

# Quick Takes

by ATRA Technical  
Department

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**W**elcome to *Quick Takes!* This is a simple, easy-to-use information resource covering the newest transmissions to hit the streets.

In *Quick Takes* you'll find all the basics: The transmission designation, what cars it appears in, and the most general explanation of its configuration. You'll find general specs, service requirements, and maintenance suggestions.

Think about the things you need to know when a new transmission shows up at your door. How many speeds? Any special shift characteristics? When

does the factory recommend service? What type of fluid? And other reference information.

Looking for in-depth coverage and explanations of the theory for today's transmissions? You won't find that in *Quick Takes*: This is just the down-and-dirty, basic intro and info for the latest units coming down the pike.

Of course we'll still be providing those in-depth descriptions, diagnostic procedures and repair tips that you've come to expect from *GEARS*. They'll usually come later, once the unit gets closer to the end of its warranty coverage. And they'll come elsewhere in the

magazine. *Quick Takes* is exclusively for those unit introductions that are so critical when a new unit makes its way into your bays.

So have a look and pay attention: *Quick Takes* is the crystal ball for your business... you can bet that what you see here will provide your first glimpse into your future.

# CHRYSLER 62TE

The 62TE is the new generation of FWD/AWD transaxles in production for Dodge and Chrysler, including JS Sebring, Sebring Convertible, Avenger with the 3.5L V6, and CS Pacifica with the 4.0L V6.

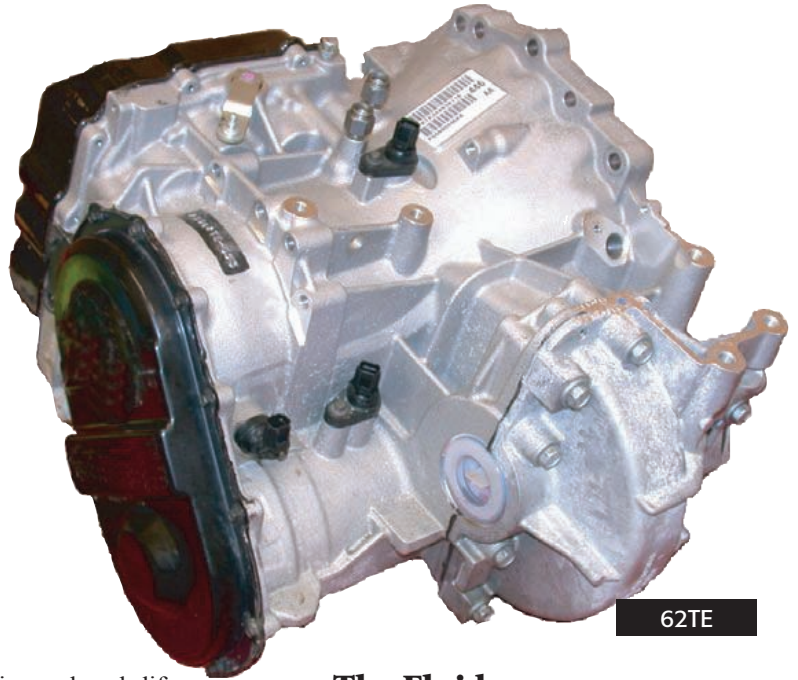
The idea was to take the proven-reliable 41TE 4-speed and split the transfer/pinion drive with an underdrive/direct clutch to split the ratio to the final drive. This concept has been around for many years but has been reintroduced in the 2007 model year.

Although this is classified as a 6-speed FWD transaxle, there are 7 forward speeds with the addition of a 4<sup>th</sup> gear prime ratio used during a 6-4 kickdown. This prevents a double swap of components, allowing for a smooth kickdown.

## The Guts

The planetary geartrain for the 62TE transaxle provides six forward gear ratios, including two 4<sup>th</sup> gear ratios, and one reverse gear ratio.

- Underdrive (UD) Compounder Assembly
  1. Low Clutch (LC)
  2. Direct Clutch (DC)
  3. Overrunning Clutch (ORC)
  4. Planetary gear set
  
- Fore-Mounted Valve Body/Solenoid/Pressure Switch Assembly
  1. DC solenoid
  2. LC solenoid
  3. DC pressure switch
  4. LC pressure switch
  5. Torque Converter Clutch (TCC) and pressure control Solenoids
  6. Line Pressure Sensor (LPS)
  7. An additional (third) speed sensor
  8. A "squashed" or flatter torque converter
  9. A new cover for valve body access
  10. 23-way connector for the solenoid/pressure switch assembly
  11. A remote pinion gear



62TE

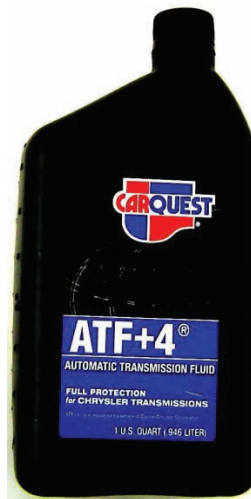
- A two-piece, closed differential case with structural clam-shell housing.

## The Fluid

The 62TE requires +4 ATF. There are many different blends of ATF that meet the +4 requirement (markings for +4 are clear on the labels).

Service Fill Level: 5.5 qts/5.2L  
Total Unit Capacity: 9.0 qts/8.5L

The addition of the underdrive compounder assembly components improves low-end torque multiplication, enhancing low-end power capability.



CLUTCH APPLICATION CHART									
ELEMENTS APPLIED									
GEAR	RATIO	UD	OD	R	2-4	L-R	LC	DC	ORC
1	4.127	A				A	A ^		H
2	2.842	A				A		A	
3 *	2.284	A			A		A ^		H
4	1.573	A			A			A	
4	1.452	A	A				A ^		H
5	1	A	A					A	
6	0.689		A		A			A	
R	3.215			A		A	A		

# CHRYSLER AS68RC

Dodge trucks now offer two different automatic transmission packages:

1. AS68RC — Used in the cab-and-chassis field only (3500 series and larger)
2. 68RFE — Used in the 1500 and 2500 series trucks

The AS68RC is a 6-speed, rear wheel drive automatic transmission, with a 26,000 lb. gross capacity rating. With a rating this high, the torque converter and geartrain have to be extremely heavy duty. This unit is capable of standing up to 730 lb-ft of input torque, although Dodge rates the 3500 truck for 565 lb-ft of input torque. The unit weighs in at 400 lbs without the torque converter.

