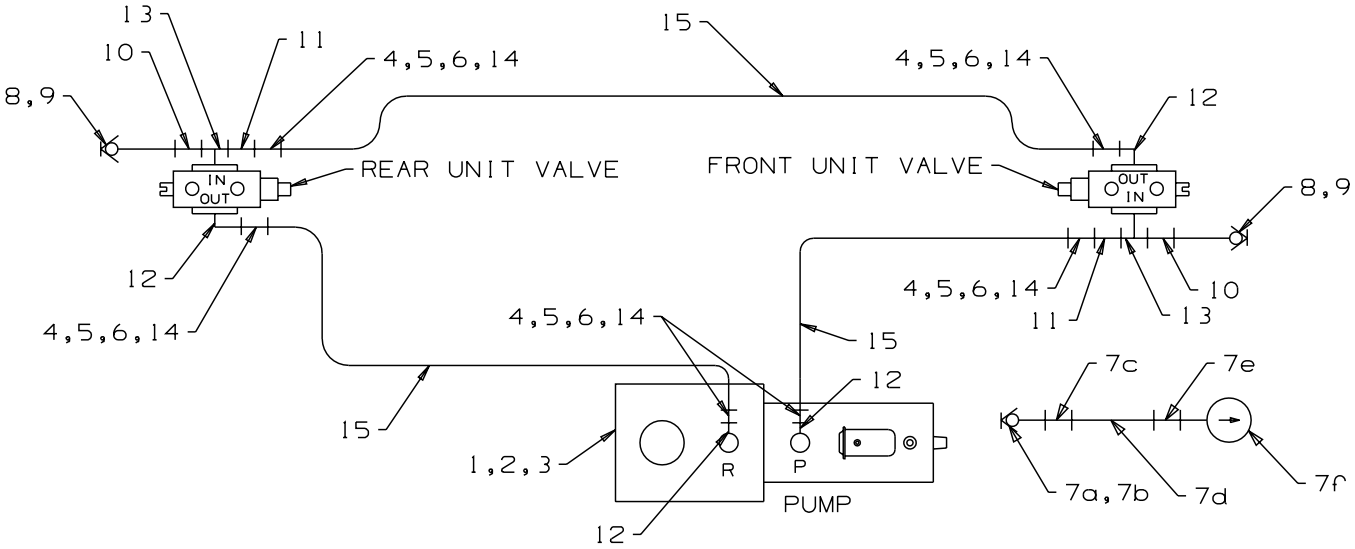
ELECTRIC/AIR BRAKE SYSTEM GROUP - 163987 - FULL
ELECTRIC/AIR BRAKE SYSTEM GROUP - 163988 - ABBREVIATED
BRAKE SYSTEM ELECTRICAL WIRING

ITEM	PART NO	DESCRIPTION	QTY
1	F014874	Cable Grip	2
2	F013279	Lock Nut	2
3	F009594	Machine Screw, #10-24 x 5/8" Rd Hd	2
4	F014406	Circuit Breaker	1
5	F018569	Solenoid	1
6	F023445	Relay Socket	1
7	F023444	Relay	1
8	F023443	Bail	1
9	F017311	Grommet	1
10	F007801	Screw, #8 x 5/8" Rd Hd Self-Tap	2
11	F022039	Hex Flg Nut, #10-24	2
12	F017159	Indicator Light.	1
13	F023886	Switch	1
14	F009594	Machine Screw, #10-24 x 5/8" Rd Hd	4
15	F022039	Hex Flg Nut, #10-24	4
16	F009265	Screw, #12 x 1/2" Rd Hd Self-Tap	9
17	168107	Switch Mount	1
18	168464	Decal, Panel	1
19	157633	Decal, Do Not Propel...(not Illustrated)	1

HYDRAULIC POWER PACK GROUP - 168104
HYDRAULIC SYSTEM

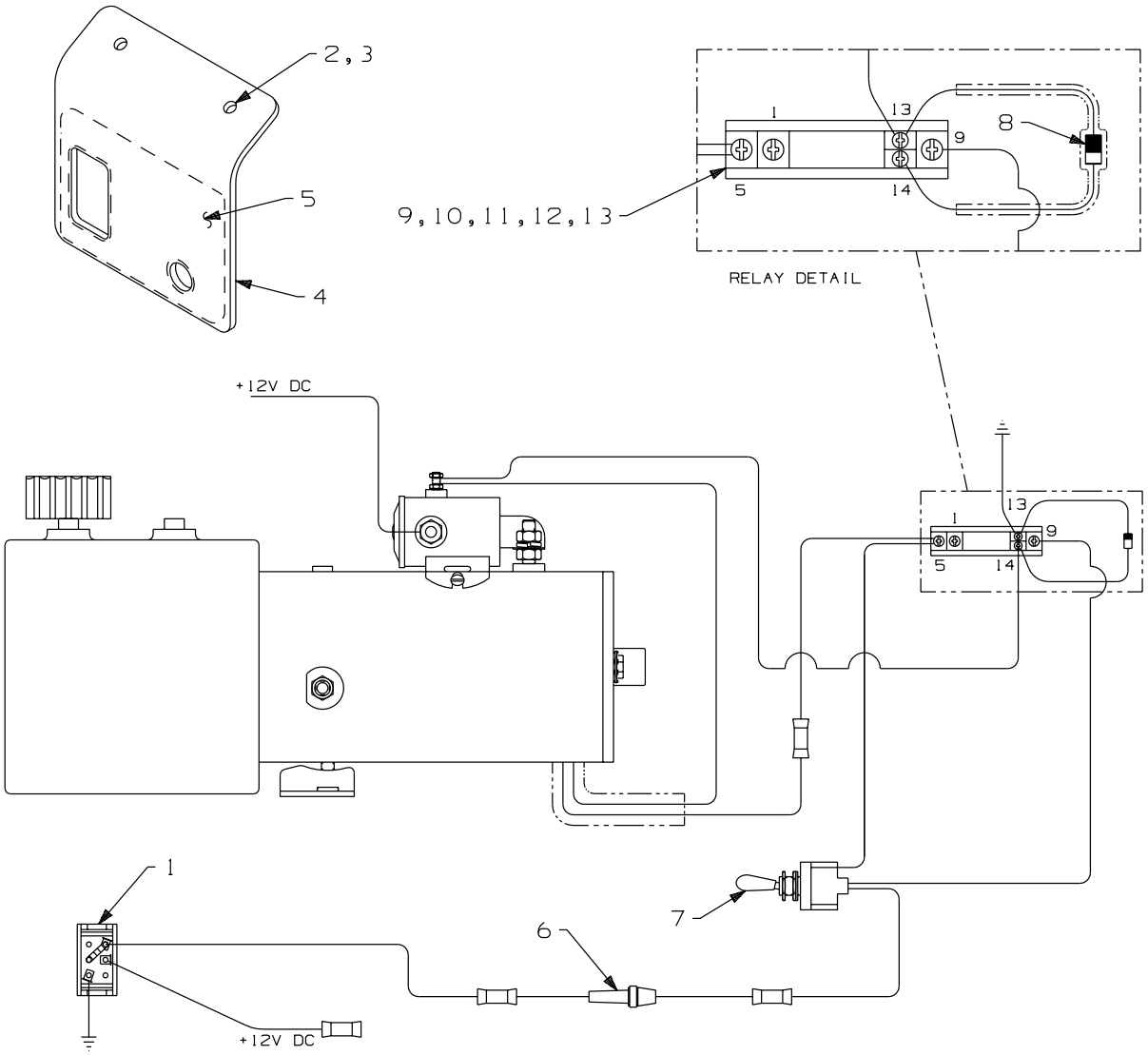


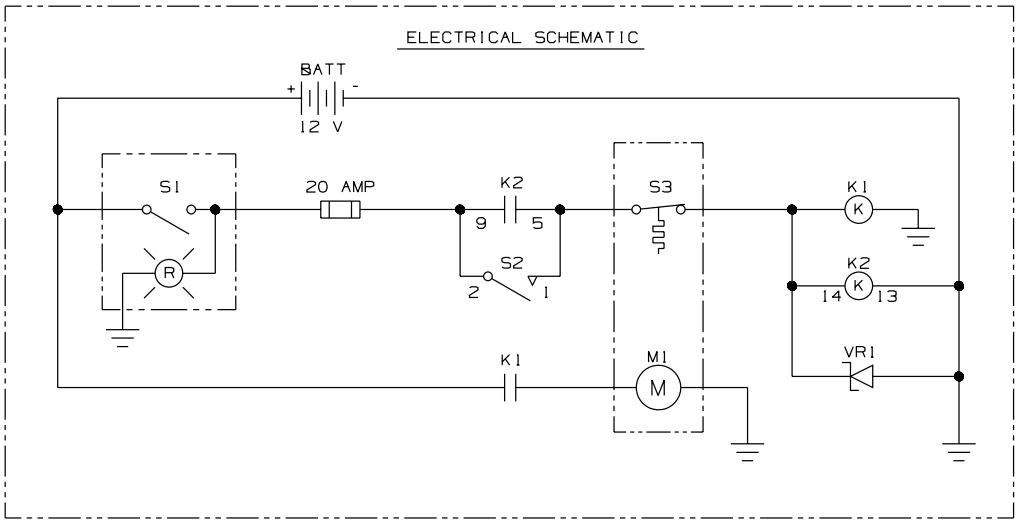
SE021523A-1

HYDRAULIC POWER PACK GROUP - 168104
HYDRAULIC SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	F025767	Hydraulic Unit	1
2	F004683	Cap Screw, 3/8-16 x 5/8" GR 5 Hex Hd	2
3	F001025	SAE Lock Washer, 3/8"	2
4	F009825	Cap Screw, 1/4-20 x 1" GR 5 Hex Hd	8
5	F009535	SAE Lock Washer, 1/4"	8
6	F007022	Hex Nut, 1/4"-20	8
7	099137K	PRESSURE GAUGE ASSEMBLY	1
7a	F015110K	Female Coupler	1
7b	F015111	Dust Cap	1
7c	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	1
7d	171878	Hose, 5/16 x 14" Swivel 9/16 F JIC Both Ends	1
7e	F011109	Adapter, 9/16 M JIC x 1/4 F NPT	1
7f	F011432K	Pressure Gauge - 0 to 3000 PSI, 1/4 M NPT	1
8	F015303K	Male Coupler	2
9	F015077	Dust Cap	2
10	F011604	Nipple, 3/8 M NPT x 3/8 M NPT	2
11	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	2
12	F012055	90° Elbow, 3/8 M NPT x 9/16 M JIC	4
13	F011594	Tee, 3/8 F NPT x 3/8 F NPT x 3/8 M NPT	2
14	F019242	Hose Clamp	8
15	140348	HOSE GROUP	1
15a	F010693	Hose, 5/16" I.D.	720"
15b	F011392	Swivel Hose Fitting, 9/16 F JIC	6

