

AUTO TRANS DIAGNOSIS - V.A.G. 01V
Article Text

1998 Volkswagen Passat

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ARTICLE BEGINNING

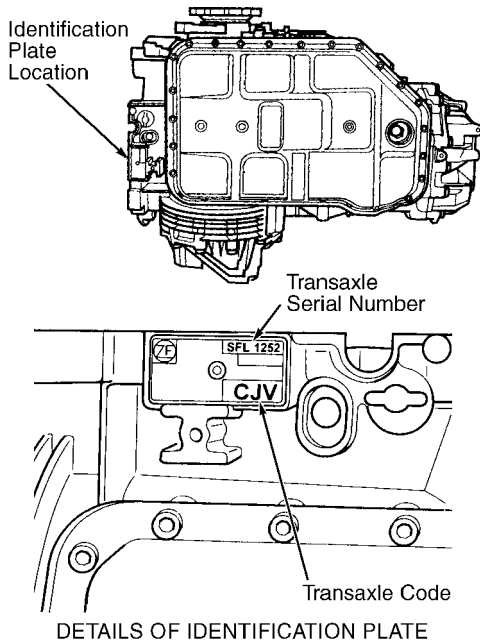
1998 AUTOMATIC TRANSMISSIONS

Volkswagen/Audi V.A.G. 01V Electronic Controls (Passat)

Passat

IDENTIFICATION

Volkswagen Audi Group (VAG) transaxle type is cast into transaxle case above left output shaft flange. Transaxle code and build date are located on front top of transaxle case. See Fig. 1.



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Fig. 1: Locating Transaxle Identification Plate
Courtesy of Audi of America, Inc.

CAUTION: Vehicle is equipped with a Supplemental Restraint System (SRS). When servicing vehicle, use care to avoid accidental air bag deployment. All SRS electrical connections and wiring harness are covered with Yellow insulation. SRS-related components are located in steering column, center console, instrument panel and lower panel on instrument panel. DO NOT use electrical test equipment on these circuits. It may be necessary to deactivate SRS before servicing components. See AIR BAG SERVICING article in APPLICATIONS & IDENTIFICATION.

APPLICATIONS

TRANSAXLE APPLICATIONS

AA
Vehicle Application Transaxle Model

Passat

1.8L	(1) 01V.DDT
2.8L	(2) 01V.DRD

- (1) - From 4/97, 3.09 differential gearing.
- (2) - From 8/97, 2.72 differential gearing.

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DESCRIPTION & OPERATION

TRANSAXLE

Transaxle includes a 5-speed automatic transmission, a torque converter with clutch, a final drive and solenoid-operated valve body. Under normal conditions, all shifts are controlled by a Transaxle Control Module (TCM), 5th gear is an overdrive gear. The electronic control consists of a TCM (attached to the brake pedal bracket), control solenoids, various sensors and switches. The control solenoids direct oil pressure inside the valve body. The TCM monitors input and output signals. If electrical problems occur, TCM will record faults in TCM memory and may go into fail-safe mode. The TCM memory can only be read on VAG Tester (1551). The TCM also controls shift-lock system. This system locks the gear selector in Park or Neutral unless the brake pedal is pushed down. The TCM uses a shift-lock control relay to release a gear-selector mounted solenoid. See VOLKSWAGEN SHIFT INTERLOCK SYSTEMS article.

TROUBLE SHOOTING

MECHANICAL & ELECTRICAL CHECKS

CAUTION: When battery is disconnected, Transmission Control Module (TCM) must be reset to Basic Setting using VAG Tester (1551).

If gear selector is stuck in Park or Neutral, see VOLKSWAGEN SHIFT INTERLOCK SYSTEMS article. If gear positions are missing, shift quality is poor or no shifts are possible, ensure all electrical connections are okay and fluid level is correct. Check for Diagnostic Trouble Codes (DTC).

