HR0305 SERIES A
UNIVERSAL HY-RAIL®
GUIDE WHEEL EQUIPMENT
MANUALLY OPERATED

OPERATOR'S SERVICE AND PARTS MANUAL

ISSUED 4 - 2000 BULLETIN 1207A

■ **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.

FACILITY LOCATIONS

Harsco Track Technologies
415 North Main Street
Fairmont, MN
56031-1837
Tel: (507) 235-3361
Fax: (507) 235-7370

Harsco Track Technologies
200 South Jackson Road
Ludington, MI
49431
Tel: (231) 843-3431
Fax: (231) 843-4830

Harsco Track Technologies
2401 Edmund Road, Box 20
Cayce-West Columbia, SC
29171-0020
Tel: (803) 822-9160
Fax: (803) 822-7471

Harsco Track Technologies
Giltway, Giltbrook
Nottingham, NG16 2GQ
England
Tel: 0115 938 7000
Fax: 0115 938 7001

Harsco Track Technologies
Clark Street, PO Box 309
East Syracuse, NY
13057
Tel: (315) 437-2547
Fax: (315) 463-0180

Harsco Track Technologies
4 Strathwyn Street, PO Box 5287
Brendale, Queensland 4500
Australia
Tel: 61 7 205 6500
Fax: 61 7 205 7369

Harsco Track Technologies
28 Eagle Road
Danbury, CT
06810
Tel: (203) 778-6811
Fax: (203) 778-8670

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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 THE 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 THE 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 THE GUIDE WHEEL EQUIPMENT.**

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

- **DO NOT EXCEED 45 MPH WHEN OPERATING VEHICLE ON TRACK. RAILROAD RULES GOVERNING SPEEDS SHOULD BE OBSERVED AT ALL TIMES. REDUCE SPEED WHEN PROPELLING THE VEHICLE THROUGH SWITCHES, CROSSINGS, BRANCH LINES AND ANY SPECIAL TRACK WORKS. OPERATING THE VEHICLE AT UNSAFE SPEEDS COULD RESULT IN DERAILMENT OF VEHICLE.**

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

1

Safety Information

- **AT MAXIMUM LOADED GROSS VEHICLE WEIGHT ON TRACK (including driver, passengers, equipment, tools, payload, etc.) DO NOT EXCEED ANY OF THE FOLLOWING:**
  - **VEHICLE'S G.V.W.R. (Gross Vehicle Weight Rating)**
  - **VEHICLE'S FRONT G.A.W.R. (Gross Axle Weight Rating) OR THE SUM OF THE FRONT RAIL PILOT UNIT GUIDE WHEEL RATED LOAD CAPACITY PLUS (+) VEHICLE'S FRONT TIRE/WHEEL RATED LOAD CAPACITY, WHICHEVER IS LOWER.**
  - **VEHICLE'S REAR G.A.W.R. (Gross Axle Weight Rating) OR THE SUM OF THE REAR RAIL PILOT UNIT GUIDE WHEEL 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. RAIL PILOT UNIT RATED LOAD CAPACITY (575 lbs (261 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 THE VEHICLE.**

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

- **SUPPLIED LIFT HANDLES ARE DESIGNED FOR OPERATING ONLY PROPERLY MAINTAINED GUIDE WHEEL EQUIPMENT. DO NOT USE THE LIFT HANDLE FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS DESIGNED. IF LIFT HANDLE IS DAMAGED (BENT, BROKEN, ETC.), IT MUST NOT BE REPAIRED (STRAIGHTENED, WELDED, ETC.), IT MUST BE REPLACED.**

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

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

Identification View

FIGURE 1-1
HR0305 SERIES A HY-RAIL® EQUIPPED VEHICLE

Description

The FAIRMONT™ HR0305 Series A HY-RAIL® guide wheel equipment can be applied to various down-sized utility vehicles and down-sized pickup trucks, providing the G.V.W.R. (gross vehicle weight rating) and/or G.A.W.R. (gross axle weight rating) does not exceed the specified limits listed in the Harsco Track Technologies Vehicle Specifications manual.

The HY-RAIL® guide wheel equipment has front and rear rail pilot units which are manually operated, and are mounted onto the vehicle frame. All weight of the rail pilot units is carried on the vehicle frame, above the springs, when the rail pilot units are in the "highway" position. Load bearing guide wheel assemblies guide the vehicle during on track operation.

The HY-RAIL® equipped vehicle uses the vehicle propulsion and braking systems for propelling and braking on the track.

Vehicle 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 tags on both the front and rear rail pilot units. Always provide these factory serial numbers when calling or writing about the units. The serial number tags are located on the right side of the channel assembly on both units.

FIGURE 1-2
FRONT RAIL PILOT UNIT SERIAL NUMBER TAG

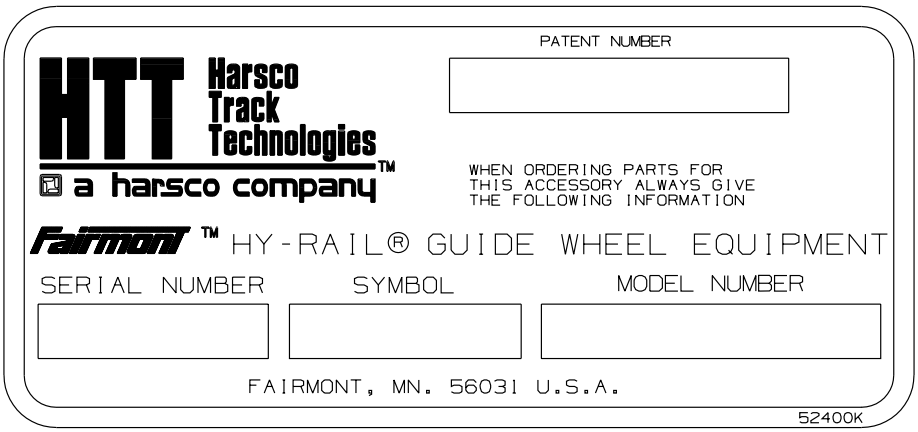
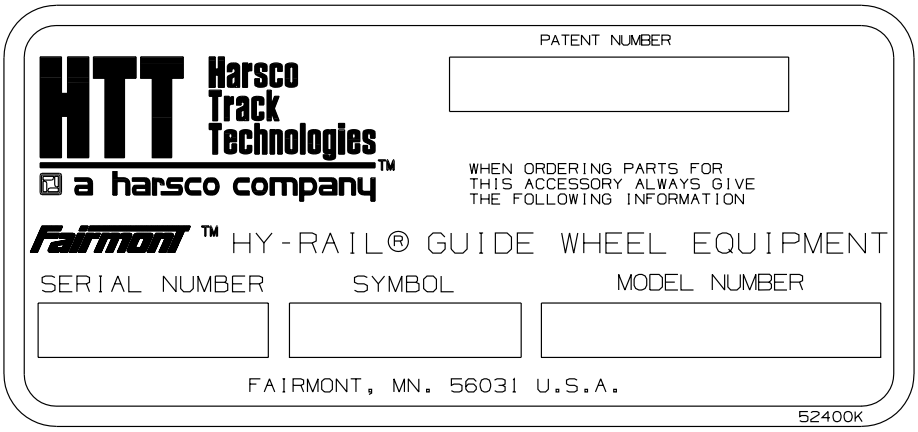


FIGURE 1-3
REAR RAIL PILOT UNIT SERIAL NUMBER TAG



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 UNIT

Track Gauge	56-1/2 in	(1435 mm)
Guide Wheels - All Tread Types - Flange Diameter	12-1/4 in	(311 mm)
- Tread Diameter	10 in	(254 mm)
Weight - Front Unit	220 lbs	(100 kg)
- Rear Unit	220 lbs	(100 kg)
Recommended Load Per Guide Wheel - All Tread Types (with vehicle at curb weight)	200 - 250 lbs	(91 - 113 kg)
Maximum load per guide wheel - All Tread Types	575 lbs	(261 kg)

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SECTION 2 - OPERATION
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Speedometer

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

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

Preparing for Operation

VEHICLE

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

a. Engine oil level.
b. Radiator fluid level.
c. Fuel tank level.
d. Brakes work properly.
e. Parking brake works properly.
f. Head, brake and signal lights work properly.
g. Tires properly inflated to 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.
h. 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

i. 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. Overall for damaged or worn parts.
b. Proper alignment and guide wheel loads.
c. Proper lubrication at recommended operating hourly intervals.

Misalignment Indicators

■ **BEFORE OPERATING A VEHICLE WITH NEWLY INSTALLED GUIDE WHEEL EQUIPMENT ON TRACK, VERIFY THAT 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 Alignment Procedure.

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

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

3. Vibration felt throughout the vehicle at various speeds during 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 THE VEHICLE ON THE TRACK, MAKE SURE:**
  - **ALL FOUR GUIDE WHEELS ARE LOWERED, LOCKED IN THE RAIL POSITION, AND SECURED WITH THE LOCK PIN.**
  - **ALL GUIDE WHEEL FLANGES ARE ENGAGED ON THE INSIDE OF THE RAIL.**
  - **THE FRONT WHEELS ARE POINTED STRAIGHT AHEAD AND THE STEERING WHEEL LOCK IS ENGAGED.**

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

- **THE SUPPLIED LIFT HANDLES ARE DESIGNED FOR OPERATING ONLY PROPERLY MAINTAINED GUIDE WHEEL EQUIPMENT. DO NOT USE THE LIFT HANDLE FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS DESIGNED. IF THE LIFT HANDLE IS DAMAGED (BENT, BROKEN, ETC.), IT MUST NOT BE REPAIRED (STRAIGHTENED, WELDED, ETC.), IT MUST BE REPLACED.**

- **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

LOWERING GUIDE WHEELS

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

2. At a road crossing, drive the vehicle about 25 feet (7.6 m) past the track. Back the vehicle onto the track so that the vehicle rear wheels are centered on 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 automatic transmission in "PARK" or manual transmission in "NEUTRAL". Apply the parking brake.

4. Lower and lock the rear guide wheels first. The rear guide wheels should be lowered first so the vehicle front tires can be maneuvered to align the front guide wheels with the rails.

5. See Figure 2-1. Remove lock pin (1). Button in the "T" end of the pin must be pressed in to remove the lock pin. Place the lock pin in a position so that it does not become entangled in the mechanical lock mechanism.

6. Insert the end of the hand lever (5) with the single bend (A) into socket (2). Maintain a firm grip on the hand lever to prevent the guide wheels from dropping suddenly when the mechanical lock is released.

7. Push the locking pawl handle (4) to release the mechanical lock. Use the hand lever (5) to lower the guide wheel to the rail.

8. Remove the hand lever (5) from socket (2) and insert opposite end with the long bend (B) into socket (3). Push down on the hand lever, forcing the guide wheel down until the locking mechanism fully locks, securing the guide wheel in the "rail" position.

9. Insert lock pin (1) to secure the locking pawl handle (4). Button in "T" end of the pin must be pressed in to insert the lock pin. Remove the hand lever (5) from socket (3).

10. Repeat Steps 5 through 9 to lower and lock the other rear guide wheel in the "rail" position.

11. After the rear guide wheels are locked in the "rail" position, move the vehicle so that the front wheels are centered on the rail. Follow the same procedure to lock the front guide wheels in the "rail" position.

STEERING LOCK

12. See Figures 2-2 and 2-3. Turn the steering wheel to set the vehicle front wheels straight ahead. Secure the steering wheel in this position with the steering lock, located on the steering column. Steering locks may vary from vehicle to vehicle but will operate similarly.

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

Placing Vehicle on Track

FIGURE 2-1
PLACING VEHICLE ON TRACK

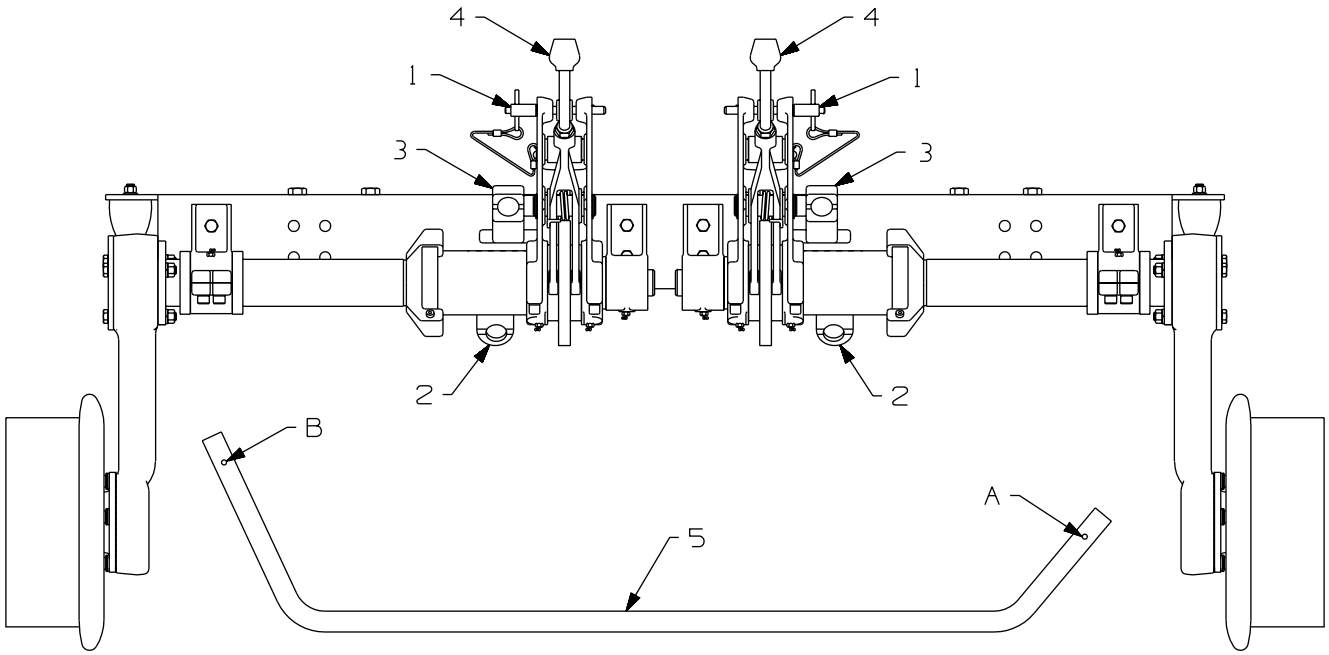

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FIGURE 2-2
STEERING LOCK IN UNLOCKED POSITION

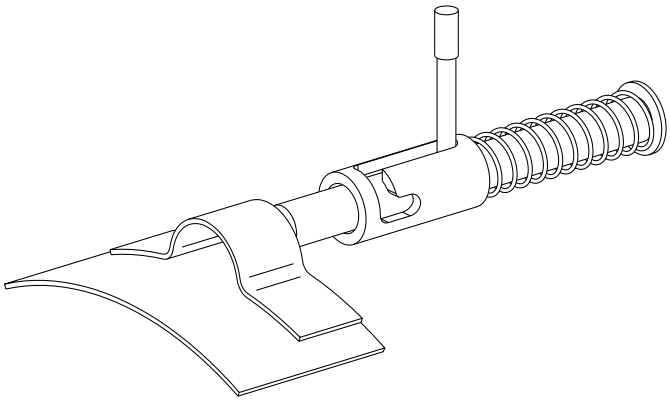

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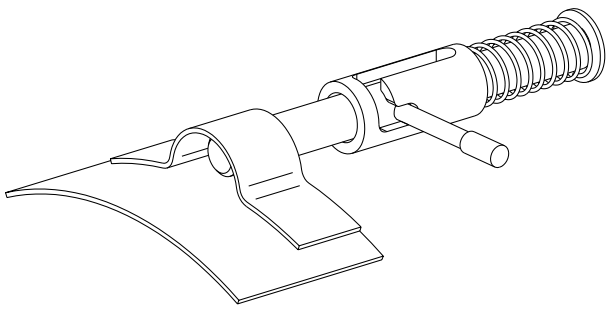
FIGURE 2-3
STEERING LOCK IN LOCKED POSITION



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RAIL SWEEPS

13. The rail pilot units may be equipped with rail sweeps. The rail sweeps are positioned ahead of the front guide wheels and behind the rear guide wheels. The rail sweeps clear the rail of debris, lengthening the service life of the guide wheels.

    The rail sweeps are attached to the wheel arm and will lower when the guide wheels are lowered to the "rail" position and will raise when the guide wheels are raised to the "highway" position.

Guide Wheel Load on Track

- **IMPROPER LOADING OF HY-RAIL® EQUIPPED VEHICLE CAN CAUSE DERAILMENT OF VEHICLE.**
- **APPLY VEHICLE PARKING BRAKE AND STOP VEHICLE ENGINE BEFORE CHECKING GUIDE WHEEL LOAD.**
- **NEVER OPERATE THE VEHICLE ON THE "RAIL" WITH ONE OR MORE OF THE OVERLOAD SET SCREWS BOTTOMED OUT.**
- **ALWAYS CHECK THE GUIDE WHEEL LOAD BEFORE OPERATING THE VEHICLE ON TRACK. MINIMUM LOAD ON ANY GUIDE WHEEL MUST BE AT LEAST 200 LBS (91 kg). MAXIMUM LOAD ON ANY GUIDE WHEEL MUST NOT EXCEED 575 LBS (261 kg). NEVER OPERATE THE VEHICLE ON TRACK IF THE LOAD ON ANY GUIDE WHEEL IS NOT WITHIN THESE RANGES.**
- **DO NOT USE ANY OTHER JACK THEN THE HARSCO TRACK TECHNOLOGIES WHEEL WEIGHING JACK NO. 073527 TO CHECK THE GUIDE WHEEL LOAD. USE OF ANY OTHER JACK WILL RESULT IN INCORRECT GUIDE WHEEL LOAD INFORMATION.**
- **MISUSE OF THE WHEEL WEIGHING JACK MAY CAUSE GAUGE TO EXPLODE. READ ANSI B40.1 AND APPARATUS INSTALLATION / OPERATING INSTRUCTIONS BEFORE USE.**
- **DO NOT USE THE WHEEL WEIGHING JACK TO LIFT THE VEHICLE. EXCESSIVE WEIGHT MAY CAUSE JACK TO FAIL.**

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

1. See Figure 2-4. Lower and lock all guide wheels in the "rail" position. When the vehicle is at curb weight (with permanent attachments such as: spare tire, tool box less tools, utility box, crane, aerial lift boom, etc; and without passengers, baggage, load, etc.) there should be 3/8 inch (9.5 mm) clearance between the overload set screw and the stop on the casting. Check the overload set screws on each guide wheel whenever the vehicle is loaded or additional load is added to the existing vehicle load on "rail". If any of the overload set screws are bottomed out against the stop on the casting, the load must be redistributed or some of the load removed. Never operate the vehicle on "rail" with one or more of the overload set screws bottomed out.

2. Use the wheel weighing jack (Harsco Track Technologies part no. 073527) to check the guide wheel load if any of the overload set screws are bottomed out against the stop on the casting and/or to determine the load on the guide wheel. Do not use any other jack then the Harsco Track Technologies wheel weighing jack no. 073527 to check the guide wheel load. Use of any other jack will result in incorrect guide wheel load information.

Guide Wheel Load on Track

3. See Figure 2-5. Place the wheel weighing jack (073527) under the guide wheel arm directly below the wheel spindle. Jack the guide wheel up until the guide wheel just clears the top of the rail. Note the gauge reading. The gauge reading indicates the pounds of load on the guide wheel.

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

4. With the vehicle at curb weight, the recommended guide wheel load is 200 - 250 lbs (91 - 113 kg) @ the specified guide wheel height. With the vehicle loaded, the maximum guide wheel load is 575 Lbs (261 kg).

5. If the measured load is less than the minimum guide wheel load of 200 lbs (91 kg) or exceeds the maximum guide wheel load of 575 lbs (261 kg) on any guide wheel, the guide wheel unit must be adjusted or the vehicle load must be redistributed or some of the load removed. Never operate the vehicle on track if the load on any guide wheel is not within these ranges. See the Adjustment Section - Guide Wheel Equipment Alignment Procedure.

