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2013-1-18 Appendix G - Extended Warranty Coverage

For Base Part Number 9A825 (Speed Control Cable)
New Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
POWERTRAINCARE	3 Years	48000	90	131	87	9	1	0	0	0	0	0	0	0
		60000	3	8	14	2	0	0	0	0	0	0	0	0
		75000	8	19	5	1	0	0	0	0	0	0	0	0
		100000	5	13	20	1	0	0	0	0	0	0	0	0
	4 Years	36000	31	0	0	0	0	0	0	0	0	0	0	0
		48000	8	32	40	12	5	0	0	0	0	0	0	0
		60000	5	48	64	2	2	0	0	0	0	0	0	0
		75000	3	9	15	3	0	0	0	0	0	0	0	0
		100000	10	23	20	6	3	0	0	0	0	0	0	0
	5 Years	36000	2	7	11	6	2	1	0	0	0	0	0	0
		48000	0	4	6	2	0	1	0	0	0	0	0	0
		60000	31	68	79	25	8	3	0	0	0	0	0	0
		75000	22	63	111	34	7	1	0	0	0	0	0	0
		100000	22	76	94	18	2	2	0	0	0	0	0	0
	6 Years	36000	2	1	4	3	1	2	0	0	0	0	0	0
		48000	2	1	10	2	2	1	0	0	0	0	0	0
		60000	14	19	27	4	5	2	0	0	0	0	0	0
		75000	5	48	91	37	14	4	0	0	0	0	0	0
		100000	26	86	503	351	283	135	0	0	0	0	0	0
	7 Years	36000	0	0	2	1	0	0	0	0	0	0	0	0
		48000	0	0	2	0	0	0	0	0	0	0	0	0
		60000	0	10	3	5	1	1	0	0	0	0	0	0
		75000	0	9	14	1	3	0	0	0	0	0	0	0
		100000	0	0	22	7	1	1	0	0	0	0	0	0

Used Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
POWERTRAINCARE	6 Months	6000	61	20	50	71	82	37	38	9	7	1	1	0
	1 Year	12000	4	1	36	65	73	50	44	9	5	6	4	1
	2 Years	24000	0	8	100	150	200	135	121	27	29	10	15	3
	3 Years	24000	0	0	0	0	0	0	0	0	0	0	2	0
		36000	0	7	53	73	68	56	24	21	9	14	5	3
	4 Years	48000	0	4	48	60	71	18	16	10	7	4	2	0
	5 Years	60000	0	0	0	0	0	0	0	0	0	1	2	0

Extended Service Plan Contract Coverage

New Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
BASECARE	3 Years	48000	22	25	6	0	0	0	0	0	0	0	0	0
		60000	9	19	12	1	2	0	0	0	0	0	0	0
		75000	13	20	9	3	0	0	0	0	0	0	0	0
		76000	1	0	0	0	0	0	0	0	0	0	0	0
		100000	16	29	23	1	1	0	0	0	0	0	0	0
	4 Years	36000	88	0	0	0	0	0	0	0	0	0	0	0
		48000	14	19	22	14	6	4	0	0	0	0	0	0
		60000	11	26	19	8	5	0	0	0	0	0	0	0
		75000	22	40	12	5	2	0	0	0	0	0	0	0
		100000	26	58	46	24	0	1	0	0	0	0	0	0
	5 Years	36000	10	28	12	5	1	1	0	0	0	0	0	0
		48000	10	15	24	9	5	2	0	0	0	0	0	0
		60000	135	245	192	52	20	2	1	0	0	0	0	0
		75000	104	213	191	52	12	2	0	0	0	0	0	0
		100000	68	194	180	74	13	1	0	0	0	0	0	0
	6 Years	36000	11	10	9	4	4	3	0	0	0	0	0	0
		48000	12	16	17	9	2	1	0	0	0	0	0	0
		60000	63	107	99	57	33	10	0	0	0	0	0	0
		75000	64	163	297	133	57	8	0	0	0	0	0	0
		100000	53	123	135	36	17	2	0	0	0	0	0	0
	7 Years	36000	0	0	3	2	1	0	0	0	0	0	0	0
		48000	0	0	10	3	3	0	0	0	0	0	0	0
		60000	0	21	26	9	7	2	0	0	0	0	0	0
		75000	0	15	27	9	3	2	0	0	0	0	0	0
		100000	0	0	14	8	2	2	0	0	0	0	0	0

Used Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
BASECARE	6 Months	6000	4	1	32	45	38	32	25	5	3	0	0	2
	1 Year	12000	0	6	38	66	71	75	56	5	4	3	4	0
	2 Years	24000	0	36	270	345	385	264	202	63	24	26	22	7
	3 Years	24000	0	0	0	0	0	0	0	0	0	0	5	1
		36000	0	47	346	360	302	194	123	55	40	26	8	0
		48000	0	0	0	0	0	0	0	0	0	0	3	0
	4 Years	48000	8	40	144	160	130	62	32	17	25	11	4	1
		60000	0	0	0	0	0	0	0	0	0	0	1	0
	5 Years	60000	0	0	0	0	0	0	0	0	0	2	0	0

Extended Service Plan Contract Coverage

New Contract Counts

			2000 through 2003 MY Taurus and Sable											
	Coverage		Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
EXTRACARE	3 Years	48000	30	56	17	4	0	0	0	0	0	0	0	0
		60000	60	89	48	4	1	0	0	0	0	0	0	0
		75000	49	113	34	8	2	0	0	0	0	0	0	0
		100000	47	80	50	12	1	0	0	0	0	0	0	0
	4 Years	36000	2	0	0	0	0	0	0	0	0	0	0	0
		48000	29	60	53	13	10	2	0	0	0	0	0	0
		60000	62	109	59	14	1	0	0	0	0	0	0	0
		75000	118	236	98	27	7	0	0	0	0	0	0	0
		100000	160	302	172	44	0	0	0	0	0	0	0	0
	5 Years	36000	20	70	61	30	15	3	0	0	0	0	0	0
		48000	45	98	63	20	9	2	0	0	0	0	0	0
		60000	607	1240	765	140	31	10	1	0	0	0	0	0
		75000	942	1969	1265	267	69	6	0	0	0	0	0	0
		100000	255	713	647	135	36	0	0	0	0	0	0	0
	6 Years	36000	93	166	89	24	28	6	1	0	0	0	0	0
		48000	120	152	96	58	17	4	0	0	0	0	0	0
		60000	691	1169	758	198	73	32	0	0	0	0	0	0
		75000	611	1450	1768	523	221	54	1	0	0	0	0	0
		100000	230	577	320	83	31	3	0	0	0	0	0	0
	7 Years	36000	0	0	52	16	3	0	0	0	0	0	0	0
		48000	0	0	47	19	10	2	0	0	0	0	0	0
		60000	0	261	147	41	19	1	0	0	0	0	0	0
		75000	0	262	297	99	54	14	2	0	0	0	0	0
		100000	0	0	76	22	12	2	0	0	0	0	0	0

Used Contract Counts

			2000 through 2003 MY Taurus and Sable											
	Coverage		Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
EXTRACARE	1 Year	12000	0	3	32	38	24	18	21	7	3	0	0	0
	2 Years	24000	0	43	278	322	289	190	125	44	36	22	20	1
	3 Years	24000	0	0	0	0	0	0	0	0	0	0	5	0
		36000	1	153	816	702	512	265	149	61	30	19	13	1
		60000	0	0	0	0	0	0	0	0	0	0	0	1
	4 Years	36000	0	0	0	0	0	0	0	0	0	0	2	0
		48000	0	113	397	377	262	129	49	24	31	3	6	1
	5 Years	60000	0	0	0	0	0	0	0	0	0	4	3	0

Extended Service Plan Contract Coverage

New Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
PREMIUMCARE	3 Years	48000	110	154	110	12	8	0	0	0	0	0	0	0
		60000	165	231	294	15	3	1	0	0	0	0	0	0
		61000	14	1	0	0	0	0	0	0	0	0	0	0
		62500	61	80	230	0	0	0	0	0	0	0	0	0
		75000	106	210	166	28	5	0	0	0	0	0	0	0
		76000	0	1	2	0	0	0	0	0	0	0	0	0
		100000	96	250	161	21	2	0	0	0	0	0	0	0
		101000	5	2	2	0	0	0	0	0	0	0	0	0
	4 Years	36000	5	0	0	0	0	0	0	0	0	0	0	0
		48000	83	181	193	31	11	6	0	0	0	0	0	0
		49000	1	0	0	0	0	0	0	0	0	0	0	0
		60000	163	246	247	34	16	1	0	0	0	0	0	0
		75000	219	462	350	77	21	0	0	0	0	0	0	0
		100000	254	720	604	138	15	0	0	0	0	0	0	0
	5 Years	36000	88	280	348	94	60	27	0	0	0	0	0	0
		48000	95	219	368	85	38	15	0	0	0	0	0	0
		60000	1241	2658	2770	516	139	39	0	0	0	0	0	0
		75000	1732	4246	5224	1098	297	34	0	0	0	0	0	0
		76000	0	2	0	0	0	0	0	0	0	0	0	0
		100000	711	2135	2150	396	87	8	0	0	0	0	0	0
	6 Years	36000	492	911	801	305	174	103	3	0	0	0	0	0
		48000	397	512	534	206	81	32	2	0	0	0	0	0
		60000	1818	3386	4208	1233	509	259	6	0	0	0	0	0
		75000	1780	4635	5427	1527	595	163	4	0	0	0	0	0
		100000	838	2298	1497	286	118	15	0	0	0	0	0	0
	7 Years	36000	0	0	301	106	76	29	0	0	0	0	0	0
		48000	0	0	319	92	48	10	0	0	0	0	0	0
		60000	0	990	801	198	115	47	2	0	0	0	0	0
		75000	0	825	862	184	121	42	0	0	0	0	0	0
		100000	0	0	291	76	41	13	0	0	0	0	0	0

Used Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
PREMIUMCARE	1 Year	12000	0	2	15	17	29	12	19	9	4	1	0	0
	2 Years	24000	0	16	333	362	398	270	246	79	31	16	13	4
	3 Years	24000	0	0	0	0	0	0	0	0	0	0	13	1
		36000	0	39	375	649	526	310	206	100	45	55	29	5
		48000	0	0	0	0	0	0	0	0	0	0	2	0
		60000	0	0	0	0	0	0	0	0	0	0	0	1
	4 Years	36000	0	0	0	0	0	0	0	0	0	0	16	1
		48000	0	0	420	46	51	0	2	98	71	20	2	0
	5 Years	60000	0	0	0	0	0	0	0	0	0	15	8	1

Extended Service Plan Contract Coverage

Used Contract Counts

			2000 through 2003 MY Taurus and Sable											
	Coverage		Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
ROYALSHIELD	1 Month	1000	0	0	0	0	0	0	0	0	1	1	0	0
	2 Months	3000	0	0	0	0	0	0	0	4	2	1	0	0
	3 Months	4000	1	65	418	433	521	353	336	61	59	36	46	3
	6 Months	6000	0	8	2	0	0	0	0	0	0	0	13	0
	1 Year	12000	0		2	0	0	0	0	0	0	0	33	6
	2 Years	24000	0	0	0	0	0	0	0	0	0	0	0	1

For Base Part Number 9728 (Mounting Bracket)
New Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
PREMIUMCARE	3 Years	48000	110	154	110	12	8	0	0	0	0	0	0	0
		60000	165	231	294	15	3	1	0	0	0	0	0	0
		61000	14	1	0	0	0	0	0	0	0	0	0	0
		62500	61	80	230	0	0	0	0	0	0	0	0	0
		75000	106	210	166	28	5	0	0	0	0	0	0	0
		76000	0	1	2	0	0	0	0	0	0	0	0	0
		100000	96	250	161	21	2	0	0	0	0	0	0	0
		101000	5	2	2	0	0	0	0	0	0	0	0	0
	4 Years	36000	5	0	0	0	0	0	0	0	0	0	0	0
		48000	83	181	193	31	11	6	0	0	0	0	0	0
		49000	1	0	0	0	0	0	0	0	0	0	0	0
		60000	163	246	247	34	16	1	0	0	0	0	0	0
		75000	219	462	350	77	21	0	0	0	0	0	0	0
		100000	254	720	604	138	15	0	0	0	0	0	0	0
	5 Years	36000	88	280	348	94	60	27	0	0	0	0	0	0
		48000	95	219	368	85	38	15	0	0	0	0	0	0
		60000	1241	2658	2770	516	139	39	0	0	0	0	0	0
		75000	1732	4246	5224	1098	297	34	0	0	0	0	0	0
		76000	0	2	0	0	0	0	0	0	0	0	0	0
		100000	711	2135	2150	396	87	8	0	0	0	0	0	0
	6 Years	36000	492	911	801	305	174	103	3	0	0	0	0	0
		48000	397	512	534	206	81	32	2	0	0	0	0	0
		60000	1818	3386	4208	1233	509	259	6	0	0	0	0	0
		75000	1780	4635	5427	1527	595	163	4	0	0	0	0	0
		100000	838	2298	1497	286	118	15	0	0	0	0	0	0
	7 Years	36000	0	0	301	106	76	29	0	0	0	0	0	0
		48000	0	0	319	92	48	10	0	0	0	0	0	0
		60000	0	990	801	198	115	47	2	0	0	0	0	0
		75000	0	825	862	184	121	42	0	0	0	0	0	0
		100000	0	0	291	76	41	13	0	0	0	0	0	0

Used Contract Counts

	Coverage		2000 through 2003 MY Taurus and Sable Plan Years											
	Time	Mileage	2000	2001	2002	2004	2005	2006	2007	2009	2010	2011	2012	2013
PREMIUMCARE	1 Year	12000	0	2	15	17	29	12	19	9	4	1	0	0
	2 Years	24000	0	16	333	362	398	270	246	79	31	16	13	4
	3 Years	24000	0	0	0	0	0	0	0	0	0	0	13	1
		36000	0	39	375	649	526	310	206	100	45	55	29	5
		48000	0	0	0	0	0	0	0	0	0	0	2	0
		60000	0	0	0	0	0	0	0	0	0	0	0	1
	4 Years	36000	0	0	0	0	0	0	0	0	0	0	16	1
		48000	0	0	420	46	51	0	2	98	71	20	2	0
	5 Years	60000	0	0	0	0	0	0	0	0	0	15	8	1

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DRIVEABILITY—IDLE AIR CONTROL (IAC) VALVE DIAGNOSTIC SERVICE TIPS	Article No. 03-3-5

FORD: 2000-2003 TAURUS
2002 THUNDERBIRD
2000-2003 EXPLORER, RANGER
2001-2003 EXPLORER SPORT TRAC, EXPLORER SPORT

LINCOLN: 2000-2002 LS

MERCURY: 2000-2003 SABLE, MOUNTAINEER

ISSUE

Some vehicles, may exhibit drivability conditions. These may include:

- No start
- Difficult to start
- Stall
- Low idle
- Rough idle
- High idle
- Hesitation/surge while accelerating or at steady speed

These conditions may be intermittent with no Diagnostic Trouble Codes (DTC) and no Malfunction Indicator Lamp (MIL). In some cases DTC and MIL may be evident.

ACTION

Trouble cannot be identified with 95% of returned Idle Air Control (IAC) valves. The following procedure is supplemental information to normal diagnostics to facilitate accurate identification of malfunctioning valves. These symptoms would include engine stall, hard start, crank/no start, idling problems, and Idle Speed Control System related DTC's.

If the service writer uses the attached worksheet (Figure 2) for all drivability concerns including stalls it will assist the technician making a correct repair the first time.

Perform normal diagnostics.

SERVICE INFORMATION

NOTE

IT MAY NOT BE POSSIBLE TO DUPLICATE THE CUSTOMER CONCERN. ALTHOUGH THE CONDITION MAY NOT BE DUPLICATED, IT IS RECOMMENDED THAT ANY EVALUATION OF THE IAC VALVE BE DONE IN ACCORDANCE WITH THE FOLLOWING SERVICE PROCEDURE.

IAC DIAGNOSTIC SERVICE TIPS - GENERAL

Never clean an IAC valve. Carburetor cleaners and other cleaning agents may temporarily repair the drivability concern, but the long-term functionality of the valve is compromised.

For all drivability concerns, make certain the service writer obtains as much information as possible from the customer as to the conditions causing drivability concern. Attached is a drivability concern check off sheet (Figure 2) that if used, can help reduce the time required to diagnose a vehicle.

NOTE

IF THE ENGINE STALLED WHILE THE VEHICLE WAS IN GEAR AND MOVING THE POSSIBILITY OF THE IAC VALVE CAUSING THIS IS UNLIKELY UNLESS IT OCCURRED ON DECELERATION.

Use the following Supplemental information for 3.0L 4V Duratec Engines, in the Taurus/Sable, and Lincoln LS.

1. Use the following conditions for the test described below:
   - Transmission in park
   - Engine temperature should be at least 190° F (88° C)
   - All accessories should be off steering wheel in the center position
   - EGVR and EVAPDUTY CYCLE at zero, if the vehicle has an EGR system
   - Short and long term fuel trims less than 15%
   - At stabilized engine speed (RPM) and temperature (hot idle) per the Powertrain Control Emission Diagnostics (PC/ED) manual, verify the IAC duty cycle is within reference values called out in the following chart in this TSB.

NOTE
IT IS USUAL TO SEE THE IAC DUTY CYCLE VARY BY 1% TO 2% OVER SEVERAL MINUTES.

If the Duty Cycle is out of specification, proceed with the following steps:

1. Ensure that there is no purge flow.
2. Verify PCM harness integrity by performing a wiggle test on the harness while the engine is running and observe the IAC duty cycle and engine performance. Should abnormalities be observed, repair the harness as required.
3. For an IAC duty cycle high concern, unplug and plug in the IAC power connector several times. If the duty cycle remains high, replace IAC valve.
4. For an IAC duty cycle low concern, there may be an intake air leak. See the below IAC diagnostic service tip for DTC 1506 and other high idle concerns.

Use the following Supplemental information for the 3.9L Lincoln LS and Thunderbird.

1. Use the following conditions for the test described below:
   - Transmission in park
   - Engine idle at approximately 650 RPM
   - Engine temperature should be at least 190° F (88° C)
   - All accessories and the engine cooling fan should be off
   - Steering wheel in the center position
   - EGRVR and EVAPDUTY CYCLE are zero
   - Short and long term fuel trims less than 15%

NOTE
IT IS USUAL TO SEE THE IAC DUTY CYCLE VARY BY 1% TO 2% OVER SEVERAL MINUTES.

NOTE
IT IS EXTREMELY IMPORTANT TO CHECK THE IAC DUTY CYCLE WHEN THE RPM IS AT 650 RPM. EVEN 700 RPM IS TOO HIGH FOR CHECKING the IAC VALVE DUTY CYCLE UNDER THESE CONDITIONS. IF THE RPM IS OVER 650 RPM, MOMENTARILY OPENING AND CLOSING THE THROTTLE AND A SHORT EQUILIBRATION TIME WILL LOWER THE RPM.

At stabilized engine speed and temperature, verify that the IAC duty cycle is between 27-36% with no purge flow (EVAPV duty cycle is 0%).

If the Duty Cycle is out of specification, proceed with the following steps:

1. Ensure there is no purge flow.
2. Verify PCM harness integrity by performing a wiggle test on the harness while the engine is running and observe the IAC duty cycle and engine performance. Should abnormalities be observed, repair the harness as required.
3. For an IAC duty cycle high concern, unplug and plug in the IAC power connector several times. If the duty cycle remains high, replace IAC valve.
4. For an IAC duty cycle low concern, there may be an intake air leak. See the below IAC diagnostic service tip for DTC 1506 and other high idle concerns.

NOTE
IF THE ORIGINAL IAC VALVE WAS WITHIN DUTY CYCLE SPECIFICATION OR THE DUTY CYCLE REMAINS OUT OF SPECIFICATIONS AFTER IAC VALVE REPLACEMENT FURTHER DIAGNOSTICS ARE REQUIRED TO ADDRESS THE CUSTOMER CONCERN.

Use the following Supplemental information for 4.0L SOHC Engines in the Ranger, Explorer, Mountaineer, Explorer Sport and Explorer Sport Trac.

If no DTC's present check the following items in this order before examining the IAC valve:

- BARO Hz reading - Refer to Barometric Pressure Chart listed in this TSB
- Battery and fuse box power lead
- Ground wire attachments
- Wiring (wiggle test)
- PCM voltage
- Vacuum leaks

Examine IAC valve under these conditions:

- PCM updated to the latest available calibration
- Transmission in park
- Warm stabilized vehicle with engine temperature at least 190° F (88° C)
- All accessories and cooling fan should be off
- Steering wheel in the center position
- EGVR and EVAPDC at zero, if the vehicle has an EGR system
- Short and long term fuel trims (less than 15)

Perform the following steps in order:

1. Using either NGS or WDS bring up the following PIDS: IACTRIM, IACKAM2, IACKAM3.
2. Allow vehicle to idle until the IACTRIM PID is 0.

NOTE
IACTRIM ALWAYS TRIES TO GO TO 0. WHEN MOVING TOWARDS 0, THE IACKAM2 PID SHOULD BE CHANGING. IF IACKAM3 IS CHANGING, THEN THE AIR CONDITIONING SHOULD BE TURNED OFF.

3. If IACKAM2 is between -0.35 and +0.35 with IACTRIM=0, then the valve is operating properly at idle. The remainder of this TSB will help diagnose true root cause.
4. If IACKAM2 is not between -0.35 and +0.35, it is highly likely that the engine idle system (to include the throttle body and air intake system) is not operating properly.

NOTE
FOR ALL VEHICLES PLEASE RECORD THE OBSERVED IAC DUTY CYCLE AND ENGINE RPM IN THE WARRANTY CLAIMS COMMENTS FOR THIS DIAGNOSTIC.

IAC Diagnostic Service Tips - DTC 1506 (IAC Over Speed Error) and other High Idle Concerns:

- There are two primary causes of high idle:

1. Damaged IAC valves and
2. Vacuum leaks

- IAC valves can be damaged from engine induction backfires. Many times the customer may not notice the induction backfire but will notice the high idle afterwards. Indications of valve damage can be a shiny, almost polished appearance in the interior of the valve and a dislocated pintle. An IAC valve damaged by backfire should be replaced. Refer to Figure 1.
- Inspect PCV system for leaks especially looking for cracks along any rubber elbow joints; also verify that the correct PCV valve is installed.
- Inspect for vacuum hoses loose or disconnected from intended ports and connections. Induction backfire can loosen or disconnect vacuum hoses.
- Two indicators can help you identify if a vacuum leak is present, even if the engine RPM appear normal in the service bay. If the duty cycle is below specification that is indicative that the engine is receiving too much air (from a vacuum leak) and the PCM is ordering the valve to close up to restrict flow. Another indication is fuel trim. Record the long term and short term fuel trim PIDS (LONGFT1, LONGFT2, SHORTFT1, etc.), if short term fuel trims are high (above specification) this is a possible indication of a vacuum leak, making the engine run lean, and the PCM is attempting to compensate.

IAC Diagnostic Service Tips - DTC 1507 (IAC Under Speed Error) and Other Low Idle Concerns:

- An under speed error may not necessarily be a fault with the IAC valve. A large friction load on the engine or obstruction in the air intake system could also reduce the engine RPMs.
- There are four possible sources of friction load that can contribute to under speed error or low idle concerns.

1. Power Steering Load
2. Air Conditioning Load
3. Electrical Load
4. Automatic Transmission Torque Converter Load

IAC Diagnostic Service Tips - Rough Idle Concerns:

- Rough idle concerns are often a result of a lean running condition
- Another possible cause is contamination build up on the MAF sensor

IAC Diagnostic Service Tips - Engine Hard Start/Engine Crank-No Start

- While performing diagnostics, the technician should ensure that the fuel system is working correctly for all engines with hard start/crank no-start complaints.
- When diagnosing a mechanical return less fuel system, the following correction to the PC/ED pinpoint HC (4) diagnostic procedure should be used when performing the KEOE fuel pressure test:
- Perform the KOEO fuel pressure test as specific in the PC/ED manual.
- The fuel pressure should drop off no more than 10 psi from maximum pressure (no lower than 55 psi for a 65 psi max system or no lower than 45 psi for a 55 psi max system) within 5 minutes of the start of the test.
- The fuel pressure should drop off to no less than 30 psi within 30 minutes of the start of the test.
- For greatest accuracy, the service technician should read the fuel pressure as soon as possible after pump shut off, no more than 5 minutes after the start of the test.

NOTE

RETURNABLE AND ELECTRONIC RETURN LESS SYSTEMS SHOULD ALSO BE DIAGNOSED USING THE PROCEDURES LISTED FOR THEM IN PINPOINT TEST HC.

IAC Diagnostic Service Tips - High Idle RPM at Start Up:

- Most engines will have a temporary high idle at engine start up to allow for catalyst light off. If DTC 1506 is not present, this indicates that there is no fault present with the IAC.
- A vehicle with very low odometer miles, may exhibit a higher than normal temporary startup fast idle (1600-2500 RPM that decreases slowly). No repairs should be attempted because this is a normal temporary PCM calibration strategy to prevent spark plug fouling during plant/transportation operation. The calibration will permanently revert to its normal strategy after the PCM has seen its first 4 miles of continuous drive cycle. A brand new vehicle may accumulate some mileage without turning this strategy off if the drive cycle has been below 4 miles at a time.

IAC Diagnostic Service Tips - IAC Valve Noise Issues

For IAC valve noise concerns check for obstructed or potentially damaged IAC valve from backfire.

NOTE

ON SOME NEWER MODEL YEAR VEHICLES THE REACTION SPEED OF THE IAC VALVE IS FAST ENOUGH THAT IT MIGHT MAKE A "POPPING" SOUND AS IT REACTS TO A LARGE IDLE LOAD. THIS IS A NORMAL CHARACTERISTIC AND NO ATTEMPTS SHOULD BE MADE IN AN EFFORT TO MODIFY THE PERFORMANCE OF THE IAC VALVE. IF POSSIBLE, COMPARE AGAINST A LIKE VEHICLE.

2000 MODEL YEAR - IAC DUTY CYCLE AND ENGINE RPM				
Vehicle Line	Engine Size	IAC Duty Cycle	Engine DSDRPM	Engine RPM
Lincoln LS (A/T)	3.0L	27-47%	725	695-755
Lincoln LS (M/T)	3.0L	20-40%	850	820-880
Lincoln LS (A/T)	3.9L	27-36%	650	628-668
Taurus	3.0L 4V	16-50%	704	674-734
Sable	3.0L 4V	16-50%	704	674-734

2001 MODEL YEAR - IAC DUTY CYCLE AND ENGINE RPM				
Vehicle Line	Engine Size	IAC Duty Cycle	Engine DSDRPM	Engine RPM
Lincoln LS (A/T)	3.0L	27-47%	725	695-755
Lincoln LS (M/T)	3.0L	20-40%	850	820-880
Lincoln LS (A/T)	3.9L	27-36%	650	628-668
Taurus	3.0L 4V	24-52%	704	674-734
Sable	3.0L 4V	24-52%	704	674-734

2002 MODEL YEAR - IAC DUTY CYCLE AND ENGINE RPM				
Vehicle Line	Engine Size	IAC Duty Cycle	Engine DSDRPM	Engine RPM
Lincoln LS (A/T)	3.0L	30-50%	725	695-755
Lincoln LS (M/T)	3.0L	31-51%	850	820-880
Lincoln LS (A/T)	3.9L	27-36%	650	628-668
Thunderbird (A/T)	3.9L	27-36%	650	628-668
Taurus	3.0L 4V	24-52%	656	626-686
Sable	3.0L 4V	24-52%	656	626-686

2003 MODEL YEAR - IAC DUTY CYCLE AND ENGINE RPM				
Vehicle Line	Engine Size	IAC Duty Cycle	Engine DSDRPM	Engine RPM
Taurus	3.0L 4V	24-52%	656	626-686
Sable	3.0L 4V	24-52%	656	626-686

NOTE

REMEMBER THAT MOST WEATHER SERVICES REPORT A LOCAL BAROMETRIC PRESSURE THAT HAS BEEN CORRECTED TO SEA LEVEL. THE BARO PID, ON THE OTHER HAND, REPORTS THE ACTUAL BAROMETRIC PRESSURE FOR THE ALTITUDE THE VEHICLE IS BEING OPERATED IN. LOCAL WEATHER CONDITIONS (HIGH AND LOW PRESSURE AREAS) WILL CHANGE THE LOCAL BAROMETRIC PRESSURE BY SEVERAL INCHES OF MERCURY (±3 Hz, ±1 in. Hg.).

NOTE

BARO IS UPDATED ONLY WHEN THE VEHICLE IS AT HIGH THROTTLE OPENINGS. THEREFORE, A VEHICLE, WHICH IS DRIVEN DOWN FROM A HIGHER ALTITUDE MAY NOT HAVE HAD AN OPPORTUNITY TO UPDATE THE BARO VALUE IN KAM. IF YOU ARE NOT CONFIDENT THAT BARO HAS BEEN UPDATED, PERFORM THREE OR FOUR HEAVY, SUSTAINED ACCELERATIONS AT GREATER THAN HALF-THROTTLE TO ALLOW BARO TO UPDATE.

BAROMETRIC PRESSURE REFERENCE			
Barometric Pressure (in. Hg.)	Barometric Pressure (kPa)	BARO/MAP PID (Hz)	Altitude above sea level (ft)
3.5	11.8	89.3	
5	16.9	92.8	
10	33.8	104.6	
15	50.7	117.0	14,000
20	67.5	129.6	10,000
21	70.9	132.5	9,000
22	74.3	135.4	8,000
23	77.7	138.3	7,000
24	81.1	141.1	6,000
25	84.4	144.0	5,000
26	87.8	146.9	4,000
27	91.2	149.8	3,000
28	94.6	152.8	2,000
29	97.9	155.8	1,000
30	101.3	158.9	0 (sea level)
31	104.7	162.0	
31.875	107.7	164.7	

OTHER APPLICABLE ARTICLES: NONE
WARRANTY STATUS: INFORMATION ONLY
OASIS CODES: 602300, 603300, 607000, 607400, 607700, 608000, 608400, 611000, 618400, 619400, 698298

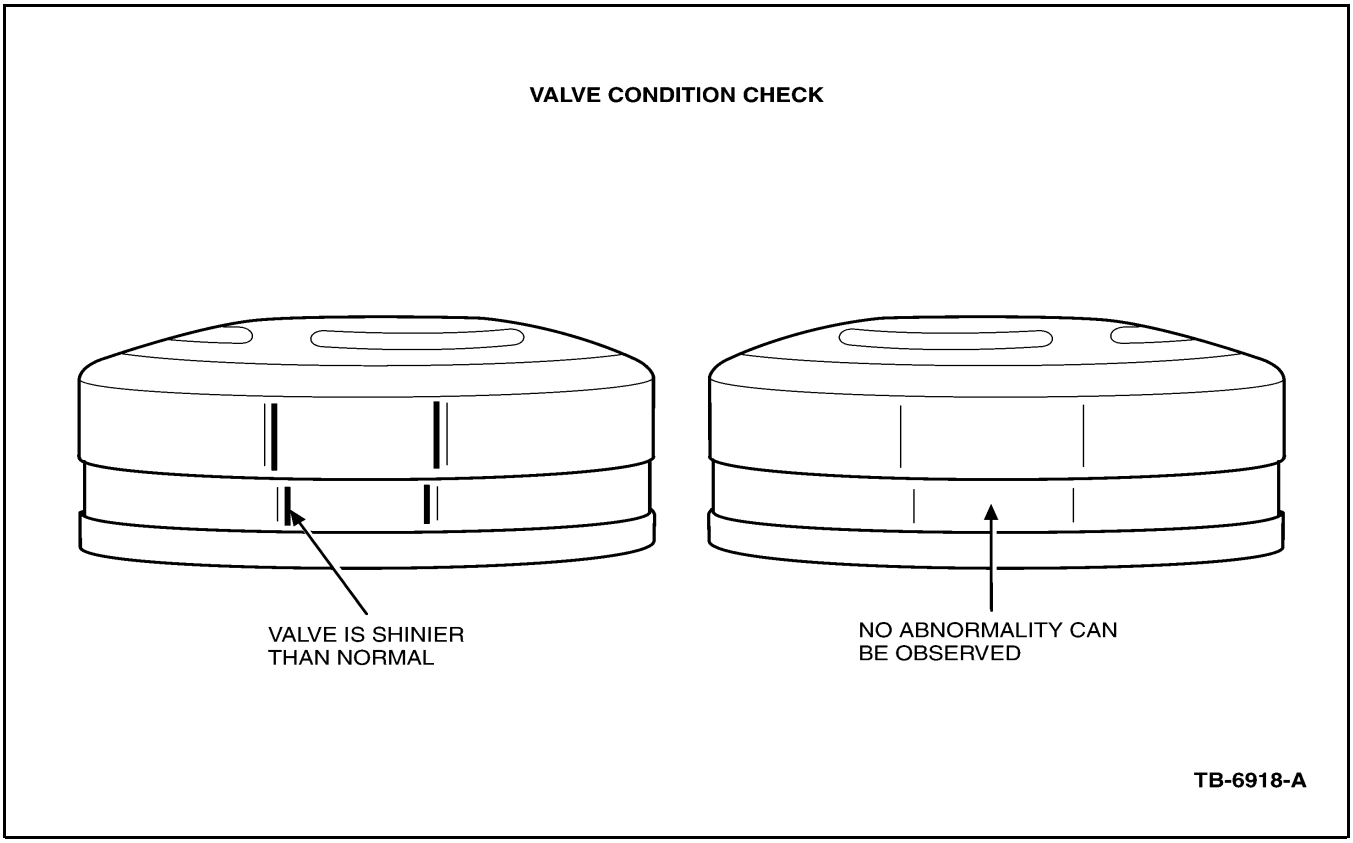


Figure 1 - Article 03-3-5

Ford Motor Company™

Ford Motor Company Driveability Concern Check Sheet

Dealer Code: _____ Dealer Name: _____

Dealer Phone: _____ Contact Name: _____

Vehicle Information	
Model Year:	Vehicle Line:
Market Derived:	Warranty Start Date:
Body/Cab Type:	Production Date:
Version/Series:	VIN:

In the customer's words what happened.
Has the vehicle been repaired for a driveability issue before?

_____
_____
_____
_____
_____
_____
_____
_____

Mileage at last concern:_____miles **Mileage Now:**_____miles

Frequency of Occurrence _____Constantly _____Times Per Week ____Once ____Other (specify above)

Previously Repaired?	☐ Yes	☐ No	
Ambient Temperature	☐ Hot	☐ Warm	☐ Cold approx. temp. =_____F
Weather Conditions	☐ Dry	☐ Wet	☐ Other (specify above)
Driving Conditions	☐ Stop-Go	☐ Highway	☐ Other (specify above)
Vehicle Speed	☐ 0-10 mph	☐ 10-20 mph	☐ Other (specify above)
Transmission Gear	Circle: **P R N D 4 3 2**		
Fuel Level in Tank	☐ Full	☐ 3/4	☐ 1/2 ☐ 1/4 ☐ Very Low
Restarting	☐ Restarts only with ignition key ☐ Restarts itself immediately		☐ Will not restart ☐ Restarts after long crank
Engine Stalls Information	☐ At steady throttle ☐ Shifting into drive ☐ Loses power then quits ☐ When maneuvering at low speed		☐ Turning left/right ☐ When accelerating ☐ Slowing down ☐ After starting

Has the vehicle had any non-approved devices installed? (i.e. Alarm, Tracker, Radio, Telephone etc.)
☐ No ☐ Yes, Specify _____
_____
_____
_____

TB-6997-A

Figure 2 - Article 03-3-5

Article Number: 04-14-10
Article Type: T
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
NA	***	07/12/2004	07/09/2024
WD	***	07/12/2004	07/09/2024

Title:

2004 TAURUS/SABLE: MALFUNCTION INDICATOR LAMP (MIL) ILLUMINATION - WIRE HARNESS CHAFING

Text:

SOME VEHICLES MAY EXHIBIT AN ILLUMINATED OR BLINKING MALFUNCTION INDICATOR LAMP (MIL) WITH VARIOUS DTC CODES STORED IN MEMORY. THERE MAY ALSO BE DRIVEABILITY CONDITIONS PRESENT AND/OR INTERMITTENT RPM FLUCTUATIONS. THESE CONDITIONS MAY BE DUE TO THE UNDERSIDE OF THE PCM WIRE HARNESS (12B637) CHAFING ON THE CROSS CAR BEAM, WHERE IT RESTS ON THE BRACKET AT THE RIGHT SIDE FRONT STRUT TURRET. TO SERVICE, REPAIR ANY WIRE CHAFING CONDITIONS OR REPLACE THE WIRING HARNESS IF THE DAMAGED CIRCUIT IS A SHIELDED WIRE. SECURE THE PCM WIRE HARNESS WITH A TIE STRAP AS DIRECTED PER THE TSB SERVICE PROCEDURE.

Vehicles:

2004	SABLE (00082)
2004	TAURUS (00117)

Symptom Code:

400000	ENGINE
499000	ENGINE BASIC ENGINE
600000	DRIVEABILITY
601000	DRIVE-STARTING
602300	DRIVEABILITY HARD START/LONG START
606000	DRIVE-PERFORMANCE
607000	DRIVEABILITY STALLS/QUITS
608000	DRIVEABILITY RUNS ROUGH
608500	DRIVEABILITY RUNS ROUGH - ACCELERATION
609000	DRIVEABILITY MISSES
609500	DRIVEABILITY MISSES - ACCELERATION
610000	DRIVEABILITY BUCK/JERK
611000	DRIVEABILITY HESITATION/STUMBLE
611500	DRIVEABILITY HESITATION/STUMBLE - ACCELERATION
612000	DRIVEABILITY SURGE
614000	DRIVEABILITY LACK/LOSS OF POWER
614500	DRIVEABILITY LACK/LOSS OF POWER - ACCELERATION
698298	DRIVEABILITY MALFUNCTION INDICATOR LAMP - MIL

Global Customer Symptom Codes:

Category	Q1	Q2	Q3	Full Code
Driver Aides & Information				2*****
Driver Aides & Information	Warning Indicators/Messages/Chimes			227***
Driver Aides & Information	Warning Indicators/Messages/Chimes	Service Engine Soon (Engine Image)		227Q**
Driver Aides & Information	Warning Indicators/Messages/Chimes	Service Engine Soon (Engine Image)	Flashes	227Q30

Article Number: 14340
Article Type: S
Author: BGARRISO
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
AP	***	08/31/2000	10/01/2003
NA	***	08/31/2000	08/31/2010
SA	***	08/31/2000	10/01/2003
WD	***	08/31/2000	08/31/2010

Title:

PCM REPROGRAMMING - SERVICE TIP

Text:

SOME 2000 TAURUS/SABLES THAT HAD POWERTRAIN CONTROL MODULES REPROGRAMMED BY DEALERS PRIOR TO 08/04/2000 MAY EXHIBIT A LOSS OF POWER, HESITATION, HARD START, MIL LIGHT ON WITH DTC P1635, DEGRADED FUEL ECONOMY AND/OR CRUISE SURGE. THIS MAY BE CAUSED BY SPARK TIMING THAT DEFAULTED TO RETARD DURING THE PCM REPROGRAM. TO SERVICE: 1) VALIDATE THE VEHICLE EXISTING PCM PART NUMBER AND TEAR TAG CODE LOCATED ON THE PCM. 2)USE EXISTING INFORMATION TO DOWNLOAD THE LATEST CALIBRATION FROM FORD STAR TO YOUR NGS FLASH CARD OR WDS. NOTE: WDS MUST BE CONNECTED TO YOUR LAN SERVER AND UPDATED WITH THE LATEST WDS SOFTWARE. 3) REPROGRAM VEHICLE WITH LATEST CALIBRATION. NOTE: DURING THE REPROGRAM YOU WILL BE PROMPTED TO ENTER THESE VALUES. USE 797 FOR 'TIRE SIZE' AND 3.47 FOR 'FINAL DRIVE RATIO'.

Vehicles:

2000	SABLE (00082)
2000	TAURUS (00117)

Symptom Code:

600000	DRIVEABILITY
602300	DRIVEABILITY HARD START/LONG START
608000	DRIVEABILITY RUNS ROUGH
609000	DRIVEABILITY MISSES
610000	DRIVEABILITY BUCK/JERK
610500	DRIVEABILITY BUCK/JERK - ACCELERATION
611000	DRIVEABILITY HESITATION/STUMBLE
612000	DRIVEABILITY SURGE
613000	DRIVEABILITY BACKFIRES
613400	DRIVEABILITY BACKFIRE AT IDLE
614000	DRIVEABILITY LACK/LOSS OF POWER
614500	DRIVEABILITY LACK/LOSS OF POWER - ACCELERATION
618400	DRIVEABILITY IDLE - ROLLING IDLE
622000	DRIVEABILITY POOR FUEL ECONOMY
698298	DRIVEABILITY MALFUNCTION INDICATOR LAMP - MIL
P1635	

Article Number: 15239
Article Type: S
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
AP	***	09/14/2001	02/05/2003
NA	***	09/14/2001	02/05/2003
SA	***	09/14/2001	02/05/2003
WD	***	09/14/2001	02/05/2003

Title:

PRE DELIVERY TEMPORARY FAST IDLE

Text:

ALL 2001-2002 TAURUS/SABLES WITH VERY LOW ODOMETER MILES, MAY EXHIBIT A HIGHER THAN NORMAL TEMPORARY START-UP FAST IDLE (1600-2500 RPM THAT DECREASES SLOWLY). NO REPAIRS SHOULD BE ATTEMPTED BECAUSE THIS IS A NORMAL TEMPORARY PCM CALIBRATION STRATEGY TO PREVENT SPARK PLUG FOULING DURING PLANT/TRANSPORTATION OPERATION. THE CALIBRATION WILL PERMANENTLY REVERT TO ITS NORMAL IDLE STRATEGY AFTER THE PCM HAS SEEN ITS FIRST 4 MILE CONTINUOUS DRIVE CYCLE. NOTE: BRAND NEW VEHICLES MAY ACCUMULATE SOME MILEAGE WITHOUT TURNING THIS STRATEGY OFF IF THE DRIVE CYCLES HAVE BEEN BELOW 4 MILES AT A TIME.

Vehicles:

2001-2002	SABLE (00082)
2001-2002	TAURUS (00117)

Symptom Code:

503000	DRIVELINE AUTO TRANS ENGAGEMENT CONCERNS
503300	DRIVELINE AUTO TRANS SHIFT LEVER/LINKAGE
504000	DRIVELINE OTHER AUTO TRANS CONCERNS
597997	DRIVELINE NOISE CONCERNS
617400	DRIVEABILITY IDLE - SLOW RETURN TO IDLE
619400	DRIVEABILITY IDLE - FAST IDLE

Article Number: 16613
Article Type: S
Author: AKONYHA
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
AP	***	02/06/2003	10/01/2003
NA	***	02/06/2003	02/06/2004
SA	***	02/06/2003	10/01/2003
WD	***	02/06/2003	02/06/2004

Title:

2002-2003 TAURUS/SABLE - TEMPORARY FAST IDLE / NO SERVICE NECESSARY

Text:

ALL 2002-2003 TAURUS/SABLE VEHICLES, WITH VERY LOW ODOMETER MILES, MAY EXHIBIT A HIGHER THAN NORMAL TEMPORARY START-UP FAST IDLE (1600-2500 RPM THAT DECREASES SLOWLY). NO SERVICE SHOULD BE ATTEMPTED BECAUSE THIS IS A NORMAL TEMPORARY PCM CALIBRATION STRATEGY TO PREVENT SPARK PLUG FOULING DURING ASSEMBLY PLANT/TRANSPORTATION OPERATION. THE CALIBRATION WILL PERMANENTLY REVERT TO NORMAL IDLE STRATEGY AFTER THE PCM HAS SEEN THE FIRST 4 MILE CONTINUOUS DRIVE CYCLE. NOTE: BRAND NEW VEHICLES MAY ACCUMULATE SOME MILEAGE WITHOUT TURNING THIS STRATEGY OFF IF THE DRIVE CYCLES HAVE BEEN BELOW 4 MILES AT A TIME.

Vehicles:

2002-2003	SABLE (00082)
2002-2003	TAURUS (00117)

Symptom Code:

503000	DRIVELINE AUTO TRANS ENGAGEMENT CONCERNS
617400	DRIVEABILITY IDLE - SLOW RETURN TO IDLE
619400	DRIVEABILITY IDLE - FAST IDLE

PE12-033

FORD

1/18/2013

2013-1-18 Appendix I

Ford Motor Company

Frank M. Ligon
Director
Vehicle Service and Programs
Ford Customer Service Division

Ford Motor Company
P. O. Box 1904
Dearborn, Michigan 48121

October 2002

TO: All Ford and Lincoln Mercury Dealers

SUBJECT: Safety Recall 02S40: Certain 2000 through 2002 Model Year Taurus and Sable Vehicles Equipped with Adjustable Pedals – Inspection and Adjustment of Pedal Lateral Spacing

AFFECTED VEHICLES

Certain 2000 through 2002 model year Taurus and Sable vehicles equipped with adjustable pedals built at the Atlanta and Chicago Assembly plants from May 3, 1999 through September 14, 2001.

SAFETY CONCERN

Ford has received reports that some of the affected vehicles may have less lateral space between the brake and accelerator pedal than others, resulting in pedal misapplication. The spacing concern is due to manufacturing variability. Simultaneous application of both the brake and accelerator pedals may result in 'unintended vehicle speed increase' or somewhat extended stopping distance. Should such conditions occur, the driver will be able to correct the condition by repositioning his or her foot correctly on the brake pedal and applying the brakes in a normal manner.

SERVICE ACTION

The dealer will inspect the distance between the brake and accelerator pedal and adjust the distance if required. After adjustment, the dealer will re-check pedal lateral spacing.

It is estimated that 90% of affected vehicles will have sufficient pedal lateral distance and will only require inspection to complete this recall. Due to the high estimated inspection rate, and in the interest of customer satisfaction, it is recommended that inspection be performed in the service lane.

PLEASE NOTE

Correct all vehicles in stock before delivery. Federal law requires dealers to complete any outstanding safety recall service before a new vehicle is delivered to the buyer or lessee. Violation of this requirement by a dealer could result in a civil penalty of up to $5,000 per vehicle.

ATTACHMENTS

Attachment I: Administrative Information
Attachment II: Labor Allowances and Parts Ordering Information
Attachment III: Technical Information
Customer Notification Letter(s)

QUESTIONS?

Claims Information:……..……..……....1-800-423-8851
Online Involved Unit Listings ……1-800-555-9601
Other (Dealer Only) Recall Questions:……..……...1-800-325-5621

Sincerely,

Frank M. Ligon

Frank M. Ligon

Safety Recall 02S40:
Certain 2000 Through 2002 Model Year Taurus and Sable Vehicles with Adjustable Pedals
Inspection and Adjustment of Pedal Lateral Spacing

OASIS

You must use OASIS to determine if a vehicle is eligible for this recall.

PROMPTLY CORRECT

Promptly correct all affected vehicles on your dealer Online Involved Unit Listing available on QCDealer.com. Also, correct other affected vehicles identified in OASIS which are brought to your dealership.

DEALER-OWNER CONTACT

Immediately contact any of your affected owners whose names are not on your VIN list but identified in OASIS. Give the owner a copy of the Owner Letter and schedule a service date.

Note: These dealer listings may contain customer names and addresses obtained from Motor Vehicle Registration Records. The use of such motor vehicle registration data for any purpose other than in connection with this recall is a violation of law in several states/provinces/countries. Accordingly, limit the use of this listing to the follow-up necessary to complete this action.

REGIONAL CONTACT

Advise regional office if an owner:

- cannot be contacted.
- does not make a service date.

CLAIMS PREPARATION AND SUBMISSION

- Enter claims using DWE.
- Refer to ACESII manual for claims preparation and submission information.

OWNER REFUNDS

Ford Motor Company will only refund owner-paid repairs to adjust lateral pedal spacing which were made before the date of the Owner Letter (or after the date of the Owner Letter if an emergency repair was made away from the servicing dealer). Refer to ACESII manual for refund information.

RENTAL CARS

The use of rental vehicles is not authorized for this program.

Safety Recall 02S40:
Certain 2000 Through 2002 Model Year Taurus and Sable Vehicles with Adjustable Pedals
Inspection and Adjustment of Pedal Lateral Spacing

LABOR ALLOWANCES

Description	Labor Operation	Labor Time
Check Clearance-No Adjustment Required	02S40A	0.1 Hour
Check and Adjust at Pivot Bolts	02S40B	0.2 Hour
Check and Adjust at Pivot Bolts and Anchor Nuts	02S40C	0.3 Hour
Administrative Allowance	Misc. Expense Code "ADMIN"	0.1 Hour

NOTE: Only one (1) labor operation (A, B or C) will be allowed per claim in combination with misc. expense code "ADMIN". ACES II edits will reject multiple labor operations.

PARTS REQUIREMENTS

No parts are required for this recall.

NOTE: In some of the affected vehicles, the left, outboard accelerator pedal bracket anchor nut was intentionally not installed during the assembly process. It does not affect pedal operation. It is not necessary to install the missing nut when checking or adjusting the pedal lateral spacing or when replacing a pedal assembly.

ROTUNDA SPECIAL TOOL REQUIREMENTS

Rotunda Special Tool OTC 206-088 is utilized in this recall during inspection and pedal adjustment.

The special tool serves two (2) functions: One end of the tool performs a "checking" function (for inspection) between the brake and accelerator pedal. The other end of the tool performs a "setting" function (for pedal adjustment) between the two pedals.

Rotunda Special Tool OTC 206-088 has been shipped to the dealership (quantity of 2 tools per dealer). It is expected that tools will arrive at the dealership the week of October 20, 2002. Additional tools may be ordered at no-charge by calling the Special Service Support Center at 1-800-325-5621.

Frank M. Ligon
Director
Service Engineering Operations
Ford Customer Service Division

Ford Motor Company
P. O. Box 1904
Dearborn, Michigan 48121

March 2004

TO: All U.S. Ford and Lincoln Mercury Dealers

SUBJECT: **DEMONSTRATION / DELIVERY HOLD:** Safety Recall 04S12:
All 2000 Model Year Taurus and Sable Vehicles
Certain 2001 through 2003 Model Year Taurus and Sable Vehicles Equipped with Adjustable Pedals
Stop Lamp Switch and Wire Harness Replacement

NOTE: Safety Recall 04S12 supercedes Safety Recall 01S08.

AFFECTED VEHICLES

All 2000 MY (model year) Taurus and Sable vehicles built at the Chicago Assembly Plant from Job #1 through Job Last and Atlanta Assembly Plant from Job #1 through Job Last.

Certain 2001 through 2003 MY Taurus and Sable vehicles equipped with adjustable pedals built at the Chicago Assembly Plant from Job #1 2001 through March 31, 2003 and Atlanta Assembly Plant from Job #1 2001 through February 27, 2003.

Affected vehicles are identified in OASIS. In addition, for a list of vehicles assigned to your dealership, visit https://web.fsavinlists.dealerconnection.com.

REASON FOR THIS SAFETY RECALL

The stop lamp switch and/or associated wiring may fail causing the vehicle brake lights to either not illuminate when the brake pedal is depressed or stay on continuously. Malfunctioning brake lights may not alert other drivers that the vehicle is slowing down, which may result in a rear end crash. If the switch and/or associated wiring fail in the open position, the brake lights will not illuminate and the driver will not be able to shift the vehicle out of park. If the switch fails in the closed position, the brake lights will remain on, which will not allow the speed control to be activated or may cause the battery to discharge.

SERVICE ACTION

DO NOT DEMONSTRATE OR DELIVER any of the affected vehicles until the service procedure has been performed. Owners will be instructed to take their vehicles to a Ford or Lincoln Mercury dealer to have the stop lamp switch and associated wiring removed and replaced with a newly designed stop lamp switch and wiring assembly. This must be done on all of the affected vehicles in your inventory, as well as vehicles that have been delivered to customers.

OWNER NOTIFICATION MAILING SCHEDULE

Parts to repair this condition are currently not available in sufficient quantities to service all of the affected owners. Therefore, to ensure that this limited supply of parts will not negatively impact customer satisfaction, owners of affected vehicles will be notified in four separate phased mailings. Phase mailing will begin April 5, 2004, prioritized by age of vehicle (2000 MY vehicles first followed by 2001 MY, etc). Please note that dealers should repair any affected vehicles that arrive at their dealerships, whether or not the customer has received a letter.

PLEASE NOTE:

Correct all vehicles in stock before demonstration or delivery. Federal law requires dealers to complete any outstanding safety recall service before a new vehicle is delivered to the buyer or lessee. Violation of this requirement by a dealer could result in a civil penalty of up to $5,000 per vehicle.

ATTACHMENTS

Attachment I: Administrative Information
Attachment II: Labor Allowances and Parts Ordering Information
Attachment III: Technical Information
Attachment IV: Questions and Answers
Customer Notification Letter

QUESTIONS?

Claims Information: ……..……..……..…… 1-800-423-8851
Special Service Support Center (Dealer Only) Questions: ……. 1-800-325-5621

Sincerely,

Frank M. Ligon

Frank M. Ligon

DEMONSTRATION / DELIVERY HOLD: Safety Recall 04S12
All 2000 Model Year Taurus and Sable Vehicles
Certain 2001 through 2003 MY Taurus and Sable Vehicles Equipped with Adjustable Pedals
Stop Lamp Switch and Wire Harness Replacement

OASIS ACTIVATED? Yes

FSA VIN LIST ACTIVATED? Yes

Available through FMCDealer.com or at https://web.fsavinlists.dealerconnection.com.

NOTE: Your FSA VIN list may contain owner names and addresses obtained from motor vehicle registration records. The use of such motor vehicle registration data for any purpose other than in connection with this recall is a violation of law in several states, provinces, and countries. Accordingly, you must limit the use of this listing to the follow-up necessary to complete this action.

STOCK VEHICLES

Correct all affected stock vehicles before demonstrating or delivering.

SOLD VEHICLES

- Owners of affected vehicles will be directed to dealers for repairs. Immediately contact any of your affected owners whose vehicles are not on your VIN lists but are identified in OASIS. Give the owner a copy of the Customer Notification Letter (when available) and schedule a service date.
- Correct other affected vehicles identified in OASIS which are brought to your dealership.

TITLE BRANDED / SALVAGED VEHICLES

Affected title branded and salvaged vehicles are eligible for this Field Service Action.

RELATED DAMAGE

If a related damage condition exists that you believe to be caused by the covered condition, call the Special Service Support Center to request approval **prior** to the repair of any related damage. Requests for approval after completion of the repair will not be granted.

ADDITIONAL LABOR TIME

- If a condition exists that requires additional labor to complete the repair, call the Special Service Support Center to request approval **prior** to performing any additional labor. Requests for approval after completion of the repair will not be granted.
- If you encounter aftermarket equipment or modifications to the vehicle which might prevent the repair of the covered condition, call the Special Service Support Center.

DEMONSTRATION / DELIVERY HOLD: Safety Recall 04S12
All 2000 Model Year Taurus and Sable Vehicles
Certain 2001 through 2003 MY Taurus and Sable Vehicles Equipped with Adjustable Pedals
Stop Lamp Switch and Wire Harness Replacement

OWNER REFUNDS

- Ford Motor Company is offering a refund for owner-paid repairs covered by this Safety Recall if the repair was performed prior to the date indicated in the reimbursement plan, which is posted with this bulletin. This plan is also available to owners through the Customer Relationship Center (CRC). The CRC will direct owners to seek reimbursement through authorized dealers or, at their option, directly through Ford Motor Company at P.O. Box 1904, Dearborn, MI 48121.
- Dealers are also authorized to refund owner-paid emergency repairs that were performed away from an authorized servicing dealer after the end date specified in the reimbursement plan. Refund claims that include other non-covered repairs, or those judged by Ford to be excessive, will not be accepted for reimbursement.
- **This safety recall must still be performed, even if the customer has paid for a previous repair. Claiming a refund will not close out the VIN for this recall.**
- Refund Claiming Information (Submit on separate repair line)
  - Program Code: 04S12
  - Misc. Expense: REFUND
  - Misc. Expense: ADMIN
  - Misc. Expense: 0.2 Hr.

RENTAL VEHICLES

The use of rental vehicles is not authorized for this program.

CLAIMS PREPARATION AND SUBMISSION

- Enter claims using Direct Warranty Entry (DWE).
- Refund and related damage must be claimed on a repair line that is separate from the FSA's repair line.
- "MT" labor should be submitted on a separate repair line with the related damage flag checked.
- Refer to ACESII manual for claims preparation and submission information.

DEMONSTRATION / DELIVERY HOLD: Safety Recall 04S12
All 2000 Model Year Taurus and Sable Vehicles
Certain 2001 through 2003 MY Taurus and Sable Vehicles Equipped with Adjustable Pedals
Stop Lamp Switch and Wire Harness Replacement

LABOR ALLOWANCES

Description	Labor Operation	Labor Time
Stop Lamp Switch and Wire Harness Replacement	04S12B	0.6 Hour

PARTS REQUIREMENTS / ORDERING INFORMATION – SEED STOCK

Parts were Seed Stocked to all Ford Authorized Distributors (WD locations). Dealer Seed Stock will begin the week of March 8, 2004. Ford Motor Company will be placing two or more additional Dealer Seed Stock orders as material becomes available. If additional parts are required due to special customer situations, contact the Special Service Support Center (1-800-325-5621) and a small supplemental order can be placed. Please provide the owner name and VIN to the call center.

Part Number	Description	Quantity
SW-6170 or 3F1Z-13480-AA	Stop Lamp Switch and Wire Harness Kit	1

The DOR/COR for this program is 50316. This number identifies parts ordered for this recall through the Special Service Support Center (1-800-325-5621).

DEALER PRICE

For latest prices, refer to DOES II.

EXCESS STOCK RETURN

Excess stock returned for credit must have been purchased from Ford Customer Service Division in accordance with Policy Procedure Bulletin 4000.

DEMONSTRATION / DELIVERY HOLD: Safety Recall 04S12
All 2000 Model Year Taurus and Sable Vehicles
Certain 2001 through 2003 MY Taurus and Sable Vehicles Equipped with Adjustable Pedals
Stop Lamp Switch and Wire Harness Replacement

QUESTIONS AND ANSWERS

Q. Why are you recalling these vehicles?

A. We have found an unacceptably high rate of potential failure in the stop lamp switch and/or associated wiring on these vehicles. Customers will be notified to take their cars into a Ford or Lincoln Mercury dealer to have the stop lamp switch replaced with a more robust design and a wiring harness repair.

Q. What happens in the affected vehicles?

A. In some cases, the stop lamp switch can fail, causing the car's brake lights to either stay on, or not come on at all, regardless of the position of the brake pedal. If the stop lamp switch fails, and the brake lights do not come on, then the vehicle cannot be shifted out of park.

Q. What about vehicles built before the 2000 model year? What about 2004 cars?

A. Taurus and Sable vehicles built before model year 2000 had a different switch design. The switch was changed for the 2000 model year. This switch was used through February 2003. Design improvements were implemented in March 2003 and are currently in production in the 2004 vehicles.

Q. Why are fixed pedal and adjustable pedal vehicles affected in 2000 MY vehicles and only adjustable pedal vehicles affected in 2001 – 2003 MY vehicles?

A. Design improvements for fixed pedal vehicles were implemented for 2001 MY vehicles. Design improvements for adjustable pedal vehicles were not implemented until March 2003.

Q. What happened in the first recall (01S08) of these cars? Why wasn't the problem fixed right the first time?

A. The original service action included only vehicles equipped with the optional adjustable pedal assemblies. Investigation in 2001 concluded that grease from the adjustable pedal assembly was migrating to the switch and causing it to malfunction. The service fix involved removing the exposed grease. However, we have now found that grease in the mechanism can continue to cause the concern. In addition, the possible wiring harness concern being addressed in this action was not completely understood at the time of the initial recall.

Article Number: 18614
Article Type: S
Author: AKONYHA
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
NA	***	05/19/2005	05/19/2015
WD	***	05/19/2005	05/19/2015

Title:

1996-2005 TAURUS/SABLE - SURGING DUE TO AIR BOX MIS-ASSEMBLY

Text:

SOME 1996-2005 TAURUS AND SABLE VEHICLES EQUIPPED WITH A 3.0 2V OR 3.0 4V ENGINE MAY EXHIBIT VARIOUS INTERMITTENT DRIVABILITY SYMPTOMS AT IDLE (SURGE, IDLE ROLL, ROUGH IDLE), ONLY WHEN THE ENGINE COOLING FANS ARE OPERATING. THIS MAY BE DUE TO THE LOWER PORTION OF THE AIR CLEANER BOX NOT BEING PROPERLY SECURED. OFTEN TIMES THESE SYMPTOMS WILL NOT HAVE AN ASSOCIATED DTC. TO DIAGNOSE, DETERMINE IF THE CONDITION IS ONLY PRESENT WHEN THE ENGINE COOLING FANS ARE OPERATING. IF SO, INSPECT THE 3 LOWER TABS OF THE UPPER AIR CLEANER ASSEMBLY FOR CORRECT INSTALLATION IN THE LOWER AIR CLEANER ASSEMBLY SLOTS. IF THEY ARE NOT, SECURE CORRECTLY, CLEAR KEEP ALIVE MEMORY, AND RETEST.

Vehicles:

1996-2005	SABLE (00082)
1996-2005	TAURUS (00117)

Symptom Code:

600000	DRIVEABILITY
606000	DRIVE-PERFORMANCE
608000	DRIVEABILITY RUNS ROUGH
608400	DRIVEABILITY RUNS ROUGH AT IDLE
609000	DRIVEABILITY MISSES
609400	DRIVEABILITY MISSES AT IDLE
612000	DRIVEABILITY SURGE
617000	DRIVE-IDLE
618400	DRIVEABILITY IDLE - ROLLING IDLE

Global Customer Symptom Codes:

Category	Q1	Q2	Q3	Full Code
Driving Performance				5*****
Driving Performance	Idle Quality			551***
Driving Performance	Idle Quality	Rough		5519**
Driving Performance	Idle Quality	Rough	Intermittent	551939
Driving Performance	Engine Surge			558***
Driving Performance	Engine Surge	At Idle		5581**
Driving Performance	Engine Surge	At Idle	Intermittent	558139

Article Number: 21126
Article Type: S
Author: CPIERMA2
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
NA	***	12/03/2009	12/02/2013
WD	***	12/03/2009	12/02/2013

Title:

MULTIPLE VEHICLE LINE MAF SENSOR SERVICE TIP.

Text:

SOME 1997-2010MY GAS ENGINE EQUIPPED VEHICLES MAY EXHIBIT DIAGNOSTIC TROUBLE CODES P0171-P0175 WITH LACKS POWER, HESITATION, RUNS ROUGH OR SURGE DRIVABILITY CONCERNS DUE TO CONTAMINATED MASS AIRFLOW SENSORS(MAF). IF NORMAL PCED DIAGNOSTICS LEAD TO THE MAF SENSOR, CAREFULLY INSPECT SENSOR HOTWIRE FOR CONTAMINATION. IF HOTWIRE IS CONTAMINATED WITH OIL, DIRT OR DEBRIS CLEAN THE SENSOR WITH CRC MASS AIR FLOW SENSOR CLEANER #05110. DO NOT USE SHOP AIR OR HARSH CHEMICALS SUCH AS BRAKE PARTS CLEANER OR CARBURETOR CLEANER ON MAF SENSORS. THIS CAN CAUSE SERIOUS DAMAGE TO SENSITIVE ELECTRONIC PARTS. CRC MAF SENSOR CLEANER WILL SAFELY AND EASILY CLEAN THE MAF HOTWIRE AND ELECTRICAL COMPONENTS WITHOUT DAMAGE TO THE WIRES OR PLASTIC HOUSING. MONITOR LONGFT1 AND LONGFT2(DUAL BANK ENGINES) PIDS AFTER MAF SENSOR CLEANING TO CONFIRM REPAIR.