HYDRAULIC POWER PACK GROUP - 168104
ELECTRICAL SYSTEM





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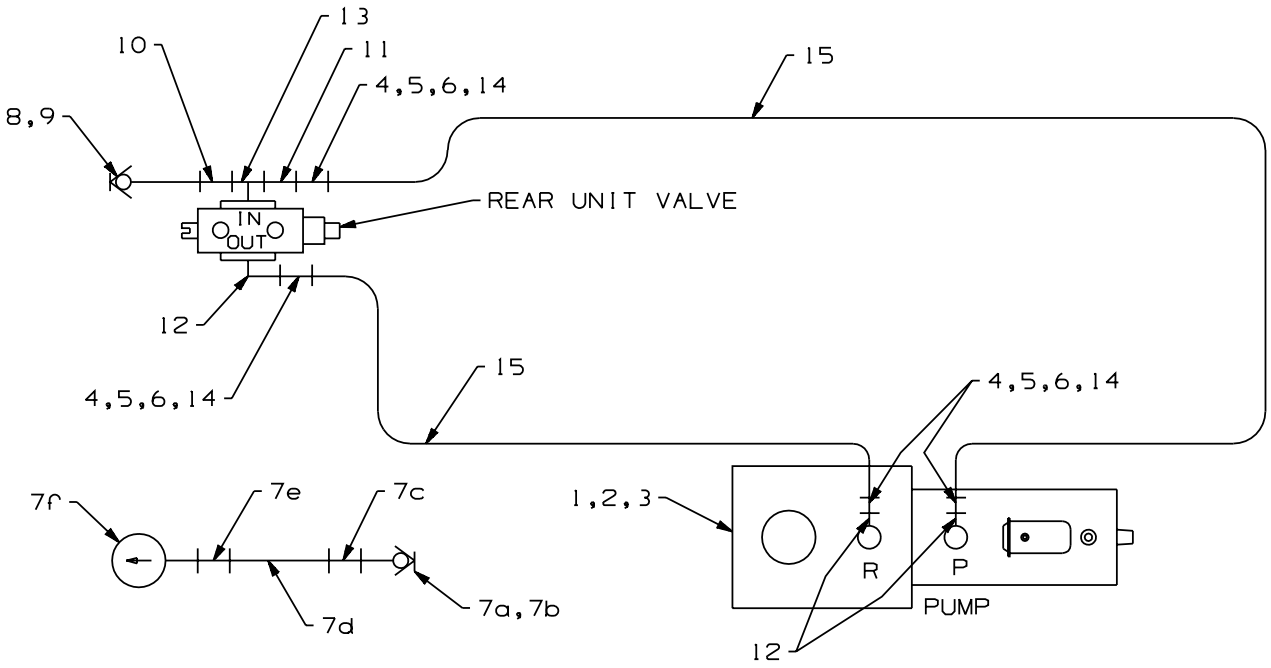
HYDRAULIC POWER PACK GROUP - 168104
ELECTRICAL SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	F023886	Switch, ON/OFF	1
2	F009594	Machine Screw, #10-24 x 5/8" Rd Hd	2
3	F022039	Hex Flg Nut, #10-24	2
4	168107	Switch Mount	1
5	168108	Decal, Panel	1
6	F017476	Fuse Holder, With 20 Amp Fuse	1
7	F017149	Switch	1
8	F022246	Noise Suppresser	1
9	F007801	Screw, #8 x 5/8" Rd Hd Self-Tap	2
10	F023563	Connector	2
11	F023443	Bail	1
12	F023444	Relay	1
13	F023445	Relay Socket	1

HYDRAULIC POWER PACK GROUP - 168105, REAR ONLY
HYDRAULIC SYSTEM



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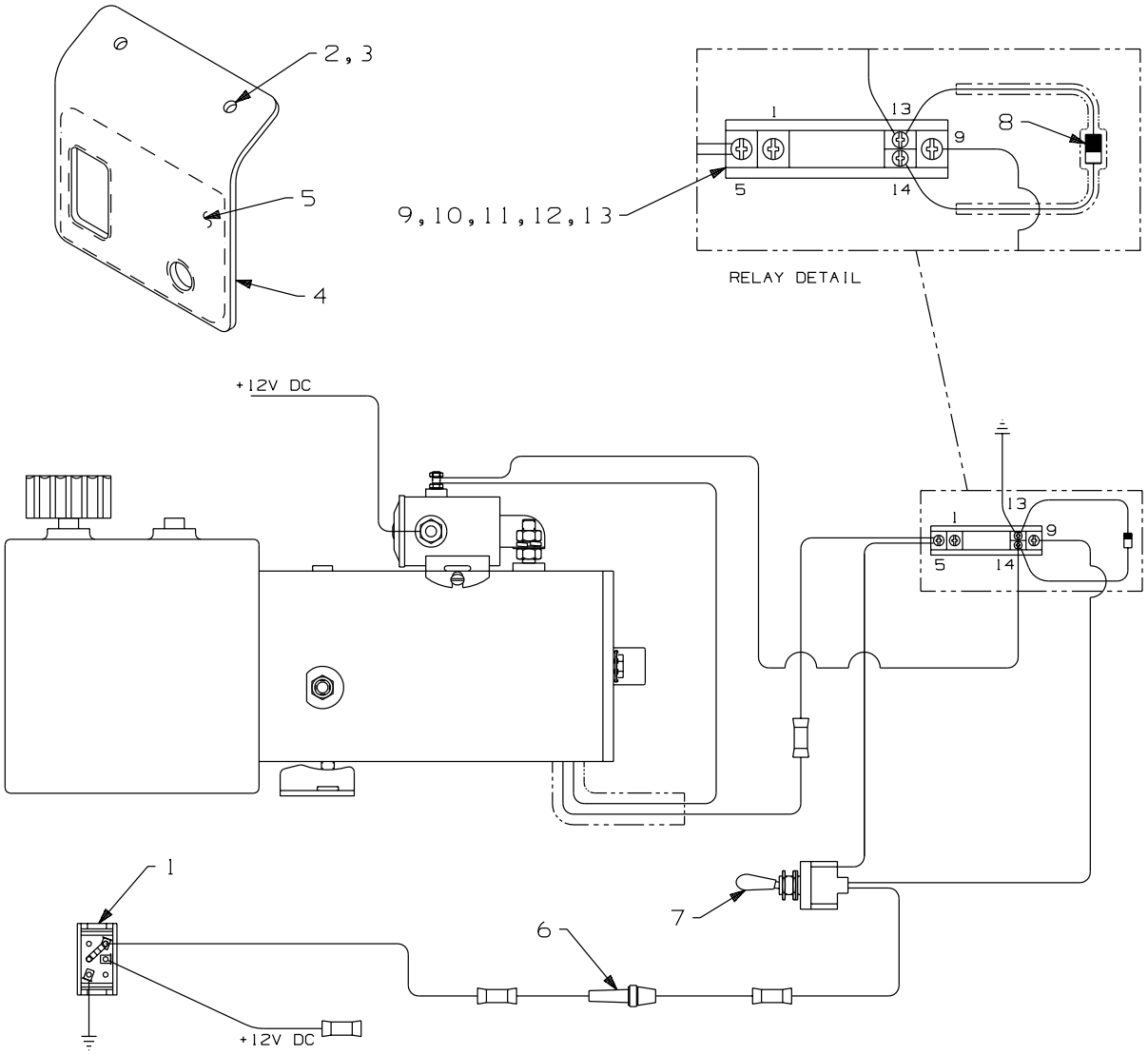
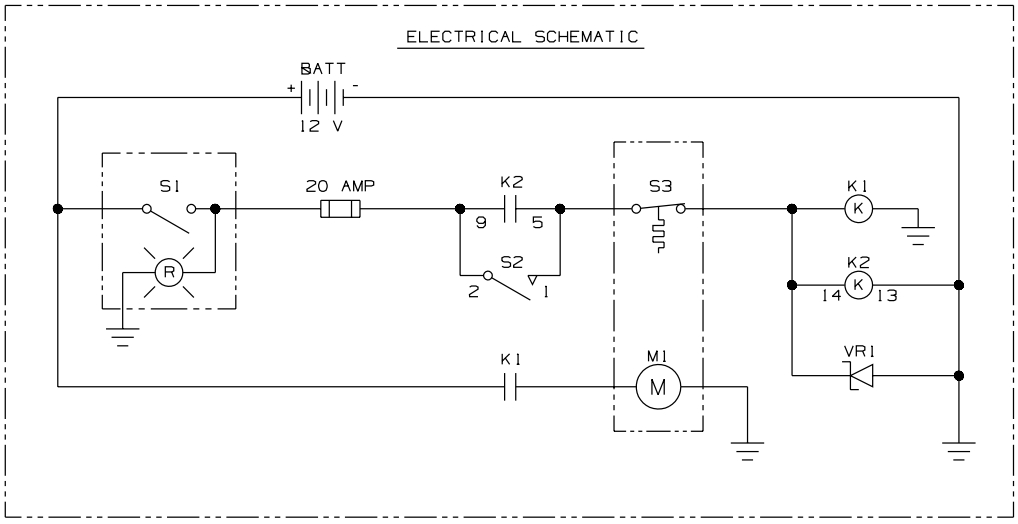
HYDRAULIC POWER PACK GROUP - 168105, REAR ONLY
HYDRAULIC SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	F025767	Hydraulic Unit	1
2	F004683	Cap Screw, 3/8-16 x 5/8" GR 5 Hex Hd	2
3	F001025	SAE Lock Washer, 3/8"	2
4	F009825	Cap Screw, 1/4-20 x 1" GR 5 Hex Hd	4
5	F009535	SAE Lock Washer, 1/4"	4
6	F007022	Hex Nut, 1/4"-20	4
7	099137K	PRESSURE GAUGE ASSEMBLY	1
7a	F015110K	Female Coupler	1
7b	F015111	Dust Cap	1
7c	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	1
7d	171878	Hose, 5/16 x 14" Swivel 9/16 F JIC Both Ends	1
7e	F011109	Adapter, 9/16 M JIC x 1/4 F NPT	1
7f	F011432K	Pressure Gauge - 0 to 3000 PSI, 1/4 M NPT	1
8	F015303K	Male Coupler	1
9	F015077	Dust Cap	1
10	F011604	Nipple, 3/8 M NPT x 3/8 M NPT	1
11	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	1
12	F012055	90° Elbow, 3/8 M NPT x 9/16 M JIC	3
13	F011594	Tee, 3/8 F NPT x 3/8 F NPT x 3/8 M NPT	1
14	F019242	Hose Clamp	4
15	154047	HOSE GROUP	1
15a	F010693	Hose, 5/16" I.D.	600"
15b	F011392	Swivel Hose Fitting, 9/16 F JIC	4