FIGURE 2-4
GUIDE WHEEL OVERLOAD SET SCREWS

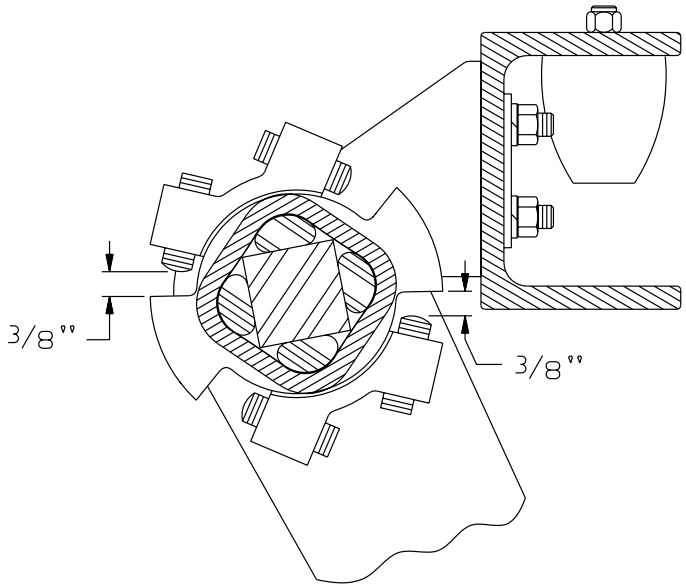

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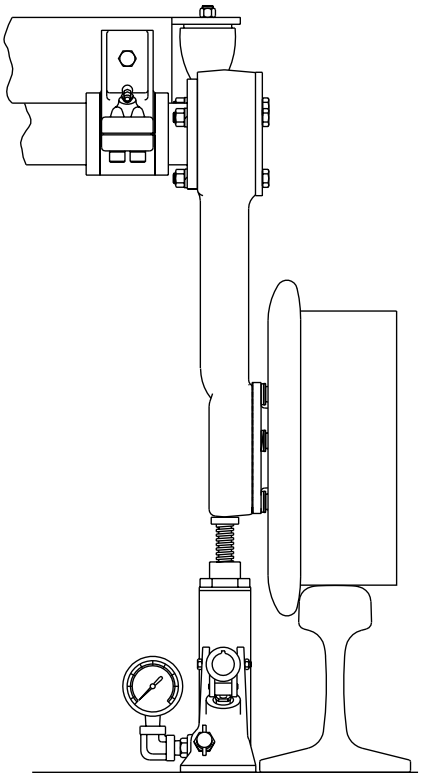
FIGURE 2-5
WHEEL WEIGHING JACK



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Propelling on Track

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

- **ALWAYS CHECK THE GUIDE WHEEL LOAD BEFORE OPERATING THE VEHICLE ON TRACK. MINIMUM LOAD ON ANY GUIDE WHEEL MUST BE AT LEAST 200 LBS (91 kg). MAXIMUM LOAD ON ANY GUIDE WHEEL MUST NOT EXCEED 575 LBS (261 kg). NEVER OPERATE THE VEHICLE ON TRACK IF THE LOAD ON ANY GUIDE WHEEL IS NOT WITHIN THESE RANGES.**

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

- **BEFORE OR WHEN PROPELLING ON TRACK:**
  - **OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS.**
  - **OPERATOR MUST LOOK 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 45 MPH (72 km/h) WHEN OPERATING VEHICLE ON TRACK. RAILROAD RULES GOVERNING SPEEDS SHOULD BE OBSERVED AT ALL TIMES. REDUCE SPEED WHEN PROPELLING THE VEHICLE THROUGH SWITCHES, CROSSINGS, BRANCH LINES AND ANY SPECIAL TRACK WORKS. OPERATING VEHICLE AT UNSAFE SPEEDS COULD RESULT IN DERAILMENT OF THE VEHICLE.**
  - **STEERING LOCK MUST BE ENGAGED AT ALL TIMES WHEN OPERATING VEHICLE ON THE 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 HR0305 Series A HY-RAIL® Guide Wheel Equipment use the vehicle propulsion system for propelling on track.. Do not accelerate suddenly. Traction is reduced on the track, and 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 WILL NOT OPERATE TRACK SIGNAL CIRCUITS, AND ONCOMING VEHICLES OR PEDESTRIANS MAY NOT YIELD THE RIGHT OF WAY.**

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

Vehicles equipped with HR0305 Series A HY-RAIL® Guide Wheel Equipment use the vehicle brake system for braking on track. Stopping distance may be greater on track than on typical road surfaces. Apply the brakes gradually to avoid sliding the tires.

Removing Vehicle from Track

- **PLACE VEHICLE AUTOMATIC TRANSMISSION IN "PARK" OR MANUAL TRANSMISSION IN "NEUTRAL". APPLY PARKING BRAKE.**
- **UNDERSTAND EQUIPMENT OPERATION AND BE AWARE OF ALL PINCH POINTS BEFORE OPERATING OR MAKING ADJUSTMENTS TO THE GUIDE WHEEL EQUIPMENT.**
- **BEFORE PROPELLING VEHICLE OFF TRACK, MAKE SURE:**
  - **ALL FOUR GUIDE WHEELS ARE RAISED, LOCKED IN HIGHWAY POSITION, AND SECURED WITH LOCK PIN.**
  - **STEERING WHEEL LOCK IS DISENGAGED.**

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

- **SUPPLIED LIFT HANDLES ARE DESIGNED FOR OPERATING ONLY PROPERLY MAINTAINED GUIDE WHEEL EQUIPMENT. DO NOT USE THE LIFT HANDLE FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS DESIGNED. IF LIFT HANDLE IS DAMAGED (BENT BROKEN, ETC.), IT MUST NOT BE REPAIRED (STRAIGHTENED, WELDED, ETC.), IT MUST BE REPLACED.**
- **OBSERVE AND FOLLOW ALL RAILROAD SAFETY RULES AND REGULATIONS**
- **IF THE VEHICLE IS EQUIPPED WITH A STROBE LIGHT (BEACON) AND RAILROAD RULES AND REGULATIONS REQUIRE ITS USE, THE STROBE LIGHT (BEACON) MUST BE ILLUMINATED WHEN OPERATING THE VEHICLE ON TRACK AND WHEN REMOVING VEHICLE FROM TRACK.**

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

RAISING GUIDE WHEELS

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

2. Approach a road crossing and stop with the vehicle front wheels on the crossing.

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

4. See Figures 2-2 and 2-3. Disengage the steering lock. Steering locks may vary from vehicle to vehicle but will operate similarly.

5. Raise the front guide wheels first. Then the rear guide wheels.

Removing Vehicle from Track

RAISING GUIDE WHEELS

6. See Figure 2-1. Remove lock pin (1). Button in "T" end of the pin must be pressed in to remove the lock pin. Place lock pin in a position so that it does not become entangled in the mechanical lock mechanism.

7. Insert the end of the hand lever (5) with the long bend (B) into socket (3). Push down to remove pressure from the locking pawl handle. Maintain a firm grip on the hand lever (5).

8. Push the locking pawl handle (4) to release the mechanical lock. Raise hand lever (5) to raise the guide wheel until it rests on the rail.

9. Remove the hand lever (5) from socket (3) and insert opposite end with short single bend (A) into socket (2). Push down on the hand lever, forcing the guide wheel up until the locking mechanism fully locks, securing the guide wheel in the "highway" position.

10. Insert lock pin (1) to secure the locking pawl handle (4). Button in "T" end of the pin must be pressed in to insert the lock pin. Remove hand lever (5) from socket (2).

11. Repeat Steps 6 through 10 to raise the other front guide wheel to the "highway" position.

12. After the front guide wheels are locked in the "highway" position, follow the same procedure to lock the rear guide wheels in the "highway" position.

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 GUIDE WHEELS.**

- **TOW TRAILER / EQUIPMENT AT A REASONABLE SPEED, 20 MPH (32 km/h) 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 HAS:**
  - **FRONT AND REAR GUIDE WHEELS LOWERED AND LOCKED IN RAIL POSITION.**
  - **ALL FRONT AND REAR GUIDE WHEEL FLANGES ENGAGED ON INSIDE OF RAILS.**
  - **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 RAIL PILOT UNITS.**

- **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 TRACK, SPINNING VEHICLE TIRES COULD DAMAGE THEM.**

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 operator's manual for towing information.

2. Use the vehicle manufacturer's recommendations to determine the maximum weight the towing vehicle can tow. Do not exceed the 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 has:
   a. Front and rear guide wheels lowered and locked in the rail position.
   b. All front and rear guide wheel flanges engaged on the inside of the rails.
   c. 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 rail pilot units.

8. Observe and follow all railroad safety rules and regulations.

9. Do not accelerate suddenly. Traction is reduced on track. Spinning the vehicle tires could damage them.

10. Stopping distance is greater on track than on typical road surfaces. Apply the vehicle brakes gradually to avoid sliding the vehicle tires and the guide 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 (32 km/h) 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 HAS:**
  - **FRONT AND REAR RAIL PILOT UNITS RAISED AND LOCKED IN HIGHWAY POSITION.**
  - **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 RAIL PILOT UNITS.**

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

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 operator's manual for towing information.

2. Use the vehicle manufacturer's recommendations to determine the maximum weight the towing vehicle can tow. Do not exceed the 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 has:
   a. Front and rear rail pilot units raised and locked in the highway position.
   b. 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 rail pilot units.

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 (16 km/h) 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 HAS:**
  - **FRONT AND REAR RAIL PILOT UNITS LOWERED AND LOCKED IN RAIL POSITION.**
  - **ALL FRONT AND REAR GUIDE WHEEL FLANGES ENGAGED ON INSIDE OF RAILS.**
  - **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 FRAME. DO NOT MOUNT OR ATTACH TOW BAR TO DISABLED VEHICLE RAIL PILOT UNITS.**
- **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 TRACK, 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 operator's 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 has:
   a. Front and rear rail pilot units lowered and locked in the rail position.
   b. All front and rear guide wheel flanges engaged on the inside of the rails.
   c. 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 rail pilot units. 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 track. Spinning the towing vehicle tires / machine wheels could damage them.

9. Stopping distance is greater on track 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 (16 km/h) 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 HAS:**
  - **FRONT AND REAR RAIL PILOT UNITS RAISED AND LOCKED IN HIGHWAY POSITION.**
  - **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 FRAME. DO NOT MOUNT OR ATTACH TOWING EQUIPMENT TO DISABLED VEHICLE RAIL PILOT UNITS.**

- **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 operator's 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. 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 frame. Do not mount or attach the towing equipment to the disabled vehicle rail pilot units.

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

- **BEFORE PERFORMING ANY ADJUSTMENTS TO THE RAIL PILOT UNITS OR VEHICLE, ALWAYS PLACE THE AUTOMATIC TRANSMISSION IN "PARK" OR THE 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 HEED THESE WARNINGS 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.

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. 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.

3. Tires must be inflated to 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.

4. 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.

5. Verify that the vehicle that 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.

6. 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 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 305 mm). Harsco Track Technologies, Harsco Corporation recommends that this be checked by a reputable alignment shop.

Guide Wheel Equipment Alignment Procedure

VEHICLE CHECK

7. Follow the mounting instructions on the application drawing which is supplied with each Guide Wheel Equipment Group.

8. After mounting the guide wheel equipment, have the front wheels of the vehicle checked for caster, camber, and toe-in. If necessary, adjust to vehicle manufacturer's recommendations.

PLACING VEHICLE ON TRACK

9. Place the vehicle on straight, level, tangent track or on an alignment rack constructed for guide wheel equipment alignment. Place the automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Stop the engine. Lower and lock all four guide wheels in the "rail" position. See Operation Section -Placing Vehicle On Track.

   If track or an alignment rack is not available, use 6 x 6 inch lumber, on a level floor, to simulate track. Space the lumber so it measures 56-1/2 inches between the inside edges. Using 6 x 6 inch lumber will allow the wheel weighing jack to fit underneath the wheel arm to weigh the guide wheel load when the guide wheels are in the "rail" position.

10. Set the vehicle wheels straight ahead. Secure the steering wheel using the steering lock.

Guide Wheel Equipment Alignment Procedure

RAIL PILOT UNIT TRACK GAUGE - See Figures 3-1 and 3-7

11. Measure the track gauge of both the front and rear rail pilot units. Measure from back of left wheel flange, directly below the center line of the wheel spindle, to the same point on the right wheel flange. Track gauge must be 53-3/8 - 53-1/2 inches (1356 - 1359 mm) for both the front and rear rail pilot units. If not see Adjustment.

Adjustment

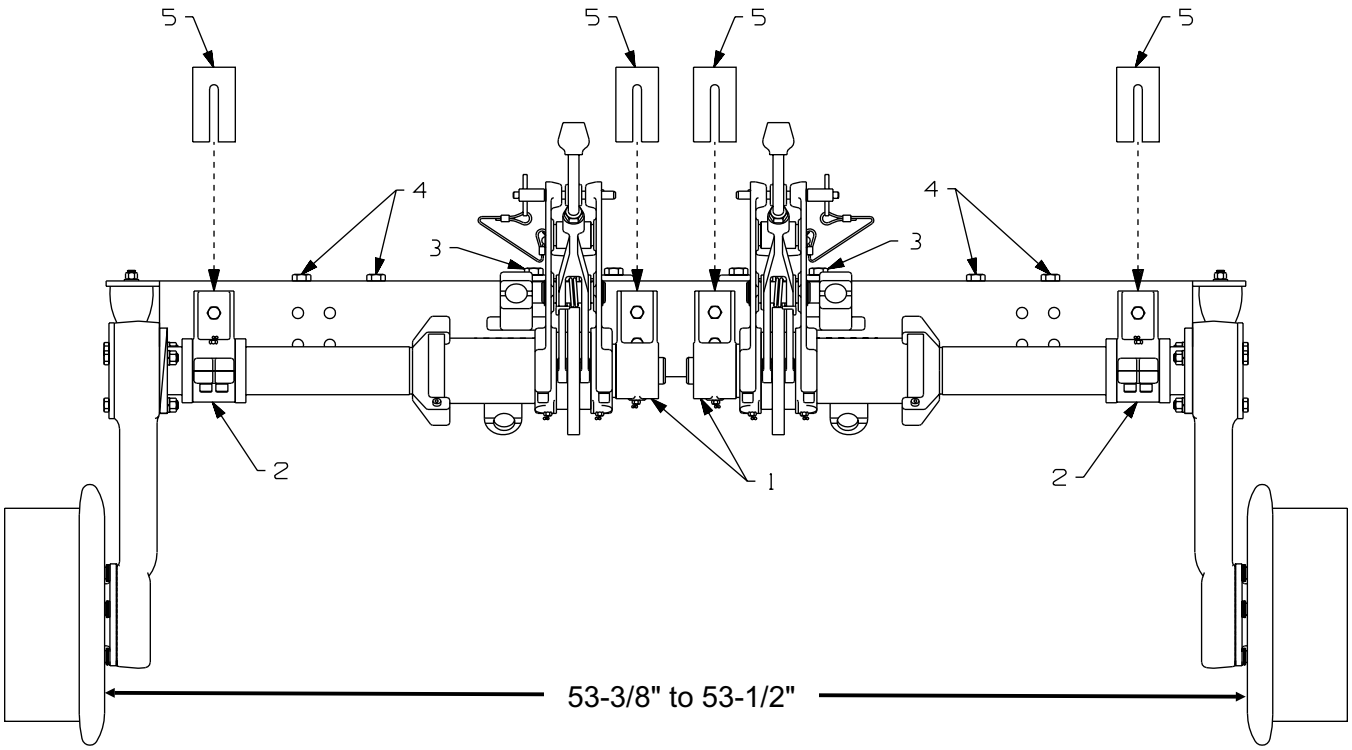
a. Unlock both front and/or both rear guide wheels from the "rail" position. Let the guide wheels rest on the rail.

b. Loosen the inner (1) and outer (2) pivot bearings and trunnion nut bracket cap screws (3). Shift one or both of the guide wheel assemblies. Re-tighten the cap screws.

c. Lock all guide wheels in the "rail" position. Recheck the rail pilot unit track gauge.

d. Repeat the procedure until the rail pilot unit track gauge is correct.

FIGURE 3-1
RAIL PILOT UNIT



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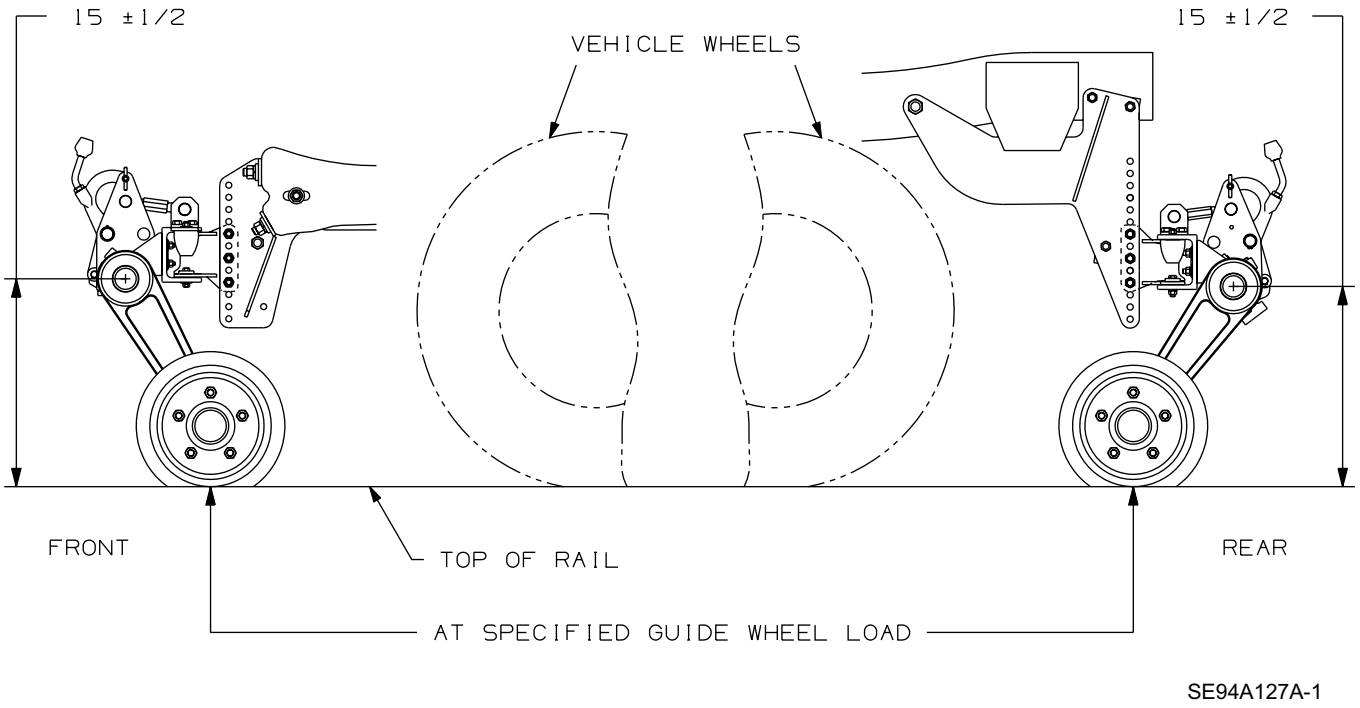
Guide Wheel Equipment Alignment Procedure

FIGURE 3-2
RAIL PILOT UNIT WHEEL ARM VERTICAL HEIGHT



GUIDE WHEEL ARM VERTICAL HEIGHT - See Figures 3-2, 3-3 and 3-4

12. Figure 3-2 illustrates a side view of a typical HR0305 Series A HY-RAIL® Guide Wheel Equipment application. Rail pilot unit mounting will vary depending on the vehicle application.

13. Lower and lock all four guide wheels in the "rail" position. Measure the vertical distance from the top of the rail to the pivot center of the wheel arm on all guide wheels.

    With the vehicle at curb weight, the recommended height is 15" ± 1/2" (381 mm ± 12.7 mm) @ specified guide wheel load.

    Note: For maximum load carrying capacity, set both rear wheel arms to the upper recommended height limit.

    If the vertical height is not correct on any of the wheel arms, see Adjustment.

Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL ARM VERTICAL HEIGHT - See Figures 3-2, 3-3 and 3-4

Adjustment

a. Unlock both front and/or both rear guide wheels from the "rail" position. Let the guide wheels rest on the rails.

b. Re-adjust only the wheel arm(s) that were initially not within the recommended height. The difference between the measured height and the recommended height is the approximate height that the wheel arms must be adjusted.

c. Figures 3-3 and 3-4 illustrate typical mounting bracket configurations used on the front and rear rail pilot units. Mounting brackets may vary depending on the vehicle application.

d. The adjustments can be made in 1 inch or 1/2 inch increments. Either one or a combination of both can be used to achieve the recommended height. Do not adjust one end of the pilot unit more then 1/2 inch different from the opposite end of the pilot unit. Before removing any bolts, securely block the rail pilot unit.

1 inch (25.4 mm) increments:	Remove cap screws (1) and relocate in a different set of holes in the mounting plate (2). Reinstall and re-tighten the cap screws.
1/2 inch (12.7 mm) increments:	Remove cap screws (3) and mounting bracket (4). Reverse the mounting bracket (4) (top to bottom) and reinstall. Be sure to reinstall the 1/32" and 1/16" shims (5) on the top or bottom of the mounting bracket (4). The mounting bracket (4) must fit snug inside of the cross channel (6). The shims are used as required. Reinstall and re-tighten the cap screws.

e. Lock all guide wheels in the "rail" position. Recheck the vertical height on all wheel arms.

Note: Any wheel arm height adjustment made may change the guide wheel load. Recheck the guide wheel load. Wheel arm vertical height and guide wheel load must both be attained at the same time within the specified height dimensions and load limits. If the wheel arm vertical height and guide wheel load can not be attained at the same time within the specified height dimensions and load limits, the rubber cords may need to be replaced.

Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL ARM VERTICAL HEIGHT

FIGURE 3-3
GUIDE WHEEL ARM VERTICAL ADJUSTMENT
FRONT RAIL PILOT UNIT

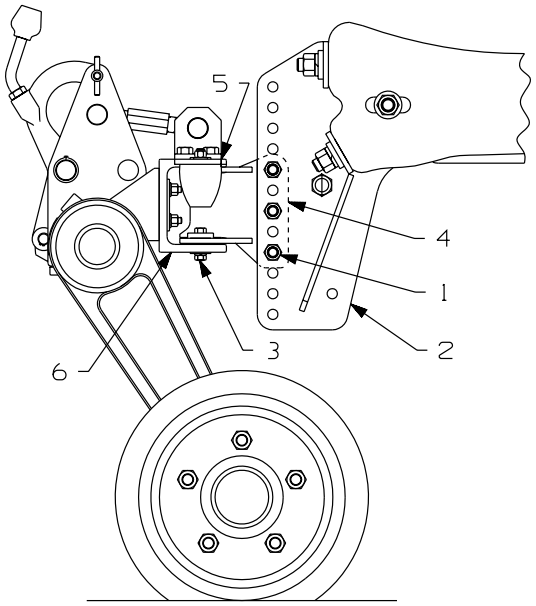


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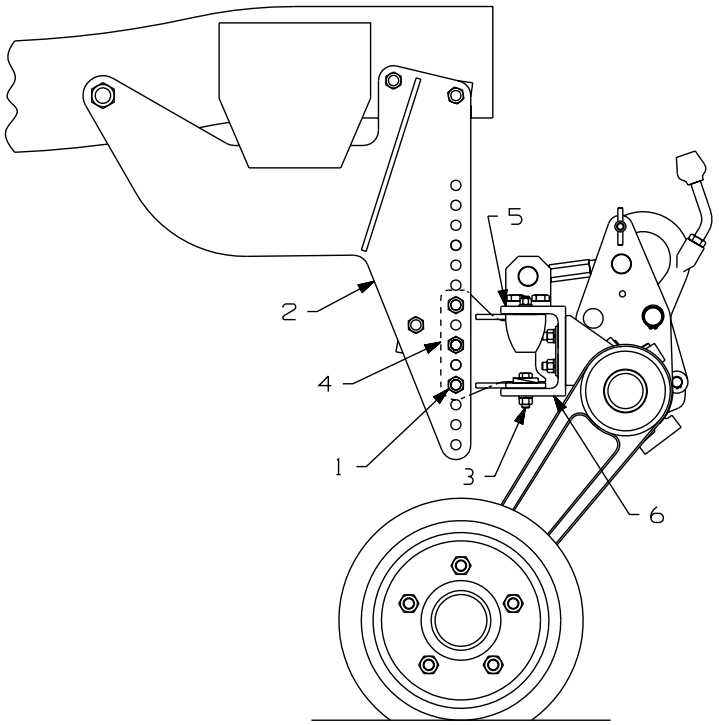
FIGURE 3-4
GUIDE WHEEL ARM VERTICAL ADJUSTMENT
REAR RAIL PILOT UNIT



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GUIDE WHEEL LOAD

CAUTION

- **DO NOT USE ANY OTHER JACK THAN THE HARSCO TRACK TECHNOLOGIES WHEEL WEIGHING JACK NO. 073527 TO CHECK THE GUIDE WHEEL LOAD. USE OF ANY OTHER JACK WILL RESULT IN INCORRECT GUIDE WHEEL LOAD INFORMATION.**

- **DO NOT USE THE WHEEL WEIGHING JACK TO LIFT THE VEHICLE. EXCESSIVE WEIGHT MAY CAUSE JACK TO FAIL. MISUSE OF WHEEL WEIGHING JACK MAY CAUSE GAUGE TO EXPLODE. READ ANSI B40.1 AND APPARATUS INSTALLATION / OPERATING INSTRUCTIONS BEFORE USE.**

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

Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL LOAD - See Figures 3-5 and 3-6

14. Lower and lock all guide wheels in the "rail" position. Do not use any other jack than the Harsco Track Technologies wheel weighing jack no. 073527 to check the guide wheel load. Use of any other jack will result in incorrect guide wheel load information. Place the wheel weighing jack no. 073527 under the guide wheel arm directly below the wheel spindle, see Figure 3-5. Jack the guide wheel up until the guide wheel just clears the top of the rail. Note the gauge reading. The gauge reading indicates the pounds of load on the guide wheel.

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

With the vehicle at curb weight, the recommended guide wheel load is 200 - 250 lbs (91 - 113 kg) @ specified guide wheel height.

Note: For maximum load carrying capacity, set both rear guide wheels to the lower recommended load limit.

With the vehicle loaded, the maximum guide wheel load is 575 lbs (261 kg).

If the load is not correct on any guide wheel, see Adjustment.

Adjustment

a. Unlock both front and/or rear guide wheels from the "rail" position. Let the guide wheels rest on the rails.

b. Figure 3-6 illustrates the load adjustment stud on the front and rear units. Each guide wheel is adjusted independently of the other.

c. Loosen the jam nut (1) using the provided wrench (part no. 079792).

To Increase The Load:	Turn the adjusting stud (2) clockwise, shortening the distance between the trunnion nuts (3).
To Decrease The Load:	Turn the adjusting stud (2) counter-clockwise, lengthening the distance between the trunnion nuts (3).

Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL LOAD - continued

d. Lock all guide wheels in the "rail" position. Recheck the guide wheel load on all guide wheels. When the load indicated is within the recommended weight, tighten the jam nut (1) securely.

e. If the recommended guide wheel load cannot be achieved by turning the adjusting stud, the guide wheel arm vertical height must be adjusted lower.

Note: Any guide wheel load adjustment made may change the guide wheel arm vertical height. Recheck the guide wheel arm vertical height. Guide wheel load and guide wheel arm vertical height must both be attained at the same time within the specified load limits and height dimensions.

15. The end of the load adjusting stud (2) should not extend more than 1/4 inch (6.4 mm) beyond and not more than 1/8 inch (3.2 mm) within the face of the trunnion nut (3).

If adjusting stud extends more than 1/4 inch (6.4 mm) beyond the face of the trunnion nut, it may be necessary to replace the rubber cords in the torque coupling.

If the end of the adjusting stud is within the face of the trunnion nut, there may be foreign material lodged in the torque coupling assembly. Disassemble and clean.

FIGURE 3-5
WHEEL WEIGHING JACK

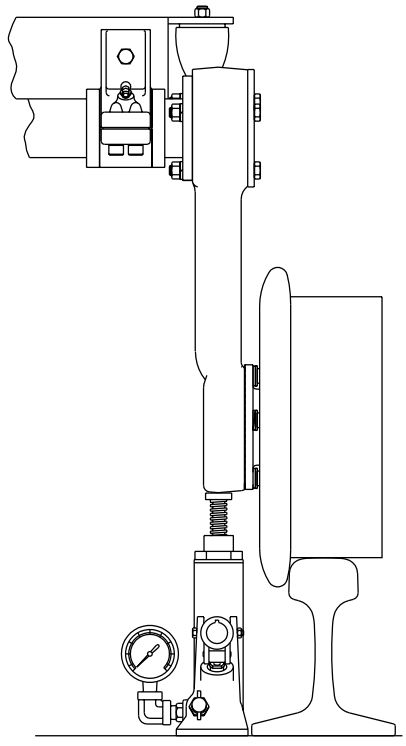

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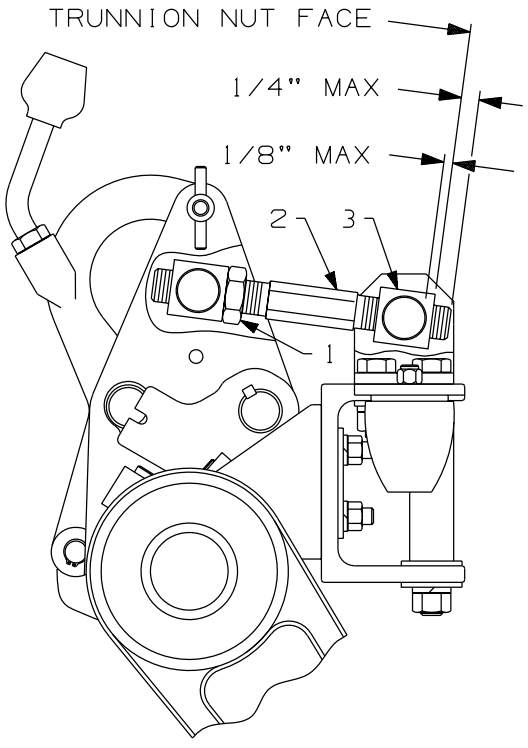
FIGURE 3-6
LOAD ADJUSTING STUD



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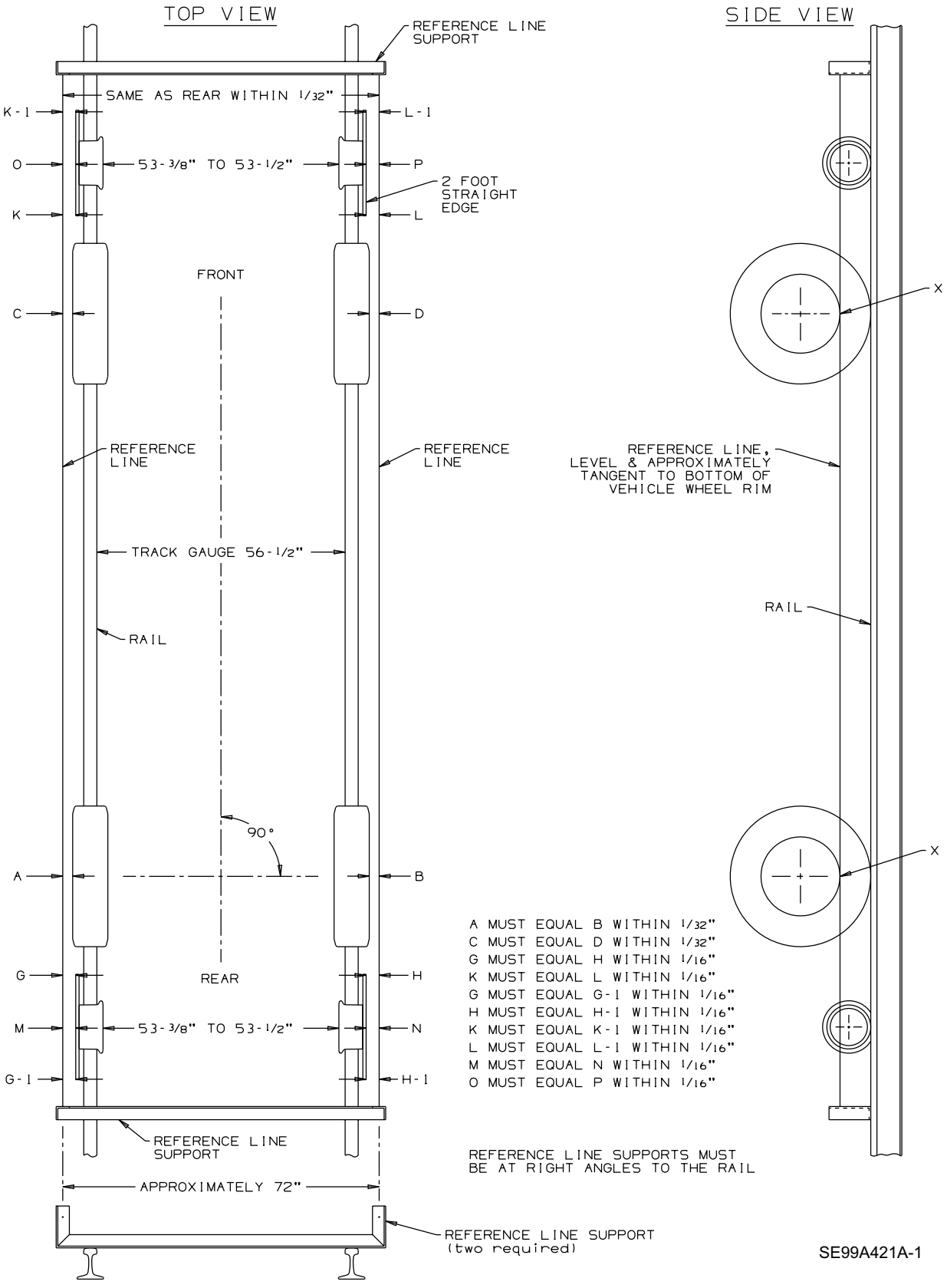
Guide Wheel Equipment Alignment Procedure

FIGURE 3-7
GUIDE WHEEL EQUIPMENT ALIGNMENT



Guide Wheel Equipment Alignment Procedure

STRING LINING SET-UP - See Figure 3-7

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

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

16. Establish parallel reference lines on each side of vehicle as shown in Figure 3-7.

17. 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 should be approximately 6 inches high, 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 72 inches apart. The distance between the wires or cords must be equal or within 1/32 inch at each support.

18. Clamp the supports to the rail in front of and behind the vehicle. The supports should be at right angles to the rail. Stretch the wires or cords between the supports, level with the bottom edge of the vehicle wheel rim (point X). The reference lines must be level.

19. Shift the supports on the rail until dimensions A = B and C = D are equal or within 1/32 inch. These measurements should be taken from the edge of the vehicle rim directly below the axle (point X) to the reference line. When shifting the supports, keep them at right angles to the rail so the reference lines stay level and parallel to each other. Rotate the vehicle wheels 180 degrees and recheck the measurements. If the measurements change, set the reference lines at the average of the two measurements.

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

Guide Wheel Equipment Alignment Procedure

RAIL PILOT UNIT ALIGNMENT - See Figures 3-7 and 3-8

21. Lower and lock all guide wheels in the "rail" position. Take measurements M, N, O & P. Measure from the outer edge of the guide wheels, directly below the center line of the wheel spindle, to the reference line. Measurements M, N, O & P must all be equal or within 1/16 inch. If not, see Adjustment.

Adjustment

a. Unlock both front and/or both rear guide wheels from the "rail" position. Let the guide wheels rest on the rails.

b. Loosen the eight adapter bracket cap screws (4) on the top and bottom of the cross channel. Shift the entire rail pilot unit until measurements M, N, O & P are all equal. Re-tighten the cap screws.

c. Lock all guide wheels in the "rail" position. Recheck the rail pilot unit alignment.

d. Repeat the procedure until the rail pilot unit alignment is correct.

22. Lower and lock all guide wheels in the "rail" position. The guide wheels must track straight, not toed in or out. Hold a two foot long straight edge against the outer edge of the guide wheel with the straight edge centered on the guide wheel. Check that dimensions G = G-1, H = H-1, K = K-1 & L = L-1. These dimensions must be equal or within 1/16 inch. If not, see Adjustment.

Note: When verifying whether the guide wheel is toed-in or toed-out, it may be helpful to visualize the traveling direction of the vehicle when in rail position.

The guide wheel is toed-in if the front dimension of the straight edge to the reference line is larger than the rear dimension. (Example - Left Rear Guide Wheel: Dimension G is larger than dimension G-1).

The guide wheel is toed-out if the front dimension of the straight edge to the reference line is smaller than the rear dimension. (Example - Left Rear Guide Wheel: Dimension G is smaller than dimension G-1).

a. Unlock both front and/or both rear guide wheels from the "rail" position. Let the guide wheels rest on the rails.

b. Loosen the appropriate inner (1) or outer (2) pivot bearing cap screws. Add or remove shims (5) (part no. 101818K) between the pivot bearing and cross channel. Re-tighten the cap screws.

Guide Wheel Equipment Alignment Procedure

RAIL PILOT UNIT ALIGNMENT - continued

Adjustment

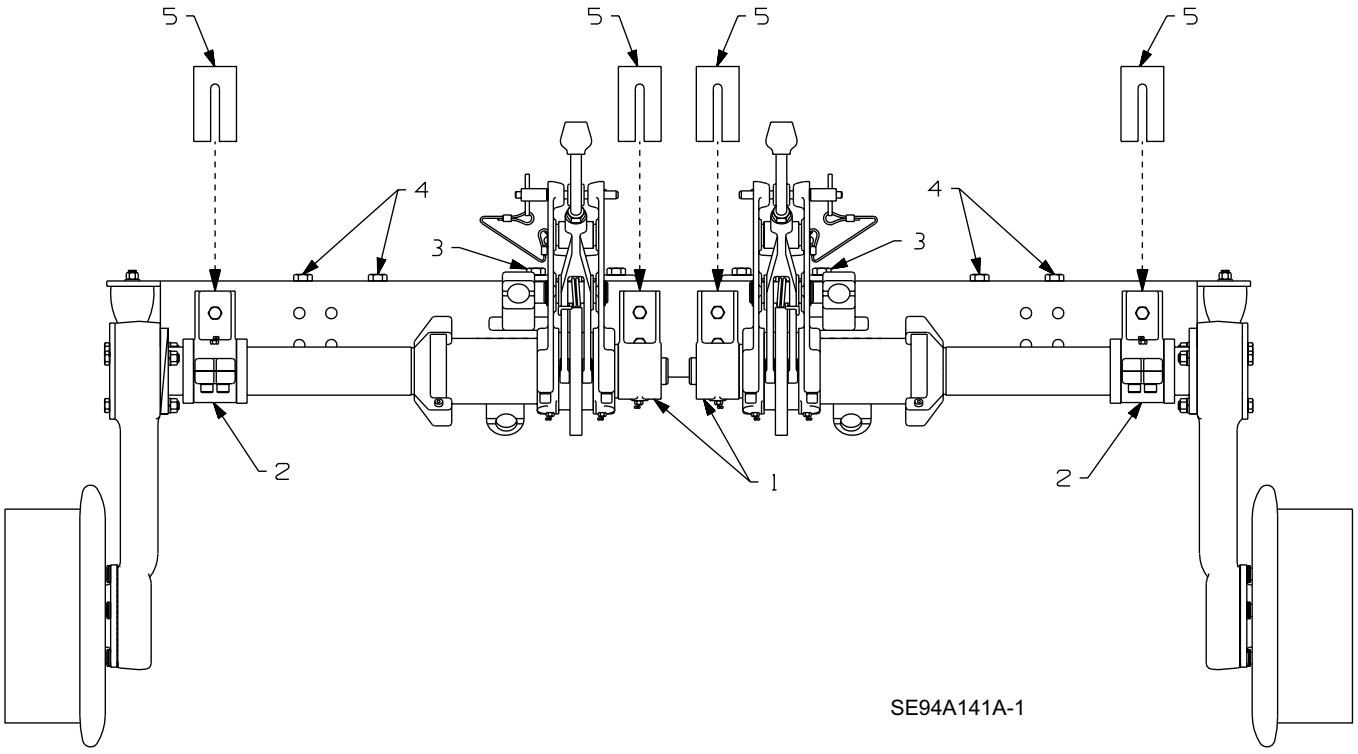
Note: Do not use more than two shims on any pivot bearing during the original application of the guide wheel units or three shims on any pivot bearing during field inspection and adjustment.

Front Guide Wheel Toed In:	Add shims to inner pivot bearing or remove shims from outer pivot bearing.
Front Guide Wheel Toed Out:	Add shims to outer pivot bearing or remove shims from inner pivot bearing.
Rear Guide Wheel Toed In:	Add shims to outer pivot bearing or remove shims from inner pivot bearing.
Rear Guide Wheel Toed Out:	Add shims to inner pivot bearing or remove shims from outer pivot bearing.

c. Lock all guide wheels in the "rail" position. Recheck the rail pilot unit alignment.

d. Repeat the procedure until the rail pilot unit alignment is correct.

FIGURE 3-8
RAIL PILOT UNIT



Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL OVERLOAD SET SCREWS - See Figure 3-9

23. The "rail" overload set screws carry the load in case of an overload or a tire failure, instead of transferring the load through the rubber cords when the guide wheels are in the "rail" position. Each guide wheel has two overload set screws for a combined total of eight on the vehicle.

24. Lower and lock all guide wheels in the "rail" position. With the vehicle at curb weight, measure the distance between the set screw and the stop on the casting.

The recommended dimension for all eight overload set screws is 3/8 inch (9.5 mm).

Note: An easy way to check the dimension is to insert a 3/8 inch cap screw in the gap. If the cap screw slips in with little play, the overload dimension is correct. If the cap screw does not slip in or is sloppy, adjustment is necessary.

