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 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 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.

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.

![TCC Solenoid](image1)
![TCC Boost Valve & Worn Sleeve](image2)
![TCC Apply Valve](image3)
**VW 01M, 01N, 01P, 099**

**Part No. 119940-01K**

**Engine stall during stop or N-D engagement**

**Secondary Complaint:**
- Converter overheat

**Cause**

Wear between the TCC boost valve and sleeve prevents proper stroking of the converter clutch apply valve to the release position.

**Correction**

This replacement TCC boost valve and sleeve kit restores hydraulic integrity to the circuit with tightly controlled tolerances.

**Part No. 119940-01K**

1 TCC Boost Valve & Sleeve
1 TCC Spring

**SONNAX PART SUMMARY**

In VW 01M, 01N, 01P and 099 transmissions the TCC boost valve wears the inside diameter of the sleeve due to constant valve oscillation. When wear is significant, oil leaks past the valve, preventing it from properly stroking the converter clutch apply valve into the release position, leading to engine stalls and converter overheat. Sonnax now offers a replacement valve and sleeve assembly 119940-01K that restores hydraulic integrity to the circuit with tight tolerances and proper material.

**FEATURES AND BENEFITS**

- Valve manufactured from hard anodized aluminum.
- Sleeve made from highly wear-resistant aluminum.
- TCC spring included in kit replaces broken OEM part.

**Save**

$350-$600 on valve body replacement and labor time
Audi AG4, VW 01M/096, 01N/097, 01P/098

Part Nos. 119940-10, -11, -12 & 119940K

OEM plastic valve body shift valve end plugs break

Secondary Complaint:
- Not available from OEM
- No shift
- Uncontrolled shifts

End plugs damaged from overheating or valve contact.

These shift cups are a direct replacement for OEM shift cups, but are designed to be stronger and last longer than the OEM.

SONNAX PART SUMMARY
Sonnax offers replacement shift cups for the Audi AG4 and VW 01M/096 and 01N/097 valve bodies. These cups are not available from OEM. Shift cups can be purchased separately or as kit 119940-K, which includes the following:

119940-10, two medium shift cups located at the 3-4 regulator valve and 2-3 regulator valve.

119940-11, four small shift cups located at the B2 actuator valve, K1 actuator valve, K-1 cushion valve and K3 manual low valve.

119940-12, one large shift cup located at the main pressure regulator valve.

FEATURES AND BENEFITS
• Made from die-cast aluminum for longer life.
• No modifications required.

$350-$600 on valve body replacement and labor time
Solenoids are prone to contamination and wear, which can restrict solenoid movement and allow oil to build up pressure and stroke the valve when it shouldn’t. The Sonnax solenoids 119954-01 and 119952-01 are direct OEM replacements and eliminate problems linked to contamination and wear.
### Wiring Looms

#### Features & Benefits:

- **Direct replacement**
- **OEM approved**

#### Part No. 119957

**Wiring Loom, Valve Body, 095, 096**

#### Part No. 119957A

**Wiring Loom, Valve Body, 01M, 1995-up**

#### Part No. 119957B

**Wiring Loom, Valve Body, 097, 01N, 1990-up**

#### Part No. 119957C

**Wiring Loom, Valve Body, 098, 01P, 1990-up**

### PART SUMMARY

Wiring looms become hard and brittle over time, and can cause open circuits or intermittent open circuits, while connector ends are easily damaged during removal. The Sonnax wiring looms 119957, 119957A, 119957B and 119957C are direct OEM replacements and eliminate problems caused by deterioration of the original parts.
Many vehicles with G4A-EL, G4A-HL or GF4A-EL transmissions suffer from low line pressure, high line pressure, harsh shifts, lack of cooler flow and/or blued converters. In many instances these complaints are caused by a worn valve body bore at the pressure regulator valve. The constant oscillation of the pressure regulator valve wears out the bore, allowing leakage of valuable oil and improper functioning of the valve.

Sonnax has developed an oversized pressure regulator valve 74846-05 to restore hydraulic integrity to the circuits and prevent future leakage. This part must be used on conjunction with Sonnax tool 74846-TL5, which allows you to ream and modify the existing valve body to accommodate the oversized valve. The valve features a specially designed spring seat to compensate for the oversized valve, which also provides higher line pressure at idle.

Fix these common complaints
- Low or high line pressure
- Harsh shifts
- Lack of cooler flow
- Blued converters

Pressure Modifier Valve
Part Nos.: 74846-04, 74846-TL4

Wear to the valve body bore in GF4A-EL units by the constant movement of the steel pressure modifier valve can cause loss of valuable EPC oil to the circuit. Wear to the balance spool bore prevents the valve from stroking to regulate EPC pressure, while wear at the middle spool bore allows line pressure to exhaust.

The Sonnax Oversized Pressure Modifier Valve 74846-04, used in conjunction with Sonnax tool kit 76846-TL4, allows you to ream the worn valve body and restore hydraulic integrity to the circuit. This valve has been manufactured from anodized aluminum to prevent wear, and the spring seat depth has been shortened to compensate for the oversized valve, allowing reuse of the OEM spring.

Fix these common complaints
- Erratic shift quality
- High or low line rise
- High or low EPC pressure