HYDRAULIC POWER PACK GROUP - 168105, REAR ONLY
ELECTRICAL SYSTEM





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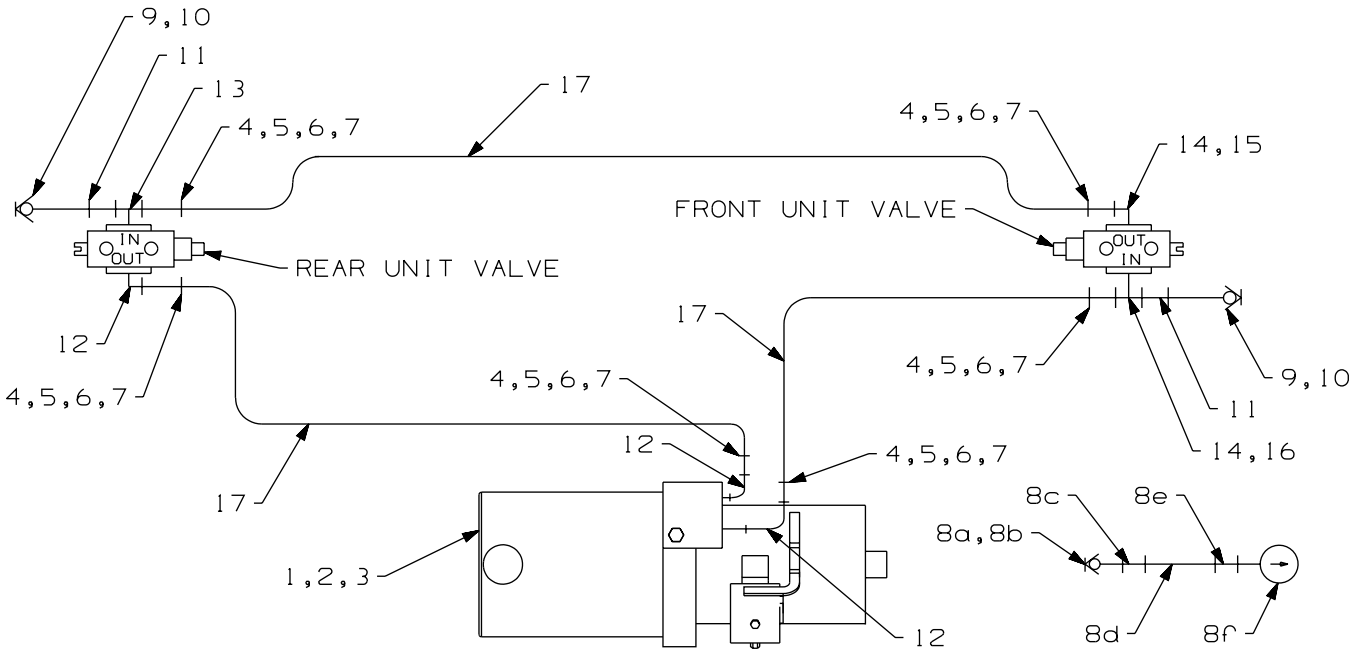
HYDRAULIC POWER PACK GROUP - 168105, REAR ONLY
ELECTRICAL SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	F023886	Switch, ON/OFF	1
2	F009594	Machine Screw, #10-24 x 5/8" Rd Hd	2
3	F022039	Hex Flg Nut, #10-24	2
4	168107	Switch Mount	1
5	168108	Decal, Panel	1
6	F017476	Fuse Holder, With 20 Amp Fuse	1
7	F017149	Switch	1
8	F022246	Noise Suppresser	1
9	F007801	Screw, #8 x 5/8" Rd Hd Self-Tap	2
10	F023563	Connector	2
11	F023443	Bail	1
12	F023444	Relay	1
13	F023445	Relay Socket	1