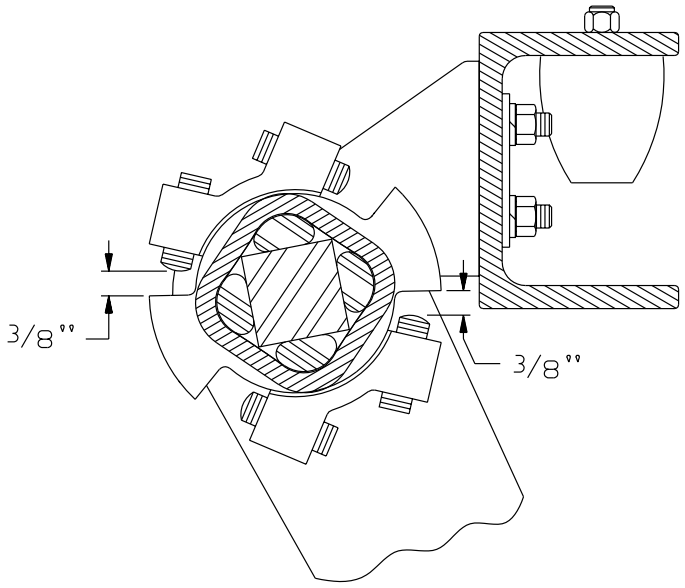
If any of the eight overload set screws are not set correctly, see Adjustment.

Adjustment

a. Insert the 3/8 inch cap screw in the gap. Tighten or loosen the set screw until the cap screw is snug with little play.

b. Repeat the procedure to set all eight overload set screws.

FIGURE 3-9
GUIDE WHEEL OVERLOAD ADJUSTMENT



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Guide Wheel Equipment Alignment Procedure

GUIDE WHEEL HIGHWAY SET SCREWS - See Figure 3-10

25. The highway set screws secure the guide wheel arms against the rubber bumpers on the cross frame when the rail pilot units are in the "highway" position. The rubber bumpers absorb the shocks encountered in highway driving instead of transferring the shocks through the rubber cords. Each guide wheel has two highway set screws for a combined total of eight on the vehicle.

26. Raise and lock all guide wheels in the "highway" position. The wheel arms should be solidly against the rubber bumpers. If any of the highway set screws are not set correctly, see adjustment.

Adjustment

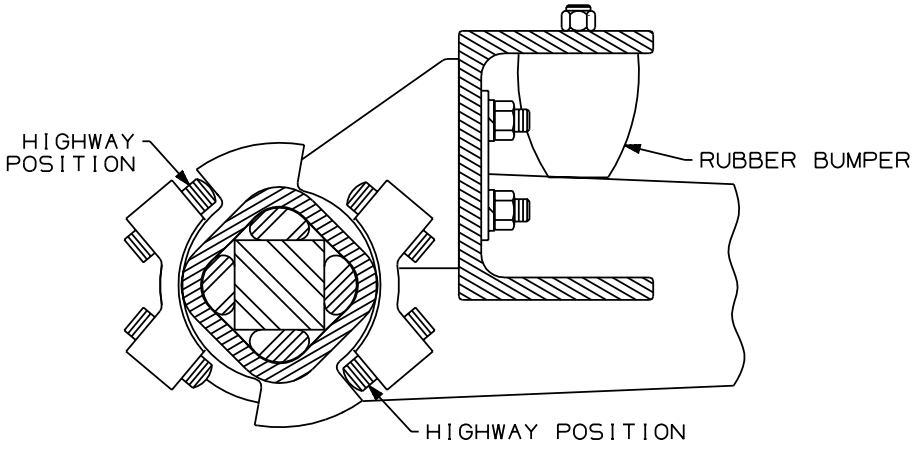
a. Unlock the guide wheel from the "highway" position. Let the guide wheel rest on the rails.

b. Turn both highway set screws to move the wheel arm up or down.

c. Lock the guide wheel in the "highway" position. Recheck the guide wheel arm.

d. Repeat the procedure until the guide wheel arm is solidly against the rubber bumper. If the rubber bumper is worn so the arm cannot be adjusted solidly against it, replace the bumper.

FIGURE 3-10
GUIDE WHEEL HIGHWAY ADJUSTMENT



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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.**

27. 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.

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

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

30. Lower and lock all guide wheels in the "rail" position.

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

32. 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.

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

34. See Figure 3-8. If the vehicle pulls noticeable to the right when traveling forward, add a shim (5) (part no. 101818K) behind the right front outer bearing. Do not use more than two shims on any pivot bearing during the original application of the guide wheel units or three shims on any pivot bearing during field inspection and adjustment.

    If the vehicle pulls noticeable to the left when traveling forward, add a shim (5) (part no. 101818K) behind the left front outer bearing. Do not use more than two shims on any pivot bearing during the original application of the guide wheel units or three shims on any pivot bearing during field inspection and adjustment.

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

Adjustments

LOCKING MECHANISM - See Figure 3-11

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

The locking mechanism is secured in the "rail" or "highway" position by a lock pin inserted through the pawl handle and the side plates of the locking mechanism. The lock pin must insert easily in either position. If not, re-align.

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 pushed in. If the lock pin does not operate properly, replace the pin.

1. Place the vehicle on straight, level track. Place the automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Stop the engine.

Rail Position Adjustment

2. Lower and lock all four guide wheels in the "rail" position.

3. If the lock pin (1) cannot be inserted or is hard to insert, re-align the locking pawl.

4. To re-align, adjust the set screw (2) so the hole in the pawl handle (4) aligns with the holes in the side plates (5). Turn the screw clockwise to move the hole in the pawl handle towards the vehicle. Turn the screw counter-clockwise to move the hole in the pawl handle away from the vehicle.

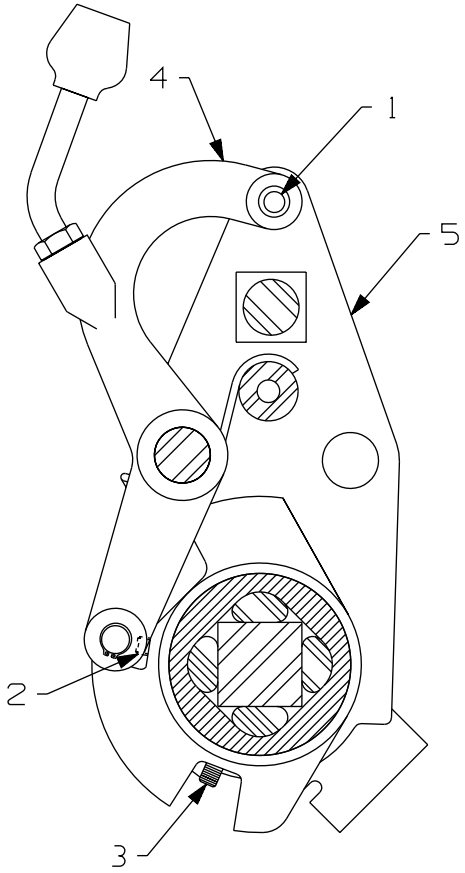
Highway Position Adjustment

5. Raise and lock all four guide wheels in the "highway" position.

6. If the lock pin (1) cannot be inserted or is hard to insert re-align the locking pawl.

7. To re-align, adjust the set screw (3) so the hole in the pawl handle (4) aligns with the holes in the side plates (5). Turn the screw clockwise to move the hole in the pawl handle towards the vehicle. Turn the screw counter-clockwise to move the hole in the pawl handle away from the vehicle.

FIGURE 3-11
LOCKING MECHANISM



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Guide Wheel Equipment Adjustment

RAIL SWEEP - See Figure 3-12

1. Place the vehicle on straight, level track. Place the automatic transmission in "Park" or manual transmission in "Neutral". Apply the parking brake. Stop the engine.

2. Lower and lock all four guide wheels in the "rail" position, the rail sweeps are attached to the wheel arm and will lower to the rail when the guide wheels are lowered.

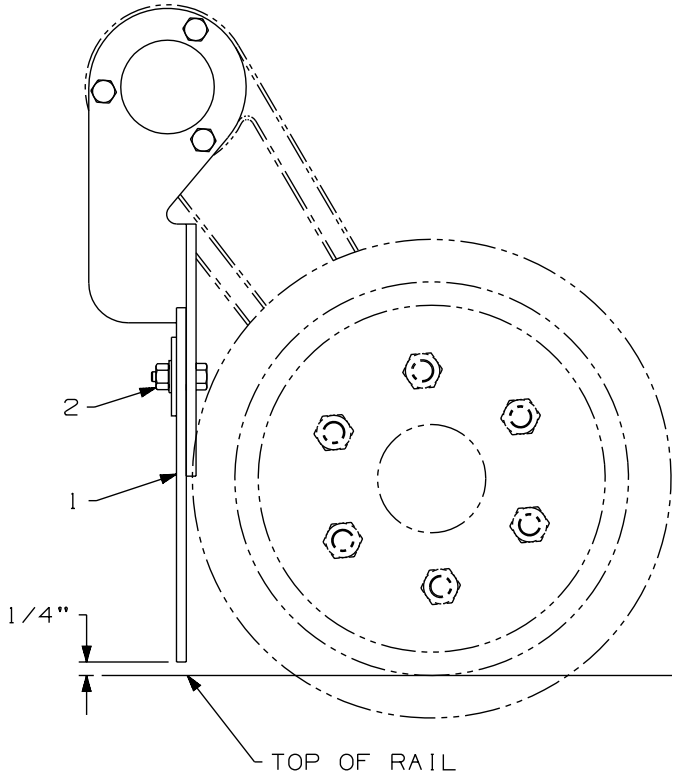
3. The rubber sweep (1) should clear the top of the rail by 1/4 inch (6.4 mm). If not, adjustment is necessary.

4. Loosen the two cap screws (2). Move the rail sweep (1) until the sweep clears the top of the rail by 1/4 inch (6.4 mm). Re-tighten the cap screws.

5. If the rubber sweep (1) is worn and can not be lowered, remove the two cap screws (2). Relocate the cap screws in the next upper set of holes in the rubber sweep (1). Then adjust the sweep. See Step 4.

6. If the rubber sweep (1) is worn and in the last, upper set of holes and can not be lowered, replace the rubber sweep.

FIGURE 3-12
RAIL SWEEP



SECTION 4 - MAINTENANCE
TABLE OF CONTENTS

Maintenance Schedule

■ **RE-TORQUE VEHICLE WHEEL LUG NUTS, WHEEL SPACER LUG NUTS AND GUIDE WHEEL LUG NUTS AFTER FIRST 50 MILES OF OPERATION. THEREAFTER TORQUE WHEEL NUTS ACCORDING TO RECOMMENDED MAINTENANCE SCHEDULE. FAILURE TO HEED THIS WARNING COULD RESULT IN SEVERE BODILY INJURY.**

Daily:

1. Inspect both front and rear rail pilot units for damaged or missing parts.

2. Note the amount of effort required to lower and raise the guide wheels. Effort required should be about the same for each guide wheel. The rear guide wheels, which are locked in the rail position first, should be somewhat easier to lower.

3. Check the locking mechanism for ease of operation. The lock pins should never be able to be pulled out unless the button on the "T" end is pushed in. The button in the lock pin must push in easily and 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. When the vehicle is operated on the track, listen for unusual noises. Unusual noises may indicate incorrectly lowered guide wheels, or damaged or missing parts. Pay attention to the quality of the ride. Check alignment if the vehicle crowds one side of the track instead of floating from side to side. See Adjustment - Guide Wheel Equipment Alignment Procedure.

Weekly:

1. Check guide wheel equipment alignment. See Adjustments Section, Guide Wheel Equipment Alignment Procedure - Vehicle Track Test.

2. Inspect 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 or excessive play. If the guide wheel does not rotate properly, the bearings and spindle may be damaged. Replace the bearing/spindle assembly if necessary.

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

5. Check 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 rail pilot unit pivot bearings for tightness.

7. Check all bolts for tightness. See Appendices, Appendix A - Bolt Torque Requirements Chart.

Maintenance Schedule

At 50 Vehicle Miles (80 Vehicle km):

1. Torque wheel spacer lug nuts, vehicle wheel lug nuts and guide wheel lug nuts to the recommended specifications. See the decal attached to the vehicle wheel for the recommended wheel bolt torque specifications. Thereafter refer to the wheel manufacturer's wheel torque specifications.

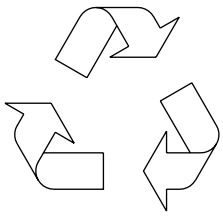
Every 2000 Track Miles (3200 Track km):

1. Lubricate rail pilot unit locations provided with grease fittings. See Lubrication.

2. Lubricate the locking mechanism and other pivot points with light oil or a lubricating spray.

3. Torque guide wheel lug nuts to 90 ft lbs (122 N-m).

Waste Disposal



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

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

Rail Pilot Unit Lubrication

Lubricate the guide wheel equipment every 2000 track miles (3200 track km) maximum or each time the vehicle is serviced.

RAIL PILOT UNIT LUBRICATION - See Figure 4-1

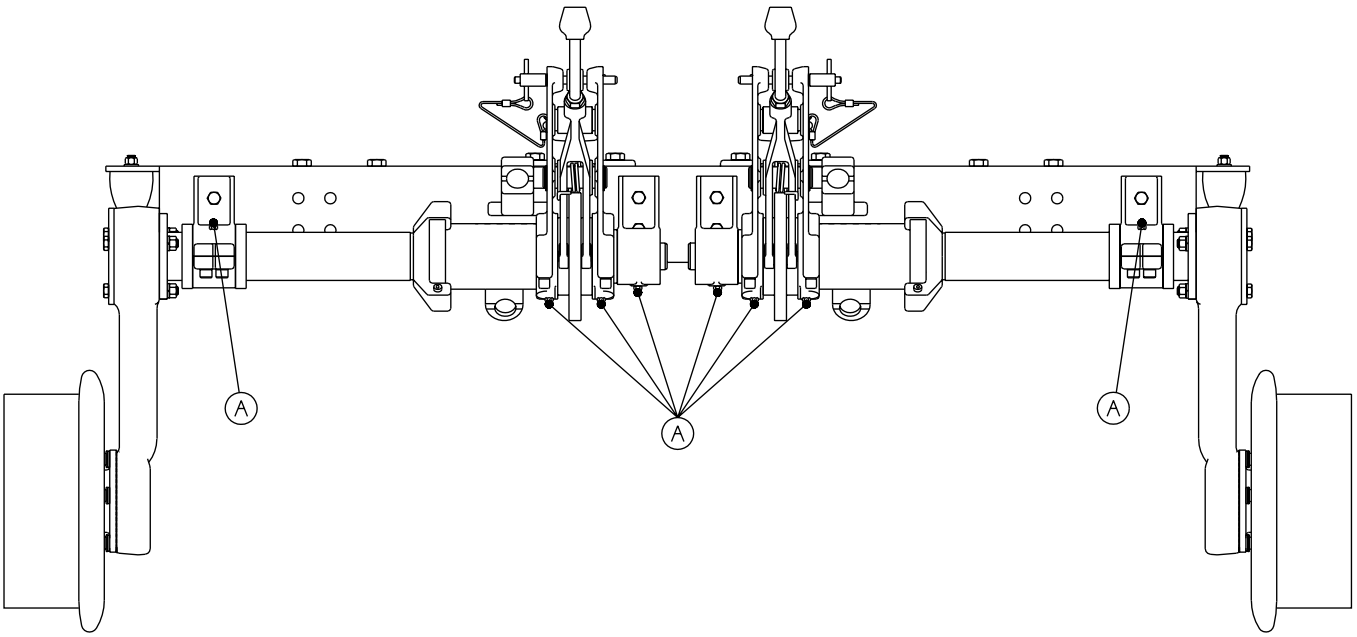
1. Apply the vehicle parking brake. Stop the engine.

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

3. Lubricate the locking mechanism and other pivot points with a light weight oil or a lubricating spray.

Note: HR0305 Series A guide wheel equipment utilizes sealed bearings in the guide wheels. Do not re-pack the guide wheel bearings. If the bearings are worn, replace the spindle, hub and bearing assembly.

FIGURE 4-1
RAIL PILOT UNIT LUBRICATION DIAGRAM



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Vehicle Wheels

WHEEL REPLACEMENT

■ **USE REPLACEMENT WHEEL(S) 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 the best results. Torque vehicle wheel lug nuts to recommended specifications. See the decal attached to the vehicle wheel for the recommended wheel bolt torque specifications.

TIRE REPLACEMENT

■ **USE REPLACEMENT TIRES WITH THE SAME ROLLING RADIUS, TREAD WIDTH, PLY RATING, AND LOAD RATING AS RECOMMENDED IN THE HARSCO TRACK TECHNOLOGIES'S 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 5-1/2 inches of tread width.

Inflate tires to 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. The wheels and tires should be static balanced or balanced after installation on the vehicle for the best results. Torque vehicle wheel lug nuts to recommended specifications. See the decal attached to the vehicle wheel for the recommended wheel bolt torque specifications.

After installing new tire(s) on the vehicle, check rail pilot unit wheel arm vertical height and guide wheel load. See the Adjustment Section - Guide Wheel Equipment Alignment Procedure.

Guide Wheels

ALLOWABLE WEAR - 138093 ALUMINUM WHEEL WITH RUBBER TREAD

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. See Figure 4-2. Measure the wheel flange at position "A" with the wheel caliper.

   The minimum allowable flange dimension is: Position "A".....1/4 inch (6.4 mm)

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

4

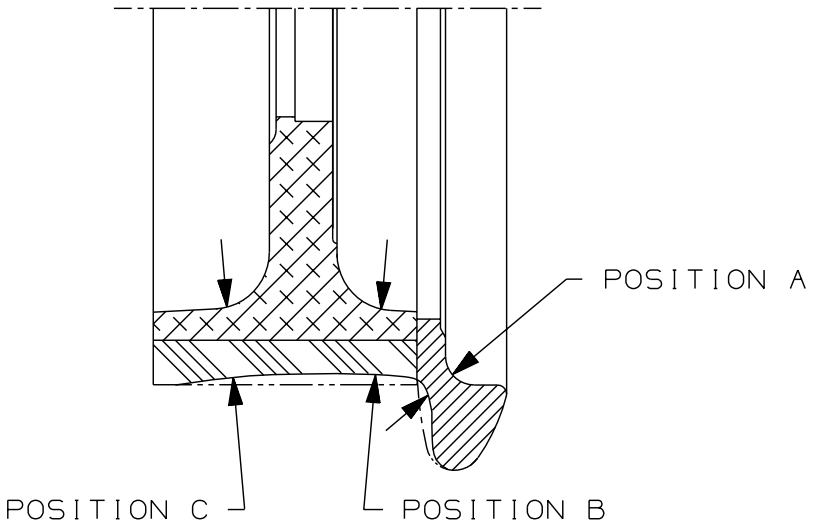
3. See Figure 4-2. Measure the wheel tread at positions "B" and "C" with the wheel caliper.

   The minimum allowable tread dimensions are: Position "B".....11/16 inch (17.5 mm)
   Position "C" .....11/16 inch (17.5 mm)

   If any of the guide wheel tread dimensions are less than the allowable limits, replace the wheel immediately.

4. The rubber tread must not have gouges. The aluminum wheel and/or flange must not have hairline cracks. If any of these are evident, replace the wheel immediately.

FIGURE 4-2
ALLOWABLE WEAR - 138093 ALUMINUM GUIDE WHEEL WITH RUBBER TREAD



Guide Wheels

ALLOWABLE WEAR - 138113 STEEL GUIDE WHEEL

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. See Figure 4-3. Measure the wheel flange at position "A" with the wheel caliper.

   The minimum allowable flange dimension is: Position "A".....1/4 inch (6.4 mm)

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

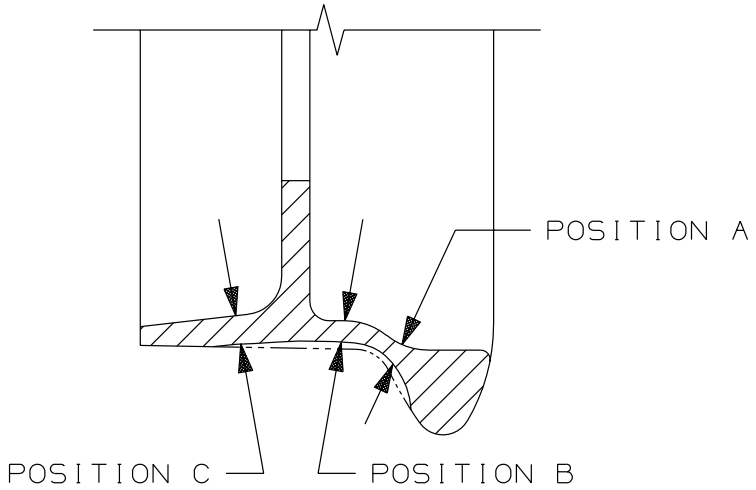
3. See Figure 4-3. Measure the wheel tread at positions "B" and "C" with the wheel caliper.

   The minimum allowable tread dimensions are: Position "B".....1/4 inch (6.4 mm)
   Position "C" .....1/4 inch (6.4 mm)

   If any of the guide wheel tread dimensions are less than the allowable limits, replace the wheel immediately.

