

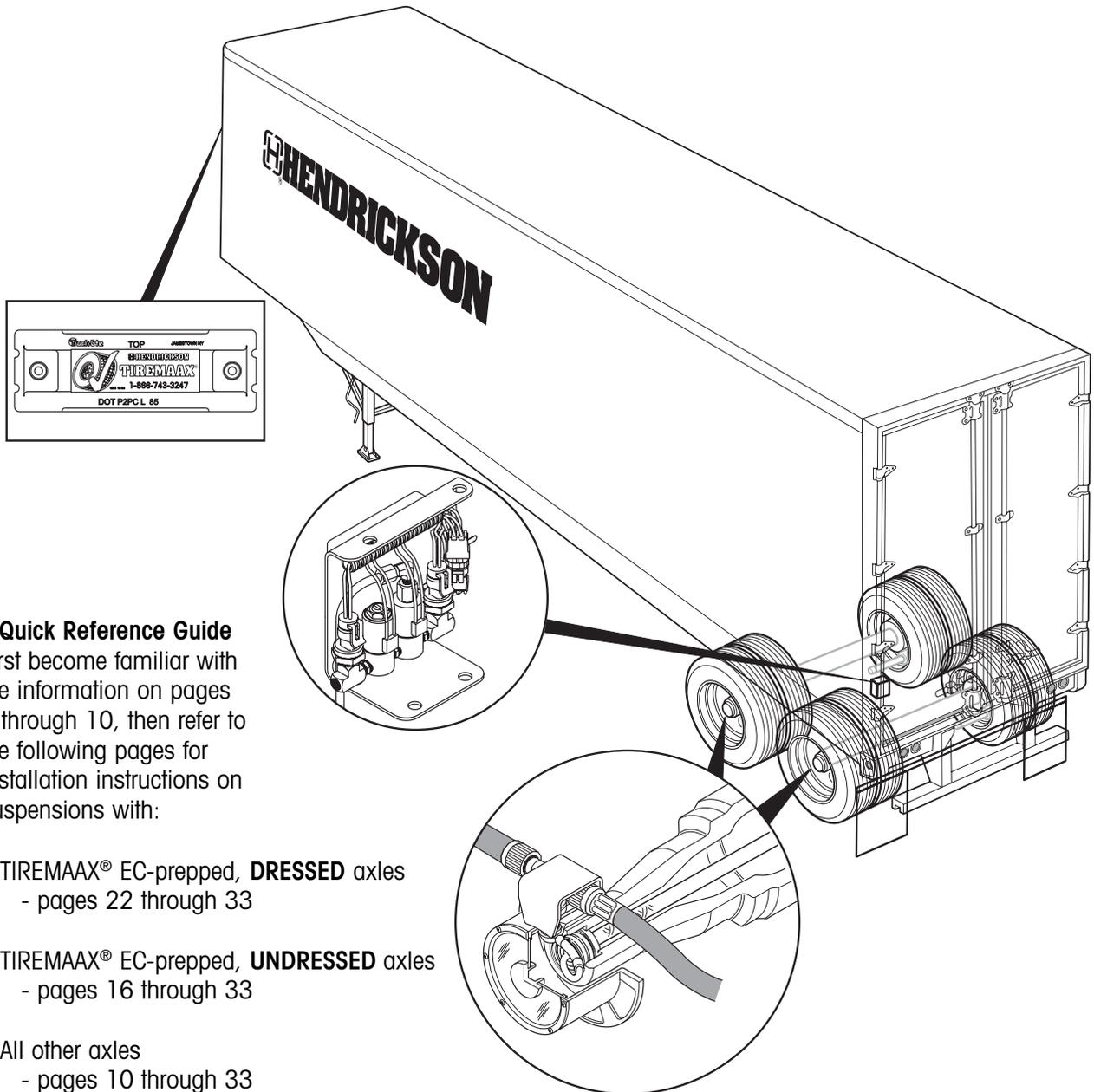
TECHNICAL PROCEDURE

TIREMAAX® EC TIRE INFLATION SYSTEM

SUBJECT: Installation, Service and
Troubleshooting Procedures

LIT NO: L818

DATE: October 2007 **REVISION:** E



Quick Reference Guide

First become familiar with the information on pages 4 through 10, then refer to the following pages for installation instructions on suspensions with:

- TIREMAAX® EC-prepped, **DRESSED** axles
- pages 22 through 33
- TIREMAAX® EC-prepped, **UNDRESSED** axles
- pages 16 through 33
- All other axles
- pages 10 through 33

Refer to page 33 for the system integrity check procedure

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The Hendrickson TIREMAAX® tire inflation system is available in two versions: TIREMAAX® EC (electronic controller) and TIREMAAX® CP (constant pressure).

This document describes installation, service and troubleshooting procedures for the Hendrickson TIREMAAX EC tire inflation system. It is only applicable to TIREMAAX EC systems.

If you need installation, service and troubleshooting information for the Hendrickson TIREMAAX CP tire inflation system, please refer to Hendrickson publication L995, *TIREMAAX CP Installation, Service and Troubleshooting Procedures*, available as a download from www.hendrickson-intl.com.

The descriptions and specifications contained in this publication are current at the time of printing.

Hendrickson reserves the right to discontinue or modify its models and / or procedures and to change specifications at any time without notice.

Any reference to brand name in this publication is made as an example of the types of tools and materials recommended for use and should not be considered an endorsement. Equivalents may be used.

IMPORTANT NOTICE

Hazard signal words (such as Warning or Caution) appear in various locations throughout this publication. Information accented by one of these signal words must be observed at all times. Additional notes are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions indicate the use of these signal words as they appear throughout the publication.

⚠ WARNING: Indicates hazards or unsafe practices which **COULD** result in severe personal injury or death.

⚠ CAUTION: Indicates hazards or unsafe practices which could result in damage to equipment or minor personal injury.

NOTE: Additional service information not covered in the service procedures.

Departure from the instructions, choice of tools, materials and recommended parts mentioned in this publication may jeopardize the personal safety of the service technician or vehicle operator.

Always use genuine Hendrickson replacement parts.

Every effort has been made to ensure the accuracy of all information in this publication. **However, Hendrickson makes no expressed or implied warranty or representation based on the enclosed information.**

GENERAL INFORMATION

ABOUT THIS MANUAL

This manual is provided to support the Hendrickson TIREMAAX® EC tire inflation system. The manual provides the following information:

- General Information
- Operation
- Components
- Installation
- Service
- Troubleshooting
- Glossary

SYSTEM OVERVIEW

The TIREMAAX EC tire inflation system is designed to automatically inflate tires that are below their target pressure setting using compressed air from the trailer air tank.

NOTE: For TIREMAAX EC to function properly, the trailer air tank pressure must be higher than the target tire pressure. TIREMAAX EC is only capable of allowing available air tank pressure to reach the tires. It is not capable of supplying pressure above the available air tank pressure.

Air seals and hoses remain non-pressurized when the system is not actively checking or inflating the tires. A trailer mounted indicator will turn on when the pressure in one or more tires is low by 20 psi or more, or when a system problem occurs. When the trailer mounted indicator comes on, additional troubleshooting information can be obtained through blink codes flashed by the LED on the TIREMAAX EC controller assembly. Refer to the BLINK CODE DESCRIPTIONS section on page 35 for more troubleshooting details. The trailer mounted indicator will not turn on for minimal inflation requirements of less than 20 psi, helping avoid operator distraction when no action is required.

If a tire is low, the remaining tires are protected from pressure loss by integral check valves located in each tire hose.

FEATURES

- Indicator on when tire pressure is low by 20 psi (or more)
- Checks tire pressure every 10 minutes
- Non-pressurized lines and seals when not inflating

- Indicator on only when service is required (not every inflation)
- Does not pressurize axle tube (helps prevent contamination of air seals)
- Seal and line leaks will not pressurize wheel ends
- No venting at wheel end helps prevent contamination from entering hubcap
- Check-valves located in hoses at tee fitting
- Manual pressure check or fill available at hose end
- Leaky tire detection
- Serviceable filter at supply solenoid helps keep lines and seals clean
- Factory programmed to one of 13 possible target pressures (70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125 or 130 psi) selected by the customer. An optional hand-held programming device is available to program a target pressure other than the factory preset value
- In-axle filter prevents hub contamination and allows any wheel-end air leaks to evacuate through the axle vent

SYSTEM SPECIFICATIONS

- Tire pressure setting range: 70 to 130 psi
- Pressure accuracy: ±1%
- Pressure resolution: 0.5 psi
- Pressure check interval: 10 minutes
- Power requirement (at 12VDC): <240 mW idle
15.6 W inflating
- Minimum operating voltage: 9 volts
- Indicator current range: 50mA to 1A
- Inflate capacity (one tire): 10 psi in approx. two minutes

COMPONENT WEIGHTS

- Controller assembly: 3 lbs.
- Misc. fittings and air line: 1 lb. per axle
- Wire harness: 1 oz. (std)
1.4 oz. (ABS)
- Hubcap spacers (if required) 1 lb. per axle
- Wheel-end hardware
 - dual wheels 1.7 lbs. per end
 - super single wheels 1.4 lbs. per end
- Indicator light kit 1.8 lbs.

OPERATION

SYSTEM OPERATION

To ensure that the system is functioning, the operator should verify that a two-blink indicator bulb check occurs (one second on, one second off, one second on, then off) when the unit is powered. The system is powered from the “blue circuit” on the seven-pin trailer connector. After the indicator bulb check is finished, the LED on the TIREMAAX® EC controller assembly (see figure 27 for LED location) flashes a code representing the present target pressure setting. The codes are as follows:

- 1 blink = 70 psi
- 2 blinks = 75 psi
- 3 blinks = 80 psi
- 4 blinks = 85 psi
- 5 blinks = 90 psi
- 6 blinks = 95 psi
- 7 blinks = 100 psi
- 8 blinks = 105 psi
- 9 blinks = 110 psi
- 10 blinks = 115 psi
- 11 blinks = 120 psi
- 12 blinks = 125 psi
- 13 blinks = 130 psi

After the target pressure setting code has flashed, the LED turns off for approximately six seconds to indicate the end of the code sequence, then comes back on and remains on constantly to indicate adequate electrical power to the controller assembly.

Once powered, the system will then pressurize the lines and measure tire pressure. If one or more tires are low, the system automatically inflates the low tire(s) to the target pressure setting. The remaining tires are protected from pressure loss by check-valves located in each tire hose. If one or more tires are low by 20 psi or more, the indicator will turn on and remain on until the tire(s) reinflate to within 20 psi of target pressure. The system continues to inflate to the proper pressure.

Once the tires are at the proper pressure, the seals and air lines will be depressurized preventing unnecessary wear on the seals. The system rechecks tire pressure every 10 minutes by momentarily pressurizing the lines and measuring tire pressure as described above.

If the indicator remains on, the system is attempting to inflate the tires but may not be able to adequately maintain proper tire pressure. The operator should stop and check the tires to determine if it is safe to continue to operate the vehicle and should seek service at the next opportunity.

⚠ CAUTION: All hoses must be connected for the system to operate properly. If any of the hoses are removed or damaged, the system cannot inflate any low tire(s).

MANUALLY CHECKING TIRE PRESSURE

⚠ WARNING: TO PREVENT INJURY, ALWAYS WEAR EYE PROTECTION WHEN MAINTAINING OR SERVICING THE VEHICLE.

NOTE: Check valves in the tire hoses help prevent tire pressure loss when a tire hose is removed. You may, however, experience air flow at the open line and a low tire indication on the indicator, if the tire hose is disconnected and the system is powered and attempts to check tire pressures.

To manually check tire pressure (figure 1):

- Turn vehicle off
- Disconnect tire hose from tee at hubcap (or from elbow at hubcap if super single configuration)
- Use a conventional gauge to measure tire pressure at hose end
- Reattach and firmly hand-tighten tire hose. Using pliers, carefully and gently verify that the hose connection is tight

⚠ CAUTION: Do not overtighten tire hose or the internal tire hose seal may be damaged. Ensure tire hoses are not stretched or rubbing on the wheel.

INDICATOR DESCRIPTION

TWO BLINKS AT POWER-UP

When +12 VDC power is applied, the indicator (figure 2) will blink two times (one second on, one second off, one second on, then off) as a system verification and indicator bulb check. If the indicator does not blink two times at power-up, the indicator bulb may be burned out or the system may not be functioning. Verify proper power is applied to the system.

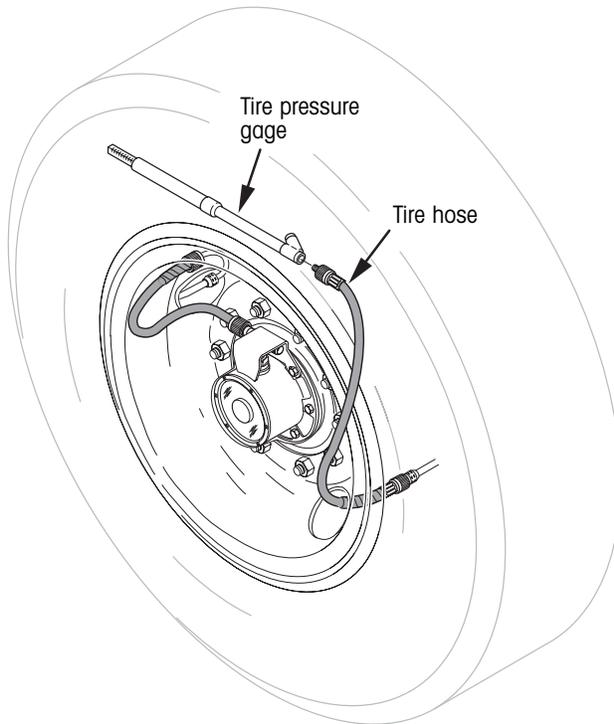


Figure 1. Manually checking tire pressure

NOTE: The TIREMAAX® EC system utilizes the trailer's blue circuit for power. Some early model tractors do not power this circuit, resulting in no power to the system.

INDICATOR ON CONTINUOUSLY

The indicator will illuminate if the measured pressure of one or more tires is 20 psi or more below the target pressure setting. The indicator will remain on until the tires are reinflated to within 20 psi of the target pressure setting. If the indicator remains on for an extended period of time, the operator should stop the vehicle and check the tires for damage. Under some normal operating conditions, you may find that the indicator illuminates when no visible damage is apparent. This may be due to changes in ambient temperature while the trailer is idle. When the system is first powered on a trailer at a temperature significantly lower than when previously operated, cooling of the tires may result in a drop of pressure below 20 psi of the target pressure, thus illuminating the indicator. Refer to the Appendix (figure 49) for examples of temperature effects on tire pressure.

In addition, the indicator may turn on and remain on due to a significant air line leak or to the system failing to depressurize.

HOW THE SYSTEM OPERATES

The system checks the tire pressures at 10-minute intervals. To measure the tire pressure, the system charges the air lines with a series of pulses. If the line pressure has not increased to the target tire pressure after a specified period of time, the system will begin to inflate the low tire(s). If the measured tire pressure is 20 psi or more below the target tire pressure, the indicator will illuminate while the system is inflating the tire(s) to inform the driver of a potential tire leak. Once the target tire pressure is achieved, the system performs an additional check to verify that the control lines have depressurized.

To prevent air from leaking while the control lines are not pressurized, a check valve (springless valve core) is used in each of the tire hoses.

If the indicator remains lit for an extended period of time, the driver should check all the tires for damage and take corrective actions if applicable.

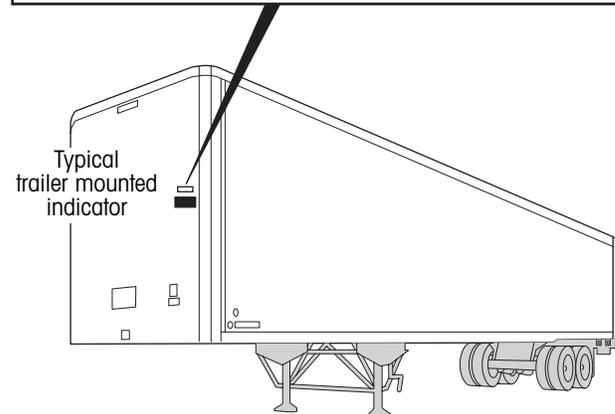
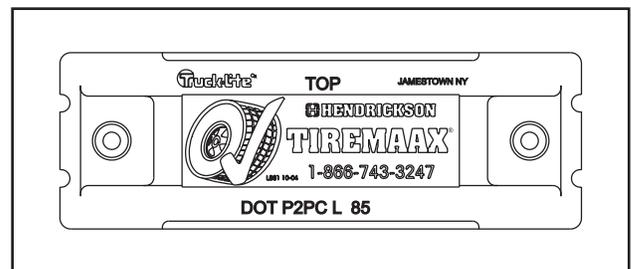


Figure 2. Trailer mounted indicator



COMPONENTS

COMPONENT DESCRIPTION

Refer to figure 3 for major TIREMAAX® EC component illustrations. Refer to figures 18 through 22 for a complete description of air fittings and hoses.

TIRE HOSE (WITH INTEGRAL CHECK VALVE)

- Provides an air passage from the hubcap tee to the tire
- Integral check valves in the tire hoses allow the air lines and seals to remain non-pressurized when the system is not checking or inflating the tires
- No modification to the standard valve stem or core is required
- Allows for manual pressure check and fill at the hose end

ROTARY JOINT

- Provides a means to allow the air to flow from a non-rotating axle spindle to the rotating hubcap
- Composed of seals and bearings — the seal prevents air leakage from the rotating shaft
- Spindle plug provides a secure surface to mount the rotary union and provides an air pressure vent in the hubcap during normal use and in the event of rotary joint damage
- Under normal operation, the rotary joint will be non-pressurized for the majority of the time

CONTROLLER ASSEMBLY WITH ELECTRONIC CONTROL UNIT (ECU)

- Mounting bracket
- Solenoid valves
 - control the flow of air to the tires
 - separate supply side (air IN) and delivery side (air OUT) ports, see figure 3
 - supply pressure solenoid valve has a serviceable inlet filter to reduce contamination from the air source
- Pressure sensors
 - read tire pressure
 - read supply pressure (serves as a redundant function check to verify sensor operation)

ELECTRONIC CONTROL UNIT

- Uses input from pressure sensors to control the solenoid valves, thus maintaining tire pressure
- Performs an indicator check to inform the driver that the system is powered and operational
- Turns on the indicator when the measured tire pressure drops more than 20 psi below the target pressure
- Detects faults and displays service codes via the LED on the controller assembly
- Provides diagnostic support via blink codes
- Allows the target tire pressure to be reprogrammed using an optional, hand-held programming device

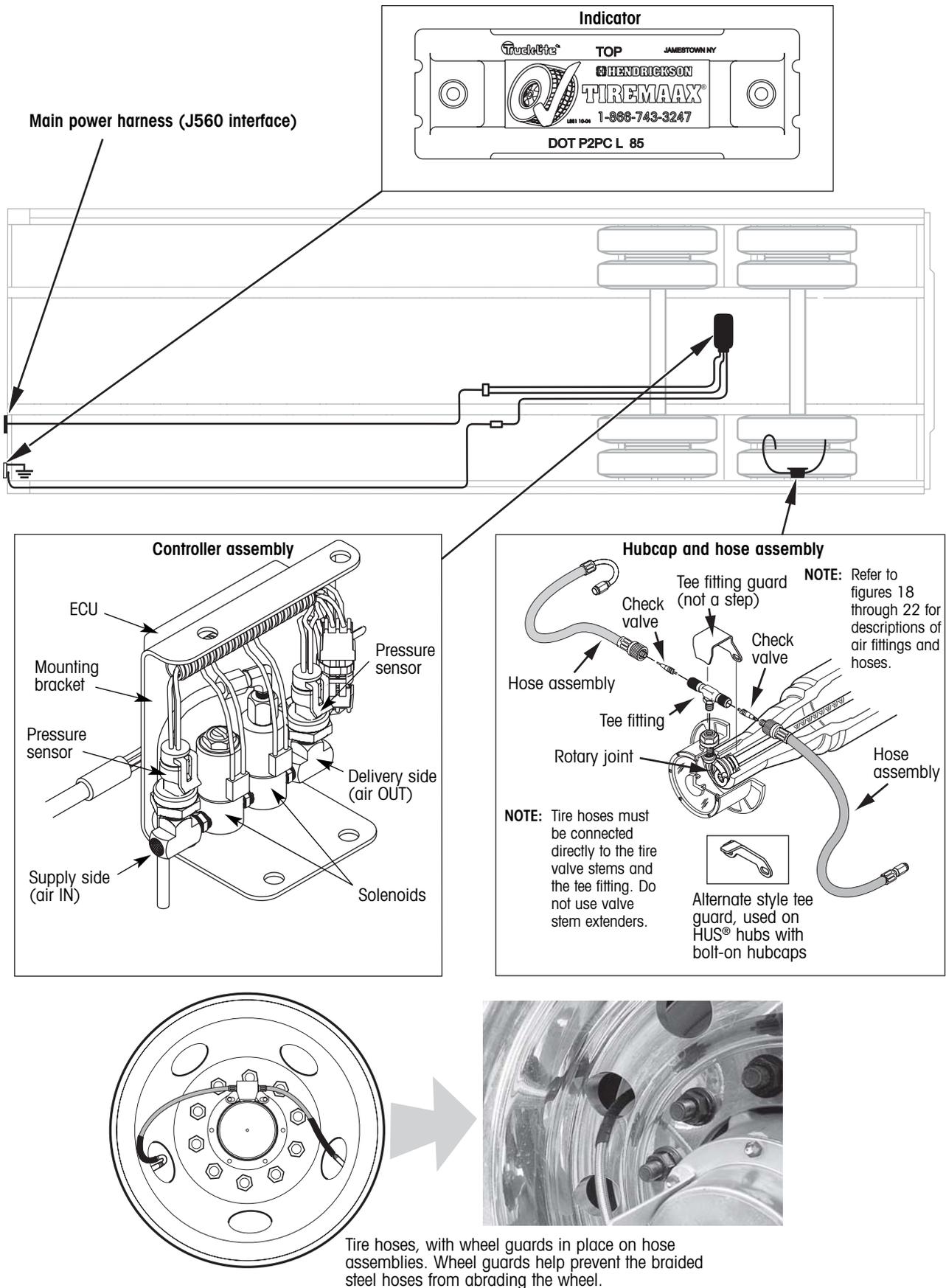


Figure 3. TIREMAX® EC components



INSTALLATION

INSTALLATION MATERIALS AND SUPPLIES

In addition to the hardware provided, the installer shall provide the following:

- Hubcap* (unless pre-installed on dressed axle)
- Spindle plug driver and handle* (figure 9), unless the spindle plugs are already installed in the axle from the factory
- Air lines and fittings (figures 18-22)
- Indicator and wire (figure 17)
- Optional hand-held programming device* to set target tire pressure (if a target tire pressure other than the preset value is desired) (figure 31)
- Controller assembly mounting bolts (figure 16)
- Pressure protection valve
- A regulated air supply at or below the target tire pressure (to pressurize the system for leak checks)
- An air chuck with a 1/4-inch push-to-connect fitting (conveniently attaches to the exhaust tube on the controller, used to pressurize the system for leak checks)

*Components unique to TIREMAAX® EC, available only from Hendrickson

INSTALLATION INTRODUCTION

Identify the bullet item below that describes the condition of your trailer axles and proceed as directed.

- If the TIREMAAX EC system hardware is already installed on a dressed axle, skip to the section titled *Controller Assembly Installation* on page 22.
- If the TIREMAAX EC system axle hose and spindle plugs are already installed on the axle, skip to the section titled *Rotary Joint Installation* on page 18.
- If the axles have been pre-drilled but no hardware has been installed, skip to the section titled *Component Installation* on page 14.
- For retrofit installations, start with the procedures described below.

AXLE PREPARATION

The following describes the procedure for preparing a Hendrickson trailer axle (figure 4) for TIREMAAX EC system installation.