FAIL-SAFE FUNCTION

When one or more components or sensors fail, the TCM will substitute functions and continue to operate. If a critical component fails, and the TCM is active, transmission will shift into 4th gear with torque converter clutch disengaged and entire gear display will light. Reverse can be engaged and selector lock will not work. If a critical component fails, and the TCM is inactive, symptoms will be the same, but OBD codes cannot be accessed.

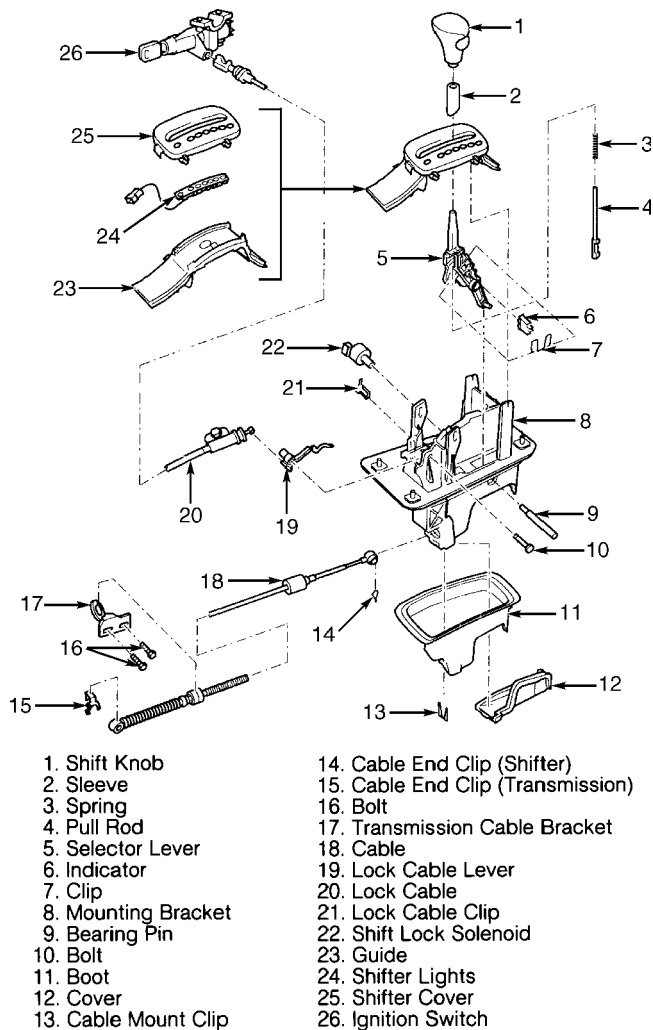
SHIFT LOCK SYSTEM

Functional Check

1) With ignition key removed, ensure gear selector cannot be moved from Park. Insert key in ignition switch. Turn ignition on. Ensure gear selector can only be moved with brake pedal pressed down. Move gear selector to Neutral position. Without pressing brake pedal, ensure gear selector cannot move out of Neutral.

2) Press brake pedal down. Ensure it is now possible to move gear selector. If shift lock system does not operate as described, check electrical system of shift lock system with VAG Tester (1551). If tester is not available, see testing information under ELECTRONIC SELF-DIAGNOSTICS. See Figs. 4-10.

3) If any problems are found, service harness or components. If shift lock system still does not operate correctly, check for worn or damaged parts and replace as necessary. See Fig. 2. If no problems are found, TCM may be defective.



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Fig. 2: Exploded View Of Shift Lock & Gear Selector Console Assembly
Courtesy of Audi of America, Inc.

ELECTRONIC SELF-DIAGNOSTICS

1) Electronic control consists of TCM (attached to brake

pedal bracket), control solenoids and various sensors and switches. TCM monitors input and output signals. If TCM detects problems in transaxle-related circuits or devices, TCM may record a trouble code in memory. To obtain trouble codes, use VAG Tester (1551). See Fig. 3.