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

FIGURE 4-3
ALLOWABLE WEAR - 138113 STEEL GUIDE WHEEL



Guide Wheels

GUIDE WHEEL CHECK

Guide wheels which do not run true on the tread and flange will vibrate and give a rough ride. If the vehicle vibrates and gives a rough ride on track, there may be foreign matter (dirt, rust, paint, etc.) between the wheel and hub, the spindle bearings may be worn, or the tread and flange of the wheel may be worn or damaged, causing a wobbling sensation. On wheels with rubber tread, there may also be foreign matter lodged between the mating surfaces of the steel flange and the aluminum wheel, giving the same sensation.

1. Verify that the five lug nuts are torqued properly to 90 ft lbs (122 N-m). Tighten if necessary.

2. Rubber Guide Wheels Only: Verify that the six 3/8 inch hex flange head cap screws securing flange to the rubber tread wheel are torqued properly to 40 ft lbs (55 N-m).

3. Track test the vehicle to verify whether the vibrations were caused by loose guide wheels or flanges.

   If track testing shows that the vibrations persist, go on to the following steps.

4. Check the spindle bearing by grasping the guide wheel and working it from side to side. If there is excessive play in the spindle, remove the guide wheel and verify that the four 3/8 inch cap screws that secure the spindle to the wheel arm are properly torqued to 31 ft lbs (42 N-m). Re-tighten if necessary.

5. Recheck the spindle bearing by grasping the spindle and working it from side to side. If there is excessive play in the spindle bearing, the bearings are worn. Replace the spindle and hub assembly.

6. Check for foreign material on the mating surfaces of the guide wheel and the hub. Remove any foreign material on these surfaces.

7. Rubber Guide Wheels Only: Remove the flange from the guide wheel and check for foreign material on the mating surfaces of the flange and the guide wheel. Remove any foreign material on these surfaces. Reinstall the flange on the guide wheel and torque the fasteners to 40 ft lbs (55 N-m).

8. Reinstall the guide wheel onto the spindle and hub. Torque wheel nuts to 90 ft lbs (122 N-m).

9. Track test the vehicle to verify whether the vibrations were caused by worn spindle bearings or foreign material between guide wheel/flange mounting surfaces.

   If track testing shows that the vibrations persist, the wheel may be sprung or bent. Replace the wheel.

Locking Mechanism

The spring loaded locking mechanism should move freely so that it engages itself when the guide wheel is raised or lowered. Periodically inspect this area for worn or damaged parts. When the vehicle is operated in muddy or slushy conditions, foreign material may get into the locking mechanism, preventing the lock from operating correctly. Remove this foreign material, being careful not to damage the locking mechanism.

The locking mechanism is secured in the "rail" or "highway" position by a lock pin inserted through the pawl handle and side plates of the locking mechanism. The lock pin must insert easily in either position. If not, re-adjust. See Adjustment Section - Locking Mechanism. The button in the locking 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 locking pin is pushed in. If the lock pin does not operate properly, replace the pin.

Pivot Bearings

The inner and outer pivot bearings on the rail pilot unit should be checked carefully at weekly intervals for wear. To check the bearings, the guide wheels must be in the "highway" position.

Insert a pry bar between the cross channel and the pivot. Check for looseness. The pivot bearings are non-adjustable. If the pivot bearings are worn, replace them.

Rubber Cord Replacement

See Adjustment Section, Figure 3-6. The end of the load adjustment stud, behind the locking pawl mechanism, should not extend more than 1/4 inch (6.4 mm) beyond and not more than 1/8 inch (3.2 mm) within the face of the trunnion nut.

If the adjusting stud extends more than 1/4 inch (6.4 mm) beyond the face of the trunnion nut, it may be necessary to replace the rubber cords in the torque coupling. See Service Data Sheet no. 400

Bolt Torque Requirements

■ **CHECK ALL BOLTS AND NUTS PERIODICALLY, AND KEEP THEM TIGHTENED TO TORQUE SPECIFIED IN APPENDICES SECTION - APPENDIX A. IF BOLT REPLACEMENT BECOMES NECESSARY, REPLACE WORN BOLT WITH EQUAL GRADE 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
Extreme effort required to unlock and lower or raise guide wheels.	Components bent, broken, etc.	Replace components.
	Foreign material (mud, slush, dirt, etc;) in torque coupler.	Clean.
	Pivot bearings are dirty and/or not lubricated.	Disassemble and clean. Lubricate.
Extreme effort required to lock or unlock guide wheels in the "rail" position.	Vehicle incorrectly loaded or overloaded.	Redistribute or remove some of the load.
	Vehicle 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.
	Rail pilot unit wheel arm height and/or guide wheel load adjusted incorrectly.	Re-adjust. See Adjustment Section - Guide Wheel Equipment Alignment Procedure.

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Minimal effort required to lock or unlock guide wheels in the "rail" position.	Vehicle tires are over-inflated.	Check pressure. If too high, deflate to the tire manufacturer's recommended maximum pressure printed on the sidewalls or wheel manufacturer's recommended maximum pressure, stamped on the wheel, whichever is lower.
	Rail pilot unit wheel arm height and/or guide wheel load adjusted incorrectly.	Re-adjust. See Adjustment Section - Guide Wheel Equipment Alignment Procedure.
Vehicle pulls noticeably to the left or right when on track.	Vehicle loaded heavy on one side.	Move load to center of vehicle.
	Steering lock not engaged.	Engage the steering lock.
	Vehicle wheels not aligned with steering lock when engaged.	Re-align. See Adjustment Section - Guide Wheel Equipment Adjustment Procedure.
	Guide wheels are not aligned with vehicle.	Re-align. See Adjustment Section - Guide Wheel Equipment Alignment Procedure.
	Vehicle front tires out of alignment.	Re-align front tires.
Vehicle derails.	Rail pilot units, vehicle axle(s), 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
Vibration felt in the vehicle when traveling on track.	Rail pilot unit mounting hardware loose.	Tighten all bolts to recommended torque.
	Guide wheel spindle bearings worn.	Replace bearing/spindle assembly.
	Guide wheel worn or damaged.	Replace guide wheel.
	Rail pilot unit pivot bearings worn.	Check inner and outer pivot bearings. If necessary, Replace pivot bearings.
	Vehicle rim bent.	Replace rim. See Maintenance Section - Vehicle Wheels.
	Vehicle tires out of balance.	Balance tires. See Maintenance Section - Tire Replacement.
	Wheel spacer lug nuts and or vehicle lug nuts loose.	Torque wheel spacer lug nuts and vehicle lug nuts to recommended specifications. See Maintenance Section.
Unusual or excessive noise when traveling on track.	Guide wheel spindle bearings worn.	Replace bearing/spindle assembly.
	Rail pilot unit flanging hard to the right or left.	Re-align. See Adjustment Section - Guide Wheel Equipment Alignment Procedure.

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Vibration felt in the vehicle when traveling on road.	Rail pilot unit mounting hardware loose.	Tighten all bolts to recommended torque.
	Guide wheels are not locked and secured in "highway" position.	STOP IMMEDIATELY. Make sure all four guide wheels are locked and secured in "highway" position.
	Guide wheel "highway" set screws are adjusted incorrectly.	Re-adjust. Wheel arms should be tight against rubber bumper on the cross tube. If rubber bumper is worn, replace.
	Vehicle wheel bent.	Replace wheel. See Maintenance Section - Vehicle Wheels.
	Vehicle tires out of balance.	Balance tires. See Maintenance Section - Tire Replacement/Balancing.
	Wheel spacer lug nuts and or vehicle lug nuts loose.	Torque wheel spacer lug nuts and vehicle lug nuts to recommended specifications. See maintenance Section.

Troubleshooting Guide Wheel Equipment

PROBLEM	PROBABLE CAUSE	POSSIBLE REMEDY
Guide wheel "rail" overload set screws bottomed out.	Vehicle incorrectly loaded or overloaded.	Redistribute or remove some of the load.
	Vehicle 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 arm height and/or guide wheel load adjusted incorrectly.	Re-adjust. See Adjustment Section - Guide Wheel Equipment Alignment Procedure.
	"Rail" overload set screws adjusted incorrectly.	Re-adjust. See Adjustment Section - Guide Wheel Equipment Alignment Procedure.
	Rubber cords in torque coupler worn.	Have rubber cords replaced.
	Foreign material (mud, slush, dirt, etc;) in torque coupler.	Clean.

SECTION 6 - APPENDICES
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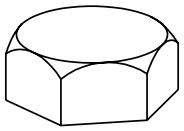
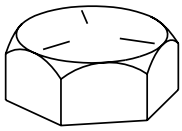
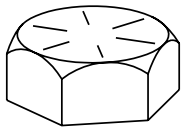
Appendix A - Conversion Tables

Appendix B - Service Data Sheets

Appendix A

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

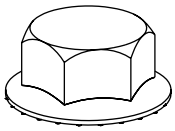
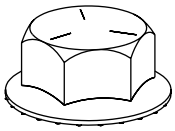
The torque values listed below are for standard-type fasteners only. The torque values listed are based on wet (lubricated) and dry conditions. The torque values for 1/4 and 5/16 inch size fasteners are listed in in-lbs torque only. The torque values for all other size fasteners are listed in ft-lbs 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.

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
BOLT TORQUE REQUIREMENTS TABLE
SERRATED-TYPE FLANGE FASTENERS

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

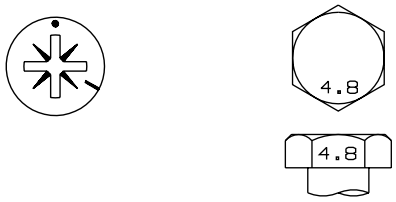
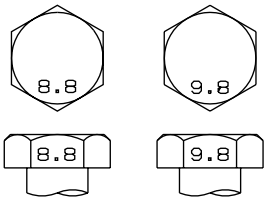
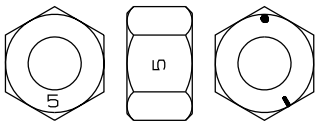
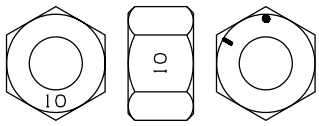
SAE Grade	**1 or 2**				**5**			
Fastener Standard SAE Grade Markings								
Fastener Body Size	**Torque Wet**		**Dry**		**Torque Wet**		**Dry**	
Inch Thrd	ft-lb	(kg-m)	ft-lb	(kg-m)	ft-lb	(kg-m)	ft-lb	(kg-m)
1/4 - 20	8	(1.1)	11	(1.5)	11	(1.5)	15	(2.1)
1/4 - 28	9	(1.2)	12	(1.7)	12	(1.7)	16	(2.2)
5/16 - 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
METRIC BOLT AND CAP SCREW TORQUE VALUES

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

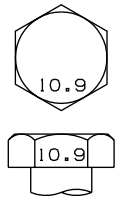
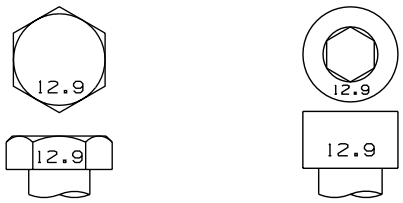
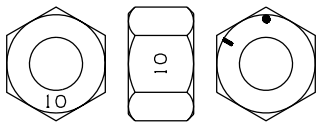
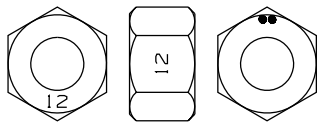
* Lubricated means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. Dry means plain or zinc plated without any lubrication.

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

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

Appendix A

FIGURE 6-4
METRIC BOLT AND CAP SCREW TORQUE VALUES

Property Class and Head Markings	10.9 	12.9 
Property Class and Nut 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
°F MINUS 32, DIVIDED BY 1.8 EQUALS °C

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

Appendix A

FIGURE 6-11
MILES PER HOUR TO KILOMETERS PER HOUR
CONVERSION TABLE
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

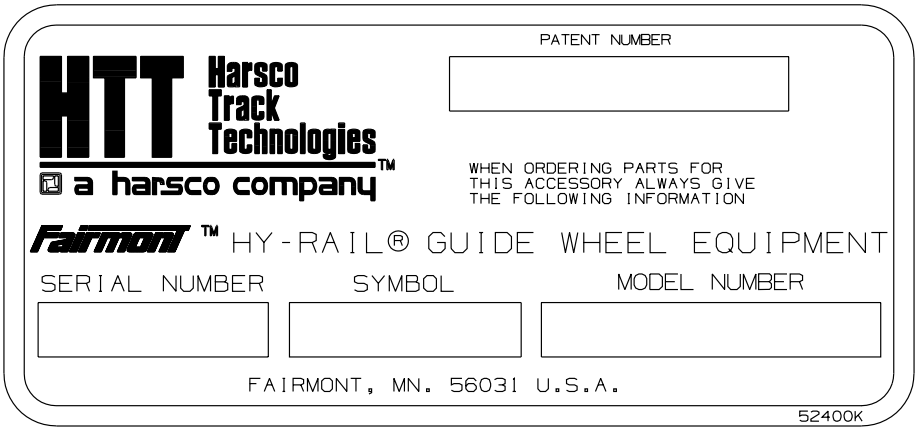
GAL	LITER	GAL	LITER	GAL	LITER	GAL	LITER
100	378.54	10	37.85	1	3.79	0.1	0.38
200	757.08	20	75.71	2	7.57	0.2	0.76
300	1,135.62	30	113.56	3	11.36	0.3	1.14
400	1,514.16	40	151.42	4	15.14	0.4	1.51
500	1,892.71	50	189.27	5	18.93	0.5	1.89
600	2,271.25	60	227.12	6	22.71	0.6	2.27
700	2,649.79	70	264.98	7	26.50	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

SECTION 7 - PARTS
TABLE OF CONTENTS

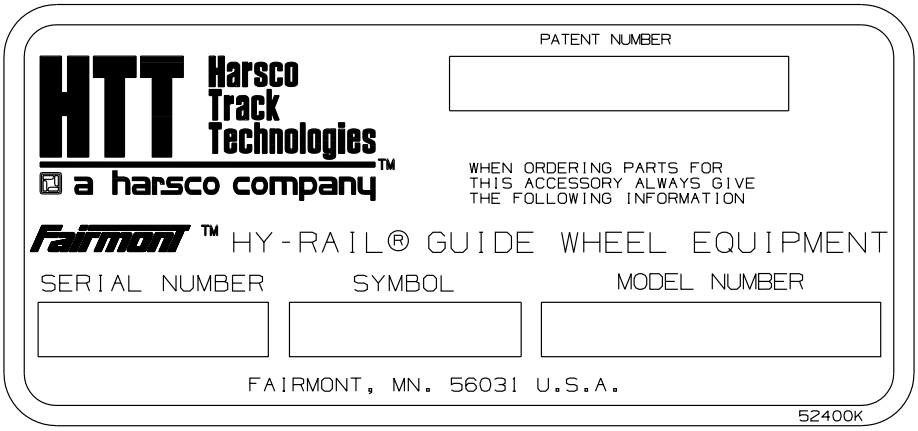
Serial Numbers

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

FRONT RAIL PILOT UNIT
SERIAL NUMBER TAG



REAR RAIL PILOT UNIT
SERIAL NUMBER TAG



Instructions For Ordering Parts

1. Turn to the rear of the Parts Section and locate the Vehicle Application charts.

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

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

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

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

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

7. For Convenience in ordering, parts are listed by item number, part number, description, and quantity in each assembly or group. If in doubt as to any part wanted, send 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 recorded above.
    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.

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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.

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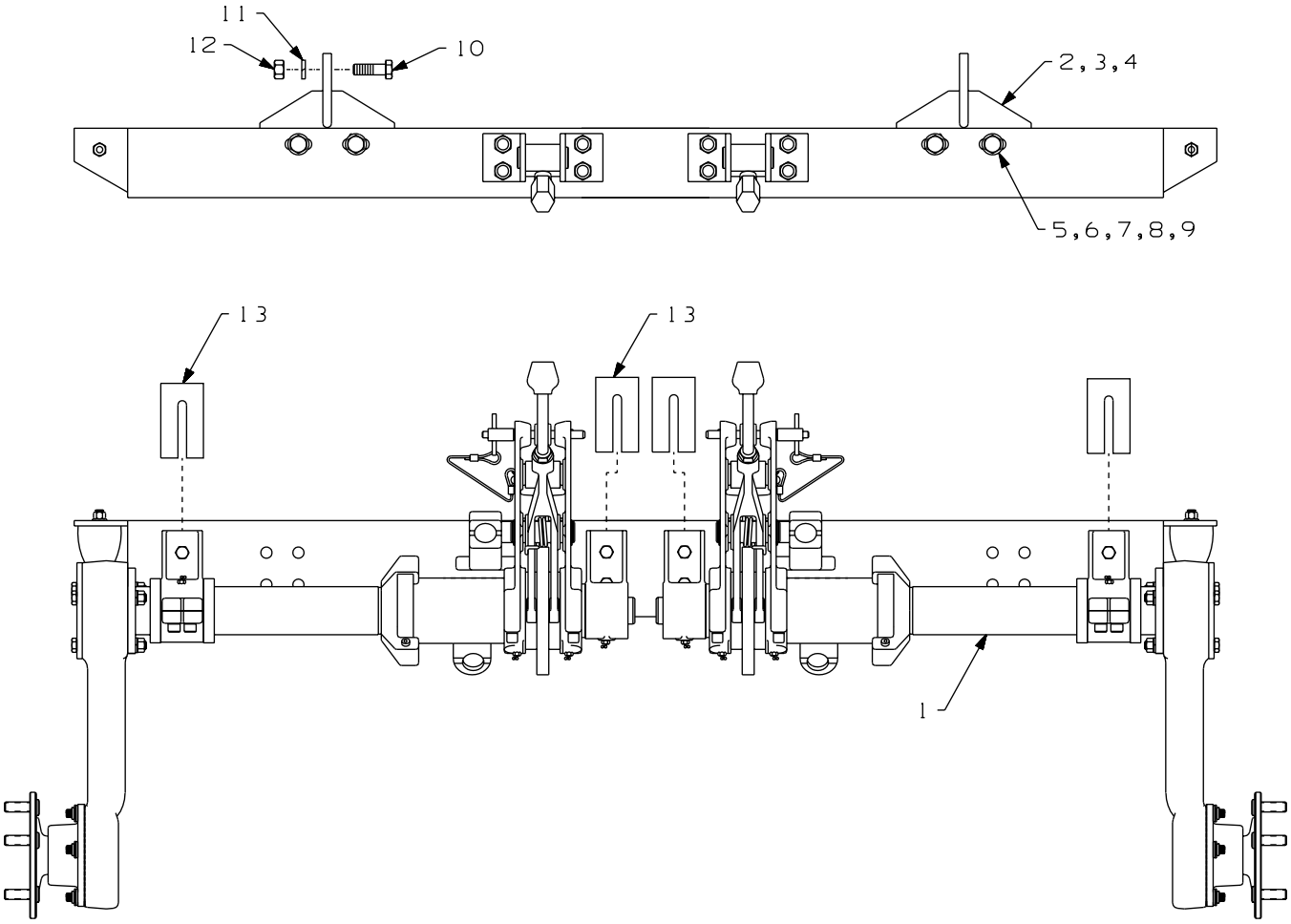
Hazardous Material Disclaimer

