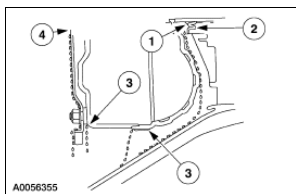


Item	Part Number	Description
1	7F401	Seal assembly converter impeller hub
2	7A137	Pipe plug 1/8-27 dry seal case (pressure taps - 4 required)
3	7D273	Connector assembly 3/8-18 cooler line fitting (2 required)
4	7B353	Gasket transaxle split flange
5	7F337	Seal assembly manual control
6	7A020	Indicator assembly fluid level
7	7N243	Grommet fluid filler tube
8	7G331	Gasket pump body separator
9	7B498	Seal manual control lever
10		Lever assembly manual control
11	N605903-S36	Bolt M8 - 1.25 x 17 hex flange head (attaches manual control lever)
12	1177	Seal assembly differential (2 required)
13	7Z101	O-ring transmission speed sensor
14	7A248	Seal pump O-ring
15	7N279	Plug 1/4-18 dry seal tapered thread (line pressure)
16	7D027	Cover assembly intermediate overdrive servo
17	7F396	Gasket main control cover
18	7A246	Vent assembly main control cover

Fluid Leakage in Torque Converter Area

Use the following procedures to locate the exact source of leakage in the torque converter area. Leakage at the front of transaxle, as evidenced by fluid around the converter housing, may have several sources. By careful observation, it is possible in many instances to pinpoint the source of the leak before removing the transaxle from the vehicle. The paths which the fluid can take to reach the bottom of the converter housing are as follows (numbers on illustration relate to items below):

Leakage Points



1. Fluid leaking by the converter impeller hub seal lip will tend to move along the drive hub and onto the back of the impeller housing. Except in the case of a total seal failure, fluid leakage by the lip of the seal will be deposited on the inside of the converter housing only, near the outside diameter of the housing.
2. Fluid leakage by the outside diameter of the converter impeller hub seal and the case will follow the same path as leaks by the inside diameter of the seal.
3. Fluid leakage from the converter-to-flexplate stud weld will appear at the outside diameter of the torque converter, on the back face of flexplate, and in the converter housing only near the flexplate. If a converter-to-flexplate stud leak is suspected, remove converter and pressure check.
4. Engine oil leaks are sometimes incorrectly diagnosed as transaxle pump seal leaks. The following areas of possible leakage should be checked to determine if engine oil leakage is causing the concern.
 - Leakage at the valve cover may allow oil to flow over the converter housing or seep down between the converter housing and cylinder block causing oil to be present in or at the bottom of the converter housing.
 - Oil plug leaks will allow oil to flow down the rear face of the cylinder block to the converter housing.
 - Leakage at the crankshaft seal will work back to the flexplate and then into the converter housing.

Leak Check Test

The following procedures should be used to determine the cause of the leakage before repair is made.

1. Remove the fluid level indicator and note the color of the fluid. Original factory fill fluid is dyed red to aid in determining if leakage is from the engine or transaxle. Unless a considerable amount of makeup fluid has been added or the fluid has been changed, the red color should assist in pinpointing the leak.
2. Remove the dust cover. Clean off any fluid from the top and bottom of the converter housing, front of the case, and rear face of the engine and oil pan. Clean the torque converter area by washing with a suitable nonflammable solvent and blow dry with compressed air.
3. Wash out the converter housing and the front of the flexplate. The converter housing can be washed out using cleaning solvent and a squirt-type oil can. Blow dry all washed areas with compressed air.
4. Start and run the engine until the transaxle reaches normal operating temperature. Observe the back of the block and top of the converter housing for evidence of fluid leakage. Raise the vehicle on a hoist. Run the engine at fast idle, then at engine idle, occasionally shifting to the DRIVE and REVERSE ranges to increase pressure within the transaxle. Observe the front of the flexplate, back of the block (in as far as possible) and inside the converter housing and front of the case. Run the engine until fluid leakage is evident and the source of leakage can be determined.

