



# PRODUCT INFORMATION

700 Spring Mill Avenue  
Conshohocken, PA 19428  
TEL: 610-825-6300  
FAX: 610-825-6440

## SERVICE BULLETIN #53

DATE: August 10, 1990

FROM: Fred W. Buchler

TO: ALL OEM MIDSHIP CUSTOMERS AND HALE PARTS SERVICE CENTERS

SUBJECT: PUMP SHIFT/AUTOMATIC TRANSMISSION

As a component manufacturer for fire apparatus, we are constantly aware of the interfacing of our products with other components of the vehicle. Occasionally, situations or problems occur between the major components that are not quickly or easily identified. One such situation recently surfacing between components is the midship pump shift system and the Allison automatic transmission. Initially upon receiving reports from the field regarding pump shift problems, (particularly when shifting from Pump Position to Road Position), we accepted them as Hale's problem. The field shifting reports have noted varying degrees of severity, particularly when attempting the shift into Road Position, ranging from loud gear racking to a few broken shift forks. Our response to the reported problems was to design an improved, stronger shifting fork. Our latest information, however, indicates we have been treating a symptom and not the problem.

From our ongoing investigation we now know that this problem results from the severe stresses placed on our pump gearbox components. These stresses originate from the automatic transmission due to the effects of the hi-range lockup on it even though the transmission is in the "neutral" position. Our recommended pump shift procedures require that the truck transmission be placed in "neutral" position before attempting a pump shift. With the truck transmission in neutral one would think there would be little or no rotation or torque in the drive shaft between the truck transmission and the pump gearbox. **NOT TRUE:** the effects of hi-range lockup on the current automatic transmission design can produce excessive rotation and torque on the drive shaft when in neutral. This rotation and torque is then transferred to our pump gearbox and can negatively influence the shift procedure by causing severe gear racking (noise and stress) and has even resulted in several shifting fork failures. These are real forces coming from the truck transmission; in fact, we have been advised of reports that these forces, originating in the automatic transmission, when in neutral have the potential to move the vehicle when shifting into road position. This is a serious problem that requires your immediate attention. It is imperative that steps be taken to eliminate the unnecessary rotation of the drive shaft when the truck transmission is in a neutral position.

Eliminating the rotation of the drive shaft when in neutral will eliminate the problem and we have been advised by Allison that utilizing a transmission neutral safety switch in the lockup procedure will accomplish this goal. **It is important that these new recommendations are followed to preserve the integrity and warranty of our product.** We strongly suggest that even current production vehicles be reviewed for compliance with these new recommendations.

Some of you are already utilizing a neutral safety switch as part of your hi-range lockup procedure. If you are, you are probably not experiencing the shifting problems previously mentioned. If, however, you are wiring from the pump shift air switch directly to the lockup solenoids, the transmission lockup is simultaneous with the pump shift. This direct method of lockup has been identified as the problem when shifting into Road Position. With the simultaneous lockup procedure placing the truck transmission in neutral (after pumping) the truck transmission remains in lockup which creates the rotational forces responsible for the gearbox shift problems. By utilizing a neutral safety switch and relay valve in your lockup sequence, as recommended, lockup will disengage when the transmission is returned to neutral (after pumping) eliminating the drive shaft rotation and allowing a smooth uninhibited shift to Road Position. (If the drive shaft does not come to a virtual stop, it could indicate a transmission problem: contact your transmission dealer.) Our new lockup wiring recommendation will have no impact on the pump shift system or warning lights which are activated with the air pressure signal from our shift selector valve.

Allison's recommendations (Instruction Sheet No. 101 and schematic enclosed) in this matter becomes Hale's recommendation and we encourage you to implement this change immediately to ensure the integrity performance and warranty of our product. Allison further recommends that a pause of four (4) seconds after placing the shift tower in neutral is required for the drive shaft rotation to dissipate.

Some manufacturers have found placing the pump shift valve to the left of the driver's position ensures this slight delay in the shift sequence.

P.S. The enclosed Allison document is intended as a reference only. Specific detailed information for all Allison Transmission Models are available from Allison.

Fred Buchler  
Assistant Vice President  
Marketing - OEM Accounts

In June, 1983, the transmission transient shift behavior was changed even further with the release of "Consistent Hydraulic Calibration" (CHC) controls. The CHC was designed to introduce momentary converter operation during lockup-to-lockup shifts, thereby improving the shift quality of coaches. When used in fire trucks, this controls change provided for the more rapid exhaust of 1st clutch (needed to eliminate the engine stall problem during road-to-pump modes), and also improved the fill characteristics of 2nd cloth (needed to minimize the 1-2 shift flare in road mode when the larger 1st clutch exhaust was utilized). PIM 536 (22JN83) documented the release of CHC. There were no revisions to PIM 311 as a result of the CNC controls introduction.

CHC dramatically reduced fire truck complaints beginning in the last half of calendar year 1983.

PIM 542 (30N083) introduced the specific installation requirements of ATFC transmissions in Fire Trucks to obtain high-range lockup. ATFC required three electrical signals to initiate a software shift in the ECU pattern logic:

1. Neutral range selected.
2. Wire 315 grounded to Wire 309 in the secondary mode circuit.
3. Wire 313 grounded to Wire 309 in the secondary mode circuit.

It was recommended that the last two signals be initiated by two separate switches, i.e. (1) selection of pump mode, (2) engagement of the pump. It was also noted that the two signals could be tied to a single switch. The reader was directed to AS00-134 for ATFC wiring circuitry.

With the advent of ATFC, the use of HT-700 five speed transmissions were again made available for fire truck use. Due to feedback from the field requesting more specific instructions, PIM 542A (20FE84) was issued. In this revision, the appropriate secondary mode circuitry was highlighted in this document. The reader was again referred to AS00-134 for additional wiring circuitry for an ATEC installation.

## **Installation**

All components may be installed onto the transmission as shown in figure 1, 2, and 3.

Figure 1 illustrates the parts and explains the location relative to the transmission.

Figure 2 schematically illustrates the relay and solenoid circuit. It should be noted that the transmission neutral switch shown in Figure 2 must be separate from the neutral switch in the vehicle starting circuit. The transmission neutral switch is furnished and installed by the equipment manufacturer. It should also be noted the orientation of the solenoids is important. Be sure the solenoids are installed with axis of large hexagonal valve cap in a horizontal position (See Figure b).

Figure 3 shows the circuit connection (in schematic form) to the transmission with a brief explanation.

**NOTE:** When the hydraulic lines are assembled it is recommended that the cluster end of each hose be attached and assembled prior to attaching the 90° elbow fitting to the other end of the hose. This will permit indexing the 90° elbow fitting in the proper direction to prevent twisting the hose during installation on the transmission. Any one (1) length of hose should not exceed three (3) feet in length.

**NOTE:** As related above in Paragraph 1, "It should be noted that the transmission neutral switch shown in Figure 2 must be separate from the neutral switch in the vehicle starting circuit."