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

168444 RAIL PILOT UNIT

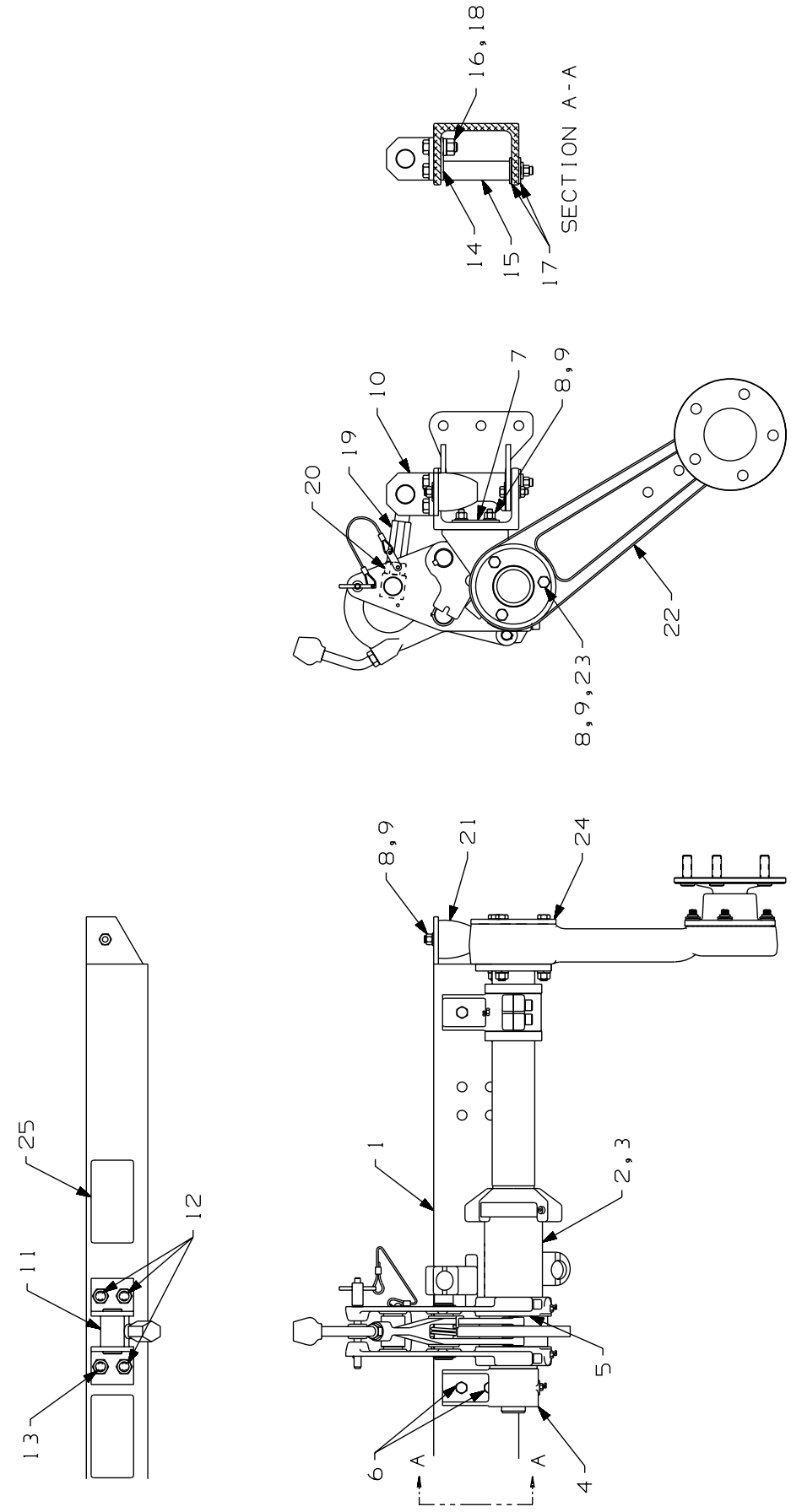


SE168444A-1

168444 RAIL PILOT UNIT

ITEM	PART NO	DESCRIPTION	QTY
1	168443	Rail Pilot Unit Assembly (see separate breakdown)	2
2	101813K	Side Bar Adapter	4
3	101816	Spacer, 1/16"	8
4	101817	Spacer, 1/32"	8
5	F016365	Cap Screw, 3/8-24 x 1-1/2" Hex Hd	16
6	F023111	Harden Washer	16
7	058528	Washer	16
8	F001025	SAE Lock Washer, 3/8"	16
9	F016820	Hex Nut, 3/8"-24	16
10	F001090	Cap Screw, 1/2-13 x 1-1/2" Hex Hd	12
11	F001075	SAE Lock Washer, 1/2"	12
12	F003598	Hex Nut, 1/2"-13	12
13	101818K	Bearing Shim, 1/16" (use as required for wheel alignment)	10
14	079792	Wrench, 1-1/8" Open End (not illustrated)	1
15	135744	Lift Handle (not illustrated)	1

168443 RAIL PILOT UNIT ASSEMBLY

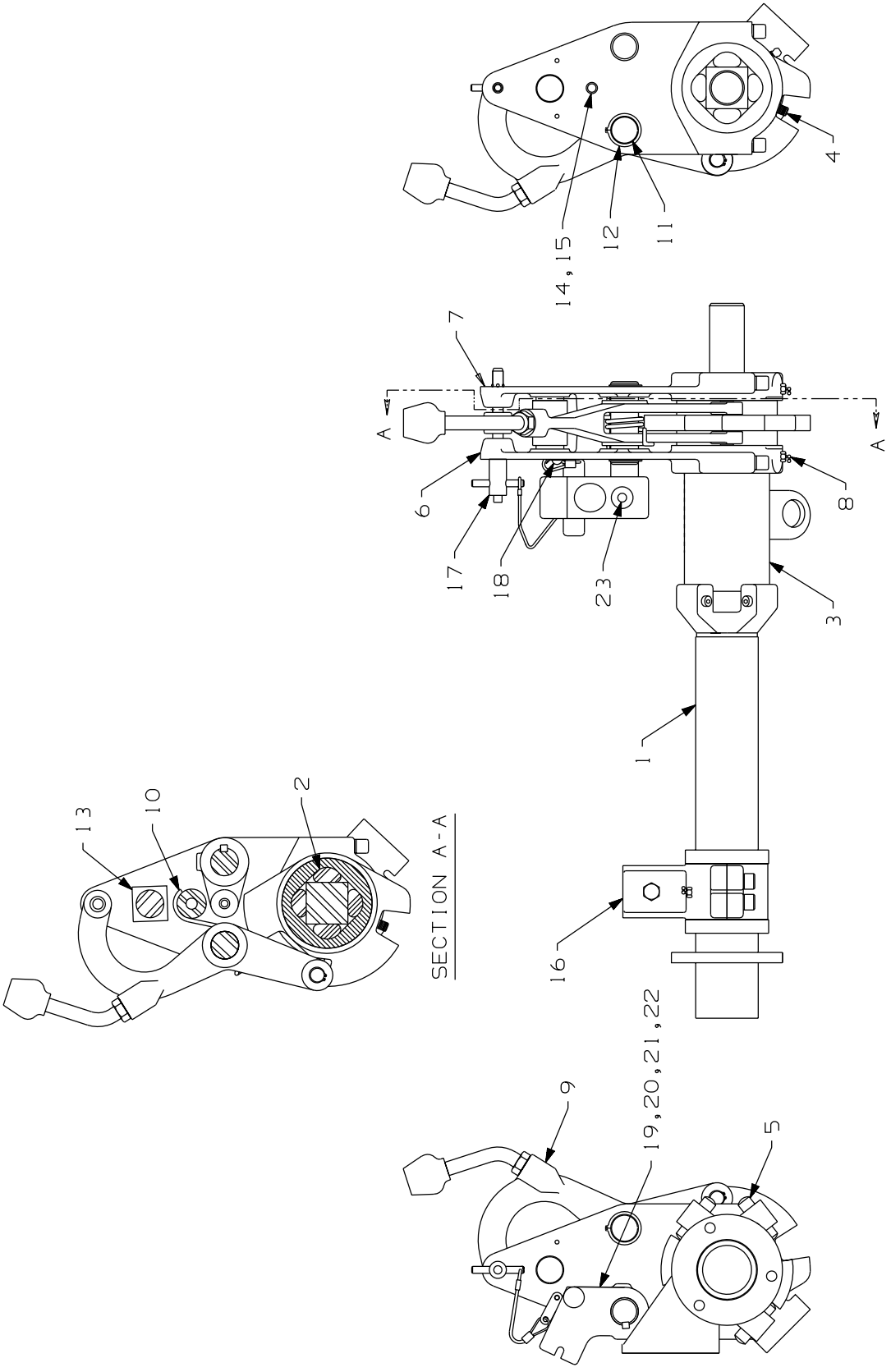


SE168443A-1

168443 RAIL PILOT UNIT ASSEMBLY

ITEM	PART NO	DESCRIPTION	QTY
	168443	RAIL PILOT UNIT ASSEMBLY	1
1	162060	Cross Channel	1
2	168441	Coupling And Tube RF/LR (see separate breakdown)	1
3	168440	Coupling And Tube LF/RR (see separate breakdown)	1
4	083119	INNER PIVOT BEARING	2
4a	F014262	Grease Seal	2
4b	F008014	Grease Fitting	1
5	083121	Thrust Washer	2
6	F016365	Cap Screw, 3/8-24 x 1-1/2" GR 8 Hex Hd	8
7	101799	Bolt Strip	4
8	F001025	SAE Lock Washer, 3/8"	16
9	F016820	Hex Nut, 3/8"-24	16
10	083122	Angle	4
11	083118	Trunnion Nut	2
12	F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	6
13	F001525	Cap Screw, 1/2-13 x 5-1/2" GR 5 Hex Hd	2
14	101802	Bolt Strip	4
15	101803	Spacer	2
16	F001075	SAE Lock Washer, 1/2"	8
17	F001267	Wrought Washer, 1/2"	8
18	F003598	Hex Nut, 1/2"-13 GR 5	8
19	083123	Adjusting Stud	2
20	F005170	Lock Nut, 3/4"-16 GR 5	2
21	F011732	Rubber Bumper	2
22	168452	Wheel Arm Assembly (see separate breakdown)	2
23	F017427	Cap Screw, 3/8-24 x 3-1/4" GR 8 Hex Hd	6
24	168453	Washer	2
25	162058	Decal, Warning, Fairmont Tamper....	2

168441 COUPLING AND TUBE ASSEMBLY - RF/LR

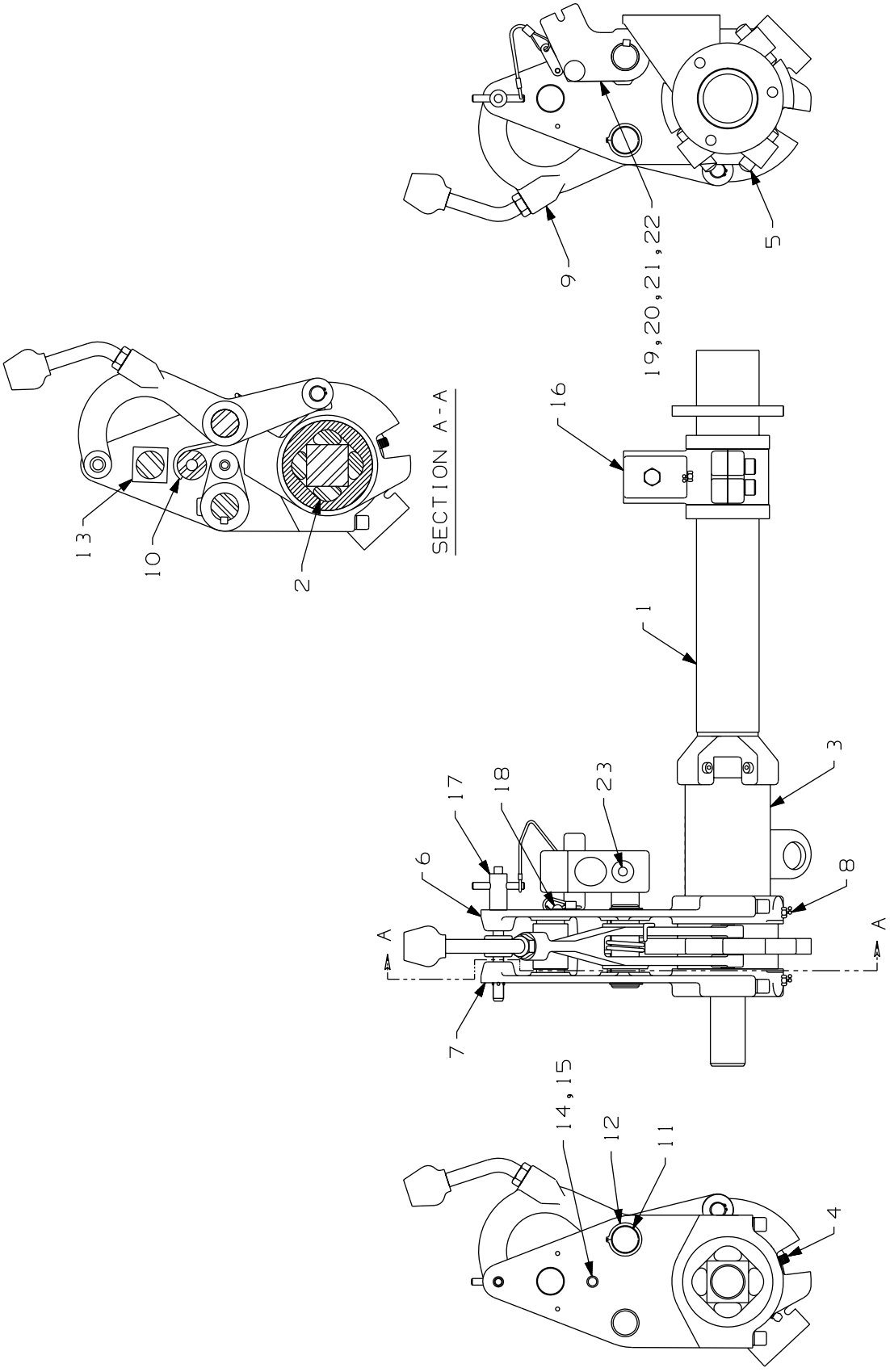


SE168441A-1

168441 COUPLING AND TUBE ASSEMBLY - RF/LR

ITEM	PART NO	DESCRIPTION	QTY
1	168442	Tube And Shaft	1
2	132888	Rubber Cord	4
3	118504	Torque Coupling	1
4	F018272	Set Screw, 5/16-18 x 3/4" Cup Point	2
5	F012772	Set Screw, 1/2-13 x 1-1/2" Oval Point	4
6	083088	LOCK SUPPORT	1
6a	F012849	Cap Screw, 3/8-24 x 1-1/2" Soc Hd	2
6b	F011455	Lock Washer, 3/8"	2
7	083114	Lock Support	1
8	F008014	Grease Fitting, 1/4" Straight	2
9	083093K	LOCKING PAWL	1
9a	083095K	Sleeve	1
9b	084877	Stud, Handle	1
9c	F002737	Hex Jam Nut, 1/2"-13 GR 2	1
9d	F014260K	Knob	1
9e	107533	Pin	1
9f	F009169K	Retaining Ring, 1/2" External	2
10	083097	Torsion Spring	1
11	130705	Pin	1
12	F011450	Retaining Ring, 1" External	2
13	083100	Trunnion Nut	1
14	F008549	Cap Screw, 3/8-24 x 1-1/2" Soc Hd	1
15	F011455	Lock Washer, 3/8" High Collar	1
16	083106	OUTER BEARING	1
16a	F013472	Dust Seal	1
16b	F010722	Grease Fitting, 1/4" 90°	1
17	083105K1	Lockpin And Lanyard	1
18	F023158	Cap Screw, #10-24 x 3/8" Hex Flg Hd	1
19	085957	PIVOT ARM	1
19a	093467	Roller	1
19b	F011954	Roll Pin, 3/8 x 1-1/2"	1
19c	F012127	Set Screw, 3/8-16 x 1/2" Cup Point	1
20	M002310	Square Key, 1/4 x 1-1/2"	2
21	159452	Shaft	1
22	159451	Socket	1
23	F012127	Set Screw, 3/8-16 x 1/2" Cup Point	1

168440 COUPLING AND TUBE ASSEMBLY - LF/RR

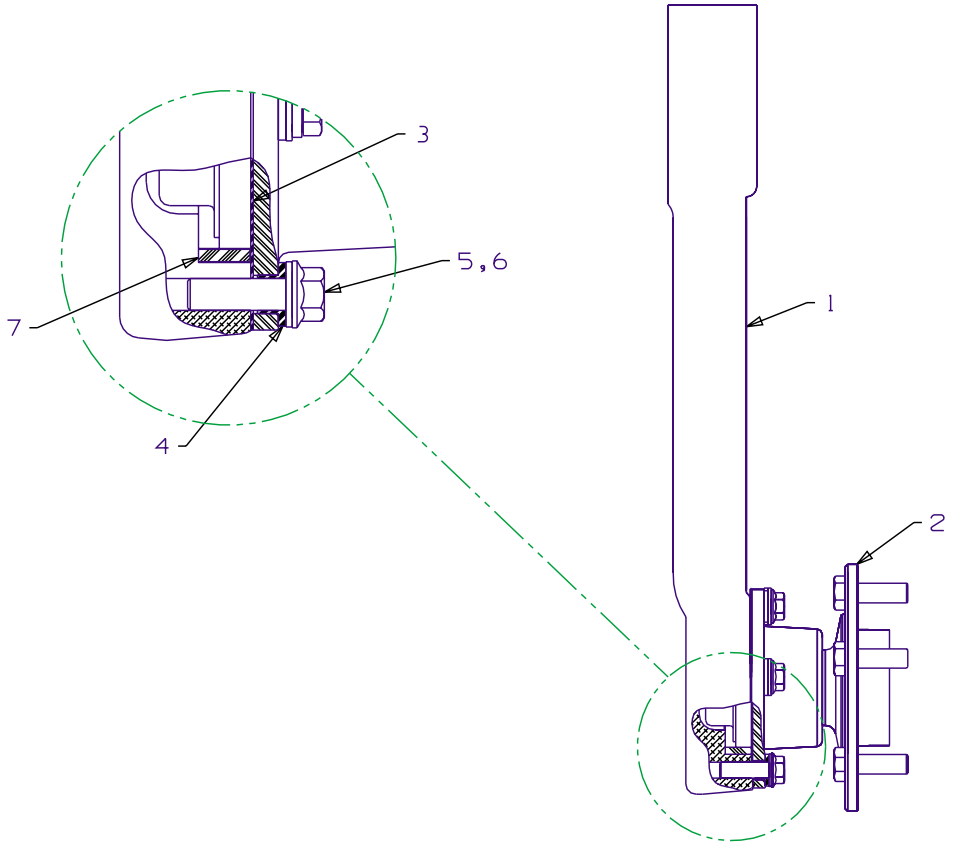


SE168440A-1

168440 COUPLING AND TUBE ASSEMBLY - LF/RR

ITEM	PART NO	DESCRIPTION	QTY
1	168442	Tube And Shaft	1
2	132888	Rubber Cord	4
3	118503	Torque Coupling	1
4	F018272	Set Screw, 5/16-18 x 3/4" Cup Point	2
5	F012772	Set Screw, 1/2-13 x 1-1/2" Oval Point	4
6	083088	LOCK SUPPORT	1
6a	F012849	Cap Screw, 3/8-24 x 1-1/2" Soc Hd	2
6b	F011455	Lock Washer, 3/8"	2
7	083114	Lock Support	1
8	F008014	Grease Fitting, 1/4" Straight	2
9	083093K	LOCKING PAWL	1
9a	083095K	Sleeve	1
9b	084877	Stud, Handle	1
9c	F002737	Hex Jam Nut, 1/2"-13	1
9d	F014260K	Knob	1
9e	107533	Pin	1
9f	F009169K	Retaining Ring, 1/2" External	2
10	083097	Torsion Spring	1
11	130705	Pin	1
12	F011450	Retaining Ring, 1" External	2
13	083100	Trunnion Nut	1
14	F008549	Cap Screw, 3/8-24 x 1-1/2" Soc Hd	1
15	F011455	Lock Washer, 3/8" High Collar	1
16	083106	OUTER BEARING	1
16a	F013472	Dust Seal	1
16b	F010722	Grease Fitting, 1/4" 90°	1
17	083105K1	Lockpin And Lanyard	1
18	F023158	Cap Screw, #10-24 x 3/8" Hex Flg Hd	1
19	085957	PIVOT ARM	1
19a	093467	Roller	1
19b	F011954	Roll Pin, 3/8 x 1-1/2"	1
19c	F012127	Set Screw, 3/8-16 x 1/2" Cup Point	1
20	M002310	Square Key, 1/4 x 1-1/2"	2
21	159452	Shaft	1
22	159451	Socket	1
23	F012127	Set Screw, 3/8-16 x 1/2" Cup Point	1

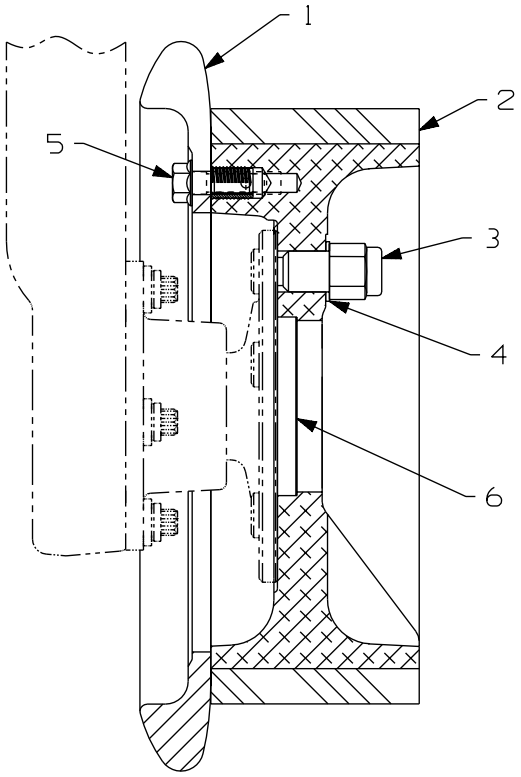
168452 WHEEL ARM ASSEMBLY



SE158378A-1

ITEM	PART NO	DESCRIPTION	QTY
	168452	WHEEL ARM ASSEMBLY	1
1	168438K	Wheel Arm	1
2	F023021	Integral Spindle	1
3	157640	Insulator	1
4	157639	Bushing	4
5	F001362	Wrought Washer 5/16"	4
6	F023417	Cap Screw, 3/8-16 x 1-1/2" GR 5 Hex Flg Hd	4
7	157641	Insulator	1