NOTE: The TIREMAAX EC system is not compatible with the castle (cotter pin-locked) spindle nut system. Use only the standard three-piece

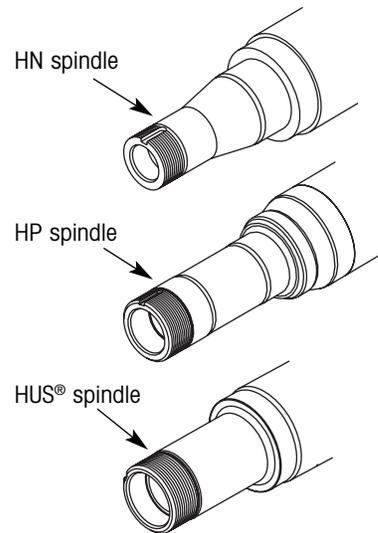


Figure 4. Axle spindle identification

spindle nut system (HN or HP spindles) or the HUS® spindle locking hardware (HUS spindles) with the TIREMAAX EC system. The PRO-TORQ spindle nut system may be used, but it may also require a Hendrickson hubcap spacer kit to provide the necessary clearance between it and the rotary joint assembly.

⚠ WARNING: BLOCK ALL WHEELS BEFORE BEGINNING THIS INSTALLATION PROCEDURE. NEVER WORK UNDER A VEHICLE SUPPORTED ONLY BY A JACK.

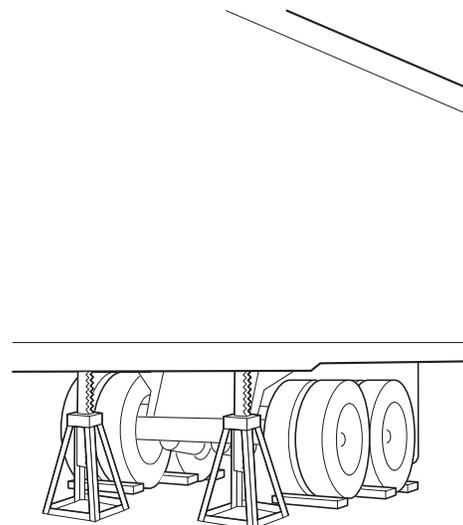


Figure 5. Trailer preparation

TIREMAX® EC INSTALLATION, SERVICE AND TROUBLESHOOTING PROCEDURES

1. Block the tires to keep the trailer from moving (figure 5).
 2. Exhaust the trailer air system.
 3. If the wheel end is oil lubricated, drain the oil from the hubcap and discard the oil.
 4. Remove the hubcap bolts and hubcap.
 5. Remove the spindle plug from the spindle.
 6. Remove the in-axle filter.
 7. Inspect the spindle plug bore and remove any burrs or sealant.
 8. Check the inside of the spindle to ensure that there is a passage through the axle to allow installation of the air line.
 9. **For all INTRAAX® and VANTRAAX® suspensions** - locate the three ¼-inch pipe plugs in the axle wrap windows, remove the plugs and proceed to the *Component Installation* section on page 14. If the axle does not have pre-drilled holes in the axle wrap windows, proceed to step 10 for hole drilling details.
- For Hendrickson Trailer Axles** - locate the three ¼-inch pipe plugs in the middle of the axle, remove the plugs, and proceed to the *Component Installation* section on page 14. If

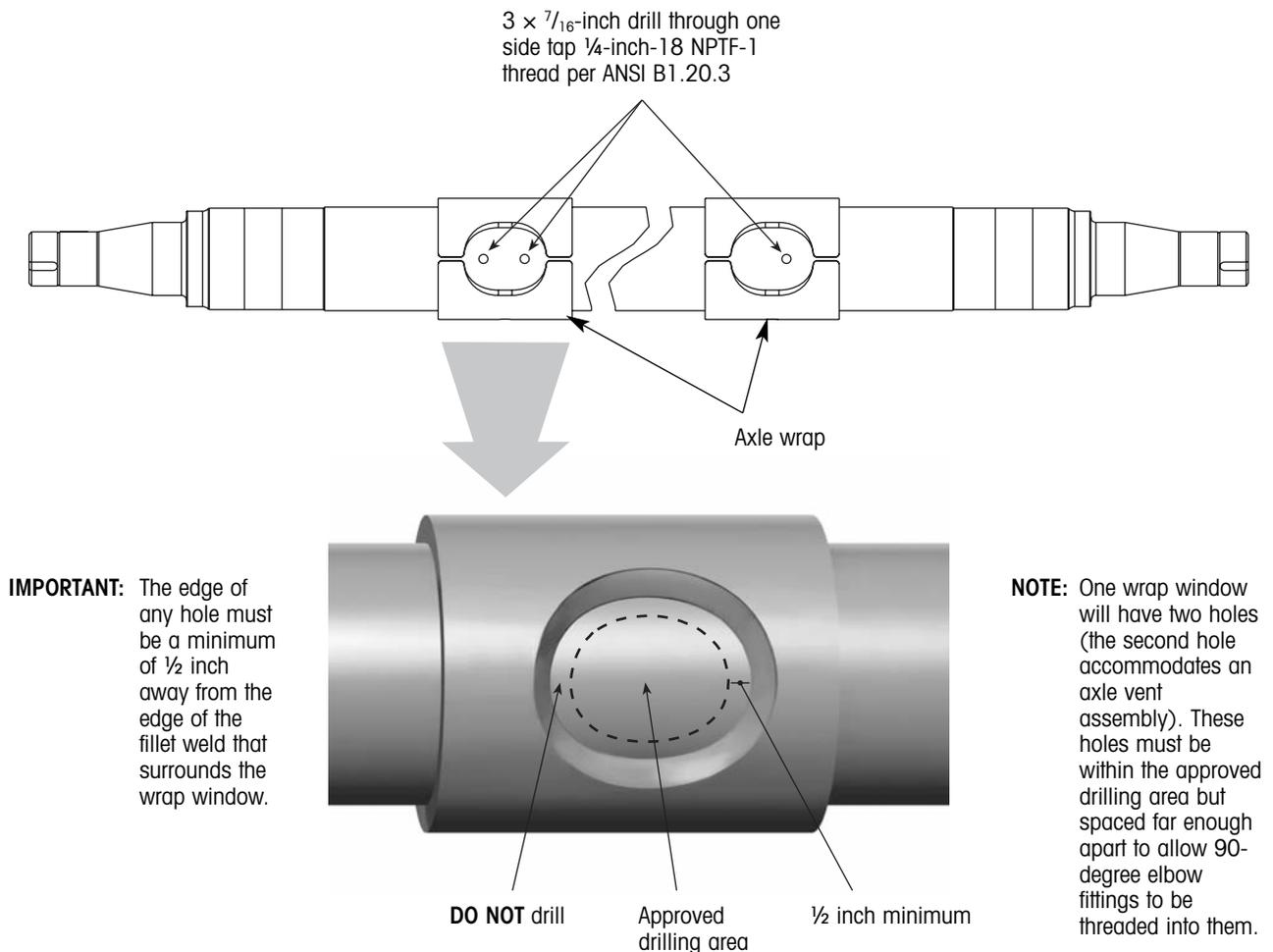


Figure 6. INTRAAX / VANTRAAX suspension axle drilling details

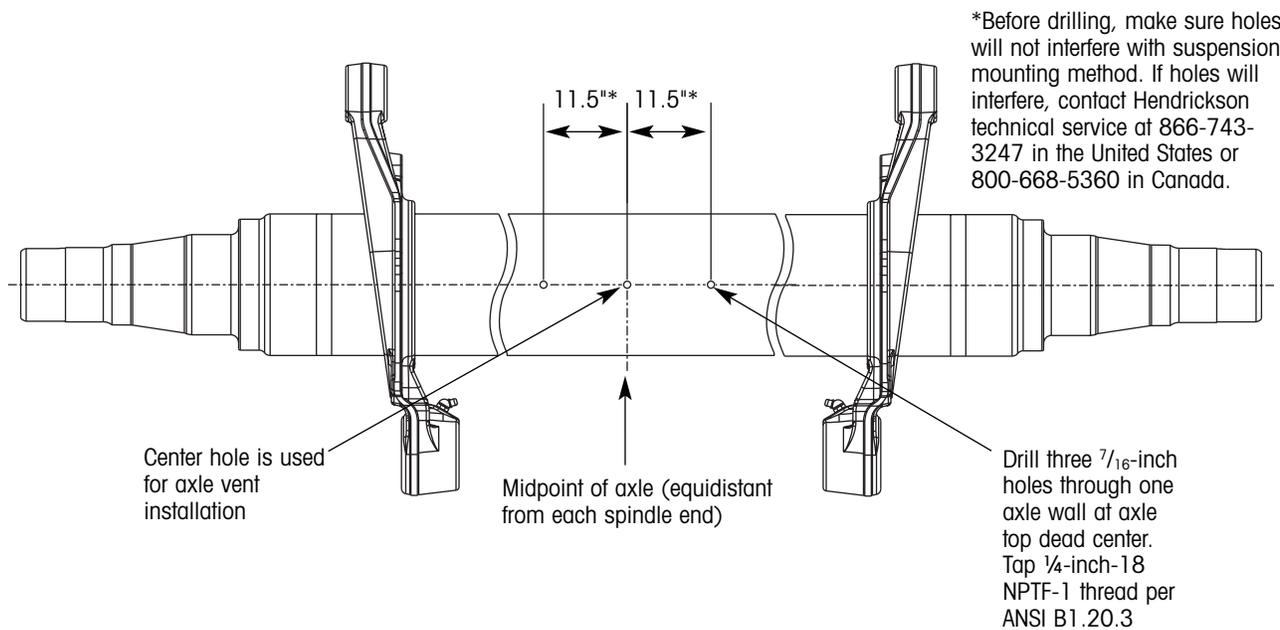


Figure 6a. Hendrickson Trailer Axle drilling details

the axle does not have three pre-drilled holes in the middle of the axle, proceed to step 10 for hole drilling details.

10. Using the information in figure 6 or 6a, drill and tap three 1/4-inch - 18 NPT holes in the axle wrap windows (on INTRAAX and VANTRAAX suspensions) or at the midpoint of the axle (on Hendrickson Trailer Axles) to prepare for component installation.

NOTE: In most cases, it will be necessary to remove the slack adjuster and camshaft to gain access to the approved drilling area. Refer to Hendrickson publication L496, *Wheel-End Maintenance Procedures* (available at www.hendrickson-intl.com), for complete slack adjuster and camshaft removal instructions.

NOTE: Remove the debris generated by the drilling and tapping operations from inside the axle before proceeding with the next step.

11. Proceed to the COMPONENT INSTALLATION section on page 14.



NOTE: Tapered (HN) spindle shown, but procedure is the same for HP and HUS® spindles.

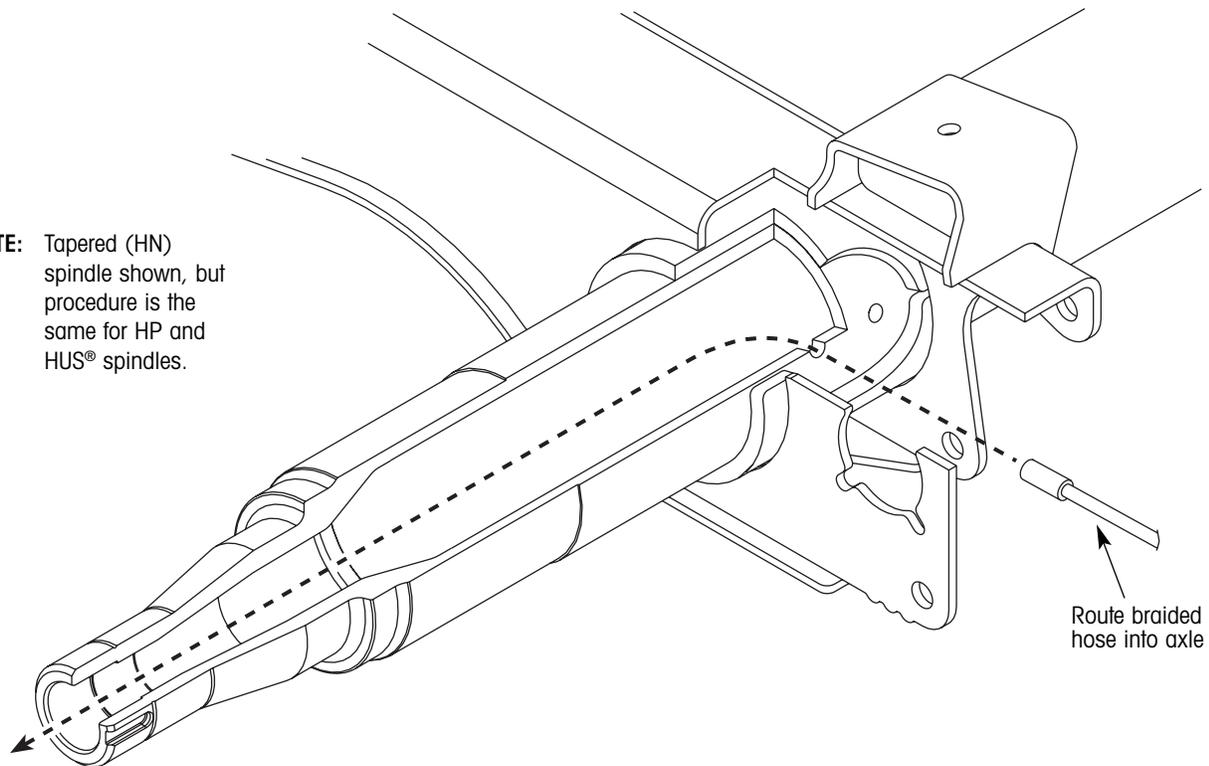


Figure 7. Routing hose in axle

COMPONENT INSTALLATION

Refer to the following assembly procedures to complete the installation of the TIREMAAX® EC tire inflation system. Component installation procedures include:

- Axle hose installation
- Spindle plug installation
- Hub installation requirements
- Hendrickson hubcap spacer kit installation
- Rotary joint installation
- Hubcap assembly
- Controller assembly installation
- Wiring harness installation
- Axle vent and control line installation
- Tire hose installation

AXLE HOSE INSTALLATION

1. On the end of the axle tube with two ¼-inch holes in the wrap window (on INTRAAX and VANTRAAX suspensions), route the small end of the metal braided hose into the hole closest to the spindle end (figure 7). On Hendrickson Trailer Axles, route the small end of the metal braided hose into the hole closest to the spindle.
2. Making sure that the hose heads toward the spindle end, continue feeding the metal braided hose into the axle tube until the small end of the hose exits the spindle end.

NOTE: Tapered (HN) spindle shown, but procedure is the same for HP and HUS® spindles.

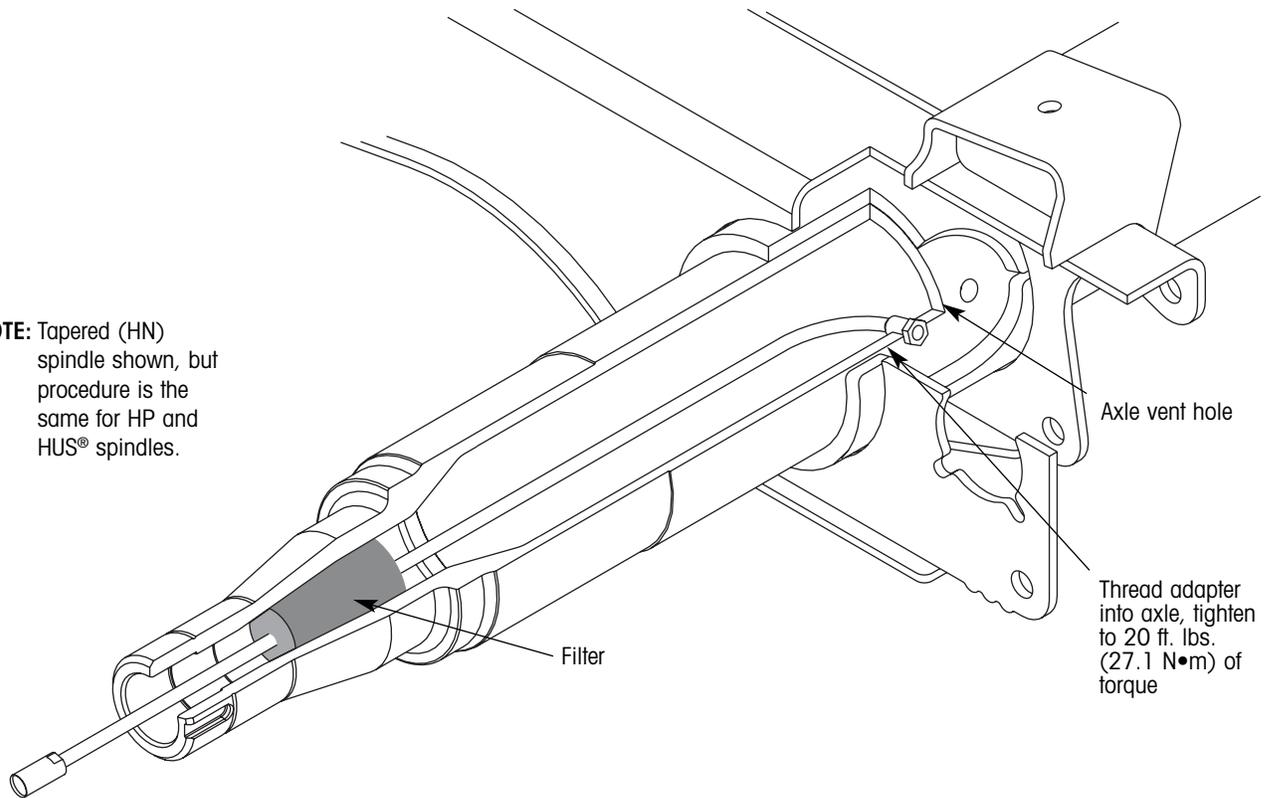
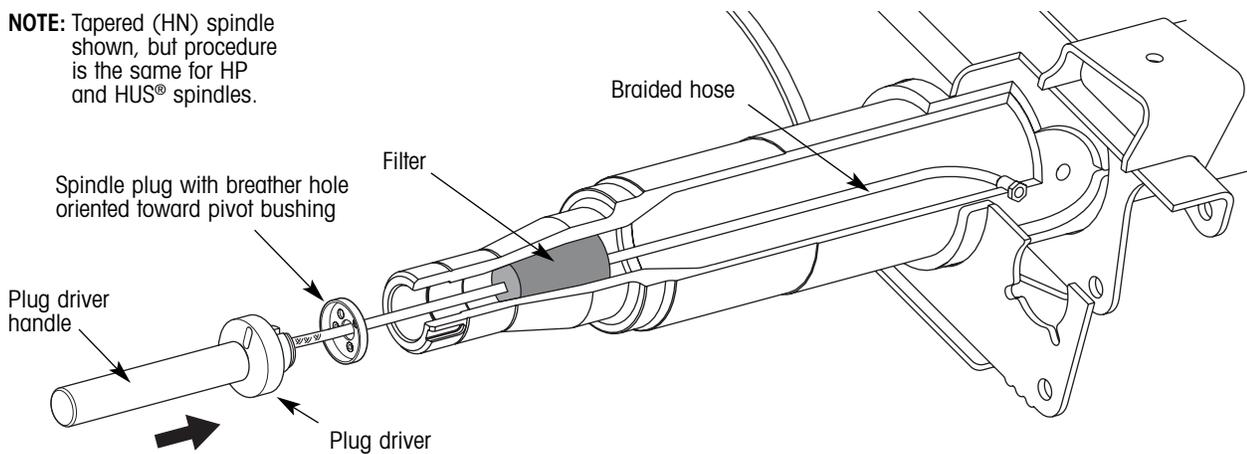


Figure 8. Installed position of hose assembly

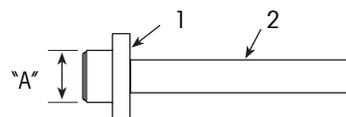
3. Thread the large adapter end of the axle hose assembly into the axle and tighten to 20 ft. lbs. (27.1 N•m) of torque (figure 8).
4. If not already present, cut an inch-wide slit in the center of the axle filter and feed the metal braided hose through the slit in the filter. Push the axle filter into the spindle cavity (figure 8).
5. Remove the protective coverings from the end of the axle hose assembly and blow air through the hose assembly to remove any debris.
6. Repeat steps one through five on the other end of the axle. Leave the axle vent hole (figure 8) vacant for now. This hole will be used to accommodate the axle vent in a later installation.



NOTE: Tapered (HN) spindle shown, but procedure is the same for HP and HUS® spindles.



Plug Driver and Handle Assembly Ordering Information



Item	Name	Part Number	"A" Dimension	Spindle Type
1	Plug driver	S-28146-1	1.75 inches	HN
1	Plug driver	S-28146-2	2.50* inches	HP*
1	Plug driver	S-28146-3	2.75* inches	HP* & HUS
2	Plug driver handle	S-27399	—	—

* Before March 28, 2003, Hendrickson manufactured HP spindles with both 2.5" and 2.75" inner bore diameters. After this date, the HP spindle bore was standardized at 2.75".

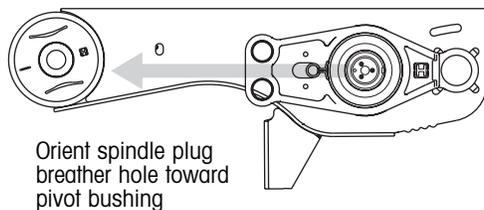


Figure 9. Spindle plug installation

SPINDLE PLUG INSTALLATION

1. On one end of the axle, route the end of the braided hose through the center of the spindle plug (figure 9).
2. With the spindle plug breather hole oriented toward the pivot bushing (figure 9), place the plug assembly against the spindle end.
3. Route the braided hose into the center of the plug driver and press the plug into the spindle end until the driver bottoms on the end of the spindle.

NOTE: The driver regulates the correct installation depth. Refer to Hendrickson publication *B113, TIREMAX® EC Spindle Plug Installation Depth* (available from www.hendrickson-intl.com) for complete installation details.

4. Repeat steps one through three on the other end of the axle.

HUB INSTALLATION REQUIREMENTS

⚠ WARNING: A minimum hub bore depth is required when installing the TIREMAX EC system (figure 10). This hub requirement helps keep the proper clearance between the rotary joint assembly and the spindle nut system (figure 10), thus preventing contact or interference between these parts which could result in wheel-end failure and severe personal injury or death.

Any hub may be used with the TIREMAX EC system, provided a minimum hub bore depth requirement (dimension "A" in figure 11) is maintained.

If the hub bore dimension is greater than or equal to the dimension shown in the chart in figure 11, you may use the hub "as is" with the TIREMAX EC system.