Vehicles:

2005-2006	2006 ZEPHER (00172)
2003-2005	AVIATOR (00152)
2002-2003	BLACKWOOD (00145)
1998-2002	CONTINENTAL (00010)
1998-2010	CROWN VICTORIA (00015)
1997-2010	E-SERIES (00016)
2007-2010	EDGE (00176)
2001-2010	ESCAPE (00130)
2005-2007	ESCAPE HYBRID (00162)
2000-2005	EXCURSION (00126)
1997-2010	EXPEDITION (00026)
2002-2010	EXPLORER 4DR (00134)
1997-2010	F-SERIES LD (00029)
2000-2010	F-SERIES MOTORHOME/COMMERCIAL (00175)
1999-2010	F-SERIES SUPER DUTY (00028)
2005-2006	FIVE HUNDRED (00165)
2003-2010	FOCUS (00122)
2005-2006	FREESTYLE (00166)
2007-2010	FUSION (00170)
1998-2010	GRAND MARQUIS (00044)
2000-2006	LS (00124)
2005-2010	MARINER (00163)
2006-2007	MARINER HYBRID (00174)
2007-2008	MARK LT (00173)
1997-1998	MARK VIII (00064)
2006-2010	MILAN (00171)
2010	MKS (00190)
2007-2010	MKX (00177)
2007-2010	MKZ (00179)
2005-2006	MONTEGO (00167)
2002-2005	MOUNTAINEER (00070)
1998-2010	MUSTANG (00071)
1998-2010	NAVIGATOR (00106)
2007-2010	RANGER (00081)
2000-2004	SABLE (00082)
2000-2010	TAURUS (00117)

2008-2009	TAURUS X (00185)
2002-2005	THUNDERBIRD (00092)
1998-2010	TOWN CAR (00094)

Symptom Code:

600000	DRIVEABILITY
606000	DRIVE-PERFORMANCE
607000	DRIVEABILITY STALLS/QUITS
608000	DRIVEABILITY RUNS ROUGH
611000	DRIVEABILITY HESITATION/STUMBLE
614000	DRIVEABILITY LACK/LOSS OF POWER
698298	DRIVEABILITY MALFUNCTION INDICATOR LAMP - MIL
P0171	
P0175	

Global Customer Symptom Codes:

Category	Q1	Q2	Q3	Full Code
Driving Performance				5*****
Driving Performance	Lack/Loss of Power			554***
Driving Performance	Lack/Loss of Power	Acceleration		5542**
Driving Performance	Lack/Loss of Power	Acceleration	Always	554202

- **DRIVEABILITY—SURGE/ROLLING IDLE—GEAR DRIVEN SYNCHRONIZERS—INCORRECT INSTALLATION—CAMSHAFT POSITION SYNCHRONIZER (CMP) INSTALLATION TOOL CORRECT APPLICATION**
- **ENGINE—GEAR DRIVEN SYNCHRONIZERS—INCORRECT INSTALLATION—CAMSHAFT POSITION SYNCHRONIZER (CMP) INSTALLATION TOOL CORRECT APPLICATION**

Article No. 02-22-1

FORD: 1994-1997 THUNDERBIRD
1995-2003 TAURUS
1996-2003 MUSTANG
1995-1997 AEROSTAR
1995-2003 RANGER, WINDSTAR
1996-2000 EXPLORER
1997-2003 E SERIES, F-150

MERCURY: 1994-1997 COUGAR
1995-2003 SABLE
1997-2000 MOUNTAINEER

ISSUE

Incorrectly installed gear driven camshaft position (CMP) sensor synchronizer assemblies may be hard to diagnose. Vehicle may exhibit poor fuel economy, driveability Diagnostic Trouble Codes (DTCs) P1336, P1309, P0340 with MIL light on. Loss of power, surge, hesitation and runs rough on acceleration may also be present.

ACTION

New diagnostics have been developed for WDS to diagnose incorrectly installed gear driven camshaft position (CMP) synchronizer assemblies. Refer to the following Service Procedure to diagnose a possible mis-installed synchronizer assembly and proper installation procedure.

SERVICE INFORMATION

Items Covered In This Article:

- "Hall" vs. "VRS" sensor function
- Vehicle history scrutiny for past service of the synchronizer assembly
- WDS - Power balance test
- WDS - CMP and CKP wave signal comparison
- Wave Comparison chart - CMP vs. CKP
- Correct (CMP) synchronizer installation tool application & installation procedure
- "Top Dead Center" (TDC) alignment
- Synchronizer installation tool application chart

Hall - Effect (Hall) and Variable Reluctance (VRS) CMP Sensors

CMP sensors are used on all current model year engines, regardless of fuel system or ignition system type. The CMP sensor provides the Powertrain Control Module (PCM) with cam position information to indicate # 1 cylinder, on the compression stroke

There are two different types of CMP sensors:

- The three- pin, Hall-effect sensor (Figure 1)
- The two-pin Variable Reluctance sensor (Figure 1)

Although the Hall-effect (three-pin) and the Variable Reluctance (two-pin) CMP sensors perform the same function, their signal appearance is quite different and they are not interchangeable.

- The three-pin Hall-effect sensor uses a Hall effect device and a magnet to generate a digital square wave signal (Figure 2)
- The two-pin Variable Reluctance sensor is a magnetic transducer, which uses differential voltage across windings to generate a voltage waveform that is similar to a sine wave (Figure 2)

Both sensors provide a switching voltage as the engine rotates.

SERVICE PROCEDURE

If you suspect that a vehicle (engine) may have had the synchronizer assembly (Figure 3) installed incorrectly, check the vehicle history to see if related service has been performed. If you determine that the synchronizer could have been installed incorrectly, use the following procedure with WDS to verify correct installation (Figure 5).

NOTE
CORRECT CAMSHAFT POSITION SYNCHRONIZER ASSEMBLY INSTALLATION IS CRITICAL. AN INCORRECTLY INSTALLED SYNCHRONIZER CAN CAUSE HARD TO DIAGNOSE DRIVEABILITY CONDITIONS AND POSSIBLE SERIOUS ENGINE DAMAGE.

Reasons for incorrect installation are:

- Not setting the # 1 cylinder on Top Dead Center (TDC) of the compression stroke
- Use of the incorrect camshaft synchronizer tool for installation
- Incorrect alignment of the synchronizer tool

Power Balance Test In WDS

The WDS Power Balance Test can be used to quickly determine if the CMP synchronizer assembly is installed incorrectly. Use the following procedure.

1. Run the vehicle while viewing the power balance test in WDS to insure that no engine misses are occurring.
2. Shut the engine off and remove the # 1 cylinder injector electrical connector.
3. Start the engine and view the WDS power balance test.
4. The test should indicate a power loss in the # 1 cylinder (Figure 4).
   - If the # 1 cylinder is indicated, then the CMP synchronizer assembly IS NOT grossly mis-installed. (Figure 4) Continue to Step 5 in this procedure
   - If any other cylinder is indicated during the power balance test, then the CMP synchronizer assembly HAS BEEN INSTALLED INCORRECTLY, and must be reinstalled. (Refer to the installation procedure, tool chart and TDC reference described in this TSB, or refer to the appropriate model year Workshop Manual Section 303-14, Synchronizer-Camshaft).
5. If power loss is indicated in the # 1 cylinder (Figure 4), connect a 104 pin break-out box between the PCM and the PCM electrical connector.
6. Insert the red WDS probe into pin # 21 and the black WDS probe into pin # 85 of the break-out Box.
7. Select oscilloscope from the WDS Toolbox.
8. Select "Channel one Auto Mode", then select the Crankshaft Position (CKP) sensor.
9. Select "Channel two Auto Mode", then select the CMP sensor based on whether it is a VRS (2-pin) or Hall-effect (3 pin) CMP sensor.
10. Press the start button and view both the CKP sensor as well as the CMP sensor signals. Figure 6, 7 and 8).
11. Compare the wave forms of both sensors.
    - The missing tooth of the CKP sensor trigger wheel will be shown on the screen as an extra space between the wave forms. This position is 60° Before Top Dead Center (BTDC)
    - The upper peaks of the wave form are each spaced 10° of crankshaft rotation apart
    - The CMP timing setting on all current 6-cylinder engines should be between 10 and 40° After Top Dead Center (ATDC)

On all Hall-effect sensors, the CMP wave form rising edge should occur between the 7th and the 10th peak past the missing tooth. (Figure 6)

On the VRS sensors (except 5.0L engines), the falling edge of the CMP waveform should cross the zero reference line between the 7th and 10th peak past the missing tooth waveform. (Figure 7).

On 5.0L engines with a VRS CMP sensor, the falling edge waveform should cross the zero reference line between the 6th and the 9th peak past the CKP missing tooth (Figure 8).

On 5.0L engines with a Hall-effect VRS CMP sensor, the rising edge of the wave form should occur between the 6th and 9th peak past the CKP missing tooth wave form.

(CMP) SYNCHRONIZER INSTALLATION PROCEDURE

1. Set the # 1 cylinder on Top Dead Center (TDC) of the compression stroke.

NOTE
THE # 1 CYLINDER MUST BE SET ON TOP DEAD CENTER (TDC) OF THE COMPRESSION STROKE OR THE SYNCHRONIZER ASSEMBLY WILL NOT BE INSTALLED CORRECTLY.

2. Disconnect the battery ground cable.
3. Remove the CMP sensor from the synchronizer assembly.
4. Remove the synchronizer clamp (hold down bolt) and remove the synchronizer assembly.

NOTE
IN SOME CASES THE OIL PUMP INTERMEDIATE SHAFT MAY NOT COME OUT WITH THE SYNCHRONIZER ASSEMBLY. IF SO, RETRIEVE THE INTERMEDIATE SHAFT BEFORE PROCEEDING.

5. After performing the required service and before beginning the installation of the synchronizer assembly, ALWAYS COAT THE SYNCHRONIZER DRIVE GEAR WITH CLEAN ENGINE OIL PRIOR TO INSTALLATION.
6. Install the correct engine and model year synchronizer alignment installation tool. Install the tool to the synchronizer assembly by rotating the tool until it engages the notches in the camshaft synchronizer housing and the armature (Figure 10).

CAUTION
SOME OF THE TOOLS WILL FIT ACROSS ENGINE LINES AND COULD BE PERCEIVED AS BEING THE CORRECT TOOL. ALTHOUGH THE TOOLS MAY APPEAR SIMILAR, THERE ARE SUBTLE DIFFERENCES BETWEEN THEM, ALWAYS CHECK THE TOOL APPLICATION CHART PROVIDED IN THIS TSB (FIGURE 9).

7. During the installation of the synchronizer assembly (with the tool attached) into the engine, the arrow on the tool will rotate until the intermediate shaft and the camshaft gear fully engage.

NOTE
THE ARROW WILL ROTATE CLOCKWISE OR COUNTER CLOCKWISE DEPENDING ON THE ENGINE TYPE AND ENGINE ROTATION.

8. Install the camshaft synchronizer assembly so the arrow on the installation tool (Figure 3) is in the correct position as specified in the appropriate model year vehicle and engine. (Refer to Workshop Manual Section 303-14, Synchronizer-Camshaft).
9. Install the synchronizer clamp (bolt) before removing the installation tool. Tighten to 18 Lb-ft (25 N•m).
10. Remove the installation tool.
11. Install the CMP sensor. Tighten to 27 Lb-in (3 N•m).
12. Install battery ground cable.

CAUTION
DO NOT LOOSEN THE SYNCHRONIZER BOLT AND ROTATE THE SYNCHRONIZER ASSEMBLY. THE SYNCHRONIZER ASSEMBLY IS NOT ADJUSTABLE; DO NOT LOOSEN THE SYNCHRONIZER BOLT AFTER THE ALIGNMENT TOOL HAS BEEN REMOVED IN ORDER TO ALIGN THE CMP ELECTRICAL CONNECTOR FOR ANY REASON. IF THE ELECTRICAL CONNECTOR IS NOT IN THE CORRECT POSITION, THE SYNCHRONIZER ASSEMBLY HAS TO BE REMOVED, THE ALIGNMENT TOOL REINSTALLED AND THE ASSEMBLY REINSTALLED ASSUMING THE ENGINE HAS NOT BEEN ROTATED FROM TDC OF THE COMPRESSION STROKE ON # 1 CYLINDER.

OTHER APPLICABLE ARTICLES: NONE
WARRANTY STATUS: INFORMATION ONLY
OASIS CODES: 404000, 490000, 499000, 608000, 608500, 610000, 610500, 611000, 611500, 612000, 612500, 614000, 614500, 622000, 698298

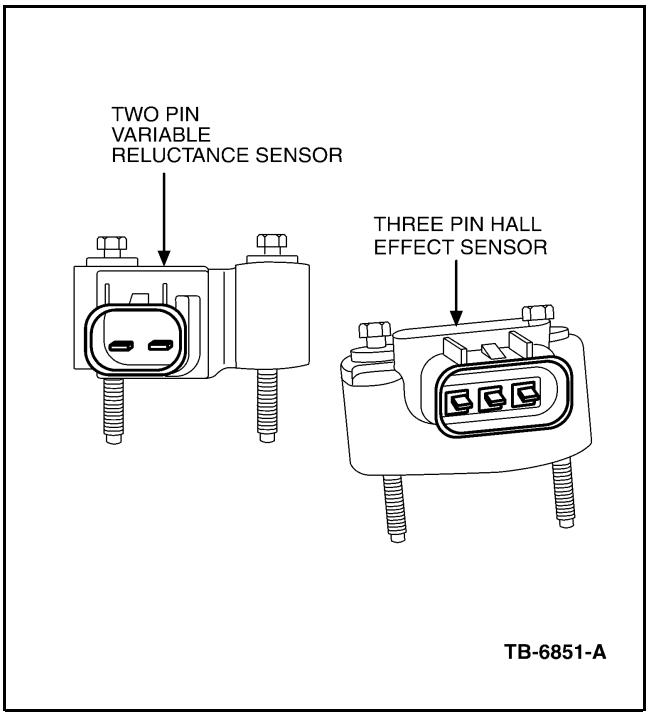
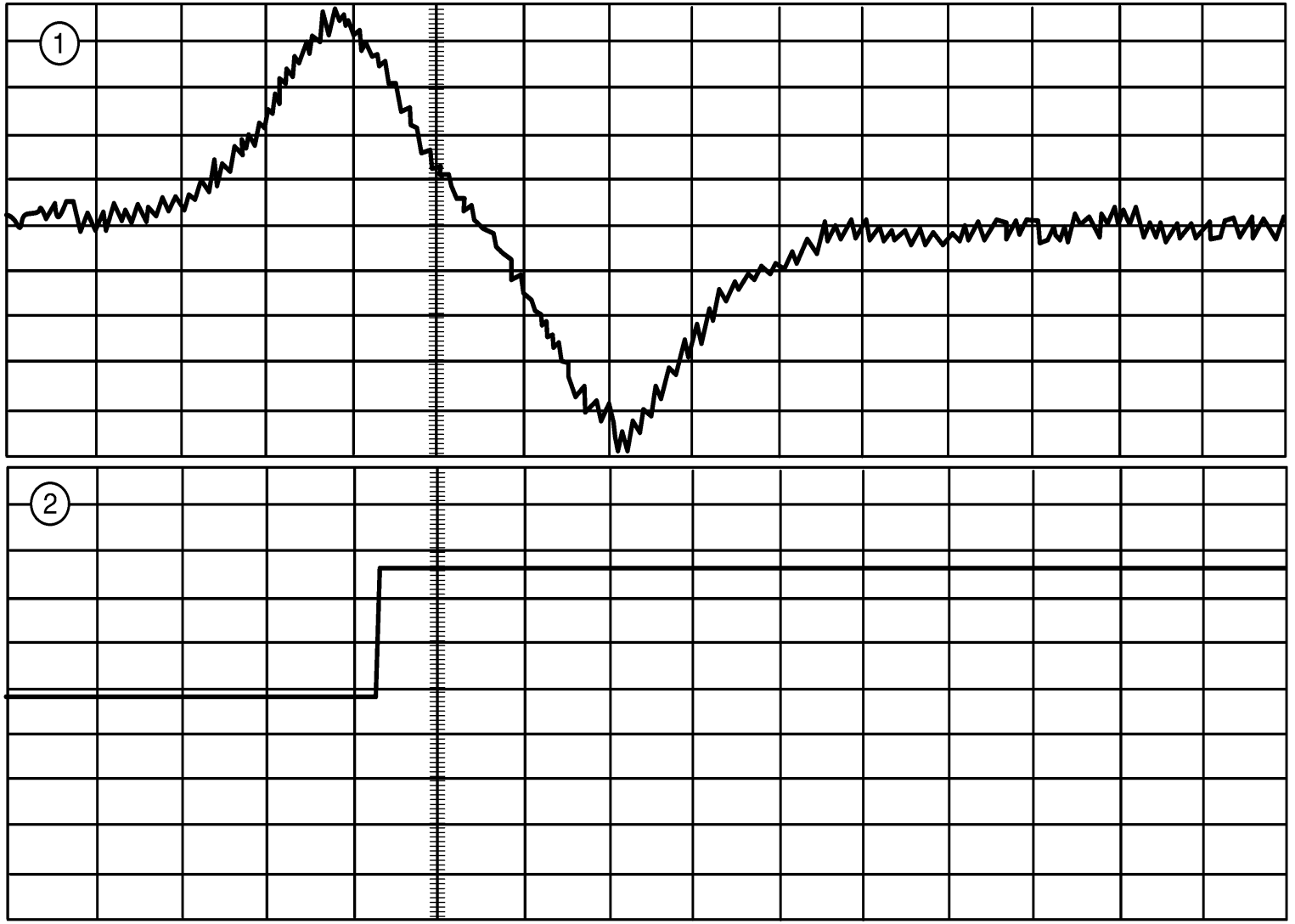


Figure 1 - Article 02-22-1

Figure 2 - Article 02-22-1

CMP SIGNALS AS DISPLAYED IN THE WDS OSCILLOSCOPE MODE



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	SINE WAVE-TYPE (VARIABLE RELUCTANCE) SIGNAL	2	SQUARE WAVE (HALL-EFFECT) SIGNAL

TB-6852-A

ILLUSTRATIONS OF THE GEAR-DRIVEN CMP SYNCHRONIZER ASSEMBLY INSTALLATION

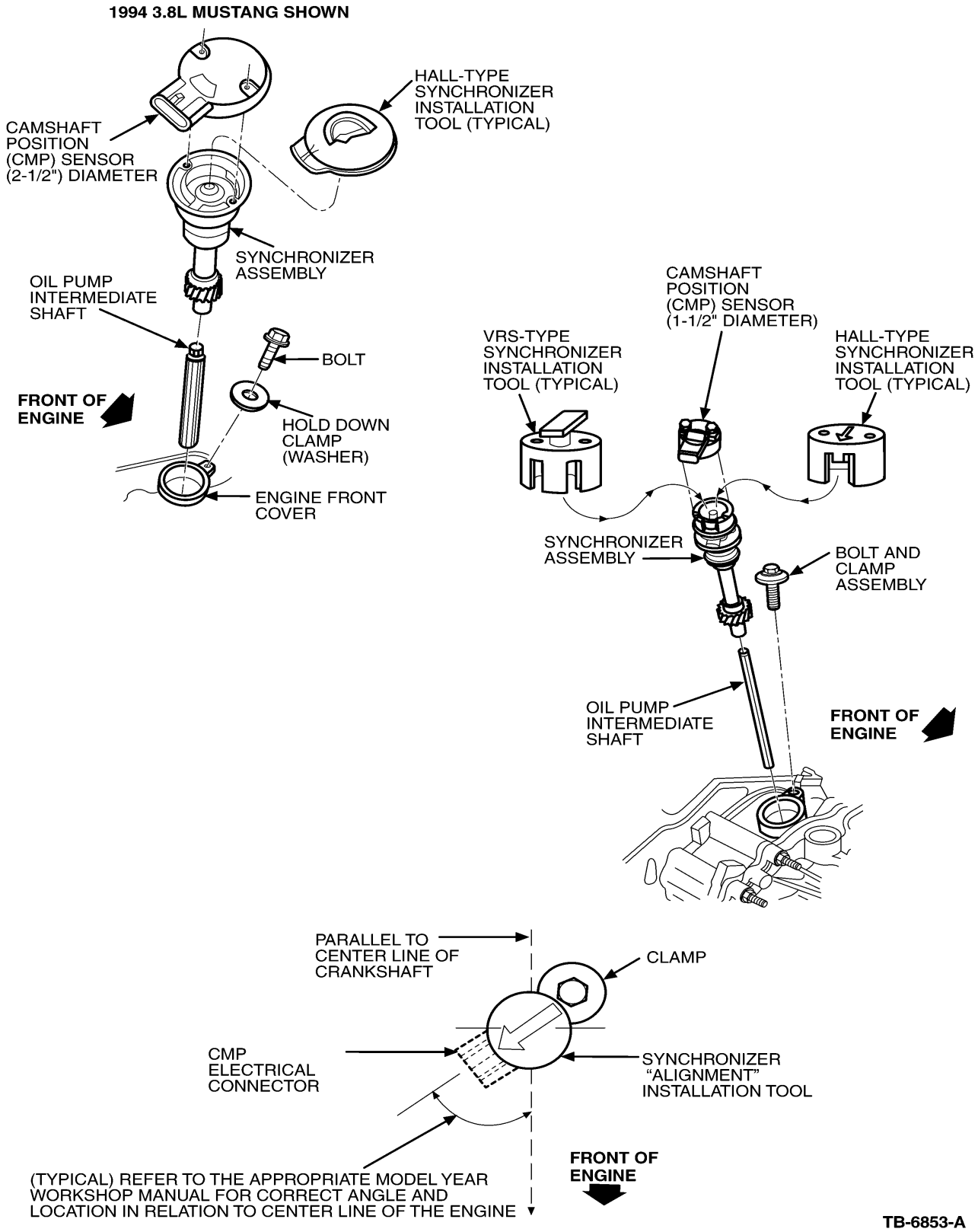
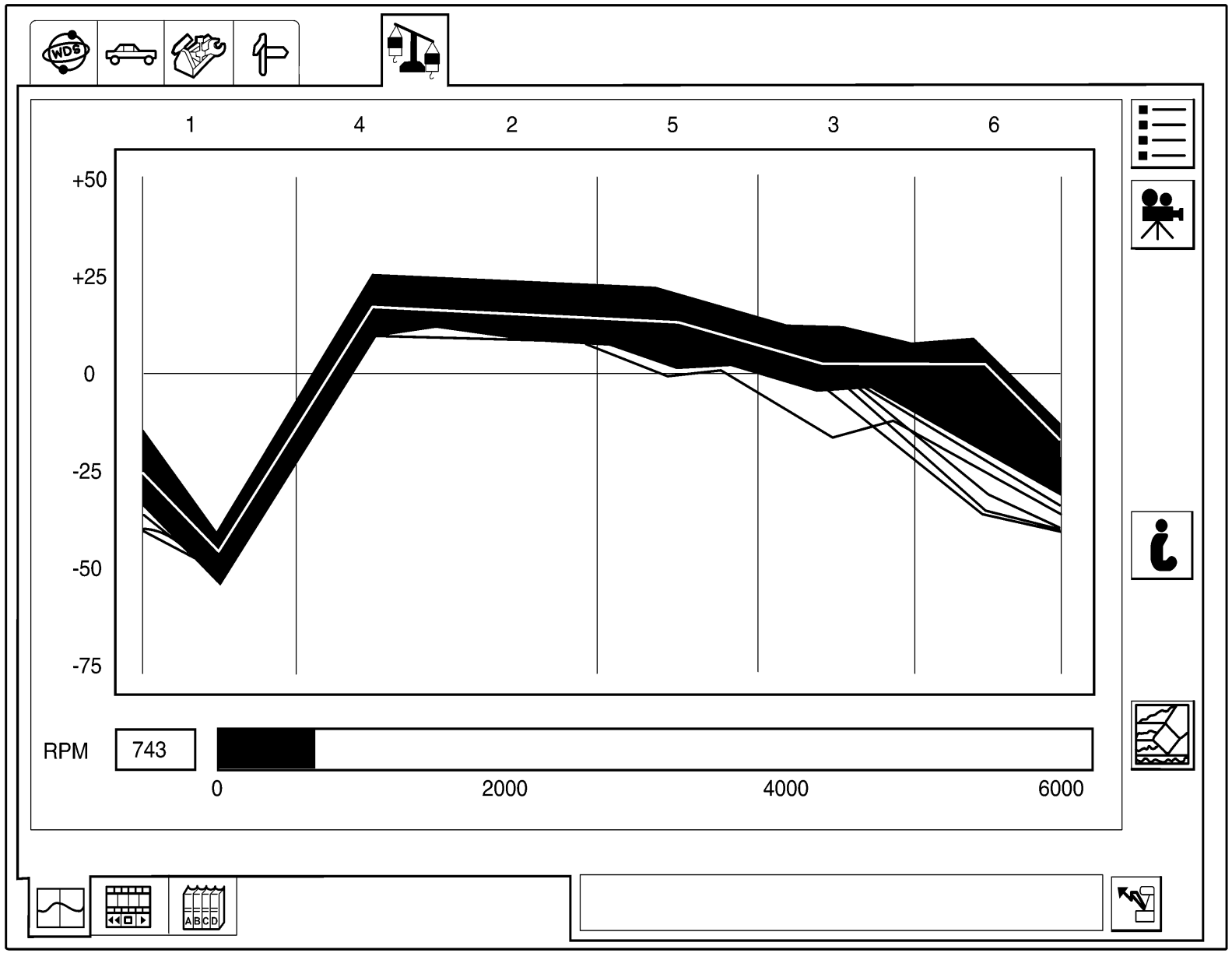


Figure 3 - Article 02-22-1

Figure 4 - Article 02-22-1

WDS SCREEN SHOWING POWER LOSS IN # 1 CYLINDER



TB-6854-A

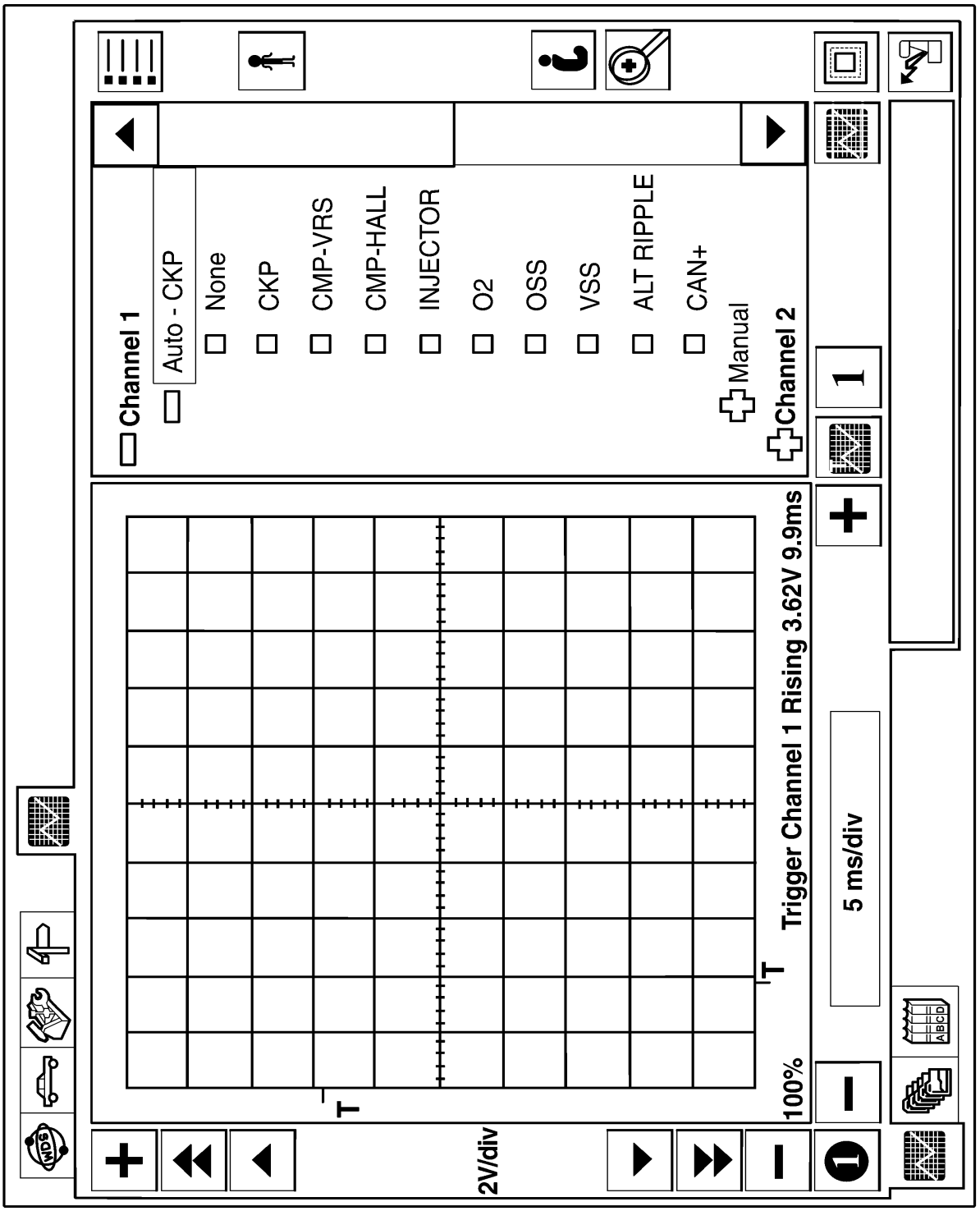
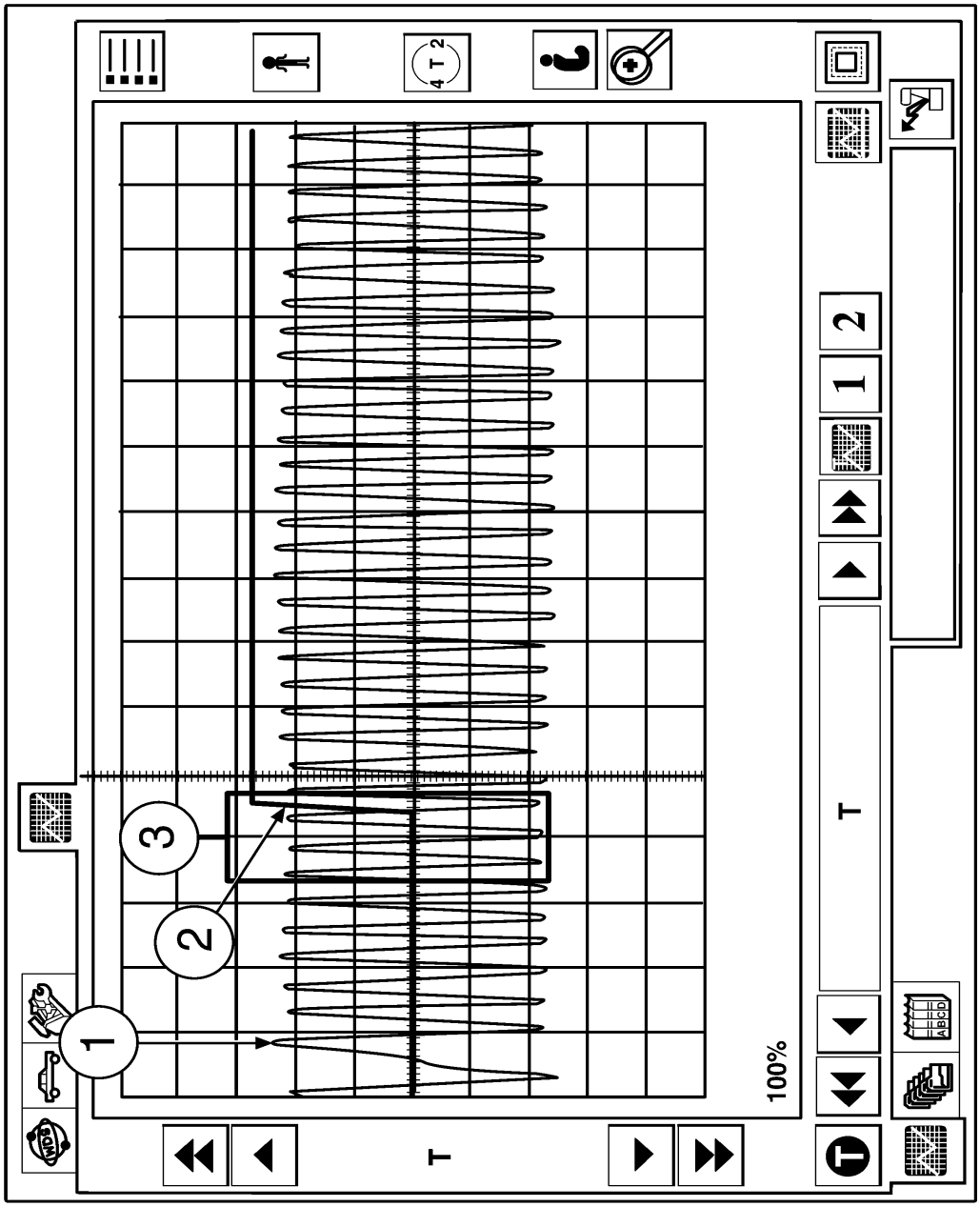


Figure 5 - Article 02-22-1

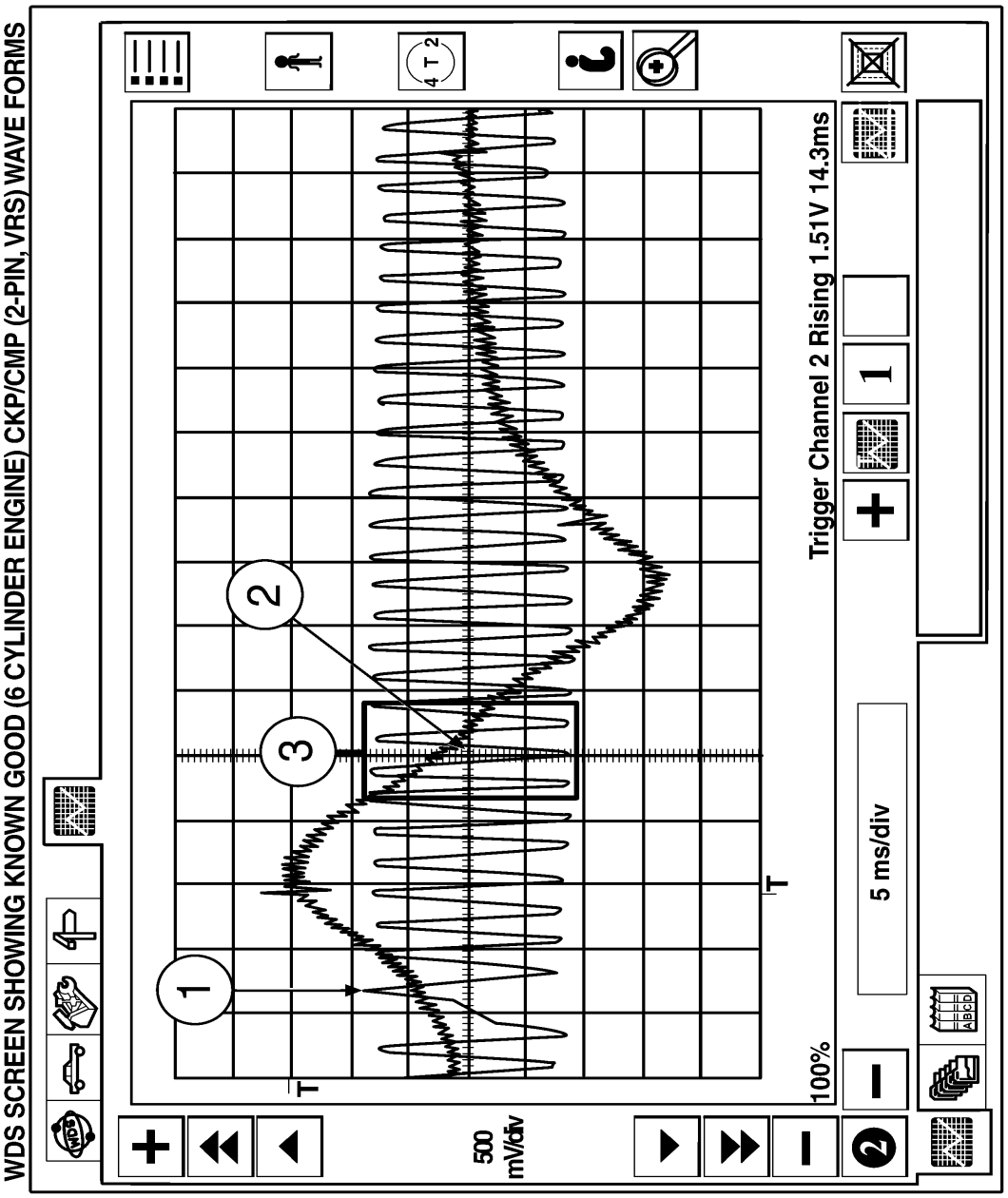
WDS SCREEN SHOWING KNOWN GOOD CKP/CMP (3-PIN, HALL EFFECT) WAVE FORMS



ITEM	DESCRIPTION
1	CKP WAVE FORM (APPEARS IN YELLOW ON WDS SCREEN) MISSING TOOTH ON CKP TRIGGER WHEEL (60° BTDC ON THIS 6 CYLINDER APPLICATION)
2	CMP WAVE FORM RISING EDGE (APPEARS IN RED ON WDS SCREEN)
3	BOX INDICATES ACCEPTABLE RANGE WHERE CMP WAVE FORM RISING EDGE SHOULD OCCUR RELATIVE TO CKP MISSING TOOTH (BETWEEN 7TH AND 10TH PEAK)

TB-6856-A

Figure 6 - Article 02-22-1



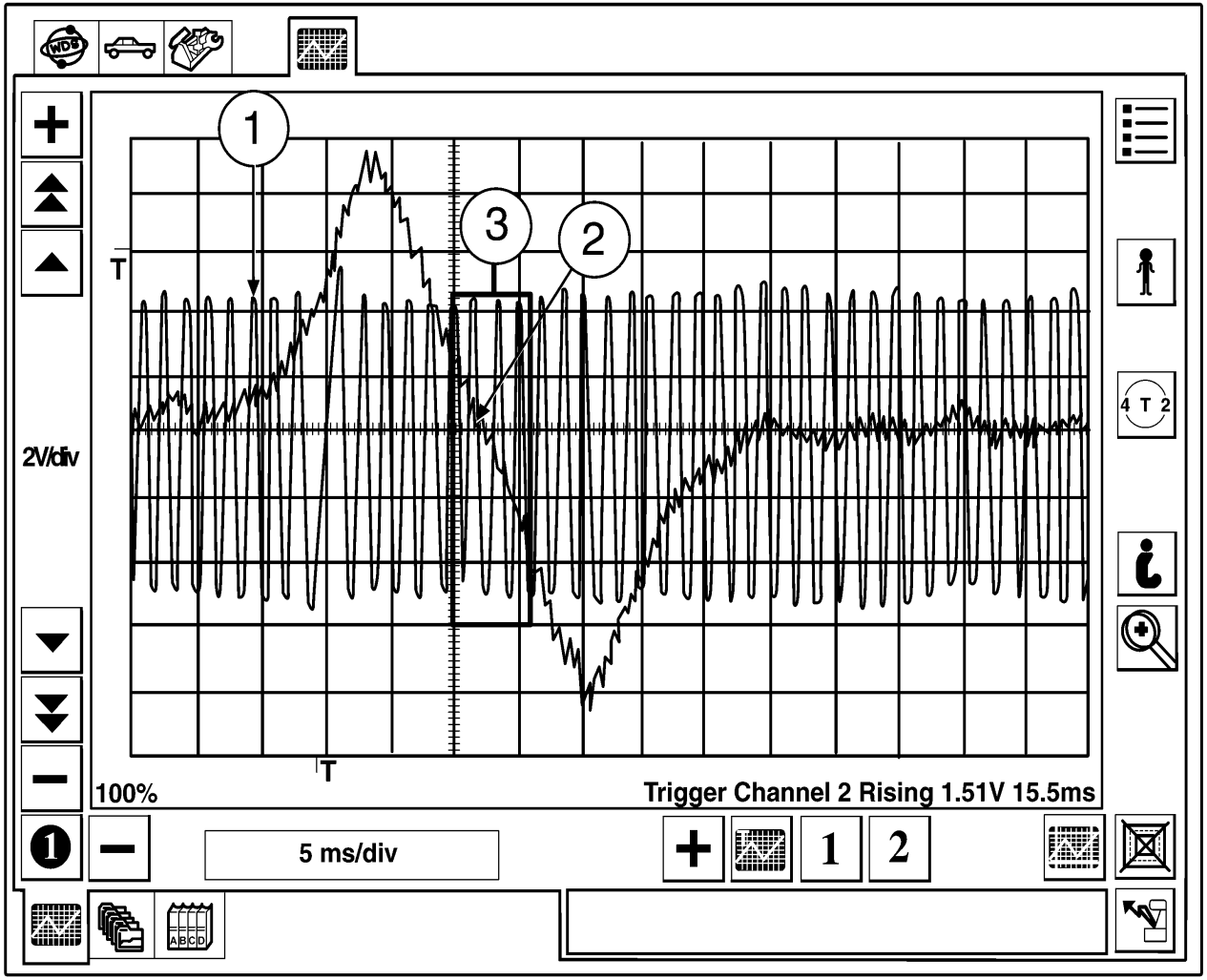
ITEM	DESCRIPTION
1	CKP WAVE FORM (APPEARS IN YELLOW ON WDS SCREEN) MISSING TOOTH ON CKP TRIGGER WHEEL (60° BTDC ON THIS 6 CYLINDER APPLICATION)
2	CMP WAVE FORM FALLING EDGE (APPEARS IN RED ON WDS SCREEN)
3	BOX INDICATES ACCEPTABLE RANGE WHERE CMP WAVE FORM FALLING EDGE SHOULD OCCUR RELATIVE TO CKP MISSING TOOTH (BETWEEN 7TH AND 10TH PEAK)

TB-6857-A

Figure 7 - Article 02-22-1

Figure 8 - Article 02-22-1

WDS SCREEN SHOWING KNOWN GOOD CKP/CMP 5.0L ENGINE (2-PIN, VRS) WAVE FORMS



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	CKP WAVE FORM (APPEARS IN YELLOW ON WDS SCREEN) MISSING TOOTH ON CKP TRIGGER WHEEL (50° BTDC)	3	BOX INDICATES ACCEPTABLE RANGE WHERE CMP WAVE FORM FALLING EDGE CAN CROSS THE ZERO REFERENCE LINE (BETWEEN 6TH AND 9TH PEAK)
2	CMP WAVE FORM FALLING EDGE (APPEARS IN RED ON WDS SCREEN)		

TB-6858-A

Figure 9 - Article 02-22-1

GEAR DRIVEN CAMSHAFT POSITION SENSOR (CMP) SYNCHRONIZER TOOL APPLICATION CHART

VEHICLES	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Mustang (3.8L)	303-358 T89P-12200-A (Hall)		303-562 T96T-12200-A (Hall)			303-630 (VRS)				
Taurus/Sable (3.0 2V)	Not Applicable (N/A)	303-453 T93P-12200-A (Hall)	303-529 T95T-12200-A (Hall)		303-589 (VRS)					
T-Bird/Cougar (3.8L)	303-358 T89P-12200-A (Hall)		303-562 T96T-12200-A (Hall)		Not Applicable (N/A)					
Windstar (3.0L 2V)	Not Applicable (N/A)	303-529 T95T-12200-A (Hall)			303-589 (VRS)			Not Applicable (N/A)		
Windstar (3.8L)	Not Applicable (N/A)	303-358 T89P-12200-A (Hall)	303-562 T96T-12200-A (Hall)			303-630 (VRS)				
Aerostar (3.0 L)	Not Applicable (N/A)	303-529 T95T-12200-A (Hall)			Not Applicable (N/A)					
Aerostar (4.0 L)	Not Applicable (N/A)		303-529 T95T-12200-A (Hall)		Not Applicable (N/A)					
Ranger (3.0L 2V)	Not Applicable (N/A)	303-529 T95T-12200-A (Hall)			303-589 (VRS)					
Ranger (4.0L)	Not Applicable (N/A)		303-529 T95T-12200-A (Hall)			303-638 (VRS)		Not Applicable (N/A)		
Explorer (4.0L)	Not Applicable (N/A)		303-529 T95T-12200-A (Hall)			303-638 (VRS)		Not Applicable (N/A)		
Explorer (5.0L)	Not Applicable (N/A)		303-562 T96T-12200-A (Hall)			303-630 (VRS)		Not Applicable (N/A)		
Mountaineer (5.0L)	Not Applicable (N/A)			303-562 T96T-12200-A (Hall)		303-630 (VRS)		Not Applicable (N/A)		
F-150 (4.2L)	Not Applicable (N/A)			303-562 T96T-12200-A (Hall)						
E-150 (4.2L)	Not Applicable (N/A)			303-562 T96T-12200-A (Hall)						

TB-6859-C

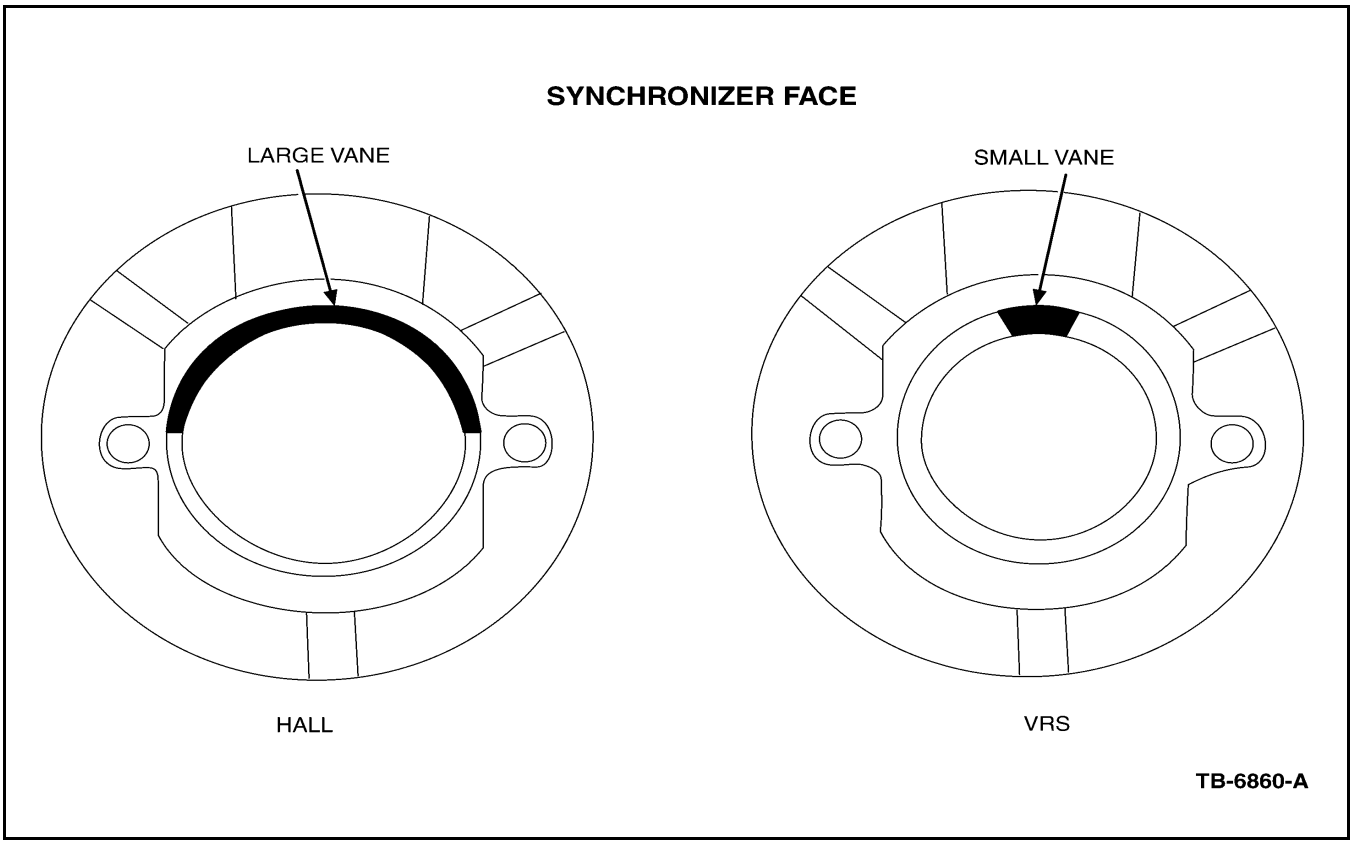


Figure 10 - Article 02-22-1

Article Number: 03-02-02
Article Type: T
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
AP	***	01/20/2003	03/13/2003
NA	***	01/20/2003	03/13/2003
SA	***	01/20/2003	03/13/2003
WD	***	01/20/2003	03/13/2003

Title:

2000-2002 VARIOUS VEHICLES - DRIVEABILITY - DTCS P0401, P0402, P1400 OR P1401, WITH OR WITHOUT (MIL), RUNS ROUGH, LACKS POWER, SURGE, POOR FUEL ECONOMY

Text:

SOME VEHICLES MAY EXHIBIT A MALFUNCTION INDICATOR LAMP (MIL) "ON" WITH OR WITHOUT THE FOLLOWING SYMPTOMS: ROUGH RUNNING, LACK OF POWER, SURGE OR POOR FUEL ECONOMY, ALONG WITH DIAGNOSTIC TROUBLE CODES (DTC'S) P0401, P0402, P1400 OR P1401. AN INTERMITTENTLY FUNCTIONING TUBE-MOUNTED DELTA PRESSURE FEEDBACK EGR (DPFE) SENSOR MAY BE THE CAUSE. FOR VEHICLES EQUIPPED WITH A TUBE-MOUNTED DPFE SENSOR PERFORM THE TSB DIAGNOSTIC PROCEDURE AND REPAIR ACTION. THE TSB PROCEDURE SUPERSEDES THE DIAGNOSTIC PROCEDURE IN THE PC/ED MANUAL.

Vehicles:

2001-2002	COUGAR (00013)
2001-2002	CROWN VICTORIA (00015)
2001-2002	E-SERIES (00016)
2001-2002	ESCAPE (00130)
2001-2002	EXPEDITION (00026)
2001-2002	EXPLORER (00110)
2002	EXPLORER 4DR (00134)
2001-2002	F-SERIES LD (00029)
2001-2002	FOCUS (00122)
2001-2002	GRAND MARQUIS (00044)
2002	MOUNTAINEER (00070)
2001-2002	MUSTANG (00071)
2001-2002	RANGER (00081)
2000-2002	SABLE (00082)
2000-2002	TAURUS (00117)
2001-2002	TOWN CAR (00094)
2001-2002	WINDSTAR (00118)

Symptom Code:

608000	DRIVEABILITY RUNS ROUGH
612000	DRIVEABILITY SURGE
614000	DRIVEABILITY LACK/LOSS OF POWER
698298	DRIVEABILITY MALFUNCTION INDICATOR LAMP - MIL
P0401	
P0402	
P1400	
P1401	

Article Number: 03-22-03
Article Type: T
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
NA	***	10/27/2003	02/04/2004
WD	***	10/27/2003	02/04/2004

Title:

2000-2002 VARIOUS VEHICLES: DRIVEABILITY - STREAMLINED DIAGNOSTIC PROCEDURE FOR VEHICLES WITH MIL ON AND DTCS P0401, P0402, P1400 OR P1401 - ADDITIONAL SYMPTOMS MAY INCLUDE RUNS ROUGH, LACKS POWER, SURGE, POOR FUEL ECONOMY

Text:

SOME VEHICLES MAY EXHIBIT A MALFUNCTION INDICATOR LAMP (MIL) "ON" WITH OR WITHOUT THE FOLLOWING SYMPTOMS: ROUGH RUNNING, LACK OF POWER, SURGE OR POOR FUEL ECONOMY, ALONG WITH DIAGNOSTIC TROUBLE CODES (DTC'S) P0401, P0402, P1400 OR P1401. THIS MAY BE CAUSED BY AN INTERMITTENTLY FUNCTIONING TUBE-MOUNTED DELTA PRESSURE FEEDBACK EGR (DPFE) SENSOR (TSB FIGURE 1). AN IMPROVED TUBE- MOUNTED EGR PRESSURE SENSOR KIT (9J460) IS BEING PHASED IN TO COVER SELECTED VEHICLE APPLICATIONS. CONSULT THE TSB PART APPLICATION CHART. AN INSTRUCTION SHEET IS INCLUDED WITH THIS KIT.

Vehicles:

2001-2002	COUGAR (00013)
2001-2002	CROWN VICTORIA (00015)
2001-2002	E-SERIES (00016)
2001-2002	ESCAPE (00130)
2001-2002	EXPEDITION (00026)
2001-2002	EXPLORER (00110)
2002	EXPLORER 4DR (00134)
2001-2002	F-SERIES LD (00029)
2001-2002	FOCUS (00122)
2001-2002	GRAND MARQUIS (00044)
2002	MOUNTAINEER (00070)
2001-2002	MUSTANG (00071)
2001-2002	RANGER (00081)
2000-2002	SABLE (00082)
2000-2002	TAURUS (00117)
2001-2002	TOWN CAR (00094)
2001-2002	WINDSTAR (00118)

Symptom Code:

608000	DRIVEABILITY RUNS ROUGH
608400	DRIVEABILITY RUNS ROUGH AT IDLE
612000	DRIVEABILITY SURGE
612600	DRIVEABILITY SURGE - CRUISE
614000	DRIVEABILITY LACK/LOSS OF POWER
614500	DRIVEABILITY LACK/LOSS OF POWER - ACCELERATION
698298	DRIVEABILITY MALFUNCTION INDICATOR LAMP - MIL
P0401	
P0402	
P1400	
P1401	

Article Number: 04-03-01
Article Type: T
Global Concern Number:
Market(s):

Area Code	Geo Sales Area	Date of Activation	Date of Deactivation
NA	***	02/05/2004	05/25/2004
WD	***	02/05/2004	05/25/2004

Title:

2000-2002 VARIOUS VEHICLES: DRIVEABILITY - STREAMLINED DIAGNOSTIC PROCEDURE FOR VEHICLES WITH MIL ON AND DTCS P0401, P0402, P1400 OR P1401 - ADDITIONAL SYMPTOMS MAY INCLUDE RUNS ROUGH, LACKS POWER, SURGE, POOR FUEL ECONOMY

Text:

SOME VEHICLES MAY EXHIBIT A MALFUNCTION INDICATOR LAMP (MIL) "ON" WITH OR WITHOUT THE FOLLOWING SYMPTOMS: ROUGH RUNNING, LACK OF POWER, SURGE OR POOR FUEL ECONOMY, ALONG WITH DIAGNOSTIC TROUBLE CODES (DTC'S) P0401, P0402, P1400 OR P1401. THIS MAY BE CAUSED BY AN INTERMITTENTLY FUNCTIONING TUBE-MOUNTED DELTA PRESSURE FEEDBACK EGR (DPFE) SENSOR. TWO (2) DIFFERENT TUBE-MOUNTED DPFE SENSORS ARE CURRENTLY AVAILABLE (MODEL AND ENGINE APPLICATION DEPENDENT). CONSULT THE TSB PART APPLICATION CHART. IT IS IMPORTANT TO USE THE APPROPRIATE PART FOR THE AFFECTED VEHICLE.

Vehicles:

2001-2002	COUGAR (00013)
2001-2002	CROWN VICTORIA (00015)
2001-2002	E-SERIES (00016)
2001-2002	ESCAPE (00130)
2001-2002	EXPEDITION (00026)
2001-2002	EXPLORER (00110)
2002	EXPLORER 4DR (00134)
2001-2002	F-SERIES LD (00029)
2001-2002	FOCUS (00122)
2001-2002	GRAND MARQUIS (00044)
2002	MOUNTAINEER (00070)
2001-2002	MUSTANG (00071)
2001-2002	RANGER (00081)
2000-2002	SABLE (00082)
2000-2002	TAURUS (00117)
2001-2002	TOWN CAR (00094)
2001-2002	WINDSTAR (00118)

Symptom Code:

608000	DRIVEABILITY RUNS ROUGH
608400	DRIVEABILITY RUNS ROUGH AT IDLE
612000	DRIVEABILITY SURGE
612600	DRIVEABILITY SURGE - CRUISE
614000	DRIVEABILITY LACK/LOSS OF POWER
614500	DRIVEABILITY LACK/LOSS OF POWER - ACCELERATION
698298	DRIVEABILITY MALFUNCTION INDICATOR LAMP - MIL
P0401	
P0402	
P1400	
P1401	

DRIVEABILITY—STREAMLINED DIAGNOSTIC PROCEDURE FOR VEHICLES WITH MIL ON AND DTCS P0401, P0402, P1400 OR P1401—ADDITIONAL SYMPTOMS MAY INCLUDE RUNS ROUGH, LACKS POWER, SURGE, POOR FUEL ECONOMY

Article No. 04-11-1

FORD: 2000-2002 TAURUS
2001-2002 CROWN VICTORIA, FOCUS, MUSTANG
2001 EXPLORER USPS
2001-2002 E SERIES, ESCAPE, EXPEDITION, EXPLORER SPORT TRAC, EXPLORER SPORT, F-150, RANGER, WINDSTAR
2002-2003 EXPLORER

LINCOLN: 2001-2002 TOWN CAR

MERCURY: 2000-2002 SABLE
2001-2002 COUGAR, GRAND MARQUIS
2002-2003 MOUNTAINEER

This article supersedes TSB **04-3-1** to update service part information and applications.

ISSUE

Some vehicles may exhibit a malfunction indicator lamp (MIL) "ON" with or without the following symptoms: Rough Running, Lack of Power, Surge or Poor Fuel Economy, along with diagnostic trouble codes (DTC's) P0401, P0402, P1400 or P1401. This may be caused by an intermittently functioning tube-mounted delta pressure feedback EGR (DPFE) sensor (Figure 1).

ACTION

For vehicles equipped with a tube-mounted DPFE sensor, perform the following diagnostic procedure and repair action. This procedure supersedes the diagnostic procedure in the PC/ED Manual for the issue described above.

NOTE
ALL LISTED APPLICATIONS CAN NOW BE SERVICED WITH DPFE SENSOR 4U7Z-9J460-AA

TYPICAL TUBE-MOUNTED D.P.F. EGR SENSOR

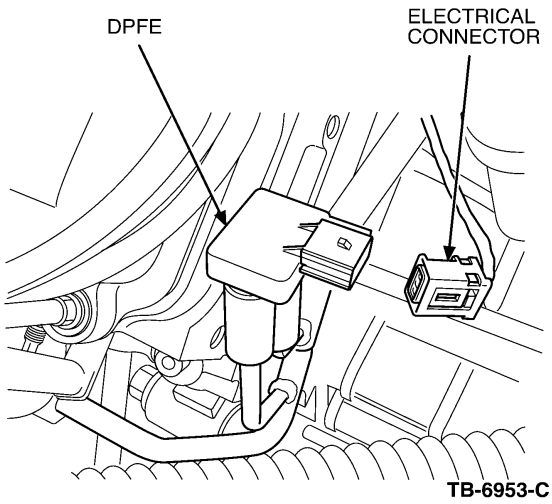


Figure 1 - Article 04-11-1

NOTE

THIS ARTICLE APPLIES TO THE FULL MODEL YEAR FOR ALL VEHICLES LISTED EXCEPT THE FOLLOWING:

- 2002 Taurus/Sable 3.0L DOHC - Built After May 2002
- 2002 Taurus/Sable 3.0L OHV - Built After February 2002
- 2002 Econoline And F-150 4.2L OHV - Built After April 9, 2002
- 2003 Explorer 4dr/Mountaineer 4.6L SOHC - Built After February 2, 2003

SERVICE PROCEDURE

1. Retrieve continuous DTC(s).
2. If P0401, P0402, P1400 or P1401 are present, turn ignition OFF and replace the DPFE sensor.
3. Clear continuous DTC(s).
4. Perform key on engine off (KOEO) and key on engine running (KOER) self-test.

ENGINE APPLICATION CHART

Model Year	Vehicle Line	Engine	Part
2001-2002	Cougar	2.5L DOHC	4U7Z-9J460-AA
2001-2002	Crown Victoria/Grand Marquis	4.6L SOHC	4U7Z-9J460-AA
2001-2002	Econoline	4.2L OHV	4U7Z-9J460-AA
2001	Econoline	4.6L SOHC	4U7Z-9J460-AA
2001-2002	Escape	2.0L Zetec and 3.0L DOHC	4U7Z-9J460-AA
2001-2002	Expedition	4.6L SOHC	4U7Z-9J460-AA
2002-2003	Explorer 4dr/Mounaineer	4.6L SHOC	4U7Z-9J460-AA
2002	Explorer 4dr/Mountaineer	4.0L SOHC	4U7Z-9J460-AA
2001-2002	Explorer Sport	4.0L SOHC	4U7Z-9J460-AA
2001-2002	Explorer Sport Trac	4.0L SOHC	4U7Z-9J460-AA
2001	Explorer USPS	4.0L SOHC	4U7Z-9J460-AA
2001-2002	Focus	2.0L Zetec	4U7Z-9J460-AA
2001-2002	F-Series	4.2L OHV and 4.6L SOHC	4U7Z-9J460-AA
2001-2002	Mustang	3.8L OHV	4U7Z-9J460-AA
2001-2002	Ranger	4.0L SOHC	4U7Z-9J460-AA
2000-2002	Taurus/Sable	3.0L DOHC	4U7Z-9J460-AA
2001-2002	Taurus/Sable	3.0L OHV and FFV	4U7Z-9J460-AA
2001-2002	Town Car	4.6L SOHC	4U7Z-9J460-AA
2001-2002	Windstar	3.8L OHV	4U7Z-9J460-AA

LABOR OPERATION CLAIMING CHART			
Operation	**Labor Description**	**Vehicle**	**Time**
041101A	Retrieve Diagnostic Trouble Codes, Replace Tube Mounted Delta Pressure Feedback Sensor (DPFE), Clear Continuous DTC's And Perform KOEO And KOER Retest	2001-2002 Escape 2.0L Zetec	0.4
		2001-2002 Escape 3.0L DOHC	0.4
		2001-2002 Focus 2.0L Zetec	0.4
		2001-2002 Cougar 2.5L DOHC	0.4
		2000-2002 Taurus/Sable 3.0L DOHC	0.4
		2001-2002 Taurus/Sable 3.0L OHV and FFV	0.4
		2001-2002 Mustang 3.8L OHV	0.4
		2001-2002 Windstar 3.8L OHV	0.4
		2001-2002 Explorer Sport 4.0L SOHC	0.4
		2001-2002 Explorer Sport Trac: 4.0L SOHC	0.4
		2002 Explorer/Mountaineer 4.0L SOHC	0.4
		2001 Explorer USPS 4.0L SOHC	0.4
		2001-2002 Ranger 4.0L SOHC	0.4
		2001-2002 Econoline 4.2L OHV	0.6
		2001-2002 F-Series 4.2L OHV	0.4
		2001-2002 Crown Victoria/Grand Marquis 4.6L SOHC	0.5
		2001 Econoline 4.6L SOHC	0.6
		2001-2002 Expedition 4.6L SOHC	0.5
		2001-2002 F-Series 4.6L SOHC	0.4
		2001-2002 Town Car: 4.6L SOHC	0.6
		2002-2003 Explorer/Mountaineer 4.6L SOHC	0.5

PART NUMBER	PART NAME
4U7Z-9J460-AA	DPFE Sensor

OTHER APPLICABLE ARTICLES: NONE

WARRANTY STATUS: Eligible Under The Provisions Of New Vehicle Limited Warranty Coverage And Emissions Warranty Coverage

DEALER CODING

BASIC PART NO.	CONDITION CODE
9J460	42

SPEED CONTROL DIAGNOSTICS—W/O SCP | TSB 06-8-5

FORD:
2000-2003 Escort
2000-2004 Crown Victoria, Mustang
2000-2005 Focus, Taurus
2000-2001 Explorer
2000-2004 E-Series, Expedition, F-150, F-Super Duty
2000-2005 Excursion, Ranger
2001-2003 Explorer Sport
2001-2005 Escape, Explorer Sport Trac
2004 F-150 Heritage

LINCOLN:
2000-2002 Navigator
2001-2002 Blackwood

MERCURY:
2000-2002 Cougar
2000-2004 Grand Marquis
2000-2005 Sable
2003-2004 Marauder
2000-2001 Mountaineer
2005 Mariner

ISSUE

Stand-alone speed control system diagnostic updates have been made in 2006 model year and newer Workshop Manuals (WSM). These diagnostic updates also apply to 2000-2005 model year vehicles. This TSB provides these WSM updates for 2000-2005 model year vehicles.