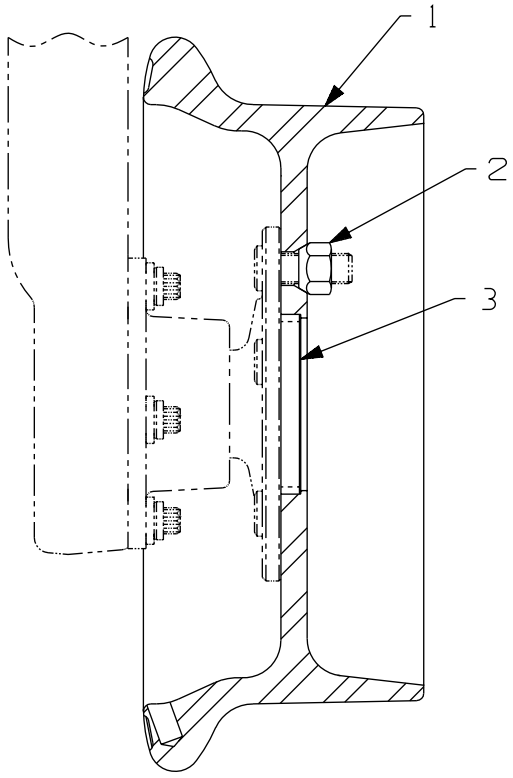
138093 RUBBER TREAD GROUP



SE020083A-1

ITEM	PART NO	DESCRIPTION	QTY
	138093	RUBBER TREAD GROUP	1
1	136133	Flange	1
2	137683	Rubber Tread	1
3	F023472	Lug Nut, M12 x 1.5	5
4	F023457	Washer, 11/16"	5
5	F023255	Cap Screw, 3/8-16 x 1" GR 5 Hex Flg Hd	6
6	123795	Tube	1

138113 STEEL TREAD GROUP



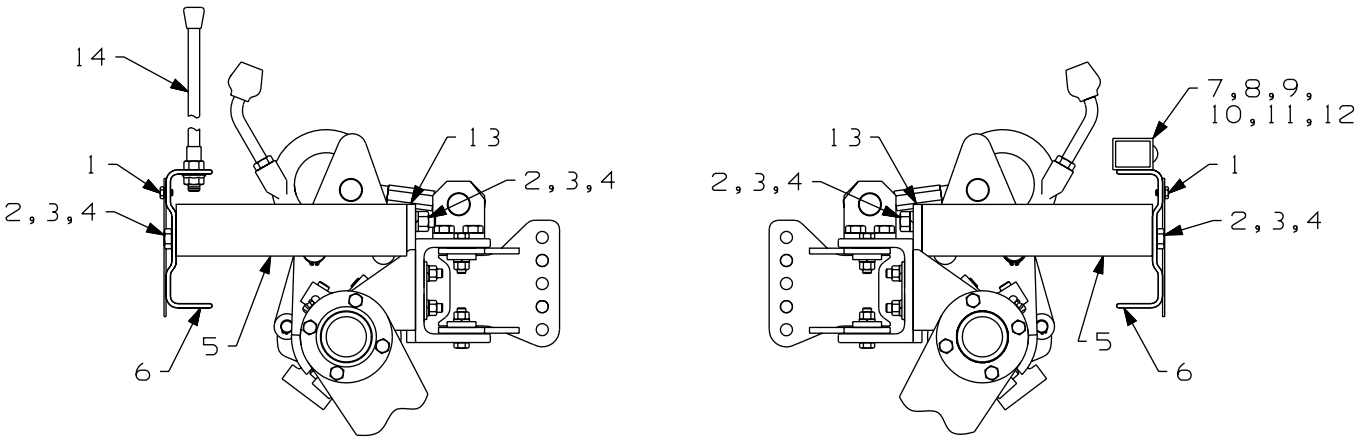
SE020084A-1

ITEM	PART NO	DESCRIPTION	QTY
	138113	STEEL TREAD GROUP	1
1	136297	Steel Tread	1
2	F019949K	Hex Cone Nut, M12 x 1.5	5
3	123795	Tube	1

STEERING LOCKS

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.

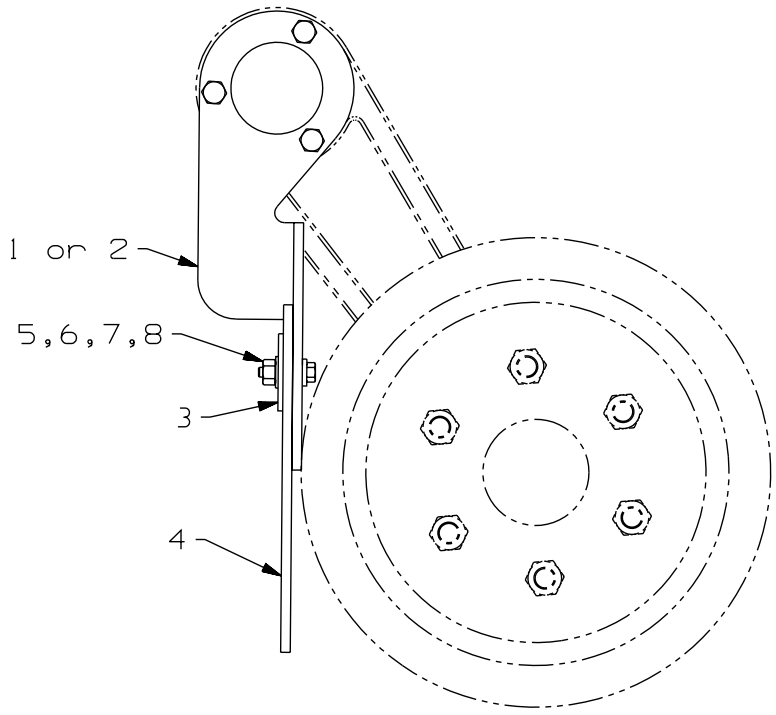
135255 BUMPER GROUP WITH SIGHT RODS



SE019574A-1

ITEM	PART NO	DESCRIPTION	QTY
	135255	BUMPER GROUP WITH SIGHT RODS	1
1	F014765	Screw, 1/4 x 1/2" Self Tapping	4
2	F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	24
3	F001075	SAE Lock Washer, 1/2"	24
4	F003598	Hex Nut, 1/2"-13	24
5	083139K2	Bumper Bracket	4
6	132404	Bumper	2
7	F015664	License Lamp	1
8	F019325	Connector	1
9	107874	Light Bracket	1
10	F002355	Cap Screw, 1/4-20 x 3/4" GR 5 Hex Hd	2
11	F009535	Lock Washer, 1/4"	2
12	F007022	Hex Nut, 1/4"-20 GR 5	2
13	133208	Bracket Bar	4
14	130195	Sight Rod Kit (includes two sight rods and mounting hardware)	1

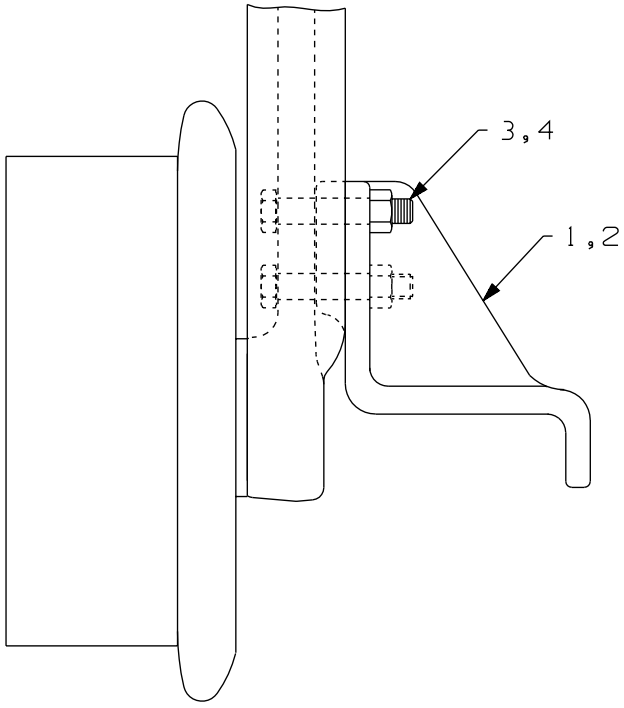
168766 RAIL SWEEP GROUP



SE021724A-1

ITEM	PART NO	DESCRIPTION	QTY
	168766	RAIL SWEEP GROUP	1
1	168764	Bracket, Left Front or Right Rear	1
2	168765	Bracket, Right Front or Left Rear	1
3	088525	Link	2
4	088524K	Rubber Sweep	2
5	F007020	Hex Nut, 3/8"-16	4
6	F001025	Lock Washer, 3/8"	4
7	F001115	Wrought Washer, 3/8"	4
8	F001024	Cap Screw, 3/8-16 x 1-1/2" Hex Hd	4

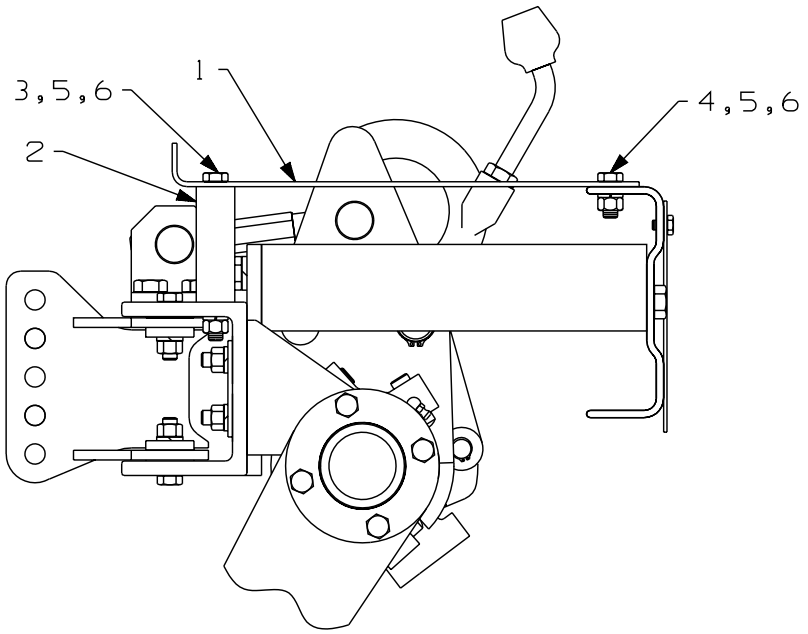
137682 DERAIL SKID GROUP



SE020086A-1

ITEM	PART NO	DESCRIPTION	QTY
	137682	DERAIL SKID GROUP	1
1	140100	Derail Skid - LF/RR	1
2	139613	Derail Skid - RF/LR	1
3	F003095	Cap Screw, 1/2-13 x 2-3/4" Hex Hd	4
4	F013500	Hex Elastic Stop Nut, 1/2"-13	4

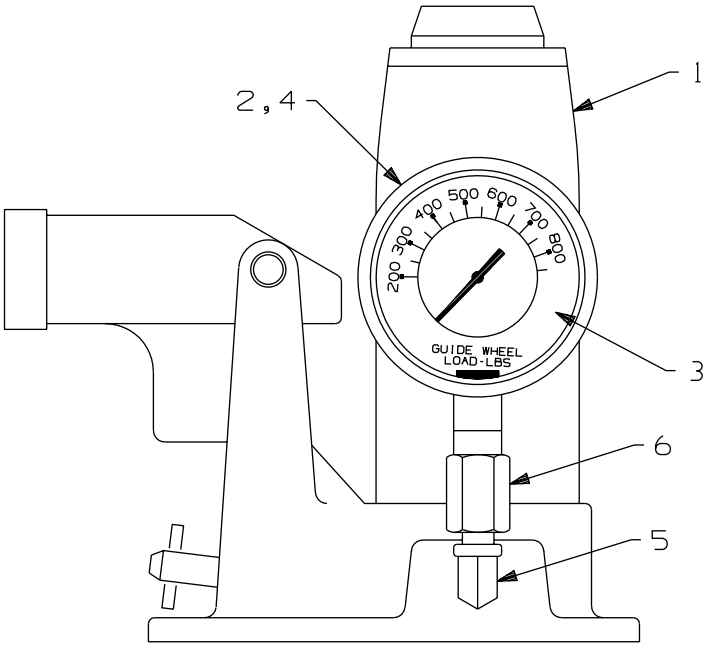
135914 BUMPER STEP PLATE GROUP



SE019699A-1

ITEM	PART NO	DESCRIPTION	QTY
	135914	BUMPER STEP PLATE GROUP	1
1	135913	Step Plate	2
2	135894	Mounting Tube	4
3	F001499	Cap Screw, 3/8-16 x 4" GR 5 Hex Hd.	4
4	F001125	Cap Screw, 3/8-16 x 1-1/4" GR 5 Hex Head	6
5	F001025	Lock Washer, 3/8"	10
6	F007020	Hex Nut, 3/8"-16 5	10

073527 WHEEL WEIGHING JACK



SE073527A-1

ITEM	PART NO	DESCRIPTION	QTY
	073527	JACK ASSEMBLY	1
1	F025513	Hydraulic Jack	1
2	F024256	Gauge	1
3	154383	Decal, Gauge Face	1
4	156051	Decal, Warning - Misuse Of Product...	1
5	146353	90° Elbow, 1/8 M NPT x 1/8 F NPT	1
6	F023088	Adapter, 1/8 M NPT x 1/4 F NPT	1

168454 DECAL SERVICE GROUP

PART NO	DESCRIPTION	QTY
168454	DECAL SERVICE GROUP	1
F018082	Decal, Safety Instructions - Lock Front Wheels...	1
F018084	Decal, Operation	2
168665	Decal, Operating Instructions	1
140220	Decal, Warning - Do Not Operate This Machine Before...	3
155007	Decal, Hy-Rail® Vehicle Completed By...	1
162058	Decal, Fairmont Tamper Supplied Lift Handles...	4

156020 STROBE LIGHT

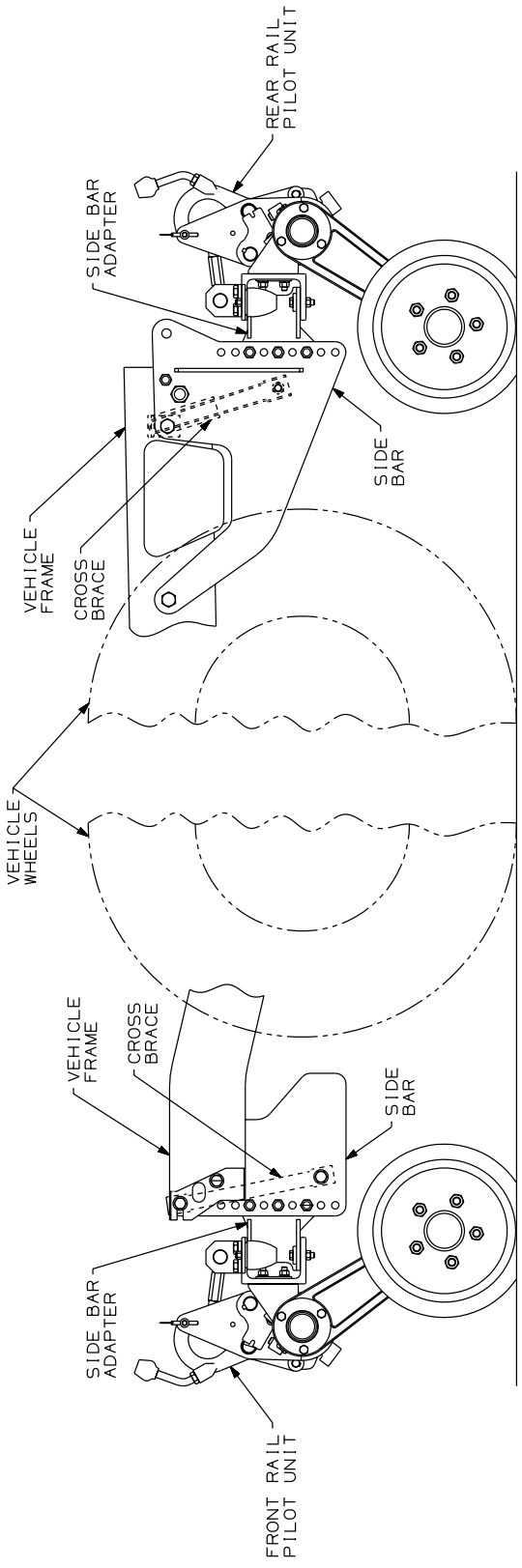
PART NO	DESCRIPTION	QTY
156020	STROBE LIGHT GROUP	1
F024799	Strobe Light	1
F014868	Switch	1
F040160	Wire, 16 ga.	120"
F040576	Wire, 16 ga.	120"
F009863	Butt Connector	2
F024813	Fuse, 1 amp	1
F017476	Fused Line Connector	1
F024812	Screw, #8 x 1/2" Self Tap	3

OPTIONAL TOOLS

PART NO	DESCRIPTION	QTY
137386	RUBBER CORD REPLACEMENT TOOLS	1
083132	Tool, Used To Separate Cords While Inserting	1
137359	Tool, Used To Insert Cords Partially	1
137371	Tool, Used To Insert Cords Fully	1
137375	Tool, Mounts On Press Base	1
137387	Tool, Mounts On Press Ram	1
M019889	Wheel Caliper	1

TYPICAL MOUNTING BRACKET GROUP ILLUSTRATION

This illustration shows typical mounting brackets that are common in most groups and rail pilot units, mounted on a vehicle. Mounting brackets and applications will vary from vehicle to vehicle. See vehicle application charts, at the end of this Parts Section, to find the correct mounting bracket group applicable to your make, model and year of vehicle.



SE94A139A-1

138108 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
138108	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

138435	Side Bar, Right	1
138438	Side Bar, Left	1
139088	Bar	2
F001090	Cap Screw, 1/2-13 x 1-1/2"GR 5 Hex Hd	12
F001075	Lock Washer, 1/2"	12
F003598	Hex Nut, 1/2"-13 GR 5	12
F005192	Cap Screw, 5/8-11 x 1-3/4" GR 5 Hex Hd	2
F001103	Lock Washer, 5/8"	4
F001121	Wrought Washer, 5/8"	2
125978	Washer	4
F001107	Cap Screw, 5/8-11 x 3-1/2" GR 5 Hex Hd	2
F001753	Wrought Washer, 3/4"	2
F007023	Hex Nut, 5/8"-11 GR 5	4
101813K	Side Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
058528	Washer	8
F001025	Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
F023111	Washer	8
101816	Spacer (use as required)	8
101817	Spacer (use as required)	8
020080	Front Unit Application Drawing	

138108 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
138108	MOUNTING BRACKET GROUP	1

Parts For Rear Unit Mounting

139089	Angle	1
139090	Angle	1
139091	Spacer	2
139092	Bar	2
139094	Bar	2
F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	18
F001075	Lock Washer, 1/2"	18
F005551	Cap Screw, 3/4-10 x 1-1/2" GR 5 Hex Hd	2
F001354	Lock Washer, 3/4"	2
139096	Side Bar, Left	1
139099	Side Bar, Right	1
F003598	Hex Nut, 1/2"-13 5	14
F002965	Washer, 1/2"	8
133209	Channel	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
F001025	Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
058528	Washer	8
F023111	Washer	8
101816	Spacer (use as required)	8
101817	Spacer (use as required)	8
020081	Rear Unit Application Drawing	

156085 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
156085	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

156076	Side Bar, Left	1
156077	Side Bar, Right	1
F003566	Cap Screw, 5/8-11 x 1-1/2" GR 5 Hex Hd	4
F021924	Hex Flg Nut, 5/8"-11 GR 5	4
F023417	Cap Screw, 3/8-16 x 1-1/2" GR 5 Hex Flg Hd	4
F023225	Hex Flg Nut, 3/8"-16 GR 5	4
F023386	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Flg Hd	6
F022037	Hex Flg Nut, 1/2"-13 GR 5	6
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
F023378	Hex Flg Nut, 3/8"-24 GR 5	8
058528	Washer, 3/8"	8
F023111	Harden Washer.	8
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
021708	Front Unit Application Drawing	

156085 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
156085	MOUNTING BRACKET GROUP	1

Parts For Rear Unit Mounting

137036	Side Bar, Right	1
137037	Side Bar, Left	1
F003566	Cap Screw, 5/8-11 x 1-1/2" GR 5 Hex Hd	6
F001103	SAE Lock Washer, 5/8"	6
F007023	Hex Nut, 5/8"-11 GR 5	6
163634	Brace End	1
163635	Brace End	1
137010	Angle	1
F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	10
F001075	SAE Lock Washer, 1/2"	10
F003598	Hex Nut, 1/2"-13 GR 5	10
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
058528	Washer, 3/8"	8
F023111	Washer	8
F001025	SAE Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
135943	Exhaust Tube	1
F011834K	Clamp	1
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
F005551	Cap Screw, 3/4-10 x 1-1/2" GR 5 Hex Hd	2
F013695	Hex Nut, 3/4"-10 GR 5	2
F001354	SAE Lock Washer, 3/4"	2
021700	Rear Unit Application Drawing	

