2023-02 – Automatic Tire Inflation and Tire Pressure Monitoring Systems

Created: April 27, 2023

Summary

This inspection bulletin provides details for inspecting tires on a vehicle with an automatic tire inflation system (ATIS), which adjusts tire pressure based on a set cold tire pressure, and tires with a tire pressure monitoring system (TPMS).

Some models of ATIS automatically adjust tire pressure based on the load on the trailer. An ATIS that responds to the load, will reduce the tire pressure when some of the load is removed or increase pressure as weight is added. There are also tire pressure systems that reduce the tire pressure for off-road applications, typically used in logging operations. These systems are usually identified as central tire inflation systems (CTIS). However, these systems are generally activated manually, as needed.

Minimum tire pressures for a given tire load are listed in the "Tire and Rim Association Yearbook" for each tire size and configuration. TPMS may be standalone or coupled with ATIS to track tire pressures in real time, ensuring the ATIS is keeping the tires at the proper tire pressure.

Typical Automatic Tire Inflation System

The system uses compressed air from the trailer air brake system to inflate any tire when its pressure decreases below the system air pressure setting during operation. Air from the existing trailer air supply passes through a pressure protection valve (PPV), routed through a control box through each axle, through rotary union assemblies at the wheel ends, then through the tire hoses to each tire, as needed. Check valves in the tire hoses or hub caps isolate each tire so that loss of air in a single tire will not affect the pressure in the other tires. The ATIS indicator light, typically mounted on the front of the trailer, will illuminate when the system is active. This may be the result of (1) a leaking tire, (2) a leaking tire inflation system component, or (3) initial charging of the system when a tractor is initially connected to the trailer. Some systems have a thermal event indicator system that will activate when a wheel end reaches an abnormally high temperature. This may create an audible noise coming from the over-heated wheel end, and the indicator light will remain on. When the indicator light illuminates during a trip, the driver should pull over at the next safe opportunity to determine the cause of the air flow.

NOTE: A thermal event indicator system that activates when a wheel end reaches an abnormally high temperature will create a fourth possible cause for the ATIS light to illuminate. In this case, an audible noise coming from the over-heated wheel end may occur, allowing the thermal event to be diagnosed. Systems equipped with this feature are identified by product information decals near the ATIS indicator light and/or by the axles.