ACTION

The vehicles in this article are equipped with a 10-pin speed control servo without a standard corporate protocol (SCP) communication control system. Follow the Service Procedures and Diagnostic Tips in this TSB to assist with accurate diagnosis and repair of speed control issues.

GENERAL SERVICE PROCEDURE

1. Visually inspect the vehicle. Any after market modifications, including but not limited to those listed below, may cause speed control to not operate correctly:
   - Any wiring or lamp modifications affecting brake lamp operation
   - LED brake lamps
   - Non-factory installed trailer wiring
   - Radios (speed sensitive, auto mute)
   - Remote starters and alarms
   - Lighting and electrical accessories modifications
2. Visually inspect the servo and accelerator controls:
   - Visually inspect speed control cable without removing and ensure smooth cable operation. Inspect cable connection to the throttle body
   - Visually inspect accelerator cable without removing and ensure smooth cable operation. Inspect cable connection to throttle body. Also check for interference with carpet, bulkhead grommet, insulation, and instrument panel wiring

SERVICE PROCEDURE

Start by running speed control servo integrated self test diagnostics. The servo has integrated self test diagnostics which is a key tool in quickly and accurately diagnosing speed control system faults. Self test diagnostics are also the basis for starting speed control trouble shooting.

WARNING
THIS TEST IS A KEY ON ENGINE OFF (KOEO) TEST THAT IS CONDUCTED ONLY WHILE PARKED WITH THE PARKING BRAKE FULLY ENGAGED. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

NOTE
THE SELF-TEST IS COMPRISED OF TWO PARTS. THE FIRST PART IS A STATIC CHECK OF THE SPEED CONTROL ELECTRONICS MODULE AND SYSTEM. THE SECOND PART IS A DYNAMIC PULL-TEST TO CHECK THE ACTUATOR MOTOR AND GEAR MECHANISM.

NOTE
THE MODULE TIMES OUT IF EACH BUTTON IS NOT PRESSED WITHIN 1 SECOND OF THE PREVIOUS BUTTON. IF A MODULE TIME OUT OCCURS (SPEED CONTROL LAMP STOPS FLASHING PART WAY THROUGH THE TEST), THE PROCEDURE MUST BE RE-INITIATED.

NOTE
ON VEHICLES EQUIPPED WITH A MANUAL TRANSMISSION, THE CLUTCH PEDAL SHOULD NOT BE DEPRESSED EXCEPT FOR ESCAPE/MARINER, WHICH SHOULD BE DEPRESSED, IN ORDER TO CORRECTLY PERFORM THE SELF-TEST. ON VEHICLES EQUIPPED WITH AN AUTOMATIC TRANSMISSION, THE TRANSMISSION SELECTOR LEVER NEEDS TO BE IN THE “P” POSITION FOR THE SELF TEST EXCEPT FOR THE ESCAPE/MARINER WHICH SHOULD BE IN “N”.

NOTE
REVIEW THE FOLLOWING STEPS BEFORE CARRYING OUT THE SELF-TEST DIAGNOSTIC PROCEDURE.

1. Self Test Diagnostic Procedure - Static Test

    a. Connect the diagnostic scan tool (DST) to a power source that is not interrupted when the ignition switch changes positions. With the ignition switch in the RUN position, set the DST to monitor the powertrain control module (PCM) throttle position PID while the speed control actuator carries out the self-test.

    b. Enter self-test diagnostics by firmly pressing and holding the speed control OFF switch while quickly cycling the ignition switch from RUN-to-OFF-to-RUN, making sure the engine does not start and is not running.

    c. The speed control indicator lamp on the instrument panel will flash once to indicate that the speed control module has entered the self test diagnostic mode. Release the OFF switch. If 5 flashes are displayed at this point, a speed control subsystem concern exists. Refer to the Symptom Chart in the vehicle WSM.

    d. Then firmly press and release the remaining switches WITHIN 1 SECOND of each other in the sequence below. The speed control indicator lamp flashes once after each of the buttons is successfully pressed.

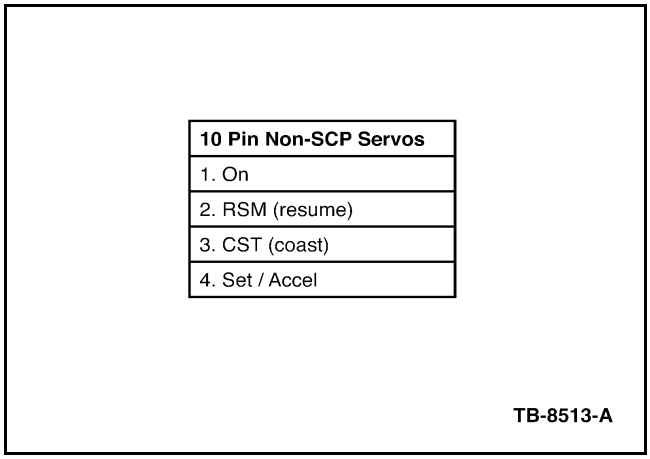


Figure 1 - Article 06-8-5

NOTE
MONITOR THE PCM THROTTLE POSITION PID AFTER THE LAST BUTTON IS PRESSED.

NOTE
THERE WILL BE A SLIGHT DELAY FROM WHEN THE LAST BUTTON IS PRESSED AND THE CLUSTER LAMP FLASHES DIAGNOSTIC CODES.

NOTE
IF THE SELF-TEST WILL NOT START OR CANNOT BE COMPLETED AFTER MULTIPLE ATTEMPTS, GO TO THE VEHICLE WSM SYMPTOM CHART.

    e. Follow the list below for diagnostic flash codes, then go to the WSM Symptom Chart.

Sequence of Button Press	Button	Resulting Cluster Lamp Flashes
1	Off	• 1 Flash: confirms button was pressed correctly • 5 Flashes: indicates a faulty speed control module
2	On	• 1 Flash: confirms button was pressed correctly
3	Resume	• 1 Flash: confirms button was pressed correctly
4	Coast	• 1 Flash: confirms button was pressed correctly
5	Set / Accel	There is a delay which is followed by diagnostic flash codes consisting of 0 to 5 flashes. The dynamic test occurs within .25 seconds after the flash codes. • 0 Flashes: no flash after last button pressed - suspect circuitry or speed control steering wheel switches • 1 Flash: static test passed • 2 Flashes: BPP switch is damaged, circuit is damaged or the brake pedal or clutch is applied • 3 Flashes: brake deactivation switch is open or circuit is damaged • 4 Flashes: Escape/Mariner the Clutch (CPP)/neutral switch (TR sensor) circuit is damaged, clutch switch is damaged or the clutch is not applied. On all other vehicles, 4 flashes indicates the speed signal circuit is open or damaged • 5 Flashes: suspect circuitry or module

TB-8514-A

Figure 2 - Article 06-8-5

2. Self Test Diagnostic Procedure - Dynamic Test

NOTE
THE DYNAMIC TEST OCCURS AUTOMATICALLY AFTER THE STATIC TEST PASSES. IF THE STATIC TEST FAILS RESULTING IN FLASH CODES, THERE WILL BE NO DYNAMIC PULL TEST.

a. Within .25 seconds after the static test has completed, the speed control actuator carries out a dynamic pull test. The actuator automatically pulls the speed control cable .04 to .39″ (1 to 10 mm) to move the throttle from the idle position and then releases the speed control cable returning the throttle to the idle position.

NOTE
THE 2001-2005 ESCAPE/MARINER HOLDS THE PEAK THROTTLE PULL FOR 3 SECONDS PRIOR TO RELEASING.

b. If the throttle position PID voltage value does not change during the dynamic throttle pull, go to the WSM Symptom Chart Section for Dynamic Pull Test failure.

SPEED CONTROL DIAGNOSTIC TIPS

Servo Pin-Out Test Tips

NOTE
MEASURING THE RESISTANCE OF A SERVO WILL INDICATE THAT A SERVO IS BAD IF READINGS ARE OUTSIDE THE RANGES SPECIFIED BELOW. HOWEVER, A SERVO CAN HAVE RESISTANCE READINGS WITHIN THE SPECIFIED RANGES AND STILL BE FAULTY.

The following readings are the expected values for a good servo.

Resistance between Pins 6 and 10 should measure less than 5 ohms. This is the ground circuit through the module. Resistance between Pins 7 and 10 will vary with polarity, the type of meter, and source voltage of the meter. Also measurements between Pins 7 and 10 can be any of the following: an open circuit, increasing reading (as a capacitor charging), or changing value (re-apply leads and different value indicated), or a stable reading of 10,000 ohms or greater are all valid results as this is a solid state circuit.

DST Testing Tips (TPS PID)

1. Pinpoint Test: The Speed Control Does Not Disengage When The Brakes Are Applied

With the vehicle speed above 30 MPH (48 Km/h) engage the speed control. Then check to see if the TPS PID returns to base voltage when the brakes are applied. If it does return to base voltage, then the speed control system is working. Need to advise customer that tapping the brakes deactivates speed control and that the brakes must be applied to make the vehicle slow down. On the Escape/Mariner the brake pedal should be depressed at least 13/32″ (10 mm) in order to deactivate speed control.

NOTE
CHECK FOR CALIBRATION SERVICE MESSAGES RELATING TO DASHPOT OR IDLE SPEED CONTROL UPDATES.

2. Pinpoint Test: The Speed Control Does Not Disengage When The Clutch Is Applied

Check to see if the TPS PID returns to base voltage when the clutch is pressed. If it does then the speed control system is working. Need to advise customer that pressing clutch deactivates speed control and that the brakes must be applied to make the vehicle slow down.

NOTE
CHECK FOR CALIBRATION SERVICE MESSAGES RELATING TO DASHPOT OR IDLE SPEED CHANGES. ALSO A SLIGHT ENGINE RPM FLARE MAY OCCUR ON SOME VEHICLES WHEN SPEED CONTROL IS DISENGAGED WHICH IS A NORMAL CONDITION.

Speed Signal Testing Tips

NOTE
A FAULTY VEHICLE SPEED SIGNAL TO THE SERVO CAN RESULT IN INTERMITTENT, IRREGULAR OR INOPERATIVE SPEED CONTROL.

NOTE
FOR VEHICLES THAT HAVE OSS OR HALL EFFECT VEHICLE SPEED SIGNALS TO THE SERVO, REFER TO WSM FOR DIAGNOSTICS.

To verify that the speed control signal sent to the servo is valid, the following inspection may be done for ABS and PCM generated speed signals:

1. Disconnect speed control module (C122).
2. Connect DVOM set to Hz to C122 Pin 3 harness side and C122 Pin 10 (ground) harness side.
3. Start the vehicle; place the transmission in DRIVE, test drive vehicle between 25-30 MPH (40-48 Km/h).
4. Measure the frequency between the speed control actuator C122 Pin 3 harness side and C122 Pin 10 (ground) harness side. Divide frequency by 2.2 to give MPH and compare to speedometer reading. Measure AC Volts and record.
5. If the AC Voltage is greater than 4.5V and the frequency reading does match the speedometer reading then the speed signal is valid. If further diagnostics are required see WSM.

Deactivator Switch Inspection Tips

A faulty deactivator switch can result in intermittent or inoperative speed control. There are two types of deactivator switches; a brake line pressure switch, which is integrated into the brake master cylinder, and a pedal travel switch, which is connected to the brake pedal arm.

Proper switch function should be confirmed. Inoperative switches of both types should be inspected for connector corrosion or pin push-out. Pedal travel switches should also be inspected for proper mechanical adjustment relative to brake pedal travel.

ADDITIONAL REFERENCE INFORMATION

Speed Control Servo Operation and Function

NOTE
ALL FUNCTIONALITY LISTED BELOW IS PERFORMED WITH CONNECTORS CONNECTED AND KEY IN RUN POSITION UNLESS OTHERWISE NOTED.

PIN 1 - Indicator. (if used) Speed control servo grounds this circuit to turn the speed control lamp in cluster on during operation. This will not affect operation of system.

PIN 2 - Clutch/TRS Input. (Escape/Mariner only) Signal comes from clutch switch (MT) or TRS (AT). On the harness side the signal can be measured by connecting a DVOM, set to ohms, between Pins 2 and B-. With clutch depressed (MT) or in N (AT) you should read 0 ohms, which disables speed control. With clutch released (MT) or in D (AT) signal should read greater than 10,000 ohms, which enables speed control operation.

PIN 3 - VSS Input. (Note: Performed with engine running and vehicle driven.) Signal comes from PCM, ABS, OSS, hall effect sensor depending on application. Except for hall effect sensor, the signal can be measured by removing Connector C122 and measuring the frequency between Pins 3 and 10 with a DVOM set to AC Hz. The signal should measure 2.2 Hz/MPH. The vehicle must be traveling 30 MPH (48 Km/h) before the system will set, therefore a minimum of 66 Hz must be observed. Take note that on vehicles equipped with SVC (speed sensitive volume control), an internal problem within the radio can bring signal down to 0 Hz even though it reads correctly in PCM PIDs. If signal is missing disconnect radio and retest. Note, for vehicles with a hall effect input to the speed control servo, see WSM for speed signal verification.

PIN 4 - Brake Switch Input (BOO/BPP).

NOTE
ENSURE THAT BRAKE LAMPS ARE FUNCTIONING CORRECTLY.

Vehicles with automatic transmission and all Escape and Mariner vehicles (auto and manual): With a DVOM set to ohms, measure resistance between Pins 4 and B- with brake pedal not depressed, you should get less than 5 ohms. Then measure voltage with brake pedal depressed, you should get 12 V. Operation: The servo sends out a reference voltage on Pin 4 (4-7V) which is grounded through the brake lamps or switched directly to ground.

Vehicles with manual transmissions (except Escape and Mariner vehicles, see above): With a DVOM set to ohms, measure resistance between Pin 4 and B- with brake pedal not depressed and clutch pedal not depressed, you should get less than 5 ohms. Next, depress clutch pedal only, measuring resistance, you should get an open circuit / infinite resistance. Then measure voltage with brake pedal depressed, clutch pedal not depressed and you should get 12 V. Repeat with both pedals depressed and you should get 0 volts. Operation: The servo sends out a reference voltage on Pin 4 (4-7V) which is grounded through the brake lamps or switched directly to ground when the clutch pedal is not depressed.

PIN 5 - Control Switch Input. (Note: Performed with key in OFF position.) Remove Connector C122, using a DVOM set to resistance, measure the resistance between Pins 5 and 6. See table of resistance readings below for each switch when it is depressed.

Speed Control Switch	Resistance Value
Coast	Between 114 and 126 ohms
Set / Accel	Between 646 and 714 ohms
Resume	Between 2,090 and 2,310 ohms
Off	Less than 5 ohms
No Buttons Pressed	**Infinite**

TB-8516-A

Figure 3 - Article 06-8-5

PIN 6 - Control Switch Return. This is the return side of the switches, which are grounded internally to the servo to Pin 10. If test for Pin 5 checks good then Pin 6 is functioning normally.

PIN 7 - Power. Remove Connector C122, Using a DVOM set to DC volts, measure the voltage between Pin 7 and ground. You should read greater than 10 volts with the key in the run position. Record the voltage from Pin 7 to ground, then re-measure with a test lamp (1156) from Pin 7 to ground, to ensure current carrying capability. The difference between the two measurements should be less than 0.3 VDC. If voltage drop test fails then check wiring.

PIN 8 - Not used.

PIN 9 - Brake Deactivator Switch (BPS). This is a redundant shutoff switch. Without depressing the brake pedal, measure voltage on Pin 9, and re-measure with a test lamp (1156) from Pin 9 to ground, to ensure current carrying capability. The difference between the two measurements should be less than 0.3 VDC. The system requires enough current at this pin to engage properly. If voltage drop test fails, check for corroded wiring or deactivation switch. You should measure 0 volts at Pin 6 when the brake pedal is depressed firmly.

An alternate to the voltage drop test would be to disconnect the switch connector and measure the switch resistance. It should be less than 5 ohms. If the switch is suspected, a bypass test may also be done: On the harness side of the BPS connector, connect a jumper between the two deactivation switch pins and drive vehicle above 30 MPH (48 Km/h). If speed control engages then the brake deactivation switch was faulty, otherwise wiring is at fault.

PIN 10 - Ground. Using a DVOM set to DC volts, measure the voltage between B+ and Pin 10. You should read greater than 10 volts. Record the voltage between B+ and Pin 10 , then re-measure with a test lamp (1156) from B+ to Pin 10. The difference between the two measurements should be less than 0.3 VDC. If voltage drop test fails then check wiring. This verifies circuit can carry proper load as well as continuity to ground.

WARRANTY STATUS: Information Only

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2013-1-18 Appendix L - Part Change Log

2000 - 2003 Ford Taurus and Mercury Sable Part Changes or Modifications - 3.0L DOHC (4 valve) V6

	A	B	C	D	E	F		G	H
Part Name	**Date Part Incorporated Into Vehicle Production**	**Description of Change**	**Reasons for Change**	**Original**	**Modified**	**Disposition of Original Parts**		**New Component Availability Date For Service**	**New Component Interchangeable With Old (Y/N)**
				Ford Engineering and Service Part Numbers	**Ford Engineering and Service Part Numbers**	**Withdrawn from Ford Production Inventory (Scrap/ Consume/ Rework)**	**Effective Date**		
1) Speed Control Cable Assembly									
CABLE ASY - ACTUATOR SPEED CONTROL	Job 1 2000 MY (Aug 1999)	Initial Release for Production	Initial Release for production	Start of program	YF1F-9A825-BD (prod) YF1Z-9A825-BA (serv)	C	August, 1999	August, 1999	Y
CABLE ASY - ACTUATOR SPEED CONTROL	January 6, 2000 (est.)	New cable - Eliminate elongated nail head connection, increase cable lenth from servo to mounting bracket by 5mm.	Changes made to simplify assembly	YF1F-9A825-BD (eng) YF1Z-9A825-BA (serv)	YF1F-9A825-CA (eng) YF1Z-9A825-CA (serv)	C	January 6, 2000 (est.)	January 6, 2000 (est.)	Y
2) Bracket Assembly									
BRKT-ACEL.SHAFT	Job 1 2000 MY (Aug 1999)	Initial Release for Production	Initial Release for production	Start of program	YF12-9728-BA (prod) YF1Z-9728-BA (serv)	C	August, 1999	August, 1999	Y
BRKT-ACEL.SHAFT	Running Change September 1,1999 (est.)	Revise speed cable attaching hole. Revise return spring attaching hole.	Changes made to simplify assembly	YF12-9728-BA (prod) YF1Z-9728-BA (serv)	YF12-9728-BB (prod) YF1Z-9728-BB (serv)	C	September 1, 1999 (est.)	September 1, 1999 (est.)	Y

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2013-1-18 Appendix M - Service Part Sales

Speed Control Cable Assembly:

Supplier: KONGSBERG DRIVELINE SYSTEMS II CORP
1208 UNIROYAL DRIVE
LAREDO, TX 78045

Contact: LILIAN MENDEZ
956-717-2820 Ext: 235

Engineering Part: YF1F-9A825-CA
Service Part: YF1Z-9A825-CA

Year	Quantity
2012	4760
2011	4778
2010	4387
2009	3441
2008	2641
2007	1901
2006	992
2005	619
2004	352
2003	280
2002	158
2001	155
2000	4

Month	Year	Quantity
12	2012	281
11	2012	297
10	2012	417
9	2012	391
8	2012	448
7	2012	514
6	2012	507
5	2012	539
4	2012	395
3	2012	464
2	2012	326
1	2012	346
12	2011	296
11	2011	321
10	2011	338
9	2011	417
8	2011	525
7	2011	445
6	2011	482
5	2011	497

4	2011	411
3	2011	415
2	2011	335
1	2011	296
12	2010	289
11	2010	277
10	2010	330
9	2010	371
8	2010	486
7	2010	464
6	2010	500
5	2010	434
4	2010	387
3	2010	375
2	2010	247
1	2010	227

Engineering Part: YF1F-9A825-BD
Service Part: YF1Z-9A825-BA

Year	Quantity
2012	0
2011	0
2010	0
2009	0
2008	0
2007	7
2006	34
2005	51
2004	74
2003	44
2002	66
2001	121
2000	101

Bracket Assembly:

Supplier: DRIVESOL WORLDWIDE, INC.
7346 STATE RTE 120
LYONS, OH 43533

Contact: TERESA
419-923-7010 Ext: 101

Engineering Part: YF12-9728-BB
Service Part: YF1Z-9728-BB

Year	Quantity
2012	0
2011	0
2010	0
2009	0
2008	0
2007	4
2006	1
2005	3
2004	2
2003	11
2002	6
2001	6
2000	2

Engineering Part: YF12-9728-BA
Service Part: YF1Z-9728-BA

Year	Quantity
2012	0
2011	0
2010	0
2009	0
2008	0
2007	0
2006	1
2005	1
2004	0
2003	5
2002	1
2001	3
2000	7

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Appendix O - Service Procedures

Cylinder Head LH

IN-VEHICLE REPAIR

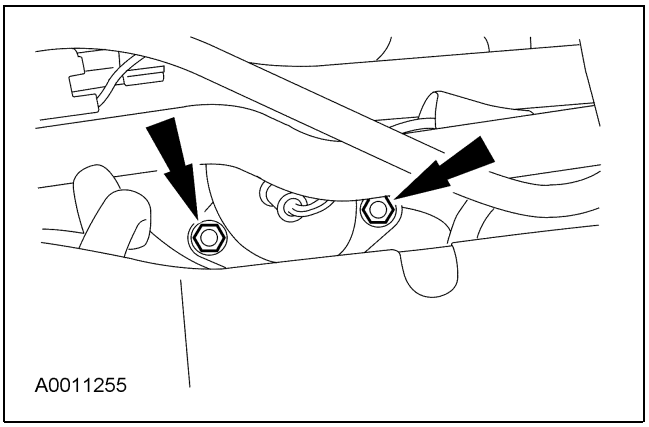
Cylinder Head LH

Material

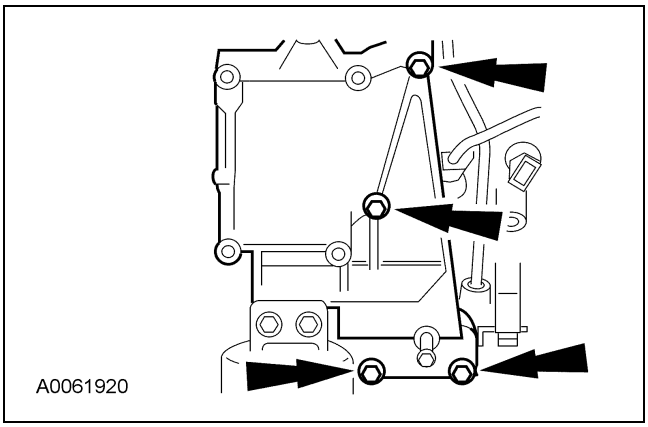
Item	Specification
SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP	WSS-M2C153-H

Removal

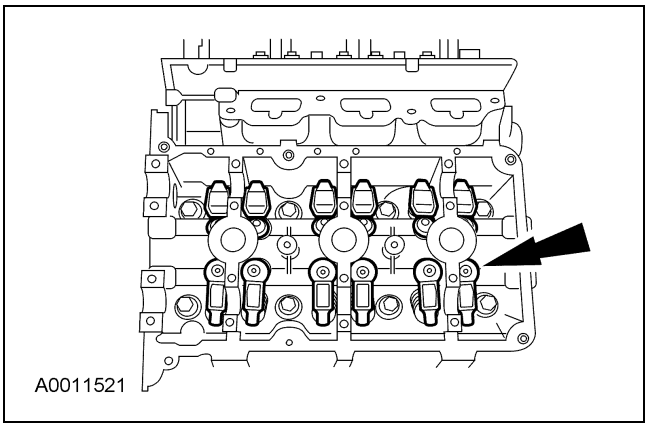
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. Release the fuel system pressure. For additional information, refer to Section 310-00.
3. Remove the coolant pump bypass tube. For additional information, refer to Section 303-03.
4. Remove the LH exhaust manifold-to-pipe nuts.



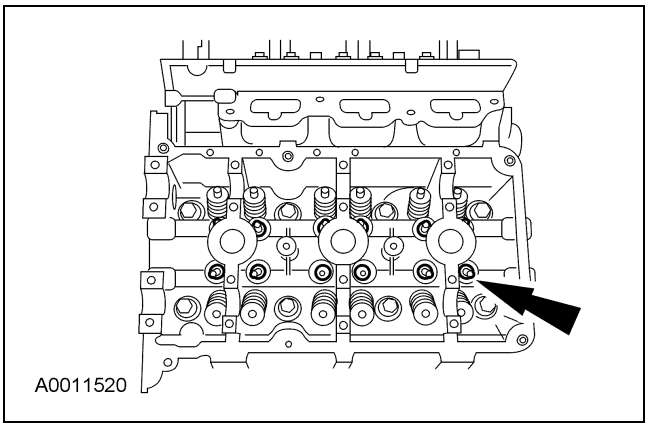
5. Remove the coolant pump. For additional information, refer to Section 303-03.
6. Remove the lower intake manifold. For additional information, refer to Lower Intake Manifold in this section.
7. Remove the LH camshafts. For additional information, refer to Camshafts LH in this section.
8. Using the special tools, lower the engine until it is aligned with the A/C compressor bracket, and finger-tighten the four bolts.



9. Remove the three-bar engine support.
10. Remove the camshaft followers.



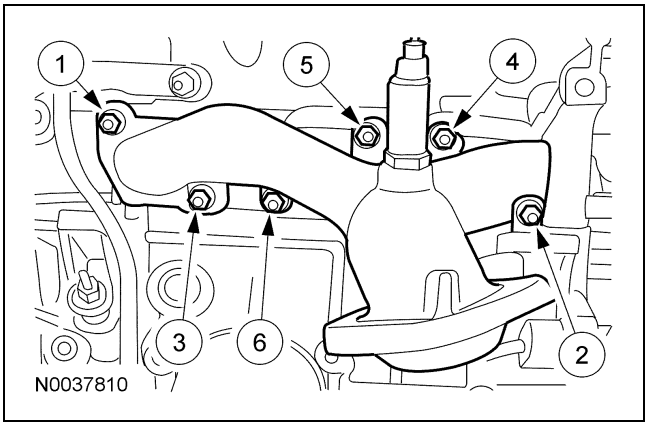
11. Remove the hydraulic lash adjusters.



12. Disconnect the LH heated oxygen sensor (HO2S) electronic connector.

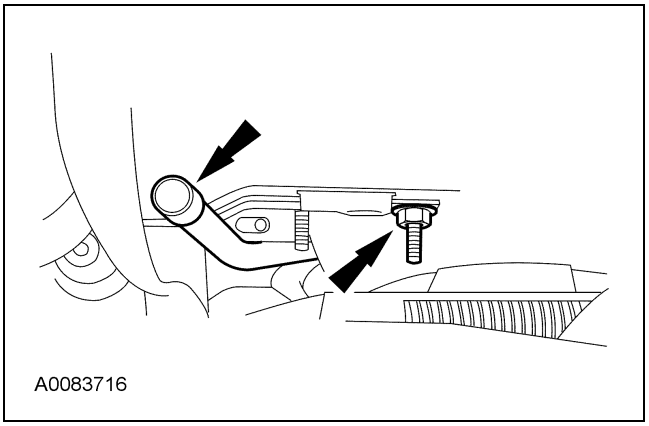
IN-VEHICLE REPAIR (Continued)

13. Remove the nuts in the sequence shown and remove the LH exhaust manifold.
    - Remove the studs.
    - Discard the gasket, studs and nuts.

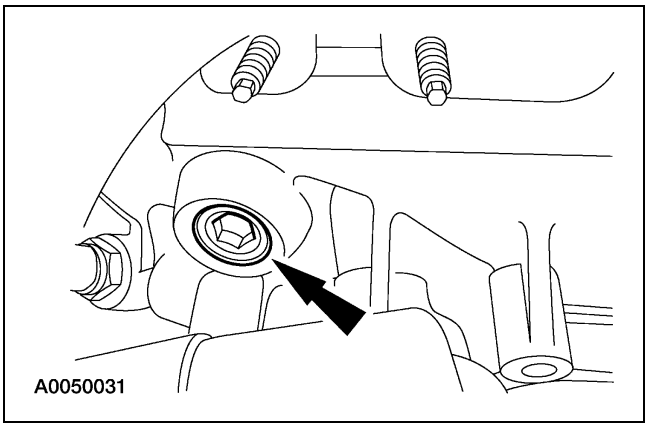


14. Remove the oil level indicator.

15. Remove the nut and the oil level indicator tube.
    - Inspect and, if necessary, install a new O-ring seal.

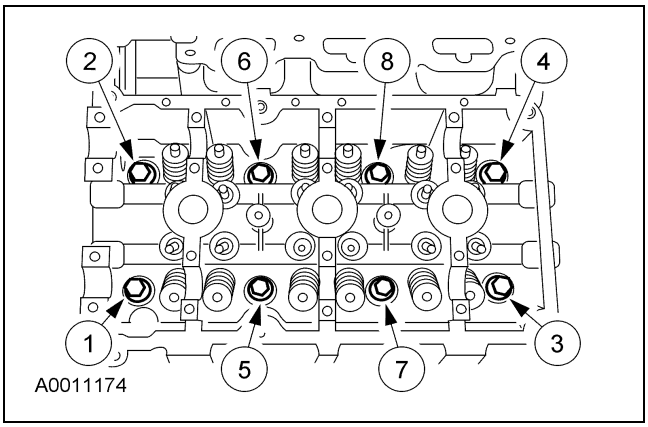


16. Remove the LH cylinder block drain plug.



17. **NOTE:** New cylinder head bolts must be installed. They are torque-to-yield designed and cannot be reused.

    Remove the bolts in the sequence shown and remove the cylinder head.
    - Discard the gasket and the bolts.



18. **NOTE:** The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of tool length.

    Support the cylinder head on a bench with the head gasket side up. Inspect all areas of the deck face with a straightedge and feeler gauge. The cylinder head must not have depressions deeper than 0.0254 mm (0.001 in) across a 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.001 in) deep.

IN-VEHICLE REPAIR (Continued)

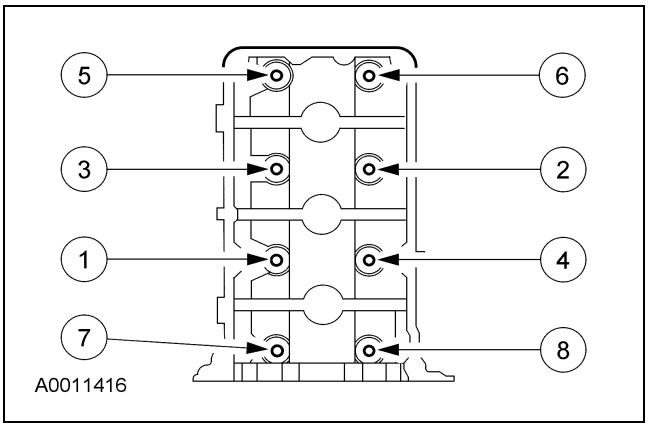
Installation

1. *NOTICE:* **Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges which make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.**

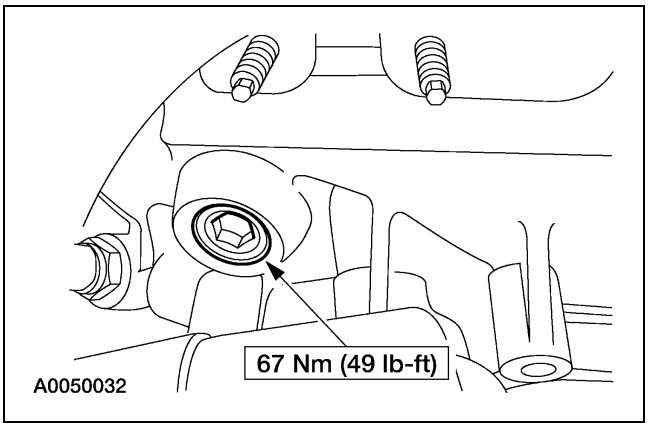
   NOTE: New cylinder head bolts must be installed. They are torque-to-yield designed and cannot be reused.

   Position the LH cylinder head, gasket and install the bolts in the sequence shown in six stages.

   - Tighten the bolts in six stages.
   - Stage 1: Tighten to 40 Nm (30 lb-ft).
   - Stage 2: Tighten bolts 90 degrees.
   - Stage 3: Loosen one full turn.
   - Stage 4: Tighten to 40 Nm (30 lb-ft).
   - Stage 5: Tighten 90 degrees.
   - Stage 6: Tighten 90 degrees.

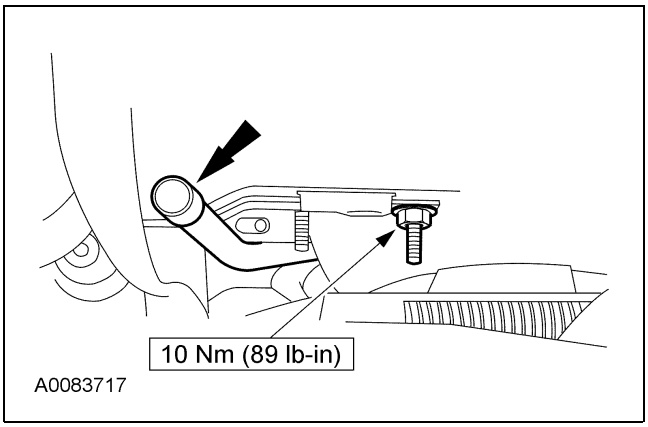


2. Install the LH cylinder block drain plug.



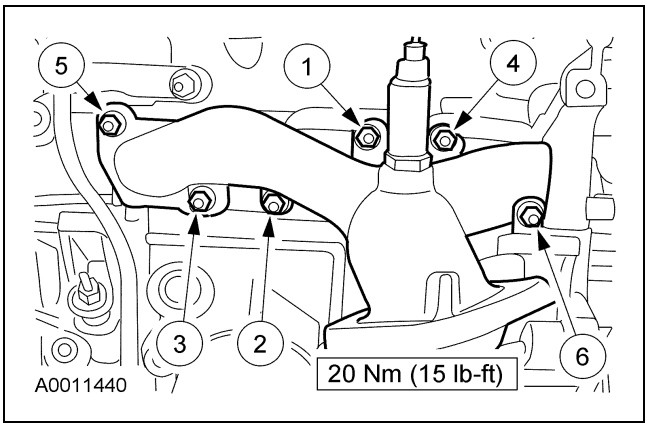
3. **NOTE:** Lubricate the oil level indicator tube O-ring with clean engine oil.

   Install the oil level indicator tube and the nut.



4. Install the new LH exhaust manifold studs.
   - Tighten to 12 Nm (9 lb-ft).

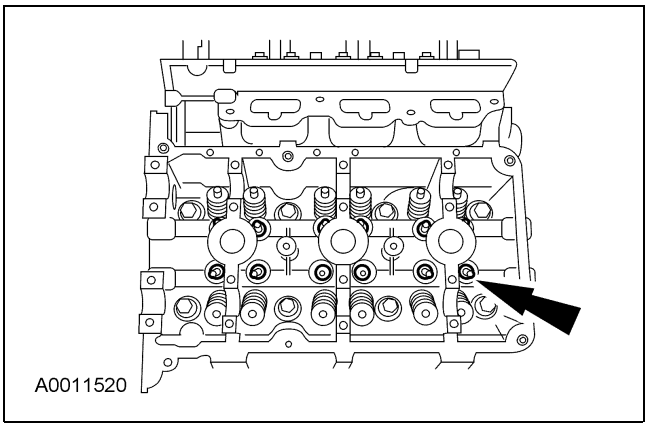
5. Install the new LH exhaust manifold gasket, the exhaust manifold and the new nuts.
   - Tighten the nuts in the sequence shown.



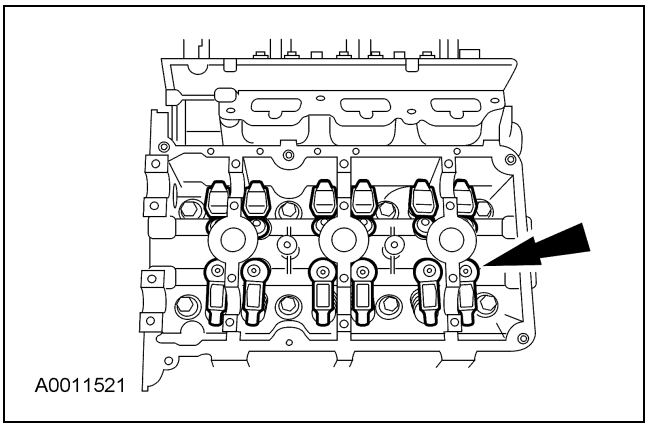
6. Connect the LH H02S electrical connector.

IN-VEHICLE REPAIR (Continued)

7. Install the hydraulic lash adjusters.
   - Lubricate the hydraulic lash adjusters with clean engine oil.

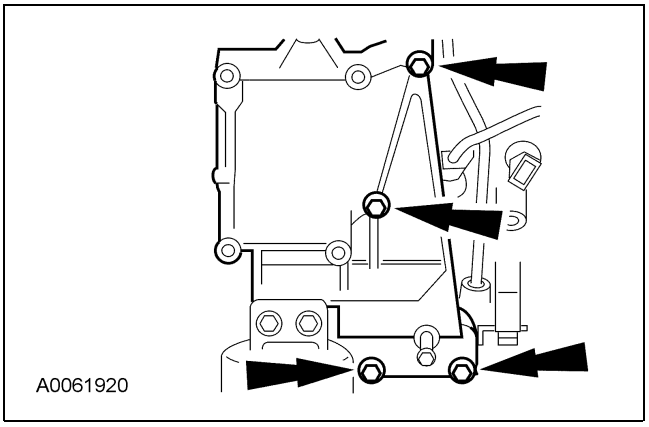


8. Install the camshaft followers.
   - Lubricate the camshaft followers with clean engine oil.

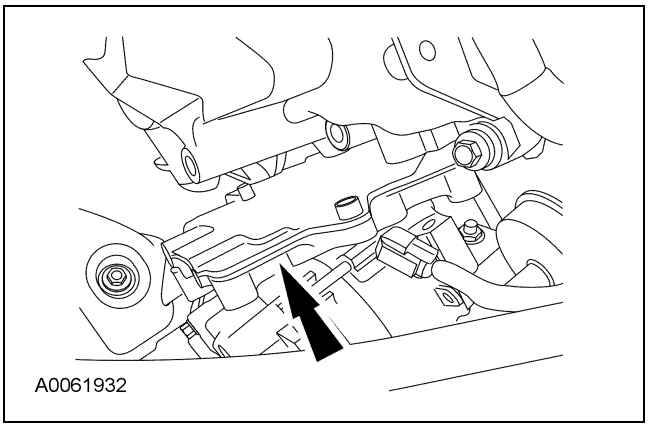


9. Install the three-bar engine support.

10. Remove the four A/C compressor bracket bolts.



11. Using the special tools, raise the engine away from the A/C compressor bracket.

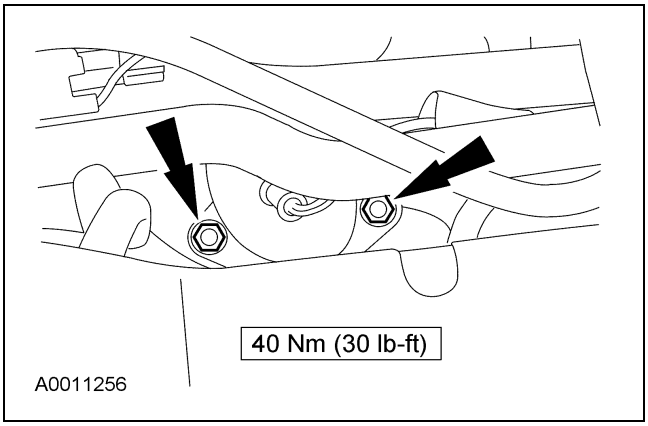


12. Install the LH camshafts. For additional information, refer to Camshafts LH in this section.

13. Install the lower intake manifold. For additional information, refer to Lower Intake Manifold in this section.

14. Install the coolant pump. For additional information, refer to Section 303-03.

15. Install the LH exhaust manifold-to-pipe nuts.



16. Install the coolant pump bypass tube. For additional information, refer to Section 303-03.

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Appendix O - Service Procedures

Cylinder Head RH

IN-VEHICLE REPAIR

Cylinder Head RH

Material

Item	Specification
SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP	WSS-M2C153-H

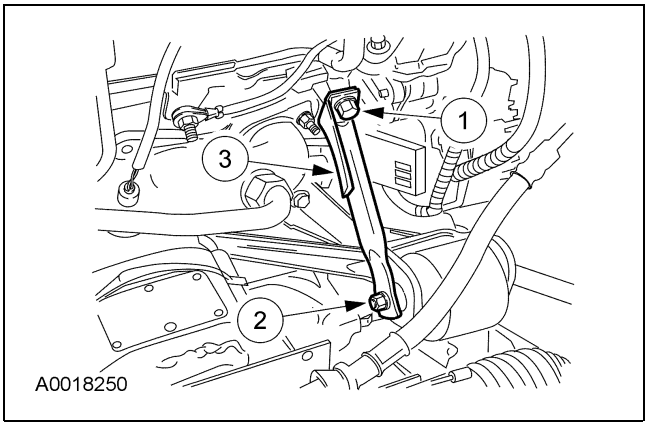
Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.

2. Release the fuel system pressure. For additional information, refer to Section 310-00.

3. Remove the coolant pump bypass tube. For additional information, refer to Section 303-03.

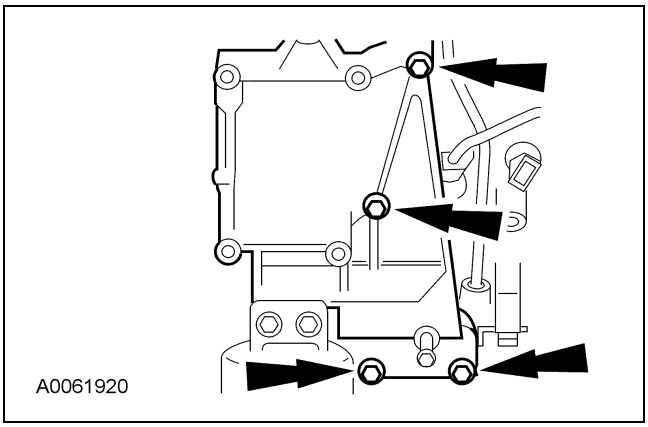
4. Remove the rear support brace.
   1 Remove the bolt.
   2 Remove the nut.
   3 Remove the rear support brace.



5. Remove the lower intake manifold. For additional information, refer to Lower Intake Manifold in this section.

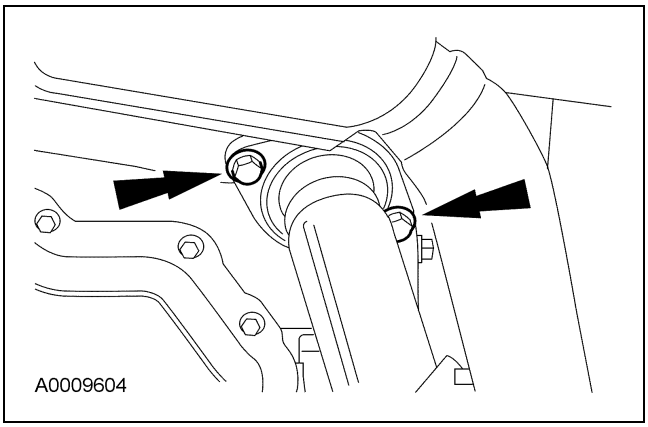
6. Remove the RH camshafts. For additional information, refer to Camshafts RH in this section.

7. Using the special tools, lower the engine until it is aligned with the A/C compressor bracket, and finger-tighten the four bolts.

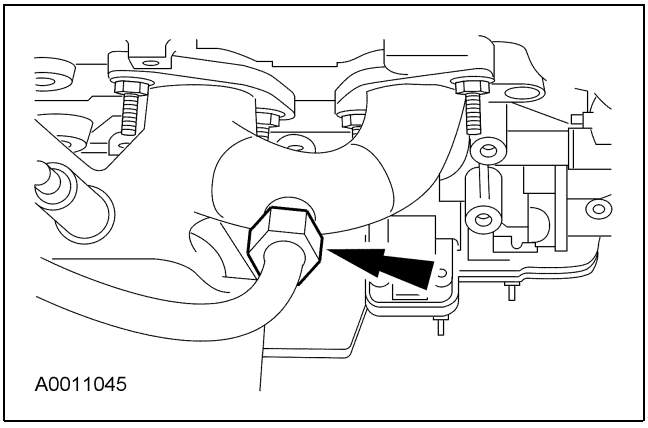


8. Remove the three-bar engine support.

9. Remove the RH exhaust manifold-to-pipe bolts.

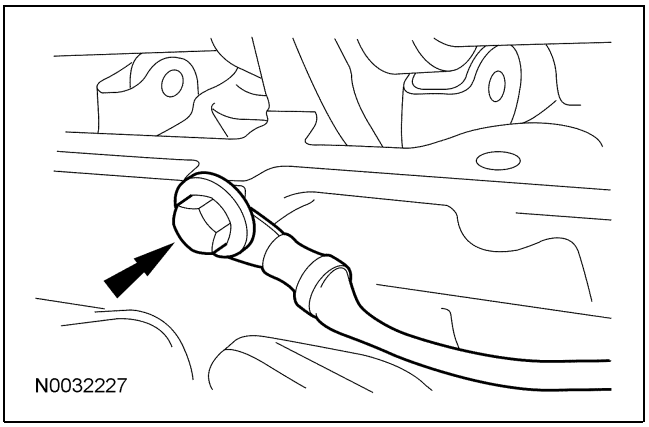


10. Disconnect the exhaust gas recirculation (EGR) tube from the exhaust manifold.

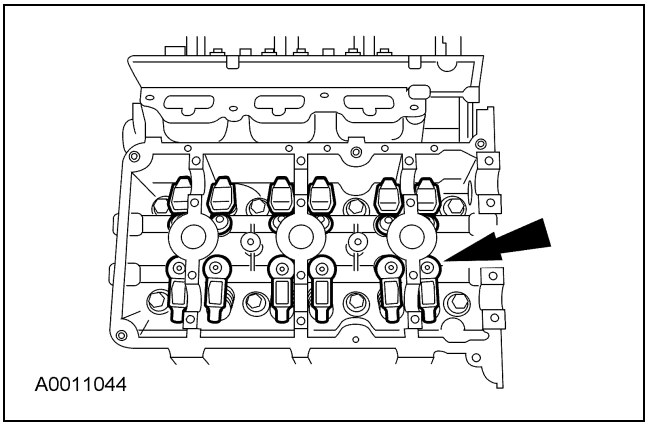


IN-VEHICLE REPAIR (Continued)

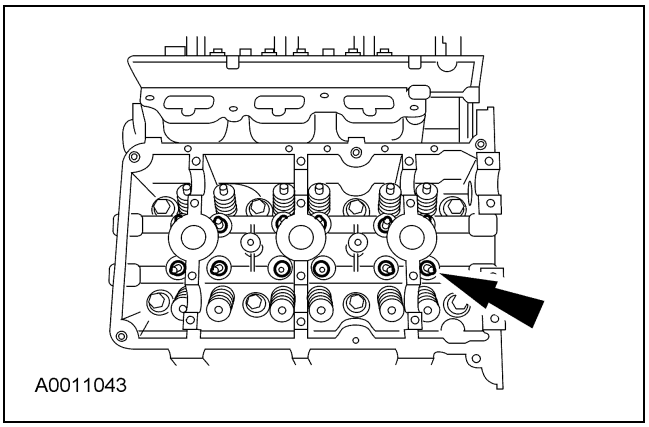
11. Remove the bolt and the ground wire.



12. Remove the camshaft followers.

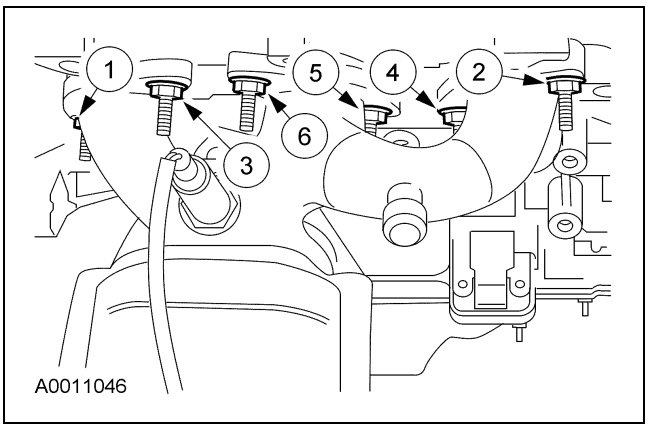


13. Remove the hydraulic lash adjusters.

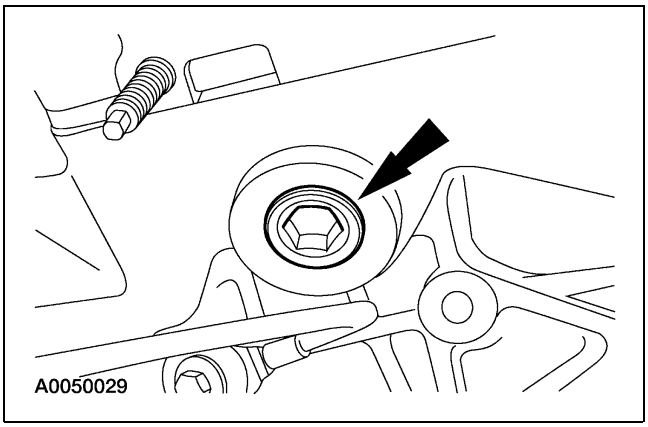


14. Disconnect the RH heated oxygen sensor (H02S) electrical connector.

15. Remove the nuts in the sequence shown and remove the RH exhaust manifold.
    - Remove the studs.
    - Discard the gasket, studs and nuts.

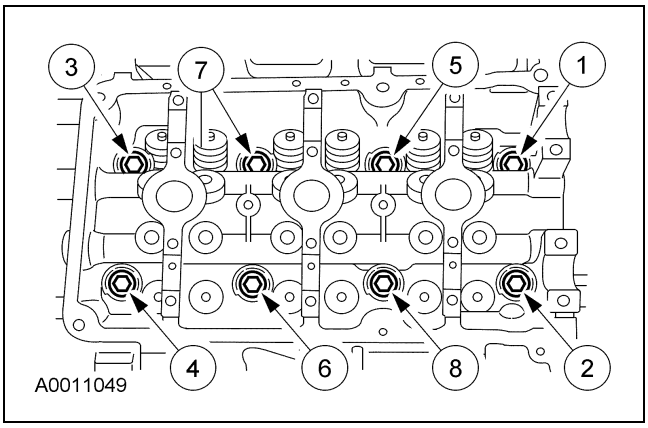


16. Remove the RH cylinder block drain plug.



17. **NOTE:** New cylinder head bolts must be installed. They are torque-to-yield designed and cannot be reused.

    Remove the bolts in the sequence shown and remove the cylinder head.
    - Discard the gasket and the bolts.



IN-VEHICLE REPAIR (Continued)

18. **NOTE:** The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of tool length.

    Support the cylinder head on a bench with the head gasket side up. Inspect all areas of the deck face with a straightedge and feeler gauge. The cylinder head must not have depressions deeper than 0.0254 mm (0.001 in) across a 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.001 in) deep.

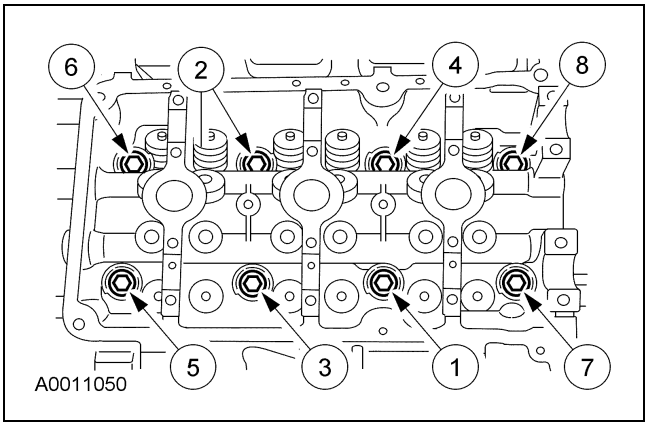
Installation

1. ***NOTICE:*** **Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges which make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.**

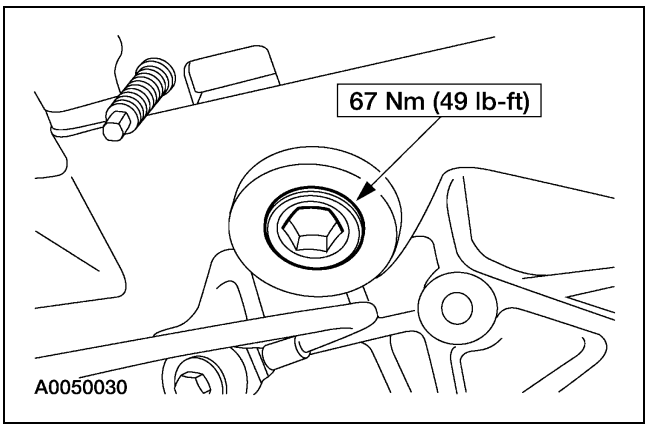
   NOTE: New cylinder head bolts must be installed. They are torque-to-yield designed and cannot be reused.

   Position the RH cylinder head, gasket and install the bolts in the sequence shown in six stages.

   - Tighten the bolts in six stages.
   - Stage 1: Tighten to 40 Nm (30 lb-ft).
   - Stage 2: Tighten bolts 90 degrees.
   - Stage 3: Loosen one full turn.
   - Stage 4: Tighten to 40 Nm (30 lb-ft).
   - Stage 5: Tighten 90 degrees.
   - Stage 6: Tighten 90 degrees.

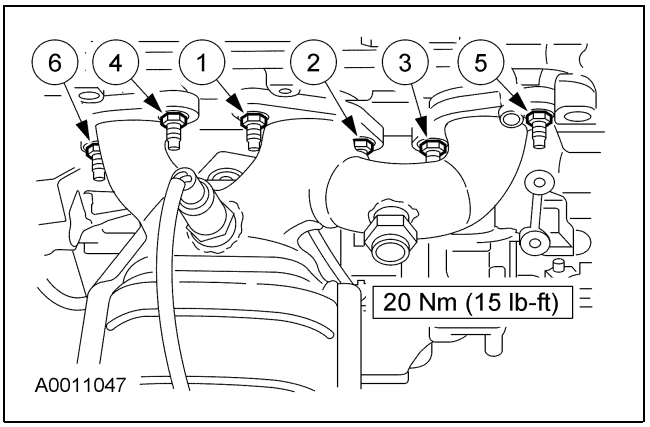


2. Install the RH cylinder block drain plug.



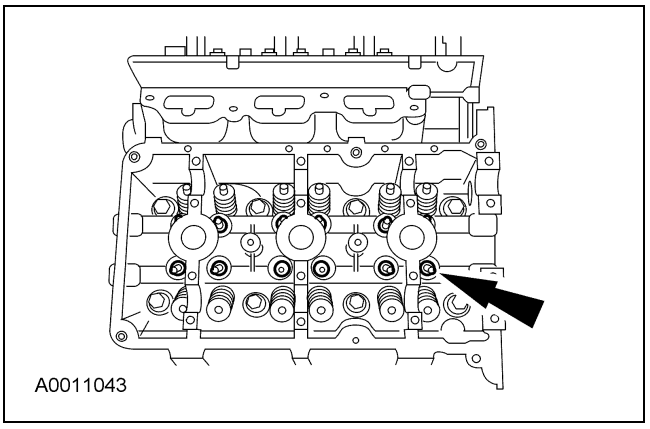
3. Install the new RH exhaust manifold studs.
   - Tighten to 12 Nm (9 lb-ft).

4. Install the new RH exhaust manifold gasket, the exhaust manifold and the new nuts.
   - Tighten the nuts in the sequence shown.



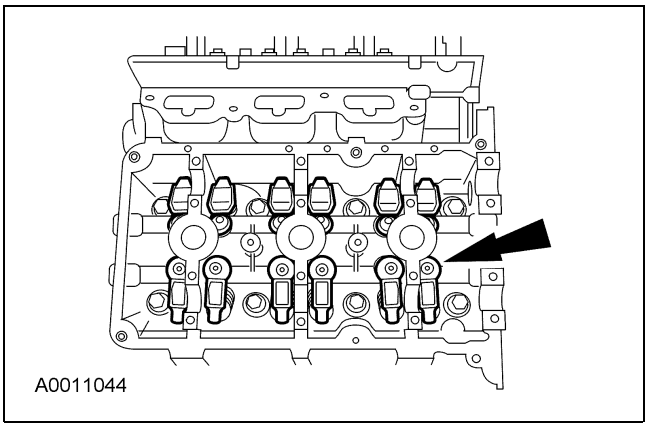
5. Connect the RH HO2S electrical connector.

6. Install the hydraulic lash adjusters.
   - Lubricate the hydraulic lash adjusters with clean engine oil.

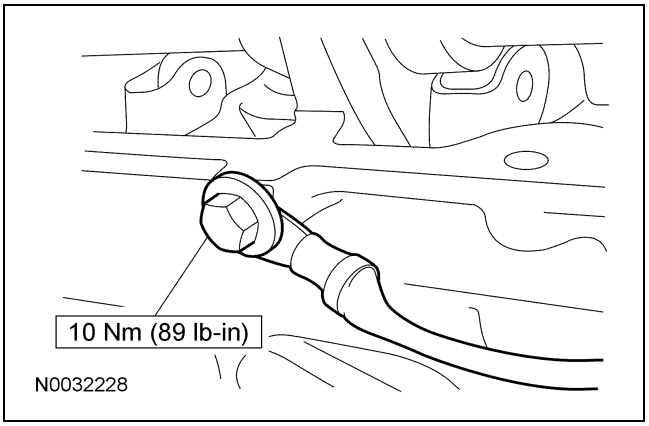


IN-VEHICLE REPAIR (Continued)

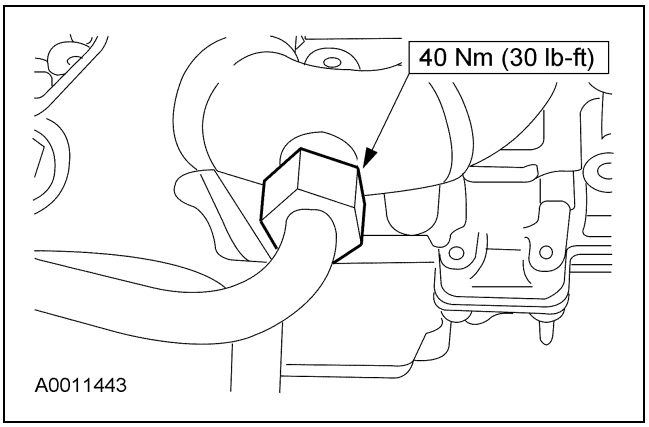
7. Install the camshaft followers.
   - Lubricate the camshaft followers with clean engine oil.



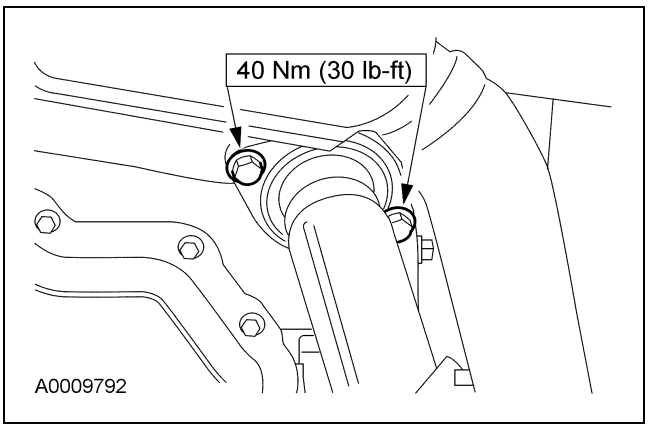
8. Install the ground wire and bolt.