2) All trouble code and related testing information is contained in tester. See DIAGNOSTIC TROUBLE CODE (DTC) DEFINITIONS table. If tester is not available, turn ignition off. Disconnect TCM harness connector. Install Back-Probe Harness (VAG 1598) and 88-Pin Adapter (1598/20) between TCM and TCM harness.

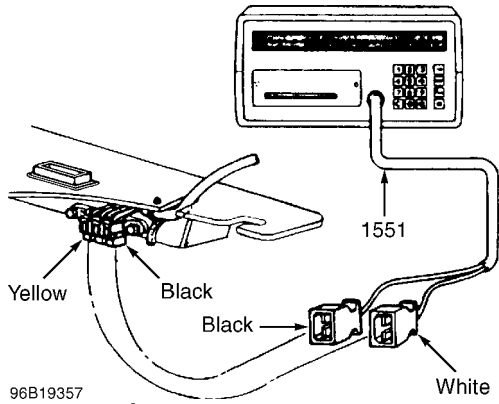
3) Measure voltage and resistance between specified terminals of TCM connector. See Figs. 4-10. If problem is found, service harness or component(s). If no problem is found, TCM may be defective. All testing should be done with components at ambient temperature. All resistance testing is done with Back-Probe Harness (VAG 1598) disconnected. All voltage testing is done with Back-Probe Harness (VAG 1598) connected.

DIAGNOSTIC TROUBLE CODE (DTC) DEFINITIONS

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 VAG DTC Definition

00000	No Communication With TCM
00258	Solenoid Valve No. 1
00260	.....	Solenoid Valve No. 2
00262	.....	Solenoid Valve No. 3
00264	.....	Solenoid Valve No. 4
00266	.....	Solenoid Valve No. 5
00268	.....	Solenoid Valve No. 6
00270	.....	Solenoid Valve No. 7
00293	.....	Transmission Range Switch
00296	.....	Kickdown Switch
00297	.....	Output Speed Sensor (VSS)
00300	.....	Transmission Temperature Sensor
00518	.....	TPS Out Of Range
00526	.....	Brake Light Switch
00529	.....	RPM Information Missing
00532	.....	Supply Battery Voltage Low
00543	.....	RPM Information Maximum Exceeded
00545	.....	Engine/Transmission Electrical Connection
00549	.....	Consumption Signal
00638	.....	Engine/Transmission Electrical Connection (Terminal No. 2 Or No. 30)
00652	.....	Incorrect Gear Ratio
01192	.....	Torque Converter Clutch RPM Deviation
01236	.....	Shift Lock Solenoid
17101	.....	Turbine Input Speed Sensor
18141	.....	Tiptronic Switch, Down
18147	.....	Tiptronic Switch, Up
18152	Tiptronic Switch, Recognition
18192	High/Downshift Wire
18193	High/Downshift Wire
65535	TCM Faulty

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Fig. 3: Connecting Scan Tool (VAG 1551)
Courtesy of Audi of America, Inc.