Leak Check Test With Black Light

Oil-soluble aniline or fluorescent dyes pre-mixed at the rate of 2.5 ml (1/2 teaspoon) of dye powder to 0.23 liter (1/2 pint) of transmission fluid have proven helpful in locating the source of fluid leakage. Such dyes can be used to determine whether an engine oil or transmission fluid leak is present, or if the fluid in the transmission fluid cooler leaks into the engine coolant system. A black light must be used with the fluorescent dye solution.

Transmission Fluid Cooler

⚠ CAUTION: Whenever a transaxle has been disassembled to install new parts or because the valve body sticks from foreign material, the torque converter and transmission fluid cooler must be cleaned by using a suitable cleaner. Under no circumstances should an attempt be made to clean converters by hand agitation with solvent.

When internal wear or damage has occurred in the transaxle, metal particles, clutch plate material or band material can be carried into the torque converter and transmission fluid cooler. These contaminants are a major cause of recurring transaxle concerns and must be removed from the system before the transaxle is returned for repair.

Transmission Fluid Cooler Flow Test

NOTE: The transaxle linkage adjustment, fluid level and line pressure must be within specification before carrying out this test. Refer to [Section 307-05](#) for transaxle linkage adjustment procedure. For transmission fluid level checking procedures, refer to [Preliminary Inspection](#) in this section. For transaxle line pressure testing, refer to [Special Testing Procedures](#) in this section.


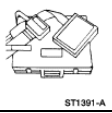







1. Remove fluid level indicator from fluid filler tube.
2. Place funnel in fluid filler tube.
3. Raise vehicle on hoist and position suitable safety stands under vehicle.
4. Remove cooler return line (rear fitting) from fitting on transaxle case.
5. Connect one end of a hose to the cooler return line and route the other end of the hose up to a point where it can be inserted into the funnel at the fluid filler tube.
6. Remove safety stands and lower vehicle. Insert end of hose into funnel.
7. Start engine and run at idle with transaxle in NEUTRAL range.
8. When fluid flowing from hose is all liquid, an adequate amount of fluid should be observed (approximately 1.0 liter (1.0 quart) of liquid delivered in 15 seconds). If adequate flow is observed, test is completed.
9. If flow is not adequate, stop engine. Disconnect hose from cooler return line and connect it to converter-out line (front fitting) on case.
10. Repeat Steps 7 and 8. If flow is now liberal, carry out back flushing and cleaning procedures in [Cleaning and Inspection](#). Refer to diagnosis of transaxle fluid cooler, [Section 307-02](#) . If flow is still not liberal, repair the pump or converter.

Transmission Fluid Cooler Tube Replacement

When fluid leakage is found at the transmission fluid cooler tubes or installation of new cooler tubes is necessary, refer to [Section 307-02](#) .

Diagnosis By Symptom

Special Tool(s)

 ST1644-A	CD4E Cable 418-F113 (007-00125) or equivalent
 ST1391-A	Breakout Box, EEC-V Control System 418-049 (T94L-50-EEC-V) or equivalent
 ST1645-A	MLP-D Cable 418-F117 (007-00129) or equivalent
 ST2332-A	Worldwide Diagnostic System (WDS) 418-F224 New Generation STAR (NGS) Tester 418-F052 or equivalent
 ST1137-A	73III Digital Multimeter 105-R0057 or equivalent
 ST1639-A	Alignment Gauge, TR Sensor 307-351 (T97L-70010-A)
 ST1801-A	Air Test Plate, Transmission 307-301 (T94P-77000-S)
 ST1399-A	Transmission Tester 307-F016 (007-00130) or equivalent
 ST1300-A	12 Volt UV Spot Lamp 164-R0751 or equivalent

The Diagnosis by Symptom charts give the technician diagnostic information, direction and possible components of concern, using a symptom as a starting point.

The Diagnosis by Symptom charts are divided into two categories: electrical routines, indicated by 200 series numbers, and hydraulic/mechanical routines, indicated by 300 series numbers. The electrical routines list the possible electrical components that could cause or contribute to the symptom described. The hydraulic/mechanical routines list the possible hydraulic or mechanical components that could cause or contribute to the symptom described.