186157 HYDRAULIC POWER PACK GROUP
HYDRAULIC SYSTEM

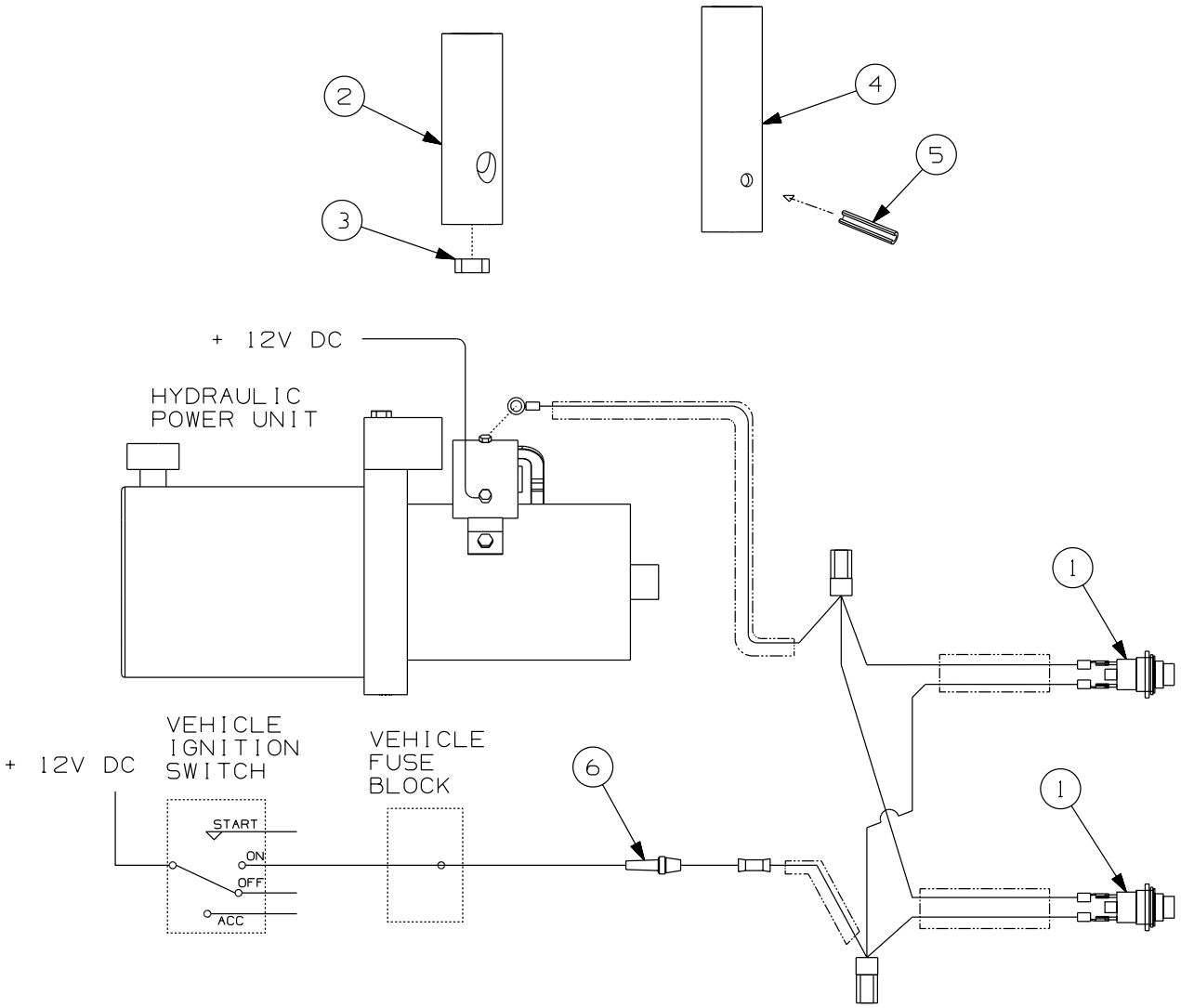


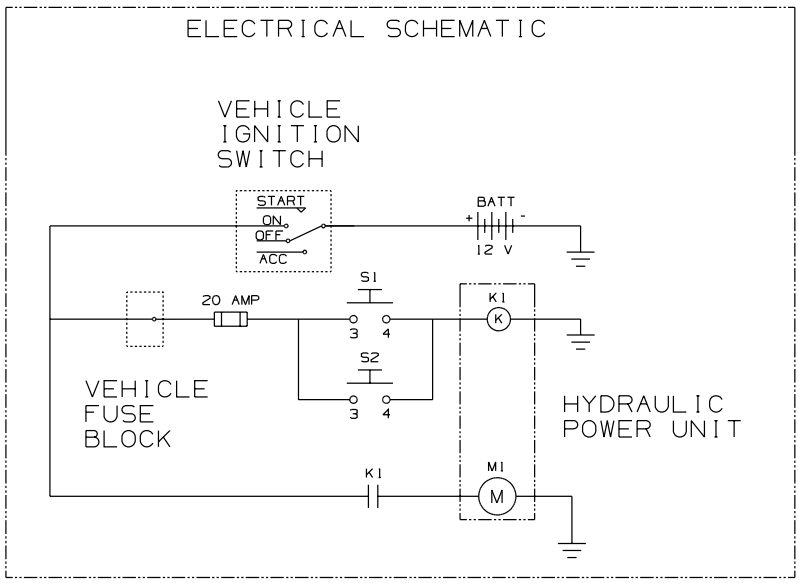
SE023172A-1

186157 HYDRAULIC POWER PACK GROUP
HYDRAULIC SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	186119	Hydraulic Unit	1
2	F004683	Cap Screw, 3/8-16 x 5/8" GR 5 Hex Hd	2
3	F001025	SAE Lock Washer, 3/8"	2
4	F019242	Hose Clamp	8
5	F009825	Cap Screw, 1/4-20 x 1" GR 5 Hex Hd	8
6	F009535	SAE Lock Washer, 1/4"	8
7	F007022	Hex Nut, 1/4"-20	8
8	099137K	PRESSURE GAUGE ASSEMBLY	1
8a	F015110K	Female Coupler	1
8b	F015111	Dust Cap	1
8c	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	1
8d	171878	Hose, 3/8 x 14" Swivel 9/16 F JIC Both Ends	1
8e	F011109	Adapter, 9/16 M JIC x 1/4 F NPT	1
8f	F011432K	Pressure Gauge - 0 to 3000 PSI, 1/4 M NPT	1
9	F015303K	Male Coupler	2
10	F015077	Dust Cap	2
11	F011604	Nipple, 3/8 M NPT x 3/8 M NPT	2
12	F012055	90° Elbow, 3/8 M NPT x 9/16 M JIC	4
13	F011594	Tee, 3/8 F NPT x 3/8 F NPT x 3/8 M NPT	1
14	F013518	Adapter, 9/16 M JIC x 3/4 M STR	2
15	F012808	90° Elbow, 9/16 F STR x 9/16 M JIC	1
16	F015626	Tee, 9/16 M JIC x 9/16 M JIC x 9/16 F STR	1
17	140348	HOSE GROUP	1
17a	F010693	Hose, 5/16" I.D.	720"
17b	F011392	Swivel Hose Fitting, 9/16 F JIC	6

186157 HYDRAULIC POWER PACK GROUP
ELECTRICAL SYSTEM





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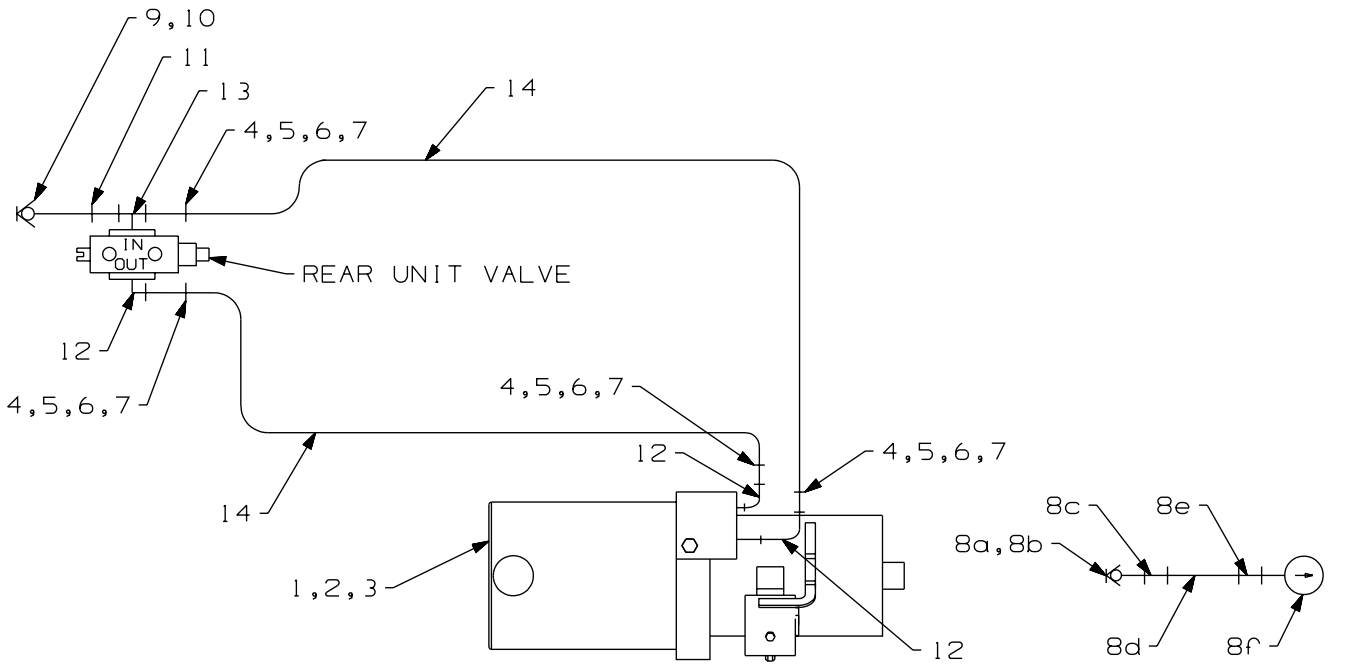
186157 HYDRAULIC POWER PACK GROUP
ELECTRICAL SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	F025620	Switch	2
2	186118	Handle / Switch Mount Tube, HR18A Rail Pilot Unit	1
3	F025777	Hex Nut, M8 x 1.25	1
4	184549	Handle / Switch Mount Tube, HR2000 Rail Pilot Unit	1
5	700751087	Spring Pin, 3/16 x 7/8"	1
6	F017476	Fused Line Connector With 20 amp Fuse	1