9. Connect the EGR tube to the exhaust manifold.

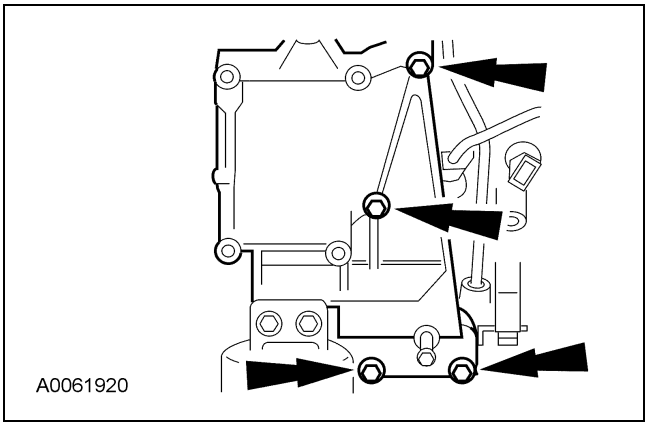


10. Install the RH exhaust manifold-to-pipe bolts.

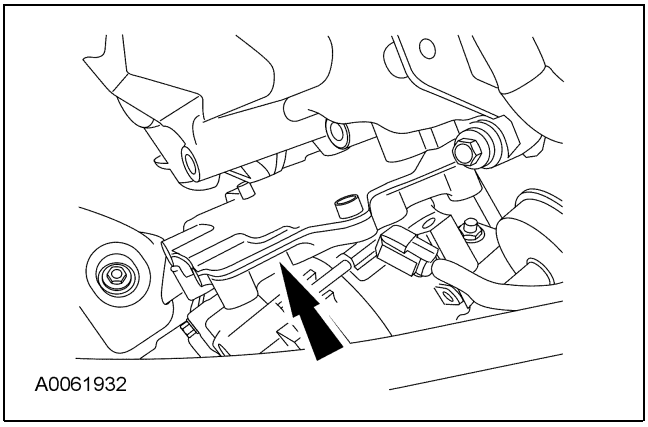


11. Install the three-bar engine support.

12. Remove the four A/C compressor bracket bolts.



13. Using the special tools, raise the engine away from the A/C compressor bracket.

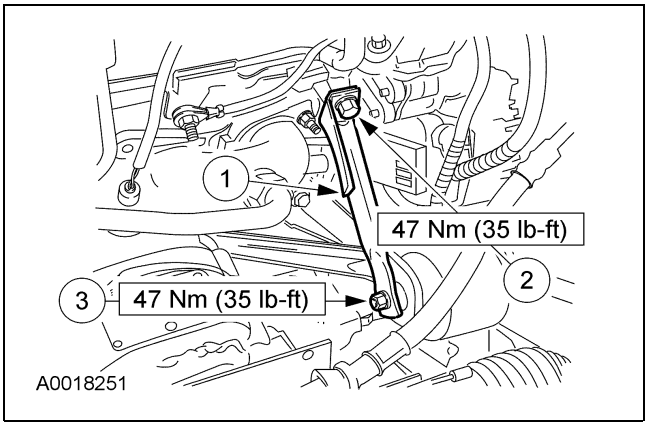


14. Install the RH camshafts. For additional information, refer to Camshafts RH in this section.

15. Install the lower intake manifold. For additional information, refer to Lower Intake Manifold in this section.

IN-VEHICLE REPAIR (Continued)

16. Install the rear support brace.
    1 Install the rear support brace.
    2 Install the bolt.
    3 Install the nut.



17. Install the coolant pump bypass tube. For additional information, refer to Section 303-03.

PE12-033

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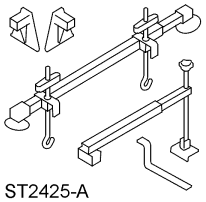
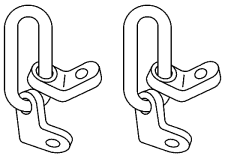
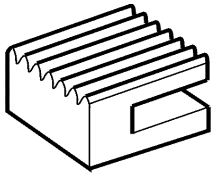
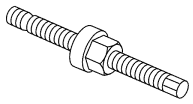
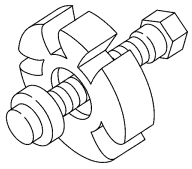
Appendix O - Service Procedures

Engine Front Cover

IN-VEHICLE REPAIR

Engine Front Cover

Special Tool(s)

 ST2425-A	3-Bar Engine Support Kit 303-F072
 ST1595-A	Engine Lifting Bracket 303-050 (T70P-6000)
 ST1696-A	Flywheel Holding Tool 303-544 (T96P-6375A)
 ST1287-A	Crankshaft Damper Replacer 303-102 (T74P-6316-B)
 ST1286-A	Crankshaft Damper Remover 303-009 (T58P-6316-D)

Material

Item	Specification
Motorcraft Metal Surface Cleaner ZC-21	WSE-M5B392-A
Silicone Gasket and Sealer TA-30	WSE-M4G323-A4

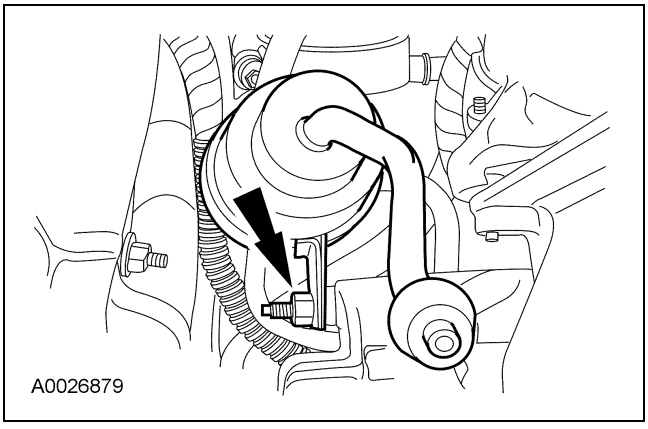
(Continued)

Material

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (in Canada Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12) or equivalent	WSS-M2C930-A

Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. Disconnect the battery ground cable. For additional information, refer to Section 414-01.
3. Remove the LH valve cover. For additional information, refer to Valve Cover LH in this section.
4. Remove the RH valve cover. For additional information, refer to Valve Cover RH in this section.
5. Remove the power steering pump. For additional information, refer to Section 211-02.
6. Remove the retaining nut and position the power steering pressure line and muffler out of the way.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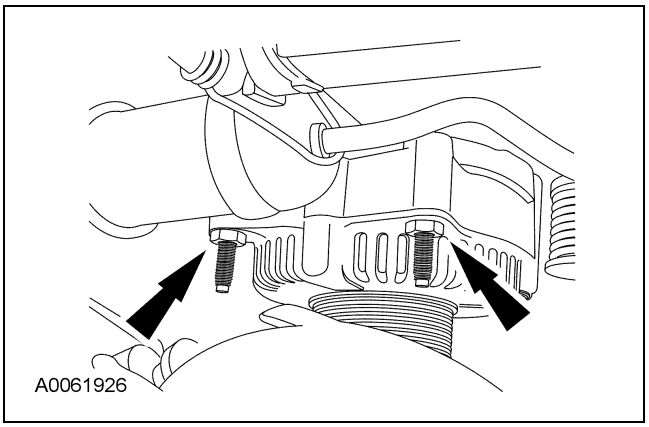
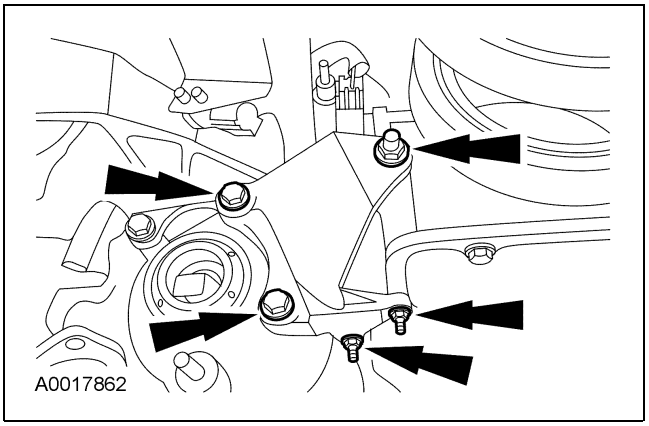
IN-VEHICLE REPAIR (Continued)

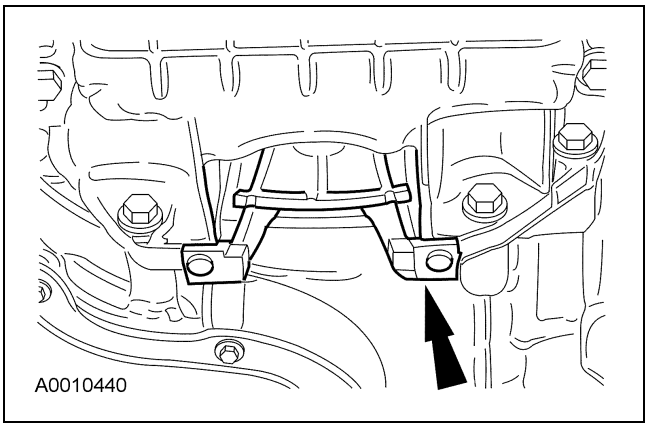
7. Remove the upper retaining bolts from the generator.



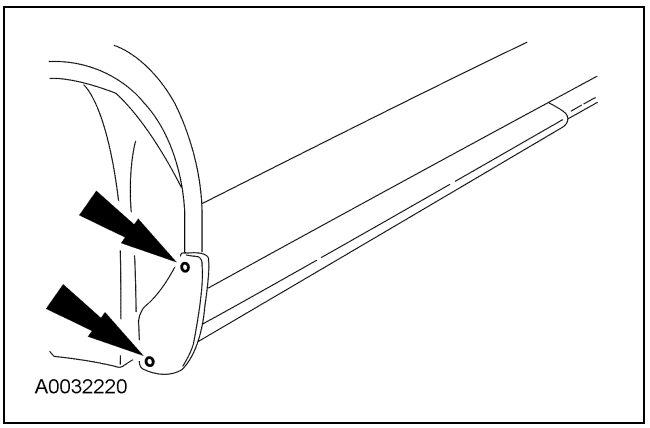
8. Remove the bolts, nuts and the engine-to-transaxle bracket.



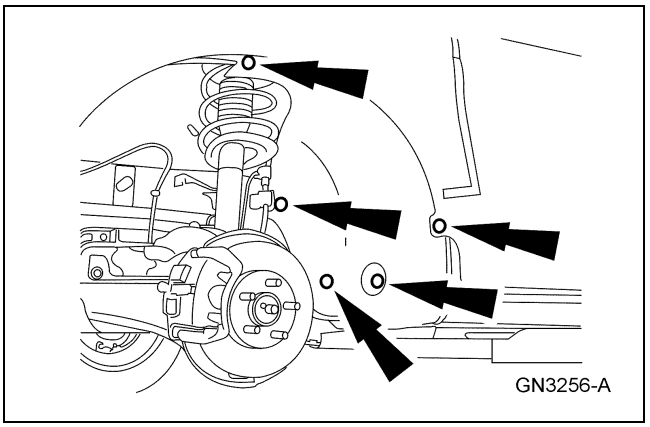
9. Remove the torque converter inspection cover.



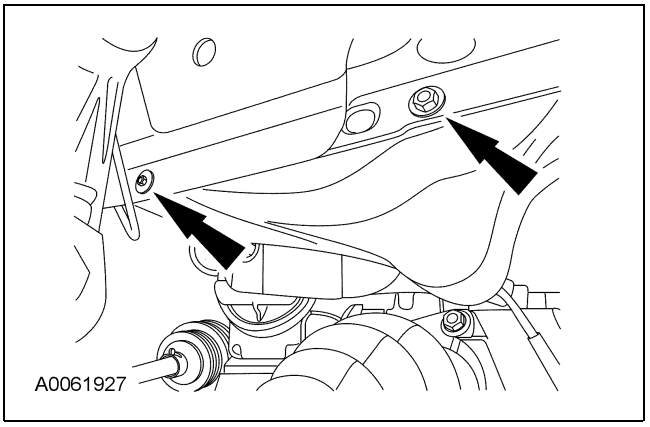
10. Remove the front pin-type retainers and position the front rocker panel moulding aside.



11. Remove the rear portion of the front fender splash shield.
    - Remove the screws and the pin-type retainers.

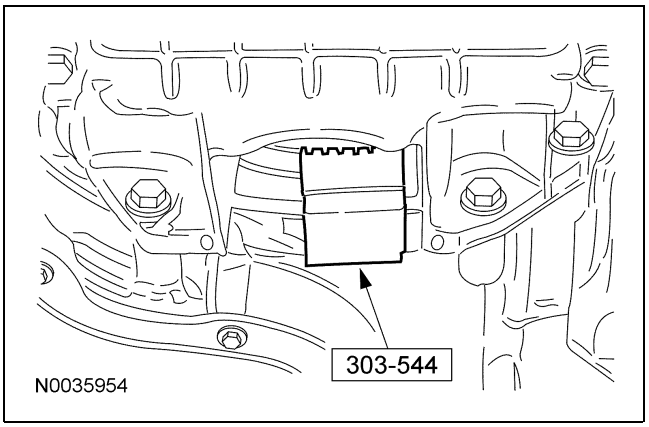


12. Remove the two screws and the generator splash shield.

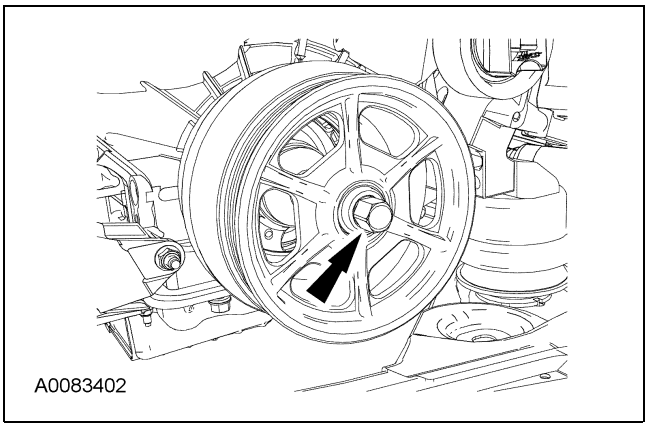


IN-VEHICLE REPAIR (Continued)

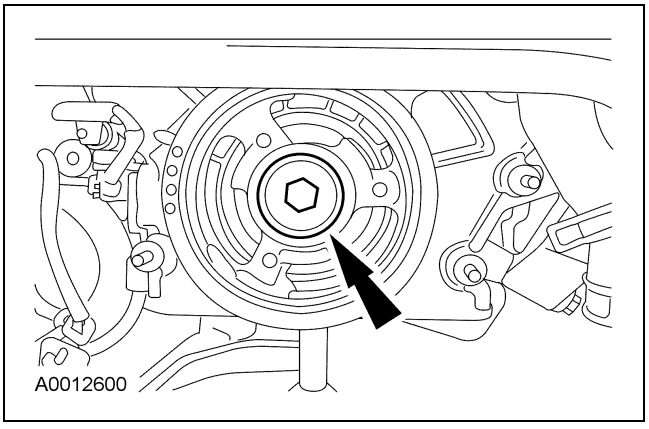
13. Install the special tool.



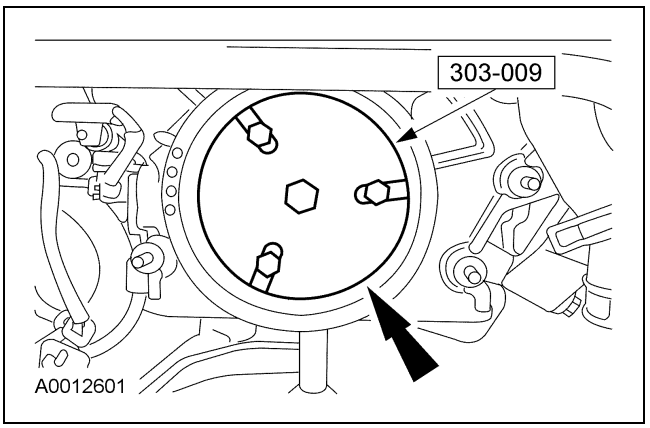
14. **NOTE:** The pulley bolt has a reverse thread. Remove the crankshaft damper pulley.



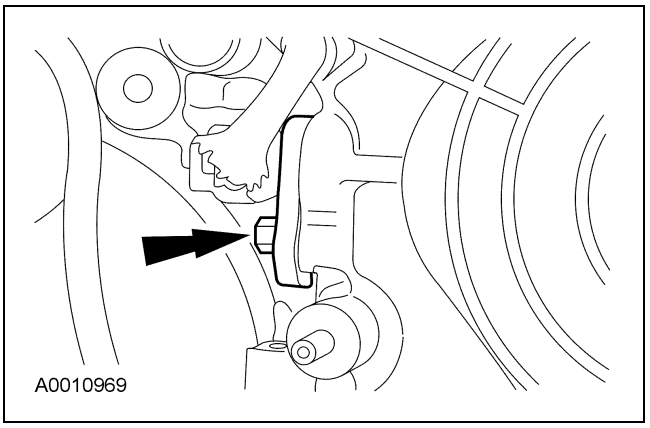
15. Remove the crankshaft damper bolt and washer.



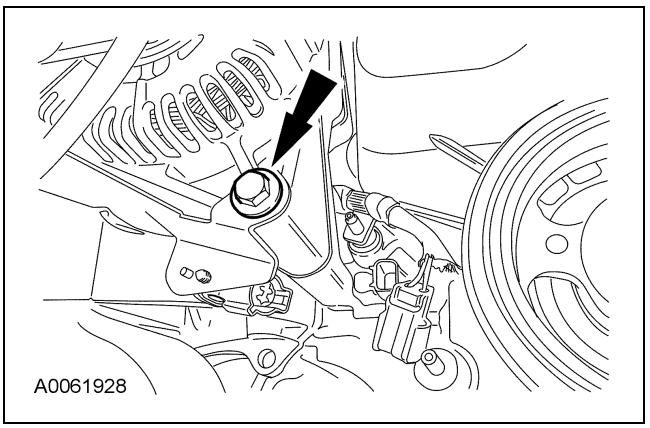
16. Using the special tool, remove the crankshaft damper.



17. Disconnect the crankshaft position (CKP) sensor electrical connector. Remove the bolt and the CKP sensor.

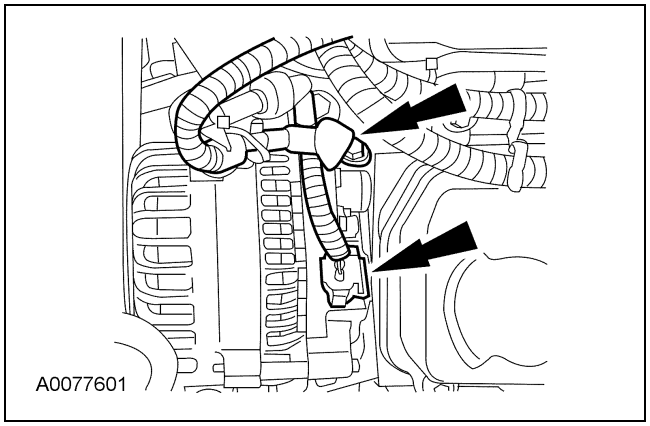


18. Remove the generator bolt and position the generator to gain access to the electrical connector and terminal nut.

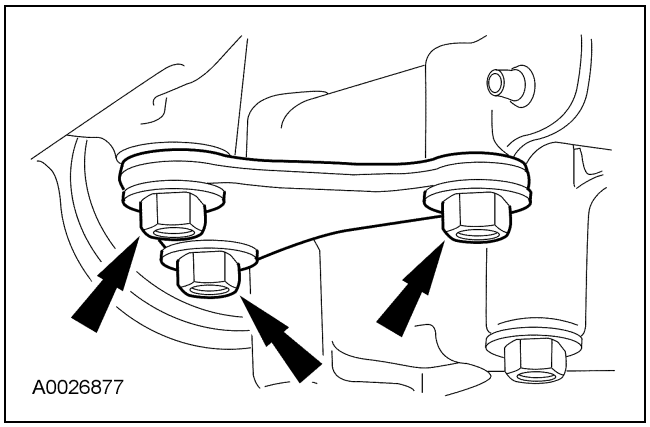


IN-VEHICLE REPAIR (Continued)

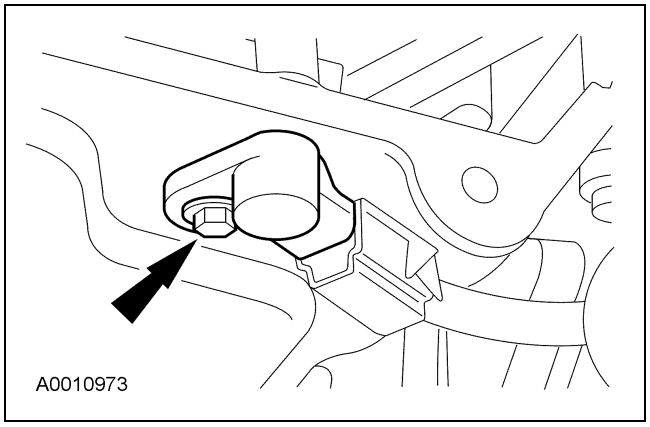
19. Disconnect the generator electrical connectors.
    - Remove the nut and the B+ wire terminal.
    - Disconnect the generator electrical connector.



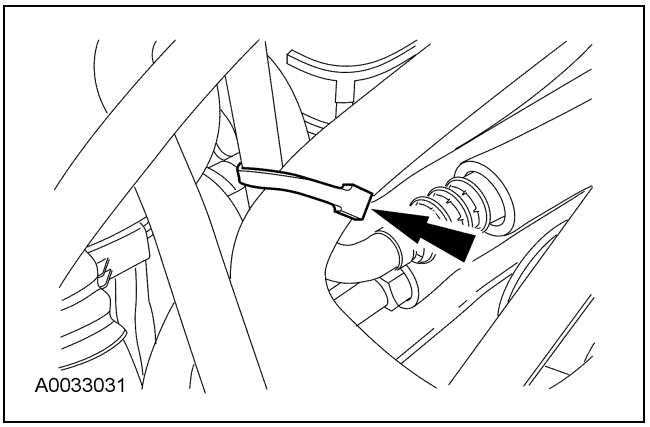
20. Remove the bolts and the A/C compressor to front cover bracket.



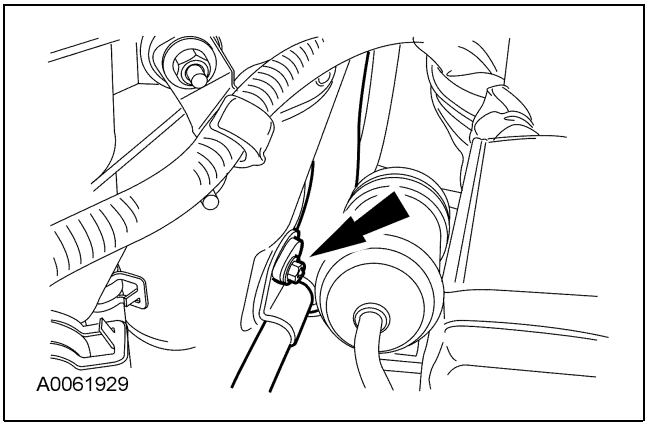
21. Disconnect the camshaft position (CMP) sensor electrical connector. Remove the bolt and remove the CMP sensor.



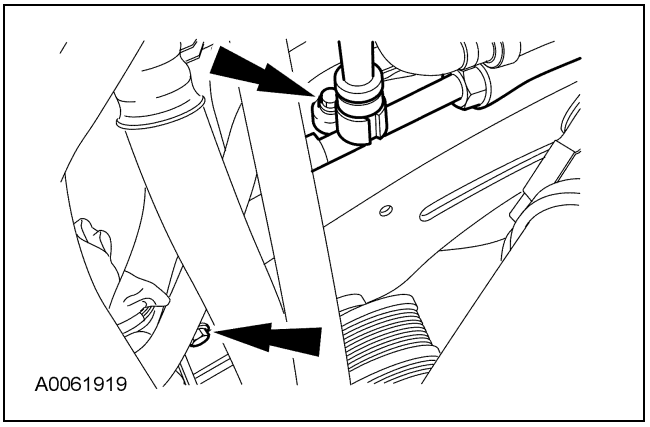
22. Remove the tie strap from the power steering hose.



23. Remove the retaining nut and position the A/C low-pressure hose out of the way.

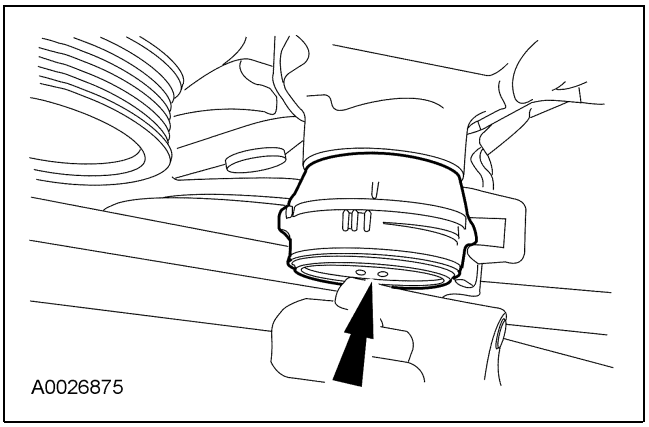


24. Remove the bolts and position the A/C high-pressure hose on top of the belt tensioner.

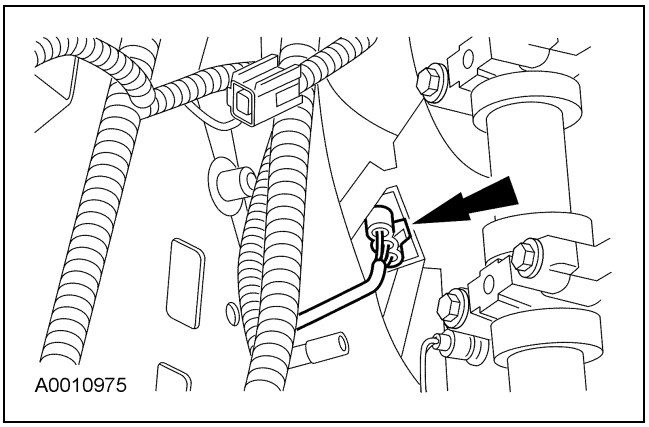


IN-VEHICLE REPAIR (Continued)

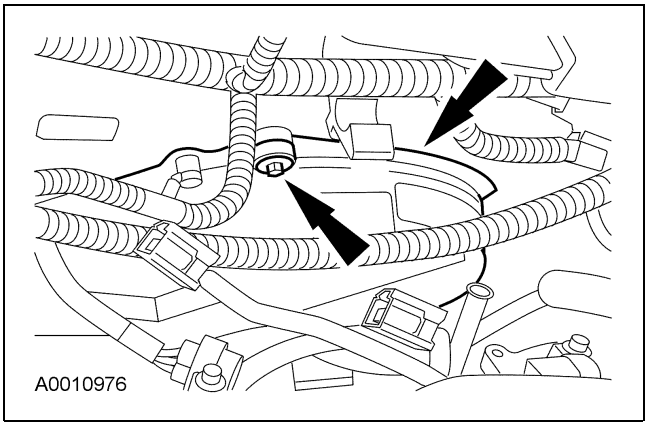
25. Remove the bolt and remove the belt tensioner.



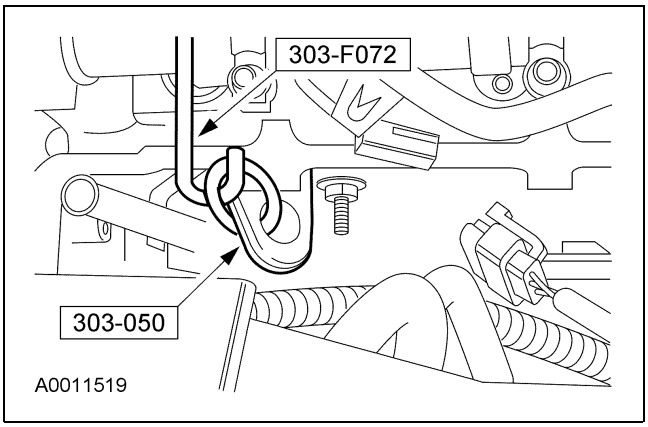
26. Disconnect the engine cooling fan electrical connector and unclip the wiring harness.



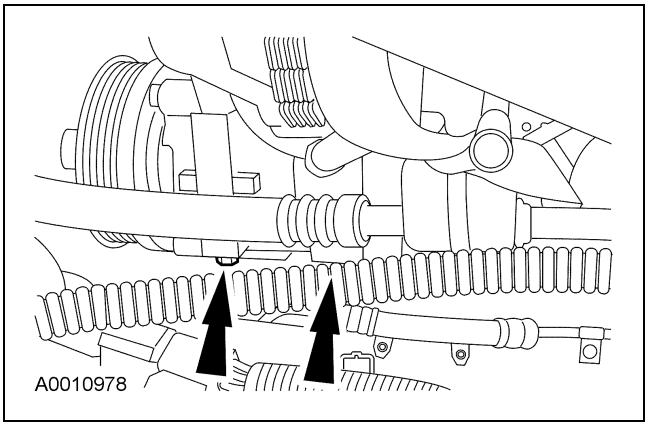
27. Remove the bolt and the engine cooling fan.



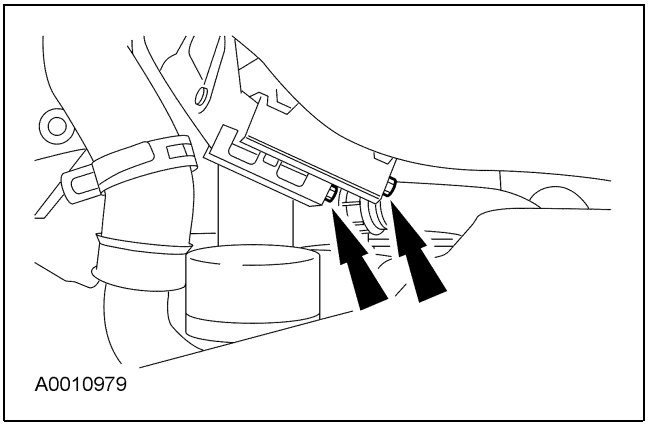
28. Install the special tools to support the engine.



29. Remove the two upper A/C compressor bolts.

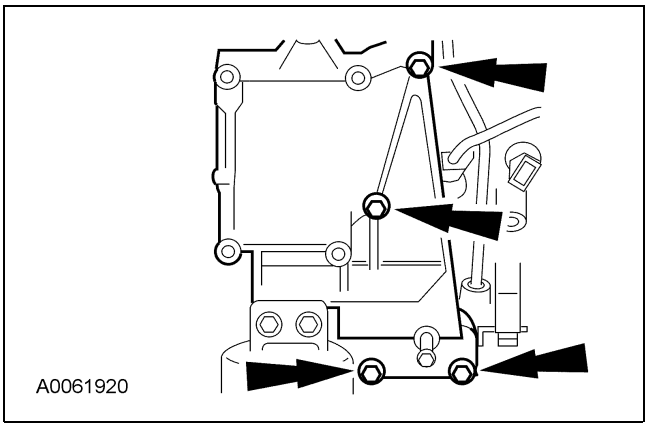


30. Remove the two lower A/C compressor bolts and position the A/C compressor aside.

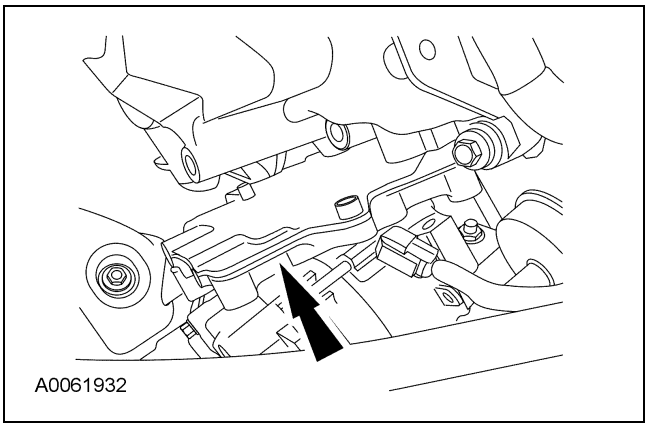


IN-VEHICLE REPAIR (Continued)

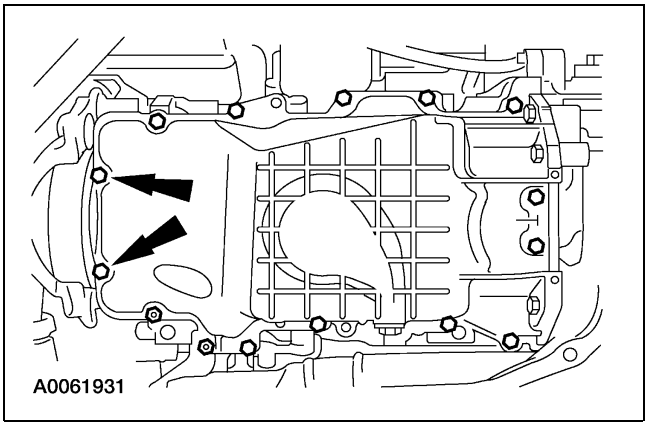
31. Remove the bolts from the A/C bracket.



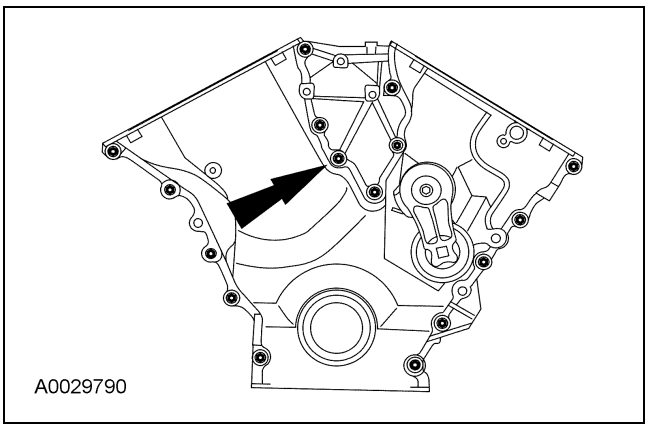
32. Raise the engine away from the A/C bracket using the engine support tool.



33. Remove the two oil pan-to-front cover bolts.



34. Remove the bolts, studs and the engine front cover.



Installation

1. ***NOTICE:*** **Do not use metal scrapers, wire brushes, power abrasive discs, or other means to clean the sealing surface. These tools cause scratches and gouges which make leak paths. Use a plastic scraping tool to remove all traces of sealant.**

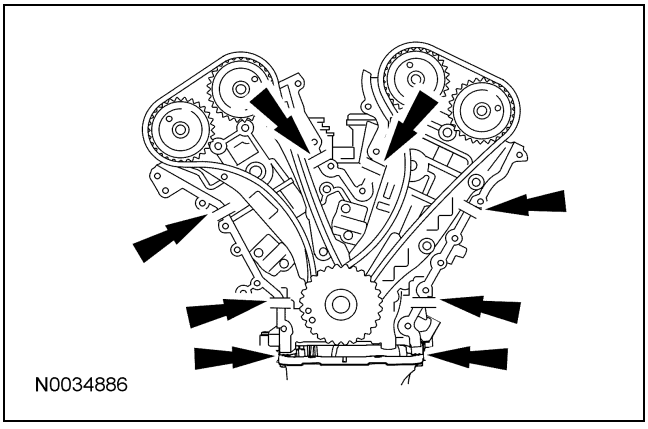
   NOTICE: **Do not damage the oil pan gasket while cleaning the sealant from the lower cylinder block-to-oil pan joint.**

   Clean all sealing surfaces with metal surface cleaner.

2. Install three new gaskets in the front cover.

3. **NOTE:** The engine front cover must be installed and the bolts tightened within four minutes of applying the sealant.

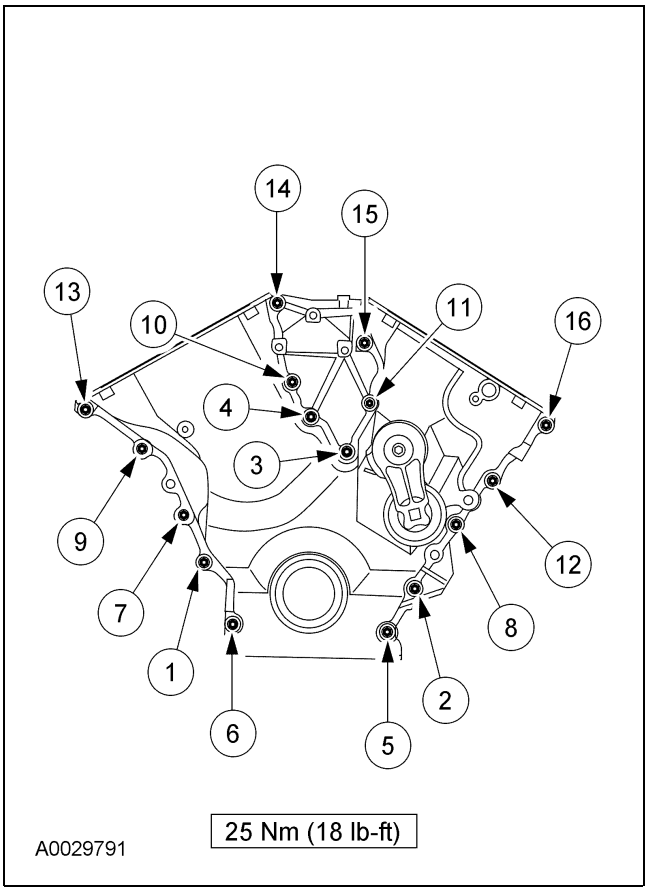
   Apply a 6 mm (0.24 in) diameter dot of silicone gasket and sealer to the cylinder block, lower cylinder block, cylinder head and oil pan mating surfaces.



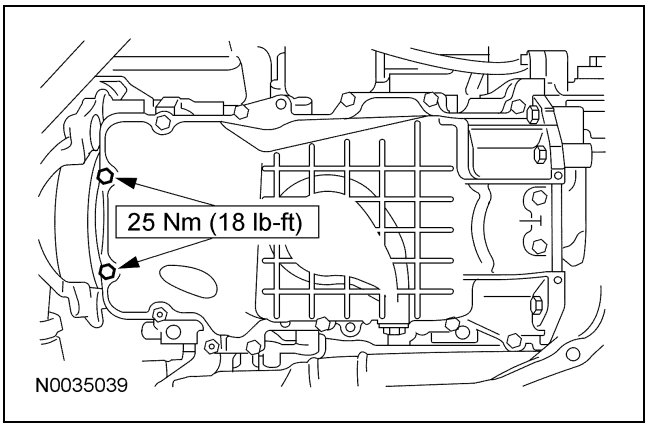
IN-VEHICLE REPAIR (Continued)

4. **NOTE:** Fasteners No. 1 and 6 are studs.

   Position the cover and install the bolts in the sequence shown.



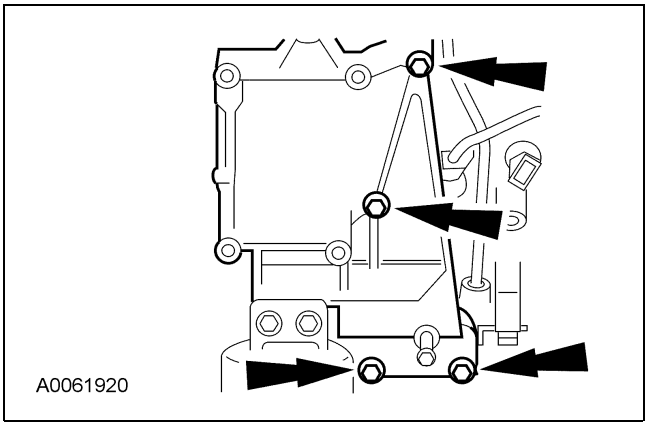
5. Install the two oil pan-to-front cover bolts.



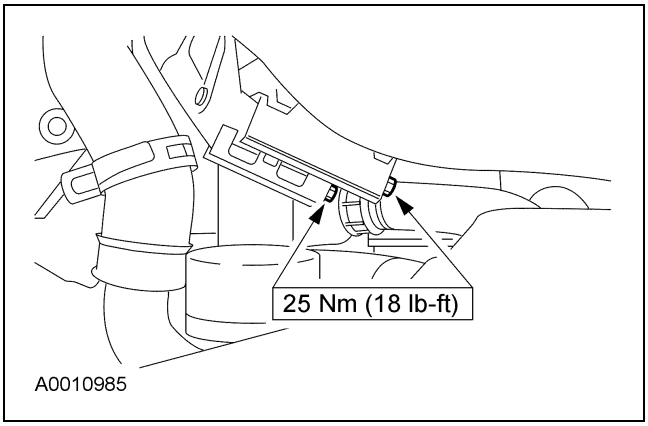
6. Remove the oil pan plug and drain the engine oil.
   - Install the plug and tighten to 26 Nm (19 lb-ft).

7. Using the engine support tool, lower the engine back together with the A/C bracket.

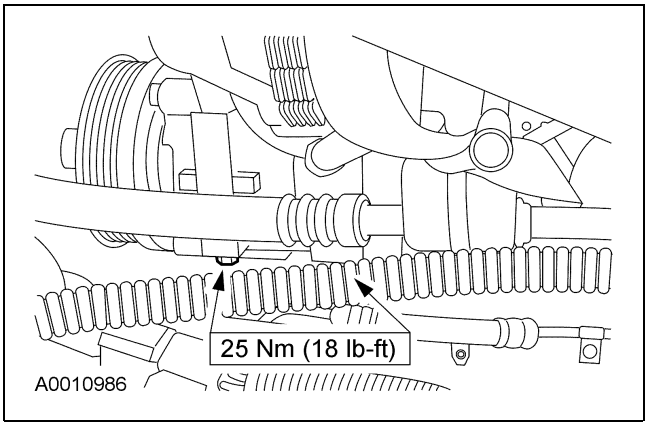
8. Install the bolts.
   - Tighten the bolts in two stages.
   - Stage 1: Tighten to 25 Nm (18 lb-ft).
   - Stage 2: Tighten an additional 90 degrees.



9. Position the A/C compressor and install the two lower bolts.

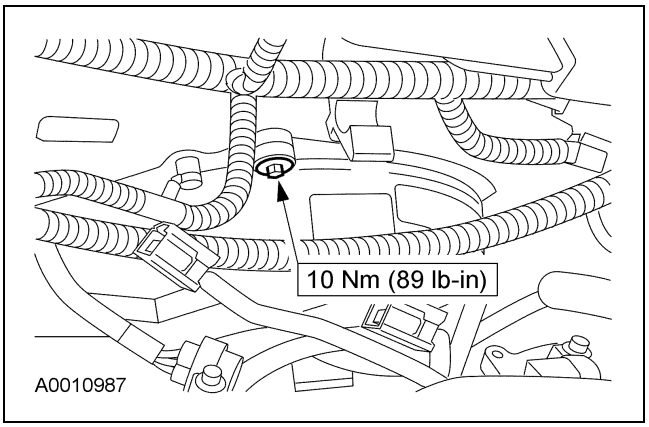


10. Install the two upper A/C compressor bolts.

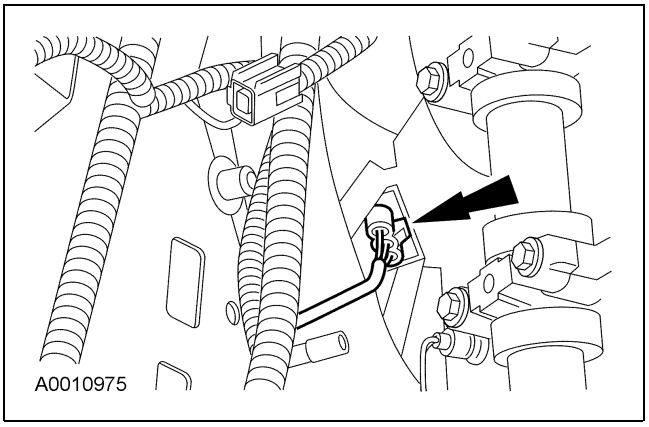


IN-VEHICLE REPAIR (Continued)

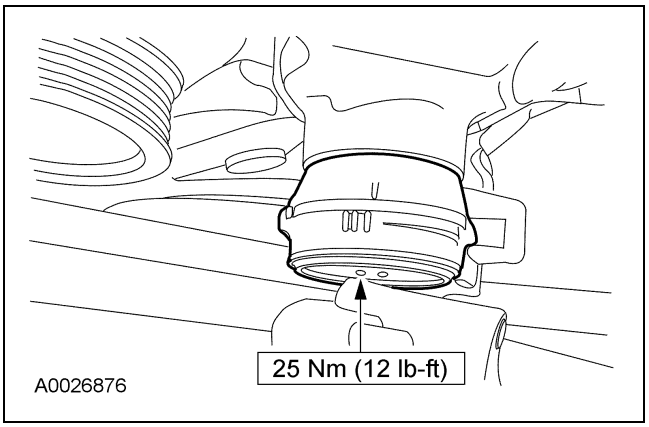
11. Position the engine cooling fan and install the bolt.



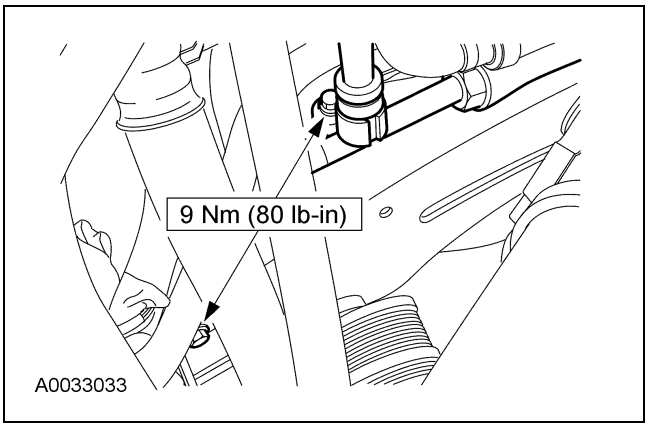
12. Connect the engine cooling fan electrical connector and clip the wiring harness.



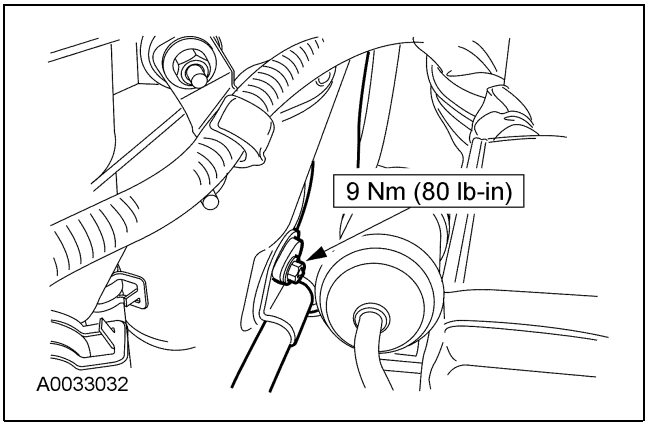
13. Position the belt tensioner and install the bolt.



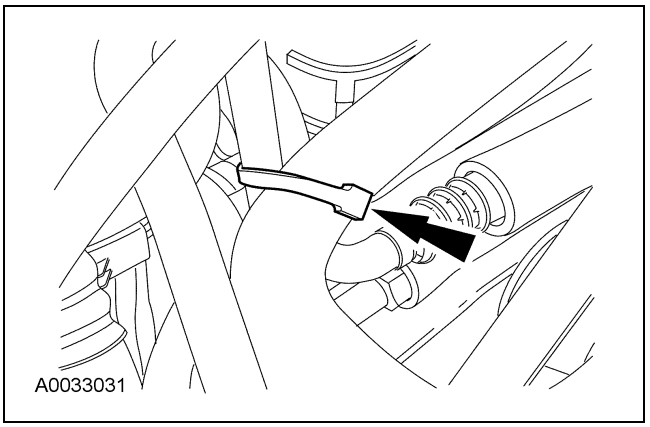
14. Position the A/C high-pressure hose and install the bolts.



15. Position the A/C low-pressure hose and install the retaining nut.

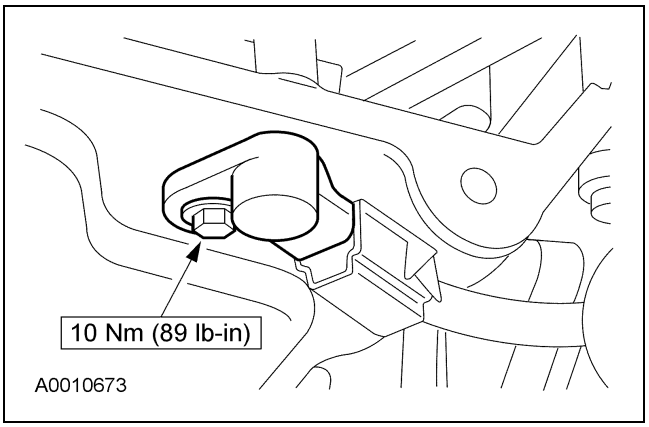


16. Install the tie strap to the power steering hose.

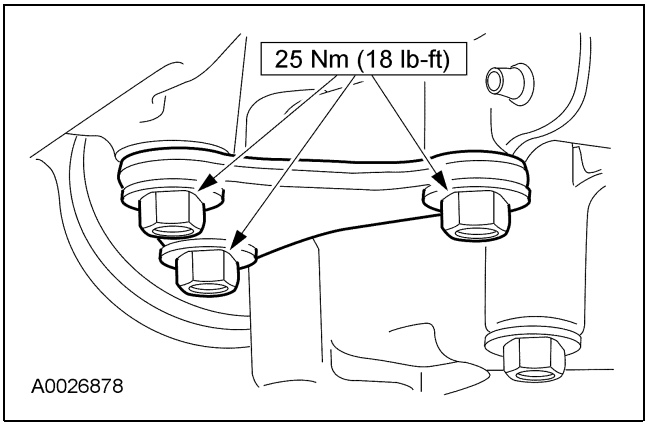


IN-VEHICLE REPAIR (Continued)

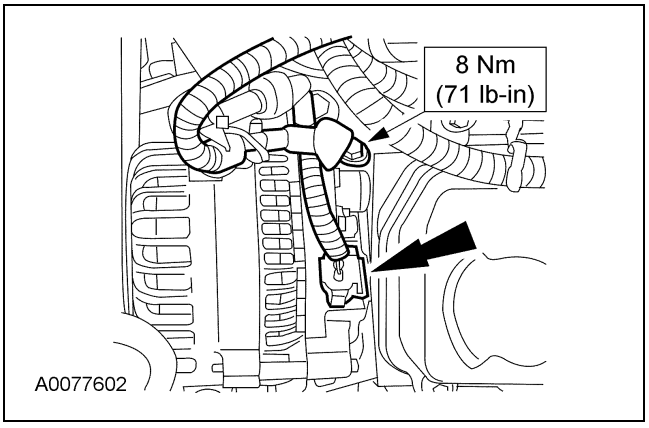
17. Install the CMP sensor and install the bolt. Connect the CMP sensor electrical connector.



18. Position the A/C compressor to front cover bracket and install the bolts.

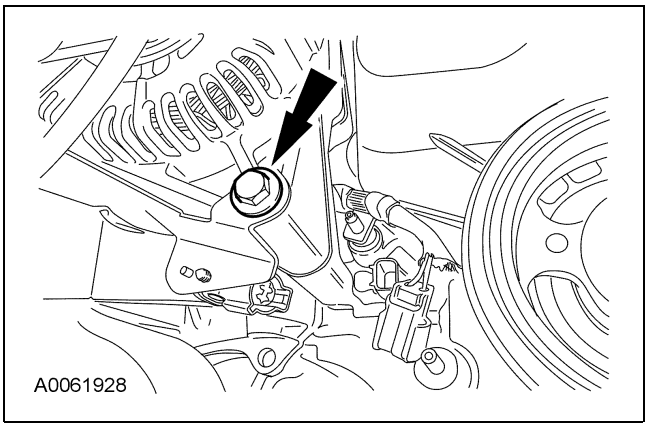


19. Connect the generator.
    - Install the B+ wire terminal and nut.
    - Connect the generator electrical connector.

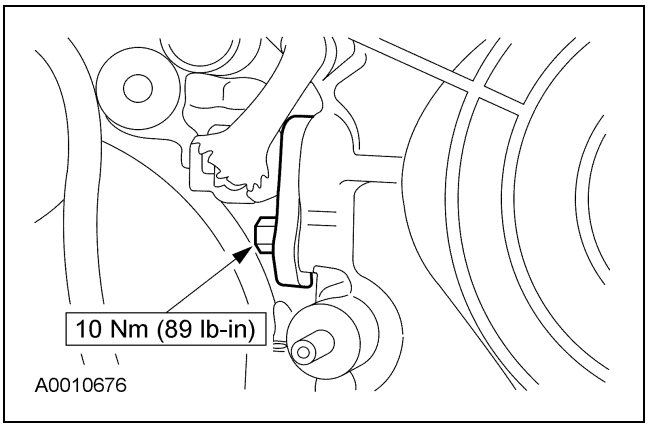


20. **NOTE:** The upper rear bolt is installed with the generator.

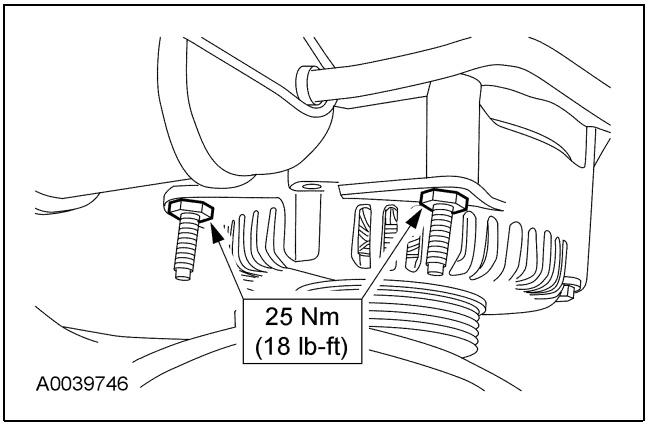
    Install the generator and the lower bolt.



21. Install the CKP sensor. Connect the CKP sensor electrical connector.

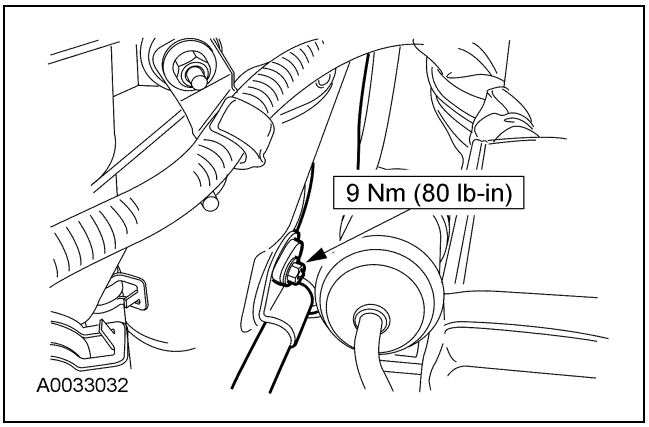


22. Install the generator upper bolts.

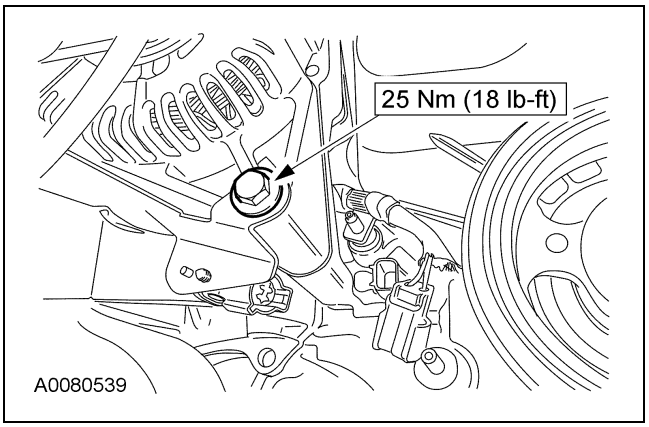


IN-VEHICLE REPAIR (Continued)

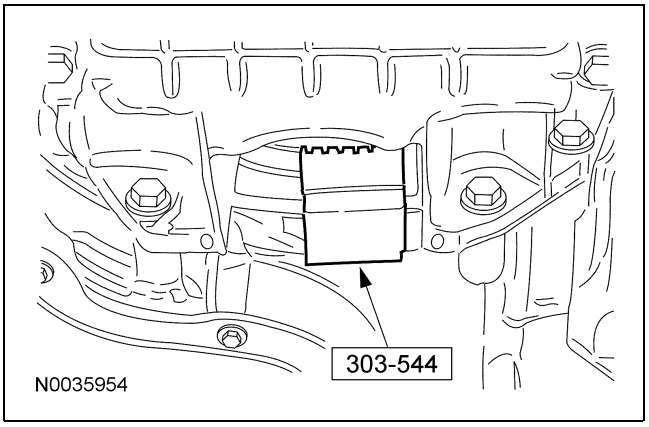
23. Reposition the power steering line and muffler and install the retaining nut.



24. Tighten the generator lower bolt.



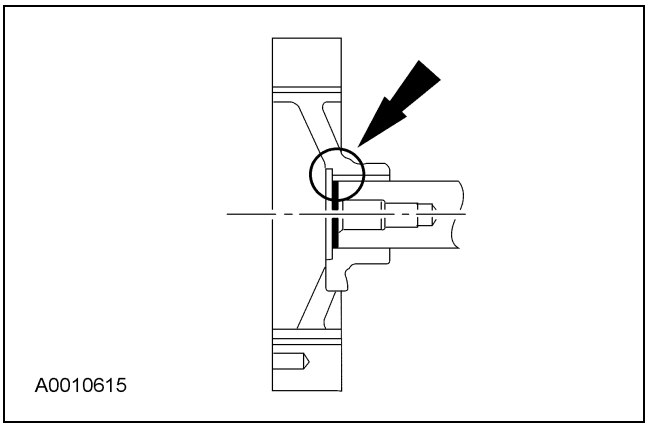
25. Install the special tool.



26. **NOTE:** Clean the keyway and slot using metal surface cleaner before applying silicone gasket and sealer.

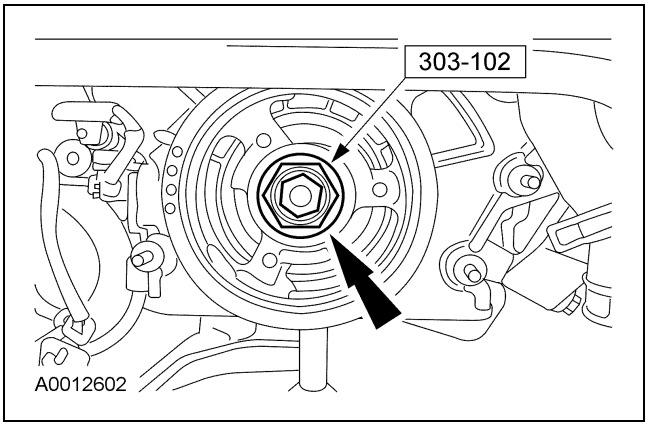
    NOTE: The crankshaft damper must be installed and the bolt tightened within four minutes of applying the silicone gasket and sealer.

    Apply silicone gasket and sealant to the end of the keyway slot.



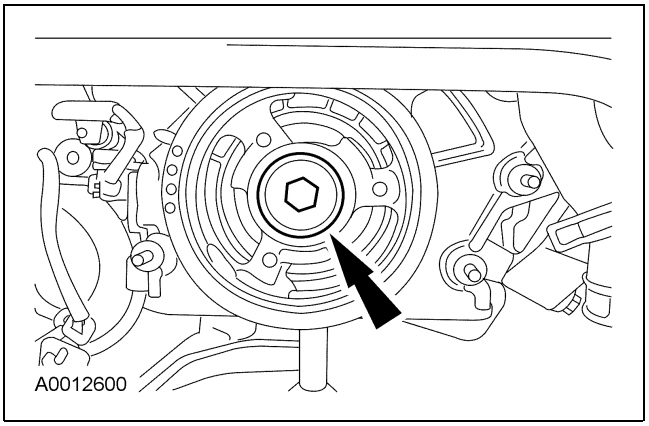
27. **NOTE:** Lubricate the outside diameter sealing surface of the crankshaft damper with clean engine oil.

    Using the special tool, install the crankshaft damper.

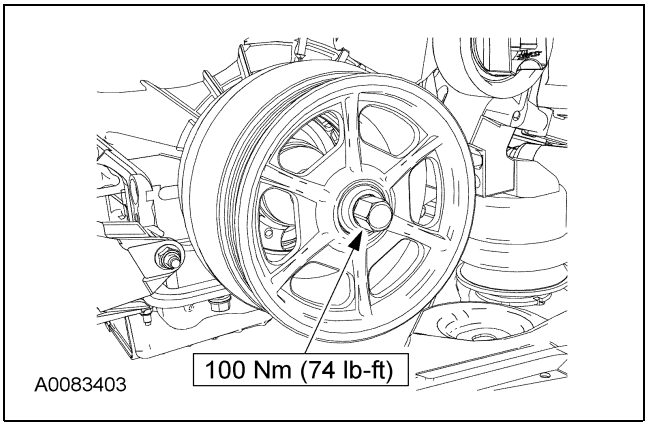


IN-VEHICLE REPAIR (Continued)

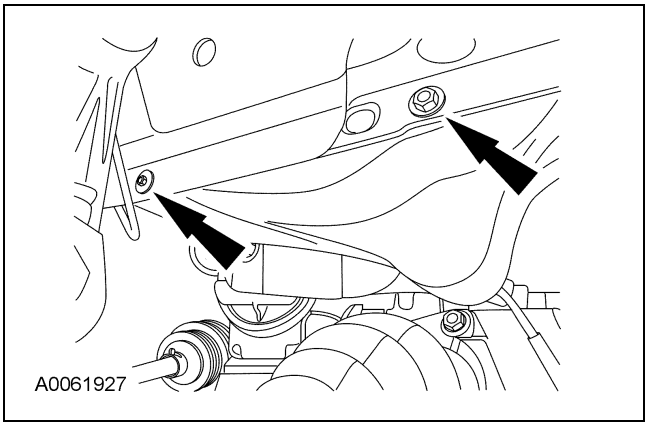
28. Install the bolt and washer and tighten in four stages.
    - Stage 1: Tighten to 120 Nm (89 lb-ft).
    - Stage 2: Loosen 360 degrees.
    - Stage 3: Tighten to 50 Nm (37 lb-ft).
    - Stage 4: Tighten 90 degrees.



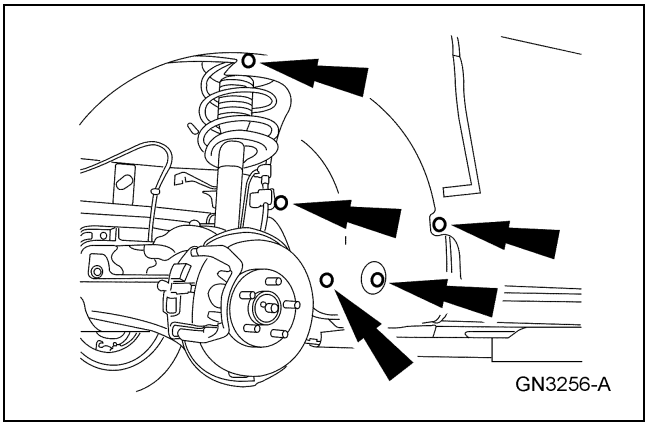
29. **NOTE:** The pulley has reverse threads.
    Install the crankshaft pulley.



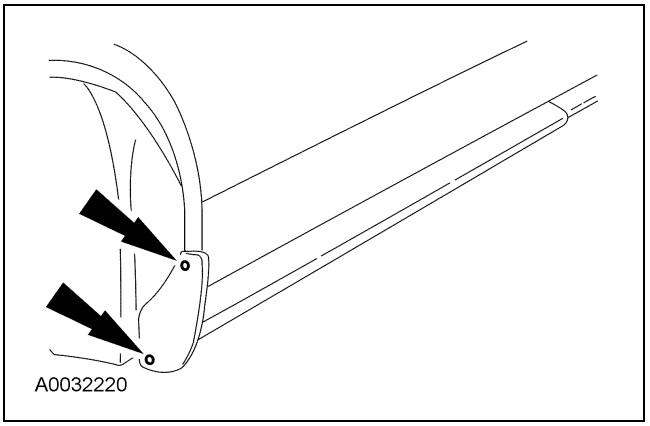
30. Install the generator splash shield and the two screws.