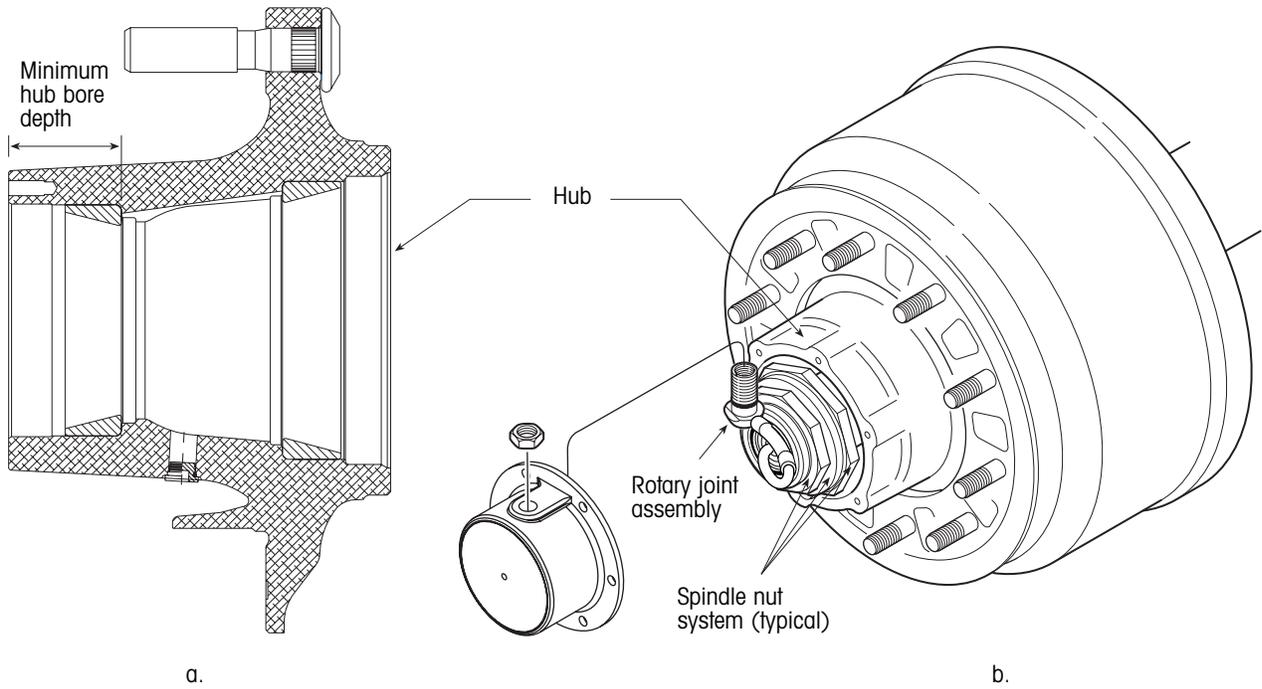


Figure 10. TIREMAAX® EC hub requirement

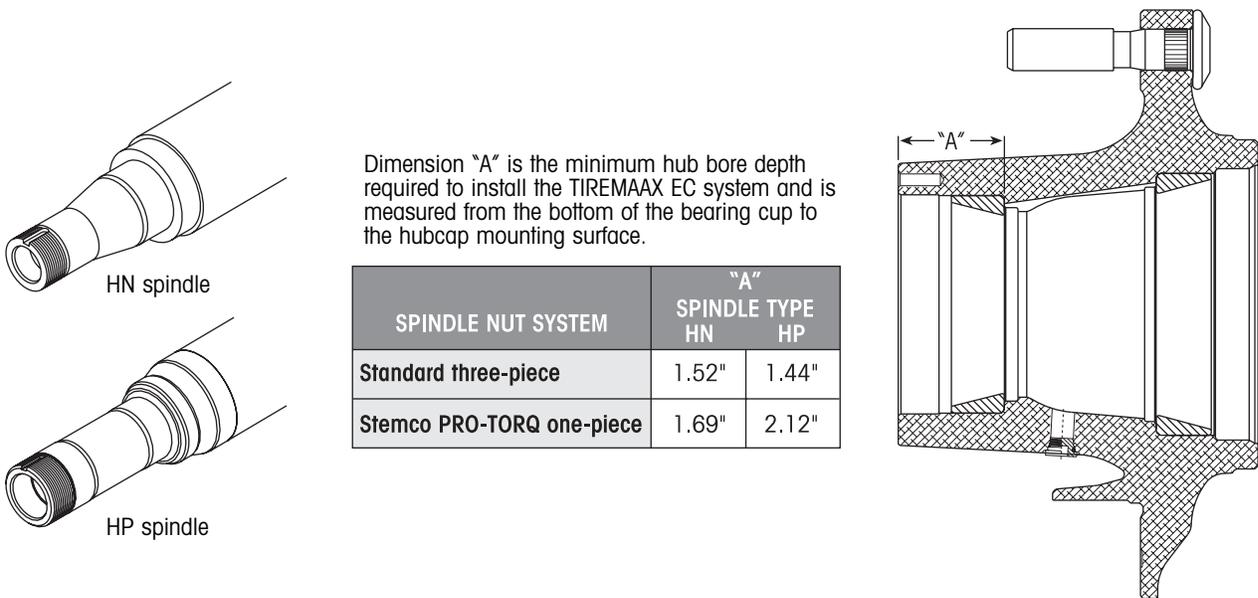


Figure 11. Minimum hub bore depth



If the hub bore dimension is less than the dimension shown in the chart in figure 11, you may still use the hub with the TIREMAAX EC system, but a Hendrickson hubcap spacer kit is required.

Hendrickson offers hubcap spacer kits for HN and HP spindles to accommodate most hubs without the required bore dimension. Each kit consists of 3/8-inch spacers, gaskets, hubcap bolts and lock washers in quantities to adapt one axle. The hubcap spacer kit part numbers are:

SPINDLE TYPE	HUBCAP SPACER KIT PART NUMBER
HN	S-28040
HP	S-28093

HENDRICKSON HUBCAP SPACER KIT INSTALLATION

If the hub you intend to use does not meet the minimum hub bore depth requirement, use the following procedure to install the hubcap spacer kit.

1. Sandwich the spacer between two gaskets as shown in figure 12.
2. Install the hubcap using the bolts and lock washers provided in the kit. Tighten the hubcap bolts to 12-18 ft. lbs. (16-24 N•m) of torque.

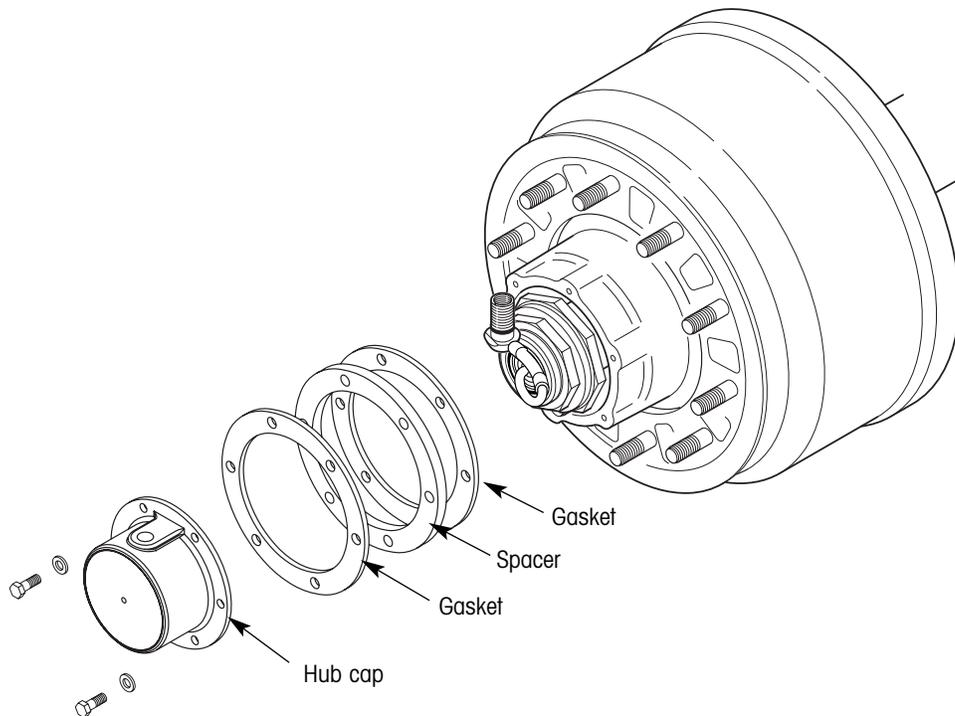


Figure 12. Hubcap spacer kit installation

ROTARY JOINT INSTALLATION

NOTE: The hubs and drums should be installed before installing the rotary joint assemblies.

There are two styles of rotary joint assembly (figure 12a): one with a threaded axle hose connector (current production) and one with a barbed axle hose connector (earlier style). Use the procedure below that matches your rotary joint and axle hose hardware.

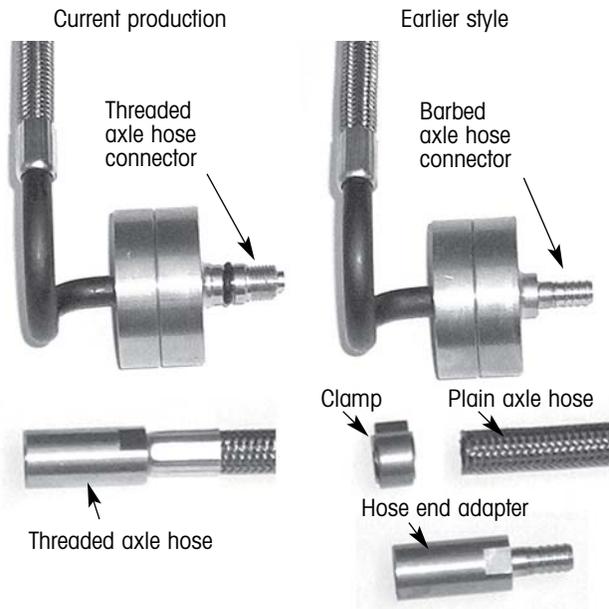


Figure 12a. Rotary union / axle hose connections

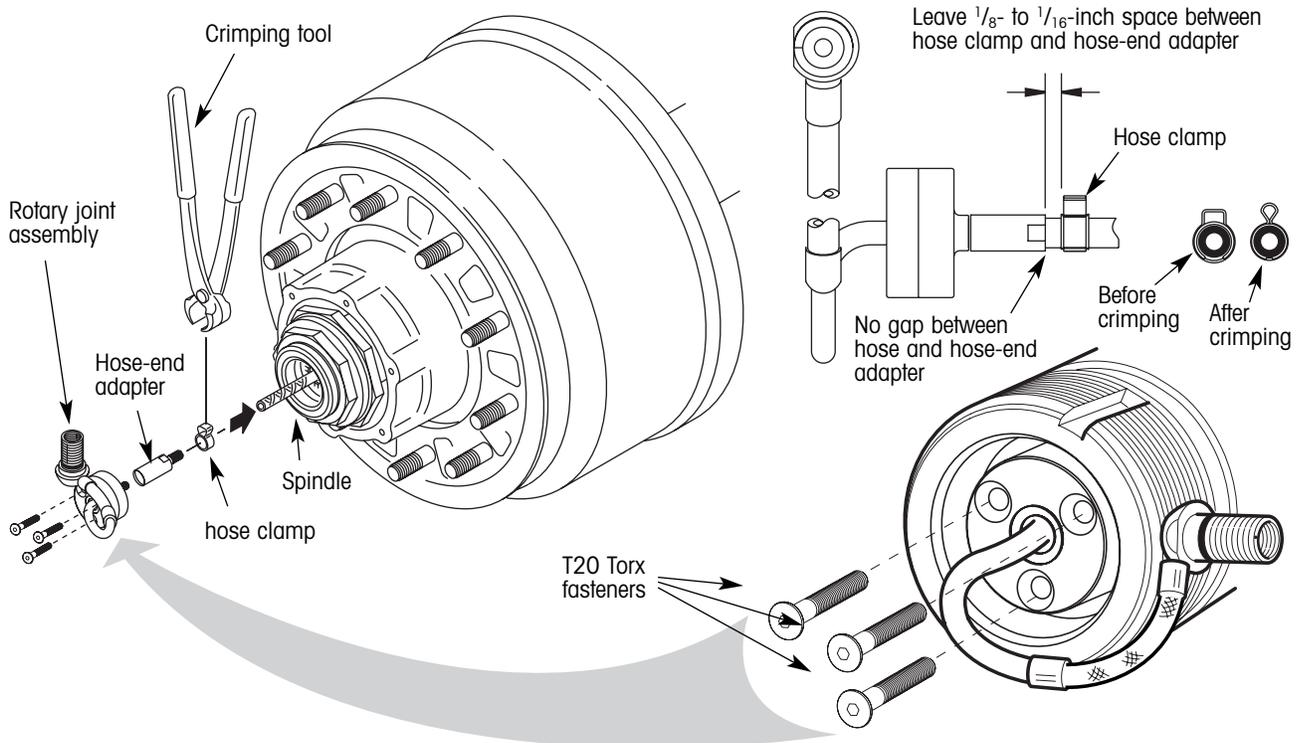


Figure 13. Rotary joint installation

If your axle hose is threaded, you will not need to install the hose-end adapter (figure 12a). Continue with step 4.

If your axle hose has a plain end, you will need to install the hose-end adapter as follows:

1. On one end of the axle, place the hose clamp onto the braided axle hose sticking out of the spindle plug (figure 13).
2. Slide the barbed end of the hose-end adapter completely into the end of the braided hose assembly until the hose bottoms on the adapter. There must not be any gap between the hose and the hose-end adapter (figure 13).
3. Position the clamp over the barbed end of the hose-end adapter. Leave a $\frac{1}{8}$ - to $\frac{1}{16}$ -inch space between the clamp and the hose-end adapter as shown in figure 13. Using a crimping tool (Oetiker® pliers), squeeze the clamp to tighten the hose to the hose-end adapter. The clamp inner surfaces must touch for a proper seal (figure 13). Continue with step 4.

4. Using the rotary union spanner wrench (figure 13a), screw the threaded rotary union into the threaded axle hose (or hose-end adapter) and tighten to 30 in. lbs. (3.4 N•m) of torque.

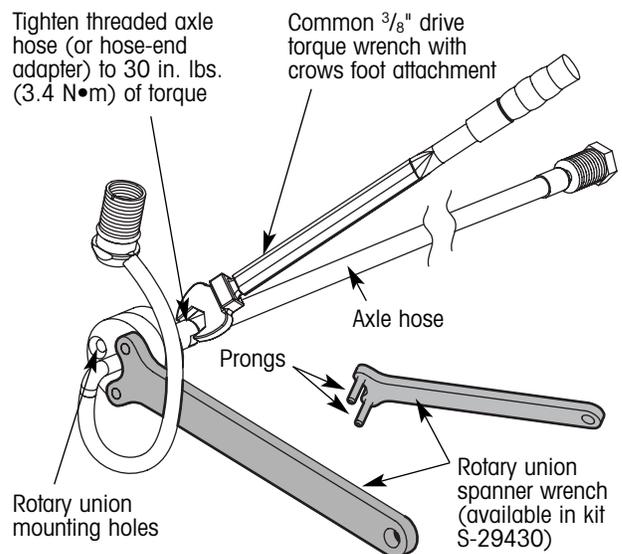


Figure 13a. Rotary union spanner wrench use

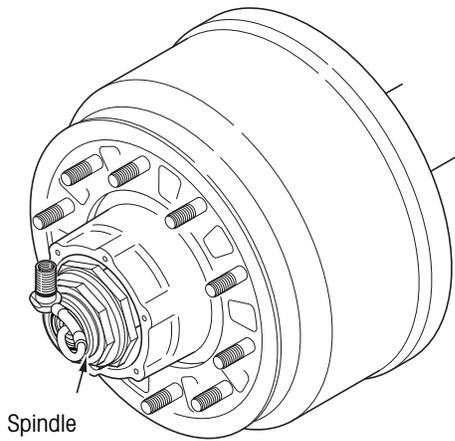


Figure 14. Completed installation of rotary joint assembly

NOTE: The rotary union spanner wrench serves two purposes. It offers a convenient way to hold the rotary union stationary while the threaded axle hose connection is tightened. And since the rotary union is manufactured in two halves, the prongs keep both halves of the rotary union from rotating while the axle hose connection is being made, thereby ensuring that the mounting holes in both halves of the rotary union stay aligned.

5. Push the rotary union / axle hose assembly into the spindle plug, aligning the holes in the rotary union with the threaded holes in the spindle plug.

IMPORTANT: To align the holes, rotate the rotary union / axle hose assembly **CLOCKWISE ONLY**. This ensures that the torqued connection will not loosen.

6. Insert the three T20 Torx fasteners into the rotary joint assembly and fasten to the spindle plug (figure 13). Tighten the fasteners to 45 ± 5 in. lbs. ($5 \pm \frac{1}{2}$ N•m) of torque.
7. Rotate the rotary joint assembly one full turn. Make sure that the steel air tube does not contact any part of the spindle or spindle nut system.
8. Repeat steps one through five on the other side of the axle.

HUBCAP ASSEMBLY

1. Place a hubcap gasket over the rotary joint exit tube and bulkhead adapter.
2. Lubricate the O-ring on the rotary joint bulkhead adapter. Use the same lubricant as is used in the hub or a light film of #2 grease, white lithium grease or Vaseline®.
3. From the inside, insert the bulkhead adapter through the hole in the hubcap labeled "Air".
4. Align the flat on the bulkhead adapter with the anti-rotation flat in the hubcap (figure 15).

Note the orientation indicator on the top of the bulkhead adapter threads (figure 15, view a). Use this indicator (some models have a dot, other models have a notch) to properly orient the bulkhead adapter in the hubcap hole. When the flat on the bulkhead adapter is properly aligned with the anti-rotation flat in the hubcap, the orientation indicator will face outboard (figure 15, view b).

⚠ WARNING: Failure to properly align the flats as described above will result in wheel-end contamination and could lead to wheel-end failure.

Do not use pliers or any kind of wrench to pull the bulkhead adapter up through the hole in the hubcap. This could cause the bulkhead adapter to rotate before it engages the flat in the hubcap, potentially damaging the rotary union or hubcap.

Attach the jam nut and hand tighten. When properly seated, the top of the bulkhead adapter will be flush (or higher) with the top of the jam nut when hand tightened (figure 15, view c).

NOTE: If wheels are installed, refer to figure 23 to determine the correct "clocking" of the hubcap. The wheel must be properly "clocked" to the hubcap to prevent the hoses from rubbing on the wheel. Failure to properly "clock" the wheels may result in hose failure.

5. Install the hubcap. If the hubcap is a screw-on style used on the HUS hub, tighten it to 50-100 ft. lbs. (68-137 N•m) of torque. If the hubcap is

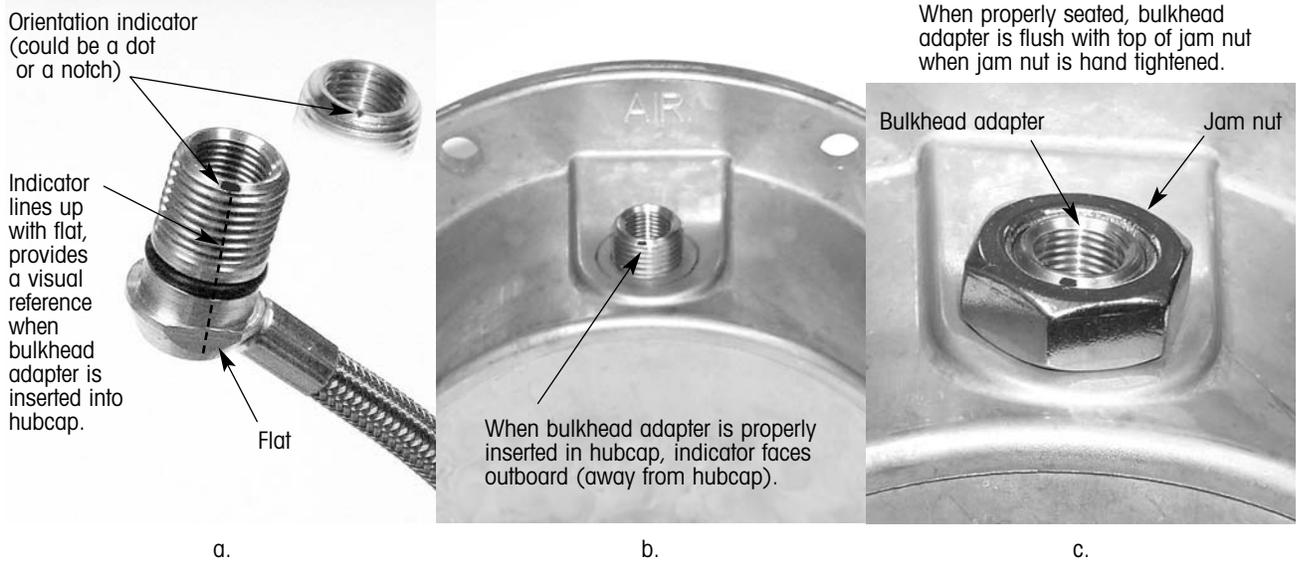
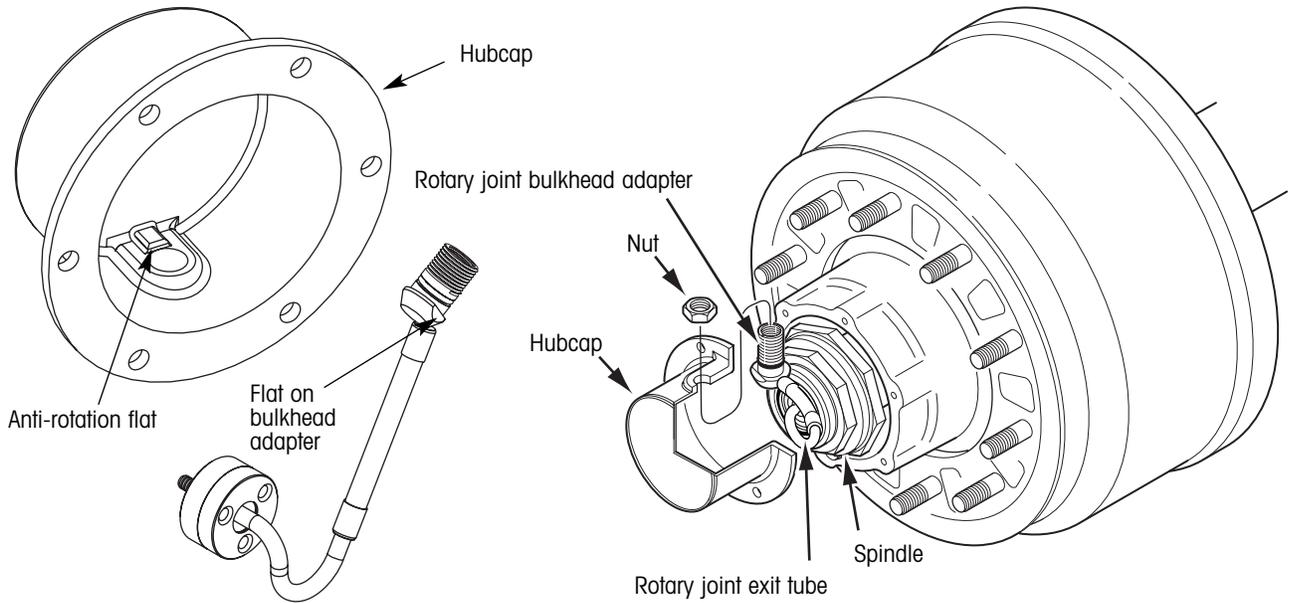


Figure 15. Hubcap to bulkhead adapter connection details

a bolt-on style used on the other hubs, tighten the hubcap bolts to 12-18 ft. lbs. (16-24 N•m) of torque.

6. Tighten the rotary joint jam nut to 15 ft. lbs. (20 N•m) of torque.
7. For oil filled hubs, install lubricant in the wheel end to the correct level.

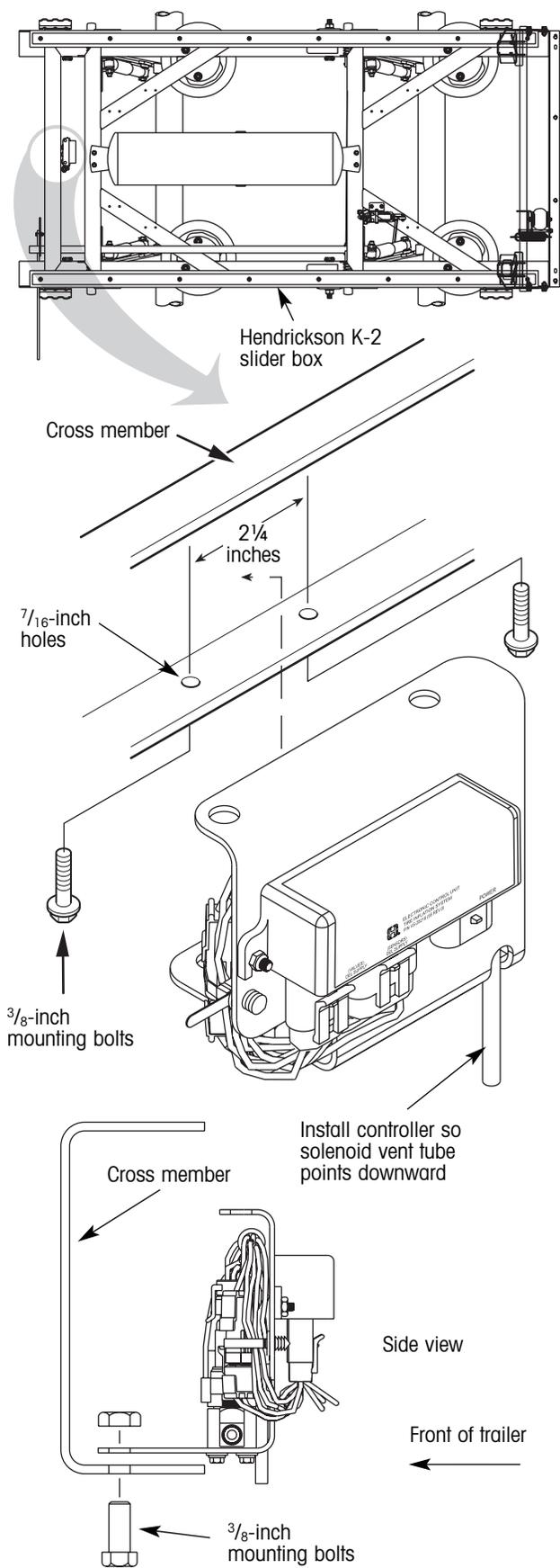


Figure 16. Controller assembly installation

CONTROLLER ASSEMBLY INSTALLATION

On Hendrickson K-2® slider box suspensions, mounting holes for the controller assembly are provided on the forward cross member (figure 16). On other suspensions without mounting holes, a location must be selected and holes drilled to mount the controller assembly.

