

Sonnax Technical Bulletin

AG4 PROBLEMS Can Drive Rebuilders TO THE EDGE

Volkswagens and Audis are tremendously popular because drivers love them. Transmission rebuilders, however, can be driven crazy trying to troubleshoot the causes of hard parts failure and shift concerns across a variety of units and phases. Each phase introduced by the automaker over the years has meant changes in valve body design, the function of some of the solenoids used and the way TCC is controlled.

But regardless of the unit model or phase, there's a common theme: Most hard part failures and shift problems are caused by either electronic control malfunctions or valve body wear. That can help you narrow your search considerably when you're trying to pinpoint a

root cause for everything from engine stalls to uncontrolled shifts.

First, look at the solenoids for signs of contamination and/or wear. Trapped contamination can restrict solenoid movement. Restricted movement can allow oil that should be exhausting to build pressure instead and begin to stroke the valve when it shouldn't or, on the other hand, may reduce fluid flow needed to build apply pressure. The copper-coated solenoid checkballs can wear and become pitted: When that happens, the ball will no longer seal, so that the pressure that should stroke the valve is reduced and valve stroke is incomplete. In fact, wear and restriction problems are so common that, at the very least, we

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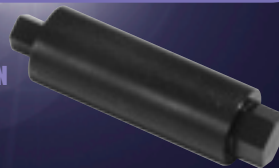
PRODUCT SPOTLIGHT

Transmissions in the BAXA and M6HA family are prone to soft shifts and/or low line pressure. These symptoms are often caused by incorrect or soft factory calibration of the clutch pressure control solenoids (CPCS), and the condition can be further aggravated if there is any line pressure leakage within the transmission. Adjusting the solenoids can

HONDA "BAXA," CIVICS & ACCORDS, '96-UP SOLENOID ADJUSTMENT TOOL PART NO.: 88950-T

FIX THESE COMMON COMPLAINTS

- Soft shifts
- Low line rise



give you firmer shifts and increased line rise.

The Sonnax Solenoid Adjustment Tool **88950-T** is specially designed to fit the pentagonal-shaped recesses of the solenoids and allows you to make the necessary adjustments. This tool can be used with the unit in the vehicle, so removal of the transmission is not necessary.

recommend you test these components hydraulically and electronically on a solenoid tester or simply replace them.

There are two solenoid styles used throughout the AG4 family, which includes both VW and Audi transmissions. All three phases make use of 60-ohm resistance solenoids for shift and shift apply feel solenoids. Similarly, all three phases use 5-ohm resistance solenoids as EPC solenoids. The 5-ohm solenoid is also used in Phase 2 units as a PWM controlled TCC solenoid.

The EPC solenoid operates on a PWM signal whenever the engine is running. As the “ON” time of the signal is increased, more signal oil pressure is applied to the end of the pressure regulator control valve, increasing the force against the spring. This results in lower boost signal pressure being fed to the spring side of the main pressure regulator valve – resulting in lower line pressure. Shutting off EPC

hydraulic problem. If there’s no change in amps, you have an electrical problem.



TCC Solenoid



TCC Boost Valve & Worn Sleeve



TCC Apply Valve

The solenoid itself is not the only cause of electrical problems. You must examine the wiring harnesses, or looms. These harnesses naturally become brittle and hard over time. A common symptom is open circuits or –even worse– intermittent open circuits. Connector ends are easily damaged during removal.

You can do some electrical testing to find the culprit. With the harness connected to the solenoids, measure the circuit resistance through the connector pins. This will confirm whether there’s continuity between the harness, solenoids and connector. Readings should be around 60 ohms for a shift solenoid alone, and 5 ohms for an EPC solenoid. It’s important to remember that temperature affects resistance values. To isolate a questionable reading on one solenoid, compare multiple solenoids of the same rating, at the same temperature. You’re looking for open circuits or shorts or a reading that differs noticeably from another similar solenoid. If the circuit looks wrong, isolate and retest the components. The harness wires should have zero resistance. If each component tests out by itself but not when hooked up, check the connector at the solenoid.

Finally, take a good look at the valve body. Worn bores, sleeves or valves, and broken or leaking end plugs are common problems that can easily be diagnosed through a Wet Air Test or Vacuum Test.

When you’ve finally isolated your problem, remember to doublecheck what unit and phase you’re working on. Many major components, including the valve bodies and harnesses, are not interchangeable. Use the three-letter code found at the beginning of the Unit ID number to correctly identify the unit, phase and date range, engine calibration, and ring and pinion and transfer gear ratios before you order your parts.

AG4 Units & Phases

Vehicles	All VW Except Eurovan	Audi	Eurovan
Unit Names			
Phase 0	096	097	098
Phase 1	096	097	098
Phase 2 (units renamed)	01M	01N	01P

signal allows the PR valve to establish maximum line pressure. To verify that EPC is functioning effectively, monitor line pressure and EPC duty cycle. If the pressure doesn’t drop as EPC duty cycle increase is commanded, there are two potential root causes: electrical or hydraulic.

Here’s how to tell the difference. Monitor amperage/current of the EPC solenoid. The amps should increase as the solenoid duty cycle increases to lower line pressure. If there’s a change in the current draw but no change in pressure, you have a