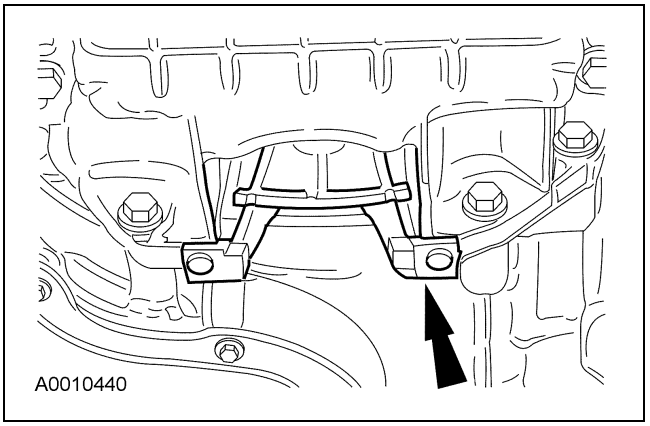
31. Install the rear portion of the front fender splash shield. Install the screws and the pin-type retainers.



32. Position the front rocker panel moulding and install the pin-type retainers.

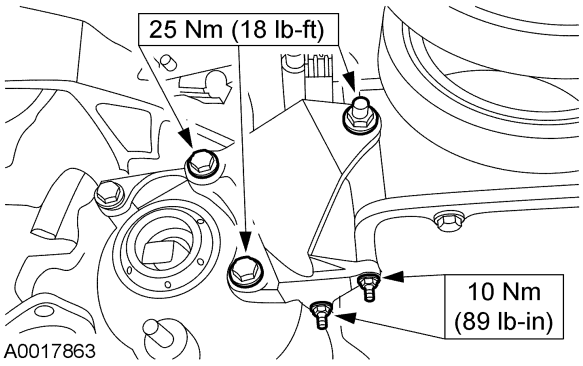


33. Install the torque converter inspection cover.



IN-VEHICLE REPAIR (Continued)

34. Position the engine-to-transaxle bracket and install the nuts and bolts.



35. Install the RH valve cover. For additional information, refer to Valve Cover RH in this section.

36. Install the LH valve cover. For additional information, refer to Valve Cover LH in this section.

37. Fill the engine with clean engine oil.

38. Connect the battery ground cable. For additional information, refer to Section 414-01.

39. Install the power steering pump. For additional information, refer to Section 211-02.

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Appendix O - Service Procedures

Ignition Coil on Plug Procedure

REMOVAL AND INSTALLATION

Ignition Coil-On-Plug — RH

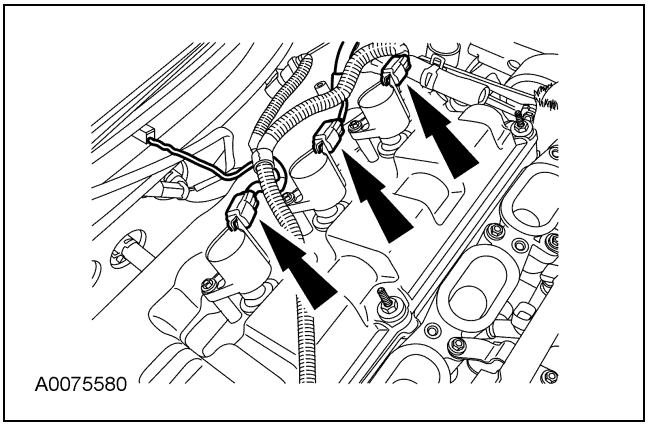
Material

Item	Specification
Silicone Brake Caliper Grease and Dielectric Compound D7AZ-19A331-A	ESE-M1C171-A

Removal and Installation

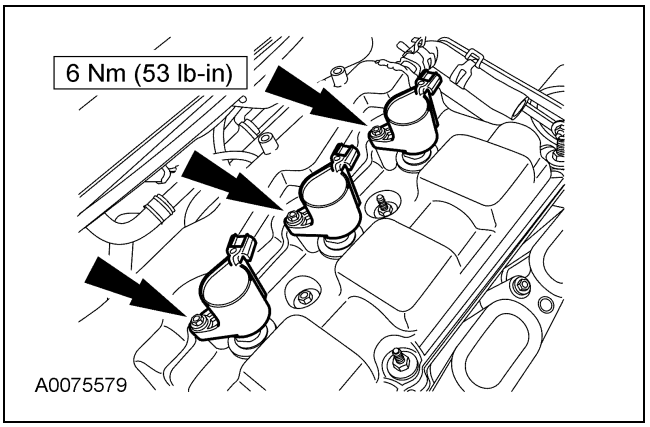
1. Remove the upper intake manifold. For additional information, refer to Section 303-01B.

2. Disconnect the electrical connectors from the ignition coils.



3. **NOTE:** When removing the ignition coils, a slight twisting motion will break the seal and ease removal.

   Remove the bolts and the ignition coils.



4. To install, reverse the removal procedure.
   - Apply a light film of Silicone Brake Caliper Grease and Dielectric compound D7AZ-19A331-A or equivalent meeting Ford specifications ESE-M1C171-A to the inside of the coil boots before installation.

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Appendix O - Service Procedures

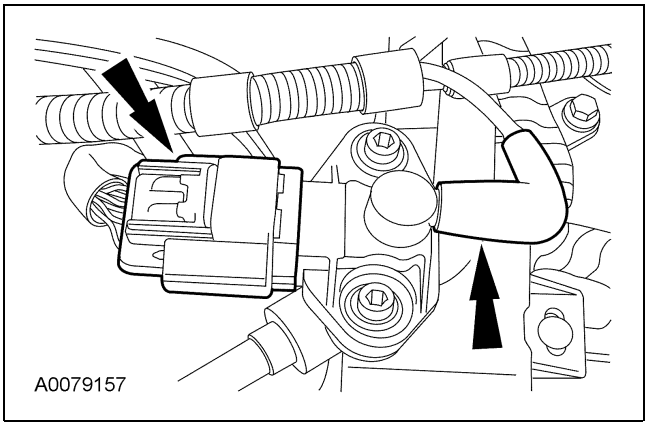
Lower Intake Manifold

IN-VEHICLE REPAIR

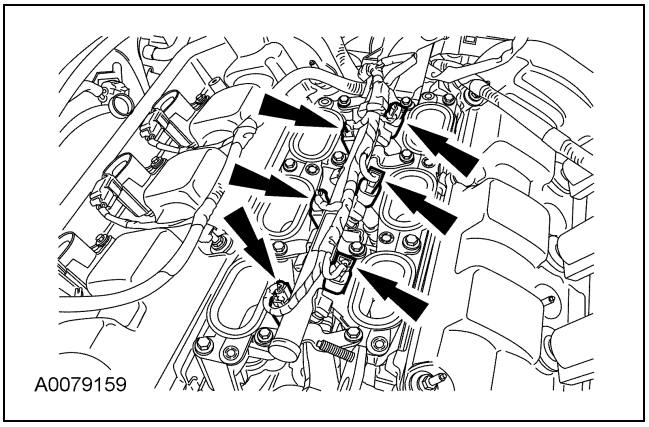
Lower Intake Manifold

Removal

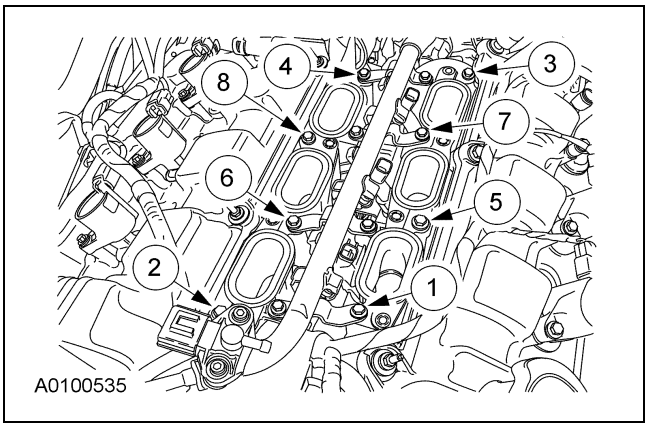
1. Release the fuel system pressure. For additional information, refer to Section 310-00.
2. Disconnect the fuel hose quick release coupling from the fuel supply manifold. For additional information, refer to Section 310-00.
3. Remove the upper intake manifold. For additional information, refer to Upper Intake Manifold in this section.
4. Disconnect the fuel injection pressure and temperature sensor vacuum tube and the electrical connector.



5. Disconnect the fuel injector electrical connectors.



6. Remove the bolts in sequence shown, and remove the lower intake manifold.

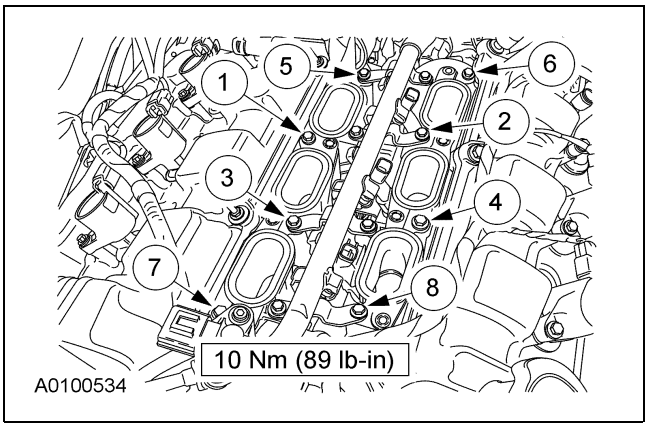


7. Remove and discard the gaskets from the lower intake manifold.

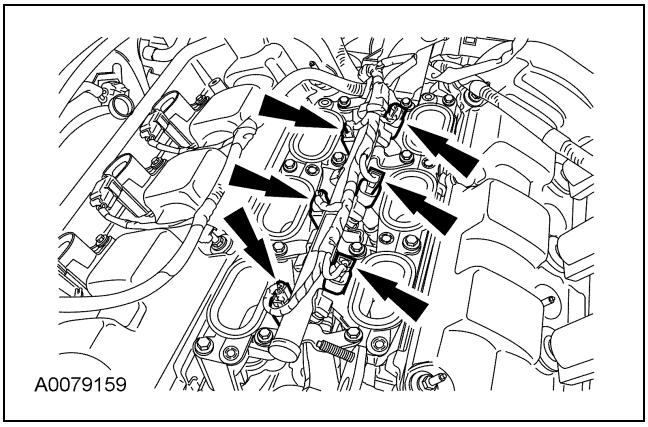
Installation

1. **NOTE:** Clean and inspect all mating surfaces and install new gaskets in the lower intake manifold.

   Install the lower intake manifold and tighten the bolts in the sequence shown.

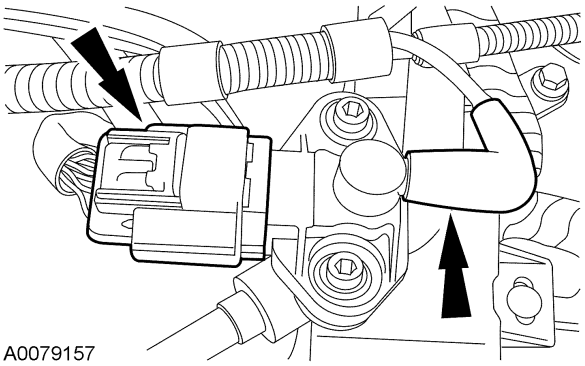


2. Connect the fuel injector electrical connectors.



IN-VEHICLE REPAIR (Continued)

3. Connect the fuel injection pressure and temperature sensor vacuum tube and the electrical connector.



4. Connect the fuel hose quick release coupling from the fuel supply manifold. For additional information, refer to Section 310-00.

5. Install the upper intake manifold. For additional information, refer to Upper Intake Manifold in this section.

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Appendix O - Service Procedures

Spark Plug Removal

REMOVAL AND INSTALLATION

Spark Plug

Removal and Installation

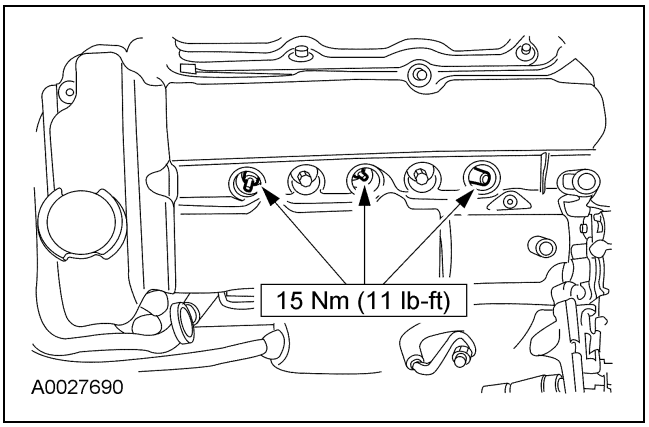
1. Remove the ignition coil-on-plugs. For additional information, refer to Ignition Coil-On-Plug — LH and Ignition Coil-On-Plug — RH in this section.

2. **CAUTION: Only use hand tools when removing or installing the spark plugs, or damage can occur to the cylinder head or spark plug.**

   NOTE: Use compressed air to remove any debris from the spark plug well before removing the spark plugs.

   NOTE: LH shown, RH similar.

   Remove the LH and RH spark plugs.

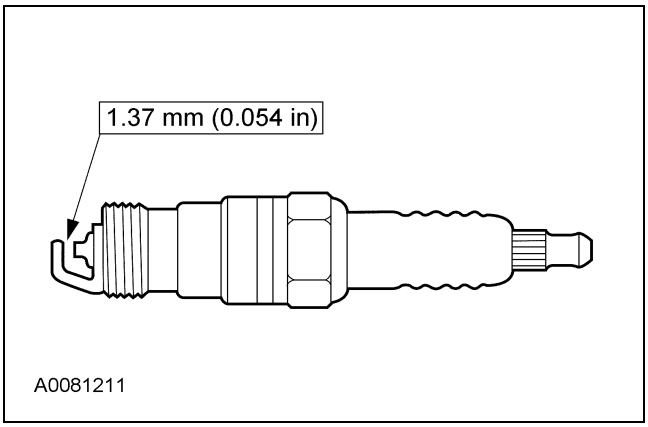


3. Inspect the spark plugs. For additional information, refer to Section 303-00.

4. To install, reverse the removal procedure.

5. **NOTE:** Clean the spark plugs with a wire brush or a professional spark plug cleaner (follow the manufacturer's instructions).

   Adjust the plug gap as necessary.



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Appendix O - Service Procedures

Speed Control Cable

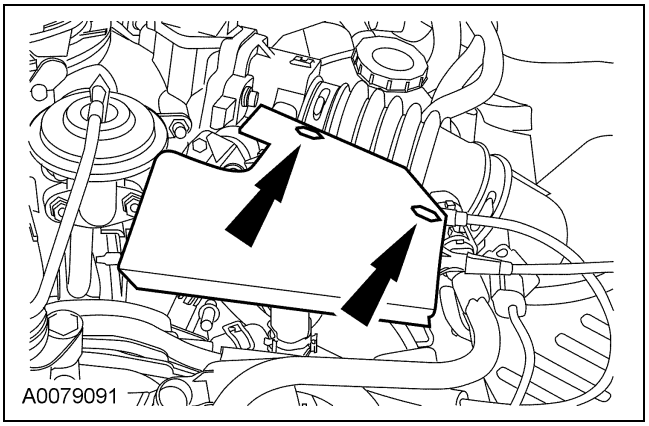
REMOVAL AND INSTALLATION

Speed Control Cable — 3.0L (4V)

Removal and Installation

1. Disconnect the battery. For additional information, refer to Section 414-01.

2. Remove the pin-type retainers and the accelerator control splash shield.



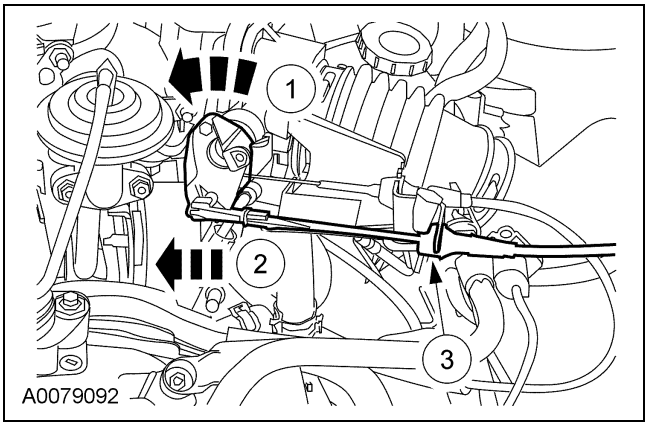
3. ⚠ **CAUTION: Make sure the speed control cable is removed in the direction indicated on the cable where it attaches to the throttle cam.**

   Disconnect the speed control cable from the throttle cam.

   1 Rotate the throttle valve.

   2 Disconnect the cable.

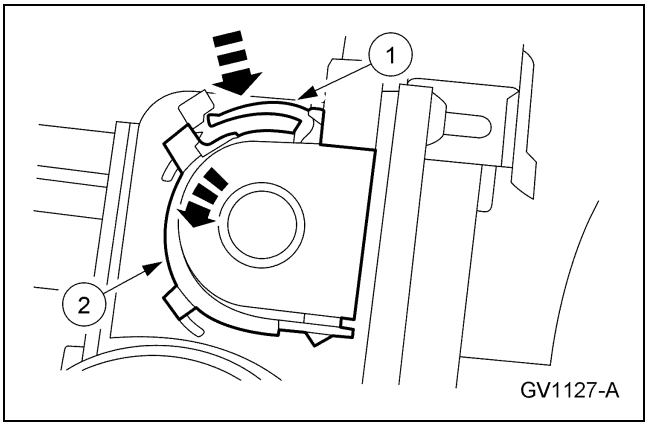
   3 Squeeze the speed control cable tabs and remove the cable from the cable bracket.



4. Release the speed control cable cap.

   1 Press the speed control cable cap retaining tab.

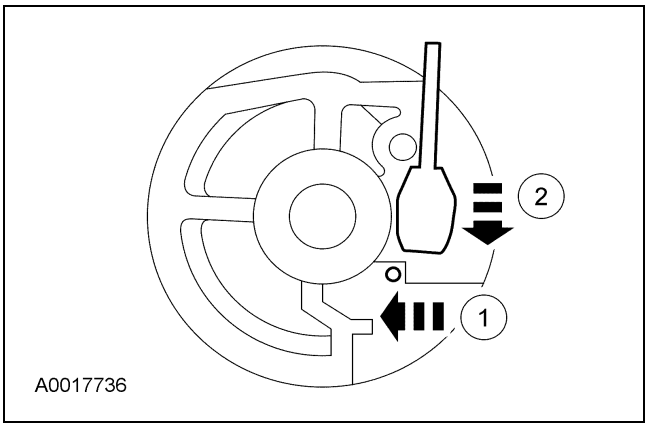
   2 Rotate the speed control cable cap counterclockwise and pull the cable cap away from the actuator housing.



5. Remove the speed control cable.

   1 Press the spring retainer.

   2 Slide the core wire end out of the speed control actuator pulley and remove the speed control cable.



6. To install, reverse the removal procedure.

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Appendix O - Service Procedures

Upper Intake Manifold

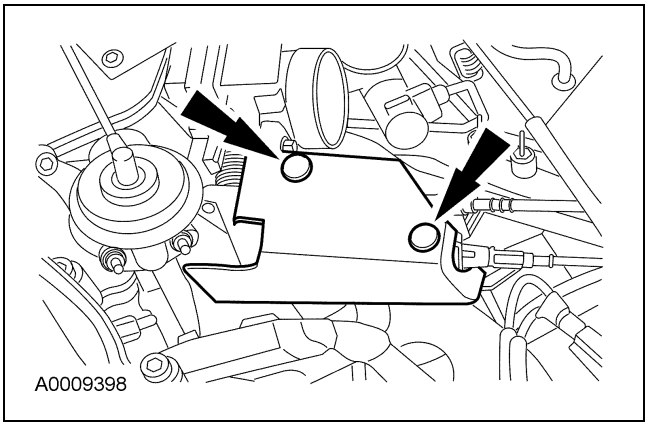
IN-VEHICLE REPAIR

Upper Intake Manifold

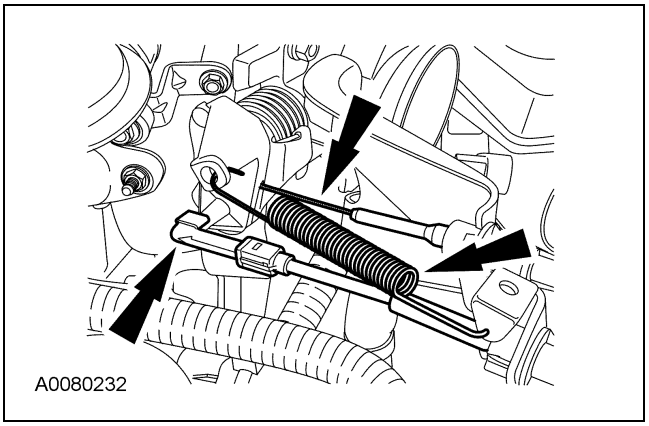
Removal

1. Remove the air cleaner outlet pipe. For additional information, refer to Section 303-12.

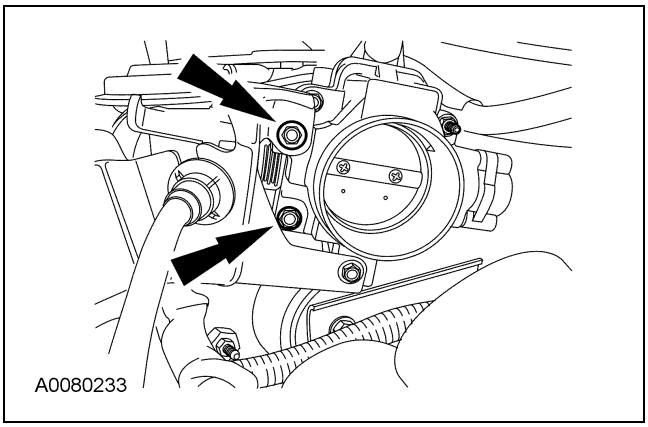
2. Remove the pin-type retainers and the accelerator cable splash shield.



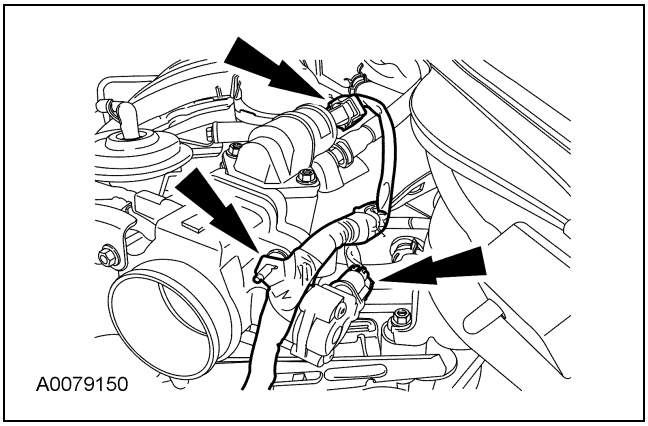
3. Disconnect the accelerator cable, the cruise control cable and the throttle return spring.



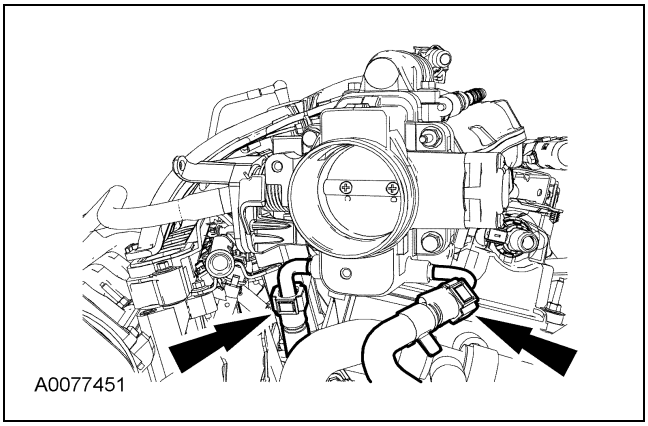
4. Remove the bolts and position the bracket and cables aside.



5. Disconnect the throttle position (TP) sensor and the idle air control (IAC) valve electrical connectors.
   - Detach the harness retainer from the throttle body stud bolt.

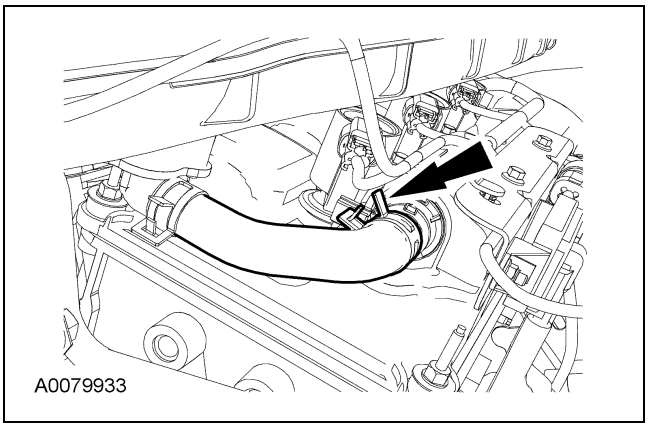


6. Disconnect the heated throttle body coolant tubes.

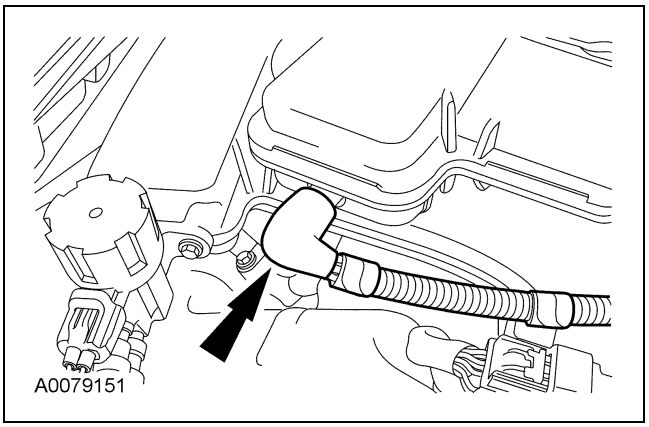


IN-VEHICLE REPAIR (Continued)

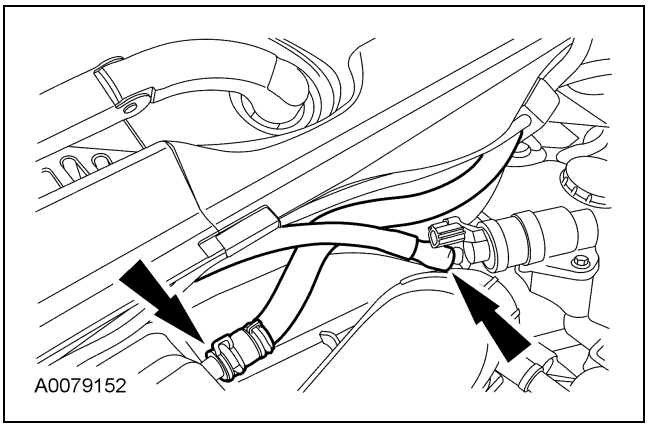
7. Disconnect the positive crankcase ventilation (PCV) hose.



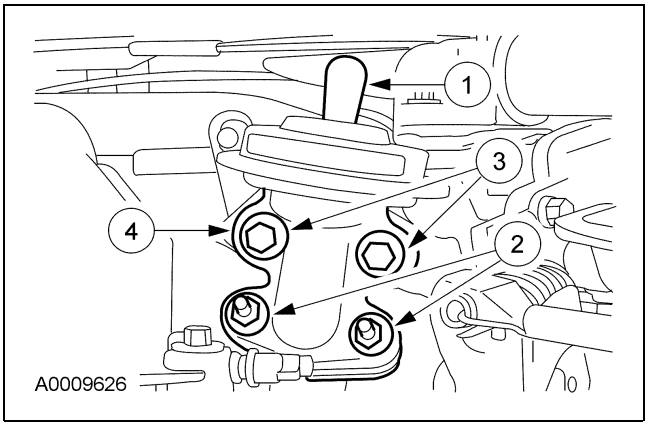
8. Disconnect the vacuum supply hose.



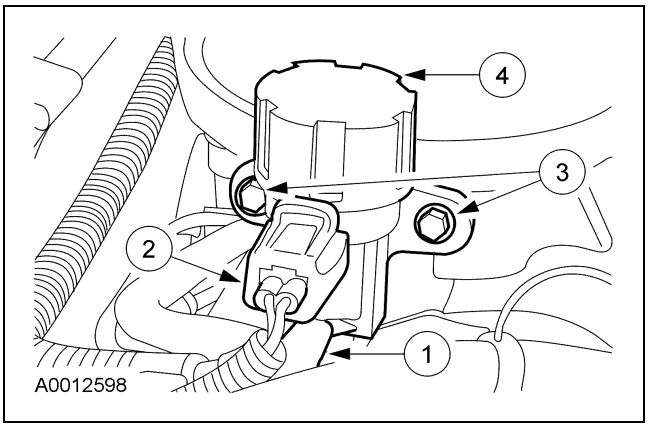
9. Disconnect the brake booster and evaporative emissions (EVAP) vacuum hoses.



10. Remove the exhaust gas recirculation (EGR) valve.
    1 Disconnect the vacuum hose.
    2 Remove the nuts.
    3 Remove the bolts.
    4 Remove the EGR valve.

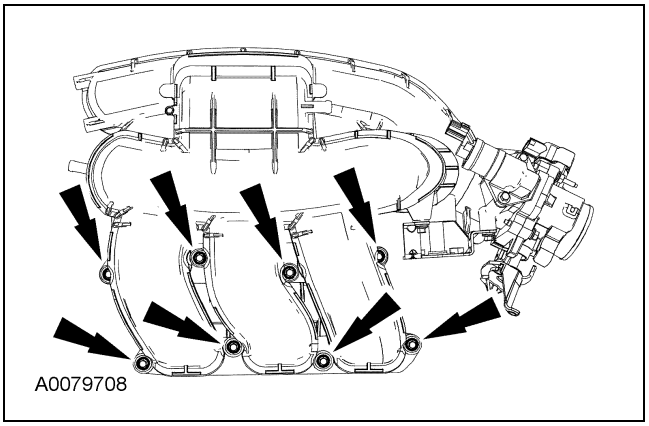


11. Remove the EGR vacuum regulator (EVR) valve.
    1 Disconnect the vacuum hose.
    2 Disconnect the electrical connector.
    3 Remove the bolts.
    4 Remove the valve.



IN-VEHICLE REPAIR (Continued)

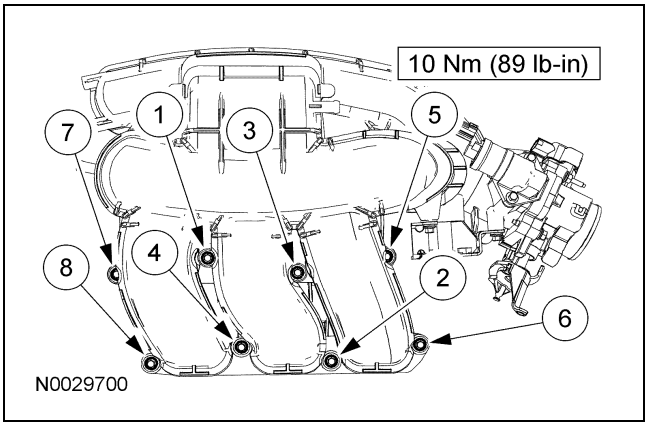
12. Remove the eight bolts and the upper intake manifold.
    - Remove and discard the gaskets.
    - Clean all mating surfaces.



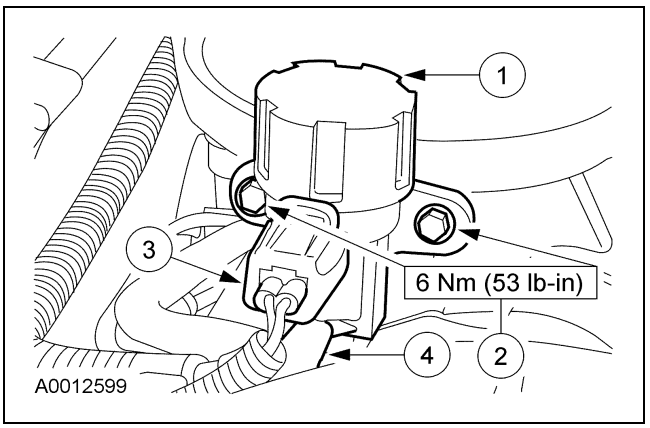
Installation

1. Position new gaskets in the upper intake manifold.

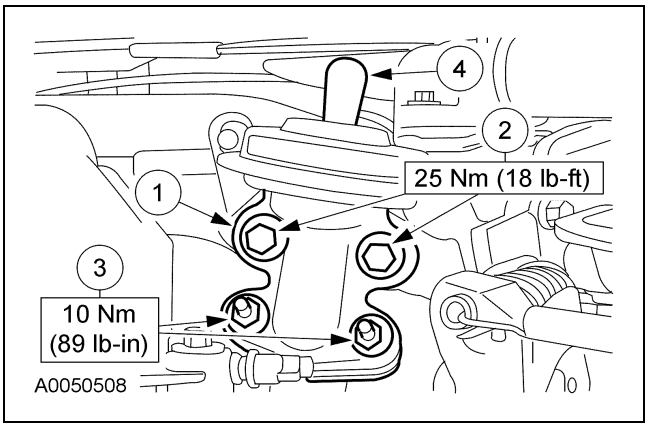
2. Position the upper intake manifold and install the bolts in the sequence shown.



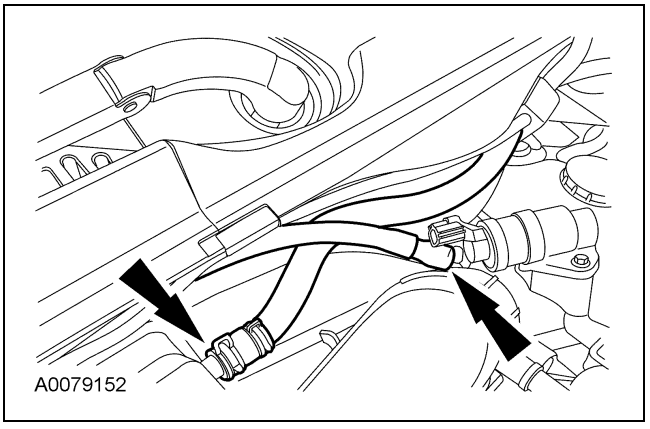
3. Install the EGR vacuum regulator valve.
   1 Position the valve.
   2 Install the bolts.
   3 Connect the electrical connector.
   4 Connect the vacuum hose.



4. Install the EGR valve.
   1 Position the EGR.
   2 Install the bolts.
   3 Install the nuts
   4 Connect the vacuum hose.

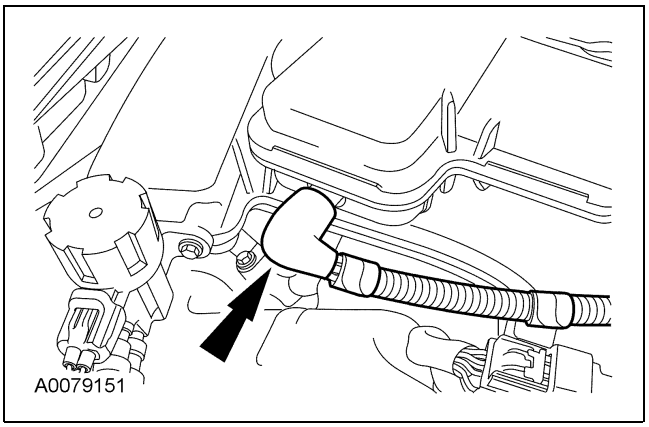


5. Connect the brake booster and PCV vacuum hoses.

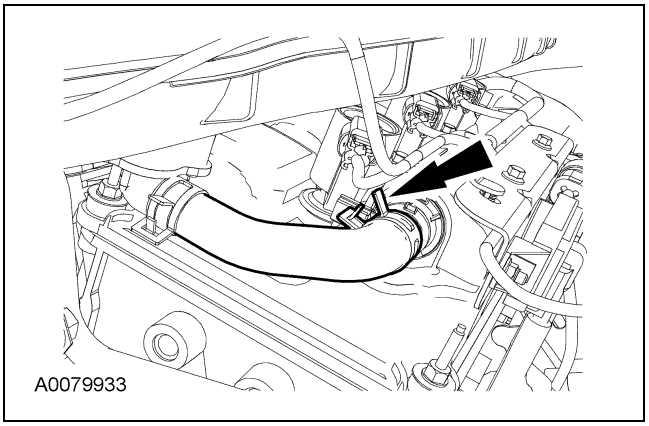


IN-VEHICLE REPAIR (Continued)

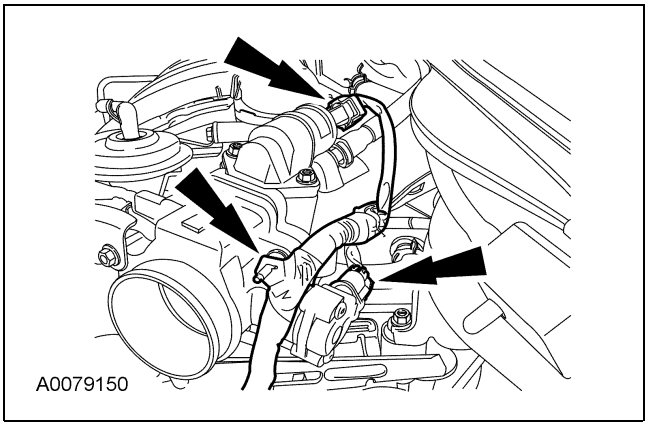
6. Connect the vacuum supply hose.



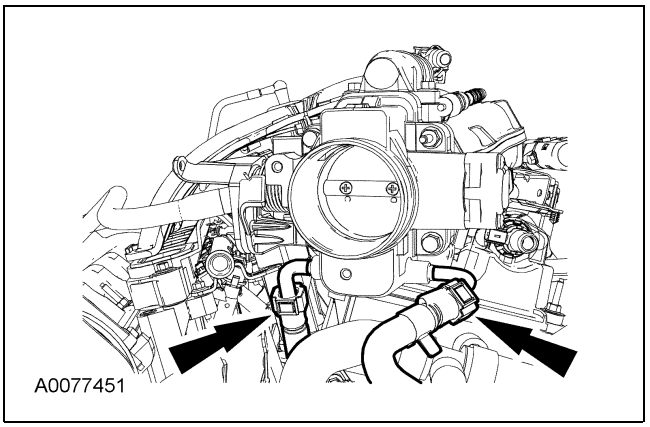
7. Connect the PCV valve hose.



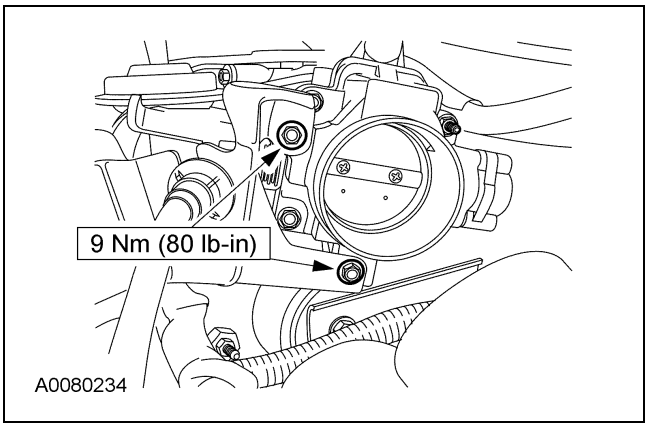
8. Connect the TP and IAC valve electrical connectors.
   - Attach the harness retainer to the throttle body stud bolt.



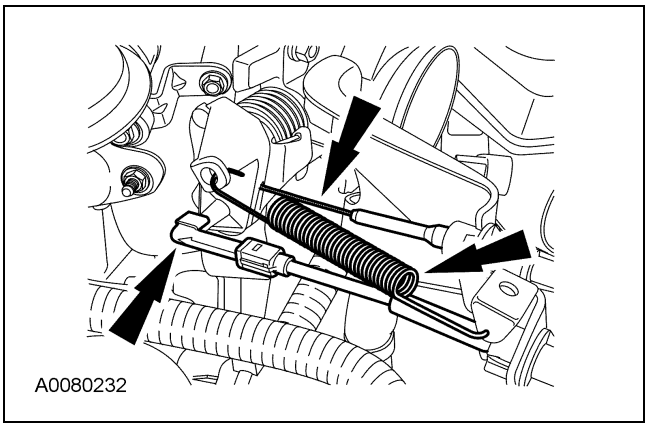
9. Connect the heated throttle body coolant tubes.



10. Position the bracket and cables and install the bolts.

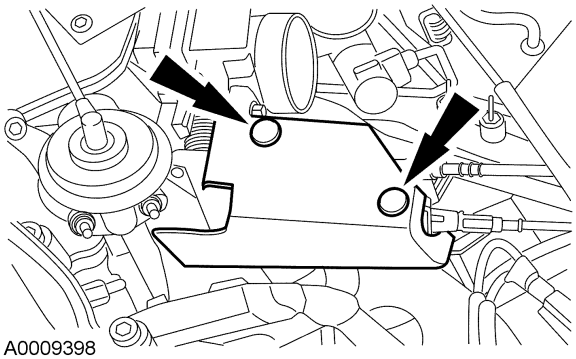


11. Connect the throttle return spring, accelerator cable and the cruise control cable.



IN-VEHICLE REPAIR (Continued)

12. Install the pin-type retainers and the accelerator cable splash shield.



13. Install the air cleaner outlet pipe. For additional information, refer to Section 303-12.

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Appendix O - Service Procedures

Valve Cover RH

IN-VEHICLE REPAIR

Valve Cover RH

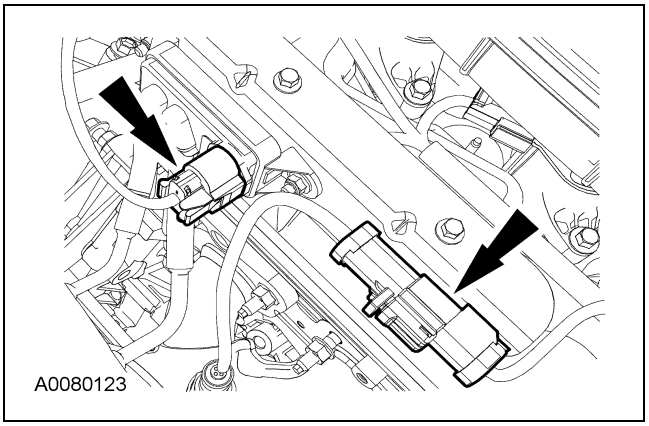
Material

Item	Specification
Silicone Gasket and Sealant F7AZ-19554-EA	WSE-M4G323-A4
Silicone Brake Caliper Grease and Dielectric Compound D7AZ-19A221-A	ESE-M1C171-A
Metal Surface Cleaner F4AZ-19A536-RA	WSE-M5B392-A

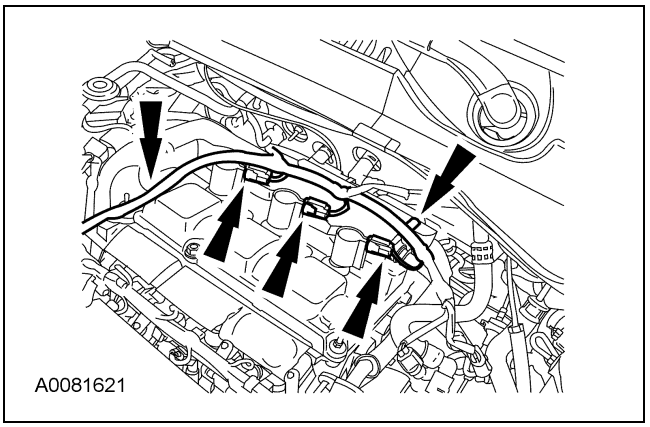
Removal

1. Remove the upper intake manifold. For additional information, refer to Upper Intake Manifold in this section.

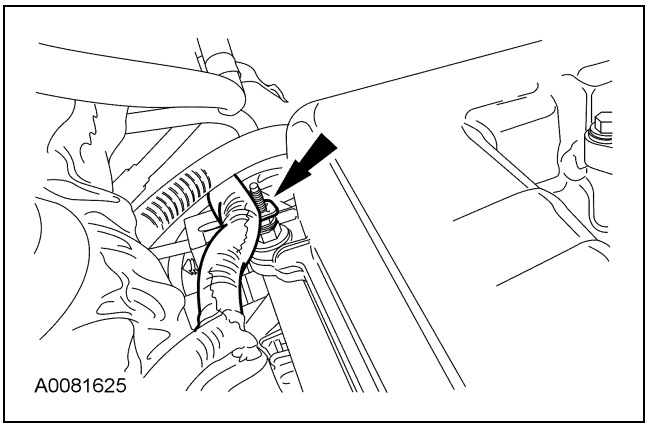
2. Disconnect the differential pressure feedback exhaust gas recirculation (EGR) sensor and the RH heated oxygen sensor (HO2S) electrical connectors.



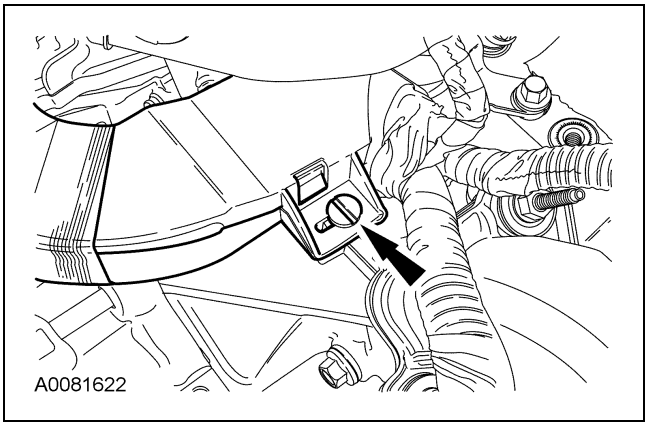
3. Disconnect the coil-on-plug electrical connectors.
   - Detach the wiring harness retainers and position the wiring harness aside.



4. Detach the wiring harness retainer from the stud.

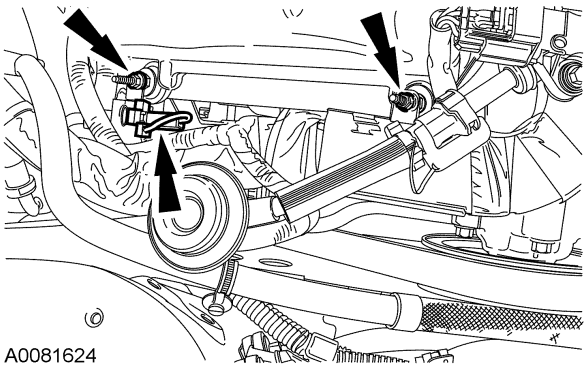


5. Detach the pin-type retainer.

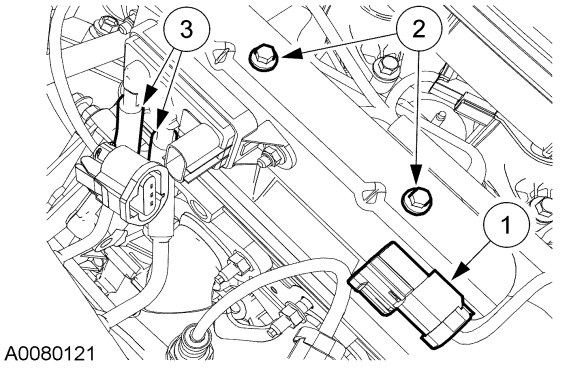


IN-VEHICLE REPAIR (Continued)

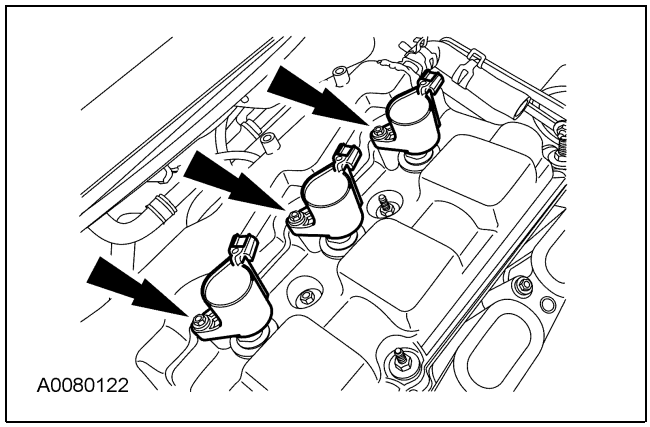
6. Remove the nuts from the valve cover studs.
   - Position the radio interference capacitor and wiring harness conduit aside.



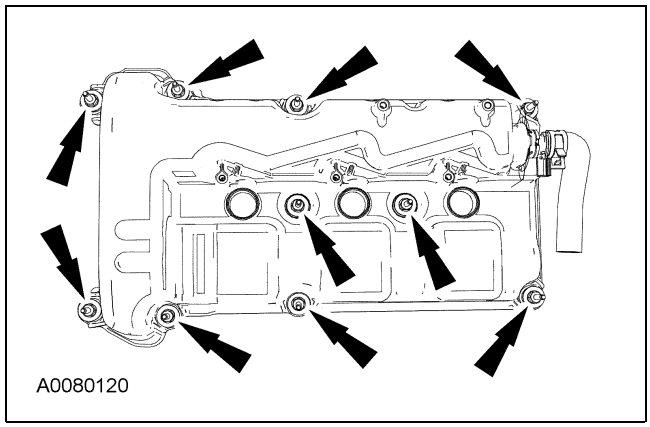
7. Remove the differential pressure feedback EGR sensor tube and bracket.
   1 Detach the electrical connector pin-type retainer.
   2 Remove the bolts from the differential pressure feedback EGR bracket.
   3 Disconnect and remove differential pressure feedback EGR and bracket from the vacuum tubes.



8. Remove the bolts and the ignition coils.



9. Remove the studs and the valve cover.
   - Remove and discard the gaskets.



IN-VEHICLE REPAIR (Continued)

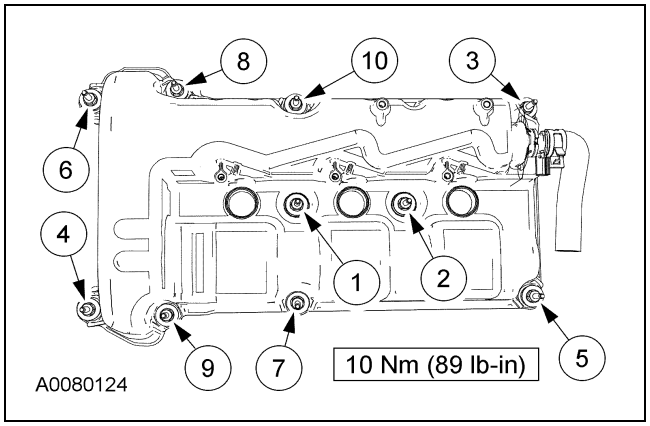
Installation

1. **NOTE:** Clean the valve cover sealing area before installing a new gasket.

   NOTE: Clean the head and the front cover sealing surfaces using metal surface cleaner before applying silicone gasket and sealant.

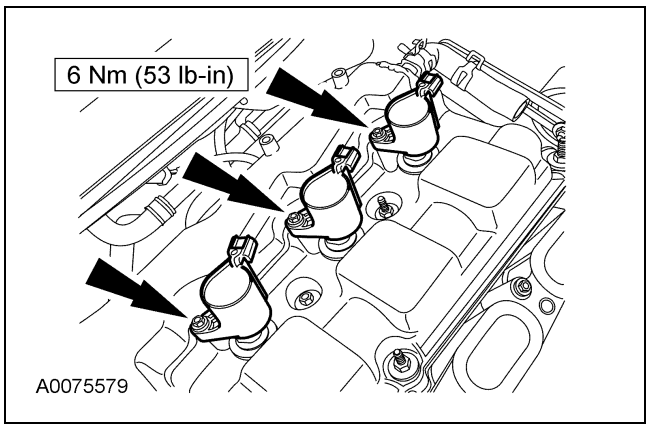
   NOTE: Apply a 5 mm (0.2 in) dot of gasket and sealant to the front cover-to-cylinder head joints. The valve cover must be installed within four minutes of applying the sealant.

   Tighten the valve cover studs in the sequence shown.

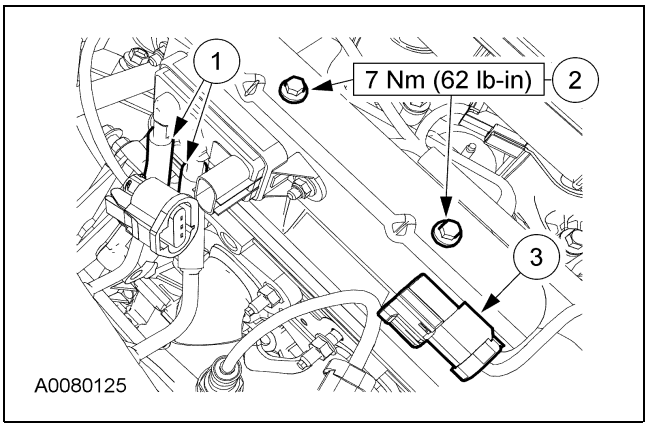


2. **NOTE:** Apply a film of caliper grease and dielectric compound to the ignition coil boot prior to installation.

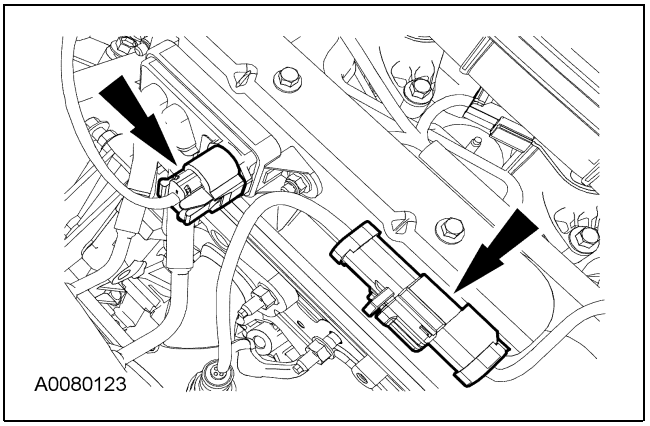
   Install the bolts and the ignition coils.



3. Install the differential pressure feedback EGR valve sensor and bracket.
   1 Connect the differential pressure feedback EGR valve tube and bracket to the vacuum tubes.
   2 Install the differential pressure feedback EGR sensor and bracket and install the bolts.
   3 Attach the H02S electrical connector pin-type retainer.

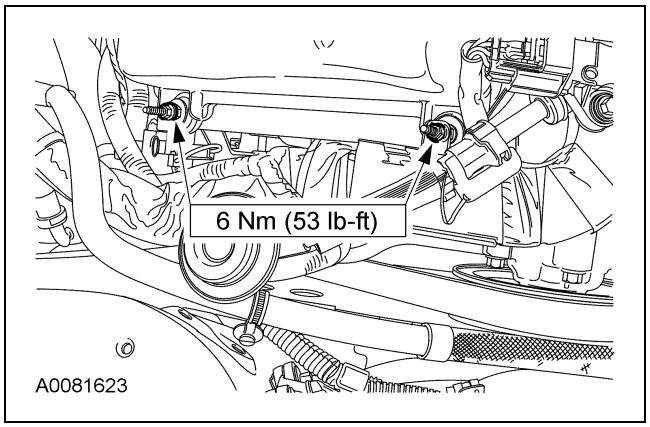


4. Connect the differential pressure feedback EGR sensor and the RH heated HO2S electrical connectors.

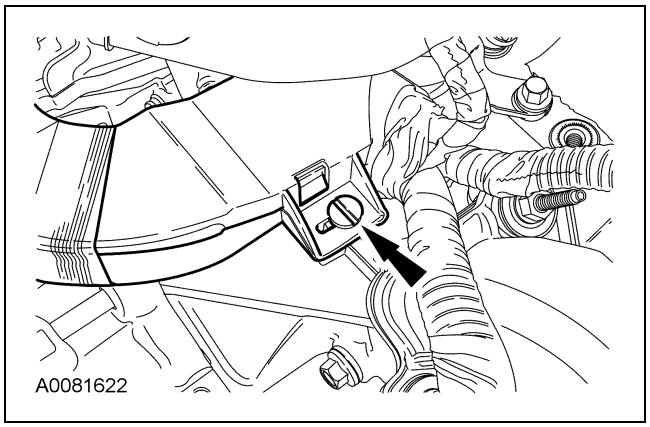


IN-VEHICLE REPAIR (Continued)

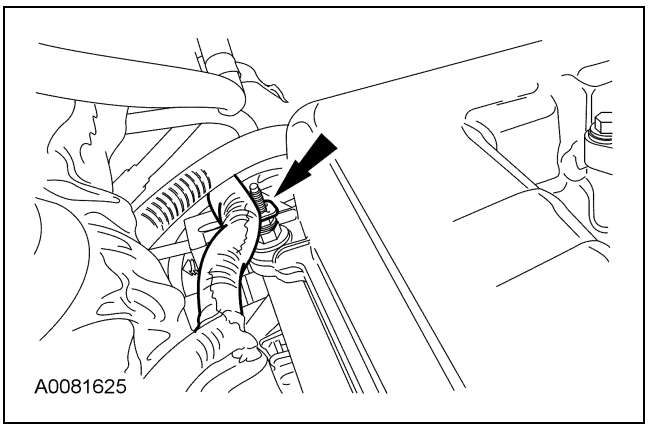
5. Position the radio interference capacitor and wiring harness conduit and install the nuts.



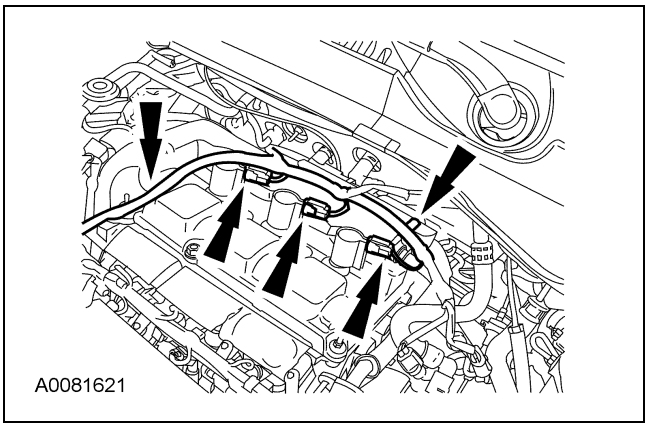
6. Attach the pin-type retainer.



7. Attach the wiring harness retainer to the stud.



8. Attach the wiring harness retainers and connect the coil-on-plug electrical connectors.



9. Install the upper intake manifold. For additional information, refer to Upper Intake Manifold in this section.

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Appendix O - Service Procedures

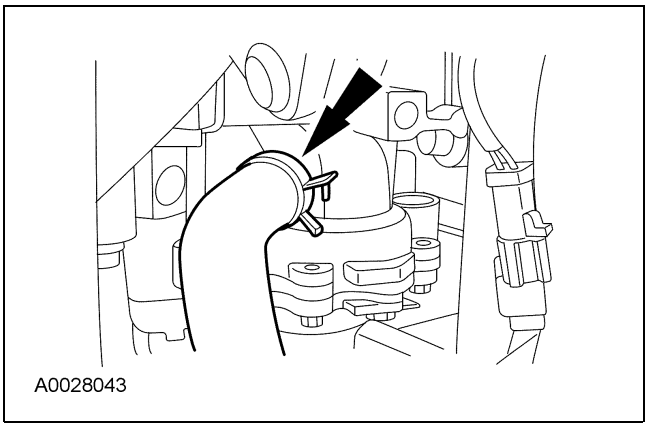
Water Pump

REMOVAL AND INSTALLATION

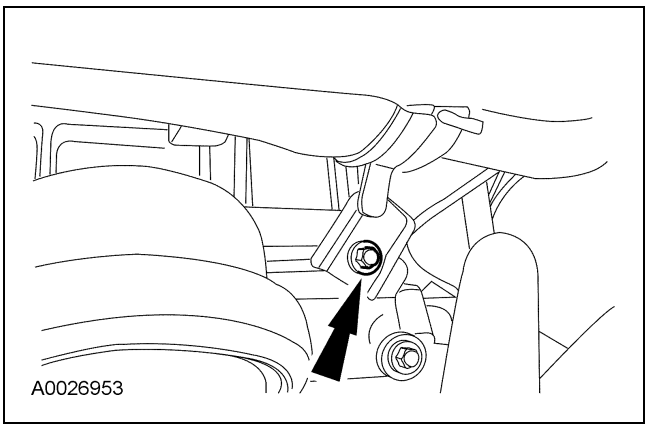
Water Pump — 3.0L (4V)

Removal

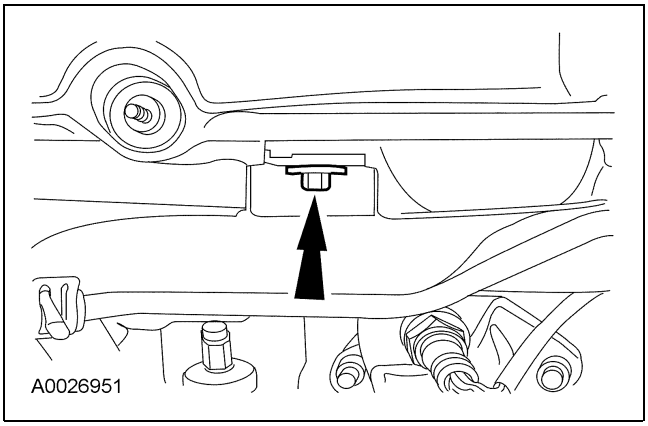
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. Remove the air cleaner assembly. For additional information, refer to Section 303-12.
3. Remove the battery and the battery tray. For additional information, refer to Section 414-01.
4. Remove the coolant pump belt. For additional information, refer to Section 303-05.
5. Drain the cooling system. For additional information, refer to Cooling System Draining, Filling and Bleeding in this section.
6. Disconnect the heater hose from the bottom of the coolant pump.



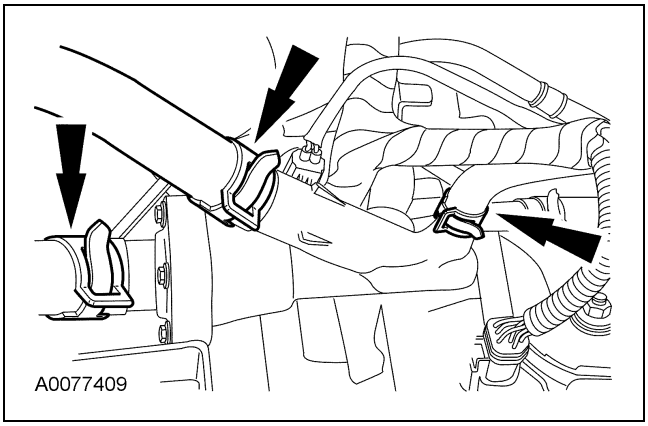
7. Remove the radiator lower tube bolt.



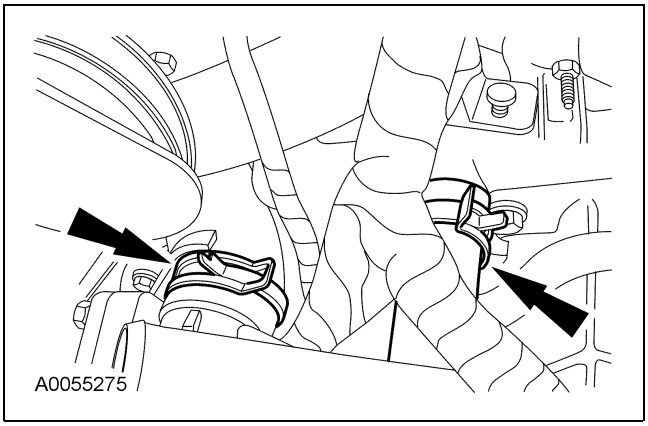
8. Remove the radiator upper front tube bolt.