1. Pick a mounting location for the controller assembly so that it can be conveniently connected to the trailer air tank. Rigidly mount (no rubber insulator) the controller in a location that is accessible and free of hazards. For example, inboard of the trailer frame rails and away from the tires.
2. Drill two holes on 2 1/4-inch centers to accommodate the mounting bracket. Attach the controller assembly with two 3/8-inch fasteners (figure 16). Orient the controller so that it is protected within the cross member and the ECU points rearward (figure 16).

⚠ CAUTION: The controller assembly must be mounted vertically with the solenoid vent tube pointing down (figure 16). This properly orients the exhaust port to prevent damage.

⚠ CAUTION: Do not weld on the controller assembly mounting bracket without first removing the ECU and solenoid valves from the bracket. Refer to the Service Procedures section beginning on page 46 for ECU and solenoid valve removal instructions.

⚠ CAUTION: Cover controller assembly prior to painting or undercoating the trailer to prevent plugging of pressure sensors and ECU ports.

WIRING HARNESS INSTALLATION

TIREMAX® EC comes standard with a three-wire, 18-inch long harness (figure 17). The red wire of this harness is the indicator power lead, it connects to the trailer-mounted indicator. The white wire must be connected to vehicle ground and the blue wire must be connected to 12 VDC vehicle power. The

H TIREMAAX® EC INSTALLATION, SERVICE AND TROUBLESHOOTING PROCEDURES

termination of these wires is the responsibility of the installer. Terminals and connectors must be weather-proof, and corrosion prevention compound must be used on all connectors. Refer to TMC RP 113, 114, and 704 for recommended wiring practices.

A premium, 15-foot long ABS-ready harness is an available option. It plugs into the five-pin Packard connector coming from the J560 interface and provides a pass-through ABS connection. To install the TIREMAAX® EC wiring harness:

1. **Standard harness** - Connect the blue wire to vehicle power and the white wire to vehicle ground.

ABS harness - Plug the five-pin male Packard connector into the mating connector coming from the J560 interface.

2. Connect the other end of the harness to the ECU.
3. Mount the indicator on the front corner or side of the trailer within view of the operators side view mirror. On tractor applications with large wind fairings, locating the indicator near the left rear wheels (near the ABS warning lamp) may be preferable. Connect one side of the indicator to ground (an internal ground, or a dedicated ground wire from the indicator to the plug that connects the trailer to the tow vehicle is recommended).
4. Route the indicator power wire (16 AWG minimum) and connect it to the red wire on the TIREMAAX EC harness.
5. Secure harness and wires as required.

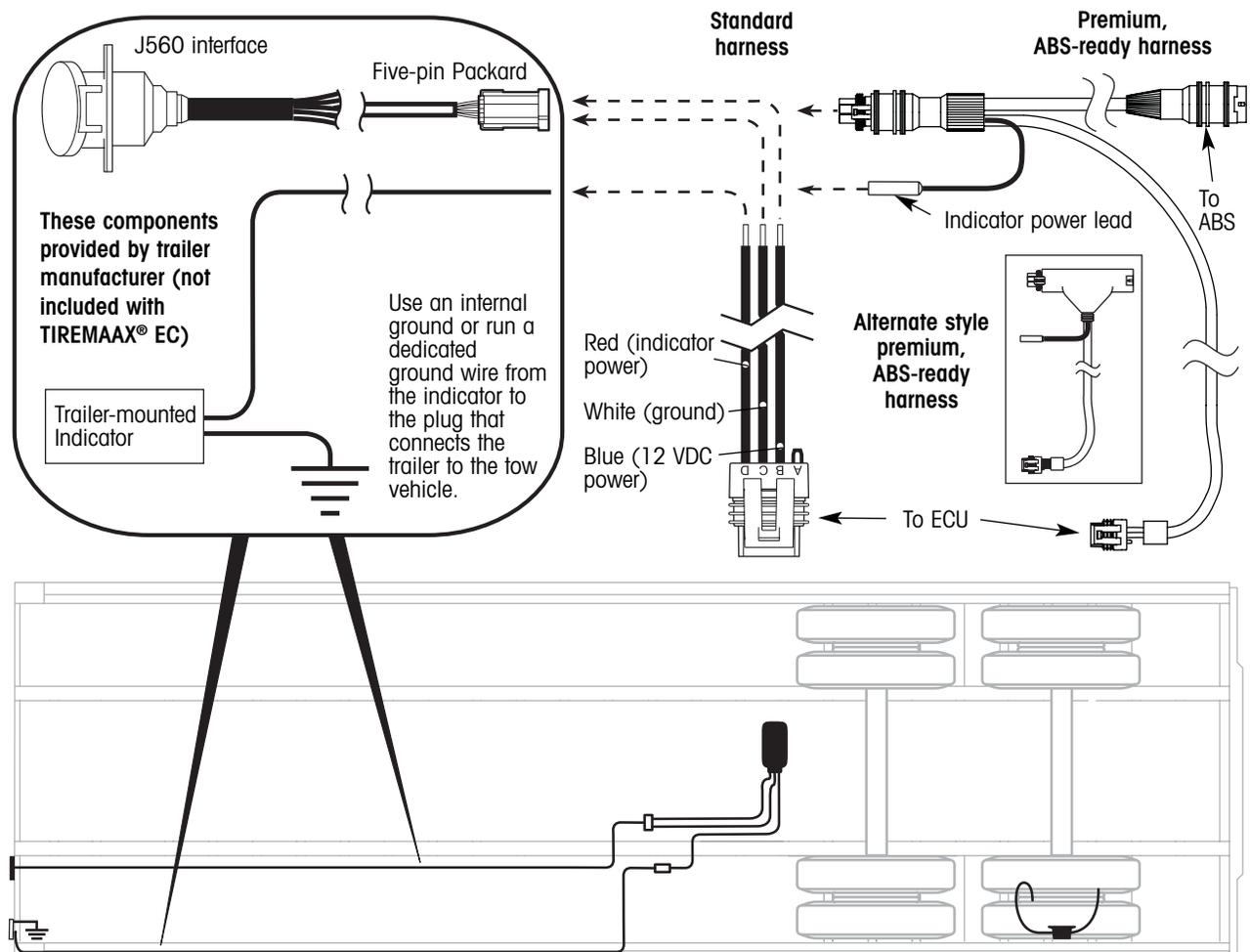


Figure 17. Trailer wiring harness installation

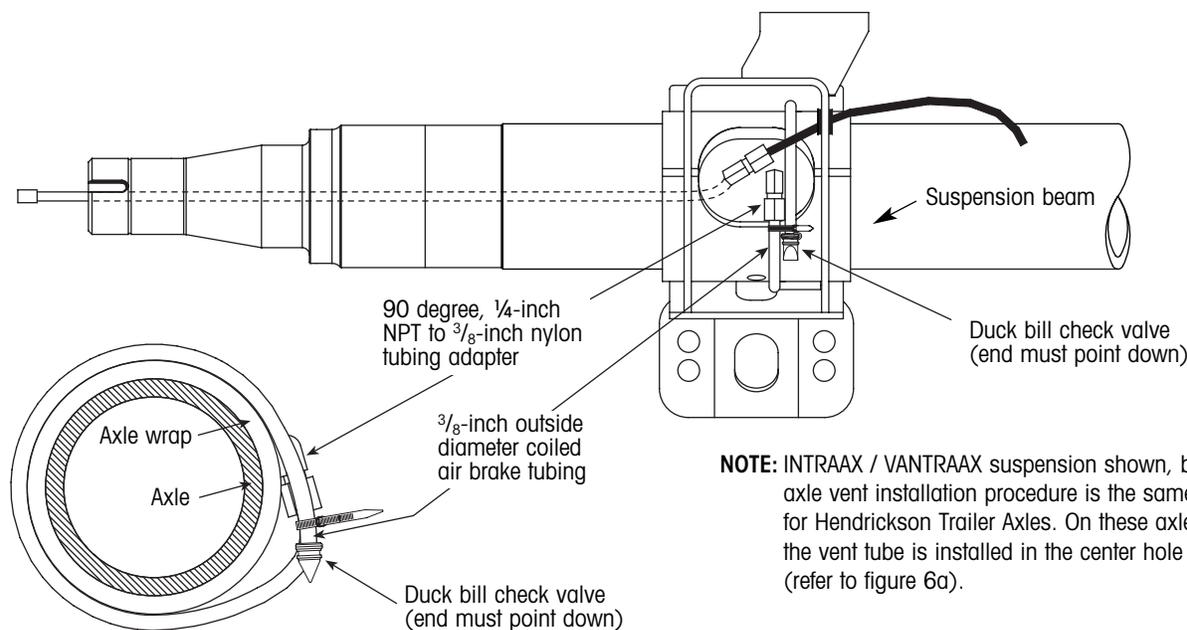


Figure 18. Typical axle vent installation

AXLE VENT INSTALLATION

1. Install a 90 degree, 1/4-inch NPT male to 3/8-inch nylon tubing adapter in the remaining 1/4-inch threaded hole in the axle tube (figure 18).
2. Loop the 3/8-inch outside diameter coiled tubing around the axle. On INTRAAX / VANTRAAX suspensions, loop the coiled tubing around the axle inside the suspension beam as shown in figure 18. If not already installed, attach the duck bill check valve to the tubing making sure the end points down to prevent contamination (figure 18). To attach the duck bill check valve, slide the duck bill check valve onto the tubing and secure with the provided clamp. Do not use glue or any other substance that could plug the duck bill valve.

⚠ CAUTION: To prevent contamination of the axle, ensure the adapters and the duck bill check valve are securely fastened and the duck bill check valve-end points down.

⚠ WARNING: Failure to properly install axle vent may result in wheel-end pressurization and/or water ingestion, which could cause wheel-end failure and severe personal injury or death.

CONTROL LINE INSTALLATION

Proper TIREMAAX® EC operation requires correct air line diameters and lengths. The following diagrams (figures 19-22) show air brake tubing lengths and sizes and associated fittings required to complete the system installation. Control line routing recommendations are also included.

⚠ CAUTION: To prevent twisting the air line inside the axle when tightening fittings to the axle hose fitting, use a wrench to hold the axle hose fitting.

⚠ CAUTION: Proper TIREMAAX EC operation requires correct air line diameters and lengths. Installation sizes and lengths must be within limits shown.

⚠ CAUTION: Proper TIREMAAX EC operation requires correct air line connections. All junctions of two or more 1/4-inch lines must increase to 3/8-inch line for adequate air flow.

⚠ CAUTION: To prevent TIREMAAX EC contamination, do not install fittings on the bottom of the trailer air tank.

ADDITIONAL AXLES

For systems with three or four axles, observe the installation requirements as shown in the following diagrams (figures 19-22). Extend the main 3/8-inch run as necessary. However, all total line lengths must still remain within the limits listed in the diagrams.

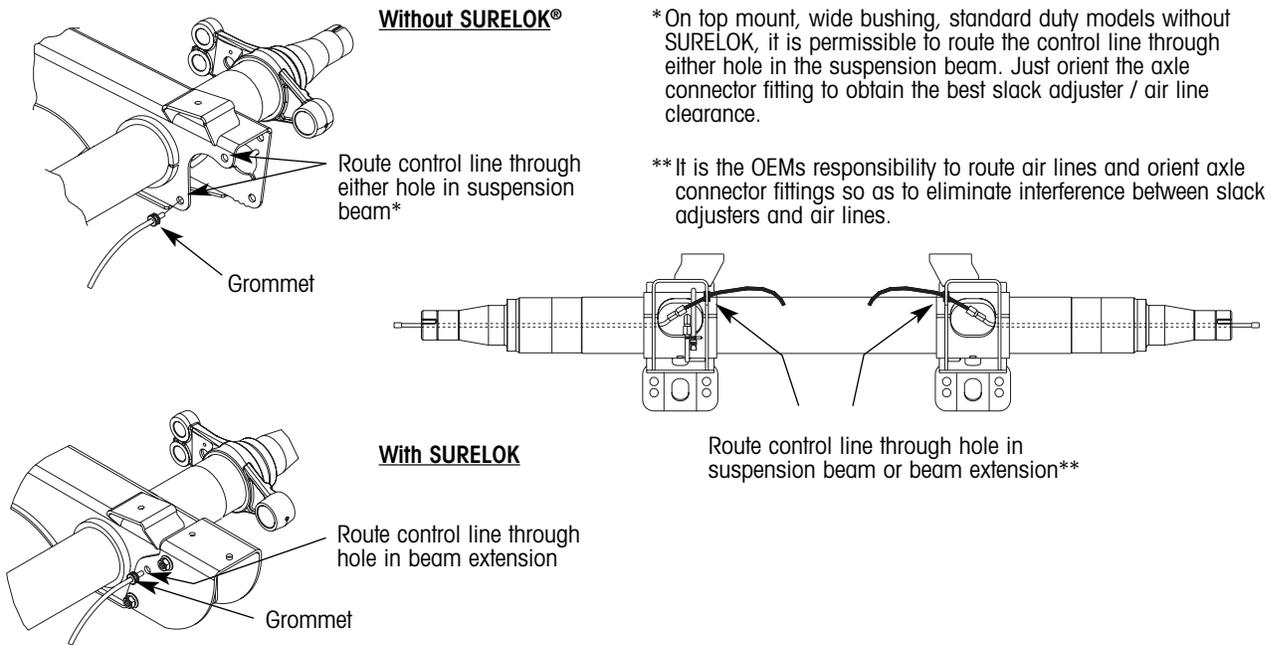


Figure 19. Suggested control line installation details for Top Mount, Wide Bushing, Standard Duty Models (AAT, HKAT)

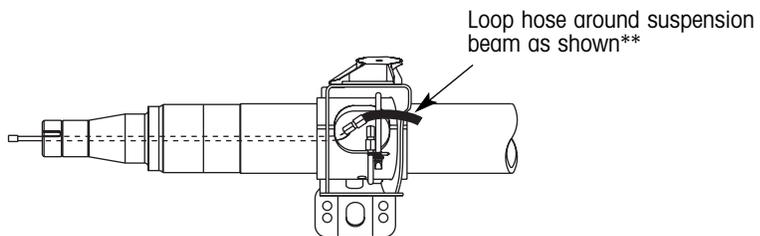


Figure 19a. Suggested control line installation details for Top Mount, Narrow Bushing, Standard Duty Models (HKANT, AANT, AAZNT)

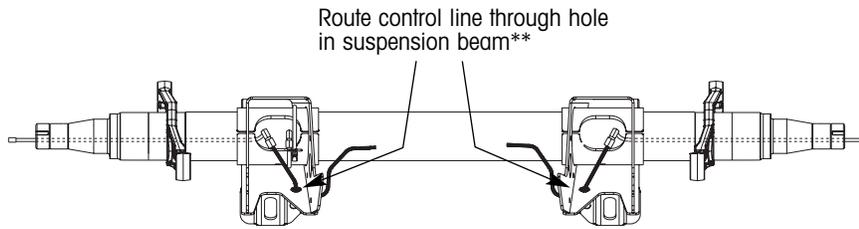


Figure 19b. Suggested control line installation details for Low Ride, Wide Bushing, Standard Duty (AAL 23K, AAL 25K, AAZL, AAL 30K); Low Ride, Wide Bushing, Extreme Duty (AAEDL 30K); and Top Mount, Wide Bushing, Extreme Duty (AAEDT 30K) Models

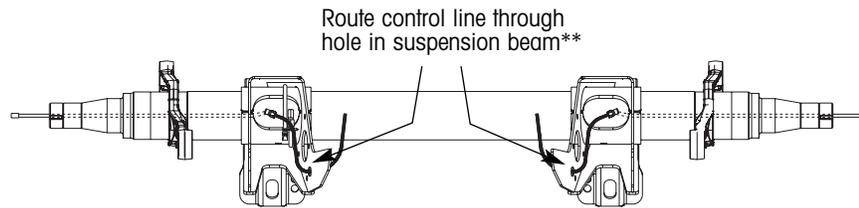


Figure 19c. Suggested control line installation details for Low Ride, Short Beam, Narrow Bushing, Standard Duty Models (AANLS 20K)

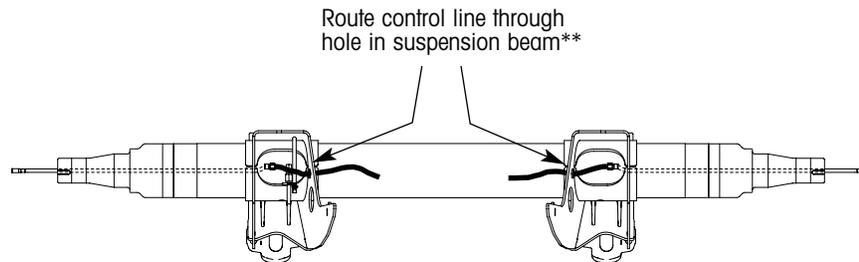
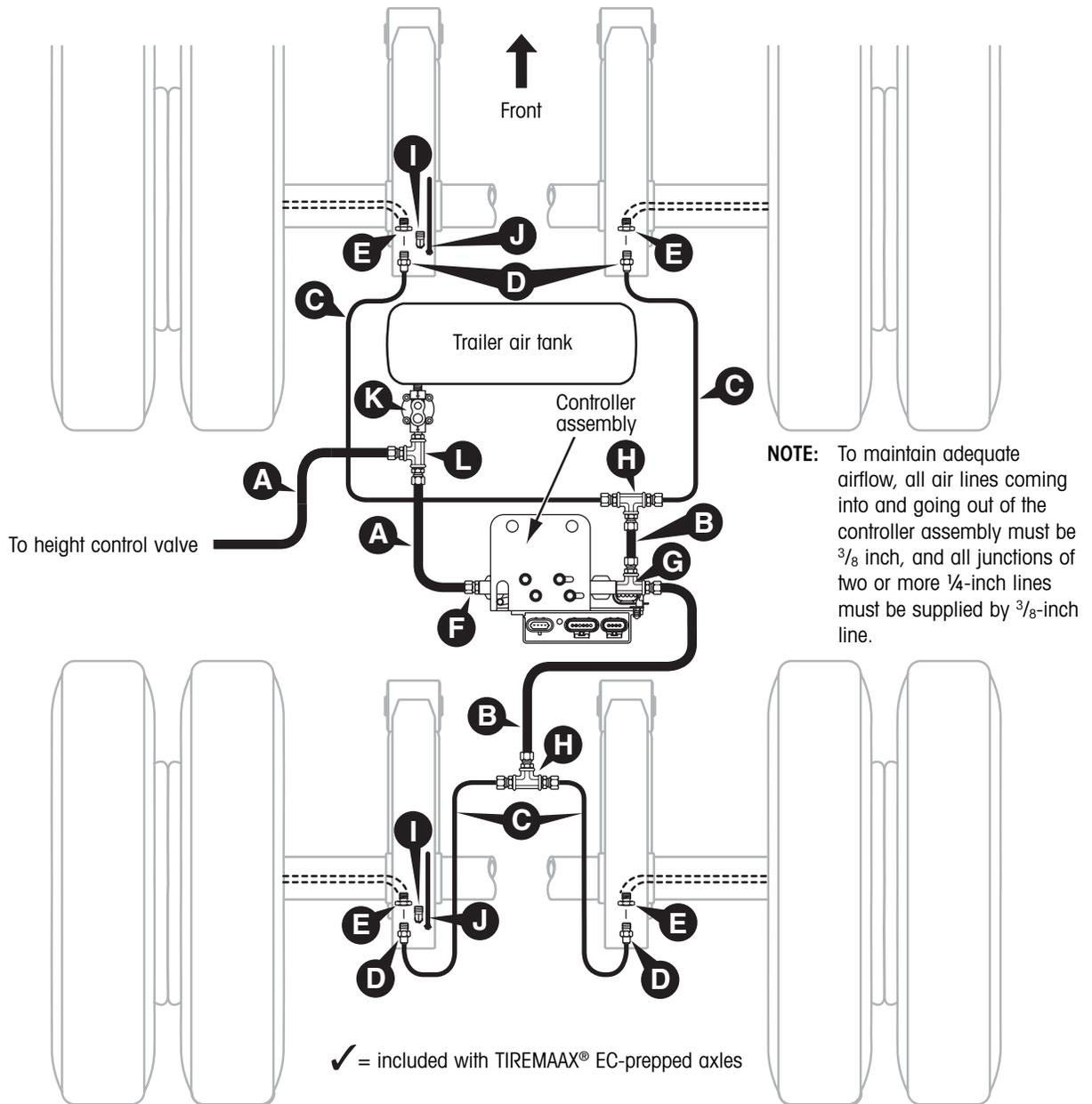


Figure 19d. Suggested control line installation details for Low Ride, Narrow Bushing, Standard Duty Models (AANL)

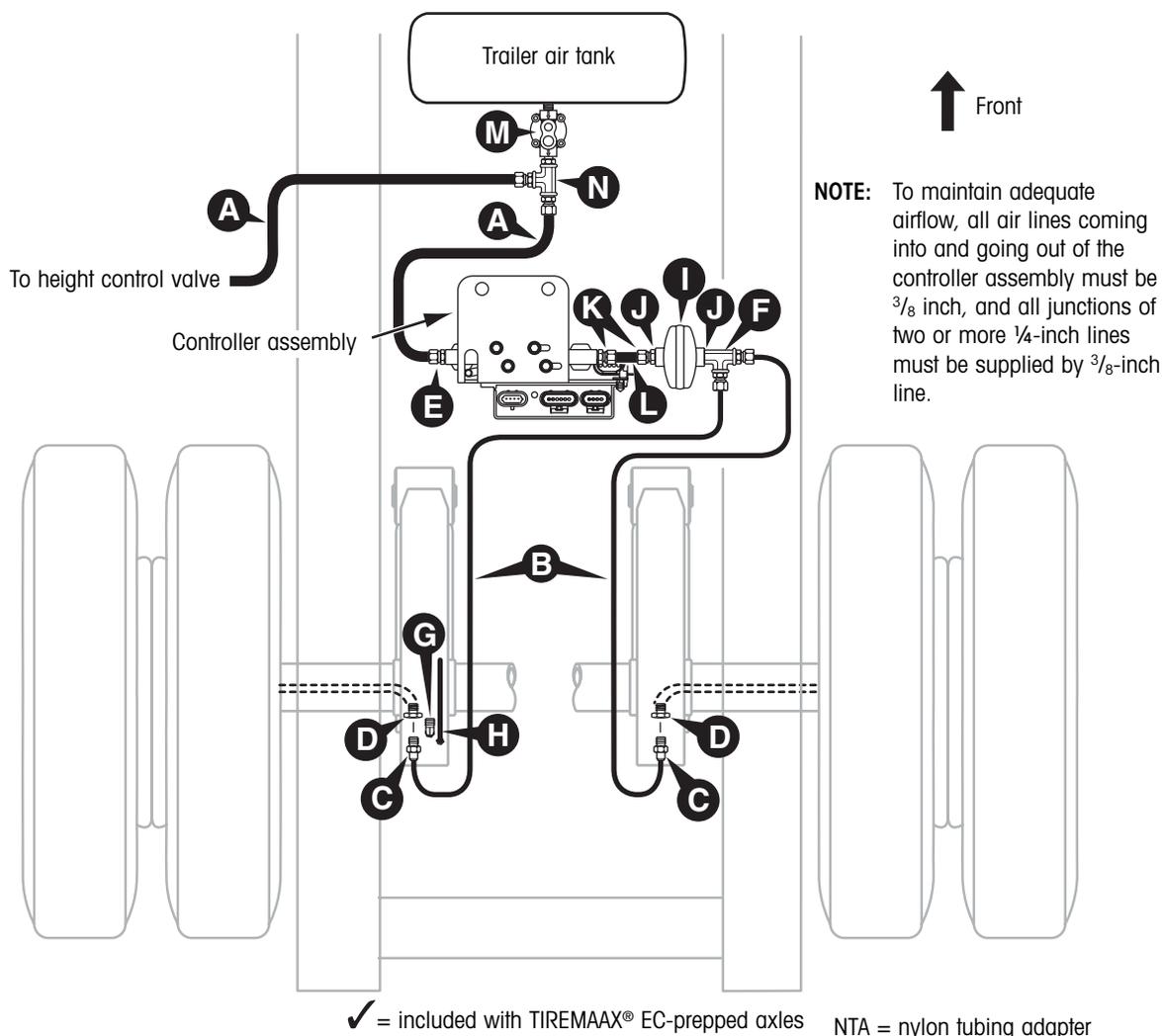
** It is the OEMs responsibility to route air lines and orient axle connector fittings so as to eliminate interference between slack adjusters and air lines.