## The Guts

The AS68RC is, for the most part, a clutch-to-clutch shifted transmission. But in drive range 1<sup>st</sup> gear, it does use a one-way sprag (F1) to launch. For engine braking while in 1<sup>st</sup> gear range, you'll need to place the shifter in manual 1. In manual 1, the B2 brake applies to provide engine braking, and the extra strength needed to prevent damage to the F1 sprag.



AS68RC

The B2 brake prevents the sprag from freewheeling. All other shifts (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup>) are clutch-to-clutch shifts and will automatically provide a form of engine braking in each range.

The mechanical components of this transmission consist of:

- Three sets of driving clutch packs — K1, K2 and K3
- Two sets of holding brake packs — B1 and B2
- A one-way clutch — F1
- Three planetary gearsets — P1, P2 and P3
- An oil pump

## The Fluid

The AS68RC requires a special blend of fluid that's designed specifically for this unit. The bottles are clearly marked as *Mopar AS68RC Automatic Transmission Fluid*. It's available in quarts and gallons, and is the only fluid that should be used in this transmission (figure x).

Service Fill Level: 6.8 liters (7.2 quarts)

Total Unit Capacity: 14.2 liters (15.0 quarts)

The factory recommended service interval is 30,000 miles. The torque converter on the AS68RC fills in both park and neutral, so it'd be a good idea to fill it with the selector in park, to prevent any unexpected movement.

One of the nice features of the AS68RC is that it's equipped with a dipstick for checking the fluid level. But it does require a temperature-compensated checking procedure. Here's how to check and adjust the fluid level:

- Vehicle must be on level surface, in park, with the engine running.
- Cycle the shift lever through all gear ranges, pausing in each range for a few seconds.
- Use a scan tool to check the transmission temperature.
- Adjust fluid level as necessary.

Use the chart (figure xx) to determine proper fill. Best results are obtained at temperatures above 60°C (140°F).

Shift Lever Position	Description
P	Park and starting
R	Reverse gear
N	Neutral and starting. No power transmission takes place. The vehicle can be moved freely. Allows starting engine with the vehicle in motion.
D	All six forward gears are available (O/D not canceled and Tow/Haul not requested, off)
3	Upshifts only to 3 <sup>rd</sup> gear. Provides engine braking.
2	Upshifts only to 2 <sup>nd</sup> gear. Provides engine braking.
1	Drives only in 1 <sup>st</sup> gear. Provides maximum engine braking.

Shift Lever Position	Gear Ratio	Driving Clutches K1 K2 K3	Holding Clutches B1 B2 F1
P	Park		A
R	Reverse		A
N	Neutral		A
D	1 <sup>st</sup>	A	A
	2 <sup>nd</sup>	A	A
	3 <sup>rd</sup>	A	A
	4 <sup>th</sup>	A	A
	5 <sup>th</sup>	A	A
	6 <sup>th</sup>	A	A
Man 1	1 <sup>st</sup> Engine Braking	A	A

- A torque converter with multi-disc lockup clutch (apply clutch pack, similar to the NAG1/722.6)
- A valve body
- Linear solenoids
- On/Off solenoids

# FORD 6F35

The Ford 6F35 is a 6-speed transaxle with electronic shift control. This transaxle has a 4-element torque converter design, which includes a torque converter clutch (TCC) and a geartrain with three planetary gearsets.

It's designed for operation in a transverse powertrain for front wheel drive (FWD) and all-wheel drive (AWD) vehicles. Designated for the 2009 Escape, this unit's coverage is sure to expand like its big brother, the 6F50N.

## The Guts

The hydraulic control system of the 6F35 uses seven electronically-controlled solenoids for:

- Shift feel (through line pressure control and shift pressure control)
- Shift scheduling and timing
- TCC operation

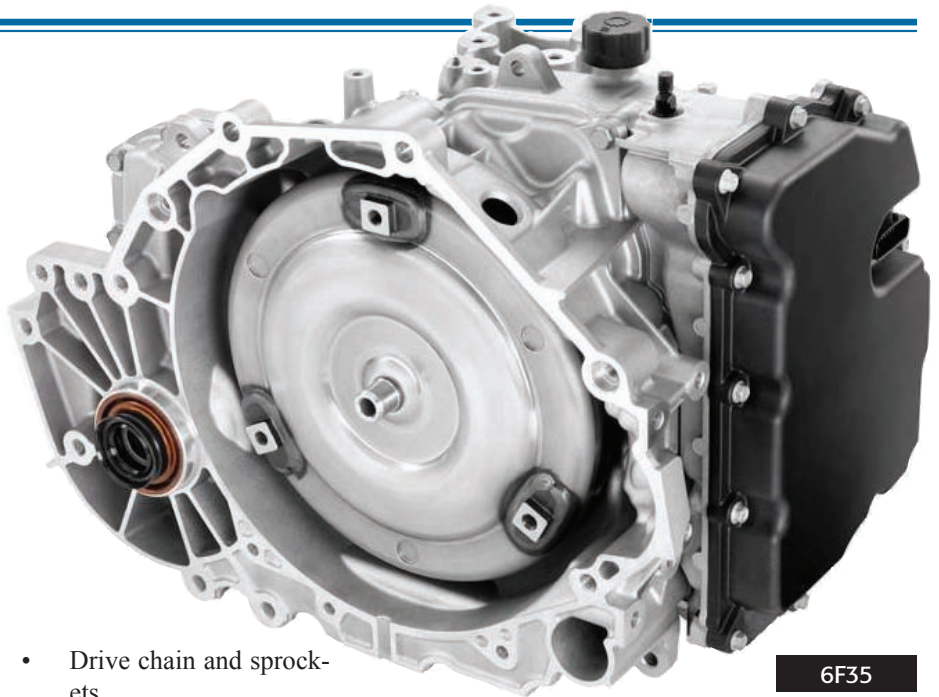
This transaxle uses these major components:

- Case with torque converter housing
- Two drive clutches:
  1. Direct clutch
  2. Overdrive (O/D) clutch
- Four brake clutches:
  1. Forward clutch
  2. Low one-way clutch
  3. Low/reverse clutch
  4. Intermediate clutch
- Three planetary gearsets:
  1. Front
  2. Center
  3. Rear

### Shift Speeds 3.0L

Throttle Position	Range	Shift	KM/H	MPH
Light Throttle <sup>a</sup>	D	1-2	13-18	8-11
	D	2-3	19-26	12-16
	D	3-4	29-37	18-23
	D	4-5	45-56	28-35
Medium Throttle <sup>a</sup>	D	5-6	72-90	45-56
	D	1-2	32-42	20-26
	D	2-3	48-61	30-38
	D	3-4	63-82	39-51
	D	4-5	80-108	50-67
Heavy Throttle <sup>a</sup>	D	5-6	117-159	73-99
	D	1-2	58-72	36-45
	D	2-3	85-106	53-66
	D	3-4	126-156	78-97
	D	4-5	151-192	94-119
	D	5-6	217-261	135-162

<sup>a</sup> Do not exceed the speed limit.