9. Disconnect the upper radiator hose, the heater hose and the thermostat housing hose.

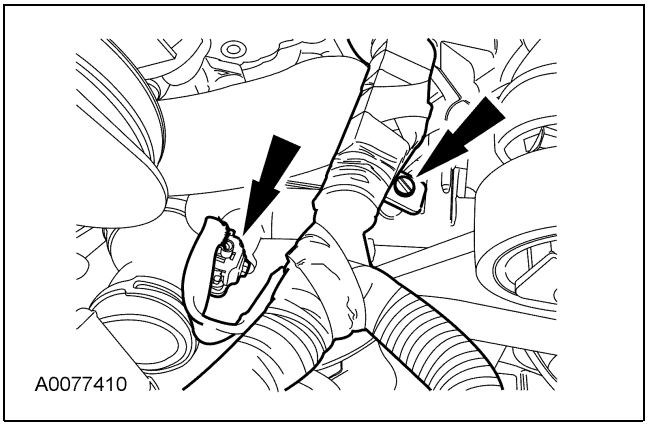


10. Remove the radiator bypass hose assembly.

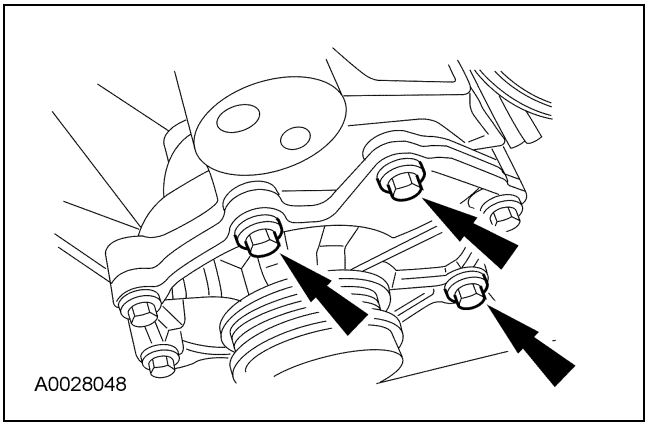


REMOVAL AND INSTALLATION (Continued)

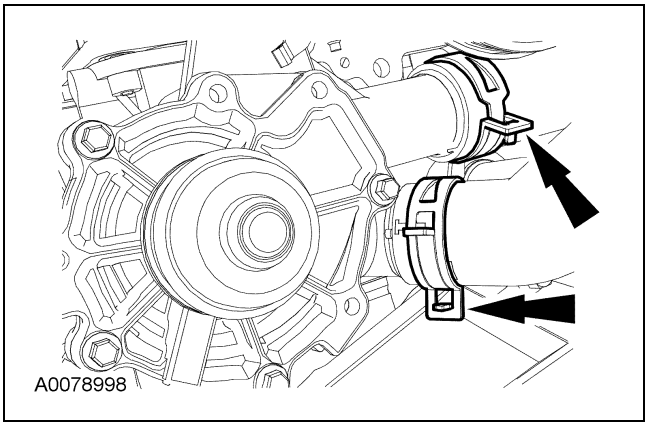
11. Remove the pin-type retainer, disconnect the engine coolant temperature (ECT) sensor electrical connector and position the harness aside.



12. Remove the three bolts, and reposition the coolant pump to access the remaining hoses.

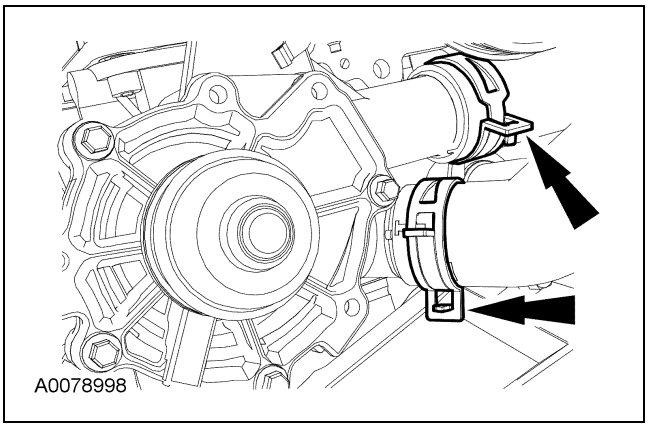


13. Loosen the clamps, disconnect the hoses and remove the coolant pump.

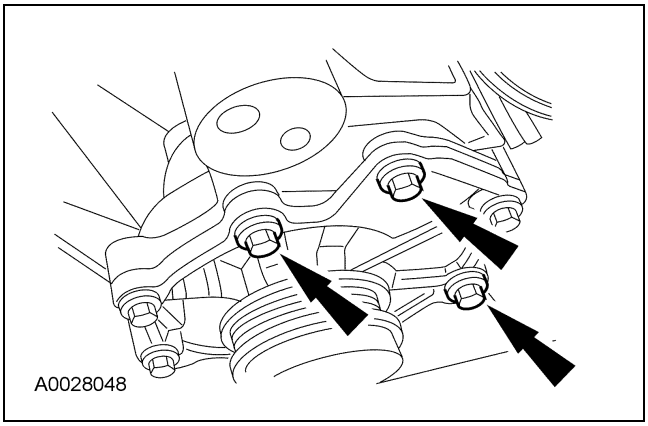


Installation

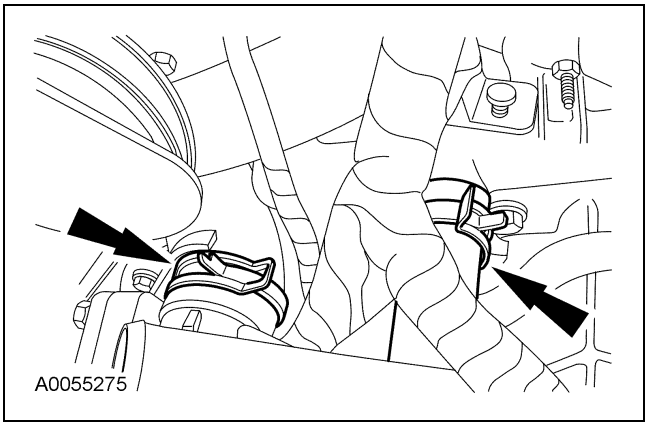
1. Connect the hoses to the coolant pump.



2. Position the coolant pump and install the mounting bolts. Tighten the bolts in two stages:
   - Stage 1: Tighten to 10 Nm (89 lb-in).
   - Stage 2: Tighten an additional 90 degrees.

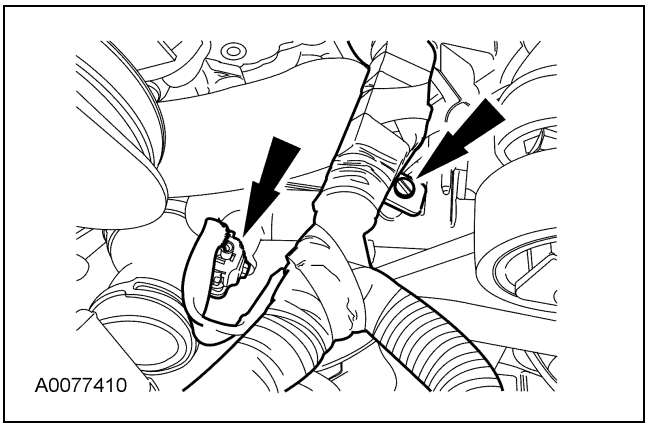


3. Install the radiator bypass hose assembly.

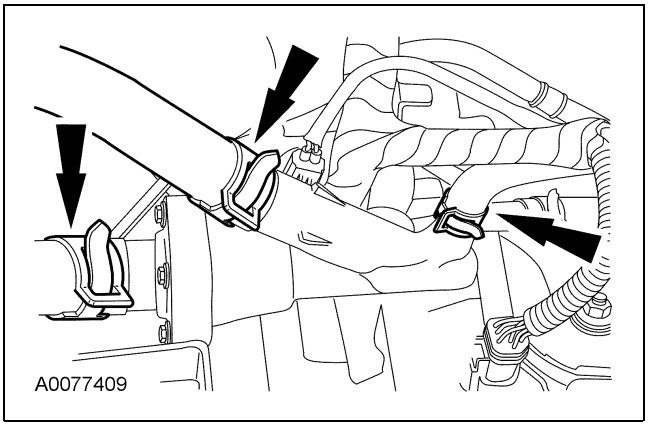


REMOVAL AND INSTALLATION (Continued)

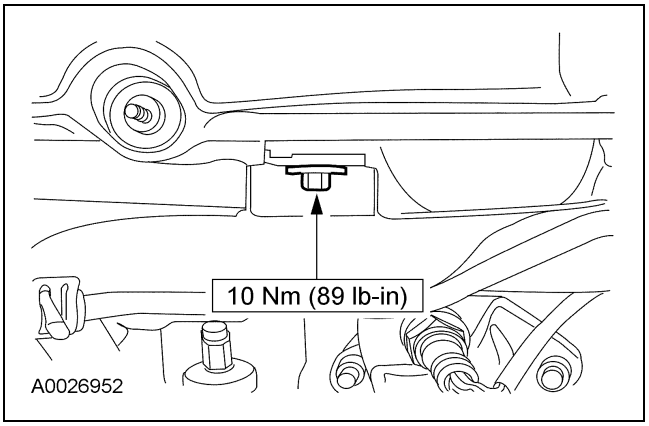
4. Connect the ECT sensor electrical connector and attach the pin-type retainer.



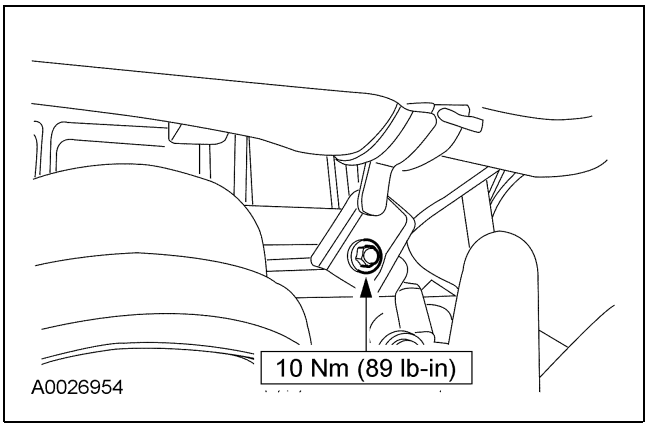
5. Connect the upper radiator hose, the heater hose and thermostat housing hose.



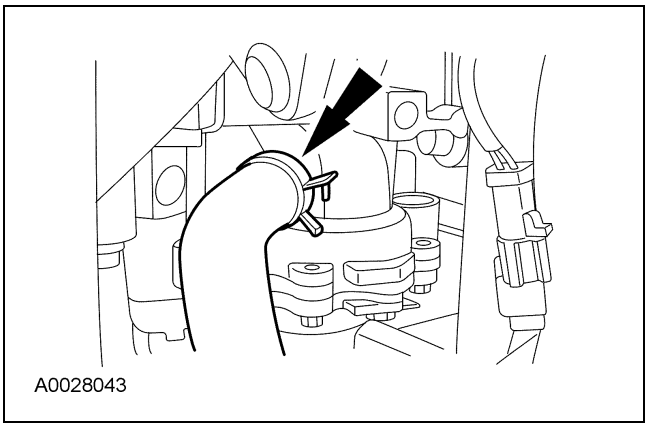
6. Install the radiator upper front cooling tube bolt.



7. Install the lower cooling tube bolt.



8. Connect the heater hose to the bottom of the coolant pump.



9. Install the coolant pump belt. For additional information, refer to Section 303-05.

10. Install the battery and the battery tray. For additional information, refer to Section 414-01.

11. Install the air cleaner assembly. For additional information, refer to Section 303-12.

12. Fill and bleed the engine cooling system. For additional information, refer to Cooling System Draining, Filling and Bleeding in this section.

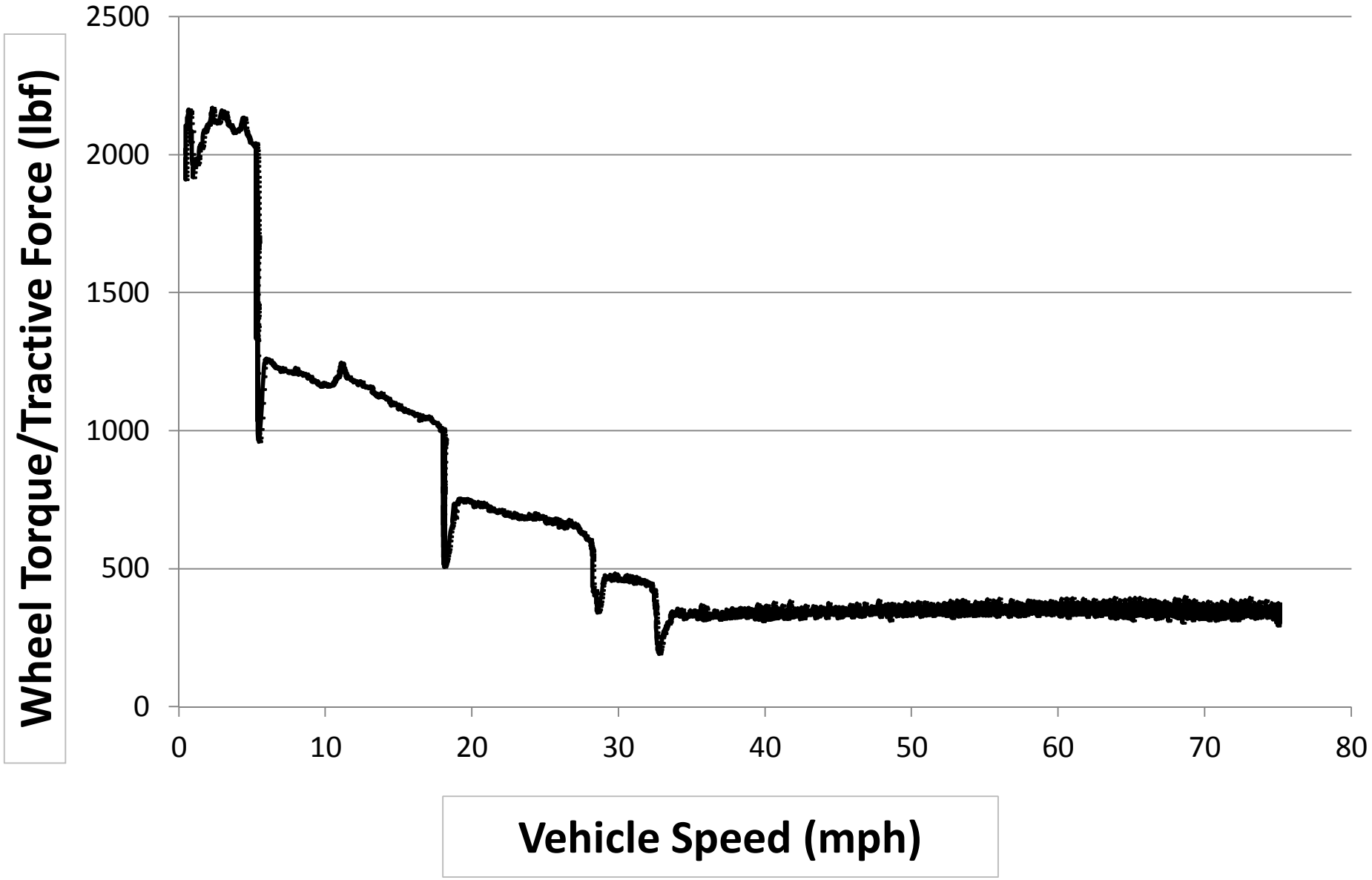
PE12-033

FORD

1/18/2013

2013-1-18 Appendix Q - Wheel Torque

2002 Ford Taurus 3.0L 4V/AX4N
29% Throttle



PE12-033

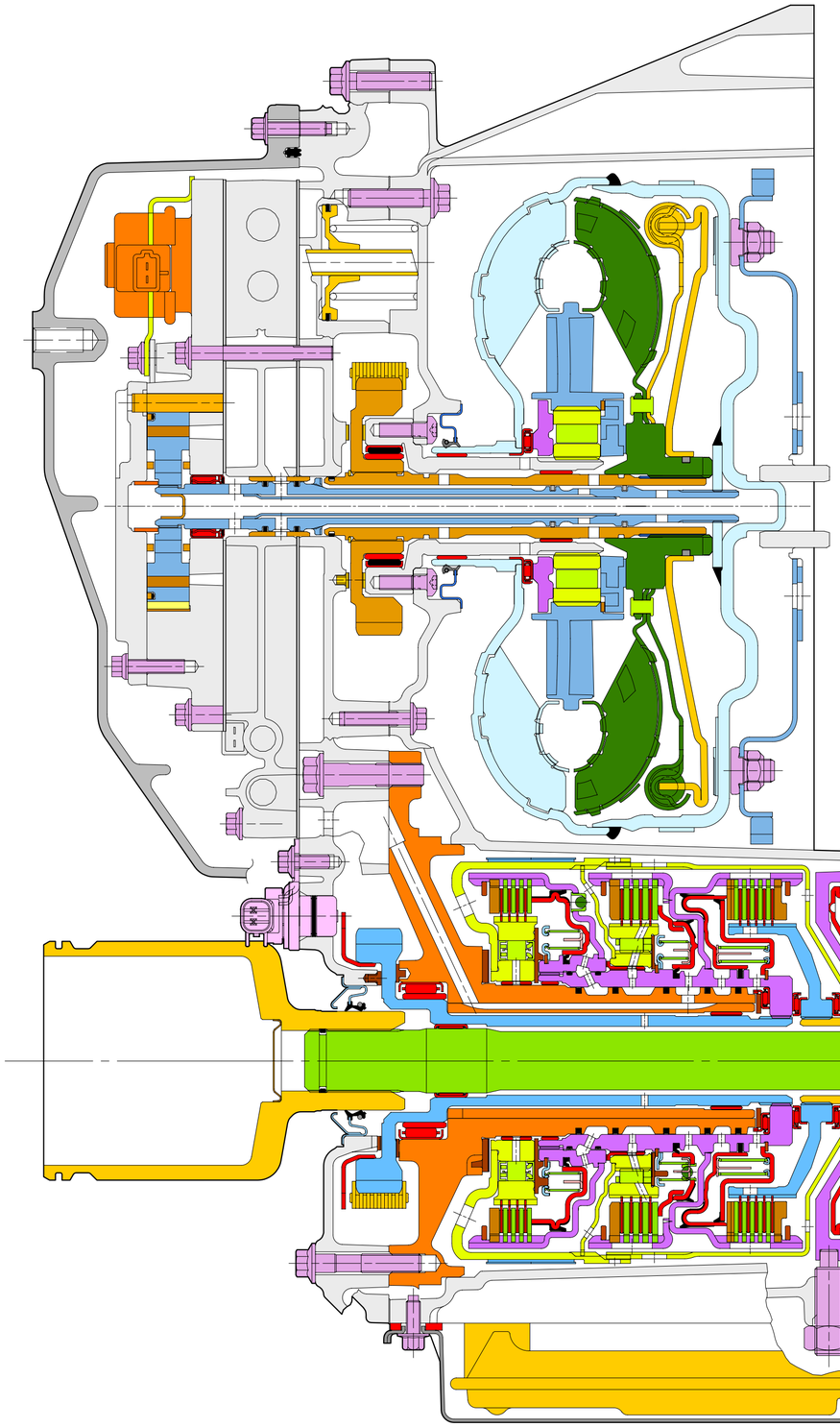
FORD

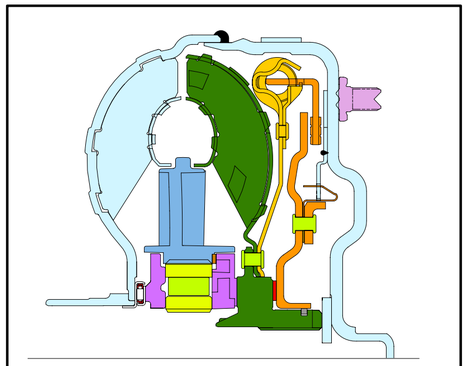
1/18/2013

Appendix R - Transmission Information

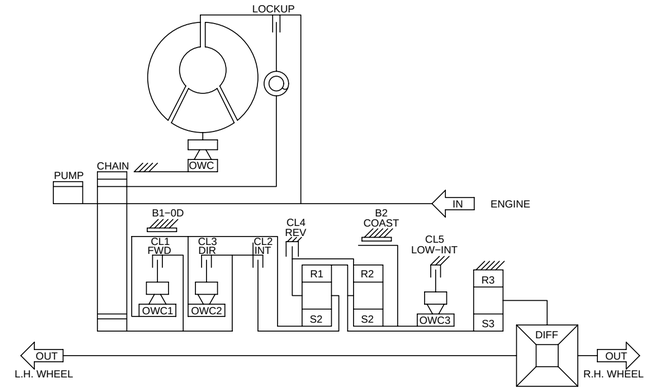
AX4N Service Manual

4F50N AUTOMATIC TRANSAXLE





V229 4.2L



GEAR	CL1	CL2	CL3	CL4	CL5	B1	B2	DRIVE MODE			COAST MODE			RATIO
								OWC1	OWC2	OWC3	OWC1	OWC2	OWC3	
1M	X		X		X		X	X	N/A	X	N/A	X	N/A	2.771
2M	X	X			X		X	O/R	N/A	X	O/R	N/A	N/A	1.543
1	X				X			X	N/A	X	O/R	N/A	O/R	2.771
2	X	X			X			O/R	N/A	X	O/R	N/A	O/R	1.543
3		X	X		X			FF	X	O/R	N/A	O/R	O/R	1.000
4		X	X		X	X		FF	O/R	O/R	FF	O/R	O/R	.694
R	X			X				X	N/A	N/A	O/R	N/A	N/A	2.263

X − LOCKED AND CARRYING TORQUE
O/R − OVERRUNNING
N/A − LOCKED AND NOT CARRYING TORQUE
FF − ONE OF THE RACES IS INDETERMINATE

ATEO Illustration

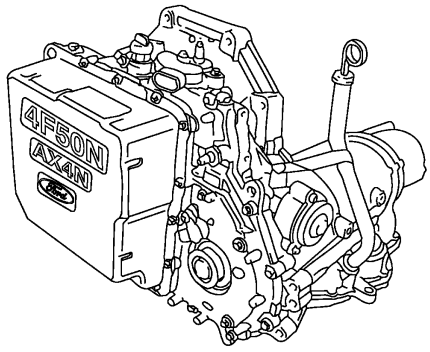
http://www.ateo.ford.com/illustration

2004

OCTOBER 15, 2003

DESCRIPTION AND OPERATION

Transaxle Description



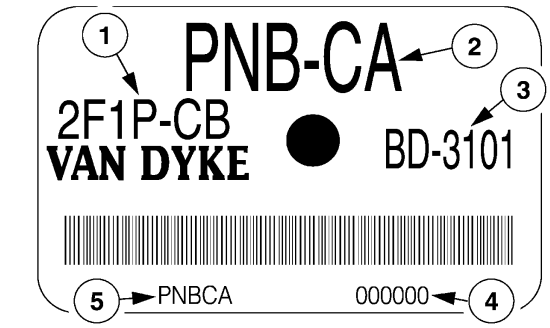
A0024309

The 4F50N (AX4N) automatic transaxle is a four-speed unit with electronic shift control. It is designed for operation in a transverse powertrain for front-wheel drive vehicles and has the following major components:

- case with chain cover
- chain drive
- apply components:
  - — two friction bands: overdrive, coast
  - — five friction clutches: forward, direct, intermediate, reverse, low-intermediate
  - — three one-way clutches: low, direct, low-intermediate
- two simple planetary gearsets:
  - — front
  - — rear
- final drive planetary gearset
- differential
- pump assembly
- main control

DESCRIPTION AND OPERATION

Identification Tags



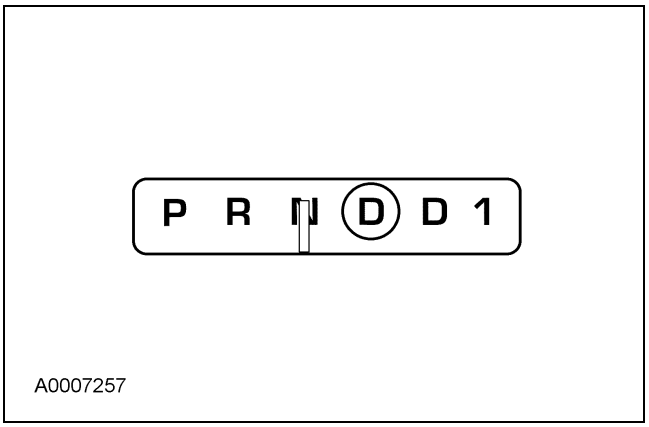
Item	Part Number	Description
1	—	Assembly number prefix and suffix
2	—	Model
3	—	Built date
4	—	Serial number
5	—	Model number

When servicing the automatic transaxle, use the identification tag located on top of the converter housing.

DESCRIPTION AND OPERATION

Range Selection

The transmission has six range positions: P, R, N, (D), D and 1.



Park

In the PARK position:

- there is no powerflow through the transaxle.
- the parking pawl locks the final drive.
- the engine may be started.
- the ignition key may be removed.

Reverse

In the REVERSE position:

- the vehicle may be operated in a rearward direction, at a reduced gear ratio.
- engine braking will occur.

Neutral

In the NEUTRAL position:

- there is no powerflow through the transmission.
- the output shaft is not held and is free to turn.
- the engine may be started.

Overdrive

OVERDRIVE is the normal position for most forward driving.

OVERDRIVE provides:

- automatic shifts.
- apply and release of the torque converter clutch.
- maximum fuel economy during normal operation.

Drive

This position provides all automatic shifts for 1st through 3rd gears. This position also provides apply and release of the torque converter clutch (TCC). Coast braking occurs in third gear.

Manual 1 Position

If this position is selected at normal road speeds, the transmission will shift into second gear, then into first when the vehicle reaches a speed below approximately 24 km/h (15 mph).

This position provides:

- first gear operation only.
- engine braking for descending steep grades.

DESCRIPTION AND OPERATION

Shift Patterns

Upshifts

Upshifting is controlled by the powertrain control module (PCM). The PCM receives inputs from various engine or vehicle sensors and driver demands to control shift scheduling, shift feel and torque converter clutch (TCC) operation.

The PCM has an adaptive learn strategy to electronically control the transaxle which will automatically adjust the shift feel. The first few hundred miles of operation of the transaxle may have abrupt shifting. This is a normal operation. If the battery has been disconnected for any reason it will need to be kept disconnected for approximately 20 minutes to reset the adaptive shift pressure strategy or use the scan tool to clear the transmission keep alive memory (KAM) tables.

Downshifts

Under certain conditions the transaxle will downshift automatically to a lower gear range (without moving the transaxle range selector lever). There are three categories of automatic downshifts: coastdown, torque demand, and forced or kickdown shifts.

Coastdown

The coastdown downshift occurs when the vehicle is coasting down to a stop.

Torque Demand

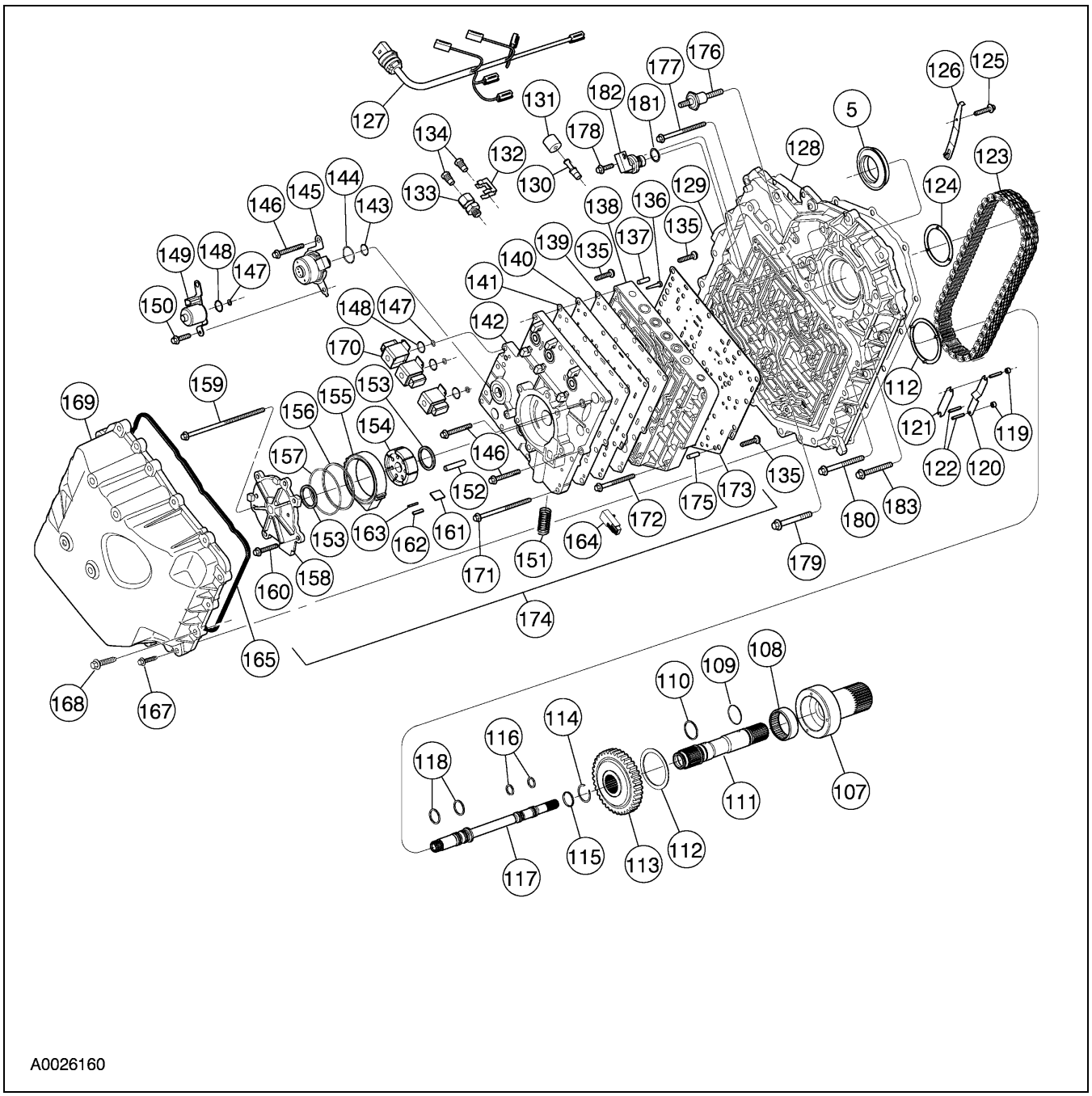
The torque demand downshift occurs (automatically) during part throttle acceleration when the demand for torque is greater than the engine can provide at that gear ratio. If applied, the transmission will disengage the TCC to provide added acceleration.

Kickdown

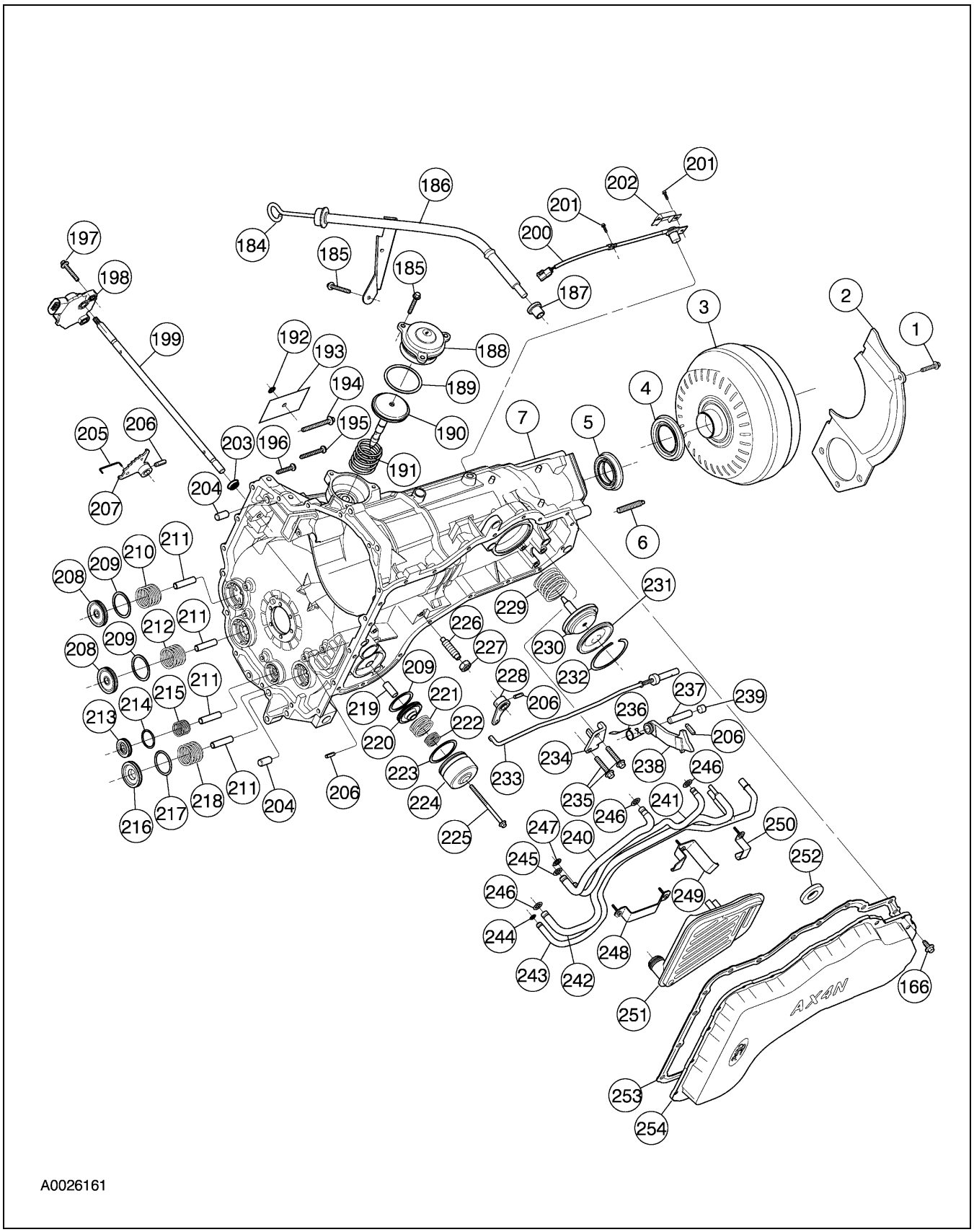
For maximum acceleration, the driver can force a downshift by pressing the accelerator pedal to the floor. A forced downshift into a lower gear is possible below calibrated speeds. Specifications for downshift speeds are subject to variations due to tire size, engine and transaxle calibration requirements.

DESCRIPTION AND OPERATION

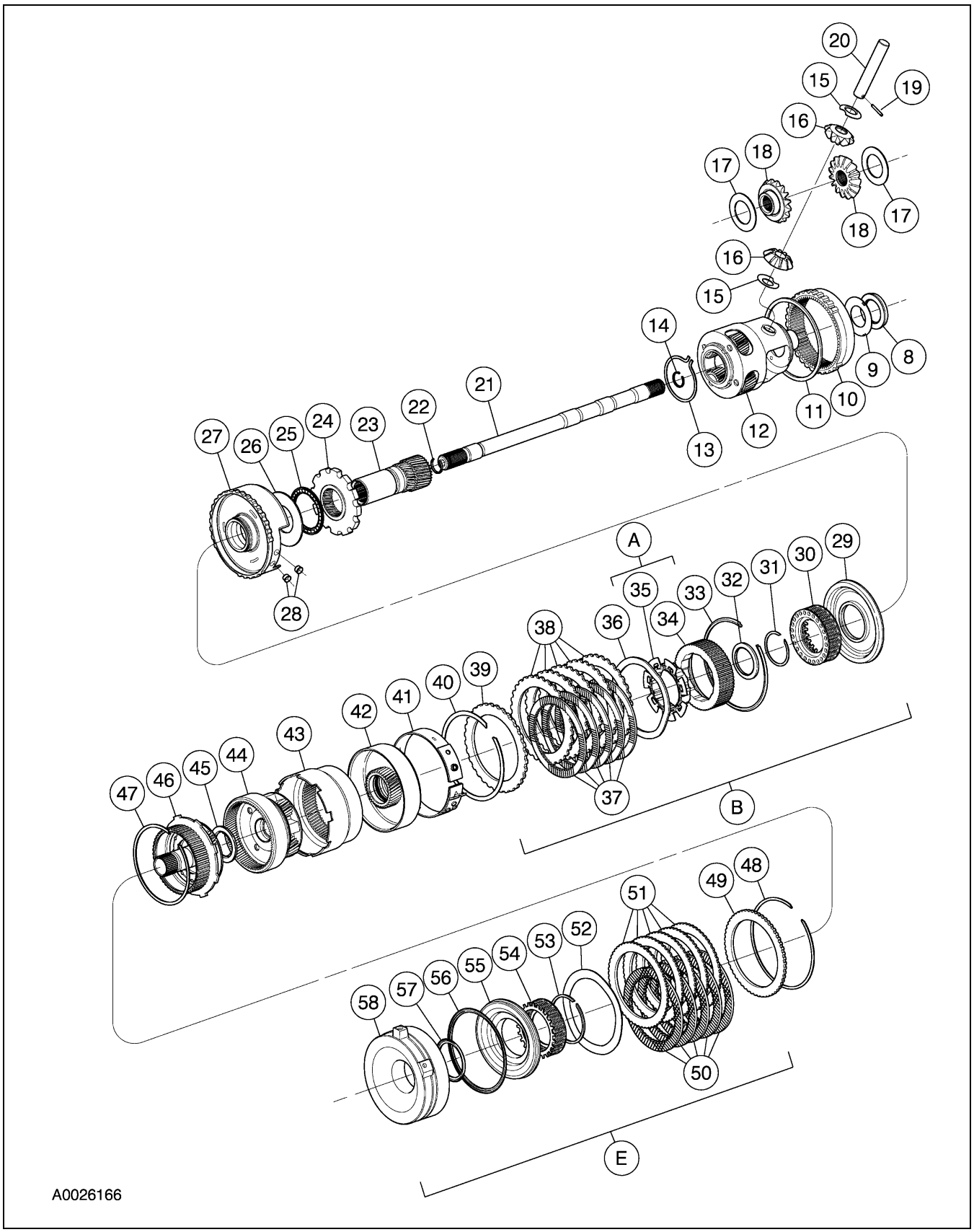
Disassembled Views



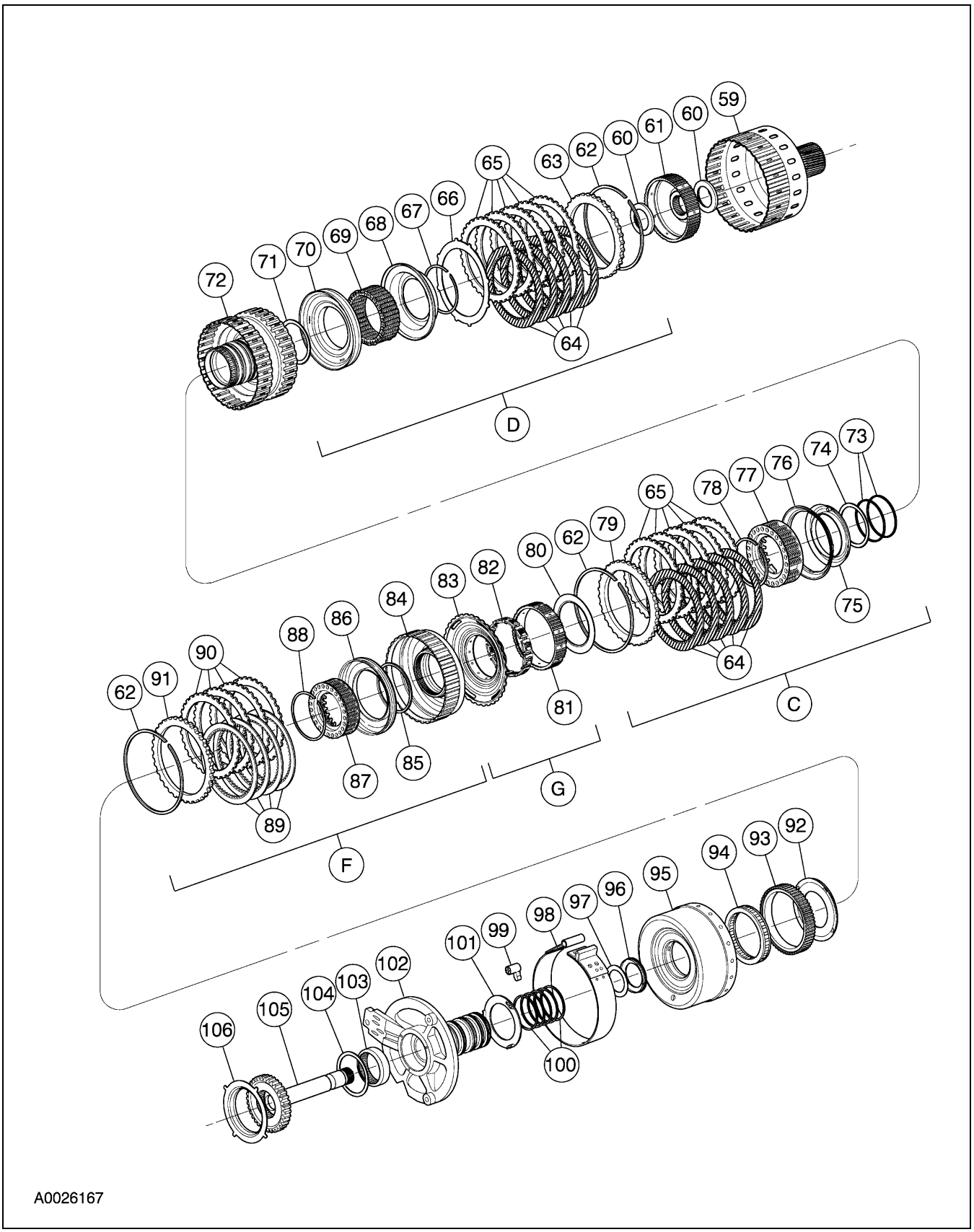
DESCRIPTION AND OPERATION (Continued)



DESCRIPTION AND OPERATION (Continued)



DESCRIPTION AND OPERATION (Continued)



DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	N605890-S1036	Bolt — M6-1.0 x 16.5 hex flange head (2 req'd) (attaches dust cover to case)
2	7986	Cover — lower converter housing
3	7902	Converter assembly
4	7F401	Seal assembly — converter impeller hub
5	1177	Seal assembly — differential (2 req'd)
6	N806944-S1036	Stud — M10 - 1.5 x 60.5 pilot
7	7005	Case assembly
8	7G112	Bearing and race assembly — differential carrier thrust No. 19
9	7G103	Washer — differential carrier thrust No. 18
10	7F343	Gear — final drive ring
11	7C144	Rear support spacer
12	7F465	Gear and differential case assembly
13	W705051-S	Ring — 77.3 mm retaining external (retains pinion shaft in differential case)
14	N803200-S	Ring — 27 mm (1.08 in) retaining external (retains output shaft in differential case assembly)
15	4230	Washer — rear axle differential pinion thrust (2 req'd)
16	4215	Pinion — front wheel drive differential (2 req'd)
17	4228	Washer — differential side gear thrust (2 req'd)
18	4236	Gear — differential side (2 req'd)
19	67847-S	Pin — coiled spring (retains differential pinion shaft)
20	4211	Shaft — differential pinion
21	7060	Shaft — differential output
22	N804139-S	Circle clip — output shaft retaining
23	7F342	Gear and deflector assembly — final drive sun
24	7A233	Gear — parking
25	7F405	Bearing and race assembly — final drive gear thrust No. 16

(Continued)

Item	Part Number	Description
26	7F451	Race — Final drive gear thrust — front No. 16 (select fit)
27	7A130	Support assembly — rear planetary
28	7G085	Seal assembly — fluid transfer tube (2 req'd)
29	7H290	Piston and seal assembly — low/intermediate clutch
30	7H266	Washer — support and spring assembly — low/intermediate clutch (bonded)
31	7D483	Ring — 56.3 mm (2.25 in) retainer type SU external
32	7G178	Bearing and race assembly — sun gear thrust No. 15
33	7D483	Ring — 170 mm (6.8 in) 14.5 degree bevel (retains rear support in case) (select fit)
34	7D171	Race — Low/intermediate one-way clutch — outer
35	7A089	Low/intermediate one-way clutch — race and roller assembly
36	7E085	Spring — low/intermediate clutch cushion
37	7B164	Plate assembly — low/intermediate clutch — internal (5 req'd) (friction)
38	7B442	Plate — low/intermediate clutch — external (5 req'd) steel
39	7B066	Plate — low/intermediate clutch — pressure
40	7D483	Retainer — low/intermediate clutch (select fit)
41	7A162	Band assembly — coast
42	7A626	Gear/drum/race assembly — rear sun
43	7A153	Gear — rear ring
44	7D006	Gear assembly — rear planetary
45	7G177	Bearing and race assembly — planetary thrust center No. 13
46	7A398	Gear assembly — front planetary
47	7D483	Ring — front planetary retaining
48	7D483	Ring — 153.9 mm (6.15 in) internal retaining (select fit)

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
49	7B066	Plate — reverse clutch — pressure
50	7B164	Plate assembly — reverse clutch — internal (4 req'd) (friction)
51	7B442	Plate — reverse clutch — external (4 req'd) (steel)
52	7E085	Spring — reverse clutch piston
53	N803048-S	Ring — 67.0 mm (2.68 in) retaining type SU — eternal (retains support and spring assembly in reverse clutch cylinder)
54	7G335	Support and spring assembly — reverse clutch
55	7D402	Piston — reverse clutch
56	7D403	Seal — reverse clutch piston — outer
57	7D404	Seal — reverse clutch piston — inner
58	7F341	Cylinder — reverse clutch
59	7D064	Gear and shell assembly — front sun
60	7C096	Bearing and race assembly — forward sun gear thrust No. 10 and 11
61	7B067	Hub - intermediate clutch
62	7D483	Ring — 152.26 mm (6.09 in) retainer style — internal (select fit)
63	7B066	Plate — intermediate clutch — pressure
64	7B164	Plate assembly — intermediate/direct clutch — internal (friction)
65	7B442	Plate — intermediate/direct clutch — external (steel)
66	7E085	Spring — intermediate clutch wave
67	7C122	Ring — 72.0 mm (2.88 in) retaining style SU — external
68	7H185	Piston assembly — intermediate clutch balance
69	7F222	Support and spring assembly — intermediate clutch
70	7E005	Piston assembly — intermediate clutch
71	7F225	Seal — Intermediate clutch piston — inner

(Continued)

Item	Part Number	Description
72	7G120	Cylinder and hub assembly — direct/intermediate clutch
73	7G102	Seal — intermediate/direct clutch hub (2 req'd)
74	7F225	Seal — direct clutch piston — inner
75	7A262	Piston assembly — direct clutch
76	7G448	Ring — direct clutch apply
77	7F235	Support and spring assembly — direct clutch
78	7C122	Ring — 77.0 mm (3.08 in) retaining style SU — external (retains direct clutch support and spring assembly to cylinder)
79	7B066	Plate — direct clutch — pressure
80	7F369	Washer — direct one-way clutch thrust No. 7
81	7D171	Race — direct one-way clutch — outer
82	7A089	Clutch assembly — direct one-way
83	7G156	Race and bushing assembly — direct one-way clutch — inner
84	7A360	Cylinder and valve assembly — forward clutch
85	7A548	Seal — forward clutch piston — inner
86	7A262	Piston assembly — forward clutch
87	7G299	Support and spring assembly — forward clutch
88	N803053-S	Ring — 85.0 mm (3.4 in) retaining type style SU — external (retains forward clutch support and spring assembly in cylinder)
89	7B164	Plate assembly — forward clutch — internal (3.0L 2V 3 plates req'd) (3.0L 4V 4 plates req'd) (friction)
90	7B442	Plate assembly — forward clutch — external (3.0L 2V 3 plates req'd) (3.0L 4V 4 plates req'd) (steel)
91	7B066	Plate — forward clutch — pressure
92	7A166	Washer — forward clutch thrust No. 6

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
93	7D171	Race — low one-way clutch — outer
94	7A089	Clutch assembly — low one-way
95	7L669	Drum assembly — overdrive
96	7F240	Bearing and race assembly — direct clutch hub No. 9
97	7G273	Washer — driven sprocket support thrust No. 8 (select fit)
98	7F196	Band assembly — overdrive
99	7D430	Retainer — overdrive band
100	7D019	Seal — forward clutch cylinder (5 req'd)
101	7D014	Washer — support thrust front No. 5 (select fit)
102	7G166	Support assembly — driven sprocket
103	7G247	Bearing assembly — driven sprocket
104	7G115	Washer — driven sprocket thrust No. 4
105	7G132	Sprocket and race assembly — driven
106	7H150	Wheel — driven sprocket speed sensor
107	7A108	Support assembly — stator (part of 7N825 support assembly)
108	7G233	Bearing assembly — drive sprocket
109	6749	Seal — turbine shaft O-ring
110	7G091	Seal — turbine shaft — rear
111	7F213	Shaft — turbine
112	7G099	Washer — drive sprocket thrust No. 1 and 2
113	7G129	Sprocket assembly — drive
114	N803178-S	Ring — 26.36 mm (1.05 in) retaining style SU — external (retains turbine shaft to drive sprocket)
115	7G090	Seal — turbine shaft — front
116	7G093	Seal — pump shaft — rear (2 req'd)
117	7B328	Shaft assembly — pump drive
118	7G092	Seal — front pump shaft (2 req'd)

(Continued)

Item	Part Number	Description
119	7G089	Collar — fluid level thermostatic retaining (2 req'd)
120	7G191	Element — fluid level thermostatic
121	7G190	Plate — fluid level thermostatic valve
122	N804184-S	Pin — 4 mm (0.16 in) x 22 coiled (3 req'd) (retains fluid level thermostatic valve plate and fluid)
123	7G249	Chain assembly — drive
124	7G096	Washer — chain cover thrust No. 3
125	N605890-S1000	Bolt — M6-1.0 x 16.5 hex flange head (attaches detent spring assembly to chain cover)
126	7E332	Spring assembly — manual valve detent
127	7G276	Bulkhead assembly — wiring connector
128	7G303	Gasket — chain cover
129	7G188	Cover assembly — chain
130	7035	Vent assembly — case
131	7L282	Vent cap
132	7Z465	Retainer — clip transaxle cooler tube (2 req'd)
133	7D273	Connector assembly — cooler 3/8 (2 req'd)
134	390685-S36	Plug — 1/8-27 mm hex head special pilot (2 req'd) (pressure tap plugs for chain cover)
135	N807737-S	Screw — M6-1.0 x 17 pan head pilot (attaches separator plate to valve body)
136	7G308	Screen assembly — bypass clutch solenoid (2 req'd)
137	N807739-S	Pin — 6 mm x 20 spring coiled (part of 7A100)
138	7A100	Control assembly — main
139	7A136	Gasket — pump assembly to valve body
140	7A142	Plate — pump body separator
141	7G331	Gasket — pump body to separator plate
142	7A104	Body, bearing and seal assembly — pump

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
143	7Z144	Seal — 12.42 x 1.78 O-ring — outer (small)
144	7Z144	Seal — 25.12 x 1.78 O-ring — inner (large)
145	7G383	Solenoid assembly — electronic pressure control (EPC)
146	N803727-S	Bolt — M6-1.0 x 30 hex head (3-attaches pump assembly to main control)
147	7Z484	Seal — 6.07 x 1.78 O-ring — outer (small) (1 on solenoid assembly (EPC) — 1 on solenoid assembly (TCC) — 3 on solenoid assembly — shift)
148	7Z484	Seal — 15.6 x 1.78 O-ring — inner (large) (1 on solenoid assembly (EPC) — 1 on solenoid assembly (TCC) — 3 on solenoid assembly — shift)
149	7G136	Solenoid assembly — torque converter clutch (TCC)
150	N605772-S	Bolt — M6-1.0 x 16 large hex flange head (attaches torque converter solenoid and pressure control solenoid to pump body)
151	7G285	Spring — pump bore ring
152	N803499-S	Pin — 8 mm x 37.7 straight hardened
153	7G287	Ring — pump valve support (2 req'd)
154	7A146	Rotor — pump
155	7R194	Ring — pump body
156	7G282	Support — pump bore ring side gear
157	7G281	Seal — pump bore ring side
158	7G187	Cover and sleeve assembly — pump
159	N807073-S1100	Bolt — M6-1.0 x 88.5 hex flange head pilot (4-attaches pump cover / pump body / valve body to chain cover)
160	N605892-S21	Bolt — M6-1.0 x 22.5 hex head (2-attaches pump cover to pump body)
161	7G286	Vane — pump (7 req'd)
162	7G283	Seal — pump bore ring radial
163	7G284	Support — pump bore ring radial seal

(Continued)

Item	Part Number	Description
164	7H141	Sensor assembly — transmission fluid temperature (TFT)
165	7F396	Gasket — main control cover
166	N811076-S1036	Bolt — M6-1.0 x 16.5 hex flange pilot (19-attaches bottom pan to case)
167	N605893-S309	Bolt — M6-1.0 x 27.5 hex flange pilot (4-attaches main control cover to chain cover)
168	N605908-S309	Bolt — M8-1.25 x 38 hex flange pilot (11-attaches main control cover to chain cover)
169	7G004	Cover — main control
170	7G484	Solenoid valve — shift (3 req'd)
171	N606026-S1000	Bolt — M6-1.0 x 60 hex flange head (15-attaches pump body and main control to chain cover)
172	N606022-S1000	Bolt — M6-1.0 x 40 hex flange head (4-attaches valve body to chain cover)
173	7Z490	Plate assembly — control valve body separator (bonded)
174	7A100	Pump and control assembly
175	N807738-S	Pin — 5 mm (0.2 in) x 14 spring coiled
176	N805551-S101	Stud — M8 x 1.25-1.25 x 81.8 hex head shoulder (attaches chain cover assembly to case assembly)
177	N606024-S36	Bolt — M6-1.0 x 50 hex flange head (attaches chain cover to case)
178	N605771-S36	Bolt — M6-1.0 x 14 hex flange head (attaches turbine shaft speed sensor to chain cover assembly)
179	N803807-S1000	Bolt — M10-1.50 x 43 hex (attaches chain cover to driven sprocket and support assembly)
180	N606042-S2	Bolt — M8-1.25 x 45 hex flange head (2- attaches chain cover to driven sprocket support assembly)
181	7Z101	Seal — 14.0 x 1.78 O-ring (2 req'd)
182	7M101	Sensor — turbine shaft speed (TSS)

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
183	N605789-S1036	Bolt — M8-1.25 x 35 hex flange head (15-attaches chain cover to case)
184	7A020	Indicator assembly — fluid level
185	N605892-S1036	Bolt — M6-1.0 x 22.5 hex flange head (1-attaches filler tube to case and 3-attaches O.D. servo cover to case)
186	7A228	Tube assembly — filler
187	7N243	Grommet — filler tube
188	7D027	Cover — overdrive servo piston
189	7D024	Seal — overdrive servo cover
190	7H188	Piston assembly — overdrive servo
191	7F201	Spring — overdrive servo piston return
192	373907-S2	Nut — 1/4 spring (attaches I.D. tag to case)
193	7B148	Tag — service identification
194	N605789-S101	Bolt — M8-1.25 x 35 hex flange head (2-attaches case to chain cover)
195	N808161-S36	Screw — M6-1.0 x 28 pan head (5 req'd) (5-attaches case to chain cover)
196	N802996-S1000	Screw — M6-1.0 x 20 pan head (6-attaches stator support to converter housing)
197	N605775-S103	Bolt — M6-1.0 x 30 hex flange head (2-attaches transmission range sensor to case)
198	7F293	Sensor assembly — transmission range (TRS)
199	7C493	Shaft — manual control lever
200	7H103	Sensor assembly — transmission output shaft sensor (OSS)
201	N605890-S36	Bolt — M6-1.0 x 16.5 hex flange head (attaches the OSS sensor)
202	7A434	Heat shield — OSS
203	7F337	Seal assembly — manual control shaft
204	N802998-S	Pin — 12.76 mm (0.51 in) x 25 dowel harden (2 req'd)
205	7N049	Rod — manual control valve actuating

(Continued)

Item	Part Number	Description
206	7G100	Pin — shaft retainer (1 used as park pawl shaft retainer, 3 used as manual control shaft pin)
207	7A115	Lever assembly — manual valve detent (inner)
208	7F251	Piston — 1-2, 2-3 shift accumulator
209	7G095	Seal — 1-2, 2-3 and N-D shift accumulator piston
210	7G267	Spring — 1-2 shift accumulator
211	7G094	Shaft — shift accumulator piston (4 req'd)
212	7F285	Spring — 2-3 shift accumulator
213	7H273	Piston — reverse shift accumulator
214	7H274	Seal — reverse shift accumulator piston
215	7E485	Spring — reverse shift accumulator
216	7F287	Piston — 3-4 shift accumulator
217	7F248	Seal — 3-4 shift accumulator piston
218	7G266	Spring — 3-4 shift accumulator
219	7H276	Shaft — drive shift accumulator
220	7G274	Piston — drive shift accumulator
221	7G300	Spring — drive shift accumulator (outer)
222	7G301	Spring — drive shift accumulator (inner)
223	7H277	Seal — drive shift accumulator cover
224	7H275	Cover — drive shift accumulator
225	N807757	Bolt — M6-1.0 x 60 hex flange head (attaches drive shift accumulator cover to case)
226	N804647-S	Screw — M12 x 1.75 x 45 set hex socket (reverse clutch assembly locator bolt)
227	N620015-S	Nut — M12 x 1.75 hex (reverse clutch assembly locator nut)

(Continued)

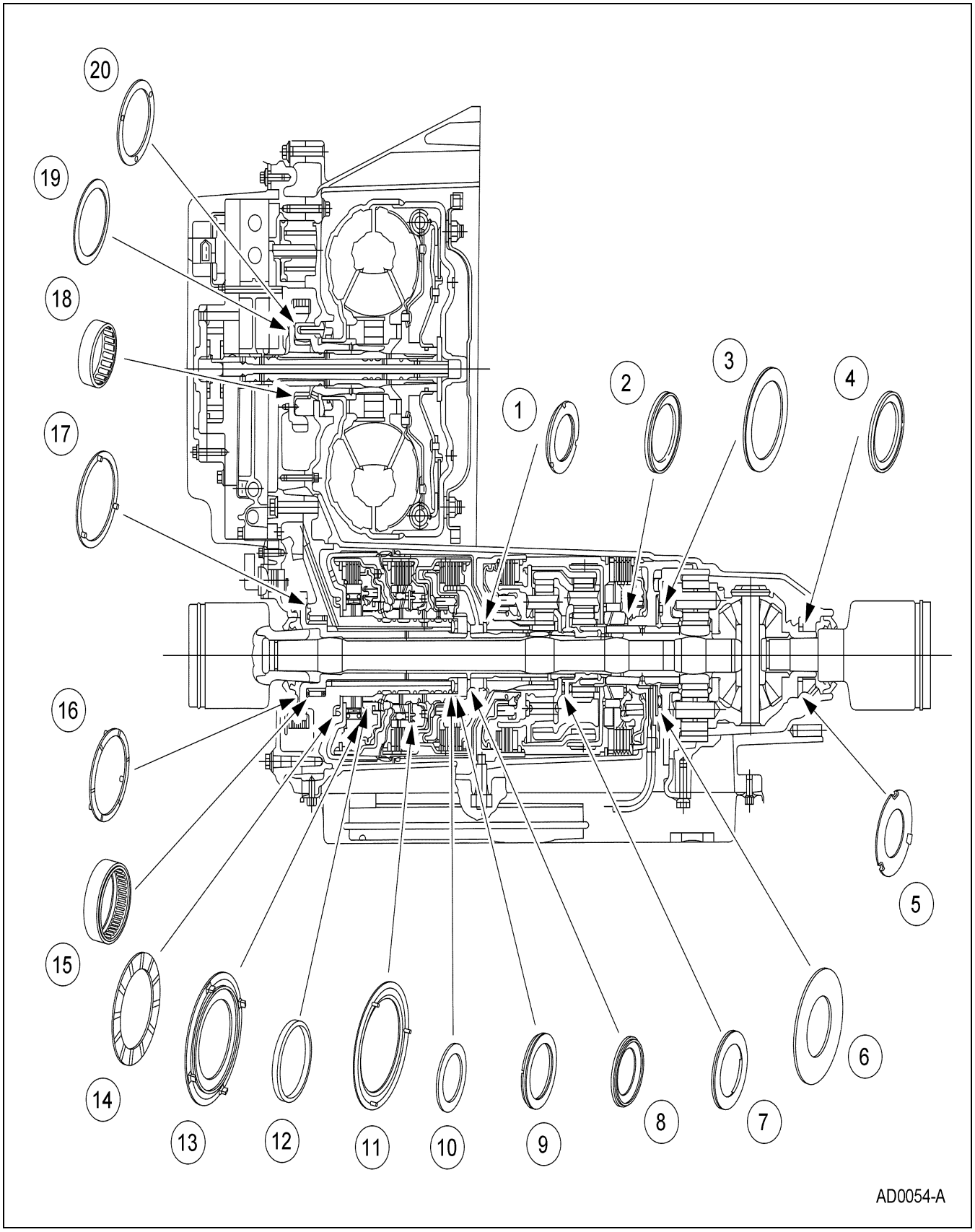
DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
228	7A256	Lever assembly — manual control
229	7H291	Spring — coast servo return
230	7H281	Piston and rod assembly — coast servo
231	7H284	Cover and seal assembly — coast servo
232	7H285	Ring — coast servo cover retainer
233	7A232	Rod assembly — parking pawl actuator
234	7G101	Abutment — parking pawl actuator
235	N605787-S1000	Bolt — M8 x 1.25 x 25 hex flange head (2-attaches abutment to case)
236	7D070	Spring — parking pawl return
237	7D071	Shaft — parking pawl
238	7A441	Pawl — parking brake
239	N802947-S	Plug — 13.9 mm (0.55 in) cup
240	7G199	Tube — reverse fluid supply transfer
241	7G087	Tube — servo apply fluid transfer
242	7G463	Tube — low/intermediate clutch apply fluid transfer
243	7G084	Tube — rear lube fluid transfer
244	N808020-S100	Seal — O-ring (used on rear lube fluid tube)
245	N808021-S100	Seal — O-ring (used on reverse fluid supply tube)
246	N808022-S100	Seal — O-ring (used on servo apply tube - reverse supply tube and low/intermediate clutch apply tube)
247	N808023-S100	Seal — O-ring (used on servo apply tube)
248	7G353	Bracket assembly — tube support main
249	7G353	Bracket assembly — tube support (reverse clutch and servo apply)
250	7G353	Bracket assembly — tube support (rear lube and low/intermediate clutch)
251	7A098	Filter and seal assembly — fluid
252	7L027	Magnet — ceramic case
253	7A191	Gasket — transaxle pan
254	7A194	Pan — transaxle
A	—	Low/intermediate one-way clutch
B	—	Low/intermediate clutch
C	—	Reverse clutch
D	—	Intermediate clutch
E	—	Direct clutch
F	—	Forward clutch
G	—	Direct one-way clutch

(Continued)

DESCRIPTION AND OPERATION

Bearing and Thrust Washer Locator



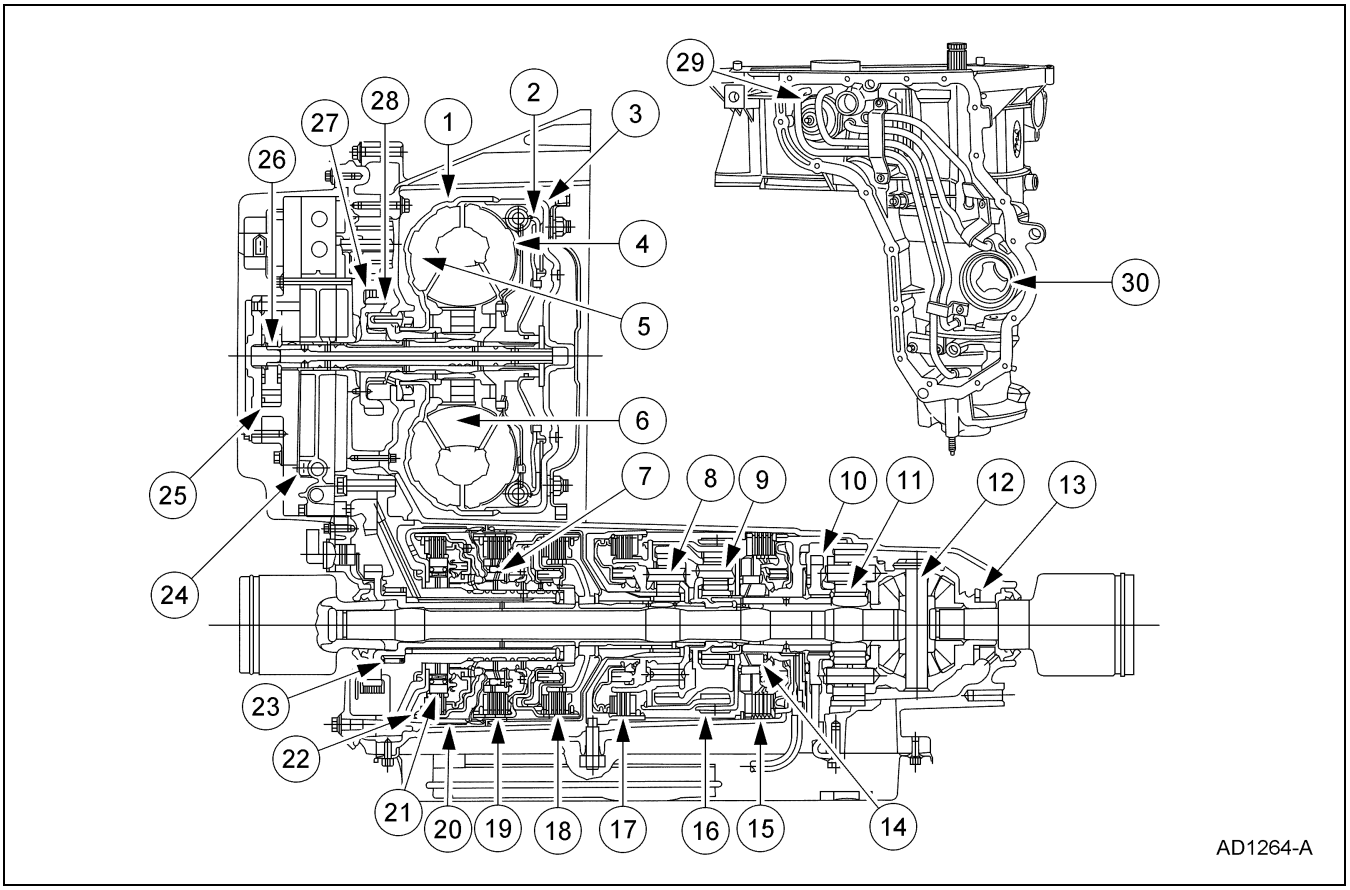
DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	7C096	Bearing and race assembly forward sun gear thrust No. 10
2	7G178	Bearing and race assembly sun gear thrust rear No. 15
3	7F405	Bearing and race assembly — final drive thrust No. 16
4	7G112	Bearing and race assembly differential carrier thrust No. 19
5	7G103	Washer differential carrier thrust No. 18
6	7F451	Race drive gear thrust front No. 16
7	7G177	Bearing and race assembly No. 13
8	7C096	Bearing and race assembly forward sun gear thrust No. 10
9	7F240	Bearing and race assembly direct clutch hub No. 9
10	7G237	Washer — driven sprocket thrust No. 8
11	7F369	Washer — direct clutch thrust No. 7
12	7G123	Bushing — direct intermediate clutch
13	7A116	Washer — forward clutch thrust No. 6
14	7D014	Washer — support thrust front No. 5
15	7G247	Bearing assembly driven sprocket
16	7G096	Washer — chain cover thrust No. 3
17	7G115	Washer — driven sprocket thrust No. 4
18	7G233	Bearing assembly drive sprocket
19	7G009	Washer — drive sprocket thrust No. 1
20	7G099	Washer — drive sprocket thrust No. 2

(Continued)

DESCRIPTION AND OPERATION

Main Components and Functions



Item	Part Number	Description
1	7902	Torque converter
2	—	Torque converter clutch (piston plate clutch and damper assembly) (part of 7902)
3	—	Torque converter cover (part of 7902)
4	—	Torque converter turbine (part of 7902)
5	—	Torque converter impeller (part of 7902)
6	—	Torque converter reactor (part of 7902)
7	7A089	Clutch assembly — direct one-way
8	7A398	Gear assembly — planet front
9	7D006	Rear planet assembly
10	7A233	Gear — parking
11	7F342	Gear and deflector assembly — final drive sun

(Continued)

Item	Part Number	Description
12	7F465	Gear and differential case assembly
13	7G112	Bearing and race assembly — differential carrier thrust No. 19
14	7C190	Low/intermediate one-way clutch
15	7B164	Low/intermediate clutch
16	7A162	Band assembly — coast
17	7B164	Plate assembly — reverse clutch internal (friction)
18	7G120	Plate assembly — intermediate/clutch
19	7G120	Plate assembly — direct clutch
20	7F196	Band assembly — overdrive
21	7A089	Clutch assembly — low one-way
22	7A360	Forward clutch cylinder
23	7G132	Sprocket assembly — driven

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
24	7A100	Control assembly — main
25	—	Pump assembly (part of 7A100)
26	7B328	Shaft assembly — oil pump drive
27	7G249	Chain assembly — drive
28	7G129	Sprocket assembly — drive
29	7H275	Neutral drive accumulator
30	7H284	Coast clutch servo

(Continued)

DESCRIPTION AND OPERATION

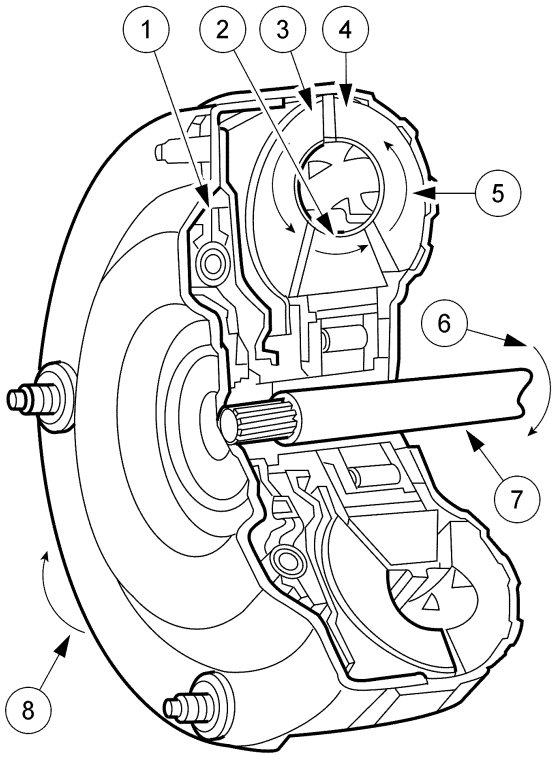
Torque Converter

The torque converter transmits and multiplies torque. The torque converter is a four-element device:

- impeller assembly
- turbine assembly
- reactor assembly
- clutch and damper assembly

The standard torque converter components operate as follows:

- Rotation of the converter housing and impeller set the fluid in motion.
- The turbine reacts to the fluid motion from the impeller, transferring rotation to the geartrain through the input shaft.
- The reactor redirects fluid going back into the impeller, providing for torque multiplication.
- The clutch and damper assembly dampens powertrain torsional vibration and provides a direct mechanical connection for improved efficiency.
- Power is transmitted from the torque converter to the planetary gearsets and other components through the input shaft.