Voltage measurement – switch multimeter to 20V measuring range					
Test step	VAG 1598/20 socket	Test of	• Test conditions – Additional operations	Specified value	Corrective action
1	54 + 28 55 + 34 55 + 6	Voltage supply to TCM -J217-	• Ignition switched on	Approx. B+	– Check wiring according to wiring diagram – Check wiring from terminals 6, 34 and 28 to Ground – Check wiring from terminals 54 and 55 to terminal 15 of central electric
	0 V				
	26 + 6 26 + 34	Battery Positive Voltage (B+) (terminal 30) for TCM -J217-	• Ignition switched off	Approx. B+		– Check wiring according to wiring diagram
2	2 + 6	Shift lock solenoid -N110-	• Ignition switched on	Approx. B+	– Check wiring according to wiring diagram – Check multi-function TR switch -F125- for short circuit – Check shift lock solenoid -N110- for short circuit – Perform test step 17
3	10 + 6 10 + 28	Brake light switch -F-	• Ignition switched on • Brake pedal not depressed	0 V	– Check wiring according to wiring diagram – Replacing and adjusting brake light switch -F- ⇒ Repair Manual, ABS and ABS/EDL OBD; Repair Group 01; Adjusting brake light switch -F-
			– Brake pedal depressed	Approx. B+	
4	9 + 6 9 + 28	Voltage supply for cruise control control module -J213-	• Ignition switched on • Selector lever in D, 4, 3	Approx. B+	– Check wiring from terminal 6 and 28 to Ground – Check wiring from terminal 9 to terminal 15 of central electric – Check wiring to cruise control control module -J213- – Perform test step 6
			• Selector lever in P, R, N, 2	Less than 5V	
5	18 + 54	Kick down switch -F8-	• Ignition switched on – Depress accelerator pedal to kick down	Approx. B+	– Check wiring according to wiring diagram – Adjust or replace accelerator pedal cable ⇒ Repair Group 20; Adjusting accelerator pedal cable
6	36 + 34 36 + 6 36 + 28	Multi-function TR switch -F125-	• Ignition switched on – Selector lever in P, N or D	Approx. B+	– Check multi-function TR switch connector for contact corrosion, replace if necessary – Check wiring according to wiring diagram – Check voltage supply for multi-function TR switch -F125- – Replace multi-function TR switch -F125- ⇒ Repair Group 38; replacing multi-function TR switch -F125-
			– Selector lever in R, 4, 3 and 2	0 V	
	• Ignition switched on – Selector lever in R, N or 4		Approx. B+		
	– Selector lever in P, D, 3 and 2		0 V		
	– Selector lever in N, D, 4 and 2		Approx. B+		
	– Selector lever in P, R and 3		0 V		
	– Selector lever in D, 4 and 3		Approx. B+		
– Selector lever in P, R, N and 2	0 V				
8 + 34 8 + 6 8 + 28					
37 + 34 37 + 6 37 + 28					
9 + 34 9 + 6 9 + 28					

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Fig. 4: Testing TCM Harness & Components Type 01V (1 Of 5)
Courtesy of Volkswagen United States,

Resistance measurement – switch multimeter to 200Ω measuring range					
Test step	VAG 1598/20 socket	Test of	• Test conditions – Additional operations	Specified value	Corrective action
7	36 + 8	Multi-function switch -F125-	• Ignition switched off – Selector lever in N	Less than 20 Ω	– Check multi-function switch connector for contact corrosion, replace if necessary – Check wiring according to wiring diagram – Replace multi-function TR switch -F125- ⇒ Repair Group 38; replacing multi-function TR switch -F125-
	37 + 9		– Selector lever in P, R, D, 4, 3, 2	Infinite Ω ¹⁾	
			• Ignition switched off – Selector lever in D and 4	Less than 20 Ω	
	37 + 36		– Fuse 31 disconnected ²⁾ – Selector lever in P, R, N, 3 and 2	Infinite Ω ¹⁾	
• Ignition switched off – Selector lever in N and D		Less than 20 Ω			
8	6 + 34 28 + 34	TCM -J217- Ground connection	• Ignition switched off	Less than 1 Ω	– Check wiring according to wiring diagram
	34 + battery Ground			Less than 1 Ω	
9	52 + 53	Voltage supply for solenoid valves	• Ignition switched off	Less than 1 Ω	– Check wiring according to wiring diagram – Check wiring harness for transmission
10	52 + 30	Solenoid valve 1 -N88-	• Ignition switched off	25 to 35 Ω	– Check wiring according to wiring diagram – Replace wiring harness for transmission or replace valve body
	30 + 34			Infinite Ω ¹⁾	
11	52 + 33	Solenoid valve 2 -N89-	• Ignition switched off	25 to 35 Ω	⇒ Repair Group 38; Removing and installing valve body
	33 + 34			Infinite Ω ¹⁾	
12	52 + 32	Solenoid valve 3 -N90-	• Ignition switched off	25 to 35 Ω	
	32 + 34			Infinite Ω ¹⁾	
13	52 + 5	Solenoid valve 4 -N91-	• Ignition switched off	6 to 8 Ω	
	5 + 34			Infinite Ω ¹⁾	
14	52 + 1	Solenoid valve 5 -N92-	• Ignition switched off	6 to 8 Ω	– Check wiring according to wiring diagram
	1 + 34			Infinite Ω ¹⁾	
15	52 + 29	Solenoid valve 6 -N93-	• Ignition switched off	6 to 8 Ω	– Replace wiring harness for transmission or replace valve body
	29 + 34			Infinite Ω ¹⁾	
16	52 + 4	Solenoid valve 7 -N94-	• Ignition switched off	6 to 8 Ω	⇒ Repair Group 38; Removing and installing valve body
	4 + 34			Infinite Ω ¹⁾	
17	18 + 34	Shift lock solenoid -N110-	• Ignition switched off – Selector lever in "P"	14 to 28 Ω	– Check wiring according to wiring diagram – Replace shift lock solenoid -N110- ⇒ Repair Group 37; Servicing selector mechanism
18	18 + 34	Kick down switch -F8- ³⁾	• Ignition switched off • Accelerator pedal not depressed	Infinite Ω ¹⁾	– Check wiring according to wiring diagram – Adjust accelerator pedal cable or replace ⇒ Repair Group 20
			– Depress accelerator pedal as far as kick down	less than 1.5 Ω	