186159 HYDRAULIC POWER PACK GROUP - REAR ONLY
HYDRAULIC SYSTEM



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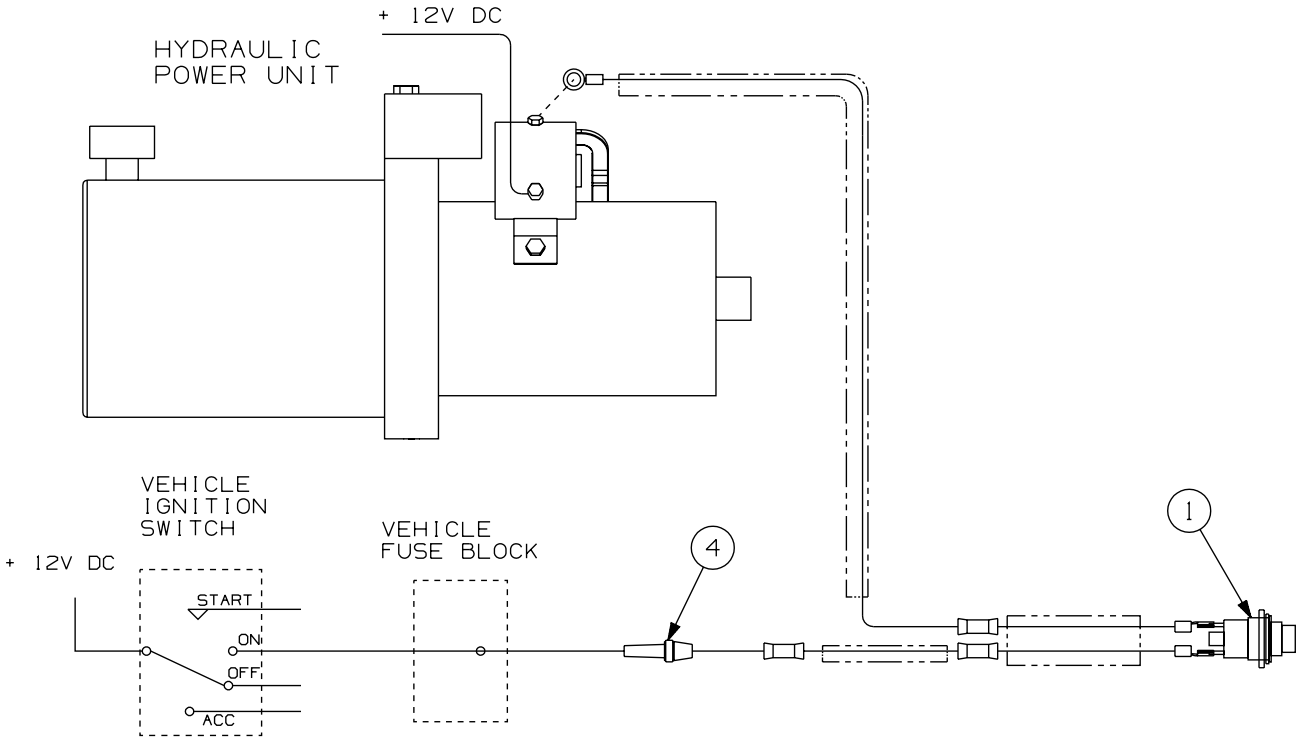
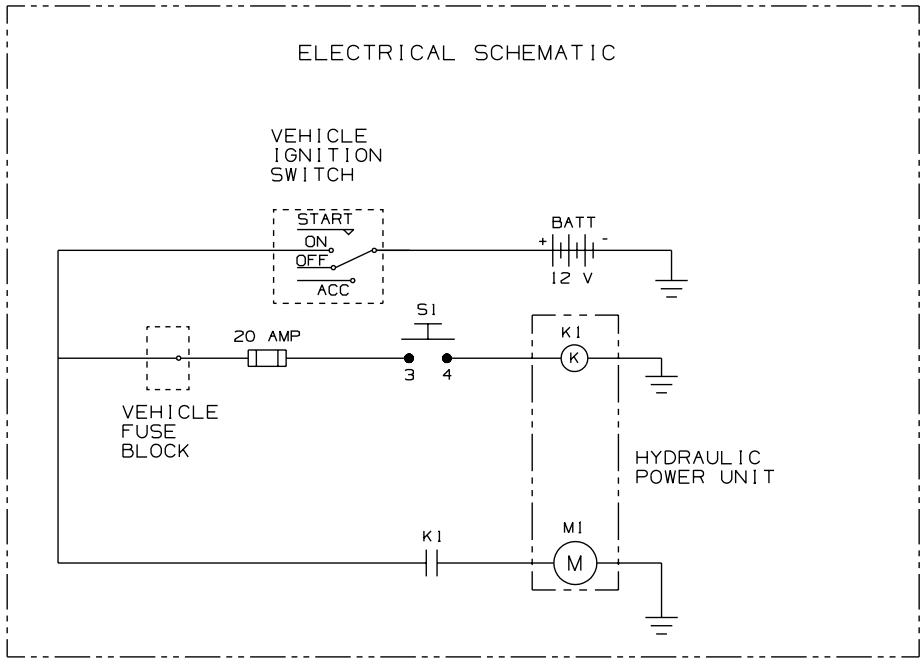
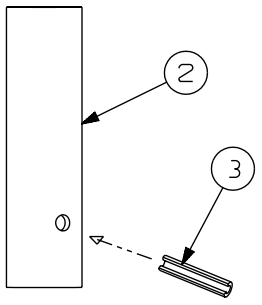
186159 HYDRAULIC POWER PACK GROUP - REAR ONLY
HYDRAULIC SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	186119	Hydraulic Unit	1
2	F004683	Cap Screw, 3/8-16 x 5/8" GR 5 Hex Hd	2
3	F001025	SAE Lock Washer, 3/8"	2
4	F019242	Hose Clamp	5
5	F009825	Cap Screw, 1/4-20 x 1" GR 5 Hex Hd	5
6	F009535	SAE Lock Washer, 1/4"	5
7	F007022	Hex Nut, 1/4"-20	5
8	099137K	PRESSURE GAUGE ASSEMBLY	1
8a	F015110K	Female Coupler	1
8b	F015111	Dust Cap	1
8c	F012056	Adapter, 3/8 M NPT x 9/16 M JIC	1
8d	171878	Hose, 3/8 x 14" Swivel 9/16 F JIC Both Ends	1
8e	F011109	Adapter, 9/16 M JIC x 1/4 F NPT	1
8f	F011432K	Pressure Gauge - 0 to 3000 PSI, 1/4 M NPT	1
9	F015303K	Male Coupler	1
10	F015077	Dust Cap	1
11	F011604	Nipple, 3/8 M NPT x 3/8 M NPT	1
12	F012055	90° Elbow, 3/8 M NPT x 9/16 M JIC	3
13	F011594	Tee, 3/8 F NPT x 3/8 F NPT x 3/8 M NPT	1
14	154047	HOSE GROUP	1
14a	F010693	Hose, 5/16" I.D.	600"
14b	F011392	Swivel Hose Fitting, 9/16 F JIC	4

186159 HYDRAULIC POWER PACK GROUP - REAR ONLY
ELECTRICAL SYSTEM







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186159 HYDRAULIC POWER PACK GROUP - REAR ONLY
ELECTRICAL SYSTEM

ITEM	PART NO	DESCRIPTION	QTY
1	F025620	Switch	2
2	184549	Handle / Switch Mount Tube	2
3	700751087	Spring Pin, 3/16 x 7/8"	2
4	F017476	Fused Line Connector With 20 amp Fuse	1

MOUNTING BRACKET GROUP - 162460 - REAR ONLY

PART NO	DESCRIPTION	QTY
162460	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
162457	Side Bar, Right	1
162458	Side Bar, Left	1
156004	Shim (use as required)	2
156005	Shim (use as required)	2
F015134	Cap Screw, 3/4-10 x 1-3/4" GR 5 Hex Hd	4
099193	Washer	4
F001354	SAE Lock Washer, 3/4"	4
F013695	Hex Nut, 3/4"-10	4
F020919	Hardened Washer	6
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
F002753	Cap Screw, 1/2-13 x 2-1/4" GR 5 Hex Hd	2
F001075	SAE Lock Washer, 1/2"	2
F003598	Hex Nut, 1/2"-13	2
161895	Channel (weld on)	2
021195	Rear Unit Application Drawing - HR2000A3	
021272	Rear Unit Application Drawing - HR2000A3	

MOUNTING BRACKET GROUP - 164044 - REAR ONLY

PART NO	DESCRIPTION	QTY
164044	MOUNTING BRACKET GROUP	1

Rear Unit Mounting Parts

164040	Side Bar	1
164041	Side Bar	1
156004	Shim (use as required)	2
156005	Shim (use as required)	2
F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	2
F001075	SAE Lock Washer, 1/2"	2
F003598	Hex Nut, 1/2"-13	2
F005192	Cap Screw, 5/8-11 x 1-3/4" GR 5 Hex Hd	4
125978	Washer	4
F001103	SAE Lock Washer, 5/8"	4
F007023	Hex Nut, 5/8"-11	4
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
F020919	Hardened Washer	6
F021924	Hex Flg Nut, 5/8"-11	6
021418	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 174348 - REAR ONLY

PART NO	DESCRIPTION	QTY
174348	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
163636	Brace End	1
163634	Brace End	1
F024047	Washer	4
174321	Side Bar, Right	1
174322	Side Bar, Left	1
108823	Shim (use as required)	4
108824	Shim (use as required)	4
F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	2
F001075	SAE Lock Washer, 1/2"	2
F003598	Hex Nut, 1/2"-13 GR 5	2
F005192	Cap Screw, 5/8-11 x 1-3/4" GR 5 Hex Hd	4
125978	Washer	4
F001103	SAE Lock Washer, 5/8"	4
F007023	Hex Nut 5/8"-11 GR 5	4
F018860	Cap Screw, 1/2-13 x 2-3/4" GR 8 Hex Hd	6
F024047	Washer	6
174323	Bar	2
F014487	Elastic Stop Nut, 1/2"-13	6
021418	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 175219 - REAR ONLY

PART NO	DESCRIPTION	QTY
175219	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
164040	Side Bar	1
164041	Side Bar	1
156004	Shim (use as required)	2
156005	Shim (use as required)	2
F001539	Cap Screw, 1/2-13 x 1-1/4" GR 5 Hex Hd	2
F001075	SAE Lock Washer, 1/2"	2
F003598	Hex Nut, 1/2"-13	2
F005192	Cap Screw, 5/8-11 x 1-3/4" GR 5 Hex Hd	4
125978	Washer	4
F001103	Lock Washer, 5/8"	4
F007023	Hex Nut, 5/8"-11	4
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
F020919	Hardened Washer	6
F021924	Hex Flg Nut, 5/8"-11	6
021418	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 175221 - REAR ONLY

PART NO	DESCRIPTION	QTY
175221	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
162457	Side Bar, Right	1
162458	Side Bar, Left	1
156004	Shim (use as required)	2
156005	Shim (use as required)	2
F015134	Cap Screw, 3/4-10 x 1-3/4" GR 5 Hex Hd	4
099193	Washer	4
F001354	Lock Washer, 3/4"	4
F013695	Hex Nut, 3/4"-10	4
F020919	Hardened Washer	6
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
F002753	Cap Screw, 1/2-13 x 2-1/4" GR 5 Hex Hd	2
F001075	SAE Lock Washer, 1/2"	2
F003598	Hex Nut, 1/2"-13	2
021272	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 175697 - REAR ONLY

PART NO	DESCRIPTION	QTY
175697	MOUNTING BRACKET GROUP	1

Rear Unit Mounting Parts

F020919	Hardened Washer	6
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
F021924	Hex Flg Nut, 5/8"-11	6
161895	Frame Extension	2
156004	Shim (use as required)	2
156005	Shim (use as required)	2
021719	Rear Unit Application Drawing - HR2000A2	
021195	Rear Unit Application Drawing - HR2000A3	

MOUNTING BRACKET GROUP - 179945 - REAR ONLY

PART NO	DESCRIPTION	QTY
179945	MOUNTING BRACKET GROUP	1

Rear Unit Mounting Parts

F020919	Hardened Washer	6
700566225	Cap Screw, 5/8-11 x 2-1/4" GR 8 Hex Hd	6
F017188	Hex Elastic Stop Nut, 5/8"-11	6
126023	Frame Extension (weld on)	2
156004	Shim (use as required)	2
156005	Shim (use as required)	2
021728	Rear Unit Application Drawing - HR2000A2	
020647	Rear Unit Application Drawing - HR2000A3	

MOUNTING BRACKET GROUP - 181482 - REAR ONLY

PART NO	DESCRIPTION	QTY
181482	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
139647	Frame Extension (weld on)	2
156004	Shim (use as required)	2
156005	Shim (use as required)	2
149966	Cap Screw, 5/8-11 x 2-1/2" GR 8 Hex Hd	6
F020919	Hardened Washer	6
F012452	Hex Elastic Stop Nut, 5/8"-11	6
022724	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 181687 - REAR ONLY

