



Tech Tips

Transfer Case

Safety-Shift

Safety-Shift was introduced in 2003 to help prevent "shift-on-the-fly" damage caused by shifting at excessive speed. The Safety-Shift system employs a micro-processor that receives speed information from a case-mounted sensor. Within a specified speed range it will activate solenoids that supply air to the case to effect shifting. Safety-Shift has inherent limitations, and is not a substitute for proper operating practices. No transfer case or axle should ever be shifted at speeds greater than 5 miles-per-hour.

Versions

There are currently two versions of the Safety-Shift system in service. 1st Generation units (2003-2007) are calibrated to shift between 1 and 5 miles-per-hour. The 2nd Generation (1/08 - present) system will shift from 0 to 5 miles-per-hour. Contact Marmon Herrington Customer Service to identify your system version.

Operation

ALL VERSIONS: With vehicle at a full stop, select desired transfer case function with dash-mounted switch. Allow vehicle to idle forward (or backwards) no faster than 5mph until shift is complete. Shift is not complete until appropriate indicator light on dash is lit. Do not accelerate until proper dash light is lit. If shifting is unsuccessful moving forward, stop vehicle and try shifting in reverse. Dash-mounted indicator lights are controlled by mechanical pressure switches on the transfer case. They are the only physical assurance that a complete shift has occurred.

In the case of an "incomplete shift", it is possible that the teeth of the shift collar and drive gear are not fully engaged. Accelerating in this condition can cause the transfer case to become stuck between high and low ranges (neutral). It is also possible to cause severe damage to the engagement teeth.

Installation

We have found many system failures to be due to improper installation of our kits and components. When diagnosing Safety-Shift issues, start by ensuring that the components are wired and plumbed per the correct installation diagram. The two most common installation errors are:

- Power supplied to module by other than "keyed and fused" source. Constant "hot" power will likely fail the module.
 - Incorrect orientation of solenoid leads. Black lead must go to ground; yellow attaches to module. The yellow lead has an in-line diode to protect the module from voltage spikes.
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Axles

Leaks

When diagnosing suspected axle shaft or hub seal leaks, be advised of the following:

Hub Vents

Planetary hub capacity on Marmon Herrington front drive axles are typically just less (1.87pts) than 2 pints. They can be difficult to fill due to a lack of space inside the outer hub cover; hence they are frequently over-filled and not allowed to drain down to the correct level. At road speed there is sufficient pressure developed to push lube up the vent tube and out the vent. This purging of lube is often mistaken for a leaking hub seal or axle shaft seal.

If lube has been pushed up the breather tube, the tube and vent must be removed and flushed to prevent capillary siphoning effect after refilling.

Felt Wipers

Marmon Herrington axles use a conventional axle shaft seal and felt wiper on both sides of the steering joint. The felt wipers are designed to become saturated with lube, keeping the seal surface of the shaft free of dust and debris. When new, the felt wipers are quite porous and will flow an amount of lube that can resemble seal failure. While the felt will never be completely dry, the flow should dissipate when the felt has cured, generally between 4,000 – 5,000 miles.

When addressing leak issues, service personnel are encouraged to check vents, felt wipers, and lube levels prior to disassembly. Area of leak must always be cleaned and free of mud and road grime before any definitive determination can be made.

Wheel Studs

Wheel nuts should be torqued to 450 – 500 pounds. Wheel studs are designed to stretch as they're being torqued, and then impart a clamp force against the wheel as they attempt to reestablish their static length. If over-torqued, they will be stretched beyond any ability to generate this clamping action. If under-torqued, no clamp loading exists and nuts will likely loosen during service.

When replacing wheel studs, always replace full sets rather than single units. Take care to drive studs squarely out of hub so as not to damage or elongate the bores. The same care should also be taken when loading studs back into the hub. If the bores become damaged, the studs will not ride squarely in the hub, preventing secure wheel attachment.

Spindle Nut Torque

The spindle nut torque and wheel bearing pre-load procedure for Marmon Herrington axles is as follows:

Rotate the hub while tightening the inner spindle nut to 145 pounds, then back the nut off 1/8th turn. Install the lock ring, but do not fold tabs yet. Install outer spindle nut and torque to 330-360 pounds. Fold one tab into slot of inner nut, and one into outer nut.