¹⁾ Switch multimeter to highest Ω range

³⁾ Not for TDI engines

²⁾ Fuse for voltage supply of multi-function TR switch -F125-

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Fig. 5: Testing TCM Harness & Components Type 01V (2 Of 5)
Courtesy of Volkswagen United States,

Resistance measurement – switch multimeter to 20K Ω measuring range						
Test step	VAG 1598/20 socket	Test of	• Test conditions – Additional operations	Specified value	Corrective action	
19	14 + 42	Transmission vehicle speed sensor -G38-	• Ignition switched off	min.	0.8 K Ω	<ul style="list-style-type: none"> – Check wiring according to wiring diagram – Replace transmission vehicle speed sensor -G38- \Rightarrow Page 01–24, Fig. 9 \Rightarrow Repair Group 38; Removing and installing valve body
				max.	1.2 K Ω	
				Infinite Ω ¹⁾		
	14 + 34 14 + 54 42 + 54 42 + 34					
	15 + 34 15 + 54	Shielding for -G38-	• Ignition switched off	Infinite Ω ¹⁾	– Check wiring according to wiring diagram	
20	16 + 44	Sensor for transmission RPM -G182-	• Ignition switched off	min.	230 K Ω	<ul style="list-style-type: none"> – Check wiring according to wiring diagram – Replace sensor for transmission RPM -G182- \Rightarrow Repair Group 38; Removing and installing valve body
				max.	300 K Ω	
				Infinite Ω ¹⁾		
	44 + 34 44 + 54 16 + 54 16 + 34					
	23 + 34 23 + 54	Shielding for -G38-	• Ignition switched off	Infinite Ω ¹⁾	– Check wiring according to wiring diagram	

¹⁾ Switch multimeter to highest Ω range

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Fig. 6: Testing TCM Harness & Components Type 01V (3 Of 5)
Courtesy of Volkswagen United States,

