



# Technical Information...

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### AW55-50 (FA 57) Saab Electronic Functions

#### Electronic Control System

The transaxle is controlled by a TCM. The TCM uses inputs from the Shift Lever Module, (SLM), transaxle fluid temperature sensor, input/output speed sensors, gear selector position sensor, steering wheel switch unit, & other inputs from the Bus communication. The TCM outputs are (5) shift solenoids, PWM lock-up solenoid, PWM transmission pressure solenoid & PWM shift pressure solenoid. Shift solenoids are on/off type & PWM solenoids operate @ 300 Hz. Solenoids are powered by the TCM & ground through casing of the solenoid to the valve body.

When the TCM detects a serious problem it sets a trouble code, sends a "CHECK GEARBOX" bus message, sets an indicator lamp in instrument cluster, & shuts power off to shift & pressure solenoids, putting the transmission in "limp-in" mode, allowing only 5<sup>th</sup> gear in the D range & reverse in the R range. NOTE: 2<sup>nd</sup> gear can be selected in M range on some models.

The TCM is reprogrammable & uses an EEPROM to store memory functions/trouble codes. Disconnecting power to TCM will **NOT** clear codes or reset shift adapts. **Tech 2 Scan Tool** or equivalent must be used to clear codes or reset shift adapts. In addition, if TCM is replaced & sometimes after reprogramming, Tech 2 must be used to "marry" TCM to vehicle so other modules can communicate.

#### Alternate Shift Programs

**Manual Shifting** - can be accomplished by moving manual shift lever to "M" position, whereby you can control up & down shifts using + and - buttons on steering wheel. The TCM overrides manual controls if engine RPM's get too high & shift has not been commanded by driver, or if driver forgets to down shift when vehicle speed drops below threshold for selected gear. The TCM will not allow driver to down shift vehicle manually until vehicle speed drops below predetermined point for a particular gear. Driver can start from a stop in 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup>. Manual feature can even be used with cruise control.

**Temperature Program 1** - activated when transmission fluid temp exceeds 125C. Lock-up is activated in 3<sup>rd</sup> & 4<sup>th</sup> with no converter slip & shifts are at higher speed to cool transmission fluid. When fluid temp drops below 120C, Temperature Program 1 deactivates & it will not activate when TCM is in "limp home."

**Temperature Program 2** - activated when transmission fluid temp exceeds 135C & forces up shifts at higher speed & converter lock-up happens more often than Temperature Program 1. Lock-up is commanded with no slippage. Temperature Program 2 deactivates when transmission fluid temp drops below 127C & returns to Temperature Program 1. NOTE: If transmission fluid temp rises above 155C for more than 2 seconds, code P0218 is set, temperature is recorded, "CHECK GEARBOX" light does **NOT** light, & TCM sends a bus message "TRANSMISSION OVERHEATING" in SID display. Engine torque is reduced to a max of 200Nm to protect the transaxle.

**Gear Change Program** - automatically activated if high load is detected. Up & down shifts occur at higher engine speed to keep fluid from overheating. An example of when program engages is driving up long hills & trailer towing. NOTE: Will not initiate over 150 km/h.

**Differential Protection System (DPS)** - reduces engine torque during extreme wheel spin. DPS only activates below 80km/h. 150Nm is the maximum engine torque allowed during DPS activation.

**Reverse Inhibit Feature** - turns on SI solenoid which releases B3 brake, if TCM detects that vehicle is moving over 7 km/h, (4.3 mph).

#### Resetting Adapts

Using a Tech2 or equivalent scan tool, zero out shift adapts in the EEPROM. Transmission temp must be 65-110C for TCM to relearn adapts. **DO NOT stall test transaxle to warm it up!** The Saab service manual states that 10-15 minutes of varying driving should be sufficient for TCM to relearn adapts after zeroing with a Tech 2, however, driving the vehicle will **not** relearn the N-D & N-R adapts!

**Engagement Relearn** - Set parking brake & with engine idling @ operating temp, shift N-R. Keep in R for 3 seconds & shift back to N. Repeat 5x & perform same procedure for D.

**Up & Down Shift Relearn** - NOTE: Always perform engagement relearn 1st, then perform shift relearn. Put manual shift lever in D & accelerate to just over 50 km/h @ 15-20% throttle angle until car shifts into 4<sup>th</sup>. Slow car to stop w/light brake pressure. It's important that it takes at least 30 seconds to get to 4<sup>th</sup> gear & more than 14 seconds to stop. Repeat 5x.

**Manual Shifting 2<sup>nd</sup>-1<sup>st</sup> Relearn** - Engage M2 w/shift lever. Accelerate to 25 km/h. Engage M1 & brake smoothly to stop. Repeat 10x.

#### Saab Service Bulletins For This Transaxle

TSB # 440-2425, January 2004. Springy up shift from 2<sup>nd</sup> to 3<sup>rd</sup> or 2-3 slide/slip. This bulletin involves reprogramming TCM.

TSB # 440-2498, October 2004. Hard, delayed or incorrect shifting, rising engine speed during shifting with various symptoms.

Depending on the symptoms the fix could be sensors, software upgrades or internal transaxle repairs.

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