Item	Description
Ⓐ Air line	3/8-inch OD nylon air brake tubing; any length
Ⓑ Air line	3/8-inch OD nylon air brake tubing; up to 15 feet total system length
✓ Ⓒ Air line	1/4-inch OD nylon air brake tubing; 30 to 50 feet total system length
✓ Ⓓ Axle connector	90-degree elbow, 1/8-inch NPT male to 1/4-inch NTA
✓ Ⓔ Axle hose fitting	1/8-inch NPT female
Ⓕ Controller IN fitting	1/8-inch NPT male to 3/8-inch NTA
Ⓖ Controller OUT fitting	run tee: 1/8-inch NPT male, 3/8-inch NTA, 3/8-inch NTA
Ⓗ Tee assembly	1/4-inch NPT union tee, two 1/4-inch NTA fittings and one 3/8-inch NTA fitting (four total fittings)
✓ Ⓘ Axle vent fitting	90-degree elbow, 1/4-inch NPT male to 3/8-inch NTA
✓ Ⓝ Air line	3/8-inch OD nylon air brake tubing; one loop around axle with duck bill check valve on end required
Ⓚ Pressure protection valve	70 psi minimum closing pressure; existing suspension valve can be used
Ⓛ PPV OUT fitting	run tee: 1/4-inch NPT male, 3/8-inch NTA, 3/8-inch NTA

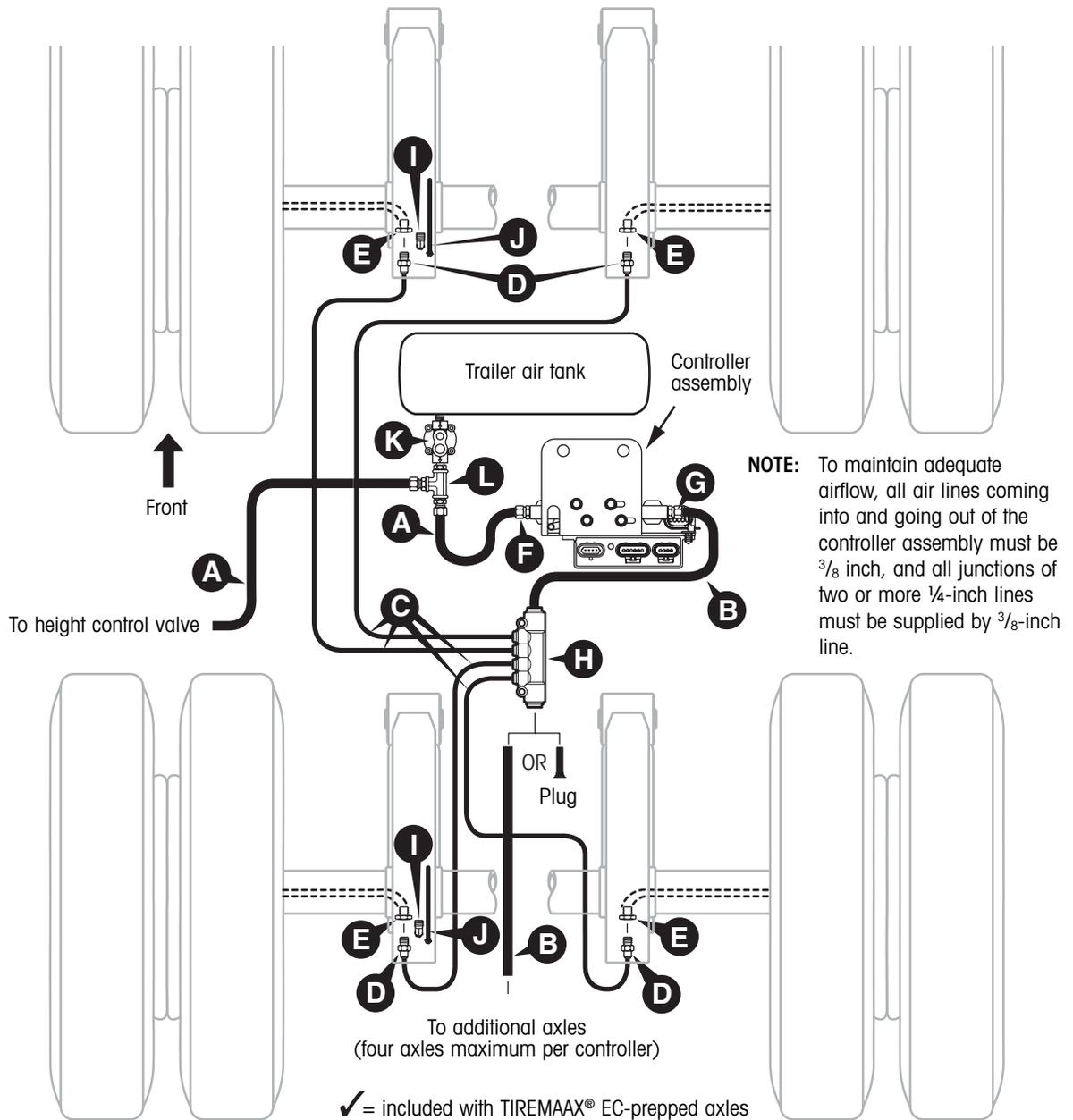
NTA = nylon tubing adapter

Figure 20. Typical TIREMAAX EC plumbing schematic — two axles with 3/8- and 1/4-inch lines



Item	Description
Ⓐ Air line	$\frac{3}{8}$ -inch OD nylon air brake tubing; any length
✓ Ⓑ Air line	$\frac{1}{4}$ -inch OD nylon air brake tubing; 10 to 25 feet total system length
✓ Ⓒ Axle connector	$\frac{1}{8}$ -inch NPT male to $\frac{1}{4}$ -inch NTA
✓ Ⓓ Axle hose fitting	90-degree elbow, $\frac{1}{8}$ -inch NPT female
Ⓔ Controller IN fitting	$\frac{1}{8}$ -inch NPT male to $\frac{3}{8}$ -inch NTA
Ⓕ Reservoir OUT assembly	run tee: $\frac{1}{8}$ -inch NPT male, $\frac{1}{4}$ -inch NTA, $\frac{1}{4}$ -inch NTA (three total fittings)
✓ Ⓖ Axle vent fitting	90-degree elbow, $\frac{1}{4}$ -inch NPT male to $\frac{3}{8}$ -inch NTA
✓ Ⓗ Air line	$\frac{3}{8}$ -inch OD nylon air brake tubing; one loop around axle with duck bill check valve on end
Ⓘ Reservoir	10 to 20 cubic inch capacity; Hendrickson part number A-22357
Ⓝ Bushing	$\frac{1}{2}$ -inch NPT male to $\frac{1}{8}$ -inch NPT
Ⓚ Fitting	$\frac{1}{8}$ -inch NPT male to $\frac{3}{8}$ -inch NTA
Ⓛ Air line	$\frac{3}{8}$ -inch OD nylon air brake tubing; two feet maximum length
Ⓜ Pressure protection valve	required; 70 psi minimum closing pressure; existing suspension valve can be used
Ⓝ PPV OUT fitting	run tee: $\frac{1}{4}$ -inch NPT male, $\frac{3}{8}$ -inch NTA, $\frac{3}{8}$ -inch NTA

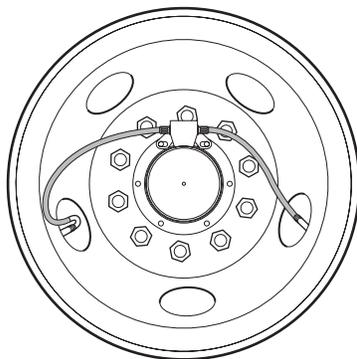
Figure 21. Typical TIREMAAX EC plumbing schematic — single axle with $\frac{1}{4}$ - and $\frac{3}{8}$ -inch lines



Item	Description
Ⓐ Air line	$\frac{3}{8}$ -inch OD nylon air brake tubing; any length
Ⓑ Air line	$\frac{3}{8}$ -inch OD nylon air brake tubing; up to 15 feet total system length
✓ Ⓒ Air line	$\frac{1}{4}$ -inch OD nylon air brake tubing; 30 to 50 feet total system length
✓ Ⓓ Axle connector	90-degree elbow, $\frac{1}{8}$ -inch NPT male to $\frac{1}{4}$ -inch NTA
✓ Ⓔ Axle hose fitting	$\frac{1}{8}$ -inch NPT female
Ⓕ Controller IN fitting	$\frac{1}{8}$ -inch NPT male to $\frac{3}{8}$ -inch NTA
Ⓖ Controller OUT fitting	$\frac{1}{8}$ -inch NPT male to $\frac{3}{8}$ -inch NTA
Ⓗ Junction manifold	$\frac{3}{8}$ -inch NTA inlet, $\frac{1}{4}$ -inch NTA outlets
✓ Ⓘ Axle vent fitting	90-degree elbow, $\frac{1}{4}$ -inch NPT male to $\frac{3}{8}$ -inch NTA
✓ Ⓙ Air line	$\frac{3}{8}$ -inch OD nylon air brake tubing; one loop around axle with duck bill check valve on end required; 70 psi minimum closing pressure; existing suspension valve can be used
Ⓚ Pressure protection valve	run tee; $\frac{1}{4}$ -inch NPT male, $\frac{3}{8}$ -inch NTA, $\frac{3}{8}$ -inch NTA
Ⓛ PPV OUT fitting	

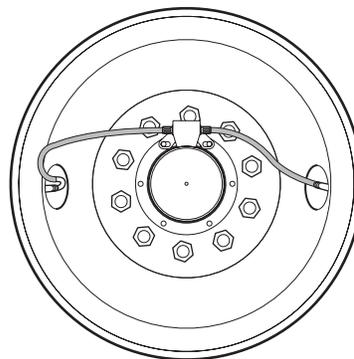
NTA = nylon tubing adapter

Figure 22. Typical TIREMAX EC plumbing schematic — two axles with $\frac{3}{8}$ - and $\frac{1}{4}$ -inch lines and junction manifold



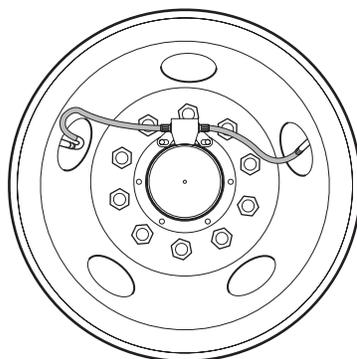
Dual wheel configuration clock "A"

For 17.5- or 22.5-inch, five-hole or five-spoked wheels



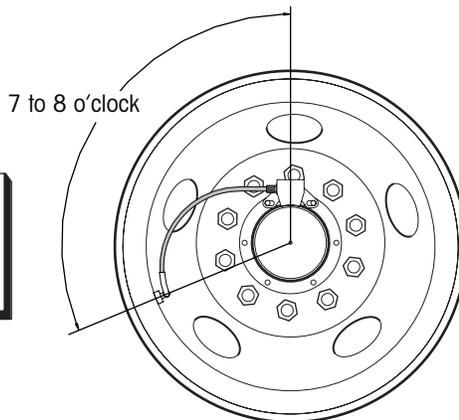
Dual wheel configuration clock "C"

For any size, two-hole or four / six-spoked wheels



Dual wheel configuration clock "B"

For 19.5- or 24.5-inch, five-hole or five-spoked wheels



Super single wheel configuration

With the bulkhead adapter in the 12 o'clock position, the valve stem should be located between 7 and 8 o'clock for most applications. When the wheel is installed, verify that the tire hose is not stretched so tightly that a strain is introduced at either the valve stem or hubcap fitting. Also make sure the tire hose is not so loose that it contacts the wheel.

This illustration shows the valve stem pointing outboard (toward the viewer). Other valve stem orientations could be supplied by the wheel manufacturer. Do not rotate or otherwise alter the orientation of the valve stem as supplied from the wheel manufacturer. Valve stem orientation is not critical to TIREMAX performance as long as the hose is routed as noted above.

Check to ensure that no portion of the tire hose extends further outboard than the outer face of the wheel. If this occurs, contact Hendrickson for instructions on how to route the hoses to avoid this.

NOTE: For dual wheel configurations, proper clocking is particularly important since two wheels (inner and outer) must be properly oriented for proper installation.

Figure 23. Properly clocking the wheels to prevent the hoses from rubbing

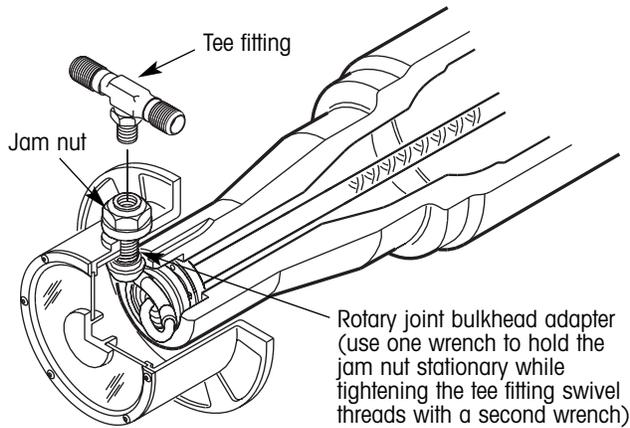
NOTE: All air lines coming into and going out of the controller assembly must be $\frac{3}{8}$ inch, and all junctions of two or more $\frac{1}{4}$ -inch lines must increase to $\frac{3}{8}$ -inch line to maintain adequate air flow.

TIRE HOSE INSTALLATION

NOTE: Tire hoses must be connected directly to the tire valve stems and the tee fitting. Do not use valve stem extenders.

1. Position the hubcap and wheel so the hoses will not stretch or rub on the wheel. Refer to figure 23.

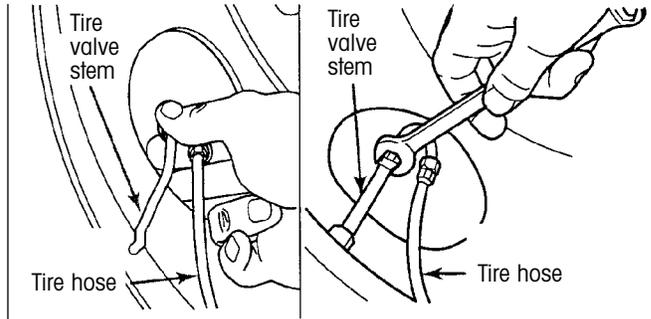
CAUTION: The wheel must be properly "clocked" to the hubcap to prevent the hoses from rubbing on the wheel (figure 23). Failure to do so may result in hose failure.



NOTE: A dual wheel tee fitting is shown in the illustration above, but the installation is the same for elbow-style tee fittings used on super single wheel configurations.

Figure 23a. Tee installation

2. Screw the tee fitting onto the rotary joint bulkhead adapter (figure 23a) and tighten the swivel threads to 130 ±10 in.lbs. of torque. Use two wrenches to achieve the final torque value. Use one wrench to hold the jam nut on the rotary joint bulkhead adapter stationary and use the second wrench to tighten the tee fitting swivel threads to the final torque value.



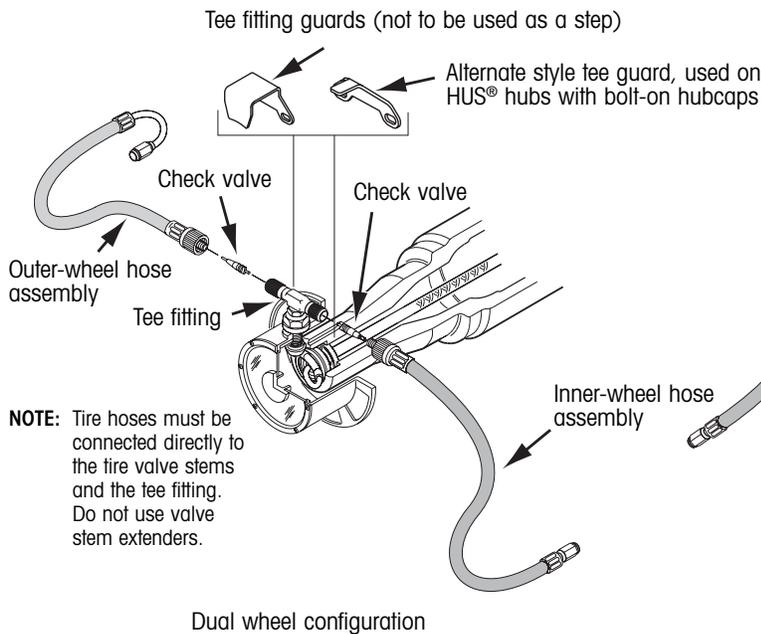
Tighten finger tight...

then use a wrench to tighten an additional one-half turn

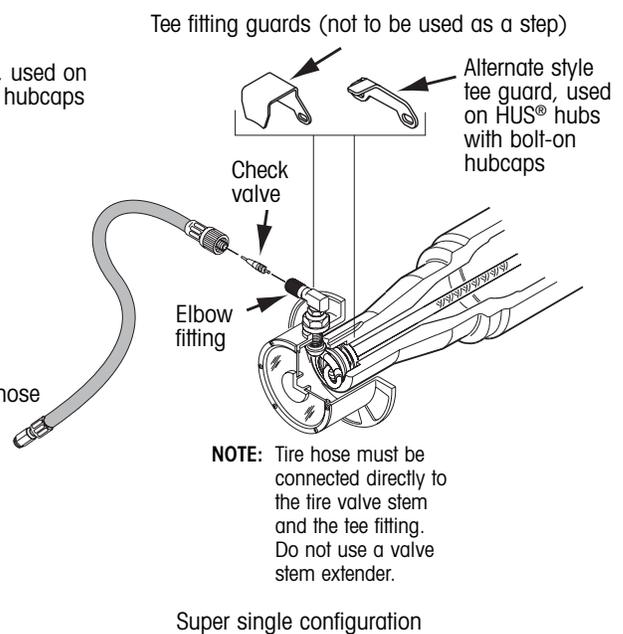
Figure 24a. Attaching the tire hose to the tire valve stem

One way to approximate 130 ±10 in. lbs. of torque is to tighten the tee fitting swivel threads hand tight and then use the two-wrench method as described previously to tighten the swivel threads one additional turn. Hendrickson recommends tightening to the stated torque value, but if you use the approximate method, make sure the tee fitting cannot be rotated freely within the bulkhead fitting after the additional one full turn.

3. Attach the tire hose(s) to the tire valve stem(s) and tighten finger tight (figure 24a).



Dual wheel configuration



Super single configuration

Figure 24. Tire hose, check valve and tee fitting guard installation



NOTE: Tire hoses must be connected directly to the fire valve stems and the tee fitting. Do not use valve stem extenders.

- Using a 7/16-inch wrench, tighten the tire hose / valve stem connection an additional one-half turn (figure 24a). **Do not overtighten this connection.** The hose and tee connections are tight enough when moving the hose back and forth does not cause the connection to move.

CAUTION: **DO NOT overtighten the tire hose(s) on the tire valve stem(s). Doing so may damage the tire hose internal gasket, causing a leak or decreased system performance. Only tighten the connection an additional one-half turn with the wrench.**

- Attach tire hose and check valve assemblies to the tee or elbow fitting and tighten finger tight (figure 24). Using pliers, carefully and gently verify that the hose connection is tight.

CAUTION: **DO NOT overtighten the knurled tire hose nut. Doing so will bend the tee / elbow fitting stem and compromise the integrity of internal tee / elbow fitting components. Do not damage knurled finish on tire hose nut. Doing so will make tire hose removal extremely difficult.**

Recheck the tire hose connections at the valve stems. Verify that the tire hose / valve stem connection did not loosen during the tire hose / tee fitting connection process.

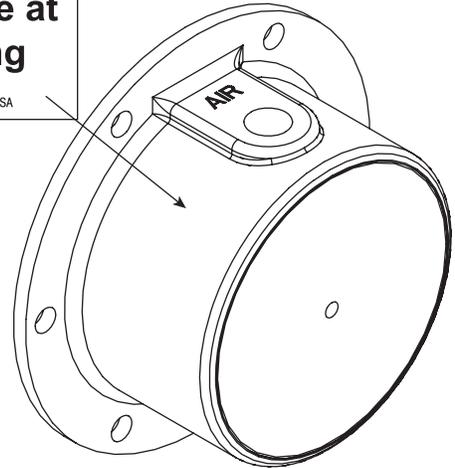


Figure 25a. Recommended decal mounting location

After assembly is complete, the tire hose / valve stem connection (and all other air system connections) will be checked for leaks using the system integrity check found on page 33.

NOTE: Simply spraying the connections to look for leaks will not work. Use a commercially available leak detector solution and the system integrity check to verify airtight connections.

- Attach the tee fitting guard. Remove the two hub cap bolts closest to the rotary joint bulkhead adapter, place the tee fitting guard over the rotary joint bulkhead adapter and reinstall the hub cap bolts through the holes in the tee fitting guard. Tighten to 12 - 18 ft. lbs. (16 - 24 N•m) of torque.

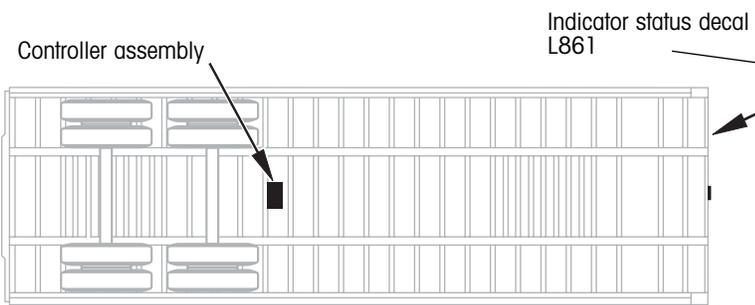


Figure 25. Recommended controller assembly mounting location and label placement

NOTE: The tee fitting guard is not used on HUS® hubs with screw-on hubcaps.