PART NO	DESCRIPTION	QTY
181687	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
181661	Side Bar, Right	1
181662	Side Bar, Left	1
156004	Shim (use as required)	2
156005	Shim (use as required)	2
F020672	Cap Screw, 3/4-10 x 5" GR 8 Hex Hd	2
F013633	Elastic Stop Nut, 3/4"-10	2
F021137	Hardened Washer	2
F022822	Cap Screw, 5/8-11 x 4-1/2" GR 8 Hex Hd	2
F012452	Elastic Stop Nut, 5/8"	8
183875	Cap Screw, 1/2-13x4 1/2" Gr8 Hex Hd	4
F013500	Elastic Stop Nut, 1/2"-13	4
F001267	Wrought Washer, 1/2"	4
F016378	Cap Screw, 5/8-11 x 3-1/2" GR 8 Hex Hd	6
F023012	Hardened Washer	6
022910	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 184094 - REAR ONLY

PART NO	DESCRIPTION	QTY
184094	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
184092	Channel	2
149966	Cap Screw, 5/8-11 x 2-1/2" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	12
F017188	Hex Elastic Stop Nut, 5/8"-11	6
156004	Shim (use as required)	2
156005	Shim (use as required)	2
023095	Rear Unit Application Drawing - HR2000A2	

MOUNTING BRACKET GROUP - 184095 - REAR ONLY

PART NO	DESCRIPTION	QTY
184095	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
184092	Channel	2
149966	Cap Screw, 5/8-11 x 2-1/2" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	12
F017188	Hex Elastic Stop Nut, 5/8"-11	6
156004	Shim (use as required)	2
156005	Shim (use as required)	2
023095	Rear Unit Application Drawing - HR2000A2	
023094	Rear Unit Application Drawing - HR2000A3	

MOUNTING BRACKET GROUP - 184098 - REAR ONLY

PART NO	DESCRIPTION	QTY
184098	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
184092	Channel	2
149966	Cap Screw, 5/8-11 x 2-1/2" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	12
F017188	Hex Elastic Stop Nut, 5/8"-11	6
156004	Shim (use as required)	2
156005	Shim (use as required)	2
023095	Rear Unit Application Drawing - HR2000A2	
023094	Rear Unit Application Drawing - HR2000A3	

MOUNTING BRACKET GROUP - 184099 - REAR ONLY

PART NO	DESCRIPTION	QTY
184099	MOUNTING BRACKET GROUP	1
Rear Unit Mounting Parts		
184092	Channel	2
149966	Cap Screw, 5/8-11 x 2-1/2" GR 8 Hex Hd	6
F009425	SAE Washer, 5/8"	12
F017188	Hex Elastic Stop Nut, 5/8"-11	6
156004	Shim (use as required)	2
156005	Shim (use as required)	2
023094	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 184522 - REAR ONLY

PART NO	DESCRIPTION	QTY
184522	MOUNTING BRACKET GROUP	1

Rear Unit Mounting Parts

F002929	SAE Washer, 3/4"	4
700666075	Hex Lock Nut, 3/4"-10	2
F023012	Hardened Washer	20
F020460	Cap Screw, 5/8-11 x 2" GR 8 Hex Hd	4
F017188	Hex Elastic Stop Nut, 5/8"-11	10
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd	2
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
184508	Side Bar, Right	1
184507	Side Bar, Left	1
156004	Shim (use as required)	2
156005	Shim (use as required)	2
023062	Rear Unit Application Drawing	

MOUNTING BRACKET GROUP - 186149 - REAR ONLY

PART NO	DESCRIPTION	QTY
186149	MOUNTING BRACKET GROUP	1

Rear Unit Mounting Parts

F002929	SAE Washer, 3/4"	4
700666075	Hex Lock Nut, 3/4"-10	2
F023012	Hardened Washer	20
F020460	Cap Screw, 5/8-11 x 2" GR 8 Hex Hd	4
F017188	Hex Elastic Stop Nut, 5/8"-11	10
F020458	Cap Screw, 3/4-10 x 2-1/2" GR 8 Hex Hd	2
F005191	Cap Screw, 5/8-11 x 2-1/4" GR 5 Hex Hd	6
184508	Side Bar, Right	1
184507	Side Bar, Left	1
156004	Shim (use as required)	2
156005	Shim (use as required)	2
023062	Rear Unit Application Drawing	

WHEEL MODIFICATION GROUP - 156010

PART NO	DESCRIPTION	QTY
156010	WHEEL MODIFICATION GROUP	1
116833	Wheel, 16 x 6"	5
155057	SPACER ASSEMBLY	2
F024582	Stud, 5/8"-18	8
162432	Decal, Studs In This Drake Drum...	1
F017989	Hex Wheel Nut, 9/16"-18	16
F024581	Wheel Nut, 5/8"-18	16
020657	Wheel Modification Application Drawing	

WHEEL MODIFICATION GROUP - 159849

PART NO	DESCRIPTION	QTY
159849	WHEEL MODIFICATION GROUP	1
137670	Wheel, 19-1/2 x 6"	5
133600	Spacer	2
164036	Wheel Stud, M 14 x 1.5	16
137881	Steering Stop, Right	1
137882	Steering Stop, Left	1
F016365	Cap Screw, 3/8-24 x 1-1/2" GR 8 Hex Hd	4
F015839	Hex Lock Nut, 3/8"-24	4
159920	Bar	2
F001115	Wrought Washer, 3/8"	4
F001025	SAE Lock Washer, 3/8"	4
021102	Wheel Modification Application Drawing	

WHEEL MODIFICATION GROUP - 169031

PART NO	DESCRIPTION	QTY
169031	WHEEL MODIFICATION GROUP	1
133242	WHEEL, 19-1/2 x 6"	5
133243	Decal, Ratings Represent...	1
161453	Decal, Warning - When Wheel / Tire Modifications...	1
170774	Decal, Wheel Nut Torque...	1
184106	Hex Flange Nut	32
179142	Decal, Torque Specifications	5
F025796	Wheel Nut	16
171054	WHEEL SPACER ASSEMBLY REAR	2
F026230	Wheel Stud	8
162432	Decal, Studs In This Drake Drum...	1
171051	Wheel Spacer Front	2
F025952	Shock Absorber	2
169037	Bushing	4
169329	Decal	2
169036	Tube	2
F002929	SAE Washer, 3/4"	16
044564	Bearing Pad	2
116904	Pad	2
021758	Wheel Modification Application	1
021810	Steering Stop Application	1

WHEEL MODIFICATION GROUP - 170051

PART NO	DESCRIPTION	QTY
170051	WHEEL MODIFICATION GROUP	1
137649	Wheel, 19-1/2 x 6"	5
170736	Wheel Spacer	2
170735	WHEEL SPACER ASSEMBLY	2
178170	Stud, 9/16"-18	8
162432	Decal, Studs In This Drake Drum...	1
179141	Hex Flg Nut, 9/16"-18	32
F017989	Hex Wheel Nut, 9/16"-18	16
170390	Bar	2
M007298	Spring	2
F019582	Clip	2
F001099	Cap Screw, 5/16-18 x 1" Hex Hd	2
179142	Decal, Wheel Nut Torque	5
F001100	SAE Lock Washer, 5/16"	2
180015	Stud, 9/16"-18	16
F007021	Hex Nut, 5/16"-18	2
137349	Spring	2
021871	Wheel Modification Application Drawing	

WHEEL MODIFICATION GROUP - 175595

PART NO	DESCRIPTION	QTY
175595	WHEEL MODIFICATION GROUP	1
175260	SPACER ASSEMBLY	2
F024582	Stud, 5/8"-18	10
162432	Decal, Studs In This Drake Drum...	1
175593	Wheel Nut, 5/8"-18	20
022323	Wheel Modification Application Drawing	

184448 WHEEL MODIFICATION GROUP

PART NO	DESCRIPTION	QTY
184448	WHEEL MODIFICATION GROUP	1
181612	WHEEL, 19-1/2 x 6"	5
169051	Decal, Wheel Nut Torque...	1
161453	Decal, Warning: When Wheel...	1
184150	Decal, Ratings Represent...	1
186130	Spacer	2
184550	Hex Flange Nut	32
188359	Wheel Stop Assembly	2
187235	Bar	2
F014801	Hose Clamp, 1"	3
F002355	Cap Screw, 1/4-20 x 3/4" GR 5 Hex Hd	3
F013588	Elastic Stop Nut, 1/4"-20	3
187092	Bar	1
F019742	Cap Screw, 3/8-16 x 1-3/4" GR 8 Hex Hd	2
F011998	Elastic Stop Nut, 3/8"-16	2
F006471	Cap Screw, 1/4-20 x 1-3/4" GR 5 Hex Hd	2
023214	Wheel Modification Application Drawing	
023412	Wheel Stop Application Drawing	

187149 WHEEL MODIFICATION GROUP

PART NO	DESCRIPTION	QTY
187149	WHEEL MODIFICATION GROUP	1
184138	WHEEL, 19-1/2 x 6-3/4"	2
187291	Decal, Caution - Use As Inside Dual Only	1
187298	Decal, Ratings Represent	1
023228	Wheel Modification Application Drawing	

188439 WHEEL MODIFICATION GROUP

PART NO	DESCRIPTION	QTY
188439	WHEEL MODIFICATION GROUP	1
181612	WHEEL, 19-1/2 x 6"	5
169051	Decal, Wheel Nut Torque...	1
161453	Decal, Warning: When Wheel...	1
184150	Decal, Ratings Represent...	1
186130	Spacer	2
184550	Hex Flange Nut	32
188436	Wheel Stop	1
188437	Wheel Stop	1
F014801	Hose Clamp, 1"	3
F002355	Cap Screw, 1/4-20 x 3/4" GR 5 Hex Hd	3
F013588	Elastic Stop Nut, 1/4"-20	3
187091	Bar	2
187092	Bar	1
F019742	Cap Screw, 3/8-16 x 1-3/4" GR 8 Hex Hd	4
F011998	Elastic Stop Nut, 3/8"-16	4
023414	Wheel Modification Application Drawing	1
023413	Wheel Stop Application Drawing	1