Resistance measurement – switch multimeter to 2M Ω measuring range							
Test step	VAG 1598/20 socket	Test of	• Test conditions – Additional operations	Specified value	Corrective action		
21	21 + 22	Transmission fluid temperature sensor -G93-	<ul style="list-style-type: none"> • Ignition switched off • ATF temperature <p>approx. 20 °C</p> <p>approx. 60° C</p> <p>approx. 120° C</p>	<p>approx. 0.83 KΩ²⁾</p> <p>approx. 1.28 KΩ²⁾</p> <p>approx. 1.88 KΩ²⁾</p>	<ul style="list-style-type: none"> – Check wiring according to wiring diagram – Check wiring harness for transmission, replace if necessary -G93- is integrated in wiring harness (in transmission). ⇒ Repair Group 38; Removing and installing valve body 		
	21 + 34 22 + 28					• Ignition switched off	Infinite Ω ¹⁾
	21 + 54 22 + 54						Infinite Ω ¹⁾
22	41 + 28 41 + 34 41 + 55	Wiring to ECM (throttle position)	<ul style="list-style-type: none"> • Ignition switched off • ECM disconnected 	Infinite Ω ¹⁾	– Check wiring according to wiring diagram		
	41 + xx ³⁾					Less than 1.5 Ω	
23	35 + 28 35 + 34	Wiring to ECM (consumption signal)	<ul style="list-style-type: none"> • Ignition switched off • ECM disconnected 	More than 40 K Ω	– Check wiring according to wiring diagram		
	35 + xx ³⁾					Less than 1.5 Ω	
	35 + 34 35 + 28					<ul style="list-style-type: none"> • Ignition switched on • ECM disconnected 	More than 5 V
24	40 + 28 40 + 34	Wiring to ECM (engine RPM)	<ul style="list-style-type: none"> • Ignition switched off • ECM disconnected 	15 ... 80 K Ω	<ul style="list-style-type: none"> – Check wiring according to wiring diagram – Check on-board computer 		
	40 + xx ³⁾					Less than 1.5 Ω	⇒ Repair Manual, Electrical system, Repair Group 01; On Board Diagnostic (OBD) of instrument cluster
25	20 + 28 20 + 34 20 + 55	Wiring to ECM (torque reduction)	<ul style="list-style-type: none"> • Ignition switched off • ECM disconnected 	Infinite Ω ¹⁾	– Check wiring according to wiring diagram		
	20 + xx ³⁾					Less than 1.5 Ω	
26	51 + 28 51 + 34 51 + 55	Wiring to ECM (change up/down signal)	<ul style="list-style-type: none"> • Ignition switched off • ECM disconnected 	Infinite Ω ¹⁾	– Check wiring according to wiring diagram		
	51 + xx ³⁾					Less than 1.5 Ω	

1) Switch multimeter to highest Ω range

2) Permissible tolerance: ± 0.1 K Ω

3) Terminal assignment on ECM

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Fig. 7: Testing TCM Harness & Components Type 01V (4 Of 5)
Courtesy of Volkswagen United States,

Voltage measurement – switch multimeter to 20V measuring range					
Test step	VAG 1598/20 socket	Test of	• Test conditions – Additional operations	Specified value	Corrective action
27	13 + 54 13 + 55	Tiptronic switch -F189- Tiptronic recognition signal	• Ignition switched off – Selector lever not in Tiptronic gate	Less than 1.5 V	– Check wiring according to wiring diagram – If necessary replace Tiptronic switch -F189- (printed circuit) ¹⁾ ⇒ Repair Group 37; Servicing selector mechanism
			• Ignition switched on – Selector lever in Tiptronic gate	Approx. B+	
28	46 + 54 46 + 55	Tiptronic switch -F189- Change up/down signal	• Ignition switched on – Selector lever in Tiptronic gate	Less than 1 V	The driver can select any desired gear manually with the change up and change down switches. – Check wiring according to wiring diagram – If necessary replace Tiptronic switch -F189- (printed circuit) ¹⁾ ⇒ Repair Group 37; Servicing selector mechanism
			• Ignition switched on – Change up switch activated	Approx. B+	
	• Ignition switched on – Selector lever in Tiptronic gate	Less than 1 V			
	• Ignition switched on – Change down switch activated	Approx. B+			
	47 + 54 47 + 55				

¹⁾ If malfunctions occur in the Tiptronic switch, the shift symbol insert with integral printed circuit must be replaced.
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Fig. 8: Testing TCM Harness & Components Type 01V (5 Of 5)
Courtesy of Volkswagen United States,