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Typical ATIS

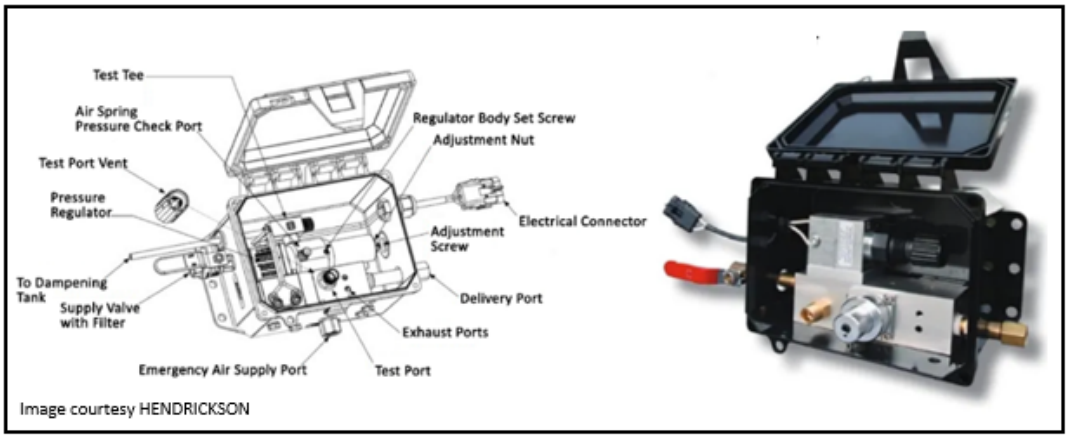


Image courtesy HENDRICKSON

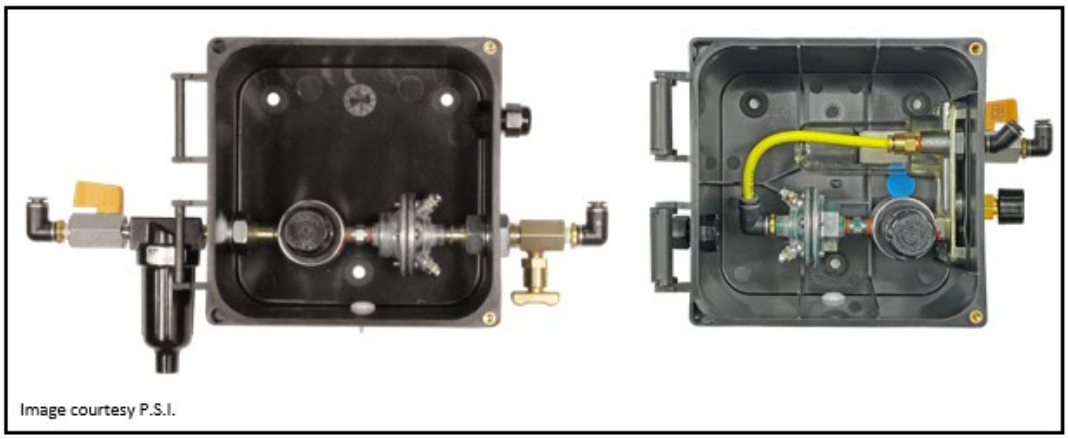
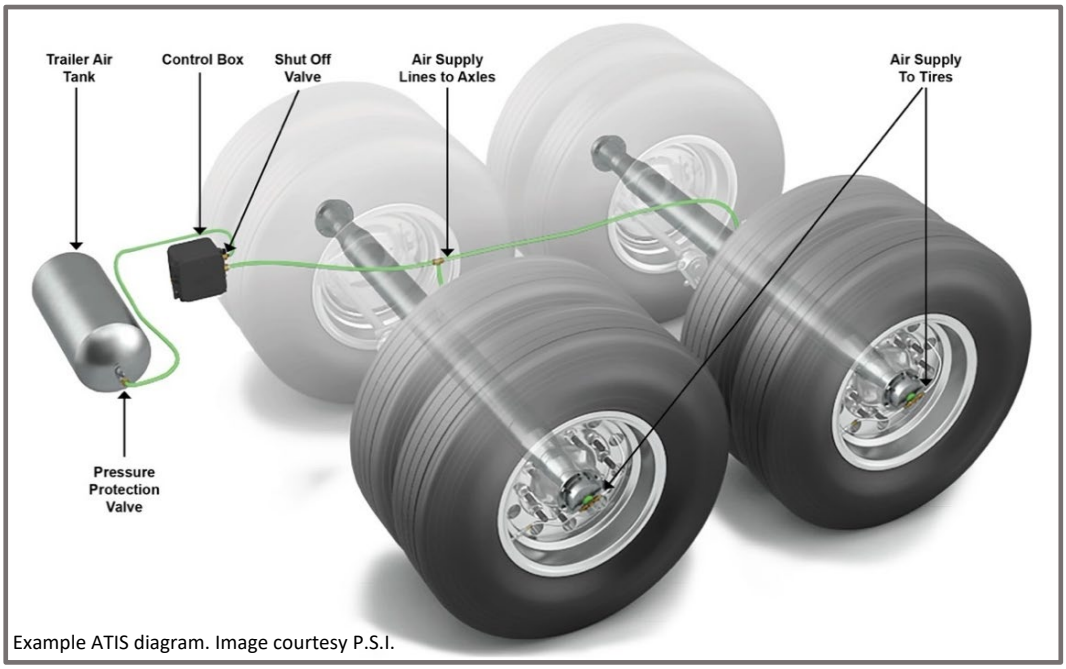


Image courtesy P.S.I.



Example ATIS diagram. Image courtesy P.S.I.