Item	Part Number	Description
1	—	Converter clutch and damper (Part of 7902)
2	—	Reactor (part of 7902)
3	—	Turbine (part of 7902)
4	—	Impeller (part of 7902)
5	—	Fluid motion
6	—	Transmission input rotation
7	—	Input shaft
8	—	Engine rotation

DESCRIPTION AND OPERATION

Geartrain

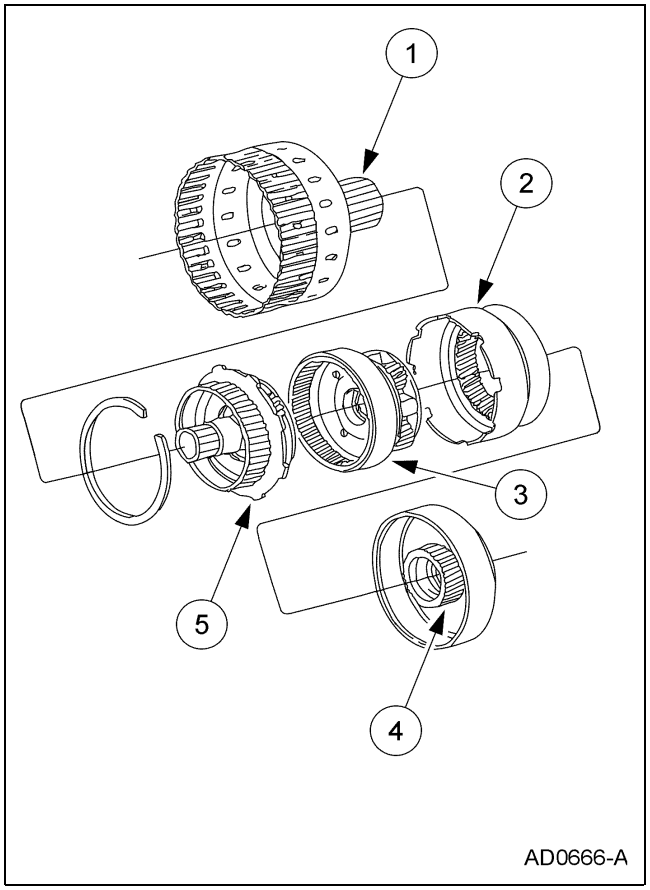
The geartrain consists of the planetary gearsets, apply components, final drive gearset and differential.

Planetary Gearset

The transaxle has two planetary gearsets to provide operation in reverse and four forward speeds.

The gearsets are comprised of the following components:

- front sun gear (part of the front sun gear and shell assembly)
- front carrier
- rear ring gear
- front ring gear and rear carrier
- rear sun gear



Item	Part Number	Description
1	7D064	Gear and shell assembly — front sun
2	7A153	Gear — rear ring

(Continued)

Item	Part Number	Description
3	7D006	Planet rear gear assembly
4	7A626	Rear sun gear assembly
5	7A398	Planet front gear assembly

Turbine Shaft

The turbine shaft is splined to both the torque converter stator and the drive sprocket. This allows input torque to be transmitted from the torque converter to the drive chain and driven sprocket.

Output Shaft

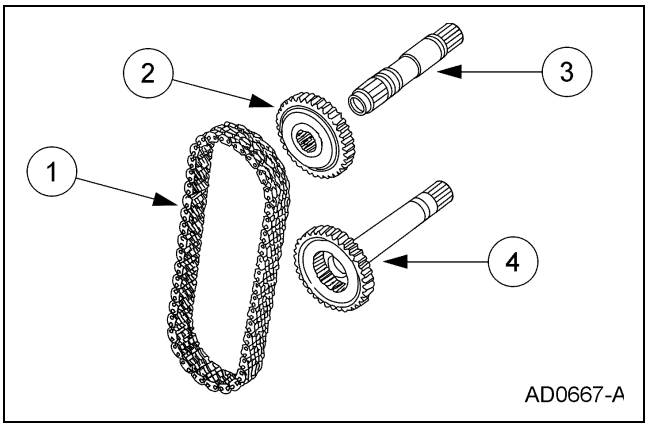
The output shaft is splined to one of the differential side gears on one end, supported by the driven sprocket and driven sprocket support on the other end. This allows power flow through the differential for even output torque to the drive axles.

Drive Chain and Sprockets

A chain drive transfers torque from the torque converter turbine to the planetary gearsets. The chain drive is composed of the following components:

- drive sprocket
- driven sprocket
- drive chain

The transaxle case has a support for the drive sprocket that also serves as the support for the torque converter stator. A driven sprocket support mounts in the barrel of the transaxle case and also supports the clutches and gearset components.



Item	Part Number	Description
1	7G249	Drive chain
2	7G129	Drive sprocket

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
3	7F213	Turbine shaft
4	7G132	Driven sprocket

Final Drive Gearset

The final drive consists of a planetary gearset that transfers and multiplies torque from the planetary gearsets to the differential.

The final drive consists of the following components:

- sun gear
- carrier (part of the differential case)
- ring gear

The sun gear is splined to the front ring gear and rear carrier of the planetary gearsets. The sun gear acts as the driving member and the carrier as the driven member. The ring gear is held stationary inside the case using lugged teeth.

Differential

The differential allows the halfshafts and wheels to rotate at different speeds during cornering.

The differential assembly consists of the following components:

- differential case (part of the final drive carrier)
- two pinion gears supported by a pinion shaft
- two side gears supported by the differential case and halfshafts

When driving in a straight line both front wheels rotate at relatively the same speed. This means both side gears are rotating at the same speed, as well, while both pinion gears revolve (but do not rotate) with the side gears. During cornering, the wheel on the outside of the turn is forced to rotate faster than the wheel on the inside of the turn. Since the side gears must now rotate at different speeds, the pinion gears rotate on the pinion shaft allowing the drive axles to rotate at different speeds while still transferring output torque.

DESCRIPTION AND OPERATION

Apply Components

Band — Overdrive

The overdrive band holds the front planetary sun gear stationary in fourth gear (overdrive).

Band — Coast

The coast band allows the transaxle case to hold the rear planetary sun gear stationary. The coast band is applied in second and manual first gears.

Clutches — Direct

The direct clutch cylinder connects the driven sprocket to the outer race of the direct one-way clutch.

Clutches — Forward

The forward clutch locks the driven sprocket and the low one-way clutch.

Clutches — Intermediate

The intermediate clutch connects the driven sprocket to the front planetary carrier and rear planetary ring gear in second and third gears.

Clutches — Reverse

The reverse clutch holds the front planetary gearset and the rear ring gear of the rear planetary gearset stationary in reverse gear.

Clutches — Low-Intermediate

The low-intermediate clutch connects the transaxle case of the outer race of the low-intermediate one-way clutch in manual low, first and second gears.

One-Way Clutch — Low-Intermediate

The low-intermediate one-way clutch connects the low-intermediate clutch to the rear planetary sun gear. The low-intermediate one-way clutch transmits torque during drive operation in first and second gear, as well as manual second and manual first gears.

One-Way Clutch — Low

The low one-way clutch transmits torque from the driven sprocket to the sun gear of the front planetary gearset in first gear.

One-Way Clutch — Direct

The direct one-way clutch transmits torque from the driven sprocket to the front planetary sun gear in third gear and provides engine braking in manual low in connection with the direct clutch.

DESCRIPTION AND OPERATION

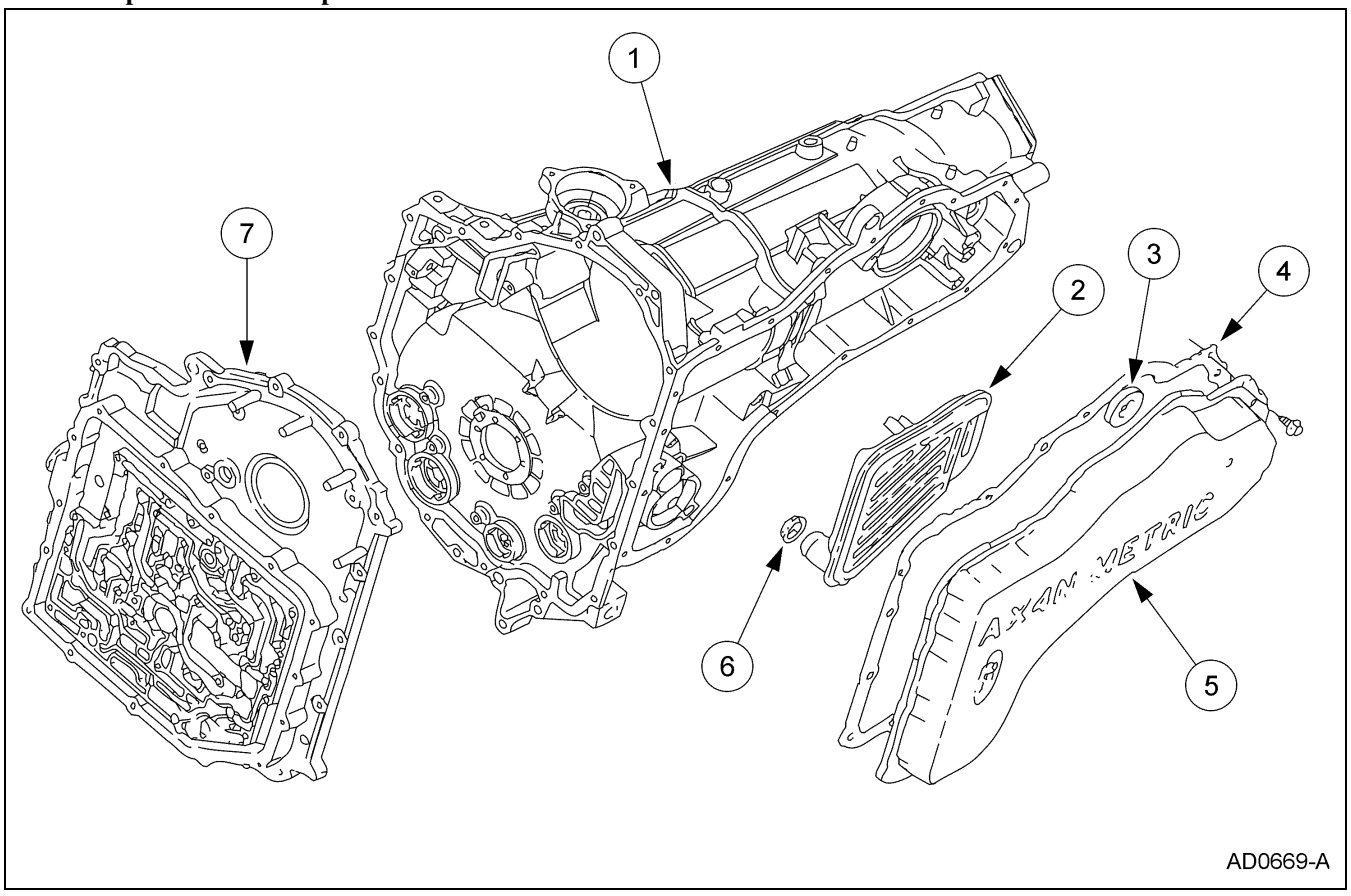
Hydraulic System

Filter

Fluid in the sump area formed by the transaxle pan flows through a filter to the pump assembly. A magnet attached to the transaxle pan collects unwanted metallic material.

A thermostatic fluid control valve prevents foaming of fluid by maintaining a sump level below the rotating components.

Fluid Sump and Case Components

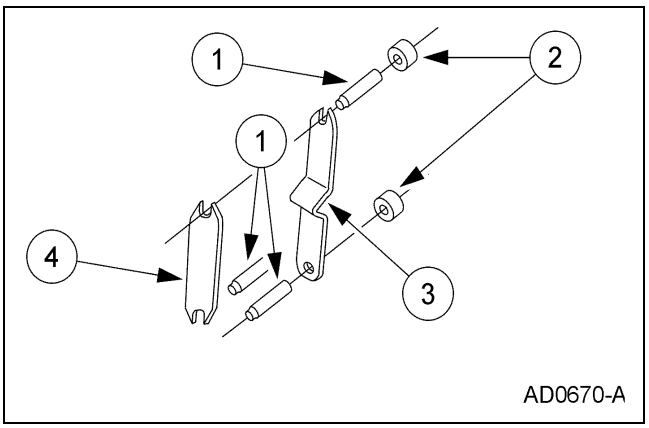


Item	Part Number	Description
1	7005	Case assembly
2	7A098	Filter and seal assembly — fluid
3	—	Magnet — ceramic case (part of 7A194)
4	7A191	Gasket — transaxle pan (reusable)
5	7A194	Pan — transaxle
6	—	Seal — fluid filter (part of 7A098)
7	7G188	Cover assembly — chain

The thermostatic fluid control valve stores fluid in the area of the main control when the fluid expands due to temperature. When the fluid is cold, the valve allows more fluid from the main control area to return to the sump.

The transmission fluid level check is correctly carried out when fluid temperature is hot.

DESCRIPTION AND OPERATION (Continued)



Item	Part Number	Description
1	—	Coil pin
2	—	Retaining collar

(Continued)

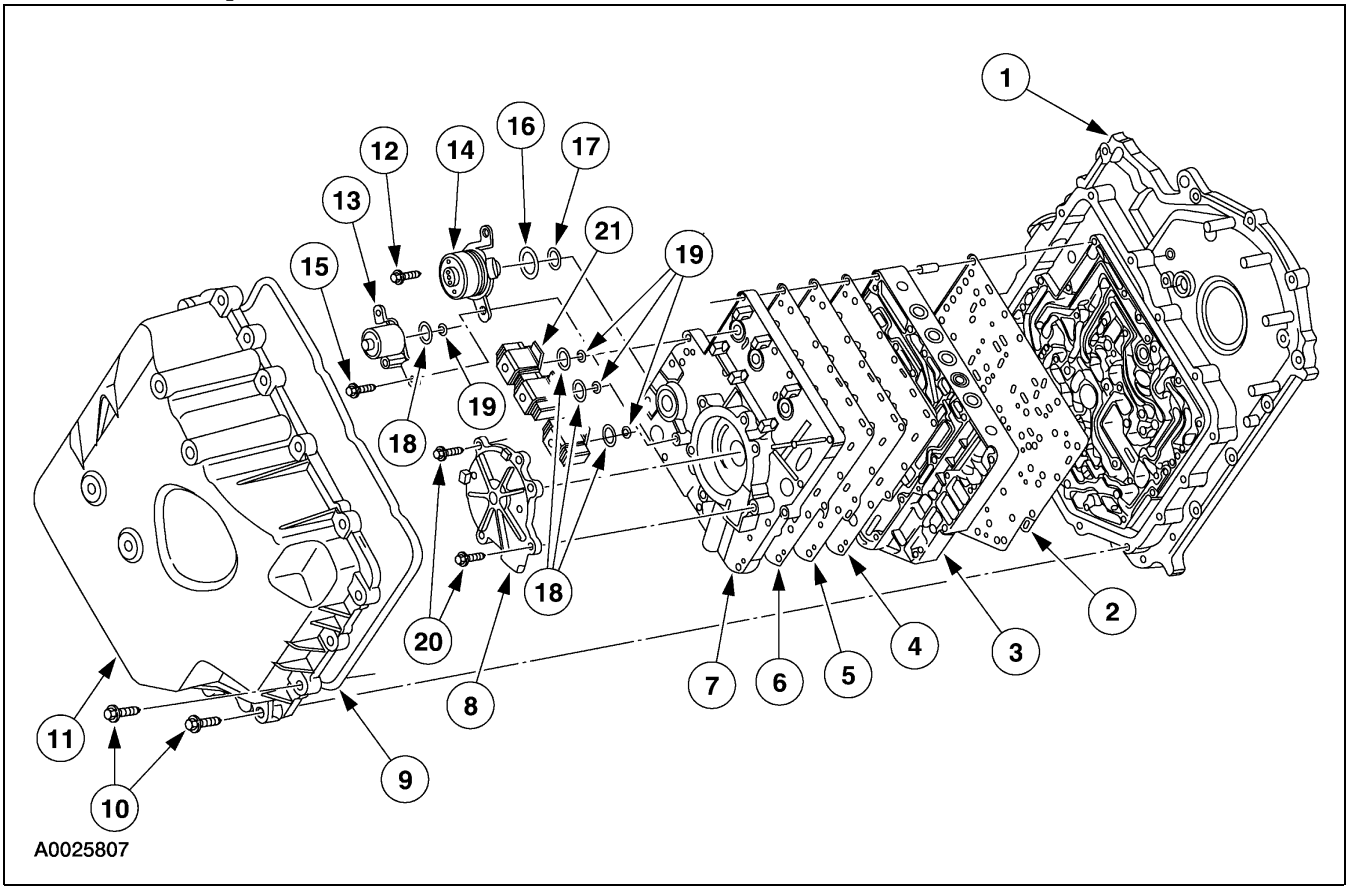
Item	Part Number	Description
3	7G191	Element fluid level thermostatic
4	7G192	Plate fluid level thermostatic valve

Main Control

The hydraulic system has a main control assembly. The pump assembly, hydraulic control valves and electro-hydraulic actuators are located in the main control.

Gaskets are used for the separator plate between the pump body and valve body. The separator plate between the valve body and chain cover has integral gaskets.

Main Control Components



Item	Part Number	Description
1	7G188	Cover assembly — chain
2	—	Plate assembly — control valve body separator (part of 7A100)

(Continued)

Item	Part Number	Description
3	—	Control assembly — main (part of 7A100)
4	—	Gasket — pump assembly (part of 7A100)

(Continued)

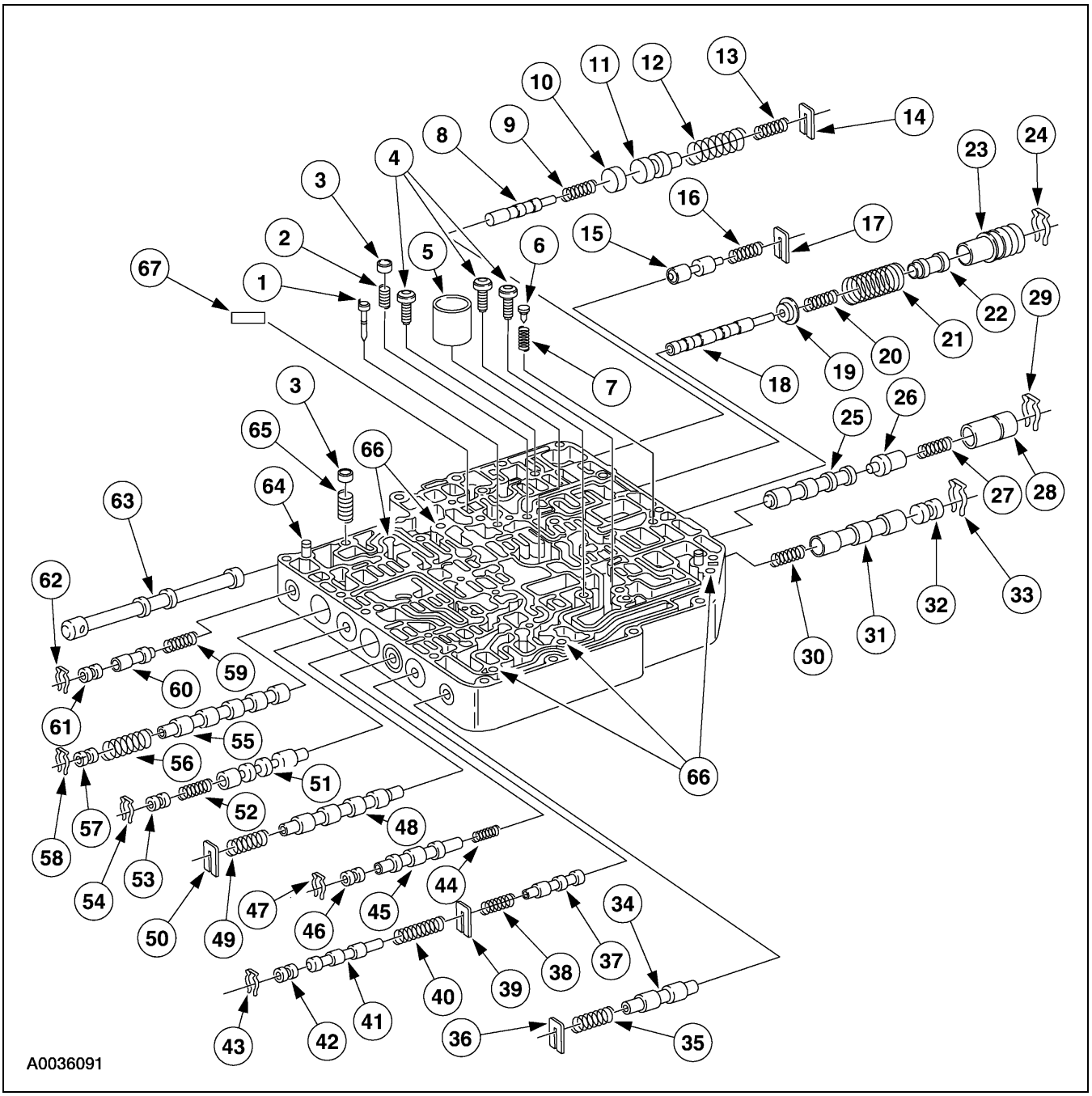
DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
5	—	Plate — pump body separator (part of 7A100)
6	—	Gasket — pump separator (part of 7A100)
7	—	Body, bearing and seal assembly — pump (part of 7A100)
8	—	Cover and sleeve assembly — pump (part of 7A100)
9	7F396	Gasket — main control cover (reusable)
10	N811076-S1427	Bolt — M6 - 1.0 x 16.5 hex flange pilot (15 req'd)
11	7G004	Cover — main control
12	N803727-S	Bolt — M6 - 1.0 x 28 hex head (2 req'd)
13	7G136	Solenoid valve — torque converter clutch
14	7H144	Solenoid valve — pressure control
15	N605772-S	Bolt — M6 - 1.0 x 16 large hex flange head (2 req'd)
16	7Z144	Seal — 25.12 x 1.78 O-ring — inner (large)
17	7Z144	Seal — 12.42 x 1.78 O-ring — outer (small)
18	7Z484	Seal — 15.6 x 1.78 O-ring — inner (large)
19	7Z484	Seal — 6.07 x 1.78 O-ring — outer (small)
20	N605892-S2	Bolt — M6 - 1.0 x 20 hex head (2 req'd)
21	7G484	Solenoid valve — shift (3 req'd)

(Continued)

DESCRIPTION AND OPERATION (Continued)

Main Control Valves



Item	Part Number	Description
1	7G308	Filter (1 req'd)
2	7G315	Drainback valve spring
3	7D453	Cap modulator check valve (2 req'd)
4	N807737-S	Screw (used to hold bonded gasket) (3 req'd)
5	7G318	Valve body sleeve
6	7E217	Trans manual low relief valve
7	7N155	Cooler bypass spring

(Continued)

Item	Part Number	Description
8	7G473	Solenoid regulator valve
9	7G411	Solenoid regulator spring
10	7L215	Plug valve
11	7G307	Converter regulator valve
12	7G316	Converter regulator spring — outer
13	7G307	Converter regulator spring — inner
14	7F194	Spring retainer plate

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
15	7H166	Pressure failsafe valve
16	7H167	Failsafe spring
17	7F194	Spring retainer plate
18	7C388	Main regulator valve
19	7A478	Spring retainer
20	7G364	Isolator spring
21	7A270	Main regulator spring
22	7D003	Main regulator boost valve
23	7G183	Main regulator boost sleeve
24	7F445	Retainer
25	7G179	Bypass clutch control valve
26	7G320	Bypass clutch control plunger
27	7H140	Bypass clutch control spring
28	7G319	Bypass clutch control sleeve
29	7F445	Retainer
30	7G314	Line modulator spring
31	7G408	Line press modulator valve
32	7F187	Line modulator valve plunger
33	7E335	Line modulator sleeve retainer
34	7H146	Forward clutch control valve
35	7H147	Forward clutch control spring
36	7F194	Retainer plate
37	7D059	3-2 shift timing valve
38	7F414	3-2 shift timing spring
39	7F194	Retainer plate
40	7G312	Engagement spring
41	7G317	Engagement valve
42	7F187	Valve retaining plug
43	7G007	Retainer plug
44	7F382	Manual downshift modulator spring
45	7D225	Manual downshift modulator valve
46	7F187	Valve retaining plug
47	7G007	Valve plug retainer
48	7F259	3-4 shift valve
49	7H147	3-4 shift spring
50	7F194	Retainer plate
51	7D053	2-3 shift valve
52	7A320	2-3 shift spring
53	7F187	Valve retaining plug
54	7G007	Valve plug retainer
55	7G182	1-2 shift valve
56	7H147	1-2 shift spring
57	7F187	Valve retainer plug
58	7G007	Valve plug retainer
59	7F423	Capacity modulator spring
60	7E477	2-3 capacity modulator valve
61	7F187	Valve retainer plug
62	7G007	Valve plug retainer
63	7C389	Manual control valve
64	N807739-S	Coil pin (2 req'd)
65	7G310	Modulator check spring
66	7E195	Check ball (5 req'd)
67	7G308	Solenoid regulator filter

Accumulators

The hydraulic system has accumulators in circuits for five apply components. Each accumulator has a piston (with seal and spring) positioned on a hollow shaft.

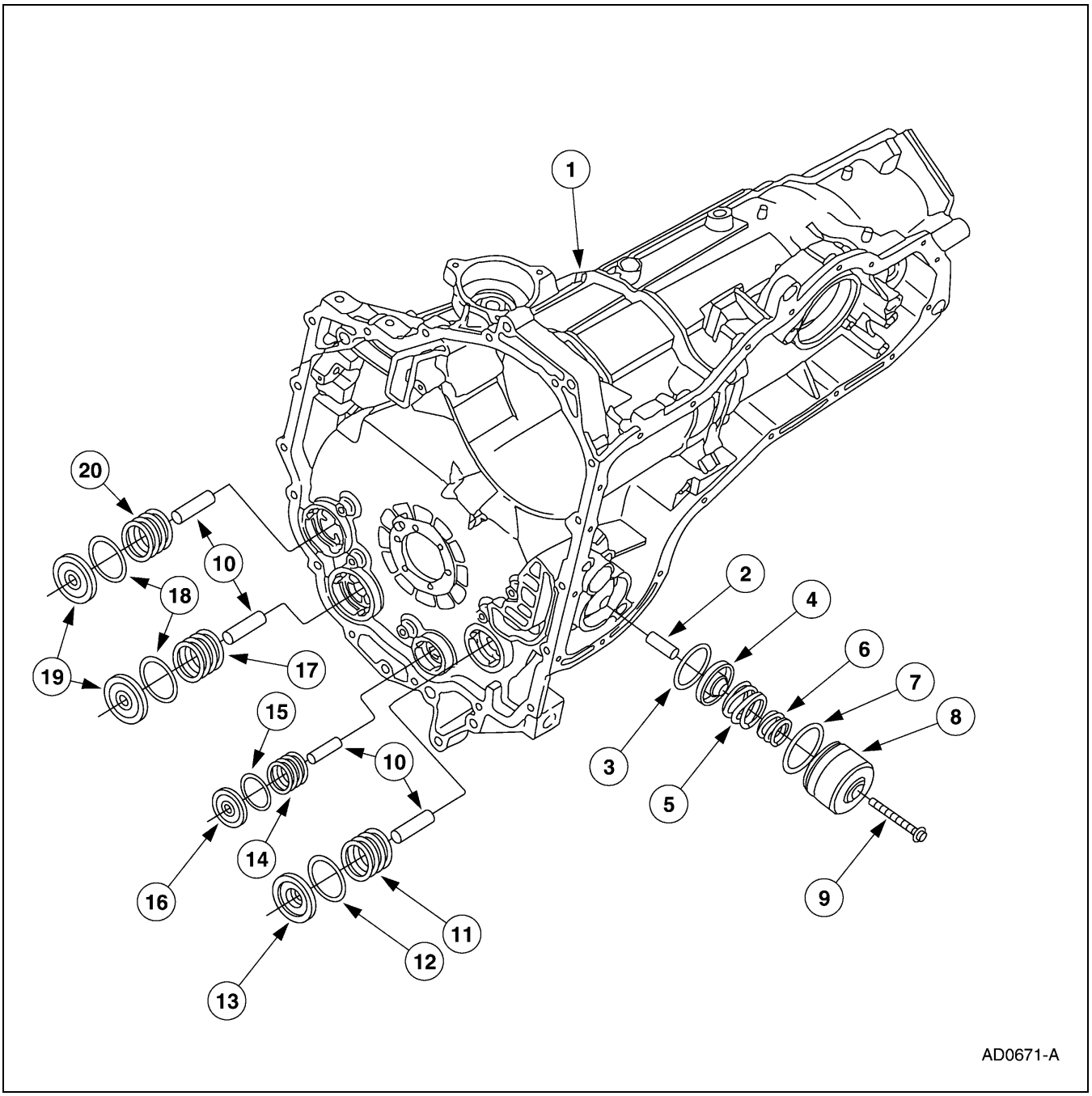
The low-intermediate (N-D) accumulator is located in the bottom of the transaxle case.

The chain cover and side of the transaxle case contain four accumulators:

- reverse (N-R)
- intermediate (1-2)
- direct (2-3)
- overdrive (3-4)

DESCRIPTION AND OPERATION (Continued)

Accumulators



Item	Part Number	Description
1	7005	Case assembly
2	7H276	Shaft — drive shift accumulator
3	7G095	Seal — 1-2, 2-3 and N-D shift accumulator piston
4	7G274	Piston — drive shift accumulator
5	7G300	Spring — drive shift accumulator

(Continued)

Item	Part Number	Description
6	7G301	Spring — drive shift accumulator
7	7H277	Seal — drive shift accumulator cover
8	7H275	Cover — drive shift accumulator
9	N807757-S	Bolt — 6 mm x 1.0 hex flange head (1 req'd)
10	7G094	Shaft — shift accumulator

(Continued)

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
11	7G266	Spring — 3-4 shift accumulator
12	7F248	Seal — 3-4 accumulator piston
13	7F246	Piston — 3-4 shift accumulator
14	7E485	Spring — reverse shift accumulator
15	7H274	Seal — reverse shift accumulator
16	7H273	Piston — reverse shift accumulator
17	7F285	Spring — 2-3 shift accumulator
18	7G095	Seal — 1-2, 2-3 and N-D shift accumulator piston
19	7G133	Piston — 1-2, 2-3 shift accumulator
20	7G267	Spring — 1-2 shift accumulator

(Continued)

DESCRIPTION AND OPERATION

Transaxle Electronic Control System

Electronic System Description

The powertrain control module (PCM) and its input/output network controls the following operations:

- shift timing
- line pressure (shift feel)
- torque converter clutch

The transaxle control is separate from the engine control strategy in the PCM, although some of the input signals are shared. When determining the best operating strategy for transaxle operation, the PCM uses input information from certain engine-related and driver-demand related sensors and switches.

In addition, the PCM receives input signals from certain transaxle-related sensors and switches. The PCM also uses these signals when determining transaxle operating strategy.

Using all of these input signals, the PCM can determine when the time and conditions are right for a shift, or when to apply or release the torque converter clutch. It will also determine the best line pressure needed to optimize shift feel. To accomplish this the PCM uses output solenoids to control transaxle operation.

The following provides a brief description of each of the sensors and actuators used to control transaxle operation.

Electronic Ignition (EI) System

The electronic ignition (EI) system consists of the PCM, a crankshaft position sensor (CKP sensor) and two 4-tower ignition coils. The crankshaft position sensor sends a crankshaft position signal to the PCM. The PCM then sends the appropriate ignition signal to the ignition coils. The PCM also uses this signal as well as wide open throttle (WOT) shift control, torque converter clutch control and electronic pressure control.

Throttle Position (TP) Sensor

The throttle position (TP) sensor is a potentiometer mounted on the throttle body. The TP sensor detects the position of the throttle plate and sends this information to the processor assembly as varying voltage signal.

The PCM uses the monitored voltage level of the TP sensor for control of EPC pressure, torque converter clutch operation and shift scheduling.

If a malfunction occurs in the TP sensor circuit, the processor will recognize that the TP sensor signal is out of specification. The processor will then operate the transaxle in a high capacity mode to prevent transaxle damage.

Powertrain Control Module (PCM)

The powertrain control module (PCM) controls operation of the transaxle. Many input sensors provide information to the powertrain control module. The PCM then controls the actuators which affect transaxle operation.

Digital Transmission Range (TR) Sensor

The digital transmission range (TR) sensor has a twelve pin connector. The sensor is located on the outside of the transaxle at the manual lever. The digital sensor completes the start circuit in PARK and NEUTRAL, the back up lamp circuit in REVERSE. The digital TR sensor also opens/closes a set of four switches that are monitored by the powertrain control module to determine the position of the manual lever (P, R, N, (D), 3, 1).

Brake Pedal Position (BPP) Switch

The brake pedal position (BPP) switch tells the powertrain control module when the brakes are applied. The torque converter clutch disengages when the brakes are applied. The BPP switch closes when the brakes are applied and opens when they are released.

Turbine Shaft Speed (TSS) Sensor

This sensor is a magnetic pickup that sends a signal to the powertrain control module that indicates transaxle turbine shaft input speed. The turbine shaft speed (TSS) sensor provides converter turbine speed information for torque converter clutch (TCC) strategy. Also used in determining static EPC pressure settings.

DESCRIPTION AND OPERATION (Continued)

Output Shaft Speed (OSS) Sensor

The output shaft speed (OSS) sensor is a magnetic pickup, located at the output shaft ring gear, that send a signal to the powertrain control module to indicate transmission output speed. The OSS is used for torque converter clutch control, speed scheduling and to determine electronic pressure control.

Shift Solenoids (SSA, SSB, SSC)

Three ON/OFF solenoids are used for electronic shift scheduling. The three solenoids are located in the main control valve body. The solenoids are two-way, normally open style. Shift solenoids SSA, SSB, and SSC provide selection of first through fourth gear by controlling the pressure of the three shift valves.

Transmission Fluid Temperature (TFT) Sensor

This sensor is located on the transaxle main control body. It is a temperature-sensitive device called a thermistor. The resistance value of the transmission fluid temperature (TFT) sensor will vary with temperature change. The PCM monitors the voltage across the TFT to determine the temperature of the transmission fluid.

The PCM uses this initial signal to determine whether a cold start shift schedule is necessary. The cold start shift schedule allows quicker shifts when the transmission fluid temperature is cold. The PCM also inhibits torque converter clutch operation at low transmission fluid temperatures. Corrects EPC pressures for temperature.

Electronic Pressure Control (EPC) Solenoid

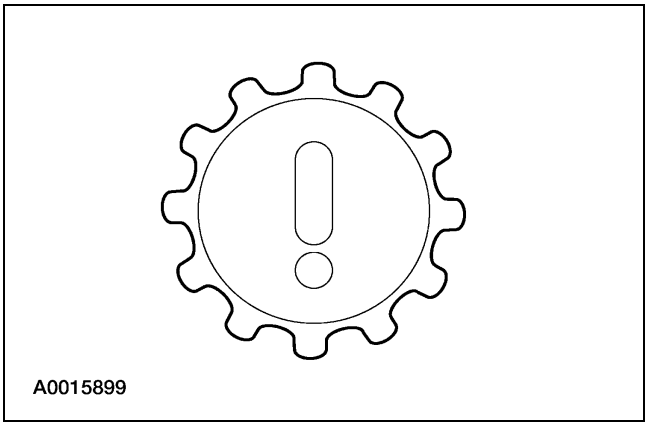
This solenoid is a variable-force style (VFS) solenoid. The VFS-type solenoid is an electro-hydraulic actuator combining a solenoid and a regulating valve. It supplies electronic pressure control (EPC) solenoid which regulates transaxle line pressure and line modulator pressure. This is done by producing resisting forces to the main regulator and line modulator circuits. These two pressures control clutch application pressures.

The PCM has an adaptive learn strategy to electronically control the transaxle which will automatically adjust the shift feel. The first few hundred miles of operation of the transaxle may have abrupt shifting. This is a normal operation. If the battery has been disconnected for any reason it will need to be kept disconnected for approximately 20 minutes to reset the adaptive shift pressure strategy or use the scan tool to do the keep alive memory (KAM) reset.

Torque Converter Clutch (TCC) Solenoid

The torque converter clutch (TCC) solenoid is used in the transaxle control system to control the application, modulation and release of the torque converter clutch.

Check Transaxle Light



The Check Transaxle Light will flash when the transaxle has overheated 149°C (300°F). Other transaxle faults will also cause the Check Transaxle Light to flash. Currently, the KOEO bulb function test is not available on this powertrain control module (PCM) output. Diagnostic test-out may be completed for this PCM output by using the scan tool or WDS tester. The PIDs are:

- TCILF = NO (OK)
- TCILF = YES (BAD)

Mass Air Flow (MAF) Sensor

This sensor directly measures the mass of the air flowing into the engine. The sensor output is a DC (analog) signal ranging from about 0.5 volt to 5.0 volts by the powertrain control module to calculate the injector pulse width for stoichiometry. The mass air flow (MAF) sensor input is used for EPC pressure control, shift and torque converter clutch (TCC) control.

DESCRIPTION AND OPERATION (Continued)

Intake Air Temperature (IAT) Sensor

The intake air temperature (IAT) sensor provides the sequential fuel injection (SFI) system mixture temperature information. The IAT sensor is used both as a density corrector for air flow calculation and to proportion cold enrichment fuel flow. The IAT sensor is installed in the air cleaner outlet tube. The IAT sensor is also used in determining electronic pressure control (EPC) pressures.

Air Conditioning A/C Clutch

An electromagnetic clutch is energized when the clutch cycling pressure switch closes. The switch is located on the suction accumulator/drier. The closing of the switch completes the circuit to the clutch and draws it into engagement with the compressor driveshaft. When the A/C is engaged, electronic pressure control (EPC) pressure is adjusted to compensate for the additional load on the engine.

Engine Coolant Temperature (ECT) Sensor

The engine coolant temperature (ECT) sensor detects the temperature of the engine coolant and supplies the information to the powertrain control module. The ECT sensor is used to control torque converter clutch (TCC) operation. The ECT is installed in the heater outlet fitting or cooling passage on the engine. For engine control applications, the ECT signal is used to modify ignition timing, EGR flow and air-to-fuel ratio as a function of engine coolant temperature.

SPECIFICATIONS

General Specifications

Item	Specification
Fluid	
Motorcraft MERCON®V Automatic Transmission Fluid XT-5-QM	MERCON®V

General Specifications (Continued)

Item	Specification
Fluid Capacities	
All	13.0L (13.7 quarts)
Lubricants	
Multi-Purpose Grease D0AZ-19584-AA	ESB-M1C93-B

Solenoid Operation Chart

Transmission Range Selector Lever Position	PCM Gear Commanded	AX4N Solenoids			
		Eng Brake	SSA	SSB	SSC
P/N[a]	P/N	NO	OFF[b]	ON[a]	OFF
R	R	YES	OFF	OFF	OFF
(D) (OVERDRIVE)	1 2 3 4	NO NO NO YES	OFF OFF ON ON	ON OFF OFF ON	OFF OFF ON ON
D (DRIVE)	1 2 3	NO NO YES	OFF OFF ON	ON OFF OFF	OFF OFF OFF
MANUAL 1	1[c] 2[c] 3[c]	YES YES YES	OFF OFF ON	ON OFF OFF	OFF OFF OFF

a When transmission fluid temperature is below 10°C (50°F) then SSA=OFF, SSB=ON, SSC=ON to prevent cold creep in NEUTRAL only.
b Not contributing to power flow.
c When a manual pull-in occurs above calibrated speed the transaxle will downshift from the higher gear until the vehicle speed drops below this calibrated speed.

Band And Clutch Application Chart A

Gear	OD Band	Coast Band	Forward Clutch	Direct Clutch	Int Clutch	Rev Clutch	Low/ Int Clutch
P			A				
R			A			A	
N			A[a]				
1st			A				A
2nd			A/I		A		A
3rd				A	A		A/I
4th	A			A/I	A		A/I
M-3rd			A	A	A		A/I
M-1st		A	A	A			A
Planet Comp	FS	RS	FS	FS	FC/RR	FC/RR	RS

SPECIFICATIONS (Continued)

a. Above 100°F TFT (Transmission Fluid Temperature)

A = Applied

A/I = Applied/Ineffective

FS = Front Sun Gear

RS = Rear Sun Gear

FC/RR = Front Carrier/Rear Ring Gear

Band And Clutch Application Chart B

	Low One-Way Clutch		Direct One-Way Clutch		Low/Int One-Way Clutch	
Gear	Drive	Coast	Drive	Coast	Drive	Coast
P	H					
R	H	OR				
N	H					
1st	H	OR			H	OR
2nd	OR	OR			H	OR
3rd			H	OR	OR	OR
4th			OR	OR	OR	OR
M-3rd		H	H		OR	OR
M-1st	H			H	H	
Planet Comp	FS	FS	FS	FS	RS	

H = Holding

OR = Overrunning

FS = Front Sun Gear

RS = Rear Sun Gear

Line Pressure Chart

Pressures at Idle[a]			Pressure at Wide Open Throttle (WOT) Stall		
Gear	EPC	Line	Gear	EPC	Line
P[b]	P[b] 45-55	P[b] 146-171	—	—	—
P	10-20	60-84	P	—	—
R	10-20	78-108	R	70-90	328
N	10-20	60-84	N	—	—
(D)	10-20	60-84	(D)	70-90	208-257
3	30-40	102-138	3	70-90	208-257
1	15-45	67-155	1	70-90	208-257

a All pressures are in PSI and are approximate.

b Special Note: This condition will occur when transmission fluid temperature is below 10°C (50°F) and prior to the initial engagement.

SPECIFICATIONS (Continued)

Torque Specifications

Description	Nm	lb-ft	lb-in
Case to chain cover (10 mm socket size)	26	19	—
Case to chain cover (8 mm socket size)	12	9	—
Chain cover to case (10 mm socket size)	25	18	—
Chain cover to case (24 mm socket size)	31	23	—
Chain cover to case (13 mm socket size)	43	32	—
Chain cover-to-case bolts (8 mm socket size)	11	8	—
Chain cover to case Torx® bolts	12	9	—
Case to stator support	11	8	—
Transmission range sensor to case	10	—	89
Valve body to pump	10	—	89
Pump assembly to main control	10	—	89
Valve body/solenoid to chain cover	10	—	89
Pump cover to pump body	10	—	89
Pump body to chain cover	10	—	89
EPC and TCC-to-pump body	12	9	—
Separator plate to pump body and valve body	11	8	—
Park rod abutment bolts	28	21	—
Detent spring to chain cover	11	8	—
Lube tube support bracket bolts	11	8	—
Fluid pan to case (lower reservoir)	12	9	—
Filler tube to case bolt	11	8	—
Reverse clutch locator bolt	11	8	—
Reverse clutch locator lock nut	43	32	—

Torque Specifications (Continued)

Description	Nm	lb-ft	lb-in
Turbine shaft speed (TSS) sensor retaining bolt	11	8	—
Output shaft speed (OSS) sensor retaining bolt	10	—	89
Shift cable-to-manual lever nut	24	18	—
Overdrive server cover-to-case	11	—	8
Neutral/drive accumulator retaining bolt	11	8	—
Pressure tap plug for chain cover and pump body	8	—	71
Cooler line fitting at transaxle	20	15	—
Transaxle shift cable bracket retaining nut	23	17	—
Upper transaxle to engine bolts	62	46	—
Lower engine-to-transaxle bolts — 3.0L (4V)	40	30	—
Lower engine-to-transaxle bolts — 3.0L (2V)	62	46	—
Brake hose routing clip bolt	11	8	—
Torque converter-to-flexplate nuts	35	26	—
RH engine mount-to-transaxle case bolts and nut	62	46	—
Dust cover to case	10	—	89
Transmission housing cover bolts	10	—	89
Engine mount bolts	98	72	—
Rear engine support bolts	70	52	—
Engine mount to support	90	66	—
Shaft cable stud chain cover to case	31	23	—
Manual lever to manual shaft	13	10	—

SPECIFICATIONS (Continued)

Torque Specifications (Continued)

Description	Nm	lb-ft	lb-in
Manual cable bracket bolt	23	17	—
Rear engine transaxle-to-support bracket bolts	62	46	—
Ground strap nut	20	15	—
Cooler tube bracket bolts	11	8	—
Y-pipe assembly nuts and bolts	40	30	—
Brake hose routing clip bolt	11	8	—
Driven sprocket support bolts	25	18	—
Catalytic converter	40	30	—
Rear support brace	47	35	—
Cooling tube nut	10	89	—
Structural side pan 6 mm bolts	12	9	—

Torque Specifications (Continued)

Description	Nm	lb-ft	lb-in
Structural side pan 8 mm bolts	25	18	—
Stamped steel side pan 8 mm bolts	22	16	—
Stamped steel side pan 6 mm bolts	12	9	—
RH engine mount-to-transaxle structural side pan bolts	62	46	—
Cooler tube bracket bolts	11	8	—
Exhaust hanger-to-case stud	10	—	89
Electrical connector bracket	10	—	89
Power steering line bracket	10	—	89
Battery tray	10	—	89
RH engine mount-to-oil pan nuts	12	9	—

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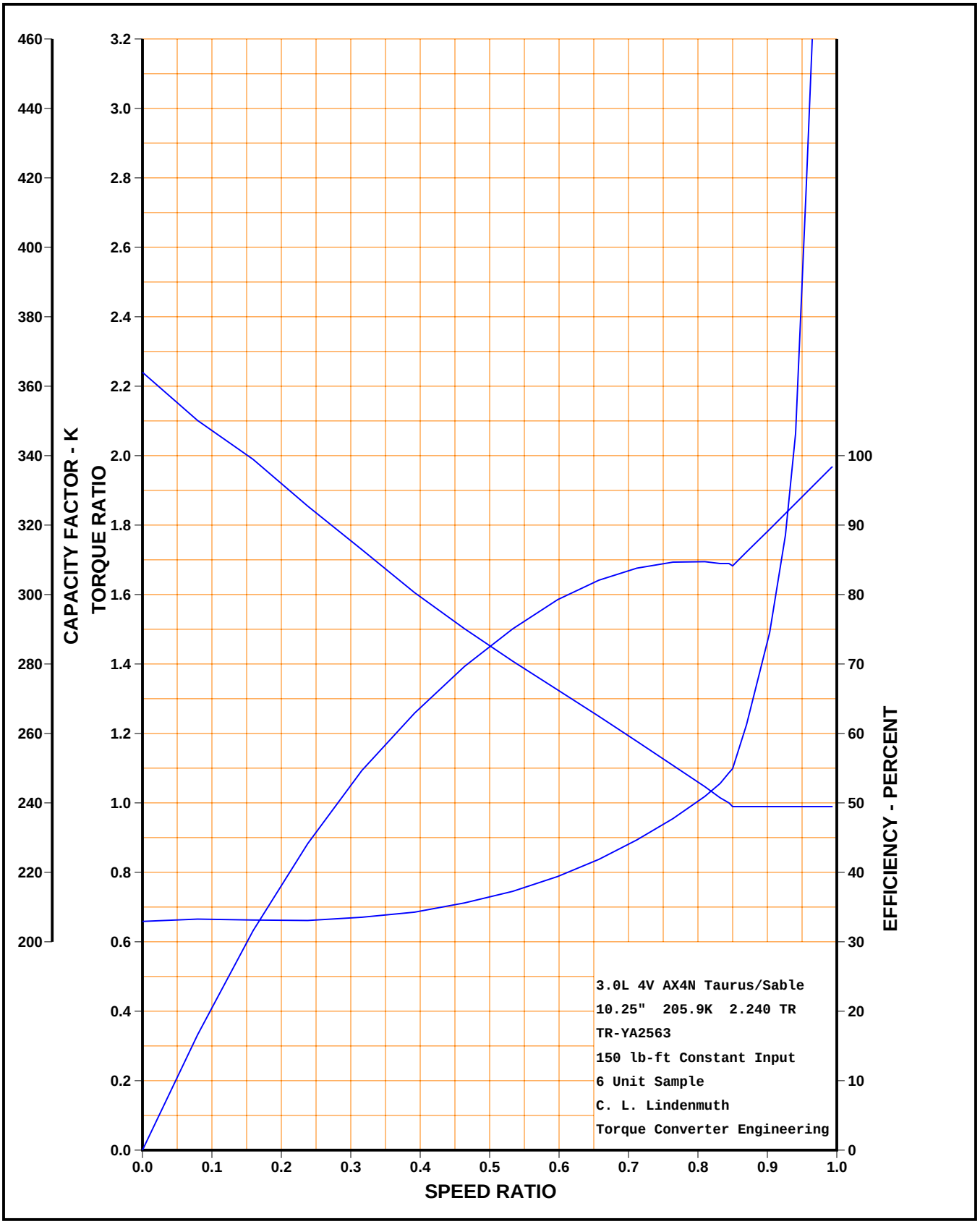
Appendix R - Transmission Information

Torque Converter Characteristic Curves

TORQUE CONVERTER PERFORMANCE

CURVE NO. c2312.r0



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Appendix R - Transmission Information

Torque Converter Stall Speeds

2000 Usage Index - Passenger Car

Vehicle	Axle Ratio	Engine			Transmission	Converter						Engine Stall Speed		
		Size	Curve Number	Peak SAE Net Torque		Curve Number	K	T/R	Diameter	Type	-7902- Assembly	Minimum	Maximum	Range
Taurus/Sable	3.77	3.0L 2V	C-699020	185.16	AX4N/S	C2081	165	2.3	10.25"	Radial	F8DP-CA	1982	2345	363
Taurus/Sable	3.98	3.0L 4V	C-699018	194.20	AX4N	C2312	205	2.2	10.25"	Radial	F88P-AB	2586	3013	427
Continental	3.56	4.6L 4V	X-297010	272.63	AX4N	C2078	140	2.0	10.25"	Radial	F8OP-AB	2042[1]	2462	420
Focus (CW170)*	4.15	1.6L Sigma	X-398014	93.36	4F27E	C2290	260	2.2	9.25"	Axial	XS4P-AD	2262	2637	375
Focus (CW170)	3.69	2.0L SPI	X-398015	120.50	4F27E	C2291	240	2.1	9.25"	Axial	XS4P-BD	2406	2811	405
Focus (CW170)	3.91	2.0L Zetec	X-398016	128.50	4F27E	C2291	240	2.1	9.25"	Axial	XS4P-BD	2439	2837	398
Mazda 626	4.23	2.0L DOHC	X- 491070	128.16	CD4E	C1821	235	2.0	9.25"	Radial	F3RP-LB	2259	2677	418
Contour/Mystique, Mondeo	3.92/4.23	2.0L Zetec	C- 595053	126.80	CD4E	C1821	235	2.0	9.25"	Radial	F3RP-LB	2313	2731	418
Contour/Mystique, Mondeo	3.77	2.5L 4V	C- 595054	161.90	CD4E	C2034	205	2.1	10.25"	Radial	F4RP-DA	2385	2808	423
Cougar	3.77	2.5L 4V	X- 199001	164.10	CD4E	C2034	205	2.1	10.25"	Radial	F4RP-DA	2403	2797	394
Mustang	3.08	3.8L	C-598018	217.50	4R70W	C1665	165	2.4	12.00"	Radial	F85P-AA	2207	2590	383
Crown Vic/Grand Marquis	2.73/3.08	4.6L	C-198002	278.29	4R70W	C1704	140	2.3	12.00"	Radial	F8AP-AA	2094	2440	346
Crown Vic Police/Hdl Pkg	3.55	4.6L	C-198001	278.29	4R70W	C1541	155	2.4	11.25"	Radial	F8LP-AA	2319	2750	431
Mustang GT	3.27	4.6L HO	C-797024	290.50	4R70W	C1541	155	2.4	11.25"	Radial	F8LP-AA	2341	2737	396
Town Car	3.08/3.55	4.6L	C-197002	279.29	4R70W	C1704	140	2.3	12.00"	Radial	F8AP-AA	2116	2471	355
Town Car Handling Pkg	3.55	4.6L	C-198003	286.29	4R70W	C1541	155	2.4	11.25"	Radial	F8LP-AA	2369	2797	428
Jaguar X200	3.31	3.0L JV6	X- 298009	216.23	5R55N	C2491	200	2.0	10.25"	Axial	XW4P-BD	2647	3100	453
Lincoln LS6	3.58	3.0L 4V	C-1098031	203.41	5R55N	C2491	200	2.0	10.25"	Axial	XW4P-BD	2564	3058	494
Lincoln LS8	3.58	3.9L AJ30	C-1098032	256.26	5R55N	C2490	180	2.0	10.25"	Axial	XW4P-AD	2562	2981	419
Jaguar X200	3.31	4.0L AJ28	X- 298008	286.34	5R55N	C2490	180	2.0	10.25"	Axial	XW4P-AD	2642	3100	458

*CW170 converter is a non-Ford design (manufactured by Daikin Drivetrain Corp). No further converter detail is available.
[1]Stall speed represents a combination of calculated values and actual test data (6 unit sample with green engine)

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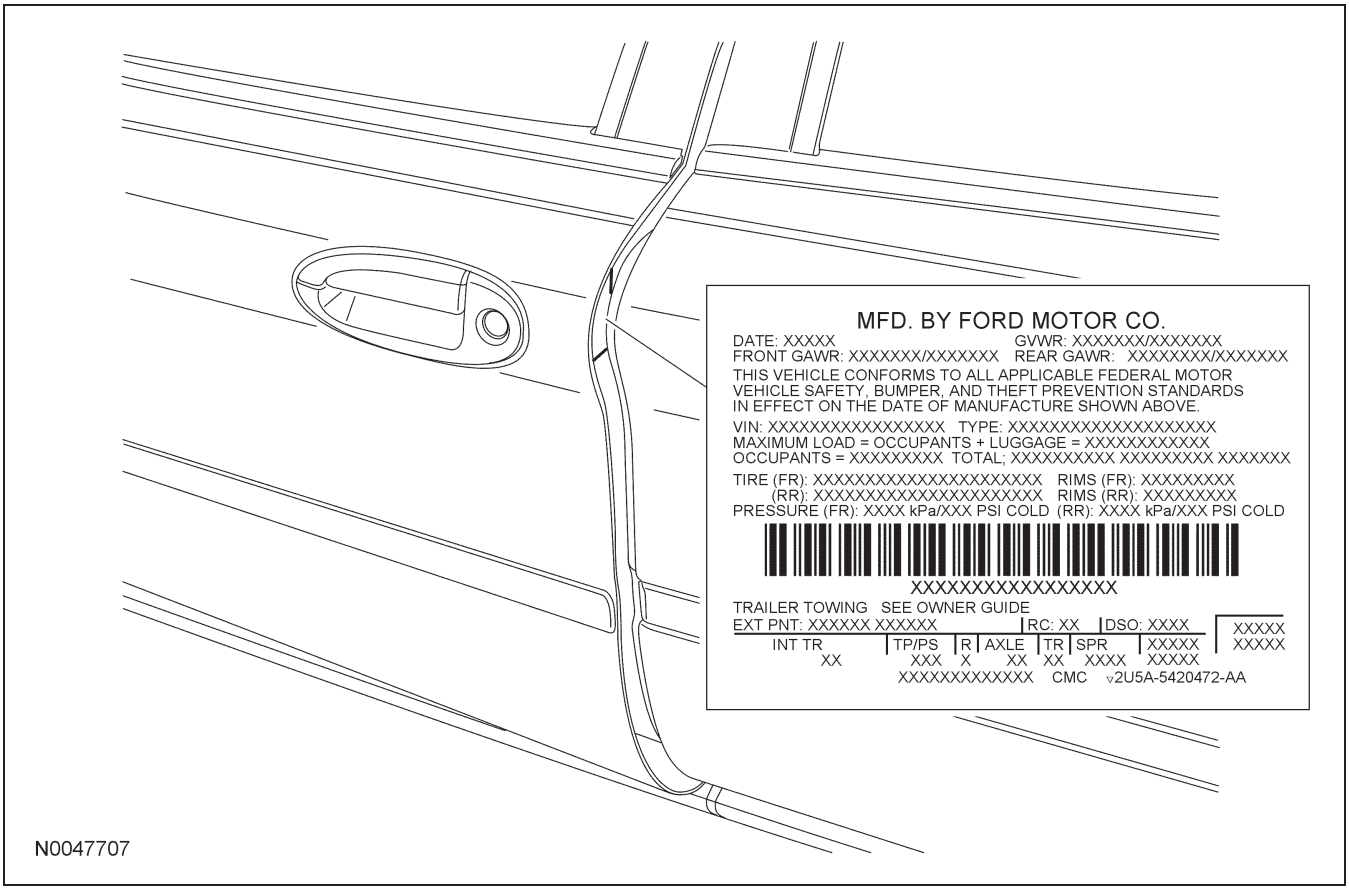
Appendix R - Transmission Information

VC Label Instructions

DESCRIPTION AND OPERATION (Continued)

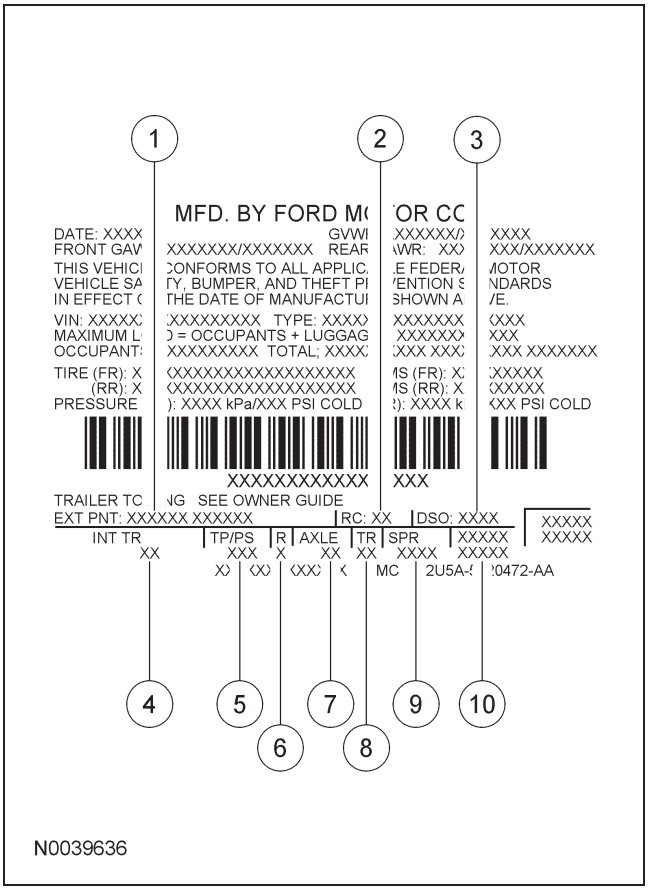
Vehicle Certification (VC) Label

Vehicle Certification (VC) Label Locator



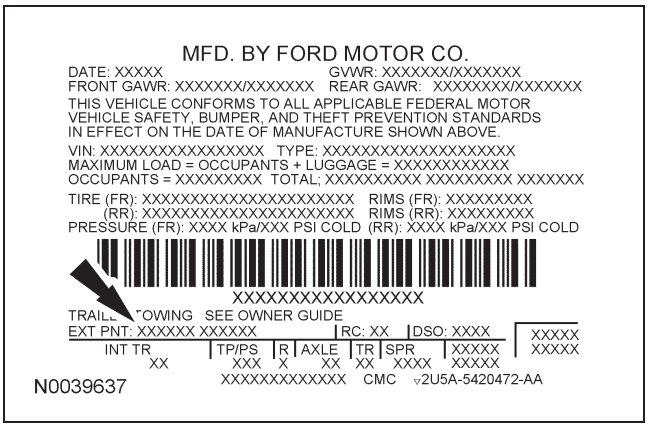
DESCRIPTION AND OPERATION (Continued)

The vehicle certification (VC) label contains the manufacturer name, the month and year of manufacture, the certification statement and the VIN. It also includes gross vehicle weight ratings (GVWR).