LABEL LOCATION

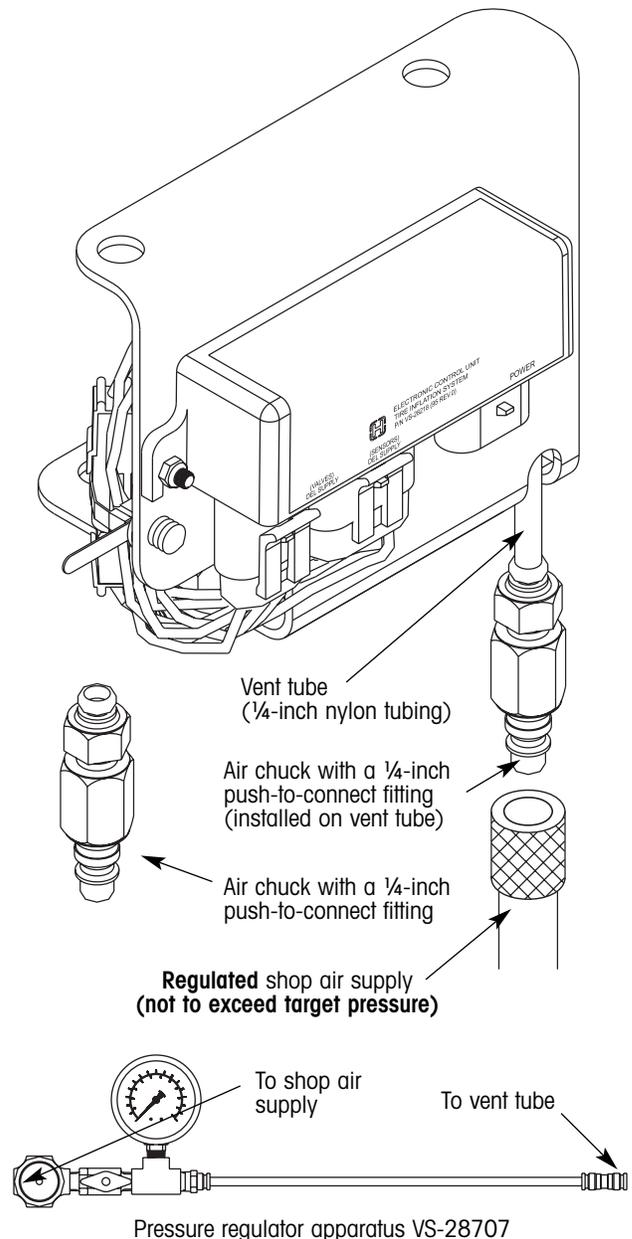
1. Install indicator status decal L861 at the front of the trailer near the indicator (figure 25).
2. If decal L918 is included in the literature packet, install it on the hubcap as shown in figure 25a.

SYSTEM INTEGRITY CHECK

After the installation is complete but before the trailer is put into service, all air system connections must be checked for leaks. This is done by manually pressurizing the system from a shop air supply and applying soapy water to all air connections. A hissing sound or bubbles in the soapy water will provide audio and visual indications of air leaks.

The TIREMAAX® EC system can be manually pressurized without applying electrical power. An air chuck with a 1/4-inch push-to-connect fitting can be attached to the vent tube on the delivery solenoid valve, conveniently allowing shop air to pressurize the system. Hendrickson offers a regulator apparatus specifically for this purpose (part number VS-28707, figure 26). The push-to-connect fitting also has the added benefit of being easy to install and remove from the vent tube. Manually pressurize the TIREMAAX EC system as follows:

1. Fill the trailer air system and set all tire pressures as close to target pressure as possible. With electrical power disconnected, manually measure pressure at each tire:
 - Disconnect tire hose from tee at hubcap (or from elbow at hubcap if super single configuration)
 - Use a conventional gauge to measure tire pressure at hose end
 - Reattach and firmly hand-tighten tire hose. Using pliers, carefully and gently verify that the hose connection is tight
2. With electrical power still disconnected, connect an air chuck with a 1/4-inch push-to-connect fitting to the vent tube on the delivery solenoid valve (figure 26).
3. Connect a **regulated** shop air supply to the air chuck. **Regulate the air supply pressure so it is at or below the desired target pressure.**



⚠ CAUTION: Potential overinflation hazard. When performing the system integrity check, the shop air supply **MUST NOT** be higher than the target pressure setting.

If the shop air supply is higher, the tires will overinflate during the system integrity check. No method exists to exhaust the overinflated tires, other than disconnecting the tire hoses and manually depressing the valve stem core at each tire.

Figure 26. Manually pressurizing the system to check for air leaks



The shop air supply provides a continuous source of air pressure to the system. This allows one person to thoroughly check all air-fitting connections for leaks.

4. Apply soapy water to all air-fitting connections. Bubbles in the soapy water will provide a visual indication of an air leak. Fix if necessary. All connections must be air tight.
5. Remove air supply and air chuck from the vent tube before applying electrical power. If electrical power is applied with the air supply still on the vent tube, the controller assembly will interpret this as a plugged vent tube and will produce a false error code.

An additional benefit of the system integrity check is balanced tire pressures. For example, assume that eight new tires were added to the trailer and the desired target tire pressure is 95 psi. The new tires could conceivably have pressures of 89, 91, 94 or anywhere near the desired 95 psi target pressure. While you are using the system integrity check to identify possible leaks, it will simultaneously inflate any low tires to the 95 psi target tire pressure (there will be no change to tires already at or above 95 psi).

SYSTEM SETUP

The TIREMAAX® EC controller is pre-programmed from the factory, therefore no additional setup is required. To program a pressure other than the factory setting, use the optional hand-held programming device (available from Hendrickson) and follow the instructions beginning on page 37.

NOTE: For TIREMAAX EC to function properly, the trailer air tank pressure must be higher than the target tire pressure. TIREMAAX EC is only capable of allowing available air tank pressure to reach the tires. **It is not capable of supplying pressure above the available air tank pressure.**

TRUBLESHOOTING

TRUBLESHOOTING INTRODUCTION

The system identifies certain fault conditions and reports them by illuminating the trailer mounted indicator. The operator is informed whenever a tire is low enough to require service (20 psi or more) or there is a fault in the system. When the indicator is on, additional troubleshooting information can be obtained through blink-codes flashed by the LED on the controller assembly ECU (figure 27). The blink codes are only displayed while the controller is powered and the control program is active. If the cause of a fault has been satisfactorily corrected, the controller will recognize the correction on the next reset cycle (10 minutes later in most cases) and turn off the indicator. If the system had been powered down to correct an issue, the controller will not show a fault when powered back up unless it finds the same fault again or a different fault.

The last six faults are stored in memory and can be displayed with the optional hand-held programming device. No more than six faults are stored. If more

than six faults occur, the newest fault simply overwrites the oldest.

BLINK-CODE DESCRIPTIONS

Blink codes provide a means to determine what possible faults exist without using any special tools. The following troubleshooting chart gives the LED blink code, the associated trailer mounted indicator response, a general description and possible causes and issues associated with the blink code.

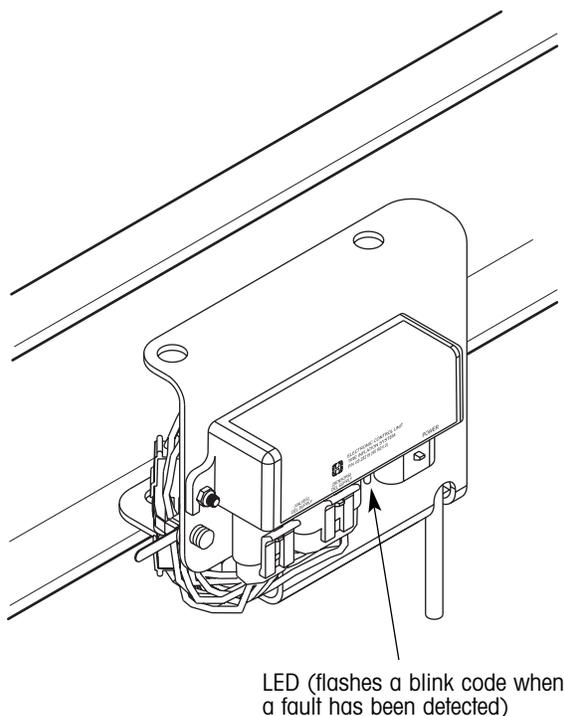


Figure 27. Location of LED on controller assembly ECU



TIREMAAX® EC LED Blink Codes			
LED	Indicator	Description	Possible Cause and Issues
Off	Off	No system power	Low battery, disconnected wire or no trailer power.
Constantly on	Off	System OK	Functioning normally. Adequate electrical power to controller. No tire less than 20 psi below target value.
1 blink	On	Tire 20 psi low	Low tire pressure detected (one or more tires are more than 20 psi below target value). Could be caused by a less-serious issue (trailer sitting idle for an extended period of time, significant temperature drop, etc.) or a more-serious issue (leaky tire hose fitting, leaky tire hose check valve, punctured tire, corroded tire bead seat, etc.). When low tire pressure is detected, the TIREMAAX EC system will attempt to inflate the tires to within 20 psi of target value for a period of 30 minutes. If accomplished within the 30 minute period, the blink code disappears. If unable to accomplish within the 30 minute period, the system assumes a more serious cause/issue has created the low pressure indication and generates blink code 2 or 3 (see below).
2 blinks	On	Check valve leak	Tire hose check valve leaking or not properly seated. Contamination is preventing the check valve from seating and system is unable to reset check valve. System is powering the delivery solenoid valve to seal the exhaust vent, keeping the rotary union pressurized. Tire will deflate when electrical power is turned off. A less likely possibility is a leaking supply solenoid valve.
3 blinks	On	Line/tire leak	Air line is leaking between controller and tire hoses (program unable to enter tire pressure check and fill mode). Other possibilities are punctured tire, ruptured air line, tire off rim, corroded tire bead seat, ruptured tire hose, loose air fittings, no delivery pressure sensor signal or separated rotary union.
4 blinks	Off	No pressure signal/low trailer air tank	Low or no trailer air tank pressure, supply pressure sensor failed at 0 psi or supply pressure sensor not receiving power. Trailer air tank pressure lower than target tire pressure. Trailer just hooked up, weak compressor or target tire pressure higher than air system capability. Pressure protection valve may not be functioning properly.

TIREMAAX® EC LED Blink Codes (Continued)			
LED	Indicator	Description	Possible Cause and Issues
5 blinks	On	Solenoid/pressure sensor malfunction	<p>If you are getting this blink code, make sure the air supply is removed from the vent tube before applying electrical power (refer to System Integrity Check on page 33 for complete details).</p> <p>If blink code persists, replace the controller assembly.</p>
6 blinks	On	Emergency fill / very low tire pressure	<p>The system has found one or more tires with very low air pressure (less than 20 psi), or an air line leak/failure has occurred. The system will determine if air lines and tires are capable of holding air pressure. If pressure can be held, the system will attempt to inflate the tires to within 20 psi of target value, and the blink code disappears. If pressure cannot be held, the system generates blink code 3 at the next system check (10 minutes later).</p>

HAND-HELD PROGRAMMING DEVICE OPERATION INTRODUCTION

The optional hand-held programming device is used to:

- Program a target pressure setting other than the factory preset value
- Run diagnostics
- Display fault code history

NOTE: The hand-held programming device is not required to identify the fault that caused the trailer mounted indicator to illuminate. Before power is removed from the trailer, the LED on the controller assembly will blink a code associated with the fault that caused the indicator to illuminate (refer to the blink code descriptions on page 36 for more details). However if the blink code was not observed before power was removed from the trailer, the hand-held programming device will be needed to reveal the last fault code stored before power was removed.

To use the hand-held programming device for any of these tasks, it must first be connected to the TIREMAAX® EC controller assembly, between the pressure sensors and the ECU. When connected, the

hand-held programming device will be powered from the trailer power circuit and is ready for use. No additional power supplies or on/off switches are required to use the hand-held programming device. Use the following procedure to connect the hand-held programming device to the controller assembly.

IMPORTANT: Do not vary the connection order from what is presented in the following steps. The last connection made must be the four-pin trailer power cable into the hand-held programming device.

HAND-HELD PROGRAMMING DEVICE CONNECT PROCEDURE

1. Power the trailer.

The hand-held programming device derives power from the trailer, so the trailer must be powered for the hand-held programming device to function.

NOTE: Do not plug the four-pin trailer power cable into the hand held programming device at this time. This connection must be the last one made in order for the hand-held programming device to properly enter the target pressure setting mode.

2. Pressurize the trailer air tank (optional).

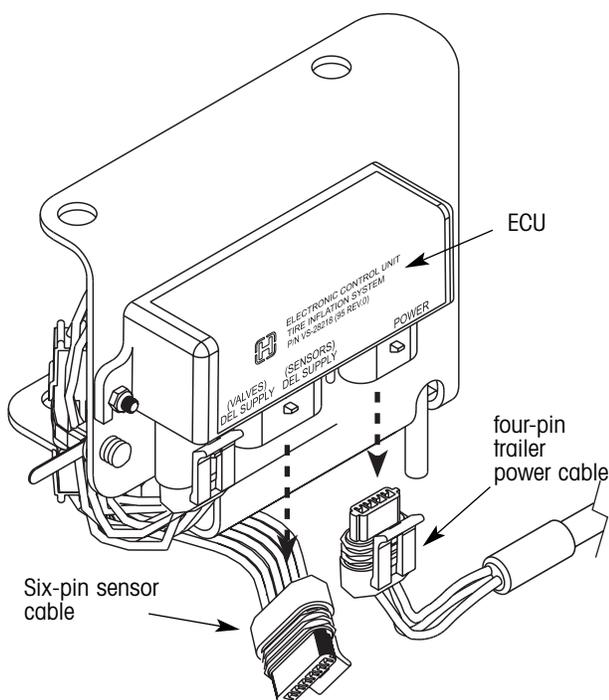


Figure 28. Unplugging the power and sensor cables

If you wish to run the diagnostics to functionally check the solenoid valves and pressure sensors, the trailer must have enough air pressure (90 psi) to open the pressure protection valve on the trailer air tank. If you do not wish to run the diagnostics, this step can be skipped.

⚠ CAUTION: Potential overinflation hazard. When performing diagnostics, the trailer air tank pressure **MUST NOT** be higher than the target pressure setting.

If the trailer air tank pressure is higher, the tires will overinflate when

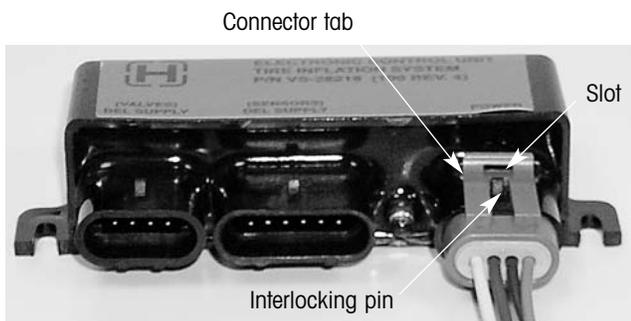


Figure 29. Typical connector items

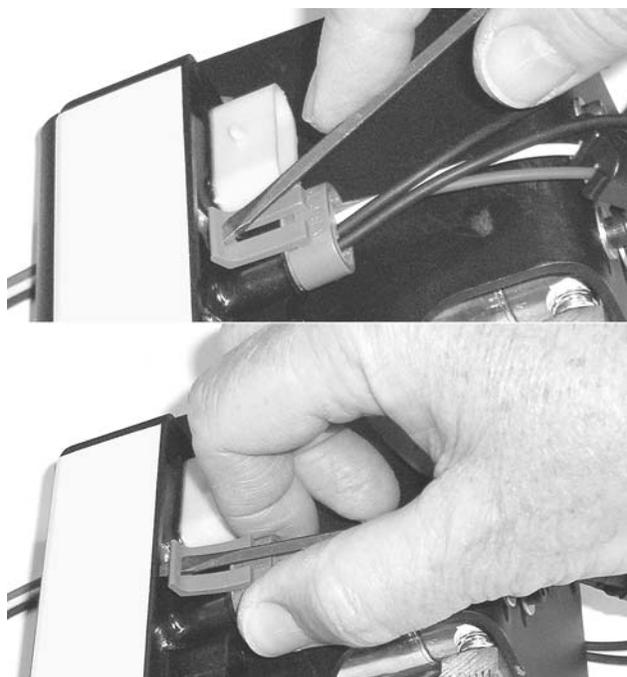


Figure 30. Connector unplugging technique

both supply and delivery solenoid valves are opened at the same time. No method exists to exhaust the overinflated tires, other than disconnecting the tire hoses and manually depressing the valve stem core at each tire.

- Unplug the four-pin trailer power cable from the controller assembly ECU (figure 28).

NOTE: To unplug the connectors, insert the tip of a small flat blade screwdriver into the slot on the connector tab and **GENTLY** push down on the screwdriver to disengage the tab from the interlocking pin (figures 29 and 30). With the tab disengaged, gently pull the connector apart (figure 30). **DO NOT** overbend the tab. Even though the connector is made of a resilient plastic, it is possible to damage the connector if excessive force is used.

- Unplug the six-pin sensor cable from the controller assembly ECU (figure 28).
- Plug the four-pin connector from the hand-held programming device into the open four-pin socket on the controller assembly ECU

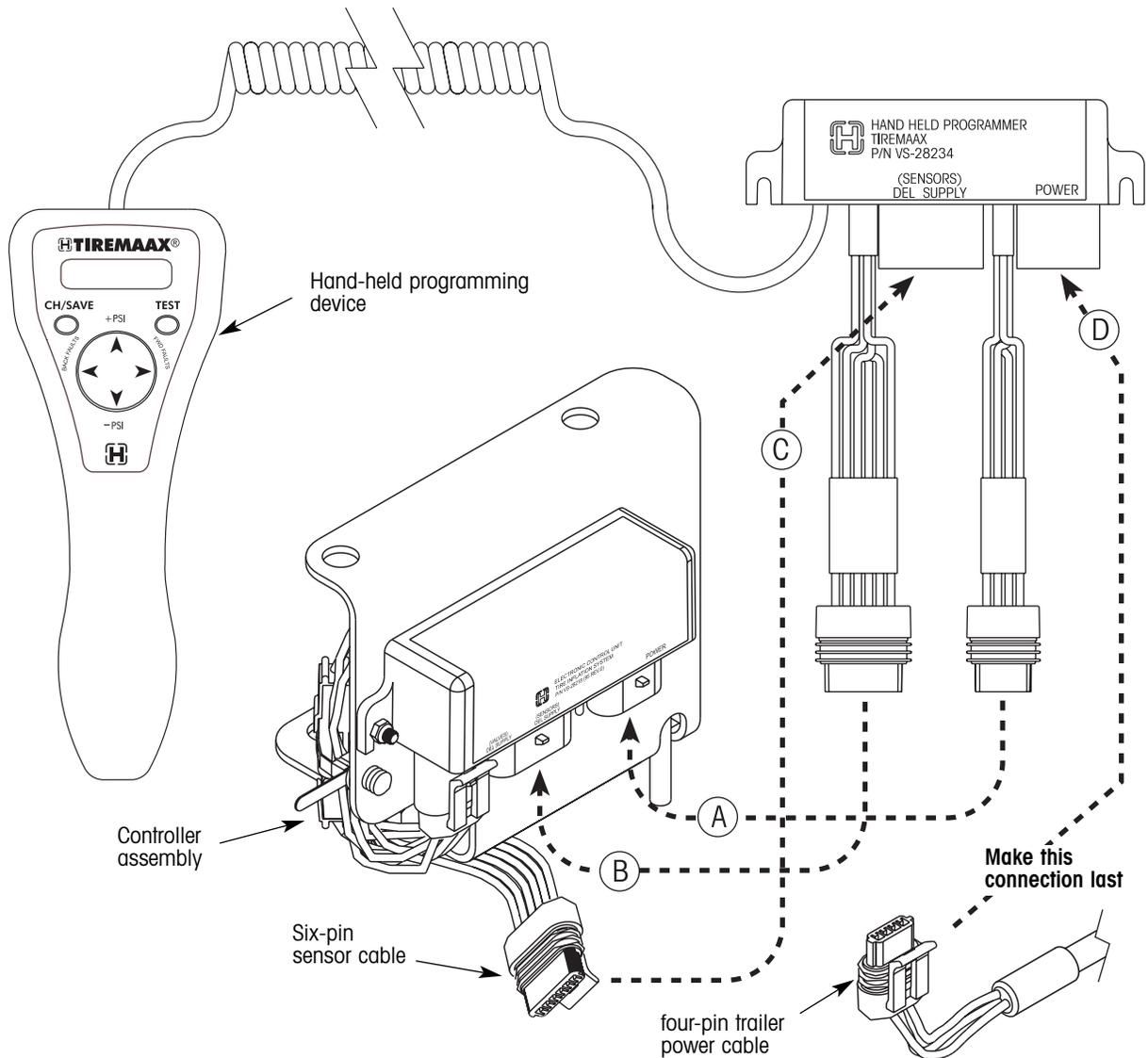


Figure 31. Connecting the hand-held programming device to the controller assembly ECU

6. Plug the six-pin connector from the hand-held programming device into the open six-pin socket on the controller assembly ECU (connection B, figure 31).
7. Plug the six-pin sensor cable from the controller assembly into the six-pin socket on the hand-held programming device (connection C, figure 31).
8. Plug the four-pin trailer power cable into the four-pin socket on the hand-held programming device (connection D, figure 31).



When connected as described, the hand-held programming device will automatically enter the tire pressure setting mode. The tire pressure setting mode displays the present target pressure setting in the upper right corner of the display (figure 32).

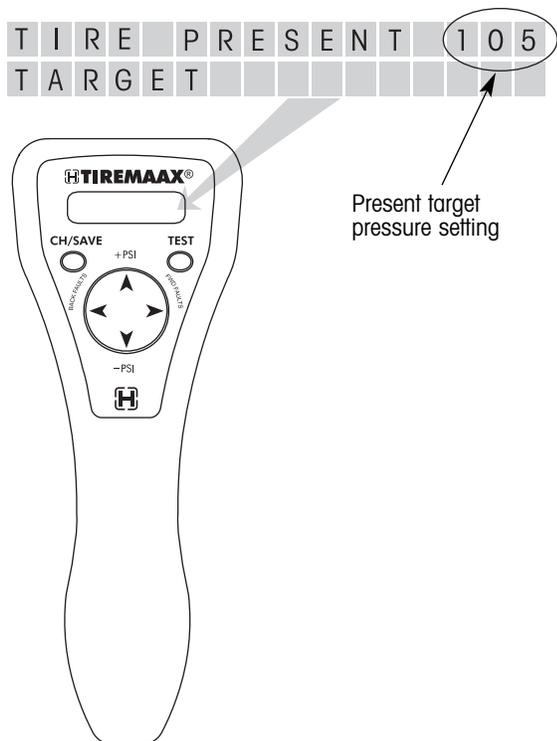


Figure 32. Initial target pressure setting mode display

If you don't see this screen on the hand-held programming device, unplug everything and reconnect the hand-held programming device in the order previously described. Make sure the last connection made is the four-pin trailer power cable to the hand-held programming device.

The hand-held programming device has three operational modes:

- target pressure setting mode
- diagnostic test mode
- fault code history mode

The target pressure setting mode is always the first mode entered when the hand-held programming device is powered. To navigate to the other operational modes, use the TEST button, BACK FAULTS or FWD FAULTS arrows, and the +PSI or -PSI arrows as shown in figure 33.

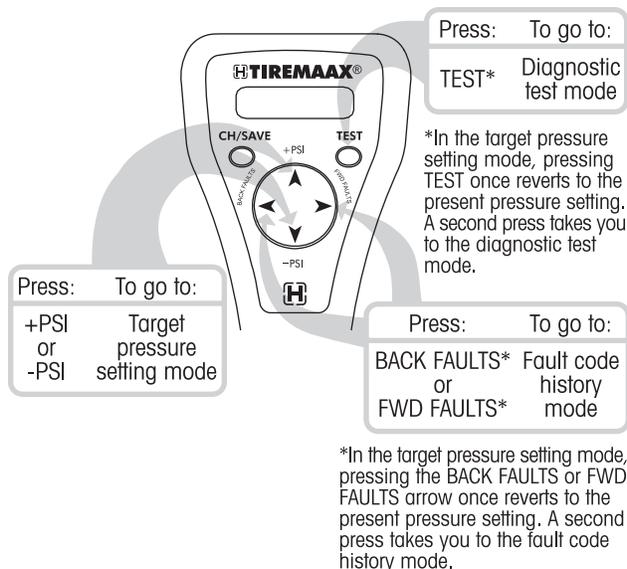


Figure 33. Navigating through the operational modes

TARGET PRESSURE SETTING

The target pressure setting mode is used to program a different tire pressure setting into the TIREMAAX® EC controller.