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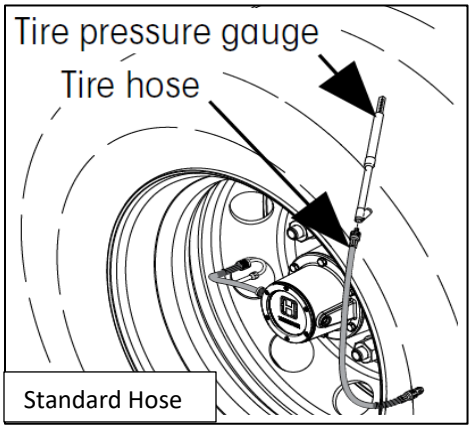
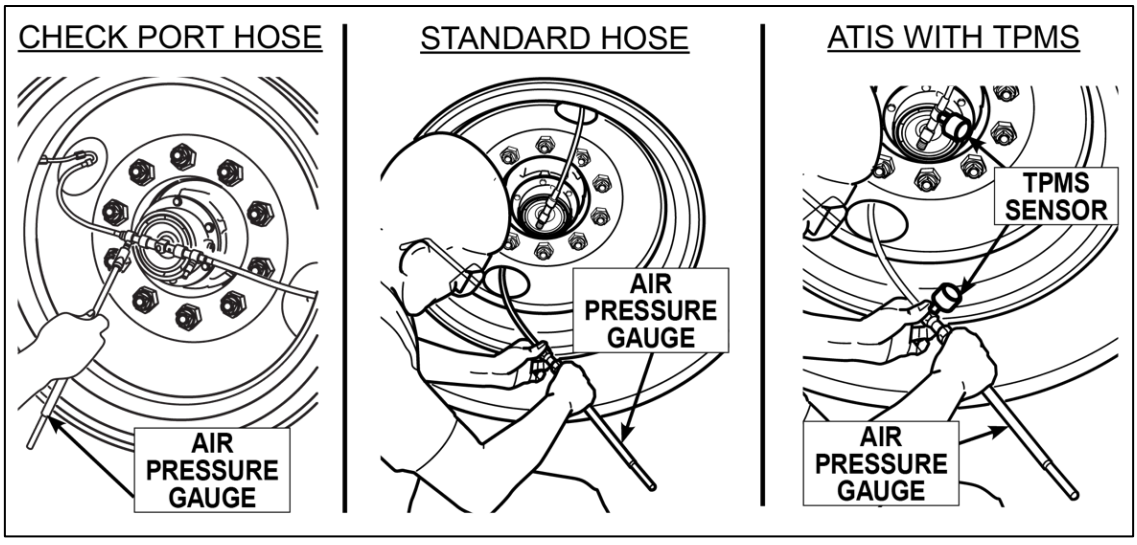
Tire Pressure Check on Vehicle with ATIS Installed

With ATIS, a tire hose is an extension of the tire, meaning that when the hose is disconnected from the hubcap area, the pressure measured at the hose will be the actual pressure in the tire.

- Tire pressure can be checked by removing the tire hose connection at the hubcap or thru-tee, depending on the ATIS installed.
- If equipped with check port (CP) hoses, tire pressure can be checked on the additional check port without removal of the hose.
- Dual check port (CP2) hoses are made to accommodate tire pressure checks without the removal of a TPMS sensor.





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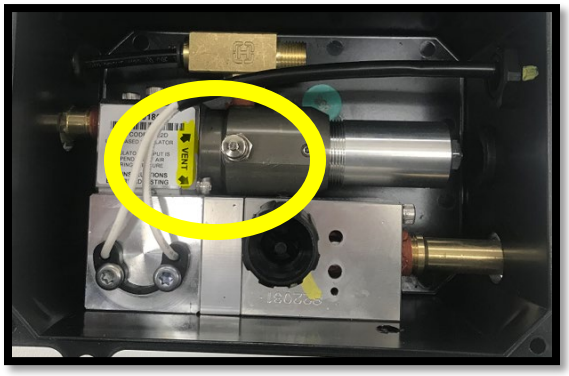
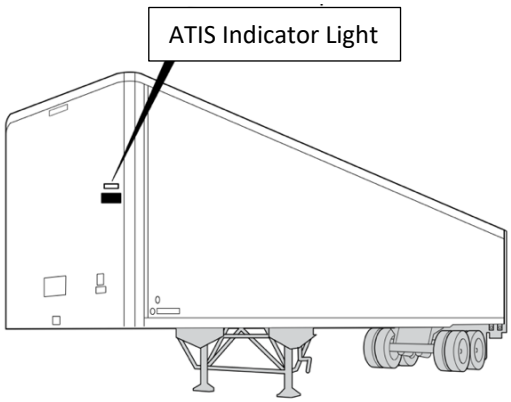
Air Venting Noise and ATIS Indicator Light



On some systems, when the parking brakes are released, the regulator may allow air to vent from the tires. This venting can be audible and is normal if the controller is adjusting tire pressure for reduced axle load. This venting occurs at vent holes, highlighted in yellow in the image on the right. Setting the parking brakes should stop the venting. Venting may resume once the parking brakes are released again.

When air is supplied to the trailer, the system indicator light may illuminate while the system is charging. If the indicator light remains illuminated for more than 10 minutes, a tire may be losing air pressure. Inspect the tires for damage and air leaks. Repair damaged or leaking tires before returning the vehicle to service.



Typical Tire Pressure Monitoring System

TPMS can be used on tractors as well as trailers. TPMS uses sensors to provide tire pressure and temperature information in real time. It will also alert drivers and/or fleet maintenance personnel of pressure or temperature changes. Sensors report in intervals, sending tire health information to the on-board display for the driver, or through a telematics gateway to the cloud, alerting fleet maintenance personnel remotely.