6F35

- Drive chain and sprockets
- Final drive planetary gearset and differential assembly
- Pump and filter assembly
- Main control:
  1. Valve body assembly
  2. Solenoid body assembly
- 2. Remove the transmission fluid drain plug and allow the ATF to drain.
- 3. Reinstall the transmission fluid drain plug and tighten it to 9 Nm (80 lb-in).
- 4. Fill the transaxle with clean transmission fluid.
- 5. Start the engine and let it run for 3 minutes. Move the range selector lever slowly through each gear position.
- 6. Repeat steps 2, 3, 4 and 5 two more times.

## The Fluid

To completely clean the torque converter, you'll need to drain and refill the unit three times:

1. Raise the vehicle, with the shifter in neutral.

**NOTE:** If you suspect an internal problem, drain the transmission fluid through a paper filter. A small amount of metal or friction particles is normal; if you find an excessive amount of metal or friction material, you'll need to rebuild the unit.

### Solenoid Operation Chart

Base Selector Lever Position	PCM Commanded Gear	Shift Solenoid						TCC (VFS) NL
		SSA (VFS) NL (CB 1,2,3,4)	SSB (VFS) NH (3,5,R)	SSC (VFS) NL (CB 2,6)	SSD (VFS) NH (CB L,R/C 4,5,6)	SSE (On/Off) NC		
P	P	Off	On	Off	On	On	Off	
R	R	Off	Off	Off	Off	On	Off	
N	N	Off	On	Off	On <sup>a</sup>	On <sup>a</sup>	Off	
	1	On	On	Off	On	On	Off	
D	2	On	On	On	On	Off	Off	
	3	On	Off	Off	On	Off	Off	
	4	On	On	Off	Off	Off	On/Off	
	5	Off	Off	Off	Off	Off	On/Off	
	6	Off	On	On	Off	Off	On/Off	
L	L	On	On	Off	Off <sup>a</sup>	On	Off	

<sup>a</sup> Solenoid state will change if vehicle is moving forward with the selector lever in the NEUTRAL position.

CB = Clutch brake  
 NC = Normally closed  
 NH = Normally high  
 NL = Normally low

### Line Pressure Chart

Gear	Line
<b>Pressures at Idle<sup>a</sup></b>	
P	338-379 kPa (49-55 psi)
R	621-689 kPa (90-100 psi)
N	338-379 kPa (49-55 psi)
D	338-379 kPa (49-55 psi)
L	338-379 kPa (49-55 psi)
<b>Pressure at Wide Open Throttle (WOT) Stall<sup>a</sup></b>	
P	338-379 kPa (49-55 psi)
R	1,868-2,068 kPa (271-300 psi)
N	338-379 kPa (49-55 psi)
D	1,868-2,068 kPa (271-300 psi)
L	1,868-2,068 kPa (271-300 psi)

a All pressures are approximate.

Item	Specification	Fill Capacity
Motorcraft® MERCON® LV Automatic Transmission Fluid XT-10-QLV	MERCON® LV	8.5L (9 qt)
Multi-Purpose Grease XG-4 and/or XL-5	ESB-M1C93-B	—

### Gear Ratio Chart

Gear	Ratio
1st/low	4.584:1
2nd	2.964:1
3rd	1.912:1
4th	1.446:1
5th	1:1
6th	0.746:1
Reverse	2.94:1

### Shift Speeds 2.5L

Throttle Position	Range	Shift	KM/H	MPH
Light Throttle <sup>a</sup>	D	1-2	11-16	7-10
	D	2-3	21-27	13-17
	D	3-4	29-37	18-23
	D	4-5	45-56	28-35
	D	5-6	72-90	45-56
Medium Throttle <sup>a</sup>	D	1-2	27-43	17-23
	D	2-3	42-55	26-34
	D	3-4	58-77	36-48
	D	4-5	77-106	48-66
	D	5-6	135-177	84-110
Heavy Throttle <sup>a</sup>	D	1-2	51-66	32-41
	D	2-3	79-100	49-62
	D	3-4	113-143	70-89
	D	4-5	150-190	93-118
	D	5-6	201-245	125-152

a Do not exceed the speed limit.

### Clutch Application Chart

Gear	Direct (C 3,5,R)	Overdrive (C 4,5,6)	Forward (CB 1,2,3,4)	Low/Reverse (CB L,R)	Inter-mediate (CB 2,6)	One-Way
1st			X	X <sup>a</sup>		X
2nd			X		X	O/R
3rd	X		X			O/R
4th		X	X			O/R
5th	X	X				O/R
6th		X			X	O/R
Reverse	X			X		

a Turns off above 6 km/h (4 mph).

CB = Clutch brake

O/R = Overrunning

# FORD 6R80

The Ford 6R80 is the next intermediate-sized transmission to hit the streets. This 6-speed transmission's little brother, the 6R60, is fading out and the 6R80 is taking its place.

The 6R80 is designated for the same applications as the 6R60: Explorer, Mountaineer, F150, Expedition and most other mid-sized SUVs.

## The Guts

The 6R80 uses planetary gears with hydraulic/electronic controls. The Transmission Control Module (TCM) and the main control valve body form a composite element that's installed as a single unit inside the transmission.