NOTE: For TIREMAAX EC to function properly, the trailer air tank pressure must be higher than the target tire pressure. TIREMAAX EC is only capable of allowing available air tank pressure to reach the tires. It is not capable of supplying pressure above the available air tank pressure.

When the target pressure setting mode is entered, the display shows the present target pressure setting (figure 32). This screen provides a visual indication that you are in the target pressure setting mode.

1. To select a different pressure setting:

Press the +PSI arrow on the direction pad to increase the target pressure setting or the -PSI arrow on the direction pad to decrease the target pressure setting (figure 34).

Each time the +PSI or -PSI arrow is pressed, the target pressure setting is raised or lowered by five psi and the display shows the newly selected pressure setting (figure 34). Possible target pressure settings are 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125 and 130.

- Press the TEST button to cancel or reset the new target pressure setting. The lower right corner of the display will clear and the upper right corner of the display will revert to the present (or saved) target pressure setting (the same pressure setting that was in effect when the target pressure setting mode was first entered).

In the target pressure setting mode, before the CH/SAVE button is pressed, one press of the TEST button, BACK FAULTS or FWD FAULTS arrow acts as a "reset" or "do over" function. A second press of the TEST button changes focus to the diagnostic mode, and a second press of the BACK FAULTS or FWD FAULTS arrow changes focus to the fault code history mode.

- Press the CH/SAVE (change/save) button to save the new target pressure setting (figure 35).

The display will show the newly selected pressure setting in the upper right corner of the display as the present target pressure setting.

- Disconnect the hand-held programming device or go to one of the other operational modes.

If you wish to disconnect the hand-held programming device, refer to the disconnect procedure on page 45 (the four-pin trailer power cable must be the first one disconnected from the hand-held programming device and the last one connected to the controller assembly ECU).

T	I	R	E	P	R	E	S	E	N	T	9	5
T	A	R	G	E	T							

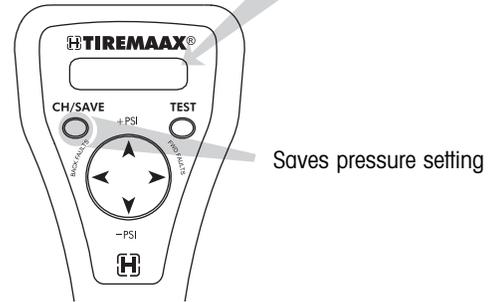


Figure 35. Saving the new target pressure setting

If you wish to go to the diagnostic test mode, press the TEST button.

If you wish to go to the fault code history mode, press either the BACK FAULTS or FWD FAULTS arrow on the direction pad.

T	I	R	E	P	R	E	S	E	N	T	1	0	5
T	A	R	G	E	T	N	E	W	9	5			

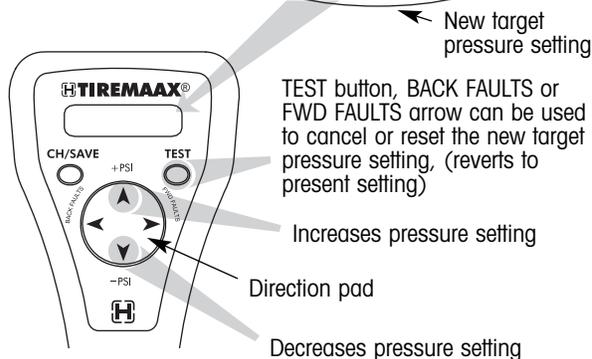


Figure 34. Selecting a different target pressure setting



DIAGNOSTIC TEST OPERATION

The diagnostic test mode can be used to toggle the trailer mounted indicator and controller assembly LED, the delivery solenoid valve and the supply solenoid valve on and off to see if these components respond properly. The diagnostic test mode also displays delivery and supply pressure sensor outputs in psi.

NOTE: Temporarily disconnect (unscrew) a wheel hose at the tee fitting on the wheel after entering the diagnostic test mode. This will prevent inadvertent tire overinflation during solenoid valve response testing when both supply and delivery solenoids are opened at the same time.

When the diagnostic test mode is entered, the display shows the supply and delivery pressure sensor outputs and the current state of the trailer mounted indicator (figure 36). This screen provides a visual indication that you are in the diagnostic test mode.

- To test the trailer mounted indicator and controller assembly LED response:

S	U	P		D	E	L						L	A	M	P
1	3	0				0							O	F	F

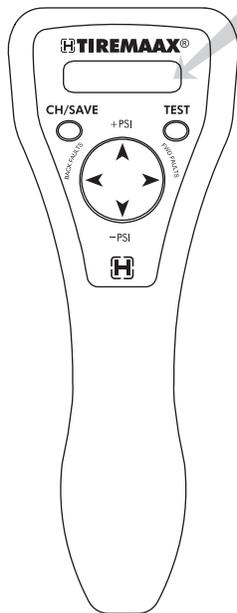
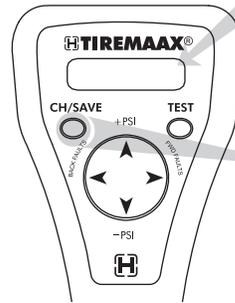


Figure 36. Initial diagnostic test mode display

S	U	P		D	E	L						L	A	M	P
1	3	0				0							O	N	

Display toggles with each press of the CH/SAVE button

S	U	P		D	E	L						L	A	M	P
1	3	0				0							O	F	F



Toggles indicator

Figure 37. Testing the trailer mounted indicator and controller assembly LED response

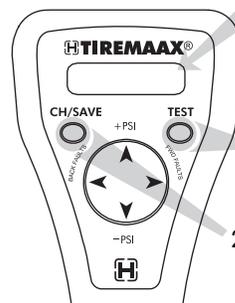
Press the CH/SAVE (change/save) button to toggle the trailer mounted indicator and LED from off to on (figure 37). Press the CH/SAVE button again to toggle from on to off.

The trailer mounted indicator and controller assembly LED will remain in the last state chosen (either on or off) when the diagnostic focus is changed in the next step.

S	U	P		D	E	L						V	A	L	V	E
1	3	0				0		S	U	P		O	F	F		

Display toggles with each press of the CH/SAVE button

S	U	P		D	E	L						V	A	L	V	E
1	3	0				0		S	U	P		O	N			



1. Shifts focus to supply solenoid (SUP)

2. Toggles supply solenoid valve (SUP) on or off

Figure 38. Testing the supply solenoid valve (SUP) response

- To test the supply solenoid valve response, press the TEST button (figure 38). The diagnostic focus shifts from the indicator to the supply solenoid valve.

Press the CH/SAVE (change/save) button to toggle the supply solenoid valve from off to on. Press the CH/SAVE button again to toggle the valve from on to off (figure 38).

CAUTION: Potential overinflation hazard. When performing diagnostics, the trailer air tank pressure **MUST NOT** be higher than the target pressure setting.

If the trailer air tank pressure is higher, the tires will overinflate when both supply and delivery solenoid valves are opened at the same time. No method exists to exhaust the overinflated tires, other than disconnecting the tire hoses and manually depressing the valve stem core at each tire.

The supply solenoid valve will remain in the last state chosen (either on or off) when the diagnostic focus is changed in the next step.

- To test the delivery solenoid valve response, press the TEST button (figure 39). The diagnostic focus shifts from the supply solenoid valve to the delivery solenoid valve.

Press the CH/SAVE button to toggle the delivery solenoid valve from off to on. Press the CH/SAVE button again to toggle the valve from on to off (figure 39).

The delivery solenoid valve will remain in the last state chosen (either on or off) when shifting to another mode of operation.

When indicator and solenoid valve response testing is complete, set all responses to the OFF state and reconnect the wheel hose at the tee fitting.

- Disconnect the hand-held programming device or go to one of the other operational modes.

If you wish to disconnect the hand-held programming device, refer to the disconnect

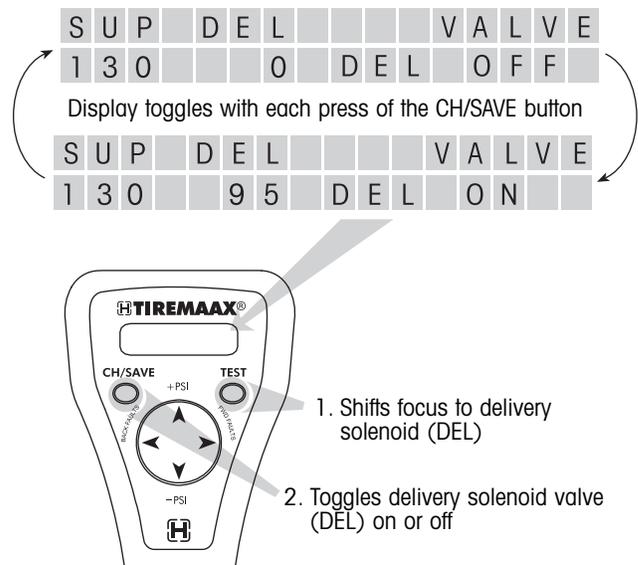


Figure 39. Testing the delivery solenoid valve (DEL) response

procedure on page 45 (the four-pin trailer power cable must be the first one disconnected from the hand-held programming device and the last one connected to the controller assembly ECU).

If you wish to go to the target pressure setting mode, press the +PSI or -PSI arrow on the direction pad.

If you wish to go to the fault code history mode, press the BACK FAULTS or FWD FAULTS arrow on the direction pad.

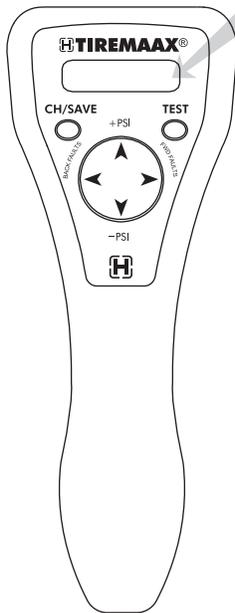


FAULT CODE HISTORY OPERATION

The fault code history mode is used to review fault codes that have been stored in the TIREMAAX® EC controller.

When the fault code history mode is entered, the display will show the last recorded fault (figure 40). This screen provides a visual indication that you are in the fault code history mode.

L A S T F A U L T C O D E X
 X X X X X X X X X X X X X X X X



(The X's are specific to each fault code)

Figure 40. Initial fault code history mode display

There are five possible fault codes that can be displayed in the fault code history mode (figure 41). The upper right corner of the fault code display shows the fault code number. This number will match the number of times the LED on the controller assembly blinks when a fault is detected. The bottom line of the display contains a brief description of the fault. Refer to the Blink Code Descriptions section on page 36 for additional fault details.

1. Press the BACK FAULTS arrow on the direction pad to go back through the six most-recently recorded faults (figure 42).

C O D E 1
 T I R E 1 0 P S I L O W

C O D E 2
 C H E C K V A L V E L E A K

C O D E 3
 L I N E / T I R E L E A K

C O D E 4
 N O P S I / L O W T A N K

C O D E 5
 B A D S E N S O R / V A L V E

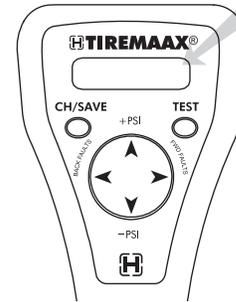


Figure 41. Possible fault codes

2. Press the FWD FAULTS arrow on the direction pad to go forward through the six most-recently recorded faults (figure 42).

The upper left corner of the display identifies the fault by its relationship to the last fault (figure 42).

After reviewing the fault code history, the nature of the fault can be identified and the following steps can be taken to correct the fault:

- a. Disconnect the hand-held programming device and reconnect the proper cables to the ECU on the controller assembly, but do not apply power to the trailer.
- b. Fix the fault and pressurize the trailer air tank to at least five psi above the target pressure.
- c. After the trailer air tank is adequately pressurized, apply power to the trailer.

L	A	S	T		F	A	U	L	T		C	O	D	E	2
C	H	E	C	K		V	A	L	V	E		L	E	A	K

2	N	D		F	A	U	L	T		C	O	D	E	4	
N	O		P	S	I	/		L	O	W		T	A	N	K

3	R	D		F	A	U	L	T		C	O	D	E	4	
N	O		P	S	I	/		L	O	W		T	A	N	K

4	T	H		F	A	U	L	T		C	O	D	E	1	
T	I	R	E		T	O	P	S	I		L	O	W		

⋮

6	T	H		F	A	U	L	T		C	O	D	E	3	
L	I	N	E		/		T	I	R	E		L	E	A	K

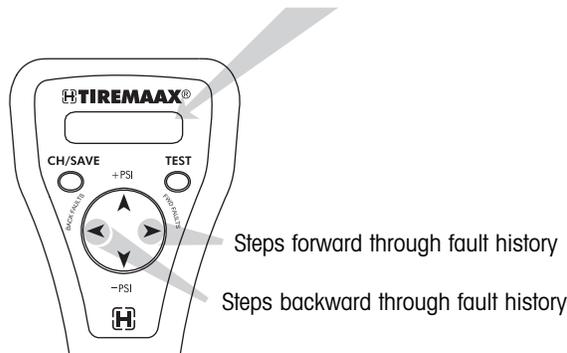


Figure 42. Stepping through the fault code history

When the controller is repowered, it will go into its normal operating mode. As the controller proceeds through its system routines, it will assume the fault has been corrected.

If the fault was not fixed, the controller will detect it and the LED on the controller assembly will blink the fault code. This LED blink code will be adequate to diagnose issues until resolved, without needing to re-attach the hand-held programming device. Every time power is removed from the controller and then reapplied, it will assume the fault has been corrected and will not repeat a fault code unless it detects the same one again.

A fault code will not be stored as a repeated code unless the same fault is the first one recorded after a power up. If the same fault is displayed in two consecutive locations in the fault code history, the fault was re-detected after controller power was reconnected.

It is not possible to clear faults from the register. When a new fault is detected, it becomes the last fault and all pre-existing faults shift one location. The last location, the sixth fault, gets overwritten.

3. Disconnect the hand-held programming device or go to one of the other operational modes.

If you wish to disconnect the hand-held programming device, refer to the following disconnect procedure (the four-pin trailer power cable must be the first one disconnected from the hand-held programming device and the last one connected to the controller assembly ECU).

If you wish to go to the target pressure setting mode, press the +PSI or -PSI arrow on the direction pad.

If you wish to go to the diagnostic test mode, press the TEST button twice. Pressing the TEST button once takes you to the target pressure setting mode. The second press will take you to the diagnostic test mode.

HAND-HELD PROGRAMMING DEVICE DISCONNECT PROCEDURE

1. Unplug the four-pin trailer power cable from the hand-held programming device. Do not plug this connector back into the controller assembly ECU at this time, it will be reconnected in step six.
2. Unplug the six-pin sensor cable from the hand-held programming device.
3. Unplug the hand-held programming device six-pin connector from the controller assembly ECU.
4. Unplug the hand-held programming device four-pin connector from the controller assembly ECU.
5. Plug the six-pin sensor cable back into the six-pin connector on the controller assembly ECU.
6. Plug the four-pin trailer power cable back into the four-pin connector on the controller assembly ECU.
7. Observe the LED on the controller assembly. Make sure it does not blink a fault code associated with loose or leaking tire hoses.



SERVICE PROCEDURES
WIRING HARNESS REPLACEMENT

Two wiring harnesses are available with TIREMAAX® EC: a standard, three-wire, 18-inch long harness and a premium, ABS-ready, 15-foot long harness.

With the standard wiring harness, replacement is simply a matter of disconnecting the existing harness and connecting the new one. On the standard harness, the red wire is the indicator power lead, the white wire is vehicle ground and the blue wire is 12 VDC vehicle power. The termination of these wires is the responsibility of the harness installer. Terminals and connectors must be weatherproof, and corrosion prevention compound must be used on all connectors. Refer to TMC RP 113, 114 and 704 for recommended wiring practices.

Use the following procedure to replace the premium wiring harness.

REMOVAL

1. Disconnect the five-pin ABS connector (figure 43).
2. Disconnect the five-pin power supply connector.
3. Disconnect the indicator connection.
4. Disconnect the ECU connector.

INSTALLATION

1. Connect the five-pin ABS connector.
2. Connect the five-pin power supply connector.
3. Connect the indicator connector.
4. Connect the ECU connector.

These components not included with TIREMAAX® EC

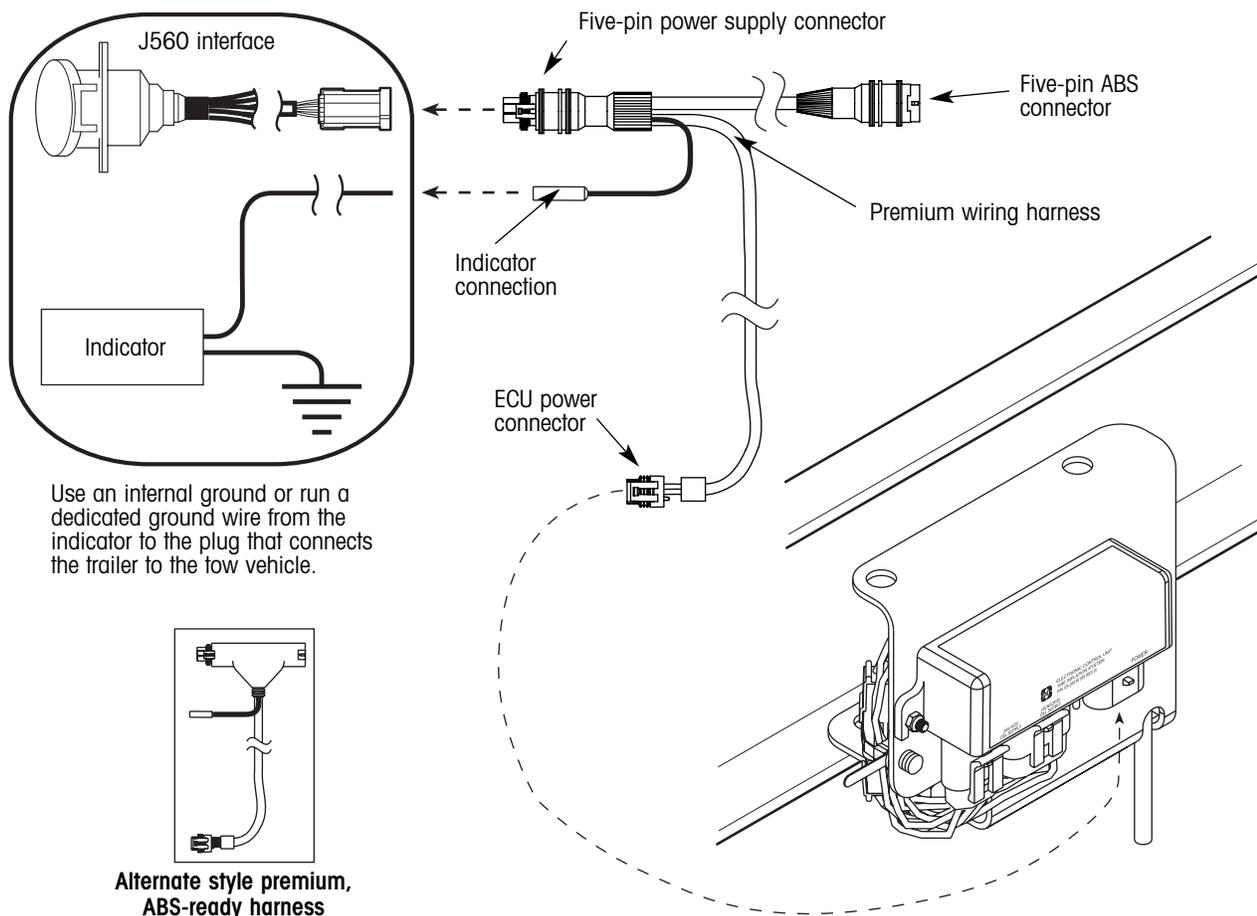


Figure 43. Premium wiring harness replacement

CONTROLLER ASSEMBLY REPLACEMENT

This procedure replaces the controller assembly as one complete unit.

REMOVAL

1. Exhaust the trailer air tank.
2. Disconnect the ECU power connector (figure 44).
3. Disconnect the air supply line. Label the line "IN" to avoid confusion when installing the new controller assembly.
4. Disconnect the air delivery line. Label the line "OUT" to avoid confusion when the new controller assembly is installed.

5. If reusing the air line fittings, remove them from the tee fittings on the controller assembly.
6. Remove the two bracket-to-frame mounting bolts.

INSTALLATION

1. Install the two bracket-to-frame mounting bolts.
2. If necessary, apply thread sealant to air fittings.
3. Install air line fittings on tee fittings.
4. Connect the air IN and air OUT lines to the appropriate ports. Test for air leaks by listening or using soapy water.

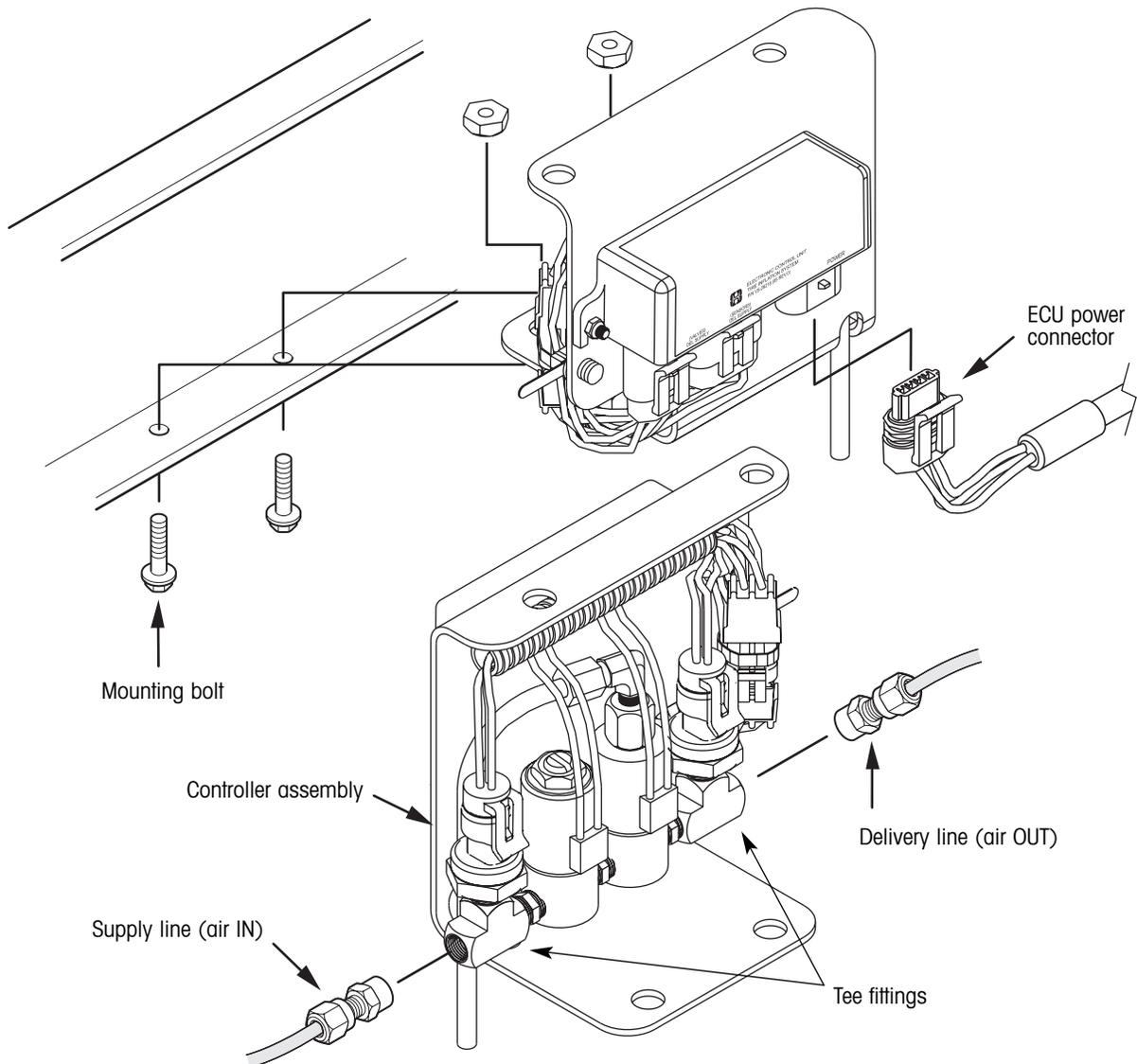


Figure 44. Controller assembly replacement



5. Connect the ECU connector.
6. Recharge the trailer air system.
7. Manually measure tire pressure. Refer to the section titled MANUALLY CHECKING TIRE PRESSURE on page 6 for complete manual tire pressure measuring instructions.
8. Verify that the target tire pressure matches the desired operating tire pressure.