Diagnosis by Symptom Chart Directions

NOTE: The powertrain control module (PCM) has an adaptive learn strategy to electronically control the transaxle. The adaptive learn strategy will automatically adjust the shift feel to the driver demands. The first

2002 Escape Workshop Manual

few hundred miles of operation the transaxle may have abrupt shifts, this is a normal operation and will correct itself. If the battery has been disconnected for longer than 20 minutes the shift tables will reset and need to be relearned. Upshifting is controlled by the PCM. The PCM receives inputs from various engine and vehicle sensors along with driver demands to control shift scheduling, shift feel, and torque converter clutch operation.

1. Use the index and select the symptom/concern that best describes the condition.

2. Turn to the routine indicated in the index.

3. Always begin diagnosis of a symptom by using the following:

- ◆ preliminary inspections
- ◆ verification of condition
- ◆ fluid level check
- ◆ other test procedures as directed

4. Begin with the electrical routine if indicated. Follow the reference or action required statements. Always carry out the On-Board Diagnostic Tests as required. Never skip steps. Repair as required. If the concern is still present after electrical diagnosis, proceed to the hydraulic/mechanical routine listed.

NOTE: Not all concerns and conditions with electrical components will set a diagnostic trouble code (DTC). Be aware that components listed can still be the cause. Verify correct function of those components prior to proceeding to the hydraulic/mechanical routine listed.

5. The hydraulic/mechanical routines list possible hydraulic or mechanical components that could cause the concern. These components are listed in the removal sequence and by "most likely." All components listed must be inspected to verify correct servicing is carried out.

Diagnosis by Symptom Index

Title	Routines	
	Electrical ^a	Hydraulic/Mechanical
Engagement Concerns		
No Forward Only	201	301
No Reverse Only	202	302
Harsh Reverse or Forward	203	303
Delayed/Soft Reverse or Forward	205	305
No Forward and No Reverse	207	307
Shift Concerns		
Some or All Shifts Missing	210	310
Shift Timing Early/Late	211	311
Timing Erratic/Hunting	212	312
Feel Soft/Slipping	213	313
Feel Harsh	214	314
No First Gear, Engages in Higher Gear ("D" Position)	215	315
No Manual First Gear (First in "D", OK)	216	316

Torque Converter Operation Concerns		
No Apply	240	340
Always Applied/May Stall Engine	241	341
Other Shift Concerns		
Shift Lever Effort High	251	351
External Leaks	252	352
Vehicle Driveability Concerns	253	353
Noise/Vibration Forward/Reverse	254	354
Engine will Not Crank	255	355
No PARK Range	256	356
Transaxle Overheating	257	357
No Engine Braking in Manual First Position	258	358
No Engine Braking in DRIVE (TCS ON) or Manual 2nd Position	259	359
Vehicle Movement with Gear Selector in the "N" Position	262	362
Reference: Pressure Chart		401
Reference: Clutch/Band Application		601

^a Carry out electrical routines first.

Diagnostic Routines

ENGAGEMENT CONCERN: NO FORWARD

Possible Component	Reference/Action
201 - ELECTRICAL ROUTINE	
Powertrain Control Systems	
• No Electrical Concerns	
301 - HYDRAULIC/MECHANICAL ROUTINE	
Shift Linkage	
• Damaged, out of adjustment, misassembled	• Inspect and repair as required. Verify linkage adjustment. Refer to Section 307-05 . After repairing linkage, verify that the transmission range (TR) sensor is correctly adjusted.
Pump Assembly	
• Bolts out of torque specification	• Adjust bolts to specification.
• Gaskets damaged	• Inspect for damage. Install new as necessary.
• Porosity/cross leaks or ball plug missing or leaking, or a plugged hole	• Inspect for porosity and leaks. Install new as necessary.
• Pump support seal ring, No. 3 or No. 4, damaged	• Inspect for damage. Repair as necessary.
Main Controls	
• Bolts out of torque specification	• Adjust bolts to specification.
• Gaskets damaged or leaking	• Inspect for damage. Repair as necessary.
• Pressure tap plate/gasket damaged or leaking	• Inspect for damage. Repair as necessary.
• Separator plates damaged	• Inspect for damage. Repair as necessary.
• Hydraulic passages damaged	• Inspect for damage. Repair as necessary.
	• Inspect for damage. Repair as necessary.