It has these features:

- Six forward speeds
- Torque converter with an integral converter clutch sensor
- Electronic shift and pressure controls
- Single planetary gearset
- Double planetary gearset
- Two fixed, multidisc clutches
- Three multiplate clutches

All hydraulic functions are directed by electronic solenoids to control:

- Engagement feel
- Shift feel
- Shift scheduling
- Modulated Torque Converter Clutch (TCC) applications

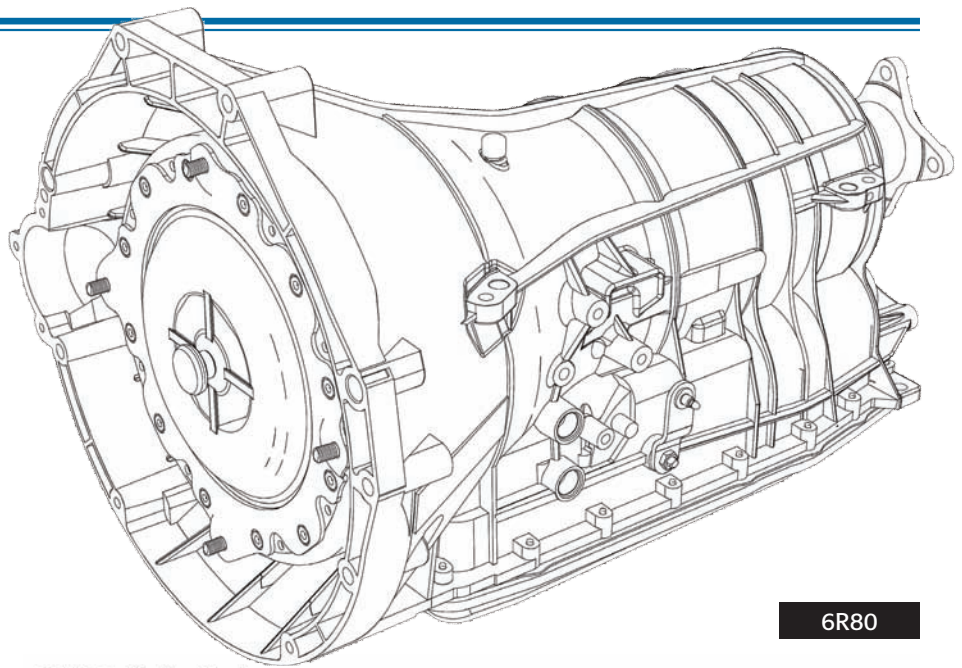
This transmission includes a Mechatronic unit — also referred to as a TCM — which contains:

- Turbine Shaft Speed (TSS) sensor
- Output Shaft Speed (OSS) sensor
- Internal P, R, N, D selector shaft position
- Transmission Fluid Temperature (TFT) sensor

The torque converter includes a converter clutch. Two planetary gearsets create six forward ranges and one reverse.

## The Fluid

**CAUTION:** Always use the factory recommended fluid. Using anything other than the fluid specified can cause the transmission to fail or operate improperly.



6R80

Clutch Application Chart

Gear	SSA (VFS1) Proportional	SSB (VFS2) Inversely Proportional	SSC (VFS3) Proportional	SSD (VFS4) Inversely Proportional	PCA (VFS5) Inversely Proportional	TCC (VFS6) Proportional	SSE (SS1) ON/OFF
Park				X	a		
Reverse		X		X	a		
Neutral				X	a		
1st Gear Manual	X			X	a	a	
2nd Gear Manual	X		X		a	a	
3rd Gear Manual	X	X			a	a	
1st Gear D	X			X	a	a	
2nd Gear D	X		X		a	a	
3rd Gear D	X	X			a	a	
4th Gear D	X			X	a	a	X
5th Gear D		X		X	a	a	X
6th Gear D			X	X	a	a	X

a Transmission control module (TCM) controlled

1. Raise the vehicle with the transmission in neutral.
2. Remove the transmission fluid fill plug and fluid level indicator assembly located on the passenger side front of the case. This relieves any vacuum buildup in the transmission, making it easier to remove the pan.
3. Remove the pan and allow the fluid to drain.
4. Remove the pan gasket; if it isn't damaged, you can reuse it during reassembly.
5. Remove the transmission filter; you may reuse the filter if it isn't severely contaminated.
6. Clean and inspect the transmission fluid pan and magnet.

**NOTE:** If you're repairing the transmission for a contamination-related failure, install a new filter and seal assembly. You can reuse the filter if the unit isn't severely contaminated.

7. Check the transmission case for the filter seal. If the seal is in the case, carefully remove the seal without scratching the case.
8. Install the filter; make sure a new seal is on the filter and lubricate the seal with ATF.
9. Position the magnet in the transmission fluid pan.
10. Install the pan gasket.
11. Install the pan and tighten the bolts to 12 Nm (106 lb-in) using a criss-cross pattern.
12. Fill and check the transmission fluid.

## Shift Speeds

**NOTE:** Shift speed ranges are approximate for all applications. For specific applications (engine, axle ratio, tire size and application), refer to the Automatic Transmission Specification booklet. Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.

Throttle Position	Shift	MPH	Km/H
Light Throttle	1-2	8-13	13-21
	2-3	16-21	26-34
Throttle Position Sensor Voltage	3-4	22-27	35-43
	4-5	35-40	56-64
	5-6	44-49	71-79
1.25 Volts	6-5	35-40	56-64
	5-4	25-30	40-48
	4-3	8-13	13-21
	3-2	2-7	3-11
	2-1	1-4	2-6
Closed Throttle	1-2	28-33	45-53
	2-3	54-59	87-95
	3-4	87-92	140-148
Wide Open Throttle	1-2	28-33	45-53
	2-3	54-59	87-95
	3-4	87-92	140-148

## Material

Gear Ratio	
1st	4.17 to 1
2nd	2.34 to 1
3rd	1.52 to 1
4th	1.14 to 1
5th	0.87 to 1
6th	0.69 to 1
Reverse	3.40 to 1

Item	Specification	Fill Capacity
Dye-Lite® ATF/Power Steering Fluid Leak Detection Dye 164-R3701 (Rotunda)	—	—
Motorcraft® MERCON® LV Automatic Transmission Fluid XT-10-QLV	MERCON® LV	10.4L (11 qt)
Multi-Purpose Grease XG-4 and/or XL-5	ESB-MIC93-B	—

## Clutch Application Chart

Gear	Forward (A)	Direct (B)	Intermediate (C)	Low/Reverse (D)	Overdrive (E)
Park				X	
Reverse		X		X	
Neutral				X	
1st Gear Manual	X			X	
2nd Gear Manual	X		X		
3rd Gear Manual	X	X			
1st Gear D	X			X	
2nd Gear D	X		X		
3rd Gear D	X	X			
4th Gear D	X				X
5th Gear D		X			X
6th Gear D			X		X

## GM 2ML70

The next generation of transmissions to enter the marketplace has been introduced for the 2008 model year. Known as a 2-mode design, the transmission was designated as the 2ML70 (RPO M99).