WHEEL HOUSING MODIFICATION GROUP - 121658

PART NO	DESCRIPTION	QTY
121658	WHEEL HOUSING MODIFICATION GROUP	1
118074	Strip	2
118075	Sheet	4
F009602	Screw, #10 x 1/2 Self Tap	120
F001118	Carriage Bolt, 5/16-18 x 1-1/2"	6
F007120	Hex Grip Nut, 5/16"-18	6
F022221	Caulking, 12" Strip	30
017280	Modification Drawing, Metal Floor	
017281	Modification Drawing, Wood Floor	

WHEEL HOUSING MODIFICATION GROUP - 121659

PART NO	DESCRIPTION	QTY
121659	WHEEL HOUSING MODIFICATION GROUP	1
118016	Sheet	2
118017	Sheet	4
118018	Sheet	4
F009602	Screw, #10 x 1/2 Self Tap	120
F022221	Caulking, 12" Strip	30
017271	Modification Drawing, Wood Floor	

FRAME REINFORCEMENT GROUP - 140349

PART NO	DESCRIPTION	QTY
140349	FRAME REINFORCEMENT GROUP	1
140355	Bar	1
140353	Bar	1
140354	Bar	1
140350	Bar	1
140351	Bar	1
140352	Bar	1
F023690	Washer	4
F023872	Cap Screw, M 12 x 1.75 x 50 mm	4
F023874	Retainer Clip	1
F023875	Retainer Clip	1
020251	Frame Reinforcement Application Drawing	

FRAME REINFORCEMENT GROUP - 167783

PART NO	DESCRIPTION	QTY
167783	FRAME REINFORCEMENT GROUP	1
167779	Bar	2
F023874	Retainer Clip	1
F023875	Retainer Clip	1
021640	Frame Reinforcement Application Drawing	

SECTION 8 - VEHICLE APPLICATIONS
TABLE OF CONTENTS

1996 CHEV/GMC
C30943 4 X 2
SIX MAN
CREW CAB
9,000 / 9,600
10,000 GVWR
HR1000A1 FRONT
HR2000A3 REAR

REQUIRED GROUPS

HY-RAIL® Application 170698
Rear Rail Pilot Unit - Insulated 169314
Rear Rail Pilot Unit - Non-Insulated 169318
Mounting Brackets 164044
Steering Lock 169632
Wheel Modification 159849
Wheel Housing Modification 121658
Application Drawing - Rear 021418

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Rear 154522
Hydraulic Power Pack - Rear Only 168105
Brakes
Rear Unit Brake Group 163990
Rear Brake Connection Group 163991
Electric / Air Brake Group - Full 163987
Electric / Air Brake Group - Abbr. 163988

* Recommended Safety Option

	1997 CHEV/GMC C30943 4 X 2 SIX MAN CREW CAB 9,000 / 9,600 10,000 GVWR HR0307A1 FRONT HR2000A3 REAR	1997 CHEV/GMC C30943 4 X 2 SIX MAN CREW CAB 9,000 / 9,600 10,000 GVWR HR1000A1 FRONT HR2000A3 REAR

REQUIRED GROUPS

HY-RAIL® Application	175218	170698
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	175219	164044
Steering Lock	169632	169632
Wheel Modification	159849	159849
Wheel Housing Modification	121658	121658
Application Drawing - Rear	021418	021418

ACCESSORY GROUP OPTIONS

*	Rail Sweeps - Rear	168480	168480
	Hydraulic Power Pack - Rear Only	168105	168105
	Brakes		
	Rear Unit Brake Group	168477	168447
	Rear Brake Connection Group	163991	163991
	Electric / Air Brake Group - Full	163987	163987
	Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1997 CHEV/GMC C31003 HD 4 X 2 CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1997 CHEV/GMC C31403 HD 4 X 2 CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR
REQUIRED GROUPS		
HY-RAIL® Application	175227	175227
Rear Rail Pilot Unit - Insulated	166464	166464
Rear Rail Pilot Unit - Non-Insulated	168457	168457
Mounting Brackets	175697	175697
Steering Lock	169632	169632
Wheel Modification	175595	175595
Application Drawing - Rear	021195	021195
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	168104	168104
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1998 CHEV/GMC C30943 4 X 2 SIX MAN CREW CAB 9,000 / 9,600 10,000 GVWR HR0307A1 FRONT HR2000A3 REAR	1998 CHEV/GMC C30943 4 X 2 SIX MAN CREW CAB 9,000 / 9,600 10,000 GVWR HR1000A1 FRONT HR2000A3 REAR

REQUIRED GROUPS

HY-RAIL® Application	175218	170698
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	175219	164044
Steering Lock	169632	169632
Wheel Modification	159849	159849
Wheel Housing Modification	121658	121658
Application Drawing - Rear	021418	021418

ACCESSORY GROUP OPTIONS

*	Rail Sweeps - Rear	168480	168480
	Hydraulic Power Pack - Rear Only	168105	168105
	Brakes		
	Rear Unit Brake Group	168477	168447
	Rear Brake Connection Group	163991	163991
	Electric / Air Brake Group - Full	163987	163987
	Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

1998 CHEV/GMC
K30943 4 X 4
REGULAR AND
CHASSIS CAB
WITH SRW
9,200 GVWR
HR0307A1
HR2000A3

REQUIRED GROUPS

HY-RAIL® Application 181688
Rear Rail Pilot Unit - Insulated 169314
Rear Rail Pilot Unit - Non-Insulated 169318
Mounting Brackets 181687
Steering Lock 169632
Wheel Modification 169031
Wheel Housing Modification 121658
Application Drawing - Rear 022910

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Rear 168480
Rear Bumper Group 168682
Hydraulic Power Pack - Rear Only 168105
Brakes
Rear Unit Brake Group 168477
Rear Brake Connection Group 163991
Electric / Air Brake Group - Full 163987
Electric / Air Brake Group - Abbr. 163988

* Recommended Safety Option

	1998 CHEV/GMC C31003 HD 4 X 2 CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1998 CHEV/GMC C31403 HD 4 X 2 CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR
REQUIRED GROUPS		
HY-RAIL® Application	175227	175227
Rear Rail Pilot Unit - Insulated	166464	166464
Rear Rail Pilot Unit - Non-Insulated	168457	168457
Mounting Brackets	175697	175697
Steering Lock	169632	169632
Wheel Modification	175595	175595
Application Drawing - Rear	021719	021719
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	168104	168104
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

1999 CHEV/GMC
K30903 4 X 4
REGULAR AND
CHASSIS CAB
WITH SRW
9,200 GVWR
HR0307A1
HR2000A3

REQUIRED GROUPS

HY-RAIL® Application 181688
Rear Rail Pilot Unit - Insulated 169314
Rear Rail Pilot Unit - Non-Insulated 169318
Mounting Brackets 181687
Steering Lock 169632
Wheel Modification 169031
Wheel Housing Modification 121658
Application Drawing - Rear 022910

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Rear 168480
Rear Bumper Group 168682
Hydraulic Power Pack - Rear Only 186159
Brakes
Rear Unit Brake Group 168477
Rear Brake Connection Group 163991
Electric / Air Brake Group - Full 163987
Electric / Air Brake Group - Abbr. 163988

* Recommended Safety Option

	1999 CHEV/GMC C30943 4 X 2 SIX MAN CREW CAB 9,000 / 9,600 10,000 GVWR HR0307A1 FRONT HR2000A3 REAR	1999 CHEV/GMC C30943 4 X 2 SIX MAN CREW CAB 9,000 / 9,600 10,000 GVWR HR1000A1 FRONT HR2000A3 REAR

REQUIRED GROUPS

HY-RAIL® Application	175218	170698
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	174348	164044
Steering Lock	169632	169632
Wheel Modification	159849	159849
Wheel Housing Modification	121658	121658
Application Drawing - Rear	021418	021418

ACCESSORY GROUP OPTIONS

*	Rail Sweeps - Rear	168480	168480
	Hydraulic Power Pack - Rear Only	186159	186159
	Brakes		
	Rear Unit Brake Group	168477	168447
	Rear Brake Connection Group	163991	163991
	Electric / Air Brake Group - Full	163987	163987
	Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 CHEV/GMC C31003 HD 4 X 2 CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1999 CHEV/GMC C31403 HD 4 X 2 CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR
REQUIRED GROUPS		
HY-RAIL® Application	175227	175227
Rear Rail Pilot Unit - Insulated	166464	166464
Rear Rail Pilot Unit - Non-Insulated	168457	168457
Mounting Brackets	175697	175697
Steering Lock	169632	169632
Wheel Modification	175595	175595
Application Drawing - Rear	021719	021719
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

2000 CHEV/GMC
K30903 4 X 4
CHASSIS CAB
WITH SRW
9,200 GVWR
HR0307A1
HR2000A3

REQUIRED GROUPS

HY-RAIL® Application 181688
Rear Rail Pilot Unit - Insulated 169314
Rear Rail Pilot Unit - Non-Insulated 169318
Mounting Brackets 181687
Steering Lock 169632
Wheel Modification 169031
Wheel Housing Modification. 121658
Application Drawing - Rear 022910

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Rear 168480
Rear Bumper Group 168682
Hydraulic Power Pack - Rear Only. 186159
Brakes
Rear Unit Brake Group 168477
Rear Brake Connection Group 163991
Electric / Air Brake Group - Full 163987
Electric / Air Brake Group - Abbr. 163988