WIRING DIAGRAMS

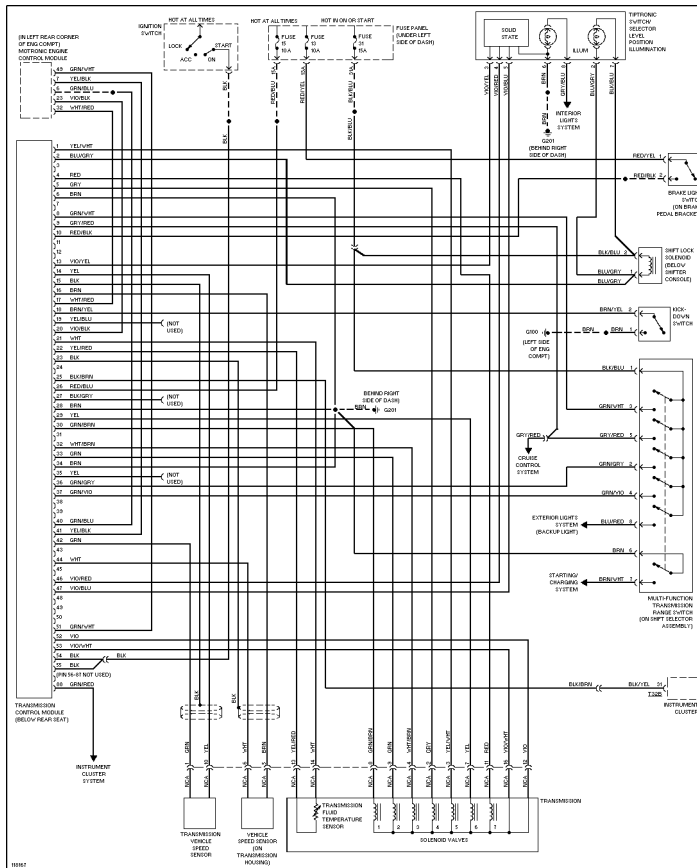


Fig. 9: Transmission Wiring Diagram (1998 Passat 1.8L)

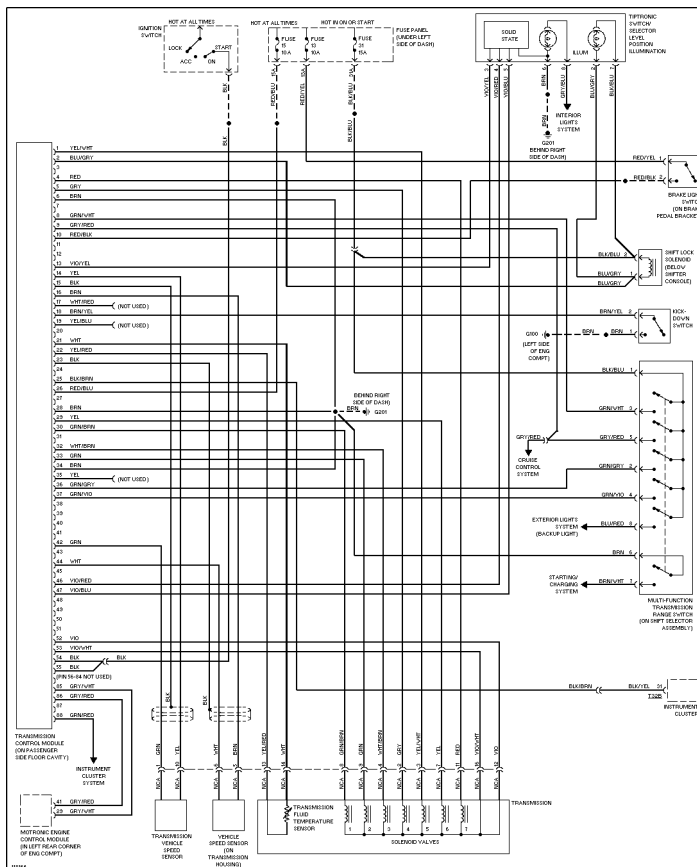


Fig. 10: Transmission Wiring Diagram (1998 Passat 2.8L)

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