The 2ML70 is available with the 6.0L engine (RPO LFA) and the hybrid system (RPO HP2). The 2-mode system was introduced on the Chevrolet Tahoe and GMC Yukon for the 2008 model year. Its use will expand for 2009.

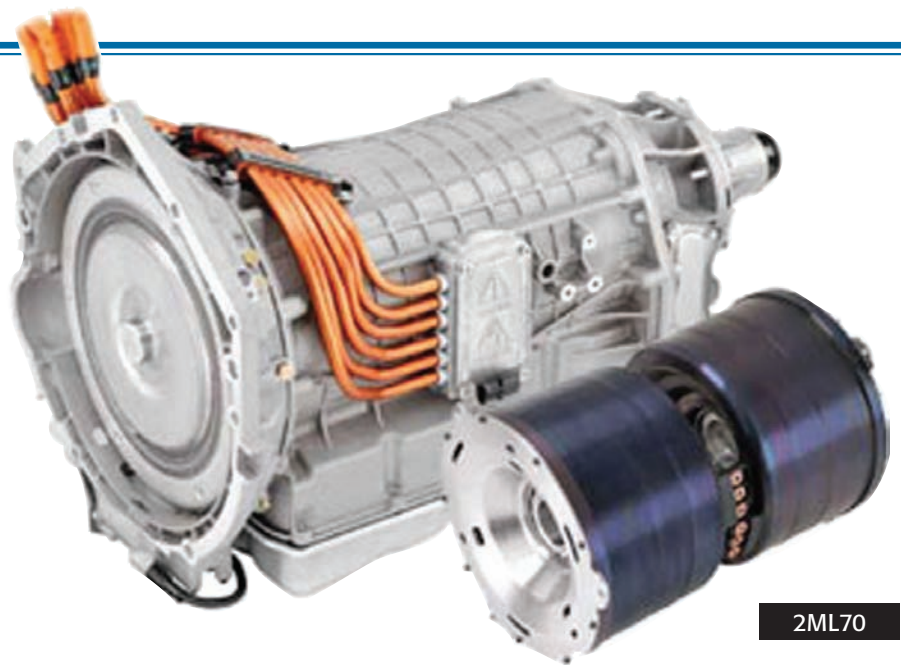
The "T" model transmission will be designated for rear wheel drive applications, the "C" model will be an upscale rear wheel drive application, while the "F" model will be a front wheel drive application. The 2ML70 is also used by Dodge and BMW in some of their vehicles.

The 2-mode design offers several advantages over conventional automatic transmissions, including substantial gains in performance, fuel economy, and significant emissions reduction. Overall fuel economy gains for the C/K truck ranges between 25-40%. In addition to the common transmission functions, the 2ML70 also eliminates the need for an alternator or starter.

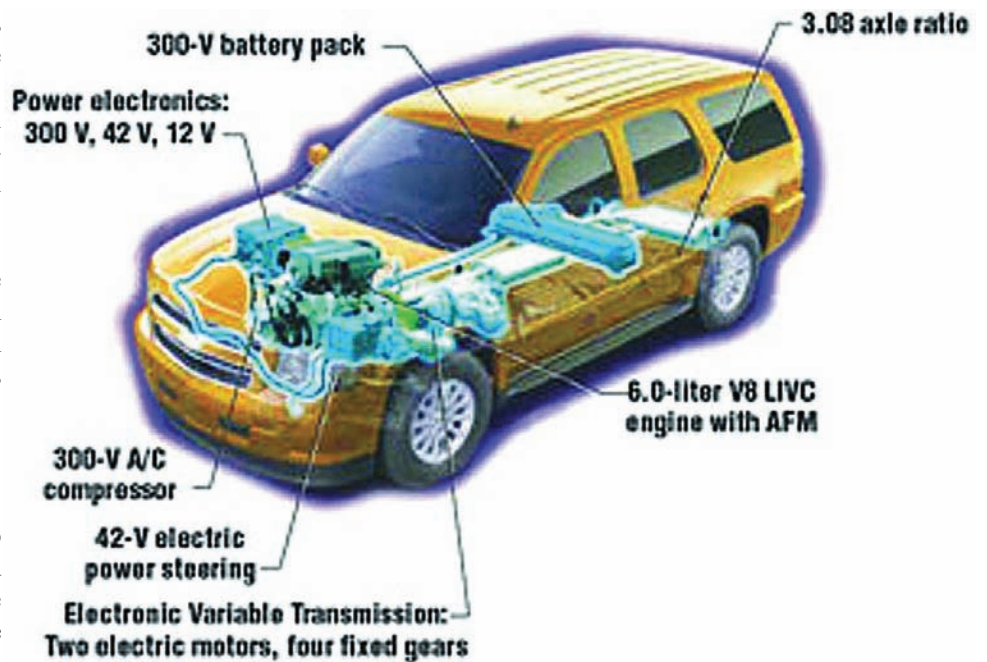
### The Guts

The 2ML70 is a 2-mode, continuously variable, electric ratio hybrid transmission with four fixed gear ratios. Two electric motors provide infinitely variable ratios, with engine on/off operational capability.

- Gear Ratios
  - 1<sup>st</sup> — 3.69:1
  - 2<sup>nd</sup> — 1.70:1
  - 3<sup>rd</sup> — 1.00:1
  - 4<sup>th</sup> — 0.73:1
- EVT #1 Infinity to 1.70:1
- EVT #2 1.70 to 0.50:1
- Reverse Infinity to 1.70:1
- Max engine torque 380 lb-ft (515 Nm)
- Max engine power 369 bhp (275 kW)
- Two 65 kW (peak) electric motors (Drive Motor #1, Drive Motor #2); Y-wound, 3-phase, 300 volts AC, permanent magnet
- Motor cooling accomplished by a transmission fluid circulation system



2ML70



- Electric motor torque 242 lb-ft (320 Nm)
- 300-volt, 40-cell nickel-metal-hydride battery (located under the back seats)
- Auxiliary fluid pump
- Three planetary gearsets
- Four multiple-disc clutches (2 holding, 2 driving)
- Two shift solenoids used (On/Off design): SS1, SS2
- Six variable bleed solenoids: PCS, PCS2, PCS3, PCS4, PCS5, TCC (TCC not used)

### The Fluid

This unit is filled for life and doesn't require replacement.