ELECTRONIC CONTROL UNIT REPLACEMENT

REMOVAL

1. Disconnect trailer from power source.
2. Disconnect all three ECU connectors (figure 45).
3. Remove the two ECU-to-bracket mounting screws and remove the ECU.

INSTALLATION

1. Install the replacement ECU and secure with the two ECU-to-bracket mounting screws and washers.
2. Connect the ECU connectors.
3. Apply power to the trailer (blue circuit on the seven-pin trailer connector). The replacement

ECU comes from the factory with a pre-set target pressure. No further programming is required unless a target pressure setting other than the factory setting is desired. In that case a hand-held programming device, available from Hendrickson, can be used to program a new target pressure setting.

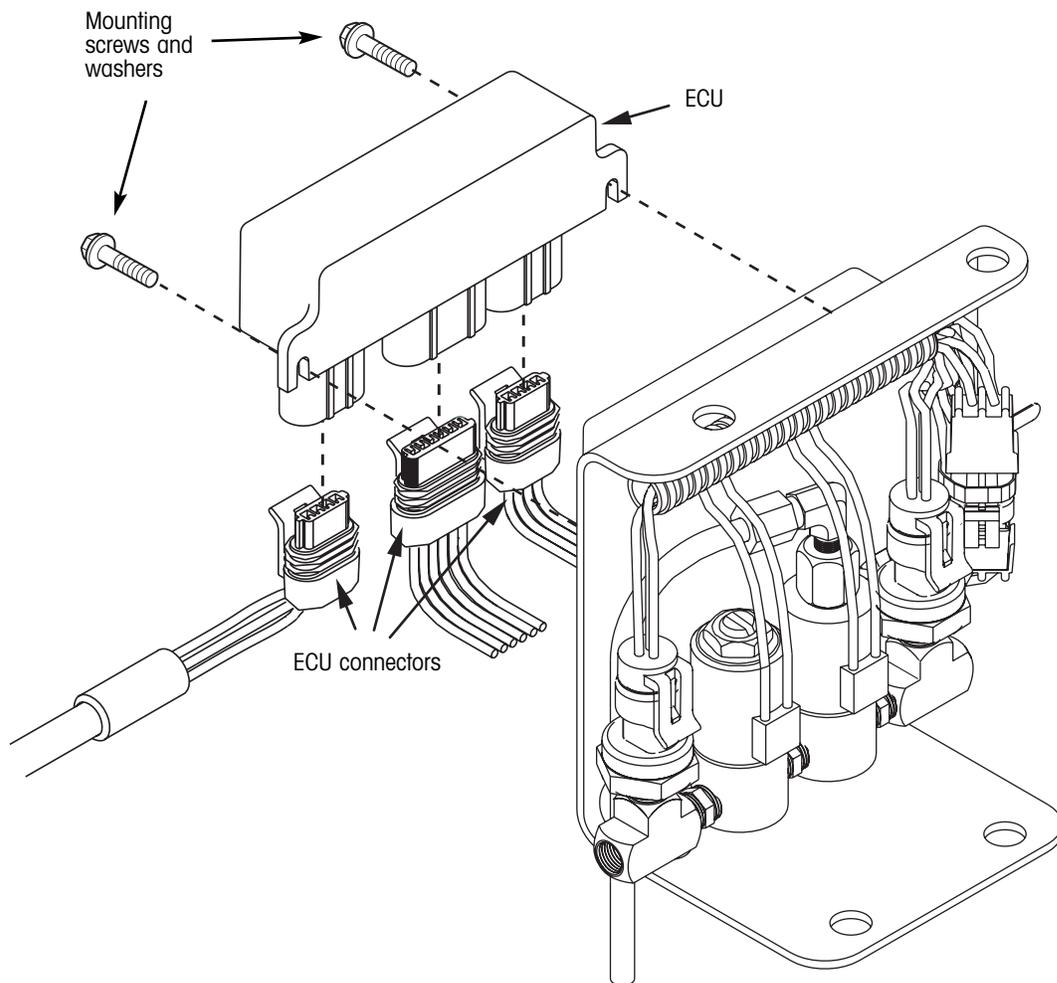


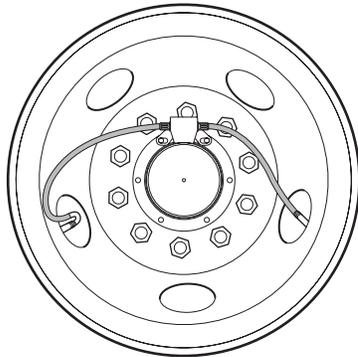
Figure 45. ECU replacement



WHEEL REMOVAL AND INSTALLATION

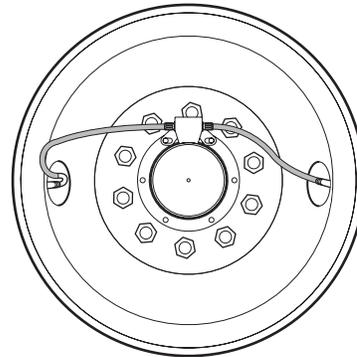
Disable the system before wheel removal. This will eliminate potential faults if the system attempts to check tire pressure while the tire hoses are disconnected.

1. Turn vehicle off and disconnect the tire hose(s) at the tee on the hubcap (figure 46).



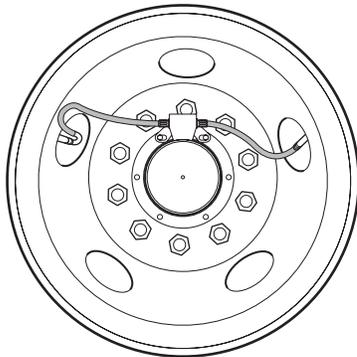
Dual wheel configuration clock "A"

For 17.5- or 22.5-inch, five-hole or five-spoked wheels



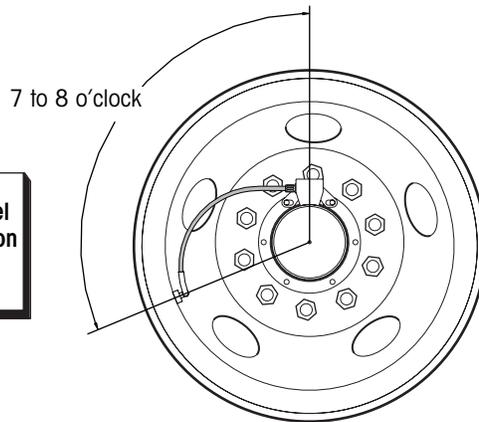
Dual wheel configuration clock "C"

For any size, two-hole or four / six-spoked wheels



Dual wheel configuration clock "B"

For 19.5- or 24.5-inch, five-hole or five-spoked wheels



Super single wheel configuration

With the hubcap fitting in the 12 o'clock position, the valve stem should be located between 7 and 8 o'clock for most applications. When the wheel is installed, verify that the tire hose is not stretched so tightly that a strain is introduced at either the valve stem or hubcap fitting. Also make sure the tire hose is not so loose that it contacts the wheel.

This illustration shows the valve stem pointing outboard (toward the viewer). Other valve stem orientations could be supplied by the wheel manufacturer. Do not rotate or otherwise alter the orientation of the valve stem as supplied from the wheel manufacturer. Valve stem orientation is not critical to TIREMAX performance as long as the hose is routed as noted above.

Check to ensure that no portion of the tire hose extends further outboard than the outer face of the wheel. If this occurs, contact Hendrickson for instructions on how to route the hoses to avoid this.

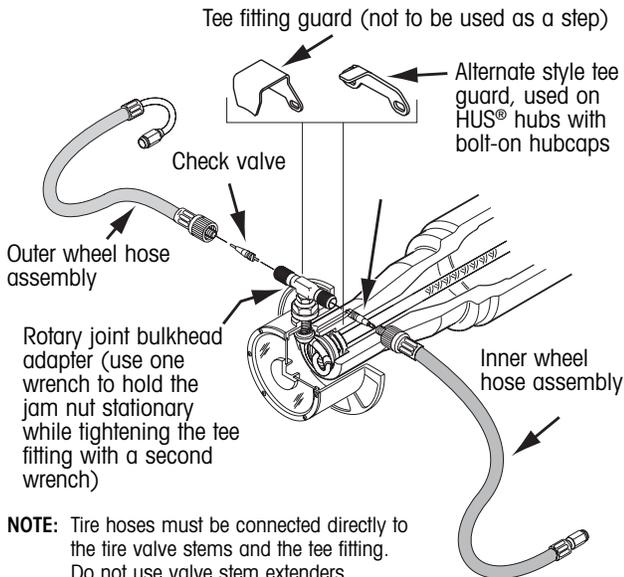


Figure 46. Tire removal and installation

NOTE: There will be no air loss when the tire hoses are disconnected at the tee since a check valve is located in each tire hose.

NOTE: Steps 2 through 4 describe the complete removal of the tee fitting guard and tee fitting when removing the wheel. As an alternative, the wheel can be removed with the tee fitting guard and tee fitting still installed on the hubcap **as long as the wheel assembly is rotated so that the tee fitting is in the six o'clock position.** With the tee fitting in the six o'clock position, it is more protected from potential damage when the wheel assembly drops down onto the hub after clearing the wheel studs. Note that if a wheel dolly is being used, the wheel must be lowered to clear the tee fitting.

2. Remove the two hubcap bolts securing the tee fitting guard to the wheel end and remove the tee fitting guard.

NOTE: The tee fitting guard may not be used on all TIREMAAX® EC systems. For example, it is not used on HUS® hubs with screw-on hubcaps.

3. Remove the tee from the hubcap fitting. Cover (plug) the hubcap fitting to prevent contamination from entering the system.
4. On dual-wheel configurations, observe and record the orientation of the wheel to the hub before removal of the wheel (clock A, B, or C. Refer to figure 46).
5. Remove and reinstall the wheel. Take care not to damage the hubcap fitting. Make sure the wheel is properly oriented to the hub as indicated in figure 46.
6. If the tee fitting was removed, reinstall the tee fitting and tighten the swivel threads to 130 ±10 in. lbs. of torque. Refer to the TIRE HOSE INSTALLATION procedure on page 30 for complete tee fitting and tire hose tightening details.
7. Attach tire hose and check valve assemblies to the tee or elbow fitting and tighten finger tight (figure 24). Using pliers, carefully and gently verify that the hose connection is tight.

⚠ CAUTION: **DO NOT overtighten the knurled tire hose nut. Doing so will bend the tee / elbow fitting stem and compromise the integrity of internal tee / elbow fitting components. Do not damage knurled finish on tire hose nut. Doing so will make tire hose removal extremely difficult.**

NOTE: Tire hoses must be connected directly to the tire valve stems and the tee fitting. Do not use valve stem extenders.

8. Attach the tire hose(s) to the tire valve stem(s) and tighten finger tight.
9. Using a $\frac{7}{16}$ -inch wrench, tighten the tire hose/valve stem connection an additional one-half turn. Do not overtighten this connection.

⚠ CAUTION: **DO NOT overtighten the tire hose(s) on the tire valve stem(s). Doing so may damage the tire hose internal gasket, causing a leak or decreased system performance. Only tighten the connection an additional one-half turn with the wrench.**

10. If the tee fitting guard was removed, reinstall the tee fitting guard and tighten the hub cap bolts to 12 - 18 ft. lbs. (16 - 24 N•m). Check all air system connections for leaks using the system integrity check found on page 33.

WHEEL-END SERVICE (HUB REMOVAL)

When it is necessary to remove the hub, care must be taken to avoid damaging the rotary joint assembly:

- On HP and HUS® spindles (axles with same size inner and outer bearings), the hub may be removed with the rotary joint in place. Follow the WHEEL REMOVAL AND INSTALLATION procedure on the previous page to remove the wheel. Then remove the jam nut from the rotary joint bulkhead adapter and remove the hubcap. Finally, remove the hub. If necessary, refer to Hendrickson publication L496, *Wheel-End Maintenance Procedures*, for complete hub removal details.
- To remove the hub on HN spindles, the rotary joint must be detached from the spindle plug, but not completely removed from the braided axle hose.



While detached from the spindle plug, the rotary joint can be moved, tipped or otherwise manipulated so the hub can clear it and be removed. There is no need to disconnect the rotary joint from the braided axle hose. Follow the WHEEL REMOVAL AND INSTALLATION procedure on the previous page to remove the wheel, then use the following procedure to detach the rotary joint for hub removal:

ROTARY JOINT DETACHMENT (FOR HUB REMOVAL ON HN SPINDLES)

1. Remove the jam nut from the rotary joint bulkhead adapter and remove the hubcap (figure 47).
2. Remove the three fasteners holding the rotary joint assembly to the spindle plug (figure 48).
3. When detached, the rotary joint can be moved, tipped or otherwise manipulated so the spindle nuts, outer bearing and hub can clear the rotary joint and be removed. DO NOT disconnect the rotary joint from the braided axle hose.

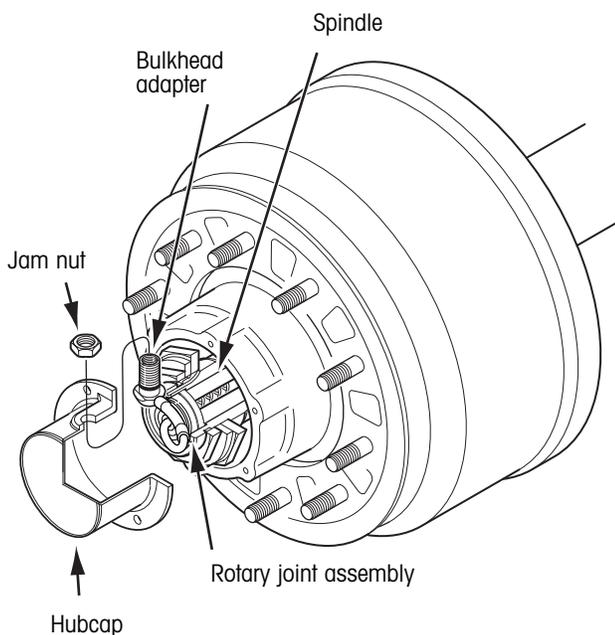


Figure 47. Hubcap to bulkhead adapter removal

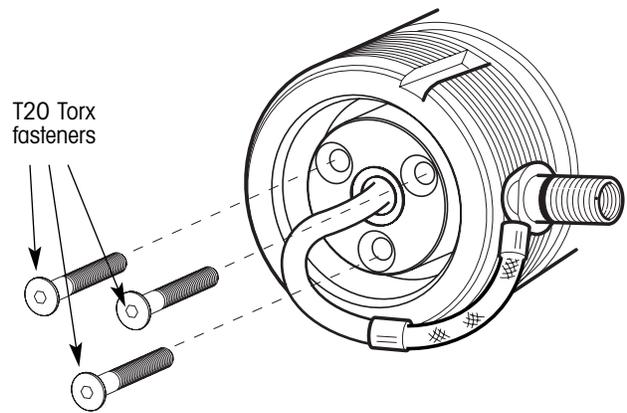


figure 48. Rotary joint removal from spindle

ROTARY JOINT REATTACHMENT

1. When hub / wheel-end service is complete, reattach the rotary joint to the spindle plug by installing the three T20 Torx fasteners and tightening to 45 ± 5 in. lbs. ($5 \pm \frac{1}{2}$ N•m) of torque.
2. Rotate the rotary joint exit tube one full revolution. Make sure that the steel air tube does not contact any part of the spindle or spindle nut system.

HUBCAP ASSEMBLY

1. Place hubcap gasket over rotary joint exit tube and bulkhead adapter.
2. Lubricate O-ring on the rotary joint bulkhead adapter. Use the same lubricant as is used in the hub or a light film of #2 grease, white lithium grease or Vaseline®.
3. From the inside, insert the bulkhead adapter through the hole in the hubcap labeled "Air". Align the flat on the bulkhead adapter with the anti-rotation flat in the hubcap (figure 15). Note the orientation indicator on the top of the bulkhead adapter threads (figure 15, view a). Use this indicator (some models have a dot, other models have a notch) to properly orient the bulkhead adapter in the hubcap hole. When the flat on the bulkhead adapter is properly aligned with the anti-rotation flat in the hubcap, the orientation indicator will face outboard (figure 15, view b).

Do not use pliers or any kind of wrench to pull the bulkhead adapter up through the hole in the

hubcap. This could cause the bulkhead adapter to rotate before it engages the flat in the hubcap, potentially damaging the rotary union or hubcap.

Attach the jam nut and hand tighten. When properly seated, the top of the bulkhead adapter will be flush (or higher) with the top of the jam nut when hand tightened (figure 15, view c).

⚠ CAUTION: Wheel must be properly “clocked” to the hubcap to prevent the hoses from rubbing on the wheel (figure 23). Failure to properly “clock” the wheels may result in hose failure.

4. Install the hubcap. If the hubcap is a screw-on style used on the HUS hub, tighten it to 50-100 ft. lbs. (68-137 N•m) of torque. If the hubcap is a bolt-on style used on the other hubs, tighten the hubcap bolts to 12-18 ft. lbs. (16-24 N•m) of torque.
5. Tighten the rotary joint jam nut to 15 ft. lbs. (20 N•m) of torque.
6. Refer to the TIRE HOSE INSTALLATION section on page 30 to complete the reassembly.

GLOSSARY

TIREMAAX® EC Tire Inflation System — A system that maintains the pressure of selected tires and activates a warning to alert the vehicle operator if the pressure drops by more than 20 psi.

Electronic Control Unit (ECU) — The ECU is programmed with the target tire pressure and directs the system to supply air to the tires when needed. A significant drop in tire pressure causes the ECU to illuminate the indicator.

Rotary Joint — Rotary air seal assembly that allows air transfer from wheel end to tire(s) while vehicle is in motion. The rotary joint is only pressurized while the system is checking tire pressure or inflating.

Target Tire Pressure — The desired tire pressure.

Bulkhead Adapter — The threaded portion of the rotary union assembly that gets inserted through the hubcap from the inside.

Controller Assembly — Consists of the ECU, mounting bracket, solenoid valves and pressure sensors and controls the flow of air from the onboard air tank to the tires.

Axle Vent — On INTRAAX / VANTRAAX suspensions, the axle vent is the remaining hole in the axle wrap window. On Hendrickson Trailer Axles, the axle vent is the hole in the midpoint of the axle, equidistant from each spindle end. In both cases, it vents the axle to atmospheric pressure through a duck bill check valve.

System Integrity Check — A manual air leak test or check of all connections in the TIREMAAX system. It must be accomplished after installation and before putting the vehicle into service. It is done by manually pressurizing the TIREMAAX system through the controller assembly vent tube from a shop air supply and applying soapy water to all connections to check for leaks.

Controller Assembly Vent Tube — A ¼ inch nylon tube that extends through the controller assembly mounting bracket and originates from the delivery side solenoid.



APPENDIX

Ambient temperature when the target tire pressure is set

	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
-40	100	97	-95	92	90	88	86	84	82	80	78	76	74	73	71	70	68
-30	103	100	97	95	93	90	88	86	84	82	80	78	77	75	73	72	70
-20	105	103	100	97	95	93	90	88	86	84	82	81	79	77	75	74	72
-10	108	105	103	100	98	95	93	91	89	86	85	83	81	79	77	76	74
0	111	108	105	103	100	98	95	93	91	89	87	85	83	81	79	78	76
10	114	111	108	105	102	100	98	95	93	91	89	87	85	83	82	80	78
20	116	113	110	108	105	102	100	98	95	93	91	89	87	85	84	82	80
30	119	116	113	110	107	105	102	100	98	95	93	91	89	87	86	84	82
40	122	119	116	113	110	107	105	102	100	98	96	94	91	90	88	86	84
50	125	121	118	115	112	110	107	105	102	100	98	96	94	92	90	88	86
60	127	124	121	118	115	112	110	107	105	102	100	98	96	94	92	90	88
70	130	127	123	120	117	115	112	109	107	105	102	100	98	96	94	92	90
80	133	129	126	123	120	117	114	112	109	107	104	102	100	98	96	94	92
90	136	132	129	126	122	120	117	114	111	109	107	104	102	100	98	96	94
100	138	135	131	128	125	122	119	116	114	111	109	106	104	102	100	98	96
110	141	137	134	131	127	124	122	119	116	114	111	109	106	104	102	100	98
120	144	140	137	133	130	127	124	121	118	116	113	111	109	106	104	102	100

For example: Target tire pressure is set to 100 psi in Little Rock, Arkansas, where the air temperature is 70 degrees F. The trailer is then driven to International Falls, Minnesota, where the air temperature is 20 degrees F. Instead of 100 psi, the pressure in the tires is now 89 psi, due solely to the effects of temperature on pressure.

NOTE: Temperature values in chart above are only for 100 psi target tire pressure.

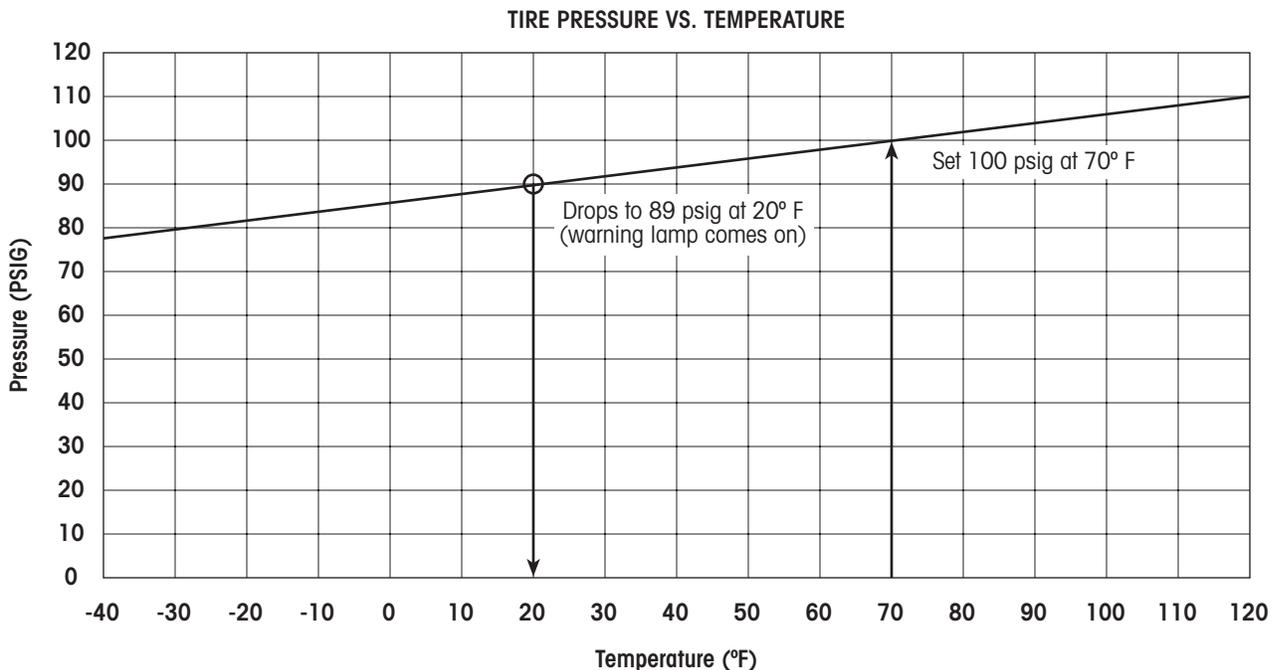


figure 49. Typical tire maintenance system performance at 100 psig

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