Item	Description
1	Exterior paint code
2	Region code
3	Domestic special order code
4	Interior trim code
5	Tape/paint pinstripe code
6	Radio code
7	Axle code
8	Transmission code
9	Spring code
10	Powertrain calibration information

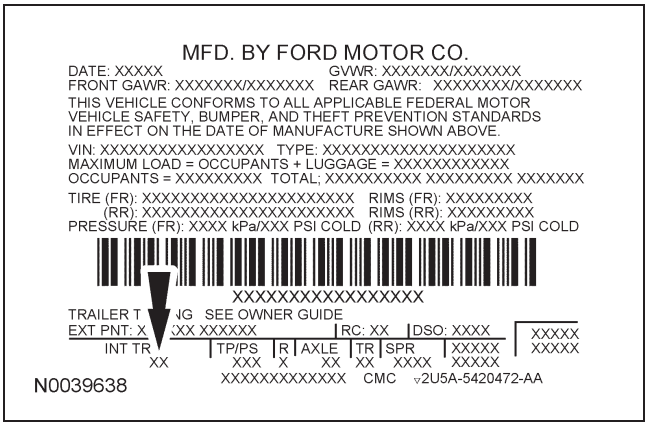
Paint Code



Paint codes are listed as a 2-part code. The first set of characters listed indicate the vehicle primary body color. The second set of characters listed (if applicable) indicate a 2-tone or accent body color. All colors are base coat/clear coat.

- AQ — Arizona Beige
- C2 — Gold Ash Metallic
- DV — Light Tundra/Titanium Green
- FX — Merlot
- P3 — Windveil Blue
- T8 — Tungsten Metallic
- TS — Silver Frost
- UA — Ebony
- WT — Performance White

Interior Trim Code



Interior trim codes are listed as a 2-part code. The first character listed indicates the seat and fabric style. The second character listed indicates the interior trim color.

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Appendix N2 - Testing Summary

Maximum In Vehicle Strain Summary

Maximum Acceleration and Strain Values Attained from in vehicle testing

Intended Speed Control Cable Routing UNDER airbox		Maximum Strain Attained
CAB001 Bending Strain on Cruise Control Cable	uE +Cable_Forward	89.78
CAB002 Axial Strain on Cruise Control Cable	uE +Tension	201.40
CAB003 Longitudinal Acceleration of Throttle Body at Intake Manifold	g +Aft	2.38
CAB004 Lateral Acceleration of Throttle Body at Intake Manifold	g +Right	2.45
CAB005 Vertical Acceleration of Throttle Body at Intake Manifold	g +Up	3.42
CAB006 Longitudinal Acceleration of Body at Left Front Strut Tower	g +Aft	1.66
CAB007 Lateral Acceleration of Body at Left Front Strut Tower	g +Right	1.59
CAB008 Verticall Acceleration of Body at Left Front Strut Tower	g +Up	1.04
CAB001 Bending Strain on Cruise Control Cable	uE +Cable_Forward	194.06
CAB002 Axial Strain on Cruise Control Cable	uE +Tension	341.81
CAB003 Longitudinal Acceleration of Throttle Body at Intake Manifold	g +Aft	3.68
CAB004 Lateral Acceleration of Throttle Body at Intake Manifold	g +Right	2.80
CAB005 Vertical Acceleration of Throttle Body at Intake Manifold	g +Up	4.30
CAB006 Longitudinal Acceleration of Body at Left Front Strut Tower	g +Aft	1.60
CAB007 Lateral Acceleration of Body at Left Front Strut Tower	g +Right	1.21
CAB008 Verticall Acceleration of Body at Left Front Strut Tower	g +Up	2.61
CAB001 **Bending Strain** on Cruise Control Cable	uE +Cable_Forward	**284.37**
CAB002 **Axial Strain** on Cruise Control Cable	uE +Tension	**346.17**

Summary of strain Gage Testing on gray end fitting.

Baseline Testing

4 Parts instrumented and tested at Central Labs to provide BASELINE Strain vs. Deflection curves

Tensile Test					
	VIN	**Miles**	**Model Year**	**Condition of cable**	**Strain Gauge Data Set (Condition Number)**
NEW cable tested for Tensile strength	T1	0	new	new	1&2
OLD cable tested for Tensile strength	A187586	84,000 miles	2005MY	crazed / No cracks	3
Cracked Window cable tested for Tensile Strength	G600349	48,000 miles	2002MY	crazed / Crack OPPOSITE of stairstep side (crack starting on stairstep side)	4

Side Load Test					
	VIN	**Miles**	**Model Year**	**Condition of cable**	**Strain Gauge Data Set (Condition Number)**
NEW cable tested for Side load	SL1	0	new	new	5&6
OLD cable tested for Side Load	G109534	270,171 miles	2004MY	crazed / No cracks	7
Cracked Window cable tested for Side Load	G606077	147,064 miles	2002MY	Crazed / Crack on stairstep side	8

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Appendix N2 - Testing Summary

Sample Summary for Cracked Collar Testing

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Appendix N2 - Testing Summary

Summary of Lab testing and Results

Summary of Ford Lab Testing and Results

Ford gathered speed control cables from Ford Taurus and Mercury Sable vehicles equipped with a 4-valve Duratec engine from the field for testing and analysis. Some of these parts contained collars that had no cracking and were not broken, some had collars that contained one or more "hairline" cracks in which the material had completely separated (usually just below the retention tab), while others had collars that were broken in which the retention tabs were completely missing from the collar.

Ford's evaluation of the field returned parts with collars that were not broken or cracked identified varying levels of surface cracking or "crazing" of the speed control cable collar. Further analysis suggested that a source of this surface crazing is chemical exposure. As a result, testing was conducted using various chemicals that the collar could be exposed to throughout the life of the vehicle such as oils, fuel, road salt, aftermarket engine cleaners, and battery acid in an effort to determine the cause of the surface crazing. The only chemical that was found to affect the collar material was battery acid, which caused melting of the test sample using a 37% solution of sulfuric acid in distilled water. This test was then repeated using a 6% solution of sulfuric acid in distilled water and resulted in surface cracking or crazing of the collar material test sample.

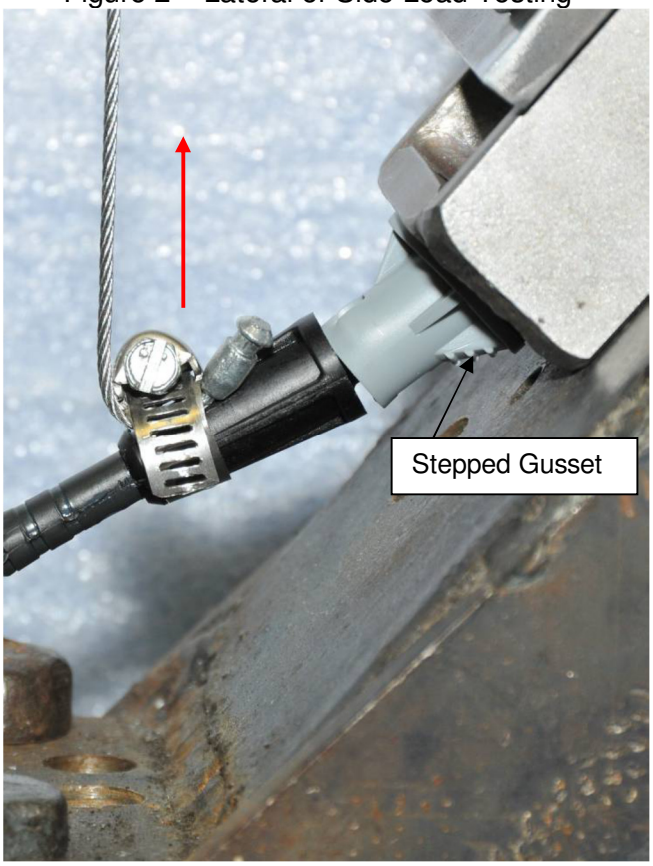
Ford conducted further evaluations to assess the effect that surface crazing might have on collar material strength, and found that surface crazing has very little effect on the strength of the collar. Tensile testing (shown in Figure 1, below) was performed on both new parts as well as on field return parts of various time in service (mileage from approximately 68,000 miles to approximately 154,000 miles) that exhibited collar crazing. As summarized below and in Ford's response to the agency's request, the average tensile force required to fracture the collar was only 8% lower on aged/crazed parts (256 N) compared with the new parts (277 N.)

Cable Condition	Average Mileage	Average Tensile Force to Failure (N)	Average Bend Force to Failure (N)*	Difference from New Cable (%)
New	N/A	277	155	N/A
Crazed	103,023	256	N/A	8%
Crazed	270,171	N/A	144	7%
Hairline Crack	48000	55	N/A	80%
Hairline Crack	147064	N/A	149	4%

Similarly, a side load test, intended to simulate a possible lateral loading condition (shown in Figure 2, below), was performed on both new and field return parts with collar crazing present. These tests resulted in fracture of either the collar or the black ferrule. The average side loading force required to fracture either the collar or the ferrule was only 7% lower on aged/crazed parts (144 N) compared with new cable parts (155 N) when applied away from the stepped gusset on the cable collar (away from the battery as mounted in vehicle).

Figure 1 – Tensile Testing

Figure 2 – Lateral or Side Load Testing



Next, Ford evaluated field return parts that contained one or more “hairline” cracks in the collar with the retention tabs still present. Analysis of these parts again identified surface crazing similar to those samples without collar cracks. Further analysis of the inside of the cracked surface indicated that the cracks likely resulted from a single event overload condition and not fatigue.

These parts were then evaluated for strength using the same tensile and side loading tests mentioned above. In addition to the force required for fracture of either the cable collar or the cable ferrule, strain across the cracked portion of the cable collar was also measured. The tensile force required to fracture the collar was 55 N. Similarly, the corresponding side load test resulted in a force of 149 N that was required in order to break or separate a cracked collar from the cable ferrule.

	Speed Control Cable Relative to Accelerator Cable	Speed Control Cable Relative to Air Inlet Tube	Accelerator Cable Relative to Air Inlet Tube	**Average Strain Bending/Axial (Micro strain) – Vehicle Stationary**	*Approximate Force Bending/Axial (N) – Vehicle Stationary*	**Maximum Strain While Driving Bending/Axial (Micro strain)**	*Approximate Maximum Force While Driving Bending/Axial (N)*
1	Inboard	Under	Under	**267**/ **268**	*18/ 18*	**284**/ **346**	*19.2/ 23*
2	Outboard	Under	Under	**61** / **143**	*5/ 11.5*		

(While other routing scenarios are possible, they are unlikely)

As can be seen in the above table, when the speed control cable is routed as intended (scenario 1) there is a slight bending and axial force that is acting on the cable collar. When the speed control cable is routed outboard of the accelerator cable (scenario 2), both the axial and bending forces decrease slightly despite the contact with the accelerator cable. Ford's vehicle evaluations found that only this routing scenario, combined with heavy acceleration and a significantly damaged cable, was able to cause the cable ferrule to come out of a damaged collar (i.e. no retention tabs present). With this cable routing, Ford believes that the engine roll can allow the accelerator cable to potentially provide additional outward axial force on the speed control cable that is not present in routing scenario 1. Ford notes that a stuck throttle condition was only able to be reproduced with a cable collar that already had broken and missing retention tabs. In addition, in both scenarios 1 and 2, the bending and axial forces acting on the speed control cable collar as installed are significantly less than the force required to break a crazed or even cracked cable collar, as shown in the testing above.

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Appendix P - Additional Service Procedures

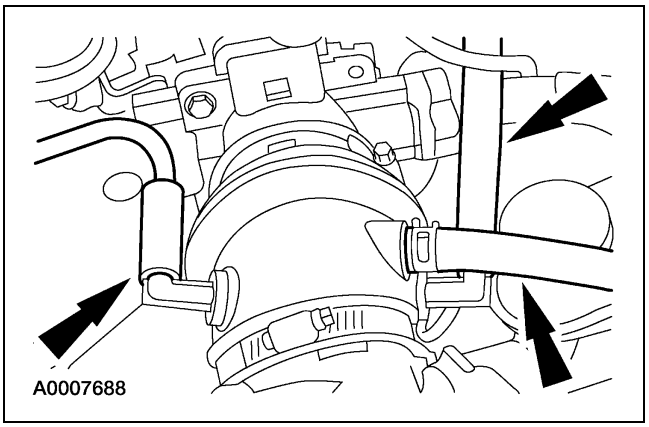
Air Cleaner Outlet Pipe

REMOVAL AND INSTALLATION

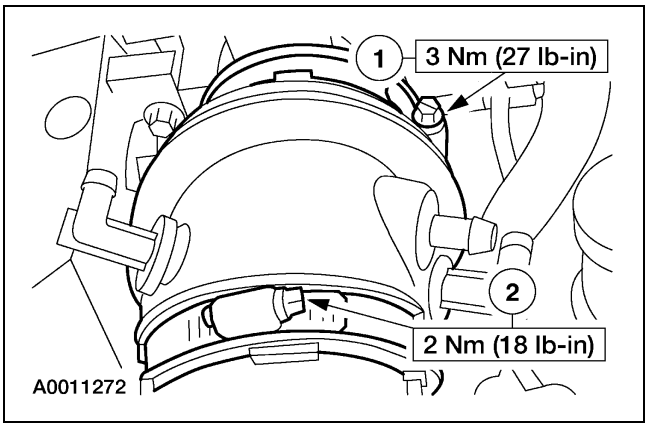
Air Cleaner Outlet Pipe — 3.0L (4V)

Removal and Installation

1. Disconnect the crankcase ventilation hoses (6758) from the air cleaner outlet tube (9B659).



2. Disconnect the air cleaner tube.
   1 Disconnect the outlet tube from the throttle body (9E926).
   2 Disconnect the outlet tube from the air cleaner (ACL)(9600).



3. To install, reverse the removal procedure.

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Appendix P - Additional Service Procedures

Air Cleaner

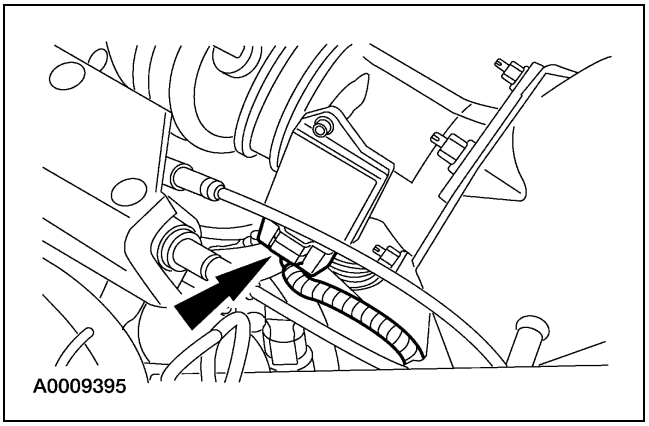
REMOVAL AND INSTALLATION

Air Cleaner

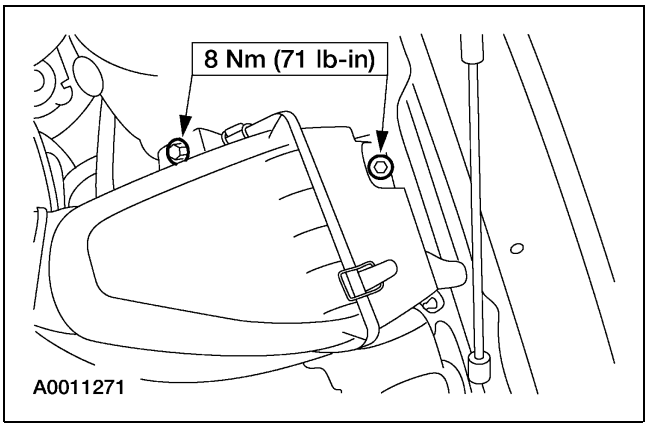
Removal and Installation

1. Remove the air cleaner outlet tube. For additional information, refer to Air Cleaner Outlet Pipe—3.0L (2V) or Air Cleaner Outlet Pipe—3.0L (4V).

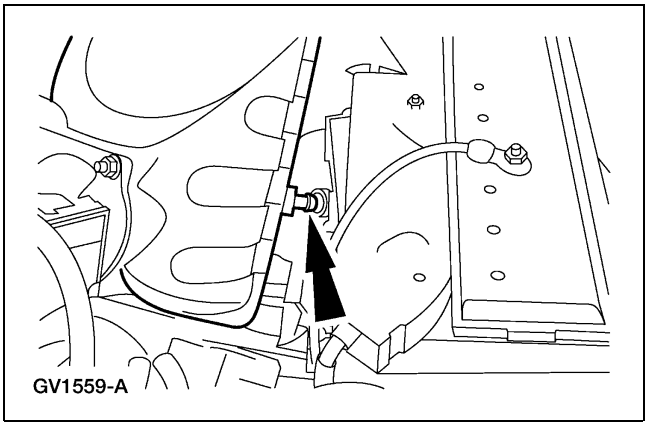
2. Disconnect the mass airflow sensor electrical connector.



3. Remove the two air cleaner housing bolts.



4. Lift there air cleaner housing off the locating pin.



5. To install, reverse the removal procedure.

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Appendix P - Additional Service Procedures

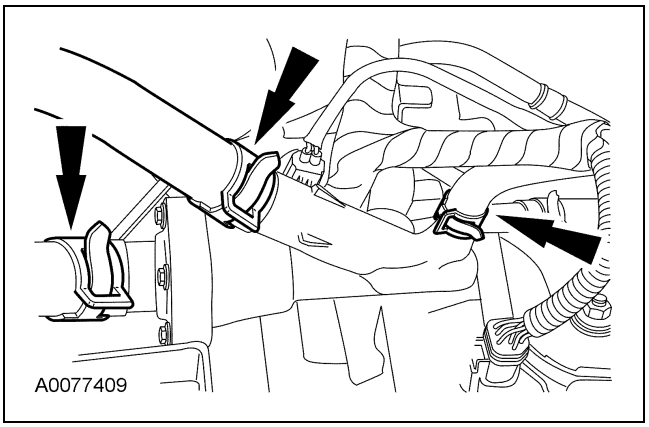
Bypass Tube

REMOVAL AND INSTALLATION

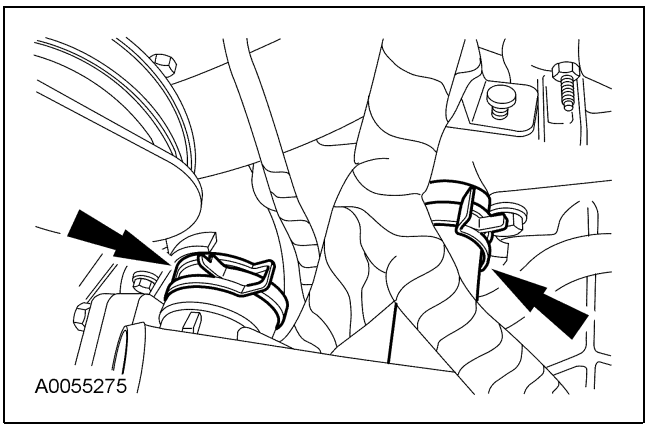
Bypass Tube — 3.0L (4V)

Removal and Installation

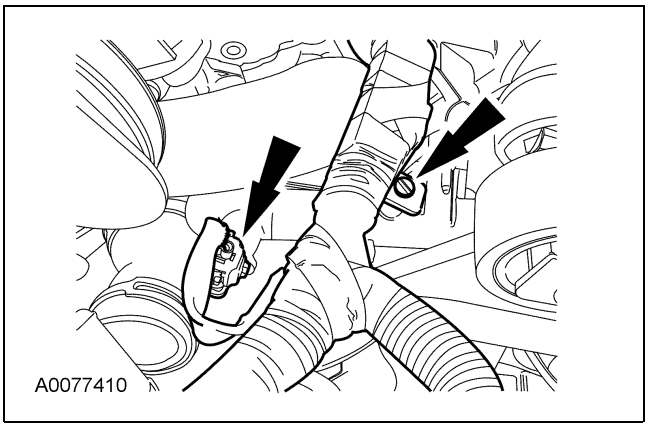
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. Drain the cooling system. For additional information, refer to Cooling System Draining, Filling and Bleeding in this section.
3. Remove the air cleaner assembly. For additional information, refer to Section 303-12.
4. Remove the battery and battery tray. For additional information, refer to Section 414-01.
5. Disconnect the upper radiator hose, the thermostat housing hose and the heater hose.



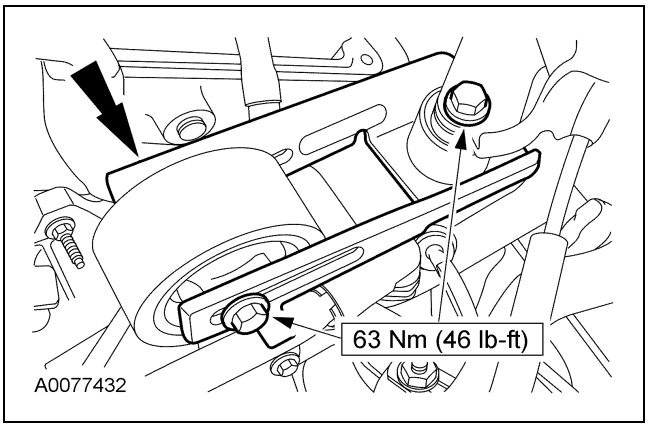
6. Disconnect and remove the radiator bypass hose assembly.



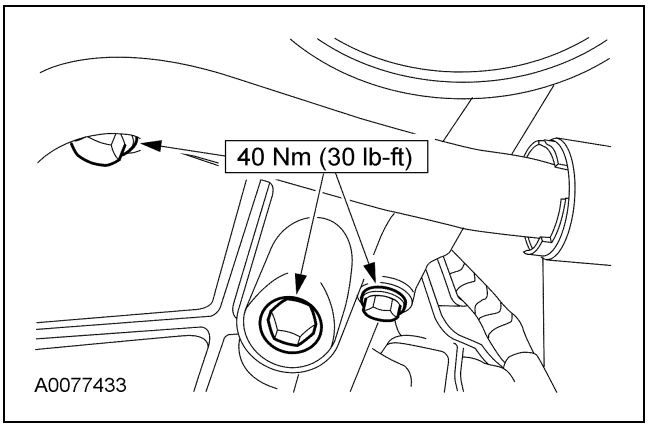
7. Remove the pin-type retainer, disconnect the engine coolant temperature (ECT) sensor electrical connector and position the harness aside.



8. Remove the bolts and the roll restrictor bracket.

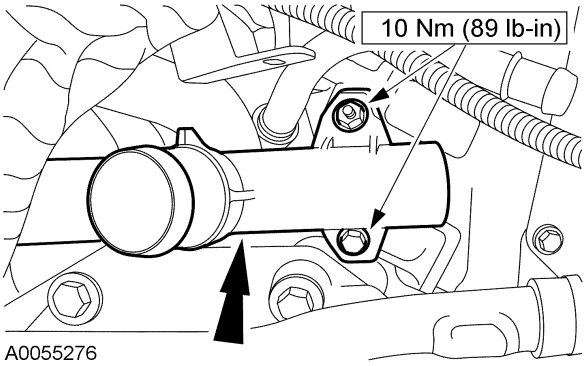


9. Remove the bolts and the roll restrictor.



REMOVAL AND INSTALLATION (Continued)

10. Remove the bolt, the stud and the coolant bypass tube.
    - Remove and discard the O-ring and gasket.



11. To install, reverse the removal procedure.
12. **NOTE:** Lubricate the O-ring with clean engine coolant.

    Clean the sealing surfaces and install a new gasket and O-ring.

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Appendix P - Additional Service Procedures

ECT Sensor

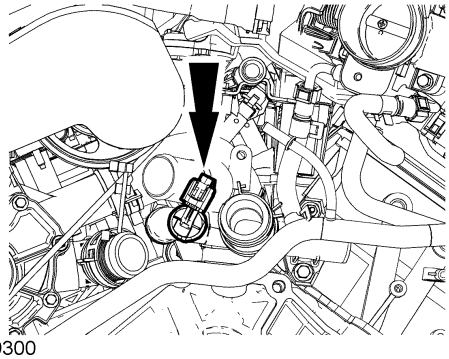
REMOVAL AND INSTALLATION

Engine Coolant Temperature (ECT) Sensor — 3.0L (4V)

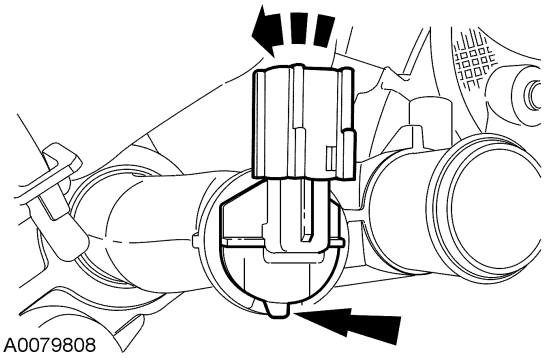
Removal and Installation

1. Drain the cooling system. For additional information, refer to Section 303-03.
2. Remove the air cleaner assembly. For additional information, refer to Section 303-12.
3. Remove the battery tray. For additional information, refer to Section 414-01.
4. **NOTE:** Engine shown partially disassembled for clarity.

   Disconnect the engine coolant temperature (ECT) sensor electrical connector.



5. Remove the ECT sensor.
   - Pull upward on the locking tab.
   - Rotate the sensor counterclockwise and remove.



6. To install, reverse the removal procedure.

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Appendix P - Additional Service Procedures

Exhaust Manifold RH

IN-VEHICLE REPAIR

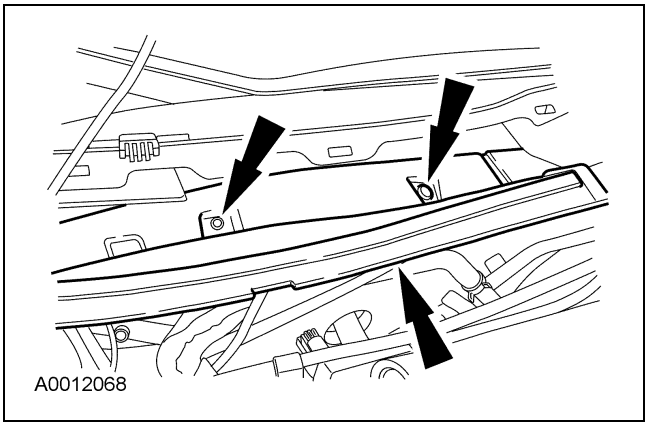
Exhaust Manifold RH

Removal

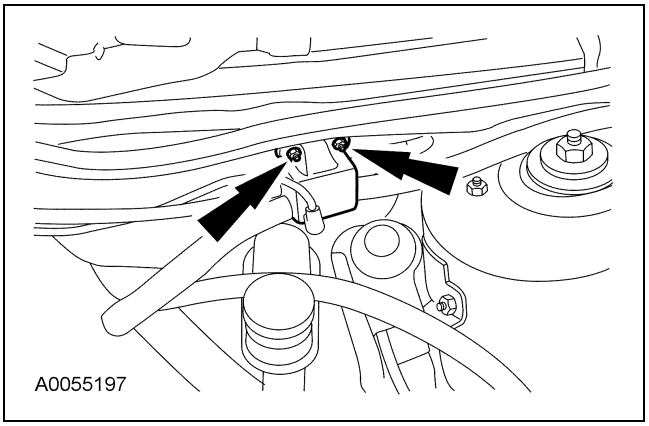
1. Remove the wiper mounting arm and pivot shaft. For additional information, refer to Section 501-16.

2. Remove the air cleaner outlet pipe. For additional information, refer to Section 303-12.

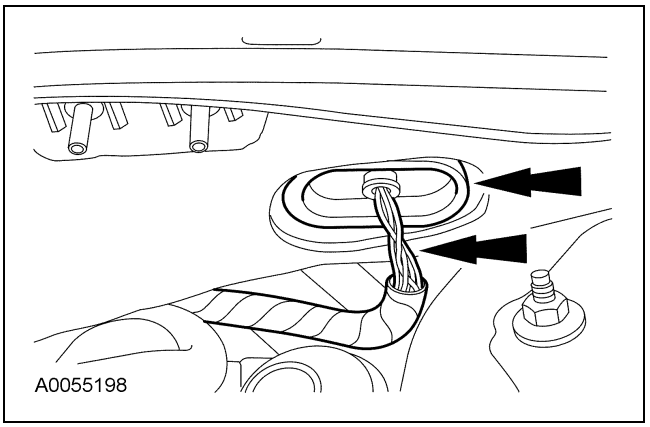
3. Remove the three retaining screws and the RH cowl top inner panel.



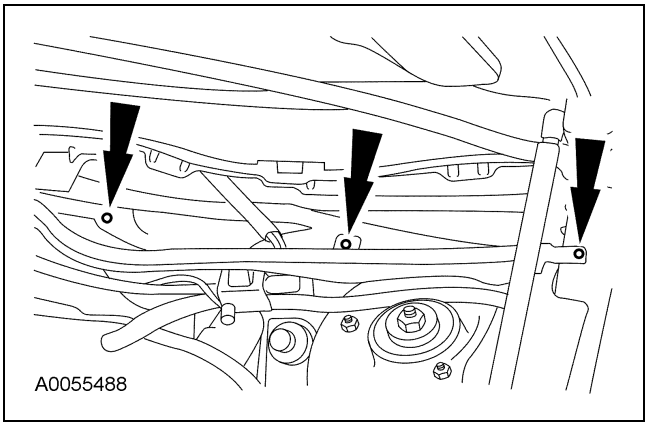
4. Remove the two retaining nuts and position the vacuum outlet manifold assembly aside.



5. Unseat the windshield wiper motor wiring harness grommet. Pull the wiring harness through the grommet.

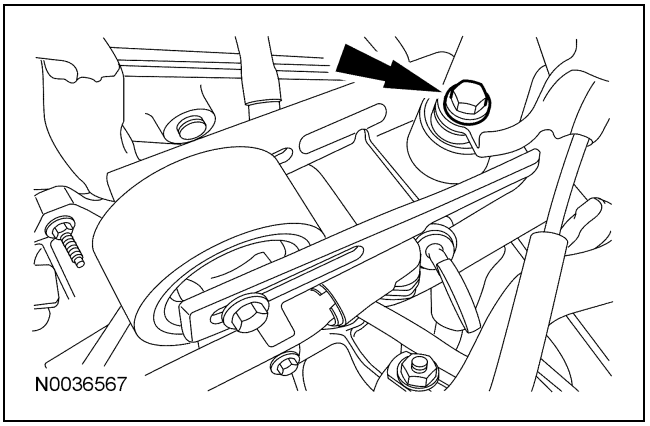


6. Disconnect the cowl drain tube, remove the three retaining screws and the LH cowl top inner panel.



7. Remove the upper intake manifold. For additional information, refer to Upper Intake Manifold in this section.

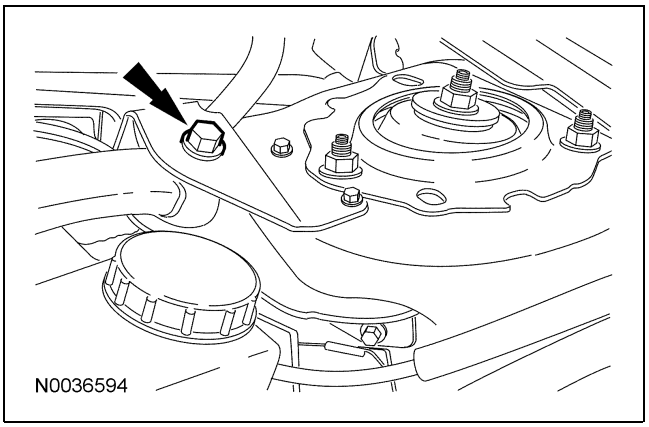
8. If equipped, remove the bolt from the roll restrictor bracket.



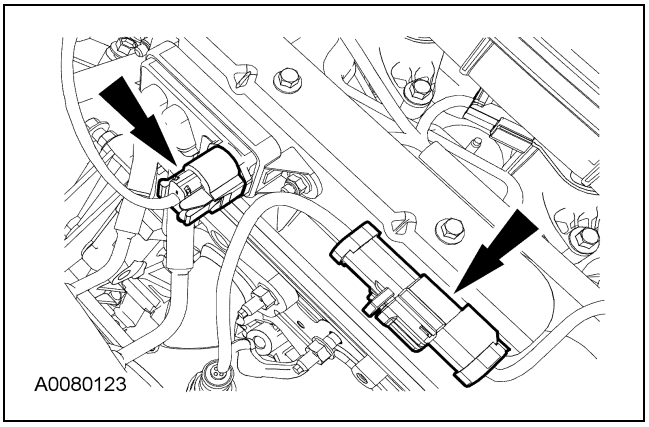
IN-VEHICLE REPAIR (Continued)

9. **NOTE:** LH shown, RH similar.

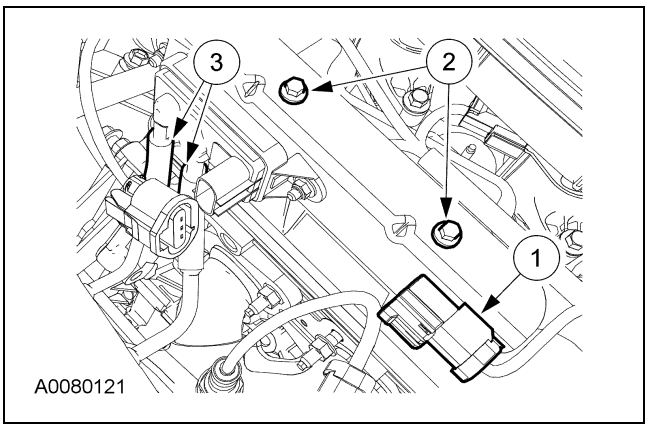
   If equipped, remove the LH and RH roll restrictor bar bolts and the roll restrictor bar.



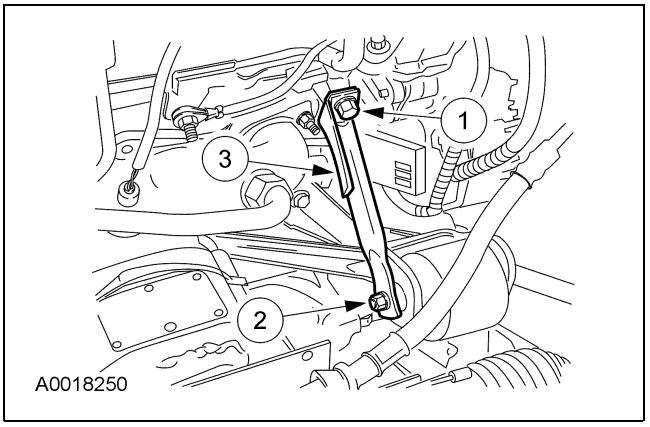
10. Disconnect the differential pressure feedback exhaust gas recirculation (EGR) sensor and the RH heated oxygen sensor (HO2S) electrical connectors.



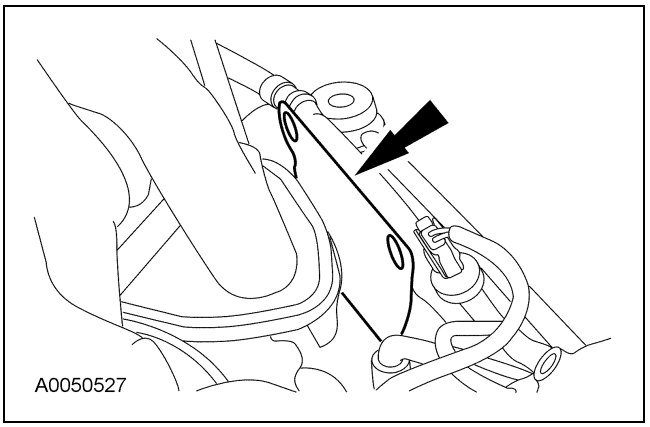
11. Remove the differential pressure feedback EGR sensor tube and bracket.
    1 Detach the electrical connector pin-type retainer.
    2 Remove the bolts from the differential pressure feedback EGR bracket.
    3 Disconnect and remove the differential pressure feedback EGR and bracket from the vacuum tubes.



12. Remove the rear support brace.
    1 Remove the bolt.
    2 Remove the nut.
    3 Remove the rear support brace.



13. Remove the steering gear heat shield.

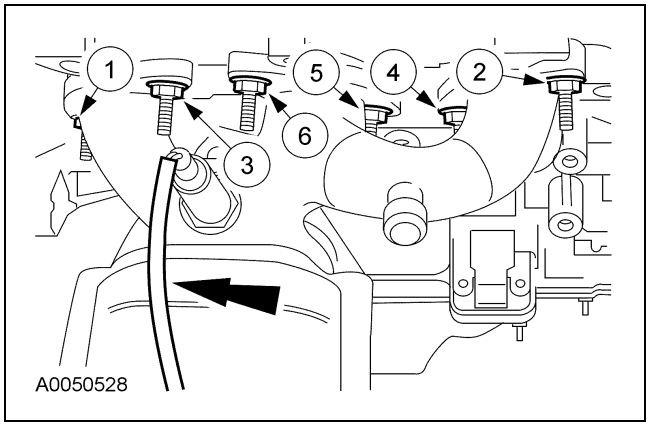


14. Remove the EGR tube. For additional information, refer to Section 303-08.

15. Remove the dual converter Y-pipe. For additional information, refer to Section 309-00.

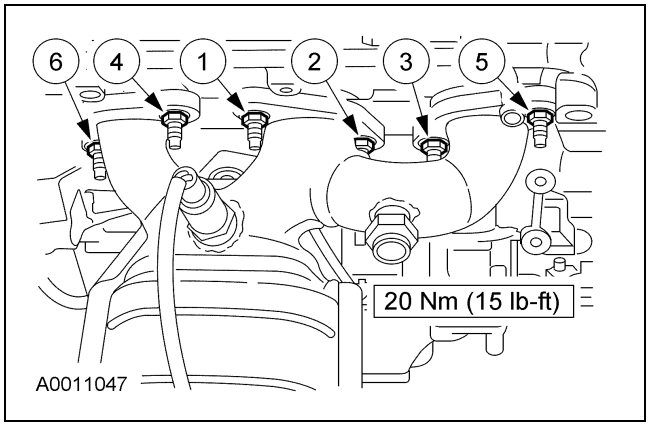
IN-VEHICLE REPAIR (Continued)

16. Remove the nuts in the sequence shown and remove the exhaust manifold.
    - Remove the studs.
    - Discard the gasket, studs and nuts.

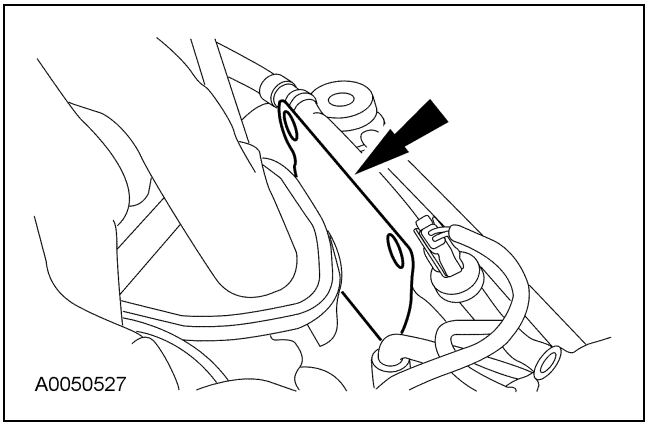


Installation

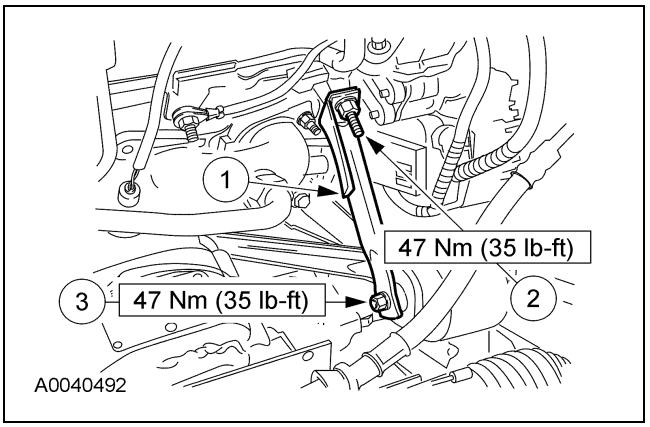
1. Install the new exhaust manifold studs.
    - Tighten to 12 Nm (9 lb-ft).
2. Install the new exhaust manifold gasket, the exhaust manifold and the new nuts.
    - Tighten the nuts in the sequence shown.



3. Install the dual converter Y-pipe. For additional information, refer to Section 309-00.
4. Install the EGR tube. For additional information, refer to Section 303-08.
5. Install the steering gear heat shield.

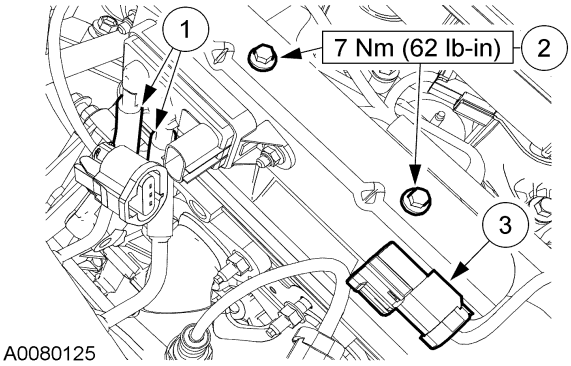


6. Install the rear support brace.
    1 Position the rear support brace.
    2 Install the nut.
    3 Install the bolt.

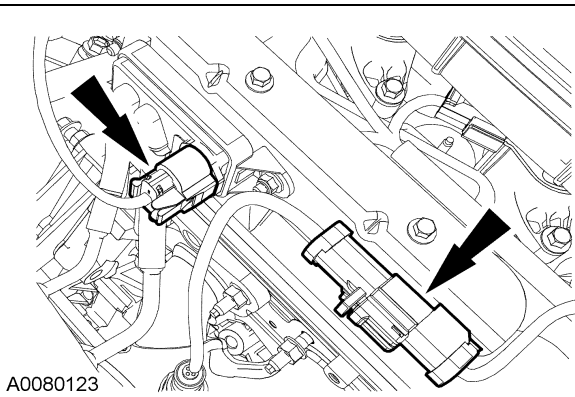


IN-VEHICLE REPAIR (Continued)

7. Install the differential pressure feedback EGR valve sensor and bracket.
   1 Connect the differential pressure feedback EGR valve tube and bracket to the vacuum tubes.
   2 Position the differential pressure feedback EGR sensor and bracket and install the bolts.
   3 Attach the H02S electrical connector pin-type retainer.

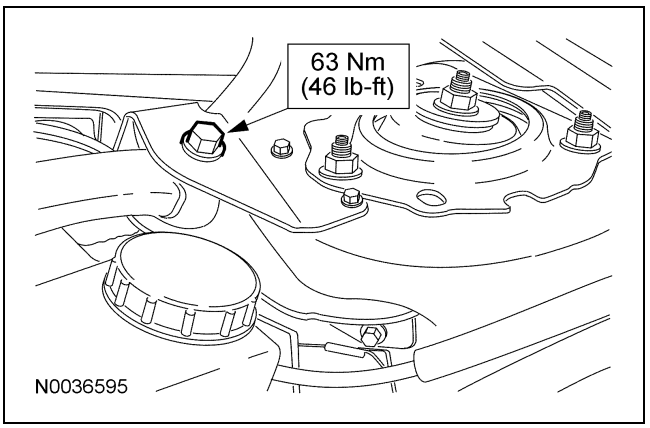


8. Connect the differential pressure feedback EGR sensor and the RH HO2S electrical connectors.

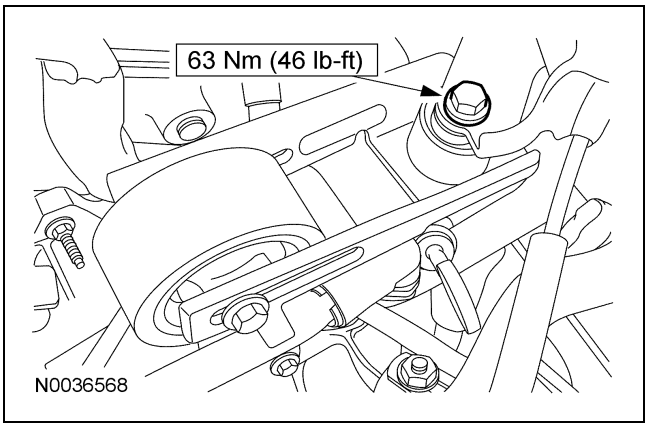


9. **NOTE:** LH shown, RH similar.

   If equipped, install the roll restrictor bar and the LH and RH roll restrictor bar bolts.

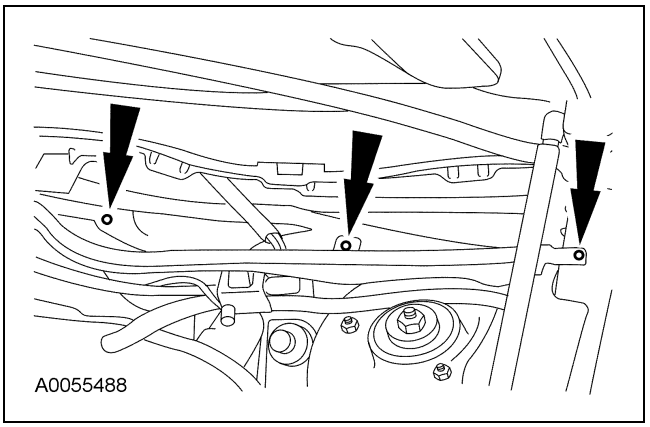


10. If equipped, install the bolt to the roll restrictor bracket.



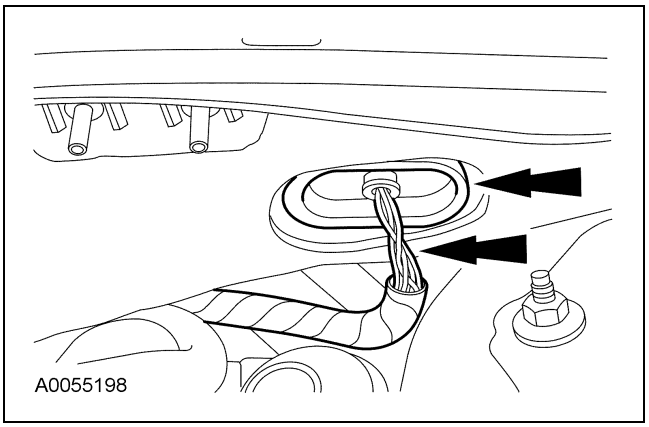
11. Install the upper intake manifold. For additional information, refer to Upper Intake Manifold in this section.

12. Install the LH cowl top inner panel and install the three retaining screws. Connect the cowl drain tube.

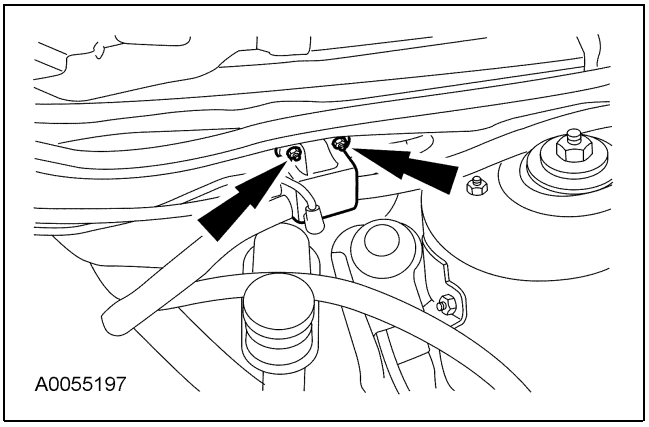


IN-VEHICLE REPAIR (Continued)

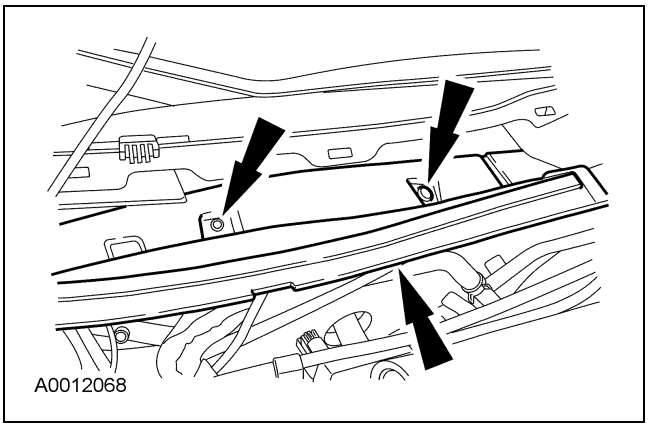
13. Install the windshield wiper motor wiring harness grommet.



14. Position the vacuum outlet manifold assembly and install the two retaining nuts.



15. Install the RH cowl inner panel and the three retaining screws.



16. Install the air cleaner outlet pipe. For additional information, refer to Section 303-12.

17. Install the wiper mounting arm and pivot shaft. For additional information, refer to Section 501-16.

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Appendix P - Additional Service Procedures

Throttle Body

REMOVAL AND INSTALLATION

Throttle Body

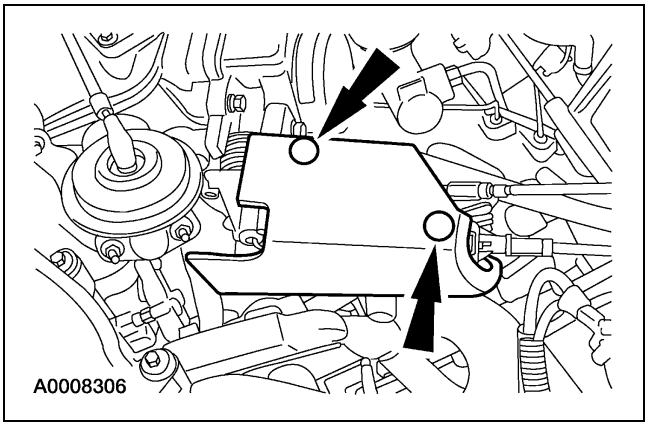
Removal and Installation

⚠ WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related components. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in personal injury.

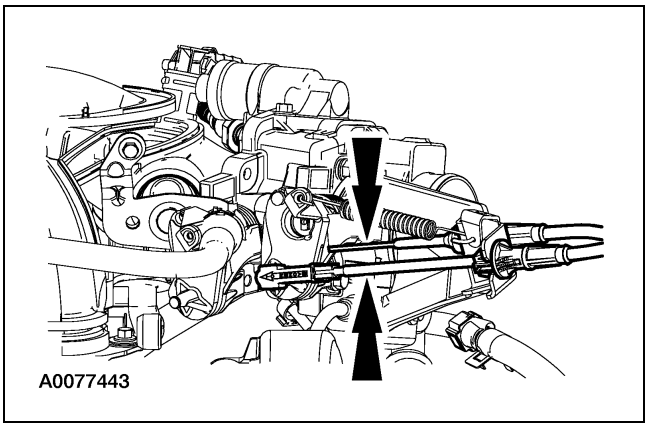
⚠ CAUTION: Throttle body bore and plate area have a special coating and cannot be cleaned.

1. Remove the air cleaner outlet tube. For additional information, refer to Section 303-12.

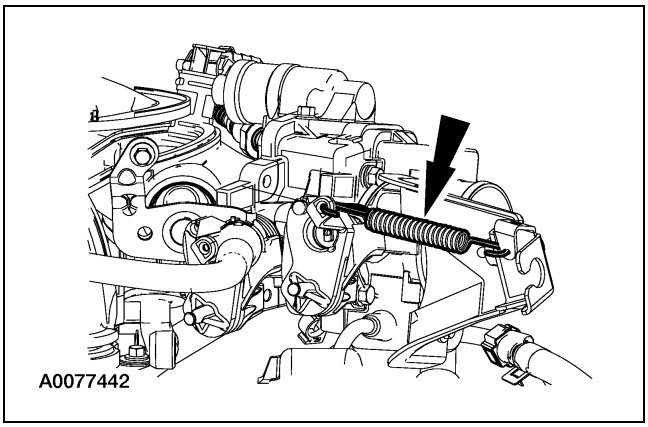
2. Remove the pin-type retainers and the accelerator cable cover.



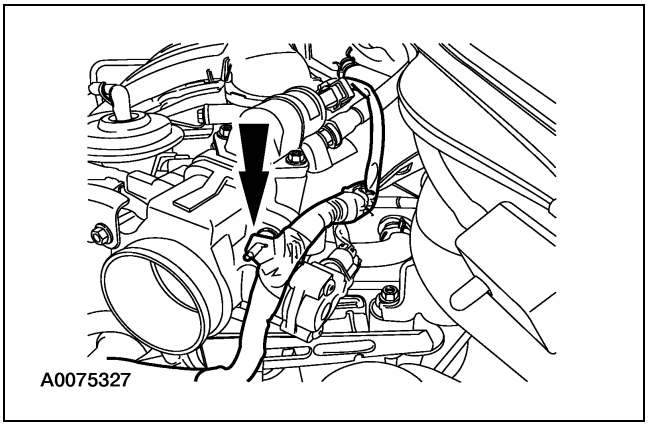
3. Disconnect and unclip the accelerator and speed control cables.



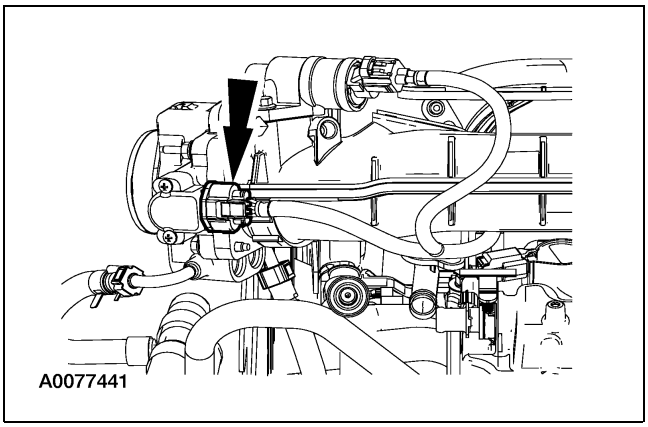
4. Remove the throttle return spring.



5. Disconnect the wiring harness retainer from the throttle body mounting stud.

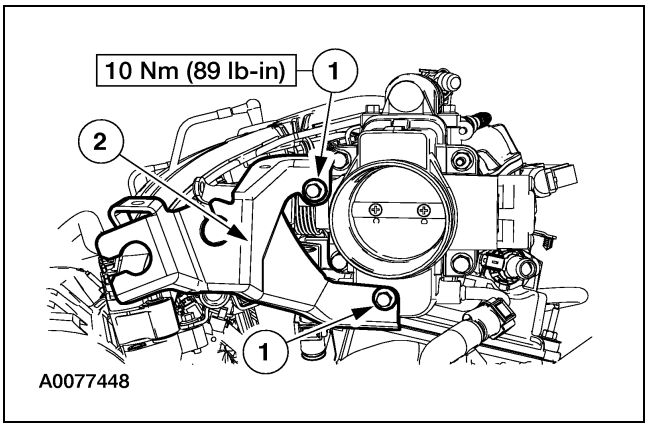


6. Disconnect the throttle position (TP) sensor electrical connector.

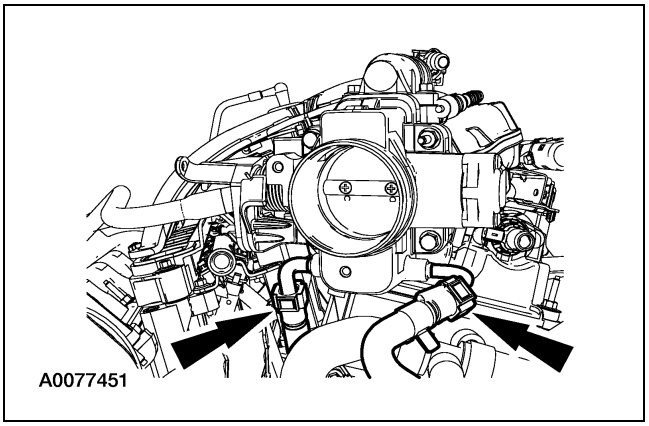


REMOVAL AND INSTALLATION (Continued)

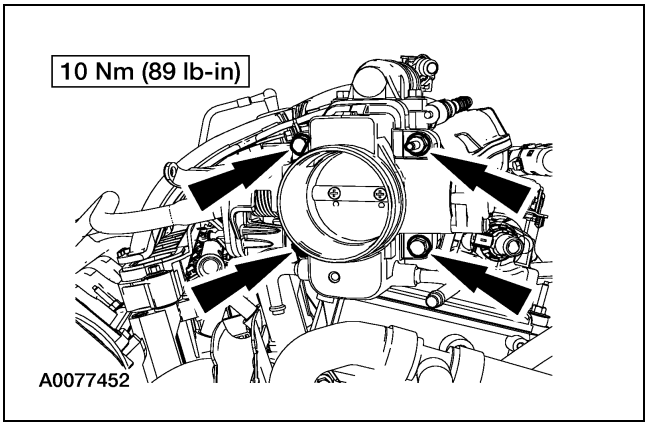
7. Remove the accelerator cable bracket.
   1 Remove the retaining bolts.
   2 Position aside the accelerator cable bracket.



8. Disconnect the throttle body coolant feed and return hoses.
   - Push the connector toward the hose to release pressure.
   - Press the coolant hose quick-release coupling button and pull the coolant hose to disconnect.



9. **NOTE:** Gasket is press-in-place in manifold.
   Remove the bolts, stud bolt and the throttle body.
   - Remove and discard the throttle body gasket.



10. Clean and inspect the sealing surfaces.

11. ⚠ **CAUTION: Upon installation of the throttle body coolant feed and return hoses, make sure the tube clicks into place. Pull on the hose to verify seating.**
    NOTE: Install a new throttle body gasket.
    To install, reverse the removal procedure.