**WARNING:** Servicing a 2-mode vehicle or transmission requires specialized training. Failure to follow proper safety procedures can cause injury or death. Some basic service procedures:

- Pay close attention to all Hazard Labels.

Hazard labels identify where potential shock hazards may occur. Areas include the transmission, high voltage cables (orange or blue), hybrid battery, DMGCM, PIM, APM, A/C compressor, and so on.



# GM 2ML70

- Always use personal protective equipment.

Class 0, 1000-volt electrical protective gloves are *required*. Always check the expiration date on gloves; never use gloves after their expiration date. Always check the gloves for pinholes and general overall condition.

- Always wear proper eye protection.

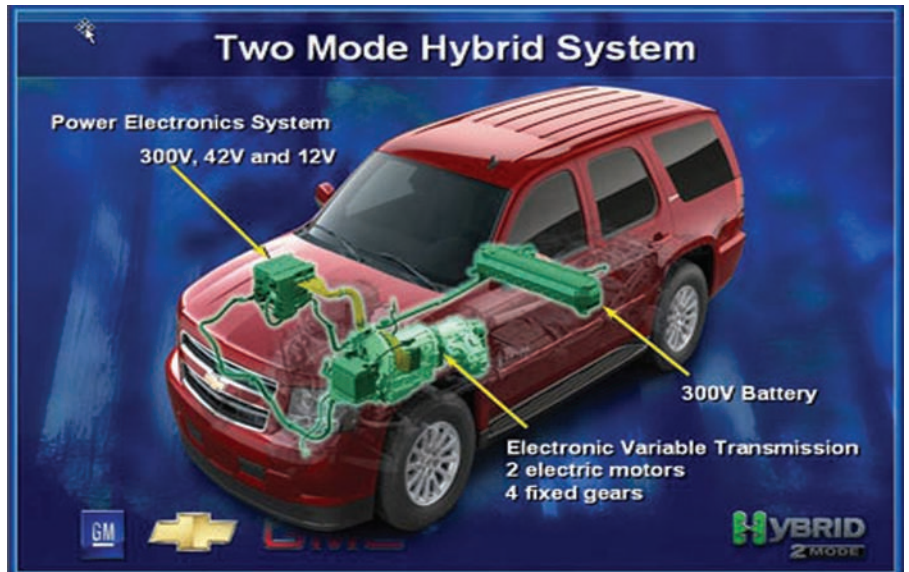
Your digital multimeter and leads must meet or exceed category 3 or 1000-volt specifications.

- Never place both hands across vehicle components. Touching the wrong exposed terminals or leads may lead to injury or death. Use the *One-Hand Rule* — Only use one hand for diagnosis and repair when possible. Keep the other hand behind your back.
- Remove *all* jewelry, belt buckles, watches and other metal items before servicing these vehicles.
- Any time you disconnect high voltage leads, always insulate the ends using GM tools EL-48569 or UL-listed isolation tape rated at 600

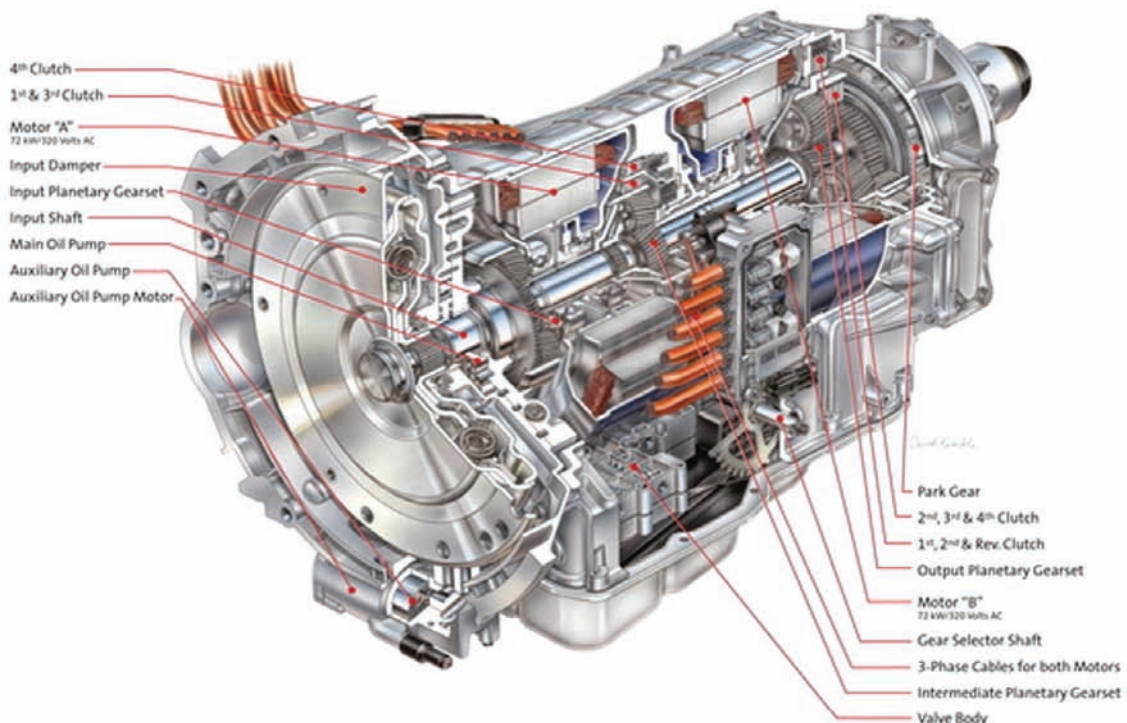
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- volts or more.
- Always torque all high voltage terminals to specifications.
- Never use AC-powered test equipment to probe the high voltage system.
- Before servicing any high voltage systems — including the transmission — *always disable the system using the this procedure:*
  - o Remove the ignition key.