157226 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
157226	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

157225	Side Bar	2
F003566	Cap Screw, 5/8-11 x 1-1/2" GR 5 Hex Hd	2
F021924	Hex Flg Nut, 5/8"-11 GR 5	2
F023386	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Flg Hd	13
F022037	Hex Flg Nut, 1/2"-13 GR 5	13
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
F023378	Hex Flg Nut, 3/8"-24 GR 5	8
058528	Washer, 3/8"	8
F023111	Washer	8
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
163636	Brace End	1
163634	Brace End	1
101813K	Plate Adapter	2
021699	Front Unit Application Drawing	

157226 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
157226	MOUNTING BRACKET GROUP	1

Parts For Rear Unit Mounting

137036	Side Bar, Right	1
137037	Side Bar, Left	1
F003566	Cap Screw, 5/8-11 x 1-1/2" GR 5 Hex Hd	6
F001103	SAE Lock Washer, 5/8"	6
F007023	Hex Nut, 5/8"-11 GR 5	6
163634	Brace End	1
163635	Brace End	1
137010	Angle	1
F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	10
F001075	SAE Lock Washer, 1/2"	10
F003598	Hex Nut, 1/2"-13 GR 5	10
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
058528	Washer, 3/8"	8
F023111	Washer	8
F001025	SAE Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
135943	Exhaust Tube	1
F011834K	Clamp	1
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
F005551	Cap Screw, 3/4-10 x 1-1/2" GR 5 Hex Hd	2
F013695	Hex Nut, 3/4"-10 GR 5	2
F001354	SAE Lock Washer, 3/4"	2
021700	Rear Unit Application Drawing	

170719 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
170719	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

170712	Side Bar, Right	1
170713	Side Bar, Left	1
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	10
F013500	Elastic Stop Nut	12
F015066	Cap Screw, 9/16-12 x 1-1/2" GR 5 Hex Hd	4
F002398	Hex Nut, 9/16"-12 GR 5	4
F002782	SAE Lock Washer, 9/16"	4
F023222	Washer	24
188333	Cap Screw, 9/16-12 x 4" GR 8 Hex Hd.	2
163635	Brace End	1
163634	Brace End	1
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
F019742	Cap Screw, 3/8-16 x 1-3/4" GR 8 Hex Hd	8
058528	Washer, 3/8"	8
F015922	Elastic Stop Nut, 3/8"-16	8
F023111	Hardened Washer	8
021909	Front Unit Application Drawing	

170719 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
170719	MOUNTING BRACKET GROUP	1

Parts For Rear Unit Mounting

156019	Side Bar	1
156022	Side Bar	1
F020599	Cap Screw, 1/2-13 x 4" GR 8 Hex Hd	4
F013500	Elastic Stop Nut	13
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	13
163634	Brace End	1
163636	Brace End	1
F001267	Wrought Washer, 1/2"	7
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
F019742	Cap Screw, 3/8-16 x 1-3/4" GR 8 Hex Hd	8
058528	Washer, 3/8"	8
F015922	Elastic Stop Nut, 3/8"-16	8
F023111	Hardened Washer	8
021910	Rear Unit Application Drawing	

170722 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
170722	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

170687	Side Bar, Right	1
170714	Side Bar, Left	1
170685	Angle	1
175646	Angle	1
F012484	Cap Screw, 5/8-18 x 1-1/2" GR 5 Hex Hd	2
F013239	Hex Lock Nut, 5/8"-18	2
F001121	Wrought Washer, 5/8"	2
F010232	Cap Screw, 7/16-20 x 1-1/4" Hex Hd	4
F001373	Wrought Washer, 7/16	4
F017965	Hex Lock Nut, 7/16"-20	4
F012762	Cap Screw, 1/2-20 x 2" GR 5 Hex Hd	2
F001267	Wrought Washer, 1/2"	2
F010606	Hex Lock Nut, 1/2"-20	8
F008973	Cap Screw, 1/2-20 x 1-1/2" GR 5 Hex Hd	6
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
F023111	Washer	8
058528	Washer	8
F001025	SAE Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
171048	Light Bracket	2
021913	Front Unit Application Drawing	

170722 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
170722	MOUNTING BRACKET GROUP	1

Parts For Rear Unit Mounting

170688	Side Bar, Left	1
170683	Side Bar, Right	1
F008973	Cap Screw, 1/2-20 x 1-1/2" GR 5 Hex Hd	15
F010606	Hex Lock Nut, 1/2"-20	15
F001267	Wrought Washer, 1/2"	8
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2 GR 5 Hex Hd	8
F023111	Washer	8
058528	Washer	8
F001025	SAE Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
163636	Brace End	1
163634	Brace End	1
021914	Rear Unit Application Drawing	

178109 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
178109	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

178094	Side Bar, Right	1
178100	Side Bar, Left	1
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	10
F013500	Elastic Stop Nut	10
F001075	SAE Lock Washer, 1/2"	6
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
F023378	Hex Flg Nut, 3/8"-24 GR 5	8
F023111	Washer	8
163636	Brace End	1
163634	Brace End	1
058528	Washer	8
F024047	Washer	6
022474	Front Unit Application Drawing	

Parts For Rear Unit Mounting

178095	Side Bar, Right	1
178115	Side Bar, Left	1
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	16
F013500	Elastic Stop Nut	16
137010	Angle	1
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
058528	Washer	8
F023111	Washer	8
F001025	SAE Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
163634	Brace End	1
163635	Brace End	1
022475	Rear Unit Application Drawing	

178178 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
178178	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

178171	Side Bar, Right	1
178172	Side Bar, Left	1
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	10
F013500	Elastic Stop Nut	10
F001075	SAE Lock Washer, 1/2"	6
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
F023378	Hex Flg Nut, 3/8"-24 GR 5	8
F023111	Washer	8
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
163636	Brace End	1
163634	Brace End	1
058528	Washer	8
F024047	Washer	6
022496	Front Unit Application Drawing	

Parts For Rear Unit Mounting

178162	Side Bar, Right	1
178161	Side Bar, Left	1
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	16
F013500	Elastic Stop Nut	16
137010	Angle	1
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
058528	Washer	8
F023111	Washer	8
F001025	SAE Lock Washer, 3/8"	8
F016820	Hex Nut, 3/8"-24	8
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
163634	Brace End	1
163635	Brace End	1
022495	Rear Unit Application Drawing	

181710 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
181710	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

058528	Washer	8
101813K	Plate Adapter	2
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
163636	Brace End	1
163634	Brace End	1
181766	Side Bar	2
F013500	Elastic Stop Nut, 1/2"-13	12
F015922	Elastic Stop Nut, 3/8"-16	8
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	10
F018861	Cap Screw, 1/2-13 x 2-1/4" GR 8 Hex Hd	2
F019742	Cap Screw, 3/8-16 x 1-3/4" GR 8 Hex Hd	8
F023111	Hardened Washer	8
F023222	Washer	12
022923	Front Unit Application Drawing	

Parts For Rear Unit Mounting

058528	Washer	8
101813K	Plate Adapter	2
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
181713	Side Bar, Right	1
181714	Side Bar, Left	1
F023222	Washer	10
181721	Block	4
F022822	Cap Screw, 5/8-11 x 4-1/2" GR 8 Hex Hd	4
F013500	Elastic Stop Nut	8
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	6
F015922	Elastic Stop Nut, 3/8"-16	8
181719	Plate	2
F023012	Washer	4
F019742	Cap Screw, 3/8-16 x 1-3/4" GR 8 Hex Hd	8
F023111	Hardened Washer	8
F012452	Elastic Stop Nut, 5/8"	4
F019500	Cap Screw, 1/2-13 x 1-1/4" GR 8 Hex Hd	2
022924	Rear Unit Application Drawing	

188344 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
188344	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

188340	Side Bar, Right	1
188342	Side Bar, Left	1
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	4
F013500	Elastic Stop Nut	6
F015066	Cap Screw, 9/16-12 x 1-1/2" GR 5 Hex Hd	2
700660056	Hex Elastic Stop Nut, 9/16"-12	2
F023222	Washer	24
188333	Cap Screw, 9/16-12 x 4" GR 8 Hex Hd.	2
163635	Brace End	1
163634	Brace End	1
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
F016821	Cap Screw, 3/8-24 x 1-1/2" GR 5 Hex Hd	8
058528	Washer	8
F016820	Hex Nut, 3/8"-24	8
F011455	Lock Washer, 3/8".	8
F001090	Cap Screw, 1/2-13 x 1-1/2" GR 5 Hex Hd	2
F002965	SAE Washer, 1/2"	2
023300	Front Unit Application Drawing	

Parts For Rear Unit Mounting

156019	Side Bar	1
156022	Side Bar	1
F020599	Cap Screw, 1/2-13 x 4" GR 8 Hex Hd.	4
F013500	Elastic Stop Nut	7
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	3
163634	Brace End	1
163636	Brace End	1
F001267	Wrought Washer, 1/2".	7
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
058528	Washer	8
F019742	Cap Screw, 3/8-16 x 1-3/4" GR 8 Hex Hd	8
F015922	Elastic Stop Nut, 3/8"-16.	8
F023111	Hardened Washer.	8
021910	Rear Unit Application Drawing	

188838 MOUNTING BRACKET GROUP

PART NO	DESCRIPTION	QTY
188838	MOUNTING BRACKET GROUP	1

Parts For Front Unit Mounting

F018861	Cap Screw, 1/2-13 x 2-1/4" GR 8 Hex Hd	2
181766	Plate	2
163636	Brace End	1
163634	Brace End	1
F023222	Washer	12
F013500	Elastic Stop Nut	12
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	10
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
022923	Front Unit Application Drawing	

Parts For Rear Unit Mounting

188834	Side Bar, Right	1
188835	Side Bar, Left	1
F023222	Washer	10
181721	Block	4
F022822	Cap Screw, 5/8-11 x 4-1/2" GR 8 Hex Hd	4
F013500	Elastic Stop Nut	8
F018650	Cap Screw, 1/2-13 x 1-1/2" GR 8 Hex Hd	6
181719	Plate	2
F023012	Harden Washer	4
F012452	Elastic Stop Nut, 5/8"	4
F019500	Cap Screw, 1/2-13 x 1-1/4" GR 8 Hex Hd	2
101816	Spacer, 1/16" (use as required)	8
101817	Spacer, 1/32" (use as required)	8
101813K	Plate Adapter	2
023547	Rear Unit Application Drawing	

138109 WHEEL MODIFICATION GROUP

PART NO	DESCRIPTION	QTY
138109	WHEEL MODIFICATION GROUP	1
F023638	Wheel, 15 x 7"	5
136139	Decal, Wheel Nut Torque	5
F018977	Decal, Wheel Nut Torque Chart	1
020160	Wheel Modification Drawing	

156086 WHEEL MODIFICATION GROUP

PART NO	DESCRIPTION	QTY
156086	WHEEL MODIFICATION GROUP	1
F014271	Wheel Bolt, 1/2-20 x 2-5/16"	12
156083	Spacer	2
020763	Wheel Modification Drawing	

163510 WHEEL MODIFICATION GROUP

PART NO	DESCRIPTION	QTY
163510	WHEEL MODIFICATION GROUP	1
135406	Wheel	5
135937	Washer	2
F019949K	Hex Cone Nut, M12 x 1.5	20
021311	Wheel Modification Drawing	

178154 WHEEL MODIFICATION GROUP

PART NO	DESCRIPTION	QTY
178154	WHEEL MODIFICATION GROUP	1
178155	Wheel	5
135937	Washer	2
F019949K	Hex Cone Nut, M12 x 1.5	20
188424	Wheel Stud	10
022507	Wheel Modification Drawing	

VEHICLE APPLICATIONS

	1995 CHEV/GMC T10506 4 X 4 BLAZER/JIMMY	1996 CHEV/GMC T10506 4 X 4 BLAZER/JIMMY
REQUIRED GROUPS		
HY-RAIL® Application	170756	170756
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	170722	170722
Steering Lock Group	169632	169632
Wheel Modification Group	163510	163510
Application Drawing - Front	021913	021913
Application Drawing - Read	021914	021914
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1997 CHEV/GMC T10506 4 X 4 BLAZER/JIMMY	1998 CHEV/GMC T10506 4 X 4 BLAZER/JIMMY
REQUIRED GROUPS		
HY-RAIL® Application	178157	178157
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	170722	170722
Steering Lock Group	169632	169632
Wheel Modification Group	178154	178154
Application Drawing - Front	021913	021913
Application Drawing - Read	021914	021914
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1999 CHEV/GMC T10506 4 X 4 BLAZER/JIMMY	2000 CHEV/GMC T10506 4 X 4 BLAZER/JIMMY
REQUIRED GROUPS		
HY-RAIL® Application	178157	178157
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	170722	170722
Steering Lock Group	169632	169632
Wheel Modification Group	178154	178154
Application Drawing - Front	021913	021913
Application Drawing - Read	021914	021914
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
Leaf Spring Kit	188279	188279
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1995 DODGE DAKOTA 4 X 2 6,100 GVWR	1995 DODGE DAKOTA 4 X 4 5,870 GVWR
REQUIRED GROUPS		
HY-RAIL® Application	168670	168669
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	156085	157226
Steering Lock Group	168097	168097
Wheel Modification Group	156086	———
Application Drawing - Front	021708	021699
Application Drawing - Rear	021700	021700
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1996 DODGE DAKOTA 4 X 2 6,100 GVWR	1996 DODGE DAKOTA 4 X 4 5,870 GVWR
REQUIRED GROUPS		
HY-RAIL® Application	168670	168669
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	156085	157226
Steering Lock Group	168097	168097
Wheel Modification Group	156086	———
Application Drawing - Front	021708	021699
Application Drawing - Rear	021700	021700
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1997 DODGE DAKOTA 4 X 2 REGULAR & CLUB CAB 6,100 GVWR	1997 DODGE DAKOTA 4 X 4 REGULAR & CLUB CAB 5,990 GVWR
REQUIRED GROUPS		
HY-RAIL® Application	178175	178108
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	178178	178109
Steering Lock Group	168097	168097
Wheel Modification Group	———	———
Application Drawing - Front	022496	022474
Application Drawing - Rear	022495	022475
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1998 DODGE DAKOTA 4 X 2 REGULAR & CLUB CAB 6,100 GVWR	1998 DODGE DAKOTA 4 X 4 REGULAR & CLUB CAB 5,990 GVWR
REQUIRED GROUPS		
HY-RAIL® Application	178175	178108
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	178178	178109
Steering Lock Group	168097	168097
Wheel Modification Group	———	———
Application Drawing - Front	022496	022474
Application Drawing - Rear	022495	022475
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

1998 DODGE
DURANGO 4 X 4
6,400 GVWR

REQUIRED GROUPS

HY-RAIL® Application	181709
Rail Pilot Unit - Front or Rear	168443
Mounting Bracket Group	181710
Steering Lock Group	168097
Wheel Modification Group	———
Application Drawing - Front	022923
Application Drawing - Rear	022924

GUIDE WHEEL OPTIONS

Steel Tread Guide Wheel	138113
Rubber Tread Guide Wheel	138093

BUMPER GROUPS

Bumpers, Front & Rear With Sight Rods	135255

ACCESSORY GROUP OPTIONS

*	Rail Sweeps	168766
*	Derail Skids	137682
	Step Plates	135914
	Wheel Weighing Jack	073527
*	Roof Mount Strobe Light	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1999 DODGE DAKOTA 4 X 2 REGULAR & CLUB CAB 6,100 GVWR	1999 DODGE DAKOTA 4 X 4 REGULAR & CLUB CAB 5,990 GVWR
REQUIRED GROUPS		
HY-RAIL® Application	178175	178108
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	178178	178109
Steering Lock Group	168097	168097
Wheel Modification Group	———	———
Application Drawing - Front	022496	022474
Application Drawing - Rear	022495	022475
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

1999 DODGE
DURANGO 4 X 4
6,400 GVWR

REQUIRED GROUPS

HY-RAIL® Application	181709
Rail Pilot Unit - Front or Rear	168443
Mounting Bracket Group	181710
Steering Lock Group	168097
Wheel Modification Group	———
Application Drawing - Front	022923
Application Drawing - Rear	022924

GUIDE WHEEL OPTIONS

Steel Tread Guide Wheel	138113
Rubber Tread Guide Wheel	138093

BUMPER GROUPS

Bumpers, Front & Rear With Sight Rods	135255

ACCESSORY GROUP OPTIONS

*	Rail Sweeps	168766
*	Derail Skids	137682
	Step Plates	135914
	Wheel Weighing Jack	073527
*	Roof Mount Strobe Light	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	2000 DODGE DAKOTA 4 X 2 REGULAR & CLUB CAB 6,100 GVWR	2000 DODGE DAKOTA 4 X 4 REGULAR & CLUB CAB 5,990 GVWR
REQUIRED GROUPS		
HY-RAIL® Application	178175	178108
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	178178	178109
Steering Lock Group	168097	168097
Wheel Modification Group	———	———
Application Drawing - Front	022496	022474
Application Drawing - Rear	022495	022475
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

2000 DODGE
DURANGO 4 X 4
6,400 GVWR

REQUIRED GROUPS

HY-RAIL® Application 188840
Rail Pilot Unit - Front or Rear 168443
Mounting Bracket Group 188838
Steering Lock Group 168097
Wheel Modification Group . . . . . ———
Application Drawing - Front 022923
Application Drawing - Rear 023547

GUIDE WHEEL OPTIONS

Steel Tread Guide Wheel 138113
Rubber Tread Guide Wheel 138093

BUMPER GROUPS

Bumpers, Front & Rear With Sight Rods 135255

ACCESSORY GROUP OPTIONS

* Rail Sweeps 168766
* Derail Skids 137682
Step Plates 135914
Wheel Weighing Jack 073527
* Roof Mount Strobe Light 156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1995 FORD EXPLORER 4 X 4 4 DOOR	1996 FORD EXPLORER 4 X 4 4 DOOR
REQUIRED GROUPS		
HY-RAIL® Application	170737	170737
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	170719	170719
Steering Lock Group	168091	168091
Wheel Modification Group	———	———
Application Drawing - Front	021909	021909
Application Drawing - Rear	021910	021910
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1997 FORD EXPLORER 4 X 4 4 DOOR	1998 FORD EXPLORER 4 X 4 4 DOOR
REQUIRED GROUPS		
HY-RAIL® Application	170737	181632
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	170719	170719
Steering Lock Group	168091	181548
Wheel Modification Group	———	———
Application Drawing - Front	021909	021909
Application Drawing - Rear	021910	021910
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1999 FORD EXPLORER 4 X 4 4 DOOR	2000 FORD EXPLORER 4 X 4 4 DOOR
REQUIRED GROUPS		
HY-RAIL® Application	188346	188346
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	188344	188344
Steering Lock Group	181548	181548
Wheel Modification Group	———	———
Application Drawing - Front	023300	023300
Application Drawing - Rear	021910	021910
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1995 JEEP CHEROKEE 4 X 4	1996 JEEP CHEROKEE 4 X 4
REQUIRED GROUPS		
HY-RAIL® Application	170760	170760
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	138108	138108
Steering Lock Group	170715	170715
Wheel Modification Group	138109	138109
Application Drawing - Front	020080	020080
Application Drawing - Rear	020081	020081
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1997 JEEP CHEROKEE 4 X 4	1998 JEEP CHEROKEE 4 X 4
REQUIRED GROUPS		
HY-RAIL® Application	170760	170760
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	138108	138108
Steering Lock Group	170715	170715
Wheel Modification Group	138109	138109
Application Drawing - Front	020080	020080
Application Drawing - Rear	020081	020081
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

VEHICLE APPLICATIONS

	1999 JEEP CHEROKEE 4 X 4	2000 JEEP CHEROKEE 4 X 4
REQUIRED GROUPS		
HY-RAIL® Application	170760	170760
Rail Pilot Unit - Front or Rear	168443	168443
Mounting Bracket Group	138108	138108
Steering Lock Group	170715	170715
Wheel Modification Group	138109	138109
Application Drawing - Front	020080	020080
Application Drawing - Rear	020081	020081
GUIDE WHEEL OPTIONS		
Steel Tread Guide Wheel	138113	138113
Rubber Tread Guide Wheel	138093	138093
BUMPER GROUPS		
Bumpers, Front & Rear With Sight Rods	135255	135255
ACCESSORY GROUP OPTIONS		
* Rail Sweeps	168766	168766
* Derail Skids	137682	137682
Step Plates	135914	135914
Wheel Weighing Jack	073527	073527
* Roof Mount Strobe Light	156020	156020

* Recommended Safety Option

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HARSCO TRACK TECHNOLOGIES
HARSCO CORPORATION
415 North Main Street
Fairmont, Minnesota, 56031-1837 U.S.A.

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