* Recommended Safety Option

2000 CHEV/GMC	2000 CHEV/GMC
C30943 4 X 2	C30943 4 X 2
SIX MAN	SIX MAN
CREW AND	CREW AND
CHASSIS CAB	CHASSIS CAB
9,000 / 9,200	9,000 / 9,200
10,000 GVWR	10,000 GVWR
HR0307A1 FRONT	HR1000A1 FRONT
HR2000A3 REAR	HR2000A3 REAR

REQUIRED GROUPS

HY-RAIL® Application	175218	170698
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	174348	164044
Steering Lock	169632	169632
Wheel Modification	159849	159849
Wheel Housing Modification	121658	121658
Application Drawing - Rear	021418	021418

ACCESSORY GROUP OPTIONS

*	Rail Sweeps - Rear	168480	168480
	Hydraulic Power Pack - Rear Only	186159	186159
	Brakes		
	Rear Unit Brake Group	168477	168447
	Rear Brake Connection Group	163991	163991
	Electric / Air Brake Group - Full	163987	163987
	Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

2000 CHEV/GMC
C31003 HD 4 X 2
CHASSIS CAB
15,000 GVWR
HR18A1 FRONT
HR2000A2 REAR

REQUIRED GROUPS

HY-RAIL® Application 175227
Rear Rail Pilot Unit - Insulated 166464
Rear Rail Pilot Unit - Non-Insulated 168457
Mounting Brackets 175697
Steering Lock 169632
Wheel Modification 175595
Application Drawing - Rear 021719

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Rear 168480
Rear Bumper Group 168682
Hydraulic Power Pack 186157
Brakes
Rear Unit Brake Group 168477
Rear Brake Connection Group 163991
Electric / Air Brake Group - Full 163987
Electric / Air Brake Group - Abbr. 163988

* Recommended Safety Option

	1996 FORD F350 4 X 4 REGULAR CAB STYLESIDE WITH SRW 9,000 GVWR SERIES 0307 FRONT HR2000A3 REAR	1996 FORD F350 4 X 4 CREW CAB STYLESIDE WITH SRW 9,200 GVWR SERIES 0307 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	170395	170395
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	162460	162460
Steering Lock	158687	158687
Wheel Modification	170051	170051
Wheel Housing Modification	121659	121659
Application Drawing - Rear	021195	021272
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	154522	154522
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	168105	168105
Brakes		
Rear Unit Brake Group	163990	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

1997 FORD F350 4 X 4 REGULAR CAB STYLESIDE WITH SRW 9,000 GVWR SERIES 0307 FRONT HR2000A3 REAR	1997 FORD F350 4 X 4 REGULAR CAB STYLESIDE WITH SRW 9,000 GVWR HR0307A1 FRONT HR2000A3 REAR

REQUIRED GROUPS

HY-RAIL® Application	170395	175220
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	162460	175221
Steering Lock	158687	158687
Wheel Modification	170051	170051
Wheel Housing Modification	121659	121659
Application Drawing - Rear	021272	021272

ACCESSORY GROUP OPTIONS

*	Rail Sweeps - Rear	168480	168480
	Rear Bumper Group	168682	168682
	Hydraulic Power Pack - Rear Only	168105	168105
	Brakes		
	Rear Unit Brake Group	168477	168477
	Rear Brake Connection Group	163991	163991
	Electric / Air Brake Group - Full	163987	163987
	Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1997 FORD F350 4 X 4 CREW CAB STYLESIDE WITH SRW 9,200 GVWR SERIES 0307 FRONT HR2000A3 REAR	1997 FORD F350 4 X 4 CREW CAB STYLESIDE WITH SRW 9,200 GVWR HR0307A1 FRONT HR2000A3 REAR

REQUIRED GROUPS

HY-RAIL® Application	170395	175220
Rear Rail Pilot Unit - Insulated	169314	169314
Mounting Brackets	162460	175221
Steering Lock	158687	158687
Wheel Modification	170051	170051
Wheel Housing Modification	121659	121659
Application Drawing - Rear	021272	021272

ACCESSORY GROUP OPTIONS

*	Rail Sweeps - Rear	168480	168480
	Rear Bumper Group	168682	168682
	Hydraulic Power Pack - Rear Only	168105	168105
	Brakes		
	Rear Unit Brake Group	168477	168477
	Rear Brake Connection Group	163991	163991
	Electric / Air Brake Group - Full	163987	163987
	Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

1997 FORD
F350 4 x 2
REGULAR CHASSIS
CAB WITH DRW
11,000 GVWR
HR18A1 FRONT
HR2000A2 REAR

REQUIRED GROUPS

HY-RAIL® Application 181481
Rear Rail Pilot Unit - Insulated 166464
Rear Rail Pilot Unit - Non-Insulated 168457
Mounting Brackets 181482
Steering Lock 158687
Wheel Modification 156010
Frame Reinforcement 167783
Application Drawing - Rear 022724

ACCESSORY GROUP OPTIONS

* Rail Sweeps - Rear 168480
Rear Bumper Group 168682
Hydraulic Power Pack 168104
Brakes
Rear Unit Brake Group 168477
Rear Brake Connection Group 163991
Electric / Air Brake Group - Full 163987
Electric / Air Brake Group - Abbr. 163988

* Recommended Safety Option

	1997 FORD F-SUPER DUTY 4 X 2 REGULAR CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1997 FORD F-SUPER DUTY 4 X 2 REGULAR CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	179937	179938
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	179945	179945
Steering Lock	158687	158687
Application Drawing - Rear	021728	020647
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	168104	168104
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1997 FORD F-SUPER DUTY 4 X 2 REGULAR CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1997 FORD F-SUPER DUTY 4 X 2 REGULAR CHASSIS CAB 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	179939	179940
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	179945	179945
Steering Lock	158687	158687
Frame Reinforcement	140349	140349
Application Drawing - Rear	021728	020647
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	168104	168104
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 REGULAR CAB PICKUP WITH SRW 9,200 GVWR HR0307A1 FRONT HR2000A3 REAR	1999 FORD F350 4 X 2 SUPER CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186148	186148
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	186149	186149
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023062	023062
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 CREW CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR	1999 FORD F350 4 X 4 REGULAR CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186148	184523
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	186149	184522
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023062	023062
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 4 SUPER CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR	1999 FORD F350 4 X 4 CREW CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184523	184523
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	184522	184522
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023062	023062
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186151	184103
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184095	184095
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 2 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186151	184103
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184095	184095
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 2 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186151	184103
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184095	184095
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184104	186154
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184098	184098
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 4 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 4 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184104	186154
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184098	184098
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 4 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 4 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184104	186154
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184098	184098
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187170	187169
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 4 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 4 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187170	187169
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 4 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 4 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187170	187169
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184101	184105
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 2 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184101	184105
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F350 4 X 2 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F350 4 X 2 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184101	184105
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F450 4 X 2 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F450 4 X 2 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F450 4 X 4 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F450 4 X 4 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F450 4 X 2 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F450 4 X 2 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	1999 FORD F450 4 X 4 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	1999 FORD F450 4 X 4 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 REGULAR CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR	2000 FORD F350 4 X 2 SUPER CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186148	186148
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	186149	186149
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023062	023062
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 CREW CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR	2000 FORD F350 4 X 4 REGULAR CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186148	184523
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	186149	184522
Steering Lock	181548	181548
Wheel Modification	184448	188493
Application Drawing - Rear	023062	023062
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 4 SUPER CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR	2000 FORD F350 4 X 4 CREW CAB PICKUP WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184523	184523
Rear Rail Pilot Unit - Insulated	169314	169314
Rear Rail Pilot Unit - Non-Insulated	169318	169318
Mounting Brackets	184522	184522
Steering Lock	181548	181548
Wheel Modification	188439	188439
Application Drawing - Rear	023062	023062
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186151	184103
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184095	184095
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 2 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186151	184103
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184095	184095
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 2 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	186151	184103
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184095	184095
Steering Lock	181548	181548
Wheel Modification	184448	184448
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184104	186154
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184098	184098
Steering Lock	181548	181548
Wheel Modification	188439	188439
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 4 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 4 SUPER CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184104	186154
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184098	184098
Steering Lock	181548	181548
Wheel Modification	188439	188439
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 4 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 4 CREW CHASSIS CAB WITH SRW 9,900 GVWR HR0307A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184104	186154
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184098	184098
Steering Lock	181548	181548
Wheel Modification	188439	188439
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack - Rear Only	186159	186159
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 4 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187170	187169
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 4 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 4 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187170	187169
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 4 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 4 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187170	187169
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 2 REGULAR CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184101	184105
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 2 SUPER CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184101	184105
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F350 4 X 2 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F350 4 X 2 CREW CHASSIS CAB WITH DRW 11,200 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	184101	184105
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F450 4 X 2 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F450 4 X 2 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

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	2000 FORD F450 4 X 4 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F450 4 X 4 REGULAR CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F450 4 X 2 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F450 4 X 2 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

	2000 FORD F450 4 X 4 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A2 REAR	2000 FORD F450 4 X 4 CREW CHASSIS CAB WITH DRW 15,000 GVWR HR18A1 FRONT HR2000A3 REAR
REQUIRED GROUPS		
HY-RAIL® Application	187148	187147
Rear Rail Pilot Unit - Insulated	166464	169314
Rear Rail Pilot Unit - Non-Insulated	168457	169318
Mounting Brackets	184094	184099
Steering Lock	181548	181548
Wheel Modification	187149	187149
Application Drawing - Rear	023095	023094
ACCESSORY GROUP OPTIONS		
* Rail Sweeps - Rear	168480	168480
Rear Bumper Group	168682	168682
Hydraulic Power Pack	186157	186157
Brakes		
Rear Unit Brake Group	168477	168477
Rear Brake Connection Group	163991	163991
Electric / Air Brake Group - Full	163987	163987
Electric / Air Brake Group - Abbr.	163988	163988

* Recommended Safety Option

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