- o Remove the cover from the passenger side of the hybrid battery assembly.
- o Remove the high voltage manual disconnect lever.
- o Wait at least 5 minutes for the system capacitors to discharge.
- o Disconnect the vehicle's 12-volt battery.



## 2-Mode RWD Hybrid Transmission



# GM 6T40/6T45

Two additional 6-speed transaxles have been introduced into the GM family: the 6T40 and 6T45. Known as the *global 6-speed* or GF6, the 6T40/6T45 improves fuel economy an average of 4% and performance 8% over its 4-speed cousins. The 6T40/6T45 share the same architecture and most of the parts are the same.

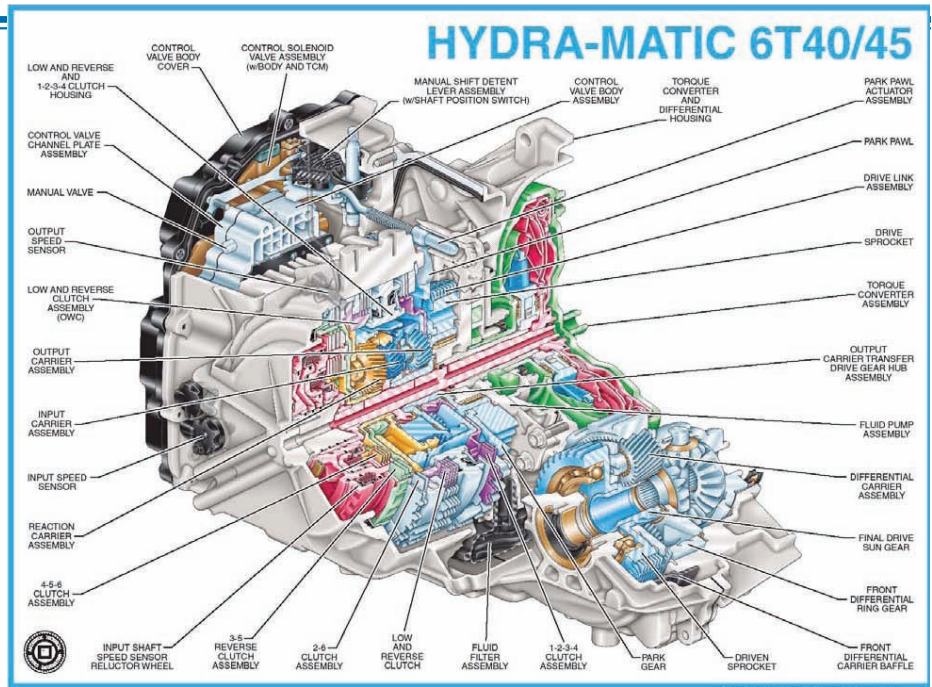
The first car to receive this transaxle in the United States was the 2008 Chevrolet Malibu, followed by the 2009 Saturn Aura and Pontiac G6. It's also the primary application for the Daewoo Tosca and Buick Lacrosse in Asia, and the Chevrolet Epica in Europe.

The 6T40/45 family of transaxles is poised to become the largest 6-speed FWD application that GM will produce. In the US market the transaxles will be fitted behind gas engines, while those destined for the European markets may be used with diesel engines.

## The Guts

The primary difference between these two units is the 6T45 is a heavy-duty version of the 6T40. The heavy-duty parts in the 6T45 include:

- 1.25" wide chain verses a 1" chain
- Input planetary is a 5-pinion assembly
- Heavier ribbed case
- Heavier differential



## Checking Fluid Level

The 6T40/45 use a thermal element to control the oil level, similar to other GM units. Known as a *Fluid Level Control Valve*, the unit is basically a thermally-controlled stand pipe.

At temperatures below 60°C (140°F), fluid is allowed to drain into the sump.

At temperatures above 60°C (140°F), drainback is blocked, allowing the side cover (valve body area) to fill with fluid. If you're changing fluid in one of these units, make sure the unit is cold.

If you remove the drain plug in the bottom of the case, only about 50% of the fluid will drain out of the unit.

You'll need to remove the bottom pan to drain the unit completely.

To check the fluid level, the transaxle TFT value must fall between 85°–95°C (185°–203°F). You can check the fluid temperature from the Driver Information Center or with a scan tool.

Checking the fluid at the wrong temperature can cause you to overfill or underfill the transaxle. These units are very sensitive to overfill. As little as ½ quart overfull can lead to fluid leaking from the vent.

Check the fluid level with the engine running, fluid temp 85°–95°C (185°–203°F), and transaxle in park. Then check the fluid level via a plug (most applications) near the axle seal in the case.

## RANGE REFERENCE 6T40/6T45

COMPONENT	PARK NEUTRAL	REV	1 <sup>ST</sup> BRK	1 <sup>ST</sup>	2 <sup>ND</sup>	3 <sup>RD</sup>	4 <sup>TH</sup>	5 <sup>TH</sup>	6 <sup>TH</sup>
1-2-3-4 CLUTCH			ON	ON	ON	ON	ON		
3-5 REV CLUTCH		ON				ON		ON	
4-5-6 CLUTCH							ON	ON	ON
LOW/REV CLUTCH	ON	ON	ON						
2-6 CLUTCH					ON				ON
LOW ONE WAY			ON	ON					

**NOTE: The Low/REV clutch is applied when the vehicle is in a forward range and the vehicle is stationary. As vehicle speed is indicated, the L/R clutch will be released. This increases torque capacity under load with the vehicle stationary**

# IMPORT: MERCEDES 722.9

The 722.9 has been around since the later part of 2004, but there isn't much information available about it. Along with seven forward speeds, this unit also has two reverse gear ratios (similar to the 722.6), depending on whether it's in Sport or Comfort mode. This 5<sup>th</sup> generation transmission is the first 7-speed automatic produced by Mercedes Benz. The Mercedes designation for this transmission is New Automatic Gearbox 2 (NAG2) or 7G-Tronic.