Internal sensors can be mounted with bands or integrated with the valve stem. Cap sensors are screwed onto the valve stems by hand, replacing the valve stem cap. Some valve stem sensors are flow-thru types with dual-seal valve stem caps, enabling pressure check and air-up without removal from the valve stem.

Some installations utilize a CP hose or CP2 hose, allowing TPMS sensors to be used with ATIS. In configurations without ATIS, installation may include a “flow-thru” bracket which is mounted to the wheel hub utilizing CP hoses to connect the sensor to the tire valve stems.

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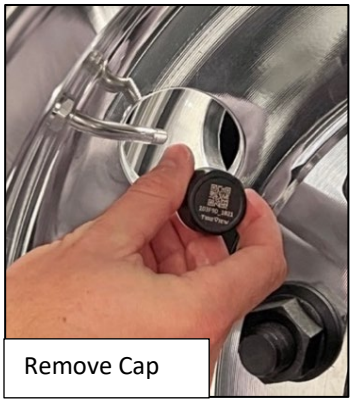
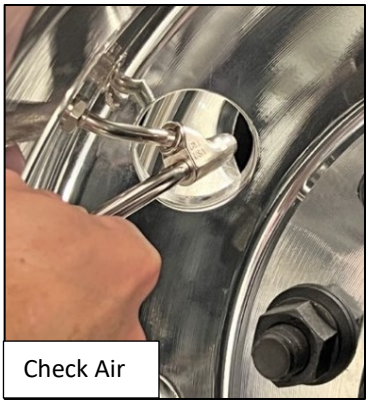
Tire Pressure Check on a Vehicle with TPMS Installed

For internally mounted sensors, pressure can be checked traditionally or as outlined for ATIS.

For cap sensors, remove sensor from valve stem to check pressure from valve stem.



Remove Cap

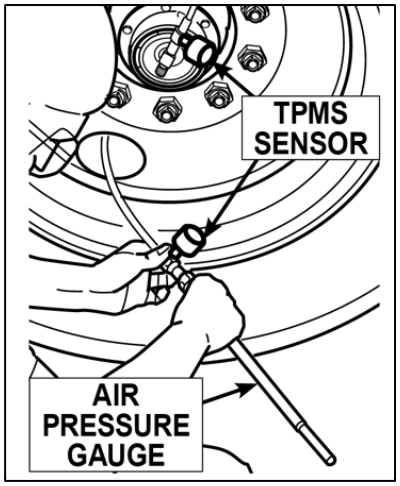


Check Air

For flow-thru sensors, check pressure directly from the sensor valve stem.

Check Air at Flow-Thru Sensor

For combined ATIS and TPMS installations with CP hoses, tire pressure can be checked by removing the tire hose connection at the hubcap or thru-tee, depending on the ATIS installed.



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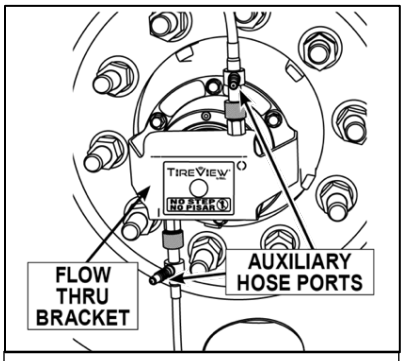
CP2 hoses are made to accommodate tire pressure checks without the removal of a TPMS sensor. Check the tire pressure by putting the gauge on the check port without the sensor.

CP2 Hose

For applications using the flow-thru bracket on the tractor or trailer, use the CP on the hose to check tire pressure.



Flow-thru Bracket with CP Hose

NOTE: Refer to T51002 and T51006 HENDRICKSON install manuals for more details. These documents are available at www.hendrickson-intl.com.

NOTE: Refer to T001-01 PSI Install Manual for more details. This document is available at www.psitireinflation.com.

Inspector Guidance

Air exhausting from an ATIS is considered a part of normal operation and should not be recorded as a violation on a roadside inspection.

An ATIS is not required equipment on commercial motor vehicles, and as such, is not required to be operative. If an ATIS is defective, inoperative or in an alert status, there is no corresponding violation. If a faulty or defective ATIS causes a violation of the Federal Motor Carrier Safety Regulations (FMCSRs), that individual violation should be addressed on a roadside inspection (e.g., flat tire, air leak other than normal system operation).

If the ATIS is in alert status, further investigation may be warranted to determine if there is a violation of the FMCSRs present.

Generally, removal of components is discouraged on a roadside inspection. However, if there is an indication that a tire is flat, have the driver remove and replace any necessary components so that tire pressures may be verified on vehicles equipped with ATIS or TPMS in accordance with this bulletin.