2002 Escape Workshop Manual

• Main regulator valve stuck, damaged or misassembled	
• Forward accumulator leaking	• Inspect for damage. Repair as necessary.
Forward Clutch and Coast Clutch Assembly	
• Seals or pistons damaged	• Carry out Air Pressure Test. Inspect for damage. Repair as necessary.
• Forward clutch return spring damaged	• Inspect for damage. Repair as necessary.
• Ball check valve damaged	• Inspect for mislocation, poor seating, damage. Install new piston as necessary.
• Friction elements severely damaged or worn	• Check for abnormal wear, damage. Repair as necessary.
• Forward/coast/direct clutch cylinder damaged, leaking, misassembled or binding	• Inspect for damage. Repair as necessary.
• Cylinder to hub weld broken or splines damaged	• Inspect for damage. Repair as necessary.
• Low one-way clutch assembly, worn, damaged, misassembled	• Inspect for damage. Repair as necessary.
• Forward one-way clutch assembly, worn, damaged, misassembled	• Inspect for damage. Repair as necessary.
• Low intermediate carrier, damaged, misassembled	• Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: NO REVERSE ONLY

Possible Component	Reference/Action
202 - ELECTRICAL ROUTINE	
Powertrain Control System	
• Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module, SSA on, transmission range (TR) sensor	• Run On-Board Diagnostics tests. Refer to Powertrain Control/Emissions Diagnosis Manual for diagnosis. <u>Go To Pinpoint Test A</u> and <u>Go To Pinpoint Test D</u> .
302 - HYDRAULIC/MECHANICAL ROUTINE	
External Shift Linkage	
• Damaged, out of adjustment	• Inspect and repair as necessary. Verify linkage adjustment. Refer to <u>Section 307-05</u> . After repairing linkage, verify that the transmission range (TR) sensor is correctly adjusted.
Incorrect Pressures	
• Low line pressure	• Check pressure at line pressure tap. Carry out Line Pressure and Stall Speed Tests. Refer to <u>Special Testing Procedures</u> in this section. If pressure is low, check the following possible components: main control, pump assembly, reverse clutch assembly, low/reverse clutch assembly.
Main Controls	
• Bolts out of torque specification	• Adjust bolts to specification.
• Gasket damaged	• Inspect for damage. Repair as necessary.

2002 Escape Workshop Manual

• 1-2 shift valve, SSA, main regulator valve, low/reverse modulator valve, low/reverse accumulator piston, pressure tap plate damaged, missing, stuck, misassembled	• Inspect for damage. Repair as necessary.
• Separator plates damaged	• Inspect for damage. Repair as necessary.
• Hydraulic passages damaged	• Inspect for damage. Repair as necessary.
Pump Assembly	
• Bolts out of torque specification	• Adjust bolts to specification.
• Gasket damaged	• Inspect for damage. Install new as necessary.
• Porosity/cross leaks/ball plug missing or leaking, plugged hole	• Install a new pump assembly.
• Pump support seal rings, No. 6 or No. 7, damaged	• Inspect for damage. Repair as necessary.
Reverse Clutch Assembly	
	• Carry out Air Pressure Test.
• Seals, piston damaged	• Inspect for damage. Repair as necessary.
• Ball check valve damaged	• Inspect for damage. Repair as necessary.
• Friction elements worn, severely damaged or misassembled	• Inspect for damage. Repair as necessary.
• Piston return spring damaged	• Inspect for damage. Repair as necessary.
• Reverse clutch hub to forward/coast/direct hub splines damaged	• Inspect for damage. Repair as necessary.
Low/Reverse Clutch Assembly	
	• Carry out Air Pressure Test.
• Seals or piston damaged	• Inspect for damage. Repair as necessary.
• Friction elements worn or severely damaged	• Inspect for damage. Repair as necessary.
• Piston return spring damaged	• Inspect for damage. Repair as necessary.
• Wave springs missing	• Inspect for damage. Repair as necessary.
• Piston bore damaged	• Inspect for damage. Repair as necessary.
Forward/Coast/Direct Clutch Cylinder	
• Reverse seal rings damaged, missing, misassembled	• Inspect for damage. Repair as necessary.
Case	
• Reverse to low/reverse clutch feeds have severe cross- leakage or porosity	• Carry out Air Pressure Test.
	• Inspect for damage. Repair as necessary.
Reverse/Overdrive Gear Set	
• Damaged	• Inspect for damage. Repair as necessary.