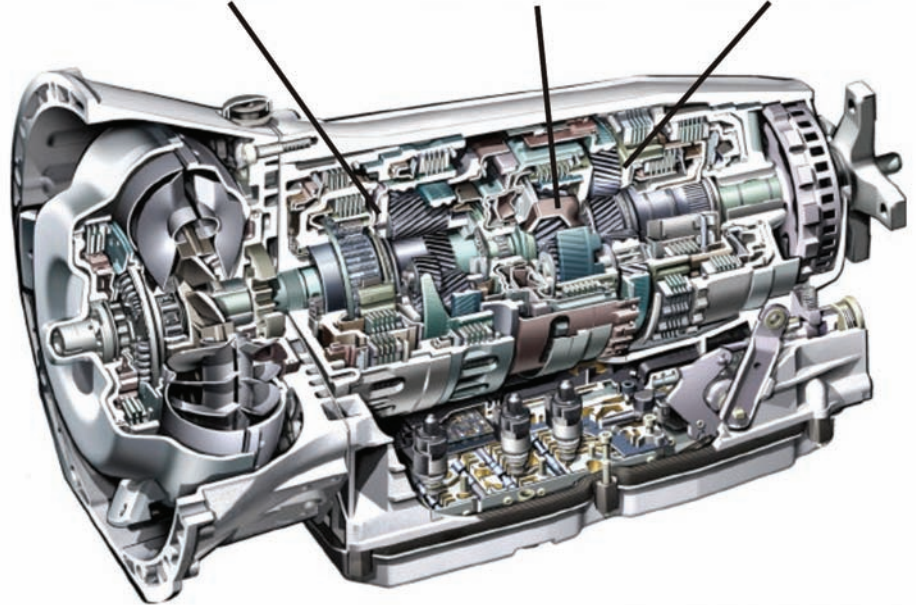
The 722.9 is available in these vehicles:

- 2004–06 SL500
- 2005–up CL500, E500, S430, 500, SLK350, 55 AMG
- 2006–up C230, 280, 350, CLK350, CLS500, E350, E63 AMG, R350, 500, SLK280
- 2007–up CLK550, CLS550, CL600, CLS63 AMG, E550, E63 AMG, GL320, 450, ML350, 500, ML63 AMG, R63, and S550.

## The Guts

- 4 multidisc brakes
- 3 multidisc clutches
- No sprag

Ravigneaux Planet Front      Simple Planet Middle      Simple Planet Rear



Gear ratios are achieved with one Ravigneaux and two simple planetary assemblies shown in figure x. Unlike the Lepelletier geartrain, the 722.9 geartrain has the sun gear fixed to the K1 clutch assembly. Although located in the front of the unit (figure x), the Ravigneaux planetary assembly is also located in the front section of the transmission (figure x). There are two simple planets located toward the back of the transmission, one in front of the other.

## The Fluid

The 722.9 requires a newly developed, suggested-use-only transmission fluid, referred to as ATF 3353. It claims higher friction consistency, thermal stability and temperature rating, and can be used on previous model 722.3/.4/.5/.6 transmissions. No scheduled maintenance required (fill for life) and the fluid is available at Shell and Fuchs Europe oil suppliers in 1-liter bottles under Mercedes Benz

Shift Member		B1	B2 *	B3	BR *	K1	K2	K3
Shift Valve		Y3/8y5	Y3/8y6	Y3/8y7	Y3/8y6	Y3/8y2	Y3/8y3	Y3/8y4
Valve State		Pressure / Current	Pressure / Current	Pressure / Current	Pressure / Current	Pressure / Current	Pressure / Current	Pressure / Current
Gear	Ratio	▲	▲	▲		▲	▲	▲
1	4.377	C=Max / P=0	X / C=V / P=V	X / C=V / P=V		C=0 / P=0	C=Max / P=0	X / C=V / P=V
2	2.859	X / C=V / P=V	X / C=V / P=V	C=0 / P=0		C=0 / P=0	C=Max / P=0	X / C=V / P=V
3	1.921	C=Max / P=0	X / C=V / P=V	C=0 / P=0		X / C=V / P=V	C=Max / P=0	X / C=V / P=V
4	1.368	C=Max / P=0	X / C=V / P=V	C=0 / P=0		X / C=V / P=V	X / C=V / P=V	C=Max / P=0
5	1	C=Max / P=0	C=0 / P=0	C=0 / P=0		X / C=V / P=V	X / C=V / P=V	X / C=V / P=V
6	0.82	X / C=V / P=V	C=0 / P=0	C=0 / P=0		C=0 / P=0	X / C=V / P=V	X / C=V / P=V
7	0.728	C=Max / P=0	C=0 / P=0	X / C=V / P=V		C=0 / P=0	X / C=V / P=V	X / C=V / P=V
N (1)		C=Max / P=0	C=0 / P=0	X / C=V / P=V	C=0 / P=0	C=0 / P=0	C=Max / P=0	X / C=V / P=V
N (2)		X / C=V / P=V	C=0 / P=0	C=0 / P=0	C=0 / P=0	C=0 / P=0	C=Max / P=0	X / C=V / P=V
R (1)	-3.416	C=Max / P=0	see BR	X / C=V / P=V	X / C=V / P=V	C=0 / P=0	C=Max / P=0	X / C=V / P=V
R (2)	-2.231	X / C=V / P=V	see BR	C=0 / P=0	X / C=V / P=V	C=0 / P=0	C=Max / P=0	X / C=V / P=V

X = Shift member applied    C = Current applied to solenoid valve    P = Pressure from solenoid valve to shift member (0 = zero / V = variable / Max = maximum)

\* B2 and BR share the same solenoid valve, the oil is directed to a different member via the selector shift valve.

▲ No current = no pressure (1) = S mode  
 ▼ No current = max. pressure (2) = C mode

If transmission enters emergency mode while driving, all solenoid valves are switched off. Trans will shift into 6th gear.

? This is because the solenoid valves for B1, K2 & K3 deliver max pressure with no current applied.

? After engaging P position, then D position; only 2nd and R gear is available.

# IMPORT: MERCEDES 722.9

part number A001 989 45 03 10.

This transmission has no dipstick. The fluid level is checked using the overflow method. The oil pan has an overflow pipe clipped onto the pan, just above the drainplug. The fluid level must be checked at a specific fluid temperature.



- Continued -

Gear	Gear ratio W7A 700	B 1	B 2	B 3	BR	K 1	K 2	K 3
1	4.377		●	●				●
2	2.859	●	●					●
3	1.921		●			●		●
4	1.368		●			●	●	
5	1.000					●	●	●
6	0.820	●					●	●
7	0.728			●			●	●
N (1)				●				●
R (1)	-3.416			●	●			●
R (2)	-2.231	●			●			●