ENGAGEMENT CONCERN: HARSH REVERSE OR FORWARD

Possible Component	Reference/Action
203 - ELECTRICAL ROUTINE	
Powertrain Control System	

<ul style="list-style-type: none"> • Electrical inputs/outputs, vehicle wiring harnesses, powertrain control module, EPC solenoid, transmission fluid temperature (TFT) sensor, 3-2 T/CCS 	<ul style="list-style-type: none"> • Run On-Board Diagnostics Tests. Refer to Powertrain Control/Emissions Diagnosis Manual for diagnosis. <u>Go To Pinpoint Test B</u> and <u>Go To Pinpoint Test E</u> .
303 - HYDRAULIC/MECHANICAL ROUTINE	
Fluid	
<ul style="list-style-type: none"> • Level 	<ul style="list-style-type: none"> • Fill to correct level.
<ul style="list-style-type: none"> • Condition 	<ul style="list-style-type: none"> • Inspect fluid condition. For additional information, refer to <u>Preliminary Inspection</u> in this Section.
CV Joints/Front Wheel Driveshaft and Joint	
<ul style="list-style-type: none"> • Splines damaged 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
Powertrain Mounts	
<ul style="list-style-type: none"> • Loose, broken, missing or misaligned 	<ul style="list-style-type: none"> • Inspect mounts. Repair as necessary.
<ul style="list-style-type: none"> • Powertrain contacting other vehicle components 	<ul style="list-style-type: none"> • Inspect for contact. Repair as necessary.
External Shift Linkage	
<ul style="list-style-type: none"> • Damaged, out of alignment 	<ul style="list-style-type: none"> • Inspect and repair as necessary. Verify linkage adjustment. Refer to <u>Section 307-05</u> . After repairing linkage, verify that the transmission range (TR) sensor is correctly adjusted.
Incorrect Pressures	
<ul style="list-style-type: none"> • Incorrect line pressure 	<ul style="list-style-type: none"> • Check pressure at line tap. Carry out Line Pressure and Stall Speed Tests. Refer to <u>Special Testing Procedures</u> in this section. If high, verify engagements at minimum EPC using the Transmission Tester. If line remains high, check the following components: main control.
Fluid Filter and Seal Assembly	
<ul style="list-style-type: none"> • Filter/seal damaged, plugged 	<ul style="list-style-type: none"> • Install a new filter and seal assembly.
<ul style="list-style-type: none"> • Recirculation seal damaged, plugged or out of position 	<ul style="list-style-type: none"> • Install a new recirculation seal.
Main Controls	
<ul style="list-style-type: none"> • Bolts out of torque specification 	<ul style="list-style-type: none"> • Adjust bolts to specification.
<ul style="list-style-type: none"> • Gaskets damaged 	<ul style="list-style-type: none"> • Inspect for damage. Install new as necessary.
<ul style="list-style-type: none"> • Low/reverse accumulator piston and spring (reverse), main regulator valve, forward accumulator piston and spring misassembled, stuck or damaged 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • EPC solenoid stuck or damaged 	<ul style="list-style-type: none"> • Inspect for damage, contamination. Activate solenoid using transmission tester. Repair as necessary.
Forward Clutch Assembly (Forward Only)	
<ul style="list-style-type: none"> • Forward clutch cylinder damaged 	<ul style="list-style-type: none"> • Carry out Air Pressure Test.
<ul style="list-style-type: none"> • Piston bore damaged 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Friction elements damaged, worn 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Forward clutch return spring damaged or missing 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.
<ul style="list-style-type: none"> • Ball check damaged 	<ul style="list-style-type: none"> • Inspect for damage. Repair as necessary.